



High-voltage switches 500 V - 950 V
CoolMOS™ - CoolSiC™ - CoolGaN™

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EN





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Infineon masters it all – for you

Experience the difference in power with CoolMOS™, CoolSiC™, and CoolGaN™

The key to the next essential step towards an energy-efficient world is the use of new materials, such as wide bandgap semiconductors that allow for greater power efficiency, smaller size, lighter weight, lower overall cost – or all of these together. As the leading and trusted power supplier, Infineon is offering the broadest product and technology portfolio of silicon (Si) and wide bandgap (WBG) solutions with more than 40 years of heritage in silicon, and several decades of heritage in wide bandgap technology development.

Equipped with a 300-millimeter wafer fab for power semiconductors, Infineon is best positioned to fully seize the growth opportunities in the power semiconductor industry.

CoolMOS™ SJ MOSFET products boast outstanding figures of merit in terms of conduction, switching and driving losses. CoolSiC™ and CoolGaN™ enable extremely efficient and compact system designs that meet future demands for greener and better performing products. Additionally, a comprehensive portfolio of gate-driver ICs for silicon and wide bandgap technologies unlock the full potential of the switches.

The 600 V/650 V/750 V class of power products is the area where CoolMOS™, CoolSiC™ and CoolGaN™ will coexist, delivering a specific value proposition depending on application requirements.

CoolMOS™ Superjunction MOSFETs



- › Best price/performance ratio
- › Largest SJ MOSFET portfolio on the market
- › Mature, stable, well-established

CoolSiC™ MOSFETs



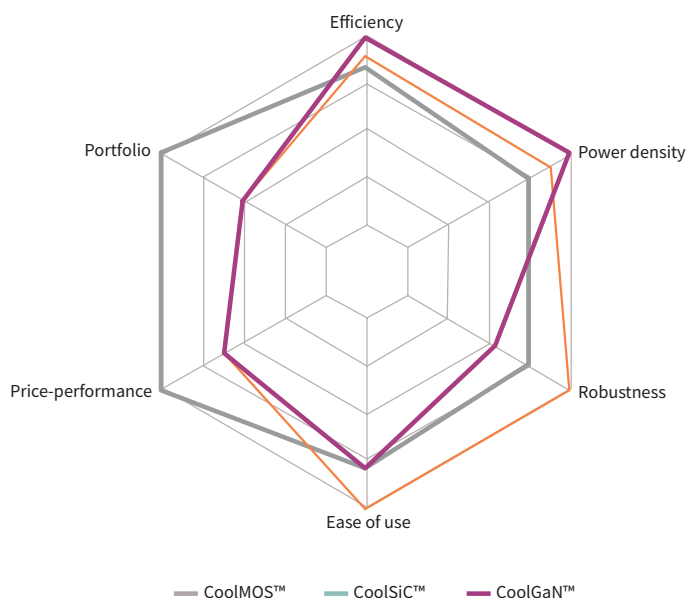
- › High performance, robustness and ease of use
- › High reliability especially with high temperature and in harsh environments
- › Smaller system size

CoolGaN™ GIT HEMTs



- › Highest efficiency at the highest frequency
- › Smallest system size
- › Enables system integration

Technology comparison



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Application to product matrix

Application	CoolMOS™ 7												CoolMOS™ Automotive				CoolSiC™			CoolGaN™		
	S7 600 V	CFD7 600 V	PFD7 600 V	C7 650 V	C7 600 V	G7 650 V	G7 600 V	P7 600 V	P7S 600 V	P7S 700 V	P7S 800 V	P7S 950 V	CFD7A 650 V	CFDA 650 V	C3A 800 V	CPA 600 V	SiC Diode	SiC MOS 650 V	SiC MOS 750 V	600 V	400 V	IPS
Automotive																						
On-board charger (OBC)													✓	✓		✓			✓			
HV-LV DC-DC converter													✓	✓	✓				✓			
Industrial																						
EV Charging		✓		✓		✓		✓										✓				
Server	✓	✓		✓	✓	✓	✓	✓			✓						✓	✓		✓		
Telecom	✓	✓		✓	✓	✓	✓	✓			✓						✓	✓		✓		
Industrial SMPS	✓	✓		✓	✓	✓	✓	✓			✓						✓	✓		✓		
Solar/UPS	✓			✓		✓		✓			✓						✓	✓		✓		
LSEV (industrial battery charger)		✓		✓		✓		✓									✓	✓				
Solid state relays and circuit breakers	✓							✓		✓	✓											
Battery formation	✓	✓		✓	✓	✓	✓	✓			✓						✓	✓				
Consumer																						
TV/PC/Gaming									✓	✓	✓									✓		
Charger/adapters			✓	✓	✓				✓	✓	✓	✓								✓		✓
Lighting									✓	✓	✓	✓								✓		
Audio									✓	✓	✓										✓	
Smart meter										✓	✓	✓										
Major home appliances			✓																	✓		

Automotive portfolio

CoolMOS™ C3A – 800 V	CoolMOS™ CPA – 600 V	CoolMOS™ CFDA – 650 V		CoolMOS™ CFD7A – 650 V		CoolSiC™ CFD7A – 650 V	
Bias supply	PFC	PFC	LLC	PFC	LLC	PFC	LLC
$R_{DS(on)}$: 22-2700 mΩ							

Industrial portfolio

CoolMOS™ S7 – 600	CoolMOS™ C7 – 600 V C7 – 650 V G7 – 600 V G7 – 650 V CFD7 – 600 V	CoolMOS™ C7 – 600 V G7 – 600 V CFD7 – 600 V CFD7 – 650 V P7 – 600 V	CoolMOS™ CFD7 – 600 V CFD7 – 650 V	CoolMOS™ P7 – 600 V	CoolSiC™ MOSFET 650 V	CoolSiC™ diode 600 V/650 V	CoolGaN™ GIT HEMT 600 V	
Synchronous Rectification	PFC	LLC	ZVS PS FB	PFC	PFC	PFC	PFC	LLC
R _{DS(on)} : 17 – 190 mΩ					R _{DS(on)} : 27 - 107 mΩ	I _F : 4-20 A	R _{DS(on)} : 70-190 mΩ	

Consumer portfolio

CoolMOS™ PFD7 – 600 V			CoolMOS™ P7 – 600 V		CoolMOS™ P7 – 700 V		CoolMOS™ P7 – 800 V		CoolMOS™ P7 – 950 V		CoolGaN™ 400 V	CoolGaN™ 600 V		
PFC	Flyback	Inverter	Flyback	LLC	PFC	Flyback	PFC	Flyback	PFC	Flyback	Flyback	PFC	Flyback	LLC
$R_{DS(on)}$ 125 mΩ - 2 Ω			$R_{DS(on)}$ 0.18 – 0.6 Ω		$R_{DS(on)}$ 0.36 – 2.0 Ω		$R_{DS(on)}$ 0.28 – 4.5 Ω		$R_{DS(on)}$ 0.45 – 3.7 Ω		$R_{DS(on)}$ 70 Ω	$R_{DS(on)}$ 70 - 190 mΩ		

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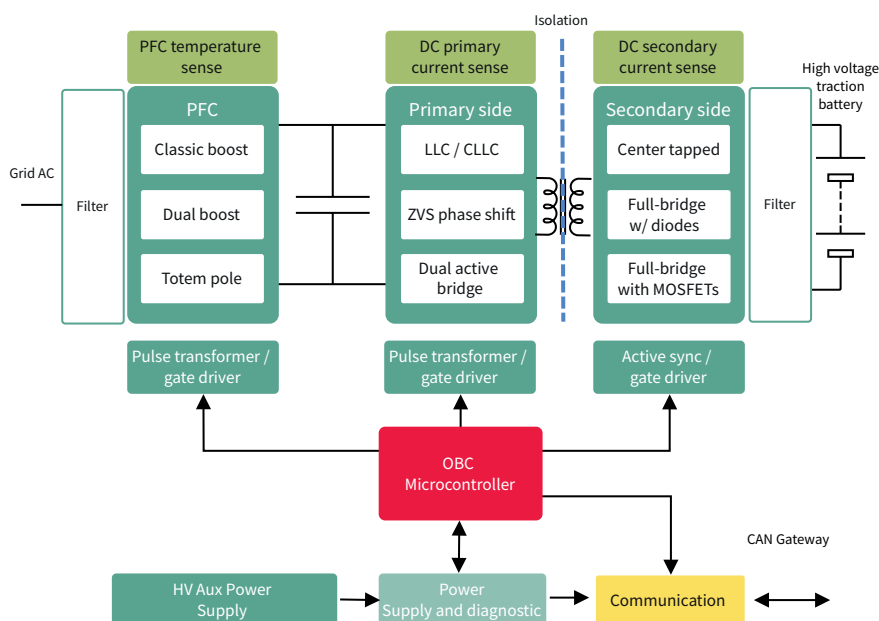


On-board charger

Automotive-qualified products have a long track record at Infineon. With a proven experience in serving major market players with high quality and reliable devices, Infineon offerings balance highest performance at attractive costs combined with high delivery reliability. While further improving performance of new products, Infineon continuously invests in capacity expansion to support the upcoming demand. The mainstream applications use high voltage battery systems up to 475 V_{DC} supporting system cost optimization.

On-board charger

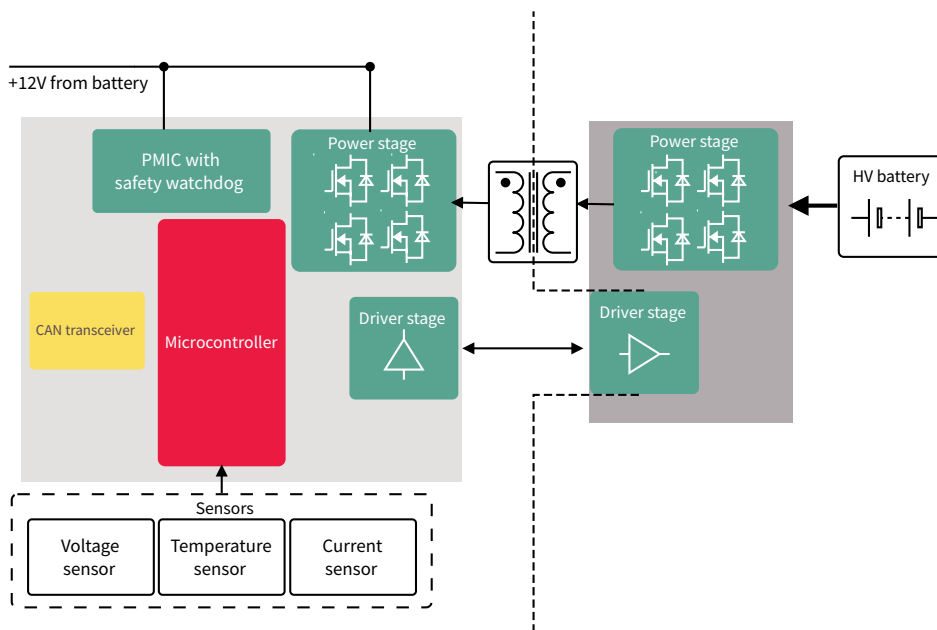
Every plug-in hybrid electric vehicle (PHEV) and pure electric cars are equipped with at least one on-board charger, allowing battery recharge from any standard AC power outlet. Available power depends on regional regulations and installation base, typically providing up-to 7.4 kW for PHEVs and up-to 22 kW maximum power. System designers face the challenge of supporting the varied voltage and current levels while increasing the power density. When it comes to on-board charging, the key success factors involve efficiency and a high power density for a small form factor. The longterm trend is moving towards bidirectional charging, where the charger also feeds power from the car to the smart grid.





High-voltage to low-voltage DC-DC converter

The architecture of electric vehicles comprises at least one low-voltage sub-network with low-voltage energy storage and multiple electrical loads and one high-voltage sub-network with high-voltage energy storage. The auxiliary HV/LV DC-DC converter's function is to enable the bidirectional energy flow between these two electrical subnets. Typical design challenges are achieving the greatest-possible efficiency and keeping the overall system costs under control. The space required for the DC-DC converter should also be kept to an absolute minimum. Infineon's portfolio is specially designed to help easily overcome these barriers.



Automotive products for onboard units

Functional block	Product category	Description
Power	Automotive CoolMOS™ CFD7A	650 V SJ MOSFET with integrated fast body diode, $R_{DS(on)}$: 22 to 230 mΩ
	Automotive CoolMOS™ CFDA	650 V SJ MOSFET with integrated fast body diode, $R_{DS(on)}$: 48 to 660 mΩ
	Automotive CoolMOS™ C3A	800 V SJ MOSFET, $R_{DS(on)}$: 290 and 2700 mΩ
	Automotive CoolMOS™ CPA	600 V SJ MOSFET, $R_{DS(on)}$: 45 to 299 mΩ
	Automotive TRENCHSTOP™ 5 IGBT	600 V/650 V IGBT with and wo co-packed SiC or fast body diode, 15-50 A
	Automotive CoolSiC™ diode	650 V SiC diode, 8-50 A
	Automotive CoolSiC™ MOSFET	1200 V, 20 to 120 mΩ, 750 V, 8 to 146 mΩ
Gate driver	Automotive EiceDRIVER™	Single- and dual-channel isolated driver
Supply and control	OPTIREG™	System supply optimized for AURIX™
	CAN FD Transceiver	High-speed automotive CAN transceiver
Control and communication	AURIX™ microcontroller	32-bit lockstep microcontroller



EV charging

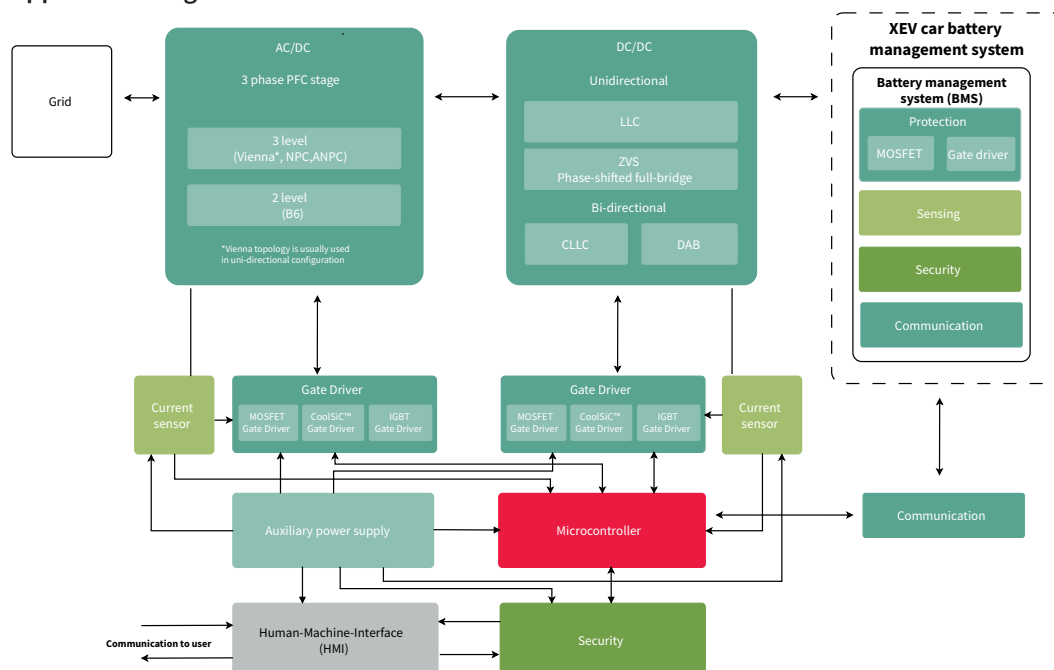
As e-mobility increasingly becomes part of daily life, there is a growing need for more efficient charging solutions. Fast electric vehicle (EV) charging stations equipped with powerful DC chargers are the answer. DC EV chargers are an attractive choice because they allow much faster charging than the standard AC EV ones that many EV owners have at home. Today, a DC charger with 150 kW can put a 200 km charge on an EV in around 15 minutes. As fast charging and battery technologies continue to evolve and improve in the near future, experts anticipate the charging time to drop even further.

As a market leader and the global front-runner in power electronics, Infineon enables you to bring energy-efficient DC EV charger designs to life, with our highly efficient components and in-depth technical support. We cover power ranges from kilowatts to megawatts in our broad portfolio of high-quality power semiconductor, microcontrollers, gate drivers, security, safety, and authentication solutions. Our CoolMOS™ and CoolSiC™ MOSFETs, together with EiceDRIVER™ gate drivers, for example, are ideal in a wide range of DC EV charging designs. Their matchless advantages include high-frequency operation, high power density and reduced switching losses, allowing you to reach high efficiency levels in any battery charging system.

Infineon offering and customer benefits

Infineon offering	Customer benefits
<ul style="list-style-type: none"> > CoolMOS™ and CoolSiC™ discrete and power module semiconductor solutions 	<ul style="list-style-type: none"> > Highly efficient power conversion for reducing system size by up to 50 percent and reduced cooling efforts
<ul style="list-style-type: none"> > EiceDRIVER™ gate driver and XMC™ microcontroller 	<ul style="list-style-type: none"> > Scalability across various platforms for upgrading system power charger levels on demand
<ul style="list-style-type: none"> > XENSIV™ magnetic current sensor 	<ul style="list-style-type: none"> > Safe drive, advanced protection and ease of control
<ul style="list-style-type: none"> > OPTIGA™ 	<ul style="list-style-type: none"> > Bidirectional high precision current sensing
<ul style="list-style-type: none"> > Power supply ICs (LDO, DC-DC) 	<ul style="list-style-type: none"> > Identity protection against fake devices and protection against the manipulation of the data
<ul style="list-style-type: none"> > Communication (CAN transceiver) 	<ul style="list-style-type: none"> > Robust quality and easy to use implementation shorten time to market and guarantee long operation

Application diagram





Infineon's solution recommendation for DC EV charging system blocks

Our solutions have been designed for harsh environmental conditions and long lifetime thanks to Infineon's deep understanding of quality requirements. Take the next step by exploring our product portfolio for DC EV charging systems.

PFC stage (three-phase input)

Product category	Product family	Product	Additional information
High-voltage MOSFET/ SiC MOSFET/IGBT	650 V CoolMOS™ C7	IPW65R019C7	650 V, 19 mΩ, TO-247
	600 V CoolMOS™ C7	IPW60R017C7	600 V, 17 mΩ, TO-247
	600 V CoolMOS™ P7	IPW60R024P7	600 V, 24 mΩ, TO-247
		IPW60R037P7	600 V, 37 mΩ, TO-247
	CoolSiC™ MOSFET 650 V	IMW65R027M1H	650 V, 27 mΩ, TO-247-3
		IMZ65R027M1H	650 V, 27 mΩ, TO-247-4
		IMWA65R027M1H	650 V, 48 mΩ, TO-247-3
		IMZA65R027M1H	650 V, 48 mΩ, TO-247-4
	650 V TRENCHSTOP™ 5 H5	IKW50N65EH5/IKZ50N65EH5	650 V, 50 A, TO-247-3/4
		IKW75N65EH5/IKZ75N65EH5	650 V, 75 A, TO-247-3/4
	650 V HighSpeed H3 Easy hybrid module	FS3L50R07W2H3F_B11	650 V, 50 A, Easy 2B, three-level
	650 V TRENCHSTOP™ 5 H5 Easy hybrid module	FS3L40R07W2H5F_B11	650 V, 40 A, Easy 2B, three-level
		FS3L40R07W2H5F_B67	650 V, 40 A, Easy 2B, three-level
	650 V TRENCHSTOP™ 5 S5 Easy hybrid module	F3L200R07W2S5FP_B55	650 V, 200 A, Easy 2B, three-level
		F3L200R07W2S5FP_B56	650 V, 200 A, Easy 2B, three-level
		F3L200R07W2S5F_B11	650 V, 200 A, Easy 2B, three-level
	650 V TRENCHSTOP™ 5 S5 Easy module	F3L200R07W2S5_B11	650 V, 200 A, Easy 2B, three-level
	CoolSiC™ MOSFET 1200 V	IMW120R045M1/IMZ120R045M1	1200 V, 45 mΩ, TO-247-3/4
	CoolSiC™ Easy modules 1200 V	F3L11MR12W2M1_B74	1200 V, 11 mΩ, Easy 2B, ANPC
		FF6MR12W2M1(P)_B11 *	1200 V, 6 mΩ, Easy 2B, half-bridge
		FF8MR12W2M1(P)_B11 *	1200 V, 8 mΩ, Easy 2B, half-bridge
		FF11MR12W1M1(P)_B11 *	1200 V, 11 mΩ, Easy 1B, half-bridge
		FF23MR12W1M1(P)_B11 *	1200 V, 23 mΩ, Easy 1B, half-bridge
		FS45MR12W1M1_B11	1200 V, 45 mΩ, Easy 1B, six-pack
SiC diodes	CoolSiC™ Schottky diodes 1200 V G5	IDW15G120C5B/IDWD15G120C5	1200 V, 15 A, TO-247-3/2
		IDW20G120C5B/IDWD20G120C5	1200 V, 20 A, TO-247-3/2
		IDW30G120C5B/IDWD30G120C5	1200 V, 30 A, TO-247-3/2

HV DC-DC main stage

Product category	Product family	Product	Additional information
High-voltage MOSFET/ SiC MOSFET	600 V CoolMOS™ CFD7 / CSFD	IPW60R018CFD7	600 V, 18 mΩ, TO-247
		IPW60R024CFD7	600 V, 24 mΩ, TO-247
		IPW60R037CSFD	600 V, 37 mΩ, TO-247
		IPW60R040CFD7	600 V, 40 mΩ, TO-247
	600 V CoolMOS™ C7	IPW60R040C7	600 V, 40 mΩ, TO-247
	650 V CoolMOS™ CFD7	IPW65R018CFD7 / IPZA65R018CFD7	650 V, 29 mΩ, TO-247-3/4
		IPW65R029CFD7 / IPZA65R029CFD7	650 V, 29 mΩ, TO-247-3/4
		IPW65R041CFD7	650 V, 41 mΩ, TO-247
	CoolSiC™ SiC MOSFET 650 V	IMW65R027M1H / IMZA65R027M1H	650 V, 27 mΩ, TO-247-3/4
		IMW65R048M1H / IMZA65R048M1H	650 V, 48 mΩ, TO-247-3/4
	CoolSiC™ SiC MOSFET 1200 V	IMW120R045M1/IMZ120R045M1	1200 V, 45 mΩ, TO-247-3/4
	CoolSiC™ Easy module 1200 V	FF6MR12W2M1(P)_B11 *	1200 V, 6 mΩ, Easy 2B, half-bridge
		FF8MR12W2M1(P)_B11 *	1200 V, 8 mΩ, Easy 2B, half-bridge
		FF11MR12W1M1(P)_B11 *	1200 V, 11 mΩ, Easy 1B, half-bridge
		FF23MR12W1M1(P)_B11 *	1200 V, 23 mΩ, Easy 1B, half-bridge
		FF45MR12W1M1(P)_B11 *	1200 V, 45 mΩ, Easy 1B, half-bridge
		F4-45MR12W1M1(P)_B76 *	1200 V, 45 mΩ, Easy 1B, four-pack
		F4-23MR12W1M1(P)_B76 *	1200 V, 23 mΩ, Easy 1B, four-pack
		F4-15MR12W2M1(P)_B76 *	1200 V, 15 mΩ, Easy 2B, four-pack
		F4-11MR12W2M1(P)_B76 *	1200 V, 11 mΩ, Easy 2B, four-pack
		FS45MR12W1M1_B11	1200 V, 45 mΩ, Easy 1B, sixpack
SiC diodes Output rectification diodes	CoolSiC™ Schottky diode 1200 V G5	IDW15G120C5B/IDWD15G120C5	1200 V, 15 A, TO-247-3/2
		IDW20G120C5B/IDWD20G120C5	1200 V, 20 A, TO-247-3/2
		IDW30G120C5B/IDWD30G120C5	1200 V, 30 A, TO-247-3/2
	CoolSiC™ Schottky diode 1200 V G5 rectifier bridge modules	DDB2U20N12W1RF(P)_B11 *	1200 V, 20 A, Easy 1B, rectifier bridge
		DDB2U40N12W1RF(P)_B11 *	1200 V, 40 A, Easy 1B, rectifier bridge
		DDB2U60N12W1RF(P)_B11 *	1200 V, 60 A, Easy 1B, rectifier bridge
	CoolSiC™ Schottky diode 650 V G5	IDW12G65C5	650 V, 12 A, TO-247
		IDW16G65C5	650 V, 16 A, TO-247
		IDW20G65C5	650 V, 20 A, TO-247
		IDW20G65C5B	650 V, 10 A, TO-247
		IDW24G65C5B	650 V, 24 A, TO-247
		IDW30G65C5	650 V, 30 A, TO-247
		IDW32G65C5B	650 V, 32 A, TO-247
		IDW40G65C5	650 V, 40 A, TO-247
		IDW40G65C5B	650 V, 40 A, TO-247
	CoolSiC™ Schottky diode 650 V G6	IDH20G65C6	650 V, 20 A, TO-220
		IDH16G65C6	650 V, 16 A, TO-220 real 2-pin
		IDH12G65C6	650 V, 12 A, TO-220 real 2-pin
		IDH10G65C6	650 V, 10 A, TO-220 real 2-pin
		IDH08G65C6	650 V, 8 A, TO-220 real 2-pin
		IDH06G65C6	650 V, 6 A, TO-220 real 2-pin
		IDH04G65C6	650 V, 4 A, TO-220 real 2-pin
		IDDD20G65C6	650 V, 20 A, Double DPAK
		IDDD16G65C6	650 V, 16 A, Double DPAK
		IDDD12G65C6	650 V, 12 A, Double DPAK
		IDDD10G65C6	650 V, 10 A, Double DPAK
		IDDD08G65C6	650 V, 8 A, Double DPAK
		IDDD06G65C6	650 V, 6 A, Double DPAK
		IDDD04G65C6	650 V, 4 A, Double DPAK

(P): Module with pre-applied thermal interface material (TIM)

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Gate driver and galvanic isolation

Product category	Product family	Product	Additional information
Gate-driver ICs	EiceDRIVER™ (non-isolated)	1EDN family, 2EDN family	➤ Single-channel/dual-channel, non-isolated low-side gate driver ICs
		1ED4417xN01B	➤ Single-channel with fast, accurate (+/- 5%), integrated overcurrent protection (OCP)
		2ED24427N01F	➤ Dual-channel, 10 A low-side gate driver in DSO-8 package with power-pad ➤ Integrated UVLO and enable (EN) function ➤ Suitable for high frequency, high power operation w/BOM savings
	EiceDRIVER™ level-shift gate driver	2ED2184S06F 2ED2110S06M	➤ 650 V half-bridge gate driver for IGBTs and MOSFETs with SOI technology ➤ Integrated bootstrap diode ➤ High-frequency switching (500 kHz) and superior -VS transient voltage immunity
		IRS2186S, IRS21864S	➤ 600 V, 4 A high- and low-side gate driver
		IR2114SS, IR2214SS	➤ 600 V/1200 V half-bridge gate driver with DESAT, 2L SRC, soft-SD
		IR2213S	➤ 1200 V high- and low-side gate driver
	EiceDRIVER™ 2EDF/S isolated gate driver	2EDF7175F, 2EDF7275F	➤ Dual-channel functional isolated (1,5 kV)
		2EDS8265H, 2EDS8165H	➤ Dual-channel reinforced (safe) isolated (6 kV)
	EiceDRIVER™ Compact isolated gate driver	1EDI20I12MF, 1EDI20N12AF, 1EDI60N12AF, 1EDI60I12AF	➤ 1200 V single-channel, cost-effective functional isolated driver with Miller clamp / separate output
		1ED3122MU12H, 1ED-3124MU12H, 1ED3125MU12F, 1ED3124MU12F	➤ 5.7 kV / 3 kV single-channel isolated driver with Miller clamp or separate output, UL 1577 certification
	EiceDRIVER™ Enhanced isolated gate driver	1ED3491MU12M, 1ED3890MU12M	➤ 5.7 kV single-channel isolated driver with analog/digital configurability, DESAT, Miller clamp, and Soft-off, UL 1577 certification
		1ED020I12-F2, 2ED020I12-F2	➤ 1200 V, single-/dual-channel, functional isolated driver with DESAT and Miller clamp

Current sensor

Product category	Product family	Product	Additional information
Magnetic current sensor	XENSIV™	TLI4971-A120T5-E0001	–
		TLI4971-A120T5-U-E0001	UL certified

Microcontroller

Product category	Product family	Product	Additional information
Microcontroller	XMC™	XMC1400 family (PFC stage)	Arm® Cortex® M0 based microcontroller
		XMC4500/XMC4700 (HV DC-DC/PWM stage)	Arm® Cortex® M4F based microcontroller
	AURIX™	TC26X/TC27X TC36X/TC37X	TriCore™ AURIX™ 32-bit microcontroller HSM (hardware secure module) full EVITA compliance

Internal power supply

Product category	Product family	Product	Additional information
AC-DC power conversion	CoolSET™ 5 QR/FF flyback	ICE5QR0680AG	800 V, 42 W, 710 mΩ, PG-DSO-12
		ICE5AR0680AG	800 V, 42 W, 710 mΩ, PG-DSO-12
	5 th generation PWM controllers and CoolMOS™ P7	ICE5QSBG and IPP80R360P7	800 V, 360 mΩ, TO-220
		ICE5QSBG and IPA95R450P7	950 V, 450 mΩ, TO-220 FP
	CoolMOS™ HV SJ MOSFETs	IPN95R1K2P7	950 V, 450 mΩ, SOT-223
		IPN80R1K4P7	800 V, 1.4 Ω, SOT-223
DC-DC power conversion	Low power LDOs	TLS805 / TLS810	50 mA/100 mA ultralow quiescent current linear voltage regulator with a wide input voltage range
		TLS202	150 mA LDO in a small-footprint package
		TLS203 / TLS205	300/500 mA low noise LDO
		TLS850B	500 mA wide input voltage LDO
	Buck converter	TLE8366E	1.9 A DC-DC buck converter
	Safety PMIC for AURIX™ MCU	TLF35584	Multichannel power supply IC, optimized for AURIX™ MCU, up to ASIL-D rated

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* For more information on the product, contact our [product support](#)



Authentication and encryption

As embedded systems are increasingly becoming targets of attackers, Infineon offers OPTIGA™ - a turnkey security solution.

Product category	Product family	Product	Additional information
Security	OPTIGA™ Trust B	SLE95250000XTSA1	Asymmetric ECC authentication with individual certificate key pair and an extended temperature range of -40 to 110°C
	OPTIGA™ Trust TPM	SLB9670XQ2.0 *	Fully TCG TPM 2.0 standard compliant module with the SPI interface
	SLC37	SLC37ESA2M0 , SLI97CSIFX1M00PE *	New class of performance and security cryptocontroller adhering to CC EAL6+ high targeted and EMVCo targeted certifications for payment and eSIM applications

Communication




Product category	Product family	Product	Additional information
CAN transceiver	Automotive CAN transceiver	TLE9250SJ	Automotive-grade high-speed CAN-FD transceiver with 5 Mbps, certified to ISO11898-5 in DSO-8 package
		TLE9250LE	Automotive-grade high-speed CAN-FD transceiver with 5 Mbps, certified to ISO1189-5 in TSON-8 package



Battery powered applications

We live in a mobile world filled with electrical devices - consumer-grade robots, light electric vehicles, multicopters and other end-products driven by highly efficient electric motors. As these products evolve and improve, there is an increasing need for designers and engineers to find solutions that are more efficient, smaller, and less costly. Based on the industry-leading technology, highest quality, and manufacturing expertise, Infineon provides a variety of innovative power semiconductors addressing a broad range of battery powered motor control applications, such as power tools, forklifts, all kinds of light electric vehicles including e-skateboards, e-scooters, pedelecs, low speed cars, and many others. Through an excellent selection of devices for power management, consumption and voltage regulation – such as power MOSFETs (e.g. CoolMOS™, OptiMOS™, and HEXFET™/StrongIRFET™), XMC™ microcontrollers, EiceDRIVER™ gate drivers and more, Infineon offers all components that are needed for the compact, cost-effective designs of today, and for the innovative designs of tomorrow.

Key enabling products for battery powered applications

	Consumer robotics 	Home and professional applications 	Light electric vehicles 
MOSFETs	HEXFET™/StrongIRFET™ 20-300 V		
	OptiMOS™ 25-100 V		OptiMOS™ 80-300 V
	CoolMOS™ 7		CoolMOS™ 7
Gate driver ICs	EiceDRIVER™		
	200 V and 600 V gate driver ICs		
IPM	CIPOS™ Nano		
Microcontrollers	XMC1100	XMC1300/XMC1400	
	XMC1000/XMC4000	XMC4500/XMC4400	
	iMOTION™ and embedded power ICs		
Microcontroller and driver supply	Linear voltage and DC-DC switching regulators		
CAN transceivers	IFX1050, IFX1051		
Magnetic sensors	Hall and xMR sensors		
Authentication	OPTIGA™ Trust B/X, OPTIGA™ TPM	OPTIGA™ Trust B	

A complete set of components that ensure system-cost competitiveness and high performance solution

Infineon product offering		Consumer robotics	Home and professional applications	Light electric vehicles
Supply voltage		12-48 V	10.8-56 V	24-144 V
OptiMOS™ and HEXFET™/StrongIRFET™ power MOSFETs	Voltage	25-200 V	20-100 V	60-300 V
	Package	SuperS08, PQFN 3x3, DirectFET™ S/M/L-Can, TOLL, TO-220, DPAK, D ² PAK	SuperS08, PQFN 3x3, DirectFET™ S/M/L-Can, TOLL, TO-220, TO-247, DPAK, D ² PAK, D ² PAK 7-pin	SuperS08, PQFN 3x3, TO-220, DPAK, D ² PAK, D ² PAK 7-pin, D2PAK 7-pin+, TOLL, DirectFET™ L-Can
HV MOSFETs CoolMOS™ 7	Voltage	600 -950 V CoolMOS™ P7	600-950 V CoolMOS™ P7	600 V CoolMOS™ P7 600 V CoolMOS™ CFD7/CSFD
Gate driver ICs		1EDN, 2EDN, 1EDN7550, 1EDN7550B, 1EDN8550B, 2EDL811x, 2EDF7275K, 2EDF7235K, 6ED003L02-F2, 6ED003L06-F2, 6EDL04N02PR, 6EDL04N06PT, 2EDL05N06PF, Integrated gate driver ICs: IFX9201/2, NovalithIC™ BTN8982, Trilith IC BTM7752	1EDN/2EDN/6EDL04N02PR, 6ED003L02-F2, 2EDL05N06PF, 2ED2304S06F, 2EDF7275K, 2EDF7235K, 1EDN7550B, 1EDN8550B Integrated: IFX9201SG/ BTN8982	1EDN/2EDN/ 2EDL/ 6EDL04N02PR, 6ED003L02-F2, 2EDL05N06PF, 2ED2304S06F
IPM – CIPOS™ Nano		IRSM836-0x4MA (x=2,4,8), IRSM808-204MH	IRSM005-800MH, IRSM005-301MH	
Authentication IC, security		OPTIGA™ Trust B/X, OPTIGA™ TPM	OPTIGA™ Trust B	OPTIGA™ Trust B
XMC™ microcontrollers iMotion™ ePower		XMC1100 XMC1000/XMC4000 iMOTION™: IRMCK099M ePower: TLE987X (BLDC), TLE986X (BDC)	XMC1300 XMC4400/XMC4500 iMOTION™ IRMCK099M ePower: TLE987X (BLDC)	XMC1300 XMC 4400/XMC4500
Microcontroller and driver supply: linear voltage and DC-DC switching regulators		IFX1763/IFX54441/IFX54211/IFX30081/IFX90121/IFX91041		
CAN transceivers		IFX1050, IFX1051		
Sensors		Hall switches (TLE 496X), angle sensor (TLI5012B, TLE5501), 3D magnetic sensor (TLV493D), current sensor (TLI4970)	Hall switches (TLE496X), angle sensor (TLI5012B), 3D magnetic sensor (TLV493D)	Hall switches (TLE496X), angle sensor (TLI5012B), 3D magnetic sensor (TLV493D)

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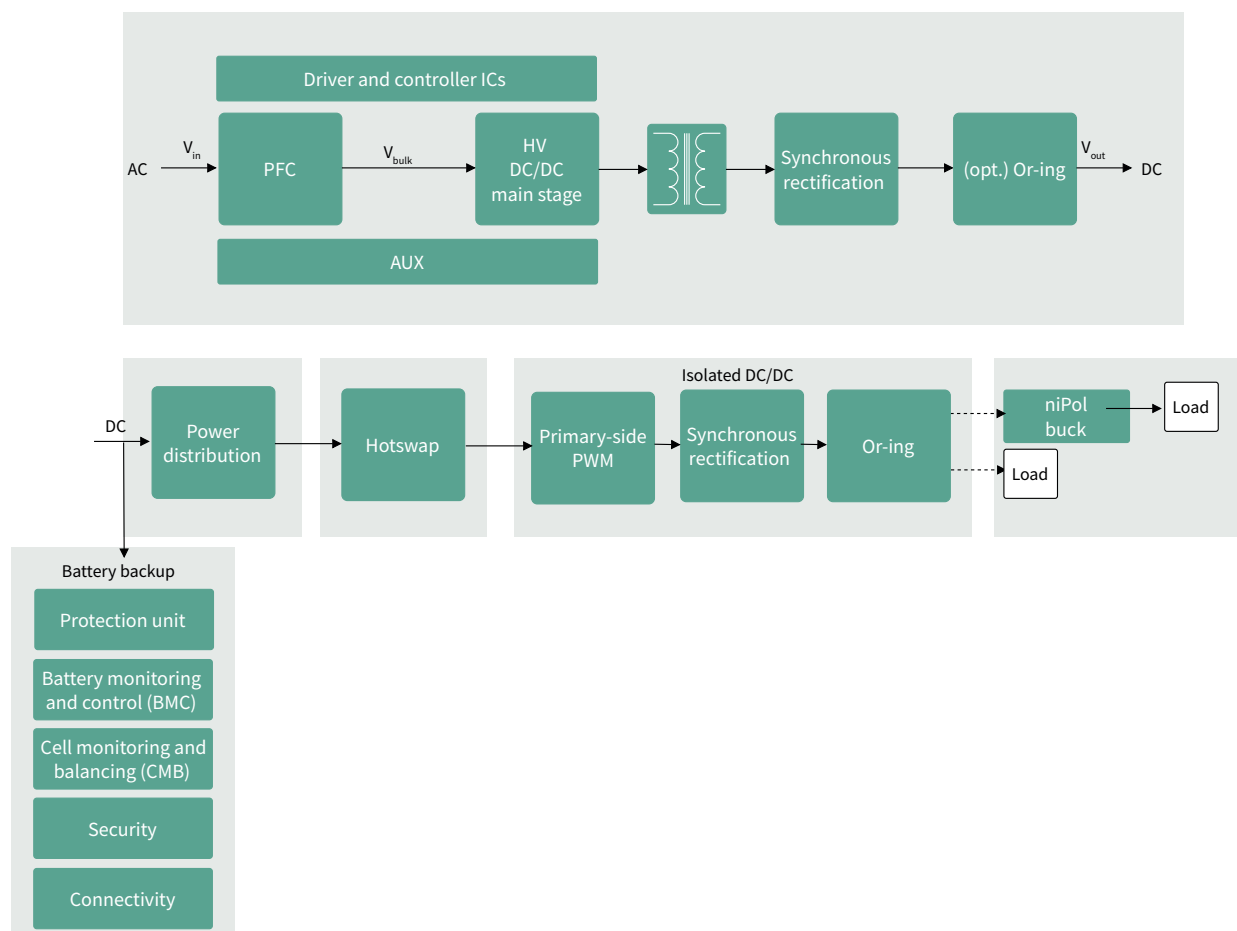


Telecom power supply

The ever increasing data consumption, coupled with new levels of virtualization and complexity of the 5G telecom infrastructure, is bringing its demanding requirements into the telecom power arena. The outstanding improvements made in telecom SMPS performance in the past decade have been primarily brought by the dramatic reduction of the on resistance achieved in high voltage MOSFETs, using the revolutionary superjunction principle. This principle was introduced by Infineon at the end of the nineties with the CoolMOS™ series.

To achieve the current demanding, flat energy efficiency targets, it has been increasingly popular to employ synchronous rectification utilizing the unique performance of medium-voltage OptiMOS™ power MOSFETs. OptiMOS™ power MOSFET family, which has gained terrific popularity in DC-DC brick solutions, coupled with gate-driver ICs and microcontrollers efficiently powers the BBUs, RRUs and AAUs of the macro and the small cells.

Infineon's wide bandgap technologies, such as CoolGaN™ GIT HEMTs 600 V (gallium-nitride-based) and CoolSiC™ 650 V (silicon-carbide-based) for primary side and upcoming CoolGaN™ SG HEMTs 100 V/200 V* for synchronous rectification, complement the wide portfolio of silicon-based switches, enabling highest electrical conversion efficiency and robustness at attractive system costs. Infineon's EiceDRIVER™ gate driver IC family perfectly matches the CoolGaN™ and CoolSiC™ wide bandgap products, and CoolMOS™ and OptiMOS™ MOSFET products.



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* in development

Functional block	Product category	Topology	Product family	Benefits
PFC	High voltage MOSFETs	CCM/interleaved PFC; TTF	600 V/650 V CoolMOS™ C7/ G7	<ul style="list-style-type: none"> Best FOM $R_{DS(on)} \cdot Q_G$ and $R_{DS(on)} \cdot E_{oss}$ Lowest $R_{DS(on)}$ per package Low dependency of switching losses from $R_{g,ext}$
			600 V CoolMOS™ P7	<ul style="list-style-type: none"> Low turn-off losses Low Q_{oss} Low Q_G
			650 V TRENCHSTOP™ 5 IGBT H5 650 V TRENCHSTOP™ 5 IGBT S5	<ul style="list-style-type: none"> Best trade-off between switching and conduction losses Low gate charger Q_G High current density
	High voltage GaN HEMTs	CCM totem pole	CoolGaN™ GIT HEMTs 600 V	<ul style="list-style-type: none"> Switching at high frequencies (> Si) Enables high power density
	SiC MOSFETs	CCM totem pole	CoolSiC™ MOSFET 650 V	<ul style="list-style-type: none"> Increase efficiency Increase power density Supports harsh and high temperature operations
	High voltage MOSFETs	CCM totem pole	600 V CoolMOS™ S7	S7 offers the lowest $R_{DS(on)}$ MOSFET for bridge rectifier
	SiC diodes	CCM/interleaved PFC	CoolSiC™ Schottky diode 650 V G6	Low FOM $V_F \cdot Q_C$
	Control ICs	CCM PFC ICs	800 V – ICE3PCS0xG	High PFC and low THD
	Gate Driver ICs for SiC and GaN	CCM/interleaved PFC TTF	EiceDRIVER™ 2EDi (2EDF7275F, 2EDF7175F) iceDRIVER™ 1EDB (1EDB7275F, 1EDB8275F)	EiceDRIVER™ 1EDB, 2EDi <ul style="list-style-type: none"> Functional isolation up to 1500 V_{DC} channel-to-channel isolation Strong driving for increased switching speed Low part-to-part skew and low channel-to-channel mismatch for dead-time optimization
	GaN gate-driver ICs	Totem-pole PFC	EiceDRIVER™ 1EDF5673F, 1EDF5673K	<ul style="list-style-type: none"> Negative VGS voltage to avoid false triggering Differential output for GIT technology based GaN driving CMTI > 200 V/ns
	SiC MOSFET gate-driver ICs	Totem-pole PFC	EiceDRIVER™ 2EDF9275F, 1EDB9275F	<ul style="list-style-type: none"> 37 ns/45 ns typical propagation delay time Functional isolation 1.5 kV CMTI > 150 V/ns
	Gate-driver ICs	Totem-pole PFC	EiceDRIVER™ 2EDFx275F/1EDBx275F	<ul style="list-style-type: none"> 37 ns/45 ns typical propagation delay time Functional isolation 1.5 kV CMTI > 150 V/ns
			EiceDRIVER™ Compact: 1EDI60N12AF, 1ED3124MU12F	Isolated gate driver, up to 14 A, 100 ns propagation delay
			EiceDRIVER™ level-shift: 2ED2304S06F, 2EDL23N06PJ, 2ED2182S06F	<ul style="list-style-type: none"> Integrated bootstrap diode using Infineon SOI technology, low level-shift loss Excellent ruggedness against negative transient voltages on VS pin
		Interleaved dual-boost PFC	EiceDRIVER™ 2EDN852x/1EDN851x	<ul style="list-style-type: none"> 5 A source and sink driver capability for 2EDN A sink and 4 A source driver capability for 1EDN 17 ns propagation delay precision for fast MOSFET and GaN switching
			EiceDRIVER™ 1EDN8550B for Kelvin-source CoolMOS™	<ul style="list-style-type: none"> 8 A sink and 4 A source driver capability 45 ns for propagation delay precision for fast MOSFET and GaN switching True differential inputs for ground shift robustness CMR up to +/-150 V)
			EiceDRIVER™ low side: 2ED24427N01F	<ul style="list-style-type: none"> Dual-channel, 10 A low-side gate driver in PG-DSO-8 package with power-pad UVLO and Enable (EN), high frequency, high power operation with BOM savings

Functional block	Product category	Topology	Product family	Benefits
DC-DC main stage	High voltage MOSFETs	CCM/interleaved PFC; TTF HB LLC	600 V CoolMOS™ C7/P7	<ul style="list-style-type: none"> Fast-switching speed for improved efficiency and thermals Low gate charge for enhanced light load efficiency and low power consumption at no load condition Optimized V_{GS} threshold for lower turn-off losses Rugged body diode which prevents device failure during hard commutation
		LLC	600 V CoolMOS™ P7	<ul style="list-style-type: none"> Low turn-off losses Low Q_{OSS} Low Q_G
		HB/FB LLC, ZVS PSFB	600 V CoolMOS™ CFD7	<ul style="list-style-type: none"> Best-in-class Q_{rr} and t_{rr} level Significantly reduced Q_G Improved efficiency over previous CoolMOS™ fast body diode series
	Control ICs	HB LLC	ICE1HS01G-1, ICE2HS01G	<ul style="list-style-type: none"> High efficiency and low EMI
	High voltage GaN GIT HEMTs	LLC, ZVS phase shift full-bridge	CoolGaN™ GIT HEMTs 600 V	<ul style="list-style-type: none"> Enable the highest efficiency and highest power density
	Gate driver ICs	HB LLC, ZVS phase shift full-bridge	EiceDRIVER™ 2EDS8x65H	<ul style="list-style-type: none"> 37 ns typical propagation delay time Reinforced isolation 8 kVpk CMTI > 150 V/ns
			EiceDRIVER™ 2EDN8524F with pulse transformer	<ul style="list-style-type: none"> 5 A source and sink driver capability 17 ns propagation delay precision for fast MOSFET and GaN switching (-)10 V input robustness
			EiceDRIVER™ Compact: 1ED160N12AF, 1ED-3124MU12F	<ul style="list-style-type: none"> Isolated gate driver, up to 14 A, 100 ns propagation delay
			EiceDRIVER™ level-shift: 2ED2304S06F, 2EDL23N-06PJ, 2ED2182S06F	<ul style="list-style-type: none"> Integrated bootstrap diode using Infineon SOI technology, low level-shift loss Excellent ruggedness against negative transient voltages on VS pin
	Gate driver ICs for high voltage GaN	LLC, ZVS phase shift full-bridge	EiceDRIVER™ 1EDi (1EDS5663H)	<ul style="list-style-type: none"> Negative V_{GS} voltage to avoid false triggering Differential output for GiT technology based GaN driving CMTI > 200 V/ns
Synchronous rectification	Low voltage MOSFETs	Synchronous rectification MOSFET (Secondary side)	OptiMOS™ 80-200 V	<ul style="list-style-type: none"> Industry's lowest FOM ($R_{DS(on)} \cdot Q_G$) leading to high efficiency at good price/performance Low voltage overshoots enabling easy design-in Industry's lowest $R_{DS(on)}$ Highest system efficiency and power density Outstanding quality and reliability Reduces the need for a snubber circuit
	Gate-driver ICs	Synchronous rectification	EiceDRIVER™ 2EDF7275K	<ul style="list-style-type: none"> Functional isolation up to 650 VDC channel-to-channel isolation Compact solution available in LGA-13 5x5 mm package
			EiceDRIVER™ 2EDL811x / 2EDL801x	<ul style="list-style-type: none"> Level-shift half-bridge gate driver up to 120 V isolation
			Low side: EiceDRIVER™ 2EDN75xx / 2EDN85xx, 1EDN751x / 1EDN851x	<ul style="list-style-type: none"> 5 A Source and Sink driver capability for 2EDN 8 A sink and 4 A source driver capability for 1EDN 17/19 ns propagation delay precision for fast MOSFET and GaN switching (-)10 V input robustness
			EiceDRIVER™ level-shift: IRS2186S, IRS21864S	<ul style="list-style-type: none"> 4 A / 4 A high- and low-side gate driver
Auxiliary power supply	Control ICs	5 th generation QR/FF flyback CoolSET™	QR 800 V - ICE5QRxx80Ax FF 800 V - ICE5xRxx80AG	<ul style="list-style-type: none"> Quasi-resonant switching operation for high efficiency and low EMI signature Fixed frequency switching operation for ease of design - 100 KHz and 125 KHz Fast and robust start-up with cascode configuration Robust protection with adjustable line input over-voltage protection, V_{CC} and CS pin short-to-ground protection Optimized light-load efficiency with selectable burst mode entry/exit profile Frequency reduction for mid- and light-load condition to reduce switching losses and increase efficiency Direct feedback and regulation with integrated error amplifier for non-isolated output High power delivery of up to 42 W with 800 V CoolSET™ in heatsink-free SMD package
Housekeeping	Microcontrollers	-	XMC1xxx	<ul style="list-style-type: none"> Flexibility, HR PWM, digital communication ARM® based standard MCU family and wide family
Conversion	Microcontrollers	-	XMC4xxx	<ul style="list-style-type: none"> Flexibility, HR PWM, digital communication ARM® based standard MCU family and wide family
Isolated DC-DC	Microcontrollers	-	XDPP1100	<ul style="list-style-type: none"> Optimized for 48 V telecom isolated conversion Highly flexible digital core State-of-the-art dedicated AFE State-machine based fast loop control Pre-programmed peripherals in ROM Negligible internal power consumption Industry smallest digital power controller
Or-ing	Low voltage MOSFETs	Or-ing MOSFET	OptiMOS™ 60-200 V	<ul style="list-style-type: none"> Industry's lowest FOM ($R_{DS(on)} \cdot Q_G$) leading to high efficiency at good price/performance Low voltage overshoots enabling easy design-in

Functional block	Product category	Topology	Product family	Benefits
Battery protection	Low-voltage MOSFETs	Back-to-back disconnect	OptiMOS™ 80-200 V StrongIRFET™ 80-200 V	<ul style="list-style-type: none"> › Industry's lowest $R_{DS(on)}$ › Wide SOA › Perfect match of robust and excellent price/performance
	Microcontroller	-	PSoC 4	<ul style="list-style-type: none"> › 32-bit MCU Subsystem › 48-MHz Arm® Cortex®-M0+ CPU › Flash: Up to 256KB flash › RAM: 32KB SRAM › Up to 2 CAN › USB/ Up to 4 serial Channels
	Current sensing	Coulomb count	TLI4971	<ul style="list-style-type: none"> › Ultralow-power loss due to minimal resistance of the current rail › Reliable current measurement over the lifetime (no re-calibration) › Functional isolation for high-voltage application › Easy and compact package allows high power density design
	Battery management IC	Cell monitoring	TLE9012	<ul style="list-style-type: none"> › Robust communication without the need of transformers or common-mode chokes › Best in class voltage measurement accuracy even after soldering thanks to stress sensor technology › Integrated diagnosis easing functional safety design › Integrated UART communication for systems with a microcontroller on local ground
	Small signal N/P channel MOSFET	Cell balancing	OptiMOS™ 20-30 V StrongIRFET™ 20-30 V	<ul style="list-style-type: none"> › Wide range of packages › Suitable for space constraints › Suitable equalizing current between 0.5 A to 2.5 A › Compact solution with smaller PCB footprint
	Communication	-	LIN CAN	<ul style="list-style-type: none"> › Low quiescent current › ISO11898 compliant › Excellent EMI performance › Standby / sleep mode › Wake and failure detection › High ESD robustness
	Security	-	OPTIGA™ Trust M	<ul style="list-style-type: none"> › High-end CC EAL6+ (high) certified security controller: ECC, RSA®, AES, SHA, TLS, HKDF › Full turnkey solution › Host code with an abstraction layer › Customer-specific certificate provided for zero-touch provisioning
Isolated DC-DC	Low voltage MOSFETs	Primary side PWM MOSFET	OptiMOS™ 60-200 V	<ul style="list-style-type: none"> › Industry's lowest $R_{DS(on)}$ › Highest system efficiency and power density › Outstanding quality and reliability › Reduces the need for a snubber circuit
			StrongIRFET™ 60-200 V	
			Small signal MOSFETs 60-200 V	
		Synchronous rectification MOSFET	OptiMOS™ 40-100 V StrongIRFET™ 40-100 V	
		Active snubber	OptiMOS™ Power MOSFET 60 V/100 V/150 V	



Server power supply

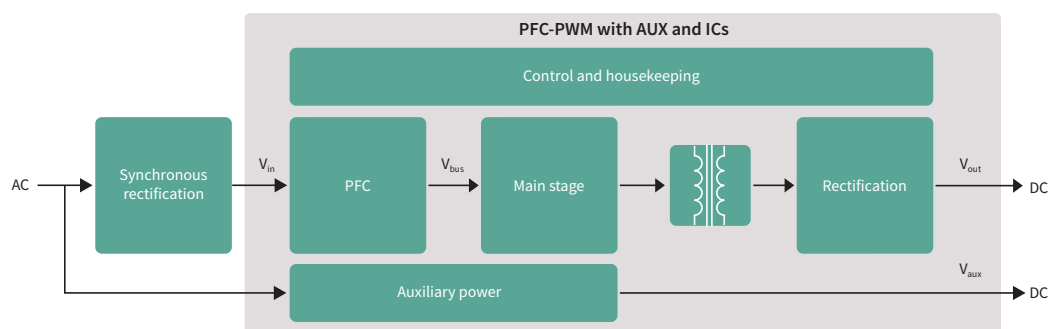
The trend in the field of data center and enterprise servers is to deliver more power per rack. Meanwhile, the rising cost of energy and environmental concerns make SMPS-efficiency optimization a key requirement across the entire load range for server and data center designs. This challenging task is combined with the requirement for higher power density and cost effectiveness.

In the PFC stage and generally in hard-switching topologies used in server applications, Infineon recommends its 600 V CoolMOS™ C7 and G7 families offering the lowest FOM $R_{DS(on)} \cdot Q_G$ and $R_{DS(on)} \cdot E_{oss}$. These MOSFET series provide the lowest switching losses, which is necessary in fast-switching-frequency operations in high-end server SMPS. With Infineon's C7 and G7 series, the efficiency is optimized already from a very light-load operation. 600 V CoolMOS™ C7 and G7 products are used with Infineon's industry-benchmark non-isolated 2EDN752x gate-driver IC family, and EiceDRIVER™ Compact 1ED-AF isolated driver family. Available in compact SMD packages such as ThinPAK, DDPK and TOLL, these SJ MOSFETs offer benefits in space usage and power density.

Complementary to the 600 V CoolMOS™ C7 in high efficiency PFC is the CoolSiC™ Schottky diodes. The 600 V CoolMOS™ P7 family offers a good compromise between price and performance. This is valuable in both PFC and HV DC-DC stages where low Q_G and turn-off losses are important benefits, especially in case of high-switching-frequency operation and high light-load efficiency requirements.

As high power (2-6 kW and above) require ultrahigh efficiency (96-98 percent peak) and high power density, Infineon's CoolGaN™ GIT HEMTs 600 V family with totem-pole PFC controls deliver the highest efficiency and power density in the world. Using the 600 V CoolMOS™ S7 devices with active bridge circuit fulfills the Titanium requirement at the lowest cost. Operating expenses (OPEX) and capital expenditures (CAPEX) are both reduced through simplified topologies and the power density in the server PSU is doubled.

In applications with low output voltage and high output current, further efficiency improvements are enabled by the continuous reduction of on-resistance. This can be achieved by using Infineon's low-voltage OptiMOS™ MOSFET series in the synchronous rectification stage. Infineon's low-voltage products are complemented by StrongIRFET™ devices that are optimized for lower switching frequencies and highest system robustness. Infineon's EiceDRIVER™ gate-driver IC family perfectly matches the CoolGaN™ and CoolSiC™ wide bandgap products, and CoolMOS™ and OptiMOS™ MOSFET products.



Functional block	Product category	Topology	Product family	Benefits
PFC	High voltage MOSFETs	CCM/interleaved PFC; TTF	600 V/650 V CoolMOS™ C7 600 V/650 V CoolMOS™ G7 600 V CoolMOS™ S7	<ul style="list-style-type: none"> Best FOM $R_{DS(on)} \cdot Q_G$ and $R_{DS(on)} \cdot E_{oss}$ Lowest $R_{DS(on)}$ per package Low dependency of switching losses from $R_{g,ext}$
	High voltage SiC MOSFETs	Totem-pole PFC	CoolSiC™ MOSFET 650 V	<ul style="list-style-type: none"> Increased efficiency Increased power density Supports harsh and high temperature operations
	High-voltage GaN HEMTs	Totem-pole PFC	CoolGaN™ GIT HEMTs 600 V	<ul style="list-style-type: none"> Enabling highest efficiency and power density
	SiC diodes	CCM/interleaved PFC	CoolSiC™ Schottky diode 650 V G6 and G5	<ul style="list-style-type: none"> Low FOM $V_F \cdot Q_G$
	Control ICs	CCM PFC IC	ICE3PCS0xG	<ul style="list-style-type: none"> Ease of use

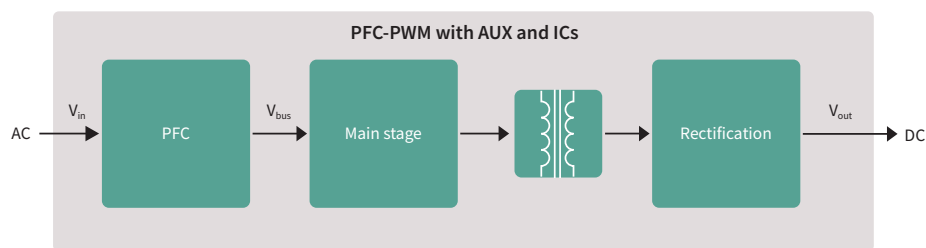
Functional block	Product category	Topology	Product family	Benefits
PFC	Gate-driver ICs	Interleaved PFC	EiceDRIVER™ 2EDN852x / 1EDN8511B EiceDRIVER™ 1EDN8550B for Kelvin source CoolMOS™	<ul style="list-style-type: none"> Source and sink driver capability: <ul style="list-style-type: none"> - 5 A for 2EDN - 4 A/8 A for 1EDN 17 nS (45 ns for 1EDN8550B) propagation delay precision for fast MOSFET and GaN switching (-)10 V input robustness (1EDN8550B has true differential inputs for ground-shift robustness CMR up to ± 150 V)
			EiceDRIVER™ low side: 2ED24427N01F	<ul style="list-style-type: none"> Dual-channel, 10 A low-side driver in DSO-8 with power-pad Integrated UVLO protection and enable (EN) function High frequency, high power operation w/BOM savings
			EiceDRIVER™ level-shift: 2ED2181S06F, 2ED21814S06J	<ul style="list-style-type: none"> 650 V half-bridge SOI driver with integrated bootstrap diode Superior -VS transient voltage immunity High frequency switching (500 kHz)
		Totem-pole PFC	EiceDRIVER™ level-shift: IRS2186S, IRS21864S	<ul style="list-style-type: none"> 4 A/ 4 A high- and low-side gate driver
			EiceDRIVER™ Compact: 1EDI60N12AF, 1ED3124MU12F	<ul style="list-style-type: none"> Isolated gate driver, up to 14 A, 100 ns propagation delay
			EiceDRIVER™ low side: 1ED44173N01B	<ul style="list-style-type: none"> Single-channel with fast, accurate (+/- 5%), integrated overcurrent protection (OCP)
	Gate driver ICs for SiC MOSFETs	Totem-pole PFC	EiceDRIVER™ 2EDI, 1EDB*: (2EDF9275F, 1EDB9275F)	<ul style="list-style-type: none"> Up to 1500 VDC channel-to-channel isolation 14 V UVLO version for SiC MOSFETs driving
Main stage	High voltage MOSFETs	ITTF	600 V CoolMOS™ C7/P7	<ul style="list-style-type: none"> Fast switching speed for improved efficiency and thermals, low gate charge for enhanced light load efficiency and low power consumption at no load condition Optimized V_{GS} threshold for lower turn-off losses Rugged body diode which prevents device failure during hard commutation
		LLC, half-bridge below 1 kW	600 V CoolMOS™ P7/CFD7	<ul style="list-style-type: none"> Low turn-off losses Low Q_{oss} Low Q_G
		LLC, phase shift full-bridge below 1 kW	600 V CoolMOS™ CFD7 650 V CoolMOS™ CFD2	<ul style="list-style-type: none"> Fast and rugged body diode Optimized low Q_G and soft commutation behavior to reach highest efficiency Highest reliability for 650 V V_{DS}
	GaN GIT HEMTs	LLC, ZVS phase shift full-bridge	CoolGaN™ GIT HEMTs 600 V	<ul style="list-style-type: none"> Enable the highest efficiency and highest power density
	Control ICs	HB LLC IC	ICE1HS01G-1 ICE2HS01G	<ul style="list-style-type: none"> High efficiency and low EMI
	Gate driver ICs for high voltage MOSFETs	LLC, ZVS phase-shift full-bridge, TTF	EiceDRIVER™ Compact: 1EDI60N12AF, 1ED-3124MU12F	<ul style="list-style-type: none"> Isolated gate driver, up to 14 A, 100 ns propagation delay
			EiceDRIVER™ 2EDS8165H, 2EDS8265H	<ul style="list-style-type: none"> 37 ns typical propagation delay time Reinforced (safe) isolation 6 kV, CMTI > 150 V/ns
			EiceDRIVER™ 2EDN8524F with pulse transformer	<ul style="list-style-type: none"> 5 A source and sink driver capability 17 nS propagation delay precision for fast MOSFET and GaN switching
			EiceDRIVER™ low side: 2ED24427N01F with pulse transformer	<ul style="list-style-type: none"> Dual-channel, 10 A low-side driver in DSO-8 with power-pad Integrated UVLO protection and enable (EN) function High frequency, high power operation w/BOM savings
			EiceDRIVER™ level-shift: 2ED2181S06F, 2ED21814S06J	<ul style="list-style-type: none"> 650 V half-bridge SOI driver with integrated bootstrap diode Superior -VS transient voltage immunity High frequency switching (500 kHz)
			EiceDRIVER™ level-shift: IRS2186S, IRS21864S	<ul style="list-style-type: none"> 4 A/ 4 A high- and low-side gate driver
	Gate driver ICs for high voltage GaN	LLC, ZVS phase shift full-bridge	EiceDRIVER™ 1EDI-GaN (1EDS5663H)	<ul style="list-style-type: none"> Functional isolation up to 1500 V_{DC} channel-to-channel isolation Robust driving against switching induced gate overshoots Reduced reverse conduction losses compared to bipolar driving

Functional block	Product category	Topology	Product family	Benefits
Synchronous rectification	Low voltage MOSFETs	HB LLC and centertap	OptiMOS™ 40 V	› High efficiency over whole load range, layout tolerance
		ITTF	OptiMOS™ 60 V	› High efficiency, low thermals, low V_{DS} overshoot
		ZVS PS FB and center-tap	OptiMOS™ 80 V	› High efficiency over whole load range, low V_{DS} overshoot and oscillations
	Gate-driver ICs	Synchronous rectification	EiceDRIVER™ 2EDF7275K/2EDF7235K 2EDL811x / 2EDL801x for bridge rectifier	› EiceDRIVER™ 2EDF72x5K › Functional isolation up to 650 V _{DC} channel-to-channel isolation › Compact solution available in LGA-13 5x5 mm package › EiceDRIVER™ 2EDL8x1x › Level-shift half-bridge gate driver up to 120 V isolation
			Low side: EiceDRIVER™ 2EDN75xx / 2EDN85xx, 1EDN751x / 1EDN8511B	› 5 A source and sink driver capability for 2EDN (4A/8A for 1EDN) › 17/19 nS propagation delay precision for fast MOSFET and GaN switching › (-)10 V input robustness
			EiceDRIVER™ low side: 2ED24427N01F	› Dual-channel, 10 A low-side driver in DSO-8 with power-pad › Integrated UVLO protection and enable (EN) function › High frequency, high power operation w/BOM savings
			EiceDRIVER™ level-shift: 2ED2181S06F, 2ED21814S06J	› 650 V half-bridge SOI driver with integrated bootstrap diode › Superior -VS transient voltage immunity › high frequency switching (500 kHz)
			EiceDRIVER™ level-shift: IRS2186S, IRS21864S	› 4 A/ 4 A high- and low-side gate driver
			EiceDRIVER™ 1EDNx550B	› True differential inputs for ground shift robustness CMR up to +/-150 V
Auxiliary power supply	Control ICs	QR/FF flyback CoolSET™	800 V – ICE2QRxx80(Z)(G) ICE3xRxx80J(Z)(G) 700 V ICE5QRxx70A(Z)(G) 800 V ICE5QRxx80A(Z)(G)	› Low standby power, high efficiency and robustness › An integrated 700 V/800 V superjunction power MOSFET with avalanche capability › Standby power at › Burst mode entry/exit to optimize different low load conditions
Housekeeping	Microcontrollers	-	XMC1xxx	› Flexibility, HR PWM, digital communication › ARM® based standard MCU family and wide family
Conversion	Microcontrollers	-	XMC4xxx	› Flexibility, HR PWM and digital communication
PFC, PWM/ resonant converter, synchronous rectification	Gate-driver ICs	-	EiceDRIVER™ Compact: 1EDI60N12AF, 1ED- 3124MU12F	› 100 ns typical propagation delay time › Functional isolation up to 14 A › Separate sink and source output
		-	EiceDRIVER™ 2EDNx	› 8 V UVLO option › -10 V input robustness › Output robust against reverse current



Industrial SMPS

Industrial SMPS powers a wide range of devices from industrial automation robots to medical equipment and vending machines. With the expansion of the Internet of Things (IoT) and the adoption of Industry 4.0, the demand for industrial SMPS is on the rise. Industrial switch-mode power supplies (SMPS) are mostly operated in outdoor environments without air conditioning or systems without fans. Such operating conditions make reliability and robustness the key requirements for the industrial SMPS, especially when it comes to high-temperature operations, outdoor use, line surges, load jumps, short circuit, etc. In addition to quality, reliable supply and long-term product availability are also some of the key customer concerns. Industrial SMPS life cycle goes over 10 years and it takes 3 to 5 years to ramp. Hence, not only do customers need a high-quality product, but also a stable and reliable supply over the industrial SMPS life cycle (10 to 20 years). Infineon offers this with its CoolMOS™, OptiMOS™, and StrongIRFET™ product families with EiceDRIVER™ gate driver, which thanks to the high robustness and reliable performance have been meeting customer and market requirements for more than 20 years. Infineon's products offer the best price/performance ratio along with the highest efficiency and reliability. For new designs, we highlight our CoolMOS™ P7 600 V/800 V/950 V parts, as well as the latest generation of OptiMOS™ 30 V/40 V/60 V/80 V/ 100 V/150 V and 250 V products. For designs with convection-cooled, high power supplies, our CoolMOS™ S7 in active bridge will reduce the power losses to enable the operation without fans.



Functional block	Product category	Topology	Technology	Benefits
PFC/Main stage	High-voltage Si MOSFETs	CrCM/DCM PFC	600 V / 800 V / 950 V CoolMOS™ P7	<ul style="list-style-type: none"> Best thermal performance Rugged body diode ESD enhancement for production line Wide $R_{DS(on)}$ portfolio including both THD and SMD packages
			600 V CoolMOS™ P6	<ul style="list-style-type: none"> Fast-switching speed for improved efficiency and thermals Low gate charge for enhanced light-load efficiency and low power consumption at no load condition Optimized V_{GS} threshold for low turn-off losses
			600 V CoolMOS™ S7	<ul style="list-style-type: none"> PFC efficiency boost ~1% Lowest $R_{DS(on)}$ in SMD packages
	Boost diodes	DCM PFC	650 V Rapid 1	<ul style="list-style-type: none"> Low conduction losses
		CCM PFC	650 V Rapid 2	<ul style="list-style-type: none"> Low reverse recovery losses and PFC switch turn-on losses
	Control ICs	CCM PFC ICs	ICE3PCS0xG	<ul style="list-style-type: none"> High PFC and low THD
	High-voltage SiC MOSFETs	Totem-pole PFC	CoolSiC™ MOSFET 650 V	<ul style="list-style-type: none"> Increased efficiency Increased power density Supports harsh and high temperature operations
	High-voltage GaN HEMTs	Totem-pole PFC	CoolGaN™ 600 V	<ul style="list-style-type: none"> Enabling highest efficiency and power density
	SiC diodes	CCM/interleaved PFC	CoolSiC™ Schottky diode 650 V G6 and G5	<ul style="list-style-type: none"> Low FOM VF^*QG
Main stage	Control ICs	HB LLC ICs	650 V – ICE1HS01G-1/ ICE2HS01G	<ul style="list-style-type: none"> High efficiency and low EMI
	High-voltage GaN		CoolGaN™ 600 V GiT HEMT	<ul style="list-style-type: none"> Enabling highest efficiency and power density
Synchronous rectification	Medium voltage diodes	HB LLC + center-tap	OptiMOS™ 30 V/40 V/60 V/80 V/150 V/250 V	<ul style="list-style-type: none"> Optimized cost/performance and low thermals
PFC / Main stage / Synchronous rectification	Gate Driver ICs	Boost PFC	EiceDRIVER™ Low side: 1ED44173N01B	<ul style="list-style-type: none"> Single-channel with fast, accurate (+/- 5%), integrated over-current protection (OCP)
		Totem-pole PFC / HB LLC	EiceDRIVER™ Compact: 1ED160N12AF , 1ED3124MU12F	<ul style="list-style-type: none"> Isolated gate driver, up to 14 A, 100 ns propagation delay
			EiceDRIVER™ level-shift: 2ED2181S06F , 2ED21814S06J	<ul style="list-style-type: none"> 650 V half-bridge SOI driver with integrated bootstrap diode Superior -VS transient voltage immunity High-frequency switching (500 kHz)
			EiceDRIVER™ level-shift: IRS2186S , IRS21864S	<ul style="list-style-type: none"> 4 A/ 4 A high- and low-side gate driver
		Interleaved PFC / HB LLC	EiceDRIVER™ Low side: 2ED24427N01F	<ul style="list-style-type: none"> Dual-channel, 10 A low-side driver in DSO-8 with power-pad Integrated UVLO protection and enable (EN) function High frequency, high power operation w/BOM savings

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* Coming soon



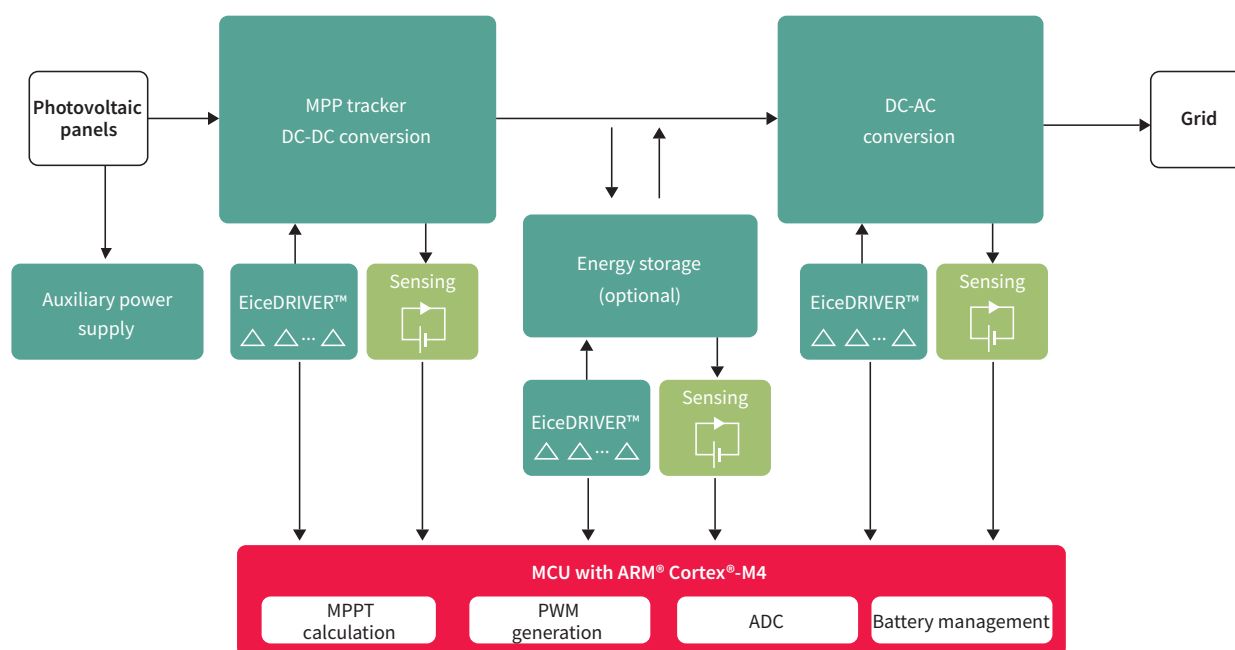
Solar

High efficiency designs for solar power systems

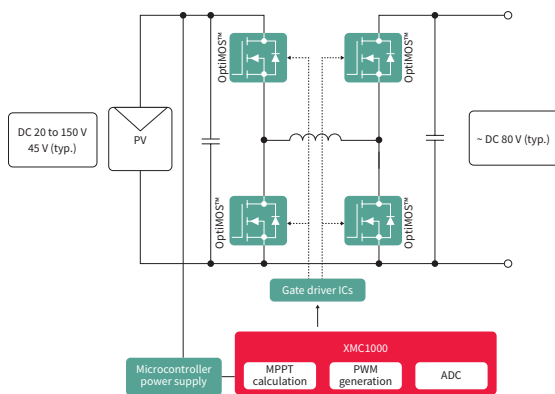
Infineon provides a comprehensive portfolio to deliver the best efficiency and reliability for solar applications. Cutting-edge technologies such as CoolMOS™ SJ MOSFETs, HighSpeed 3 IGBT and TRENCHSTOP™ 5, CoolSiC™ Schottky diodes, CoolSiC™ MOSFETs, coreless transformers, drivers and many more combined with the rich experience and highest quality ensure Infineon's unique supplier position for solar applications. The newly added Arm® Cortex™-M4 based MCU enables easy and high-efficiency design.

	Optimizer 250 W-750 W	Single and multiple panel micro inverter 250 W-1500 W	String inverter 1 kW-200 kW	Central inverter 500 kW-5000 kW
MOSFETs	OptiMOS™ SuperSO8/DirectFET™ 60 V-150 V	OptiMOS™ SuperSO8 DirectFET™ 60 V-200 V	OptiMOS™ 150 V-300 V	
SiC MOSFETs		CoolMOS™ TOLL/D²PAK 600 V-800 V	CoolMOS™ TO-247-3/TO-247-4 D²PAK/TOLL/QDPAK 600/650 V	
IGBTs			CoolSiC™ MOSFET TO-247-3/TO-247-4 1200 V	
			650 V TRENCHSTOP™ 5 / 1200 V HighSpeed 3 TO-247-3/TO-247-4/TO-247PLUS 600 V/650 V/1200 V	
Gate driver ICs	EiceDRIVER™ 2EDi / 1ED Compact (1ED-AF) / 650 V SOI / 1EDB / IRS2011	EiceDRIVER™ 2EDi / 1EDB / 1ED Compact (1ED-AF) / 650 V SOI / 1EDB	EiceDRIVER™ 2EDi/650 V SOI/ X3 Compact(1ED31xx) / X3 Analog(1ED34xx) / 1ED-F3 / 1EDB / IRS2011	PrimePACK™ / EconoDUAL™ 3 / 62 mm
SiC diodes		CoolSiC™ Schottky diodes DPAK/TO-220 600 V/1200 V D²PAK 650 V	CoolSiC™ Schottky diodes TO-220/TO-247/TO-247-2/DPAK/D²PAK 650 V/1200 V	EiceDRIVER™ X3 Compact(1ED31xx) / X3 Analog(1ED34xx) / 1ED-F3 / 1EDB 2ED2442TN01F / 650 V SOI
Auxiliary power supply			BAT165 Schottky diode	
			CoolSET™ 800 V	
Microcontrollers	XMC1xxx Arm® Cortex®-M0	XMC1xxx Arm® Cortex®-M0	XMC1xxx Arm® Cortex®-M0	XMC1xxx Arm® Cortex®-M0
	XMC45xx Arm® Cortex®-M4	XMC45xx Arm® Cortex®-M4	XMC45xx Arm® Cortex®-M4	XMC45xx Arm® Cortex®-M4

Infineon's products for complete solar system



Optimizer

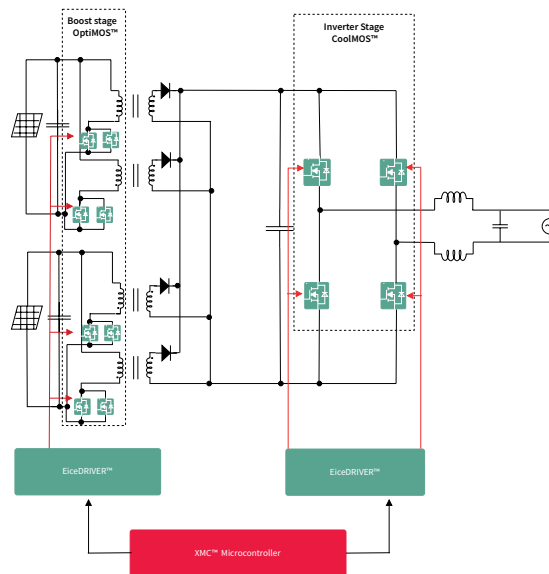


Functional block	Product family	Input voltage	Voltage class [V _{DS} max]	Package *	Part number *	R _{DS(on)}
Buck boost MPPT	OptiMOS™	≤ 48 V	60 V	SuperSO8	BSC012N06NS	1.2 mΩ
				DirectFET™	BSB028N06NN3 G	2.8 mΩ
		≤ 64 V	80 V	SuperSO8	BSC021N08NS5	2.1 mΩ
				DirectFET™	BSB044N08NN3 G	4.4 mΩ
		≤ 80 V	100 V	SuperSO8	BSC027N10NS5	2.7 mΩ
				DirectFET™	BSB056N10NN3 G	5.6 mΩ
		≤ 125 V	200 V	SuperSO8	BSC220N20NSFD	9.3 mΩ
	Gate-driver ICs	Single channel		PG-SOT23-6	1EDN8550	
				DSO-8	1EDI60N12AF [10 A] 1ED3124MU12F [14 A]	
		Dual channel		VDSON	2EDL81xx	
DSO-8				IRS2011 [1 A]		
DSO-8				2ED2181S06F [2.5 A] IRS2186ST [4 A]		
Microcontroller	XMC1000					

Microinverter

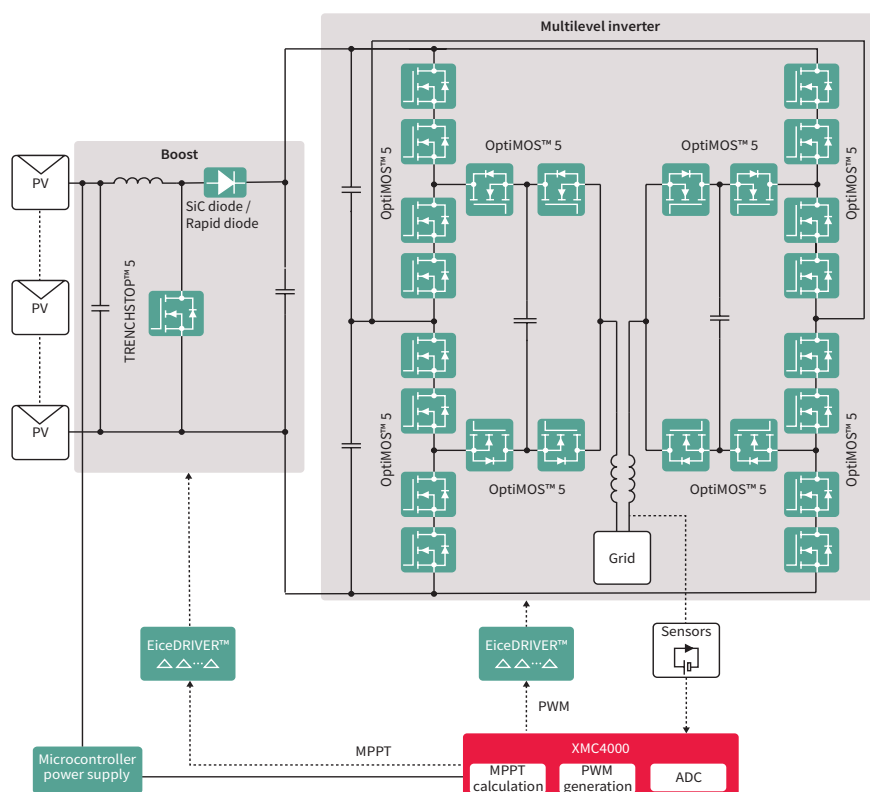
Microinverter can either be used per

- › single (~300 W) PV panel or
- › multiple PV panels (600 – 1500 W)



Functional block	Product family	Voltage class [V _{DS} max]	Package	Part number	R _{DS(on)}	
MPPT – Boost stage	OptiMOS™	60 V	SuperSO8	BSC028N06NS	2.8 mΩ	
		80 V		BSC026N08NS5	2.6 mΩ	
		120 V		BSC190N12NS3	19.0 mΩ	
		150 V		BSC093N15NS5	9.3 mΩ	
				BSC160N15NS5	16.0 mΩ	
	CoolSiC™ Schottky diode	1200 V	DPAK	IDM02G120C5	2.0 A	
				IDM05G120C5	5.0 A	
				IDM08G120C5	8.0 A	
	Gate driver: EiceDRIVER™			VDSON-8	2EDL81xx	
				PG-DSO-8-60/PG-TSSOP-8-1	2EDN7524F	
				DFN-10 (3 x 3mm)	2ED2742/44/48S01G*, 2ED2732/34/38S01G*	
				DSO-8 with power-pad	2ED24427N01F	
				DSO-8	IRS2011S , IRS2005S , IRS2007S , IRS2008S	
				DSO-8	1EDI60N12AF , 1ED3124MU12F	
Inverter stage	CoolMOS™	600 V	TO-Leadless	IPT60R102G7	102.0 mΩ	
			D ² PAK	IPB60R145CDF7	145.0 mΩ	
			TO-247	IPW60R145CFD7	145.0 mΩ	
		650 V	D ² PAK	IPB65R150CFD	150.0 mΩ	
			TO-247	IPW65R150CFD	150.0 mΩ	
	Gate driver: EiceDRIVER™			PG-DSO-16	2EDS8165H	
				2EDS8265H		
				PG-DSO-8/PG-DSO-14	2ED2181S06F , 2ED21814S06F	
				DSO-8	1EDI60N12AF , 1ED3124MU12F	
Microcontroller				XMC1000, XMC4000		

Single-phase string inverter – multilevel topology



In a multilevel inverter, four high-voltage MOSFETs/IGBTs in an H-bridge topology are replaced with a higher number of lower-voltage MOSFETs. Compared to a conventional H-bridge inverter, a multilevel inverter, composed of lower voltage MOSFETs, offers several advantages:

- › With much lower $R_{DS(on)}$ and switching loss parameters, it significantly reduces conduction and switching losses
- › Higher effective output frequency (smaller magnetics) is possible with lower switching losses
- › Improved EMC due to reduced switching voltages
- › Significant reduction in the cooling system, size and weight

Discrete power devices for multilevel string inverter

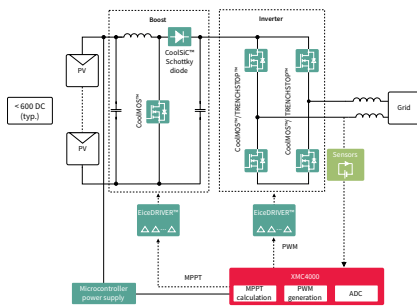
Functional block	Product family	Voltage class [$V_{DS\ max}$]	Package	Part number	$R_{DS(on)}$
Boost	CoolMOS™	600 V	TO-247	IPW60R017C7	17 mΩ
			TO-247	IPW60R024P7	24 mΩ
			D ² PAK	IPB60R045P7	45 mΩ
	IGBT TRENCHSTOP™ 5	650 V	TO-247	IKW40N65EH5, IKW40N65ES5	40 A
			D ² PAK	IKB40N65EH5, IKB40N65ES5	40 A
	CoolSiC™ Schottky diode	650 V	TO-247	IDW20G65C5	20 A
Flying-capacitor-based active neutral-point-clamp (NPC)	OptiMOS™	150 V	PG-SOT23-6	1EDN8511B	4 A/8 A
			SuperSO8	BSC093N15NS5	9.3 mΩ
			SuperSO8	BSC110N15NS5	11 mΩ
			DirectFET™	IRF150DM115 *	11.3 mΩ
			D ² PAK	IPB044N15N5	4.4 mΩ
			D ² PAK	IPB048N15N5	4.8 mΩ
Gate-driver ICs	EiceDRIVER™ 2EDi	650 V	NB-DSO16	2EDF7275F	4 A/8 A
	EiceDRIVER™ SOI		DSO-8, DSO-14	2ED2181S06F / 2ED21814S06J	2.5 A
	EiceDRIVER™ Compact	1200 V/2300 V	DSO-8	1EDI60N12AF, 1ED3124MU12F	10 A, 14 A
Microcontroller	XMC4000				

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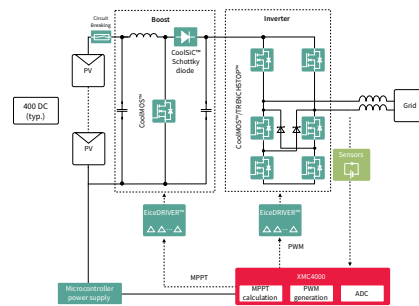
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Single-phase string inverter

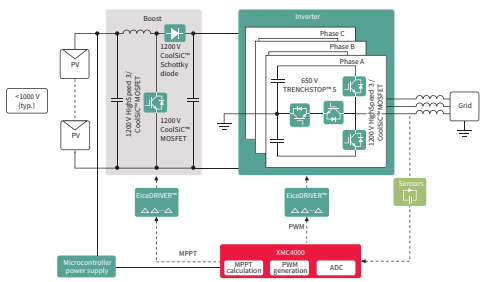
H4 topology



H6 topology



Three-phase string inverter



Discrete power devices for string inverter

Inverter type	Functional block	Product category	Product technology	Voltage	Package	Part number	R _{DS(on)}	Ampere	
Single phase	MPPT – Boost stage	Si MOSFET	CoolMOS™ P7	600 V	TO-247-3	IPW60R037P7	37 mΩ	-	
					TO-247-4	IPZA60R037P7	37 mΩ	-	
		SiC MOSFET	CoolSiC™ MOSFET	650 V	TO-247-4	IMZA65R027M1H	27 mΩ	-	
					TO-247-3	IMW65R048M1H	48 mΩ	-	
				1200 V	TO-247-3	IMW120R045M1	45 mΩ	-	
		IGBT	TRENCHSTOP™ 5 S5/H5	650 V	TO-247-3	IKW40N65ES5, IKW40N65EH5	-	40 A	
					TO-247-4	IKZ50N65ES5, IKZ50N65EH5	-	50 A	
	Diode	CoolSiC™ diode	650 V	TO-247	IDW20G65C5	-	20 A		
	Inverter	Si MOSFET	CoolMOS™ C7	650 V	TO-247-3	IPW65R65C7*	65 mΩ	-	
				600 V	TO-Leadless	IPT60R022S7	22 mΩ	-	
			CoolMOS™ S7	CoolMOS™ S7	600 V	TO-Leadless	IPT60R040S7	40 mΩ	-
							IPW60R018CFD7	18 mΩ	-
		CoolMOS™ CFD 7	CoolMOS™ CFD 7	600 V	TO-247-3	IPW60R018CFD7	18 mΩ	-	
				600 V	TO-247-3	IPW60R031CFD7	31 mΩ	-	
		SiC MOSFET	CoolSiC™ MOSFET	650 V	TO-247-4	IMZA65R027M1H	27 mΩ	-	
					TO-247-3	IMW65R048M1H	48 mΩ	-	
				1200 V	TO-247-3	IMW120R045M1	45 mΩ	-	
IGBT		TRENCHSTOP™ 5 S5/H5	650 V	TO-247-4	IKZ50N65ES5, IKZ50N65EH5	-	50 A		
	TO-247-3			IKW40N65ES5, IKW40N65EH5*	-	40 A			
Three phase	MPPT – Boost stage	IGBT	HighSpeed 3	1200 V	TO-247-3	IKW40N120H3	-	40 A	
					TO-247PLUS-3	IKQ75N120CH3	-	75 A	
		SiC MOSFET	CoolSiC™ MOSFET	1200 V	TO-247-3/-4	IMW120R030M1H, IMZ120R030M1H	30 mΩ	-	
						IMW120R045M1, IMZ120R045M1	45 mΩ	-	
	IMW120R060M1H, IMZ120R060M1H					60 mΩ	-		
	Inverter	IGBT	HighSpeed 3	1200 V	TO-247-3	IKW40N120H3	-	40 A	
					TO-247PLUS-3	IKQ750N120CH3*	-	75 A	
		SiC MOSFET	CoolSiC™ MOSFET	1200 V	TO-247-3/-4	IMW120R030M1H, IMZ120R030M1H	30 mΩ	-	
						IMW120R045M1, IMZ120R045M1	45 mΩ	-	
IMW120R060M1H, IMZ120R060M1H						60 mΩ	-		
Gate-driver ICs			EiceDRIVER™ low side	25 V	SOT23-6	1ED44175/3N01B	2.6 A		
				24 V	DSO-8	2ED24427N01F	10 A		
			EiceDRIVER™ SOI	650 V	DSO-8	2ED2181S06F	2.5 A		
			EiceDRIVER™	1200 V	SSOP-23, DSO-16	IR2214SS, IR2213S	2.5 A		
			EiceDRIVER™ Compact	1200 V	DSO-8	1EDI60I12AF, 1EDI30I12MF	10 A, 6 A		
				2300 V	DSO-8	1ED3124MU12H, 1ED3122MU12H	14 A, 10 A		
			EiceDRIVER™ Enhanced	1200 V	DSO-16/36	1ED020I12-F2, 2ED020I12-F2	2 A		
				2300 V	DSO-16	1ED3491MU12M, 1ED3890MU12M	9 A		
						EiceDRIVER™ 2EDN family, EiceDRIVER™ 1EDB			
Microcontroller			XMC4000						



FET-based high-voltage solid-state relays

Best-in-class $R_{DS(on)}$ x A enables unprecedented low losses in combination with advanced control and protection features

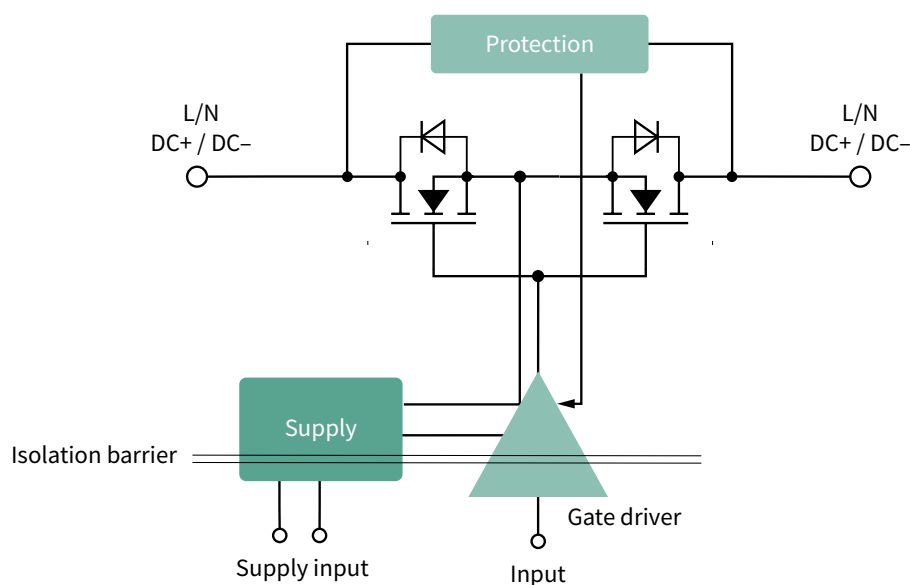
Electromechanical relays are a mature technology and well established. However, they suffer from some inherent weaknesses. The mechanical movement of metal contacts causes noise. The high voltages can arc before the contacts are completely opened or closed, which leads to contact degradation. An increase of the contact resistance over the lifetime causes the behavior to become less predictable. Triacs (or silicon-controlled rectifies, SCRs) are widely used as solid-state relays in AC applications. However, their controllability is limited and they suffer from high power dissipation in the range of 1 W/A.

FET-based solid-state solutions offer many benefits in relay applications. This includes significantly faster switching while eliminating arcing and the noise associated with electromechanical devices. Inherently, this results in higher reliability and more stable performance. When considering the maintenance, repair and operations (MRO) cost, a strong argument can be made for using solid-state. Compared to triacs, a FET-based solution offers advanced control and protection methods. The significantly lower power dissipation minimizes the cooling effort in the application. The latest CoolMOS™ S7(A) technology is a perfect match for solid-state relay applications. It offers an unprecedentedly low $R_{DS(on)} \times A$ figure of merit that will meet the needs of customers and their end markets.

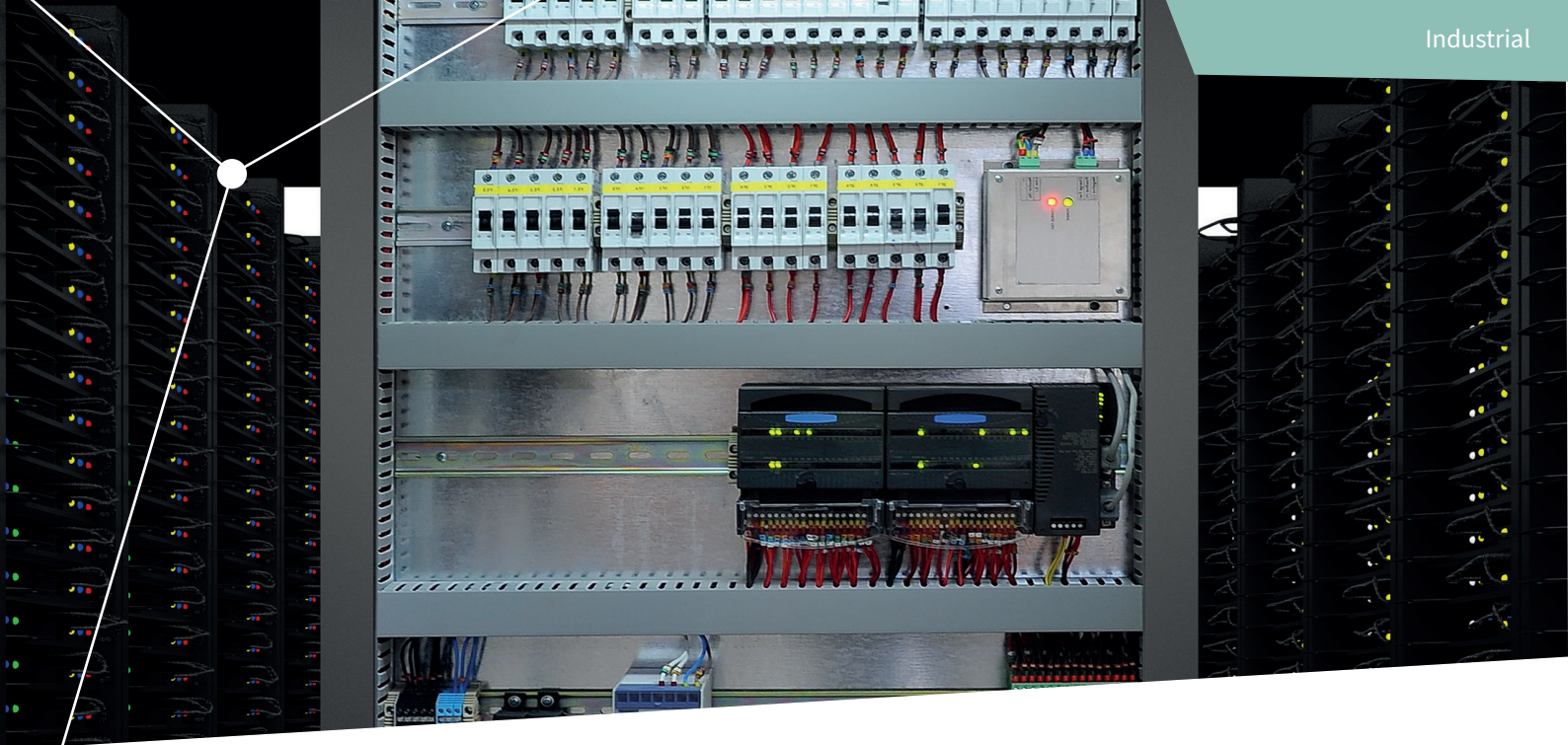
Features and benefits

Key features	Key benefits
› Operational lifetime: tens of millions operations	› Maintenance free (no degradation of contacts), MRO cost savings
› No mechanical parts	› Arcing-free operation, no contact bounce, clicking noise is eliminated
› Significantly faster switching	› Advanced control and protection methods
› No increasing resistance vs. lifetime	› Stable performance, predictable behavior
› Lowest $R_{DS(on)}$ x A in class	› Highest power density, minimized cooling effort, parallelization and scalability

Application diagram



www.infineon.com/ssr
www.infineon.com/S7



Product portfolio

Product	Product family	Voltage class [V _{DS} max]	R _{DS(on)}	Package	Part number
MOSFETs	MOSFETs CoolMOS™ S7 Industrial	600 V	10 mΩ	PG-HDSOP-22-1	IPDQ60R010S7
			22 mΩ	PG-HSOF-8-2	IPT60R022S7 , IPT60R022S7
			40 mΩ	PG-HSOF-8-2	IPT60R040S7
			65 mΩ	PG-HSOF-8-2	IPT60R022S7
	CoolMOS™ S7A Automotive	600 V	40 mΩ	PG-HDSOP-22-101	IPQC60R040S7A**
			22 mΩ	PG-HDSOP-22-1 PG-HDSOP-22-101 PG-TO247-3-61	IPDQ60R022S7A** , IPQC60R022S7A** , IPW60R022S7A** ,
			17 mΩ	PG-HDSOP-22-101	IPQC60R017S7A**
			10 mΩ	PG-HDSOP-22-1 PG-HDSOP-22-101 PG-TO247-3-61	IPDQ60R010S7A* , IPQC60R010S7A** , IPW60R010S7A**

Product	Product family	Output voltage	Output current	Isolation voltage	Part number
Gate drivers	EiceDRIVER™	20 V	± 2 A to ± 6 A	1.2 kV	1EDIx0I12MF
			± 2 A to ± 6 A	2.5 kV	1EDCx0I12MF
		40 V	± 10 A to ± 14 A	2.5 kV	1ED312xMU12F
			± 10 A	5.7 kV	1ED3122MU12H
			± 3 A	5.7 kV	1ED3431MU12M
			± 6 A	5.7 kV	1ED3461MU12M
			± 9 A	5.7 kV	1ED3491MU12M

Product	Product family	Load voltage	Output / load current	Isolation voltage	Part number
Integrated solid-state relays	Photovoltaic isolators (PVI)	-	2 x 5 μA	3.75 kV	PVI5033R
		-	2 x 5 μA	2.5 kV	PVI1050N
	Photovoltaic relays (PVR)	60 V	2 A	4 kV	PVG612A
		400 V	1 A	3.75 kV	PVX6012

www.infineon.com/solid-state-relay

www.infineon.com/S7

* Released

** Coming soon



TV power supply

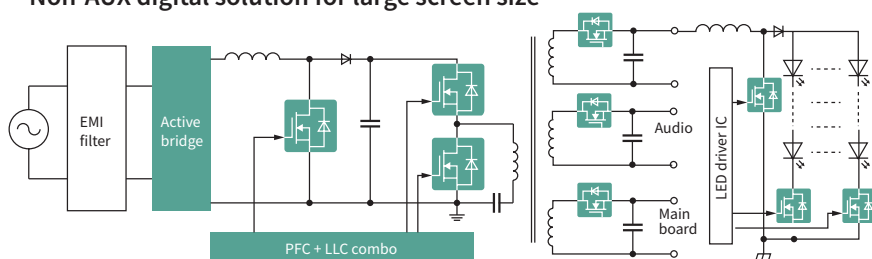
In addition to their outstanding image quality, new generation TVs gain attention for their user interface, low power consumption, and slim design. This requires the power supply unit (PSU) to either keep a low profile to maintain the slim appearance of a TV and a low thermal dissipation image or to have an external adapter. In addition, a growing number of TV manufacturers use external adapters to deliver DC power to the TV. Infineon products based on digital power technology have been designed to meet challenging efficiency and standby power requirements for the IoT-enabled TVs (both embedded PSU and adapter).

Thanks to digital power, our customers can reduce the number of TV power supplies by adapting the digital IC parameters to different TV and screen models by flexible and easy parameter-setting. Infineon's digital-based flyback controllers are ideal for low-power adapters for TVs and monitors. With digital soft switching, the adapter power density can significantly be improved.

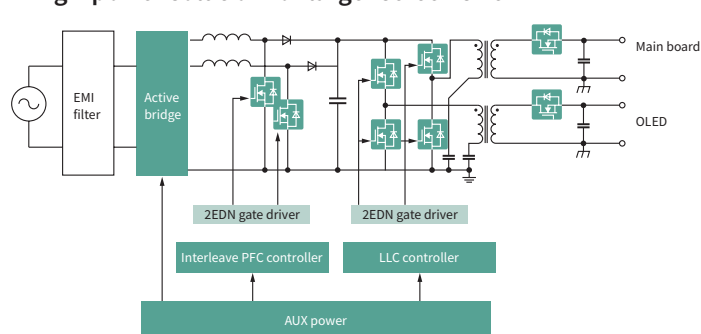
The 600 V CoolMOS™ P7 series has been developed to cover a broad spectrum of different applications where excellent performance and perfect ease of use are required. The rugged body diode enables the use of hard-switching topologies, such as power factor correction (PFC), boost, and two-transistor forward (TTF) and resonant topologies such as LLC, where the technologies lead to high efficiency in both hard-switching and resonant circuits.

For higher on-state resistance ($R_{DS(on)}$) classes, there is a new feature of an integrated ESD diode that helps improve the quality in manufacturing. At the same time, the low $R_{DS(on)}$ and gate charge (Q_G) enable high efficiency in the various topologies. The 600 V CoolMOS™ P7 comes with a wide variety of $R_{DS(on)}$ s and packages on consumer-grade to make it best suitable for TV power by balancing the cost and performance. Infineon developed specifically for TV power supplies a family of packages, characterized by short lead, SOT-223 mold stopper, and wide creepage distance, which enable low-cost and reliable manufacturing for our customers.

Non-AUX digital solution for large screen size

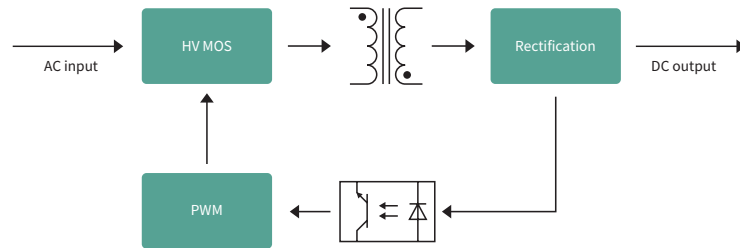


High-power solution for larger screen size



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Flyback solution for small screen size

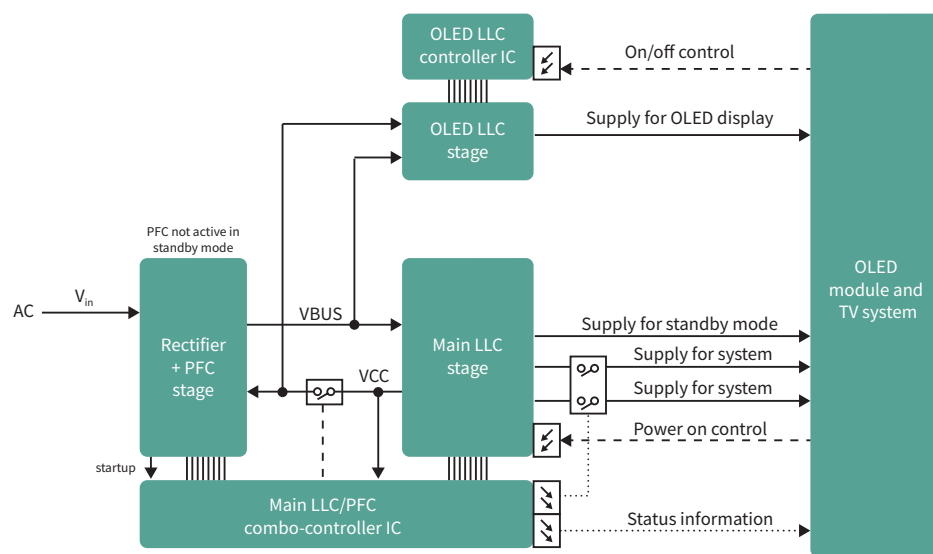


Recommended products

Functional block	Product category	Topology	Product family	Benefits
Main stage/PFC combo non-AUX	High-voltage MOSFETs	Active bridge	600 V CoolMOS™ S7	<ul style="list-style-type: none"> Body diode robustness at AC line commutation Improved thermal resistance Absolute lowest $R_{DS(on)}$ in the market Enables top-side cooling with DDPACK and QDPAK Ideal fit for solid-state and hybrid relays and circuit breakers
			PFC, HB LLC	<ul style="list-style-type: none"> Fast-switching speed for improved efficiency Low gate charge for enhanced light-load efficiency and low power consumption at no-load condition Optimized V_{GS} threshold for lower turn-off losses Rugged body diode for HB LLC application
		HB LLC	600 V CoolMOS™ PFD7	<ul style="list-style-type: none"> Robustness and reliability with integrated robust, fast body diode and up to 2 kV ESD protection in gate Reduced gate charge for enhanced light-load efficiency, and lower hysteresis loss
	Gate-driver IC	HB LLC	EiceDRIVER™ level-shift: 2ED2181S06F , 2ED21814S06J	<ul style="list-style-type: none"> 650 V half-bridge SOI driver with integrated bootstrap diode High-frequency switching (500 kHz)
	Control ICs	PFC+ LLC (combo)	IDP2308, PFC-LLC non-AUX digital IC for TV embedded PSU	<ul style="list-style-type: none"> Low BOM count/system cost due to high integration Low standby power High system reliability Shorter development cycles and higher design and production flexibility
		PFC+ LLC (combo)	IDP2303A, PFC-LLC non-AUX digital IC for TV adapter	<ul style="list-style-type: none"> Low BOM count/system cost due to high integration Low standby power Small form factor designs High system reliability
Synchronous rectification	Low-voltage MOSFETs	Synchronous rectification	OptiMOS™ 5 100-150 V	<ul style="list-style-type: none"> Low conduction losses, reduced overshoot FullPAK package available
	Low voltage GaN HEMTs	Synchronous rectification	CoolGaN™ 100 V low-voltage GaN SG HEMTs	<ul style="list-style-type: none"> Highest efficiency contribution via less parasitic parameter Space saving with SMD smaller package
PFC	Boost diodes	DCM PFC	650 V Rapid diode	<ul style="list-style-type: none"> Low conduction losses
	Control ICs	CCM PFC ICs	ICE3PCS0xG	<ul style="list-style-type: none"> High PFC and low THD
	High-voltage MOSFETs	PFC	600 V CoolMOS™ P7	<ul style="list-style-type: none"> High PFC and low THD
	WBG	PFC	CoolGaN™ GIT HEMTs 600 V	<ul style="list-style-type: none"> Highest efficiency contribution via less parasitic parameter Space saving with SMD smaller package
	Gate-driver IC	PFC	1ED44173N01B	<ul style="list-style-type: none"> Single-channel with fast, accurate (+/- 5%), integrated over-current protection (OCP)
LLC	Control ICs	HB LLC ICs	ICE1HS01G-1/ICE2HS01G	<ul style="list-style-type: none"> High efficiency and low EMI
	High-voltage GaN GIT HEMTs	HB LLC	CoolGaN™ 600 V Integrated Power Stage	<ul style="list-style-type: none"> Highest efficiency, Highest power density High reliability Isolated gate driver integrated
	High-voltage MOSFETs	HB LLC	600 V CoolMOS™ P7	<ul style="list-style-type: none"> Fast-switching speed for improved efficiency Low gate charge for enhanced light-load efficiency and low power consumption at no-load condition Optimized V_{GS} threshold for lower turn-off losses Rugged body diode for HB LLC application
			600 V CoolMOS™ PFD7	<ul style="list-style-type: none"> Robustness and reliability with integrated robust, fast body diode and up to 2 kV ESD protection in gate Reduced gate charge for enhanced light-load efficiency, and lower hysteresis loss
Auxiliary power supply	Control ICs	QR/FF flyback CoolSET™	700 V/800 V– ICE5QRxx70/80A(Z)(G)	<ul style="list-style-type: none"> Low standby power, high efficiency, and robustness
Flyback	Control ICs	Digital ZVS flyback	IDP21071	<ul style="list-style-type: none"> Forced resonant ZVS control reduces the switching loss Multilevel protection enables the robust design Flexible firmware provides more differentiation for OEMs
	High-voltage MOSFETs	Flyback	700 V CoolMOS™ P7	<ul style="list-style-type: none"> Optimized for flyback topologies Best price competitive CoolMOS™ SJ MOSFET family Lower switching losses versus standard MOSFET Controlled dV/dt and dI/dt for better EMI



OLED TV power block diagram

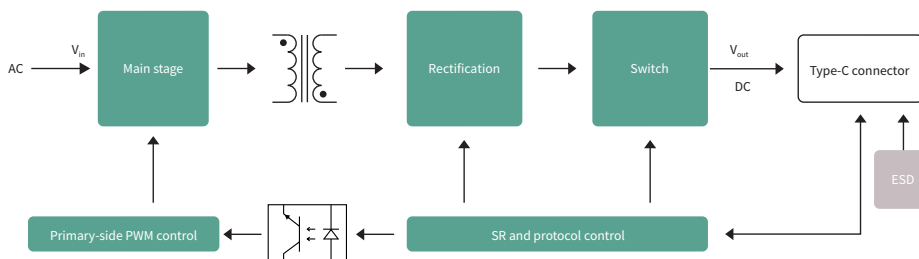


OLED TVs improve user experience as they can be thinner, lighter, more flexible, and than LCD/LED TVs. With the excellent performance of Infineon's GaN HEMTs, the OLED TV becomes even thinner and more reliable (for the full CoolGaN™ portfolio, see [CoolGaN™ GIT HEMTs](#)).

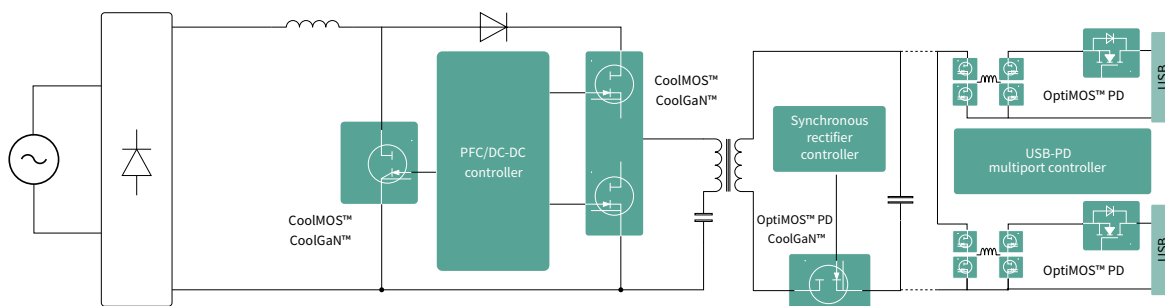


Adapter and charger power supply

Modern mobile devices require a charger that provides faster charging but comes in a small size. High power density and cost-effective power supplies can be designed by operating the converter at a higher switching frequency to avoid a considerable increase in the transformer and the output capacitor size. In achieving the required thermal performance and EMI behavior, power devices with lower losses and controlled switching behavior enable effective and fast product development. To address these requirements, Infineon offers its CoolMOS™ P7 SJ MOSFET family for adapters and chargers. Special care has been taken to ensure very good thermal behavior, increased efficiency, meeting all EMI requirements and ease of design. In addition, power devices in SMD packages enable optimal PCB layout through minimal footprint. SMD packages offer additional benefits for automatized large volume production. Specifically, Infineon's SOT-223 cost-effective package enables high power density at low manufacturing cost allowing SMT manufacturing to maintain very good thermal performances. Infineon's state-of-the-art XDP™ digital-based controllers enable the forced-frequency-resonant flyback, forced-quasi-resonant flyback, as well as hybrid flyback with zero-voltage-switching (ZVS) operation, ideal for high-power-density adapters and well support USB-PD (power delivery) requirements. In addition, the digital soft-switching controller, CoolMOS™ high-voltage MOSFETs, OptiMOS™ low-voltage MOSFETs and synchronous rectification IC and broad EZ-PD™ protocol controller portfolios enable high power density designs possible whilst meeting the thermal requirements. The EZ-PD™ CCG3PA-NFET is a highly integrated USB-C PD port controller for power adapters. It integrates NFET gate driver for VBUS and is compatible with the latest USB-C Power Delivery standard. In addition CCG3PA-NFET also supports legacy protocols including QC4.0, Apple 2.4 A charging, Samsung AFC and BC1.2 with no additional BOM.

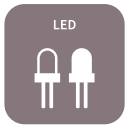


As the charger and adapter market has undergone a paradigm shift recently, and the original equipment manufacturers (OEMs) no longer sell the chargers/adapters together with the devices, the end-user demand for aftermarket supply has increased. It triggers multi-port (like 1A1C, 2C, etc.) designs from a technology point of view. The multi-port control with dynamic load sharing poses a new challenge for designers. Through its product offering, Infineon aims to help debunk the most efficient USB-PD designs and shorten time-to-market for its customers.



Complete product offering for charger and adapter

Functional block	Product category	Topology	Product	Benefits
Flyback converter	High-voltage MOSFETs and HEMTs	Flyback	600 V/700 V/800 V CoolMOS™ P7 SJ MOSFETs	<ul style="list-style-type: none"> Fast switching speed for improved efficiency and thermals Reduced gate charge for enhanced light-load efficiency Optimized gate-to-source voltage (VGS) threshold for lower turn-off losses
			600 V/650 V CoolMOS™ C7	<ul style="list-style-type: none"> High switching performance enabling highest efficiency Ease of use level high Optimized devices for highest efficiency switched-mode power supplies
		ACF, FMC1	600 V CoolMOS™ PFD7 SJ MOSFETs	<ul style="list-style-type: none"> Robustness and reliability with integrated robust fast body diode and up to 2 kV ESD protection Reduced gate charge for enhanced light-load efficiency Lower hysteresis loss
		Flyback (ACF, FFR, etc.)	CoolGaN™ GIT HEMTs 600 V	<ul style="list-style-type: none"> Highest efficiency Highest power density
	Control ICs	FFR flyback IC	XDPS21071	<ul style="list-style-type: none"> DCM operation with digital force-frequency resonant Ideal for USB-PD
		FFR flyback IC	XDPS21081	<ul style="list-style-type: none"> Optimization of low line AC input with forced quasi-resonant Suitable for high power density design
		Hybrid flyback IC	XDPS2201	<ul style="list-style-type: none"> Asymmetrical half-bridge ZVS control to maximize efficiency Supports a wide range of configurable parameters Supports Ultra-high power density (20W/in3) design
		QR flyback	PAG1P/S	<ul style="list-style-type: none"> Secondary-side-controlled flyback solution 2 chip flyback solution with integrated SR+PD controller
	Gate driver IC	Active-clamp flyback (ACF)	IRS25752L	<ul style="list-style-type: none"> High-side gate driver enables active clamp mode of operation Cost-effective, 600 V, single-channel driver in SOT23 package
			IRS21271S	<ul style="list-style-type: none"> High-side gate driver enables active clamp mode of operation 600 V, single-channel driver with over-current protection (OCP)
PFC DC-DC	High-voltage MOSFETs, HEMTs, and diodes	DCM PFC	600 V CoolMOS™ P7 SJ MOSFETs	<ul style="list-style-type: none"> Fast switching speed for improved efficiency Reduced gate charge for enhanced light load efficiency Optimized gate-to-source voltage (VGS) threshold for lower turn-off losses
		DCM/CCM PFC	CoolGaN™ GIT HEMTs 600 V	<ul style="list-style-type: none"> Highest efficiency contribution via less parasitic parameter Space saving with SMD smaller package
	Boost diode	DCM/PFC	650 V Rapid 1 diodes	<ul style="list-style-type: none"> Low conduction losses
	High-voltage MOSFETs and HEMTs	PFC/LLC Combo	IDP2308	<ul style="list-style-type: none"> Digital multi-mode PFC and LLC combined controller with a floating high side driver and a startup cell Comprehensive and configurable protection features Wide set of configurable parameters
		HB LLC	600 V CoolMOS™ P7 SJ MOSFETs	<ul style="list-style-type: none"> Fast switching speed for improved efficiency and thermals Reduced gate charge for enhanced light load efficiency Optimized gate-to-source voltage (VGS) threshold for lower turn-off losses
			CoolGaN™ 600 V integrated power stage (half-bridge)	<ul style="list-style-type: none"> Highest efficiency and highest power density Isolated gate driver integrated
	Gate driver IC	HB LLC	EiceDRIVER™ Compact: 1ED160N12AF, 1ED3124MU12F	<ul style="list-style-type: none"> Isolated gate driver, up to 14 A, 100 ns propagation delay
Synchronous rectification	Low-voltage MOSFETs	Synchronous rectification	OptiMOS™ PD 100-150 V	<ul style="list-style-type: none"> Low conduction losses, reduced overshoot Adapter-oriented synchronous rectification MOSFETs
	Control ICs	Synchronous rectification	IR1161LTRPBF	<ul style="list-style-type: none"> High efficiency Simple external circuitry
			PAG1S	<ul style="list-style-type: none"> Integration of synchronous rectification and PD controller Configurable protection, like OTP, OCP, OVP, UVP, short circuit, etc.
Protocol control	USB-C ICs	Protocol controller	PAG1S	<ul style="list-style-type: none"> Supports USB PD2.0, PD 3.0 with PPS, QC4+, QC 4.0, QC 3.0, QC 2.0, Samsung AFC, Apple charging, and BC v1.2 charging protocols
		Protocol controller	EZ-PD™ CCG3PA-NFET	<ul style="list-style-type: none"> Supports USB PD3.0 with Programmable Power Supply (PPS) Independent constant current (CC) and constant voltage (CV) modes Configurable OVP, OCP, and OTP Integrates NFET gate driver to drive the load switch 64KB Flash Memory
			EZ-PD™ CCG3PA	<ul style="list-style-type: none"> Supports USB PD3.0 with PPS, QC4, Apple 2.4 A charging, AFC, BC1.2 etc. Supports 1C and 1A port 64 kB flash memory
		Multi-port controller	EZ-PD™ CCG7D multi-port controller	<ul style="list-style-type: none"> Integrates 2 USB-C PD controllers + 2 DC-DC controllers in one single chip Supports latest USB-C PD v3.0 with PPS, QC4+, QC4.0, Samsung AFC, Apple 2.4A, BCv1.2 Configurable switching frequency of 150 kHz- 600 kHz Arm® Cortex®-M0 with flash allows users to implement custom features
Connector	ESD	ESD protection	Multi-purpose diodes for ESD protection	<ul style="list-style-type: none"> Small packaging to support minimum board space consumption High linearity - reducing harmonic generation/enabling suppression EMC problems Exceptional quality and reliability



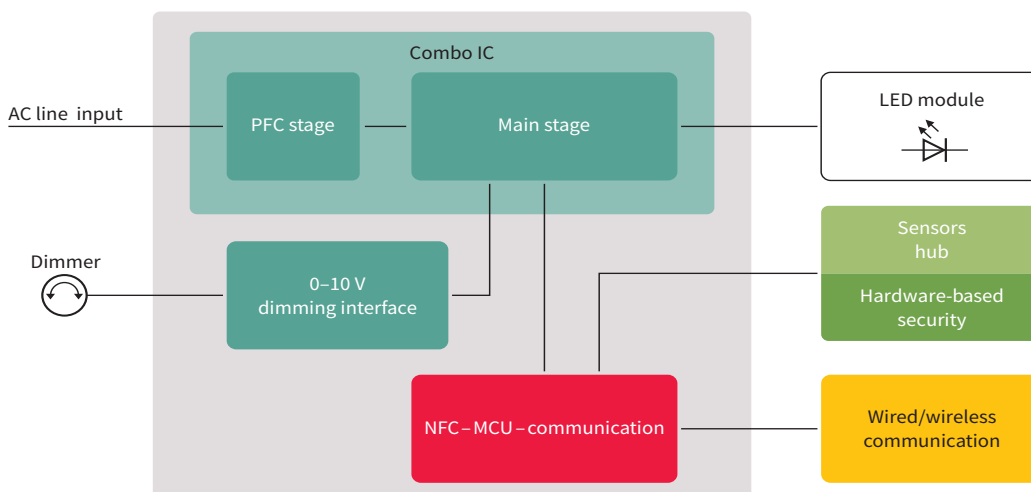
LED lighting

Infineon supplies tailored products for LED drivers, LED strips, horticultural and smart lighting. Our broad portfolio of tailored products and solutions for LED lighting comprises LED driver ICs, MOSFETs, and microcontrollers suited for LED drivers as well as sensors and dedicated ICs for secure communication. In addition to offering products of proven quality, a competent global lighting team supports our lighting customers in designing LED lighting products and systems in collaboration with our channel partners.

Key trends and challenges in LED lighting and our offering:

- › Human-centric lighting (HCL)
 - The lowest cost implementation of tunable white with single-stage flyback constant voltage and smart linear regulators with advanced headroom control ensuring high efficiency – [BCR601](#)
- › Configuration of output current and some further parameters
 - Our NFC controller allows the configuration of the output current without the need for an additional microcontroller
 - Our XDPL lighting IC family allows, besides output current, also adjustment of other features like protection, dimming curves, etc.
- › Cost reduction combined with efficiency increase
 - Integration of resonance inductor for PFC + resonant topology enables highest efficiency at low cost
 - Integration is enabled by the coreless transformer technology that enables high switching frequencies

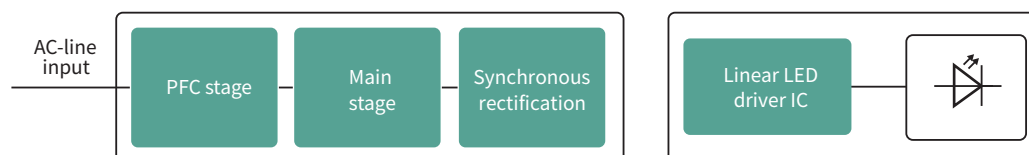
LED drivers



Recommended LED driver products

Functional block	Product type	Product family	MOSFET technology	Voltage class
PFC stage	PFC	IRS2505	CoolMOS™ P7	600 V/700 V/800 V/950 V ¹⁾
Main stage	PFC + LCC (constant current) PFC + LLC (constant current)	ICL5102 ²⁾	CoolMOS™ P7 (up to 600 m) CoolMOSTM PFD7	600 V/600V
			CoolMOS™ CE (above 600 m)	600 V
		ICL5102HV ⁴⁾	CoolMOSTM PFD7	950 V
	PFC + flyback (dual stage)	XDPL8221 ²⁾	CoolMOS™ P7	800 V/950 V
	PFC/flyback (single-stage constant current)	XDPL8105	CoolMOS™ P7	800 V/950 V
	PFC/flyback (single-stage constant voltage)	XDPL8219	CoolMOS™ P7	800 V/950 V
	PFC/flyback (single-stage constant voltage)	ICL8800/ICL8810/ ICL8820	CoolMOS™ P7	800 V/950 V
	PFC, flyback low-side gate driver	1EDN7550B	any CoolMOS™ SJ MOSFETs	-
		2EDN8524F	any CoolMOS™ SJ MOSFETs	-
	Half-bridge LLC gate driver	2ED2101S06F	any CoolMOS™ SJ MOSFETs	650 V (SOI)
Buck/linear solutions	Secondary buck (single-channel) Secondary buck (multichannel)	ILD8150	integrated	80 V
	High side buck gate driver	1EDB8275F	any CoolMOS™ SJ MOSFETs	650 V
	Low side buck gate driver	1EDN8511B	any CoolMOS™ SJ MOSFETs	-
	Secondary linear controller with feedback	BCR601	small-signal MOSFETs	75 V/100 V
	Tunable white with linear LED driver	BCR601, BCR602	small-signal MOSFETs	75 V/100 V
	Synchronous rectification controller	IR11688	OptiMOS™	100 V/150 V/200 V
Dimming	0-10 V dimming interface IC	CDM10 V	-	-
		CDM10 VD	-	-
NFC	NFC configuration IC	NLM0010/NLM0011	-	-
Microcontroller	XMC™ microcontroller	XMC1100	-	-

LED driver with constant voltage output and linear/switch mode LED driver ICs



Linear LED driver IC product portfolio

Functional block	Topology	IC product family	MOSFET technology
Lowest cost LED driver IC	Linear	BCR400W series	Integrated
Low voltage drop LED driver IC		BCR430/BCR431	
Robust LED driver IC		BCR40xU/BCR42xU	

For additional portfolio, take a look at [Lighting ICs](#).

www.infineon.com/lighting

1) 700 V, 800 V and 950 V CoolMOS™ P7 are optimized for PFC and flyback topologies.
600 V CoolMOS™ P7 is suitable for hard as well as so switching topologies (flyback, PFC and LLC)

2) PFC and resonant combo controllers

3) PFC and flyback combo controllers

4) Higher input voltage

* In addition to current configuration also constant lumen output (CLO) feature is included.



Audio power supply

For consumer audio SMPS solutions Infineon's 600 V, 700 V and 800 V CoolMOS™ P7 SJ MOSFETs are the ideal switch allowing for lower switching noise, voltage ripple, and a proper switching frequency to not produce additional audio noise. Higher efficiency and less thermals allow for smaller form factors and thus for lower cost and easier integration into speakers and sound systems.

Class D audio amplifiers offer 0 percent distortion and 100 percent efficiency. What decreases the actual number depends on how close the PWM is to an ideal waveform shape and how much power loss is in the device. The zero reverse recovery charge in the body diode and very small, linear input and output capacitances from Infineon CoolGaN™ 400 V technology allow switching waveforms to be close to an ideal switch device and thus is perfectly suitable for professional audio solutions.

600 V/700 V/800 V CoolMOS™ P7



- › Allows to reduce the number of total components while maintaining performance
- › Increased efficiency
- › Allows smaller form factors
- › Reduced noise

CoolGaN™ benefits in Class D amplifier



- › Efficient: best FOM of 400 V power devices
- › Very low noise: zero reverse recovery charge enables quiet hard switching
- › Small and linear C_{oss} narrows dead time window for better THD
- › Easy-to-use: compatible with class D audio control ICs

Audio power supply portfolio

Functional block	Product category	Product family	Benefits
Main power supply	High voltage MOSFET	600/700/800 V CoolMOS™ P7	› Enables increased system level efficiency and compactness
Auxiliary power supply	Control IC with integrated MOSFET	PWM FF CoolSET™ 5 th generation: › ICE5xRxxxxAG › ICE5xRxxxxBZS	› Adjustable line input OVP (only SMD) › Adjustable OLP › Adjustable burst mode entry/exit level › Ability to disable burst mode operation › CCM/DCM › 100kHz and 125kHz
	Control IC	ICE5ASAG ICE5GSAG	
Synchronous rectification	Low voltage MOSFET	OptiMOS™ 5 80 V › BSC0xxN08NS5 › BSZxxxN08NS5 › IPP020N08N5 › IPB017N08N5	› Fine-tuned for synchronous rectification applications reaching higher efficiency than the best competitor devices in the market over the whole load range
		OptiMOS™ 5 60 V › BSC070xLS › BSZ070xLS	
		OptiMOS™ 80 V › BSZ0602LS	
		OptiMOS™ 5 100 V › IPA050N10NM5S	

CoolGaN™ GIT HEMTs 400 V product offering for class D amplifiers

	CoolGaN™ GIT HEMTs 400 V	Recommended discrete audio amplifier driver IC
Package	HSOF-8-3 (TO-leadless)	IRS209575PBF
P_{max}	Up to 200 W	
$R_{DS(on) max.}$	70 mΩ	
Part number	IGT40R070D1 E8220	

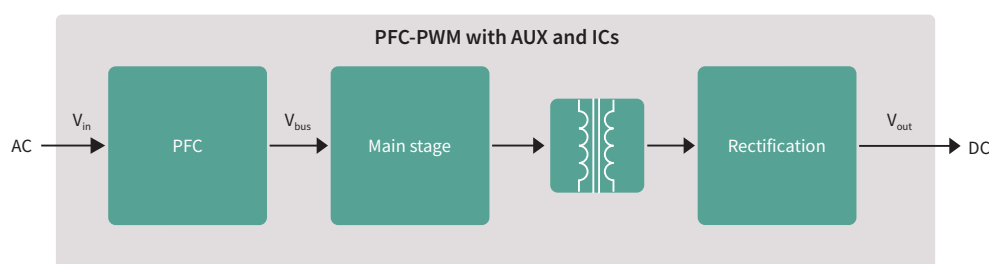


PC power supply

The PC power market is divided into high-end gaming PC and better cost-performance sectors to achieve a better price/performance for desktop SMPS. The PC OEMs are implementing the desktop SMPS by removing the AUX power block to save the cost of having a flyback circuit.

Due to the new structure of the CPU and GPU, higher and higher peak power is needed (1.5 to 2 times higher than normal power). In addition to the needed CCM PFC, Infineon 600 V CoolMOS™ P7 and OptiMOS™ 40 V / 60 V offer the best price/performance and reliability to meet the design requirements, as well as to achieve the highest efficiency enabled by semiconductors available in the market.

For that CPU and GPU power-hungry gaming PCs, the ICE3PCS0xG CCM PFC IC provides high efficiency over the whole load range and low count of external components, besides that, the ICE3PCS0xG CCM PFC IC offers fast output dynamic response during load jump. In addition to PGFC IC, Infineon's LLC ICs [ICE1HS01G](#)/[ICE2HS01G](#) support customers to minimize the external component count.



Functional block	Product category	Topology	Technology	Benefits
PFC/Main stage	High voltage MOSFETs	CrCM/DCM PFC	600 V CoolMOS™ P7	<ul style="list-style-type: none"> > Best thermal performance > Rugged body diode > ESD enhancement for production line > Wide $R_{DS(on)}$ portfolio including both THD and SMD packages
			600 V CoolMOS™ P6	<ul style="list-style-type: none"> > Fast-switching speed for improved efficiency and thermals > Low gate charge for enhanced light-load efficiency and low power consumption at no load condition > Optimized V_{GS} threshold for low turn-off losses
			500 V CoolMOS™ CE	<ul style="list-style-type: none"> > Optimized cost/performance > Lower transition losses versus standard MOSFET
	Boost diodes	DCM PFC	650 V Rapid 1	> Low conduction losses
		CCM/interleaved PFC	650 V Rapid 2	> Low reverse recovery losses and PFC switch turn-on losses
	Control ICs	CCM PFC ICs	CoolSiC™ diode 650 V G6	> Very low reverse recovery losses
			ICE3PCS0xG	> High PFC and low THD
Main stage	Control ICs	HB LLC ICs	650 V – ICE1HS01G-1/ ICE2HS01G	> High efficiency and low EMI
Synchronous rectification	Medium voltage diodes	HB LLC + center-tap	OptiMOS™ 40 V	> Optimized cost/performance and low thermals
			OptiMOS™ 60 V	> Layout tolerance and low thermals

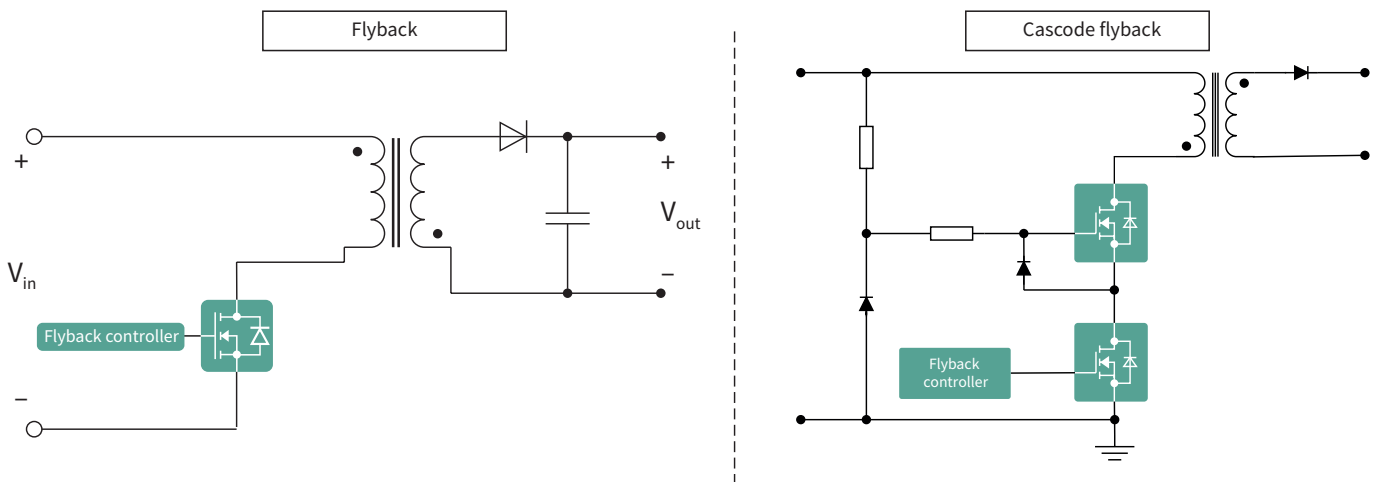


Smart meter

In today's technologically advanced world the demand for electrical energy is going up, as the traditional mechanical energy-based systems now depend on electrical power. An increasing trend can be seen in active monitoring and in dynamic pricing of electricity. A typical energy meter measures the amount of electrical energy consumed in kilowatt-hours (kWh) and can be mainly categorized into single phase and three phase types of smart meter. Existing and future energy meters should limit the self-consumption to 4 VA (~1.2 W) for single-phase or 8 VA (~2.4 W) for three-phasing energy meters. There is a tendency of moving from the traditional techniques of powering the meter to switch-mode-power-supply-based powering of the modern smart-grid-enabled smart energy meter.

Among the key characteristics of the smart meter SMPS are a wide input voltage ($60 V_{AC}$ to $580 V_{AC}$) and a quite low output voltage (12 V, 5 V, 3.3 V), as well as relatively low level of the output power (3-15 W). Among the requirements for the smart meter SMPS are low cost and low component count.

Infineon's latest CoolMOS™ P7 family, specifically 700 V/800 V/950 V CoolMOS™ P7, fulfills these requirements and satisfies comparatively high input voltage. The CoolMOS™ P7 technology brings the benefits of increased efficiency, low switching losses, high quality and reliability, and best-in-class thermal performance, being the right fit for the application.

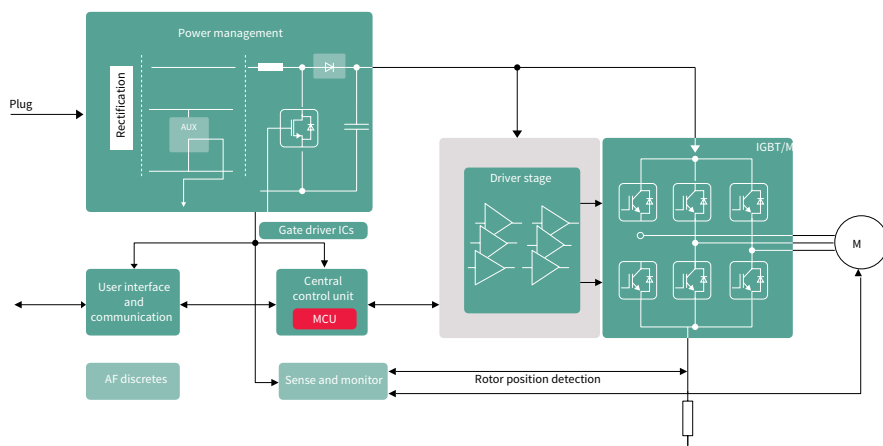


Functional block	Product category	Product family	Benefits
Flyback	High voltage MOSFETs	800/950 V CoolMOS™ P7	<ul style="list-style-type: none"> › Best-in-class performance › Highest efficiency › Outstanding thermal behavior
Cascode flyback		700/800/950 V CoolMOS™ P7	<ul style="list-style-type: none"> › Best-in-class performance › Highest efficiency › Outstanding thermal behavior
Controller ICs for flyback and cascode flyback topologies	AC-DC PWM controller ICs	PWM-FF (fixed frequency) PWM-QR (Quasi resonant)	<ul style="list-style-type: none"> › High reliability › High efficiency



Major home appliances

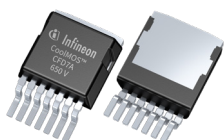
Based on industry-leading technology and manufacturing expertise, Infineon's line of innovative components for household appliances meets and exceeds even the most rigorous requirements for reliability and quality. The following block diagram example of an air conditioning system, together with the product selection table, provides effective recommendation for engineers selecting the right component for each power management stage inside major home appliances. The latest 600 V CoolMOS™ PFD7 series sets a new benchmark in 600 V super junction (SJ) technologies dedicated for ultrahigh power density designs as well as low power motor drives. It combines best-in-class performance with state-of-the-art ease-of-use, crystalized from Infineon's over 20 years' pioneering superjunction technology innovation and experience.



Functional block	Topology	Voltage class	Technology/product family	Selection/benefit
PFC AC-DC	IGBT – PFC CCM (high frequency – SC)	600 V	HighSpeed 3	Recommendation
	IGBT – PFC CCM (low frequency – SC)	600 V	TRENCHSTOP™ Performance	Recommendation
	IGBT – PFC CCM (cost competitive – no SC)	650 V	TRENCHSTOP™ 5 – H5	Recommendation
	IGBT – PFC CCM (low losses - SC)	650 V	TRENCHSTOP™ IGBT6	Recommendation
	IGBT – PFC	600 V	TRENCHSTOP™ Advanced Isolation	Recommendation
	IGBT – PFC (cost competitive - no SC)	650 V	TRENCHSTOP™ 5 WR5	Recommendation
	MOSFET – PFC CCM	600 V	CoolMOS™ P7	Reference
	Diode – PFC CCM	650 V	Rapid 1 and Rapid 2 diodes	Recommendation
	Controller – PFC CCM	–	ICE2PCS0xG, ICE3PCS0xG	Recommendation
	IPM – PFC CCM	650 V	CIPOS™ Mini PFC interleaved IPM series, CIPOS™ PFC integrated IPM series	Recommendation
	Low-side gate driver IC-PFC	25 V	Single low-side driver 1ED44176N01F Dual low-side driver IRS4427S Single low-side driver IRS44273L	OCP, fault and enable function in DSO-8 Rugged and reliable in DSO-8 Rugged and reliable in SOT23-5
DC-AC	IGBT – B6-VSI	650 V	TRENCHSTOP™ IGBT6	Efficiency
	IGBT – B6-VSI	600 V	RC-Drives Fast	Recommendation
	MOSFET - B6-VSI	600 V	CoolMOS™PFD7	Cost/performance
	IPM – B6-VSI	600 V	CIPOS™ Mini	Recommendation
	Half-bridge gate driver IC	650 V	2ED2304S06F	SOI with integrated bootstrap diode
	Half-bridge gate driver ICs	600 V	2EDL05I06PF, 2EDL23I06PJ, 2ED28073J	Integrated bootstrap diode/FET
	Three-phase gate driver ICs	600 V	6EDL04I06PT, IR2136S, 6ED003L06-F2	OCP, fault and enable function
AUX	Flyback fixed frequency	700 V	CoolSET™ F5	Recommendation
Microcontroller/ motor control IC	32-bit ARM® Cortex®-M4	-	XMC4100/XMC4200	Recommendation
	iMOTION™	-	IRMCxx motor control IC (incl. motion control algorithm)	Recommendation
Microcontroller supply	Linear voltage regulator	Up to 20 V	IFX1763, IFX54441, IFX54211, IFX3008	Efficiency
Communication	CAN transceiver	-	IFX1050, IFX1051, IFX1040	Robustness
Position sensing	Angle sensor	-	TLE5009, TLI5012B	Recommendation
	Hall switch	-	TLI496x	Recommendation

Package highlights for industrial applications

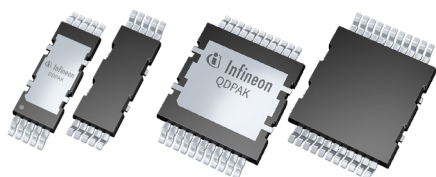
Space-saving and high performance packages



An SMD package for high efficiency and controllability in automotive applications

TO-263-7 (D2PAK-7-pin)

The TO-263-7-pin package is a SMD package addressing automotive-specific requirements including high efficiency and controllability. The Kelvin source pin leads to reduced switching losses. Furthermore, the new 7-pin design increases the creepage distance at the PCB and therefore helps to improve the manufacturability.



Innovative top-side cooled SMD solution for high-power applications

Top-side cooled Double & Quadruple DPAK (DDPAK + QDPAK)

These top-side cooled surface mount device (SMD) packages address high-power SMPS applications such as PC power, solar, server and telecom as well as automotive applications like HV eDisconnect, HV eFuse and on-board charger. SMD-based SMPS designs support fast switching and help to reduce the parasitic inductance associated with long leaded packages such as the common TO-220 and TO-247 package. In today's SMD-based designs, the output power is restricted by the thermal limit of the PCB material because the heat must be dissipated through the board. Thanks to the top-side cooling concept of DDPAK and QDPAK, the thermal decoupling of board and semiconductor is possible, enabling higher power density or improved system lifetime.



For highest efficiency and controllability in high power SMPS markets

TO-247 4-pin with asymmetric leads

The TO-247 4-pin package with asymmetric leads is an optimized version of the standard TO-247 4-pin and enables highest efficiency and controllability in the high power SMPS market. The fourth pin acts as a Kelvin source. The main current of the switch is placed outside of the gate loop and the feedback is eliminated. This leads to less switching losses, especially at high currents. Secondly, the EMI will be reduced due to cleaner waveforms. In addition, the asymmetric leads further improve the ease of use in the design-in process. Compared to the standard TO-247 4-pin the distance between the critical pins has been increased to enable simplified wave soldering and reduced board yield loss.



For highest efficiency and controllability in high power SMPS markets

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Enabling significant space savings

ThinPAK 8x8

With very small footprint of only 64 mm² (vs. 150 mm² for the D²PAK) and a very low profile with only 1 mm height (vs. 4.4 mm for the D²PAK) the ThinPAK 8x8 leadless SMD package for high voltage MOSFETs is a first choice to decrease system size in power-density driven designs. Low parasitic inductance and a separate 4-pin Kelvin source connection offer best efficiency and ease of use.

The package is RoHS compliant with halogen-free mold compound.



Optimized for high power applications

TO-Leadless

Combined with the latest CoolMOS™ C7 Gold (G7) technology, the TO-leadless (TOLL) package is Infineon's flagship SMD package for high power/high current SMD solutions. Compared to D2PAK 7-pin, TO-leadless shows a 30 percent reduction in footprint, yet offers improved thermal performance. This and the 50 percent height reduction result in a significant advantage whenever highest power density is demanded. Equipped with 4-pin Kelvin source connection and low parasitic inductances the package offers best efficiency and ease of use. The package is MSL1 compliant and reflow solderable.

Package highlights for consumer applications

Addressing today's consumer needs



**Solution for slim and small
adapters and chargers**

ThinPAK 5x6

ThinPAK 5x6 reduces the PCB area by 52 percent and height by 54 percent when compared to the DPAK package which is widely used in chargers and adapters. ThinPAK 5x6 is the right device to replace DPAK and meet the market demands of slimmer and smaller designs. Also, ThinPAK 5x6 enables a reduced charger and adapter case hot spot temperature by increasing the space between the MOSFET and the charger and adapter case.



**Cost-effective drop-in
replacement for DPAK**

SOT-223

The SOT-223 package without middle pin is a cost-effective alternative to DPAK, addressing the need for cost reductions in price sensitive applications. It offers a smaller footprint, while still being pin-to-pin compatible with DPAK, thus, allowing a drop-in replacement for DPAK and second sourcing. Moreover, SOT-223 achieves comparable thermal performance to DPAK and enables customers to achieve improved form factors or space savings in designs with low power dissipation.



**Solution for higher assembly yield in
charger applications**

IPAK Short Lead with ISO Standoff

ThinPAK 5x6 reduces the PCB area by 52 percent and height by 54 percent when compared to the DPAK package which is widely used in chargers and adapters. ThinPAK 5x6 is the right device to replace DPAK and meet the market demands of slimmer and smaller designs. Also ThinPAK 5x6 enables a reduced charger and adapter case hot spot temperature by increasing the space between the MOSFET and the charger and adapter case.



**Solution for height reduction
in adapters and chargers**

TO-220 FullPAK Narrow Lead

Infineon's TO-220 FullPAK Narrow Lead addresses customer needs with regards to height reduction requirements in adapter and charger applications. By offering an optimized standoff width and height and improved creepage distance, the package can be fully inserted into the PCB without any production concerns and, therefore, is especially suitable for slim and semi-slim adapter solutions.



**Improved creepage distance for
open frame power supplies**

TO-220 FullPAK Wide Creepage

This package solution has an increased creepage distance between the pins to 4.25 mm compared to 2.54 mm of a TO-220 FullPAK package. It targets open frame power supplies such as TV sets and PC power, where dust can enter the case through air vents. Dust particles can reduce the effective creepage between pins over time, which may lead to high voltage arcing. The package meets the requirements of open frame power supplies without any additional measures. Thus, it reduces system cost by offering an alternative to frequently used approaches to increase creepage distance.

CoolMOS™ portfolio

950 V CoolMOS™ P7



R _{DS(on)} [mΩ]	TO-220	TO-220 FullPAK	SOT-223	TO-251 Long lead	TO-252 (DPAK)
450		IPA95R450P7		IPU95R450P7	IPD95R450P7
750		IPA95R750P7		IPU95R750P7	IPD95R750P7
1200		IPA95R1K2P7	IPN95R1K2P7	IPU95R1K2P7	IPD95R1K2P7
2000			IPN95R2K0P7	IPU95R2K0P7	IPD95R2K0P7
3700			IPN95R3K7P7	IPU95R3K7P7	

900 V CoolMOS™ C3



R _{DS(on)} [mΩ]	TO-220	TO-262 (I ² PAK)	TO-263 (D ² PAK)	TO-220 FullPAK	TO-247	TO-252 (DPAK)
120					IPW90R120C3	
340	IPP90R340C3	IP190R340C3	IPB90R340C3	IPA90R340C3	IPW90R340C3	
500		IP190R500C3		IPA90R500C3	IPW90R500C3	
800	IPP90R800C3			IPA90R800C3		
1000	IPP90R1K0C3			IPA90R1K0C3		
1200	IPP90R1K2C3	IP190R1K2C3		IPA90R1K2C3		IPD90R1K2C3

800 V CoolMOS™ P7



R _{DS(on)} [mΩ]	TO-220	TO-220 FullPAK	TO-247	TO-252 (DPAK)	TO-251 (IPAK)	TO-251 (IPAK Short Lead)	SOT-223	TO-220 FullPAK narrow lead	ThinPAK 5x6
280	IPP80R280P7	IPA80R280P7	IPW80R280P7	IPD80R280P7				IPAN80R280P7	
360	IPP80R360P7	IPA80R360P7	IPW80R360P7	IPD80R360P7				IPAN80R360P7	
450	IPP80R450P7	IPA80R450P7		IPD80R450P7				IPAN80R450P7	
600	IPP80R600P7	IPA80R600P7		IPD80R600P7	IPU80R600P7	IPS80R600P7	IPN80R600P7		IPLK80R600P7*
750	IPP80R750P7	IPA80R750P7		IPD80R750P7	IPU80R750P7	IPS80R750P7	IPN80R750P7		IPLK80R750P7*
900	IPP80R900P7	IPA80R900P7		IPD80R900P7	IPU80R900P7	IPS80R900P7	IPN80R900P7		IPLK80R900P7*
1200	IPP80R1K2P7	IPA80R1K2P7		IPD80R1K2P7	IPU80R1K2P7	IPS80R1K2P7	IPN80R1K2P7		IPLK80R1K2P7*
1400	IPP80R1K4P7	IPA80R1K4P7		IPD80R1K4P7	IPU80R1K4P7	IPS80R1K4P7	IPN80R1K4P7		IPLK80R1K4P7*
2000				IPD80R2K0P7	IPU80R2K0P7	IPS80R2K0P7	IPN80R2K0P7		IPLK80R2K0P7*
2400				IPD80R2K4P7	IPU80R2K4P7	IPS80R2K4P7	IPN80R2K4P7		
3300				IPD80R3K3P7	IPU80R3K3P7		IPN80R3K3P7		
4500				IPD80R4K5P7	IPU80R4K5P7		IPN80R4K5P7		

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800 V CoolMOS™ CE



R _{DS(on)} [mΩ]	TO-220 FullPAK	TO-247	TO-251 (IPAK)
310	IPA80R310CE		
460	IPA80R460CE		
650	IPA80R650CE		
1000	IPA80R1K0CE		IPU80R1K0CE
1400	IPA80R1K4CE		
2800			

800 V CoolMOS™ C3



R _{DS(on)} [mΩ]	TO-220	TO-263 (D ² PAK)	TO-220 FullPAK	TO-247	TO-252 (DPAK)
85				SPW55N80C3	
290	SPP17N80C3	SPB17N80C3	SPA17N80C3	SPW17N80C3	
450	SPP11N80C3		SPA11N80C3	SPW11N80C3	
650	SPP08N80C3		SPA08N80C3		
900	SPP06N80C3		SPA06N80C3		SPD06N80C3
1300	SPP04N80C3		SPA04N80C3		SPD04N80C3
2700			SPA02N80C3		SPD02N80C3

700 V CoolMOS™ P7



R _{DS(on)} [mΩ]	TO-251 (IPAK Short Lead)	TO-220 FullPAK	TO-252 (DPAK)	TO-220 FullPAK narrow lead	TO-251 (IPAK Short Lead w/ ISO Standoff)	SOT-223	ThinPAK 5x6
360	IPS70R360P7S	IPA70R360P7S	IPD70R360P7S	IPAN70R360P7S	IPSA70R360P7S	IPN70R360P7S	
450		IPA70R450P7S		IPAN70R450P7S	IPSA70R450P7S	IPN70R450P7S	
600	IPS70R600P7S	IPA70R600P7S	IPD70R600P7S	IPAN70R600P7S	IPSA70R600P7S	IPN70R600P7S	IPLK70R600P7
750		IPA70R750P7S		IPAN70R750P7S	IPSA70R750P7S	IPN70R750P7S	IPLK70R750P7
900	IPS70R900P7S	IPA70R900P7S	IPD70R900P7S	IPAN70R900P7S	IPSA70R900P7S	IPN70R900P7S	IPLK70R900P7
1200					IPSA70R1K2P7S	IPN70R1K2P7S	IPLK70R1K2P7
1400	IPS70R1K4P7S		IPD70R1K4P7S		IPSA70R1K4P7S	IPN70R1K4P7S	IPLK70R1K4P7
2000					IPSA70R2K0P7S	IPN70R2K0P7S	IPLK70R2K0P7

700 V CoolMOS™ CE



R _{DS(on)} [mΩ]	TO-220 FullPAK Wide Creepage	TO-262 (IPAK)	TO-251 (IPAK Short Lead with ISO Standoff)	TO-252 (DPAK)	TO-251 (IPAK Short Lead)	SOT-223
600	IPAW70R600CE		IPSA70R600CE	IPD70R600CE		
950	IPAW70R950CE	IP170R950CE	IPSA70R950CE	IPD70R950CE	IPS70R950CE	
1000						IPN70R1K0CE
1400			IPSA70R1K4CE	IPD70R1K4CE	IPS70R1K4CE	
1500						IPN70R1K5CE
2000			IPSA70R2K0CE	IPD70R2K0CE	IPS70R2K0CE	
2100						IPN70R2K1CE

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650 V CoolMOS™ C7 Gold (G-series)



$R_{DS(on)}$ [mΩ]	TO-Leadless (TOLL)
33	IPT65R033G7
105	IPT65R105G7
195	IPT65R195G7

650 V CoolMOS™ C7



$R_{DS(on)}$ [mΩ]	TO-220	TO-263 (D ² PAK)	TO-220 FullPAK	TO-247	TO-247 4-pin	TO-252 (DPAK)	ThinPAK 8x8
19				IPW65R019C7	IPZ65R019C7		
45	IPP65R045C7	IPB65R045C7	IPA65R045C7	IPW65R045C7	IPZ65R045C7		
65	IPP65R065C7	IPB65R065C7	IPA65R065C7	IPW65R065C7	IPZ65R065C7		
70							IPL65R070C7
95	IPP65R095C7	IPB65R095C7	IPA65R095C7	IPW65R095C7	IPZ65R095C7		
99							IPL65R099C7
125	IPP65R125C7	IPB65R125C7	IPA65R125C7	IPW65R125C7			
130							IPL65R130C7
190	IPP65R190C7	IPB65R190C7	IPA65R190C7	IPW65R190C7		IPD65R190C7	
195							IPL65R195C7
225	IPP65R225C7	IPB65R225C7	IPA65R225C7			IPD65R225C7	
230							IPL65R230C7

650 V CoolMOS™ CE



$R_{DS(on)}$ [mΩ]	TO-220 FullPAK	TO-252 (DPAK)	TO-251 (IPAK)	TO-251 (IPAK Short Lead)	SOT-223	TO-220 FullPAK Narrow Lead
400	IPA65R400CE	IPD65R400CE		IPS65R400CE		
650	IPA65R650CE	IPD65R650CE		IPS65R650CE		IPAN65R650CE
1000	IPA65R1K0CE	IPD65R1K0CE		IPS65R1K0CE		
1500	IPA65R1K5CE	IPD65R1K5CE			IPN65R1K5CE	

650 V CoolMOS™ CFD2



$R_{DS(on)}$ [mΩ]	TO-220	TO-262 (I ² PAK)	TO-263 (D ² PAK)	TO-220 FullPAK	TO-247	TO-252 (DPAK)	ThinPAK 8x8
41					IPW65R041CFD		
80					IPW65R080CFD		
110	IPP65R110CFD		IPB65R110CFD	IPA65R110CFD	IPW65R110CFD		
150	IPP65R150CFD		IPB65R150CFD	IPA65R150CFD	IPW65R150CFD		
165							IPL65R165CFD
190	IPP65R190CFD	IPB65R190CFD	IPB65R190CFD	IPA65R190CFD	IPW65R190CFD		
210							IPL65R210CFD
310	IPP65R310CFD		IPB65R310CFD	IPA65R310CFD			
340							IPL65R340CFD
420	IPP65R420CFD			IPA65R420CFD	IPW65R420CFD	IPD65R420CFD	
660				IPA65R660CFD		IPD65R660CFD	
950						IPD65R950CFD	
1400						IPD65R1K4CFD	

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600 V CoolMOS™ C7 Gold (G-series)

R _{DS(on)} [mΩ]	TO -220	TO-Leadless (TOLL)		QDPAK TSC	QDPAK BSC
10			IPW60R010S7	IPDQ60R010S7	IPQC60R010S7*
17			IPW60R017S7		IPQC60R017S7*
22	IPP60R022S7	IPT60R022S7	IPW60R022S7	IPDQ60R022S7*	IPQC60R022S7*
40	IPP60R040S7*	IPT60R040S7	IPW60R040S7	IPDQ60R040S7*	IPQC60R040S7*
65	IPP60R065S7*	IPT60R065S7	IPW60R065S7	IPDQ60R065S7*	

600 V CoolMOS™ P7

Industrial grade

R _{DS(on)} [mΩ]	TO -220	TO-220 FullPAK	TO-247	TO-247 4-pin Metric leads	Charger	Adapter	Lighting	TV	PC Power	Solar	LSEV	Server	Telecom	EV charger
24			IPW60R024P7											
37			IPW60R037P7	IPZA60R037P7										
45			IPW60R045P7	IPZA60R045P7										IPB60R045P7
60	IPP60R060P7	IPA60R060P7	IPW60R060P7	IPZA60R060P7										IPB60R060P7
65											IPL60R065P7			
80	IPP60R080P7	IPA60R080P7	IPW60R080P7	IPZA60R080P7							IPL60R085P7			IPB60R080P7
99	IPP60R099P7	IPA60R099P7	IPW60R099P7	IPZA60R099P7										IPB60R099P7
105											IPL60R105P7			
120	IPP60R120P7	IPA60R120P7	IPW60R120P7	IPZA60R120P7										IPB60R120P7
125											IPL60R125P7			
160	IPP60R160P7	IPA60R160P7												
180	IPP60R180P7	IPA60R180P7	IPW60R180P7	IPZA60R180P7	IPD60R180P7									IPB60R180P7
185											IPL60R185P7			
280	IPP60R280P7	IPA60R280P7			IPD60R280P7									IPB60R280P7
285											IPL60R285P7			
360	IPP60R360P7	IPA60R360P7			IPD60R360P7									IPB60R360P7
365											IPL60R365P7			
600	IPP60R600P7	IPA60R600P7			IPD60R600P7									

600 V CoolMOS™ P7

Standard grade



R _{DS(on)} [mΩ]	TO-220 FullPAK	TO-220 FullPAK Narrow lead	TO-252 (DPAK)	TO-220 FullPAK Wide Creepage	SOT-223
180	IPA60R180P7S	IPAN60R180P7S	IPD60R180P7S	IPAW60R180P7S	
280	IPA60R280P7S	IPAN60R280P7S	IPD60R280P7S	IPAW60R280P7S	
360	IPA60R360P7S	IPAN60R360P7S	IPD60R360P7S	IPAW60R360P7S	IPN60R360P7S
600	IPA60R600P7S	IPAN60R600P7S	IPD60R600P7S	IPAW60R600P7S	IPN60R600P7S

950 V CoolMOS PFD7



R _{DS(on)} [mΩ]	TO-220 FullPAK	TO247	TO252 DPAK
60		IPW95R60PFD7*	
130	IPA95R130PFD7*	IPW95R130PFD7*	
310	IPA95R310PFD7*	IPW95R310PFD7*	
450	IPA95R450PFD7*		IPD95R450PFD7*



600 V CoolMOS™ CFD7

R _{DS(on)} [mΩ]	TO-220	TO-263 (D ² PAK)	TO-220 FullIPAK	TO-247	TO-252 (DPAK)	ThinPAK 8x8	DDPAK	TO-Leadless (TOLL)
18				IPW60R018CFD7				
24				IPW60R024CFD7				
31/35				IPW60R31CFD7				IPT60R035CFD7*
40/45		IPB60R040CFD7		IPW60R40CFD7			IPDD60R045CFD7*	IPT60R045CFD7*
55		IPB60R055CFD7		IPW60R55CFD7			IPDD60R055CFD7*	IPT60R055CFD7*
60						IPL60R060CFD7		
70	IPP60R70CFD7	IPB60R70CFD7		IPW60R70CFD7				
75						IPL60R75CFD7	IPDD60R075CFD7*	IPT60R075CFD7*
90/95	IPP60R90CFD7	IPB60R090CFD7		IPW60R90CFD7		IPL60R095CFD7	IPDD60R090CFD7*	IPT60R090CFD7*
105/115	IPP60R105CFD7	IPB60R105CFD7		IPW60R105CFD7		IPL60R115CFD7	IPDD60R105CFD7*	IPT60R105CFD7*
125/140	IPP60R125CFD7	IPB60R125CFD7	IPA60R125CFD7	IPW60R125CFD7		IPL60R140CFD7	IPDD60R125CFD7*	IPT60R125CFD7*
145/160	IPP60R145CFD7	IPB60R145CFD7	IPA60R145CFD7	IPW60R145CFD7	IPD60R145CFD7	IPL60R160CFD7	IPDD60R145CFD7*	IPT60R145CFD7*
170	IPP60R170CFD7	IPB60R170CFD7	IPA60R170CFD7	IPW60R170CFD7	IPD60R170CFD7		IPDD60R170CFD7*	
185						IPL60R185CFD7		
210/225	IPP60R210CFD7	IPB60R210CFD7	IPA60R210CFD7		IPD60R210CFD7	IPL60R225CFD7		
280	IPP60R280CFD7	IPB60R280CFD7	IPA60R280CFD7		IPD60R280CFD7			
360	IPP60R360CFD7	IPB60R360CFD7	IPA60R360CFD7		IPD60R360CFD7			

650 V CoolMOS™ CFD7

R _{DS(on)} [mΩ]	TO-220	TO-247	TO247-4	TO-263 D ² PAK	ThinPAK 8x8	TOLL	QDPAK
17/18		IPW65R018CFD7	IPZA65R018CFD7				IPDQ65R017CFD7
29		IPW65R029CFD7	IPZA65R029CFD7				IPDQ65R029CFD7
40/41	IPP65R041CFD7	IPW65R041CFD7		IPB65R041CFD7		IPT65R040CFD7	IPDQ65R040CFD7
60/65w	IPP65R060CFD7	IPW65R060CFD7			IPL65R065CFD7	IPT65R060CFD7	IPDQ65R060CFD7
80						IPT65R080CFD7	IPDQ65R080CFD7
90/95/99	IPP65R090CFD7	IPW65R090CFD7		IPB65R090CFD7	IPL65R095CFD7	IPT65R099CFD7	IPDQ65R099CFD7
110/115	IPP65R110CFD7	IPW65R110CFD7		IPB65R110CFD7	IPL65R115CFD7		
125/130		IPW65R125CFD7		IPB65R125CFD7	IPL65R130CFD7	IPT65R125CFD7	IPDQ65R125CFD7
155/160	IPP65R155CFD7	IPW65R155CFD7		IPB65R155CFD7	IPL65R160CFD7	IPT65R155CFD7	
190/200	IPP65R190CFD7				IPL65R200CFD7	IPT65R190CFD7	



600 V CoolMOS™ C7 Gold (G-series)

$R_{DS(on)}$ [mΩ]	TO-Leadless (TOLL)	Double DPAK
28	IPT60R028G7	
50	IPT60R050G7	IPDD60R050G7
80	IPT60R080G7	IPDD60R080G7
102	IPT60R102G7	IPDD60R102G7
125	IPT60R125G7	IPDD60R125G7
150	IPT60R150G7	IPDD60R150G7
190		IPDD60R190G7



600 V CoolMOS™ C7

$R_{DS(on)}$ [mΩ]	TO-220	TO-263 (D ² PAK)	TO-220 FullPAK	TO-247	TO-247 4-pin	TO-252 (DPAK)	ThinPAK 8x8
17				IPW60R017C7	IPZ60R017C7		
40	IPP60R040C7	IPB60R040C7		IPW60R040C7	IPZ60R040C7		
60	IPP60R060C7	IPB60R060C7	IPA60R060C7	IPW60R060C7	IPZ60R060C7		
65							IPL60R065C7
99	IPP60R099C7	IPB60R099C7	IPA60R099C7	IPW60R099C7	IPZ60R099C7		
104							IPL60R104C7
120	IPP60R120C7	IPB60R120C7	IPA60R120C7	IPW60R120C7			
125							IPL60R125C7
180	IPP60R180C7	IPB60R180C7	IPA60R180C7	IPW60R180C7		IPD60R180C7	
185							IPL60R185C7



600 V CoolMOS™ P6

$R_{DS(on)}$ [mΩ]	TO-220	TO-220 FullPAK	TO-247	TO-247 4-pin	TO-252 (DPAK)	ThinPAK 5x6	ThinPAK 8x8
41			IPW60R041P6				
70			IPW60R070P6	IPZ60R070P6			
99	IPP60R099P6	IPA60R099P6	IPW60R099P6	IPZ60R099P6			
125	IPP60R125P6	IPA60R125P6	IPW60R125P6				
160	IPP60R160P6	IPA60R160P6	IPW60R160P6				
180							IPL60R180P6
190	IPP60R190P6	IPA60R190P6	IPW60R190P6				
210							IPL60R210P6
230		IPA60R230P6					
255							
280	IPP60R280P6	IPA60R280P6	IPW60R280P6				
330/360						IPL60R360P6S	
380		IPA60R380P6			IPD60R380P6		
600		IPA60R600P6			IPD60R600P6		
650						IPL60R650P6S	

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600 V CoolMOS™ PFD7



R _{DS(on)} [mΩ]	TO-220 FullPAK Narrow Leads	TO-251 (IPAK Short Lead)	TO-252 (DPAK)	SOT-223	ThinPAK 5x6
125	IPAN60R125PFD7S				
210	IPAN60R210PFD7S	IPS60R210PFD7S	IPD60R210PFD7S		
280	IPAN60R280PFD7S	IPS60R280PFD7S	IPD60R280PFD7S		
360	IPAN60R360PFD7S	IPS60R360PFD7S	IPD60R360PFD7S	IPN60R360PFD7S	IPLK60R360PFD7
600		IPS60R600PFD7S	IPD60R600PFD7S	IPN60R600PFD7S	IPLK60R600PFD7
1000		IPS60R1K0PFD7S	IPD60R1K0PFD7S	IPN60R1K0PFD7S	IPLK60R1K0PFD7
1500			IPD60R1K5PFD7S	IPN60R1K5PFD7S	IPLK60R1K5PFD7
2000			IPD60R2K0PFD7S	IPN60R2K0PFD7S	

600 V CoolMOS™ CE



R _{DS(on)} [mΩ]	TO-220 FullPAK	TO-220 FullPAK Wide Creepage	TO-252 (DPAK)	TO-251 (IPAK)	TO-251 (IPAK Short Lead)	SOT-223	TO-220 FullPAK Narrow Lead
190		IPAW60R190CE					
280		IPAW60R280CE					
380		IPAW60R380CE					
400	IPA60R400CE		IPD60R400CE		IPS60R400CE		
460	IPA60R460CE		IPD60R460CE		IPS60R460CE		
600		IPAW60R600CE					
650	IPA60R650CE		IPD60R650CE		IPS60R650CE		IPAN60R650CE
800			IPD60R800CE		IPS60R800CE		IPAN60R800CE
1000	IPA60R1K0CE		IPD60R1K0CE	IPU60R1K0CE	IPS60R1K0CE	IPN60R1K0CE	
1500	IPA60R1K5CE		IPD60R1K5CE	IPU60R1K5CE	IPS60R1K5CE	IPN60R1K5CE	
2100			IPD60R2K1CE	IPU60R2K1CE	IPS60R2K1CE	IPN60R2K1CE	
3400			IPD60R3K4CE		IPS60R3K4CE	IPN60R3K4CE	

500 V CoolMOS™ CE



R _{DS(on)} [mΩ]	TO-220	TO-220 FullPAK	TO-252 (DPAK)	SOT-223	TO-220 FullPAK Narrow Lead
190	IPP50R190CE	IPA50R190CE			
280	IPP50R280CE	IPA50R280CE	IPD50R280CE		
380	IPP50R380CE	IPA50R380CE	IPD50R380CE		
500		IPA50R500CE	IPD50R500CE		IPAN50R500CE
650			IPD50R650CE	IPN50R650CE	
800		IPA50R800CE	IPD50R800CE	IPN50R800CE	
950		IPA50R950CE	IPD50R950CE	IPN50R950CE	
1400			IPD50R1K4CE	IPN50R1K4CE	
2000			IPD50R2K0CE	IPN50R2K0CE	
3000			IPD50R3K0CE	IPN50R3K0CE	

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CoolMOS™ SJ MOSFET automotive portfolio

800 V CoolMOS™ C3A



$R_{DS(on)}$ @ $T_J = 25^\circ\text{C}$ $V_{GS} = 10\text{ V}$ [mΩ]	TO-247	TO-252	TO-263
290	IPW80R290C3A		IPB80R290C3A
2700		IPD80R2K7C3A	

650 V CoolMOS™ CFDA



$R_{DS(on)}$ @ $T_J = 25^\circ\text{C}$ $V_{GS} = 10\text{ V}$ [mΩ]	TO-220	TO-247	TO-252	TO-263
48		IPW65R048CFDA		
80		IPW65R080CFDA		
110	IPP65R110CFDA	IPW65R110CFDA		IPB65R110CFDA
150	IPP65R150CFDA	IPW65R150CFDA		IPB65R150CFDA
190	IPP65R190CFDA	IPW65R190CFDA		IPB65R190CFDA
310	IPP65R310CFDA			IPB65R310CFDA
420			IPD65R420CFDA	
660			IPD65R660CFDA	IPB65R660CFDA

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650 V CoolMOS™ CFD7A



$R_{DS(on)}$ @ $T_J = 25^\circ\text{C}$ $V_{GS} = 10\text{ V}$ [mΩ]	TO-220	TO-247	TO-247 Short lead	TO-263-3 D ² PAK 3-pin	TO-263-7 D ² PAK 7-pin
22		IPW65R022CFD7A	IPWS65R022CFD7A		
35		IPW65R035CFD7A	IPWS65R035CFD7A		
50	IPP65R050CFD7A	IPW65R050CFD7A	IPWS65R050CFD7A	IPB65R050CFD7A	IPBE65R050CFD7A
75	IPP65R075CFD7A	IPW65R075CFD7A	IPWS65R075CFD7A	IPB65R075CFD7A	IPBE65R075CFD7A
99	IPP65R099CFD7A	IPW65R099CFD7A		IPB65R099CFD7A	IPBE65R099CFD7A
115	IPP65R115CFD7A	IPW65R115CFD7A		IPB65R115CFD7A	IPBE65R115CFD7A
145	IPP65R145CFD7A	IPW65R145CFD7A		IPB65R145CFD7A	IPBE65R145CFD7A
190	IPP65R190CFD7A	IPW65R190CFD7A		IPB65R190CFD7A	IPBE65R190CFD7A
230				IPB65R230CFD7A	IPBE65R230CFD7A

600 V CoolMOS™ CPA



$R_{DS(on)}$ @ $T_J = 25^\circ\text{C}$ $V_{GS} = 10\text{ V}$ [mΩ]	TO-220	TO-247	TO-262	TO-263
45		IPW60R045CPA		
75		IPW60R075CPA		
99	IPP60R099CPA	IPW60R099CPA	IPI60R099CPA	IPB60R099CPA
199				IPB60R199CPA
299				IPB60R299CPA

600 V CoolMOS™ S7A



$R_{DS(on)}$ @ $T_J = 25^\circ\text{C}$ $V_{GS} = 10\text{ V}$ [mΩ]	QDPAK TSC	QDPAK BSC	TO-247-3
40	IPDQ60R040S7A	IPQC60R040S7A	IPW60R040S7A
22	IPDQ60R022S7A	IPQC60R022S7A	IPW60R022S7A
17	IPDQ60R017S7A	IPQC60R017S7A	IPW60R017S7A
10	IPDQ60R010S7A	IPQC60R010S7A	IPW60R010S7A

Wide bandgap semiconductors

Gallium nitride (GaN) and silicon carbide (SiC)








The key to the next essential step towards an energy-efficient world is the use of new materials, such as wide bandgap semiconductors that allow for greater power efficiency, smaller size, lighter weight, lower overall cost – or all of these together. As the leading and trusted power supplier, Infineon is offering the broadest product and technology portfolio of silicon (Si) and wide bandgap (WBG) solutions with more than 40 years of heritage in silicon, and several decades of heritage in wide bandgap technology development.

CoolGaN™ – ultimate efficiency and reliability

Compared to silicon (Si), the breakdown field of Infineon's CoolGaN™ GIT HEMTs (e-mode) is ten times higher and the electron mobility is double. Both the output charge and gate charge are ten times lower than with Si and the reverse recovery charge is almost zero which is key to high-frequency operations. GaN is the best-suited technology in hard-switching as well as resonant topologies, and is enabling new approaches in current modulation. Infineon's GaN solution is based on the most robust and performing concept in the market – the enhancement-mode concept - offering fast turn-on and turn-off speed. CoolGaN™ products focus on high performance and robustness, and add significant value to a broad variety of systems across many applications such as server, telecom, hyperscale data centers, wireless charging, adapter/charger, and audio. CoolGaN™ switches are easy to design-in with the matching EiceDRIVER™ gate driver ICs optimized for CoolGaN™ 600 V from Infineon.

CoolSiC™ - revolution to rely on

Silicon carbide (SiC) has a wide bandgap of 3 electronvolts (eV) and a much higher thermal conductivity compared to silicon. SiC-based MOSFETs are best-suited for high-breakdown, high-power applications that operate at higher frequencies compared to traditional IGBTs. CoolSiC™ MOSFETs come along with a fast internal freewheeling diode, thus making hard commutation without additional diode chips possible. Due to its unipolar character, the MOSFETs show very low, temperature-independent switching and low conduction losses, especially under partial load conditions. Based on proven, high-quality volume manufacturing, Infineon's silicon carbide solutions combine revolutionary technology with benchmark reliability – for our customers' success today and tomorrow. The offering is completed by EiceDRIVER™ SiC MOSFET gate driver ICs based on Infineon's successful coreless transformer technology.

CoolSiC™ MOSFET 650 V		      	
$R_{DS(on)}$ max. [mΩ]	$R_{DS(on)}$ typ. [mΩ]	TO-247 4-pin	TO-247
34	27	IMZA65R027M1H	IMW65R027M1H
42	30	IMZA65R030M1H	IMW65R030M1H
50	39	IMZA65R039M1H	IMW65R039M1H
64	48	IMZA65R048M1H	IMW65R048M1H
74	57	IMZA65R057M1H	IMW65R057M1H
94	72	IMZA65R072M1H	IMW65R072M1H
111	83	IMZA65R083M1H	IMW65R083M1H
142	107	IMZA65R107M1H	IMW65R107M1H

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CoolSiC™ Schottky diodes 650 V G6



I_F [A]	TO-220 R2L	Double DPAK
4	IDH04G65C6	IDDD04G65C6
6	IDH06G65C6	IDDD06G65C6
8	IDH08G65C6	IDDD08G65C6
10	IDH10G65C6	IDDD10G65C6
12	IDH12G65C6	IDDD12G65C6 *
16	IDH16G65C6	IDDD16G65C6
20	IDH20G65C6	IDDD20G65C6

CoolSiC™ Schottky diodes 650 V G5



I_F [A]	TO-220 R2L	TO-247 Dual Die	TO-247	D ² PAK R2L	ThinPAK 8x8
2	IDH02G65C5			IDK02G65C5	IDL02G65C5
3	IDH03G65C5			IDK03G65C5	
4	IDH04G65C5			IDK04G65C5	IDL04G65C5
5	IDH05G65C5			IDK05G65C5	
6	IDH06G65C5			IDK06G65C5	IDL06G65C5
8	IDH08G65C5			IDK08G65C5	IDL08G65C5
9	IDH09G65C5			IDK09G65C5	
10	IDH10G65C5		IDW10G65C5	IDK10G65C5	IDL10G65C5
12	IDH12G65C5		IDW12G65C5	IDK12G65C5	IDL12G65C5
16	IDH16G65C5		IDW16G65C5		
20	IDH20G65C5	IDW20G65C5B	IDW20G65C5		
24		IDW24G65C5B			
30/32		IDW32G65C5B	IDW30G65C5		
40		IDW40G65C5B	IDW40G65C5		

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„B“ in product name refers to dual die
with the common-cathode configuration.



CoolSiC™ Schottky diodes 600 V G3



I_F [A]	TO-220 R2L	DPAK R2L
3	IDH03SG60C	IDD03SG60C
4	IDH04SG60C	IDD04SG60C
5	IDH05SG60C	IDD05SG60C
6	IDH06SG60C	IDD06SG60C
8	IDH08SG60C	IDD08SG60C
9	IDH09SG60C	IDD09SG60C
10	IDH10SG60C	IDD10SG60C
12	IDH12SG60C	

CoolSiC™ automotive MOSFET 750 V



$R_{DS(on)}$ max. @25°C TJ [mΩ]	$R_{DS(on)}$ typ. @25°C TJ [mΩ]	QDPAK TSC	(D ² PAK) TO263-7	TO247-4	QDPAK BSC
11	8	AIMDQ75R008M1H*		AIMZA75R008M1H*	AIMQC75R008M1H*
23	17	AIMDQ75R017M1H*	AIMBG75R017M1H*	AIMZA75R017M1H*	AIMQC75R017M1H*
30	22	AIMDQ75R022M1H*	AIMBG75R022M1H*	AIMZA75R022M1H*	AIMQC75R022M1H*
43	32	AIMDQ75R032M1H*	AIMBG75R032M1H*	AIMZA75R032M1H*	AIMQC75R032M1H*
57	42	AIMDQ75R042M1H*	AIMBG75R042M1H*	AIMZA75R042M1H*	AIMQC75R042M1H*
86	63	AIMDQ75R063M1H*	AIMBG75R063M1H*	AIMZA75R063M1H*	AIMQC75R063M1H*
128	95	AIMDQ75R095M1H*	AIMBG75R095M1H*	AIMZA75R095M1H*	AIMQC75R095M1H*
197	146	AIMDQ75R146M1H*	AIMBG75R146M1H*	AIMZA75R146M1H*	AIMQC75R146M1H*

CoolGaN™ portfolio

CoolGaN™ GIT HEMTs 400 V



Package	HSOF-8-3 (TO-Leadless)
$R_{DS(on)}$ P_{max}	up to 200 W
70 mΩ	IGT40R070D1

CoolGaN™ GIT HEMTs 600 V



Package	DSO-20-85 Bottom-side cooling	DSO-20-87 Top-side cooling	HSOF-8-3 TO-Leadless	HDSOP-16-3 TOLT	LSON-8-1 DFN 8x8	TSON-8-3 ThinPAK 5x6
$R_{DS(on)}$						
42 mΩ	IGO60R042D1*	IGOT60R042D1*	IGT60R042D1*			
70 mΩ	IGO60R070D1	IGOT60R070D1	IGT60R070D1	IGLT60R070D1*	IGLD60R070D1	
190 mΩ			IGT60R190D1S	IGLT60R190D1*	IGLD60R190D1 IGLD60R190D1S*	IGLR60R190D1*
260 mΩ						IGLR60R260D1*
340 mΩ						IGLR60R340D1*

Infineon's CoolGaN™ devices, driven by single-channel isolated gate driver ICs from the EiceDRIVER™ GaN family, aim to unlock the full potential of GaN technology.

CoolGaN™ IPS 600 V half-bridge / single-channel



Package	8x8 mm QFN-28	8x8 mm QFN-21
$R_{DS(on)}$ typ.		
100 mΩ		IGI60F100A1L*
140 mΩ	IGI60F141A1L	IGI60F140A1L*
200 mΩ	IGI60F2020A1L*	IGI60F200A1L*
270 mΩ	IGI60F2727A1L*	IGI60F270A1L*
500 mΩ	IGI60F5050A1L*	

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Published by
Infineon Technologies Austria AG
9500 Villach, Austria

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Document number: B152-I0850-V3-7600-EU-EC-P
Date: 06 / 2022

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