

Renesas MPUs & MCUs

V850 MCU Selection Guide



High-Performance

Device				Memory				Clock		I/O	Bus	Timer						Serial Interface										OC	Peripheral Functions				Other									
Applications	CPU core	Commercial name	Product name	ROM size [kB]	ROM type	Single voltage flash	RAM size [kB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850ES	V850ES/HE3	μPD70F3747	128	Flash	√	8	32	8 M, 240 k	√	51	—/—	7	—	—	1	1	16 bits × 8 (6 phases, 16 bits × 1)	—	2	—	—	—	—	2	—	—	—	1	—	—	—	—	√	—	—	10	—	POC, LVI, CLM, DMA	3.7 to 5.5	64-LQFP (10 × 10)	E1 QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)
		V850ES/HF3	μPD70F3750	256	Flash	√	16	32	8 M, 240 k	√	67	—/—	7	—	—	1	1	16 bits × 8 (6 phases, 16 bits × 1)	—	2	—	—	—	—	2	—	—	1	—	—	—	—	√	—	—	12	—	POC, LVI, CLM, DMA	3.7 to 5.5	80-LQFP (12 × 12)		
		V850ES/HG3	μPD70F3752	256	Flash	√	16	32	8 M, 240 k	√	84	—/—	8	—	—	1	1	16 bits × 11 (6 phases, 16 bits × 1)	—	3	—	—	—	—	2	—	—	1	—	—	—	—	√	—	—	16	—	POC, LVI, CLM, DMA	3.7 to 5.5	100-LQFP (14 × 14)		
		V850ES/HJ3	μPD70F3755	256	Flash	√	16	32	8 M, 240 k	√	128	16/16	9	—	—	1	1	16 bits × 14 (6 phases, 16 bits × 1)	—	3	—	—	—	—	3	—	—	1	—	—	—	—	√	—	—	24	—	POC, LVI, CLM, DMA	3.7 to 5.5	144-LQFP (20 × 20)		
			μPD70F3757	512		32													16 bits × 14 (6 phases, 16 bits × 1)	4 ^{bits}	—	2 ^{bits}	—	1 ^{bits}	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Note Six UART channels are provided in the μPD70F3757.

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

Device			Memory			Clock		I/O	Bus	Timer							Serial Interface										OC	Peripheral Functions				Other														
Applications	CPU core	Commercial name	Product name	ROM size [kB]	ROM type	Single voltage flash	RAM size [kB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board				
All Flash	V850E1	V850ES/IE2	μPD70F3713	64	Flash	√	6	20	-	-	39	-/-	7	-	-	-	1	16 bits × 6 (6 phases, 16 bits × 1)	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	4+4	-	POC, LVI, CLM	3.5 to 5.5	64-LQFP (14 × 14)	E1 QB-V850ESIX2 (IECUBE)			
			μPD70F3714	128																																										
		V850E/IF3	μPD70F3451	128	Flash	√	8	64	-	-	48	-/-	13	-	-	-	-	1	16 bits × 9 (6 phases, 16 bits × 2)	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	√	-	5+5	4	-	POC, LVI, CLM, DMA, operational amplifier × 4, comparator	3.5 to 5.5	80-LQFP (14 × 14)	E1 QB-V850EIX3 (IECUBE)		
			μPD70F3452	256		12																																								
		V850E/IG3	μPD70F3453	128	Flash	√	8	64	-	-	64	-/-	13	-	-	-	-	1	16 bits × 11 (6 phases, 16 bits × 2)	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	√	-	5+5	8	-	POC, LVI, CLM, DMA, operational amplifier × 4, comparator	3.5 to 5.5	100-LQFP (14 × 14) 100-LQFP (14 × 20) 161-FBGA (10 × 10) Note 2	E1 QB-V850MINIL (MINICUBE) QB-V850EIX3 (IECUBE)			
			μPD70F3454	256		12						Note 1 16/16																																		
		V850E/IG4	μPD70F3913	256	Flash	√	24	100	-	-	67	-/-	13	-	-	-	-	1	16 bits × 13 (6 phases, 16 bits × 2)	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	√	-	4+3	12	-	POC, LVI, CLM, DMA, operational amplifier × 6, comparator	1.5/5.0	100-LQFP (14 × 14) 100-LQFP (14 × 20)	E1 QB-V850MINIL (MINICUBE)		
			μPD70F3914	384																																										
			μPD70F3915	480																																										
		V850E/IH4	μPD70F3916	256	Flash	√	24	100	-	-	80	-/-	13	-	-	-	-	1	16 bits × 13 (6 phases, 16 bits × 2)	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	√	-	4+4	12	-	POC, LVI, CLM, DMA, operational amplifier × 6, comparator	1.5/5.0	128-LQFP (14 × 20)			
			μPD70F3917	384																																										
			μPD70F3918	480																																										
		V850E/IG4-H	μPD70F3919	256	Flash	√	24	100	-	-	63	16/16	13	-	-	-	-	1	16 bits × 10 (6 phases, 16 bits × 1)	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	√	-	4+3	12	-	POC, LVI, CLM, DMA, operational amplifier × 6, comparator, USB 2.0 function	1.5/5.0/3.3	100-LQFP (14 × 14)			
			μPD70F3920	384																																										
			μPD70F3921	480																																										
		V850E/IH4-H	μPD70F3922	256	Flash	√	24	100	-	-	88	16/16	13	-	-	-	-	1	16 bits × 13 (6 phases, 16 bits × 2)	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	√	-	4+4	12	-	POC, LVI, CLM, DMA, operational amplifier × 6, comparator, USB 2.0 function	1.5/5.0/3.3	128-LQFP (14 × 20)			
			μPD70F3923	384																																										
			μPD70F3924	480																																										

Notes 1. μPD70F3454, 14 × 14 mm and 10 × 10 mm packages only.
2. μPD70F3454 only.

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

Notes 1. μ PD70F3824 only.
2. Contains an 8 KB area for data use only.

Remark LVI: Low-voltage detector
CLM: Clock monitor

Device				Memory			Clock		I/O	Bus	Timer							Serial Interface										OC	Peripheral Functions				Other																
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board							
All Flash	V850ES	V850ES/JE3-E	μPD70F3826 *	64	Flash	√	32 ^{bits 1}	50	220 k	√	26	—/—	11	—	Real-time counter	—	1	16 bits × 6	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	√	—	—	10	—	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6	64-LQFP (10 × 10) 64-WQFN (9 × 9)	E1 QB-V850MINIL (MINICUBE) QB-V850ESJX3E (IECUBE)						
			μPD70F3827 *	128			48 ^{bits 1}																																										
			μPD70F3828 *	256			64 ^{bits 1}																																										
			μPD70F3829 *																																														
		V850ES/JF3-E	μPD70F3830 *	64	Flash	√	32 ^{bits 1}	50	220 k	√	42	—/—	11	—	Real-time counter	—	1	16 bits × 7 (6 phases, 16 bits × 1)	—	—	—	1	—	1	2	—	—	—	—	—	—	—	—	—	—	√	—	—	10	—	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6		80-LQFP (12 × 12)					
			μPD70F3831 *	128			48 ^{bits 1}																																										
			μPD70F3832 *	256			64 ^{bits 1}																																										
			μPD70F3833 *																																														
		V850ES/JG3-E	μPD70F3834 *	64	Flash	√	32 ^{bits 1}	50	220 k	√	62	—/—	11	—	Real-time counter	—	1	16 bits × 8 (6 phases, 16 bits × 1)	—	—	—	1	—	1	2	2	—	—	—	—	—	—	—	—	—	√	—	—	10	—	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6		100-LQFP (14 × 14) 121-FBGA (8 × 8) ^{bits 1}					
			μPD70F3835 *	128			48 ^{bits 1}																																										
			μPD70F3836 *	256			64 ^{bits 1}																																										
			μPD70F3837 *																																														
		V850ES/JH3-E	μPD70F3778	256	Flash	√	76 ^{bits 1}	50	220 k	√	84	16/22	13	—	Real-time counter	—	1	16 bits × 12 (6 phases, 16 bits × 1)	—	—	2	2	—	1	3	1	—	—	—	—	—	—	—	—	—	√	—	—	10	—	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6		128-LQFP (14 × 20)					
			μPD70F3779	384																																													
			μPD70F3780	512																																													
			μPD70F3781	384				124 ^{bits 2}																																									
			μPD70F3782	512																																													
			μPD70F3783																																														
		V850ES/JJ3-E	μPD70F3784	512	Flash	√	76 ^{bits 1}	50	220 k	√	100	16/24	13	—	Real-time counter	—	1	16 bits × 13 (6 phases, 16 bits × 1)	—	—	2	4	—	1	3	1	—	—	1	—	—	—	—	—	—	√	—	—	12	—	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6		144-LQFP (20 × 20)					
			μPD70F3785					124 ^{bits 2}																																									
			μPD70F3786																																														

Notes 1. Contains a 16 KB area for data use only.
2. Contains a 64 KB area for data use only.
3. μPD70F3837 only.

* Under development

Remark LVI: Low-voltage detector
CLM: Clock monitor

Device			Memory				Clock		I/O	Bus	Timer				Serial Interface					OCD	Peripheral Functions			Other							
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850E2M	V850E2/MN4	μPD70F3510	1024	Flash	√	64	200	-	-	188	32/26	4 ch × 1 unit	16 ch × 4 units	2	1	1	6	4	6	4	6	-	-	√	12 ^{bits1}	12 ^{bits1}	DMA, USB 2.0 host/function, H-bus shared memory: 64 KB; H-bus memory side cache: 16 KB; DMA dedicated to secondary memory controller, inverter timer support, boundary scan	1.1 to 1.3 (internal) 3.0 to 3.6 (external) 3.0 to 3.6 or 4.5 to 5.5 (analog system)	304-FBGA (19 × 19)	QB-V850MINIL (MINICUBE)
			μPD70F3512																												
			μPD70F3514				64 × 2									2	2														
			μPD70F3515	2048																											
		V850E2/ML4	μPD70F4021 *	768			64				120	4 ch × 1 unit	16 ch × 2 units		1	1	2	2	2	2	-	1	√	12 ^{bits1}	12 ^{bits2}	DMA, USB 2.0 host/function, H-bus shared memory: 64 KB; Ethernet controller, inverter timer support, boundary scan	1.1 to 1.3 (internal) 3.0 to 3.6 (external) 3.0 to 3.6 or 4.5 to 5.5 (analog system)	216-LQFP (24 × 24)	QB-V850MINIL (MINICUBE)		
			μPD70F4022 *	1024			64																								

Notes 1. Only when 5 V analog power supply is used.
2. Only when 3.3 V analog power supply is used.

* Under development

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface										OC	Peripheral Functions				Other								
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
General Purpose (High End)	V850E2	V850E2/ME3	μPD703500	168	RAM	-	32	200	-	-	78	32/26	12	-	-	-	-	16 bits × 8	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	√	-	-	8	-	8 KB instruction cache, 8 KB data cache, USB, DMA	1.4 to 1.65 3.0 to 3.6	176-QFP (24 × 24)	QB-V850MINIL (MINICUBE)
	V850E1	V850E/ME2	μPD703111B-06	128	RAM	-	16	66	-	-	78	32/26	12	-	-	-	-	16 bits × 8	1	-	1	-	-	-	1	-	-	-	-	-	-	-	√	-	-	8	-	8 KB instruction cache, USB, DMA	1.35 to 1.65 3.0 to 3.6	176-LQFP (24 × 24)	QB-V850MINIL (MINICUBE)	
			μPD703111B-10					100																																		
			μPD703111B-13					133																																		
			μPD703111B-15					150																																		
	V850E/MA3	μPD703136BY	Mask	256	Mask	-	8	80	-	-	112	16/26	9	-	-	-	-	1	16 bits × 6 (6 phases, 16 bits × 1)	-	-	3	-	-	-	-	-	-	-	-	-	-	√	-	-	8	-	DMA, ROMC	2.3 to 2.7 3.0 to 3.6	144-LQFP (20 × 20) 161-FBGA (13 × 13)	E1 QB-V850MINIL (MINICUBE) QB-V850EMA3 (IECUBE)	
							16																																			
							32																																			
							16																																			
							32																																			
							Flash																																			√

Remark ROMC: ROM correction

Device				Memory				Clock		I/O	Bus	Timer						Serial Interface										OC	Peripheral Functions					Other									
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size (mm))	In-circuit emulator Emulation board	
Inverter Control	V850E1	V850E/IA3	μPD703183	128	Mask	-	6	64	-	-	50	-/-	8	-	-	-	1	16 bits × 5 (6 phases, 16 bits × 1)	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	12	DMA, ROMC, operational amplifier × 5, comparator	2.3 to 2.7 4.0 to 5.5	80-QFP (14 × 14)	E1 QB-V850EIA4 (IECUBE)		
			μPD70F3184	256	Flash	√	12																																				
		V850E/IA4	μPD703185	128	Mask	-	6	64	-	-	64	-/-	9	-	-	-	1	16 bits × 6 (6 phases, 16 bits × 2)	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	16	DMA, ROMC, operational amplifier × 6, comparator	2.3 to 2.7 4.0 to 5.5	100-LQFP (14 × 14) 100-QFP (14 × 20)	E1 QB-V850MINIL (MINICUBE) QB-V850EIA4 (IECUBE)		
			μPD703186	256			12																																				
			μPD70F3186		Flash	√																													√								
	V850ES	V850ES/IK1	μPD703327	64	Mask	-	4	32	-	-	39	-/-	7	-	-	-	1	16 bits × 6 (6 phases, 16 bits × 1)	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	8	-	POC, LVI, ROMC	3.5 to 5.5	64-LQFP (14 × 14)	E1 QB-V850EIA4 (IECUBE)
			μPD703329	128			6																																				
			μPD70F3329		Flash	√																																					

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
ROMC: ROM correction

		Device		Memory			Clock			I/O	Bus	Timer					Serial Inetrface					OC	Peripheral Functions					Other				
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board	
Car Electronics	V850E2M	V850E2/SG4-H	μPD70F4013 *	1024 ^{KB}	Flash	√	96	160	8 M, 240 k	√	58	16/20	4 ch × 1 unit	16 ch × 1 unit	-	1	2	4	-	2	2	4	1	1	√	-	8	DMA, real-time clock, multiplexed SRAM interface (8/16 bits), IISA interface: 4 ch; PCM interface: 1 ch; MLB: 1 ch; POC (available in M1 products, not available in M2 products), CLM, data CRC, LVI, HBUS-RAM: 32 KB; Data flash: 32 KB; backup RAM: 32 KB; instruction cache: 8 KB/2-way associative (4 KB/way)	1.1 to 1.3 (supplied internally) 3.0 to 3.6 (supplied from I/O)	100-LQFP (14 × 14)	E1 QB-V850MINIL (MINICUBE) QB-V850E2 (IECUBE2)	
			μPD70F4014 *	1536 ^{KB}			128																									
		V850E2/SJ4-H	μPD70F4015 *	1024 ^{KB}	Flash	√	96	160	8 M, 240 k	√	100	16/24	4 ch × 1 unit	16 ch × 1 unit	-	1	2	5	-	2	3	4	1	2	√	-	16	DMA, real-time clock, SDRAM interface, multiplexed/separate SRAM interface (8/16 bits), IISA interface: 4 ch; PCM interface: 2 ch; MLB: 1 ch; POC (available in M1 products, not available in M2 products), CLM, data CRC, LVI, KR, HBUS-RAM: 32 KB; Data flash: 32 KB; backup RAM: 32 KB; instruction cache: 8 KB/2-way associative (4 KB/way)	1.1 to 1.3 (supplied internally) 3.0 to 3.6 (supplied from I/O)	144-LQFP (20 × 20)		
			μPD70F4016 *	1536 ^{KB}			128																									
		V850E2/SK4-H	μPD70F4017	1536 ^{KB}	Flash	√	128	160	8 M, 240 k	√	127	32/24	4 ch × 1 unit	16 ch × 2 units	2	1	2	5	-	2	3	4	1	2	√	-	16	DMA, real-time clock, SDRAM interface, multiplexed/separate SRAM interface (8/16/32 bits), IISA interface: 6 ch; PCM interface: 2 ch; MLB: 1 ch; POC (available in M1 products, not available in M2 products), CLM, data CRC, LVI, KR, HBUS-RAM: 32 KB; Data flash: 32 KB; backup RAM: 32 KB; instruction cache: 8 KB/2-way associative (4 KB/way)	1.1 to 1.3 (supplied internally) 3.0 to 3.6 (supplied from I/O)	176-LQFP (24 × 24)		
			μPD70F4018	2048 ^{KB}			192																									

Note This is the size of the code flash.

* Under development

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

Applications		CPU core	Device		Memory				Clock		I/O	Bus	Timer						Serial Interface										OCD	Peripheral Functions				Other									
			Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-drout emulator Emulation board
Car Electronics Car Multimedia (On-Chip IEBus) (All Flash)	V850E1	V850E/SJ3-H	μPD70F3931B	512	Flash	√	60	48	220 k	√	128	16/24	13	-	Real-time counter	1	1	16 bits × 12	2	1	-	1	2	-	3	1	-	1	2	1	-	-	-	√	-	-	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)	E1 QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)	
			μPD70F3934B	768			76																																				
			μPD70F3937B	1024																																							
			μPD70F3474A	1280			92																																				
			μPD70F3477A	1536																																							
	V850E/SK3-H	μPD70F3925A	1024	Flash	√	76	48	220 k	√	156	16/24	13	-	Real-time counter	1	1	16 bits × 12	2	1	-	2	2	1	3	1	1	2	1	-	-	-	√	-	-	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	176-LQFP (24 × 24)				
		μPD70F3486A	1280			92																																					
		μPD70F3480A	1536																																								

Remark LVI: Low-voltage detector
CLM: Clock monitor
ROMC: ROM correction

		Device		Memory				Clock		I/O	Bus	Timer						Serial Interface										OC	Peripheral Functions				Other										
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board	
Car Electronics Car Multimedia (On-Chip IEBus) (All Flash)	V850ES	V850ES/SG3	μPD70F3333	256	Flash	√	24	32	220 k	√	84	16/22	8	-	-	-	1	1	16 bits × 9	-	-	-	1	-	2	-	3	1	-	-	1	-	-	-	√	-	-	12	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	100-LQFP (14 × 14)	E1 QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)
			μPD70F3334	384			32																																				
			μPD70F3340	512			40																																				
			μPD70F3341	640			48																																				
			μPD70F3342	768			60																																				
			μPD70F3343	1024																																							
		V850ES/SJ3	μPD70F3344	384	Flash	√	32	32	220 k	√	128	16/24	11	-	-	-	1	1	16 bits × 12	-	1	-	1	-	2	-	4	1	-	-	1	-	-	-	√	-	-	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)	
			μPD70F3345	512			40																																				
			μPD70F3346	640			48																																				
			μPD70F3347	768			60																																				
			μPD70F3348	1024																																							

Remark LVI: Low-voltage detector
CLM: Clock monitor
ROMC: ROM correction

Applications		Device		Memory			Clock			I/O	Bus	Timer							Serial Interface										OC	Peripheral Functions					Other													
		CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subdock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board					
Car Electronics	Car Multimedia (On-Chip CAN) (All Flash)	V850ES	V850ES/SG3	μPD70F3335	256	Flash	√	24	32	220 k	√	84	16/22	8	-	-	1	1	16 bits × 9	-	-	-	1	-	2	-	3	1	-	-	-	-	1	-	√	-	-	12	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	100-LQFP (14 × 14)	E1 QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)					
				μPD70F3336	384		32																																									
				μPD70F3350	512		40																																									
				μPD70F3351	640		48																																									
				μPD70F3352	768		60																																									
				μPD70F3353	1024																																											
		V850ES/SJ3	μPD70F3354	384	Flash	√	32	32	220 k	√	128	16/24	11	-	-	1	1	16 bits × 12	-	1	-	1	-	2	-	4	1	-	-	-	-	-	-	1	-	√	-	-	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)					
			μPD70F3355	512		40																																										
			μPD70F3356	640		48																																										
			μPD70F3357	768		60																																										
			μPD70F3358	1024																																												
			μPD70F3364	384		32																																										
			μPD70F3365	512		40																																										
			μPD70F3366	640		48																																										
			μPD70F3367	768		60																																										
			μPD70F3368	1024																																												
	V850E1	V850E/SJ3-H	μPD70F3932B	512	Flash	√	60	48	220 k	√	128	16/24	13	-	Real-time counter	1	1	16 bits × 12	2	1	-	1	-	2	-	3	1	-	1	1	-	-	1	-	√	-	-	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)	E1 QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)					
			μPD70F3933B																																													
			μPD70F3935B	768		76																																										
			μPD70F3936B																																													
			μPD70F3938B	1024																																												
			μPD70F3939B																																													
			μPD70F3475A	1280																																												
			μPD70F3476A																																													
			μPD70F3478A	1536																																												
			μPD70F3479A																																													
		V850E/SK3-H	μPD70F3926A	1024	Flash	√	76	48	220 k	√	156	16/24	13	-	Real-time counter	1	1	16 bits × 12	2	1	-	2	-	2	1	3	1	1	2	1	1	-	-	√	-	-	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	176-LQFP (24 × 24)							
			μPD70F3927A																																													
			μPD70F3487A	1280																																												
			μPD70F3488A																																													
			μPD70F3481A	1536																																												
			μPD70F3482A																																													

Remark LVI: Low-voltage detector
CLM: Clock monitor
ROMC: ROM correction

		Device		Memory			Clock			I/O	Bus	Timer					Serial Interface					OCD	Peripheral Functions			Other						
Applications		CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics	Body Control (All Flash)	V850E2M	V850E2/FG4	μPD70F3548 *	512	Flash	√	48	80	8 M, 240 k	-	66	-	4 ch × 2 units	16 ch × 2 units	1	1	1	5	-	2	1	1	-	2	√	20	-	Data flash: 32 KB Backup RAM: 4 KB/8 KB Instruction cache: 8 KB/2-way associative (4 KB/way) DMA, motor control, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	100-LQFP (14 × 14)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
				μPD70F3549 *	768			64																								
				μPD70F3550 *	1024			80																								
				μPD70F4000 ^{Note *}	512			48																								
				μPD70F4001 ^{Note *}	768			64																								
				μPD70F4002 ^{Note *}	1024			80																								
			V850E2/FJ4	μPD70F3551 *	512	Flash	√	48	80	8 M, 240 k	√	103	-	4 ch × 2 units	16 ch × 6 units	1	1	2	6	-	2	2	1	-	3	√	24	-	Data flash: 32 KB/64 KB Backup RAM: 4 KB/8 KB/16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU (μPD70F3554, 70F4006 only) DMA, motor control, POC, PMC, DLY, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	144-HLQFP (20 × 20)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
				μPD70F3552 *	768			64																								
				μPD70F3553 *	1024			80																								
				μPD70F3554 *	1536			112																								
				μPD70F4003 ^{Note *}	512			48																								
				μPD70F4004 ^{Note *}	768			64																								
			V850E2/IFK4	μPD70F3555 *	768	Flash	√	64	80	8 M, 240 k	√	128	16/22	4 ch × 2 units	16 ch × 7 units	1	1	2	8	-	2	3	1	-	4	√	40	-	Data flash: 32 KB/64 KB Backup RAM: 8 KB/16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU (μPD70F3557, 70F3558, 70F4009, 70F4010 only) MEMC, DMA, motor control, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	176-HLQFP (24 × 24)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
				μPD70F3556 *	1024			80																								
				μPD70F3557 *	1536			112																								
				μPD70F3558 *	2048			144																								
				μPD70F4007 ^{Note *}	768			64																								
				μPD70F4008 ^{Note *}	1024			80																								
		V850E2/FL4	μPD70F3559 *	1536	Flash	√	112	80	8 M, 240 k	√	158	16/22	4 ch × 2 units	16 ch × 8 units	1	1	2	12	-	2	3	1	-	4	√	48	-	Data flash: 64 KB Backup RAM: 16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, MEMC, DMA, motor control, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	208-QFP (28 × 28), 256-BGA (21 × 21)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)	
			μPD70F3560 *	2048			144																									
			μPD70F4011 ^{Note *}	1536			112																									
			μPD70F4012 ^{Note *}	2048			144																									

Note Contains a FlexRay controller.

* Under development

Remark POC: Power-on clear circuit; CLM: Clock monitor; FLX: FLEXRay controller; MEMC: External memory interface; PMC: PWM diagnostic module; DLY: PWM delay unit; RNG: Random number generator

Device			Memory				Clock			I/O	Bus	Timer						Serial Interface						OCD	Peripheral Functions				Other			
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board	
Car Electronics	V850E2S	V850E2/FE4-L	μPD70F3570 *	256	Flash	√	24	48	8 M, 240 k	-	45	-	4 ch × 1 unit	16 ch × 1 unit	-	1	2	2	-	2	-	1	-	1	√	-	12	Data flash: 32 KB Backup RAM: 4 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	64-LQFP (10 × 10)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)	
			μPD70F3571 *	384			28																									
			μPD70F3572 *	512			32																									
		V850E2/FF4-L	μPD70F3573 *	256	Flash	√	24	48	8 M, 240 k	-	61	-	4 ch × 1 unit	16 ch × 1 unit	-	1	2	2	-	2	-	1	-	1	√	-	14	Data flash: 32 KB Backup RAM: 4 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	80-LQFP (12 × 12)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)	
			μPD70F3574 *	384			28																									
			μPD70F3575 *	512			32																									
		V850E2/FG4-L	μPD70F3576 *	256	Flash	√	24	48	8 M, 240 k	-	76	-	4 ch × 1 unit	16 ch × 1 unit	-	1	2	3	-	3	-	1	-	2	√	-	20	Data flash: 32 KB Backup RAM: 4 KB/8 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	100-LQFP (14 × 14)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)	
			μPD70F3577 *	384			28																									
			μPD70F3578 *	512			32																									
			μPD70F3579 *	768			48																									64
			μPD70F3580 *	1024			64																									
		V850E2/FJ4-L	μPD70F3582 *	384	Flash	√	28	48	8 M, 240 k	-	116	-	4 ch × 1 unit	16 ch × 2 units	-	1	2	3	-	3	-	1	-	2	√	-	24	Data flash: 32 KB Backup RAM: 4 KB/8 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	144-LQFP (20 × 20)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)	
			μPD70F3583 *	512			32																									
			μPD70F3584 *	768			48																									64
			μPD70F3585 *	1024			64																									

Remark POC: Power-on clear circuit
CLM: Clock monitor

* Under development

		Device		Memory			Clock			I/O	Bus	Timer					Serial Interface					OCD	Peripheral Functions				Other					
Applications		CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics	Body Control, Advanced Function (All Flash)	V850E2M	V850E2/FK4-H	μPD70F3561 *	2048	Flash	√	144	160	8 M, 240 k	√	131	16/22	4 ch × 2 units	16 ch × 7 units	√	1	2	12	-	2	3	1	-	4	√	40	-	Data flash: 64 KB Backup RAM: 16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, MEMC, DMA, DCAN, motor control, ETH, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan, FLX	3.0 to 5.5	176-HLQFP (24 × 24)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			V850E2/FL4-H	μPD70F3564 *	2048	Flash	√	144	160	8 M, 240 k	√	161	16/22	4 ch × 2 units	16 ch × 8 units	√	1	2	12	-	3	3	1	-	5	√	48	-	Data flash: 64 KB Backup RAM: 16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, MEMC, DMA, DCAN, motor control, ETH, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan, FLX	3.0 to 5.5	208-QFP (28 × 28), 272-BGA (21 × 21)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
	Body Control, Motor Control (All Flash)	V850E2/FF4-M	μPD70F3543 *	256	Flash	√	32	80	8 M, 240 k	-	49	-	4 ch × 1 unit	16 ch × 2 units	1	1	2	3	-	2	-	1	-	1	√	12	-	Data flash: 32 KB Backup RAM: 4 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, DMA, motor control, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	80-LQFP (12 × 12)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)	
			μPD70F3544 *	384		40																										
			μPD70F3545 *	512		48																										
Body Control (All Flash)	V850E2/FK4-G	μPD70F3592 *	1024	Flash	√	128	80	8 M, 240 k	√	136	-	4 ch × 2 units	16 ch × 2 units	-	1	2	5	-	2	1	1	-	6	√	24+12	-	Data flash: 32 KB Backup RAM: 8 KB Instruction cache: 8 KB/2-way associative (4 KB/way) DMA, POC, voltage comparator, CLM, RNG, data CRC, boundary scan, FLX	3.0 to 5.5	176-HLQFP (24 × 24)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)		

Remark POC: Power-on clear circuit; CLM: Clock monitor; FLX: FLexRay controller; MEMC: External memory interface; DCAN: Diagnostic CAN; PMC: PWM diagnostic module; ETH: Ethernet controller; DLY: PWM delay unit; RNG: Random number generator

* Under development

		Device			Memory			Clock		I/O	Bus	Timer						Serial Interface										OC	Peripheral Functions				Other													
Applications		CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board			
Car Electronics Body Control (All Flash)	V850ES	V850ES/FE3	μPD70F3370A	128	Flash	√	8	32	8 M, 240 k	√	51	—/—	7	—	—	—	1	1	16 bits × 8 (6 phases, 16 bits × 1)	—	2	—	—	—	—	2	—	—	1	—	1	—	—	√	—	—	10	—	POC, LVI, CLM, DMA	3.3 to 5.5	64-LQFP (10 × 10)	E1 QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)				
			μPD70F3371	256	Flash	√	16	32	8 M, 240 k	√	67	—/—	7	—	—	—	—	—	—	—	—	—	2	—	—	—	—	1	—	1	—	—	√	—	—	12	—	POC, LVI, CLM, DMA	3.3 to 5.5	80-LQFP (12 × 12)						
		V850ES/FG3	μPD70F3372	128	Flash	√	8	32	8 M, 240 k	√	67	—/—	7	—	—	—	—	—	—	—	—	—	2	—	—	—	—	1	—	1	—	—	√	—	—	12	—	POC, LVI, CLM, DMA	3.3 to 5.5	80-LQFP (12 × 12)						
			μPD70F3373	256	Flash	√	16	32	8 M, 240 k	√	67	—/—	7	—	—	—	—	—	—	—	—	—	2	—	—	—	—	1	—	1	—	—	√	—	—	12	—	POC, LVI, CLM, DMA	3.3 to 5.5	80-LQFP (12 × 12)						
			μPD70F3374	128	Flash	√	8	32	8 M, 240 k	√	84	—/—	8	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	1	—	2	—	—	√	—	—	16	—	POC, LVI, CLM, DMA	3.3 to 5.5	100-LQFP (14 × 14)					
			μPD70F3375	256	Flash	√	16	32	8 M, 240 k	√	84	—/—	8	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	1	—	2	—	—	√	—	—	16	—	POC, LVI, CLM, DMA	3.3 to 5.5		100-LQFP (14 × 14)			
		μPD70F3376A	384	Flash	√	24	48	8 M, 240 k	√	84	—/—	8	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	1	—	2	—	—	√	—	—	16	—	POC, LVI, CLM, DMA	3.3 to 5.5	100-LQFP (14 × 14)					
		μPD70F3377A	512	Flash	√	32	48	8 M, 240 k	√	84	—/—	8	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	1	—	2	—	—	√	—	—	16	—	POC, LVI, CLM, DMA	3.3 to 5.5	100-LQFP (14 × 14)					
		V850ES/FJ3	μPD70F3378	256	Flash	√	16	32	8 M, 240 k	√	128	—/—	9	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	3	—	—	—	√	—	—	24	—	POC, LVI, CLM, DMA	3.3 to 5.5	144-LQFP (20 × 20)					
			μPD70F3379	384	Flash	√	24	48	8 M, 240 k	√	128	—/—	9	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	4	—	—	√	—	—	24	—	POC, LVI, CLM, DMA	3.3 to 5.5	144-LQFP (20 × 20)					
			μPD70F3380	512	Flash	√	32	48	8 M, 240 k	√	128	—/—	9	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	4	—	—	√	—	—	24	—	POC, LVI, CLM, DMA	3.3 to 5.5	144-LQFP (20 × 20)					
			μPD70F3381	768	Flash	√	40	48	8 M, 240 k	√	128	—/—	9	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	4	—	—	√	—	—	24	—	POC, LVI, CLM, DMA	3.3 to 5.5	144-LQFP (20 × 20)					
			μPD70F3382	1024	Flash	√	48	48	8 M, 240 k	√	128	—/—	9	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	4	—	—	√	—	—	24	—	POC, LVI, CLM, DMA	3.3 to 5.5	144-LQFP (20 × 20)					
		V850ES/FK3	μPD70F3383	512	Flash	√	32	48	8 M, 240 k	√	152	—/—	12	—	—	—	—	—	—	—	—	—	—	8	—	—	—	—	—	4	—	—	1	—	5	—	—	√	—	—	24+16		—	POC, LVI, CLM, DMA	3.3 to 5.5	176-LQFP (24 × 24)
			μPD70F3384	768	Flash	√	48	48	8 M, 240 k	√	152	—/—	12	—	—	—	—	—	—	—	—	—	—	8	—	—	—	—	—	—	—	—	—	—	√	—	—	24+16	—	POC, LVI, CLM, DMA	3.3 to 5.5		176-LQFP (24 × 24)			
			μPD70F3385	1024	Flash	√	60	48	8 M, 240 k	√	152	—/—	12	—	—	—	—	—	—	—	—	—	—	8	—	—	—	—	—	—	—	—	—	—	√	—	—	24+16	—	POC, LVI, CLM, DMA	3.3 to 5.5		176-LQFP (24 × 24)			
		V850ES/FE3-L	μPD70F3610	64	Flash	√	6	20	8 M, 240 k	√	51	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	2	—	—	1	—	1	—	—	√	—	—	10		—	POC, LVI, CLM	3.3 to 5.5	64-LQFP (10 × 10)
			μPD70F3611	96	Flash	√	8	20	8 M, 240 k	√	51	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	10	—	POC, LVI, CLM	3.3 to 5.5		64-LQFP (10 × 10)			
			μPD70F3612	128	Flash	√	12	20	8 M, 240 k	√	51	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	10	—	POC, LVI, CLM	3.3 to 5.5		64-LQFP (10 × 10)			
			μPD70F3613	192	Flash	√	16	20	8 M, 240 k	√	51	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	10	—	POC, LVI, CLM	3.3 to 5.5		64-LQFP (10 × 10)			
			μPD70F3614	256	Flash	√	16	20	8 M, 240 k	√	51	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	10	—	POC, LVI, CLM	3.3 to 5.5		64-LQFP (10 × 10)			
		V850ES/FF3-L	μPD70F3615	64	Flash	√	6	20	8 M, 240 k	√	67	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	2	—	—	1	—	1	—	—	√	—	—	12		—	POC, LVI, CLM	3.3 to 5.5	80-LQFP (12 × 12)
			μPD70F3616	96	Flash	√	8	20	8 M, 240 k	√	67	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	12	—	POC, LVI, CLM	3.3 to 5.5		80-LQFP (12 × 12)			
			μPD70F3617	128	Flash	√	12	20	8 M, 240 k	√	67	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	12	—	POC, LVI, CLM	3.3 to 5.5		80-LQFP (12 × 12)			
			μPD70F3618	192	Flash	√	16	20	8 M, 240 k	√	67	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	12	—	POC, LVI, CLM	3.3 to 5.5		80-LQFP (12 × 12)			
			μPD70F3619	256	Flash	√	16	20	8 M, 240 k	√	67	—/—	6	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	√	—	—	12	—	POC, LVI, CLM	3.3 to 5.5		80-LQFP (12 × 12)			
		V850ES/FG3-L	μPD70F3620	128	Flash	√	8	20	8 M, 240 k	√	84	—/—	6	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	2	—	—	1	—	1	—	—	√	—	—	16		—	POC, LVI, CLM	3.3 to 5.5	100-LQFP (14 × 14)
			μPD70F3621	192	Flash	√	12	20	8 M, 240 k	√	84	—/—	6	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	√	—	—	16	—	POC, LVI, CLM	3.3 to 5.5		100-LQFP (14 × 14)			
			μPD70F3622	256	Flash	√	16	20	8 M, 240 k	√	84	—/—	6	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	√	—	—	16	—	POC, LVI, CLM	3.3 to 5.5		100-LQFP (14 × 14)			

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

		Device			Memory			Clock		I/O	Bus	Timer						Serial Interface										OC	Peripheral Functions				Other																			
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I ² C	UART supporting LIN, I ² C	UART supporting LIN, CSI, I ² C	CSI	CSI, I ² C	CSI with automatic transmission/reception function	I ² C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I ² C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board										
Car Electronics Dashboard Control (All Flash)	V850E1	V850E/DG3	μPD70F3416	128	Flash	√	6	24	240 k	√	80	—/—	12	—	—	1	1	16 bits × 3	—	2	—	—	—	—	—	2	—	—	—	1	—	1	—	—	√	40 × 4	—	8	—	Meter driver × 4, POC, CLM, ROMC, sound generator	3.5 to 5.5	100-LQFP (14 × 14)	QB-V850MINIL (MINICUBE) QB-703427 (IECUBE)									
			μPD70F3417	256			12																																													
	V850E/DJ3			μPD70F3421	256	Flash	√	12	32	240 k	√	114	—/—	27	—	—	1	1	16 bits × 11	—	2	—	—	—	—	2	—	—	2	—	3	—	—	√	40 × 4	—	12	—	Meter driver × 6, POC, CLM, DMA, ROMC, voltage comparator, sound generator, LCD bus interface	3.5 to 5.5	144-LQFP (20 × 20)	QB-V850MINIL (MINICUBE) QB-703427 QB-703426 (IECUBE)										
				μPD70F3422	384			20																																												
				μPD70F3423	512			20																																												
				μPD70F3424				24	64					31																																	3					2
				μPD70F3425	1024			32																																												
				μPD70F3426A	2048			84																																												
	V850E/DL3		μPD70F3427	1024	Flash	√	60	64	240 k	√	117	32/24	31	—	—	—	1	1	16 bits × 11	—	2	—	—	—	—	3	—	—	2	—	3	—	—	√	—	—	16	—	Meter driver × 6, POC, CLM, DMA, ROMC, voltage comparator, sound generator, LCD bus interface	3.5 to 5.5	208-LQFP (28 × 28)	QB-V850MINIL (MINICUBE) QB-703427 (IECUBE)										

Remark POC: Power-on clear circuit
CLM: Clock monitor
ROMC: ROM correction

		Device		Memory				Clock		I/O	Bus	Timer						Serial Interface						OC	Peripheral Functions				Other																										
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subdock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	I ² S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board																						
Car Electronics Instrument Cluster Control	V850E2	V850E2/DJ4	μ PD70F3522	256	Flash	✓	24	80	8 M/240 k	✓	105	—/—	4 ch × 3 units	16 ch × 5 units	—	1	2	2	—	3	—	2	—	3	—	✓	16	—	—	Data flash: 32 KB Backup RAM: 16 KB Real-time clock FPU, instruction cache, DMA LCD bus interface, POC, CLM, boundary scan LCD [segments x commons] 69 × 6	2.7 to 5.5	144-LQFP (20 x 20) 144-HLQFP (20 x 20)	E1 QB-V850E2 (IECUBE)																						
			μ PD70F3523	512			48																																																
			μ PD70F3524	1024			96																																																
			μ PD70F3525	2048			192	120														1		1																															
			μ PD70F3526	3072			256																																																

Remark FPU: Floating-point unit
POC: Power-on clear circuit
LVI: Low-voltage detector

		Device		Memory			Clock		I/O	Bus	Timer				Serial Interface					OC	Peripheral Functions				Other									
Applications		CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subdock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	I ² S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics	Instrument cluster Control	V850E2	V850E2/DK4-H	μ PD70F3529	2048	Flash	√	96	80	8 M, 240 k	√	127	-	4 ch × 1 unit	16 ch × 3 units	-	1	2	2	-	2	1	3	-	√	12	-	-	Data flash: 32 KB Backup RAM: 8 KB/16 KB Video RAM: 592 K/8 MB FPU, instruction cache, DMA LCD bus interface, 2D graphics functions, POC, CLM, boundary scan HFSI: 1 ch to 2 ch	2.7 to 5.5	176-HLQFP (24 x 24)	E1 QB-V850E2 (IECUBE)		
		V850E2/DN4-H	μ PD70F3532	3072	256			160	165	32/24	4 ch × 3 units	16 ch × 5 units	-	4	3	1	16																	
		V850E2/DP4-H	μ PD70F3535	3072	256			-	-	-	-	-	-	-	-	-																		
			μ PD70F3536																															
			μ PD70F3537																															

Remark FPU: Floating-point unit
POC: Power-on clear circuit
LVI: Low-voltage detector

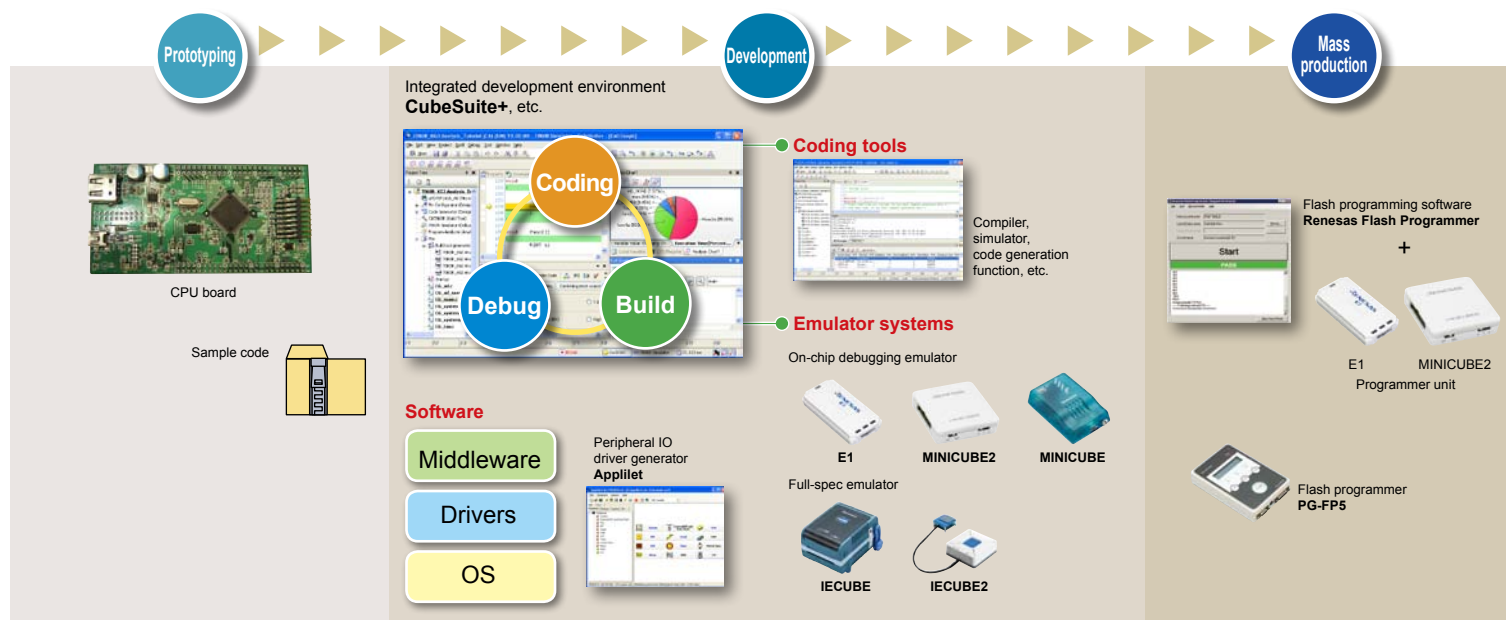
Applications		Device	Memory				Clock		I/O	Bus	Timer						Serial Interface					OC	Peripheral Functions				Other							
		CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	24-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	I ² S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics	Body Control	V850E1	V850E/PG2	μ PD70F3413	240	Flash	√	12	64	-	-	49	-/-	1 + 5 units	2 units	6 units	-	-	3	-	2	-	-	-	1	-	-	22	-	-	Tuning RAM: 2 KB DMA, motor control, LVI, NBD	4.0 to 5.5 (external) 1.35 to 1.65 (internal)	100-QFP (14 x 14)	E1 QB-V850E2 (IECUBE) QB-MINI2 (MINICUBE2)
				μ PD70F3414	496			32																	2									

Remark NBD: Non-break debug
LVI: Low-voltage detector

		Device		Memory			Clock		I/O	Bus	Timer				Serial Interface				OC ¹	Peripheral Functions				Other										
Applications		CPU core	Commercial name	Product name	ROM size [kB]	ROM type	Single voltage flash	RAM size [kB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subdock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I ² C	I ² S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics	Body Control	V850E2	V850E2/PJ4	μ PD70F3506*	512	Flash	√	40	80	-	-	73	-/-	4 ch × 2 units	16 ch × 2 units	2 units	2	1	3	-	3	2	-	-	2	1	√	22	-	-	Data flash: 32 KB FPU, motor control, data CRC, POF, LVI, CLM, DMA	3.0 to 3.6 (external) 1.1 to 1.3 (internal)	144-HLQFP (20 x 20)	E1 QB-V850MINIL (MINICUBE)
				μ PD70F3507*				4.5 to 5.5 (external) 1.1 to 1.3 (internal)																										
				μ PD70F3508*				1024	80	160	3.0 to 3.6 (external) 1.1 to 1.3 (internal)																							
				μ PD70F3509*							4.5 to 5.5 (external) 1.1 to 1.3 (internal)																							
			V850E2/PG4-L	μ PD70F4154*	384	Flash	√	24	80	-	-	46	-/-	4 ch × 1 unit	16 ch × 1 unit	1 unit	2	1	2	-	2	-	-	-	2	-	√	18	-	-	Data flash: 16 KB motor control, data CRC, POF, LVI, CLM, DMA	3.0 to 5.5	100-LQFP (14 x 14)	E1 QB-V850MINIL (MINICUBE)
				μ PD70F4155*																														

Remark FPU: Floating-point unit
POF: Power-on flag
LVI: Low-voltage detector
CLM: Clock monitor

* Under development



* A free evaluation version is also available for the coding tools and flash programming software (Renesas Flash Programmer).

V850 Development Tool Lineup

MCU	Real-time OS	Software Tools	Emulators		Programming Tools
			On-chip debugging emulator	Full-spec emulator	Programmer ⁵
V850	Ri850V4 ¹ Ri850MP (V850E2M Dual Core)	Integrated Development Environment CubeSuite+ for V850 (includes integrated development environment ² , compiler, simulator, and emulator debugger)	E1 ⁴ MINICUBE2 MINICUBE (JTAG emulator for V850)	IECUBE IECUBE2	PG-FP5 ⁶ E1 ^{4,7} MINICUBE2 ^{7,8}
		Software Package for V850 [SP850] (includes integrated development environment ² , compiler, simulator, and emulator debugger)			

Notes:

- Some MCUs support the RX850V4 real-time OS instead.
- The integrated development environment is CubeSuite+.
- The integrated development environment is the project manager PM+.
- The E20 emulator may be used as well, but the supported debugging functions are equivalent to those of the E1.
- This is a programmer for flash MCUs from Renesas. For details about which programmers can be used with each MCU and the programmer specifications, see the Renesas website (<http://www.renesas.com/programmer>).
- Used together with a programming GUI (provided free of charge).
- Used together with the programming software Renesas Flash Programmer (a free evaluation version is available).
- Used together with the programming software QB-Programmer (provided free of charge).

* CubeSuite+ is not generally promoted to the U.S. and European customers. Customers in the U.S. and Europe who are interested in CubeSuite+ are requested to contact our regional marketing departments for details.

* For details about which emulators can be used with each MCU and emulator specifications, see the Renesas website (http://www.renesas.com/emulation_debugging). The emulator that can be used might differ depending on the MCU part number.

CPU Board

This CPU board is used to evaluate the operation of a V850 MCU by using the on-chip debugging emulator E1 or MINICUBE2 (each sold separately). By using this board, you can evaluate a series of development processes from program development to actual operation.

All MCU pins are assigned to peripheral board connectors, letting you create evaluation circuits using a commercially available universal board.



QB-V850ESJG3L-TB



QB-V850ESJG3U-TB

Target Device		Product Name	Emulator (sold separately)
Core	Group		
V850E2	V850E2/MN4	QB-V850E2MN4DUAL-TB *	E1
	V850E2/ML4	QB-V850E2ML4-TB	E1
V850E	V850E/IF3	QB-V850EIG3-TB *	E1 or MINICUBE2
	V850E/IG3		
V850ES	V850E/1H4-H	QB-V850E1H4H-TB *	E1 or MINICUBE2
	V850E/1H2	QB-V850ESHG2-TB *	E1 or MINICUBE2
	V850E/1HF2		
	V850E/1HG2		
	V850E/1HJ2		
	V850E/1HE3	QB-V850ESHG3-TB *	E1 or MINICUBE2
	V850E/1HF3		
	V850E/1HG3		
	V850E/1HJ3		
	V850E/1IE2	QB-V850ESIE2-TB *	E1 or MINICUBE2
	V850E/1JG2	QB-V850ESJG2-TB *	E1 or MINICUBE2
	V850E/1JJ2		
	V850E/1JF3-L	QB-V850ESJG3L-TB *	E1 or MINICUBE2
	V850E/1JG3-L		
	V850E/1JC3-L	QB-V850ESJG3LUSB-TB *	E1 or MINICUBE2
	V850E/1JE3-L		
	V850E/1JF3-L		
	V850E/1JG3-L		
	V850E/1JG3-U	QB-V850ESJG3U-TB *	E1 or MINICUBE2
	V850E/1JH3-U		
	V850E/1JE3-E	QB-V850ESJJ3E-TB *	E1 or MINICUBE2
	V850E/1JF3-E		
	V850E/1JG3-E		
	V850E/1JH3-E		
	V850E/1JJ3-E		
	V850E/1JG3	QB-V850ESJJ3-TB *	E1 or MINICUBE2
	V850E/1JJ3		
	V850E/1KE2	QB-V850ESKG2-TB *	E1 or MINICUBE2
	V850E/1KF2		
	V850E/1KG2		
	V850E/1KJ2		



QB-F14T16-01

* A 14-/16-pin conversion adapter QB-F14T16-01 (sold separately) is required when connecting an E1 emulator to a CPU board that has a connector for the MINICUBE2 emulator.

Extensive Renesas Development Ecosystem

A wide variety of products for the V850 family, such as compilers and programmers, are available from partner tool vendors. These products enable the V850 family to be used in an even broader range of applications.

■ IDE/Compilers/Code generators

- Accurate Technologies
- CATS CO.,LTD.
- CriticalBlue
- dSPACE GmbH
- Gaio Technology Co., Ltd.
- Green Hills Software
- IAR Systems
- MathWorks
- Red Hat, Inc.
- Ubiquitous Corporation
- Vector Informatik GmbH

■ Co-verification

- Accurate Technologies
- ETAS GmbH
- Gaio Technology Co., Ltd.
- IAR Systems
- Synopsys
- Vector Informatik GmbH
- Yokogawa Digital Computer Corporation

■ OS

- EB (Elektrobit)
- ETAS GmbH
- Green Hills Software
- SEGGER Microcontroller
- Vector Informatik GmbH

■ Middleware/Drivers/Software IP

- Aplix Corporation
- E-Globaleedge Corporation
- eSOL Co., Ltd.
- Kyoto Software Research, Inc.
- Mentor Graphics Corporation
- Ubiquitous Corporation
- Vector Informatik GmbH

■ Emulators and related emulation tools

- Accurate Technologies
- Computex Co., Ltd.
- ETAS GmbH
- Green Hills Software
- iSYSTEM AG
- Kyoto Microcomputer Co., Ltd.
- Lauterbach
- Tokyo Eletech Corporation
- Yokogawa Digital Computer Corporation

■ Starter kits/Evaluation boards/Platforms

- Sophia Systems Co., Ltd.
- Vector Informatik GmbH
- Yokogawa Digital Computer Corporation

■ Programmers

- Flash Support Group, Inc.
- Hokuto Denshi Co., Ltd.
- Tokyo Eletech Corporation
- Vector Informatik GmbH
- WaveTechnology Co., Ltd.
- Yokogawa Digital Computer Corporation



The Alliance Partner Program provides online tools to increase the synergy between our Customers, 3rd Party Partners, and Renesas.

<http://www.renesas.com/partners>

Renesas MPUs & MCUs V850 MCU Selection Guide

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