



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## LV5762LF — Bi-CMOS IC Step-down Switching Regulator

### Overview

LV5762LF is a 1ch step-down voltage switching regulator.

### Functions

- 1ch step-down switching regulator controller
- Frequency fold back function
- Built-in pulse-by-pulse OCP circuit. It is detected by using ON resistance of an external MOS.
- Load-independent soft start circuit
- ON/OFF function

### Specifications

Maximum Ratings at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{IN}$ max		45	V
Allowable power dissipation	$P_d$ max	*)	0.65	W
Operating temperature	$T_{opr}$		-40 to 85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to 150	$^\circ\text{C}$

\* Specified board: 24.0mm × 15.0mm × 1.6mm, glass epoxy board (2-layer).

Recommended Operating Conditions at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage range 1	$V_{IN}$		8 to 42	V
Error amplifier input voltage	$V_{FB}$		0 to 1.6	V

Electrical Characteristics at  $T_a = 25^\circ\text{C}$ ,  $V_{IN} = 12\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage block						
Internal reference voltage	$V_{ref}$	Including offset of E/A	0.695	0.705	0.715	V
5V power supply	$V_{DD}$	$I_{OUT}=0$ to 5mA	4.7	5.2	5.7	V

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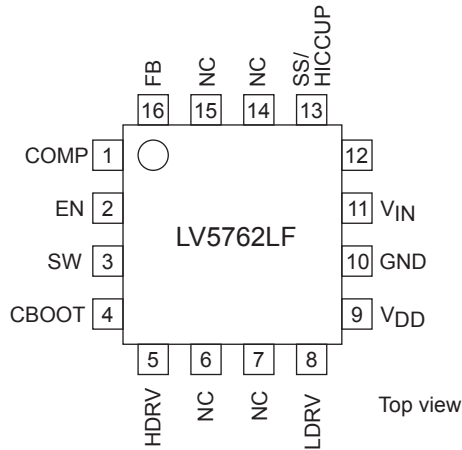
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Triangular waveform oscillator block						
Oscillation frequency	$f_{OSC}$		870	1000	1130	kHz
Frequency variation	$f_{OSC\_DV}$	$V_{IN}=8$ to 42V		1		%
Oscillatory frequency fold back detection voltage	$V_{OSC\_FB}$	Detect IN voltage after the end of SS		0.5		V
Oscillatory frequency after fold back	$f_{OSC\_FB}$		100	150	200	kHz
ON/OFF circuit block						
IC start-up voltage	$V_{EN\_on}$	$V_{IN}=8$ to 42V		3.4	4.3	V
IC off voltage	$V_{EN\_off}$	$V_{IN}=8$ to 42V	1.1	1.3		V
Soft start circuit block						
Soft start source current	$I_{SS\_SC}$	$EN > 5V, SS=0V$	3.4	4.3	5.2	$\mu A$
Soft start sink current	$I_{SS\_SK}$	$EN > 1V, V_{DD}=5V, SS=1V$		2		mA
Voltage to end the soft start function	$V_{SS\_END}$		0.7	0.9	1.1	V
UVLO circuit block						
UVLO lock release voltage	$V_{UVLO}$		7.0	7.4	7.8	V
UVLO hysteresis	$V_{UVLO\_H}$			0.6		V
Error amplifier						
Input bias current	$I_{EA\_IN}$				100	$\mu A$
Error amplifier transconductance	GEA		1000	1400	1800	$\mu A/V$
Common mode input voltage range	$V_{EA\_R}$	$V_{IN}=8$ to 42V	0.0		1.6	V
Sink output current	$I_{EA\_OSK}$	FB=1.0V		-100		$\mu A$
Source output current	$I_{EA\_OSC}$	FB=0V		100		$\mu A$
Current detection amplifier gain	GISNS			1.3		
Over current limiter circuit block						
Reference current	$I_{LIM}$		-10%	20	+10%	$\mu A$
Over current detection comparator offset voltage	$V_{LIM\_OFS}$		-5		+5	mV
Over current detection comparator common mode input range			$V_{IN}-0.45$		$V_{IN}$	V
PWM comparator						
Input threshold voltage	$V_{tmax}$	Duty cycle=DMAX	0.95	1.1	1.25	V
	$V_{t0}$	Duty cycle=0%	0.35	0.45	0.55	V
Maximum ON duty	DMAX		75	80		%
Output block						
Output stage ON resistance(the upper side)	$R_{ONH}$			5		$\Omega$
Output stage ON resistance(the under side)	$R_{ONL}$			5		$\Omega$
Output stage ON current(the upper side)	$I_{ONH}$		240			mA
Output stage ON current(the under side)	$I_{ONL}$		240			mA
The whole device						
Standby current	$I_{CCS}$	$EN < 1V$			60	$\mu A$
Mean consumption current	$I_{CCA}$	$EN > 5V$		3.6		mA

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## Pin Assignment



## Pin Function

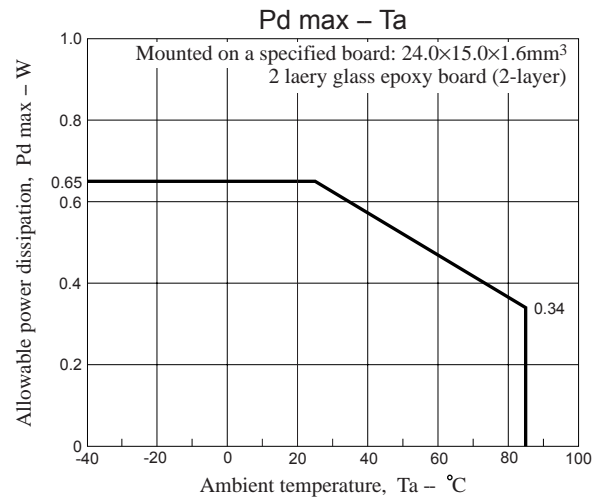
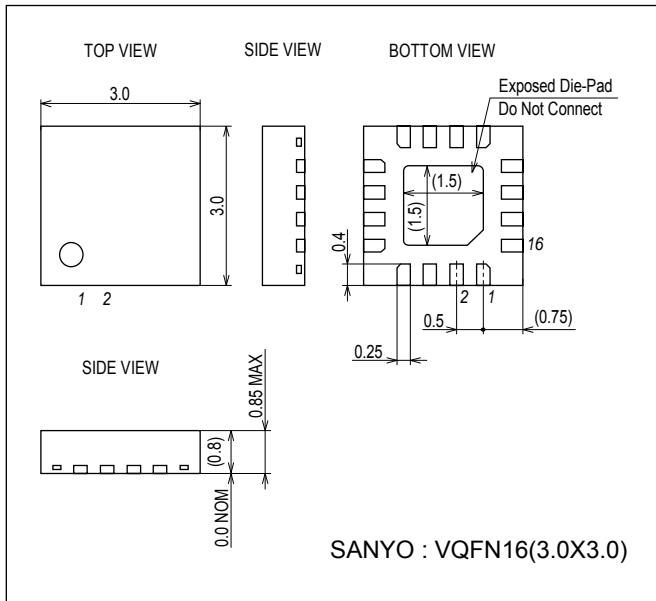
Pin No.	Pin name	Function
1	COMP	Error amplifier output pin. Connect a phase compensation circuit between this pin and GND.
2	EN	ON/OFF pin.
3	SW	Pin to connect with switching node. The source of Nch MOSFET connects to this pin.
4	CBOOT	Bootstrap capacity connection pin. This pin becomes a GATE drive power supply of an external Nch MOSFET. Connect a bypass capacitor between CBOOT and SW.
5	HDRVV	An external the upper MOSFET gate drive pin.
6, 7 14, 15	NC	No connection
8	LDRV	An external the lower MOSFET gate drive pin.
9	V <sub>DD</sub>	Power supply pin for an external the MOS-FET gate drive.
10	GND	Ground pin. Each reference voltage is based on the voltage of the ground pin.
11	V <sub>IN</sub>	Power supply pin. This pin is monitored by UVLO function. When the voltage of this pin becomes 7.8V or more by UVLO function, The IC starts and the soft start function operates.
12	I <sub>LIM</sub>	Reference current pin for current detection. The sink current of about 20μA flows to this pin. When a resistance is connected between this pin and V <sub>IN</sub> outside and the voltage applied to the SW pin is lower than the voltage of the terminal side of the resistance, the upper Nch MOSFET is off by operating the current limiter comparator. This operation is reset with respect to each PWN pulse.
13	SS/HICCUP	Pin to connect a capacitor for soft start. A capacitor for soft start is charged by using the voltage of about 4.3μA. This pin ends the soft start period by using the voltage of about 0.9V and the frequency fold back function becomes active.
16	FB	Error amplifier reverse input pin. By operating the converter, the voltage of this pin becomes 0.7V. The voltage in which the output voltage is divided by an external resistance is applied to this pin. Also, the oscillation frequency become one-eighth when the voltage of this pin becomes 0.4V or less after soft start function.

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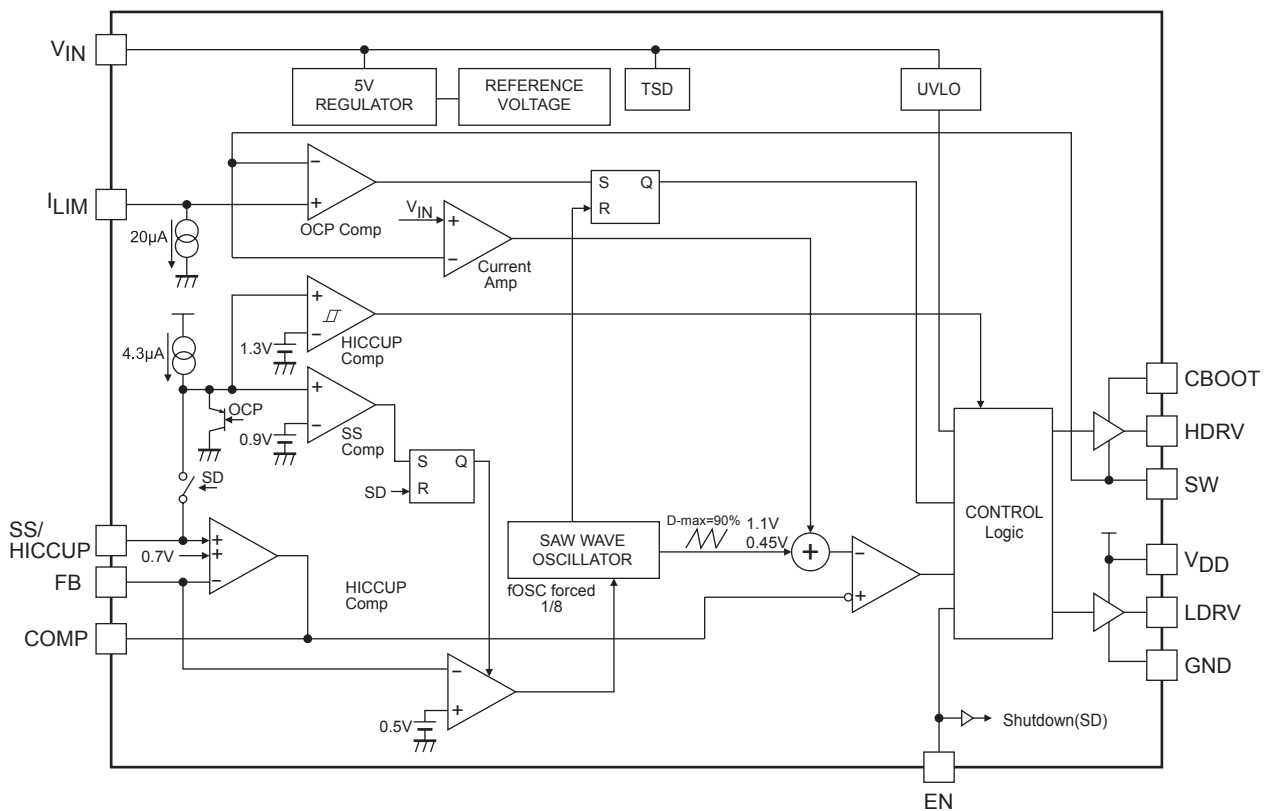
## Package Dimensions

unit : mm (typ)

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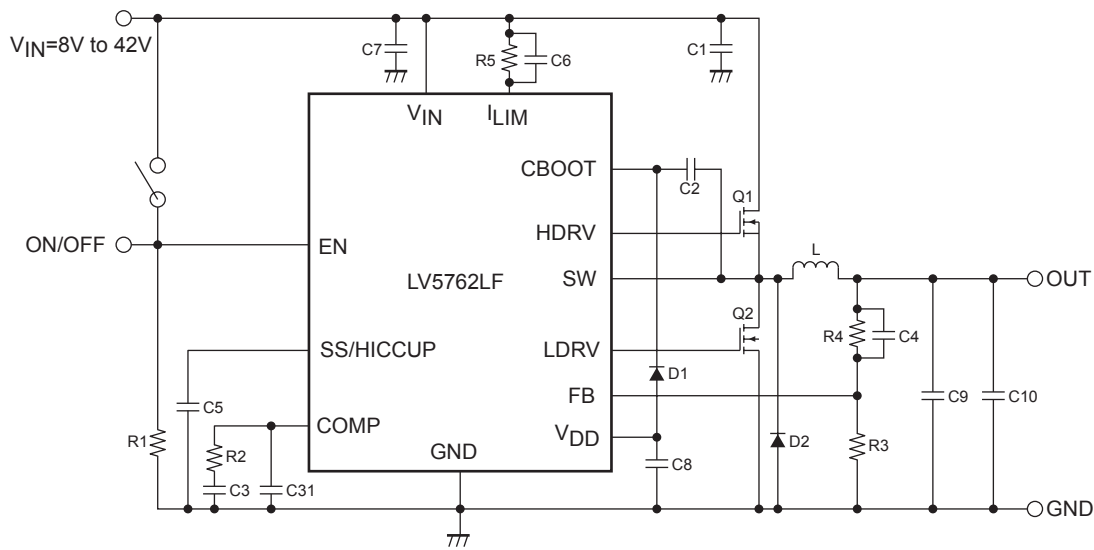


## Block Diagram



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## Sample Application Circuit



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