

### Features

- Vin Range up to 60V
- Output range: 1.5V~5.0V
- Maximum output current: 250mA
- Dropout voltage: 700mV @ IOUT=100mA
- Ultra low quiescent current: 5μA @ 8V
- Output voltage tolerances of ±2% Over the temperature range
- Internal thermal overload protection
- Built-in Short-Circuit Protection, Current Limiter

### Applications

- E-meters, Water Meters and Gas Meters
- Cellphones, radiophone, digital cameras
- Fire Alarm, Smoke Detector
- Appliances and White Goods

### General Description

The HL69xx is ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 5μA quiescent current at no load, the HL69xx is ideally suited for standby micro-control-unit systems, especially for always-on applications like E-meters, fire alarms, smoke detectors and other battery-operated systems. The HL69xx retains all of the features that are common to low dropout regulators including a low dropout

PMOS pass device, short circuit protection, and thermal shutdown.

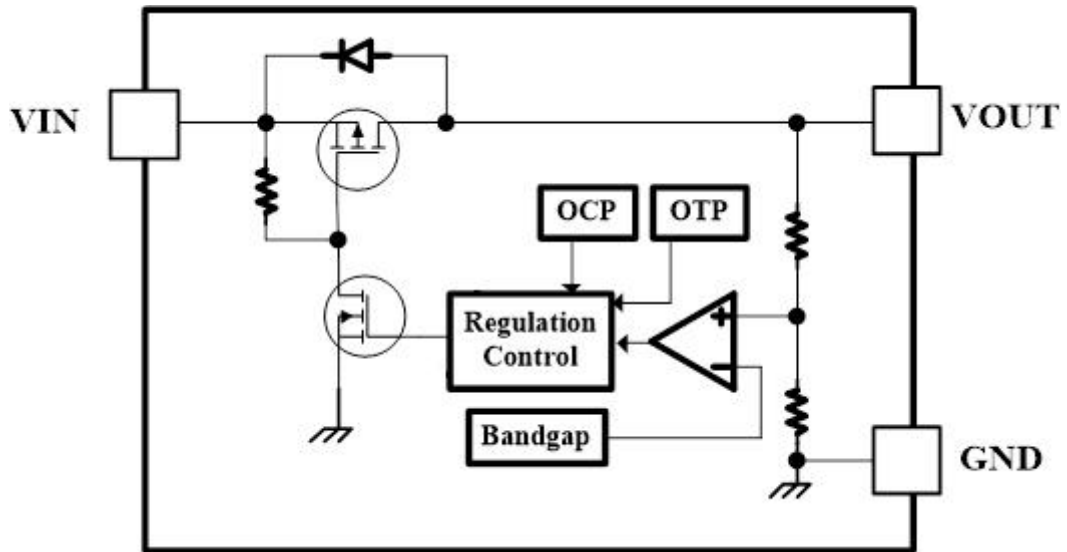
The HL69xx has 40V maximum operating voltage limit, and -40°C to 125°C operating temperature range, and ±2% output voltage tolerance over the entire output current, input voltage, and temperature range. The HL69xx regulators are available in standard SOT23-3, SOT89 and SOT223 packages.

### Order Information

HL69xx-①②③④

Designator	Symbol	Description
①②	Integer	Output Voltage(1.5~5.0V)
③	M	Package: SOT23-3
	P	Package: SOT89
	G	Package: SOT223
④	R	RoHS / Pb Free
	G	Halogen Free

## Block Diagram



## Pin Assignment

SOT23-3 (Top View)

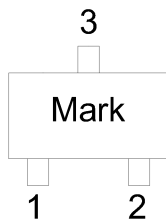


Table1: HL69xx series (SOT23-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

SOT89 (Top View)



Table2: HL69xx series (SOT89 PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

SOT223 (Top View)

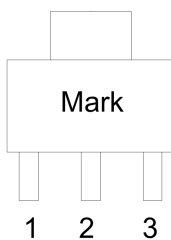


Table3: HL69xx series (SOT223 PKG)

PIN NO.	PIN NAME	FUNCTION
1	VIN	Input voltage pin
2	GND	GND pin
3	VOUT	Output voltage pin

### Absolute Maximum Ratings

Input Voltage.....	-0.3V to 60V	Lead Temperature(Soldering, 10 sec.).....	300°C
V <sub>OUT</sub> .....	-0.3V to 7V	Junction Temperature.....	-40°C to 125°C
Storage Temperature .....	-55°C to 150°C		

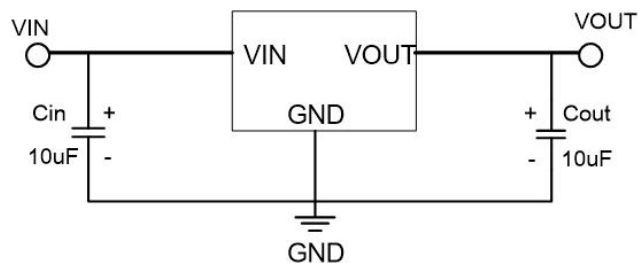
Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

### Electrical Characteristics

The following specifications apply for V<sub>IN</sub>=12V, I<sub>OUT</sub>=1mA, C<sub>IN</sub>=C<sub>OUT</sub>=1uF, T<sub>J</sub>=25°C, unless specified otherwise

SYMBOL	ITEMS	CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>IN</sub>	Input Voltage		2.7	--	50	V
V <sub>OUT</sub>	Output Range		1.5	---	5.5	V
ΔV <sub>OUT</sub>	Output Voltage Accuracy		-2	V <sub>OUT</sub>	2	%
I <sub>Q</sub>	Quiescent Current	T <sub>J</sub> = 25°C	---	5	---	μA
I <sub>LIMIT</sub>	Current Limit		260	---	---	mA
V <sub>DROP</sub>	Dropout Voltage	I <sub>OUT</sub> =100mA	---	700	---	mV
ΔV <sub>LINE</sub>	Line Regulation	V <sub>IN</sub> = V <sub>OUT</sub> + 1V to 40V, or V <sub>IN</sub> = 5V to 40V, if V <sub>OUT</sub> < 4V	---	2	10	mV
ΔV <sub>LOAD</sub>	Load Regulation	I <sub>OUT</sub> = 1mA to 100mA	---	10	---	mV
		I <sub>OUT</sub> = 1mA to 250mA	---	20	---	mV
PSRR	Power Supply Rejection Rate	F=1KHz	---	60	---	dB
T <sub>SD</sub>	Thermal Shutdown		---	160	---	°C
T <sub>HY</sub>	Thermal Shutdown Hysteresis		---	20	---	°C

### Application Circuits





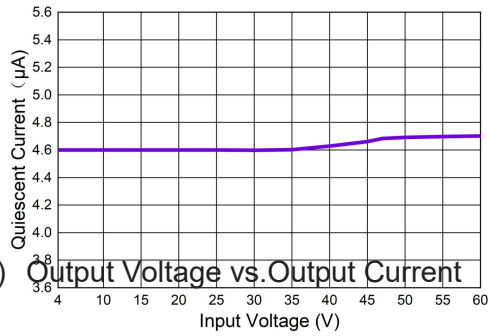
# HL69xx series

60V250mA UltraLowCurrentConsumptionCMOSVoltageRegulator

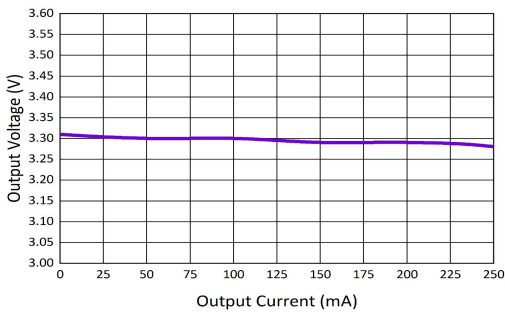
## Typical Performance Characteristics

$C_{IN}=1\mu F$ ,  $C_{OUT}=1\mu F$ ,  $V_{IN}=12V$ ,  $V_{OUT}=3.3V$   $T_J=25^\circ C$ , unless specified otherwise)

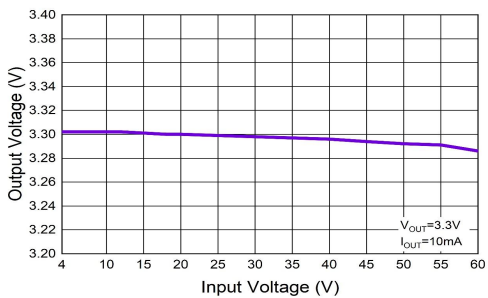
### (1) Quiescent current vs Input voltage



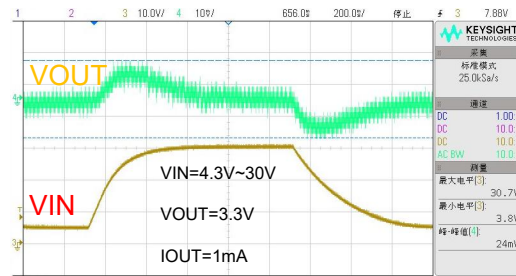
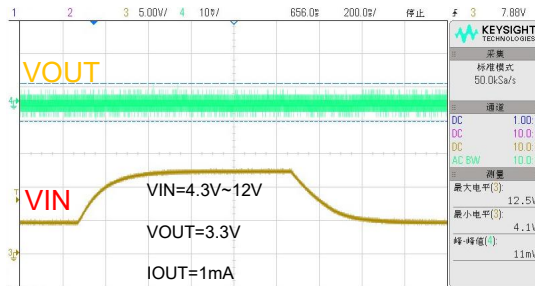
### (2) Output Voltage vs. Output Current



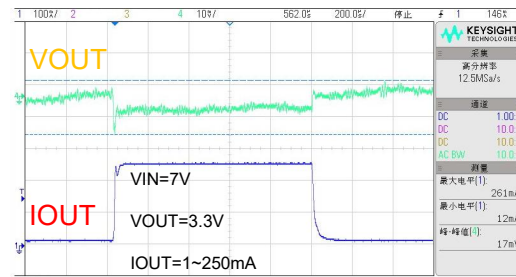
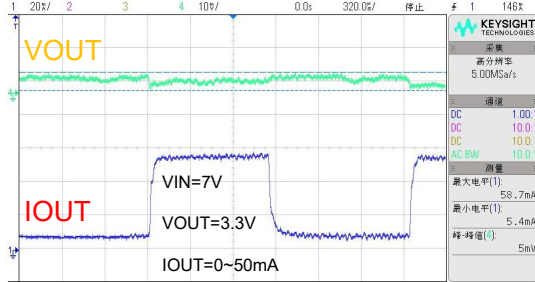
### (3) Output Voltage vs. Input voltage



### (4) Input Transient Response

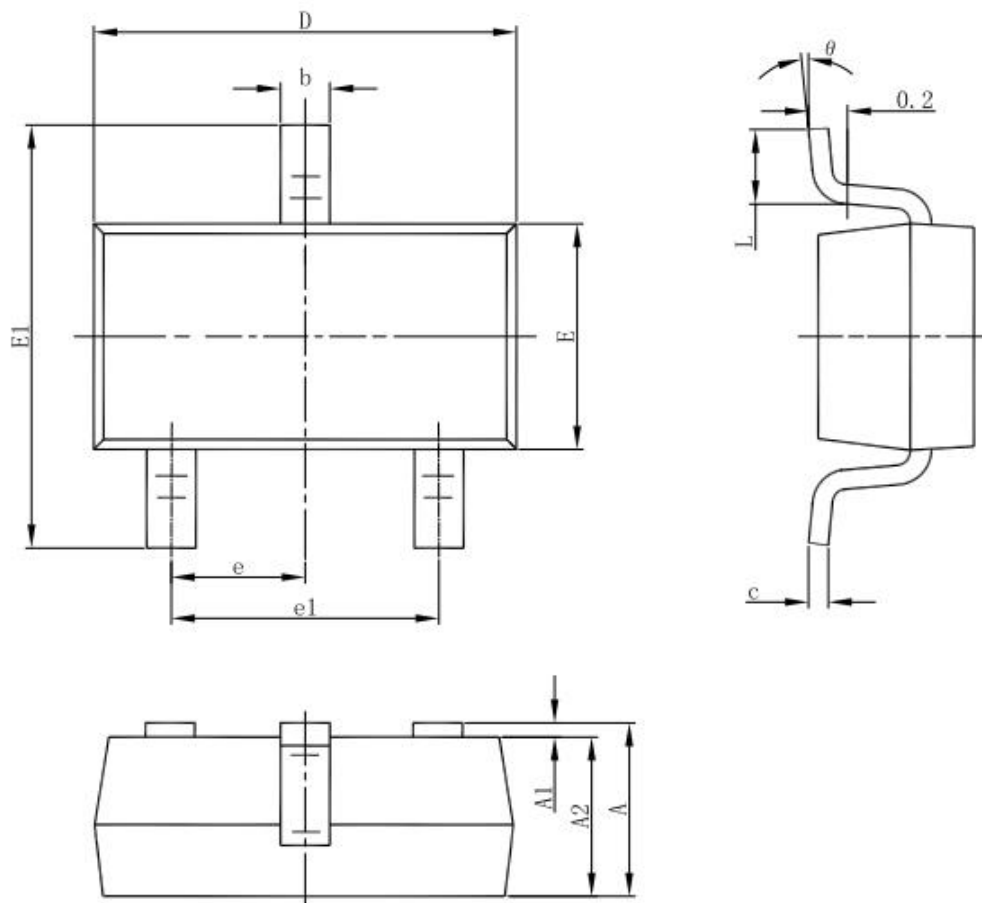


### (5) Load Transient Response



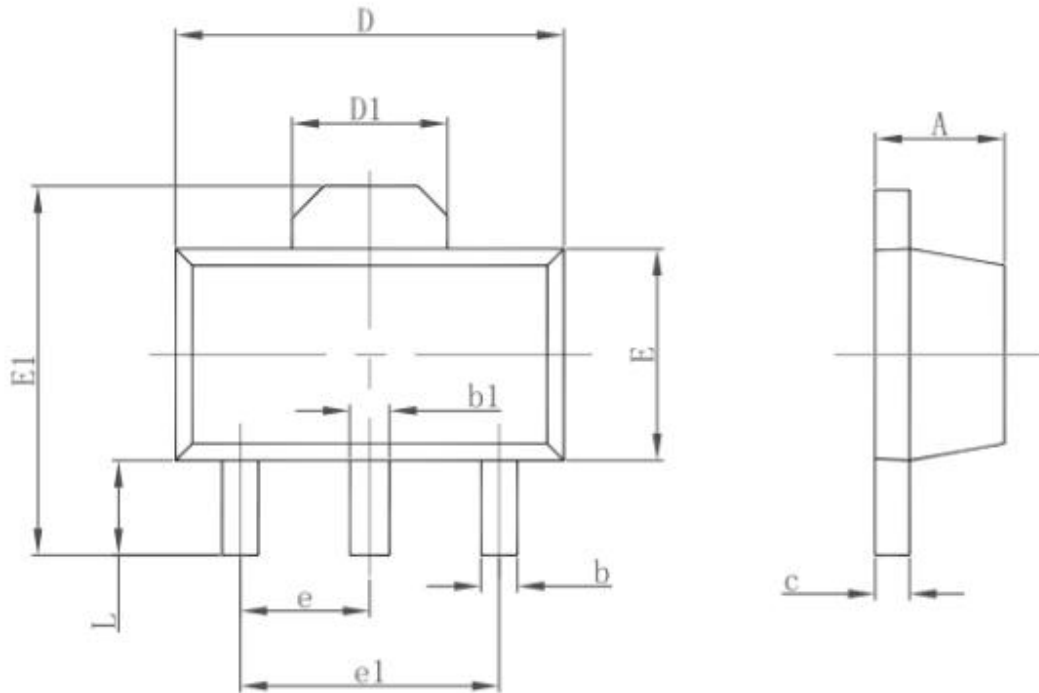
## Package Information

### 3-pin SOT23-3 Outline Dimensions



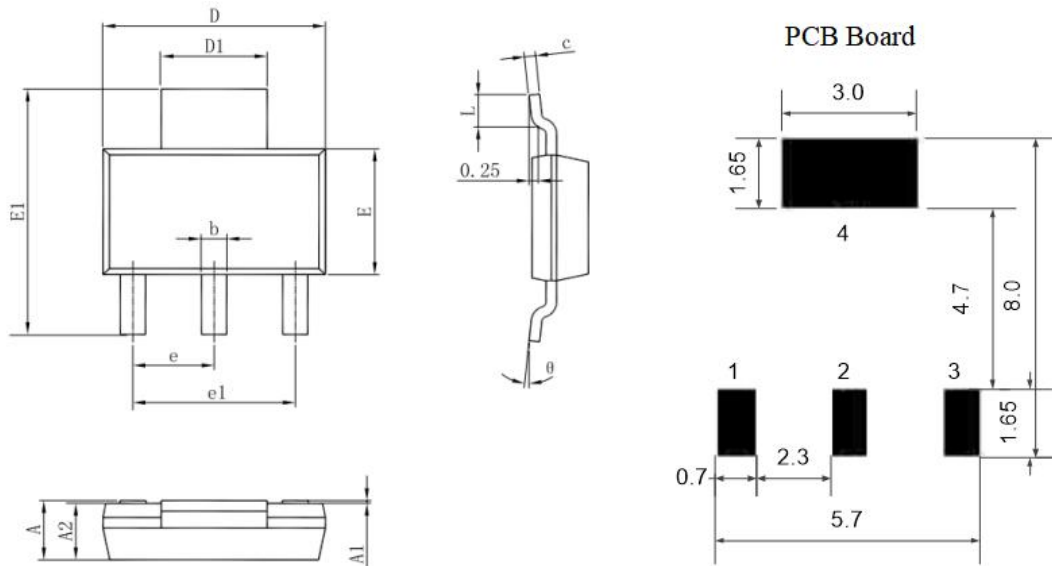
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

## SOT89-3 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

## SOT223 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
$\theta$	0°	10°	0°	10°