

Features

- Low voltage drop: 0.06V@100mA
- High input voltage: 12V
- Low temperature coefficient
- Low Quiescent Current: 2uA at 5.0V
- Output voltage accuracy: tolerance $\pm 2\%$
- Support Fixed Output Voltage: 3.0v/3.3v/5.0v

Applications

- Battery-powered equipment
- Hand-Hold Equipment
- GRS Receivers
- Wireless LAN

General Description

The HE2009 series is a group of positive voltage output, three-pin regulators that provide a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and laser trimming technologies.

voltage reference, an error amplification circuit, and a current limited output driver. Transient response to a load variations have improved in comparison to the existing series.

SOT89-3 packages are available.

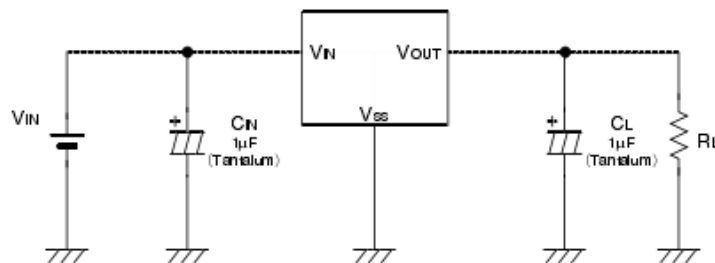
The HE2009 consists of a high-precision

Order Information

HE2009①②③④

Designator	Symbol	Description
①	P	Package:SOT89
②③	Integer	Output Voltage(1.2~5.0V)
④	R	RoHS / Pb Free
	G	Halogen Free

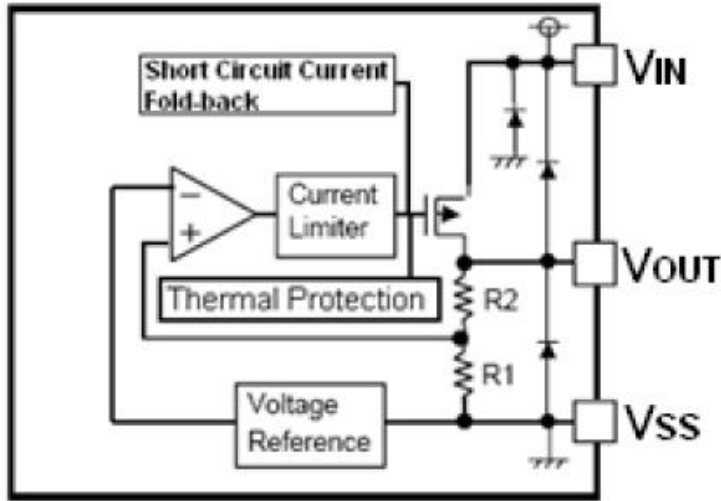
Typical Application



Note1: Input capacitor $C_{IN}=1\mu F$.

Note2: Output capacitor $C_{OUT}=1\mu F/6.8\mu F$ (1uF Tantalum capacitor or 6.8uF ceramic capacitor is recommended).

Block Diagram



Pin Assignment

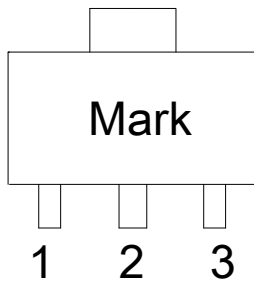
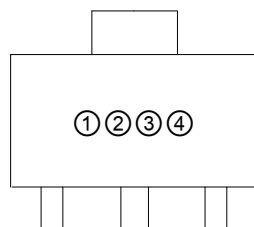


Table1 HE2009 series (SOT89 PKG)

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

Marking Rule
SOT89-3



① represents the integer of the output voltage

SYMBOL	VOLTAGE(V)
1	1.②
2	2.②
3	3.②
4	4.②
5	5.②
6	6.②

② represents the decimal number of the output voltage

SYMBOL	VOLTAGE(V)	SYMBOL	VOLTAGE(V)
A	①. 0	F	①. 5
B	①. 1	H	①. 6
C	①. 2	K	①. 7
D	①. 3	L	①. 8
E	①. 4	M	①. 9

③ based on internal standards

SYMBOL
0

④ represents the assembly LOT No.
Based on internal standards

Absolute Maximum Ratings

Supply Voltage-0.3V to 12V Operating Temperature-40°C to 85°C
Output Current.....1.1A Storage Temperature-40°C to 125°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

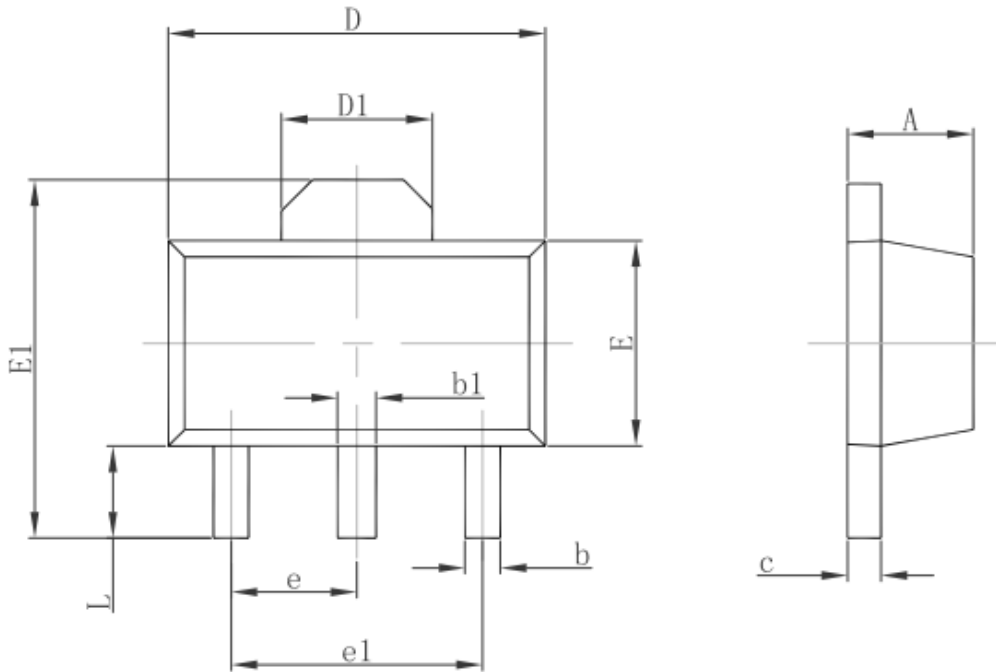
HE2009 for any output voltage (Ta=25°C)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{OUT}	Output Voltage	V _{in} =V _{out} +1V 1.0mA≤I _{out} ≤30mA	V _{out} ×0.98	--	V _{out} ×1.02	V
I _{OUT}	Output Current*1	V _{in} -V _{out} =1V	--	1000	--	mA
V _{DROP}	Low dropout*2	Refer to the next table				
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	1.6V≤V _{in} ≤8V I _{out} =100mA	--	0.05	0.2	%/V
$\Delta V_{OUT} / \Delta I_{OUT}$	ΔV _{out} / ΔI _{out}	V _{in} = V _{out} +1V 1.0mA≤I _{out} ≤100mA	--	12	30	mV
Output voltage Temperature Coefficiency	ΔV _{out} /(Ta·V _{out})	I _{out} =30mA 0°C≤Ta≤70°C	--	±100	--	Ppm/°C
Supply Current	I _{ss}	--	--	2	5	uA
Input Voltage	V _{in}	--	--	--	12	V

Electrical Characteristics by Output Voltage:

Output Voltage V _{out} (V)	Dropout Voltage V _{dif} (V)		
	Conditions	Typ.	Max.
V _{out} ≤ 2.0V	I _{out} =60 mA	0.05	0.08
2.0 < V _{out} ≤ 3.0	I _{out} =80 mA	0.05	0.08
3.0 < V _{out} ≤ 4.0	I _{out} =100 mA	0.06	0.08
4.0 < V _{out} ≤ 5.0		0.05	0.08
3.0 < V _{out} ≤ 4.0	I _{out} =200 mA	0.13	0.16
4.0 < V _{out} ≤ 5.0		0.12	0.16
3.0 < V _{out} ≤ 4.0	I _{out} =1000 mA	0.65	0.8
4.0 < V _{out} ≤ 5.0		0.6	0.8

Package Information
3-pin SOT89 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