

Description

GM6250H is designed for applications requiring high input voltage (up to 25V). The GM6250H family combines high accuracy with very low power consumption, and provides high output current even when the application requires extremely low input-output voltage dropout. The quiescent current of GM6250H is typically $1\mu\text{A}$, it makes it possible for wider application fields with battery supplies.

GM6250H includes a precision voltage reference, an error correction circuit, over-temperature protection, and a current limited output driver. Fast transient response to load variations provides excellent stability under dynamic loads.

GM6250H comes in SOT-23 (150mW), and SOT-89 (500mW).

Features

- ◆ Input Operating Voltage range: 2.7V to 25V
- ◆ Operating at low output current from $1\mu\text{A}$
- ◆ Maximum output current up 300mA
- ◆ Output voltage accuracy : $\pm 2\%$
- ◆ CMOS low power consumption, typically $1.0\mu\text{A}$ at $V_{\text{OUT}} = 5.0\text{V}$
- ◆ Stable with $1\mu\text{F}$ MLCC or without capacitors
- ◆ SOT-23 (150mW), SOT-89 (500mW) and TO-92 packages

Application

Palmtops

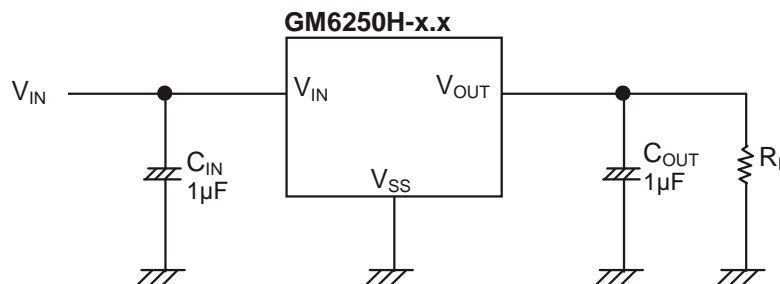
Portable Cameras

Video Recorders

Battery Powered Equipment

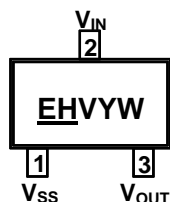
Reference Voltage Sources

Typical Application Circuits

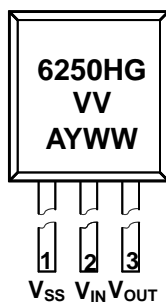


Marking Information and Pin Configurations – Green Product(Top View)

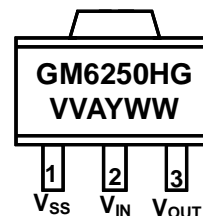
SOT23



TO92



SOT89



EH: Device Code, Green Product

V: Voltage Code (see next page)

Y: Year (8 = 2008, 9 = 2009)

W: Week Code

Week 1-26 : **A** – **Z**

Week 27-52 : **A** – **Z**

Week 53 : **A**

G: Green Product

VV: Voltage suffix (18 = 1.8V, 50 = 5.0V...)

A: Assembly Site Code

Y: Year (3 = 2013, 4 = 2014)

WW: Week Code

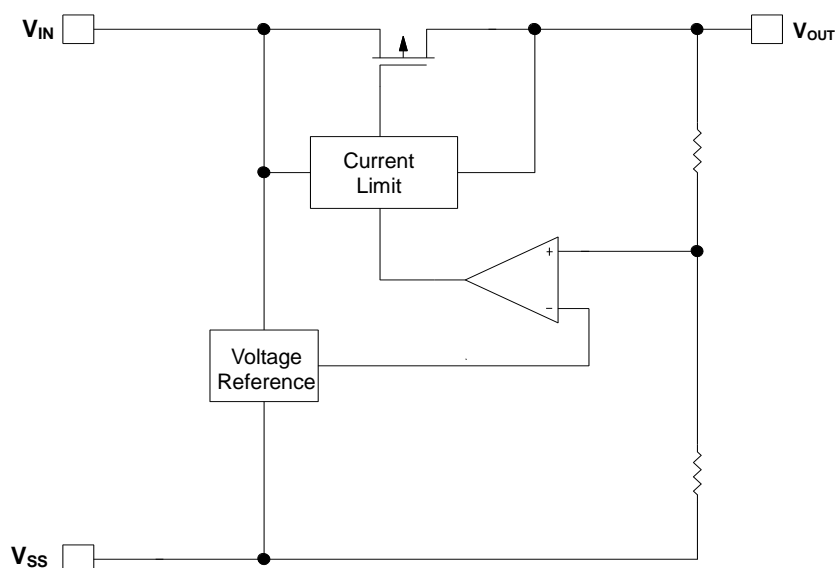
Ordering Information – Green Product

Ordering Number	Output Voltage	Voltage Code	Package	Shipping
GM6250H-1.5T92BG	1.5V		TO-92	1,000 Units/Bag
GM6250H-1.5ST23RG		C	SOT-23	3,000 Units/Tape and Reel
GM6250H-1.5ST89RG			SOT-89	1,000 Units/Tape and Reel
GM6250H-1.8T92BG	1.8V		TO-92	1,000 Units/Bag
GM6250H-1.8ST23RG		E	SOT-23	3,000 Units/Tape and Reel
GM6250H-1.8ST89RG			SOT-89	1,000 Units/Tape and Reel
GM6250H-2.5T92BG	2.5V		TO-92	1,000 Units/Bag
GM6250H-2.5ST23RG		G	SOT-23	3,000 Units/Tape and Reel
GM6250H-2.5ST89RG			SOT-89	1,000 Units/Tape and Reel
GM6250H-3.3T92BG	3.3V		TO-92	1,000 Units/Bag
GM6250H-3.3ST23RG		K	SOT-23	3,000 Units/Tape and Reel
GM6250H-3.3ST89RG			SOT-89	1,000 Units/Tape and Reel
GM6250H-4.0T92BG	4.0V		TO-92	1,000 Units/Bag
GM6250H-4.0ST23RG		M	SOT-23	3,000 Units/Tape and Reel
GM6250H-4.0ST89RG			SOT-89	1,000 Units/Tape and Reel
GM6250H-5.0T92BG	5.0V		TO-92	1,000 Units/Bag
GM6250H-5.0ST23RG		Q	SOT-23	3,000 Units/Tape and Reel
GM6250H-5.0ST89RG			SOT-89	1,000 Units/Tape and Reel

Absolute Maximum Ratings

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	28	V
Output Current		I_{OUT}	500	mA
Output Voltage		V_{OUT}	$V_{SS} - 0.3$ to $V_{IN} + 0.3$	V
Continuous Total Power Dissipation	SOT-23	P_D	150	mW
	SOT-89		500	
	TO-92		300	
Operating Ambient Temperature		T_A	- 40 to 125	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	- 65 to 150	$^{\circ}\text{C}$
Lead Temperature (Soldering, 10 sec)			+ 260	$^{\circ}\text{C}$
ESD Protection, HBM			2000	V

Block Diagram



Electrical Characteristics

($T_A = 25^\circ\text{C}$, $V_{IN} = V_{OUT} + 1\text{V}$, but $> 2.7\text{V}$, $C_{OUT} = 2.2\mu\text{F}$, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		2.7		25	V
Output Voltage Range	V_{OUT}		1.2		12	V
Quiescent Current	I_Q			1.0	3.0	μA
Output Voltage Accuracy	ΔV_{OUT}	$I_{OUT} = 1\text{mA}$, $V_{IN} = V_{OUT} + 1\text{V}$	-2		+2	%
		$I_{OUT} = 1\mu\text{A}$, $V_{IN} = 9\text{V}$	-5		5	
Line Regulation	ΔV_{OI}	$I_{OUT} = 1\text{mA}$, $V_{OUT} + 0.5\text{V} < V_{IN} < 20\text{V}$ or $3\text{V} < V_{IN} < 18\text{V}$		0.02	0.3	%/V
Load Regulation	ΔV_{OL}	$1\text{mA} < I_{OUT} < 250\text{mA}$	-3	1	3	%
Dropout Voltage	ΔV	$I_{OUT} = 160\text{mA}$, $V_{OUT} = 3.3\text{V}$		0.4	0.7	V
Output Current Limit	I_{CL}		500			mA
Power Supply Rejection Ration	PSRR	10kHz		10		dB

Application Note

Notes on Usage

1. It is recommended to operate the GM6250H series within the stipulated absolute maximum ratings as the IC is liable to malfunction if it is operated outside the ratings.
2. There is a possibility of heat or oscillation as a result of the impedance present between the power supply and the IC's input. Where impedance is greater than 10Ω , it is recommended to use a capacitor (C_{IN}) of at least $1\mu F$ at the input terminal.
3. With a large output current, operations can be stabilized by increasing capacitor size (C_{IN}). If C_{IN} is too small and capacitance of (C_L) is increased, there is a possibility of oscillation due to input impedance. In such case, operation can be stabilized by either increasing the size of C_{IN} or decreasing the size of C_L .
4. Please ensure the output current (I_{OUT}) is less than $P_d \div (V_{IN} - V_{OUT})$ and does not exceed the stipulated continuous total power dissipation value (P_d) for the package.

CALCULATING POWER DISSIPATION

The GM6250H series precision linear regulators include thermal shutdown and current limit circuitry to protect the devices. However, high power regulators normally operate at high junction temperatures so it is important to calculate the power dissipation and junction temperatures accurately to be sure that you use an adequate heat sink.

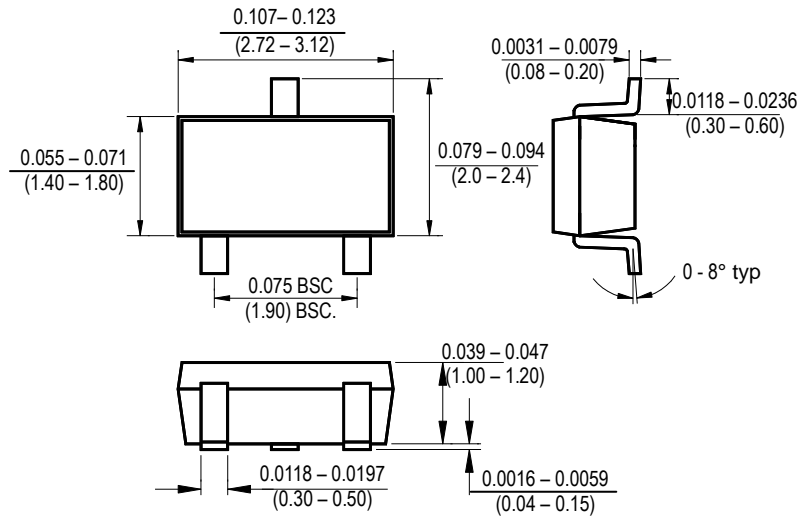
The thermal characteristics of an IC depend on four factors:

1. Maximum Ambient Temperature T_A ($^{\circ}C$)
2. Power Dissipation P_D (Watts)
3. Maximum Junction Temperature T_J ($^{\circ}C$)
4. Thermal Resistance Junction to ambient R_{JA} ($^{\circ}C/W$)

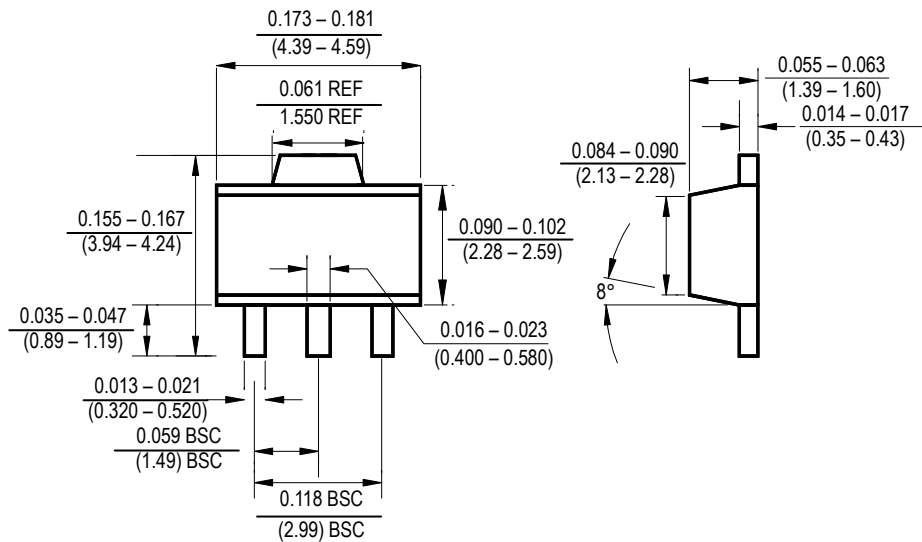
These relationships of these four factors is expressed by equation : $T_J = T_A + P_D \times R_{JA}$

Maximum ambient temperature and power dissipation are determined by the design while the maximum junction temperature and thermal resistance depend on the manufacturer and the package type.

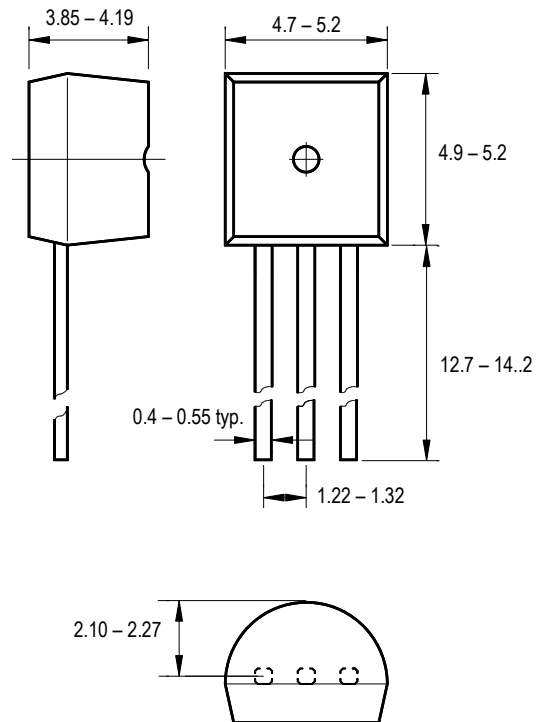
Package Outline Dimensions – SOT 23



Package Outline Dimensions – SOT 89



Package Outline Dimensions – TO 92



Ordering Number

GM 6250H - 3.3 T92 B G

APM Gamma Micro	Circuit Type	Output Voltage	Package Type	Shipping Type	
		2.5 = 2.5V	T92: TO 92	B: Bag	G:Green
		3.3 = 3.3V	ST89: SOT 89	T: Tube	
		5.0 = 5.0V	ST23: SOT 23	R: Tape & Reel	

Note:

Pb-free products:

- ◆ RoHS compliant and compatible with the current requirements of IPC/JEDEC J-STD-020.
- ◆ Suitable for use in Pb-free soldering processes with 100% matte tin (Sn) plating.

Green products:

- ◆ Lead-free (RoHS compliant)
- ◆ Halogen free(Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight)