

1A Adjustable Voltage High Speed LDO Regulators ME6117 Series

General Description

The ME6117 series are highly accurate, low noise, LDO Voltage Regulators that are capable of providing an output current that is in excess of 800mA with a maximum dropout voltage of 1.2 V at 800mA. This series contains two fixed output voltages of 3.3 V, and 5.0 V that have no minimum load requirement to maintain regulation. On chip trimming adjusts the reference/output voltage to within $\pm 2\%$ accuracy. Internal protection features consist of output current limiting, safe operating area compensation, and thermal shutdown. The ME6117 series can operate with up to 15 V input. Devices are available in SOT223.

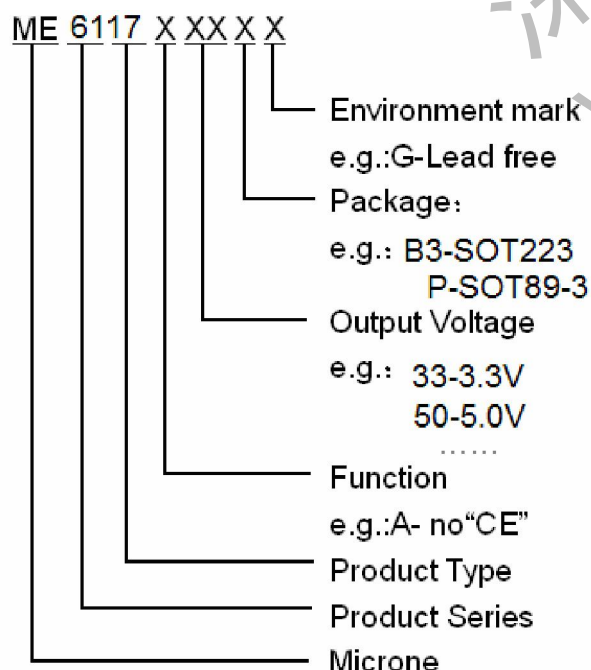
Features

- | Output Current in Excess of 800mA
- | Dropout Voltage: 120mV@ $I_{OUT} = 100mA$
- | Operating Voltage Range: 3.6V ~ 15V
- | Highly Accuracy: $\pm 2\%$
- | Adjustable Output Voltage Option
- | Standby Current: 90uA (TYP.)
- | High Ripple Rejection: 72dB@1KHz (ME6117A33)
- | Line Regulation: 0.1% (TYP.)
- | Temperature Stability $\pm 0.5\%$
- | Thermal Shutdown Protection : 150
- | Packages: SOT223, SOT89-3

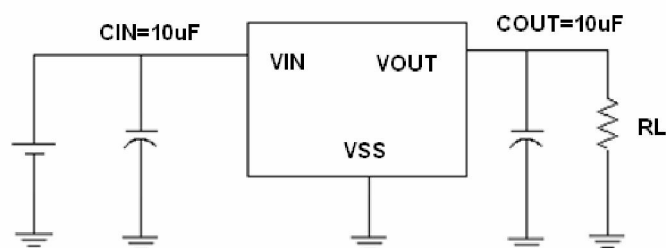
Typical Application

- | Consumer and Industrial Equipment Point of Regulation
- | Switching Power Supply Post Regulation
- | Hard Drive Controllers
- | Battery Chargers

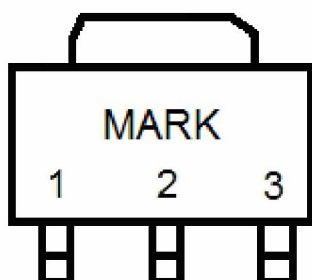
Selection Guide



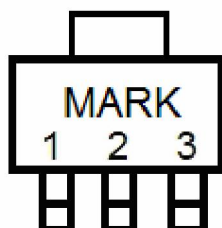
Typical Application Circuit



Pin Configuration



SOT223



SOT89-3

Pin Assignment

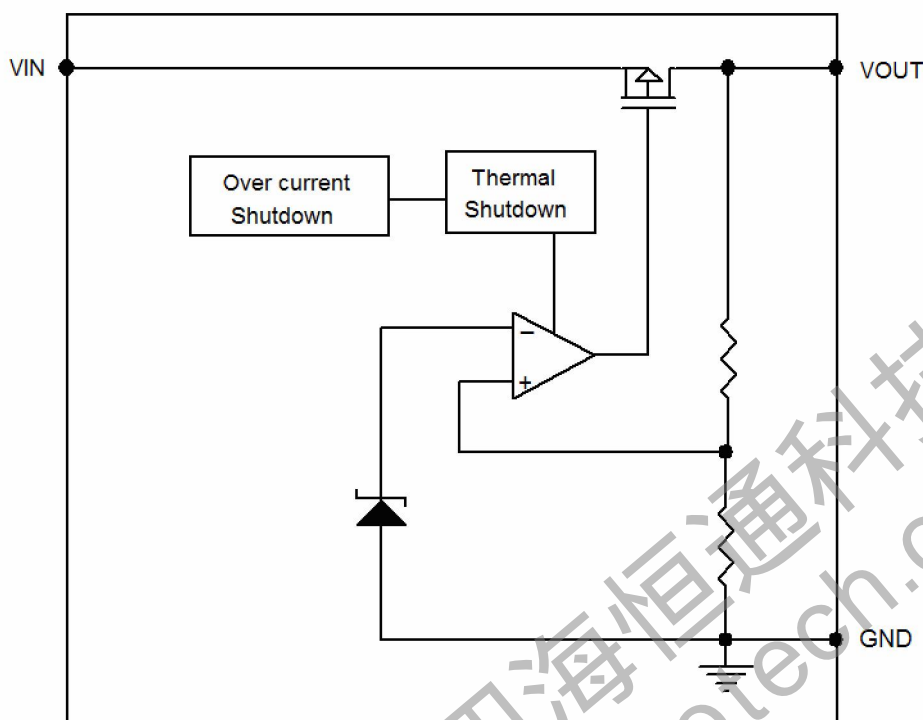
ME6117AXX

Pin Number		Pin Name	Functions
SOT223	SOT89-3		
1	1	GND	Ground
2	3	V_{OUT}	Output
3	2	V_{IN}	Power Input

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Voltage		V_{IN}	18	V
Output Current		I_{OUT}	1.1	A
Output Voltage		V_{OUT}	$V_{SS}-0.3 \sim V_{IN}+0.3$	V
Power Dissipation	SOT223	P_D	750	mW
	SOT89-3		500	mW
Operating Temperature Range		T_{OPR}	- 40 ~ + 125	
Storage Temperature Range		T_{STG}	- 40 ~ + 150	
Lead Temperature			260 , 4sec	

Block Diagram



Electrical Characteristics

ME6117A33

($V_{IN} = V_{OUT} + 1.5V$, $C_{IN} = C_L = 10\mu F$, $T_a = 25^\circ C$, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$, $V_{IN} = V_{OUT} + 1.5V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	$V_{IN} = V_{OUT} + 1.5V$		800		mA
Load Regulation	V_{OUT}	$V_{IN} = V_{OUT} + 1.5V$, $0mA < I_{OUT} < 800mA$		5	10	mV
Dropout Voltage (Note 3)	V_{DIF1}	$I_{OUT} = 100mA$		120		mV
	V_{DIF2}	$I_{OUT} = 500mA$		620		mV
	V_{DIF3}	$I_{OUT} = 800mA$		1050		mV
Quiescent Current	I_{SS}	$V_{IN} = V_{OUT} + 1.5V$		90		μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 0mA$ $V_{OUT} + 1.5V < V_{IN} < 15V$		2	5	mV
Ripple Rejection Rate	PSRR	$V_{IN} = 6.3V$ $+1Vp-pAC$	$I_{OUT} = 100mA, 1kHz$	72		dB
			$I_{OUT} = 200mA, 1kHz$	68		
			$I_{OUT} = 500mA, 1kHz$	61		

ME6117A50
 $(V_{IN} = V_{OUT} + 1.5V, C_{IN} = C_L = 10\mu F, T_a = 25^\circ C, \text{ unless otherwise noted})$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT}(E)$ (Note 2)	$I_{OUT} = 10mA,$ $V_{IN} = V_{OUT} + 1.5V$	X 0.98	$V_{OUT}(T)$ (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	$V_{IN} = V_{OUT} + 1.5V$		800		mA
Load Regulation	V_{OUT}	$V_{IN} = V_{OUT} + 1.5V,$ $0mA \leq I_{OUT} \leq 800mA$		5	10	mV
Dropout Voltage (Note 3)	V_{DIF1}	$I_{OUT} = 100mA$		100		mV
	V_{DIF2}	$I_{OUT} = 500mA$		520		mV
	V_{DIF3}	$I_{OUT} = 800mA$		880		mV
Quiescent Current	I_{SS}	$V_{IN} = V_{OUT} + 1.5V$		90		μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 0mA$ $V_{OUT} + 1.5V \leq V_{IN} \leq 15V$		2	5	mV
Ripple Rejection Rate	PSRR	$V_{IN} = 8.0V$ $+1Vp-pAC$	$I_{OUT} = 100mA, 1kHz$	72		dB
			$I_{OUT} = 200mA, 1kHz$	68		
			$I_{OUT} = 500mA, 1kHz$	61		

Note :

- $V_{OUT}(T)$: Specified Output Voltage
- $V_{OUT}(E)$: Effective Output Voltage (ie. The output voltage when " $V_{OUT}(T) + 1.5V$ " is provided at the V_{IN} pin while maintaining a certain I_{OUT} value.)
- $V_{DIF} : V_{IN1} - V_{OUT}(E)'$
 V_{IN1} : The input voltage when $V_{OUT}(E)'$ appears as input voltage is gradually decreased.
 $V_{OUT}(E)'$: A voltage equal to 98% of the output voltage whenever an amply stabilized I_{OUT} and $\{V_{OUT}(T) + 1.5V\}$ is input.

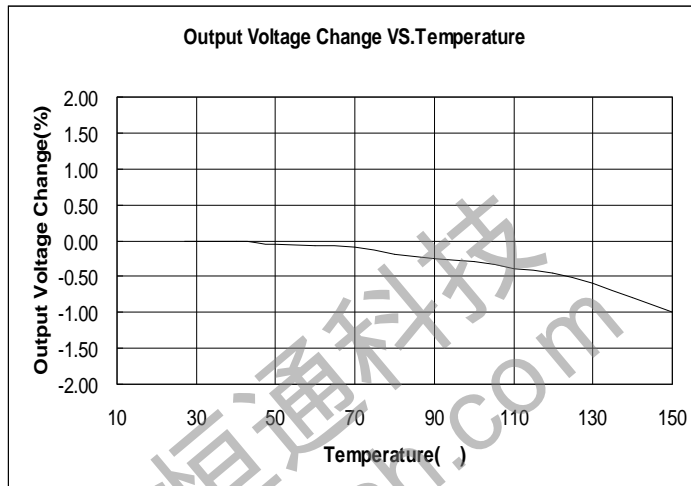
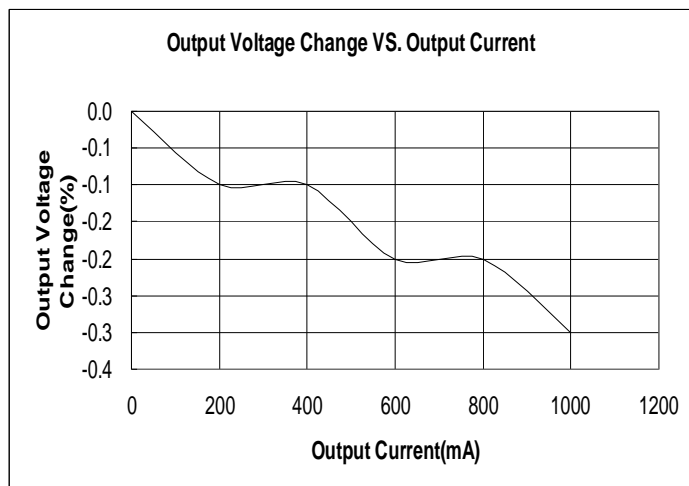
Type Characteristics

(1) Output Voltage Change VS. Output Current
($V_{IN}=V_{OUT}+1.5V$, $T_a = 25\text{ }^\circ\text{C}$)

ME6117A33

(2) Output Voltage Change vs. Temperature
($V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10\text{mA}$)

ME6117A33

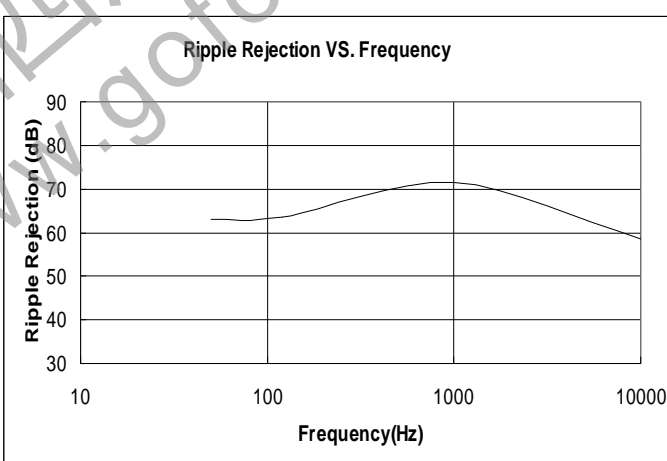
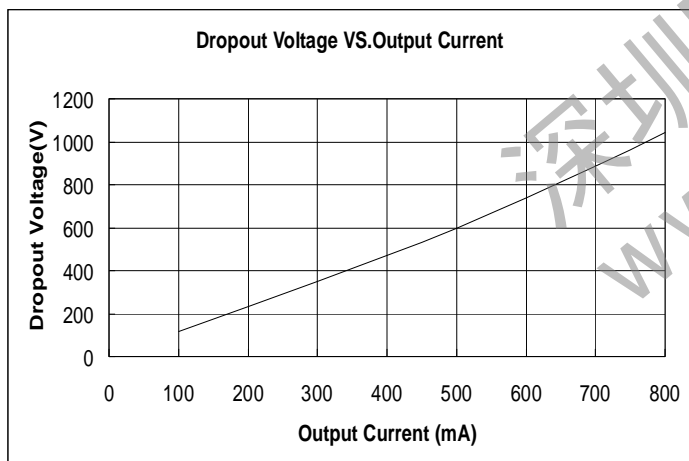


(3) Dropout Voltage VS. Output Current ($T_a = 25\text{ }^\circ\text{C}$)

ME6117A33

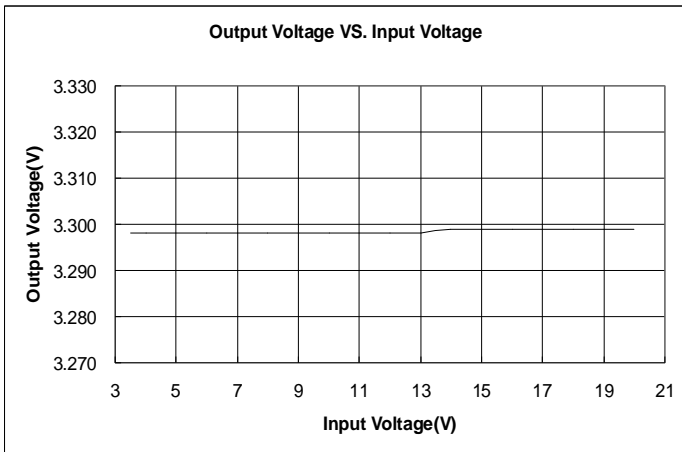
(4) Ripple Rejection vs. Frequency ($I_o=100\text{mA}$)

ME6117A33



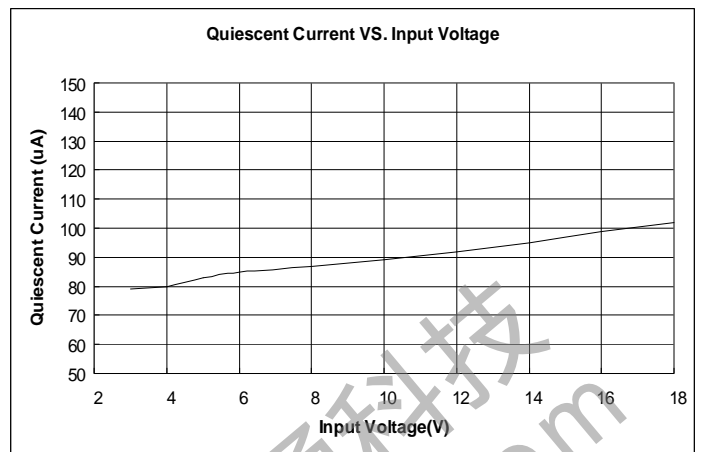
(5) Output Voltage VS. Input Voltage (Ta = 25 °C)

ME6117A33



(6) Quiescent Current VS. Input Voltage

ME6117A33

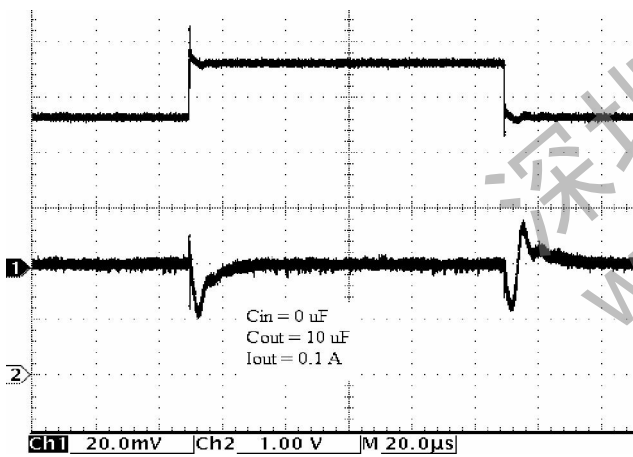


(7) Line Transient Response

ME6117A33

Ch1 : Input Voltage Ch2 : Output Voltage

$V_{IN}=4.8V, I_{OUT}=1000mA, T_a = 25\text{ }^{\circ}C$

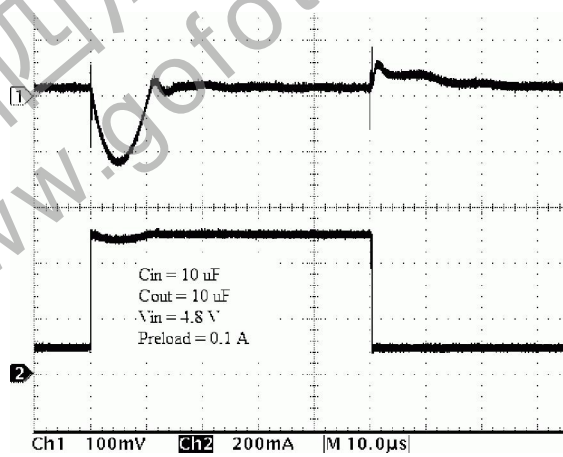


(8) Load Transient Response

ME6117A33

Ch1 : Onput Voltage Ch2 : Load Current

$V_{IN}=4.8V, T_a = 25\text{ }^{\circ}C$



Applications Information

1. Input Bypass Capacitor

An input capacitor is recommended. A 10uF tantalum on the input is a suitable input bypassing for almost all applications.

2. Output Capacitor

The output capacitor is critical in maintaining regulator stability, and must meet the required conditions for both minimum amount of capacitance and ESR (Equivalent Series Resistance). The minimum output capacitance required by the ME6117 is 10μF, if a tantalum capacitor is used. Any increase of the output capacitance will merely improve the loop stability and transient response. The ESR of the output capacitor should be less than 0.5 .

3. Load Regulation

The ME6117 regulates the voltage that appears between its output and ground pins, or between its output and adjust pins. In some cases, line resistances can introduce errors to the voltage across the load. To obtain the best load regulation, a few precautions are needed. Figure 1, shows a typical application using a fixed output regulator. The R_{t1} and R_{t2} are the line resistances. It is obvious that the V_{LOAD} is less than the V_{OUT} by the sum of the voltage drops along the line resistances. In this case, the load regulation seen at the R_{LOAD} would be degraded from the datasheet specification. To improve this, the load should be tied directly to the output terminal on the positive side and directly tied to the ground terminal on the negative side.

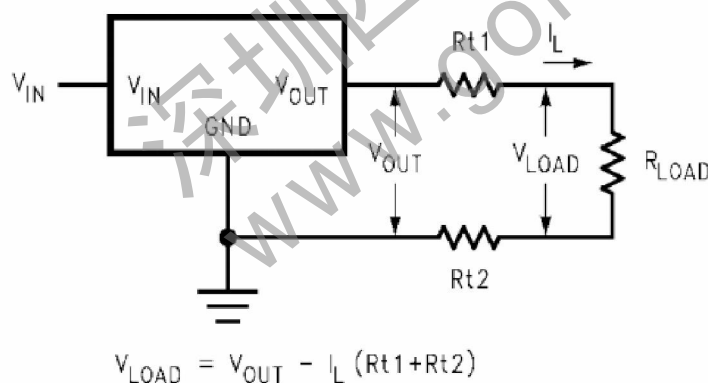
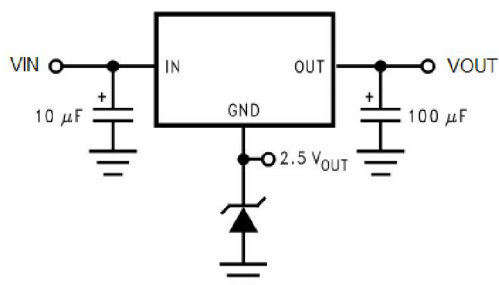


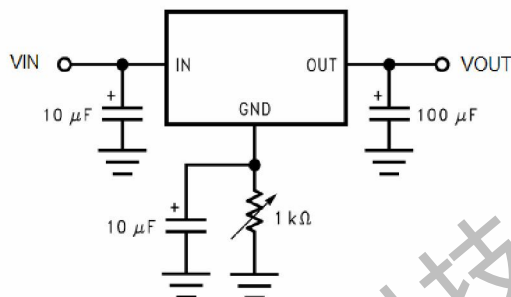
FIGURE 1. Typical Application using Fixed Output Regulator

Application Circuit

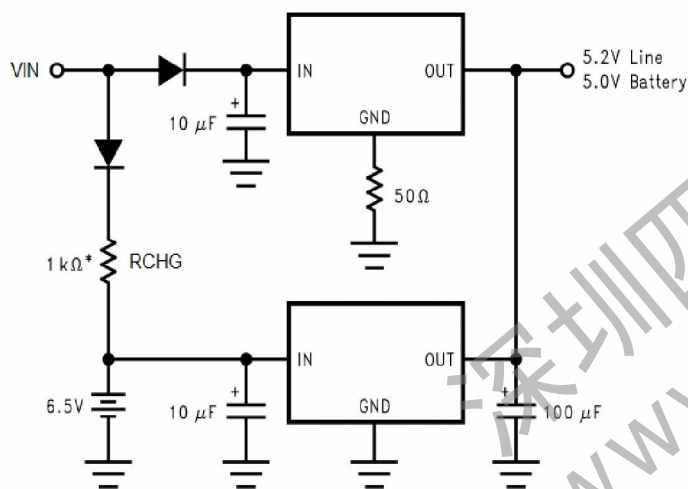
(1) Regulator with Reference



(2) Adjusting Output of Fixed Voltage Regulators

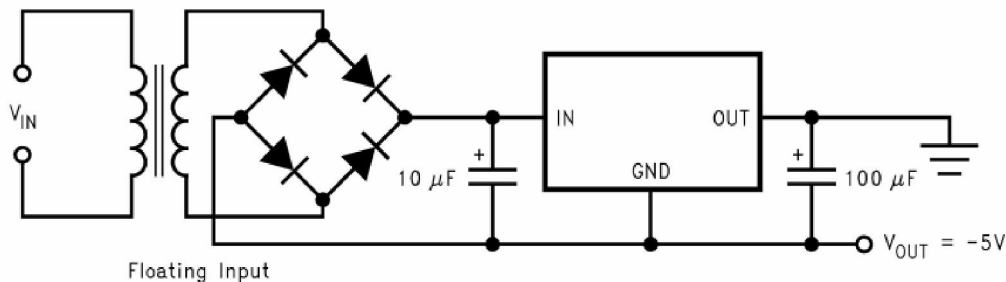


(3) Battery Backed-Up Power Supply



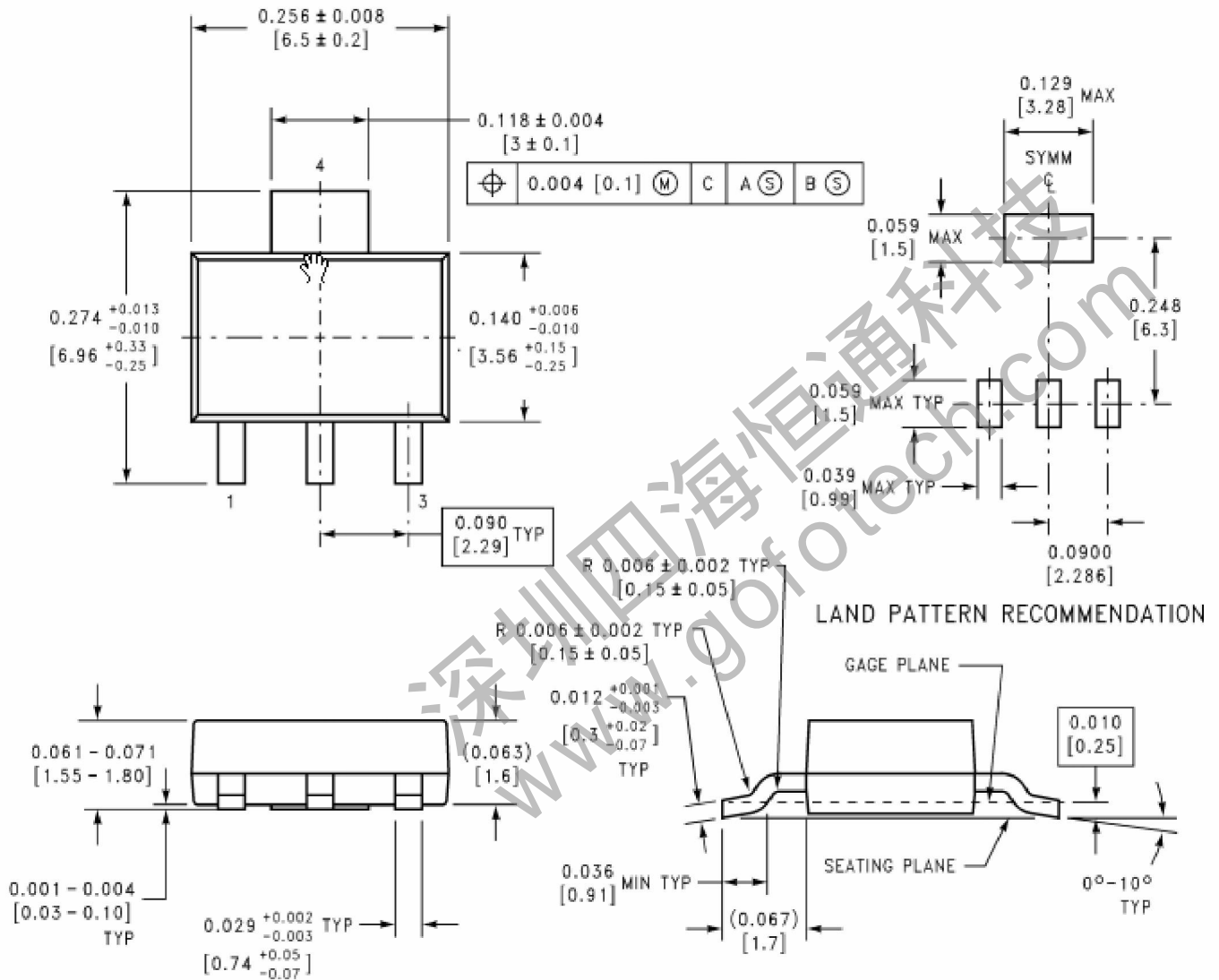
* Select for charge rate.

(4) Low Dropout Negative Supply

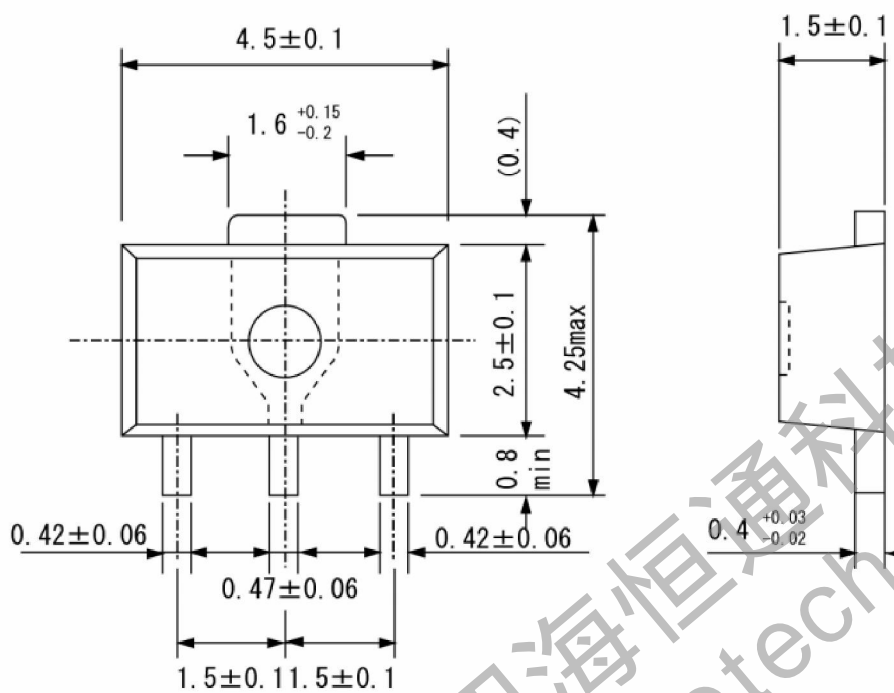


Packaging Information

SOT223



SOT89-3



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