40V, Low Power, High Accuracy, High PSRR LDO Regulators

Description

The ME6233 series are high accuracy, CMOS LDO Voltage Regulators, offering low power, high ripple rejection ratio and low dropout. the ME6233 series is ideal for today's cutting edge mobile phone. Internally the ME6233 includes a reference voltage source, error amplifiers, driver transistors, current limiters and phase compensators. The ME6233's current limiters' foldback circuit also operates as a short protect for the output current limiter and the output pin. The ME6233 series is also fully compatible with low ESR ceramic capacitors, reducing cost and improving output stability. This high level of output stability is maintained even during frequent load fluctuations, due to the excellent transient response performance and high PSRR achieved across a broad range of frequencies. The CE function allows the output of regulator to be turned off, resulting in greatly reduced power consumption.

Feature

- Maximum Output Current: 100mA（V_{IN}＝4.5V,V_{OUT}＝3.3V）
- Dropout Voltage: 116mV@I_{OUT} =10mA（V_{OUT}＝3.3V）
- Operating Voltage Range: 4.5V~40V
- Output Voltage Range: 1.6V~12.0V
- Highly Accuracy: ±1％
- Low Power Consumption: 3.5uA（TYP.）
- Standby Current: 0.4 uA（TYP.）
- High Ripple Rejection: 61dB@1KHz（ME6233C33）
- Line Regulation: 0.035％/V（TYP.）
- Built-in temperature protection and current limiting protection

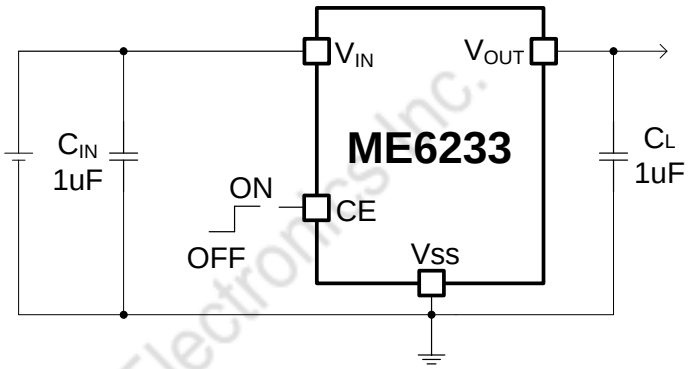
Applications

- Mobile phones
- Cordless phones, radio communication equipment
- Portable games
- Cameras, Video cameras
- Reference voltage sources
- Battery powered equipment

Package

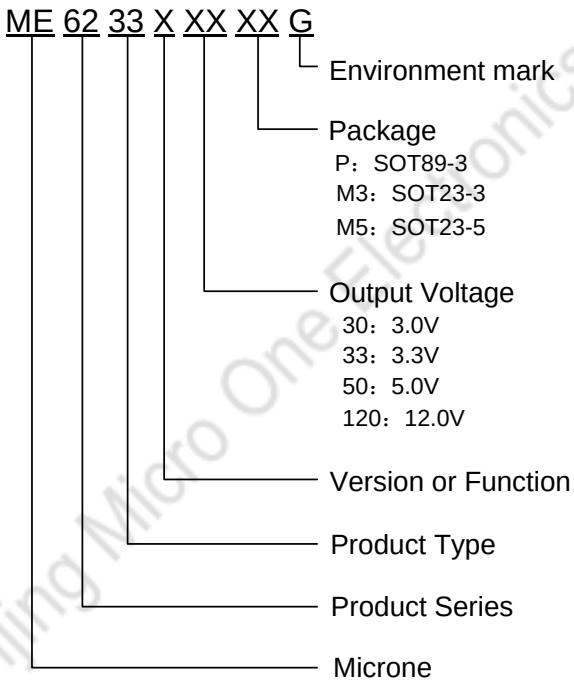
- 3-pin SOT23-3、SOT89-3
- 5-pin SOT23-5

Typical Application Circuit



Note: Ceramic capacitor with X7R and X5R offer improved voltage and temperature coefficients.10uF Ceramic capacitor is recommended for excellent load transient response and linne transient response.

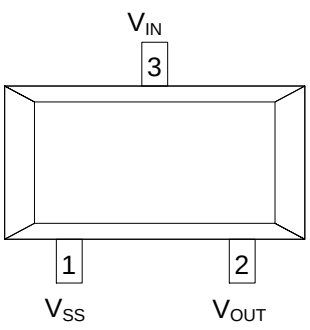
Selection Guide



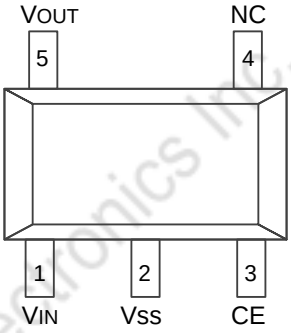
product serise	Product Function
ME6233A30M3G	V_{OUT}=3.0V；Package：SOT23-3
ME6233A33PG	V_{OUT}=3.3V；Package：SOT89-3
ME6233A50M3G	V_{OUT}=5.0V；Package：SOT23-3
ME6233A50PG	V_{OUT}=5.0V；Package：SOT89-3
ME6233A120PG	V_{OUT}=12.0V；Package：SOT89-3
ME6233C30M5G	Enable can be set；V_{OUT}=3.0V；Package：SOT23-5
ME6233C33M5G	Enable can be set；V_{OUT}=3.3V；Package：SOT23-5
ME6233C50M5G	Enable can be set；V_{OUT}=5.0V；Package：SOT23-5
ME6233C120M5G	Enable can be set；V_{OUT}=12.0V；Package：SOT23-5

NOTE: If you need other voltage and package, please contact our sales staff。

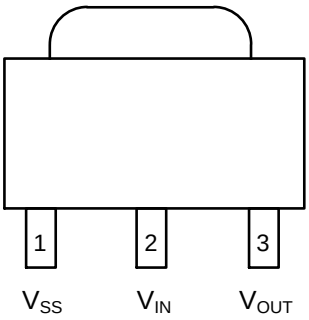
Pin Configuration（Top View）



SOT23-3



SOT23-5

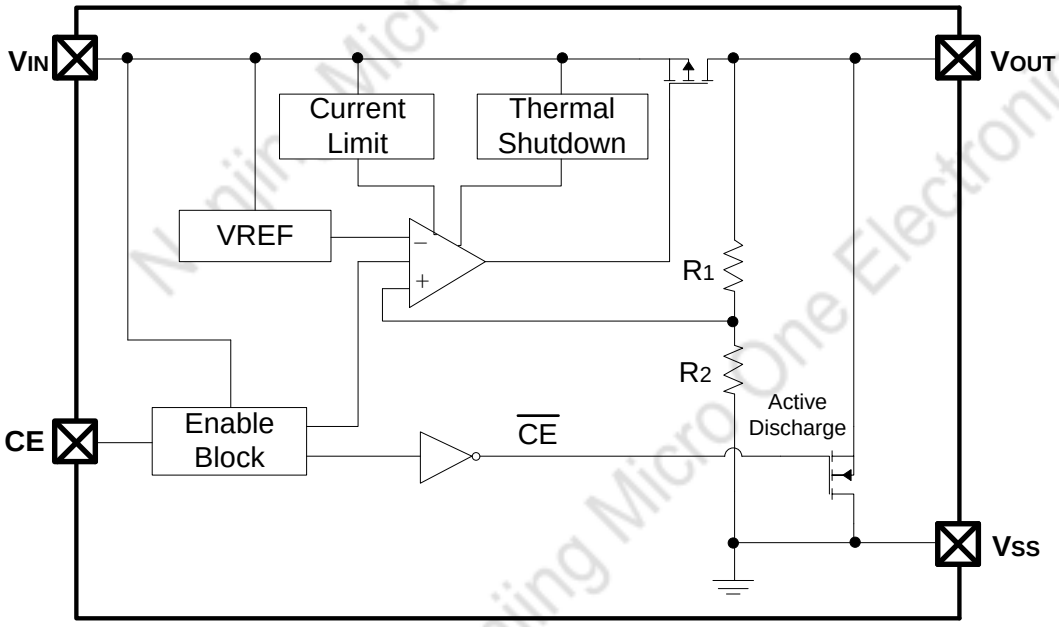


SOT89-3

Pin Assignment

PIN Number (SOT23-3)	PIN Number (SOT23-5)	PIN Number (SOT89-3)	symbol	Function
3	1	2	V_{IN}	Power Input
1	2	1	Vss	Ground
-	3	-	CE	ON/OFF Control
-	4	-	NC	No Connect
2	5	3	V_{OUT}	Output

Block Diagram



Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Voltage		V_{IN}	-0.3 ~ 40	V
CE Pin Voltage		V_{CE}	V_{IN} -0.3 ~ V_{IN}+0.3	V
V_{OUT} Voltage		V_{OUT}	V_{IN} -0.3 ~ V_{IN}+0.3	V
V_{OUT} Current		I_{OUT}	300	mA
Internal Power Dissipation（T_A=25℃）	SOT23-3	Pd	0.54	W
	SOT23-5		0.6	
	SOT89-3		1.25	
Thermal resistance (Junction to air)	SOT23-3	θ_{JA}	230	℃/W
	SOT23-5		210	
	SOT89-3		100	
Operating Ambient Temperature Range		T_{Opr}	-40~+85	℃
Storage Temperature Range		T_{stg}	-55~+150	℃
Maximum junction temperature		T_J	-40~+150	℃

Electrical Characteristic

(V_{IN}= V_{OUT}+1.5V，V_{CE} = V_{IN}，C_{IN}=C_L=1uF，Ta=25^{O}C , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Operating Input Voltage	V_{IN}		4.5	-	40	V
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=10mA,V_{IN}= V_{OUT}+2V	X 0.99	V_{OUT} (T) (Note 1)	X 1.01	V
Maximum Output Current	I_{OUTMAX}	V_{IN}= V_{OUT}+2V	-	100	-	mA
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT}+2V,1mA≤I_{OUT}≤100mA	-	11	-	mV
Dropout Voltage (Note 3)	V_{DIF}	I_{OUT}=10mA	-	0.116	-	V
		I_{OUT}=50mA	-	0.577	-	
		I_{OUT}=100mA	-	1.198	-	
Supply Current	I_{SS}	VIN= VOUT+2V VOUT<8V	-	3.5	6	μA
		VIN= VOUT+2V 8≤VOUT≤12V		5	7	
Stand-by Current	I_{CEL}	V_{CE}＝0V	-	0.4	1	μA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT} =10mA, V_{OUT}+2V ≤V_{IN}≤40V	-	0.01	-	%/V
Output Current Limit	I_{LIM}	Peak Output Current	-	211	-	mA
CE “High” Voltage	V_{CEH}	Start up	0.9	-	-	V
CE “Low” Voltage	V_{CEL}	Shut down	-	-	0.7	V
Active Output Discharge Resistance	R_{DIS}	V_{CE}<0.5V	-	1600	-	Ω
Ripple Rejection	PSRR	V_{IN} =5V+1VrmsAC , f=100Hz	-	63	-	dB

Rate(Note 4)		I_{OUT}=10mA	f=1kHz	-	61	-	
			f=10kHz	-	45	-	
Thermal Shutdown Temperature(Note 4)	T_{SD}	Temperature increasing, I_{OUT}=10mA		-	151	-	℃
Thermal Shutdown Hysteresis(Note 4)	ΔT_{SD}	Temperature falling		-	25	-	℃

NOTES：

1. V_{OUT} (T) ： Specified Output Voltage

2.V_{OUT} (E) ： Effective Output Voltage (Ie. The output voltage when "V_{OUT} (T)+1.0V"is provided at the Vin pin while maintaining a certain Iout value.)

3.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 Iout {V_{OUT} (T)+1.0V} is input.

4. guaranteed by design.

Typical Performance Characteristics

ME6233C33M5G （V_{CE} = V_{IN},Ta=25℃，CIN=CL=1uF，unless otherwise noted.）

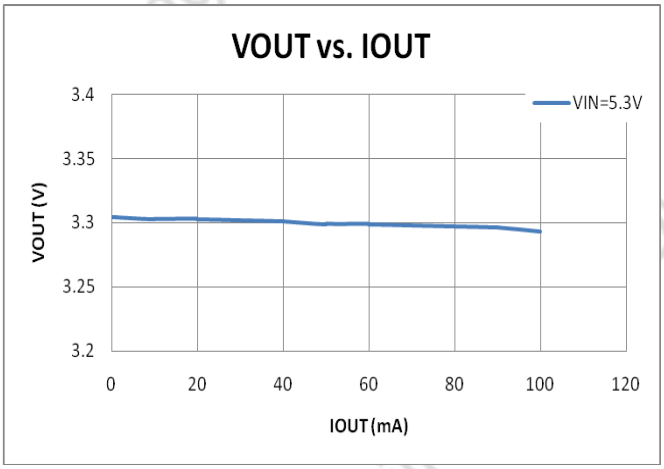


Figure 1. Output Voltage vs. Output Current

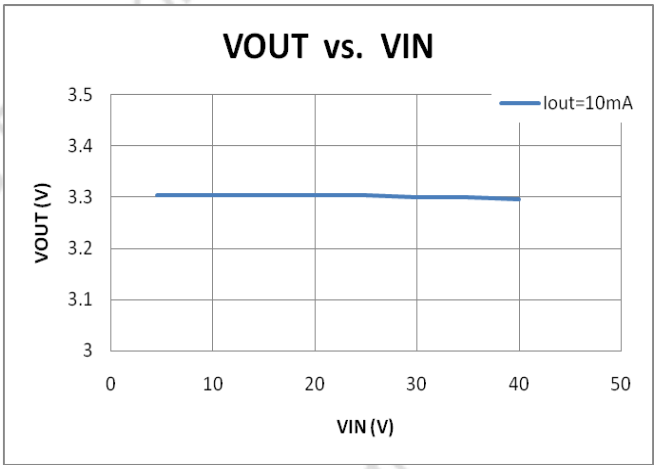


Figure 2. Output Voltage vs. Input Voltage

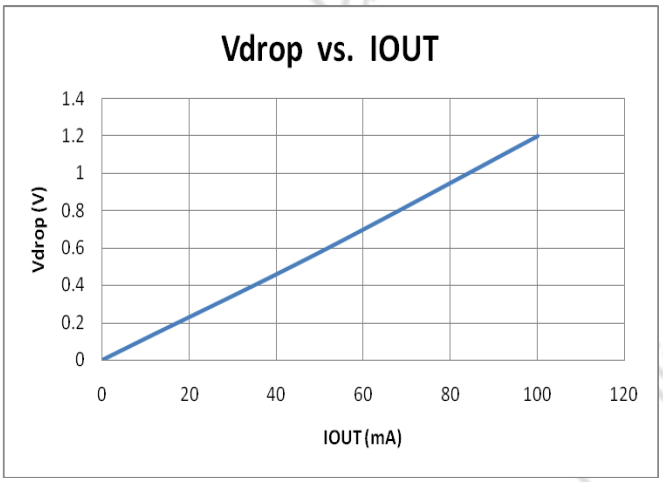


Figure 3. Dropout Voltage vs. Output Current

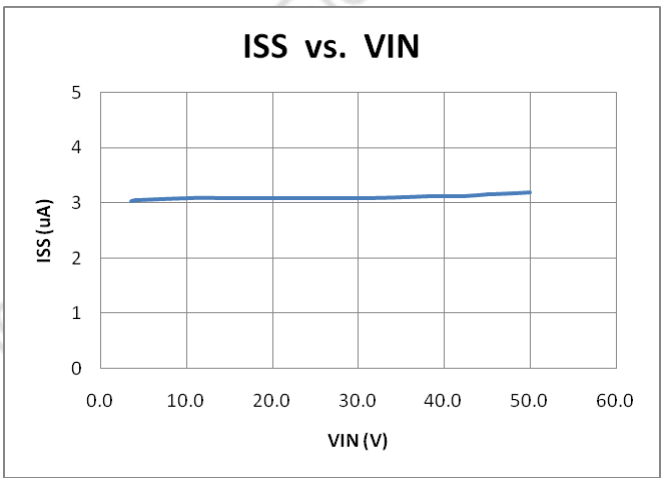


Figure 4.Quiescent Current vs. Input Voltage

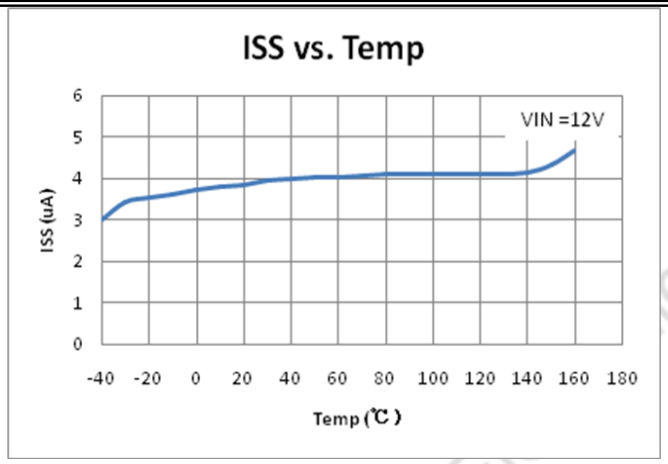


Figure 5. Quiescent Current vs. Temperature

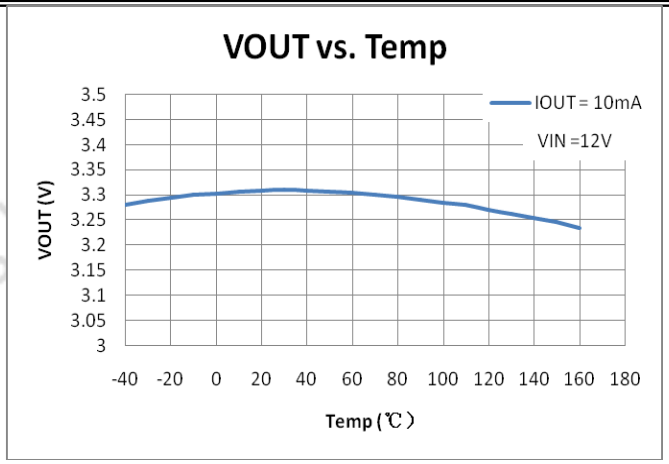


Figure 6. Output Voltage vs. Temperature

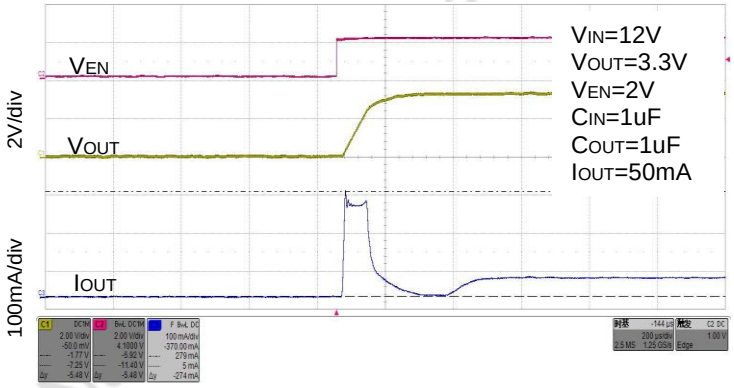


Figure 7. Enable Turn-on Response

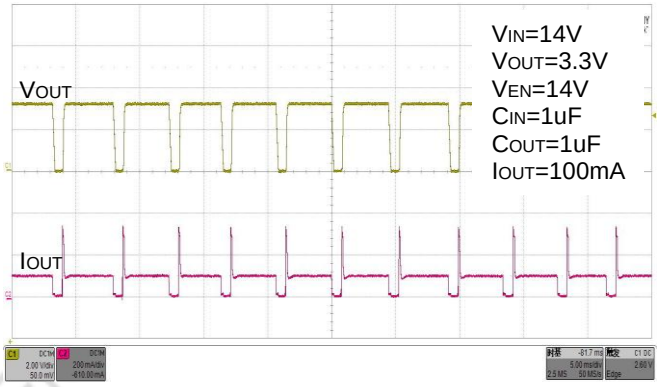


Figure8. Thermal Shutdown

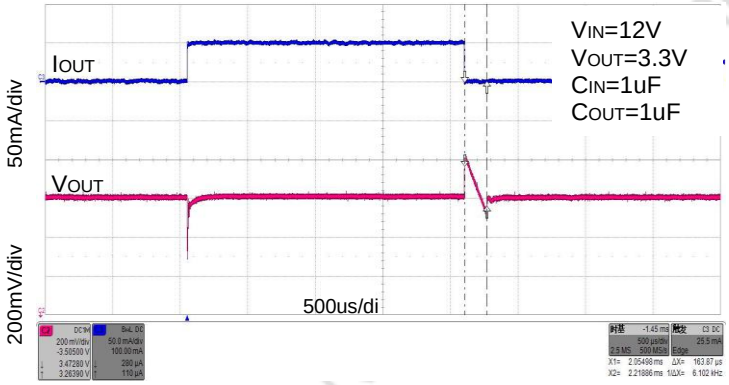


Figure 9. Load Transient Response
IOUT=1mA to 50mA

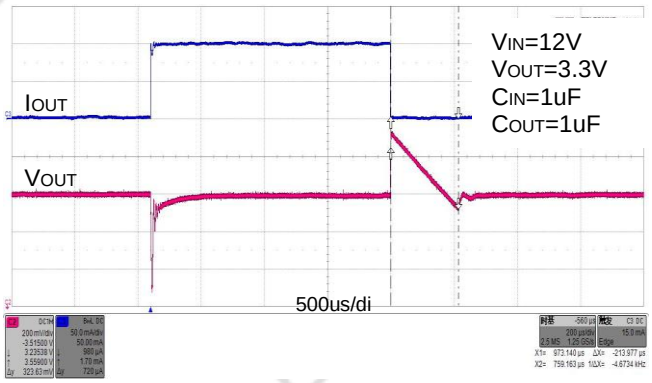


Figure 10. Load Transient Response
IOUT=10mA to 100mA

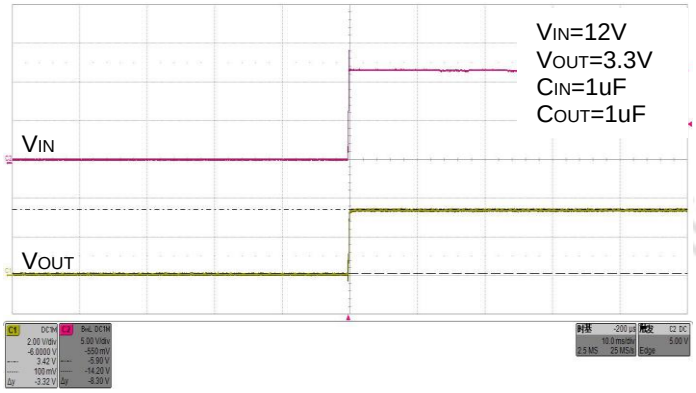


Figure 11. Single Hot plug and hot Un-plug

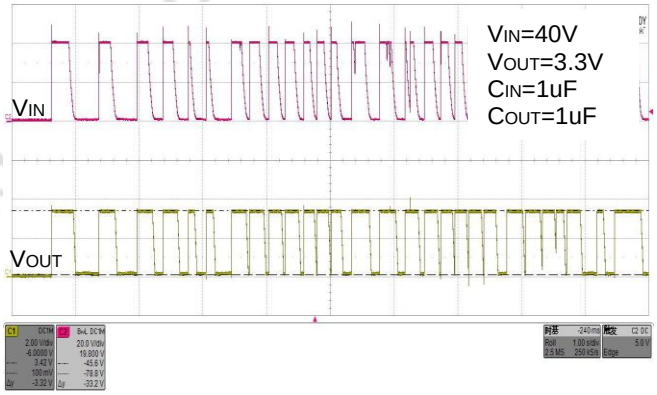
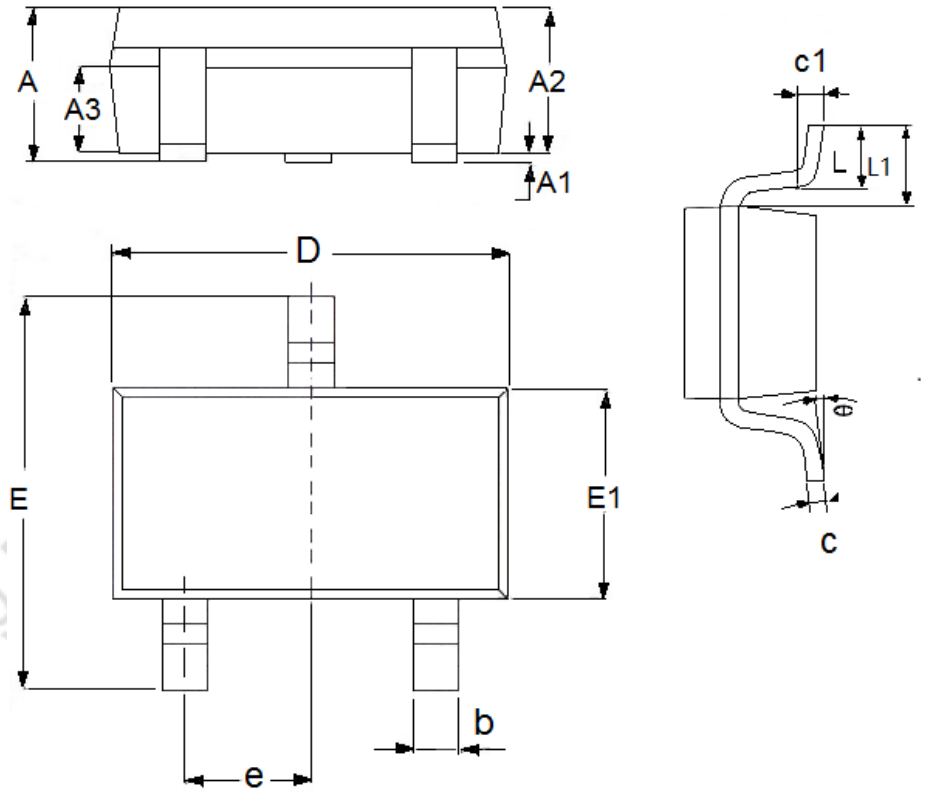


Figure 12. Continuous Hot plug and hot Un-plug

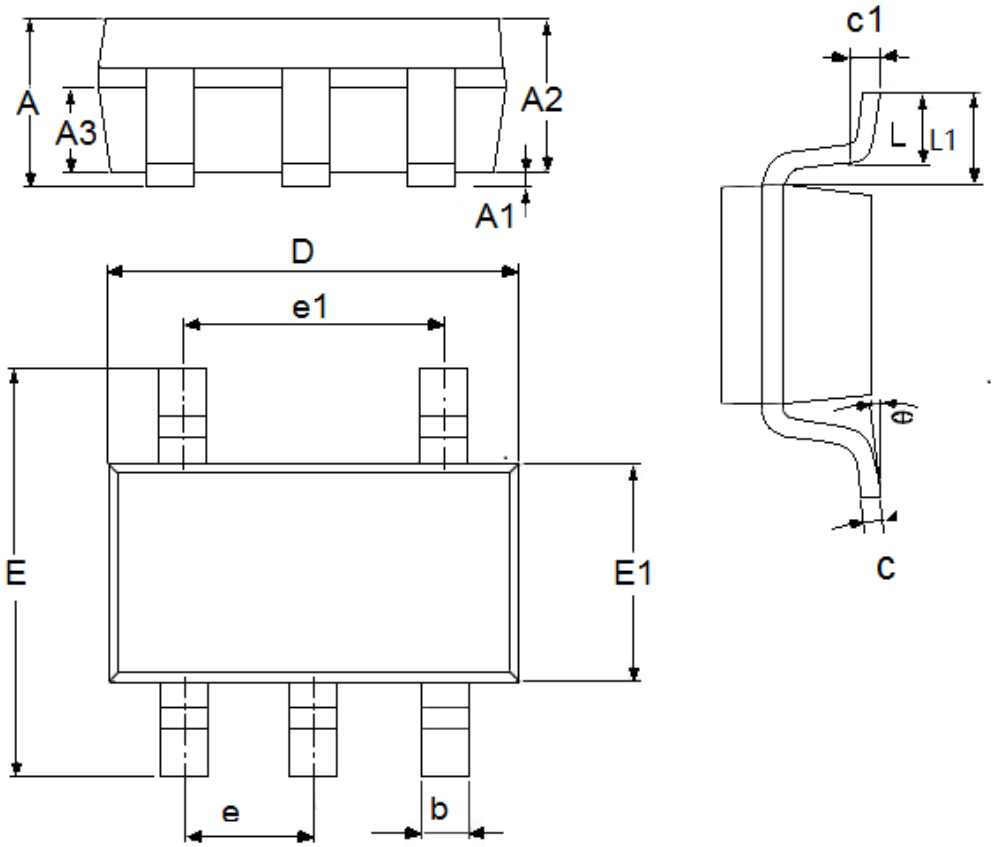
Packaging Information

- **Package Type:SOT23-3**



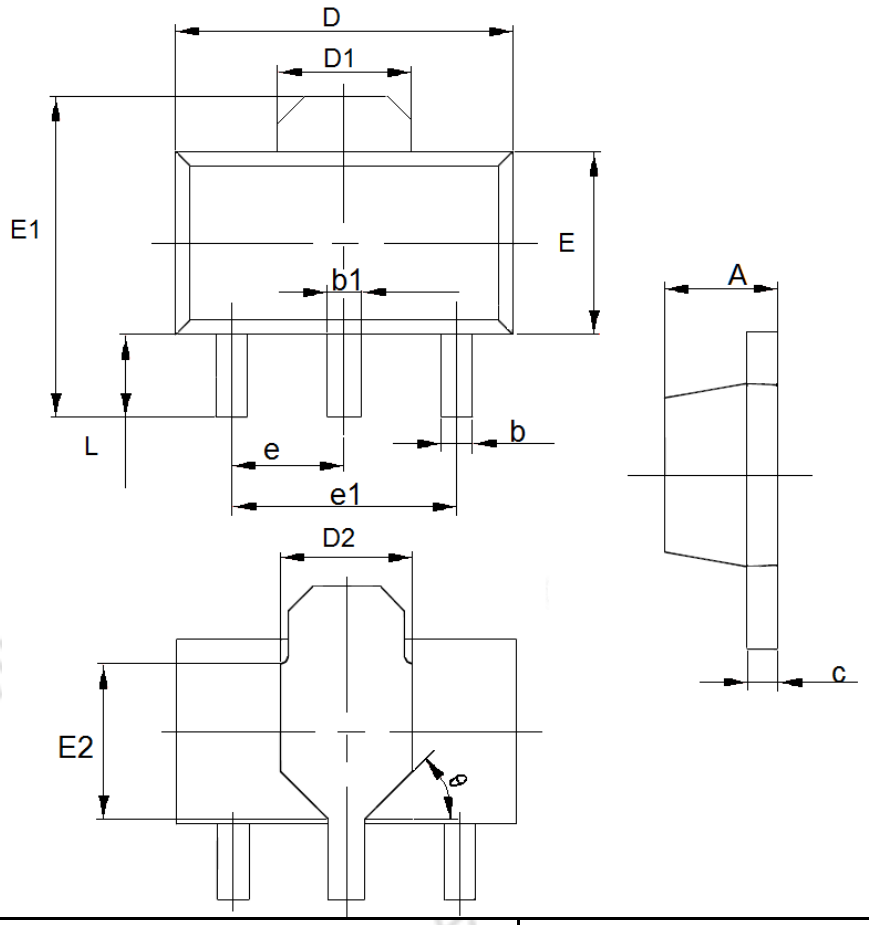
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.8	3.1	0.1102	0.1220
E	2.6	3.1	0.1023	0.1220
E1	1.5	1.8	0.0591	0.0709
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

- **Package Type:SOT23-5**



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.23	0.0039	0.0091
D	2.82	3.05	0.1110	0.1201
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.05	0.1024	0.1201
E1	1.5	1.75	0.0512	0.0689
e	0.95(TYP)		0.0374(TYP)	
L	0.3	0.6	0.0118	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

- **Package Type: SOT89-3**



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.0630
b	0.32	0.52	0.0126	0.0205
b1	0.4	0.58	0.0157	0.0228
c	0.35	0.45	0.0138	0.0177
D	4.4	4.6	0.1732	0.1811
D1	1.55(TYP)		0.061(TYP)	
D2	1.75(TYP)		0.0689(TYP)	
e1	3.0(TYP)		0.1181(TYP)	
E	2.3	2.6	0.0906	0.1023
E1	3.94	4.4	0.1551	0.1732
E2	1.9(TYP)		0.0748(TYP)	
e	1.5(TYP)		0.0591(TYP)	
L	0.8	1.2	0.0315	0.0472
θ	45°		45°	

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