## ❖ GENERAL DESCRIPTION

AMS1117 is a low dropout positive adjustable or fixed-mode regulator with minimum of 1A output current capability. The product is specifically designed to provide well-regulated supply for low voltage IC applications such as high-speed bus termination and low current 3.3V logic supply. AMS1117 is also well suited for other applications such as VGA cards. AMS117 is guaranteed to have lower than 1.4V dropout at full load current making it ideal to provide well-regulated outputs of 1.25 to 5.0 with VOUT+1.4V to 12V input supply VOLTAGE.

❖ FEATURES

- 1.4V maximum dropout at full load current
- Fast transient response
- Output current limiting
- Built-in thermal shutdown
- Good noise rejection
- MLCC Capacitors are available.
- 3-Terminal Adjustable or Fixed 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V
- Green (RoHS)
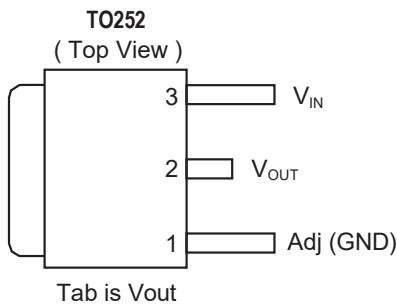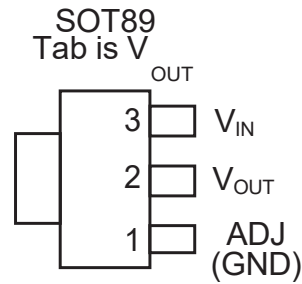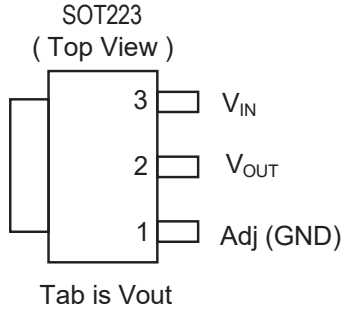- Packages: SOT223, TO252 and SOT89.

❖ BLOCK DIAGRAM

JYELECTRONICS
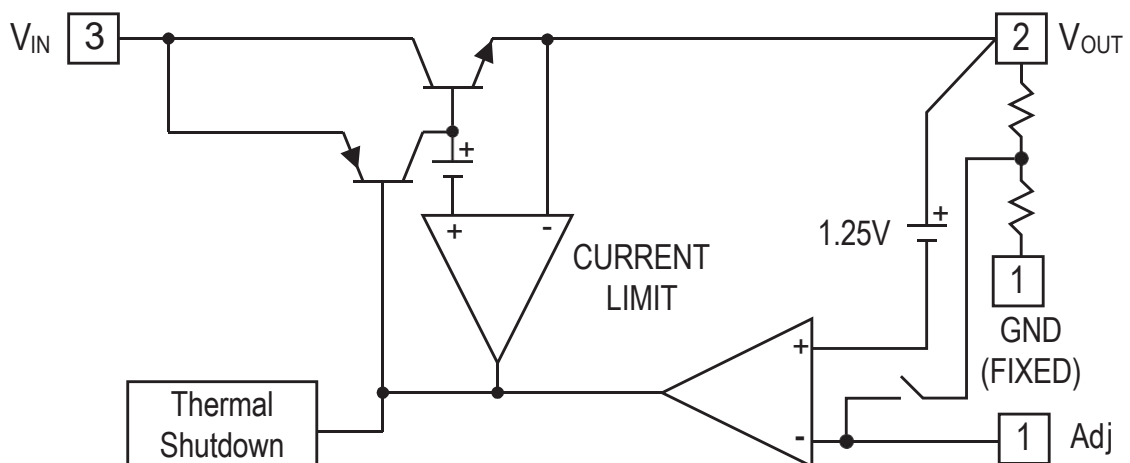
❖ **PIN ASSIGNMENT**

The packages of AMS1117 are SOT223-3L, TO252-3L and SOT89-3L; the pin assignment is given by:

SOT223
(Top View)

3 — V_{IN}
2 — V_{OUT}
1 — Adj (GND)

Tab is Vout

SOT89
Tab is V_{OUT}

3 — V_{IN}
2 — V_{OUT}
1 — ADJ (GND)

TO252
(Top View)

3 — V_{IN}
2 — V_{OUT}
1 — Adj (GND)

Tab is Vout

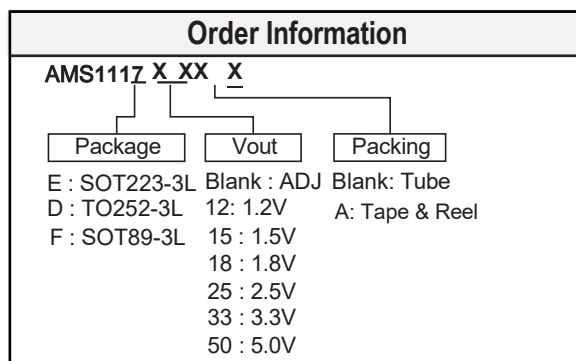| Name	Description
Adj (GND)	A resistor divider from this pin to the V_{OUT} pin and ground sets the output voltage. (Ground only for Fixed-Mode)
V_{OUT}	The output of the regulator. **(Note1,2)**
V_{IN}	The input pin of regulator. Typically a large storage capacitor is connected from this pin to ground to insure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 1.5V higher than V_{OUT} in order for the device to regulate properly. **(Note1)**

Note1: To prevent oscillation, a 0.2uF minimum X7R or X5R dielectric is strongly recommended if ceramics are used as output capacitors.
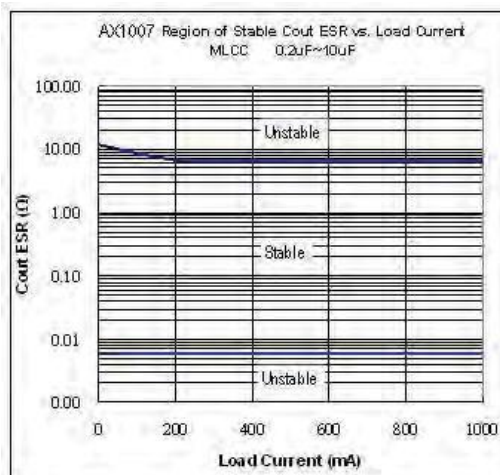
Note2: A minimum of 3.3uF EL capacitor to 100uF (10mΩ ≤ ESR ≤ 1Ω) must be connected from this pin to ground to insure stability.

❖ **ORDER/MARKING INFORMATION**

Order Information
AMS1117 **X XX X**
Package ┃ Vout ┃ Packing
E : SOT223-3L ┃ Blank : ADJ ┃ Blank: Tube
D : TO252-3L ┃ 12: 1.2V ┃ A: Tape & Reel
F : SOT89-3L ┃ 15 : 1.5V ┃
┃ 18 : 1.8V ┃
┃ 25 : 2.5V ┃
┃ 33 : 3.3V ┃
┃ 50 : 5.0V ┃

Part name	Packing	Quantity Per Reel
AMS1117	SOT223-3L	3000
	SOT89-3L	3000
	SOT252-3L	1000

❖ **ABSOLUT** MAXIMUM RATINGS

Characteristics		Symbol	Rating	Unit
DC Supply Voltage		V_{IN}	-0.3 to 15	V
Operating Junction Temperature Range		Top	-40 to +125	°C
Maximum junction Temperature		T_{MJ}	150	°C
Power Dissipation (Heat sink area 5mm*5mm.) $T_A=25^oC$, $T_J=125^oC$	SOT-223	P_D	1300	mW
	TO-252		2200	
	SOT89		620	
Power Dissipation (No heat sink ;No air flow) $T_A=25°C$, $T_J=125°C$	SOT-223	P_D	850	mW
	TO-252		1050	
	SOT89		330	
Storage Temperature		T_{ST}	-65 to 150	°C

❖ ELECTRICAL CHARACTERISTICS

(T_A=25°C, Under Operating Conditions)

Characteristics	Conditions		Min	Typ	Max	Units
Operation Input Voltage			2.7	-	12	V
Reference Voltage	AMS1117EA	I_{OUT} = 10mA, T_J=25°C, (V_{IN-OUT})=1.5V	1.225	1.250	1.275	V
Output Voltage	AMS1117-1.2	I_{OUT}=10mA , T_J = 25°C, 2.7V≤V_{IN}≤12V	1.176	1.200	1.224	V
	AMS1117-1.5	I_{OUT} = 10mA , T_J = 25°C, 3V≤V_{IN}≤12V	1.470	1.500	1.530	V
	AMS1117-1.8	I_{OUT} = 10mA, T_J = 25°C, 3.3V≤V_{IN}≤12V	1.764	1.800	1.836	V
	AMS1117-2.5	I_{OUT} = 10mA, T_J = 25°C, 4V≤V_{IN}≤12V	2.450	2.500	2.550	V
	AMS1117-3.3	I_{OUT} = 10mA, T_J = 25°C, 4.8V≤V_{IN}≤12V	3.235	3.300	3.365	V
	AMS1117-5.0	I_{OUT} = 10mA, T_J = 25°C, 6.5V≤V_{IN}≤12V	4.900	5.000	5.100	V
Line Regulation	AMS1117-XXX	I_{OUT} =10mA, V_{OUT}+1.5V< V_{IN}<12V, T_J=25°C **(Note 1,2)**	-	0.2	0.5	%
Load Regulation	AMS1117-ADJ	V_{IN}=2.7V,10mA≤I_{OUT} ≤1A, T_J=25°C **(Note 1,2)**	-	0.4	1	%
	AMS1117-1.2	V_{IN}=2.7V, 10mA≤I_{OUT}≤1A,, T_J=25°C **(Note 1,2)**	-	10	12	mV
	AMS1117-1.5	V_{IN}=3V, 10mA≤I_{OUT}≤1A,, T_J=25°C **(Note 1,2)**	-	12	15	mV
	AMS11171.8	V_{IN}=3.3V, 0mA≤I_{OUT}≤1A, T_J=25°C **(Note 1,2)**	-	15	18	mV
	AMS1117-2.5	V_{IN}=4V, 10mA≤I_{OUT}≤1A, T_J=25°C **(Note 1,2)**	-	20	25	mV

1A Low Dropout Linear Regulator

	AMS1117-3.3	V_{IN}=5V,10mA≤I_{OUT}≤1A, T_J=25°C **(Note 1,2)**	-	26	33	mV
	AMS1117-5.0	V_{IN}=6.5V,10mA≤I_{OUT}≤1A, T_J=25°C **(Note 1,2)**	-	40	50	mV
Dropout Voltage (V_{IN}-V_{OUT})	AMS1117-ADJ /1.2/1.5/1.8 /2.5/3.3/5.0	I_{OUT} = 1A , ΔV_{OUT}=1%V_{OUT}	-	1.2	1.4	V
Current Limit	AMS1117-ADJ/1.2/ 1.5/1.8/2.5/3.3/5.0	(V_{IN}-V_{OUT}) = 1.5V	1.0		1.8	A
Minimum Load Current	AMS1117-XXX	0°C≤Tj≤125°C	-	5	7	mA
Adjust pin current	AMS1117-ADJ	(V_{IN}-V_{OUT}) = 1.5V, I_{OUT}=10mA	-	50	100	uA
Ripple Rejection	F=120Hz, C_{OUT}=10μf, 0.2μf AMS1117-XX, (V_{IN}-V_{OUT}) = 1.		50	60	70	dB
Temperature Stability	5V I_{OUT}=10mA		-	0.5	-	%
Thermal shutdown Temp (Over temperature protect)			-	145	-	°C
Thermal Shutdown Hysteresis			-	40	-	°C
Lead Temperature			-	260	-	°C
θ_{JA} Thermal Resistance Junction-to-Ambient **(Note4)**		SOT-223	-	75		°C/W
		TO-252	-	45	-	
		SOT89	-	160	-	
Thermal Resistance Junction-to-Ambient (No heat sink ;No air flow)		SOT-223	-	117	-	°C/W
		TO-252	-	92	-	
		SOT89	-	300	-	
θ_{JC} Thermal Resistance Junction-to-Case		SOT-223	-	15	-	°C/W
		TO-252	-	10	-	
		SOT89	-	100	-	

Note1: See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

Note2: Line and load regulation are guaranteed up to the maximum power dissipation of 6W. Power dissipation is determined by the difference between input and output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Note3: Quiescent current is defined as the minimum output current required in maintaining regulation. At 12V input/output differential the device is guaranteed to regulate if the output current is greater than 10mA.
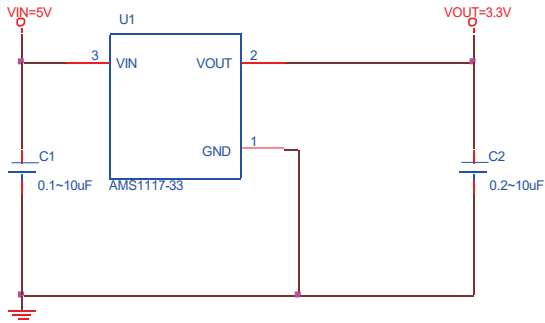
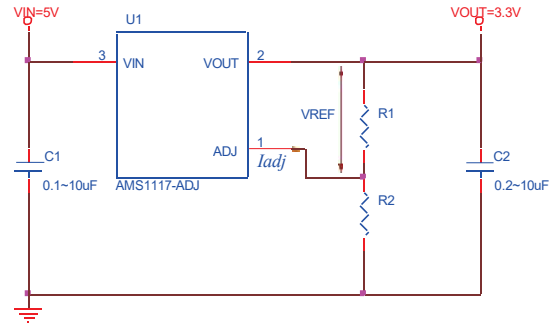Note4: Tab is connected to the multi-layer PCB cupper area 5mm*5mm.

❖ APPLICATION CIRCUIT

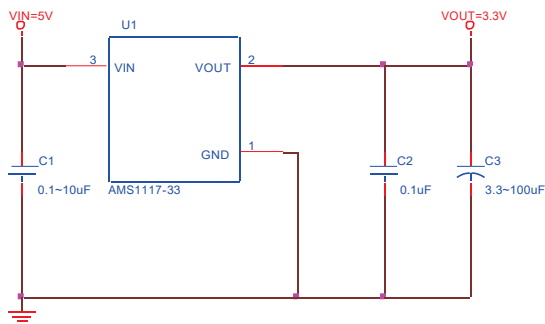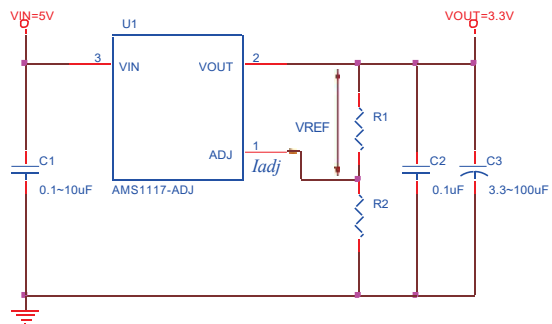### (1) Using Multilayer Ceramic Capacitor (MLCC)

Fixed Output

ADJ Output

$$V_{OUT} = V_{REF} \times (1 + \frac{R2}{R1}) + Iadj \times R2$$

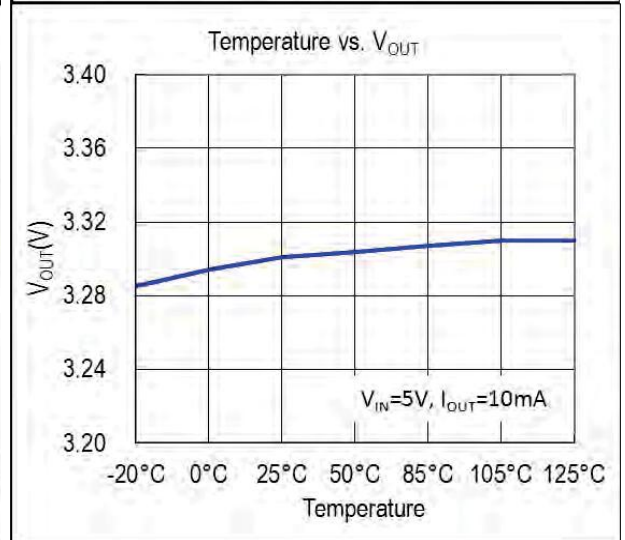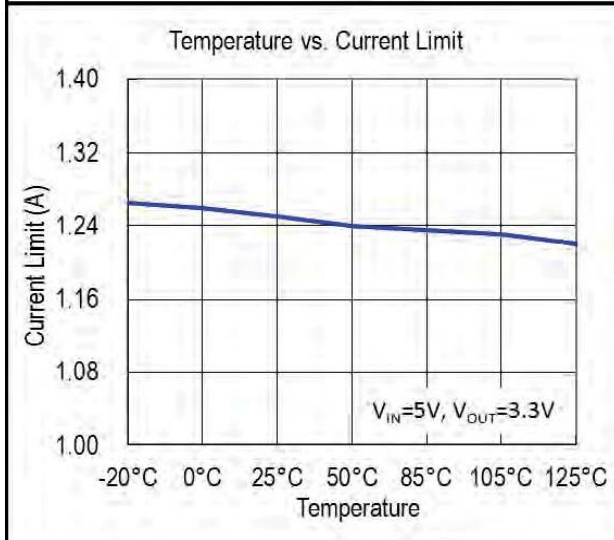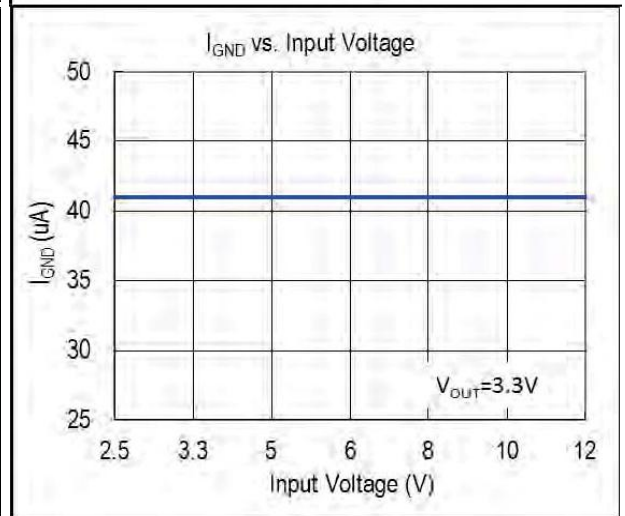### (2) Using Aluminum Electrolytic Capacitor (AL)

Fixed Output
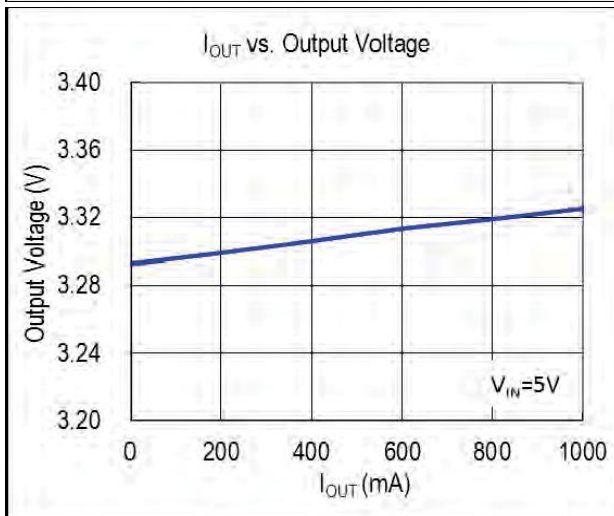
ADJ Output

$$V_{OUT} = V_{REF} \times (1 + \frac{R2}{R1}) + Iadj \times R2$$

JYELECTRONIC

❖ TYPICAL CHARACTERISTICS

Iout vs. Dropout Voltage

Line Regulation

I_{OUT}=10mA

I_{OUT} vs. Output Voltage

V_{IN}=5V

I_{GND} vs. Input Voltage

V_{OUT}=3.3V

Temperature vs. Current Limit

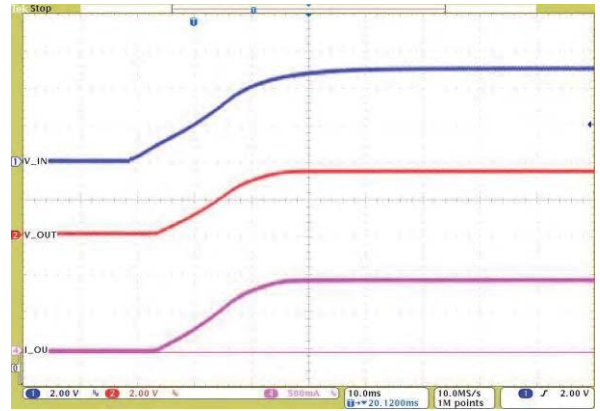V_{IN}=5V, V_{OUT}=3.3V

Temperature vs. V_{OUT}
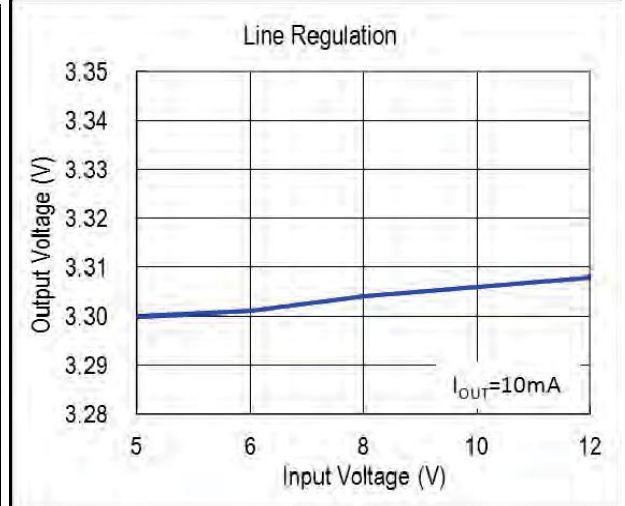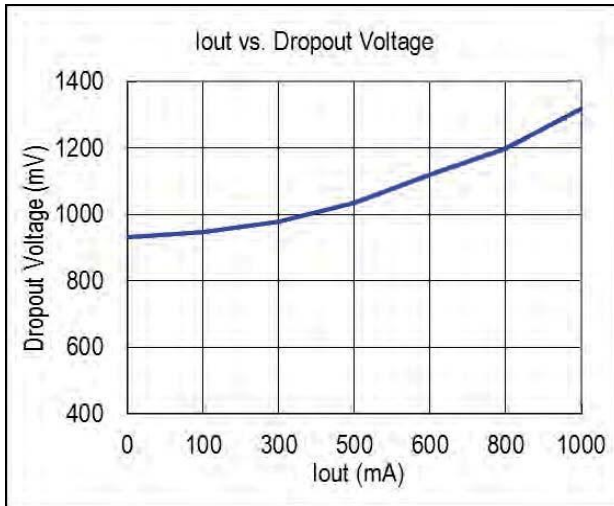
V_{IN}=5V, I_{OUT}=10mA

❖ TYPICAL CHARACTERISTICS (CONTINUOUS)

5→3.3V (I$_{OUT}$=300mA)

5→3.3V (I$_{OUT}$=1A)
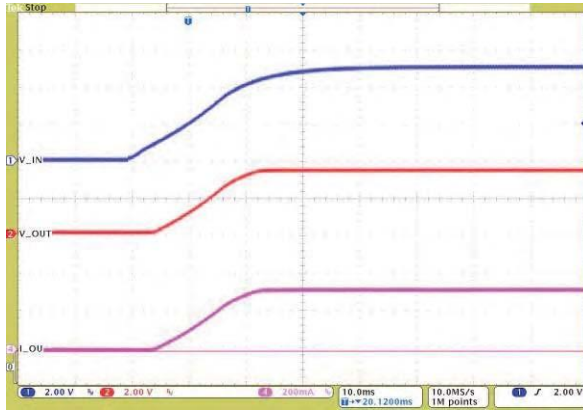
V$_{IN}$=5V, V$_{OUT}$=2.5V, I$_{OUT}$=0~600mA
C$_{IN}$=0.1u, C$_{OUT}$=0.2u MLCC

V$_{IN}$=5V, V$_{OUT}$=3.3V, I$_{OUT}$=100mA~1A,
C$_{IN}$=0.1u, C$_{OUT}$=0.2u MLCC
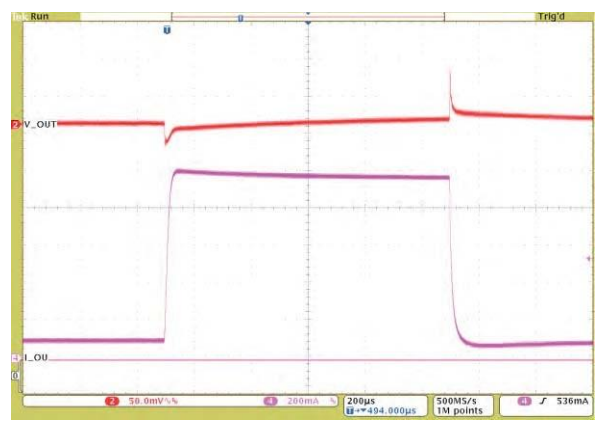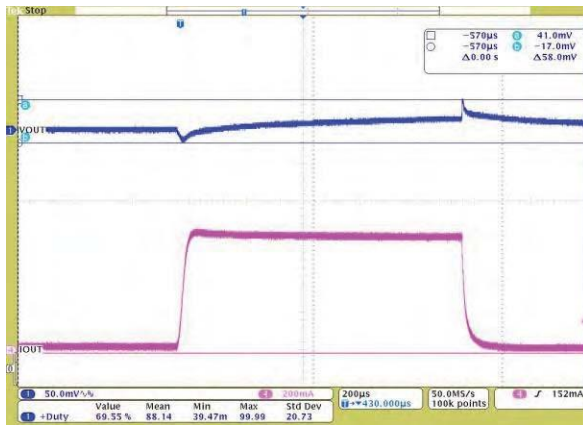
❖ PACKAGE OUTLINES

(1) SOT223-3L

  MSL-3

Land Pattern Recommendation (Unit: mm)

Seating Plane
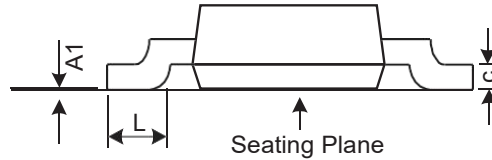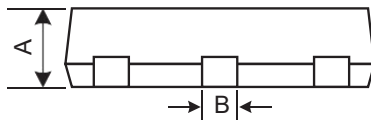
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	1.8	-	-	0.071
A1	0.02	0.06	0.1	0.001	0.002	0.004
B	0.66	0.75	0.84	0.026	0.03	0.033
B1	2.9	3	3.1	0.114	0.118	0.122
C	0.23	0.315	0.35	0.009	0.012	0.014
D	6.3	6.5	6.7	0.248	0.256	0.264
E	3.3	3.5	3.7	0.13	0.138	0.146
H	6.7	7	7.3	0.264	0.278	0.287
L	0.75	-	-	0.03	-	-
K	1.5	1.75	2	0.059	0.069	0.079
e	2.3 Basic			0.091 Basic		
e1	4.6 Basic			0.181 Basic		

(2) TO252-3L
MSL-3

Land Pattern Recommendation (Unit: mm)

SEATING PLANE
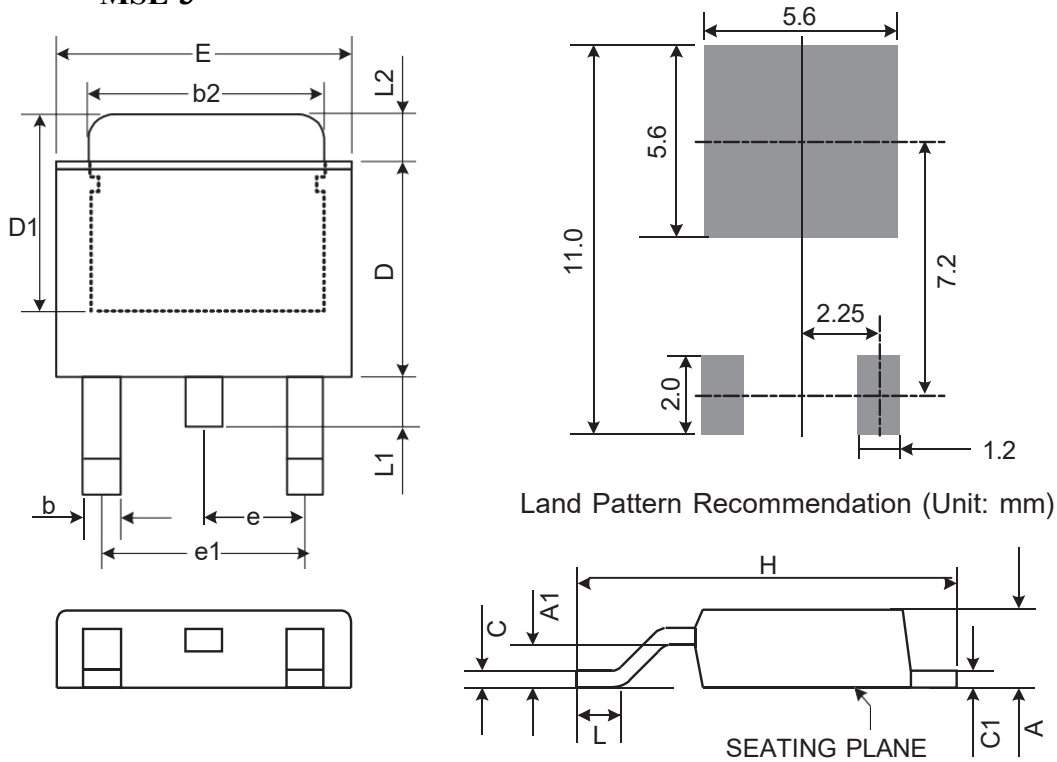
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	2.18	2.29	2.39	0.086	0.09	0.094
A1	-	-	0.13	-	-	0.005
b	0.51	0.71	0.89	0.02	0.028	0.035
b2	4.95	5.21	5.46	0.195	0.205	0.215
C	0.46	0.53	0.61	0.018	0.021	0.024
C1	0.46	0.53	0.58	0.018	0.021	0.023
D	5.33	5.46	5.59	0.21	0.215	0.22
D1	4.57	-	-	0.18	-	-
E	6.35	6.55	6.73	0.25	0.258	0.265
e	2.29 BSC			0.090 BSC.		
e1	4.58 BSC			0.180 BSC.		
H	9.4	9.7	10.4	0.37	0.382	0.41
L	1.4	1.6	1.78	0.055	0.063	0.07
L1	-	-	1.02	-	-	0.04
L2	1.52	1.78	2.03	0.06	0.07	0.08

Mold flash shall not exceed 0.005inch per side
JEDEC outline: TO-252 AB

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(3) SOT89-3L

MSL-3

Land Pattern Recommendation (Unit: mm)
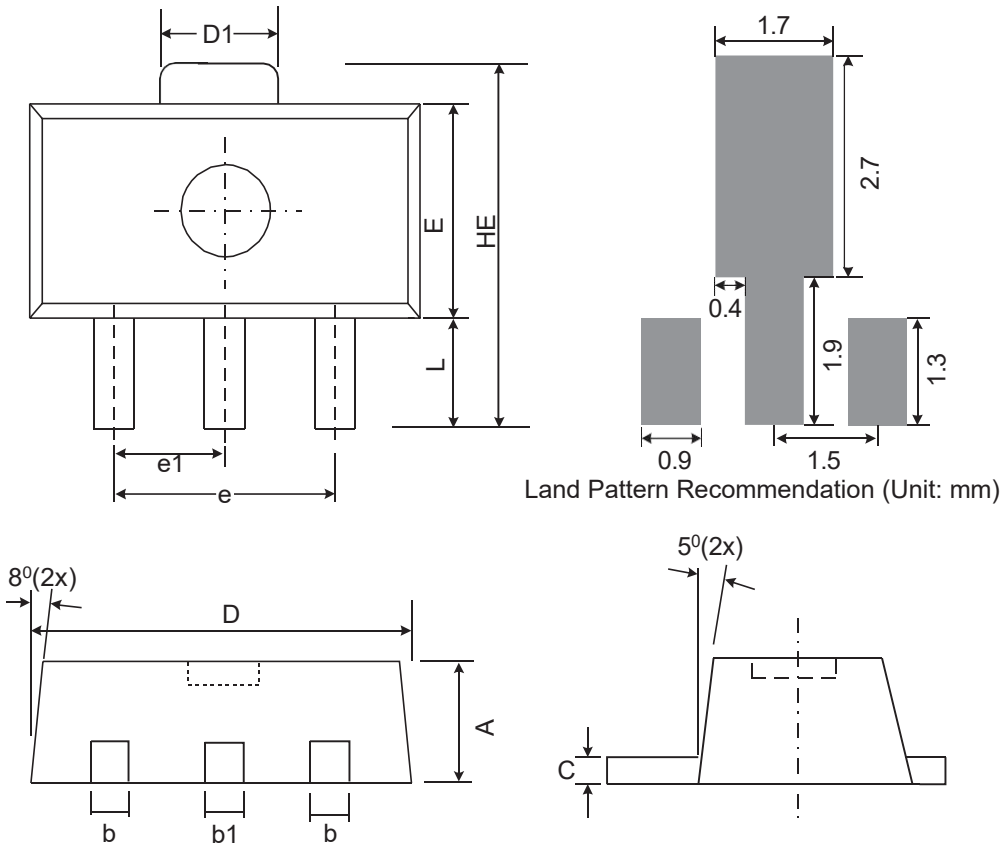
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.50	1.60	0.055	0.059	0.063
b	0.36	0.42	0.48	0.014	0.017	0.019
b1	0.44	0.50	0.56	0.017	0.02	0.022
C	0.35	0.40	0.44	0.014	0.016	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.35	1.59	1.83	0.053	0.063	0.072
e	3.0 BSC			0.118 BSC		
e1	1.5 BSC			0.059 BSC		
E	2.29	2.45	2.60	0.09	0.097	0.102
HE	3.94	4.10	4.25	0.155	0.161	0.167
L	0.80	1.00	1.20	0.031	0.04	0.047

Carrier Dimensions

SOT223-3L
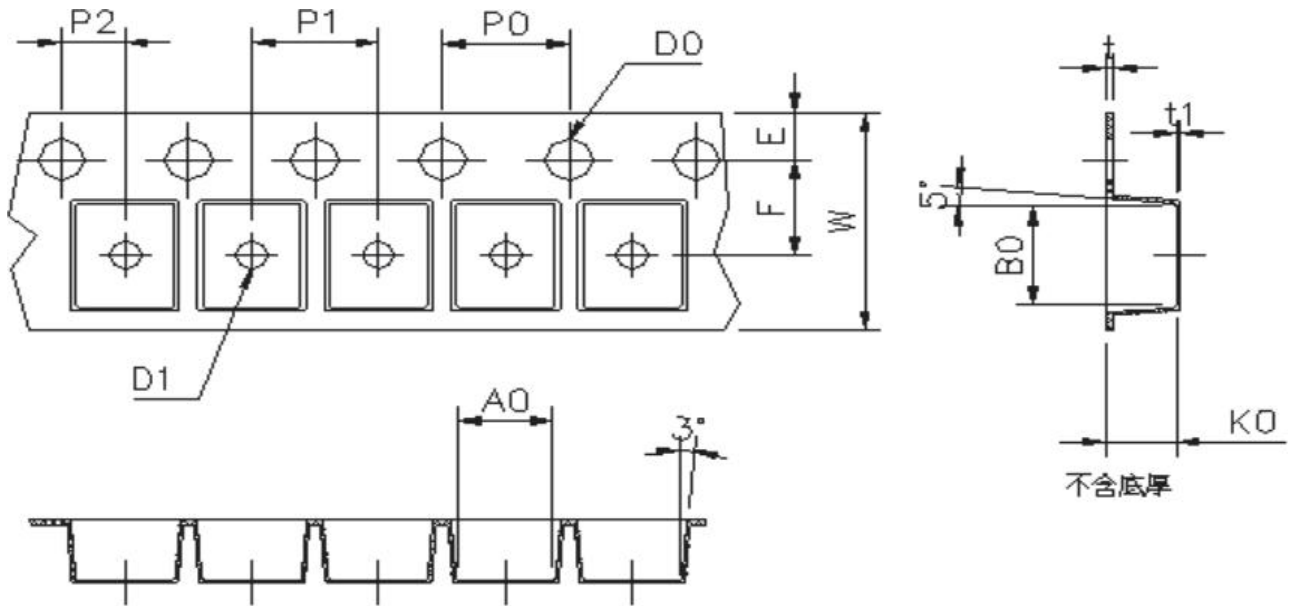
Symbol	Spec	Symbol	Spec
W	12.00±0.10	A_0	7.00±0.10
E	1.75±0.10	B_0	7.27±0.10
F	5.50±0.10	K_0	1.85±0.10
D_0	1.50 (+0.10; −0)	$10*p_0$	40.00±0.20
D_1	1.50 (+0.10; −0)		
P_0	4.00±0.10		
P_1	8.00±0.10		
P_2	2.00±0.10		
t	0.25−0.28		
t_1	0.05以上		

Carrier Dimensions

SOT89-3L

不含底厚
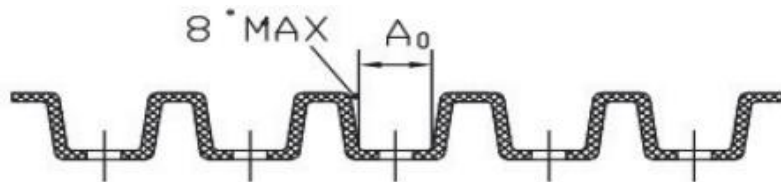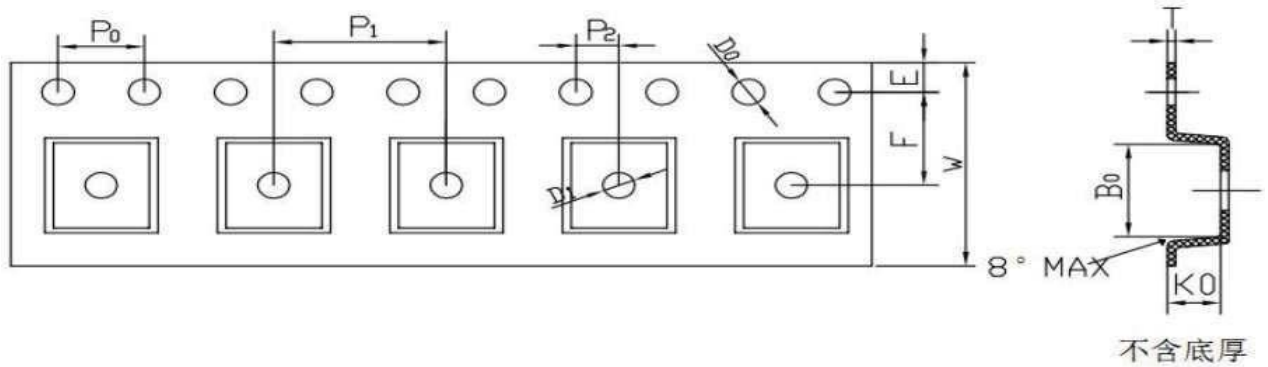
Symbol	Spec	Symbol	Spec
W	12.00±0.10	A_0	4.90±0.10
E	1.75±0.10	B_0	4.50±0.10
F	5.50±0.05	K_0	1.85±0.10
D_O	1.50 (+0.10, -0)		
D_1	1.50 (+0.10, -0)		
P_0	4.00±0.10		
P_1	8.00±0.10		
P_2	2.00±0.05		
t	0.25-0.28		
t_1	0.05以上		

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