1A Adjustable/Fixed Positive Low Dropout Linear Regulator

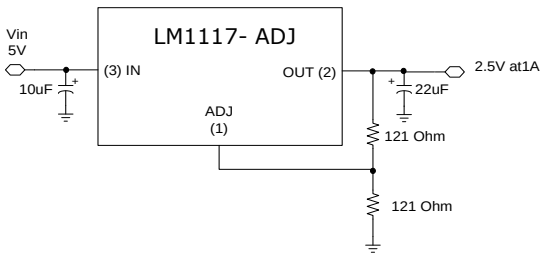
DESCRIPTION

The LM1117 -1.2, adj., -1.5, -1.8, -2.5, -3.3 and -5.0 are low dropout three-terminal regulators with 1A output current capability. These devices have been optimized for low voltage where transient response and minimum input voltage are critical.

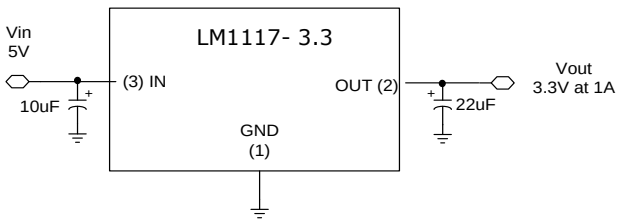
FEATURES

- Adjustable or fixed output(1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5V)
- Output Current of 1A
- Safe Operating Area (SOA) Protection
- Over Voltage Protection (OVP)
- Over Current Protection (OCP)
- Thermal shutdown protection
- Low dropout, 1.1V Typical at 1A output current
- Operating temperature range : -40℃ ~ +125℃
- Halogen-Free Package is Available
- High Level ESD Protection : 500V (MM), 5KV (HBM)

TYPICAL APPLICATIONS



<LM1117- ADJ>

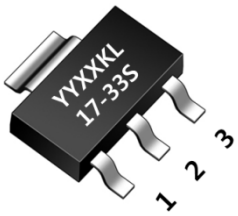


<LM1117- 3.3>

Pin Connection (Top View)

SOT-89

(4.5mm x 4.1mm)



SOT-223

(6.3mm x 7mm)

TO-252

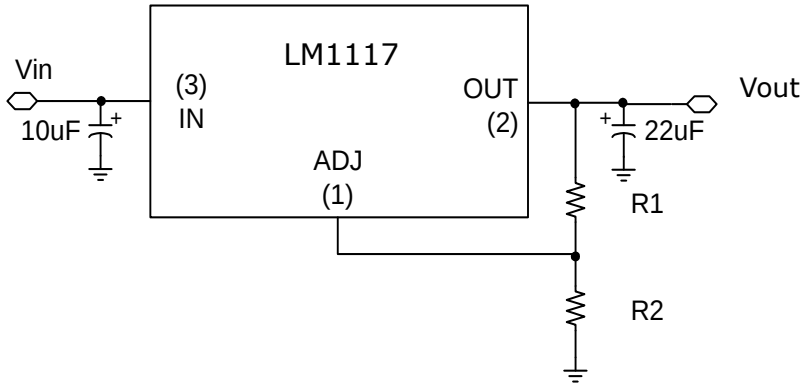
(6.4mm x 9.44mm)

PIN INFO. 1. GND/ADJ PIN 2. OUTPUT PIN 3. INPUT PIN

Tab (Heat sink) is Vout

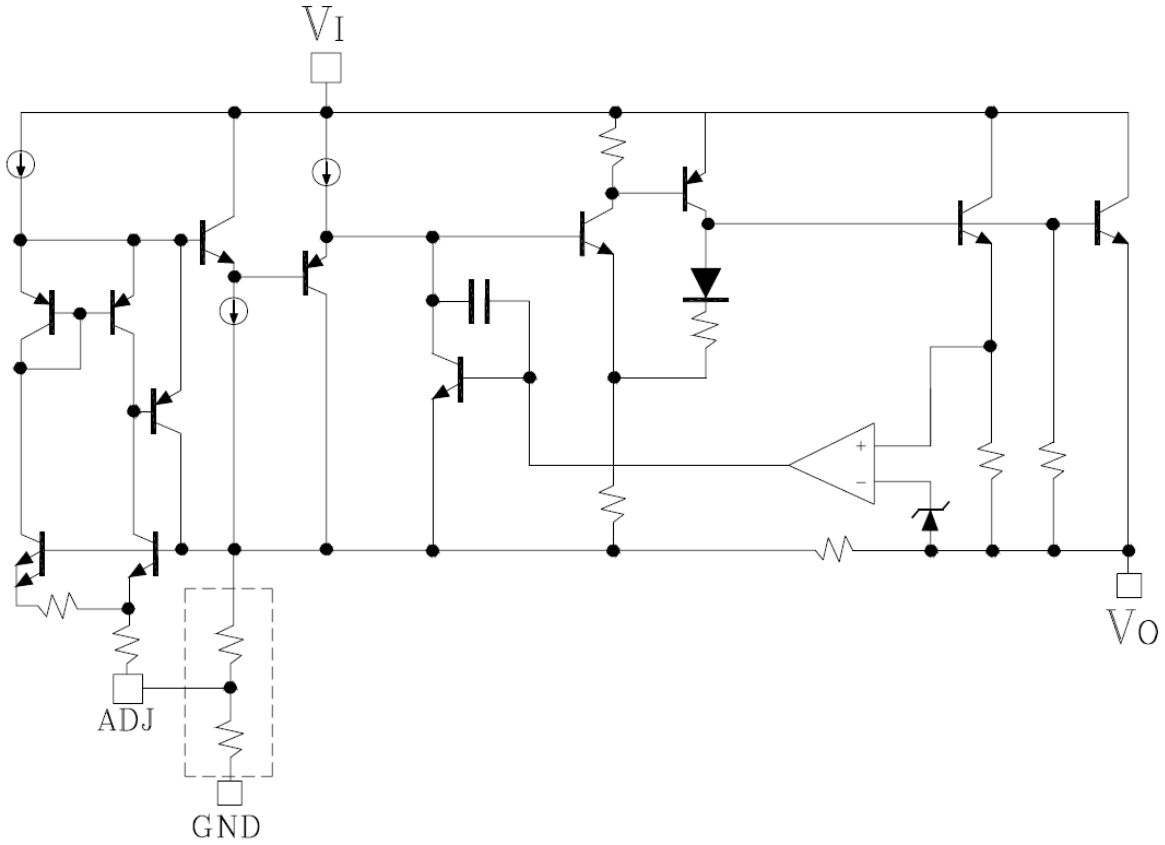
Application Summary

[Calculation of adjustable output voltage]



$$V_{OUT} = V_{REF}(1 + R2/R1) + I_{ADJ} \bullet R2$$

Block Diagram



Ordering Information

Part No	Package	Packing	Finish	Halogen	Reel Unit	Remark
LM1117S-XX	SOT-223	Reel & Tape	Sn	Free	2,500ea	XX : Output Voltage option *
LM1117R-XX	TO-252	Reel & Tape	Sn	Free	2,500ea	XX : Output Voltage option *
LM1117Q-XX	SOT-89	Reel & Tape	Sn	Free	1,000ea	XX : Output Voltage option *

* Voltage option (XX) : 1.2V(1.2), 1.5V(1.5), 1.8V(1.8), 2.5V(2.5), 3.3V(3.3),5.0V(5.0),ADJ(ADJ)

Maximum Ratings (TA=25 ℃, unless otherwise noted)

Rating	Symbol	Value			Unit
Input Voltage	VI	16			V
Power Dissipation	PD	SOT-89	SOT-223	TO-252	W
	†	0.4	1.0	1.4	
	*	0.5	1.4	2.7	
Storage Junction Temperature	Tstg	-55 ~ +150			℃
Operating Temperature Range	Topr	-40 ~ +125			℃
Junction Temperature Range	Tj	+150			℃

† TA=25 ℃, No Heat Sink

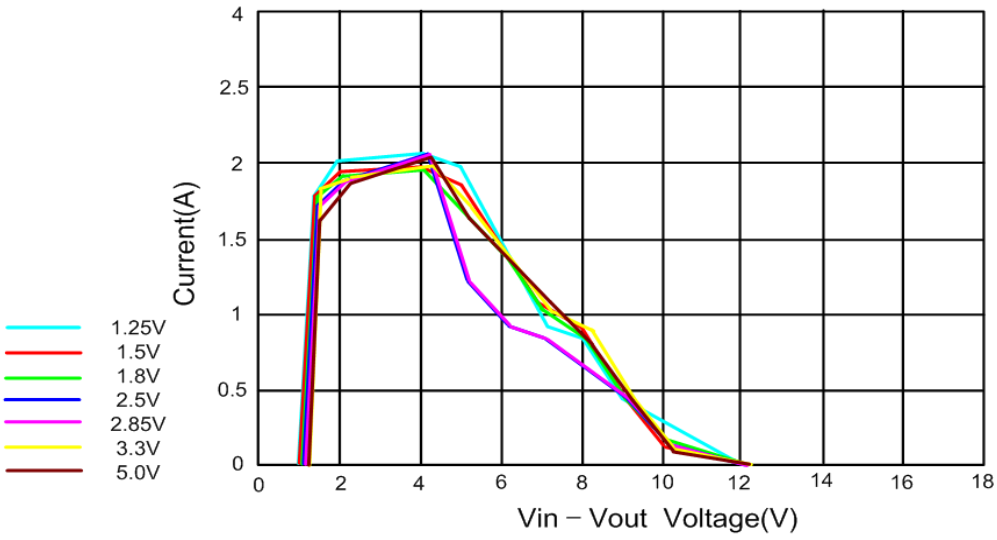
* Mounted on a glass epoxy PCB Board (25.4 mm x 25.4 mm)

Stresses exceeding Maximum ratings may damage the device. Maximum ratings are stress ratings. Functional operation above the recommended operating conditions is not implied.
Extended exposure to stresses the above the recommended operating conditions may affect device reliability.

Recommended Operating Condition

Characteristic	Symbol	Min	Max	Units
Input voltage	Vin	Vout+1.5	Vout+7	V
Output current	Iout	10	1000	mA

Safe Operating Area



Electrical characteristics

Operating Conditions: Vin -Vout ≤7V, TJ= 0℃~125℃ unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Reference Voltage	Vref	LM1117 10mA<Iout<1A /,1.5V<(Vin-Vout)<13.75V	1.219	1.250	1.281	V
Output Voltage	Vout	LM1117-1.2 10mA < Iout < 1A, / 3.0V < Vin < 12V	1.152	1.200	1.248	V
		LM1117-1.5 10mA < Iout < 1A, / 3.0V < Vin < 12V	1.470	1.500	1.530	V
		LM1117-1.8 10mA < Iout < 1A, / 3.3V < Vin < 12V	1.764	1.800	1.836	V
		LM1117-2.5 10mA < Iout < 1A, / 4.0V < Vin < 12V	2.450	2.500	2.550	V
		LM1117-3.3 10mA < Iout < 1A, / 4.8V < Vin < 12V	3.234	3.300	3.366	V
		LM1117-5.0 10mA < Iout < 1A, / 6.5V < Vin < 15V	4.90	5.000	5.100	V
Line Regulation 1.2	dVout1	LM1117 Iout = 10mA, (VOUT+1.5V) < Vin < 12V	-	0.05	0.4	%

Notes:

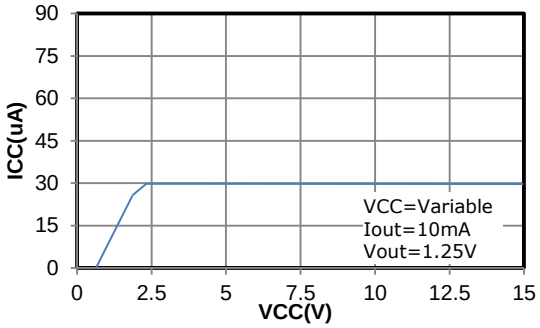
1. See thermal regulation specifications for changes in output voltage due to heating effects. Load and line regulation are measured at a constant junction temperature by low duty cycle pulse testing.
2. Line and load regulation are guaranteed up to the maximum power dissipation. Power dissipation is determined by input/output differential and the output current. Guaranteed Maximum output power will not be available over the full input/output voltage range.

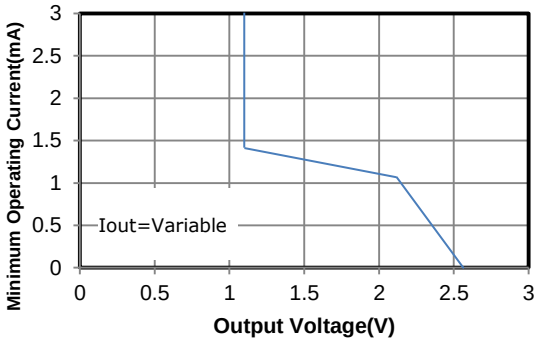
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Load Regulation	dVout2	LM1117 (Vin - Vout) = 2.0V, 10mA < Iout < 1A	-	0.1	0.5	%
Dropout voltage	Vdrop	Iout = 1A	- -	1.100	1.25	V
Quiescent current	Iq	Vin =Vout+1.25V	-	5	10	mA
Ripple Rejection	RR	f = 120Hz, Cout = 22uF Tantalum, (Vin-Vout) = 3V, Iout=500mA	60	72	-	dB
Current Limit	Ilimit	(Vin - Vout) = 2V	1.1	1.5	-	A
Adjust Pin Current 3.4	Iadj		-	35	120	uA
Adjust Pin Current Change 3.4	Ichg	10mA < Iout < 1A 1.5V < (Vin - Vout) < 7V	-	0.2	5	uA
Minimum Load Current	Imin	VIN=VOUT+1.5V	-	2	10	mA
Temperature Stability	Stable	Ta=125^{O}C, 1000hrs	-	0.5	-	%
RMS Output Noise (% of VOUT)	Vn	TA=25^{O}C 10Hz < f < 10kHz	-	0.003	-	%
Thermal Shutdown	Tsd	Junction Temperature	-	160	-	^{O}C
Thermal Shutdown Hysteresis	Thys		-	15	-	^{O}C

Notes:

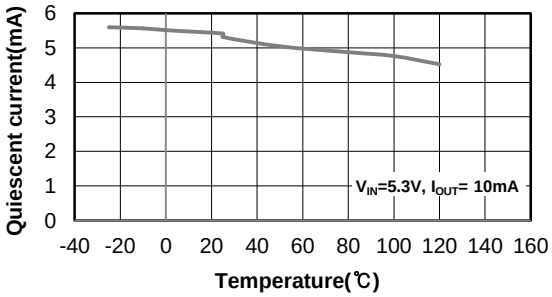
3. LM1117 ADJ
4. Output current must be limited to meet the absolute maximum ratings of the part.

Electrical Characteristic Curves

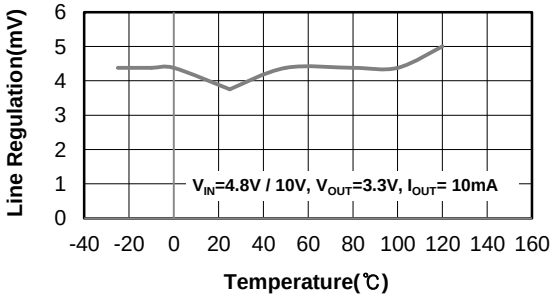




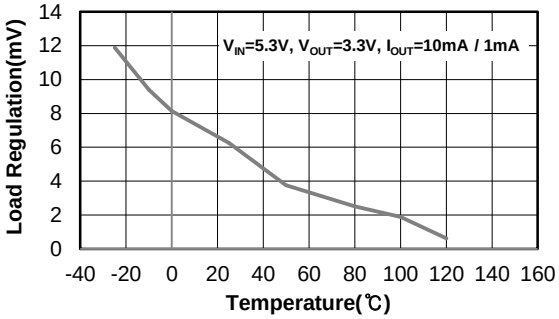
Quiescent current vs temperature



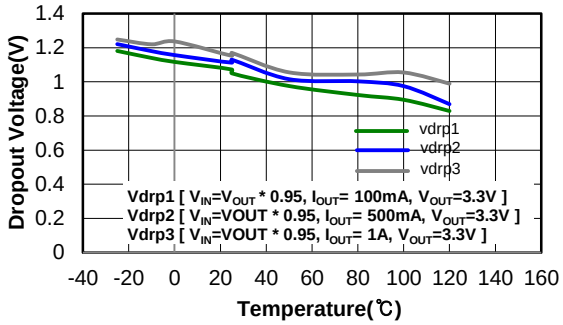
Line Regulation vs. Temperature



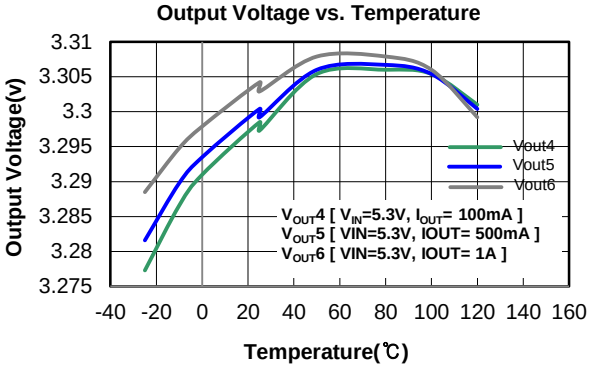
Load Regulation vs. Temperature



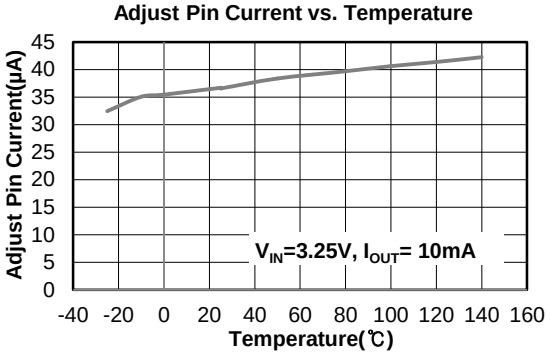
Dropout Voltage vs. Temperature



Output Voltage vs. Temperature



Adjust Pin Current vs. Temperature

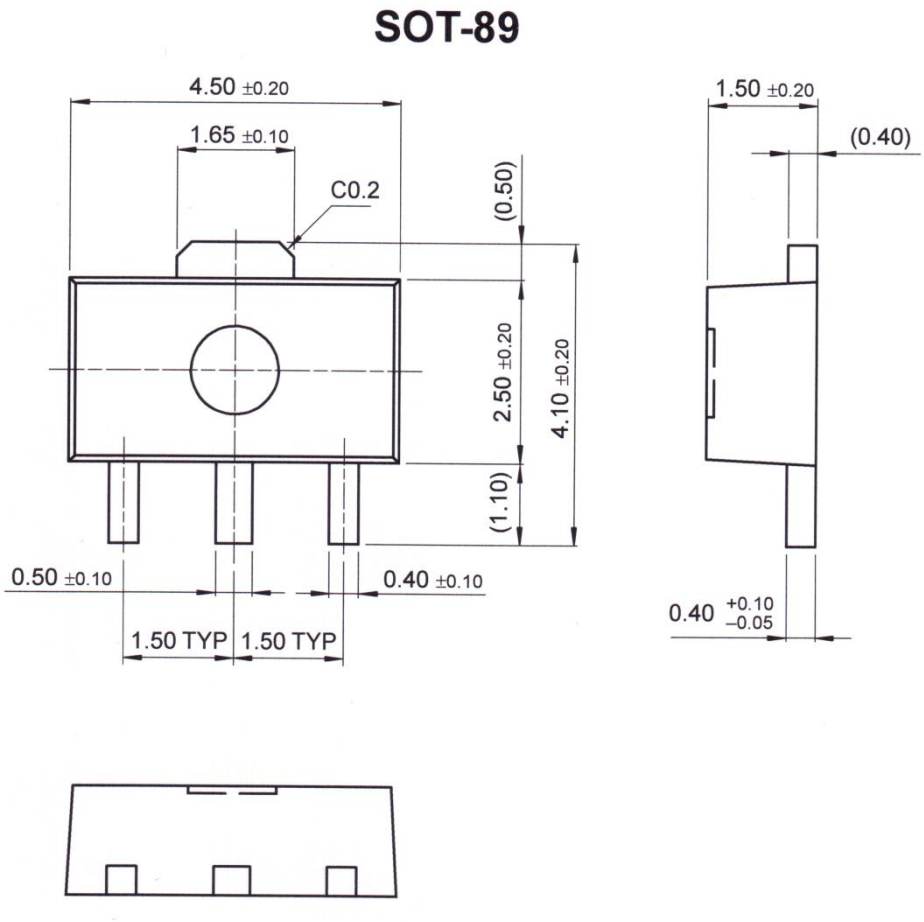


Graph 5 Electrical Characteristics Curves

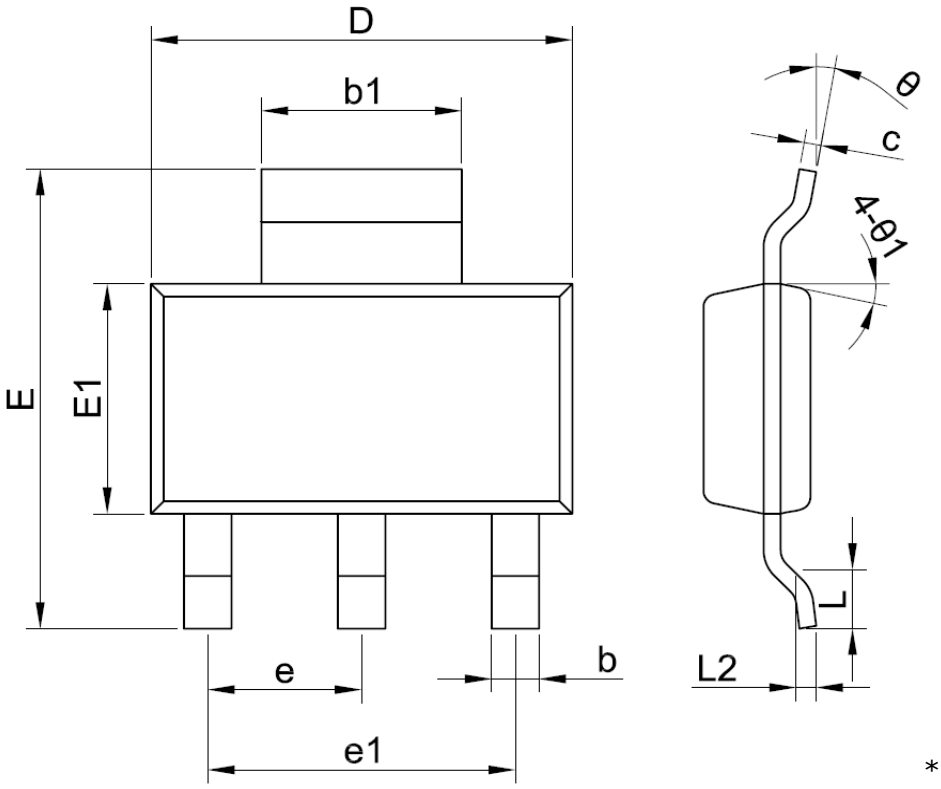
Package Dimensions

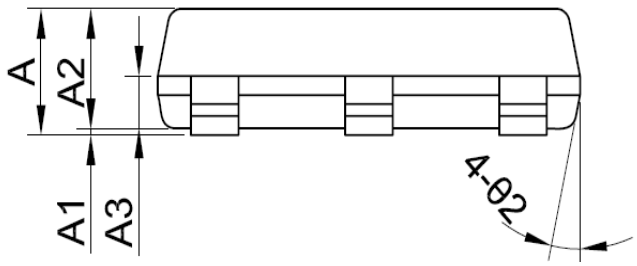
SOT-89 Outline Dimension

Unit : mm



SOT-223 Outline Dimension

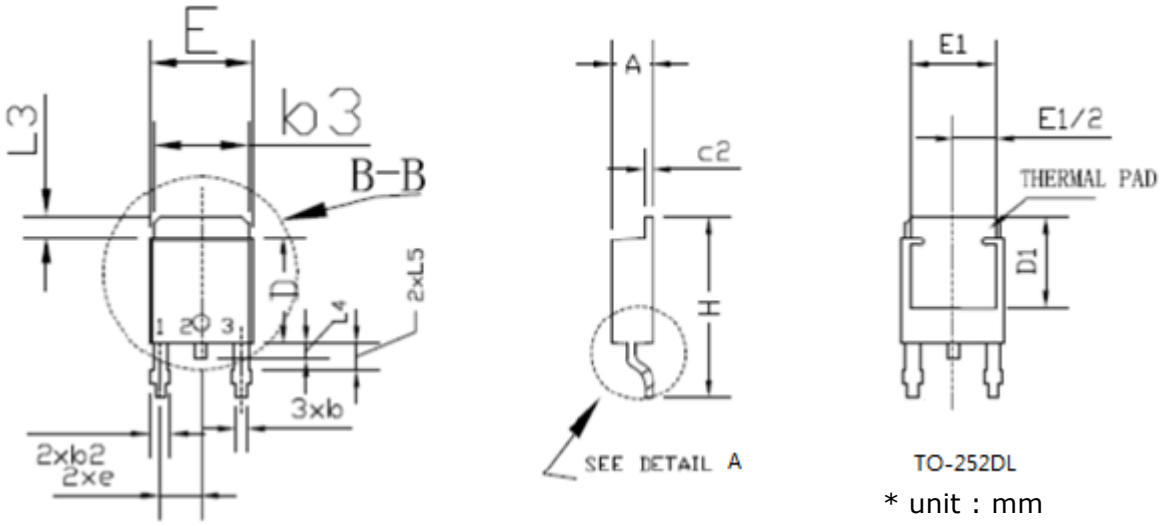




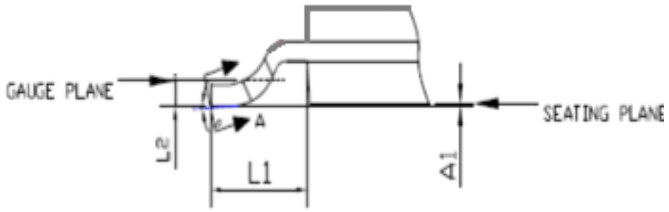
* unit : mm

SYMBOL	MIN	NOM	MAX
A	1.55	——	1.80
A1	0.02	——	0.12
A2	1.45	1.60	1.75
A3	0.60	0.70	0.80
b	0.60	——	0.80
b1	2.90	——	3.10
c	0.24	——	0.32
D	6.20	6.30	6.50
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
e	2.299REF		
e1	4.598REF		
L	0.90MIN		
L2	0.30BSC		
θ	0°	——	10°
θ_1	10°	12°	14°
θ_2	10°	12°	14°

TO-252 Outline Dimension



* unit : mm



SYMBOL	MIN	MAX
A	2.220	2.420
A1	0	0.125
b	0.550	0.650
b2	0.60	0.960
b3	5.200	5.400
c2	0.450	0.550
D	5.950	6.250
D1	4.200	4.500
E	6.400	6.700
E1	4.750	4.850
e	2.28 REF	
H	9.440	10.140
L1	2.75 REF	
L2	0.5 REF	
L3	0.900	1.000
L4	0.650	0.950
L5	1.150	1.550
Θ	0	6

Revision History

No	Date	Contents
1	2015-01-30	Initial Brief Datasheet Release
2	2015-06-22	ESD Level Update
3	2016-05-23	SOT-89 Package Update

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