

LM317

DATASHEET

Specification Revision History:

Version	Date	Description
V1.0	2020/09	New
V1.1	2023/02	Modify Ordering Information
V1.2	2025/02	Modify Ordering Information
V1.3	2025/03	Add application precautions and overall typesetting.

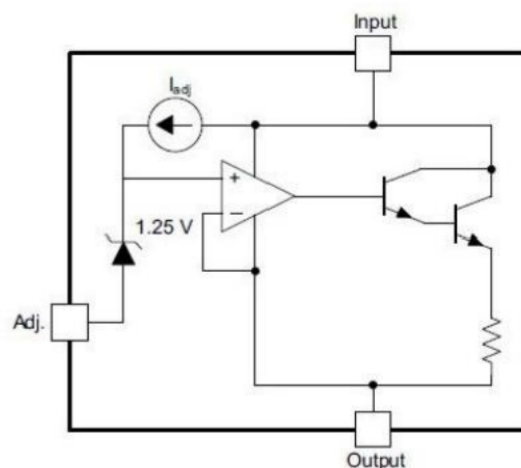
Features

- Output current greater than 1.5A
- Range Output voltage range adjustable from 1.25V to 37V

Applications

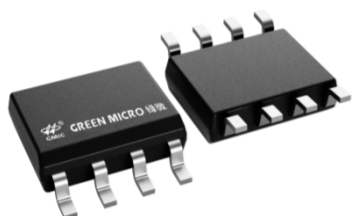
- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board
- ADSL Modem
- Post Regulators for Switching Supplies

Block Diagram

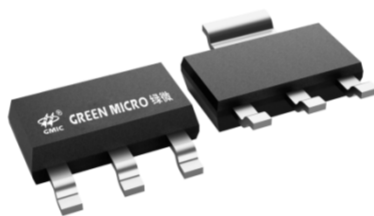


General Description

The LM317 device is an adjustable three-terminal positive-voltage regulator capable of supplying more than 1.5A over an output-voltage range of 1.25V to 37V. LM317 features a very low standby current 1.5mA.



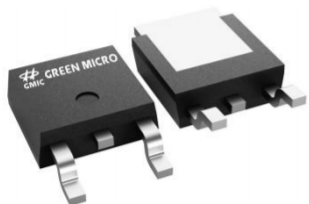
SOP-8



SOT-223



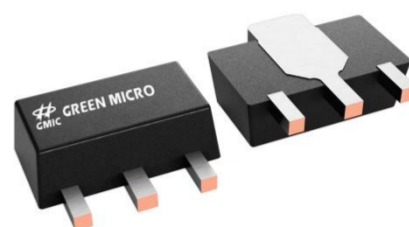
TO-220-3



TO-252



TO-263-2



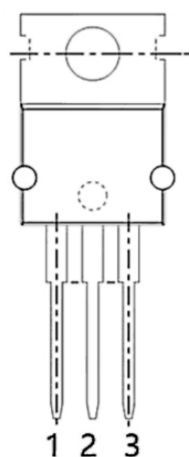
SOT-89-3

Ordering Information

Product Model	Package Type	Packing	Packing Qty
LM317LDR162	SOP-8	REEL	2500PCS/REEL
LM317LFR	SOT-89-3	REEL	1000PCS/REEL
LM317LER	SOT-223	REEL	2500PCS/REEL
LM317TAT	TO-220-3	TUBE	1000PCS/BOX
LM317MDT	TO-252	REEL	2500PCS/REEL
LM317D2KT	TO-263-2	REEL	1000PCS/REEL
LM317	TO-220-3	TUBE	1000PCS/BOX
LM317	TO-252-2	REEL	2500PCS/REEL
LM317	TO-263-2	REEL	1000PCS/REEL

Pin Configuration

TO220 Top View



SOT223 (Top View)



TO-252

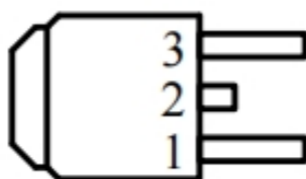


Table1:LM317 series(TO220 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Table2:LM317 series(SOT223 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin
4	VOUT	Output voltage pin

Table3:LM317 series(TO252 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Absolute Maximum Ratings

Max Input Voltage	40V
Max Operating Junction Temperature(Tj)	150°C
Ambient Temperature(Ta).....	-20°C~85°C
Storage Temperature(Ts)	-40°C~150°C

Caution:Exceed these limits to damage to the device.Exposure to absolute maximum rating conditions may affect device reliability.

Thermal Information

Symbol	Parameter	TO220	UNIT
$R_{\theta(JA)}$	Junction-to-ambient thermal resistance	37.9	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top)thermal resistance	51.1	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	23.2	°C/W
Ψ_{JT}	Junction-to-top characterization parameter	13.0	°C/W
Ψ_{JB}	Junction-to-board characterization parameter	22.8	°C/W
$R_{\theta JC(bot)}$	Junction-to-case(bottom)thermal resistance	4.2	°C/W

Electrical Characteristics

$T_A=25^{\circ}\text{C}$, unless otherwise noted.

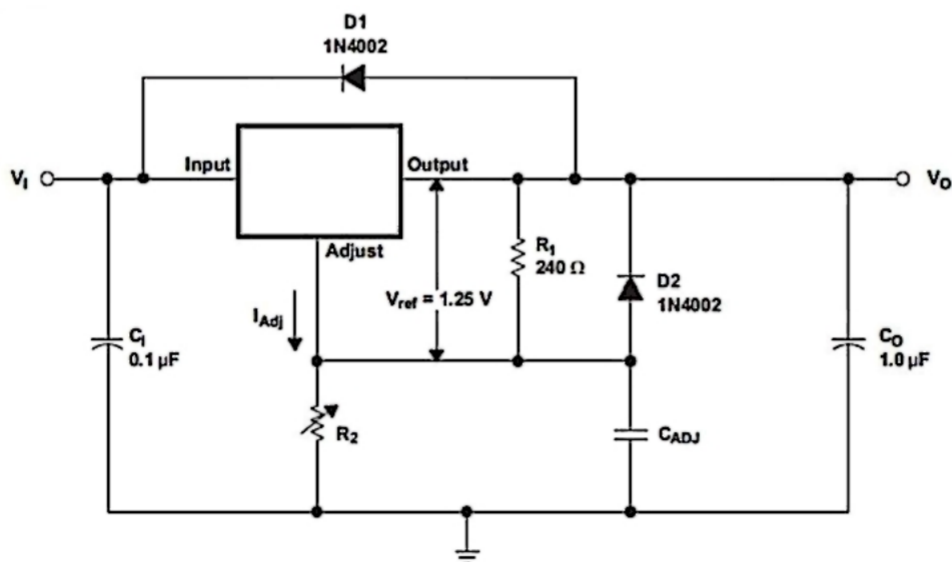
Parameter	Test Conditions		Min	Typ	Max	Unit
Line regulation	$V_I-V_O=3\text{V to }40\text{V}$	$T_J=25^{\circ}\text{C}$	-5	--	5	mV
Load regulation	$I_O=10\text{mA to }1500\text{mA}$		-25	--	25	mV
Reference voltage	$V_I-V_O=3\text{V to }40\text{V}, P_D \leq 20\text{W}, I_O=10\text{mA to }1.5\text{A}$		1.2	1.25	1.3	V
Output-voltage Temperature stability	$T_J=0^{\circ}\text{C to }125^{\circ}\text{C}$			0.7		$\%V_O$
Maximum output current	$V_I-V_O \leq 15\text{V}, T_J=25^{\circ}\text{C}$		1.5	2		A

Detailed Description

LM317 device is an adjustable three-terminal positive-voltage regulator capable of supplying up to 1.5A over an output-voltage range of 1.25V to 37V. It requires only two external resistors to set the output voltage. The device features a typical line regulation of 1mV and typical load regulation of 7 mV.

The LM317 device is versatile in its applications, including uses in programmable output regulation and local on-card regulation. Or, by connecting a fixed resistor between the ADJUST and OUTPUT terminals, the LM317 device can function as a precision current regulator. An optional output capacitor can be added to improve transient response.

Typical Application



Adjustable Voltage Regulator

1. R_1 and R_2 are required to set the output voltage.

2. C_{ADJ} is recommended to improve ripple rejection. It prevents amplification of the ripple as the output voltage is adjusted higher.

3. C_I is recommended, particularly if the regulator is not in close proximity to the power-supply filter capacitors. A 0.1 μ F or 1 μ F ceramic or tantalum capacitor provides sufficient bypassing for most applications, especially when adjustment and output capacitors are used.

4. C_O improves transient response, but is not needed for stability.

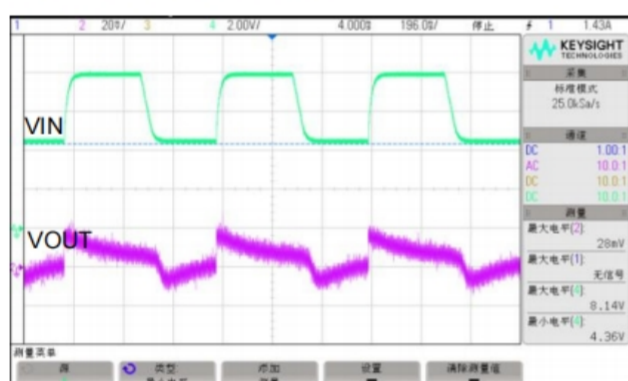
5. Protection diode D2 is recommended if C_{ADJ} is used. The diode provides a low-impedance discharge path to prevent the capacitor from discharging into the output of the regulator.

6. Protection diode D1 is recommended if C_O is used. The diode provides a low-impedance discharge path to prevent the capacitor from discharging into the output of the regulator.

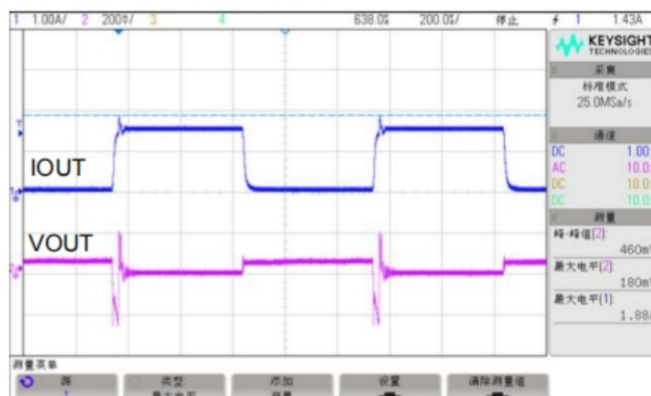
7. V_O is calculated as shown: $V_O = V_{REF}(1 + R2/R1) + (I_{ADJ} \times R2)$, I_{ADJ} is typically 50 μ A and negligible in most applications.

Typical Performance Characteristics

Line Transient Response

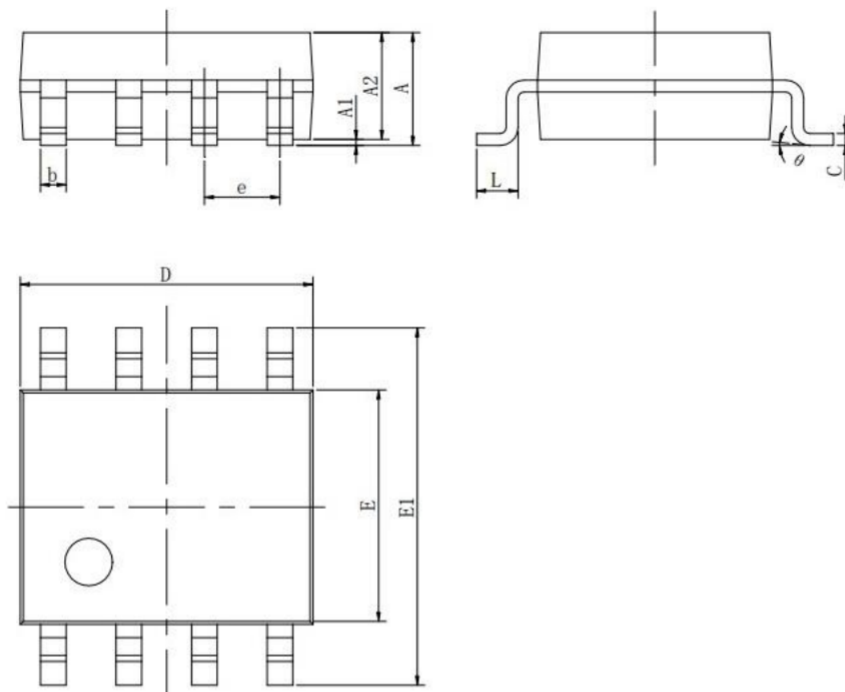


Load Transient Response



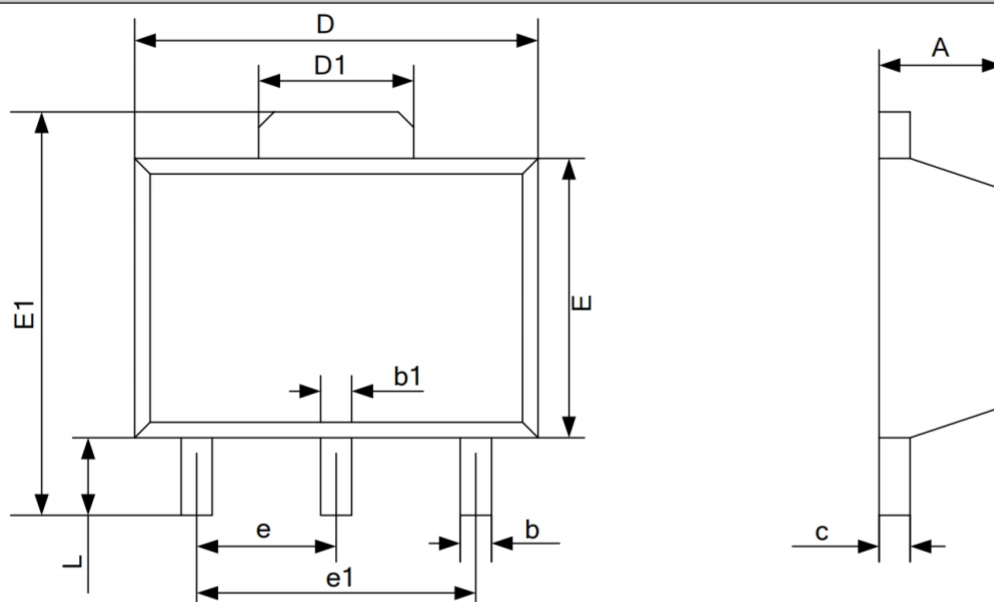
Package Information

SOP-8



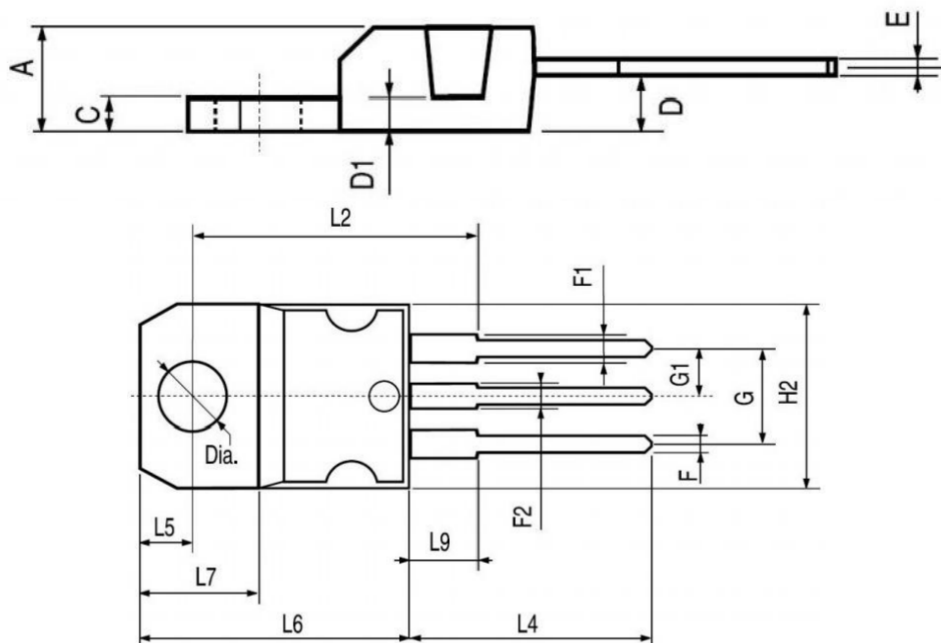
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.800	0.053	0.071
A1	0.050	0.250	0.004	0.010
A2	1.250	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
C	0.170	0.250	0.006	0.010
D	4.780	5.000	0.185	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOT-89-3



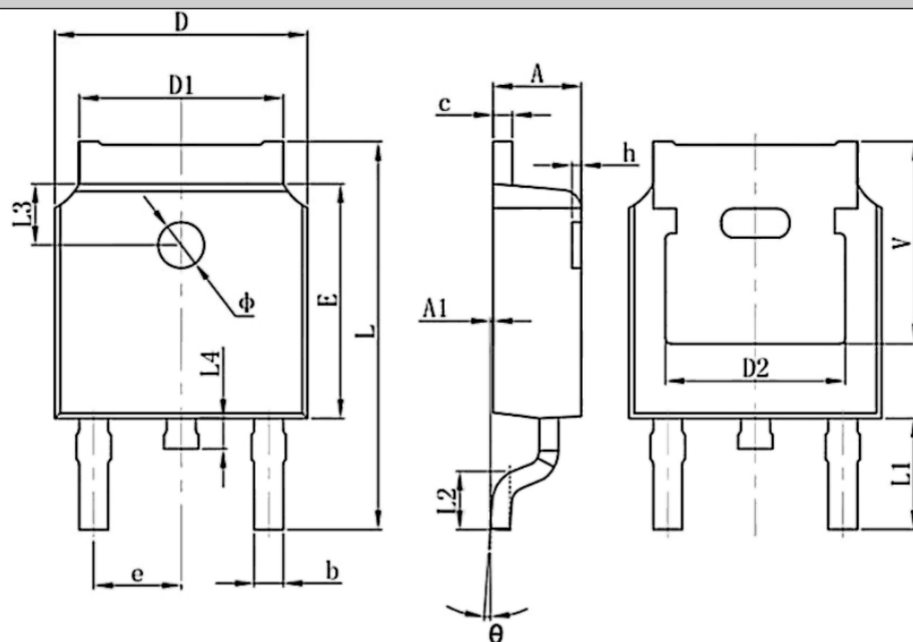
SYMBOL	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 TYP		0.061 TYP	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060 TYP	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047

TO-220-3



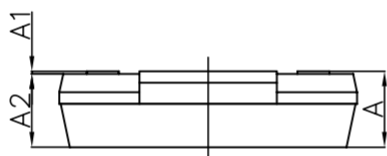
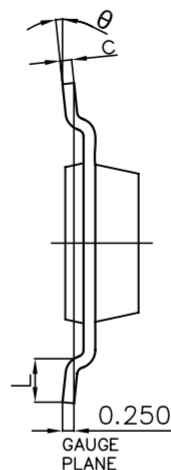
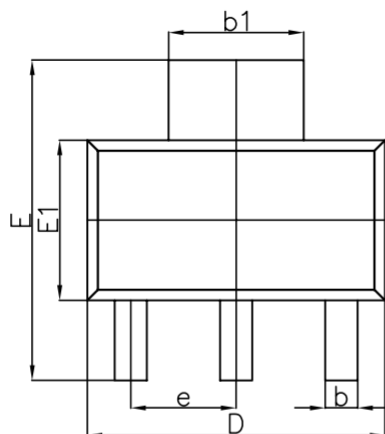
Symbol	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.70	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151

TO-252

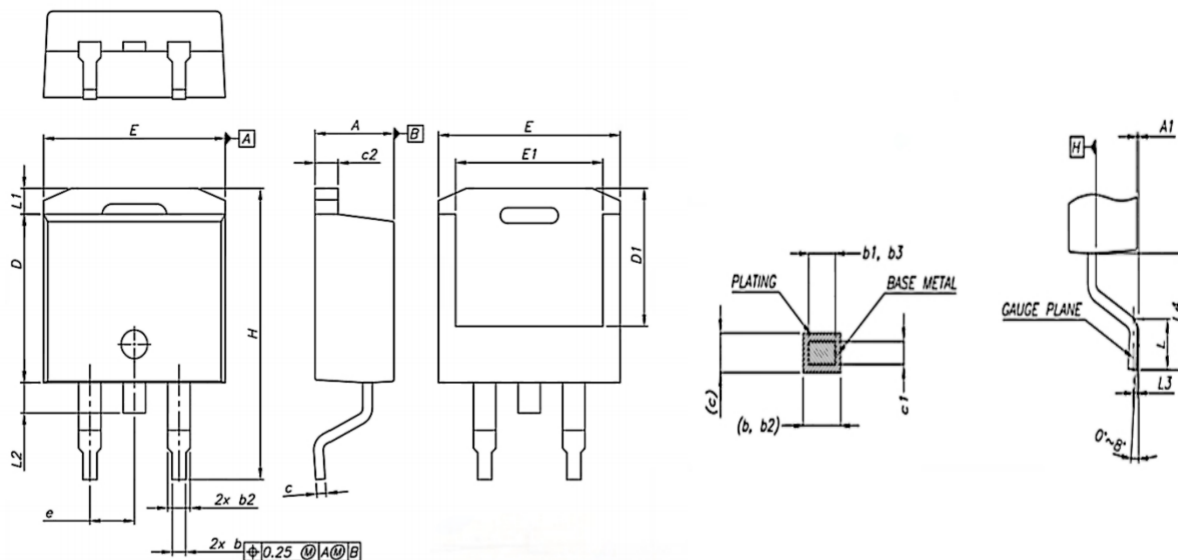


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

SOT-223



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	---	1.800	---	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	---	0.030	---
theta	0°	10°	0°	10°

TO-263-2


Dim.	mm		
	Min.	Typ.	Max.
A	4.36		4.56
A1	0		0.25
b	0.70		0.90
b1	0.51		0.89
b2	1.17		1.37
b3	1.36		1.46
C	0.38		0.694
c1	0.38		0.534
c2	1.19		1.34
D	8.60		9.00
D1	6.90		7.50
E	10.15		10.55
E1	8.10		8.70
e		2.54	
H	15.00		15.60
L	1.90		2.50
L1			1.65
L2			1.78
L3		0.25	
L4	4.78		5.28

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