

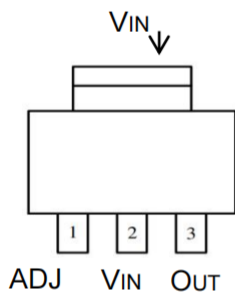
Features

- Output Adjustable between 1.2V and 37V
- Output current up to 1.5A
- Internal Thermal Overload Protection
- internal thermal Overload protection
- Output transistor safe area compensation

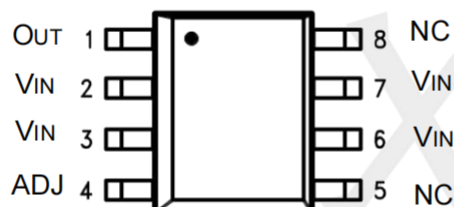
Applications

- HVAC Systems
- SMPS Post Regulation
- Test and Measurement Equipment
- Industrial Power Supplies

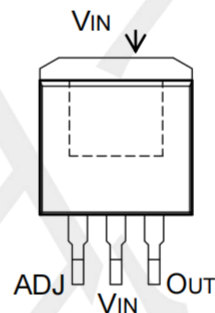
PIN CONFIGURATION



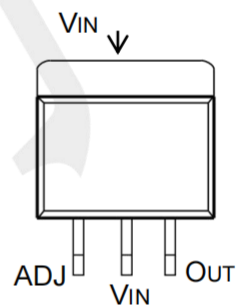
SOT-223-3
(TOP VIEW)



SOP8
(TOP VIEW)



TO-263-3
(TOP VIEW)



TO-252-3
(TOP VIEW)

Pin Number				Pin Name	Pin Function
LM317Y3	LM317W3	LM317K3	LM317S8		
SOT-223-3	TO-263-3	TO-252-3	SOP8		
1	1	1	4	ADJ	Adjust pin
2	2	2	2,3,6,7	VOU	Output of the Regulator
3	3	3	1	VIN	Input of Supply Voltage
--	--	--	5,8	NC	No connection

Absolute Maximum Ratings

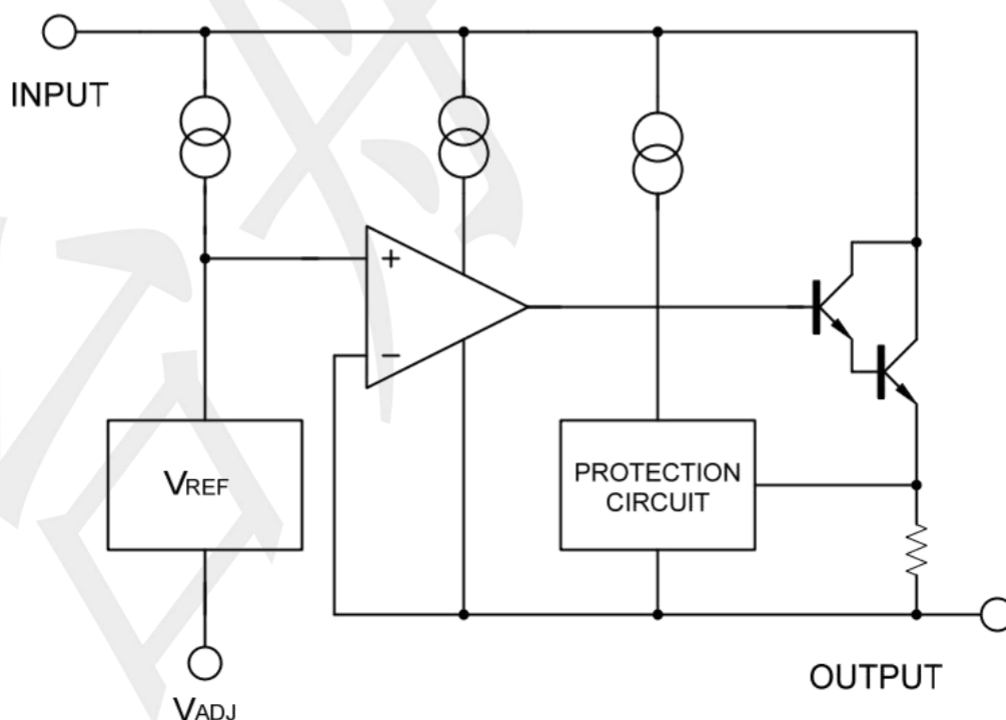
over operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	RATINGS	UNIT
$V_I - V_O$	Input-Output Voltage Differential	40	V
P_D	Power Dissipation	Internally Limited	W
T_J	Operating Junction Temperature Range	+125	°C
T_{stg}	Storage temperature range	-65~ +150	°C
T_{OPR}	Operating Temperature	-40 ~ +85	°C

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223-3	θ_{JA}	140	°C/W
	SOP8		111.3	°C/W
	TO-263-3		62.5	°C/W
	TO-252-3		103	°C/W
Junction to Case	SOT-223-3	θ_{JC}	23.5	°C/W
	SOP8		56.1	°C/W
	TO-263-3		5.5	°C/W
	TO-252-3		12.2	°C/W

BLOCK DIAGRAM



Electrical Characteristics (TA=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions		MIN	TYP	MAX	UNIT
Line Regulation (Note 1)	$\Delta V_{OUT} / V_{OUT}$	$T_A = +25^{\circ}\text{C}$, $3.0\text{V} \leq V_I - V_O \leq 40\text{V}$		--	0.01	0.04	%/V
Load Regulation (Note 1)	ΔV_{OUT}	$T_A = +25^{\circ}\text{C}$, $10\text{mA} \leq I_O \leq 1.5\text{A}$	$ V_O \leq 5.0\text{V}$	--	5	25	mV
			$ V_O \geq 5.0\text{V}$	--	0.1	0.5	%
Adjustment Pin Current	I_{ADJ}			--	50	100	μA
Adjustment Pin Current Change	ΔI_{ADJ}	$3.0\text{V} \leq V_I - V_O \leq 40\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$, $P_D \leq P_{MAX}$, $T_A = +25^{\circ}\text{C}$		--	2.0	5.0	μA
Reference Voltage	V_{REF}	$T_A = +25^{\circ}\text{C}$, $3.0\text{V} \leq V_I - V_O \leq 40\text{V}$		1.215	1.250	1.285	V
		$10\text{mA} \leq I_O \leq 1.5\text{A}$, $P_D \leq P_{MAX}$, $T_J = T_{LOW}$ to T_{HIGH}		1.20	1.25	1.30	V
Temperature Stability	T_S	$T_{LOW} \leq T_J \leq T_{HIGH}$		--	0.7	--	% V_O
Minimum Load Current to Maintain Regulation	I_{LMIN}	$ V_I - V_O \leq 10\text{V}$		--	1.5	6.0	mA
		$ V_I - V_O \leq 40\text{V}$		--	2.5	10	mA
Maximum Output Current	I_{MAX}	$ V_I - V_O \leq 15\text{V}$, $P_D \leq P_{MAX}$		1.5	2.2	--	A
		$ V_I - V_O \leq 40\text{V}$, $P_D \leq P_{MAX}$, $T_J = +25^{\circ}\text{C}$		0.3	0.4	--	A
RMS Noise	N	% of V_O , $T_A = +25^{\circ}\text{C}$, $10\text{Hz} \leq f \leq 10\text{kHz}$		--	0.003	--	% V_O
Ripple Rejection	RR	$V_O = -10\text{V}$, $f = 120\text{Hz}$ (Note 2)	Without C_{ADJ}	--	65	--	dB
			$C_{ADJ} = 10\mu\text{F}$	66	80	--	dB
Long-Term Stability	S	$T_J = T_{HIGH}$ (Note 4), $T_A = +25^{\circ}\text{C}$ for Endpoint Measurements			0.3	1.0	%/1.0k Hrs.
Thermal Regulation		$T_A = +25^{\circ}\text{C}$ (Note 3), 10ms Pulse			0.003	0.4	% V_O /W

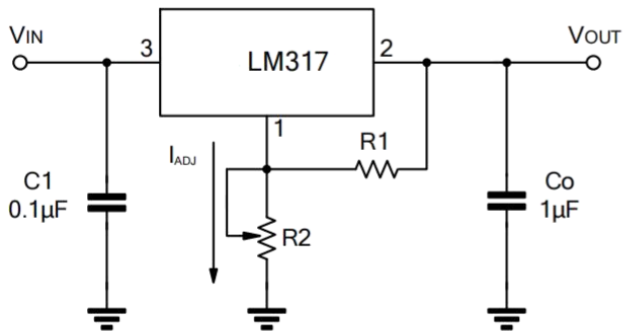
Notes: 1. Load and line regulation are specified at constant junction temperature. Change in V_O because of heating effects is covered under the Thermal Regulation specification. Pulse testing with a low duty cycle is used.

2. C_{ADJ} , when used, is connected between the adjustment pin and ground.

3. Power dissipation within an IC voltage regulator produces a temperature gradient on the die, affecting individual IC components on the die. These effects can be minimized by proper integrated circuit design and layout techniques. Thermal Regulation is the effect of these temperature gradients on the output voltage and is expressed in percentage of output change per watt of power change in a specified time.

4. Since Long Term Stability cannot be measured on each device before shipment, this specification is an engineering estimate of average stability from lot to lot.

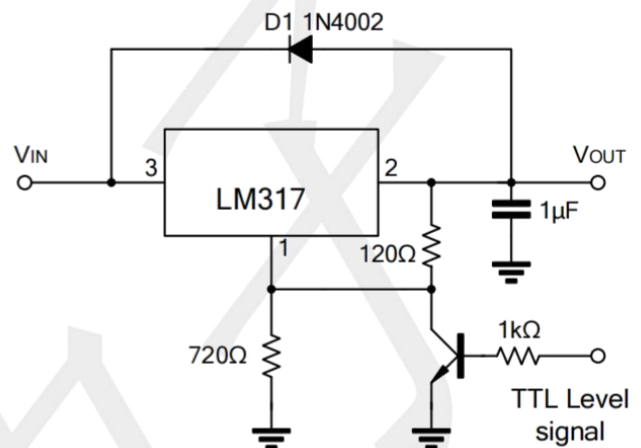
Typical Application Circuit



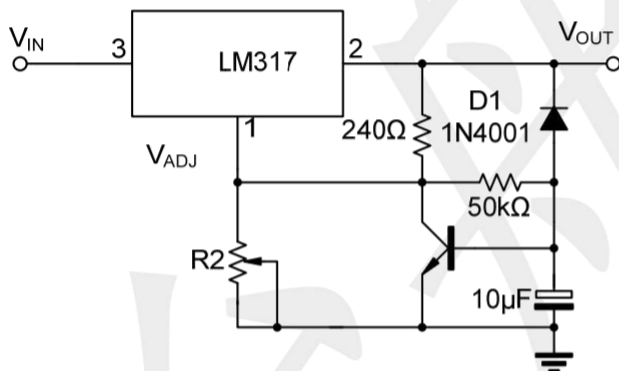
$$V_{OUT} = 1.25V \times (1 + R2/R1) + I_{ADJ} \times R2$$

C1 is required when regulator is located an appreciated distance from power supply. Co is needed to improve transient response.

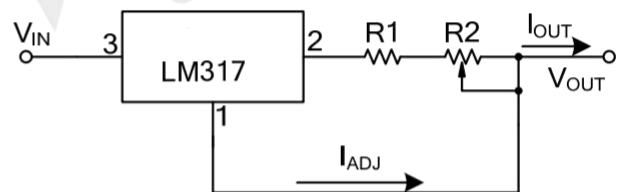
Programmable voltage regulator



Regulator with On-off control



Soft Start Application



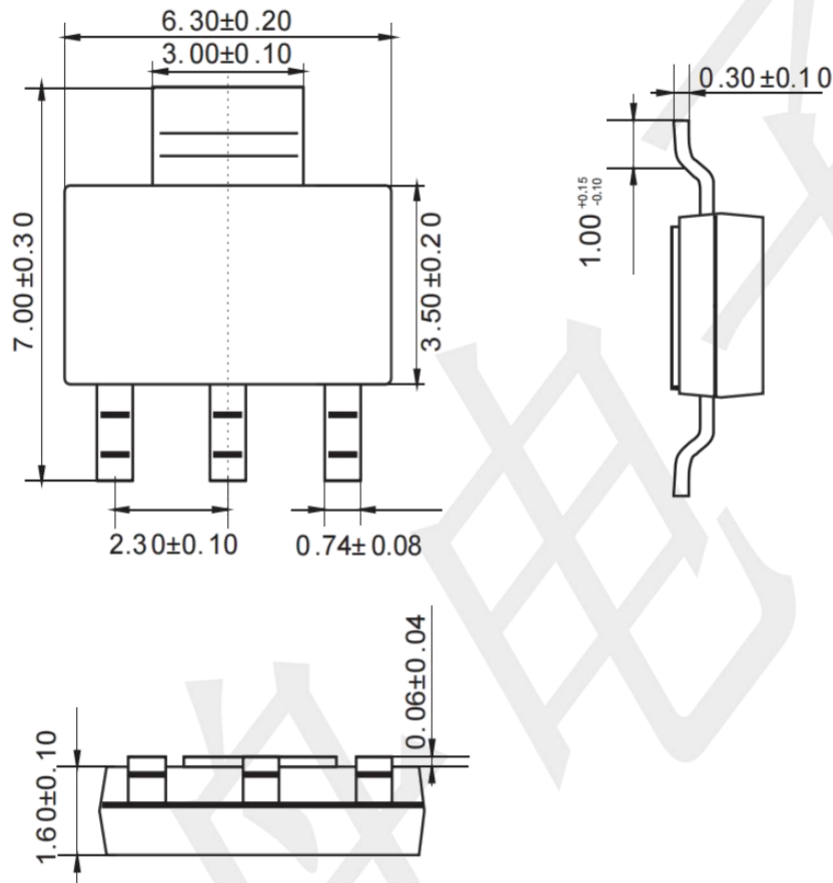
$$I_{O(MAX)} = \left(\frac{V_{REF}}{R1} \right) + I_{ADJ} = \frac{1.25V}{R1}$$

$$I_{O(MIN)} = \left(\frac{V_{REF}}{R1+R2} \right) + I_{ADJ} = \frac{1.25V}{R1+R2}$$

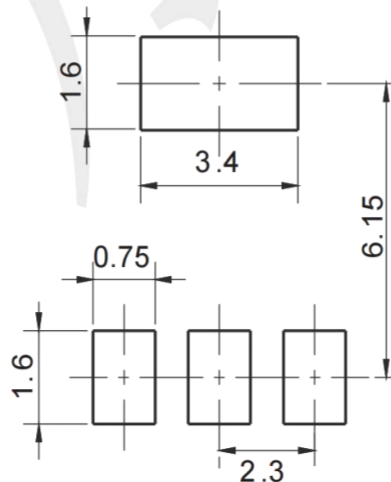
Constant Current Application

Package Outline Dimensions (unit: mm)

SOT-223-3

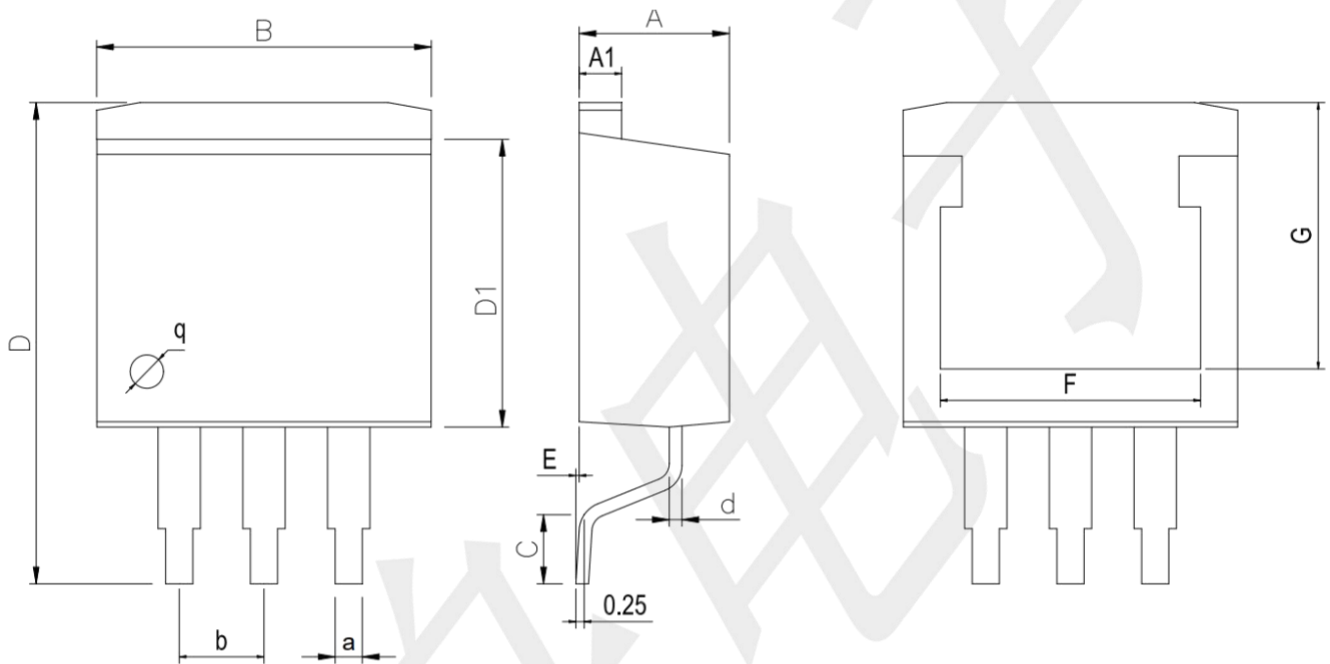


Mounting Pad Layout (unit: mm)



Package Outline Dimensions (unit: mm)

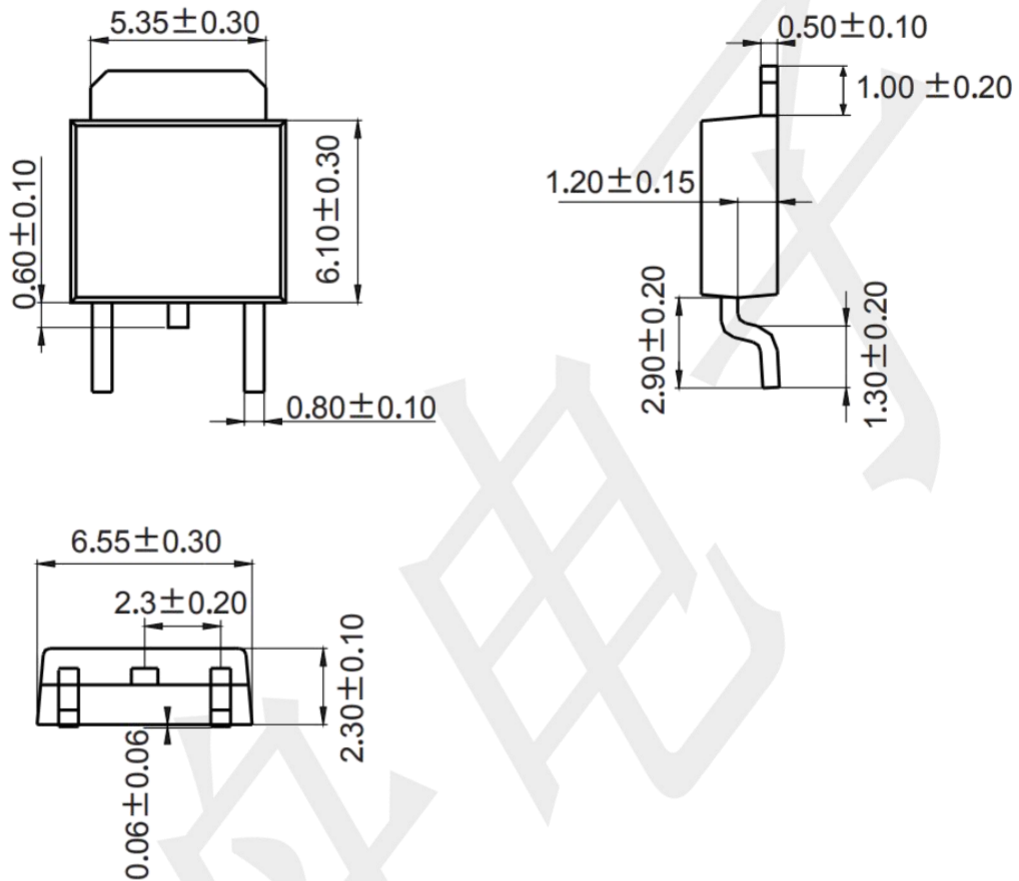
T0-263-3



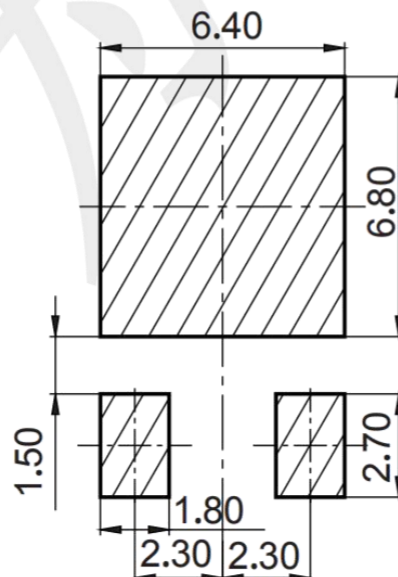
Dimensions In Millimeters(TO-263-3)											
Symbol:	A	A1	B	C	D	D1	E	F	G	a	b
Min:	4.45	1.22	10	1.89	13.7	8.38	0	8.332	7.70	0.71	2.54BSC
Max:	4.62	1.32	10.4	2.19	14.6	8.89	0.305	8.552	8.10	0.97	

Package Outline Dimensions (unit: mm)

T0-252-3

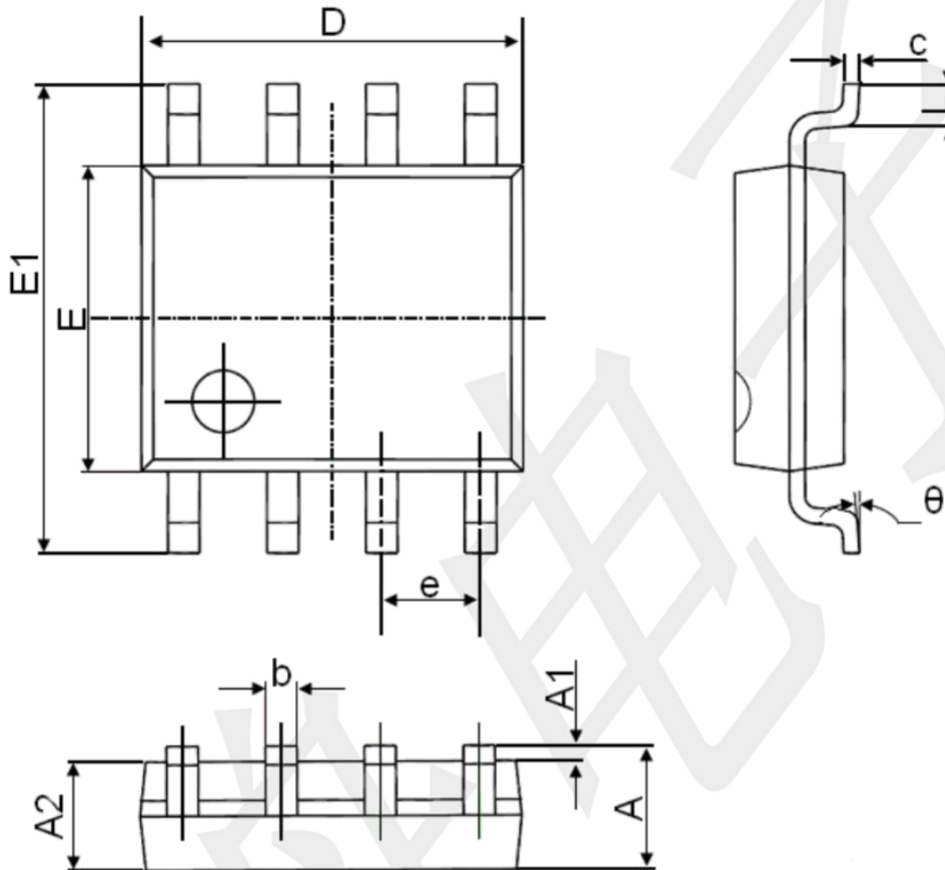


Mounting Pad Layout (unit: mm)



Package Outline Dimensions (unit: mm)

SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	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	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	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°