



圓創科技股份有限公司

## AT1117

### Preliminary Product Information 1A Low Dropout Fast Response Positive Adjustable Regulator

#### Features

- Guaranteed Output Voltage Accuracy within 2%
- Fast Transient Response
- Guaranteed Dropout Voltage at Multiple Currents
- Load Regulation : 0.1% Typ.
- Line Regulation : 0.03% Typ.
- Low Dropout Voltage : 1.1V Typ. at I=1A
- Trimmed Current Limit : 1A Typ. at T<sub>j</sub>=125°C
- On-Chip Thermal Limiting : 150°C Typ.
- Adjustable Output : 1.25~7.75V
- Standard 3-pin TO-252 , SOT-223 Power Packages

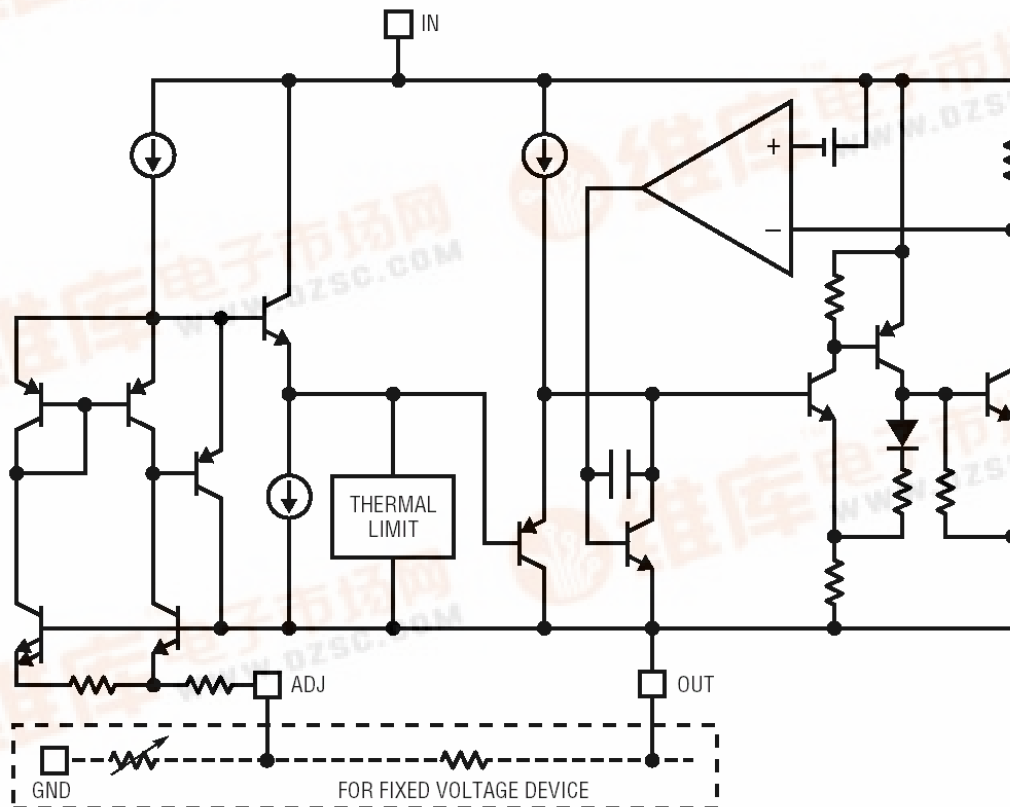
#### Applications

- Active SCSI Terminators
- Low Voltage Logic Supplies
- Battery-Powered Circuitry
- Post Regulator for Switching Power Supply

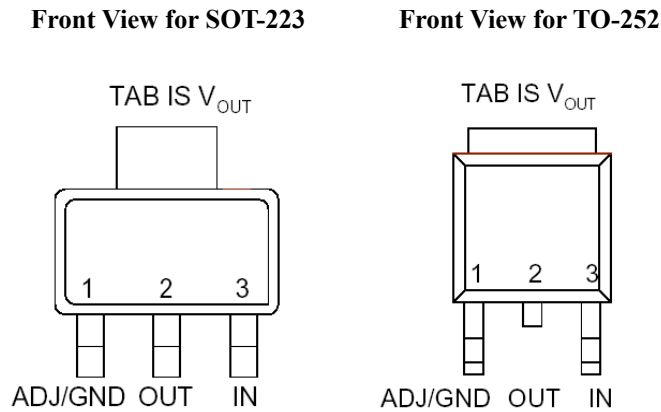
#### General Description

The AT1117 is a low dropout three-terminal adjustable regulators with 1A output current capability. In order to obtain lower dropout voltage and faster transient response, which is critical for low voltage applications, the AT1117 has been optimized. The device is available in an adjustable version and fixed output voltages of 1.8V, 2.5V, 2.85V, 3.3V and 5V, the output available voltage range is from 1.25~7.75V with an input supply below 9V. Dropout voltage is guaranteed at a maximum of 1.2V at 1A. Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal limiting provides protection against any combination of overload that would create excessive junction temperatures. The AT1117 is available in the industry standard 3-pin TO-252 the low profile surface mount SOT-223 power packages which can be used in applications where space is limited.

#### Block Diagram



**Pin Configuration**



**AT1117**

**Ordering Information**

Part number	Package	Marking
AT1117-□□V	SOT-223	AT1117V xxxxxxΔΔ
AT1117-□□Y	TO-252	AT1117Y ΔΔ xxxxxx

□□:Output Voltage 18:1.8V 25:2.5V 28:2.85V 33:3.3V 50:5.0V

xxxxxx:Date Code ΔΔ: Output Voltage

**Pin Description**

Pin No.	Symbol	I/O	Description
1	ADJ/GND	--	Adjust Pin / Ground pin
2	OUT	O	Regulated voltage output pin
3	IN	I	Supply voltage input pin

### Absolute Maximum Ratings

(T<sub>J</sub>=+25°C)

Parameter	Symbol	Limits	Unit
Input voltage	V <sub>IN</sub>	13.2	V
Operating junction temperature range	T <sub>J</sub>	0 to 125	°C
Control section		0 to 150	°C
Power transistor		0 to 150	°C
Storage temperature	T <sub>STG</sub>	-65 to +150	°C
Lead Temperature ( soldering, 10 second)	T <sub>L</sub>	260	°C

### Electrical Characteristics

(T<sub>J</sub>=+25°C)

Parameter	Part number	Symbol	Condition	Values			Unit
				Min.	Typ.	Max.	
Reference Voltage	AT1117	V <sub>REF</sub>	10mA ≤ I <sub>OUT</sub> ≤ 1A, 1.5V ≤ (V <sub>IN</sub> - V <sub>OUT</sub> ) ≤ 10.75V	1.225	1.250	1.275	V
Output Voltage	AT1117-18	V <sub>OUT</sub>	0A ≤ I <sub>OUT</sub> ≤ 1A, 3.3V ≤ V <sub>IN</sub> ≤ 12V	1.764	1.800	1.836	V
	AT1117-25		0A ≤ I <sub>OUT</sub> ≤ 1A, 4.0V ≤ V <sub>IN</sub> ≤ 12V	2.450	2.500	2.550	V
	AT1117-28		0A ≤ I <sub>OUT</sub> ≤ 1A, 4.35V ≤ V <sub>IN</sub> ≤ 12V	2.790	2.850	2.910	V
	AT1117-33		0A ≤ I <sub>OUT</sub> ≤ 1A, 4.75V ≤ V <sub>IN</sub> ≤ 12V	3.235	3.300	3.365	V
	AT1117-50		0A ≤ I <sub>OUT</sub> ≤ 1A, 6.5V ≤ V <sub>IN</sub> ≤ 12V	5.100	5.000	4.900	V
Line Regulation	AT1117	REG <sub>LINE</sub>	I <sub>OUT</sub> = 10mA, 1.5V ≤ (V <sub>IN</sub> - V <sub>OUT</sub> ) ≤ 10.75V (Note 1)		0.03	0.2	%
	AT1117-18		I <sub>OUT</sub> = 0A, 3.3V ≤ V <sub>IN</sub> ≤ 12V (Note 1)		1	6	mV
	AT1117-25		I <sub>OUT</sub> = 0A, 4.0V ≤ V <sub>IN</sub> ≤ 12V (Note 1)		1	6	mV
	AT1117-28		I <sub>OUT</sub> = 0A, 4.35V ≤ V <sub>IN</sub> ≤ 12V (Note 1)		1	6	mV
	AT1117-33		I <sub>OUT</sub> = 0A, 4.75V ≤ V <sub>IN</sub> ≤ 12V (Note 1)		1	6	mV
	AT1117-50		I <sub>OUT</sub> = 0A, 6.5V ≤ V <sub>IN</sub> ≤ 12V (Note 1)		1	10	mV
Load Regulation	AT1117	REG <sub>LOAD</sub>	(V <sub>IN</sub> - V <sub>OUT</sub> ) = 3V, 10mA ≤ I <sub>OUT</sub> ≤ 1A (Note 1)		0.1	0.4	%
	AT1117-18		V <sub>IN</sub> = 3.3V, 0A ≤ I <sub>OUT</sub> ≤ 1A (Note 1)		1	10	mV

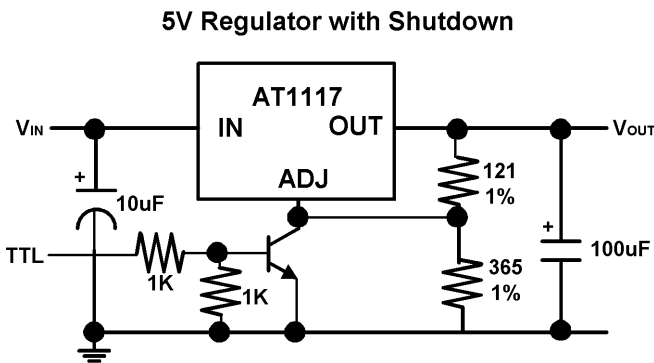
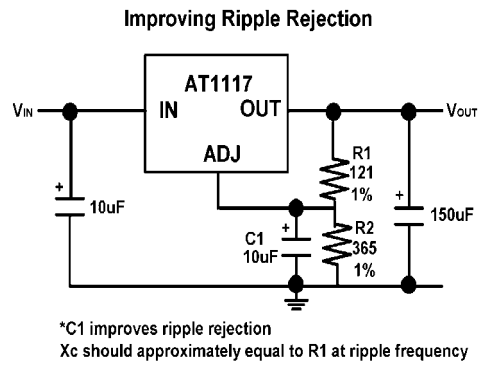
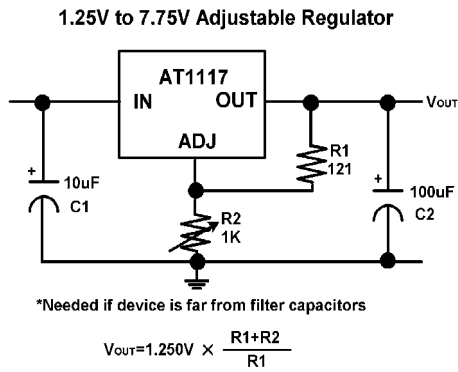
	AT1117-25		$V_{IN}=4.0V, 0A \leq I_{OUT} \leq 1A$ (Note 1)		1	10	mV
	AT1117-28		$V_{IN}=4.35V, 0A \leq I_{OUT} \leq 1A$ (Note 1)		1	10	mV
	AT1117-33		$V_{IN}=4.75V, 0A \leq I_{OUT} \leq 1A$ (Note 1)		1	10	mV
	AT1117-50		$V_{IN}=6.5V, 0A \leq I_{OUT} \leq 1A$ (Note 1)		1	15	mV
Dropout Voltage		$V_D$	$I_{OUT}=100mA$ (Note 2)		1	1.1	V
			$I_{OUT}=500mA$ (Note 2)		1.05	1.2	V
			$I_{OUT}=1A$ (Note 2)		1.1	1.3	V
Current Limit		$I_{LIMIT}$	$(V_{IN}-V_{OUT})=5V$	1000			mA
Adjust Pin Current		$I_{ADJ}$	$(V_{IN}-V_{OUT})=3V, I_{OUT}=10mA$		60	120	$\mu A$
Adjust Pin Current		$\Delta I_{ADJ}$	$0A \leq I_{OUT} \leq 1A,$ $1.5V \leq (V_{IN}-V_{OUT}) \leq 12V$		0.2	5	$\mu A$
Minimum Load Current		$I_O$	$(V_{IN}-V_{OUT})=12V$ (Note 1)		1.7		mA
Ripple Rejection		PSRR	$F_{RIPPLE}=120HZ, V_{RIPPLE}=1V_{P-P},$ $(V_{IN}-V_{OUT})=3V$	60	75		dB
Thermal Rejection		$T_R$	$T_J=25^\circ C, 30ms$ Pulse		0.01	0.1	%/W
Temperature Stability		$T_S$			0.5		%
Long Term Stability		$L_S$	$T_J=125^\circ C, 1000Hrs$		0.3		%
RMS Output Noise		$V_N$	$T_J=25^\circ C, 10Hz \leq F \leq 10KHz,$ (% of $V_{OUT}$ )		0.003		%
Thermal Resistance		$\theta_{JC}$	(Junction-to-Case, at Tab)		15		$^\circ C/W$
Quiescent Current	AT1117-18	$I_{IN}$	$V_{IN} \leq 12V$		5	10	mA
	AT1117-25		$V_{IN} \leq 12V$		5	10	mA
	AT1117-28		$V_{IN} \leq 12V$		5	10	mA
	AT1117-33		$V_{IN} \leq 12V$		5	10	mA
	AT1117-50		$V_{IN} \leq 12V$		5	10	mA

Note 1: See thermal regulation specifications for changes in output voltage due to heating effects. Load line regulations are measured at a constant junction temperature by low duty cycle pulse testing.

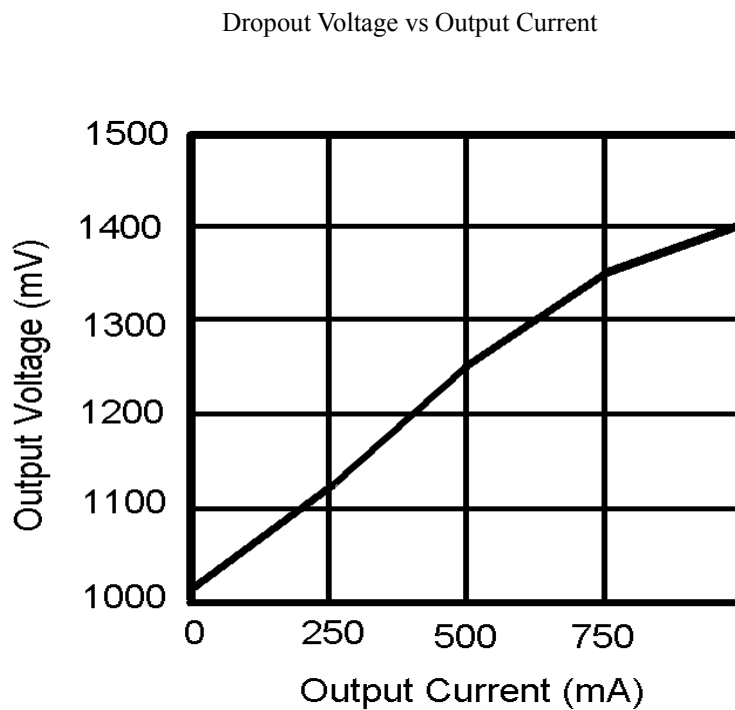
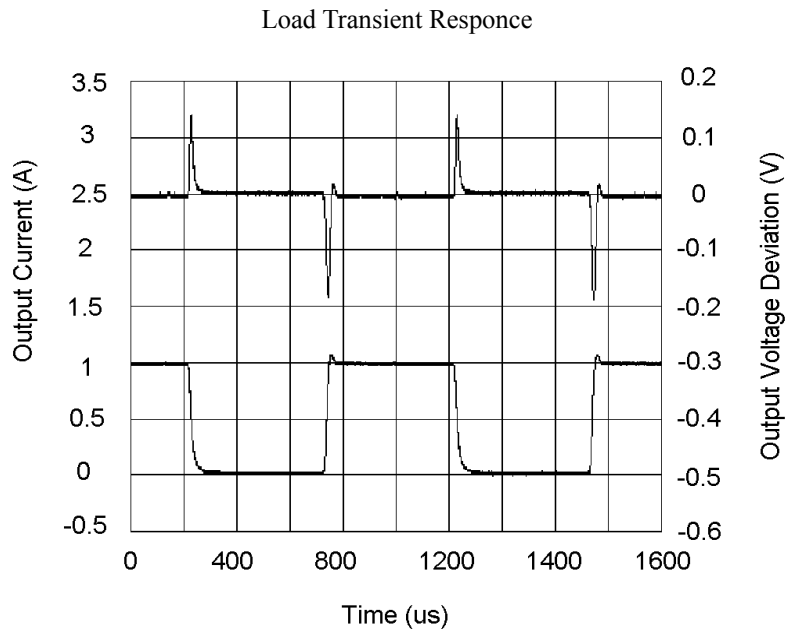
Note 2: Dropout voltage is specified over the full output current range of the device. Dropout voltage is defined as the minimum input/output differential measured at the specified output current. Test points and limits are also shown on the Dropout Voltage curve.

Note 3: Minimum load current is defined as the minimum output current required to maintain regulation.

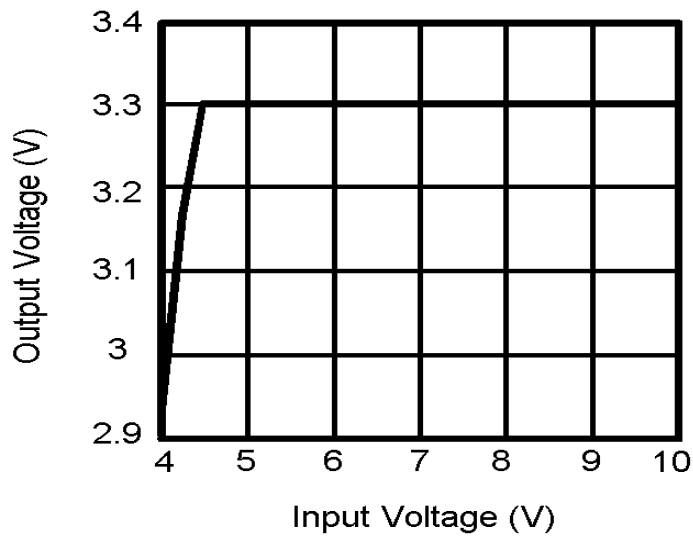
**Typical Application Circuit**



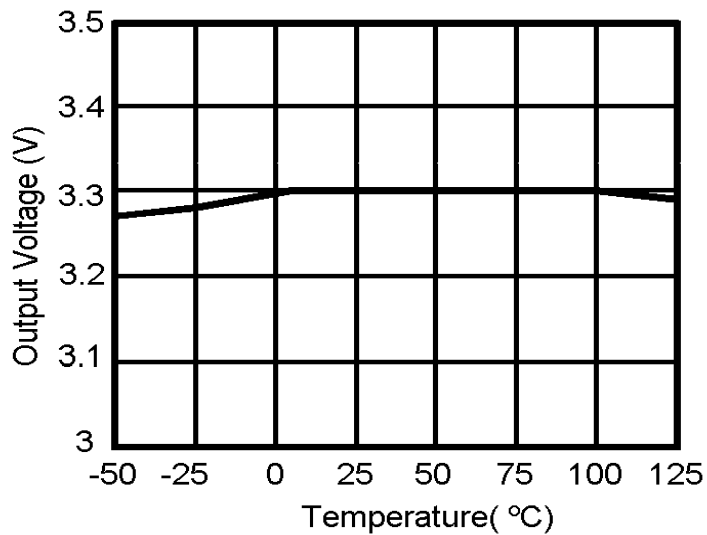
**Timing Curve**



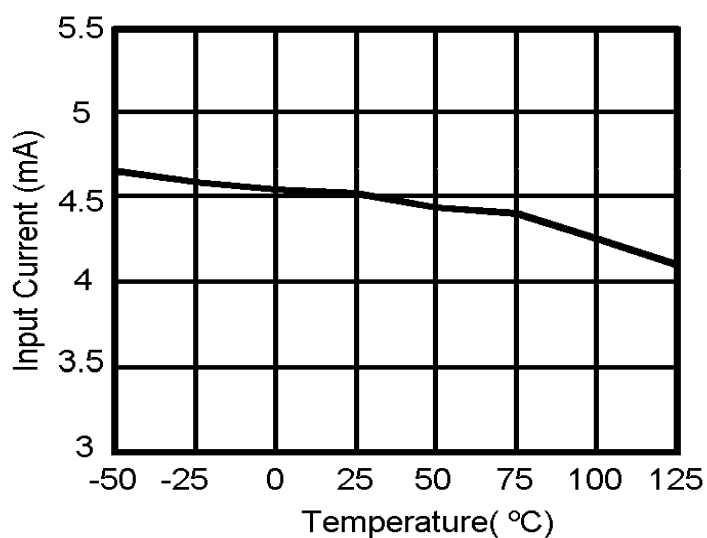
Output Voltage vs Input Voltage



Input Current vs Input Voltage

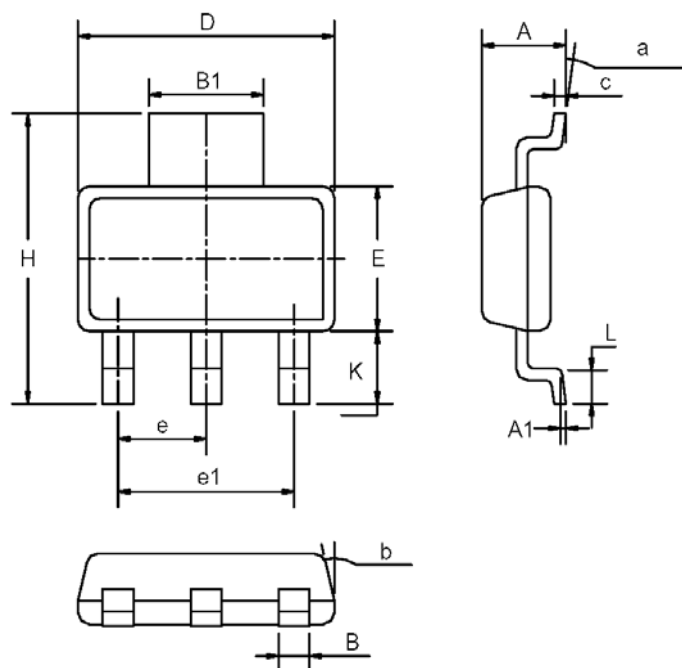


Input Current vs Temperature



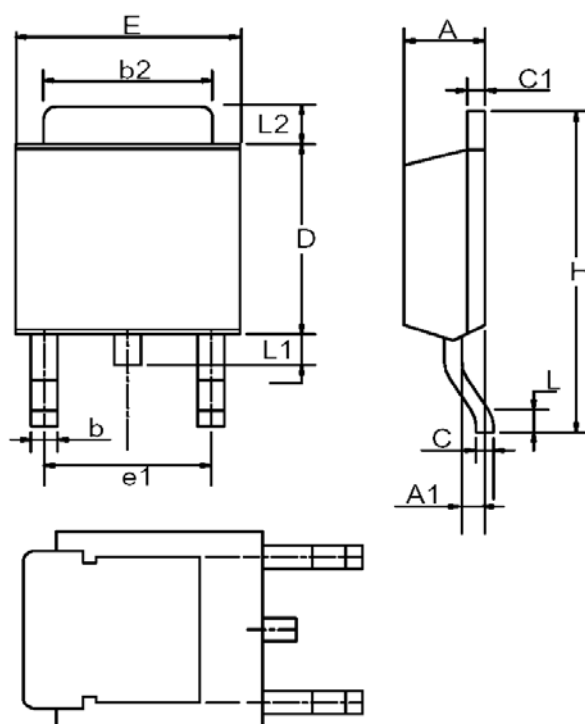


**Small Outline 3-pin Plastic SOT-223**



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.06	0.07	1.50	1.80	-
A1			0.02	0.08	-
B	0.02	0.03	0.60	0.80	-
B1	0.11	0.12	2.90	3.10	-
c	0.01	0.01	0.28	0.32	-
D	0.25	0.26	6.30	6.70	-
E	0.13	0.15	3.30	3.70	-
e	0.09BSC		2.3BSC		-
e1	0.18BSC		4.6BSC		-
H	0.26	0.29	6.70	7.30	-
L	0.04	0.04	0.91	1.10	-
K	0.06	0.08	1.50	2.00	-
$\alpha$	0°	10°	0°	10°	-
$\beta$	13°		13°		-

Small Outline 3-pin Plastic TO-252



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.086	0.094	2.18	2.39	-
A1	0.035	0.050	0.89	1.27	-
b	0.020	0.035	0.508	0.89	-
b2	0.205	0.215	5.207	5.461	-
C	0.018	0.023	0.46	0.58	-
C1	0.018	0.023	0.46	0.58	-
D	0.210	0.245	5.334	6.22	-
E	0.250	0.265	6.35	6.73	-
e1	0.156	0.204	3.96	5.18	-
H	0.370	0.410	9.398	10.41	-
L	0.020		0.51		-
L1	0.025	0.040	0.64	1.02	-
L2	0.035	0.080	0.89	2.032	-