1A Positive Voltage Regulators

Introduction (General Description)

The EC50117 series of high performance low dropout voltage regulators are designed for applications that require efficient conversion and fast transient response.

Applications

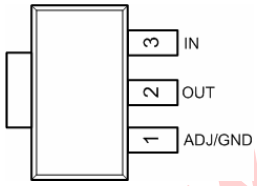
- Active SCSI Terminators
- High Efficiency Linear Regulators
- 5V to 3.3V Linear Regulators
- Motherboard Clock Supplies

Features

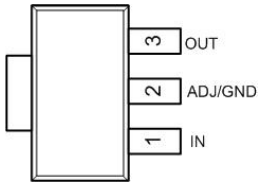
- Low Dropout Performance
- Guaranteed 1A Output Current
- Wide Input Supply Voltage Range
- Over-temperature and Over-current Protection
- Fixed or Adjustable Output Voltage
- Rugged 3KV ESD withstand capability
- Available in SOT-223 & TO-252 & SOT-89 Packages

Pin Configuration (TOP-VIEW)

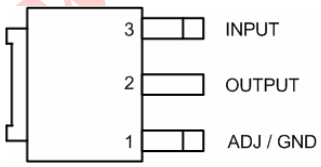
Package: SOT-223



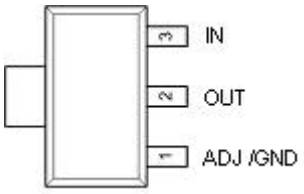
Package: SOT-223 (B1)



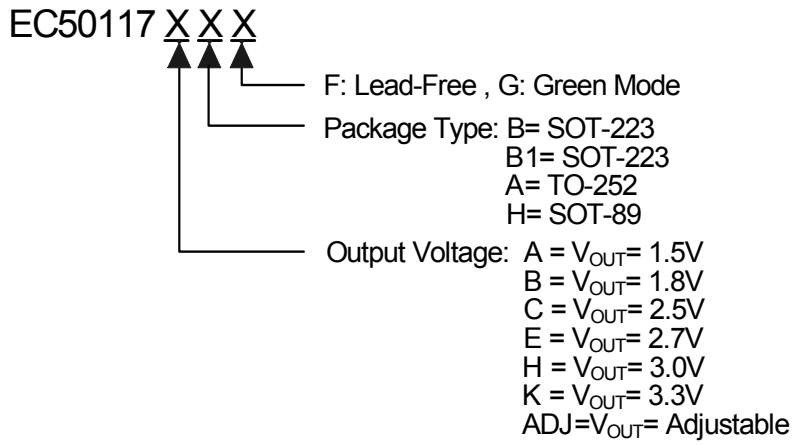
Package: TO-252



Package: SOT-89



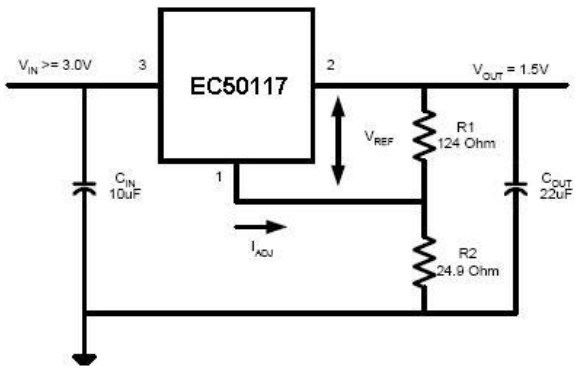
Ordering Information



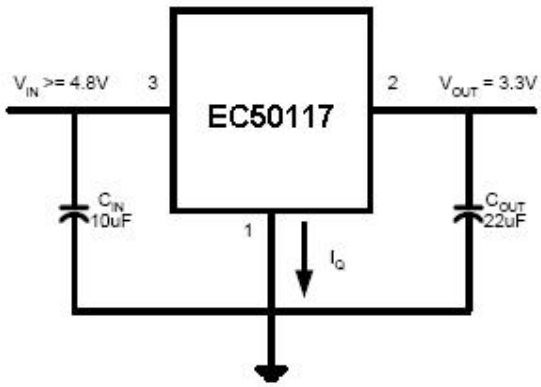
Part Number	Marking ID	Package	VOUT Voltage
EC50117KBF	50117K-F	SOT-223	output voltages; B Type ,voltage options (3.3V). Lead Free
EC50117KB1F	50117K1-F	SOT-223	output voltages; B1 Type, voltage options (3.3V). Lead Free
EC50117KBG	50117K-G	SOT-223	output voltages; B Type, voltage options (3.3V). Green Package
EC50117KB1G	50117K1-G	SOT-223	output voltages; B1 Type, voltage options (3.3V). Green Package
EC50117KAF	50117K-F	TO-252	output voltages; A Type, voltage options (3.3V). Lead Free
EC50117KAG	50117K-G	TO-252	output voltages; A Type, voltage options (3.3V). Green Package
EC50117KHF	50117K-F	SOT-89	output voltages; H Type, voltage options (3.3V). Lead Free
EC50117EBG	50117E-G	SOT-223	output voltages; B Type, voltage options (2.7V). Green Package
EC50117CAG	50117C-G	TO-252	output voltages; A Type, voltage options (2.5V). Green Package
EC50117CBG	50117C-G	SOT-223	output voltages; B Type, voltage options (2.5V). Green Package
EC50117CB1G	50117C1G	SOT-223	output voltages; B1 Type, voltage options (2.5V). Green Package
EC50117CHF	117C-F	SOT-89	output voltages; H Type, voltage options (2.5V). Lead Free
EC50117CHG	117C-G	SOT-89	output voltages; H Type, voltage options (2.5V). Green Package
EC50117BAG	50117B-G	TO-252	output voltages; A Type, voltage options (1.8V). Green Package
EC50117BBG	50117B-G	SOT-223	output voltages; B Type, voltage options (1.8V). Green Package
EC50117BB1G	50117B1G	SOT-223	output voltages; B1 Type, voltage options (1.8V). Green Package
EC50117ABG	50117A-G	SOT-223	output voltages; B Type, voltage options (1.5V). Green Package
EC50117ADJAG	50117ADJ-G	TO-252	output voltages; A Type ,voltage options (ADJ). Green Package
EC50117ADJBF	50117ADJ-F	SOT-223	output voltages; B Type ,voltage options (ADJ). Lead Free
EC50117ADJBG	50117ADJ-G	SOT-223	output voltages; B Type ,voltage options (ADJ). Green Package

Typical Application

Adjustable Voltage Regulator



Fixed Voltage Regulator



$$V_{OUT} = V_{REF}(1 + \frac{R_2}{R_1}) + I_{ADJ}R_2$$

Application Hints

Like any linear voltage regulator, EC50117 requires external capacitors to ensure stability. The external capacitors must be carefully selected to ensure performance.

Input Capacitor

An input capacitor of at least 10μF is required. Ceramic or Tantalum can be used. The value can be increase without upper limit.

Output Capacitor

An output capacitor is required for stability. It must be placed no more than 1 cm away from the VOUT pin, and connected directly between VOUT and GND pins. The minimum value is 22μF but may be increase without limit.

Thermal Considerations

It is important that the thermal limit of the package is not exceeded. The EC50117 has built-in thermal protection. When the thermal limit is exceeded, the IC will enter protection, and VOUT will be pulled to ground. The power dissipation for a given application can be calculated as following:

The power dissipation (PD) is

PD = IOUT * [VIN – VOUT]

The thermal limit of the package is then limited to PD(MAX) = [TJ – TA]/ΘJA where TJ is the junction temperature, TA is the ambient temperature, and ΘJA is around 60°C/W for EC50117. EC50117 is designed to enter thermal protection at 175°C. For example, if TA is 25°C then the maximum PD is limited to about 2.5W. In other words, if IOUT(MAX) = 1A, then [VIN – VOUT] cannot exceed 2.5V.

Absolute maximum ratings

Symbol	Parameter		Maximum	Units
VIN	Input Supply Voltage		9	V
θJA	Thermal Resistance Junction to Ambient	SOT-89	45	°C/W
		SOT-223	60	
		TO-252	33	
θJC	Thermal Resistance Junction to Case	SOT-89	13	°C/W
		SOT-223	23	
		TO-252	11.5	
TJ	Operating Junction Temperature Range		0 to 125	°C
TSTG	Storage Temperature Range		-40 to 150	°C
TLEAD	Lead Temperature (Soldering 10 Sec)		260	°C

Electrical Characteristics

VIN, MAX ≤ 8V, VIN, MIN – VOUT = 1.5V, IOUT = 10mA, CIN = 10μF, COUT = 22μF, TJ = 0 – 125°C, unless otherwise specified.

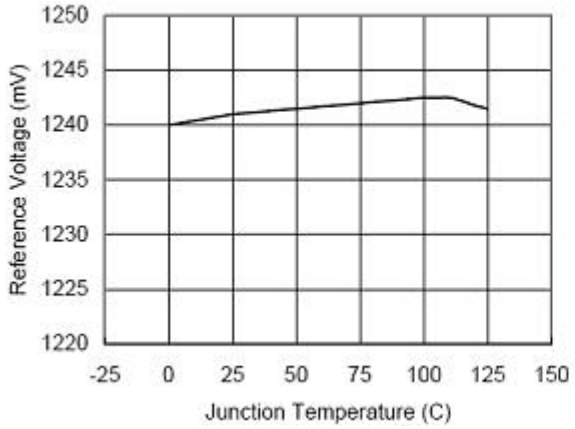
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
VO	Output Voltage (1)	(VIN-VOUT)=1.5V, IOUT=10mA, TA=25°C	(-2%)		(+2%)	V
		EC50117A		1.5		
		EC50117B		1.8		
		EC50117C		2.5		
		EC50117E		2.7		
		EC50117H		3.0		
		EC50117K		3.3		
VREF	Reference Voltage(1) (ADJ. Voltage Version)	(VIN-VOUT)=1.5V, IOUT=10mA	(-2%)	1.250	(+2%)	V
VSR	Line Regulation(1)	IOUT=10mA	—	0.3	—	%
VLR	Load Regulation(1)	(VIN-VOUT)=1.5V, 10mA ≤ IOUT ≤ 1A	—	0.5	—	%
IQ	Quiescent Current	Fixed Output Version	—	3.3	—	mA
IADJ	Adjust Pin Current		—	65	—	uA
△IADJ	Adjust Pin Current Change	10mA ≤ IOUT ≤ 1A	—	0.2	—	uA
VD	Dropout Voltage(2)	△VREF = 2%, IOUT =1A	—	1.2	—	V
ID	Minmum Load Curren		—	4	—	mA
ICL	Current Limit		—	1.8	—	A
TC	Temperature Coefficient		—	0.07	—	%/°C
OTP	Thermal Protection		—	175	—	°C
VN	RMS Output Noise	TA = 25°C, 10Hz ≤ f ≤ 10KHz	—	0.003	—	%VO
RA	Ripple Rejection Ratio	F=120Hz, COUT=22uF(Tantalum), (VIN-VOUT)=3V,IOUT=1A	—	35	—	dB

Notes:

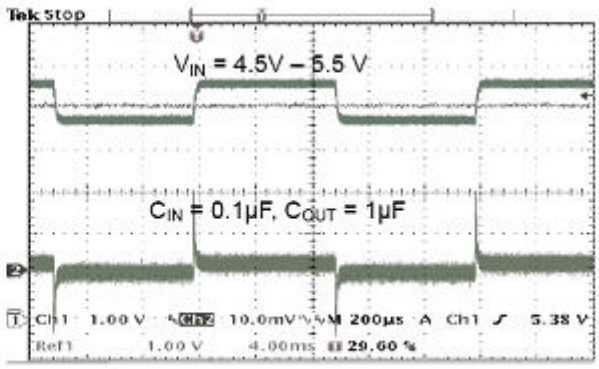
1. Low duty cycle pulse testing with which TJ remains unchanged.
2. ΔVOUT, ΔVREF = 2%.

Typical Performance Characteristics

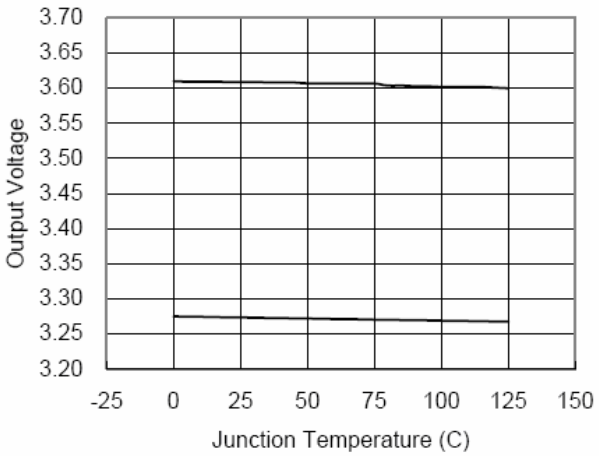
Reference Voltage VS Junction Temperature



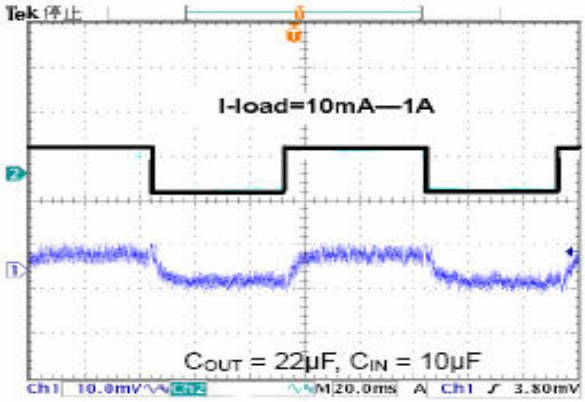
Line Transients



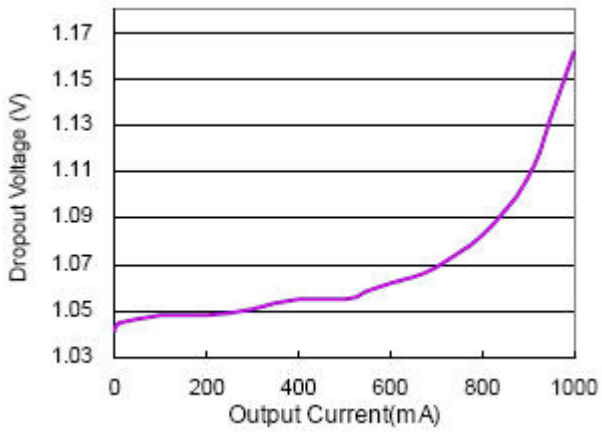
Output Voltage VS Junction Temperature



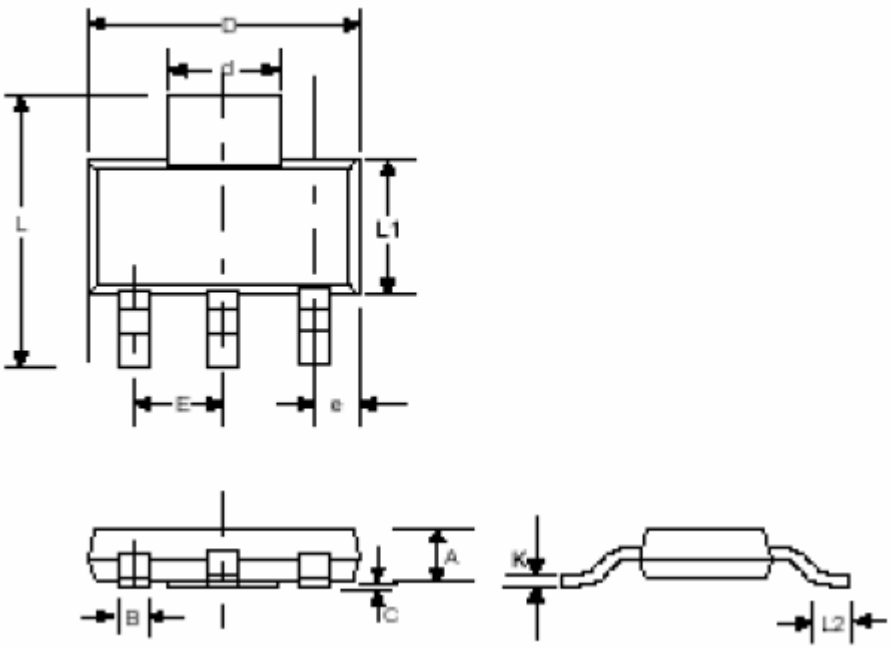
Load Transients



Dropout Voltage vs Output Current

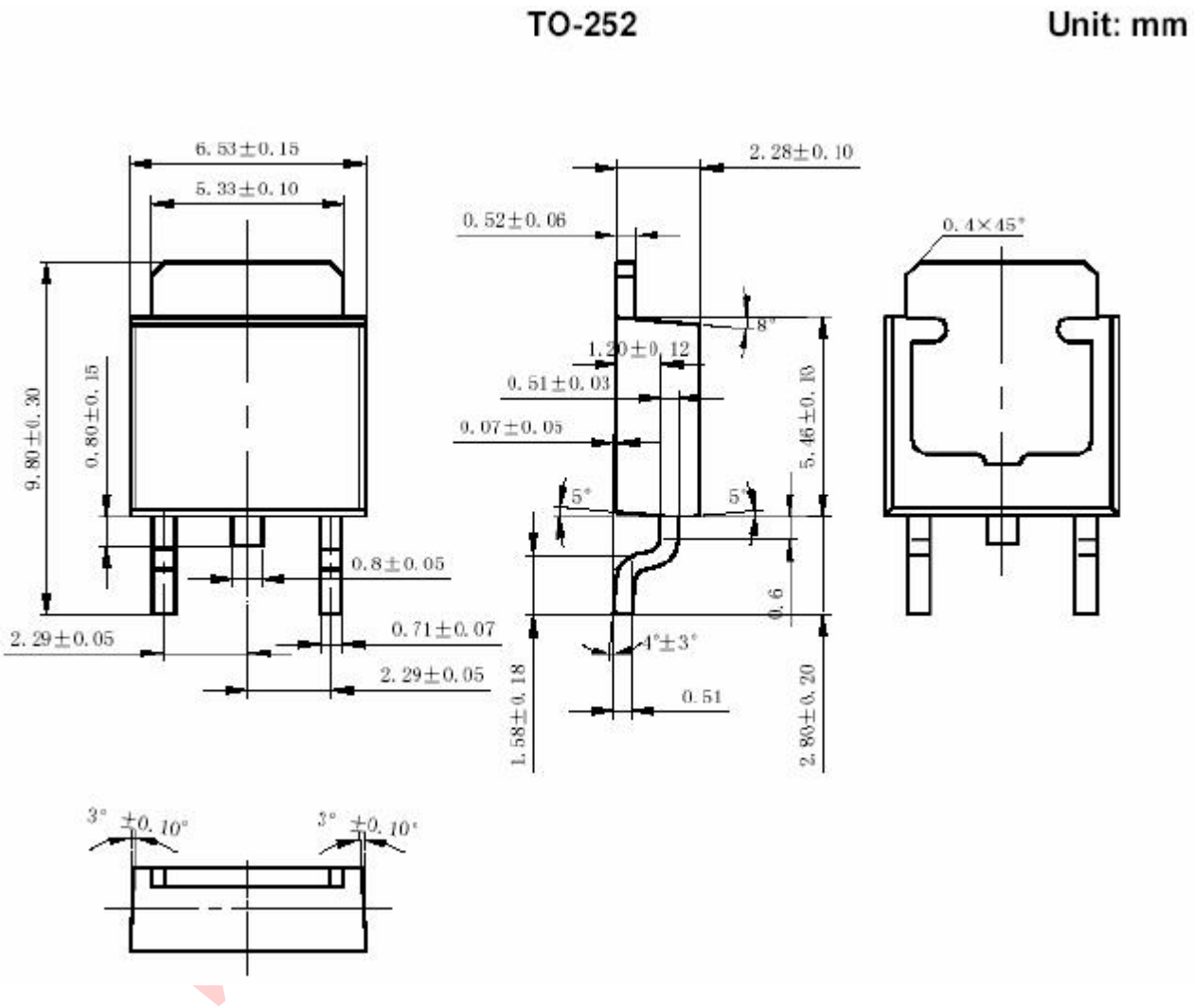


Outline Drawing for SOT-223

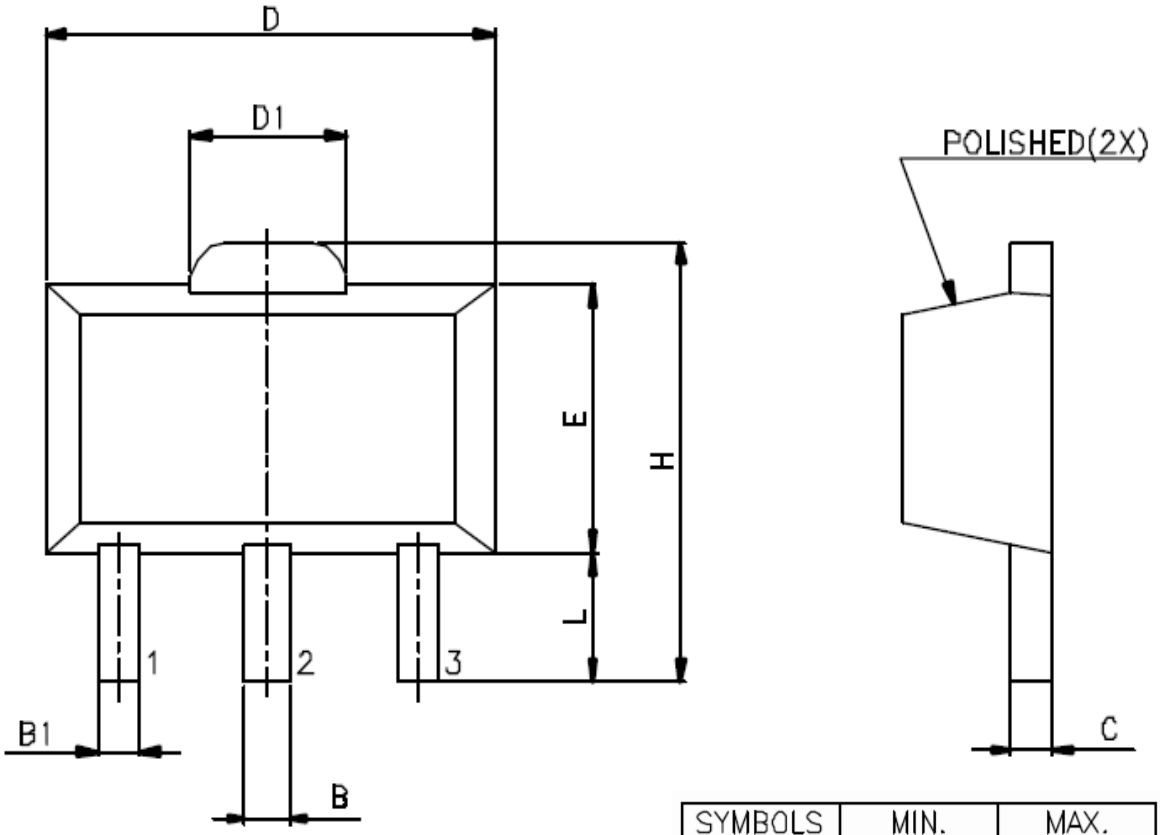


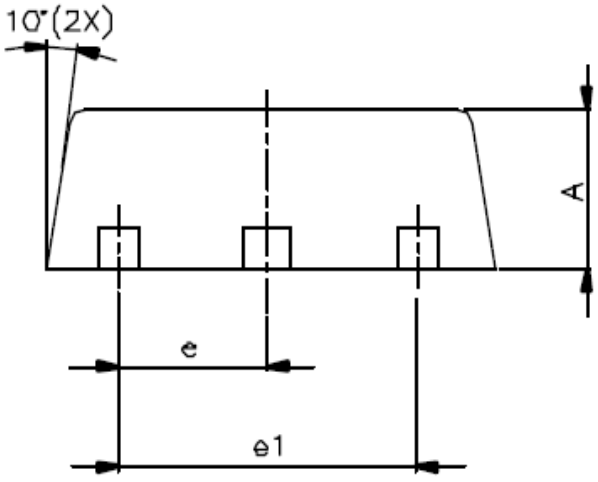
DIMENSIONS				
DIMN	INCHES		MM	
	MIN	MAX	MIN	MAX
A	--	0.071	--	1.80
B	0.025	0.033	0.64	0.840
C	0.012	--	0.31	--
D	0.248	0.264	6.30	6.71
d	0.115	0.124	2.95	3.15
E	--	0.090	--	2.29
e	0.033	0.041	0.840	1.04
L	0.264	0.287	6.71	7.29
L1	0.130	0.148	3.30	3.71
L2	0.012	--	0.310	--
K	0.010	0.014	0.250	0.360

Outline Drawing for TO-252



Outline Drawing for SOT-89





SYMBOLS	MIN.	MAX.
A	1.40	1.60
B	0.44	0.56
B1	0.36	0.48
C	0.35	0.44
D	4.40	4.60
D1	1.35	1.83
E	2.29	2.60
H	3.94	4.25
e	1.50 BSC	
e1	3.00 BSC	
L	0.89	1.2

UNIT : mm

NOTES:

1.JEDEC OUTLINE : TO-243 AA

2.DIMENSION B1, 2 PLACES.