



Halogens free devices

### FEATURES

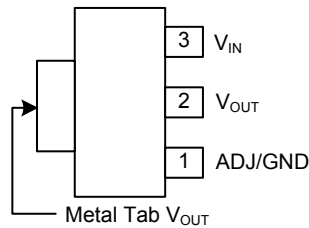
- 1.3V maximum dropout at full load current
- Fast transient response
- Output current limiting
- Built-in thermal shutdown
- Good noise rejection
- 3-Terminal Adjustable or Fixed 1.5V, 1.8V, 2.5V, 3.3V

### APPLICATIONS

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-video player
- NIC/Switch
- Telecom Equipment
- ADSL Modem
- Printer and other Peripheral Equipment

### PIN CONFIGURATION

(1) SOT223



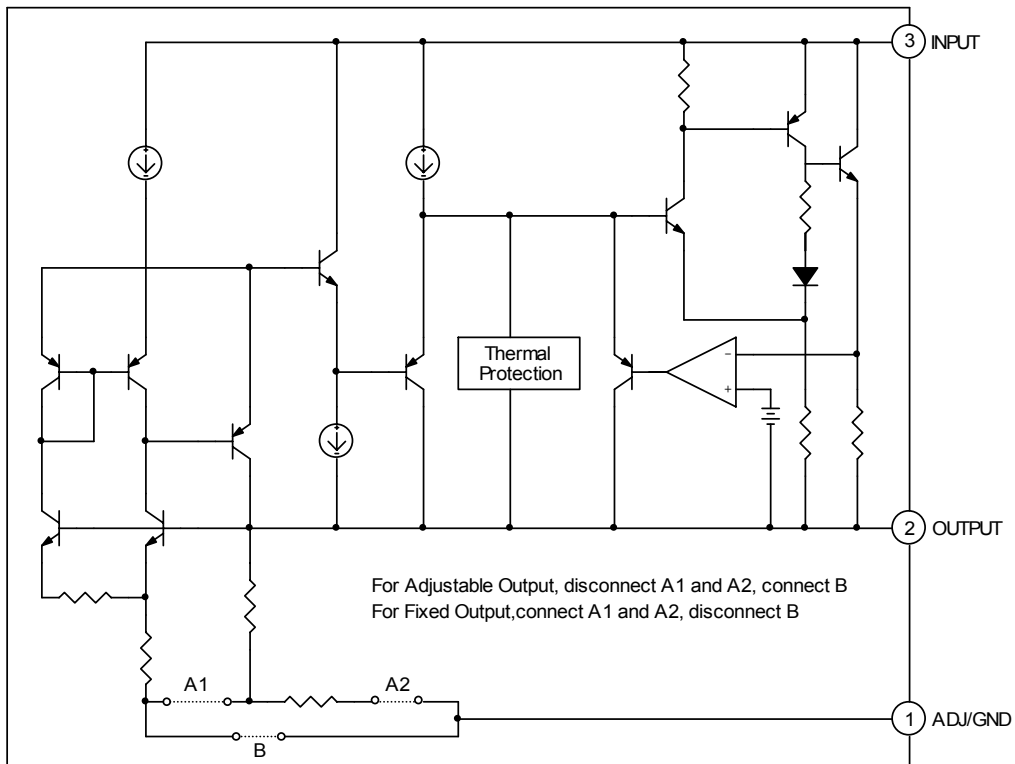
### GENERAL DESCRIPTION

The CHC1117 is a series of low dropout three-terminal regulators with a dropout of 1.4V at 1A output current. The CHC1117 series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within 2% for 1.5V, 1.8V, 2.5V, 3.3V and adjustable versions. Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The CHC1117 has an adjustable version that can provide the output voltage from 1.25V to 8V with only two external resistors.

The CHC1117 series is available in the industry standard and SOT223 power packages.

### BLOCK DIAGRAM



*Halogens free devices***■ ABSOLUTE MAXIMUM RATINGS (NOTE 1)**

Symbol	Parameter	Rating	Unit
$V_{IN}$	Input Voltage	9	V
$T_J$	Maximum Junction Temperature	150	
$T_S$	Storage Temperature	-65~150	
$T_{LEAD}$	Lead Temperature (10 sec.)	300	
ESD	ESD (Machine Model)	600	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress rating only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

**■ RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Rating	Unit
$V_{IN}$	Input Voltage	8	V
$T_J$	Operating Junction Temperature Range	-40~125	

**■ ELECTRICAL CHARACTERISTICS**

Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = 25^\circ C$ , unless otherwise specified

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Reference Voltage	$V_{REF}$	CHC1117 -Adj $I_O = 10mA, V_{IN} - V_{OUT} = 1.5V$	1.225	1.250	1.275	V
		$I_O = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 8V$	1.225	1.250	1.275	
Output Voltage	$V_{OUT}$	CHC1117 -1.5 $I_O = 10mA, V_{IN} = 3V$	1.485	1.5	1.515	V
		$I_O = 10mA, 3V \leq V_{IN} \leq 8V$	1.470	1.5	1.530	
		CHC1117 -1.8 $I_O = 10mA, V_{IN} = 3.3V$	1.782	1.8	1.818	V
		$I_O = 10mA, 3.3V \leq V_{IN} \leq 8V$	1.764	1.8	1.836	
		CHC1117 -2.5 $I_O = 10mA, V_{IN} = 4V$	2.475	2.5	2.5	V
		$I_O = 10mA, 4V \leq V_{IN} \leq 8V$	2.450	2.5	2.550	
Line Regulation	$Reg_{LINE}$	CHC1117-XXX $I_O = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 8V$		0.3		%
		CHC1117 -Adj $V_{IN} = 3V, 10mA < I_O < 1A$		0.5		
Load Regulation	$Reg_{Load}$	CHC1117 -1.5 $V_{IN} = 3V, 10mA < I_O < 1A$		12	15	mV
		CHC1117 -1.8 $V_{IN} = 3.3V, 10mA < I_O < 1A$		15	18	
		CHC1117 -2.5 $V_{IN} = 4V, 10mA < I_O < 1A$		20	25	
		CHC1117 -3.3 $V_{IN} = 5V, 10mA < I_O < 1A$		26	33	
Dropout Voltage	$V_{IN} - V_{OUT}$	CHC1117-XXX $I_{OUT} = 1A, \Delta V_{OUT} = 1\% V_{OUT}$		1.3		V
Current Limit	$I_{LIMIT}$	CHC1117-XXX $V_{IN} - V_{OUT} = 3V$		1.8		A
Ripple Rejection		CHC1117-XXX $F = 120Hz, C_{OUT} = 25\mu F$ Tantalum, $V_{IN} - V_{OUT} = 3V$	57			dB
Temperature Stability		CHC1117-XXX $I_O = 10mA$		0.07		%/



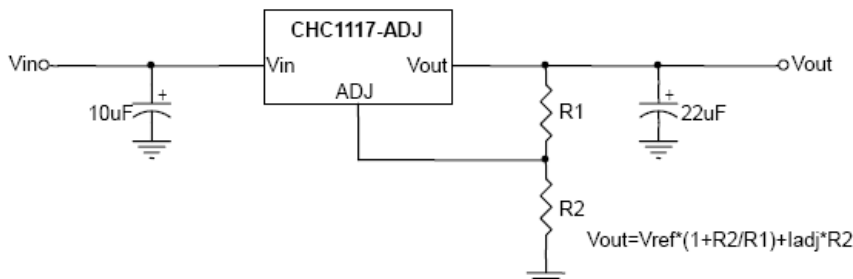
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### ELECTRICAL CHARACTERISTICS (CONTINUED)

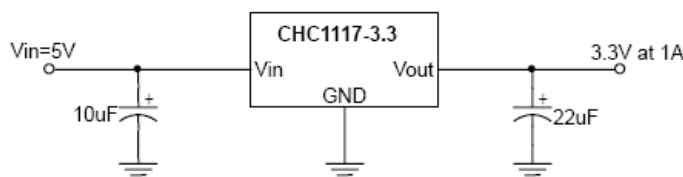
Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = 25^\circ C$ , unless otherwise specified

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Adjust Pin Current		$I_O = 10mA \sim 1A$ , $1.5V \leq V_{IN} - V_{OUT} \leq 8V$		65		$\mu A$
Adjust Pin Current Change		$I_O = 10mA \sim 1A$ , $1.4V \leq V_{IN} - V_{OUT} \leq 8V$		14		$\mu A$
Minimum Load Current(ADJ)		CHC1117 $1.5V \leq V_{IN} - V_{OUT} \leq 8V$		0.4		mA
Quiescent Current	$I_q$	$V_{IN} = V_{OUT} + 1.25V$		3		mA
Long-term Stability		$T_A = 125^\circ C$ , 1000hrs		0.3		%
RMS Output Noise (% of $V_{OUT}$ )		$T_A = 25^\circ C$ , $10Hz \leq f \leq 10kHz$		0.003		%
Power Dissipation	$P_d$	TO252		1.2		W
		SOT223		0.625		
Thermal Resistance, Junction to Ambient	$\theta_{JA}$	TO252		55		$^\circ C/W$
		SOT223		75		
Thermal Resistance, Junction to case	$\theta_{JC}$	TO252		10		$^\circ C/W$
		SOT223		15		
Thermal Shutdown		Junction Temperature		175		$^\circ C$
Thermal Shutdown Hysteresis				25		$^\circ C$

### TYPICAL APPLICATIONS



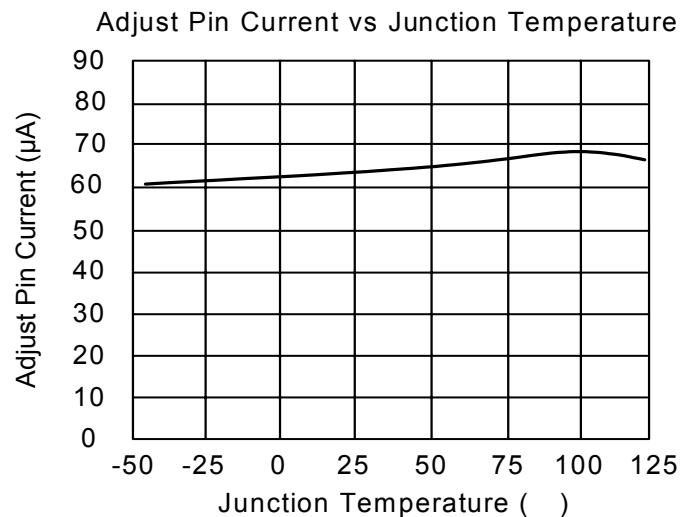
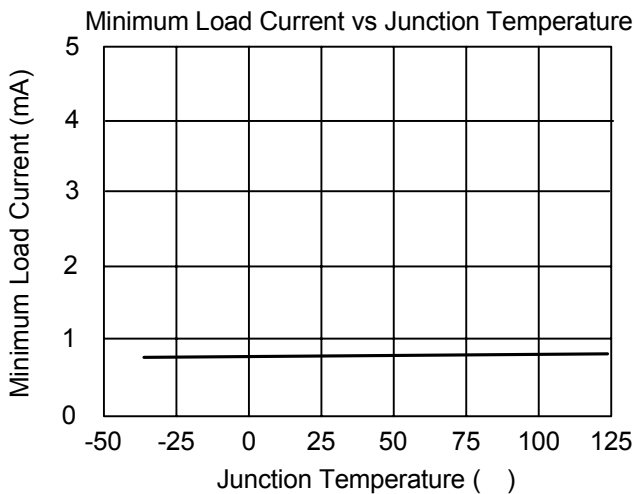
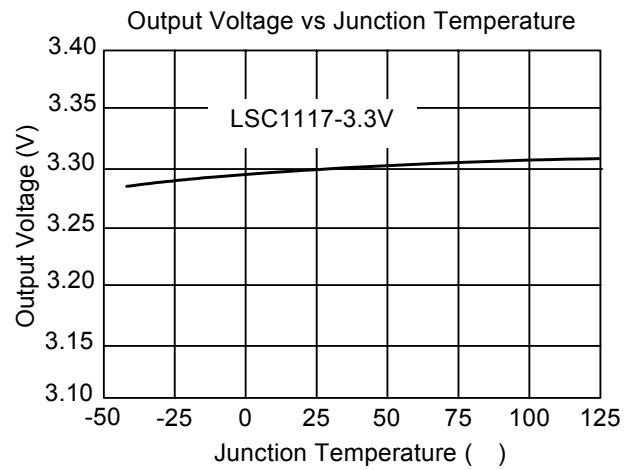
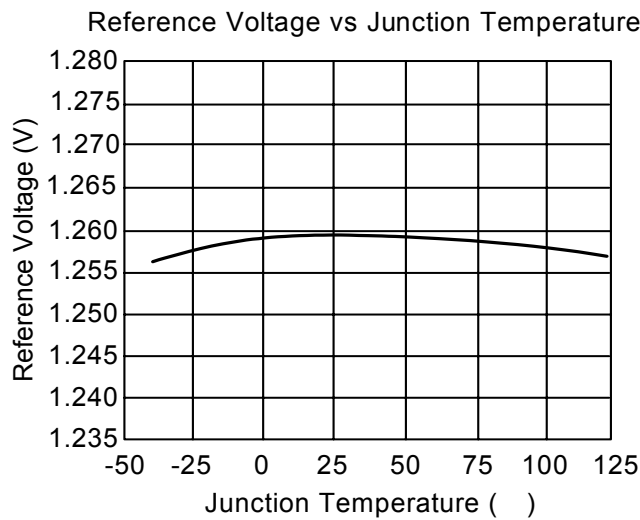
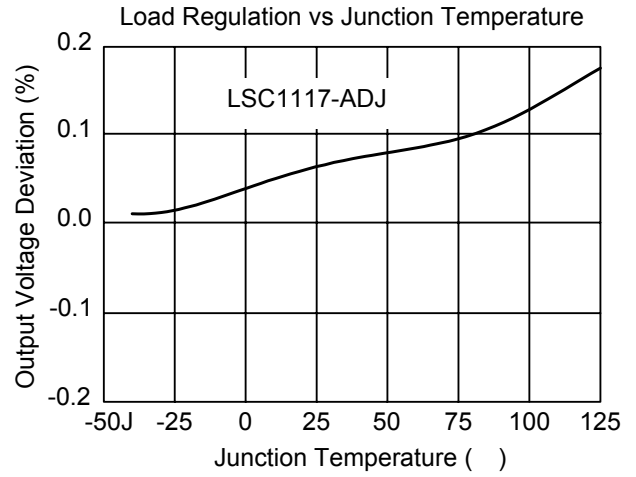
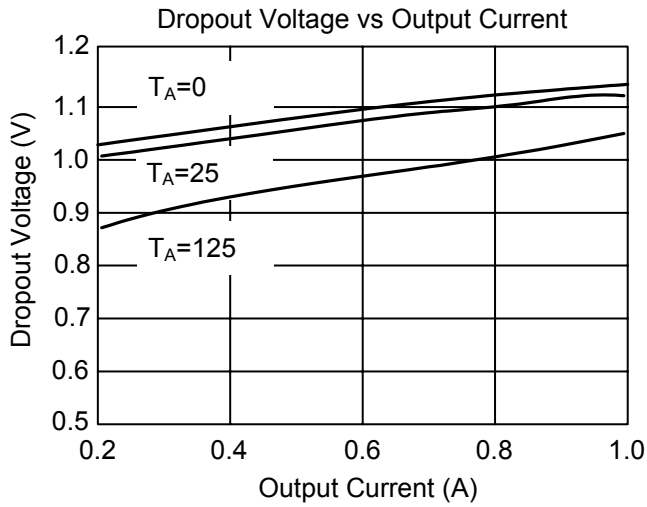
The CHC1117 keeps a constant 1.25V between the output pin and the adjust pin. By placing a resistor R1 across these two pins a constant current flows through R1, adding to the  $I_{adj}$  current and into the R2 resistor producing a voltage equal to the  $(1.25/R1) * R2 + I_{adj} * R2$  which will be added to the 1.25V to set the output voltage. This is summarized in the above equation. Since the minimum load current requirement of the CHC1117 is 10mA, R1 is typically selected to be 121 $\Omega$  resistor so that it automatically satisfies the minimum current requirement. Notice that since  $I_{adj}$  is typically in the range of 50 $\mu A$  it only adds a small error to the output voltage and should only be considered when a very precise output voltage setting is required. For example, in a typical 3.3V application where R1=121 $\Omega$  and R2=200 $\Omega$  the error due to  $I_{adj}$  is only 0.3% of the nominal set point.





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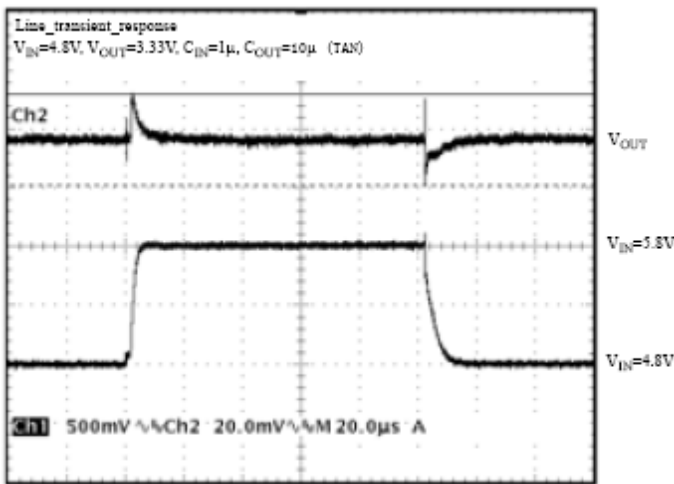
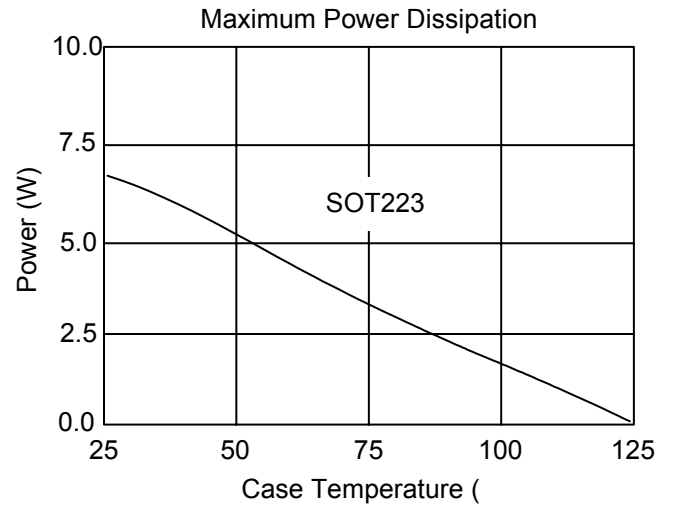
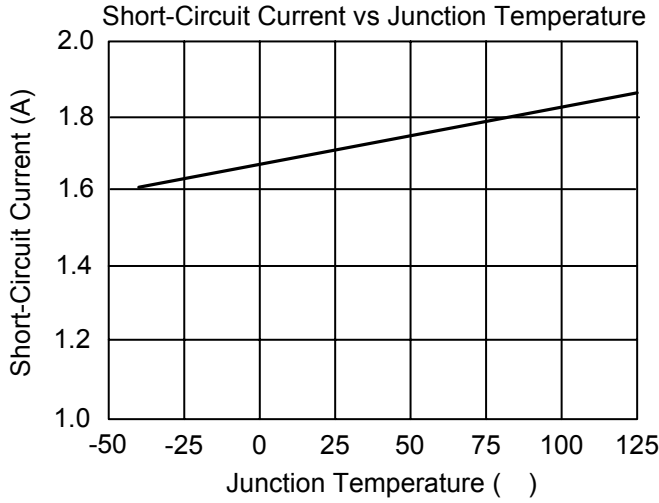
TYPICAL PERFORMANCE CHARACTERISTICS



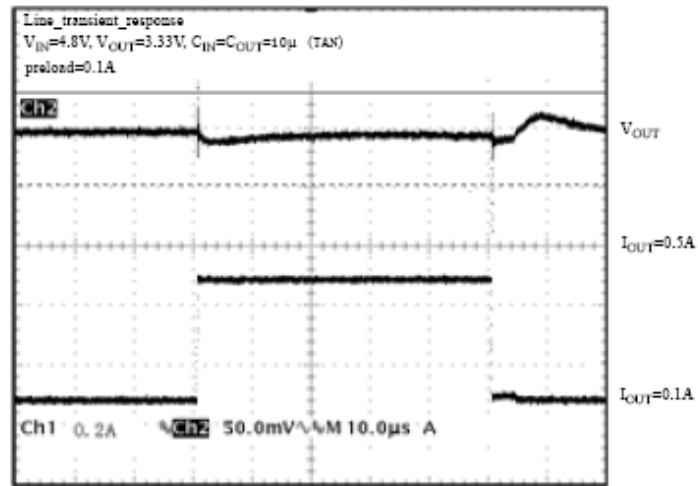


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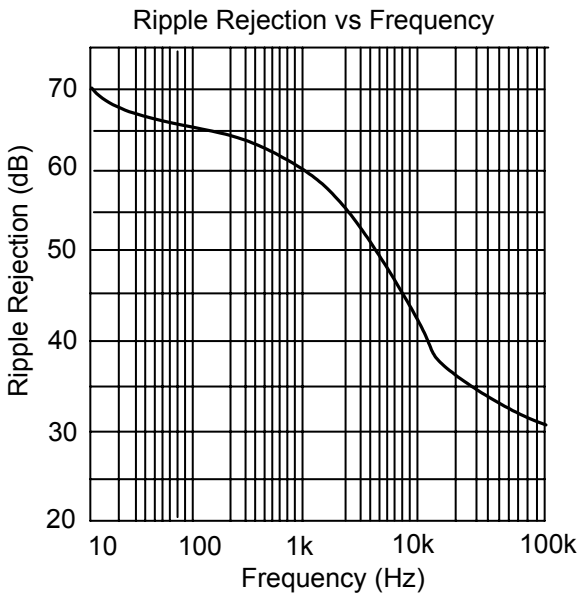
TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)



Line Transient Response



Load Transient Response



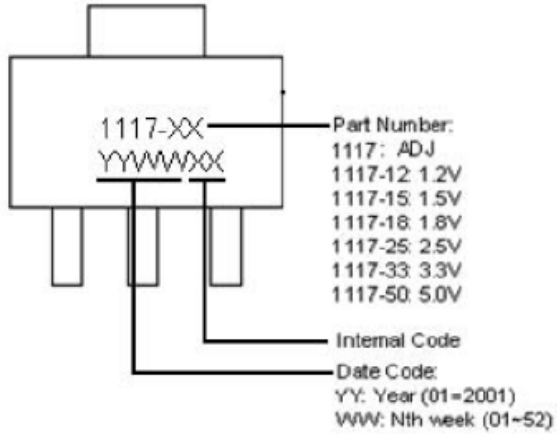


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1A Low Dropout Voltage Regulator ...

MARKING INFORMATION

(1) SOT223

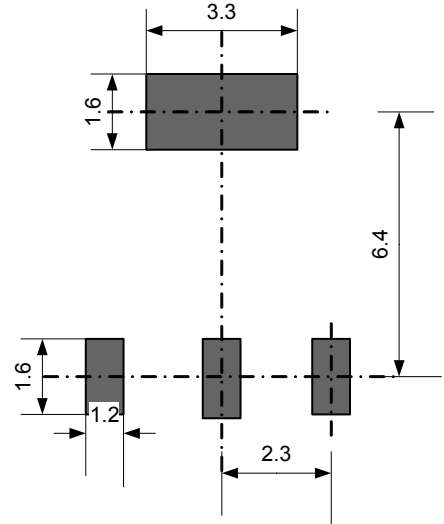
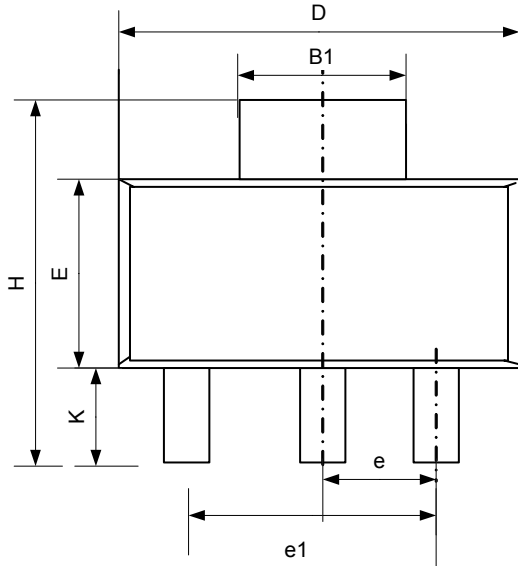


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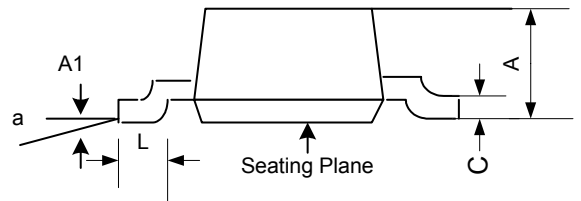
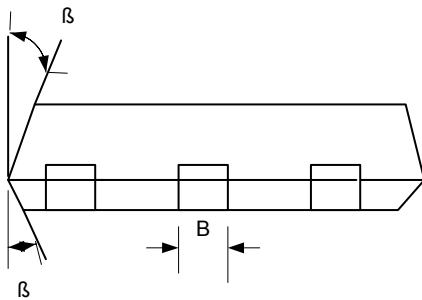


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(1) SOT223



Land Pattern Recommendation (Unit :mm)



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.50	1.65	1.80	0.059	0.065	0.071
A1	0.02	0.05	0.08	0.001	0.002	0.003
B	0.60	0.70	0.80	0.024	0.028	0.031
B1	2.90		3.15(Ref.)	0.114		0.124(Ref.)
c	0.28	0.30	0.32	0.011	0.012	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
E	3.30	3.50	3.70	0.130	0.138	0.146
e	2.3Basic			0.091Basic		
e1	4.6Basic			0.181Basic		
H	6.70	7.00	7.30	0.264	0.276	0.287
L	0.91	1.00	1.10	0.036	0.039	0.043
K	1.50	1.75	2.00	0.059	0.069	0.079
α	0°	5°	10°	0°	5°	10°
β		13°			13°	