TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TS1117B

800mA Low Dropout Positive Voltage Regulator

TO-252



SOT-223



TO-220



Pin Definition:
1. Fixed / Adj
2. Output (tab)
3. Input

SOP-8



Pin Definition:

1. Fixed / Adj	8. N/C
2. Output	7. Output
3. Output	6. Output
4. Input	5. N/C

General Description

The TS1117B Series are high performance positive voltage regulators are designed for use in applications requiring low dropout performance at full rated current, Additionally, the TS1117B Series provides excellent regulation over variations due to changes in line, load and temperature. Outstanding features include low dropout performance at rated current, fast transient response, internal current limiting and thermal shutdown protection of the output device. The TS1117B Series are three terminal regulators with fixed and adjustable voltage options available in popular packages.

Features

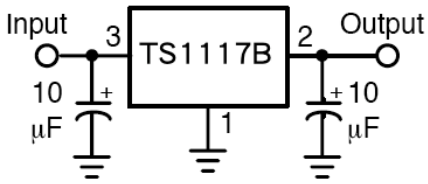
- Low Dropout Performance 1.5V max.
- Fill Current Rating Over Line and Temperature
- Fast Transient Response
- ±2% Total Output Regulation Over Line, Load and Temperature
- Adjust Pin Current max 90uA Over Temperature
- Line Regulation Typical 0.015%
- Load Regulation Typical 0.05%
- Fixed / Adjustable Output Voltage
- TO-220, TO-252, SOT-223 and SOP-8 Package

Ordering Information

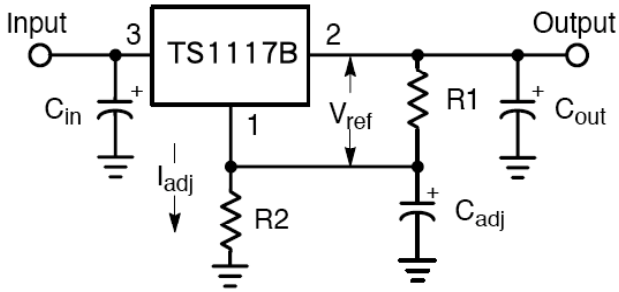
Part No.	Package	Packing
TS1117BCZ**xx** C0	TO-220	50pcs / Tube
TS1117BCP**xx** RO	TO-252	2.5Kpcs / 13” Reel
TS1117BCW**xx** RP	SOT-223	2.5Kpcs / 13” Reel
TS1117BCS**xx** RL	SOP-8	2.5Kpcs / 13” Reel
TS1117BIP**xx** RO	TO-252	2.5Kpcs / 13” Reel
TS1117BIW**xx** RP	SOT-223	2.5Kpcs / 13” Reel
TS1117BIS**xx** RL	SOP-8	2.5Kpcs / 13” Reel

Note: Where **xx** denotes voltage option, available are 5.0V, 3.3V, 2.5V, 1.8V and 1.2V. Leave blank for adjustable version.

Typical Application Circuit



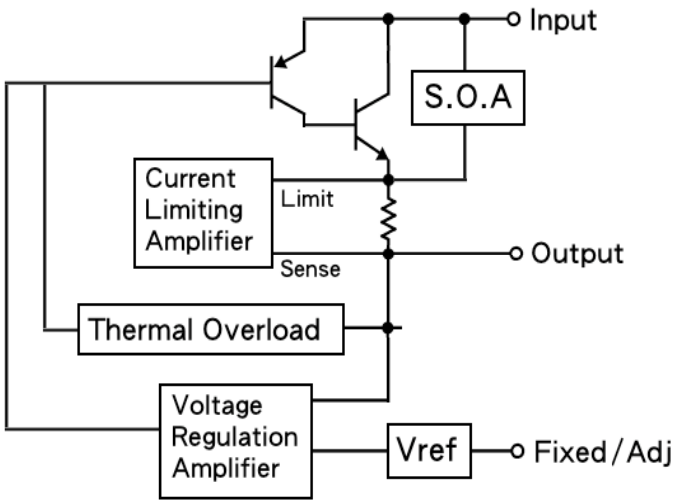
Fixed Output Voltage Version



$V_{out} = V_{ref}(1+R2/R1) + I_{adj} R2$

Adjustable Output Voltage Version

Block Diagram



Absolute Maximum Rating (Note 1)

Parameter		Symbol	Limit	Unit
Input Supply Voltage		V_{IN}	15	V
Recommend Operation Input Supply Voltage		V_{IN} (Opr. Typ.)	12	V
Power Dissipation (Note 2)		P_D	Internal limited	
Thermal Resistance Junction to Ambient	TO-220	Θ_{JA}	80	°C/W
	TO-252		105	
	SOT-223		130	
	SOP-8		160	
Operating Temperature Range	TS1117B	T_{OPER}	0 ~ +125	°C
	TS1117BI		-40 ~ +125	
Junction Temperature Range		T_J	+150	
Storage Temperature Range		T_{STG}	-65 ~ +150	
Lead Soldering Temperature (260 °C)	TO-220		10	S
	TO-252 / SOT-223		5	
	SOP-8		2	

Electrical Specification (Ta = 25 °C, unless otherwise specified.)

Parameter	Conditions	Min	Typ	Max	Unit
Reference Voltage	Vin= 2.75, Io=800mA	1.225	1.25	1.275	V
Output Voltage	Vin = 2.7V~12V, Io=800mA	1.176	1.2	1.224	V
	Vin = 3V~12V, Io=800mA	1.470	1.5	1.530	V
	Vin = 3.3V~12V, Io=800mA	1.764	1.8	1.836	V
	Vin = 4V~12V, Io=800mA	2.450	2.5	2.550	V
	Vin = 4.8V~12V, Io=800mA	3.235	3.3	3.366	V
	Vin = 6.5V~12V, Io=800mA	4.900	5.0	5.100	V
Line Regulation	Vo+1.5V ≤ Vin ≤ 12V, Io= 10mA	--	0.2	0.5	%
Load Regulation (Note 1,2)	Vin= Vout +1.5V, Io= 10mA~800mA	--	0.05	1.0	%
Dropout Voltage	Io=800mA, ΔVout= 1% Vout	--	1.3	1.5	V
Quiescent Current	Vin= 5V	--	5	10	mA
Adjustable Pin Current		--	90	--	uA
Output Current Limit	Vin-Vout= 3V	1.1	--	--	A
Temperature Stability	Io=10mA,	--	0.5	--	%
Ripple Rejection	F= 120Hz, Io= 800mA, Cout= 25uF, Vin= Vout+3V	--	60	70	dB

Note 1: See thermal regulation specification for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

Note 2: Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the input / output voltage difference and the output current. Guaranteed maximum power dissipation will not be available over the full input / output voltage range.

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

Electrical Characteristics Curve

FIGURE 1 – Dropout Voltage vs. Output Current

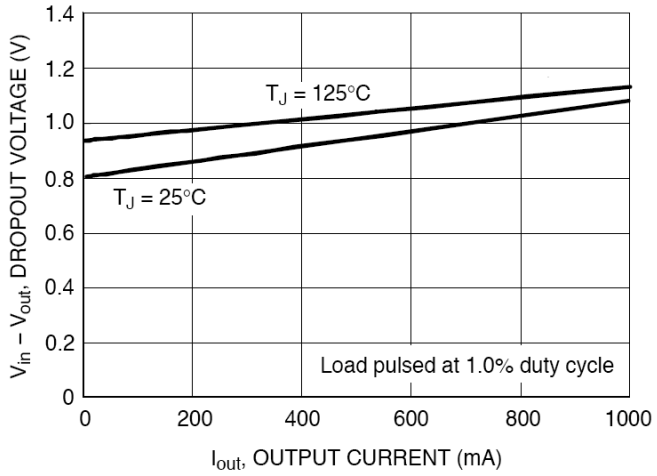


FIGURE 2 – Vout Change vs. Temperature

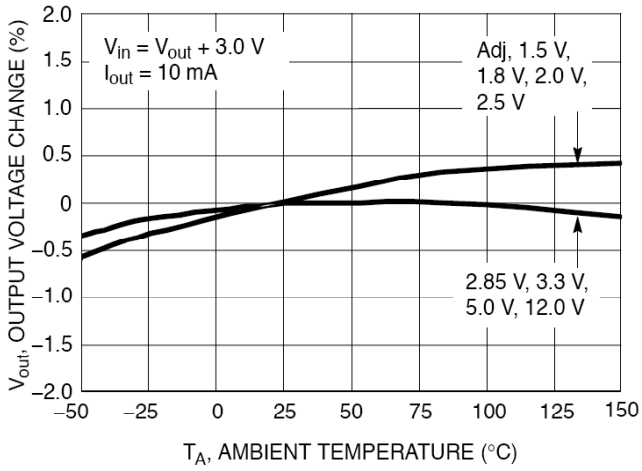


FIGURE 3 – Output Short Circuit Current vs. Differential Voltage

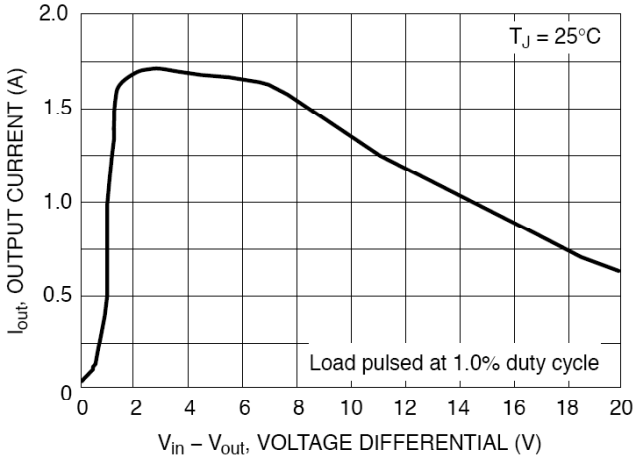


FIGURE 4 – Output Short Circuit Current vs. Temperature

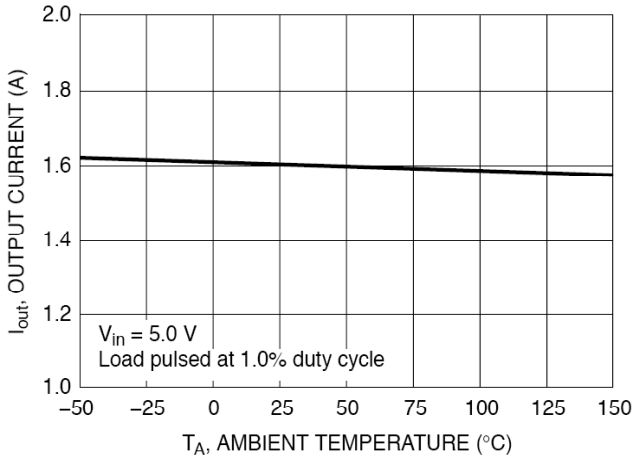


FIGURE 5 – Adjust Pin Current vs. Temperature

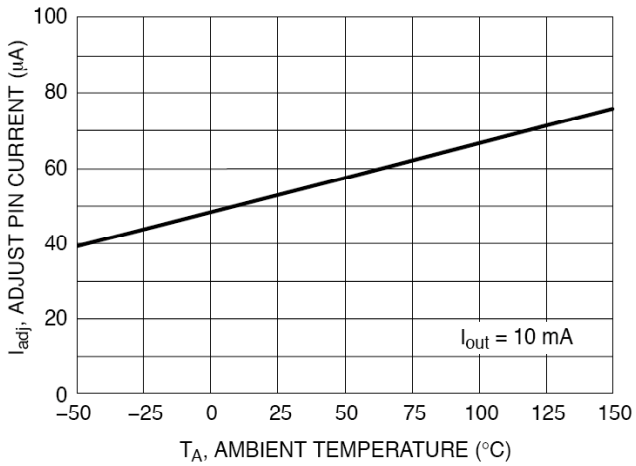
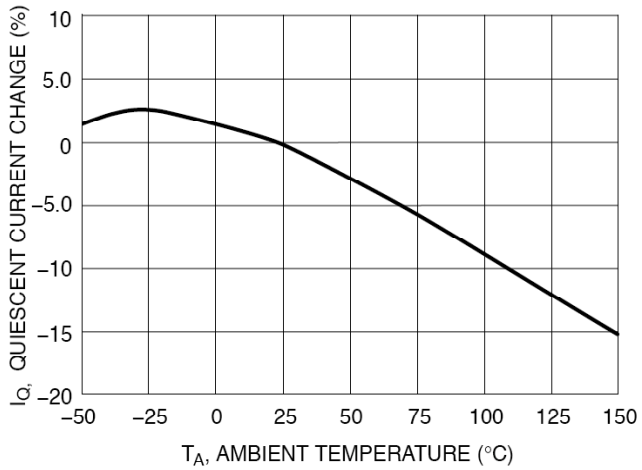


FIGURE 6 – Iq Change vs. Temperature



Application Information

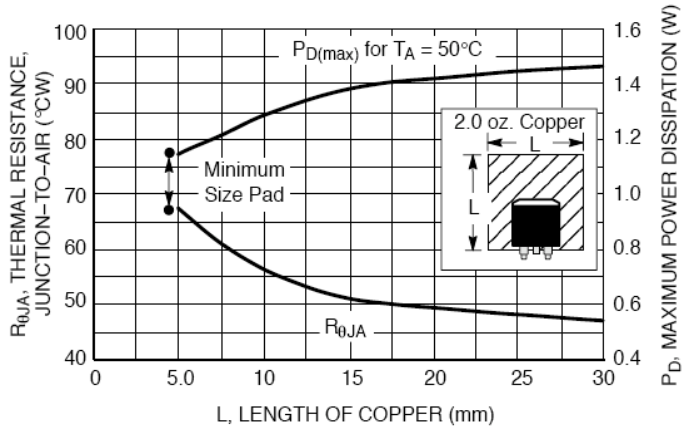


Figure 7 – DPAK Thermal Resistance and Maximum Power Dissipation vs. P.C.B Copper Length

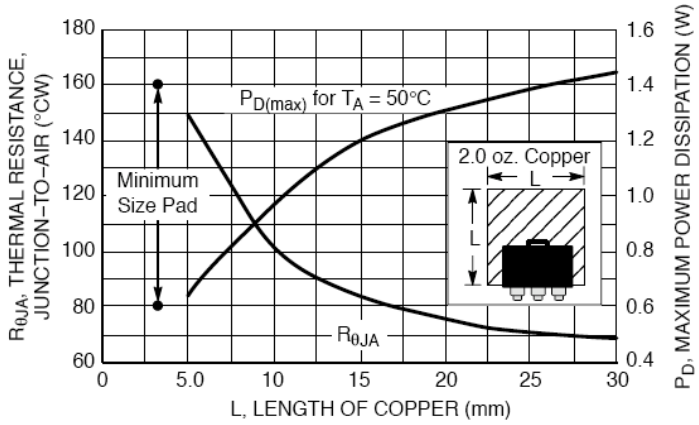
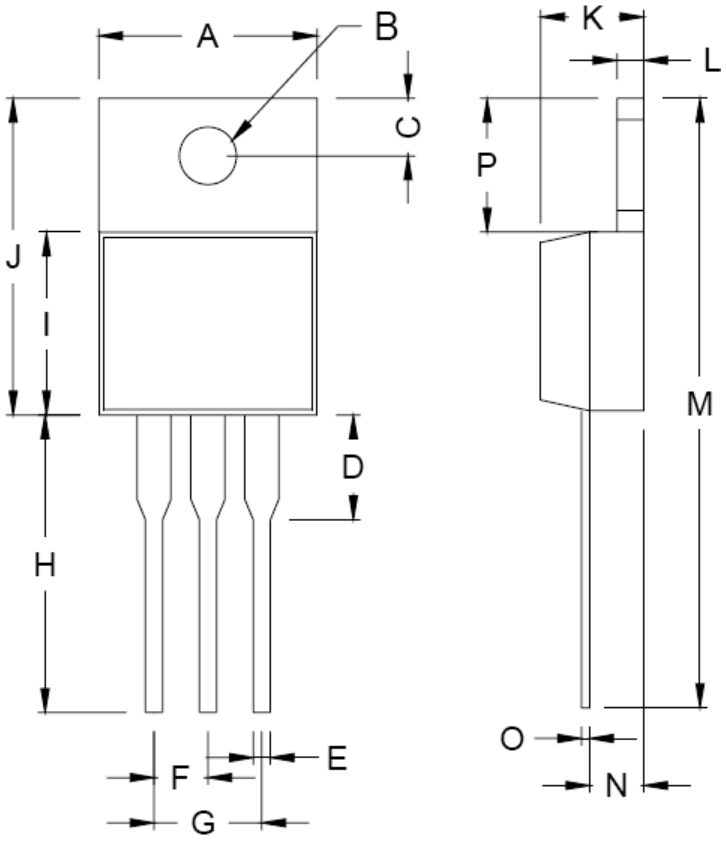


Figure 8 – SOT-223 Thermal Resistance and Maximum Power Dissipation vs. P.C.B Copper Length

TS1117B

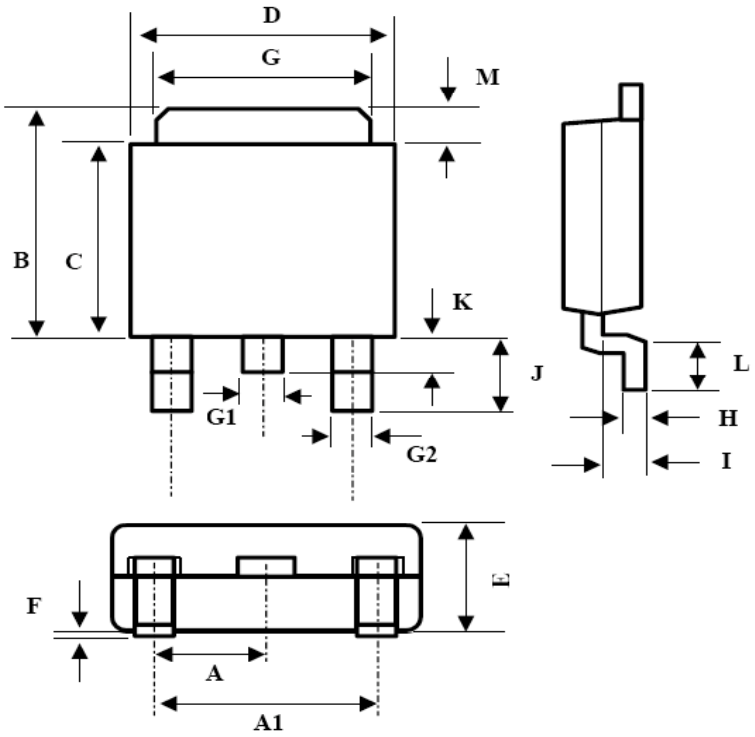
800mA Low Dropout Positive Voltage Regulator

TO-220 Mechanical Drawing



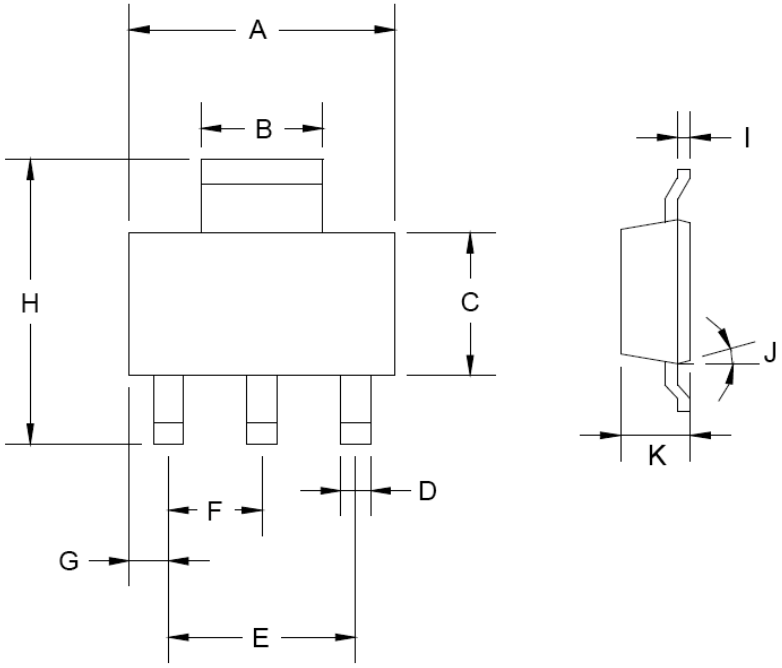
TO-220 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.000	10.500	0.394	0.413
B	3.240	4.440	0.128	0.175
C	2.440	2.940	0.096	0.116
D	-	6.350	-	0.250
E	0.381	1.106	0.015	0.040
F	2.345	2.715	0.092	0.058
G	4.690	5.430	0.092	0.107
H	12.700	14.732	0.500	0.581
I	8.382	9.017	0.330	0.355
J	14.224	16.510	0.560	0.650
K	3.556	4.826	0.140	0.190
L	0.508	1.397	0.020	0.055
M	27.700	29.620	1.060	1.230
N	2.032	2.921	0.080	0.115
O	0.255	0.610	0.010	0.024
P	5.842	6.858	0.230	0.270

TO-252 Mechanical Drawing



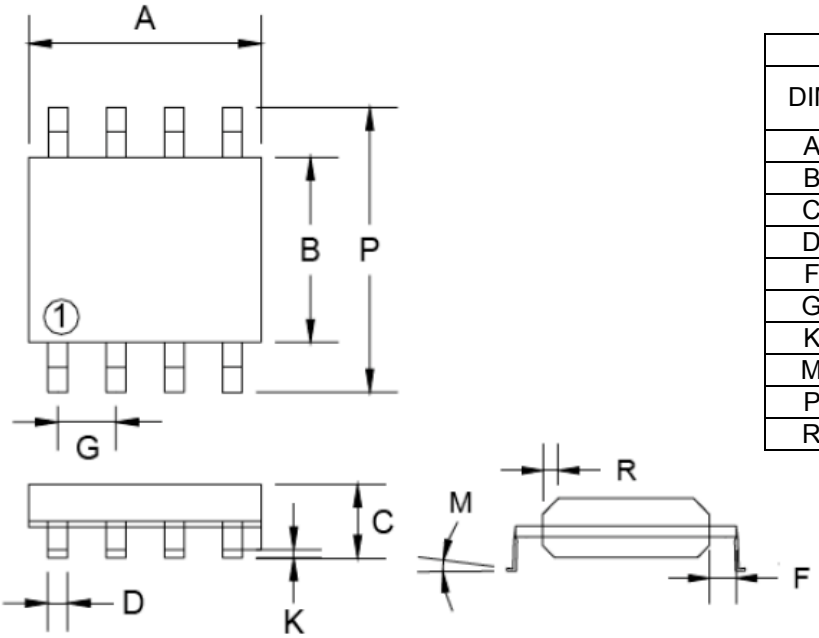
TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.3BSC		0.09BSC	
A1	4.6BSC		0.18BSC	
B	6.80	7.20	0.268	0.283
C	5.40	5.60	0.213	0.220
D	6.40	6.65	0.252	0.262
E	2.20	2.40	0.087	0.094
F	0.00	0.20	0.000	0.008
G	5.20	5.40	0.205	0.213
G1	0.75	0.85	0.030	0.033
G2	0.55	0.65	0.022	0.026
H	0.35	0.65	0.014	0.026
I	0.90	1.50	0.035	0.059
J	2.20	2.80	0.087	0.110
K	0.50	1.10	0.020	0.043
L	0.90	1.50	0.035	0.059
M	1.30	1.70	0.051	0.67

SOT-223 Mechanical Drawing



SOT-223 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.350	6.850	0.250	0.270
B	2.900	3.100	0.114	0.122
C	3.450	3.750	0.136	0.148
D	0.595	0.635	0.023	0.025
E	4.550	4.650	0.179	0.183
F	2.250	2.350	0.088	0.093
G	0.835	1.035	0.032	0.041
H	6.700	7.300	0.263	0.287
I	0.250	0.355	0.010	0.014
J	10°	16°	10°	16°
K	1.550	1.800	0.061	0.071

SOP-8 Mechanical Drawing



SOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27BSC		0.05BSC	
K	0.10	0.25	0.004	0.009
M	0º	7º	0º	7º
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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