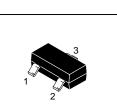
General Purpose Transistors NPN Silicon

COLLECTOR 3 BASE

EMITTER

MAXIMUM RATINGS

Rating	Symbol	Value	Unit	
Collector-Emitter Voltage	VCEO	45	V	
Collector-Base Voltage	V _{CBO}	50	V	
Emitter-Base Voltage	V _{EBO}	5.0	V	
Collector Current — Continuous	IC	500	mAdc	



BC817-16LT1

BC817-25LT1

BC817-40LT1

CASE 318-08, STYLE 6 SOT-23 (TO-236AB)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit	
Total Device Dissipation FR–5 Board, (1) T _A = 25°C Derate above 25°C	PD	225 1.8	mW mW/°C	
Thermal Resistance, Junction to Ambient	R _{θJA}	556	°C/W	
Total Device Dissipation Alumina Substrate, (2) T _A = 25°C Derate above 25°C	PD	300 2.4	mW mW/°C	
Thermal Resistance, Junction to Ambient	R _{θJA}	417	°C/W	
Junction and Storage Temperature	т _Ј , Т _{stg}	-55 to +150	°C	

DEVICE MARKING

BC817-16LT1 = 6A; BC817-25LT1 = 6B; BC817-40LT1 = 6C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I _C = -10 mA)	V(BR)CEO	45	—	—	V
Collector – Emitter Breakdown Voltage (V _{EB} = 0, I _C = -10μ A)	V(BR)CES	50	_	—	V
Emitter–Base Breakdown Voltage ($I_E = -1.0 \mu A$)	V(BR)EBO	5.0	_	—	V
Collector Cutoff Current $(V_{CB} = 20 \text{ V})$ $(V_{CB} = 20 \text{ V}, T_A = 150^{\circ}\text{C})$	СВО			100 5.0	nA μA

1. FR $-5 = 1.0 \times 0.75 \times 0.062$ in.

2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

Thermal Clad is a registered trademark of the Bergquist Company.



BC817-16LT1 BC817-25LT1 BC817-40LT1

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

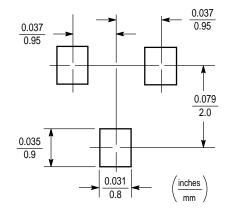
Characteristic	Symbo	Min	Тур	Max	Unit
ON CHARACTERISTICS		•	•	•	
$\begin{array}{l} \mbox{DC Current Gain} \\ (I_{C} = 100 \mbox{ mA}, \mbox{V}_{CE} = 1.0 \mbox{ V}) \\ BC817-16 \\ BC817-16 \\ BC817-25 \\ BC817-25 \\ BC817-40 \\ \\ (I_{C} = 500 \mbox{ mA}, \mbox{V}_{CE} = 1.0 \mbox{ V}) \end{array}$	hfe	100 160 250 40	_ _ _	250 400 600 —	—
Collector-Emitter Saturation Voltage $(I_C = 500 \text{ mA}, I_B = 50 \text{ mA})$	VCE(sat) —	-	0.7	V
Base-Emitter On Voltage (I _C = 500 mA, V_{CE} = 1.0 V)	V _{BE(on)}	-	-	1.2	V
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I _C = 10 mA, V_{CE} = 5.0 Vdc, f = 100 MHz)	fT	200	-	-	MHz
Output Capacitance (V _{CB} = 10 V, f = 1.0 MHz)	C _{obo}	-	10	-	pF

INFORMATION FOR USING THE SOT-23 SURFACE MOUNT PACKAGE

MINIMUM RECOMMENDED FOOTPRINT FOR SURFACE MOUNTED APPLICATIONS

Surface mount board layout is a critical portion of the total design. The footprint for the semiconductor packages must be the correct size to insure proper solder connection

interface between the board and the package. With the correct pad geometry, the packages will self align when subjected to a solder reflow process.





SOT-23 POWER DISSIPATION

The power dissipation of the SOT–23 is a function of the pad size. This can vary from the minimum pad size for soldering to a pad size given for maximum power dissipation. Power dissipation for a surface mount device is determined by $T_{J(max)}$, the maximum rated junction temperature of the die, $R_{\theta JA}$, the thermal resistance from the device junction to ambient, and the operating temperature, T_A . Using the values provided on the data sheet for the SOT–23 package, P_D can be calculated as follows:

$$P_{D} = \frac{T_{J}(max) - T_{A}}{R_{\theta}JA}$$

The values for the equation are found in the maximum ratings table on the data sheet. Substituting these values into the equation for an ambient temperature T_A of 25°C, one can calculate the power dissipation of the device which in this case is 225 milliwatts.

$$P_{D} = \frac{150^{\circ}C - 25^{\circ}C}{556^{\circ}C/W} = 225 \text{ milliwatts}$$

The 556°C/W for the SOT–23 package assumes the use of the recommended footprint on a glass epoxy printed circuit board to achieve a power dissipation of 225 milliwatts. There are other alternatives to achieving higher power dissipation from the SOT–23 package. Another alternative would be to use a ceramic substrate or an aluminum core board such as Thermal Clad[™]. Using a board material such as Thermal Clad, an aluminum core board, the power dissipation can be doubled using the same footprint.

SOLDERING PRECAUTIONS

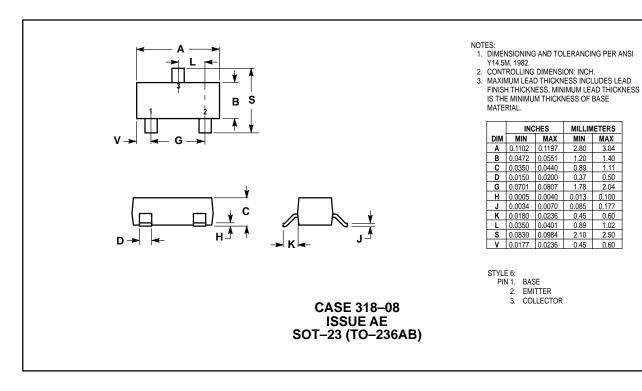
The melting temperature of solder is higher than the rated temperature of the device. When the entire device is heated to a high temperature, failure to complete soldering within a short time could result in device failure. Therefore, the following items should always be observed in order to minimize the thermal stress to which the devices are subjected.

- Always preheat the device.
- The delta temperature between the preheat and soldering should be 100°C or less.*
- When preheating and soldering, the temperature of the leads and the case must not exceed the maximum temperature ratings as shown on the data sheet. When using infrared heating with the reflow soldering method, the difference shall be a maximum of 10°C.
- The soldering temperature and time shall not exceed 260°C for more than 10 seconds.
- When shifting from preheating to soldering, the maximum temperature gradient shall be 5°C or less.
- After soldering has been completed, the device should be allowed to cool naturally for at least three minutes. Gradual cooling should be used as the use of forced cooling will increase the temperature gradient and result in latent failure due to mechanical stress.
- Mechanical stress or shock should not be applied during cooling.

* Soldering a device without preheating can cause excessive thermal shock and stress which can result in damage to the device.

BC817-16LT1 BC817-25LT1 BC817-40LT1

PACKAGE DIMENSIONS



How to reach us:

USA/EUROPE: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036. 1–800–441–2447 JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, Toshikatsu Otsuki, 6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 03–3521–8315

MFAX: RMFAX0@email.sps.mot.com - TOUCHTONE (602) 244–6609 INTERNET: http://Design-NET.com

 \Diamond

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298

