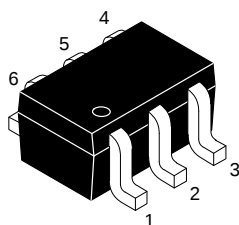


Dual General Purpose Transistor

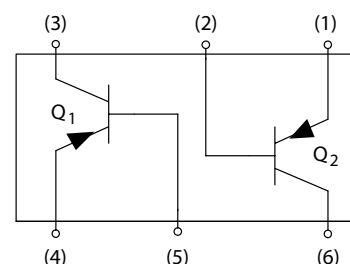
FEATURES:

- We declare that the material of product is ROHS compliant and halogen free.

Circuit Diagram & Pin Configuration:



SOT363/SC-88



DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
TMBT2907DW	M2B	3000/Tape&Reel
TMBT2907ADW	2F	3000/Tape&Reel

MAXIMUM RATINGS

Rating	Symbol	Value		Unit
		2907	2907A	
Collector–Emitter Voltage	V_{CEO}	–40	–60	Vdc
Collector–Base Voltage	V_{CBO}	–60		Vdc
Emitter–Base Voltage	V_{EBO}	–5.0		Vdc
Collector Current — Continuous	I_C	–600		mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, (1) $T_A = 25^{\circ}\text{C}$	P_D	225	mW
Derate above 25°C		1.8	mW/ $^{\circ}\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^{\circ}\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^{\circ}\text{C}$	P_D	300	mW
Derate above 25°C		2.4	mW/ $^{\circ}\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^{\circ}\text{C}/\text{W}$
Junction and Storage Temperature	T_J, T_{stg}	–55 to +150	$^{\circ}\text{C}$

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

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage(3) (I _C = –10 mAdc, I _B = 0)	V _{(BR)CEO}			Vdc
MMBT2907		–40	—	
MMBT2907A		–60	—	
Collector–Emitter Breakdown Voltage(I _C = –10 μAdc, I _E = 0)	V _{(BR)CBO}	–60	—	Vdc
Emitter–Base Breakdown Voltage(I _E = –10 μAdc, I _C = 0)	V _{(BR)EBO}	–5.0	—	Vdc
Collector Cutoff Current(V _{CB} = –30Vdc, I _{BE(OFF)} = –0.5Vdc)	I _{CEX}	—	–50	nAdc
Collector Cutoff Current (V _{CB} = –50Vdc, I _E = 0)	I _{CBO}			μAdc
MMBT2907		—	–0.020	
MMBT2907A		—	–0.010	
(V _{CB} = –50Vdc, I _E = 0, T _A = 125°C)				
MMBT2907		—	–20	
MMBT2907A		—	–10	
Base Current(V _{CE} = –30Vdc, V _{EB(OFF)} = –0.5Vdc)	I _B	—	–50	nAdc

1. FR–5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain ($I_C = -0.1\text{mA}$, $V_{CE} = -10\text{Vdc}$)	h_{FE}	35	—	—
	MMBT2907	75	—	—
	MMBT2907A	—	—	—
($I_C = -1.0\text{mA}$, $V_{CE} = -10\text{Vdc}$)		50	—	—
	MMBT2907	100	—	—
	MMBT2907A	—	—	—
($I_C = -10\text{mA}$, $V_{CE} = -10\text{Vdc}$)		75	—	—
	MMBT2907	100	—	—
	MMBT2907A	—	—	—
($I_C = -150\text{mA}$, $V_{CE} = -10\text{Vdc}$)(3)		—	—	—
	MMBT2907	100	300	—
	MMBT2907A	—	—	—
($I_C = -500\text{mA}$, $V_{CE} = -10\text{Vdc}$)(3)		30	—	—
	MMBT2907	50	—	—
	MMBT2907A	—	—	—
Collector-Emitter Saturation Voltage(3) ($I_C = -150\text{mA}$, $I_B = -15\text{mA}$)	$V_{CE(sat)}$	—	-0.4	Vdc
($I_C = -500\text{mA}$, $I_B = -50\text{mA}$)		—	-1.6	—
Base-Emitter Saturation Voltage(3) ($I_C = -150\text{mA}$, $I_B = -15\text{mA}$)	$V_{BE(sat)}$	—	-1.3	Vdc
($I_C = -500\text{mA}$, $I_B = -50\text{mA}$)		—	-2.6	—

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product(3),(4) ($I_C = -50\text{mA}$, $V_{CE} = -20\text{Vdc}$, $f = 100\text{MHz}$)	f_T	200	—	MHz
Output Capacitance ($V_{CB} = -10\text{Vdc}$, $I_E = 0$, $f = 1.0\text{MHz}$)	C_{obo}	—	8.0	pF
Input Capacitance ($V_{EB} = -2.0\text{Vdc}$, $I_C = 0$, $f = 1.0\text{MHz}$)	C_{ibo}	—	30	pF

SWITCHING CHARACTERISTICS

Turn-On Time Delay Time Rise Time	($V_{CC} = -30\text{Vdc}$, $I_C = -150\text{mA}$, $I_{B1} = -15\text{mA}$)	t_{on} t_d t_r	— — —	45 10 40	ns
Fall Time Storage Time Turn-Off Time	($V_{CC} = -6.0\text{Vdc}$, $I_C = -150\text{mA}$, $I_{B1} = I_{B2} = 15\text{mA}$)	t_f t_s t_{off}	— — —	60 225 280	ns

3. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.

4. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

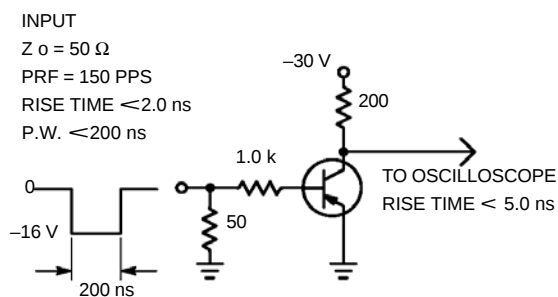


Figure 1. Delay and Rise Time Test Circuit

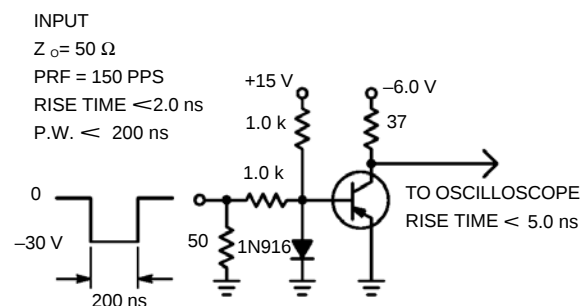


Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

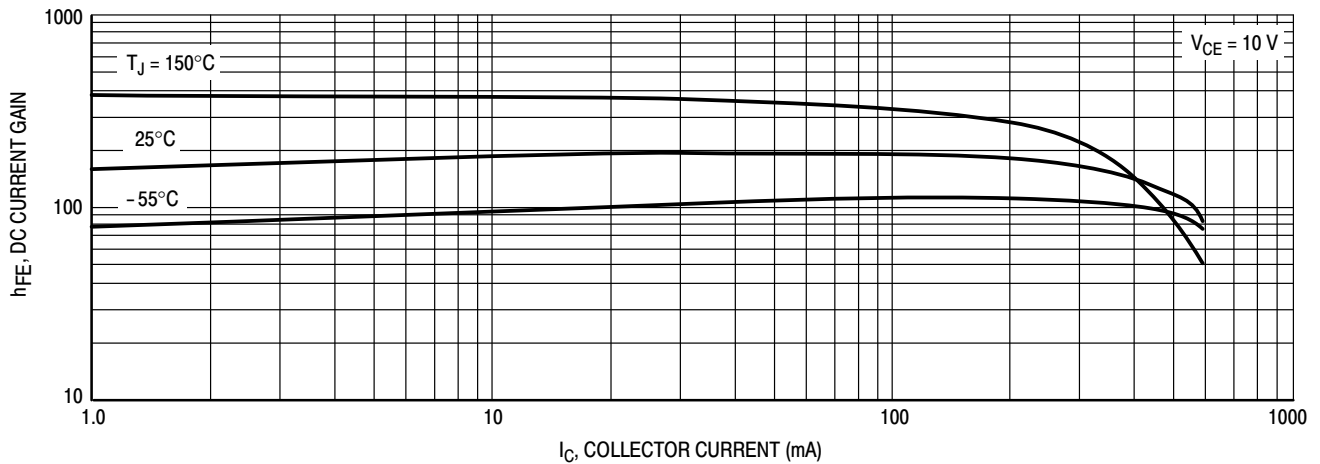


Figure 3. DC Current Gain

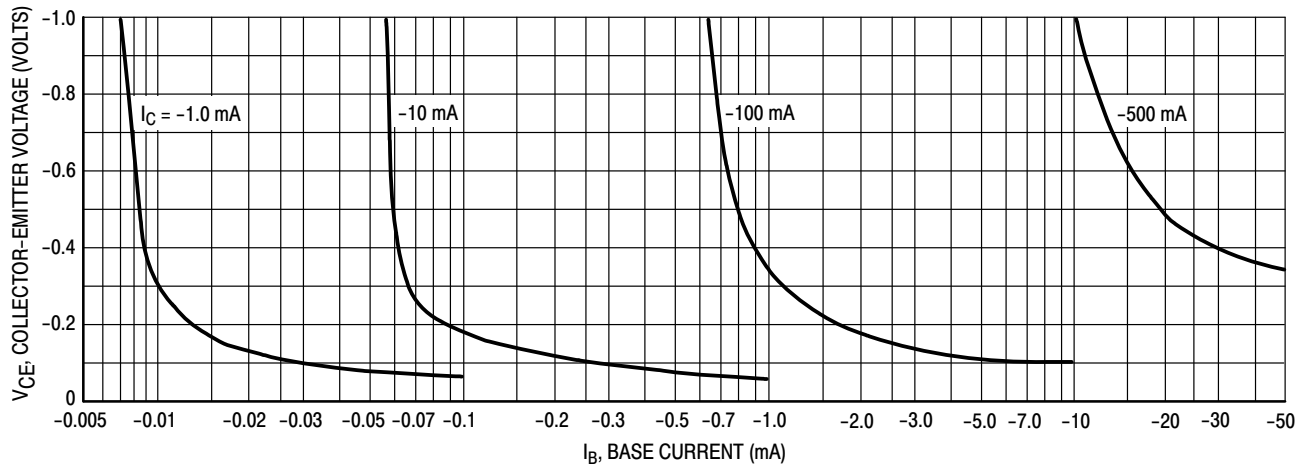


Figure 4. Collector Saturation Region

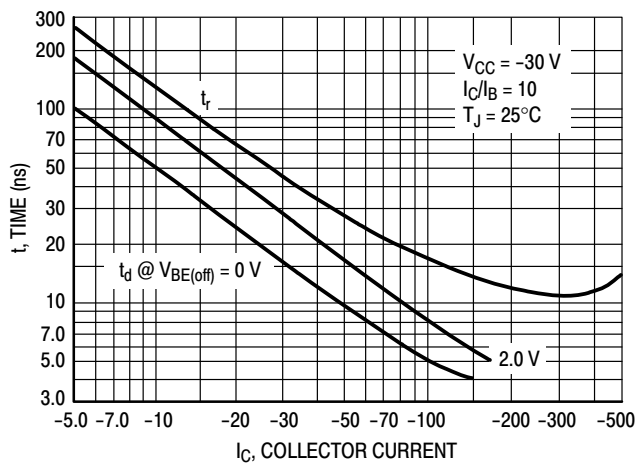


Figure 5. Turn-On Time

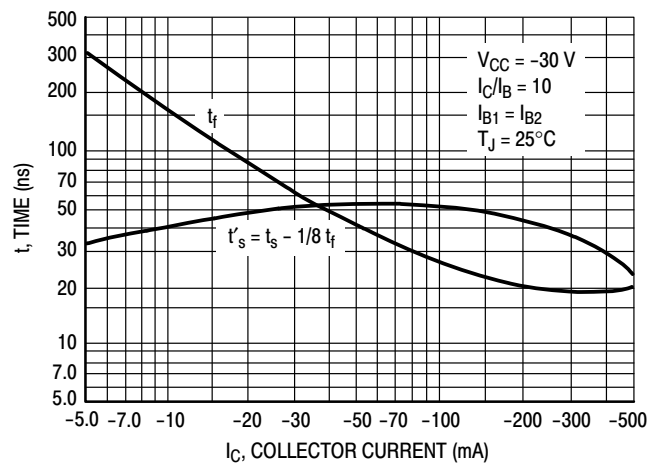


Figure 6. Turn-Off Time

TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

$V_{CE} = 10 \text{ Vdc}$, $T_A = 25^\circ\text{C}$

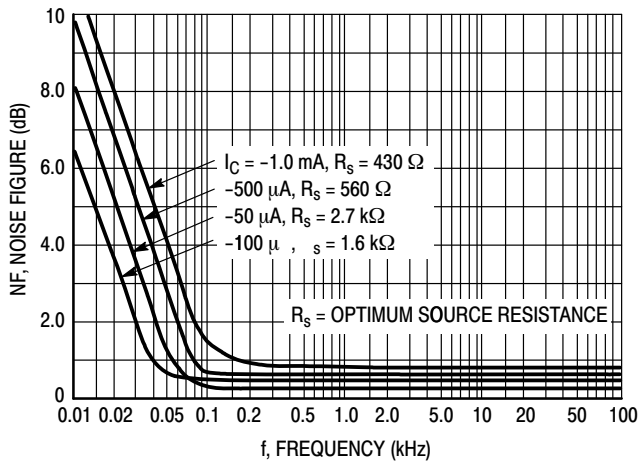


Figure 7. Frequency Effects

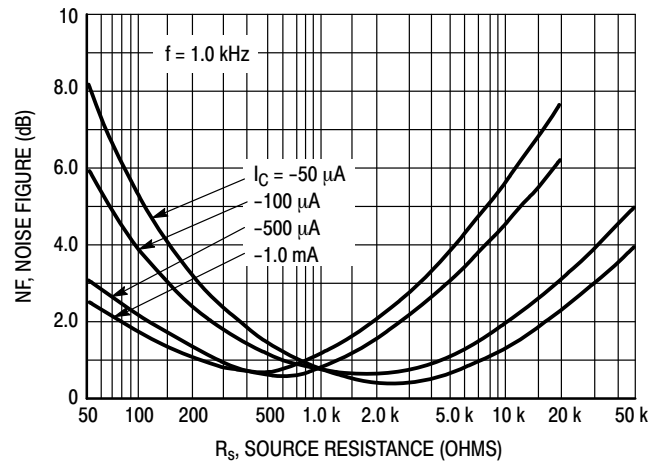


Figure 8. Source Resistance Effects

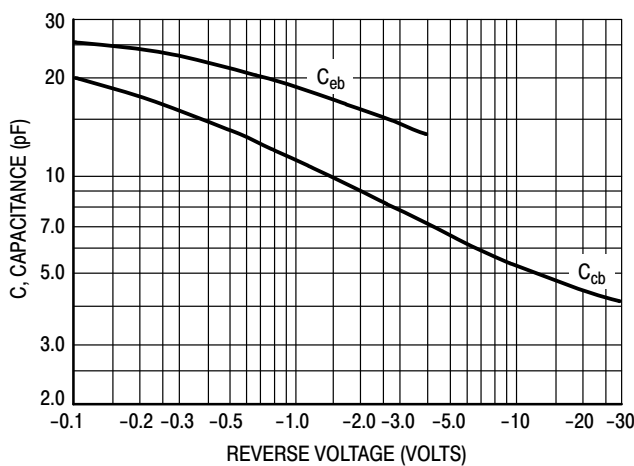


Figure 9. Capacitances

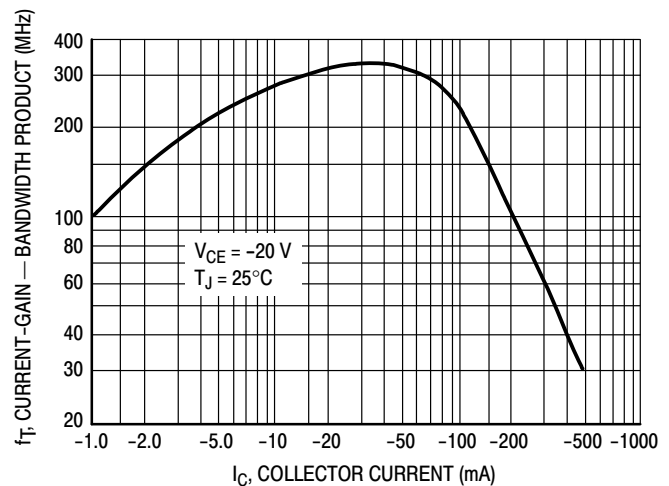


Figure 10. Current-Gain - Bandwidth Product

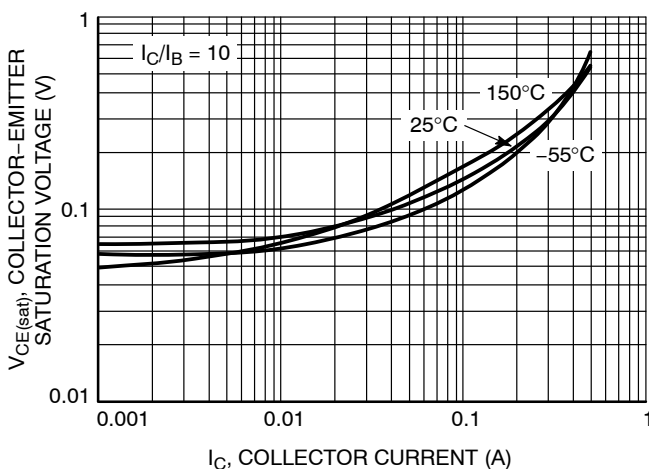


Figure 11. Collector Emitter Saturation Voltage vs. Collector Current

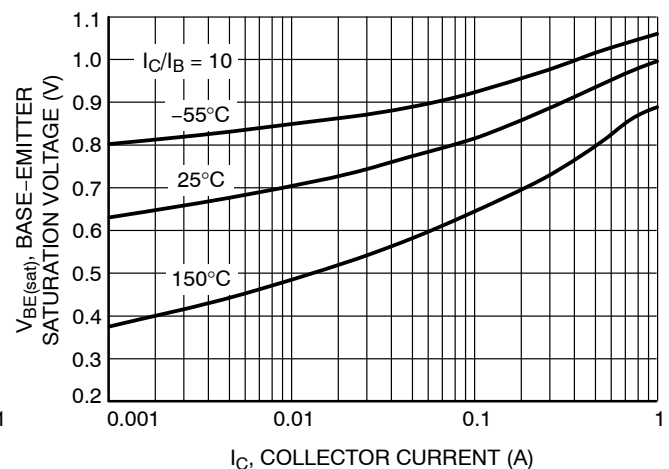


Figure 12. Base Emitter Saturation Voltage vs. Collector Current

TYPICAL SMALL-SIGNAL Characteristics NOISE FIGURE

$V_{CE} = 10 \text{ Vdc}$, $T_A = 25^\circ\text{C}$

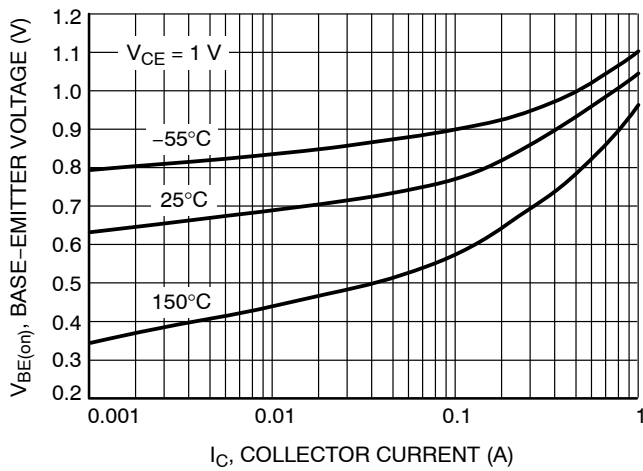


Figure 13. Base Emitter Voltage vs. Collector Current

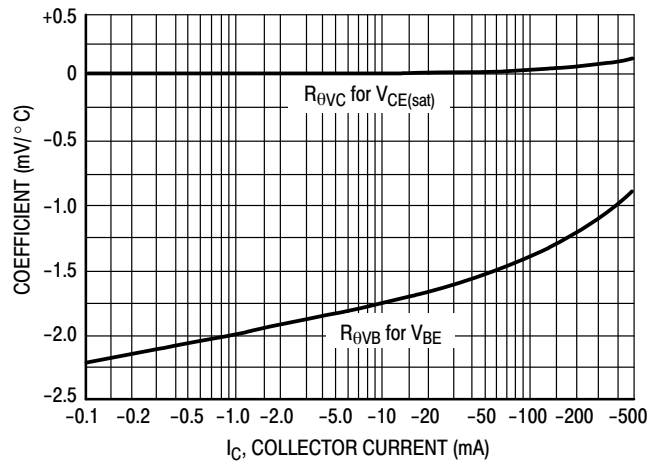


Figure 14. Temperature Coefficients

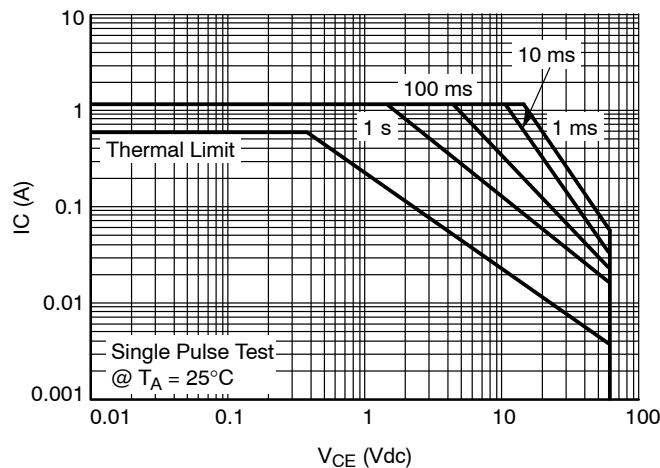
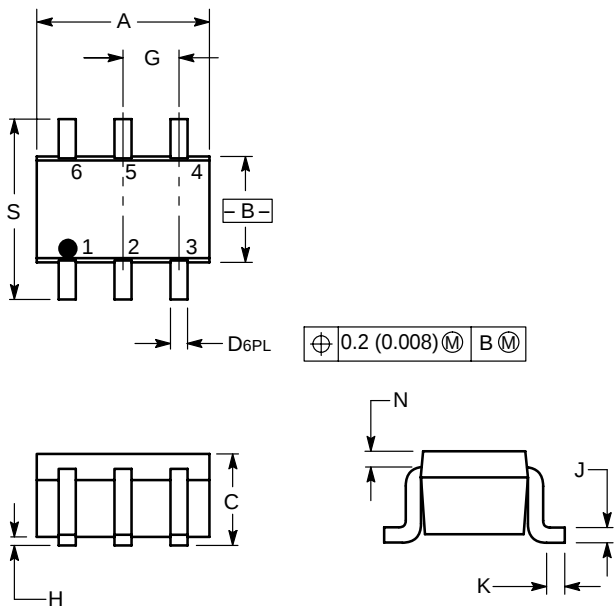


Figure 15. Safe Operating Area

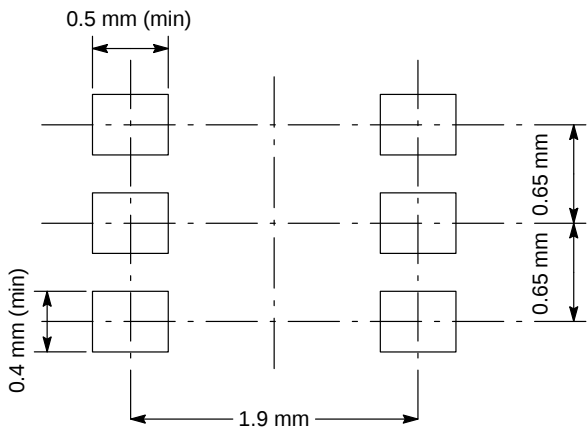
SC-88/SOT-363

NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- 2. CONTROLLING DIMENSION: INCH.



- PIN 1. EMITTER 2
- 2. BASE 2
- 3. COLLECTOR 1
- 4. EMITTER 1
- 5. BASE 1
- 6. COLLECTOR 2



NOTICE

The information presented in this document is for reference only. Tinysemi reserves the right to make changes without notice for the specification of the products displayed herein.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Tinysemi elec Co., Ltd., or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website <http://www.tinysemi.com> , or consult your nearest Tinysemi' s sales office for further assistance.