

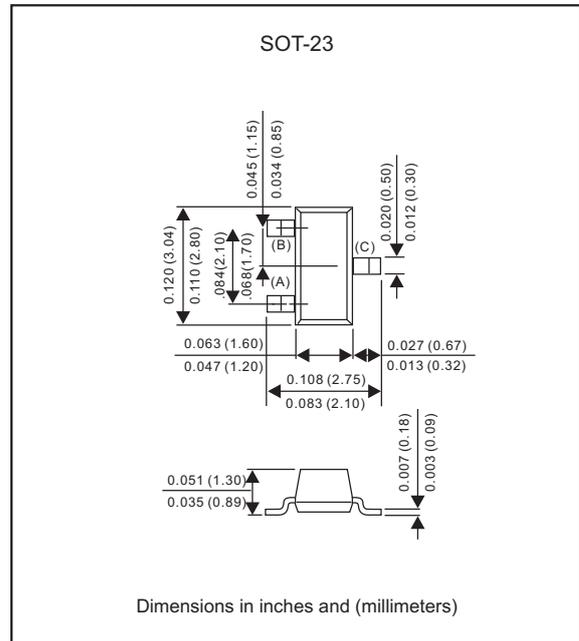
### Features

- High collector-emitter breakdown voltage.
- PNP silicon epitaxial planar transistor, is designed for general purpose and amplifier applications.
- Capable of 225mW power dissipation.
- Lead-free parts meet RoHS requirements.
- Compliant to Halogen-free

### Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any

### Package outline



### Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	Symbol	MMBT2907	MMBT2907A	UNIT
Collector-emitter voltage	$V_{CE0}$	-40	-60	V
Collector-base voltage	$V_{CBO}$	-60		V
Emitter-base voltage	$V_{EBO}$	-5.0		V
Collector current - continuous	$I_C$	-600		mA
Total device dissipation FR-5 board (1)	$P_D$	$T_A = 25^\circ\text{C}$	225	mW
		Derate above $25^\circ\text{C}$	1.8	$\text{mW}/^\circ\text{C}$
Thermal resistance	$R_{\theta JA}$	556		$^\circ\text{C}/\text{W}$
Total device dissipation alumina substrate(2)	$P_D$	$T_A = 25^\circ\text{C}$	300	mW
		Derate above $25^\circ\text{C}$	2.4	$\text{mW}/^\circ\text{C}$
Thermal resistance	$R_{\theta JA}$	417		$^\circ\text{C}/\text{W}$
Operating junction temperature range	$T_J$	-55 to +150		$^\circ\text{C}$
Storage temperature range	$T_{STG}$	-55 to +150		$^\circ\text{C}$

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.

### ELECTRICAL CHARACTERISTICS (TA = 25°C unless otherwise noted)

Characteristics		Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (IC = -10 mAdc, IB = 0)	MMBT2907 MMBT2907A	V(BR)CEO	-40 -60	- -	Vdc
Collector-Base Breakdown Voltage (IC = -10 uAdc, IE = 0)		V(BR)CBO	-60	-	Vdc
Emitter-Base Breakdown Voltage (IE = -10 uAdc, IC = 0)		V(BR)EBO	-5.0	-	Vdc
Collector Cutoff Current (VCE = -30 Vdc, VEB(off) = -0.5Vdc)		ICEX	-	-50	nAdc
Collector Cutoff Current (VCB = -50 Vdc, IE = 0)	MMBT2907 MMBT2907A	ICBO	-	-0.020	uAdc
(VCB = -50Vdc, IE = 0, TA = 125°C)	MMBT2907		-	-0.010	
	MMBT2907A		-	-20	
Base Cutoff Current (VCE = -30Vdc, VEB(off) = -0.5Vdc)	MMBT2907A	IB	-	-50	nAdc

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

Characteristics		Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain		hFE			
(IC = -0.1 mAdc, VCE = -10 Vdc)	MMBT2907 MMBT2907A		35 75	- -	
(IC = -1.0 mAdc, VCE = -10 Vdc)	MMBT2907 MMBT2907A		50 100	- -	
(IC = -10 mAdc, VCE = -10 Vdc)	MMBT2907 MMBT2907A		75 100	- -	
(IC = -150 mAdc, VCE = -10 Vdc)	MMBT2907 MMBT2907A		- 100	- 300	
(IC = -500 mAdc, VCE = -10 Vdc)	MMBT2907 MMBT2907A		30 50	- -	
Collector-Emitter Saturation Voltage (IC = -150 mAdc, IB = -15mAdc) (IC = -500 mAdc, IB = -50mAdc)		VCE(sat)	- -	-0.4 -1.6	Vdc
Base-Emitter Saturation Voltage (IC = -150 mAdc, IB = -15mAdc) (IC = -500 mAdc, IB = -50mAdc)		VBE(sat)	- -	-1.3 -2.6	Vdc

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

Characteristics	Symbol	Min	Max	Unit
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current-Gain-Bandwidth Product (1),(2) (I <sub>C</sub> = -50 mA, V <sub>CE</sub> = 20 Vdc, f = 100 MHz)	f <sub>T</sub>	200	-	MHz
Output Capacitance (V <sub>CB</sub> = -10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	-	8.0	pF
Input Capacitance (V <sub>EB</sub> = -2.0 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	-	30	pF

### SWITCHING CHARACTERISTICS

Turn-On Time	(V <sub>CC</sub> = -30 Vdc, I <sub>C</sub> = -150 mA, I <sub>B1</sub> = -15 mA)	t <sub>on</sub>	-	45	ns
Delay Time		t <sub>d</sub>	-	10	
Rise Time		t <sub>r</sub>	-	40	
Turn-Off Time	(V <sub>CC</sub> = -60 Vdc, I <sub>C</sub> = -150 mA, I <sub>B1</sub> = I <sub>B2</sub> = -15 mA)	t <sub>off</sub>	-	100	
Storage Time		t <sub>s</sub>	-	80	
Fall Time		t <sub>f</sub>	-	30	

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. f<sub>T</sub> is defined as the frequency at which |h<sub>fe</sub>| extrapolates to unity.

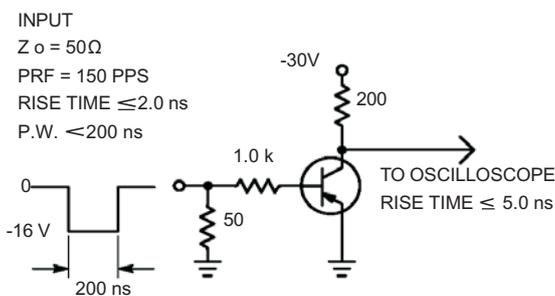


Figure 1. Delay and Rise Time Test Circuit

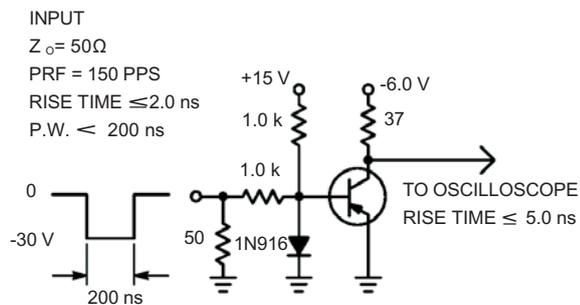


Figure 2. Storage and Fall Time Test Circuit

### Rating and characteristic curves

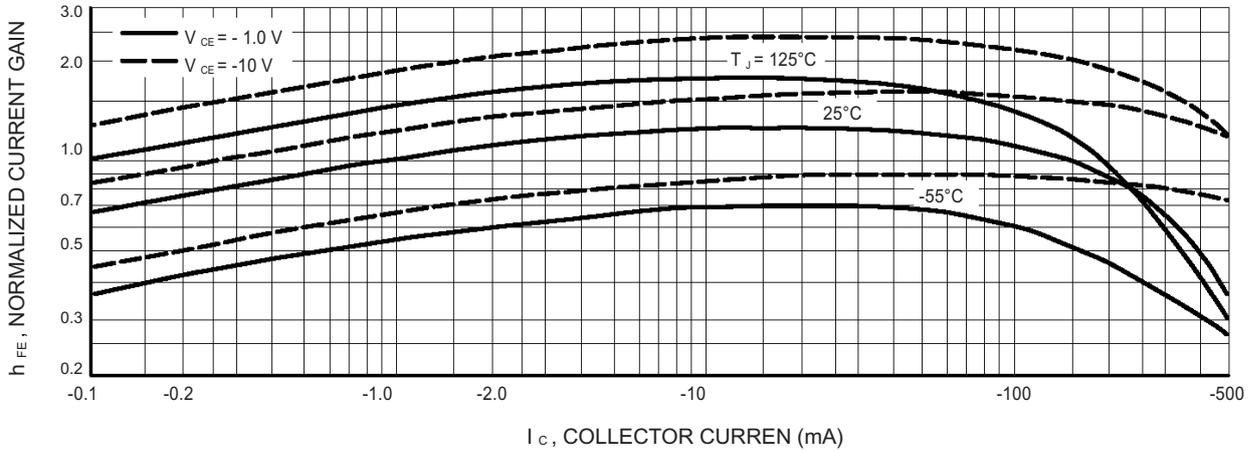


Figure 3. DC Current Gain

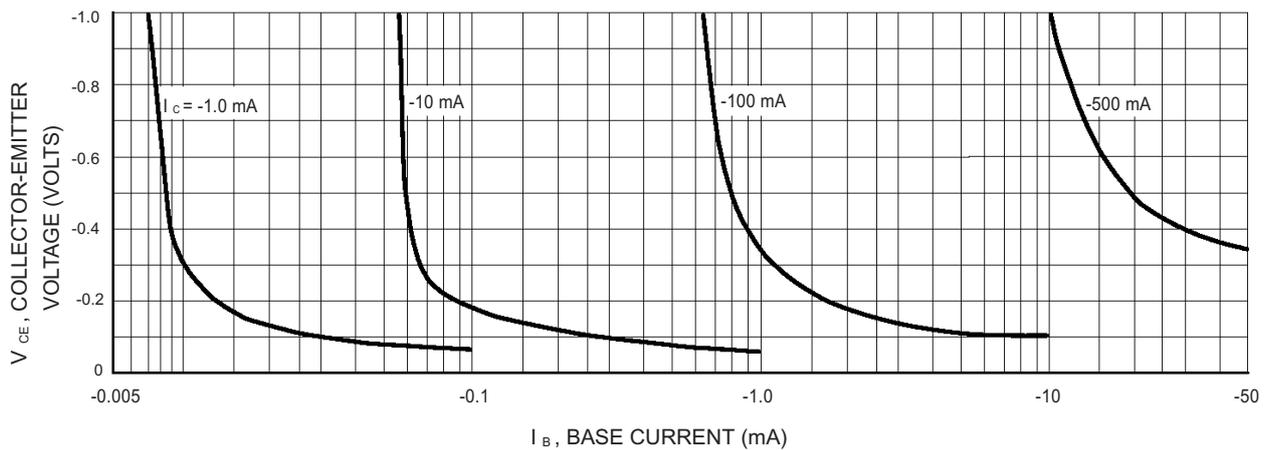


Figure 4. Collector Saturation Region

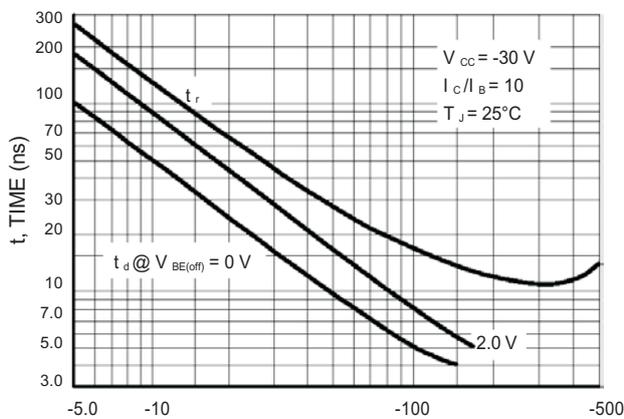


Figure 5. Turn-On Time

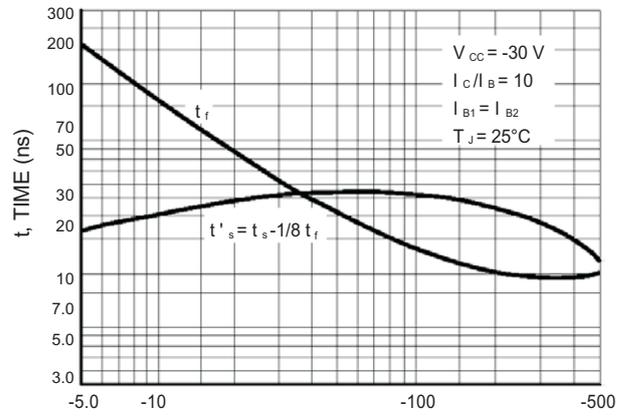


Figure 6. Turn-off Time

### Rating and characteristic curves

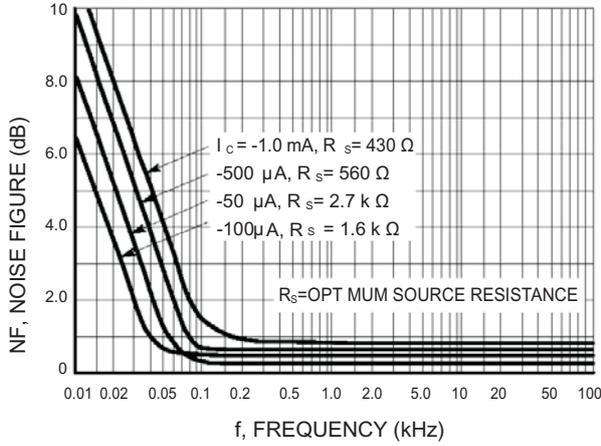


Figure 7. Frequency Effects

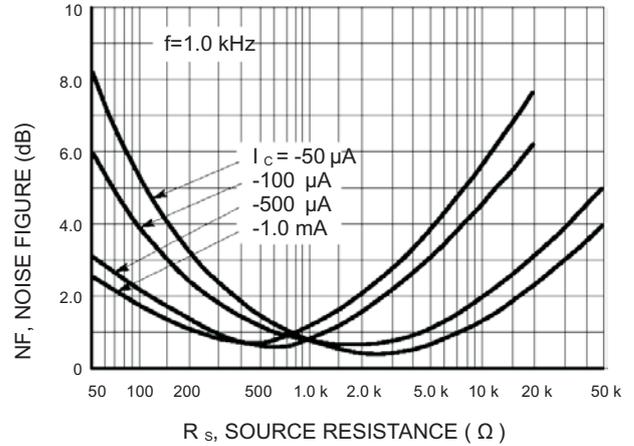


Figure 8. Source Resistance Effects

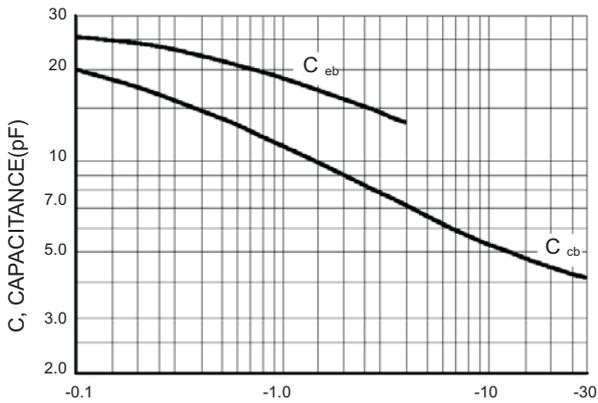


Figure 9. Capacitances

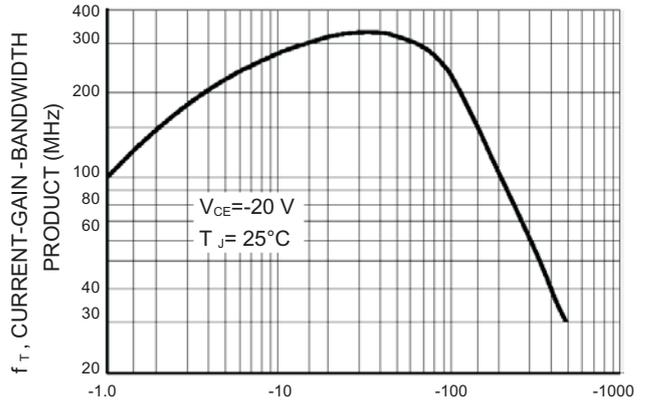


Figure 10. Current-Gain-Bandwidth Product

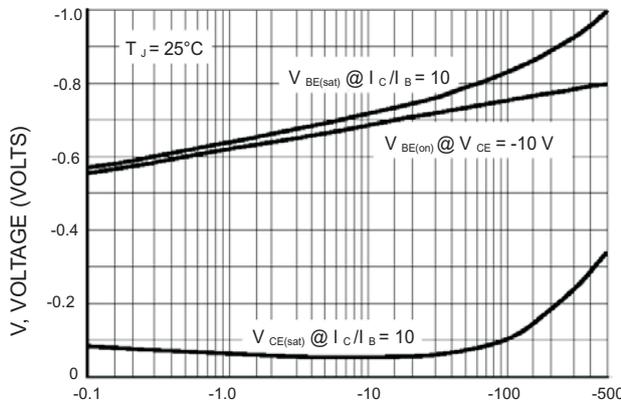


Figure 11. "On" Voltage

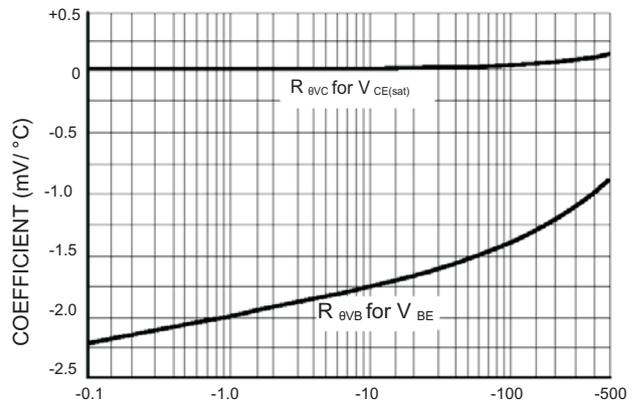
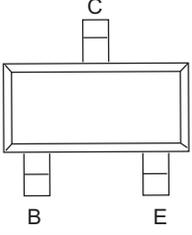
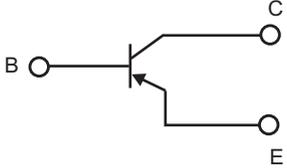


Figure 12. Temperature Coefficients

### Pinning information

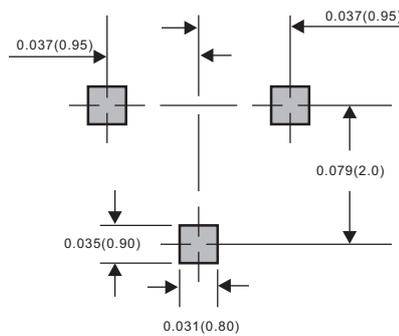
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

### Marking

Type number	Marking code
MMBT2907	M2B
MMBT2907A	2F

### Suggested solder pad layout

#### SOT-23



Dimensions in inches and (millimeters)