

General Purpose Transistor

PNP Silicon

- RoHS product for packing code suffix "G",
Halogen free product for packing code suffix "H".
- Weight : 0.008g

MMBT2907LT1
MMBT2907ALT1



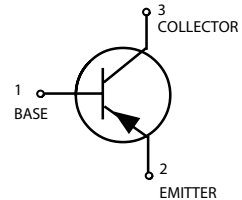
SOT-23

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



DEVICE MARKING

MMBT2907LT1 = M2B, MMBT2907ALT1 = 2F

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage(3) ($I_C = -10\text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$			Vdc
	MMBT2907	-40	—	
	MMBT2907A	-60	—	
Collector–Emitter Breakdown Voltage($I_C = -10\ \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	-60	—	Vdc
Emitter–Base Breakdown Voltage($I_E = -10\ \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current($V_{CB} = -30\text{Vdc}, I_{BE(OFF)} = -0.5\text{Vdc}$)	I_{CEX}	—	-50	nAdc
Collector Cutoff Current ($V_{CB} = -50\text{Vdc}, I_E = 0$)	I_{CBO}			μAdc
	MMBT2907	—	-0.020	
	MMBT2907A	—	-0.010	
($V_{CB} = -50\text{Vdc}, I_E = 0, T_A = 125^\circ\text{C}$)	MMBT2907	—	-20	
	MMBT2907A	—	-10	
Base Current($V_{CE} = -30\text{Vdc}, V_{EB(OFF)} = -0.5\text{Vdc}$)	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 $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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

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

SMALL-SIGNAL CHARACTERISTICS

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

SWITCHING CHARACTERISTICS

Turn-On Time Delay Time Rise Time	($V_{CC} = -30\text{V dc}$, $I_C = -150\text{mA dc}$, $I_{B1} = -15\text{mA dc}$)	t_{on} t^d t_r	— — —	45 10 40	ns
Fall Time Storage Time Turn-Off Time	($V_{CC} = -6.0\text{V dc}$, $I_C = -150\text{mA dc}$, $I_{B1} = I_{B2} = 15\text{mA dc}$)	t_f t_s t_{off}	— — —	30 80 100	ns

3. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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

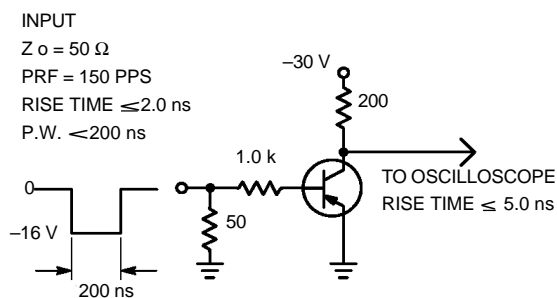


Figure 1. Delay and Rise Time Test Circuit

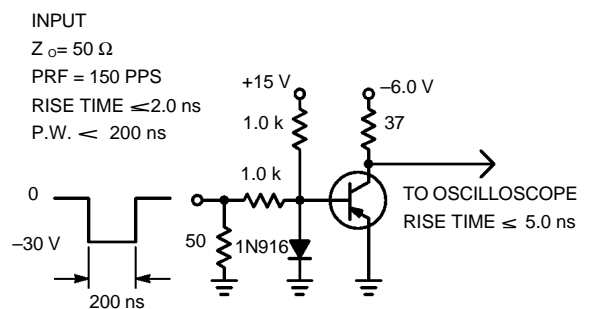


Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

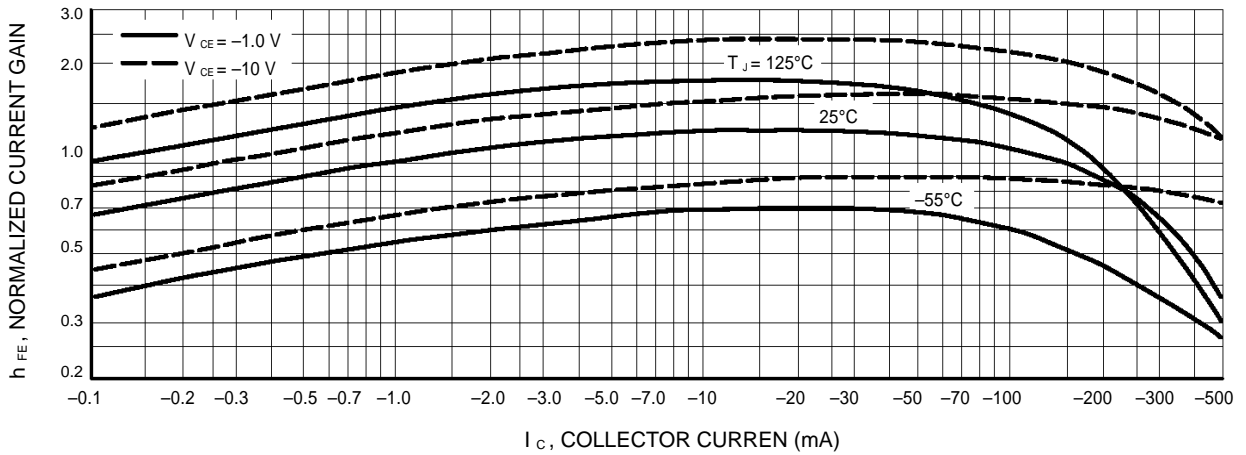


Figure 3. DC Current Gain

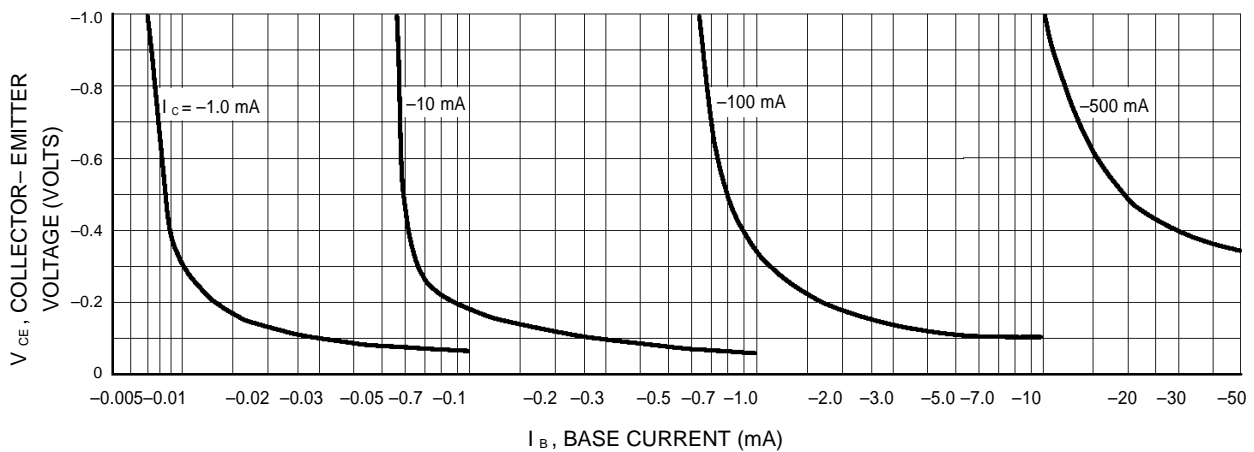


Figure 4. Collector Saturation Region

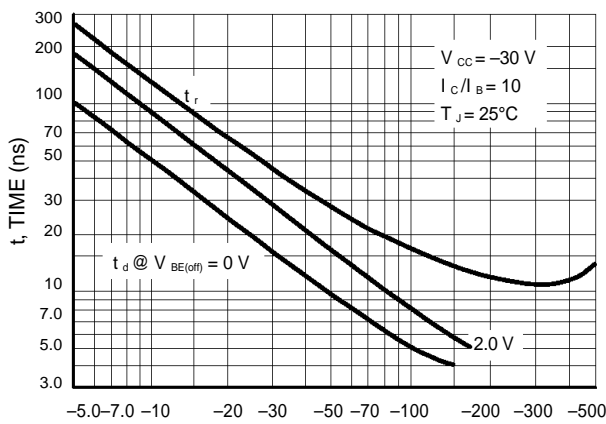


Figure 5. Turn-On Time

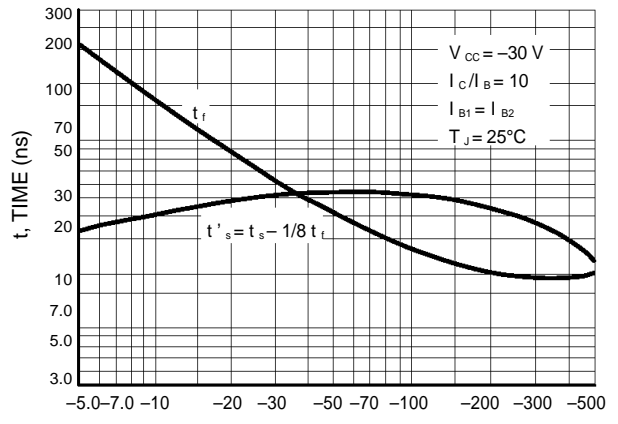


Figure 6. Turn-Off Time

TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

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

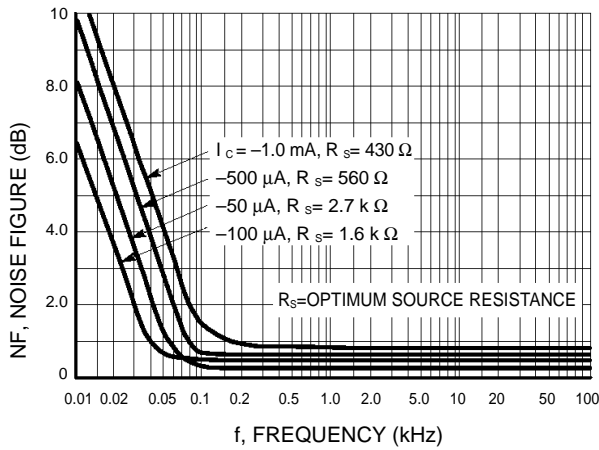


Figure 7. Frequency Effects

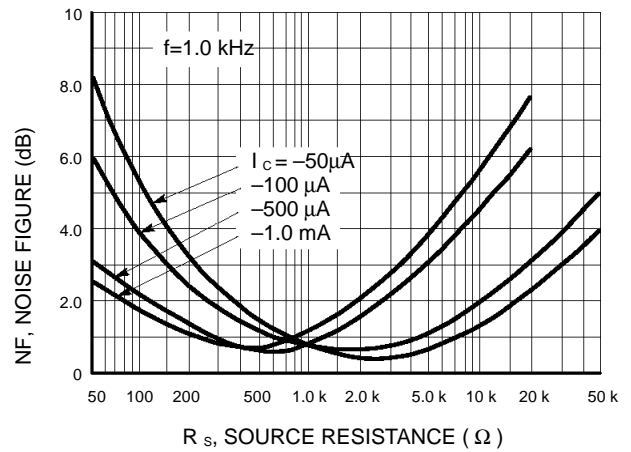


Figure 8. Source Resistance Effects

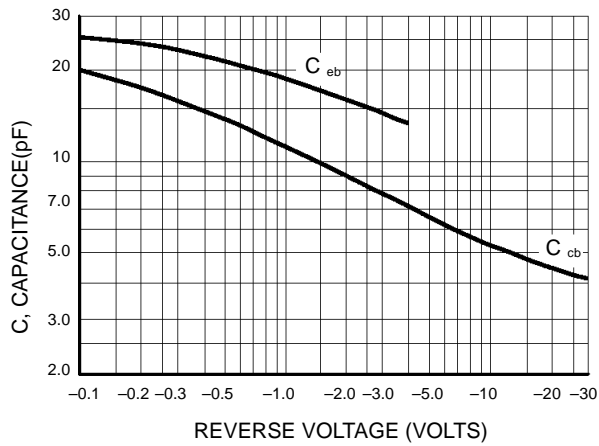


Figure 9. Capacitances

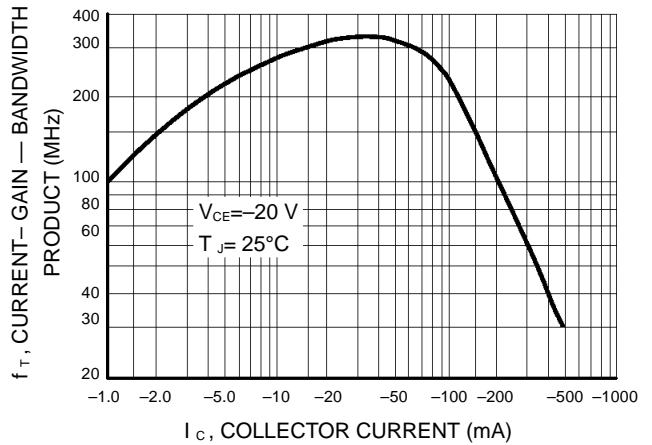


Figure 10. Current-Gain — Bandwidth Product

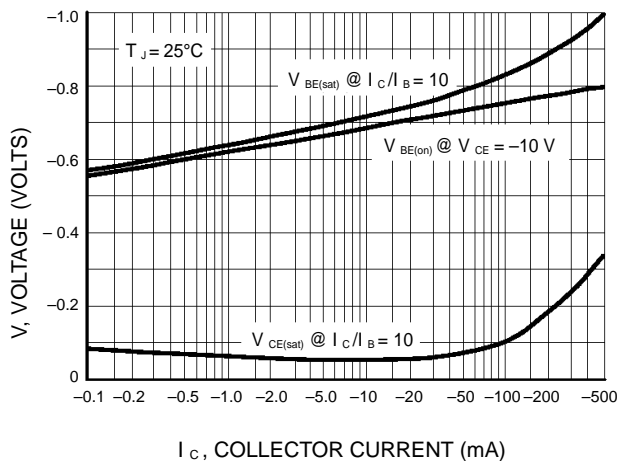


Figure 11. "On" Voltage

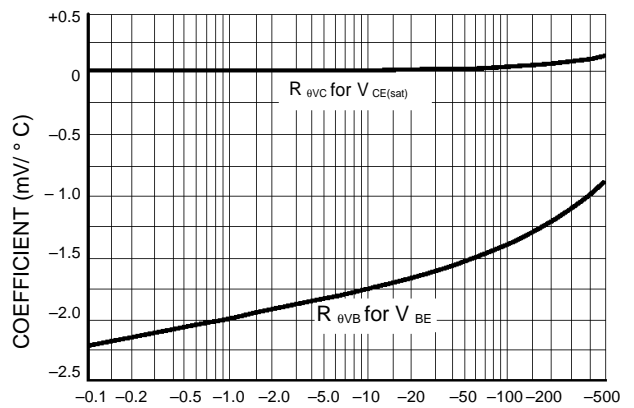
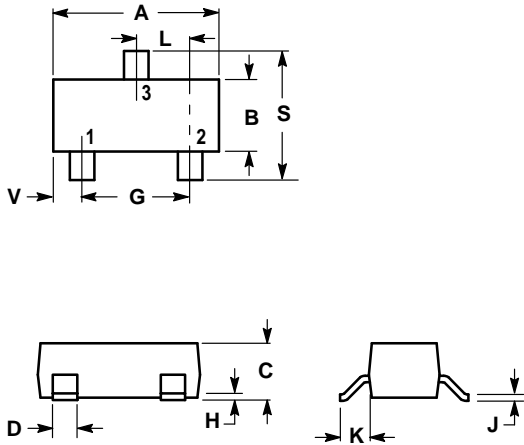


Figure 12. Temperature Coefficients

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NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

- PIN 1. BASE
 2. EMITTER
 3. COLLECTOR

