Elektronische Bauelemente

MMBT2907A

PNP Silicon

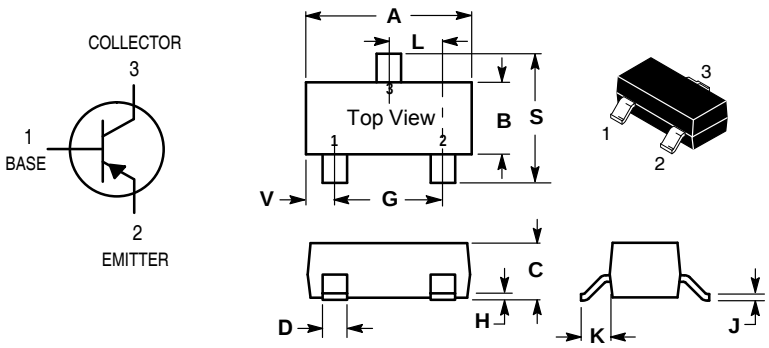
General Purpose Transistor

RoHS Compliant Product

A suffix of "-C" specifies halogen & lead-free

FEATURES

- Epitaxial Planar Die Construction
- Complementary NPN Type Available (MMBT2222A)
- Ideal for Medium Power Amplification and Switching



MAXIMUM RATINGS

Rating	Symbol	2907	2907A	Unit
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

SOT-23		
Dim	**Min**	**Max**
A	2.800	3.040
B	1.200	1.400
C	0.890	1.110
D	0.370	0.500
G	1.780	2.040
H	0.013	0.100
J	0.085	0.177
K	0.450	0.600
L	0.890	1.020
S	2.100	2.500
V	0.450	0.600
All Dimension in mm		

THERMAL CHARACTERISTICS

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

DEVICE MARKING

MMBT2907 = M2B; MMBT2907A = 2F

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)	MMBT2907	$V_{(BR)CEO}$	–40	—	Vdc
	MMBT2907A		–60	—	
Collector–Base 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_{CE} = –30 Vdc, $V_{BE(off)}$ = –0.5 Vdc)		I_{CEX}	—	–50	nAdc
Collector Cutoff Current (V_{CB} = –50 Vdc, I_E = 0)	MMBT2907	I_{CBO}	—	–0.020	μAdc
	MMBT2907A		—	–0.010	
(V_{CB} = –50 Vdc, I_E = 0, T_A = 125°C)	MMBT2907		—	–20	
	MMBT2907A		—	–10	
Base Current (V_{CE} = –30 Vdc, $V_{EB(off)}$ = –0.5 Vdc)		I_B	—	–50	nAdc

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

REM : Thermal Clad is a trademark of the Bergquist Company.

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

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			—
(I_C = –0.1 mAdc, V_{CE} = –10 Vdc)	MMBT2907		35	—	
	MMBT2907A		75	—	
(I_C = –1.0 mAdc, V_{CE} = –10 Vdc)	MMBT2907		50	—	
	MMBT2907A		100	—	
(I_C = –10 mAdc, V_{CE} = –10 Vdc)	MMBT2907		75	—	
	MMBT2907A		100	—	
(I_C = –150 mAdc, V_{CE} = –10 Vdc) (3)	MMBT2907		—	—	
	MMBT2907A		100	300	
(I_C = –500 mAdc, V_{CE} = –10 Vdc) (3)	MMBT2907		30	—	
	MMBT2907A		50	—	
Collector–Emitter Saturation Voltage (3)		$V_{CE(sat)}$			Vdc
(I_C = –150 mAdc, I_B = –15 mAdc)			—	–0.4	
(I_C = –500 mAdc, I_B = –50 mAdc)			—	–1.6	
Base–Emitter Saturation Voltage (3)		$V_{BE(sat)}$			Vdc
(I_C = –150 mAdc, I_B = –15 mAdc)			—	–1.3	
(I_C = –500 mAdc, I_B = –50 mAdc)			—	–2.6	
SMALL–SIGNAL CHARACTERISTICS					
Current–Gain — Bandwidth Product (3),(4)		f_T			MHz
(I_C = –50 mAdc, V_{CE} = –20 Vdc, f = 100 MHz)			200	—	
Output Capacitance		C_{obo}			pF
(V_{CB} = –10 Vdc, I_E = 0, f = 1.0 MHz)			—	8.0	
Input Capacitance		C_{ibo}			pF
(V_{EB} = –2.0 Vdc, I_C = 0, f = 1.0 MHz)			—	30	
SWITCHING CHARACTERISTICS					
Turn–On Time	(V_{CC} = –30 Vdc, I_C = –150 mAdc, I_{B1} = –15 mAdc)	t_{on}	—	45	ns
Delay Time		t_d	—	10	
Rise Time		t_r	—	40	
Turn–Off Time	(V_{CC} = –6.0 Vdc, I_C = –150 mAdc, I_{B1} = I_{B2} = –15 mAdc)	t_{off}	—	100	ns
Storage Time		t_s	—	80	
Fall Time		t_f	—	30	

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.

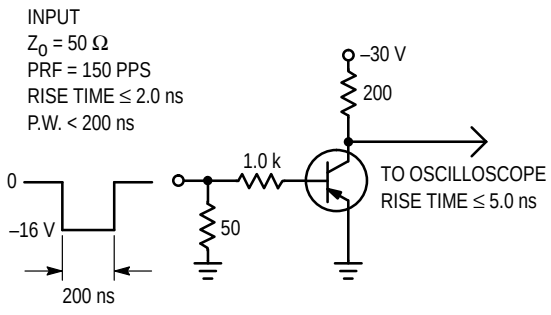


Figure 1. Delay and Rise Time Test Circuit

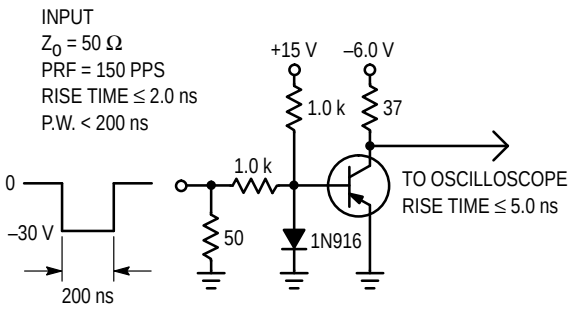


Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

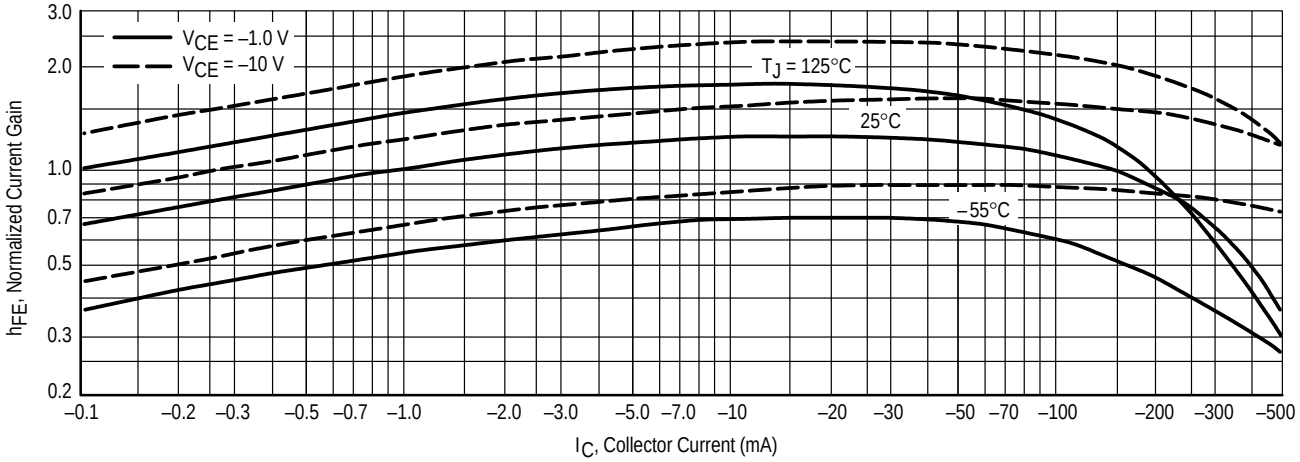


Figure 3. DC Current Gain

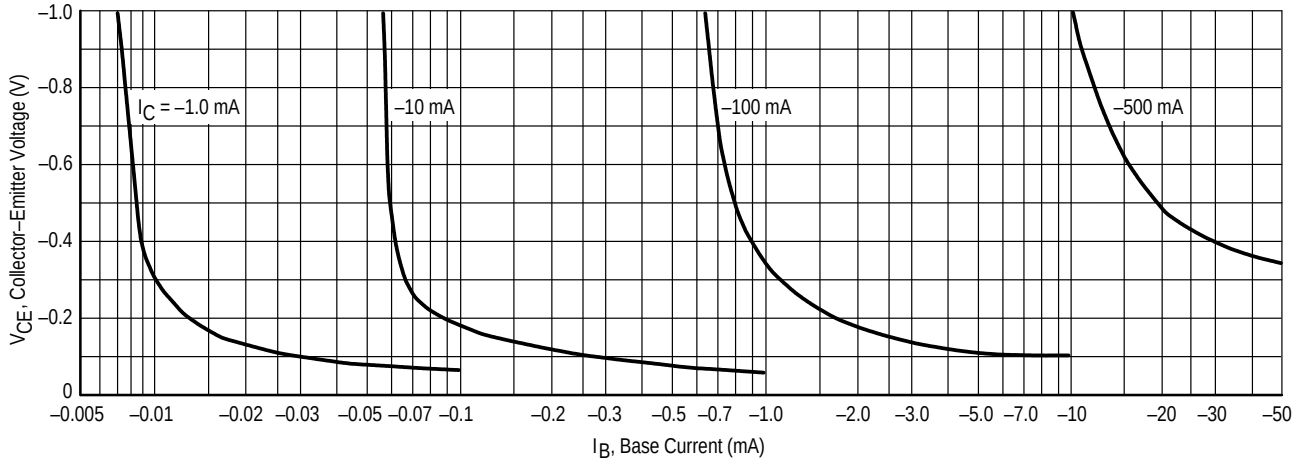


Figure 4. Collector Saturation Region

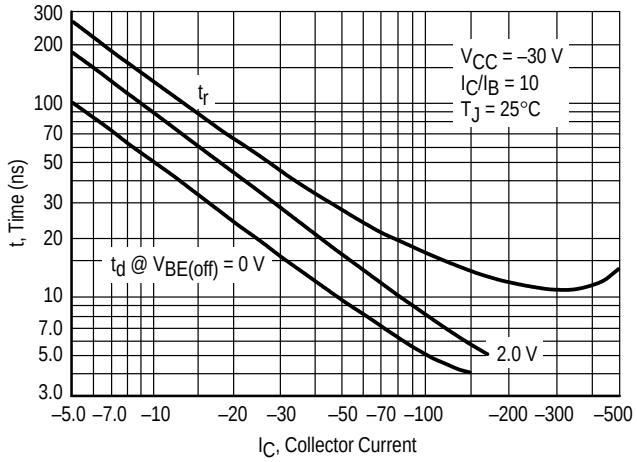


Figure 5. Turn–On Time

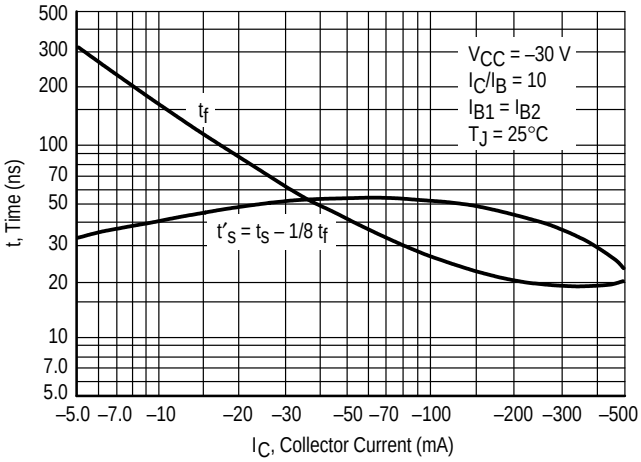


Figure 6. Turn–Off Time

TYPICAL SMALL–SIGNAL CHARACTERISTICS

NOISE FIGURE

V_{CE} = 10 Vdc, T_A = 25°C

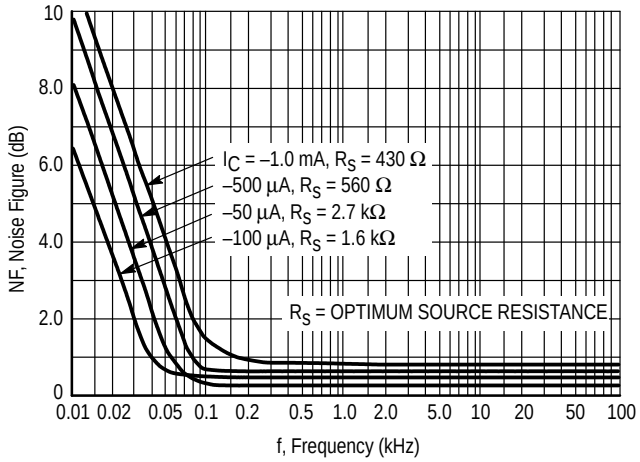


Figure 7. Frequency Effects

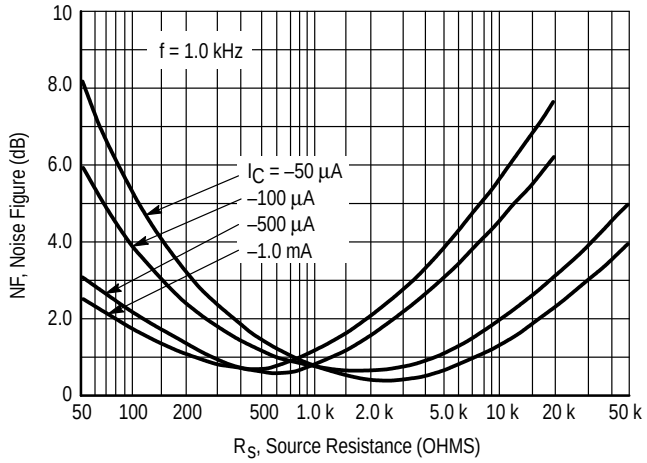


Figure 8. Source Resistance Effects

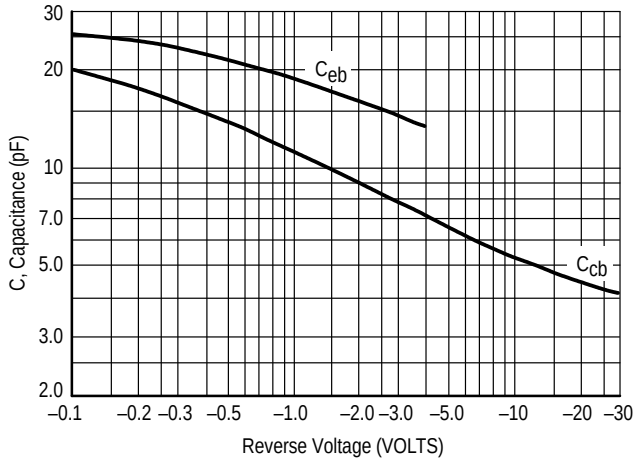


Figure 9. Capacitances

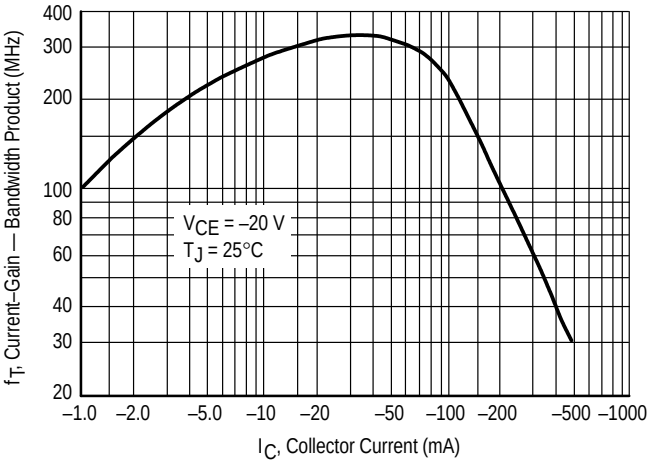


Figure 10. Current–Gain — Bandwidth Product

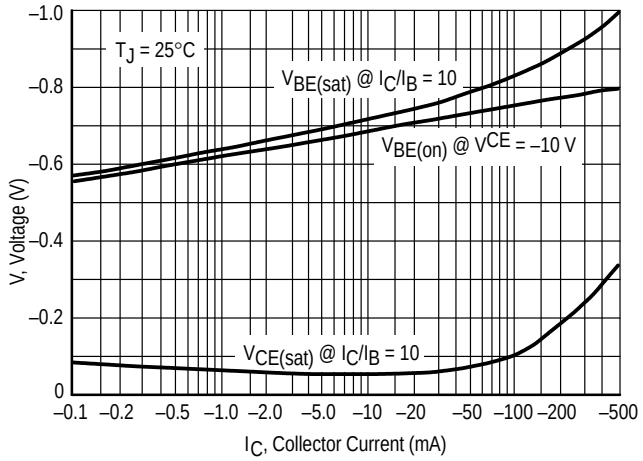


Figure 11. "On" Voltage

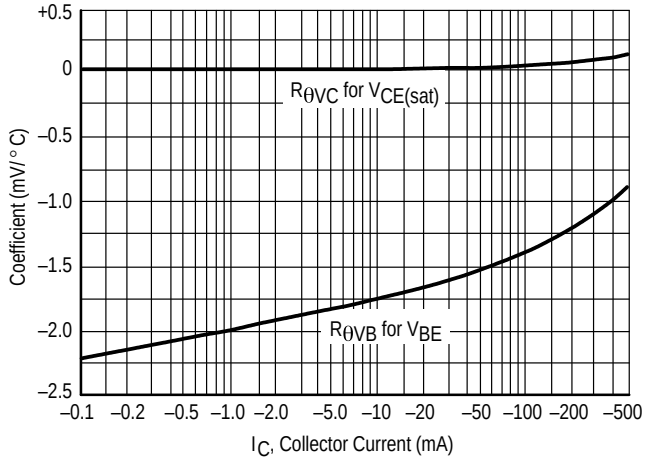


Figure 12. Temperature Coefficients