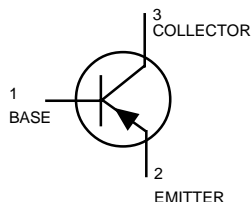


General Purpose Transistor

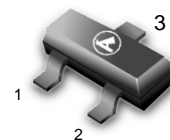
PNP Silicon



MMBT2907LT1
MMBT2907ALT1

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 |



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

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------------|-------------|---------------------------|
| Total Device Dissipation FR-5 Board, (1) $T_A = 25^\circ\text{C}$ | 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_{sig} | -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 |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | |
|---|---------------|------|--------|-----------------|
| Collector–Emitter Breakdown Voltage(3) ($I_C = -10 \text{ mAdc}, I_E = 0$) | $V_{(BR)CEO}$ | | | 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($V_{CB} = -30\text{Vdc}, I_{BE(\text{off})} = -0.5\text{Vdc}$) | 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($V_{CE} = -30\text{Vdc}, V_{EB(\text{off})} = -0.5\text{Vdc}$) | I_B | — | -50 | nAdc |

- FR-5 = $1.0 \times 0.75 \times 0.062$ in.
- Alumina = $0.4 \times 0.3 \times 0.024$ in. 99.5% alumina.
- Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

MMBT2907LT1 MMBT2907ALT1

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 | — |
| ($I_C = -1.0\text{mA}$, $V_{CE} = -10\text{Vdc}$) | | 50 | — | |
| | | MMBT2907A | 100 | — |
| ($I_C = -10\text{mA}$, $V_{CE} = -10\text{Vdc}$) | | 75 | — | |
| | | MMBT2907A | 100 | — |
| ($I_C = -150\text{mA}$, $V_{CE} = -10\text{Vdc}$)(3) | | — | — | |
| | | MMBT2907A | 100 | 300 |
| ($I_C = -500\text{mA}$, $V_{CE} = -10\text{Vdc}$)(3) | | 30 | — | |
| | | MMBT2907A | 50 | — |
| Collector–Emitter Saturation Voltage(3) ($I_C = -150\text{mA}$, $I_B = -15\text{mA}$) ($I_C = -500\text{mA}$, $I_B = -50\text{mA}$) | $V_{CE(sat)}$ | — | -0.4 | Vdc |
| | | — | -1.6 | |
| Base–Emitter Saturation Voltage(3) ($I_C = -150\text{mA}$, $I_B = -15\text{mA}$) ($I_C = -500\text{mA}$, $I_B = -50\text{mA}$) | $V_{BE(sat)}$ | — | -1.3 | Vdc |
| | | — | -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} | — — — | 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.

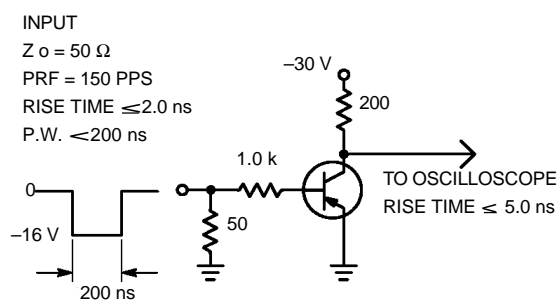


Figure 1. Delay and Rise Time Test Circuit

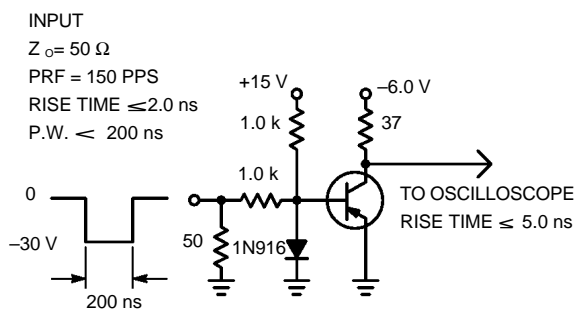


Figure 2. Storage and Fall Time Test Circuit

MMBT2907LT1 MMBT2907ALT1

TYPICAL CHARACTERISTICS

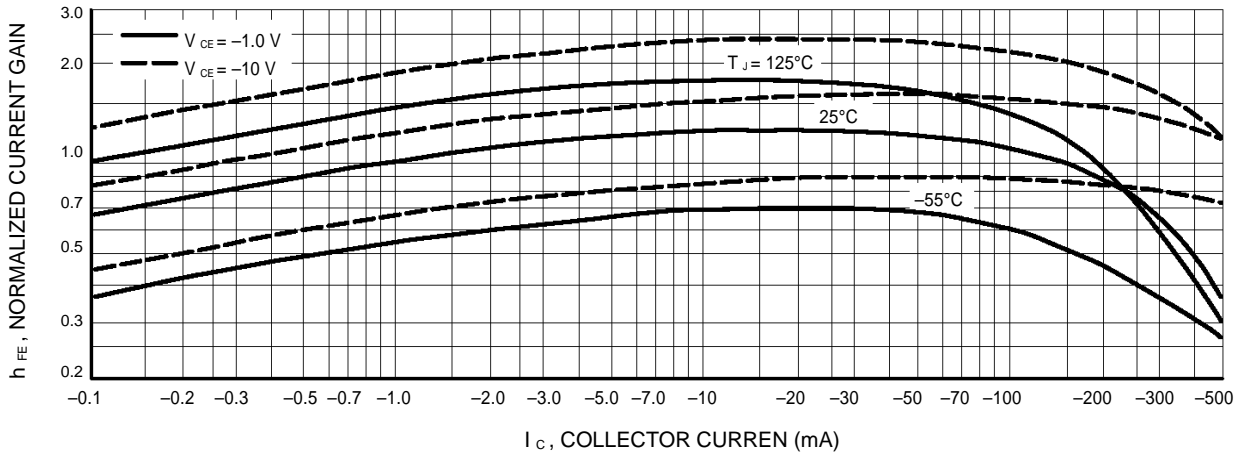


Figure 3. DC Current Gain

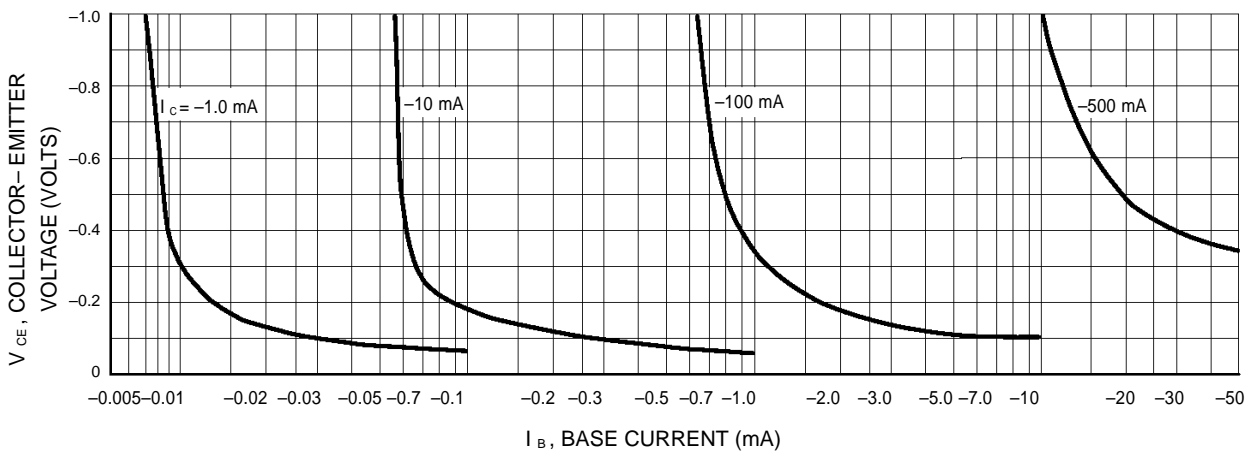


Figure 4. Collector Saturation Region

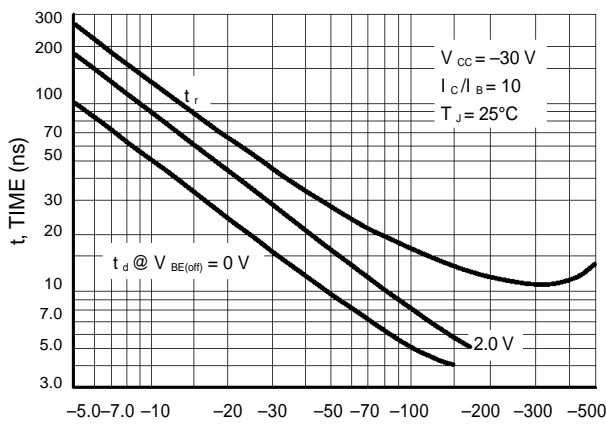


Figure 5. Turn-On Time

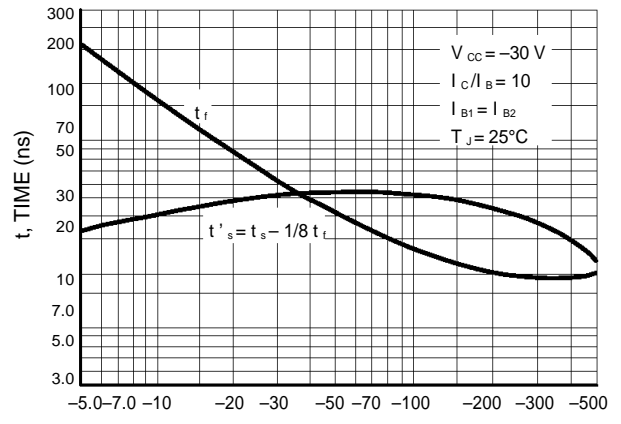


Figure 6. Turn-Off Time

MMBT2907LT1 MMBT2907ALT1

TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

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

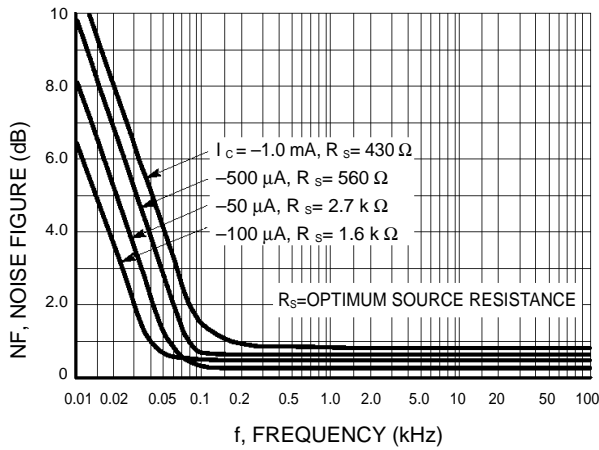


Figure 7. Frequency Effects

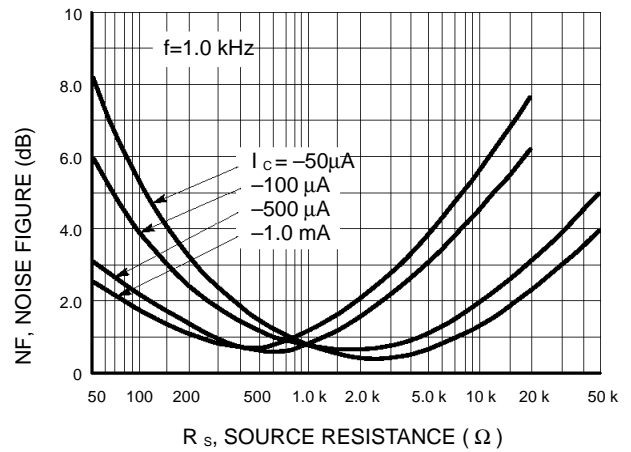


Figure 8. Source Resistance Effects

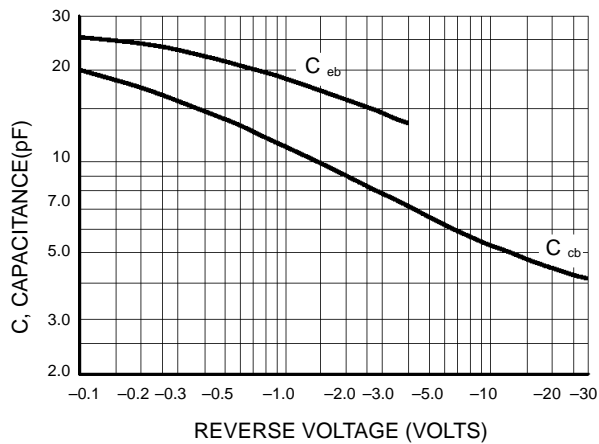


Figure 9. Capacitances

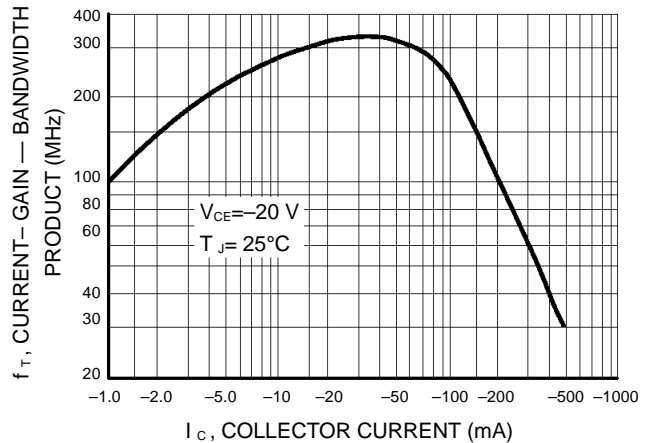


Figure 10. Current-Gain — Bandwidth Product

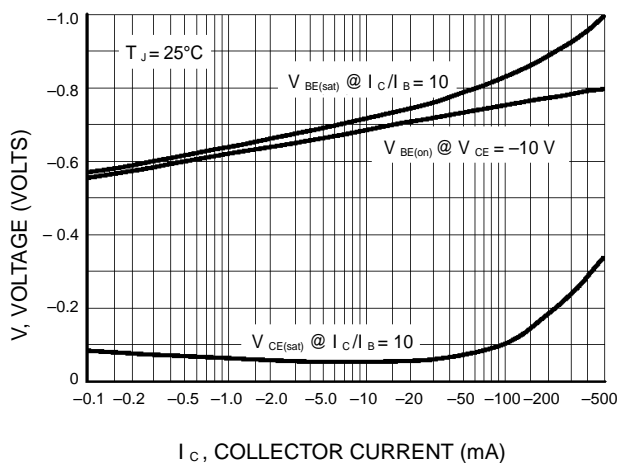


Figure 11. "On" Voltage

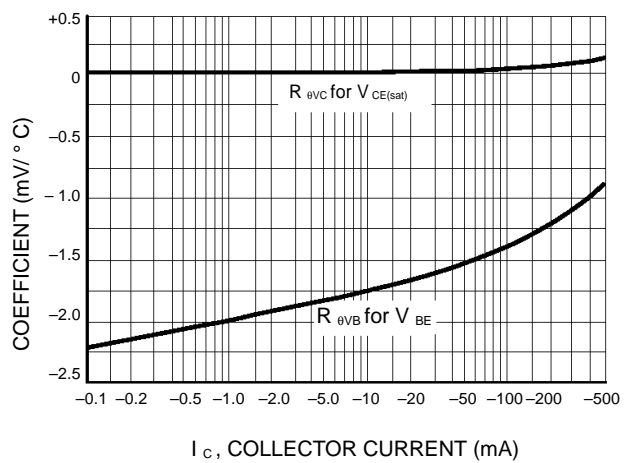


Figure 12. Temperature Coefficients