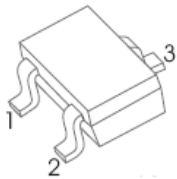


Features

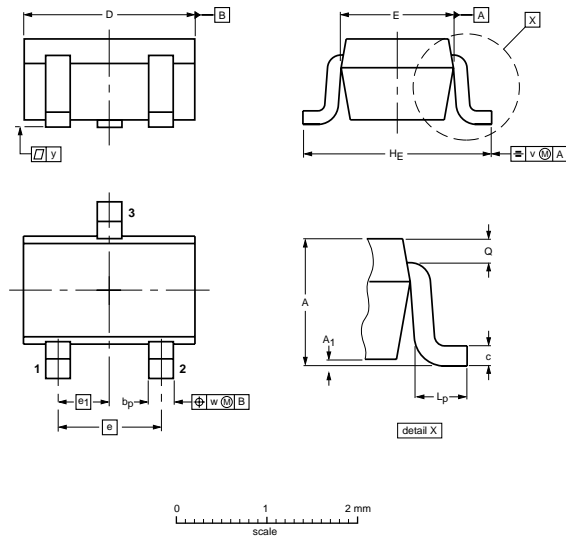
for switching and amplifier applications



SOT-323

1. BASE
2. EMITTER
3. COLLECTOR

SOT-323



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ max | b _p | c | D | E | e | e ₁ | H _E | L _p | Q | v | w |
|------|------------|-----------------------|----------------|--------------|------------|--------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm | 1.1 0.8 | 0.1 | 0.4 0.3 | 0.25 0.10 | 2.2 1.8 | 1.35 1.15 | 1.3 | 0.65 | 2.2 2.0 | 0.45 0.15 | 0.23 0.13 | 0.2 | 0.2 |

Absolute Maximum Ratings (T_a = 25 °C)

| Parameter | Symbol | Value | Unit |
|---------------------------|------------------|---------------|------|
| Collector Base Voltage | V _{CBO} | 60 | V |
| Collector Emitter Voltage | V _{CEO} | 40 | V |
| Emitter Base Voltage | V _{EBO} | 6 | V |
| Collector Current | I _C | 200 | mA |
| Total Power Dissipation | P _{tot} | 200 | mW |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature Range | T _{stg} | - 55 to + 150 | °C |

MMBT3904W

Characteristics at $T_a = 25\text{ }^\circ\text{C}$

| Parameter | Symbol | Min. | Max. | Unit |
|---|---------------|------|------|------|
| DC Current Gain at $V_{CE} = 1\text{ V}$, $I_C = 0.1\text{ mA}$ | h_{FE} | 40 | - | - |
| at $V_{CE} = 1\text{ V}$, $I_C = 1\text{ mA}$ | h_{FE} | 70 | - | - |
| at $V_{CE} = 1\text{ V}$, $I_C = 10\text{ mA}$ | h_{FE} | 100 | 300 | - |
| at $V_{CE} = 1\text{ V}$, $I_C = 50\text{ mA}$ | h_{FE} | 60 | - | - |
| at $V_{CE} = 1\text{ V}$, $I_C = 100\text{ mA}$ | h_{FE} | 30 | - | - |
| Collector Emitter Cutoff Current at $V_{CE} = 30\text{ V}$ | I_{CES} | - | 50 | nA |
| Emitter Base Cutoff Current at $V_{EB} = 3\text{ V}$ | I_{EBO} | - | 50 | nA |
| Collector Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$ | $V_{(BR)CBO}$ | 60 | - | V |
| Collector Emitter Breakdown Voltage at $I_C = 1\text{ mA}$ | $V_{(BR)CEO}$ | 40 | - | V |
| Emitter Base Breakdown Voltage at $I_E = 10\text{ }\mu\text{A}$ | $V_{(BR)EBO}$ | 6 | - | V |
| Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$ | $V_{CE(sat)}$ | - | 0.2 | V |
| at $I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$ | | - | 0.3 | |
| Base Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$ | $V_{BE(sat)}$ | 0.65 | 0.85 | V |
| at $I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$ | | - | 0.95 | |
| Transition Frequency at $V_{CE} = 20\text{ V}$, $-I_E = 10\text{ mA}$, $f = 100\text{ MHz}$ | f_T | 300 | - | MHz |
| Collector Output Capacitance at $V_{CB} = 10\text{ V}$, $f = 100\text{ KHz}$ | C_{ob} | - | 4 | pF |
| Delay Time at $V_{CC} = 3\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = 1\text{ mA}$ | t_d | - | 35 | ns |
| Rise Time at $V_{CC} = 3\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = 1\text{ mA}$ | t_r | - | 35 | ns |
| Storage Time at $V_{CC} = 3\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = -I_{B2} = 1\text{ mA}$ | t_{stg} | - | 200 | ns |
| Fall Time at $V_{CC} = 3\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = -I_{B2} = 1\text{ mA}$ | t_f | - | 50 | ns |

RATING AND CHARACTERISTIC CURVES (MMBT3904W)

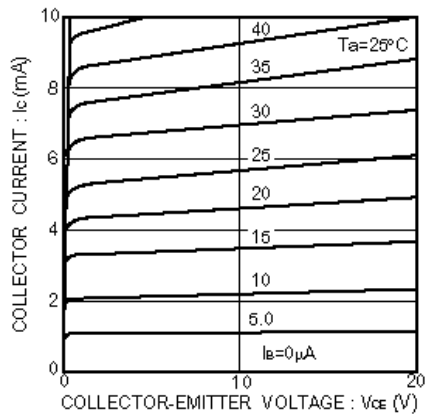


Fig.1 Grounded emitter output characteristics

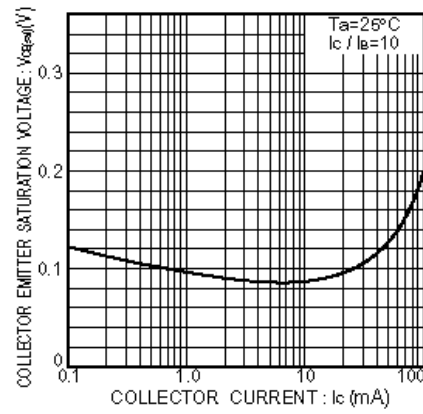


Fig.2 Collector-emitter saturation voltage vs. collector current

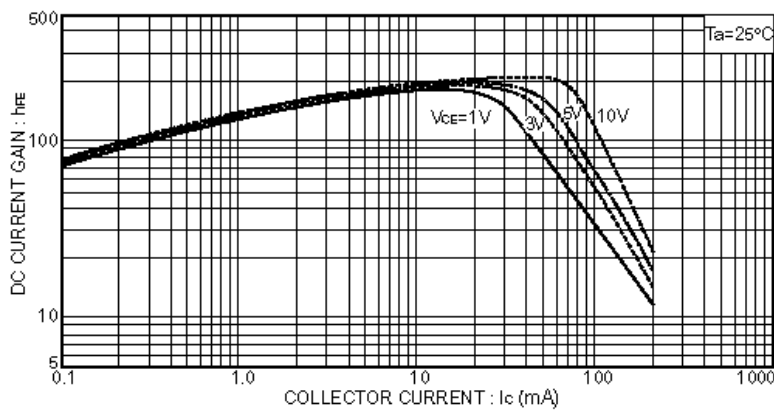


Fig.3 DC current gain vs. collector current (I)

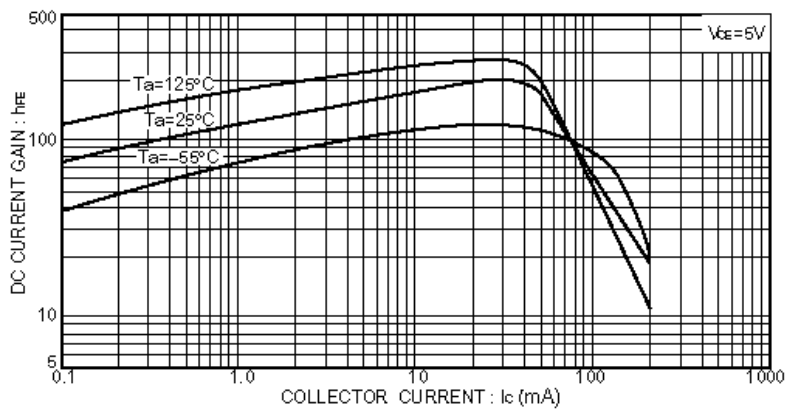
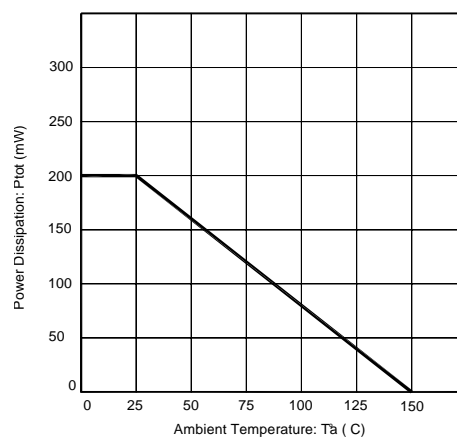
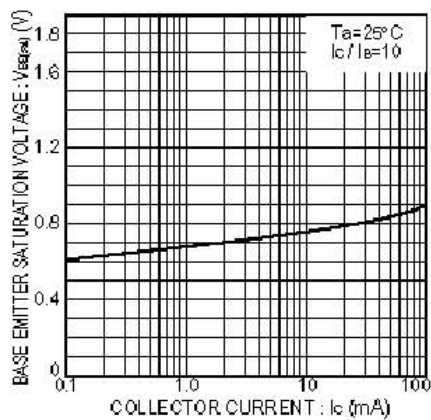
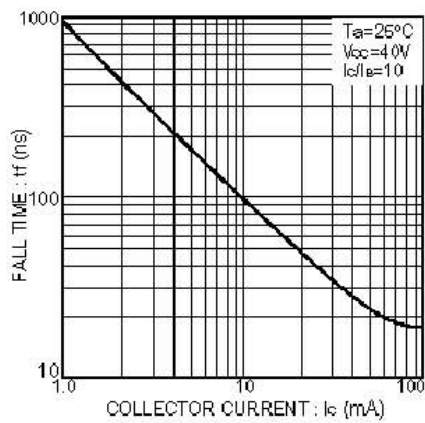
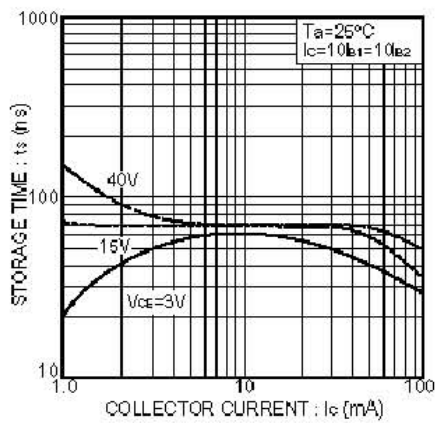
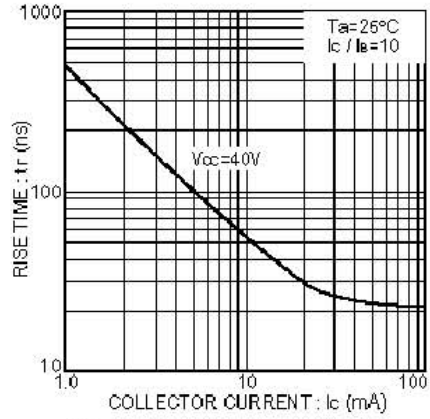
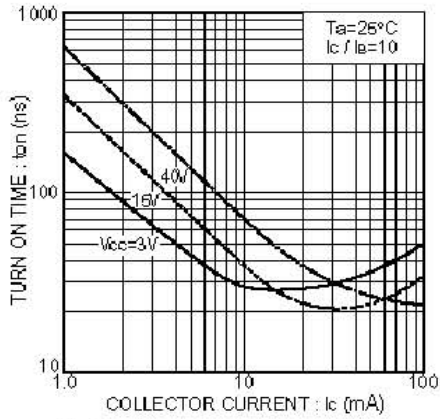


Fig.4 DC current gain vs. collector current (II)

RATING AND CHARACTERISTIC CURVES (MMBT3904W)



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