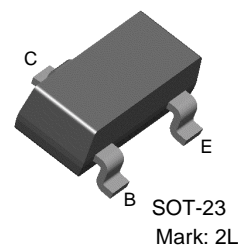


MMBT5401

PNP General Purpose Amplifier

- This device is designed as a general purpose amplifier and switch for applications requiring high voltage.



PNP Epitaxial Silicon Transistor

Absolute Maximum Ratings* $T_a=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Value | Units |
|----------------|--|-----------|------------------|
| V_{CEO} | Collector-Emitter Voltage | -150 | V |
| V_{CBO} | Collector-Base Voltage | -160 | V |
| V_{EBO} | Emitter-Base Voltage | -5.0 | V |
| I_C | Collector Current - Continuous | -600 | mA |
| T_J, T_{STG} | Operating and Storage Junction Temperature Range | -55 ~ 150 | $^\circ\text{C}$ |

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

Notes:

- These ratings are based on a maximum junction temperature of 150 degrees C.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Electrical Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Condition | Min. | Max. | Units |
|-------------------------------------|---------------------------------------|--|----------------|--------------|---------------------|
| Off Characteristics | | | | | |
| BV_{CEO} | Collector-Emitter Breakdown Voltage * | $I_C = -1.0\text{mA}, I_B = 0$ | -150 | | V |
| BV_{CBO} | Collector-Base Breakdown Voltage | $I_C = -100\mu\text{A}, I_E = 0$ | -160 | | V |
| BV_{EBO} | Emitter-Base Breakdown Voltage | $I_E = -10\mu\text{A}, I_C = 0$ | -5.0 | | V |
| I_{CBO} | Collector Cutoff Current | $V_{CB} = -120\text{V}, I_E = 0$ $V_{CB} = -120\text{V}, I_E = 0, T_a = 100^\circ\text{C}$ | | -50 | nA μA |
| I_{EBO} | Emitter Cutoff Current | $V_{EB} = -3.0\text{V}, I_C = 0$ | | -50 | nA |
| On Characteristics * | | | | | |
| h_{FE} | DC Current Gain | $I_C = -1.0\text{mA}, V_{CE} = -5.0\text{V}$ $I_C = -10\text{mA}, V_{CE} = -5.0\text{V}$ $I_C = -50\text{mA}, V_{CE} = -5.0\text{V}$ | 50 60 50 | 240 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$ | | -0.2 -0.5 | V V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$ | | -1.0 -1.0 | V V |
| Small Signal Characteristics | | | | | |
| f_T | Current Gain Bandwidth Product | $I_C = -10\text{mA}, V_{CE} = -10\text{V},$ $f = 100\text{MHz}$ | 100 | 300 | MHz |
| C_{ob} | Output Capacitance | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$ | | 6.0 | pF |
| N_F | Noise Figure | $I_C = -250\mu\text{A}, V_{CE} = -5.0\text{V}, R_S = 1.0\text{K}\Omega$ $f = 10\text{Hz to } 15.7\text{KHz}$ | | 8.0 | dB |

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

Thermal Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Max. | Units |
|-----------------|---|------|---------------------------|
| P_D | Total Device Dissipation | 350 | mW |
| | Derate above 25°C | 2.8 | mW/ $^\circ\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357 | $^\circ\text{C}/\text{W}$ |

Typical Characteristics

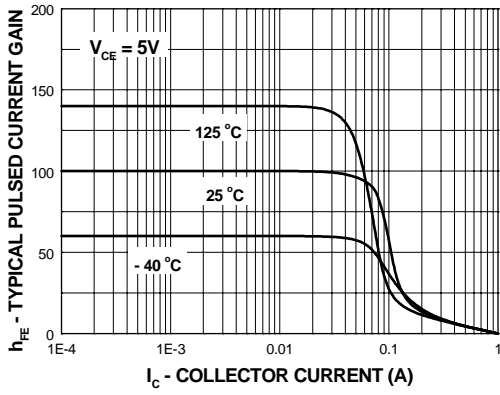


Figure 1. Typical Pulsed Current Gain vs Collector Current

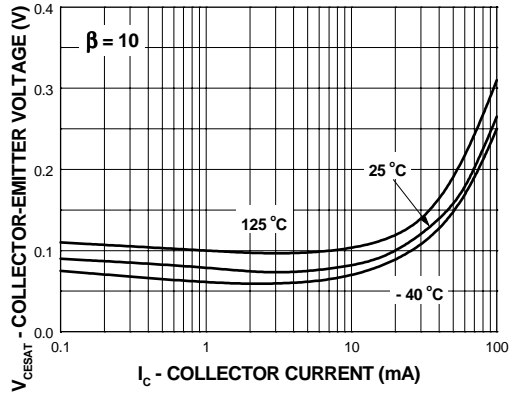


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

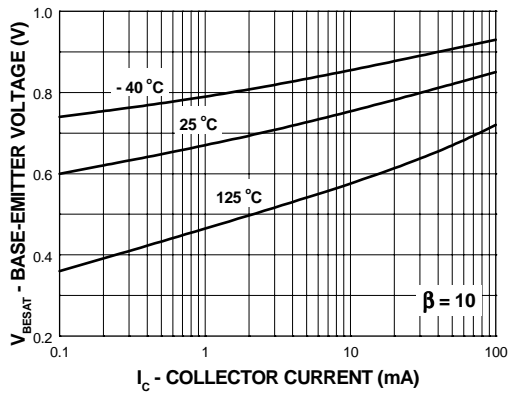


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

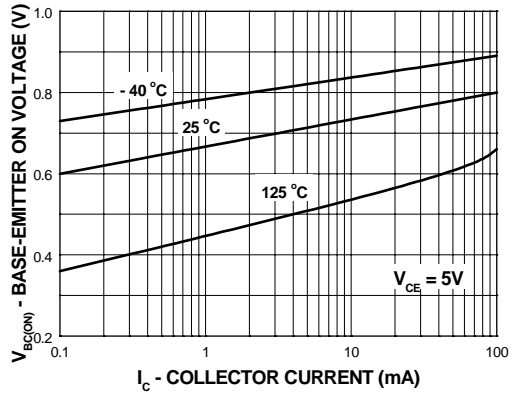


Figure 4. Base-Emitter On Voltage vs Collector Current

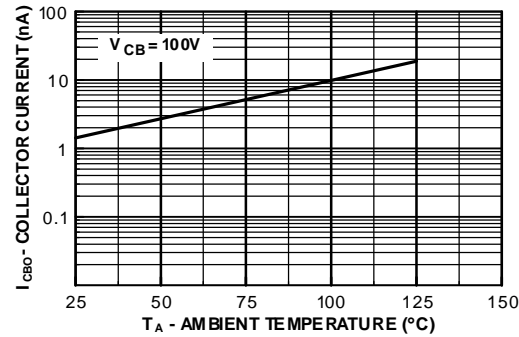


Figure 5. Collector-Cutoff Current vs Ambient Temperature

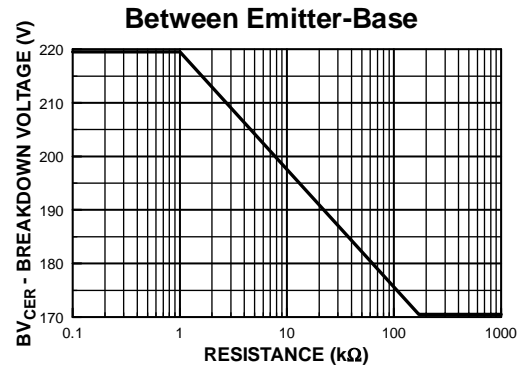


Figure 6. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base

Typical Characteristics (Continued)

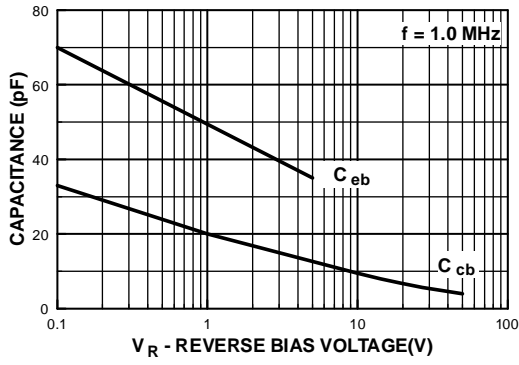


Figure 7. Input and Output Capacitance vs Reverse Voltage

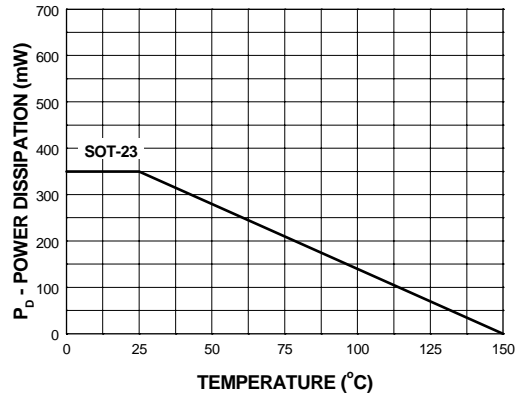
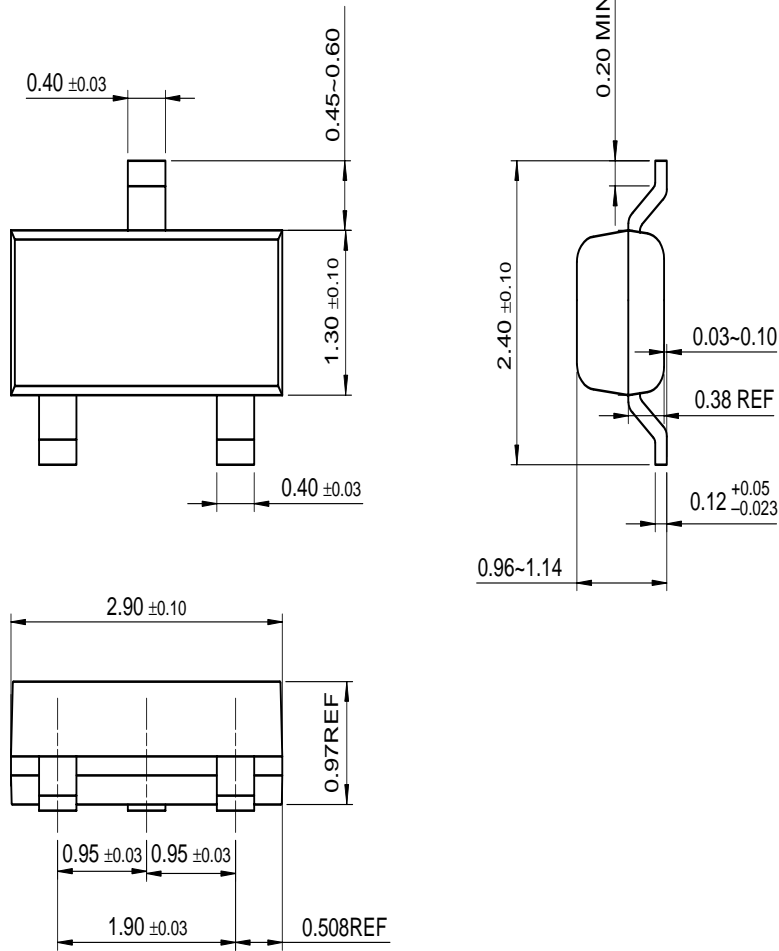


Figure 8. Power Dissipation vs Ambient Temperature

Package Dimensions

SOT-23



Dimensions in Millimeters

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