



MMBT4403

PNP GENERAL PURPOSE SWITCHING TRANSISTOR

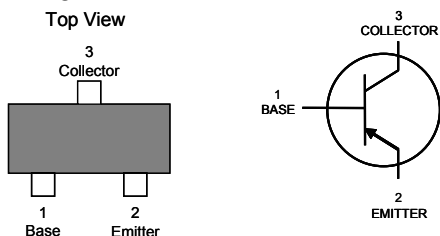
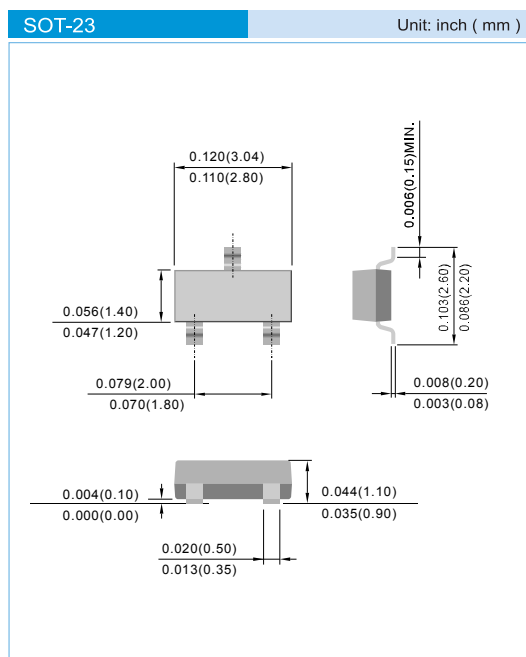
| | | | |
|----------------|------------|--------------|--------------|
| VOLTAGE | 40V | POWER | 225mW |
|----------------|------------|--------------|--------------|

FEATURES

- PNP epitaxial silicon, planar design
- Collector-emitter voltage $V_{CE} = -40V$
- Collector current $I_C = -600mA$
- Complimentary (NPN) device: MMBT4401
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Green molding compound as per IEC61249 Std. .
- (Halogen Free)

MECHANICAL DATA

Case: SOT-23
 Terminals: Solderable per MIL-STD-750, Method 2026
 Approx Weight: 0.0003 ounces, 0.0084 grams
 Marking: M3A



ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | VALUE | UNIT |
|--|----------------|------------|------|
| Collector - Emitter Voltage | V_{CEO} | -40 | V |
| Collector - Base Voltage | V_{CBO} | -40 | V |
| Emitter - Base Voltage | V_{EBO} | -5.0 | V |
| Collector Current - Continuous | I_C | -600 | mA |
| Max Power Dissipation (Note 1) | P_{TOT} | 225 | mW |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | °C |

THERMAL CHARACTERISTICS

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|-----------------|-------|------|
| Thermal Resistance , Junction to Ambient (Note 1) | $R_{\theta JA}$ | 556 | °C/W |

Note 1: Transistor mounted on FR-4 board 70 x 60 x 1mm. using minimum recommended pad.



MMBT4403

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

| PARAMETER | SYMBOL | Test Condition | MIN. | TYP. | MAX. | UNIT |
|--|---------------|---|--|------|---------------|------|
| Collector - Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = -1.0\text{mA}$, $I_B = 0$ | -40 | - | - | V |
| Collector - Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C = -100\mu\text{A}$, $I_E = 0$ | -40 | - | - | V |
| Emitter - Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E = -100\mu\text{A}$, $I_C = 0$ | -5.0 | - | - | V |
| Base Cutoff Current | I_{BEV} | $V_{CE} = -35\text{V}$, $V_{EB} = -0.4\text{V}$ | - | - | -100 | nA |
| Collector Cutoff Current | I_{CEX} | $V_{CE} = -35\text{V}$, $V_{EB} = -0.4\text{V}$ | - | - | -100 | nA |
| DC Current Gain | h_{FE} | $I_C = -0.1\text{mA}$, $V_{CE} = -1.0\text{V}$ | 30 | - | - | |
| | | $I_C = -1.0\text{mA}$, $V_{CE} = -1.0\text{V}$ | 60 | - | - | |
| | | $I_C = -10\text{mA}$, $V_{CE} = -1.0\text{V}$ | 100 | - | - | |
| | | $I_C = -150\text{mA}$, $V_{CE} = -2.0\text{V}$ | 100 | - | 300 | |
| | | $I_C = -500\text{mA}$, $V_{CE} = -2.0\text{V}$ | 20 | - | - | |
| Collector - Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C = -150\text{mA}$, $I_B = -15\text{mA}$ $I_C = -500\text{mA}$, $I_B = -50\text{mA}$ | - | - | -0.4 -0.75 | V |
| Base - Emitter Saturation Voltage | $V_{BE(SAT)}$ | $I_C = -150\text{mA}$, $I_B = -15\text{mA}$ $I_C = -500\text{mA}$, $I_B = -50\text{mA}$ | -0.75 - | - | -0.95 -1.3 | V |
| Current-Gain – Bandwidth Product | f_T | $I_C = -20\text{mA}$, $V_{CE} = -10\text{V}$, $f = 100\text{MHz}$ | 200 | - | - | MHz |
| Collector - Base Capacitance | C_{CBO} | $V_{CB} = -5.0\text{V}$, $I_E = 0$, $f = 1\text{MHz}$ | - | - | 8.5 | pF |
| Emitter - Base Capacitance | C_{EBO} | $V_{CB} = -0.5\text{V}$, $I_C = 0$, $f = 1\text{MHz}$ | - | - | 30 | pF |
| Delay Time | t_d | $V_{CC} = -30\text{V}$, $V_{BE} = -2.0\text{V}$, $I_C = -150\text{mA}$, $I_{B1} = -15\text{mA}$ | - | - | 15 | ns |
| Rise Time | t_r | | - | - | 20 | ns |
| Storage Time | t_s | | $V_{CC} = -30\text{V}$, $I_C = -150\text{mA}$, | - | - | 225 |
| Fall Time | t_f | $I_{B1} = I_{B2} = 15\text{mA}$ | - | - | 30 | ns |

SWITCHING TIME EQUIVALENT TEST CIRCUITS

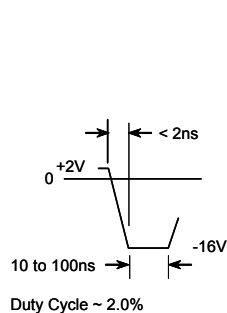


Fig. 1. Turn-On Time

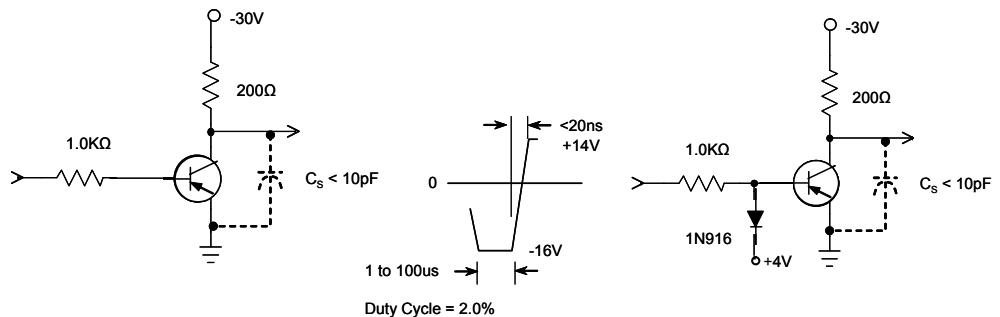


Fig. 2. Turn-Off Time



MMBT4403

ELECTRICAL CHARACTERISTICS CURVES

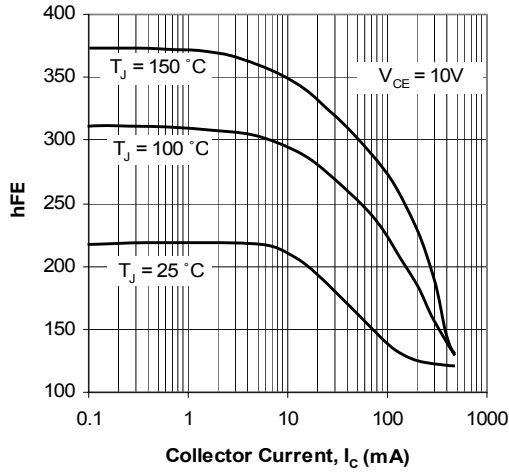


Fig. 3. Typical h_{FE} vs Collector Current

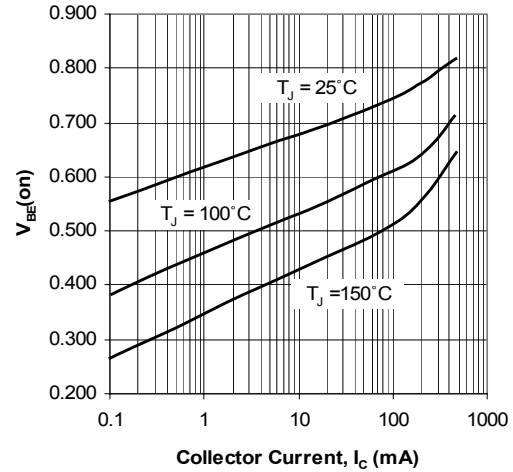


Fig. 4. Typical V_{BE} vs Collector Current

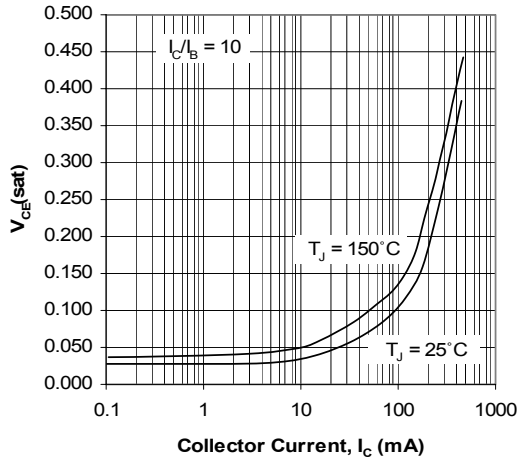


Fig. 5. Typical $V_{CE}(\text{sat})$ vs Collector Current

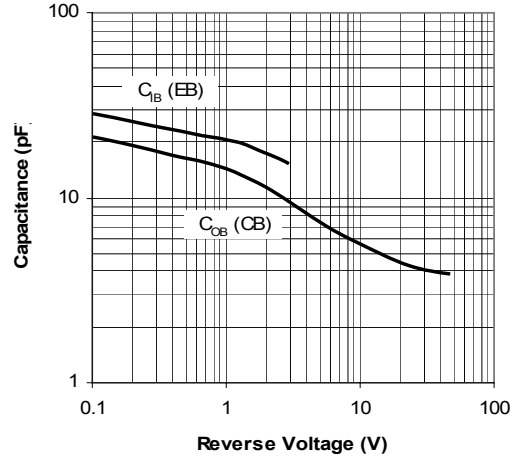
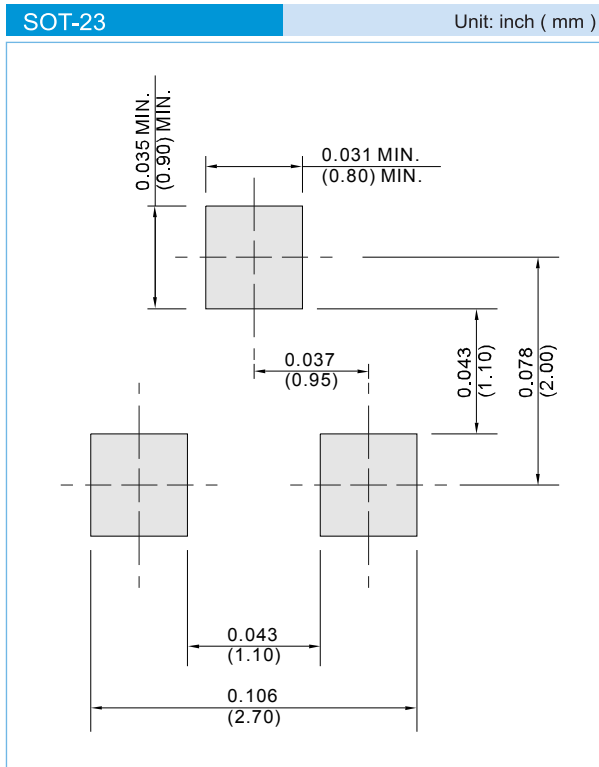


Fig. 6. Typical Capacitances vs Reverse Voltage



MMBT4403

MOUNTING PAD LAYOUT



ORDER INFORMATION

- Packing information
 - T/R - 12K per 13" plastic Reel
 - T/R - 3K per 7" plastic Reel



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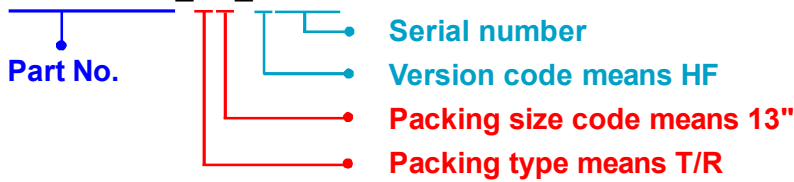
Part No_packing code_Version

MMBT4403_R1_00001

MMBT4403_R2_00001

For example :

RB500V-40_R2_00001



| Packing Code XX | | | | Version Code XXXXX | | |
|--------------------------------------|----------------------|----------------------------------|----------------------|---------------------------|----------------------|---------------------------------------|
| Packing type | 1 st Code | Packing size code | 2 nd Code | HF or RoHS | 1 st Code | 2 nd ~5 th Code |
| Tape and Ammunition Box (T/B) | A | N/A | 0 | HF | 0 | serial number |
| Tape and Reel (T/R) | R | 7" | 1 | RoHS | 1 | serial number |
| Bulk Packing (B/P) | B | 13" | 2 | | | |
| Tube Packing (T/P) | T | 26mm | X | | | |
| Tape and Reel (Right Oriented) (TRR) | S | 52mm | Y | | | |
| Tape and Reel (Left Oriented) (TRL) | L | PANASERT T/B CATHODE UP (PBCU) | U | | | |
| FORMING | F | PANASERT T/B CATHODE DOWN (PBCD) | D | | | |



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