



MMBT4401

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volt **POWER** 225 mWatt

SOT-23 Unit : inch(mm)

FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage $V_{CE} = 40V$
- Collector current $I_C = 600mA$
- 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, Plastic
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0003 ounce, 0.084 gram

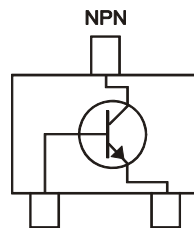
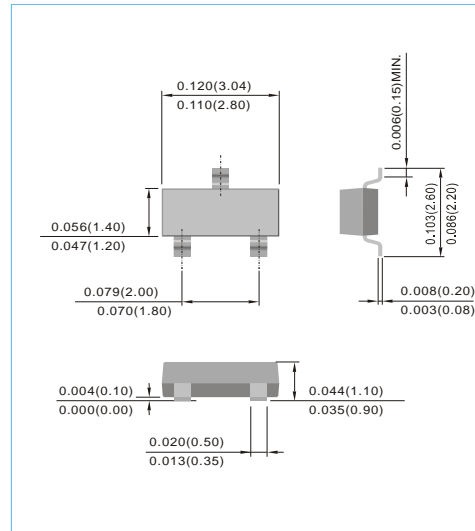


Fig.34(TOP VIEW)

ABSOLUTE RATINGS

| PARAMETER | Symbol | Value | Units |
|--------------------------------|-----------|-------|-------|
| Collector - Emitter Voltage | V_{CEO} | 40 | V |
| Collector - Base Voltage | V_{CBO} | 60 | V |
| Emitter - Base Voltage | V_{EBO} | 6 | V |
| Collector Current - Continuous | I_C | 600 | mA |

THERMAL CHARACTERISTICS

| PARAMETER | Symbol | Value | Units |
|--|-----------------|------------|---------------|
| Max. Power Dissipation (Note 1) | P_{TOT} | 225 | mW |
| Thermal Resistance , Junction to Ambient | $R_{\theta JA}$ | 556 | $^{\circ}C/W$ |
| Junction Temperature Range | T_J | -55 to 150 | $^{\circ}C$ |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^{\circ}C$ |

Note 1: Transistor mounted on FR-5 board 1.0 x 0.75 x 0.062 in.



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ELECTRICAL CHARACTERISTICS

| PARAMETER | Symbol | Test Condition | MIN. | TYP. | MAX. | Units |
|---|---------------|--|-----------|--------|--------------|-------|
| Collector - Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=1.0mA, I_B=0$ | 40 | - | - | V |
| Collector - Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C=100\mu A, I_E=0$ | 60 | - | - | V |
| Emitter - Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E=100\mu A, I_C=0$ | 6.0 | - | - | V |
| Base Cutoff Current | I_{BL} | $V_{CE}=35V, V_{EB}=0.4V$ | - | - | 100 | nA |
| Collector Cutoff Current | I_{CEX} | $V_{CE}=35V, V_{EB}=0.4V$ | - | - | 100 | nA |
| DC Current Gain (Note 2) | h_{FE} | $I_C=0.1mA, V_{CE}=1.0V$ | 20 | - | - | - |
| | | $I_C=1.0mA, V_{CE}=1.0V$ | 40 | - | - | |
| | | $I_C=10mA, V_{CE}=1.0V$ | 80 | - | - | |
| | | $I_C=150mA, V_{CE}=1.0V$ | 100 | - | 300 | |
| | | $I_C=500mA, V_{CE}=2.0V$ | 40 | - | - | |
| Collector - Emitter Saturation Voltage (Note 2) | $V_{CE(SAT)}$ | $I_C=150mA, I_B=15mA$ $I_C=500mA, I_B=50mA$ | - | - | 0.40 0.75 | V |
| Base - Emitter Saturation Voltage (Note 2) | $V_{BE(SAT)}$ | $I_C=150mA, I_B=15mA$ $I_C=500mA, I_B=50mA$ | 0.75 - | - - | 0.95 1.20 | V |
| Collector - Base Capacitance | C_{CBO} | $V_{CB}=5V, I_E=0, f=1MHz$ | - | - | 6.5 | pF |
| Emitter - Base Capacitance | C_{EBO} | $V_{CB}=0.5V, I_C=0, f=1MHz$ | - | - | 30 | pF |
| Current Gain - Bandwidth Product | F_T | $V_{CE}=10V, I_C=20mA, f=100MHz$ | 250 | - | - | MHz |
| Delay Time | t_d | $V_{CC}=30V, V_{BE}=2.0V,$ $I_C=150mA, I_{B1}=15mA$ | - | - | 15 | ns |
| Rise Time | t_r | $V_{CC}=30V, V_{BE}=2.0V,$ $I_C=150mA, I_{B1}=15mA$ | - | - | 20 | ns |
| Storage Time | t_s | $V_{CC}=30V, I_C=150mA$ $I_{B1}=I_{B2}=15mA$ | - | - | 225 | ns |
| Fall Time | t_f | $V_{CC}=30V, I_C=150mA$ $I_{B1}=I_{B2}=15mA$ | - | - | 30 | ns |



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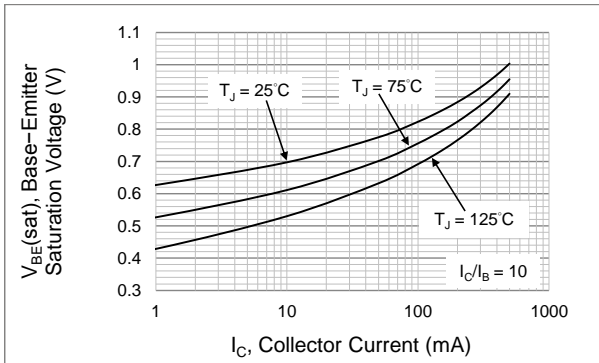


Fig.1 Base Emitter Saturation Voltage vs. Collector Current

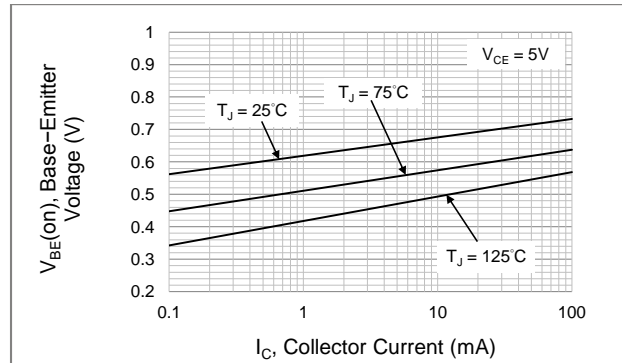


Fig.2 Base Emitter Voltage vs. Collector Current

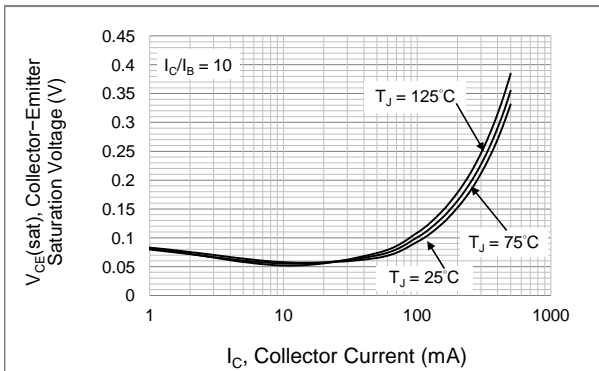


Fig.3 Collector Emitter Saturation Voltage vs. Collector Current

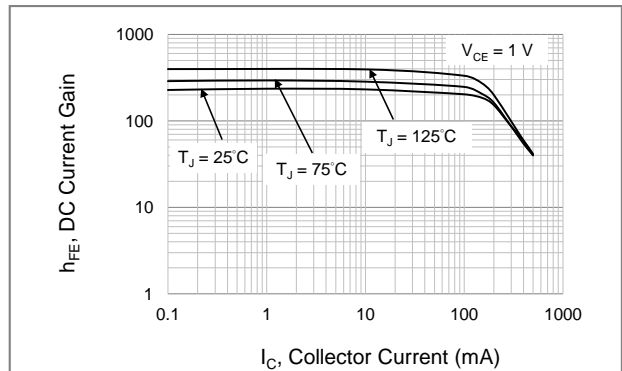


Fig.4 DC Current Gain vs. Collector Current

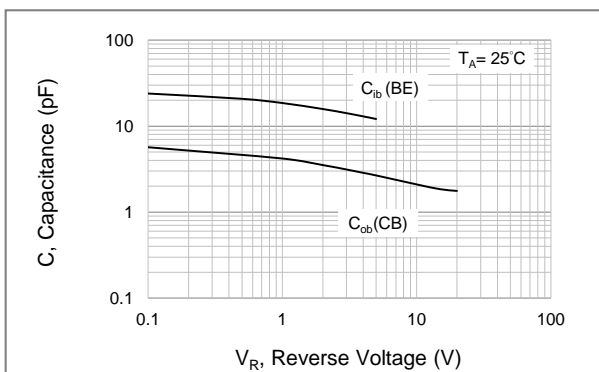


Fig.5 Typical Capacitance



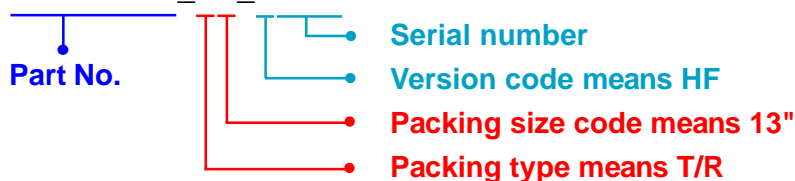
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PART NO PACKING CODE VERSION

| Part No Packing Code | Package Type | Packing Type | Marking | Version |
|----------------------|--------------|--------------------|---------|--------------|
| MMBT4401_R1_00001 | SOT-23 | 3K pcs / 7" reel | M4A | Halogen free |
| MMBT4401_R2_00001 | SOT-23 | 12K pcs / 13" reel | M4A | Halogen free |

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 | | | |

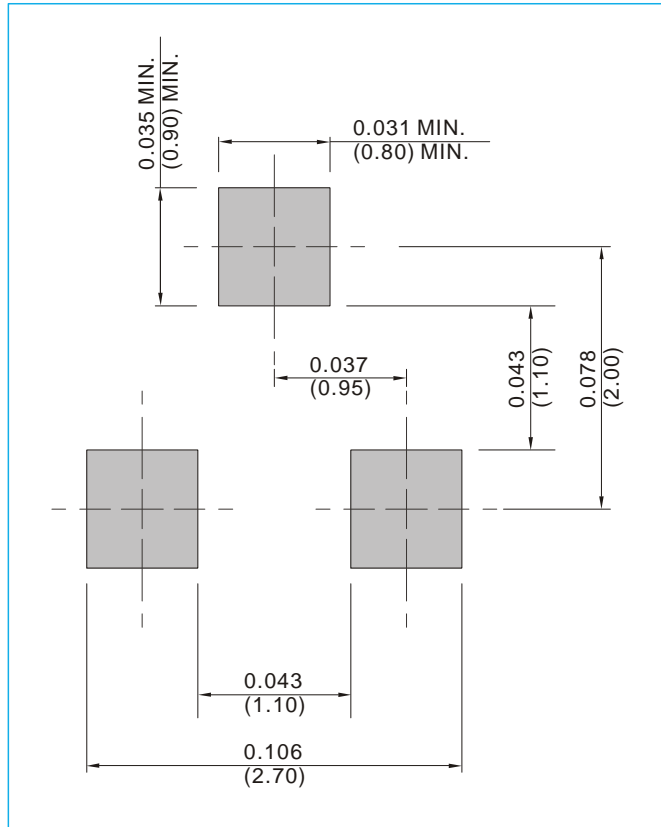


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MOUNTING PAD LAYOUT

SOT-23

Unit : inch(mm)





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