



MMBT3906

PNP GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volt **POWER** 330 mWatt

SOT-23 Unit : inch(mm)

FEATURES

- PNP epitaxial silicon, planar design
- Collector-emitter voltage $V_{CE} = -40V$
- Collector current $I_C = -200mA$
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

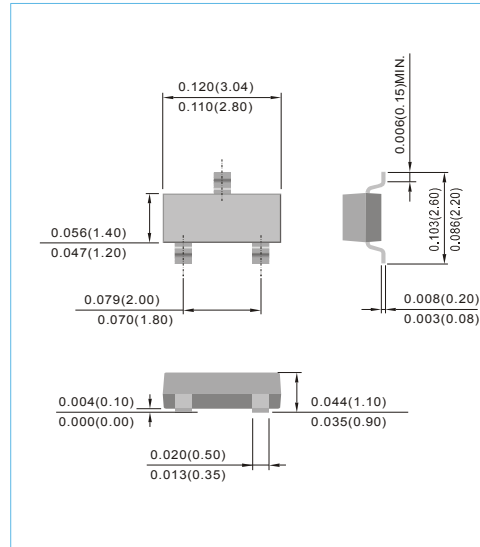
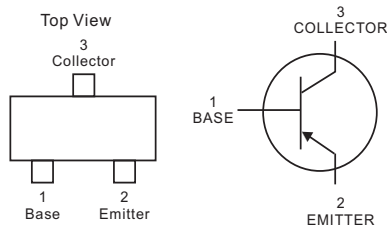
MECHANICAL DATA

Case: SOT-23, Plastic

Terminals: Solderable per MIL-STD-750, Method 2026

Approx. Weight: 0.0003 ounces, 0.0084 grams

Marking: S2A



ABSOLUTE RATINGS

| Parameter | Symbol | Value | Units |
|--------------------------------|-----------|-------|-------|
| Collector - Emitter Voltage | V_{CEO} | -40 | V |
| Collector - Base Voltage | V_{CBO} | -40 | V |
| Emitter - Base Voltage | V_{EBO} | -5 | V |
| Collector Current - Continuous | I_C | -200 | mA |

THERMAL CHARACTERISTICS

| Parameter | Symbol | Value | Units |
|--|-----------------|------------|---------------|
| Max Power Dissipation (Note 1) | P_{TOT} | 330 | mW |
| Thermal Resistance , Junction to Ambient | $R_{\theta JA}$ | 375 | $^{\circ}C/W$ |
| Operating Junction Temperature and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^{\circ}C$ |

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



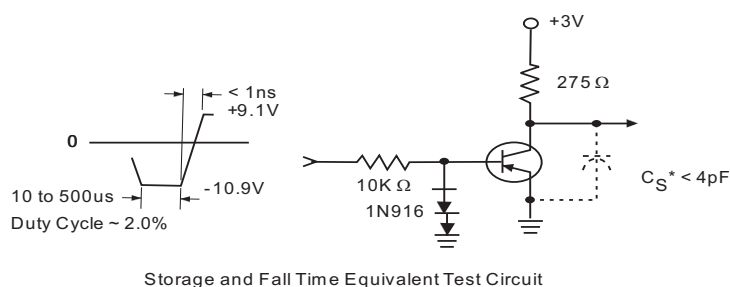
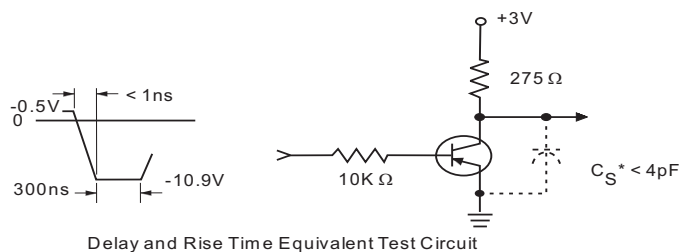
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ELECTRICAL CHARACTERISTICS

| Parameter | Symbol | Test Condition | MIN. | TYP. | MAX. | Units |
|---|---------------|--|------------|------|----------------|-------|
| Collector - Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = -1mA, I_B = 0$ | -40 | - | - | V |
| Collector - Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C = -10\mu A, I_E = 0$ | -40 | - | - | V |
| Emitter - Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E = -10\mu A, I_C = 0$ | -5 | - | - | V |
| Base Cutoff Current | I_{BL} | $V_{CE} = -30V, V_{EB} = -3V$ | - | - | -50 | nA |
| Collector Cutoff Current | I_{CEX} | $V_{CE} = -30V, V_{EB} = -3V$ | - | - | -50 | nA |
| DC Current Gain (Note 2) | h_{FE} | $I_C = -0.1mA, V_{CE} = -1V$ | 60 | - | - | - |
| | | $I_C = -1mA, V_{CE} = -1V$ | 80 | - | - | |
| | | $I_C = -10mA, V_{CE} = -1V$ | 100 | - | 300 | |
| | | $I_C = -50mA, V_{CE} = -1V$ | 60 | - | - | |
| | | $I_C = -100mA, V_{CE} = -1V$ | 30 | - | - | |
| Collector - Emitter Saturation Voltage (Note 2) | $V_{CE(SAT)}$ | $I_C = -10mA, I_B = -1mA$ $I_C = -50mA, I_B = -5mA$ | - | - | -0.25 -0.4 | V |
| Base - Emitter Saturation Voltage (Note 2) | $V_{BE(SAT)}$ | $I_C = -10mA, I_B = -1mA$ $I_C = -50mA, I_B = -5mA$ | -0.65 - | - | -0.85 -0.95 | V |
| Collector - Base Capacitance | C_{CBO} | $V_{CB} = -5V, I_E = 0, f = 1MHz$ | - | - | 4.5 | pF |
| Emitter - Base Capacitance | C_{EBO} | $V_{EB} = -0.5V, I_C = 0, f = 1MHz$ | - | - | 10 | pF |
| Delay Time | t_d | $V_{CC} = -3V, V_{BE} = -0.5V,$ $I_C = -10mA, I_B = -1mA$ | - | - | 35 | ns |
| Rise Time | t_r | $V_{CC} = -3V, V_{BE} = -0.5V,$ $I_C = -10mA, I_B = -1mA$ | - | - | 35 | ns |
| Storage Time | t_s | $V_{CC} = -3V, I_C = -10mA$ $I_{B1} = I_{B2} = -1mA$ | - | - | 225 | ns |
| Fall Time | t_f | $V_{CC} = -3V, I_C = -10mA$ $I_{B1} = I_{B2} = -1mA$ | - | - | 75 | ns |
| Current Gain-Bandwidth Product | f_T | $I_C = -10mA, V_{CE} = -20V,$ $f = 100MHz$ | 250 | - | - | MHz |

Note 2: Pulse Test: Pulse Width $\leq 300 \mu s$, Duty Cycle $\leq 2.0\%$.

SWITCHING TIME EQUIVALENT TEST CIRCUITS





ELECTRICAL CHARACTERISTICS CURVE

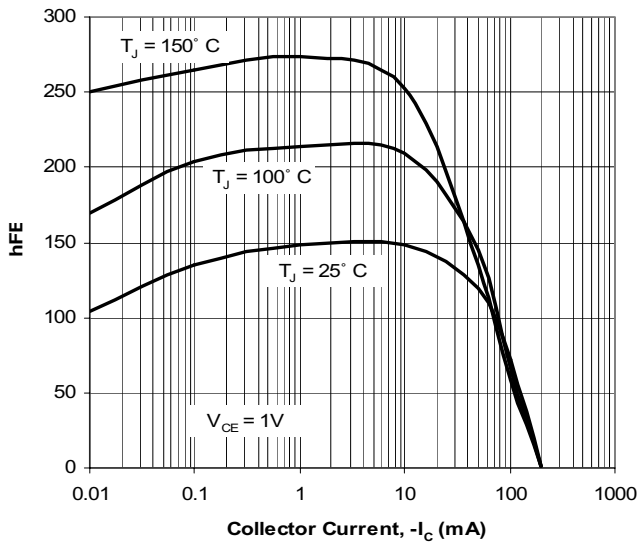


Fig. 1. Typical h_{FE} vs. Collector Current

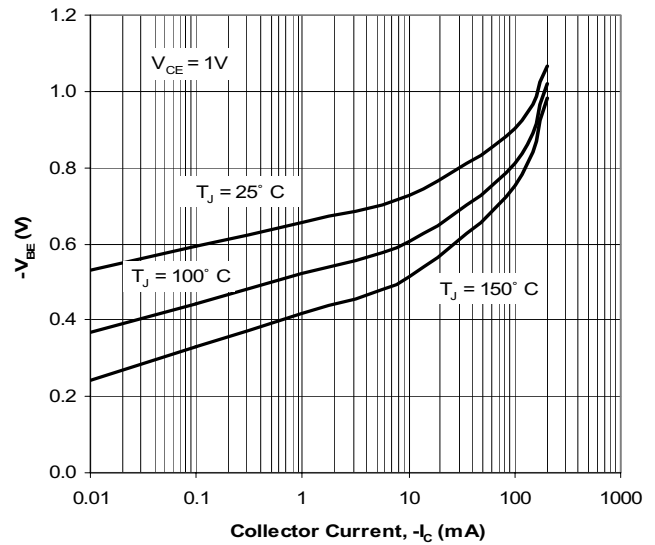


Fig. 2. Typical V_{BE} vs. Collector Current

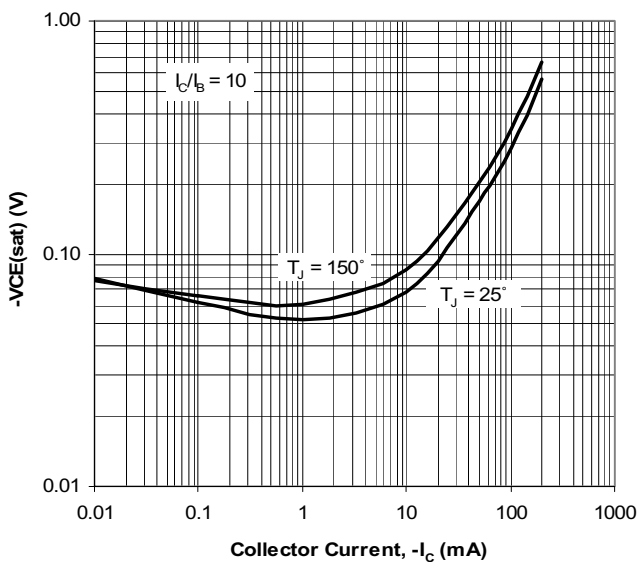


Fig. 3. Typical $V_{CE(sat)}$ vs. Collector Current

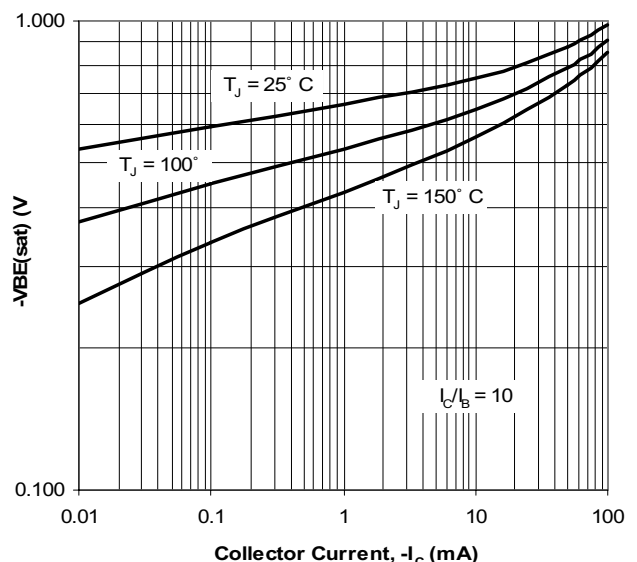


Fig. 4. Typical $V_{BE(sat)}$ vs. Collector Current

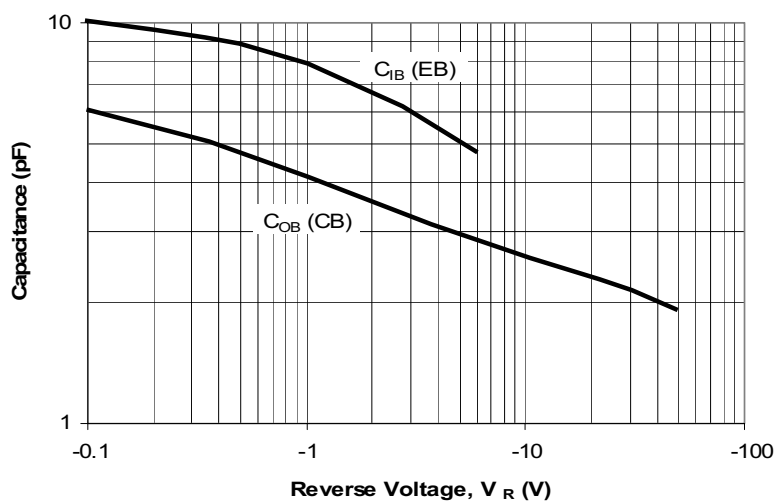


Fig. 5. Typical Capacitances vs. Reverse Voltage

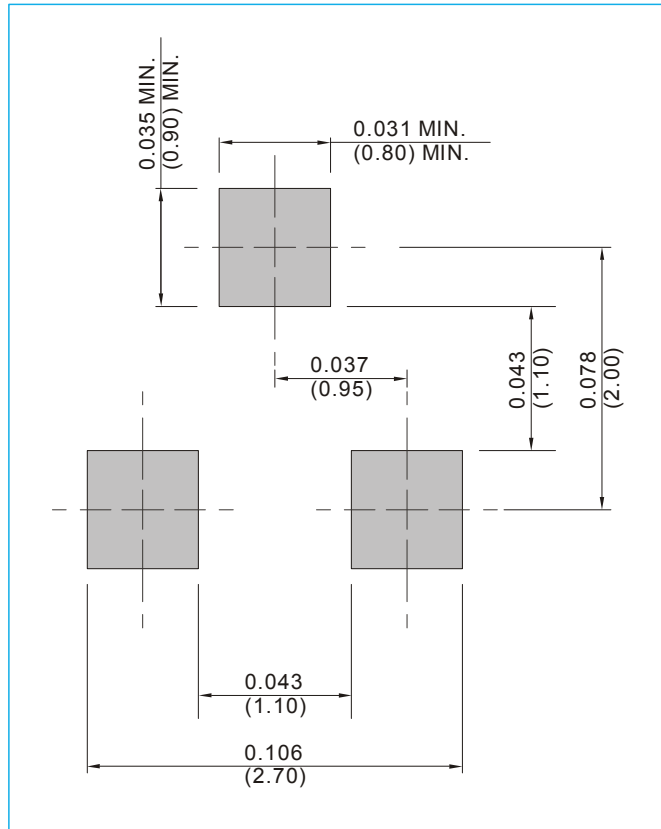


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MOUNTING PAD LAYOUT

SOT-23

Unit : inch(mm)



ORDER INFORMATION

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



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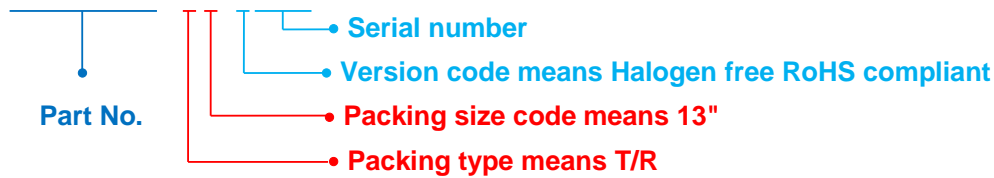
Part No. _packing code_ Version

MMBT3906_R1_00001

MMBT3906_R2_00001

For example :

RB500V-40_R2_00001



| Packing Code XX | | | | Version Code X | | Serial number XXXX |
|--------------------------------------|----------------------|----------------------------------|----------------------|-----------------------------|----------------------|---------------------------------------|
| Packing type | 1 st Code | Packing size code | 2 nd Code | HSF Level | 1 st Code | 2 nd ~5 th Code |
| Tape and Ammunition Box (T/B) | A | N/A | 0 | Halogen free RoHS compliant | 0 | serial number |
| Tape and Reel (T/R) | R | 7" | 1 | RoHS compliant | 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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