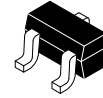


Driver Transistor

PNP Silicon

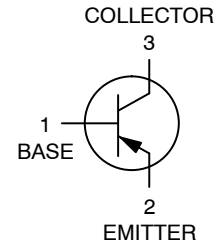
MMBTA56W, SMMBTA56W



SC-70 (SOT-323)
CASE 419
STYLE 3

Features

- Moisture Sensitivity Level: 1
- ESD Rating:
 - Human Body Model – 4 kV
 - Machine Model – 400 V
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant*



MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector – Emitter Voltage | V_{CEO} | -80 | Vdc |
| Collector – Base Voltage | V_{CBO} | -80 | Vdc |
| Emitter – Base Voltage | V_{EBO} | -4.0 | Vdc |
| Collector Current – Continuous | I_C | -500 | mAdc |

THERMAL CHARACTERISTICS

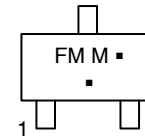
| Characteristic | Symbol | Max | Unit |
|---|-----------------|-------------|--------------------|
| Total Device Dissipation FR-5 Board $T_A = 25^\circ\text{C}$ | P_D | 460 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 272 | $^\circ\text{C/W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-4 Board, 1 oz. Cu, 100 mm².

*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MARKING DIAGRAM



FM = Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

| Device | Package | Shipping† |
|--------------|--------------------|-------------------------|
| MMBTA56WT1G | SC-70 (Pb-Free) | 3,000 / Tape & Reel |
| SMMBTA56WT1G | SC-70 (Pb-Free) | 3,000 / Tape & Reel |
| SMMBTA56WT3G | SC-70 (Pb-Free) | 10,000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MMBTA56W, SMMBTA56W

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

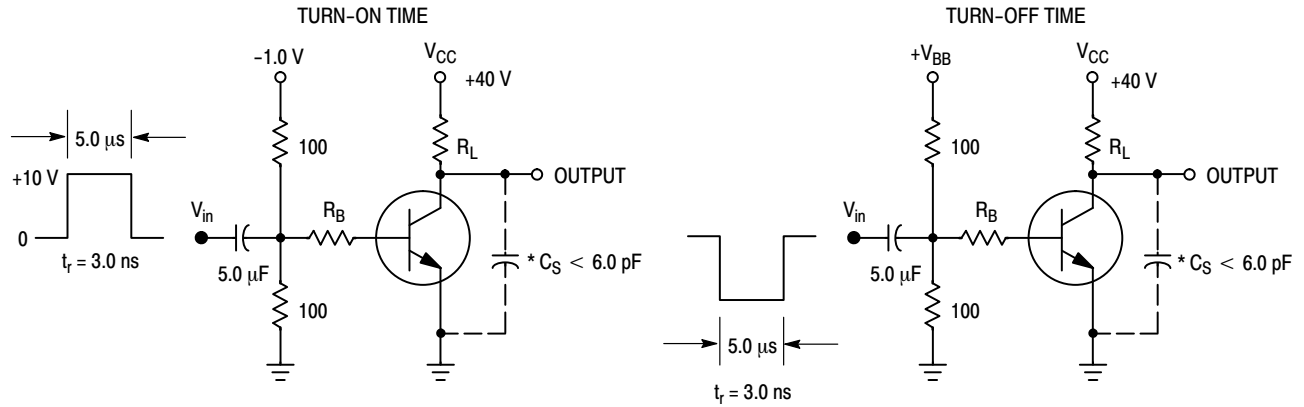
| Characteristic | Symbol | Min | Max | Unit |
|--|---------------|------|------|---------------|
| OFF CHARACTERISTICS | | | | |
| Collector - Emitter Breakdown Voltage (Note 1) ($I_C = -1.0 \text{ mA}$, $I_B = 0$) | $V_{(BR)CEO}$ | -80 | - | Vdc |
| Emitter - Base Breakdown Voltage ($I_E = -100 \mu\text{A}$, $I_C = 0$) | $V_{(BR)EBO}$ | -4.0 | - | Vdc |
| Collector Cutoff Current ($V_{CE} = -60 \text{ Vdc}$, $I_B = 0$) | I_{CES} | - | -0.1 | μA |
| Collector Cutoff Current ($V_{CB} = -60 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = -80 \text{ Vdc}$, $I_E = 0$) | I_{CBO} | - | -0.1 | μA |

| | | | | |
|--|---------------|------------|--------|-----|
| ON CHARACTERISTICS | | | | |
| DC Current Gain ($I_C = -10 \text{ mA}$, $V_{CE} = -1.0 \text{ Vdc}$) ($I_C = -100 \text{ mA}$, $V_{CE} = -1.0 \text{ Vdc}$) | h_{FE} | 100 100 | - - | - |
| Collector - Emitter Saturation Voltage ($I_C = -100 \text{ mA}$, $I_B = -10 \text{ mA}$) | $V_{CE(sat)}$ | - | -0.25 | Vdc |
| Base - Emitter On Voltage ($I_C = -100 \text{ mA}$, $V_{CE} = -1.0 \text{ Vdc}$) | $V_{BE(on)}$ | - | -1.2 | Vdc |

| | | | | |
|--|-------|----|---|-----|
| SMALL-SIGNAL CHARACTERISTICS | | | | |
| Current - Gain - Bandwidth Product (Note 2) ($I_C = -100 \text{ mA}$, $V_{CE} = -1.0 \text{ Vdc}$, $f = 100 \text{ MHz}$) | f_T | 50 | - | MHz |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.
2. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.



*Total Shunt Capacitance of Test Jig and Connectors
For PNP Test Circuits, Reverse All Voltage Polarities

Figure 1. Switching Time Test Circuits

MMBTA56W, SMMBTA56W

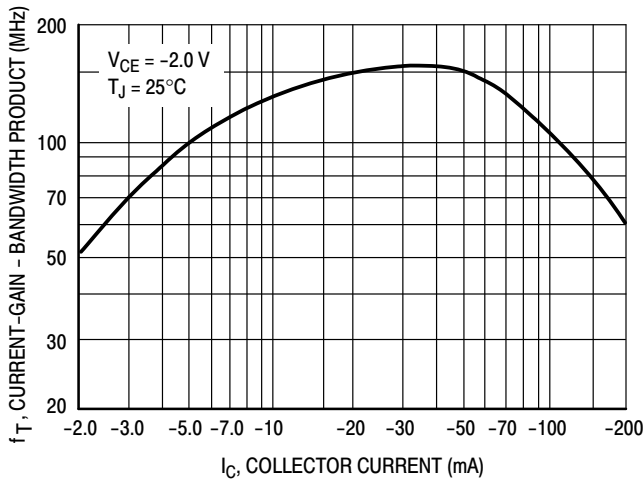


Figure 2. Current-Gain — Bandwidth Product

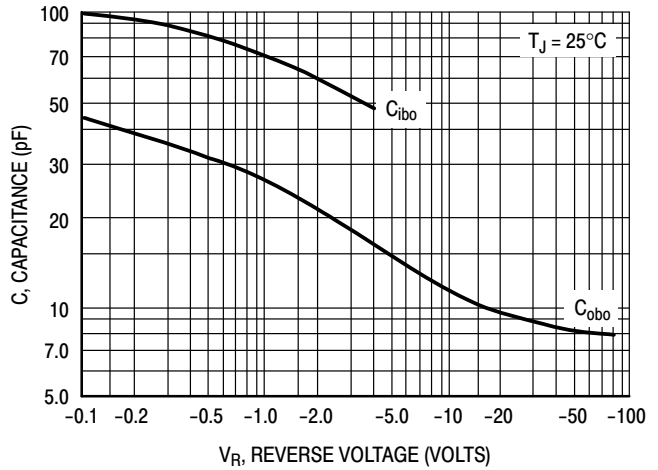


Figure 3. Capacitance

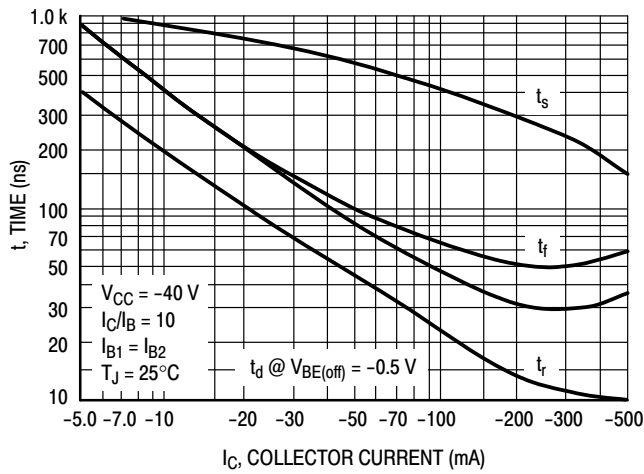


Figure 4. Switching Time

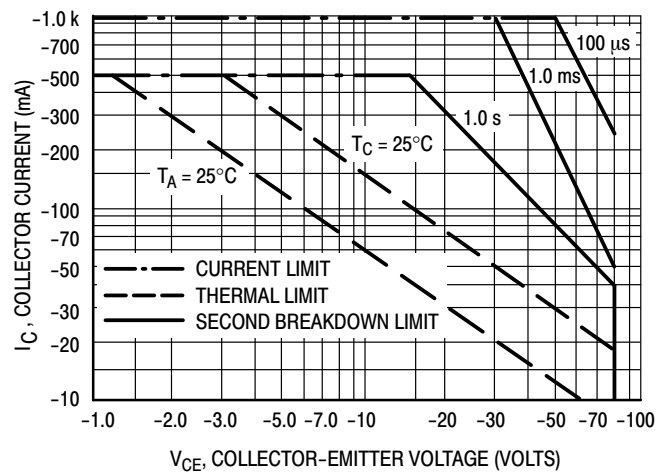


Figure 5. Active-Region Safe Operating Area

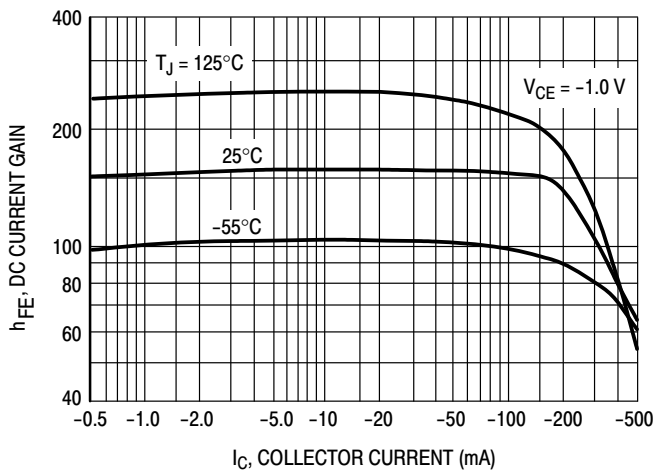


Figure 6. DC Current Gain

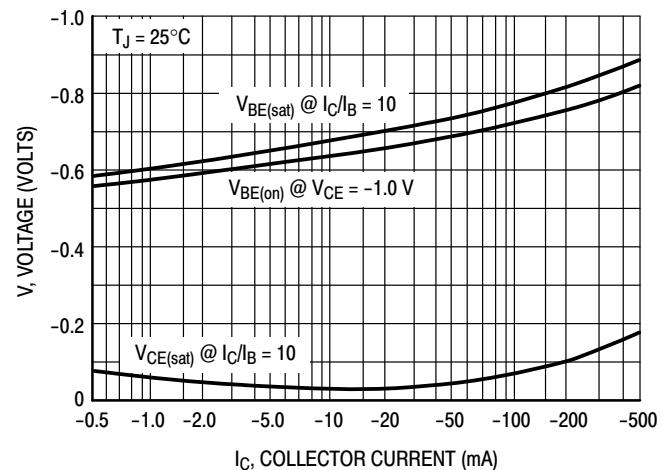


Figure 7. "ON" Voltages

MMBTA56W, SMMBTA56W

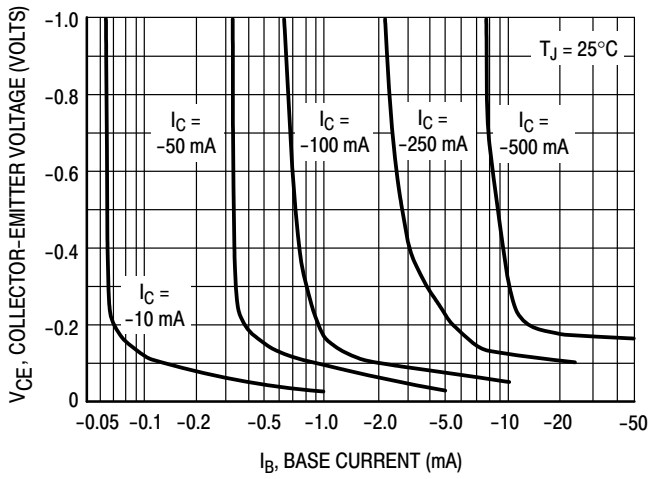


Figure 8. Collector Saturation Region

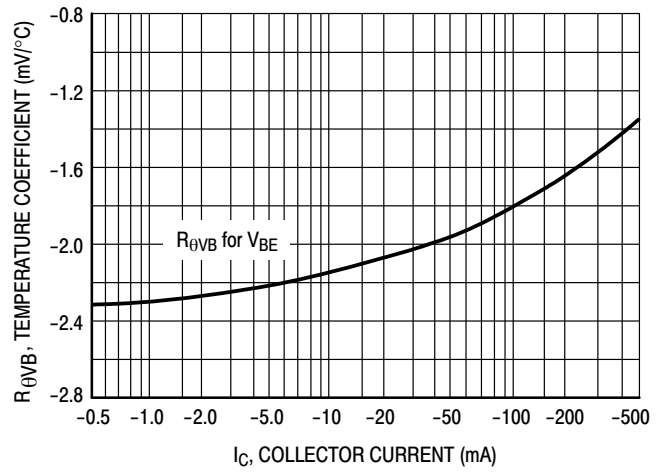
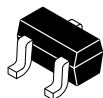


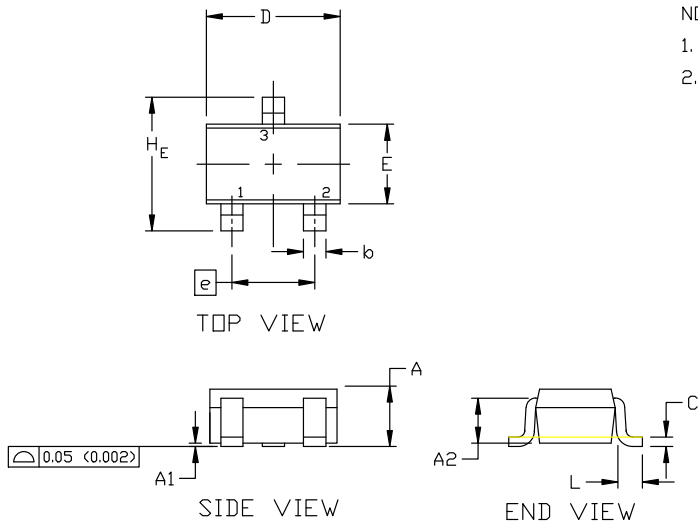
Figure 9. Base-Emitter Temperature Coefficient



SCALE 4:1

SC-70 (SOT-323)
CASE 419
ISSUE R

DATE 11 OCT 2022

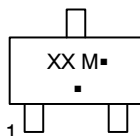


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH

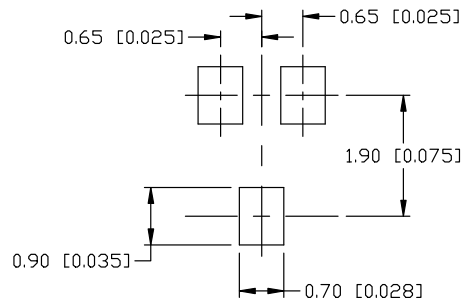
| DIM | MILLIMETERS | | | INCHES | | |
|----------------|-------------|------|------|-----------|-------|-------|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.80 | 0.90 | 1.00 | 0.032 | 0.035 | 0.040 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A2 | 0.70 REF | | | 0.028 BSC | | |
| b | 0.30 | 0.35 | 0.40 | 0.012 | 0.014 | 0.016 |
| c | 0.10 | 0.18 | 0.25 | 0.004 | 0.007 | 0.010 |
| D | 1.80 | 2.00 | 2.20 | 0.071 | 0.080 | 0.087 |
| E | 1.15 | 1.24 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e1 | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.20 | 0.38 | 0.56 | 0.008 | 0.015 | 0.022 |
| H _E | 2.00 | 2.10 | 2.40 | 0.079 | 0.083 | 0.095 |

GENERIC
MARKING DIAGRAM



- XX = Specific Device Code
- M = Date Code
- = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



* For additional information on our Pb-Free strategy and soldering details, please download the DN Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

SOLDERING FOOTPRINT

- | | | | | | |
|---|---|---|--|---|---|
| STYLE 1: CANCELLED | STYLE 2: PIN 1. ANODE 2. N.C. 3. CATHODE | STYLE 3: PIN 1. BASE 2. EMITTER 3. COLLECTOR | STYLE 4: PIN 1. CATHODE 2. CATHODE 3. ANODE | STYLE 5: PIN 1. ANODE 2. ANODE 3. CATHODE | |
| STYLE 6: PIN 1. EMITTER 2. BASE 3. COLLECTOR | STYLE 7: PIN 1. BASE 2. EMITTER 3. COLLECTOR | STYLE 8: PIN 1. GATE 2. SOURCE 3. DRAIN | STYLE 9: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE | STYLE 10: PIN 1. CATHODE 2. ANODE 3. ANODE-CATHODE | STYLE 11: PIN 1. CATHODE 2. CATHODE 3. CATHODE |

| | | |
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| DESCRIPTION: | SC-70 (SOT-323) | PAGE 1 OF 1 |

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