

# MSD42WT1G, NSVMSD42WT1G

## NPN High Voltage Transistors

This NPN Silicon Planar Transistor is designed for general purpose amplifier applications. This device is housed in the SC-70/SOT-323 package which is designed for low power surface mount applications.

### Features

- These Devices are Pb-Free, Halogen Free and are RoHS Compliant
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

| Rating                         | Symbol        | Value | Unit |
|--------------------------------|---------------|-------|------|
| Collector-Base Voltage         | $V_{(BR)CBO}$ | 300   | V    |
| Collector-Emitter Voltage      | $V_{(BR)CEO}$ | 300   | V    |
| Emitter-Base Voltage           | $V_{(BR)EBO}$ | 6.0   | V    |
| Collector Current – Continuous | $I_C$         | 150   | mA   |

### THERMAL CHARACTERISTICS

| Rating   | Symbol          | Max         | Unit               |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 1)                       | $P_D$           | 450         | mW                 |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 274         | $^\circ\text{C/W}$ |
| Junction and Storage Temperature Range           | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$   |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### ELECTRICAL CHARACTERISTICS

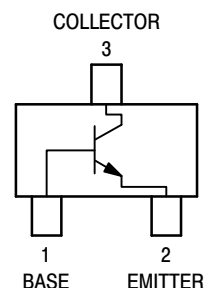
| Characteristic  | Symbol                 | Min      | Max    | Unit          |
|---|------------------------|----------|--------|---------------|
| Collector-Emitter Breakdown Voltage<br>( $I_C = 1.0\text{ mA}, I_B = 0$ )   | $V_{(BR)CEO}$          | 300      | -      | V             |
| Collector-Base Breakdown Voltage<br>( $I_C = 100\ \mu\text{A}, I_E = 0$ )   | $V_{(BR)CBO}$          | 300      | -      | V             |
| Emitter-Base Breakdown Voltage<br>( $I_E = 100\ \mu\text{A}, I_C = 0$ )   | $V_{(BR)EBO}$          | 6.0      | -      | V             |
| Collector-Base Cutoff Current<br>( $V_{CB} = 200\text{ V}, I_E = 0$ )   | $I_{CBO}$              | -        | 0.1    | $\mu\text{A}$ |
| Emitter-Base Cutoff Current<br>( $V_{EB} = 6.0\text{ V}, I_B = 0$ )   | $I_{EBO}$              | -        | 0.1    | $\mu\text{A}$ |
| DC Current Gain (Note 2)<br>( $V_{CE} = 10\text{ V}, I_C = 1.0\text{ mA}$ )<br>( $V_{CE} = 10\text{ V}, I_C = 30\text{ mA}$ ) | $h_{FE1}$<br>$h_{FE2}$ | 25<br>40 | -<br>- | -             |
| Collector-Emitter Saturation Voltage<br>(Note 2) ( $I_C = 20\text{ mA}, I_B = 2.0\text{ mA}$ )                                | $V_{CE(sat)}$          | -        | 0.5    | V             |

1. FR-4 @ 10 mm<sup>2</sup>, 1 oz. Copper traces.
2. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , D.C.  $\leq 2\%$ .



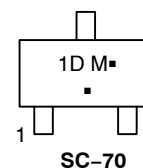
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SC-70 (SOT-323)  
CASE 419  
STYLE 3

### MARKING DIAGRAM



1D = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

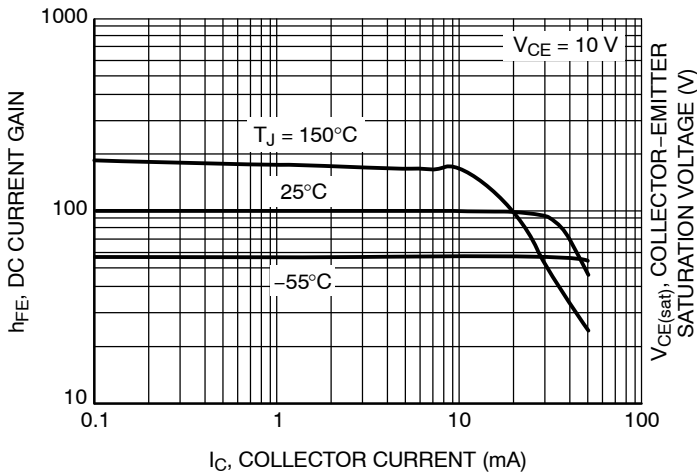
### ORDERING INFORMATION

| Device       | Package            | Shipping <sup>†</sup> |
|--------------|--------------------|-----------------------|
| MSD42WT1G    | SC-70<br>(Pb-Free) | 3000 / Tape & Reel    |
| NSVMSD42WT1G | SC-70<br>(Pb-Free) | 3000 / Tape & Reel    |

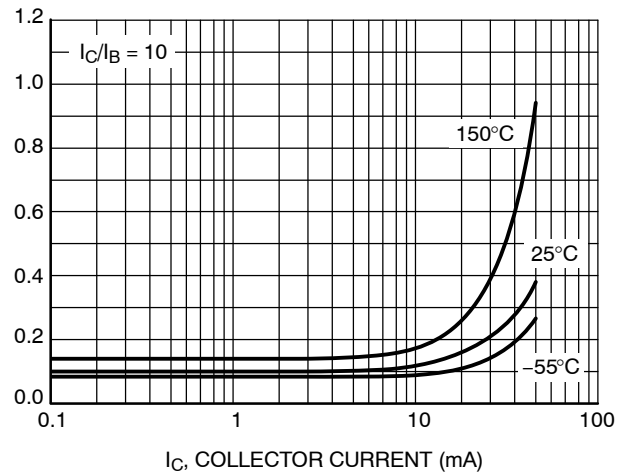
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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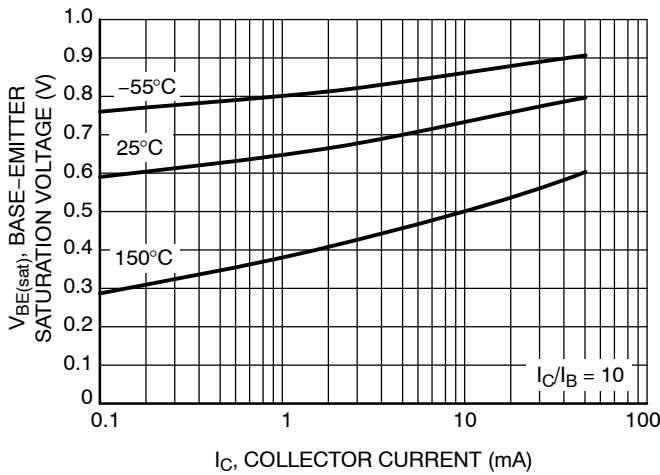
## TYPICAL CHARACTERISTICS



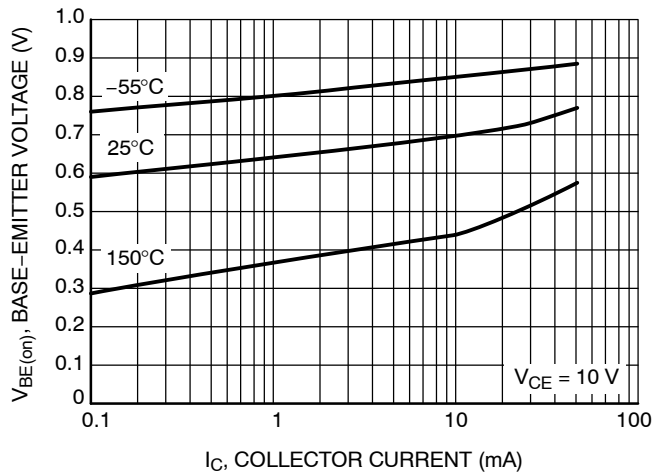
**Figure 1. DC Current Gain**



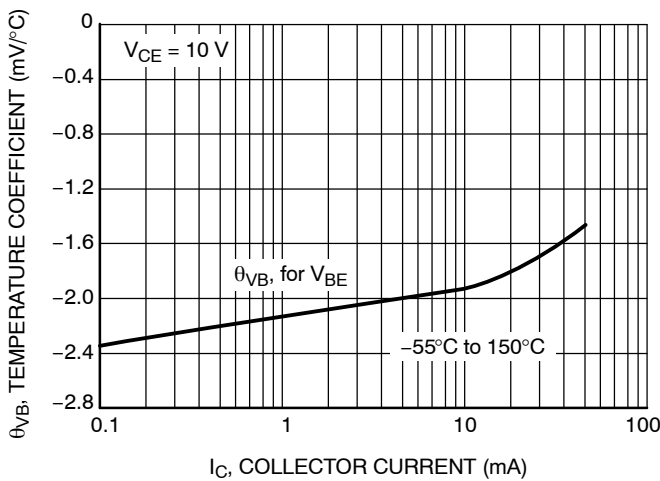
**Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current**



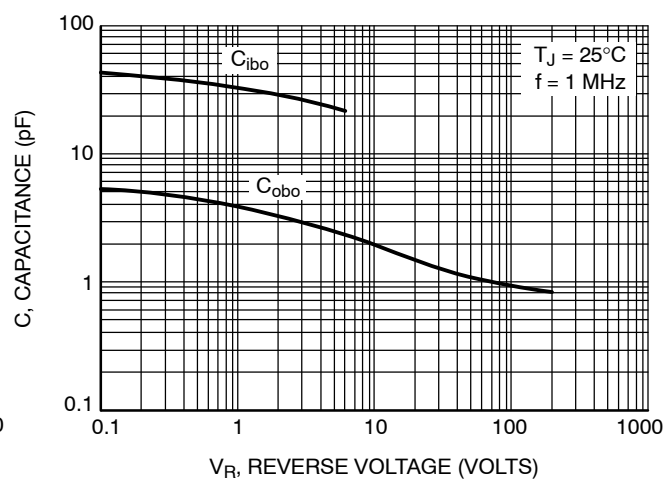
**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**



**Figure 4. Base-Emitter On Voltage vs. Collector Current**



**Figure 5. Base-Emitter Temperature Coefficient**



**Figure 6. Capacitance**

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## TYPICAL CHARACTERISTICS

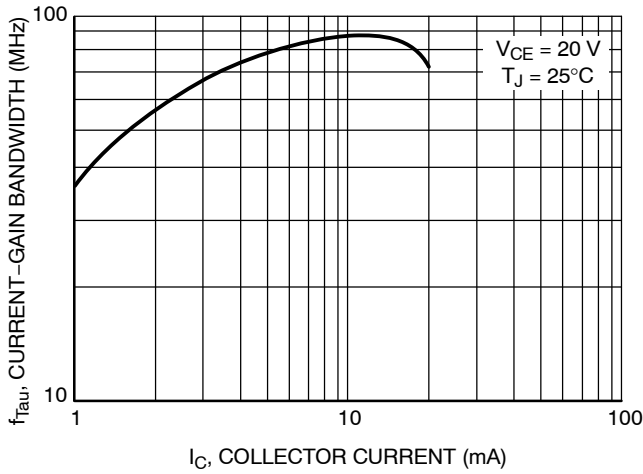


Figure 7. Current-Gain — Bandwidth Product

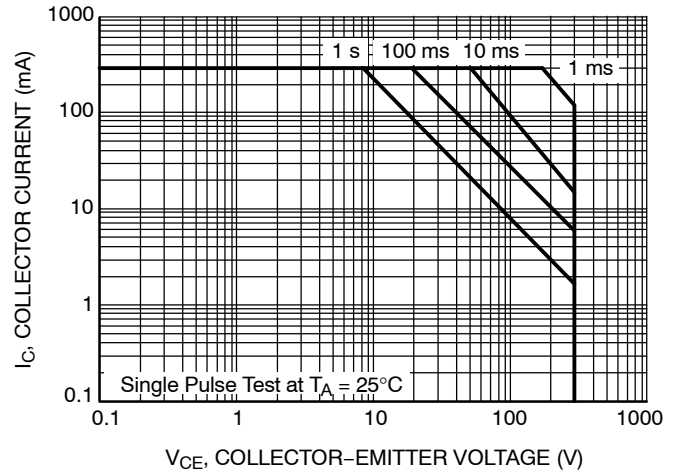


Figure 8. Safe Operating Area

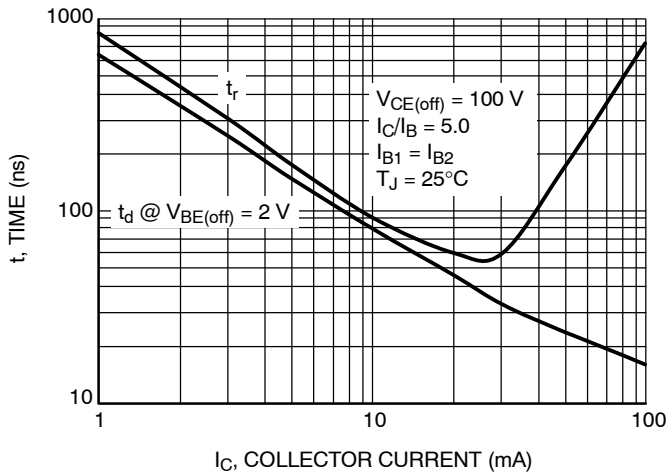


Figure 9. Turn-On Time

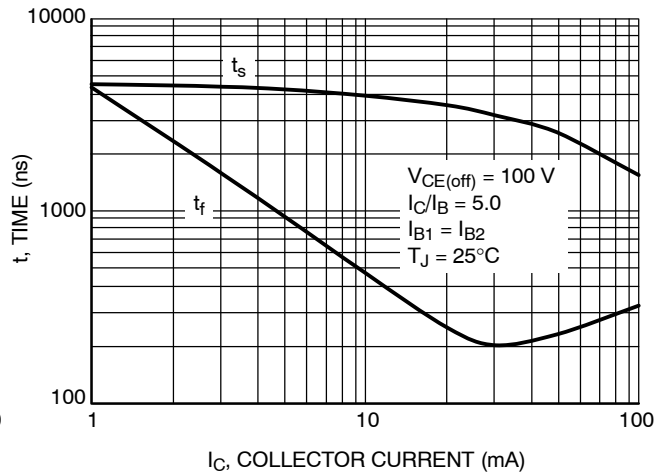
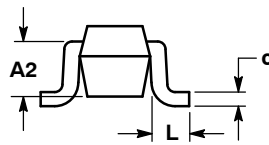
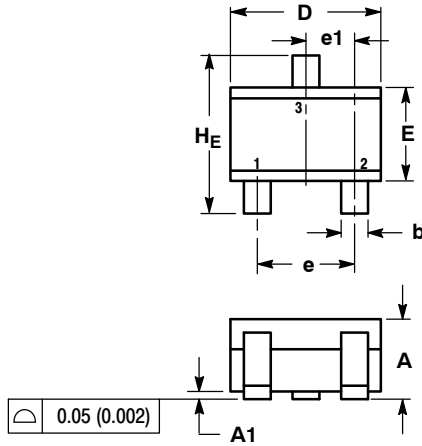


Figure 10. Turn-Off Time

# MSD42WT1G, NSVMSD42WT1G

## PACKAGE DIMENSIONS

SC-70 (SOT-323)  
CASE 419-04  
ISSUE N



NOTES:

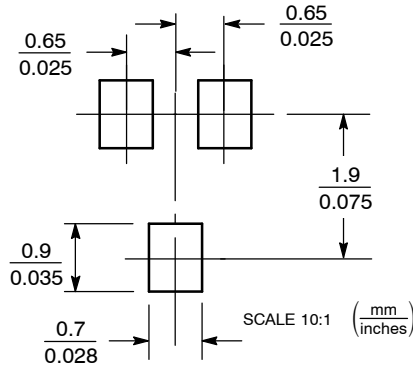
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| 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 REF |       |       |
| 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        | 2.10 | 2.20 | 0.071     | 0.083 | 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 |
| HE  | 2.00        | 2.10 | 2.40 | 0.079     | 0.083 | 0.095 |

STYLE 3:

1. BASE
2. EMITTER
3. COLLECTOR

### SOLDERING FOOTPRINT\*



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

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