

# NPN Silicon General Purpose High Voltage Transistors

## MSD42T1G

This NPN Silicon Planar Transistor is designed for general purpose amplifier applications. This device is housed in the SC-59 package which is designed for low power surface mount applications.

### Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

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

### THERMAL CHARACTERISTICS

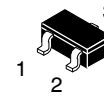
| Symbol          | Rating                                  | Max         | Unit               |
|-----------------|-----------------------------------------|-------------|--------------------|
| $P_D$           | Power Dissipation (Note 1)              | 450         | mW                 |
| $R_{\theta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

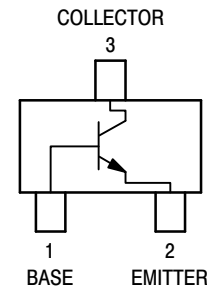
### ELECTRICAL CHARACTERISTICS

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

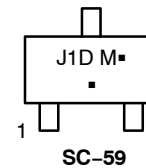
- FR-4 @ 10 mm<sup>2</sup>, 1 oz. Copper traces.
- Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , D.C.  $\leq 2\%$ .



SC-59  
CASE 318D  
STYLE 1



### MARKING DIAGRAM



J1D = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device   | Package            | Shipping†           |
|----------|--------------------|---------------------|
| MSD42T1G | SC-59<br>(Pb-Free) | 3,000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

TYPICAL CHARACTERISTICS

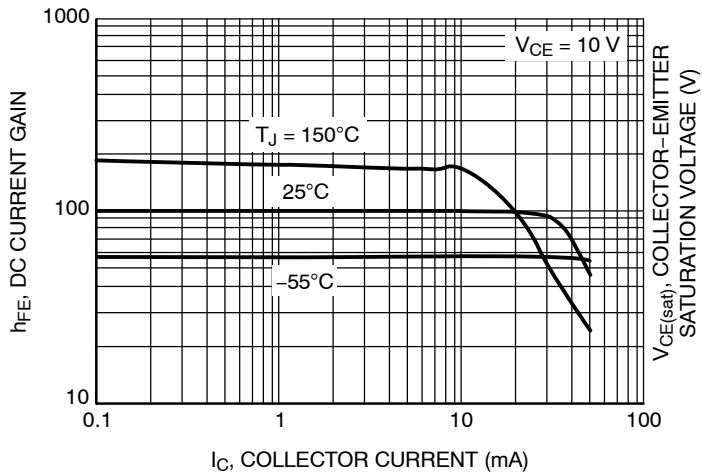


Figure 1. DC Current Gain

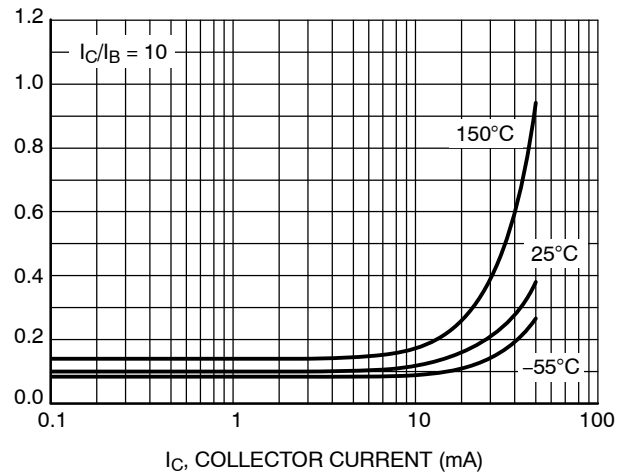


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

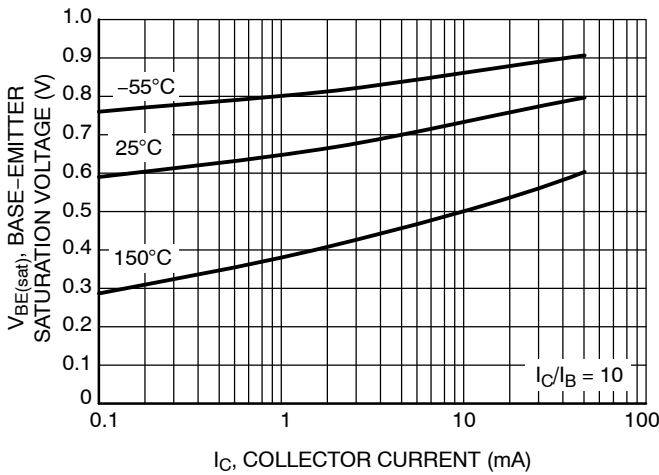


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

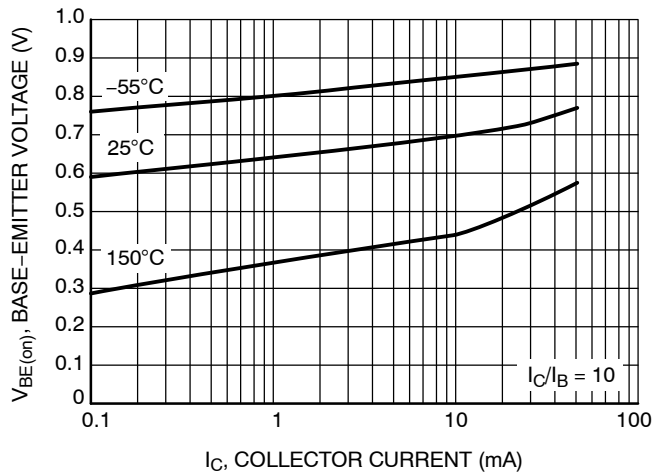


Figure 4. Base-Emitter On Voltage vs. Collector Current

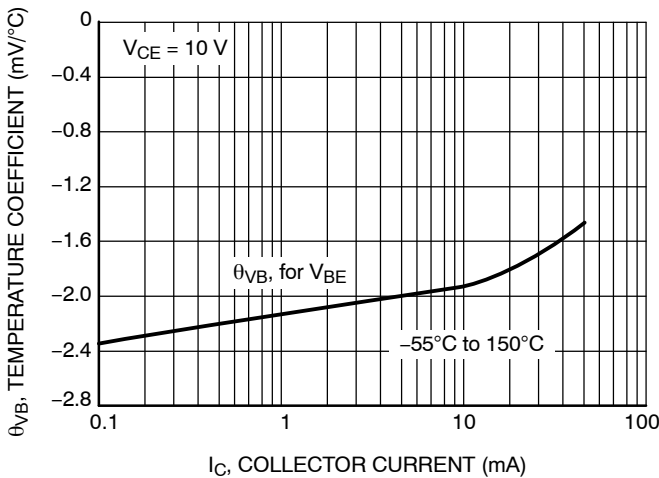


Figure 5. Base-Emitter Temperature Coefficient

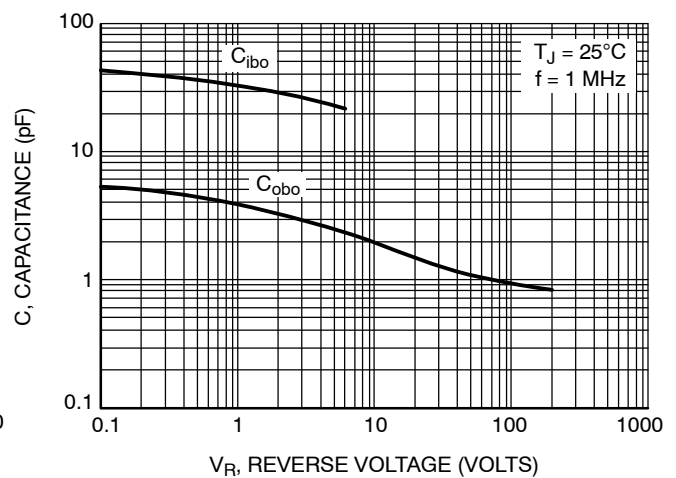


Figure 6. Capacitance

# MSD42T1G

## TYPICAL CHARACTERISTICS (continued)

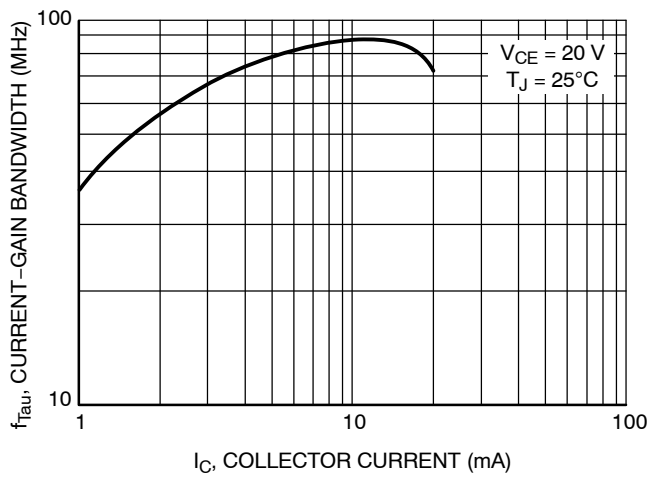


Figure 7. Current-Gain — Bandwidth Product

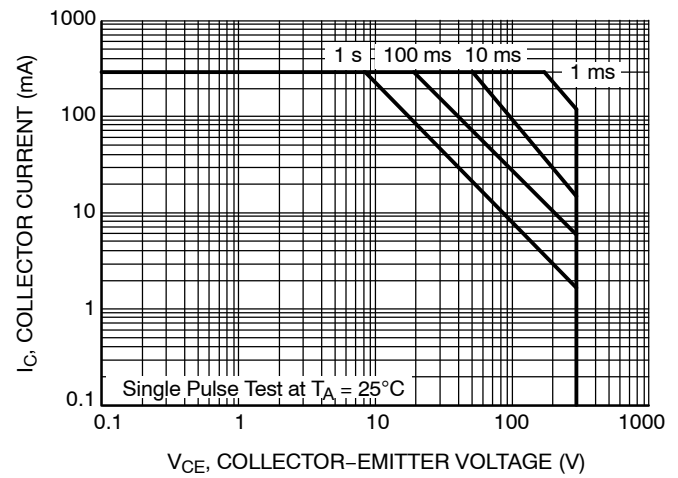
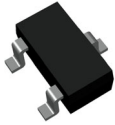
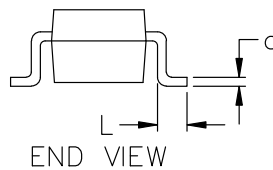
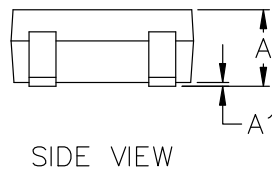
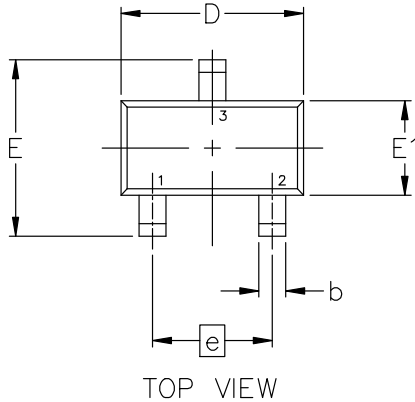


Figure 8. Safe Operating Area


**SC-59-3 2.90x1.50x1.15, 1.90P**  
**CASE 318D**  
**ISSUE J**

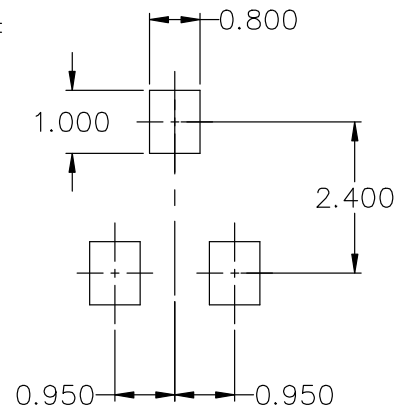
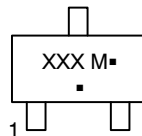
DATE 15 FEB 2024



## NOTES:

- DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
- ALL DIMENSIONS ARE IN MILLIMETERS.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 1.00        | 1.15 | 1.30 |
| A1  | 0.01        | 0.06 | 0.10 |
| b   | 0.35        | 0.43 | 0.50 |
| c   | 0.09        | 0.14 | 0.18 |
| D   | 2.70        | 2.90 | 3.10 |
| E   | 2.50        | 2.80 | 3.00 |
| E1  | 1.30        | 1.50 | 1.70 |
| e   | 1.90 BSC    |      |      |
| L   | 0.20        | 0.40 | 0.60 |


**GENERIC MARKING DIAGRAM\***


XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package\*

(\*Note: Microdot may be in either location)

\*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 ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

STYLE 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

STYLE 2:  
PIN 1. ANODE  
2. N.C.  
3. CATHODE

STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

STYLE 4:  
PIN 1. CATHODE  
2. N.C.  
3. ANODE

STYLE 5:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE

STYLE 6:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE/CATHODE

|                         |                                      |                                                                                                                                                                                  |
|-------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| <b>DESCRIPTION:</b>     | <b>SC-59-3 2.90x1.50x1.15, 1.90P</b> | <b>PAGE 1 OF 1</b>                                                                                                                                                               |

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