

# 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

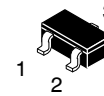
Symbol	Rating	Max	Unit
$P_D$	Power Dissipation (Note 1)	450	mW
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	274	$^\circ\text{C}/\text{W}$
$T_J, T_{stg}$	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

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.

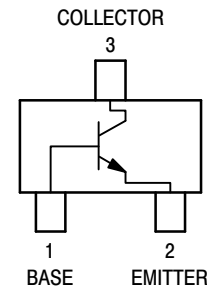
### ELECTRICAL CHARACTERISTICS

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

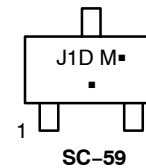
- FR-4 @ 10 mm<sup>2</sup>, 1 oz. Copper traces.
- Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , D.C.  $\leq 2\%$ .



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 <sup>†</sup>
MSD42T1G	SC-59 (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 Specification Brochure, [BRD8011/D](http://BRD8011/D).

TYPICAL CHARACTERISTICS

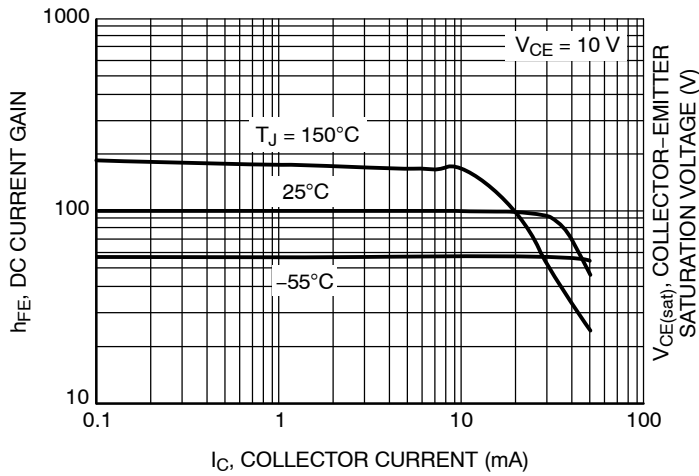


Figure 1. DC Current Gain

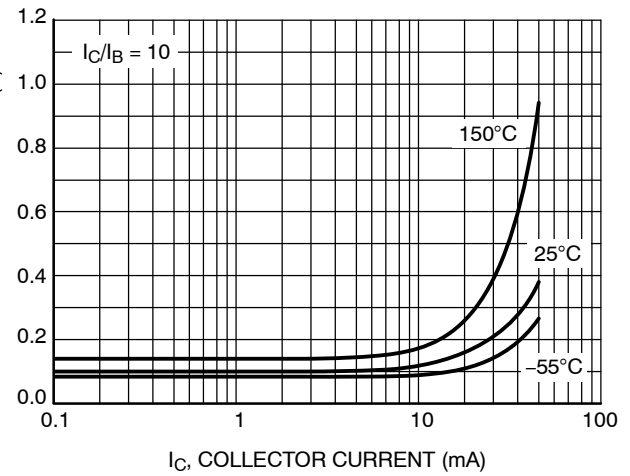


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

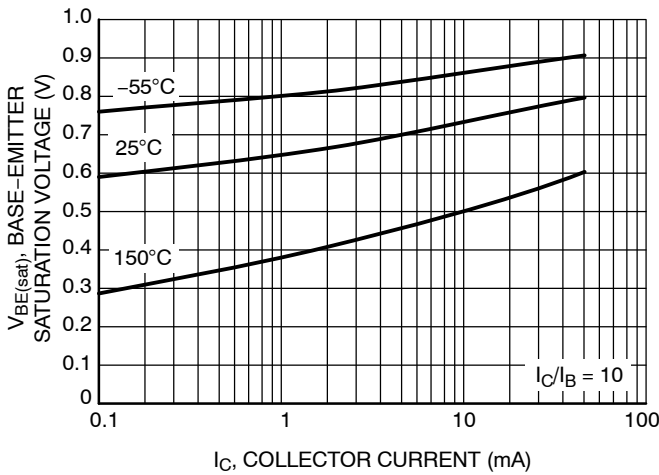


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

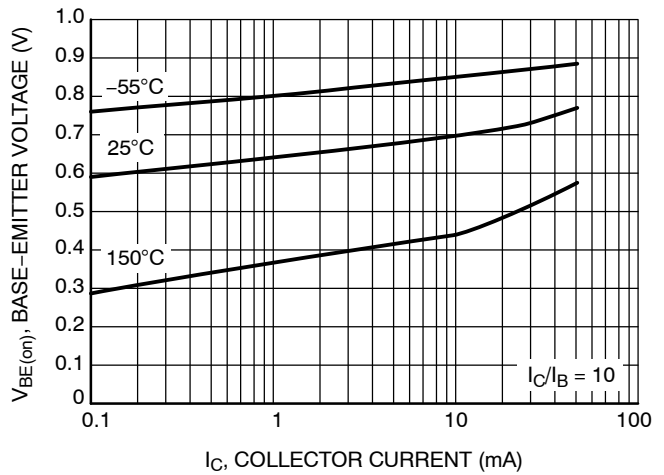


Figure 4. Base-Emitter On Voltage vs. Collector Current

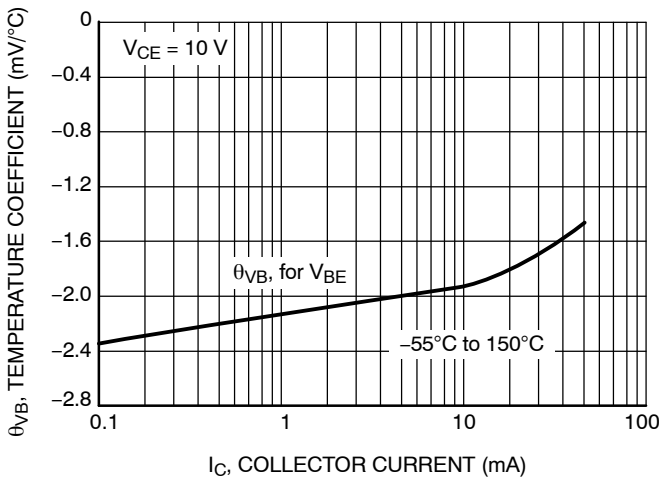


Figure 5. Base-Emitter Temperature Coefficient

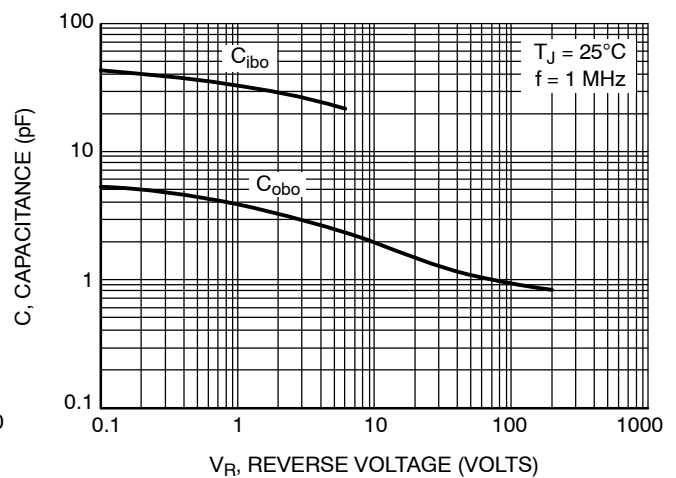


Figure 6. Capacitance

MSD42T1G

TYPICAL CHARACTERISTICS (continued)

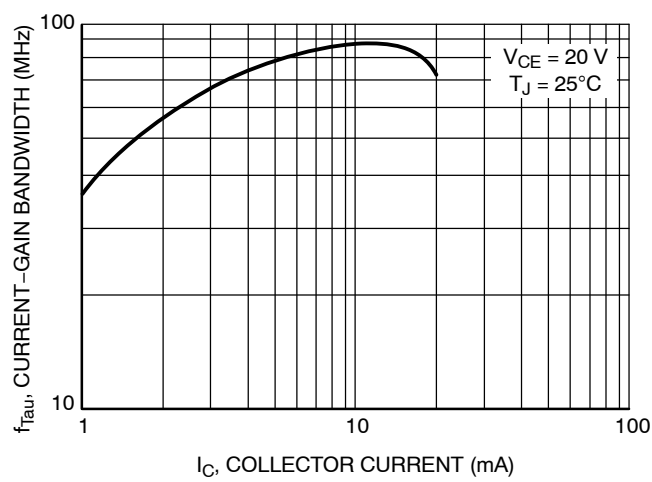


Figure 7. Current-Gain — Bandwidth Product

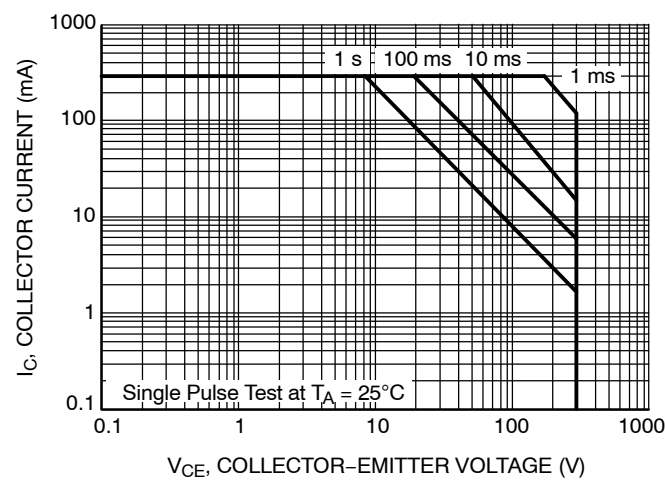


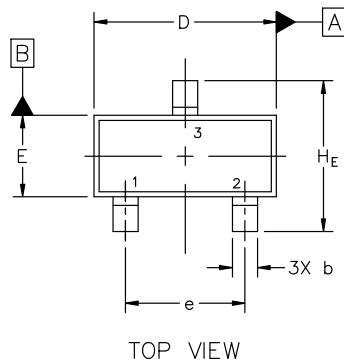
Figure 8. Safe Operating Area



SCALE 4:1

SOT-23 (TO-236) 2.90x1.30x1.00 1.90P  
CASE 318  
ISSUE AU

DATE 14 AUG 2024



MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
HE	2.10	2.40	2.64
T	0°	---	10°

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC  
MARKING DIAGRAM\*



XXX = 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.



RECOMMENDED  
MOUNTING FOOTPRINT

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

STYLES ON PAGE 2

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**SOT-23 (TO-236) 2.90x1.30x1.00 1.90P**  
**CASE 318**  
**ISSUE AU**

DATE 14 AUG 2024

STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 10: PIN 1. DRAIN 2. SOURCE 3. GATE	STYLE 11: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE	STYLE 12: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 13: PIN 1. SOURCE 2. DRAIN 3. GATE	STYLE 14: PIN 1. CATHODE 2. GATE 3. ANODE
STYLE 15: PIN 1. GATE 2. CATHODE 3. ANODE	STYLE 16: PIN 1. ANODE 2. CATHODE 3. CATHODE	STYLE 17: PIN 1. NO CONNECTION 2. ANODE 3. CATHODE	STYLE 18: PIN 1. NO CONNECTION 2. CATHODE 3. ANODE	STYLE 19: PIN 1. CATHODE 2. ANODE 3. CATHODE-ANODE	STYLE 20: PIN 1. CATHODE 2. ANODE 3. GATE
STYLE 21: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 22: PIN 1. RETURN 2. OUTPUT 3. INPUT	STYLE 23: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 24: PIN 1. GATE 2. DRAIN 3. SOURCE	STYLE 25: PIN 1. ANODE 2. CATHODE 3. GATE	STYLE 26: PIN 1. CATHODE 2. ANODE 3. NO CONNECTION
STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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