

# MSD602-RT1G

## General Purpose NPN Amplifier Transistor

### Features

- 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 ( $T_A = 25^\circ\text{C}$ )

Rating	Symbol	Value	Unit
Collector-Base Voltage	$V_{(BR)CBO}$	60	Vdc
Collector-Emitter Voltage	$V_{(BR)CEO}$	50	Vdc
Emitter-Base Voltage	$V_{(BR)EBO}$	7.0	Vdc
Collector Current – Continuous	$I_C$	500	mAdc
Collector Current – Peak	$I_{C(P)}$	1.0	Adc

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Power Dissipation	$P_D$	200	mW
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 ~ +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.

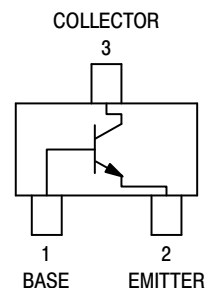


ON Semiconductor®

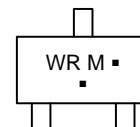
<http://onsemi.com>



SC-59  
CASE 318D  
STYLE 1



### MARKING DIAGRAM



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

### ORDERING INFORMATION

Device	Package	Shipping†
MSD-602RT1G	SC-59 (Pb-Free)	3,000 / Tape & Reel
SMSD-602RT1G	SC-59 (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 Specifications Brochure, BRD8011/D.

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

# MSD602-RT1G

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

Characteristic	Symbol	Min	Max	Unit
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	50	-	V
Collector-Base Breakdown Voltage (I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	60	-	V
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 10 μA, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	7.0	-	V
Collector-Base Cutoff Current (V <sub>CB</sub> = 20 V, I <sub>E</sub> = 0)	I <sub>CBO</sub>	-	0.1	μA
DC Current Gain (Note 1) (V <sub>CE</sub> = 10 V, I <sub>C</sub> = 150 mA) (V <sub>CE</sub> = 10 V, I <sub>C</sub> = 500 mA)	h <sub>FE1</sub> h <sub>FE2</sub>	120 40	240 -	-
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 300 mA, I <sub>B</sub> = 30 mA)	V <sub>CE(sat)</sub>	-	0.6	V
Base-Emitter On Voltage (I <sub>C</sub> = 300 mA, V <sub>CE</sub> = 5 V)	V <sub>BE(on)</sub>	-	1.0	V
Base-Emitter Saturation Voltage (I <sub>C</sub> = 300 mA, I <sub>B</sub> = 30 mA)	V <sub>BE(sat)</sub>	-	1.0	V
Output Capacitance (V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	-	15	pF

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 ≤ 300 μs, D.C. ≤ 2%.

TYPICAL CHARACTERISTICS

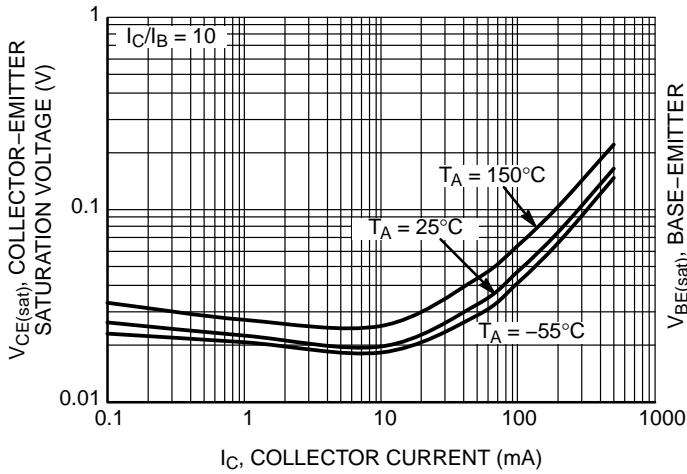


Figure 1. Collector-Emitter Saturation Voltage vs. Collector Current

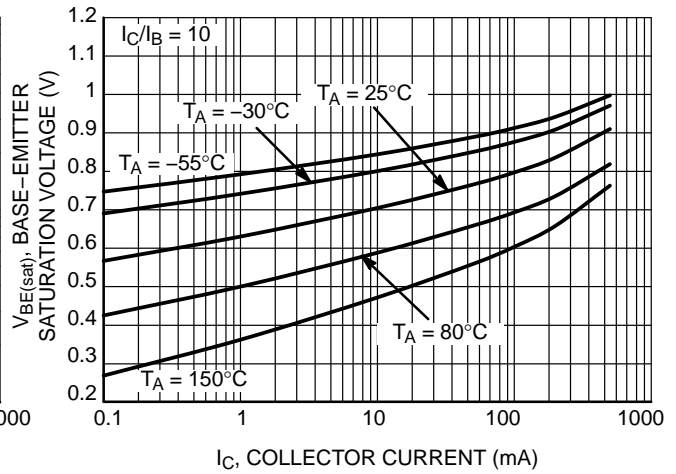


Figure 2. Base-Emitter Saturation Voltage vs. Collector Current

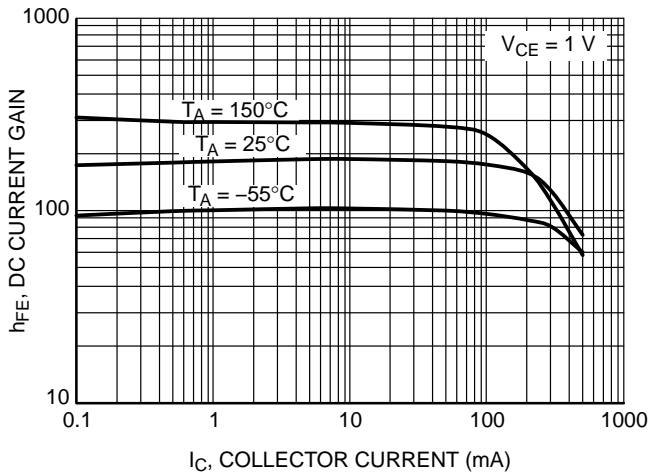


Figure 3. DC Current Gain vs. Collector Current

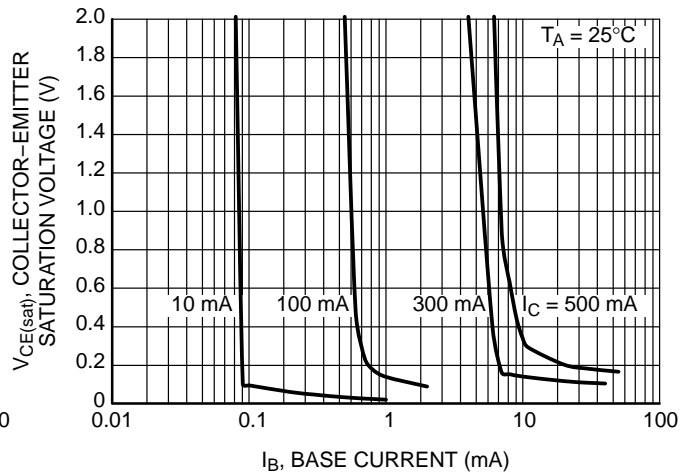


Figure 4. Saturation Region

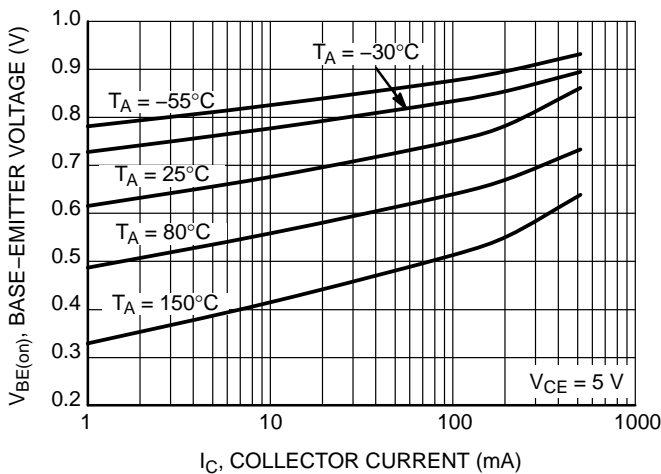


Figure 5. Base-Emitter Turn-On Voltage vs. Collector Current

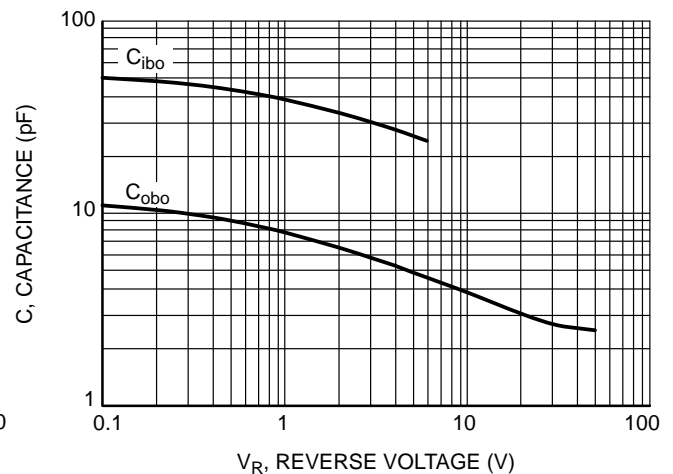
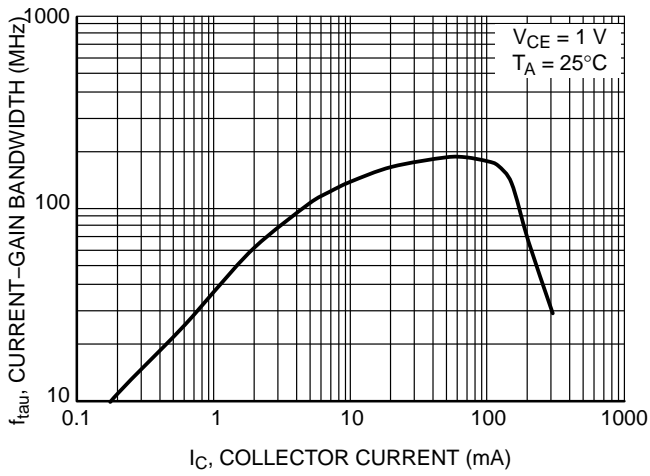


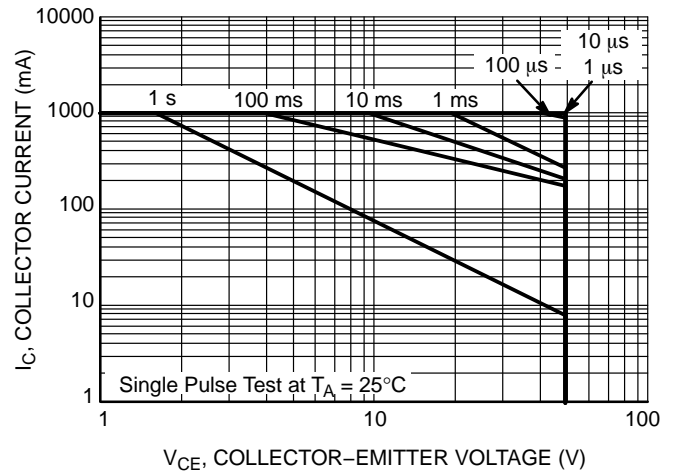
Figure 6. Capacitance

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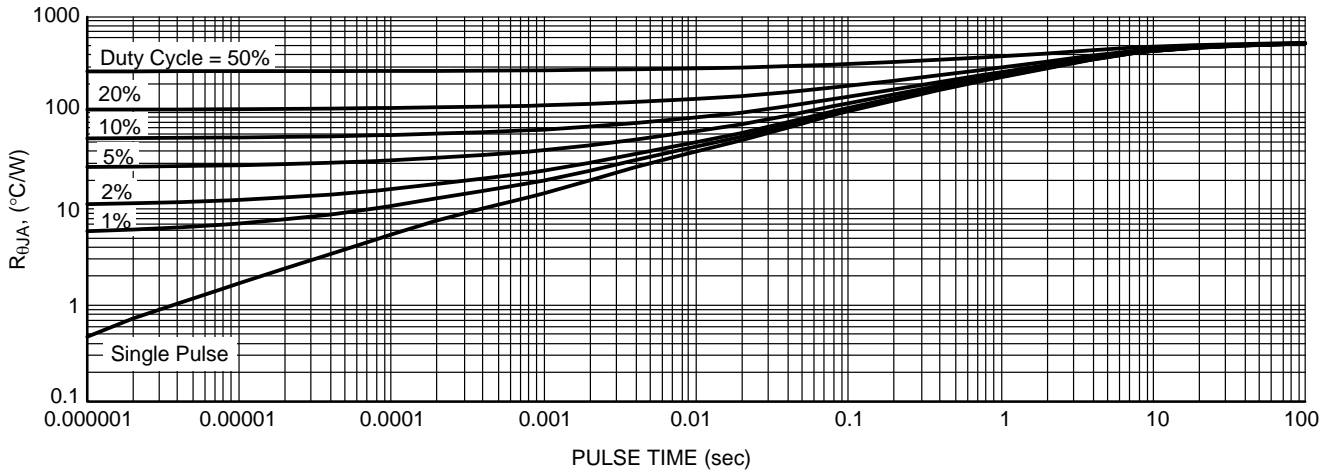
## TYPICAL CHARACTERISTICS



**Figure 7. Current Gain Bandwidth Product vs. Collector Current**



**Figure 8. Safe Operating Area**



**Figure 9. Thermal Response**

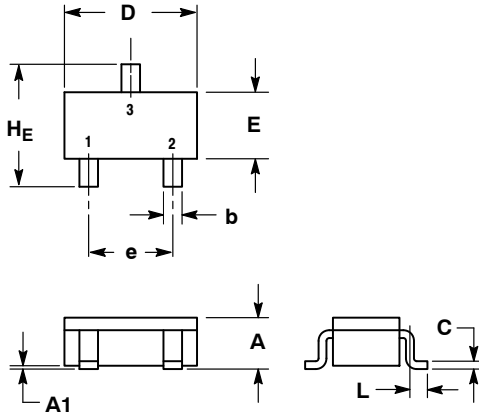
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



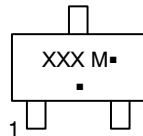
SCALE 2:1

SC-59  
CASE 318D-04  
ISSUE H

DATE 28 JUN 2012



### GENERIC MARKING DIAGRAM\*



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

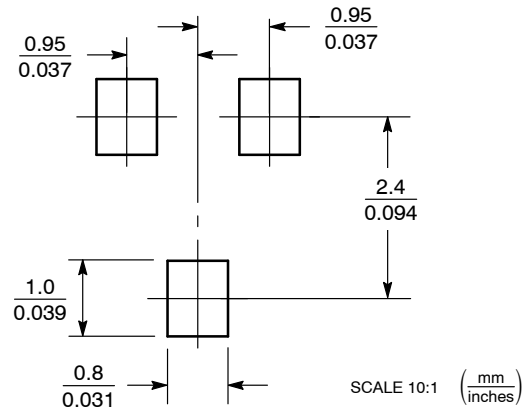
(\*Note: Microdot may be in either location)

\*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.

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

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.00	1.15	1.30	0.039	0.045	0.051
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.35	0.43	0.50	0.014	0.017	0.020
c	0.09	0.14	0.18	0.003	0.005	0.007
D	2.70	2.90	3.10	0.106	0.114	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	1.70	1.90	2.10	0.067	0.075	0.083
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.80	3.00	0.099	0.110	0.118

### RECOMMENDED SOLDERING FOOTPRINT\*



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

- |   |  |  |
|---|--|--|
| <p>STYLE 1:<br/>PIN 1. BASE<br/>2. EMITTER<br/>3. COLLECTOR</p> | <p>STYLE 2:<br/>PIN 1. ANODE<br/>2. N.C.<br/>3. CATHODE</p>    | <p>STYLE 3:<br/>PIN 1. ANODE<br/>2. ANODE<br/>3. CATHODE</p>         |
| <p>STYLE 4:<br/>PIN 1. CATHODE<br/>2. N.C.<br/>3. ANODE</p>     | <p>STYLE 5:<br/>PIN 1. CATHODE<br/>2. CATHODE<br/>3. ANODE</p> | <p>STYLE 6:<br/>PIN 1. ANODE<br/>2. CATHODE<br/>3. ANODE/CATHODE</p> |

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DESCRIPTION:	SC-59	PAGE 1 OF 1

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