

2SC5658M3T5G, 2SC5658RM3T5G

NPN Silicon General Purpose Amplifier Transistor

This NPN transistor is designed for general purpose amplifier applications. This device is housed in the SOT-723 package which is designed for low power surface mount applications, where board space is at a premium.

Features

- Reduces Board Space
- High h_{FE} , 210–460 (typical)
- Low $V_{CE(sat)}$, < 0.5 V
- ESD Performance: Human Body Model; > 2000 V, Machine Model; > 200 V
- Available in 8 mm, 7-inch/3000 Unit Tape and Reel
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free Devices

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

| Rating | Symbol | Value | Unit |
|--------------------------------|---------------|-------|------|
| Collector-Base Voltage | $V_{(BR)CBO}$ | 50 | Vdc |
| Collector-Emitter Voltage | $V_{(BR)CEO}$ | 50 | Vdc |
| Emitter-Base Voltage | $V_{(BR)EBO}$ | 7.0 | Vdc |
| Collector Current – Continuous | I_C | 150 | mAdc |

THERMAL CHARACTERISTICS

| Rating | Symbol | Max | Unit |
|----------------------------|-----------|------------|------------------|
| Power Dissipation (Note 1) | P_D | 260 | mW |
| Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | 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.

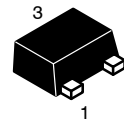
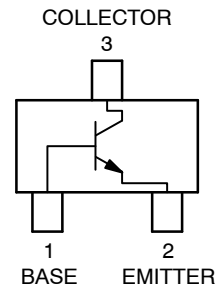
1. Device mounted on a FR-4 glass epoxy printed circuit board using the minimum recommended footprint.



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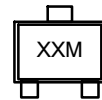
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NPN GENERAL PURPOSE AMPLIFIER TRANSISTORS SURFACE MOUNT



SOT-723
CASE 631AA

MARKING DIAGRAM



XX = Specific Device Code
(B9 = 2SC5658M3T5G
RM = 2SC5658RM3T5G)
M = Date Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------------|----------------------|--------------------|
| 2SC5658M3T5G | SOT-723 (Pb-Free) | 8000 / Tape & Reel |
| 2SC5658RM3T5G | SOT-723 (Pb-Free) | 8000 / Tape & Reel |
| NSV2SC5658M3T5G | SOT-723 (Pb-Free) | 8000 / 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.

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|---------------|------------|--------|------------|---------------|
| Collector-Base Breakdown Voltage ($I_C = 50 \mu\text{Adc}$, $I_E = 0$) | $V_{(BR)CBO}$ | 50 | – | – | Vdc |
| Collector-Emitter Breakdown Voltage ($I_C = 1.0 \text{ mAdc}$, $I_B = 0$) | $V_{(BR)CEO}$ | 50 | – | – | Vdc |
| Emitter-Base Breakdown Voltage ($I_E = 50 \mu\text{Adc}$, $I_C = 0$) | $V_{(BR)EBO}$ | 7.0 | – | – | Vdc |
| Collector-Base Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$) | I_{CBO} | – | – | 0.5 | μA |
| Emitter-Base Cutoff Current ($V_{EB} = 4.0 \text{ Vdc}$, $I_B = 0$) | I_{EBO} | – | – | 0.5 | μA |
| Collector-Emitter Saturation Voltage (Note 2) ($I_C = 50 \text{ mAdc}$, $I_B = 5.0 \text{ mAdc}$) | $V_{CE(sat)}$ | – | – | 0.4 | Vdc |
| DC Current Gain (Note 2) ($V_{CE} = 6.0 \text{ Vdc}$, $I_C = 1.0 \text{ mAdc}$) ($V_{CE} = 6.0 \text{ Vdc}$, $I_C = 1.0 \text{ mAdc}$) | h_{FE} | 120 215 | – – | 560 375 | – |
| Transition Frequency ($V_{CE} = 12 \text{ Vdc}$, $I_C = 2.0 \text{ mAdc}$, $f = 30 \text{ MHz}$) | f_T | – | 180 | – | MHz |
| Output Capacitance ($V_{CB} = 12 \text{ Vdc}$, $I_C = 0 \text{ Adc}$, $f = 1.0 \text{ MHz}$) | C_{OB} | – | 2.0 | – | 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.

*Include NSV-prefix devices where applicable.

2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, D.C. $\leq 2\%$.

TYPICAL ELECTRICAL CHARACTERISTICS

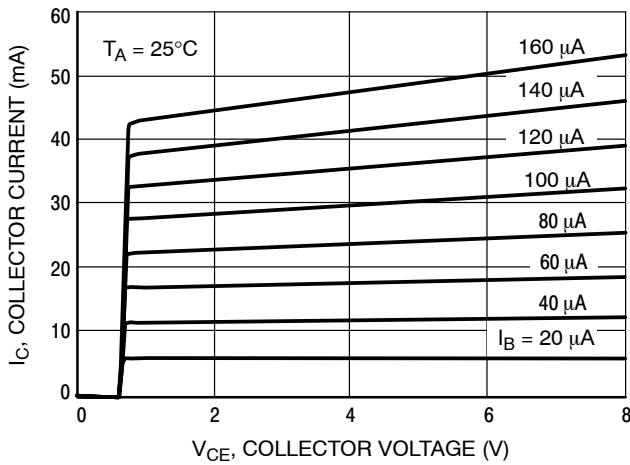


Figure 1. $I_C - V_{CE}$

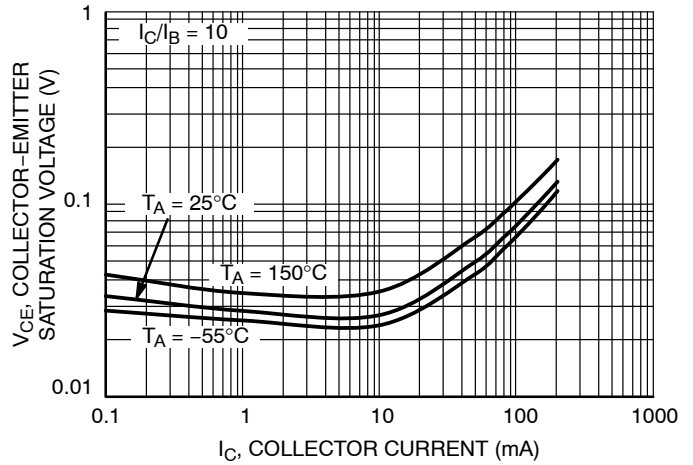


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

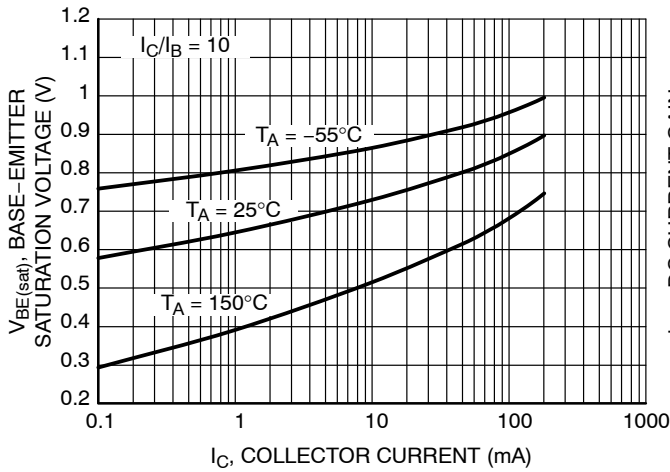


Figure 3. Base Emitter Saturation Voltage vs. Collector Current

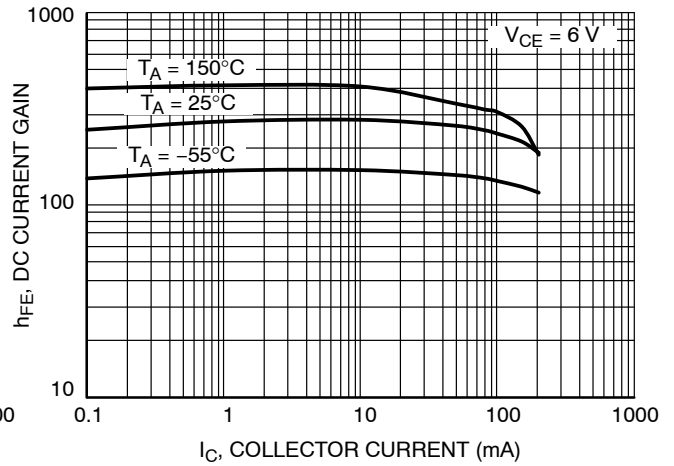


Figure 4. DC Current Gain vs. Collector Current

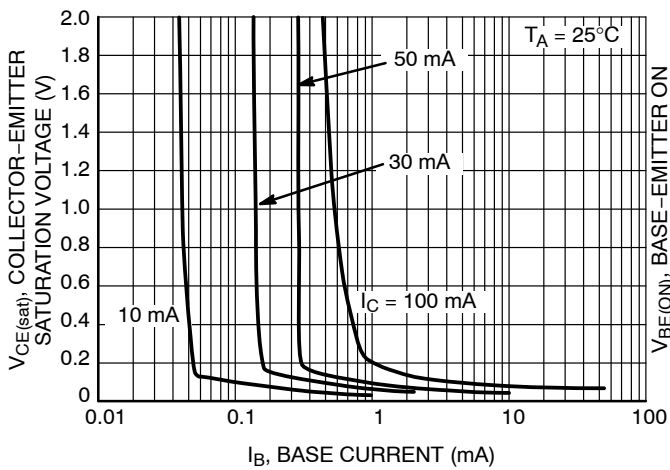


Figure 5. Saturation Region

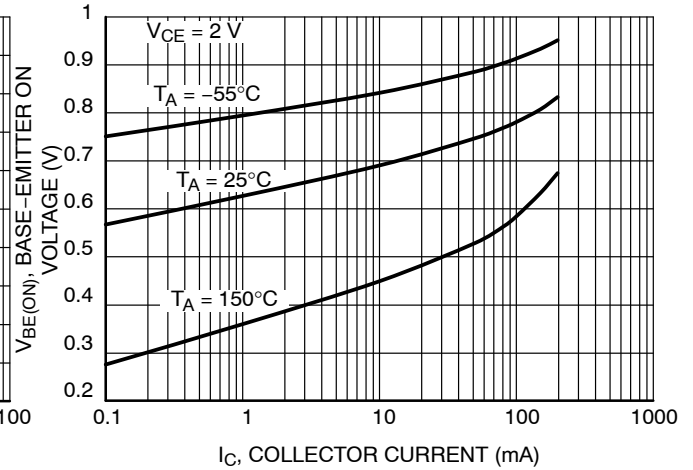


Figure 6. Base-Emitter Turn-ON Voltage vs. Collector Current

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TYPICAL ELECTRICAL CHARACTERISTICS

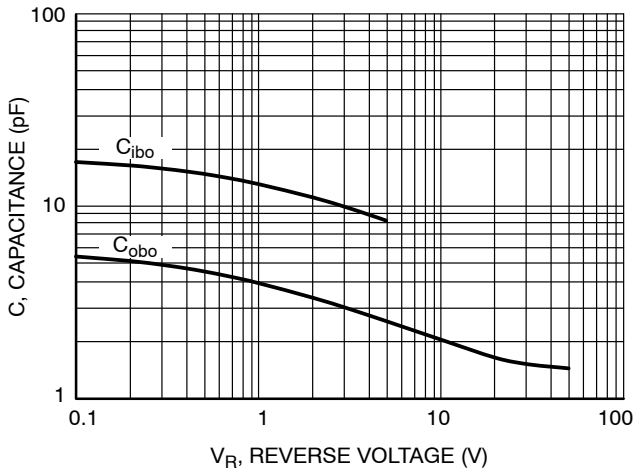


Figure 7. Capacitance

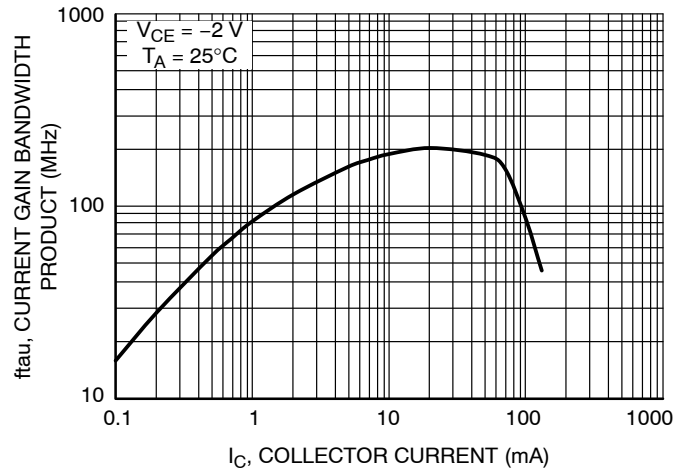


Figure 8. Current Gain Bandwidth Product vs. Collector Current

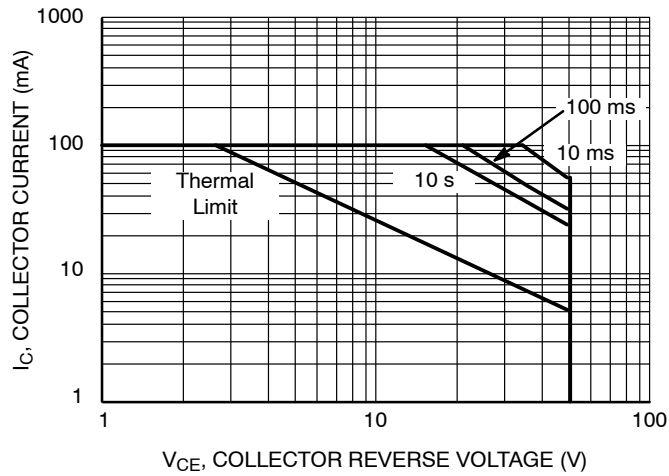
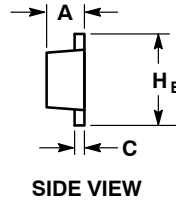
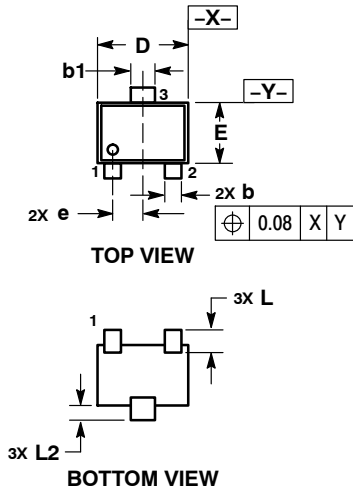


Figure 9. Safe Operating Area

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PACKAGE DIMENSIONS

SOT-723
CASE 631AA
ISSUE D

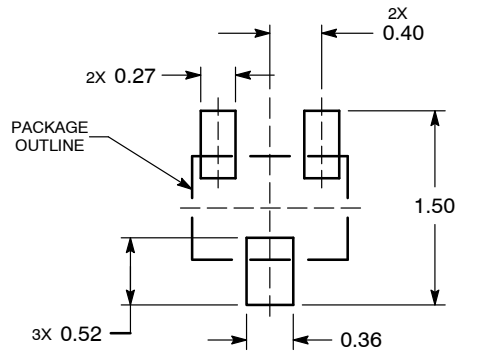


NOTES:


1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

| DIM | MILLIMETERS | | |
|-----|-------------|------|------|
| | MIN | NOM | MAX |
| A | 0.45 | 0.50 | 0.55 |
| b | 0.15 | 0.21 | 0.27 |
| b1 | 0.25 | 0.31 | 0.37 |
| C | 0.07 | 0.12 | 0.17 |
| D | 1.15 | 1.20 | 1.25 |
| E | 0.75 | 0.80 | 0.85 |
| e | 0.40 BSC | | |
| H E | 1.15 | 1.20 | 1.25 |
| L | 0.29 REF | | |
| L2 | 0.15 | 0.20 | 0.25 |

RECOMMENDED 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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