

# NS2029M3T5G

## PNP Silicon General Purpose Amplifier Transistor

This PNP 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 8000 Unit Tape & Reel with 2 mm Pitch
- This is a Pb-Free Device

### 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           | $V_{(BR)EBO}$ | –6.0  | Vdc   |
| Collector Current – Continuous | $I_C$         | –100  | mA dc |

### THERMAL CHARACTERISTICS

| Rating                     | Symbol    | Max        | Unit             |
|----------------------------|-----------|------------|------------------|
| Power Dissipation (Note 1) | $P_D$     | 265        | mW               |
| Junction Temperature       | $T_J$     | 150        | $^\circ\text{C}$ |
| Storage Temperature Range  | $T_{stg}$ | –55 ~ +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.

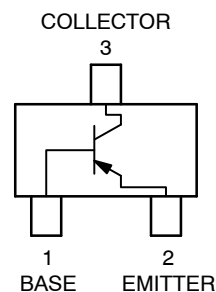
1. Device mounted on a FR-4 glass epoxy printed circuit board using the minimum recommended footprint.



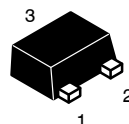
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## PNP GENERAL PURPOSE AMPLIFIER TRANSISTORS SURFACE MOUNT



### MARKING DIAGRAM



SOT-723  
CASE 631AA



9F = Specific Device Code  
M = Date Code\*

\*Date Code orientation and/or position may vary depending upon manufacturing location.

### ORDERING INFORMATION

| Device      | Package              | Shipping†        |
|-------------|----------------------|------------------|
| NS2029M3T5G | SOT-723<br>(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.

# NS2029M3T5G

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

| Characteristic                                                                                            | Symbol        | Min  | Typ | Max  | Unit          |
|-----------------------------------------------------------------------------------------------------------|---------------|------|-----|------|---------------|
| Collector-Base Breakdown Voltage ( $I_C = -50\ \mu\text{Adc}$ , $I_E = 0$ )                               | $V_{(BR)CBO}$ | -60  | -   | -    | Vdc           |
| Collector-Emitter Breakdown Voltage ( $I_C = -1.0\ \text{mAdc}$ , $I_B = 0$ )                             | $V_{(BR)CEO}$ | -50  | -   | -    | Vdc           |
| Emitter-Base Breakdown Voltage ( $I_E = -50\ \mu\text{Adc}$ , $I_C = 0$ )                                 | $V_{(BR)EBO}$ | -6.0 | -   | -    | Vdc           |
| Collector-Base Cutoff Current ( $V_{CB} = -30\ \text{Vdc}$ , $I_E = 0$ )                                  | $I_{CBO}$     | -    | -   | -0.5 | nA            |
| Emitter-Base Cutoff Current ( $V_{EB} = -7.0\ \text{Vdc}$ , $I_B = 0$ )                                   | $I_{EBO}$     | -    | -   | -0.1 | $\mu\text{A}$ |
| Collector-Emitter Saturation Voltage (Note 2)<br>( $I_C = -50\ \text{mAdc}$ , $I_B = -5.0\ \text{mAdc}$ ) | $V_{CE(sat)}$ | -    | -   | -0.5 | Vdc           |
| DC Current Gain (Note 2)<br>( $V_{CE} = -6.0\ \text{Vdc}$ , $I_C = -1.0\ \text{mAdc}$ )                   | $h_{FE}$      | 120  | -   | 560  | -             |
| Transition Frequency<br>( $V_{CE} = -12\ \text{Vdc}$ , $I_C = -2.0\ \text{mAdc}$ , $f = 30\ \text{MHz}$ ) | $f_T$         | -    | 140 | -    | MHz           |
| Output Capacitance ( $V_{CB} = -12\ \text{Vdc}$ , $I_E = 0\ \text{Adc}$ , $f = 1.0\ \text{MHz}$ )         | $C_{OB}$      | -    | 3.5 | -    | pF            |

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

TYPICAL ELECTRICAL CHARACTERISTICS

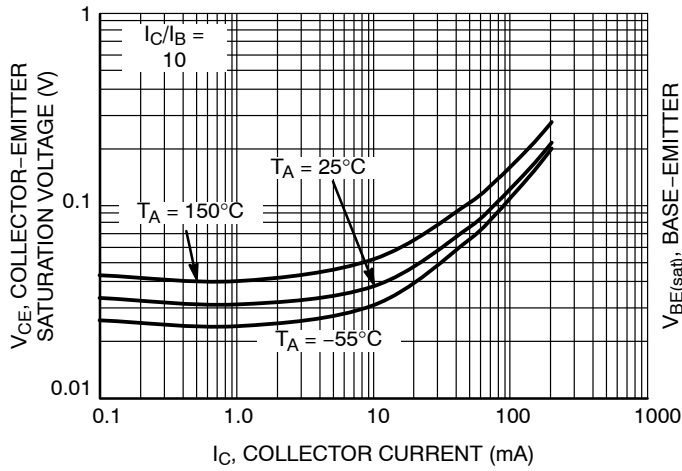


Figure 1. Collector-Emitter Saturation Voltage vs. Collector Current

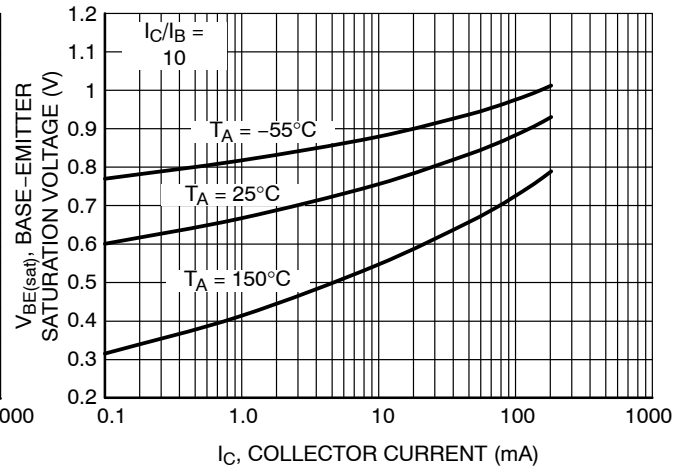


Figure 2. Base-Emitter Saturation Voltage vs. Collector Current

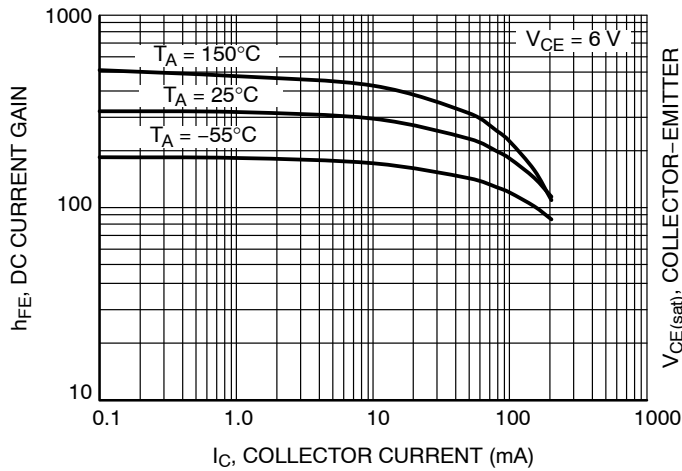


Figure 3. DC Current Gain vs. Collector Current

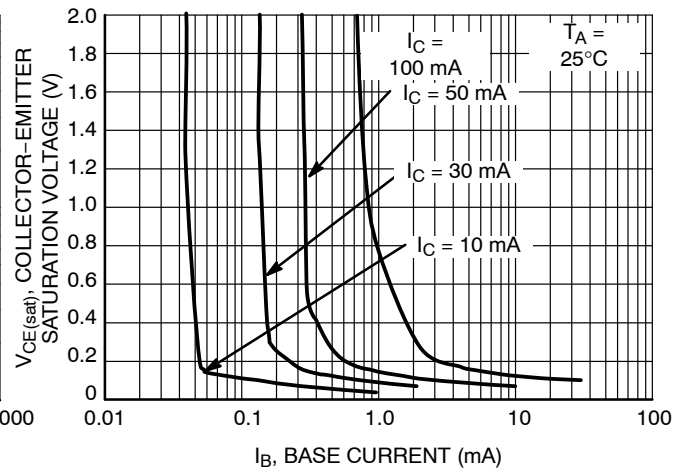


Figure 4. Saturation Region

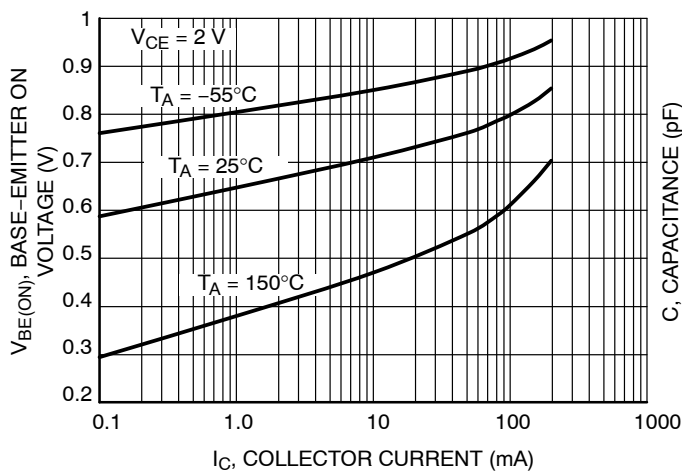


Figure 5. Base-Emitter Turn-ON Voltage vs. Collector Current

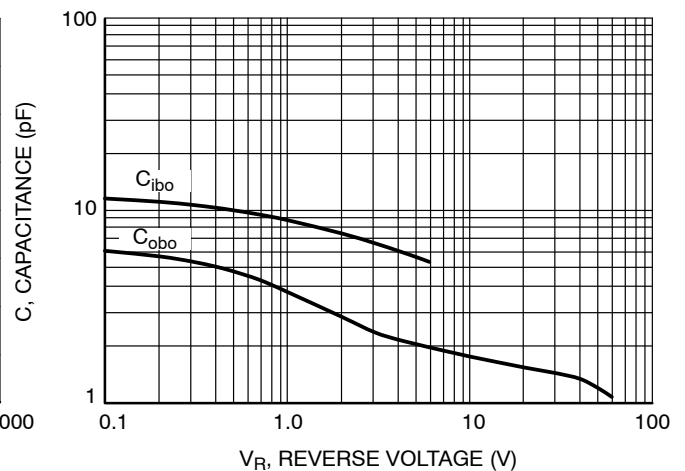


Figure 6. Capacitance

TYPICAL ELECTRICAL CHARACTERISTICS

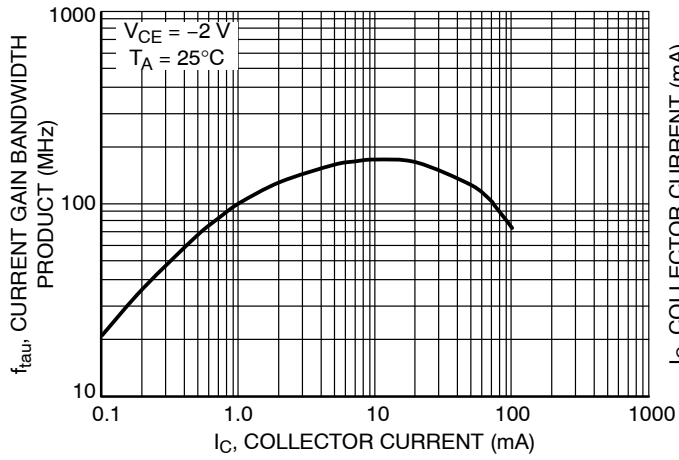


Figure 7. Current Gain Bandwidth Product vs. Collector Current

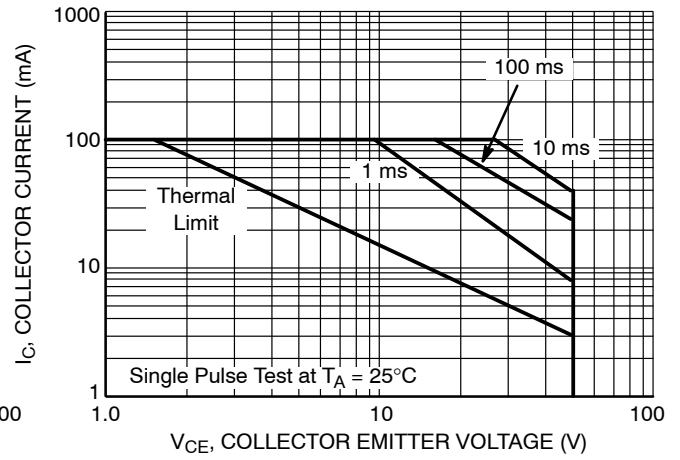
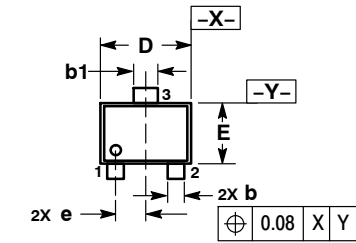


Figure 8. Safe Operating Area

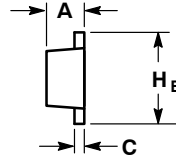
# NS2029M3T5G

## PACKAGE DIMENSIONS

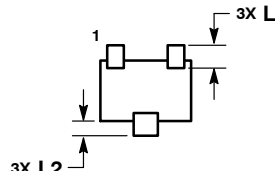
**SOT-723**  
CASE 631AA  
ISSUE D



TOP VIEW



SIDE VIEW



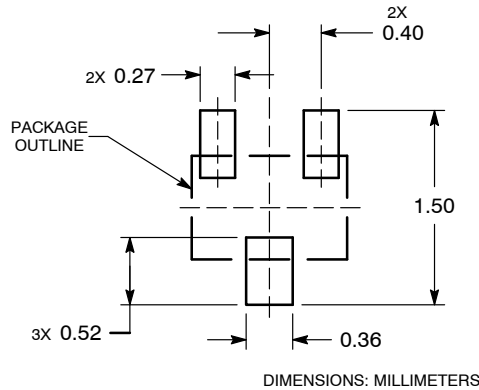
BOTTOM VIEW

### 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\*



DIMENSIONS: MILLIMETERS

\*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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