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# BCP53 Series

## PNP Silicon Epitaxial Transistors

This PNP Silicon Epitaxial transistor is designed for use in audio amplifier applications. The device is housed in the SOT-223 package which is designed for medium power surface mount applications.

- High Current
- NPN Complement is BCP56
- The SOT-223 Package can be soldered using wave or reflow.  
The formed leads absorb thermal stress during soldering, eliminating the possibility of damage to the die
- Device Marking:  
BCP53T1G = AH  
BCP53-10T1G = AH-10  
BCP53-16T1G = AH-16
- S and NSV 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<sub>C</sub> = 25°C unless otherwise noted)

| Rating   | Symbol                            | Value       | Unit       |
|--|-----------------------------------|-------------|------------|
| Collector-Emitter Voltage  | V <sub>CEO</sub>                  | -80         | Vdc        |
| Collector-Base Voltage   | V <sub>CBO</sub>                  | -100        | Vdc        |
| Emitter-Base Voltage   | V <sub>EBO</sub>                  | -5.0        | Vdc        |
| Collector Current  | I <sub>C</sub>                    | 1.5         | Adc        |
| Total Power Dissipation<br>@ T <sub>A</sub> = 25°C (Note 1)<br>Derate above 25°C | P <sub>D</sub>                    | 1.5<br>12   | W<br>mW/°C |
| Operating and Storage<br>Temperature Range                                       | T <sub>J</sub> , T <sub>stg</sub> | -65 to +150 | °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 glass epoxy printed circuit board 1.575 in. x 1.575 in. x 0.059 in.; mounting pad for the collector lead min. 0.93 sq. in.

### THERMAL CHARACTERISTICS

| Characteristic  | Symbol           | Max       | Unit    |
|---|------------------|-----------|---------|
| Thermal Resistance, Junction-to-Ambient<br>(Surface Mounted)                | R <sub>θJA</sub> | 83.3      | °C/W    |
| Lead Temperature for Soldering,<br>0.0625" from case<br>Time in Solder Bath | T <sub>L</sub>   | 260<br>10 | °C<br>s |

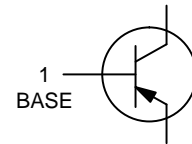


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## MEDIUM POWER HIGH CURRENT SURFACE MOUNT PNP TRANSISTORS

COLLECTOR 2, 4

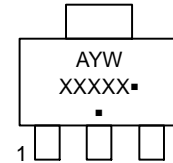


EMITTER 3

### MARKING DIAGRAM



SOT-223  
CASE 318E  
STYLE 1



- A = Assembly Location
- Y = Year
- W = Work Week
- XXXXX = Specific Device Code
- = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device         | Package              | Shipping†        |
|----------------|----------------------|------------------|
| BCP53T1G       | SOT-223<br>(Pb-Free) | 1000/Tape & Reel |
| SBCP53-10T1G   | SOT-223<br>(Pb-Free) | 1000/Tape & Reel |
| BCP53-10T1G    | SOT-223<br>(Pb-Free) | 1000/Tape & Reel |
| SBCP53-10T1G   | SOT-223<br>(Pb-Free) | 1000/Tape & Reel |
| BCP53-16T1G    | SOT-223<br>(Pb-Free) | 1000/Tape & Reel |
| SBCP53-16T1G   | SOT-223<br>(Pb-Free) | 1000/Tape & Reel |
| BCP53-16T3G    | SOT-223<br>(Pb-Free) | 4000/Tape & Reel |
| NSVBCP53-16T3G | SOT-223<br>(Pb-Free) | 4000/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.

## BCP53 Series

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

| Characteristics | Symbol | Min | Typ | Max | Unit |
|-----------------|--------|-----|-----|-----|------|
|-----------------|--------|-----|-----|-----|------|

#### OFF CHARACTERISTICS

|   |               |      |   |      |      |
|---|---------------|------|---|------|------|
| Collector–Base Breakdown Voltage<br>( $I_C = -100\ \mu\text{Adc}$ , $I_E = 0$ )                         | $V_{(BR)CBO}$ | -100 | - | -    | Vdc  |
| Collector–Emitter Breakdown Voltage<br>( $I_C = -1.0\ \text{mAdc}$ , $I_B = 0$ )                        | $V_{(BR)CEO}$ | -80  | - | -    | Vdc  |
| Collector–Emitter Breakdown Voltage<br>( $I_C = -100\ \mu\text{Adc}$ , $R_{BE} = 1.0\ \text{k}\Omega$ ) | $V_{(BR)CER}$ | -100 | - | -    | Vdc  |
| Emitter–Base Breakdown Voltage<br>( $I_E = -10\ \mu\text{Adc}$ , $I_C = 0$ )                            | $V_{(BR)EBO}$ | -5.0 | - | -    | Vdc  |
| Collector–Base Cutoff Current<br>( $V_{CB} = -30\ \text{Vdc}$ , $I_E = 0$ )                             | $I_{CBO}$     | -    | - | -100 | nAdc |
| Emitter–Base Cutoff Current<br>( $V_{EB} = -5.0\ \text{Vdc}$ , $I_C = 0$ )                              | $I_{EBO}$     | -    | - | -100 | nAdc |

#### ON CHARACTERISTICS

|  |               |     |   |      |     |
|--|---------------|-----|---|------|-----|
| DC Current Gain<br>( $I_C = -5.0\ \text{mAdc}$ , $V_{CE} = -2.0\ \text{Vdc}$ )<br>All Part Types | $h_{FE}$      | 25  | - | -    | -   |
| ( $I_C = -150\ \text{mAdc}$ , $V_{CE} = -2.0\ \text{Vdc}$ )<br>BCP53, SBCP53                     |               | 40  | - | 250  |     |
| BCP53–10, SBCP53–10  |               | 63  | - | 160  |     |
| BCP53–16, SBCP53–16, NSVBCP53–16   |               | 100 | - | 250  |     |
| ( $I_C = -500\ \text{mAdc}$ , $V_{CE} = -2.0\ \text{Vdc}$ )<br>All Part Types                    |               | 25  | - | -    |     |
| Collector–Emitter Saturation Voltage<br>( $I_C = -500\ \text{mAdc}$ , $I_B = -50\ \text{mAdc}$ ) | $V_{CE(sat)}$ | -   | - | -0.5 | Vdc |
| Base–Emitter On Voltage<br>( $I_C = -500\ \text{mAdc}$ , $V_{CE} = -2.0\ \text{Vdc}$ )           | $V_{BE(on)}$  | -   | - | -1.0 | Vdc |

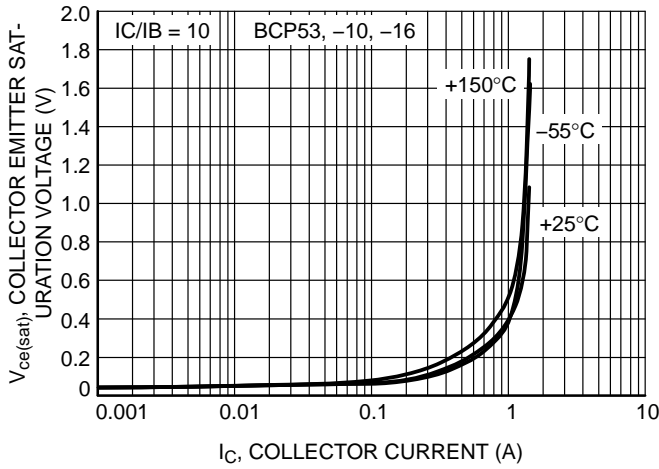
#### DYNAMIC CHARACTERISTICS

|   |       |   |    |   |     |
|---|-------|---|----|---|-----|
| Current–Gain – Bandwidth Product<br>( $I_C = -10\ \text{mAdc}$ , $V_{CE} = -5.0\ \text{Vdc}$ , $f = 35\ \text{MHz}$ ) | $f_T$ | - | 50 | - | MHz |
|---|-------|---|----|---|-----|

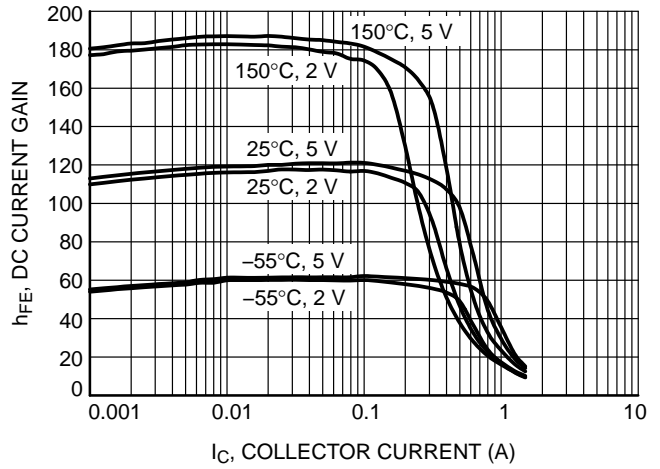
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# BCP53 Series

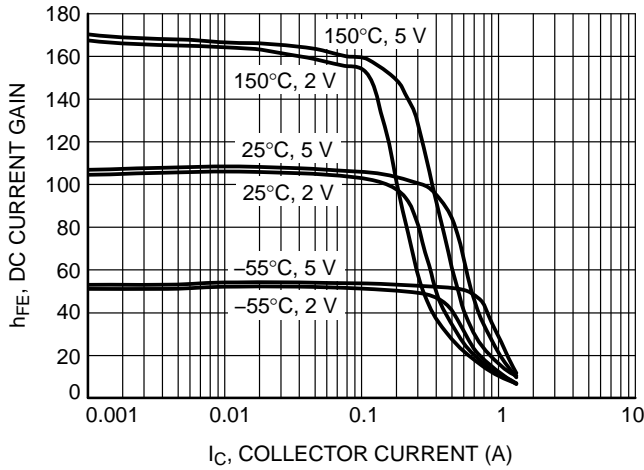
## TYPICAL CHARACTERISTICS



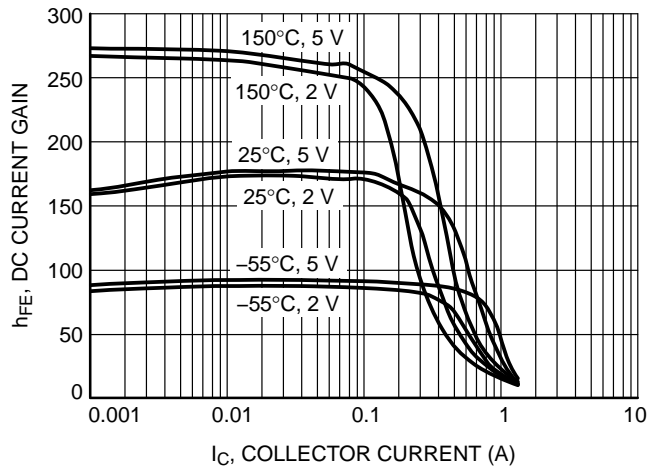
**Figure 1. Collector Emitter Saturation Voltage vs. Collector Current**



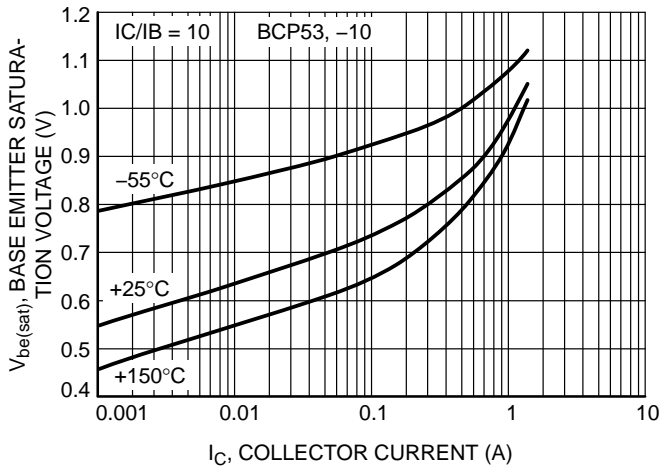
**Figure 2. DC Current Gain vs. Collector Current (BCP53)**



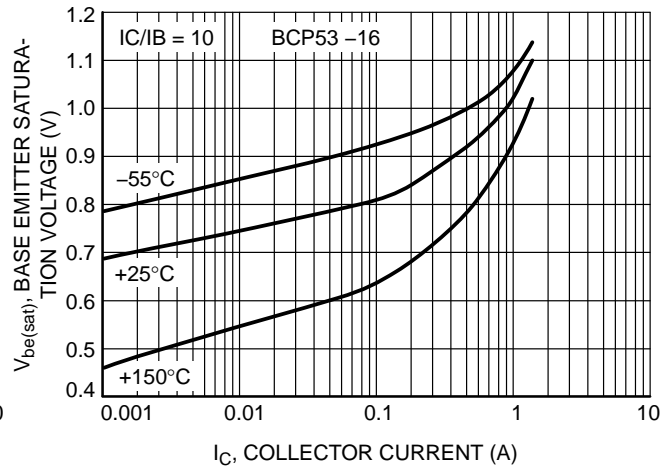
**Figure 3. DC Current Gain vs. Collector Current (BCP53-10)**



**Figure 4. DC Current Gain vs. Collector Current (BCP53-16)**



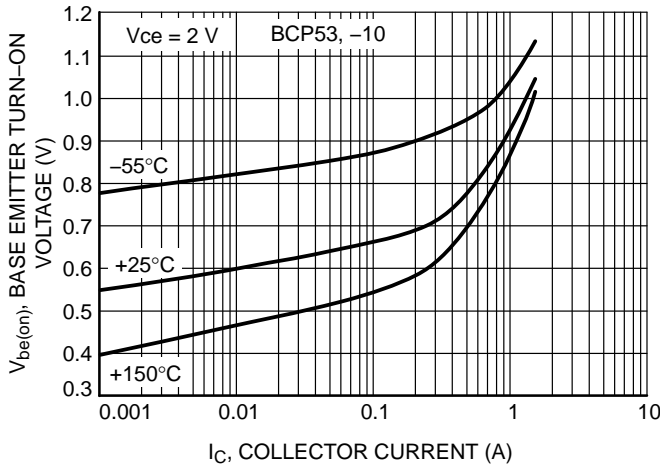
**Figure 5. BCP53, -10 Base Emitter Saturation Voltage vs. Collector Current**



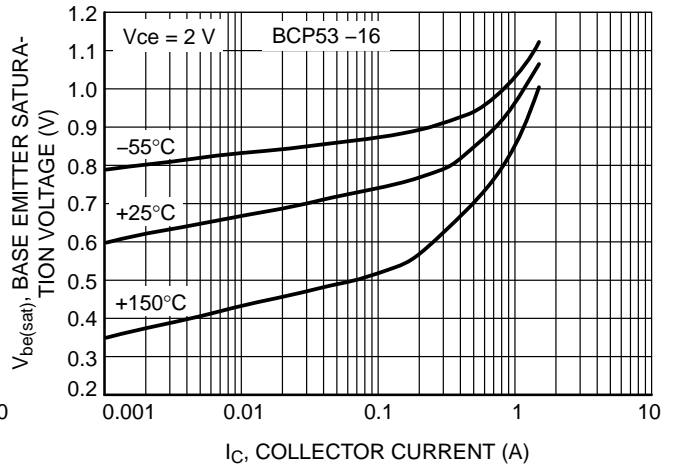
**Figure 6. BCP53-16 Base Emitter Saturation Voltage vs. Collector Current**

# BCP53 Series

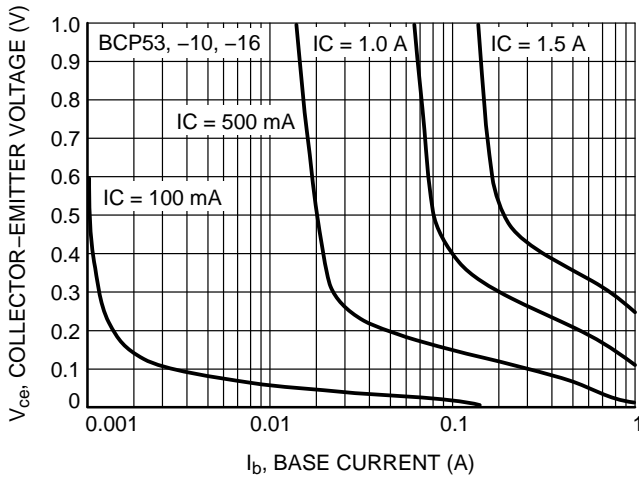
## TYPICAL CHARACTERISTICS



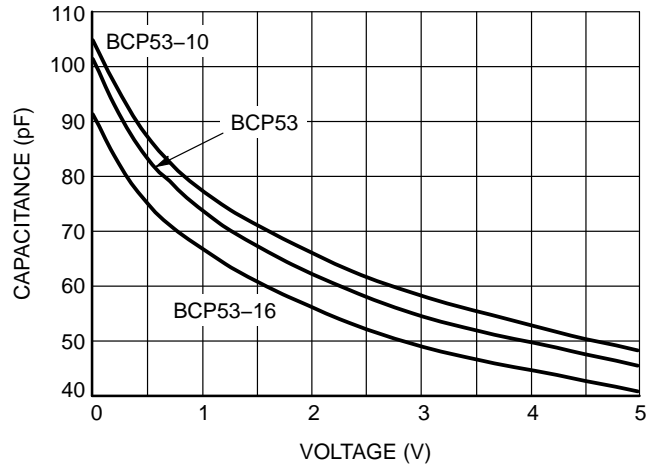
**Figure 7. BCP53, -10 Base Emitter Turn-On Voltage vs. Collector Current  $V_{BE(on)}$**



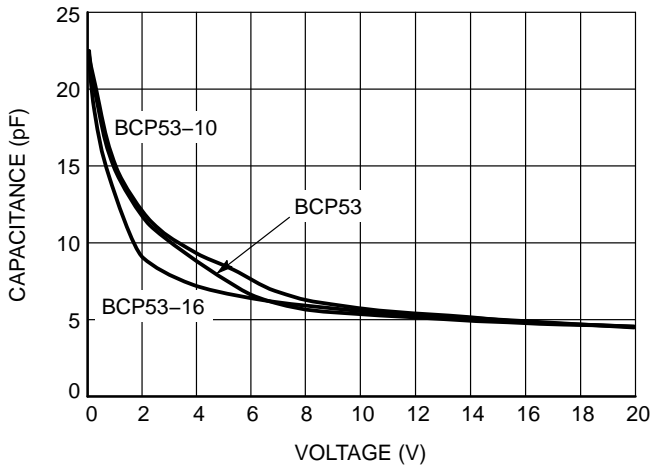
**Figure 8. BCP53-16 Base Emitter Turn-On Voltage vs. Collector Current**



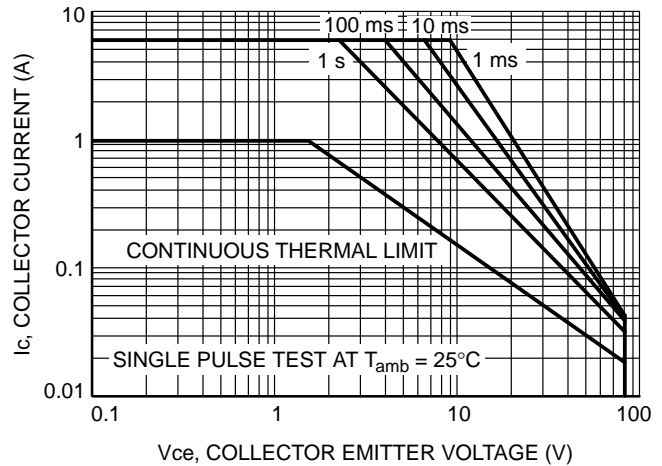
**Figure 9. BCP53, -10, -16 Saturation Region**



**Figure 10. Input Capacitance**



**Figure 11. Output Capacitance**



**Figure 12. Standard Operating Area**

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

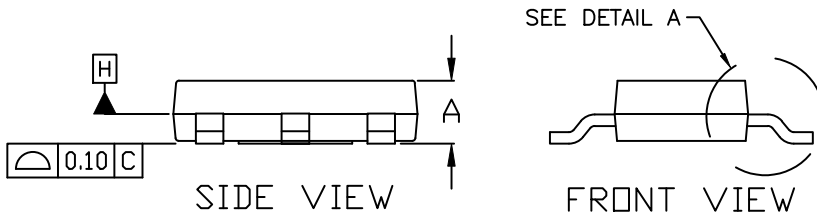
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SCALE 1:1

SOT-223 (TO-261)  
CASE 318E-04  
ISSUE R

DATE 02 OCT 2018



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.200MM PER SIDE.
4. DATUMS A AND B ARE DETERMINED AT DATUM H.
5. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
6. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

| MILLIMETERS |          |      |      |
|-------------|----------|------|------|
| DIM         | MIN.     | NOM. | MAX. |
| A           | 1.50     | 1.63 | 1.75 |
| A1          | 0.02     | 0.06 | 0.10 |
| b           | 0.60     | 0.75 | 0.89 |
| b1          | 2.90     | 3.06 | 3.20 |
| c           | 0.24     | 0.29 | 0.35 |
| D           | 6.30     | 6.50 | 6.70 |
| E           | 3.30     | 3.50 | 3.70 |
| e           | 2.30 BSC |      |      |
| L           | 0.20     | ---  | ---  |
| L1          | 1.50     | 1.75 | 2.00 |
| He          | 6.70     | 7.00 | 7.30 |
| $\theta$    | 0°       | ---  | 10°  |



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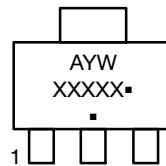
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**CASE 318E-04**  
**ISSUE R**

DATE 02 OCT 2018

- |  |   |   |   |   |
|--|---|---|---|---|
| <b>STYLE 1:</b><br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR | <b>STYLE 2:</b><br>PIN 1. ANODE<br>2. CATHODE<br>3. NC<br>4. CATHODE        | <b>STYLE 3:</b><br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE<br>4. DRAIN           | <b>STYLE 4:</b><br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE<br>4. DRAIN   | <b>STYLE 5:</b><br>PIN 1. DRAIN<br>2. GATE<br>3. SOURCE<br>4. GATE    |
| <b>STYLE 6:</b><br>PIN 1. RETURN<br>2. INPUT<br>3. OUTPUT<br>4. INPUT        | <b>STYLE 7:</b><br>PIN 1. ANODE 1<br>2. CATHODE<br>3. ANODE 2<br>4. CATHODE | <b>STYLE 8:</b><br>CANCELLED  | <b>STYLE 9:</b><br>PIN 1. INPUT<br>2. GROUND<br>3. LOGIC<br>4. GROUND | <b>STYLE 10:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE<br>4. ANODE |
| <b>STYLE 11:</b><br>PIN 1. MT 1<br>2. MT 2<br>3. GATE<br>4. MT 2             | <b>STYLE 12:</b><br>PIN 1. INPUT<br>2. OUTPUT<br>3. NC<br>4. OUTPUT         | <b>STYLE 13:</b><br>PIN 1. GATE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR |   |   |

**GENERIC  
 MARKING DIAGRAM\***



- A = Assembly Location
- Y = Year
- W = Work Week
- XXXXX = Specific Device 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.

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