

# Medium-Power Plastic PNP Silicon Transistors

## 2N4918 - 2N4920 Series

These medium-power, high-performance plastic devices are designed for driver circuits, switching, and amplifier applications.

### Features

- Low Saturation Voltage –  $V_{CE(sat)} = 0.6 \text{ Vdc (Max) @ } I_C = 1.0 \text{ A}$
- Excellent Power Dissipation,  $P_D = 30 \text{ W @ } T_C = 25^\circ\text{C}$
- Excellent Safe Operating Area
- Gain Specified to  $I_C = 1.0 \text{ A}$
- Complement to NPN 2N4921, 2N4922, 2N4923
- Pb-Free Package is Available\*

### MAXIMUM RATINGS

| Rating                                                                                | Symbol            | Value          | Unit                     |
|---------------------------------------------------------------------------------------|-------------------|----------------|--------------------------|
| Collector – Emitter Voltage<br>2N4918<br>2N4919<br>2N4920                             | $V_{CEO}$         | 40<br>60<br>80 | Vdc                      |
| Collector – Base Voltage<br>2N4918<br>2N4919<br>2N4920                                | $V_{CBO}$         | 40<br>60<br>80 | Vdc                      |
| Emitter – Base Voltage                                                                | $V_{EBO}$         | 5.0            | Vdc                      |
| Collector Current – Continuous<br>(Note 1)                                            | $I_C$<br>(Note 2) | 1.0<br>3.0     | Adc                      |
| Base Current                                                                          | $I_B$             | 1.0            | Adc                      |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$             | 30<br>0.24     | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                   | $T_J, T_{stg}$    | -65 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.

1. The 1.0 A max  $I_C$  value is based upon JEDEC current gain requirements. The 3.0 A max value is based upon actual current-handling capability of the device (See Figure 5).
2. Indicates JEDEC Registered Data for 2N4918 Series.

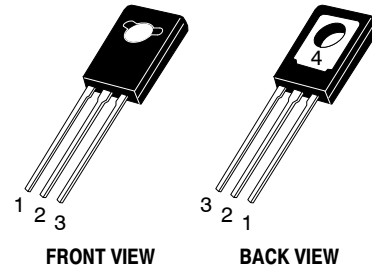
### THERMAL CHARACTERISTICS (Note 3)

| Characteristic                          | Symbol        | Max  | Unit               |
|-----------------------------------------|---------------|------|--------------------|
| Thermal Resistance,<br>Junction-to-Case | $\theta_{JC}$ | 4.16 | $^\circ\text{C/W}$ |

3. Recommend use of thermal compound for lowest thermal resistance.

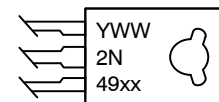
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

3.0 A, 40–80 V, 30 W  
GENERAL PURPOSE  
POWER TRANSISTORS



TO-225  
CASE 077  
STYLE 1

### MARKING DIAGRAM



xx = 18, 19, 20  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 2.

## 2N4918 – 2N4920 Series

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

| Characteristic                                                                                                                                                                                         | Symbol         | Min            | Max               | Unit |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-------------------|------|
| <b>OFF CHARACTERISTICS</b>                                                                                                                                                                             |                |                |                   |      |
| Collector–Emitter Sustaining Voltage (Note 4)<br>( $I_C = 0.1\text{ A dc}$ , $I_B = 0$ )                                                                                                               | $V_{CEO(sus)}$ | 40<br>60<br>80 | –<br>–<br>–       | Vdc  |
| Collector Cutoff Current<br>( $V_{CE} = 20\text{ Vdc}$ , $I_B = 0$ )<br>( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ )<br>( $V_{CE} = 40\text{ Vdc}$ , $I_B = 0$ )                                           | $I_{CEO}$      | –<br>–<br>–    | 0.5<br>0.5<br>0.5 | mAdc |
| Collector Cutoff Current<br>( $V_{CE} = \text{Rated } V_{CEO}$ , $V_{BE(off)} = 1.5\text{ Vdc}$ )<br>( $V_{CE} = \text{Rated } V_{CEO}$ , $V_{BE(off)} = 1.5\text{ Vdc}$ , $T_C = 125^\circ\text{C}$ ) | $I_{CEX}$      | –<br>–         | 0.1<br>0.5        | mAdc |
| Collector Cutoff Current<br>( $V_{CB} = \text{Rated } V_{CB}$ , $I_E = 0$ )                                                                                                                            | $I_{CBO}$      | –              | 0.1               | mAdc |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )                                                                                                                                    | $I_{EBO}$      | –              | 1.0               | mAdc |

### ON CHARACTERISTICS

|                                                                                                                                                                                                          |               |                |               |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|---------------|-----|
| DC Current Gain (Note 4)<br>( $I_C = 50\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )<br>( $I_C = 500\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )<br>( $I_C = 1.0\text{ A dc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) | $h_{FE}$      | 40<br>30<br>10 | –<br>150<br>– | –   |
| Collector–Emitter Saturation Voltage (Note 4)<br>( $I_C = 1.0\text{ A dc}$ , $I_B = 0.1\text{ A dc}$ )                                                                                                   | $V_{CE(sat)}$ | –              | 0.6           | Vdc |
| Base–Emitter Saturation Voltage (Note 4)<br>( $I_C = 1.0\text{ A dc}$ , $I_B = 0.1\text{ A dc}$ )                                                                                                        | $V_{BE(sat)}$ | –              | 1.3           | Vdc |
| Base–Emitter On Voltage (Note 4)<br>( $I_C = 1.0\text{ A dc}$ , $V_{CE} = 1.0\text{ Vdc}$ )                                                                                                              | $V_{BE(on)}$  | –              | 1.3           | Vdc |

### SMALL–SIGNAL CHARACTERISTICS

|                                                                                                                |          |     |     |     |
|----------------------------------------------------------------------------------------------------------------|----------|-----|-----|-----|
| Current–Gain – Bandwidth Product ( $I_C = 250\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ MHz}$ ) | $f_T$    | 3.0 | –   | MHz |
| Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 100\text{ kHz}$ )                             | $C_{ob}$ | –   | 100 | pF  |
| Small–Signal Current Gain ( $I_C = 250\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )        | $h_{fe}$ | 25  | –   | –   |

4. Pulse Test:  $PW \approx 300\text{ }\mu\text{s}$ , Duty Cycle  $\approx 2.0\%$

### ORDERING INFORMATION

| Device  | Package             | Shipping <sup>†</sup> |
|---------|---------------------|-----------------------|
| 2N4920G | TO–225<br>(Pb–Free) | 500 Unit / Bulk       |

### DISCONTINUED (Note 5)

|        |        |                 |
|--------|--------|-----------------|
| 2N4918 | TO–225 | 500 Unit / Bulk |
| 2N4919 | TO–225 | 500 Unit / Bulk |
| 2N4920 | TO–225 | 500 Unit / Bulk |

<sup>†</sup>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.

5. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

## 2N4918 – 2N4920 Series

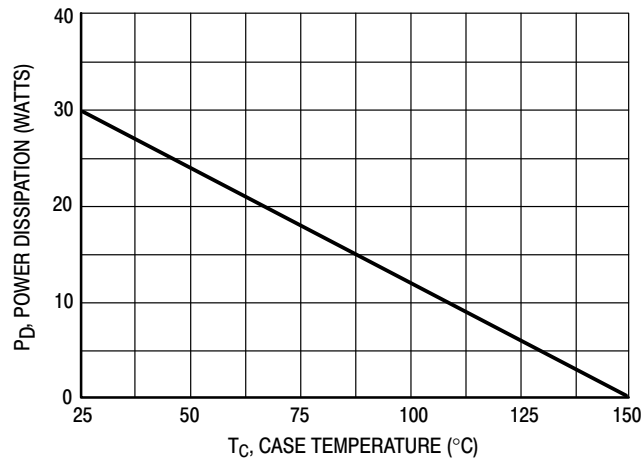


Figure 1. Power Derating

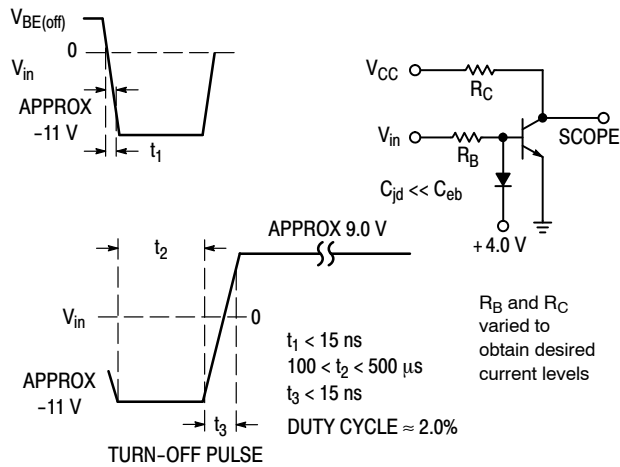


Figure 2. Switching Time Equivalent Test Circuit

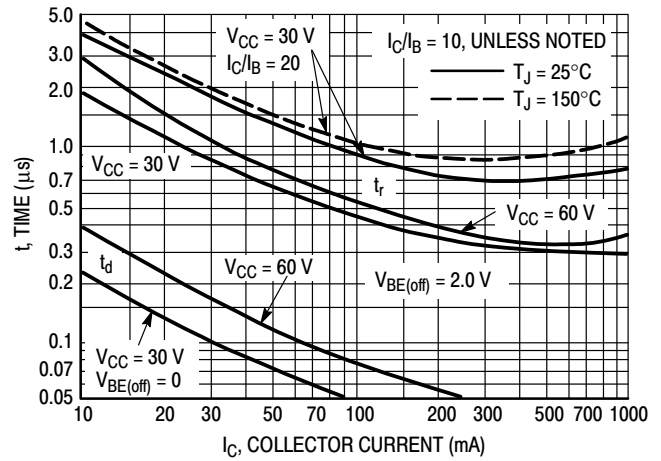


Figure 3. Turn-On Time

## 2N4918 – 2N4920 Series

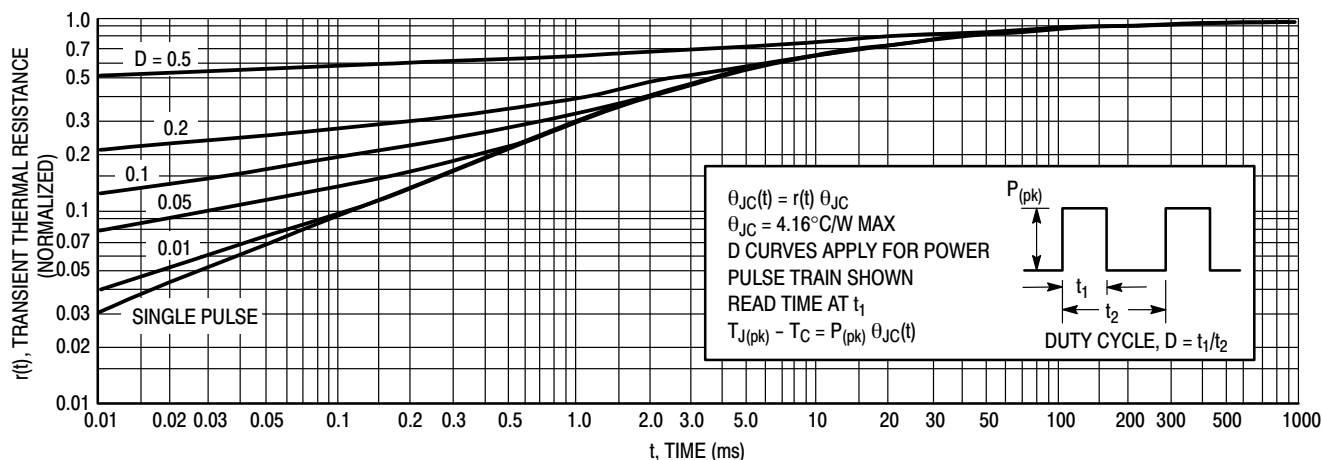


Figure 4. Thermal Response

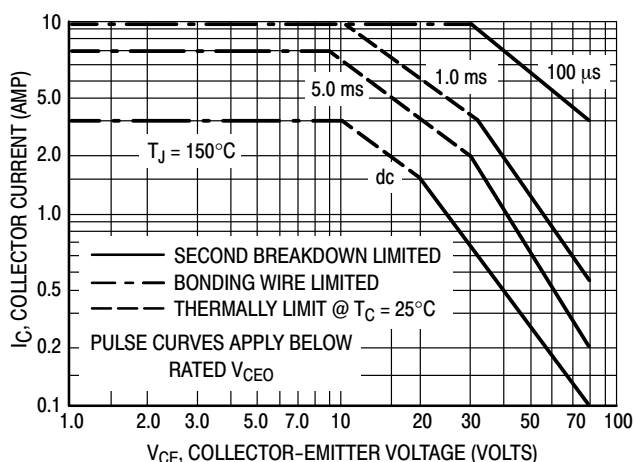


Figure 5. Active-Region Safe Operating Area

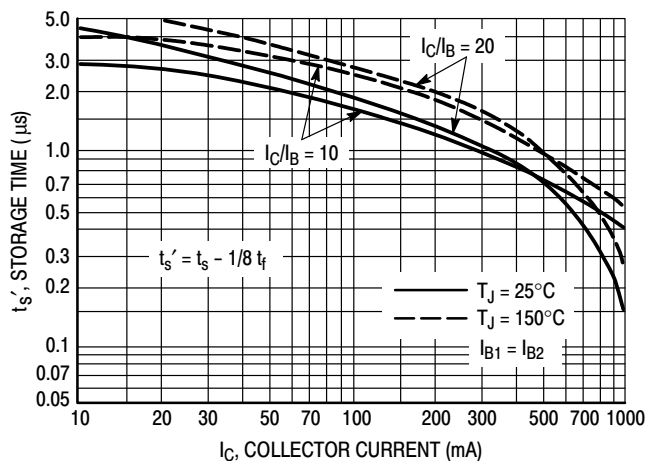


Figure 6. Storage Time

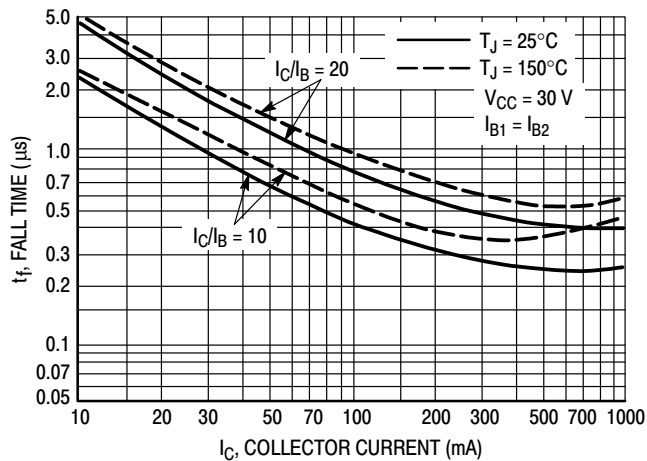


Figure 7. Fall Time

# 2N4918 – 2N4920 Series

## TYPICAL DC CHARACTERISTICS

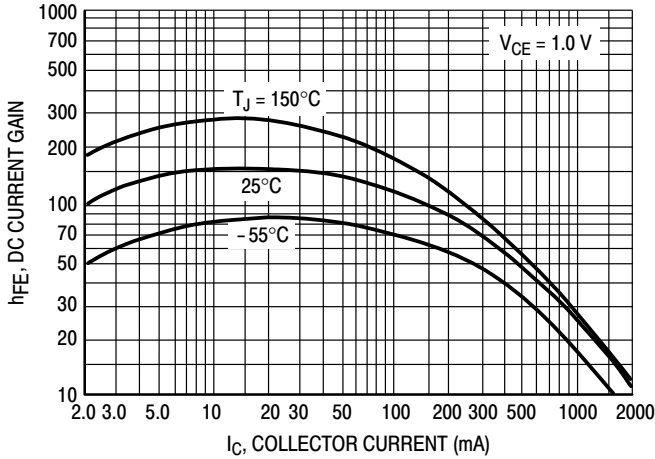


Figure 8. Current Gain

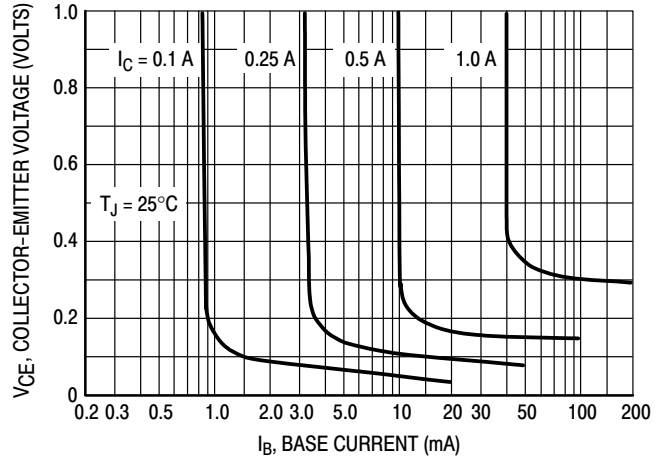


Figure 9. Collector Saturation Region

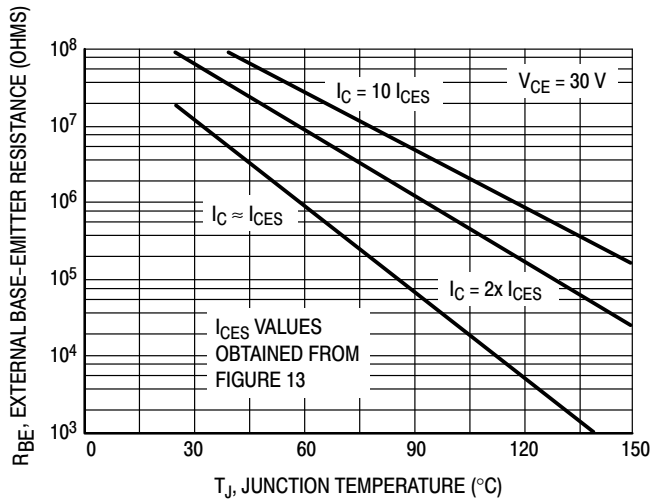


Figure 10. Effects of Base-Emitter Resistance

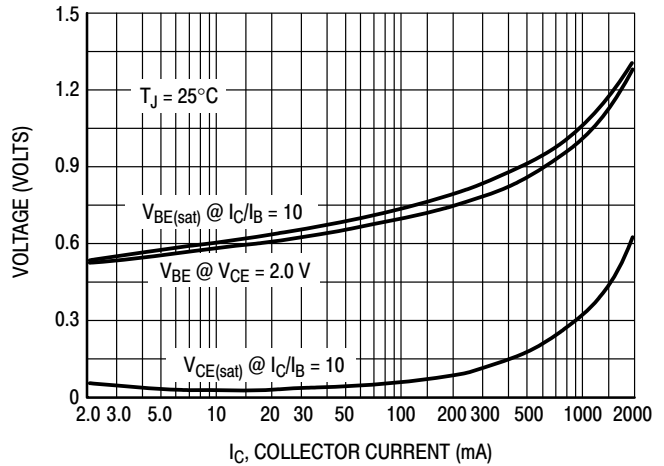


Figure 11. "On" Voltage

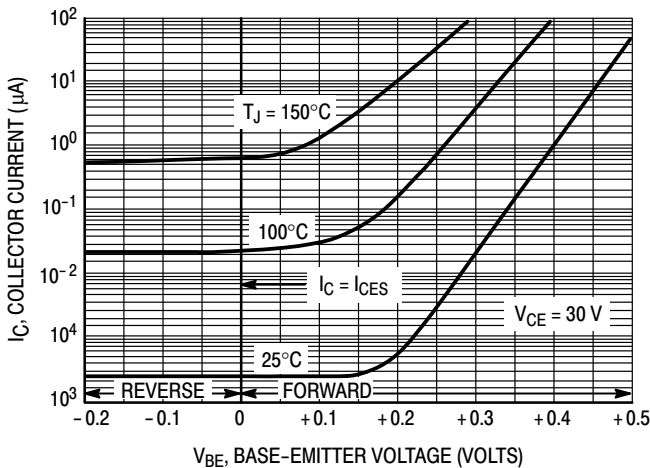


Figure 12. Collector Cut-Off Region

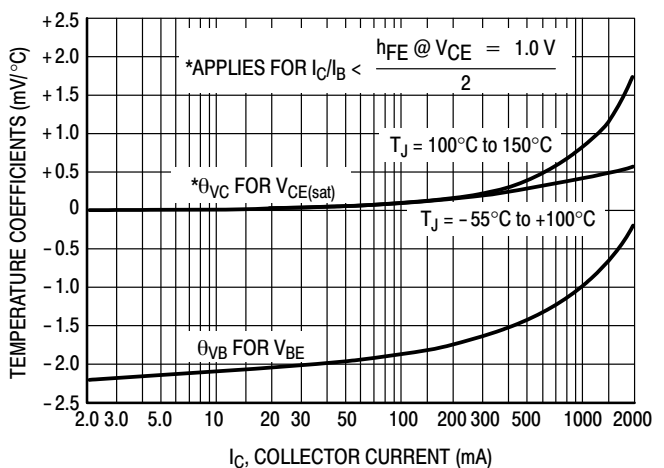
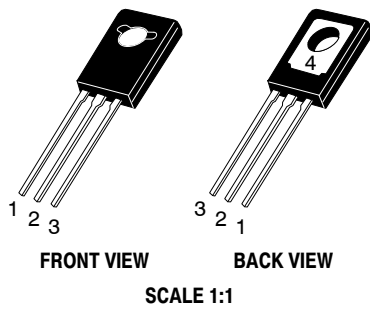
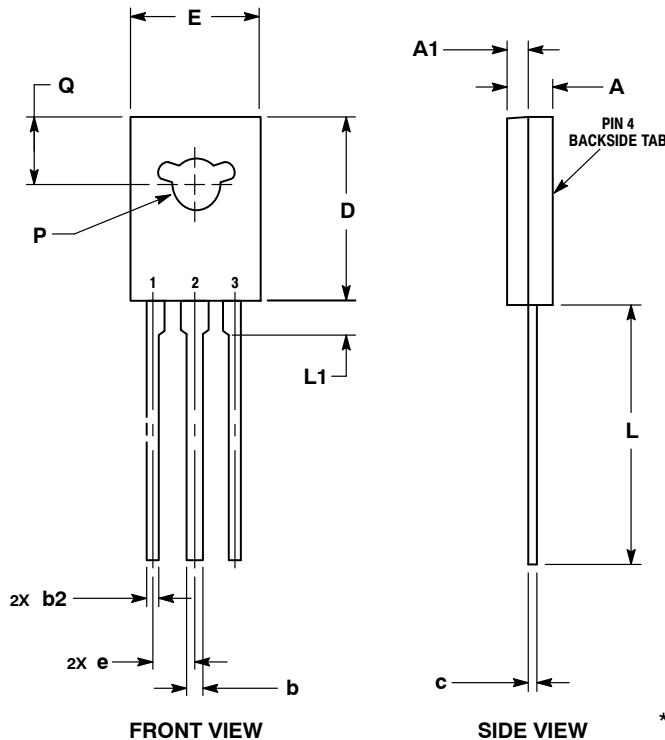


Figure 13. Temperature Coefficients



TO-225  
CASE 77-09  
ISSUE AD

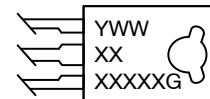
DATE 25 MAR 2015



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. NUMBER AND SHAPE OF LUGS OPTIONAL.

| MILLIMETERS |       |       |
|-------------|-------|-------|
| DIM         | MIN   | MAX   |
| A           | 2.40  | 3.00  |
| A1          | 1.00  | 1.50  |
| b           | 0.60  | 0.90  |
| b2          | 0.51  | 0.88  |
| c           | 0.39  | 0.63  |
| D           | 10.60 | 11.10 |
| E           | 7.40  | 7.80  |
| e           | 2.04  | 2.54  |
| L           | 14.50 | 16.63 |
| L1          | 1.27  | 2.54  |
| P           | 2.90  | 3.30  |
| Q           | 3.80  | 4.20  |

GENERIC  
MARKING DIAGRAM\*



Y = Year  
WW = Work Week  
XXXXX = Device Code  
G = 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.

|                                                           |                                                       |                                                           |                                                         |                                                       |
|-----------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------|
| STYLE 1:<br>PIN 1. EMITTER<br>2., 4. COLLECTOR<br>3. BASE | STYLE 2:<br>PIN 1. CATHODE<br>2., 4. ANODE<br>3. GATE | STYLE 3:<br>PIN 1. BASE<br>2., 4. COLLECTOR<br>3. EMITTER | STYLE 4:<br>PIN 1. ANODE 1<br>2., 4. ANODE 2<br>3. GATE | STYLE 5:<br>PIN 1. MT 1<br>2., 4. MT 2<br>3. GATE     |
| STYLE 6:<br>PIN 1. CATHODE<br>2., 4. GATE<br>3. ANODE     | STYLE 7:<br>PIN 1. MT 1<br>2., 4. GATE<br>3. MT 2     | STYLE 8:<br>PIN 1. SOURCE<br>2., 4. GATE<br>3. DRAIN      | STYLE 9:<br>PIN 1. GATE<br>2., 4. DRAIN<br>3. SOURCE    | STYLE 10:<br>PIN 1. SOURCE<br>2., 4. DRAIN<br>3. GATE |

|                  |             |                                                                                                                                                                                     |
|------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | TO-225      | PAGE 1 OF 1                                                                                                                                                                         |

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