

2N4918 - 2N4920 Series

Medium-Power Plastic PNP Silicon Transistors

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 2N4918 2N4919 2N4920 | V_{CEO} | 40 60 80 | Vdc |
| Collector – Base Voltage 2N4918 2N4919 2N4920 | V_{CBO} | 40 60 80 | Vdc |
| Emitter – Base Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current – Continuous (Note 1) | I_C (Note 2) | 1.0 3.0 | Adc |
| Base Current | I_B | 1.0 | Adc |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 30 0.24 | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction 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, Junction-to-Case | θ_{JC} | 4.16 | $^\circ\text{C/W}$ |

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

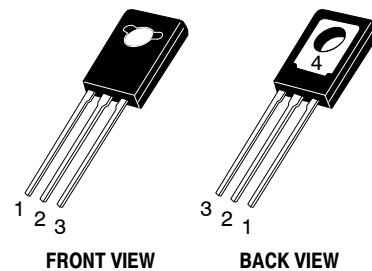
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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

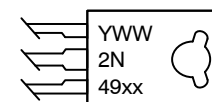


FRONT VIEW

BACK VIEW

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.

2N4918 – 2N4920 Series

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

| Characteristic | Symbol | Min | Max | Unit | |
|--|----------------------------|----------------|----------------|-------------------|------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Sustaining Voltage (Note 4) ($I_C = 0.1\text{ Adc}$, $I_B = 0$) | 2N4918 2N4919 2N4920 | $V_{CEO(sus)}$ | 40 60 80 | – – – | Vdc |
| Collector Cutoff Current ($V_{CE} = 20\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$) | 2N4918 2N4919 2N4920 | I_{CEO} | – – – | 0.5 0.5 0.5 | mAdc |
| Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 125^\circ\text{C}$) | | I_{CEX} | – – | 0.1 0.5 | mAdc |
| Collector Cutoff Current ($V_{CB} = \text{Rated } V_{CB}$, $I_E = 0$) | | I_{CBO} | – | 0.1 | mAdc |
| Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$) | | I_{EBO} | – | 1.0 | mAdc |

ON CHARACTERISTICS

| | | | | |
|---|---------------|----------------|---------------|-----|
| DC Current Gain (Note 4) ($I_C = 50\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 500\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 1.0\text{ Adc}$, $V_{CE} = 1.0\text{ Vdc}$) | h_{FE} | 40 30 10 | – 150 – | – |
| Collector–Emitter Saturation Voltage (Note 4) ($I_C = 1.0\text{ Adc}$, $I_B = 0.1\text{ Adc}$) | $V_{CE(sat)}$ | – | 0.6 | Vdc |
| Base–Emitter Saturation Voltage (Note 4) ($I_C = 1.0\text{ Adc}$, $I_B = 0.1\text{ Adc}$) | $V_{BE(sat)}$ | – | 1.3 | Vdc |
| Base–Emitter On Voltage (Note 4) ($I_C = 1.0\text{ Adc}$, $V_{CE} = 1.0\text{ Vdc}$) | $V_{BE(on)}$ | – | 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: $PW \approx 300\ \mu\text{s}$, Duty Cycle $\approx 2.0\%$

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|---------|---------------------|-----------------------|
| 2N4918 | TO–225 | 500 Unit / Bulk |
| 2N4919 | TO–225 | 500 Unit / Bulk |
| 2N4920 | TO–225 | 500 Unit / Bulk |
| 2N4920G | TO–225 (Pb–Free) | 500 Unit / Bulk |

[†]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.

2N4918 – 2N4920 Series

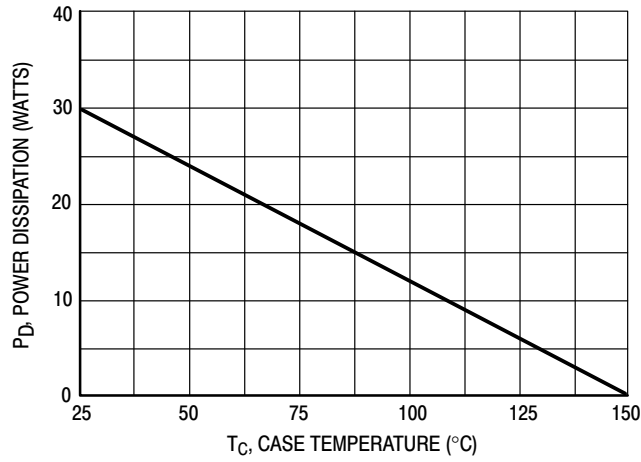


Figure 1. Power Derating

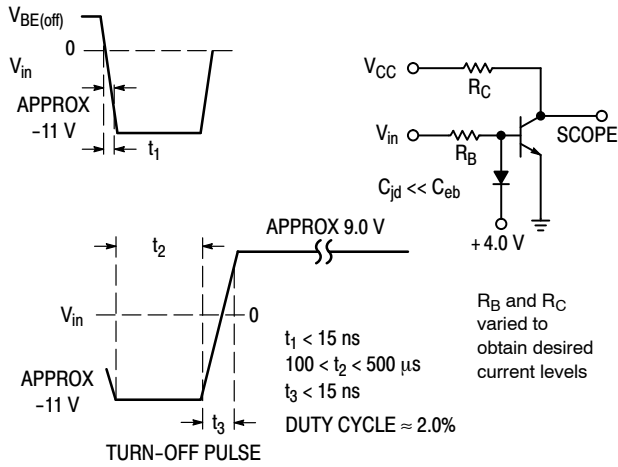


Figure 2. Switching Time Equivalent Test Circuit

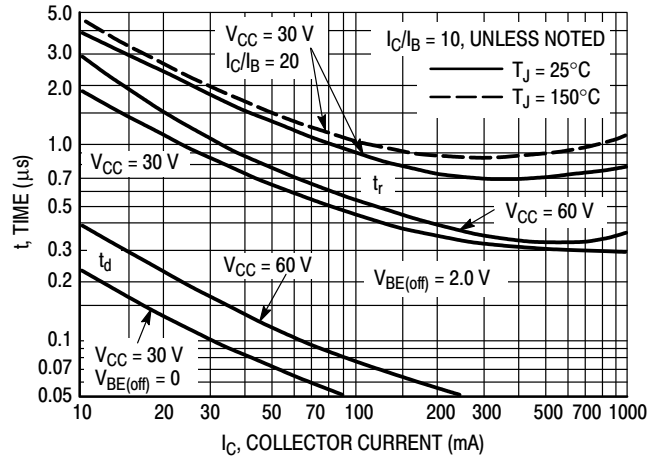


Figure 3. Turn-On Time

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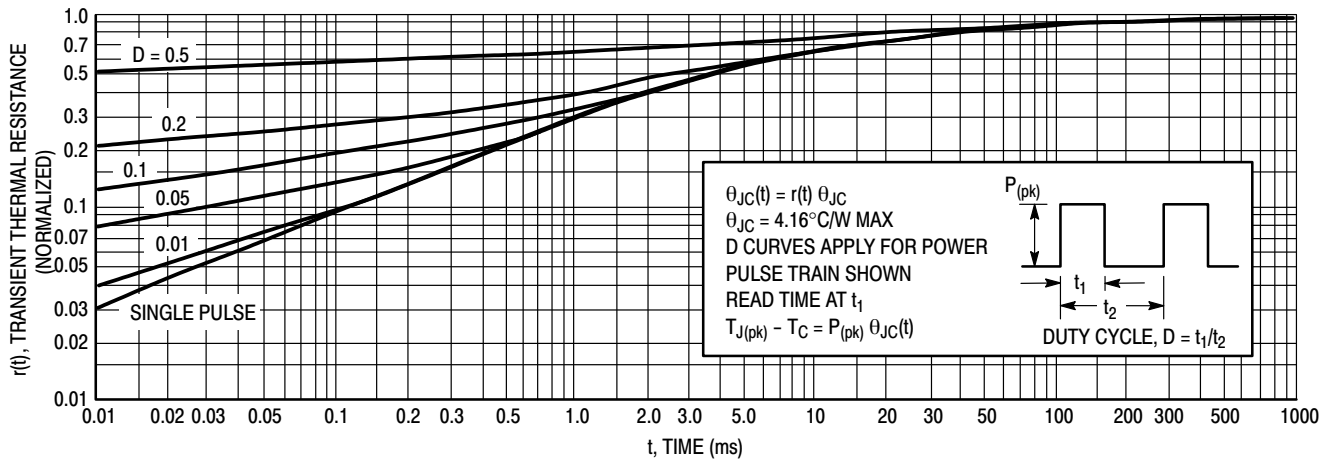


Figure 4. Thermal Response

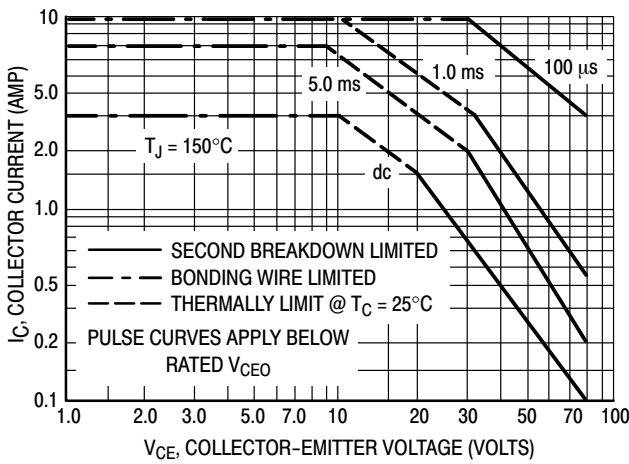


Figure 5. Active-Region Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on $T_{J(pk)} = 150^{\circ}\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^{\circ}\text{C}$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

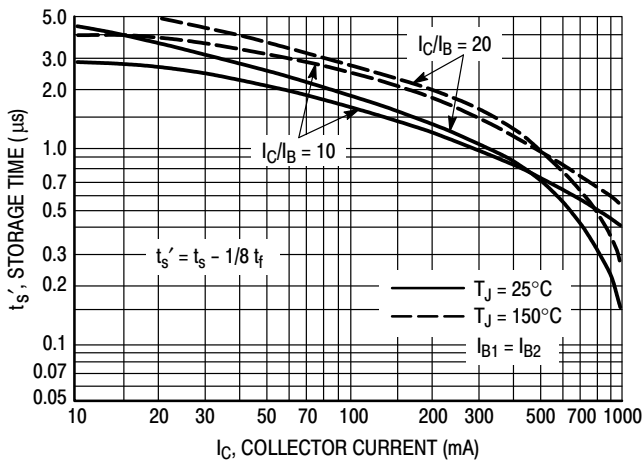


Figure 6. Storage Time

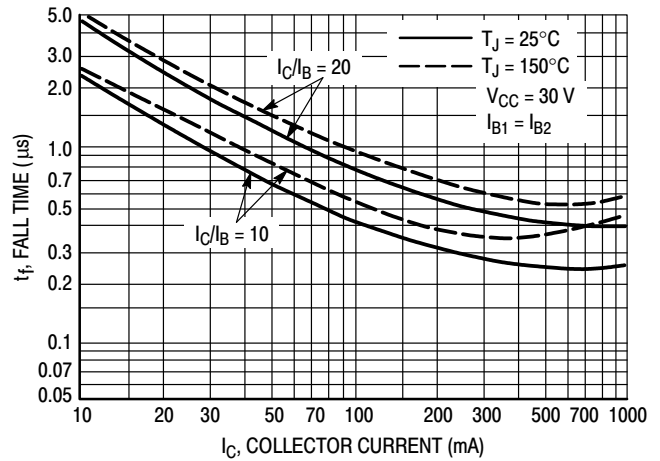


Figure 7. Fall Time

2N4918 – 2N4920 Series

TYPICAL DC CHARACTERISTICS

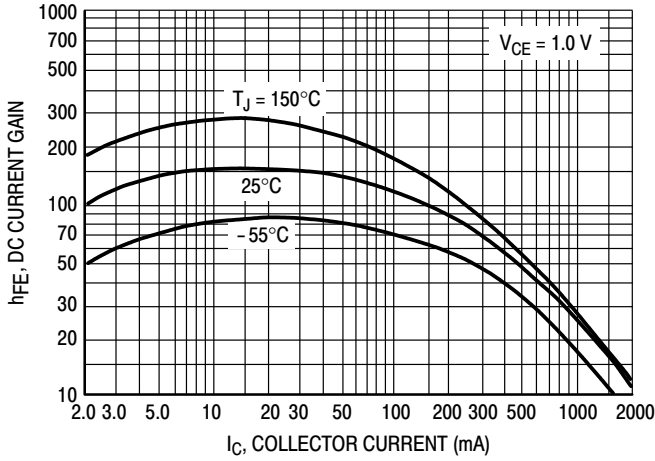


Figure 8. Current Gain

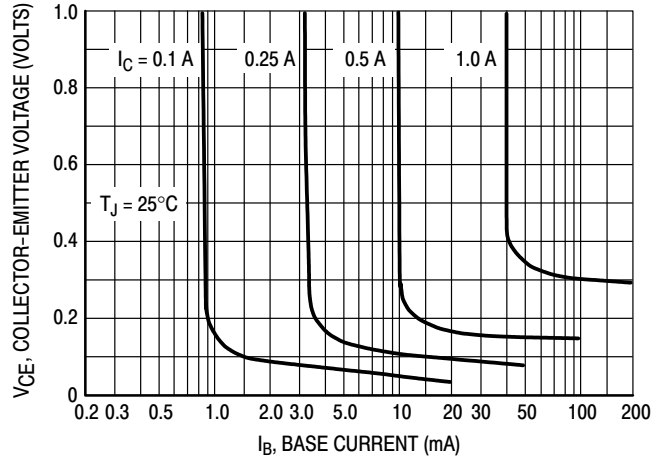


Figure 9. Collector Saturation Region

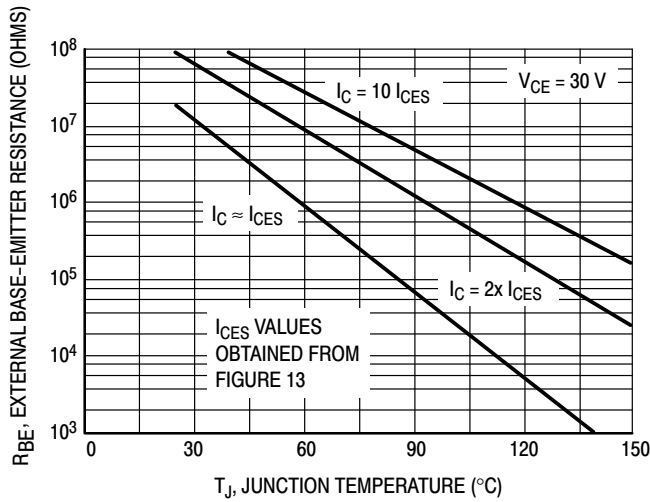


Figure 10. Effects of Base-Emitter Resistance

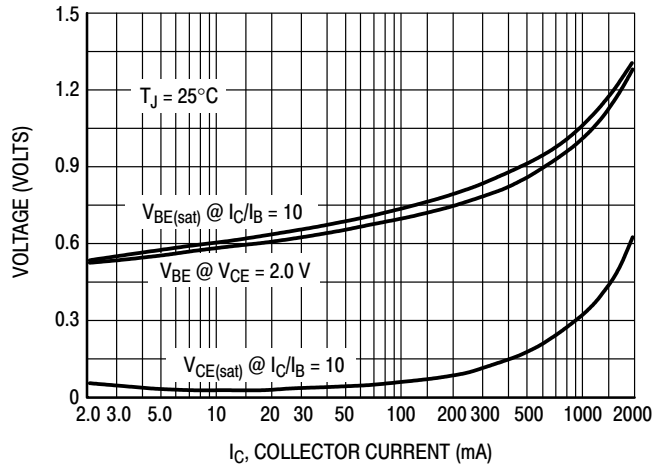


Figure 11. "On" Voltage

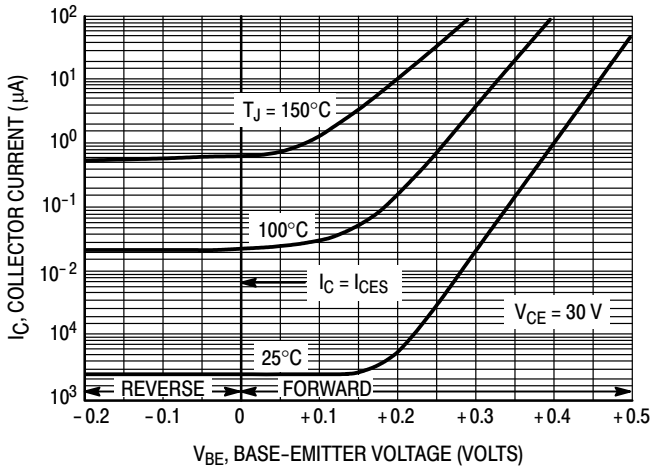


Figure 12. Collector Cut-Off Region

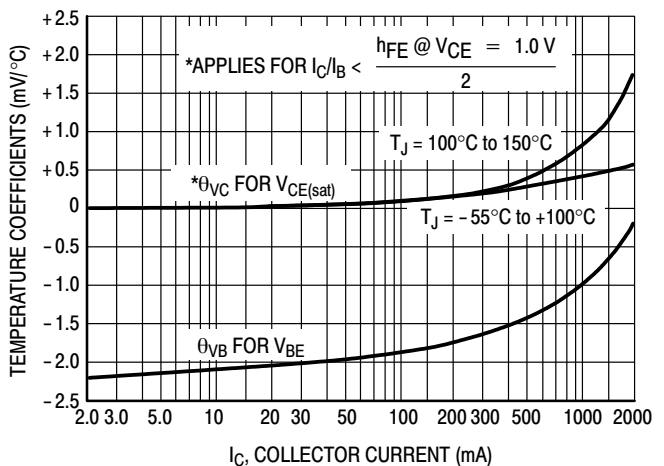
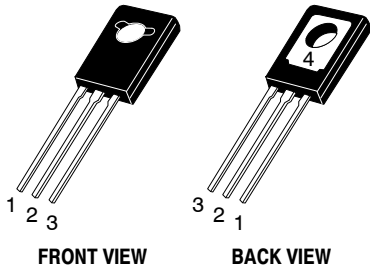


Figure 13. Temperature Coefficients

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

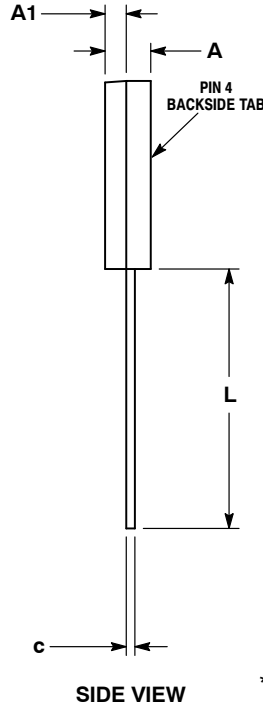
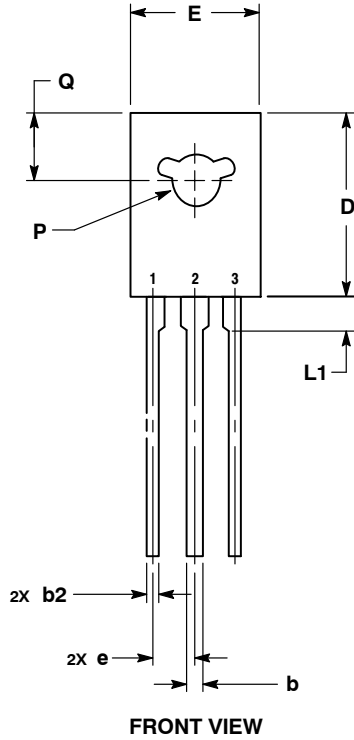
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TO-225
CASE 77-09
ISSUE AD

DATE 25 MAR 2015

SCALE 1:1

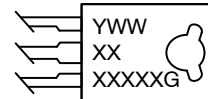


NOTES:

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

| DIM | MILLIMETERS | |
|-----|-------------|-------|
| | 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 "µ", may or may not be present.

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

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