

2SA1020

One Watt High Current PNP Transistor

Features

- This is a Pb-Free Device*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|----------------|----------------------------|
| Collector - Emitter Voltage | V_{CE} | 50 | Vdc |
| Collector - Base Voltage | V_{CB} | 50 | Vdc |
| Emitter - Base Voltage | V_{EB} | 5.0 | Vdc |
| Collector Current - Continuous | I_C | 2.0 | Adc |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 900 5.0 | mW mW/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.5 12 | W mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 125 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

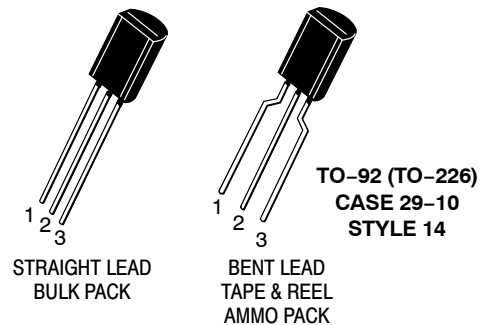
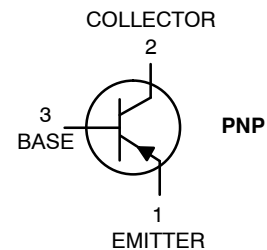
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



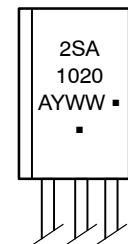
ON Semiconductor®

<http://onsemi.com>

VOLTAGE AND CURRENT ARE NEGATIVE FOR PNP TRANSISTORS



MARKING DIAGRAM



- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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

| Characteristic | Symbol | Min | Max | Unit |
|--|---------------|----------|----------|-----------------|
| OFF CHARACTERISTICS | | | | |
| Collector – Emitter Breakdown Voltage (Note 1) ($I_C = 10 \text{ mAdc}$, $I_B = 0$) | $V_{(BR)CEO}$ | 50 | – | Vdc |
| Collector Cutoff Current ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$) | I_{CBO} | – | 1.0 | μAdc |
| Emitter Cutoff Current ($V_{EB} = 5.0 \text{ V}$, $I_C = 0$) | I_{EBO} | – | 1.0 | μAdc |
| ON CHARACTERISTICS (Note 2) | | | | |
| DC Current Gain ($I_C = 500 \text{ mA}$, $V_{CE} = 2.0 \text{ V}$) ($I_C = 1.5 \text{ A}$, $V_{CE} = 2.0 \text{ V}$) | h_{FE} | 70 40 | 240 – | – |
| Collector – Emitter Saturation Voltage ($I_C = 1.0 \text{ A}$, $I_B = 50 \text{ mA}$) | $V_{CE(sat)}$ | – | 0.5 | Vdc |
| Base – Emitter Saturation Voltage ($I_C = 1.0 \text{ A}$, $I_B = 50 \text{ mA}$) | $V_{BE(sat)}$ | – | 1.2 | Vdc |
| SMALL-SIGNAL CHARACTERISTICS | | | | |
| Current – Gain – Bandwidth Product (Note 3) ($I_C = 500 \text{ mAdc}$, $V_{CE} = 2.0 \text{ Vdc}$, $f = 100 \text{ MHz}$) | f_T | 100 | – | MHz |

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle = 2.0%.
2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle = 2.0%.
3. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|--------------|--------------------|-----------------------|
| 2SA1020RLRAG | TO-92 (Pb-Free) | 2000 / 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.

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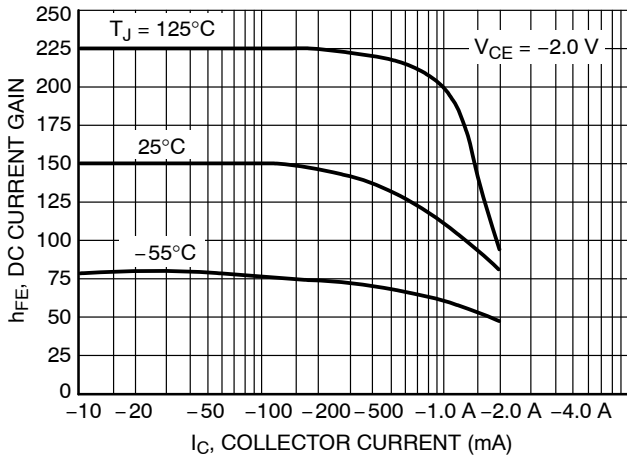


Figure 1. Typical DC Current Gain

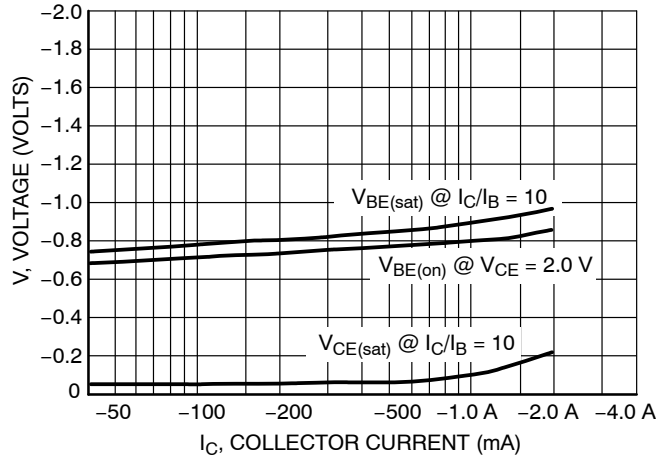


Figure 2. On Voltages

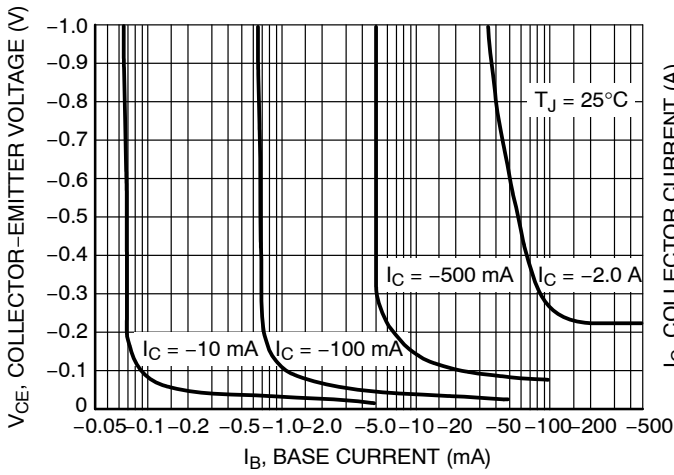


Figure 3. Collector Saturation Region

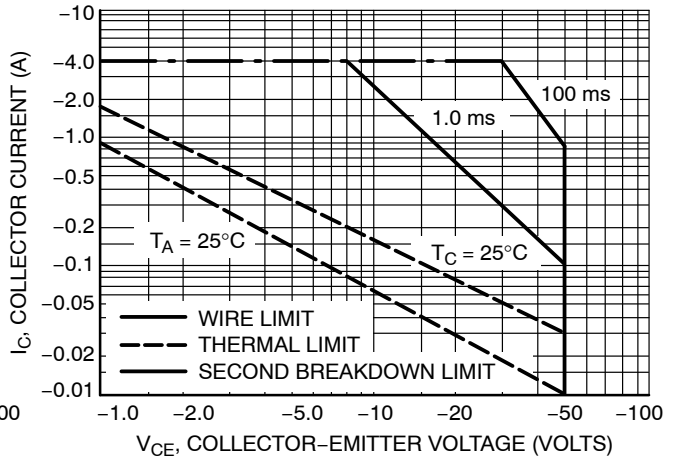
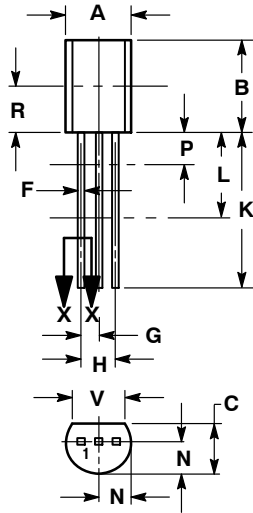


Figure 4. Safe Operating Area

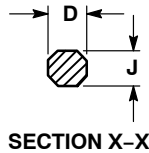
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PACKAGE DIMENSIONS

TO-92 (TO-226) 1 WATT
CASE 29-10
ISSUE O



STRAIGHT LEAD
BULK PACK



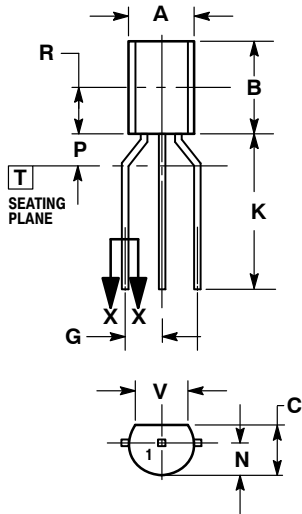
SECTION X-X

NOTES:

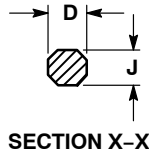
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.175 | 0.205 | 4.44 | 5.21 |
| B | 0.290 | 0.310 | 7.37 | 7.87 |
| C | 0.125 | 0.165 | 3.18 | 4.19 |
| D | 0.018 | 0.021 | 0.46 | 0.53 |
| F | 0.016 | 0.019 | 0.41 | 0.48 |
| G | 0.045 | 0.055 | 1.15 | 1.39 |
| H | 0.095 | 0.105 | 2.42 | 2.66 |
| J | 0.018 | 0.024 | 0.46 | 0.61 |
| K | 0.500 | --- | 12.70 | --- |
| L | 0.250 | --- | 6.35 | --- |
| N | 0.080 | 0.105 | 2.04 | 2.66 |
| P | --- | 0.100 | --- | 2.54 |
| R | 0.135 | --- | 3.43 | --- |
| V | 0.135 | --- | 3.43 | --- |

STYLE 14:
PIN 1. EMITTER
2. COLLECTOR
3. BASE



BENT LEAD
TAPE & REEL
AMMO PACK



SECTION X-X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
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| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.175 | 0.205 | 4.44 | 5.21 |
| B | 0.290 | 0.310 | 7.37 | 7.87 |
| C | 0.125 | 0.165 | 3.18 | 4.19 |
| D | 0.018 | 0.021 | 0.46 | 0.53 |
| G | 0.094 | 0.102 | 2.40 | 2.80 |
| J | 0.018 | 0.024 | 0.46 | 0.61 |
| K | 0.500 | --- | 12.70 | --- |
| N | 0.080 | 0.105 | 2.04 | 2.66 |
| P | --- | 0.100 | --- | 2.54 |
| R | 0.135 | --- | 3.43 | --- |
| V | 0.135 | --- | 3.43 | --- |

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