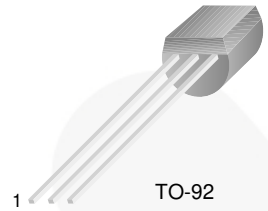
February 2015

# 2N5550
# NPN Epitaxial Silicon Transistor

## Features

- Amplifier Transistor
- Collector-Emitter Voltage: $V_{CEO}$ = 140 V



TO-92

1. Emitter 2. Base 3. Collector

## Ordering Information

| Part Number | Top Mark | Package | Packing Method |
|---|---|---|---|
| 2N5550BU | 2N5550 | TO-92 3L | Bulk |
| 2N5550TA | 2N5550 | TO-92 3L | Ammo |
| 2N5550TAR | 2N5550 | TO-92 3L | Ammo |
| 2N5550TF | 2N5550 | TO-92 3L | Tape and Reel |
| 2N5550TFR | 2N5550 | TO-92 3L | Tape and Reel |

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 160 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 140 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 6 | V |
| $I_C$ | Collector Current | 600 | mA |
| $T_J$ | Junction Temperature | 150 | °C |
| $T_{STG}$ | Storage Temperature | -55 to 150 | °C |

## Thermal Characteristics[1]

Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | Max. | Unit |
|---|---|---|---|
| $P_D$ | Total Device Dissipation | 625 | mW |
| | Derate Above 25°C | 5.0 | mW/°C |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 200 | °C/W |

**Note:**

1. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## Electrical Characteristics

Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | Collector-Base Breakdown Voltage | $I_C$ = 100 µA, $I_E$ = 0 | 160 | | | V |
| $BV_{CEO}$ | Collector-Emitter Breakdown Voltage[2] | $I_C$ = 1 mA, $I_B$ = 0 | 140 | | | V |
| $BV_{EBO}$ | Emitter-Base Breakdown Voltage | $I_E$ = 10 µA, $I_C$ = 0 | 6 | | | V |
| $I_{CBO}$ | Collector Cut-Off Current | $V_{CB}$ = 100 V, $I_E$ = 0 | | | 100 | nA |
| $I_{EBO}$ | Emitter Cut-Off Current | $V_{EB}$ = 4 V, $I_C$ = 0 | | | 50 | nA |
| $h_{FE}$ | DC Current Gain[2] | $I_C$ = 1 mA, $V_{CE}$ = 5 V | 60 | | | |
| | | $I_C$ = 10 mA, $V_{CE}$ = 5 V | 60 | | 250 | |
| | | $I_C$ = 50 mA, $V_{CE}$ = 5 V | 20 | | | |
| $V_{CE}$(sat) | Collector-Emitter Saturation Voltage[2] | $I_C$ = 10 mA, $I_B$ = 1 mA | | | 0.15 | V |
| | | $I_C$ = 50 mA, $I_B$ = 5 mA | | | 0.25 | |
| $V_{BE}$(sat) | Base-Emitter Saturation Voltage[2] | $I_C$ = 10 mA, $I_B$ = 1 mA | | | 1.0 | V |
| | | $I_C$ = 50 mA, $I_B$ = 5 mA | | | 1.2 | |
| $f_T$ | Current Gain Bandwidth Product | $I_C$ = 10 mA, $V_{CE}$ = 10 V f = 100 MHz | 100 | | 300 | MHz |
| $C_{ob}$ | Output Capacitance | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz | | | 6 | pF |
| NF | Noise Figure | $I_C$ = 250 µA, $V_{CE}$ = 5 V, $R_S$ = 1 kΩ,f = 10 Hz to 15.7 kHz | | | 10 | dB |

**Note:**

2. Pulse test: pulse width ≤ 300 µs, duty cycle ≤ 2%

## Typical Performance Characteristics

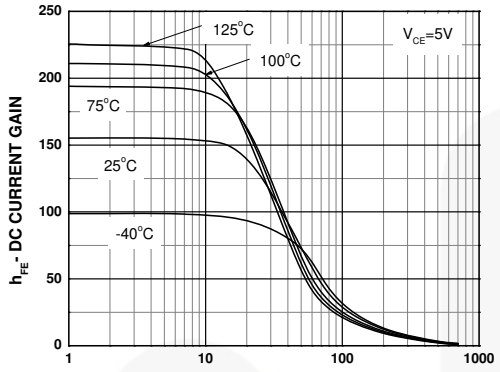



**Figure 1. Typical Pulsed Current Gain vs. Collector Current**

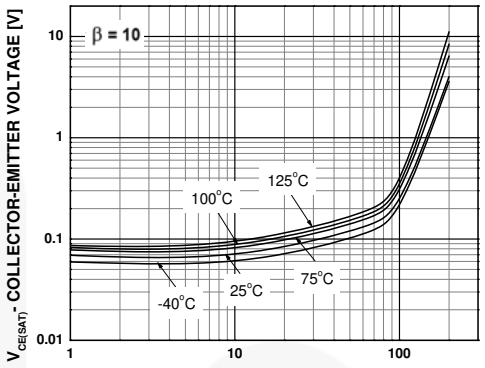



**Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current**

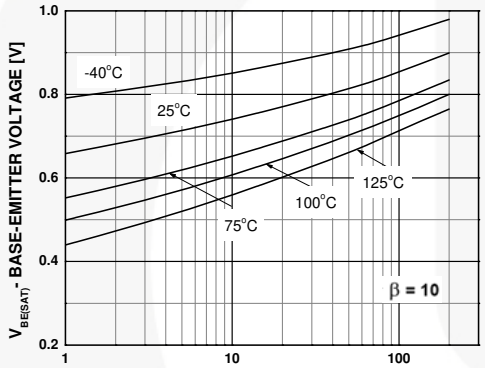



**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**

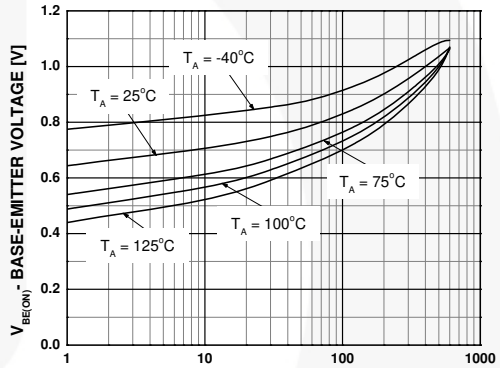



**Figure 4. Base-Emitter On Voltage vs. Collector Current**

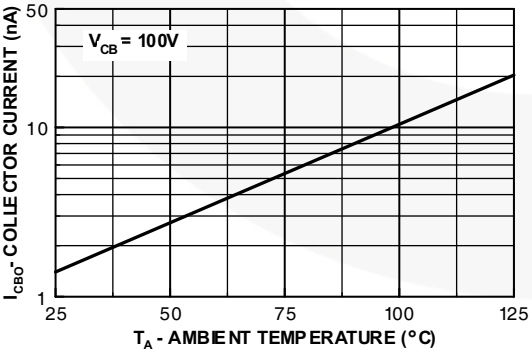



**Figure 5. Collector Cut-Off Current vs. Ambient Temperature**

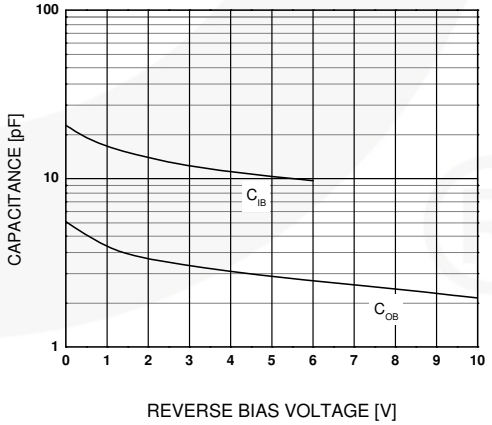



**Figure 6. Input and Output Capacitance vs. Reverse Voltage**

## Typical Performance Characteristics (Continued)

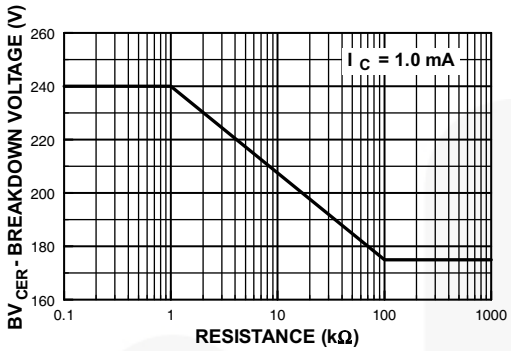



**Figure 7. Collector- Emitter Breakdown Voltage with Resistance between Emitter-Base**

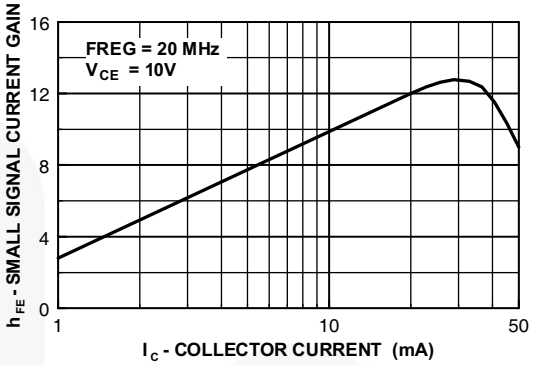



**Figure 8. Small Signal Current Gain vs. Collector Current**

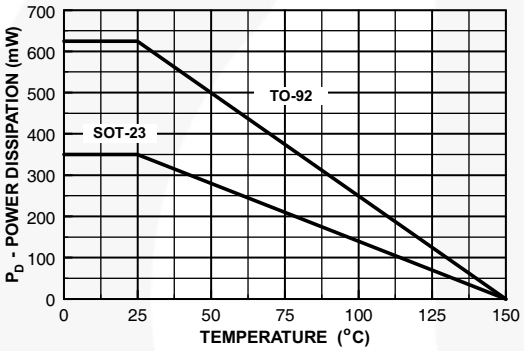
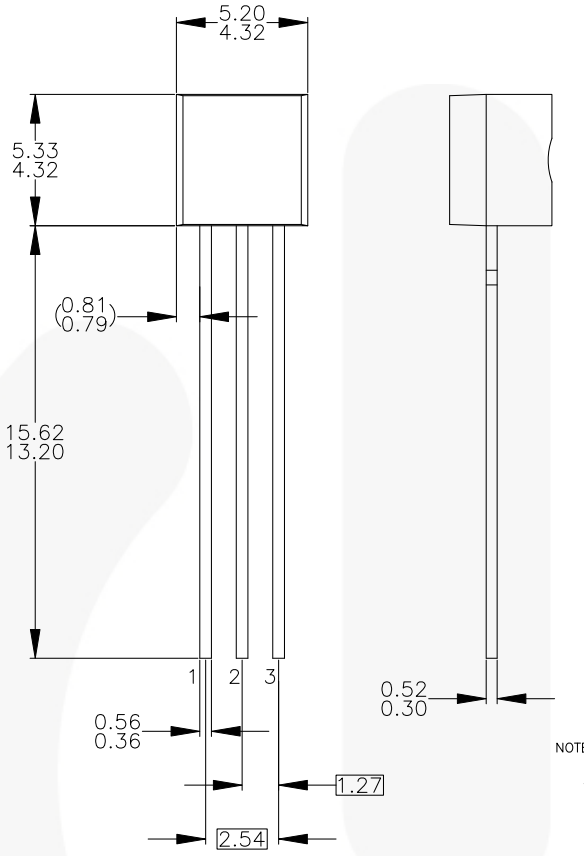



**Figure 9. Power Dissipation vs. Ambient Temperature**

## Physical Dimensions




NOTES: UNLESS OTHERWISE SPECIFIED

A) DRAWING WITH REFERENCE TO JEDEC TO−92 RECOMMENDATIONS.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DRAWING CONFORMS TO ASME Y14.5M−1994.
D) TO−92 (92,94,96,97,98) PIN CONFIGURATION:

| PIN | 92 | | | 94 | | | 96 | | | 97 | | | 98 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | F | M | P | F | M | B | F | M | P | F | M | P | F | M |
| 1 | E | S | S | E | S | S | B | D | G | C | G | D | C | G | D |
| 2 | B | D | G | C | G | D | E | S | S | B | D | G | E | S | S |
| 3 | C | G | D | B | D | G | C | G | D | E | S | S | B | D | G |

LEGEND:

| | | |
|---|---|---|
| P − BIPOLAR | E − EMITTER | D − DRAIN |
| F − JFET | B − BASE | S − SOURCE |
| M − DMOS | C − COLLECTOR | G − GATE |

E) FOR PACKAGE 92, 94, 96, 97 AND 98: PIN CONFIGURATION DRAIN "D" AND SOURCE "S" ARE INTERCHANGEAGLE AT JFET "F" OPTION.
F) DRAWING FILENAME: MKT−ZA03DREV3.

**Figure 10. 3-Lead, TO-92, JEDEC TO-92 Compliant Straight Lead Configuration, Bulk Type**

## Physical Dimensions (Continued)

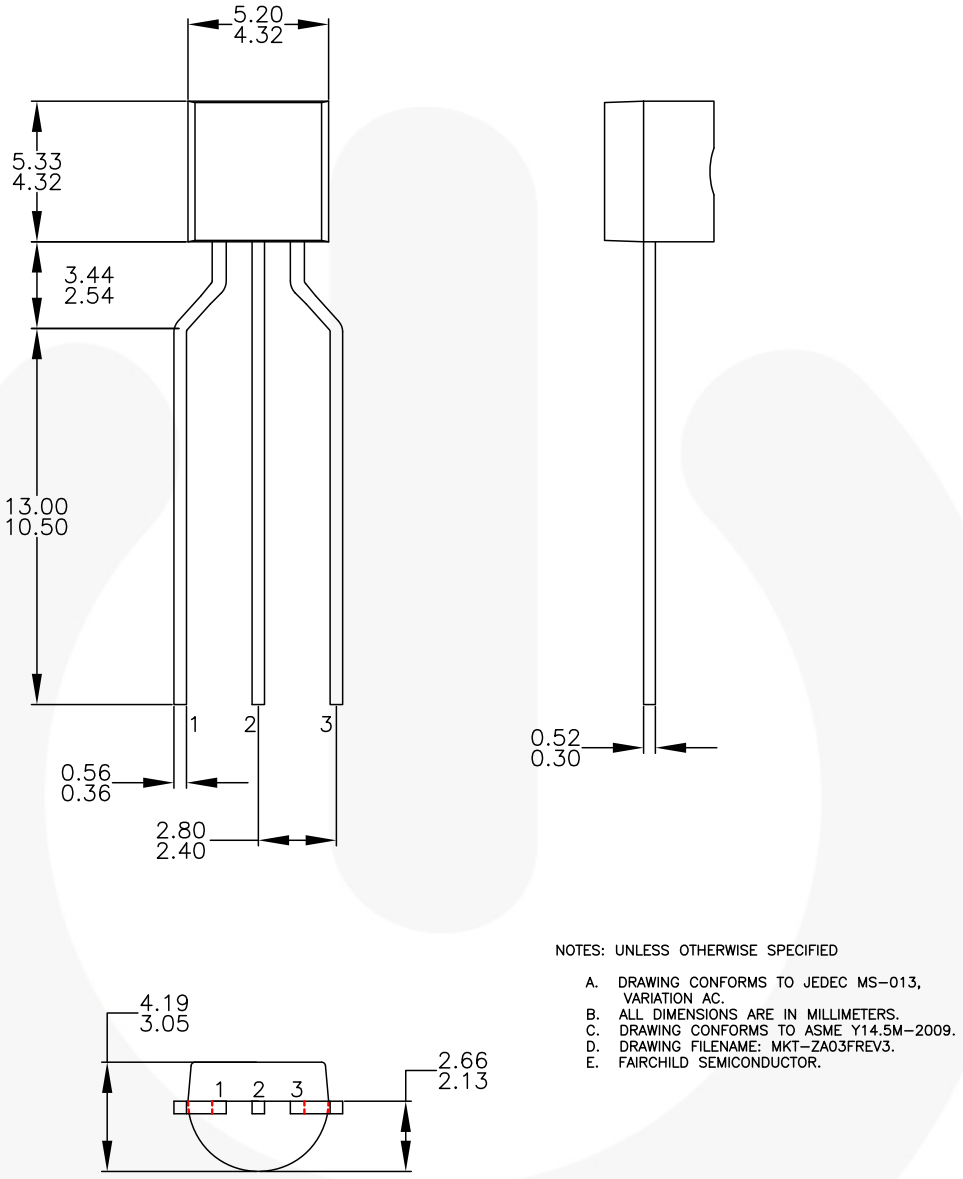



**Figure 11. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type**

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