

2N3055, MJ2955

Preferred Device

Complementary Silicon Power Transistors

... designed for general-purpose switching and amplifier applications.

- DC Current Gain – $h_{FE} = 20-70$ @ $I_C = 4$ Adc
- Collector-Emitter Saturation Voltage – $V_{CE(sat)} = 1.1$ Vdc (Max) @ $I_C = 4$ Adc
- Excellent Safe Operating Area
- Pb-Free Package is Available

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|--------------|--------------------------|
| Collector-Emitter Voltage | V_{CEO} | 60 | Vdc |
| Collector-Emitter Voltage | V_{CER} | 70 | Vdc |
| Collector-Base Voltage | V_{CB} | 100 | Vdc |
| Emitter-Base Voltage | V_{EB} | 7 | Vdc |
| Collector Current – Continuous | I_C | 15 | Adc |
| Base Current | I_B | 7 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 115 0.657 | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--------------------------------------|-----------------|------|--------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.52 | $^\circ\text{C/W}$ |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

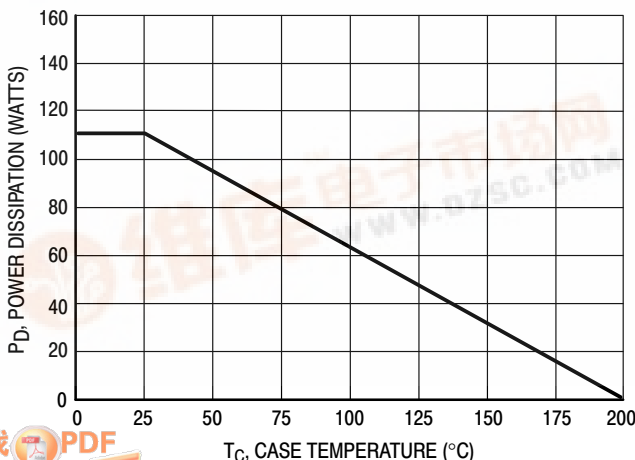


Figure 1. Power Derating

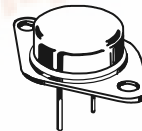


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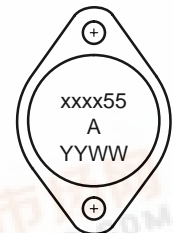
15 A POWER TRANSISTORS COMPLEMENTARY SILICON

60 V
115 W



TO-204AA (TO-3)
CASE 1-07

MARKING DIAGRAM



xxxx55 = Device Code
xxxx = 2N3055 or MJ2955
A = Assembly Location
YY = Year
WW = Work Week
x = 1, 2, or 3

ORDERING INFORMATION

| Device | Package | Shipping† |
|---------|-----------------------|------------------|
| 2N3055 | TO-204AA | 100 Units / Tray |
| 2N3055G | TO-204AA (Pb-Free) | 1 Units / Tubes |
| 2N3055H | TO-204AA | 100 Units / Tray |
| MJ2955 | TO-204AA | 100 Units / Tray |

†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.

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

Preferred devices are recommended choices for future use and best overall value.



2N3055, MJ2955

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

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

*OFF CHARACTERISTICS

| | | | | |
|--|----------------|--------|------------|------|
| Collector–Emitter Sustaining Voltage (Note 1) ($I_C = 200\text{ mAdc}$, $I_B = 0$) | $V_{CEO(sus)}$ | 60 | – | Vdc |
| Collector–Emitter Sustaining Voltage (Note 1) ($I_C = 200\text{ mAdc}$, $R_{BE} = 100\ \Omega$) | $V_{CER(sus)}$ | 70 | – | Vdc |
| Collector Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) | I_{CEO} | – | 0.7 | mAdc |
| Collector Cutoff Current ($V_{CE} = 100\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 100\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$) | I_{CEX} | – – | 1.0 5.0 | mAdc |
| Emitter Cutoff Current ($V_{BE} = 7.0\text{ Vdc}$, $I_C = 0$) | I_{EBO} | – | 5.0 | mAdc |

*ON CHARACTERISTICS (Note 1)

| | | | | |
|--|---------------|-----------|------------|-----|
| DC Current Gain ($I_C = 4.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 10\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) | h_{FE} | 20 5.0 | 70 – | – |
| Collector–Emitter Saturation Voltage ($I_C = 4.0\text{ Adc}$, $I_B = 400\text{ mAdc}$) ($I_C = 10\text{ Adc}$, $I_B = 3.3\text{ Adc}$) | $V_{CE(sat)}$ | – | 1.1 3.0 | Vdc |
| Base–Emitter On Voltage ($I_C = 4.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) | $V_{BE(on)}$ | – | 1.5 | Vdc |

SECOND BREAKDOWN

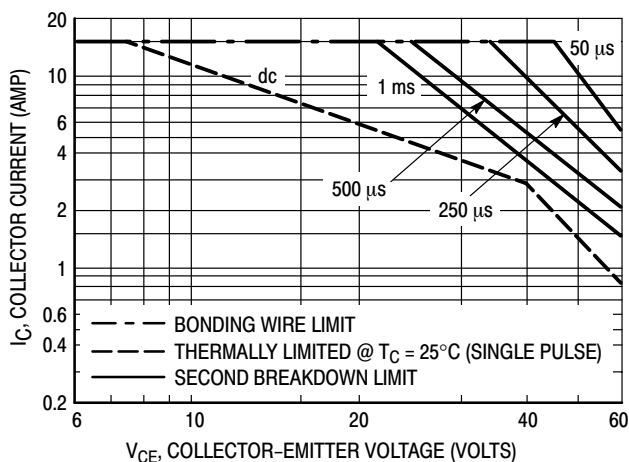
| | | | | |
|---|-----------|------|---|-----|
| Second Breakdown Collector Current with Base Forward Biased ($V_{CE} = 40\text{ Vdc}$, $t = 1.0\text{ s}$, Nonrepetitive) | $I_{s/b}$ | 2.87 | – | Adc |
|---|-----------|------|---|-----|

DYNAMIC CHARACTERISTICS

| | | | | |
|--|-----------|-----|-----|-----|
| Current Gain – Bandwidth Product ($I_C = 0.5\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ MHz}$) | f_T | 2.5 | – | MHz |
| *Small–Signal Current Gain ($I_C = 1.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$, $f = 1.0\text{ kHz}$) | h_{fe} | 15 | 120 | – |
| *Small–Signal Current Gain Cutoff Frequency ($V_{CE} = 4.0\text{ Vdc}$, $I_C = 1.0\text{ Adc}$, $f = 1.0\text{ kHz}$) | f_{hfe} | 10 | – | kHz |

*Indicates Within JEDEC Registration. (2N3055)

1. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.



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

The data of Figure 2 is based on $T_C = 25^\circ\text{C}$; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% but must be derated for temperature according to Figure 1.

2N3055, MJ2955

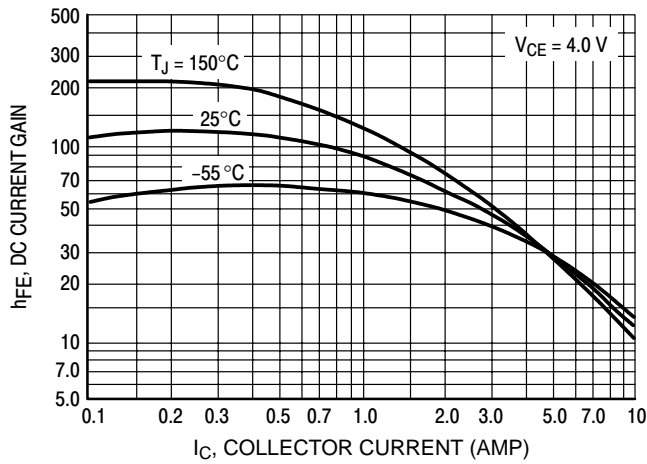


Figure 3. DC Current Gain, 2N3055 (NPN)

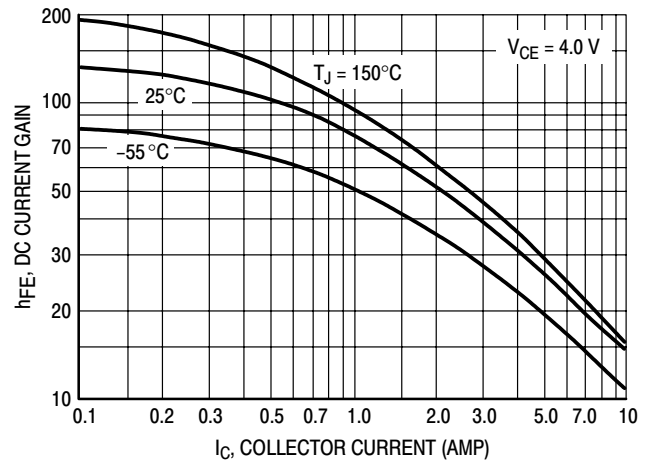


Figure 4. DC Current Gain, MJ2955 (PNP)

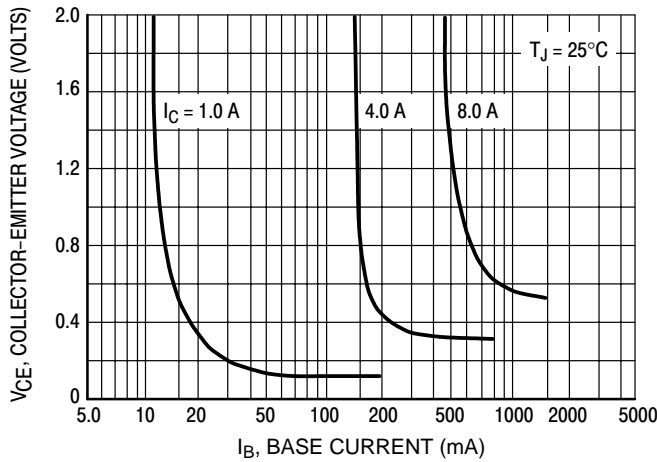


Figure 5. Collector Saturation Region, 2N3055 (NPN)

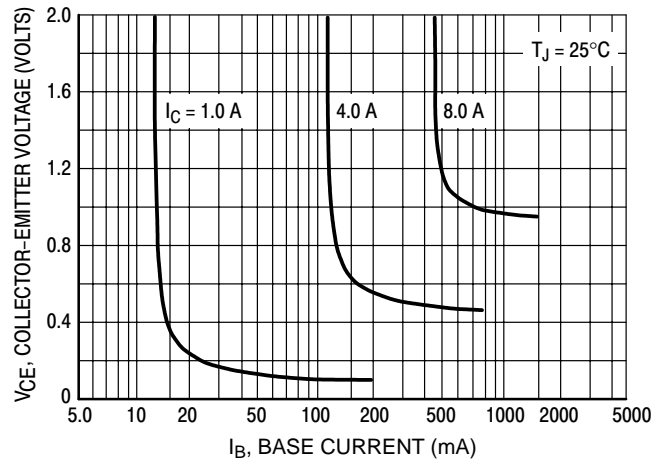


Figure 6. Collector Saturation Region, MJ2955 (PNP)

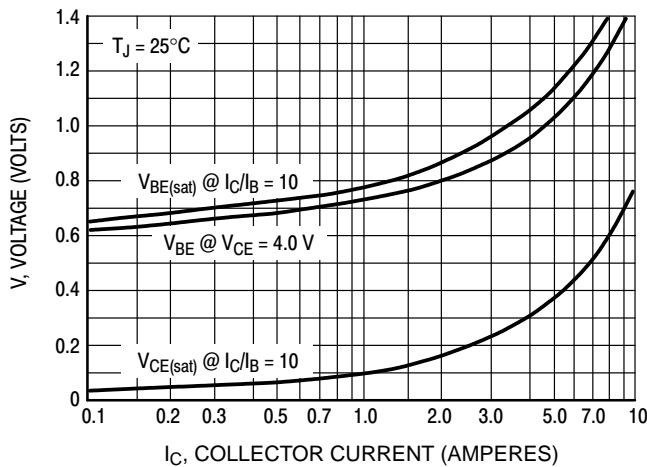


Figure 7. "On" Voltages, 2N3055 (NPN)

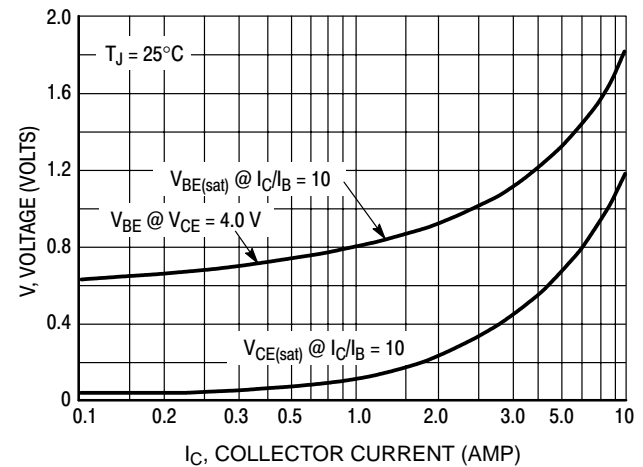
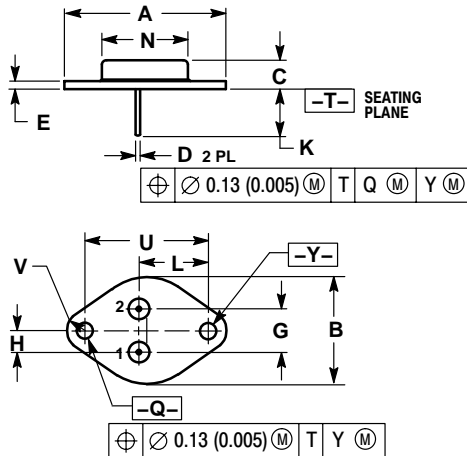


Figure 8. "On" Voltages, MJ2955 (PNP)

2N3055, MJ2955

PACKAGE DIMENSIONS


TO-204 (TO-3)
CASE 1-07
ISSUE Z



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO-204AA OUTLINE SHALL APPLY.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.550 REF | | 39.37 REF | |
| B | --- | 1.050 | --- | 26.67 |
| C | 0.250 | 0.335 | 6.35 | 8.51 |
| D | 0.038 | 0.043 | 0.97 | 1.09 |
| E | 0.055 | 0.070 | 1.40 | 1.77 |
| G | 0.430 BSC | | 10.92 BSC | |
| H | 0.215 BSC | | 5.46 BSC | |
| K | 0.440 | 0.480 | 11.18 | 12.19 |
| L | 0.665 BSC | | 16.89 BSC | |
| N | --- | 0.830 | --- | 21.08 |
| Q | 0.151 | 0.165 | 3.84 | 4.19 |
| U | 1.187 BSC | | 30.15 BSC | |
| V | 0.131 | 0.188 | 3.33 | 4.77 |

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