

MJ423

High-Voltage NPN Silicon Transistor

... designed for medium-to-high voltage inverters, converters, regulators and switching circuits.

- High Voltage — $V_{CEX} = 400$ Vdc
- Gain Specified to 3.5 Amp
- High Frequency Response to 2.5 MHz

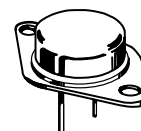
**10 AMPERE
POWER TRANSISTOR
NPN SILICON
400 VOLTS
125 WATTS**

MAXIMUM RATINGS

| Rating | Symbol | Max | Unit |
|--|-----------|-------------|------------------------------|
| Collector-Emitter Voltage | V_{CEX} | 400 | Vdc |
| Collector-Base Voltage | V_{CB} | 400 | Vdc |
| Emitter-Base Voltage | V_{EB} | 5.0 | Vdc |
| Collector Current — Continuous | I_C | 10 | Adc |
| Base Current | I_B | 2.0 | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 125 1.0 | Watts W/ $^\circ\text{C}$ |
| Operating Junction Temperature Range | T_J | -65 to +150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -65 to +200 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--------------------------------------|---------------|-----|---------------------------|
| Thermal Resistance, Junction to Case | θ_{JC} | 1.0 | $^\circ\text{C}/\text{W}$ |



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

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

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

OFF CHARACTERISTICS

| | | | | |
|--|--------------------|--------|-------------|------|
| Collector-Emitter Sustaining Voltage* (1) ($I_C = 100$ mAdc, $I_B = 0$) | $V_{(BR)CEO(sus)}$ | 325 | — | Vdc |
| Collector Cutoff Current ($V_{CE} = 400$ Vdc, $V_{EB(off)} = 1.5$ Vdc) ($V_{CE} = 400$ Vdc, $V_{EB(off)} = 1.5$ Vdc, $T_C = 125^\circ\text{C}$) | I_{CEX} | — — | 0.25 0.5 | mAdc |
| Emitter Cutoff Current ($V_{BE} = 5.0$ Vdc, $I_C = 0$) | I_{EBO} | — | 5.0 | mAdc |

ON CHARACTERISTICS

| | | | | |
|--|---------------|----------|---------|-----|
| DC Current Gain(1) ($I_C = 1.0$ Adc, $V_{CE} = 5.0$ Vdc) ($I_C = 2.5$ Adc, $V_{CE} = 5.0$ Vdc) | h_{FE} | 30 10 | 90 — | — |
| Collector-Emitter Saturation Voltage (1) ($I_C = 1.0$ Adc, $I_B = 0.10$ Adc) | $V_{CE(sat)}$ | — | 0.8 | Vdc |
| Base-Emitter Saturation Voltage ($I_C = 1.0$ Adc, $I_B = 0.1$ Adc) | $V_{BE(sat)}$ | — | 1.25 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | |
|---|-------|-----|---|-----|
| Current-Gain — Bandwidth Product ($I_C = 200$ mAdc, $V_{CE} = 10$ Vdc, $f = 1.0$ MHz) | f_T | 2.5 | — | MHz |
|---|-------|-----|---|-----|

(1) $PW \leq 300$ μs Duty Cycle $\leq 2.0\%$.

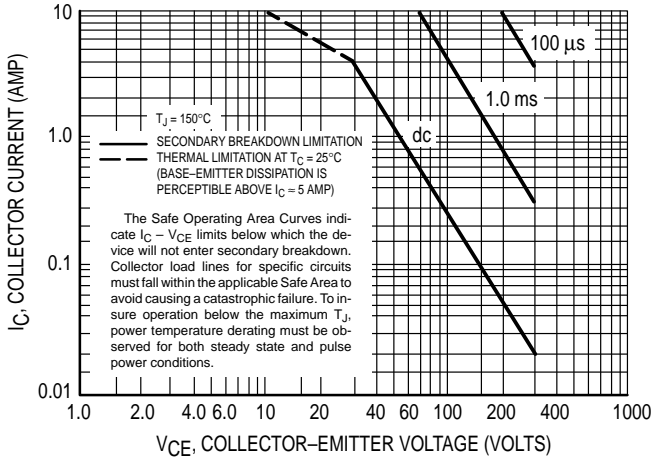


Figure 1. Active-Region Safe-Operating Area

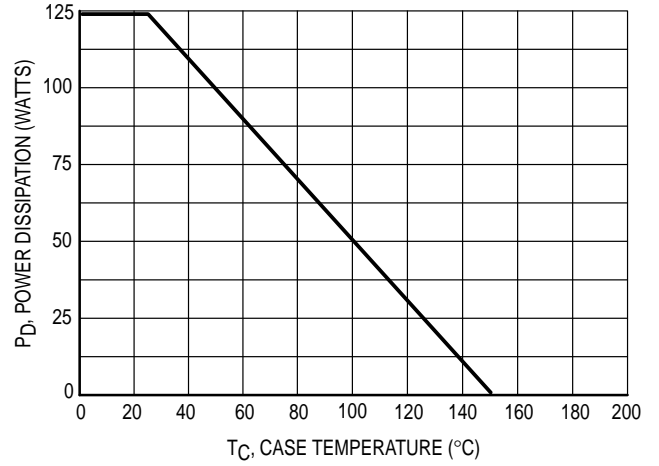


Figure 2. Power-Temperature Derating Curve

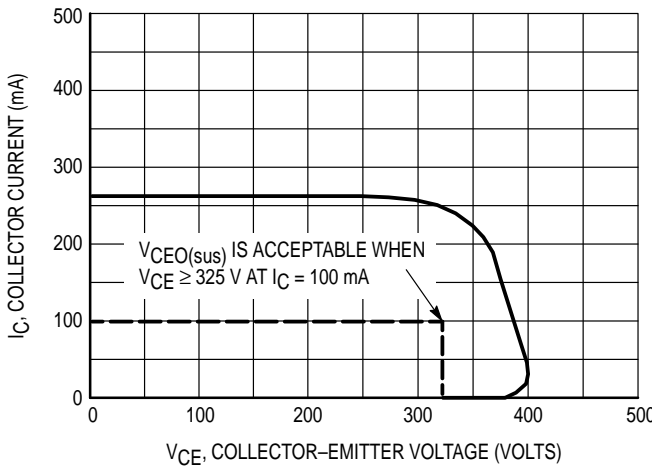


Figure 3. Sustaining Voltage Test Load Line

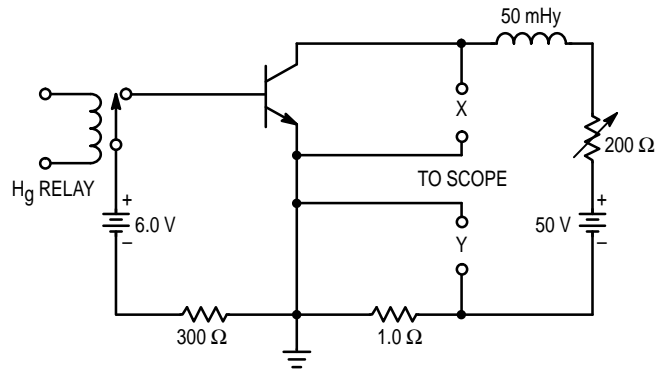


Figure 4. Sustaining Voltage Test Circuit

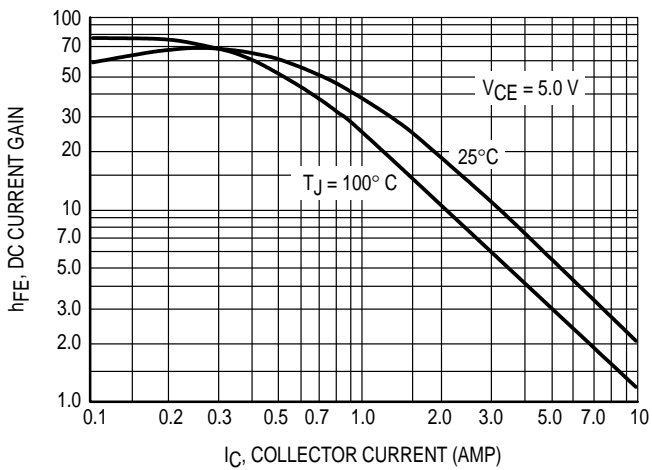


Figure 5. Current Gain

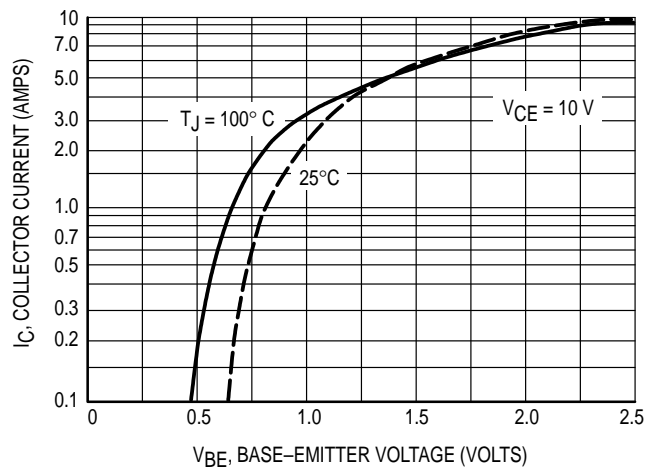
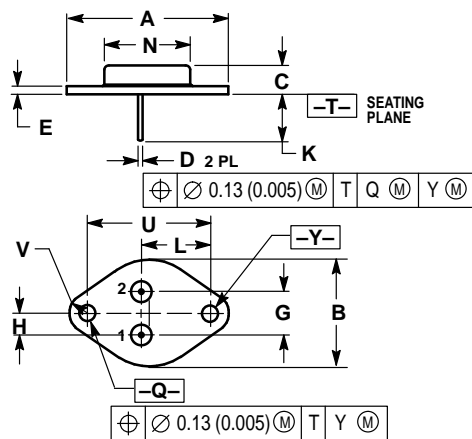


Figure 6. Transconductance

PACKAGE DIMENSIONS




- 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 |

STYLE 1:
 PIN 1. BASE
 2. EMITTER
 CASE: COLLECTOR

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

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