

## Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                 | Symbol           | Value | Unit |
|--------------------------------|------------------|-------|------|
| Collector-Base Voltage         | V <sub>CBO</sub> | 15    | V    |
| Collector-Emitter Voltage      | V <sub>CEO</sub> | 15    | V    |
| Emitter-Base Voltage           | V <sub>EBO</sub> | 6     | V    |
| Collector Current - Continuous | I <sub>C</sub>   | 500   | mA   |
| Peak Pulse Collector Current   | I <sub>CM</sub>  | 1     | A    |
| Peak Base Current              | I <sub>BM</sub>  | 100   | mA   |

## Thermal Characteristics

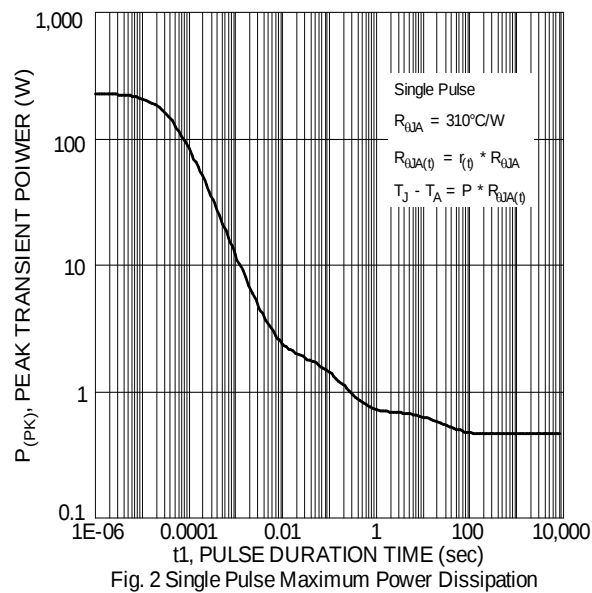
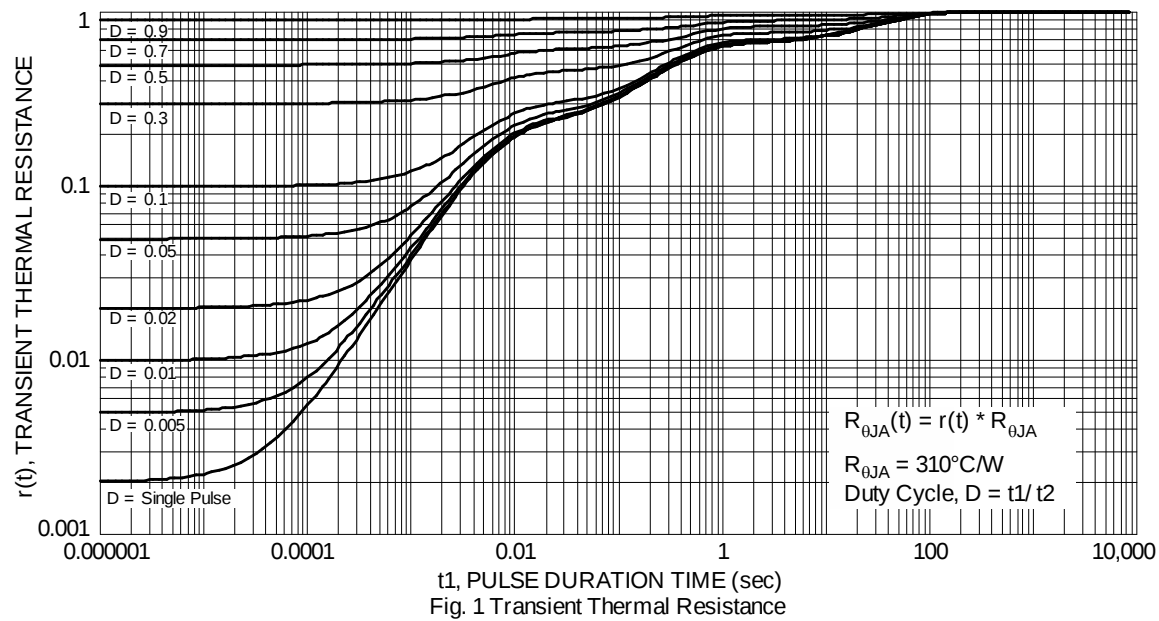
| Characteristic                              | Symbol                            | Value       | Unit |
|---------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                           | P <sub>D</sub>                    | 400         | mW   |
| (Note 5)                                    |                                   | 1,000       |      |
| Thermal Resistance, Junction to Ambient     | R <sub>θJA</sub>                  | 310         | °C/W |
| (Note 6)                                    |                                   | 120         |      |
| Thermal Resistance, Junction to Lead        | R <sub>θJL</sub>                  | 120         | °C/W |
| Operating and Storage and Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

## ESD Ratings (Note 8)

| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | B           |

- Notes:
- For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
  - Same as Note 5, except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics



# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                               | Symbol               | Min              | Typ         | Max              | Unit     | Test Condition                                                                                                                                  |
|----------------------------------------------|----------------------|------------------|-------------|------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b>                   |                      |                  |             |                  |          |                                                                                                                                                 |
| Collector-Base Breakdown Voltage             | BV <sub>CBO</sub>    | 15               | —           | —                | V        | I <sub>C</sub> = 100μA, I <sub>E</sub> = 0                                                                                                      |
| Collector-Emitter Breakdown Voltage (Note 9) | BV <sub>CEO</sub>    | 15               | —           | —                | V        | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0                                                                                                       |
| Emitter-Base Breakdown Voltage               | BV <sub>EBO</sub>    | 6                | —           | —                | V        | I <sub>E</sub> = 100μA, I <sub>C</sub> = 0                                                                                                      |
| Collector Cutoff Current                     | I <sub>CBO</sub>     | —                | —           | 100<br>50        | nA<br>μA | V <sub>CB</sub> = 15V, I <sub>E</sub> = 0<br>V <sub>CB</sub> = 15V, I <sub>E</sub> = 0, T <sub>A</sub> = +150°C                                 |
| Emitter Cutoff Current                       | I <sub>EBO</sub>     | —                | —           | 100              | nA       | V <sub>EB</sub> = 5V, I <sub>C</sub> = 0                                                                                                        |
| <b>ON CHARACTERISTICS (Note 9)</b>           |                      |                  |             |                  |          |                                                                                                                                                 |
| DC Current Gain                              | h <sub>FE</sub>      | 200<br>150<br>90 | —<br>—<br>— | —<br>—<br>—      | —        | V <sub>CE</sub> = 2V, I <sub>C</sub> = 10mA<br>V <sub>CE</sub> = 2V, I <sub>C</sub> = 100mA<br>V <sub>CE</sub> = 2V, I <sub>C</sub> = 500mA     |
| Collector-Emitter Saturation Voltage         | V <sub>CE(sat)</sub> | —<br>—<br>—      | —<br>—<br>— | 25<br>150<br>250 | mV       | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA<br>I <sub>C</sub> = 200mA, I <sub>B</sub> = 10mA<br>I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA |
| Collector-Emitter Saturation Resistance      | R <sub>CE(sat)</sub> | —                | —           | 500              | mΩ       | I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA                                                                                                   |
| Base-Emitter Saturation Voltage              | V <sub>BE(sat)</sub> | —                | —           | 1.1              | V        | I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA                                                                                                   |
| Base-Emitter Turn On Voltage                 | V <sub>BE(on)</sub>  | —                | —           | 0.9              | V        | V <sub>CE</sub> = 2V, I <sub>C</sub> = 100mA                                                                                                    |
| <b>SMALL SIGNAL CHARACTERISTICS</b>          |                      |                  |             |                  |          |                                                                                                                                                 |
| Output Capacitance                           | C <sub>obo</sub>     | —                | —           | 6                | pF       | V <sub>CB</sub> = 10V, f = 1.0MHz                                                                                                               |
| Current Gain-Bandwidth Product               | f <sub>T</sub>       | 250              | —           | —                | MHz      | V <sub>CE</sub> = 5V, I <sub>C</sub> = 100mA, f = 100MHz                                                                                        |

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

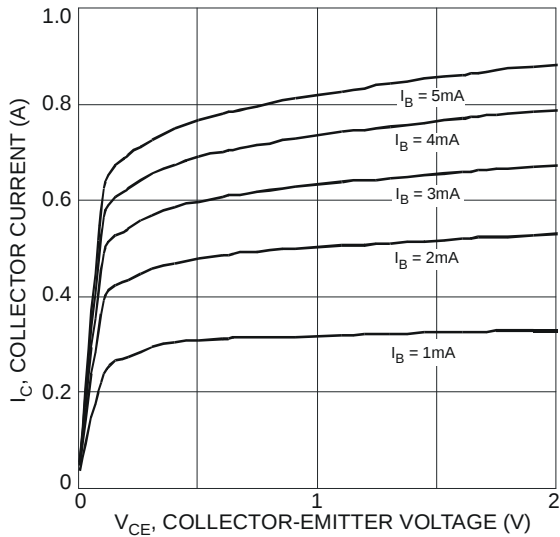


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

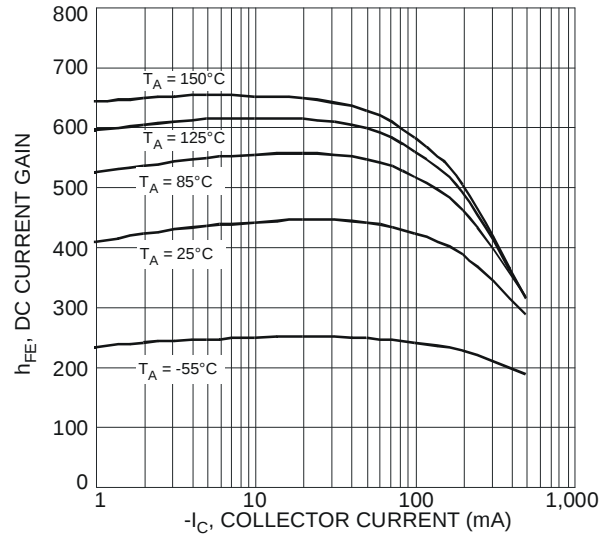


Fig. 5 Typical DC Current Gain vs. Collector Current

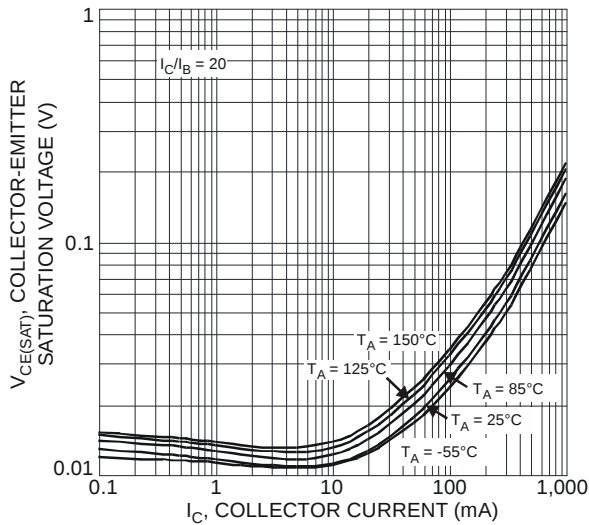


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

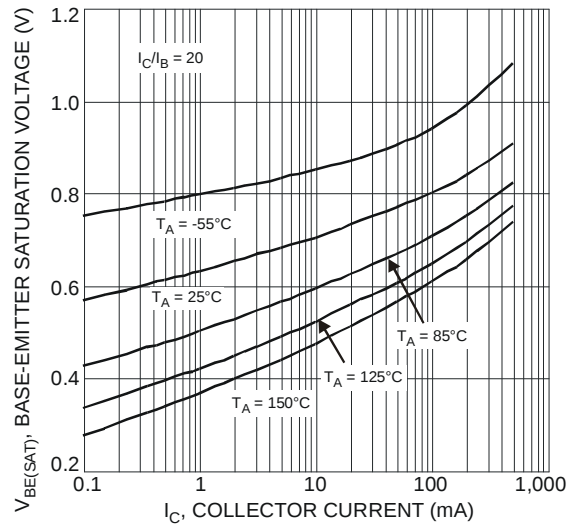


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

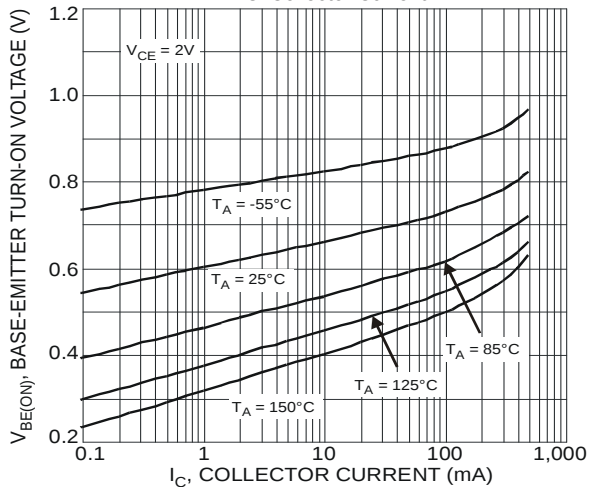


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

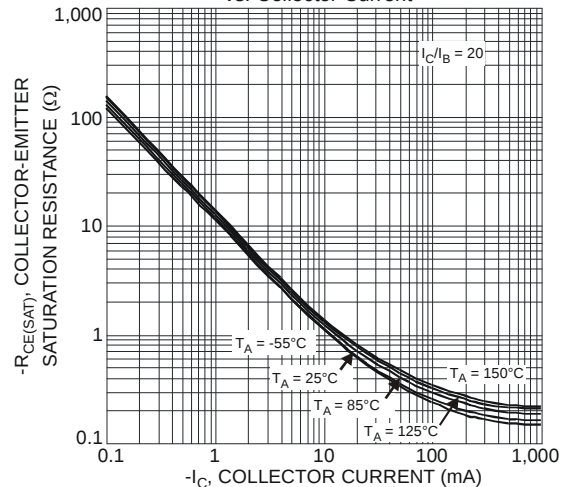
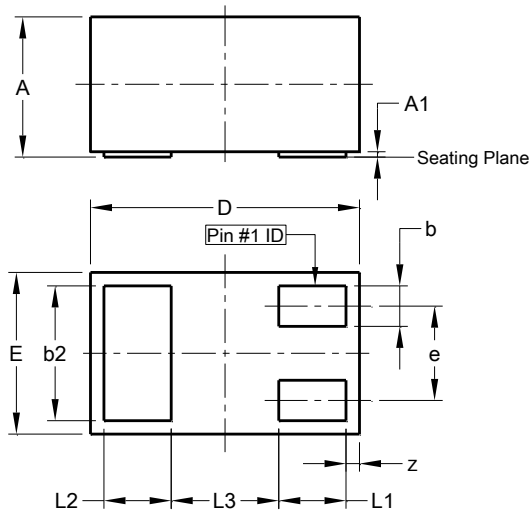


Fig. 9 Typical Collector-Emitter Saturation Resistance vs. Collector Current

## Package Outline Dimensions

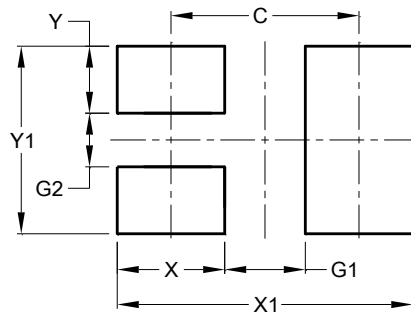
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| X1-DFN1006-3         |      |       |      |
|----------------------|------|-------|------|
| Dim                  | Min  | Max   | Typ  |
| A                    | 0.47 | 0.53  | 0.50 |
| A1                   | 0.00 | 0.05  | 0.03 |
| b                    | 0.10 | 0.20  | 0.15 |
| b2                   | 0.45 | 0.55  | 0.50 |
| D                    | 0.95 | 1.075 | 1.00 |
| E                    | 0.55 | 0.675 | 0.60 |
| e                    | -    | -     | 0.35 |
| L1                   | 0.20 | 0.30  | 0.25 |
| L2                   | 0.20 | 0.30  | 0.25 |
| L3                   | -    | -     | 0.40 |
| z                    | 0.02 | 0.08  | 0.05 |
| All Dimensions in mm |      |       |      |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.70          |
| G1         | 0.30          |
| G2         | 0.20          |
| X          | 0.40          |
| X1         | 1.10          |
| Y          | 0.25          |
| Y1         | 0.70          |

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