

**150V NPN MEDIUM POWER TRANSISTOR IN SOT89**
**Features**

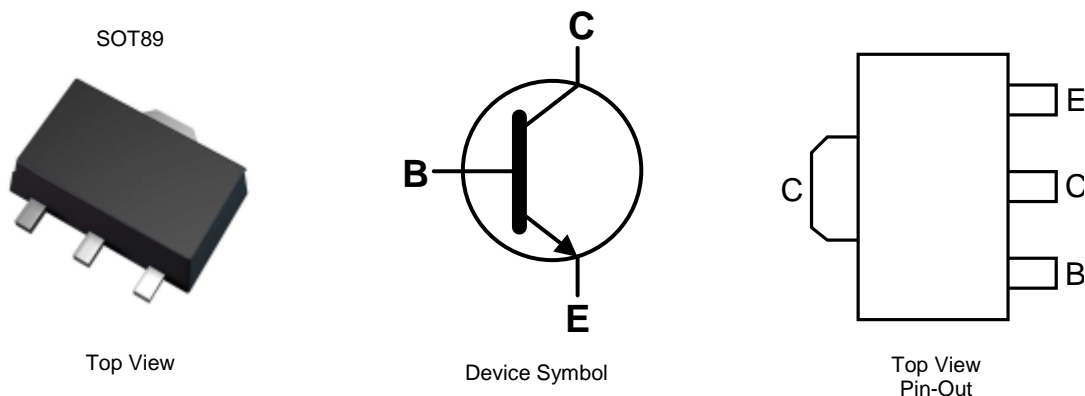
- $BV_{CEO} > 150V$
- $I_C = 1A$  High Continuous Current
- Low Saturation Voltage  $V_{CE(sat)} < 300mV @ 0.5A$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Application**

- Low Loss Power Switching

**Mechanical Data**

- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 Ⓔ
- Weight: 0.052 grams (Approximate)


**Ordering Information** (Note 4)

| Product    | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|---------|--------------------|-----------------|-------------------|
| FCX495TA   | N95     | 7                  | 12              | 1,000             |
| FCX495TC   | N95     | 13                 | 12              | 4,000             |
| FCX495-13R | N95     | 13                 | 12              | 4,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen and Antimony free, "Green" and Lead-Free.
  3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**

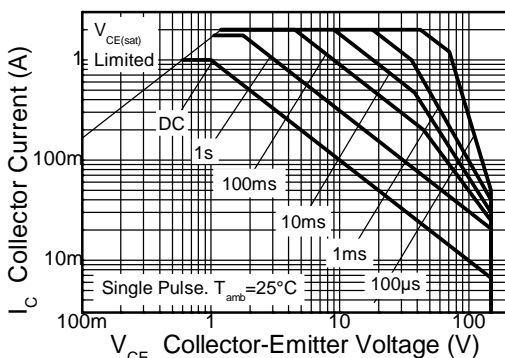
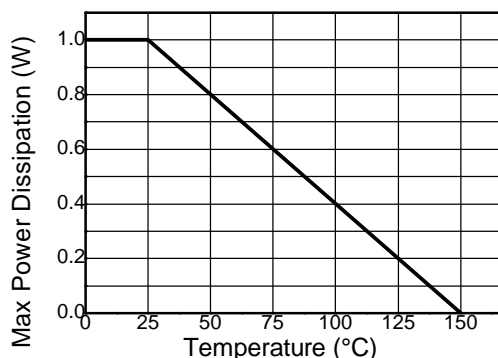
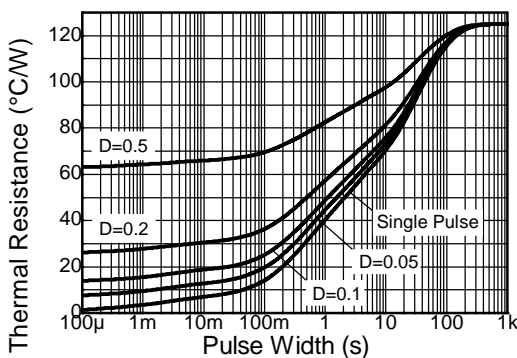
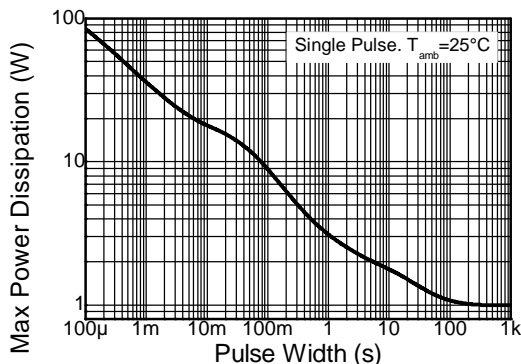

**Absolute Maximum Ratings** (@ $T_A = 25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CB0}$ | 170   | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | 150   | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | 7     | V    |
| Continuous Collector Current | $I_C$     | 1     | A    |
| Peak Pulse Current           | $I_{CM}$  | 2     | A    |
| Continuous Base Current      | $I_B$     | 200   | mA   |

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

| Characteristic                                       | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Collector Power Dissipation                          | $P_D$           | 1           | W                  |
| Thermal Resistance, Junction to Ambient Air (Note 5) | $R_{\theta JA}$ | 125         | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Leads (Note 6)       | $R_{\theta JL}$ | 10.01       | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range              | $T_J, T_{STG}$  | -65 to +150 | $^\circ\text{C}$   |

Notes: 5. For the device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.  
6. Thermal resistance from junction to solder-point (on the exposed collector pad).

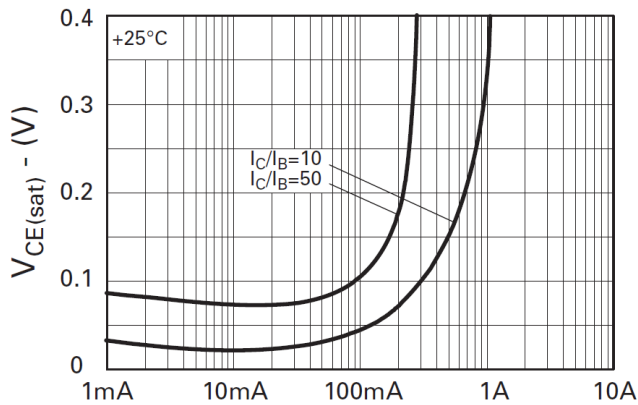
**Thermal Characteristics and Derating Information**

**Safe Operating Area**

**Derating Curve**

**Transient Thermal Impedance**

**Pulse Power Dissipation**

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

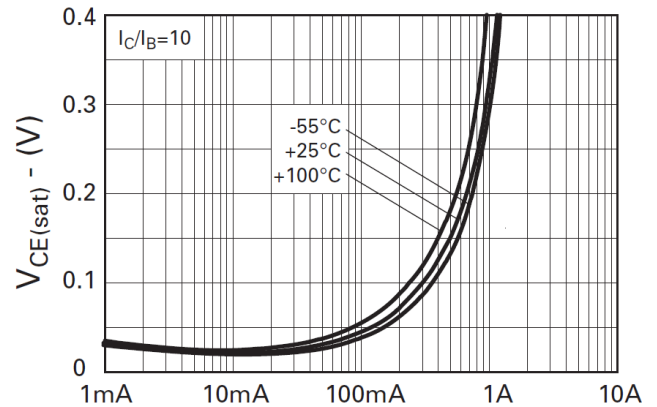
| Characteristic                                | Symbol               | Min | Typ | Max        | Unit | Test Condition   |
|---|----------------------|-----|-----|------------|------|--|
| Collector-Base Breakdown Voltage              | BV <sub>CBO</sub>    | 170 | —   | —          | V    | I <sub>C</sub> = 100μA   |
| Collector-Emitter Breakdown Voltage (Note 7)  | BV <sub>CEO</sub>    | 150 | —   | —          | V    | I <sub>C</sub> = 1mA   |
| Emitter-Base Breakdown Voltage                | BV <sub>EBO</sub>    | 7   | —   | —          | V    | I <sub>E</sub> = 100μA   |
| Collector Cut-Off Current                     | I <sub>CBO</sub>     | —   | —   | 100        | nA   | V <sub>CB</sub> = 150V   |
| Emitter Cut-Off Current                       | I <sub>EBO</sub>     | —   | —   | 100        | nA   | V <sub>EB</sub> = 5.6V   |
| Emitter Cut-Off Current                       | I <sub>CES</sub>     | —   | —   | 100        | nA   | V <sub>CE</sub> = 150V   |
| DC Current Transfer Static Ratio (Note 7)     | h <sub>FE</sub>      | 100 | —   | —          | —    | I <sub>C</sub> = 1mA, V <sub>CE</sub> = 10V  |
|   |                      | 100 | —   | 300        | —    | I <sub>C</sub> = 250mA, V <sub>CE</sub> = 10V  |
|   |                      | 50  | —   | —          | —    | I <sub>C</sub> = 500mA, V <sub>CE</sub> = 10V  |
|   |                      | 10  | —   | —          | —    | I <sub>C</sub> = 1A, V <sub>CE</sub> = 10V   |
| Collector-Emitter Saturation Voltage (Note 7) | V <sub>CE(sat)</sub> | —   | —   | 0.2<br>0.3 | V    | I <sub>C</sub> = 250mA, I <sub>B</sub> = 25mA<br>I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA |
| Base-Emitter Saturation Voltage (Note 7)      | V <sub>BE(sat)</sub> | —   | —   | 1.0        | V    | I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA  |
| Base-Emitter Turn-On Voltage (Note 7)         | V <sub>BE(on)</sub>  | —   | —   | 1.0        | V    | I <sub>C</sub> = 500mA, V <sub>CE</sub> = 10V  |
| Transitional Frequency                        | f <sub>T</sub>       | 100 | —   | -          | MHz  | I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V<br>f = 100MHz                                     |
| Output Capacitance                            | C <sub>obo</sub>     | —   | —   | 10         | pF   | V <sub>CB</sub> = 10V, f = 1MHz,   |

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

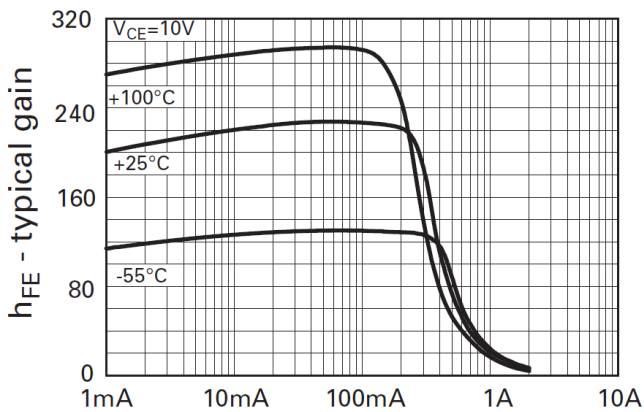
**Typical Electrical Characteristics**



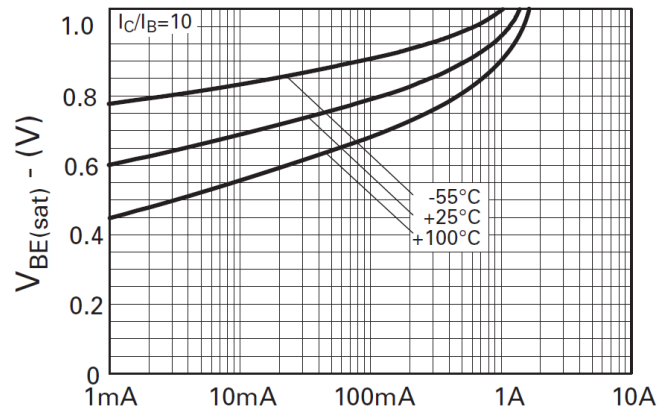
$I_C$  - Collector current  
 **$V_{CE(sat)}$  vs.  $I_C$**



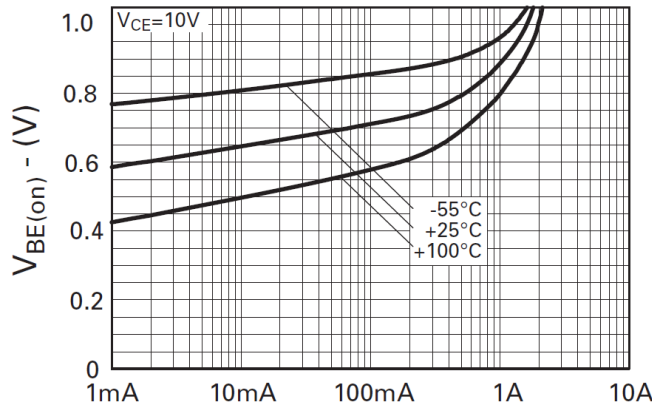
$I_C$  - Collector current  
 **$V_{CE(sat)}$  vs.  $I_C$**



$I_C$  - Collector current  
 **$h_{FE}$  vs.  $I_C$**



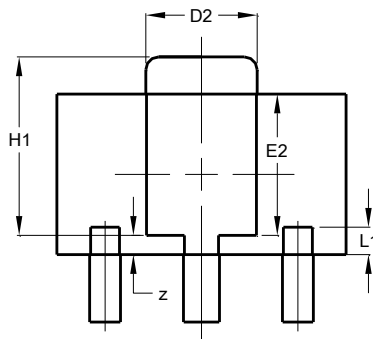
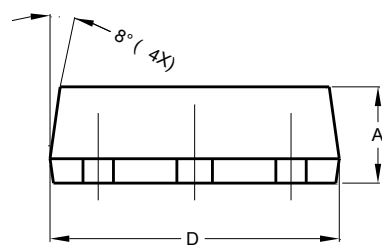
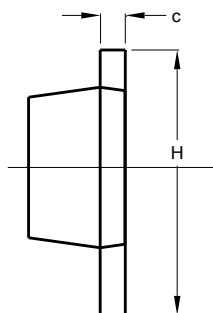
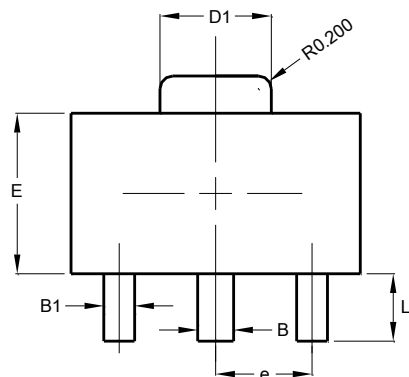
$I_C$  - Collector current  
 **$V_{BE(sat)}$  vs.  $I_C$**



$I_C$  - Collector current  
 **$V_{BE(on)}$  vs.  $I_C$**

## Package Outline Dimensions

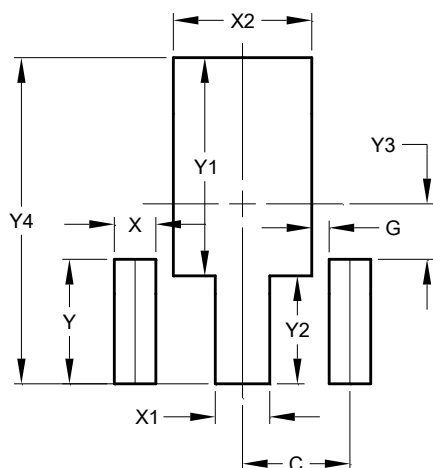
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT89                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 1.40  | 1.60  | 1.50  |
| B                    | 0.50  | 0.62  | 0.56  |
| B1                   | 0.42  | 0.54  | 0.48  |
| c                    | 0.35  | 0.43  | 0.38  |
| D                    | 4.40  | 4.60  | 4.50  |
| D1                   | 1.62  | 1.83  | 1.733 |
| D2                   | 1.61  | 1.81  | 1.71  |
| E                    | 2.40  | 2.60  | 2.50  |
| E2                   | 2.05  | 2.35  | 2.20  |
| e                    | -     | -     | 1.50  |
| H                    | 3.95  | 4.25  | 4.10  |
| H1                   | 2.63  | 2.93  | 2.78  |
| L                    | 0.90  | 1.20  | 1.05  |
| L1                   | 0.327 | 0.527 | 0.427 |
| z                    | 0.20  | 0.40  | 0.30  |
| 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          | 1.500         |
| G          | 0.244         |
| X          | 0.580         |
| X1         | 0.760         |
| X2         | 1.933         |
| Y          | 1.730         |
| Y1         | 3.030         |
| Y2         | 1.500         |
| Y3         | 0.770         |
| Y4         | 4.530         |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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