# FCX495

## 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**

## Mechanical Data

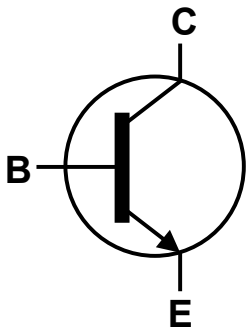
- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.052 grams (Approximate)

## Application

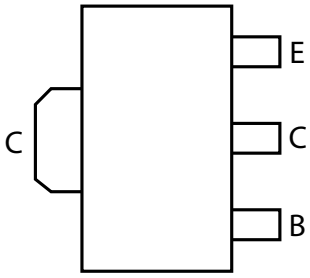
- Low loss power switching

SOT89

Top View




Device symbol



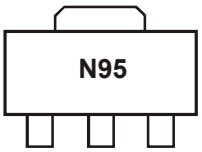

Top View
Pin-Out

## 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 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




N95 = Product Type Marking Code

## Maximum Ratings (@$T_A$ = 25°C, unless otherwise specified.)

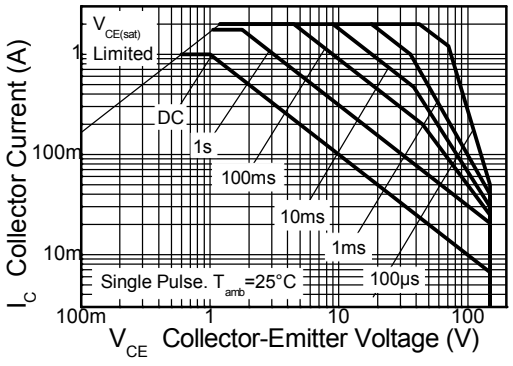
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 170 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 150 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 7 | V |
| Continuous Collector Current | $I_C$ | 1 | A |
| Peak Pulse Current | $I_{CM}$ | 2 | A |
| Continuous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

## Thermal Characteristics (@$T_A$ = 25°C, unless otherwise specified.)

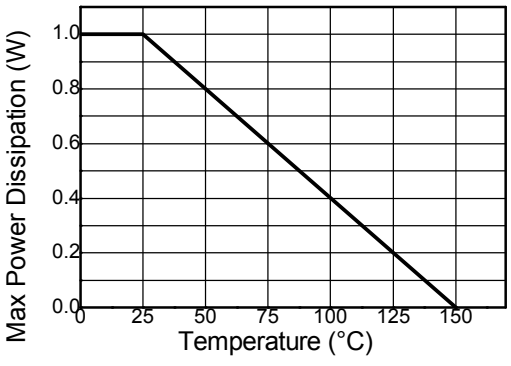
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector Power Dissipation | $P_D$ | 1 | W |
| Thermal Resistance, Junction to Ambient Air (Note 5) | $R_{\theta JA}$ | 125 | °C/W |
| Thermal Resistance, Junction to Leads (Note 6) | $R_{\theta JL}$ | 10.01 | °C/W |
| Operating and Storage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

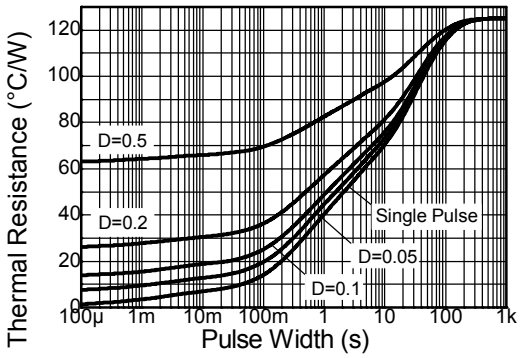
## Thermal Characteristics and Derating Information



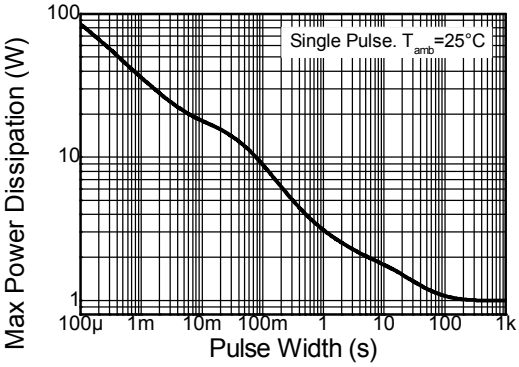

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**



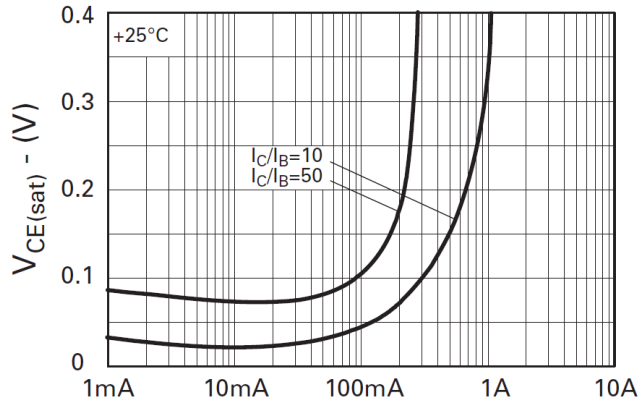

**Pulse Power Dissipation**

## Electrical Characteristics (@$T_A$ = 25°C, unless otherwise specified.)

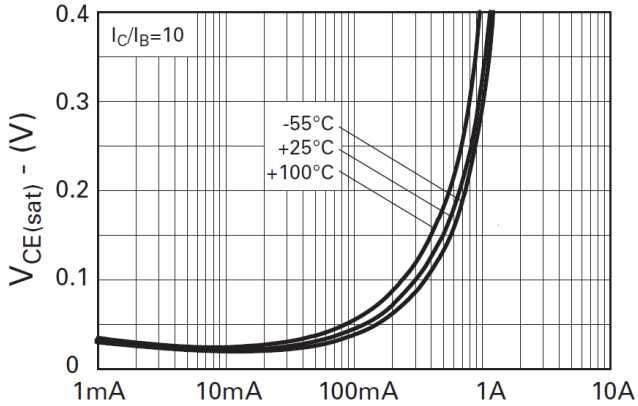
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 170 | — | — | V | $I_C$ = 100µA |
| Collector-Emitter Breakdown Voltage (Note 7) | $BV_{CEO}$ | 150 | — | — | V | $I_C$ = 1mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 7 | — | — | V | $I_E$ = 100µA |
| Collector Cutoff Current | $I_{CBO}$ | — | — | 100 | nA | $V_{CB}$ = 150V |
| Emitter Cutoff Current | $I_{EBO}$ | — | — | 100 | nA | $V_{EB}$ = 5.6V |
| Emitter Cutoff Current | $I_{CES}$ | — | — | 100 | nA | $V_{CE}$ = 150V |
| DC current transfer Static ratio (Note 7) | $h_{FE}$ | 100<br>100<br>50<br>10 | —<br>—<br>—<br>— | 300<br>—<br>—<br>— | —<br>—<br>—<br>— | $I_C$ = 1mA, $V_{CE}$ = 10V<br>$I_C$ = 250mA, $V_{CE}$ = 10V<br>$I_C$ = 500mA, $V_{CE}$ = 10V<br>$I_C$ = 1A, $V_{CE}$ = 10V |
| Collector-Emitter Saturation Voltage (Note 7) | $V_{CE(sat)}$ | —<br>— | — | 0.2<br>0.3 | V | $I_C$ = 250mA, $I_B$ = 25mA<br>$I_C$ = 500mA, $I_B$ = 50mA |
| Base-Emitter Saturation Voltage (Note 7) | $V_{BE(sat)}$ | — | — | 1.0 | V | $I_C$ = 500mA, $I_B$ = 50mA |
| Base-Emitter Turn-on Voltage (Note 7) | $V_{BE(on)}$ | — | — | 1.0 | V | $I_C$ = 500mA, $V_{CE}$ = 10V |
| Transitional Frequency | $f_T$ | 100 | — | - | MHz | $I_C$ = 50mA, $V_{CE}$ = 10V<br>f = 100MHz |
| Output capacitance | $C_{obo}$ | — | — | 10 | pF | $V_{CB}$ = 10V, f = 1MHz, |

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

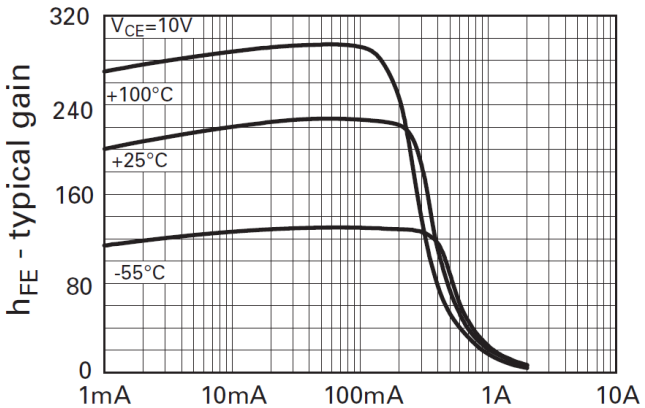
## Typical Electrical Characteristics



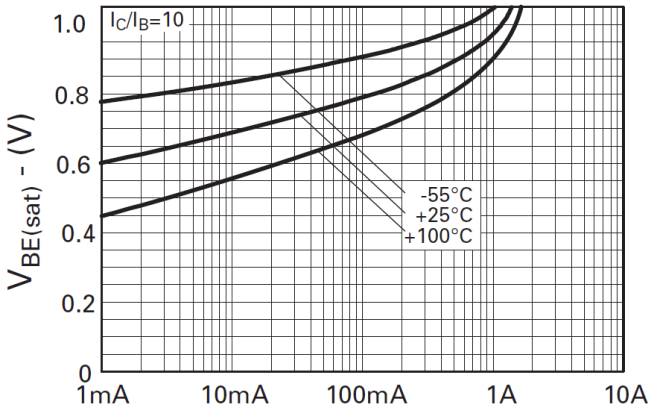

**$V_{CS(sat)}$ vs. $I_C$**



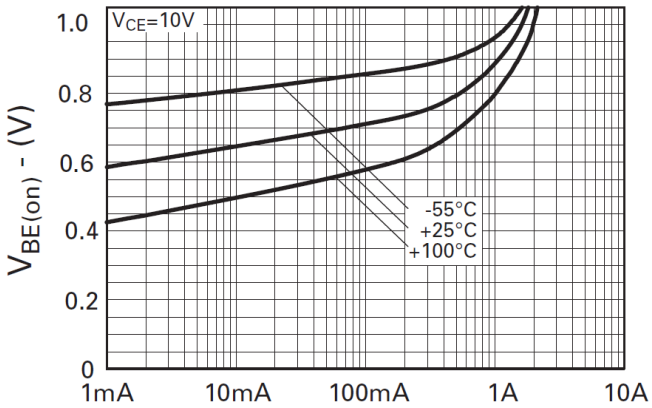

**$V_{CS(sat)}$ vs. $I_C$**




**$h_{FE}$ vs. $I_C$**



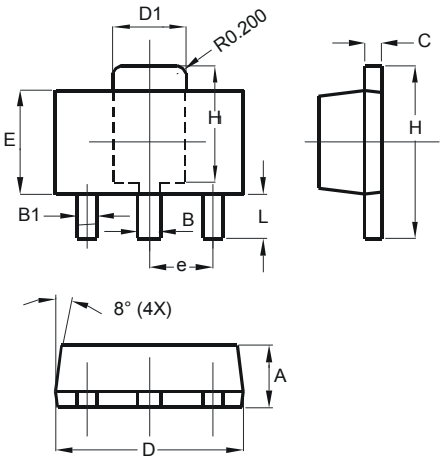

**$V_{BE(sat)}$ vs. $I_C$**




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

## Package Outline Dimensions

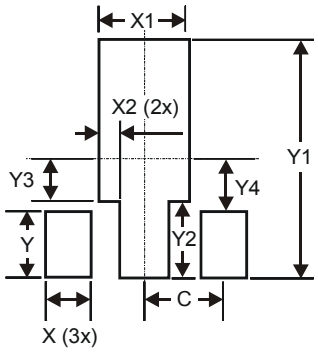
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.




| SOT89 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 1.40 | 1.60 |
| **B** | 0.44 | 0.62 |
| **B1** | 0.35 | 0.54 |
| **C** | 0.35 | 0.44 |
| **D** | 4.40 | 4.60 |
| **D1** | 1.62 | 1.83 |
| **E** | 2.29 | 2.60 |
| **e** | 1.50 Typ | |
| **H** | 3.94 | 4.25 |
| **H1** | 2.63 | 2.93 |
| **L** | 0.89 | 1.20 |
| **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) |
|---|---|
| **X** | 0.900 |
| **X1** | 1.733 |
| **X2** | 0.416 |
| **Y** | 1.300 |
| **Y1** | 4.600 |
| **Y2** | 1.475 |
| **Y3** | 0.950 |
| **Y4** | 1.125 |
| **C** | 1.500 |

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