# BCX6825

## 20V NPN SILICON PLANAR MEDIUM POWER TRANSISTOR IN SOT89

## Features

- $BV_{CEO}$ > 20V
- $I_C$ = 1A high Continuous Current
- Low saturation voltage $V_{CE(sat)}$ < 500mV @ 1A
- Complementary PNP type: BCX6925
- **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**
- **PPAP capable (Note 4)**

## Mechanical Data

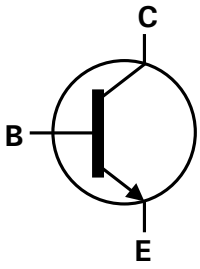
- Case: SOT89
- Case Material: molded plastic, "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

## Application

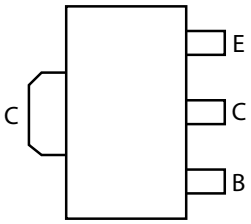
- Power MOSFET gate driving
- Low loss power switching

SOT89

Top View




Device Symbol



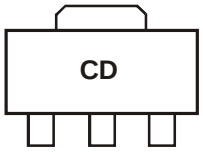

Top View
Pin Out

## Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|---|---|
| BCX6825TA | AEC-Q101 | CD | 7 | 12 | 1,000 |
| BCX6825QTA | Automotive | CD | 7 | 12 | 1,000 |

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 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
5. For packaging details, go to our website at http://www.diodes.com.

## Marking Information




CD = Product Type Marking Code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## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 25 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 20 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | V |
| Continuous Collector Current | $I_C$ | 1 | A |
| Peak Pulse Current | $I_{CM}$ | 2 | A |
| Base Current | $I_B$ | 100 | 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 6) | $R_{\theta JA}$ | 125 | °C/W |
| Thermal Resistance, Junction to Leads (Note 7) | $R_{\theta JL}$ | 10.01 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to +150 | °C |

## ESD Ratings (Note 8)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge - Human Body Model | ESD HBM | ≥ 8,000 | V | 3B |
| Electrostatic Discharge - Machine Model | ESD MM | ≥ 400 | V | C |

Notes:
6. For a device surface mounted on 15mm X 15mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; device measured when operating in steady state condition.
7. Thermal resistance from junction to solder-point (on the exposed collector pad).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.


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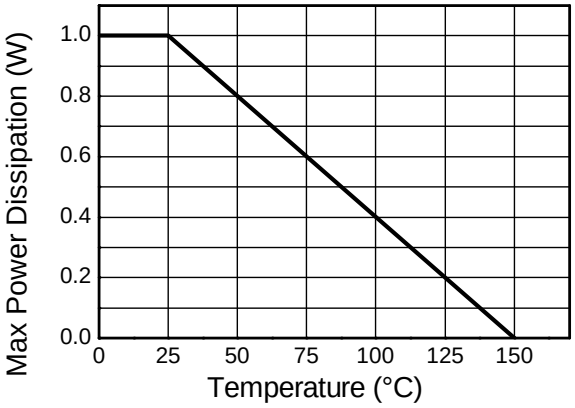
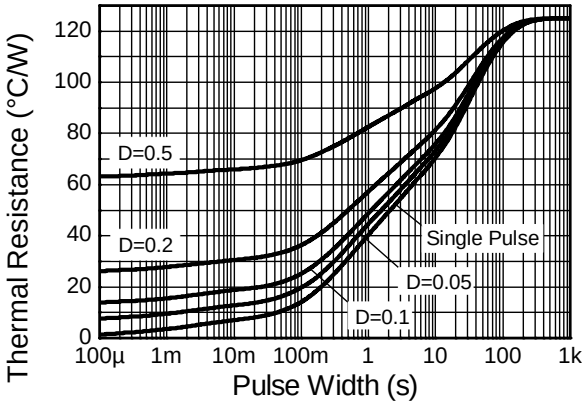
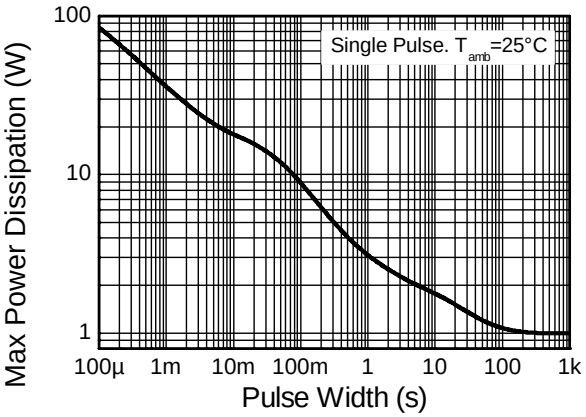
## Thermal Characteristics and Derating Information



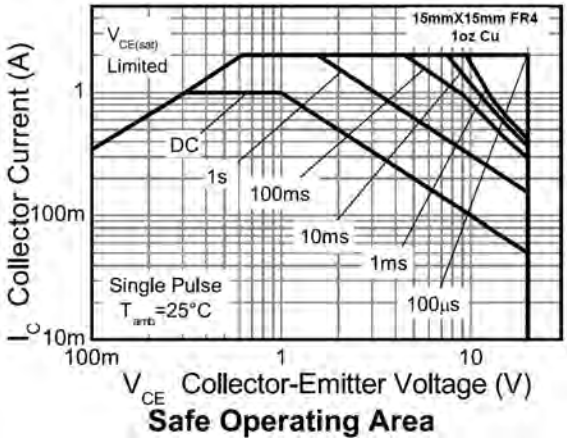

**Derating Curve**




**Transient Thermal Impedance**




**Pulse Power Dissipation**




**Safe Operating Area**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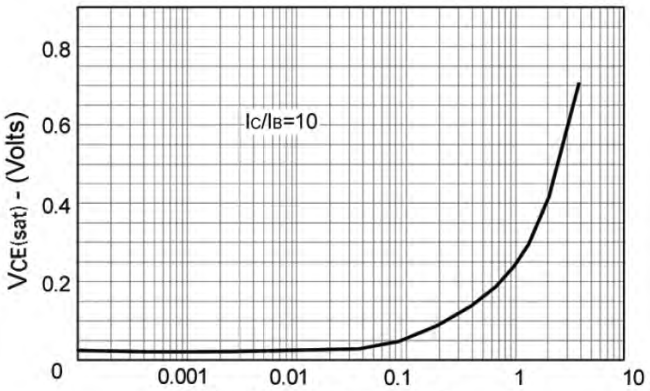
## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

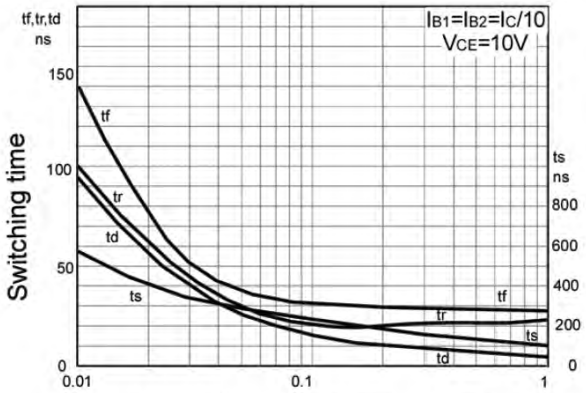
| Characteristic | Symbol | Min | Typ. | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 25 | - | - | V | $I_C$ = 100µA |
| Collector-Emitter Breakdown Voltage (Note 9) | $BV_{CEO}$ | 20 | - | - | V | $I_C$ = 10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 5 | - | - | V | $I_E$ = 100µA |
| Collector Cutoff Current | $I_{CBO}$ | - | - | 100<br>10 | nA<br>µA | $V_{CB}$ = 25V<br>$V_{CB}$ = 25V, $T_A$ = +125°C |
| Emitter Cutoff Current | $I_{EBO}$ | - | - | 100 | nA | $V_{EB}$ = 5V |
| DC current transfer Static ratio (Note 9) | $h_{FE}$ | 50<br>160<br>60 | -<br>250<br>- | -<br>400<br>- | - | $I_C$ = 5mA, $V_{CE}$ = 10V<br>$I_C$ = 500mA, $V_{CE}$ = 1V<br>$I_C$ = 1A, $V_{CE}$ = 1V |
| Collector-Emitter Saturation Voltage (Note 9) | $V_{CE(sat)}$ | - | - | 0.5 | V | $I_C$ = 1A, $I_B$ = 100mA |
| Base-Emitter Turn-on Voltage (Note 9) | $V_{BE(on)}$ | - | - | 1.0 | V | $I_C$ = 1A, $V_{CE}$ = 1V |
| Transitional Frequency | $f_T$ | 100 | - | - | MHz | $I_C$ = 100mA, $V_{CE}$ = 5V, f = 100MHz |
| Output capacitance | $C_{obo}$ | - | - | 25 | pF | $V_{CB}$ = 10V, f = 1MHz |

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

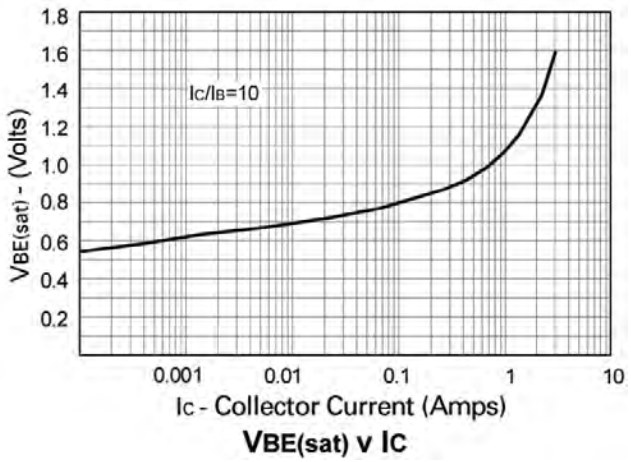
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



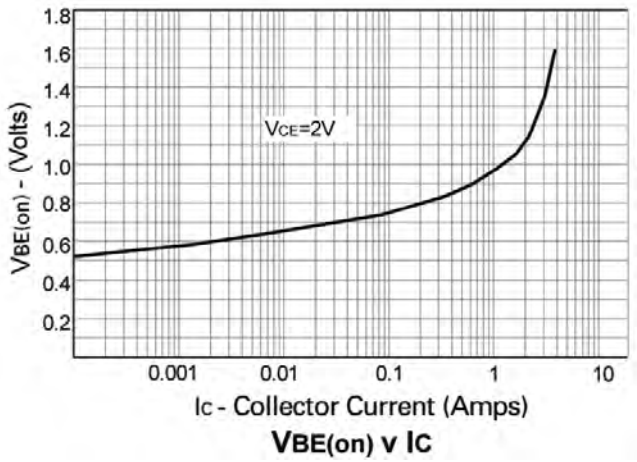

**VCE(sat) v IC**




**Switching Speeds**




**VBE(sat) v IC**




**VBE(on) v IC**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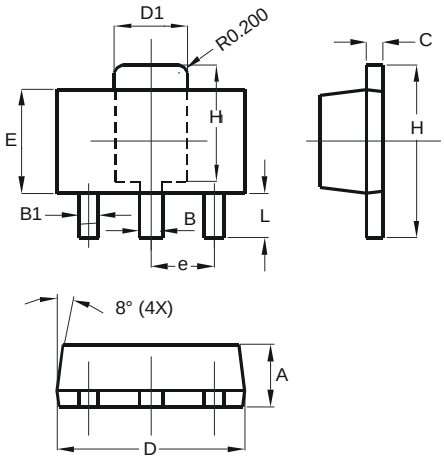
## Package Outline Dimensions

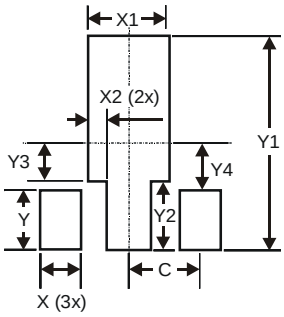
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.




| 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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