





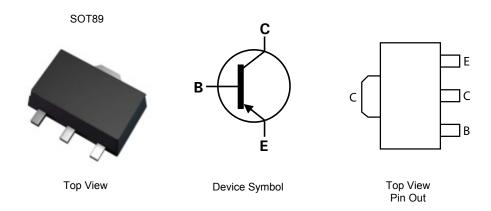
#### 120V PNP SILICON TRANSISTOR IN SOT89

#### **Features**

- BV<sub>CEO</sub> > -120V
- Max Continuous Current I<sub>C</sub> = -0.8A
- High Gain Holds up  $h_{FE} \ge 120 @ I_C = -100 mA$
- 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
- Weight: 0.05 grams (Approximate)



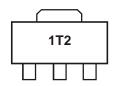
### Ordering Information (Notes 4 & 5)

| Product     | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| 2DA1201Y-7  | AEC-Q101   | 1T2     | 7                  | 12              | 1,000             |
| 2DA1201YQTC | Automotive | 1T2     | 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 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 chilorine (<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**



1T2 = Product Type Marking Code





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

| Characteristic               | Symbol          | Value | Unit |
|------------------------------|-----------------|-------|------|
| Collector-Base Voltage       | $V_{CBO}$       | -120  | V    |
| Collector-Emitter Voltage    | $V_{CEO}$       | -120  | V    |
| Emitter-Base Voltage         | $V_{EBO}$       | -7    | V    |
| Continuous Collector Current | Ic              | -800  | mA   |
| Peak Pulse Current (Note 6)  | I <sub>CM</sub> | -3    | Α    |
| Base Current                 | Ι <sub>Β</sub>  | -160  | mA   |

### **Thermal Characteristics**

| Characteristic                                   | Symbol           | Value       | Unit |
|--|------------------|-------------|------|
| Power Dissipation (Note 7)                       | $P_{D}$          | 1.5         | W    |
| Thermal Resistance, Junction to Ambient (Note 7) | $R_{\theta JA}$  | 83          | °C/W |
| Thermal Resistance, Junction to Leads (Note 8)   | $R_{	heta JL}$   | 18.3        | °C/W |
| Operating and Storage Temperature Range          | $T_{J}, T_{STG}$ | -55 to +150 | °C   |

### ESD Ratings (Note 9)

| 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    | С           |

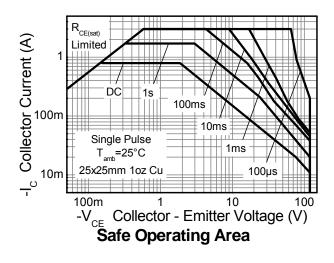
Notes:

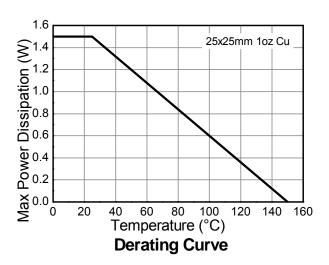
- 6. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.
  7. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions.
  8. Thermal resistance from junction to solder-point (at the end of the collector lead).
- 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

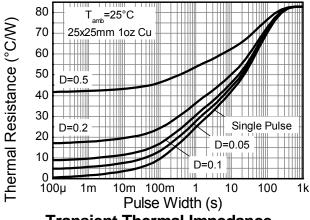


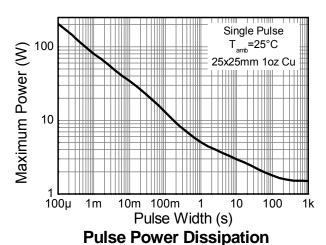


## **Thermal Characteristics and Derating Information**

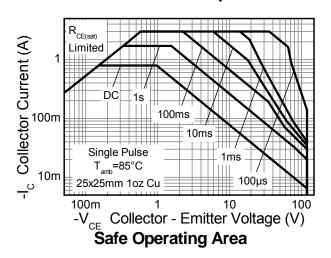








**Transient Thermal Impedance** 







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

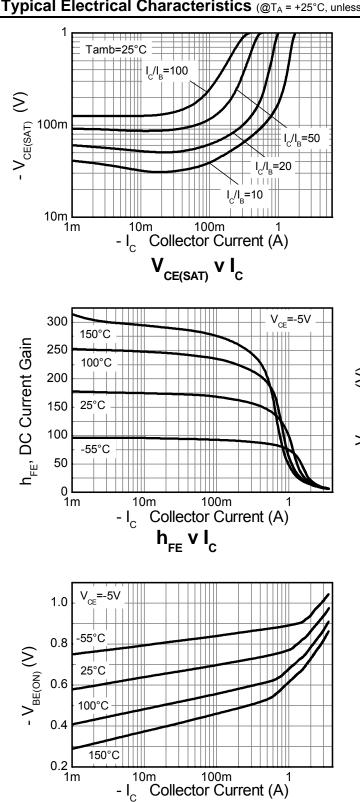
| Characteristic                                  | Symbol               | Min  | Тур | Max  | Unit | Test Condition                                  |
|---|----------------------|------|-----|------|------|---|
| Collector-Base Breakdown Voltage                | BV <sub>CBO</sub>    | -120 | -   | -    | V    | $I_{C} = -100 \mu A$                            |
| Collector-Emitter Breakdown Voltage (Note 10)   | BV <sub>CEO</sub>    | -120 | -   | -    | V    | I <sub>C</sub> = -10mA                          |
| Emitter-Base Breakdown Voltage                  | $BV_{EBO}$           | -7   | -   | -    | V    | $I_{E} = -100 \mu A$                            |
| Collector-Emitter Cut-off Current               | I <sub>CES</sub>     | -    | -   | -100 | nA   | V <sub>CE</sub> = -120V                         |
| Collector Cut-off Current                       | I <sub>CBO</sub>     | -    | -   | -100 | nA   | V <sub>CB</sub> = -120V                         |
| Emitter Cut-off Current                         | I <sub>EBO</sub>     | -    | -   | -100 | nA   | $V_{EB} = -5V$                                  |
| Static Forward Current Transfer Ratio (Note 10) | h <sub>FE</sub>      | 120  | -   | 240  | -    | $I_C = -100 \text{mA}, V_{CE} = -5 \text{V}$    |
| Collector-Emitter Saturation Voltage (Note 10)  | V <sub>CE(sat)</sub> | -    | -   | -1   | V    | $I_C = -500 \text{mA}, I_B = -50 \text{mA}$     |
| Base-Emitter Turn-On Voltage (Note 10)          | $V_{BE(on)}$         | -    | -   | -1   | V    | $I_C = -500$ mA, $V_{CE} = -5$ V                |
| Transition Frequency                            | f <sub>T</sub>       | -    | 160 | -    | MHz  | $I_C = -100 \text{mA}, V_{CE} = -5 \text{V}$    |
| Output Capacitance                              | C <sub>OBO</sub>     |      | 15  |      | pF   | VcB = -10V, IE = 0, f = 1MHz                    |
| Delay Time                                      | t <sub>(d)</sub>     | -    | 62  | -    | ns   |   |
| Rise Time                                       | t <sub>(r)</sub>     | -    | 50  | -    | ns   | $V_{CC} = -80V, I_{C} = -100mA,$                |
| Storage Time                                    | t <sub>(s)</sub>     | -    | 440 | -    | ns   | I <sub>B1</sub> = -10mA, I <sub>B2</sub> = 20mA |
| Fall Time                                       | t <sub>(f)</sub>     | -    | 42  | -    | ns   |   |

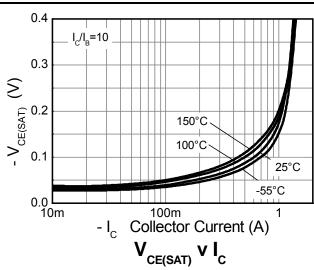
Note: 10. Measured under pulsed conditions. Pulse width  $\leq$  300 $\mu$ s. Duty cycle  $\leq$  2%.

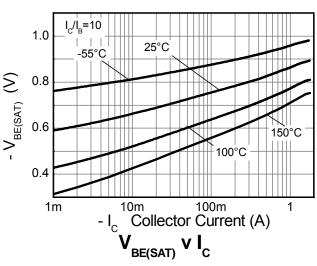




## Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)





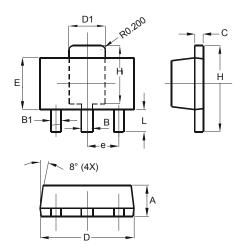






## **Package Outline Dimensions**

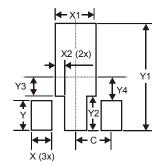
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



| SOT89                |           |      |  |  |
|----------------------|-----------|------|--|--|
| Dim                  | Min       | Max  |  |  |
| Α                    | 1.40      | 1.60 |  |  |
| В                    | 0.44      | 0.62 |  |  |
| B1                   | 0.35      | 0.54 |  |  |
| С                    | 0.35      | 0.44 |  |  |
| D                    | 4.40      | 4.60 |  |  |
| D1                   | 1.62      | 1.83 |  |  |
| Е                    | 2.29      | 2.60 |  |  |
| е                    | 1.50 Typ  |      |  |  |
| Н                    | 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         |
| С          | 1.500         |





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