

SOT-89 Plastic-Encapsulate Transistors

LJXT651

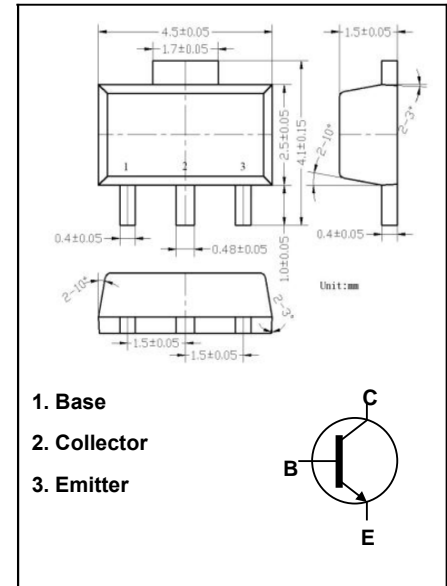
60V NPN LOW VCE(sat) TRANSISTOR IN SOT89

Features

- $V_{CE0} > 60V$
- $I_C = 3A$ high Continuous Current
- Low saturation voltage $V_{CE(sat)} < 300mV @ 1A$
- Complementary PNP Type: LJXT751
- **Totally Lead-Free & Fully RoHS compliant**
- **Halogen and Antimony Free. "Green" Device (Note 1)**
- **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 @3
- Weight: 0.052 grams (Approximate)



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

| Symbol | Characteristic | Value | Unit |
|------------------|------------------------------|-------|------|
| V _{CB0} | Collector-Base Voltage | 80 | V |
| V _{CE0} | Collector-Emitter Voltage | 60 | V |
| V _{EBO} | Emitter-Base Voltage | 5 | V |
| I _C | Collector Current | 3 | A |
| I _{CM} | Peak Pulse Collector Current | 6 | A |
| I _B | Base Current | 500 | mA |

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

| Symbol | Characteristic | Value | Unit |
|-----------------------------------|--|-------------|------|
| P _D | Power Dissipation (Note 2) | 1 | W |
| R _{θJA} | Thermal Resistance, Junction to Ambient Air (Note 2) | 125 | °C/W |
| R _{θJL} | Thermal Resistance, Junction to Leads (Note 3) | 18.2 | °C/W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +150 | °C |

Notes:

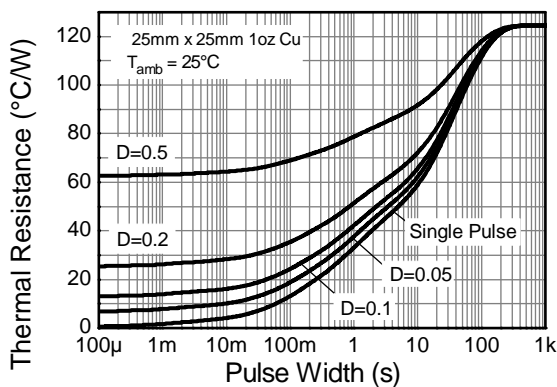
1. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
3. Thermal resistance from junction to solder-point (on the exposed collector pad).

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

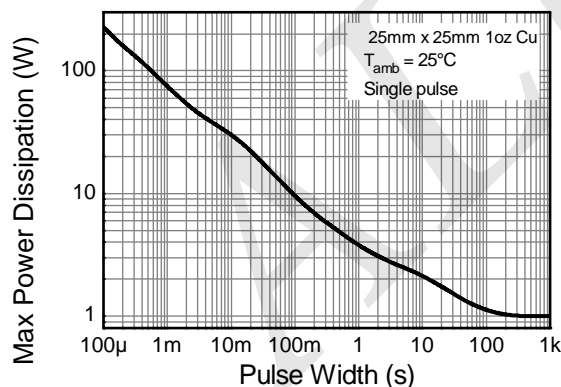
| Symbol | Characteristic | Min | Typ | Max | Unit | Test Conditions |
|-------------------------------------|--------------------------------------|-----------------------|--------------------------|--------------------|------|---|
| OFF CHARACTERISTICS (Note 4) | | | | | | |
| BV _{CBO} | Collector-Base Breakdown Voltage | 80 | — | — | V | I _C = 100μA, I _E = 0 |
| BV _{CEO} | Collector-Emitter Breakdown Voltage | 60 | — | — | V | I _C = 10mA, I _B = 0 |
| BV _{EBO} | Emitter-Base Breakdown Voltage | 5 | — | — | V | I _E = 100μA, I _C = 0 |
| I _{CBO} | Collector-Base Cutoff Current | — | — | 0.1 10 | μA | V _{CB} = 60V, I _E = 0 V _{CB} = 60V, I _E = 0, T _A = +100°C |
| I _{EBO} | Emitter-Base Cutoff Current | — | — | 0.1 | μA | V _{EB} = 4V, I _C = 0 |
| ON CHARACTERISTICS (Note4) | | | | | | |
| V _{CE(sat)} | Collector-Emitter Saturation Voltage | — | 0.08 0.23 | 0.3 0.6 | V | I _C = 1A, I _B = 100mA I _C = 3A, I _B = 300mA |
| V _{BE(sat)} | Base-Emitter Saturation Voltage | — | 0.85 | 1.25 | V | I _C = 1A, I _B = 100mA |
| V _{BE(on)} | Base-Emitter Turn-On Voltage | — | 0.8 | 1 | V | V _{CE} = 2V, I _C = 1A |
| h _{FE} | DC Current Gain | 70 100 80 40 | 200 200 185 120 | — 300 — — | — | V _{CE} = 2V, I _C = 50mA V _{CE} = 2V, I _C = 500mA V _{CE} = 2V, I _C = 1A V _{CE} = 2V, I _C = 2A |
| AC CHARACTERISTICS | | | | | | |
| f _T | Transition Frequency | 140 | 200 | — | MHz | V _{CE} = 5V, I _C = 100mA, f = 100MHz |
| C _{obo} | Output Capacitance | — | — | 30 | pF | V _{CB} = 10V, f = 1MHz |
| t _{on} t _{off} | Switching Times | — | 35 230 | — | ns | V _{CC} = 10V, I _C = 500mA, I _{B1} = I _{B2} = 50mA |

Notes: 4. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

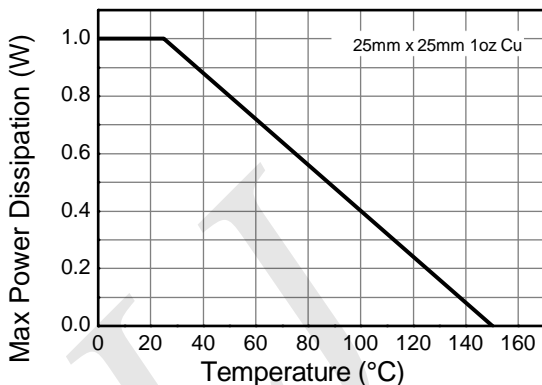
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

Thermal Characteristics and Derating Information

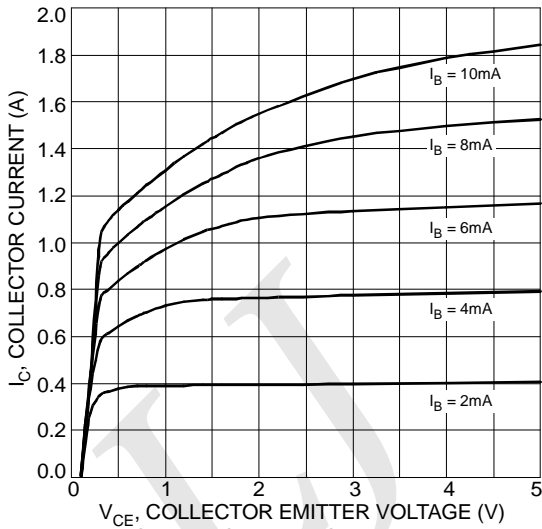


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

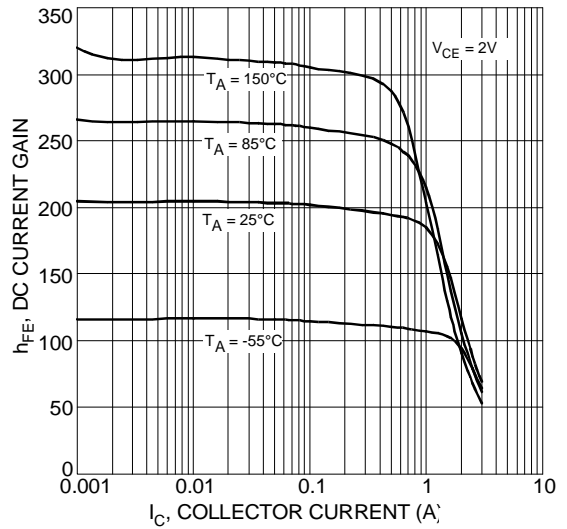


Fig. 3 Typical DC Current Gain vs. Collector Current

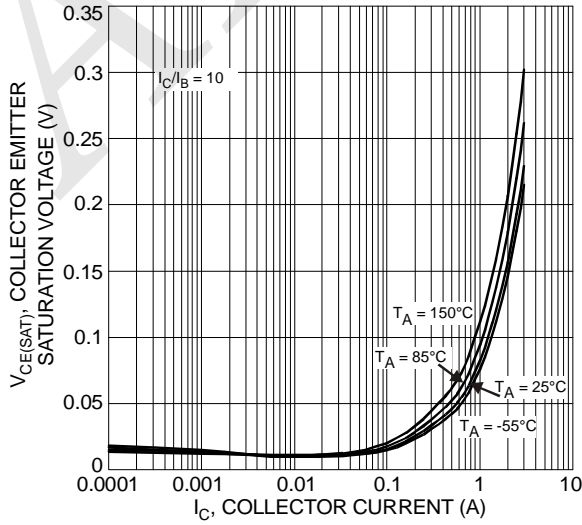


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

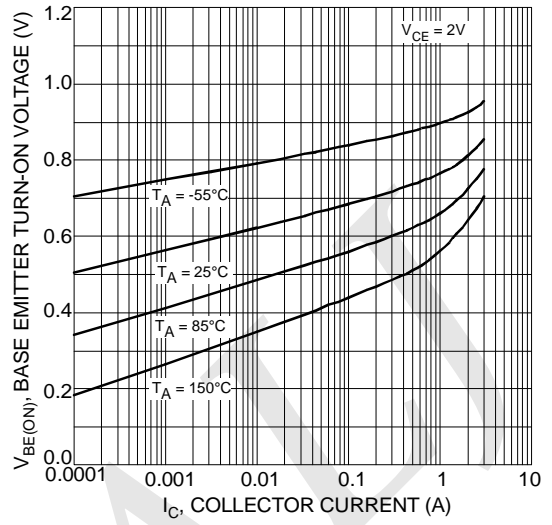


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

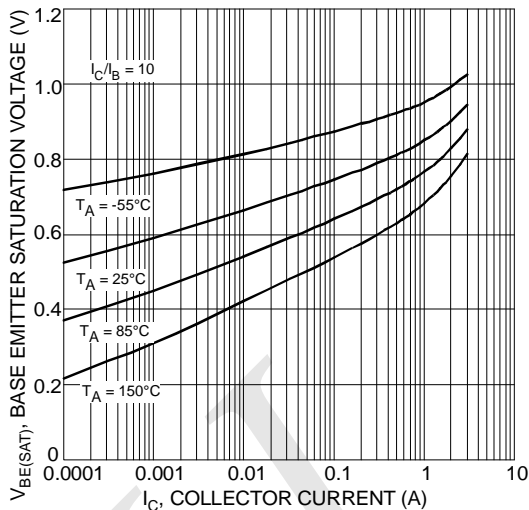


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

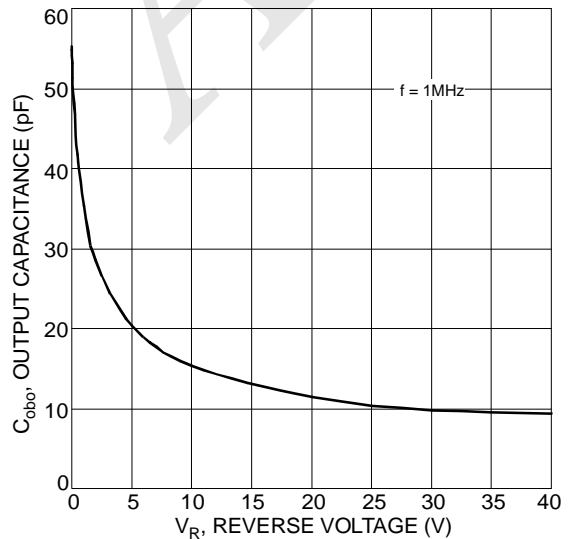


Fig. 7 Typical Output Capacitance Characteristics

Thermal Characteristics and Derating Information

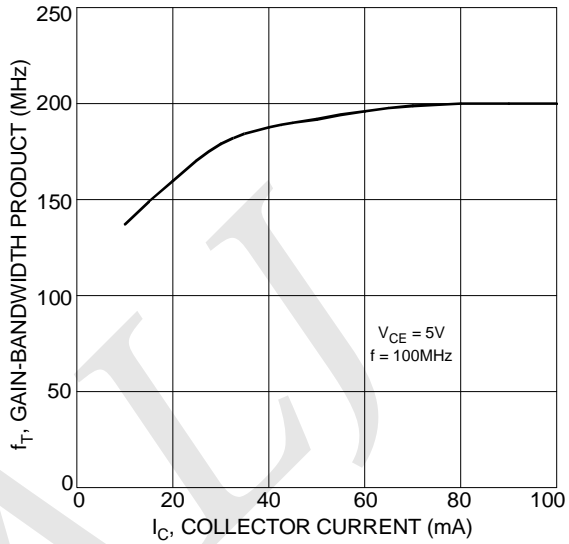
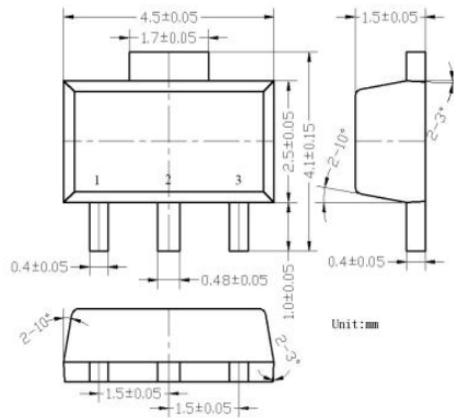
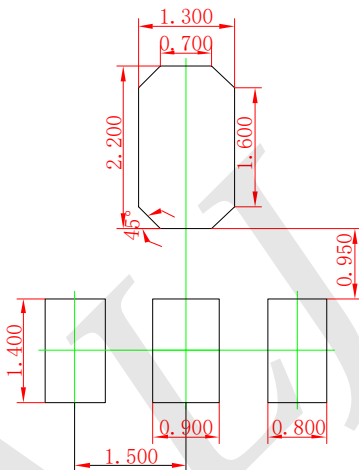


Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

SOT-89-3L Package Outline Dimensions



SOT-89-3L Suggested Pad Layout

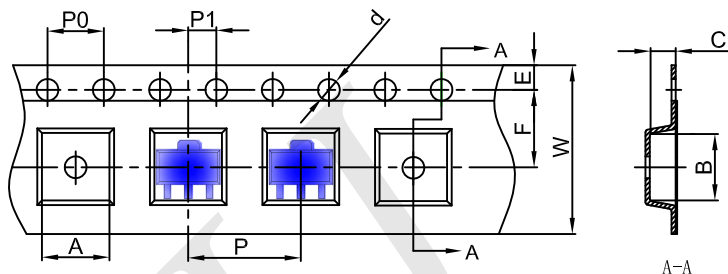


Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.

SOT-89-3L Tape and Reel

SOT-89-3L Embossed Carrier Tape

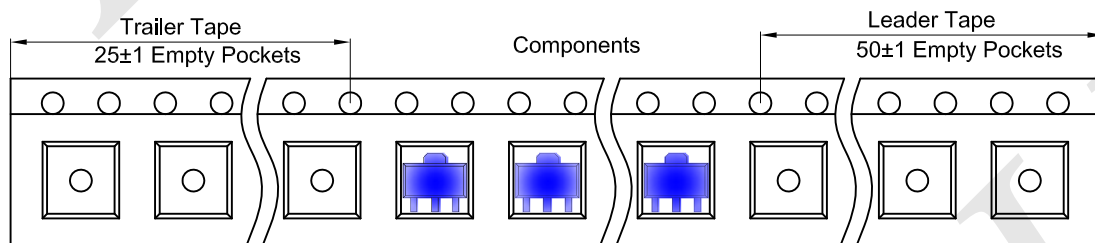


Packaging Description:

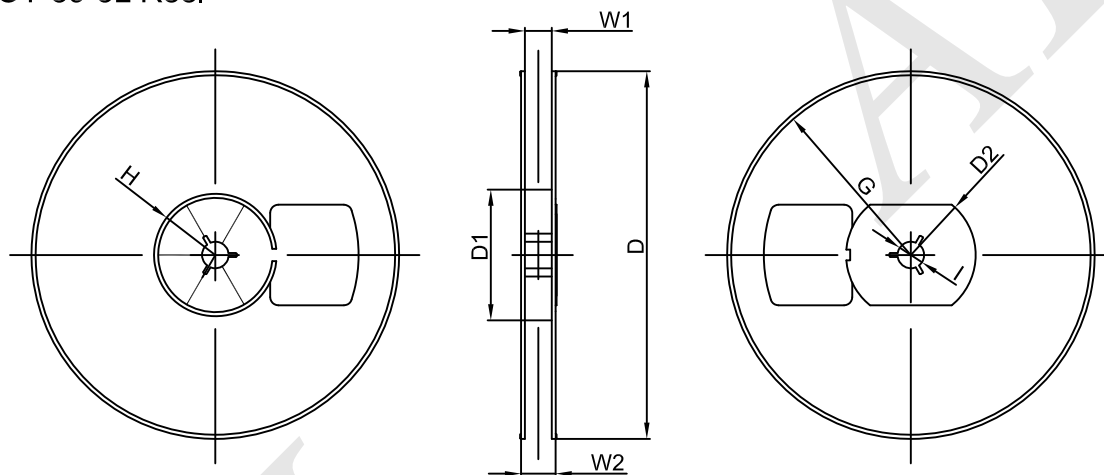
SOT-89-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 1,000 units per 7" or 18.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter | | | | | | | | | | |
|------------------------------|------|------|------|-------|------|------|------|------|------|-------|
| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-89-3L | 4.85 | 4.45 | 1.85 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

SOT-89-3L Tape Leader and Trailer



SOT-89-3L Reel



| Dimensions are in millimeter | | | | | | | | |
|------------------------------|---------|-------|--------|--------|--------|--------|-------|-------|
| Reel Option | D | D1 | D2 | G | H | I | W1 | W2 |
| 7"Dia | Ø180.00 | 60.00 | R32.00 | R86.50 | R30.00 | Ø13.00 | 13.20 | 16.50 |

| REEL | Reel Size | Box | Box Size(mm) | Carton | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|------------|-----------------|----------|
| 1000 pcs | 7 inch | 10,000 pcs | 203×203×195 | 40,000 pcs | 438×438×220 | |

Soldering Parameters

| Reflow Condition | | Pb – Free assembly |
|--|----------------------------------|--------------------|
| Pre Heat | Temperature Min ($T_{s(min)}$) | 150°C |
| | Temperature Max ($T_{s(max)}$) | 200°C |
| | Time (min to max) (t_s) | 60 – 190 secs |
| Average ramp up rate (Liquidus Temp) (T_L) to peak | | 5°C/second max |
| | | 5°C/second max |
| Reflow | Temperature (T_L) (Liquidus) | 217°C |
| | Temperature (t_L) | 60 – 150 seconds |
| | | 260+0/-5 °C |
| Time within actual peak Temperature (t_p) | | 20 – 40 seconds |
| Ramp-down Rate | | 5°C/second max |
| Time 25°C to peak Temperature (T_P) | | 8 minutes Max. |
| Do not exceed | | 280°C |

