

## Features

- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- Complementary NPN Type Available (DST847BDJ)
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Ultra Small Package**

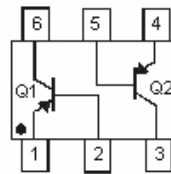
## Mechanical Data

- Case: SOT-963
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0027 grams (approximate)

SOT-963



Top View



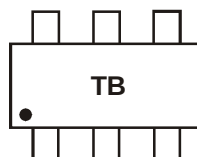
Device Schematic

## Ordering Information

| Device      | Packaging | Shipping           |
|-------------|-----------|--------------------|
| DST857BDJ-7 | SOT-963   | 10,000/Tape & Reel |

Notes: 1. No purposefully added lead. Halogen and Antimony Free.  
2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>

## Marking Information



TB = Product Type Marking Code

## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                          | Symbol           | Value | Unit |
|-----------------------------------------|------------------|-------|------|
| Collector-Base Voltage                  | V <sub>CBO</sub> | -50   | V    |
| Collector-Emitter Voltage               | V <sub>CEO</sub> | -45   | V    |
| Emitter-Base Voltage                    | V <sub>EB0</sub> | -5.0  | V    |
| Collector Current - Continuous (Note 3) | I <sub>C</sub>   | -100  | mA   |

## Thermal Characteristics

| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 3)                       | P <sub>D</sub>                    | 300         | mW   |
| Thermal Resistance, Junction to Ambient (Note 3) | R <sub>θJA</sub>                  | 417         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

Notes: 3. Device mounted on FR-4 PCB with minimum recommended pad layout.

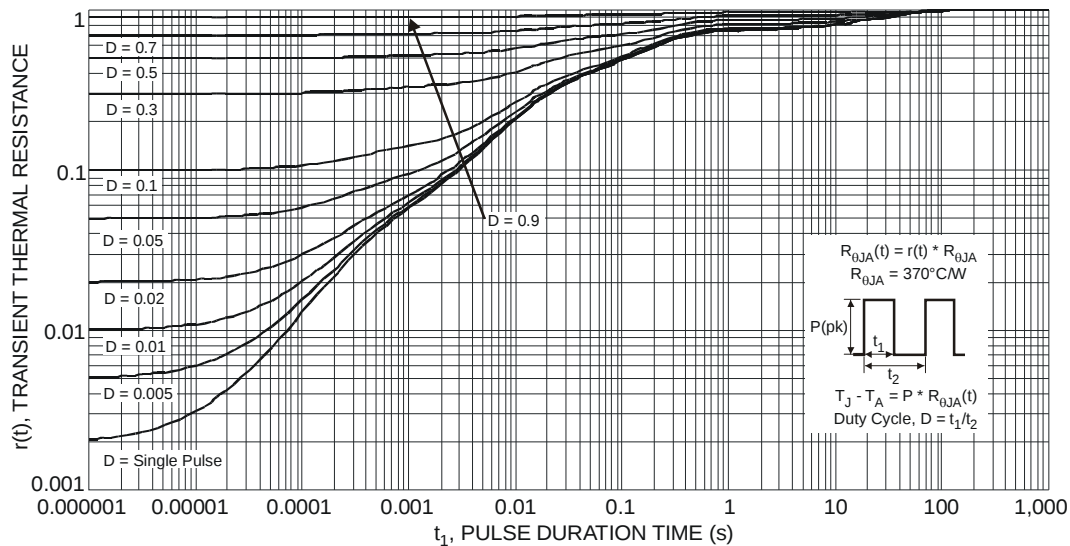


Fig. 1 Transient Thermal Response

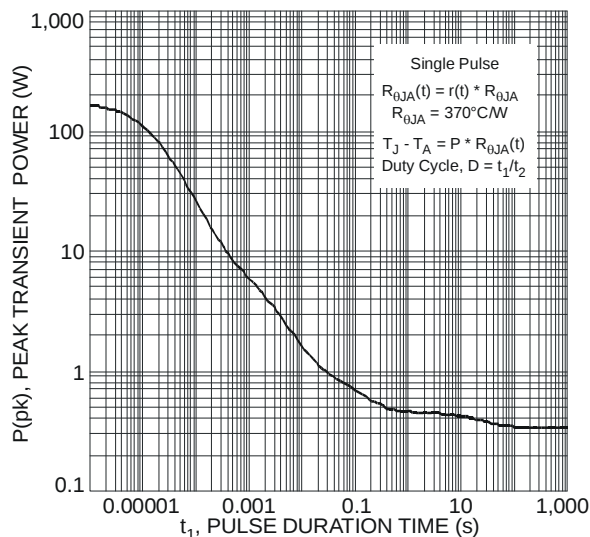


Fig. 2 Single Pulse Maximum Power Dissipation

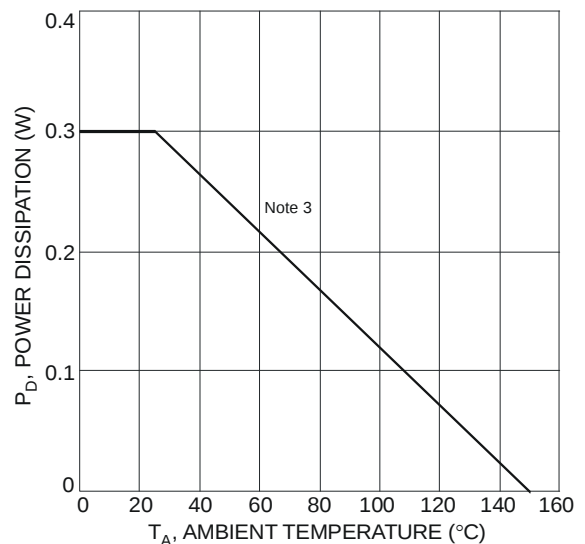


Fig. 3 Power Dissipation vs. Ambient Temperature

# Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic (Note 4)              | Symbol               | Min        | Typical      | Max            | Unit | Test Condition                                                                                      |
|--------------------------------------|----------------------|------------|--------------|----------------|------|-----------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage     | V <sub>(BR)CBO</sub> | -50        | -100         | -              | V    | I <sub>C</sub> = -10μA, I <sub>B</sub> = 0                                                          |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CES</sub> | -50        | -90          | -              | V    | I <sub>C</sub> = -10μA, I <sub>B</sub> = 0                                                          |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub> | -45        | -65          | -              | V    | I <sub>C</sub> = -1mA, I <sub>B</sub> = 0                                                           |
| Emitter-Base Breakdown Voltage       | V <sub>(BR)EBO</sub> | -6         | -8.5         | -              | V    | I <sub>E</sub> = -1μA, I <sub>C</sub> = 0                                                           |
| Collector Cutoff Current             | I <sub>CBO</sub>     | -          | -            | -15            | nA   | V <sub>CB</sub> = -30V                                                                              |
| DC Current Gain                      | h <sub>FE</sub>      | 100<br>200 | 340<br>330   | -<br>470       | -    | I <sub>C</sub> = -10μA, V <sub>CE</sub> = -5V<br>I <sub>C</sub> = -2.0mA, V <sub>CE</sub> = -5V     |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | -          | -70<br>-300  | -175<br>-500   | mV   | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA<br>I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA |
| Base-Emitter Saturation Voltage      | V <sub>BE(sat)</sub> | -          | -760<br>-885 | -1000<br>-1100 | mV   | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA<br>I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA |
| Base-Emitter Voltage                 | V <sub>BE(on)</sub>  | -600       | -670<br>-715 | -780<br>-850   | mV   | I <sub>C</sub> = -2.0mA, V <sub>CE</sub> = -5V<br>I <sub>C</sub> = -10mA, V <sub>CE</sub> = -5V     |
| Current Gain-Bandwidth Product       | f <sub>T</sub>       | 100        | 340          | -              | MHz  | V <sub>CE</sub> = -5V, I <sub>C</sub> = -10mA,<br>f = 100MHz                                        |
| Output Capacitance                   | C <sub>obo</sub>     | -          | 2.0          | -              | pF   | V <sub>CB</sub> = -10V, f = 1.0MHz                                                                  |

Notes: 4. Short duration pulse test used to minimize self-heating effect.

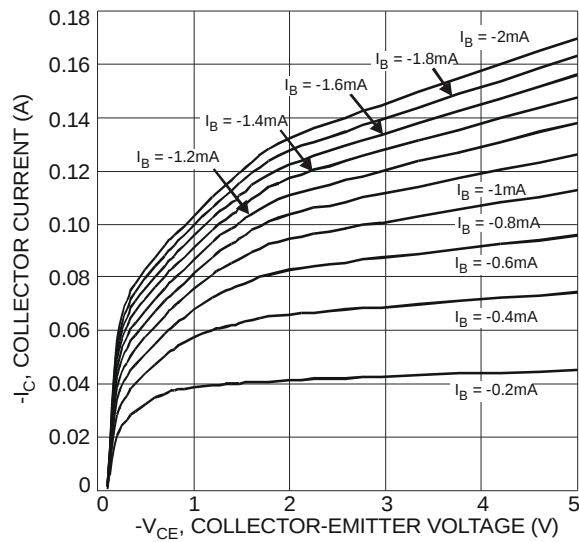


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

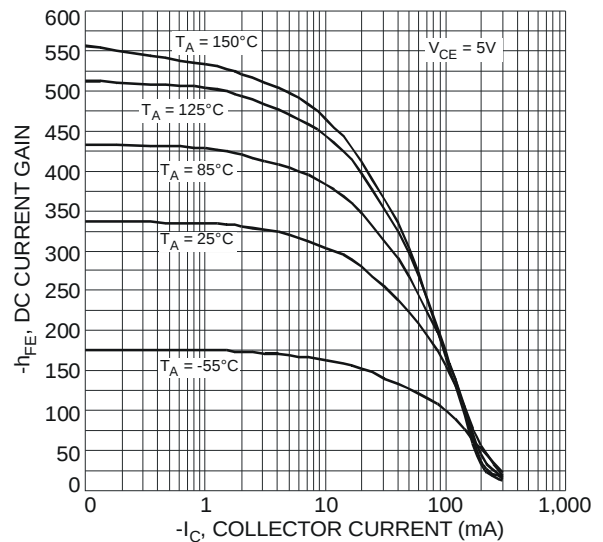


Fig. 5 Typical DC Current Gain vs. Collector Current

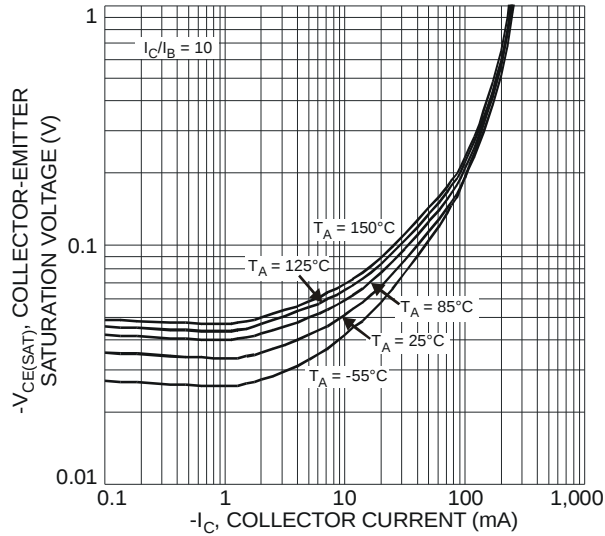


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

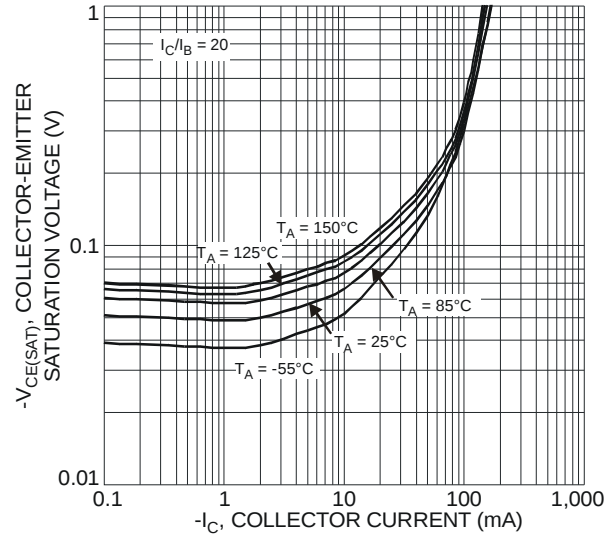


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

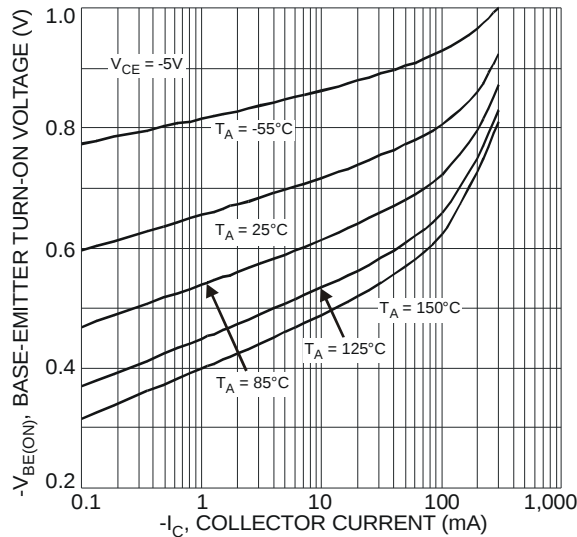


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

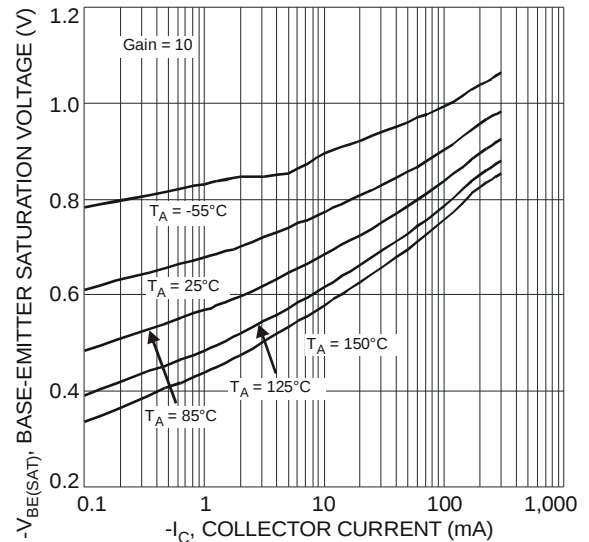
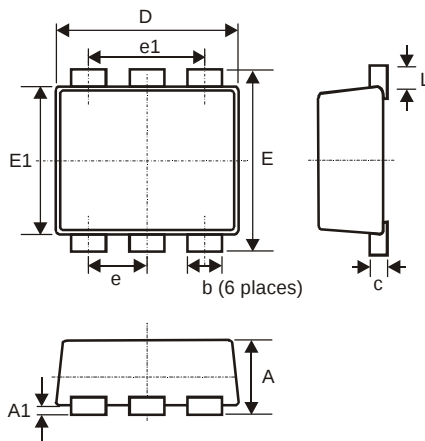


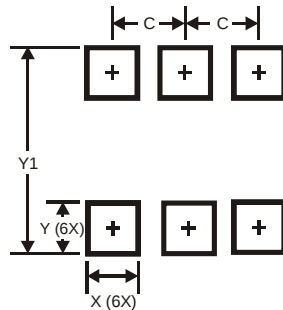
Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

## Package Outline Dimensions



| SOT-963              |          |       |       |
|----------------------|----------|-------|-------|
| Dim                  | Min      | Max   | Typ   |
| A                    | 0.40     | 0.50  | 0.45  |
| A1                   | 0        | 0.05  | -     |
| C                    | 0.120    | 0.180 | 0.150 |
| D                    | 0.95     | 1.05  | 1.00  |
| E                    | 0.95     | 1.05  | 1.00  |
| E1                   | 0.75     | 0.85  | 0.80  |
| L                    | 0.05     | 0.15  | 0.10  |
| b                    | 0.10     | 0.20  | 0.15  |
| e                    | 0.35 Typ |       |       |
| e1                   | 0.70 Typ |       |       |
| All Dimensions in mm |          |       |       |

## Suggest Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.350         |
| X          | 0.200         |
| Y          | 0.200         |
| Y1         | 1.100         |

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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.