

## Features

- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Ultra Small Package**

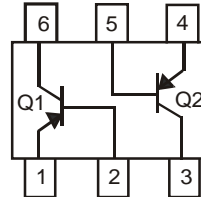
## Mechanical Data

- Case: SOT-963
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.0027 grams (approximate)

SOT-963



Top View



Device Schematic

## Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic                 | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Base Voltage         | $V_{CBO}$ | -50   | V    |
| Collector-Emitter Voltage      | $V_{CEO}$ | -50   | V    |
| Emitter-Base Voltage           | $V_{EBO}$ | -5    | V    |
| Collector Current - Continuous | $I_C$     | -100  | mA   |
| Base Current                   | $I_B$     | -30   | mA   |

## Thermal Characteristics

| Characteristic                                   | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 3)                       | $P_D$           | 300         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 3) | $R_{\theta JA}$ | 417         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

## Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic                       | Symbol        | Min       | Typ   | Max  | Unit          | Test Condition   |  |
|--------------------------------------|---------------|-----------|-------|------|---------------|--|--|
| <b>OFF CHARACTERISTICS (Note 4)</b>  |               |           |       |      |               |  |  |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | -50       | —     | —    | V             | $I_C = -10\mu\text{A}, I_E = 0$                                |  |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | -50       | —     | —    | V             | $I_C = -1\text{mA}, I_B = 0$                                   |  |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | -5        | —     | —    | V             | $I_E = -10\mu\text{A}, I_C = 0$                                |  |
| Collector Cut-Off Current            | $I_{CBO}$     | —         | —     | -0.1 | $\mu\text{A}$ | $V_{CB} = -50\text{V}, I_E = 0$                                |  |
| Emitter Cut-Off Current              | $I_{EBO}$     | —         | —     | -0.1 | $\mu\text{A}$ | $V_{EB} = -5\text{V}, I_C = 0$                                 |  |
| <b>ON CHARACTERISTICS (Note 4)</b>   |               |           |       |      |               |  |  |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | —         | -0.15 | -0.3 | V             | $I_C = -100\text{mA}, I_B = -10\text{mA}$                      |  |
| DC Current Gain                      | $h_{FE}$      | DP0150ADJ | 120   | —    | 240           | —  | $V_{CE} = -6\text{V}, I_C = -2\text{mA}$ |
|                                      |               | DP0150BDJ | 200   | —    | 400           |  |  |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |               |           |       |      |               |  |  |
| Transition Frequency                 | $f_T$         | 80        | —     | —    | MHz           | $V_{CE} = -10\text{V}, I_E = 1\text{mA}$<br>$f = 30\text{MHz}$ |  |
| Output Capacitance                   | $C_{ob}$      | —         | 1.6   | —    | pF            | $V_{CB} = -10\text{V}, I_E = 0,$<br>$f = 1\text{MHz}$          |  |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB with minimum recommended pad layout.
  4. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

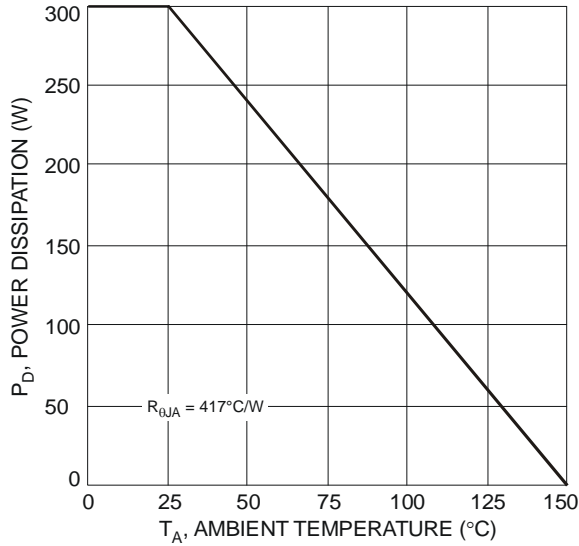


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

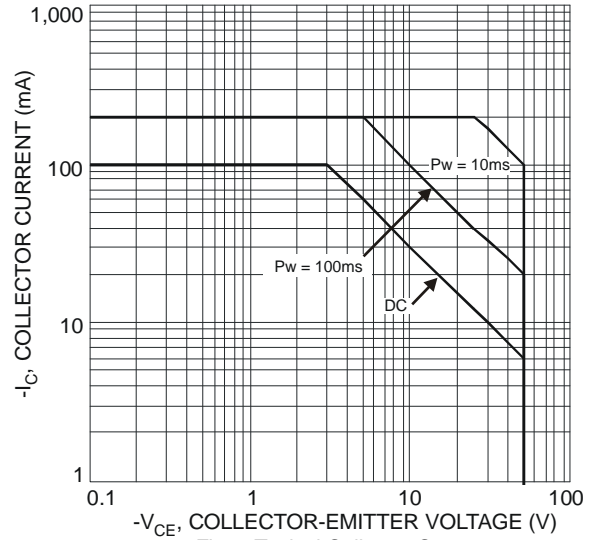


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage (Note 3)

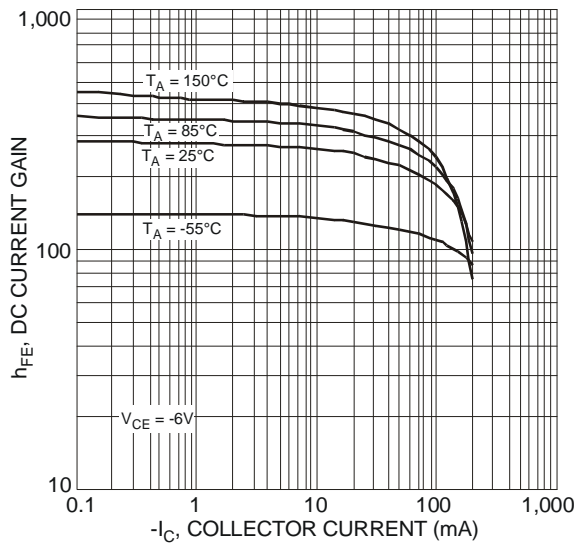


Fig. 3 Typical DC Current Gain vs. Collector Current (DN0150BDJ)

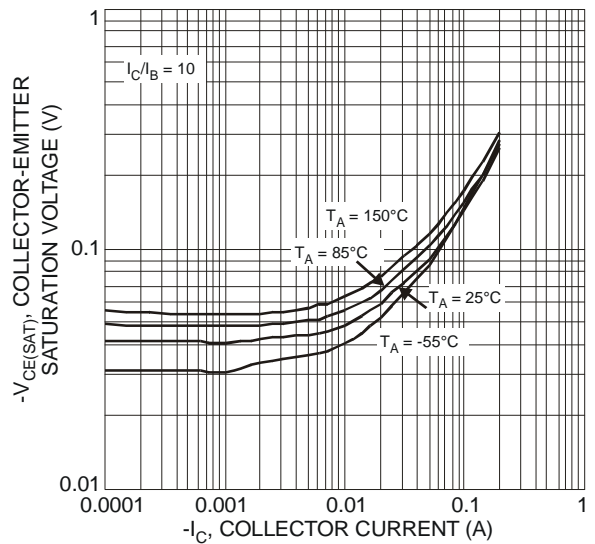


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

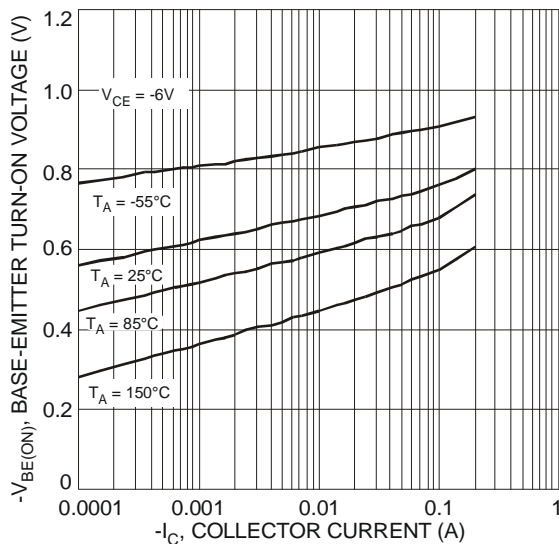


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

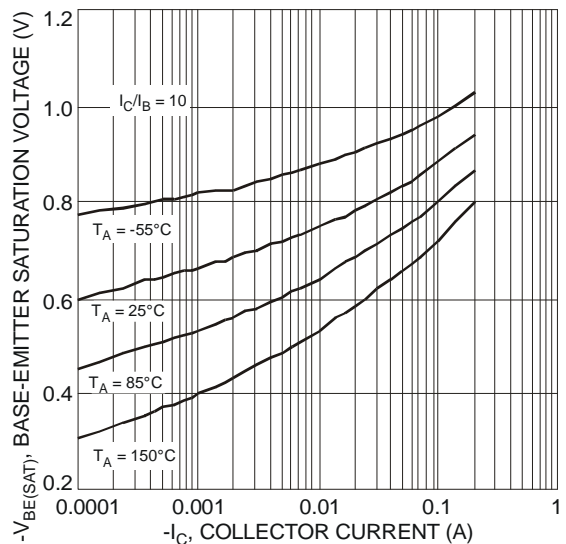


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

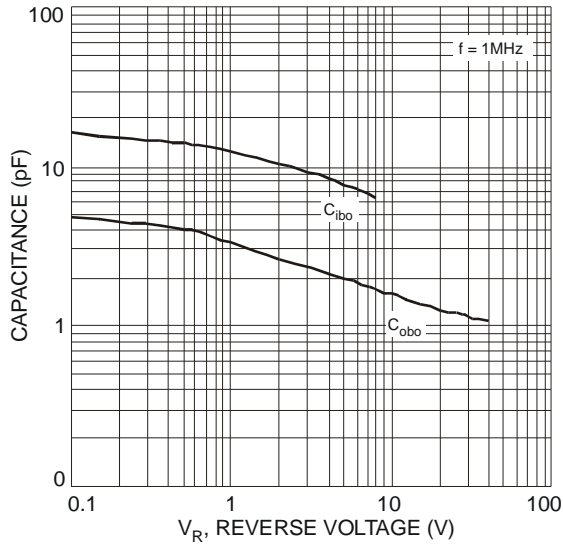


Fig. 7 Typical Capacitance Characteristics

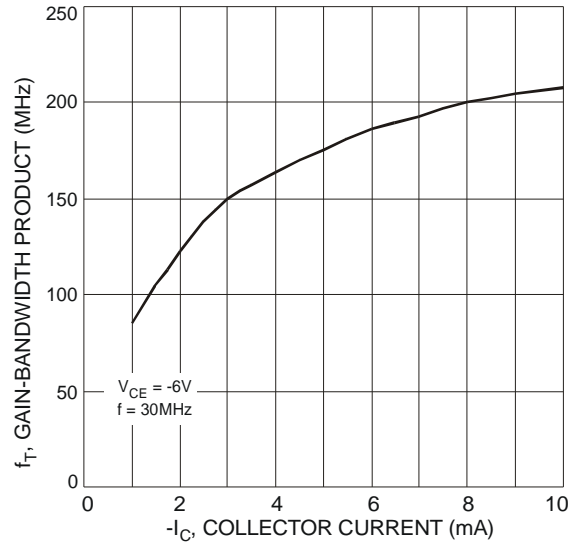


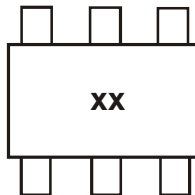
Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

**Ordering Information** (Note 5)

| Device      | Packaging | Shipping           |
|-------------|-----------|--------------------|
| DP0150ADJ-7 | SOT-963   | 10,000/Tape & Reel |
| DP0150BDJ-7 | SOT-963   | 10,000/Tape & Reel |

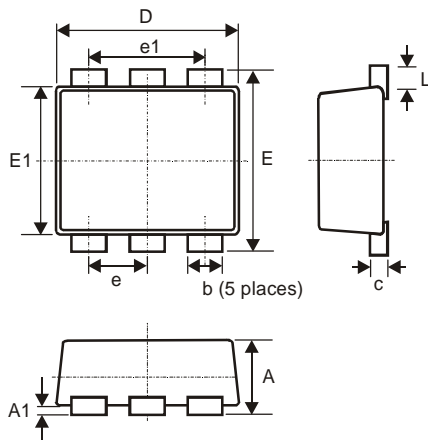
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



xx= Product Type Marking Code:  
T5 = DP0150ADJ  
T6 = DP0150BDJ

**Package Outline Dimensions**



| SOT-963              |          |       |       |
|----------------------|----------|-------|-------|
| Dim                  | Min      | Max   | Typ   |
| A                    | 0.40     | 0.50  | 0.45  |
| A1                   | 0        | 0.05  | -     |
| c                    | 0.077    | 0.177 | 0.127 |
| 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 |          |       |       |

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