



**THE DATASHEET OF  
DP0150ALP4-7**



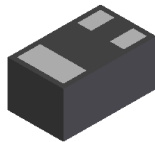
## Features

- $BV_{CE0} > -50V$
- $I_C = -100mA$  High Collector Current
- $P_D = 1000mW$  Power Dissipation
- 0.60mm<sup>2</sup> Package Footprint, 13 Times Smaller than SOT23
- 0.4mm Height Package Minimizing Off-Board Profile
- Complementary NPN Type: DN0150BLP4
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

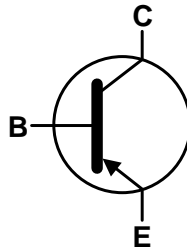
## Mechanical Data

- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—NiPdAu. Solderable per MIL-STD-202, Method 208 <sup>(4)</sup>
- Weight: 0.0008 grams (Approximate)

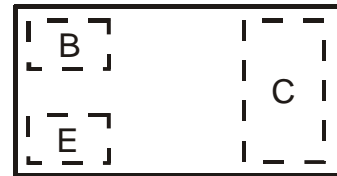
X2-DFN1006-3



Bottom View



Device Symbol



Top View  
Pin Configuration

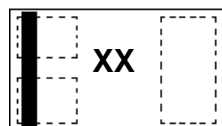
## Ordering Information (Note 4)

| Part Number   | Status   | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|----------|---------|--------------------|-----------------|-------------------|
| DP0150ALP4-7  | Obsolete | T5      | 7                  | 8               | 3,000             |
| DP0150ALP4-7B | Obsolete | T5      | 7                  | 8               | 10,000            |
| DP0150BLP4-7  | Active   | T6      | 7                  | 8               | 3,000             |
| DP0150BLP4-7B | Active   | T6      | 7                  | 8               | 10,000            |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

X2-DFN1006-3



XX = Product Type Marking Code

**Absolute 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   |
| Peak Pulse Collector Current   | $I_{CM}$  | -200  | mA   |
| Base Current                   | $I_B$     | -30   | mA   |

**Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                          | Symbol          | Value            | Unit               |
|---|-----------------|------------------|--------------------|
| Power Dissipation                       | $P_D$           | (Note 5)<br>400  | mW                 |
|   |                 | (Note 6)<br>1000 |                    |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | (Note 5)<br>310  | $^\circ\text{C/W}$ |
|   |                 | (Note 6)<br>120  |                    |
| Thermal Resistance, Junction to Lead    | $R_{\theta JL}$ | 120              | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | $T_J, T_{STG}$  | -55 to +150      | $^\circ\text{C}$   |

**ESD Ratings** (Note 8)

| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | C           |

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                               | Symbol                 | Min  | Typ  | Max  | Unit | Test Condition   |
|--|------------------------|------|------|------|------|--|
| <b>OFF CHARACTERISTICS</b>                   |                        |      |      |      |      |  |
| Collector-Base Breakdown Voltage             | $BV_{CBO}$             | -50  | -100 | —    | V    | $I_C = -100\mu\text{A}$  |
| Collector-Emitter Breakdown Voltage (Note 8) | $BV_{CEO}$             | -50  | -79  | —    | V    | $I_C = -1\text{mA}$  |
| Emitter-Base Breakdown Voltage               | $BV_{EBO}$             | -6   | -8.3 | —    | V    | $I_E = -100\mu\text{A}$  |
| Collector Cut-Off Current                    | $I_{CBO}$              | —    | -1   | -50  | nA   | $V_{CB} = -50\text{V}$   |
| Collector Cut-Off Current                    | $I_{CEX}$              | —    | -1   | -50  | nA   | $V_{CE} = -50\text{V}, V_{EB} = -3\text{V}$  |
| Emitter Cut-Off Current                      | $I_{EBO}$              | —    | -1   | -20  | nA   | $V_{EB} = -5\text{V}$  |
| Base Cutoff Current                          | $I_{BL}$               | —    | -1   | -50  | nA   | $V_{CE} = -50\text{V}, V_{EB} = -3\text{V}$  |
| <b>ON CHARACTERISTICS (Note 9)</b>           |                        |      |      |      |      |  |
| DC Current Gain                              | DP0150BLP4<br>$h_{FE}$ | 200  | 300  | 400  | —    | $V_{CE} = -6\text{V}, I_C = -2\text{mA}$   |
| Collector-Emitter Saturation Voltage         | $V_{CE(sat)}$          | —    | -150 | -300 | mV   | $I_C = -100\text{mA}, I_B = -10\text{mA}$  |
| Base-Emitter Saturation Voltage              | $V_{BE(sat)}$          | -650 | -740 | -850 | mV   | $I_C = -10\text{mA}, I_B = -1\text{mA}$<br>$I_C = -50\text{mA}, I_B = -5\text{mA}$ |
| <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                           | $C_{obo}$              | —    | 1.6  | —    | pF   | $V_{CB} = -10\text{V}, I_E = 0,$<br>$f = 1\text{MHz}$                              |

- Notes:
- For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
  - Same as Note 5, except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.
  - Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

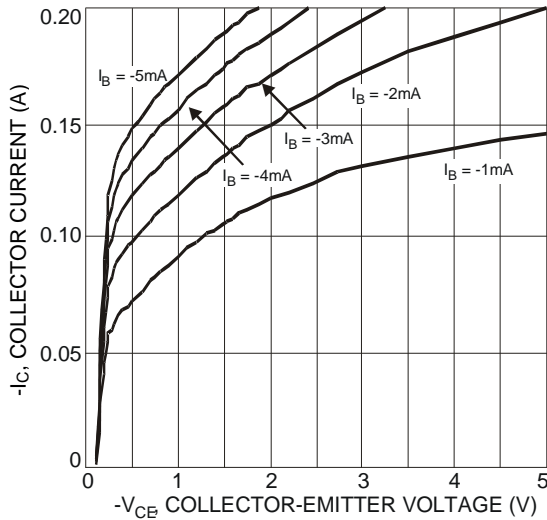


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage (DP0150BLP4)

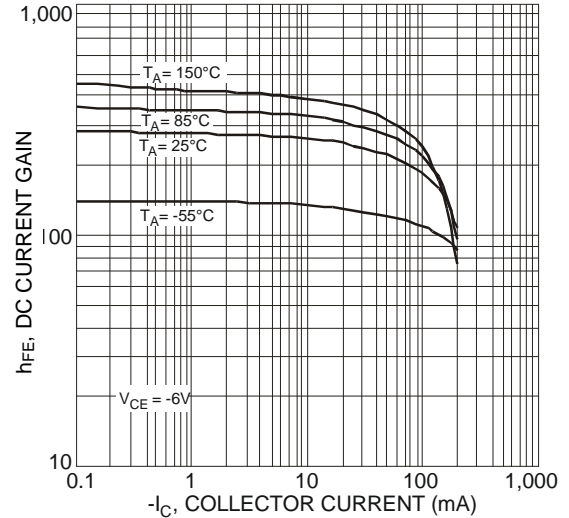


Fig. 2 Typical DC Current Gain vs. Collector Current (DP0150BLP4)

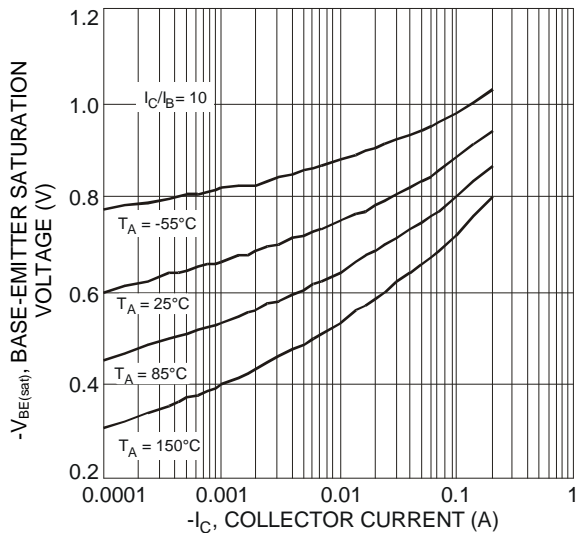


Fig. 3 Typical Base-Emitter Saturation Voltage vs. Collector Current

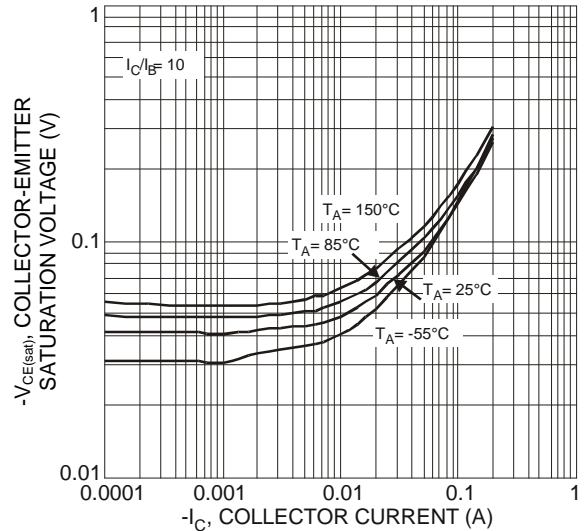


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

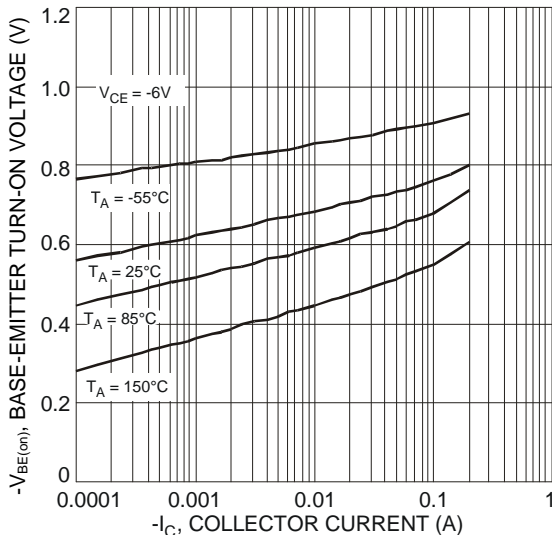


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

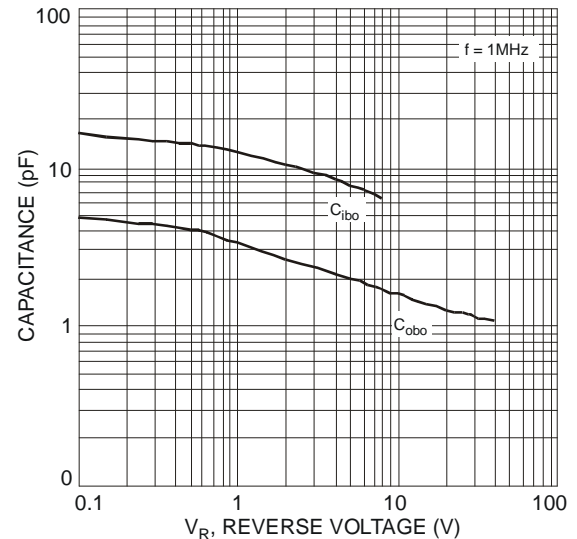


Fig. 6 Typical Capacitance Characteristics

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.) (continued)

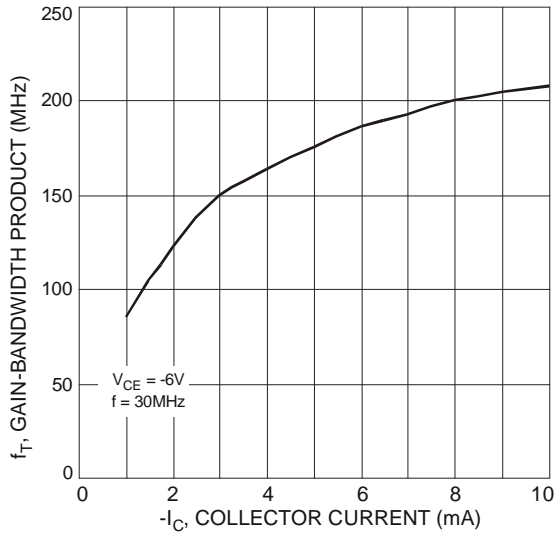
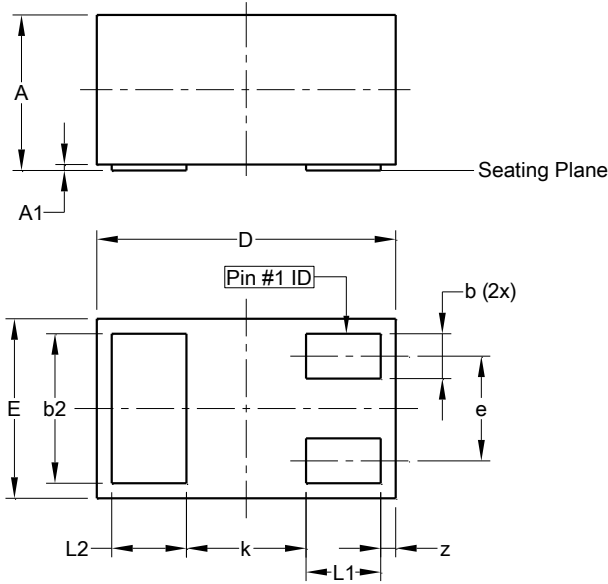


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**X2-DFN1006-3**

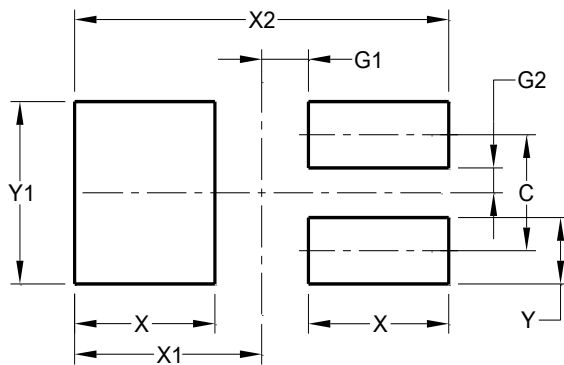


| X2-DFN1006-3         |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | —    | 0.40 | —    |
| A1                   | 0.00 | 0.05 | 0.03 |
| b                    | 0.10 | 0.20 | 0.15 |
| b2                   | 0.45 | 0.55 | 0.50 |
| D                    | 0.95 | 1.05 | 1.00 |
| E                    | 0.55 | 0.65 | 0.60 |
| e                    | —    | —    | 0.35 |
| L1                   | 0.20 | 0.30 | 0.25 |
| L2                   | 0.20 | 0.30 | 0.25 |
| k                    | —    | —    | 0.40 |
| z                    | 0.02 | 0.08 | 0.05 |
| All Dimensions in mm |      |      |      |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**X2-DFN1006-3**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.350         |
| G1         | 0.150         |
| G2         | 0.075         |
| X          | 0.450         |
| X1         | 0.600         |
| X2         | 1.200         |
| Y          | 0.200         |
| Y1         | 0.550         |

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