

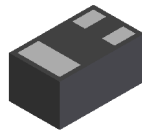
Features

- Low Collector-Emitter Saturation Voltage, $V_{CE(SAT)}$
- Ultra-Small Leadless Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

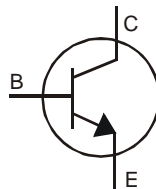
Mechanical Data

- 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 ^(e4)
- Weight: 0.0009 grams (Approximate)

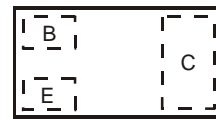
X2-DFN1006-3



Bottom View



Device Symbol



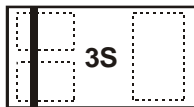
Top View
Device Schematic

Ordering Information (Note 4)

| Part Number | Marking | Reel Size (in) | Tape Width (mm) | Quantity per Reel |
|--------------|---------|----------------|-----------------|-------------------|
| BC846BLP4-7B | 3S | 7 | 8 | 10,000 |

- 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/quality/lead_free.html 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



3S = Product Type Marking Code

Top View
Bar Denotes Base and Emitter Side

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

| Characteristic | Symbol | Value | Unit |
|--------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | 80 | V |
| Collector-Emitter Voltage | V _{CEO} | 65 | V |
| Emitter-Base Voltage | V _{EBO} | 6 | V |
| Collector Current - Continuous | I _C | 100 | mA |
| Peak Collector Current | I _{CM} | 200 | mA |
| Peak Emitter Current | I _{EM} | 200 | mA |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|------------------|------|
| Power Dissipation | P _D | (Note 5) 0.46 | W |
| | | (Note 6) 1 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) 272 | °C/W |
| | | (Note 6) 120 | |
| Thermal Resistance, Junction to Leads | R _{θJL} | 110 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 8)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 200 | V | B |

- Notes:
5. For a device surface mounted on minimum recommended pad layout FR-4 PCB with single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The entire exposed collector pad is attached to the heatsink.
 6. Same as Note 5, except device is surface mounted on 25mm X 25mm collector pad heatsink with 1oz copper.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics

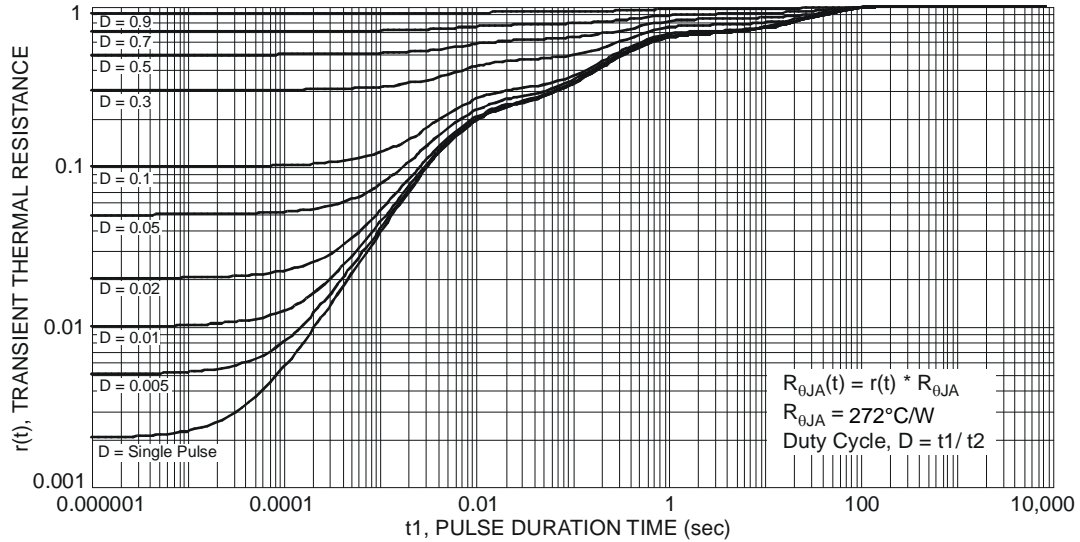


Fig. 1 Transient Thermal Resistance

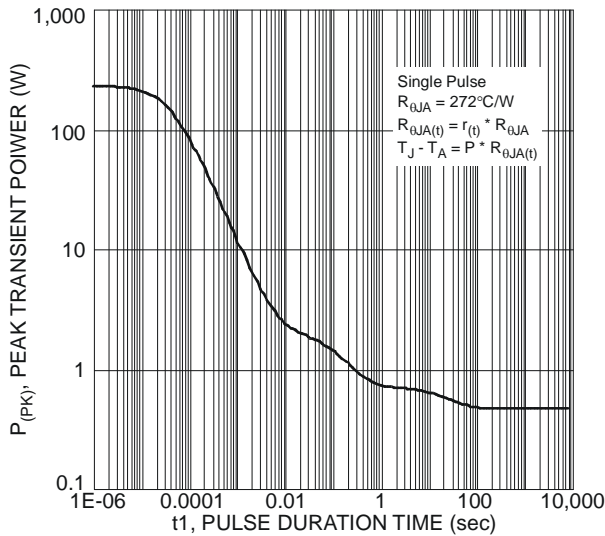


Fig. 2 Single Pulse Maximum Power Dissipation

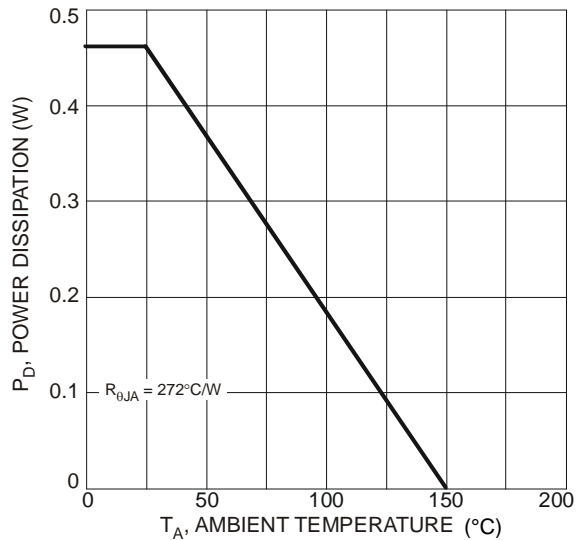


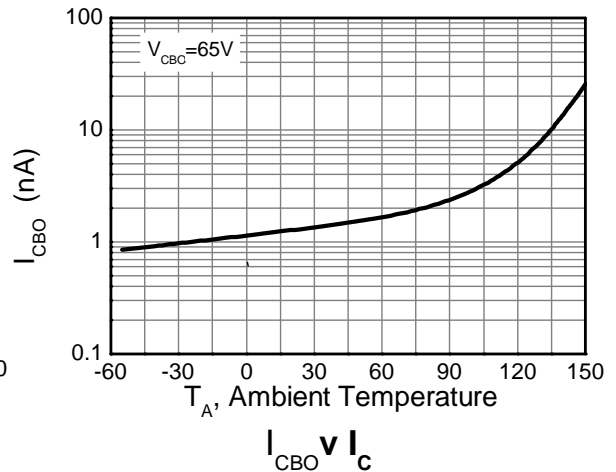
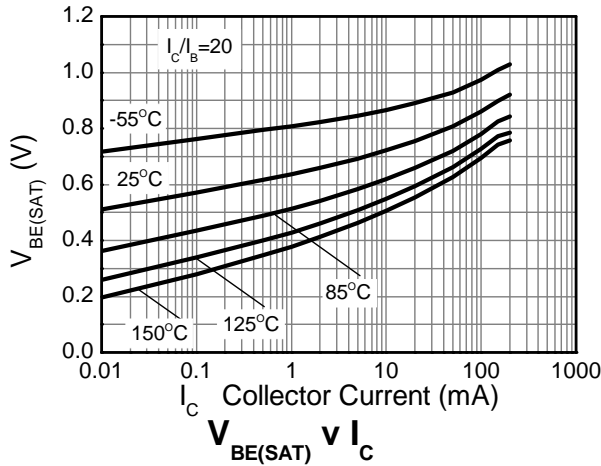
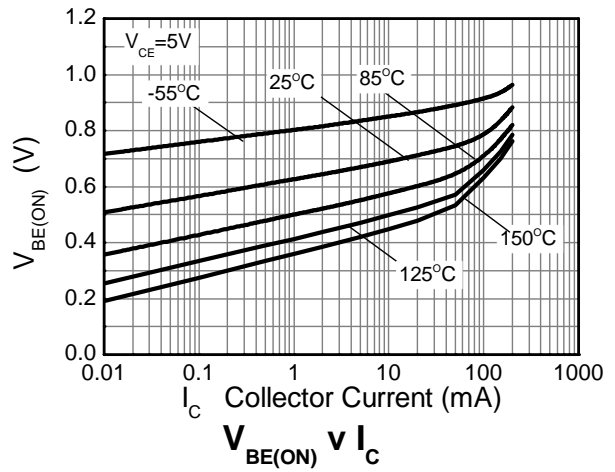
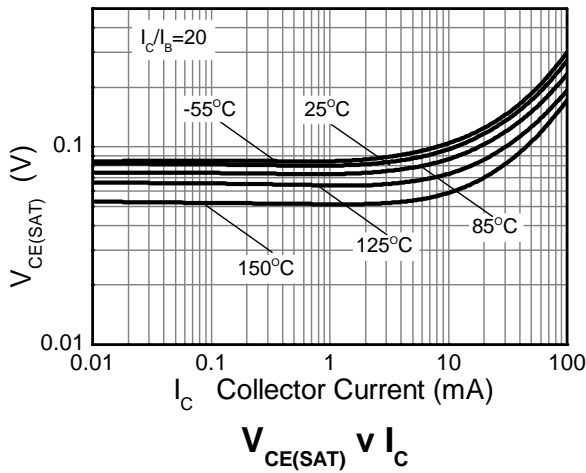
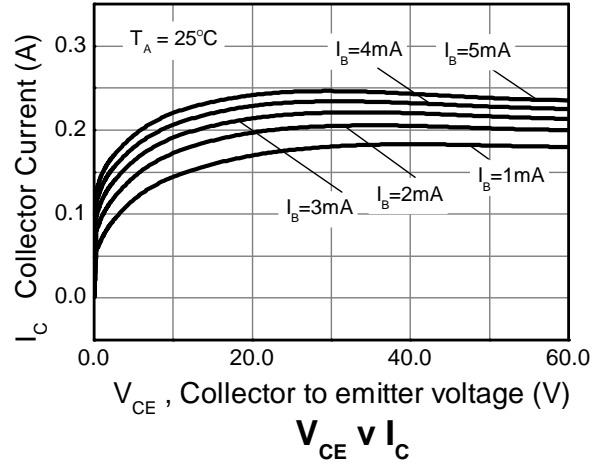
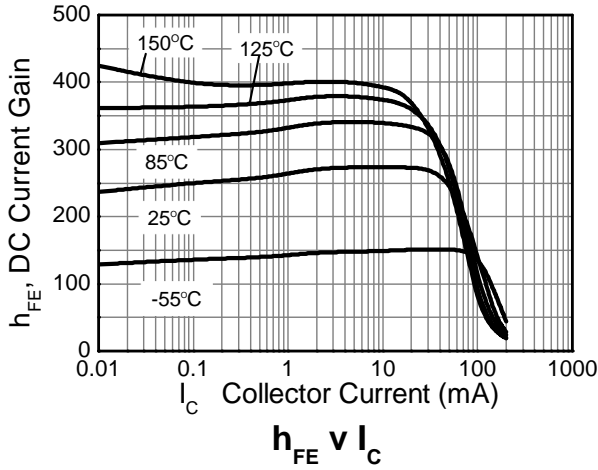
Fig. 3 Power Dissipation vs. Ambient Temperature

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

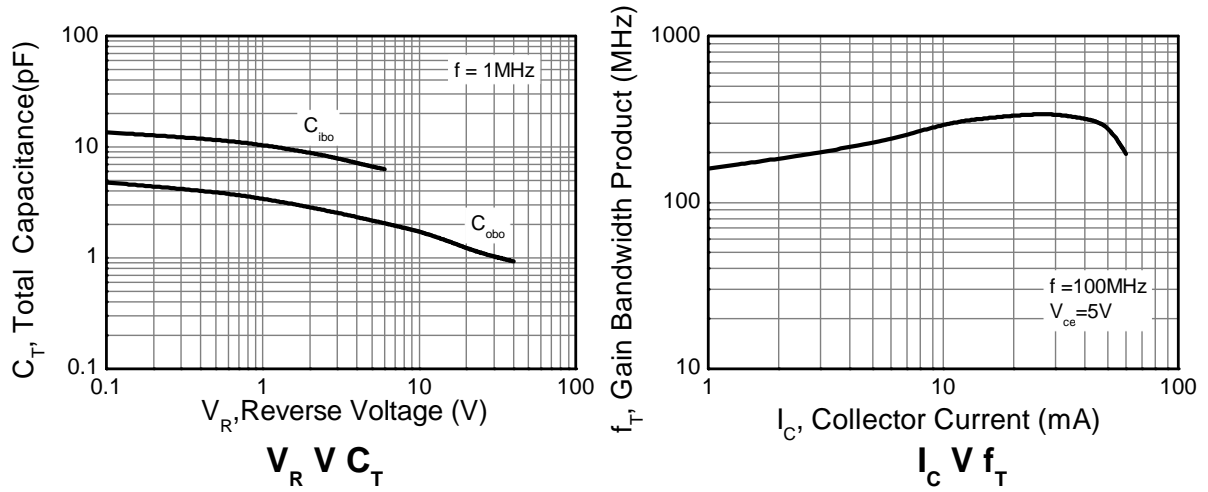
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|-----|------------|------------|----------|---|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV _{CBO} | 80 | — | — | V | I _C = 100μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 65 | — | — | V | I _C = 10mA, I _B = 0 |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 6 | — | — | V | I _E = 100μA, I _C = 0 |
| Collector Cutoff Current | I _{CES} | — | — | 15 | nA | V _{CE} = 65V |
| Collector Cutoff Current | I _{CBO} | — | — | 15 5.0 | nA μA | V _{CB} = 40V V _{CB} = 30V, T _A = +150°C |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| DC Current Gain | h _{FE} | 200 | 270 | 450 | — | V _{CE} = 5V, I _C = 2.0mA |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | — | 90 220 | 250 600 | mV | I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5.0mA |
| Base-Emitter Saturation Voltage | V _{BE(SAT)} | — | 720 870 | 900 — | mV | I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5.0mA |
| Base-Emitter Voltage | V _{BE(ON)} | 580 | 650 | 700 770 | mV | V _{CE} = 5V, I _C = 2.0mA V _{CE} = 5V, I _C = 10mA |
| SMALL SIGNAL CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{ibo} | — | 6.7 | — | pF | V _{CB} = 5V, f = 1.0MHz |
| Output Capacitance | C _{obo} | — | 1.76 | — | pF | V _{CB} = 10V, f = 1.0MHz |
| Current Gain-Bandwidth Product | f _T | 100 | 300 | — | MHz | V _{CE} = 5V, I _C = 10mA, f = 100MHz |
| Noise Figure | NF | — | 2 | 10 | dB | V _{CE} = 5V, I _C = 200μA, R _S = 2.0kΩ, f = 1.0kHz, Δf = 200Hz |
| Delay Time | t _D | — | 11.2 | — | ns | V _{CC} = 30V, I _C = 150mA, I _{B1} = -I _{B2} = 15mA |
| Rise Time | t _R | — | 59.7 | — | ns | |
| Storage Time | t _S | — | 190.8 | — | ns | |
| Fall Time | t _F | — | 108.6 | — | ns | |

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics



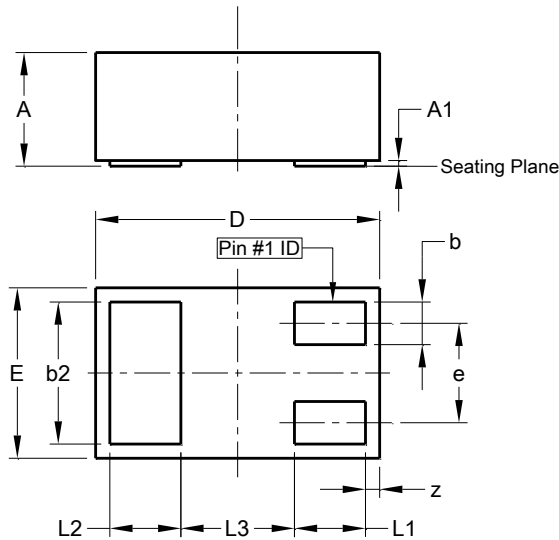
Typical Electrical Characteristics (Cont.)



Package Outline Dimensions

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

X2-DFN1006-3

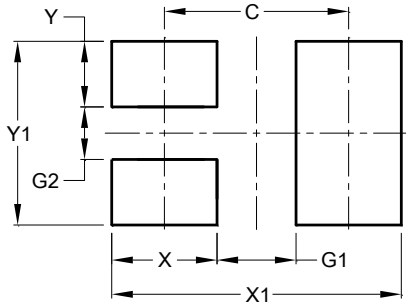


| X2-DFN1006-3 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | — | 0.40 | — |
| A1 | 0.00 | 0.05 | 0.03 |
| b | 0.10 | 0.20 | 0.15 |
| b2 | 0.45 | 0.55 | 0.50 |
| D | 0.95 | 1.05 | 1.00 |
| E | 0.55 | 0.65 | 0.60 |
| e | - | - | 0.35 |
| L1 | 0.20 | 0.30 | 0.25 |
| L2 | 0.20 | 0.30 | 0.25 |
| L3 | - | - | 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 | 0.70 |
| G1 | 0.30 |
| G2 | 0.20 |
| X | 0.40 |
| X1 | 1.10 |
| Y | 0.25 |
| Y1 | 0.70 |

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