



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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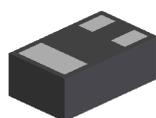
Features

- $BV_{CEO} > -45V$
- $I_C = -100mA$ High Collector Current
- $P_D = 1W$ Power Dissipation
- $0.6mm^2$ Package Footprint, 13 Times Smaller than SOT23
- 0.4mm Height Package Minimizing Off-Board Profile
- Complementary NPN Type: BC847BLP4
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

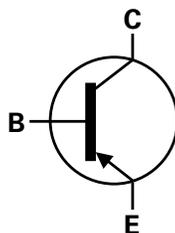
Mechanical Data

- Package: X2-DFN1006-3
- Package 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 
- Weight: 0.0008 grams (Approximate)

X2-DFN1006-3



Bottom View



Device Symbol



Top View
Device Schematic

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -45 | V |
| Emitter-Base Voltage | V _{EBO} | -5 | V |
| Collector Current | I _C | -100 | mA |
| Peak Pulse Collector Current | I _{CM} | -200 | mA |

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

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | 0.4 | W |
| | | 1 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 310 | °C/W |
| | | 120 | |
| Thermal Resistance, Junction to Lead | R _{θJL} | 120 | °C/W |
| Operating and Storage and 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 | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 200 | V | B |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|------|------|------|------|---|
| Collector-Base Breakdown Voltage | BV _{CB0} | -50 | — | — | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | -45 | — | — | V | I _C = -10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -5 | — | — | V | I _E = -100μA |
| DC Current Gain | h _{FE} | 220 | 300 | 475 | — | V _{CE} = -5V, I _C = -2mA |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(sat)} | — | -90 | -300 | mV | I _C = -10mA, I _B = -0.5mA I _C = -100mA, I _B = -5mA |
| | | — | -250 | -650 | | |
| Base-Emitter Saturation Voltage (Note 9) | V _{BE(sat)} | — | -700 | — | mV | I _C = -10mA, I _B = -0.5mA I _C = -100mA, I _B = -5mA |
| | | — | -850 | — | | |
| Base-Emitter Voltage (Note 9) | V _{BE(on)} | -600 | -670 | -750 | mV | V _{CE} = -5V, I _C = -2mA V _{CE} = -5V, I _C = -10mA |
| | | — | -710 | -820 | | |
| Collector-Cutoff Current | I _{CBO} | — | — | -15 | nA | V _{CB} = -30V V _{CB} = -30V, T _A = +150°C |
| | | — | — | -4.0 | | |
| Gain Bandwidth Product | f _T | 100 | — | — | MHz | V _{CE} = -5V, I _C = -10mA f = 100MHz |
| Collector-Base Capacitance | C _{CB0} | — | 3.0 | — | pF | V _{CB} = -10V, f = 1MHz |

- Notes:
- For the device mounted on minimum recommended pad layout 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition.
 - 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 ≤ 300μs. Duty cycle ≤ 2%.

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

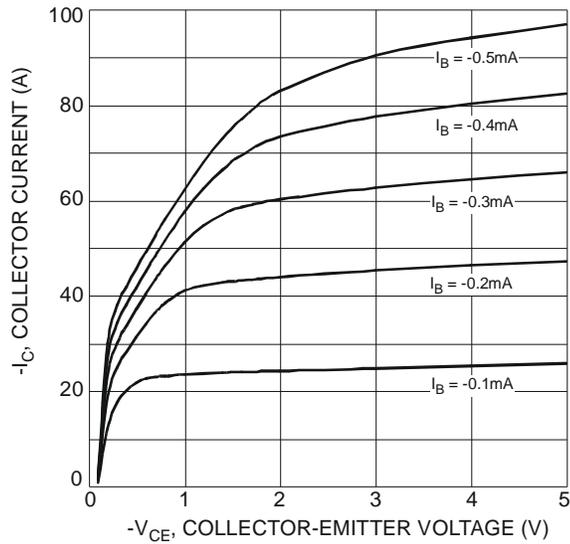


Figure 1. Typical Collector Current vs. Collector-Emitter Voltage

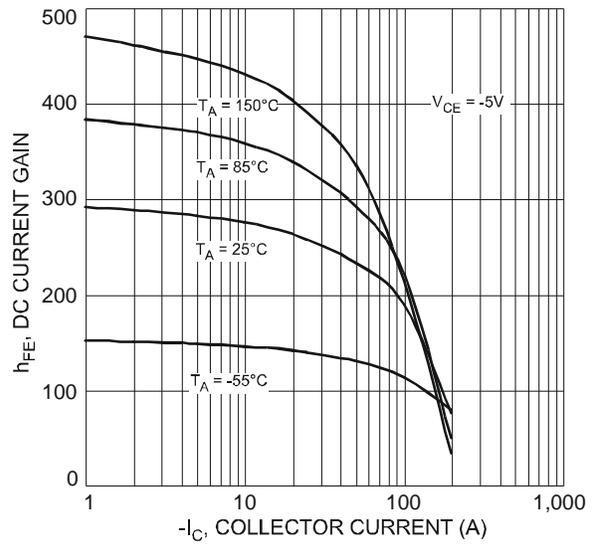


Figure 2. Typical DC Current Gain vs. Collector Current

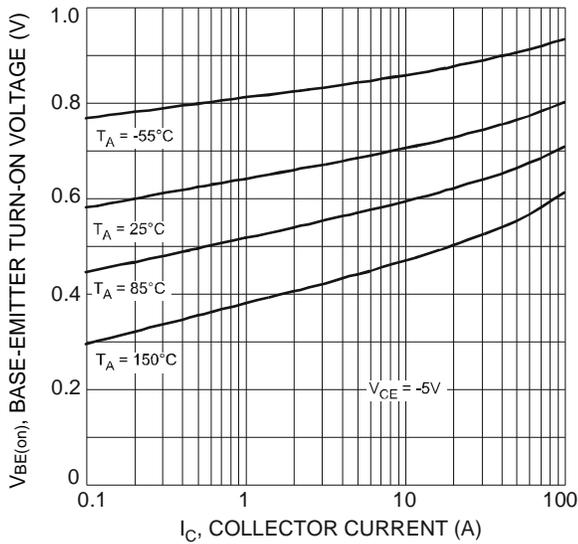


Figure 3. Typical Base-Emitter Turn-On Voltage vs. Collector Current

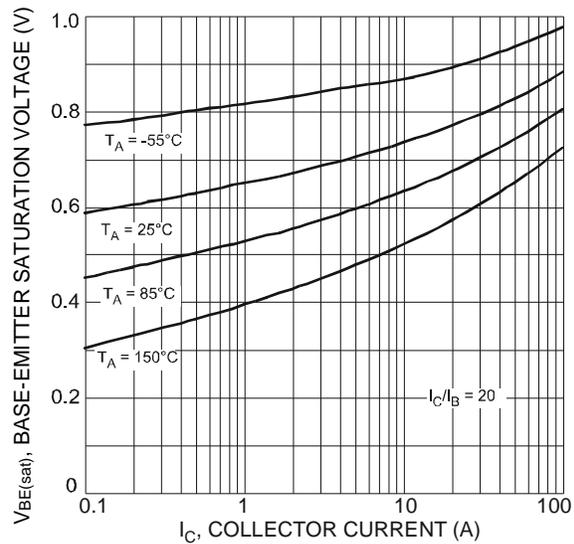
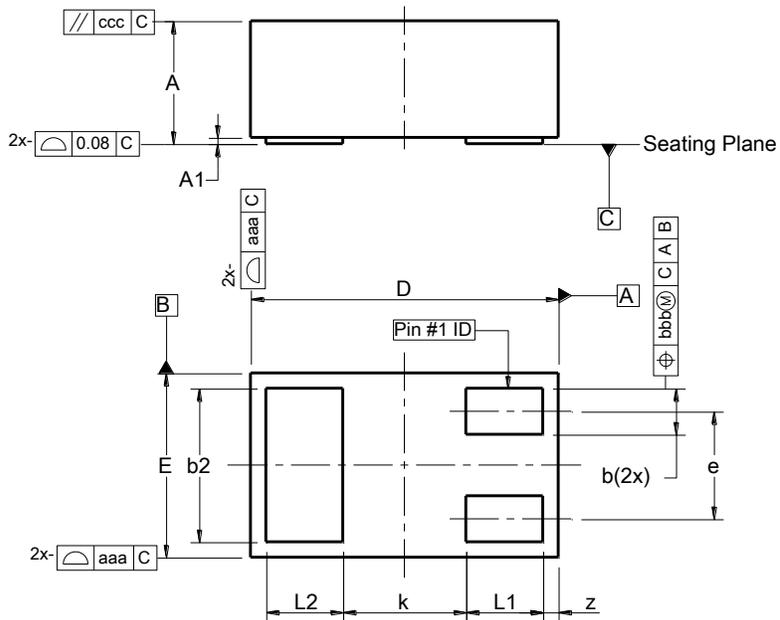


Figure 4. Typical Base-Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions

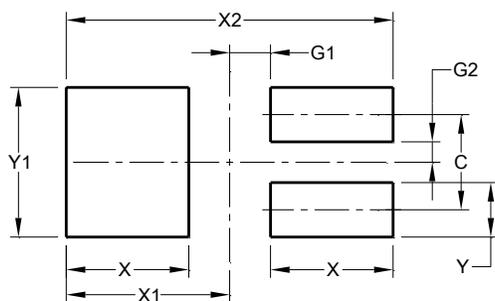
X2-DFN1006-3



| 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 |
| aaa | 0.15 | | |
| bbb | 0.05 | | |
| ccc | 0.05 | | |
| All Dimensions in mm | | | |

Suggested Pad Layout

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 |