



DUAL SURFACE MOUNT NPN/PNP TRANSISTORS (COMPLIMENTARY)

This device contains two electrically-isolated complimentary pair (NPN and PNP) general-purpose transistors. This device is ideal for portable applications where board space is at a premium.

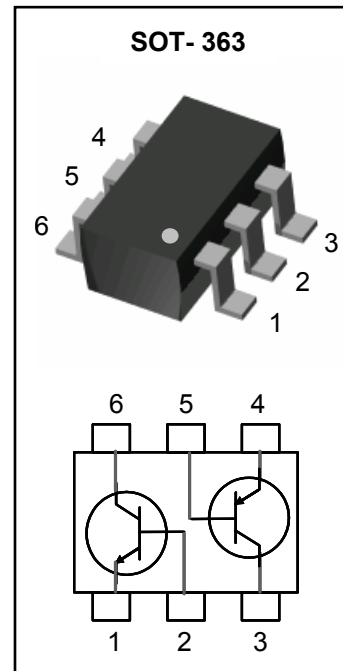
FEATURES

- Electrically-Isolated Complimentary Transistor Pairs
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

APPLICATIONS

- General Purpose Amplifier Applications
- Hand-Held Computers, PDAs

Device Marking Code: 47P



MAXIMUM RATINGS - NPN

$T_J = 25^\circ\text{C}$ Unless otherwise noted

| Rating | Symbol | Value | Units |
|------------------------------|-----------|-------|-------|
| Collector-Base Voltage | V_{CBO} | 50 | V |
| Collector-Emitter Voltage | V_{CEO} | 45 | V |
| Emitter-Base Voltage Voltage | V_{EBO} | 6.0 | V |
| Collector Current | I_C | 100 | mA |

MAXIMUM RATINGS - PNP

$T_J = 25^\circ\text{C}$ Unless otherwise noted

| Rating | Symbol | Value | Units |
|------------------------------|-----------|-------|-------|
| Collector-Base Voltage | V_{CBO} | -50 | V |
| Collector-Emitter Voltage | V_{CEO} | -45 | V |
| Emitter-Base Voltage Voltage | V_{EBO} | -5.0 | V |
| Collector Current | I_C | -100 | mA |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Units |
|--|------------|-------------|--------------------|
| Total Power Dissipation (Note 1) | P_D | 200 | mW |
| Operating Junction Temperature Range | T_J | -55 to +150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -55 to +150 | $^\circ\text{C}$ |
| Thermal Resistance, Junction to Ambient (Note 1) | R_{thja} | 556 | $^\circ\text{C/W}$ |

Note 1. FR-4 board 70 x 60 x 1mm with minimum recommended pad layout



NPN ELECTRICAL CHARACTERISTICS (Note 2)

$T_J = 25^\circ\text{C}$ Unless otherwise noted

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|--------------------------------------|---------------|---|------|------|-----|---------------|
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 10\text{mA}$ | 45 | - | - | V |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CES}$ | $I_C = 10\mu\text{A}, V_{EB} = 0$ | 50 | - | - | V |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C = 10\mu\text{A}$ | 50 | - | - | V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E = 1.0\mu\text{A}$ | 6.0 | - | - | V |
| Collector Cutoff Current | I_{CBO} | $V_{CB} = 30\text{V}, I_E = 0$ $T_J = 150^\circ\text{C}$ | - | - | 15 | nA |
| | | | - | - | 5 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 5\text{V}, I_C = 0$ | - | - | 100 | nA |
| DC Current Gain | h_{FE} | $V_{CE} = 5\text{V}, I_C = 2.0\text{mA}$ | 200 | - | 450 | - |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5\text{mA}$ | - | - | 0.1 | V |
| | | | - | - | 0.4 | V |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | $I_C = 10\text{mA}, I_B = 0.5\text{mA}$ | - | 0.75 | - | V |
| Base-Emitter Voltage | V_{BE} | $V_{CE} = 5\text{V}, I_C = 2.0\text{mA}$ | 0.58 | - | 0.7 | V |
| Gain-Bandwidth Product | f_T | $V_{CE} = 5\text{V}, I_C = 10\text{mA}$ $f = 100\text{MHz}$ | 100 | - | - | MHz |
| Collector-Base Capacitance | C_{CBO} | $V_{CB} = 10\text{V}, f = 1.0\text{MHz}$ | - | - | 1.5 | pF |
| Emitter-Base Capacitance | C_{EBO} | $V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}$ | - | 7 | - | pF |

PNP ELECTRICAL CHARACTERISTICS (Note 2)

$T = 25^\circ\text{C}$ Unless otherwise noted

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|--------------------------------------|---------------|---|------|------|-------|---------------|
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = -10\text{mA}$ | -45 | - | - | V |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CES}$ | $I_C = -10\mu\text{A}, V_{EB} = 0$ | -50 | - | - | V |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C = -10\mu\text{A}$ | -50 | - | - | V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E = -1.0\mu\text{A}$ | -5.0 | - | - | V |
| Collector Cutoff Current | I_{CBO} | $V_{CB} = -30\text{V}, I_E = 0$ $T_J = 150^\circ\text{C}$ | - | - | -15 | nA |
| | | | - | - | -4.0 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = -5\text{V}, I_C = 0$ | - | - | -100 | nA |
| DC Current Gain | h_{FE} | $V_{CE} = -5\text{V}, I_C = -2.0\text{mA}$ | 200 | - | 475 | - |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5\text{mA}$ | - | - | -0.3 | V |
| | | | - | - | -0.65 | V |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ | - | -0.7 | - | V |
| Base-Emitter Voltage | V_{BE} | $V_{CE} = -5\text{V}, I_C = -2.0\text{mA}$ | -0.6 | - | -0.75 | V |
| Gain-Bandwidth Product | f_T | $V_{CE} = -5\text{V}, I_C = -10\text{mA}$ $f = 100\text{MHz}$ | 100 | - | - | MHz |
| Collector-Base Capacitance | C_{CBO} | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}$ | - | - | 4.5 | pF |
| Emitter-Base Capacitance | C_{EBO} | $V_{EB} = -0.5\text{V}, f = 1.0\text{MHz}$ | - | 11 | - | pF |

Note 2. Short duration test pulse used to minimize self-heating



ELECTRICAL CHARACTERISTICS CURVE

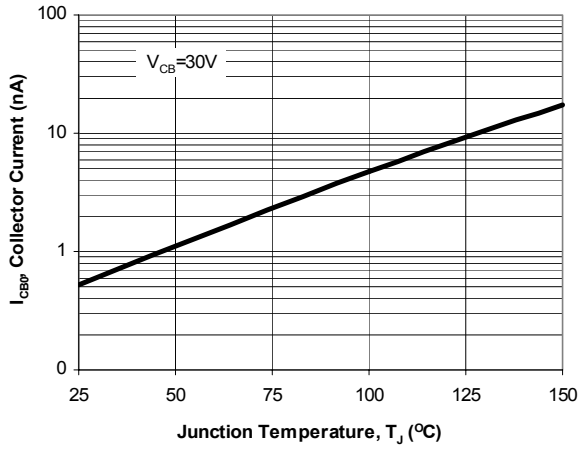


Fig. 1. Typical I_{CB0} vs. Junction Temperature

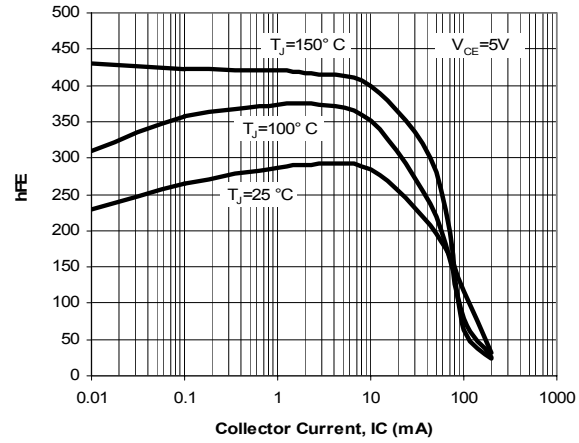


Fig. 2. Typical h_{FE} vs. Collector Current

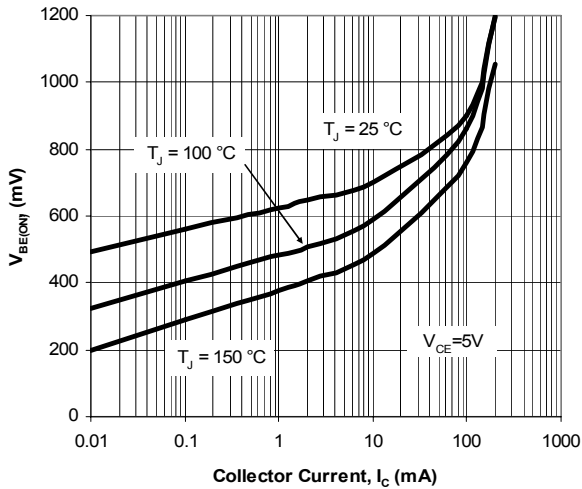


Fig. 3. Typical $V_{BE(ON)}$ vs. Collector Current

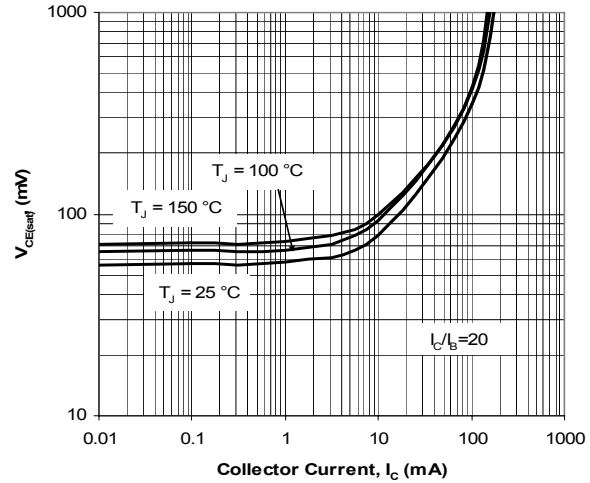


Fig. 4. Typical $V_{CE(SAT)}$ vs. Collector Current

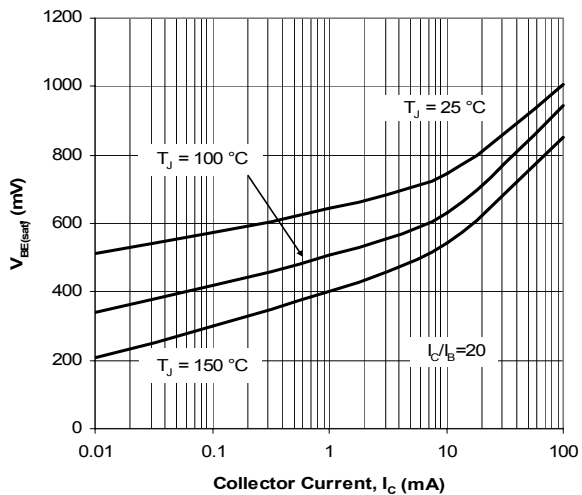


Fig. 5. Typical $V_{BE(SAT)}$ vs. Collector Current

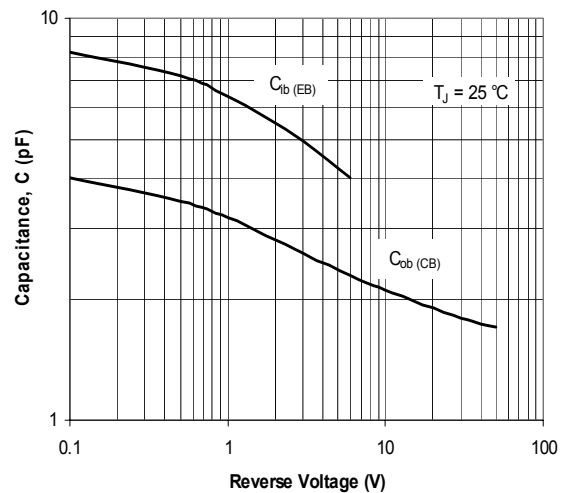
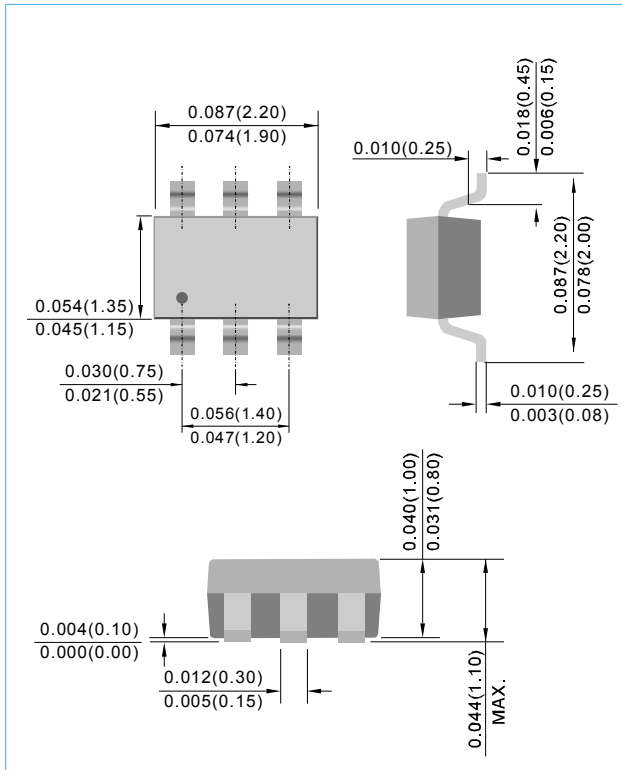


Fig. 6. Typical Capacitances vs. Reverse Voltage

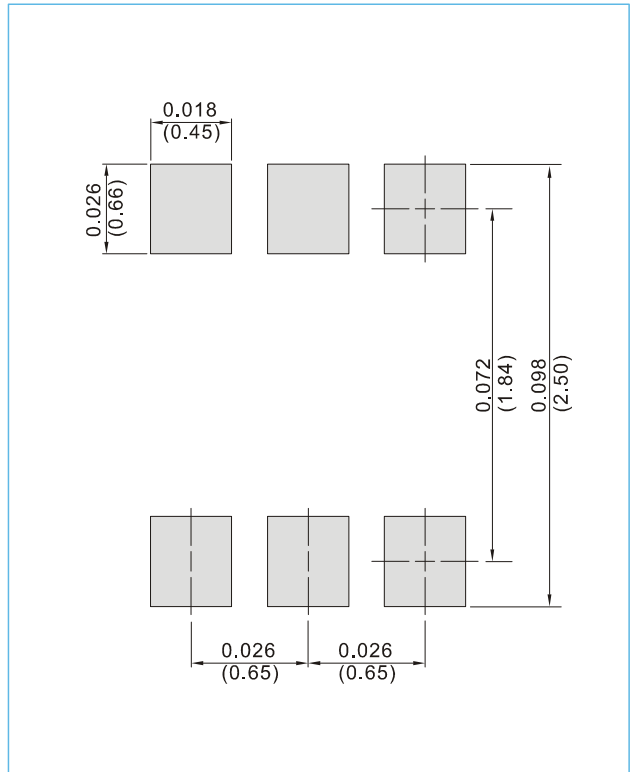


PACKAGE LAYOUT AND SUGGESTED PAD DIMENSIONS

SOT-363 Unit : inch(mm)



SOT-363 Unit : inch(mm)



ORDERING INFORMATION

BC847BPN T/R7 - 3,000 units per 7 inch reel

BC847BPN T/R13 - 10,000 units per 13 inch reel



BC847BPN

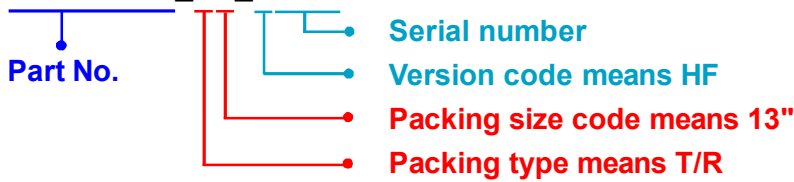
Part No_packing code_Version

BC847BPN_R1_00001

BC847BPN_R2_00001

For example :

RB500V-40_R2_00001



| Packing Code XX | | | | Version Code XXXXX | | |
|--------------------------------------|----------------------|----------------------------------|----------------------|---------------------------|----------------------|---------------------------------------|
| Packing type | 1 st Code | Packing size code | 2 nd Code | HF or RoHS | 1 st Code | 2 nd ~5 th Code |
| Tape and Ammunition Box (T/B) | A | N/A | 0 | HF | 0 | serial number |
| Tape and Reel (T/R) | R | 7" | 1 | RoHS | 1 | serial number |
| Bulk Packing (B/P) | B | 13" | 2 | | | |
| Tube Packing (T/P) | T | 26mm | X | | | |
| Tape and Reel (Right Oriented) (TRR) | S | 52mm | Y | | | |
| Tape and Reel (Left Oriented) (TRL) | L | PANASERT T/B CATHODE UP (PBCU) | U | | | |
| FORMING | F | PANASERT T/B CATHODE DOWN (PBCD) | D | | | |



BC847BPN

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