



## 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.

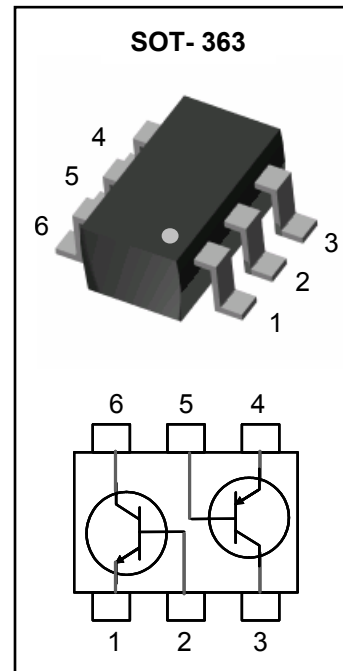
### FEATURES

- 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	$\mu\text{A}$
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	$\mu\text{A}$
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

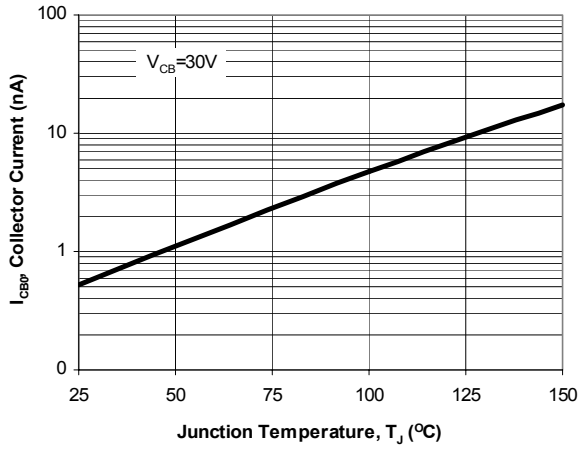


Fig. 1. Typical  $I_{CB0}$  vs. Junction Temperature

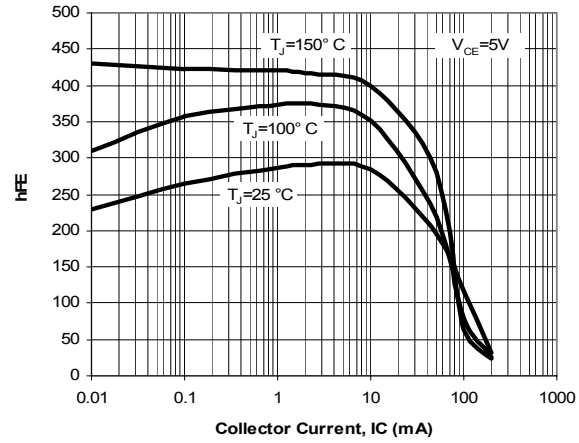


Fig. 2. Typical  $h_{FE}$  vs. Collector Current

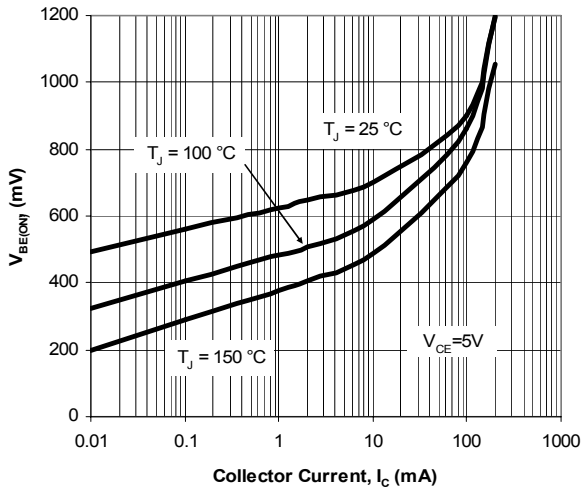


Fig. 3. Typical  $V_{BE(ON)}$  vs. Collector Current

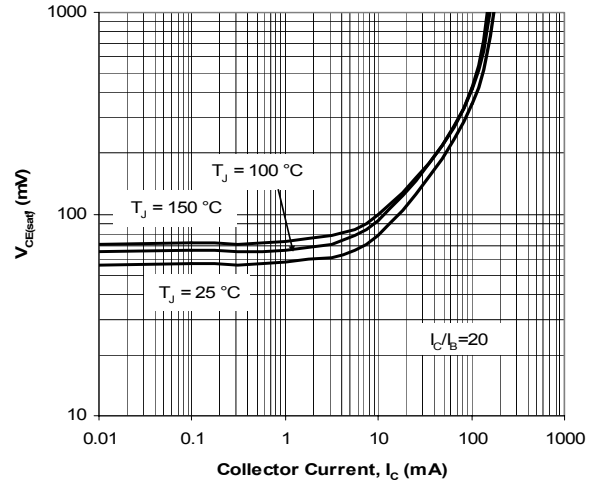


Fig. 4. Typical  $V_{CE(SAT)}$  vs. Collector Current

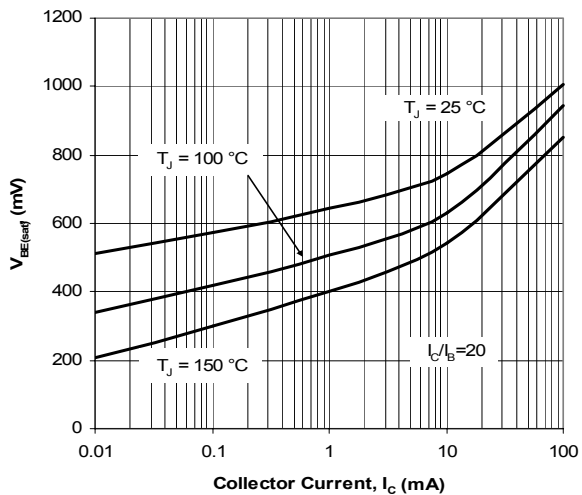


Fig. 5. Typical  $V_{BE(SAT)}$  vs. Collector Current

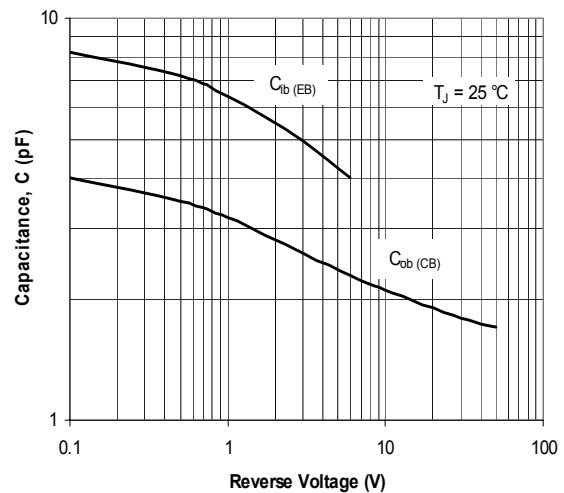
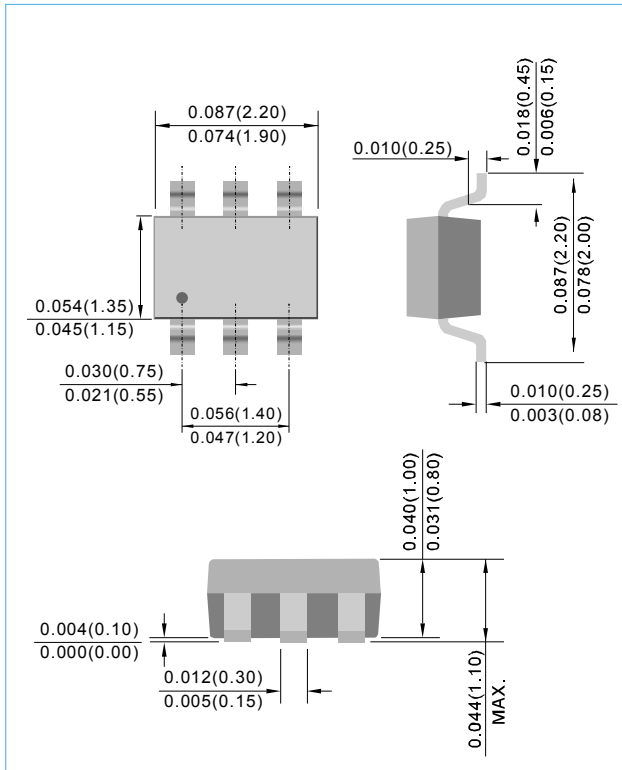


Fig. 6. Typical Capacitances vs. Reverse Voltage

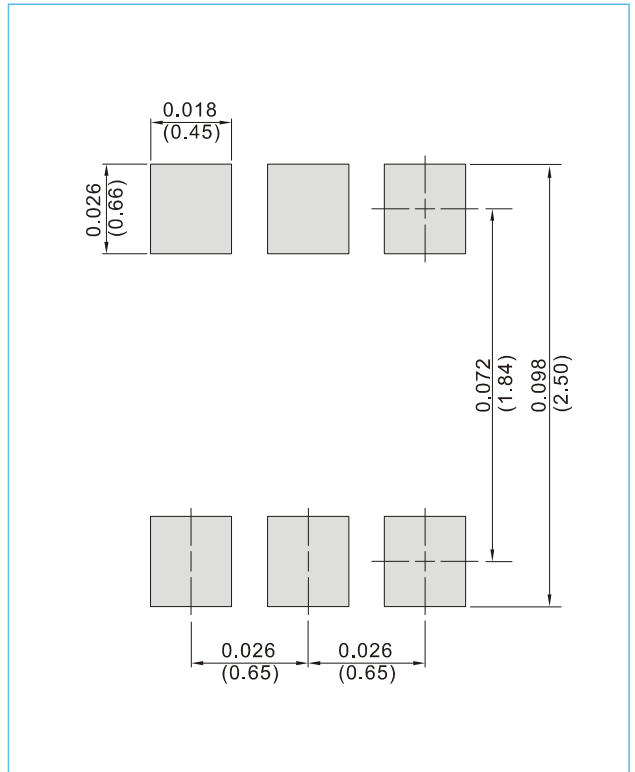


## PACKAGE LAYOUT AND SUGGESTED PAD DIMENSIONS

**SOT-363** Unit : inch(mm)



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## ORDERING INFORMATION

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

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



# BC847BPN

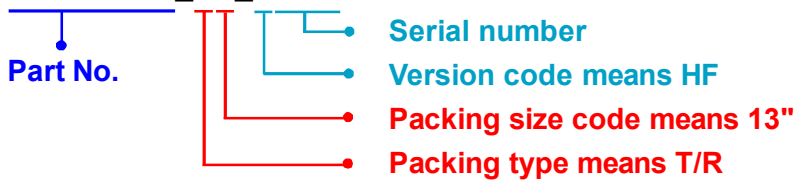
## Part No\_packing code\_Version

BC847BPN\_R1\_00001

BC847BPN\_R2\_00001

For example :

**RB500V-40\_R2\_00001**



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



## BC847BPN

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