



BC847PNQ

COMPLEMENTARY PAIR SMALL SIGNAL TRANSISTOR IN SOT363

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

Features

- Epitaxial Die Construction
- Two Internally Isolated NPN/PNP Transistors in One Package
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

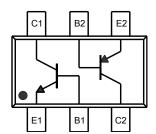
Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Finish.
 Solderable per MIL-STD-202, Method 208 (§3)
- Weight: 0.006 grams (Approximate)





Top View



Device Schematic Top View

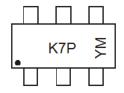
Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BC847PNQ-7-F	Automotive	K7P	7	8	3,000
BC847PNQ-7R-F	Automotive	K7P	7	8	3,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



K7P = Product Type Marking Code YM = Date Code Marking Y = Year (ex: D = 2016) M = Month (ex: 9 = September)

Date Code Key

Year	2015	201	16	2017	20)18	2019	2	2020	2021		2022
Code	С	D		E		F	G		Н	l		J
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



Absolute Maximum Ratings: NPN, BC847B Type (Q₁) (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	Ic	100	mA
Peak Collector Current	I _{CM}	200	mA
Peak Emitter Current	I _{EM}	200	mA

Absolute Maximum Ratings: PNP, BC857B Type (Q₂) (@T_A = +25°C, unless otherwise specified.)

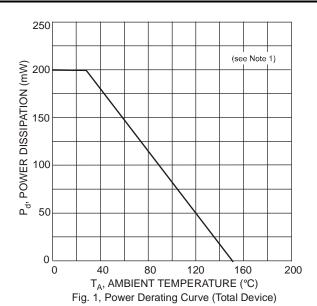
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V _{CEO}	-45	V
Emitter-Base Voltage	V _{EBO}	-6	V
Collector Current	Ic	-100	mA
Peak Collector Current	I _{CM}	-200	mA
Peak Emitter Current	I _{EM}	-200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6) Total Device	P_{D}	200	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{ hetaJA}$	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-65 to +150	°C

Note:

Thermal Characteristics – Total Device



^{6.} For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR-4 PCB; the device is measured under still air conditions whilst operating in a steady-state.



Electrical Characteristics: NPN, BC847B Type (Q₁) (@T_A = +25°C, unless otherwise specified.)

Characteristic (Note 7)	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	50	_	_	V	I _C = 100μA
Collector-Emitter Breakdown Voltage	BV _{CEO}	45	_	_	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	6	_	_	V	I _E = 100μA
DC Current Gain	h _{FE}	200	290	450	_	$V_{CE} = 5.0V, I_{C} = 2.0mA$
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	_	90 200	250 600	mV	$I_C = 10$ mA, $I_B = 0.5$ mA $I_C = 100$ mA, $I_B = 5.0$ mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	_	700 900	_	mV	$I_C = 10$ mA, $I_B = 0.5$ mA $I_C = 100$ mA, $I_B = 5.0$ mA
Base-Emitter Voltage	V _{BE(ON)}	580 —	660 —	700 720	mV	$V_{CE} = 5.0V, I_{C} = 2.0mA$ $V_{CE} = 5.0V, I_{C} = 10mA$
Collector-Cutoff Current	Ісво	_	_	15 5.0	nΑ μΑ	V _{CB} = 30V V _{CB} = 30V, T _A = +150°C
Gain Bandwidth Product	f⊤	100	300	_	MHz	$V_{CE} = 5.0V, I_{C} = 10mA,$ f = 100MHz
Collector-Base Capacitance	Ссво	_	3.5	6.0	pF	V _{CB} = 10V, f = 1.0MHz
Noise Figure	NF	_	2.0	10	dB	$V_{CE} = 5V, I_{C} = 200\mu A,$ $R_{g} = 2.0k\Omega, f = 1.0kHz,$ $\Delta f = 200Hz$

Note:

7. Short duration pulse test used to minimize self-heating effect.

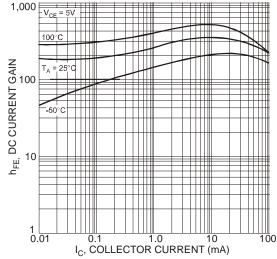


Figure 2. Typical DC Current Gain vs. Collector Current (BC847B Type)

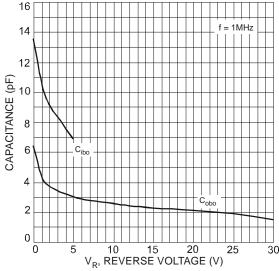


Figure 4. Typical Capacitance Characteristics (BC847B Type)

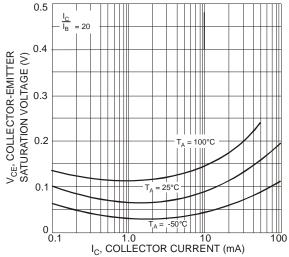


Figure 3. Typical Collector-Emitter Saturation Voltage vs. Collector Current (BC847B Type)

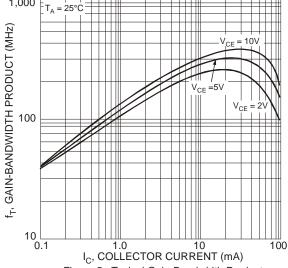


Figure 5. Typical Gain-Bandwidth Product vs. Collector Current (BC847B Type)



Electrical Characteristics: PNP, BC857B Type (Q₂) (@T_A = +25°C unless otherwise specified.)

Characteristic (Note 8)	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-50	_	_	V	$I_C = -100 \mu A$
Collector-Emitter Breakdown Voltage	BV _{CEO}	-45	_	_	V	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-6	-	_	V	$I_E = -100 \mu A$
DC Current Gain	h _{FE}	220	290	475	_	$V_{CE} = -5.0V, I_{C} = -2.0mA$
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	ı	-75 -250	-300 -650	mV	$I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5.0\text{mA}$
Base-Emitter Saturation Voltage	V _{BE(SAT)}	l	-700 -850	— -950	mV	$I_C = -10 \text{mA}, I_B = -0.5 \text{mA}$ $I_C = -100 \text{mA}, I_B = -5.0 \text{mA}$
Base-Emitter Voltage	V _{BE(ON)}	-600 —	-650 —	-750 -820	mV	$V_{CE} = -5.0V, I_{C} = -2.0mA$ $V_{CE} = -5.0V, I_{C} = -10mA$
Collector-Cutoff Current	I _{CBO}	_	-	-15 -4.0	nΑ μΑ	V _{CB} = -30V V _{CB} = -30V, T _A = +150°C
Gain Bandwidth Product	f _T	100	200		MHz	$V_{CE} = -5.0V, I_{C} = -10mA,$ f = 100MHz
Collector-Base Capacitance	C _{CBO}		3	4.5	pF	$V_{CB} = -10V, f = 1.0MHz$
Noise Figure	NF	_	_	10	dB	$V_{CE} = -5V, I_C = -200\mu A, R_g = 2.0k\Omega, f = 1.0kHz, \Delta f = 200Hz$

Note: 8. Short duration pulse test used to minimize self-heating effect.

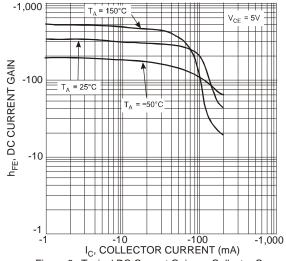


Figure 6. Typical DC Current Gain vs. Collector Current (BC857B Type)

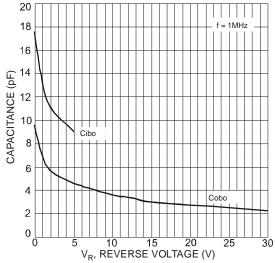


Figure 8. Typical Capacitance Characteristics (BC857B Type)

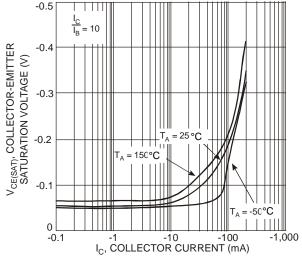


Figure 7. Typical Collector-Emitter Saturation Voltage vs. Collector Current (BC857B Type)

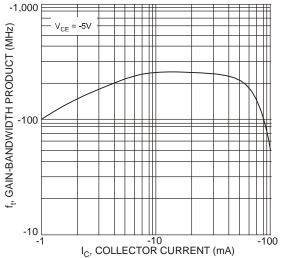


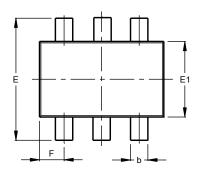
Figure 9. Typical Gain-Bandwidth Product vs. Collector Current (BC857B Type)

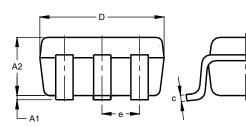


Package Outline Dimensions

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

SOT363



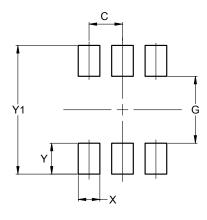


SOT363								
Dim	Min	Max	Тур					
A1	0.00	0.10	0.05					
A2	0.90	1.00	1.00					
b	0.10	0.30	0.25					
С	0.10	0.22	0.11					
D	1.80	2.20	2.15					
Е	2.00	2.20	2.10					
E1	1.15	1.35	1.30					
е	().650 B	SC					
F	0.40	0.45	0.425					
L	0.25	0.40	0.30					
а	0°	8°						
All Dimensions in mm								

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
С	0.650
G	1.300
Х	0.420
Υ	0.600
Y1	2.500



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