45V NPN SMALL SIGNAL TRANSISTOR IN DFN0806

Description

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

Features

- BV_{CEO} > 45V
- I_C = 100mA High Collector Current
- P_D = 435mW Power Dissipation
- 0.48mm^2 Package Footprint, 16 Times Smaller than SOT23
- 0.4mm Height Package Minimizing Off-Board Profile
- Complementary PNP Type BC857BFA
- **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)**

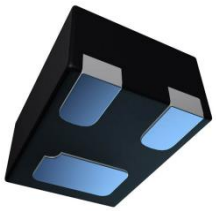
Mechanical Data

- Case: X2-DFN0806-3
- 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: 0.0008 grams (Approximate)

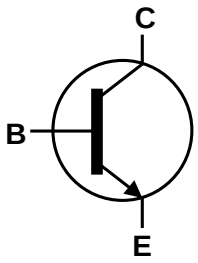
X2-DFN0806-3



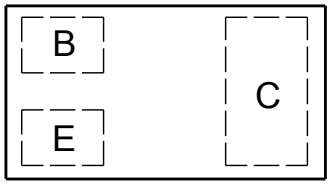
Top View



Bottom View



Device Symbol



Top View
Device Schematic

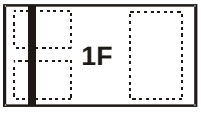
Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BC847BFAQ-7B	Automotive	1F	7	8mm	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. 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

X2-DFN0806-3



Top View
Bar Denotes Base and Emitter Side

1F = Product Type Marking Code

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Absolute Maximum Ratings (@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}	6.0	V
Continuous 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 (Note 6)	P_D	435	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	287	°C/W
Thermal Resistance, Junction to Lead (Note 8)	$R_{\theta JL}$	150	°C/W
Operating and Storage and Temperature Range	T_J, T_{STG}	-55 to +150	°C

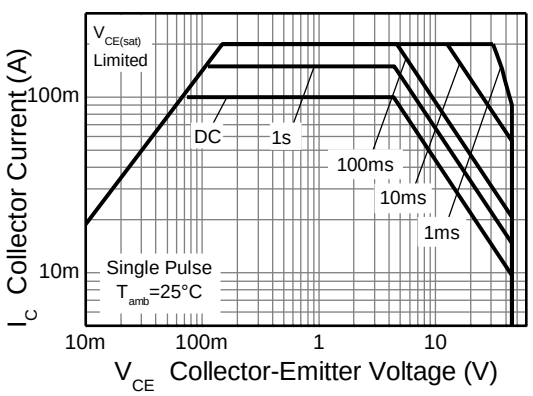
ESD Ratings (Note 8)

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

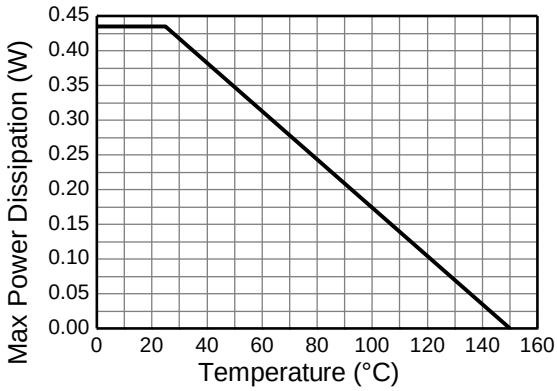
Notes:
6. For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
7. Thermal resistance from junction to solder-point (on the exposed collector pad).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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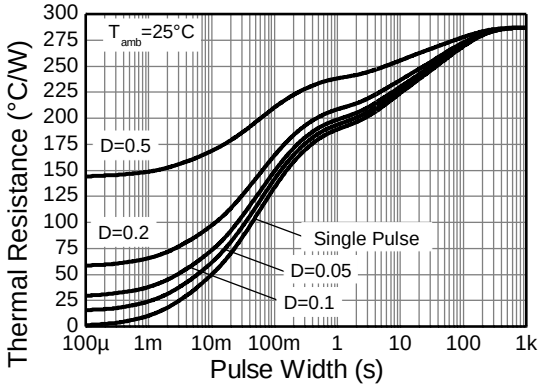
Thermal Characteristics and Derating Information



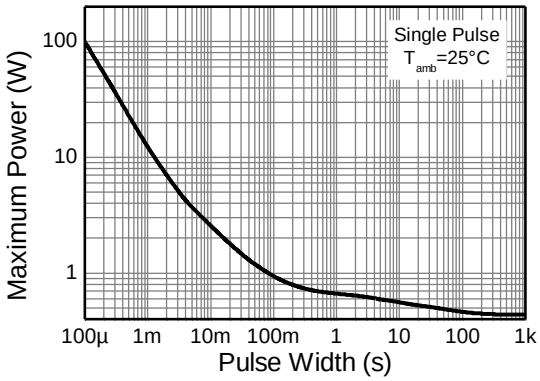
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typical	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	50	150	—	V	I_C = 50µA, I_B = 0
Collector-Emitter Breakdown Voltage	BV_{CES}	50	150	—		I_C = 50µA, I_B = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	45	65	—	V	I_C = 1mA, I_B = 0
Collector-Base Breakdown Voltage	BV_{EBO}	6.0	8.35	—	V	I_E = 50µA, I_C = 0
Collector-Base Cutoff Current	I_{CBO}	—	—	15	nA	V_{CB} = 40V
Collector-Emitter Cutoff Current	I_{CES}	—	—	15	nA	V_{CE} = 40V
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h_{FE}	— 200	220 260	— 470	—	I_C = 10µA, V_{CE} = 5.0V I_C = 2.0mA, V_{CE} = 5.0V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	50 122	125 300	mV	I_C = 10mA, I_B = 0.5mA I_C = 100mA, I_B = 5.0mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	760 880	1,000 1,100	mV	I_C = 10mA, I_B = 0.5mA I_C = 100mA, I_B = 5.0mA
Base-Emitter Voltage	$V_{BE(ON)}$	580 —	650 725	750 800	mV	I_C = 2.0mA, V_{CE} = 5V I_C = 10mA, V_{CE} = 5V
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{OBO}	—	1.5	—	pF	V_{CB} = 10.0V, f = 1.0MHz, I_E = 0
Current Gain-Bandwidth Product	f_T	100	170	—	MHz	V_{CE} = 5V, I_C = 10mA, f = 100MHz

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

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

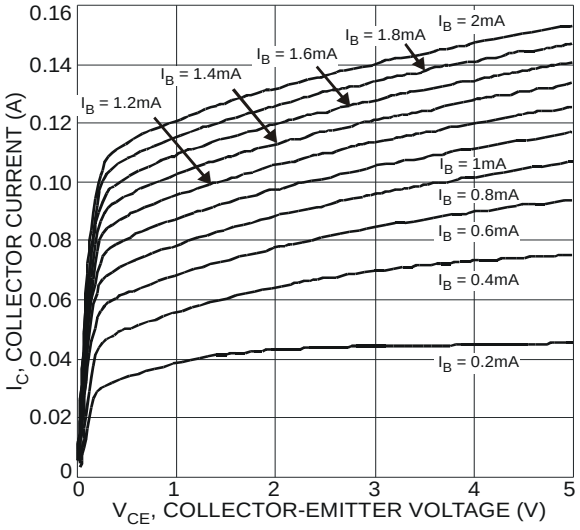


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

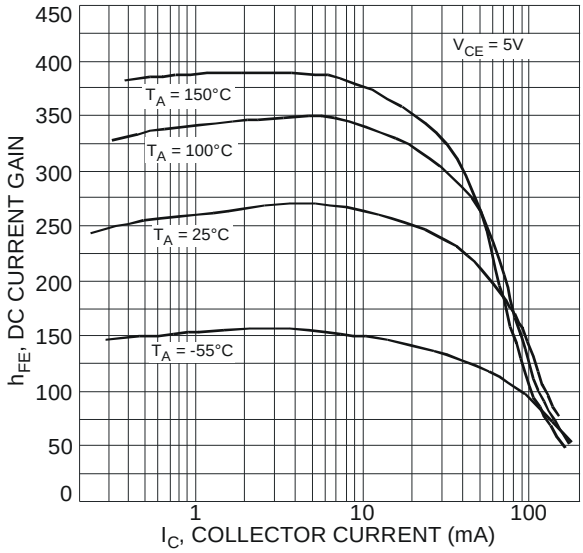


Fig. 5 Typical DC Current Gain vs. Collector Current

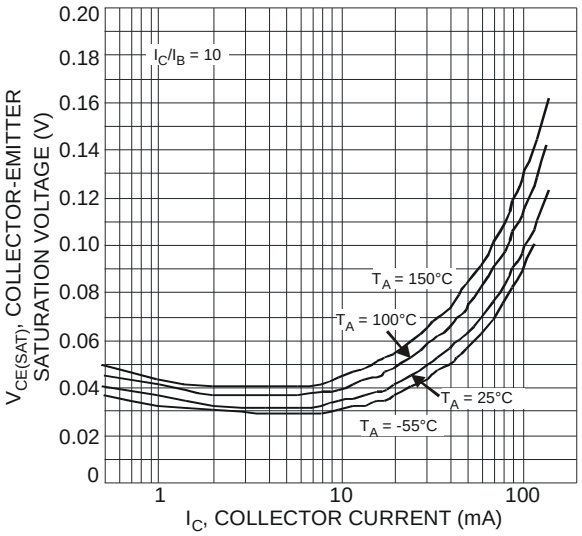


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

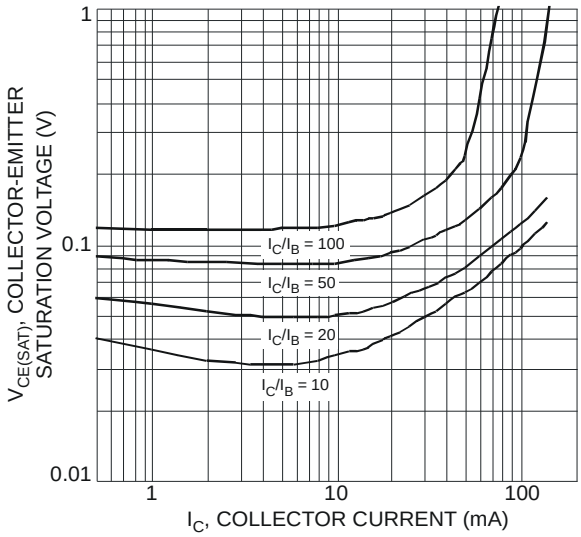


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

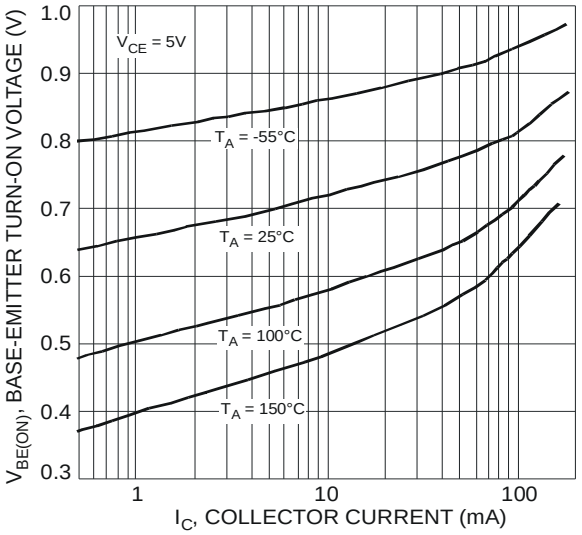


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

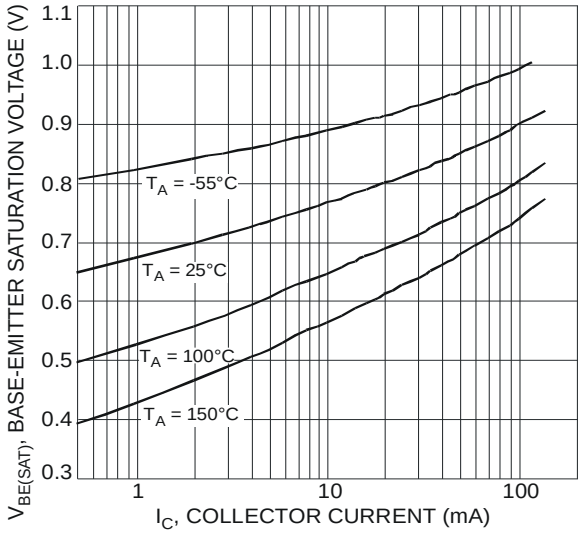


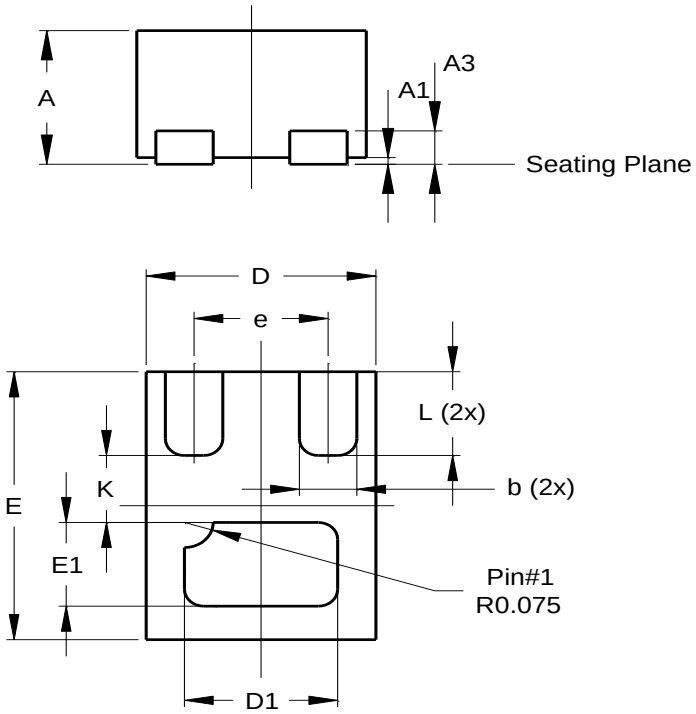
Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

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Package Outline Dimensions

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

X2-DFN0806-3

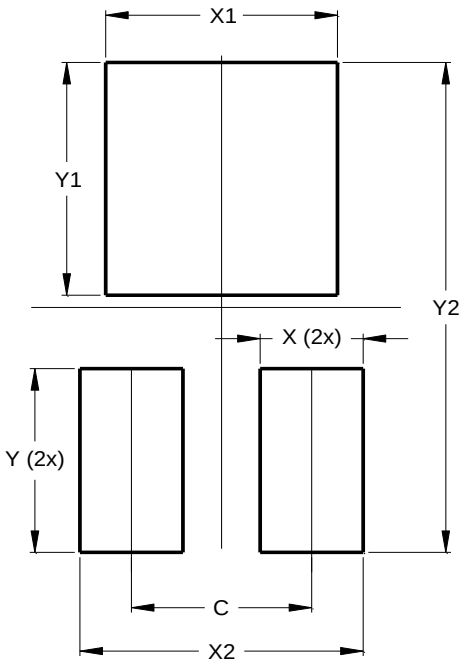


X2-DFN0806-3			
Dim	**Min**	**Max**	**Typ**
A	0.375	0.40	0.39
A1	0	0.05	0.02
A3	–	–	0.10
b	0.10	0.20	0.15
D	0.55	0.65	0.60
D1	0.35	0.45	0.40
E	0.75	0.85	0.80
E1	0.20	0.30	0.25
e	–	–	0.35
K	–	–	0.20
L	0.20	0.30	0.25
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN0806-3



Dimensions	Value (in mm)
C	0.350
X	0.200
X1	0.450
X2	0.550
Y	0.375
Y1	0.475
Y2	1.000

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