65V NPN SMALL SIGNAL TRANSISTOR IN DFN1110-3/SWP

Features

- BV_{CEO} > 65V
- I_C = 100mA High Continuous Collector Current
- Low-Profile, 0.6mm-High Package for Thin Applications
- Sidewall Tin Plating for Wettable Flanks in AOI
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under a separate datasheet (BC846BFHWQ).**

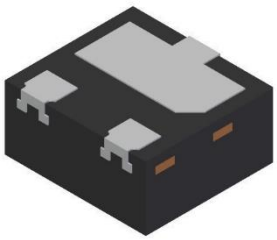
Mechanical Data

- Package: U-DFN1110-3/SWP
- Package Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.001714 grams (Approximate)

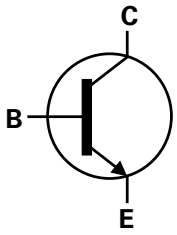
Application

- Switching and amplification

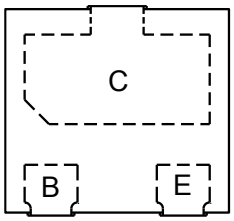
U-DFN1110-3/SWP (Type A)



Bottom View



Device Symbol



Top View
Pin-Out

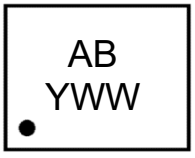
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BC846BFHW-7	U-DFN1110-3/SWP (Type A)	4L	7	8	5,000	Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

U-DFN1110-3/SWP (Type A)



AB = Product type Marking Code
YWW = Date Code Marking
Y = Last Digit of Year (ex: 5 = 2025)
WW = Week Code 01 to 53

© 2025 Copyright Diodes Incorporated. All Rights Reserved.

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	65	V
Emitter-Base Voltage	V_{EBO}	6	V
Continuous Collector Current	I_C	100	mA
Peak Pulse Collector Current	I_{CM}	200	mA
Peak Base Current	I_{BM}	100	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	420	mW
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	298	°C/W
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	109	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 7)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge – Charged Device Model	ESD CDM	1000	V	C3

Notes:
5. For a device mounted with the exposed collector pads on minimum recommended pad layout and 2oz. copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Thermal resistance from junction to the top of the case.
7. Refer to JEDEC specification JESD22-A114 and JESD22-C101.

© 2025 Copyright Diodes Incorporated. All Rights Reserved.

Thermal Characteristics and Derating Information

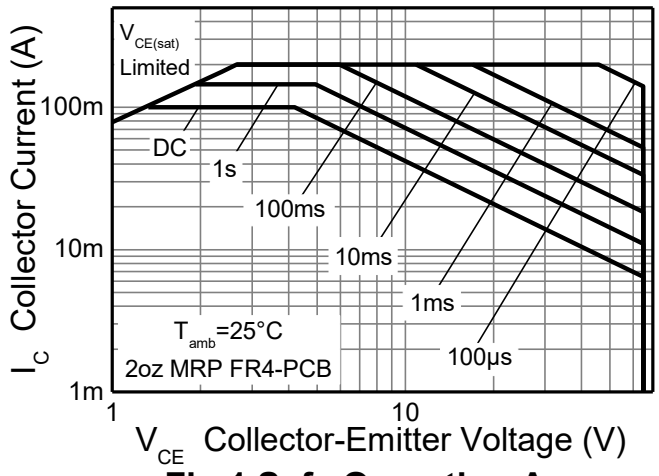


Fig.1 Safe Operating Area

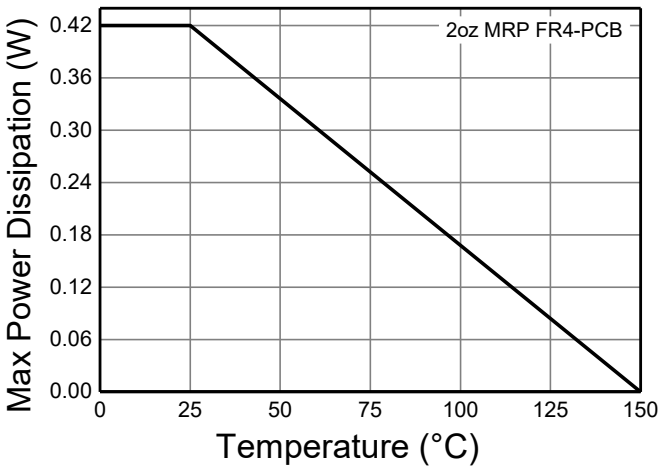


Fig.2 Derating Curve

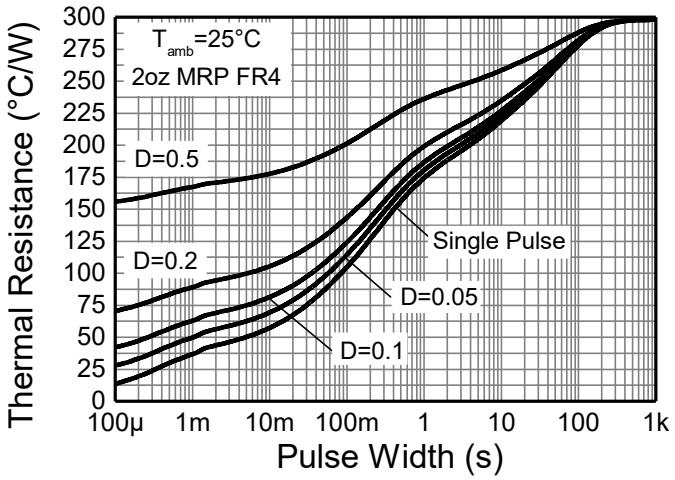


Fig.3 Transient Thermal Impedance

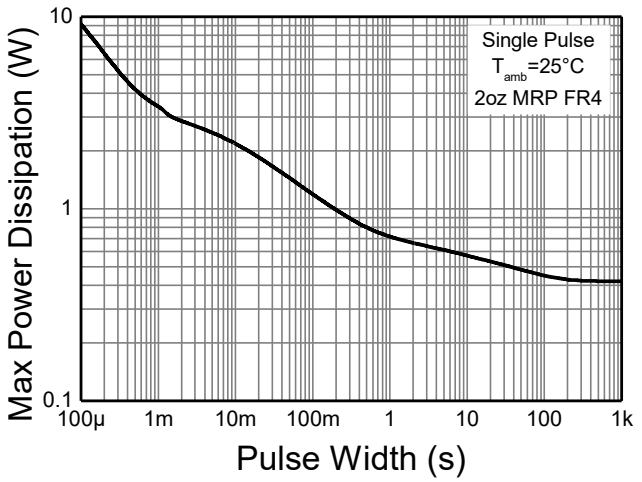


Fig.4 Pulse Power Dissipation

© 2025 Copyright Diodes Incorporated. All Rights Reserved.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	65	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	6	—	—	V	I_E = 100μA
Collector-Base Cutoff Current	I_{CBO}	—	—	15	nA	V_{CB} = 30V, I_E = 0
		—	—	5	μA	V_{CB} = 30V, I_E = 0, T_A = +150°C
Emitter-Base Cutoff Current	I_{EBO}	—	—	100	nA	V_{EB} = 6V, I_C = 0
DC Current Gain (Note 8)	h_{FE}	200	—	450	—	V_{CE} = 5V, I_C = 2mA
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	—	200	mV	I_C = 10mA, I_B = 0.5mA
		—	—	400		I_C = 100mA, I_B = 5mA
Base-Emitter Turn-on Voltage (Note 8)	$V_{BE(on)}$	580	—	700	mV	V_{CE} = 5V, I_C = 2mA
		—	—	770		V_{CE} = 5V, I_C = 10mA
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$	—	760	—	V	I_C = 10mA, I_B = 0.5mA
		—	900	—		I_C = 100mA, I_B = 5mA
Transition Frequency	f_T	100	—	—	MHz	V_{CE} = 5V, I_C = 10mA, f = 100MHz
Output (Collector) Capacitance	C_{obc}	—	—	3	pF	V_{CB} = 10V, f = 1MHz
Output (Emitter) Capacitance	C_{oec}	—	11	—	pF	V_{EB} = 0.5V, f = 1MHz
Noise Figure	NF	—	—	10	dB	V_{CE} = 5V, I_C = 200μA, R_S = 2kΩ, f = 1kHz BW=200Hz

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤2%.

© 2025 Copyright Diodes Incorporated. All Rights Reserved.

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

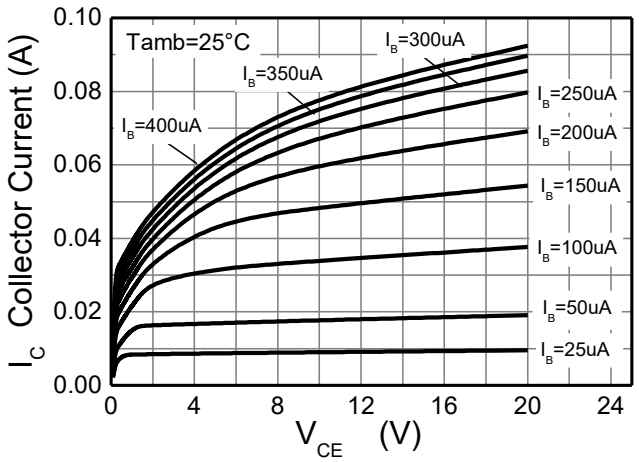


Fig.5 I_C v V_{CE}

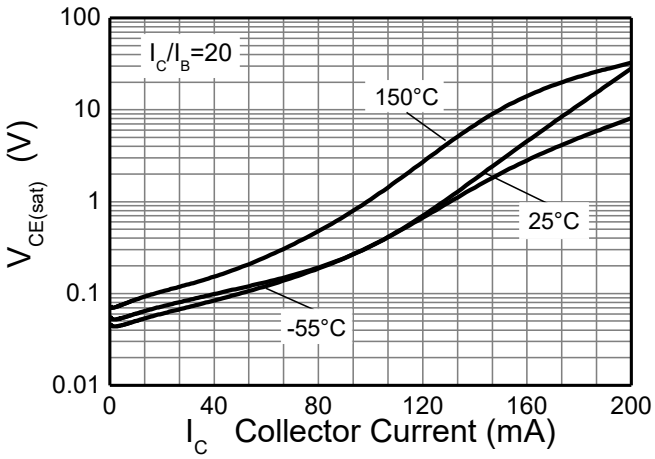


Fig.6 $V_{CE(sat)}$ v I_C

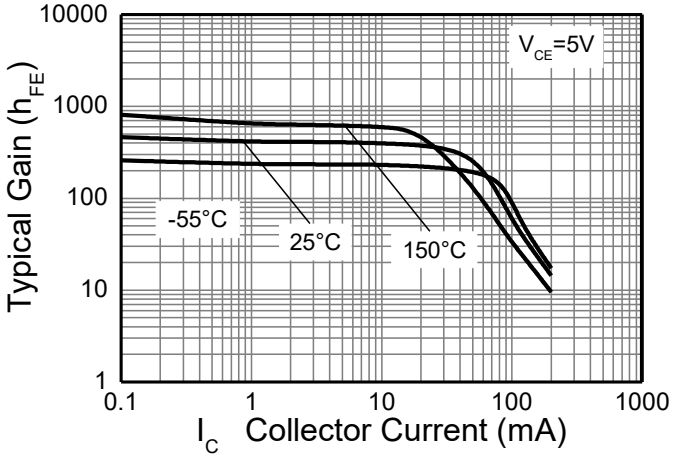


Fig.7 h_{FE} v I_C

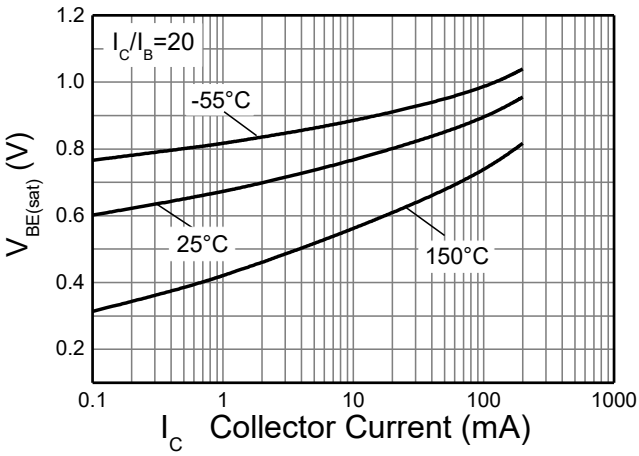


Fig.8 $V_{BE(sat)}$ v I_C

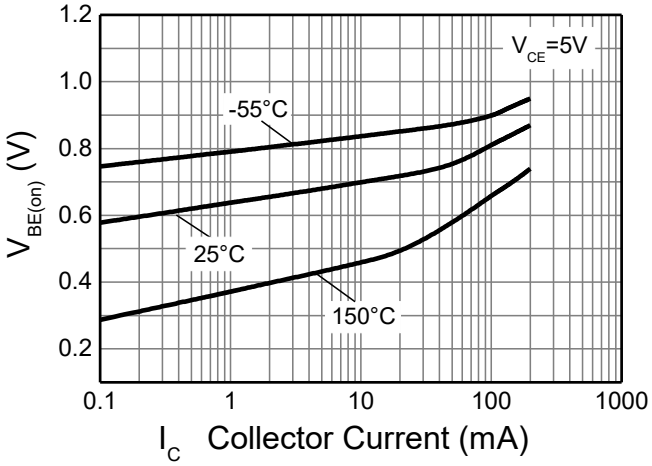


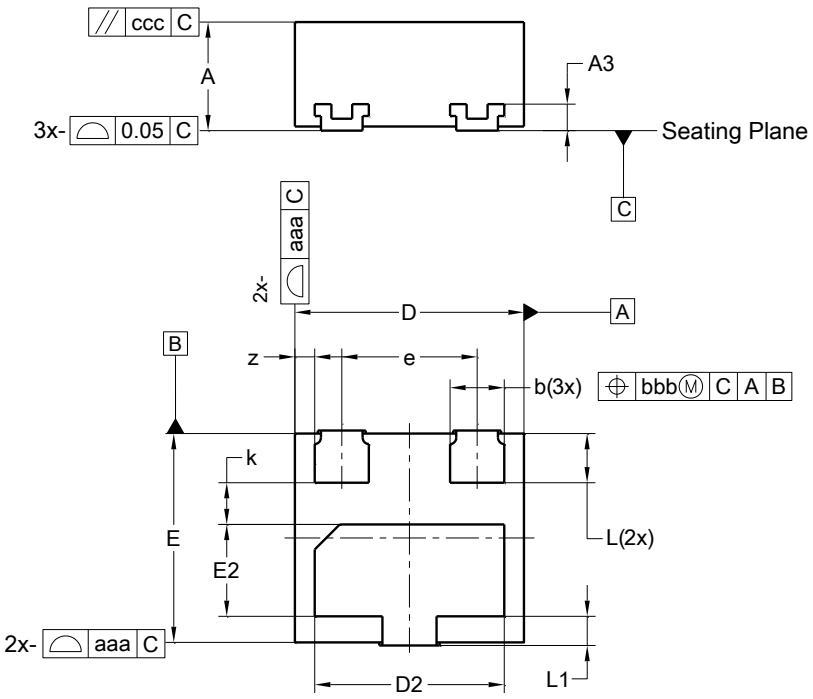
Fig.9 $V_{BE(on)}$ v I_C

© 2025 Copyright Diodes Incorporated. All Rights Reserved.

Package Outline Dimensions

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

U-DFN1110-3/SWP (Type A)



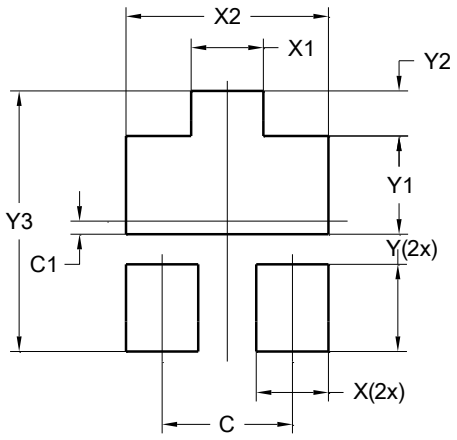
U-DFN1110-3/SWP (Type A)			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.57	0.52
A1	0.00	0.05	0.03
A3	–	–	0.127
b	0.22	0.30	0.26
D	1.05	1.15	1.10
D2	0.87	0.95	0.91
e	0.65 BSC		
E	0.95	1.05	1.00
E2	0.40	0.48	0.44
k	–	–	0.20
L	0.20	0.27	0.23
L1	0.09	0.19	0.14
z	–	–	0.095
aaa	0.25		
bbb	0.10		
ccc	0.10		
All Dimensions in mm			

Note: Side wall tin plated package for wettable flanks in AOI.

Suggested Pad Layout

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

U-DFN1110-3/SWP (Type A)



Dimensions	Value (in mm)
C	0.650
C1	0.065
X	0.360
X1	0.360
X2	1.010
Y	0.435
Y1	0.490
Y2	0.225
Y3	1.300

© 2025 Copyright Diodes Incorporated. All Rights Reserved.

IMPORTANT NOTICE

1. DIODES INCORPORATED (Diodes) AND ITS SUBSIDIARIES MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes' products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes' products. Diodes' products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of Diodes' products for their intended applications, (c) ensuring their applications, which incorporate Diodes' products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.

3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.

4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.

5. Diodes' products are provided subject to Diodes' Standard Terms and Conditions of Sale (https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

6. Diodes' products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes' products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.

7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.

8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

9. This Notice may be periodically updated with the most recent version available at https://www.diodes.com/about/company/terms-and-conditions/important-notice

The Diodes logo is a registered trademark of Diodes Incorporated in the United States and other countries.
All other trademarks are the property of their respective owners.
© 2025 Diodes Incorporated. All Rights Reserved.

www.diodes.com

© 2025 Copyright Diodes Incorporated. All Rights Reserved.