

## Features

- $BV_{CEO} > -40V$
- $h_{FE}$  Specified up to -3A for High Current Gain Hold Up
- Low-Profile, 0.62mm High Package for Thin Applications
- Sidewall Tin Plating for Wettable Flanks in AOI
- 4mm<sup>2</sup> Footprint, 50% Smaller Than SOT23
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DXTP5840CFJAWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

- Package: W-DFN2020-3
- Package Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Max Soldering Temperature +260°C for 30 secs as per JEDEC J-STD-020
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin, Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.01 grams (Approximate)

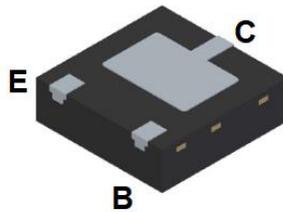
## Applications

- DC-DC converters
- Charging circuits
- Motor controls
- Power switches

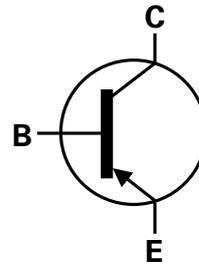
W-DFN2020-3/SWP (Type A)



Top View



Bottom View



Device Symbol

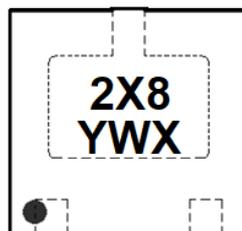
## Ordering Information (Note 4)

Orderable Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Package	Packing	
					Qty.	Carrier
DXTP5840CFJAWQ-7	2X8	7	8	W-DFN2020-3/SWP (Type A)	3000	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

W-DFN2020-3/SWP (Type A)



- 2X8 = Product Type Marking Code
- Y = Year: 0 to 9
- W = Week: A to Z: 1 to 26 Week; a to z; 27 to 52 Week; z Represents 52 and 53 Week
- X = A to Z: Internal Code

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	
Emitter-Base Voltage	V <sub>EBO</sub>	-7	
Peak Pulse Current	I <sub>CM</sub>	-8	A
Continuous Collector Current	I <sub>C</sub>	-4.8	

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

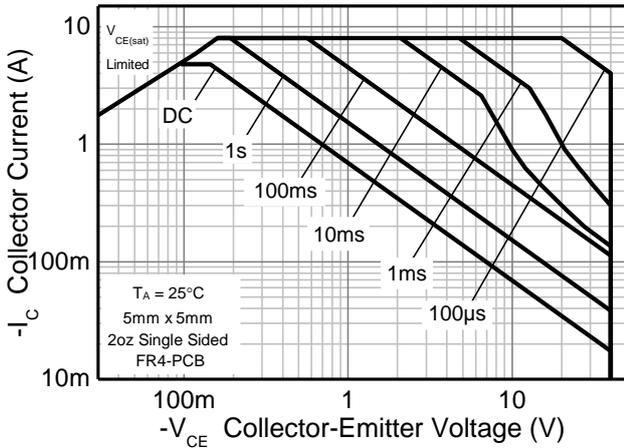
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	0.69	W
		1.75	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	180	°C/W
		71	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 7)

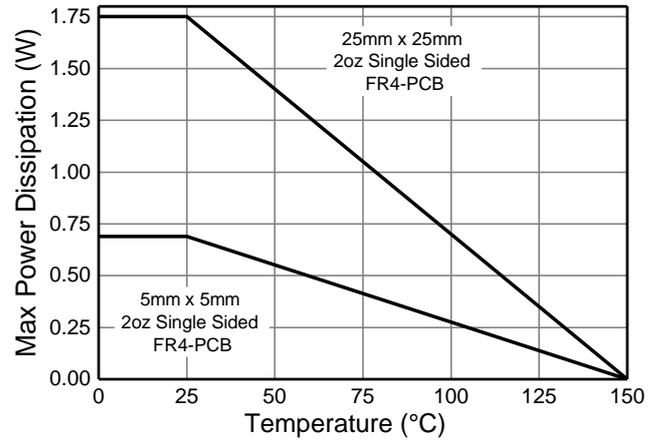
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the exposed collector on 5mm x 5mm 2oz copper on single sided FR4 PCB; device is measured under still air conditions whilst operating in the steady state.
  6. Same as Note 5 except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
  7. Refer to JEDEC specifications JESD22-A114 and JESD22-A115.

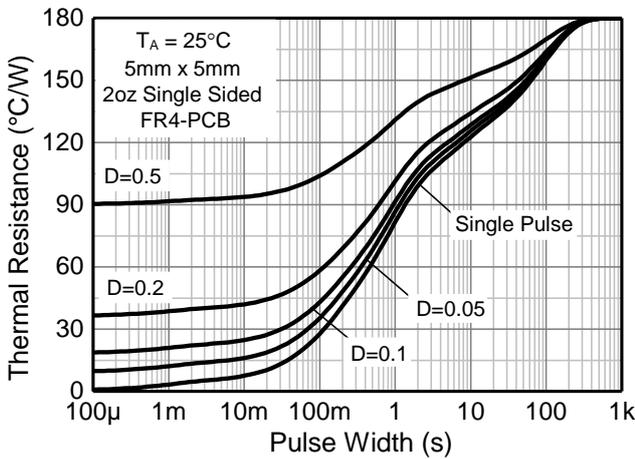
**Thermal Characteristics and Derating Information**



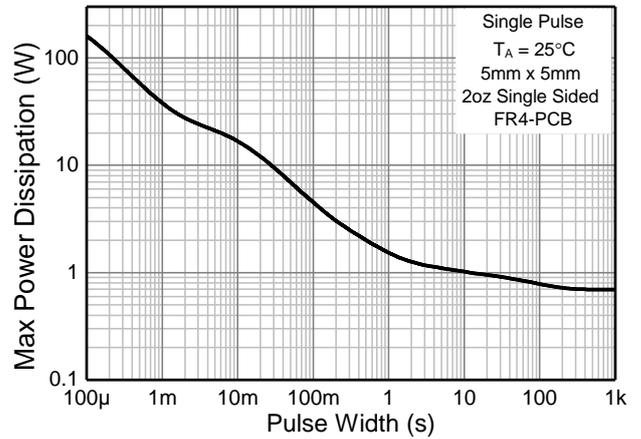
**Fig.1 Safe Operating Area**



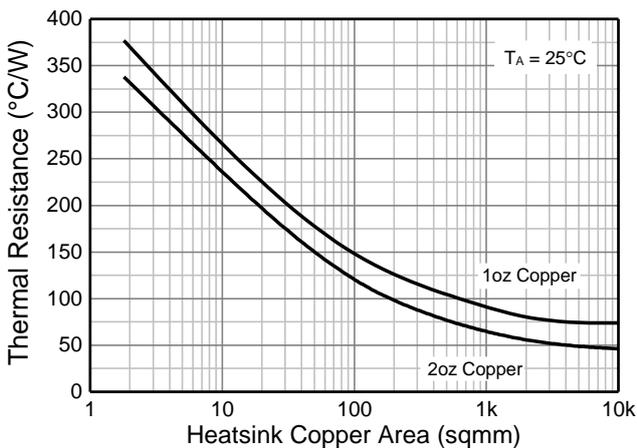
**Fig.2 Derating Curve**



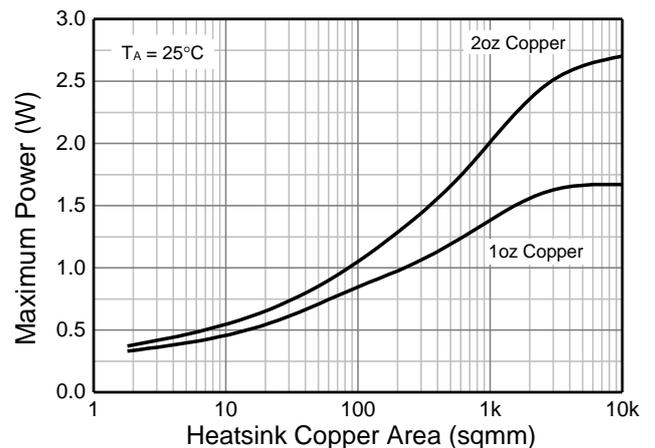
**Fig.3 Transient Thermal Impedance**



**Fig.4 Pulse Power Dissipation**



**Fig.5 Thermal Resistance vs. Copper Area**



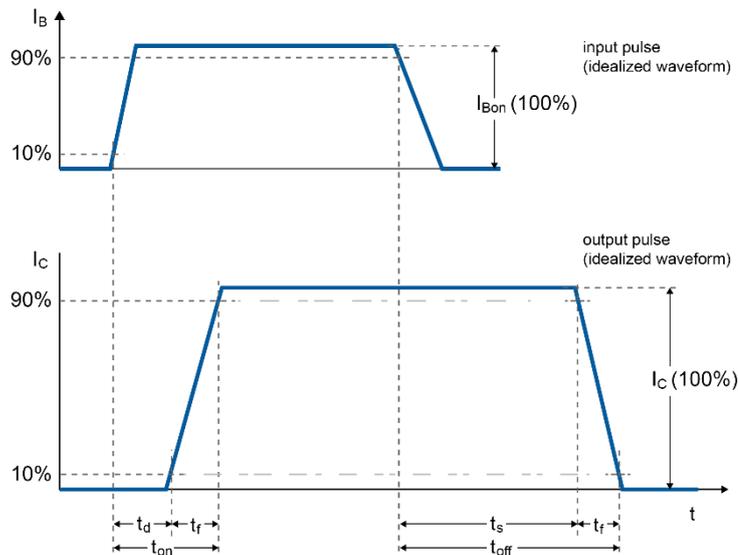
**Fig.6 Max Power Dissipation vs. Copper Area**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-40	—	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	-40	—	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	—	—	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	-3	-50	nA	V <sub>CB</sub> = -40V
Emitter Cutoff Current	I <sub>EBO</sub>	—	-3	-50	nA	V <sub>EB</sub> = -6V
Collector Emitter Cutoff Current	I <sub>CES</sub>	—	-5	-100	nA	V <sub>CES</sub> = -32V
Static Forward Current Transfer Ratio (Note 8)	h <sub>FE</sub>	250	480	—	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		240	420	—		I <sub>C</sub> = -500mA, V <sub>CE</sub> = -2V
		220	390	—		I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		180	335	—		I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
		150	290	—		I <sub>C</sub> = -3A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 8)	V <sub>CE(sat)</sub>	—	-10	-15	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA
		—	-36	-80		I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		—	-88	-130		I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		—	-150	-230		I <sub>C</sub> = -2A, I <sub>B</sub> = -20mA
		—	-240	-370		I <sub>C</sub> = -3A, I <sub>B</sub> = -50mA
		—	-115	-260		I <sub>C</sub> = -4A, I <sub>B</sub> = -400mA
Base-Emitter Turn-On Voltage (Note 8)	V <sub>BE(on)</sub>	—	-0.76	-0.9	V	I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
Base-Emitter Saturation Voltage (Note 8)	V <sub>BE(sat)</sub>	—	-0.76	-0.9	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
Output Capacitance	C <sub>obo</sub>	—	65	—	pF	V <sub>CB</sub> = -3V, f = 1MHz
Input Capacitance	C <sub>ibo</sub>	—	105	—	pF	V <sub>EB</sub> = -0.5V, f = 1MHz
Transition Frequency	f <sub>T</sub>	—	135	—	MHz	V <sub>CE</sub> = -5V, I <sub>C</sub> = -100mA, f = 100MHz
Delay Time	t <sub>d</sub>	—	55	—	ns	V <sub>CC</sub> = -30V, I <sub>C</sub> = -750mA, I <sub>B1</sub> = -I <sub>B2</sub> = -15mA
Rise Time	t <sub>r</sub>	—	110	—		
Turn-On Time	t <sub>on</sub>	—	165	—		
Storage Time	t <sub>s</sub>	—	250	—		
Fall Time	t <sub>f</sub>	—	80	—		
Turn-Off Time	t <sub>off</sub>	—	330	—		

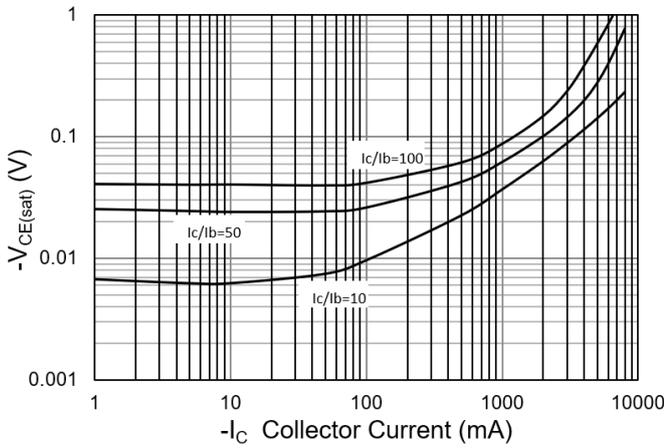
Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Timing Waveform**

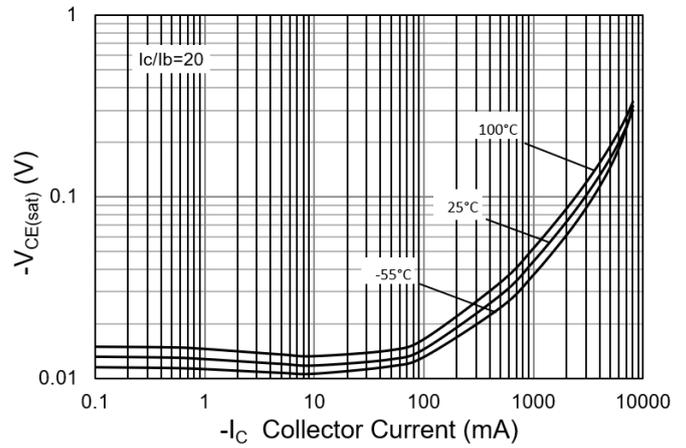


**Fig.7 Timing Waveform**

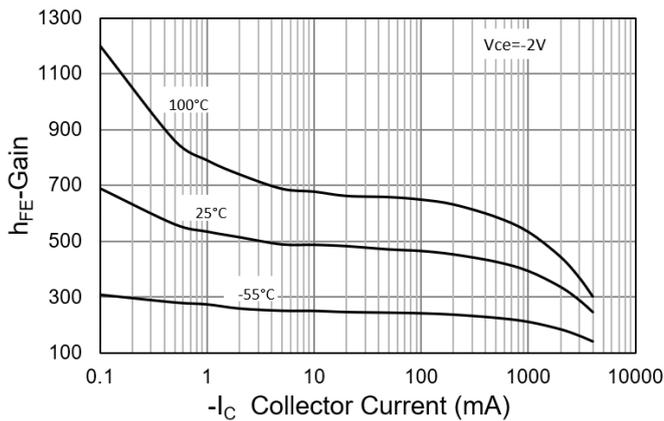
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



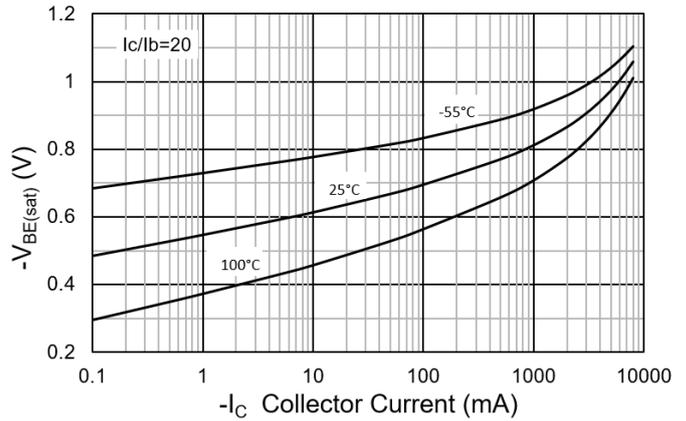
**Fig.8  $V_{CE(sat)}$  vs  $I_C$**



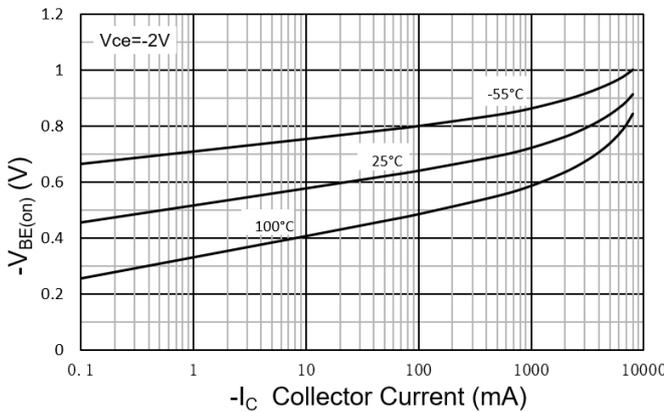
**Fig.9  $V_{CE(sat)}$  vs  $I_C$**



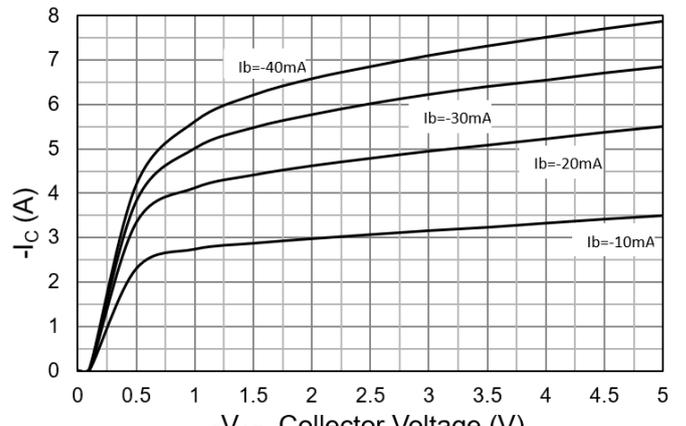
**Fig.10  $h_{FE}$  vs  $I_C$**



**Fig.11  $V_{BE(sat)}$  vs  $I_C$**



**Fig.12  $V_{BE(on)}$  vs  $I_C$**

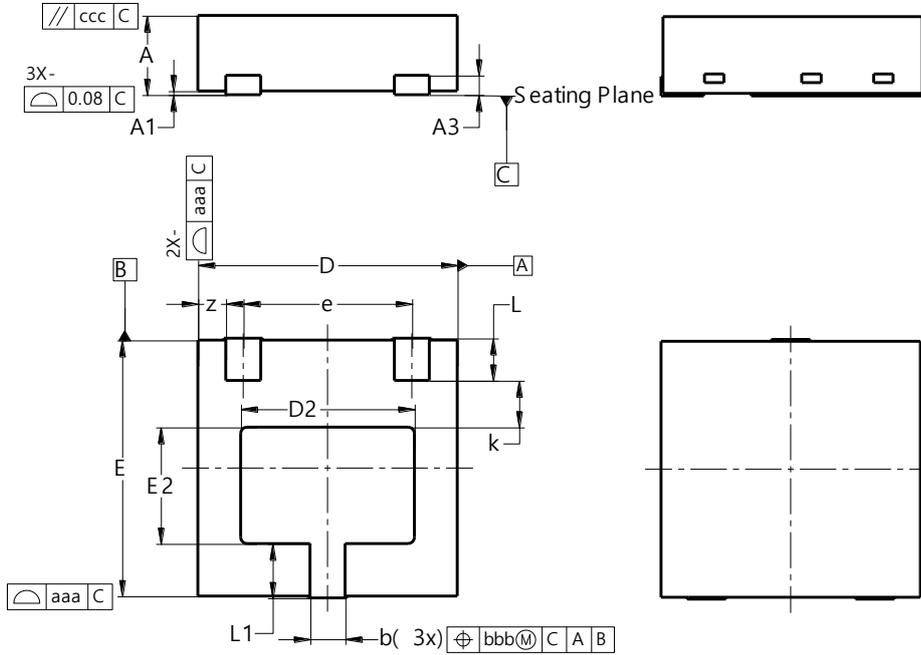


**Fig.13  $I_C$  vs  $V_{CE}$**

**Package Outline Dimensions** (Note 9)

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

**W-DFN2020-3/SWP (Type A)**



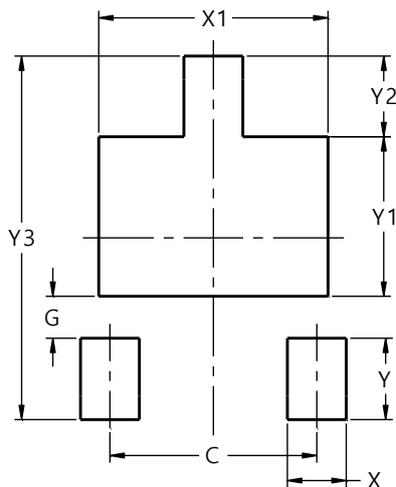
W-DFN2020-3/SWP (Type A)			
Dim	Min	Max	Typ
A	0.57	0.67	0.62
A1	0.00	0.05	0.03
A3	0.100	--	0.152
b	0.22	0.32	0.27
D	1.95	2.05	2.00
D2	1.24	1.44	1.34
E	1.95	2.05	2.00
E2	0.81	1.01	0.91
e	--	--	1.30
k	--	--	0.365
L	0.28	0.38	0.33
L1	0.375	0.475	0.425
z	--	--	0.215
aaa	0.25		
bbb	0.10		
ccc	0.10		
All Dimensions in mm			

Note: 9. 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.

**W-DFN2020-3/SWP (Type A)**



Dimensions	Value (in mm)
C	1.300
G	0.265
X	0.370
X1	1.440
Y	0.515
Y1	1.010
Y2	0.510
Y3	2.300

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