

## Description

Advanced process capability has been used to maximise the performance of this 60V, NPN transistor. The W-DFN2020-3/SWP (Type A) package offers lower profile and the derating up to +175°C allows higher dissipation for applications where power density is of utmost importance.

## Features

- $BV_{CEO} > 60V$
- $I_C = 4A$  Continuous Collector Current
- Low Saturation Voltage (100mV Max @1A)
- $R_{SAT} = 60m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  Specified up to 6A for High Current Gain Hold Up
- Tighter Gain Specification
- Low Profile 0.62mm High Package for Thin Applications
- Sidewall Tin Plating for Wettable Flanks in AOI
- $R_{\theta JA}$  Efficient, 60% Lower than SOT23
- 4mm<sup>2</sup> Footprint, 50% Smaller Than SOT23
- Rated +175°C – Ideal for High Temperature Environment
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DXTN10060DFJBWQ is suitable for automotive applications requiring specific change control and is AEC-Q101 qualified, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.**

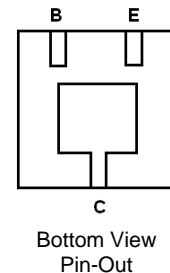
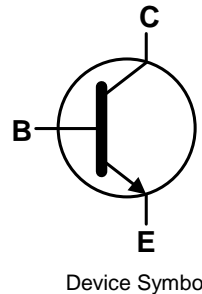
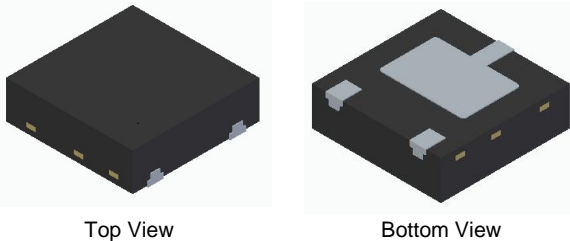
## Mechanical Data

- Case: W-DFN2020-3
- Nominal Package Height: 0.6mm
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- 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

- Automotive Systems
  - MOSFET Gate Driving
  - DC-DC Converters
  - Motor Control
  - Power Switches

W-DFN2020-3/SWP (Type A)



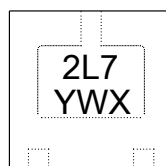
## Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DXTN10060DFJBWQ-7	Automotive	2L7	7	8	3,000

- 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)



- 2L7 = Product Type Marking Code
- Y = Year: 0~9
- W = Week: A~Z: 1~26 Week; a~z: 27~52 Week; z Represents 52 and 53 Week
- X = A~Z: Internal Code

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

Characteristic	Symbol	Value	Unit	
Collector-Base Voltage	V <sub>CBO</sub>	100	V	
Collector-Emitter Voltage	V <sub>CEO</sub>	60		
Emitter-Base Voltage	V <sub>EBO</sub>	8		
Peak Pulse Current	I <sub>CM</sub>	6	A	
Continuous Collector Current	I <sub>C</sub>	(Note 5)		4
		(Note 6)		4.3
Base Current	I <sub>B</sub>	1		

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

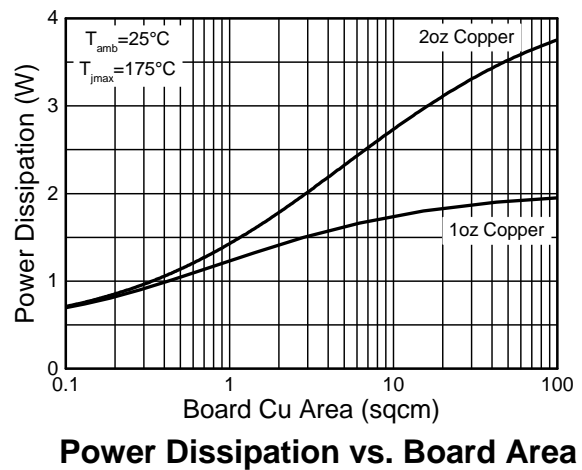
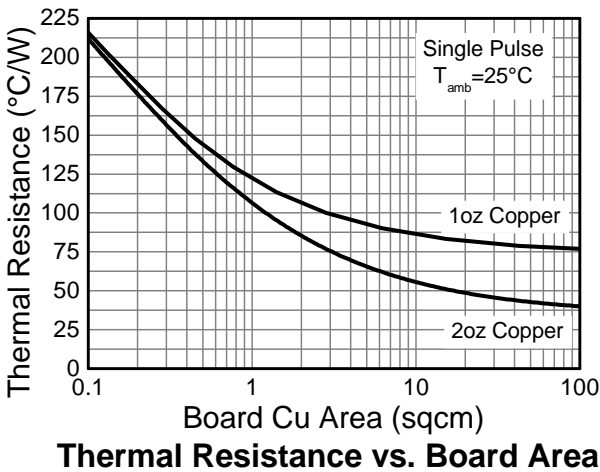
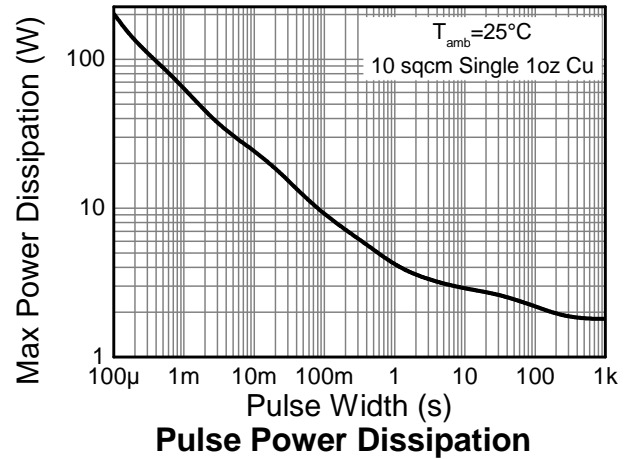
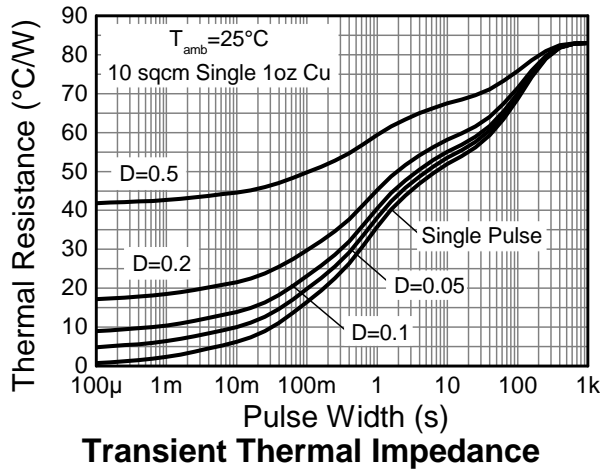
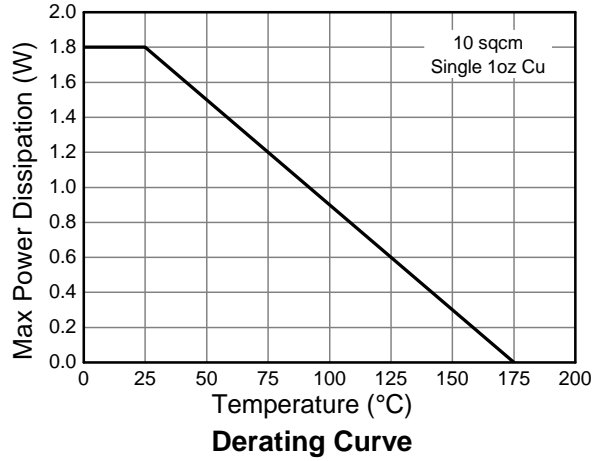
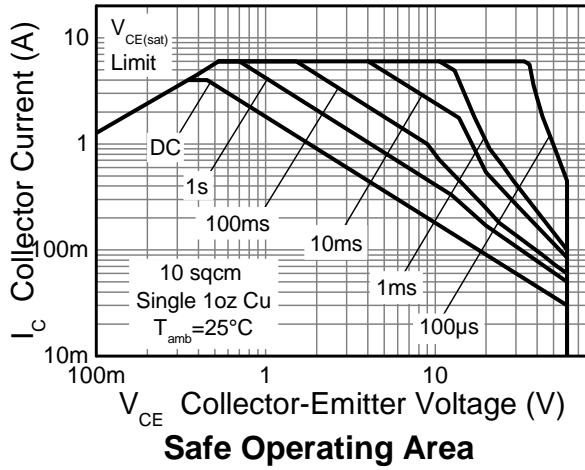
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5)	1.8
			12
Linear Derating Factor		(Note 6)	2.94
			19.6
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5)	83
		(Note 6)	51
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	16.8	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°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	400	V	C

- Notes:
5. For a device mounted with the exposed collector pad on 31mm x 31mm (10cm<sup>2</sup>) 1oz copper that is on a single sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state. The entire exposed collector pad is attached to the heatsink.
  6. Same as Note 5, except the device is measured at t ≤ 5 sec.
  7. Thermal resistance from junction to solder-point (on the exposed collector pad).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

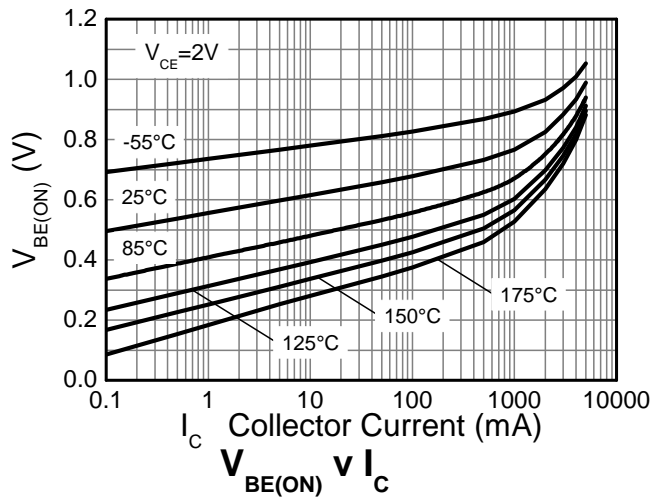
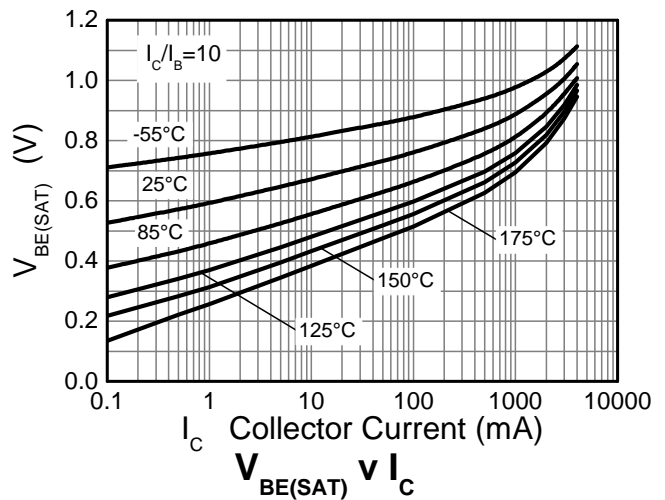
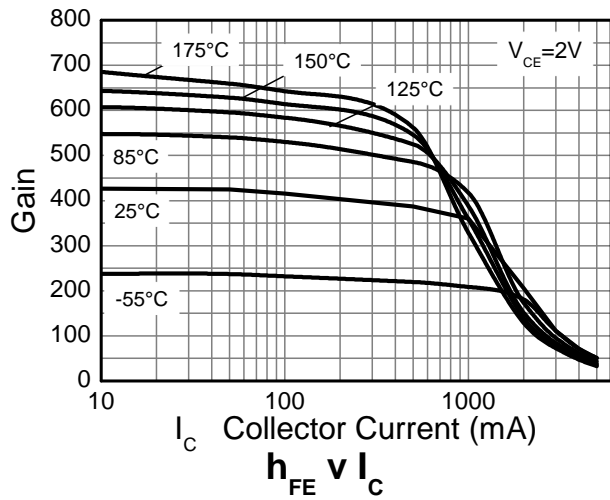
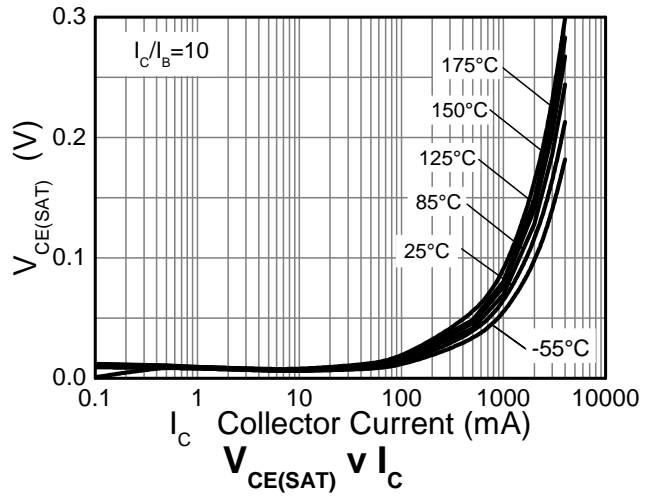
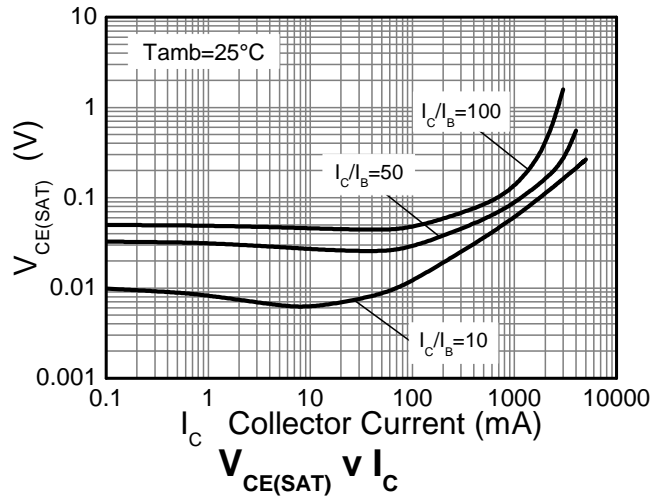


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	150	187	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	60	66	-	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	8	9	-	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	2	100	nA	V <sub>CB</sub> = 120V
Emitter Cutoff Current	I <sub>EBO</sub>	-	2	100	nA	V <sub>EB</sub> = 7V
Collector Emitter Cutoff Current	I <sub>CES</sub>	-	2	100	nA	V <sub>CES</sub> = 48V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	250	444	550	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
		340	425	500		I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V
		250	363	--		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		140	205	--		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
		20	40	--		I <sub>C</sub> = 6A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(SAT)</sub>	--	12	20	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 10mA
		--	70	100		I <sub>C</sub> = 1A, I <sub>B</sub> = 50mA
		--	125	160		I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
		--	150	200		I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA
		--	200	300		I <sub>C</sub> = 3A, I <sub>B</sub> = 100mA
--	240	320	I <sub>C</sub> = 4A, I <sub>B</sub> = 200mA			
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(ON)</sub>	--	0.94	1.00	V	I <sub>C</sub> = 4A, V <sub>CE</sub> = 2V
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(SAT)</sub>	--	1.00	1.07	V	I <sub>C</sub> = 4A, I <sub>B</sub> = 200mA
Output Capacitance	C <sub>obo</sub>	--	14	--	pF	V <sub>CB</sub> = 10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	125	--	--	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA, f = 100MHz
Turn-On Time	t <sub>ON</sub>	--	200	--	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A
Turn-Off Time	t <sub>OFF</sub>	--	700	--	ns	I <sub>B1</sub> = -I <sub>B2</sub> = 10mA

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

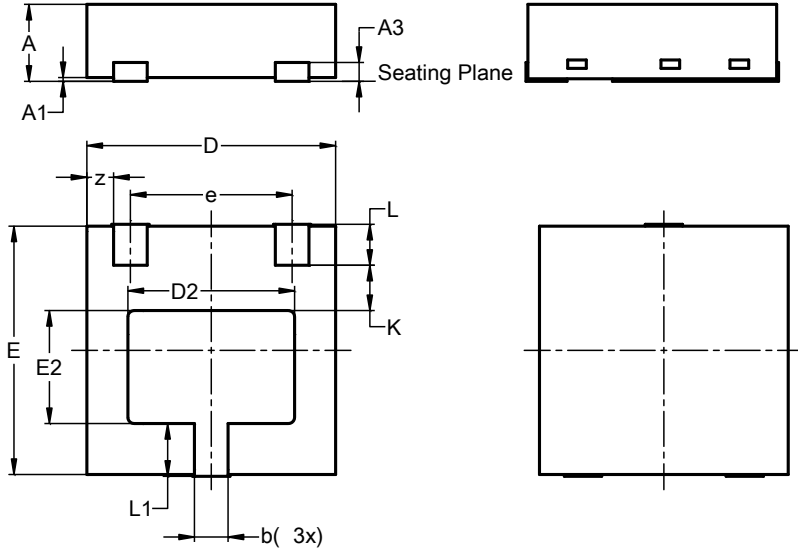
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



**Package Outline Dimensions**

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

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

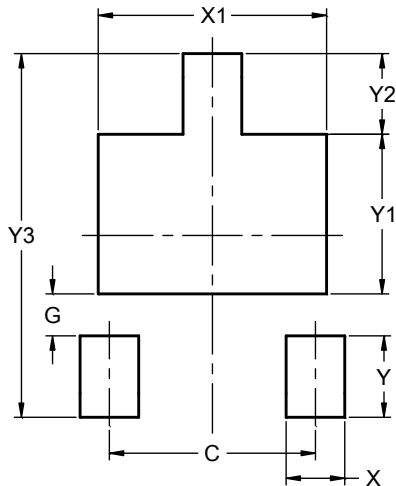


W-DFN2020-3 /SWP (Type A)			
Dim	Min	Max	Typ
A	0.57	0.67	0.62
A1	0.00	0.05	0.03
A3	—	—	0.152
b	0.22	0.32	0.27
D	1.95	2.05	2.00
D2	1.24	1.44	1.34
D4	0.56	0.76	0.66
E	1.95	2.05	2.00
E2	0.81	1.01	0.91
e	—	—	1.30
k	—	—	0.365
L	0.28	0.38	0.33
L1	0.375	0.475	0.425
z	—	—	0.215
All Dimensions in mm			

**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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