

**OBSOLETE – PART DISCONTINUED**

## Features and Benefits

### PNP Transistor

- $BV_{CEO} > -40V$
- $I_C = -3A$  Continuous Collector Current
- Low Saturation Voltage (-220mV Max @ -1A)
- $R_{SAT} = 104m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  Characterized up to -3A for High Current Gain Hold Up

### Schottky Diode

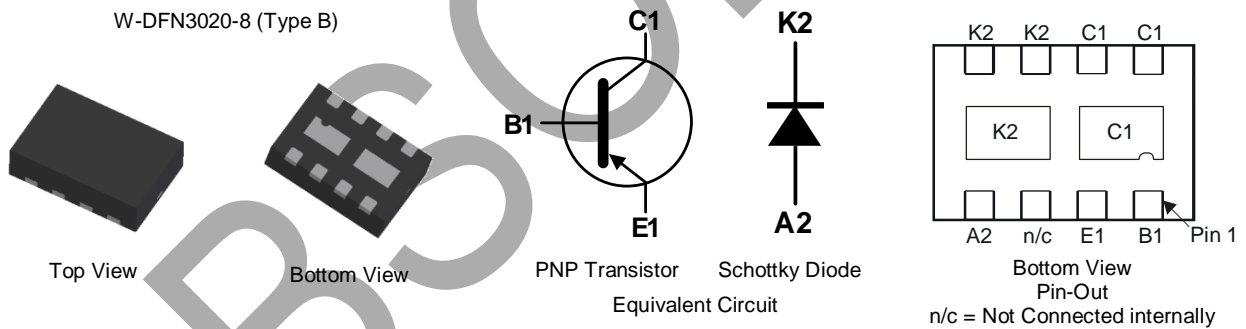
- $BV_R > 40V$
- $I_{FAV} = 3A$  Average Peak Forward Current
- Low  $V_F < 500mV$  (@1A) for Reduced Power Loss
- Fast Switching Due to Schottky Barrier
- Low Profile 0.8mm High Package for Thin Applications
- $R_{\theta JA}$  Efficient, 40% Lower than SOT26
- 6mm<sup>2</sup> Footprint, 50% Smaller than TSOP6 and SOT26
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: W-DFN3020-8
- Package 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: 0.013 grams (Approximate)

## Applications

- DC – DC converters
- Charging circuits
- Mobile phones
- Motor controls
- Portable applications



## Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ZXTPS720MCTA	W-DFN3020-8 (Type B)	3S1	7	8	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



3S1 = Product Type Marking Code  
Top view, dot denotes pin 1

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

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	
Emitter-Base Voltage	V <sub>EBO</sub>	-7	
Peak Pulse Current	I <sub>CM</sub>	-4	A
Continuous Collector Current	(Notes 5 and 8)	-3	
	(Notes 6 and 8)	-3.4	
Base Current	I <sub>B</sub>	-1	

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

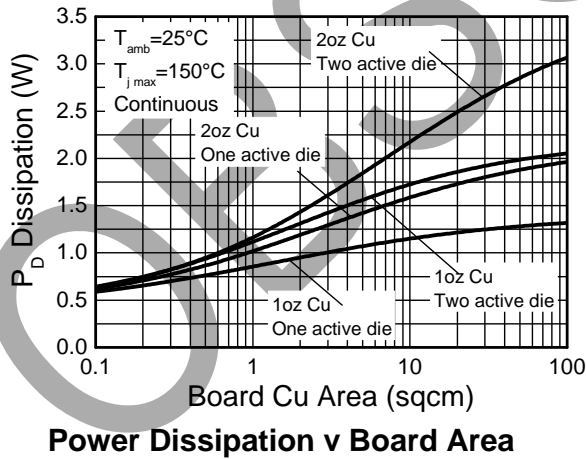
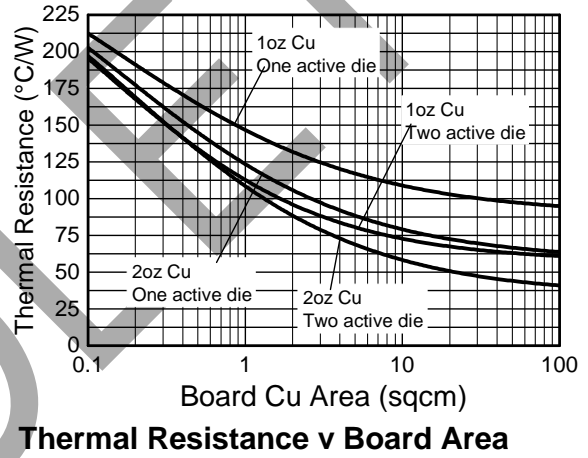
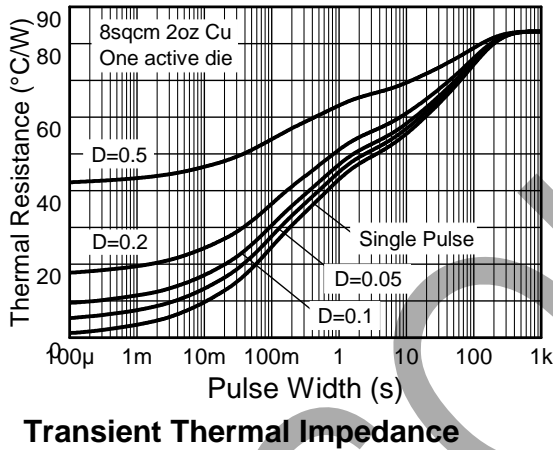
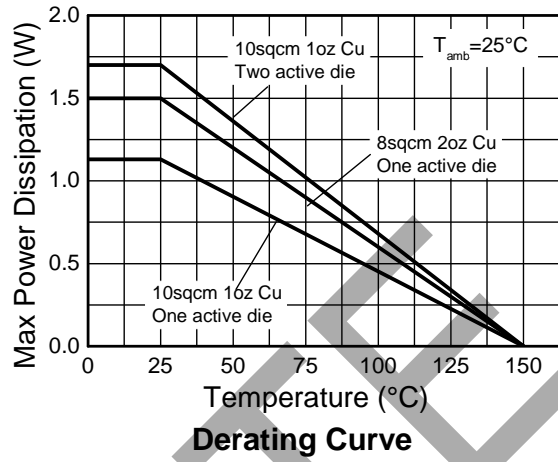
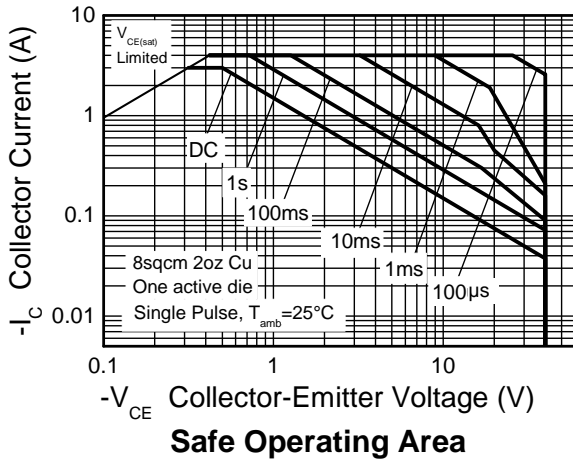
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	1.5	W mW/°C
		12	
		2.45	
		19.6	
		1.13	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	8	°C/W
		1.7	
		13.6	
		83.3	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	51.0	°C/W
		111	
		73.5	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	17.1	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
5. For a dual device surface mounted on 28mm x 28mm (8cm<sup>2</sup>) FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed collector and cathode pads connected to each half.
  6. Same as note 5, except the device is measured at t < 5 sec.
  7. Same as note 5, except the device is surface mounted on 31mm x 31mm (10cm<sup>2</sup>) FR4 PCB with high coverage of single sided 1oz copper.
  8. For a dual device with one active die.
  9. For dual device with 2 active die running at equal power.
  10. Thermal resistance from junction to solder-point (on the exposed collector pad).

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**PNP - Thermal Characteristics**

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

Parameter	Symbol	Limit	Unit	
Continuous Reverse Voltage	V <sub>R</sub>	40	V	
Continuous Forward Current	I <sub>F</sub>	1.85	A	
Repetitive Peak Forward Current	I <sub>FRM</sub>	3		
Non-Repetitive Peak Forward Surge Current	I <sub>FSM</sub>	t ≤ 100μs		12
		t ≤ 10ms		7

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

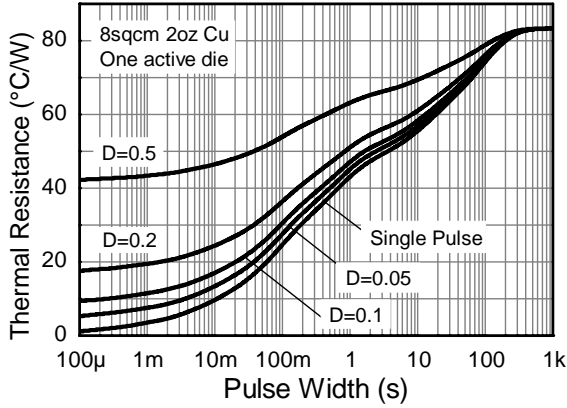
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	(Notes 11 & 14)	1.2
		(Notes 12 & 14)	12
		(Notes 13 & 14)	2
		(Notes 13 & 15)	20
		(Notes 13 & 15)	0.9
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Notes 11 & 14)	9
		(Notes 12 & 14)	1.36
		(Notes 13 & 14)	13.6
		(Notes 13 & 15)	83.3
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	51.0	°C/W
Storage Temperature Range	T <sub>STG</sub>	111	
Maximum Junction Temperature	T <sub>J</sub>	73.5	°C
		20.2	
		-55 to +150	
		+125	

- Notes:
11. For a dual device surface mounted on 28mm x 28mm (8cm<sup>2</sup>) FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed cathode and collector pads connected to each half.
  12. Same as note 11, except the device is measured at t < 5 sec.
  13. Same as note 11, except the device is surface mounted on 31mm x 31mm (10cm<sup>2</sup>) FR4 PCB with high coverage of single sided 1oz copper.
  14. For a dual device with one active die.
  15. For dual device with 2 active die running at equal power.
  16. Thermal resistance from junction to solder-point (on the exposed cathode pad).

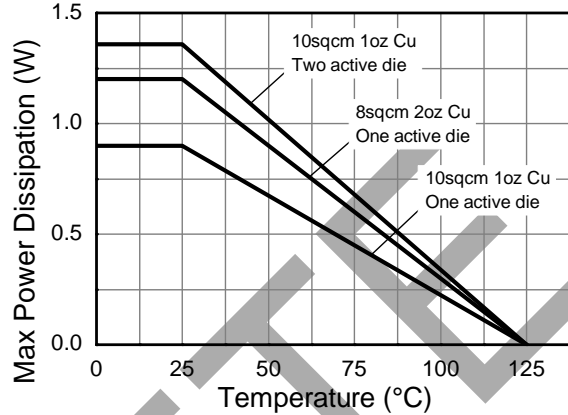
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**Schottky - Thermal Characteristics**

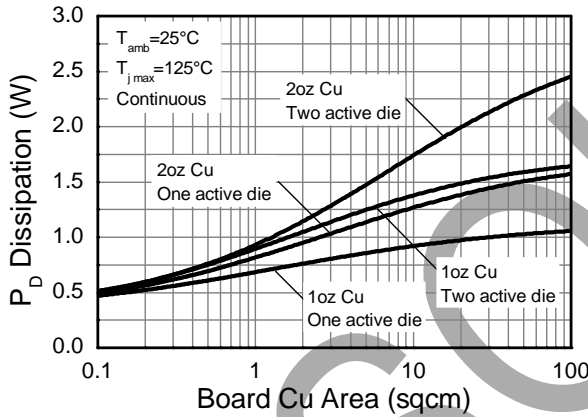
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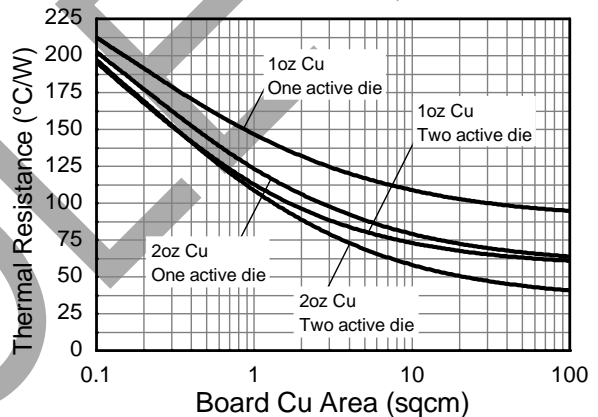
**Transient Thermal Impedance**



**Derating Curve**



**Power Dissipation v Board Area**



**Thermal Resistance v Board Area**

**PNP - 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>	-50	-80	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 17)	BV <sub>CEO</sub>	-40	-70	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.5	—	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	-100	nA	V <sub>CB</sub> = -40V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	-100	nA	V <sub>EB</sub> = -6V
Collector Emitter Cutoff Current	I <sub>CES</sub>	—	—	-100	nA	V <sub>CES</sub> = -32V
Static Forward Current Transfer Ratio (Note 17)	h <sub>FE</sub>	300	480	—	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		300	450	—		I <sub>C</sub> = -100mA, V <sub>CE</sub> = -2V
		180	290	—		I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		60	130	—		I <sub>C</sub> = -1.5A, V <sub>CE</sub> = -2V
		12	22	—		I <sub>C</sub> = -3A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 17)	V <sub>CE(sat)</sub>	—	-25	-40	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA
		—	-150	-220		I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA
		—	-195	-300		I <sub>C</sub> = -1.5A, I <sub>B</sub> = -100mA
		—	-210	-300		I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA
		—	-260	-370		I <sub>C</sub> = -2.5A, I <sub>B</sub> = -250mA
Base-Emitter Turn-On Voltage (Note 17)	V <sub>BE(on)</sub>	—	-0.89	-0.95	V	I <sub>C</sub> = -2.5A, V <sub>CE</sub> = -2V
Base-Emitter Saturation Voltage (Note 17)	V <sub>BE(sat)</sub>	—	-0.97	-1.05	V	I <sub>C</sub> = -2.5A, I <sub>B</sub> = -250mA
Output Capacitance	C <sub>obo</sub>	—	19	25	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	150	190	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
Turn-on Time	t <sub>on</sub>	—	40	—	ns	V <sub>CC</sub> = -15V, I <sub>C</sub> = -0.75A
Turn-off Time	t <sub>off</sub>	—	435	—	ns	I <sub>B1</sub> = -I <sub>B2</sub> = -15mA

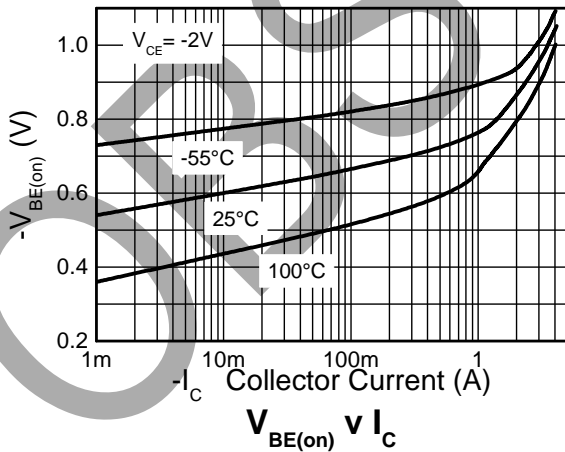
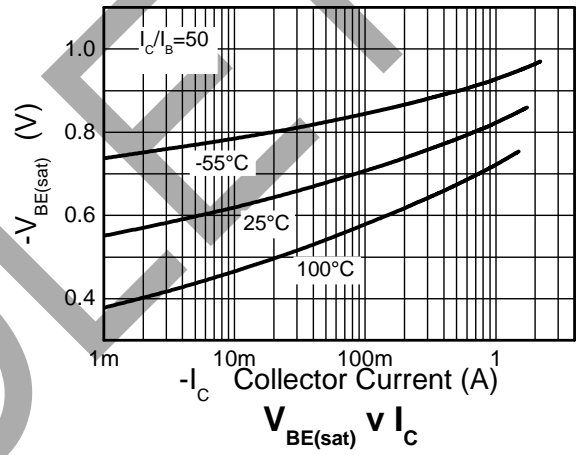
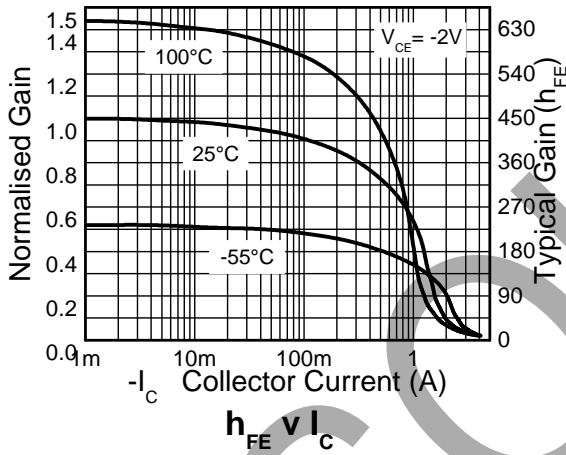
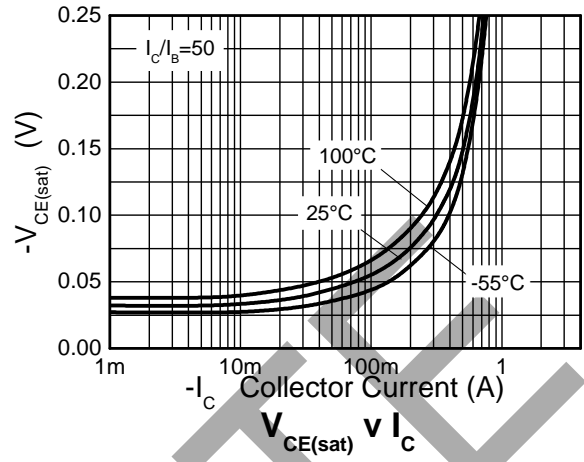
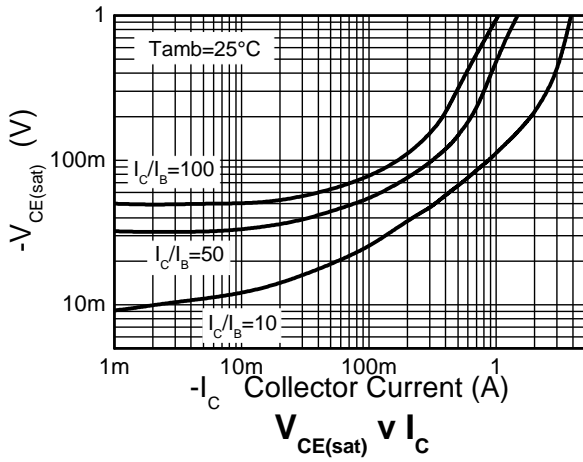
**Schottky - Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage	BV <sub>R</sub>	40	60	—	V	I <sub>R</sub> = -300μA
Forward Voltage (Note 17)	V <sub>F</sub>	—	240	270	mV	I <sub>F</sub> = 50mA
		—	265	290		I <sub>F</sub> = 100mA
		—	305	340		I <sub>F</sub> = 250mA
		—	355	400		I <sub>F</sub> = 500mA
		—	390	450		I <sub>F</sub> = 750mA
		—	425	500		I <sub>F</sub> = 1000mA
		—	495	600		I <sub>F</sub> = 1500mA
		—	420	—		I <sub>F</sub> = 1000mA, T <sub>A</sub> = +100°C
Reverse Current	I <sub>R</sub>	—	50	100	μA	V <sub>R</sub> = 30V
Diode Capacitance	C <sub>D</sub>	—	25	—	pF	V <sub>R</sub> = 25V, f = 1MHz
Reverse Recovery Time	t <sub>rr</sub>	—	12	—	ns	switched from I <sub>F</sub> = 500mA to I <sub>R</sub> = 500mA Measured at I <sub>R</sub> = 50mA

Note: 17. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

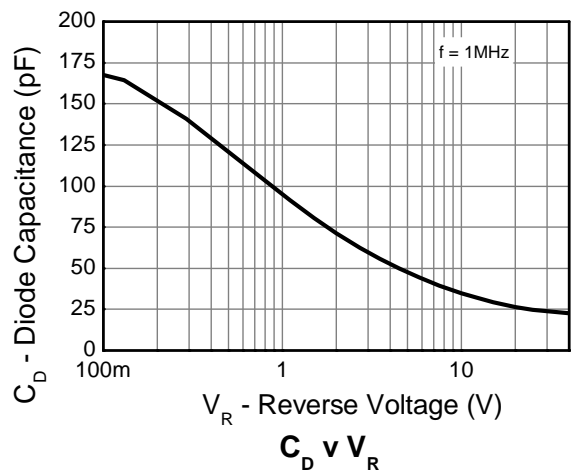
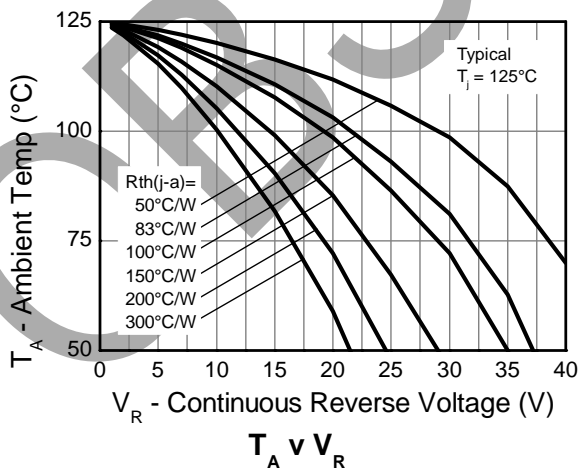
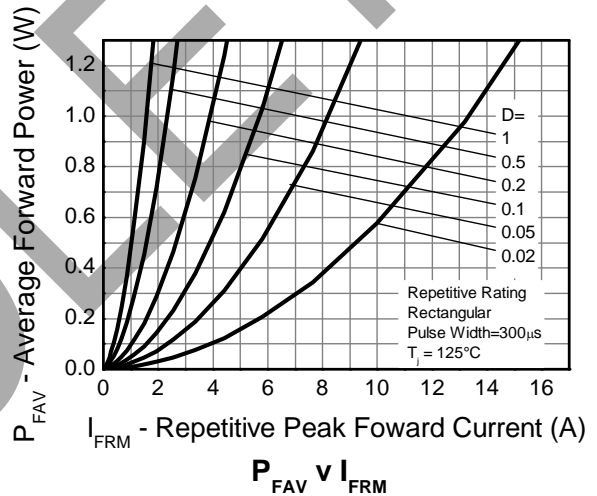
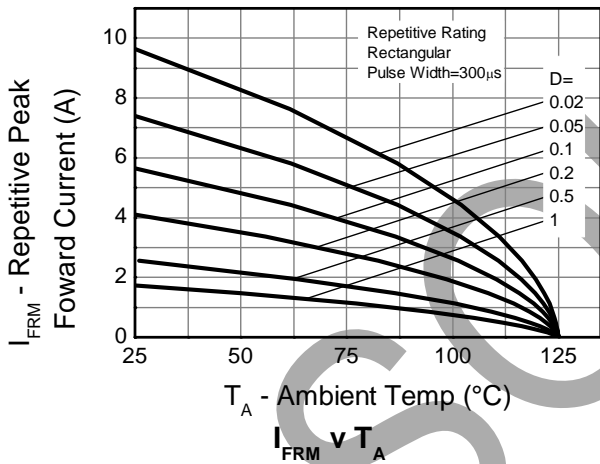
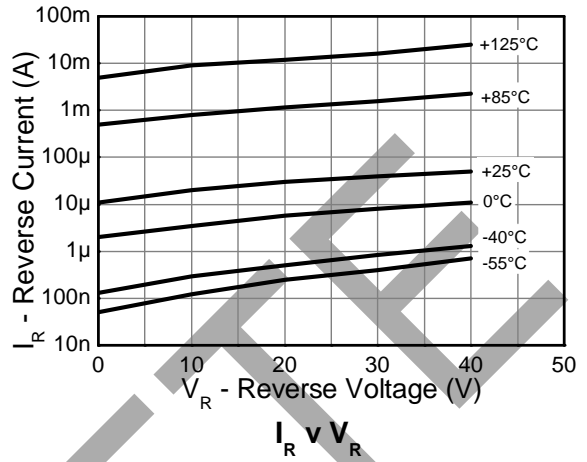
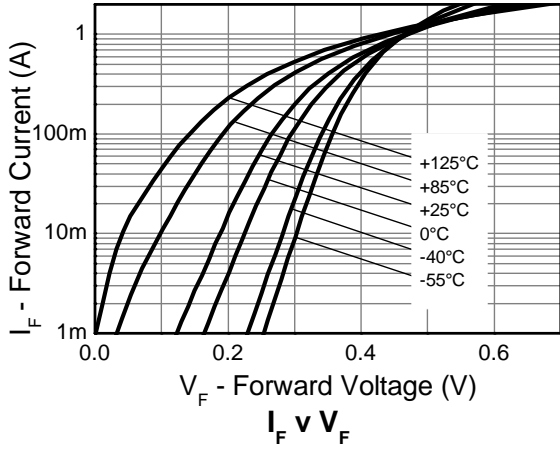
**PNP - Typical Electrical Characteristics**

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**Schottky - Typical Electrical Characteristics**

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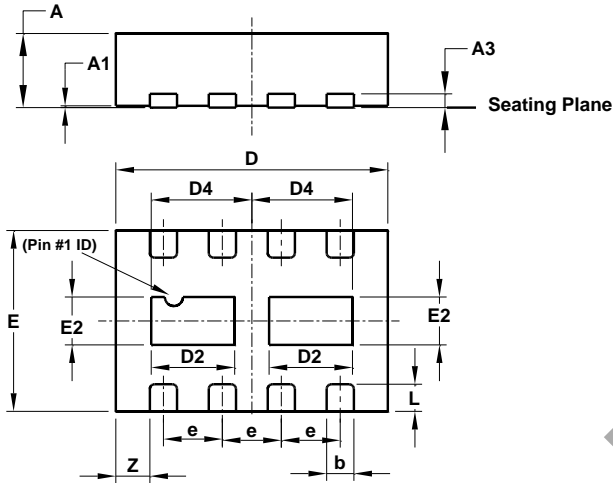




**Package Outline Dimensions**

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

W-DFN3020-8 (Type B)

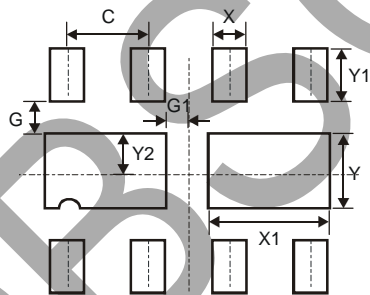


W-DFN3020-8 Type B			
Dim	Min	Max	Typ
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

**Suggested Pad Layout**

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

W-DFN3020-8 (Type B)



Dimensions	Value (in mm)
C	0.650
G	0.285
G1	0.090
X	0.400
X1	1.120
Y	0.730
Y1	0.500
Y2	0.365

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