

**12V PNP LOW SATURATION TRANSISTOR AND  
40V, 1A SCHOTTKY DIODE COMBINATION**

OBSOLETE - PART DISCONTINUED

**Features and Benefits**

**PNP Transistor**

- $BV_{CEO} > -12V$
- $I_C = -4A$  Continuous Collector Current
- Low Saturation Voltage (-140mV Max @ -1A)
- $R_{SAT} = 65m\Omega$  for a Low Equivalent On-Resistance
- hFE Characterized up to -10A for High Current Gain Hold up

**Schottky Diode**

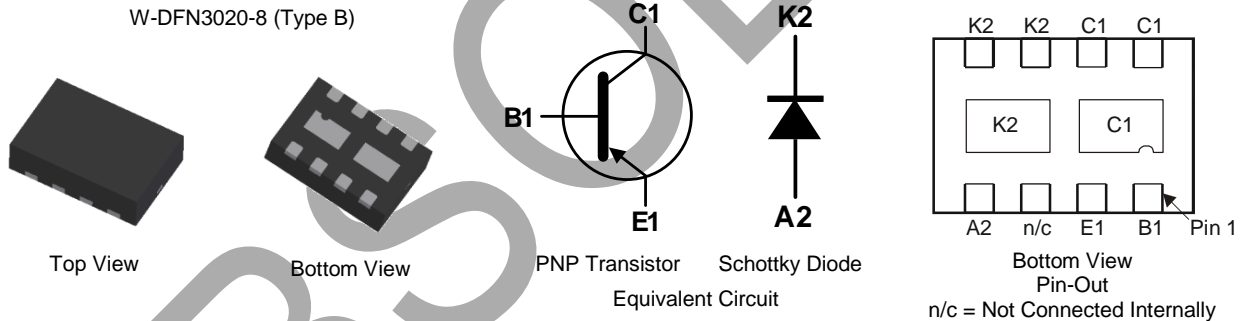
- $BV_R > 40V$
- $I_{FAV} = 3A$  Average Peak Forward Current
- Low  $V_F < 500mV$  (@ 1A) for Reduced Power Loss
- Fast Switching due to Schottky Barrier
- Low Profile 0.8mm High Package for Thin Applications
- $R_{\theta JA}$  Efficient, 40% Lower than SOT26
- 6mm<sup>2</sup> Footprint, 50% Smaller 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](mailto:contact@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 (64)
- 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
ZXTPS717MCTA	W-DFN3020-8 (Type B)	1S1	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**



1S1 = Product Type Marking Code  
Top View, Dot Denotes Pin 1

**PNP - Maximum Ratings** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	$V_{CB0}$	-20	V
Collector-Emitter Voltage	$V_{CEO}$	-12	
Emitter-Base Voltage	$V_{EBO}$	-7	
Peak Pulse Current	$I_{CM}$	-12	A
Continuous Collector Current	(Notes 5 & 8)	-4	
	(Notes 6 & 8)	-4.4	
Base Current	$I_B$	-1	

**PNP - Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

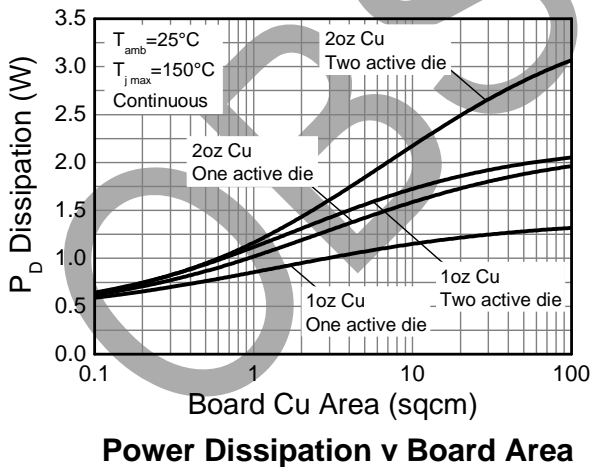
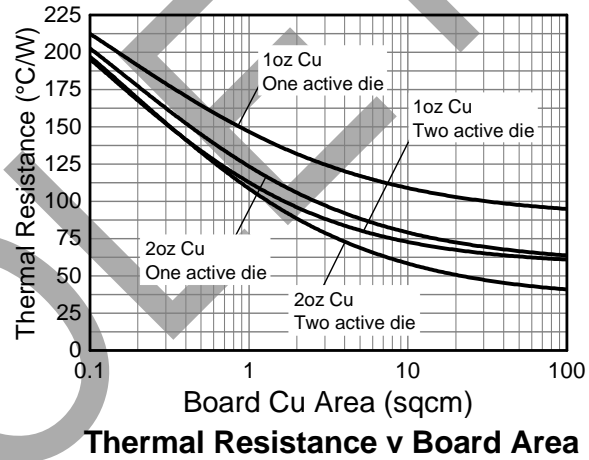
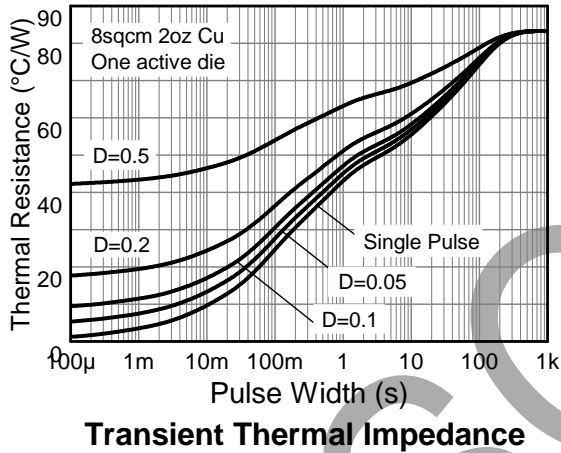
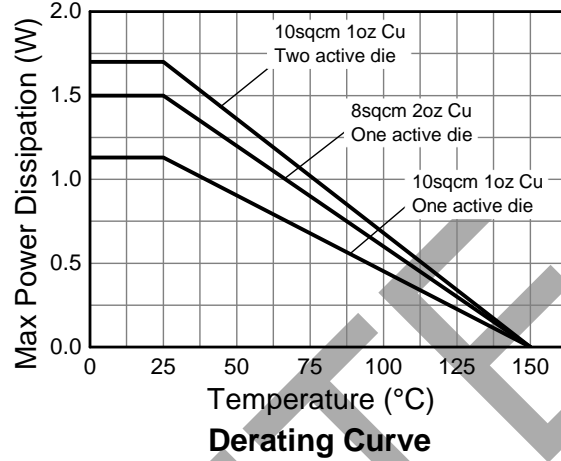
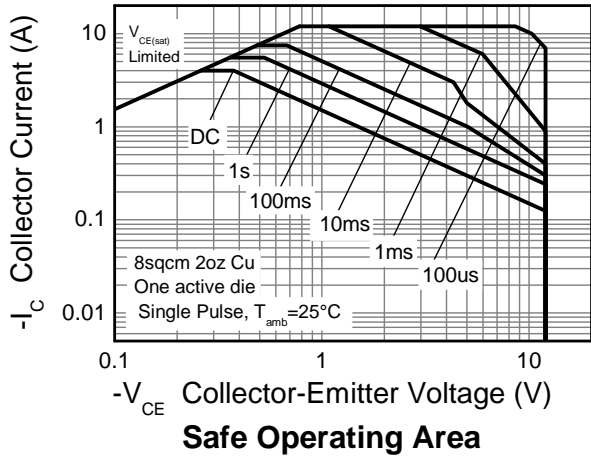
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	$P_D$	(Notes 5 & 8)	1.5
		(Notes 6 & 8)	12
		(Notes 7 & 8)	2.45
		(Notes 7 & 9)	19.6
		(Notes 7 & 9)	1.13
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Notes 5 & 8)	8
		(Notes 6 & 8)	1.7
		(Notes 7 & 8)	13.6
		(Notes 7 & 9)	83.3
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	17.1	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
- For a dual device surface mounted on 28mm x 28mm (8cm<sup>2</sup>) FR4 PCB with high coverage of single sided 2 oz 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.
  - Same as Note 5, except the device is measured at  $t < 5$  sec.
  - 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.
  - For a dual device with one active die.
  - For dual device with two active dies running at equal power.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).

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**PNP - Thermal Characteristics**

OBSOLETE - PART DISCONTINUED



**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

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

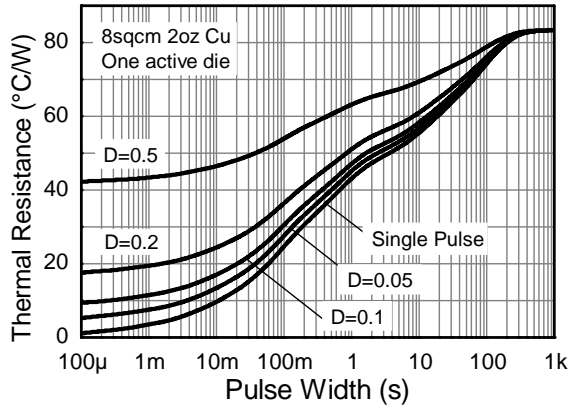
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	(Notes 11 & 14)	1.2
		(Notes 12 & 14)	12
		(Notes 13 & 14)	2
		(Notes 13 & 15)	20
		(Notes 13 & 15)	0.9
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Notes 11 & 14)	9
		(Notes 12 & 14)	1.36
		(Notes 13 & 14)	13.6
		(Notes 13 & 15)	51.0
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	73.5	°C/W
(Note 16)	20.2		
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C
Maximum Junction Temperature	T <sub>J</sub>	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 2 oz 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 two active dies running at equal power.
  16. Thermal resistance from junction to solder-point (on the exposed cathode pad).

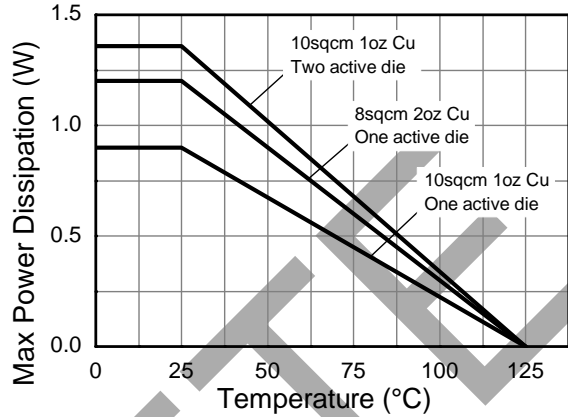
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**Schottky - Thermal Characteristics**

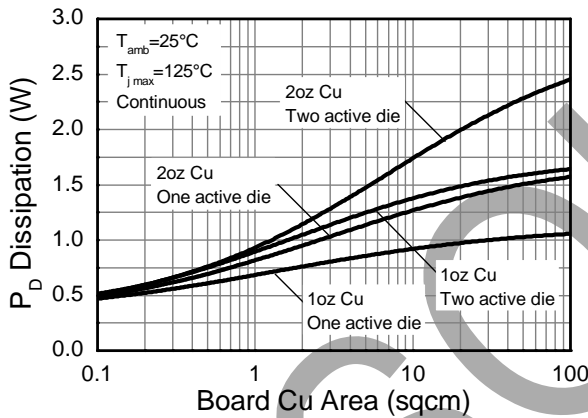
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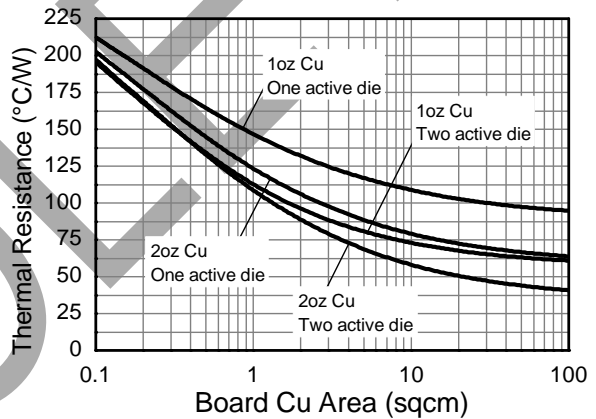
**Transient Thermal Impedance**



**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>CB0</sub>	-20	-35	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 17)	BV <sub>CEO</sub>	-12	-25	—	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> = -16V
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> = -10V
Static Forward Current Transfer Ratio (Note 17)	h <sub>FE</sub>	300	475	—	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		300	450	—		I <sub>C</sub> = -100mA, V <sub>CE</sub> = -2V
		180	275	—		I <sub>C</sub> = -2.5A, V <sub>CE</sub> = -2V
		60	100	—		I <sub>C</sub> = -8A, V <sub>CE</sub> = -2V
		45	70	—		I <sub>C</sub> = -10A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 17)	V <sub>CE(sat)</sub>	—	-10	-17	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA
		—	-100	-140		I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		—	-100	-150		I <sub>C</sub> = -1.5A, I <sub>B</sub> = -50mA
		—	-195	-300		I <sub>C</sub> = -3A, I <sub>B</sub> = -50mA
		—	-240	-310		I <sub>C</sub> = -4A, I <sub>B</sub> = -150mA
Base-Emitter Turn-On Voltage (Note 17)	V <sub>BE(on)</sub>	—	-0.87	-0.96	V	I <sub>C</sub> = -4A, V <sub>CE</sub> = -2V
Base-Emitter Saturation Voltage (Note 17)	V <sub>BE(sat)</sub>	—	-0.97	-1.07	V	I <sub>C</sub> = -4A, I <sub>B</sub> = -150mA
Output Capacitance	C <sub>obo</sub>	—	21	30	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	100	110	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA f = 100MHz
Turn-on Time	t <sub>on</sub>	—	70	—	ns	V <sub>CC</sub> = -6V, I <sub>C</sub> = -2A
Turn-off Time	t <sub>off</sub>	—	130	—	ns	I <sub>B1</sub> = -I <sub>B2</sub> = -50mA

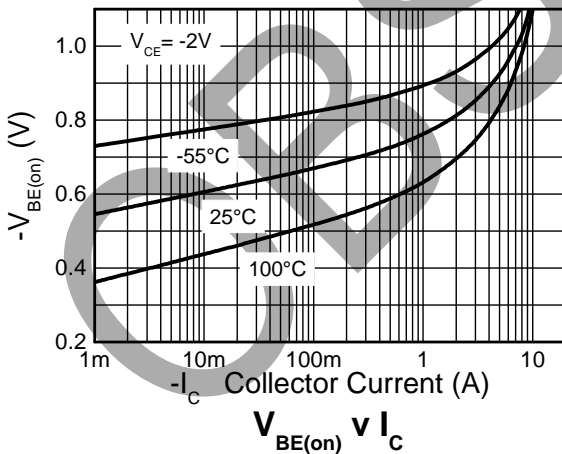
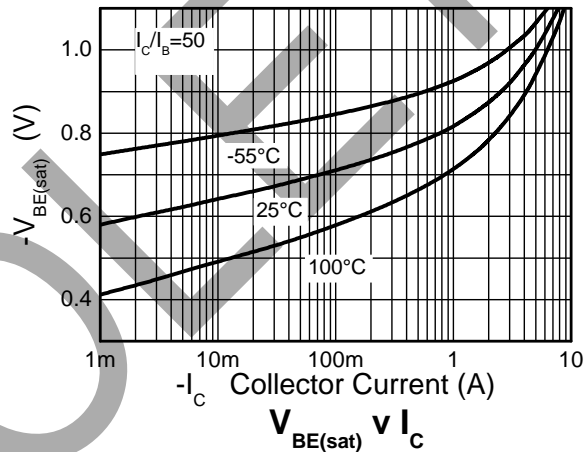
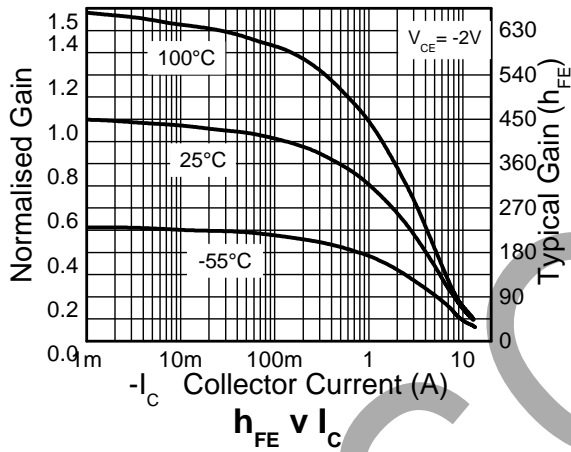
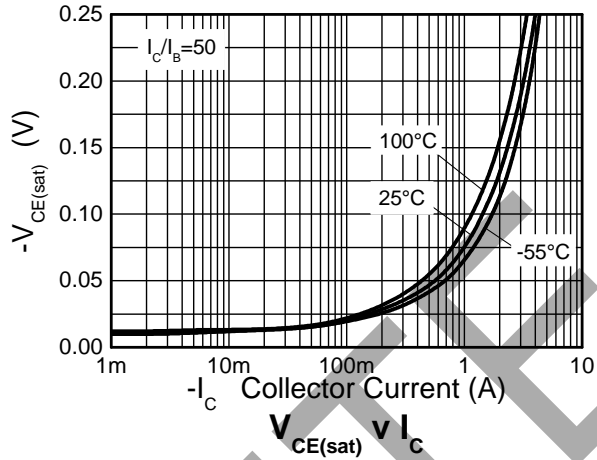
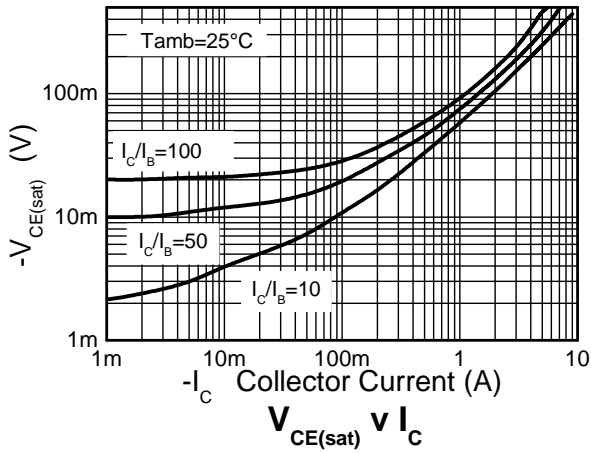
**Schottky - Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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%.

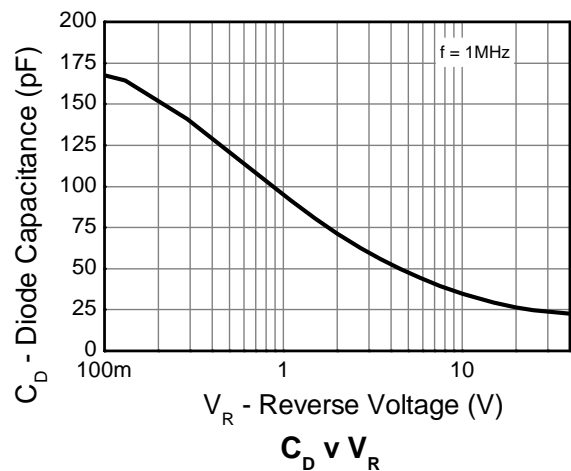
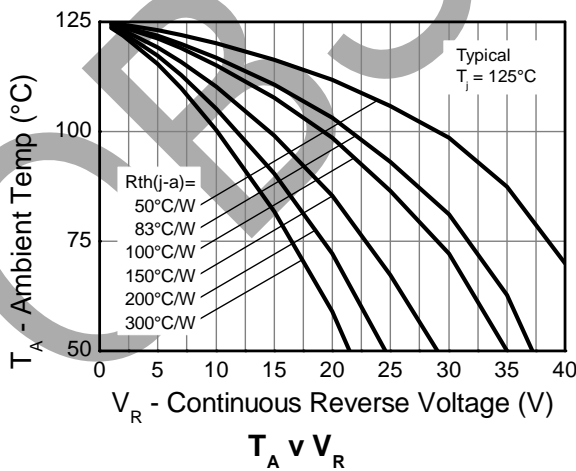
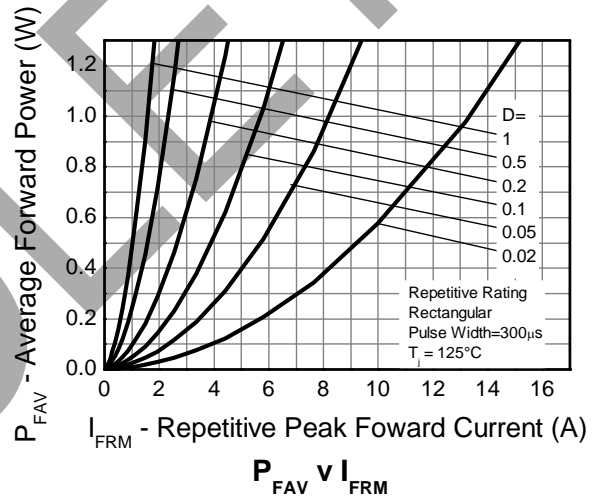
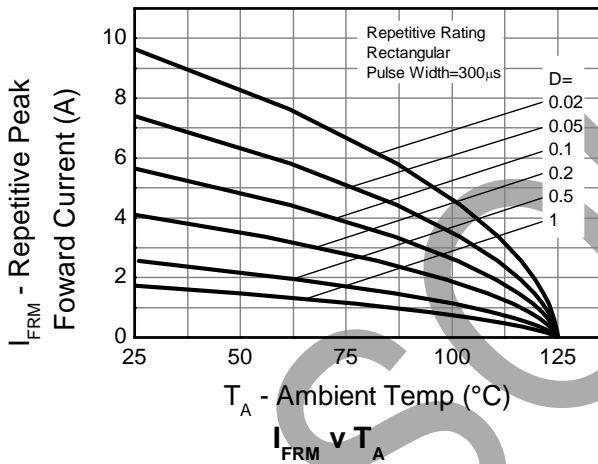
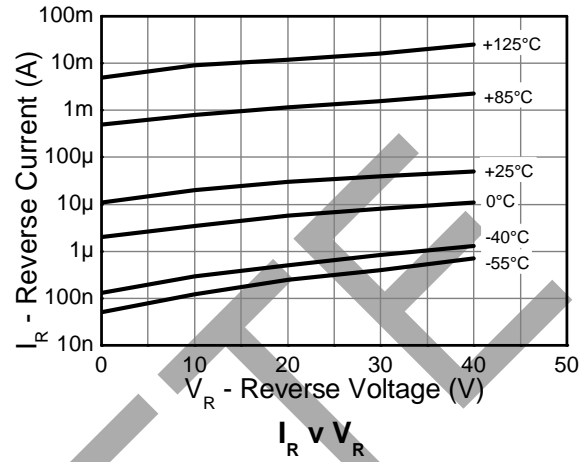
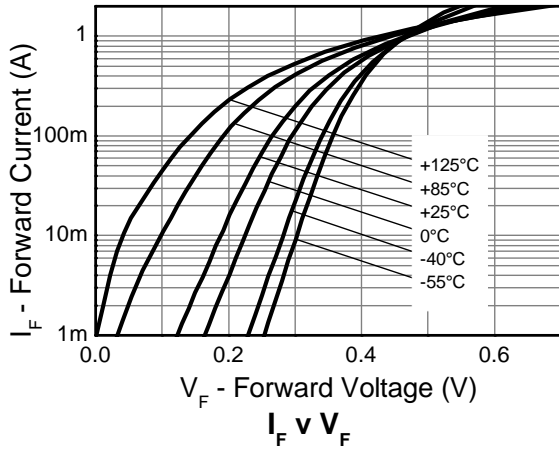
**PNP - Typical Electrical Characteristics**

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**Schottky - Typical Electrical Characteristics**

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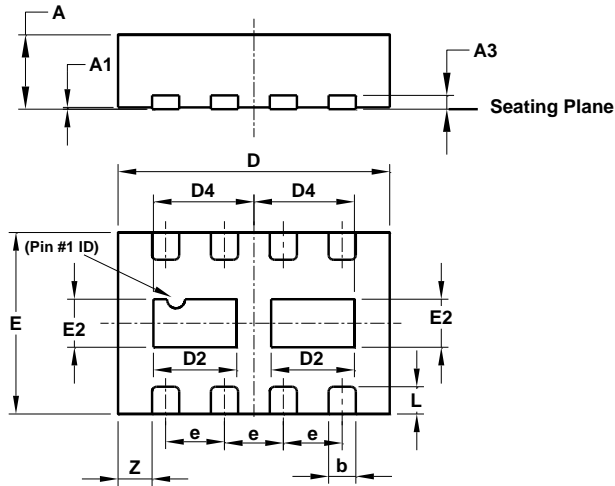




## Package Outline Dimensions

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

W-DFN3020-8 (Type B)

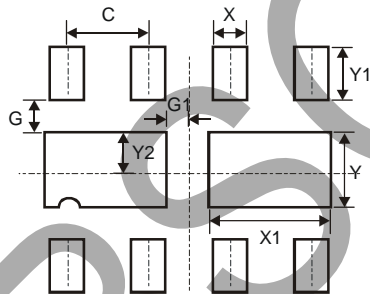


W-DFN3020-8 (Type B)			
Dim	Min	Max	Typ
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

## 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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