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ZXTPS718MC

20V PNP LOW SATURATION TRANSISTOR AND 40V, 1A SCHOTTKY DIODE COMBINATION

Features and Benefits

PNP Transistor

- BV_{CEO} > -20V
- I_C = -3.5A Continuous Collector Current
- Low Saturation Voltage (-220mV max @ -1A)
- R_{SAT} = 64mΩ for a low equivalent On-Resistance
- h_{FE} characterized up to -6A 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^2 footprint, 50% smaller than TSOP6 and SOT26
- **Lead-Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

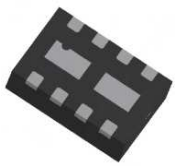
- Case: DFN3020B-8
- Case Material: Molded Plastic, "Green" Molding Component
- Terminals: Pre-Plated NiPdAu leadframe
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.013 grams (approximate)

Applications

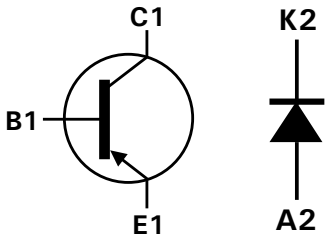
- DC – DC Converters
- Charging circuits
- Mobile phones
- Motor control
- Portable applications

DFN3020B-8

Top View

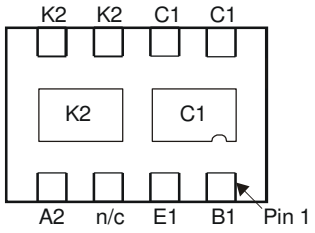


Bottom View



PNP Transistor Schottky Diode

Equivalent Circuit



Bottom View
Pin-Out
n/c = Not Connected internally

Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTPS718MCTA	2S1	7	8	3000

Notes: 1. No purposefully added lead.
2. Diodes Inc's "Green" Policy can be found on our website http://www.diodes.com
3. For packaging details, go to our website http://www.diodes.com

Marking Information

2S1 = Product type marking code
Top view, dot denotes pin 1

PNP - Maximum Ratings @ T_A = 25°C unless otherwise specified

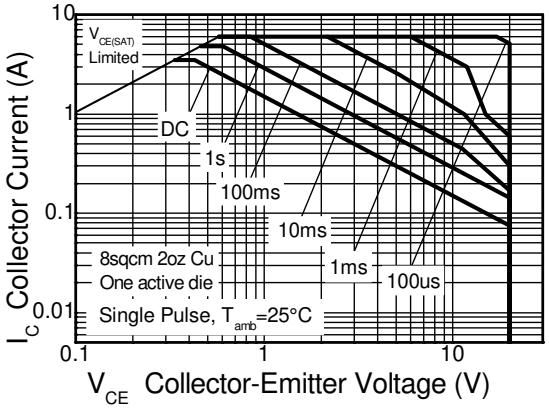
Parameter		Symbol	Limit	Unit
Collector-Base Voltage		V_{CBO}	-25	V
Collector-Emitter Voltage		V_{CEO}	-20	
Emitter-Base Voltage		V_{EBO}	-7	
Peak Pulse Current		I_{CM}	-6	A
Continuous Collector Current	(Notes 4 and 7)	I_C	-3.5	
	(Notes 5 and 7)		-3.9	
Base Current		I_B	-1	

PNP - Thermal Characteristics @ T_A = 25°C unless otherwise specified

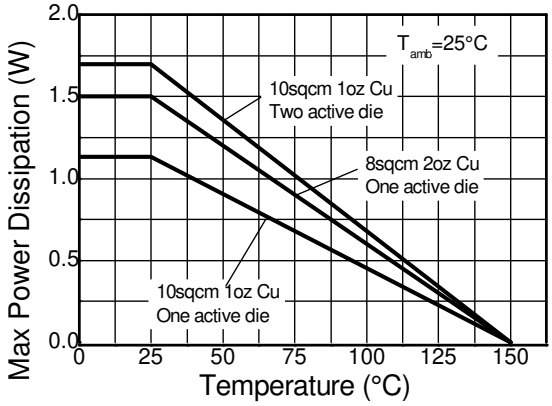
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 4 & 7)	P_D	1.5 12	W mW/°C
	(Notes 5 & 7)		2.45 19.6	
	(Notes 6 & 7)		1.13 8	
	(Notes 6 & 8)		1.7 13.6	
Thermal Resistance, Junction to Ambient	(Notes 4 & 7)	$R_{\theta JA}$	83.3	°C/W
	(Notes 5 & 7)		51.0	
	(Notes 6 & 7)		111	
	(Notes 6 & 8)		73.5	
Thermal Resistance, Junction to Lead	(Note 9)	$R_{\theta JL}$	17.1	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
4. For a dual device surface mounted on 28mm x 28mm (8cm^2) 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.
5. Same as note (4), except the device is measured at t <5 sec.
6. Same as note (4), except the device is surface mounted on 31mm x 31mm (10cm^2) FR4 PCB with high coverage of single sided 1oz copper.
7. For a dual device with one active die.
8. For dual device with 2 active die running at equal power.
9. Thermal resistance from junction to solder-point (on the exposed collector pad).

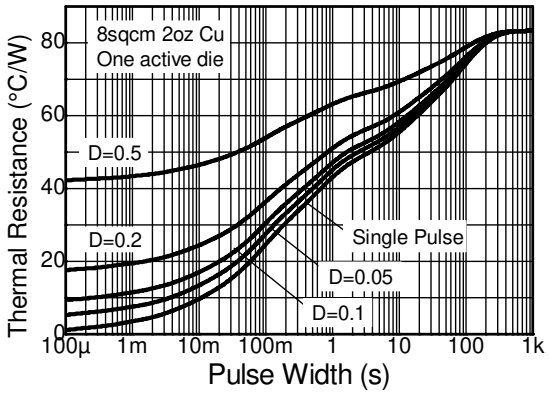
PNP - Thermal Characteristics



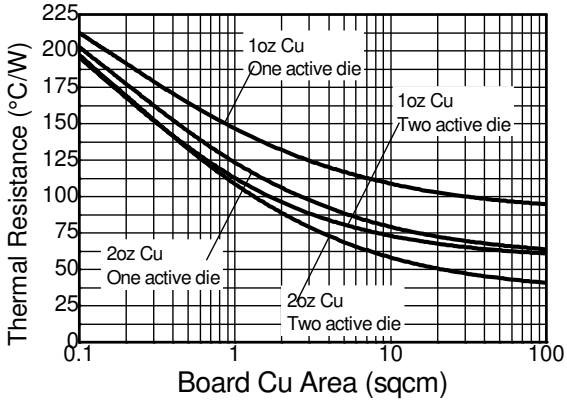
Safe Operating Area



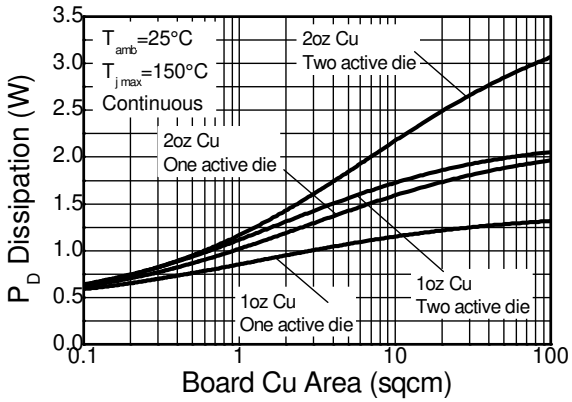
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



Power Dissipation v Board Area

Schottky - Maximum Ratings @ T_A = 25°C unless otherwise specified

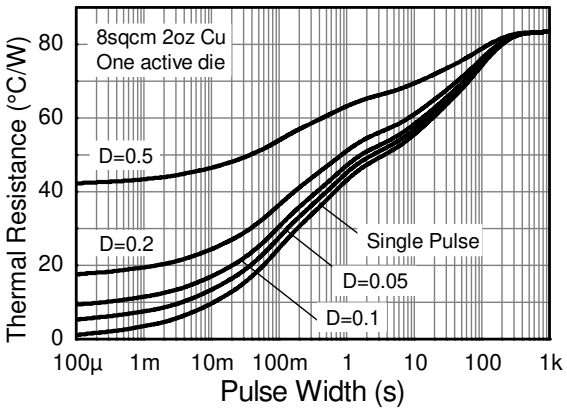
Parameter		Symbol	Limit	Unit
Continuous Reverse Voltage		V_R	40	V
Continuous Forward Current		I_F	1.85	A
Repetitive Peak Forward Current	D = 0.5 Pulse width ≤ 300µs	I_{FRM}	3	
Non-Repetitive Peak Forward Surge Current	t ≤ 100µs	I_{FSM}	12	
	t ≤ 10ms		7	

Schottky - Thermal Characteristics @ T_A = 25°C unless otherwise specified

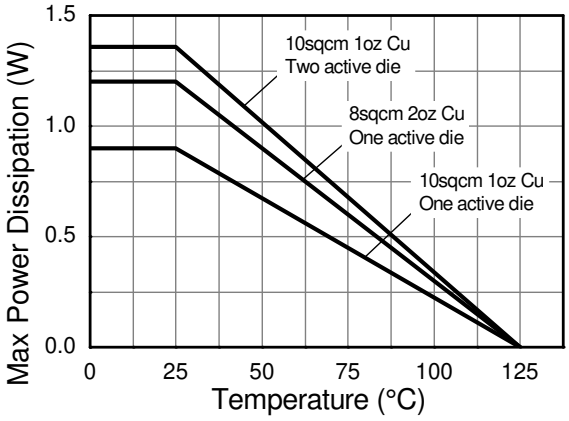
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 10 & 13)	P_D	1.2 12	W mW/°C
	(Notes 11 & 13)		2 20	
	(Notes 12 & 13)		0.9 9	
	(Notes 12 & 14)		1.36 13.6	
Thermal Resistance, Junction to Ambient	(Notes 10 & 13)	$R_{\theta JA}$	83.3	°C/W
	(Notes 11 & 13)		51.0	
	(Notes 12 & 13)		111	
	(Notes 12 & 14)		73.5	
Thermal Resistance, Junction to Lead	(Note 15)	$R_{\theta JL}$	20.2	
Storage Temperature Range		T_{STG}	-55 to +150	°C
Maximum Junction Temperature		T_J	125	

Notes:
10. For a dual device surface mounted on 28mm x 28mm (8cm^2) 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.
11. Same as note (10), except the device is measured at t <5 sec.
12. Same as note (10), except the device is surface mounted on 31mm x 31mm (10cm^2) FR4 PCB with high coverage of single sided 1oz copper.
13. For a dual device with one active die.
14. For dual device with 2 active die running at equal power.
15. Thermal resistance from junction to solder-point (on the exposed cathode pad).

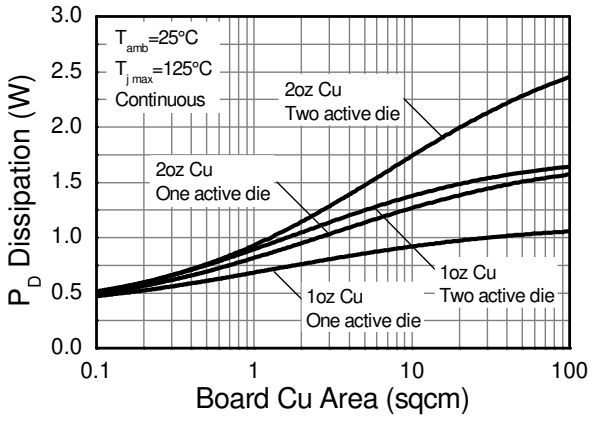
Schottky - Thermal Characteristics



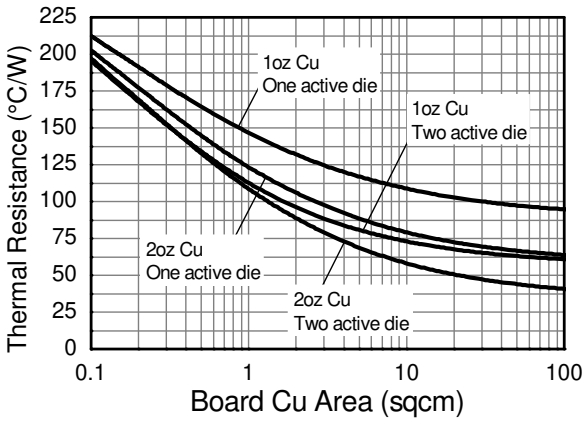
Transient Thermal Impedance



Derating Curve



Power Dissipation v Board Area



Thermal Resistance v Board Area

PNP - Electrical Characteristics @T_A = 25°C unless otherwise specified

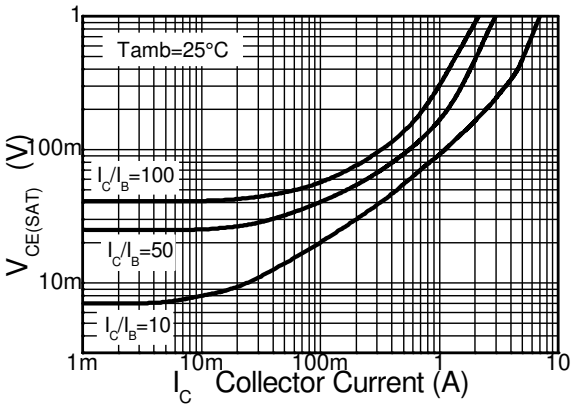
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-25	-35	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 16)	BV_{CEO}	-20	-25	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.5	-	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	V_{CB} = -20V
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	V_{EB} = -6V
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	V_{CES} = -16V
Static Forward Current Transfer Ratio (Note 16)	h_{FE}	300	475	-	-	I_C = -10mA, V_{CE} = -2V
		300	450	-		I_C = -100mA, V_{CE} = -2V
		150	230	-		I_C = -2A, V_{CE} = -2V
		15	30	-		I_C = -6A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 16)	$V_{CE(sat)}$	-	-19	-30	mV	I_C = -0.1A, I_B = -10mA
		-	-170	-220		I_C = -1A, I_B = -20mA
		-	-190	-250		I_C = -1.5A, I_B = -50mA
		-	-240	-350		I_C = -2.5A, I_B = -150mA
		-	-225	-300		I_C = -3.5A, I_B = -350mA
Base-Emitter Turn-On Voltage (Note 16)	$V_{BE(on)}$	-	-0.87	-0.95	V	I_C = -3.5A, V_{CE} = -2V
Base-Emitter Saturation Voltage (Note 16)	$V_{BE(sat)}$	-	-1.10	-1.12	V	I_C = -3.5A, I_B = -350mA
Output Capacitance	C_{obo}	-	21	30	pF	V_{CB} = -10V. f = 1MHz
Transition Frequency	f_T	150	180	-	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Turn-on Time	t_{on}	-	40	-	Ns	V_{CC} = -10V, I_C = -1A
Turn-off Time	t_{off}	-	670	-	Ns	I_{B1} = I_{B2} = -50mA

Schottky - Electrical Characteristics @T_A = 25°C unless otherwise specified

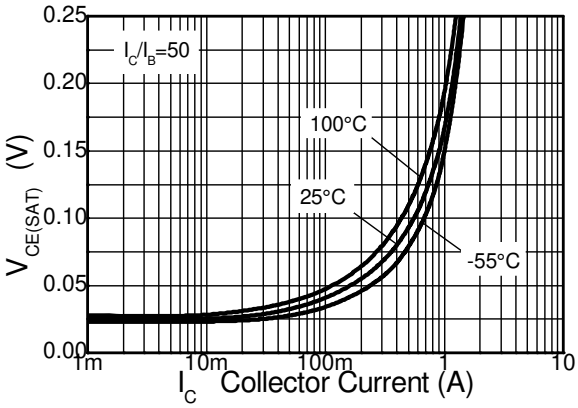
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage	BV_R	40	60	-	V	I_R = -300µA
Forward Voltage (Note 16)	V_F	-	240	270	mV	I_F = 50mA
		-	265	290		I_F = 100mA
		-	305	340		I_F = 250mA
		-	355	400		I_F = 500mA
		-	390	450		I_F = 750mA
		-	425	500		I_F = 1000mA
		-	495	600		I_F = 1500mA
		-	420	-		I_F = 1000mA, T_A = 100°C
Reverse Current	I_R	-	50	100	µA	V_R = 30V
Diode Capacitance	C_D	-	25	-	pF	V_R = 25V, f = 1MHz
Reverse Recovery Time	t_{rr}	-	12	-	Ns	switched from I_F = 500mA to I_R = 500mA Measured at I_R = 50mA

Notes: 16. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

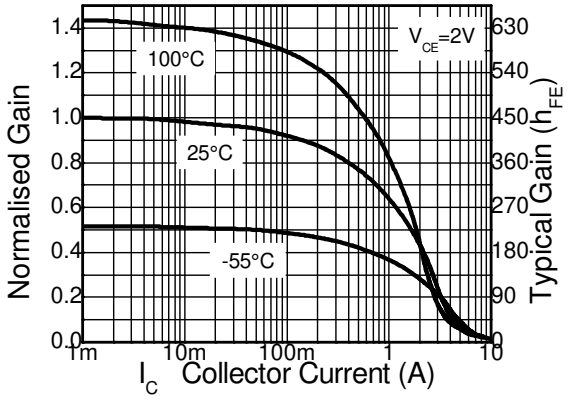
PNP - Typical Electrical Characteristics



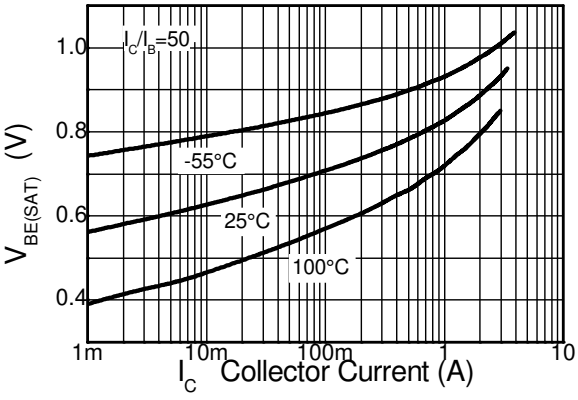
$V_{CE(SAT)}$ v I_C



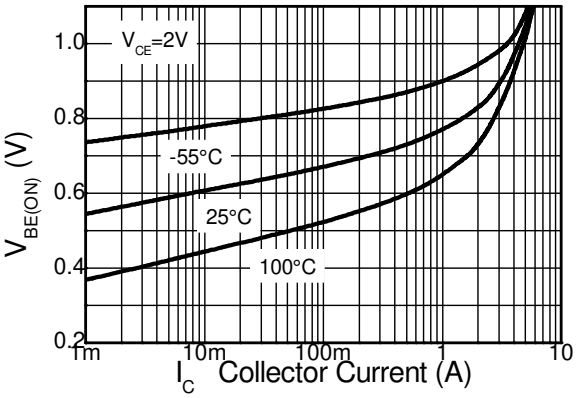
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

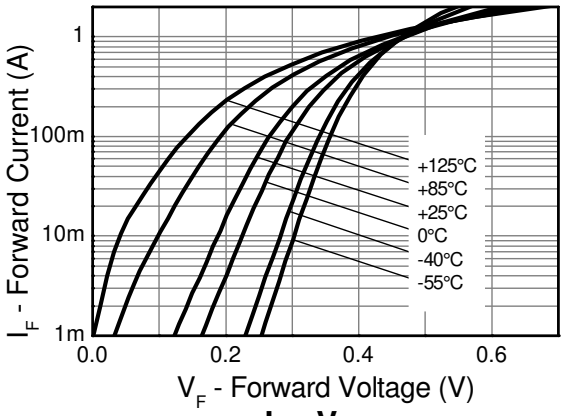


$V_{BE(SAT)}$ v I_C

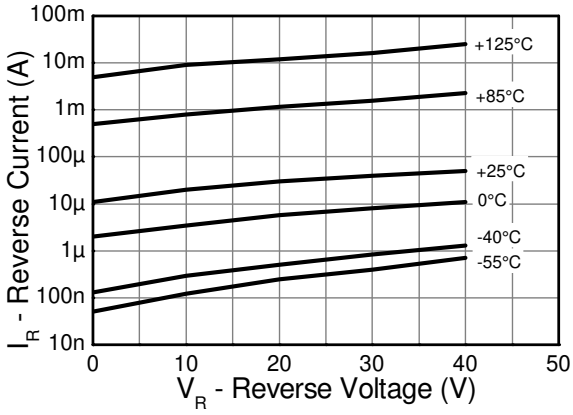


$V_{BE(ON)}$ v I_C

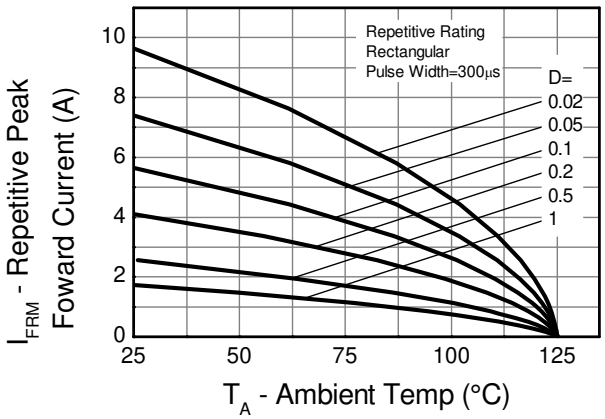
Schottky - Typical Electrical Characteristics



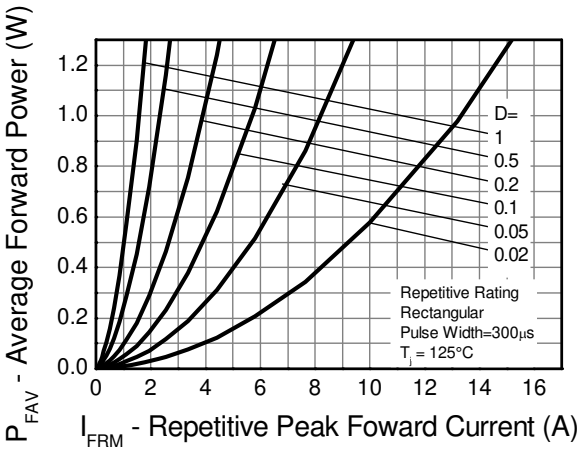
I_F v V_F



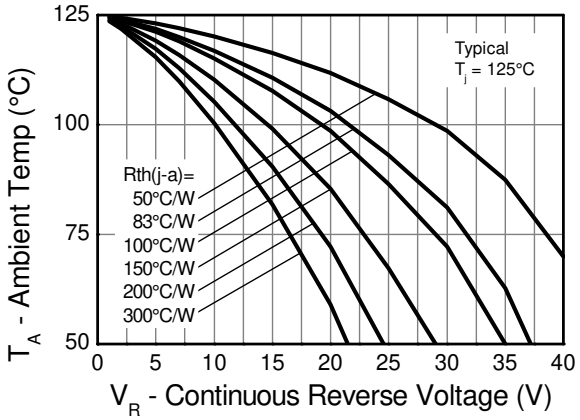
I_R v V_R



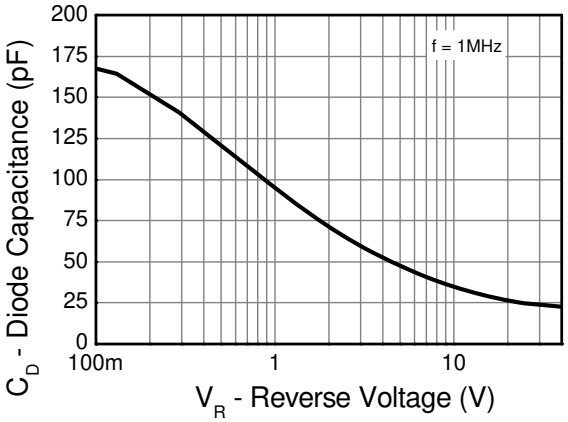
I_{FRM} v T_A



P_{FAV} v I_{FRM}

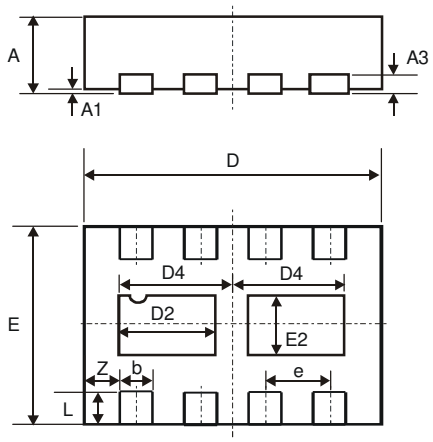


T_A v V_R



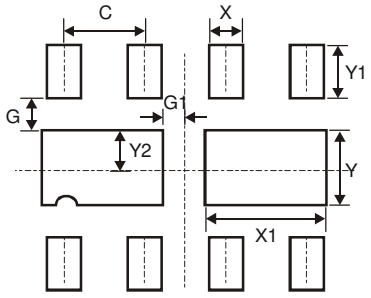
C_D v V_R

Package Outline Dimensions



DFN3020B-8			
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



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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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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