

**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)
- $R_{SAT} = 64m\Omega$  for a low equivalent On-Resistance
- $h_{FE}$  characterized up to -6A for high current gain hold up

**Schottky Diode**

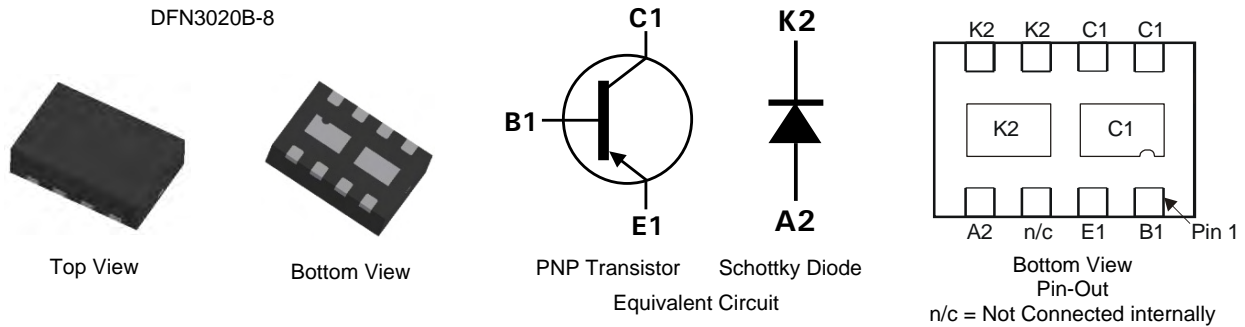
- $BV_R > 40V$
- $I_{FAV} = 3A$  Average Peak Forward Current
- Low  $V_F < 500mV$  (@1A) for reduced power loss
- Fast switching due to Schottky barrier
- Low profile 0.8mm high package for thin applications
- $R_{\theta JA}$  efficient, 40% lower than SOT26
- 6mm<sup>2</sup> footprint, 50% smaller 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



**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** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

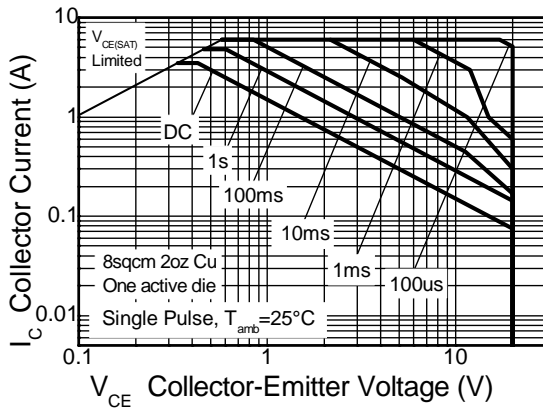
Parameter	Symbol	Limit	Unit
Collector-Base Voltage	$V_{CB0}$	-25	V
Collector-Emitter Voltage	$V_{CEO}$	-20	
Emitter-Base Voltage	$V_{EBO}$	-7	
Peak Pulse Current	$I_{CM}$	-6	A
Continuous Collector Current	(Notes 4 and 7)	-3.5	
	(Notes 5 and 7)	-3.9	
Base Current	$I_B$	-1	

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

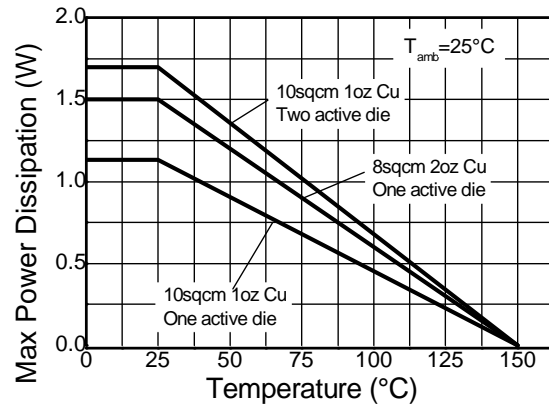
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	$P_D$	1.5	W mW/°C
		12	
		2.45	
		19.6	
		1.13	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	8	°C/W
		1.7	
		13.6	
		83.3	
		51.0	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	111	°C/W
		73.5	
		17.1	
Operating 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<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.
  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<sup>2</sup>) 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).

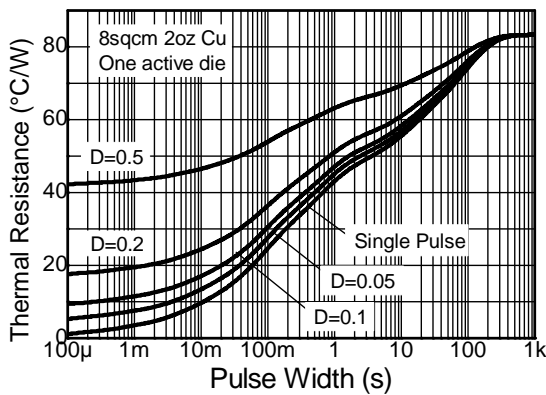
**PNP - Thermal Characteristics**



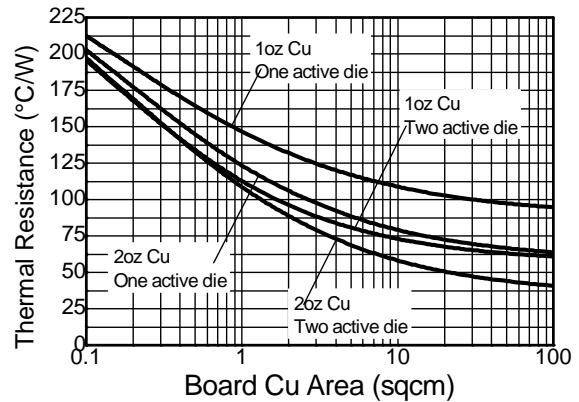
**Safe Operating Area**



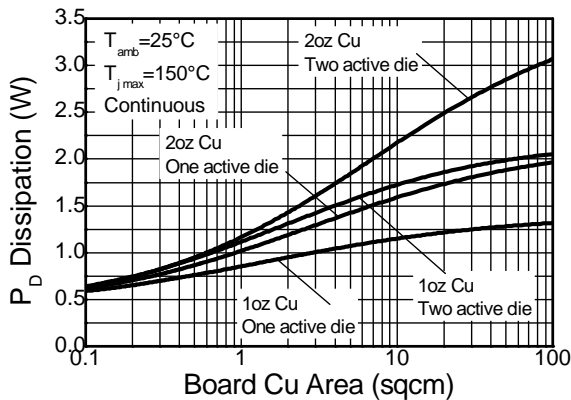
**Derating Curve**



**Transient Thermal Impedance**



**Thermal Resistance v Board Area**



**Power Dissipation v Board Area**

**Schottky - Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

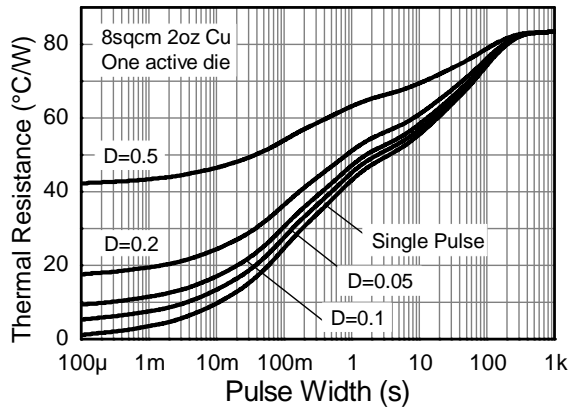
Parameter	Symbol	Limit	Unit
Continuous Reverse Voltage	$V_R$	40	V
Continuous Forward Current	$I_F$	1.85	A
Repetitive Peak Forward Current	$I_{FRM}$	3	
Non-Repetitive Peak Forward Surge Current		$t \leq 100\mu\text{s}$	
	$t \leq 10\text{ms}$	7	

**Schottky - Thermal Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

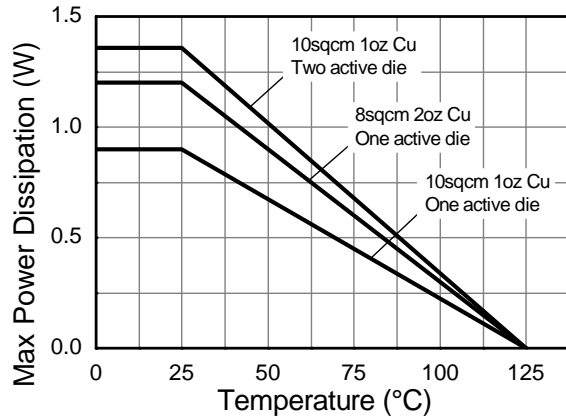
Characteristic	Symbol	Value	Unit	
Power Dissipation Linear Derating Factor	$P_D$	1.2	W mW/ $^\circ\text{C}$	
		12		
		2		
		20		
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	0.9	$^\circ\text{C/W}$	
		9		
		1.36		
		13.6		
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	83.3	$^\circ\text{C/W}$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

- Notes:
10. 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.
  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<sup>2</sup>) 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).

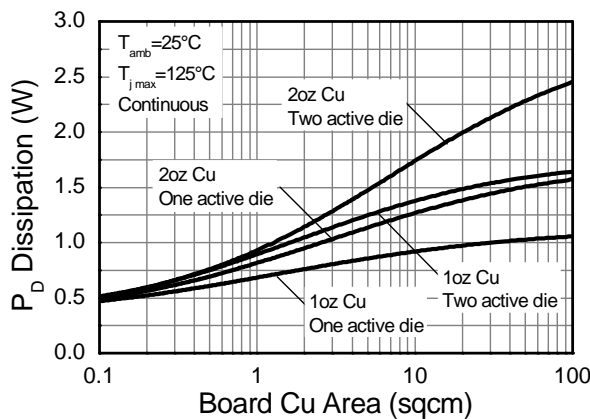
**Schottky - Thermal Characteristics**



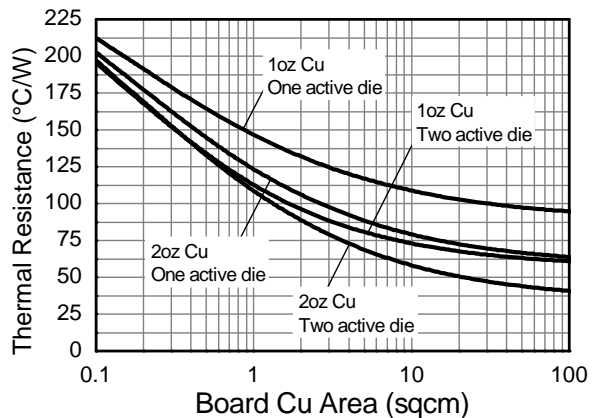
**Transient Thermal Impedance**



**Derating Curve**



**Power Dissipation v Board Area**



**Thermal Resistance v Board Area**

**PNP - Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

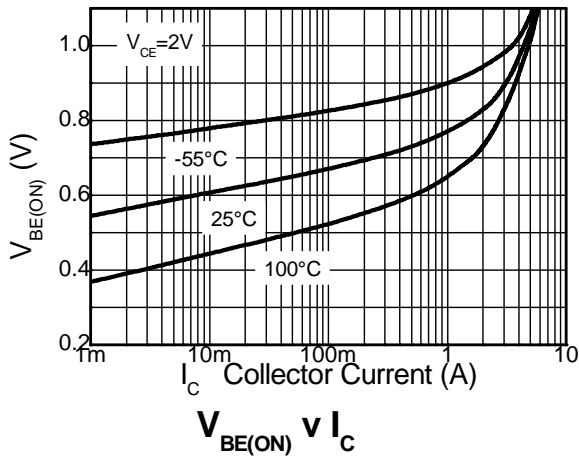
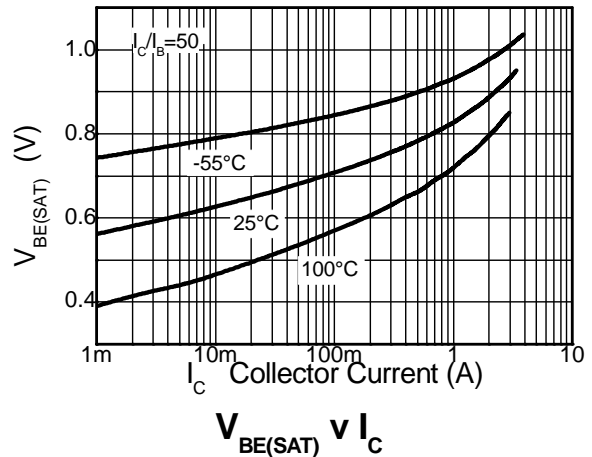
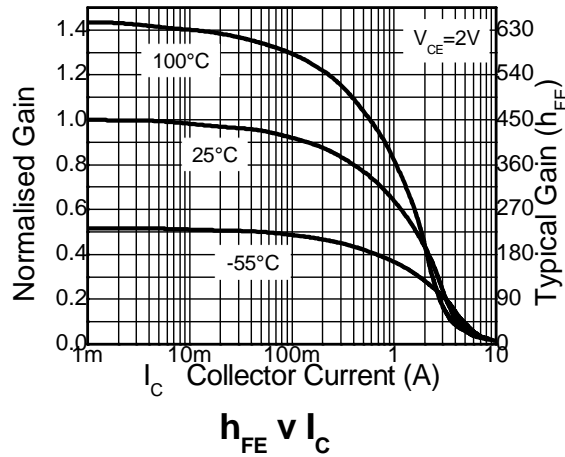
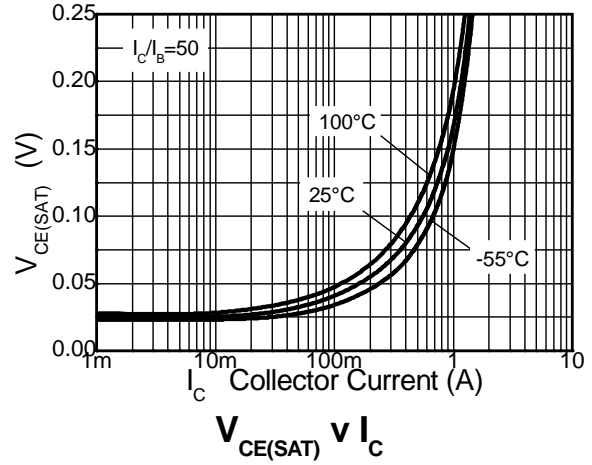
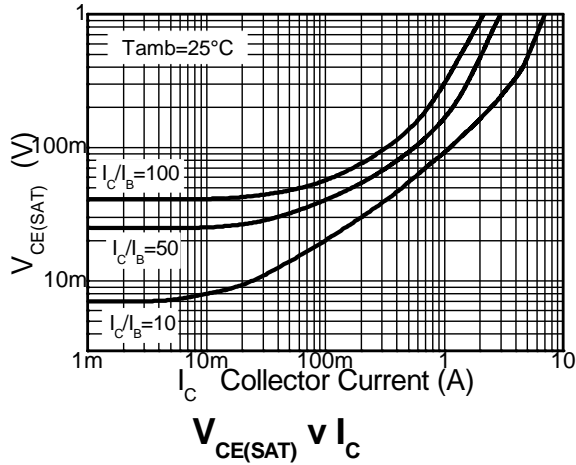
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-25	-35	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 16)	$BV_{CEO}$	-20	-25	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7	-8.5	-	V	$I_E = -100\mu\text{A}$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

**Schottky - Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

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

Notes: 16. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**PNP - Typical Electrical Characteristics**



**Schottky - Typical Electrical Characteristics**





**ZXTPS718MC**

**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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