



**ZXTD618MC**

**DUAL 20V NPN LOW SATURATION SWITCHING TRANSISTOR**

**Features and Benefits**

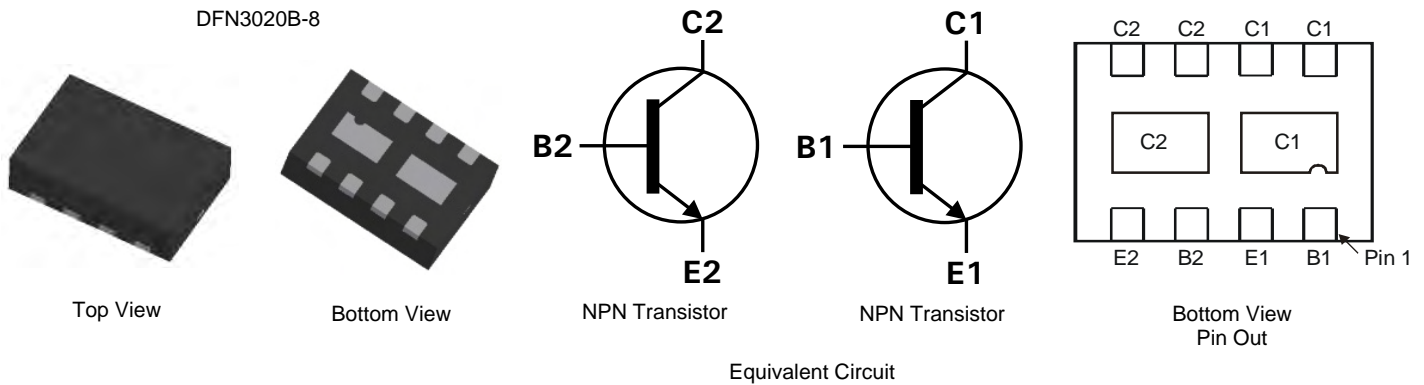
- $BV_{CEO} > 20V$
- $I_C = 4.5A$  Continuous Collector Current
- Low Saturation Voltage (150mV @ 1A)
- $R_{SAT} = 47m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  specified up to 6A for high current gain hold up
- Dual NPN saving footprint and component count
- Low profile 0.8mm high package 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-3
- Case material: Molded Plastic. "Green" Molding Compound.
- Terminals: Pre-Plated NiPdAu leadframe.
- UL Flammability Rating 94V-0
- Nominal package height: 0.8mm
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.013 grams (approximate)

**Applications**

- DC-DC Converters
- Charging circuits
- Motor control
- Power switches
- Portable applications



**Ordering Information (Note 3)**

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTD618MCTA	DBB	7	8	3,000

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

**Marking Information**



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

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

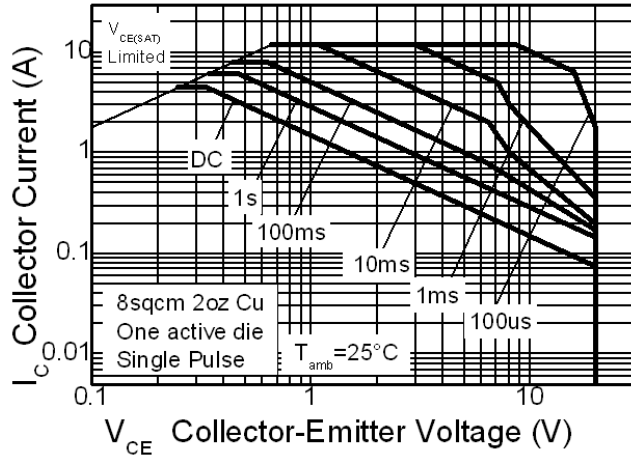
Parameter	Symbol	Limit	Unit
Collector-Base Voltage	$V_{CBO}$	40	V
Collector-Emitter Voltage	$V_{CEO}$	20	
Emitter-Base Voltage	$V_{EBO}$	7	
Peak Pulse Current	$I_{CM}$	12	A
Continuous Collector Current (Notes 4 and 7)	$I_C$	4.5	
Continuous Collector Current (Notes 5 and 7)	$I_C$	5	
Base Current	$I_B$	1	

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

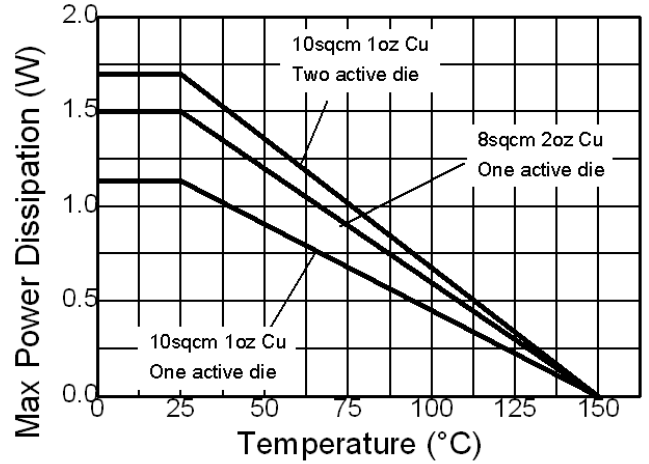
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	$P_D$	1.5	W mW/ $^\circ\text{C}$
		12	
		2.45	
		19.6	
		1.13	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	8	$^\circ\text{C/W}$
		1.7	
		13.6	
		83.3	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	51.0	$^\circ\text{C/W}$
		111	
		73.5	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- 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 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 (at the end of the collector lead).

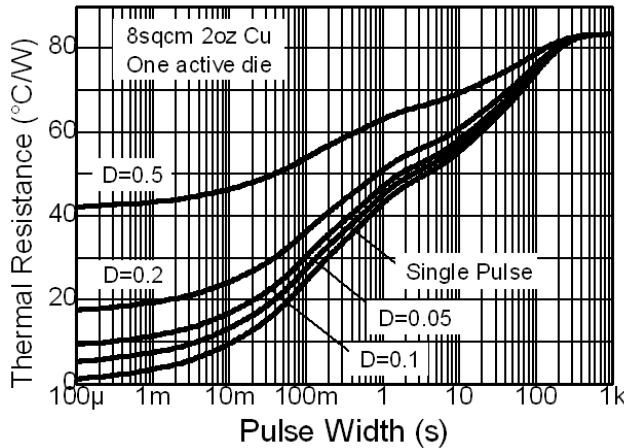
**Thermal Characteristics**



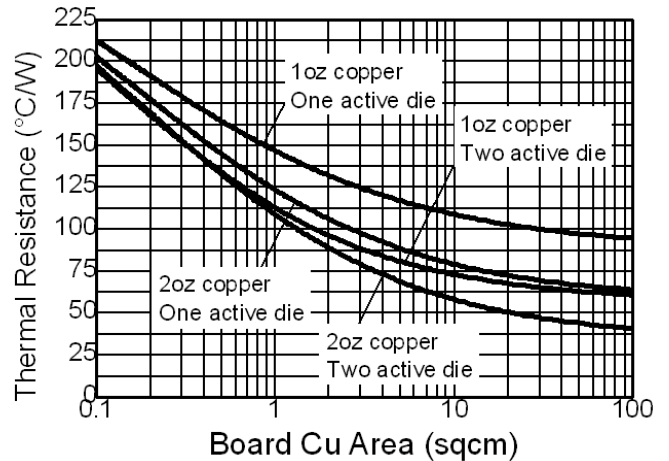
**Safe Operating Area**



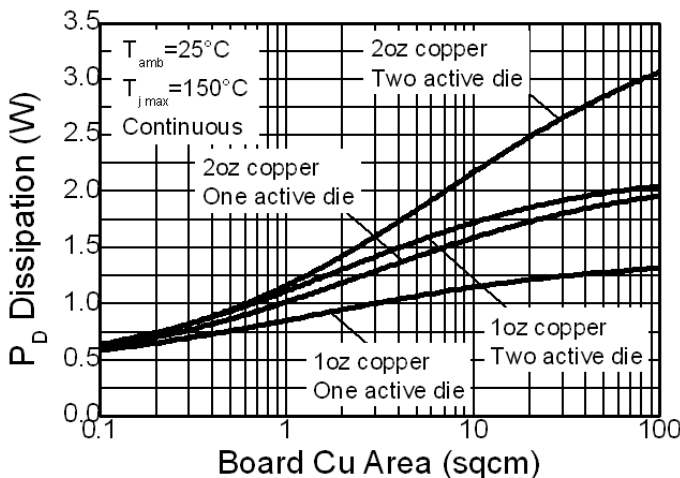
**Derating Curve**



**Transient Thermal Impedance**



**Thermal Resistance v Board Area**



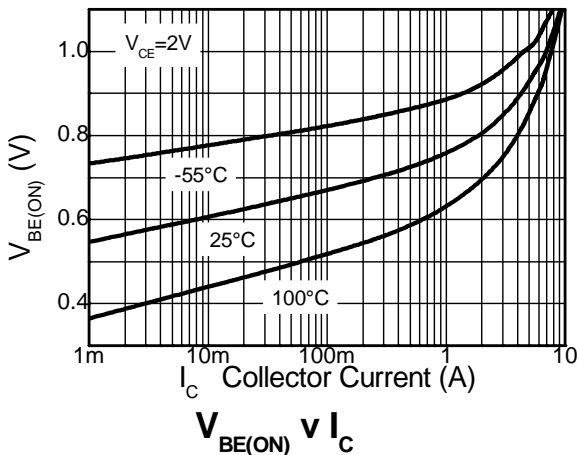
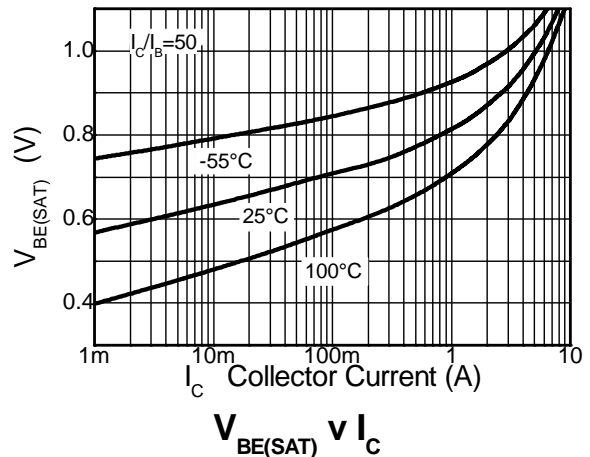
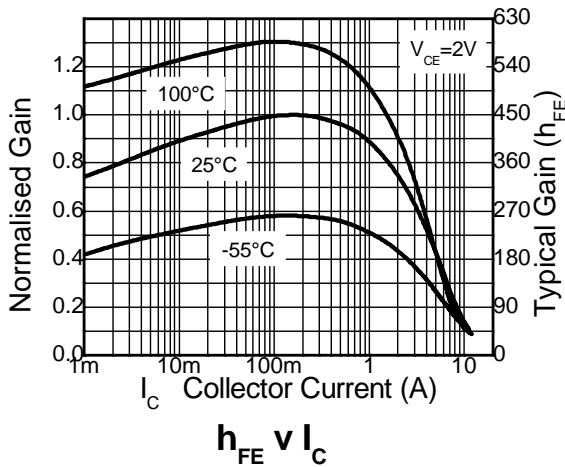
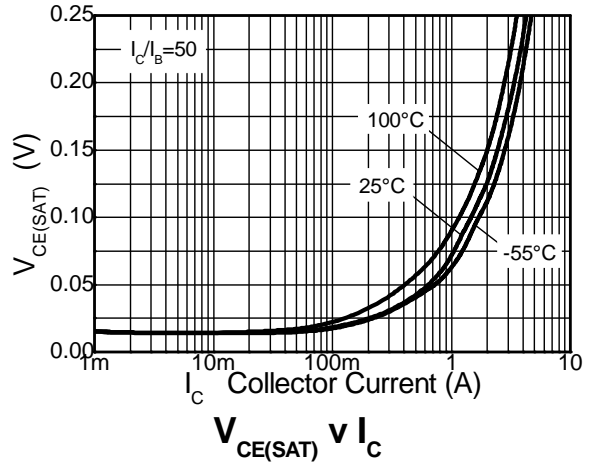
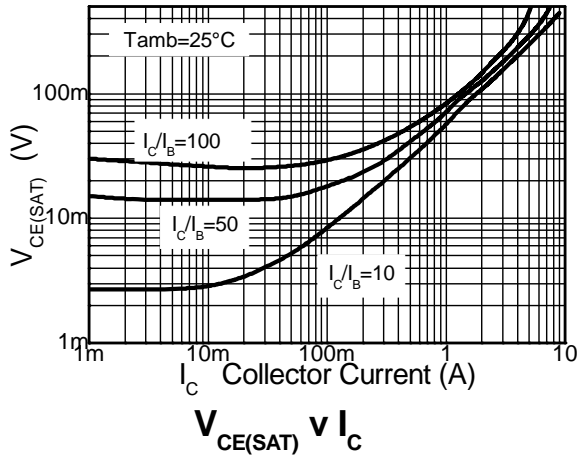
**Power Dissipation v Board Area**

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

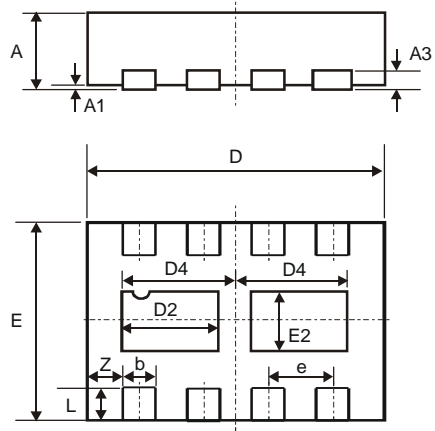
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	40	100	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	20	27	-	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7.0	8.2	-	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	-	100	nA	V <sub>CB</sub> = 30V
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> = 16V
Static Forward Current Transfer Ratio (Note 10)	h <sub>FE</sub>	200	400	-	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
		300	450	-		I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V
		200	360	-		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
		100	180	-		I <sub>C</sub> = 6A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	-	8	15	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 10mA
		-	90	150		I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
		-	115	135		I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA
		-	190	250		I <sub>C</sub> = 3A, I <sub>B</sub> = 100mA
		-	210	300		I <sub>C</sub> = 4.5A, I <sub>B</sub> = 125mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>	-	0.88	0.97	V	I <sub>C</sub> = 4.5A, V <sub>CE</sub> = 2V
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	-	0.98	1.07	V	I <sub>C</sub> = 4.5A, I <sub>B</sub> = 125mA
Output Capacitance	C <sub>obo</sub>	-	23	30	pF	V <sub>CB</sub> = 10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	100	140	-	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA, f = 100MHz
Turn-on Time	t <sub>on</sub>	-	170	-	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 3A
Turn-off Time	t <sub>off</sub>	-	400	-	ns	I <sub>B1</sub> = I <sub>B2</sub> = 10mA

Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%

**Typical Electrical Characteristics**

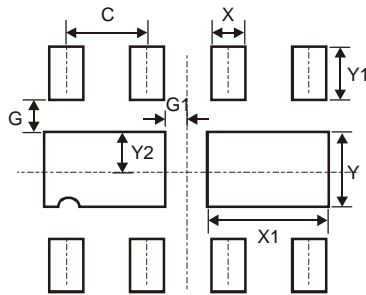


**Package Outline Dimensions**



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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