Lead-free Green

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} = 47mΩ 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^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

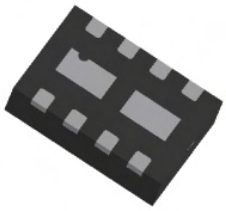
- Case: DFN3020B-3
- Case material: Molded Plastic. "Green" Molding Compound.
- Terminals: Pre-Plated NiPdAu leadframe.
- UL Flammability Rating 94V-0
- Nominal package height: 0.8mm
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.013 grams (approximate)

Applications

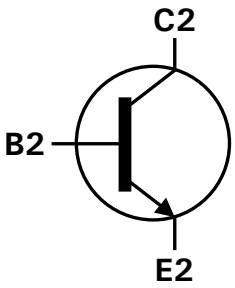
- DC-DC Converters
- Charging circuits
- Motor control
- Power switches
- Portable applications

DFN3020B-8

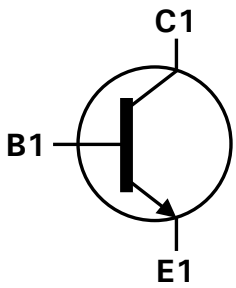
Top View



Bottom View

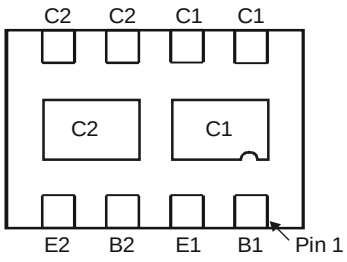


NPN Transistor



NPN Transistor

Equivalent Circuit



Bottom View
Pin Out

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°C unless otherwise specified

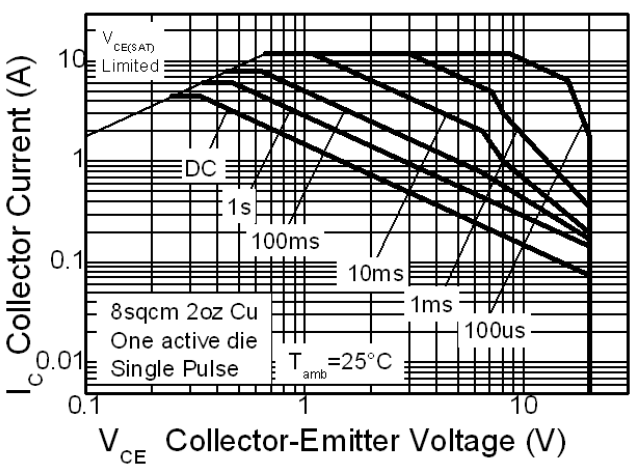
Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	20	
Emitter-Base Voltage	V_{EBO}	7	
Peak Pulse Current	I_{CM}	12	A
Continuous Collector Current (Notes 4 and 7)	I_C	4.5	
Continuous Collector Current (Notes 5 and 7)	I_C	5	
Base Current	I_B	1	

Thermal Characteristics @ T_A = 25°C unless otherwise specified

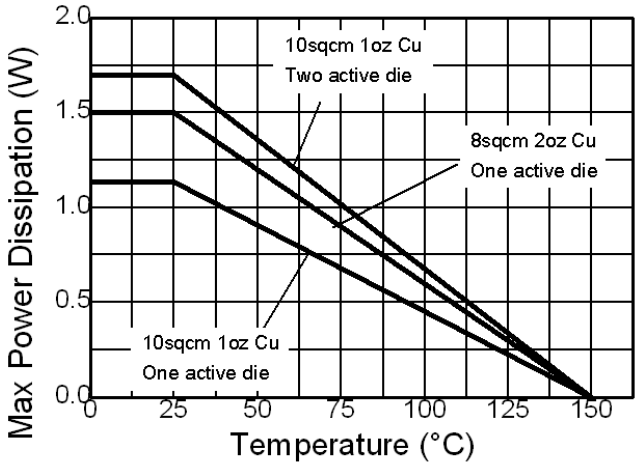
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 4 & 7)	P_D	1.5 12	W mW/°C
	(Notes 5 & 7)		2.45 19.6	
	(Notes 6 & 7)		1.13 8	
	(Notes 6 & 8)		1.7 13.6	
Thermal Resistance, Junction to Ambient	(Notes 4 & 7)	$R_{\theta JA}$	83.3	°C/W
	(Notes 5 & 7)		51.0	
	(Notes 6 & 7)		111	
	(Notes 6 & 8)		73.5	
Thermal Resistance, Junction to Lead	(Notes 7 & 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 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 (at the end of the collector lead).

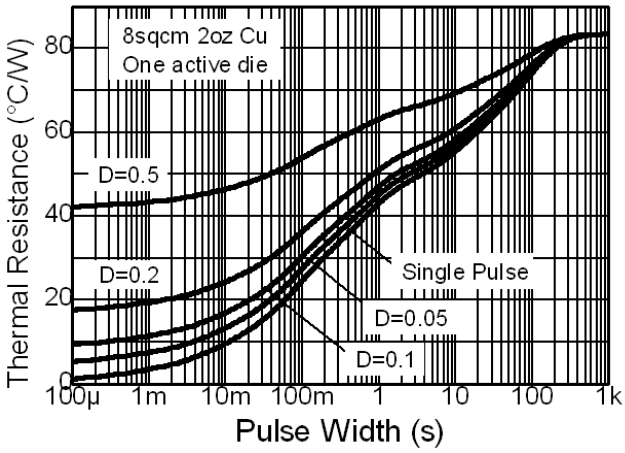
Thermal Characteristics



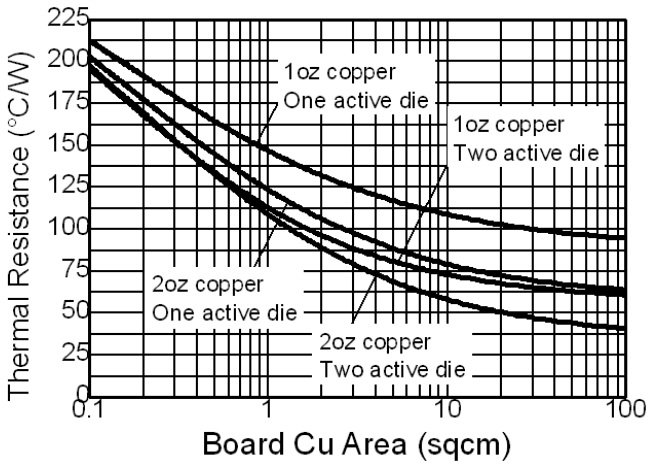
Safe Operating Area



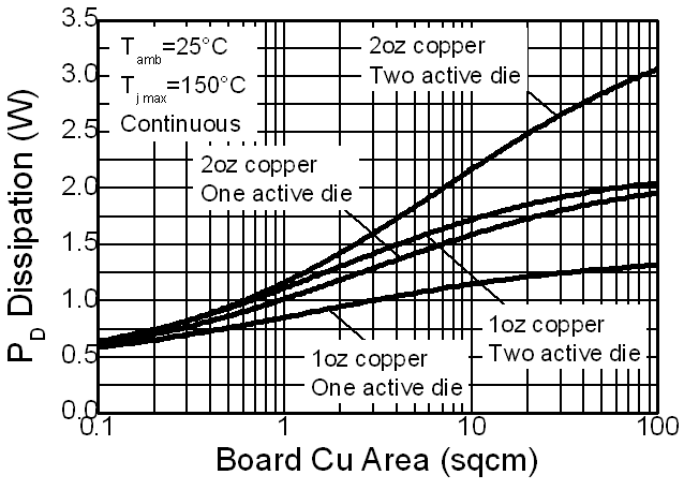
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



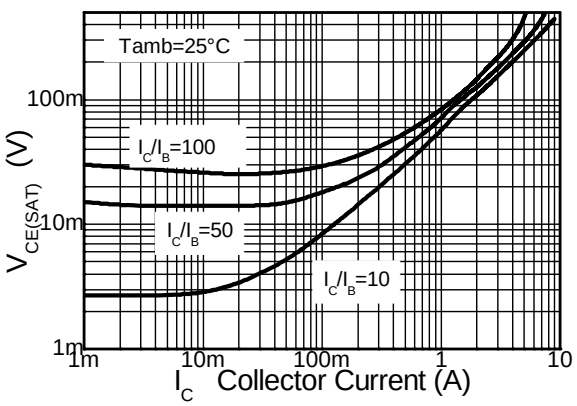
Power Dissipation v Board Area

Electrical Characteristics @T_A = 25°C unless otherwise specified

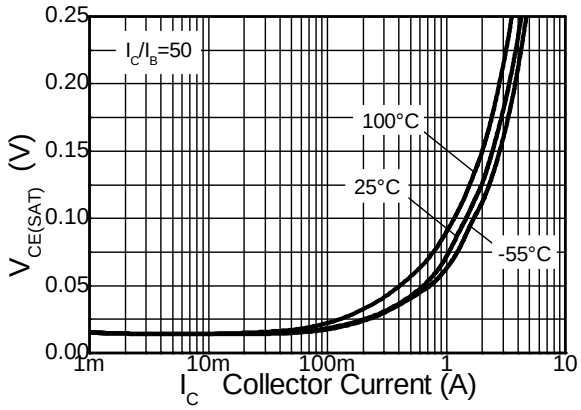
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	40	100	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	20	27	-	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7.0	8.2	-	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	-	-	100	nA	V_{CB} = 30V
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 10)	h_{FE}	200 300 200 100	400 450 360 180	- - - -	-	I_C = 10mA, V_{CE} = 2V I_C = 200mA, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 6A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	- - - - -	8 90 115 190 210	15 150 135 250 300	mV	I_C = 0.1A, I_B = 10mA I_C = 1A, I_B = 10mA I_C = 2A, I_B = 50mA I_C = 3A, I_B = 100mA I_C = 4.5A, I_B = 125mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	-	0.88	0.97	V	I_C = 4.5A, V_{CE} = 2V
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	-	0.98	1.07	V	I_C = 4.5A, I_B = 125mA
Output Capacitance	C_{obo}	-	23	30	pF	V_{CB} = 10V. f = 1MHz
Transition Frequency	f_T	100	140	-	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Turn-on Time	t_{on}	-	170	-	ns	V_{CC} = 10V, I_C = 3A
Turn-off Time	t_{off}	-	400	-	ns	I_{B1} = I_{B2} = 10mA

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

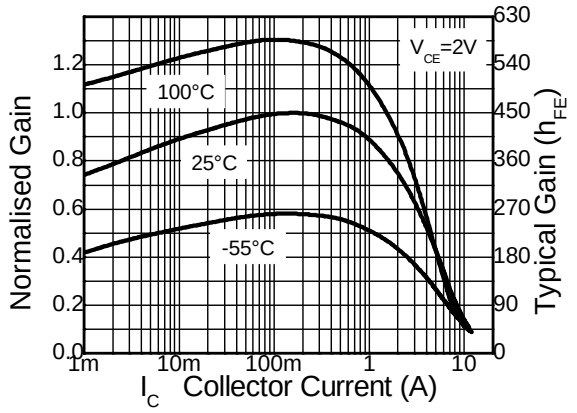
Typical Electrical Characteristics



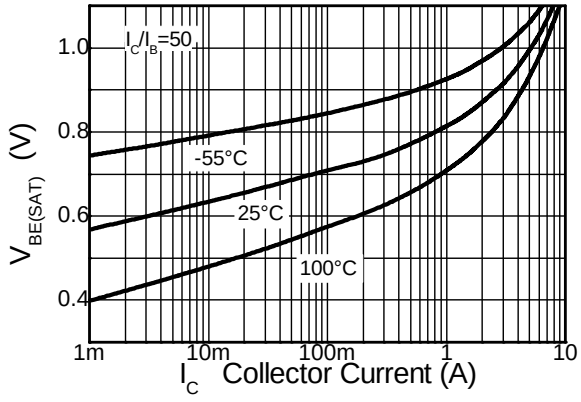
$V_{CE(SAT)}$ v I_C



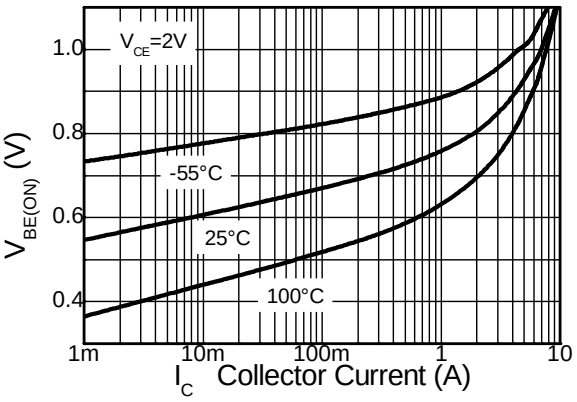
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

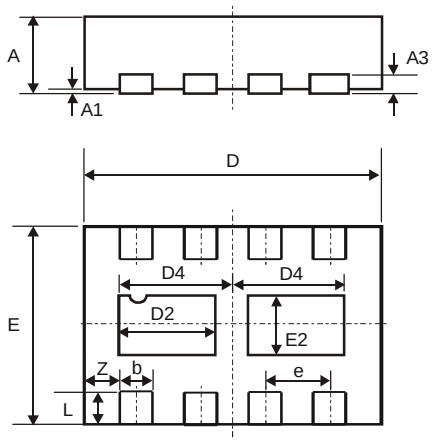


$V_{BE(SAT)}$ v I_C



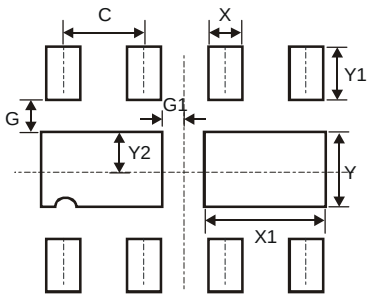
$V_{BE(ON)}$ v I_C

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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