ZXTN620MA

80V NPN LOW SATURATION TRANSISTOR

Features and Benefits

- BV_{CEO} > 80V
- I_C = 3.5A Continuous Collector Current
- Low Saturation Voltage (185mV max @ 1A)
- R_{SAT} = 68 mΩ for a low equivalent On-Resistance
- h_{FE} specified up to 5A for high current gain hold up
- Low profile 0.6mm high package for thin applications
- $R_{\theta JA}$ efficient, 60% lower than SOT23
- 4mm^2 footprint, 50% smaller than SOT23
- **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: DFN2020B-3
- Case Material: Molded Plastic. “Green” Molding Compound.
- Terminals: Pre-Plated NiPdAu leadframe.
- Nominal Package Height: 0.6mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.01 grams (approximate)

Applications

- MOSFET Gate Driving
- DC–DC Converters
- Charging circuits
- Motor Control
- Power switches

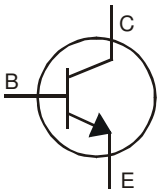
DFN2020B-3



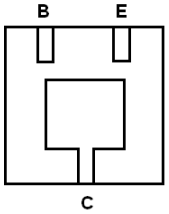
Top View



Bottom View



Device Symbol



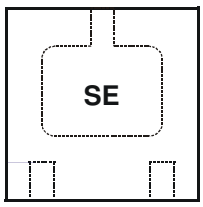
Bottom View
Pin-Out

Ordering Information

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN620MATA	SE	7	8	3000

Notes: 1. No purposefully added lead.
2. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com

Marking Information



Top View

SE = Product Type Marking code

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Maximum Ratings @T_A = 25°C unless otherwise specified

Parameter		Symbol	Limit	Unit
Collector-Base Voltage		V_{CBO}	100	V
Collector-Emitter Voltage		V_{CEO}	80	
Emitter-Base Voltage		V_{EBO}	7	
Peak Pulse Current		I_{CM}	5	A
Continuous Collector Current	(Note 3)	I_C	3.5	
	(Note 4)		3.8	
Base Current		I_B	1	

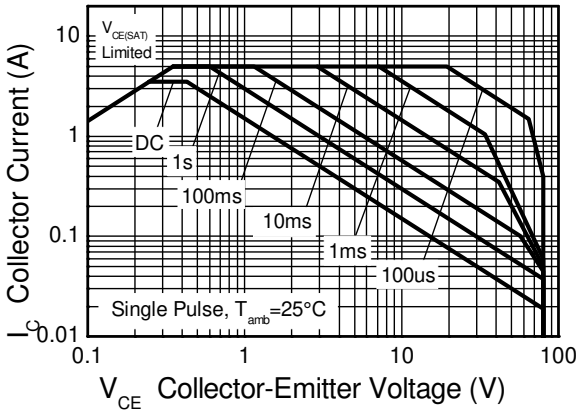
Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 3)	P_D	1.5	W
Linear Derating Factor			12	mW/°C
	(Note 4)		2.45	W
			19.6	mW/°C
Thermal Resistance, Junction to Ambient	(Note 3)	$R_{\theta JA}$	83	°C/W
	(Note 4)		51	
Thermal Resistance, Junction to Lead	(Note 5)	$R_{\theta JL}$	16.8	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

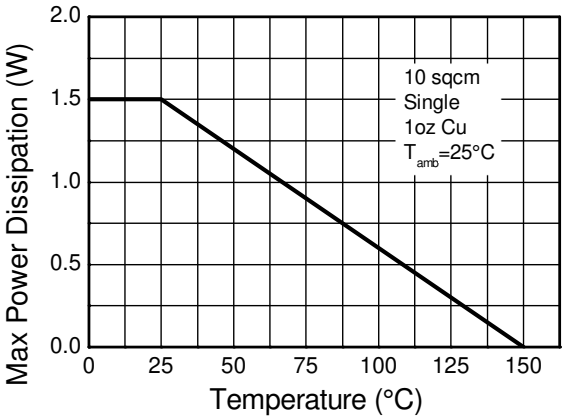
Notes:
3. For a device surface mounted on 31mm x 31mm (10cm^2) FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The entire exposed collector pad is attached to the heatsink.
4. Same as note (3), except the device is measured at t ≤ 5 sec.
5. For a single device, thermal resistance from junction to solder-point (at the end of the drain lead).

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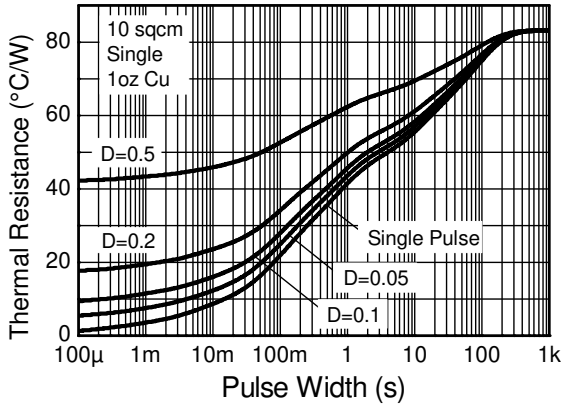
Thermal Characteristics



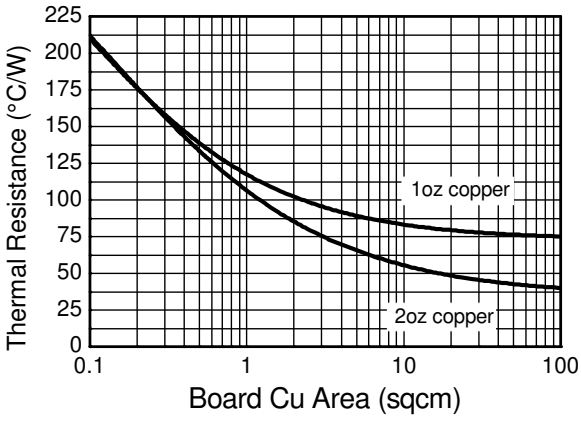
Safe Operating Area



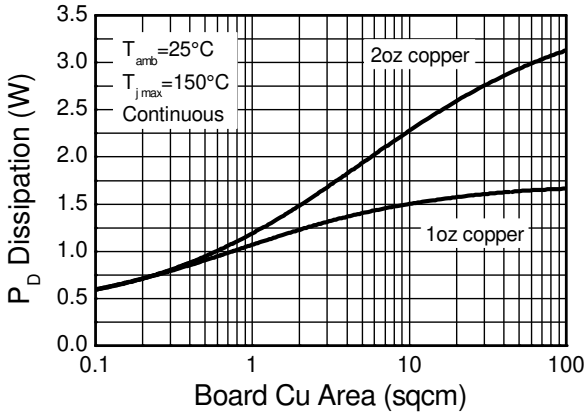
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



Power Dissipation v Board Area

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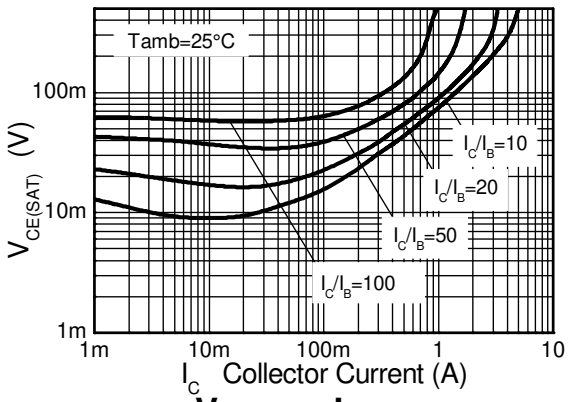
Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	100	180	-	V	I_C = 100 µA
Collector-Emitter Breakdown Voltage (Note 6)	BV_{CEO}	80	110	-	V	I_C = 10 mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.2	-	V	I_E = 100 µA
Collector Cutoff Current	I_{CBO}	-	-	100	nA	V_{CB} = 80V
Emitter Cutoff Current	I_{EBO}	-	-	100	nA	V_{EB} = 6V
Collector Emitter Cutoff Current	I_{CES}	-	-	100	nA	V_{CE} = 65V
Static Forward Current Transfer Ratio (Note 6)	h_{FE}	200 300 110 60 20 -	450 450 170 90 30 10	- 900 - - - -	-	I_C = 10mA, V_{CE} = 2V I_C = 200mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 1.5A, V_{CE} = 2V I_C = 3A, V_{CE} = 2V I_C = 5A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 6)	$V_{CE(sat)}$	- - - - -	15 45 145 160 240	20 60 185 200 340	mV	I_C = 0.1A, I_B = 10mA I_C = 0.5A, I_B = 50mA I_C = 1A, I_B = 20mA I_C = 1.5A, I_B = 50mA I_C = 3.5A, I_B = 300mA
Base-Emitter Turn-On Voltage (Note 6)	$V_{BE(on)}$	-	0.96	1.05	V	I_C = 3.5A, V_{CE} = 2V
Base-Emitter Saturation Voltage (Note 6)	$V_{BE(sat)}$	-	1.09	1.175	V	I_C = 3.5A, I_B = 300mA
Output Capacitance	C_{obo}	-	11.5	18	pF	V_{CB} = 10V. f = 1MHz
Transition Frequency	f_T	100	160	-	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Turn-On Time	t_{on}	-	86	-	ns	V_{CC} = 10V, I_C = 1A
Turn-Off Time	t_{off}	-	1128	-	ns	I_{B1} = I_{B2} = 25mA

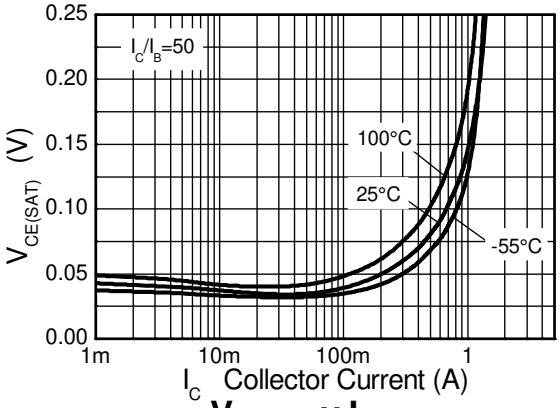
Notes: 6. Measured under pulsed conditions. Pulse width ≤ 300 µs. Duty cycle ≤ 2%.

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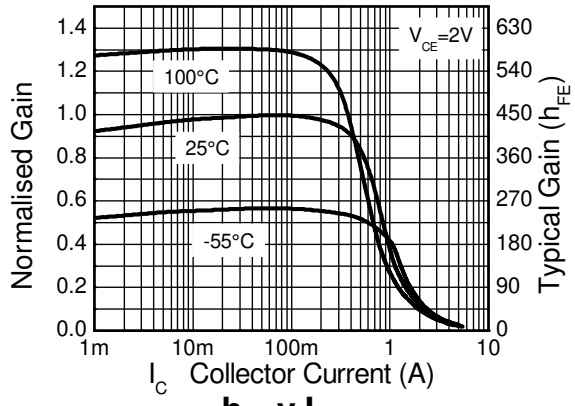
Typical Electrical Characteristics



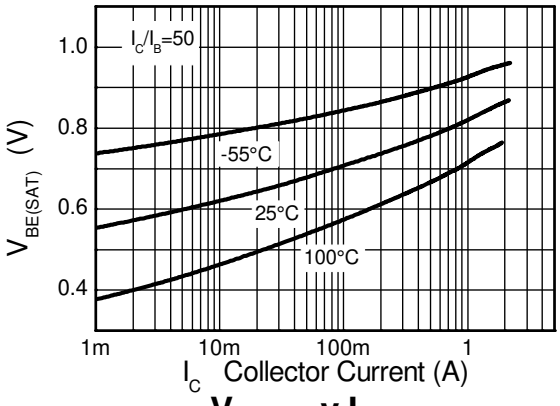
$V_{CE(SAT)}$ v I_C



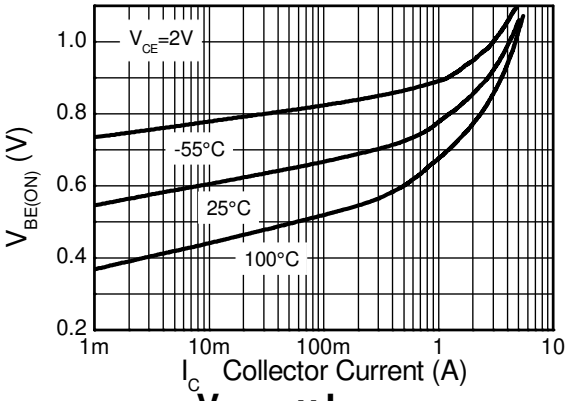
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



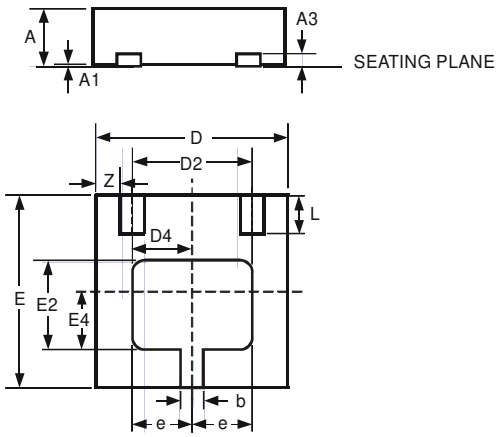
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

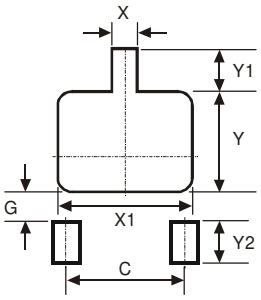
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Package Outline Dimensions



DFN2020B-3			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0	0.05	0.02
A3	—	—	0.152
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	1.22	1.42	1.32
D4	0.56	0.76	0.66
e	—	—	0.65
E	1.95	2.075	2.00
E2	0.79	0.99	0.89
E4	0.48	0.68	0.58
L	0.25	0.35	0.30
Z	—	—	0.225
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	1.30
G	0.24
X	0.35
X1	1.52
Y	1.09
Y1	0.47
Y2	0.50

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