

80V NPN LOW SATURATION TRANSISTOR

Features and Benefits

- $BV_{CEO} > 80V$
- $I_C = 3.5A$ Continuous Collector Current
- Low Saturation Voltage (185mV max @ 1A)
- $R_{SAT} = 68\ m\Omega$ 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
- 4mm² 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**

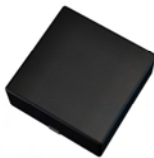
Mechanical Data

- 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)

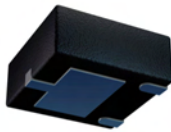
Applications

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

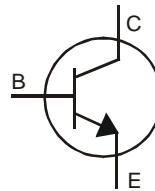
DFN2020B-3



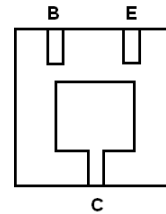
Top View



Bottom View



Device Symbol



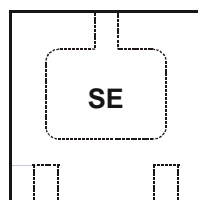
Bottom View
Pin-Out

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

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

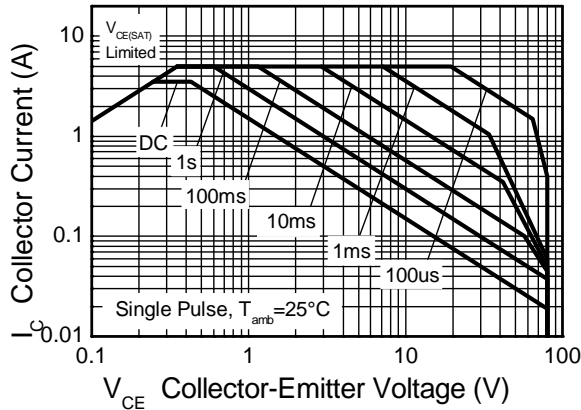
Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CB0}	100	V
Collector-Emitter Voltage	V_{CEO}	80	
Emitter-Base Voltage	V_{EBO}	7	
Peak Pulse Current	I_{CM}	5	A
Continuous Collector Current	(Note 3)	3.5	
	(Note 4)	3.8	
Base Current	I_B	1	

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

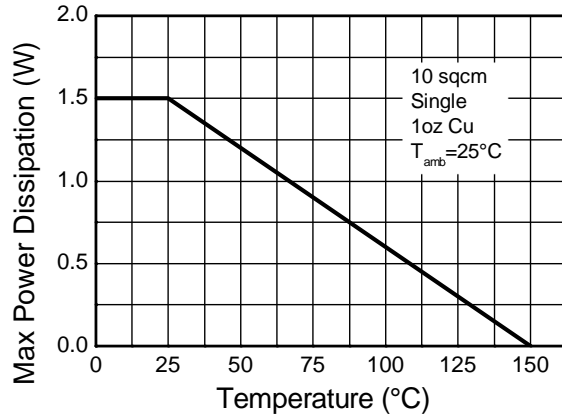
Characteristic	Symbol	Value	Unit	
Power Dissipation	P_D	1.5	W	
		12		
Linear Derating Factor		2.45		mW/°C
		19.6		
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	83	°C/W	
		51		
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	16.8		
Operating and Storage Temperature Range	T_J, T_{STG}	-55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

- Notes:
3. For a device surface mounted on 31mm x 31mm (10cm²) 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 $t \leq 5$ sec.
 5. For a single device, thermal resistance from junction to solder-point (at the end of the drain lead).

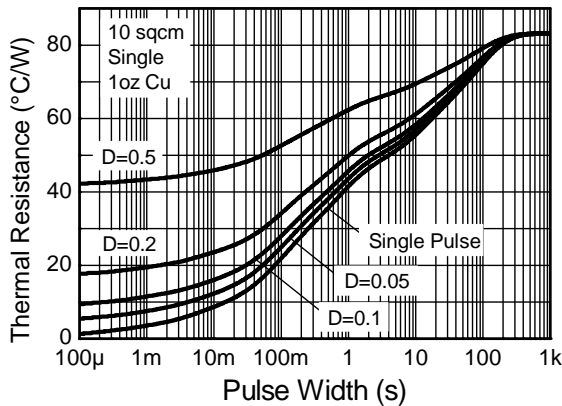
Thermal Characteristics



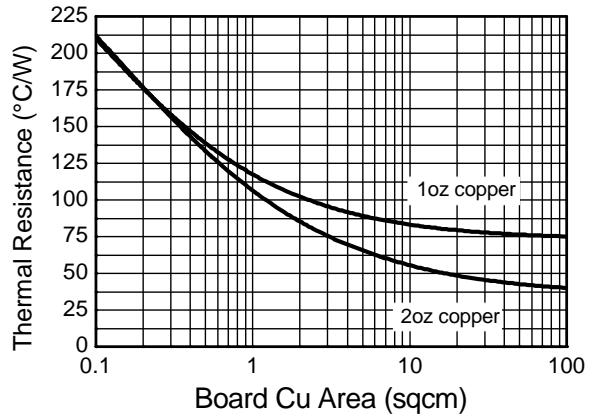
Safe Operating Area



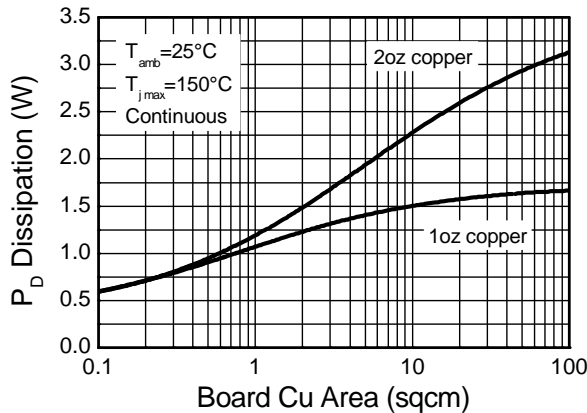
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



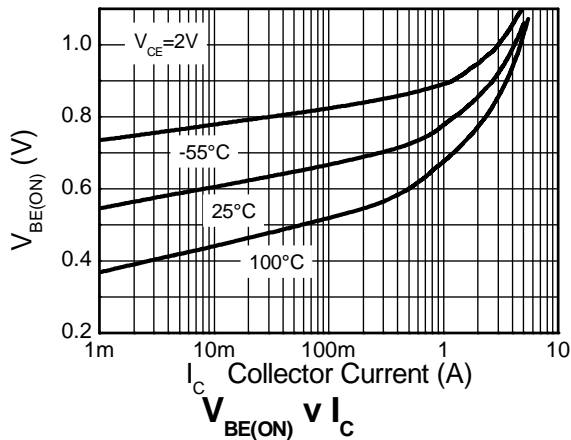
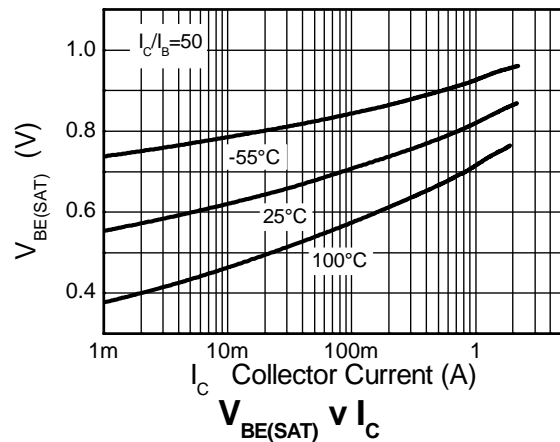
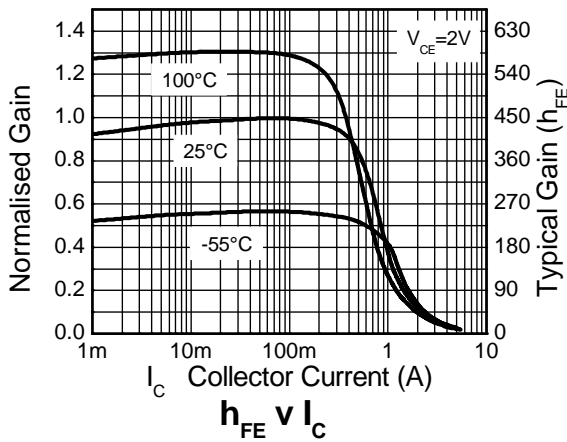
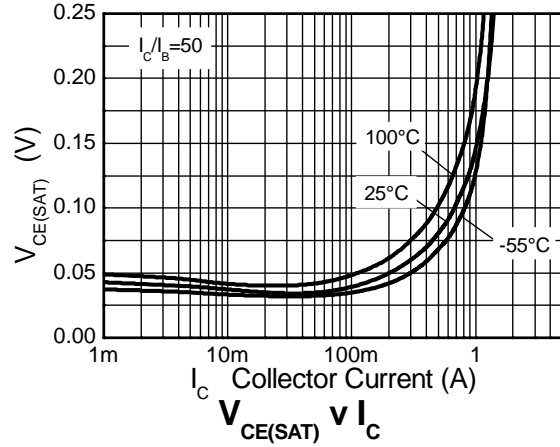
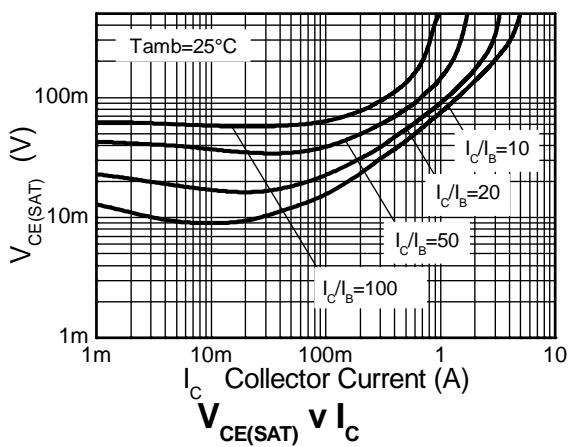
Power Dissipation v Board Area

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

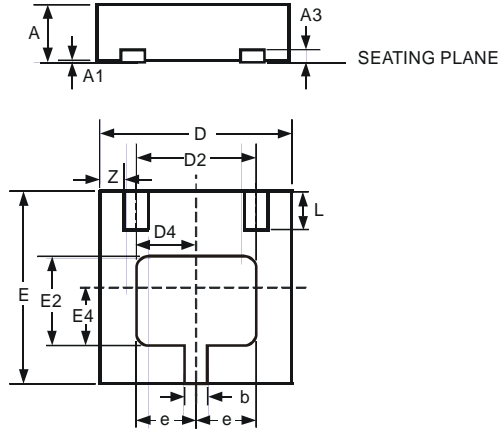
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	100	180	-	V	$I_C = 100 \mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 6)	BV_{CEO}	80	110	-	V	$I_C = 10 \text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.2	-	V	$I_E = 100 \mu\text{A}$
Collector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

Notes: 6. Measured under pulsed conditions. Pulse width $\leq 300 \mu\text{s}$. Duty cycle $\leq 2\%$.

Typical Electrical Characteristics

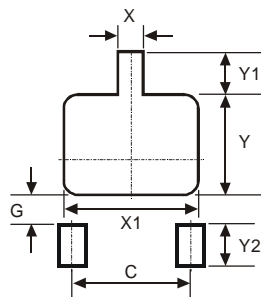


Package Outline Dimensions



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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