

20V NPN LOW SATURATION TRANSISTOR

Features and Benefits

- $BV_{CEO} > 20V$
- $I_C = 4.5A$ Continuous Collector Current
- Low Saturation Voltage (150mV max @ 1A)
- $R_{SAT} = 47 m\Omega$ for a low equivalent On-Resistance
- h_{FE} specified up to 6A 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**

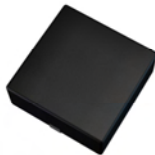
Mechanical Data

- 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)

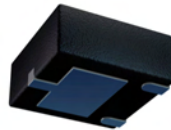
Applications

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

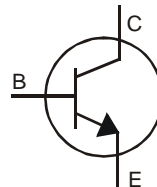
DFN2020B-3



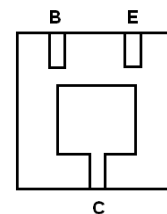
Top View



Bottom View



Device Symbol



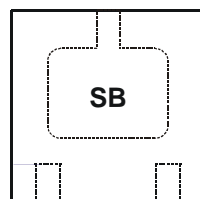
Bottom View
Pin-Out

Ordering Information

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN618MATA	SB	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

SB = Product Type Marking code

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

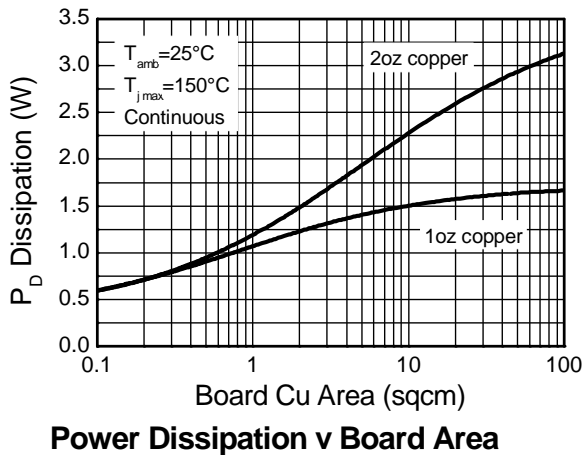
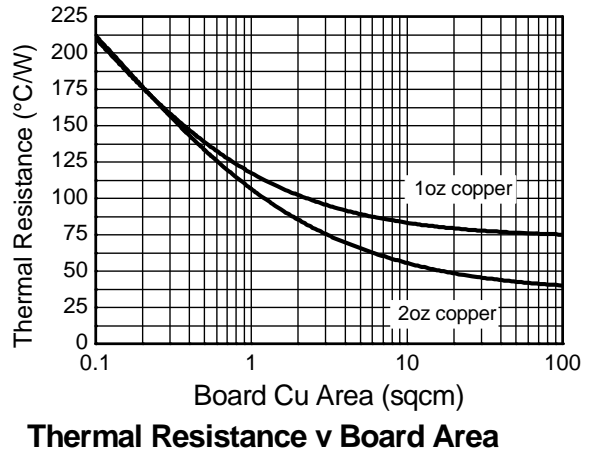
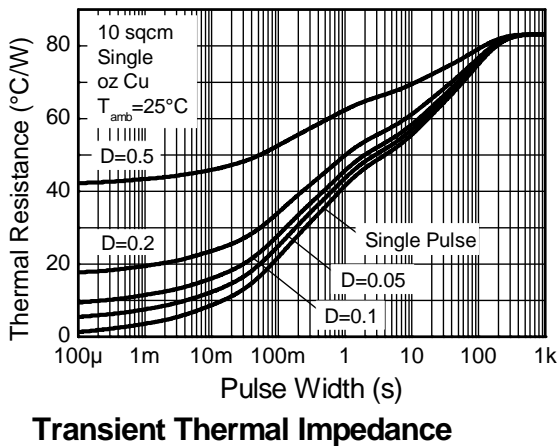
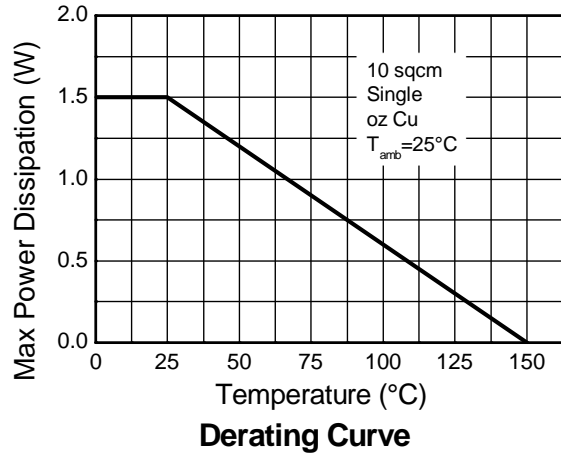
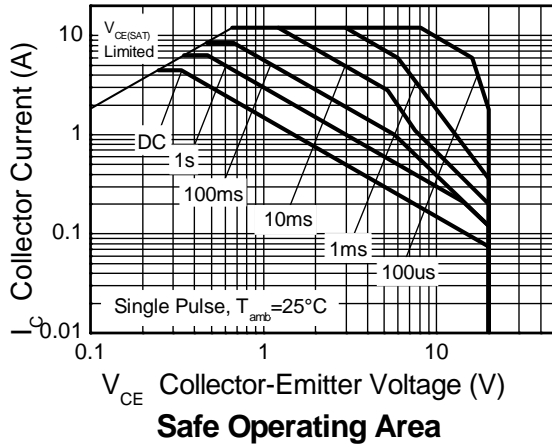
Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CB0}	40	V
Collector-Emitter Voltage	V_{CE0}	20	
Emitter-Base Voltage	V_{EBO}	7	
Peak Pulse Current	I_{CM}	12	A
Continuous Collector Current	(Note 3)	4.5	
	(Note 4)	5	
Base Current	I_B	1	

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
		12	
		2.45	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	19.6	$^\circ\text{C/W}$
		83	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	51	$^\circ\text{C/W}$
		16.8	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- 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

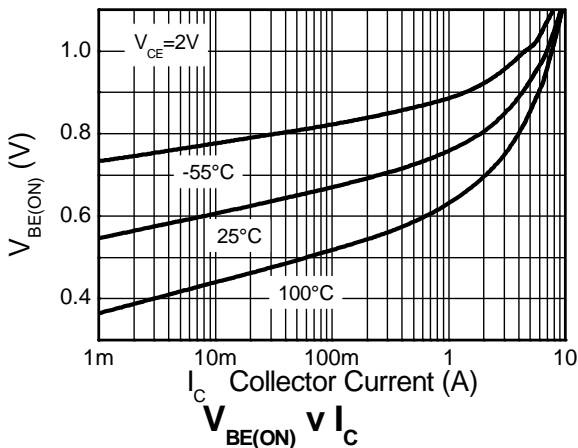
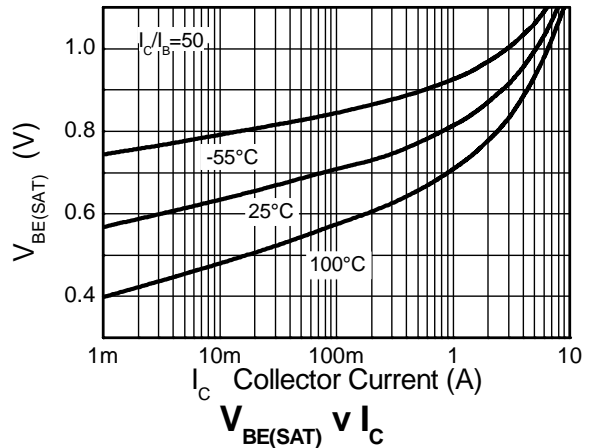
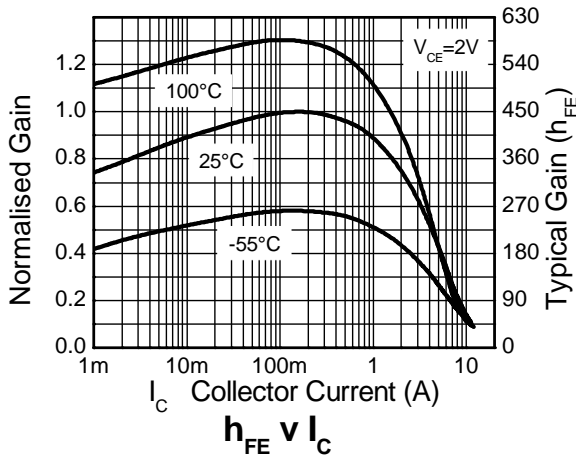
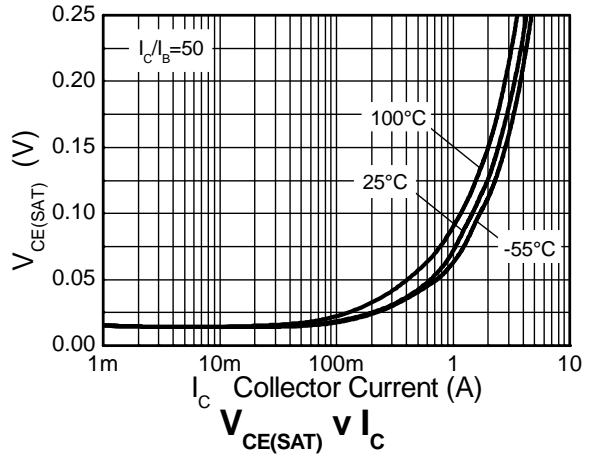
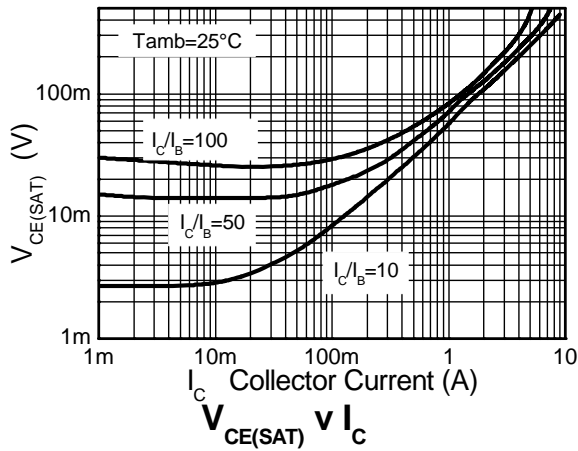


Electrical Characteristics @T_A = 25°C unless otherwise specified

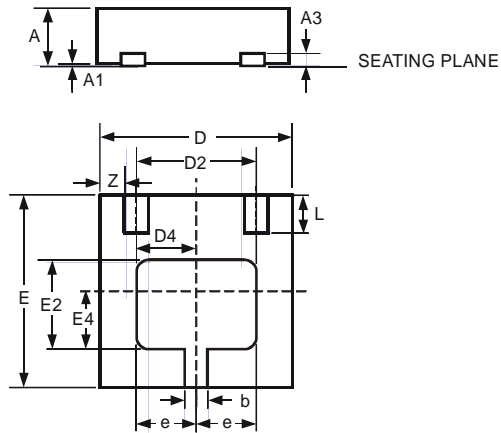
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	40	100	-	V	I _C = 100 μA
Collector-Emitter Breakdown Voltage (Note 6)	BV _{CEO}	20	27	-	V	I _C = 10 mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	8.2	-	V	I _E = 100 μA
Collector Cutoff Current	I _{CBO}	-	-	100	nA	V _{CB} = 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 6)	h _{FE}	200	400	-	-	I _C = 10mA, V _{CE} = 2V
		300	450	-		I _C = 200mA, V _{CE} = 2V
		200	360	-		I _C = 2A, V _{CE} = 2V
		100	180	-		I _C = 6A, V _{CE} = 2V
Collector-Emitter Saturation Voltage (Note 6)	V _{CE(sat)}	-	8	15	mV	I _C = 0.1A, I _B = 10mA
		-	90	150		I _C = 1A, I _B = 10mA
		-	115	135		I _C = 2A, I _B = 50mA
		-	190	250		I _C = 3A, I _B = 100mA
		-	210	300		I _C = 4.5A, I _B = 125mA
Base-Emitter Turn-On Voltage (Note 6)	V _{BE(on)}	-	0.88	0.97	V	I _C = 4.5A, V _{CE} = 2V
Base-Emitter Saturation Voltage (Note 6)	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: 6. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics

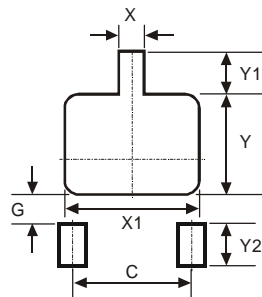


Package Outline Dimensions



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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