

**15V NPN LOW SATURATION TRANSISTOR**

**Features and Benefits**

- $BV_{CEO} > 15V$
- $I_C = 4.5A$  Continuous Collector Current
- Low Saturation Voltage (100mV max @ 1A)
- $R_{SAT} = 45 m\Omega$  for a low equivalent On-Resistance
- $h_{FE}$  specified up to 12A for high current gain hold up
- Low profile 0.6mm high package for thin applications
- $R_{\theta JA}$  efficient, 60% lower than SOT23
- 4mm<sup>2</sup> 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 switch

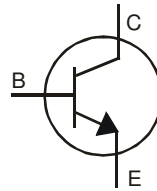
DFN2020B-3



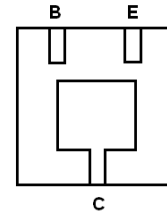
Top View



Bottom View



Device Symbol



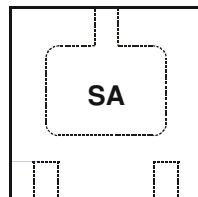
Bottom View  
Pin-Out

**Ordering Information**

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN617MATA	SA	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

SA = Product Type Marking code

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

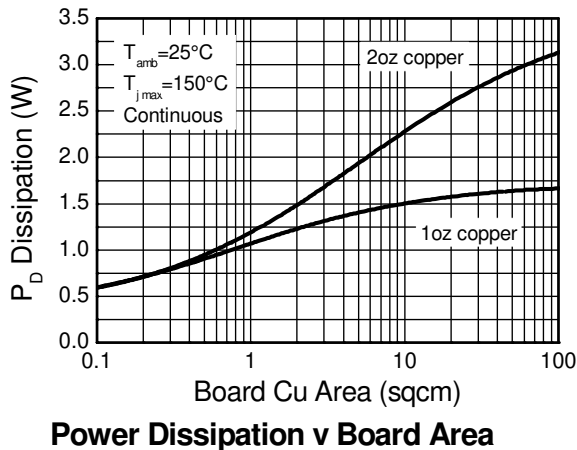
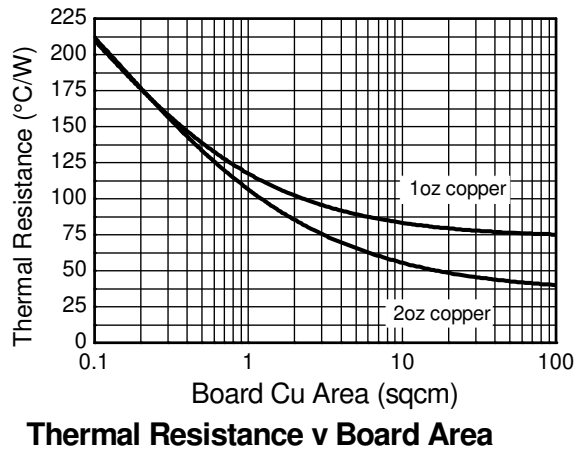
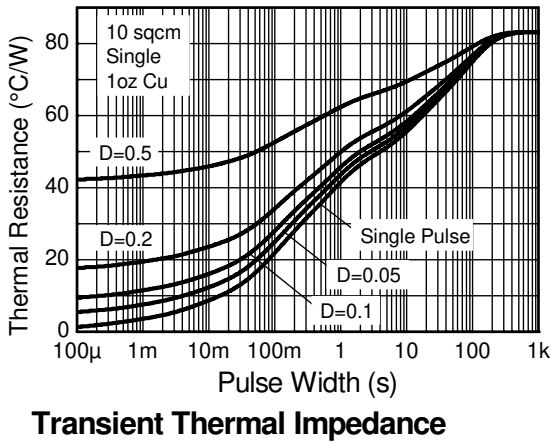
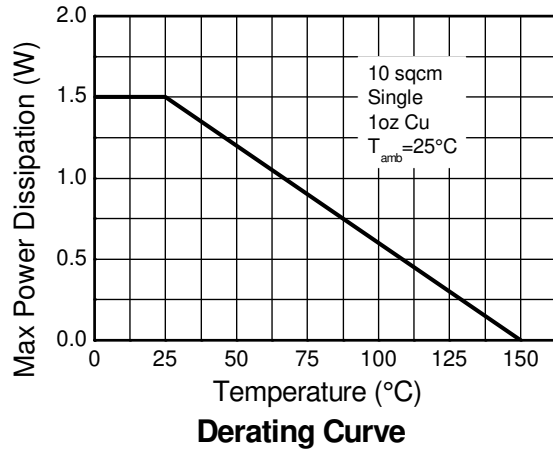
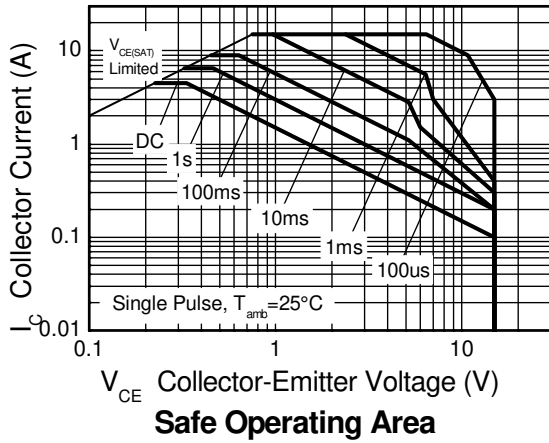
Characteristic		Symbol	Value	Unit
Collector-Base Voltage		$V_{CBO}$	40	V
Collector-Emitter Voltage		$V_{CEO}$	15	
Emitter-Base Voltage		$V_{EBO}$	7	
Peak Pulse Current		$I_{CM}$	15	A
Continuous Collector Current	(Note 3)	$I_C$	4.5	
	(Note 4)		5	
Base Current		$I_B$	1	

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 3)	$P_D$	1.5	W mW/ $^\circ\text{C}$
			12	
	(Note 4)		2.45 19.6	
Thermal Resistance, Junction to Ambient	(Note 3)	$R_{\theta JA}$	83	$^\circ\text{C}/\text{W}$
	(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	$^\circ\text{C}$

- Notes:
3. For a device surface mounted on 31mm x 31mm (10cm<sup>2</sup>) 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**

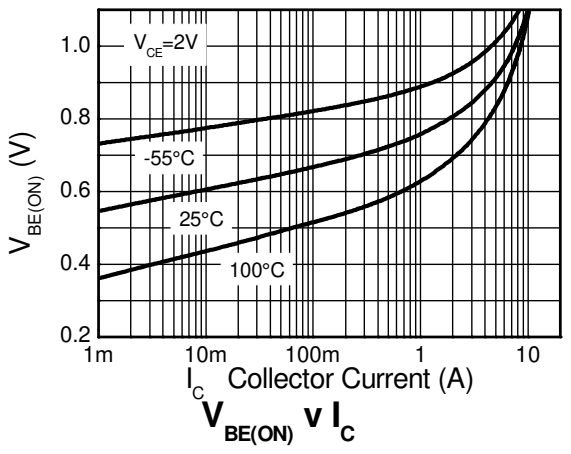
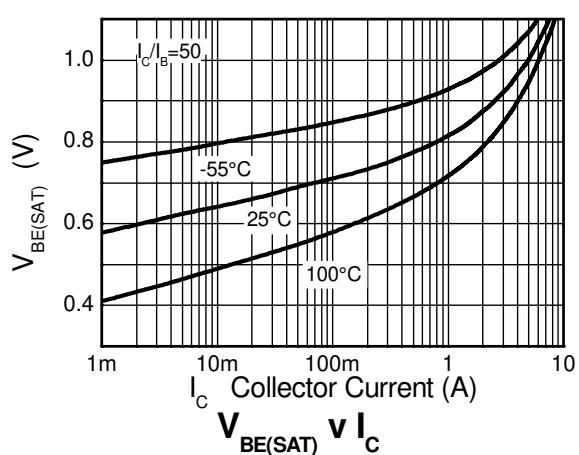
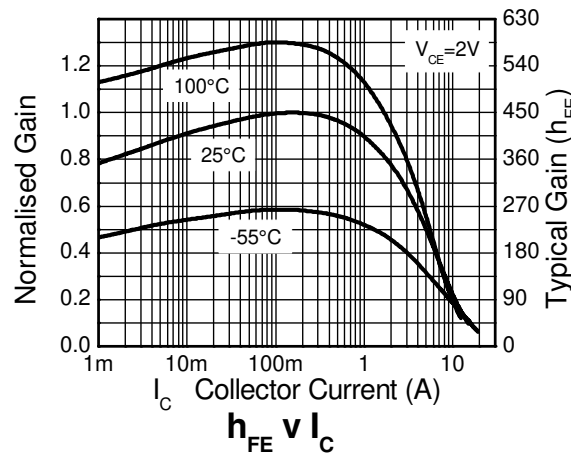
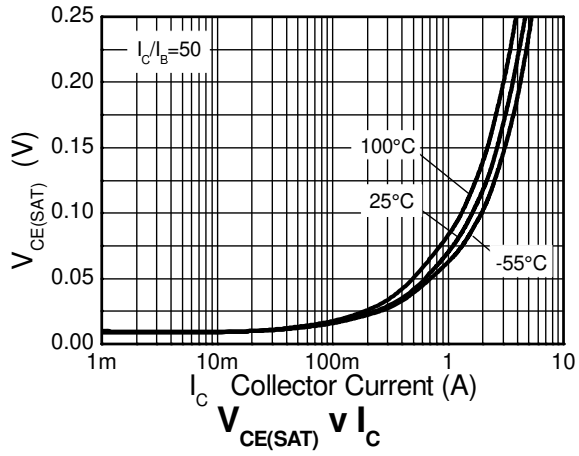
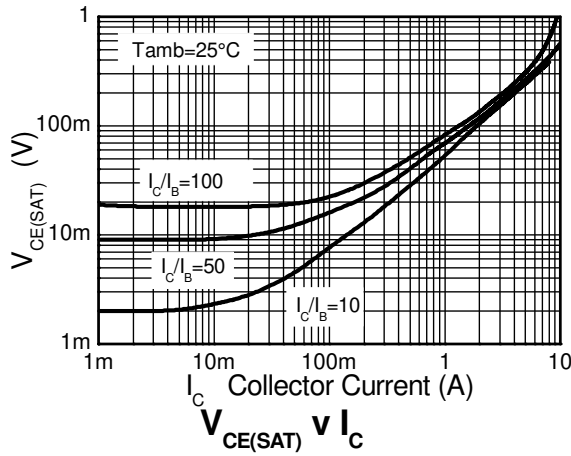


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

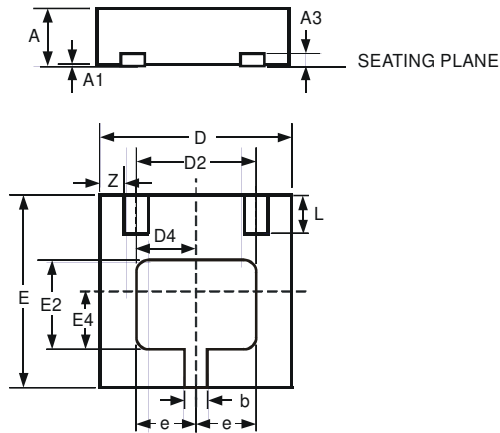
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	40	70	-	V	I <sub>C</sub> = 100 μA
Collector-Emitter Breakdown Voltage (Note 6)	BV <sub>CEO</sub>	15	18	-	V	I <sub>C</sub> = 10 mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.2	-	V	I <sub>E</sub> = 100 μA
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> = 12V
Static Forward Current Transfer Ratio (Note 6)	h <sub>FE</sub>	200	415	-	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
		300	450	-		I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V
		200	320	-		I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
		150	240	-		I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V
		-	80	-		I <sub>C</sub> = 12A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 6)	V <sub>CE(sat)</sub>	-	8	14	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 10mA
		-	70	100		I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
		-	165	200		I <sub>C</sub> = 3A, I <sub>B</sub> = 50mA
		-	240	310		I <sub>C</sub> = 4.5A, I <sub>B</sub> = 50mA
		-	200	-		I <sub>C</sub> = 4.5A, I <sub>B</sub> = 100mA
Base-Emitter Turn-On Voltage (Note 6)	V <sub>BE(on)</sub>	-	0.88	0.96	V	I <sub>C</sub> = 4.5A, V <sub>CE</sub> = 2V
Base-Emitter Saturation Voltage (Note 6)	V <sub>BE(sat)</sub>	-	0.94	1.05	V	I <sub>C</sub> = 4.5A, I <sub>B</sub> = 50mA
Output Capacitance	C <sub>obo</sub>	-	30	40	pF	V <sub>CB</sub> = 10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	80	120	-	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA, f = 100MHz
Turn-On Time	t <sub>on</sub>	-	120	-	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A
Turn-Off Time	t <sub>off</sub>	-	160	-	ns	I <sub>B1</sub> = I <sub>B2</sub> = 10mA

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

**Typical Electrical Characteristics**

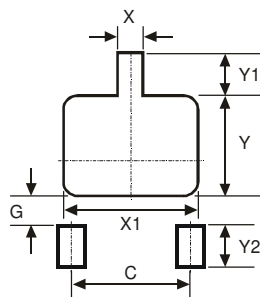


**Package Outline Dimensions**



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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