

**20V PNP LOW SATURATION SWITCHING TRANSISTOR**

**Features and Benefits**

- $BV_{CEO} > -20V$
- $I_C = -3.5A$  Continuous Collector Current
- Low Saturation Voltage (-220mV @ -1A)
- $R_{SAT} = 64\ m\Omega$  for a low equivalent On-Resistance
- $h_{FE}$  specified up to -6A for high current gain hold up
- $R_{\theta JA}$  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: DFN322
- Case material: Molded Plastic. "Green" Molding Compound.
- Terminals: Matte Tin Finish.
- Nominal package height: 0.85mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.01 grams (approximate)

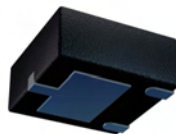
**Applications**

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

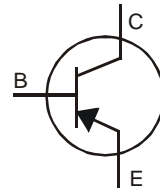
DFN322



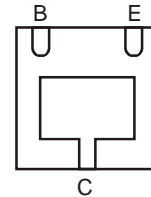
Top View



Bottom View



Device Symbol



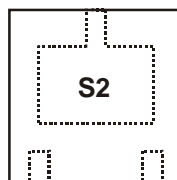
Bottom View  
Pin Out

**Ordering Information** (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXT2MATA	S2	7	8	3,000
ZXT2MATC	S2	13	8	10,000

- 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**



Top View

S2 = Product Type Marking code

## Maximum Ratings

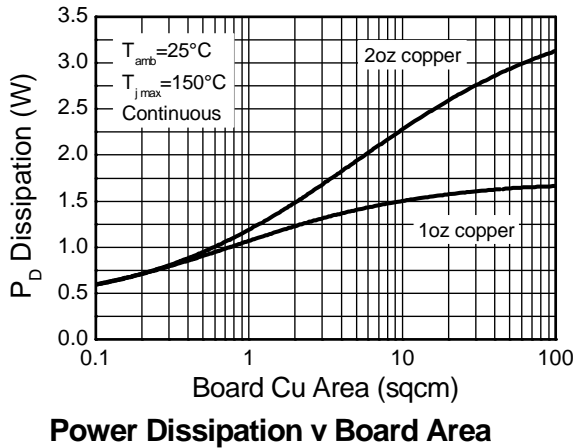
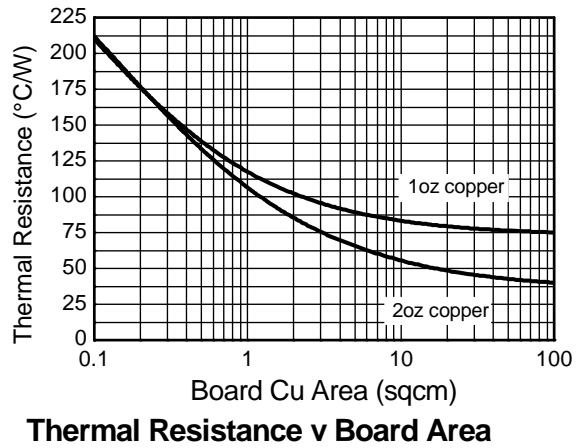
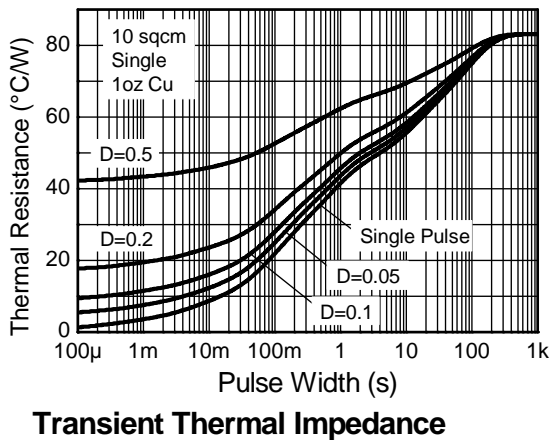
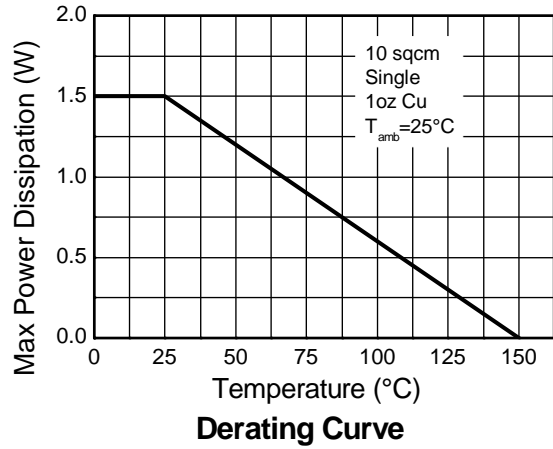
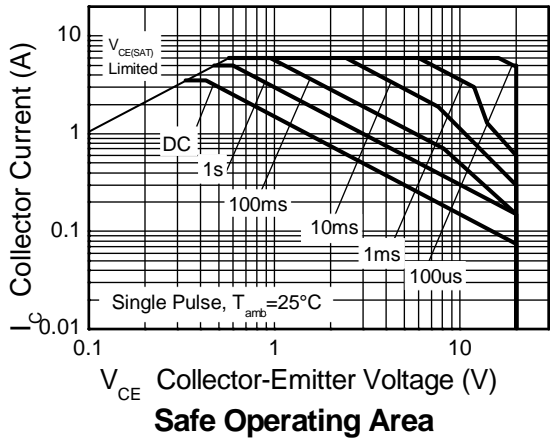
Parameter	Symbol	Limit	Unit
Collector-Base Voltage	$V_{CBO}$	-25	V
Collector-Emitter Voltage	$V_{CEO}$	-20	V
Emitter-Base Voltage	$V_{EBO}$	-7.5	V
Peak Pulse Current	$I_{CM}$	-6	A
Continuous Collector Current	(Note 4)	-3.5	A
	(Note 5)	-4.0	
Base Current	$I_B$	-1	A

## 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	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	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

- Notes:
4. 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.
  5. Same as note (4), except the device is measured at  $t < 5$  sec.
  6. Thermal resistance from junction to solder-point (at the end of the collector lead).

**Thermal Characteristics**

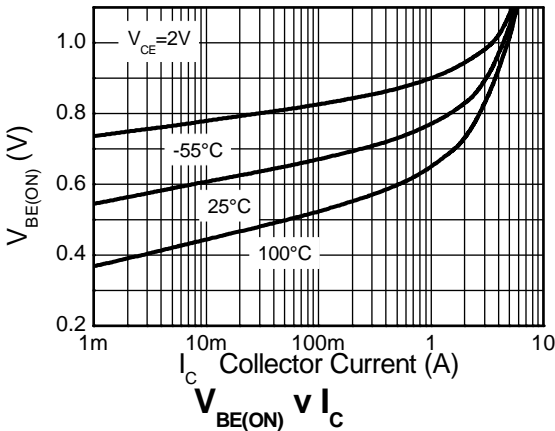
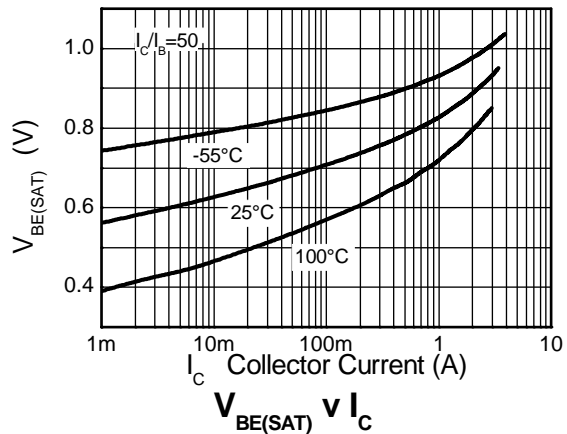
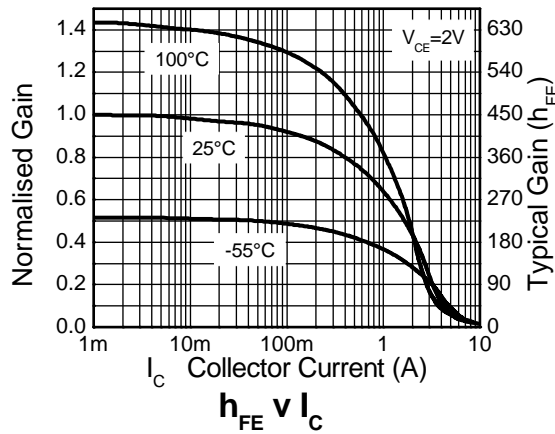
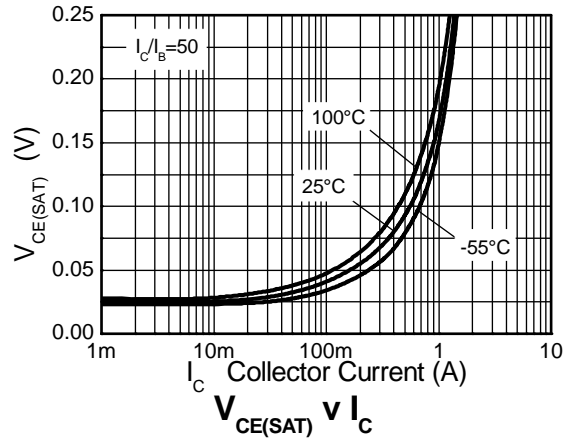
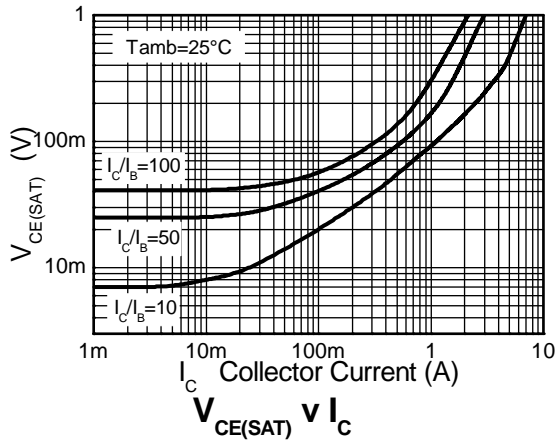


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

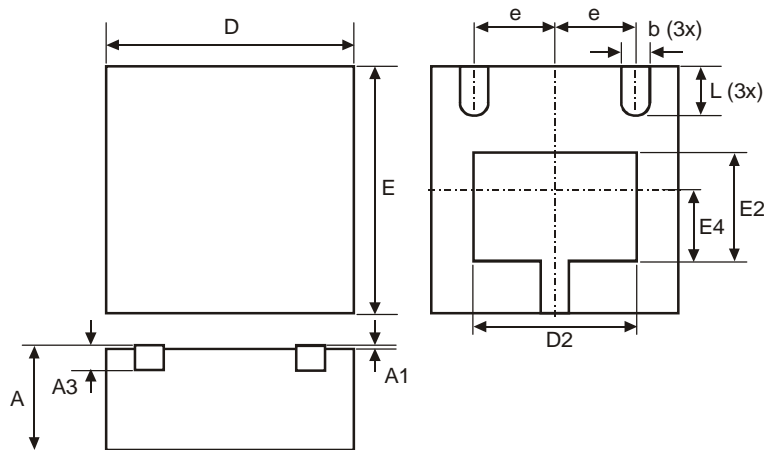
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-25	-35	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 7)	BV <sub>CEO</sub>	-20	-25	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7.5	-8.5	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	-	-25	nA	V <sub>CB</sub> = -20V
Emitter Cutoff Current	I <sub>EBO</sub>	-	-	-25	nA	V <sub>EB</sub> = -6V
Collector Emitter Cutoff Current	I <sub>CES</sub>	-	-	-25	nA	V <sub>CES</sub> = -16V
Static Forward Current Transfer Ratio (Note 7)	h <sub>FE</sub>	300	475	-	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		300	450	-		I <sub>C</sub> = -100mA, V <sub>CE</sub> = -2V
		150	230	-		I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
		15	30	-		I <sub>C</sub> = -6A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 7)	V <sub>CE(sat)</sub>	-	-19	-30	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA
		-	-170	-220		I <sub>C</sub> = -1A, I <sub>B</sub> = -20mA
		-	-190	-250		I <sub>C</sub> = -1.5A, I <sub>B</sub> = -50mA
		-	-240	-350		I <sub>C</sub> = -2.5A, I <sub>B</sub> = -150mA
		-	-225	-300		I <sub>C</sub> = -3.5A, I <sub>B</sub> = -350mA
Base-Emitter Turn-On Voltage (Note 7)	V <sub>BE(on)</sub>	-	-0.87	-0.95	V	I <sub>C</sub> = -3.5A, V <sub>CE</sub> = -2V
Base-Emitter Saturation Voltage (Note 7)	V <sub>BE(sat)</sub>	-	-1.01	-1.075	V	I <sub>C</sub> = -3.5A, I <sub>B</sub> = -350mA
Output Capacitance	C <sub>obo</sub>	-	21	30	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	150	180	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
Turn-On Time	t <sub>on</sub>	-	40	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A
Turn-Off Time	t <sub>off</sub>	-	670	-	ns	I <sub>B1</sub> = I <sub>B2</sub> = -10mA

Notes: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

**Typical Electrical Characteristics**

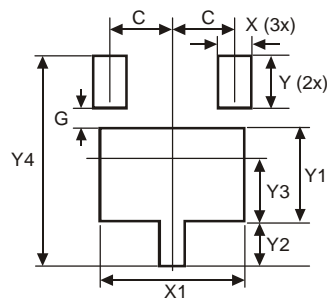


## Package Outline Dimensions



DFN322			
Dim	Min	Max	Typ
A	0.800	1.00	0.850
A1	-	0.050	-
A3	0.153	0.253	0.203
b	0.180	0.300	0.230
D	1.900	2.100	2.000
D2	1.220	1.420	1.320
e	-	-	0.650
E	1.900	2.100	2.000
E2	0.780	0.990	0.880
E4	0.480	0.680	0.580
L	0.300	0.500	0.400
All Dimensions in mm			

## Suggested Pad Layout



Dimensions	Value (in mm)
C	0.65
G	0.20
X	0.35
X1	1.52
Y	0.55
Y1	0.98
Y2	0.47
Y3	0.63
Y4	2.20

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