

20V PNP LOW SATURATION SWITCHING TRANSISTOR

Features and Benefits

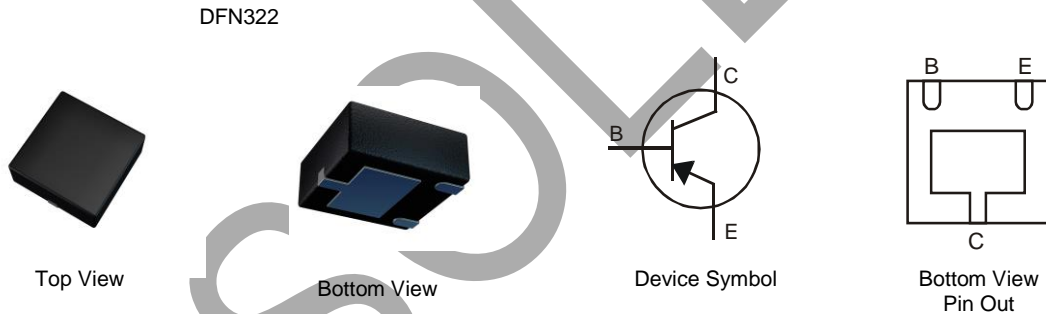
- $BV_{CEO} > -20V$
- $I_C = -3.5A$ Continuous Collector Current
- Low Saturation Voltage ($-220mV @ -1A$)
- $R_{SAT} = 64 m\Omega$ for a low equivalent On-Resistance
- h_{FE} specified up to $-6A$ for high current gain hold up
- $R_{\theta JA}$ efficient, 60% lower than SOT23
- $4mm^2$ footprint, 50% 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**

Applications

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

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)

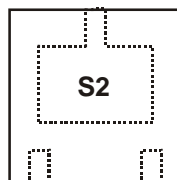


Ordering Information (Note 3)

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 purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



Top View

S2 = Product Type Marking code



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Maximum Ratings

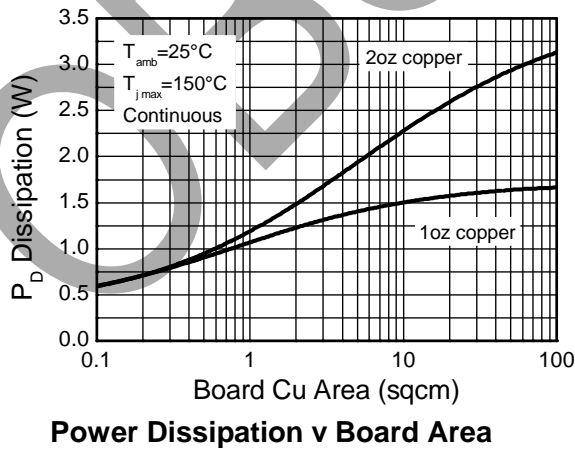
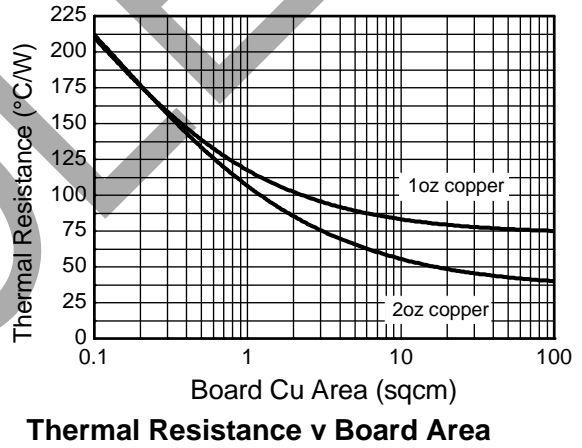
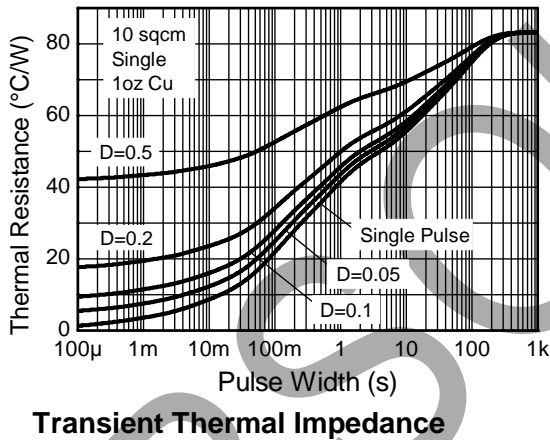
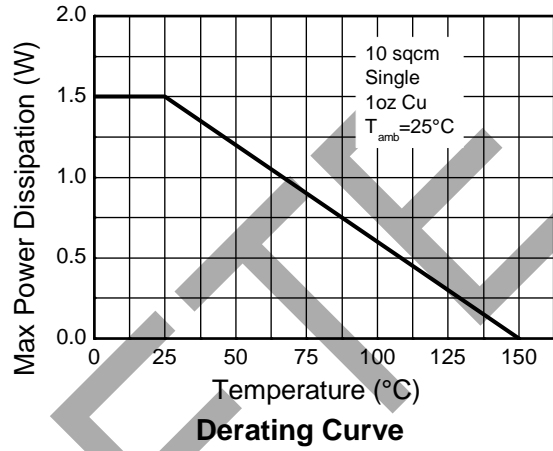
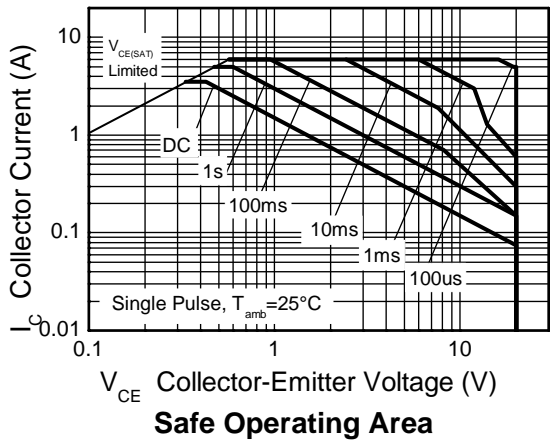
Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	-25	V
Collector-Emitter Voltage	V_{CEO}	-20	V
Emitter-Base Voltage	V_{EBO}	-7.5	V
Peak Pulse Current	I_{CM}	-6	A
Continuous Collector Current	(Note 4)	-3.5	A
	(Note 5)	-4.0	
Base Current	I_B	-1	A

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

- Notes:
4. 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.
 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



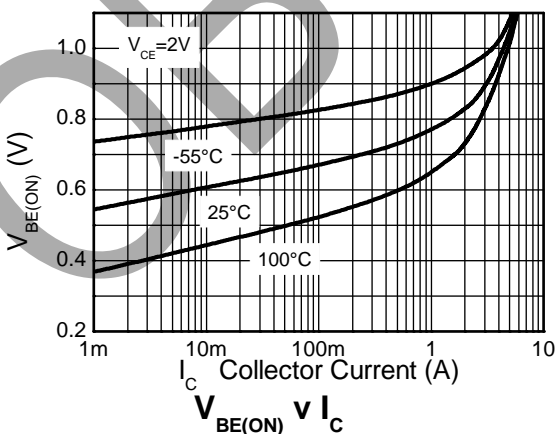
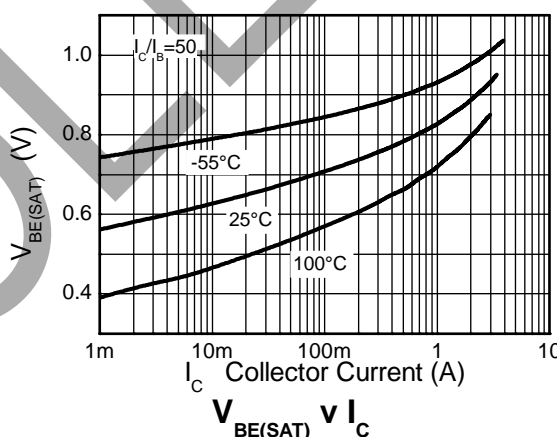
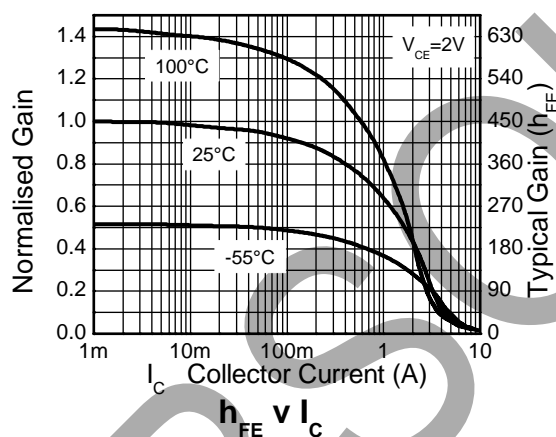
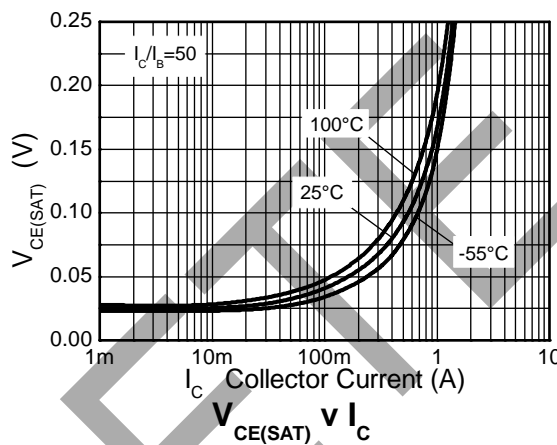
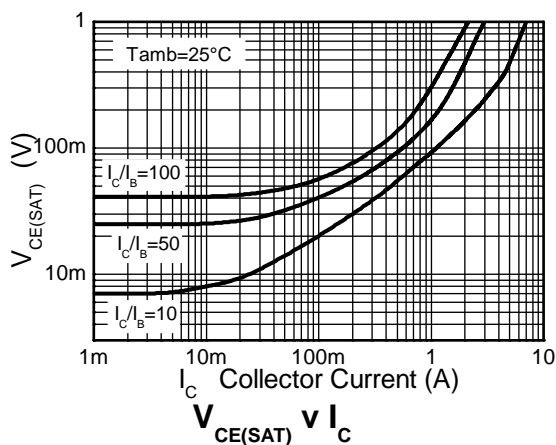
Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-25	-35	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-20	-25	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7.5	-8.5	-	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	-	-	-25	nA	$V_{CB} = -20\text{V}$
Emitter Cutoff Current	I_{EBO}	-	-	-25	nA	$V_{EB} = -6\text{V}$
Collector Emitter Cutoff Current	I_{CES}	-	-	-25	nA	$V_{CES} = -16\text{V}$
Static Forward Current Transfer Ratio (Note 7)	h_{FE}	300	475	-	-	$I_C = -10\text{mA}, V_{CE} = -2\text{V}$
		300	450	-	-	$I_C = -100\text{mA}, V_{CE} = -2\text{V}$
		150	230	-	-	$I_C = -2\text{A}, V_{CE} = -2\text{V}$
		15	30	-	-	$I_C = -6\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(sat)}$	-	-19	-30	-	$I_C = 0.1\text{A}, I_B = -10\text{mA}$
		-	-170	-220	-	$I_C = -1\text{A}, I_B = -20\text{mA}$
		-	-190	-250	-	$I_C = -1.5\text{A}, I_B = -50\text{mA}$
		-	-240	-350	-	$I_C = -2.5\text{A}, I_B = -150\text{mA}$
		-	-225	-300	-	$I_C = -3.5\text{A}, I_B = -350\text{mA}$
Base-Emitter Turn-On Voltage (Note 7)	$V_{BE(on)}$	-	-0.87	-0.95	V	$I_C = -3.5\text{A}, V_{CE} = -2\text{V}$
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(sat)}$	-	-1.01	-1.075	V	$I_C = -3.5\text{A}, I_B = -350\text{mA}$
Output Capacitance	C_{obo}	-	21	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	f_T	150	180	-	MHz	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Turn-On Time	t_{on}	-	40	-	ns	$V_{CC} = -10\text{V}, I_C = -1\text{A}$
Turn-Off Time	t_{off}	-	670	-	ns	$I_{B1} = I_{B2} = -10\text{mA}$

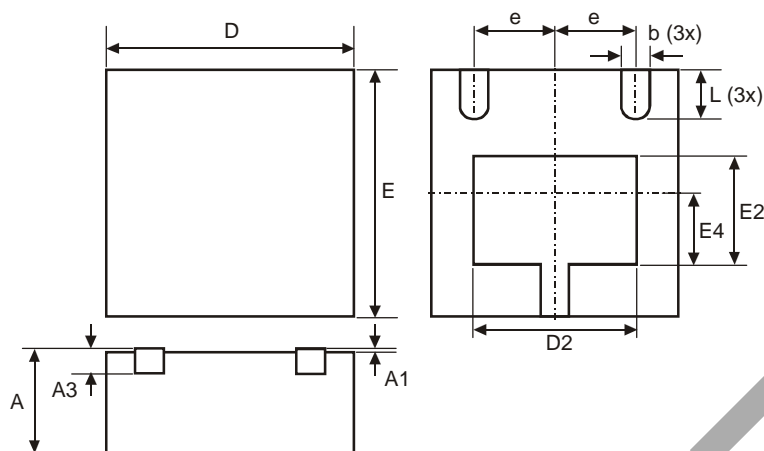
Notes: 7. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$

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Typical Electrical Characteristics

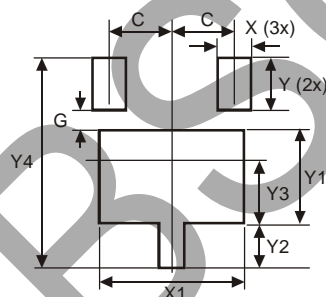


Package Outline Dimensions



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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