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 mΩ 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**

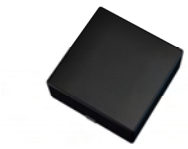
Mechanical Data

- 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)

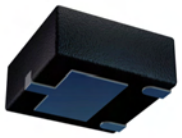
Applications

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

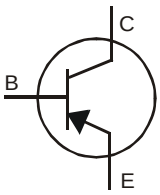
DFN322



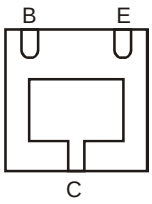
Top View



Bottom View



Device Symbol



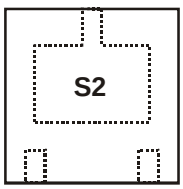
Bottom View
Pin Out

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

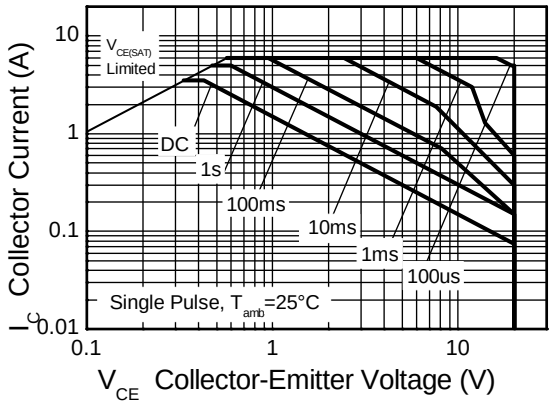
Parameter		Symbol	Limit	Unit
Collector-Base Voltage		V_{CBO}	-25	V
Collector-Emitter Voltage		V_{CEO}	-20	V
Emitter-Base Voltage		V_{EBO}	-7.5	V
Peak Pulse Current		I_{CM}	-6	A
Continuous Collector Current	(Note 4)	I_C	-3.5	A
	(Note 5)		-4.0	
Base Current		I_B	-1	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

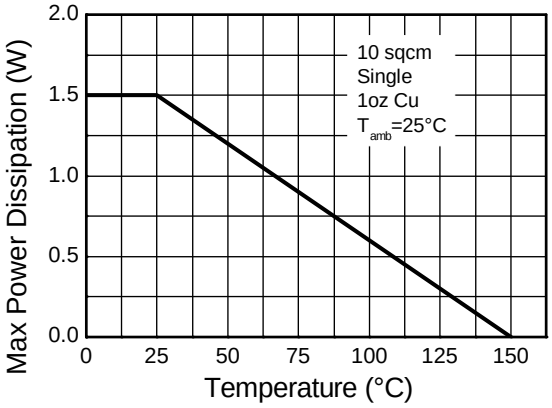
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 4)	P_D	1.5 12	W mW/°C
	(Note 5)		2.45 19.6	
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	83	°C/W
	(Note 5)		51	
Thermal Resistance, Junction to Lead	(Note 6)	$R_{\theta JL}$	16.8	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
4. For a device surface mounted on 31mm x 31mm (10cm^2) 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).

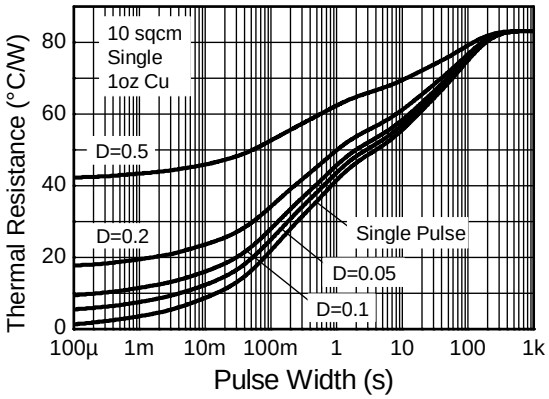
Thermal Characteristics



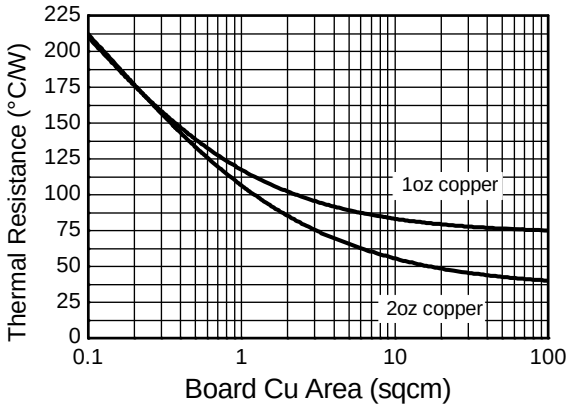
Safe Operating Area



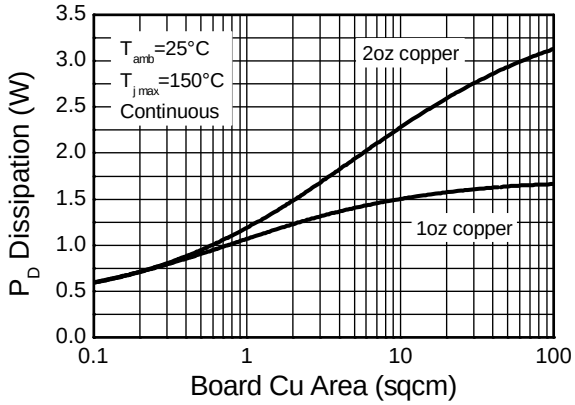
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



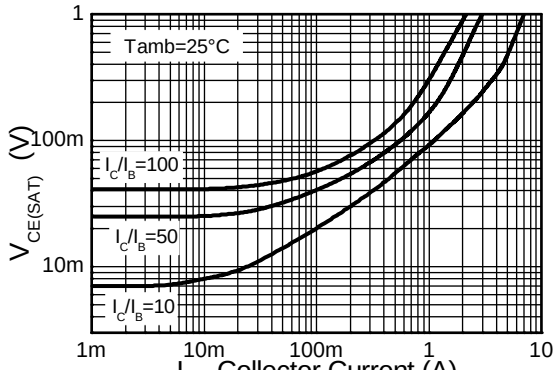
Power Dissipation v Board Area

Electrical Characteristics @T_A = 25°C unless otherwise specified

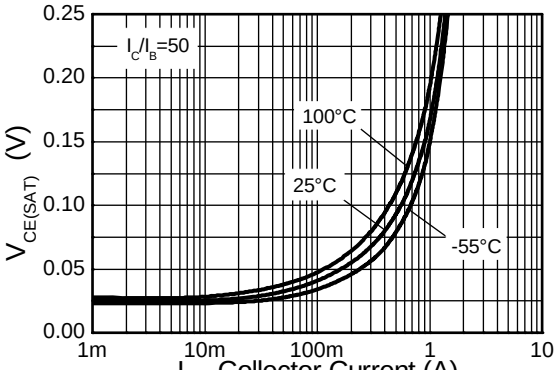
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-25	-35	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-20	-25	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7.5	-8.5	-	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	-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

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

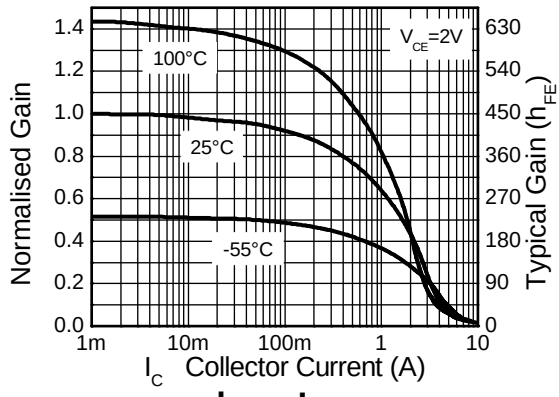
Typical Electrical Characteristics



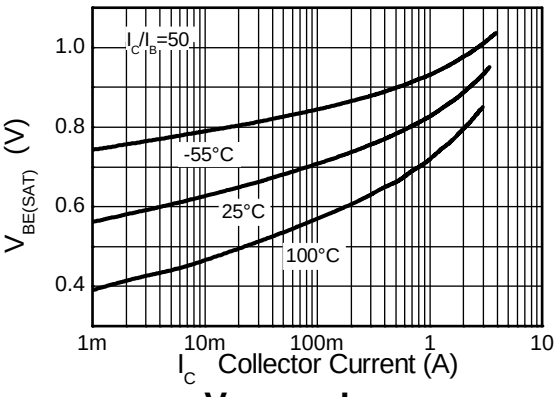
$V_{CE(SAT)}$ v I_C



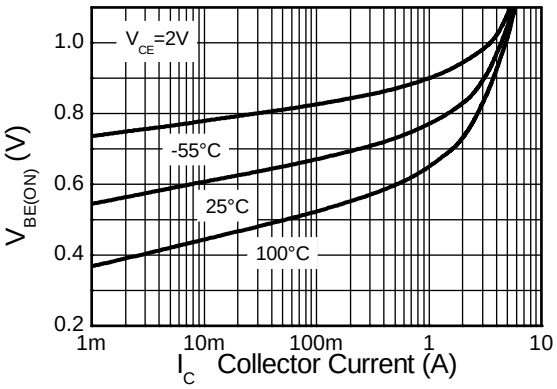
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

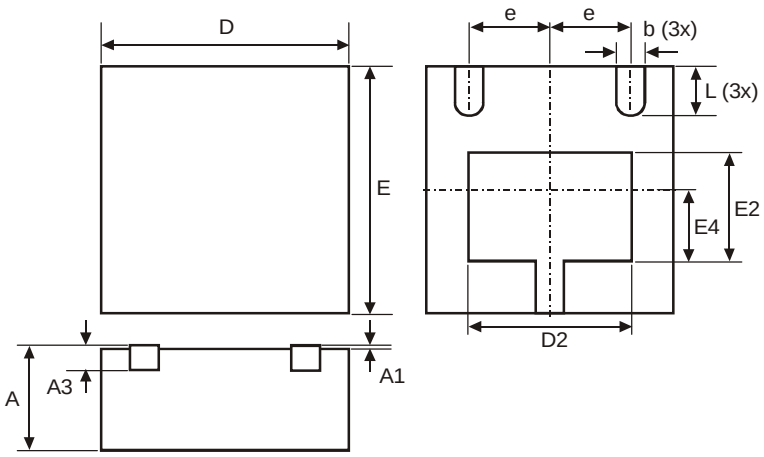


$V_{BE(SAT)}$ v I_C



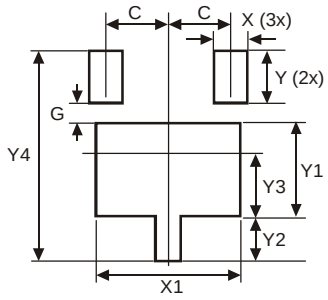
$V_{BE(ON)}$ v I_C

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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