

## Features

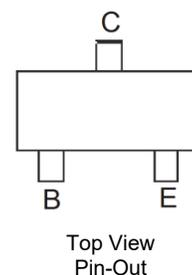
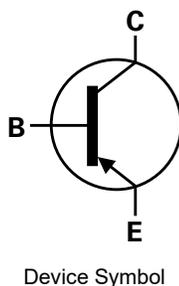
- $BV_{CEO} > -20V$
- $BV_{ECO} > -4V$
- $I_C = -4A$  Continuous Collector Current
- $V_{CE(sat)} < -60mV @ -1A$
- $R_{CE(sat)} = 39m\Omega$  typical
- $P_D = 1.25W$
- High Power Dissipation SOT23 Package
- High Peak Current
- Low Saturation Voltage
- 3V Reverse Blocking Voltage
- Complementary Part Number: ZXTN25020DFH
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.008 grams (Approximate)

## Applications

- MOSFET and IGBT gate driving
- DC-DC converters
- Motor drives
- High-side drivers

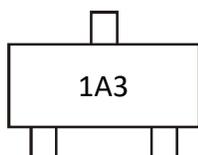


## Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ZXTP25020DFHTA	SOT23	1A3	7	8	3,000	Reel

- 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



1A3 = Product Type Marking Code

**Absolute Maximum Ratings** @ T<sub>A</sub> = +25°C, unless otherwise specified.

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-25	V
Collector-Emitter Voltage (Forward Blocking)	V <sub>CEO</sub>	-20	V
Emitter-collector voltage (Reverse Blocking)	V <sub>ECO</sub>	-4	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-4	A
Peak Pulse Current	I <sub>CM</sub>	-10	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation Linear derating factor	P <sub>D</sub>	0.73	W
		5.84	
		0.78	
		6.24	
		1.05	
		8.4	
		1.25	
		9.6	
		1.81	
		14.5	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	171	°C/W
		160	
		119	
		100	
		69	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	74.95	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	33	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

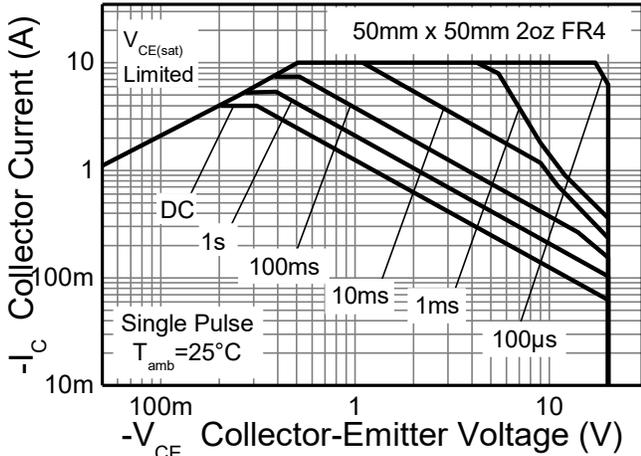
- Notes:
- For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Same as note (5), except the device is mounted on FR4 substrate PCB layout with minimum recommended pad layout.
  - Same as note (5), except the device is surface mounted on 25mm x 25mm with 2 oz copper.
  - Same as note (5), except the device is surface mounted on 50mm x 50mm with 2 oz copper.
  - Same as note (8), except the device is measured at t<5secs.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).

**ESD Ratings** (Note 11)

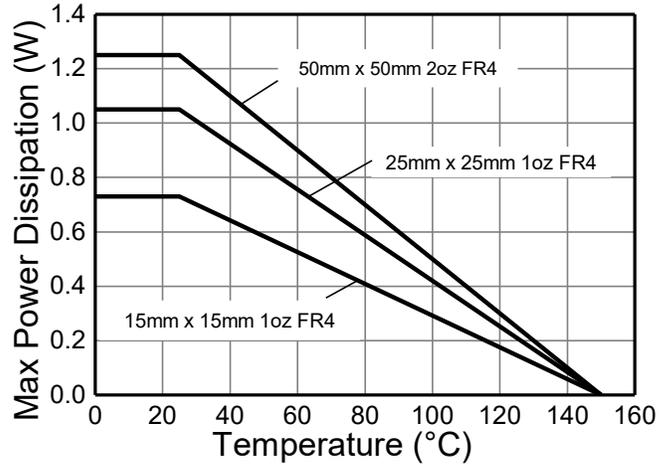
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Note: 11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

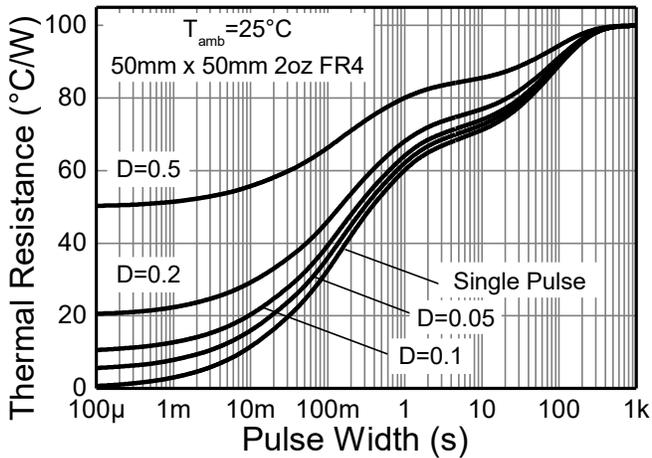
**Thermal Characteristics and Derating Information**



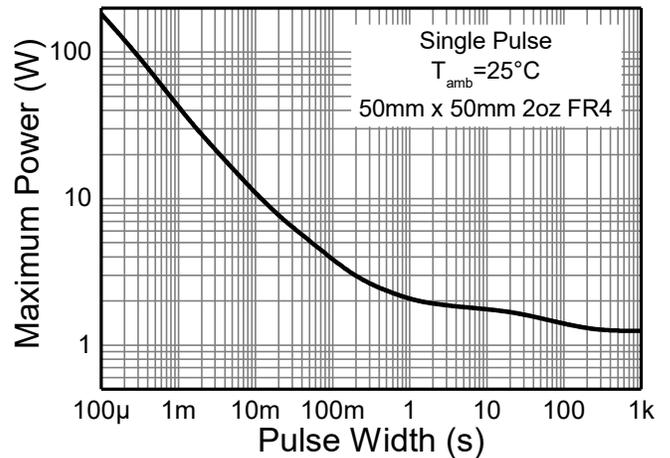
**Fig 1. Safe Operating Area**



**Fig 2. Derating Curve**



**Fig 3. Transient Thermal Impedance**



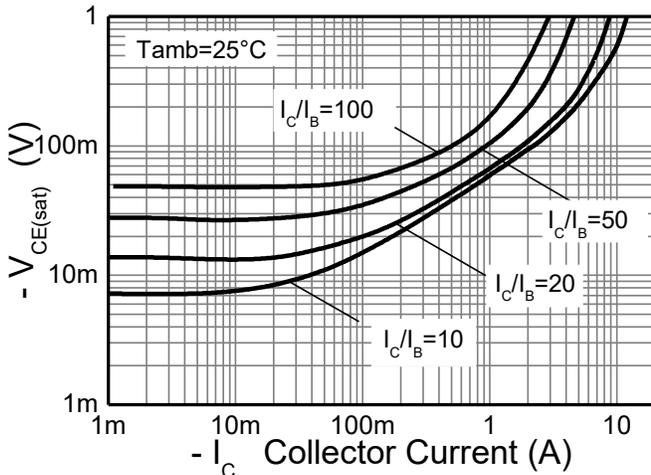
**Fig 4. Pulse Power Dissipation**

**Electrical Characteristics** (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

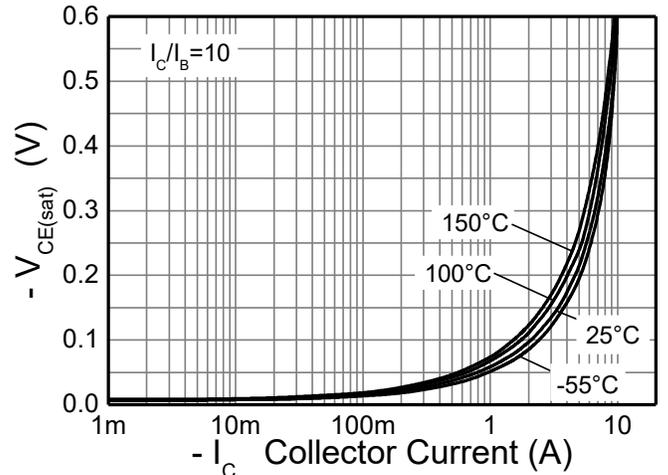
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-25	-55	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV <sub>CEO</sub>	-20	-45	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.3	-	V	I <sub>E</sub> = -100μA
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	-4	-8.5	-	V	I <sub>E</sub> = -100μA
Collector-Base Cutoff Current	I <sub>CB0</sub>	-	-1	-50	nA	V <sub>CB</sub> = -20V
		-	-	-20	μA	V <sub>CB</sub> = -20V, T <sub>amb</sub> = +100°C
Emitter-Base Cutoff Current	I <sub>EBO</sub>	-	-1	-50	nA	V <sub>EB</sub> = -5.6V
Static Forward Current Transfer Ratio (Note 12)	h <sub>FE</sub>	300	450	900	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		200	310	-		I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		70	100	-		I <sub>C</sub> = -4A, V <sub>CE</sub> = -2V
		-	20	-		I <sub>C</sub> = -10A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 12)	V <sub>CE(sat)</sub>	-	-50	-60	mV	I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		-	-150	-210		I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		-	-180	-240		I <sub>C</sub> = -2A, I <sub>B</sub> = -40mA
		-	-155	-180		I <sub>C</sub> = -4A, I <sub>B</sub> = -400mA
Base-Emitter Saturation Voltage (Note 12)	V <sub>BE(sat)</sub>	-	-960	-1050	mV	I <sub>C</sub> = -4A, I <sub>B</sub> = -400mA
Base-Emitter Saturation Voltage (Note 12)	V <sub>BE(on)</sub>	-	-815	-900	mV	I <sub>C</sub> = -4A, V <sub>CE</sub> = -2V
Output Capacitance	C <sub>obo</sub>	-	21	30	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	-	290	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 50MHz
Turn-on Time	t <sub>(on)</sub>	-	30.5	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A,
Turn-off Time	t <sub>(off)</sub>	-	218.7	-	ns	I <sub>B1</sub> = -I <sub>B2</sub> = -50mA

Note: 12. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

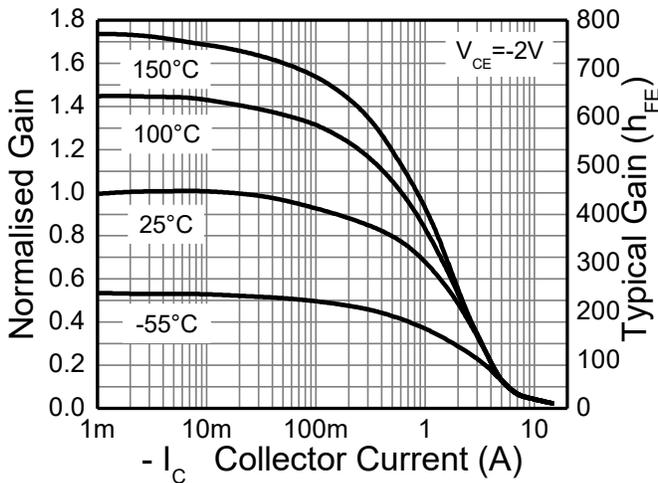
**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



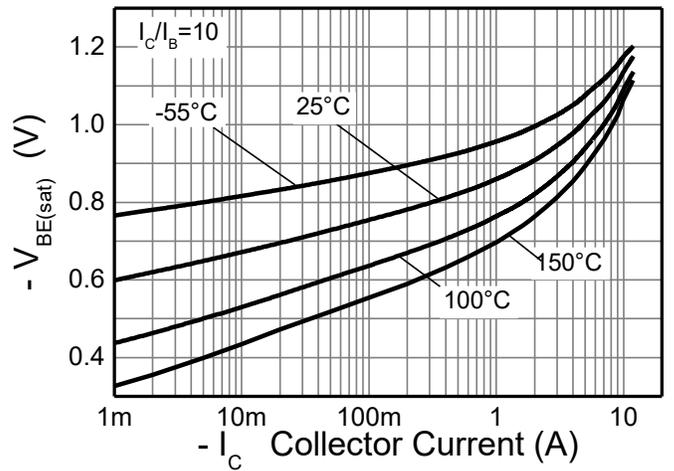
**Fig 5.  $V_{CE(sat)} \ v \ I_C$**



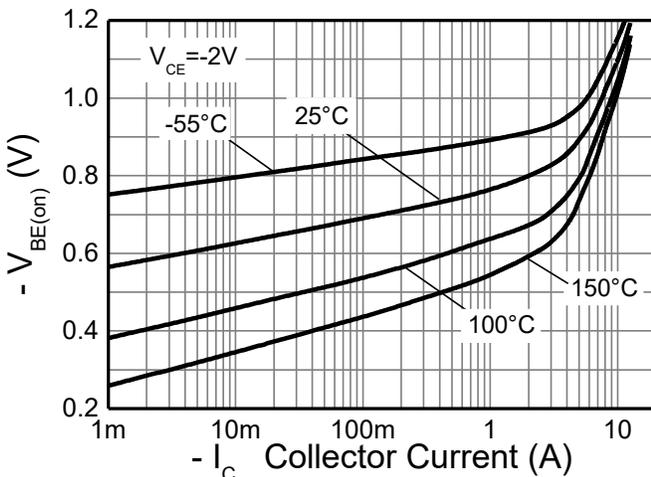
**Fig 6.  $V_{CE(sat)} \ v \ I_C$**



**Fig 7.  $h_{FE} \ v \ I_C$**



**Fig 8.  $V_{BE(sat)} \ v \ I_C$**

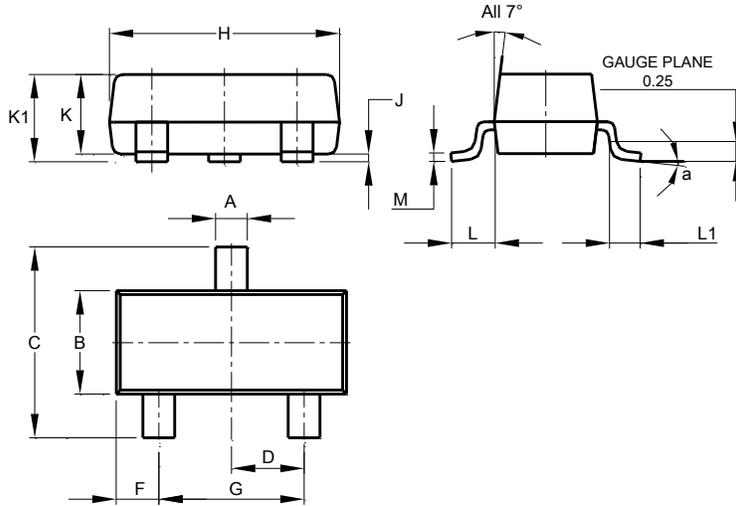


**Fig 9.  $V_{BE(on)} \ v \ I_C$**

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**

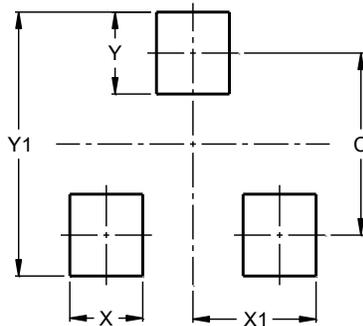


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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