20V NPN LOW SATURATION TRANSISTOR IN SOT23

Features

- BV_{CEO} > 20V
- I_C = 2A Collector Current
- Low Saturation Voltage $V_{CE(sat)}$ < 70mV @ 1A
- Epitaxial Planar Die Construction
- High Peak Current and Gain
- **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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

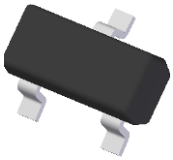
Mechanical Data

- 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)

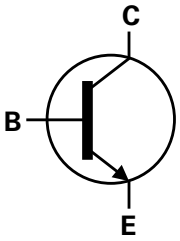
Applications

- DC-DC converters
- DC fans
- Power switches
- Motor controls
- MOSFET gate drivers

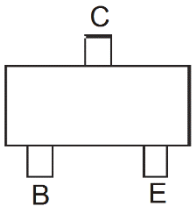
SOT23



Top View



Device Symbol



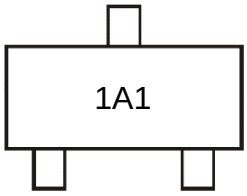
Top View
Pinout

Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ZXTN25020DFLTA	SOT23	1A1	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



1A1 = Product Type Marking Code

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage	V_{CEO}	20	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector-Emitter Voltage (Forward Blocking)	V_{CEX}	150	V
Emitter-Collector Voltage (Reverse Blocking)	V_{ECO}	5	V
Base Current	I_B	0.5	A
Continuous Collector Current	I_C	2	A
Peak Collector Current	I_{CM}	8	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	350 2.8	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	357	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Note: 5. For the device mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

Thermal Characteristics

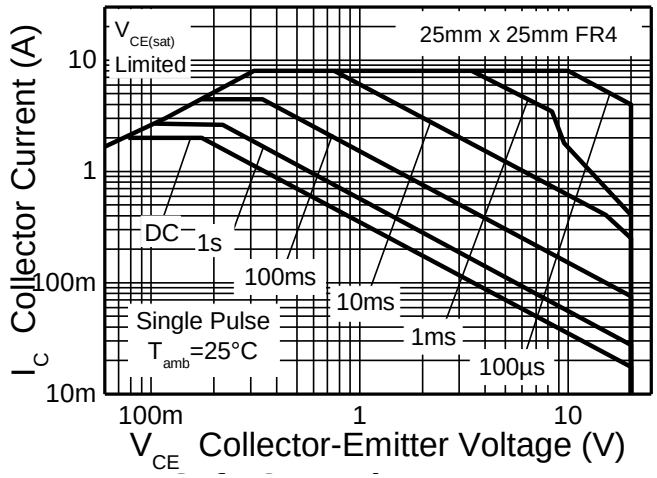


Figure 1. Safe Operating Area

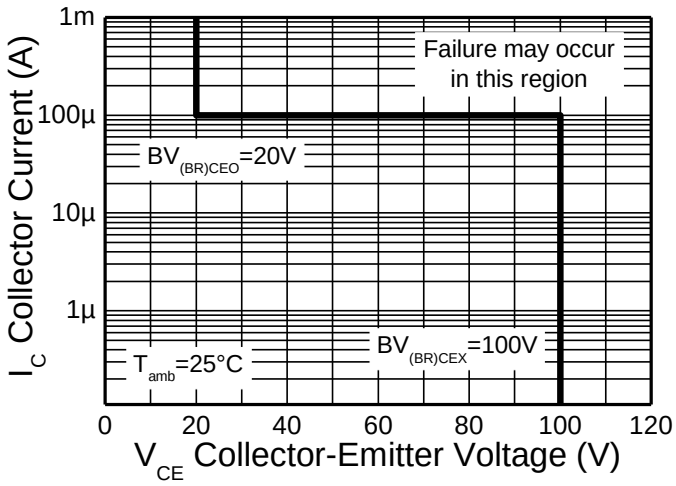


Figure 2. Safe Operating Area

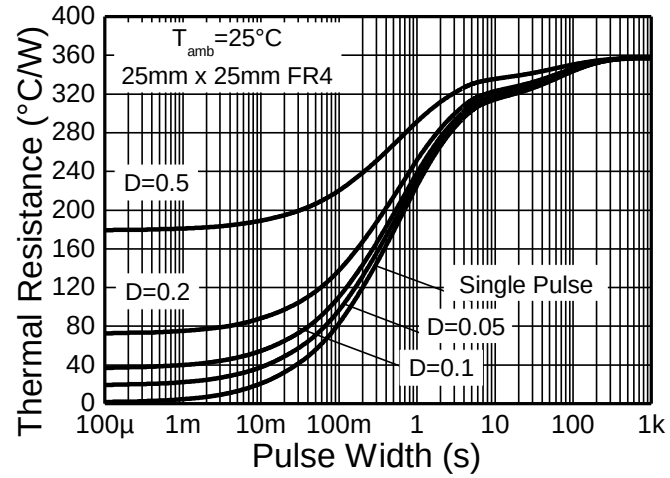


Figure 3. Transient Thermal Impedance

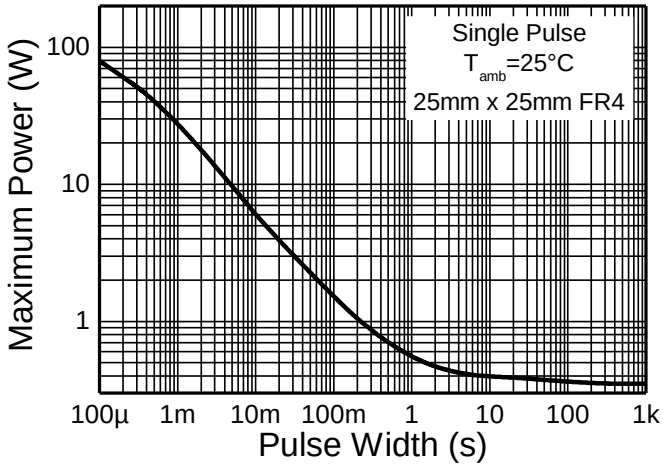


Figure 4. Pulse Power Dissipation

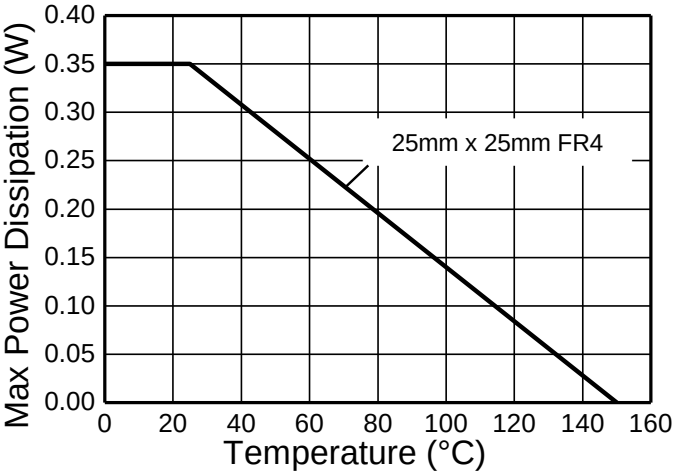


Figure 5. Derating Curve

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	100	125	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 6)	BV_{CEO}	20	35	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	I_E = 100µA
Emitter-Collector Breakdown Voltage	BV_{ECO}	5	6	—	V	I_E = 100µA
Emitter-Collector Breakdown Voltage	BV_{ECX}	6	8	—	V	I_E = 100µA, R_{BC} ≤ 1kΩ or -0.25V < V_{BC} < 0.25V
Collector-Emitter Breakdown Voltage	BV_{CEX}	100	120	—	V	I_C = 100µA, R_{BE} ≤ 1kΩ or -1V < V_{BE} < 0.25V
Collector Cutoff Current	I_{CBO}	—	1	50	nA	V_{CB} = 80V
		—	—	20	µA	V_{CB} = 80V, T_{amb} = +100°C
Emitter Cutoff Current	I_{EBO}	—	1	50	nA	V_{EB} = 5.6V
Collector-Emitter Cutoff Current	I_{CEX}	—	—	100	nA	V_{CE} = 80V, R_{BE} ≤ 1kΩ or -1V < V_{BE} < 0.25V
ON CHARACTERISTICS (Note 6)						
DC Current Gain	h_{FE}	300	450	900	—	I_C = 10mA, V_{CE} = 2V
		220	350	—		I_C = 2A, V_{CE} = 2V
		80	120	—		I_C = 4.5A, V_{CE} = 2V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	60	70	mV	I_C = 1A, I_B = 100mA
		—	85	100		I_C = 1A, I_B = 20mA
		—	140	160		I_C = 2A, I_B = 40mA
		—	180	225		I_C = 2A, I_B = 20mA
		—	245	270		I_C = 4.5A, I_B = 450mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	895	1000	mV	I_C = 2A, I_B = 40mA
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	—	825	900	mV	I_C = 2A, V_{CE} = 2V
SMALL-SIGNAL CHARACTERISTICS						
Output Capacitance (Note 6)	C_{obo}	—	16.5	25	pF	V_{CB} = 10V, f = 1MHz
Transition Frequency	f_T	—	215	—	MHz	V_{CE} = 10V, I_C = 50mA f = 100MHz
SWITCHING CHARACTERISTICS						
Delay Time	t_d	—	67.7	—	ns	V_{CC} = 10V, I_C = 1A I_{B1} = -I_{B2} = 10mA
Rise Time	t_r	—	72.2	—	ns	
Storage Time	t_s	—	361	—	ns	
Fall Time	t_f	—	63.9	—	ns	

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

Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

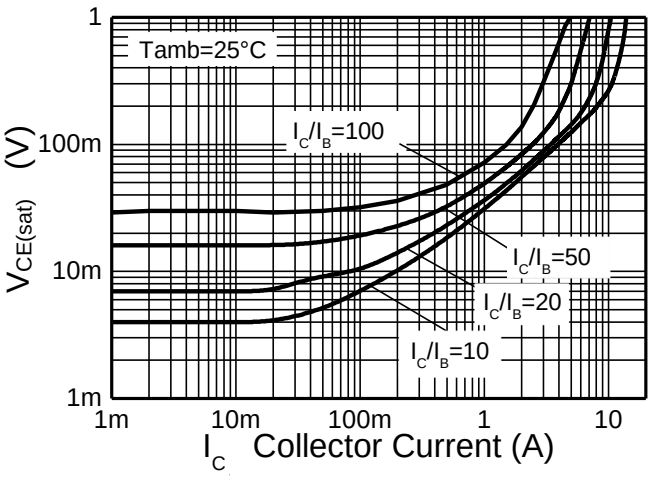


Figure 6. $V_{CE(sat)}$ vs. I_C

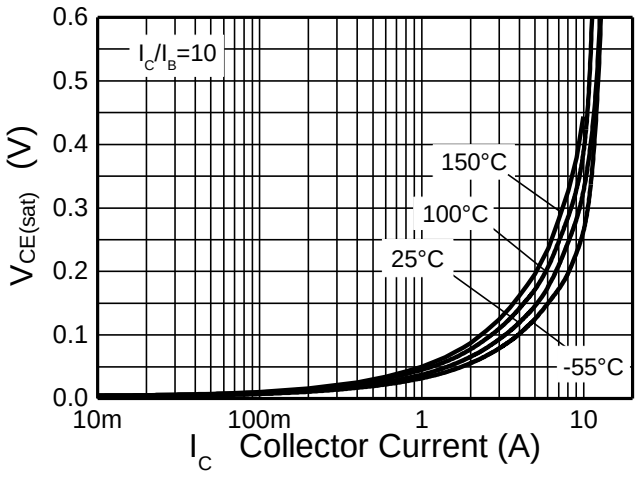


Figure 7. $V_{CE(sat)}$ vs. I_C

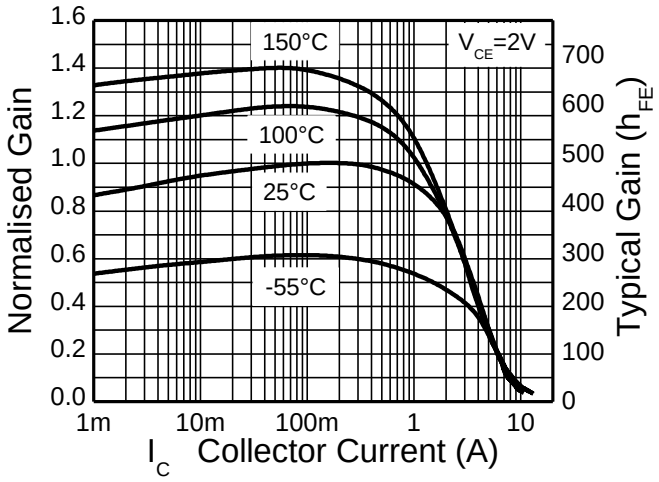


Figure 8. h_{FE} vs. I_C

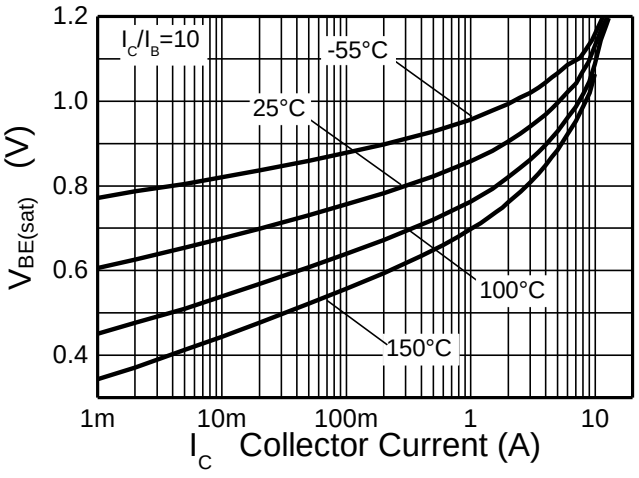


Figure 9. $V_{BE(sat)}$ vs. I_C

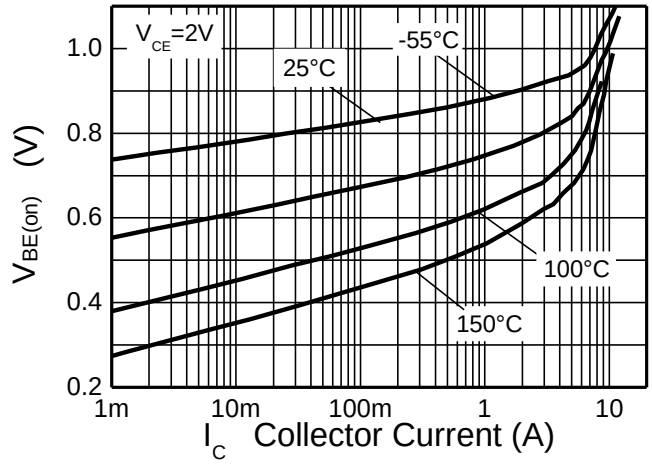
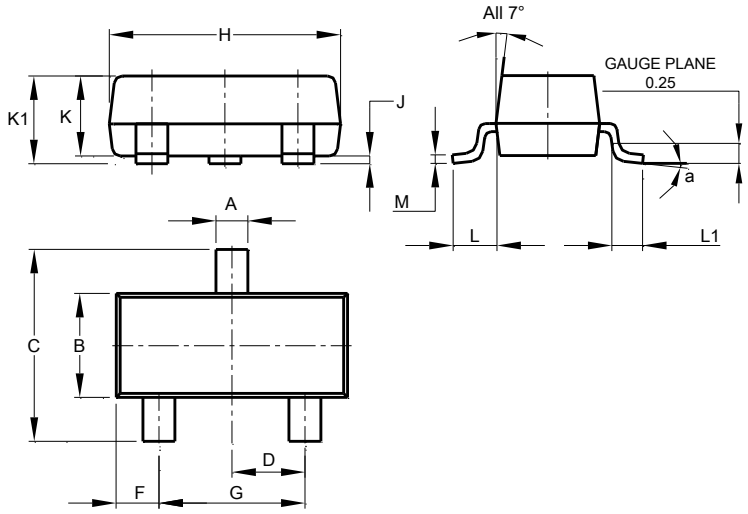


Figure 10. $V_{BE(on)}$ vs. I_C

Package Outline Dimensions

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

SOT23

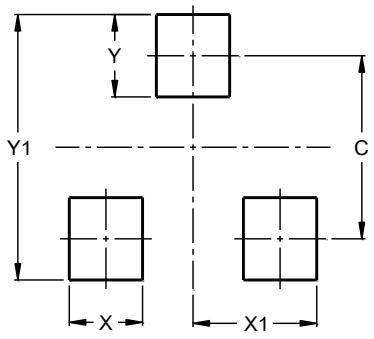


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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