60V NPN MEDIUM POWER LOW SATURATION TRANSISTOR SOT223

Features

- BV_{CEO} > 60V
- I_C = 6A Continuous Collector Current
- I_{CM} = 20A Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)}$ < 60mV Max @ 1A
- R_{SAT} = 35mΩ @ I_c =6A for Low Equivalent On-Resistance
- h_{FE} Specified up to 10A for High Gain Hold Up
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

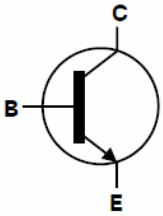
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

Applications

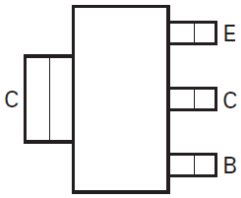
- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Solenoid, Relay and Actuator Drivers
- DC Modules
- Backlight Inverters

SOT223

Top View



Device Schematic



Pin-Out Top View

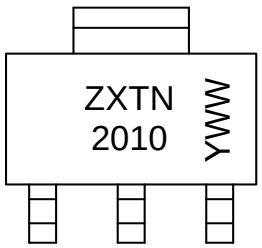
Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2010GTA	ZXTN2010	7	12	1,000

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/products/packages.html.

Marking Information

SOT223



ZXTN 2010 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5= 2015)
WW or $\overline{WW}$ = Week Code (01~53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	6	A
Peak Pulse Current	I_{CM}	20	A

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

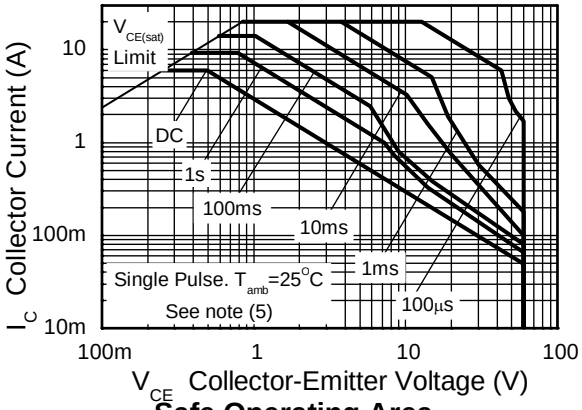
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	3.0 24	W mW/°C
	(Note 6)		1.6 12.8	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	42	°C/W
	(Note 6)	$R_{\theta JA}$	78	
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	8.8	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

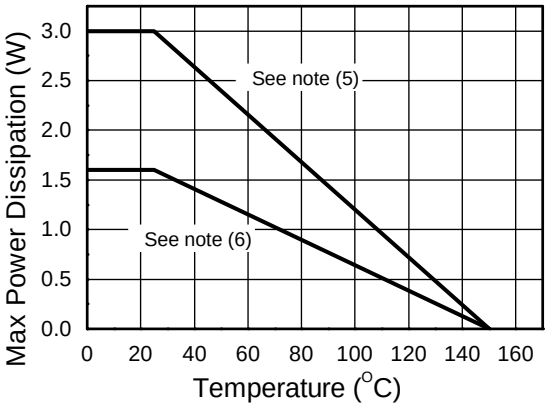
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 52mm x 52mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
7. Thermal resistance from junction to solder-point (at the end of the collector lead).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

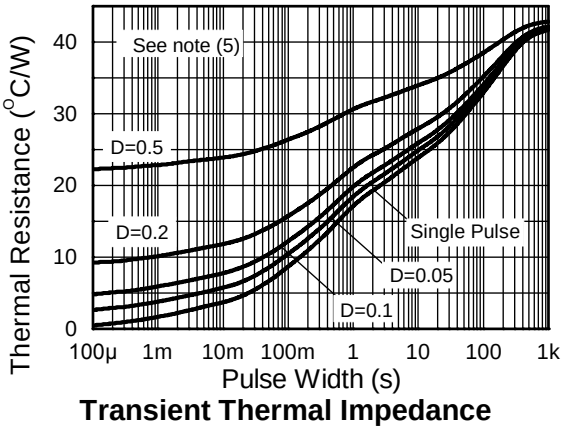
Thermal Characteristics and Derating Information



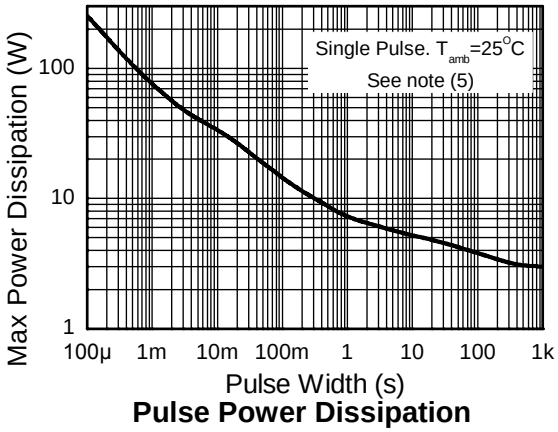
Safe Operating Area



Derating Curve



Transient Thermal Impedance



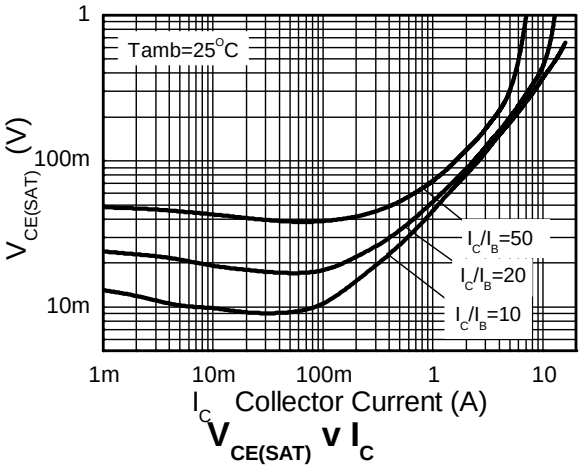
Pulse Power Dissipation

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

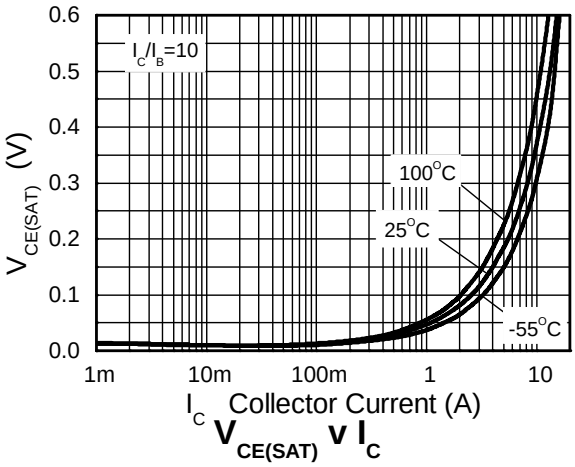
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CER}	150	190	—	V	I_C = 1µA, RB ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	80	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	I_E = 100µA
Collector Cut-Off Current	I_{CBO}	— —	— —	50 0.5	nA µA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Collector Cut-Off Current	I_{CER} R≤1kΩ	— —	— —	100 0.5	nA µA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Emitter Cut-Off Current	I_{EBO}	—	—	10	nA	V_{EB} = 6V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	— — — — —	20 45 50 100 210	30 60 70 135 260	mV	I_C = 0.1A, I_B = 5mA I_C = 1A, I_B = 100mA I_C = 1A, I_B = 50mA I_C = 2A, I_B = 50mA I_C = 6A, I_B = 300mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	1	1.1	V	I_C = 6A, I_B = 300mA
Base-Emitter Turn-on Voltage (Note 9)	$V_{BE(on)}$	—	0.94	1.05	V	I_C = 6A, V_{CE} = 1V
DC Current Gain (Note 9)	h_{FE}	100 100 55 20	200 200 105 40	— 300 — —		I_C = 10mA, V_{CE} = 1V I_C = 2A, V_{CE} = 1V I_C = 5A, V_{CE} = 1V I_C = 10A, V_{CE} = 1V
Transition Frequency	f_T	—	130	—	MHz	V_{CE} = 10V, I_C = 100mA, f = 50MHz
Output Capacitance (Note 9)	C_{obo}	—	31	—	pF	V_{CB} = 10V, f = 1MHz
Switching Times	t_{ON}	—	42	—	ns	V_{CC} = 10V, I_C = 1A, I_{B1} = -I_{B2} = 100mA
	t_{OFF}	—	760	—		

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

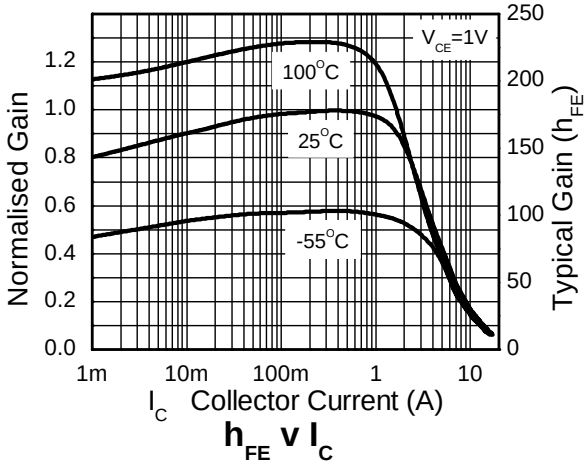
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



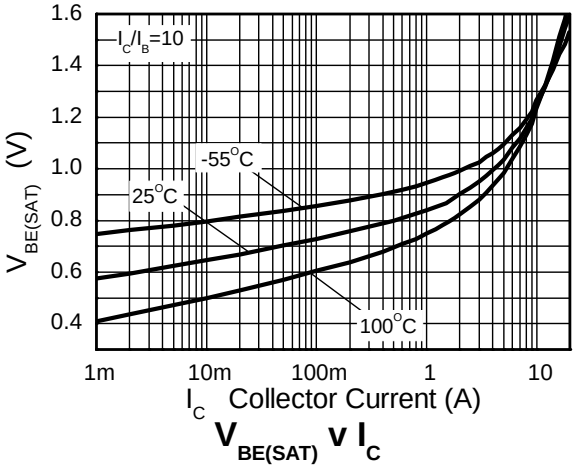
$V_{CE(SAT)}$ v I_C



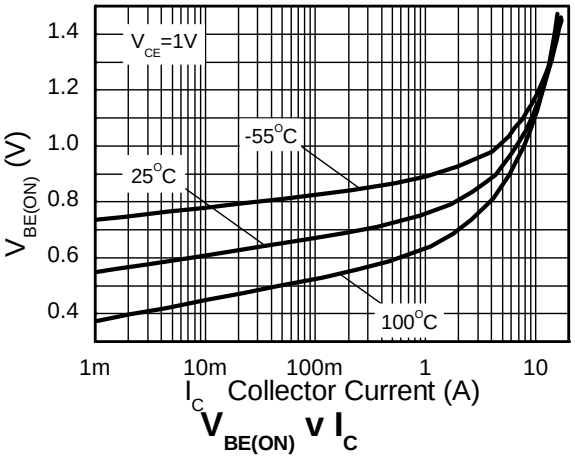
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

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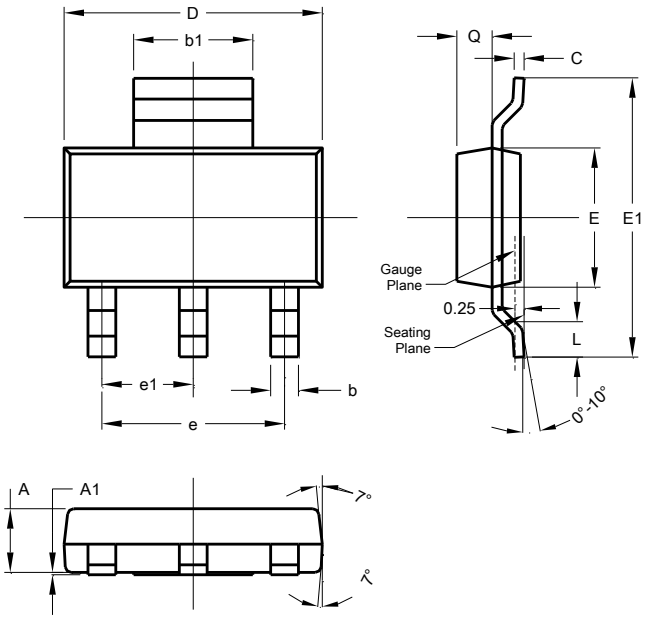

SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

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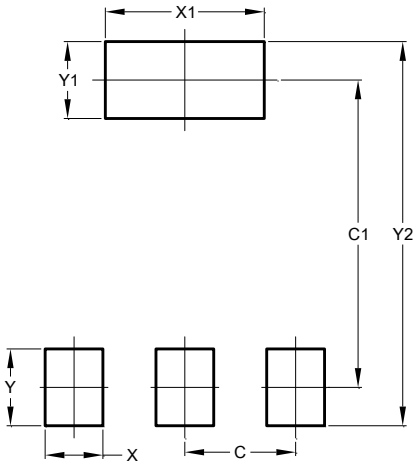

Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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