ZXTN25100DG

100V NPN HIGH GAIN TRANSISTOR IN SOT223

Features

- BV_{CEX} > 180V
- BV_{CEO} > 100V
- BV_{ECO} > 6V
- I_C = 3A High Continuous Current
- Low Saturation Voltage $V_{CE(sat)}$ < 100mV @ 1A
- $R_{CE(sat)}$ = 85mΩ
- Complementary PNP Type: ZXTP19100CG
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

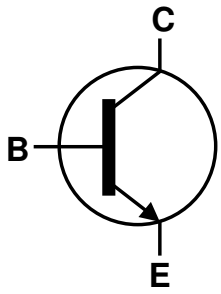
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound;
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

Applications

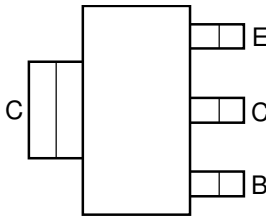
- PSU Start-Up Circuit
- DC-DC Converters
- Motor Drive
- Relay, Lamp and Solenoid Drive

SOT223

Top View



Device Symbol



Top View
Pin-Out

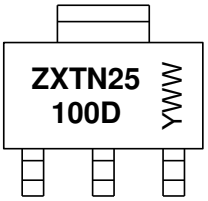
Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25100DGTA	AEC-Q101	ZXTN25100D	7	12	1,000
ZXTN25100DGQTA	Automotive	ZXTN25100D	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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

SOT223



ZXTN25100D = 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}	180	V
Collector-Emitter Voltage (forward blocking)	V_{CEX}	180	V
Collector-Emitter Voltage	V_{CEO}	100	V
Emitter-Collector Voltage (reverse blocking)	V_{ECO}	6	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	3	A
Base Current	I_B	1	A
Peak Pulse Current	I_{CM}	3.5	A

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

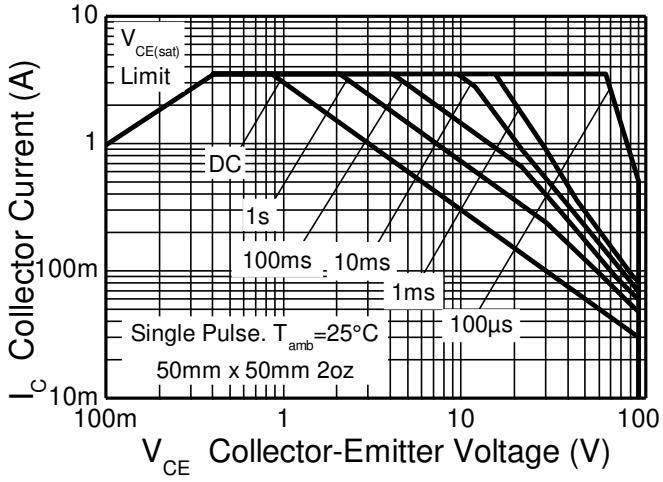
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 6)	P_D	1.2 9.6	W mW/°C
	(Note 7)		1.6 12.8	
	(Note 8)		3 24	
	(Note 9)		5.3 42	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	104	°C/W
	(Note 7)		78	
	(Note 8)		42	
	(Note 9)		23.5	
Thermal Resistance, Junction to Lead	(Note 10)	$R_{\theta JL}$	16	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 11)

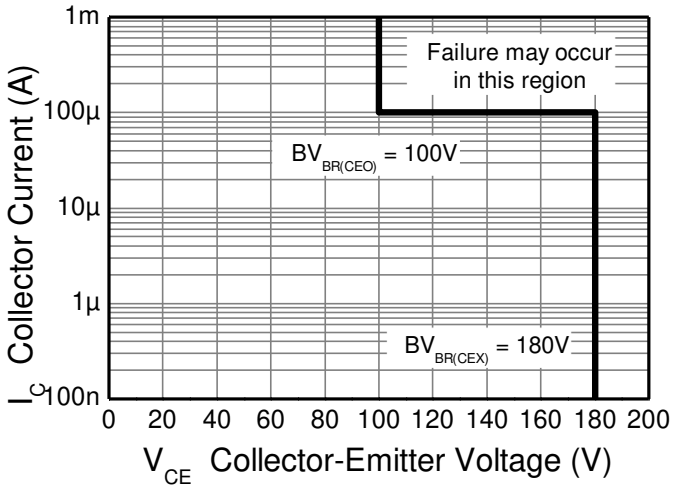
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
6. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
7. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
8. Same as Note 6, except the device is mounted on 50mm x 50mm 2oz copper.
9. Same as Note 8 measured at t<5 seconds.
10. Thermal resistance from junction to solder-point (at the end of the collector lead).
11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

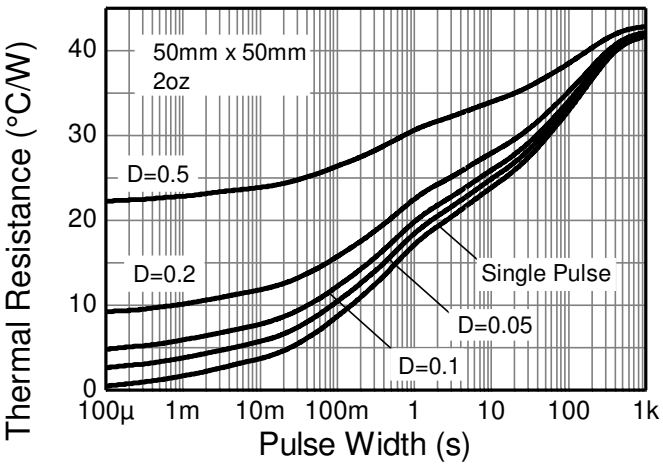
Thermal Characteristics and Derating Information (@T_A = +25°C, unless otherwise specified.)



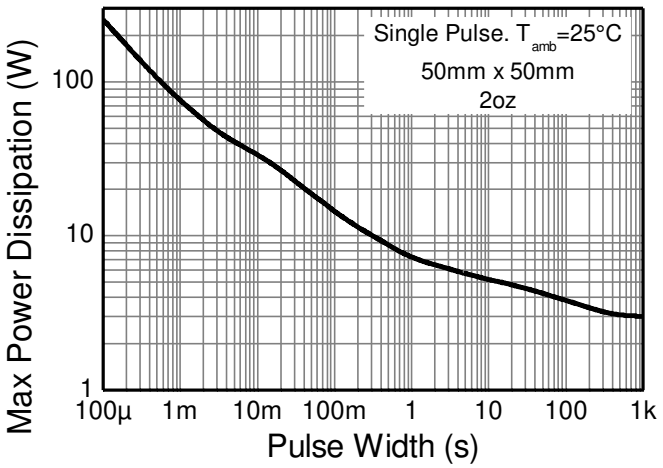
Safe Operating Area



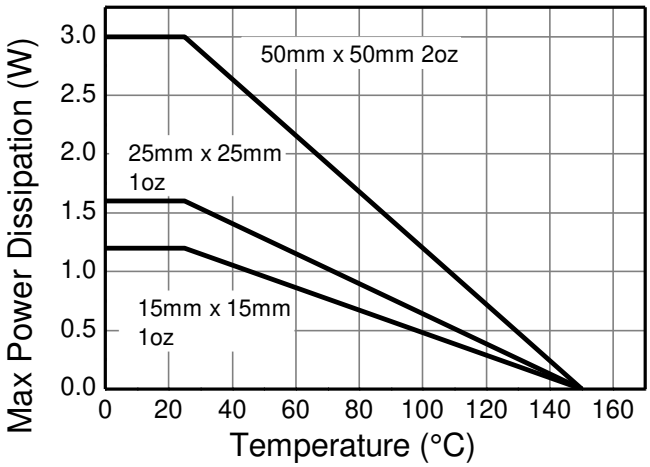
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



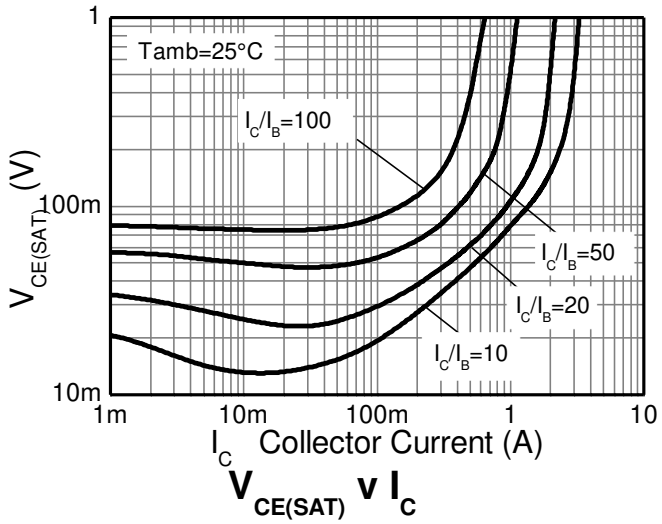
Derating Curve

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

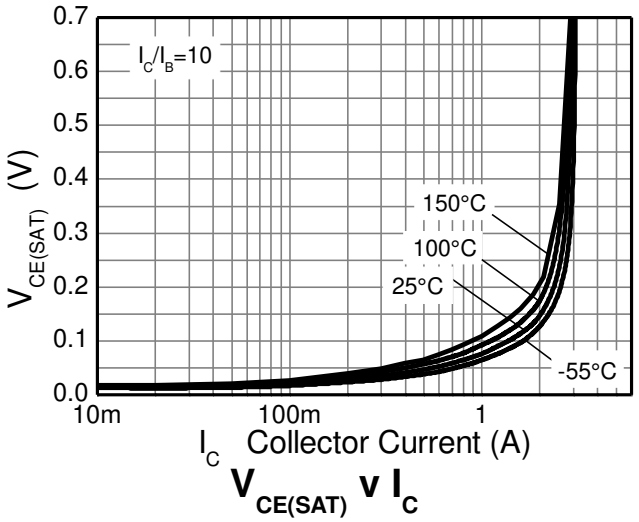
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	180	220	–	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (forward blocking)	BV_{CEX}	180	220	–	V	I_C = 100µA, R_{BE} <1kΩ or -1V< V_{BC} > 0.25V
Collector-Emitter Breakdown Voltage (Note 12)	BV_{CEO}	100	130	–	V	I_C = 10mA
Emitter-Collector Breakdown Voltage (reverse blocking)	BV_{ECX}	6	8.2	–	V	I_C = 100µA, R_{BC} <1kΩor 0.25V< V_{BC} > -0.25V
Emitter-Collector Breakdown Voltage (reverse blocking)	BV_{ECO}	6	8.7	–	V	I_E = 100µA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	–	V	I_E = 100µA
Collector Cut-Off Current	I_{CBO}	–	< 1	50	nA	V_{CB} = 180V
		–	–	0.5	µA	V_{CB} = 180V, T_A = 105°C
Collector-Emitter Cut-Off Current	I_{CEX}	–	–	100	nA	V_{CE} = 100V, R_{BE} <1kΩ or -1V < V_{BC} > 0.25V
Emitter Cut-Off Current	I_{EBO}	–	< 1	50	nA	V_{EB} = 5.6V
Collector-Emitter Saturation Voltage (Note 12)	$V_{CE(sat)}$	–	120	170	mV	I_C = 0.5A, I_B = 10mA
		–	80	100	mV	I_C = 1A, I_B = 100mA
		–	215	345	mV	I_C = 2.5A, I_B = 250mA
		–	200	500	mV	I_C = 3A, I_B = 600mA
Base-Emitter Saturation Voltage (Note 12)	$V_{BE(sat)}$	–	1020	1100	mV	I_C = 3A, I_B = 600mA
Base-Emitter Turn-On Voltage (Note 12)	$V_{BE(on)}$	–	905	1000	mV	I_C = 3A, V_{CE} = 2V
DC Current Gain (Note 12)	h_{FE}	300	450	900	–	I_C = 10mA, V_{CE} = 2V
		120	170	–	–	I_C = 0.5A, V_{CE} = 2V
		40	60	–	–	I_C = 1A, V_{CE} = 2V
		–	10	–	–	I_C = 3A, V_{CE} = 2V
Current Gain-Bandwidth Product (Note 12)	f_T	–	175	–	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Input Capacitance (Note 12)	C_{ibo}	–	154	250	pF	V_{EB} = 0.5V, f = 1MHz
Output Capacitance (Note 12)	C_{obo}	–	8.7	15	pF	V_{CB} = 10V, f = 1MHz
Delay Time	t_d	–	16.4	–	ns	I_C = 500mA, V_{CC} = 10V, I_{B1} = -I_{B2} = 50mA
Rise Time	t_r	–	115	–	ns	
Storage Time	t_s	–	763	–	ns	
Fall Time	t_f	–	158	–	ns	

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

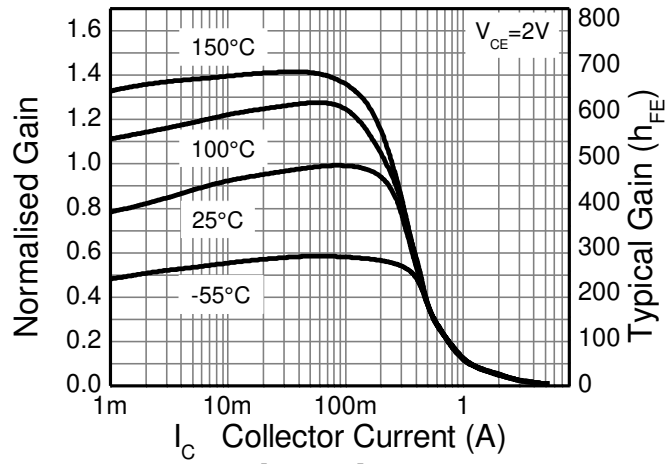
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



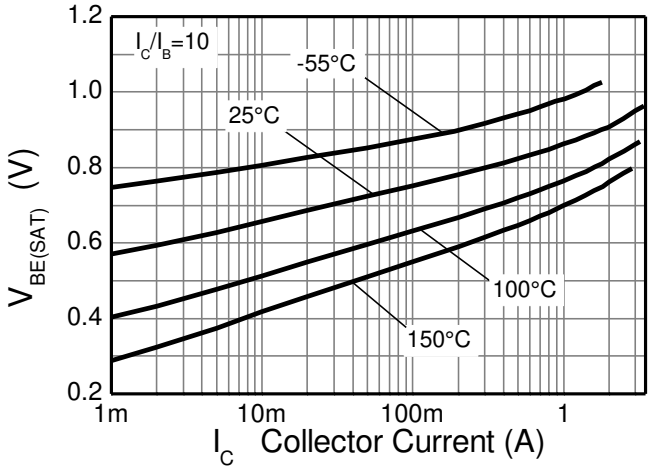
$V_{CE(SAT)}$ v I_C



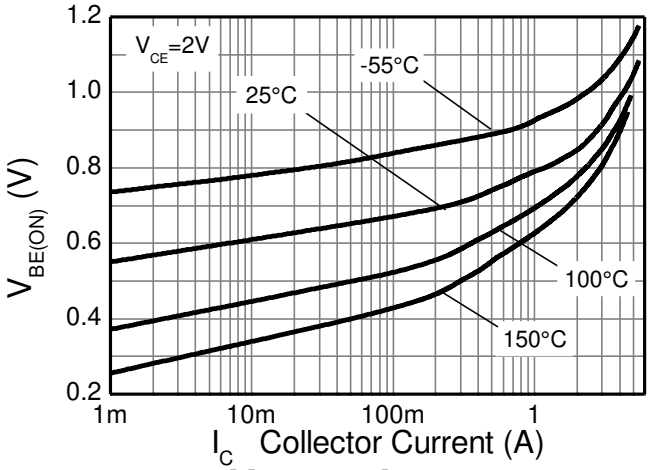
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



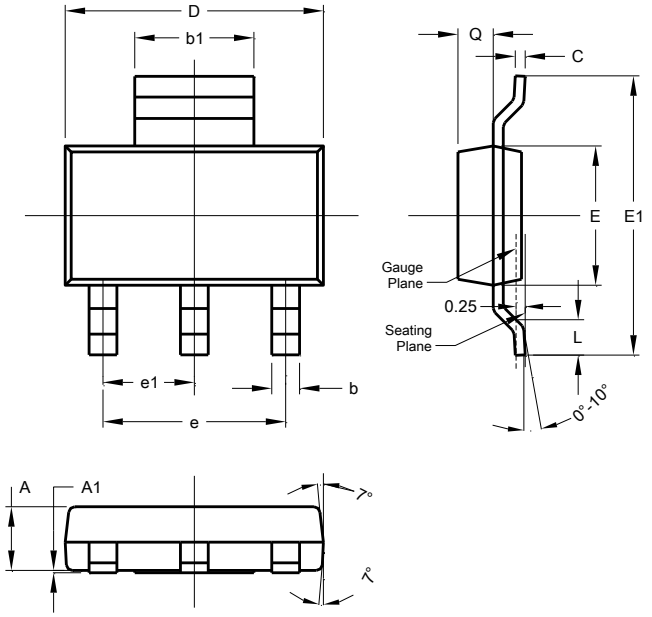
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

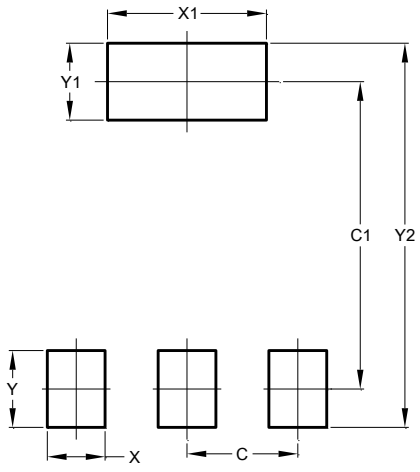
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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.



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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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