

ZXTN2005G
25V NPN LOW SATURATION TRANSISTOR IN SOT223
Features

- $BV_{CEO} > 60V$
- $I_c = 7A$ Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 50mV$ max @ 1A
- $R_{SAT} = 30m\Omega$ @ 6.5A for Low Equivalent On-Resistance
- h_{FE} Specified up to 20A 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)

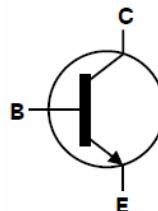
Applications

- DC-DC Converters
- MOSFET Gate Drivers
- Charging Circuits
- Power Switches
- Motor Control

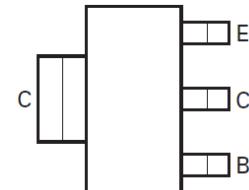
SOT223



Top View



Device Schematic



Pin-Out Top View

Ordering Information (Note 4)

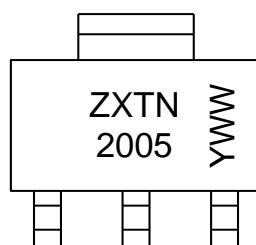
Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2005GTA	ZXTN2005	7	12	1,000

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 2005 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 5= 2015)
 WW or \bar{WW} = Week Code (01~53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	7	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	P _D	3.0	W mW/°C
		24	
Thermal Resistance, Junction to Ambient	R _{θJA}	1.6	°C/W
		12.8	
Thermal Resistance, Junction to Lead	R _{θJL}	8.8	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

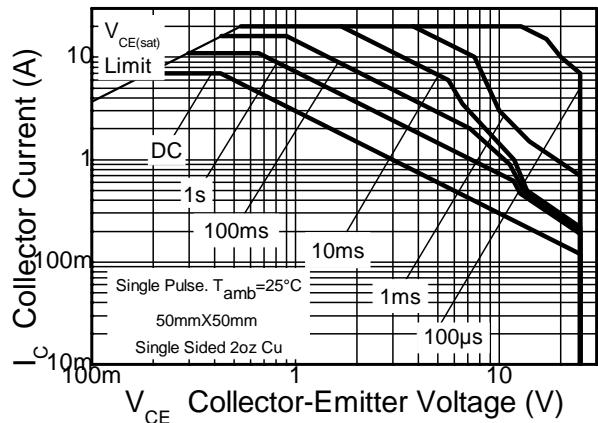
ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

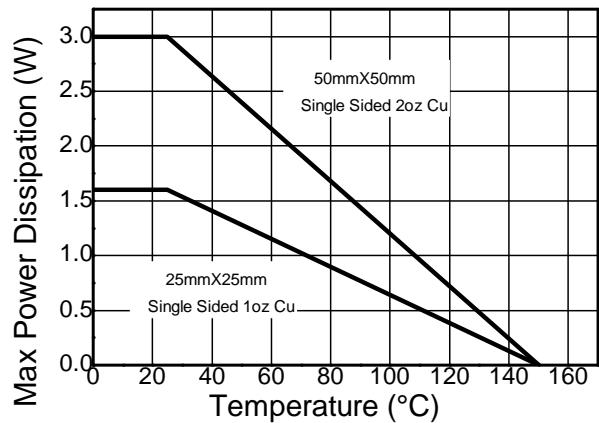
Notes:

- 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.

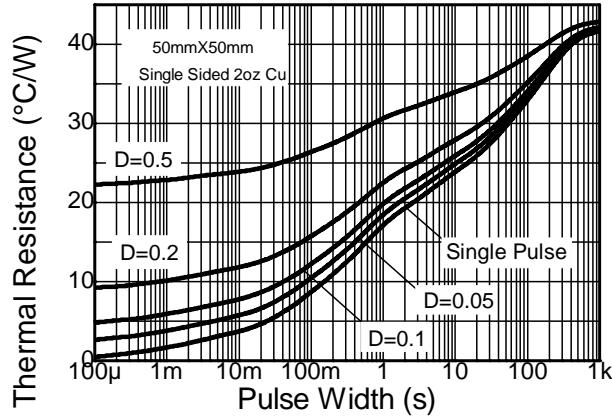
Thermal Characteristics and Derating Information



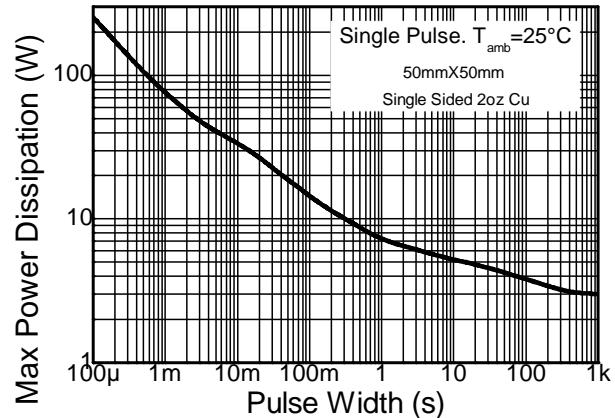
Safe Operating Area



Derating Curve



Transient Thermal Impedance



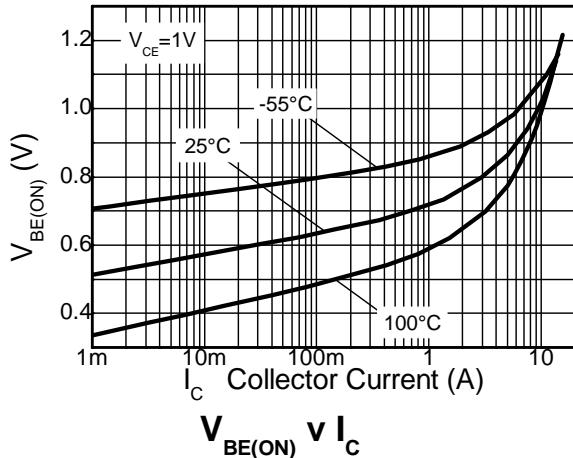
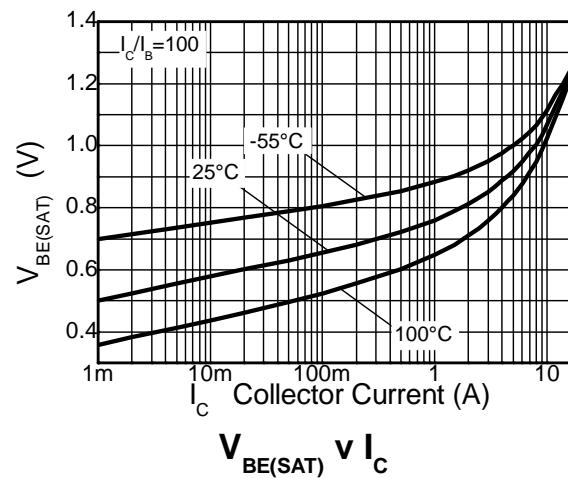
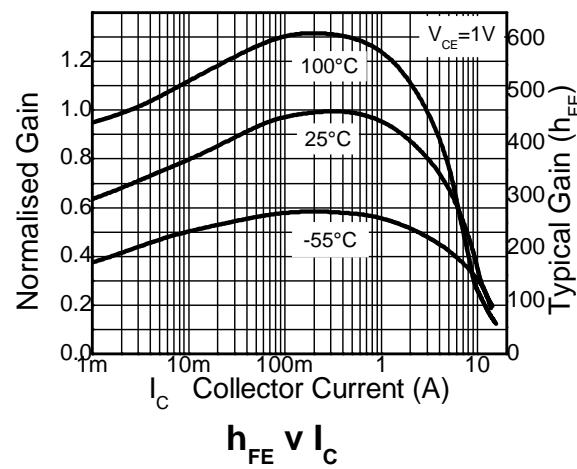
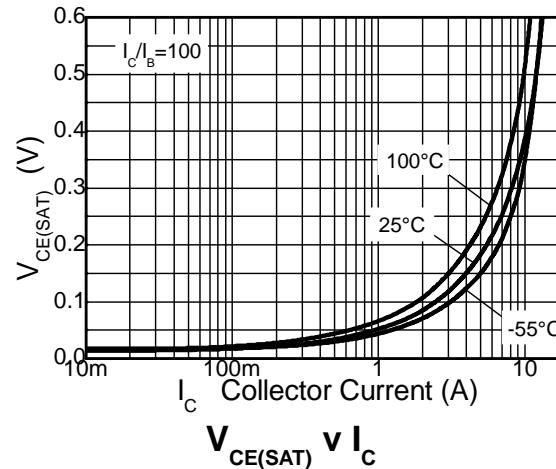
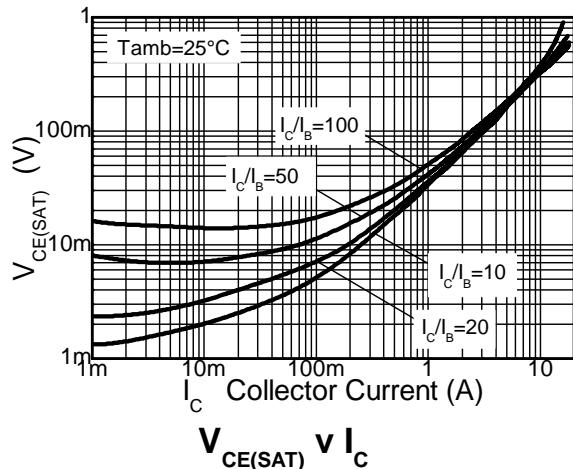
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	60	120	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CER}	60	120	—	V	$I_C = 1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	25	35	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7.0	8.1	—	V	$I_E = 100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	—	< 1	50	nA	$V_{\text{CB}} = 50\text{V}$
		—	—	0.5	μA	$V_{\text{CB}} = 50\text{V}$, $T_A = +100^\circ\text{C}$
Collector Cut-Off Current	I_{CER} $R \leq 1\text{k}\Omega$	—	< 1	100	nA	$V_{\text{CB}} = 50\text{V}$
		—	—	0.5	μA	$V_{\text{CB}} = 50\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cut-Off Current	I_{EBO}	—	< 1	10	nA	$V_{\text{EB}} = 6\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{\text{CE}(\text{sat})}$	—	28 35 55 115 195	40 50 75 140 230	mV	$I_C = 500\text{mA}$, $I_B = 10\text{mA}$ $I_C = 1\text{A}$, $I_B = 100\text{mA}$ $I_C = 1\text{A}$, $I_B = 10\text{mA}$ $I_C = 2\text{A}$, $I_B = 10\text{mA}$ $I_C = 6.5\text{A}$, $I_B = 150\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{\text{BE}(\text{sat})}$	—	980	1080	mV	$I_C = 6.5\text{A}$, $I_B = 150\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{\text{BE}(\text{on})}$	—	890	980	mV	$I_C = 6.5\text{A}$, $V_{\text{CE}} = 1\text{V}$
DC Current Gain (Note 9)	h_{FE}	300 300 200 40	400 450 275 55	—	—	$I_C = 10\text{mA}$, $V_{\text{CE}} = 1\text{V}$ $I_C = 1\text{A}$, $V_{\text{CE}} = 1\text{V}$ $I_C = 7\text{A}$, $V_{\text{CE}} = 1\text{V}$ $I_C = 20\text{A}$, $V_{\text{CE}} = 1\text{V}$
Transition Frequency	f_T	—	150	—	MHz	$V_{\text{CE}} = 10\text{V}$, $I_C = 100\text{mA}$, $f = 50\text{MHz}$
Output Capacitance (Note 9)	C_{obo}	—	48	—	pF	$V_{\text{CB}} = 10\text{V}$, $f = 1\text{MHz}$
Switching Times	t_{ON} t_{OFF}	—	33	—	ns	$V_{\text{CC}} = 10\text{V}$, $I_C = 1\text{A}$, $ I_{B1} = - I_{B2} = 100\text{mA}$
		—	464	—		

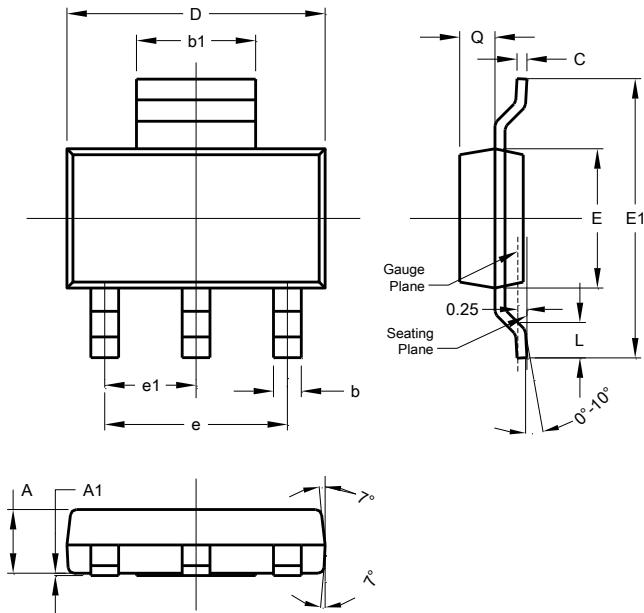
Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

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

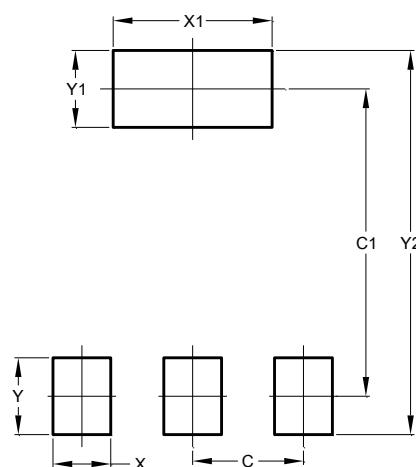


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89

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
C2	8.00

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