

# ZXTN2005G

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## 25V NPN LOW SATURATION TRANSISTOR IN SOT223

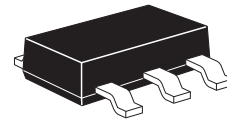
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### SUMMARY

$BV_{CEO} = 25V$  ;  $R_{SAT} = 30m\Omega$ ;  $I_C = 7A$

### DESCRIPTION

Packaged in the SOT223 outline this new low saturation 25V NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.



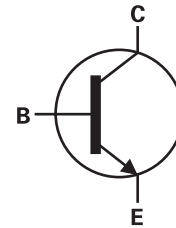
SOT223

### FEATURES

- Extremely low equivalent on-resistance;  $R_{SAT} = 30m\Omega$  at 6.5A
- 7 amps continuous current
- Up to 20 amps peak current
- Very low saturation voltages
- Excellent  $h_{FE}$  characteristics up to 20 amps

### APPLICATIONS

- DC - DC converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Motor control

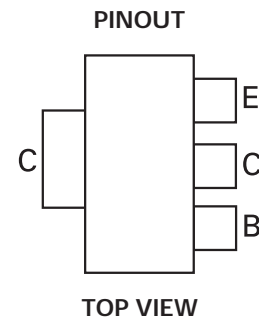


### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXTN2005GTA	7"	12mm embossed	1,000 units
ZXTN2005GTC	13"	12mm embossed	4,000 units

### DEVICE MARKING

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## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-base voltage	$BV_{CBO}$	60	V
Collector-emitter voltage	$BV_{CEO}$	25	V
Emitter-base voltage	$BV_{EBO}$	7	V
Continuous collector current	$I_C$	7	A
Peak pulse current	$I_{CM}$	20	A
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup>	$P_D$	3.0	W
Linear derating factor		24	mW/ $^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup>	$P_D$	1.6	W
Linear derating factor		12.8	mW/ $^\circ\text{C}$
Operating and storage temperature range	$T_j, T_{stg}$	-55 to +150	$^\circ\text{C}$

## THERMAL RESISTANCE

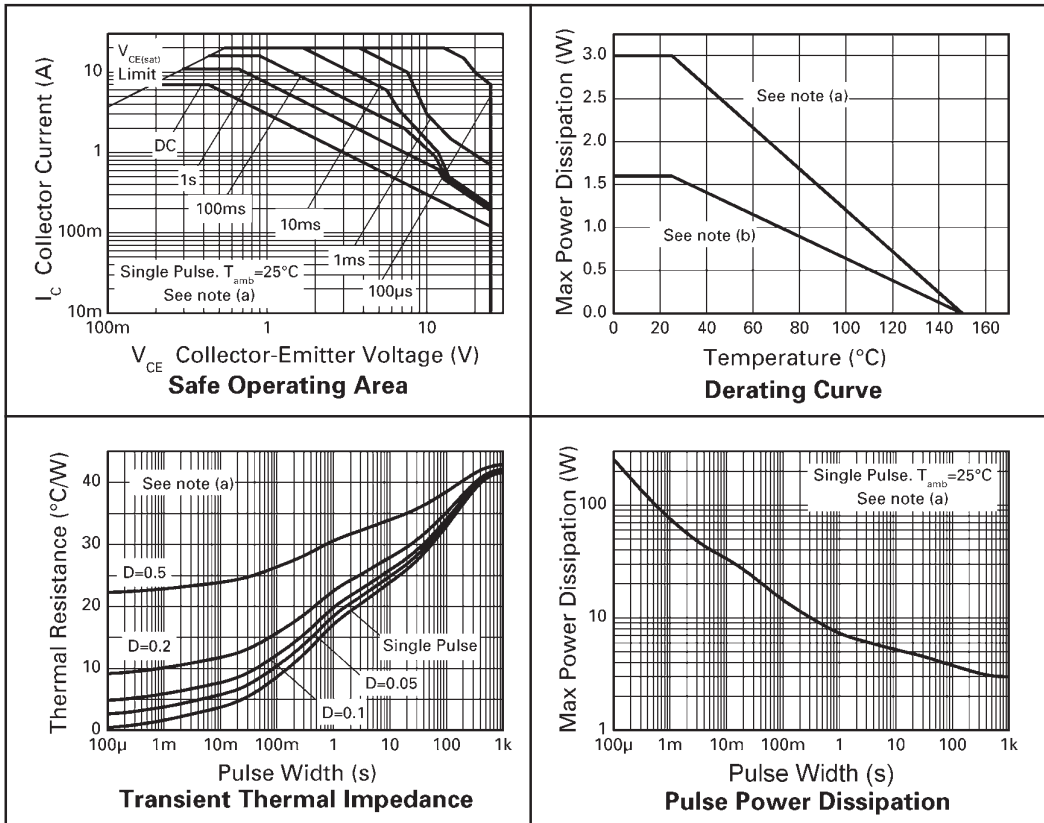
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	42	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	78	$^\circ\text{C}/\text{W}$

### NOTES

- (a) For a device surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.  
(b) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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## CHARACTERISTICS



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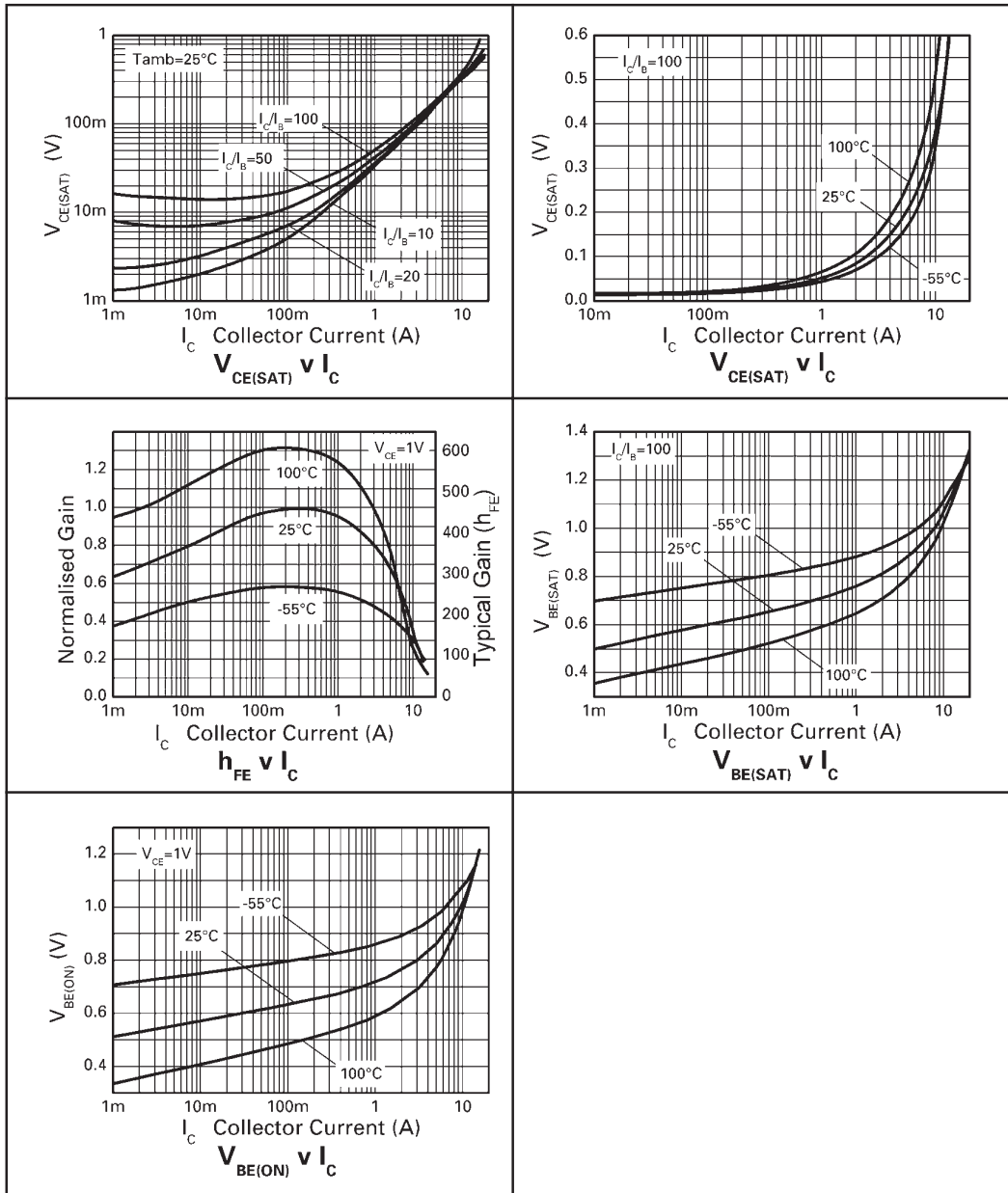
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
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	$BV_{CEO}$	25	35		V	$I_C = 10\text{mA}^*$
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.1		V	$I_E = 100\mu\text{A}$
Collector cut-off current	$I_{CBO}$			20 0.5	nA $\mu\text{A}$	$V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector cut-off current	$I_{CER}$ $R \leq 1\text{k}\Omega$			20 0.5	nA $\mu\text{A}$	$V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Emitter cut-off current	$I_{EBO}$			10	nA	$V_{EB} = 6\text{V}$
Collector-emitter saturation voltage	$V_{CE(SAT)}$		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	$V_{BE(SAT)}$		980	1080	mV	$I_C = 6.5\text{A}$ , $I_B = 150\text{mA}^*$
Base-emitter turn-on voltage	$V_{BE(ON)}$		890	980	mV	$I_C = 6.5\text{A}$ , $V_{CE} = 1\text{V}^*$
Static forward current transfer ratio	$h_{FE}$	300 300 200 40	400 450 275 55			$I_C = 10\text{mA}$ , $V_{CE} = 1\text{V}^*$ $I_C = 1\text{A}$ , $V_{CE} = 1\text{V}^*$ $I_C = 7\text{A}$ , $V_{CE} = 1\text{V}^*$ $I_C = 20\text{A}$ , $V_{CE} = 1\text{V}^*$
Transition frequency	$f_T$		150			$I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$ $f = 50\text{MHz}$
Output capacitance	$C_{OBO}$		48		pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^*$
Switching times	$t_{ON}$ $t_{OFF}$		33 464		ns	$I_C = 1\text{A}$ , $V_{CC} = 10\text{V}$ , $I_{B1} = -I_{B2} = 100\text{mA}$

\* Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

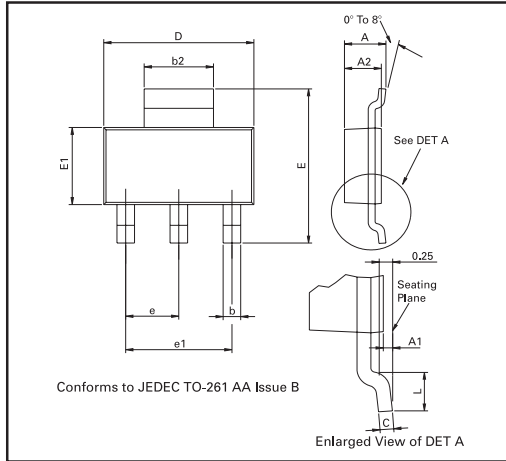
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## TYPICAL CHARACTERISTICS

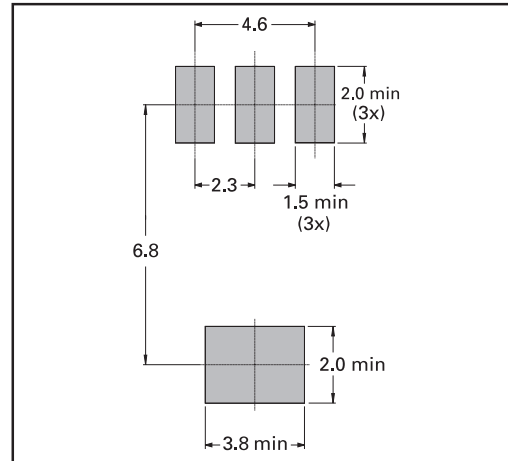


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## PACKAGE OUTLINE



## PAD LAYOUT DETAILS



Controlling dimensions are in millimeters. Approximate conversions are given in inches

## PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	-	1.80	-	0.071	e	2.30 BSC		0.0905 BSC	
A1	0.02	0.10	0.0008	0.004	e1	4.60 BSC		0.181 BSC	
b	0.66	0.84	0.026	0.033	E	6.70	7.30	0.264	0.287
b2	2.90	3.10	0.114	0.122	E1	3.30	3.70	0.130	0.146
C	0.23	0.33	0.009	0.013	L	0.90	-	0.355	-
D	6.30	6.70	0.248	0.264	-	-	-	-	-

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