

# ZX5T869G

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## 25V NPN LOW SATURATION TRANSISTOR IN SOT223

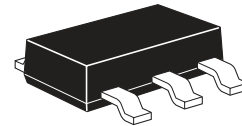
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### SUMMARY

$BV_{CEO} = 25V$  ;  $R_{SAT} = 27m\Omega$ ;  $I_C = 7A$

### DESCRIPTION

Packaged in the SOT223 outline this new 5th generation 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.



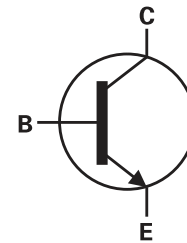
SOT223

### FEATURES

- Extremely low equivalent on-resistance;  $R_{SAT} = 27m\Omega$  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

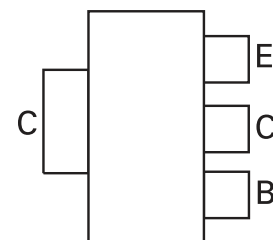
- DC - DC converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Motor control



### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZX5T869GTA	7"	12mm embossed	1000 units
ZX5T869GTC	13"	12mm embossed	4000 units

### PINOUT



TOP VIEW

### DEVICE MARKING

- X5T869

# ZX5T869G

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-base voltage	$BV_{CBO}$	60	V
Collector-emitter voltage	$BV_{CEO}$	25	V
Emitter-base voltage	$BV_{EBO}$	7.5	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/°C
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup>	$P_D$	1.6	W
Linear derating factor		12.8	mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to +150	°C

## THERMAL RESISTANCE

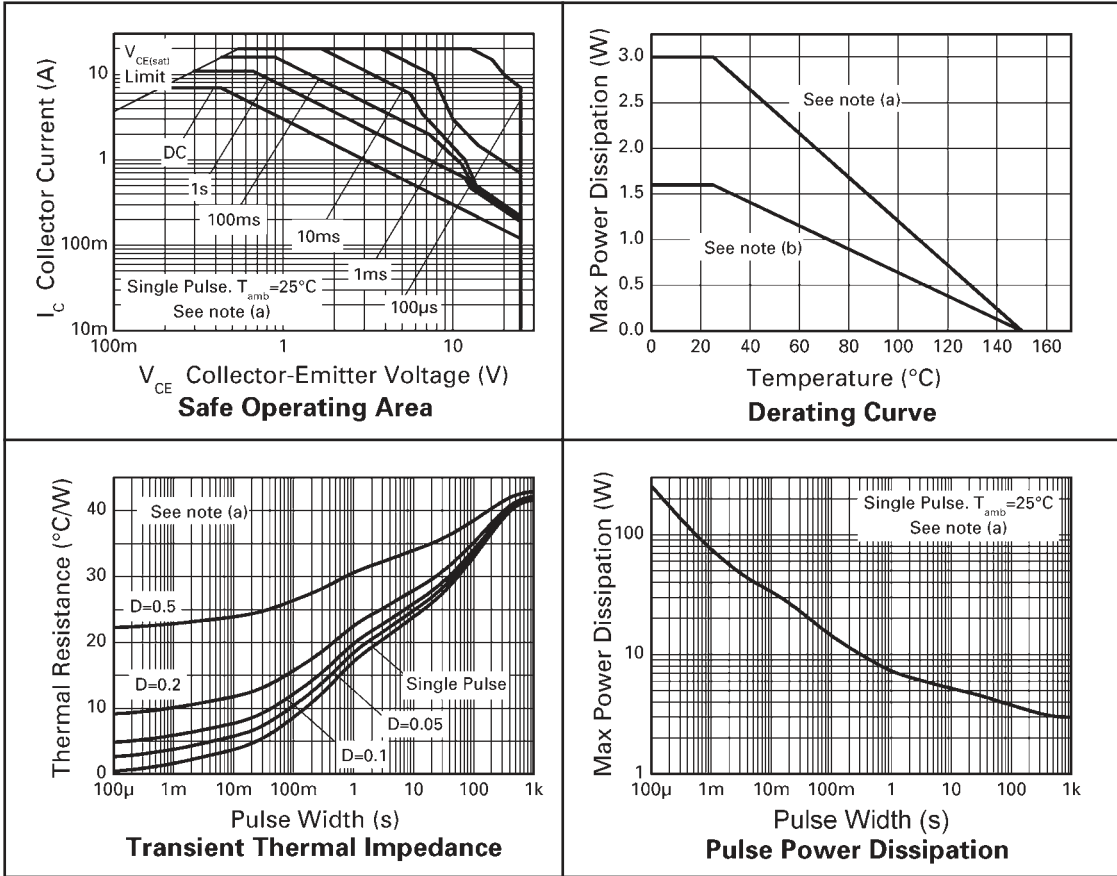
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	42	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	78	°C/W

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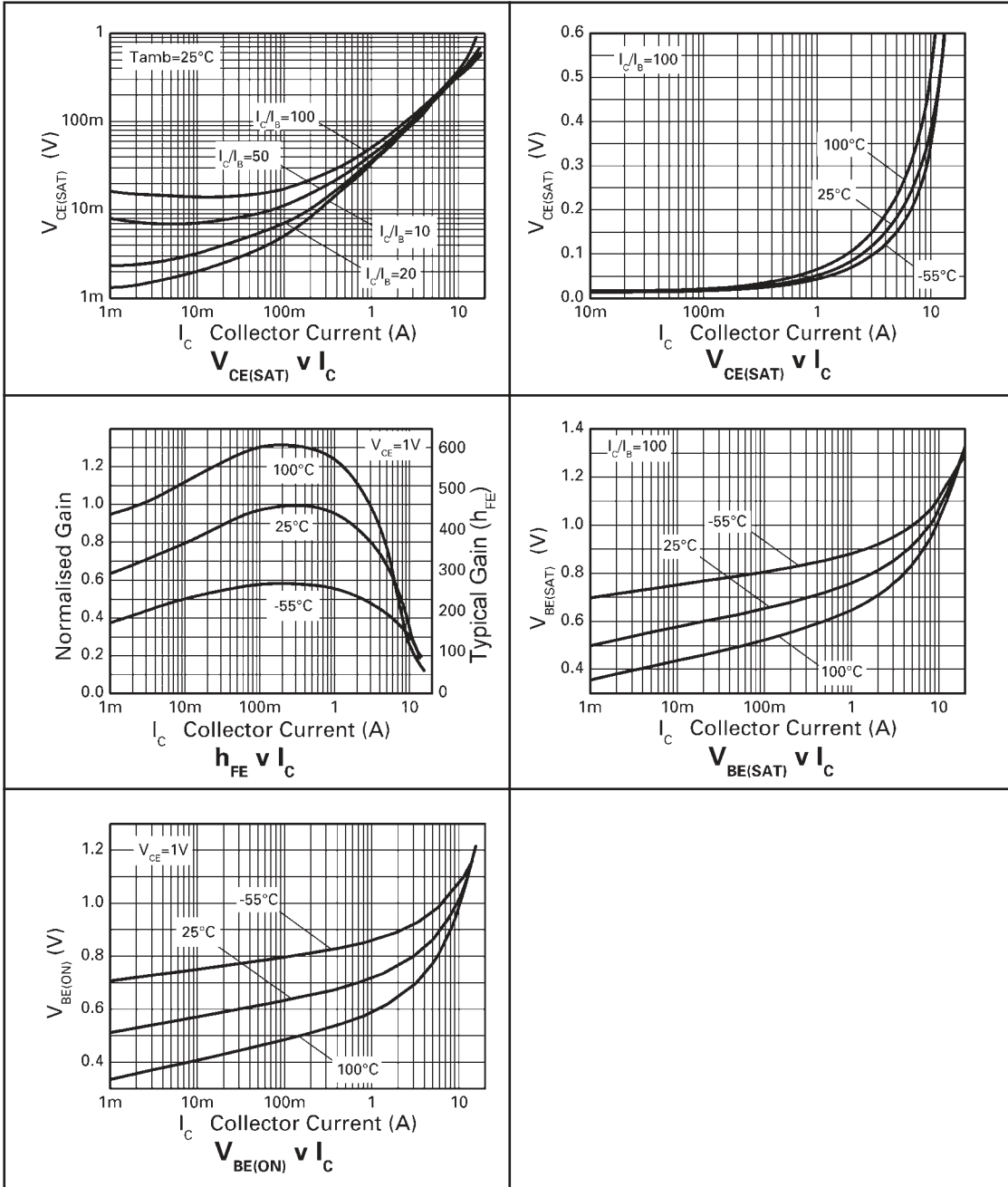
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Collector-base breakdown voltage	$BV_{CBO}$	60	105		V	$I_C=100\mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CER}$	60	105		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	$BV_{EBO}$	7.5	8.2		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	$V_{CE(SAT)}$		26 51 98 173	40 65 80 150 220	mV mV mV mV 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	$V_{BE(SAT)}$		1010	1080	mV	$I_C=6.5\text{A}$ , $I_B=150\text{mA}^*$
Base-emitter turn-on voltage	$V_{BE(ON)}$		885	980	mV	$I_C=6.5\text{A}$ , $V_{CE}=1\text{V}^*$
Static forward current transfer ratio	$h_{FE}$	300 300 200 40	400 450 300 90			$I_C=10\text{mA}$ , $V_{CE}=1\text{V}^*$ $I_C=1\text{A}$ , $V_{CE}=1\text{V}^*$ $I_C=7\text{A}$ , $V_{CE}=1\text{V}^*$ $I_C=20\text{A}$ , $V_{CE}=1\text{V}^*$
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  $\leq 2\%$ .

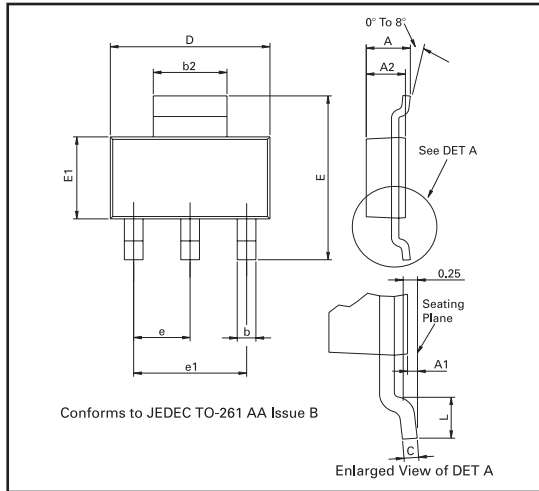
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## TYPICAL CHARACTERISTICS

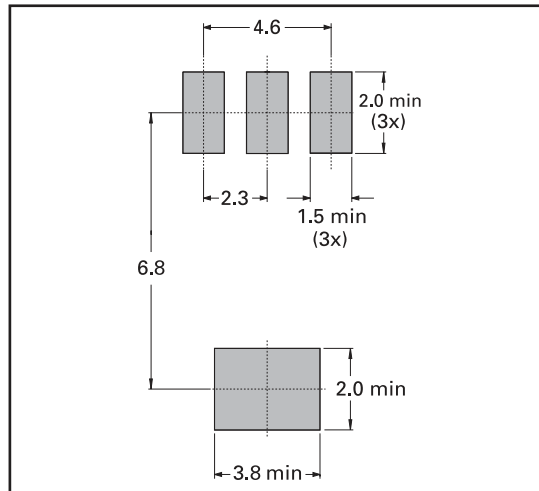


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## PACKAGE OUTLINE



## 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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