

# ZXTN2010Z

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## 60V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

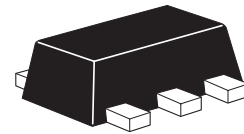
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### SUMMARY

$BV_{CEO} = 60V$  ;  $R_{SAT} = 30m\Omega$ ;  $I_C = 5A$

### DESCRIPTION

Packaged in the SOT89 outline this new low saturation 60V NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.



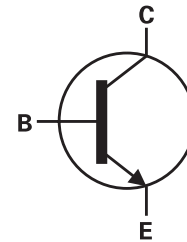
SOT89

### FEATURES

- Extremely low equivalent on-resistance;  $R_{SAT} = 30m\Omega$  at 6A
- 5 amps continuous current
- Up to 20 amps peak current
- Very low saturation voltages
- Excellent  $h_{FE}$  characteristics up to 10 amps

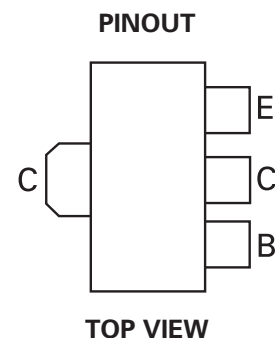
### APPLICATIONS

- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC-DC modules
- Backlight inverters
- Power switches
- MOSFET gate drivers



### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXTN2010ZTA	7"	12mm embossed	1,000 units



### DEVICE MARKING

851

# ZXTN2010Z

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-base voltage	$BV_{CBO}$	150	V
Collector-emitter voltage	$BV_{CEO}$	60	V
Emitter-base voltage	$BV_{EBO}$	7	V
Continuous collector current <sup>(a)</sup>	$I_C$	5	A
Peak pulse current	$I_{CM}$	20	A
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup>	$P_D$	1.5	W
Linear derating factor		12	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup>	$P_D$	2.1	W
Linear derating factor		16.8	mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to +150	°C

## THERMAL RESISTANCE

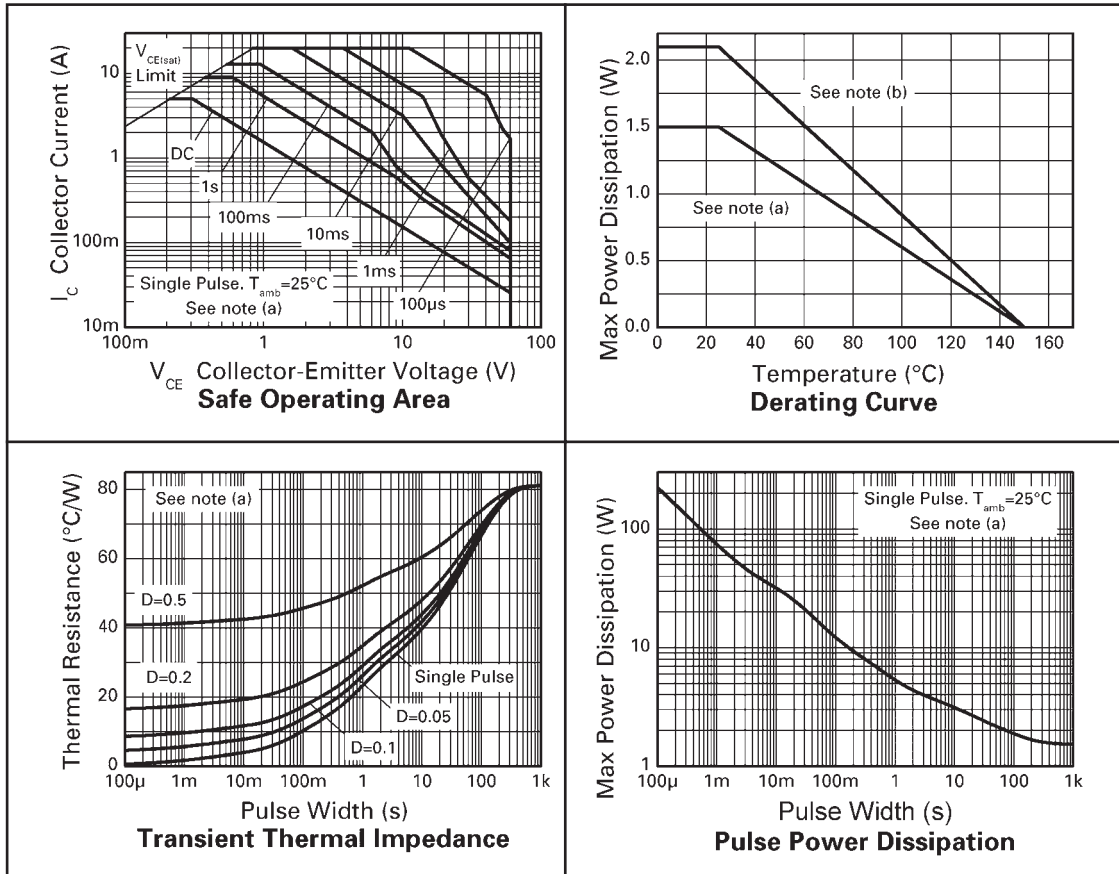
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	83	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	60	°C/W

### NOTES

- (a) 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.  
(b) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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## CHARACTERISTICS



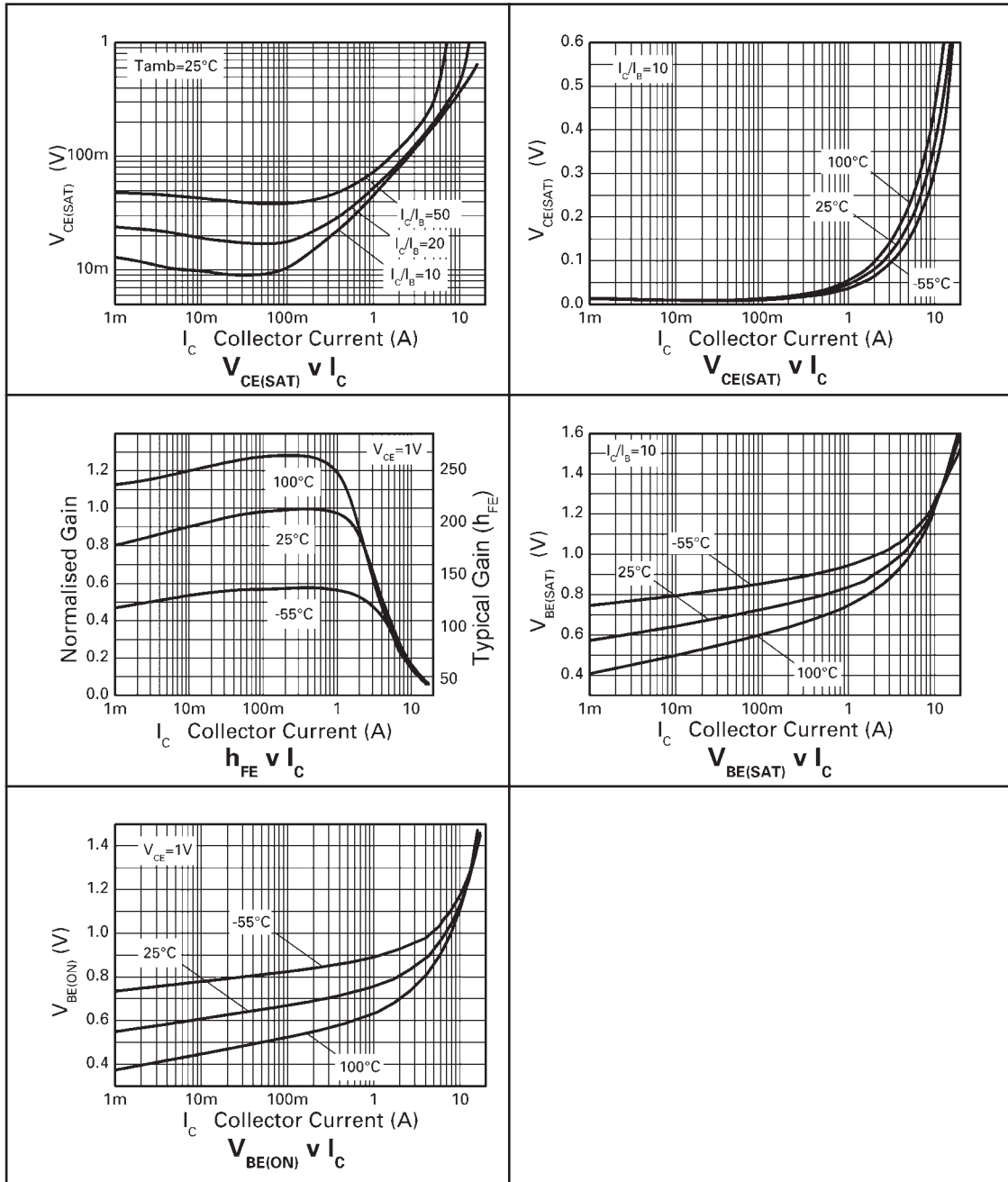
# ZXTN2010Z

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Collector-base breakdown voltage	$BV_{CBO}$	150	190		V	$I_C=100\mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CER}$	150	190		V	$I_C=1\mu\text{A}$ , $R_B\leq 1\text{k}\Omega$
Collector-emitter breakdown voltage	$BV_{CEO}$	60	80		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	$I_{CBO}$			50 0.5	nA $\mu\text{A}$	$V_{CB}=120\text{V}$ $V_{CB}=120\text{V}$ , $T_{amb}=100^{\circ}\text{C}$
Collector cut-off current	$I_{CER}$ $R \leq 1\text{k}\Omega$			100 0.5	nA $\mu\text{A}$	$V_{CB}=120\text{V}$ $V_{CB}=120\text{V}$ , $T_{amb}=100^{\circ}\text{C}$
Emitter cut-off current	$I_{EBO}$			10	nA	$V_{EB}=6\text{V}$
Collector-emitter saturation voltage	$V_{CE(SAT)}$		17 35 40 90 170	30 55 65 125 230	mV	$I_C=100\text{mA}$ , $I_B=5\text{mA}^*$ $I_C=1\text{A}$ , $I_B=100\text{mA}^*$ $I_C=1\text{A}$ , $I_B=50\text{mA}^*$ $I_C=2\text{A}$ , $I_B=50\text{mA}^*$ $I_C=6\text{A}$ , $I_B=300\text{mA}^*$
Base-emitter saturation voltage	$V_{BE(SAT)}$		970	1100	mV	$I_C=6\text{A}$ , $I_B=300\text{mA}^*$
Base-emitter turn-on voltage	$V_{BE(ON)}$		910	1050	mV	$I_C=6\text{A}$ , $V_{CE}=1\text{V}^*$
Static forward current transfer ratio	$H_{FE}$	100 100 55 20	200 200 105 40	300		$I_C=10\text{mA}$ , $V_{CE}=1\text{V}^*$ $I_C=2\text{A}$ , $V_{CE}=1\text{V}^*$ $I_C=5\text{A}$ , $V_{CE}=1\text{V}^*$ $I_C=10\text{A}$ , $V_{CE}=1\text{V}^*$
Transition frequency	$f_T$		130			$I_C=100\text{mA}$ , $V_{CE}=10\text{V}$ $f=50\text{MHz}$
Output capacitance	$C_{OBO}$		31		pF	$V_{CB}=10\text{V}$ , $f=1\text{MHz}^*$
Switching times	$t_{ON}$ $t_{OFF}$		42 760		ns	$I_C=1\text{A}$ , $V_{CC}=10\text{V}$ , $I_{B1}=I_{B2}=100\text{mA}$

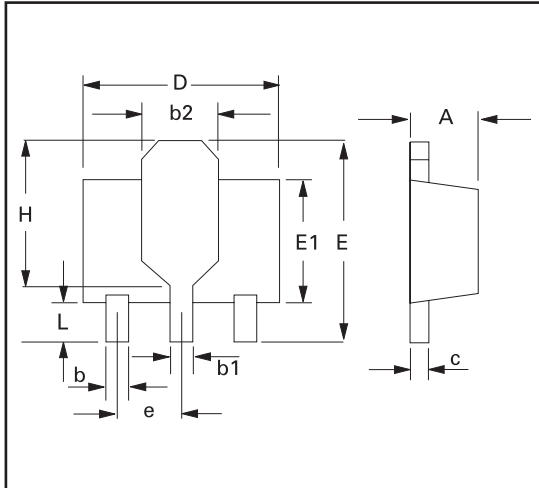
\* Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## TYPICAL CHARACTERISTICS

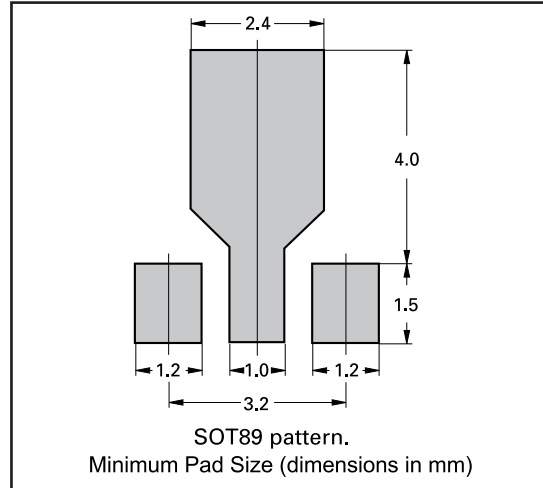


# ZXTN2010Z

## 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	1.40	1.60	0.550	0.630	e	1.40	1.50	0.055	0.059
b	0.38	0.48	0.015	0.019	E	3.75	4.25	0.150	0.167
b1	-	0.53	-	0.021	E1	-	2.60	-	0.102
b2	1.50	1.80	0.060	0.071	G	2.90	3.00	0.114	0.118
c	0.28	0.44	0.011	0.017	H	2.60	2.85	0.102	0.112
D	4.40	4.60	0.173	0.181	-	-	-	-	-

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