

# ZXTN2010Z

---

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

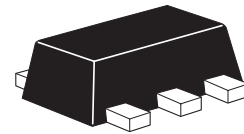
---

### 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.



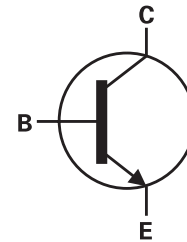
SOT89

### FEATURES

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

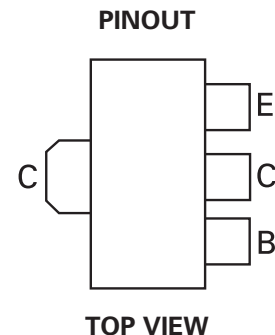
### APPLICATIONS

- 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/ $^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup>	$P_D$	2.1	W
Linear derating factor		16.8	mW/ $^\circ\text{C}$
Operating and storage temperature range	$T_j, T_{stg}$	-55 to +150	$^\circ\text{C}$

## THERMAL RESISTANCE

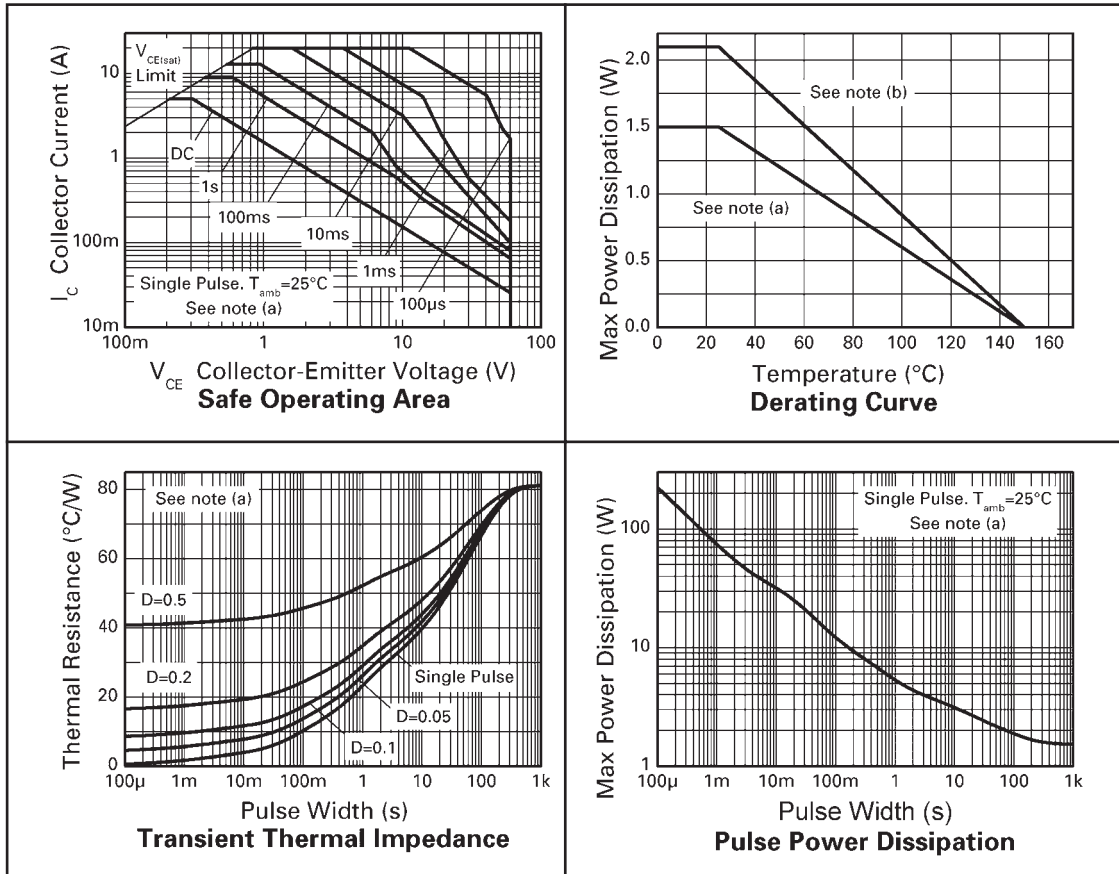
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	83	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$

### 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.

# ZXTN2010Z

## CHARACTERISTICS



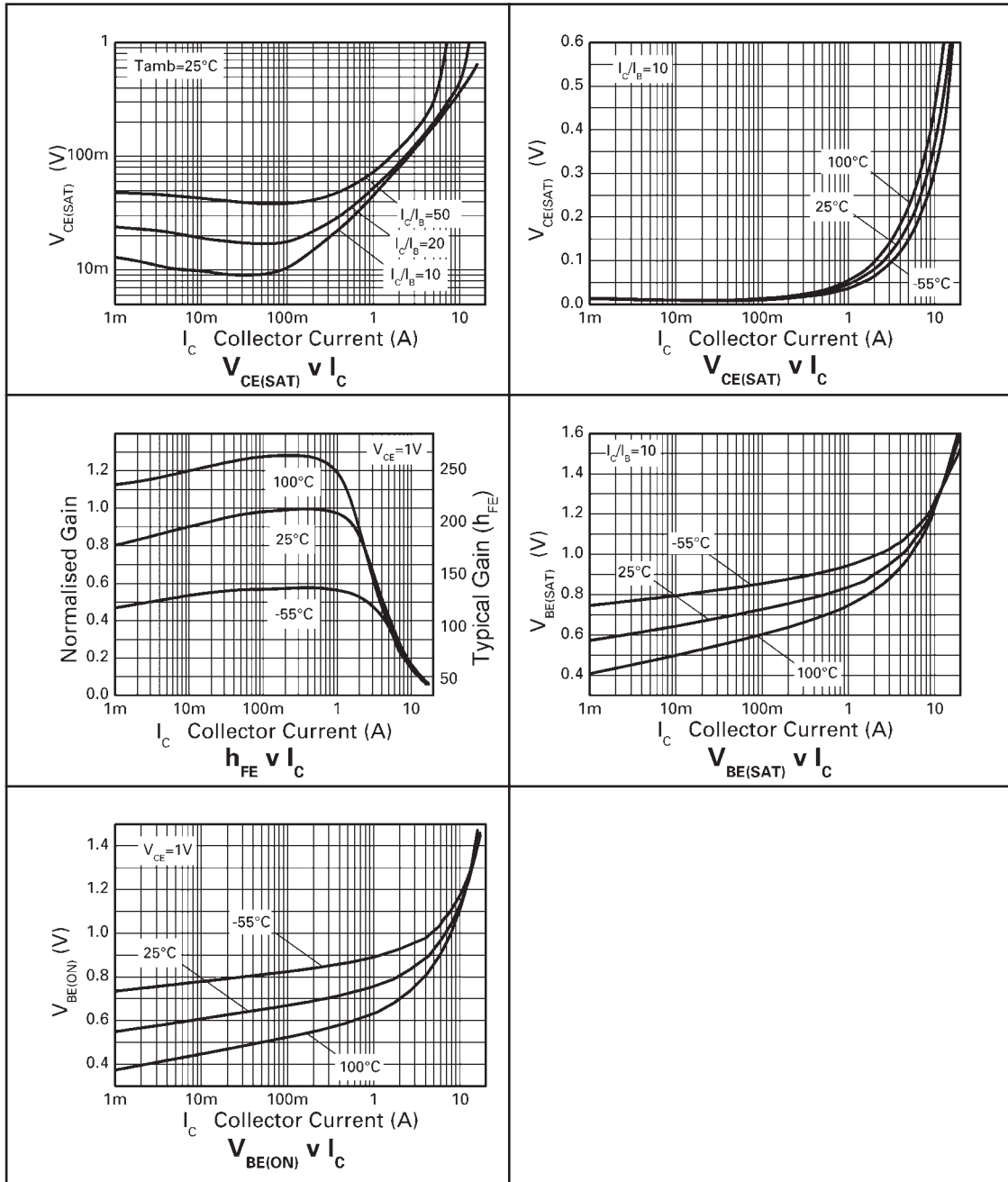
# ZXTN2010Z

## 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	$I_C=1\text{A}$ , $V_{CC}=10\text{V}$ , $I_{B1}=I_{B2}=100\text{mA}$

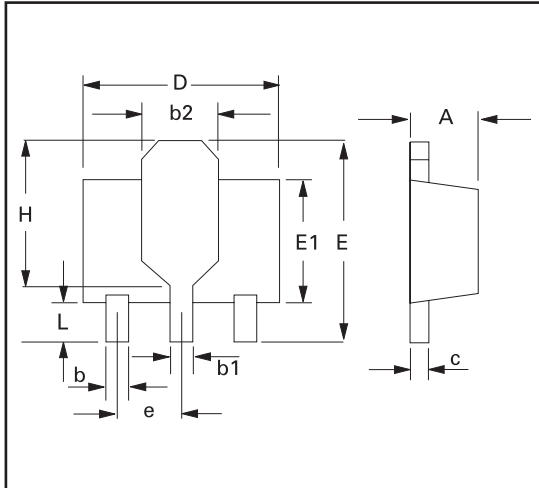
\* Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

TYPICAL CHARACTERISTICS

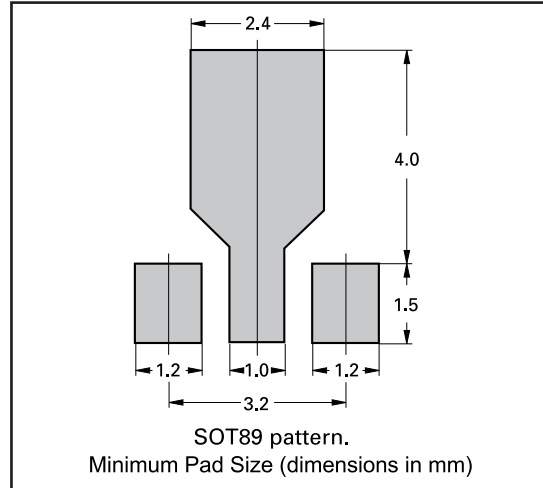


# ZXTN2010Z

## 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	-	-	-	-	-

© Zetex Semiconductors plc 2005

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Hwy Hauppauge, NY 11788 USA	Zetex (Asia) Ltd 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong	Zetex Semiconductors plc Zetex Technology Park Chadderton, Oldham, OL9 9LL United Kingdom
Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 <a href="mailto:europe.sales@zetex.com">europe.sales@zetex.com</a>	Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 <a href="mailto:usa.sales@zetex.com">usa.sales@zetex.com</a>	Telephone: (852) 26100 611 Fax: (852) 24250 494 <a href="mailto:asia.sales@zetex.com">asia.sales@zetex.com</a>	Telephone (44) 161 622 4444 Fax: (44) 161 622 4446 <a href="mailto:hq@zetex.com">hq@zetex.com</a>

These offices are supported by agents and distributors in major countries world-wide.

This publication is issued to provide outline information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or be regarded as a representation relating to the products or services concerned. The Company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.

For the latest product information, log on to [www.zetex.com](http://www.zetex.com)



ISSUE 2 - MAY 2006