

ZXTN25100DZ

100V NPN high gain transistor in SOT89

Summary

$BV_{CEX} > 180V$

$BV_{CEO} > 100V$

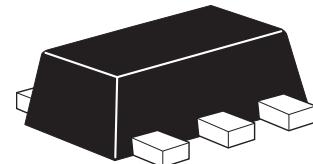
$BV_{ECO} > 6V$

$I_C(\text{cont}) = 2.5A$

$V_{CE(\text{sat})} < 100mV @ 1A$

$R_{CE(\text{sat})} = 80m\Omega$

$P_D = 2.4W$



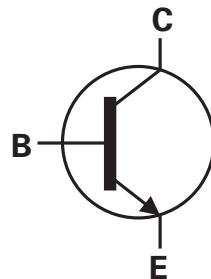
Complementary part number ZXTP25100CZ

Description

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

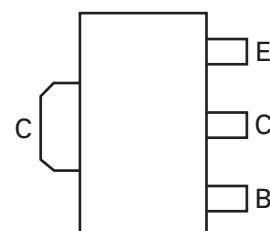
Features

- High power dissipation SOT89 package
- High gain
- Low saturation voltage
- 180V forward blocking voltage
- 6V reverse blocking voltage



Applications

- PSU start up switch
- DC - DC converters
- Motor drive
- Relay, lamp and solenoid drive



Pinout - top view

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25100DZTA	7	12	1000

Device marking

1K9

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-Base voltage	V_{CBO}	180	V
Collector-Emitter voltage (forward blocking)	V_{CEX}	180	V
Collector-Emitter voltage	V_{CEO}	100	V
Emitter-Collector voltage (reverse blocking)	V_{ECO}	6	V
Emitter-Base voltage	V_{EBO}	7	V
Continuous Collector current ^(c)	I_C	2.5	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	3.5	A
Power dissipation at $T_A = 25^\circ\text{C}$ ^(a)	P_D	1.1	W
Linear derating factor		8.8	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ ^(b)	P_D	1.8	W
Linear derating factor		14.4	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ ^(c)	P_D	2.4	W
Linear derating factor		19.2	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ ^(d)	P_D	4.46	W
Linear derating factor		35.7	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_C = 25^\circ\text{C}$ ^(e)	P_D	19.2	W
Linear derating factor		153	$\text{mW}/^\circ\text{C}$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^\circ\text{C}$

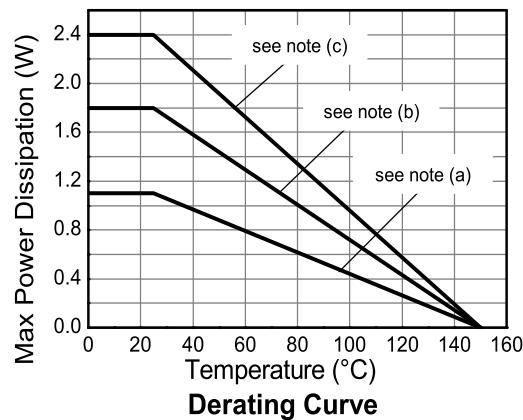
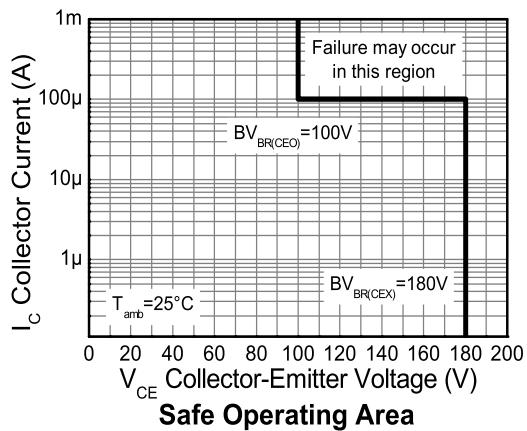
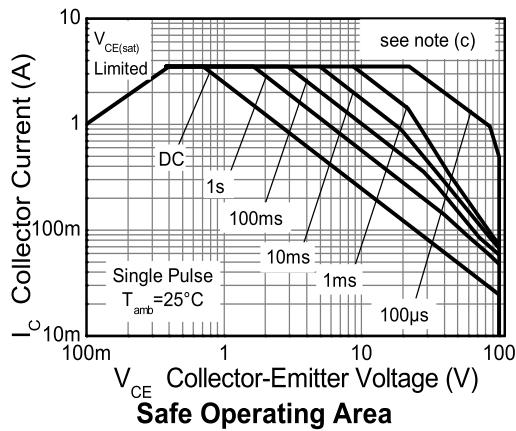
Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient ^(a)	$R_{\Theta JA}$	117	$^\circ\text{C}/\text{W}$
Junction to ambient ^(b)	$R_{\Theta JA}$	68	$^\circ\text{C}/\text{W}$
Junction to ambient ^(c)	$R_{\Theta JA}$	51	$^\circ\text{C}/\text{W}$
Junction to ambient ^(d)	$R_{\Theta JA}$	28	$^\circ\text{C}/\text{W}$
Junction to case ^(e)	$R_{\Theta JC}$	7.95	$^\circ\text{C}/\text{W}$

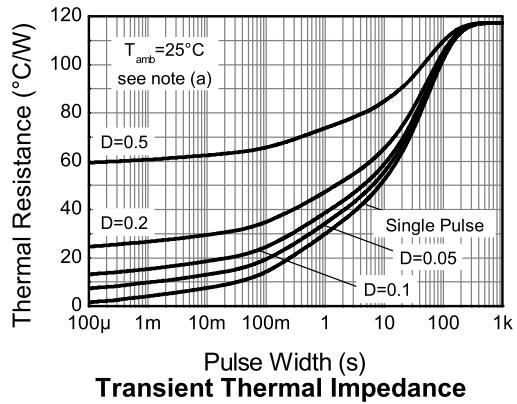
NOTES:

- (a) For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
- (b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
- (c) Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
- (d) As (c) above measured at $t < 5$ seconds.
- (e) Junction to case (collector tab). Typical

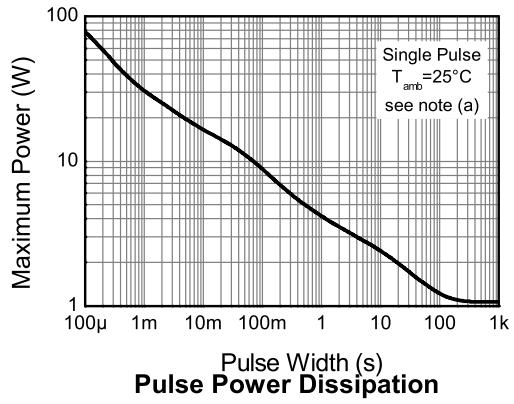
Thermal characteristics



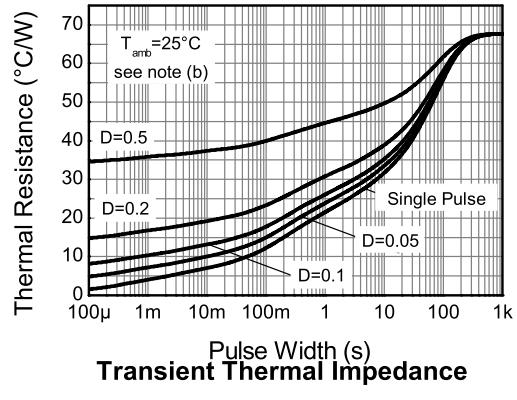
Thermal characteristics



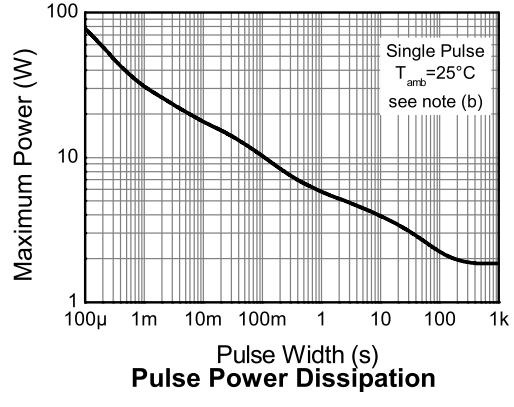
Transient Thermal Impedance



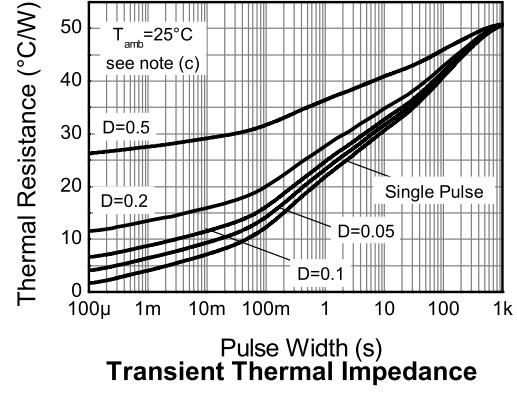
Pulse Power Dissipation



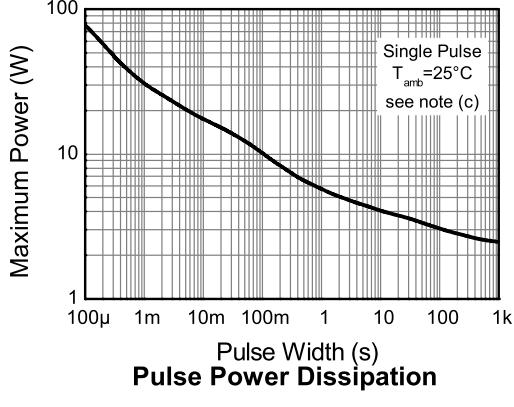
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



Pulse Power Dissipation

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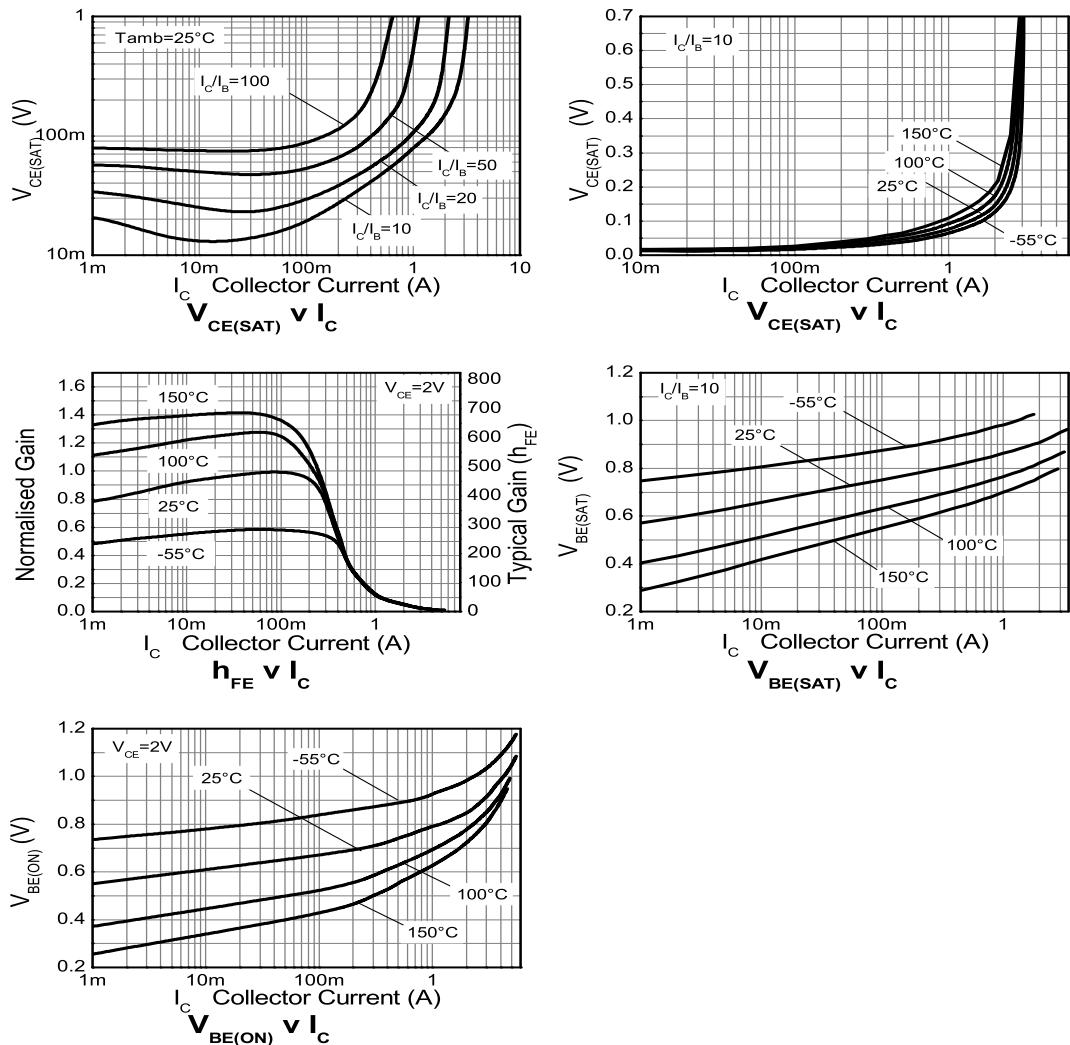
Electrical characteristics (at $T_{amb} = 25^\circ C$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV_{CBO}	180	220		V	$I_C = 100\mu A$
Collector-Emitter breakdown voltage (forward blocking)	BV_{CEX}	180	220		V	$I_C = 100\mu A, R_{BE} < 1k\Omega$ or $-1V > V_{BE} > 0.25V$
Collector-Emitter breakdown voltage	BV_{CEO}	100	130		V	$I_C = 10mA$ (*)
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.2		V	$I_E = 100\mu A, R_{BC} < 1k\Omega$ or $0.25V > V_{BC} > -0.25V$
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECO}	6	8.7		V	$I_E = 100\mu A$
Emitter-Base breakdown voltage	BV_{EBO}	7	8.3		V	$I_E = 100\mu A$
Collector-Base cut-off current	I_{CBO}		<1	50 0.5	nA μA	$V_{CB} = 180V$ $V_{CB} = 180V, T_{amb} = 100^\circ C$
Collector-Emitter cut-off current	I_{CEX}			100	nA	$V_{CE} = 100V, R_{BE} < 1k\Omega$ or $-1V < V_{BE} < 0.25V$
Emitter cut-off current	I_{EBO}		<1	50	nA	$V_{EB} = 5.6V$
Collector-Emitter saturation voltage	$V_{CE(sat)}$		120 80 220	170 100 345	mV mV mV	$I_C = 0.5A, I_B = 10mA$ (*) $I_C = 1A, I_B = 100mA$ (*) $I_C = 2.5A, I_B = 250mA$ (*)
Base-Emitter saturation voltage	$V_{BE(sat)}$		935	1000	mV	$I_C = 2.5A, I_B = 250mA$ (*)
Base-Emitter turn-on voltage	$V_{BE(on)}$		890	950	mV	$I_C = 2.5A, V_{CE} = 2V$ (*)
Static forward current transfer ratio	h_{FE}	300 120 40	450 170 60 20	900		$I_C = 10mA, V_{CE} = 2V$ (*) $I_C = 0.5A, V_{CE} = 2V$ (*) $I_C = 1A, V_{CE} = 2V$ (*) $I_C = 2.5A, V_{CE} = 2V$ (*)
Transition frequency	f_T		175		MHz	$I_C = 50mA, V_{CE} = 10V$ $f = 100MHz$
Input capacitance	C_{ibo}		154	250	pF	$V_{EB} = 0.5V, f = 1MHz$ (*)
Output capacitance	C_{obo}		8.7	15	pF	$V_{CB} = 10V, f = 1MHz$ (*)
Delay time	t_d		16.4		ns	$I_C = 500mA, V_{CC} = 10V$, $I_{B1} = -I_{B2} = 50mA$
Rise time	t_r		115		ns	
Storage time	t_s		763		ns	
Fall time	t_f		158		ns	

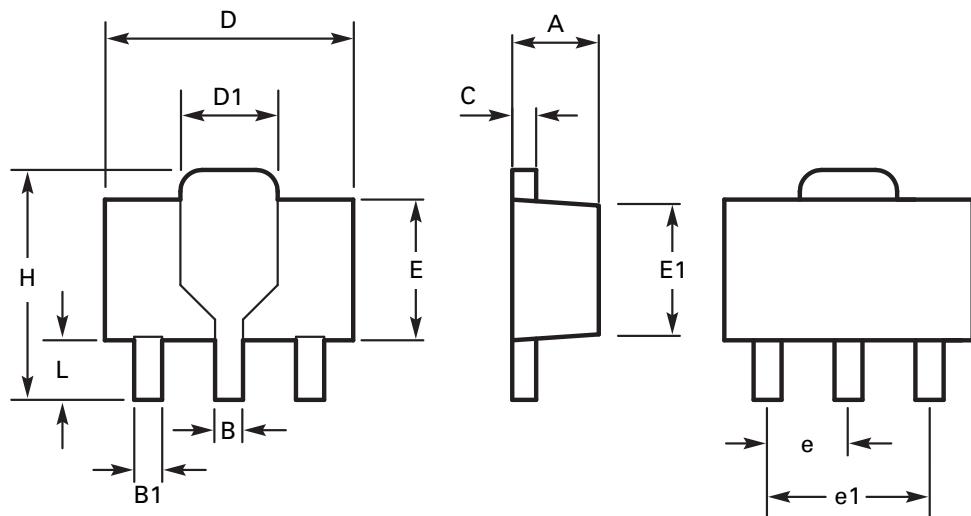
NOTES:

(*)Measured under pulsed conditions. Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

Typical characteristics



Package outline - SOT89



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	E	2.29	2.60	0.090	0.102
B	0.44	0.56	0.017	0.022	E1	2.13	2.29	0.084	0.090
B1	0.36	0.48	0.014	0.019	e	1.50 BSC		0.059 BSC	
C	0.35	0.44	0.014	0.017	e1	3.00 BSC		0.118 BSC	
D	4.40	4.60	0.173	0.181	H	3.94	4.25	0.155	0.167
D1	1.52	1.83	0.064	0.072	L	0.89	1.20	0.035	0.047

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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