



ZXTN25020DZ

20V NPN high gain transistor in SOT89

Summary

$BV_{CEX} > 100V$

$BV_{CEO} > 20V$

$BV_{ECX} > 6V$

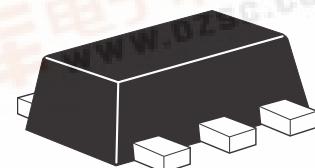
$I_{C(\text{cont})} = 6A$

$V_{CE(\text{sat})} < 48mV @ 1A$

$R_{CE(\text{sat})} = 30m\Omega$

$P_D = 2.4W$

Complementary part number ZXTP25020DZ

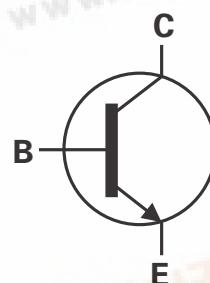


Description

Packaged in the SOT89 outline this new low saturation 20V NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions

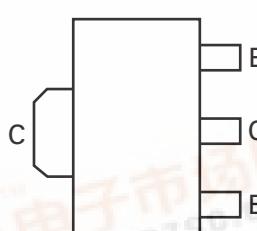
Features

- 6 Amps continuous current
- Up to 15 Amps peak current
- High current gain
- Very low saturation voltages
- 100V forward blocking voltage
- 6V reverse blocking voltage



Applications

- Emergency lighting circuits
- Motor driving
- Camera strobe
- Boost converters
- Backlight inverters
- MOSFET gate drivers
- LED Driving



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25020DZTA	7	12	1000

Device marking

1K8

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ZXTN25020DZ

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-Base voltage	V_{CBO}	100	V
Collector-Emitter voltage (forward blocking)	V_{CEX}	100	V
Collector-Emitter voltage	V_{CEO}	20	V
Emitter-Collector voltage (reverse blocking)	V_{ECX}	6	V
Emitter-Base voltage	V_{EBO}	7	V
Continuous Collector current ^(c)	I_C	6	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	15	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	°C

Thermal resistance

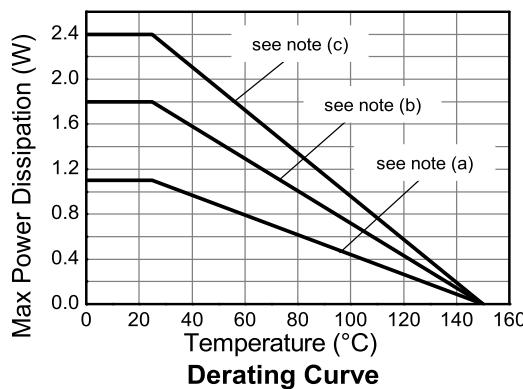
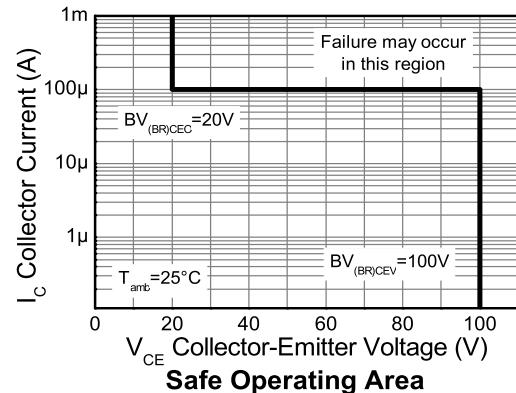
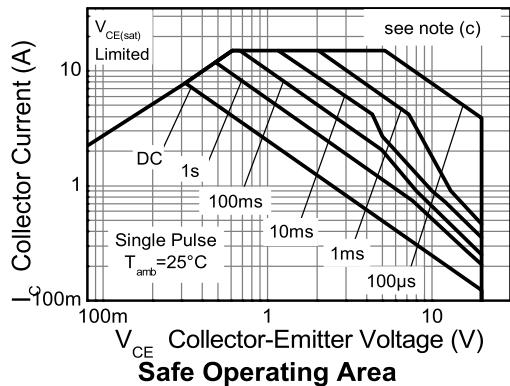
Parameter	Symbol	Limit	Unit
Junction to ambient ^(a)	$R_{\Theta JA}$	117	$^\circ\text{C}/\text{W}$
Junction to ambient ^(b)	$R_{\Theta JA}$	68	$^\circ\text{C}/\text{W}$
Junction to ambient ^(c)	$R_{\Theta JA}$	51	$^\circ\text{C}/\text{W}$
Junction to ambient ^(d)	$R_{\Theta JA}$	28	$^\circ\text{C}/\text{W}$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

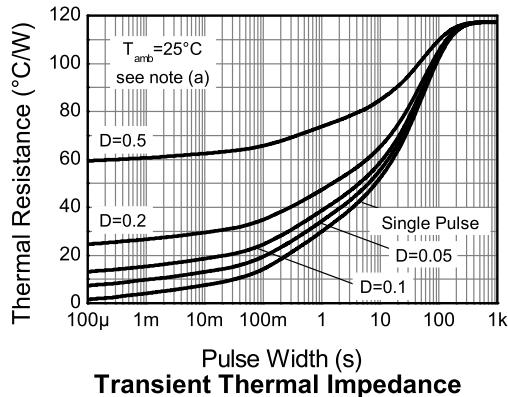
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Thermal characteristics

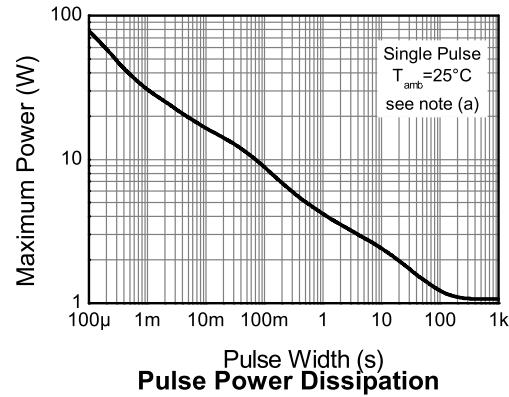


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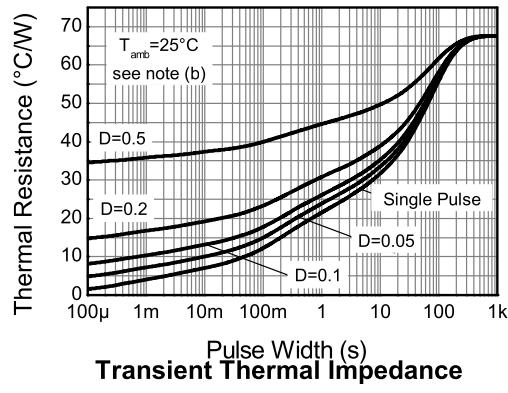
Thermal characteristics



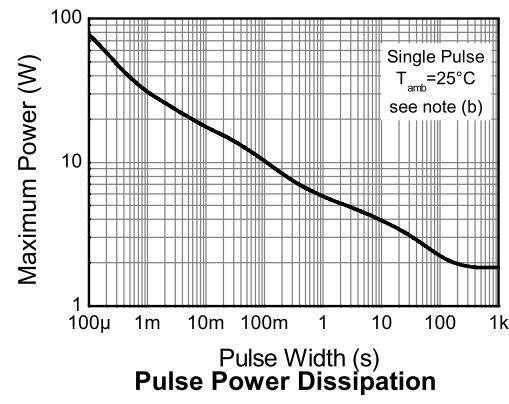
Transient Thermal Impedance



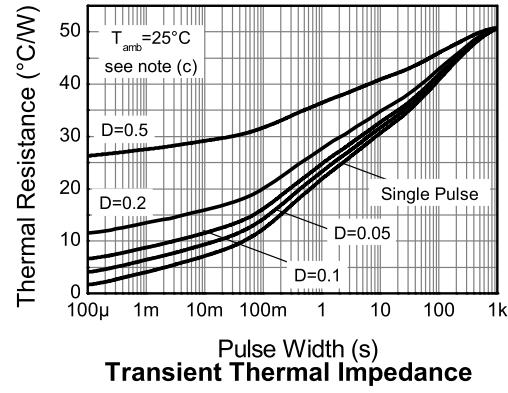
Pulse Power Dissipation



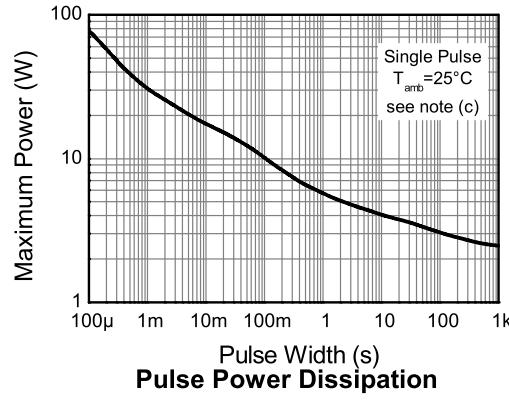
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



Pulse Power Dissipation

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

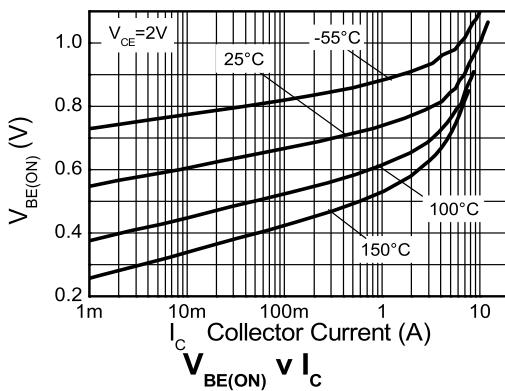
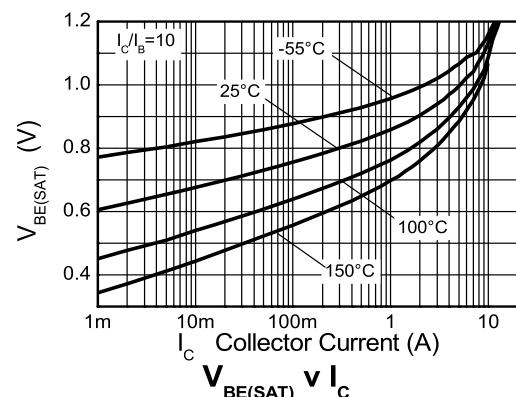
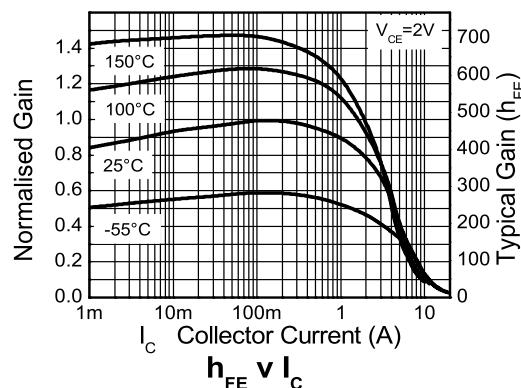
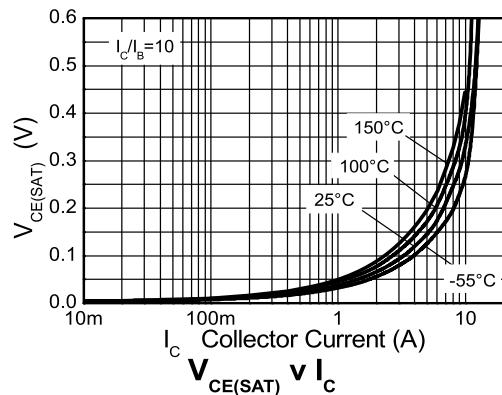
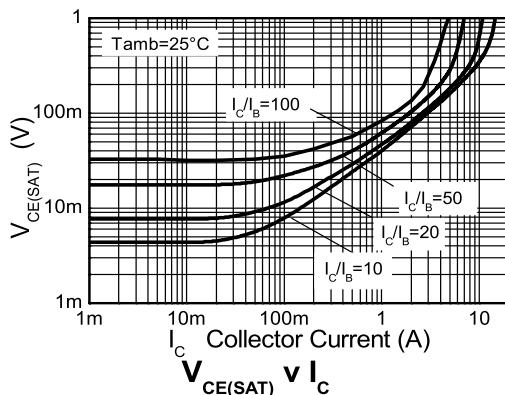
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV_{CBO}	100	125		V	$I_C = 100\mu A$
Collector-Emitter breakdown voltage (forward blocking)	BV_{CEX}	100	120		V	$I_C = 100\mu A, R_{BE} \leq 1k\Omega$ or $-1V < V_{BE} < 0.25V$
Collector-Emitter breakdown voltage	BV_{CEO}	20	35		V	$I_C = 10mA$ (*)
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8		V	$I_E = 100\mu A, R_{BC} \leq 1k\Omega$ or $0.25V > V_{BC} > -0.25V$
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECO}	5.0	6.0		V	$I_E = 100\mu A$
Emitter-Base breakdown voltage	BV_{EBO}	7.0	8.3		V	$I_E = 100\mu A$
Collector-Base cut-off current	I_{CBO}		<1	50 0.5	nA μA	$V_{CB} = 100V$ $V_{CB} = 100V, T_{amb}=100^\circ C$
Collector-Emitter cut-off current	I_{CEX}			100	nA	$V_{CE} = 100V, R_{BE} \leq 1k\Omega$ or $-1V < V_{BE} < 0.25V$
Emitter cut-off current	I_{EBO}		<1	50	nA	$V_{EB} = -5.6V$
Collector-Emitter saturation voltage	$V_{CE(sat)}$		40 60 100 130 100 210	48 75 120 180 120 270	mV mV mV mV mV mV	$I_C = 1A, I_B = 100mA$ (*) $I_C = 1A, I_B = 20mA$ (*) $I_C = 2A, I_B = 40mA$ (*) $I_C = 2A, I_B = 20mA$ (*) $I_C = 3A, I_B = 300mA$ (*) $I_C = 6A, I_B = 300mA$ (*)
Base-Emitter saturation voltage	$V_{BE(sat)}$		1000	1050	mV	$I_C = 6A, I_B = 300mA$ (*)
Base-Emitter turn-on voltage	$V_{BE(on)}$		875	950	mV	$I_C = 6A, V_{CE} = 2V$ (*)
Static forward current transfer ratio	h_{FE}	300 250 50	450 360 110 15	900		$I_C = 10mA, V_{CE} = 2V$ (*) $I_C = 2A, V_{CE} = 2V$ (*) $I_C = 6A, V_{CE} = 2V$ (*) $I_C = 15A, V_{CE} = 2V$ (*)
Transition frequency	f_T		215		MHz	$I_C = 50mA, V_{CE} = 10V$ $f = 100MHz$
Input capacitance	C_{ibo}		152		pF	$V_{EB} = 0.5V, f = 1MHz$ (*)
Output capacitance	C_{obo}		16.5	25	pF	$V_{CB} = 10V, f = 1MHz$ (*)
Delay time	t_d		67.7		ns	$I_C = 1A, V_{CC} = 10V,$ $I_{B1} = -I_{B2} = 10mA$
Rise time	t_r		72.2		ns	
Storage time	t_s		361		ns	
Fall time	t_f		63.9		ns	

NOTES:

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

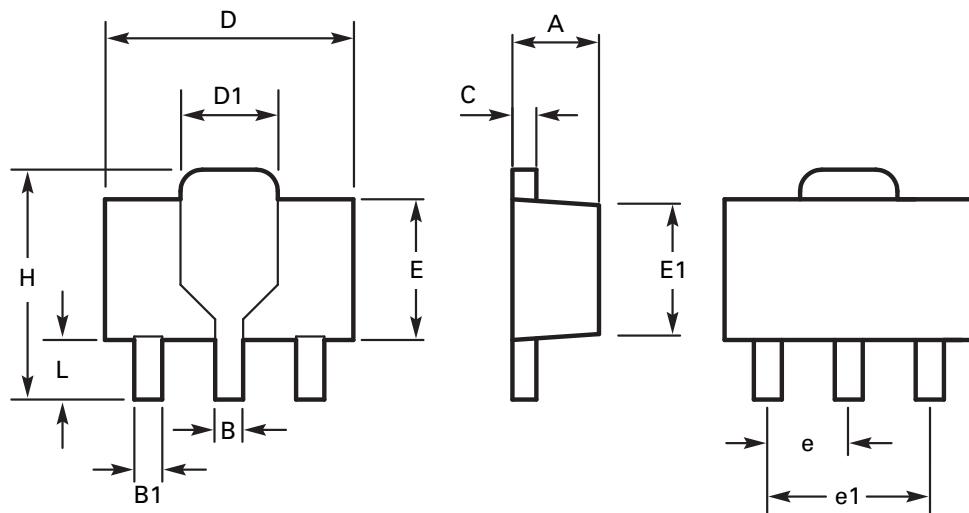
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Typical characteristics



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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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