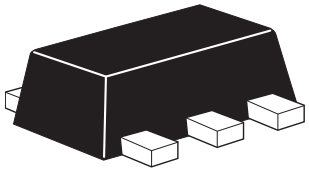
ZXTN25020DZ
20V NPN high gain transistor in SOT89

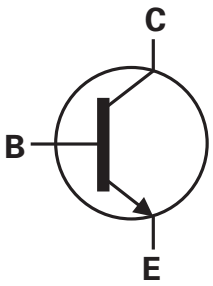
Summary



BV_{CEX} > 100V
BV_{CEO} > 20V
BV_{ECX} > 6V
$I_{C(cont)}$ = 6A
$V_{CE(sat)}$ < 48mV @ 1A
$R_{CE(sat)}$ = 30mΩ
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

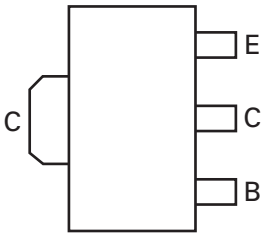


Features

- 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

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°C[a] Linear derating factor	P_D	1.1 8.8	W mW/°C
Power dissipation at T_A =25°C[b] Linear derating factor	P_D	1.8 14.4	W mW/°C
Power dissipation at T_A =25°C[c] Linear derating factor	P_D	2.4 19.2	W mW/°C
Power dissipation at T_A =25°C[d] Linear derating factor	P_D	4.46 35.7	W mW/°C
Power dissipation at T_C =25°C[e] Linear derating factor	P_D	19.2 153	W mW/°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	°C/W
Junction to ambient[b]	$R_{\theta JA}$	68	°C/W
Junction to ambient[c]	$R_{\theta JA}$	51	°C/W
Junction to ambient[d]	$R_{\theta JA}$	28	°C/W
Junction to case[e]	$R_{\theta JC}$	7.95	°C/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.

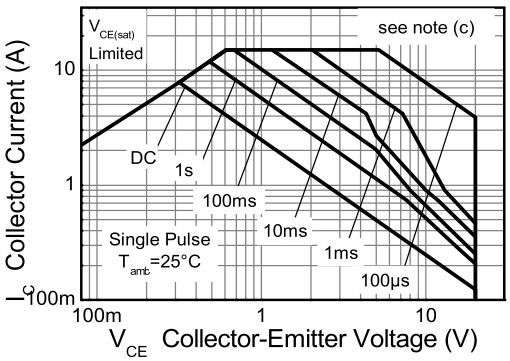
(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(c) Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

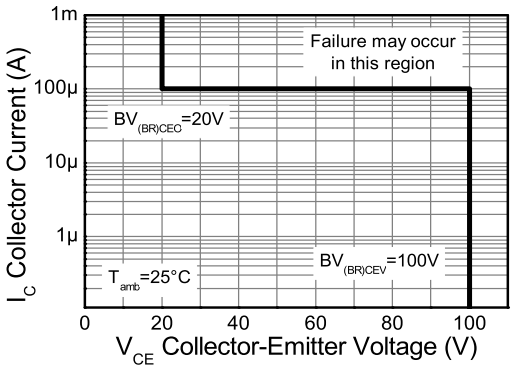
(d) As (c) above measured at t<5 seconds.

(e) Junction to case (collector tab. Typical

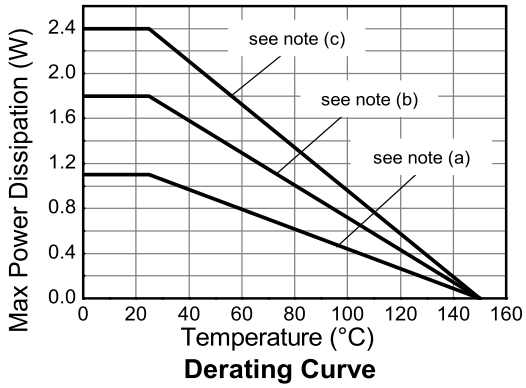
Thermal characteristics



Safe Operating Area

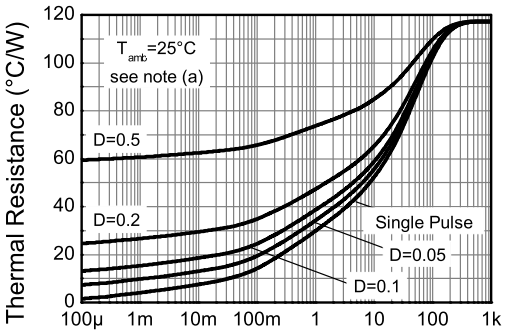


Safe Operating Area

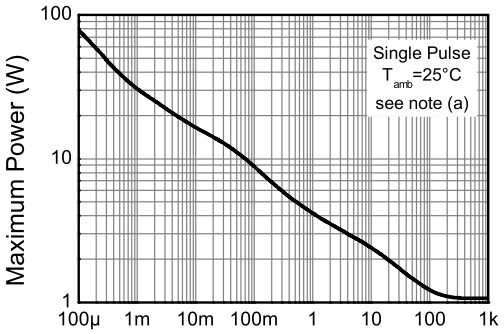


Derating Curve

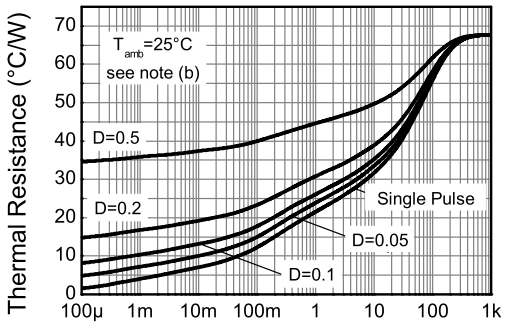
Thermal characteristics



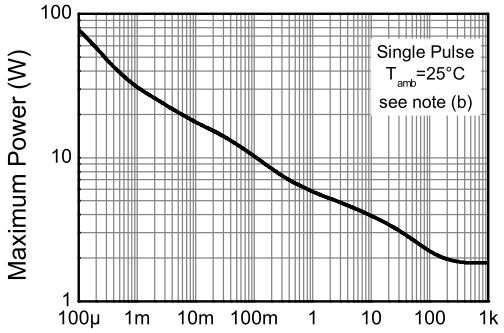
Transient Thermal Impedance



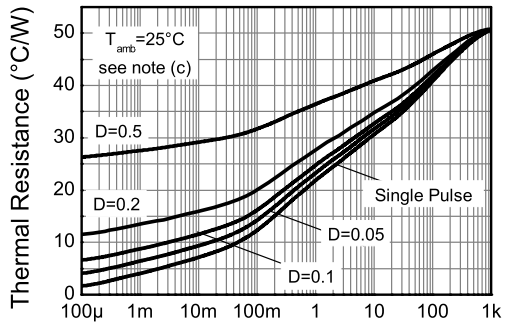
Pulse Power Dissipation



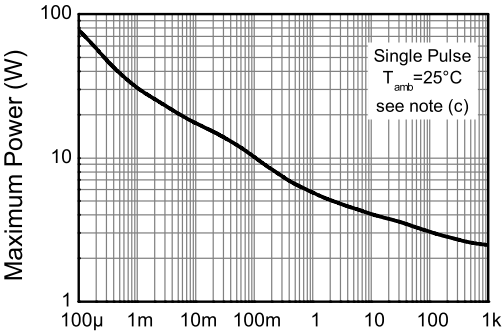
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



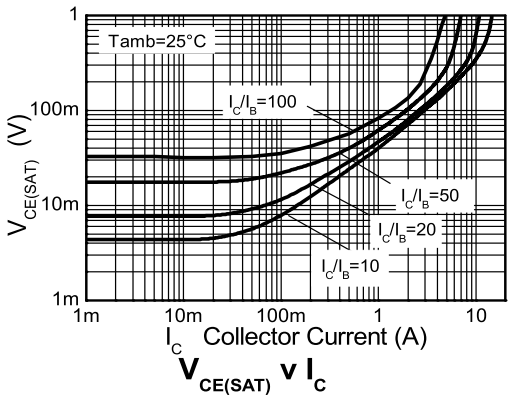
Pulse Power Dissipation

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated).

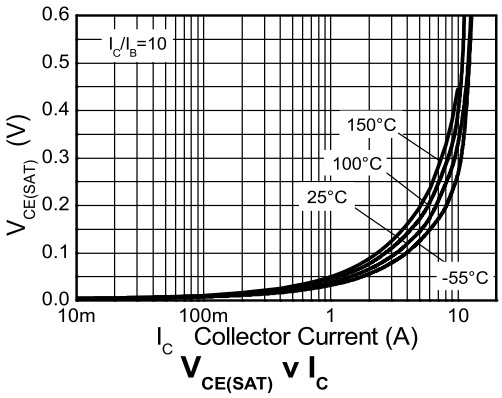
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV_{CBO}	100	125		V	I_C = 100μA
Collector-Emitter breakdown voltage (forward blocking)	BV_{CEX}	100	120		V	I_C = 100μA, $R_{BE} \leq 1k\Omega$ or $-1V < V_{BE} < 0.25V$
Collector-Emitter breakdown voltage	BV_{CEO}	20	35		V	I_C= 10mA (*)
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8		V	I_E = 100μA, $R_{BC} \leq 1k\Omega$ or $0.25V > V_{BC} > -0.25V$
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECO}	5.0	6.0		V	I_E = 100μA
Emitter-Base breakdown voltage	BV_{EBO}	7.0	8.3		V	I_E = 100μA
Collector-Base cut-off current	I_{CBO}		<1 	50 0.5	nA μA	V_{CB} = 100V V_{CB} = 100V, T_{amb}=100°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 ≤ 300μs; duty cycle ≤ 2%.

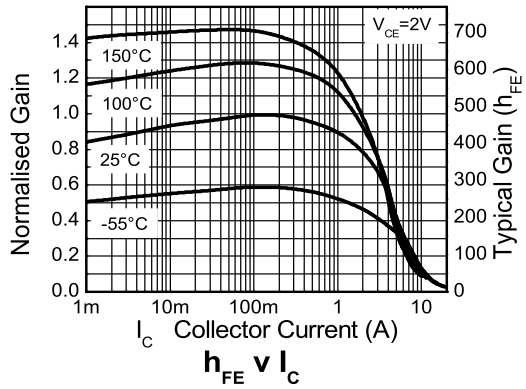
Typical characteristics



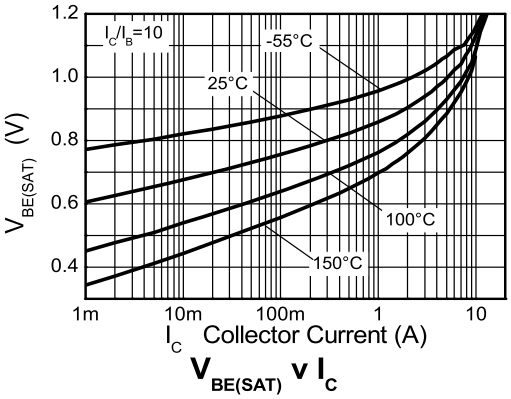
$V_{CE(SAT)}$ v I_C



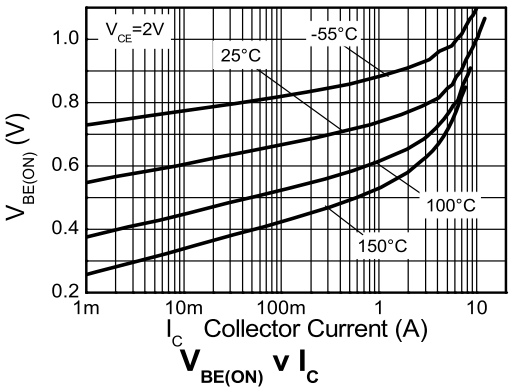
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

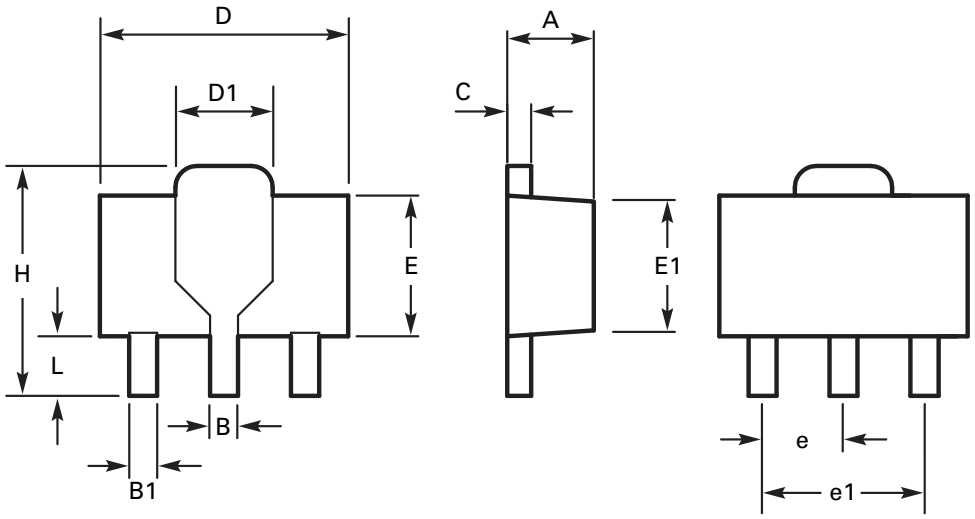


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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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