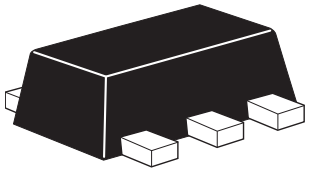
ZXTN25020DZ
20V NPN high gain transistor in SOT89

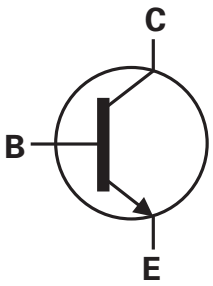
Summary



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

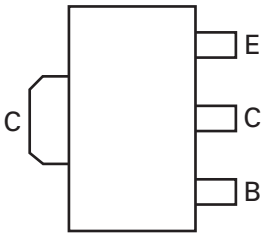


Features

- 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.

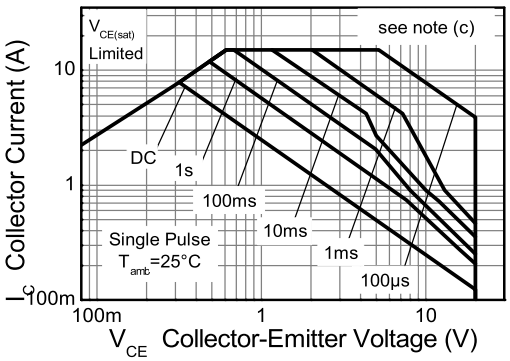
(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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

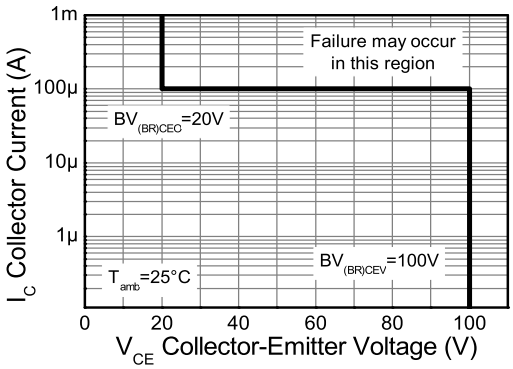
(d) As (c) above measured at t<5 seconds.

(e) Junction to case (collector tab. Typical

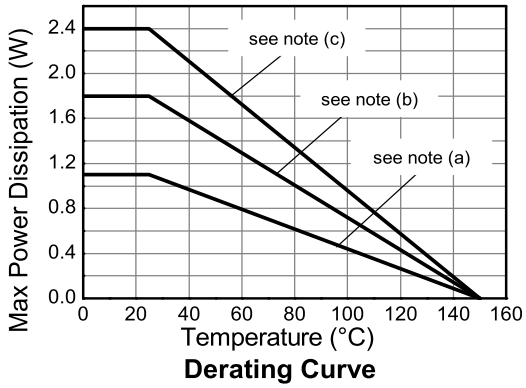
Thermal characteristics



Safe Operating Area

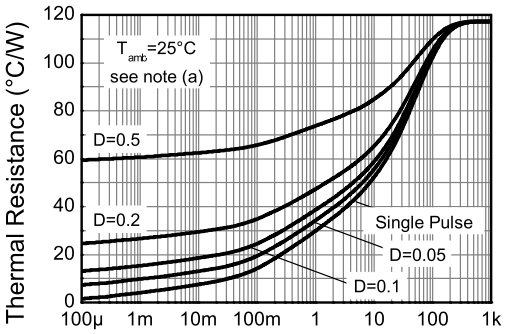


Safe Operating Area

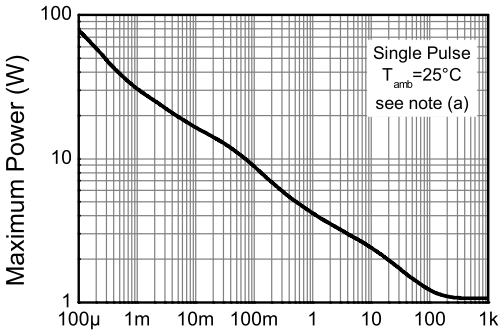


Derating Curve

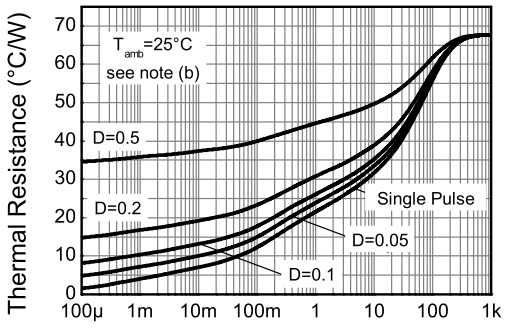
Thermal characteristics



Transient Thermal Impedance



Pulse Power Dissipation



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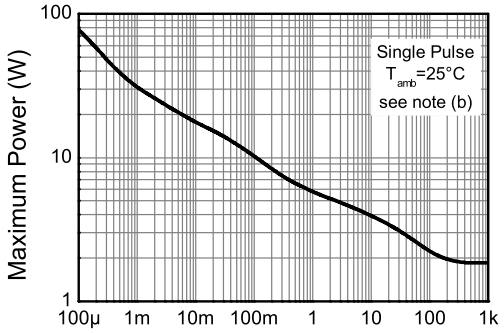
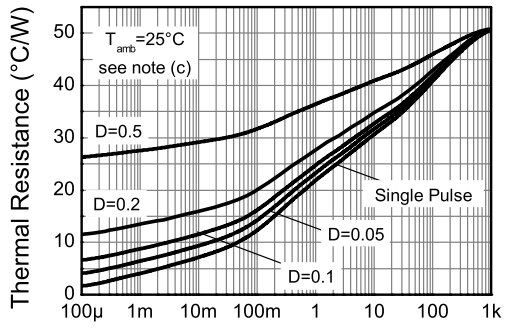
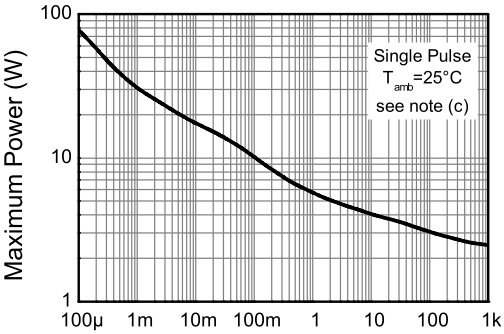


Pulse Power Dissipation



Transient Thermal Impedance



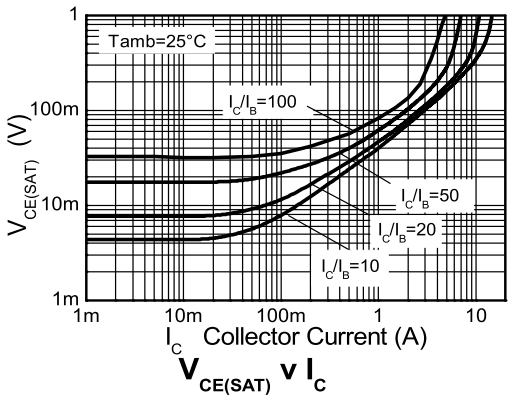
Pulse Power Dissipation

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

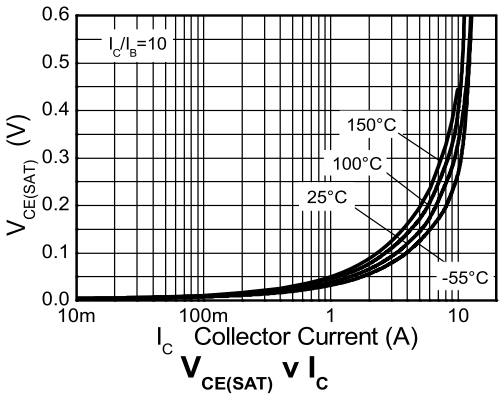
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV_{CBO}	100	125		V	I_C = 100μA
Collector-Emitter breakdown voltage (forward blocking)	BV_{CEX}	100	120		V	I_C = 100μA, $R_{BE} \leq 1k\Omega$ or $-1V < V_{BE} < 0.25V$
Collector-Emitter breakdown voltage	BV_{CEO}	20	35		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%.

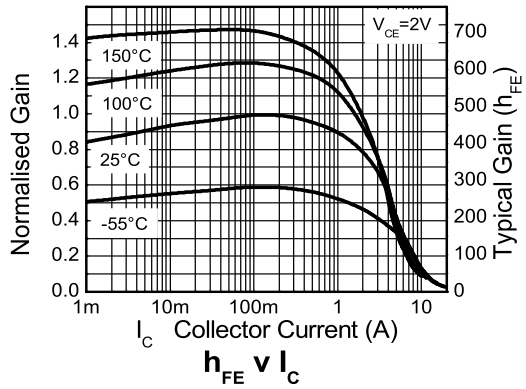
Typical characteristics



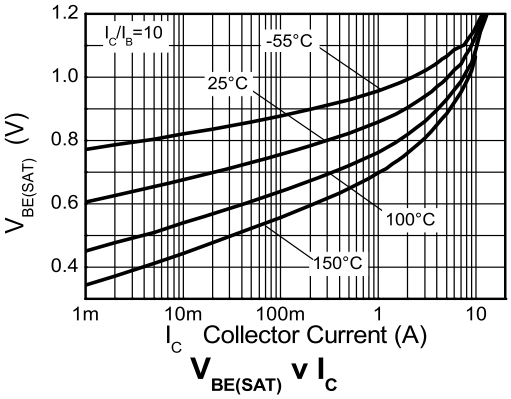
$V_{CE(SAT)}$ v I_C



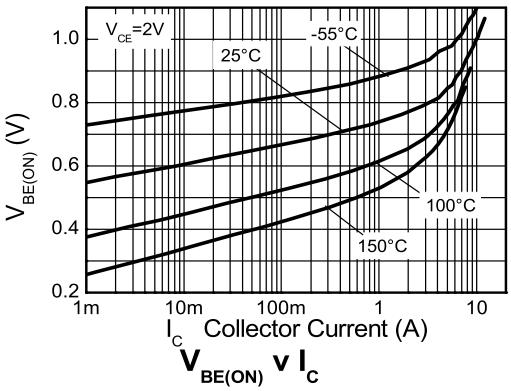
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

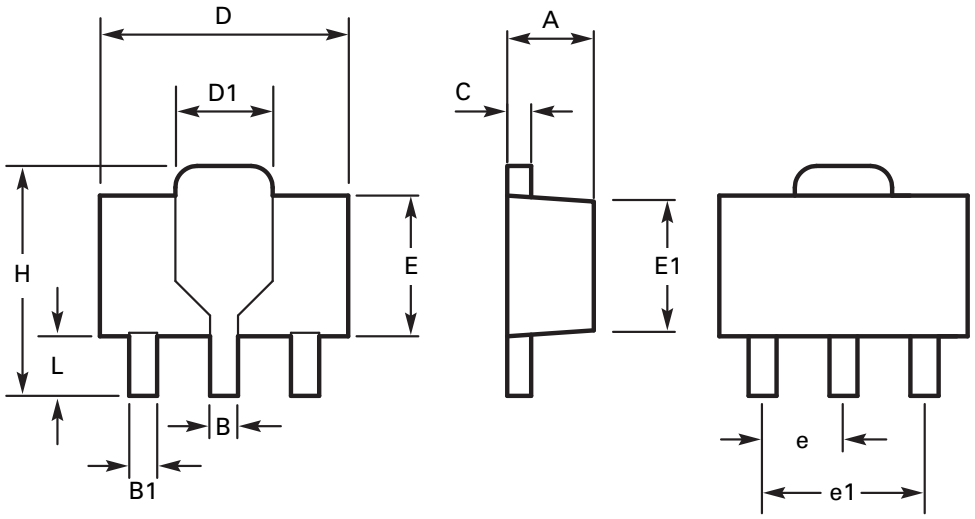


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ 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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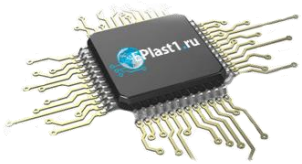

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