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[ZXTP25020DZTA](#)

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## ZXTP25020DZ 20V PNP high gain transistor in SOT89

### Summary

$BV_{CEO} > -20V$

$BV_{ECO} > -4V$

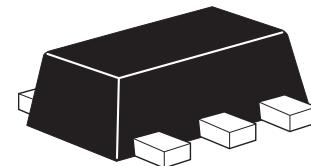
$I_{C(\text{cont})} = 5A$

$V_{CE(\text{sat})} < -65mV @ -1A$

$R_{CE(\text{sat})} = 39m\Omega$

$P_D = 2.4W$

Complementary part number ZXTN25020DZ

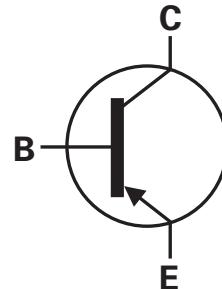


### Description

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

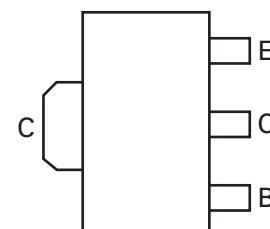
### Features

- High peak current
- Low saturation voltage
- High gain
- SOT89 package



### Applications

- DC-DC converters
- Load switch
- Motor drive
- Disconnect switch
- MOSFET and IGBT gate drive



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP25020DZTA	7	12	1000

### Device marking

- 1L5

## ZXTP25020DZ

### Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-Base voltage	$V_{CBO}$	-25	V
Collector-Emitter voltage	$V_{CEO}$	-20	V
Emitter-Base voltage (reverse blocking)	$V_{ECO}$	-4	V
Emitter-Base voltage	$V_{EBO}$	-7	V
Continuous Collector current <sup>(c)</sup>	$I_C$	-5	A
Base current	$I_B$	-1	A
Peak pulse current	$I_{CM}$	-10	A
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup>	$P_D$	1.1	W
Linear derating factor		8.8	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup>	$P_D$	1.8	W
Linear derating factor		14.4	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(c)</sup>	$P_D$	2.4	W
Linear derating factor		19.2	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(d)</sup>	$P_D$	4.46	W
Linear derating factor		35.7	$\text{mW}/^\circ\text{C}$
Power dissipation at $T_C = 25^\circ\text{C}$ <sup>(e)</sup>	$P_D$	15.7	W
Linear derating factor		126	$\text{mW}/^\circ\text{C}$
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	$^\circ\text{C}$

### Thermal resistance

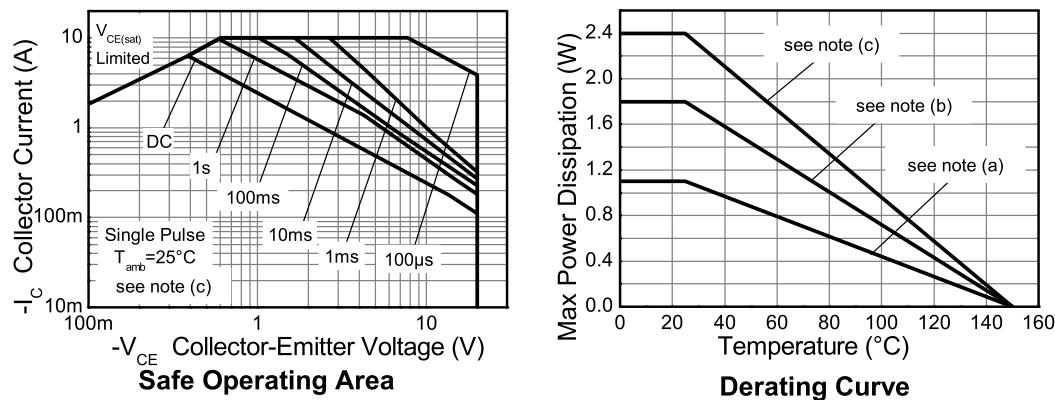
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\Theta JA}$	117	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(b)</sup>	$R_{\Theta JA}$	68	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(c)</sup>	$R_{\Theta JA}$	51	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(d)</sup>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

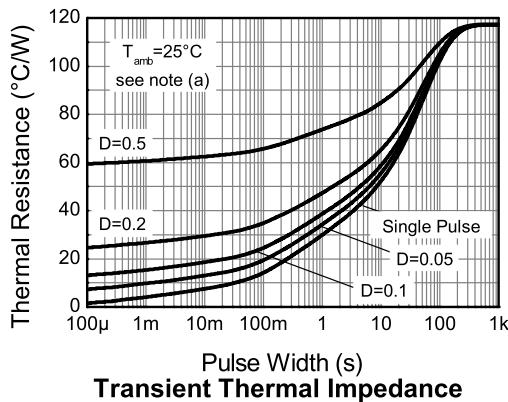
## ZXTP25020DZ

### Thermal characteristics

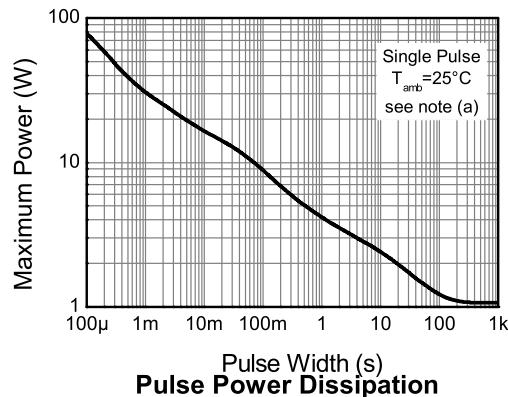


## ZXTP25020DZ

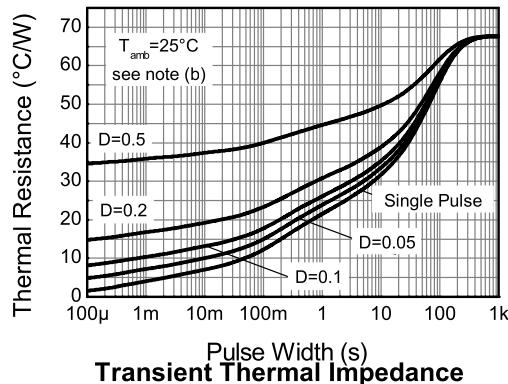
### Thermal characteristics



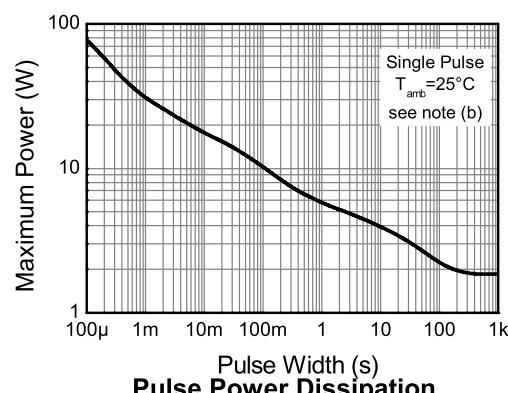
Transient Thermal Impedance



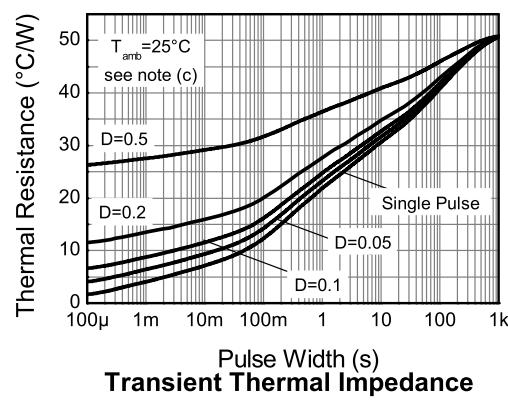
Pulse Power Dissipation



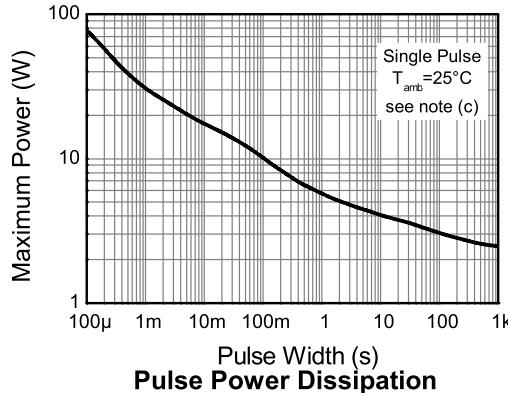
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



Pulse Power Dissipation

## ZXTP25020DZ

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

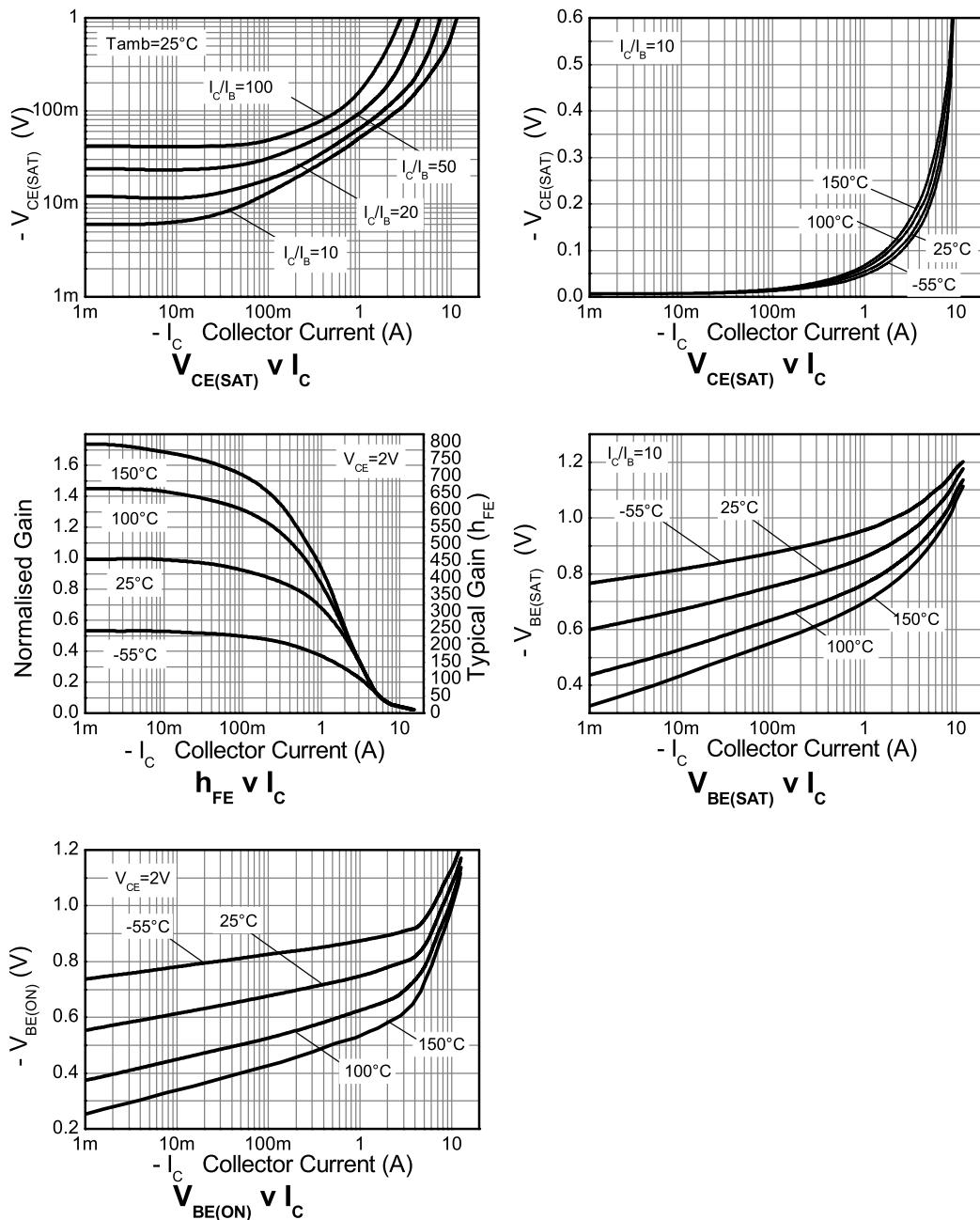
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	$\text{BV}_{\text{CBO}}$	-25	-55		V	$I_C = -100\mu\text{A}$
Collector-Emitter breakdown voltage	$\text{BV}_{\text{CEO}}$	-20	-45		V	$I_C = -10\text{mA}$ (*)
Emitter-Collector breakdown voltage (reverse blocking)	$\text{BV}_{\text{ECX}}$	-4	-8.5		V	$I_E = -100\mu\text{A}, R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-Collector breakdown voltage (reverse blocking)	$\text{BV}_{\text{ECO}}$	-4	-8.5		V	$I_E = -100\mu\text{A}$
Emitter-Base breakdown voltage	$\text{BV}_{\text{EBO}}$	-7	-8.3		V	$I_E = -5.6\text{V}$
Collector-Base cut-off current	$I_{\text{CBO}}$		<1	-50 -0.5	nA $\mu\text{A}$	$V_{CB} = -25\text{V}$ $V_{CB} = -25\text{V}, T_{amb} = 100^\circ\text{C}$
Emitter cut-off current	$I_{\text{EBO}}$		<1	-50	nA	$V_{EB} = -5.6\text{V}$
Collector-Emitter saturation voltage	$V_{\text{CE(sat)}}$		-50 -150 -185 -195	-65 -215 -245 -265	mV mV mV mV	$I_C = -1\text{A}, I_B = -100\text{mA}$ (*) $I_C = -1\text{A}, I_B = -10\text{mA}$ (*) $I_C = -2\text{A}, I_B = -40\text{mA}$ (*) $I_C = -5\text{A}, I_B = -500\text{mA}$ (*)
Base-Emitter saturation voltage	$V_{\text{BE(sat)}}$		-1010	-1100	mV	$I_C = -5\text{A}, I_B = -500\text{mA}$ (*)
Base-Emitter turn-on voltage	$V_{\text{BE(on)}}$		-870	-1000	mV	$I_C = -5\text{A}, V_{CE} = -2\text{V}$ (*)
Static forward current transfer ratio	$h_{\text{FE}}$	300 200 45	450 310 85 20	900		$I_C = -10\text{mA}, V_{CE} = -2\text{V}$ (*) $I_C = -1\text{A}, V_{CE} = -2\text{V}$ (*) $I_C = -5\text{A}, V_{CE} = -2\text{V}$ (*) $I_C = -10\text{A}, V_{CE} = -2\text{V}$ (*)
Transition frequency	$f_T$		290		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Input capacitance	$C_{\text{ibo}}$		157	400	pF	$V_{EB} = -0.5\text{V}, f = 1\text{MHz}$ (*)
Output capacitance	$C_{\text{obo}}$		21	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$ (*)
Delay time	$t_d$		14.2		ns	$V_{CC} = -10\text{V}, I_C = -1\text{A},$ $I_{B1} = -I_{B2} = -50\text{mA}$
Rise time	$t_r$		16.3		ns	
Storage time	$t_s$		186		ns	
Fall time	$t_f$		32.7		ns	

**NOTES:**

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

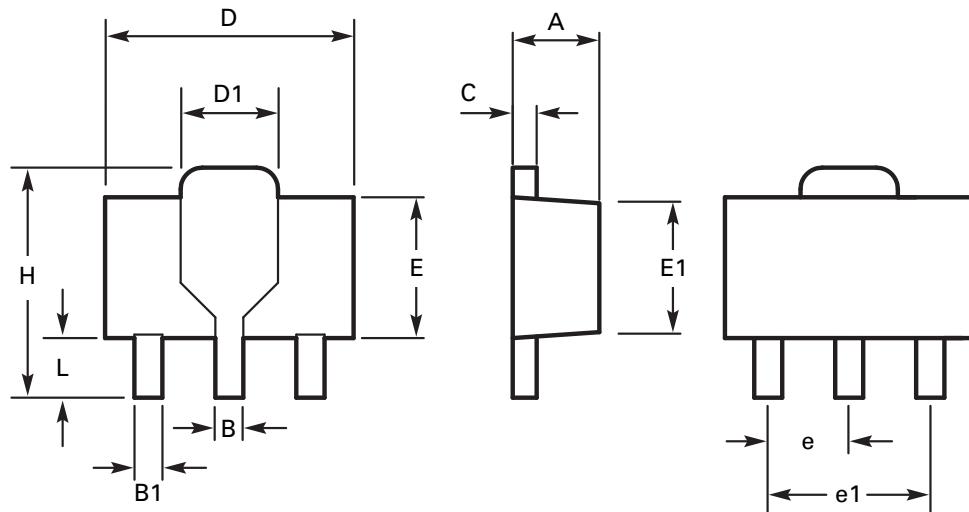
## ZXTP25020DZ

### Typical characteristics



## ZXTP25020DZ

### 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

# ZXTP25020DZ

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### Zetex sales offices

#### Europe

Zetex GmbH  
 Kustermann-park  
 Balanstraße 59  
 D-81541 München  
 Germany  
 Telefon: (49) 89 45 49 49 0  
 Fax: (49) 89 45 49 49 49  
 europe.sales@zetex.com

#### Americas

Zetex Inc  
 700 Veterans Memorial Highway  
 Hauppauge, NY 11788  
 USA  
 Telephone: (1) 631 360 2222  
 Fax: (1) 631 360 8222  
 usa.sales@zetex.com

#### Asia Pacific

Zetex (Asia Ltd)  
 3701-04 Metropiazza Tower 1  
 Hing Fong Road, Kwai Fong  
 Hong Kong  
 Telephone: (852) 26100 611  
 Fax: (852) 24250 494  
 asia.sales@zetex.com

#### Corporate Headquarters

Zetex Semiconductors plc  
 Zetex Technology Park, Chadderton  
 Oldham, OL9 9LL  
 United Kingdom  
 Telephone: (44) 161 622 4444  
 Fax: (44) 161 622 4446  
 hq@zetex.com