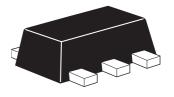


# ZXTP25020DZ 20V PNP high gain transistor in SOT89

## Summary

$$\begin{split} &\mathsf{BV}_{\mathsf{CEO}} > -20\mathsf{V} \\ &\mathsf{BV}_{\mathsf{ECO}} > -4\mathsf{V} \\ &\mathsf{I}_{\mathsf{C}(\mathsf{cont})} = 5\mathsf{A} \\ &\mathsf{V}_{\mathsf{CE}(\mathsf{sat})} < -65\mathsf{mV} @ -1\mathsf{A} \\ &\mathsf{R}_{\mathsf{CE}(\mathsf{sat})} = 39\mathsf{m}\Omega \\ &\mathsf{P}_{\mathsf{D}} = 2.4\mathsf{W} \\ &\mathsf{Complementary part number ZXTN25020\mathsf{DZ}} \end{split}$$



## 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

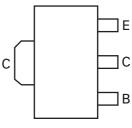
## Features

- 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

# B



Pinout - top view

## **Ordering information**

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

## **Device marking**

• 1L5

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-Base voltage	V <sub>CBO</sub>	-25	V
Collector-Emitter voltage	V <sub>CEO</sub>	-20	V
Emitter-Base voltage (reverse blocking)	V <sub>ECO</sub>	-4	V
Emitter-Base voltage	V <sub>EBO</sub>	-7	V
Continuous Collector current <sup>(c)</sup>	۱ <sub>C</sub>	-5	А
Base current	ا <sub>B</sub>	-1	А
Peak pulse current	I <sub>CM</sub>	-10	А
Power dissipation at $T_A = 25^{\circ}C^{(a)}$	PD	1.1	W
Linear derating factor		8.8	mW/°C
Power dissipation at $T_A = 25^{\circ}C^{(b)}$	PD	1.8	W
Linear derating factor		14.4	mW/°C
Power dissipation at $T_A = 25^{\circ}C^{(c)}$	PD	2.4	W
Linear derating factor		19.2	mW/°C
Power dissipation at $T_A = 25^{\circ}C^{(d)}$	PD	4.46	W
Linear derating factor		35.7	mW/°C
Power dissipation at $T_{C} = 25^{\circ}C^{(e)}$	P <sub>D</sub>	15.7	W
Linear derating factor		126	mW/°C
Operating and storage temperature range	T <sub>j</sub> , T <sub>stg</sub>	-55 to 150	°C

### Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	R <sub>OJA</sub>	117	°C/W
Junction to ambient <sup>(b)</sup>	R <sub>OJA</sub>	68	°C/W
Junction to ambient <sup>(c)</sup>	R <sub>OJA</sub>	51	°C/W
Junction to ambient <sup>(d)</sup>	R <sub>OJA</sub>	28	°C/W
Junction to case <sup>(e)</sup>	$R_{\Theta JC}$	7.95	°C/W

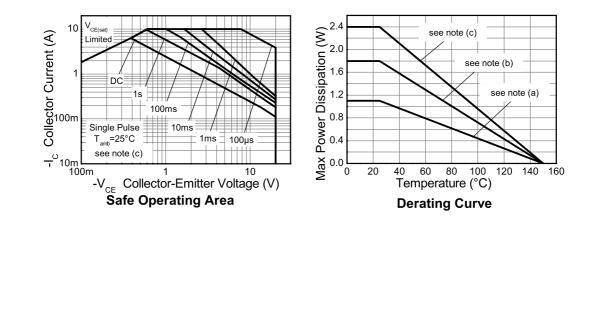
NOTES:

(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.

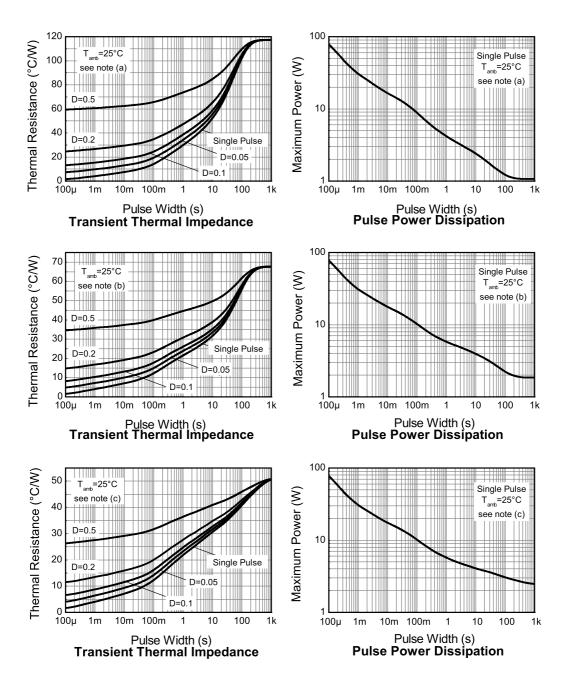
(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions. (c) Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions. (d) As (c) above measured at t<5 seconds.

(e) Junction to case (collector tab). Typical.

## **Thermal characteristics**



## **Thermal characteristics**



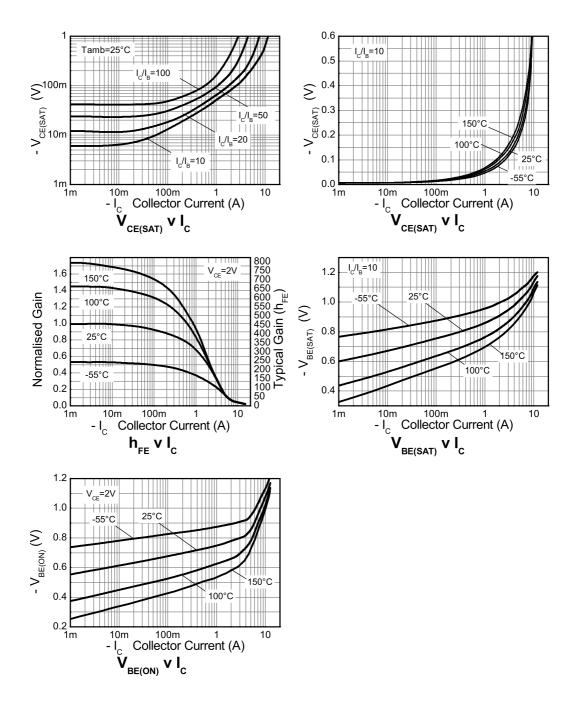
Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV <sub>CBO</sub>	-25	-55		V	I <sub>C</sub> = -100μA
Collector-Emitter breakdown voltage	BV <sub>CEO</sub>	-20	-45		V	I <sub>C</sub> = -10mA <sup>(*)</sup>
Emitter-Collector breakdown voltage (reverse blocking)	BV <sub>ECX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

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

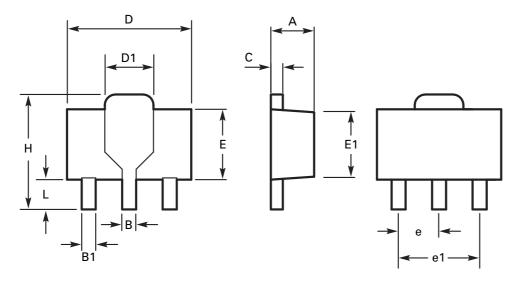
#### NOTES:

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

# **Typical characteristics**



# Package outline - SOT89



DIM	Millin	neters	Inc	hes	DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
А	1.40	1.60	0.550	0.630	E	2.29	2.60	0.090	0.102
В	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	е	1.50 BSC		0.059 BSC	
С	0.35	0.44	0.014	0.017	e1	3.00 BSC		0.118 BSC	
D	4.40	4.60	0.173	0.181	Н	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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