

# ZXTP25020DG

## 20V PNP high gain transistor in SOT223

### Summary

$BV_{CEO} > -20V$

$BV_{ECO} > -4V$

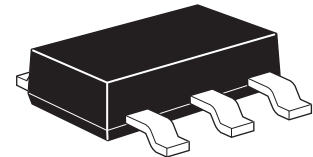
$I_{C(cont)} = 6A$

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

$R_{CE(sat)} = 42m\Omega$

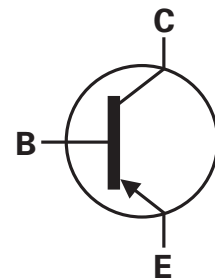
$P_D = 3.0W$

Complementary part number ZXTN25020DG



### Description

Packaged in the SOT223 outline this new low saturation PNP transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

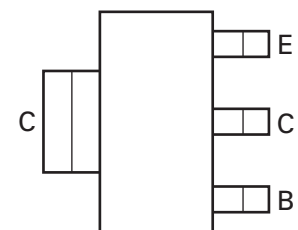


### Features

- High peak current
- Low saturation voltage
- High gain
- High power dissipation

### Applications

- Load switch
- Motor drive
- Disconnect switch
- Regulator circuit



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP25020DGTA	7	12	1000

### Device marking

- ZXTP25  
020D

# ZXTP25020DG

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-Base voltage	$BV_{CBO}$	-25	V
Collector-Emitter voltage	$BV_{CEO}$	-20	V
Emitter-Collector voltage (reverse blocking)	$BV_{ECO}$	-4	V
Emitter-Base voltage	$BV_{EBO}$	-7	V
Continuous Collector current <sup>(c)</sup>	$I_C$	-6	A
Base current	$I_B$	-1	A
Peak pulse current	$I_{CM}$	-10	A
Power dissipation at $T_A = 25^\circ\text{C}^{(a)}$	$P_D$	1.2	W
Linear derating factor		9.6	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(b)}$	$P_D$	1.6	W
Linear derating factor		12.8	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(c)}$	$P_D$	3	W
Linear derating factor		24	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(d)}$	$P_D$	5.3	W
Linear derating factor		42	mW/°C
Power dissipation at $T_C = 25^\circ\text{C}^{(e)}$	$P_D$	7.8	W
Linear derating factor		63	mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	°C

## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	104	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	78	°C/W
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	42	°C/W
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	23.5	°C/W
Junction to case <sup>(e)</sup>	$R_{\theta JC}$	16	°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.

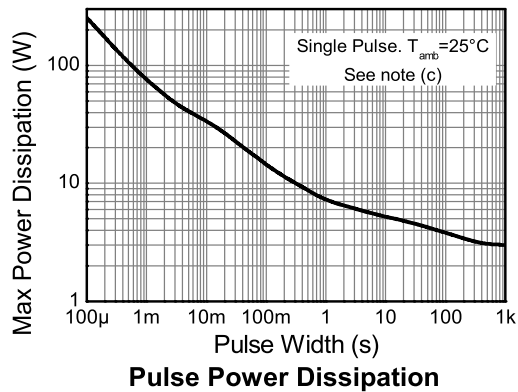
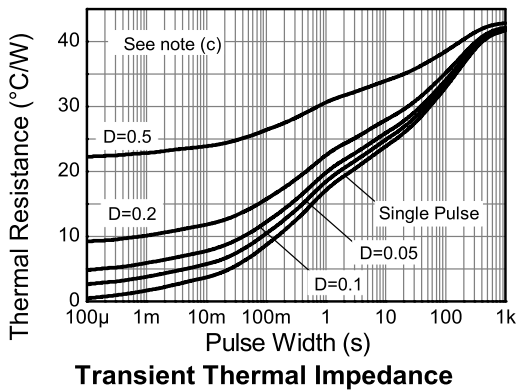
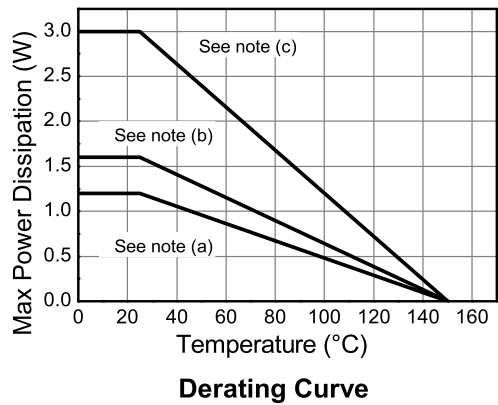
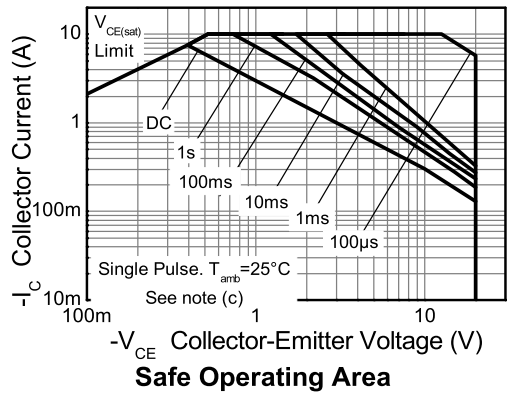
(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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



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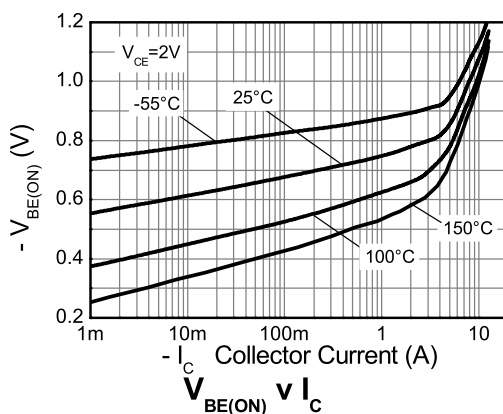
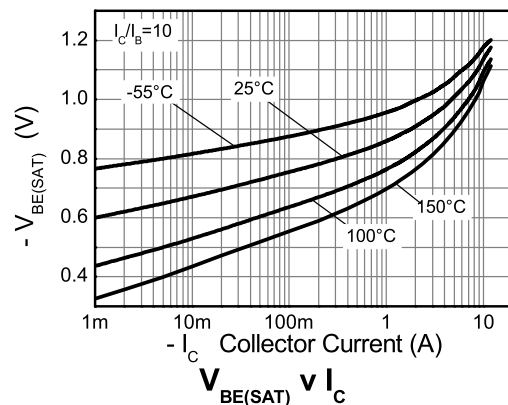
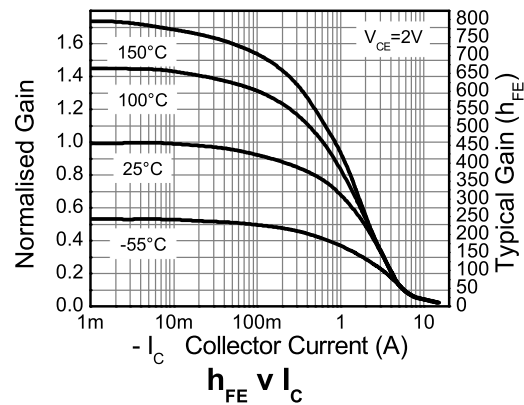
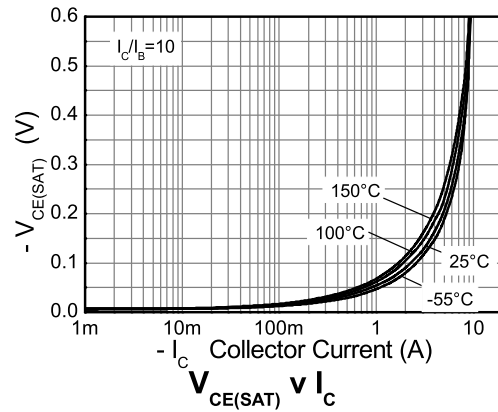
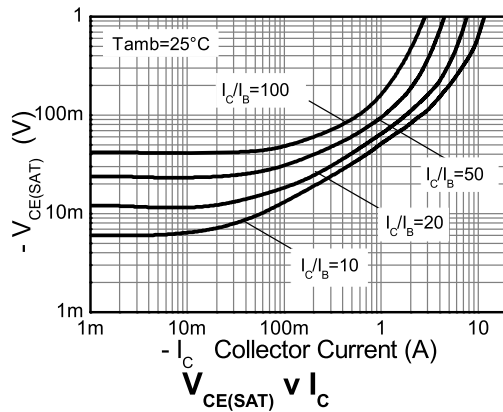
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	$BV_{CBO}$	-25	-55		V	$I_C = -100\mu\text{A}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	-20	-45		V	$I_C = -10\text{mA}^{(*)}$
Emitter-Collector breakdown voltage (reverse blocking)	$BV_{ECX}$	-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)	$BV_{ECO}$	-4	-8.5		V	$I_E = -100\mu\text{A}$
Emitter-Base breakdown voltage	$BV_{EBO}$	-7	-8.3		V	$I_E = -100\mu\text{A}$
Collector-Base cut-off current	$I_{CBO}$		<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	$I_{EBO}$		<1	100	nA	$V_{EB} = -5.6\text{V}$
Collector-Emitter saturation voltage	$V_{CE(sat)}$		-50	-65	mV	$I_C = -1\text{A}$ , $I_B = -100\text{mA}^{(*)}$
			-150	-215	mV	$I_C = -1\text{A}$ , $I_B = -10\text{mA}^{(*)}$
			-190	-245	mV	$I_C = -2\text{A}$ , $I_B = -40\text{mA}^{(*)}$
			-250	-355	mV	$I_C = -6\text{A}$ , $I_B = -600\text{mA}^{(*)}$
Base-Emitter saturation voltage	$V_{BE(sat)}$		-1050	-1150	mV	$I_C = -6\text{A}$ , $I_B = -600\text{mA}^{(*)}$
Base-Emitter turn-on voltage	$V_{BE(on)}$		-910	-1000	mV	$I_C = -6\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	300	450	900		$I_C = -10\text{mA}$ , $V_{CE} = -2\text{V}^{(*)}$
		200	310			$I_C = -1\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
		25	50			$I_C = -6\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
			20			$I_C = -10\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
Transition frequency	$f_T$		290		MHz	$I_C = -50\text{mA}$ , $V_{CE} = -10\text{V}$ $f = 50\text{MHz}$
Input capacitance	$C_{ibo}$		157	400	pF	$V_{EB} = -0.5\text{V}$ , $f = 1\text{MHz}^{(*)}$
Output capacitance	$C_{obo}$		21	30	pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		14.2		ns	$I_C = -1\text{A}$ , $V_{CC} = -10\text{V}$ , $I_{B1} = -I_{B2} = -50\text{mA}$
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  $\leq 2\%$ .

## Typical characteristics

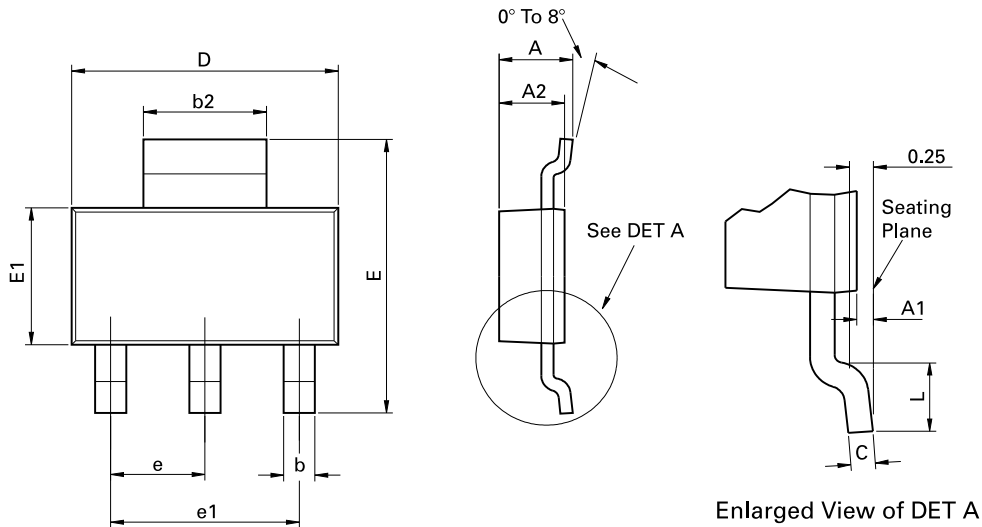


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## Package outline - SOT223



Conforms to JEDEC TO-261 AA Issue B

Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	-	1.80	-	0.071	D	6.30	6.70	0.248	0.264
A1	0.02	0.10	0.0008	0.004	e	2.30 BSC		0.0905 BSC	
A2	1.55	1.65	0.0610	0.0649	e1	4.60 BSC		0.181 BSC	
b	0.66	0.84	0.026	0.033	E	6.70	7.30	0.264	0.287
b2	2.90	3.10	0.114	0.122	E1	3.30	3.70	0.130	0.146
C	0.23	0.33	0.009	0.013	L	0.90	-	0.355	-

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Kustermann-park Balanstraße 59 D-81541 München Germany Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 9 europe.sales@zetex.com	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	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

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