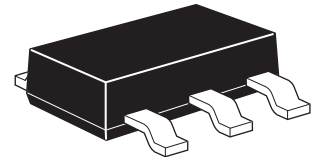


ZXTN19020DG

20V NPN high gain transistor in SOT223

Summary

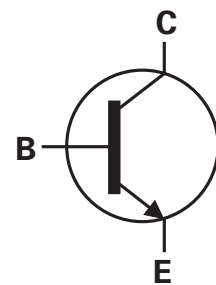
$BV_{CEX} > 70V$
 $BV_{CEO} > 20V$
 $BV_{ECO} > 4.5V$
 $I_{C(cont)} = 9A$
 $V_{CE(sat)} < 35mV @ 1A$
 $R_{CE(sat)} = 20m\Omega$
 $P_D = 3.0W$



Complementary part number ZXTP19020DG

Description

Packaged in the SOT223 outline this new low saturation 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

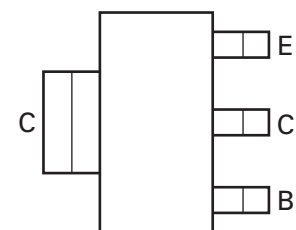
- Higher power dissipation SOT223 package
- High gain
- High peak current
- Low saturation voltage
- 70V forward blocking voltage
- 4.5V reverse blocking voltage

Applications

- DC - DC converters
- Motor drive
- Relay, lamp and solenoid drive
- Regulator circuits

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN19020DGTA	7	12	1000



Pinout - top view

Device marking

ZXTN19020D

ZXTN19020DG

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-Base voltage	V_{CBO}	70	V
Collector-Emitter voltage (forward blocking)	V_{CEX}	70	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	9	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	20	A
Power dissipation at $T_A = 25^\circ\text{C}^{(a)}$ Linear derating factor	P_D	1.2 9.6	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(b)}$ Linear derating factor	P_D	1.6 12.8	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(c)}$ Linear derating factor	P_D	3.0 24	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(d)}$ Linear derating factor	P_D	5.3 42	W mW/°C
Power dissipation at $T_C = 25^\circ\text{C}^{(e)}$ Linear derating factor	P_D	9.4 75	W mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to 150	°C

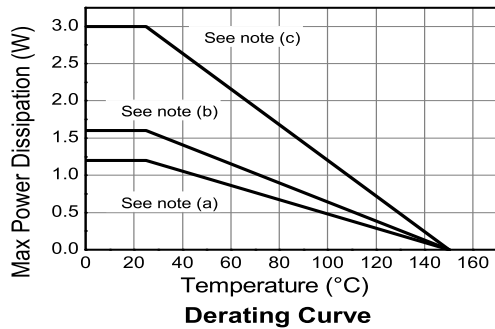
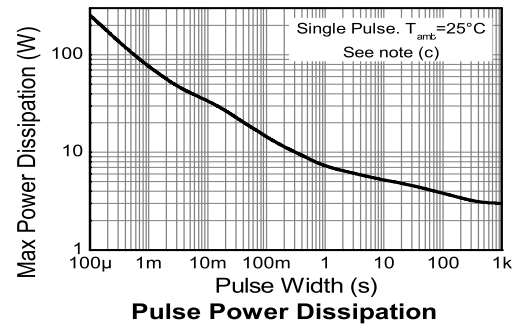
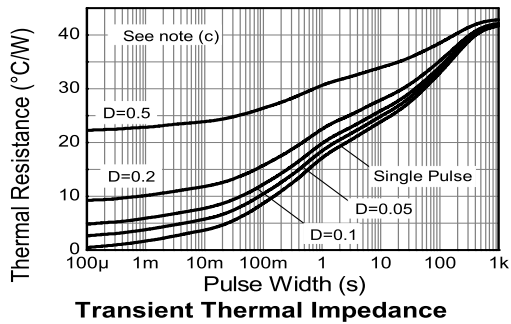
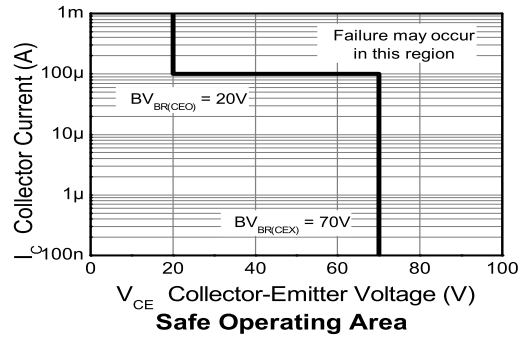
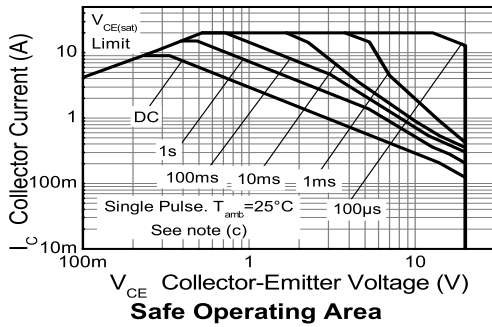
Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient ^(a)	$R_{\theta JA}$	104	°C/W
Junction to ambient ^(b)	$R_{\theta JA}$	78	°C/W
Junction to ambient ^(c)	$R_{\theta JA}$	42	°C/W
Junction to ambient ^(d)	$R_{\theta JA}$	23.5	°C/W
Junction to case ^(e)	$R_{\theta JC}$	12.3	°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



ZXTN19020DG

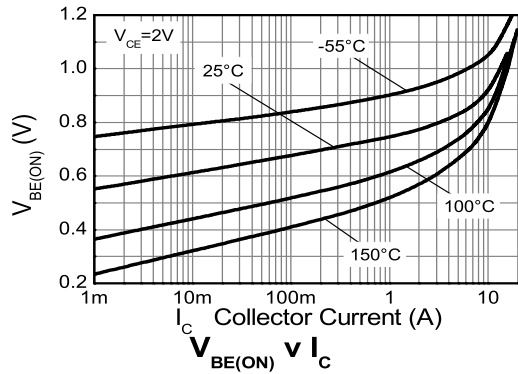
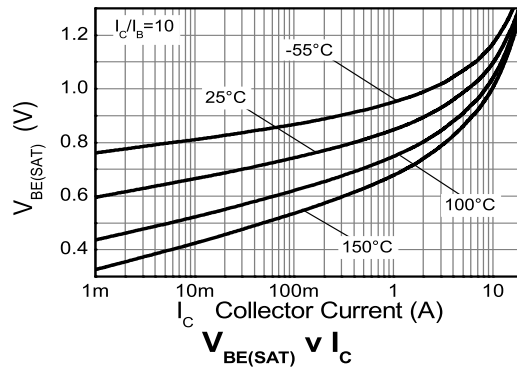
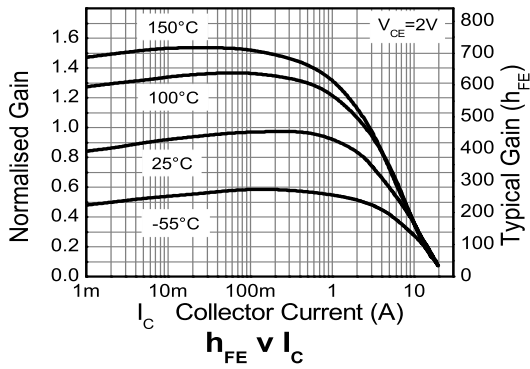
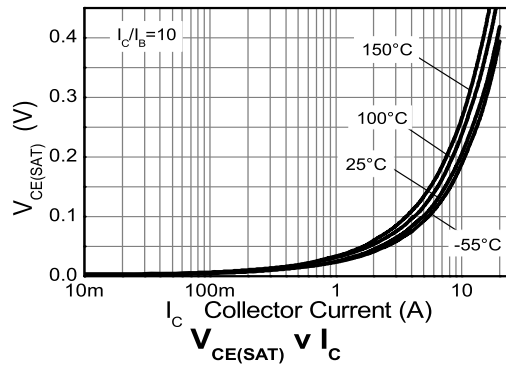
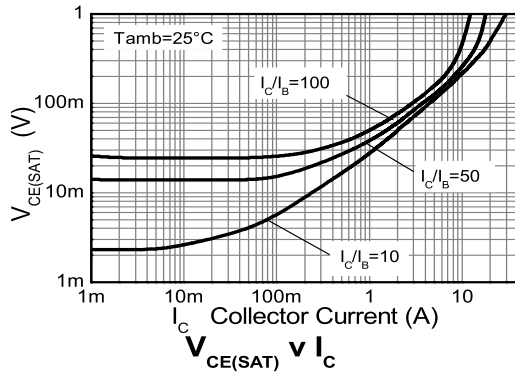
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV_{CBO}	70	100		V	$I_C = 100\mu\text{A}$
Collector-Emitter breakdown voltage (forward blocking)	BV_{CEX}	70	100		V	$I_C = 100\mu\text{A}$, $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-Emitter breakdown voltage	BV_{CEO}	20	30		V	$I_C = 10\text{mA}^{(*)}$
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.4		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}	4.5	5.7		V	$I_E = 100\mu\text{A}$
Emitter-Base breakdown voltage	BV_{EBO}	7	8.4		V	$I_E = 100\mu\text{A}$
Collector-Base cut-off current	I_{CBO}		<1	50 0.5	nA μA	$V_{CB} = 70\text{V}$ $V_{CB} = 70\text{V}$, $T_{amb} = 100^{\circ}\text{C}$
Collector-Emitter cut-off current	I_{CEX}			100	nA	$V_{CE} = 70\text{V}$, $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter cut-off current	I_{EBO}		<1	50	nA	$V_{EB} = 5.6\text{V}$
Collector-Emitter saturation voltage	$V_{CE(sat)}$		27 50 80 63 85 200	35 70 100 80 110 250	mV mV mV mV mV mV	$I_C = 1\text{A}$, $I_B = 100\text{mA}^{(*)}$ $I_C = 1\text{A}$, $I_B = 10\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 20\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}^{(*)}$ $I_C = 4\text{A}$, $I_B = 400\text{mA}^{(*)}$ $I_C = 9\text{A}$, $I_B = 450\text{mA}^{(*)}$
Base-Emitter saturation voltage	$V_{BE(sat)}$		1040	1150	mV	$I_C = 9\text{A}$, $I_B = 450\text{mA}^{(*)}$
Base-Emitter turn-on voltage	$V_{BE(on)}$		910	1050	mV	$I_C = 9\text{A}$, $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	h_{FE}	300 260 130 50	450 390 175 75 30	900		$I_C = 100\text{mA}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 2\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 9\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 15\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 20\text{A}$, $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	f_T		160		MHz	$I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Input capacitance	C_{ibo}		297	400	pF	$V_{EB} = 0.5\text{V}$, $f = 1\text{MHz}^{(*)}$
Output capacitance	C_{obo}		32.6	40	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}^{(*)}$
Delay time	t_d		129		ns	$I_C = 1\text{A}$, $V_{CC} = 10\text{V}$, $I_{B1} = -I_{B2} = 10\text{mA}$
Rise time	t_r		96		ns	
Storage time	t_s		398		ns	
Fall time	t_f		90		ns	

NOTES:

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

Typical characteristics



ZXTN19020DG

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ZXTN19020DG

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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