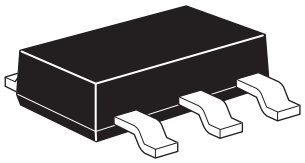
ZXTN25020DG
20V NPN high gain transistor in SOT223

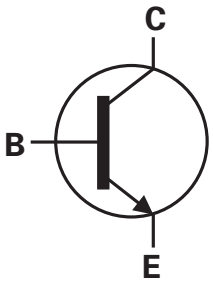
Summary



BV_{CEX} > 100V
BV_{CEO} > 20V
BV_{ECX} > 6V
$I_{C(cont)}$ = 7A
$V_{CE(sat)}$ < 48mV @ 1A
$R_{CE(sat)}$ = 31mΩ
P_D = 3.0W

Complementary part number ZXTP25020DG

Description



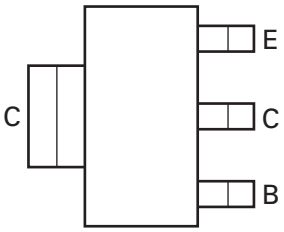
Packaged in the SOT223 outline this new low saturation NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

Features

- Higher power dissipation SOT223 package
- High gain
- High peak current
- Low saturation voltage
- 100V forward blocking voltage
- 6V reverse blocking voltage

Applications

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



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25020DGTA	7	12	1000

Device marking

ZXTN25
020D

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	7	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	1.2 9.6	W mW/°C
Power dissipation at T_A =25°C[b] Linear derating factor	P_D	1.6 12.8	W mW/°C
Power dissipation at T_A =25°C[c] Linear derating factor	P_D	3.0 24	W mW/°C
Power dissipation at T_A =25°C[d] Linear derating factor	P_D	5.3 42	W mW/°C
Power dissipation at T_C =25°C[e] Linear derating factor	P_D	7.3 58	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]	$R_{\Theta JC}$	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.

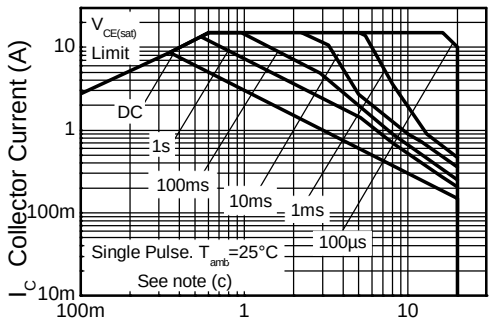
(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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

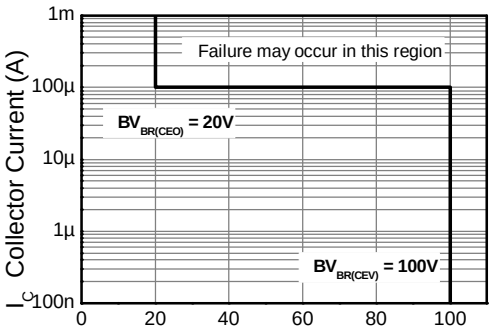
(d) As (c) above measured at t<5 seconds.

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

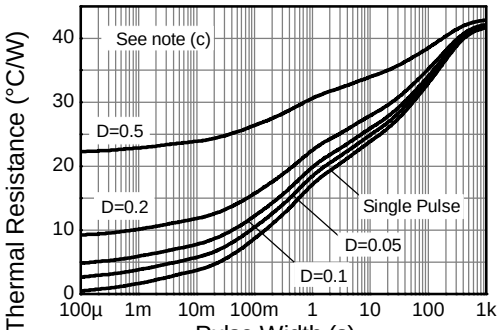
Thermal characteristics



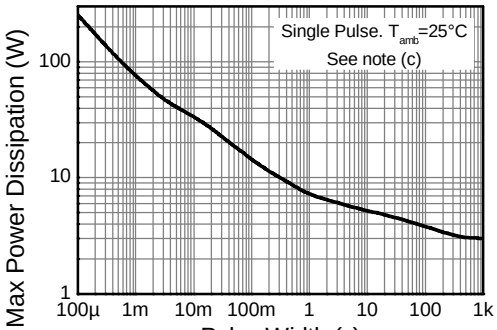
Safe Operating Area



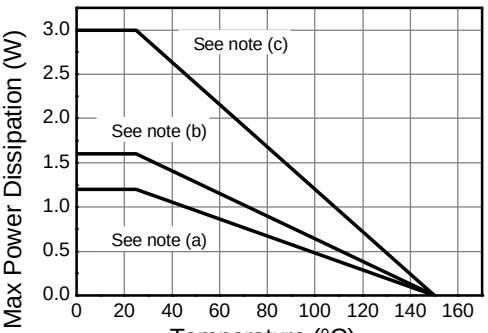
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



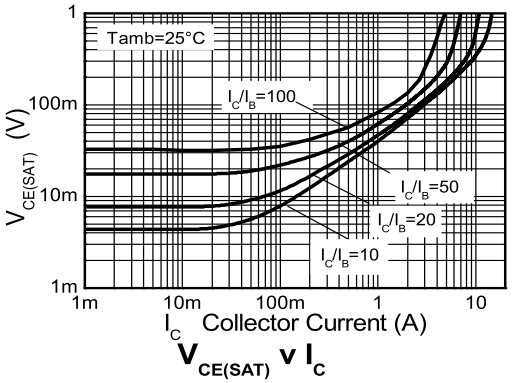
Derating Curve

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

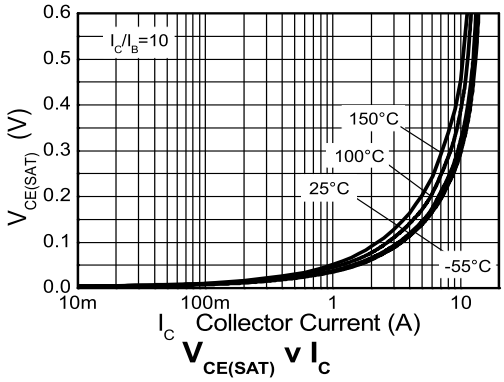
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV_{CBO}	100	125		V	I_C = 100μA
Collector-Emitter breakdown voltage (forward blocking)	BV_{CEX}	100	120		V	I_C = 100μA, R_{BE} < 1kΩ or -1V < V_{BE} < 0.25V
Collector-Emitter breakdown voltage	BV_{CEO}	20	35		V	I_C = 10mA (*)
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.3		V	I_E = 100μA, R_{BC} < 1kΩ or 0.25V > V_{BC} > -0.25V
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECO}	5	6.1		V	I_E = 100μA
Emitter-Base breakdown voltage	BV_{EBO}	7	8.35		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} < 1kΩ 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 60 100 130 225	48 75 120 180 290	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 = 7A, I_B = 700mA(*)
Base-Emitter saturation voltage	$V_{BE(sat)}$		1090	1150	mV	I_C = 7A, I_B = 700mA(*)
Base-Emitter turn-on voltage	$V_{BE(on)}$		950	1050	mV	I_C = 7A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	300 250 50	450 360 85 15	900		I_C = 10mA, V_{CE} = 2V(*) I_C = 2A, V_{CE} = 2V(*) I_C = 7A, 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%.

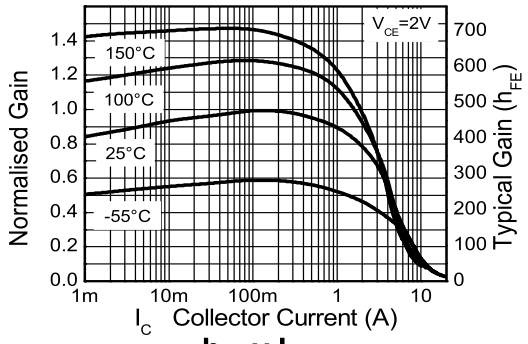
Typical characteristics



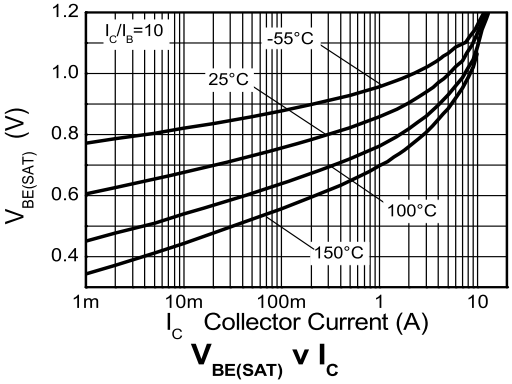
$V_{CE(SAT)}$ v I_C



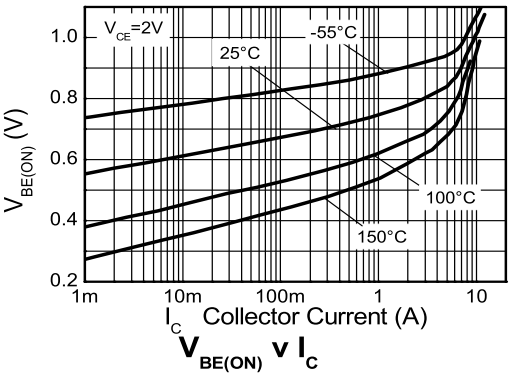
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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