

SuperSOT4™ 20V NPN SILICON LOW SATURATION TRANSISTOR

SUMMARY

$V_{CE0}=20V$; $R_{SAT} = 40m\Omega$; $I_C= 2.5A$

DESCRIPTION

This new 4th generation ultra low saturation transistor utilises the Zetex matrix structure combined with advanced assembly techniques to give extremely low on state losses. This makes it ideal for high efficiency, low voltage switching applications.

FEATURES

- Extremely Low Equivalent On Resistance
- Extremely Low Saturation Voltage
- h_{FE} characterised up to 5A
- $I_C=2.5A$ Continuous Collector Current
- SOT23 package

APPLICATIONS

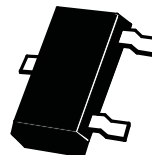
- DC - DC Converters
- Power Management Functions
- Power switches
- Motor control

ORDERING INFORMATION

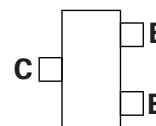
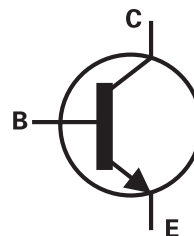
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXT11N20DFTA	7	8mm embossed	3000 units
ZXT11N20DFTC	13	8mm embossed	10000 units

DEVICE MARKING

2N0



SOT23



Top View

ZXT11N20DF

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	20	V
Emitter-Base Voltage	V_{EBO}	7.5	V
Peak Pulse Current	I_{CM}	5	A
Continuous Collector Current	I_C	2.5	A
Base Current	I_B	500	mA
Power Dissipation at $T_A=25^{\circ}\text{C}$ (a) Linear Derating Factor	P_D	625 5	mW mW/ $^{\circ}\text{C}$
Power Dissipation at $T_A=25^{\circ}\text{C}$ (b) Linear Derating Factor	P_D	806 6.4	mW mW/ $^{\circ}\text{C}$
Operating and Storage Temperature Range	$T_J:T_{stg}$	-55 to +150	$^{\circ}\text{C}$

THERMAL RESISTANCE

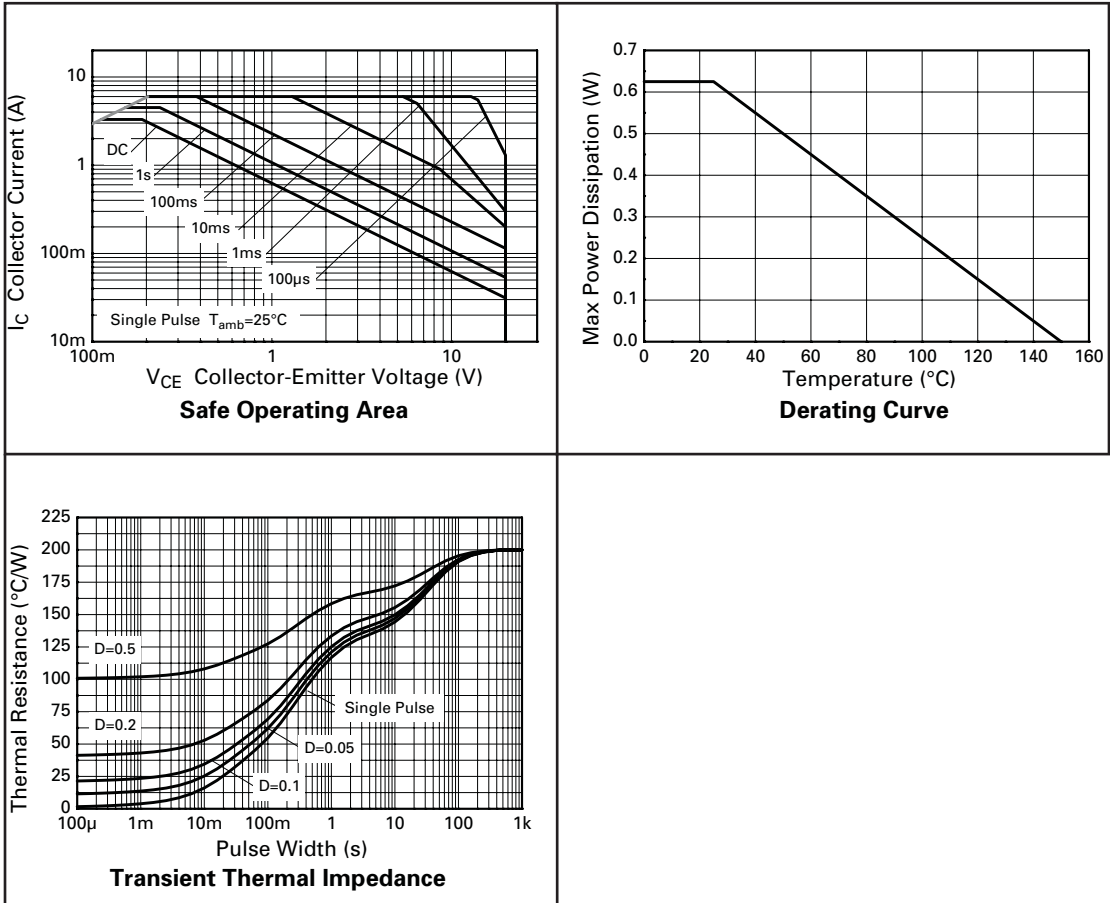
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\theta JA}$	200	$^{\circ}\text{C/W}$
Junction to Ambient (b)	$R_{\theta JA}$	155	$^{\circ}\text{C/W}$

NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at $t \leq 5$ secs.

TYPICAL CHARACTERISTICS



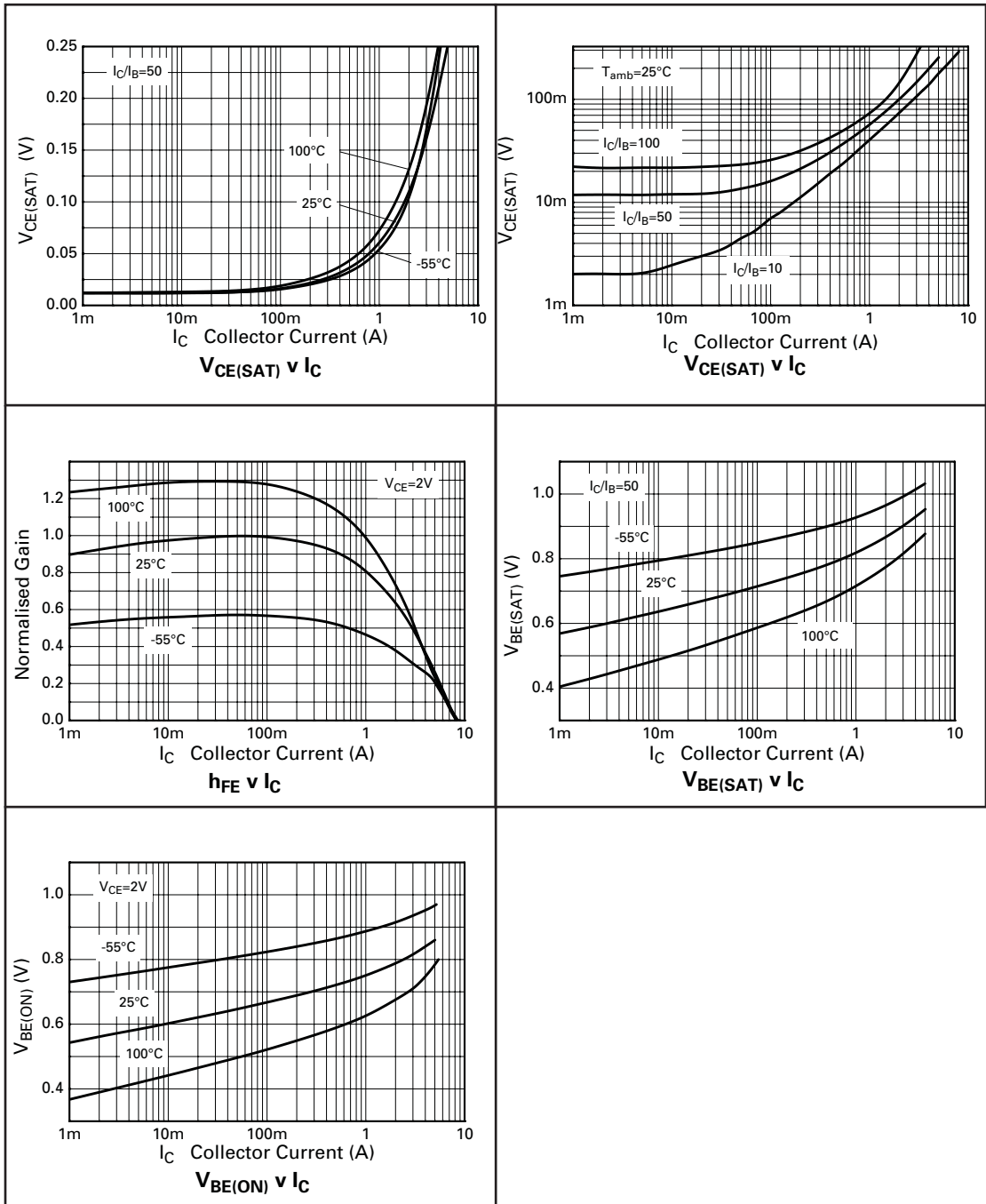
ZXT11N20DF

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	40			V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	20			V	$I_C = 10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	7.5			V	$I_E = 100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}			100	nA	$V_{CB} = 32\text{V}$
Emitter Cut-Off Current	I_{EBO}			100	nA	$V_{EB} = 6\text{V}$
Collector Emitter Cut-Off Current	I_{CES}			100	nA	$V_{CES} = 32\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		7 65 40 90	12 100 60 130	mV mV mV mV	$I_C = 0.1\text{A}, I_B = 10\text{mA}^*$ $I_C = 1\text{A}, I_B = 10\text{mA}^*$ $I_C = 1\text{A}, I_B = 100\text{mA}^*$ $I_C = 2.5\text{A}, I_B = 250\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		0.9	1.0	V	$I_C = 2.5\text{A}, I_B = 250\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		0.85	1.0	V	$I_C = 2.5\text{A}, V_{CE} = 2\text{V}^*$
Static Forward Current Transfer Ratio	h_{FE}	200 300 250 150 100		900		$I_C = 10\text{mA}, V_{CE} = 2\text{V}^*$ $I_C = 100\text{mA}, V_{CE} = 2\text{V}^*$ $I_C = 1\text{A}, V_{CE} = 2\text{V}^*$ $I_C = 3\text{A}, V_{CE} = 2\text{V}^*$ $I_C = 5\text{A}, V_{CE} = 2\text{V}^*$
Transition Frequency	f_T		160		MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}$ $f = 50\text{MHz}$
Output Capacitance	C_{obo}		20		pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$		122		ns	$V_{CC} = 10\text{V}, I_C = 2\text{A}$ $I_{B1} = I_{B2} = 20\text{mA}$
Turn-Off Time	$t_{(off)}$		295		ns	

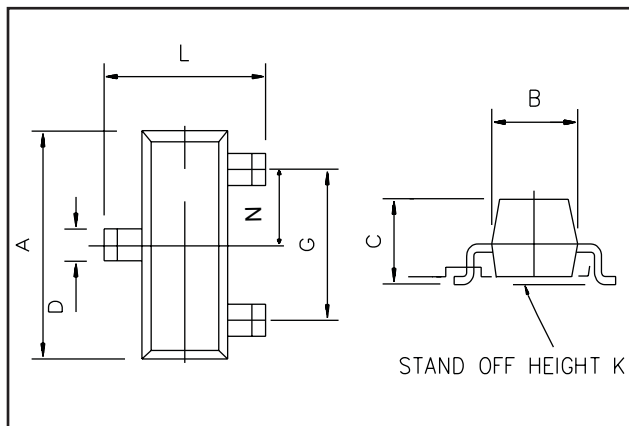
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

TYPICAL CHARACTERISTICS



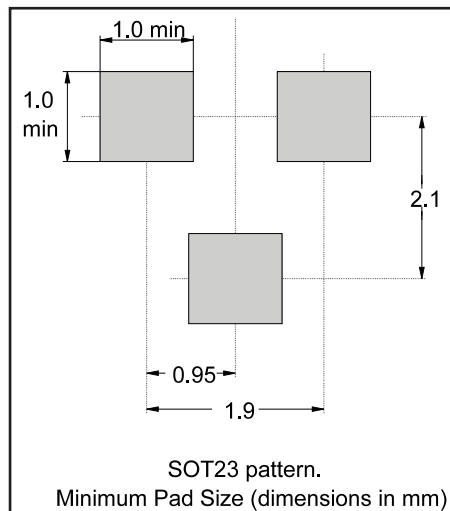
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PACKAGE DIMENSIONS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	2.67	3.05	0.105	0.120
B	1.20	1.40	0.047	0.055
C	—	1.10	—	0.043
D	0.37	0.53	0.0145	0.021
F	0.085	0.15	0.0033	0.0059
G	NOM 1.9		NOM 0.075	
K	0.01	0.10	0.0004	0.004
L	2.10	2.50	0.0825	0.0985
N	NOM 0.95		NOM 0.037	

PAD LAYOUT DETAILS



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