

SuperSOT4™ 20V PNP SILICON LOW SATURATION SWITCHING TRANSISTOR

SUMMARY

$V_{CE0} = -20V$; $R_{SAT} = 47m\Omega$; $I_C = -3.5A$

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 10A
- $I_C = 3.5A$ Continuous Collector Current
- SOT23-6 package

APPLICATIONS

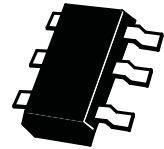
- DC - DC Converters
- Power Management Functions
- Power switches
- Motor control

ORDERING INFORMATION

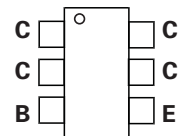
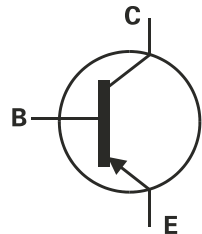
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXT13P20DE6TA	7	8mm embossed	3000 units
ZXT13P20DE6TC	13	8mm embossed	10000 units

DEVICE MARKING

P20D



SOT23-6



Top View

ZXT13P20DE6

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-Base Voltage	V_{CBO}	-25	V
Collector-Emitter Voltage	V_{CEO}	-20	V
Emitter-Base Voltage	V_{EBO}	-7.5	V
Peak Pulse Current	I_{CM}	-10	A
Continuous Collector Current	I_C	-4	A
Base Current	I_B	-500	mA
Power Dissipation at $T_A=25^\circ\text{C}$ (a) Linear Derating Factor	P_D	1.1 8.8	W mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ (b) Linear Derating Factor	P_D	1.7 13.6	W 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)	$R_{\theta JA}$	113	$^\circ\text{C}/\text{W}$
Junction to Ambient (b)	$R_{\theta JA}$	73	$^\circ\text{C}/\text{W}$

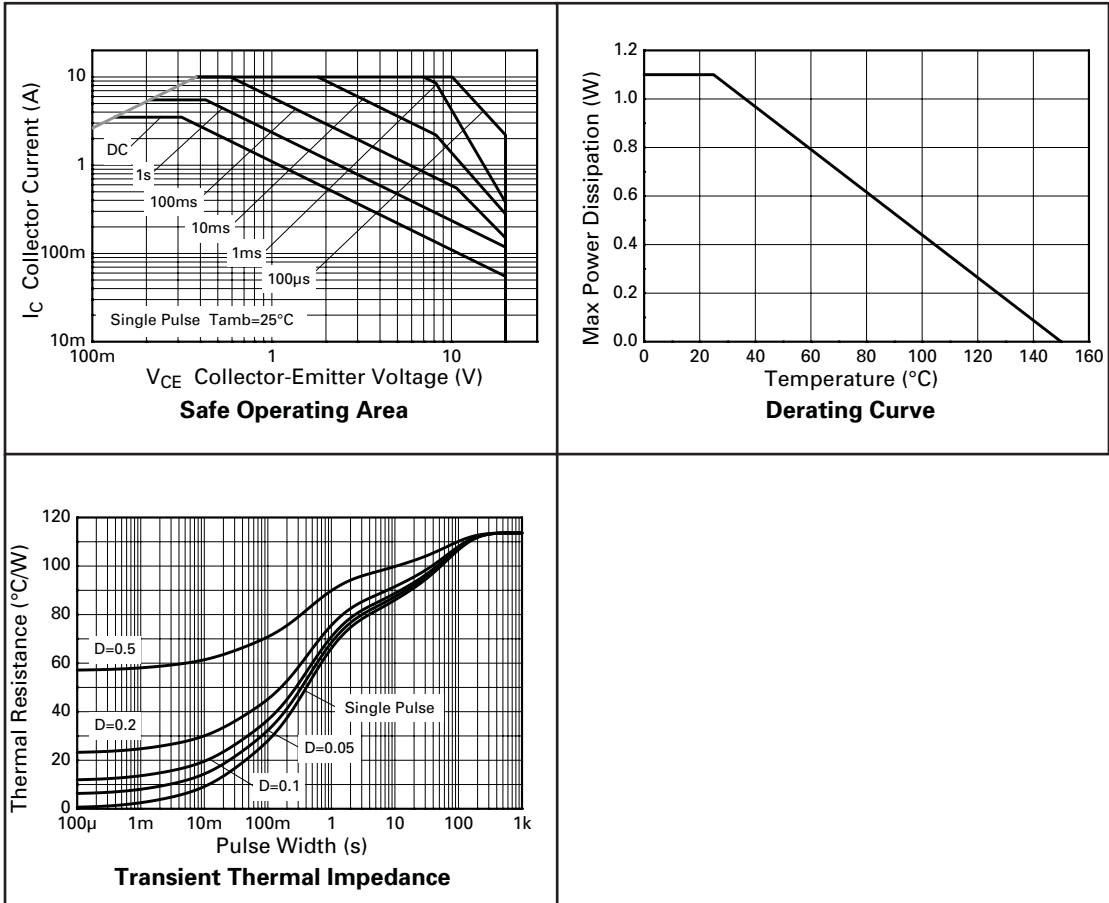
NOTES

(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.

ZXT13P20DE6

TYPICAL CHARACTERISTICS



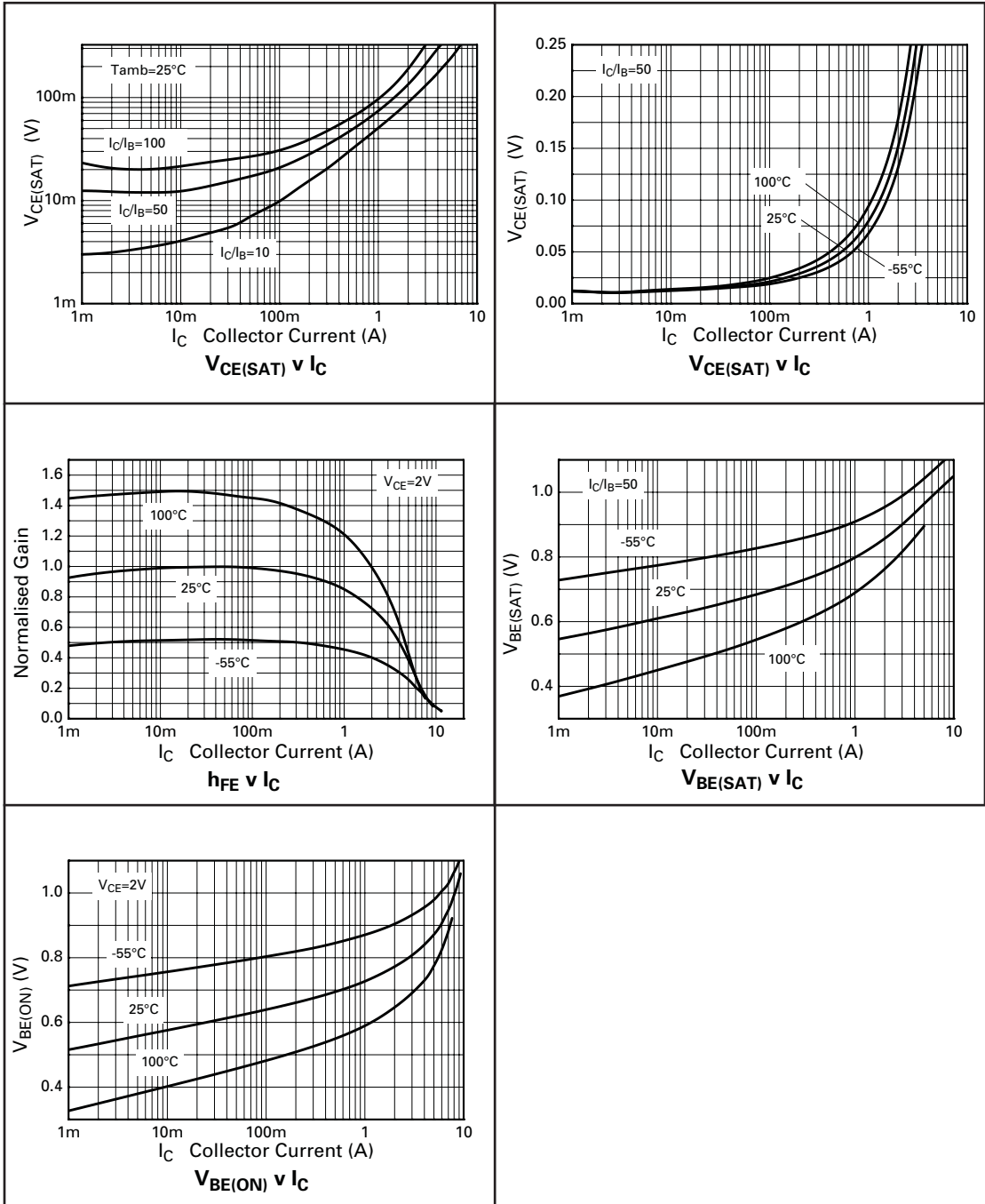
ZXT13P20DE6

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-25	-55		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-20	-50		V	$I_C = -10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-7.5	-8.5		V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}			-100	nA	$V_{CB} = -20\text{V}$
Emitter Cut-Off Current	I_{EBO}			-100	nA	$V_{EB} = -6\text{V}$
Collector Emitter Cut-Off Current	I_{CES}			-100	nA	$V_{CES} = -20\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-10 -100 -165	-15 -130 -250	mV mV mV	$I_C = -0.1\text{A}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -10\text{mA}^*$ $I_C = -3.5\text{A}, I_B = -350\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			-1.1	V	$I_C = -3.5\text{A}, I_B = -350\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$			-0.9	V	$I_C = -3.5\text{A}, V_{CE} = -2\text{V}^*$
Static Forward Current Transfer Ratio	h_{FE}	300 300 200 20	500 450 300 30	900		$I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -4\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -10\text{A}, V_{CE} = -2\text{V}^*$
Transition Frequency	f_T		90		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 50\text{MHz}$
Output Capacitance	C_{obo}		62		pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$		95		ns	$V_{CC} = -10\text{V}, I_C = -2\text{A}$ $I_{B1} = I_{B2} = -40\text{mA}$
Turn-Off Time	$t_{(off)}$		395		ns	

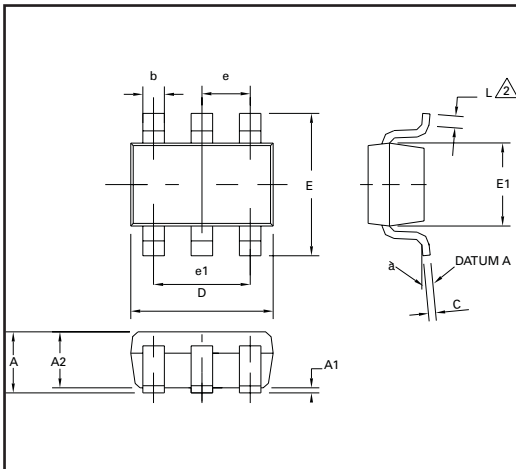
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle \leq 2%

TYPICAL CHARACTERISTICS

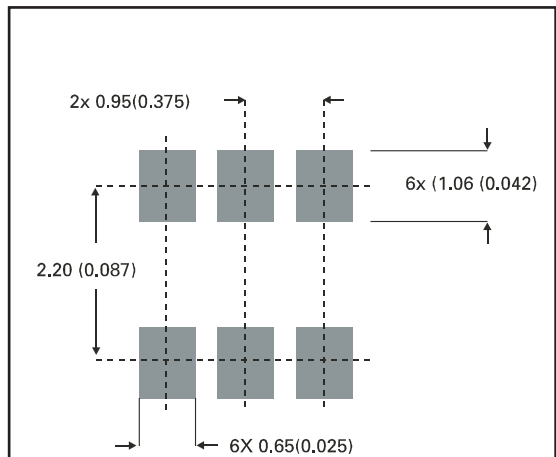


ZXT13P20DE6

PACKAGE DIMENSIONS



PAD LAYOUT DETAILS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.35	0.057
A1	0.00	0.15	0	0.006
A2	0.90	1.30	0.035	0.051
b	0.35	0.50	0.014	0.019
C	0.09	0.20	0.0035	0.008
D	2.80	3.00	0.110	0.118
E	2.60	3.00	0.102	0.118
E1	1.50	1.75	0.059	0.069
L	0.10	0.60	0.004	0.002
e	0.95 REF		0.037 REF	
e1	1.90 REF		0.074 REF	
L	0°	10°	0°	10°



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