ZXTN25012EFH
12V, SOT23, NPN medium power transistor

Summary



BV_{CEO} > 12V

BV_{ECX} > 6V

h_{FE} > 500

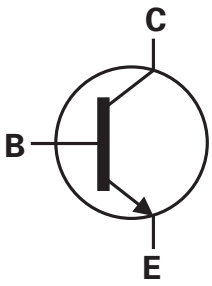
$I_{C(cont)}$ = 6A

$V_{CE(sat)}$ < 32mV @ 1A

$R_{CE(sat)}$ = 23mΩ

P_D = 1.25W

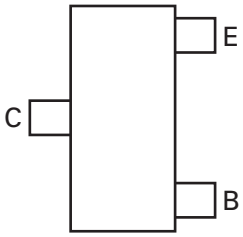
Description



Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium.

Features

- High power dissipation SOT23 package
- High peak current
- Very high gain
- Low saturation voltage
- 6V reverse blocking voltage



Pinout - top view

Applications

- MOSFET gate drivers
- Power switches
- Motor control
- DC fans
- DC-DC converters

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25012EFHTA	7	8	3,000

Device marking

1C3

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Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	20	V
Collector-emitter voltage	V_{CEO}	12	V
Emitter-collector voltage (reverse blocking)	V_{ECX}	6	V
Emitter-base voltage	V_{EBO}	7	V
Continuous collector current[c]	I_C	6	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	15	A
Power dissipation at T_{amb} =25°C[a] Linear derating factor	P_D	0.73 5.84	W mW/°C
Power dissipation at T_{amb} =25°C[b] Linear derating factor	P_D	1.05 8.4	W mW/°C
Power dissipation at T_{amb} =25°C[c] Linear derating factor	P_D	1.25 9.6	W mW/°C
Power dissipation at T_{amb} =25°C[d] Linear derating factor	P_D	1.81 14.5	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]	$R_{\Theta JA}$	171	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	119	°C/W
Junction to ambient[c]	$R_{\Theta JA}$	100	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	69	°C/W

NOTES:

(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

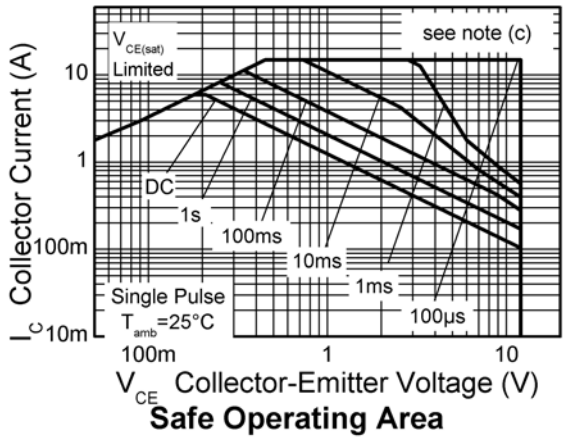
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

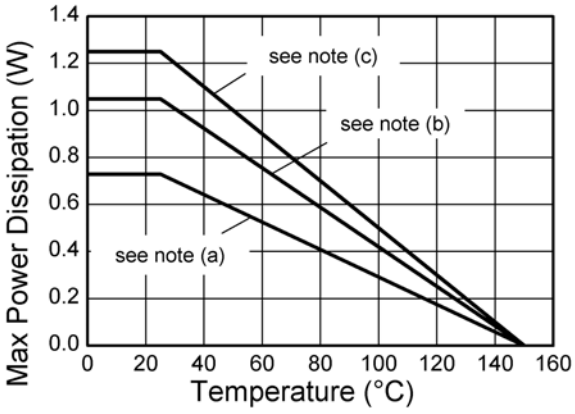
(d) As (c) above measured at t<5secs.

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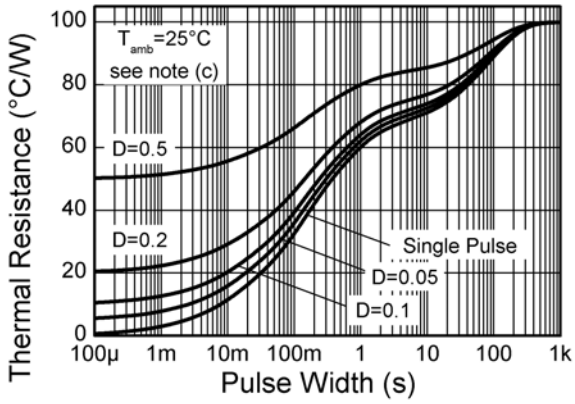
Characteristics



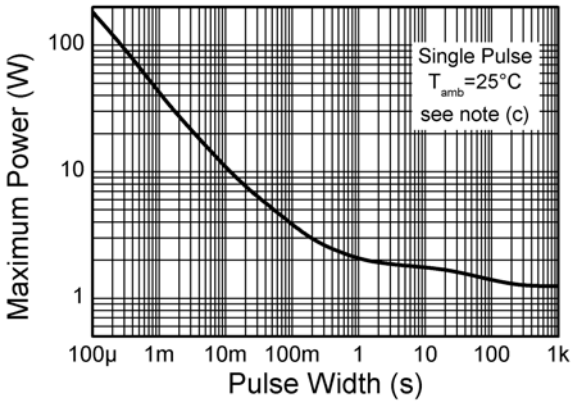
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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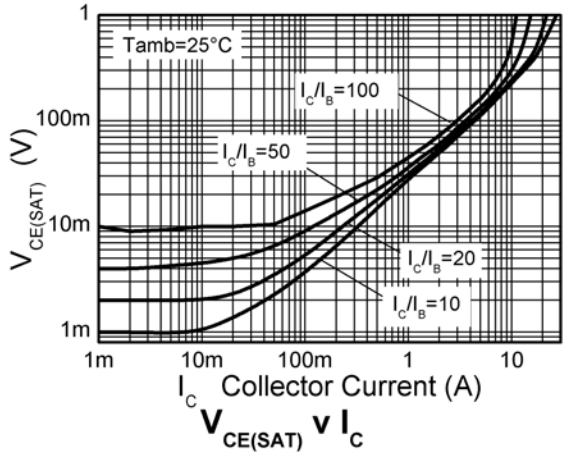
Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	20	40		V	I_C = 100μA
Collector-emitter breakdown voltage (base open)	BV_{CEO}	12	17		V	I_C = 10mA (*)
Emitter-base breakdown voltage	BV_{EBO}	7	8.3		V	I_E = 100μA
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.0		V	I_E = 100μA, R_{BC} < 1kΩ or 0.25V > V_{BC} > -0.25V
Emitter-collector breakdown voltage (base open)	BV_{ECO}	4.5	5.5		V	I_E = 100μA,
Collector-base cut-off current	I_{CBO}		<1	50 0.5	nA μA	V_{CB} = 20V V_{CB} = 20V, T_{amb}= 100°C
Emitter-base cut-off current	I_{EBO}		<1	50	nA	V_{EB} = 5.6V
Collector-emitter saturation voltage	$V_{CE(sat)}$		28 45 60 160	32 55 75 190	mV mV mV mV	I_C = 1A, I_B = 100mA(*) I_C = 1A, I_B = 10mA(*) I_C = 2A, I_B = 40mA(*) I_C = 6A, I_B = 120mA(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		920	1000	mV	I_C = 6A, I_B = 120mA(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		800	900	mV	I_C = 6A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	500 500 300 40	800 750 460 55	1500		I_C = 10mA, V_{CE} = 2V(*) I_C = 1A, V_{CE} = 2V(*) I_C = 4A, V_{CE} = 2V(*) I_C = 15A, V_{CE} = 2V(*)
Transition frequency	f_T		260		MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Output capacitance	C_{OBO}		25.6	35	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	t_d		70.9		ns	V_{CC} = 10V. I_C = 1A, I_{B1} = I_{B2}= 10mA.
Rise time	t_r		69.8		ns	
Storage time	t_s		233		ns	
Fall time	t_f		71.6		ns	

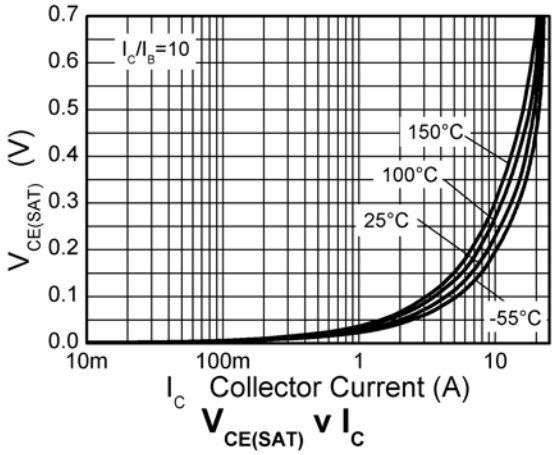
NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300μs; duty cycle ≤2%.

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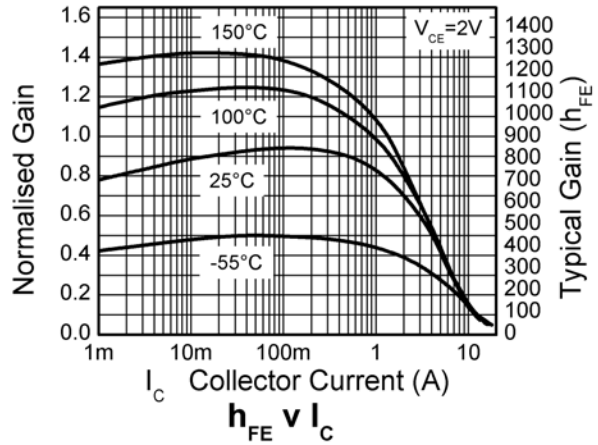
Typical characteristics



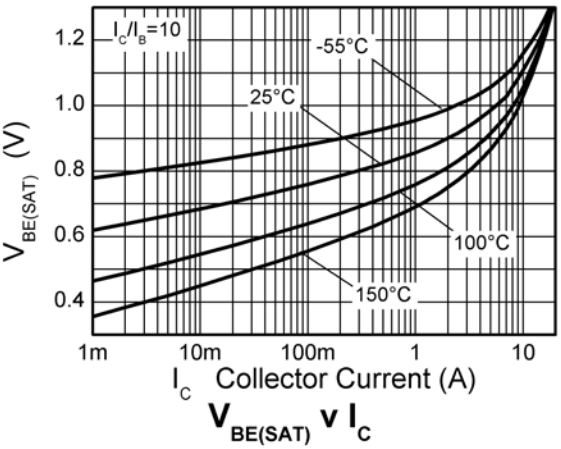
$V_{CE(SAT)}$ v I_C



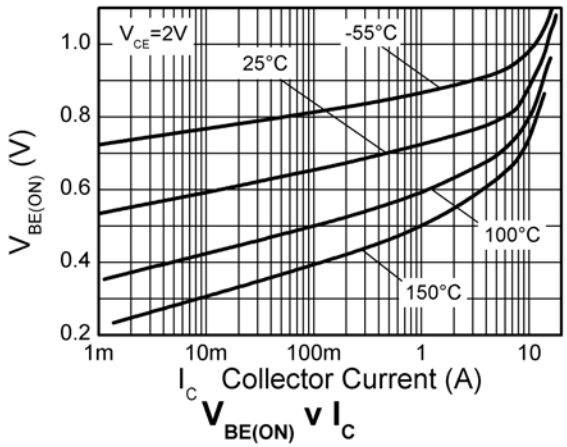
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



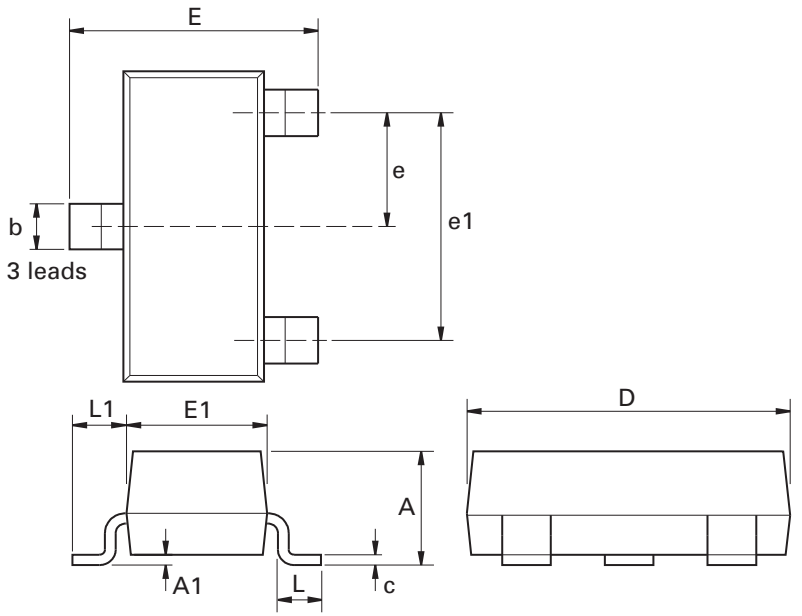
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
c	0.085	0.20	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.037 NOM		-	-	-	-	-

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

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