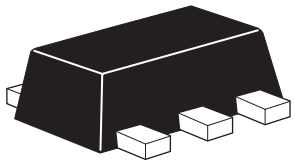
ZXTN25040DZ
40V, SOT89, NPN medium power transistor

Summary



BV_{CEX} > 130V

BV_{CEO} > 40V

BV_{ECO} > 6V

$I_{C(cont)}$ = 5A

$V_{CE(sat)}$ < 60mV @ 1A

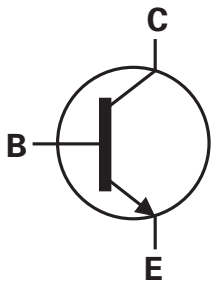
$R_{CE(sat)}$ = 38mΩ

P_D = 2.4W

Complementary part number ZXTP25040DZ

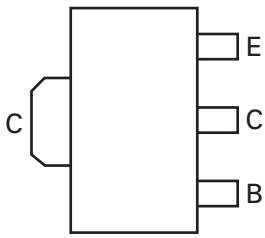
Description

Packaged in the SOT89 outline this new low saturation 40V 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

- Extremely low equivalent on resistance; $R_{CE(sat)}$ = 36mΩ at 5A
- 5A continuous current
- Up to 10 amps peak current
- Very low saturation voltages
- Excellent h_{FE} characteristics
- 6V reverse blocking capability



Pinout - top view

Applications

- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC-DC modules
- Backlight inverters
- Power switches
- MOSFET gate drivers

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25040DZTA	7	12	1000

Device marking

1C8

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Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	130	V
Collector-emitter voltage (forward blocking)	V_{CEX}	130	V
Collector-emitter voltage	V_{CEO}	40	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	6	V
Emitter-base voltage	V_{EBO}	7	V
Continuous collector current[b]	I_C	5	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	10	A
Power dissipation at T_{amb} = 25°C[a]	P_D	1.1	W
Linear derating factor		8.8	mW/°C
Power dissipation at T_{amb} = 25°C[b]	P_D	1.8	W
Linear derating factor		14.4	mW/°C
Power dissipation at T_{amb} = 25°C[c]	P_D	2.4	W
Linear derating factor		19.2	mW/°C
Power dissipation at T_{amb} = 25°C[d]	P_D	4.46	W
Linear derating factor		35.7	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]	$R_{\Theta JA}$	117	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	68	°C/W
Junction to ambient[c]	$R_{\Theta JA}$	51	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	28	°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.

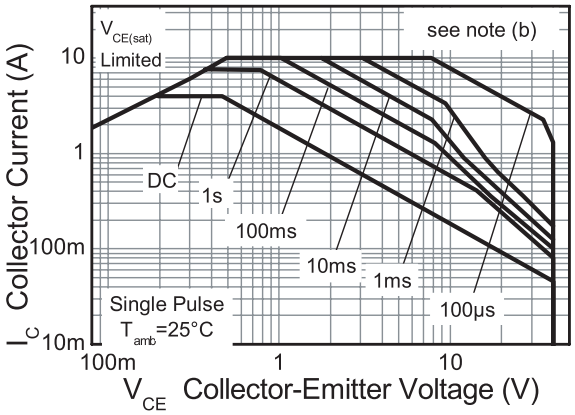
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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.

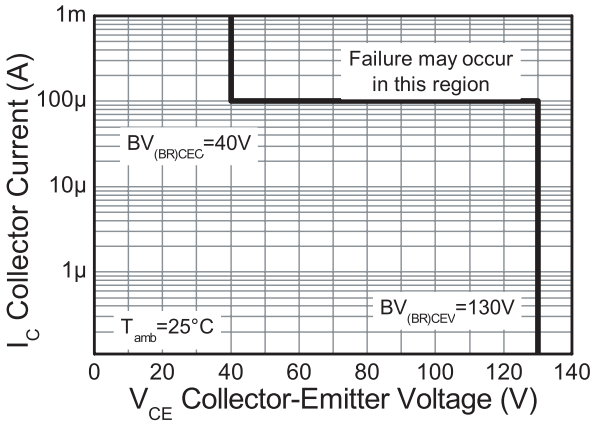
(d) As (c) above measured at t<5secs.

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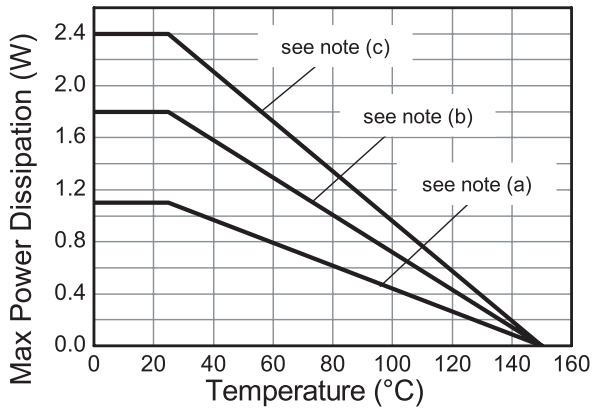
Thermal characteristics



Safe Operating Area



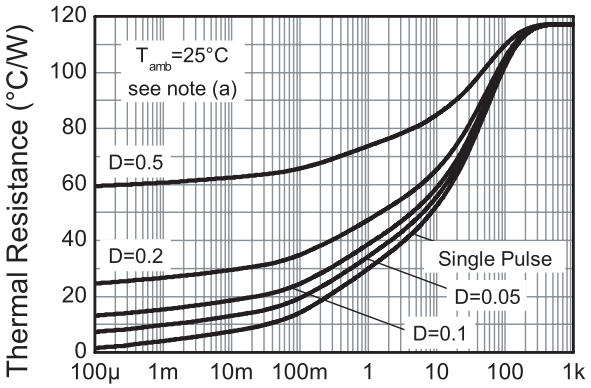
Safe Operating Area



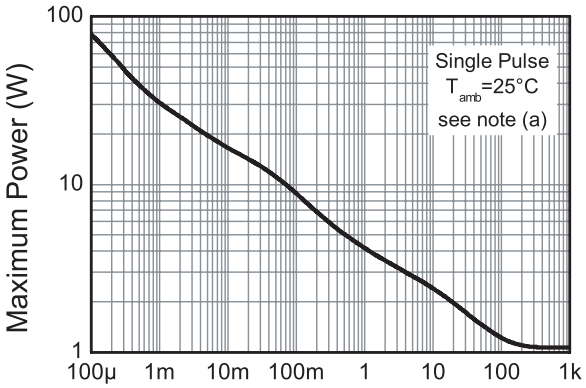
Derating Curve

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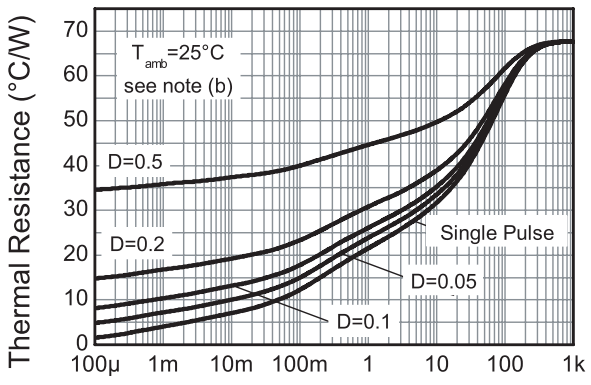
Thermal characteristics (cont.)



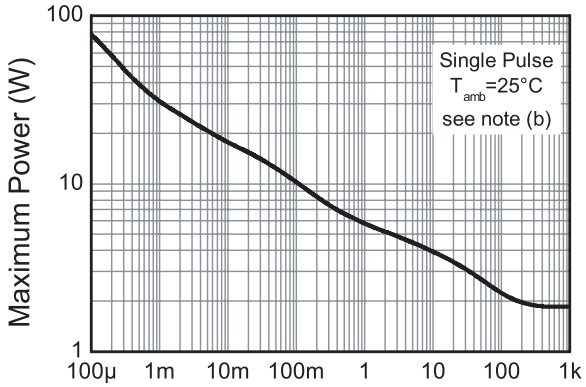
Transient Thermal Impedance



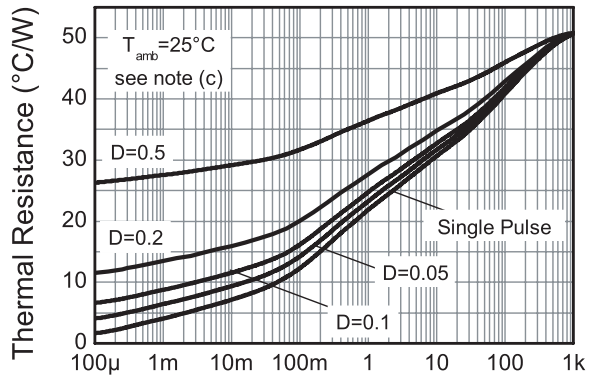
Pulse Power Dissipation



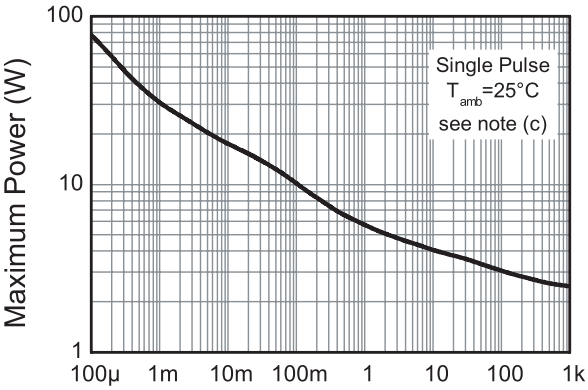
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



Pulse Power Dissipation

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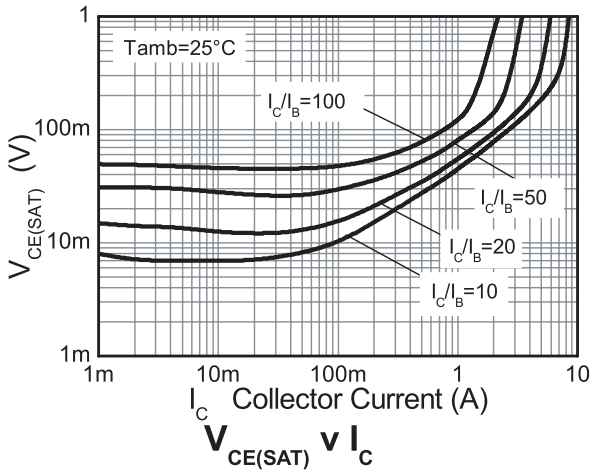
Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	130	170		V	I_C = 100μA
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	130	170		V	V_{CE} = 130V; $R_{BE} \leq 1k\Omega$ or -1V < V_{BE} < 0.25V
Collector-emitter breakdown voltage (base open)	BV_{CEO}	40	63		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	7.4		V	I_E = 100μA, $R_{BC} \leq 1k\Omega$ or 0.25V > V_{BC} > -0.25V
Emitter-collector breakdown voltage (base open)	BV_{ECO}	6	7.4		V	I_E = 100μA,
Collector-base cut-off current	I_{CBO}		<1	50 20	nA μA	V_{CB} = 100V V_{CB} = 100V, T_{amb}= 100°C
Collector-emitter cut-off current	I_{CEX}		-	100	nA	V_{CE} = 100V; $R_{BE} \leq 1k\Omega$ or -1V < V_{BE} < 0.25V
Emitter-base cut-off current	I_{EBO}		<1	50	nA	V_{EB} = 5.6V
Collector-emitter saturation voltage	$V_{CE(sat)}$		50	60	mV	I_C = 1A, I_B = 100mA(*)
			125	215	mV	I_C = 1A, I_B = 10mA(*)
			140	215	mV	I_C = 2A, I_B = 40mA(*)
			190	260	mV	I_C = 5A, I_B = 500mA(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		1000	1100	mV	I_C = 5A, I_B = 500mA(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		910	1000	mV	I_C = 5A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	300	450	900		I_C = 10mA, V_{CE} = 2V(*)
		300	450			I_C = 1A, V_{CE} = 2V(*)
		20	40			I_C = 5A, V_{CE} = 2V(*)
			10			I_C = 10A, V_{CE} = 2V(*)
Transition frequency	f_T		190		MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Output capacitance	C_{OBO}		11.7	20	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	t_d		64		ns	V_{CC} = 10V I_C = 1A, I_{B1} = I_{B2}= 10mA
Rise time	t_r		108		ns	
Storage time	t_s		428		ns	
Fall time	t_f		130		ns	

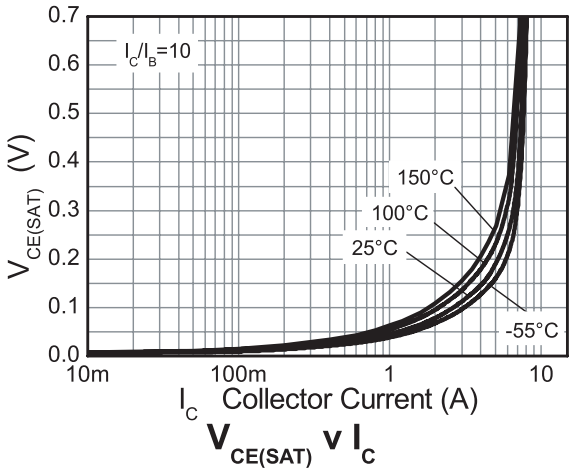
NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300μs; duty cycle ≤2%.

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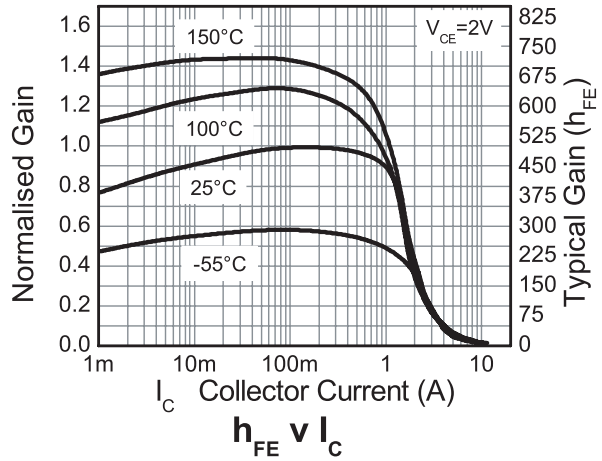
Typical characteristics



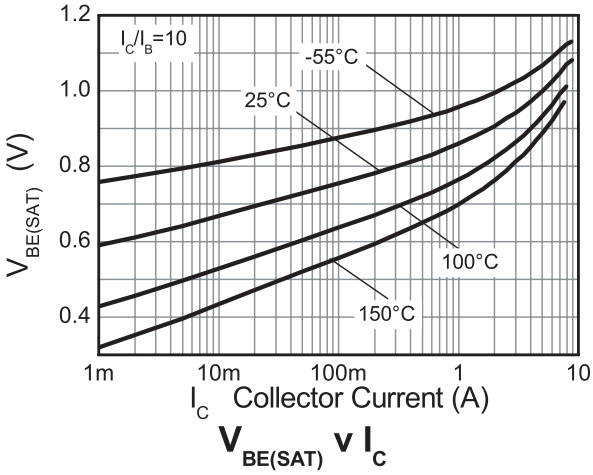
$V_{CE(SAT)}$ v I_C



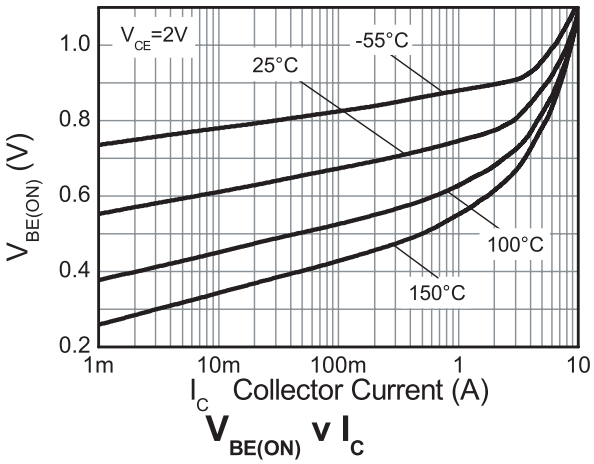
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



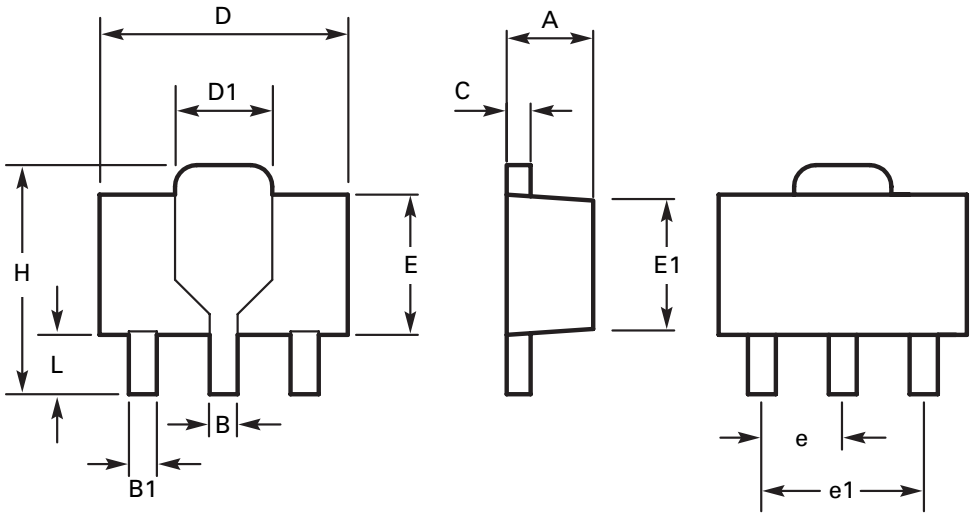
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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Package outline - SOT89



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	E1	2.13	2.29	0.084	0.090
B	0.44	0.56	0.017	0.022	e	1.50 BSC		0.059 BSC	
B1	0.36	0.48	0.014	0.019	e1	3.00 BSC		0.118 BSC	
C	0.35	0.44	0.014	0.019	H	3.94	4.25	0.155	0.167
D	4.40	4.60	0.173	0.181	L	0.89	1.20	0.155	0.167
E	2.29	2.60	0.090	0.102		-	-	-	-

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

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