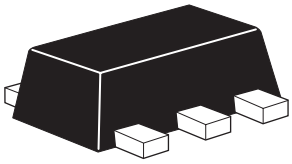
ZXTN25060BZ
60V, SOT89, NPN medium power transistor

Summary



BV_{CEX} > 150V

BV_{CEO} > 60V

BV_{ECO} > 6V

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

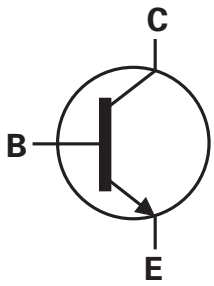
$V_{CE(sat)}$ < 70mV @ 1A

$R_{CE(sat)}$ = 48mΩ

P_D = 2.4W

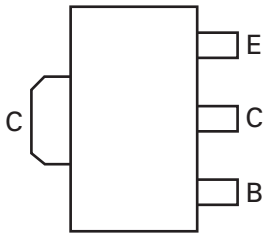
Description

Packaged in the SOT89 outline this new low saturation 60V 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; $R_{CE(sat)}$ = 46mΩ at 5A
- 5 amps 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
ZXTN25060BZTA	7	12	1000

Device marking

1C7

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	150	V
Collector-emitter voltage (forward blocking)	V_{CEX}	150	V
Collector-emitter voltage	V_{CEO}	60	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	6	V
Emitter-base voltage	V_{EBO}	7	V
Continuous collector current[c]	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:

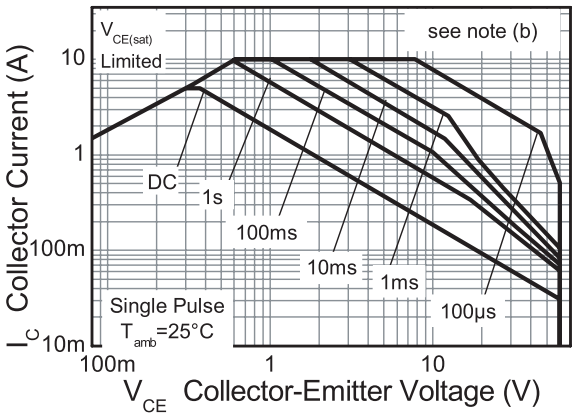
(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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.

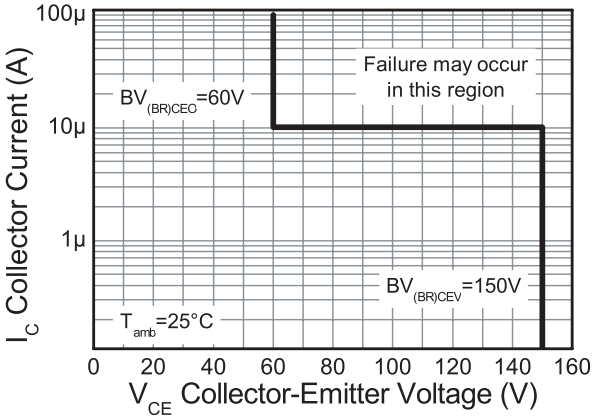
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

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

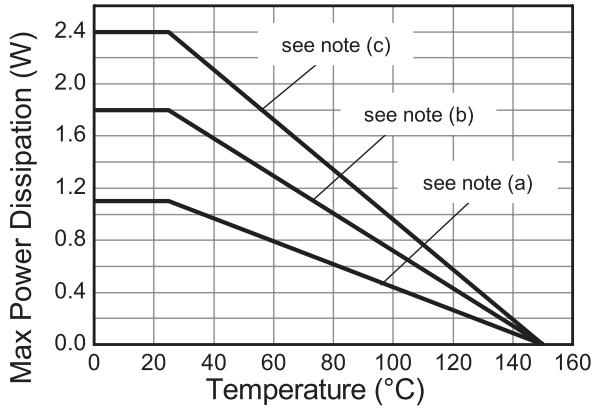
Thermal characteristics



Safe Operating Area

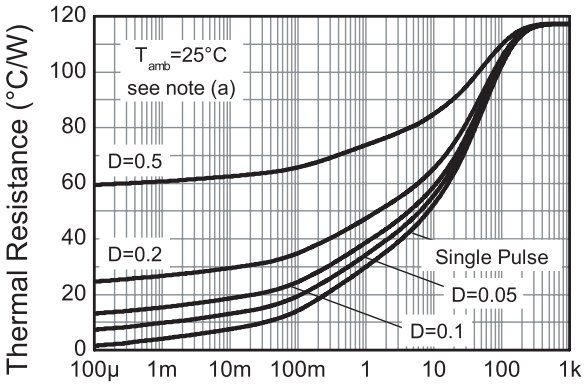


Safe Operating Area

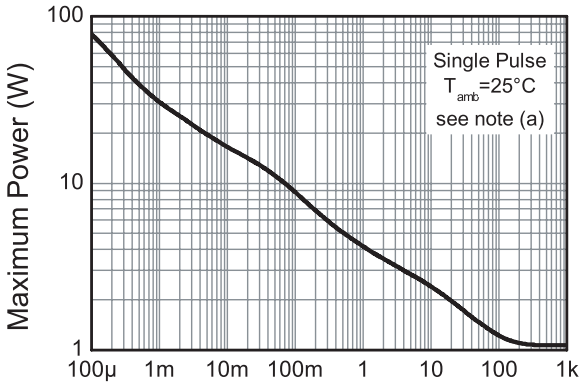


Derating Curve

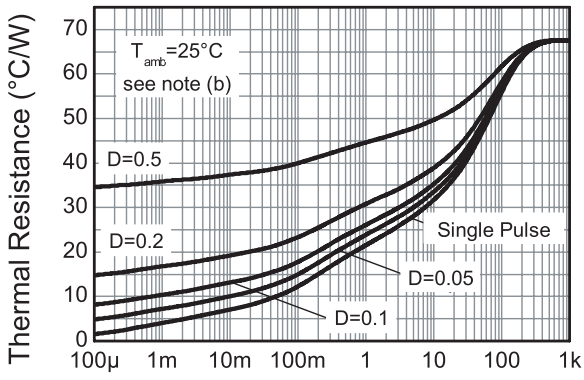
Thermal characteristics



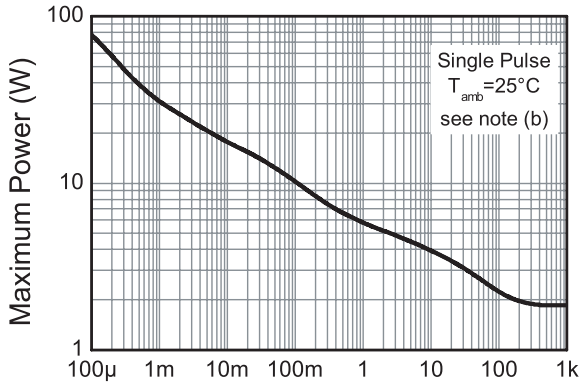
Transient Thermal Impedance



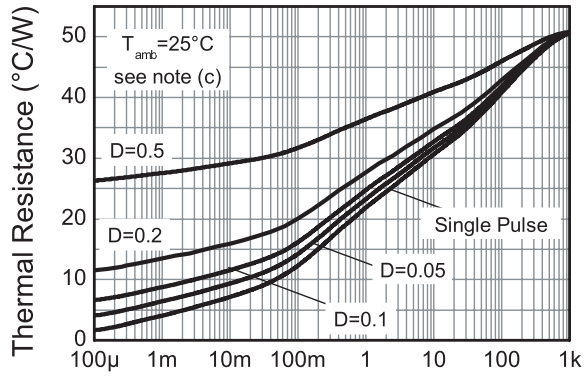
Pulse Power Dissipation



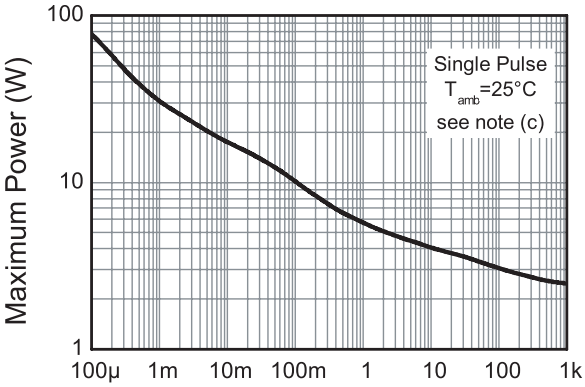
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



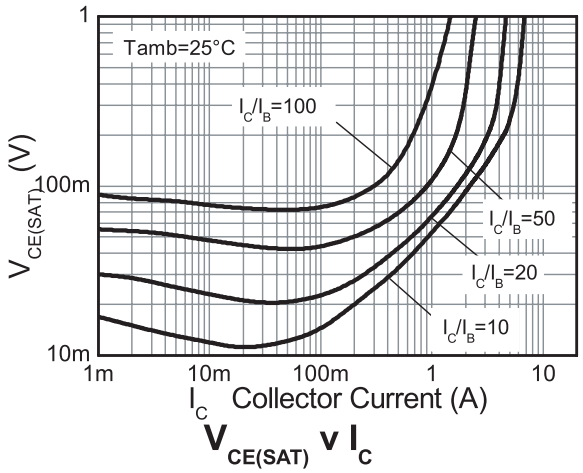
Pulse Power Dissipation

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

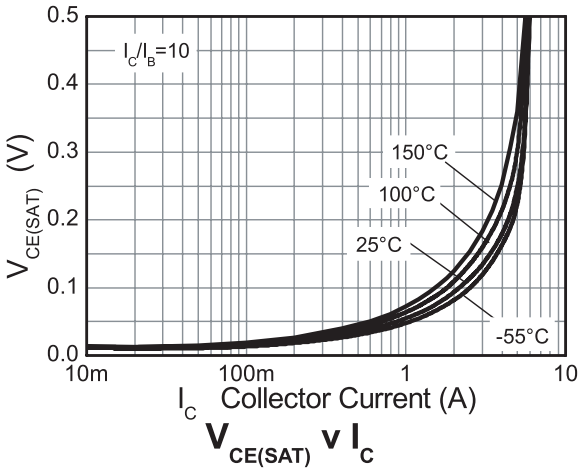
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	150	190		V	I_C = 100μA
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	150	190			I_C = 100μA, $R_{BE} \leq 1k\Omega$ or -1V < V_{BE} < 0.25V
Collector-emitter breakdown voltage (base open)	BV_{CEO}	60	80		V	I_C = 10mA (*)
Emitter-base breakdown voltage	BV_{EBO}	7	8		V	I_E = 100μA
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8		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		V	I_E = 100μA,
Collector-base cut-off current	I_{CBO}		<1	50 20	nA μA	V_{CB} = 120V V_{CB} = 120V, T_{amb}= 100°C
Collector-emitter cut-off current	I_{CEX}		-	100	nA	V_{CE} = 120V; $R_{BE} \leq 1k\Omega$ or -1V < V_{BE} < 0.25V
Emitter-base cut-off current	I_{EBO}		<1	50	nA	V_{EB} = 5.6V
Collector-emitter saturation voltage	$V_{CE(sat)}$		55 70 185 240	70 90 230 305	mV mV mV mV	I_C = 1A, I_B = 100mA(*) I_C = 1A, I_B = 50mA(*) I_C = 4A, I_B = 400mA(*) I_C = 5A, I_B = 500mA(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		1020	1100	mV	I_C = 5A, I_B = 500mA(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		960	1050	mV	I_C = 5A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	100 90 45	200 180 90 20	300		I_C = 10mA, V_{CE} = 2V(*) I_C = 1A, V_{CE} = 2V(*) I_C = 2A, V_{CE} = 2V(*) I_C = 5A, V_{CE} = 2V(*)
Transition frequency	f_T		185		MHz	I_C = 100mA, V_{CE} = 5V f = 100MHz
Output capacitance	C_{OBO}		11.5	20	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	t_d		16		ns	V_{CC} = 10V. I_C = 500mA, I_{B1} = I_{B2}= 50mA.
Rise time	t_r		15		ns	
Storage time	t_s		509		ns	
Fall time	t_f		57		ns	

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

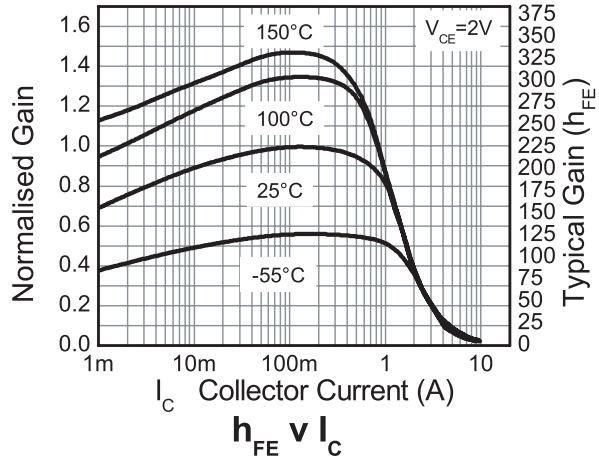
Typical characteristics



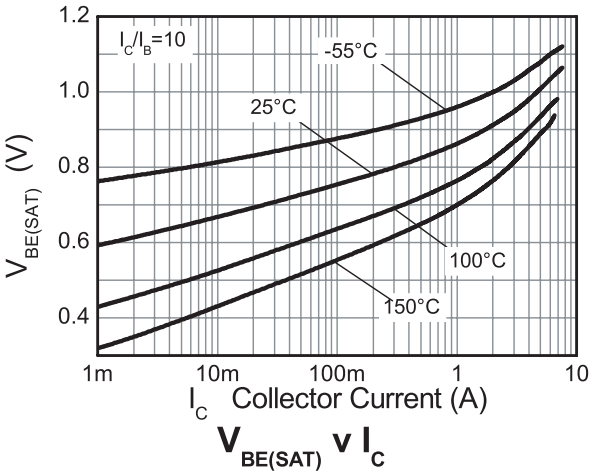
$V_{CE(SAT)}$ v I_C



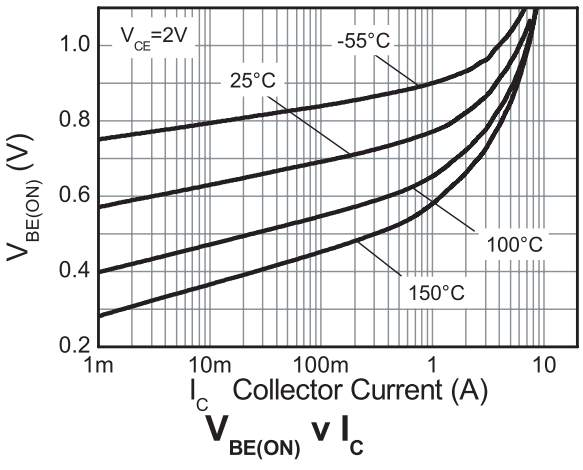
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

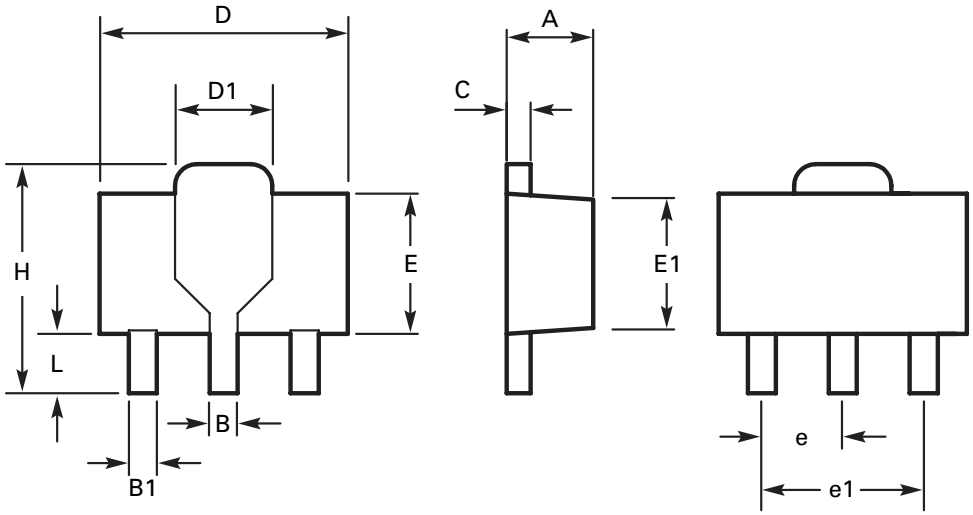


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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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