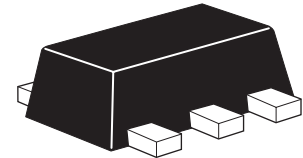


# ZXTN25040DZ

## 40V, SOT89, NPN medium power transistor

### Summary

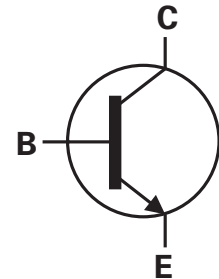
$BV_{CEX} > 130V$   
 $BV_{CEO} > 40V$   
 $BV_{ECO} > 6V$   
 $I_{C(cont)} = 5A$   
 $V_{CE(sat)} < 60mV @ 1A$   
 $R_{CE(sat)} = 38m\Omega$   
 $P_D = 2.4W$



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.

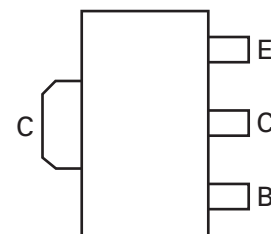


### Features

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

### Applications

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



Pinout - top view

### Ordering information

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

### Device marking

1C8

# ZXTN25040DZ

## 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 <sup>(b)</sup>	$I_C$	5	A
Base current	$I_B$	1	A
Peak pulse current	$I_{CM}$	10	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	1.1	W
Linear derating factor		8.8	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	$P_D$	1.8	W
Linear derating factor		14.4	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(c)}$	$P_D$	2.4	W
Linear derating factor		19.2	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$	$P_D$	4.46	W
Linear derating factor		35.7	mW/ $^{\circ}C$
Operating and storage temperature range	$T_j, T_{stg}$	- 55 to 150	$^{\circ}C$

## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	117	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	68	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	51	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	28	$^{\circ}C/W$

### NOTES:

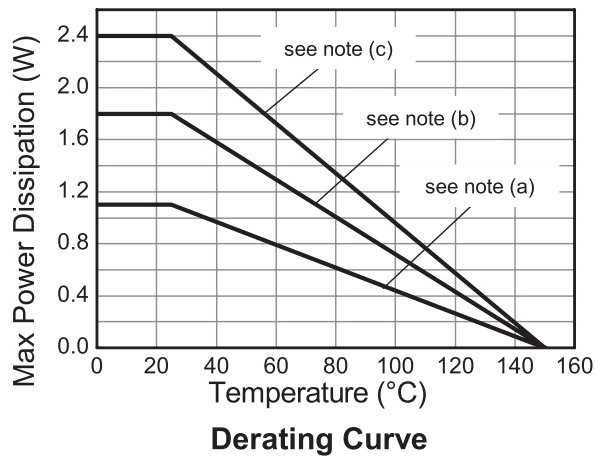
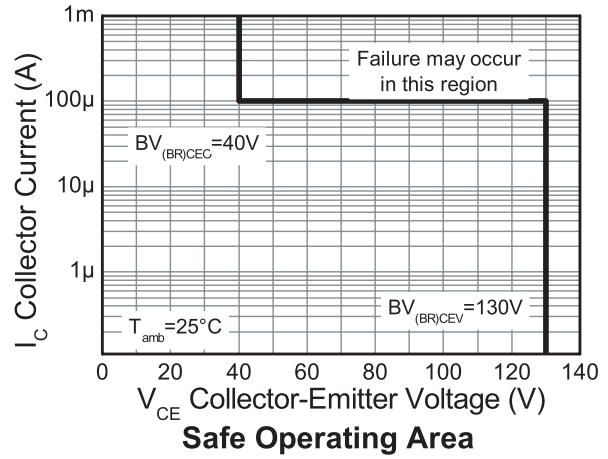
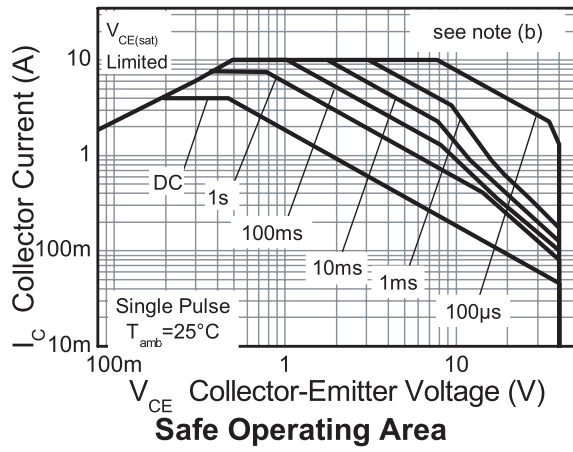
(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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.

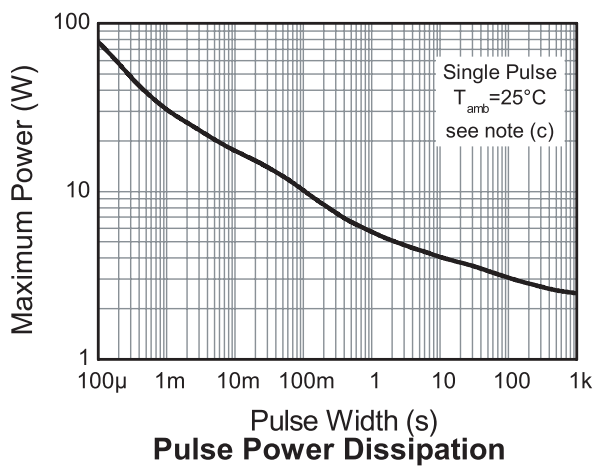
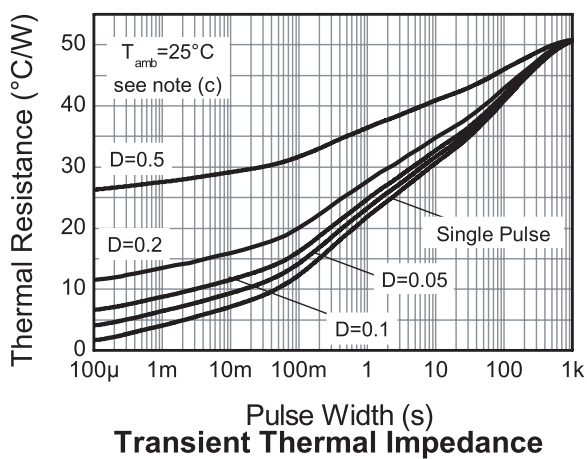
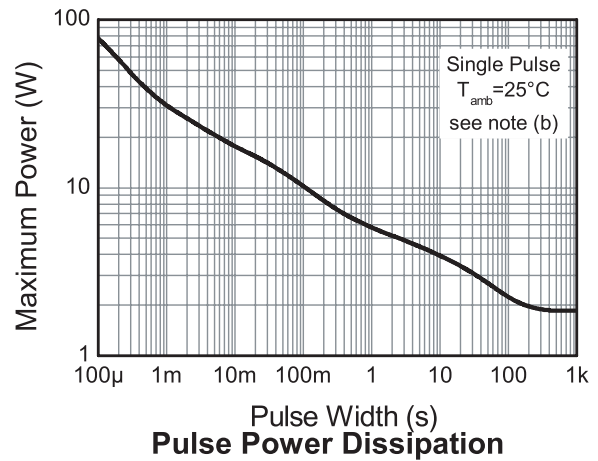
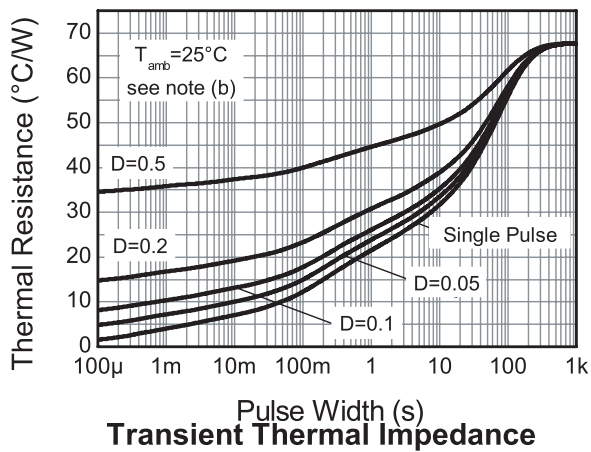
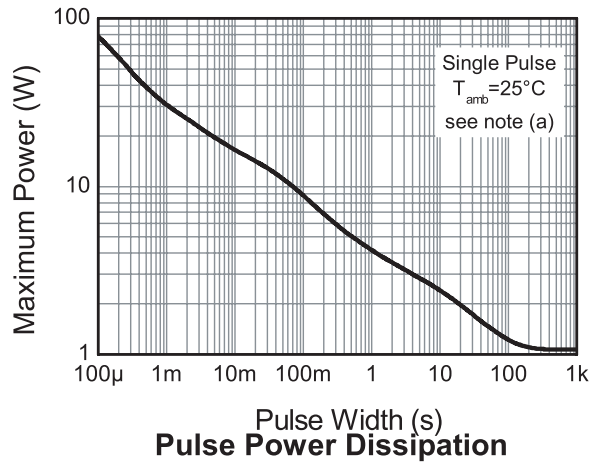
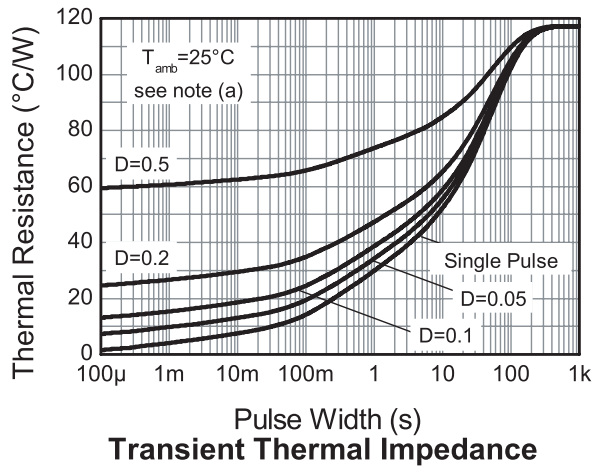
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

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

## Thermal characteristics



## Thermal characteristics (cont.)



# ZXTN25040DZ

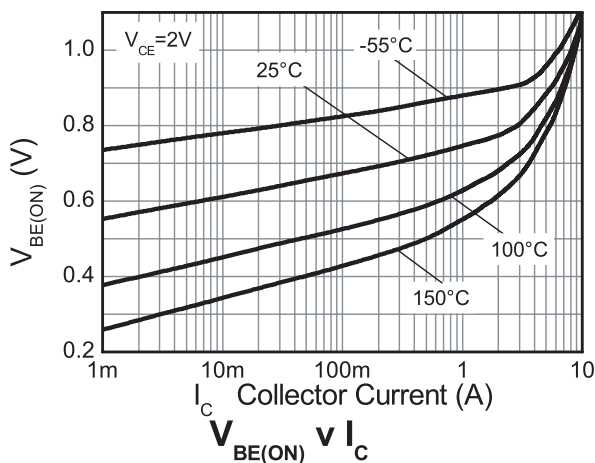
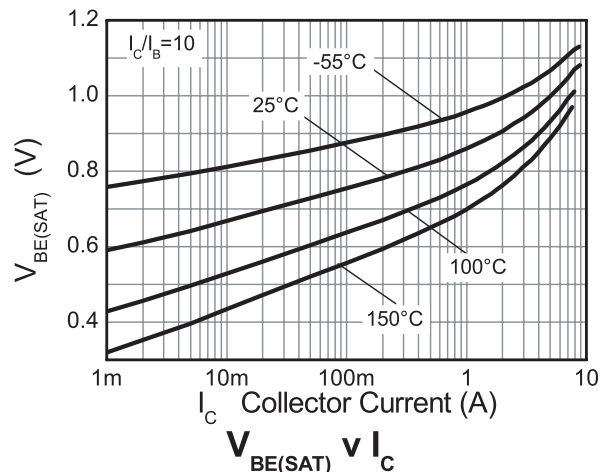
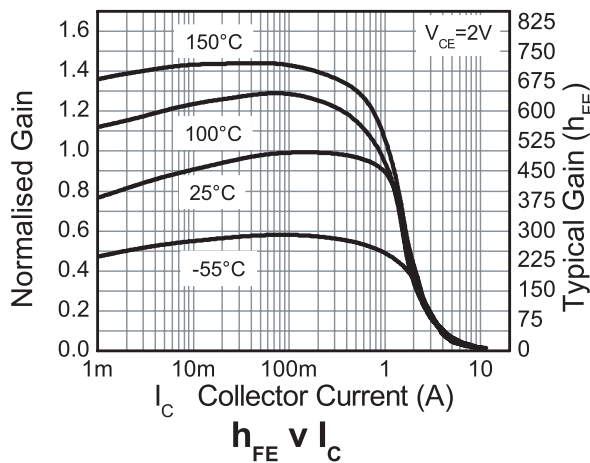
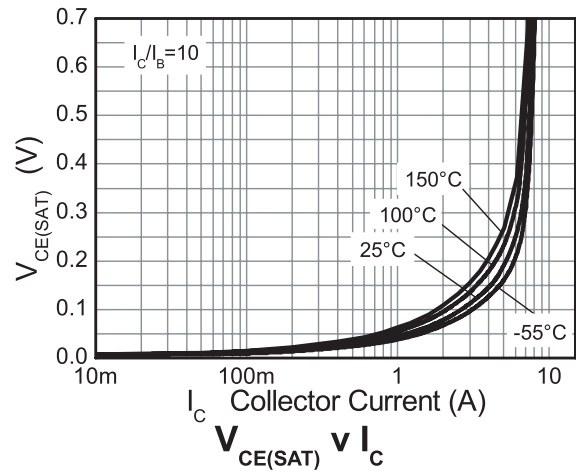
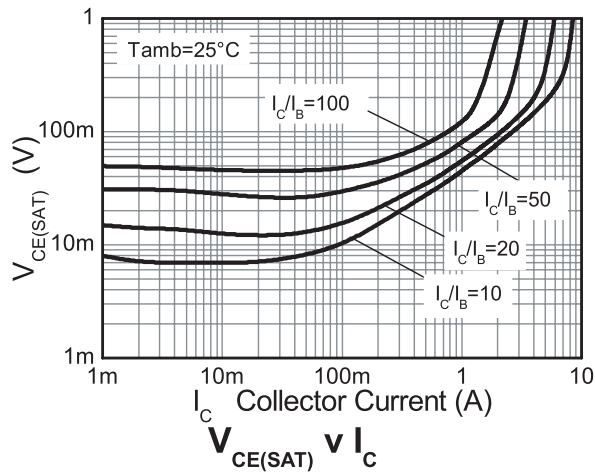
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	130	170		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	130	170		V	$V_{CE} = 130\text{V}; R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	40	63		V	$I_C = 10\text{mA}^{(*)}$
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.3		V	$I_E = 100\mu\text{A}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	6	7.4		V	$I_E = 100\mu\text{A}, R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	$BV_{ECO}$	6	7.4		V	$I_E = 100\mu\text{A}$ ,
Collector-base cut-off current	$I_{CBO}$		<1	50 20	nA $\mu\text{A}$	$V_{CB} = 100\text{V}$ $V_{CB} = 100\text{V}, T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CEX}$		-	100	nA	$V_{CE} = 100\text{V}; R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter-base cut-off current	$I_{EBO}$		<1	50	nA	$V_{EB} = 5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		50 125 140 190	60 215 215 260	mV mV mV mV	$I_C = 1\text{A}, I_B = 100\text{mA}^{(*)}$ $I_C = 1\text{A}, I_B = 10\text{mA}^{(*)}$ $I_C = 2\text{A}, I_B = 40\text{mA}^{(*)}$ $I_C = 5\text{A}, I_B = 500\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		1000	1100	mV	$I_C = 5\text{A}, I_B = 500\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		910	1000	mV	$I_C = 5\text{A}, V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	300 300 20	450 450 40 10	900		$I_C = 10\text{mA}, V_{CE} = 2\text{V}^{(*)}$ $I_C = 1\text{A}, V_{CE} = 2\text{V}^{(*)}$ $I_C = 5\text{A}, V_{CE} = 2\text{V}^{(*)}$ $I_C = 10\text{A}, V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$		190		MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Output capacitance	$C_{OBO}$		11.7	20	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		64		ns	$V_{CC} = 10\text{V}$ $I_C = 1\text{A}$ , $I_{B1} = I_{B2} = 10\text{mA}$
Rise time	$t_r$		108		ns	
Storage time	$t_s$		428		ns	
Fall time	$t_f$		130		ns	

### NOTES:

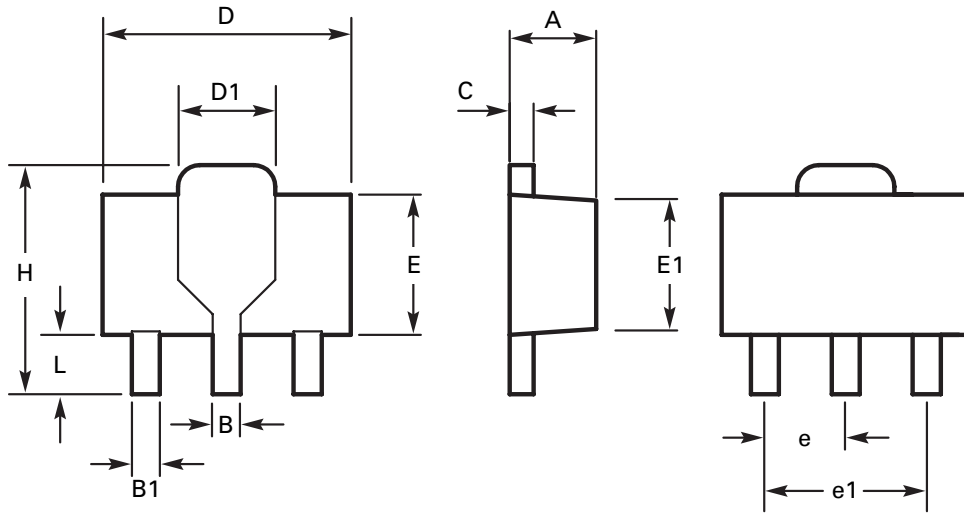
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTN25040DZ

## 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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