

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 hFF characteristics
- · 6V reverse blocking capability

Applications

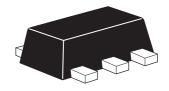
- · Emergency lighting circuits
- Motor driving (including DC fans)
- · Solenoid, relay and actuator drivers
- DC-DC modules
- · Backlight inverters
- · Power switches
- · MOSFET gate drivers

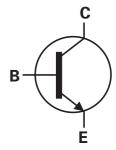
Ordering information

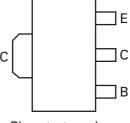
Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25040DZTA	7	12	1000

Device marking

1C8







Pinout - top view

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	Α
Base current	I _B	1	Α
Peak pulse current	I _{CM}	10	Α
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.

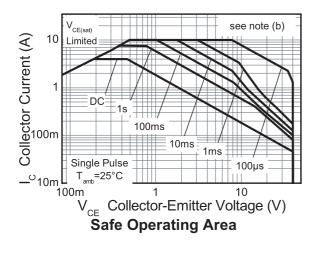
⁽b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

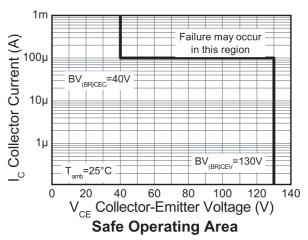
⁽c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

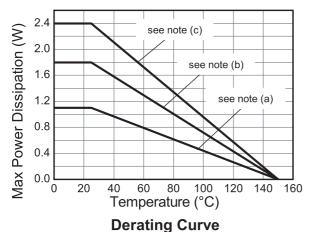
⁽d) As (c) above measured at t<5secs.

ZXTN25040DZ

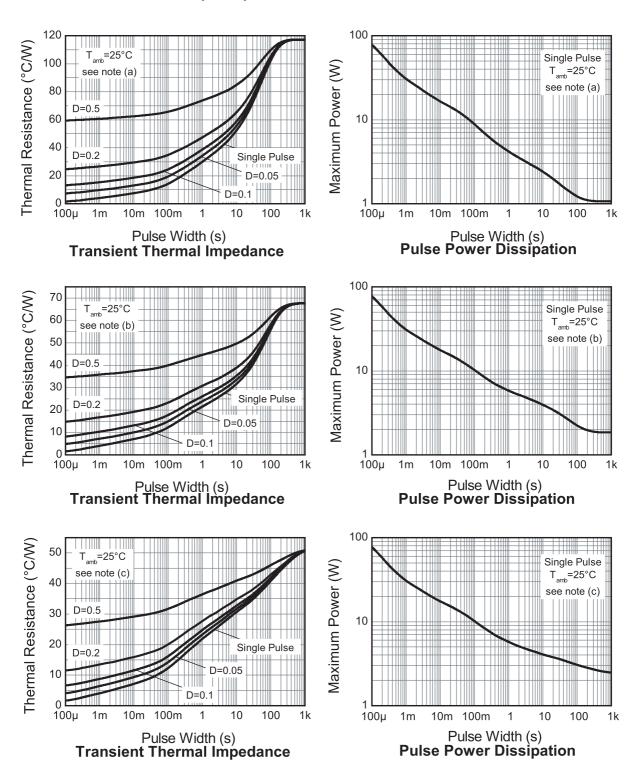
Thermal characteristics







Thermal characteristics (cont.)



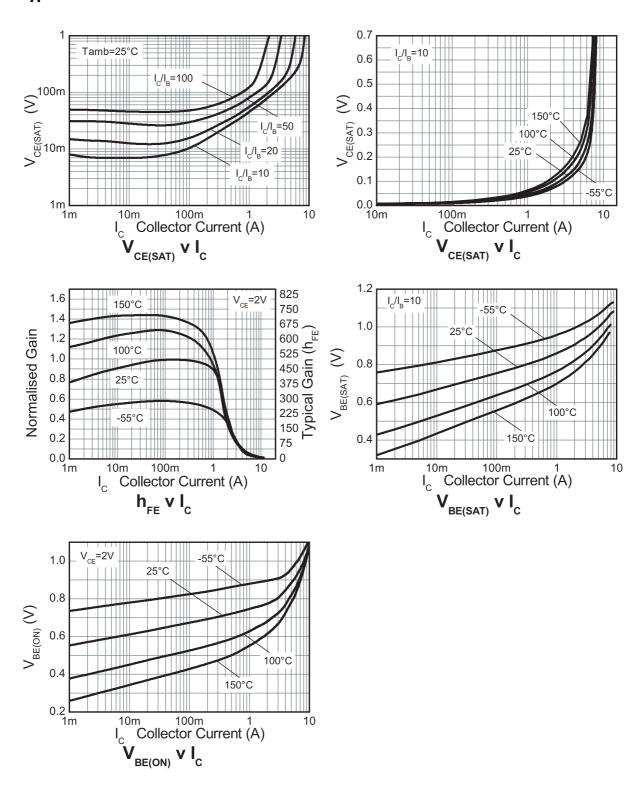
Electrical characteristics (at $T_{amb} = 25$ °C unless otherwise stated)

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV _{CBO}	130	170		V	$I_C = 100 \mu A$
Collector-emitter breakdown voltage (forward blocking)	BV _{CEX}	130	170		V	V_{CE} = 130V; $R_{BE} \le 1 k\Omega$ or $-1 V < V_{BE} < 0.25 V$
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	$\begin{aligned} I_E &= 100 \mu A, \ R_{BC} \leq 1 k \Omega \ or \\ 0.25 V > V_{BC} > -0.25 V \end{aligned}$
Emitter-collector breakdown voltage (base open)	BV _{ECO}	6	7.4		V	$I_E = 100 \mu A$,
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; $R_{BE} \le 1 k\Omega$ or $-1 V < V_{BE} < 0.25 V$
Emitter-base cut-off current	I _{EBO}		<1	50	nA	V _{EB} = 5.6V
Collector-emitter saturation	V _{CE(sat)}		50	60	mV	I _C = 1A, I _B = 100mA ^(*)
voltage			125	215	mV	$I_C = 1A, I_B = 10mA^{(*)}$
			140	215	mV	$I_C = 2A$, $I_B = 40mA^{(*)}$
			190	260	mV	$I_C = 5A$, $I_B = 500 \text{mA}^{(*)}$
Base-emitter saturation voltage	V _{BE(sat)}		1000	1100	mV	$I_C = 5A$, $I_B = 500 \text{mA}^{(*)}$
Base-emitter turn-on voltage	V _{BE(on)}		910	1000	mV	$I_C = 5A, V_{CE} = 2V^{(*)}$
Static forward current	h _{FE}	300	450	900		$I_C = 10 \text{mA}, V_{CE} = 2V^{(*)}$
transfer ratio		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
Rise time	t _r		108		ns	$I_{C} = 1A$,
Storage time	t _s		428		ns	I _{B1} = I _{B2} = 10mA
Fall time	t _f		130		ns	

NOTES

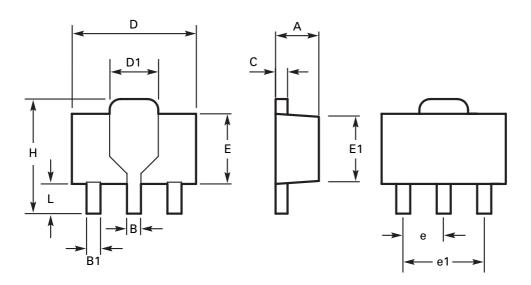
(*) Measured under pulsed conditions. Pulse width ${\leq}300\mu\text{s};$ duty cycle ${\leq}2\%.$

Typical characteristics



ZXTN25040DZ

Package outline - SOT89



DIM	Millin	neters	Inc	hes	DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
Α	1.40	1.60	0.550	0.630	E1	2.13	2.29	0.084	0.090
В	0.44	0.56	0.017	0.022	е	1.50 BSC		0.059 BSC	
B1	0.36	0.48	0.014	0.019	e1	3.00 BSC		0.118 BSC	
С	0.35	0.44	0.014	0.019	Н	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
Е	2.29	2.60	0.090	0.102		-	-	-	-

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

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