

ZXTP2009Z

40V PNP HIGH GAIN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

SUMMARY

$BV_{CEO} = -40V$; $R_{SAT} = 29m\Omega$; $I_C = -5.5A$

DESCRIPTION

Packaged in the SOT89 outline this new low saturation 40V PNP transistor offers low on state losses making it ideal for use in DC-DC circuits, line switching and various driving and power management functions.



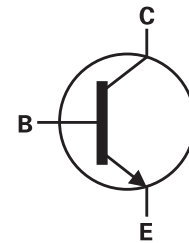
SOT89

FEATURES

- Extremely low equivalent on-resistance
- 5.5 amps continuous current
- Up to 15 amps peak current
- Very low saturation voltages < -60mV @ -1A

APPLICATIONS

- DC - DC converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Motor control



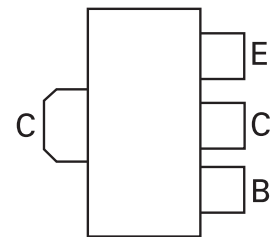
ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXTP2009ZTA	7"	12mm	1,000 units

DEVICE MARKING

53Z

PINOUT



TOP VIEW

ZXTP2009Z

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-base voltage	BV_{CBO}	-50	V
Collector-base voltage	BV_{CBS}	-50	V
Collector-emitter voltage	BV_{CEO}	-40	V
Emitter-base voltage	BV_{EBO}	-7.5	V
Continuous collector current ^(b)	I_C	-5.5	A
Peak pulse current	I_{CM}	-15	A
Power dissipation at $T_A = 25^\circ\text{C}$ ^(a)	P_D	0.9	W
Linear derating factor		7.2	mW/ $^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ ^(b)	P_D	1.5	W
Linear derating factor		12	mW/ $^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ ^(c)	P_D	2.1	W
Linear derating factor		16.8	mW/ $^\circ\text{C}$
Power dissipation at $T_A = 25^\circ\text{C}$ ^(d)	P_D	3	W
Linear derating factor		24	mW/ $^\circ\text{C}$
Operating and storage temperature range	T_j, T_{stg}	-55 to 150	$^\circ\text{C}$

THERMAL RESISTANCE

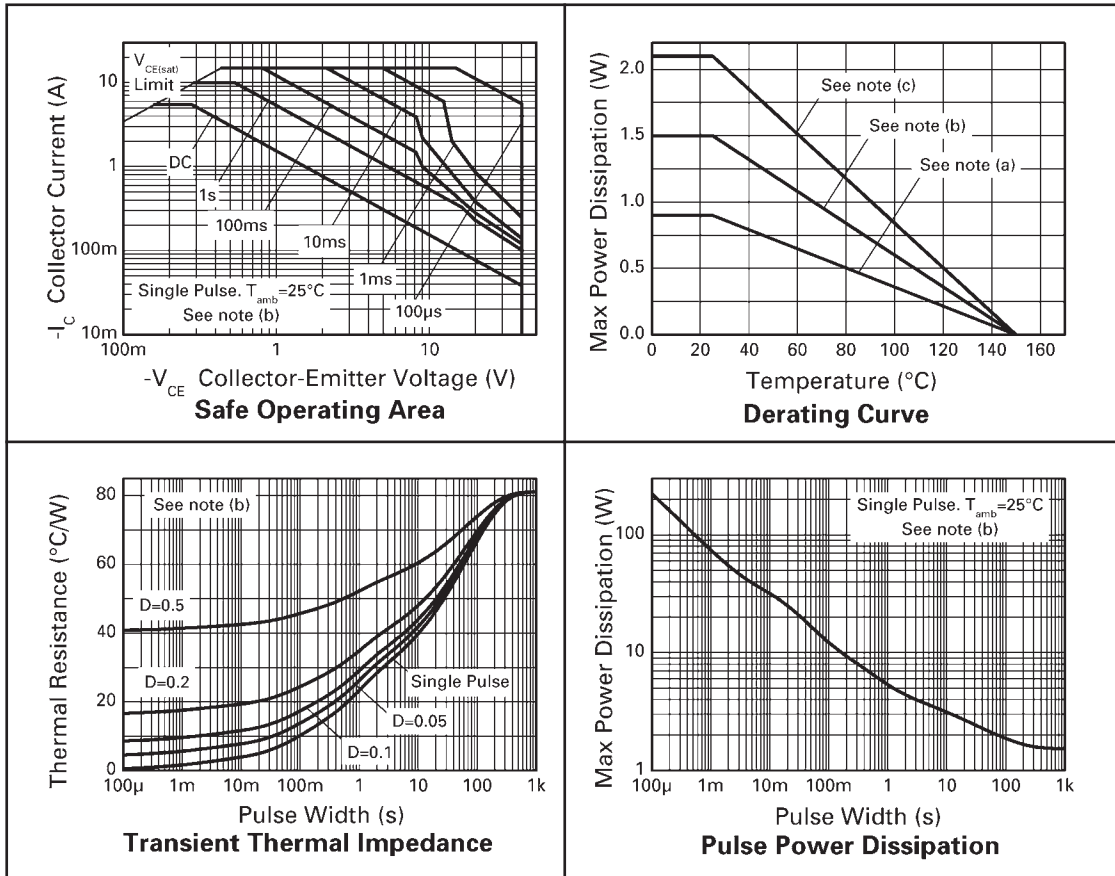
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient ^(a)	$R_{\theta JA}$	139	$^\circ\text{C}/\text{W}$
Junction to ambient ^(b)	$R_{\theta JA}$	83	$^\circ\text{C}/\text{W}$
Junction to ambient ^(c)	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$
Junction to ambient ^(d)	$R_{\theta JA}$	42	$^\circ\text{C}/\text{W}$

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) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 (c) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 (d) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB measured at $t < 5$ secs.

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CHARACTERISTICS



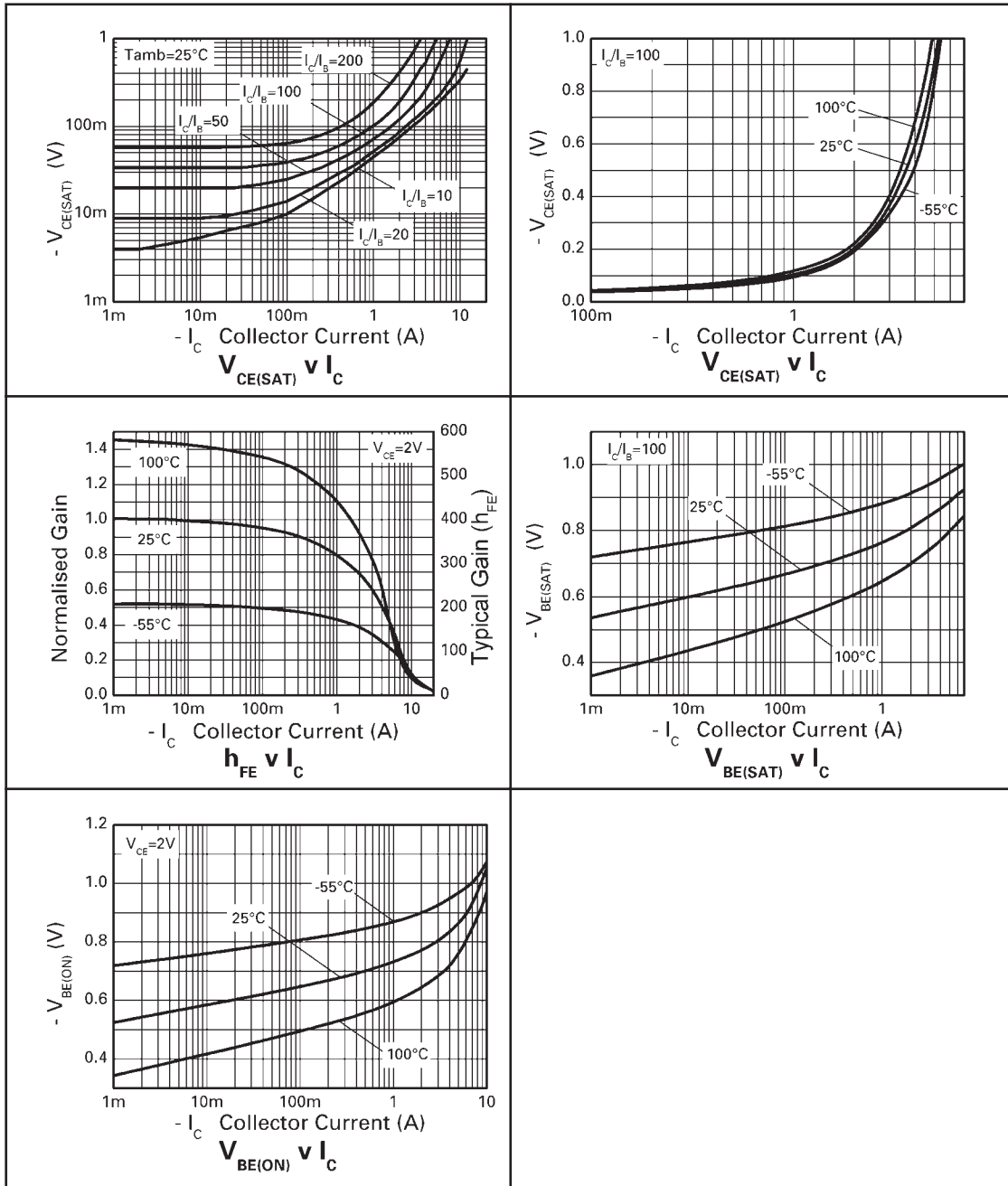
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ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Collector-base breakdown voltage	BV_{CBO}	-50	-90		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage	BV_{CES}	-50	-90		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage	BV_{CEO}	-40	-58		V	$I_C = -10\text{mA}^*$
Emitter-base breakdown voltage	BV_{EBO}	-7.5	-8.3		V	$I_E = -100\mu\text{A}$
Collector cut-off current	I_{CBO}		<1	-20	nA	$V_{CB} = -40\text{V}$
Collector cut-off current	I_{CES}		<1	-20	nA	$V_{CB} = -32\text{V}$
Emitter cut-off current	I_{EBO}		<1	-20	nA	$V_{EB} = -6\text{V}$
Collector-emitter saturation voltage	$V_{CE(SAT)}$		-15	-30	mV	$I_C = -0.1\text{A}, I_B = -10\text{mA}^*$
			-44	-60	mV	$I_C = -1\text{A}, I_B = -100\text{mA}^*$
			-50	-70	mV	$I_C = -1\text{A}, I_B = -50\text{mA}^*$
			-120	-165	mV	$I_C = -1\text{A}, I_B = -10\text{mA}^*$
			-70	-80	mV	$I_C = -2\text{A}, I_B = -200\text{mA}^*$
			-125	-175	mV	$I_C = -2\text{A}, I_B = -40\text{mA}^*$
			-130	-175	mV	$I_C = -3.5\text{A}, I_B = -175\text{mA}^*$
	-162	-185	mV	$I_C = -5.5\text{A}, I_B = -550\text{mA}^*$		
Base-emitter saturation voltage	$V_{BE(SAT)}$		-820	-900	mV	$I_C = -2\text{A}, I_B = -40\text{mA}^*$
			-1000	-1075	mV	$I_C = -5.5\text{A}, I_B = -550\text{mA}^*$
Base-emitter turn-on voltage	$V_{BE(ON)}$		-778	-850	mV	$I_C = -2\text{A}, V_{CE} = -2\text{V}^*$
			-869	-950	mV	$I_C = -5.5\text{A}, V_{CE} = -2\text{V}^*$
Static forward current transfer ratio	H_{FE}	200	390			$I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$
		200	350	550		$I_C = -0.5\text{A}, V_{CE} = -2\text{V}^*$
		170	290			$I_C = -2\text{A}, V_{CE} = -2\text{V}^*$
		110	175			$I_C = -5.5\text{A}, V_{CE} = -2\text{V}^*$
Transition frequency	f_T		152		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output capacitance	C_{OBO}		53		pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}^*$
Switching times	t_d t_r t_s t_r		18		ns	$I_C = -1\text{A}, V_{CC} = -10\text{V},$ $I_{B1} = I_{B2} = -100\text{mA}$
			17			
			325			
			60			
Switching times	t_d t_r t_s t_r		55		ns	$I_C = -2\text{A}, V_{CC} = -30\text{V},$ $I_{B1} = I_{B2} = -20\text{mA}$
			107			
			264			
			103			

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

TYPICAL CHARACTERISTICS

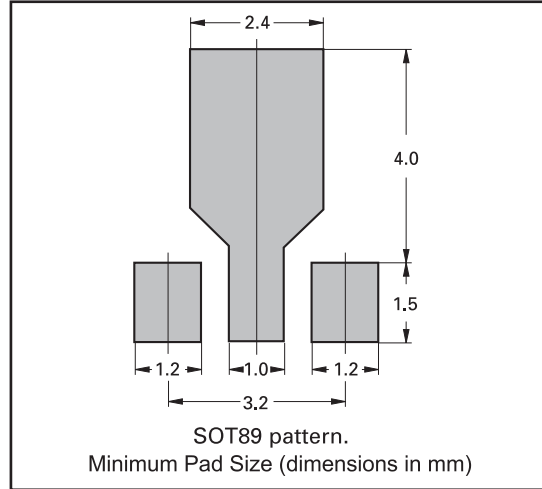


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PACKAGE OUTLINE



PAD LAYOUT DETAILS



Controlling dimensions are in millimeters. Approximate conversions are given in inches

PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	e	1.40	1.50	0.055	0.059
b	0.38	0.48	0.015	0.019	E	3.75	4.25	0.150	0.167
b1	-	0.53	-	0.021	E1	-	2.60	-	0.102
b2	1.50	1.80	0.060	0.071	G	2.90	3.00	0.114	0.118
c	0.28	0.44	0.011	0.017	H	2.60	2.85	0.102	0.112
D	4.40	4.60	0.173	0.181	-	-	-	-	-

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