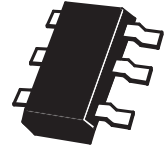


DUAL 60V NPN/PNP SILICON MEDIUM POWER TRANSISTORS

SUMMARY

NPN: $V_{CE0}=60V$; $I_C=1A$; $h_{FE}=100-300$

PNP: $V_{CE0}=-60V$; $I_C=-1A$; $h_{FE}=100-300$



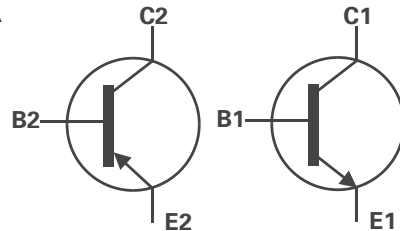
SOT23-6

DESCRIPTION

Complementary NPN and PNP medium power transistors packaged in the 6 lead SOT23 package.

FEATURES

- Low Equivalent On Resistance
 - NPN $R_{CE(sat)} 210m\Omega$ at 1A
 - PNP $R_{CE(sat)} 355m\Omega$ at -1A
- Low Saturation Voltage
- h_{FE} characterised up to 2A
- $I_C=1A$ Continuous Collector Current
- SOT23-6 package

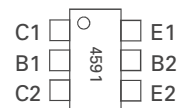


APPLICATIONS

- MOSFET gate driver
- Low Power Motor Drive
- Low Power DC-DC Converters

ORDERING INFORMATION

DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXTD4591E6TA	7	8mm embossed	3000 units
ZXTD4591E6TC	13	8mm embossed	10000 units



Top View

DEVICE MARKING

4591

ZXTD4591E6

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT NPN	LIMIT PNP	UNIT
Collector-Base Voltage	V_{CBO}	80	-80	V
Collector-Emitter Voltage	V_{CEO}	60	-60	V
Emitter-Base Voltage	V_{EBO}	5	-5	V
Peak Pulse Current	I_{CM}	2	-2	A
Continuous Collector Current	I_C	1	-1	A
Base Current	I_B	500	-500	mA
Power Dissipation at $T_A=25^\circ\text{C}$ (a) Linear Derating Factor	P_D	1.1 8.8	1.1 8.8	W mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ (b) Linear Derating Factor	P_D	1.7 13.6	1.7 13.6	W mW/ $^\circ\text{C}$
Operating and Storage Temperature Range	$T_j:T_{stg}$	-55 to +150	-55 to +150	$^\circ\text{C}$

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\theta JA}$	113	$^\circ\text{C}/\text{W}$
Junction to Ambient (b)	$R_{\theta JA}$	73	$^\circ\text{C}/\text{W}$

NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at $t \leq 5$ secs.

ZXTD4591E6

PNP TRANSISTOR

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-80			V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-60			V	$I_C = -10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5			V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}			-100	nA	$V_{CB} = -60\text{V}$
Emitter Cut-Off Current	I_{EBO}			-100	nA	$V_{EB} = -4\text{V}$
Collector Emitter Cut-Off Current	I_{CES}			-100	nA	$V_{CES} = -60\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-0.3 -0.6	V V	$I_C = -500\text{mA}, I_B = -50\text{mA}^*$ $I_C = -1\text{A}, I_B = -100\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			-1.2	V	$I_C = -1\text{A}, I_B = -100\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$			-1.0	V	$I_C = -1\text{A}, V_{CE} = -5\text{V}^*$
Static Forward Current Transfer Ratio	h_{FE}	100 100 80 15		300		$I_C = -1\text{mA}, V_{CE} = -5\text{V}^*$ $I_C = -500\text{mA}, V_{CE} = -5\text{V}^*$ $I_C = -1\text{A}, V_{CE} = -5\text{V}^*$ $I_C = -2\text{A}, V_{CE} = -5\text{V}^*$
Transition Frequency	f_T	150			MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	C_{obo}			10	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

ZXTD4591E6

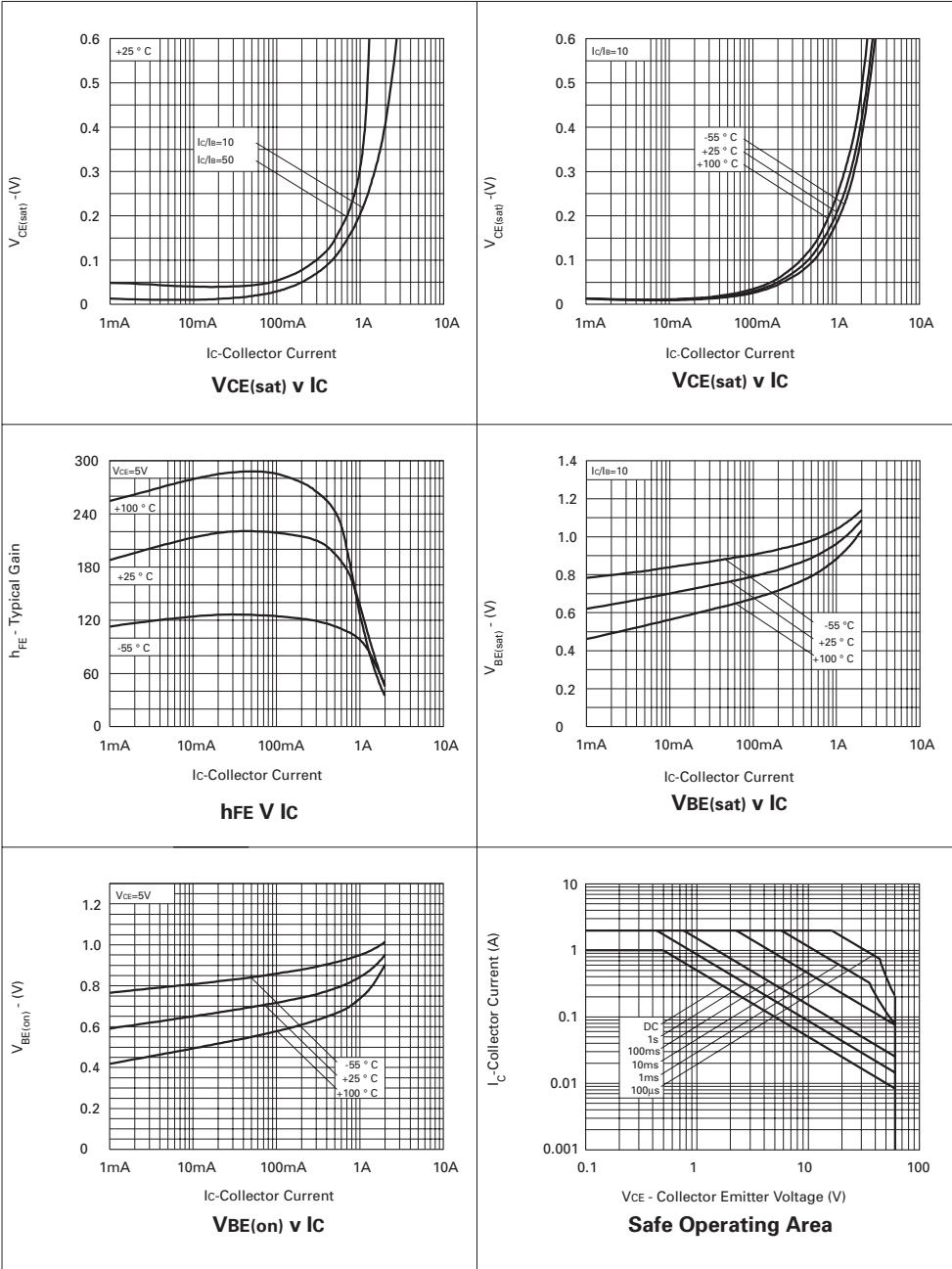
NPN

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	80			V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	60			V	$I_C = 10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_E = 100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}			100	nA	$V_{CB} = 60\text{V}$
Emitter Cut-Off Current	I_{EBO}			100	nA	$V_{EB} = 4\text{V}$
Collector Emitter Cut-Off Current	I_{CES}			100	nA	$V_{CES} = 60\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.25 0.5	V V	$I_C = 500\text{mA}, I_B = 50\text{mA}^*$ $I_C = 1\text{A}, I_B = 100\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			1.1	V	$I_C = 1\text{A}, I_B = 100\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$			1.0	V	$I_C = 1\text{A}, V_{CE} = 5\text{V}^*$
Static Forward Current Transfer Ratio	h_{FE}	100 100 80 30		300		$I_C = 1\text{mA}, V_{CE} = 5\text{V}^*$ $I_C = 500\text{mA}, V_{CE} = 5\text{V}^*$ $I_C = 1\text{A}, V_{CE} = 5\text{V}^*$ $I_C = 2\text{A}, V_{CE} = 5\text{V}^*$
Transition Frequency	f_T	150			MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	C_{obo}			10	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$

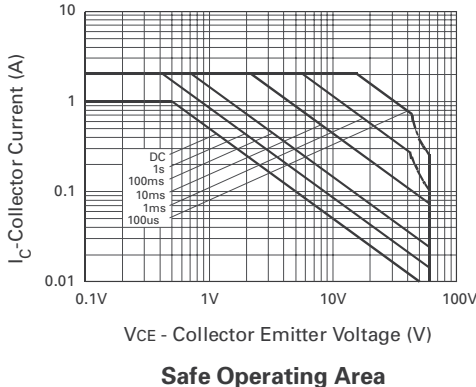
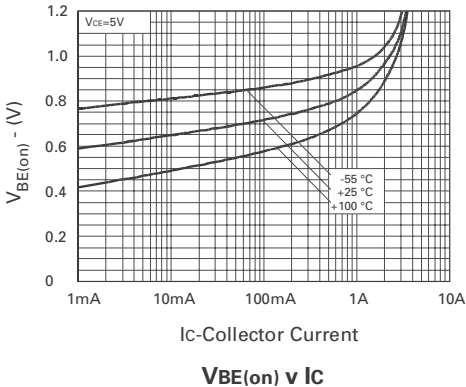
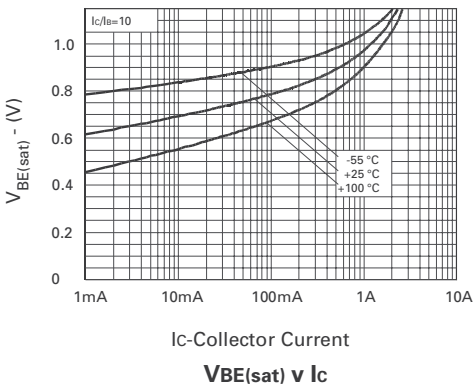
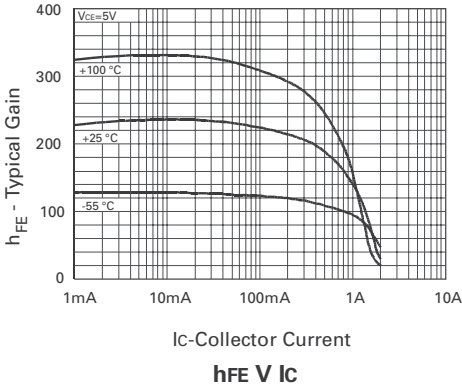
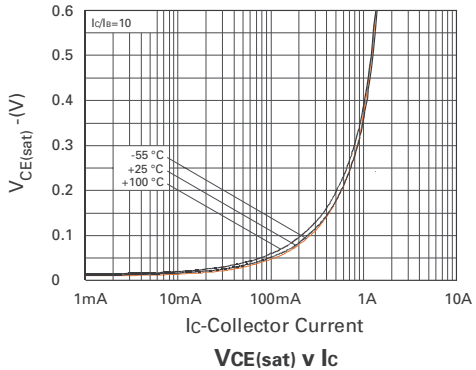
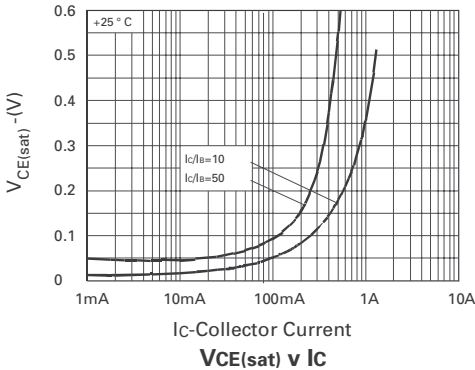
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

NPN TYPICAL CHARACTERISTICS



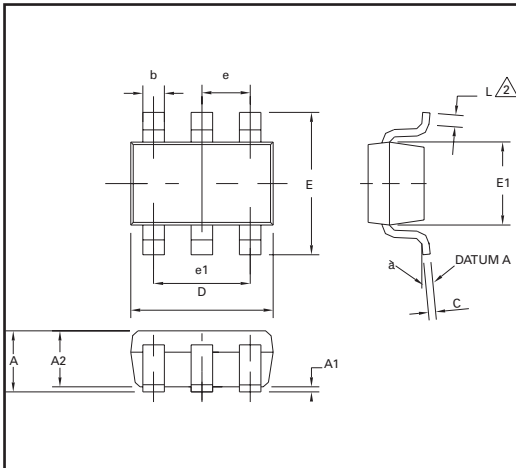
ZXTD4591E6

PNP TYPICAL CHARACTERISTICS

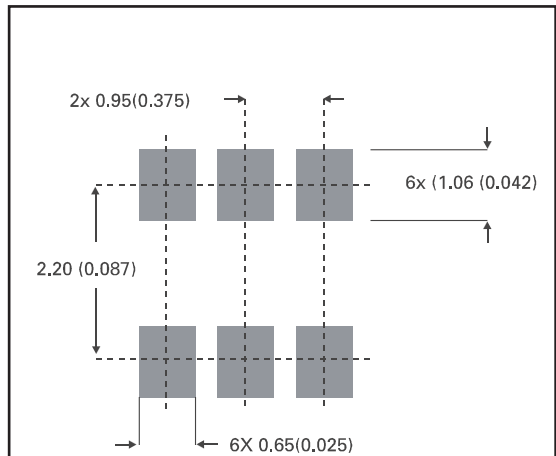


ZXTD4591E6

PACKAGE DIMENSIONS



PAD LAYOUT DETAILS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.35	0.057
A1	0.00	0.15	0	0.006
A2	0.90	1.30	0.035	0.051
b	0.35	0.50	0.014	0.019
C	0.09	0.20	0.0035	0.008
D	2.80	3.00	0.110	0.118
E	2.60	3.00	0.102	0.118
E1	1.50	1.75	0.059	0.069
L	0.10	0.60	0.004	0.002
e	0.95 REF		0.037 REF	
e1	1.90 REF		0.074 REF	
L	0°	10°	0°	10°



Zetex plc.
Fields New Road, Chadderton, Oldham, OL9-8NP, United Kingdom.
Telephone: (44)161 622 4422 (Sales), (44)161 622 4444 (General Enquiries)
Fax: (44)161 622 4420

Zetex GmbH
Streitfeldstraße 19
D-81673 München
Germany
Telefon: (49) 89 45 49 49 0
Fax: (49) 89 45 49 49 49

Zetex Inc.
47 Mall Drive, Unit 4
Commack NY 11725
USA
Telephone: (631) 543-7100
Fax: (631) 864-7630

Zetex (Asia) Ltd.
3701-04 Metroplaza, Tower 1
Hing Fong Road,
Kwai Fong, Hong Kong
Telephone: (852) 26100 611
Fax: (852) 24250 494

These are supported by
agents and distributors in
major countries world-wide
© Zetex plc 2000

Internet: <http://www.zetex.com>

This publication is issued to provide outline information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or be regarded as a representation relating to the products or services concerned. The Company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.