

DUAL 60V NPN/PNP SILICON MEDIUM POWER TRANSISTORS

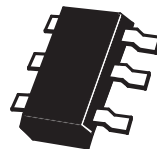
SUMMARY

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

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

DESCRIPTION

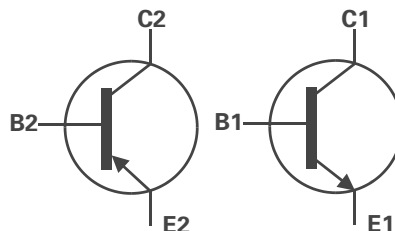
Complementary NPN and PNP medium power transistors packaged in the 6 lead SOT23 package.



SOT23-6

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

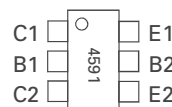


APPLICATIONS

- 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	$^{\circ}\text{C/W}$
Junction to Ambient (b)	$R_{\theta JA}$	73	$^{\circ}\text{C/W}$

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

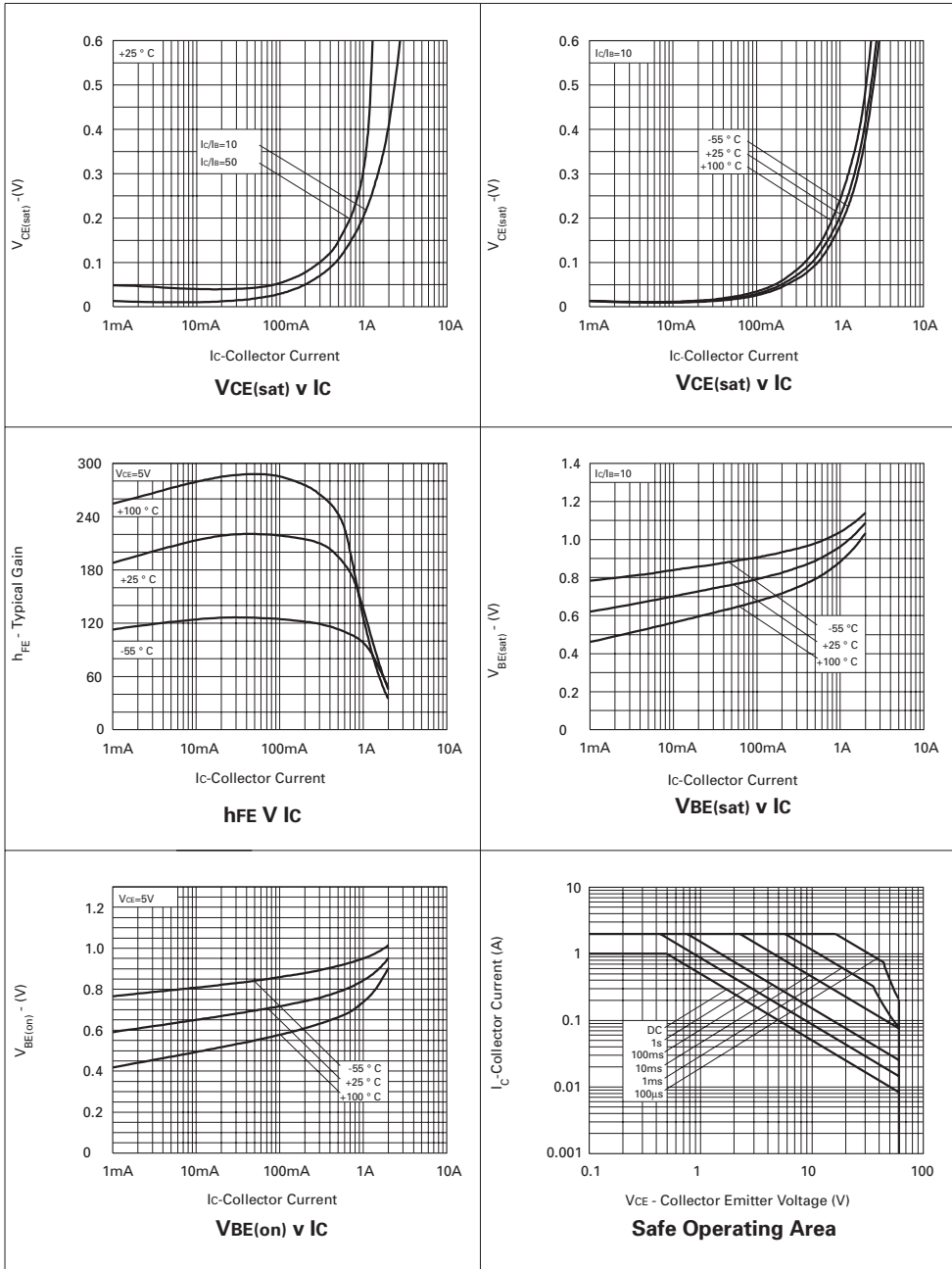
NPN

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

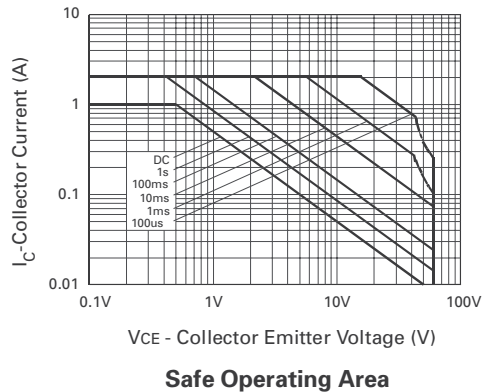
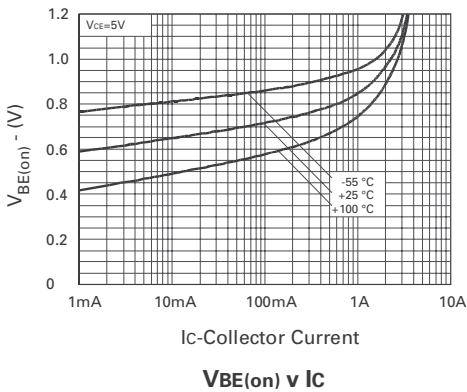
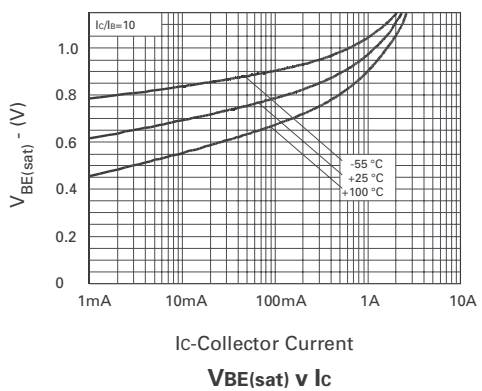
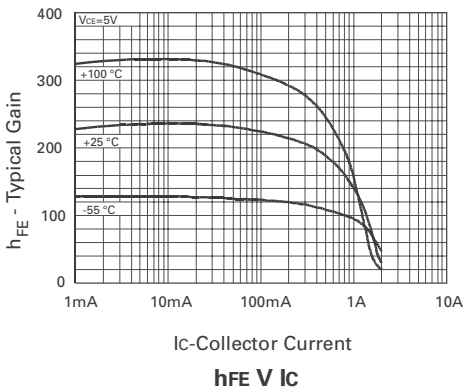
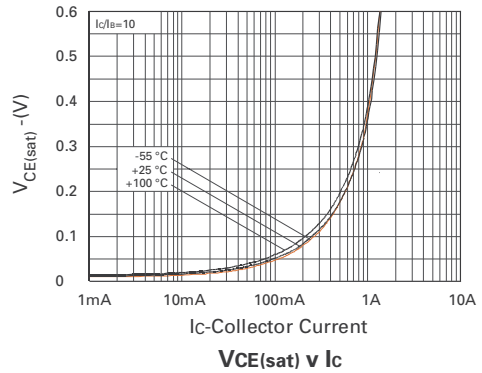
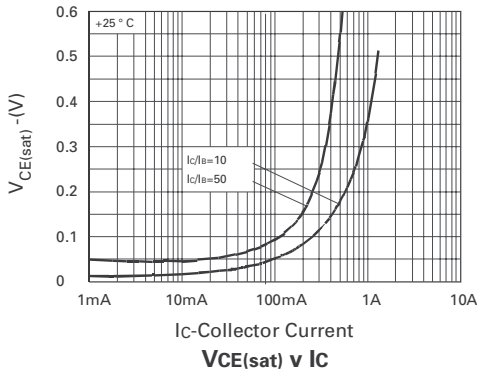
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	80			V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	60			V	$I_C = 10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_E = 100\mu\text{A}$
Collector Cut-Off Current	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

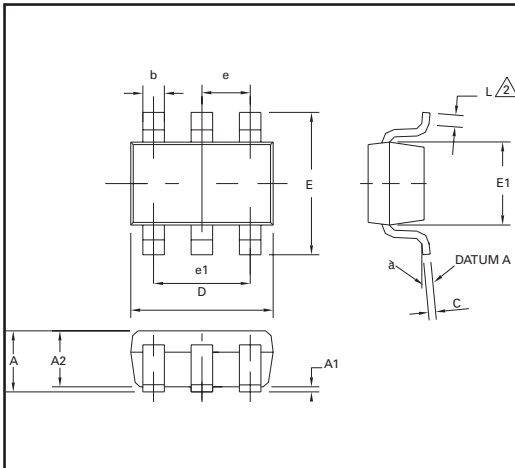


PNP TYPICAL CHARACTERISTICS

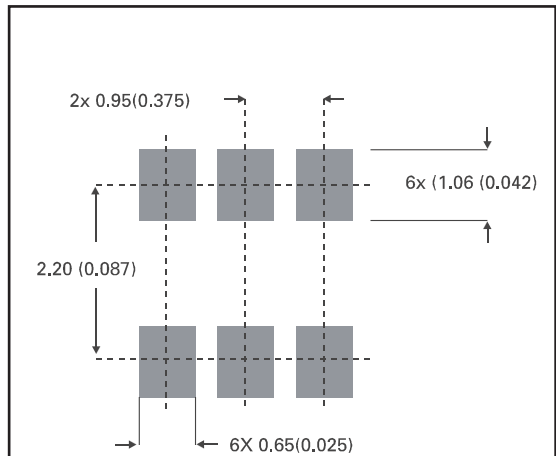


ZXTD4591E6

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°



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