

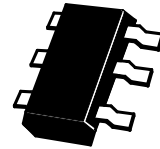
# ZXTD6717E6

## COMPLEMENTARY NPN/PNP LOW SATURATION DUAL TRANSISTORS

### SUMMARY

**NPN:**  $V_{CE0}=15V$ ;  $V_{CE(sat)}=0.1V$ ;  $I_C=1.5A$ ;

**PNP:**  $V_{CE0}=-12V$ ;  $V_{CE(sat)}=-0.175V$ ;  $I_C=-1.25A$ ;



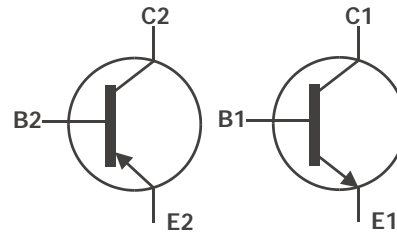
SOT23-6

### DESCRIPTION

This new combination device comprises a complementary NPN and PNP low saturation transistor housed in the SOT23-6 package. Users benefit from very efficient performance combining a high current operation, exceptionally low  $V_{CE(sat)}$  and high  $H_{FE}$  resulting in extremely low on state losses. This dual transistor is ideal for use in a variety of efficient driving functions including motors, lamps, relays and solenoids and will also benefit circuits requiring high output current switching.

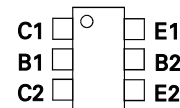
### FEATURES

- Low Saturation Voltage
- $R_{CE(sat)}$  values      NPN =135m $\Omega$  at 1.5A  
                                     PNP =150m $\Omega$  at 1.25A
- $h_{FE}$  min 200 at 1A
- $I_C=1.5A$  Continuous (NPN), 1.25A (PNP)
- SOT23-6 package with  $P_D = 1.1W$



### APPLICATIONS

- Various driving functions
  - Lamps
  - Motors
  - Relays and solenoids
- High output current switches



Top View

### ORDERING INFORMATION

DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXTD6717E6TA	7	8mm embossed	3000 units
ZXTD6717E6TC	13	8mm embossed	10000 units

### DEVICE MARKING

6717

# ZXTD6717E6

## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT NPN	LIMIT PNP	UNIT
Collector-Base Voltage	$V_{CBO}$	15	-12	V
Collector-Emitter Voltage	$V_{CEO}$	15	-12	V
Emitter-Base Voltage	$V_{EBO}$	5	-5	V
Peak Pulse Current	$I_{CM}$	5	-3	A
Continuous Collector Current	$I_C$	1.5	-1.25	A
Base Current	$I_B$	200	-200	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)	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction to Ambient (b)	$R_{\theta JA}$	45	$^\circ\text{C}/\text{W}$

### 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.

## ZXTD6717E6

### NPN TRANSISTOR

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	15			V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	15			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	$I_{CBO}$			10	nA	$V_{CB}=10\text{V}$
Emitter Cut-Off Current	$I_{EBO}$			10	nA	$V_{EB}=4\text{V}$
Collector Emitter Cut-Off Current	$I_{CES}$			10	nA	$V_{CES}=10\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		16.5 40 75 150 205	20 55 100 200 245	mV mV mV mV mV	$I_C=100\text{mA}, I_B=10\text{mA}^*$ $I_C=250\text{mA}, I_B=10\text{mA}^*$ $I_C=500\text{mA}, I_B=10\text{mA}^*$ $I_C=1\text{A}, I_B=10\text{mA}^*$ $I_C=1.5\text{A}, I_B=20\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		0.93	1.1	V	$I_C=1.5\text{A}, I_B=20\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		0.865	1.1	V	$I_C=1.5\text{A}, V_{CE}=2\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	200 300 250 200 75 30	420 450 390 300 150 75			$I_C=10\text{mA}, V_{CE}=2\text{V}^*$ $I_C=100\text{mA}, V_{CE}=2\text{V}^*$ $I_C=500\text{mA}, V_{CE}=2\text{V}^*$ $I_C=1\text{A}, V_{CE}=2\text{V}^*$ $I_C=3\text{A}, V_{CE}=2\text{V}^*$ $I_C=5\text{A}, V_{CE}=2\text{V}^*$
Transition Frequency	$f_T$		180		MHz	$I_C=50\text{mA}, V_{CE}=10\text{V}$ $f=100\text{MHz}$
Output Capacitance	$C_{obo}$		15		pF	$V_{CB}=10\text{V}, f=1\text{MHz}$
Turn-On Time	$t_{(on)}$		50		ns	$I_C=1\text{A}, V_{CC}=10\text{V}$
Turn-Off Time	$t_{(off)}$		250		ns	$I_{B1}=I_{B2}=100\text{mA}$

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

# ZXTD6717E6

## PNP TRANSISTOR

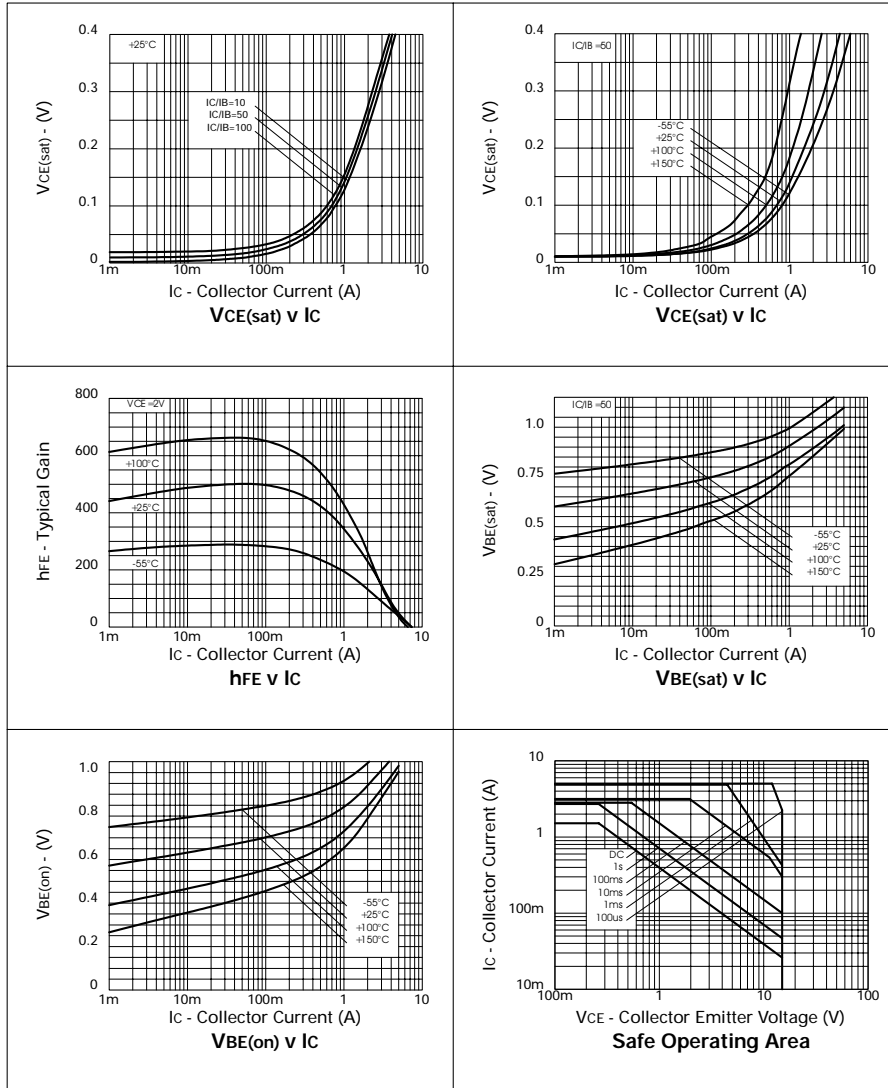
### ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-12			V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-12			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	$I_{CBO}$			-10	nA	$V_{CB} = -10\text{V}$
Emitter Cut-Off Current	$I_{EBO}$			-10	nA	$V_{EB} = -4\text{V}$
Collector Emitter Cut-Off Current	$I_{CES}$			-10	nA	$V_{CES} = -10\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-25 -55 -110 -160 -185	-40 -100 -175 -215 -240	mV mV mV mV mV	$I_C = -100\text{mA}, I_B = -10\text{mA}^*$ $I_C = -250\text{mA}, I_B = -10\text{mA}^*$ $I_C = -500\text{mA}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -50\text{mA}^*$ $I_C = -1.25\text{A}, I_B = -100\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-0.99	-1.10	V	$I_C = -1.25\text{A}, I_B = -100\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-0.85	-1.0	V	$I_C = -1.25\text{A}, V_{CE} = -2\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	300 300 200 125 75 30	490 450 340 250 140 80			$I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -100\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -500\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -1.25\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -2\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -3\text{A}, V_{CE} = -2\text{V}^*$
Transition Frequency	$f_T$		220		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	$C_{obo}$		15		pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$		50		ns	$I_C = -1\text{A}, V_{CC} = -10\text{V}$
Turn-Off Time	$t_{(off)}$		135		ns	$I_{B1} = I_{B2} = -100\text{mA}$

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

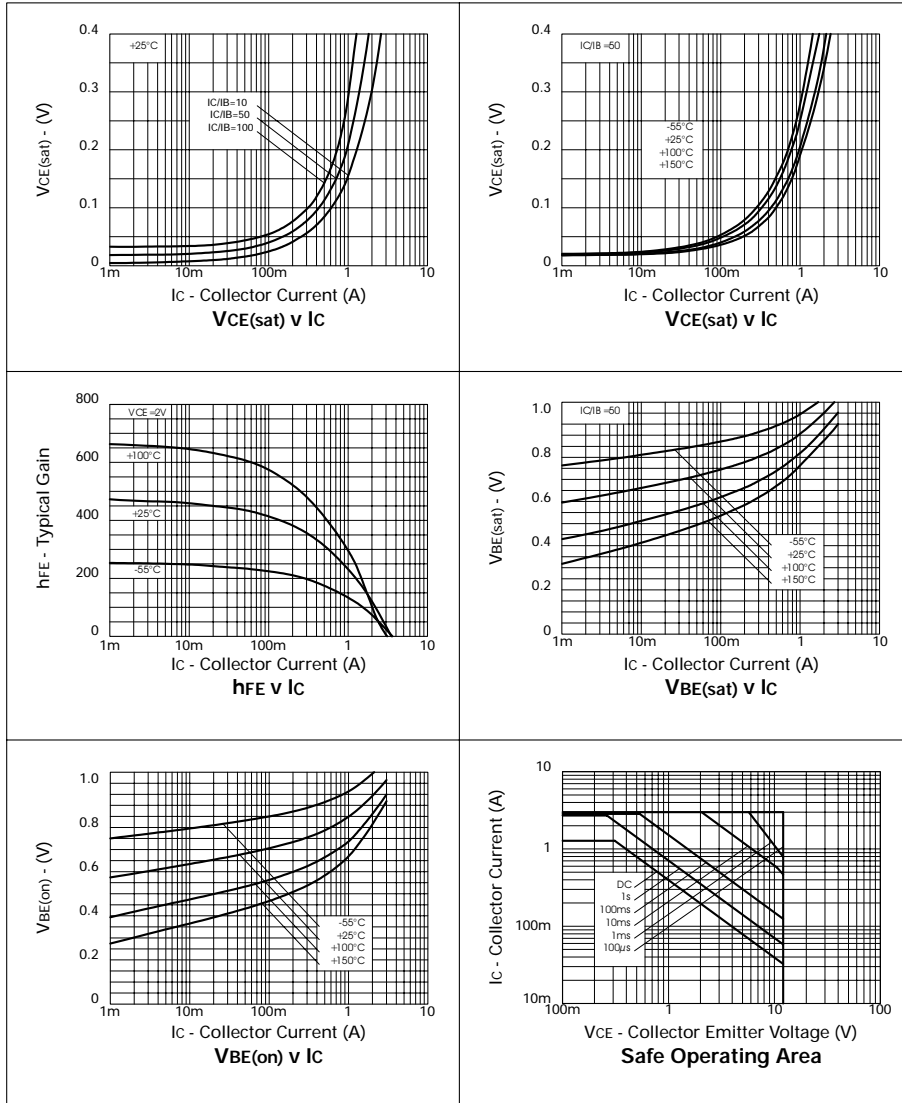
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## NPN TYPICAL CHARACTERISTICS



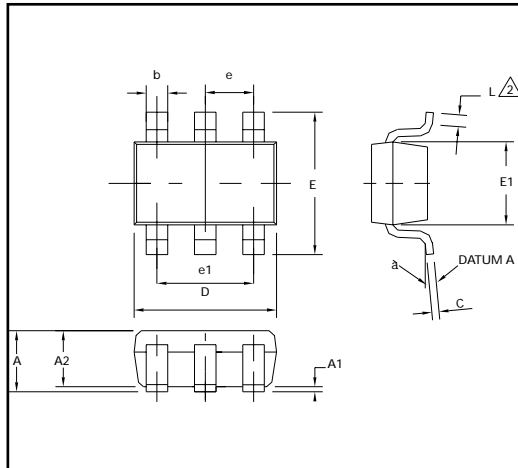
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## PNP TYPICAL CHARACTERISTICS

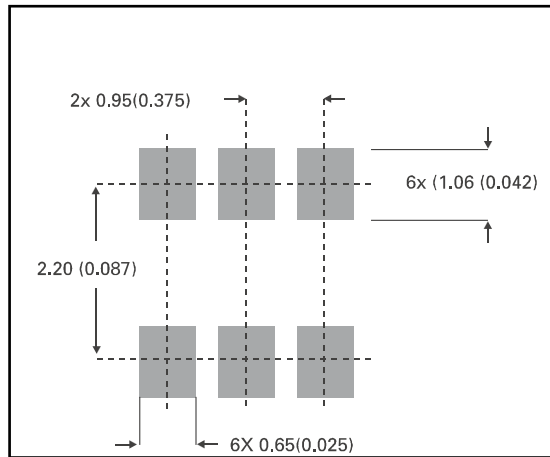


# ZXTD6717E6

## 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

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