

ZXTC2061E6

12V, SOT23-6, complementary medium power transistors

Summary

$BV_{CEO} > 12$ (-12)V

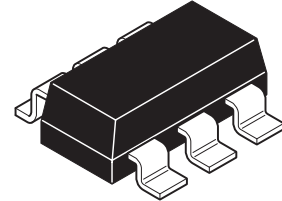
$h_{FE} > 500$

$I_{C(cont)} = 5$ (-3.5)A

$V_{CE(sat)} < 35$ (-70)mV @ 1A

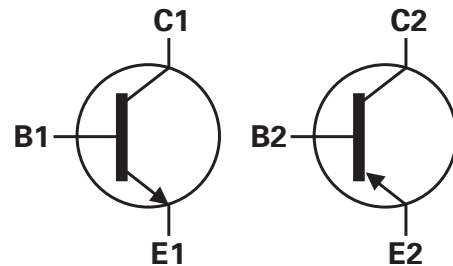
$R_{CE(sat)} = 25$ (45)m Ω

$P_D = 1.1$ W



Description

Advanced process capability has been used to achieve this high performance device. Combining NPN and PNP transistors in the SOT23-6 package provides a compact solution for the intended applications.



Features

- NPN-PNP combination
- Very low saturation voltage
- High gain
- SOT23-6 package

Applications

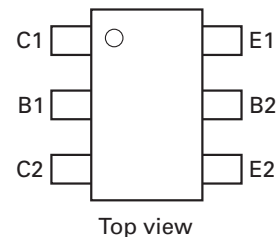
- MOSFET and IGBT gate driving
- Motor drive

Ordering information

DEVICE	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC2061E6TA	7	8	3000

Device marking

2061



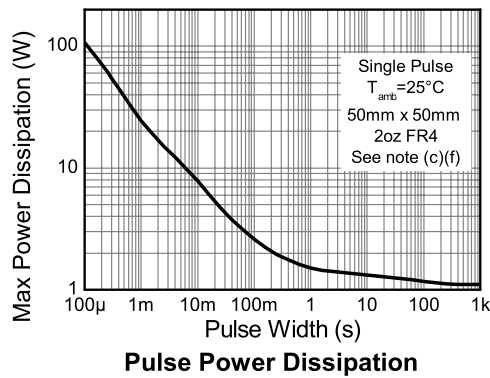
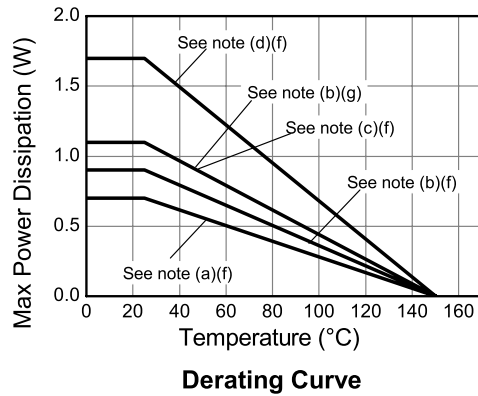
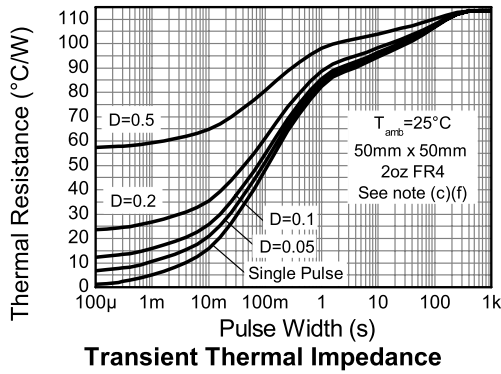
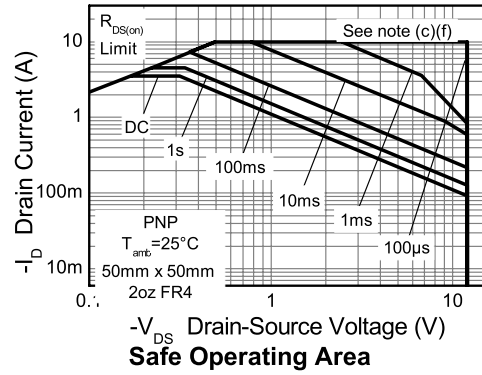
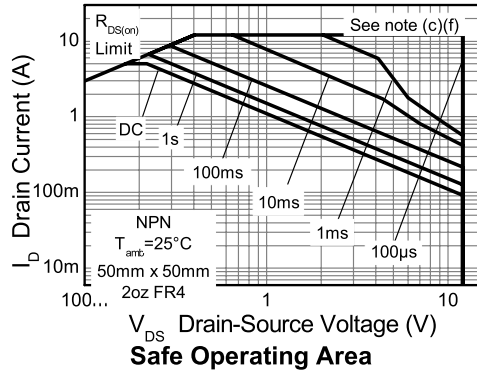
Absolute maximum and thermal ratings

PARAMETER	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	20(-12)	V
Collector-emitter voltage	V_{CEO}	12(-12)	V
Emitter-base voltage	V_{EBO}	7(-7)	V
Continuous collector current ^{(c)(f)}	I_C	5(-3.5)	A
Peak pulse current	I_{CM}	12(-10)	A
Base current	I_B	1(-1)	A
Power dissipation at $T_A = 25^\circ\text{C}$ ^{(a)(f)}	P_D	0.7	W
Linear derating factor		5.6	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ ^{(b)(f)}	P_D	0.9	W
Linear derating factor		7.2	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ ^{(b)(g)}	P_D	1.1	W
Linear derating factor		8.8	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ ^{(c)(f)}	P_D	1.1	W
Linear derating factor		8.8	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ ^{(d)(f)}	P_D	1.7	W
Linear derating factor		13.6	mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	°C
Thermal resistance junction to ambient ^{(a)(f)}	$R_{\theta JA}$	179	°C/W
Thermal resistance junction to ambient ^{(b)(f)}	$R_{\theta JA}$	139	°C/W
Thermal resistance junction to ambient ^{(b)(g)}	$R_{\theta JA}$	113	°C/W
Thermal resistance junction to ambient ^{(c)(f)}	$R_{\theta JA}$	113	°C/W
Thermal resistance junction to ambient ^{(d)(f)}	$R_{\theta JA}$	73	°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) 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 2oz copper, in still air conditions.
- (d) As above measured at $t < 5$ seconds.
- (e) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
- (f) For device with one active die, both collectors attached to a common sink.
- (g) For device with two active dice running at equal power, split sink 50% to each collector.

Thermal characteristics



ZXTC2061E6

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

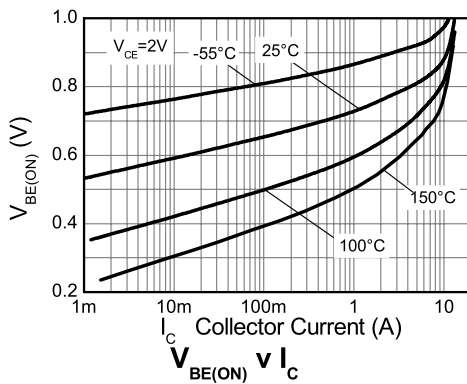
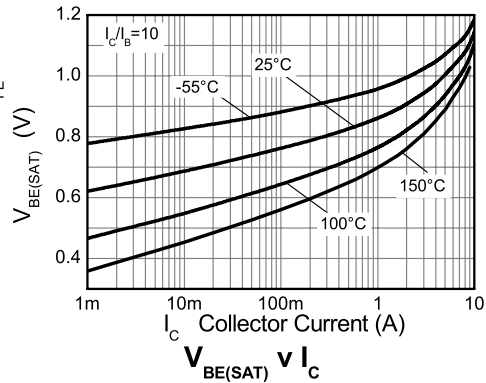
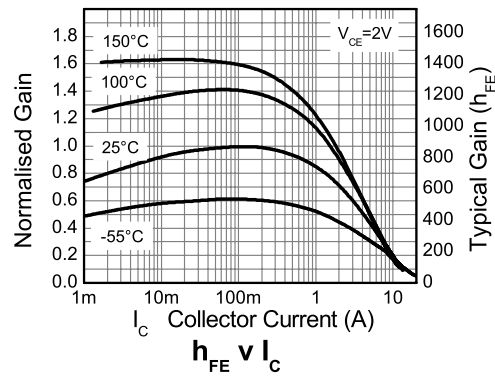
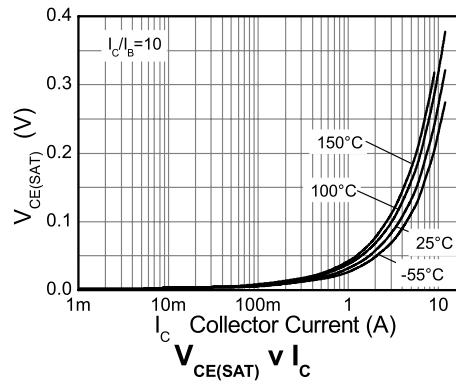
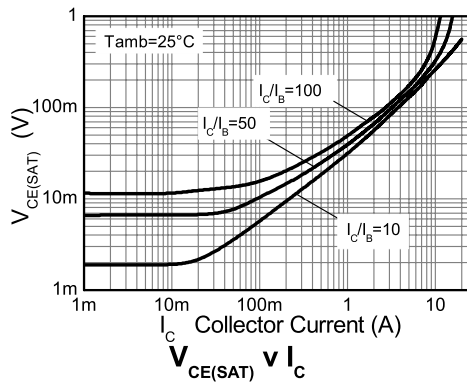
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	20(-12)	40(-35)		V	$I_C = (-)10\mu\text{A}$
Collector-emitter breakdown voltage (base open)	BV_{CEO}	(-)12	17(-25)		V	$I_C = (-)10\text{mA}^{(*)}$
Emitter-base breakdown voltage	BV_{EBO}	(-)7	(-)8.4		V	$I_E = (-)100\mu\text{A}$
Collector-base cut-off current	I_{CBO}		<1	(-)50 (-)0.5	nA μA	$V_{CB} = 20(-12)\text{V}$ $V_{CB} = 20(-12)\text{V}, T_{amb} = 100^{\circ}\text{C}$
Emitter-base cut-off current	I_{EBO}		<1	(-)50	nA	$V_{EB} = (-)5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		32(-55)	40(-70)	mV	$I_C = (-)1\text{A}, I_B = (-)100\text{mA}^{(*)}$
			50(-170)	60(-265)	mV	$I_C = (-)1\text{A}, I_B = (-)10\text{mA}^{(*)}$
			65(-220)	80(-360)	mV	$I_C = (-)2\text{A}, I_B = (-)40\text{mA}^{(*)}$
			(-150)	(-200)	mV	$(I_C = -3.5\text{A}, I_B = -350\text{mA})^{(*)}$
			145	180	mV	$I_C = 5\text{A}, I_B = 100\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		(-955)	(-1050)	mV	$(I_C = -3.5\text{A}, I_B = -350\text{mA})^{(*)}$
			920	1000	mV	$I_C = 5\text{A}, I_B = 100\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		(-830)	(-900)	mV	$(I_C = -3.5\text{A}, V_{CE} = -2\text{V})^{(*)}$
			810	900	mV	$I_C = 5\text{A}, V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	h_{FE}	500(500) 480(290) (75) 260	800(800)	1500(1500)		$I_C = (-)10\text{mA}, V_{CE} = (-)2\text{V}^{(*)}$
			750(450)			$I_C = (-)1\text{A}, V_{CE} = (-)2\text{V}^{(*)}$
			(100)			$(I_C = -3.5\text{A}, V_{CE} = -2\text{V})^{(*)}$
			390			$I_C = 5\text{A}, V_{CE} = 2\text{V}^{(*)}$
Transition frequency	f_T		260 (310)		MHz	$I_C = (-)50\text{mA}, V_{CE} = (-)10\text{V}$ $f = 100\text{MHz}$
Output capacitance	C_{OBO}		26(17)	35(25)	pF	$V_{CB} = (-)10\text{V}, f = 1\text{MHz}^{(*)}$
Delay time	t_d		71(41)		ns	$V_{CC} = (-)10\text{V}, I_C = (-)1\text{A},$ $I_{B1} = -I_{B2} = (-)10\text{mA}.$
Rise time	t_r		70(62)		ns	
Storage time	t_s		233(179)		ns	
Fall time	t_f		72(65)		ns	

NOTES:

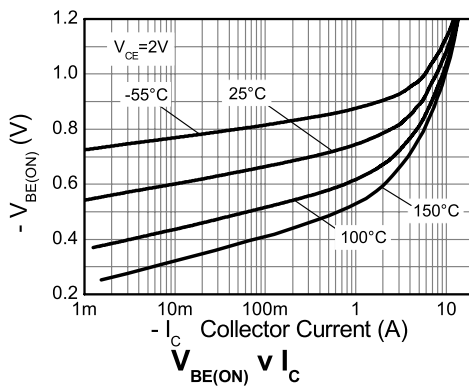
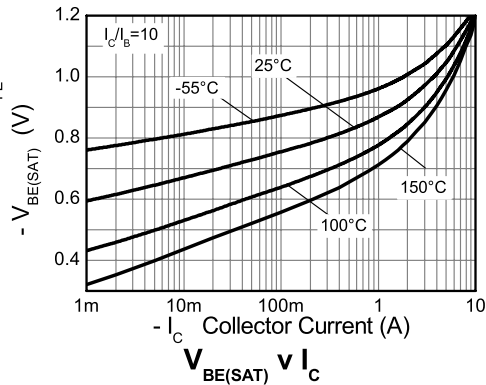
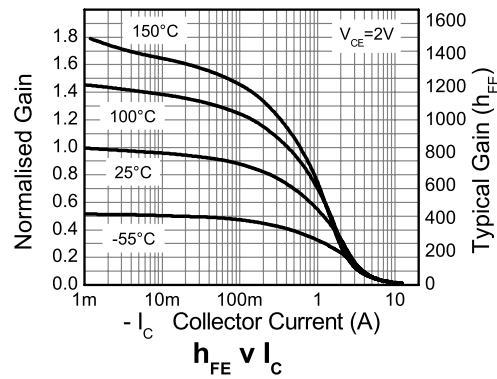
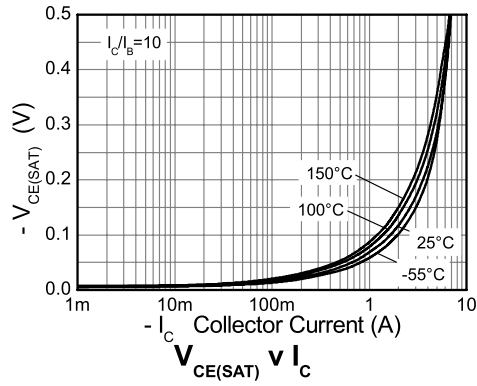
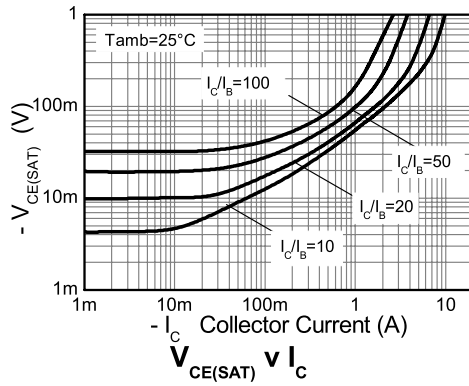
(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

() = PNP

NPN electrical characteristics



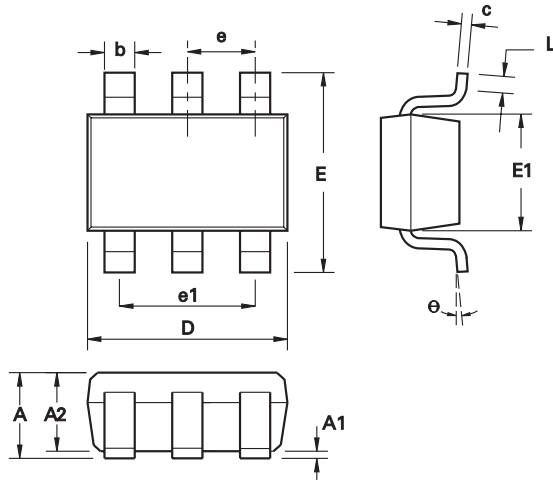
PNP electrical characteristics



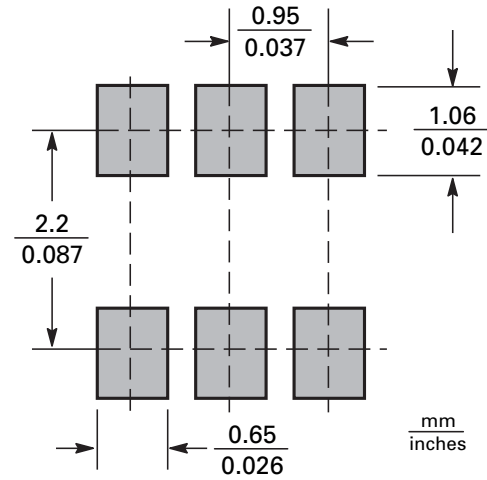
ZXTC2061E6

Package outline SOT23-6

Package outline



Pad layout details



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.45	0.354	0.0570
A1	0.00	0.15	0.00	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.35	0.50	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
L	0.10	0.60	0.0039	0.0236
e	0.95 REF		0.0374 REF	
e1	1.90 REF		0.0748 REF	
L	0°	30°	0°	30°

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

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