

ZXTC2063E6

40V, SOT23-6, complementary medium power transistors

Summary

$BV_{CE0} > 40$ (-40)V

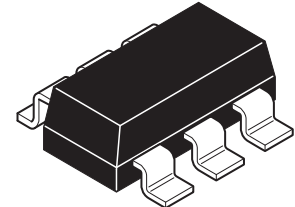
$BV_{ECO} > 6$ (-3)V

$I_{C(cont)} = 3.5$ (-3)A

$V_{CE(sat)} < 60$ (-90)mV @ 1A

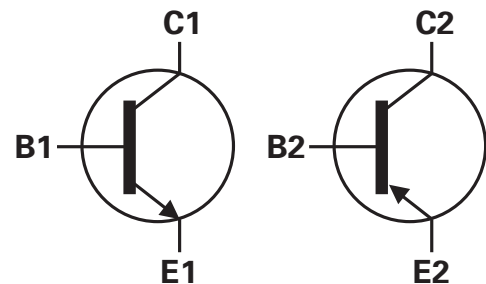
$R_{CE(sat)} = 38$ (58)m Ω

$P_D = 1.1$ 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.

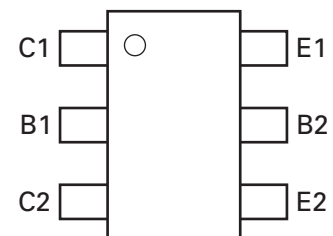


Features

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

Applications

- MOSFET and IGBT gate driving
- Motor drive



Top view

Ordering information

Device	reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC2063E6TA	7	8	3000

Device marking

2063

ZXTC2063E6

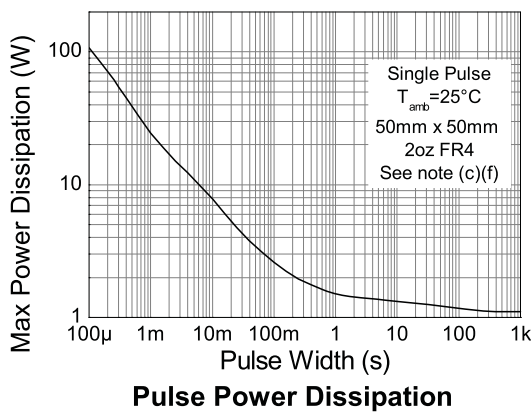
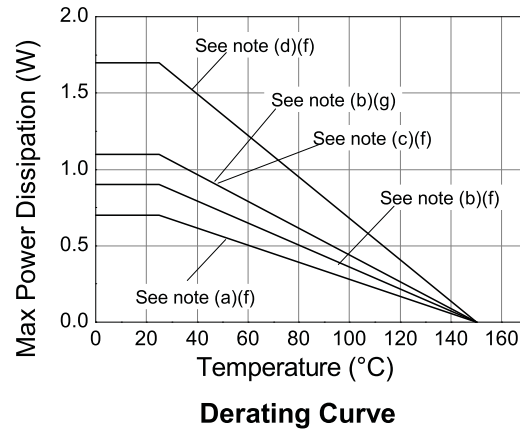
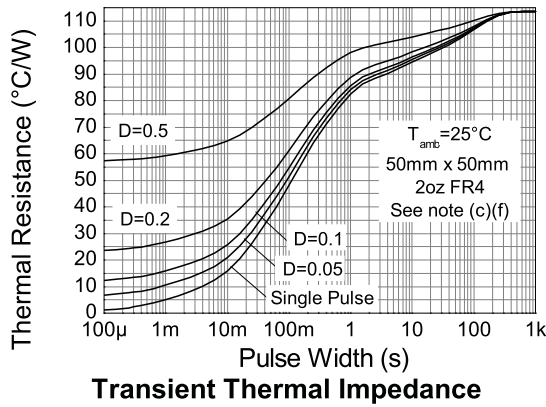
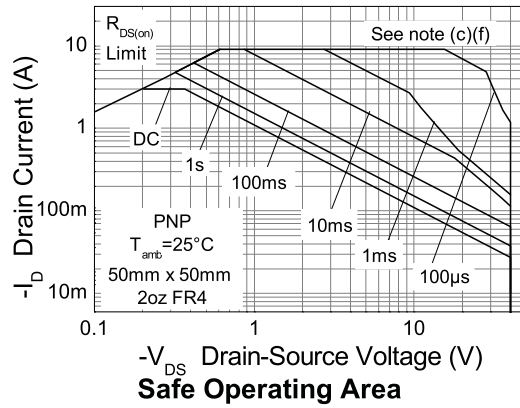
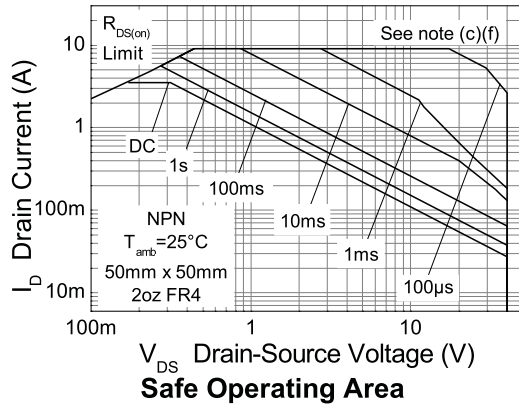
Absolute maximum and thermal ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	130(-45)	V
Collector-emitter voltage	V_{CEO}	40(-40)	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	6(-3)	V
Emitter-base voltage	V_{EBO}	7(-7)	V
Continuous collector current ^{(c)(f)}	I_C	3.5(-3)	A
Peak pulse current	I_{CM}	9(-9)	A
Base current	I_B	1(-1)	A
Power dissipation @ $T_{amb} = 25^{\circ}C^{(a)(f)}$		0.7	W
Linear derating factor	P_D	5.6	mW/ $^{\circ}C$
Power dissipation @ $T_{amb} = 25^{\circ}C^{(b)(f)}$		0.9	W
Linear derating factor	P_D	7.2	mW/ $^{\circ}C$
Power dissipation @ $T_{amb} = 25^{\circ}C^{(b)(g)}$		1.1	W
Linear derating factor	P_D	8.8	mW/ $^{\circ}C$
Power dissipation @ $T_{amb} = 25^{\circ}C^{(c)(f)}$		1.1	W
Linear derating factor	P_D	8.8	mW/ $^{\circ}C$
Power dissipation @ $T_{amb} = 25^{\circ}C^{(d)(f)}$		1.7	W
Linear derating factor	P_D	13.6	mW/ $^{\circ}C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^{\circ}C$
Thermal resistance junction to ambient ^{(a)(f)}	$R_{\theta JC}$	179	$^{\circ}C/W$
Thermal resistance junction to ambient ^{(b)(f)}	$R_{\theta JA}$	139	$^{\circ}C/W$
Thermal resistance junction to ambient ^{(b)(g)}	$R_{\theta JC}$	113	$^{\circ}C/W$
Thermal resistance junction to ambient ^{(c)(f)}	$R_{\theta JC}$	113	$^{\circ}C/W$
Thermal resistance junction to ambient ^{(d)(f)}	$R_{\theta JA}$	73	$^{\circ}C/W$

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



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

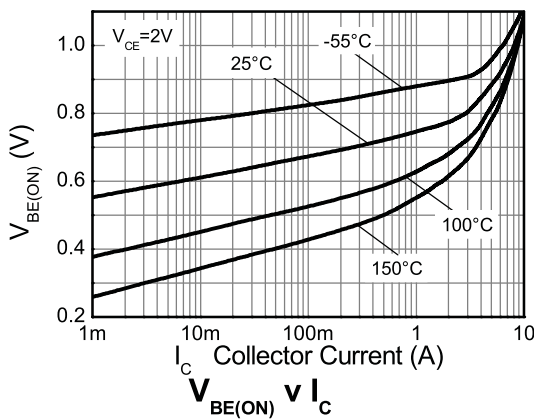
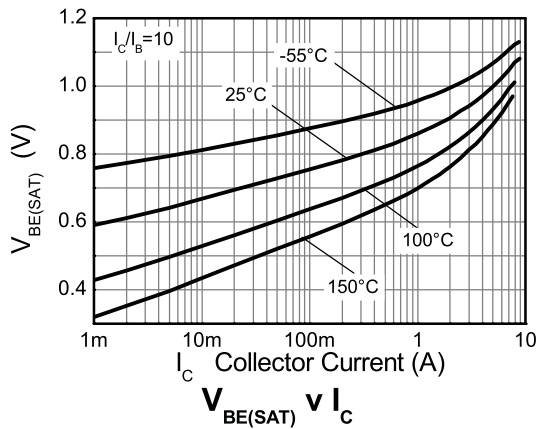
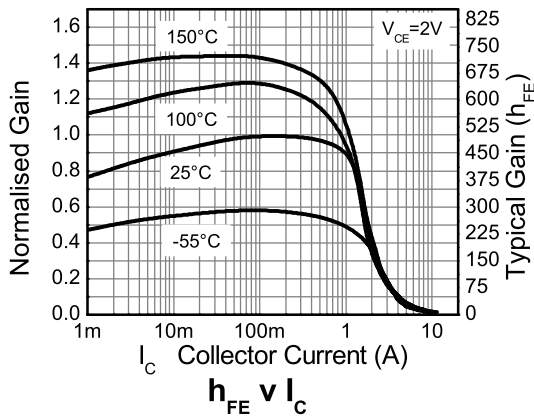
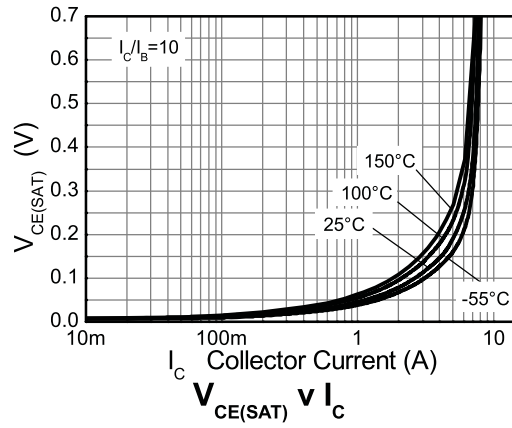
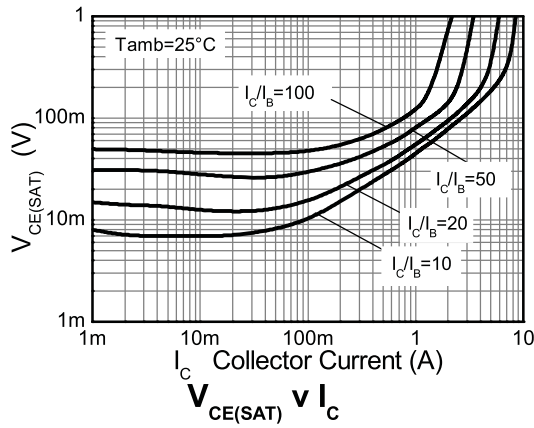
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	130(-45)	170(-80)		V	$I_C = (-)100\mu\text{A}$
Collector-emitter breakdown voltage (base open)	BV_{CEO}	(-)40	63(-65)		V	$I_C = (-)10\text{mA}^{(*)}$ *
Emitter-base breakdown voltage	BV_{EBO}	(-)7	(-)8.3		V	$I_E = (-)100\mu\text{A}$
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	(-)6	(-)7.4		V	$I_E = (-)100\mu\text{A}$, $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$ ($0.25\text{V} < V_{BC} < -0.25\text{V}$)
Emitter-collector breakdown voltage (base open)	BV_{ECO}	6(-3)	7.4(-8.7)		V	$I_E = (-)100\mu\text{A}$
Collector-base cut-off current	I_{CBO}		<1	(-)50 (-)20	nA μA	$V_{CB} = 100(-36)\text{V}$ $V_{CB} = 100(-36)\text{V}$, $T_{amb} = 100^{\circ}\text{C}$
Emitter-base cut-off current	I_{EBO}		<1	(-)50	nA	$V_{EB} = (-)5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		50(-70) 85(-195) 150 (-175) 135	60(-90) 110(-290) 220 (-260) 195	mV mV mV mV mV	$I_C = (-)1\text{A}$, $I_B = (-)100\text{mA}$ * $I_C = (-)1\text{A}$, $I_B = (-)20\text{mA}$ * $I_C = 2\text{A}$, $I_B = 40\text{mA}$ * ($I_C = -3\text{A}$, $I_B = -300\text{mA}$ *) $I_C = 3.5\text{A}$, $I_B = 350\text{mA}$ *
Base-emitter saturation voltage	$V_{BE(sat)}$		(-935) 960	(-1000) 1050	mV mV	($I_C = -3\text{A}$, $I_B = -300\text{mA}$ *) $I_C = 3.5\text{A}$, $I_B = 350\text{mA}$ *
Base-emitter turn-on voltage	$V_{BE(on)}$		(-855) 860	(-950) 950	mV mV	($I_C = -3\text{A}$, $V_{CE} = -2\text{V}$ *) $I_C = 3.5\text{A}$, $V_{CE} = 2\text{V}$ *
Static forward current transfer ratio	h_{FE}	()300 280(200) (20) 40	()450 400(280) (50) 60	()900		$I_C = (-)10\text{mA}$, $V_{CE} = (-)2\text{V}$ * $I_C = (-)1\text{A}$, $V_{CE} = (-)2\text{V}$ * ($I_C = -3\text{A}$, $V_{CE} = -2\text{V}$ *) $I_C = 3.5\text{A}$, $V_{CE} = 2\text{V}$ *
Transition frequency	f_T		190 (270)		MHz	$I_C = (-)50\text{mA}$, $V_{CE} = (-)10\text{V}$ $f = 100\text{MHz}$
Output capacitance	C_{OBO}		12(17)	20(25)	pF	$V_{CB} = (-)10\text{V}$, $f = 1\text{MHz}$ *
Delay time	t_d		64(57)		ns	$V_{CC} = (-)10\text{V}$. $I_C = (-)1\text{A}$, $I_{B1} = I_{B2} = (-)10\text{mA}$.
Rise time	t_r		108(69)		ns	
Storage time	t_s		428(154)		ns	
Fall time	t_f		130(60)		ns	

NOTES:

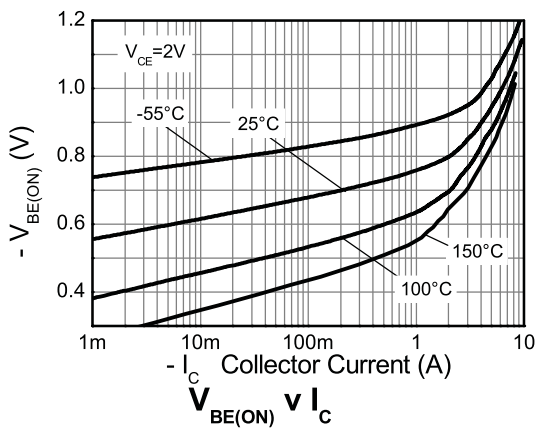
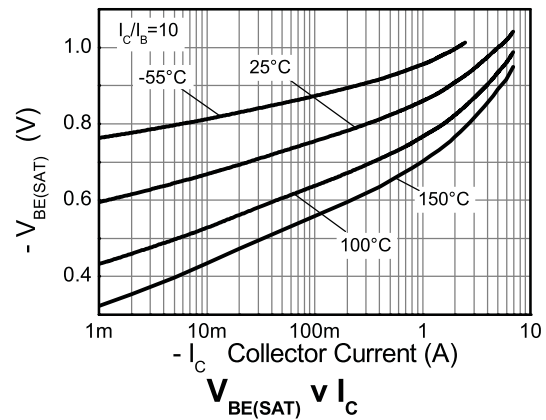
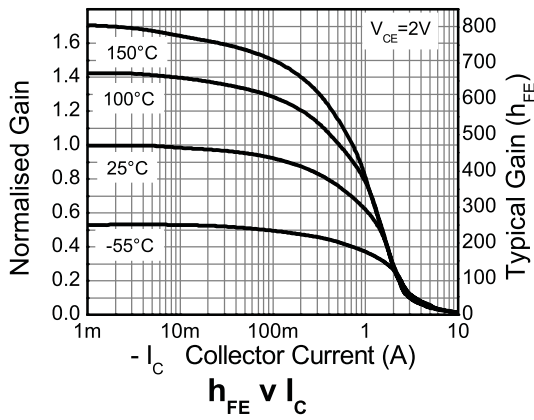
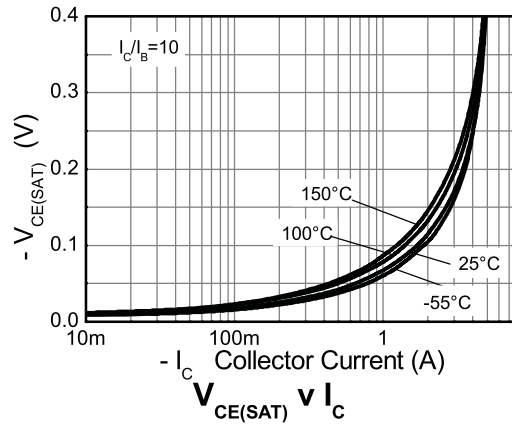
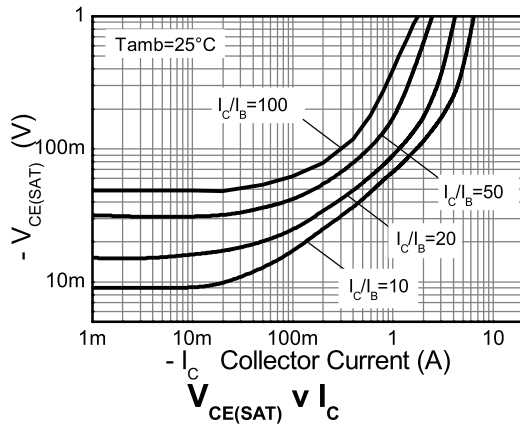
(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$

() = PNP

NPN Characteristics

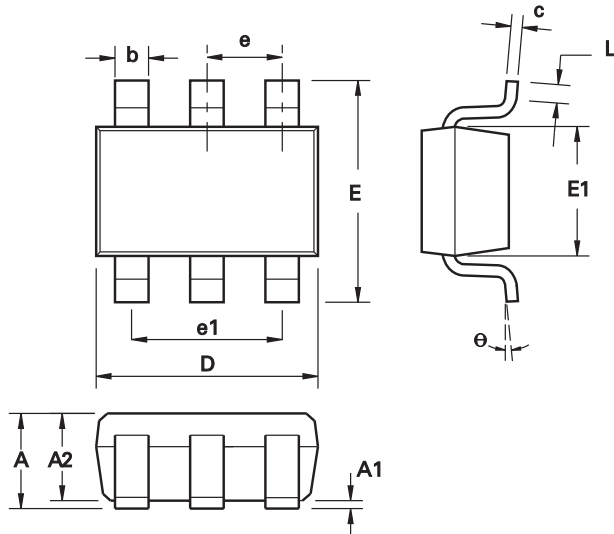


PNP Characteristics



ZXTC2063E6

Package outline - SOT23-6



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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