A Product Line of
Diodes Incorporated

ZXTC2063E6
40V, SOT23-6, complementary medium power transistors

Summary

BV_{CEO} > 40 (-40)V

BV_{ECO} > 6 (-3)V

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

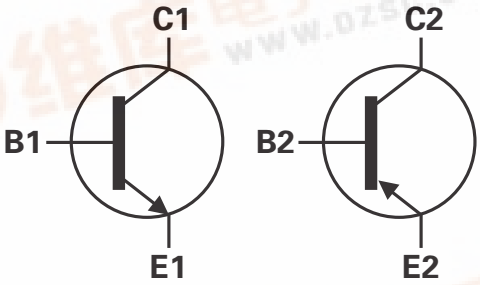
$V_{CE(sat)}$ < 60 (-90)mV @ 1A

$R_{CE(sat)}$ = 38 (58)mΩ

P_D = 1.1W

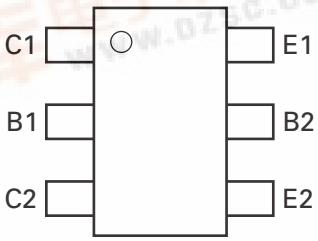
Description

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



Top view

Applications

- MOSFET and IGBT gate driving
- Motor drive

Ordering information

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

Device marking

2063

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°C[a][f]		0.7	W
Linear derating factor	P_D	5.6	mW/°C
Power dissipation @ T_{amb} = 25°C[b][f]		0.9	W
Linear derating factor	P_D	7.2	mW/°C
Power dissipation @ T_{amb} = 25°C[b][g]		1.1	W
Linear derating factor	P_D	8.8	mW/°C
Power dissipation @ T_{amb} = 25°C[c][f]		1.1	W
Linear derating factor	P_D	8.8	mW/°C
Power dissipation @ T_{amb} = 25°C[d][f]		1.7	W
Linear derating factor	P_D	13.6	mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	°C
Thermal resistance junction to ambient[a][f]	$R_{\Theta JC}$	179	°C/W
Thermal resistance junction to ambient[b][f]	$R_{\Theta JA}$	139	°C/W
Thermal resistance junction to ambient[b][g]	$R_{\Theta JC}$	113	°C/W
Thermal resistance junction to ambient[c][f]	$R_{\Theta JC}$	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.

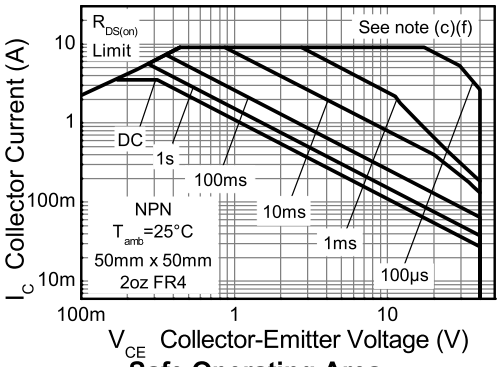
(d) As above measured at t<5 seconds.

(e) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

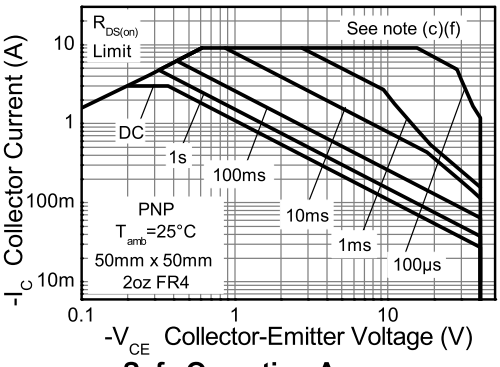
(f) For device with one active die, both collectors attached to a common sink.

(g) For device with two active dice running at equal power, split sink 50% to each collector.

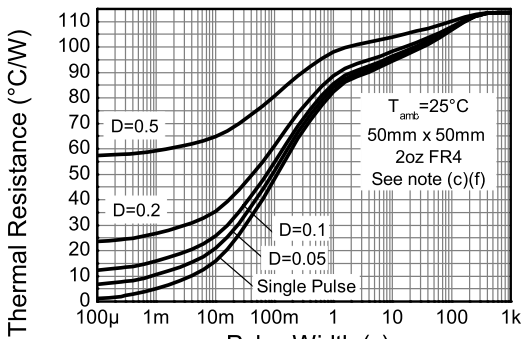
Thermal characteristics



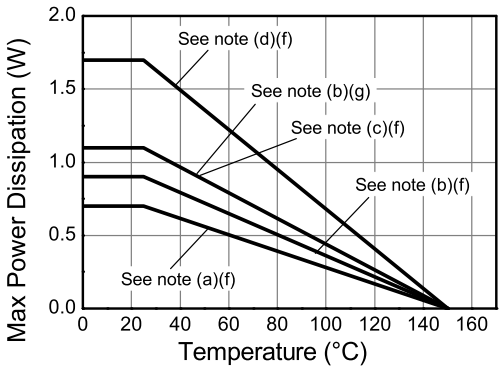
Safe Operating Area



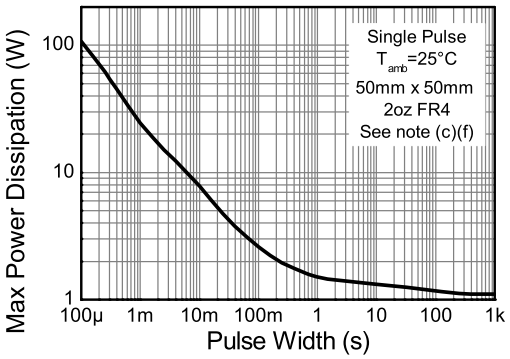
Safe Operating Area



Transient Thermal Impedance



Derating Curve



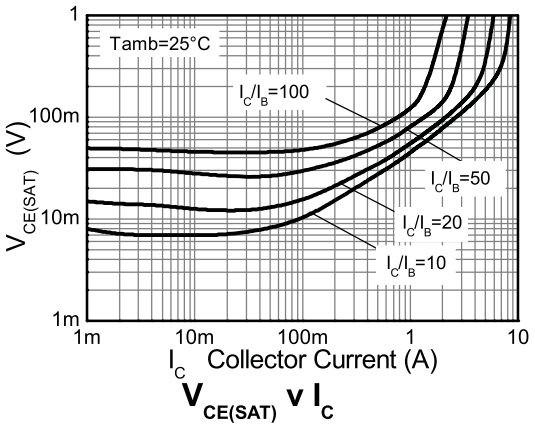
Pulse Power Dissipation

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

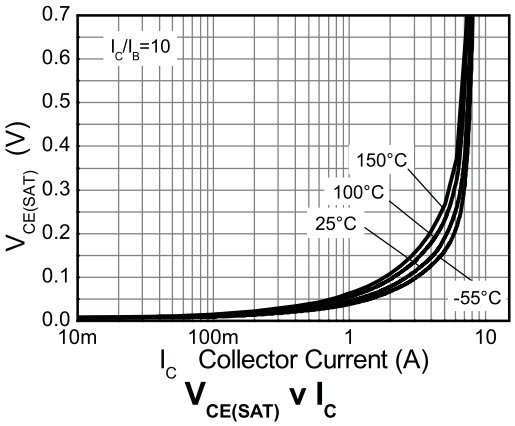
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	130(-45)	170(-80)		V	I_C = (-)100μA
Collector-emitter breakdown voltage (base open)	BV_{CEO}	(-)40	63(-65)		V	I_C = (-)10mA (*) *
Emitter-base breakdown voltage	BV_{EBO}	(-)7	(-)8.3		V	I_E = (-)100μA
Emitter-collector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

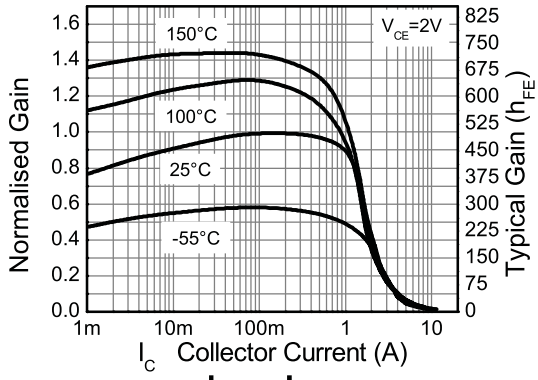
NPN Characteristics



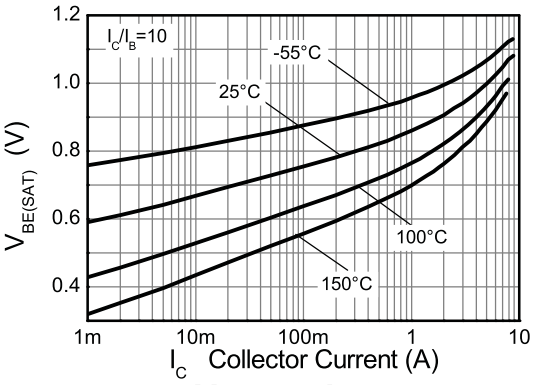
$V_{CE(SAT)}$ v I_C



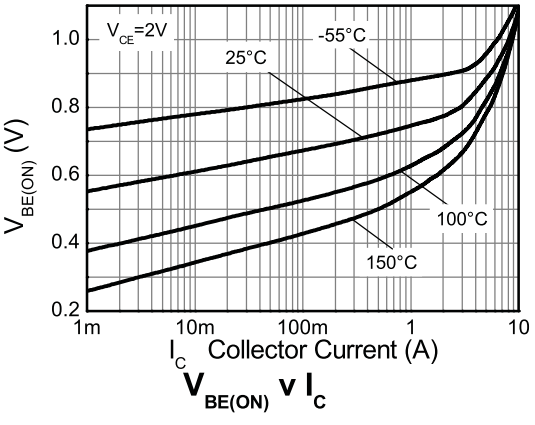
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

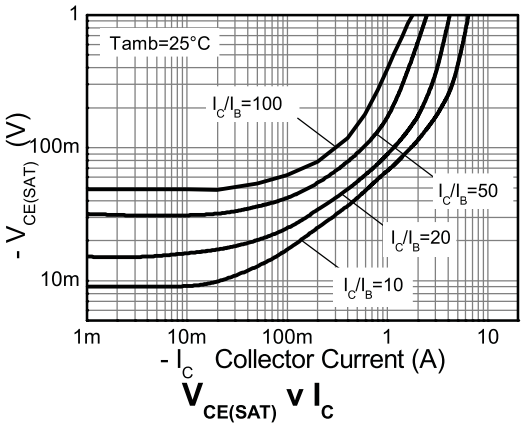


$V_{BE(SAT)}$ v I_C

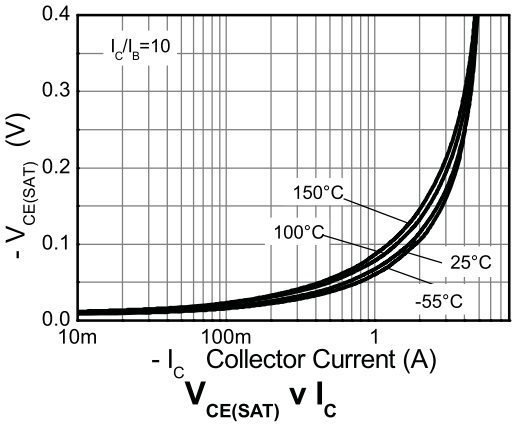


$V_{BE(ON)}$ v I_C

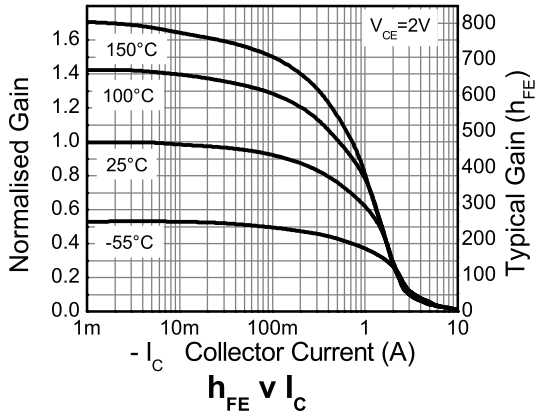
PNP Characteristics



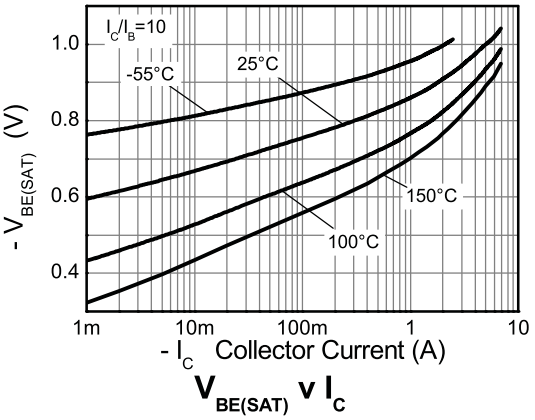
$V_{CE(SAT)}$ v I_C



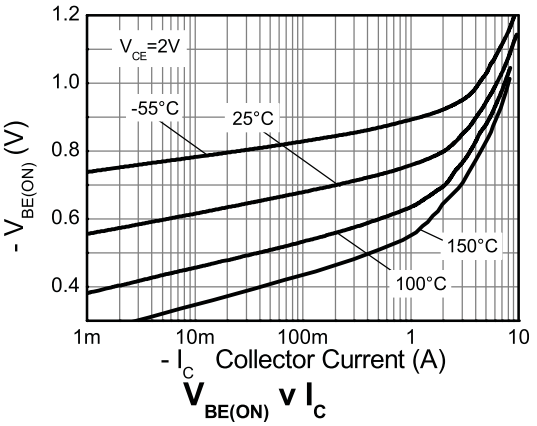
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

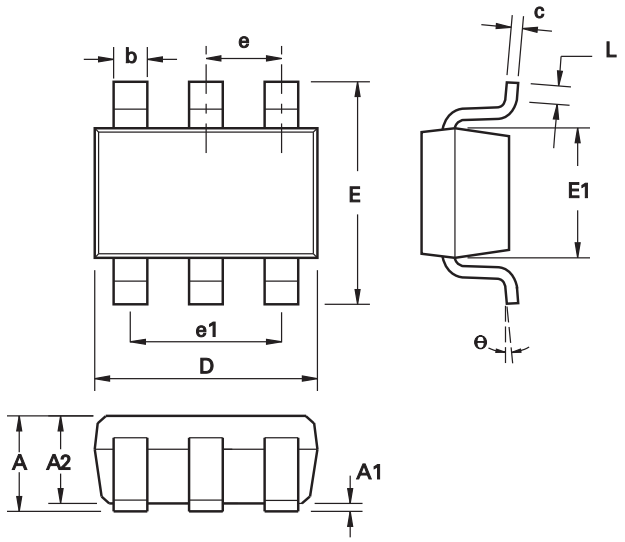


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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

Definitions

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"Active"	Product status recommended for new designs
"Last time buy (LTB)"	Device will be discontinued and last time buy period and delivery is in effect
"Not recommended for new designs"	Device is still in production to support existing designs and production
"Obsolete"	Production has been discontinued

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