

ZXTC2063E6

40V, SOT23-6, complementary medium power transistors

Summary

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

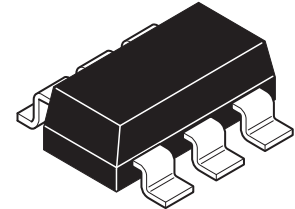
$BV_{ECO} > 6$ (-3)V

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

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

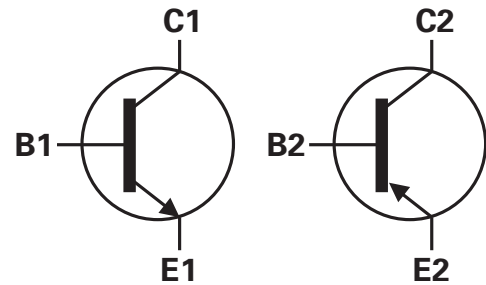
$R_{CE(sat)} = 38$ (58)m Ω

$P_D = 1.1W$



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.

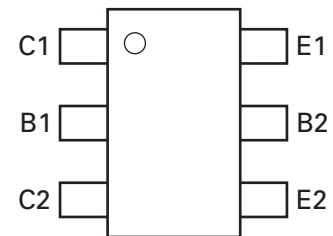


Features

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

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

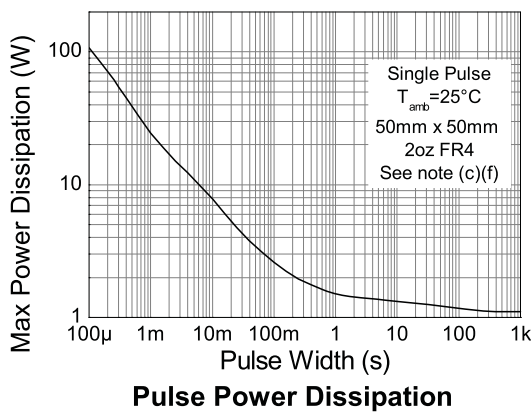
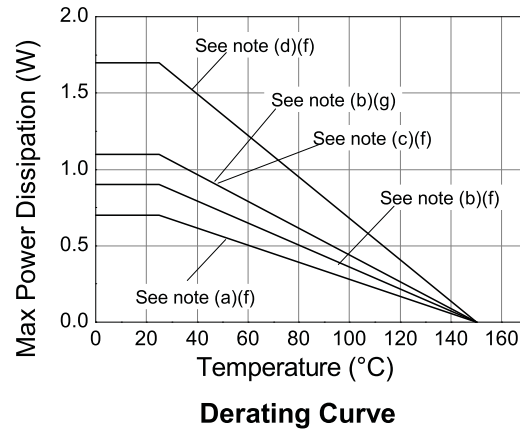
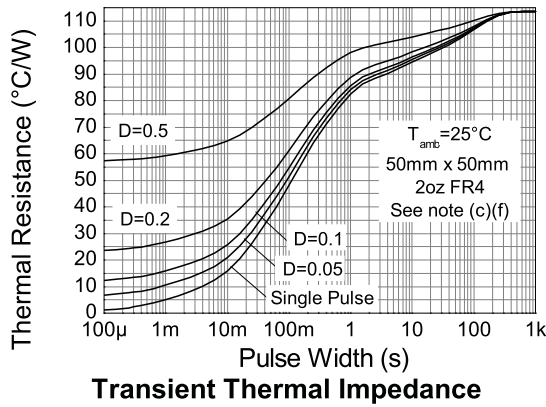
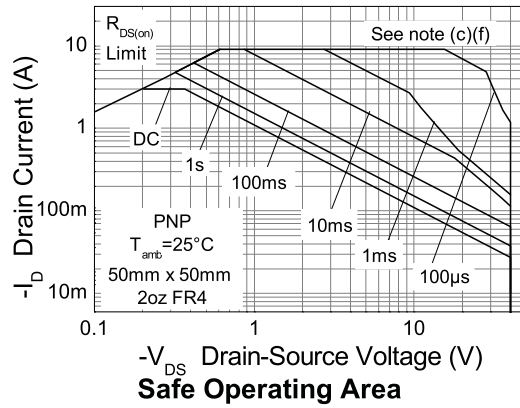
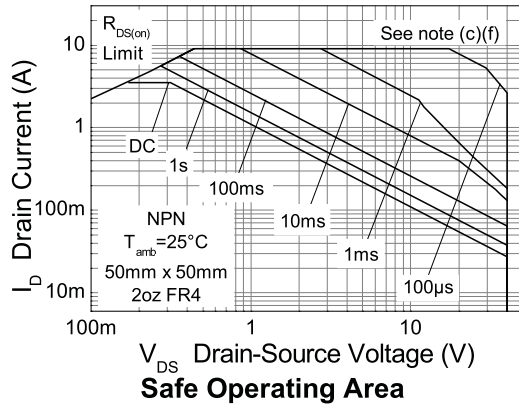
Absolute maximum and thermal ratings

| 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



ZXTC2063E6

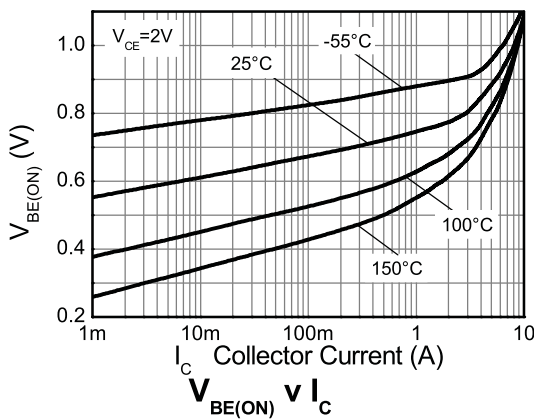
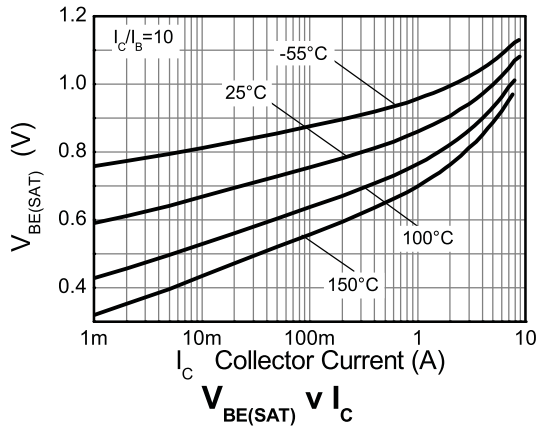
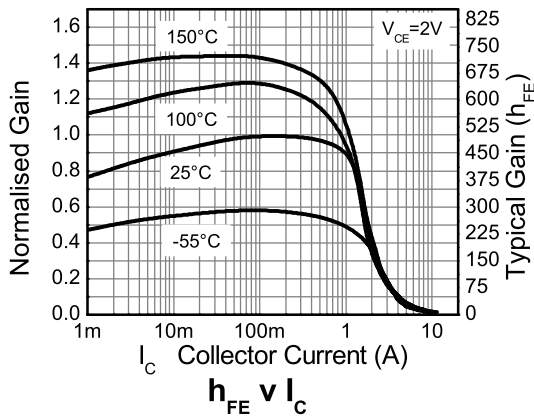
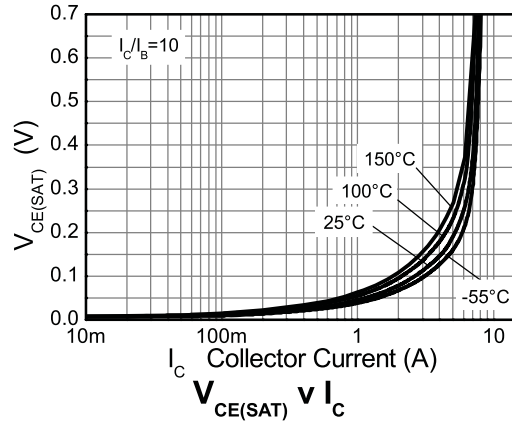
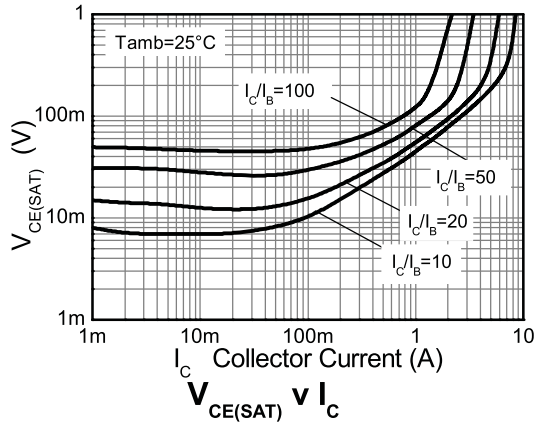
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| 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} |
| Rise time | t_r | | 108(69) | | ns | $I_{B2} = (-)10\text{mA}$. |
| Storage time | t_s | | 428(154) | | ns | |
| Fall time | t_f | | 130(60) | | ns | |

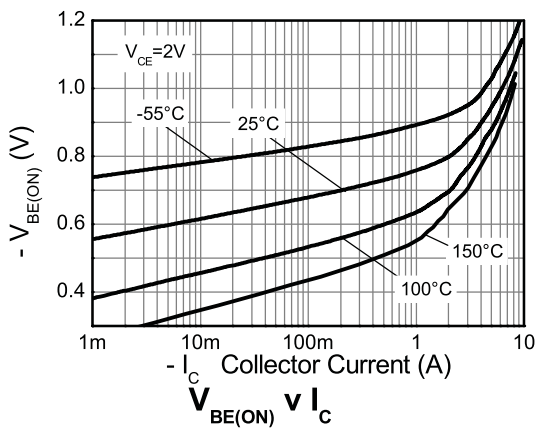
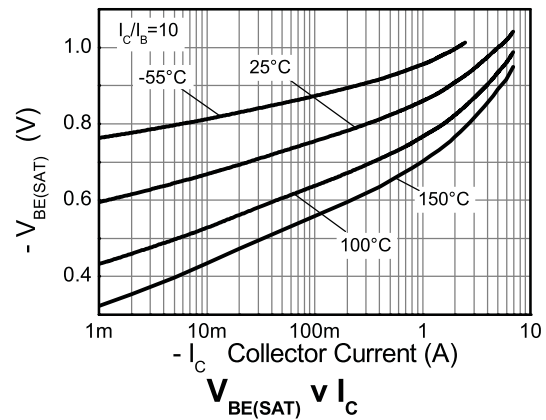
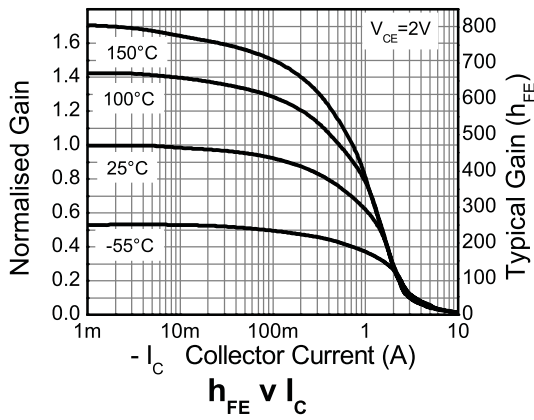
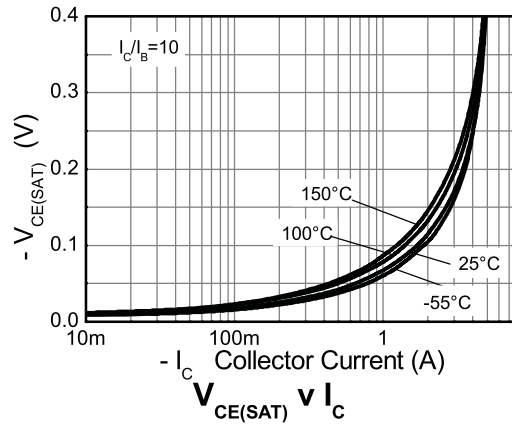
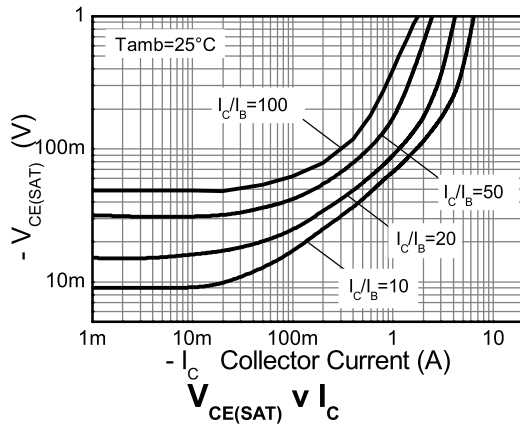
NOTES:

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

NPN Characteristics

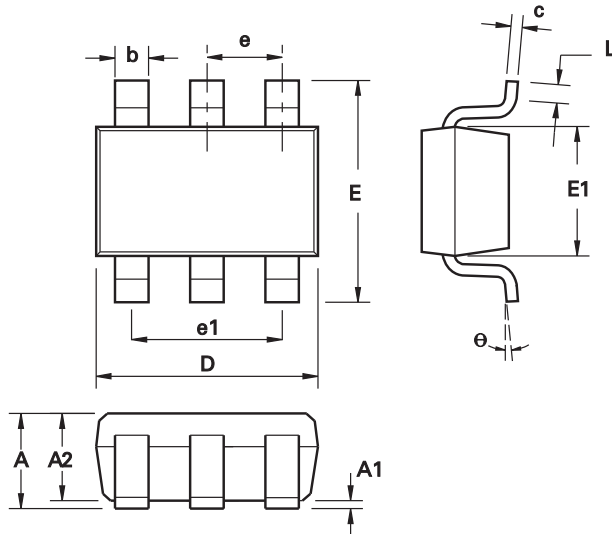


PNP Characteristics



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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| | |
|-----------------------|---|
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| Zetex GmbH Kustermann-park Balanstraße 59 D-81541 München Germany Telephone: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com | Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com | Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com | Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com |

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