

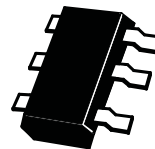
SuperSOT4™ 40V PNP SILICON LOW SATURATION SWITCHING TRANSISTOR

SUMMARY

$V_{CE0} = -40V$; $R_{SAT} = 58m\Omega$; $I_C = -3A$

DESCRIPTION

This new 4th generation ultra low saturation transistor utilises the Zetex matrix structure combined with advanced assembly techniques to give extremely low on state losses. This makes it ideal for high efficiency, low voltage switching applications.



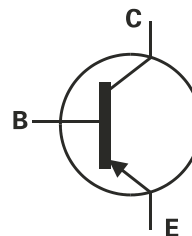
SOT23-6

FEATURES

- Extremely Low Equivalent On Resistance
- Extremely Low Saturation Voltage
- h_{FE} characterised up to 5A
- $I_C = 3A$ Continuous Collector Current
- SOT23-6 package

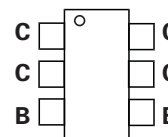
APPLICATIONS

- DC - DC Converters
- Power Management Functions
- Power switches
- Motor control



ORDERING INFORMATION

| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|---------------|--------------------|-----------------|-------------------|
| ZXT13P40DE6TA | 7 | 8mm embossed | 3000 units |
| ZXT13P40DE6TC | 13 | 8mm embossed | 10000 units |



Top View

DEVICE MARKING

P40D

ZXT13P40DE6

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | LIMIT | UNIT |
|---|----------------|-------------|---------------------------|
| Collector-Base Voltage | V_{CBO} | -40 | V |
| Collector-Emitter Voltage | V_{CEO} | -40 | V |
| Emitter-Base Voltage | V_{EBO} | -7.5 | V |
| Peak Pulse Current | I_{CM} | -10 | A |
| Continuous Collector Current | I_C | -3 | A |
| Base Current | I_B | -500 | mA |
| Power Dissipation at $T_A=25^\circ\text{C}$ (a) Linear Derating Factor | P_D | 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 | W mW/ $^\circ\text{C}$ |
| Operating and Storage Temperature Range | $T_j; T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

THERMAL RESISTANCE

| PARAMETER | SYMBOL | VALUE | UNIT |
|-------------------------|-----------------|-------|--------------------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 113 | $^\circ\text{C/W}$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 73 | $^\circ\text{C/W}$ |

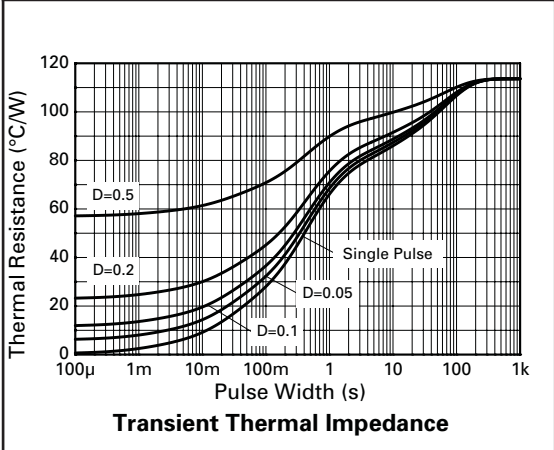
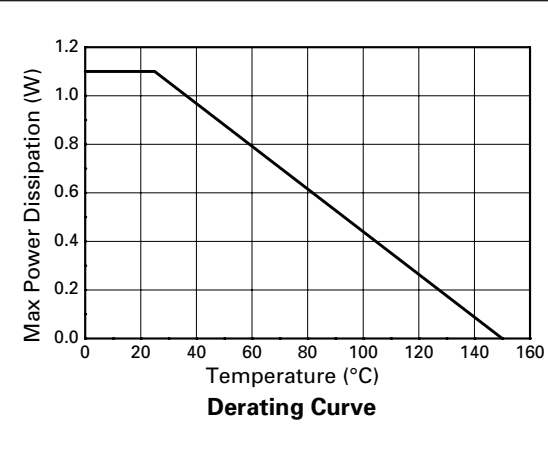
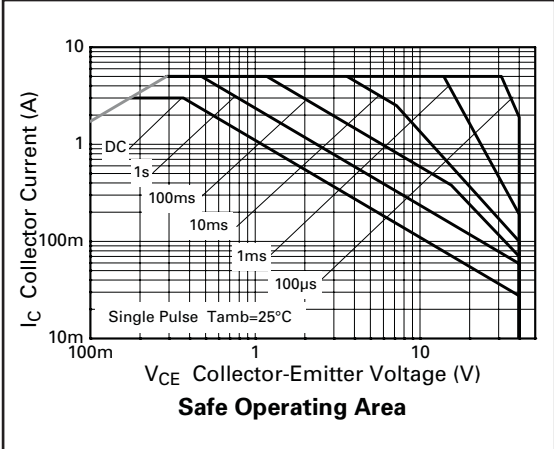
NOTES

(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.

ZXT13P40DE6

TYPICAL CHARACTERISTICS



ZXT13P40DE6

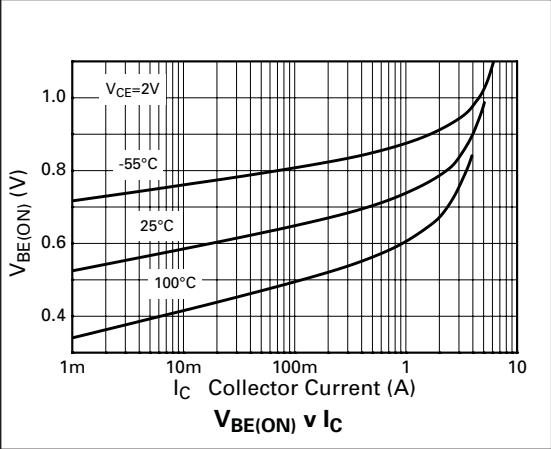
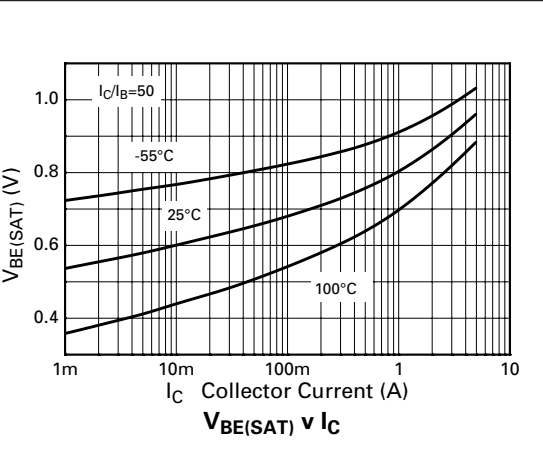
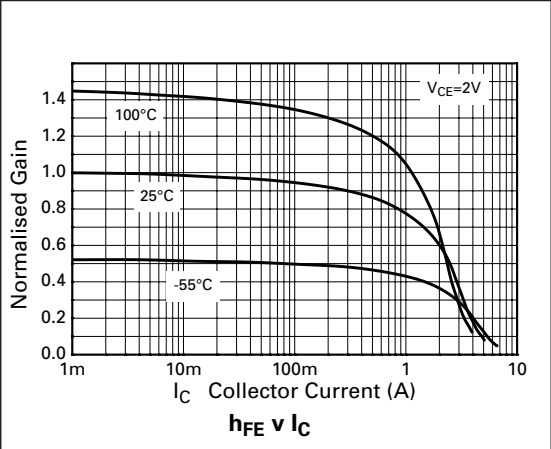
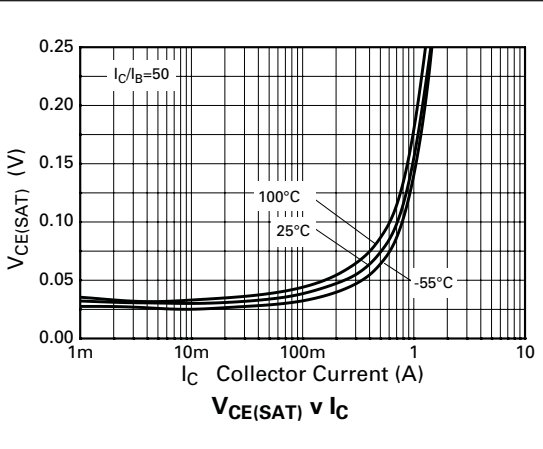
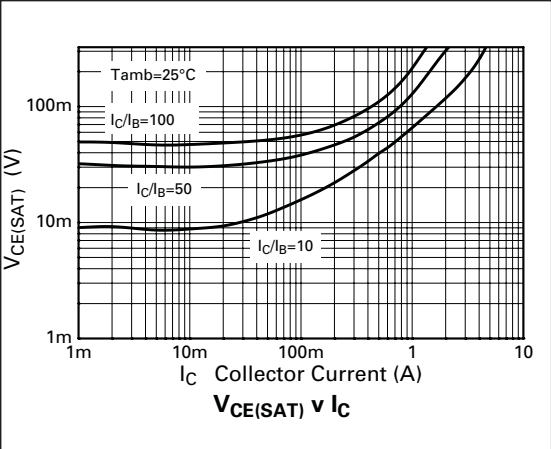
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---------------------------------------|---------------|-------------------------|-----------------------------|-----------------------------|----------------------|--|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -50 | -80 | | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -40 | -70 | | V | $I_C = -10\text{mA}^*$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -7.5 | -8.5 | | V | $I_E = -100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | | | -100 | nA | $V_{CB} = -40\text{V}$ |
| Emitter Cut-Off Current | I_{EBO} | | | -100 | nA | $V_{EB} = -6\text{V}$ |
| Collector Emitter Cut-Off Current | I_{CES} | | | -100 | nA | $V_{CES} = -40\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | -16 -110 -145 -175 | -25 -200 -190 -240 | mV mV mV mV | $I_C = -0.1\text{A}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -20\text{mA}^*$ $I_C = -2\text{A}, I_B = -100\text{mA}^*$ $I_C = -3\text{A}, I_B = -300\text{mA}^*$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | | -1.1 | V | $I_C = -3\text{A}, I_B = -300\text{mA}^*$ |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | | -0.9 | V | $I_C = -3\text{A}, V_{CE} = -2\text{V}^*$ |
| Static Forward Current Transfer Ratio | h_{FE} | 300 300 100 15 | 500 450 250 50 | 900 | | $I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -3\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -5\text{A}, V_{CE} = -2\text{V}^*$ |
| Transition Frequency | f_T | | 115 | | MHz | $I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 50\text{MHz}$ |
| Output Capacitance | C_{obo} | | 42 | | pF | $V_{CB} = -10\text{V}, f = 1\text{MHz}$ |
| Turn-On Time | $t_{(on)}$ | | 185 | | ns | $V_{CC} = -10\text{V}, I_C = -1\text{A}$ $I_{B1} = I_{B2} = -20\text{mA}$ |
| Turn-Off Time | $t_{(off)}$ | | 400 | | ns | |

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

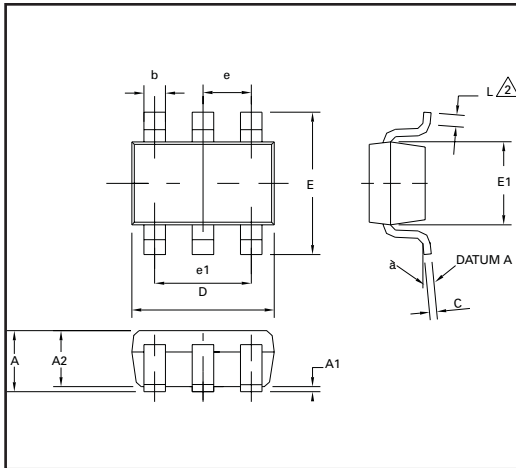
ZXT13P40DE6

TYPICAL CHARACTERISTICS

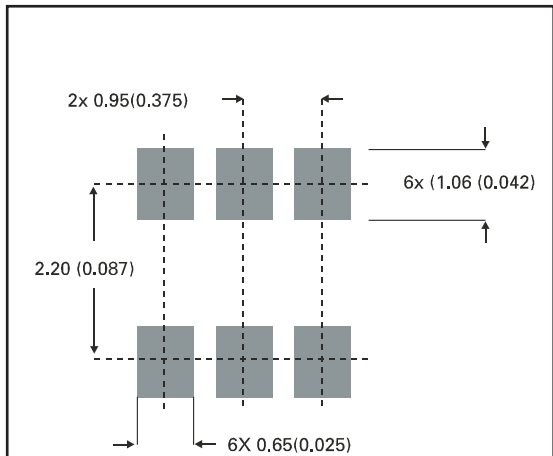


ZXT13P40DE6

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° |

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