

SuperSOT4™ 40V PNP SILICON LOW SATURATION SWITCHING TRANSISTOR

SUMMARY

$V_{CE0} = -40V$; $R_{SAT} = 26m\Omega$; $I_C = -4A$

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.



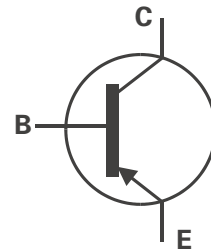
MSOP8

FEATURES

- Extremely Low Equivalent On Resistance
- Extremely Low Saturation Voltage
- h_{FE} characterised up to 8A
- $I_C = 4A$ Continuous Collector Current
- MSOP8 package

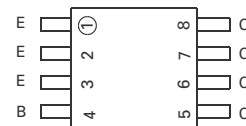
APPLICATIONS

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



ORDERING INFORMATION

| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|--------------|--------------------|-----------------|-------------------|
| ZXT14P40DXTA | 7 | 12mm embossed | 1000 units |
| ZXT14P40DXTC | 13 | 12mm embossed | 4000 units |



Top View

DEVICE MARKING

T14P40DX

ZXT14P40DX

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | LIMIT | UNIT |
|---|---------------|-------------|---------------------------|
| Collector-Base Voltage | V_{CBO} | -50 | V |
| Collector-Emitter Voltage | V_{CEO} | -40 | V |
| Emitter-Base Voltage | V_{EBO} | -7.5 | V |
| Peak Pulse Current (c) | I_{CM} | -12 | A |
| Continuous Collector Current | I_C | -4 | 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 | 1.8 14.4 | 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 | $^\circ\text{C}/\text{W}$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 70 | $^\circ\text{C}/\text{W}$ |

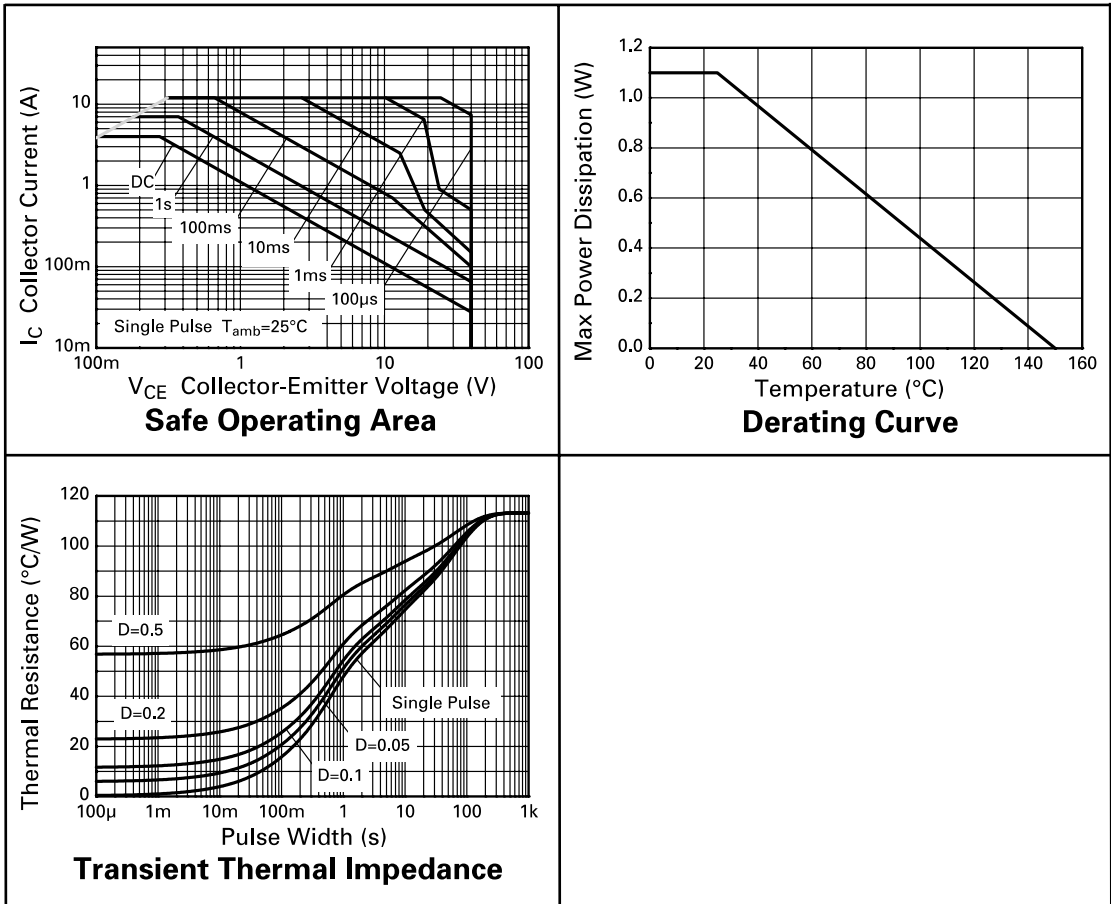
NOTES

(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 $t \leq 10$ secs.

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

CHARACTERISTICS



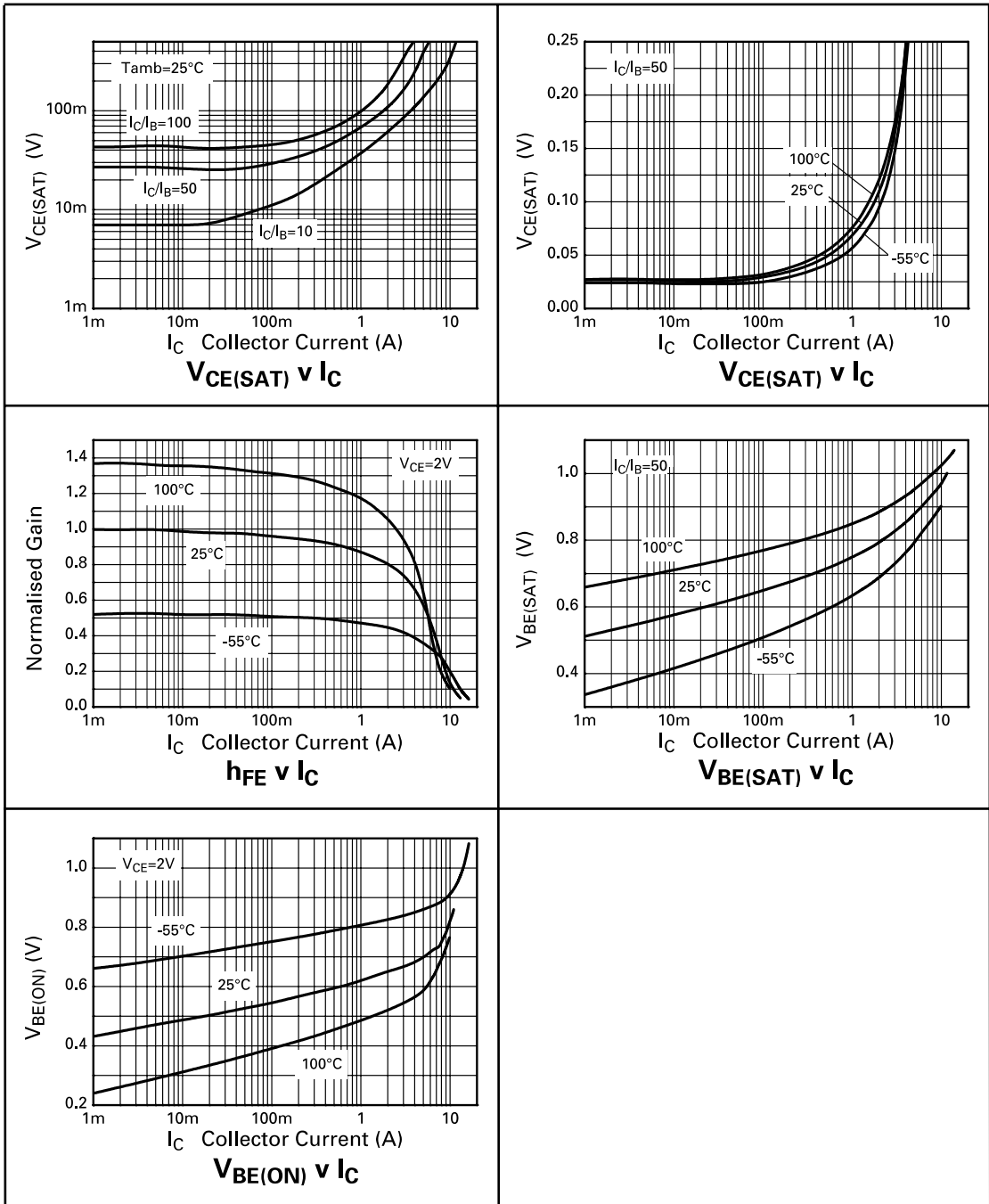
ZXT14P40DX

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 | -110 | | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -40 | -90 | | 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 | $V_{CE(sat)}$ | | -10 -100 -45 -105 -130 | -15 -125 -55 -130 -160 | mV mV mV mV mV | $I_C = -0.1\text{A}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -20\text{mA}^*$ $I_C = -1\text{A}, I_B = -50\text{mA}^*$ $I_C = -4\text{A}, I_B = -400\text{mA}^*$ $I_C = -4\text{A}, I_B = -200\text{mA}^*$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | | -1.0 | V | $I_C = -4\text{A}, I_B = -200\text{mA}^*$ |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | | -0.85 | V | $I_C = -4\text{A}, V_{CE} = -2\text{V}^*$ |
| Static Forward Current Transfer Ratio | h_{FE} | 300 300 200 50 | 500 450 380 100 | 900 | | $I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -4\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -8\text{A}, V_{CE} = -2\text{V}^*$ |
| Transition Frequency | f_T | | 185 | | MHz | $I_C = -300\text{mA}, V_{CE} = -10\text{V}$ $f = -30\text{MHz}$ |
| Output Capacitance | C_{obo} | | 95 | | pF | $V_{CB} = -10\text{V}, f = 1\text{MHz}$ |
| Turn-On Time | $t_{(on)}$ | | 130 | | ns | $V_{CC} = -10\text{V}, I_C = -4\text{A}$ $I_{B1} = I_{B2} = -100\text{mA}$ |
| Turn-Off Time | $t_{(off)}$ | | 435 | | ns | |

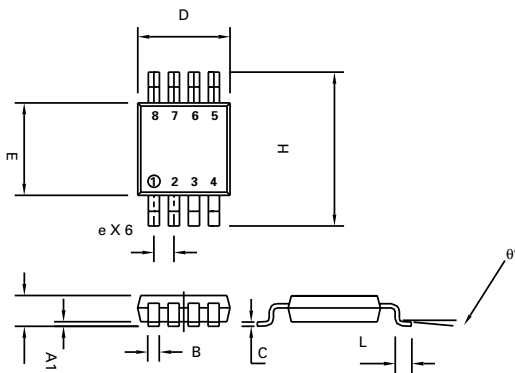
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

TYPICAL CHARACTERISTICS



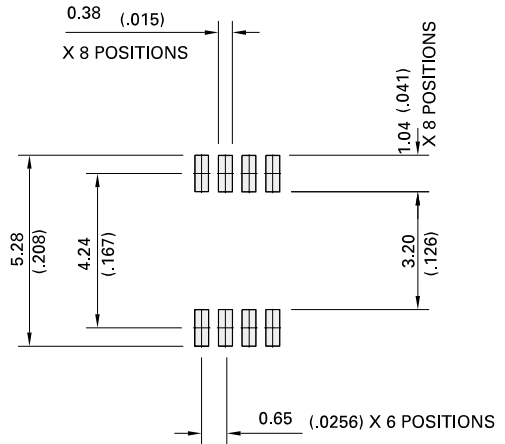
ZXT14P40DX

PACKAGE DIMENSIONS



Conforms to JEDEC MO-187 Iss A

PAD LAYOUT DETAILS



| DIM | Millimetres | | Inches | |
|-----|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | | 1.10 | | 0.043 |
| A1 | 0.05 | 0.15 | 0.002 | 0.006 |
| B | 0.25 | 0.40 | 0.010 | 0.016 |
| C | 0.13 | 0.23 | 0.005 | 0.009 |
| D | 2.90 | 3.10 | 0.114 | 0.122 |
| e | 0.65 | BSC | 0.0256 | BSC |
| E | 2.90 | 3.10 | 0.114 | 0.122 |
| H | 4.90 | BSC | 0.193 | BSC |
| L | 0.40 | 0.70 | 0.016 | 0.028 |
| q° | 0° | 6° | 0° | 6° |



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