

# ZXT3M322

## MPPS™ Miniature Package Power Solutions 40V PNP LOW SATURATION SWITCHING TRANSISTOR

### SUMMARY

$V_{CE0} = -40V$ ;  $R_{SAT} = 104m\Omega$ ;  $I_C = -3A$

### DESCRIPTION

Packaged in the innovative 2mm x 2mm MLP (Micro Leaded Package) outline, this new 4<sup>th</sup> generation low saturation transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

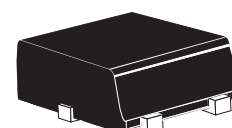
Additionally users will also gain several other **key benefits**:

**Performance capability equivalent to much larger packages**

**Improved circuit efficiency & power levels**

**PCB area and device placement savings**

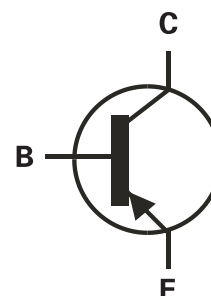
**Lower package height (nom 0.9mm)**



2mm x 2mm MLP  
(single die)

### FEATURES

- Low Equivalent On Resistance
- Extremely Low Saturation Voltage (-220mV@ -1A)
- $h_{FE}$  specified up to -3A
- $I_C = -3A$  Continuous Collector Current
- 2mm x 2mm MLP



### APPLICATIONS

- DC - DC Converters (FET Driving)
- Charging Circuits
- Power switches
- Motor control

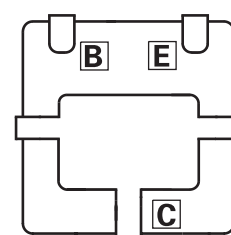
### ORDERING INFORMATION

| DEVICE     | REEL | TAPE WIDTH | QUANTITY PER REEL |
|------------|------|------------|-------------------|
| ZXT3M322TA | 7"   | 8mm        | 3000              |
| ZXT3M322TC | 13"  | 8mm        | 10000             |

### DEVICE MARKING

S3

### PINOUT



2mm x 2mm Single MLP  
underside view

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## 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                                                          | $I_{CM}$      | -4           | A                           |
| Continuous Collector Current (a)                                            | $I_C$         | -3           | A                           |
| Base Current                                                                | $I_B$         | -1000        | mA                          |
| Power Dissipation at $T_A=25^{\circ}\text{C}$ (a)<br>Linear Derating Factor | $P_D$         | 1.5<br>12    | W<br>mW/ $^{\circ}\text{C}$ |
| Power Dissipation at $T_A=25^{\circ}\text{C}$ (b)<br>Linear Derating Factor | $P_D$         | 2.45<br>19.6 | W<br>mW/ $^{\circ}\text{C}$ |
| Power Dissipation at $T_A=25^{\circ}\text{C}$ (d)<br>Linear Derating Factor | $P_D$         | 1<br>8       | W<br>mW/ $^{\circ}\text{C}$ |
| Power Dissipation at $T_A=25^{\circ}\text{C}$ (e)<br>Linear Derating Factor | $P_D$         | 3<br>24      | W<br>mW/ $^{\circ}\text{C}$ |
| Operating and Storage Temperature Range                                     | $T_J:T_{stg}$ | -55 to +150  | $^{\circ}\text{C}$          |

## THERMAL RESISTANCE

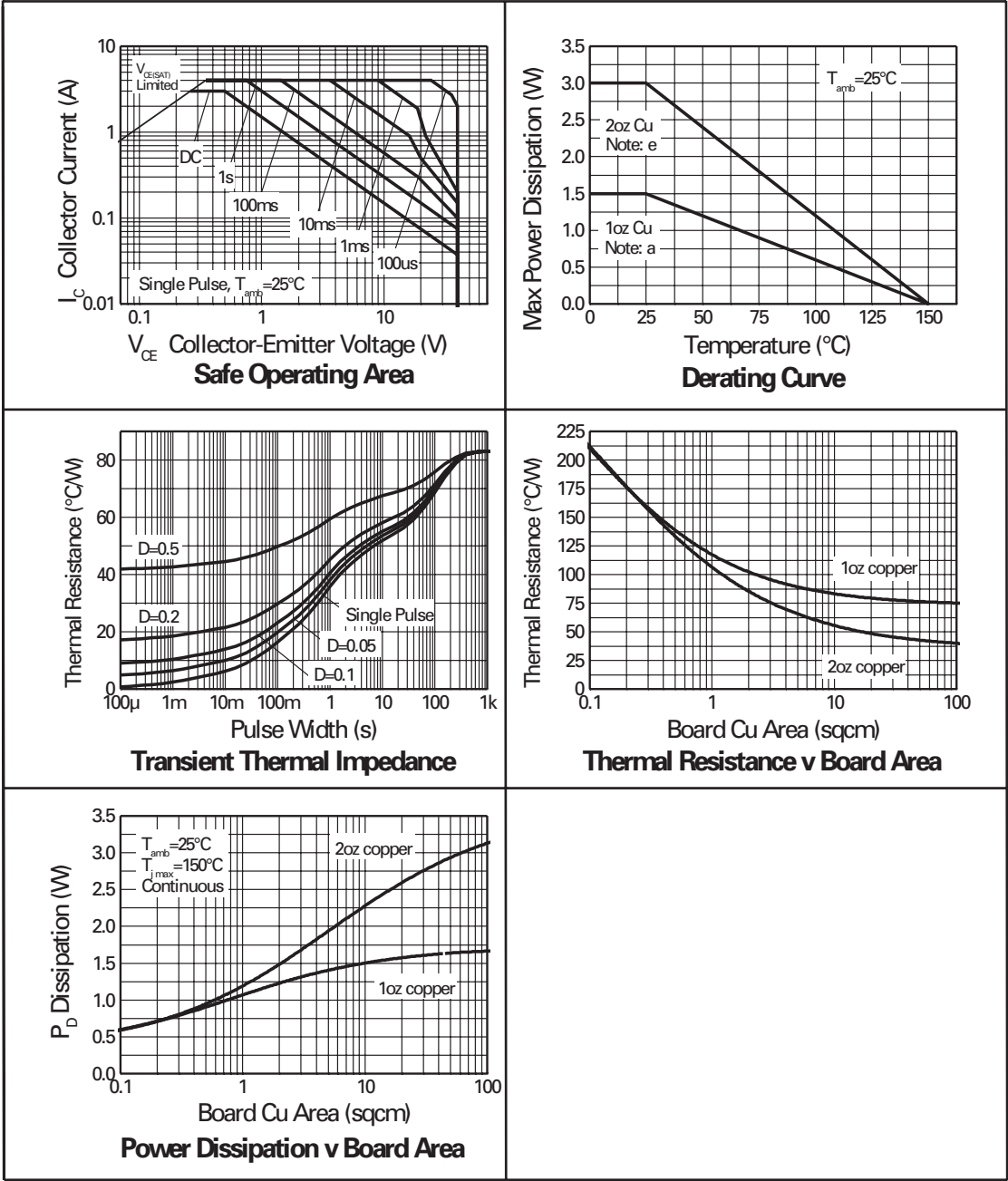
| PARAMETER               | SYMBOL          | VALUE | UNIT                 |
|-------------------------|-----------------|-------|----------------------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 83    | $^{\circ}\text{C/W}$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 51    | $^{\circ}\text{C/W}$ |
| Junction to Ambient (d) | $R_{\theta JA}$ | 125   | $^{\circ}\text{C/W}$ |
| Junction to Ambient (e) | $R_{\theta JA}$ | 42    | $^{\circ}\text{C/W}$ |

### NOTES

- (a) For a single device surface mounted on 10sq cm1oz copper on FR4 PCB in still air conditions **with all exposed pads attached**.
- (b) For a single device surface mounted on 10sq cm1oz copper on FR4 PCB in still air conditions measured at  $t \leq 5$  secs **with all exposed pads attached**.
- (c) Repetitive rating - pulse width limited by max junction temperature. refer to Transient Thermal Impedance graph.
- (d) For a single device surface mounted on 10sq cm1oz copper on FR4 PCB in still air conditions **with minimal lead connections only**.
- (e) For a single device surface mounted on 65sq cm2oz copper on FR4 PCB in still air conditions **with all exposed pads attached**.
- (f) The minimum copper dimensions required for mounting are no smaller than the exposed metal pads on the base of the device, as shown in the package dimensions data. The thermal resistance for a device mounted on 1.5mm thick FR4 board using minimum copper of 1oz weight is  $R_{\theta h}=300^{\circ}\text{C/W}$  giving a power rating of  $P_{tot}=420\text{mW}$ .

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TYPICAL CHARACTERISTICS



# ZXT3M322

## 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             | $I_{CBO}$     |      |       | -25   | nA   | $V_{CB} = -40\text{V}$                                                          |
| Emitter Cut-Off Current               | $I_{EBO}$     |      |       | -25   | nA   | $V_{EB} = -6\text{V}$                                                           |
| Collector Emitter Cut-Off Current     | $I_{CES}$     |      |       | -25   | nA   | $V_{CES} = -32\text{V}$                                                         |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |      | -25   | -40   | mV   | $I_C = -0.1\text{A}, I_B = -10\text{mA}^*$                                      |
|                                       |               |      | -150  | -220  | mV   | $I_C = -1\text{A}, I_B = -50\text{mA}^*$                                        |
|                                       |               |      | -195  | -300  | mV   | $I_C = -1.5\text{A}, I_B = -100\text{mA}^*$                                     |
|                                       |               |      | -210  | -300  | mV   | $I_C = -2\text{A}, I_B = -200\text{mA}^*$                                       |
|                                       |               |      | -260  | -370  | mV   | $I_C = -2.5\text{A}, I_B = -250\text{mA}^*$                                     |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |      | -0.97 | -1.05 | V    | $I_C = -2.5\text{A}, I_B = -250\text{mA}^*$                                     |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$  |      | -0.89 | -0.95 | V    | $I_C = -2.5\text{A}, V_{CE} = -2\text{V}^*$                                     |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 300  | 480   |       |      | $I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$                                     |
|                                       |               | 300  | 450   |       |      | $I_C = -0.1\text{A}, V_{CE} = -2\text{V}^*$                                     |
|                                       |               | 180  | 290   |       |      | $I_C = -1\text{A}, V_{CE} = -2\text{V}^*$                                       |
|                                       |               | 60   | 130   |       |      | $I_C = -1.5\text{A}, V_{CE} = -2\text{V}^*$                                     |
|                                       |               | 12   | 22    |       |      | $I_C = -3\text{A}, V_{CE} = -2\text{V}^*$                                       |
| Transition Frequency                  | $f_T$         | 150  | 190   |       | MHz  | $I_C = -50\text{mA}, V_{CE} = -10\text{V}$<br>$f = 100\text{MHz}$               |
| Output Capacitance                    | $C_{obo}$     |      | 19    | 25    | pF   | $V_{CB} = -10\text{V}, f = 1\text{MHz}$                                         |
| Turn-On Time                          | $t_{(on)}$    |      | 40    |       | ns   | $V_{CC} = -15\text{V}, I_C = -0.75\text{A}$<br>$I_{B1} = I_{B2} = -15\text{mA}$ |
| Turn-Off Time                         | $t_{(off)}$   |      | 435   |       | ns   |                                                                                 |

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

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