

# ZXTP2012Z

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## 60V PNP LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

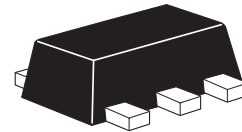
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### SUMMARY

$BV_{CEO} = -60V$  ;  $R_{SAT} = 32m\Omega$ ;  $I_C = -4.3A$

### DESCRIPTION

Packaged in the SOT89 outline this new low saturation 60V PNP transistor offers low on state losses making it ideal for use in DC-DC circuits, line switching and various driving and power management functions.



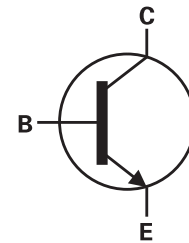
SOT89

### FEATURES

- Extremely low equivalent on-resistance;  $R_{SAT} = 32mV$  at 5A
- 4.3 amps continuous current
- Up to 15 amps peak current
- Very low saturation voltages
- Excellent gain characteristics specified up to 10 amps

### APPLICATIONS

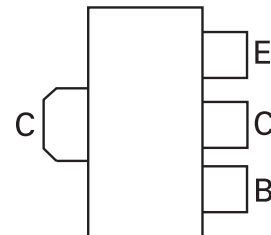
- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC-DC modules
- Backlight inverters
- Power switches
- MOSFET gate drivers



### ORDERING INFORMATION

| DEVICE      | REEL SIZE | TAPE WIDTH    | QUANTITY PER REEL |
|-------------|-----------|---------------|-------------------|
| ZXTP2012ZTA | 7"        | 12mm embossed | 1,000 units       |

### PINOUT



TOP VIEW

### DEVICE MARKING

951

# ZXTP2012Z

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER  | SYMBOL         | LIMIT       | UNIT                 |
|--|----------------|-------------|----------------------|
| Collector-base voltage                                       | $BV_{CBO}$     | -100        | V                    |
| Collector-emitter voltage                                    | $BV_{CEO}$     | -60         | V                    |
| Emitter-base voltage   | $BV_{EBO}$     | -7          | V                    |
| Continuous collector current <sup>(a)</sup>                  | $I_C$          | -4.3        | A                    |
| Peak pulse current   | $I_{CM}$       | -15         | A                    |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup> | $P_D$          | 1.5         | W                    |
| Linear derating factor                                       |                | 12          | mW/ $^\circ\text{C}$ |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup> | $P_D$          | 2.1         | W                    |
| Linear derating factor                                       |                | 16.8        | mW/ $^\circ\text{C}$ |
| Operating and storage temperature range                      | $T_j, T_{stg}$ | -55 to +150 | $^\circ\text{C}$     |

## THERMAL RESISTANCE

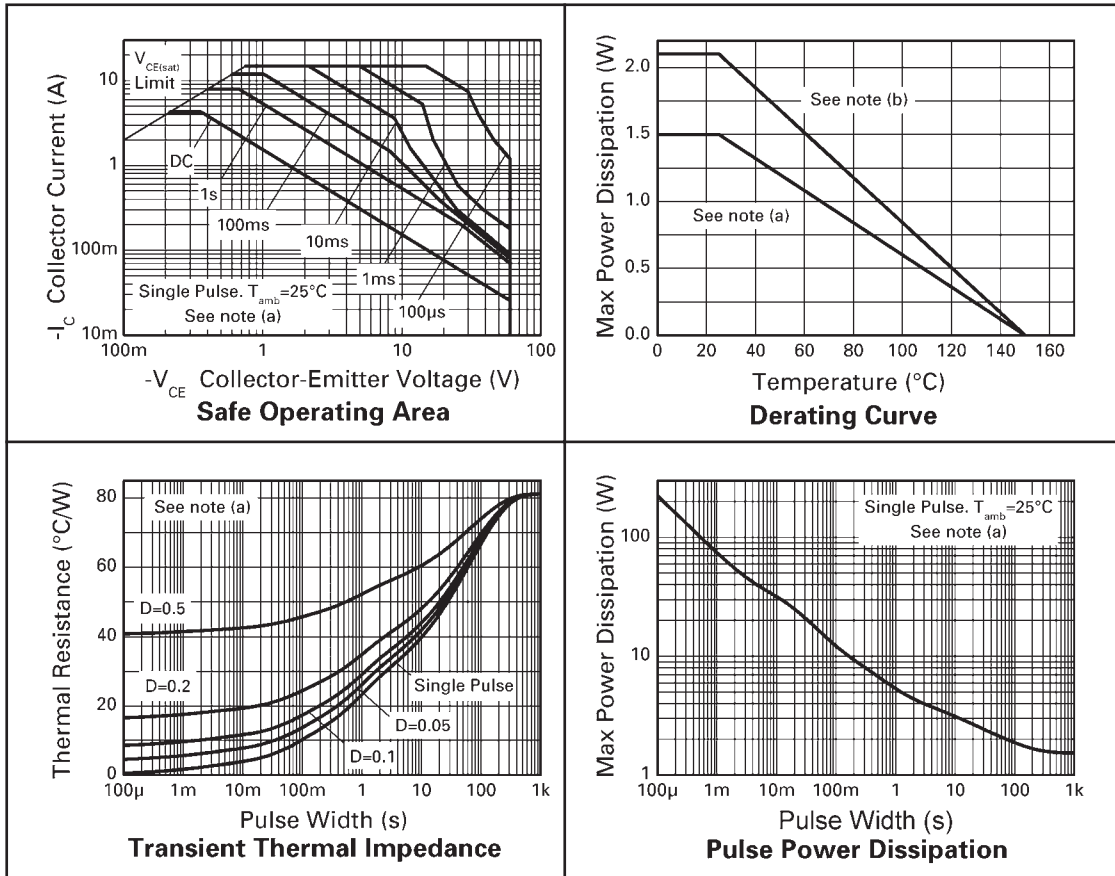
| PARAMETER                          | SYMBOL          | VALUE | UNIT                      |
|------------------------------------|-----------------|-------|---------------------------|
| Junction to ambient <sup>(a)</sup> | $R_{\theta JA}$ | 83    | $^\circ\text{C}/\text{W}$ |
| Junction to ambient <sup>(b)</sup> | $R_{\theta JA}$ | 60    | $^\circ\text{C}/\text{W}$ |

### NOTES

- (a) 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.  
(b) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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## CHARACTERISTICS



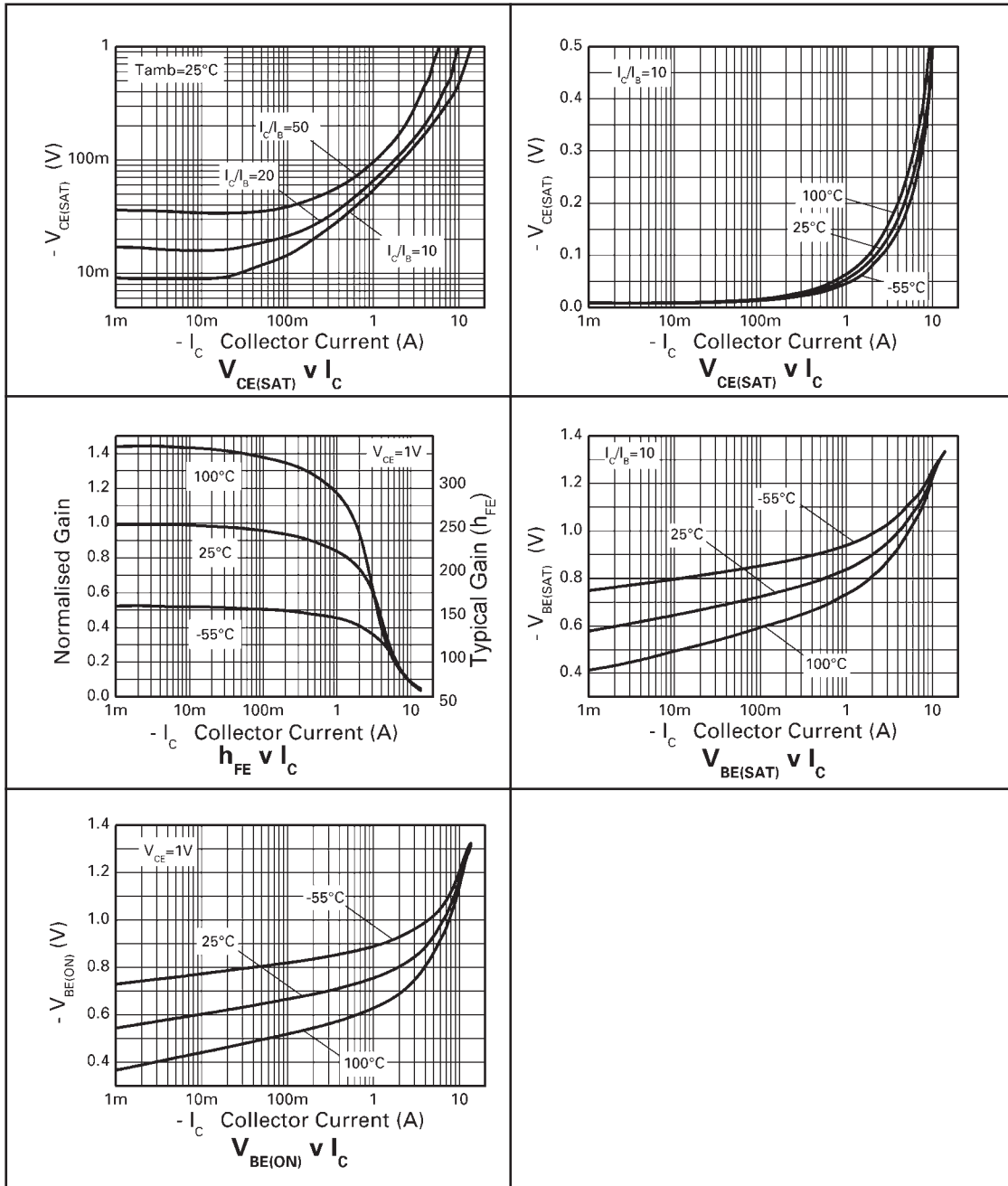
# ZXTP2012Z

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

| PARAMETER                             | SYMBOL                                | MIN.                   | TYP.                      | MAX.                       | UNIT                | CONDITIONS  |
|---------------------------------------|---------------------------------------|------------------------|---------------------------|----------------------------|---------------------|---|
| Collector-base breakdown voltage      | $BV_{CBO}$                            | -100                   | -120                      |                            | V                   | $I_C = -100\mu\text{A}$   |
| Collector-emitter breakdown voltage   | $BV_{CER}$                            | -100                   | -120                      |                            | V                   | $I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$  |
| Collector-emitter breakdown voltage   | $BV_{CEO}$                            | -60                    | -80                       |                            | V                   | $I_C = -10\text{mA}^*$  |
| Emitter-base breakdown voltage        | $BV_{EBO}$                            | -7                     | -8.1                      |                            | V                   | $I_E = -100\mu\text{A}$   |
| Collector cut-off current             | $I_{CBO}$                             |                        | <1                        | -20<br>-0.5                | nA<br>$\mu\text{A}$ | $V_{CB} = -80\text{V}$<br>$V_{CB} = -80\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$  |
| Collector cut-off current             | $I_{CER}$<br>$R \leq 1\text{k}\Omega$ |                        | <1                        | -20<br>-0.5                | nA<br>$\mu\text{A}$ | $V_{CB} = -80\text{V}$<br>$V_{CB} = -80\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$  |
| Emitter cut-off current               | $I_{EBO}$                             |                        | <1                        | -10                        | nA                  | $V_{EB} = -6\text{V}$   |
| Collector-emitter saturation voltage  | $V_{CE(SAT)}$                         |                        | -14<br>-50<br>-75<br>-160 | -20<br>-65<br>-110<br>-215 | mV                  | $I_C = -0.1\text{A}$ , $I_B = -10\text{mA}^*$<br>$I_C = -1\text{A}$ , $I_B = -100\text{mA}^*$<br>$I_C = -2\text{A}$ , $I_B = -200\text{mA}^*$<br>$I_C = -5\text{A}$ , $I_B = -500\text{mA}^*$   |
| Base-emitter saturation voltage       | $V_{BE(SAT)}$                         |                        | -950                      | -1050                      | mV                  | $I_C = -5\text{A}$ , $I_B = -500\text{mA}^*$  |
| Base-emitter turn-on voltage          | $V_{BE(ON)}$                          |                        | -840                      | -950                       | mV                  | $I_C = -5\text{A}$ , $V_{CE} = -1\text{V}^*$  |
| Static forward current transfer ratio | $H_{FE}$                              | 100<br>100<br>45<br>10 | 250<br>200<br>90<br>25    | 300                        |                     | $I_C = -10\text{mA}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -2\text{A}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -5\text{A}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -10\text{A}$ , $V_{CE} = -1\text{V}^*$ |
| Transition frequency                  | $f_T$                                 |                        | 120                       |                            | MHz                 | $I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$<br>$f = 50\text{MHz}$  |
| Output capacitance                    | $C_{OBO}$                             |                        | 48                        |                            | pF                  | $V_{CB} = -10\text{V}$ , $f = 1\text{MHz}^*$  |
| Switching times                       | $t_{ON}$<br>$t_{OFF}$                 |                        | 39<br>370                 |                            | ns                  | $I_C = -1\text{A}$ , $V_{CC} = -10\text{V}$ ,<br>$I_{B1} = I_{B2} = -100\text{mA}$  |

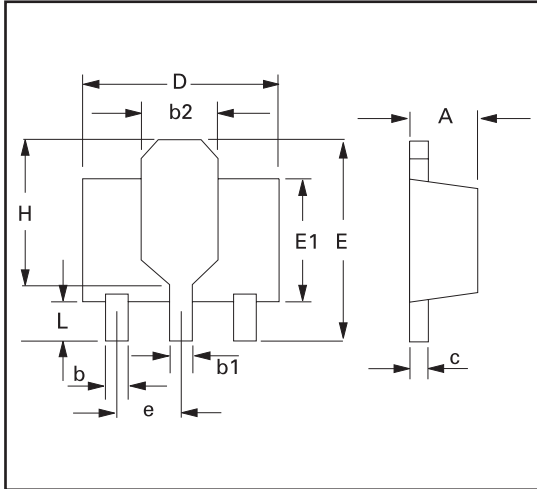
\* Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

TYPICAL CHARACTERISTICS

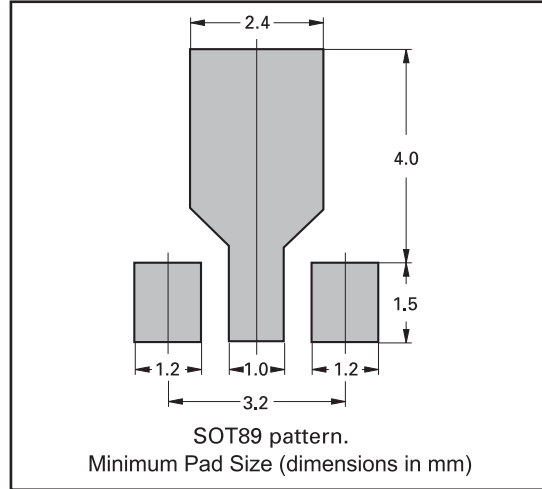


# ZXTP2012Z

## PACKAGE OUTLINE



## PAD LAYOUT DETAILS



Controlling dimensions are in millimeters. Approximate conversions are given in inches

## PACKAGE DIMENSIONS

| DIM | Millimeters |      | Inches |       | DIM | Millimeters |      | Inches |       |
|-----|-------------|------|--------|-------|-----|-------------|------|--------|-------|
|     | Min         | Max  | Min    | Max   |     | Min         | Max  | Min    | Max   |
| A   | 1.40        | 1.60 | 0.550  | 0.630 | e   | 1.40        | 1.50 | 0.055  | 0.059 |
| b   | 0.38        | 0.48 | 0.015  | 0.019 | E   | 3.75        | 4.25 | 0.150  | 0.167 |
| b1  | -           | 0.53 | -      | 0.021 | E1  | -           | 2.60 | -      | 0.102 |
| b2  | 1.50        | 1.80 | 0.060  | 0.071 | G   | 2.90        | 3.00 | 0.114  | 0.118 |
| c   | 0.28        | 0.44 | 0.011  | 0.017 | H   | 2.60        | 2.85 | 0.102  | 0.112 |
| D   | 4.40        | 4.60 | 0.173  | 0.181 | -   | -           | -    | -      | -     |

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