

# ZXTN2010G

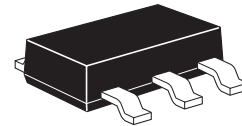
## 60V NPN MEDIUM POWER LOW SATURATION TRANSISTOR IN SOT223

### SUMMARY

$BV_{CEO} = 60V$  :  $R_{SAT} = 35m\Omega$ ;  $I_C = 6A$

### DESCRIPTION

Packaged in the SOT223 outline this new low saturation 60V NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.



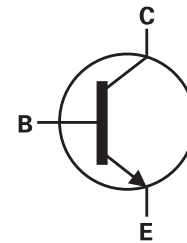
SOT223

### FEATURES

- Extremely low equivalent on-resistance;  $R_{SAT} = 35mV$  at 6A
- 6 amps continuous current
- Up to 20 amps peak current
- Very low saturation voltages
- Excellent  $h_{FE}$  characteristics up to 10 amps

### APPLICATIONS

- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC Modules
- Backlight Inverters

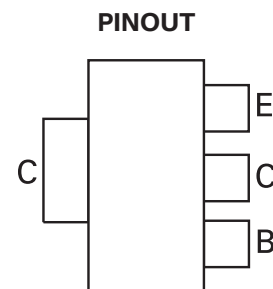


### ORDERING INFORMATION

| DEVICE      | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|------------|-------------------|
| ZXTN2010GTA | 7"        | 12mm       | 1000 units        |
| ZXTN2010GTC | 13"       | embossed   | 4000 units        |

### DEVICE MARKING

ZXTN  
2010



TOP VIEW

# ZXTN2010G

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                    | SYMBOL         | LIMIT       | UNIT                 |
|--------------------------------------------------------------|----------------|-------------|----------------------|
| Collector-base voltage                                       | $BV_{CBO}$     | 150         | V                    |
| Collector-emitter voltage                                    | $BV_{CEO}$     | 60          | V                    |
| Emitter-base voltage                                         | $BV_{EBO}$     | 7           | V                    |
| Continuous collector current <sup>(a)</sup>                  | $I_C$          | 6           | A                    |
| Peak pulse current                                           | $I_{CM}$       | 20          | A                    |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup> | $P_D$          | 3.0         | W                    |
| Linear derating factor                                       |                | 24          | mW/ $^\circ\text{C}$ |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup> | $P_D$          | 1.6         | W                    |
| Linear derating factor                                       |                | 12.8        | 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> | $R_{\theta JA}$ | 42    | $^\circ\text{C}/\text{W}$ |

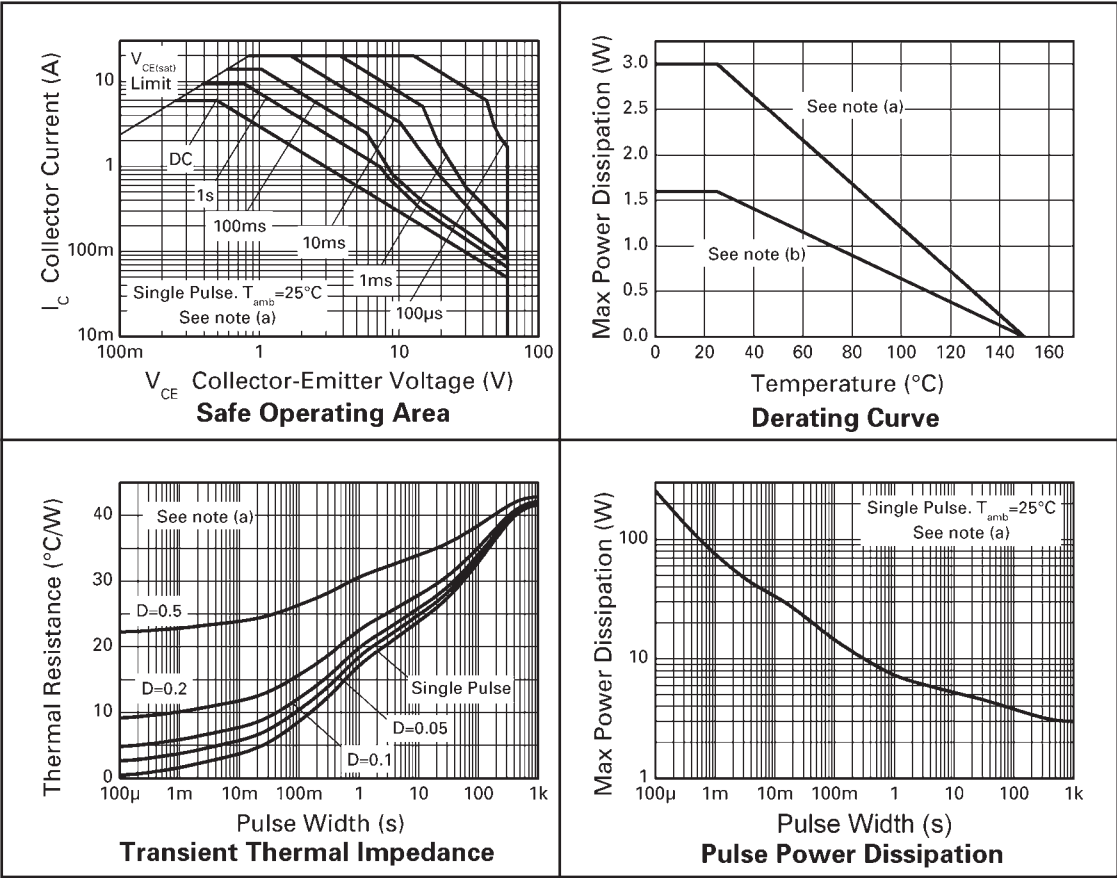
### NOTES

(a) For a device surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz 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.

# ZXTN2010G

## CHARACTERISTICS



# ZXTN2010G

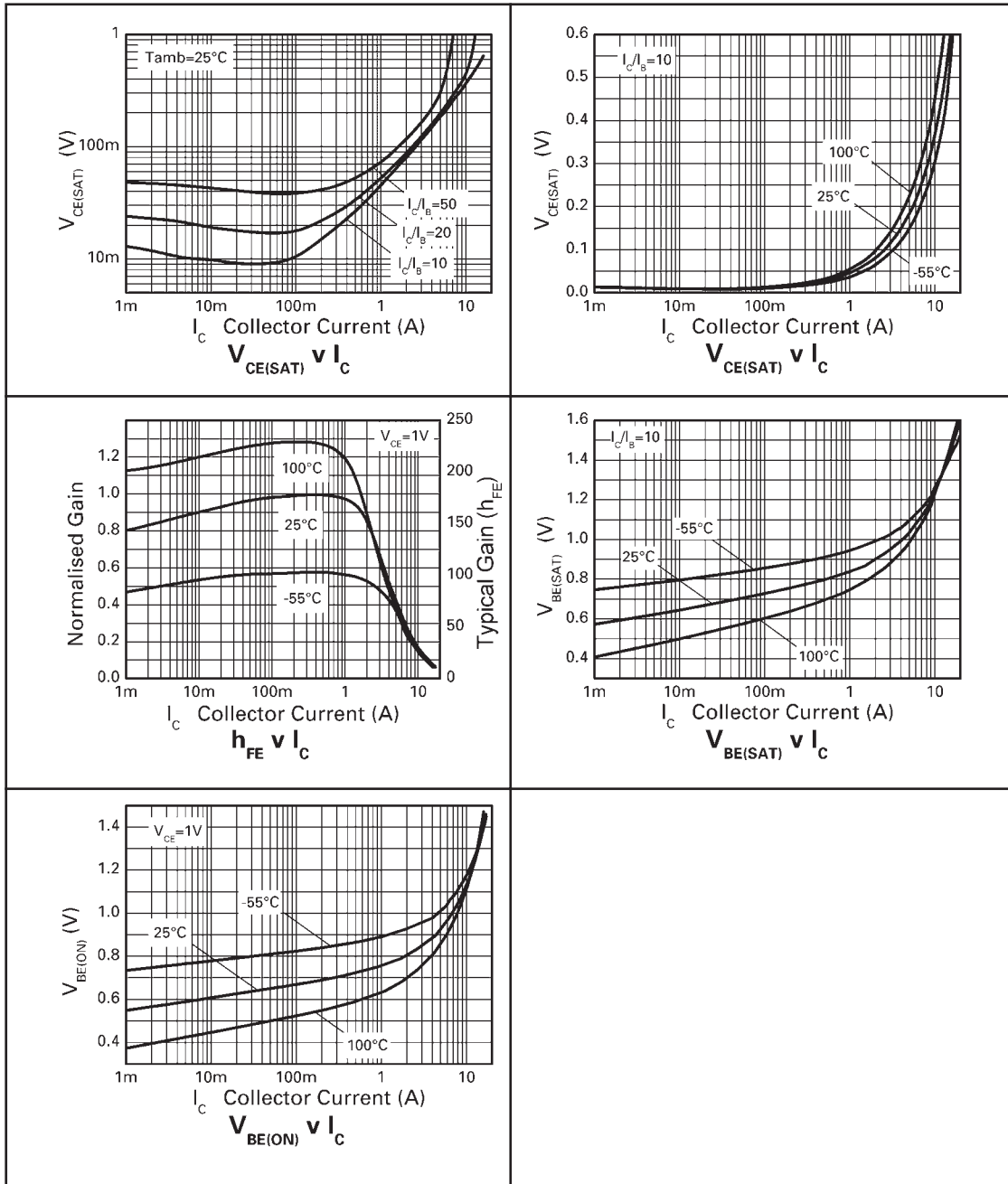
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| PARAMETER                             | SYMBOL                                | MIN.                   | TYP.                         | MAX.                         | UNIT                       | CONDITIONS                                                                                                                                                                                                    |
|---------------------------------------|---------------------------------------|------------------------|------------------------------|------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-base breakdown voltage      | $BV_{CBO}$                            | 150                    | 190                          |                              | V                          | $I_C=100\mu\text{A}$                                                                                                                                                                                          |
| Collector-emitter breakdown voltage   | $BV_{CER}$                            | 150                    | 190                          |                              | 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             | $I_{CBO}$                             |                        |                              | 20<br>0.5                    | nA<br>$\mu\text{A}$        | $V_{CB}=120\text{V}$<br>$V_{CB}=120\text{V}, T_{amb}=100^{\circ}\text{C}$                                                                                                                                     |
| Collector cut-off current             | $I_{CER}$<br>$R \leq 1\text{k}\Omega$ |                        |                              | 20<br>0.5                    | nA<br>$\mu\text{A}$        | $V_{CB}=120\text{V}$<br>$V_{CB}=120\text{V}, T_{amb}=100^{\circ}\text{C}$                                                                                                                                     |
| Emitter cut-off current               | $I_{EBO}$                             |                        |                              | 10                           | nA                         | $V_{EB}=6\text{V}$                                                                                                                                                                                            |
| Collector-emitter saturation voltage  | $V_{CE(SAT)}$                         |                        | 20<br>45<br>50<br>100<br>210 | 30<br>60<br>70<br>135<br>260 | mV<br>mV<br>mV<br>mV<br>mV | $I_C=100\text{mA}$ , $I_B=5\text{mA}^*$<br>$I_C=1\text{A}$ , $I_B=100\text{mA}^*$<br>$I_C=1\text{A}$ , $I_B=50\text{mA}^*$<br>$I_C=2\text{A}$ , $I_B=50\text{mA}^*$<br>$I_C=6\text{A}$ , $I_B=300\text{mA}^*$ |
| Base-emitter saturation voltage       | $V_{BE(SAT)}$                         |                        | 1000                         | 1100                         | mV                         | $I_C=6\text{A}$ , $I_B=300\text{mA}^*$                                                                                                                                                                        |
| Base-emitter turn-on voltage          | $V_{BE(ON)}$                          |                        | 940                          | 1050                         | mV                         | $I_C=6\text{A}$ , $V_{CE}=1\text{V}^*$                                                                                                                                                                        |
| Static forward current transfer ratio | $H_{FE}$                              | 100<br>100<br>55<br>20 | 200<br>200<br>105<br>40      | 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                  | $f_T$                                 |                        | 130                          |                              | MHz                        | $I_C=100\text{mA}$ , $V_{CE}=10\text{V}$<br>$f=50\text{MHz}$                                                                                                                                                  |
| Output capacitance                    | $C_{OBO}$                             |                        | 31                           |                              | pF                         | $V_{CB}=10\text{A}$ , $f=1\text{MHz}^*$                                                                                                                                                                       |
| Switching times                       | $t_{ON}$<br>$t_{OFF}$                 |                        | 42<br>760                    |                              | ns                         | $I_C=1\text{A}$ , $V_{CC}=10\text{V}$ ,<br>$I_{B1}=I_{B2}=100\text{mA}$                                                                                                                                       |

### NOTES

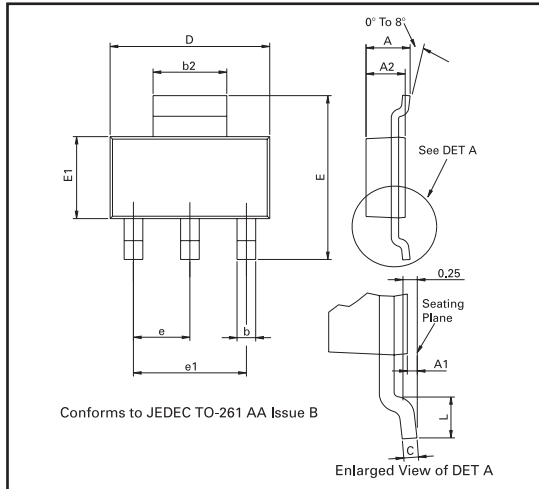
(1) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## TYPICAL CHARACTERISTICS

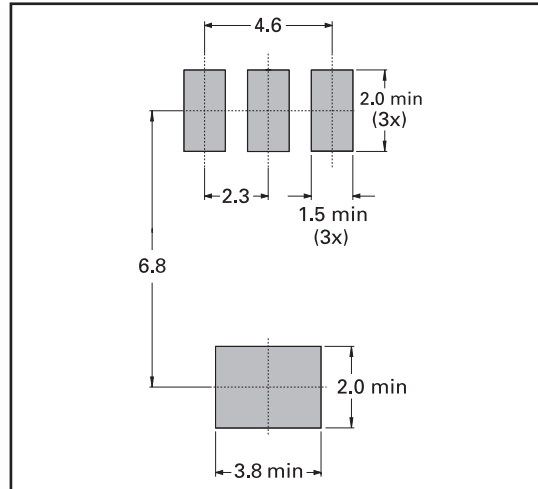


# ZXTN2010G

## 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   | -           | 1.80 | -      | 0.071 | e   | 2.30 BSC    |      | 0.0905 BSC |       |
| A1  | 0.02        | 0.10 | 0.0008 | 0.004 | e1  | 4.60 BSC    |      | 0.181 BSC  |       |
| b   | 0.66        | 0.84 | 0.026  | 0.033 | E   | 6.70        | 7.30 | 0.264      | 0.287 |
| b2  | 2.90        | 3.10 | 0.114  | 0.122 | E1  | 3.30        | 3.70 | 0.130      | 0.146 |
| C   | 0.23        | 0.33 | 0.009  | 0.013 | L   | 0.90        | -    | 0.355      | -     |
| D   | 6.30        | 6.70 | 0.248  | 0.264 | -   | -           | -    | -          | -     |

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