

# ZXTN2038F

## SOT23 80 volt NPN silicon planar medium power transistor

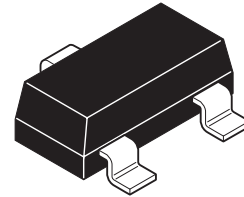
### Summary

$V_{(BR)CEV} > 80V$

$V_{(BR)CEO} > 60V$

$I_{c(cont)} = 1A$

$V_{ce(sat)} < 500mV @ 1A$



### Complementary type

ZXTP2039F

### Description

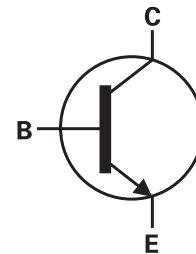
This transistor combines high gain, high current operation and low saturation voltage making it ideal for power MOSFET gate driving and low loss power switching.

### Features

- Low saturation voltage for reduced power dissipation
- 1 to 2 amp high current capability
- Pb-free
- SOT23 package

### Applications

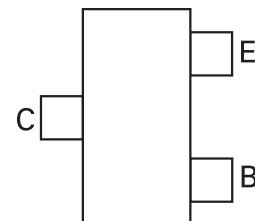
- Power MOSFET gate driving
- Low loss power switching



### Ordering information

| Device      | Reel size | Tape width | Quantity per reel |
|-------------|-----------|------------|-------------------|
| ZXTN2038FTA | 7"        | 8mm        | 3,000             |
| ZXTN2038FTC | 13"       | 8mm        | 10,000            |

Pin out - top view



### Device marking

P38

# ZXTN2038F

## Absolute maximum ratings

| Parameter                                    | Symbol         | Limit      | Unit             |
|--|----------------|------------|------------------|
| Collector-base voltage                       | $V_{CBO}$      | 80         | V                |
| Collector-emitter voltage                    | $V_{CEV}$      | 80         | V                |
| Collector-emitter voltage                    | $V_{CEO}$      | 60         | V                |
| Emitter-base voltage                         | $V_{EBO}$      | 5.0        | V                |
| Peak pulse current                           | $I_{CM}$       | 2          | A                |
| Continuous collector current*                | $I_C$          | 1          | A                |
| Peak base current                            | $I_{BM}$       | 1          | A                |
| Power dissipation @ $T_A=25^\circ\text{C}^*$ | $P_D$          | 350        | mW               |
| Operating and storage temperature            | $T_j; T_{stg}$ | 55 to +150 | $^\circ\text{C}$ |

### NOTES:

\* For a device surface mounted on a 15mm x 15mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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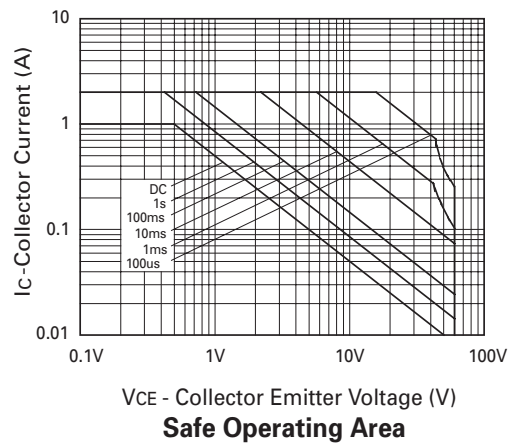
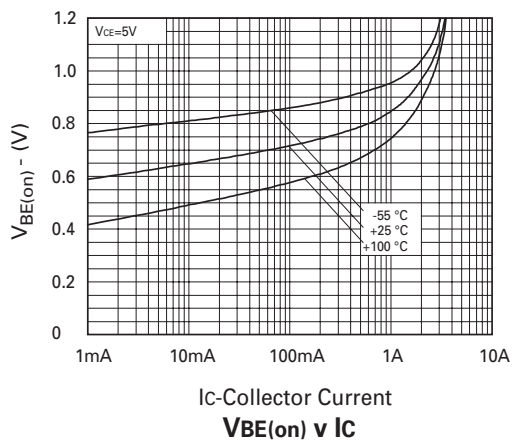
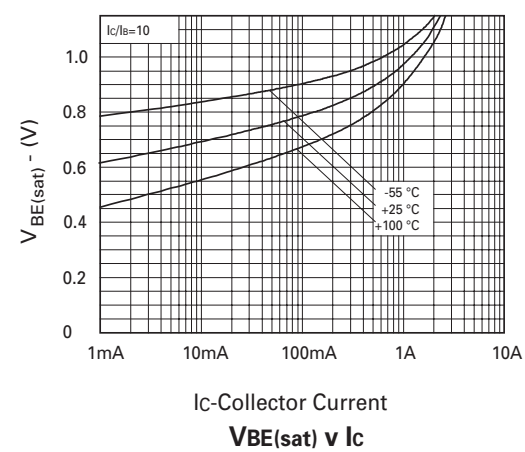
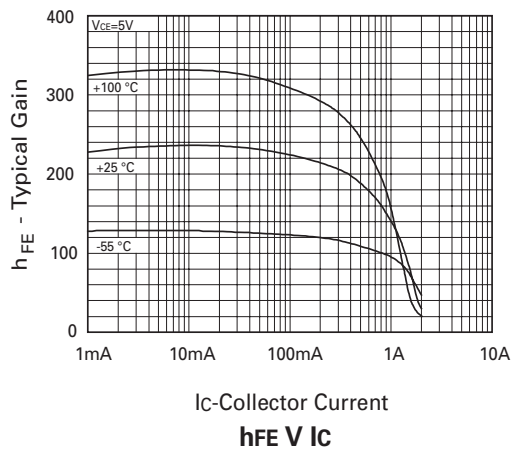
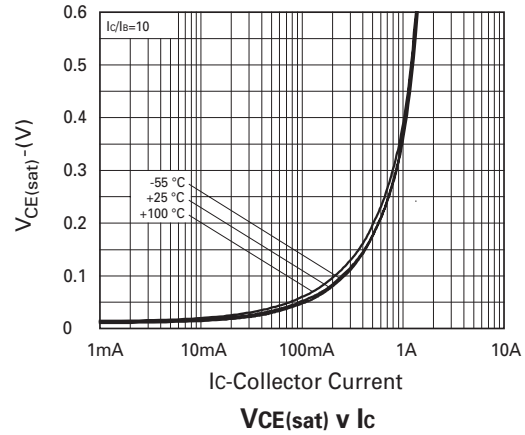
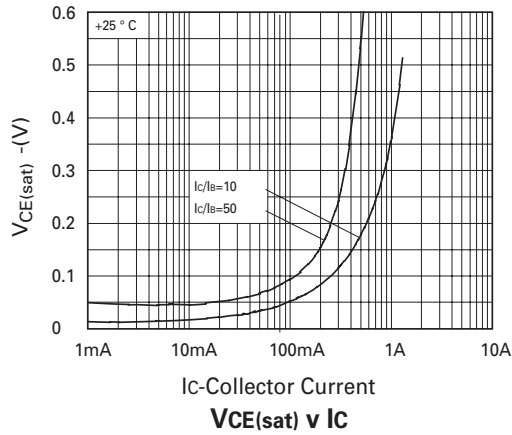
## Electrical characteristics (@T<sub>AMB</sub> = 25°C)

| Parameter                             | Symbol        | Min.                   | Max.               | Unit        | Conditions   |
|---------------------------------------|---------------|------------------------|--------------------|-------------|--|
| Collector-base breakdown voltage      | $V_{(BR)CBO}$ | 80                     |                    | V           | $I_C=100\mu A$   |
| Collector-emitter breakdown voltage   | $V_{(BR)CEV}$ | 80                     |                    | V           | $I_C=100\mu A$ ,<br>$0.3V > V_{BE} > -1V$  |
| Collector-emitter breakdown voltage   | $V_{(BR)CEO}$ | 60                     |                    | V           | $I_C=10mA^*$   |
| Emitter-base breakdown voltage        | $V_{(BR)EBO}$ | 5                      |                    | V           | $I_E=100\mu A$   |
| Collector-emitter cut-off current     | $I_{CES}$     |                        | 100                | nA          | $V_{CE}=60V$   |
| Collector-base cut-off current        | $I_{CBO}$     |                        | 100                | nA          | $V_{CB}=60V$   |
| Emitter-base cut-off current          | $I_{EBO}$     |                        | 100                | nA          | $V_{EB}=4V$  |
| Static forward current transfer ratio | $h_{FE}$      | 100<br>100<br>80<br>30 | 300                |             | $I_C=1mA, V_{CE}=5V$<br>$I_C=500mA, V_{CE}=5V^*$<br>$I_C=1A, V_{CE}=5V^*$<br>$I_C=2A, V_{CE}=5V^*$ |
| Collector-emitter saturation voltage  | $V_{CE(sat)}$ |                        | 0.2<br>0.25<br>0.5 | V<br>V<br>V | $I_C=100mA, I_B=2mA^*$<br>$I_C=500mA, I_B=50mA^*$<br>$I_C=1A, I_B=100mA^*$                         |
| Base-emitter saturation voltage       | $V_{BE(sat)}$ |                        | 1.1                | V           | $I_C=1A, I_B=100mA^*$  |
| Base-emitter turn-on voltage          | $V_{BE(on)}$  |                        | 1.0                | V           | $I_C=1A, V_{CE}=5V^*$  |
| Transition frequency                  | $f_T$         | 150                    |                    |             | $I_C=50mA, V_{CE}=10V$<br>$f=100MHz$   |
| Output capacitance                    | $C_{obo}$     |                        | 10                 | pF          | $V_{CB}=10V, f=1MHz$   |

### NOTES:

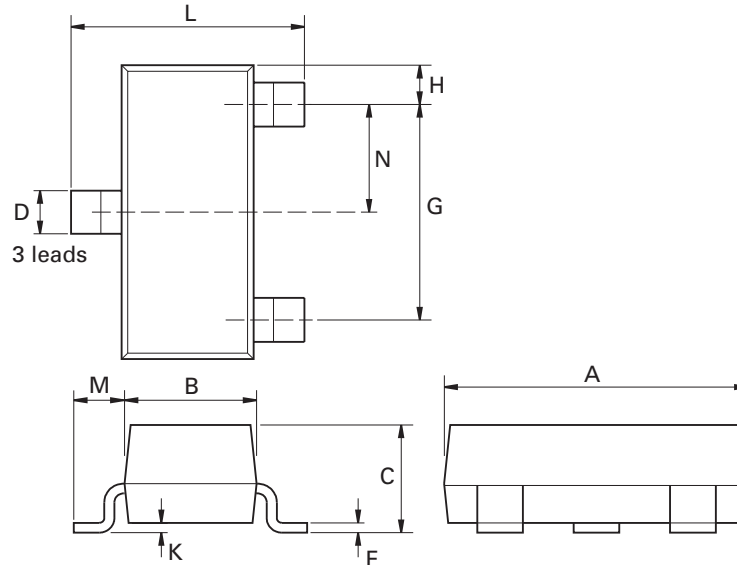
\* Measured under pulsed conditions. Pulse width=300 $\mu$ S. Duty cycle  $\leq$ 2%  
Spice parameter data is available upon request for this device

## Typical characteristics



# ZXTN2038F

## Packaging details - SOT23



## Package dimensions

Dimensions in inches are control dimensions, dimensions in millimeters are approximate.

| Dim. | Millimeters |      | Inches     |        | Dim. | Millimeters |      | Inches      |        |
|------|-------------|------|------------|--------|------|-------------|------|-------------|--------|
|      | Min.        | Max. | Min.       | Max.   |      | Min.        | Max. | Max.        | Max.   |
| A    | 2.67        | 3.05 | 0.105      | 0.120  | H    | 0.33        | 0.51 | 0.013       | 0.020  |
| B    | 1.20        | 1.40 | 0.047      | 0.055  | K    | 0.01        | 0.10 | 0.0004      | 0.004  |
| C    | -           | 1.10 | -          | 0.043  | L    | 2.10        | 2.50 | 0.083       | 0.0985 |
| D    | 0.37        | 0.53 | 0.015      | 0.021  | M    | 0.45        | 0.64 | 0.018       | 0.025  |
| F    | 0.085       | 0.15 | 0.0034     | 0.0059 | N    | 0.95 Nom.   |      | 0.0375 Nom. |        |
| G    | 1.90 Nom.   |      | 0.075 Nom. |        | -    | -           | -    | -           | -      |

### Europe

Zetex GmbH  
Streitfeldstraße 19  
D-81673 München  
Germany

Telefon: (49) 89 45 49 49 0  
Fax: (49) 89 45 49 49 49  
europe.sales@zetex.com

### Americas

Zetex Inc  
700 Veterans Memorial Highway  
Hauppauge, NY 11788  
USA

Telephone: (1) 631 360 2222  
Fax: (1) 631 360 8222  
usa.sales@zetex.com

### Asia Pacific

Zetex (Asia Ltd)  
3701-04 Metroplaza Tower 1  
Hing Fong Road, Kwai Fong  
Hong Kong

Telephone: (852) 26100 611  
Fax: (852) 24250 494  
asia.sales@zetex.com

### Corporate Headquarters

Zetex Semiconductors plc  
Zetex Technology Park, Chadderton  
Oldham, OL9 9LL  
United Kingdom

Telephone (44) 161 622 4444  
Fax: (44) 161 622 4446  
hq@zetex.com

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