

TF3400B N-Channel 30-V(D-S) MOSFET

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 30V           | 0.032Ω@ 10V     | 5A    |
|               | 0.035Ω@ 4.5V    |       |
|               | 0.045Ω@ 2.5V    |       |

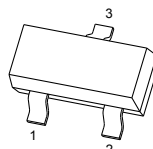
General FEATURE

- TrenchFET Power MOSFET
- Lead free product is acquired
- Surface mount package

APPLICATION

- Load Switch for Portable Devices
- DC/DC Converter

SOT-23



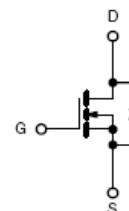
- 1.GATE  
2.SOURCE  
3.DRAIN

MARKING



\*w: week code

Equivalent Circuit



Absolute Maximum Ratings  $T_A=25^{\circ}\text{C}$  unless otherwise noted

| Parameter                              | Symbol         | Maximum    | Units |
|----------------------------------------|----------------|------------|-------|
| Drain-Source Voltage                   | $V_{DS}$       | 30         | V     |
| Gate-Source Voltage                    | $V_{GS}$       | ±12        | V     |
| Continuous Drain Current <sup>A</sup>  | $I_D$          | 5.0        | A     |
| Pulsed Drain Current <sup>B</sup>      | $I_{DM}$       | 22         |       |
| Power Dissipation <sup>A</sup>         | $P_D$          | 1.0        | W     |
| Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 to 150 | °C    |

Thermal Characteristics

| Parameter                                | Symbol          | Typ | Max | Units |
|------------------------------------------|-----------------|-----|-----|-------|
| Maximum Junction-to-Ambient <sup>A</sup> | $R_{\theta JA}$ | 65  | 90  | °C/W  |
| Maximum Junction-to-Ambient <sup>A</sup> |                 | 85  | 125 |       |
| Maximum Junction-to-Lead <sup>C</sup>    | $R_{\theta JL}$ | 43  | 60  | °C/W  |



# SHENZHEN TUOFENG SEMICONDUCTOR TECHNOLOGY CO.,LTD

## SOT-23 Plastic-Encapsulate MOSFETS

TF3400B

Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Symbol                      | Parameter                             | Conditions                                                                                | Min | Typ  | Max | Units |
|-----------------------------|---------------------------------------|-------------------------------------------------------------------------------------------|-----|------|-----|-------|
| <b>STATIC PARAMETERS</b>    |                                       |                                                                                           |     |      |     |       |
| BV <sub>DSS</sub>           | Drain-Source Breakdown Voltage        | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V                                                | 30  |      |     | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V                                                 |     |      | 1   | μA    |
| I <sub>GSS</sub>            | Gate-Body leakage current             | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V                                                |     |      | 100 | nA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =250μA                                    | 0.6 | 0.8  | 1.0 | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =5V                                                | 30  |      |     | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A                                                |     | 32   | 40  | mΩ    |
|                             |                                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.0A                                               |     | 35   | 45  | mΩ    |
|                             |                                       | V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.0A                                               |     | 45   | 60  | mΩ    |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =5.0A                                                 | 10  | 15   |     | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                                   |     | 0.71 | 1.2 | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |                                                                                           |     |      | 2.5 | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |                                                                                           |     |      |     |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz                                         |     | 820  |     | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |                                                                                           |     | 99   |     | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |                                                                                           |     | 77   |     | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                          |     | 1.2  | 3.6 | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |                                                                                           |     |      |     |       |
| Q <sub>g</sub>              | Total Gate Charge                     | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =15V, I <sub>D</sub> =5.0A                         |     | 9.7  | 12  | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |                                                                                           |     | 1.6  |     | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |                                                                                           |     | 3.1  |     | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =2.7Ω,<br>R <sub>GEN</sub> =3Ω |     | 3.3  | 5   | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |                                                                                           |     | 4.8  | 7   | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |                                                                                           |     | 26.3 | 40  | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |                                                                                           |     | 4.1  | 6   | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =5A, dI/dt=100A/μs                                                         |     | 16   | 20  | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =5A, dI/dt=100A/μs                                                         |     | 8.9  | 12  | nC    |

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.

The value in any given application depends on the user's specific board design. The current rating is based on the ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

D: The static characteristics in Figures 1 to 6,12,14 are obtained using 80μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The SOA curve provides a single pulse rating.

Rev 4 : June 2005

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

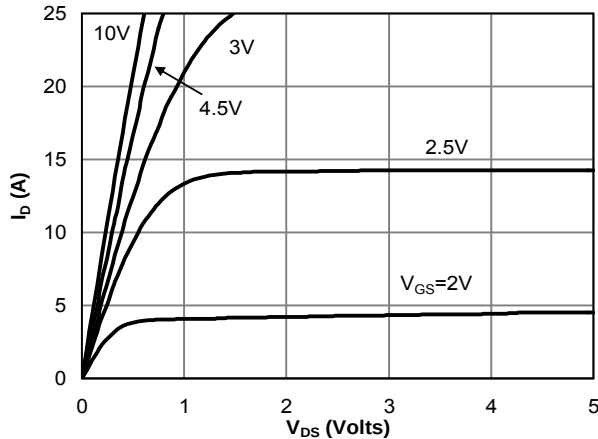


Fig 1: On-Region Characteristics

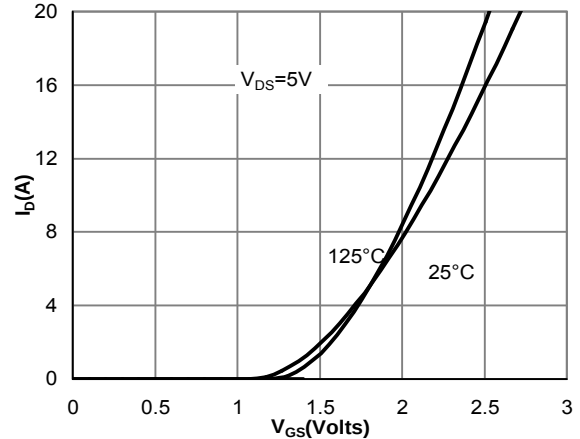


Figure 2: Transfer Characteristics

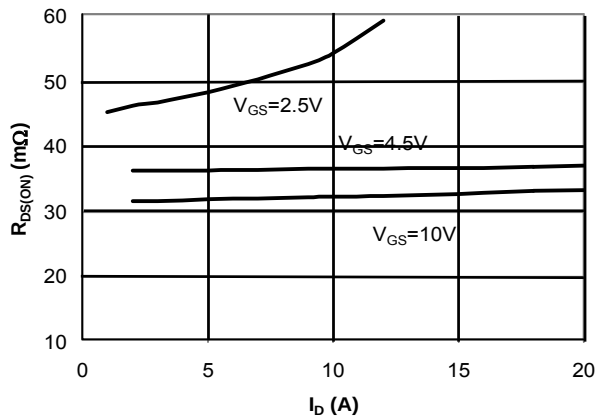


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

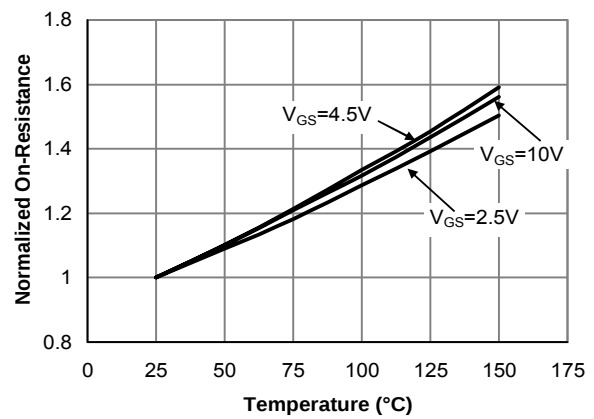


Figure 4: On-Resistance vs. Junction Temperature

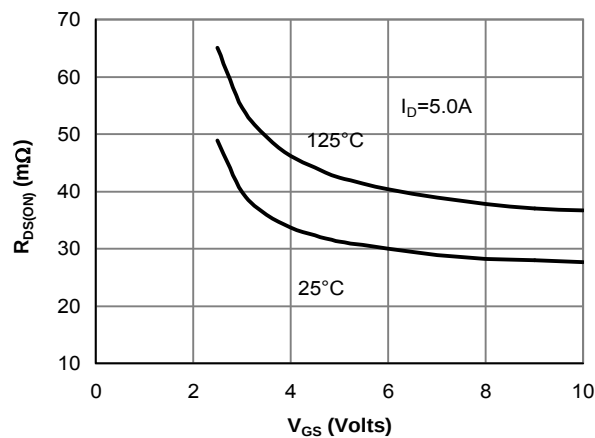


Figure 5: On-Resistance vs. Gate-Source Voltage

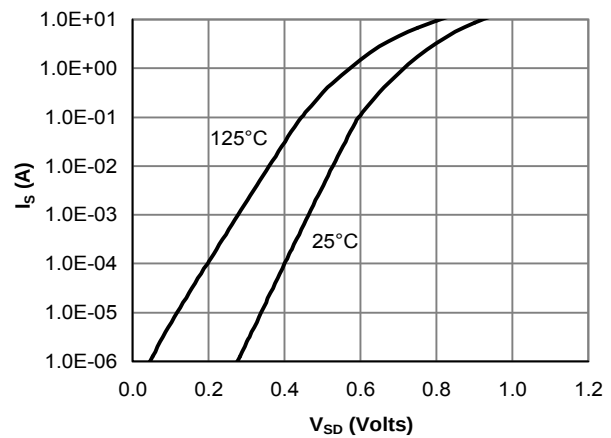
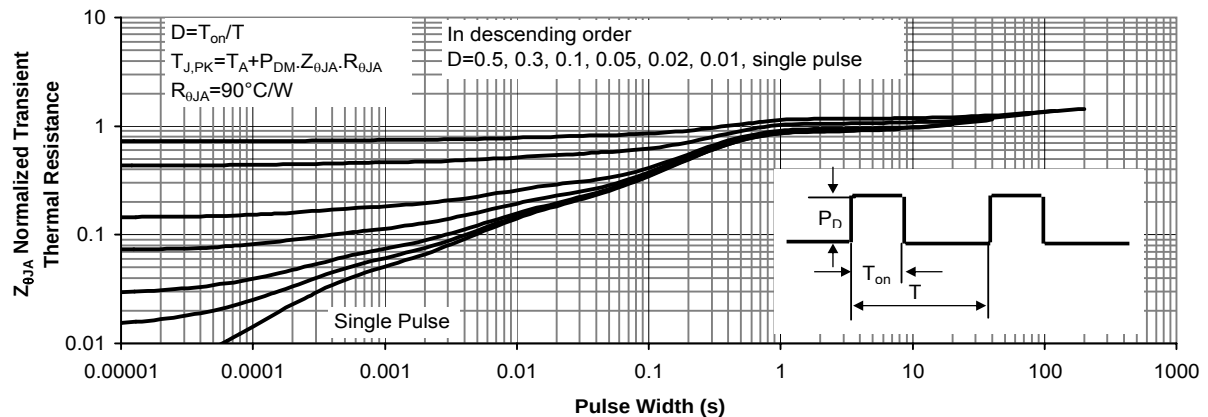
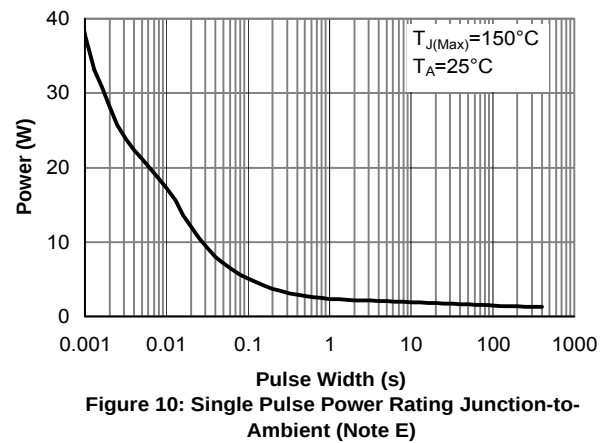
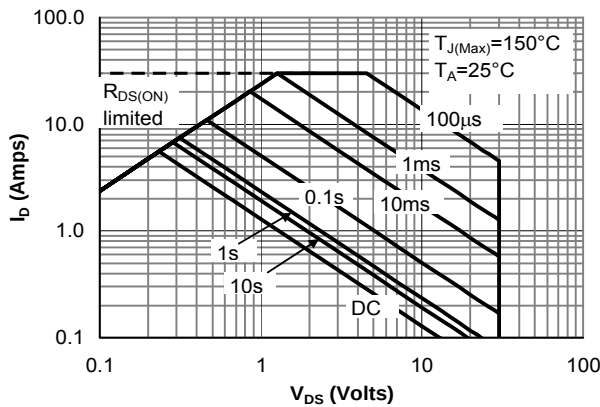
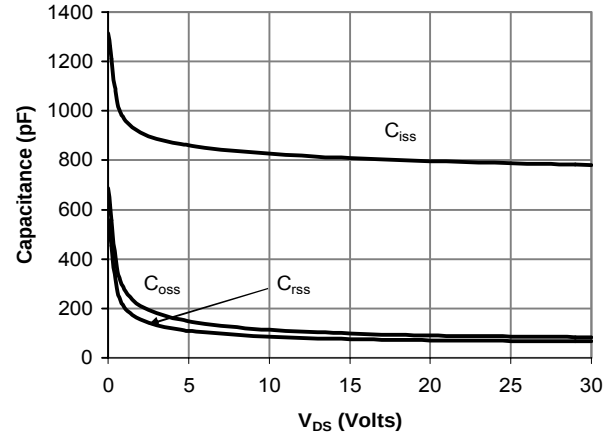
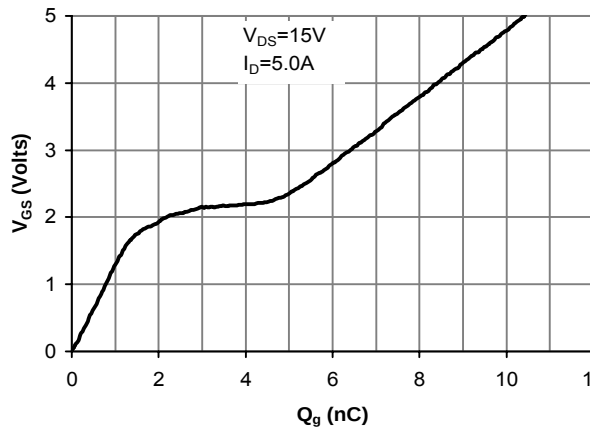
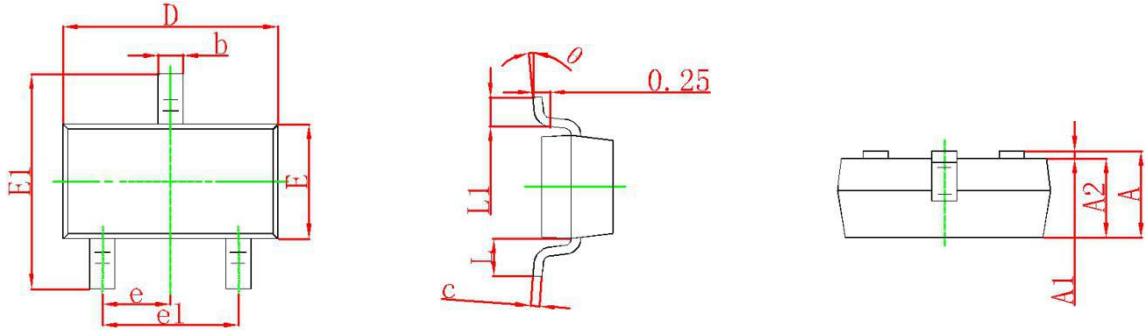


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

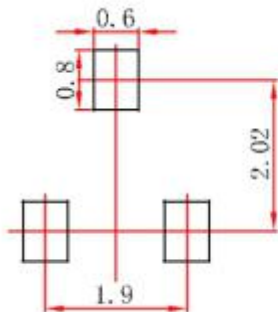


## SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-23 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.