

TF2333 P-Channel 12-V(D-S) MOSFET

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| -15V | 0.026Ω@-4.5V | -6.0A |
| | 0.033Ω@-2.5V | |
| | 0.055Ω@-1.8V | |

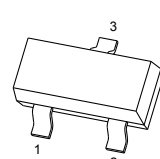
General FEATURE

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

APPLICATION

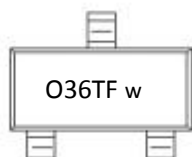
- Load Switch for Portable Devices
- DC/DC Converter

SOT-23-3L



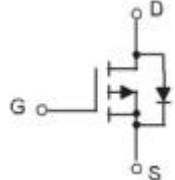
1.GATE
2.SOURCE
3.DRAIN

MARKING



*w: week code

Equivalent Circuit



Maximum ratings (T_a=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|-----------|------|
| Drain-Source Voltage | V_{DS} | -15 | V |
| Gate-Source Voltage | V_{GS} | ±12 | |
| Continuous Drain Current | I_D | -6.0 | A |
| Pulsed Drain Current | I_{DM} | -20 | |
| Continuous Source-Drain Diode Current | I_S | -1.4 | |
| Maximum Power Dissipation | P_D | 1 | W |
| Thermal Resistance from Junction to Ambient(t ≤5s) | $R_{\theta JA}$ | 69 | °C/W |
| Junction Temperature | T_J | 150 | °C |
| Storage Temperature | T_{stg} | -55 ~+150 | |



SHENZHEN TUOFENG SEMICONDUCTOR TECHNOLOGY CO.,LTD
SOT-23-3L Plastic-Encapsulate MOSFETS

TF2333

MOSFET ELECTRICAL CHARACTERISTICS

T_a =25 °C unless otherwise specified

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|--|----------------------|---|------|-------|-------|-------|
| Static | | | | | | |
| Drain-source breakdown voltage | V _{(BR)DSS} | V _{GS} = 0V, I _D =-250μA | -15 | | | V |
| Gate-source threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250μA | -0.4 | -0.7 | -1 | |
| Gate-source leakage | I _{GSS} | V _{DS} =0V, V _{GS} =±10 V | | | ±100 | nA |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =-12V, V _{GS} =0V | | | -1 | μA |
| Drain-source on-state resistance ^a | R _{DS(on)} | V _{GS} =-4.5V, I _D =-6.0A | | 0.023 | 0.026 | Ω |
| | | V _{GS} =-2.5V, I _D =-5.0A | | 0.030 | 0.033 | |
| | | V _{GS} =-1.8V, I _D =-3.0A | | 0.045 | 0.055 | |
| Forward transconductance ^a | g _{fs} | V _{DS} =-5V, I _D =-5.0A | | 17.0 | - | S |
| Dynamic^b | | | | | | |
| Input capacitance | C _{iss} | V _{DS} =-6V, V _{GS} =0V, f =1MHz | | 1100 | | pF |
| Output capacitance | C _{oss} | | | 390 | | |
| Reverse transfer capacitance | C _{rss} | | | 300 | | |
| Total gate charge | Q _g | V _{DS} =-6V, V _{GS} =-4.5V, I _D =-5.0A | | 11.5 | | nC |
| Gate-source charge | Q _{gs} | | | 1.5 | | |
| Gate-drain charge | Q _{gd} | | | 3.2 | | |
| Gate resistance | R _g | f =1MHz | 1.9 | | 19 | Ω |
| Turn-on delay time | t _{d(on)} | V _{DD} =-6V, I _D =-4.0A R _L =6Ω, V _{GEN} =-4.5V, R _g =6Ω | | 25.0 | | ns |
| Rise time | t _r | | | 45.0 | | |
| Turn-off delay time | t _{d(off)} | | | 72.0 | | |
| Fall time | t _f | | | 60.0 | | |
| Drain-source body diode characteristics | | | | | | |
| Continuous source-drain diode current | I _S | T _C =25°C | | | -1.0 | A |
| Pulse diode forward current ^a | I _{SM} | | | | -20 | |
| Body diode voltage | V _{SD} | I _S =-1.0A | | -0.8 | -1.2 | V |

Notes :

- a.Pulse Test : Pulse Width < 300μs, Duty Cycle ≤2%.
- b.Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

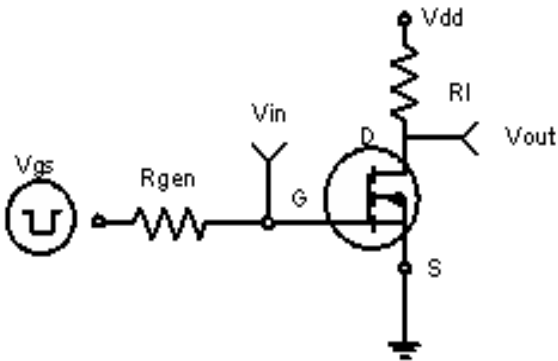


Figure 1: Switching Test Circuit

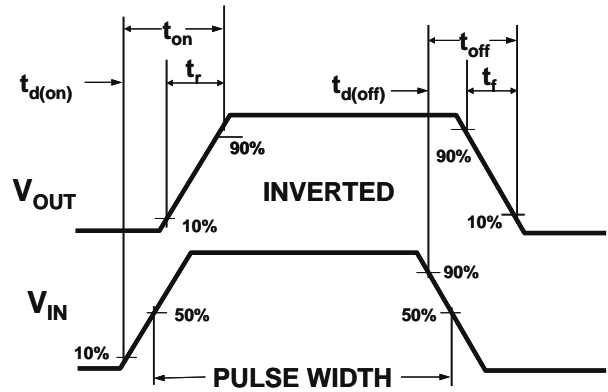
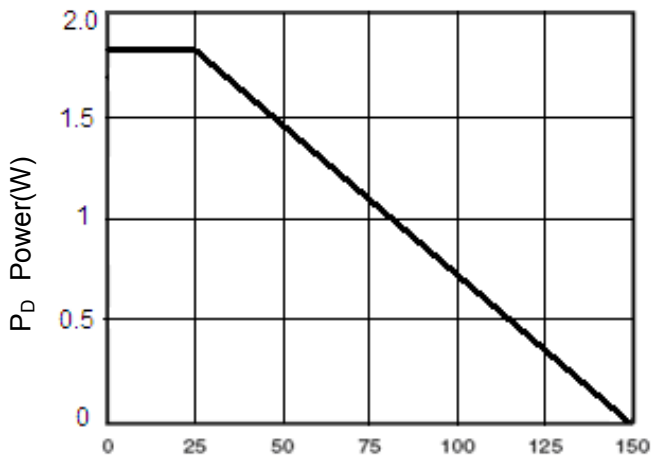
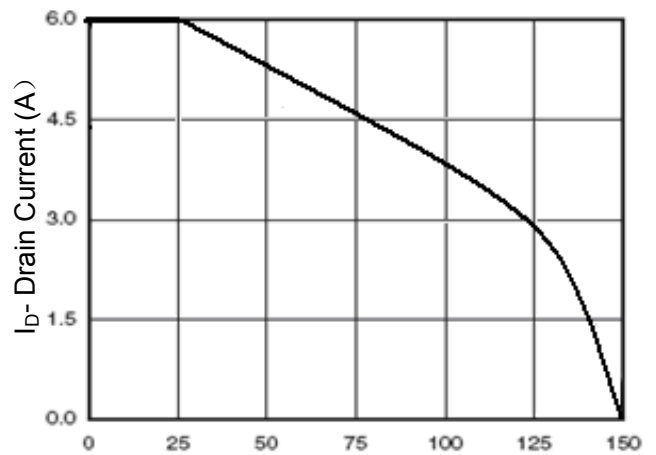


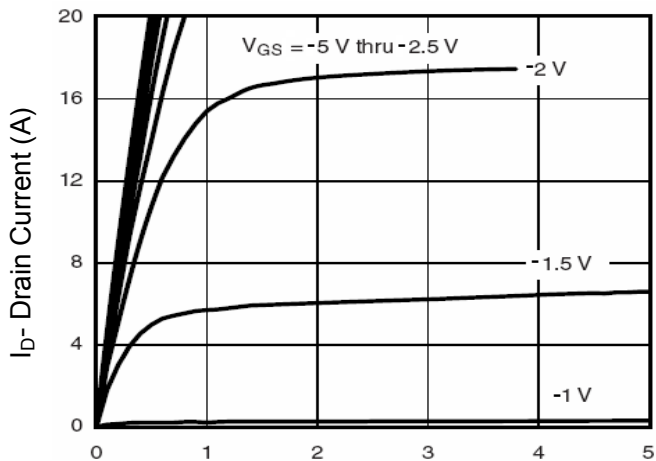
Figure 2: Switching Waveforms



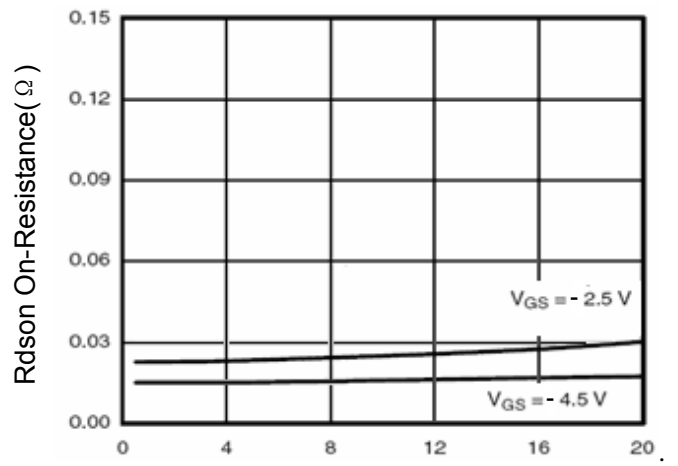
T_J-Junction Temperature(°C)
Figure 3 Power Dissipation



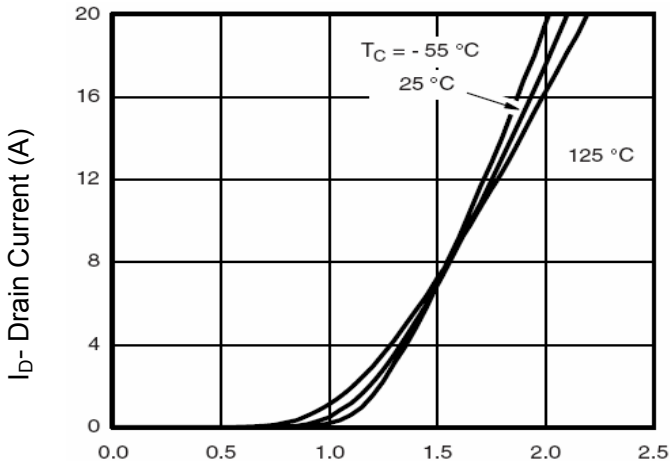
T_J-Junction Temperature(°C)
Figure 4 Drain Current



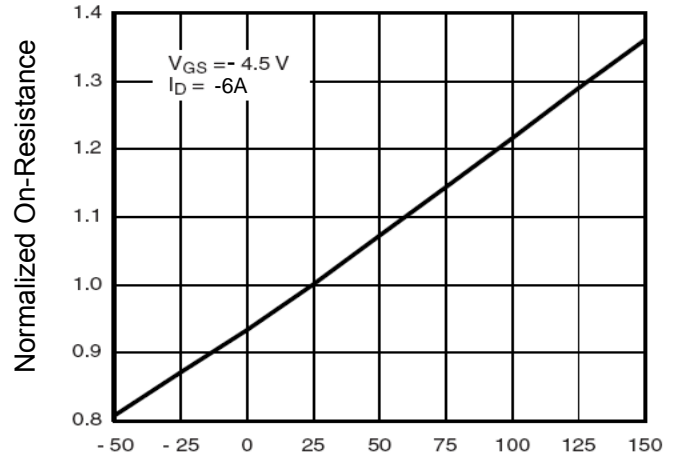
V_{ds} Drain-Source Voltage (V)
Figure 5 Output Characteristics



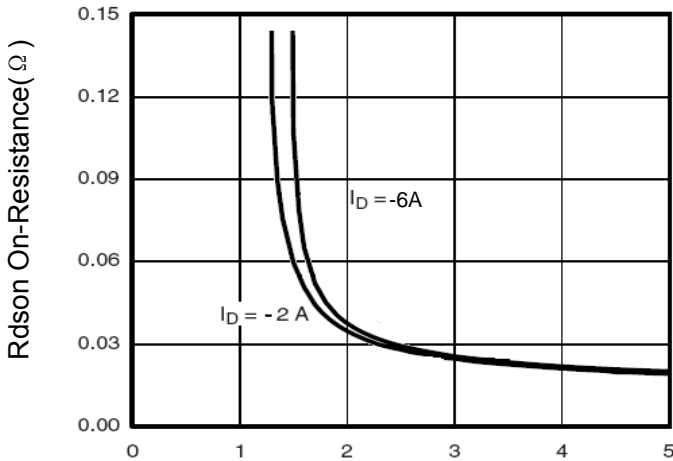
I_D- Drain Current (A)
Figure 6 Drain-Source On-Resistance



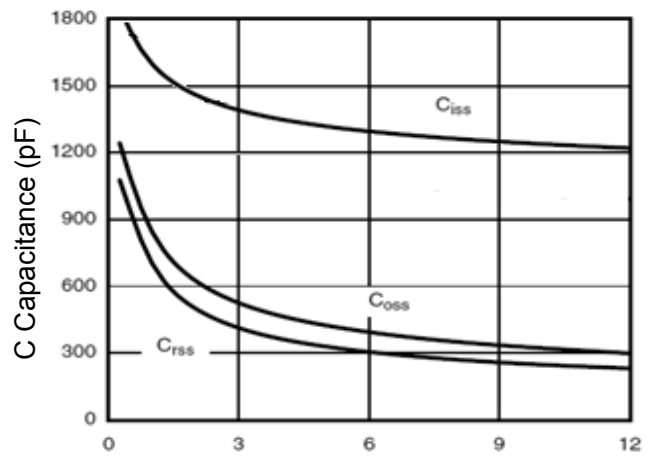
Vgs Gate-Source Voltage (V)
Figure 7 Transfer Characteristics



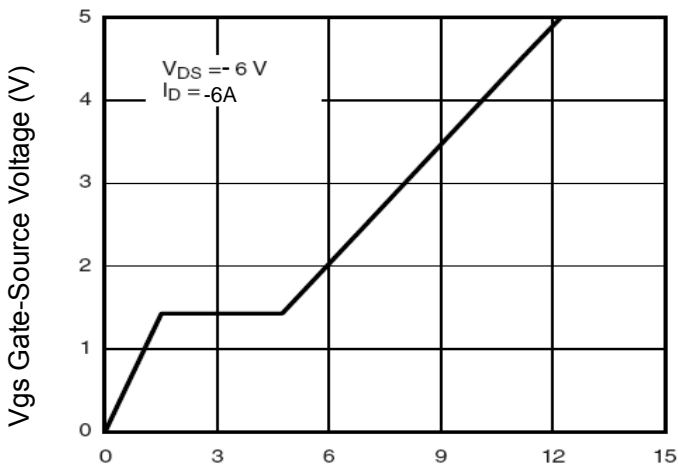
T_J -Junction Temperature($^\circ\text{C}$)
Figure 8 Drain-Source On-Resistance



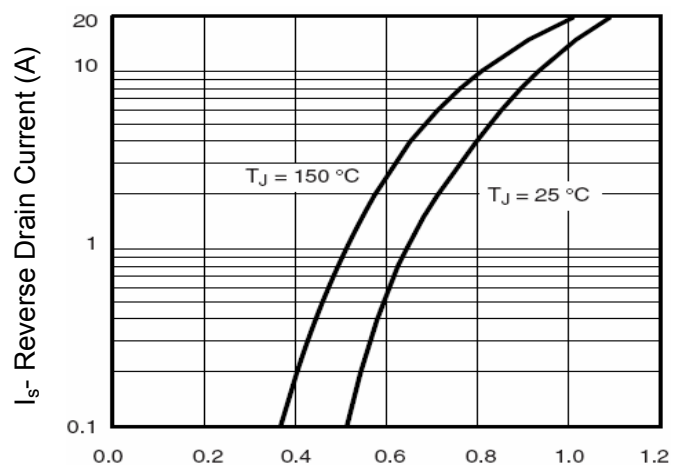
Vgs Gate-Source Voltage (V)
Figure 9 Rdson vs Vgs



Vds Drain-Source Voltage (V)
Figure 10 Capacitance vs Vds



Qg Gate Charge (nC)
Figure 11 Gate Charge



Vsd Source-Drain Voltage (V)
Figure 12 Source- Drain Diode Forward

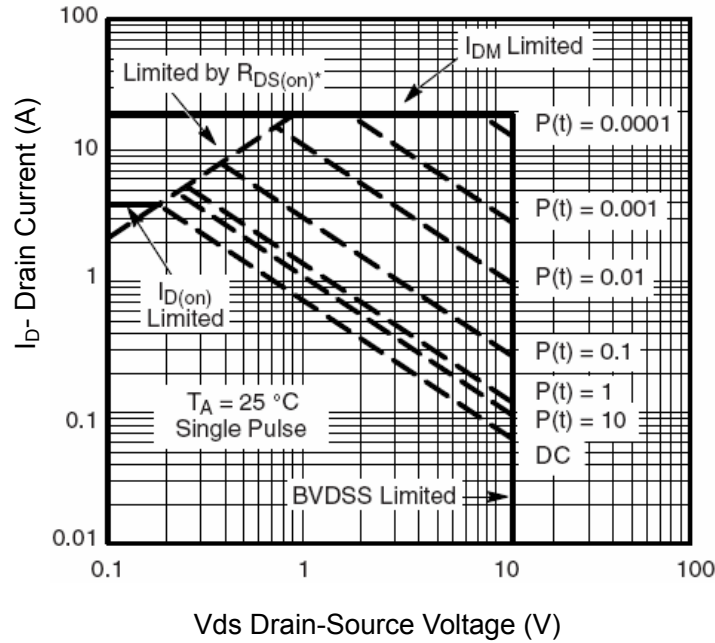


Figure 13 Safe Operation Area

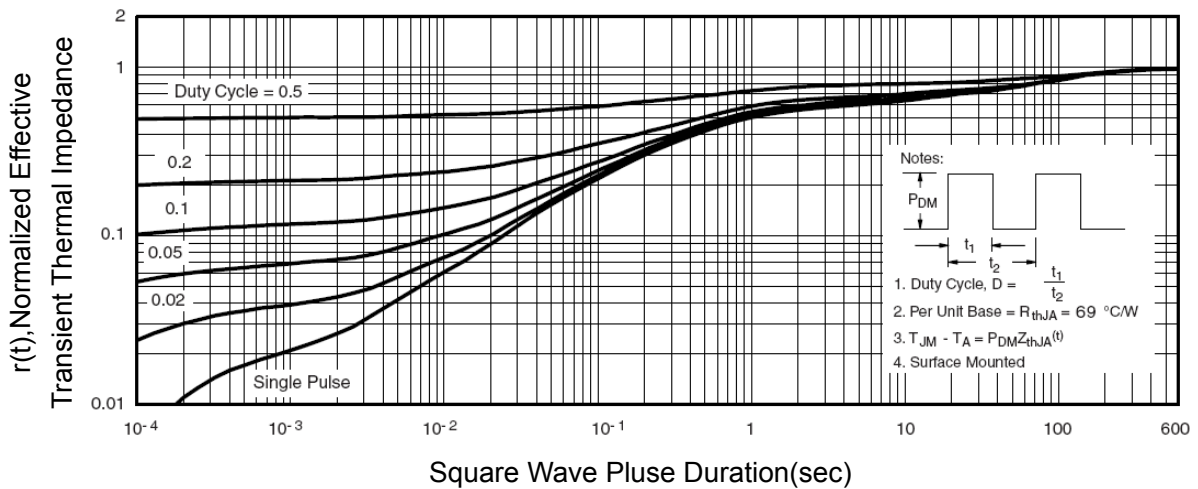
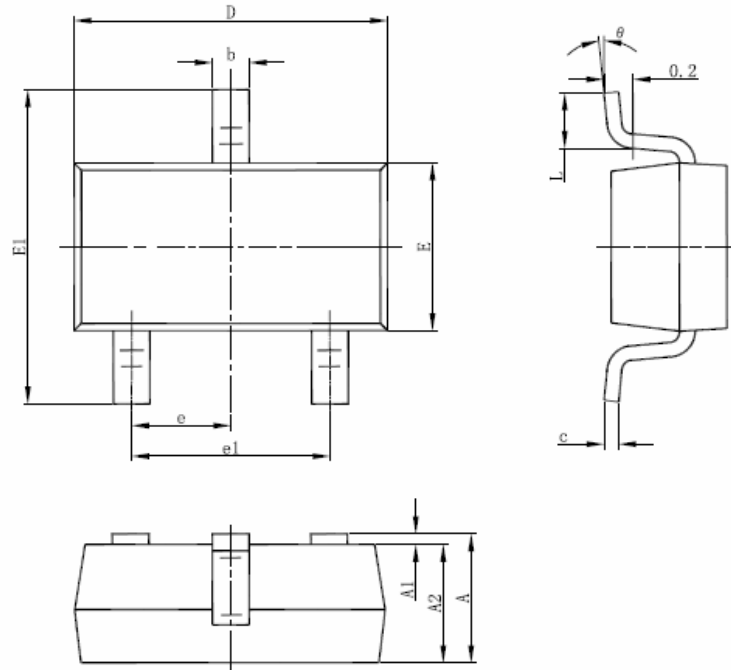


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23-3L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.