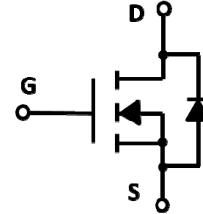


N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- V_{DS} 60V
- I_D 20A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <43mohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <47 mohm
- 100% UIS Tested
- 100% ∇V_{DS} Tested

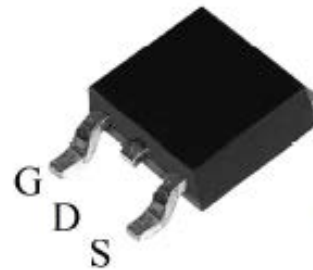


General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

- DC-DC Converters
- Power management functions
- Backlighting



TO-252

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

| Parameter | | Symbol | Limit | Unit |
|--|-------------------------|-----------------|----------|---------------------------|
| Drain-source Voltage | | V_{DS} | 60 | V |
| Gate-source Voltage | | V_{GS} | ± 20 | V |
| Drain Current | $T_C=25^\circ\text{C}$ | I_D | 20 | A |
| | $T_C=100^\circ\text{C}$ | | 14 | |
| Pulsed Drain Current ^A | | I_{DM} | 60 | A |
| Total Power Dissipation | $T_C=25^\circ\text{C}$ | P_D | 34 | W |
| | $T_C=100^\circ\text{C}$ | | 17 | |
| Single Pulse Avalanche Energy ^B | | E_{AS} | 20 | mJ |
| Thermal Resistance Junction-to-Case ^C | | $R_{\theta JC}$ | 4.4 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | | T_J, T_{STG} | -55~+175 | $^\circ\text{C}$ |

■ Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|--|----------------------|-----|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D =250μA | 60 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V | T _J =25°C | | 1 | μA |
| | | | T _J =55°C | | 5 | |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} = ±20V, V _{DS} =0V | | | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =250μA | 1.0 | 1.5 | 2.5 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} = 10V, I _D =20A | | 34 | 43 | mΩ |
| | | V _{GS} = 4.5V, I _D =10A | | 36 | 47 | |
| Diode Forward Voltage | V _{SD} | I _S =10A, V _{GS} =0V | | 0.8 | 1.2 | V |
| Maximum Body-Diode Continuous Current | I _S | | | | 20 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =30V, V _{GS} =0V, f=1MHz | | 800 | | pF |
| Output Capacitance | C _{oss} | | | 68 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 36 | | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{GS} =10V, V _{DS} =30V, I _D =10A | | 15 | | nC |
| Gate-Source Charge | Q _{gs} | | | 2.4 | | |
| Gate-Drain Charge | Q _{gd} | | | 2.5 | | |
| Reverse Recovery Charge | Q _{rr} | I _F =20A, di/dt=500A/us | | 23 | | |
| Reverse Recovery Time | t _{rr} | | | 45 | | |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =10V, V _{DD} =30V, I _D =2A, R _L =1Ω R _{GEN} =3Ω | | 5 | | ns |
| Turn-on Rise Time | t _r | | | 39 | | |
| Turn-off Delay Time | t _{D(off)} | | | 19 | | |
| Turn-off fall Time | t _f | | | 7 | | |

Typical Performance Characteristics

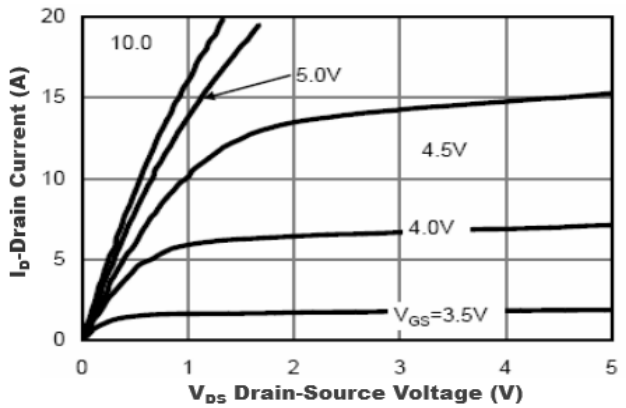


Figure1. Output Characteristics

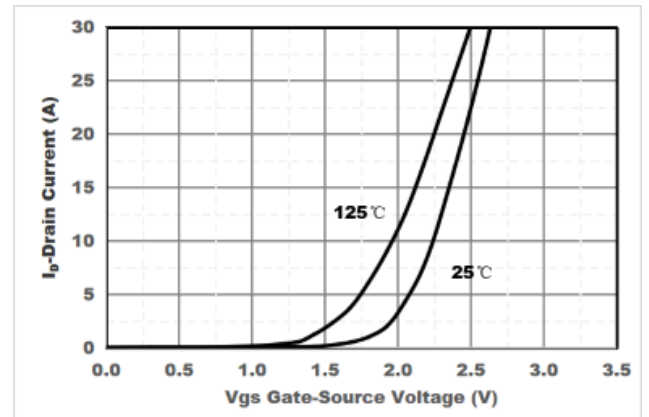


Figure2. Transfer Characteristics

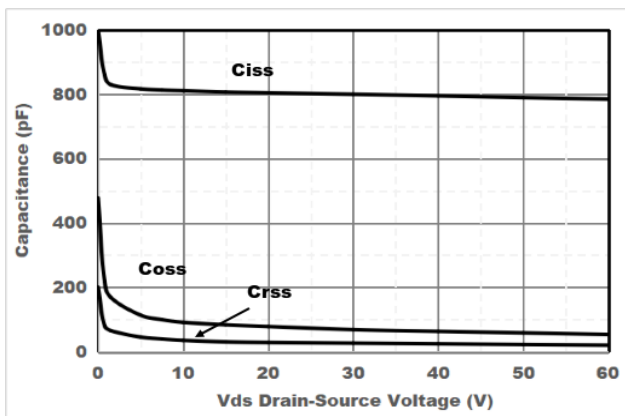


Figure3. Capacitance Characteristics

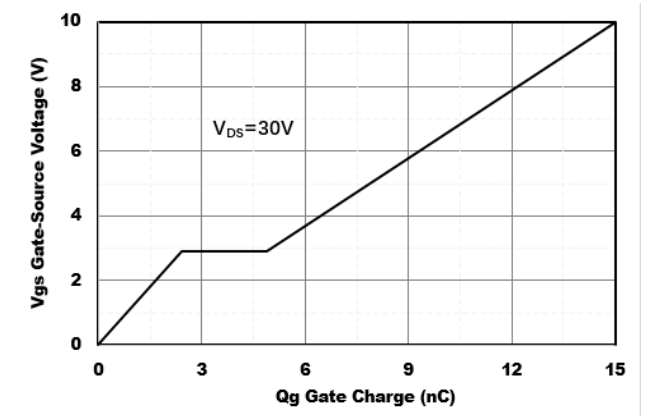


Figure4. Gate Charge

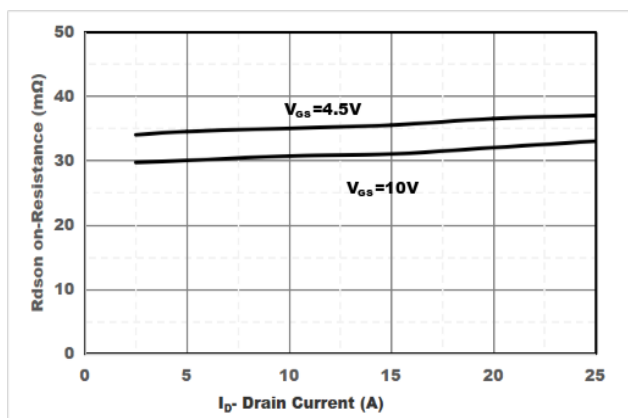


Figure5. Drain-Source on Resistance

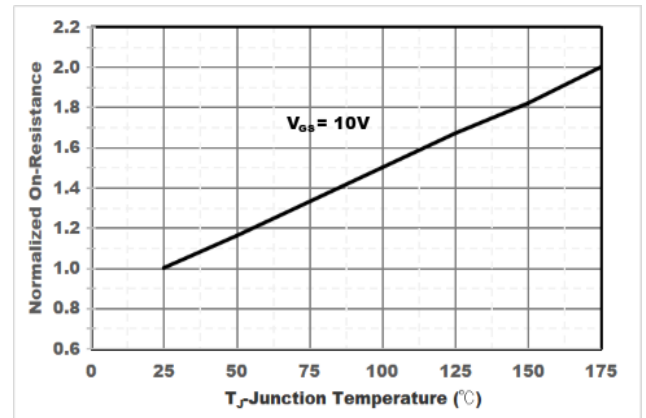


Figure6. Drain-Source on Resistance

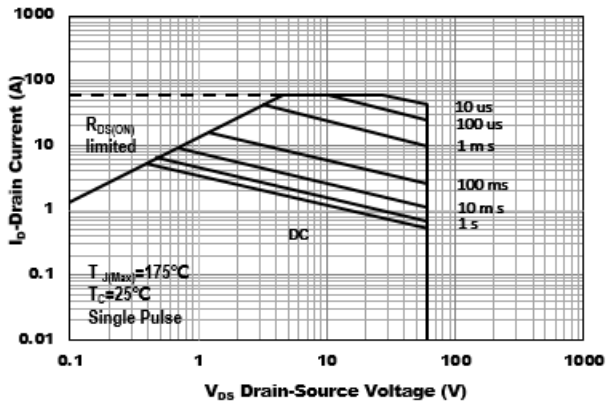


Figure7. Safe Operation Area

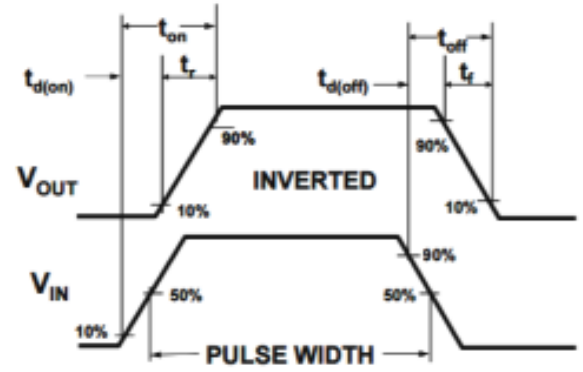
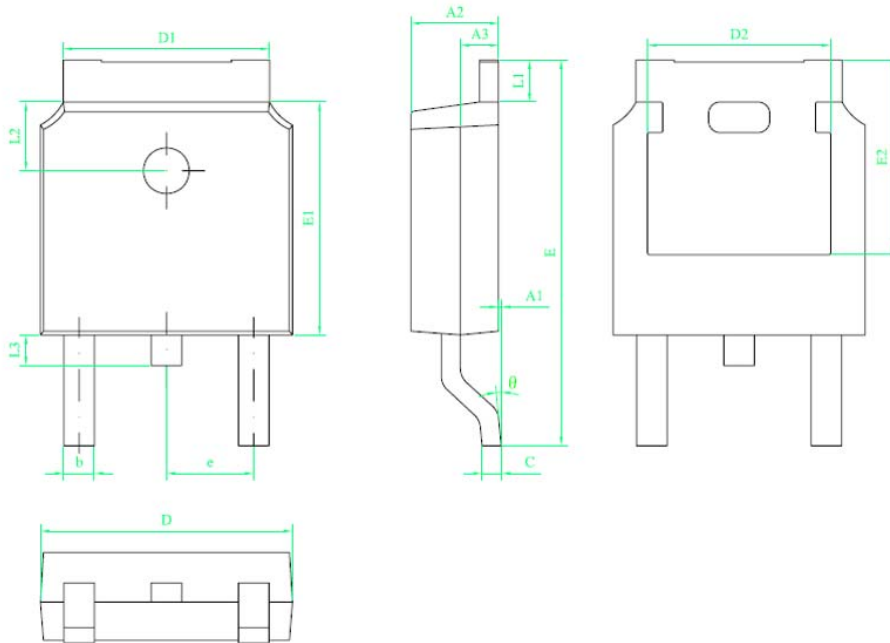


Figure8. Switching wave

■ TO-252 Package Information



| Symbol | (mm) | | |
|----------|------|-------|-------|
| | min | nom | max |
| A1 | 0 | --- | 0.10 |
| A2 | 2.20 | 2.30 | 2.40 |
| A3 | 0.90 | 1.00 | 1.10 |
| b | 0.75 | --- | 0.85 |
| c | 0.50 | --- | 0.60 |
| D | 6.50 | 6.60 | 6.70 |
| D1 | 5.30 | 5.40 | 5.50 |
| D2 | 4.70 | 4.80 | 4.90 |
| E | 9.90 | 10.10 | 10.30 |
| E1 | 6.00 | 6.10 | 6.20 |
| E2 | 5.20 | 5.30 | 5.40 |
| e | 2.20 | 2.286 | 2.40 |
| L1 | 0.90 | --- | 1.25 |
| L2 | 1.70 | 1.80 | 1.90 |
| L3 | 0.60 | 0.80 | 1.00 |
| θ | 0° | --- | 8° |