

General Description

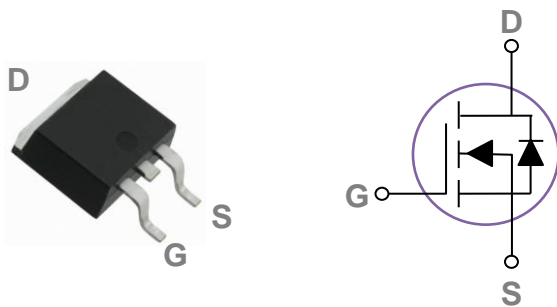
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

| | | |
|-------|-------|-----|
| BVDSS | RDSON | ID |
| 100V | 6.7mΩ | 90A |

Features

- 100V,90A, $R_{DS(ON)} = 6.7m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

TO252 Pin Configuration



Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

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

| Symbol | Parameter | Rating | Units |
|-----------|--|------------|---------------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | +20/-12 | V |
| I_D | Drain Current – Continuous ($T_c=25^\circ\text{C}$) | 90 | A |
| | Drain Current – Continuous ($T_c=100^\circ\text{C}$) | 58 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 360 | A |
| EAS | Single Pulse Avalanche Energy ² | 405 | mJ |
| IAS | Single Pulse Avalanche Current ² | 90 | A |
| P_D | Power Dissipation ($T_c=25^\circ\text{C}$) | 128 | W |
| | Power Dissipation – Derate above 25°C | 1.02 | W/ $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 62 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 0.98 | $^\circ\text{C/W}$ |

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------|--------------------------------|--|------|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V , I _D =250uA | 100 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =100V , V _{GS} =0V , T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =80V , V _{GS} =0V , T _J =85°C | --- | --- | 10 | uA |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =20V , V _{DS} =0V | --- | --- | 100 | nA |

On Characteristics

| | | | | | | |
|---------------------|-----------------------------------|--|-----|-----|-----|----|
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V , I _D =20A | --- | 5.6 | 6.7 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 2 | 2.8 | 4 | V |
| g _{fs} | Forward Transconductance | V _{DS} =10V , I _D =3A | --- | 13 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|---------------------|-------------------------------------|---|-----|------|------|----|
| Q _g | Total Gate Charge ^{3, 4} | V _{DS} =50V , V _{GS} =10V , I _D =45A | --- | 57.9 | 110 | nC |
| Q _{gs} | Gate-Source Charge ^{3, 4} | | --- | 10.8 | 20 | |
| Q _{gd} | Gate-Drain Charge ^{3, 4} | | --- | 18.2 | 38 | |
| T _{d(on)} | Turn-On Delay Time ^{3, 4} | V _{DD} =50V , V _{GS} =10V , R _G =6Ω I _D =45A | --- | 24 | 48 | ns |
| T _r | Rise Time ^{3, 4} | | --- | 19.8 | 39 | |
| T _{d(off)} | Turn-Off Delay Time ^{3, 4} | | --- | 46 | 92 | |
| T _f | Fall Time ^{3, 4} | | --- | 26 | 52 | |
| C _{iss} | Input Capacitance | V _{DS} =50V , V _{GS} =0V , F=1MHz | --- | 3590 | 7180 | pF |
| C _{oss} | Output Capacitance | | --- | 590 | 1180 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 30 | 60 | |
| R _g | Gate resistance | V _{GS} =0V , V _{DS} =0V , F=1MHz | --- | 1.7 | --- | Ω |

Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|---|------|------|------|------|
| I _S | Continuous Source Current | V _G =V _D =0V , Force Current | --- | --- | 90 | A |
| I _{SM} | Pulsed Source Current | | --- | --- | 180 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V , I _S =1A , T _J =25°C | --- | --- | 1 | V |
| t _{rr} | Reverse Recovery Time | V _R =100V , I _S =10A | --- | 110 | --- | ns |
| Q _{rr} | Reverse Recovery Charge | di/dt=100A/μs , T _J =25°C | --- | 230 | --- | nC |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=90A., R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

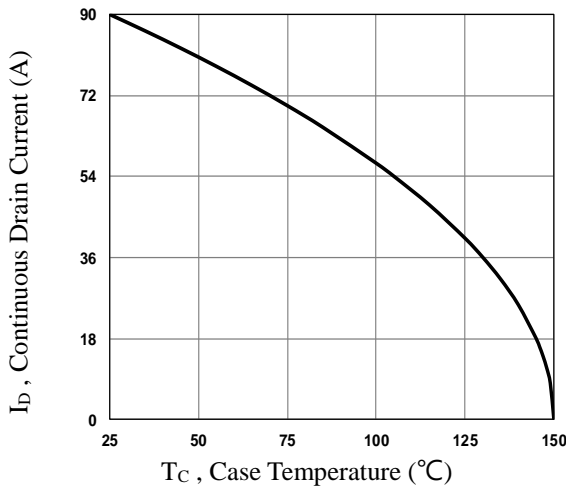


Fig.1 Continuous Drain Current vs. T_c

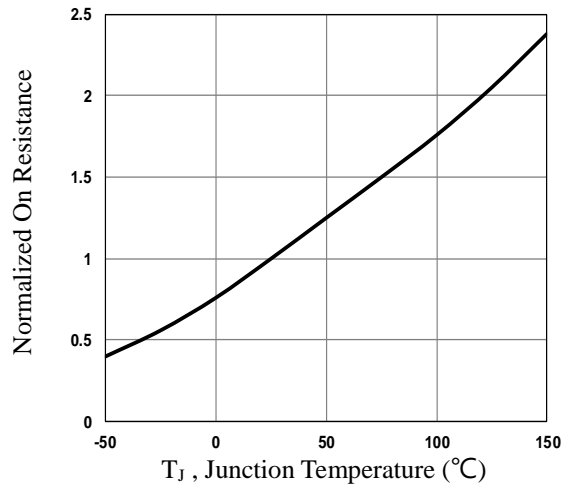


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

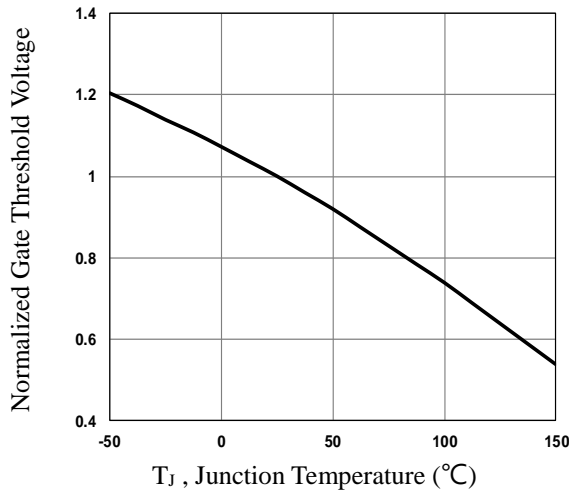


Fig.3 Normalized V_{th} vs. T_j

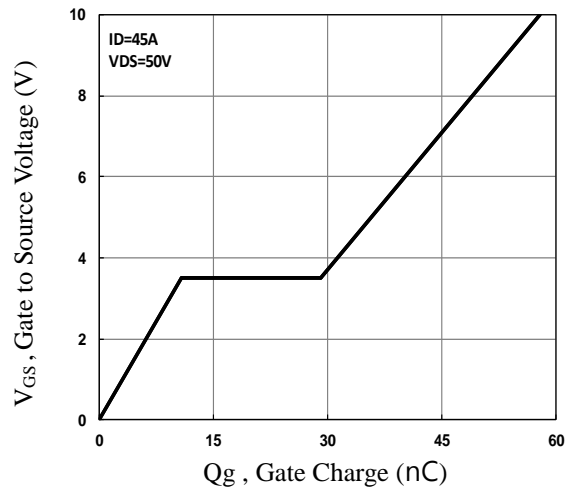


Fig.4 Gate Charge Waveform

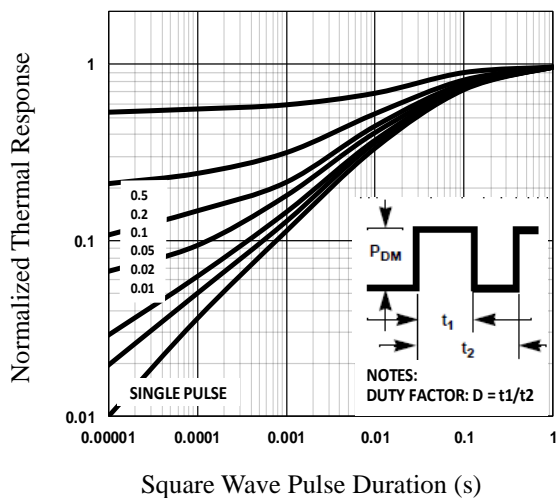


Fig.5 Normalized Transient Impedance

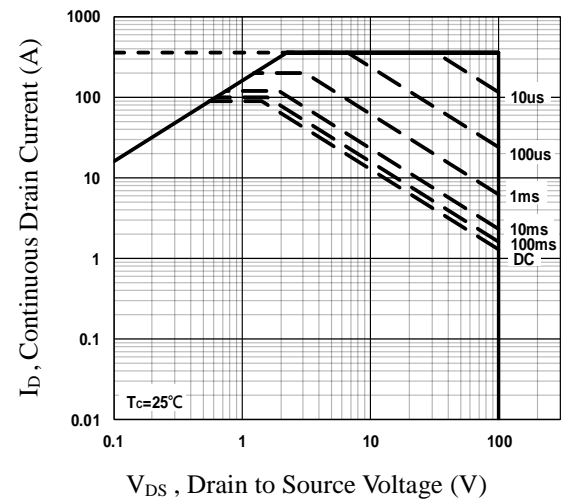


Fig.6 Maximum Safe Operation Area

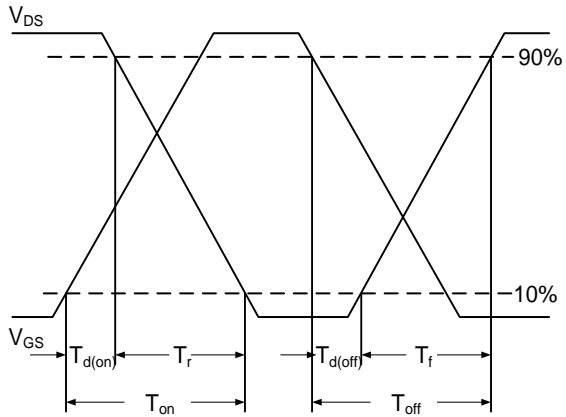


Fig.7 Switching Time Waveform

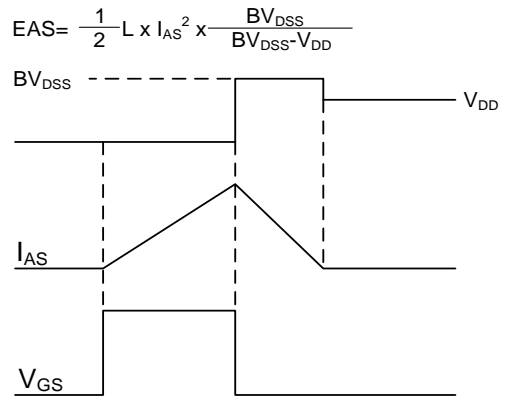
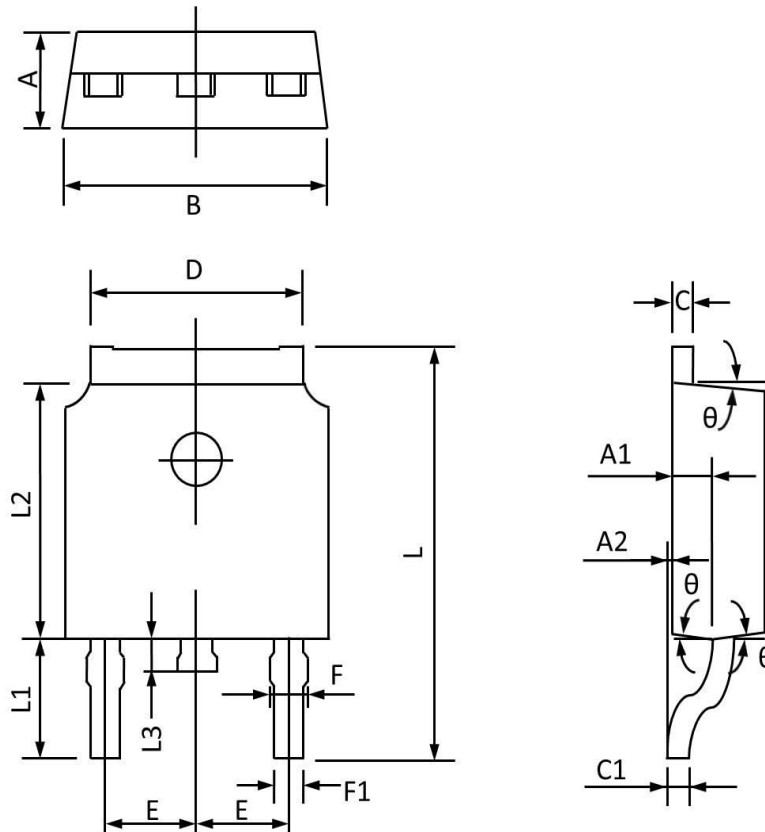


Fig.8 EAS Waveform

TO252 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | MAX | MIN | MAX | MIN |
| A | 2.450 | 2.150 | 0.096 | 0.085 |
| A1 | 1.200 | 0.910 | 0.047 | 0.036 |
| A2 | 0.150 | 0.000 | 0.006 | 0.000 |
| B | 6.800 | 6.300 | 0.268 | 0.248 |
| C | 0.580 | 0.350 | 0.023 | 0.014 |
| C1 | 0.550 | 0.380 | 0.022 | 0.015 |
| D | 5.500 | 5.100 | 0.217 | 0.201 |
| E | 2.390 | 2.000 | 0.094 | 0.079 |
| F | 0.940 | 0.600 | 0.037 | 0.024 |
| F1 | 0.860 | 0.500 | 0.034 | 0.020 |
| L | 10.400 | 9.400 | 0.409 | 0.370 |
| L1 | 3.000 | 2.400 | 0.118 | 0.094 |
| L2 | 6.200 | 5.300 | 0.244 | 0.209 |
| L3 | 1.200 | 0.600 | 0.047 | 0.024 |
| θ | 9° | 3° | 9° | 3° |

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