

General Description

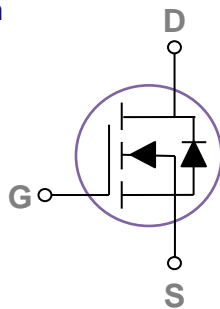
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

| | | |
|-------|-------|------|
| BVDSS | RDSON | ID |
| 100V | 4.2mΩ | 150A |

Features

- 100V,150A, $R_{DS(ON)} = 4.2m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

TO220 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 ($T_c=25^\circ\text{C}$) | 150 | A |
| | Drain Current – Continuous ($T_c=100^\circ\text{C}$) | 95 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 600 | A |
| EAS | Single Pulse Avalanche Energy ² | 378 | mJ |
| IAS | Single Pulse Avalanche Current ² | 87 | A |
| P_D | Power Dissipation ($T_c=25^\circ\text{C}$) | 275 | W |
| | Power Dissipation – Derate above 25°C | 2.22 | W/ $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -50 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -50 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 62 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 0.45 | $^\circ\text{C}/\text{W}$ |

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 | --- | 3.5 | 4.2 | mΩ |
| | | V _{GS} =4.5V , I _D =15A | --- | 4.5 | 6.0 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | 1.8 | 2.5 | V |
| g _{fs} | Forward Transconductance | V _{DS} =10V , I _D =3A | --- | 20 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|---------------------|-------------------------------------|--|-----|------|-------|----|
| Q _g | Total Gate Charge ^{3, 4} | V _{DS} =80V , V _{GS} =10V , I _D =10A | --- | 110 | 165 | nC |
| Q _{gs} | Gate-Source Charge ^{3, 4} | | --- | 11.5 | 18 | |
| Q _{gd} | Gate-Drain Charge ^{3, 4} | | --- | 28 | 42 | |
| T _{d(on)} | Turn-On Delay Time ^{3, 4} | V _{DD} =50V , V _{GS} =10V , R _G =6Ω I _D =1A | --- | 23 | 46 | ns |
| T _r | Rise Time ^{3, 4} | | --- | 32 | 64 | |
| T _{d(off)} | Turn-Off Delay Time ^{3, 4} | | --- | 157 | 320 | |
| T _f | Fall Time ^{3, 4} | | --- | 115 | 230 | |
| C _{iss} | Input Capacitance | V _{DS} =25V , V _{GS} =0V , F=1MHz | --- | 6680 | 13300 | pF |
| C _{oss} | Output Capacitance | | --- | 1690 | 3380 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 78 | 156 | |
| R _g | Gate resistance | V _{GS} =0V , V _{DS} =0V , F=1MHz | --- | 1.9 | --- | 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 | --- | --- | 150 | A |
| I _{SM} | Pulsed Source Current | | --- | --- | 300 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V , I _S =1A , T _J =25°C | --- | --- | 1 | V |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=87A., 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.

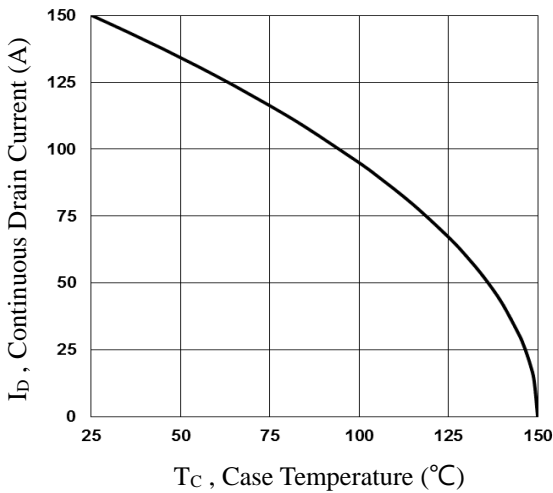


Fig.1 Continuous Drain Current vs. T_c

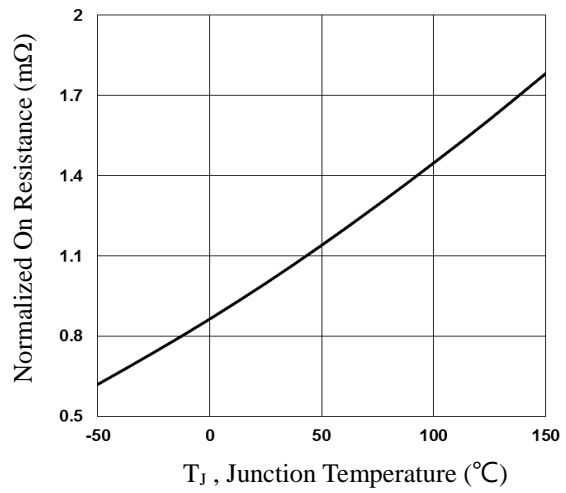


Fig.2 Normalized R_{DS(on)} vs. T_j

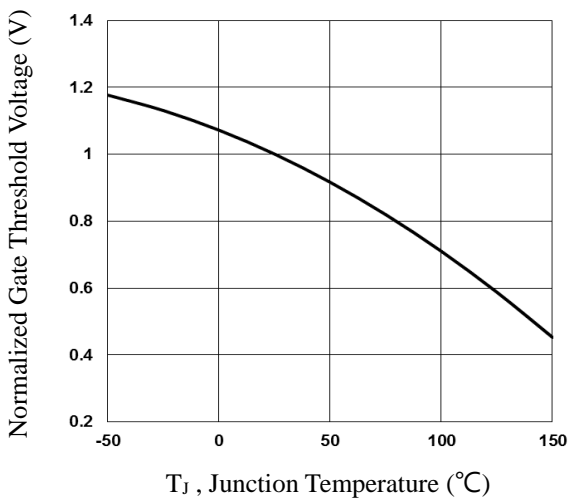


Fig.3 Normalized V_{th} vs. T_j

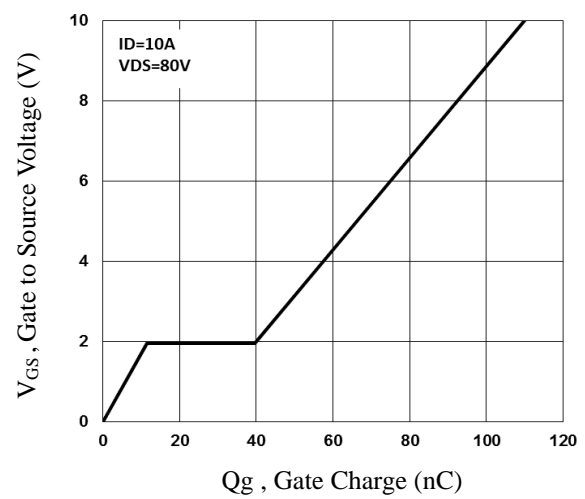


Fig.4 Gate Charge Characteristics

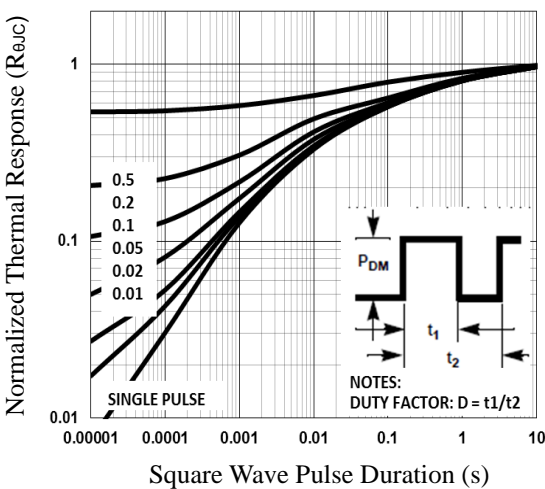


Fig.5 Normalized Transient Impedance

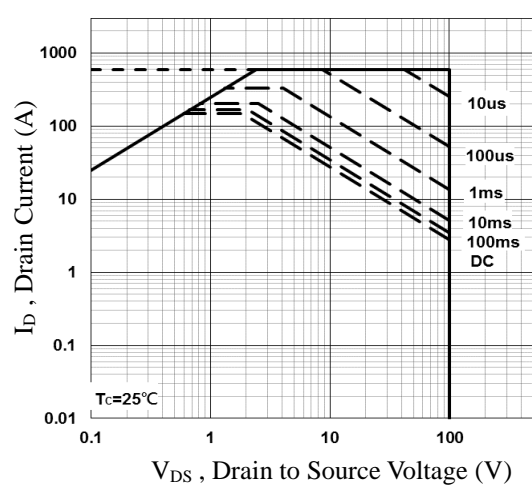


Fig.6 Maximum Safe Operation Area

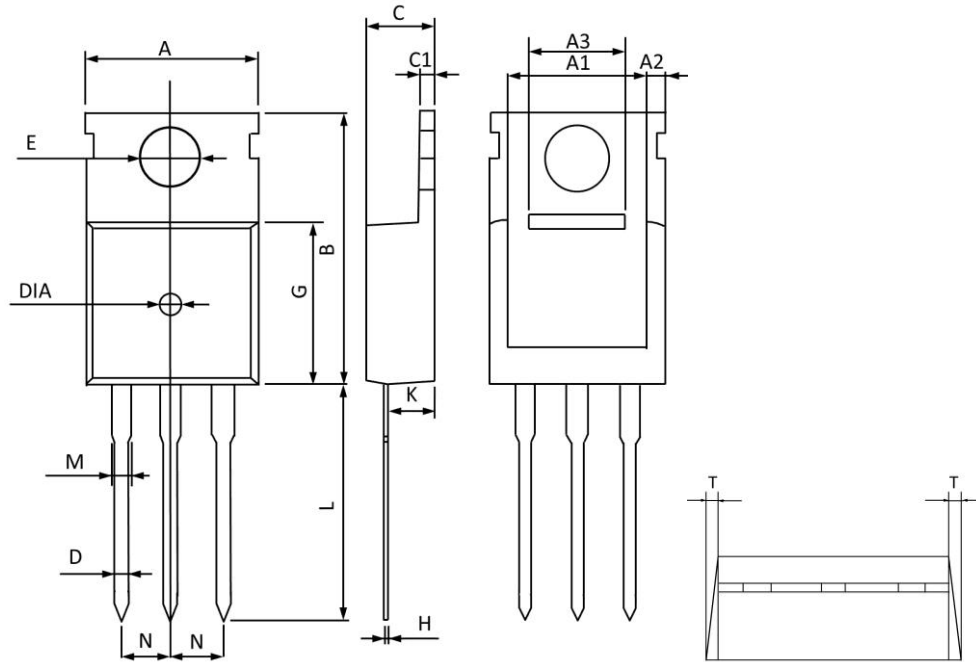


Fig.7 Switching Time Waveform



Fig.8 Gate Charge Waveform

TO220 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------------|----------------------|----------------|
| | MAX | MIN | MAX | MIN |
| A | 10.300 | 9.700 | 0.406 | 0.382 |
| A1 | 8.840 | 8.440 | 0.348 | 0.332 |
| A2 | 1.250 | 1.050 | 0.049 | 0.041 |
| A3 | 5.300 | 5.100 | 0.209 | 0.201 |
| B | 16.200 | 15.400 | 0.638 | 0.606 |
| C | 4.680 | 4.280 | 0.184 | 0.169 |
| C1 | 1.500 | 1.100 | 0.059 | 0.043 |
| D | 1.000 | 0.600 | 0.039 | 0.024 |
| E | 3.800 | 3.400 | 0.150 | 0.134 |
| G | 9.300 | 8.700 | 0.366 | 0.343 |
| H | 0.600 | 0.400 | 0.024 | 0.016 |
| K | 2.700 | 2.100 | 0.106 | 0.083 |
| L | 13.600 | 12.800 | 0.535 | 0.504 |
| M | 1.500 | 1.100 | 0.059 | 0.043 |
| N | 2.590 | 2.490 | 0.102 | 0.098 |
| T | W0.35 | | W0.014 | |
| DIA | Φ1.5 TYP. | deep0.2 TYP. | Φ0.059 TYP. | deep0.008 TYP. |

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