

General Description

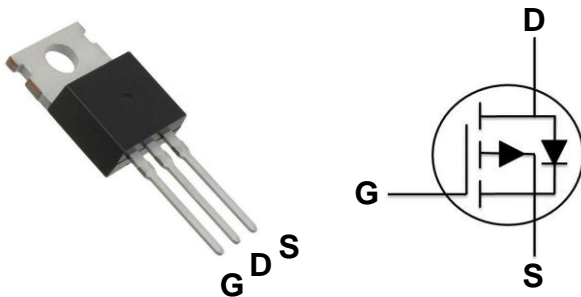
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

| | | |
|-------|---------------------|------|
| BVDSS | R _{DS(ON)} | ID |
| -100V | 45mΩ | -35A |

Features

- -100V, -35A, R_{DS(ON)} 45mΩ@V_{GS} = -10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

TO220 Pin Configuration



Applications

- Networking
- Load Switch
- LED applications



Absolute Maximum Ratings (T_c=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|------------------|--|------------|-------|
| V _{DS} | Drain-Source Voltage | -100 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D | Drain Current – Continuous (T _c =25°C) | -35 | A |
| | Drain Current – Continuous (T _c =100°C) | -22 | A |
| I _{DM} | Drain Current – Pulsed ¹ | -140 | A |
| EAS | Single Pulse Avalanche Energy ² | 180 | mJ |
| IAS | Single Pulse Avalanche Current ² | -60 | A |
| P _D | Power Dissipation (T _c =25°C) | 114 | W |
| | Power Dissipation – Derate above 25°C | 0.91 | W/°C |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C |
| T _J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJC} | Thermal Resistance Junction to Case | --- | 1.1 | °C/W |
| R _{θJA} | Thermal Resistance Junction to ambient | --- | 62 | °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 =-15A | --- | 36 | 45 | mΩ |
| | | V _{GS} =-4.5V, I _D =-10A | --- | 40 | 55 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =-250uA | -1.2 | --- | -2.5 | V |
| g _{fs} | Forward Transconductance | V _{DS} =-10V, I _D =-5A | --- | 22 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|---------------------|------------------------------------|--|-----|------|------|----|
| Q _g | Total Gate Charge ^{3,4} | V _{DS} =-50V, V _{GS} =-10V, I _D =-10A | --- | 98 | 150 | nC |
| Q _{gs} | Gate-Source Charge ^{3,4} | | --- | 16.2 | 30 | |
| Q _{gd} | Gate-Drain Charge ^{3,4} | | --- | 13.8 | 26 | |
| T _{d(on)} | Turn-On Delay Time ^{3,4} | V _{DD} =-50V, V _{GS} =-10V, R _G =25Ω I _D =-5A | --- | 58 | 105 | ns |
| T _r | Rise Time ^{3,4} | | --- | 24 | 50 | |
| T _{d(off)} | Turn-Off Delay Time ^{3,4} | | --- | 215 | 450 | |
| T _f | Fall Time ^{3,4} | | --- | 94 | 180 | |
| C _{iss} | Input Capacitance | V _{DS} =-25V, V _{GS} =0V, F=1MHz | --- | 6315 | 9000 | pF |
| C _{oss} | Output Capacitance | | --- | 220 | 330 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 50 | 100 | |

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 | --- | --- | -35 | A |
| I _{SM} | Pulsed Source Current | | --- | --- | -70 | 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}=-50V, V_{GS}=-10V, L=0.1mH, I_{AS}=-60A., Starting T_J=25°C
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

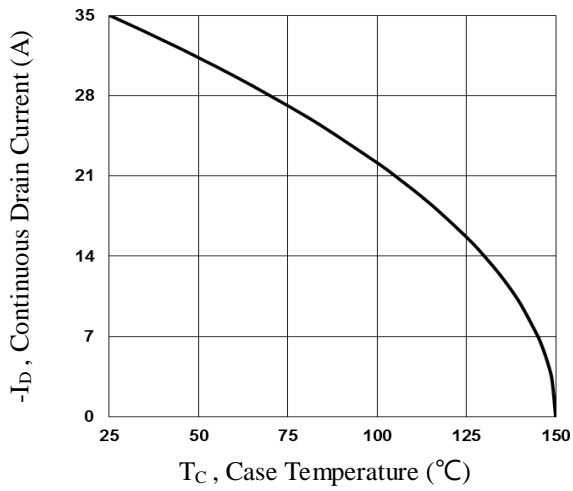


Fig.1 Continuous Drain Current vs. T_c

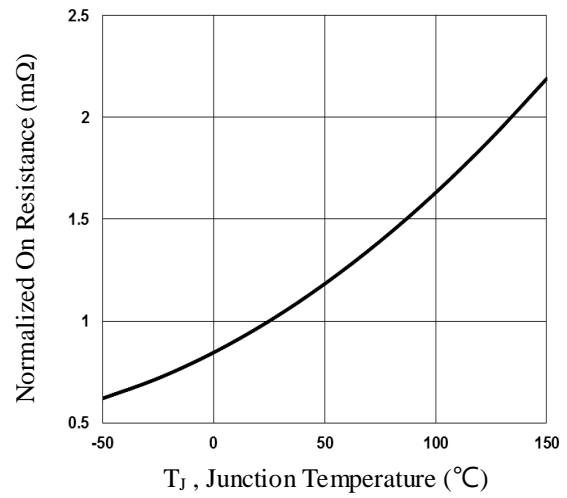


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

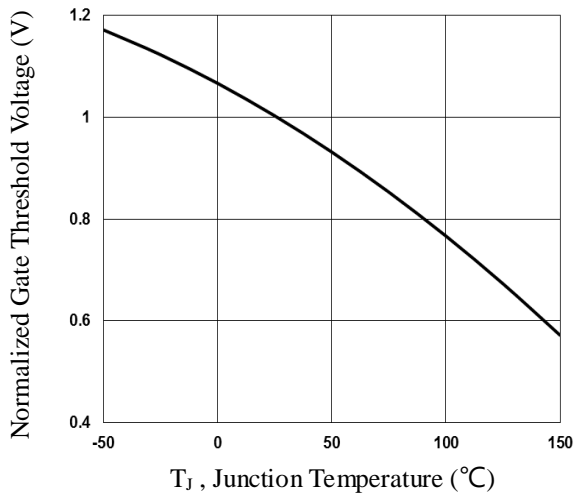


Fig.3 Normalized V_{th} vs. T_j

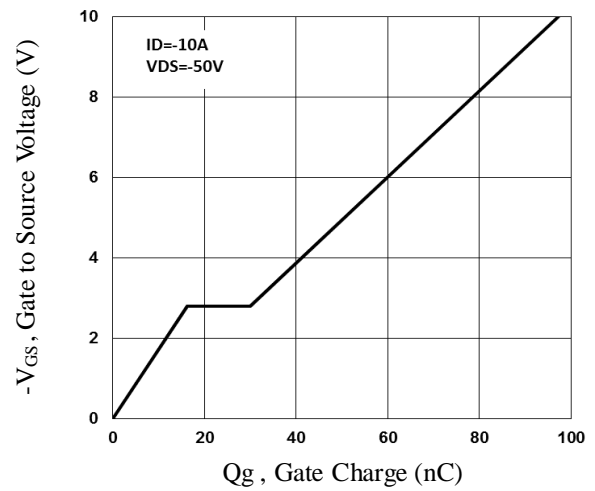


Fig.4 Gate Charge Waveform

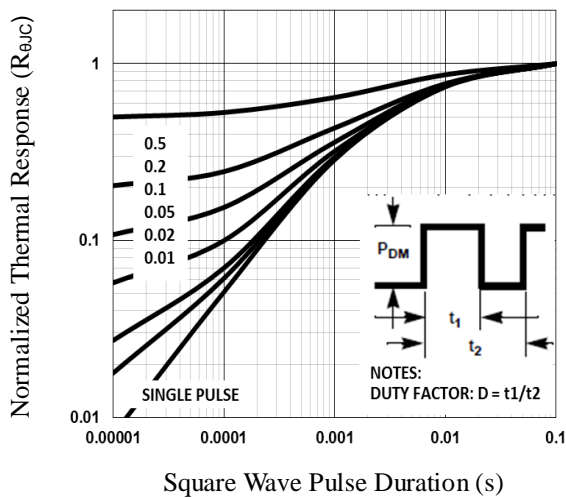


Fig.5 Normalized Transient Impedance

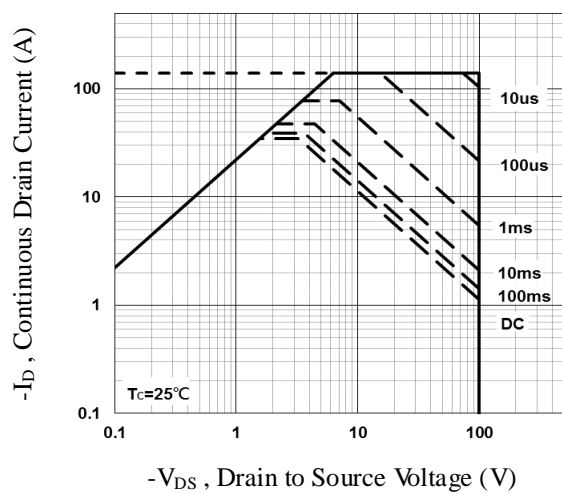


Fig.6 Maximum Safe Operation Area

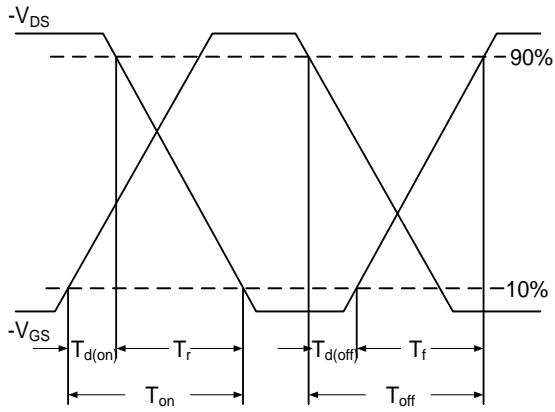


Fig.7 Switching Time Waveform

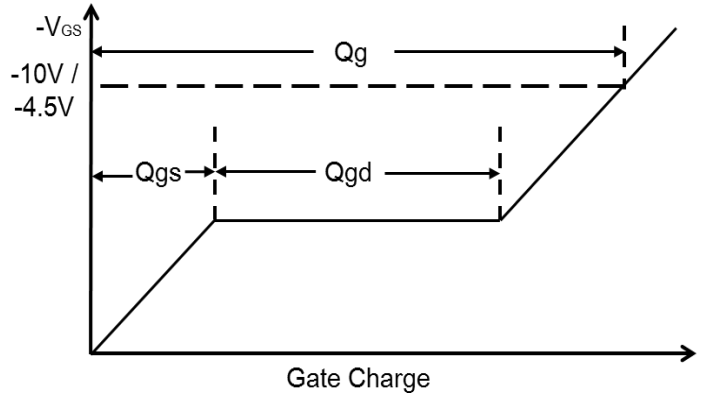
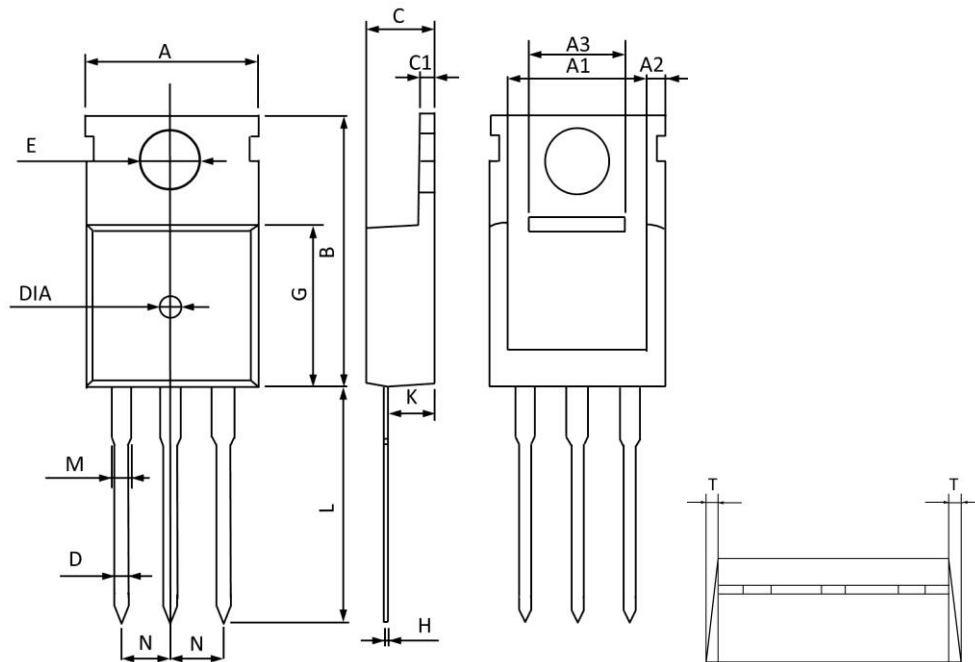


Fig.8 Gate Charge Waveform

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. |