

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 | 12mΩ | 65A |

Features

- 100V,65A, $R_{DS(ON)} = 12m\Omega @ V_{GS} = 10V$
- 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 | V |
| I_D | Drain Current – Continuous ($T_c=25^\circ\text{C}$) | 65 | A |
| | Drain Current – Continuous ($T_c=100^\circ\text{C}$) | 41 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 260 | A |
| EAS | Single Pulse Avalanche Energy ² | 125 | mJ |
| IAS | Single Pulse Avalanche Current ² | 50 | A |
| P_D | Power Dissipation ($T_c=25^\circ\text{C}$) | 129 | W |
| | Power Dissipation – Derate above 25°C | 1.03 | 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 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 0.97 | $^\circ\text{C/W}$ |

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 =250μA | 100 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =80V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | μA |
| | | V _{DS} =80V, V _{GS} =0V, T _J =85°C | --- | --- | 10 | μA |
| 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 | --- | 10 | 12 | mΩ |
| | | V _{GS} =6V, I _D =15A | --- | 14 | 18 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250μA | 2 | 3 | 4 | V |
| g _{fs} | Forward Transconductance | V _{DS} =10V, I _D =3A | --- | 10 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|---------------------|-------------------------------------|---|-----|------|------|----|
| Q _g | Total Gate Charge ^{3, 4} | V _{DS} =50V, V _{GS} =10V, I _D =30A | --- | 15.4 | 23 | nC |
| Q _{gs} | Gate-Source Charge ^{3, 4} | | --- | 3.9 | 6 | |
| Q _{gd} | Gate-Drain Charge ^{3, 4} | | --- | 4.6 | 7 | |
| T _{d(on)} | Turn-On Delay Time ^{3, 4} | V _{DD} =50V, V _{GS} =10V, R _G =6Ω I _D =30A | --- | 20 | 30 | ns |
| T _r | Rise Time ^{3, 4} | | --- | 40 | 60 | |
| T _{d(off)} | Turn-Off Delay Time ^{3, 4} | | --- | 57 | 86 | |
| T _f | Fall Time ^{3, 4} | | --- | 35 | 53 | |
| C _{iss} | Input Capacitance | V _{DS} =50V, V _{GS} =0V, F=1MHz | --- | 1180 | 1750 | pF |
| C _{oss} | Output Capacitance | | --- | 250 | 375 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 2.2 | 4 | |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | --- | 1 | --- | 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 | --- | --- | 65 | A |
| I _{SM} | Pulsed Source Current | | --- | --- | 130 | 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, di/dt=100A/μs, T _J =25°C | --- | 165 | --- | ns |
| Q _{rr} | Reverse Recovery Charge | | --- | 265 | --- | nC |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=50A., 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.

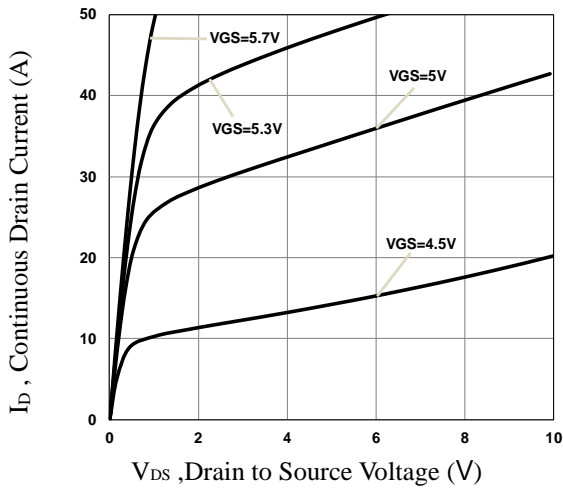


Fig.1 Typical Output Characteristics

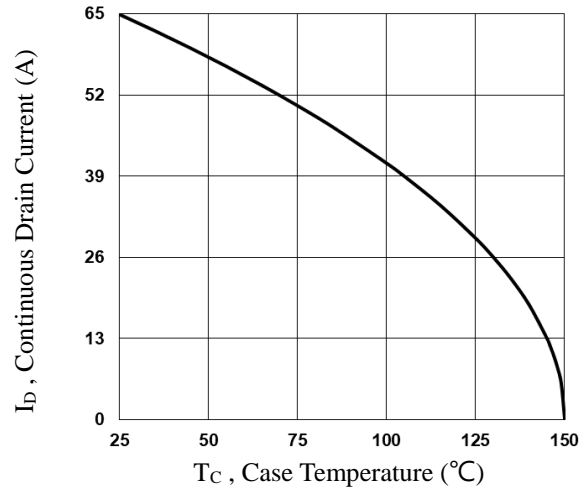


Fig.2 Continuous Drain Current vs. T_c

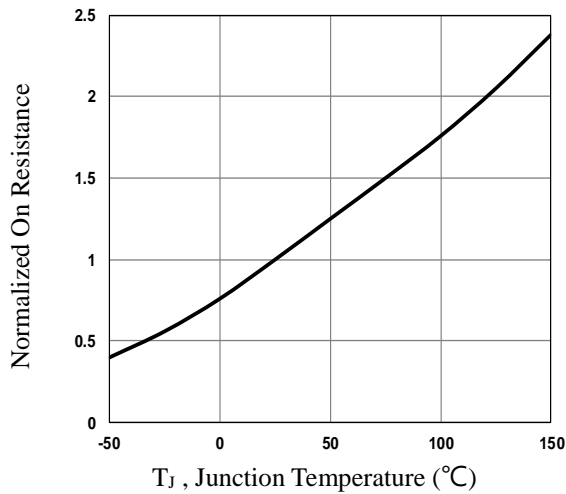


Fig.3 Normalized R_{DS(on)} vs. T_j

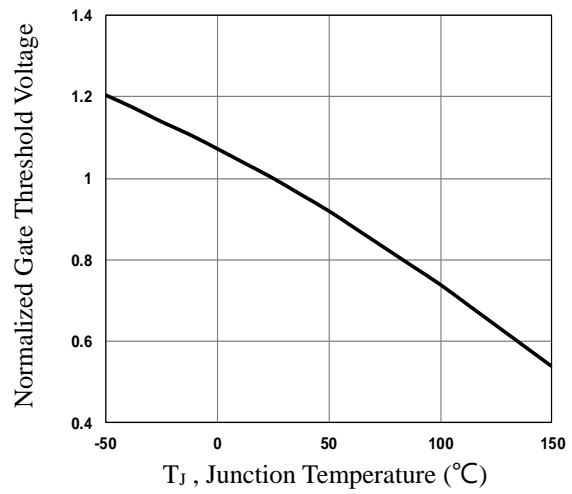


Fig.4 Normalized V_{th} vs. T_j

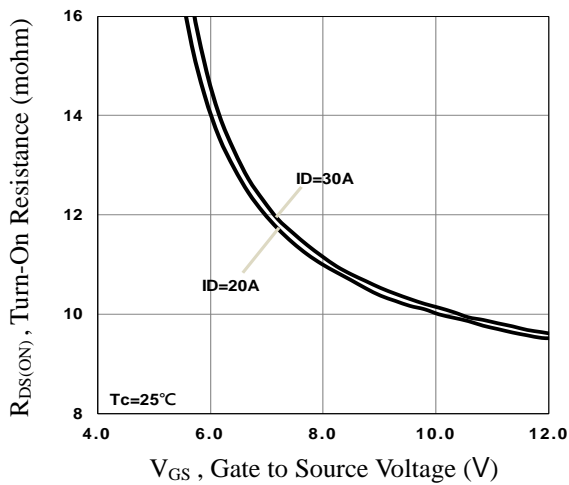


Fig.5 Turn-On Resistance vs. V_{GS}

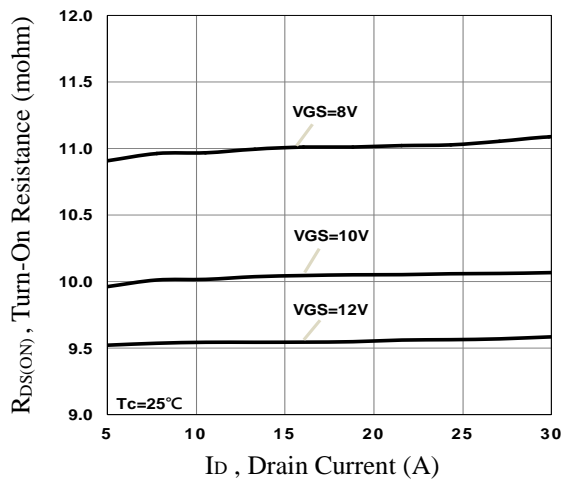


Fig.6 Turn-On Resistance vs. I_D

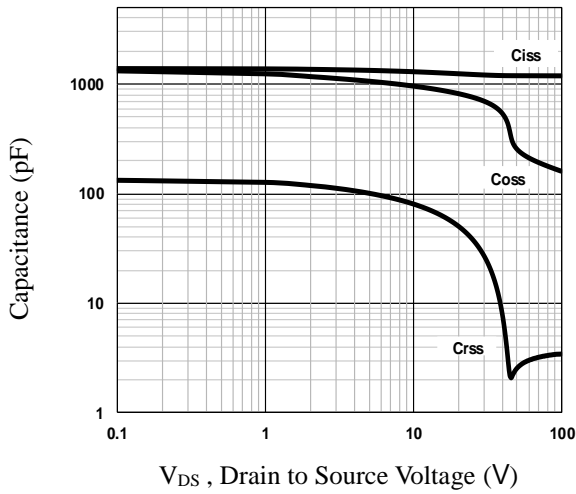


Fig.7 Capacitance Characteristics

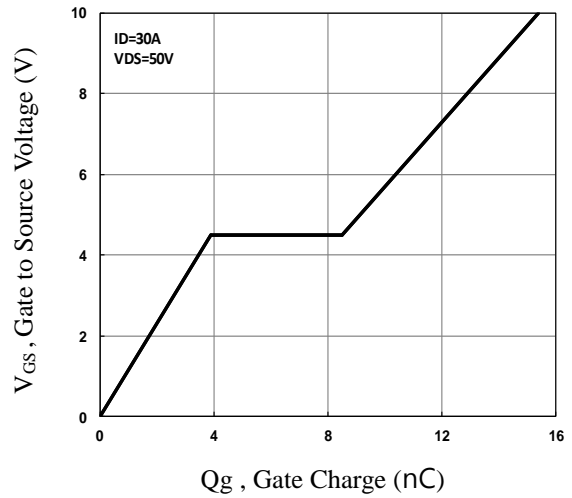


Fig.8 Gate Charge Characteristics

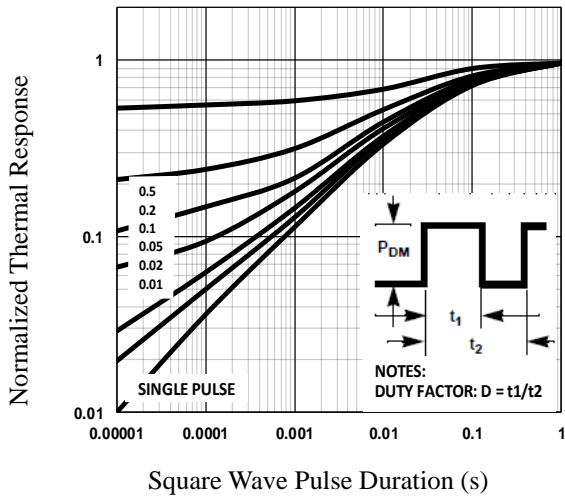


Fig.9 Normalized Transient Impedance

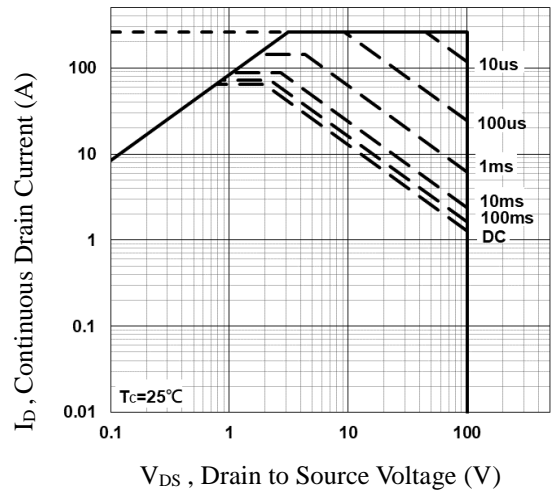


Fig.10 Maximum Safe Operation Area



Fig.11 Switching Time Waveform

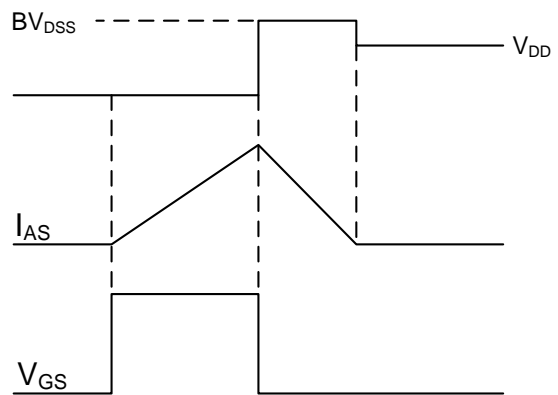
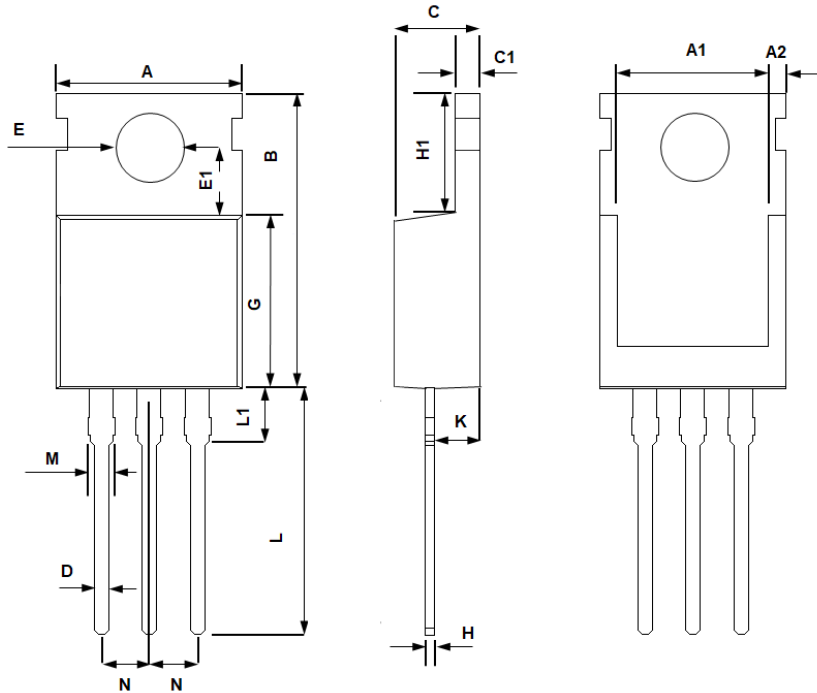


Fig.12 EAS Waveform

TO220 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | MAX | MIN | MAX | MIN |
| A | 10.400 | 9.700 | 0.409 | 0.382 |
| A1 | 8.900 | 7.400 | 0.350 | 0.291 |
| A2 | 1.400 | 0.800 | 0.055 | 0.031 |
| B | 16.500 | 14.500 | 0.650 | 0.571 |
| C | 4.750 | 4.200 | 0.187 | 0.165 |
| C1 | 1.500 | 1.100 | 0.059 | 0.043 |
| D | 1.000 | 0.600 | 0.039 | 0.024 |
| E | 4.000 | 3.300 | 0.157 | 0.130 |
| E1 | 3.800 | 3.400 | 0.150 | 0.134 |
| G | 9.400 | 8.400 | 0.370 | 0.331 |
| H | 0.600 | 0.200 | 0.024 | 0.008 |
| H1 | 6.850 | 6.200 | 0.270 | 0.244 |
| K | 2.850 | 2.100 | 0.112 | 0.083 |
| L | 14.000 | 12.500 | 0.551 | 0.492 |
| L1 | 4.000 | 2.700 | 0.157 | 0.106 |
| M | 1.750 | 1.100 | 0.069 | 0.043 |
| N | 2.640 | 2.440 | 0.104 | 0.096 |