

GI03N70

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

| | |
|---------------------|------|
| BV _{DSS} | 600V |
| R _{DS(ON)} | 4.0Ω |
| I _D | 3.3A |

Description

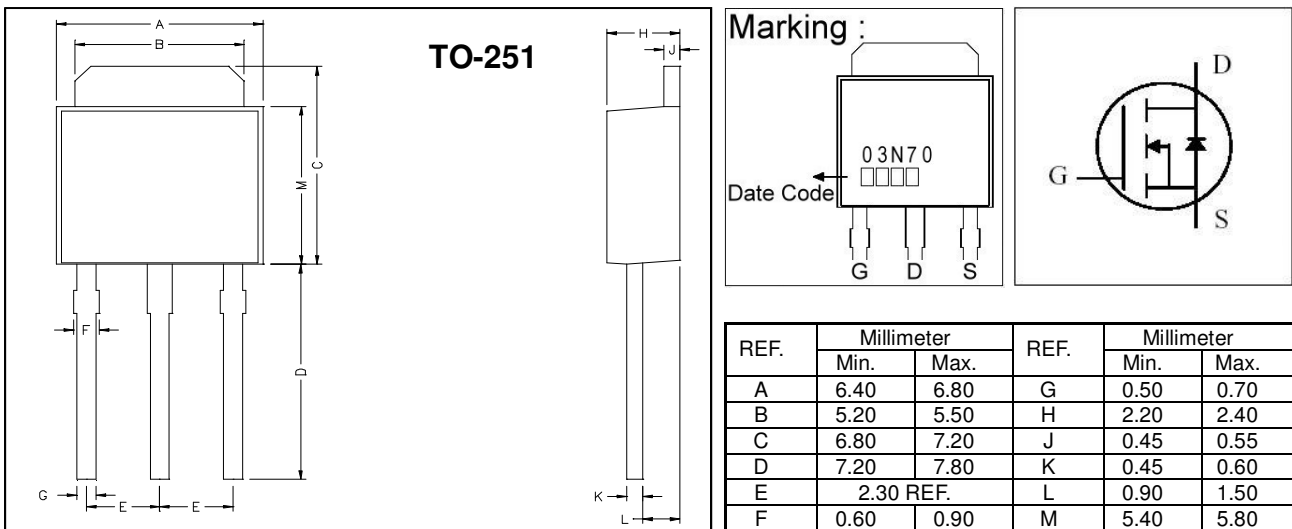
The GI03N70 is specially designed as main switching devices for universal 90~265VAC off-line AC/DC converter applications.

The TO-251 package is available for low-profile applications and suited for AC/DC converters.

Features

- *Dynamic dv/dt Rating
- *Simple Drive Requirement
- *Repetitive Avalanche Rated
- *Fast Switching Speed

Package Dimensions



Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|--|---------------------------------------|------------|------|
| Drain-Source Voltage | V _{DS} | 600 | V |
| Gate-Source Voltage | V _{GS} | ±30 | V |
| Continuous Drain Current, V _{GS} @10V | I _D @T _C =25°C | 3.3 | A |
| Continuous Drain Current, V _{GS} @10V | I _D @T _C =100°C | 2.1 | A |
| Pulsed Drain Current ¹ | I _{DM} | 13.2 | A |
| Total Power Dissipation | P _D @T _C =25°C | 45 | W |
| Linear Derating Factor | | 0.36 | W/°C |
| Single Pulse Avalanche Energy ² | E _{AS} | 85 | mJ |
| Avalanche Current | I _{AR} | 3.3 | A |
| Repetitive Avalanche Energy | E _{AR} | 3.3 | mJ |
| Operating Junction and Storage Temperature Range | T _j , T _{stg} | -55 ~ +150 | °C |

Thermal Data

| Parameter | Symbol | Value | Unit |
|--|--------------------|-------|------|
| Thermal Resistance Junction-case Max. | R _{thj-c} | 2.8 | °C/W |
| Thermal Resistance Junction-ambient Max. | R _{thj-a} | 110 | °C/W |

Electrical Characteristics (T_j = 25°C unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|--------------------------------|------|------|------|------|---|
| Drain-Source Breakdown Voltage | BV _{DSS} | 600 | - | - | V | V _{GS} =0, I _D =250uA |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS} / \Delta T_j$ | - | 0.6 | - | V/°C | Reference to 25°C, I _D =1mA |
| Gate Threshold Voltage | V _{GS(th)} | 2.0 | - | 4.0 | V | V _{DS} =V _{GS} , I _D =250uA |
| Forward Transconductance | g _{fs} | - | 2.0 | - | S | V _{DS} =10V, I _D =1.6A |
| Gate-Source Leakage Current | I _{GSS} | - | - | ±1 | uA | V _{GS} = ±30V |
| Drain-Source Leakage Current(T _j =25°C) | I _{DSS} | - | - | 100 | uA | V _{DS} =600V, V _{GS} =0 |
| Drain-Source Leakage Current(T _j =150°C) | | - | - | 500 | uA | V _{DS} =480V, V _{GS} =0 |
| Static Drain-Source On-Resistance | R _{DS(ON)} | - | - | 4.0 | Ω | V _{GS} =10V, I _D =1.6A |
| Total Gate Charge ³ | Q _g | - | 11.4 | - | nC | I _D =3.3A V _{DS} =480V V _{GS} =10V |
| Gate-Source Charge | Q _{gs} | - | 3.1 | - | | |
| Gate-Drain ("Miller") Change | Q _{gd} | - | 4.2 | - | | |
| Turn-on Delay Time ³ | T _{d(on)} | - | 8.4 | - | ns | V _{DD} =300V I _D =3.3A V _{GS} =10V R _G =10Ω R _D =91Ω |
| Rise Time | T _r | - | 6 | - | | |
| Turn-off Delay Time | T _{d(off)} | - | 17.7 | - | | |
| Fall Time | T _f | - | 5.9 | - | | |
| Input Capacitance | C _{iss} | - | 600 | - | pF | V _{GS} =0V V _{DS} =25V f=1.0MHz |
| Output Capacitance | C _{oss} | - | 45 | - | | |
| Reverse Transfer Capacitance | C _{rss} | - | 4 | - | | |

Source-Drain Diode

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|-----------------|------|------|------|------|---|
| Forward On Voltage ³ | V _{SD} | - | - | 1.5 | V | I _S =3.3A, V _{GS} =0V, T _j =25°C |
| Continuous Source Current (Body Diode) | I _S | - | - | 3.3 | A | V _D =V _G =0V, V _S =1.5V |
| Pulsed Source Current (Body Diode) ¹ | I _{SM} | - | - | 13.2 | A | |

Notes: 1. Pulse width limited by safe operating area.

2. Staring T_j=25°C, V_{DD}=50V, L=15mH, R_G=25Ω, I_{AS}=3.3A.

3. Pulse width ≤ 300us, duty cycle ≤ 2%.

Characteristics Curve

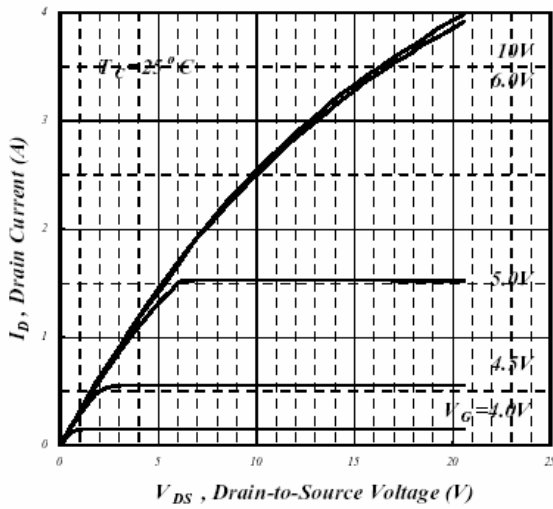


Fig 1. Typical Output Characteristics

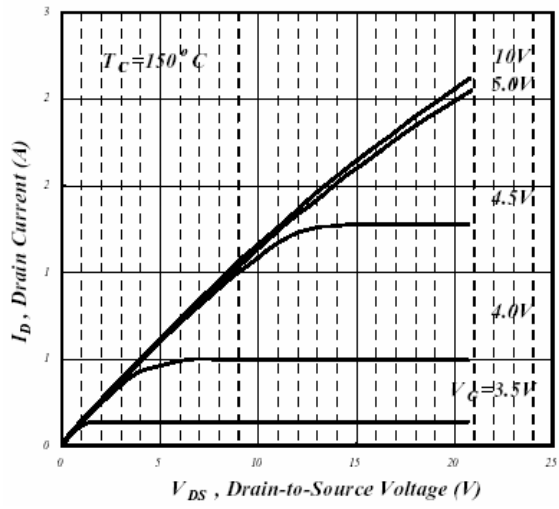


Fig 2. Typical Output Characteristics

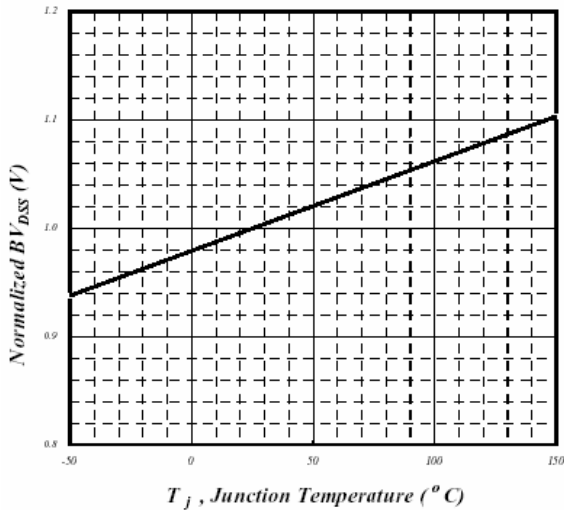


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

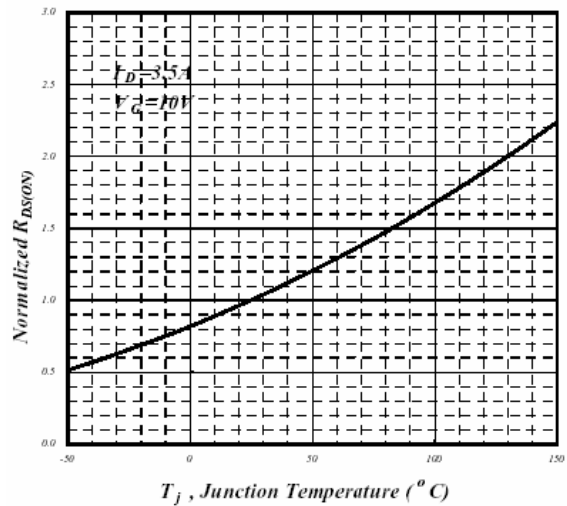


Fig 4. Normalized On-Resistance v.s. Junction Temperature

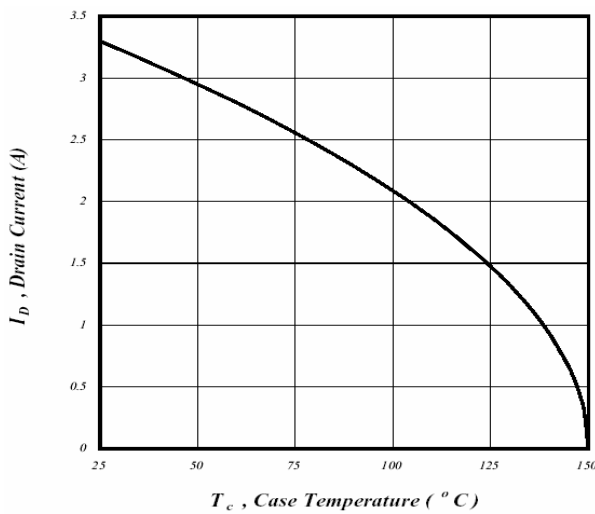


Fig 5. Maximum Drain Current v.s. Case Temperature

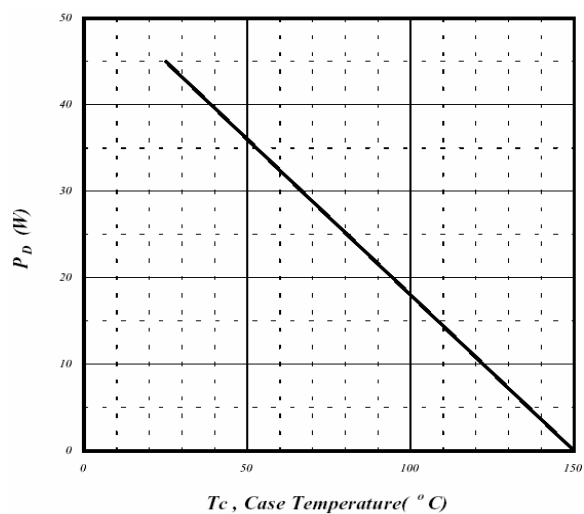


Fig 6. Type Power Dissipation

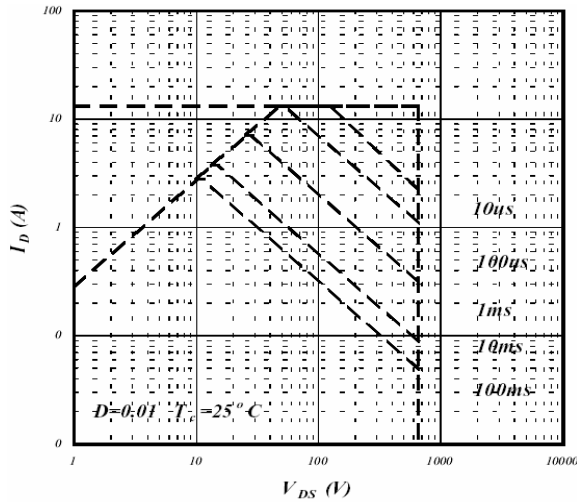


Fig 7. Maximum Safe Operating Area

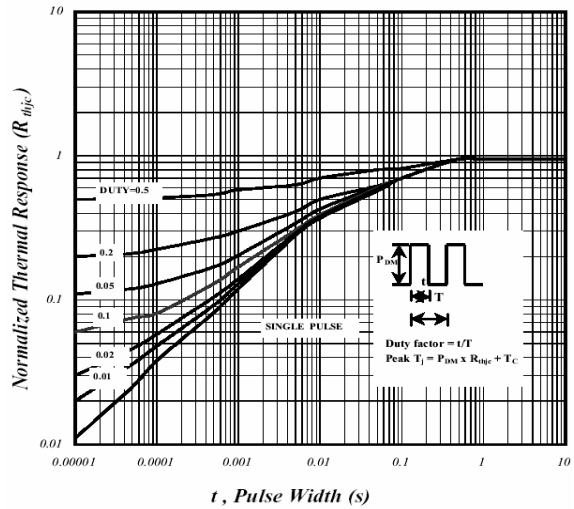


Fig 8. Effective Transient Thermal Impedance

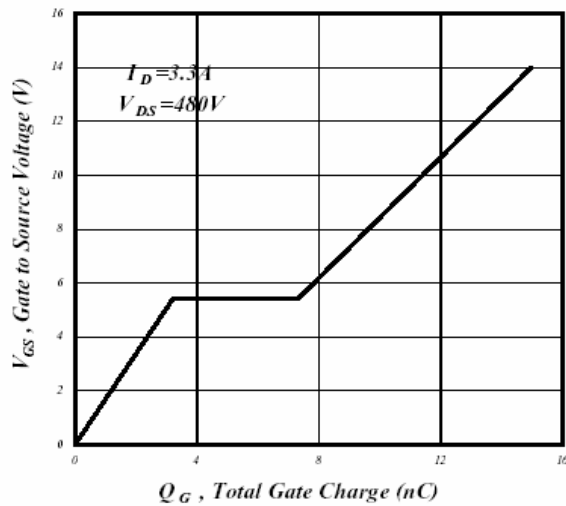


Fig 9. Gate Charge Characteristics

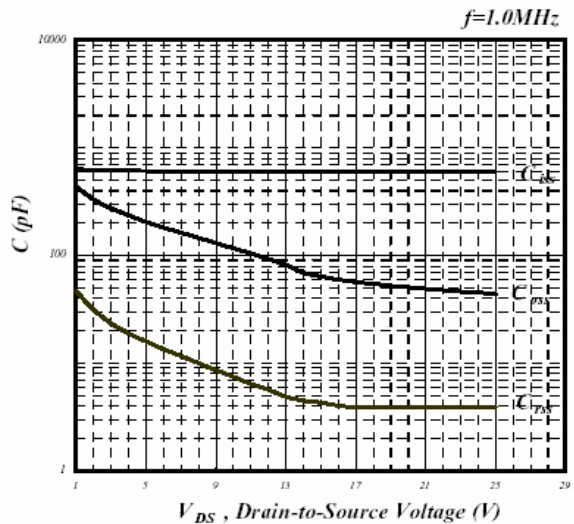


Fig 10. Typical Capacitance Characteristics

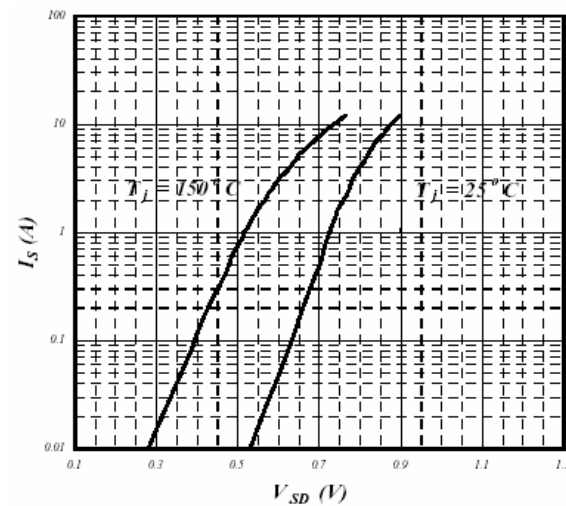


Fig 11. Forward Characteristics of Reverse Diode

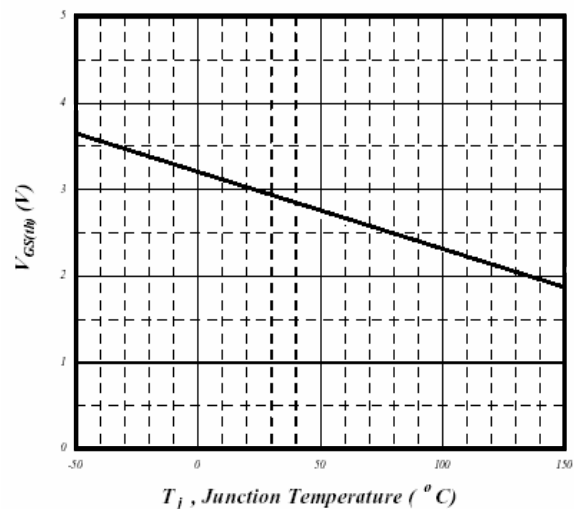


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

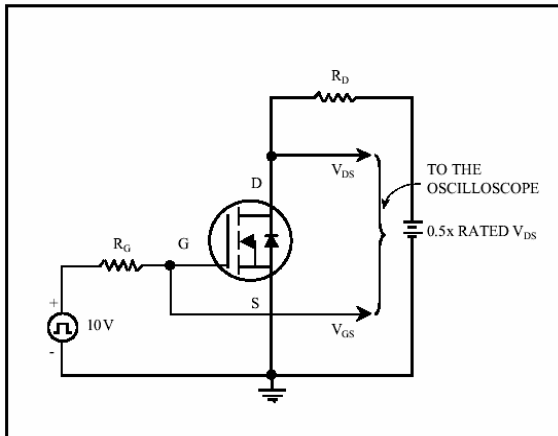


Fig 13. Switching Time Circuit

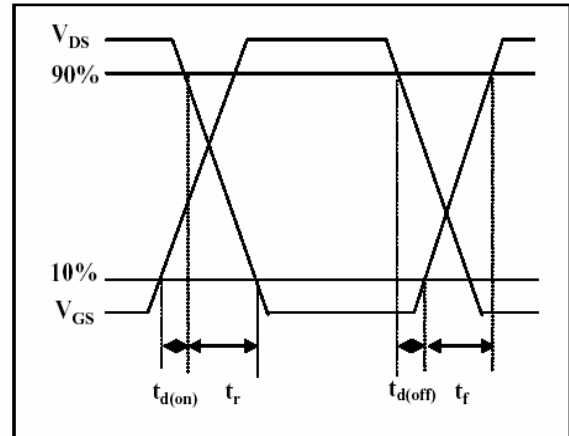


Fig 14. Switching Time Waveform

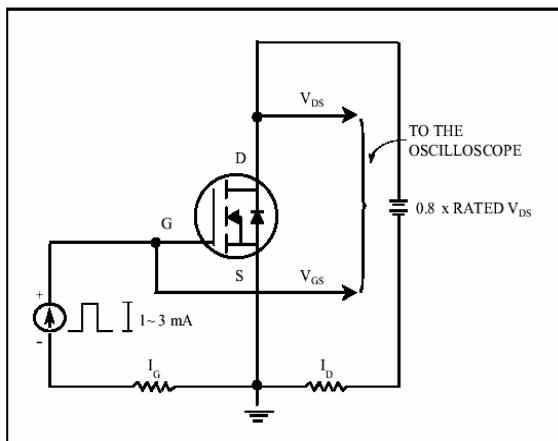


Fig 15. Gate Charge Circuit

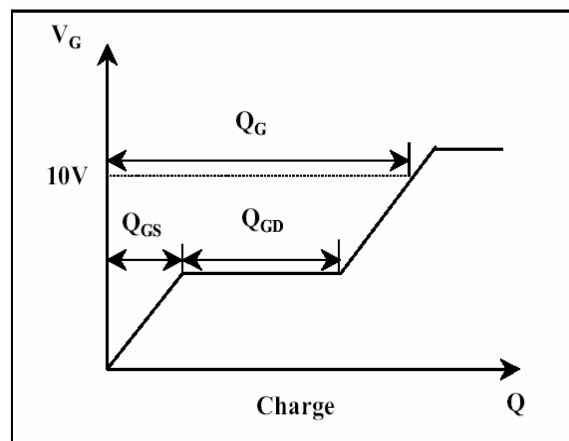


Fig 16. Gate Charge Waveform

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