

GI20N03

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

| | |
|---------|------|
| BVDSS | 30V |
| RDS(ON) | 52mΩ |
| ID | 20A |

Description

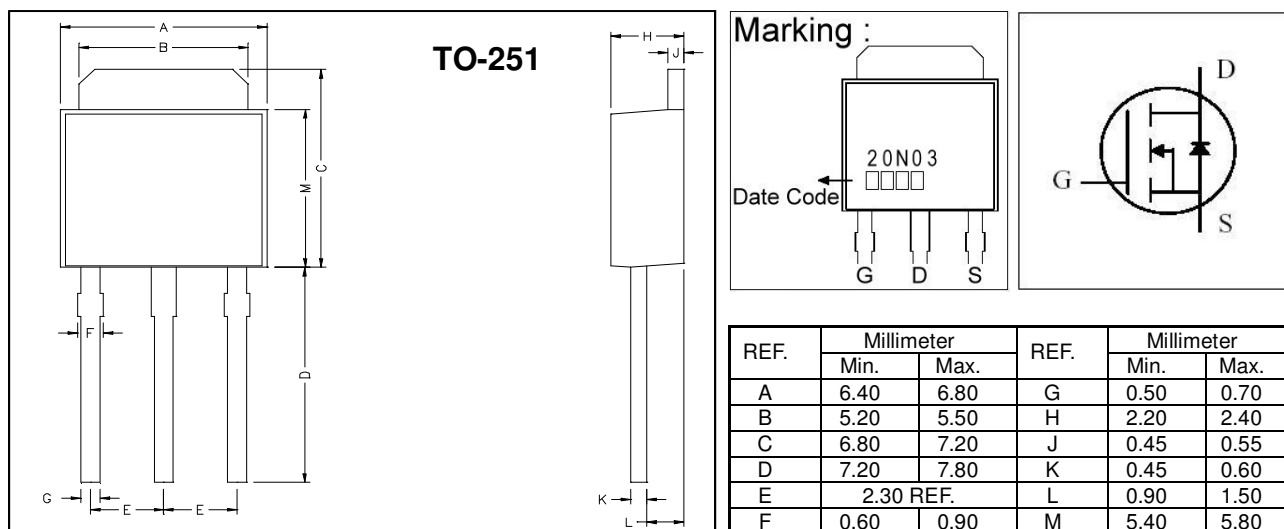
The GI20N03 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The through-hole version (TO-251) is available for low-profile applications and suited for low voltage applications such as DC/DC converters.

Features

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

Package Dimensions



Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|--------------------------------------------------|------------------------|------------|---------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current, $V_{GS}@10V$ | $I_D @T_C=25^\circ C$ | 20 | A |
| Continuous Drain Current, $V_{GS}@10V$ | $I_D @T_C=100^\circ C$ | 13 | A |
| Pulsed Drain Current ¹ | I_{DM} | 53 | A |
| Total Power Dissipation | $P_D @T_C=25^\circ C$ | 31 | W |
| Linear Derating Factor | | 0.25 | W/ $^\circ C$ |
| Operating Junction and Storage Temperature Range | T_j, T_{stg} | -55 ~ +150 | $^\circ C$ |

Thermal Data

| Parameter | Symbol | Value | Unit |
|------------------------------------------|--------|-------|--------------|
| Thermal Resistance Junction-case Max. | Rthj-c | 4.0 | $^\circ C/W$ |
| Thermal Resistance Junction-ambient Max. | Rthj-a | 110 | $^\circ C/W$ |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|-----------------------------------------------------|--------------------------------|------|-------|------|------|----------------------------------------------------------------------------------------------------------------------|
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | - | - | V | V _{GS} =0, I _D =250uA |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS} / \Delta T_j$ | - | 0.037 | - | V/°C | Reference to 25°C, I _D =1mA |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | - | 3.0 | V | V _{DS} =V _{GS} , I _D =250uA |
| Forward Transconductance | g _{fs} | - | 3 | - | S | V _{DS} =10V, I _D =10A |
| Gate-Source Leakage Current | I _{GSS} | - | - | ±100 | nA | V _{GS} = ±20V |
| Drain-Source Leakage Current(T _j =25°C) | I _{DSS} | - | - | 1 | uA | V _{DS} =30V, V _{GS} =0 |
| Drain-Source Leakage Current(T _j =150°C) | | - | - | 100 | uA | V _{DS} =24V, V _{GS} =0 |
| Static Drain-Source On-Resistance | R _{DS(ON)} | - | - | 52 | mΩ | V _{GS} =10V, I _D =10A |
| | | - | - | 85 | | V _{GS} =4.5V, I _D =8A |
| Total Gate Charge ² | Q _g | - | 6.1 | - | nC | I _D =10A V _{DS} =24V V _{GS} =5V |
| Gate-Source Charge | Q _{gs} | - | 1.4 | - | | |
| Gate-Drain ("Miller") Change | Q _{gd} | - | 4 | - | | |
| Turn-on Delay Time ² | T _{d(on)} | - | 4.9 | - | ns | V _{DS} =15V I _D =20A V _{GS} =10V R _G =3.3Ω R _D =0.75Ω |
| Rise Time | T _r | - | 29 | - | | |
| Turn-off Delay Time | T _{d(off)} | - | 14.3 | - | | |
| Fall Time | T _f | - | 3.6 | - | | |
| Input Capacitance | C _{iss} | - | 290 | - | pF | V _{GS} =0V V _{DS} =25V f=1.0MHz |
| Output Capacitance | C _{oss} | - | 160 | - | | |
| Reverse Transfer Capacitance | C _{rss} | - | 45 | - | | |

Source-Drain Diode

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|-------------------------------------------------|-----------------|------|------|------|------|----------------------------------------------------------------|
| Forward On Voltage ² | V _{SD} | - | - | 1.3 | V | I _S =20A, V _{GS} =0V, T _j =25°C |
| Continuous Source Current (Body Diode) | I _S | - | - | 20 | A | V _D =V _G =0V, V _S =1.3V |
| Pulsed Source Current (Body Diode) ¹ | I _{SM} | - | - | 53 | A | |

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

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

Characteristics Curve

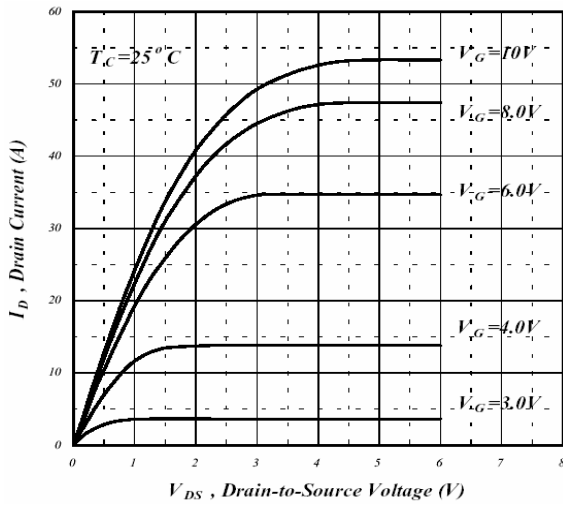


Fig 1. Typical Output Characteristics

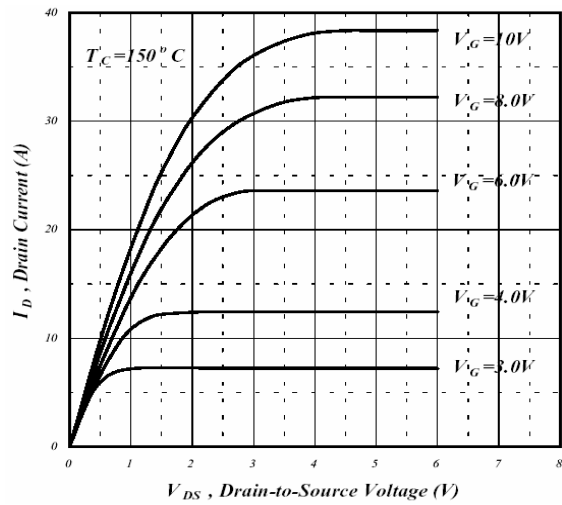


Fig 2. Typical Output Characteristics

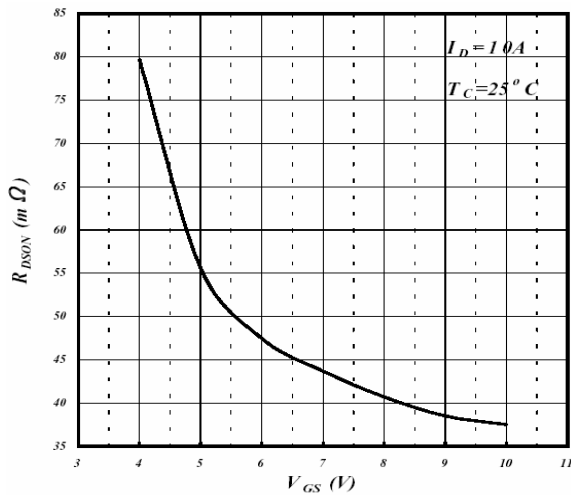


Fig 3. On-Resistance v.s. Gate Voltage

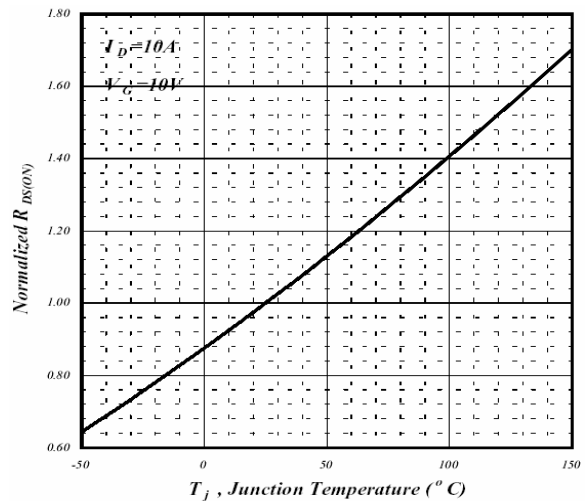


Fig 4. Normalized On-Resistance v.s. Junction Temperature

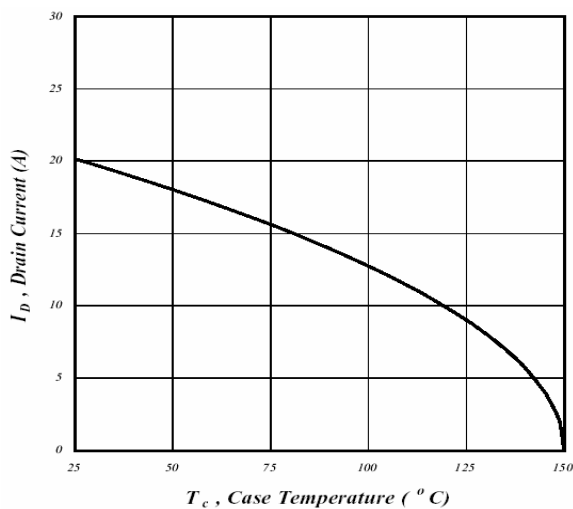


Fig 5. Maximum Drain Current v.s. Case Temperature

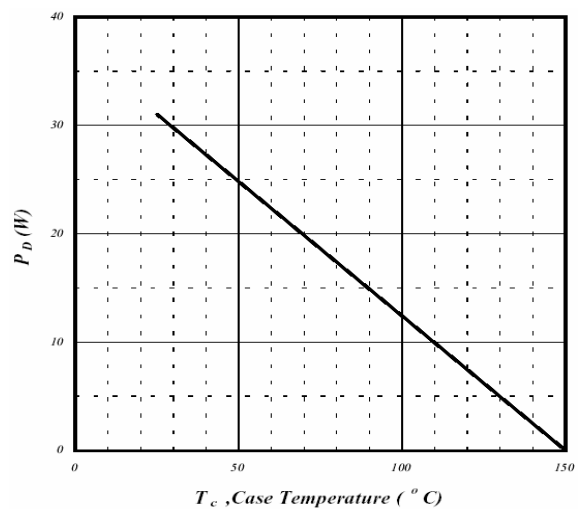


Fig 6. Type Power Dissipation

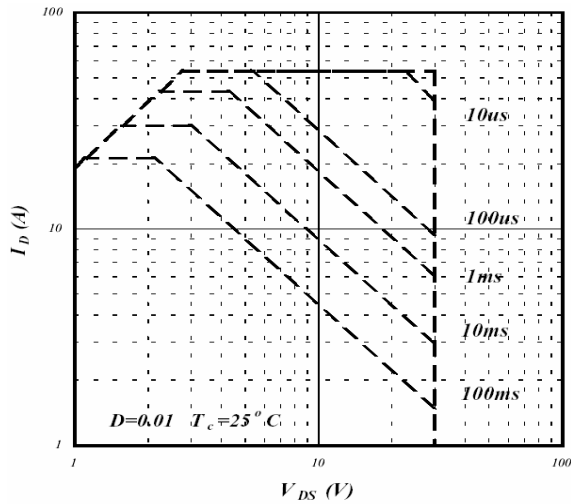


Fig 7. Maximum Safe Operating Area

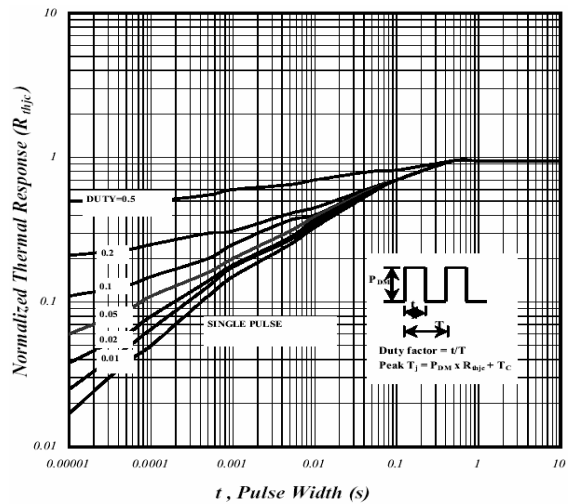


Fig 8. Effective Transient Thermal Impedance

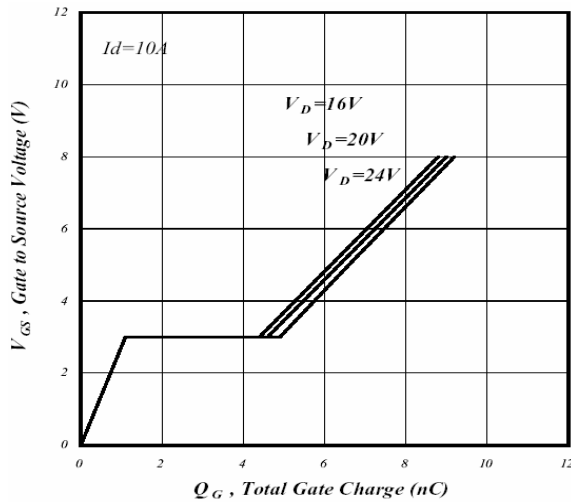


Fig 9. Gate Charge Characteristics

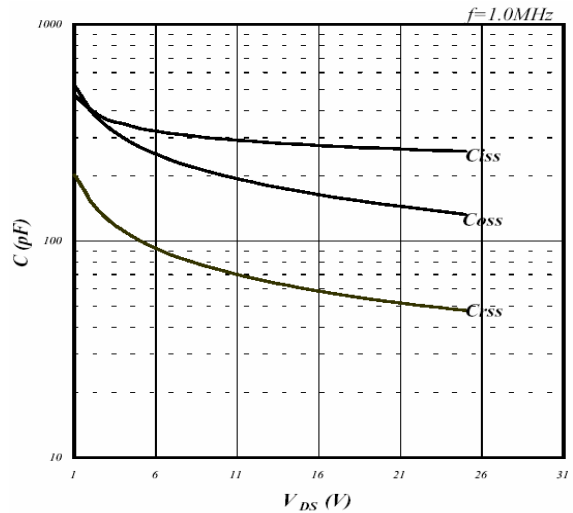


Fig 10. Typical Capacitance Characteristics

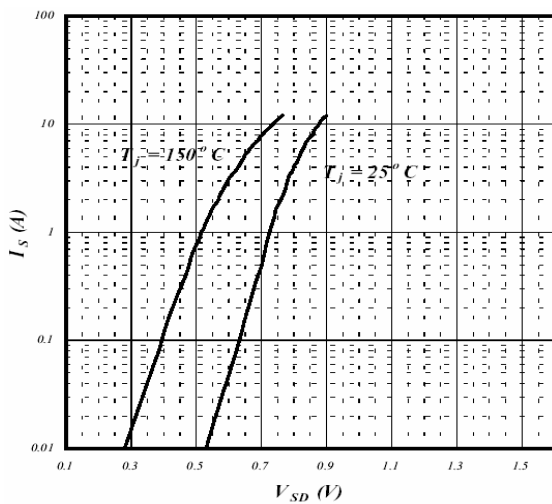


Fig 11. Forward Characteristics of Reverse Diode

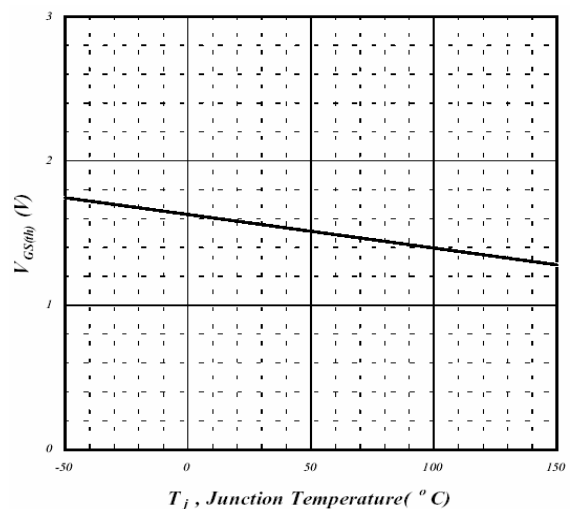


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

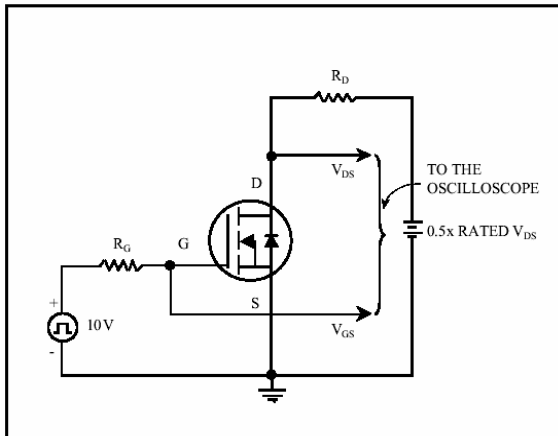


Fig 13. Switching Time Circuit

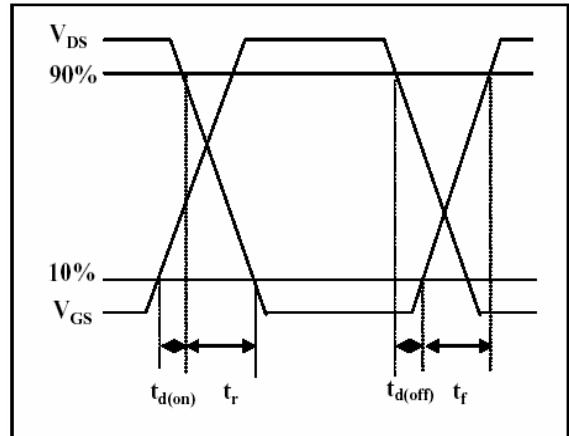


Fig 14. Switching Time Waveform

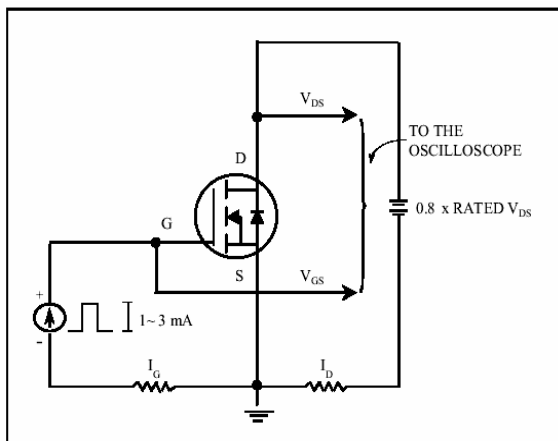


Fig 15. Gate Charge Circuit

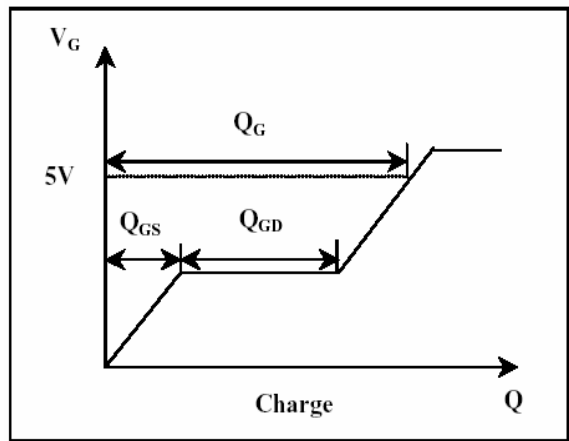


Fig 16. Gate Charge Waveform

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of GTM.
- GTM reserves the right to make changes to its products without notice.
- GTM semiconductor products are not warranted to be suitable for use in life-support Applications, or systems.
- GTM assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.

Head Office And Factory:

- **Taiwan:** No. 17-1 Tatung Rd. Fu Kou Hsin-Chu Industrial Park, Hsin-Chu, Taiwan, R. O. C.
- TEL : 886-3-597-7061 FAX : 886-3-597-9220, 597-0785
- **China:** (201203) No.255, Jang-Jiang Tsai-Lueng RD. , Pu-Dung-Hsin District, Shang-Hai City, China
- TEL : 86-21-5895-7671 ~ 4 FAX : 86-21-38950165