Pb Free Plating Product

# GTM CORPORATION

ISSUED DATE :2005/03/04
REVISED DATE :

# G3314

## P-CHANNEL ENHANCEMENT MODE POWER MOSFET

| | |
|---|---|
| $BV_{DSS}$ | -30V |
| $R_{DS(ON)}$ | 240mΩ |
| $I_D$ | -1.9A |

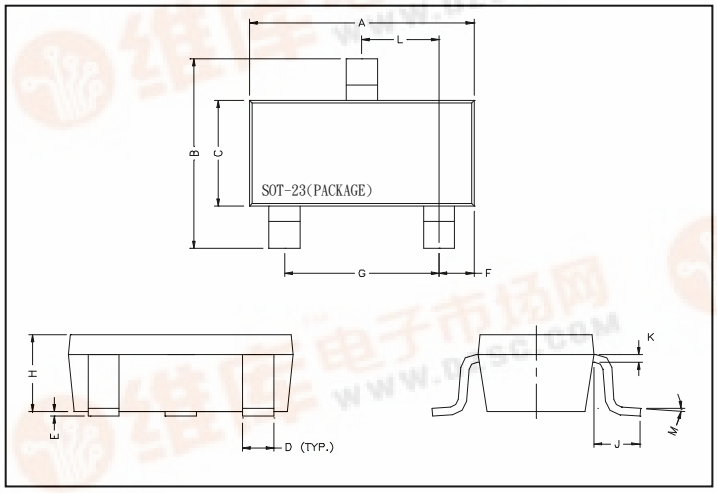
## Description

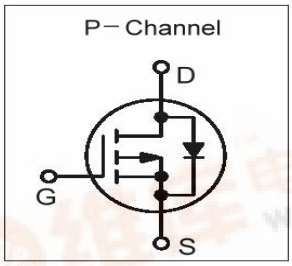
The G3314 provides the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

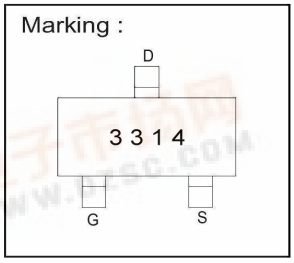
## Features

*Low On-resistance
*Ultrahigh-speed switching
*4V drive

## Package Dimensions




| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 2.70 | 3.10 | G | 1.90 | REF. |
| B | 2.40 | 2.80 | H | 1.00 | 1.30 |
| C | 1.40 | 1.60 | K | 0.10 | 0.20 |
| D | 0.35 | 0.50 | J | 0.40 | - |
| E | 0 | 0.10 | L | 0.85 | 1.15 |
| F | 0.45 | 0.55 | M | 0° | 10° |

## Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current[3] | $I_D$ @$T_A$=25℃ | -1.9 | A |
| Continuous Drain Current[3] | $I_D$ @$T_A$=70℃ | -1.5 | A |
| Pulsed Drain Current[1,2] | $I_{DM}$ | -10 | A |
| Power Dissipation | $P_D$ @$T_A$=25℃ | 1.38 | W |
| Linear Derating Factor | | 0.01 | W/℃ |
| Operating Junction and Storage Temperature Range | Tj, Tstg | -55 ~ +150 | ℃ |

## Thermal Data

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Thermal Resistance Junction-ambient[3] Max. | Rthj-a | 90 | ℃/W |

## Electrical Characteristics(Tj = 25℃ 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 | $\triangle BV_{DSS}/\triangle Tj$ | - | -0.1 | - | V/℃ | Reference to 25℃, $I_D$=-1mA |
| Gate Threshold Voltage | $V_{GS(th)}$ | -1.0 | - | - | V | $V_{DS}$=$V_{GS}$, $I_D$=-250uA |
| Forward Transconductance | $g_{fs}$ | - | 2 | - | S | $V_{DS}$=-10V, $I_D$=-1.7A |
| Gate-Source Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$= ±20V |
| Drain-Source Leakage Current(Tj=25℃) | $I_{DSS}$ | - | - | -1 | uA | $V_{DS}$=-30V, $V_{GS}$=0 |
| Drain-Source Leakage Current(Tj=70℃) | | - | - | -10 | uA | $V_{DS}$=-30V, $V_{GS}$=0 |
| Static Drain-Source On-Resistance[2] | $R_{DS(ON)}$ | - | - | 240 | mΩ | $V_{GS}$=-10V, $I_D$=-1.7A |
| | | - | - | 270 | | $V_{GS}$=-10V, $I_D$=-0.8A |
| | | - | - | 460 | | $V_{GS}$=-4.5V, $I_D$=-1.3A |
| | | - | - | 500 | | $V_{GS}$=-4V, $I_D$=-0.4A |
| Total Gate Charge[2] | $Q_g$ | - | 6.2 | - | nC | $I_D$=-1.7A<br>$V_{DS}$=-15V<br>$V_{GS}$=-10V |
| Gate-Source Charge | $Q_{gs}$ | - | 1.4 | - | | |
| Gate-Drain ("Miller") Change | $Q_{gd}$ | - | 0.3 | - | | |
| Turn-on Delay Time[2] | $T_{d(on)}$ | - | 7.6 | - | ns | $V_{DS}$=-15V<br>$I_D$=-1A<br>$V_{GS}$=-10V<br>$R_G$=6Ω<br>$R_D$=15Ω |
| Rise Time | $T_r$ | - | 8.2 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 17.5 | - | | |
| Fall Time | $T_f$ | - | 9 | - | | |
| Input Capacitance | $C_{iss}$ | - | 230 | - | pF | $V_{GS}$=0V<br>$V_{DS}$=-15V<br>f=1.0MHz |
| Output Capacitance | $C_{oss}$ | - | 130.4 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 40 | - | | |

## Source-Drain Diode

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Forward On Voltage[2] | $V_{SD}$ | - | - | 1.2 | V | $I_S$=-1.25A, $V_{GS}$=0V |
| Continuous Source Current (Body Diode) | $I_S$ | - | - | -1 | A | $V_D$= $V_G$=0V, $V_S$=-1.2V |
| Pulsed Source Current (Body Diode)[1] | $I_{SM}$ | - | - | -6.4 | A | |

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width≦300us, duty cycle≦2%.

3. Surface mounted on 1 $in^2$ copper pad of FR4 board;270℃/W when mounted on min. copper pad.

## Characteristics Curve

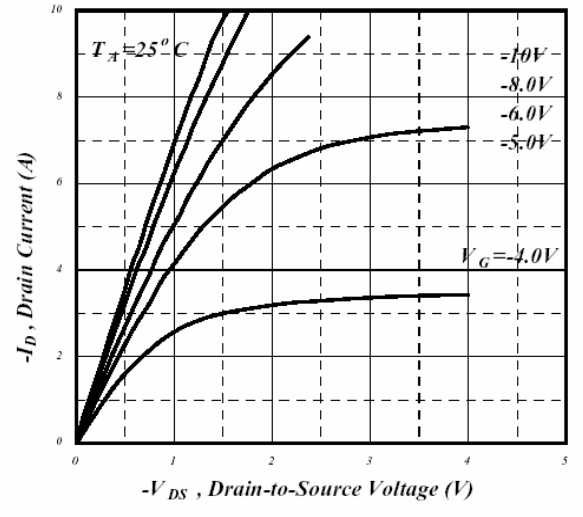



**Fig 1. Typical Output Characteristics**

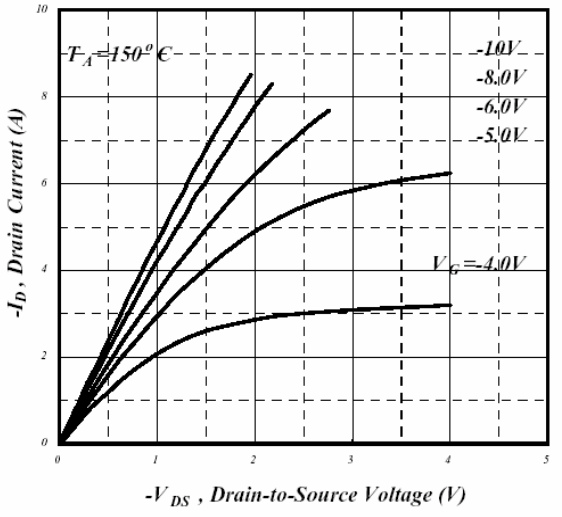



**Fig 2. Typical Output Characteristics**

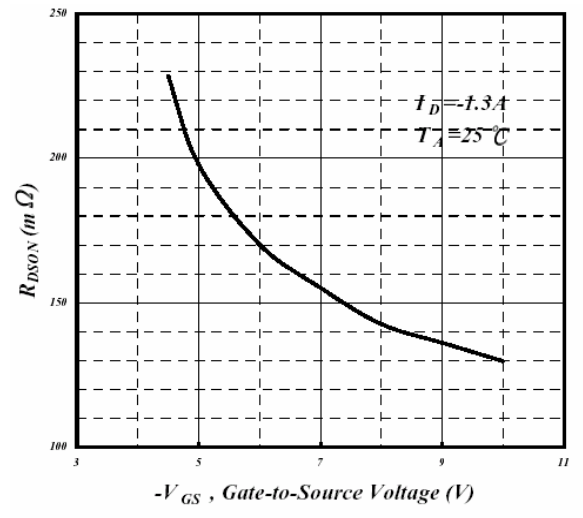



**Fig 3. On-Resistance v.s. Gate Voltage**

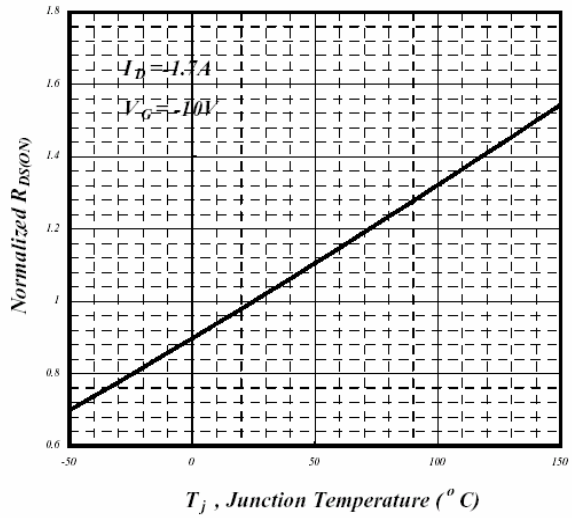



**Fig 4. Normalized On-Resistance**

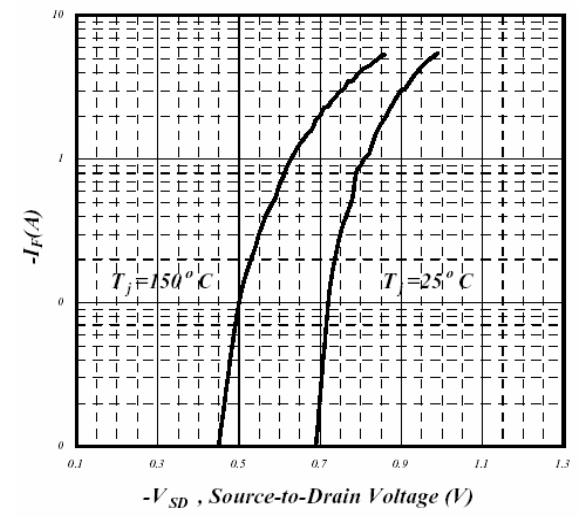



**Fig 5. Forward Characteristic of Reverse Diode**

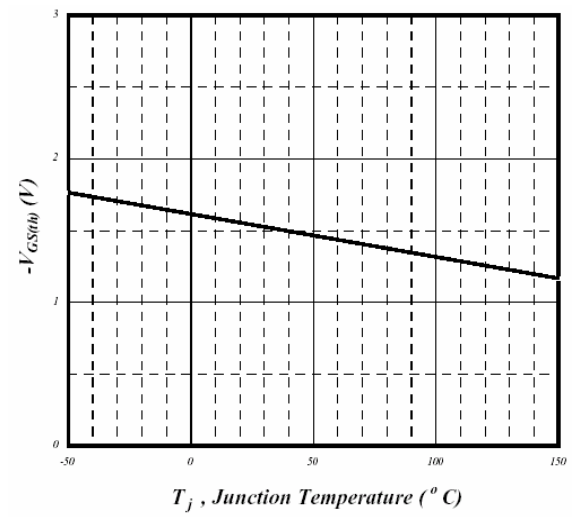



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

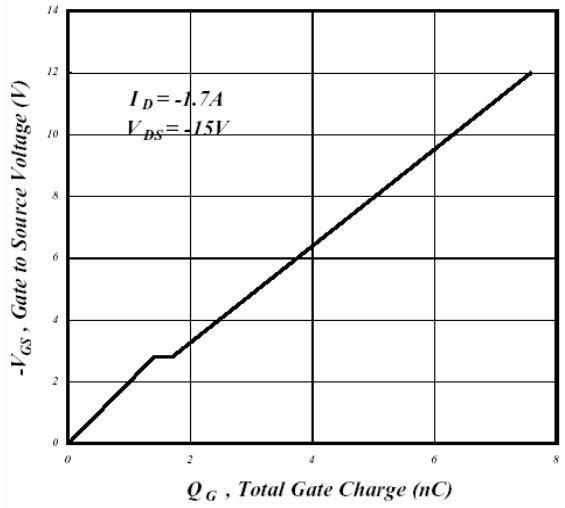



Fig 7. Gate Charge Characteristics

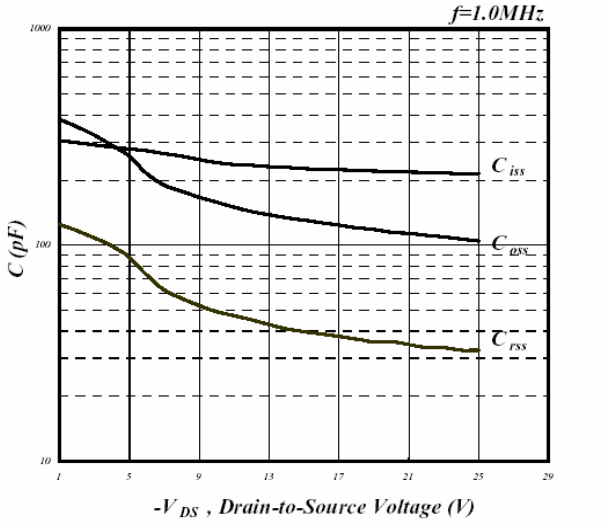



Fig 8. Typical Capacitance Characteristics

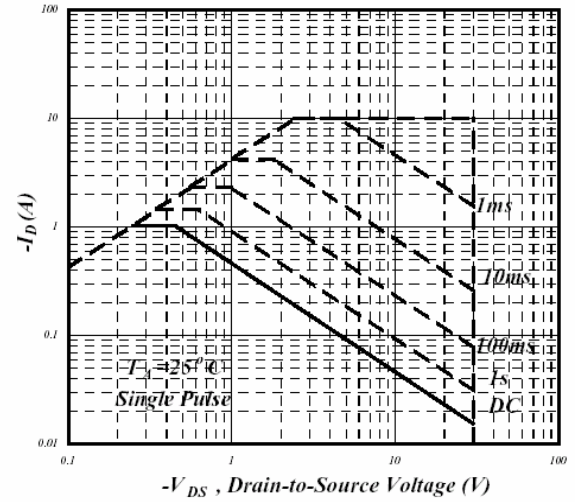



Fig 9. Maximum Safe Operating Area

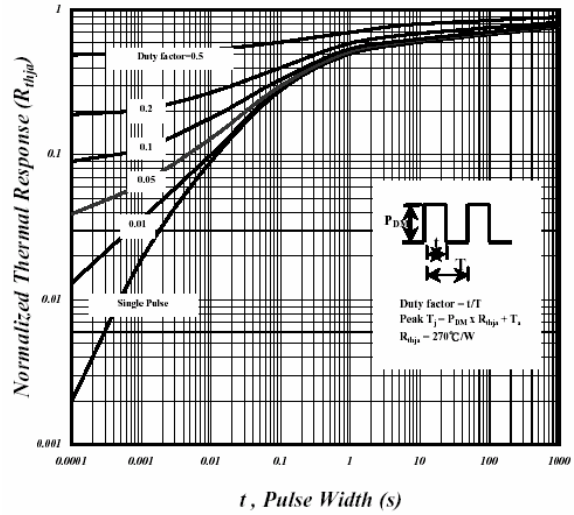



Fig 10. Effective Transient Thermal Impedance

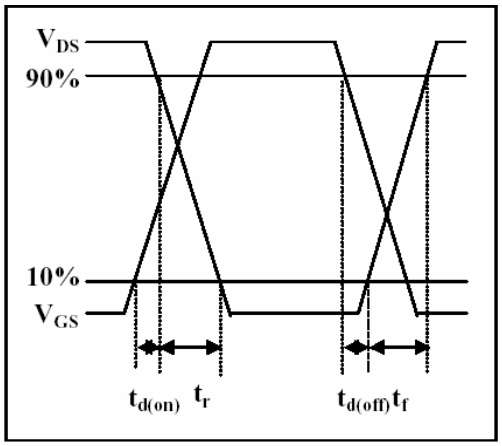



Fig 11. Switching Time Waveform

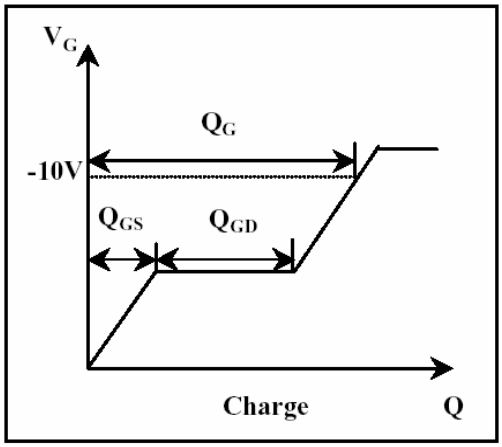



Fig 12. Gate Charge Waveform



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