TY Semicondutor®

**Product specification**

NEW PRODUCT

# DMG3414U

**N-CHANNEL ENHANCEMENT MODE MOSFET**

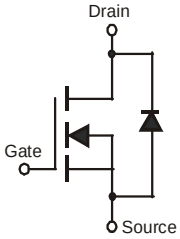
## Features

- Low On-Resistance
  - 25mΩ @ $V_{GS}$ = 4.5V
  - 29mΩ @ $V_{GS}$ = 2.5V
  - 37mΩ @ $V_{GS}$ = 1.8V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

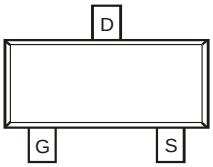
## Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (approximate)

TOP VIEW




Internal Schematic




TOP VIEW

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 20 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±8 | V |
| Continuous Drain Current (Note 3) | Steady State | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | 4.2<br>3.2 | A |
| Pulsed Drain Current (Note 4) | | | $I_{DM}$ | 30 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 3) | $P_D$ | 0.78 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = 25°C | $R_{\theta JA}$ | 162 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

Notes: 1. No purposefully added lead.
2. Device mounted on FR-4 PCB with 2oz. Copper and test pulse width t ≤ 10s.
3. Repetitive rating, pulse width limited by junction temperature.

NEW PRODUCT

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 5)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 20 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250μA |
| Zero Gate Voltage Drain Current $T_J$ = 25°C | $I_{DSS}$ | — | — | 1.0 | μA | $V_{DS}$ = 20V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±8V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 5)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.5 | — | 0.9 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA |
| Static Drain-Source On-Resistance | $R_{DS\ (ON)}$ | — | 19 | 25 | mΩ | $V_{GS}$ = 4.5V, $I_D$ = 8.2A |
| | | | 22 | 29 | | $V_{GS}$ = 2.5V, $I_D$ = 3.3A |
| | | | 28 | 37 | | $V_{GS}$ = 1.8V, $I_D$ = 2.0A |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | — | 7 | — | S | $V_{DS}$ = 10V, $I_D$ = 4A |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 829.9 | — | pF | $V_{DS}$ = 10V, $V_{GS}$ = 0V f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 85.3 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 81.2 | — | pF | |
| Total Gate Charge | $Q_g$ | — | 9.6 | — | nC | $V_{GS}$ = 4.5V, $V_{DS}$ = 10V, $I_D$ = 8.2A |
| Gate-Source Charge | $Q_{gs}$ | — | 1.5 | — | nC | |
| Gate-Drain Charge | $Q_{gd}$ | — | 3.5 | — | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 8.1 | — | ns | $V_{DD}$ = 10V, $V_{GS}$ = 4.5V, $R_L$ = 10Ω, $R_G$ = 6Ω, $I_D$ = 1A |
| Turn-On Rise Time | $t_r$ | — | 8.3 | — | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 40.1 | — | ns | |
| Turn-Off Fall Time | $t_f$ | — | 9.6 | — | ns | |

Notes: 4. Short duration pulse test used to minimize self-heating effect.