



**DMG2301U**

**P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max        | $I_D$ max<br>$T_A = +25^\circ C$ |
|---------------|-------------------------|----------------------------------|
| -20V          | 80mΩ @ $V_{GS} = 4.5V$  | -2.7A                            |
|               | 110mΩ @ $V_{GS} = 2.5V$ | -2.1A                            |

**Description**

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

**Applications**

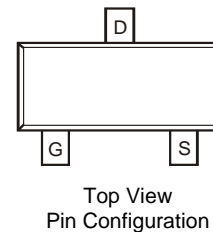
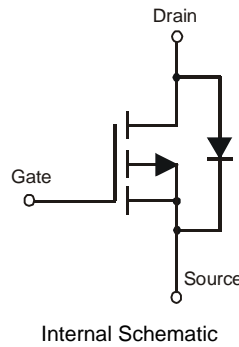
- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor control

**Features**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 standards for High Reliability**

**Mechanical Data**

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- 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)

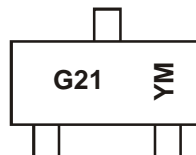


**Ordering Information** (Note 4)

| Part Number | Case  | Packaging        |
|-------------|-------|------------------|
| DMG2301U-7  | SOT23 | 3000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

**Marking Information**



G21 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: W = 2009)  
 M = Month (ex: 9 = September)

Date Code Key

| Year  | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |     |     |
|-------|------|------|------|------|------|------|------|------|------|------|-----|-----|
| Code  | W    | X    | Y    | Z    | A    | B    | C    | D    | E    | F    |     |     |
| Month | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov | Dec |
| Code  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | O    | N   | D   |

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic  |              |                           | Symbol    | Value   | Units |
|---|--------------|---------------------------|-----------|---------|-------|
| Drain-Source Voltage                                      |              |                           | $V_{DSS}$ | -20     | V     |
| Gate-Source Voltage                                       |              |                           | $V_{GSS}$ | $\pm 8$ | V     |
| Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | $I_D$     | -2.7    | A     |
|   |              | $T_A = +70^\circ\text{C}$ |           | -2.1    |       |
| Continuous Drain Current (Note 5) $V_{GS} = -2.5\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | $I_D$     | -2.1    | A     |
|   |              | $T_A = +70^\circ\text{C}$ |           | -1.7    |       |
| Pulsed Drain Current (Note 6)                             |              |                           | $I_{DM}$  | -27     | A     |

**Thermal Characteristics**

| Characteristic   | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 5)   | $P_D$           | 0.8         | W                  |
| Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5) | $R_{\theta JA}$ | 157         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range                                      | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic  | Symbol       | Min   | Typ   | Max       | Unit          | Test Condition  |
|---|--------------|-------|-------|-----------|---------------|---|
| <b>OFF CHARACTERISTICS (Note 7)</b>                       |              |       |       |           |               |   |
| Drain-Source Breakdown Voltage                            | $BV_{DSS}$   | -20   | —     | —         | V             | $V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$   |
| Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$ | $I_{DSS}$    | —     | —     | -1.0      | $\mu\text{A}$ | $V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$  |
| Gate-Source Leakage                                       | $I_{GSS}$    | —     | —     | $\pm 100$ | nA            | $V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$  |
| <b>ON CHARACTERISTICS (Note 7)</b>                        |              |       |       |           |               |   |
| Gate Threshold Voltage                                    | $V_{GS(th)}$ | -0.45 | —     | -1.0      | V             | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$  |
| Static Drain-Source On-Resistance                         | $R_{DS(ON)}$ | —     | —     | 80        | m $\Omega$    | $V_{GS} = -4.5\text{V}, I_D = -2.8\text{A}$   |
|   |              |       |       | 110       |               | $V_{GS} = -2.5\text{V}, I_D = -2.0\text{A}$   |
| Forward Transfer Admittance                               | $ Y_{fs} $   | —     | 10    | —         | S             | $V_{DS} = -5\text{V}, I_D = -2.8\text{A}$   |
| Diode Forward Voltage                                     | $V_{SD}$     | —     | -0.75 | -1.0      | V             | $V_{GS} = 0\text{V}, I_S = -1\text{A}$  |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>                   |              |       |       |           |               |   |
| Input Capacitance   | $C_{iss}$    | —     | 608   | —         | pF            | $V_{DS} = -6\text{V}, V_{GS} = 0\text{V}$<br>$f = 1.0\text{MHz}$                                      |
| Output Capacitance  | $C_{oss}$    | —     | 82    | —         | pF            |   |
| Reverse Transfer Capacitance                              | $C_{rss}$    | —     | 72    | —         | pF            |   |
| Gate Resistance   | $R_G$        | —     | 44.9  | —         | $\Omega$      | $V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1.0\text{MHz}$   |
| Total Gate Charge   | $Q_g$        | —     | 6.5   | —         | nC            | $V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V}, I_D = -3\text{A}$                                       |
| Gate-Source Charge  | $Q_{gs}$     | —     | 0.9   | —         | nC            |   |
| Gate-Drain Charge   | $Q_{gd}$     | —     | 1.5   | —         | nC            |   |
| Turn-On Delay Time  | $t_{D(on)}$  | —     | 12.5  | 40        | ns            | $V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V},$<br>$R_L = 10\Omega, R_G = 1.0\Omega, I_D = -1\text{A}$ |
| Turn-On Rise Time   | $t_r$        | —     | 10.3  | 30        | ns            |   |
| Turn-Off Delay Time                                       | $t_{D(off)}$ | —     | 46.5  | 140       | ns            |   |
| Turn-Off Fall Time  | $t_f$        | —     | 22.2  | 66        | ns            |   |

- Notes:
3. Device mounted on FR-4 PCB with minimum recommended pad layout.
  4. Repetitive rating, pulse width limited by junction temperature..
  5. Short duration pulse test used to minimize self-heating effect.
  6. Guaranteed by design. Not subject to production testing.