

**DMG3415U**

**P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on) \max}$	$I_D$ $T_A = 25^\circ\text{C}$
-20V	42.5m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-4.0A
	71m $\Omega$ @ $V_{GS} = -1.8\text{V}$	-2.0A

**Description**

This new generation 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**

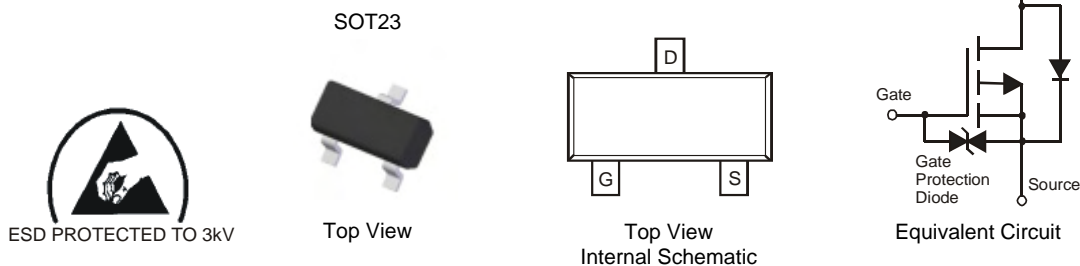
- DC-DC Converters
- Power management functions

**Features**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Up To 3kV**
- **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 **e3**
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (approximate)

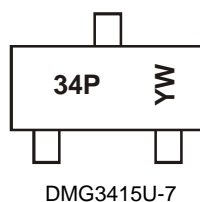


**Ordering Information** (Note 4)

Part Number	Qualification	Case	Packaging
DMG3415U-7	Commercial	SOT23	3,000/Tape & Reel
DMG3415UQ-7	Automotive	SOT23	3,000/Tape & Reel
DMG3415U-13	Commercial	SOT23	10,000/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**



34P = Product Type Marking Code  
 YW = Date Code Marking  
 Y = Year (ex: W = 2009)  
 W = Week (ex: A ~ Z = Weeks 1 ~ 26  
 a ~ y = Weeks 27 ~ 51  
 z = Weeks 52 and 53)

**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	$T_A = +25^\circ\text{C}$	$I_D$	-4.0	A
		$T_A = +70^\circ\text{C}$		-3.5	
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	-30	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	$P_D$	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	139	$^\circ\text{C/W}$
Thermal Resistance, Junction to case (Note 5)	$R_{\theta JC}$	32	$^\circ\text{C/W}$
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 6)</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	$I_{DSS}$	—	—	-1	$\mu\text{A}$	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8.0\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.3	-0.55	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	31	42.5	m $\Omega$	$V_{GS} = -4.5\text{V}, I_D = -4.0\text{A}$
		—	40	53		$V_{GS} = -2.5\text{V}, I_D = -3.5\text{A}$
		—	51	71		$V_{GS} = -1.8\text{V}, I_D = -2.0\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	3	—	S	$V_{DS} = -5\text{V}, I_D = -4\text{A}$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	—	294	—	pF	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	104	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	25	—	pF	
Gate Resistnace	$R_g$	—	250	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge	$Q_g$	—	9.1	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V}$ $I_D = -4\text{A}$
Gate-Source Charge	$Q_{gs}$	—	1.5	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	1.7	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	71	—	ns	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V},$ $R_D = 2.5\Omega, R_G = 3.0\Omega, I_D = -1\text{A}$
Turn-On Rise Time	$t_r$	—	117	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	795	—	ns	
Turn-Off Fall Time	$t_f$	—	393	—	ns	

- Notes:
3. Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.
  4. Short duration pulse test used to minimize self-heating effect.