





N-CHANNEL ENHANCEMENT MODE MOSFET

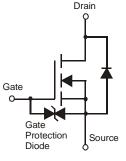
Features

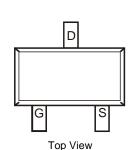
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected up to 2kV
- Lead Free By Design/RoHS Compliant (Note 1)
- "Green" Device (Note 2)
- Qualified to AEC-Q101 standards for High Reliability

Mechanical Data

- Case: SOT523
- 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 Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.002 grams (approximate)







Equivalent Circuit

Ordering Information (Note 3)

ESD PROTECTED TO 2kV

Part Number	Qualification	Case	Packaging
DMG1012T-7	Commercial	SOT523	3000/Tape & Reel
DMG1012TQ-7	Automotive	SOT523	3000/Tape & Reel

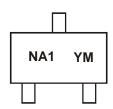
Notes:

- 1. No purposefully added lead.
- 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.

Top View

3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



NA1 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: W = 2009) M = Month (ex: 9 = September)

Date Code Key

Year	200	9	2010		2011	20	12	2013		2014	2	2015
Code	W		Х		Υ	7	7_	Α		В		С
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



Maximum Ratings @T_A = 25°C unless otherwise specified

Characterist	ic		Symbol	Value	Units
Drain-Source Voltage		V _{DSS}	20	V	
Gate-Source Voltage		V _{GSS}	±6	V	
Continuous Drain Current (Note 4)	Steady State	$T_A = 25$ °C $T_A = 85$ °C	I _D	0.63 0.45	Α
Pulsed Drain Current			I _{DM}	6	Α

Thermal Characteristics $@T_A = 25^{\circ}C$ unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 4)	P_{D}	0.28	W
Thermal Resistance, Junction to Ambient	$R_{ hetaJA}$	452	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

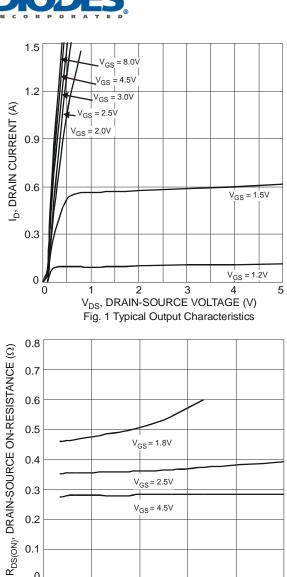
Electrical Characteristics @TA = 25°C unless otherwise specified

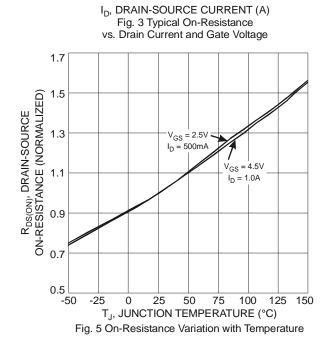
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
DFF CHARACTERISTICS (Note 5)								
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$		
Zero Gate Voltage Drain Current T _J = 25°C	I _{DSS}	-	-	100	nA	$V_{DS} = 20V, V_{GS} = 0V$		
Gate-Source Leakage	I _{GSS}	ı	-	±1.0	μΑ	$V_{GS} = \pm 4.5V, V_{DS} = 0V$		
ON CHARACTERISTICS (Note 5)								
Gate Threshold Voltage	V _{GS(th)}	0.5	-	1.0	V	$V_{DS} = V_{GS}, I_D = 250 \mu A$		
		-	0.3	0.4		$V_{GS} = 4.5V, I_D = 600mA$		
Static Drain-Source On-Resistance	R _{DS (ON)}		0.4	0.5	Ω	$V_{GS} = 2.5V, I_D = 500mA$		
			0.5	0.7		$V_{GS} = 1.8V, I_D = 350mA$		
Forward Transfer Admittance	Y _{fs}	-	1.4	-	S	$V_{DS} = 10V, I_D = 400mA$		
Diode Forward Voltage (Note 5)	V_{SD}		0.7	1.2	V	$V_{GS} = 0V, I_{S} = 150mA$		
DYNAMIC CHARACTERISTICS								
Input Capacitance	C_iss	ı	60.67	-	pF	101/11/		
Output Capacitance	Coss	-	9.68	-	pF	$V_{DS} = 16V, V_{GS} = 0V,$ - f = 1.0MHz		
Reverse Transfer Capacitance	C _{rss}	-	5.37	-	pF	1 = 1.000112		
Total Gate Charge	Qg	-	736.6	-	рC	45)/)/ 40)/		
Gate-Source Charge	Q_{gs}	-	93.6	-	рC	$V_{GS} = 4.5V, V_{DS} = 10V,$		
Gate-Drain Charge	Q_{gd}	-	116.6	-	рС	$I_D = 250 \text{mA}$		
Turn-On Delay Time	t _{D(on)}	-	5.1	-	ns	101/11/		
Turn-On Rise Time	t _r	-	7.4	-	ns	$V_{DD} = 10V, V_{GS} = 4.5V,$		
Turn-Off Delay Time	t _{D(off)}	-	26.7	-	ns	$R_L = 47\Omega$, $R_G = 10\Omega$, $R_D = 200$ mA		
Turn-Off Fall Time	t _f	-	12.3	-	ns			

Notes:

4. Device mounted on FR-4 PCB.5. Short duration pulse test used to minimize self-heating effect.



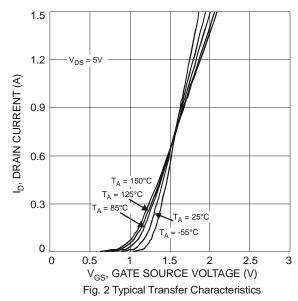




0.9

1.2

1.5



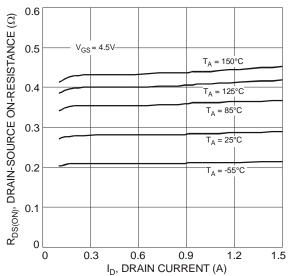


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

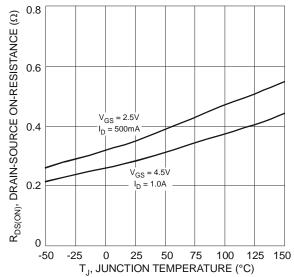


Fig. 6 On-Resistance Variation with Temperature

0

0



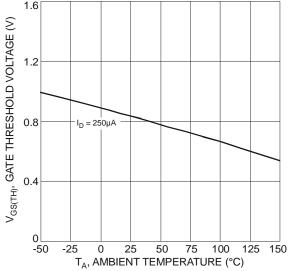
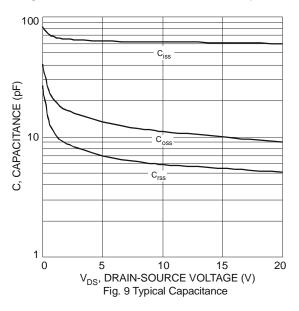
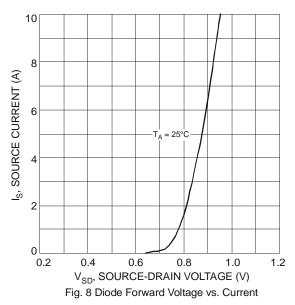
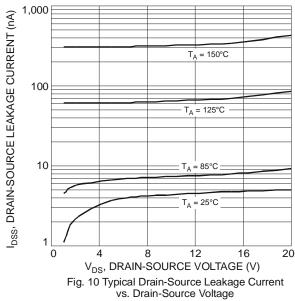


Fig. 7 Gate Threshold Variation vs. Ambient Temperature







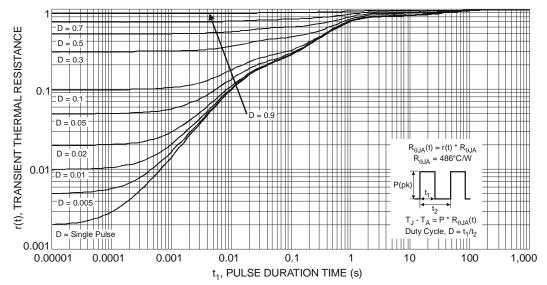
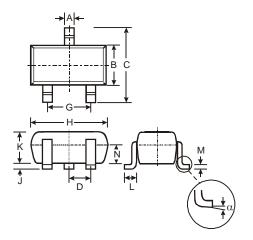


Fig. 11 Transient Thermal Response

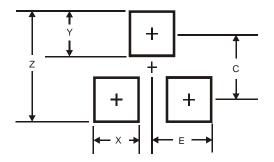


Package Outline Dimensions



	SOT523						
Dim	Min	Max	Тур				
Α	0.15	0.30	0.22				
В	0.75	0.85	0.80				
С	1.45	1.75	1.60				
D	_	_	0.50				
G	0.90	1.10	1.00				
Н	1.50	1.70	1.60				
J	0.00	0.10	0.05				
K	0.60	0.80	0.75				
L	0.10	0.30	0.22				
M	0.10	0.20	0.12				
N	0.45	0.65	0.50				
α	0°	8°	_				
All	All Dimensions in mm						

Suggested Pad Layout



Dimensions	Value (in mm)			
Z	1.8			
Х	0.4			
Y	0.51			
С	1.3			
E	0.7			



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