

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)

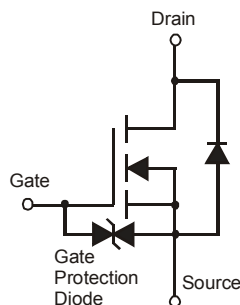


ESD PROTECTED TO 2kV

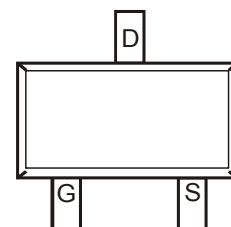
SOT523



Top View



Equivalent Circuit



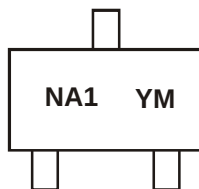
Top View

Ordering Information (Note 3)

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>.
 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	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

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°C unless otherwise specified

Characteristic			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	I _D	0.63	A
		T _A = 85°C		0.45	
Pulsed Drain Current			I _{DM}	6	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

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

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}	-	-	100	nA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±1.0	μA	V _{GS} = ±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 = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	0.3	0.4	Ω	V _{GS} = 4.5V, I _D = 600mA
			0.4	0.5		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}	-	60.67	-	pF	V _{DS} = 16V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	9.68	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	5.37	-	pF	
Total Gate Charge	Q _g	-	736.6	-	pC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
Gate-Source Charge	Q _{gs}	-	93.6	-	pC	
Gate-Drain Charge	Q _{gd}	-	116.6	-	pC	
Turn-On Delay Time	t _{D(on)}	-	5.1	-	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 10Ω, I _D = 200mA
Turn-On Rise Time	t _r	-	7.4	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	26.7	-	ns	
Turn-Off Fall Time	t _f	-	12.3	-	ns	

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

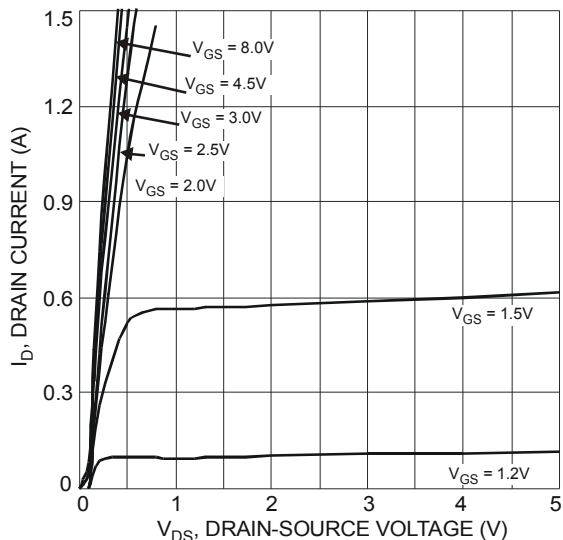


Fig. 1 Typical Output Characteristics

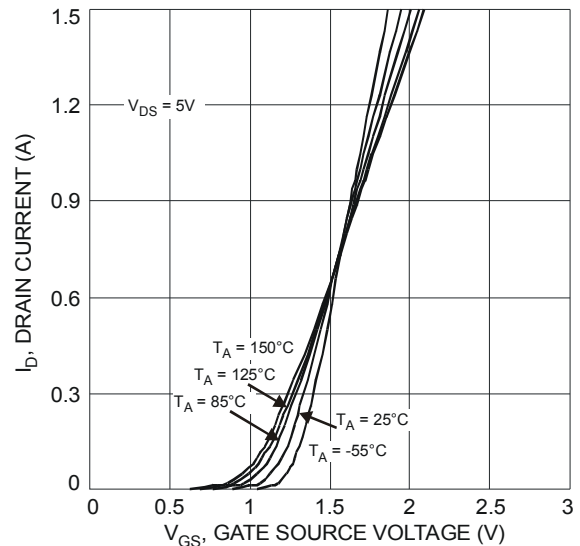


Fig. 2 Typical Transfer Characteristics

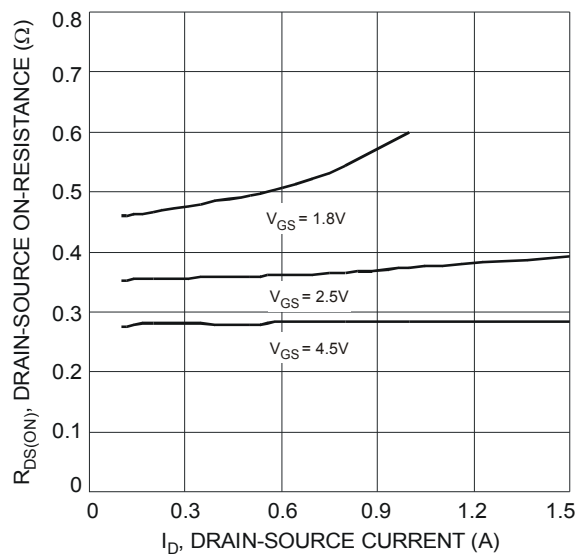


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

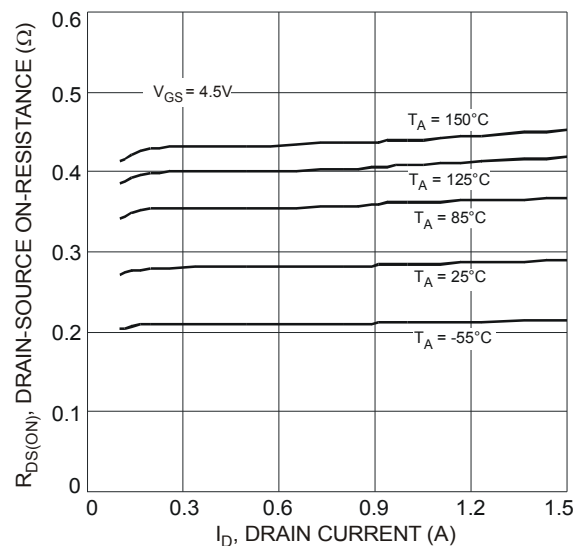


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

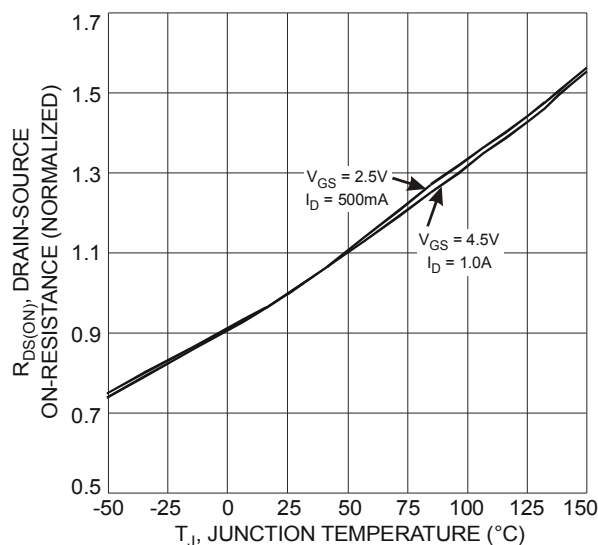


Fig. 5 On-Resistance Variation with Temperature

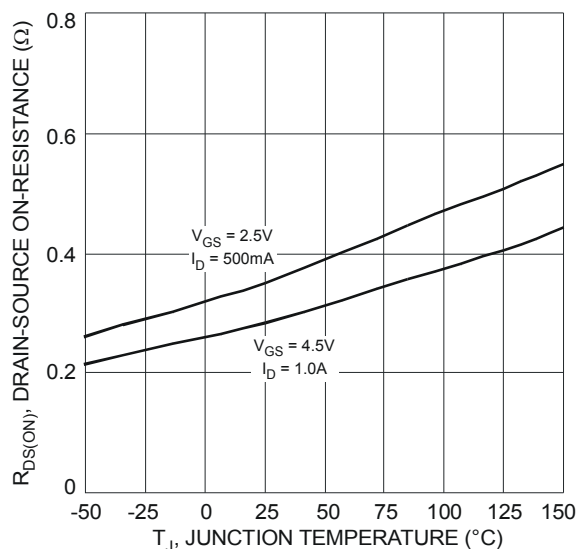


Fig. 6 On-Resistance Variation with Temperature

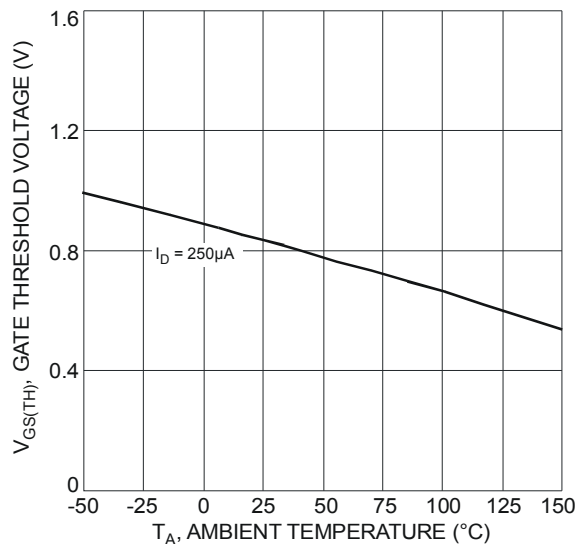


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

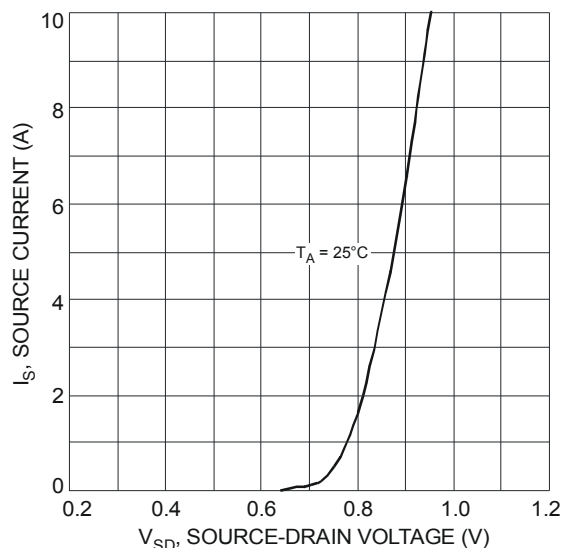


Fig. 8 Diode Forward Voltage vs. Current

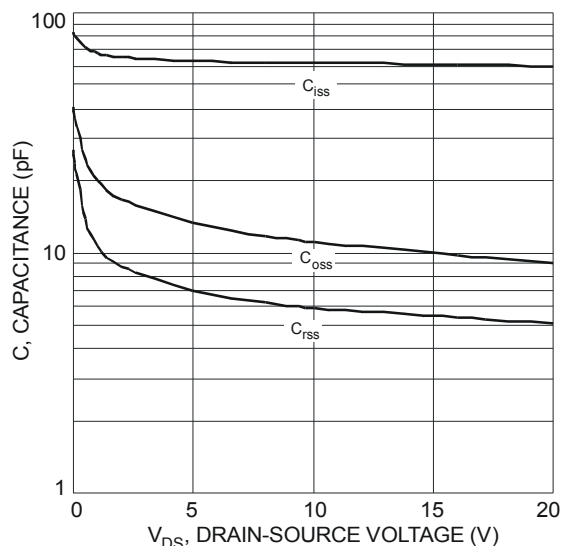


Fig. 9 Typical Capacitance

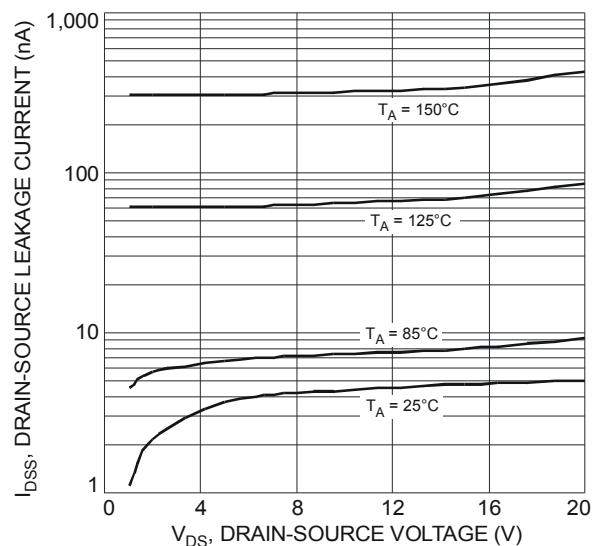


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

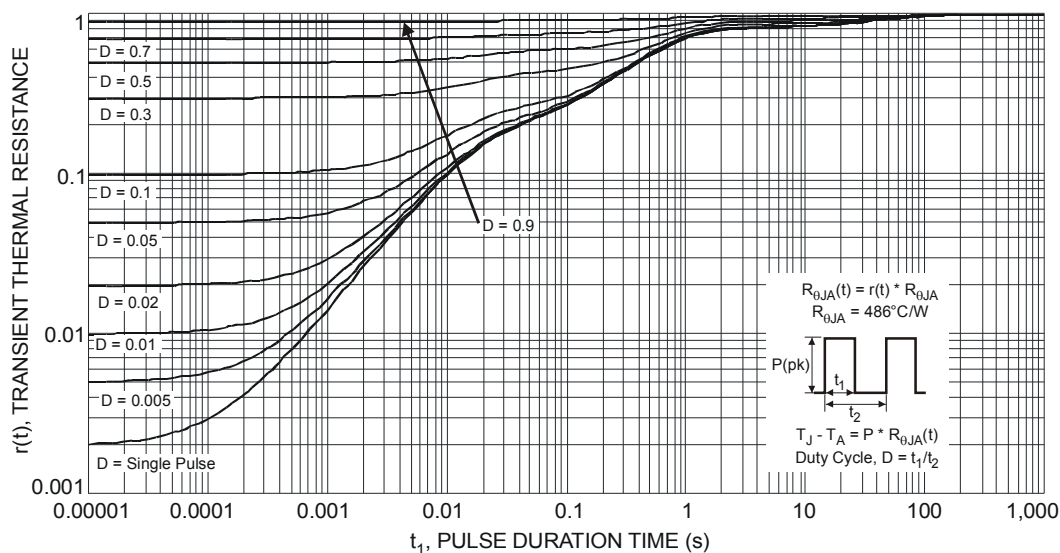
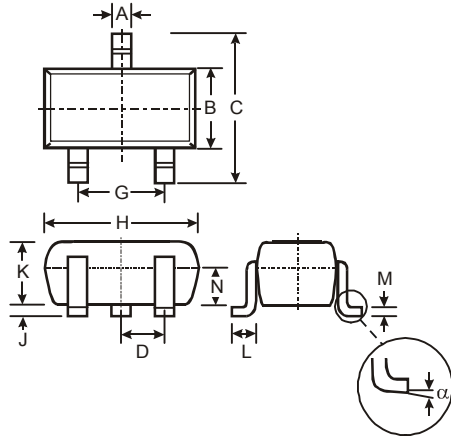


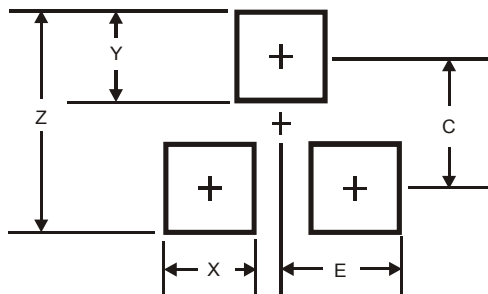
Fig. 11 Transient Thermal Response

Package Outline Dimensions



SOT523			
Dim	Min	Max	Typ
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	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 Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.8
X	0.4
Y	0.51
C	1.3
E	0.7

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