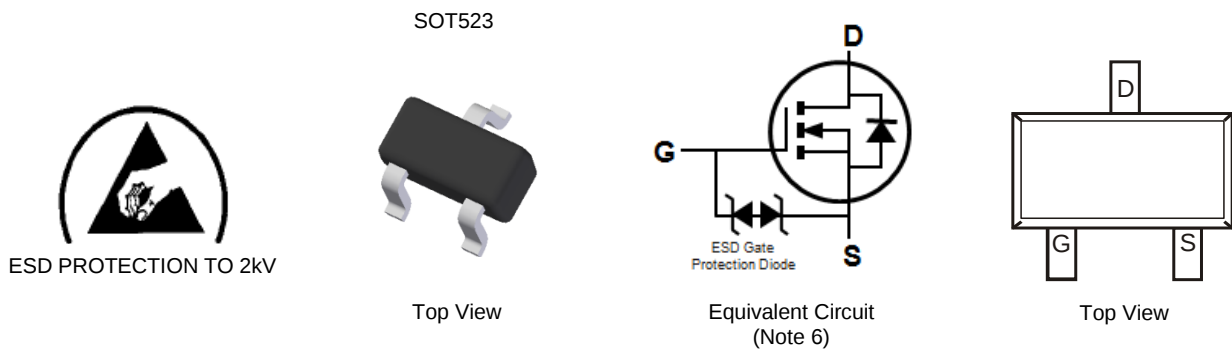


Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected up to 2kV**
- **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**
- **PPAP Capable (Note 4)**

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)

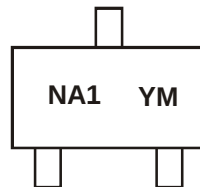


Ordering Information (Note 5)

Part Number	Qualification	Case	Packaging
DMG1012T-7	Commercial	SOT523	3000/Tape & Reel
DMG1012T-13	Commercial	SOT523	10000/Tape & Reel
DMG1012TQ-7	Automotive	SOT523	3000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
 6. The ESD gate protection diode is only designed to protect against ESD events. No gate-source voltage greater than the maximum V_{GS} rating (given on page 2) can be applied.

Marking Information



NA1 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: F = 2018)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	...	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	W	...	F	G	H	I	J	K	L	M	N

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	Unit
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±6	V
Continuous Drain Current (Note 7)	Steady State	T _A = +25°C	I _D	0.63	A
		T _A = +85°C		0.45	
Pulsed Drain Current			I _{DM}	3	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 7)	P _D	0.28	W
Thermal Resistance, Junction to Ambient (Note 7)	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 8)						
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 8)						
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
			—	—		V _{GS} = 1.8V, I _D = 350mA
Forward Transfer Admittance	Y _{fs}	—	1.4	—	S	V _{DS} = 10V, I _D = 400mA
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 150mA
DYNAMIC CHARACTERISTICS (Note 9)						
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: 7. Device mounted on FR-4 PCB, with minimum recommended pad layout.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

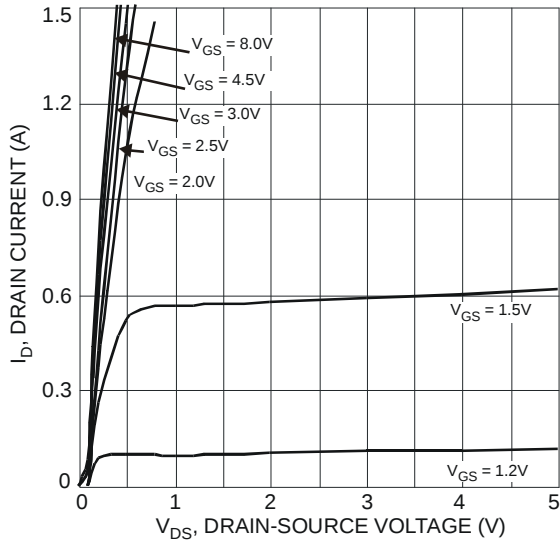


Fig. 1 Typical Output Characteristics

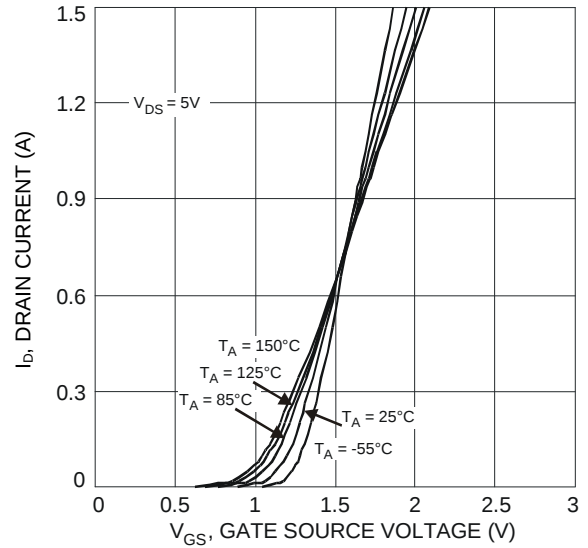


Fig. 2 Typical Transfer Characteristics

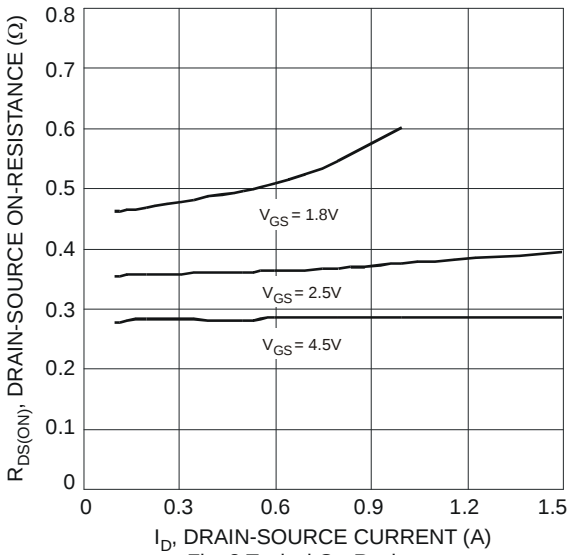


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

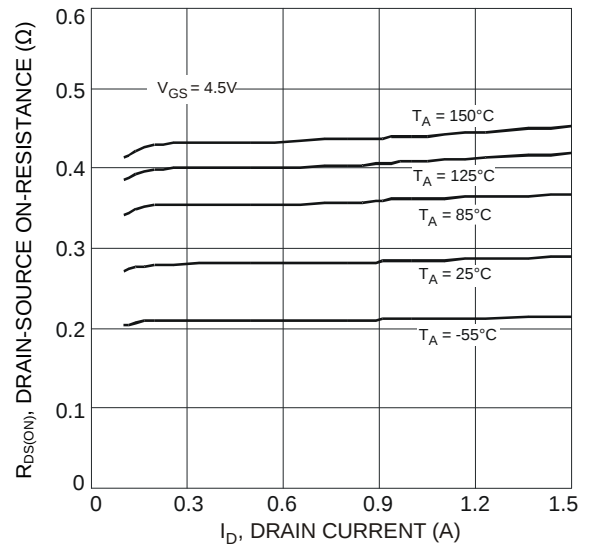


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

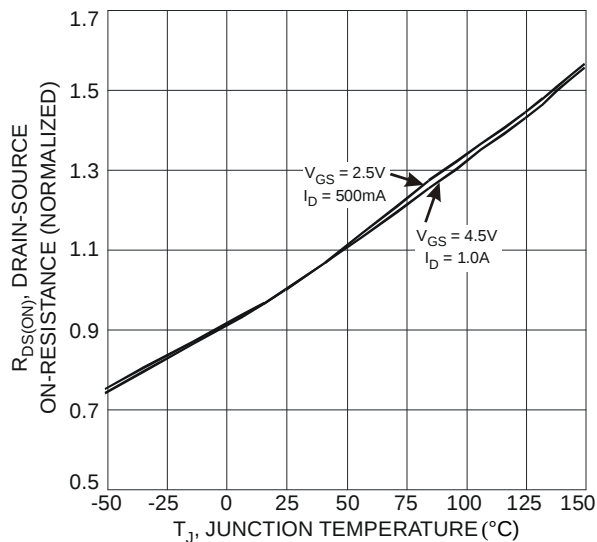


Fig. 5 On-Resistance Variation with Temperature

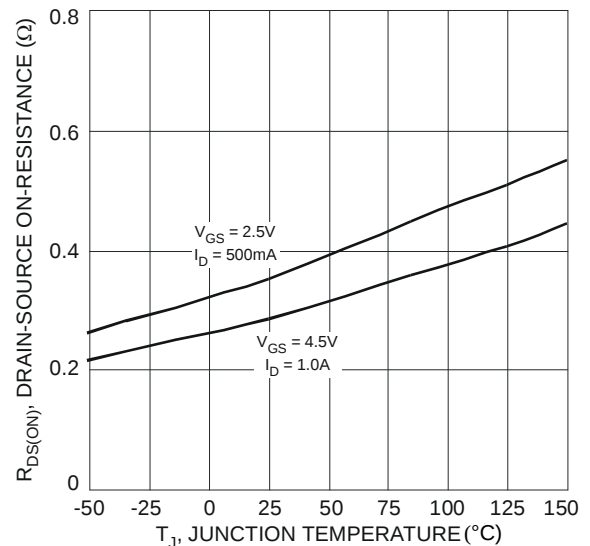


Fig. 6 On-Resistance Variation with Temperature

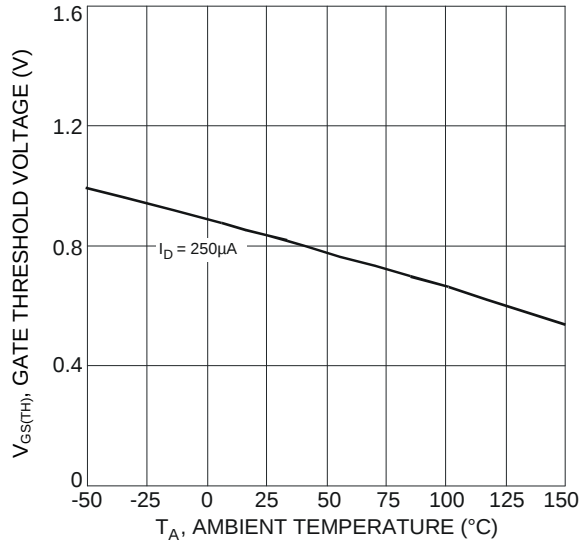


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

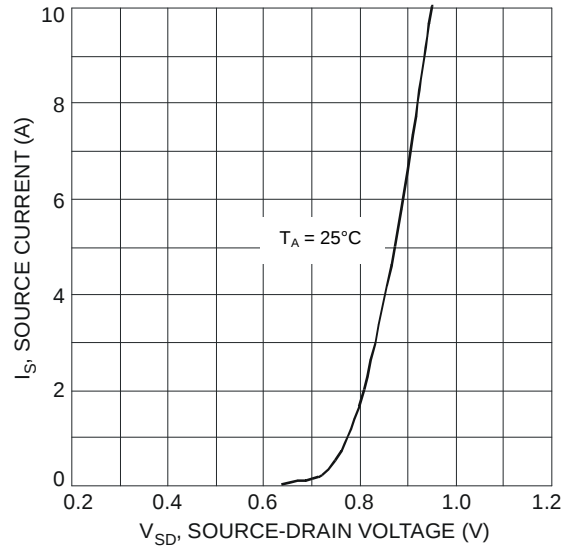


Fig. 8 Diode Forward Voltage vs. Current

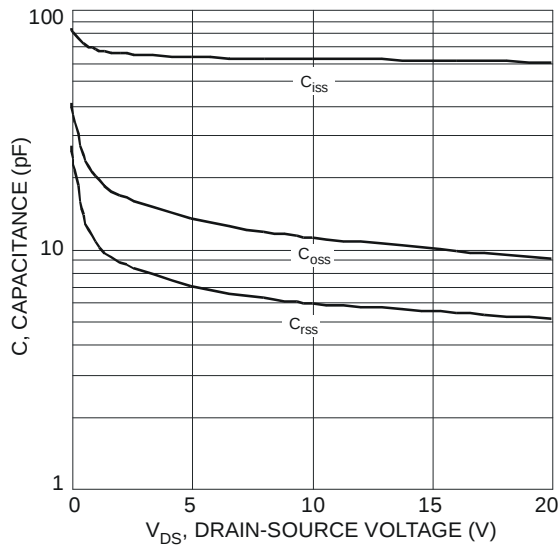


Fig. 9 Typical Capacitance

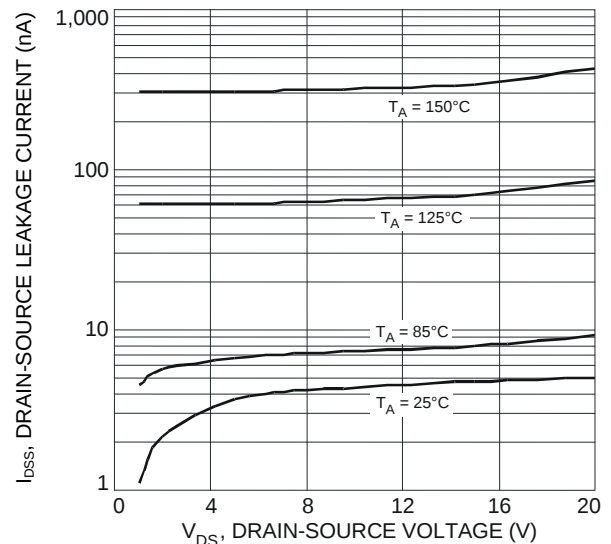


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

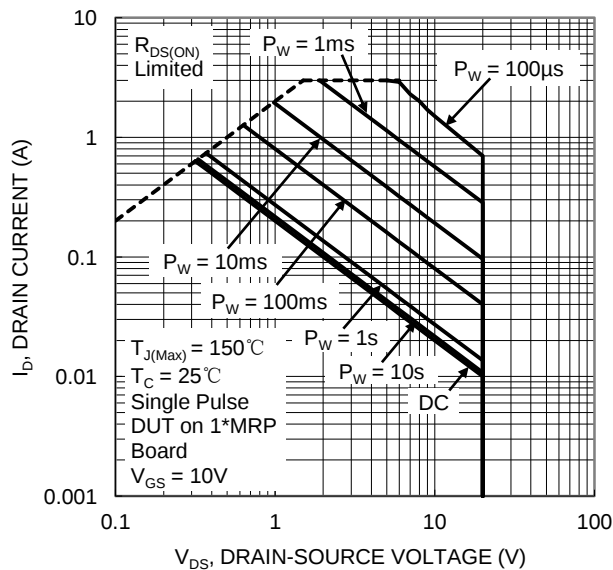
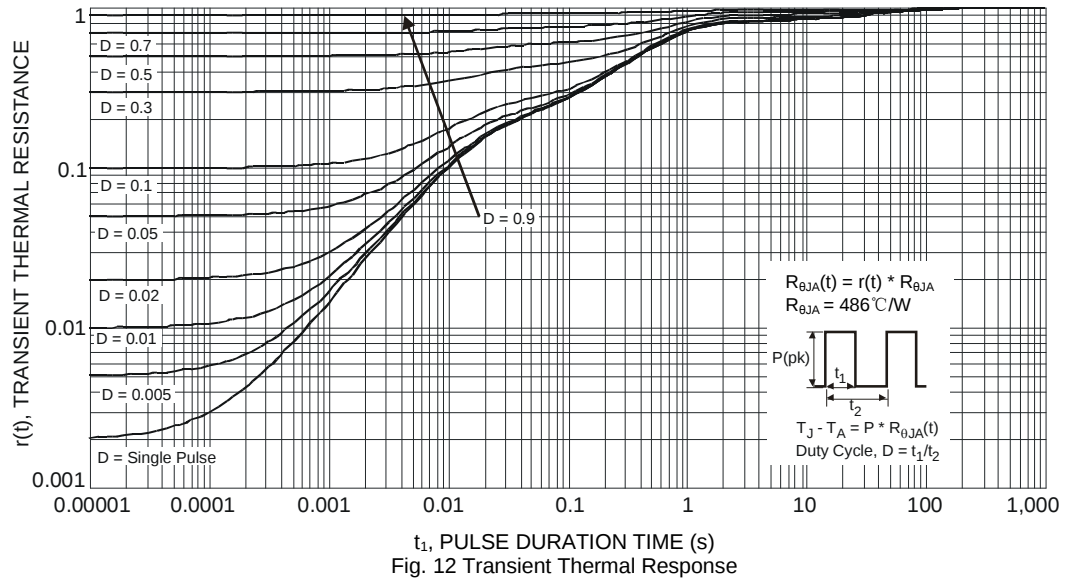


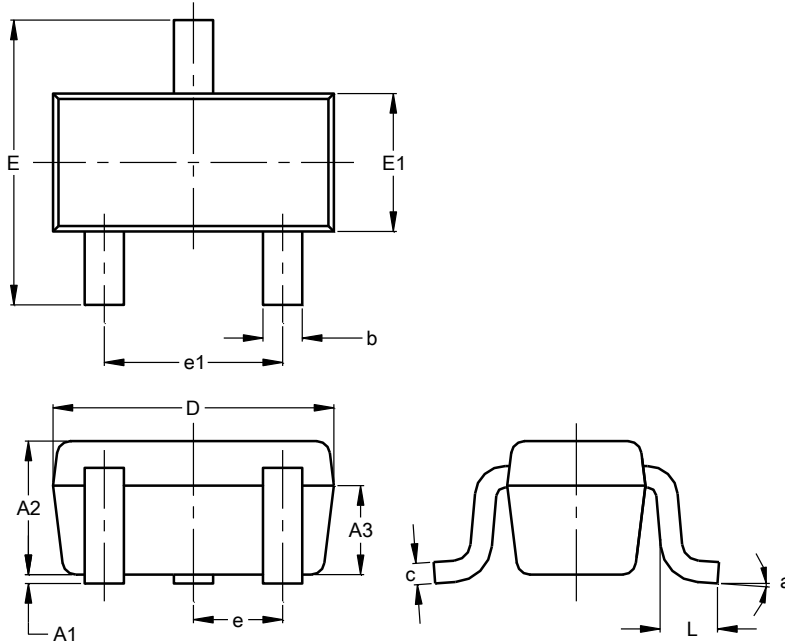
Fig. 11 SOA, Safe Operation Area



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT523

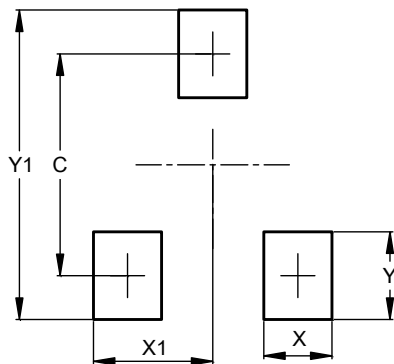


SOT523			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT523



Dimensions	Value (in mm)
C	1.29
X	0.40
X1	0.70
Y	0.51
Y1	1.80

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