P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Features

- Low $R_{DS(ON)}$
  - 72mΩ @V_{GS} = -4.5V
  - 108mΩ @V_{GS} = -2.7V
  - 123mΩ @V_{GS} = -2.5V
- Low Input/Output Leakage
- **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)**

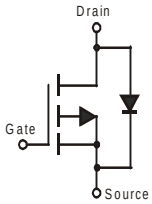
Mechanical Data

- Case: SOT23
- Case Material - Molded Plastic, "Green" Molding Compound. UL Flammability 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
- Terminal Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

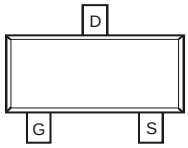
SOT23



Top View



Internal Schematic



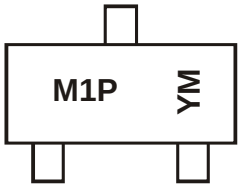
Top View

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP2123LQ-7	SOT23	3,000/Tape & Reel
DMP2123LQ-13	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. See http://www.diodes.com/quality/lead_free.html 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. For more information, please refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



M1P = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: C = 2015)
M = Month (ex: 9 = September)

Date Code Key

Year	2007	…	2015	2016	2017	2018	2019	2020	2021	2022	2023
Code	U	…	C	D	E	F	G	H	I	J	K

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

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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}	±12	V
Drain Current (Note 6) Continuous	T_A = +25°C T_A = +70°C	I_D	-3.0 -2.4	A
Pulsed Drain Current (Note 7)		I_{DM}	-15	A
Body-Diode Continuous Current (Note 6)		I_S	-2.0	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 6); Steady-State	$R_{\theta JA}$	90	°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
STATIC PARAMETERS							
Drain-Source Breakdown Voltage		BV_{DSS}	-20	—	—	V	I_D = -250µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	T_J = +25°C	I_{DSS}	—	—	-1	µA	V_{DS} = -20V, V_{GS} = 0V
Gate-Body Leakage Current		I_{GSS}	—	—	±100	nA	V_{DS} = 0V, V_{GS} = ±12V
Gate Threshold Voltage		$V_{GS(TH)}$	-0.6	—	-1.25	V	V_{DS} = V_{GS}, I_D = -250µA
On State Drain Current (Note 8)		$I_{D(ON)}$	-15	—	—	A	V_{GS} = -4.5V, V_{DS} = -5V
Static Drain-Source On-Resistance (Note 8)		$R_{DS(ON)}$	—	51 87 99	72 108 123	mΩ	V_{GS} = -4.5V, I_D = -3.5A V_{GS} = -2.7V, I_D = -3.0A V_{GS} = -2.5V, I_D = -2.6A
Forward Transconductance (Note 8)		g_{FS}	—	7.3	—	S	V_{DS} = -10V, I_D = -3.0A
Diode Forward Voltage (Note 6)		V_{SD}	—	-0.79	-1.26	V	I_S = -1.7A, V_{GS} = 0V
Maximum Body-Diode Continuous Current (Note 6)		I_S	—	—	-1.7	A	—
DYNAMIC PARAMETERS (Note 9)							
Total Gate Charge		Q_g	—	7.3	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -3.0A
Gate-Source Charge		Q_{gs}	—	2.0	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -3.0A
Gate-Drain Charge		Q_{gd}	—	1.9	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -3.0A
Turn-On Delay Time		$t_{D(ON)}$	—	12	—	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 10Ω, R_G = 6Ω
Turn-On Rise Time		t_R	—	20	—	ns	
Turn-Off Delay Time		$t_{D(OFF)}$	—	38	—	ns	
Turn-Off Fall Time		t_F	—	41	—	ns	
Input Capacitance		C_{iss}	—	443	—	pF	V_{DS} = -16V, V_{GS} = 0V f = 1.0MHz
Output Capacitance		C_{oss}	—	128	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	101	—	pF	

Notes: 6. Device mounted on 1" x 1", FR-4 PC board with 2 oz. copper and test pulse width t ≤10s.
7. Repetitive Rating, pulse width limited by junction temperature.
8. Test pulse width t = 300µs.
9. Guaranteed by design. Not subject to product testing.

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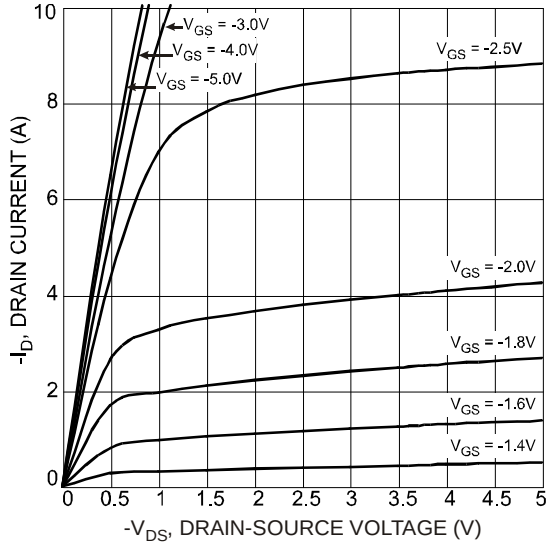


Fig. 1 Typical Output Characteristics

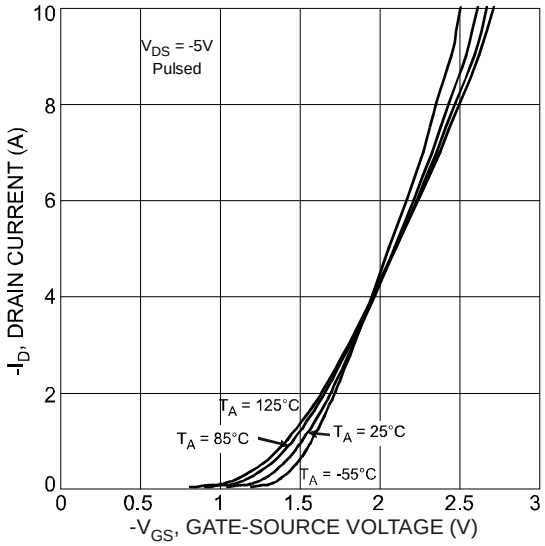


Fig. 2 Typical Transfer Characteristics

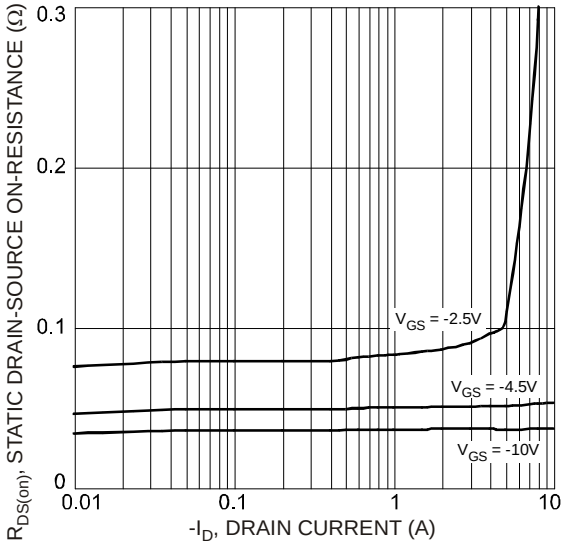


Fig. 3 On-Resistance vs. Drain Current and Gate Voltage

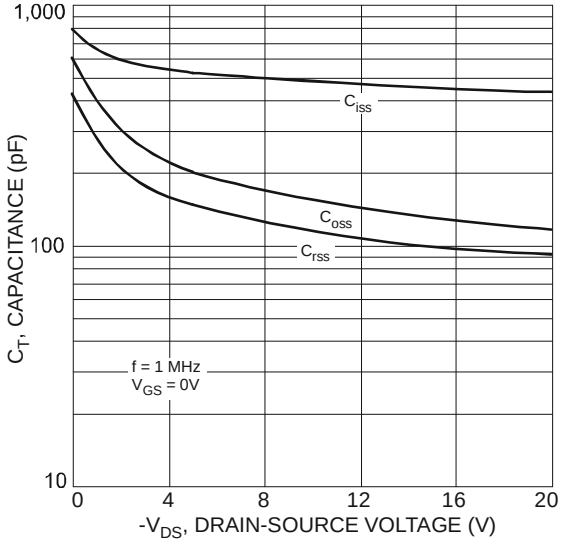


Fig. 4 Typical Total Capacitance

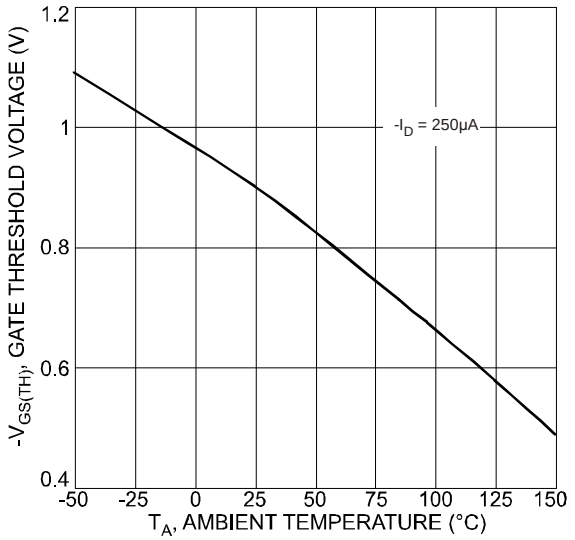


Fig. 5 Gate Threshold Voltage vs. Ambient Temperature

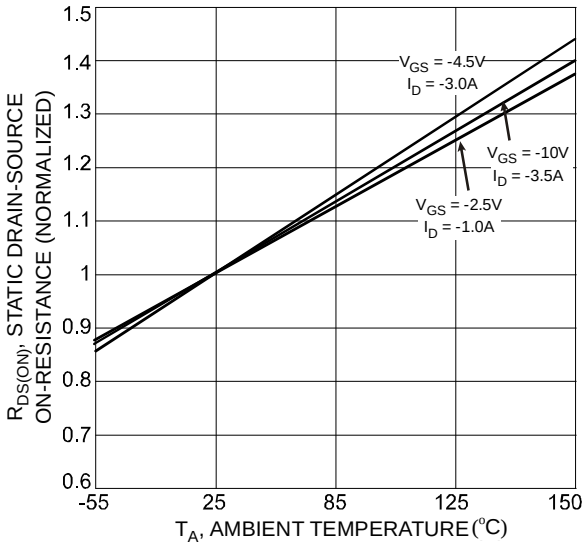


Fig. 6 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

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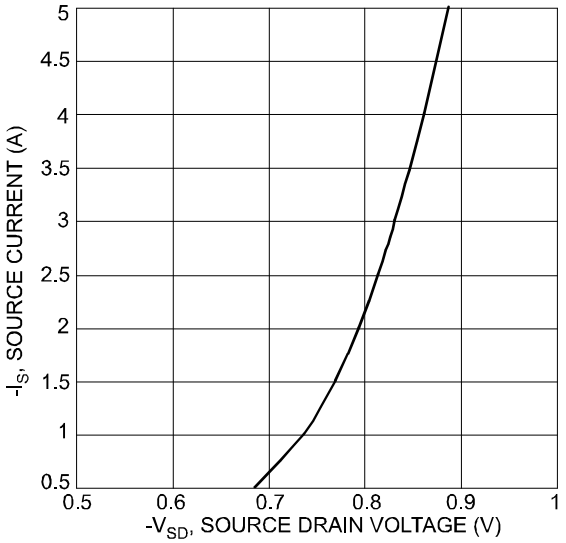


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

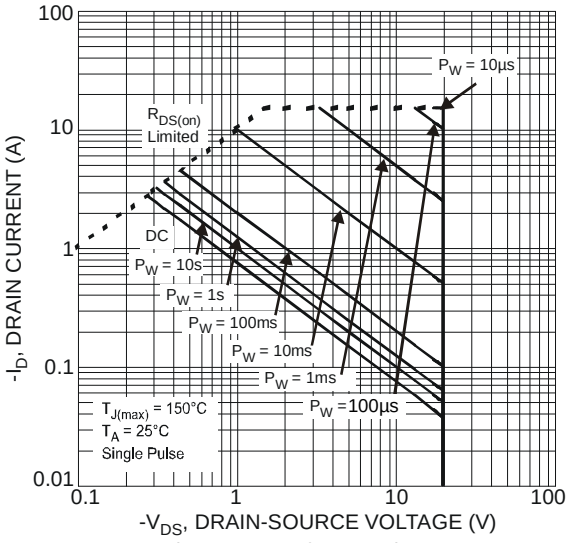
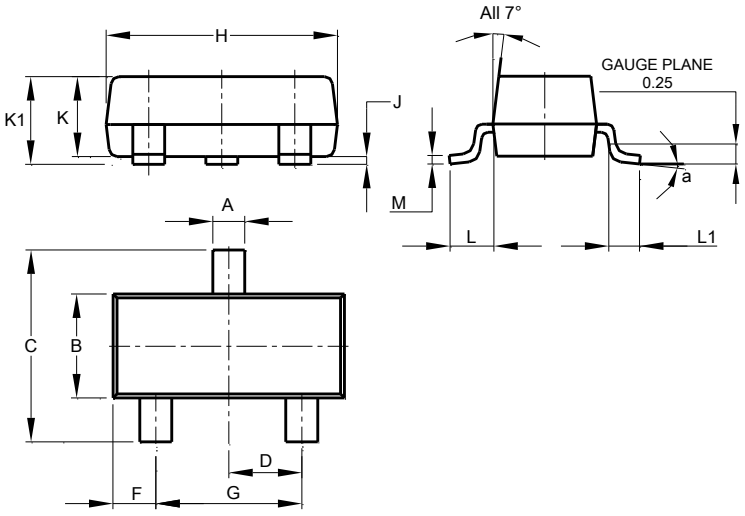


Fig. 8 SOA, Safe Operation Area

Package Outline Dimensions

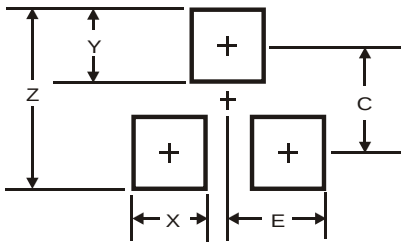
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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