



#### P-CHANNEL ENHANCEMENT MODE MOSFET

## **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(on)</sub> max	I <sub>D</sub> max T <sub>A</sub> = +25°C
	$13m\Omega$ @ $V_{GS} = -10V$	-9.3A
-20V	16mΩ @ V <sub>GS</sub> = -4.5V	-8.3A
	22mΩ @ V <sub>GS</sub> = -2.5V	-7.2A

### **Description**

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## **Applications**

- Backlighting
- Power Management Functions
- DC-DC Converters

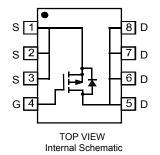


#### **Features**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Available (Note 4)

#### **Mechanical Data**

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound.
   UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish Matte Tin annealed over Copper lead frame.
   Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.074g (approximate)



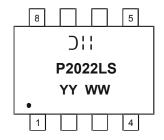
### Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
DMP2022LSSQ-13	Automotive	SO-8	2,500/Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- 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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product\_grade\_definitions/.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## **Marking Information**



Oll = Manufacturer's Marking
P2022LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 13 = 2013)
WW = Week (01 - 53)



## **Maximum Ratings** ( $@T_A = +25^{\circ}C$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	-20	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	V
Drain Current (Note 6)	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$		-9.3 -7.4	А
Pulsed Drain Current (Note 7)			I <sub>DM</sub>	-35	А

### **Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P <sub>D</sub>	1.6	W
Thermal Resistance, Junction to Ambient	$R_{ hetaJA}$	74	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	-1	μΑ	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	_	_	±100	nA	$V_{GS} = \pm 12V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.6	-0.77	-1.1	V	$V_{DS} = V_{GS}$ , $I_D = -250\mu A$
		_	8	13		$V_{GS} = -10V, I_D = -10A$
Static Drain-Source On-Resistance	R <sub>DS</sub> (ON)	_	11	16	mΩ	$V_{GS} = -4.5V$ , $I_D = -9A$
		_	17	22		$V_{GS} = -2.5V$ , $I_{D} = -8A$
Forward Transconductance	9 <sub>fs</sub>	_	28	_	S	$V_{DS} = -10V, I_{D} = -10A$
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	-0.5	-0.68	-1.2	V	$V_{GS} = 0V, I_{S} = -3A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	Ciss	_	2575	_	pF	
Output Capacitance	Coss	_	326	_	pF	$V_{DS} = -10V, V_{GS} = 0V$ -f = 1MHz
Reverse Transfer Capacitance	C <sub>rss</sub>	_	261	_	pF	1 - 1101112
Gate Resistance	$R_{G}$	_	10.9	_	Ω	$V_{GS} = 0V V_{DS} = 0V$ , $f = 1MHz$
SWITCHING CHARACTERISTICS (Note 9)	SWITCHING CHARACTERISTICS (Note 9)					
Total Gate Charge	$Q_g$	_	28.1 60.2	_		$V_{DS}$ = -10V, $V_{GS}$ = -4.5V, $I_{D}$ = -10A $V_{DS}$ = -10V, $V_{GS}$ = -10V, $I_{D}$ = -10A
Gate-Source Charge	Q <sub>gs</sub>	_	5.9	_	nC	V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A
Gate-Drain Charge	$Q_{qd}$	_	7.4	_		V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A
Turn-On Delay Time	t <sub>D(on)</sub>	_	4.5	15		
Turn-On Rise Time	t <sub>r</sub>	_	3.3	20	1	$V_{DD} = -15V$ , $I_D = -1A$ , $V_{GS} = -10V$ ,
Turn-Off Delay Time	t <sub>D(off)</sub>	_	197	216	ns $R_{GEN} = 6\Omega$	
Turn-Off Fall Time	t <sub>f</sub>	_	60.5	153	1	

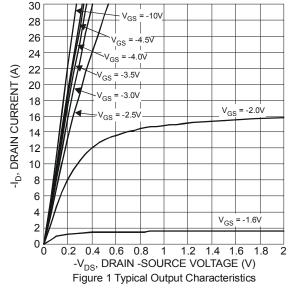
Notes: 6. Device mounted on 2 oz. Copper pads on FR-4 PCB.

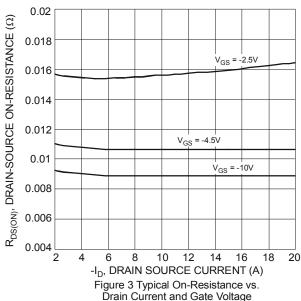
7. Pulse width  $\leq 10 \mu S$ , Duty Cycle  $\leq 1\%$ .

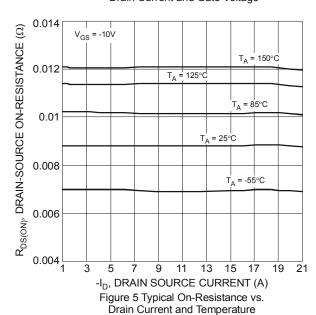
8. Short duration pulse test used to minimize self-heating effect.

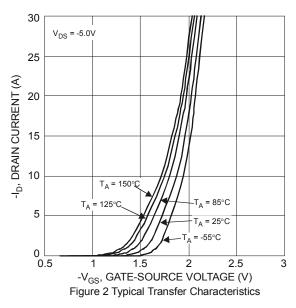
9. Guaranteed by design. Not subject to product testing.

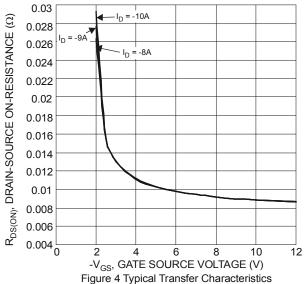


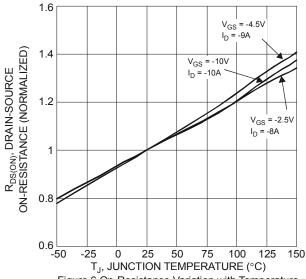




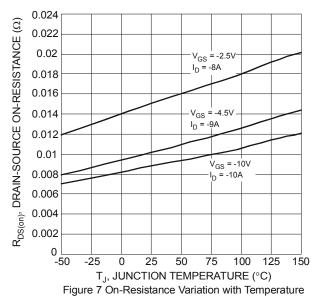


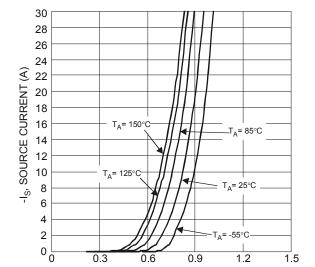




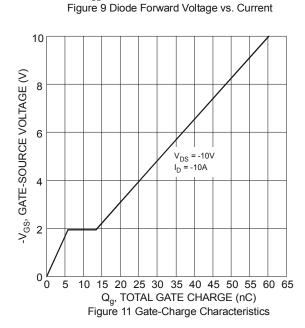








-V<sub>SD</sub>, SOURCE-DRAIN VOLTAGE (V)



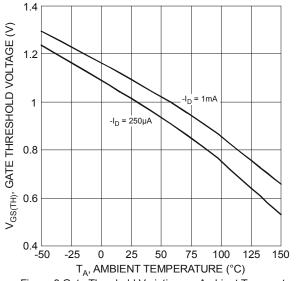
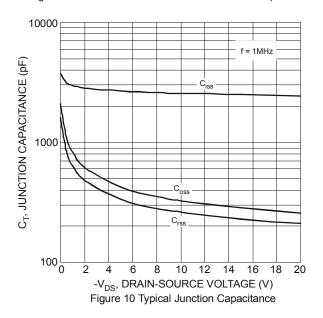
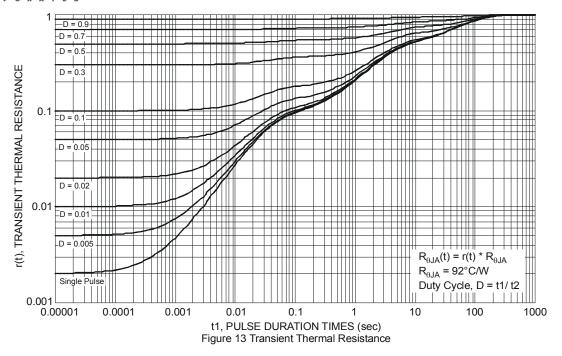


Figure 8 Gate Threshold Variation vs. Ambient Temperature



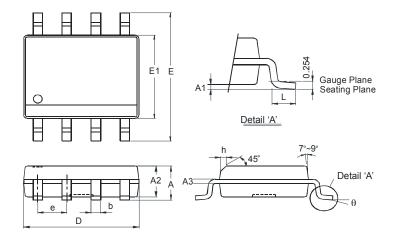
1000
| R<sub>DS(on)</sub> | Limited | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 1





## **Package Outline Dimensions**

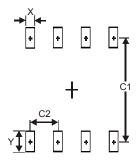
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SO-8					
Dim	Min	Max			
Α	-	1.75			
A1	0.10	0.20			
A2	1.30	1.50			
A3	0.15	0.25			
b	0.3	0.5			
D	4.85	4.95			
Е	5.90	6.10			
E1	3.85	3.95			
е	1.27 Typ				
h	-	0.35			
L	0.62	0.82			
θ	0°	8°			
All Dimensions in mm					

## **Suggested Pad Layout**

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



Dimensions	Value (in mm)
Х	0.60
Υ	1.55
C1	5.4
C2	1.27



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