SINGLE P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C
-30V	45mΩ @ V_{GS} = -10V	-4.9A
	65mΩ @ V_{GS} = -4.5V	-4.0A

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP3056LSSQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

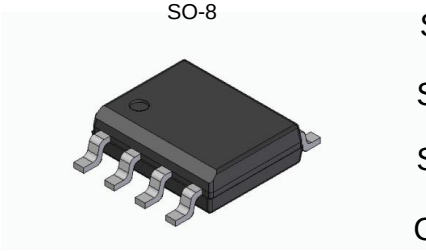
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- DC-DC Converters
- Power Management Functions
- Backlighting

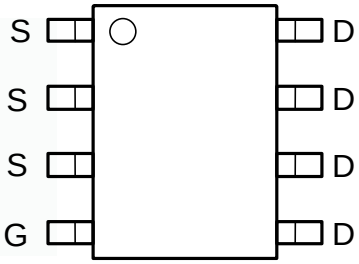
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.072 grams (Approximate)

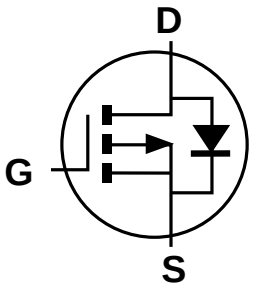
SO-8



Top View



Top View
Pin-Out



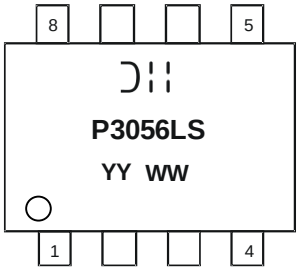
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3056LSSQ-13	SO-8	2500/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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



= Manufacturer's Marking
P3056LS = Product Type Marking Code
YYWW or $\overline{YY}$WW = Date Code Marking
YY or $\overline{YY}$ = Year (ex: 19 = 2019)
WW = Week (01 to 53)

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = -10V	T_A = +25°C T_A = +70°C	I_D	-4.9 -3.9	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	-25	A
Avalanche Current (Note 7) L = 0.1mH		I_{AS}	-17	A
Avalanche Energy (Note 7) L = 0.1mH		E_{AS}	15	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.2	W
	T_A = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	100	°C/W
	t<10s		58	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.6	W
	T_A = +70°C		1.0	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	77	°C/W
	t<10s		45	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	10	
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}	-30	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	-2.1	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	25	45	mΩ	V_{GS} = -10V, I_D = -6A
			39	65		V_{GS} = -4.5V, I_D = -5A
Diode Forward Voltage	V_{SD}	—	-0.75	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	969	—	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	138	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	102	—	pF	
Gate Resistance	R_g	—	13	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -10V)	Q_g	—	17.3	—	nC	V_{DS} = -15V, I_D = -7A
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	8.2	—	nC	V_{DS} = -15V, I_D = -7A
Gate-Source Charge	Q_{gs}	—	2.5	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.8	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.7	—	ns	V_{DS} = -15V, V_{GS} = -10V, R_L = 2.15Ω, R_{GEN} = 3Ω
Turn-On Rise Time	t_R	—	5	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	43	—	ns	
Turn-Off Fall Time	t_F	—	20	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	13.6	—	ns	I_S = -7A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	3.4	—	nC	I_S = -7A, dI/dt = 100A/µs

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

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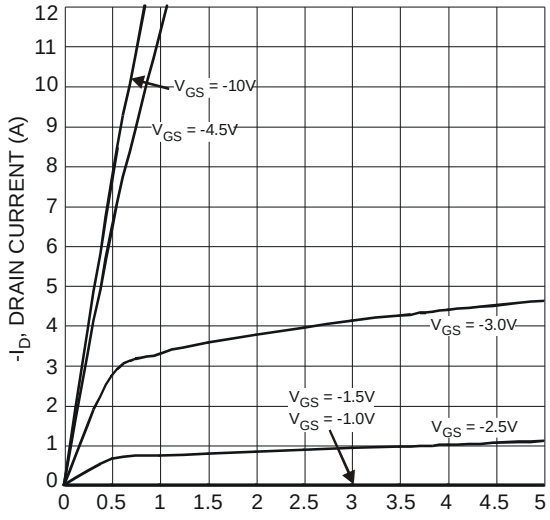


Fig. 1 Typical Output Characteristics

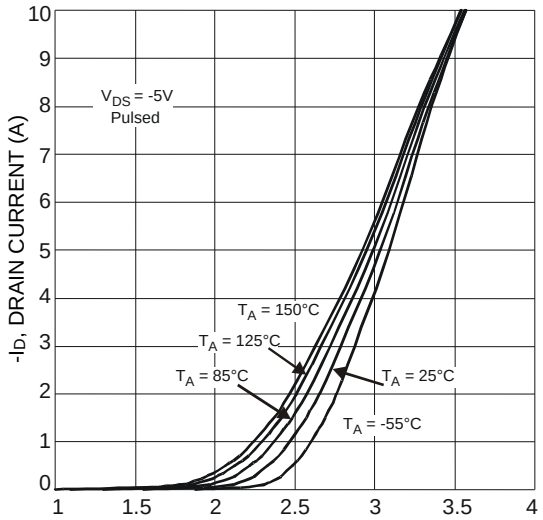


Fig. 2 Typical Transfer Characteristics

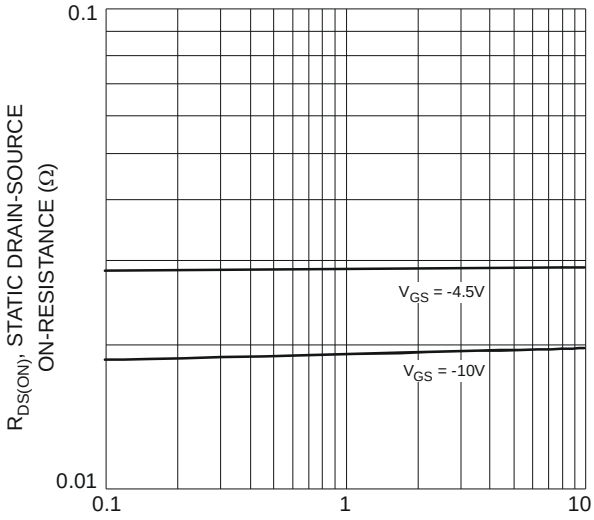


Fig. 3 On-Resistance vs. Drain Current & Gate Voltage

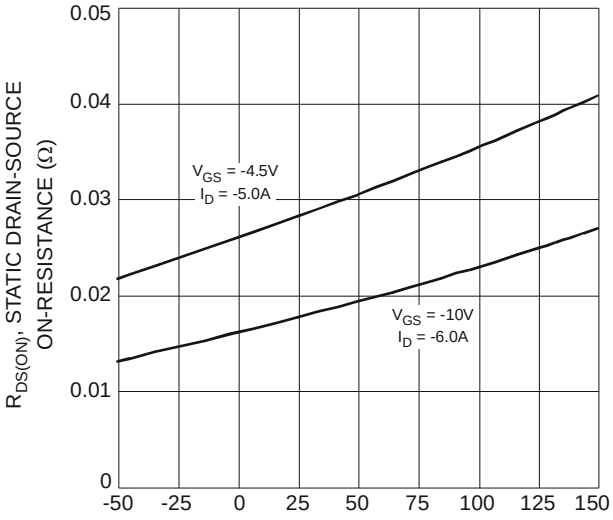


Fig. 4 Static Drain-Source On-Resistance vs. Ambient Temperature

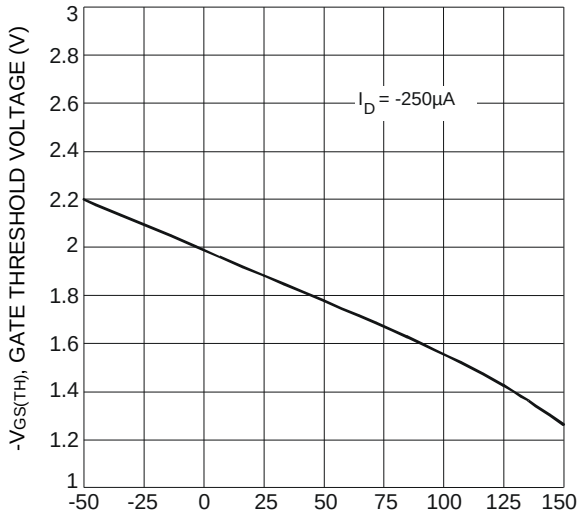


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

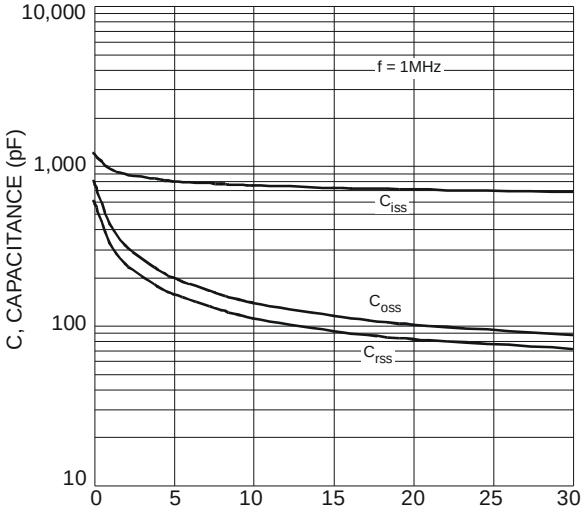


Fig. 6 Typical Total Capacitance

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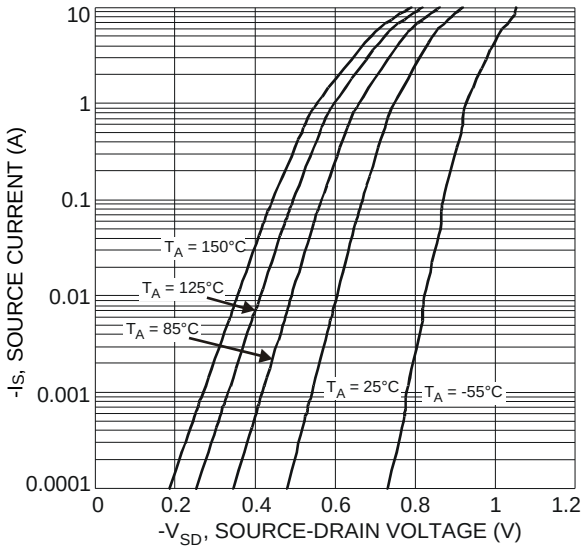


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

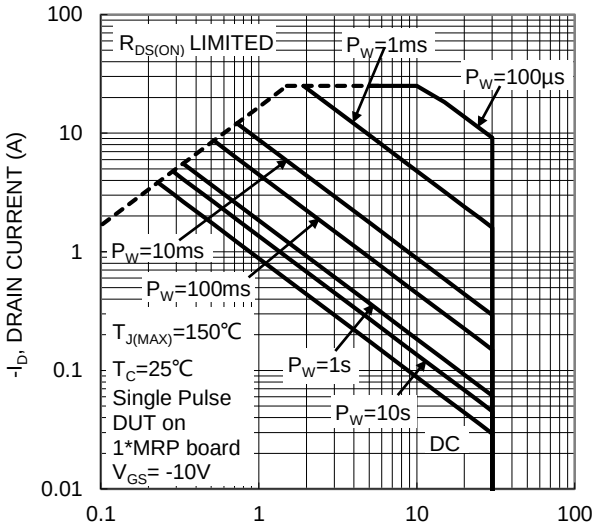


Fig. 8 SOA, Safe Operation Area

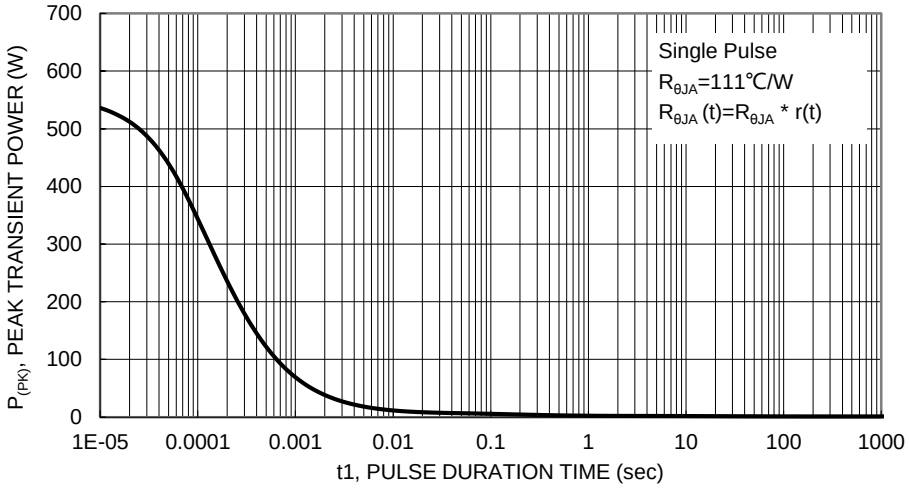


Fig. 9 Single Pulse Maximum Power Dissipation

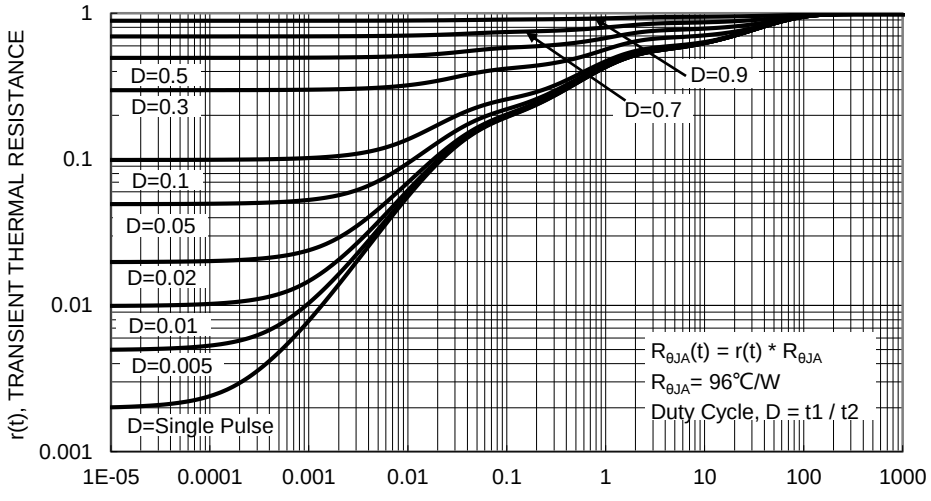


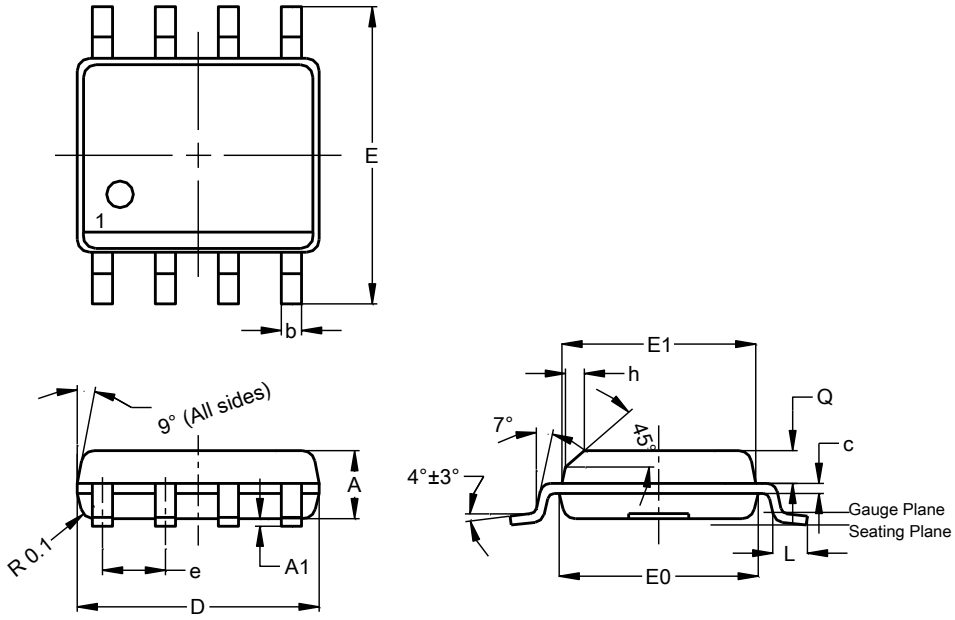
Fig. 10 Transient Thermal Resistance

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Package Outline Dimensions

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

SO-8

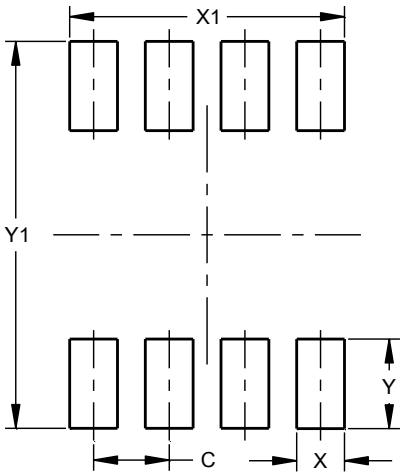


SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

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

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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