

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

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

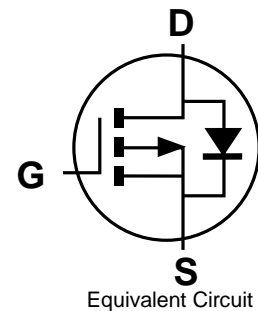
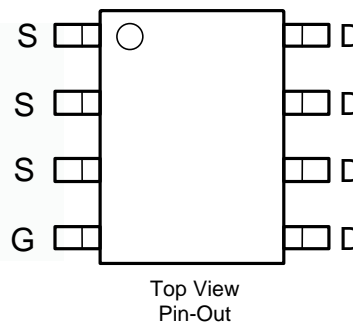
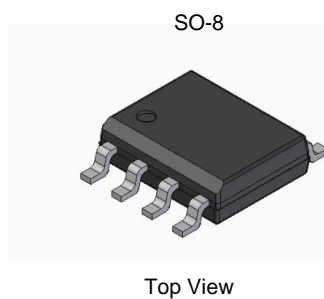
Features

- 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/>

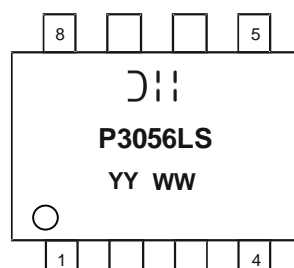
Mechanical Data

- 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)


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 YYWW = Date Code Marking
 YY or YY = Year (ex: 19 = 2019)
 WW = Week (01 to 53)

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	I _D	T _A = +25°C	-4.9	A
		T _A = +70°C	-3.9	
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)	P _D	T _A = +25°C	1.2	W
		T _A = +70°C	0.8	
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	Steady State	100	°C/W
		t < 10s	58	
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	1.6	W
		T _A = +70°C	1.0	
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	Steady State	77	°C/W
		t < 10s	45	
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	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		
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	
Turn-On Rise Time	t _r	—	5	—	ns	V _{DS} = -15V, V _{GS} = -10V, R _L = 2.15Ω, R _{GEN} = 3Ω
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 _R	—	3.4	—	nC	I _S = -7A, di/dt = 100A/µs

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

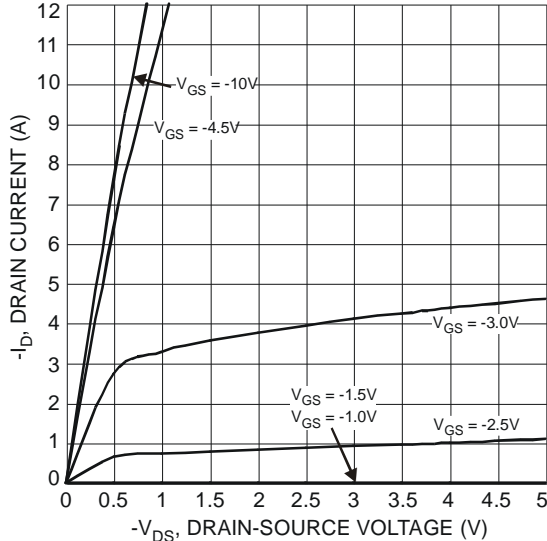


Fig. 1 Typical Output Characteristics

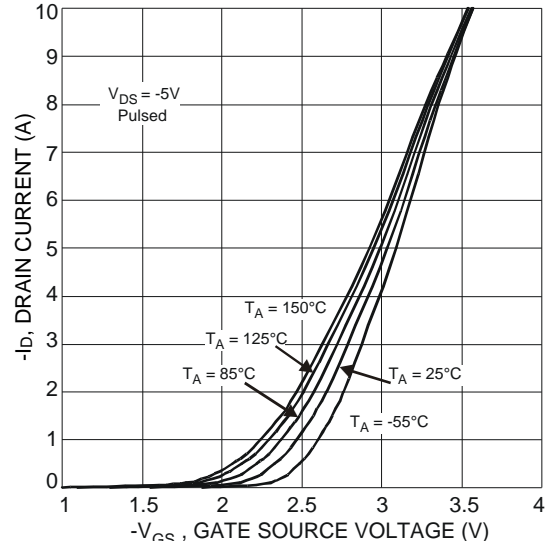


Fig. 2 Typical Transfer Characteristics

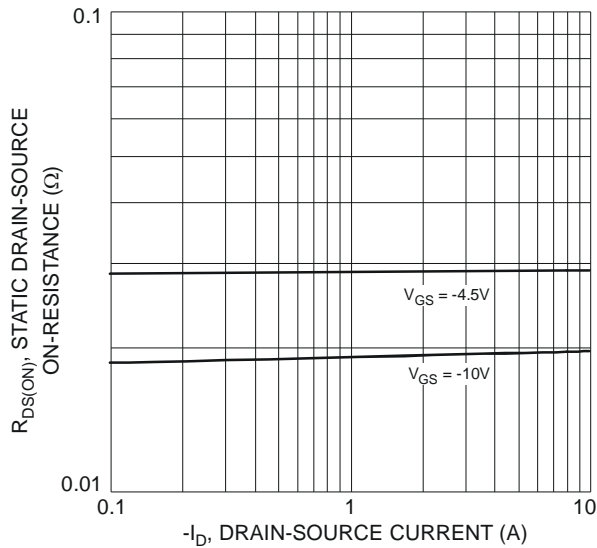


Fig. 3 On-Resistance vs. Drain Current & Gate Voltage

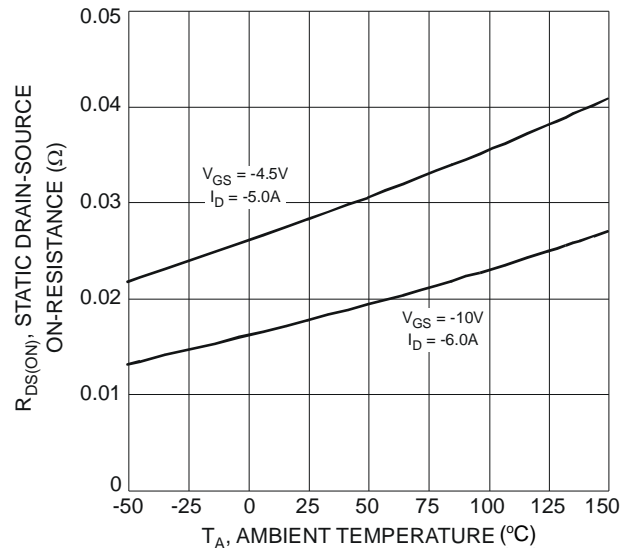


Fig. 4 Static Drain-Source On-Resistance vs. Ambient Temperature

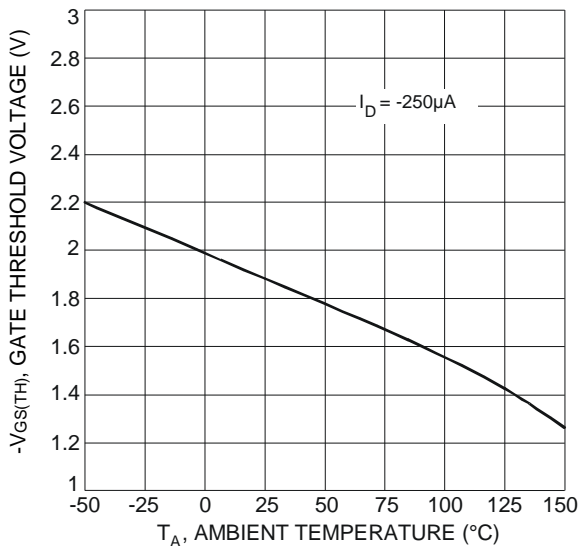


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

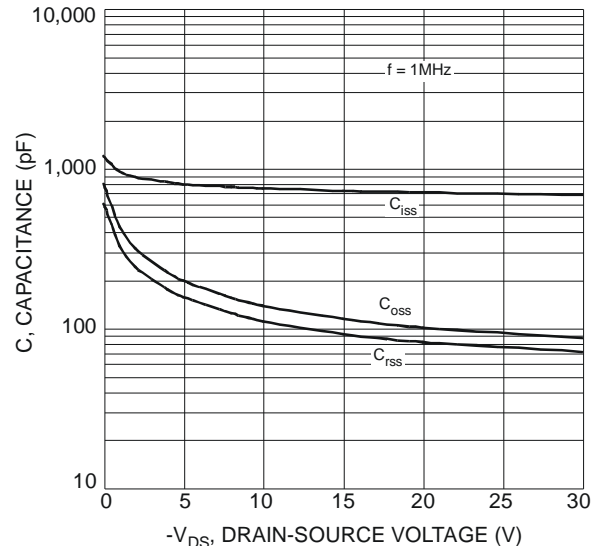


Fig. 6 Typical Total Capacitance

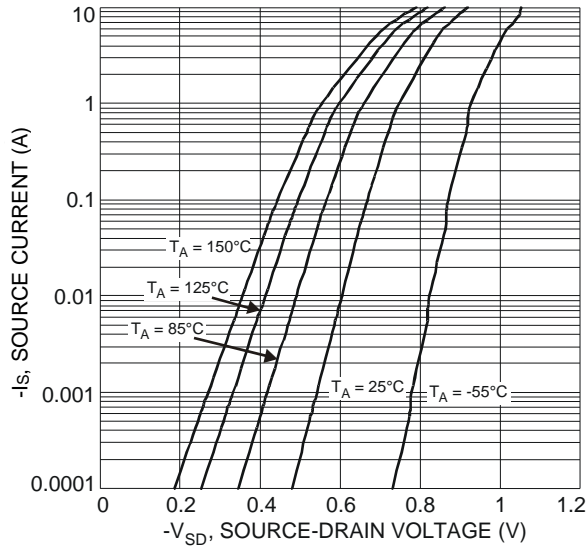


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

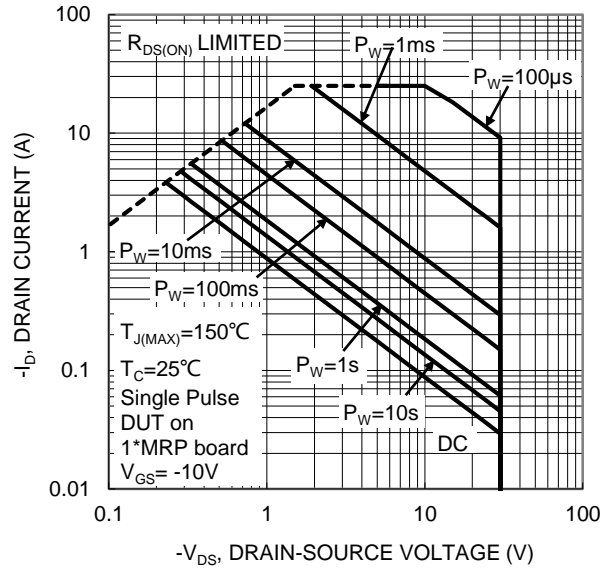


Fig. 8 SOA, Safe Operation Area

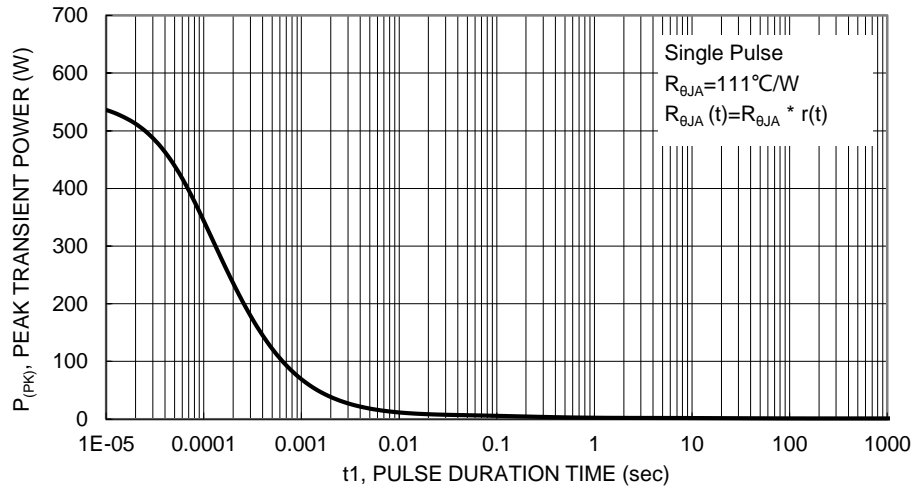


Fig. 9 Single Pulse Maximum Power Dissipation

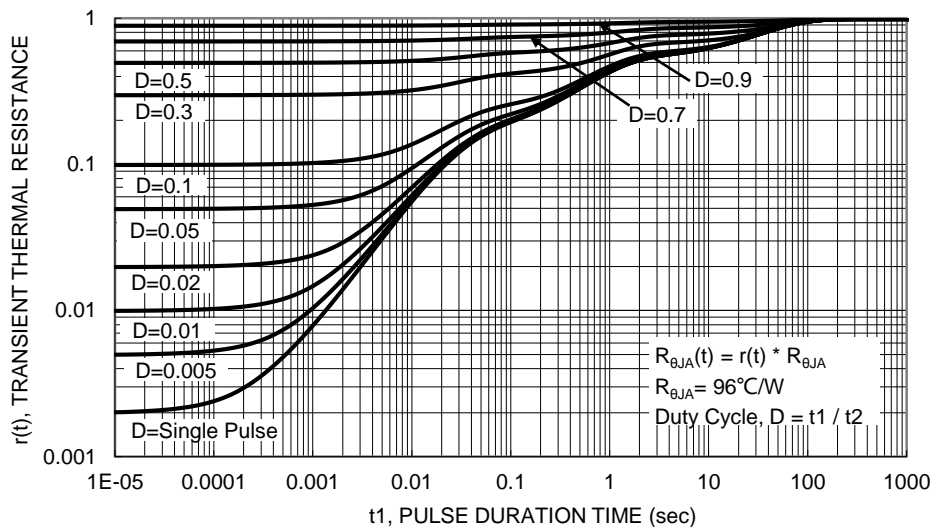
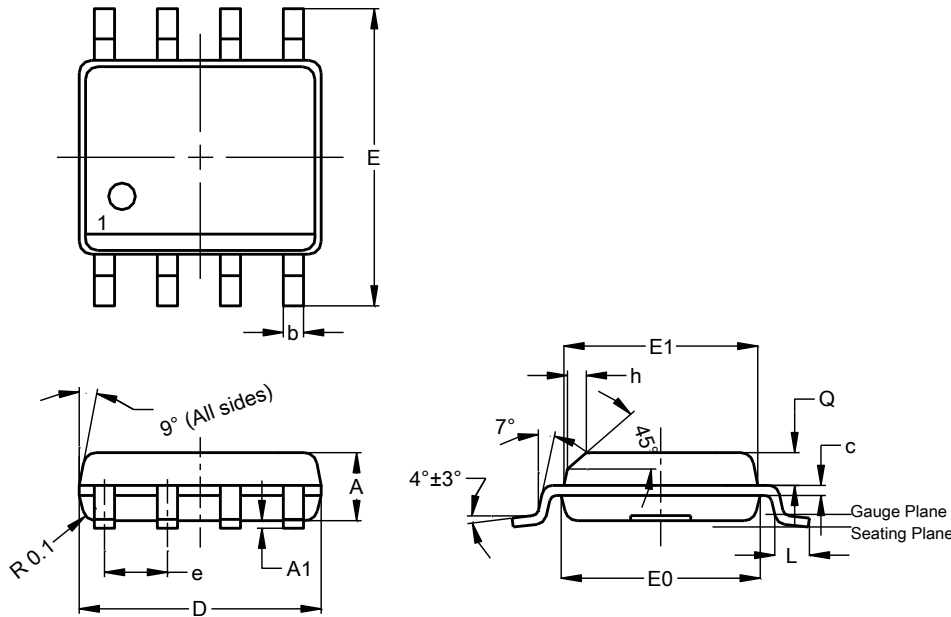


Fig. 10 Transient Thermal Resistance

Package Outline Dimensions

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

SO-8

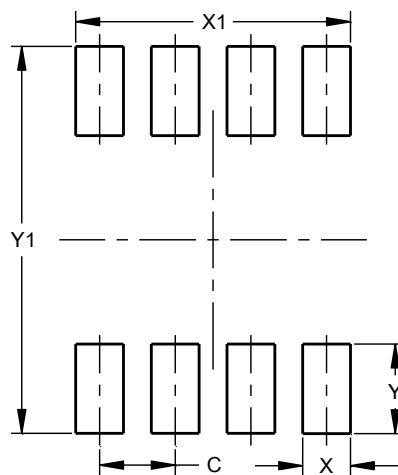


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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