

P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(ON)} Max	I _D T _C = +25°C	
-40V	$11m\Omega$ @ V_{GS} = -10V	-35A	
- 4 0V	15mΩ @ V _{GS} = -4.5V	-30A	

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen- and Antimony-Free. "Green" Device (Note 3)
- The DMP4015SK3Q 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

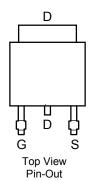
Mechanical Data

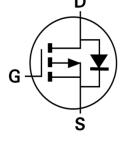
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Matte Tin Finish Annealed over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.33 grams (Approximate)

TO252 (DPAK)



Top View





Equivalent Circuit

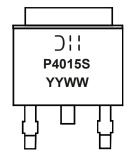
Ordering Information (Note 4)

ſ	Part Number	Compliance	Case	Packaging
	DMP4015SK3Q-13	Automotive	TO252 (DPAK)	2500/Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
- 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 http://www.diodes.com/products/packages.html.

Marking Information



Dill = Manufacturer's Marking
P4015S = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 21 = 2021)
WW = Week (01 - 53)



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

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V_{DSS}	-40	V		
Gate-Source Voltage	V _{GSS}	±25	V		
Continuous Drain Current (Note 5) V _{GS} = -10V	Steady State	T_{C} = +25°C T_{C} = +70°C	I _D	-35 -27	Α
Continuous Drain Current (Note 5) / - 40)	Steady State	T _A = +25°C T _A = +70°C	I _D	-14 -11	Α
Continuous Drain Current (Note 5) V _{GS} = -10V	t<10s	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	-22 -18	Α
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%	I _{DM}	-100	Α		
Maximum Body Diode Forward Current (Note 5)	I _S	-5.5	Α		
Avalanche Current L=0.1mH	I _{AS}	-22	Α		
Avalanche Energy L=0.1mH	E _{AS}	242	mJ		

Thermal Characteristics

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 5)	$T_A = +25^{\circ}C$	C	3.5	- W
Total Fower Dissipation (Note 5)	T _A = +70°C	P_{D}	2.2	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	р	36	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\Theta JA}$	15	
Thermal Resistance, Junction to Case (Note 5) Steady State		$R_{\Theta JC}$	4.5	
Operating and Storage Temperature Range		$T_{J_i} T_{STG}$	-55 to +150	°C

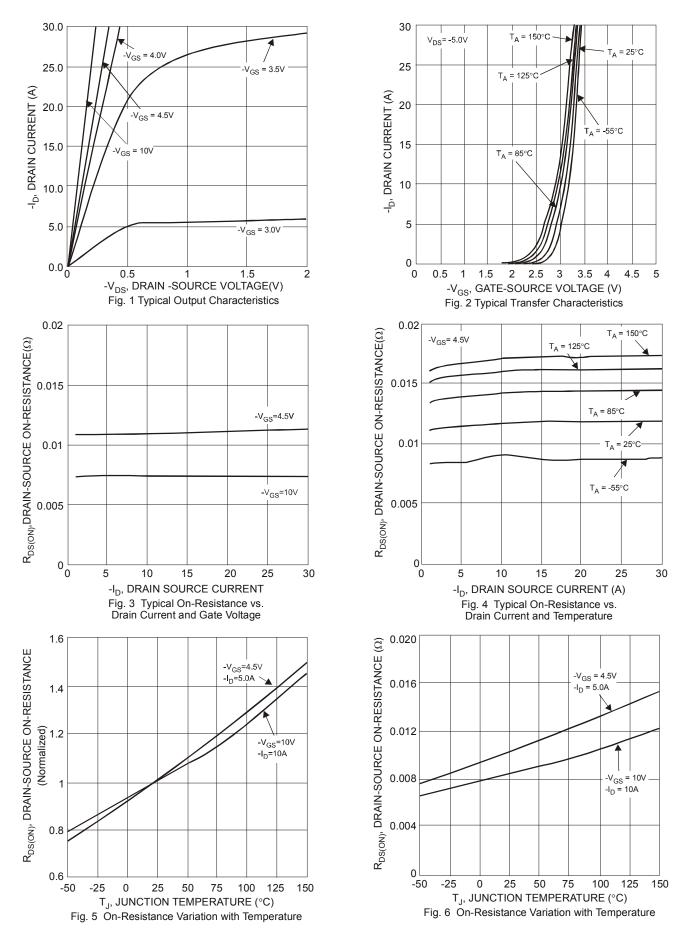
Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 6)	0,		- 71		<u> </u>	Tool contains	
Drain-Source Breakdown Voltage	BV _{DSS}	-40	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}		_	-1	μA	V _{DS} = -40V, V _{GS} = 0V	
Gate-Source Leakage	I _{GSS}		_	±100	nA	$V_{GS} = \pm 25V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 6)							
Gate Threshold Voltage	V _{GS(th)}	-1.5	-2	-2.5	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
Statia Drain Source On Begintance		_	7	11	mΩ	$V_{GS} = -10V, I_D = -9.8A$	
Static Drain-Source On-Resistance	R _{DS(ON)}		9	15	11122	$V_{GS} = -4.5V, I_D = -9.8A$	
Forward Transfer Admittance	Y _{fs}	_	26	_	S	$V_{DS} = -20V, I_{D} = -9.8A$	
Diode Forward Voltage	V _{SD}		-0.7	-1	V	V _{GS} = 0V, I _S = -1A	
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance	C _{iss}	_	4,234	_		V _{DS} = -20V, V _{GS} = 0V f = 1MHz	
Output Capacitance	Coss	_	1,036	_	pF		
Reverse Transfer Capacitance	C _{rss}	_	526	_		I = IIVIHZ	
Gate Resistance	R_G	_	7.77	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge	Qg	_	47.5	_			
Gate-Source Charge	Q _{gs}		14.2	_	nC	$V_{DS} = -20V, V_{GS} = -5V$ $I_{D} = -9.8A$	
Gate-Drain Charge	Q _{gd}	_	13.5	_			
Turn-On Delay Time	t _{D(on)}		13.2	_		$V_{GS} = -10V, V_{DD} = -20V,$ $R_{G} = 6\Omega, I_{D} = -1A$	
Turn-On Rise Time	t _r	_	10	_	nS		
Turn-Off Delay Time	t _{D(off)}		302.7	_	115		
Turn-Off Fall Time	t _f		137.9	_			

5. Device mounted on FR-4 substrate PCB, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate. Notes:

^{6.} Short duration pulse test used to minimize self-heating effect. 7. Guaranteed by design. Not subject to production testing.







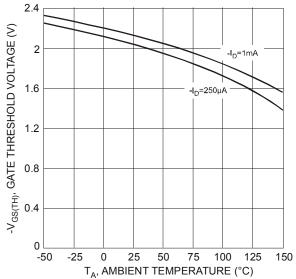
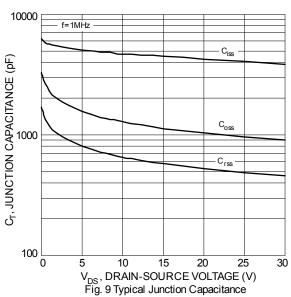
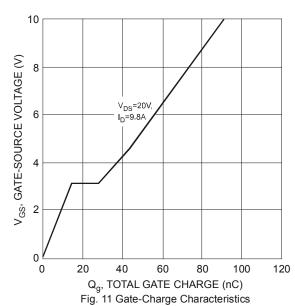
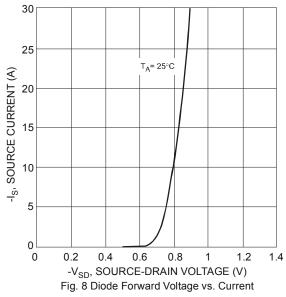


Fig. 7 Gate Threshold Variation vs. Ambient Temperature







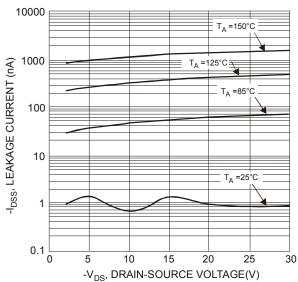


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

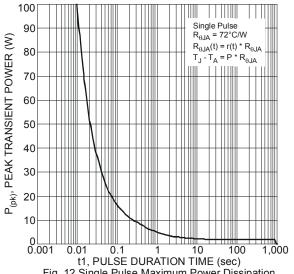
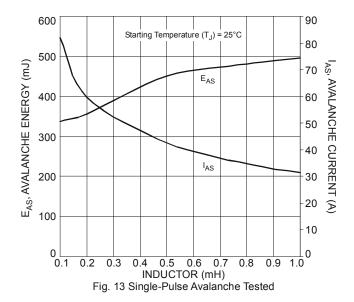
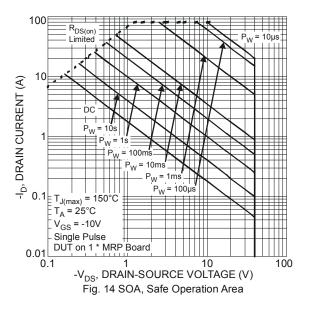
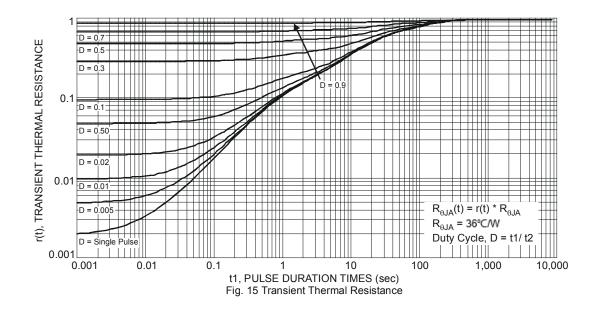


Fig. 12 Single Pulse Maximum Power Dissipation





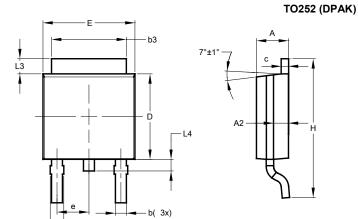


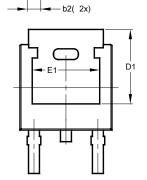


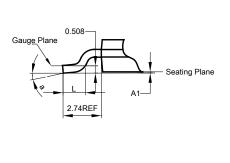


Package Outline Dimensions

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







TO252 (DPAK)					
Dim	Min	Max	Тур		
Α	2.19	2.39	2.29		
A1	0.00	0.13	0.08		
A2	0.97	1.17	1.07		
b	0.64	0.88	0.783		
b2	0.76	1.14	0.95		
b3	5.21	5.46	5.33		
С	0.45	0.58	0.531		
D	6.00	6.20	6.10		
D1	5.21	_	_		
е	_	_	2.286		
Е	6.45	6.70	6.58		
E1	4.32	_	_		
Н	9.40	10.41	9.91		
L	1.40	1.78	1.59		
L3	0.88	1.27	1.08		
L4	0.64	1.02	0.83		
а	0°	10°	_		
All Dimensions in mm					

Suggested Pad Layout

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

TO252 (DPAK)

Dimensions	Value (in mm)
С	4.572
Х	1.060
X1	5.632
Υ	2.600
Y1	5.700
Y2	10.700

February 2021



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