





40V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(on)} max	I _D max T _A = +25°C (Notes 6)	
-40V	$25m\Omega$ @ $V_{GS} = -10V$	-8.6A	
	45mΩ @ V _{GS} = -4.5V	-7.0A	

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

- Motor control
- Backlighting
- DC-DC Converters
- Printer equipment

Features

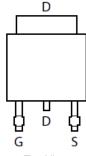
- Low On-Resistance
- Fast Switching Speed
- Low Input/Output Leakage
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

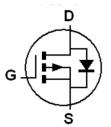
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish Matte Tin annealed over Copper lead frame.
 Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.315 grams (approximate)



Top View



Top View Pin Out



Device symbol

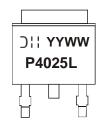
Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP4025LK3-13	P4025L	13	12	2,500

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 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

Marking Information



Oll = Manufacturer's Marking P4025L = Product Type Marking Code YYWW = Date Code Marking YY = Year (ex: 10 = 2010) WW = Week (01 - 53)





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

Characteristic			Symbol	Value	Units
Drain-Source Voltage	Drain-Source Voltage			-40	\/
Gate-Source Voltage			V _{GSS}	±20	V
		(Notes 6)		-8.6	
Continuous Drain Current	V _{GS} = -10V	$T_A = +70^{\circ}C \text{ (Notes 6)}$	I _D	-6.9]
		(Notes 5)		-6.7	
Pulsed Drain Current	$V_{GS} = -10V$	(Notes 7)	I _{DM}	-35	Α
Continuous Source Current (Body diode) (N		(Notes 7)	I _S	-8.6	
Pulsed Source Current (Body diode) (Notes 7)		I _{SM}	-35		

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

Characteristic		Symbol	Value	Unit	
Dawar Dissipation	(Notes 5)		1.7	14/	
Power Dissipation	(Notes 6)	P _D	2.78	W	
Thermal Decistores, Junction to Ambient	(Notes 5)	R _{θJA}	74		
Thermal Resistance, Junction to Ambient	(Notes 6)		45	°C/W	
Thermal Resistance, Junction to Lead	(Notes 8)	$R_{ heta JL}$	1.43		
Operating and Storage Temperature Range		T_{J}, T_{STG}	-55 to +150	°C	

Notes:

- 5. For a device surface mounted on minimum recommended FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.

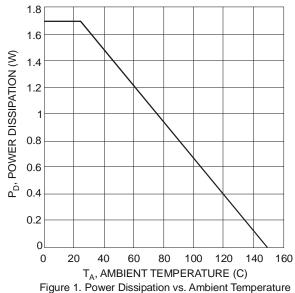
 6. Same as note (5), except the device is surface mounted on 25mm X 25mm X 1.6mm FR4 PCB.

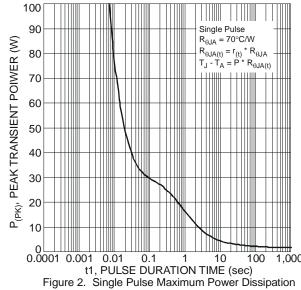
 7. Repetitive rating on 25mm X 25mm FR4 PCB, D=0.02, pulse width 300µs – pulse width by maximum junction temperature.

 8. Thermal resistance from junction to solder-point (at the end of the drain lead).



Thermal Characteristics





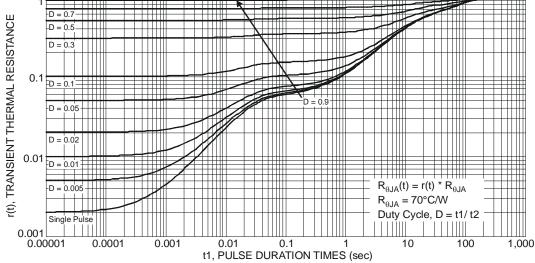


Figure 3. Transient Thermal Resistance



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

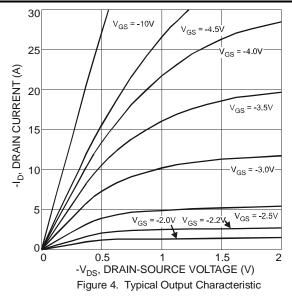
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	-40	_	_	V	$I_D = -250\mu A, V_{GS} = 0V$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	-1.0	μΑ	$V_{DS} = -40V, V_{GS} = 0V$	
Gate-Source Leakage	IGSS	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(th)}$	-0.8	-1.3	-1.8	V	$I_D = -250 \mu A$, $V_{DS} = V_{GS}$	
Static Drain-Source On-Resistance (Note 9)	В		18	25	mΩ	$V_{GS} = -10V, I_D = -3A$	
Static Dialif-Source Off-Resistance (Note 9)	R _{DS} (ON)	_	30	45	11177	$V_{GS} = -4.5V, I_{D} = -3A$	
Forward Transconductance (Notes 9 & 10)	9 _{fs}	_	16.6	_	S	$V_{DS} = -5V, I_{D} = -3A$	
Diode Forward Voltage (Note 9)	V_{SD}	_	-0.7	-1.0	V	$I_{S} = -1A, V_{GS} = 0V$	
DYNAMIC CHARACTERISTICS (Note 10)							
Input Capacitance	C _{iss}	_	1643	_		V _{DS} = -20V, V _{GS} = 0V f = 1MHz	
Output Capacitance	Coss	_	179	_	pF		
Reverse Transfer Capacitance	C _{rss}	_	128	_			
Gate Resistance	R_g	_	6.43	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (Note 11)	Qg	_	14.0	_		V _{GS} = -4.5V	
Total Gate Charge (Note 11)	Qg	_	33.7	_	~_	V _{DS} = -20V	
Gate-Source Charge (Note 11)	Qgs	_	5.5	_	nC	$V_{GS} = -10V$ $I_D = -3A$	
Gate-Drain Charge (Note 11)	Q_{gd}	_	7.3	_			
Turn-On Delay Time (Note 11)	t _{D(on)}	_	6.9	_			
Turn-On Rise Time (Note 11)	t _r	_	14.7	_	no	$V_{DD} = -20V, V_{GS} = -10V$	
Turn-Off Delay Time (Note 11)	t _{D(off)}	_	53.7		ns	$I_D = -3A$	
Turn-Off Fall Time (Note 11)	t _f	_	30.9	_			

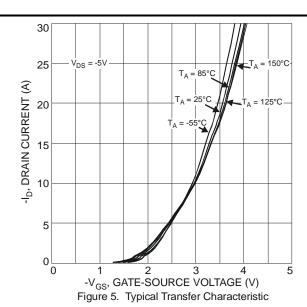
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Notes:

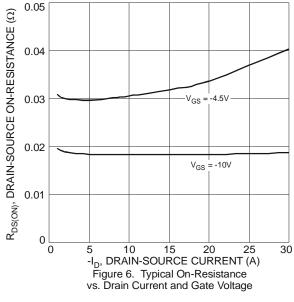
- 9. Measured under pulsed conditions. Pulse width $\leq 300 \mu s;$ duty cycle $\leq 2\%.$
- 10. For design aid only, not subject to production testing.11. Switching characteristics are independent of operating junction temperatures.

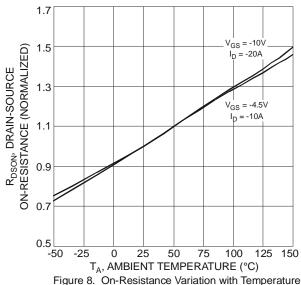
Typical Characteristics











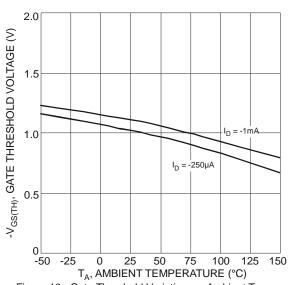
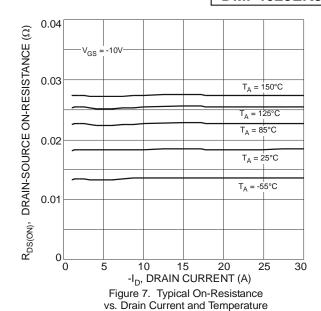


Figure 10. Gate Threshold Variation vs. Ambient Temperature



0.06 R_{DSON} , DRAIN-SOURCE ON-RESISTANCE (Ω) 0.05 0.04 0.03 I_D = -10A 0.02 V_{GS} = -10V I_D = -20A 0.01 -25 125 150 -50 25 50 75 100 T_A, AMBIENT TEMPERATURE (°C)

Figure 9. On-Resistance Variation with Temperature

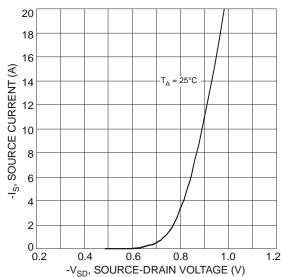
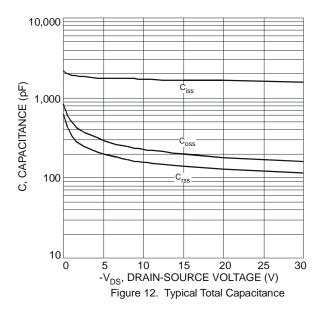
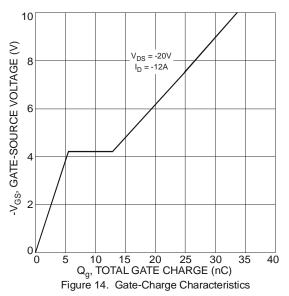
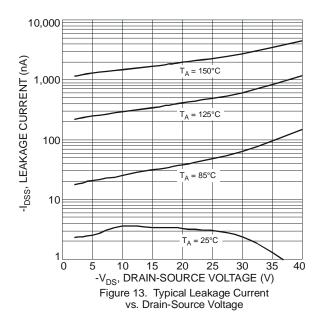


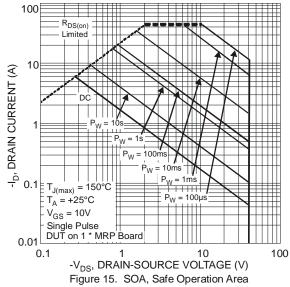
Figure 11. Diode Forward Voltage vs. Current





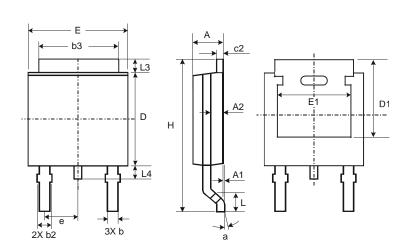






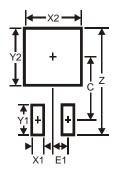


Package Outline Dimensions



TO252					
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		
q	0.64	0.88	0.783		
b2	0.76	1.14	0.95		
b3	5.21	5.46	5.33		
c2	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



Dimensions	Value (in mm)		
Z	11.6		
X1	1.5		
X2	7.0		
Y1	2.5		
Y2	7.0		
С	6.9		
E1	2.3		





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