Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_A = 25°C (Note 5)
30V	7.5mΩ @ V_{GS} = -10V	-36A
	10mΩ @ V_{GS} = -4.5V	-31A

Description and Applications

This new generation 30V P-Channel Enhancement Mode MOSFET has been designed to minimize $R_{DS(on)}$ and yet maintain superior switching performance. This device is ideal for use in Notebook battery power management and Loadswitch.

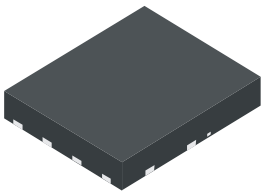
- Notebook Battery Power Management
- DC-DC Converters
- Loadswitch

Features and Benefits

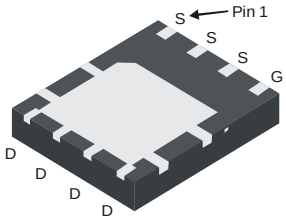
- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low $R_{DS(on)}$ – Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- ESD HBM Protected up to 1kV
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

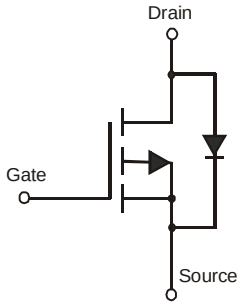
- Case: PowerDI5060-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.097 grams (approximate)



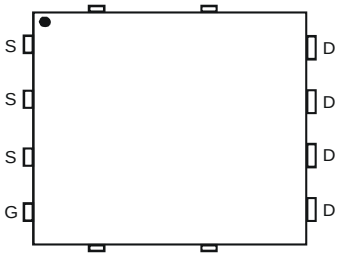
Top View



Bottom View



Internal Schematic



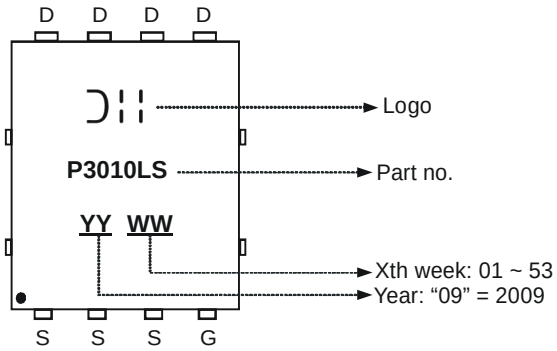
Top View
Pin Configuration

Ordering Information (Note 3)

Part Number	Case	Packaging
DMP3010LPS-13	PowerDI5060-8	2500 / Tape & Reel

Notes: 1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



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 5) V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	-36 -29	A
Continuous Drain Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	-31 -25	A
Continuous Drain Current (Note 4) V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	-14.5 -11.5	A
Pulsed Drain Current (Notes 4 & 7)			I_{DM}	-100	A
Avalanche Current (Notes 8 & 9)			I_{AR}	-17.5	A
Repetitive Avalanche Energy (Notes 8 & 9) L = 1mH			E_{AR}	153	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	2.18	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 4)	$R_{\theta JA}$	55	°C/W
Power Dissipation (Note 5)	P_D	14.37	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 5)	$R_{\theta JA}$	8.7	°C/W
Power Dissipation (Notes 5 & 6)	P_D	58.7	W
Thermal Resistance, Junction to Case @T_C = 25°C (Notes 5 & 6)	$R_{\theta JC}$	2.13	°C/W
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 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	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 9)						
Gate Threshold Voltage	$V_{GS(th)}$	-1.1	-1.6	-2.1	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	5.7	7.5	mΩ	V_{GS} = -10V, I_D = -10A
		-	7.2	10		V_{GS} = -4.5V, I_D = -10A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	30	-	S	V_{DS} = -15V, I_D = -10A
Diode Forward Voltage	V_{SD}	-	-0.65	-1.0	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	-	6234	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	1500	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	774	-	pF	
Gate Resistance	R_g	-	1.28	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -10V)	Q_g	-	126.2	-	nC	V_{DS} = -15V, I_D = -10A
Total Gate Charge (V_{GS} = -4.5V)	Q_g	-	59.2	-	nC	V_{DS} = -15V, V_{GS} = -4.5V, I_D = -10A
Gate-Source Charge	Q_{gs}	-	16.1	-	nC	
Gate-Drain Charge	Q_{gd}	-	15.7	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	11.4	-	ns	V_{DS} = -15V, V_{GEN} = -10V, R_G = 6Ω, I_D = -1A
Turn-On Rise Time	t_r	-	9.4	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	260.7	-	ns	
Turn-Off Fall Time	t_f	-	99.3	-	ns	

Notes:
4. Device mounted on FR-4 PCB with 1 inch square 2 oz. Copper, single sided.
5. Device mounted on FR-4 PCB with infinite heatsink.
6. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.
7. Repetitive rating, pulse width limited by junction temperature, 10µs pulse, duty cycle = 1%.
8. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = 25°C
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to production testing.

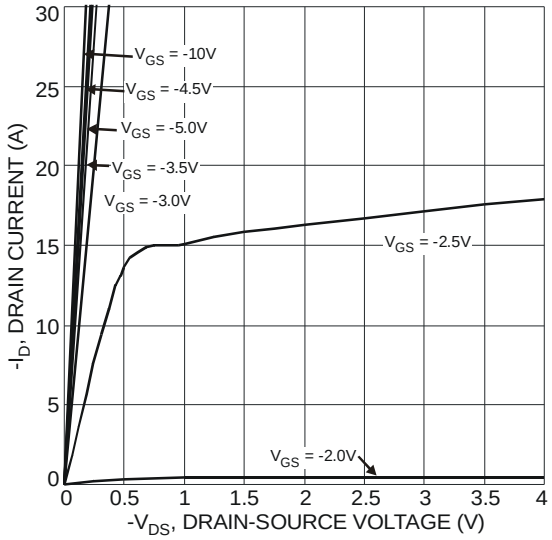


Fig. 1 Typical Output Characteristic

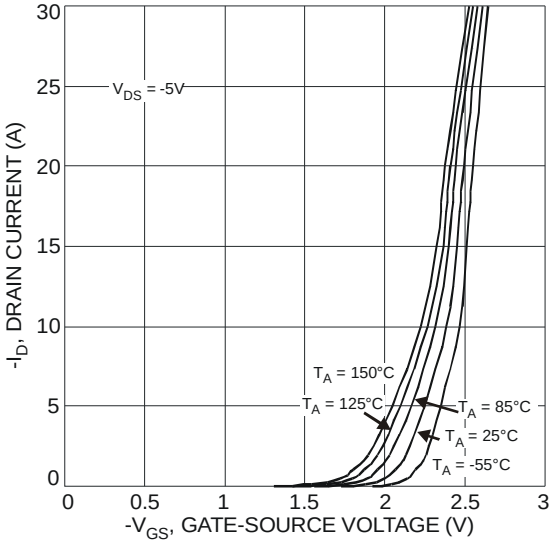


Fig. 2 Typical Transfer Characteristic

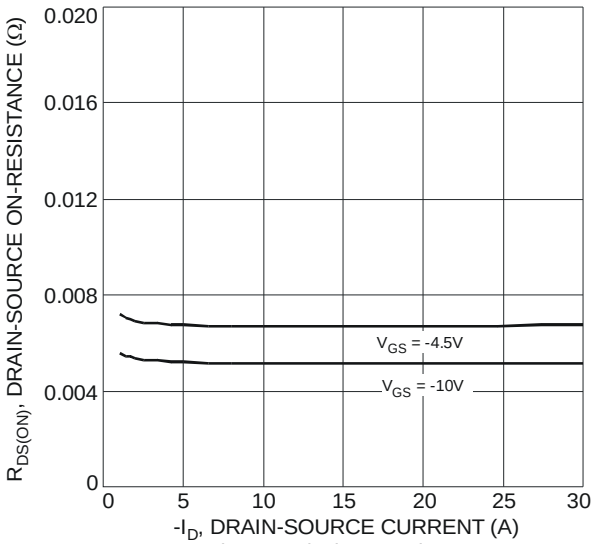


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

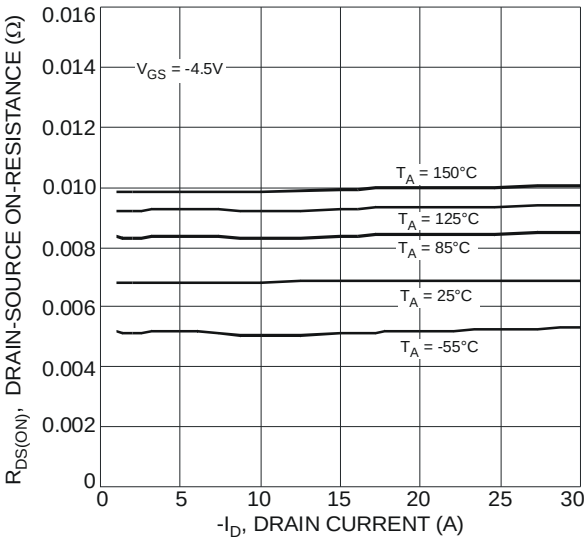


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

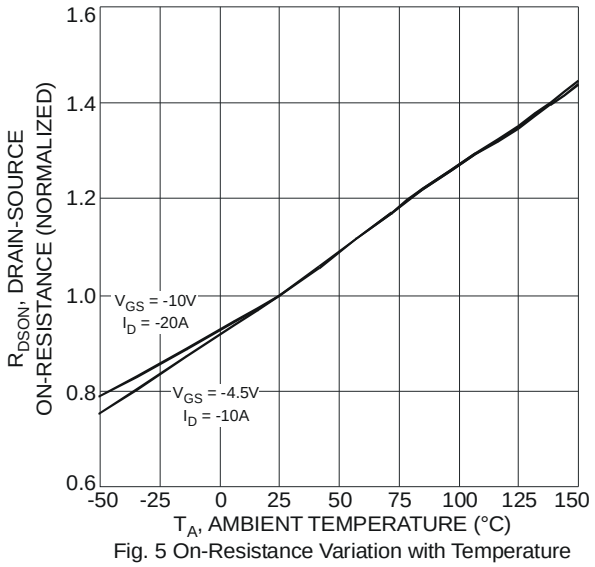


Fig. 5 On-Resistance Variation with Temperature

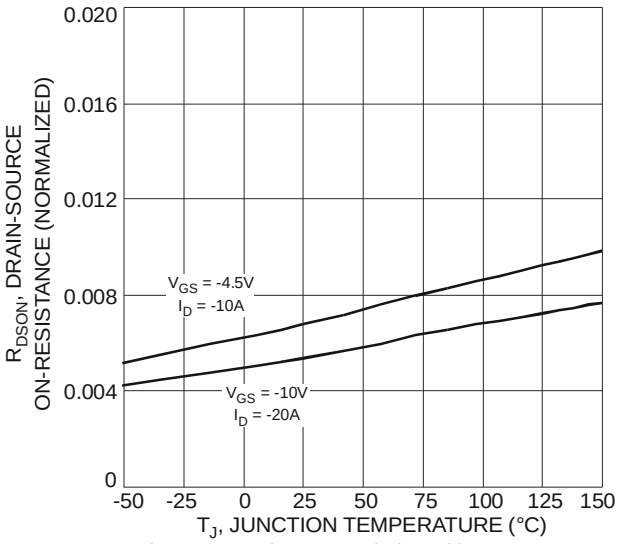


Fig. 6 On-Resistance Variation with Temperature

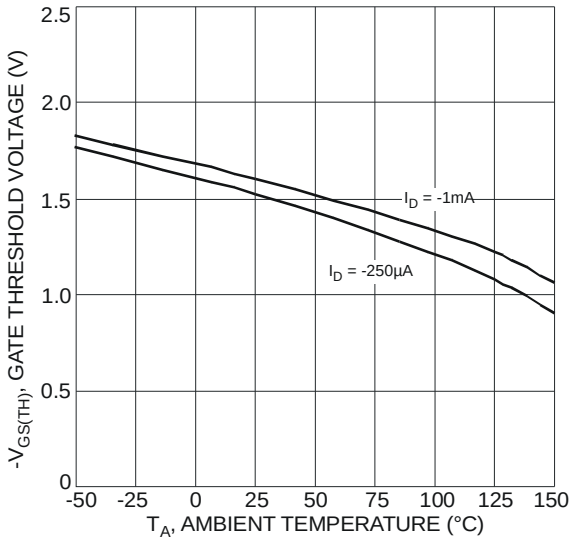


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

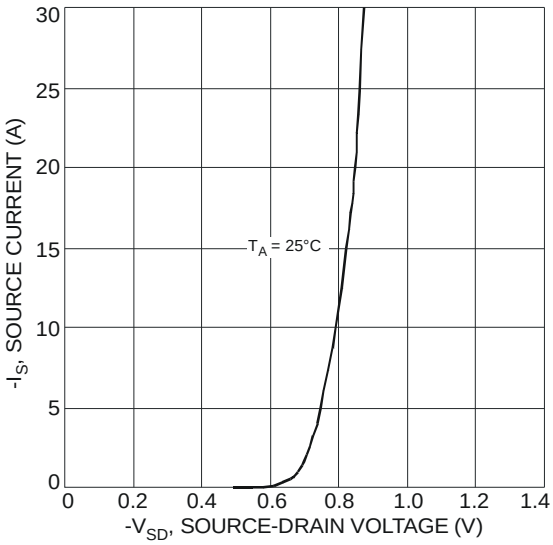


Fig. 8 Diode Forward Voltage vs. Current

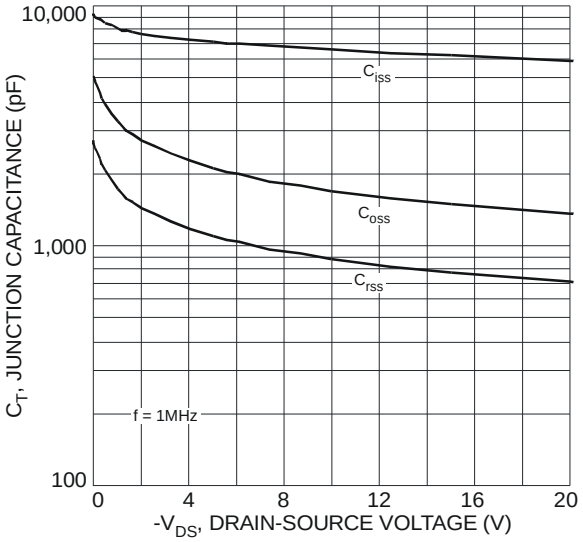


Fig. 9 Typical Total Capacitance

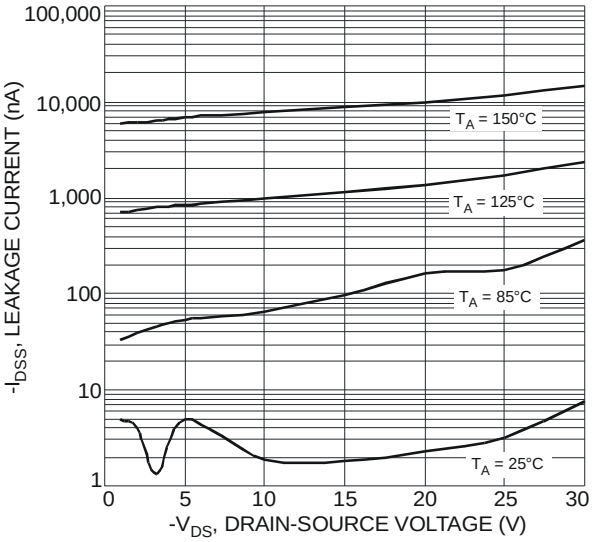


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

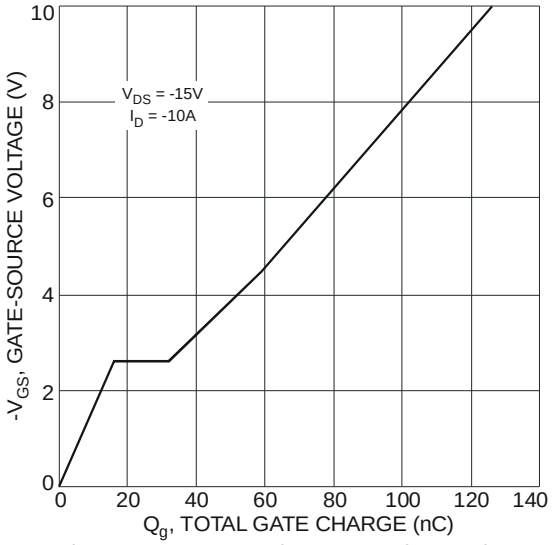


Fig. 11 Gate-Source Voltage vs. Total Gate Charge

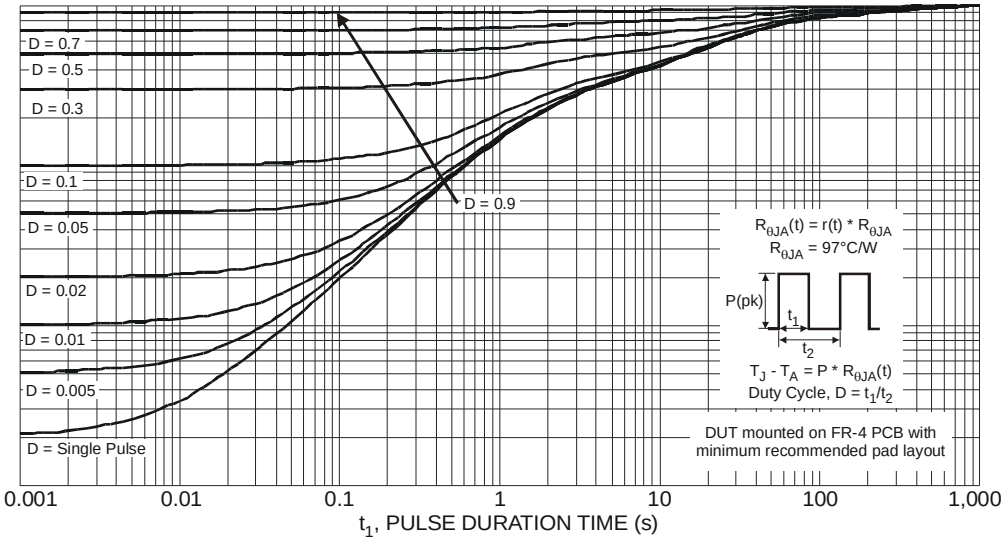
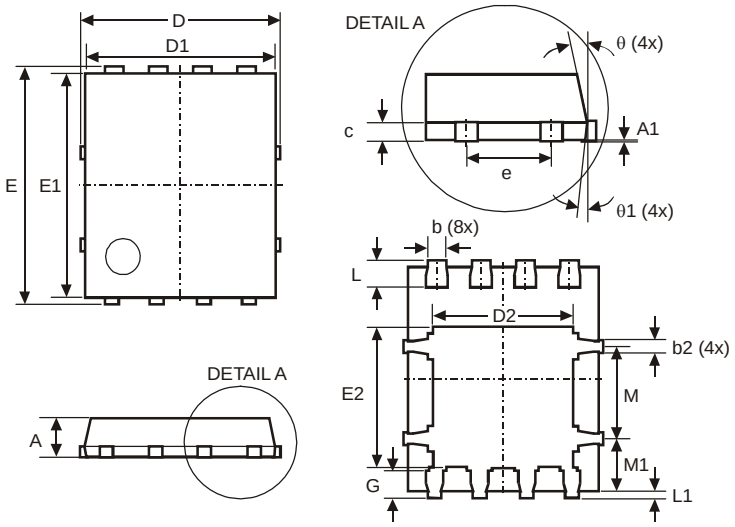


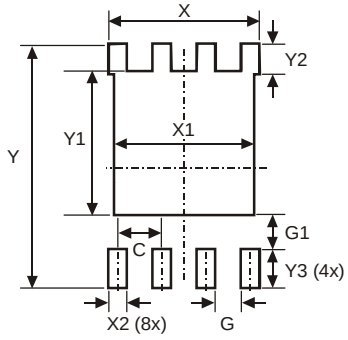
Fig. 12 Transient Thermal Response

Package Outline Dimensions



PowerDI5060-8L			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.10	1.00
A1	0.00	0.05	-
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
c	0.230	0.330	0.277
D	5.15BSC		
D1	4.70	5.10	4.90
D2	3.50	4.40	3.90
E	6.15BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
e	1.27BSC		
G	0.51	0.71	0.61
L	0.51	0.71	0.61
L1	0.050	0.20	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
θ	10°	12°	11°
θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	4.420
X1	4.100
X2	0.610
Y	6.610
Y1	3.810
Y2	1.020
Y3	1.270

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