



P-CHANNEL ENHANCEMENT MODE MOSFET POWERDI

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
	7mΩ @ V _{GS} = -10V	-90A
-30V	16mΩ @ V _{GS} = -4.5V	-60A

Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

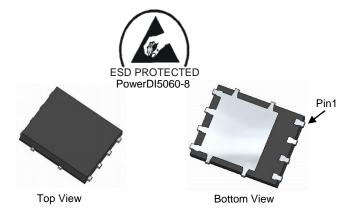
- Backlighting
- Power Management Functions
- DC-DC Converters

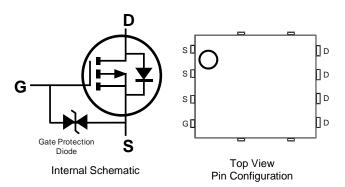
Features and Benefits

- Low R_{DS(ON)} Minimizes On-State Losses
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% Unclamped Inductive Switching Ensures More Reliability
- ESD Protected Gate
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

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 Indicator: See Diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.097 grams (Approximate)





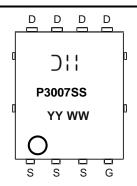
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3007SPS-13	PowerDI5060-8	2,500/Tape & Reel

Notes: 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.

- See http://www.diodes.com/quality/lead_free.html 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



⊃¦¦ = Manufacturer's Marking P3007SS = Product Type Marking Code YYWW = Date Code Marking YY = Year (ex: 16 = 2016) 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}	±25	V	
Continuous Drain Current, V _{GS} = -10V (Note 7)	$T_C = +25$ °C $T_C = +70$ °C	I _D	-90 -70	А
Maximum Continuous Body Diode Forward Current (Note 7)		Is	-90	Α
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I _{DM}	-160	Α
Avalanche Current, L=1mH (Note 8)		I _{AS}	-16	Α
Avalanche Energy, L=1mH (Note 8)		E _{AS}	130	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^{\circ}C$	P_{D}	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	90	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P_{D}	2.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{ heta JA}$	47	°C/W
Total Power Dissipation (Note 7)	$T_C = +25^{\circ}C$	P_{D}	80	W
Thermal Resistance, Junction to Case (Note 7)	$R_{ heta JC}$	1.5	°C/W	
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 9)							
Drain-Source Breakdown Voltage	BV _{DSS}	-30	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	-1	μA	V _{DS} = -24V, V _{GS} = 0V	
Gate-Source Leakage	I _{GSS}	_	_	±10	μΑ	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 9)			•	•	•		
Gate Threshold Voltage	V _{GS(TH)}	-1.0	_	-3.0	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
Otatia Basia Osamas Os Basiatasas	Б	_	4.5	7	0	V _{GS} = -10V, I _D = -15A	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	12	16	mΩ	$V_{GS} = -4.5V, I_D = -10A$	
Diode Forward Voltage	V_{SD}	_	-0.7	-1.2	V	$V_{GS} = 0V, I_{S} = -1A$	
DYNAMIC CHARACTERISTICS (Note 10)	•					•	
Input Capacitance	Ciss	_	2,826	_	pF		
Output Capacitance	Coss	_	606	_	pF	$V_{DS} = -15V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	_	305	_	pF	1 = 1.0WH2	
Gate Resistance	Rg	_	23	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge (V _{GS} = -4.5V)	Qg	_	31.2	_	nC		
Total Gate Charge (V _{GS} = -10V)	Qg	_	64.2	_	nC	1	
Gate-Source Charge	Q _{gs}	_	10.6	_	nC	V _{DS} = -15V, I _D = -11.5A	
Gate-Drain Charge	Q_{gd}	_	11.6	_	nC		
Turn-On Delay Time	t _{D(ON)}	_	4.8	_	ns		
Turn-On Rise Time	t _R	_	4.3	_	ns	$V_{DD} = -15V, V_{GS} = -10V,$	
Turn-Off Delay Time	t _{D(OFF)}	_	306	_	ns	$R_g = 6\Omega$, $I_D = -11.5A$	
Turn-Off Fall Time	t _F	_	125	_	ns		
Reverse Recovery Time	t _{RR}	_	19	_	ns		
Reverse Recovery Charge	Q_{RR}	_	9.8	_	nC	$I_S = -11.5A$, $dI/dt = 100A/\mu s$	

Notes:

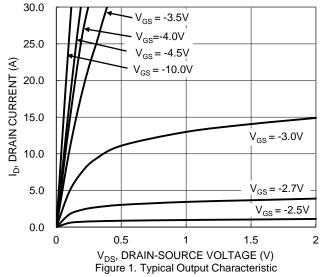
^{5.} Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.7. Thermal resistance from junction to soldering point (on the exposed drain pad).

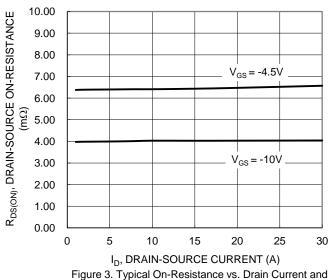
^{8.} I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.

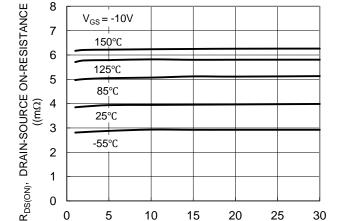
^{9.} Short duration pulse test used to minimize self-heating effect.

^{10.} Guaranteed by design. Not subject to product testing.









Gate Voltage

I_D, DRAIN CURRENT (A)
Figure 5. Typical On-Resistance vs. Drain Current and
Temperature

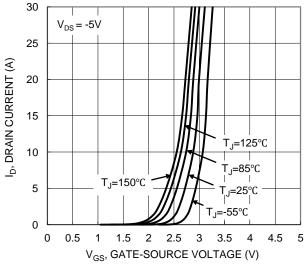
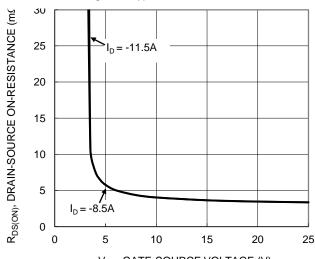


Figure 2. Typical Transfer Characteristic



V_{GS}, GATE-SOURCE VOLTAGE (V) Figure 4. Typical Transfer Characteristic

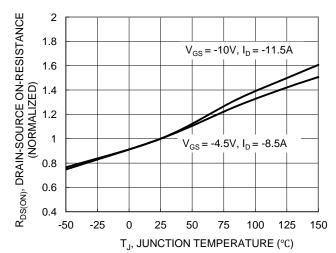


Figure 6. On-Resistance Variation with Temperature





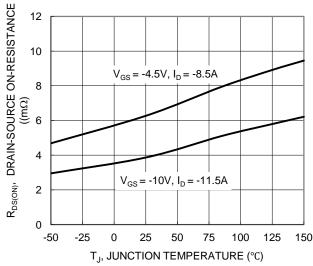


Figure 7. On-Resistance Variation with Temperature

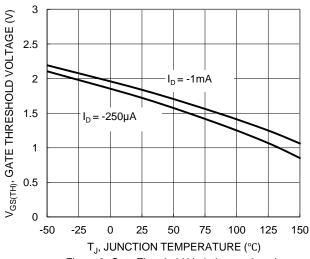


Figure 8. Gate Threshold Variation vs. Junction Temperature

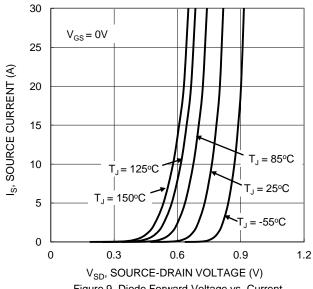


Figure 9. Diode Forward Voltage vs. Current

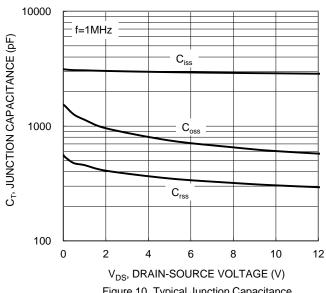
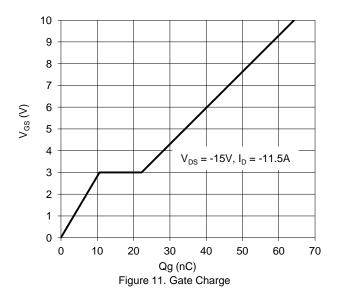
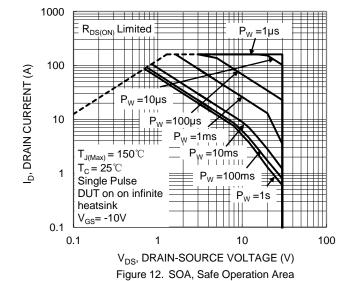


Figure 10. Typical Junction Capacitance







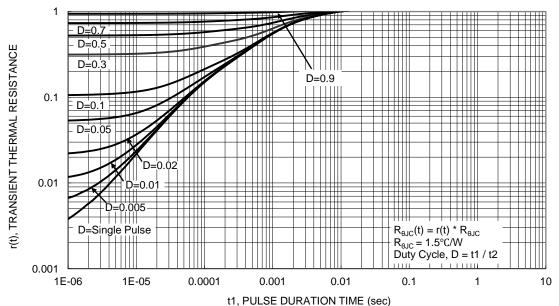


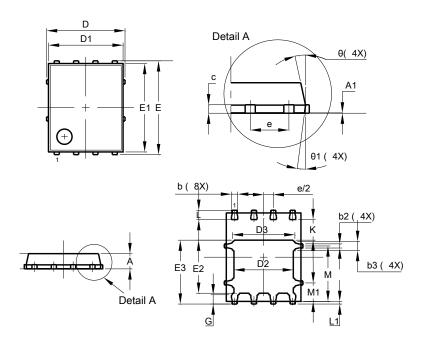
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI5060-8

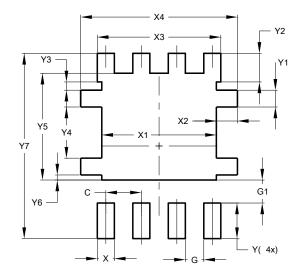


PowerDI5060-8				
Dim	Min	Max	Тур	
Α	0.90	1.10	1.00	
A1	0.00	0.05	-	
b	0.33	0.51	0.41	
b2	0.200	0.350	0.273	
b3	0.40	0.80	0.60	
С	0.230	0.330	0.277	
D		5.15 BSC		
D1	4.70	5.10	4.90	
D2	3.70	4.10	3.90	
D3	3.90	4.30	4.10	
Е	(6.15 BSC	,	
E1	5.60	6.00	5.80	
E2	3.28	3.68	3.48	
E3	3.99	4.39	4.19	
е		1.27 BSC	;	
G	0.51	0.71	0.61	
K	0.51	-	-	
L	0.51	0.71	0.61	
L1	0.100	0.200	0.175	
М	3.235	4.035	3.635	
M1	1.00	1.40	1.21	
Θ	10°	12º	11º	
Θ1	6º	8°	7º	
All Dimensions in mm				

Suggested Pad Layout

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

PowerDI5060-8



Dimensions	Value (in mm)			
С	1.270			
G	0.660			
G1	0.820			
Х	0.610			
X1	4.100			
X2	0.755			
Х3	4.420			
X4	5.610			
Υ	1.270			
Y1	0.600			
Y2	1.020			
Y3	0.295			
Y4	1.825			
Y5	3.810			
Y6	0.180			
Y7	6.610			



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