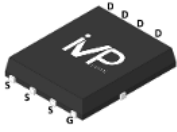
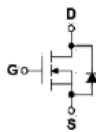


PDFN5*6

Symbol


Parameter	Value	Unit
V_{DS}	45	V
$R_{DS(ON)-Max}$	1.2	m Ω
I_D	224	A

Key Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested
- Moisture Sensitivity Level MSL1

Applications

- DC-to-DC converters
- Switch Mode Power Supply
- Brushless DC motor control

Ordering Information

Ordering part Number	Marking code	Package	Form
VPLMDF7159	7159	PDFN5*6	Tape & Reel

Absolute Maximum Ratings ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	45	V
Gate-Source Voltage	V_{GS}	± 20	V
Maximum Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Diode Continuous Forward Current	I_S	98	A
Diode Pulse Current	I_{SP}	400 ⁽¹⁾	A
Pulse Drain Current Tested	I_{DM}	800 ⁽¹⁾	A
Continuous Drain Current	I_D	224	A
		141	
Maximum Power Dissipation	P_D	96	W
		39	
Continuous Drain Current	I_D	33	A
		26	
Maximum Power Dissipation	P_D	2.1	W
		1.3	
Avalanche Current, Single pulse	$I_{AS}^{(2)}$	64	A
		34	
Avalanche Energy, Single pulse	$E_{AS}^{(2)}$	204	mJ
		290	

Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance-Junction to Case	$R_{\theta JC}$	1.3	$^\circ\text{C/W}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}^{(3)}$	60	$^\circ\text{C/W}$

- ⁽¹⁾ Max. current is limited by junction temperature.
- ⁽²⁾ UIS tested and pulse width are limited by maximum junction temperature 150°C
- ⁽³⁾ Surface Mounted on 1in² FR-4 board with 1oz.

Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Static Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	45	-	-	V	$V_{GS}=0V, I_{DS}=250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=36V, V_{GS}=0V$
Gate Threshold Voltage	$V_{GS(th)}$	1.2	2	2.5	V	$V_{DS}=V_{GS}, I_{DS}=250\mu A$
Gate Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-Source On-state Resistance	$R_{DS(ON)}^{(4)}$	-	0.95	1.2	m Ω	$V_{GS}=10V, I_{DS}=20A$
		-	1.6	2.1		$V_{GS}=4.5V, I_{DS}=10A$
Forward Transconductance	g_{fs}	-	48	-	S	$V_{DS}=5V, I_{DS}=10A$

Dynamic Characteristics⁽⁵⁾

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate Resistance	R_G	-	0.95	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ Freq.=1MHz
Input Capacitance	C_{iss}	-	5828	-	pF	$V_{GS}=0V, V_{DS}=20V,$ Freq.=1MHz
Output Capacitance	C_{oss}	-	1440	-		
Reverse Transfer Capacitance	C_{rss}	-	80	-		
Turn-on Delay Time	$t_{d(ON)}$	-	15.3	-	nS	$V_{GS}=10V, V_{DS}=22.5V,$ $I_D=1A, R_{GEN}=1\Omega$
Turn-on Rise Time	t_r	-	12.5	-		
Turn-off Delay Time	$t_{d(OFF)}$	-	49.8	-		
Turn-off Fall Time	t_f	-	88	-		

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Total Gate Charge	Q_g	-	87.2	-	nC	$V_{GS}=10V, V_{DS}=22.5V,$ $I_D=20A$
Gate-Source Charge	Q_{gs}	-	19.5	-		
Gate-Drain Charge	Q_{gd}	-	17.3	-		

Source Drain Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage	$V_{SD}^{(4)}$	-	0.7	1.1	V	$I_{SD}=10A, V_{GS}=0V$
Reverse Recovery Time	t_{rr}	-	45.1	-	nS	$I_F=10A, V_R=22.5V$ & $di_F/dt=100A/\mu s$
Reverse Recovery Charge	Q_{rr}	-	39	-	nC	

- ⁽⁴⁾ Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).
- ⁽⁵⁾ Guaranteed by design, not subject to production test

Electrical Characteristics Diagrams

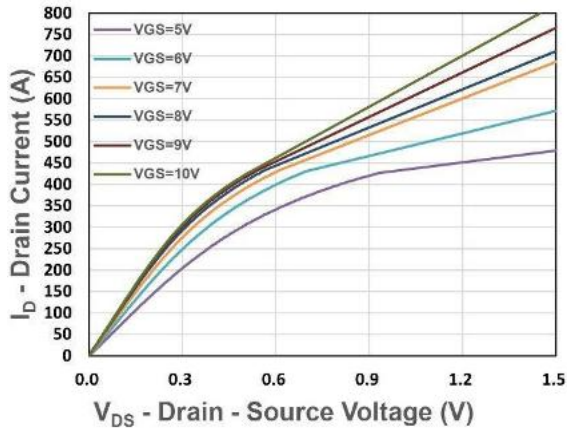


Figure 1. Output Characteristics

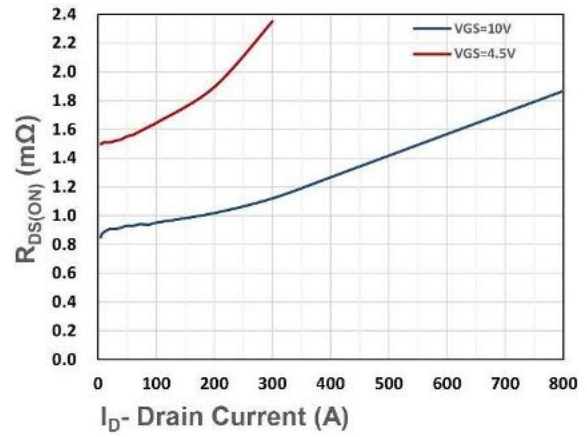


Figure 2. On-Resistance vs. I_D

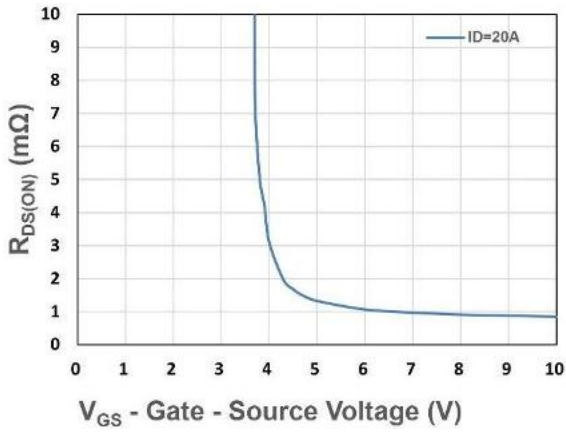


Figure 3. On-Resistance vs. V_{GS}

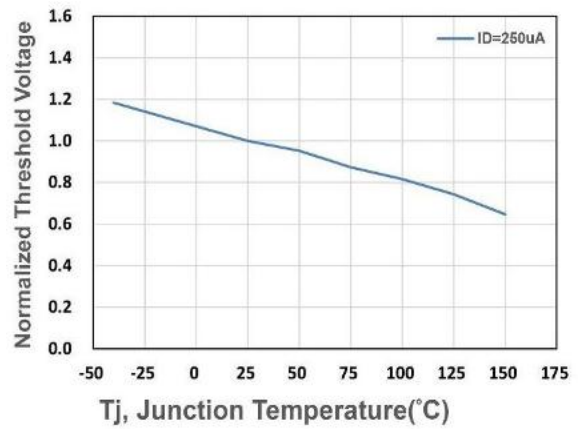


Figure 4. Gate Threshold Voltage

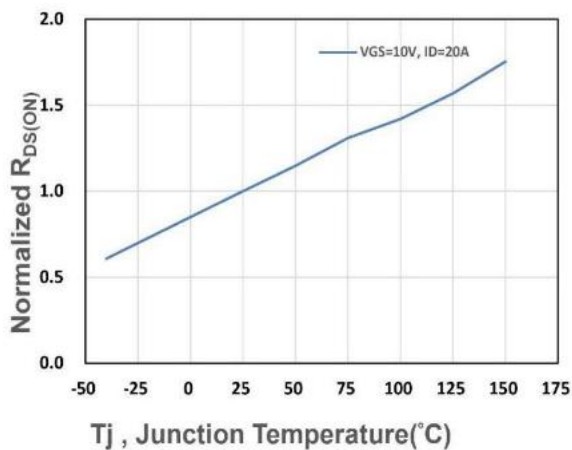


Figure 5. Drain-Source On Resistance

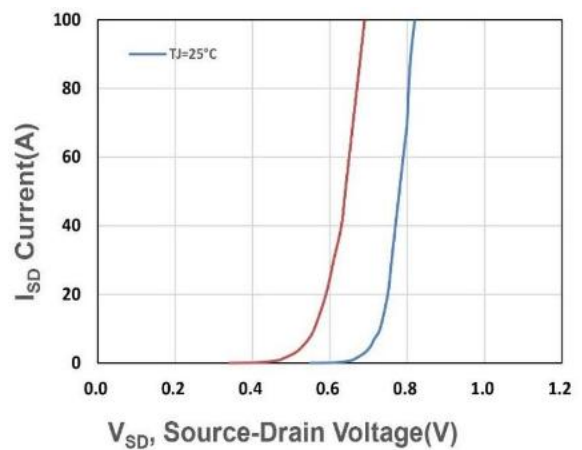


Figure 6. Source-Drain Diode Forward

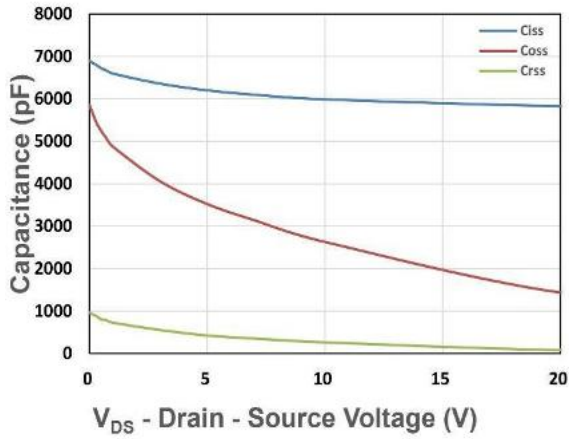


Figure 7. Capacitance

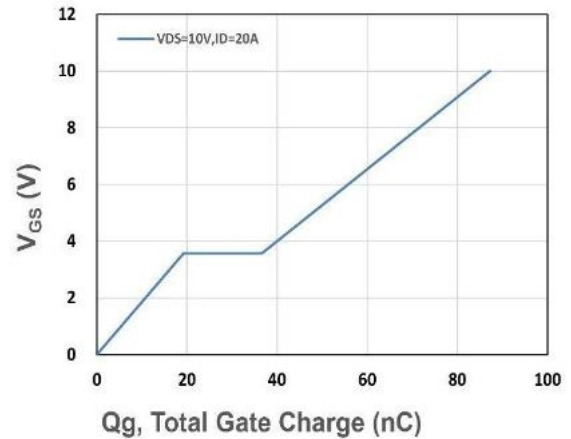


Figure 8. Gate Charge Characteristics

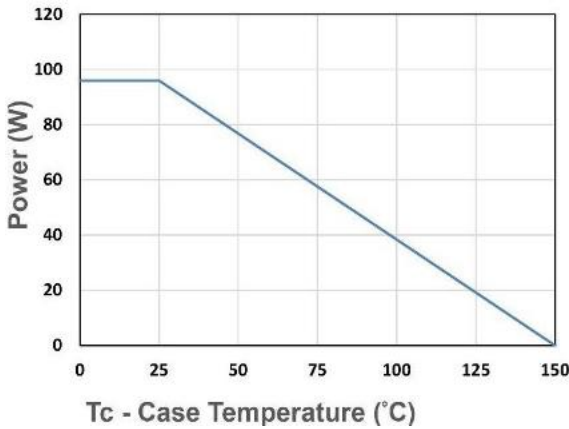


Figure 9. Power Dissipation

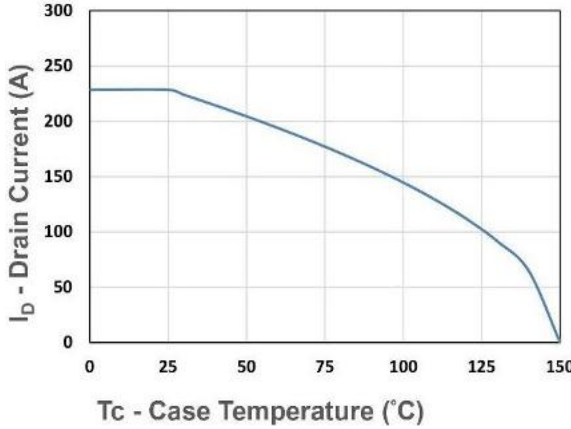


Figure 10. Drain Current

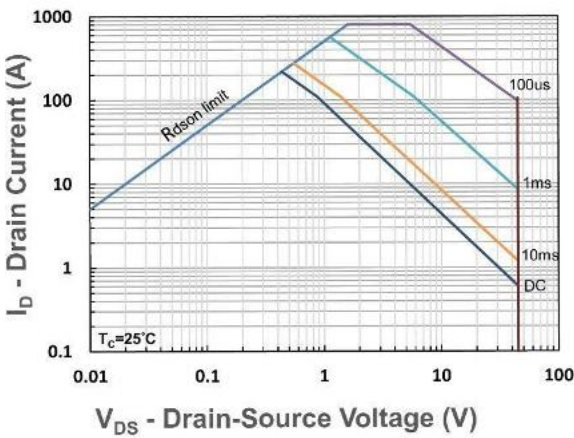


Figure 11. Safe Operating Area

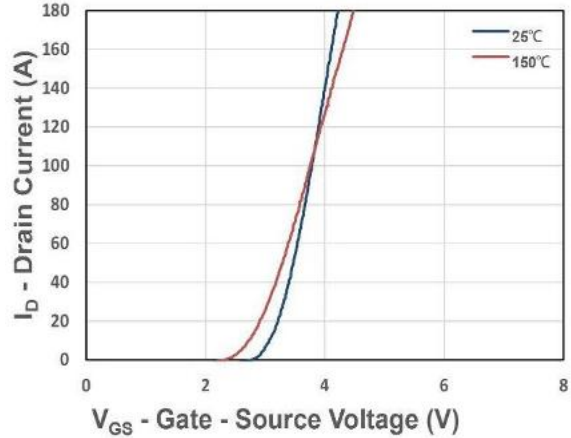


Figure 12. Transfer Characteristics

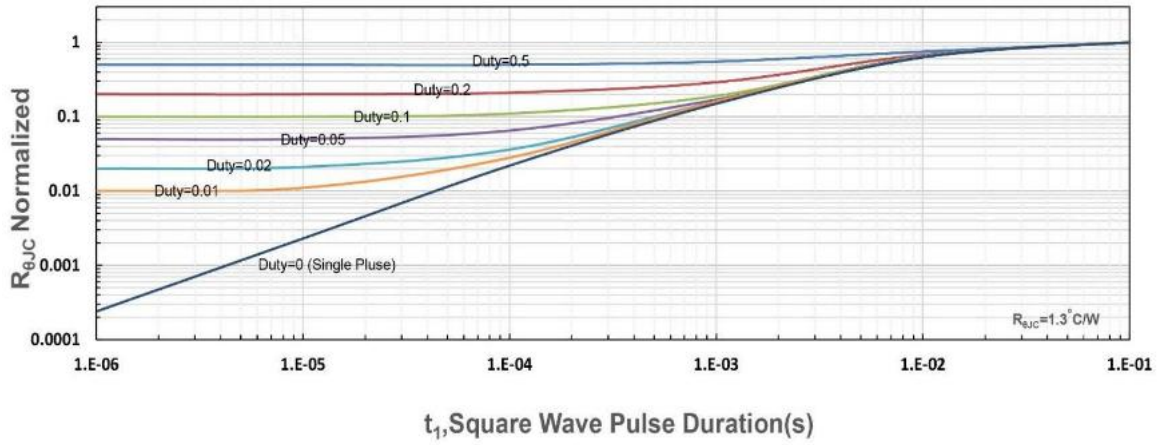
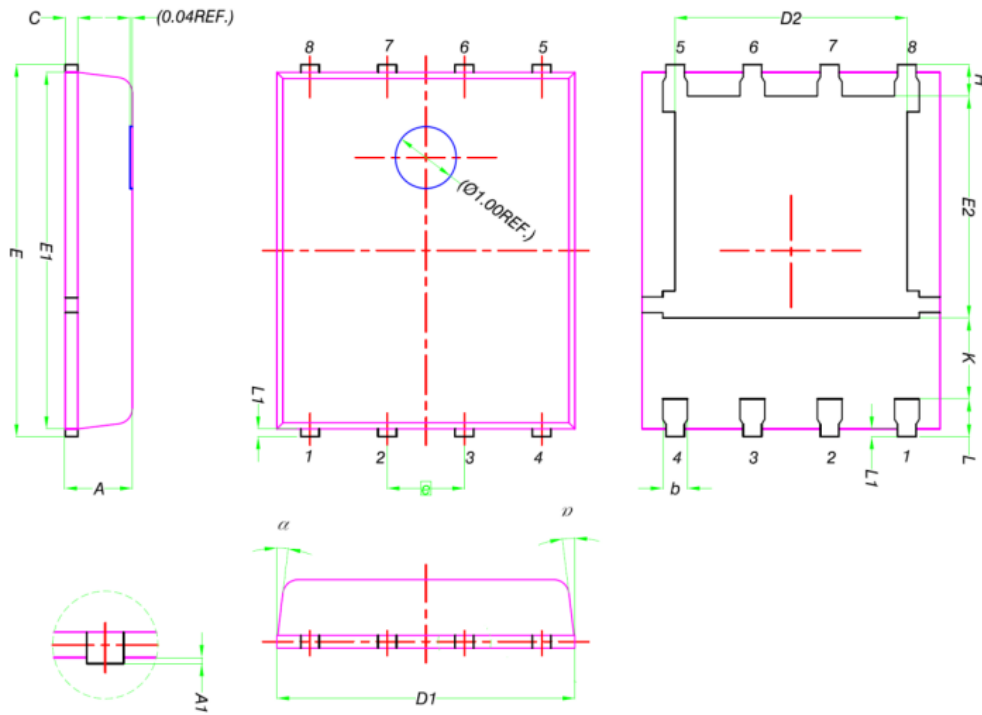


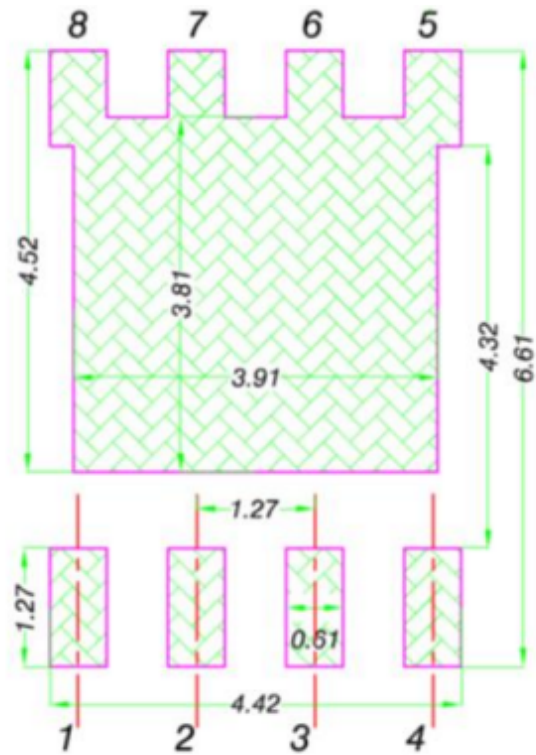
Figure 13. $R_{\theta JC}$ Transient Thermal Impedance

Package Information (PDFN5*6)



Outline dimensions in mm

Unit:mm	Min	Typ	Max
A	0.900	1.000	1.100
A1	0.000	-	0.050
b	0.330	0.410	0.510
C	0.200	0.250	0.300
D1	4.800	4.900	5.000
D2	3.610	3.810	3.960
E	5.900	6.000	6.100
E1	5.700	5.750	5.800
E2	3.380	3.580	3.780
e	1.27 BSC		
H	0.410	0.510	0.610
K	1.100	-	-
L	0.510	0.610	0.710
L1	0.060	0.130	0.200
α	0°	-	12°



Suggested Pad Layout (Unit:mm)

Disclaimer

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