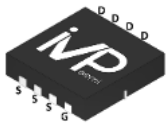
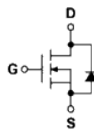


PDFN3.3*3.3

Symbol


Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(ON)-Max}$	11	m Ω
I_D	53	A

Key Features

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

Applications

- Power Management in DC/DC Converters
- USB Power Delivery (USB PD)

Ordering Information

Ordering part Number	Marking code	Package	Form
VPLMDF7014	7014	PDFN3.3*3.3	Tape & Reel

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

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	V_{DS}	60	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	28	A	
Pulse Drain Current Tested	$I_{DM}^{(1)}$	133	A	
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	53	A
		$T_C=100^\circ\text{C}$	34	
Maximum Power Dissipation	P_D	$T_C=25^\circ\text{C}$	31	W
		$T_C=100^\circ\text{C}$	13	
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	12	A
		$T_A=70^\circ\text{C}$	9.5	
Maximum Power Dissipation	P_D	$T_A=25^\circ\text{C}$	1.6	W
		$T_A=70^\circ\text{C}$	1.0	
Avalanche Current, Single pulse	$I_{AS}^{(2)}$	L=0.1mH	24	A
		L=0.5mH	13	
Avalanche Energy, Single pulse	$E_{AS}^{(2)}$	L=0.1mH	29	mJ
		L=0.5mH	42	

Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance-Junction to Case	$R_{\theta JC}$	4	$^\circ\text{C/W}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}^{(3)}$	80	$^\circ\text{C/W}$

- (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	$V_{(BR)DSS}$	60	-	-	V	$V_{GS}=0V, I_{DS}=250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=48V, V_{GS}=0V$
Gate Threshold Voltage	$V_{GS(th)}$	1	1.8	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	$R_{DS(ON)}^{(4)}$	-	8.5	11	m Ω	$V_{GS}=10V, I_{DS}=20A$
		-	13	17		$V_{GS}=4.5V, I_{DS}=10A$
Forward Transconductance	g_{fs}	-	17	-	S	$V_{DS}=5V, I_{DS}=10A$

Dynamic Characteristics⁽⁵⁾

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate Resistance	R_G	-	1	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ Freq.=1MHz
Input Capacitance	C_{iss}	-	1230	-	pF	$V_{GS}=0V, V_{DS}=30V,$ Freq.=1MHz
Output Capacitance	C_{oss}	-	317	-		
Reverse Transfer Capacitance	C_{rss}	-	46	-		
Turn-on Delay Time	$t_{d(ON)}$	-	8.8	-	nS	$V_{GS}=10V, V_{DS}=30V,$ $I_D=1A, R_{GEN}=1\Omega$
Turn-on Rise Time	t_r	-	19.6	-		
Turn-off Delay Time	$t_{d(OFF)}$	-	25.8	-		
Turn-off Fall Time	t_f	-	29	-		

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Total Gate Charge	Q_g	-	11.2	-	nC	$V_{GS}=4.5V, V_{DS}=30V$ $I_D=20A$
		-	22.3	-		$V_{GS}=10V, V_{DS}=30V,$ $I_D=20A$
Gate-Source Charge	Q_{gs}	-	4.9	-		
Gate-Drain Charge	Q_{gd}	-	4.8	-		

Source Drain Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage	$V_{SD}^{(4)}$	-	0.8	1.1	V	$I_{SD}=10A, V_{GS}=0V$
Reverse Recovery Time	t_{rr}	-	22.5	-	nS	$I_F=10A, V_R=48V$ & $di_F/dt=100A/\mu s$
Reverse Recovery Charge	Q_{rr}	-	11.1	-	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

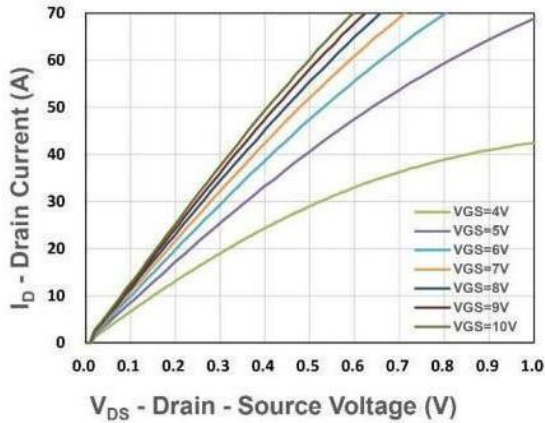


Figure 1. Output Characteristics

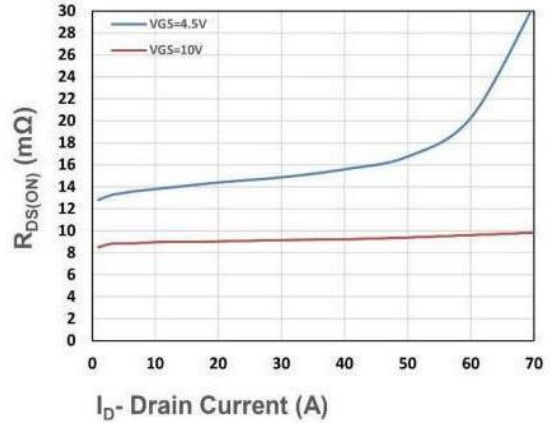


Figure 2. On-Resistance vs. I_D

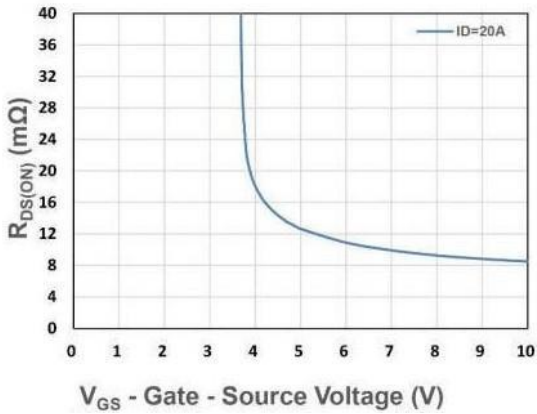


Figure 3. On-Resistance vs. V_{GS}

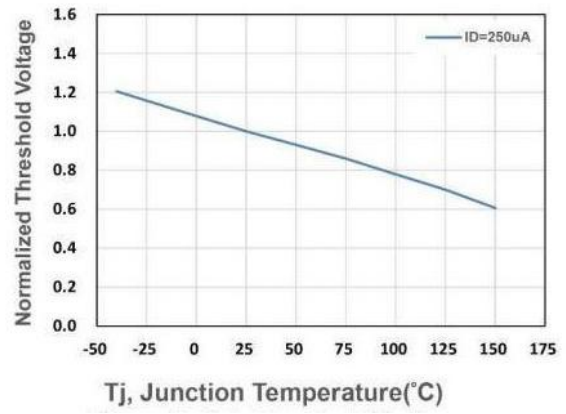


Figure 4. Gate Threshold Voltage

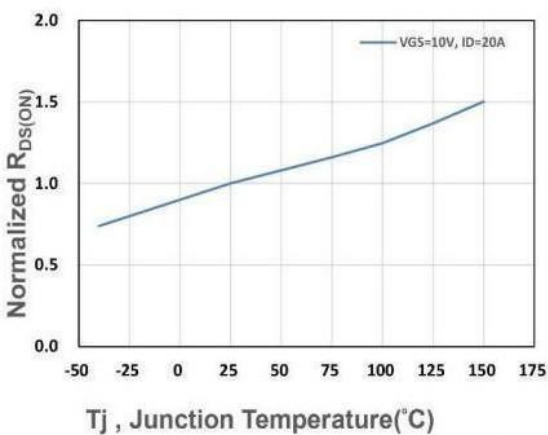


Figure 5. Drain-Source On Resistance

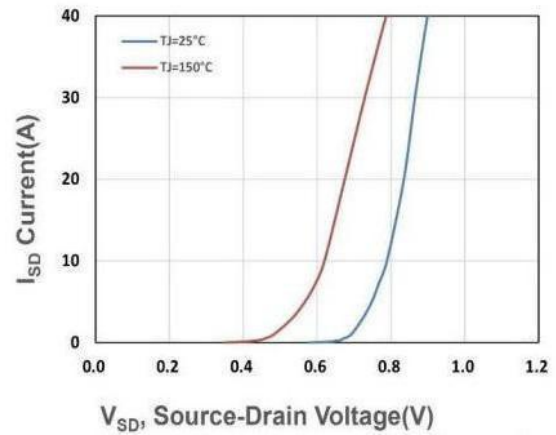
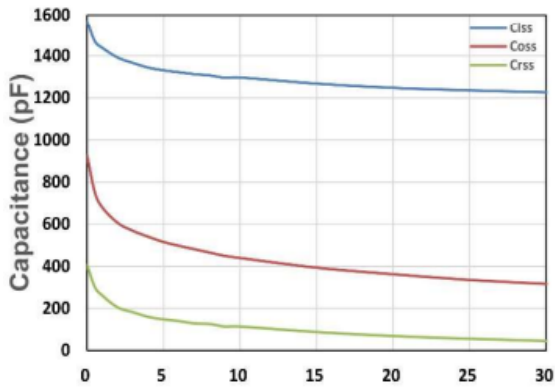
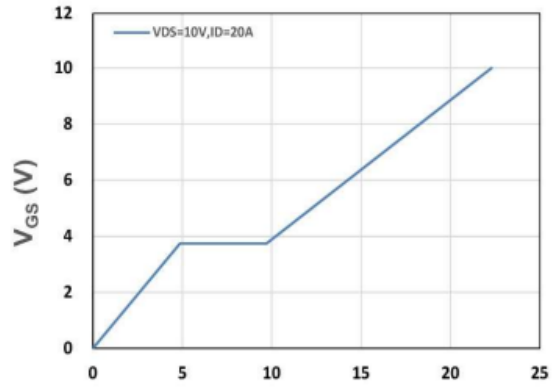


Figure 6. Source-Drain Diode Forward



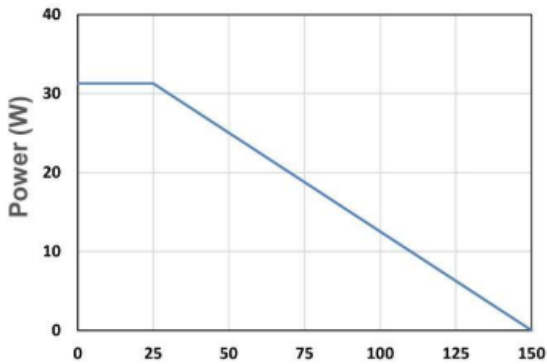
V_{DS} - Drain - Source Voltage (V)

Figure 7. Capacitance



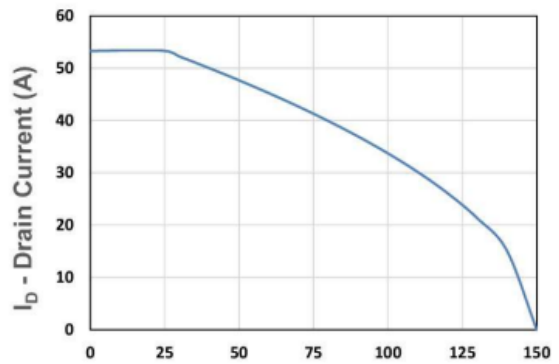
Q_g , Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



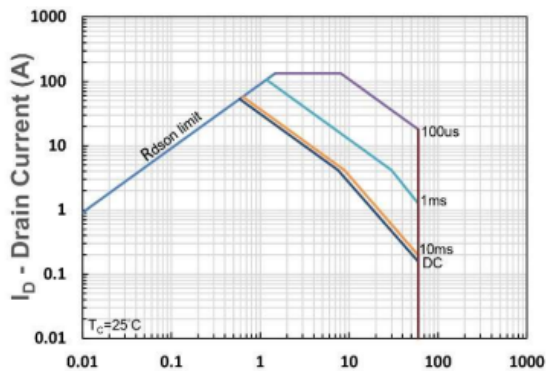
T_c - Case Temperature (°C)

Figure 9. Power Dissipation



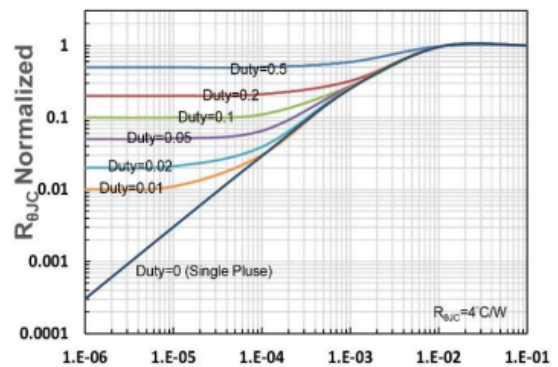
T_c - Case Temperature (°C)

Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)

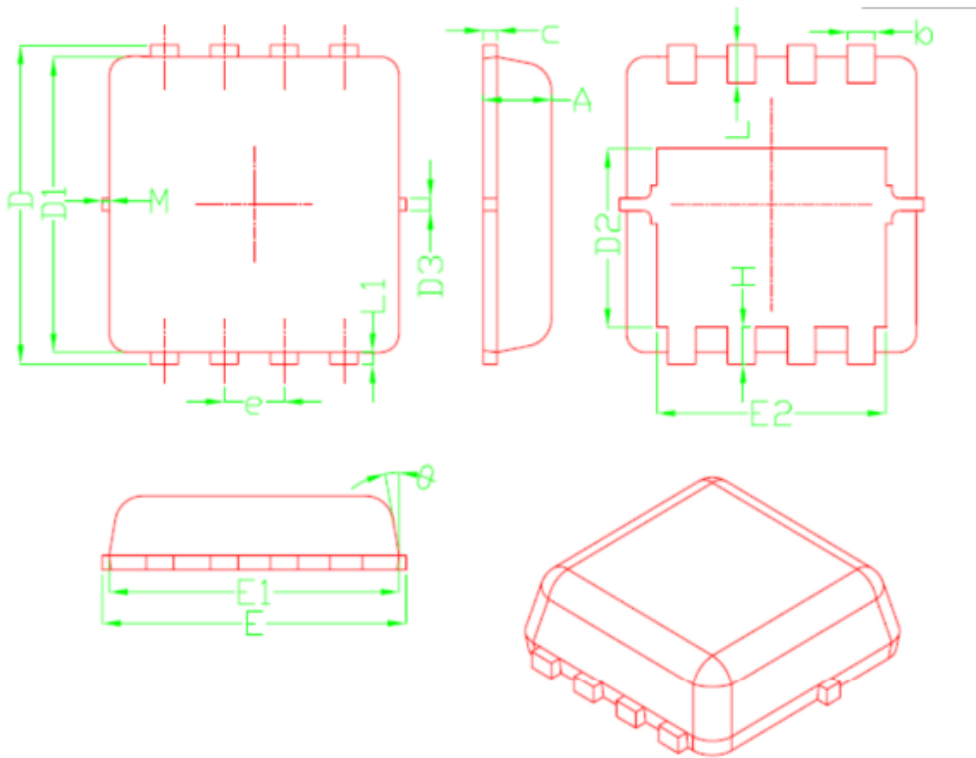
Figure 11. Safe Operating Area



t_1 , Square Wave Pulse Duration (s)

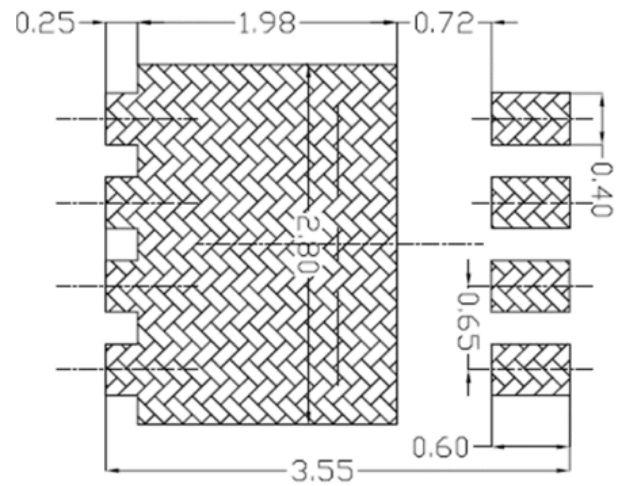
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance

Package Information (PDFN3.3*3.3)



Outline Dimensions in mm

Unit:mm	Min	Typ	Max
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
θ	-	10°	12°
M	-	-	0.15



Suggested Pad Layout (Unit:mm)

Disclaimer

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