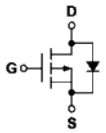
VPLMDF7133

P-Channel Enhancement Mode MOSFET

PDFN3.3*3.3

Symbol



Parameter	Value	Unit
V_{DS}	-60	V
$R_{DS(ON)\text{-}Max}$	40	mΩ
I_D	-24	A

Key Features

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

Applications

- Power Management in DC/DC Converters
- Load Switch

Ordering Information

Ordering part Number	Marking code	Package	Form
VPLMDF7133	7133	PDFN3.3*3.3	Tape & Reel

Absolute Maximum Ratings (T_J = 25°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	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C
Diode Continuous Forward Current	T_C=25°C	I_S	-38	A
Pulse Drain Current Tested	T_C=25°C	I_{DM} (1)	-59	A
Continuous Drain Current	T_C=25°C	I_D	-24	A
	T_C=100°C		-15	
Maximum Power Dissipation	T_C=25°C	P_D	42	W
	T_C=100°C		17	
Continuous Drain Current	T_A=25°C	I_D	-4.7	A
	T_A=70°C		-3.7	
Maximum Power Dissipation	T_A=25°C	P_D	1.6	W
	T_A=70°C		1	
Avalanche Current, Single pulse	L=0.1mH	I_{AS} (2)	-25	A
	L=0.5mH		-14	
Avalanche Energy, Single pulse	L=0.1mH	E_{AS} (2)	31	mJ
	L=0.5mH		49	

Thermal Characteristics

Parameter		Symbol	Rating	Unit
Thermal Resistance-Junction to Case	Steady State	$R_{\theta JC}$	3	°C/W
Thermal Resistance-Junction to Ambient	Steady State	$R_{\theta JA}$ (3)	80	°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°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}=-250uA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	-1	uA	V_{DS}=-48V, V_{GS}=0V
Gate Threshold Voltage	$V_{GS(th)}$	-2.5	-1.8	-2.5	V	V_{DS}=V_{GS}, I_{DS}=-250uA
Gate Leakage Current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
Drain-Source On-state Resistance	$R_{DS(ON)}$ (4)	-	34	40	mΩ	V_{GS}=-10V, I_{DS}=-8A
		-	38	50		V_{GS}=-4.5V, I_{DS}=-5A
Forward Transconductance	g_{fs}	-	12	-	S	V_{DS}=-10V, I_{DS}=-4A

Dynamic Characteristics(5)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate Resistance	R_G	-	3.35	-	Ω	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz
Input Capacitance	C_{iss}	-	2460	-	pF	V_{GS}=0V, V_{DS}=-30V, Freq.=1MHz
Output Capacitance	C_{oss}	-	112	-		
Reverse Transfer Capacitance	C_{rss}	-	77	-		
Turn-on Delay Time	$t_{d(ON)}$	-	9.2	-	nS	V_{GS}=-10V,V_{DS}=-30V, I_D=-1A,R_{GEN}=6Ω
Turn-on Rise Time	t_r	-	22	-		
Turn-off Delay Time	$t_{d(OFF)}$	-	85.4	-		
Turn-off Fall Time	t_f	-	25.6	-		

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Total Gate Charge	Q_g	-	24.6	-	nC	V_{GS}=-4.5V,V_{DS}=-30V I_D=-8A
		-	52.6	-		V_{GS}=-10V,V_{DS}=-30V, I_D=-8A
Gate-Source Charge	Q_{gs}	-	9	-		
Gate-Drain Charge	Q_{gd}	-	7	-		

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}=-1A, V_{GS}=0V
Reverse Recovery Time	t_{rr}	-	35	-	nS	I_F=-1A, V_R=0V & dI_F/dt=100A/μs
Reverse Recovery Charge	Q_{rr}	-	7.3	-	nC	

- (4) Pulse test (pulse width ≤ 300us, duty cycle ≤ 2%).
- (5) Guaranteed by design, not subject to production test

Electrical characteristics diagrams

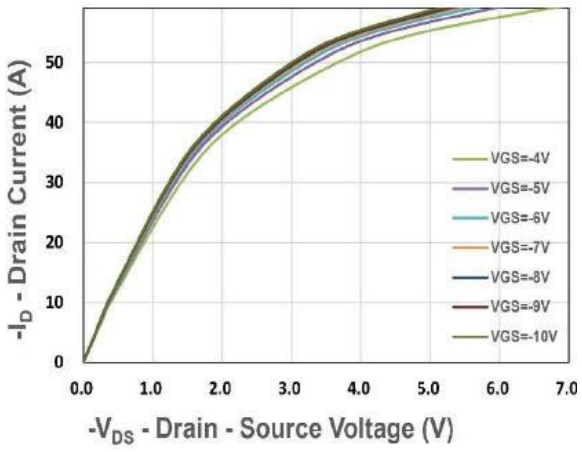


Figure 1. Output Characteristics

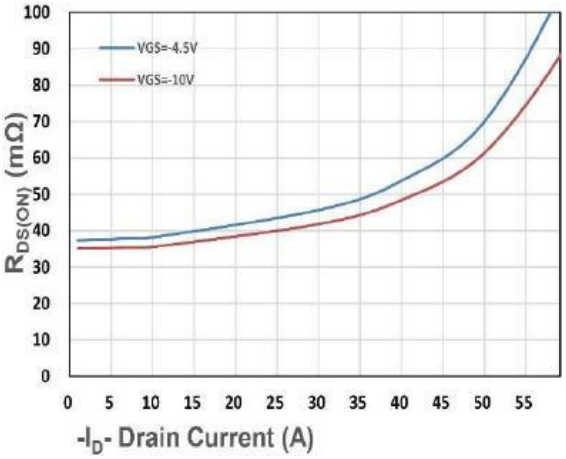


Figure 2. On-Resistance vs. ID

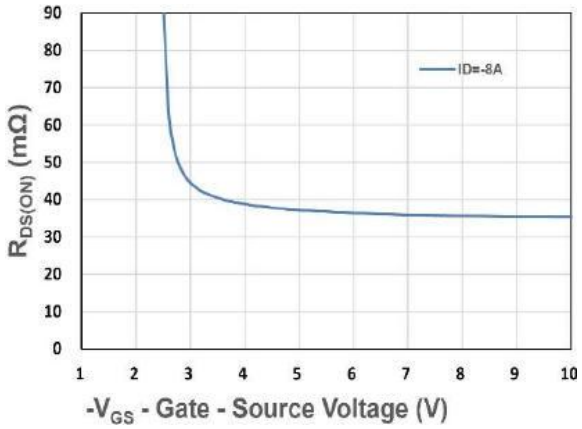


Figure 3. On-Resistance vs. VGS

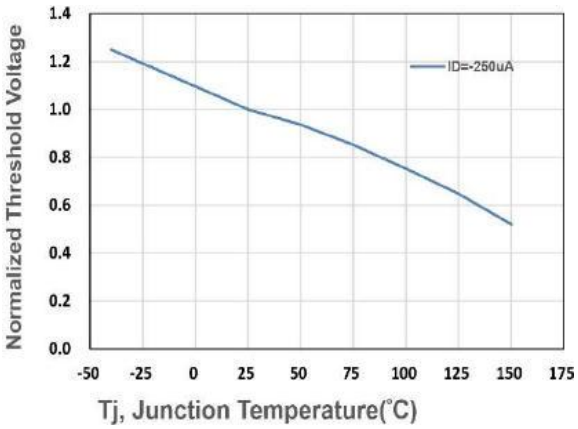


Figure 4. Gate Threshold Voltage

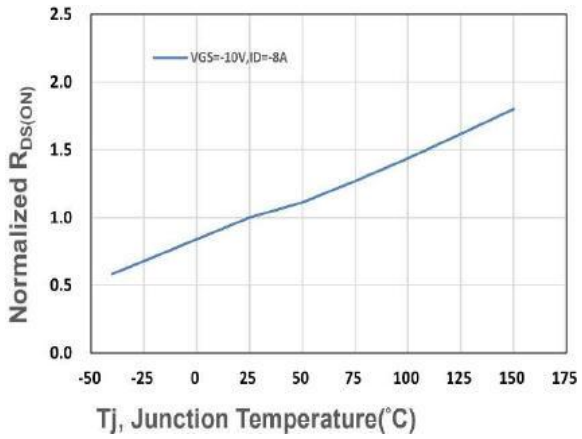


Figure 5. Drain-Source On Resistance

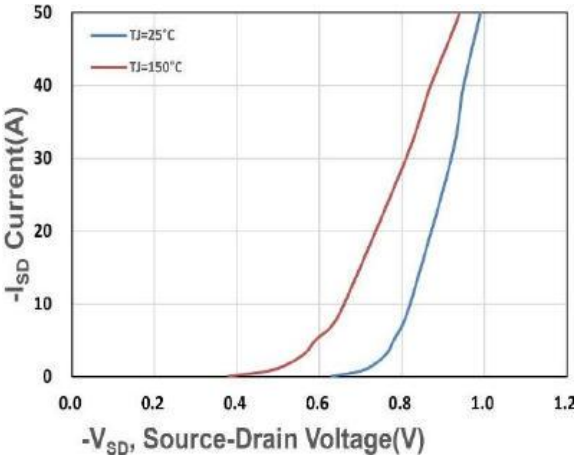


Figure 6. Source-Drain Diode Forward

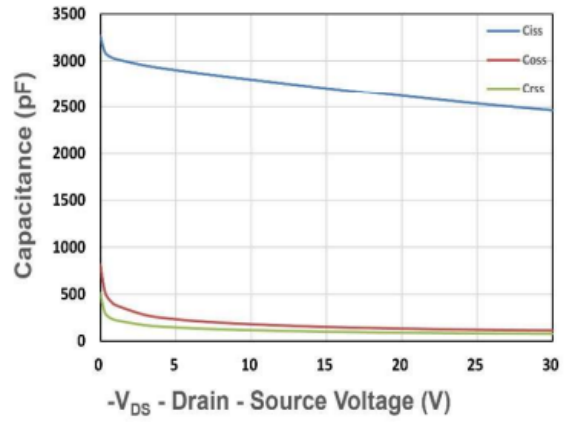


Figure 7. Capacitance

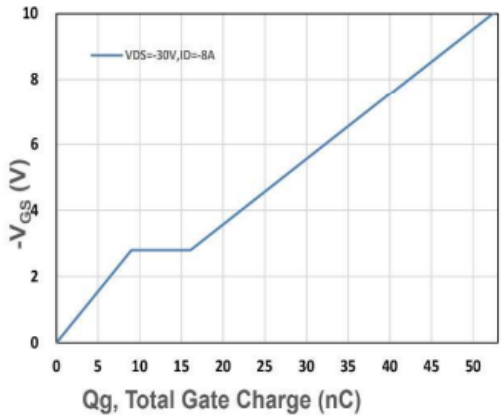


Figure 8. Gate Charge Characteristics

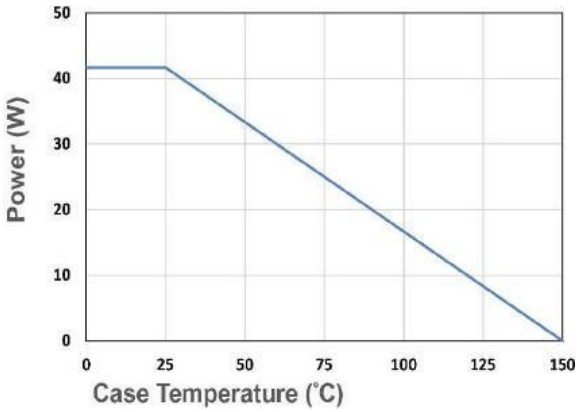


Figure 9. Power Dissipation

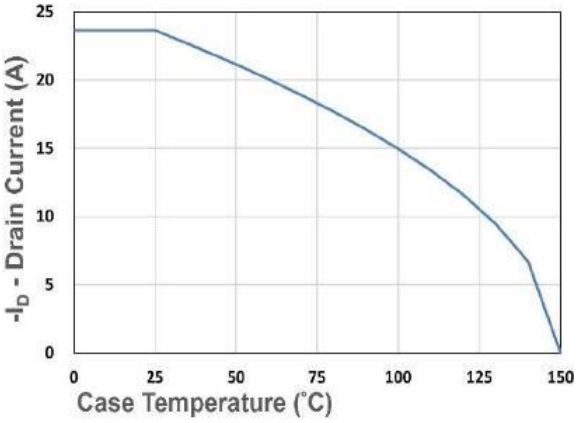


Figure 10. Drain Current

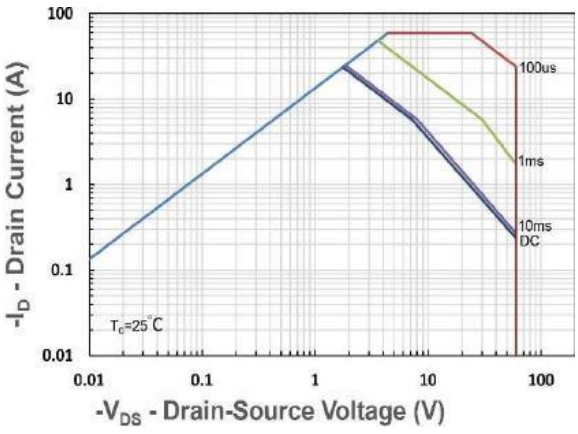


Figure 11. Safe Operating Area

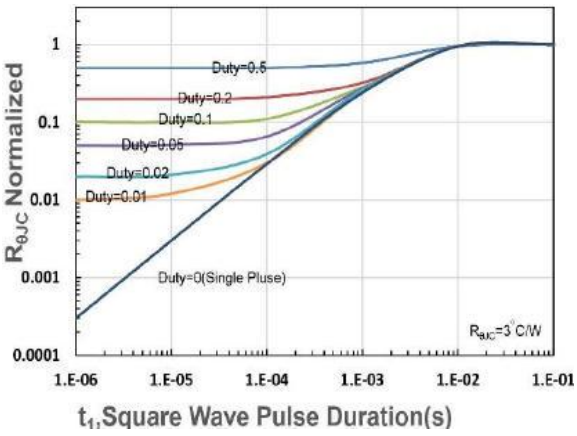
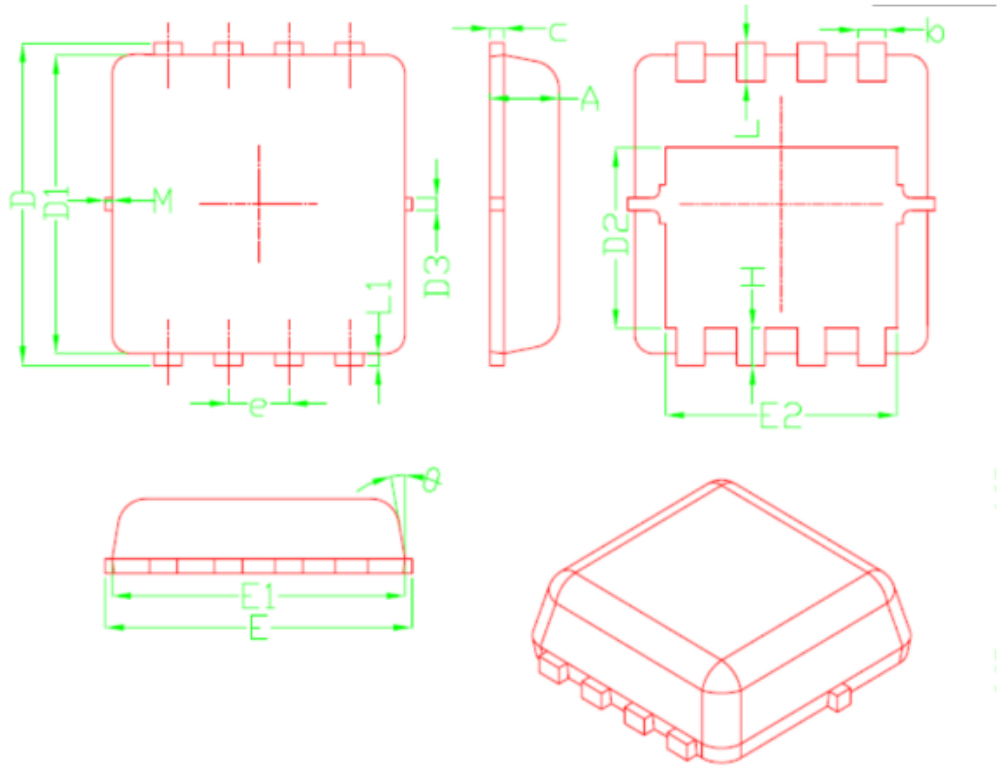


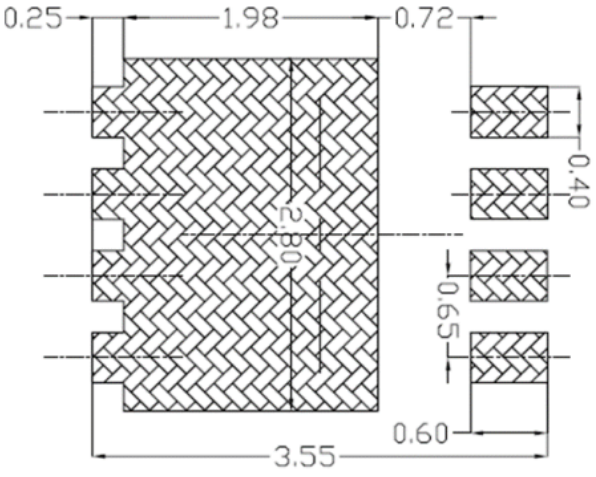
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance

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)

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