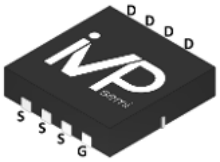
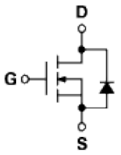
PDFN3.3*3.3



Symbol



Parameter	Value	Unit
V_{DS}	80	V
$R_{DS(ON)\text{-}Max}$	8.5	mΩ
I_D	51	A

Key Features

- Advanced trench cell design
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

Applications

- Motor drivers
- DC-DC Converter

Ordering Information

Ordering part Number	Marking code	Package	Form
VPLMDF7140	7140	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}	80	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	18	A
Pulse Drain Current Tested	T_C=25°C	I_{DM}(1)	127	A
Continuous Drain Current	T_C=25°C	I_D	51	A
	T_C=100°C		32	
Maximum Power Dissipation	T_C=25°C	P_D	36	W
	T_C=100°C		14	
Continuous Drain Current	T_A=25°C	I_D	10.9	A
	T_A=70°C		8.7	
Maximum Power Dissipation	T_A=25°C	P_D	1.7	W
	T_A=70°C		1.1	
Avalanche Current, Single pulse	L=0.1mH	I_{AS}(2)	28	A
	L=0.5mH		16	
Avalanche Energy, Single pulse	L=0.1mH	E_{AS}(2)	39	mJ
	L=0.5mH		64	

Thermal Characteristics

Parameter		Symbol	Rating	Unit
Thermal Resistance-Junction to Case	Steady State	$R_{\theta JC}$	3.5	°C/W
Thermal Resistance-Junction to Ambient	Steady State	$R_{\theta JA}$(3)	75	°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	$V_{(BR)DSS}$	80	-	-	V	V_{GS}=0V, I_{DS}=250uA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	uA	V_{DS}=64V, V_{GS}=0V
Gate Threshold Voltage	$V_{GS(th)}$	2	3	4	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)	-	7	8.5	mΩ	V_{GS}=10V, I_{DS}=20A
Forward Transconductance	g_{fs}	-	18	-	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}	-	1583	-	pF	V_{GS}=0V, V_{DS}=40V, Freq.=1MHz
Output Capacitance	C_{oss}	-	497	-		
Reverse Transfer Capacitance	C_{rss}	-	48	-		
Turn-on Delay Time	$t_{d(ON)}$	-	13	-	nS	V_{GS}=10V,V_{DS}=40V, I_D=1A,R_{GEN}=1Ω
Turn-on Rise Time	t_r	-	8	-		
Turn-off Delay Time	$t_{d(OFF)}$	-	25	-		
Turn-off Fall Time	t_f	-	54	-		

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Total Gate Charge	Q_g	-	19	-	nC	V_{GS}=6V,V_{DS}=40V I_D=20A
		-	28	-		V_{GS}=10V,V_{DS}=40V, I_D=20A
Gate-Source Charge	Q_{gs}	-	8.9	-		
Gate-Drain Charge	Q_{gd}	-	7.4	-		

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}	-	25	-	nS	I_F=10A, V_R=40V & dI_F/dt=100A/μs
Reverse Recovery Charge	Q_{rr}	-	17	-	nC	

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

Electrical characteristics diagrams

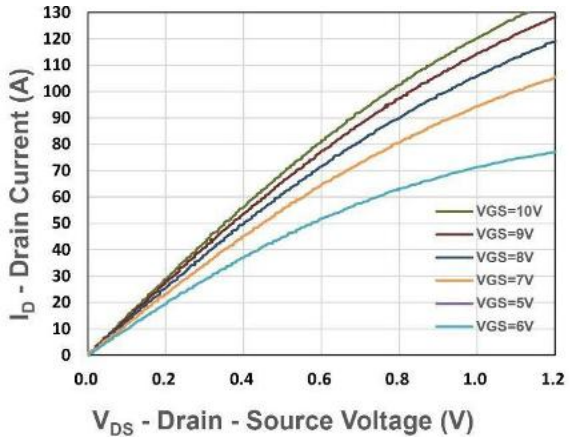


Figure 1. Output Characteristics

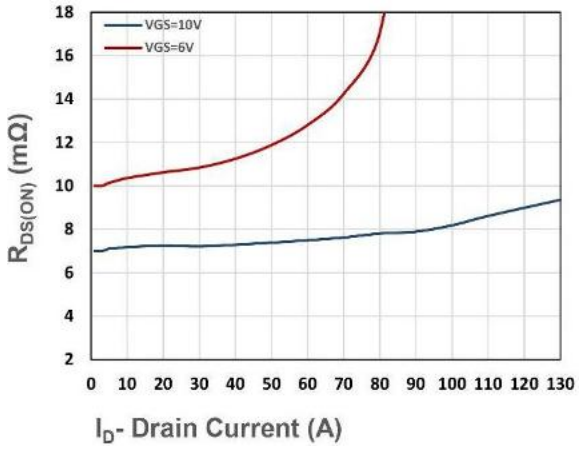


Figure 2. On-Resistance vs. ID

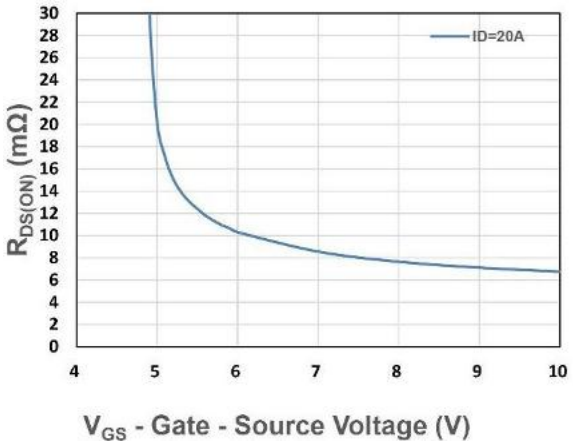


Figure 3. On-Resistance vs. VGS

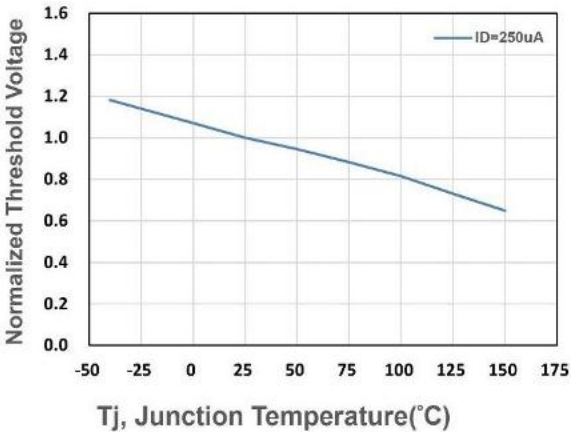


Figure 4. Gate Threshold Voltage

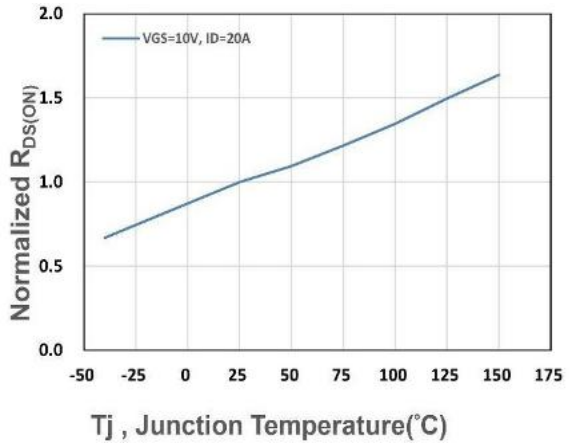


Figure 5. Drain-Source On Resistance

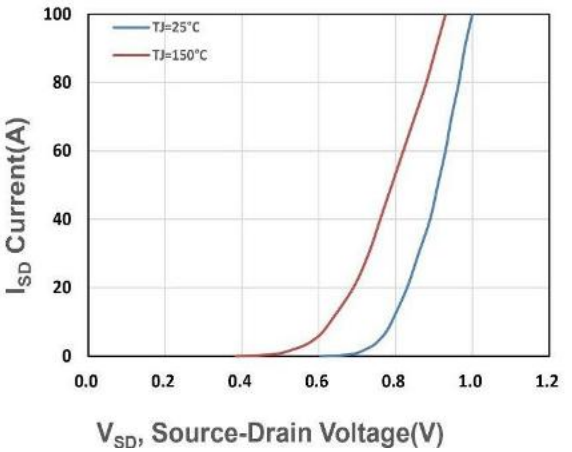


Figure 6. Source-Drain Diode Forward

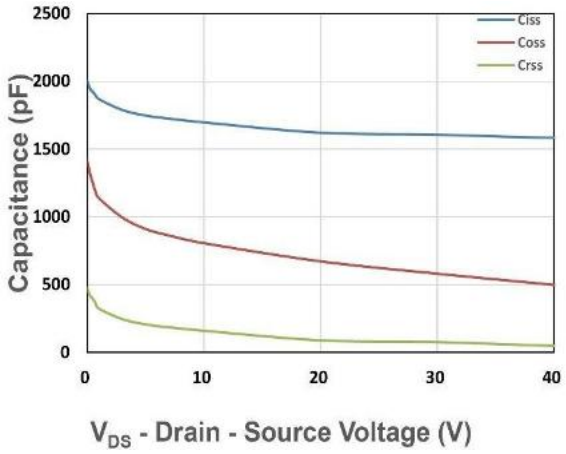


Figure 7. Capacitance

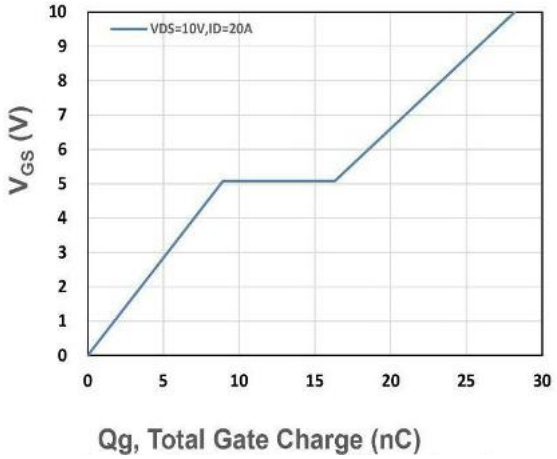


Figure 8. Gate Charge Characteristics

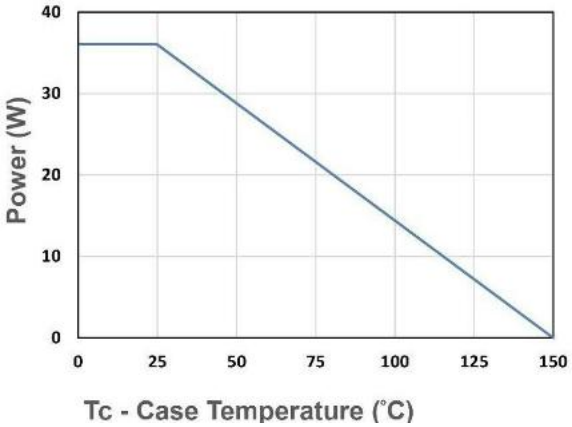


Figure 9. Power Dissipation

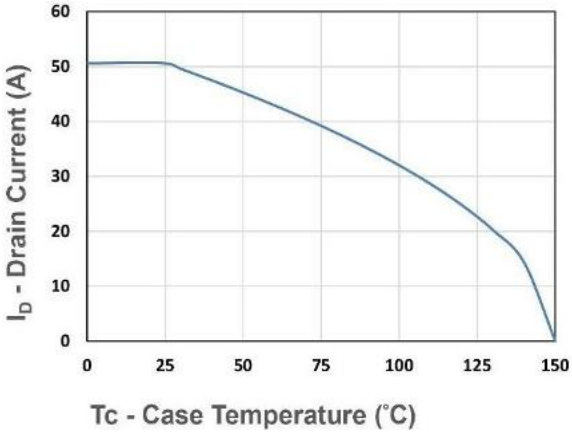


Figure 10. Drain Current

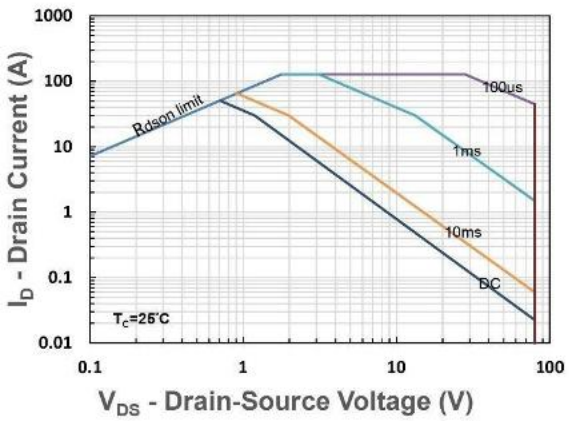


Figure 11. Safe Operating Area

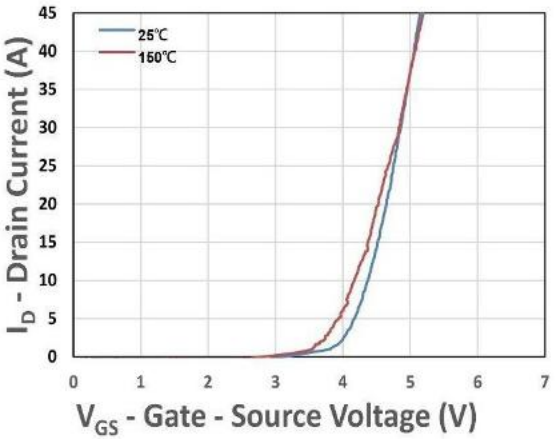
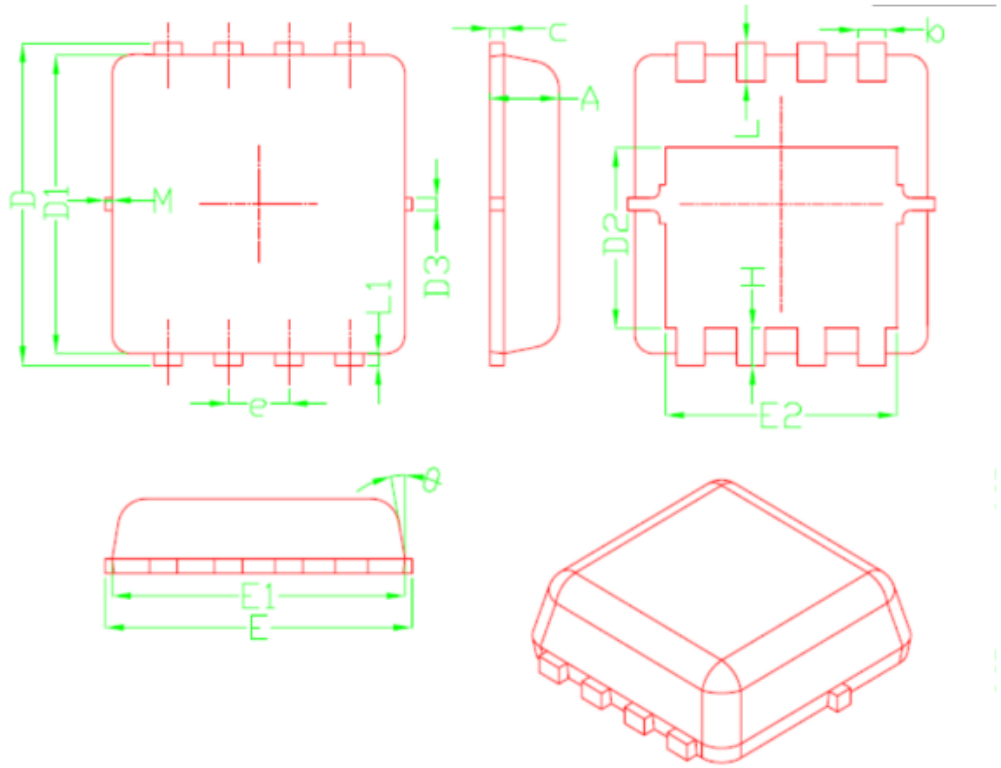


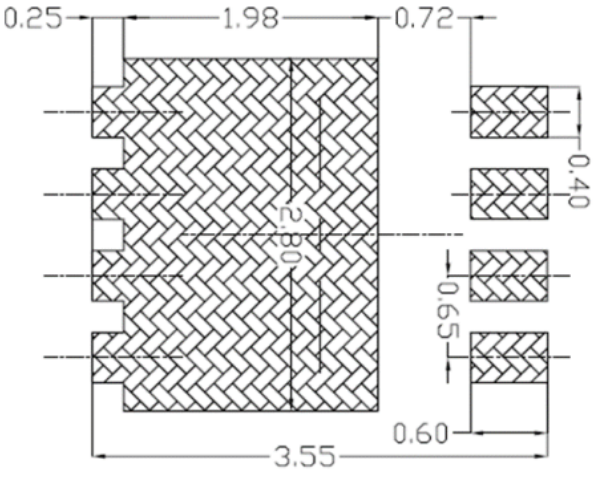
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance

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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Contact Information

indiaVP Semiconductor Pvt. Ltd.

Email: sales@ivpsemi.com

Website: www.ivpsemi.com