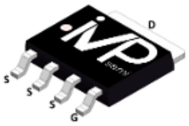
indiaVP Semiconductor Pvt. Ltd.

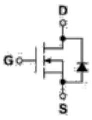
VPLMDF7117

N-Channel Enhancement Mode MOSFET

LFPAK56



Symbol



Parameter	Value	Unit
V_{DS}	45	V
$R_{DS(ON)-Max}$	0.8	mΩ
I_D	323	A

Key Features

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

Applications

- DC-to-DC converters
- Switch Mode Power Supply

Ordering Information

Ordering part Number	Marking code	Package	Form
VPLMDF7117	7117	LFPAK56	Tape & Reel

Absolute Maximum Ratings (Tj = 25°C, unless otherwise specified)

Parameter		Symbol	N-Channel	Unit
Drain-Source Voltage		V_{DS}	45	V
Gate-Source Voltage		V_{GS}	±20	V
Maximum Junction Temperature		T_J	175	°C
Storage Temperature Range		T_{STG}	-55 to 175	°C
Diode Continuous Forward Current	T_C=25°C	I_S	108	A
Pulse Drain Current Tested	T_C=25°C	I_{DM}	807(1)	A
Continuous Drain Current	T_C=25°C	I_D	323	A
	T_C=100°C		228	
Maximum Power Dissipation	T_C=25°C	P_D	166	W
	T_C=100°C		83	
Continuous Drain Current	T_A=25°C	I_D	46	A
	T_A=70°C		38	
Maximum Power Dissipation	T_A=25°C	P_D	3.3	W
	T_A=70°C		2.3	
Avalanche Current, Single pulse	L=0.1mH	I_{AS}(2)	55	A
	L=0.5mH		30	
Avalanche Energy, Single pulse	L=0.1mH	E_{AS}(2)	151	mJ
	L=0.5mH		225	

Thermal Characteristics

Parameter		Symbol	Rating	Unit
Thermal Resistance-Junction to Case	Steady State	$R_{\theta JC}$	0.9	°C/W
Thermal Resistance-Junction to Ambient	Steady State	$R_{\theta JA}$ (3)	45	°C/W

- (1) Max. current is limited by maximum junction temperature.
- (2) UIS tested and pulse width are limited by maximum junction temperature 175°C
- (3) Surface Mounted on 1in² FR-4 board with 1oz.

Electrical Characteristics (Tj = 25°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}=250uA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	uA	V_{DS}=36V, V_{GS}=0V
Gate Threshold Voltage	$V_{GS(th)}$	2.4	2.9	3.5	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)	-	0.66	0.8	mΩ	V_{GS}=10V, I_{DS}=50A
Forward Transconductance	g_{fs}	-	44	-	S	V_{DS}=5V, I_{DS}=10A

Dynamic Characteristics (5)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate Resistance	R_G	-	0.6	-	Ω	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz
Input Capacitance	C_{iss}	-	6281	-	pF	V_{GS}=0V, V_{DS}=20V, Freq.=1MHz
Output Capacitance	C_{oss}	-	2159	-		
Reverse Transfer Capacitance	C_{rss}	-	103	-		
Turn-on Delay Time	$t_{d(ON)}$	-	20	-	nS	V_{GS}=10V,V_{DS}=25V, I_D=1A,R_{GEN}=1Ω
Turn-on Rise Time	t_r	-	11	-		
Turn-off Delay Time	$t_{d(OFF)}$	-	48	-		
Turn-off Fall Time	t_f	-	100	-		

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Total Gate Charge	Q_g	-	83	-	nC	V_{GS}=10V,V_{DS}=25V, I_D=20A
Gate-Source Charge	Q_{gs}	-	25	-		
Gate-Drain Charge	Q_{gd}	-	12	-		

Source Drain Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage	V_{SD} (4)	-	0.74	-	V	I_{SD}=10A, V_{GS}=0V
Reverse Recovery Time	t_{rr}	-	68	-	nS	I_F=10A, V_R=25V & dI_F/dt=100A/µs
Reverse Recovery Charge	Q_{rr}	-	98	-	nC	

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

Electrical Characteristics Diagrams

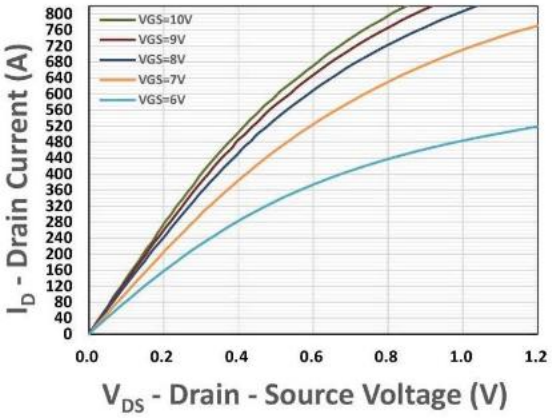


Figure 1. Output Characteristics

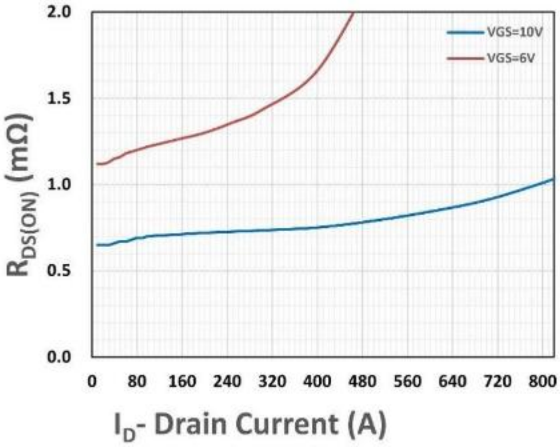


Figure 2. On-Resistance vs. ID

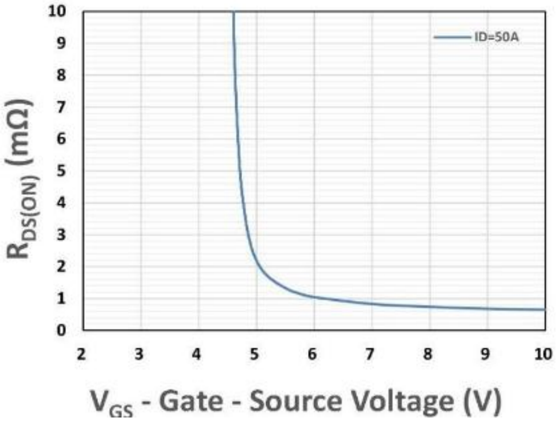


Figure 3. On-Resistance vs. VGS

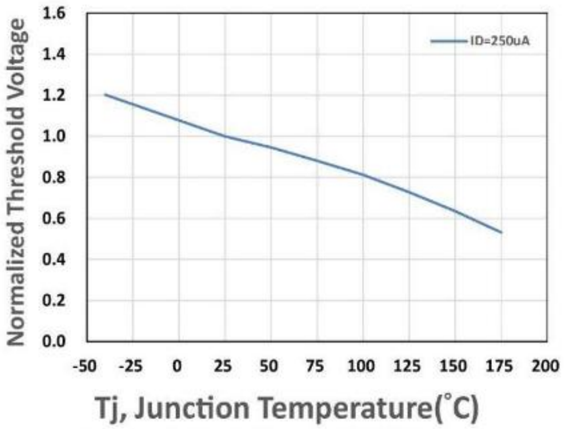


Figure 4. Gate Threshold Voltage

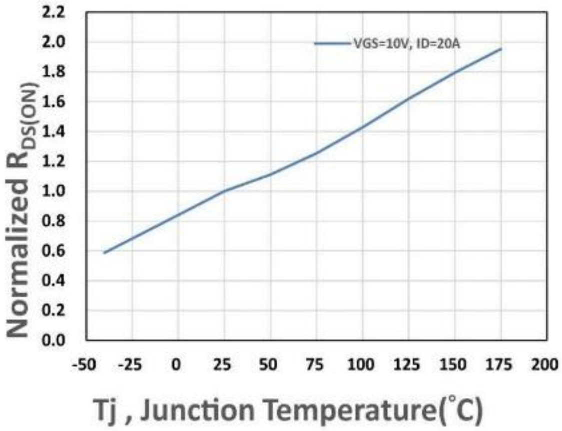


Figure 5. Drain-Source On Resistance

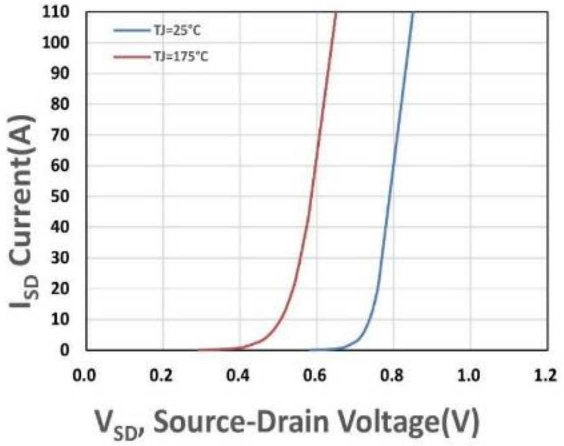


Figure 6. Source-Drain Diode Forward

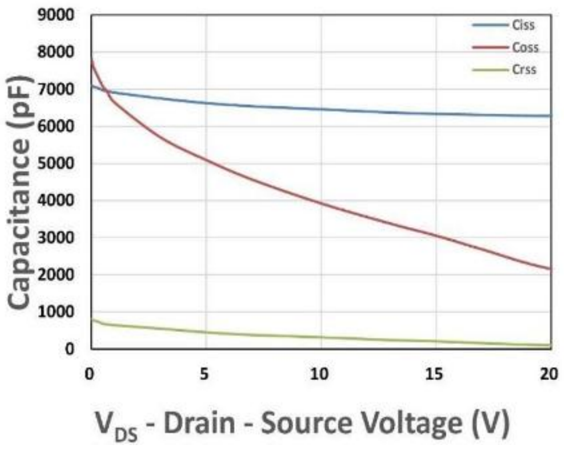


Figure 7. Capacitance

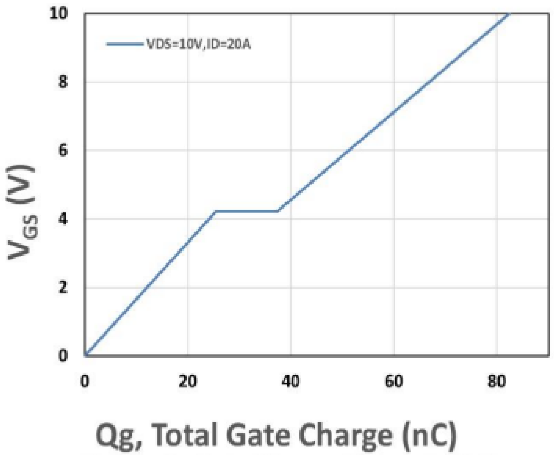


Figure 8. Gate Charge Characteristics

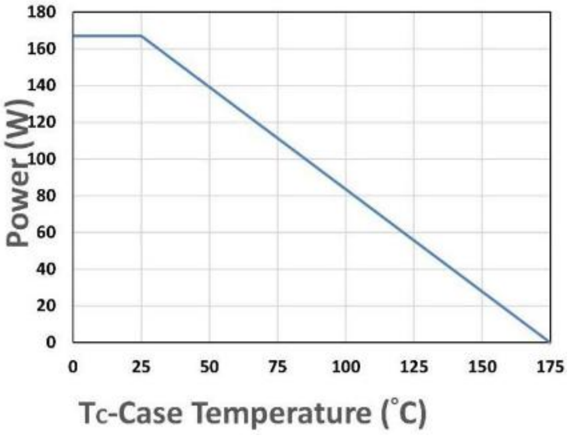


Figure 9. Power Dissipation

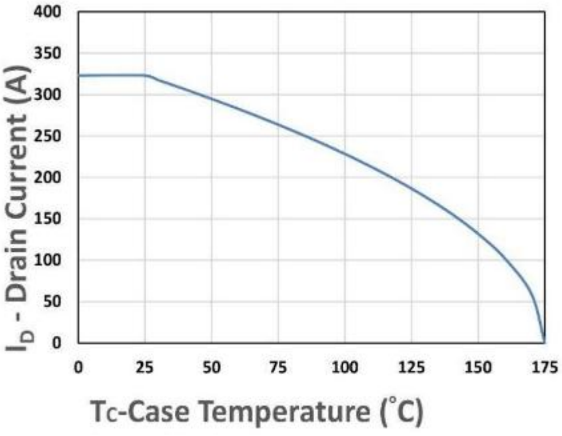


Figure 10. Drain Current

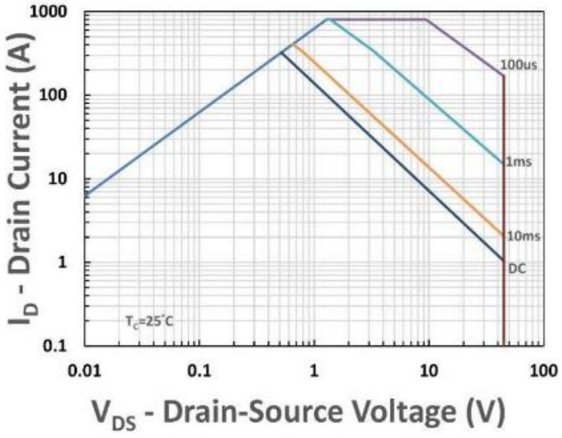


Figure 11. Safe Operating Area

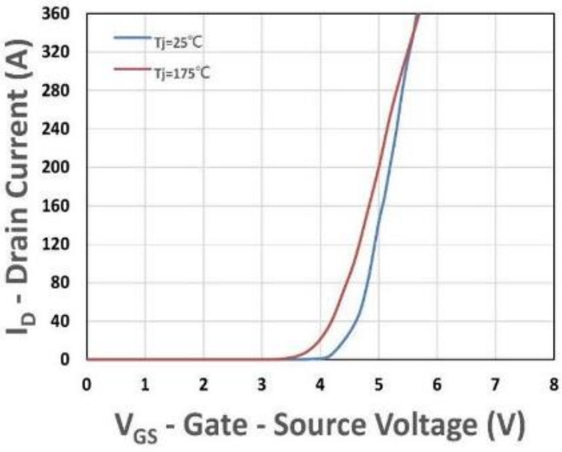


Figure 12. Transfer Characteristics

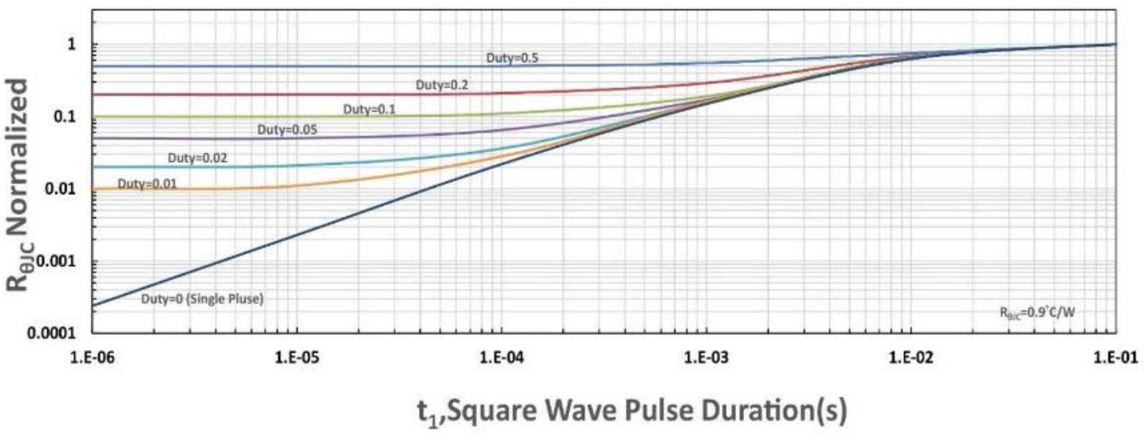
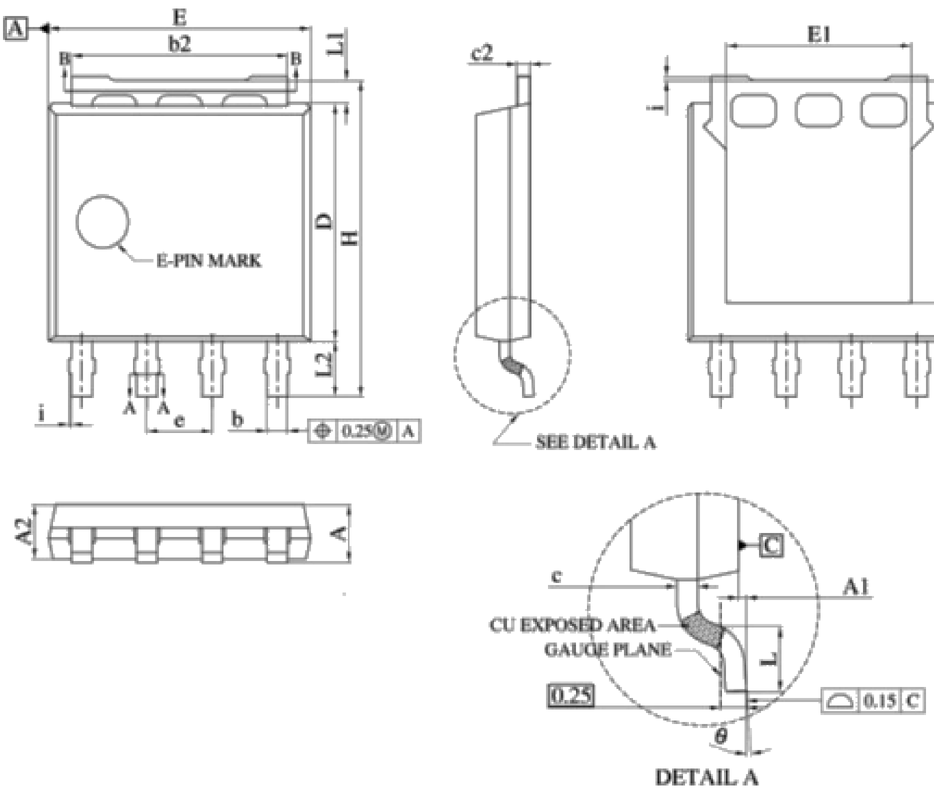


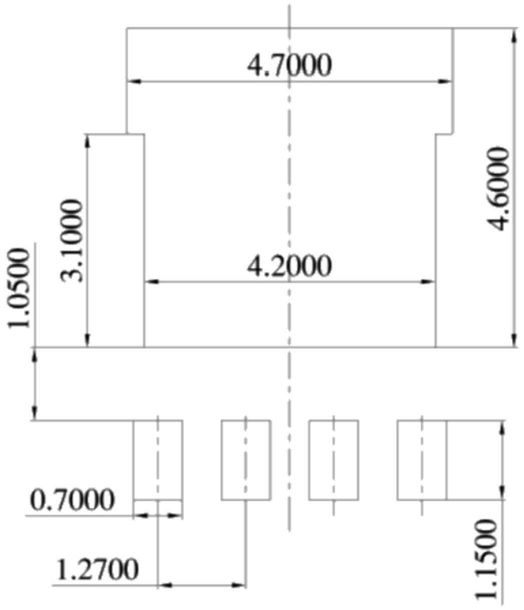
Figure 13. $R_{\theta JC}$ **Transient Thermal Impedance**

Package Information (LFPAK56)



Outline dimensions in mm

Unit:mm	Min	Typ	Max
A	1.000	-	1.300
A1	0.000	0.075	0.150
A2	0.980	1.050	1.120
b	0.350	0.420	0.500
b2	4.020	4.230	4.410
c	0.190	0.220	0.250
c2	0.240	0.270	0.300
D	4.450	-	4.700
D1	-	-	4.450
E	4.950	-	5.300
E1	3.500	-	3.700
e	1.27 BSC		
H	5.950	-	6.250
i	-	-	0.250
L	0.400	-	0.850
L1	0.270	-	0.570
L2	0.800	-	1.300
θ	0°	-	8°



Suggested Pad Layout (Unit:mm)

Disclaimer

Contact Information

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