VFPB012R070NA

Datasheet

General Description

VFPB012R070NA MOSFET is based on VMD Semiconductor's unique device design to achieve low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. The low V_{th} series is specially optimized for synchronous rectification systems with low driving voltage.

Symbol

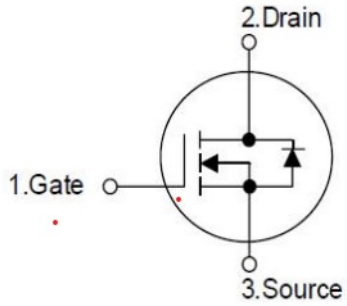


Figure 1 Symbol of VFPB012R070NA

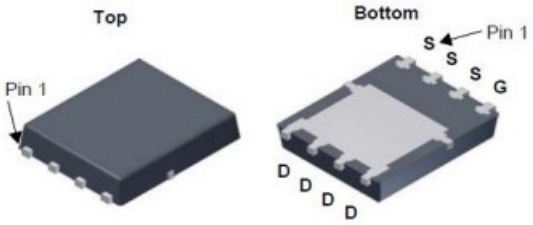
Features

- $R_{DS(ON)\_max}$ = 7.0mΩ@V_{GS} = 10V
- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity EMI Improved
- Fast switching and soft recovery

Application

- PD charger
- DC-DC converter
- Motor driver
- Switched mode power supply
- Switching voltage regulator

Package Type



PDFN5*6

Figure 2 Package Type of VFPB012R070NA

Ordering Information

Product Name	Package
VFPB012R070NA	PDFN5*6

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	120	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current(Note 1), T_C=25ºC	I_D	80	A
Pulsed Drain Current(Note 2), T_C=25ºC	I_{DM}	240	A
Max Power Dissipation(Note 3), T_C=25ºC	P_D	106	W
Avalanche Energy, Single Pulse (Note 5)	E_{AS}	60	mJ
Continuous Diode Forward Current(Note 1), T_C=25ºC	I_S	80	A
Diode Pulse Current(Note 2), T_C=25ºC	$I_{S.PULSE}$	240	A
Operation and storage temperature	T_J,T_{STG}	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		1.18		ºC/W
Thermal Resistance, Junction-to-Ambient(Note 4)	$R_{\theta JA}$		62		

Notes:

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) P_D is based on max. junction temperature, using junction-case thermal resistance.
4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with Ta=25 °C.
5) V_{DS}=50 V,V_{GS}=10 V, L=0.3 mH, starting T_J=25 °C.

Electrical Characteristics T_J= 25 ºC, unless otherwise specified

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250uA	120			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=120V, V_{GS}=0V			1	uA
Gate-Body Leakage Current	Forward	I_{GSSF}	V_{GS}=20V			100	nA
	Reverse	I_{GSSR}	V_{GS}=-20V			-100	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2.5		4.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=20A		5.5	7.0	mΩ
Gate resistance		R_G	*f*=1 MHz, Open drain		2.6		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V		5305		pF
Output Capacitance		C_{OSS}	V_{GS}=0V		1547		pF
Reverse Transfer Capacitance		C_{RSS}	f=100KHz		170		pF
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=60V		33.2		ns
Rise Time		t_r	V_{GS}=10V		47		
Turn-off Delay Time		$t_{d(off)}$	I_D=30A		59.2		
Fall Time		t_f	R_G=2.0Ω		13		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DS}=60V V_{GS}=10V I_D=30A		23.5		nC
Gate to Drain Charge		Q_{gd}			17.5		
Gate Charge Total		Q_g			73.6		
Gate Plateau Voltage		$V_{Plateau}$			5.1		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=20A			1.3	V
Reverse Recovery Time		t_{rr}	V_R=80V		73.6		ns
Reverse Recovery Charge		Q_{rr}	I_F=30A		160		nC
Peak Reverse Recovery Current		I_{rrm}	dI_F/dt=100A/us		3.8		A

Typical Performance Characteristics

Figure 3: Drain Current

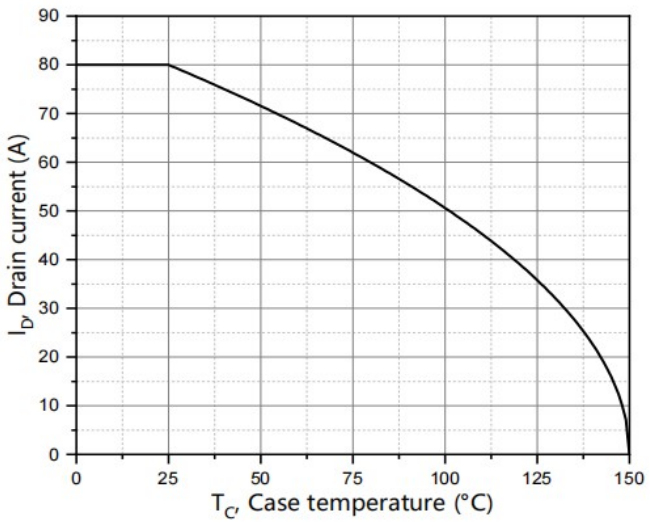


Figure 4: Typ. Output Characteristics

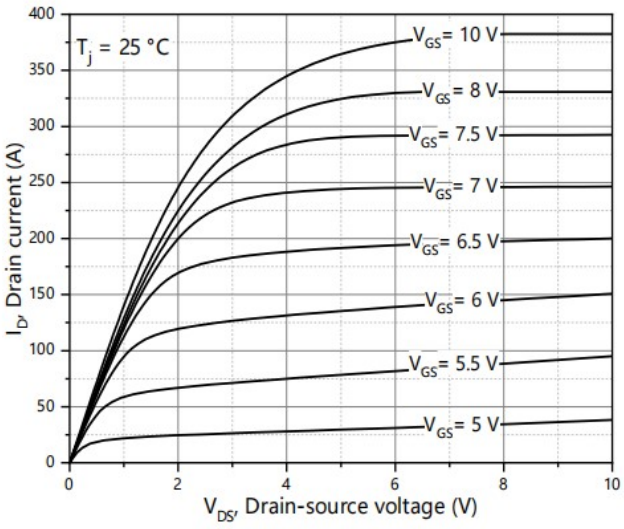


Figure 5: Drain-Source On-State Resistance

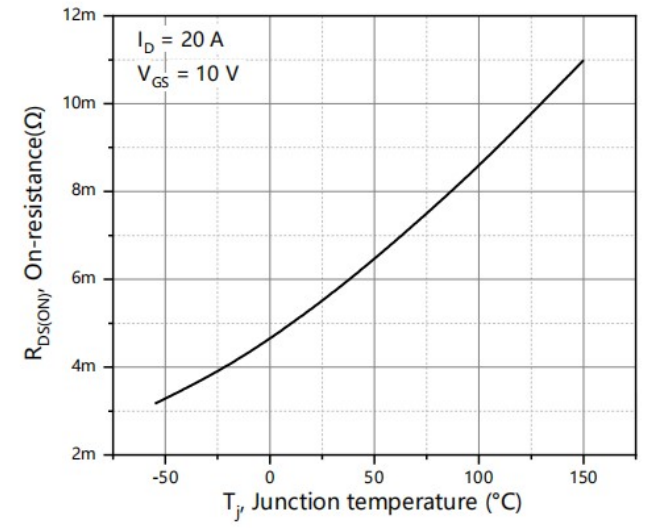


Figure 6: Drain-Source On-State Resistance

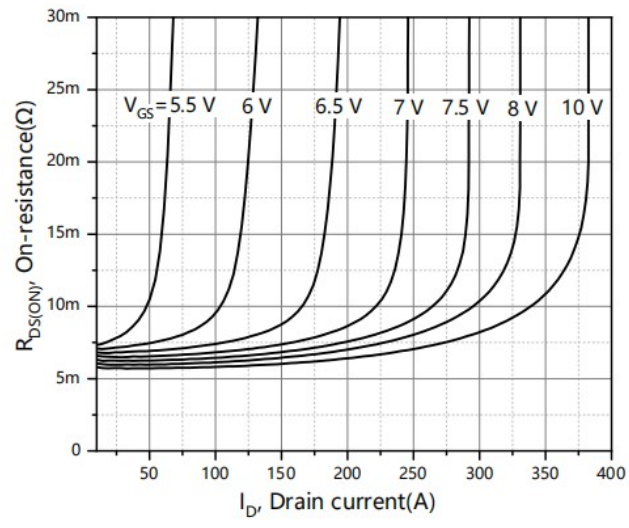


Figure 7: Drain-Source breakdown voltage

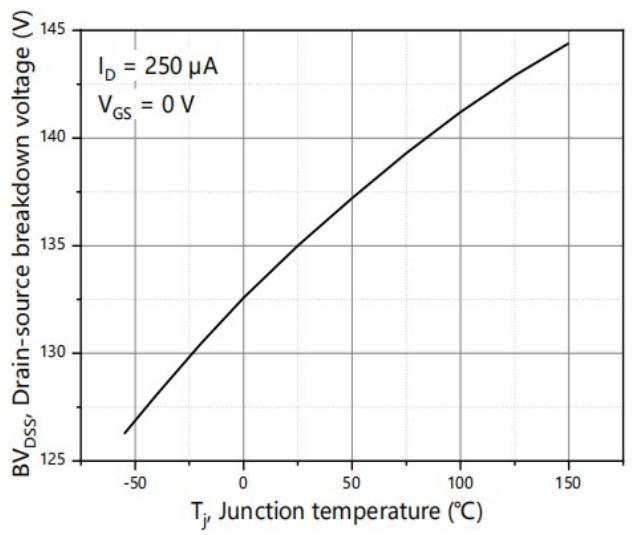


Figure 8: Typ. Gate Charge

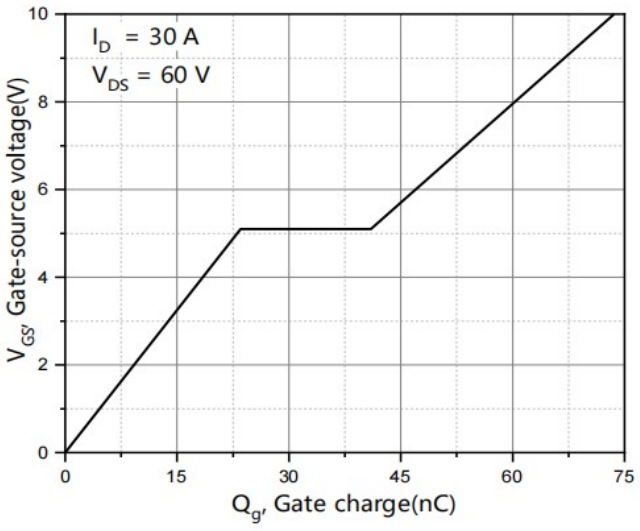


Figure 9: Typ. Capacitances

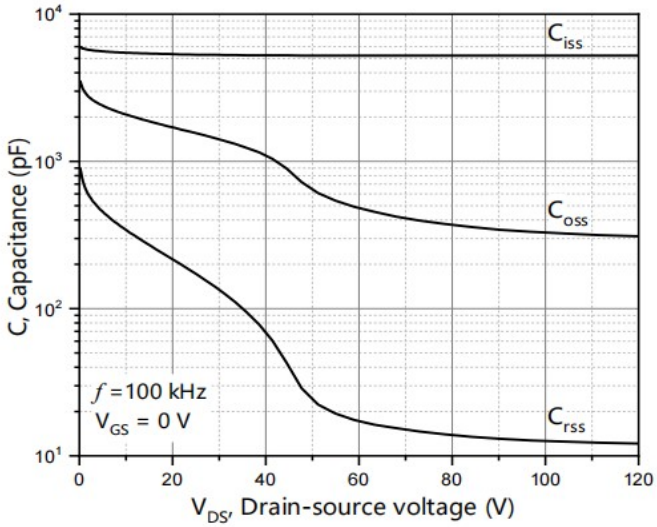


Figure 10: Forward Characteristics of Body Diode

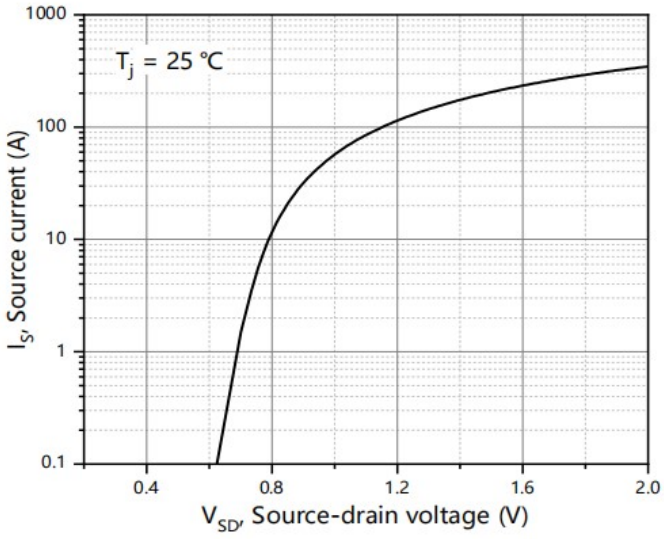


Figure 11: Typ. transfer characteristics

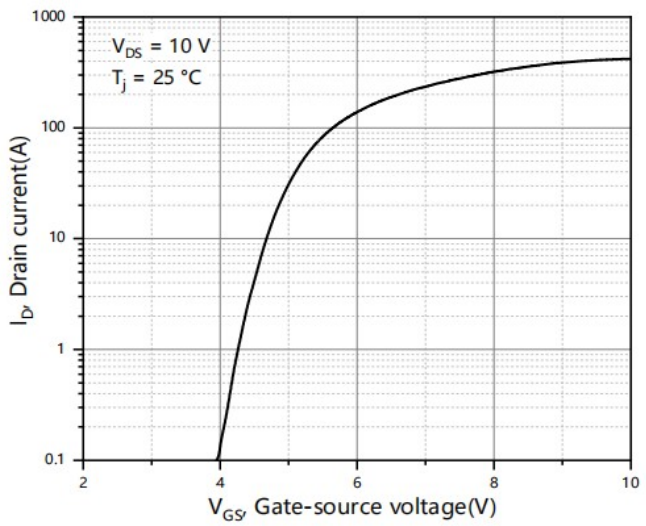


Figure 12:Threshold voltage

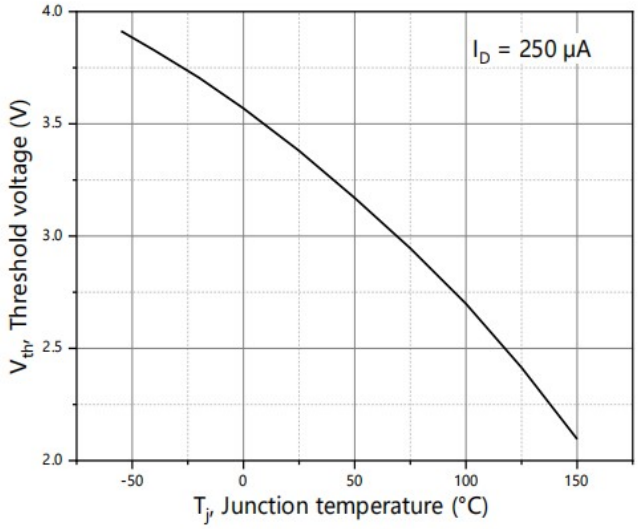


Figure13: Safe operation area for T_C=25℃

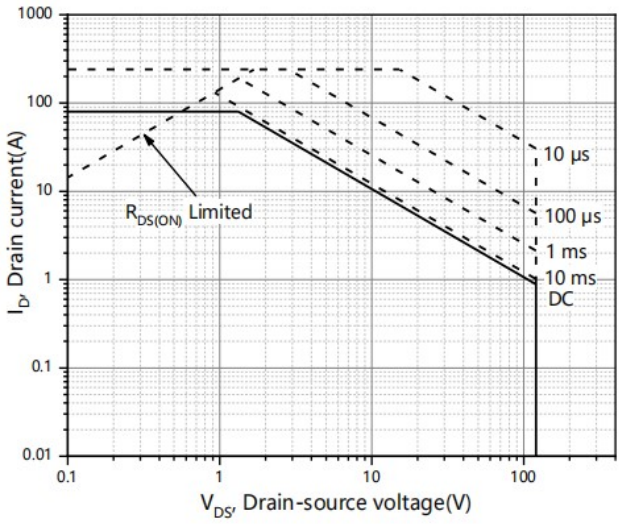
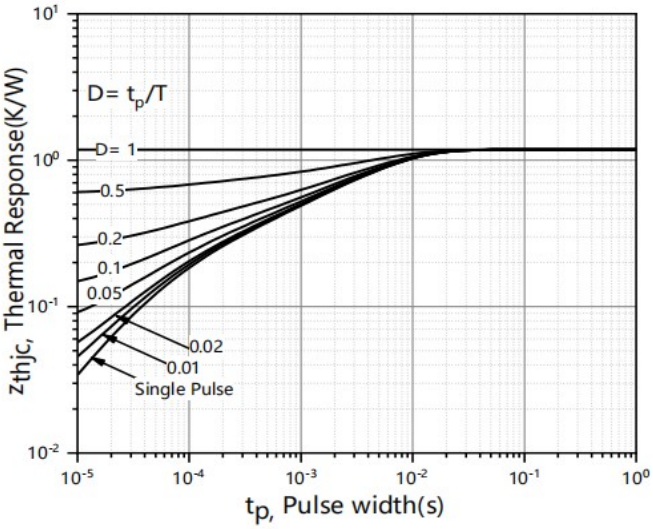
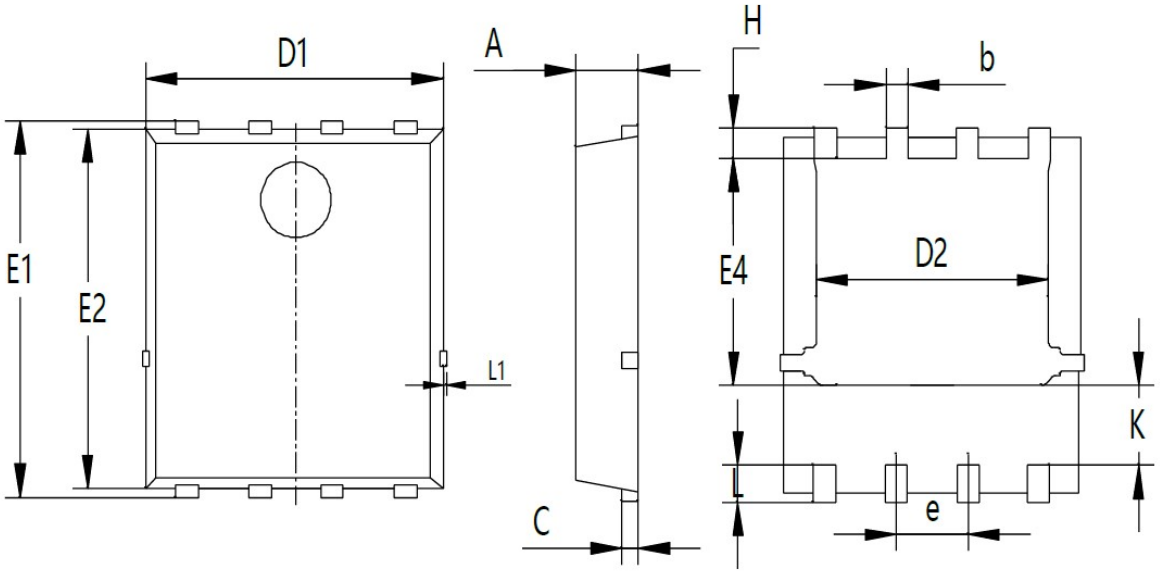


Figure14: Max. transient thermal impedance



Mechanical Dimensions(PDFN5*6 Unit:mm)



Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	1.00	1.10	1.20
b	0.30	0.40	0.50
c	0.154	0.254	0.354
D1	5.00	5.20	5.40
D2	3.80	4.10	4.25
e	1.17	1.27	1.37
E1	5.95	6.15	6.35
E2	5.66	5.86	6.06
E4	3.52	3.72	3.92
H	0.40	0.50	0.60
L	0.30	0.60	0.70
L1	0.12REF		
K	1.15	1.30	1.45

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Via-Media Semiconductor Limited Company

http://www.vmdsemi.com

Main Sites:

- **Headquarters**
Hangzhou Via-Media Semiconductor Co., LTD.
1305-1306, Building 71, No. 90, Wensan Road, Xihu District, Hangzhou, Zhejiang Province, P.R. China
Tel: +86-0571-8515 0563

- **Chengdu Office**
Chengdu Winhi Semiconductor Co., LTD.
Floor 15, Building 5, No. 171, Hele 2nd Street, Chengdu, Sichuan Province, P.R. China
Tel: +86-028-8505 0771

- **Shanghai**
Shanghai R&D Center.
1506~1508, Xinyin Building, 888 Yishan Road, Shanghai, P.R of China
Tel: +86- 021-54201999

- **Shenzhen**
Shenzhen Sales Center.
17B, No.1 Phoenix Building, 2008 Shennan Road, Shenzhen, P.R of China
Tel: +86-0755- 82570682

- **Xi'an**
Xi'an R&D Center
1703B, Building A, Greenland Center, Jinye Road, High-Tech Zone, Xi'an, Shaanxi, P.R of China