VFPB010R053NA

Datasheet

5.3mΩ, 100V, N-Channel Power MOSFET VFPB010R053NA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	5.3mΩ@10V	120A

Symbol

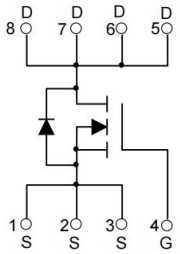
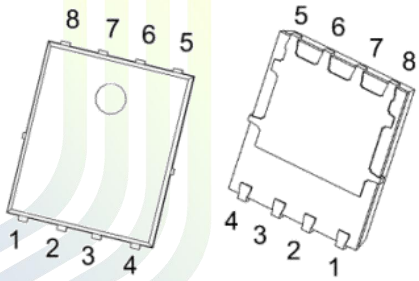


Figure 1 Symbol of VFPB010R053NA

Features

- High Power and current handing capability
- Load switch
- High density cell design for ultra low $R_{DS(ON)}$
- Lead free product is acquired

Package Type



PDFN5X6-8L

Figure 2 Package Type of VFPB010R053NA

Application

- Power Switch Application
- SMPS and general purpose applications
- Hard switched and high frequency circuits

Ordering Information

Product Name	Package
VFPB010R053NA	PDFN5X6-8L

Absolute Maximum Ratings (T_A= 25 ºC, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current[Note1]	T_C= 25 ºC	I_D	120	A
Pulsed Drain Current [Note2]		I_{DM}	280	
Avalanche Current[Note3]		I_{AS}	23	
Single Pulsed Avalanche Energy[Note3]		E_{AS}	130	mJ
Total Power Dissipation[Note4]	T_C= 25 ºC	P_D	192	W
Junction Temperature		T_J	150	ºC
Storage Temperature		T_{STG}	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient [Note6]	$R_{\theta JA}$		40		ºC/W

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	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 100V, V_{GS}=0V			1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS}= 0V			±100	nA
Gate Threshold Voltage[Note4]	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.0	3.0	4.0	V
Static Drain-Source On-Resistance[Note4]	$R_{DS(ON)}$	V_{GS}=10V, I_D= 20A		4.0	5.3	mΩ
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=45V		4023		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		732		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		40		pF
Total Gate Charge	Q_g	V_{DS}=50V		104.3		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		20.7		
Gate-Drain Charge	Q_{gd}	I_D= 22A		30.1		
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 50V		29.3		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		7.8		
Turn-off Delay Time	$t_{d(off)}$	I_D= 22A		82.1		
Turn-off Fall Time	t_f	R_G=2.2Ω		20.4		
Diode Characteristics						
Diode Forward Voltage [Note4]	V_{SD}	V_{GS}=0V, I_S= 20A			1.1	V

Notes :

1.The maximum current rating is limited by package.And device mounted on a large heatsink.

2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

3.E_{AS} condition: V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH Starting T_J = 25°C.

4.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 0.5%.

5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

6.Device mounted on 1in^2 FR-4 board with 1.5oz. Copper, in a still air environment with T_A =25°C.

Typical Performance Characteristics

Figure 3: Transfer Characteristics

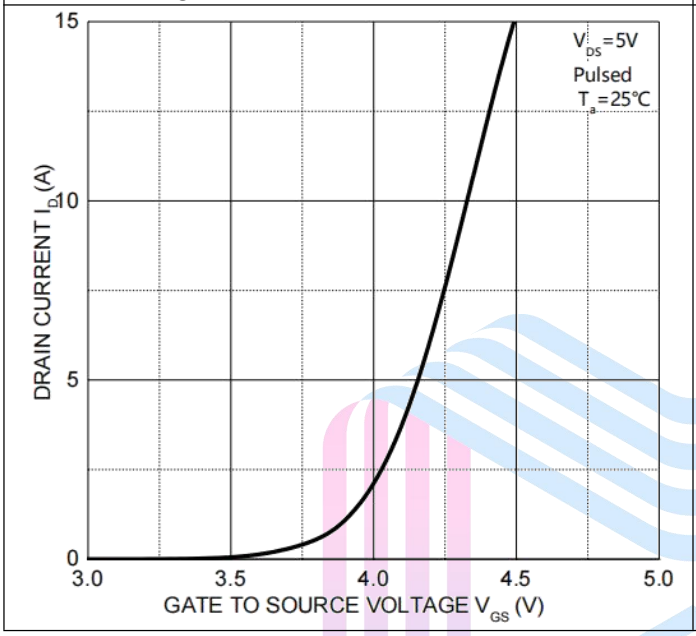


Figure 4: Output Characteristics

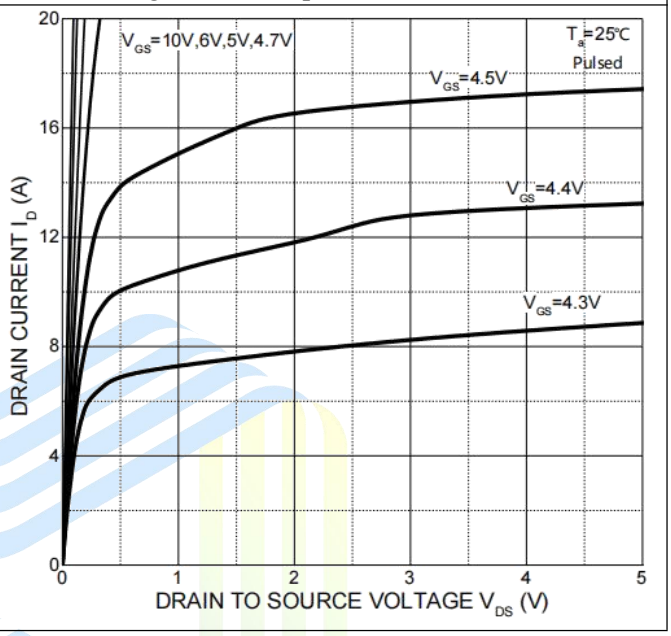


Figure 5: On-Resistance vs. Drain Current

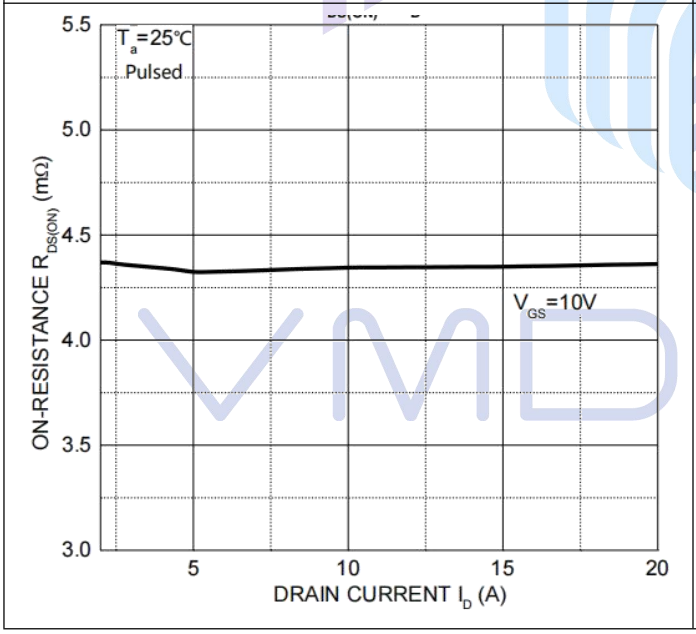


Figure 6: On-Resistance vs. Gate Voltage

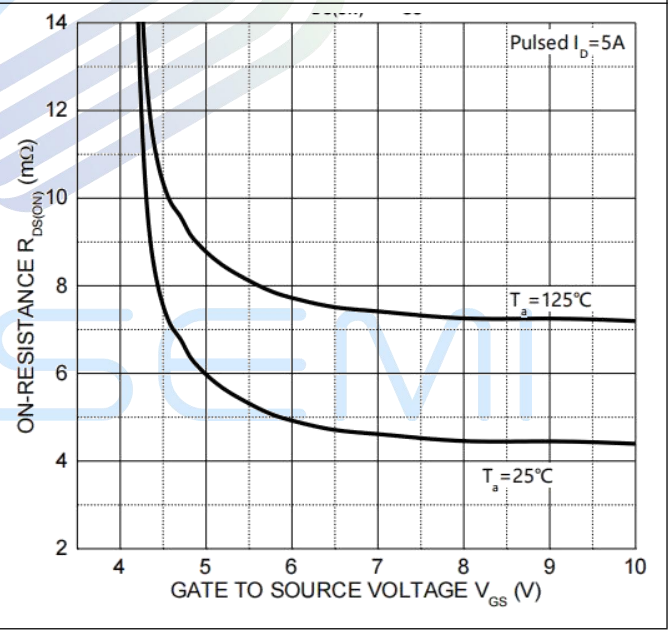


Figure 7: Body Diode Characteristics

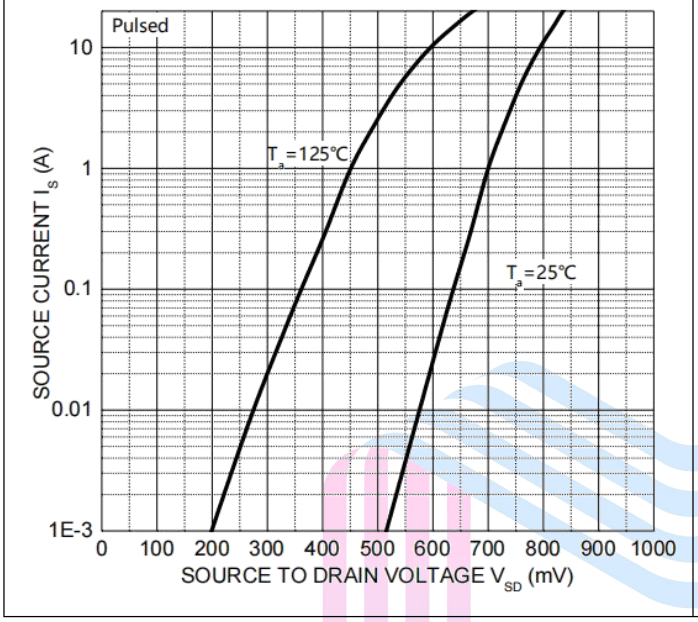
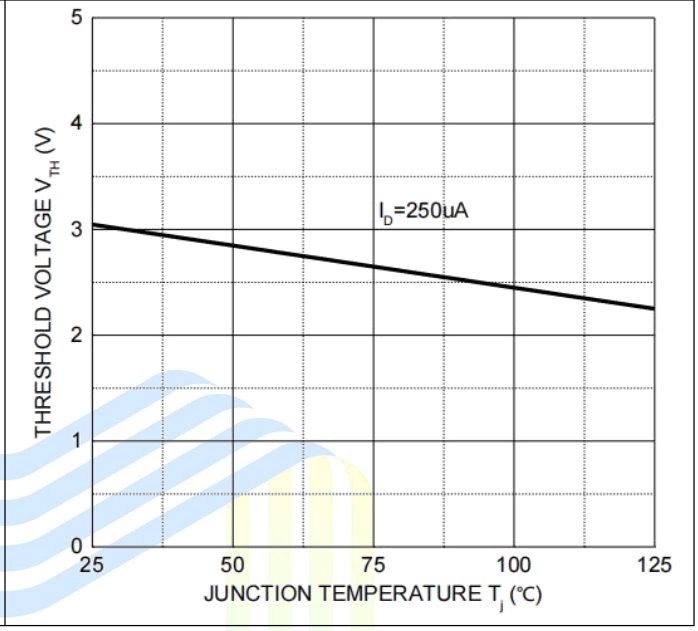
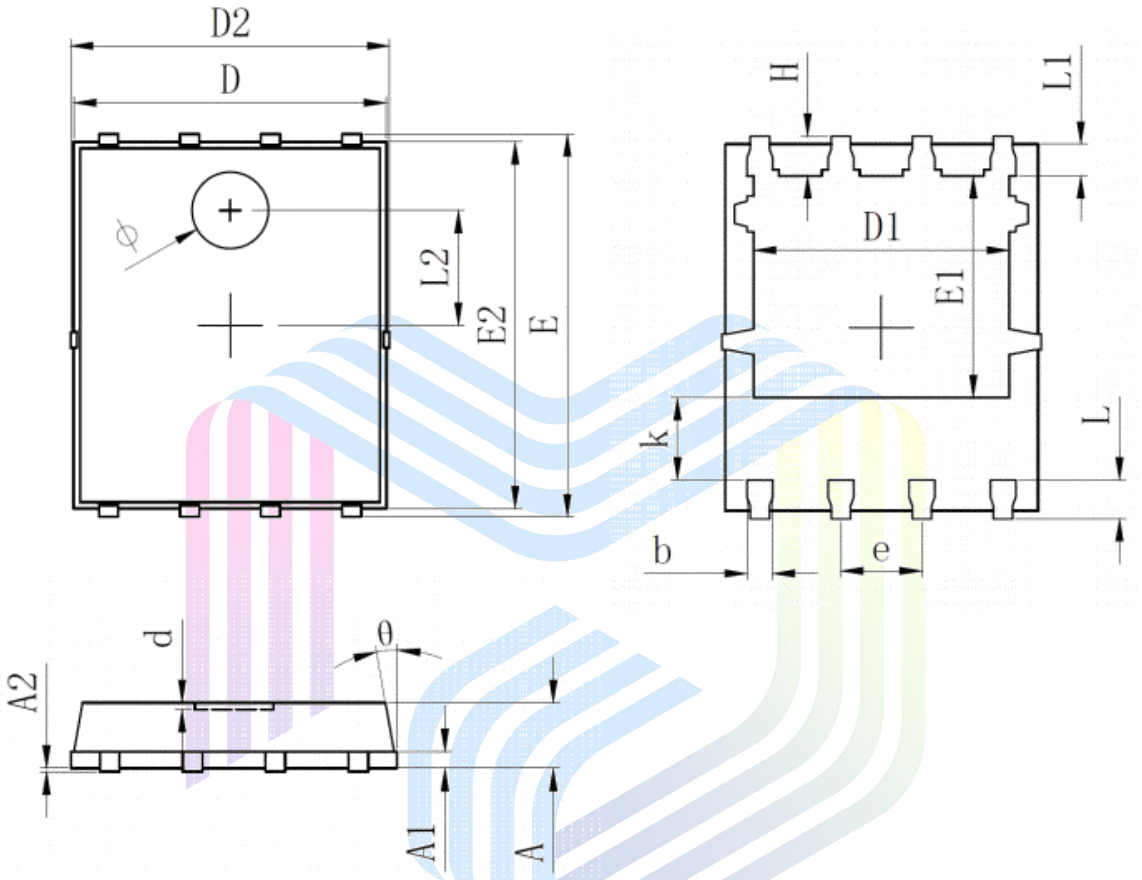


Figure 8: Threshold Voltage



Mechanical Dimensions:

PDFN5X6 _8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.254REF		0.010REF	
A2	0.000	0.050	0.000	0.002
D	4.824	4.976	0.190	0.196
D1	3.910	4.110	0.154	0.162
D2	4.924	5.076	0.194	0.200
E	5.924	6.076	0.233	0.239
E1	3.375	3.575	0.133	0.141
E2	5.674	5.826	0.223	0.229
b	0.350	0.450	0.014	0.018
e	1.270TYP		0.050TYP	
L	0.534	0.686	0.021	0.027
L1	0.424	0.576	0.017	0.023
k	1.190	1.390	0.047	0.055
H	0.549	0.701	0.022	0.028
θ	8°	12°	8°	12°
Φ	1.100	1.300	0.043	0.051
d	-	0.100	-	0.004

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