VFPB010R082NA

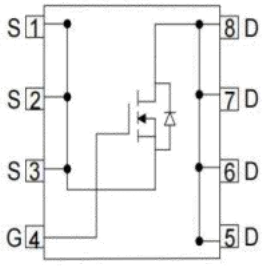
Datasheet

8.2mΩ, 100V, N-Channel Power MOSFET VFPB010R082NA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	8.2mΩ@10V	60A

Symbol



Symbol of VFPB010R082NA

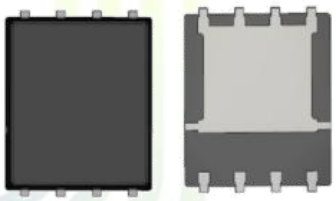
Features

- Low RDS(on)
- RoHS compliant[Note 1]
- Halogen-free [Note 1]

Application

- Battery Management System
- Motor Drivers
- DC-DC Converter

Package Type



Package Type of VFTPB010R082NA

Ordering Information

Product Name	Package
VFPB010R082NA	PDFN5X6

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

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	100	V
Drain Current - Continuous (T_C = 25°C) (Note 1)	I_D	70	A
Drain Current - Continuous (T_C = 25°C) (Note 2)		60	A
Drain Current - Continuous (T_C = 100°C)		44	A
Drain Current - Pulsed (Note 3)	I_{DM}	240	A
Gate-Source Voltage	V_{GS}	± 20	V
Single Pulsed Avalanche Energy (Note 4)	E_{AS}	144	mJ
Power Dissipation (T_C = 25°C)	P_D	73	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Thermal Resistance

Parameter	Symbol	Value	Units
Thermal Resistance, Junction-to-Case, Steady-State	$R_{\theta JC}$	1.7	°C/W
Thermal Resistance, Junction-to-Ambient, Steady State Note 5	$R_{\theta JA}$	45	°C/W

Notes:

1. The max drain current rating is silicon limited
2. The max drain current rating is package limited
3. Repetitive Rating: Pulse width limited by maximum junction temperature
4. L = 0.5 mH, V_{DD} = 50 V, I_{AS} = 24 A, R_G = 25 =Ω, Starting T_J = 25 °C
5. Mount on minimum PCB layout

Electrical Characteristics (T_J= 25 ºC, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =100 V, V_{GS} = 0 V	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS=}$ ± 20 V, V_{DS} = 0 V	-	-	±100	nA
Gate Threshold voltage	$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D = 250 μA	2	3.2	4	V
Drain-Source on-state resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D =20 A	-	6.7	8.2	mΩ
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS} =50 V, V_{GS} = 0 V, F=1 MHz	-	3120	-	pF
Output Capacitance	C_{OSS}		-	660	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	34	-	pF
Gate Resistance	R_G	F = 1 MHz	-	1.2	-	Ω
Switching Characteristics						
Turn On Delay Time	$T_{D(ON)}$	V_{DD}=50V, R_L=2.5Ω,V_{GS}=10V, R_G = 6.8 Ω	-	18	-	nS
Rise Time	T_R		-	24	-	nS
Turn Off Delay Time	$T_{D(OFF)}$		-	37	-	nS
Fall Time	T_F		-	16	-	nS
Total Gate Charge	Q_G	V_{DD} = 50V, I_D = 20A, V_{GS} = 10V	-	45	-	nC
Gate-Source Charge	Q_{GS}		-	13	-	nC
Gate-Drain Charge	Q_{GD}		-	10	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Body-Diode Forward	I_S		-	-	60	A
Maximum Pulsed Body-Diode Forward Current NOTE 1	I_{SM}		-	-	240	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 50 A	-	0.98	-	V
Reverse Recovery Time	T_{RR}	V_{DD} = 50 V, I_D =15 A, di/dt = 100 A/μS	-	58	-	nS
Reverse Recovery Charge	Q_{RR}		-	101	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	3	-	A

Electrical Characteristics Diagrams

Figure 1: On-Region Characteristics

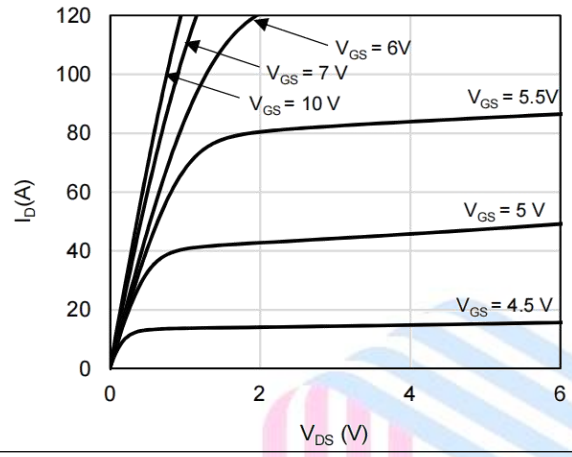


Figure 2: Transfer Characteristics

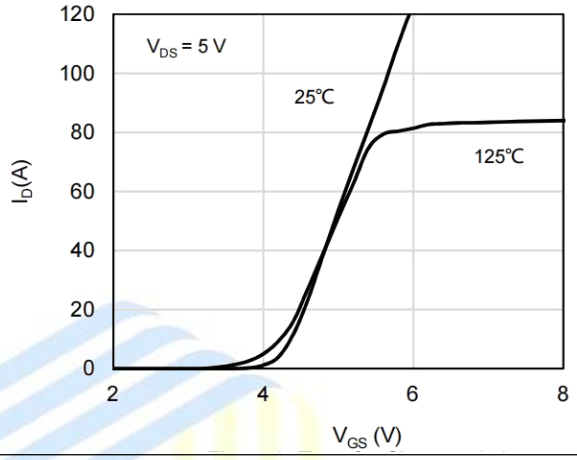


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

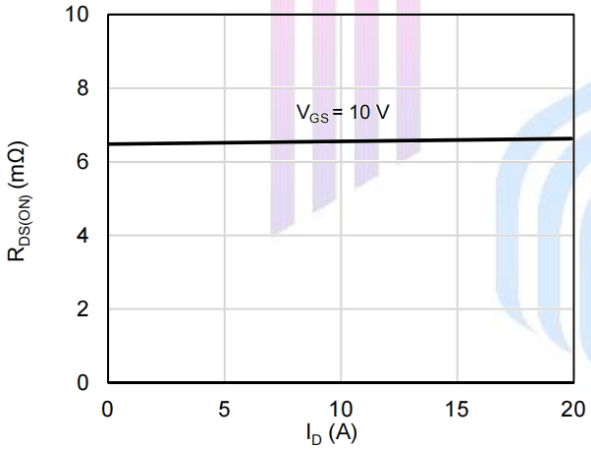


Figure 4: On-Resistance vs. Junction Temperature

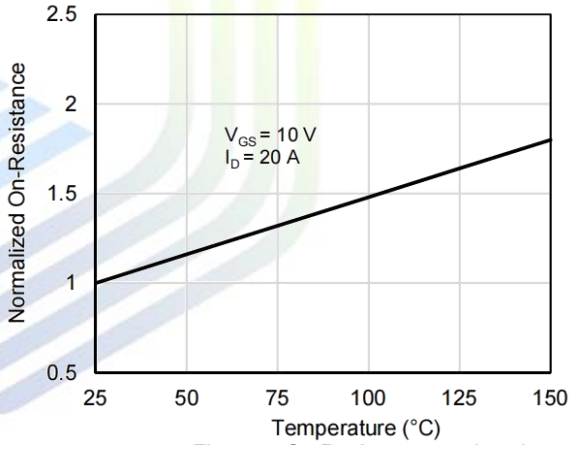


Figure 5: Breakdown Voltage vs. Junction Temperature

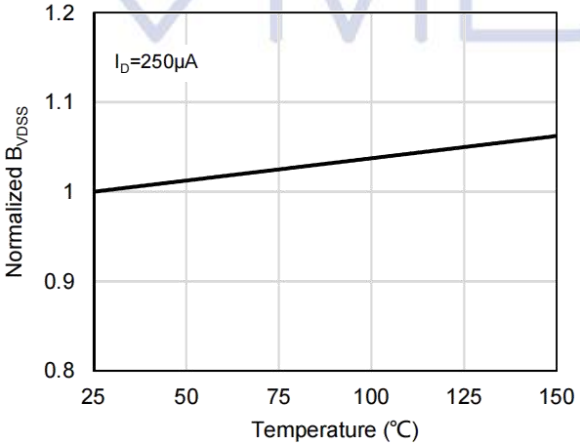


Figure 6: Threshold Voltage vs. Junction Temperature

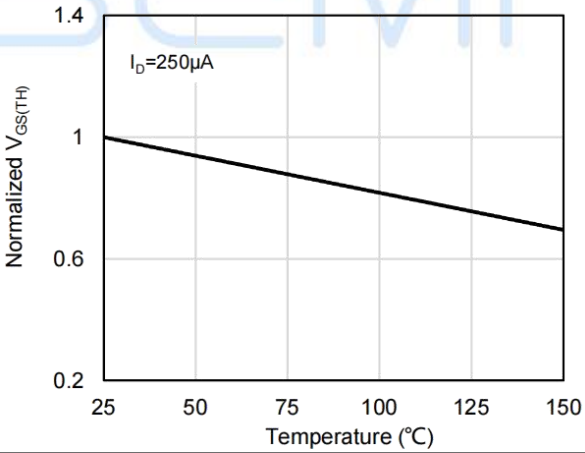


Figure 7: Body-Diode Characteristics

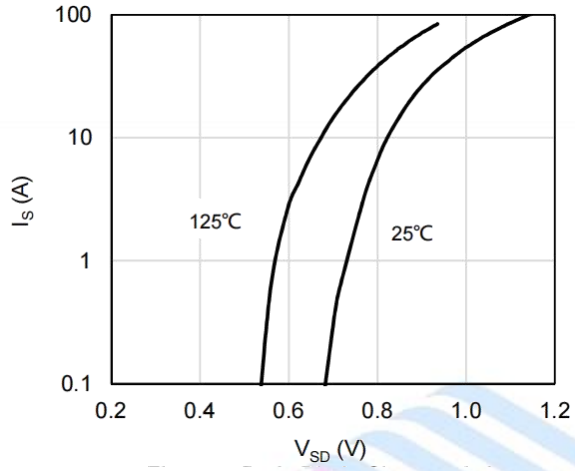


Figure 8: On-Resistance vs. Gate-Source Voltage

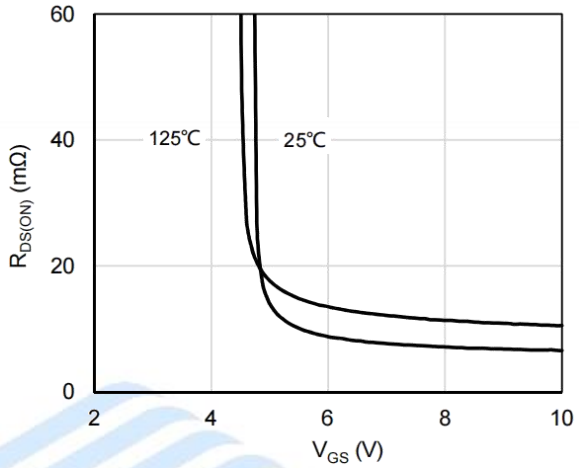


Figure 9: Capacitance Characteristics

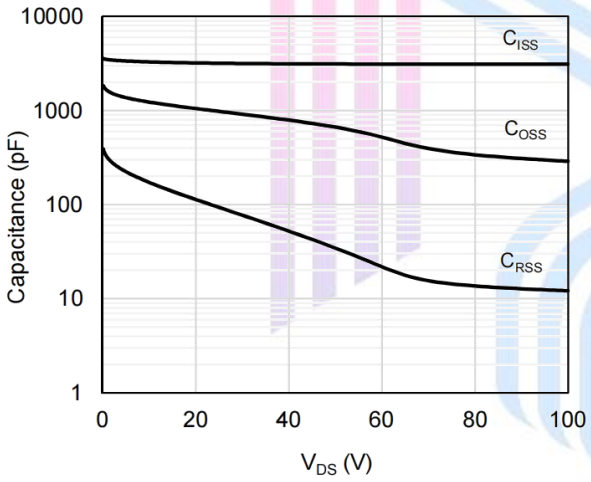


Figure 10: Gate-Charge Characteristics

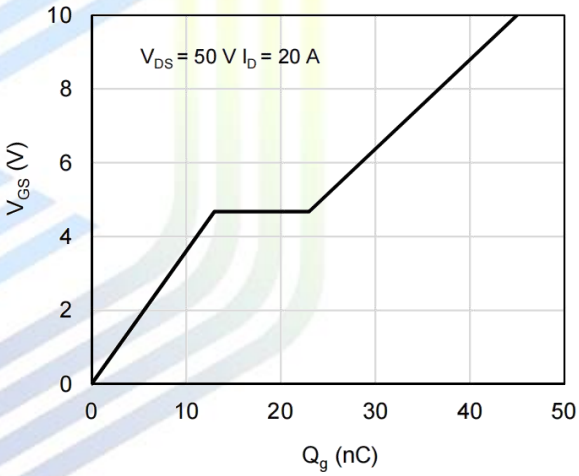


Figure 11: Power De-rating

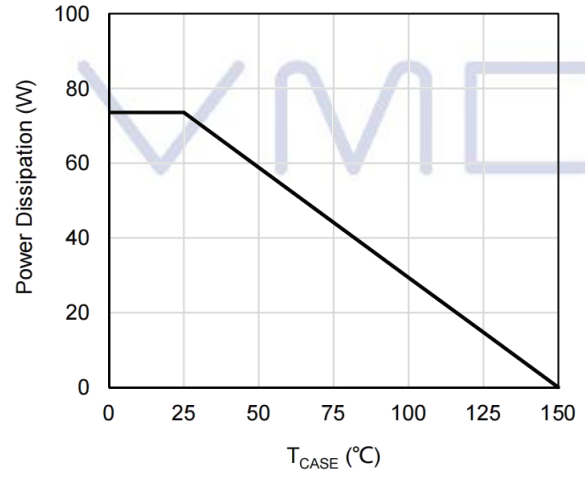


Figure 12: Current De-rating

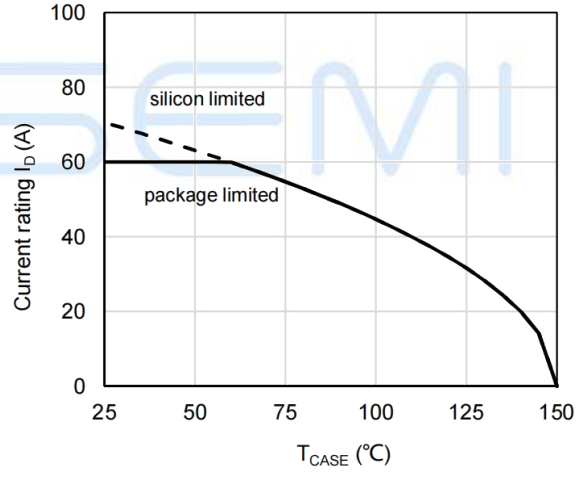


Figure 13: Normalized Maximum Transient Thermal Impedance

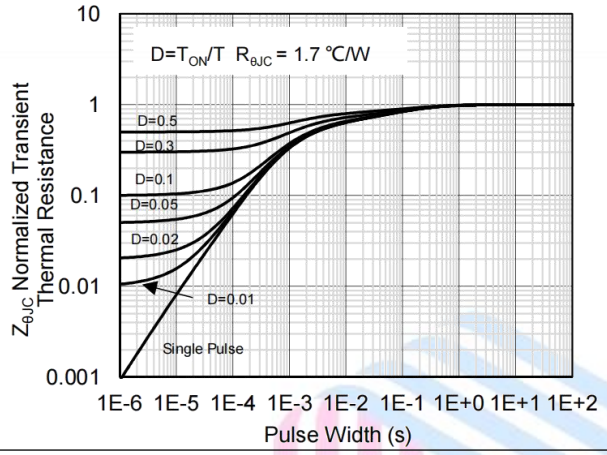
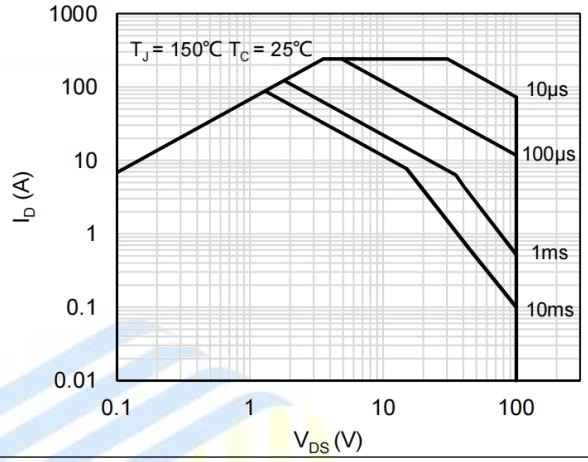
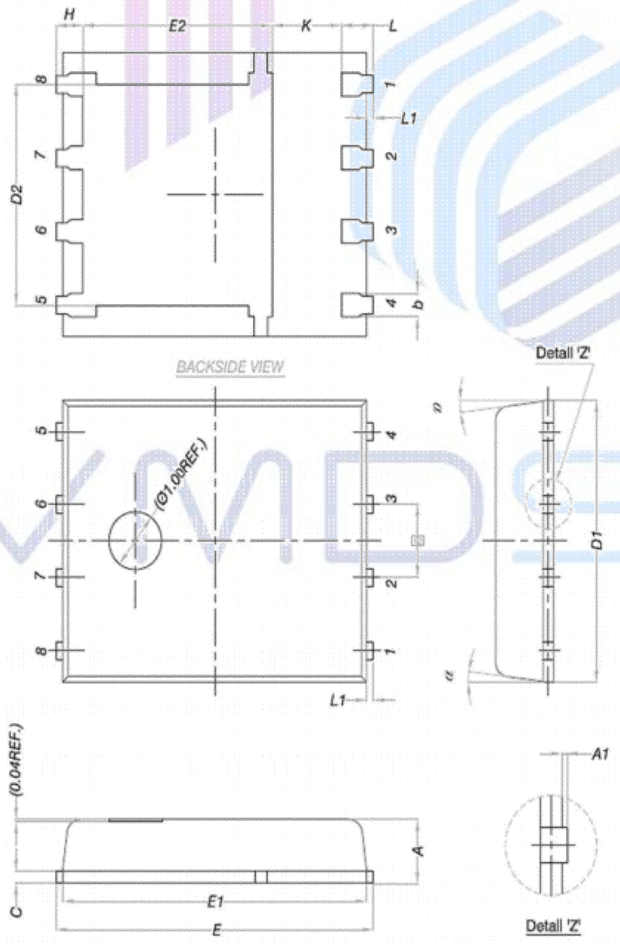


Figure 14: Maximum Forward Biased Safe Operating Area



Mechanical Dimensions

PDFN5X6 Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

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