



VMDSEMI

VFPB006R070NA

Datasheet



VMDSEMI

General Description

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	I_D
60V	7mΩ@10V	70A
	10mΩ@4.5V	

Symbol

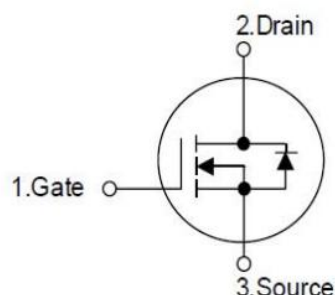


Figure 1 Symbol of VFPB006R070NA

Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Fast switching and soft recovery

Application

- BMS
- Switched mode power supply
- DC-DC converter
- Solar inverter
- UPS and energy inverter
- PD charger
- Motor driver
- Switching voltage regulator

Package Type



Figure 2 Package Type of VFPB006R070NA

Ordering Information

Product Name	Package
VFPB006R070NA	PDFN5X6

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{Note 1} $T_C=25^{\circ}\text{C}$	I_D	70	A
Pulsed Drain Current ^{Note 2}	I_{DM}	210	A
Max Power Dissipation ^{Note 3} $T_C=25^{\circ}\text{C}$	P_D	87	W
Avalanche Current, Single Pulse ^{Note 5}	I_{AS}	22	A
Avalanche Energy, Single Pulse ^{Note 5}	E_{AS}	207	mJ
Operation Junction temperature	T_J	-55 to 150	$^{\circ}\text{C}$

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient ^{Note4}	$R_{\theta JA}$		62		$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Lead	$R_{\theta JC}$		1.15		$^{\circ}\text{C/W}$

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 $T_a=25^{\circ}\text{C}$.
- 5) $V_{DS}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.5\text{mH}$, starting $T_J=25^{\circ}\text{C}$.

VMDSEMI

7mΩ, 60V, N-Channel Power MOSFET
VFPB006R070NA
Electrical Characteristics($T_J = 25\text{ }^{\circ}\text{C}$, 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	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	1.2	1.6	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =12A		4.9	7	mΩ
		V _{GS} =4.5V, I _D =8A		6.5	10	mΩ
Gate Resistance	R _G	V _{GS} =0V,V _{DS} =0V,f=1MHz		1.7		Ω
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{GS} =0V V _{DS} =30V f=1MHz		2089		pF
Output Capacitance	C _{OSS}			550		pF
Reverse Transfer Capacitance	C _{RSS}			26		pF
Turn-on Delay Time	t _{d(on)}	V _{GS} =10 V V _{DD} =30 V R _G =3 Ω I _D =12 A		6		ns
Rise Time	t _r			23		
Turn-off Delay Time	t _{d(off)}			38		
Fall Time	t _f			26		
Switching Characteristics						
Total Gate Charge (@V _{GS} =10V)	Q _g	V _{GS} =0 to 10V V _{DS} =30V I _D =10A		34.4		nC
Total Gate Charge (@V _{GS} =4.5V)	Q _g			15.4		
Gate to Source Charge	Q _{gs}			4.2		
Gate to Drain Charge	Q _{gd}			3.6		
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =10A		0.8	1.2	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V I _{sd} =10A		39.5		ns
Reverse Recovery Charge	Q _{rr}			42.2		nC
Peak Reverse Recovery Current	I _{rrm}		di/dt=100A/us		2.13	

Typical Performance Characteristics

Figure 3: Typ. Output Characteristics

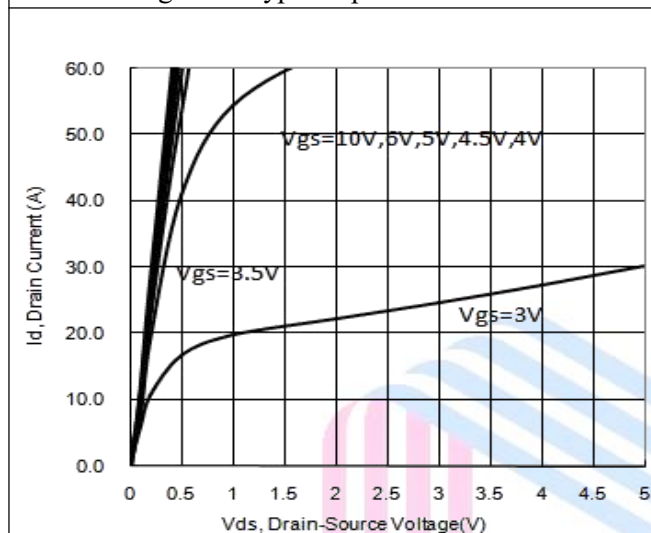


Figure 4: Typ. Transfer Characteristics

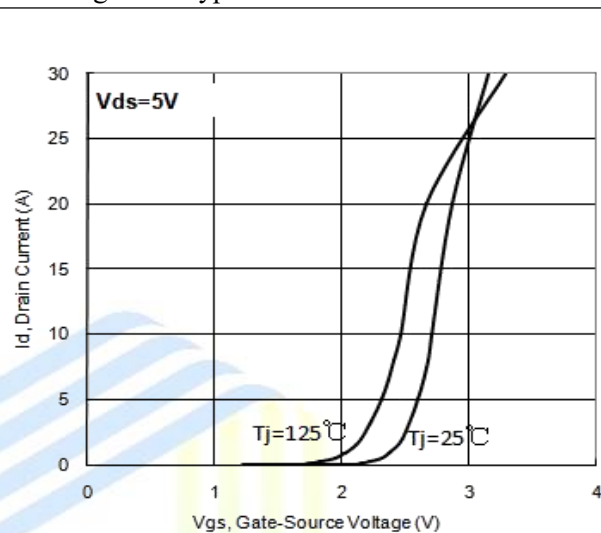


Figure 5: Drain-Source On-State Resistance

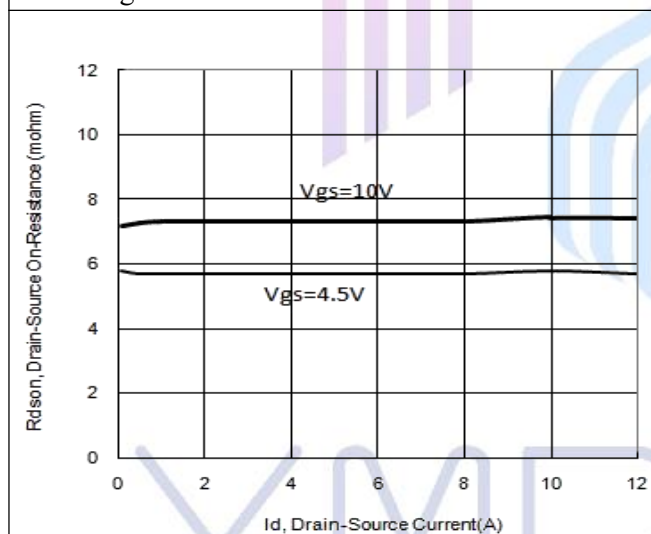
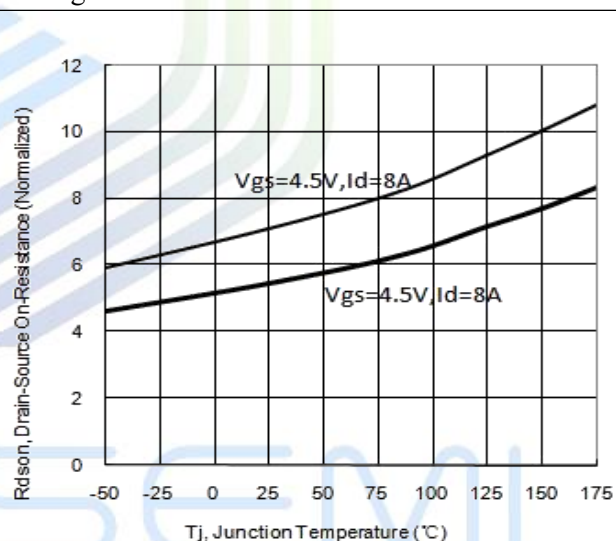


Figure 6: Drain-Source On-State Resistance



7.0m Ω , 60V, N-Channel Power MOSFET

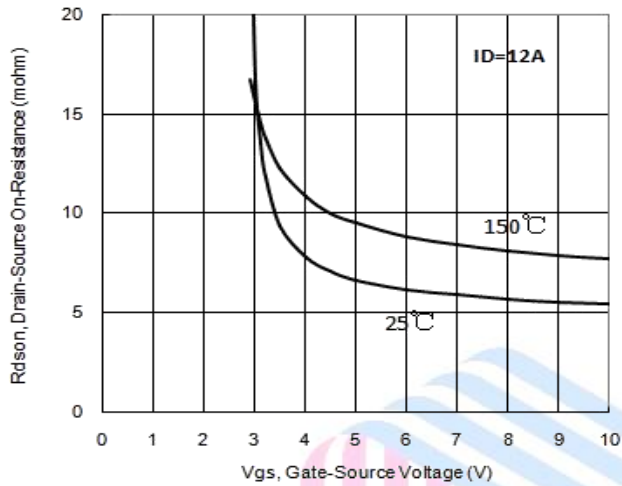
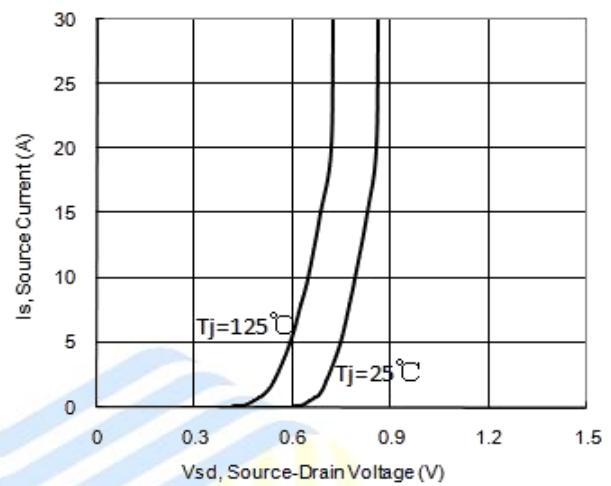
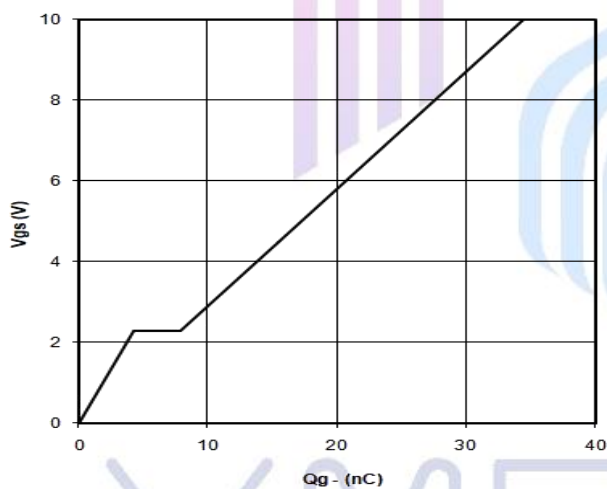
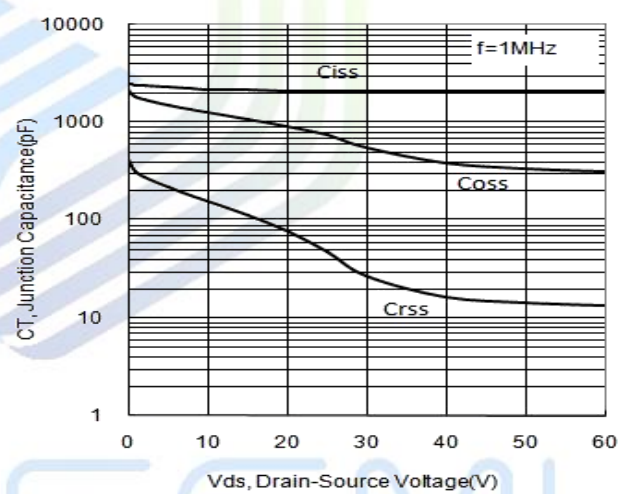
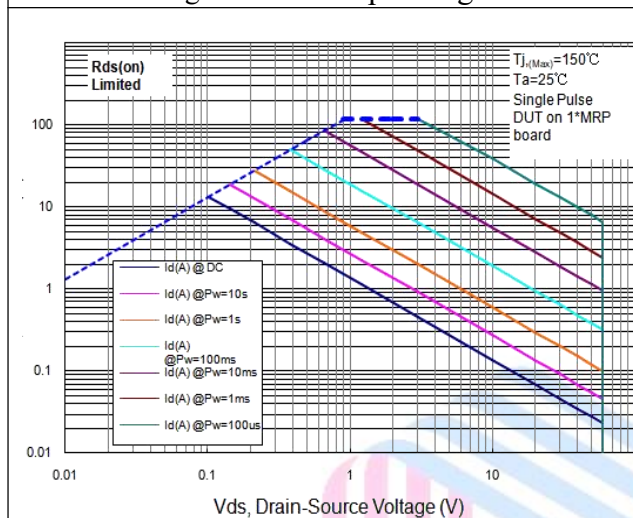
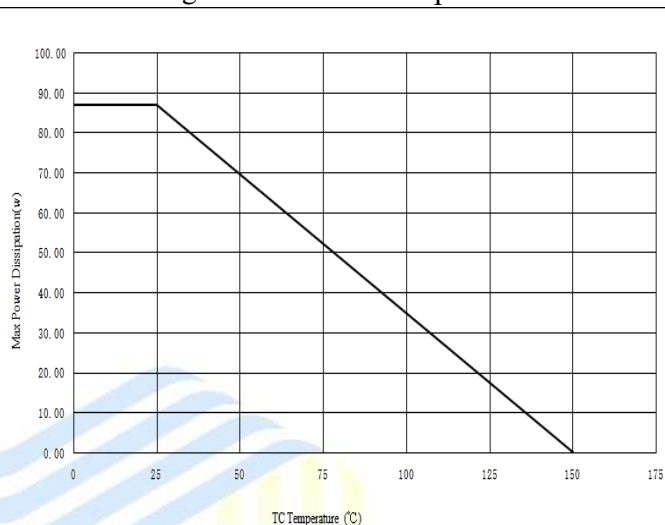
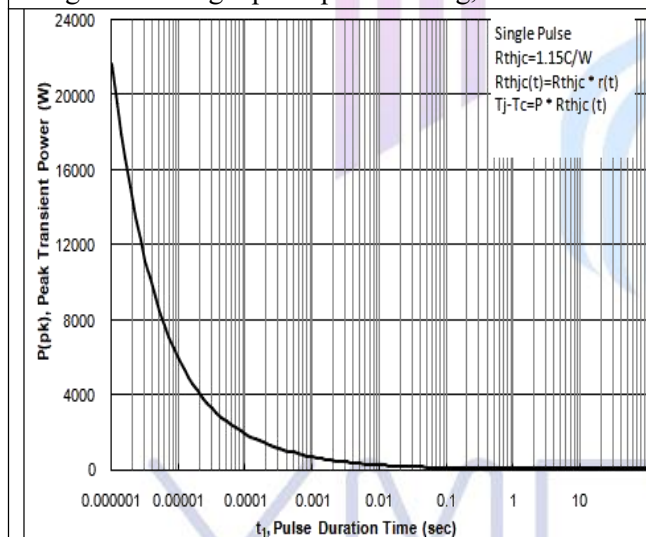
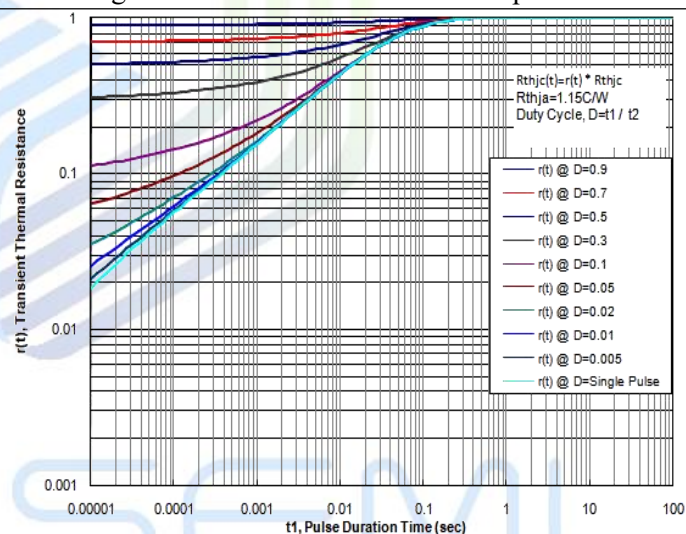
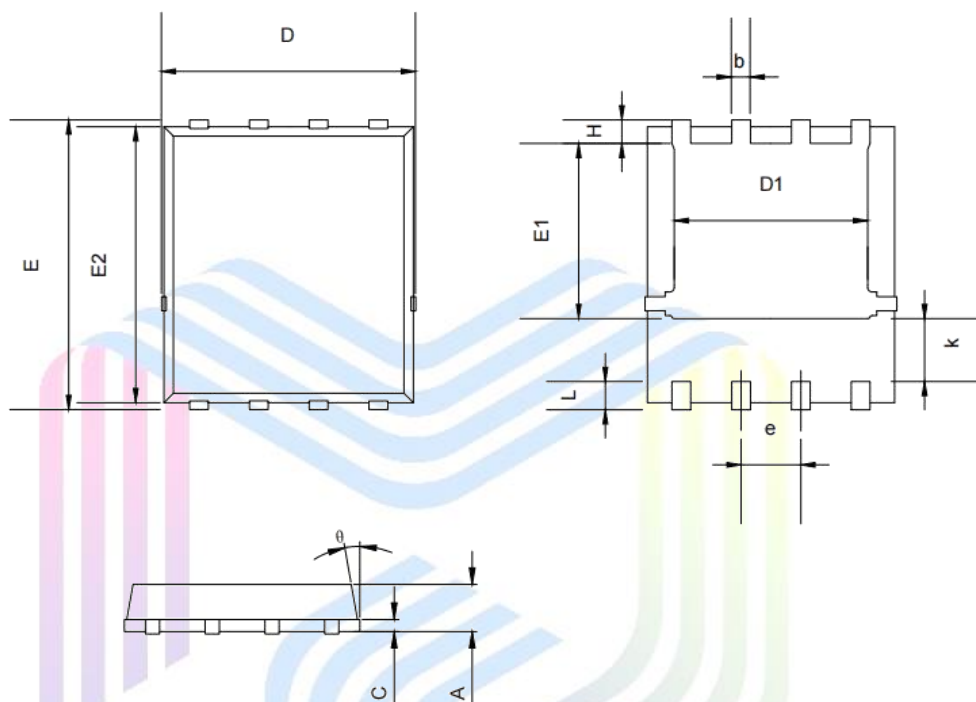
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Figure 7: On-Resistance vs. Gate-source voltage

Figure 8: Forward Characteristics of Body Diode

Figure 9: Gate Charge Characteristics

Figure 10: Typ. Capacitances


Figure11: Safe Operating Area

Figure12: Power Dissipation

Figure 13: Single pulse power rating, Junction to case

Figure 14: Max transient thermal impedance


Mechanical Dimensions

PDFN5X6 Package Information



SYMBOL	MILLIMETERS	
	MIN	MAX
A	0.90	1.20
C	0.15	0.35
D	4.80	5.40
D1	3.61	4.31
E	5.90	6.35
E1	3.30	3.92
E2	5.50	6.06
k	1.10	-
b	0.30	0.51
e	1.27BSC	
L	0.38	0.71
H	0.38	0.71
θ	0°	12°

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