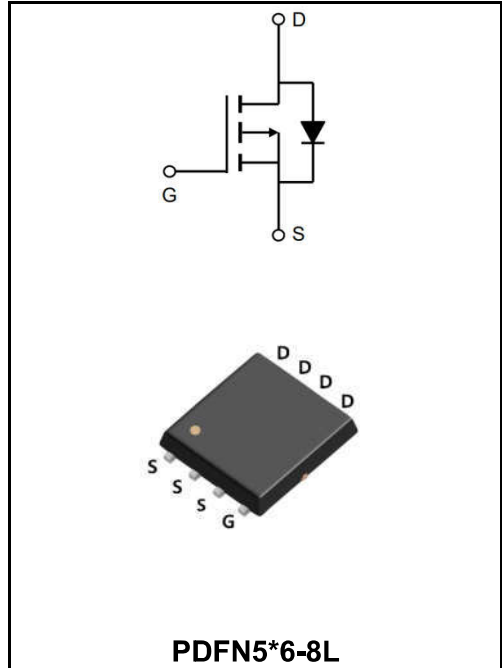


-40V P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	-50A
V_{DSS}	-40V
R_{DS(on)-typ(@V_{GS}=-10V)}	< -13mΩ (Type:10.5 mΩ)



Application

- ◆ Battery protection
- ◆ Load switch
- ◆ Uninterruptible power supply

Product Specification Classification

Part Number	Package	Marking	Pack
YFW50P04NF	PDFN5*6-8L	YFW 50P04NF XXXXX	5000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-40	V
Gate - Source Voltage	V_{GS}	±20	V
Continuous Drain Current, V _{GS} @ -10V ¹ @T _C =25°C	I_D	-50	A
Continuous Drain Current, V _{GS} @ -10V ¹ @T _C =100°C	I_D	-32	A
Pulsed Drain Current ²	I_{DM}	-105	A
Single Pulse Avalanche Energy ³	E_{AS}	146	mJ
Avalanche Current	I_{AS}	-54	A
Total Power Dissipation ⁴ @T _C =25°C	P_D	52.1	W
Total Power Dissipation ⁴ @T _A =25°C	P_D	2	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C
Thermal Resistance Junction-Ambient ¹	R_{θJA}	25	°C/W
Thermal Resistance Junction-Case ¹	R_{θJC}	2.4	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-40	-44	-	V
BV_{DSS} Temperature Coefficient	Reference to 25°C, $I_D=-1mA$	$\Delta BV_{DSS}/\Delta T_J$	-	-0.023	-	V/°C
Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-30A$	$R_{DS(on)}$	-	10.5	13	mΩ
	$V_{GS}=-4.5V, I_D=-20A$		-	15	20	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(th)}$	-1.0	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	4.74	-	mV/°C
Drain-Source Leakage Current	$V_{DS}=-32V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	-	-	1	μA
	$V_{DS}=-32V, V_{GS}=0V, T_J=55^\circ C$		-	-	5	
Gate -Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	-	-	±100	nA
Forward Transconductance	$V_{DS}=-5V, I_D=-18A$	g_{fs}	-	24	-	S
Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	R_g	-	7	14	Ω
Total Gate Charge(-4.5V)	$V_{DS}=-20V$ $V_{GS}=-4.5V$ $I_D=-12A$	Q_g	-	27.9	-	nC
Gate-Source Charge		Q_{gs}	-	7.7	-	
Gate-Drain Charge		Q_{gd}	-	7.5	-	
Turn-on delay time	$V_{DD}=-15V$ $V_{GS}=-10V$ $I_D=-1A$ $R_G=3.3\Omega$	$t_{d(on)}$	-	40	-	ns
Rise Time		T_r	-	35.2	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	100	-	
Fall Time		t_f	-	9.6	-	
Input Capacitance	$V_{DS}=-15V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	3500	-	pF
Output Capacitance		C_{oss}	-	323	-	
Reverse Transfer Capacitance		C_{rss}	-	222	-	
Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	I_S	-	-	-52	A
Pulsed Source Current ^{2,5}		I_{SM}	-	-	-105	A
Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	V_{SD}	-	-	-1	V

Note :

- 1、 The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width $\cong 300\mu s$, duty cycle $\cong 2\%$
- 3、 The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-54A$
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

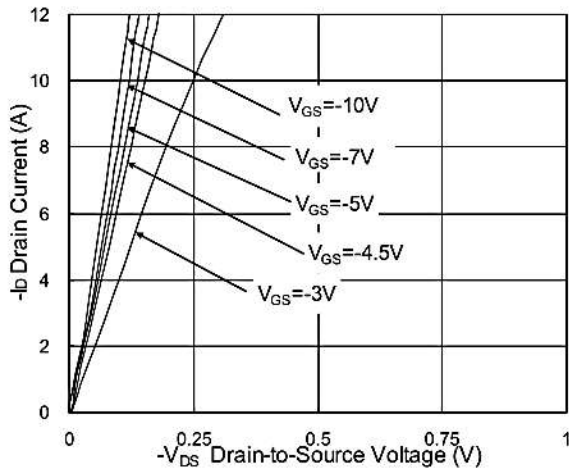


Fig.1 Typical Output Characteristics

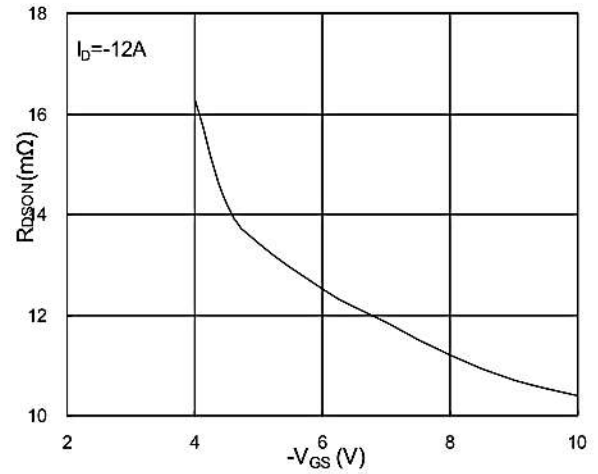


Fig.2 On-Resistance v.s Gate-Source

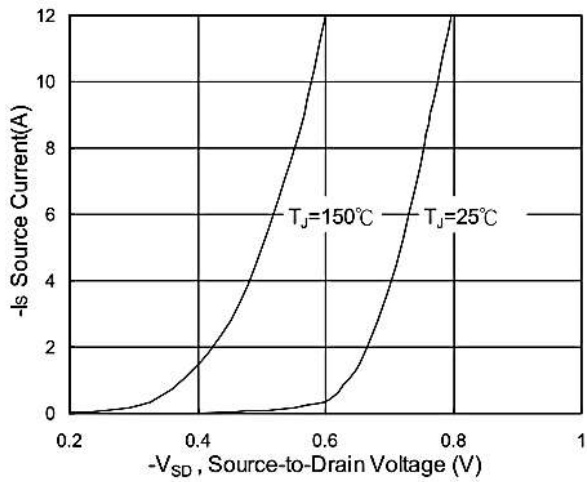


Fig.3 Forward Characteristics Of Reverse

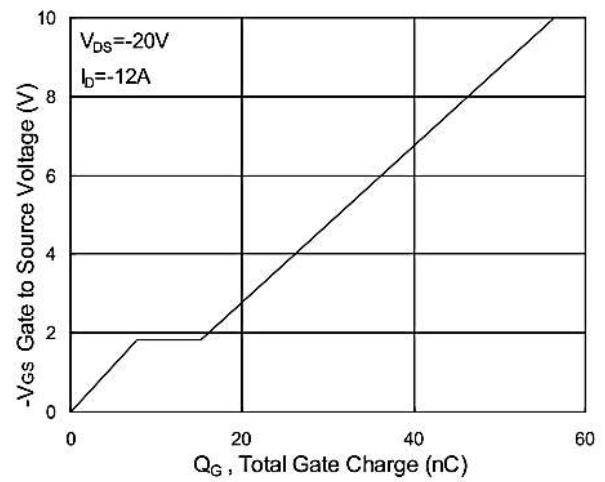


Fig.4 Gate-Charge Characteristics

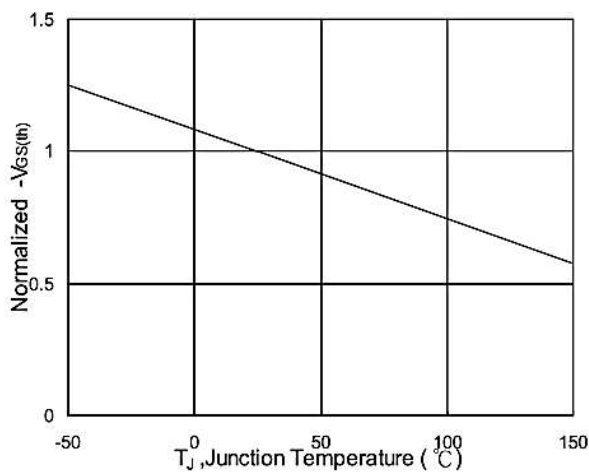


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

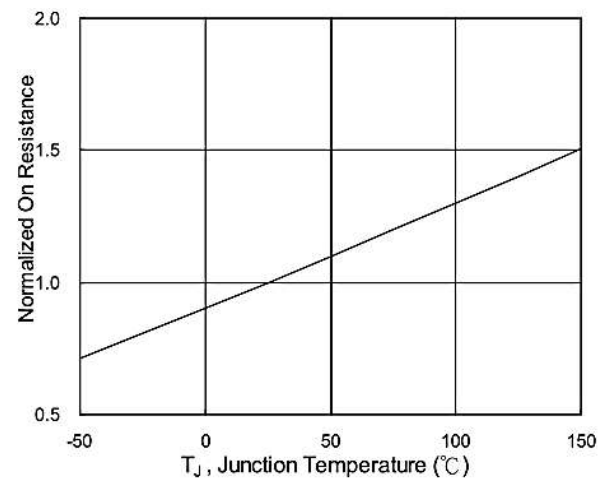


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Ratings and Characteristic Curves

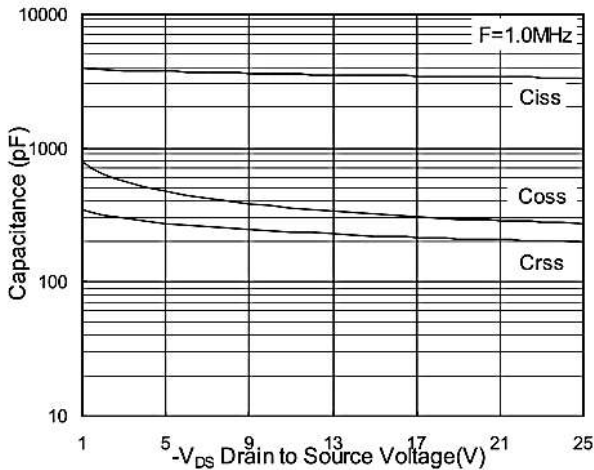


Fig.7 Capacitance

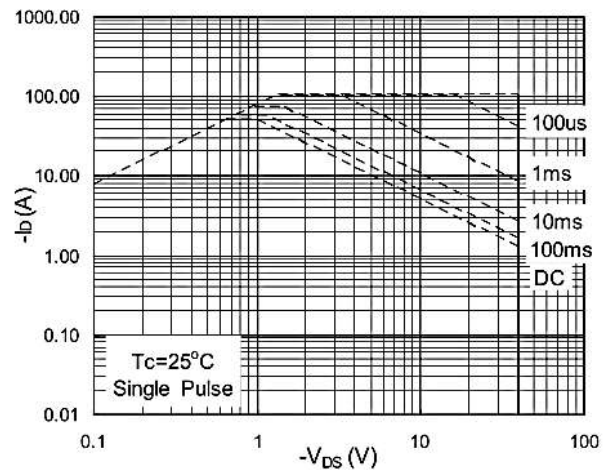


Fig.8 Safe Operating Area

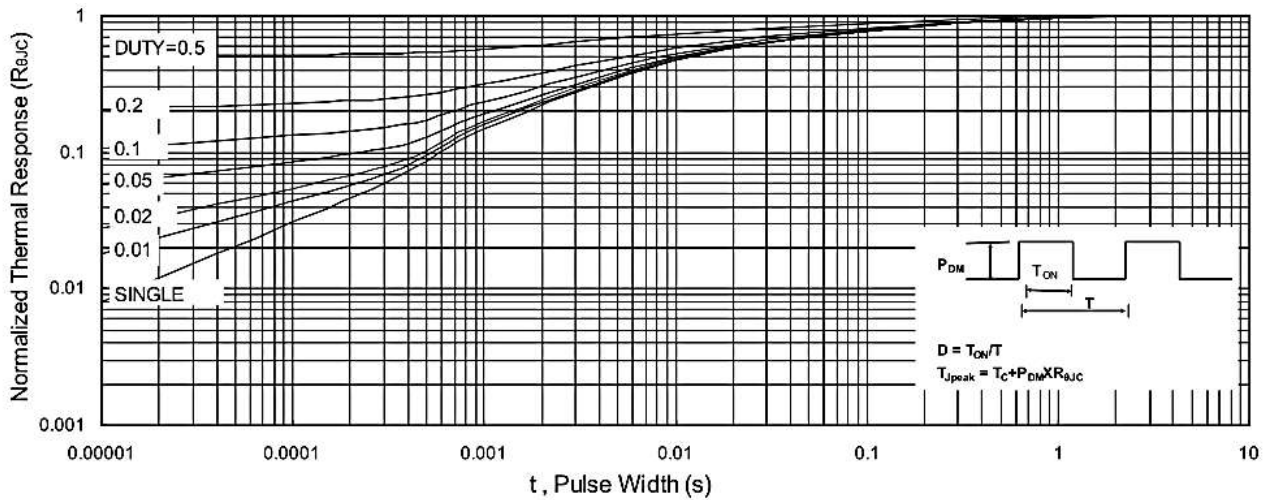


Fig.9 Normalized Maximum Transient Thermal Impedance

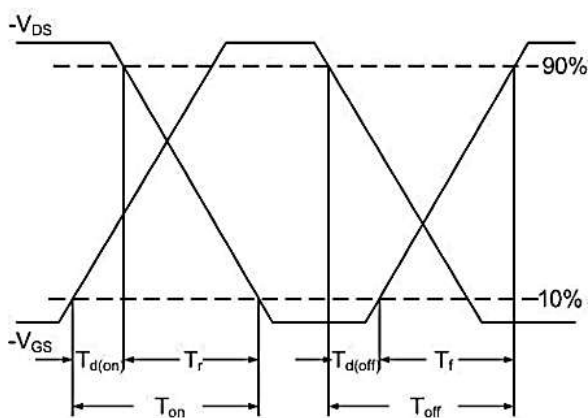


Fig.10 Switching Time Waveform

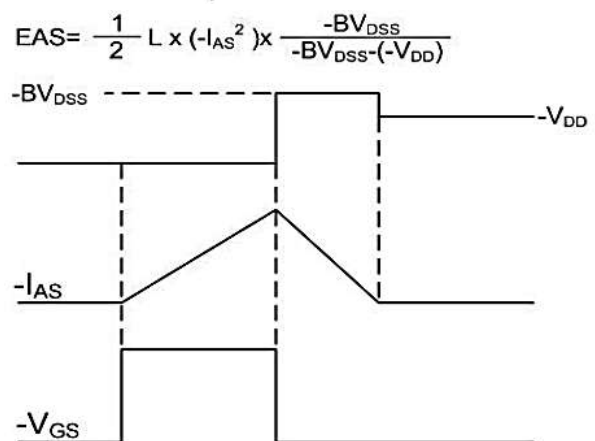
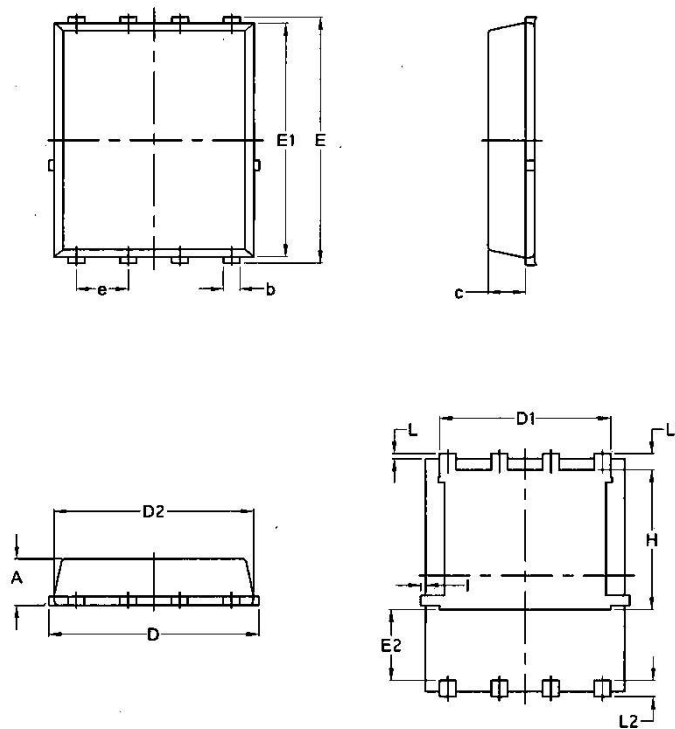


Fig.11 Unclamped Inductive Waveform

Package Outline Dimensions Millimeters

PDFN5*6-8L



Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070