

20V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

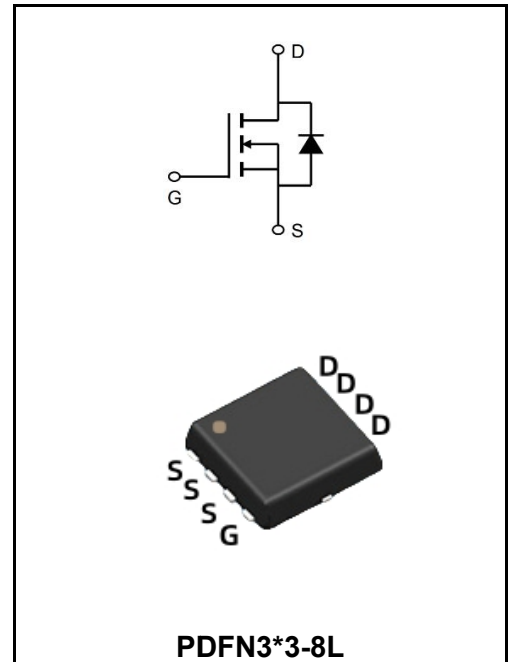
I_D	90A
V_{DS}	20V
R_{DS(on)-typ}(@V_{GS}=4.5V)	<4.0mΩ(Typ:2.8mΩ)
R_{DS(on)-typ}(@V_{GS}=2.5V)	<4.9mΩ(Typ:3.8mΩ)

DESCRIPTION

The YFW90N02DF uses advanced trench technology to provide excellent R_{DS(ON)}, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a battery protection or in other Switching application.

APPLICATION

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



Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V _{DS}	20	V
Gate - Source Voltage	V _{GS}	±12	V
Continuous Drain Current , V _{GS} @ 4.5V ¹ @T _C =25°C	I _D	90	A
Continuous Drain Current , V _{GS} @ 4.5V ¹ @T _C =100°C	I _D	48	A
Pulsed Drain Current ^{note1}	I _{DM}	270	A
Single Pulsed Avalanche Energy ^{note2}	E _{AS}	80	mJ
Avalanche Current	I _{AS}	40	A
Power dissipation	P _D	83	W
Thermal Resistance, Junction to Case	R _{θJC}	1.5	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	25	°C/W
Storage Temperature Range	T _{STG}	-55 to +150	°C
Operating Junction Temperature Range	T _J	-55 to +150	°C

Electrical Characteristics (T_c=25°C unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	BV_{DSS}	20	22	-	V
Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V	I_{DSS}	-	-	1	μA
Gate to Body Leakage Current	V _{GS} = ±12V, V _{DS} =0V	I_{GSS}	-	-	±100	nA
Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	V_{GS(th)}	0.5	0.8	1.0	V
Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =30A	R_{DS(ON)}	-	2.8	4.0	mΩ
	V _{GS} =2.5V, I _D =20A			3.8	4.9	
Input Capacitance	V _{DS} =10V V _{GS} =0V f=1.0MHz	C_{iss}	-	4307	-	pF
Output Capacitance		C_{oss}	-	501	-	
Reverse Transfer Capacitance		C_{rss}	-	321	-	
Total Gate Charge	V _{DS} =10V I _D =30A V _{GS} =4.5V	Q_g	-	48	-	nC
Gate-Source Charge		Q_{gs}	-	3.6	-	
Gate-Drain("Miller") Charge		Q_{gd}	-	19	-	
Turn-On Delay Time	V _{DS} =10V I _D =30A R _G =1.8Ω V _{GS} =4.5V	t_{d(on)}	-	9.7	-	ns
Turn-On Rise Time		T_r	-	37	-	
Turn-Off Delay Time		t_{d(OFF)}	-	63	-	
Turn-Off Fall Time		t_f	-	52	-	
Maximum Continuous Drain to Source Diode Forward Current		I_S	-	-	90	A
Maximum Pulsed Drain to Source Diode Forward Current		I_{SM}	-	-	360	A
Drain to Source Diode Forward Voltage	V _{GS} =0V, I _{SD} =30A, T _J =25°C	V_{SD}	-	-	1.2	V
Reverse Recovery Time	T _J =25°C, I _F =30A, di/dt =100A/μs	t_{rr}	-	23	-	ns
Reverse Recovery Charge		Q_{rr}	-	10	-	nC

Note:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3.The EAS condition: T_J=25°C, V_{DD}=16V, V_G=4.5V, R_G=25Ω, L=0.1mH, I_{AS}=55A
- 4.The power dissipation is limited by 175°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.

Typical Characteristics

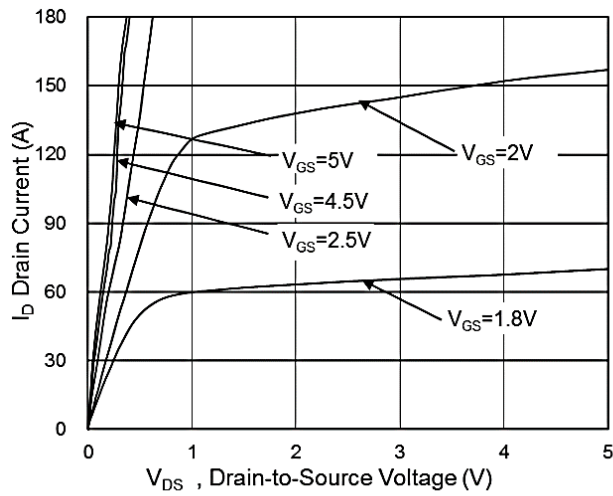


Fig.1 Typical Output Characteristics

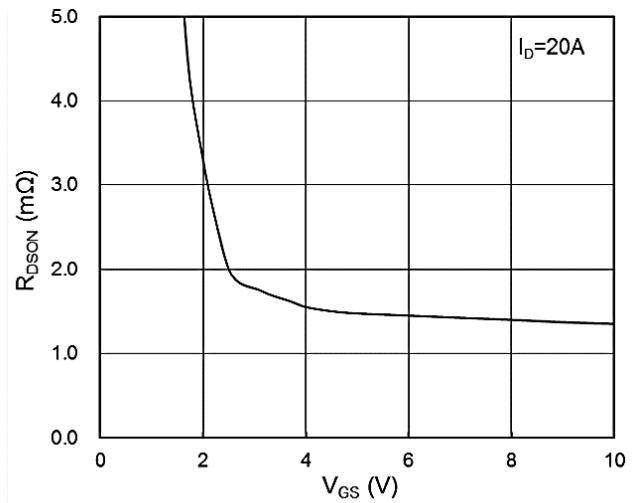


Fig.2 On-Resistance vs. Gate-Source Voltage

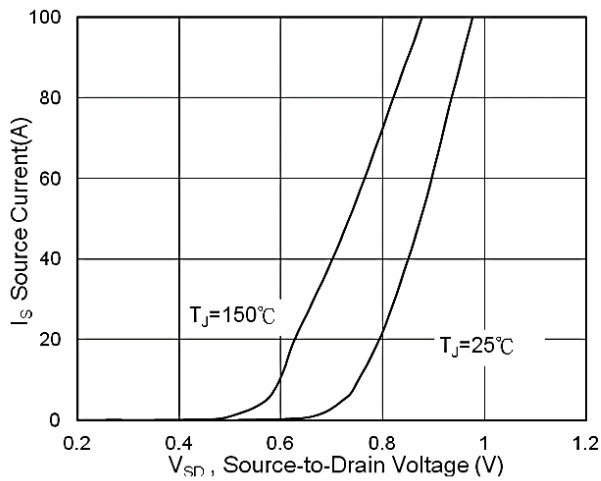


Fig.3 Forward Characteristics of Reverse

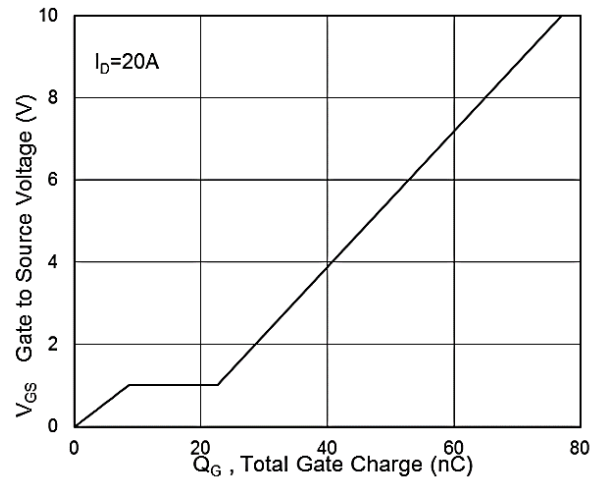


Fig.4 Gate-Charge Characteristics

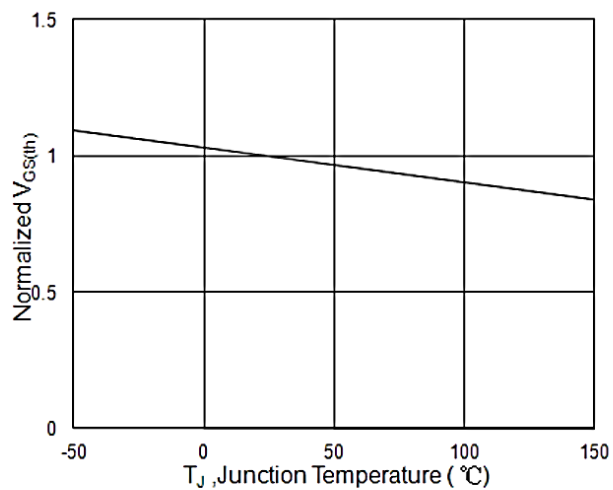


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

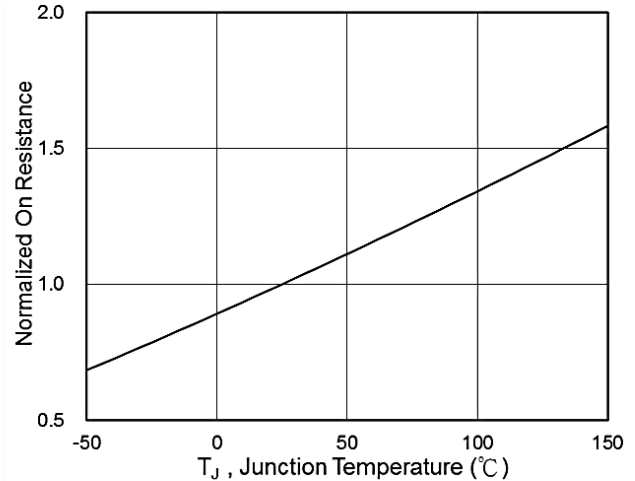


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics

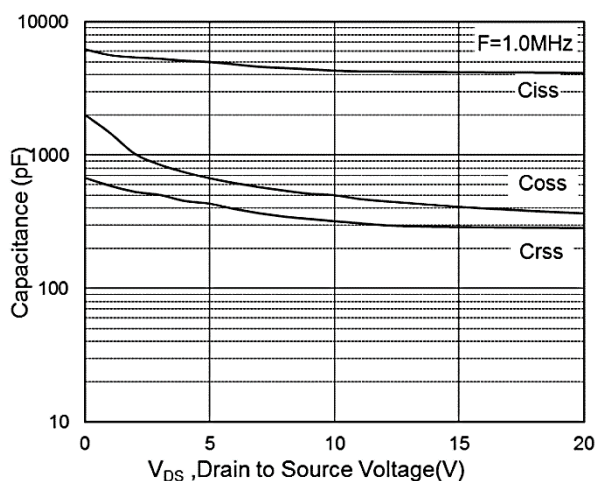


Fig.7 Capacitance

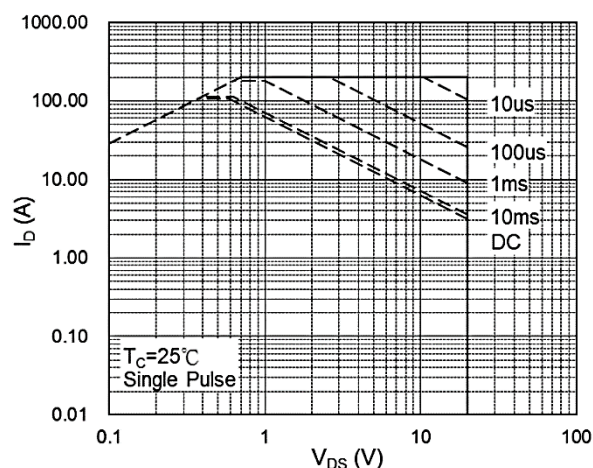


Fig.8 Safe Operating Area

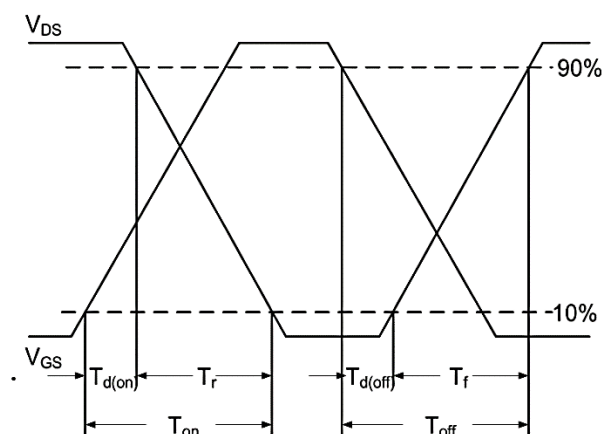


Fig.10 Switching Time Waveform

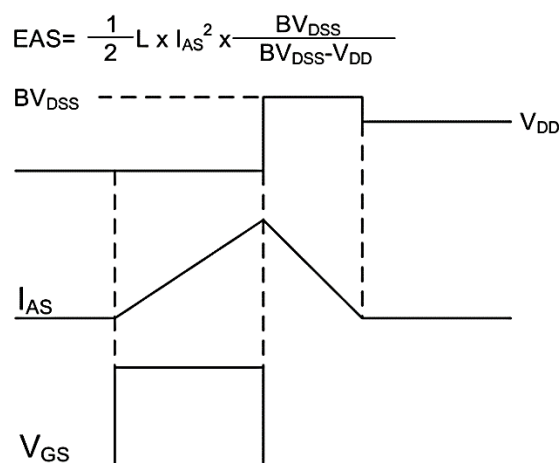


Fig.11 Unclamped Inductive Switching Waveform

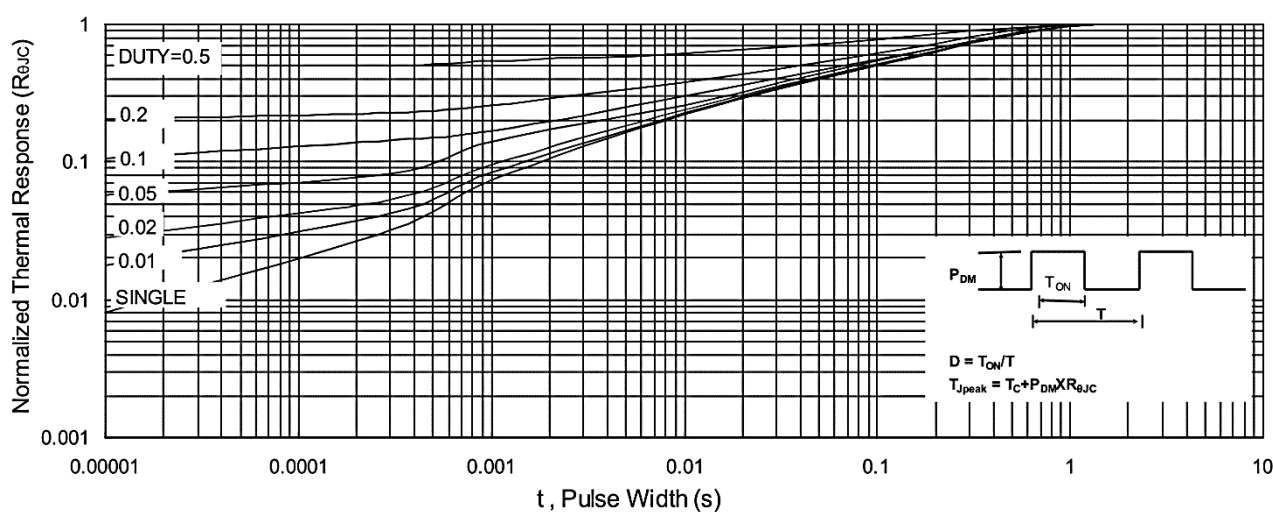
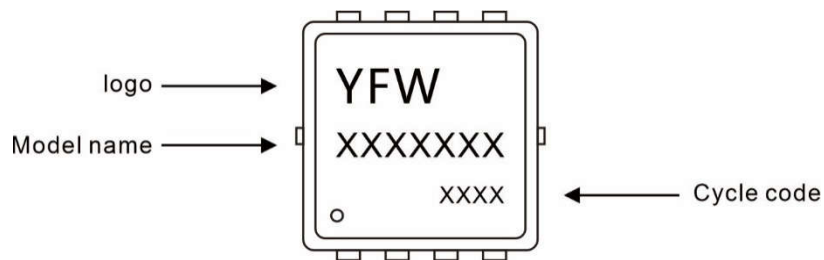


Fig.9 Normalized Maximum Transient Thermal Impedance

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW90N02DF	PDFN3*3-8L	0.0023oz(0.065g)	5000pcs/reel	10000pcs/box 50000pcs/Carton

Package Dimensions

PDFN3*3-8L

Dim	Millimeter		mil	
	Min.	Max.	Min.	Max.
A	0.70	0.85	0.0276	0.0335
A1	-	0.05	-	0.002
b	0.20	0.40	0.008	0.016
c	0.10	0.25	0.004	0.010
D	3.15	3.45	0.124	0.136
D1	3.00	3.25	0.118	0.128
D2	2.29	2.65	0.09	0.104
E	3.15	3.45	0.124	0.136
E1	2.90	3.20	0.114	0.126
E2	1.54	1.94	0.061	0.076
E3	0.28	0.65	0.011	0.026
E4	0.37	0.77	0.015	0.030
E5	0.10	0.30	0.004	0.012
e	0.60	0.70	0.024	0.028
K	0.59	0.89	0.023	0.035
L	0.30	0.50	0.012	0.020
L1	0.06	0.20	0.002	0.008
t	-	0.13	-	0.005
Φ	10℃	14℃	10℃	14℃

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