

-30V P-Channel Enhancement Mode MOSFET

MAIN CHARACTERISTICS

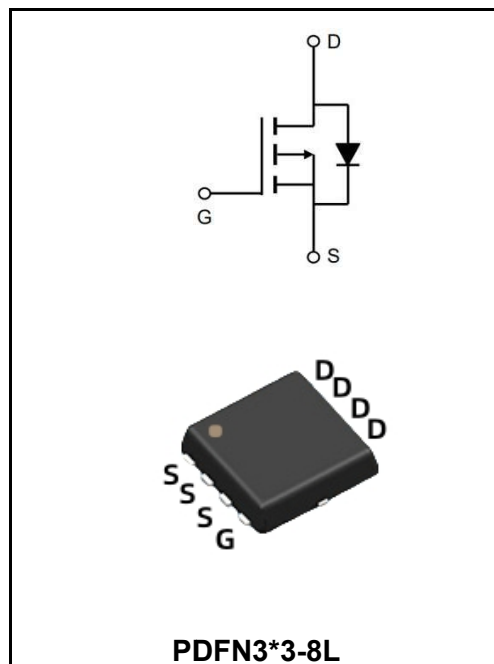
I_D	-50A
V_{DSS}	-30V
$R_{DS(on)-typ}(@V_{GS}=-10V)$	$<9.0m\Omega$ (Typ:7.2 mΩ)
$R_{DS(on)-typ}(@V_{GS}=-4.5V)$	$<12.5m\Omega$ (Typ:10 mΩ)

Description

The YFW50P03DF uses advanced trench technology to provide excellent $R_{DS(on)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

Application

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



Maximum Ratings at $T_c=25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate - Source Voltage	V_{GS}	± 20	V
Continuous Drain Current @ $T_A=25^\circ\text{C}$	I_D	-50	A
Continuous Drain Current @ $T_A=100^\circ\text{C}$	I_D	-27	A
Pulsed Drain Current ²	I_{DM}	-130	A
Single Pulse Avalanche Energy ³	E_{AS}	125	mJ
Avalanche Current	I_{AS}	-50	A
Total Power Dissipation ⁴ @ $T_C=25^\circ\text{C}$	PD	37	W
Total Power Dissipation ⁴ @ $T_A=25^\circ\text{C}$	PD	1.67	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ\text{C}$
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	75	$^\circ\text{C/W}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	3.36	$^\circ\text{C/W}$

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}	-30	-34	-	V
BVDSS Temperature Coefficient	Reference to 25°C, $I_D=-1mA$	$\Delta BV_{DSS}/\Delta T_J$	-	-0.0232	-	V/°C
Drain-source on-state resistance	$V_{GS}=-10V, I_D=-12A$	$R_{DS(ON)}$	-	7.2	9.0	mΩ
	$V_{GS}=-4.5V, I_D=-8A$		-	10	12.5	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(th)}$	-1.0	-1.5	-2.5	V
VGS(th) Temperature Coefficient		$\Delta V_{GS(th)}$	-	4.6	-	mV/°C
Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	-	-	-1	μA
	$V_{DS}=-24V, V_{GS}=0V, T_J=55^\circ C$		-	-	-5	μA
Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	-	-	±100	nA
Forward Transconductance	$V_{DS}=-5V, I_D=-30A$	g_{fs}	-	30	-	S
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	R_g	-	9	-	Ω
Total Gate Charge	$V_{DS}=-15V$ $V_{GS}=-4.5V$ $I_D=-15A$	Q_g	-	22	-	nC
Gate-Source Charge		Q_{gs}	-	8.7	-	
Gate-Drain Charge		Q_{gd}	-	7.2	-	
Turn-on delay time	$V_{DD}=-15V$ $V_{GS}=-10V,$ $R_G=3.3\Omega$ $I_D=-15A$	$t_{d(on)}$	-	8	-	ns
Rise Time		T_r	-	73.7	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	61.8	-	
Fall Time		t_f	-	24.4	-	
Input Capacitance	$V_{DS}=-15V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	2215	-	pF
Output Capacitance		C_{oss}	-	310	-	
Reverse Transfer Capacitance		C_{rss}	-	237	-	
Continuous Source Current	$V_G=V_D=0V, \text{ Force Current}$	I_S	-	-	-42	A
Pulsed Source Current		I_{SM}	-	-	-130	A
Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	V_{SD}	-	-	-1	V
Reverse Recovery Time	$I_F=-15A, di/dt=100A/\mu s,$ $T_J=25^\circ C$	t_{rr}	-	19	-	nS
Reverse Recovery Charge		Q_{rr}	-	9	-	nC

Note :

- 1.The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3.The power dissipation is limited by 175°C junction temperature
- 4.EAS condition: $T_J=25^\circ C, V_{DD}=-24V, V_G=-10V, R_G=7\Omega, L=0.1mH, I_{AS}=-50A$
- 5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

TYPICAL CHARACTERISTICS

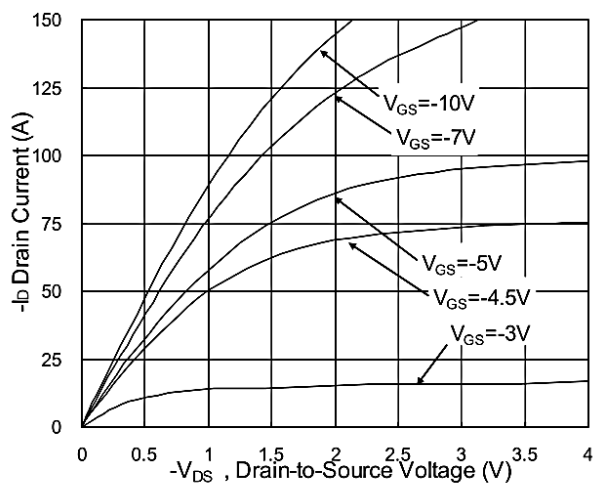


Fig.1 Typical Output Characteristics

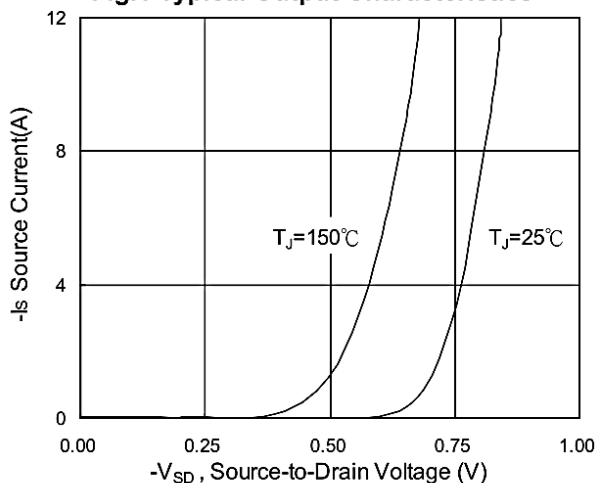


Fig.3 Forward Characteristics of Reverse

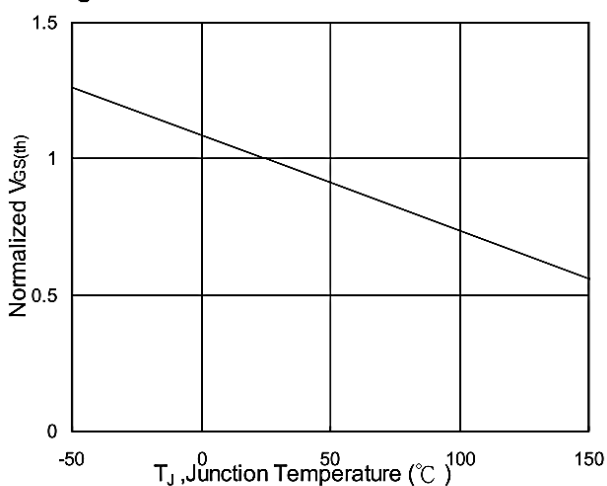


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

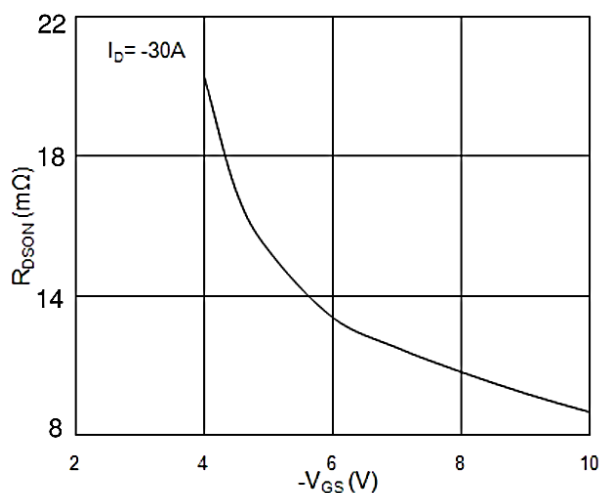


Fig.2 On-Resistance vs. G-S Voltage

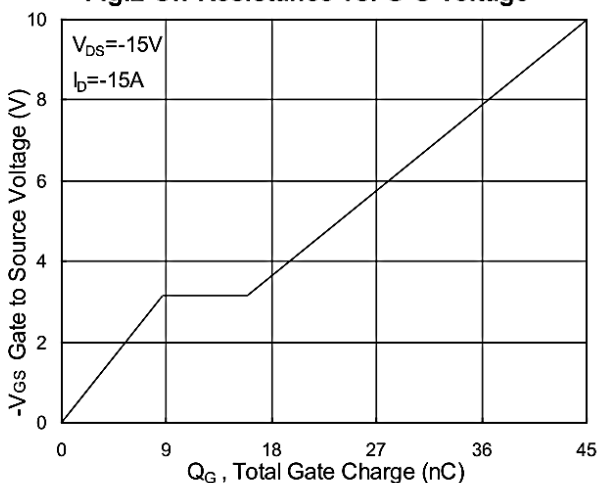


Fig.4 Gate-Charge Characteristics

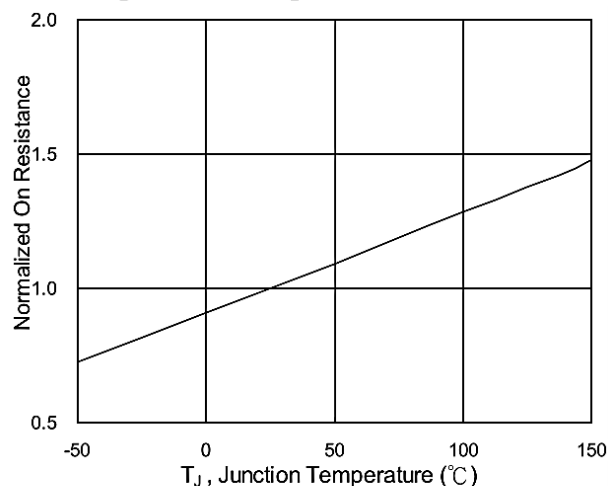


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

TYPICAL CHARACTERISTICS

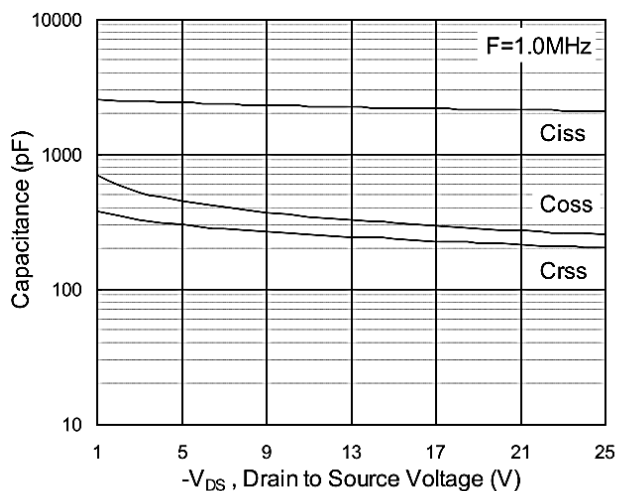


Fig.7 Capacitance

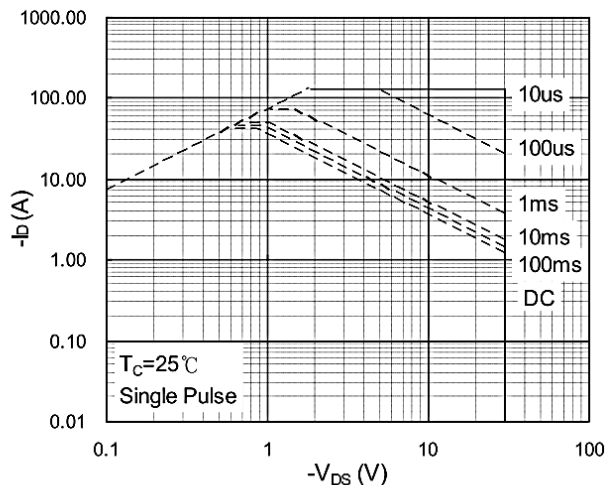


Fig.8 Safe Operating Area

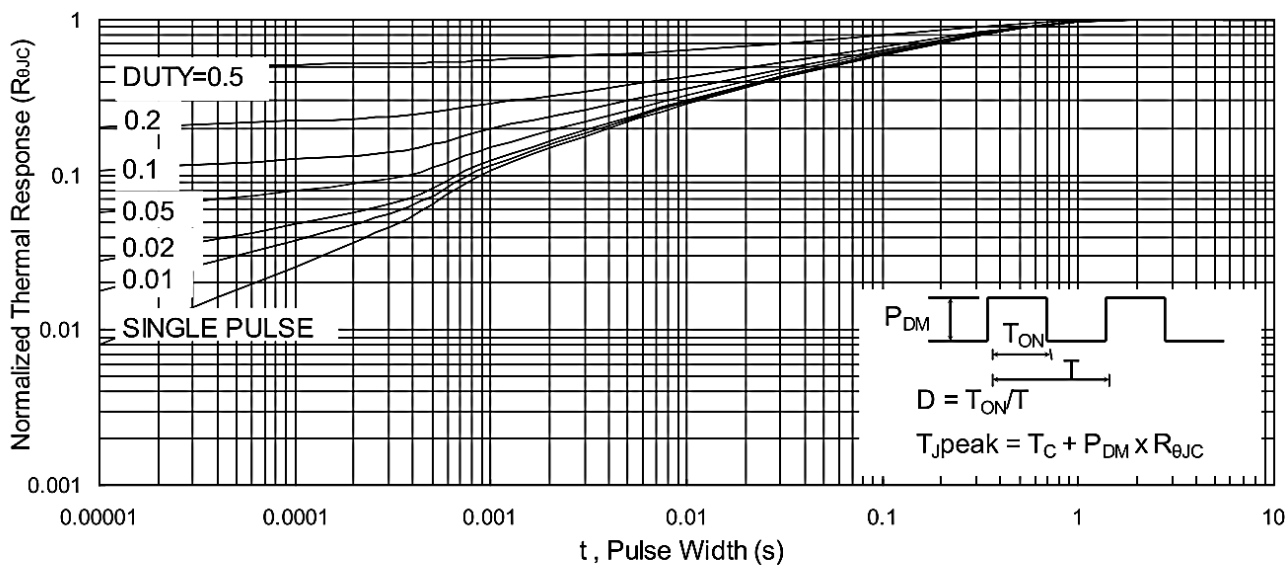


Fig.9 Normalized Maximum Transient Thermal Impedance

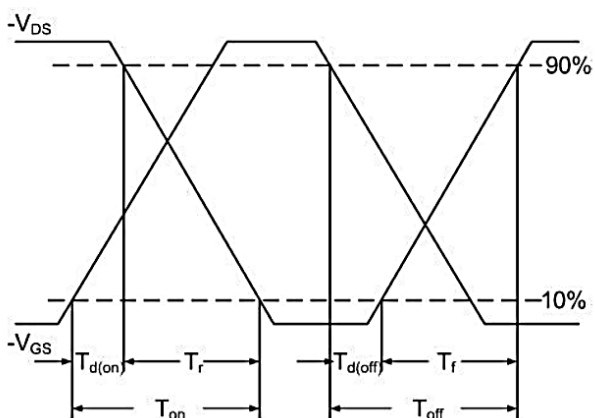


Fig.10 Switching Time Waveform

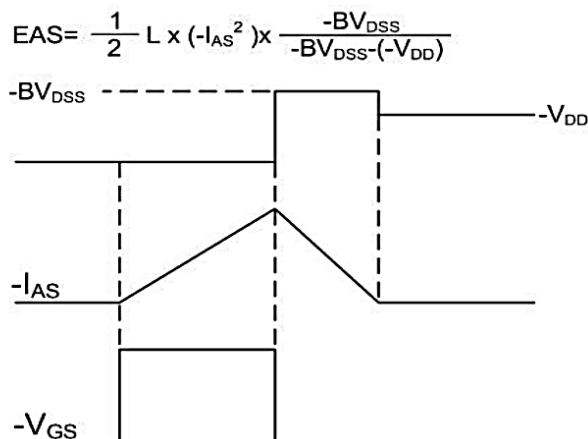
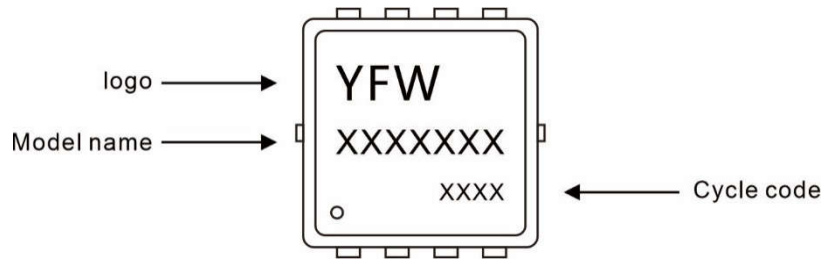


Fig.11 Unclamped Inductive Switching Waveform

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW50P03DF	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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