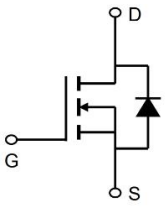
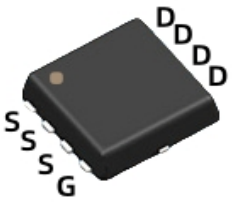
40V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	50A
V_{DSS}	40V
R_{DSON}-typ(@V_{GS}=10V)	＜10 mΩ(Typ:7.5 mΩ)
R_{DSON}-typ(@V_{GS}=4.5V)	＜16 mΩ(Typ:11 mΩ)





PDFN3*3-8L

Description

The YFW50N04DF 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

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Characteristics		Symbols	Value	Units
Drain-Source Voltage		V_{DS}	40	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current [1]	@T_C=25℃	I_D	50	A
Continuous Drain Current [1]	@T_C=100℃	I_D	28	A
Pulsed Drain Current [2]		I_{DM}	180	A
Single Pulse Avalanche Energy [3]		E_{AS}	81	mJ
Avalanche Current		I_{AS}	10	A
Total PowerDissipation [4]	T_C=25 ℃	P_D	27.8	W
Storage Temperature Range		T_{STG}	-55 to +150	°C
Operating Junction Temperature Range		T_J	-55 to +150	°C
Thermal Resistance, Junction to Ambient [1]		$R_{\theta JA}$	60	°C/W
Thermal Resistance Junction-Case [1]		$R_{\theta JC}$	4.5	°C/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	BV_{DSS}	40	---	---	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	$\triangle BV_{DSS}/\triangle T_J$	---	0.028	---	V/℃
Static Drain-Source On-Resistance	V_{GS}=10V , I_D=30A	$R_{DS(ON)}$	---	7.5	10	mΩ
	V_{GS}=4.5V , I_D=15A		---	11	16	
Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	$V_{GS(th)}$	1.0	1.9	2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\triangle V_{GS(th)}$	---	-6.16	---	mV/℃
Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃	I_{DSS}	---	---	1	uA
	V_{DS}=40V , V_{GS}=0V , T_J=55℃		---	---	5	
Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	I_{GSS}	---	---	±100	nA
Forward Transconductance	V_{DS}=5V , I_D=30A	gfs	---	22	---	S
Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	R_g	---	1.7	3.4	Ω
Total Gate Charge (4.5V)	V_{DS}=20V , V_{GS}=10V , I_D=25A	Q_g	---	37	---	nC
Gate-Source Charge		Q_{gs}	---	6	---	
Gate-Drain Charge		Q_{gd}	---	7	---	
Turn-On Delay Time	V_{DD}=30V V_{GS}=10V R_G=1Ω I_D=25A	$t_{d(on)}$	---	12	---	ns
Rise Time		T_r	---	12	---	
Turn-Off Delay Time		$t_{d(OFF)}$	---	38	---	
Fall Time		t_f	---	9	---	
Input Capacitance	V_{DS}=20V V_{GS}=0V f=1MHz	C_{iss}	---	2400	---	pF
Output Capacitance		C_{oss}	---	192	---	
Reverse Transfer Capacitance		C_{rss}	---	165	---	
Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	I_S	---	---	50	A
Pulsed Source Current[2,5]		I_{SM}	---	---	180	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	V_{SD}	---	---	1.2	V
Reverse Recovery Time	IF=30A , dI/dt=100A/μs ,T_J=25℃	t_{rr}	---	22	---	nS
Reverse Recovery Charge		Q_{rr}	---	11	---	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 ≦ 300us , duty cycle ≦ 2%
3、The EAS data shows Max. rating . The test condition is V_{DD}=36V,V_{GS} =10V,L=0.1mH,IAS =10A
4、The power dissipation is limited by 150℃ junction temperature
5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

Typical Characteristics

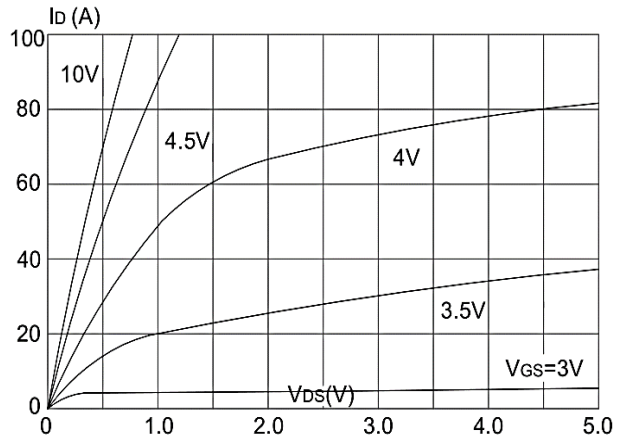


Figure1: Output Characteristics

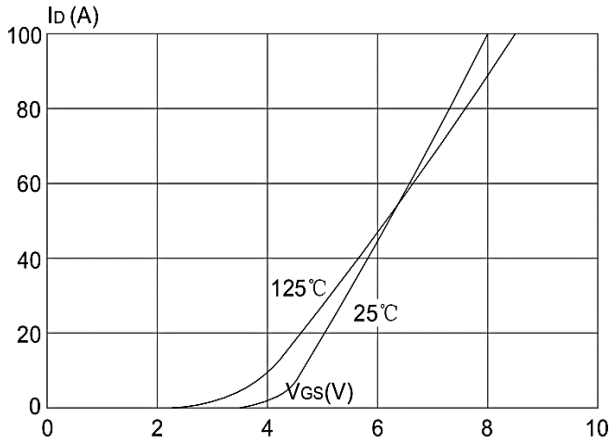


Figure 2: Typical Transfer Characteristics

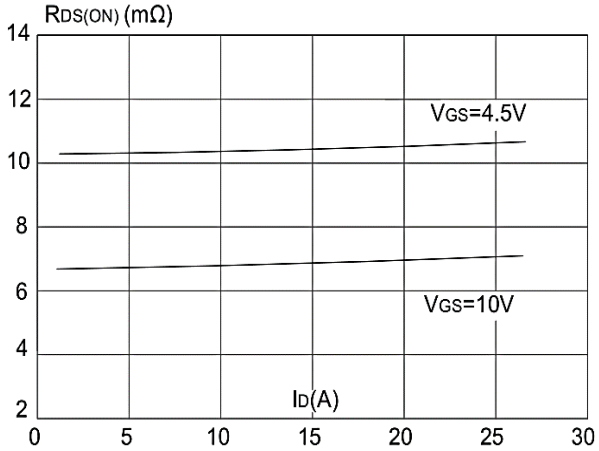


Figure 3:On-resistance vs. Drain Current

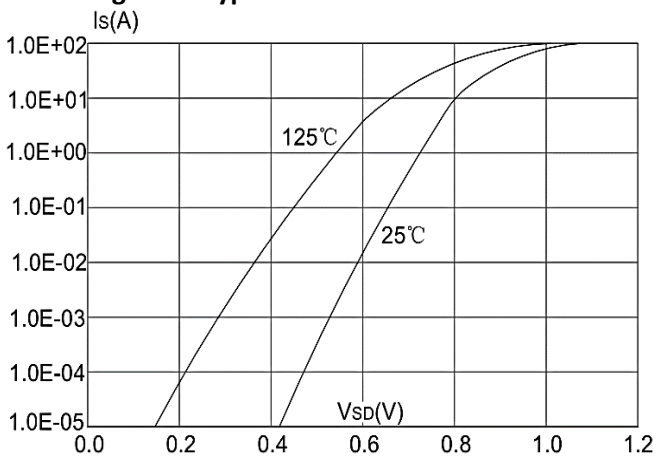


Figure 4: Body Diode Characteristics

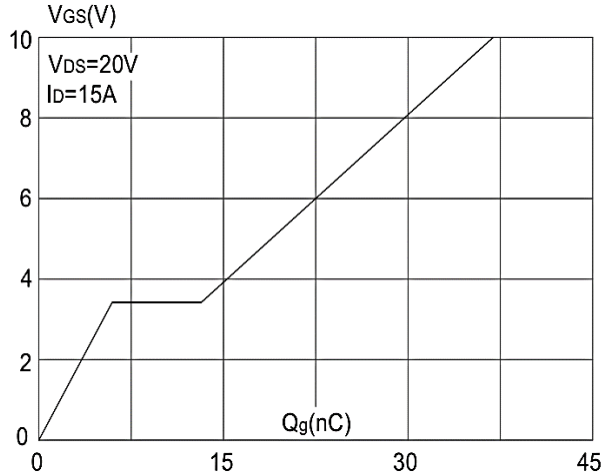


Figure 5: Gate Charge Characteristics

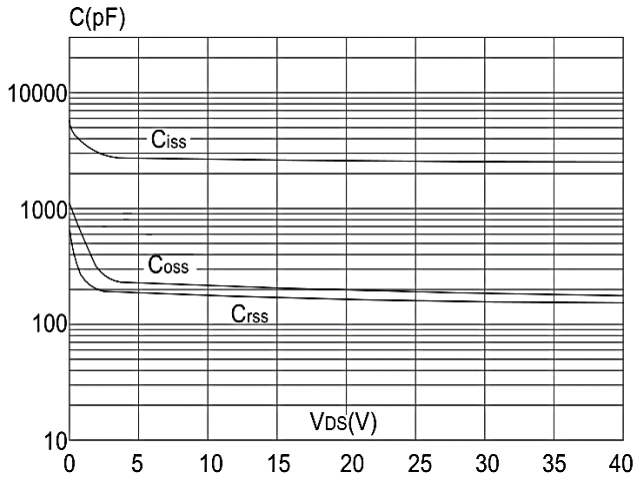


Figure 6: Capacitance Characteristics

Typical Characteristics

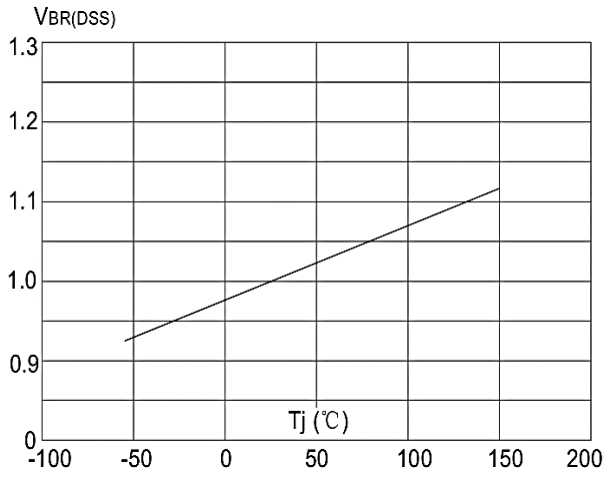


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

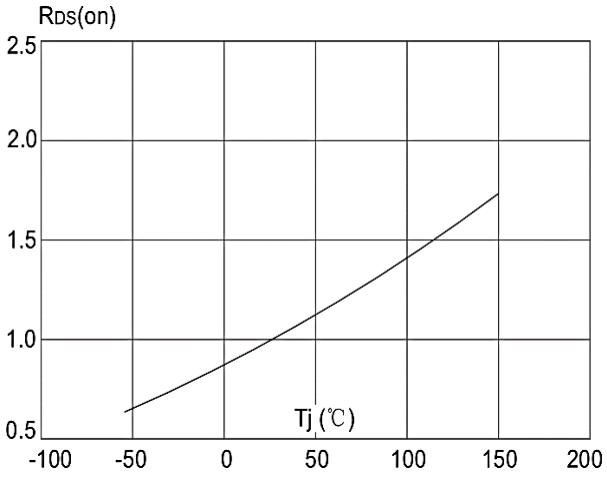


Figure 8: Normalized on Resistance vs Junction Temperature

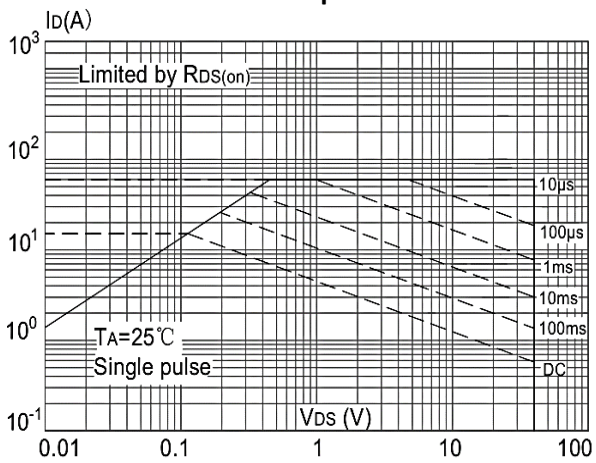


Figure 9: Maximum Safe Operating Area vs. Case Temperature

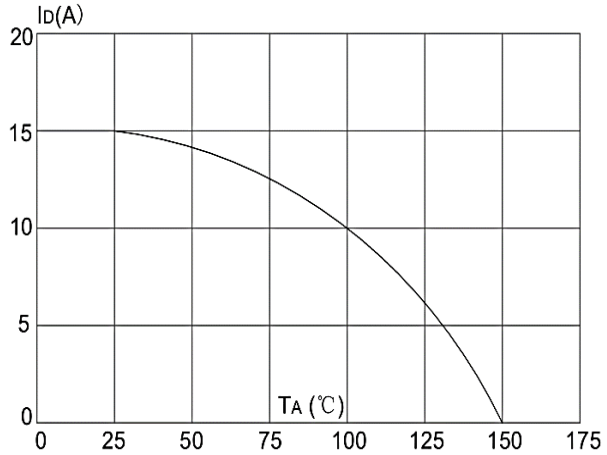


Figure 10: Maximum Continuous Drain Current

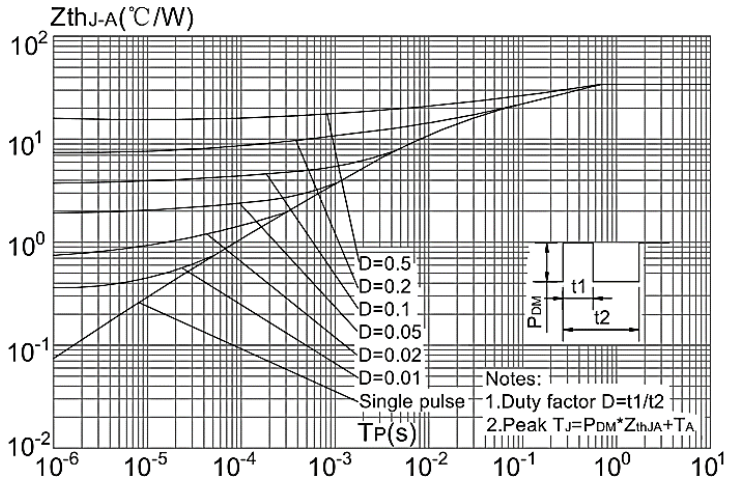
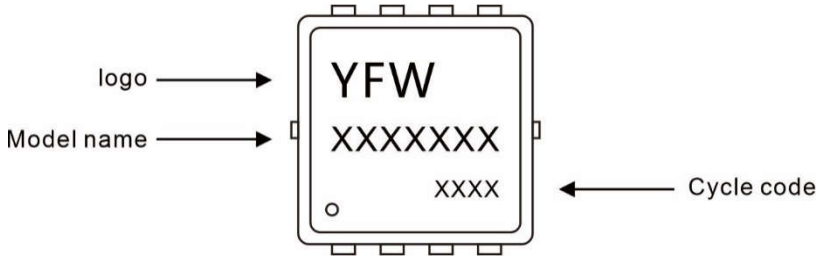


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Marking Diagram

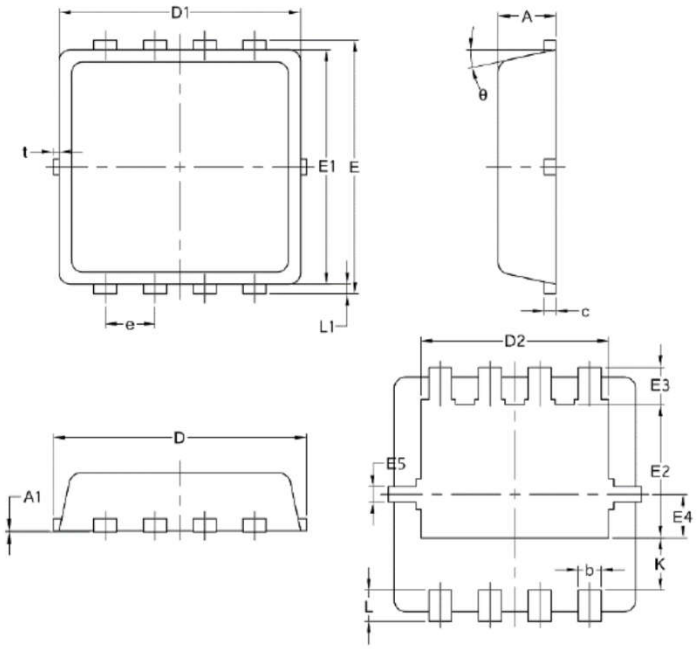


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW50N04DF	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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