

30V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

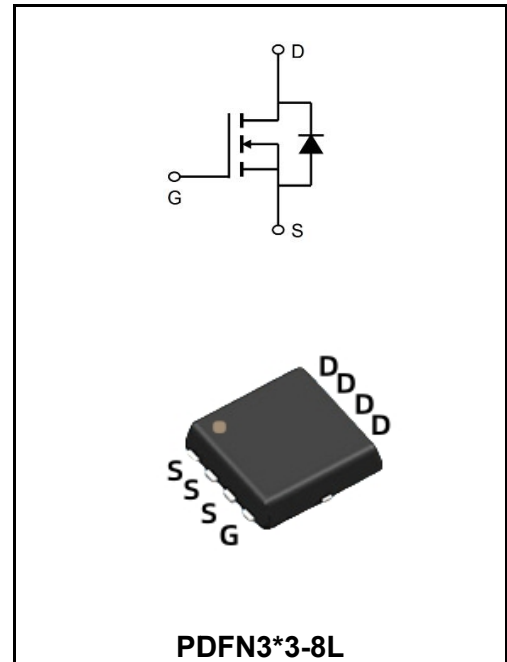
I_D	55A
V_{DS}	30V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$< 7.5\text{ m}\Omega$ (Typ: 6.5 mΩ)
$R_{DS(on)-typ}(@V_{GS}=4.5V)$	$< 13\text{ m}\Omega$ (Typ: 10 mΩ)

Description

The YFW55N03DF 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	@ $T_c=25^\circ\text{C}$	I_D	55	A
Continuous Drain Current	@ $T_c=100^\circ\text{C}$	I_D	26	A
Pulsed Drain Current ²		I_{DM}	160	A
Single Pulse Avalanche Energy ³		E_{AS}	40	mJ
Avalanche Current		I_{AS}	12.6	A
Power dissipation ⁴	$T_c=25^\circ\text{C}$	P_D	26	W
Thermal Resistance, Junction to Ambient ¹		$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Thermal Resistance Junction-Case ¹		$R_{\theta JC}$	4.8	$^\circ\text{C/W}$
Storage Temperature Range		T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range		T_J	-55 to +150	$^\circ\text{C}$

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	-	-	V
Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V$	I_{DSS}	-	-	1.0	μA
Gate-Source Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	I_{GSS}	-	-	± 100	nA
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.1	1.6	2.5	V
Drain-source on-state resistance ⁴	$V_{GS}=10V, I_D=25A$	$R_{DS(on)}$	-	6.5	7.5	m Ω
	$V_{GS}=4.5V, I_D=15A$		-	10	13	
Gate Resistance	f = 1MHz	R_g	-	3.3	-	Ω
Input Capacitance	$V_{DS}=15V$ $V_{GS}=0V$ f=1MHz	C_{iss}	-	1209	-	μF
Output Capacitance		C_{oss}	-	170	-	
Reverse Transfer Capacitance		C_{rss}	-	137	-	
Total Gate Charge	$V_{GS} = 0 \text{ to } 10V$ $V_{DS} = 15V, I_D = 15A$	Q_g	-	24	-	nC
Gate-Source Charge		Q_{gs}	-	4.7	-	
Gate Drain("Miller") Charge		Q_{gd}	-	5.4	-	
Turn-On Delay Time	$V_{GS} = 10V, V_{DD} = 15V$ $I_D = 15A, R_{GEN} = 3\Omega$	$t_{d(on)}$	-	6.5	-	ns
Rise Time		T_r	-	15	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	25	-	
Fall Time		t_f	-	5.9	-	
Maximum Continuous Drain to Source Diode Forward Current		I_S	-	-	55	A
Maximum Pulsed Drain to Source Diode Forward Current		I_{SM}	-	-	160	A
Diode Forward Voltage	$V_{GS} = 0V, I_S = 25A$	V_{SD}	-	-	1.2	V
Body Diode Reverse Recovery Time	$I_F = 20A, di/dt = 100A/\mu s$	trr	8	11	15	ns
Body Diode Reverse Recovery Charge		Q_{rr}	-	4.1	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. EAS condition: Starting $T_J=25^\circ C$, $V_{DD}=15V$, $V_{GS}=10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=12.6A$, $V_{DD}=0V$ during time in avalanche.

3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.

4. Pulse Test: Pulse Width $\leq 300 \mu s$, Duty Cycle $\leq 0.5\%$.

Typical Characteristics

Figure 1: Output Characteristics

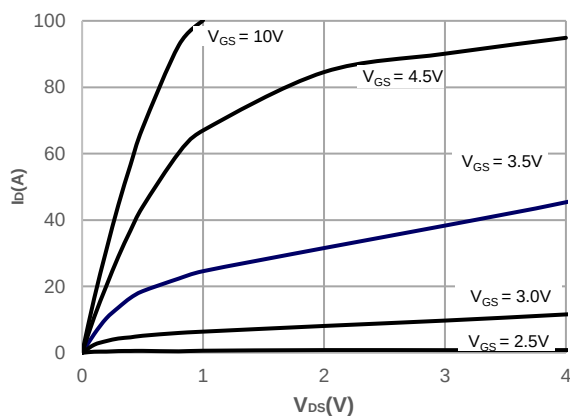


Figure 2: Typical Transfer Characteristics

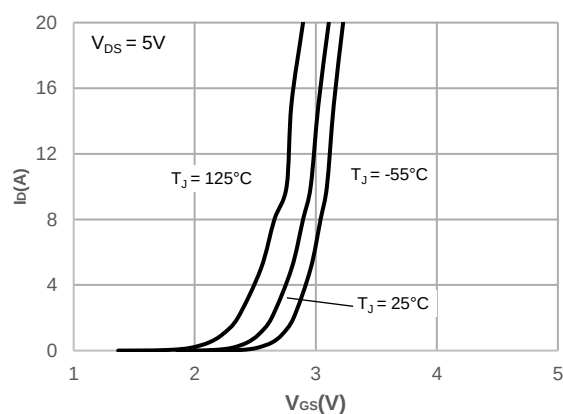


Figure 3: On-resistance vs. Drain Current

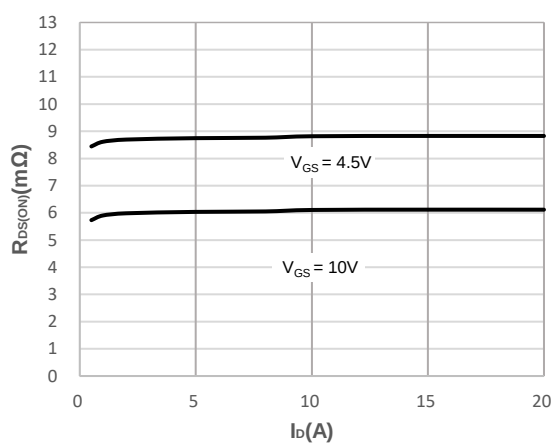


Figure 4: Body Diode Characteristics

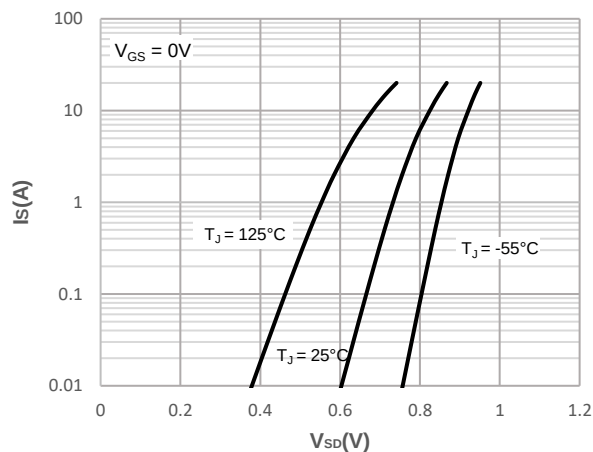


Figure 5: Gate Charge Characteristics

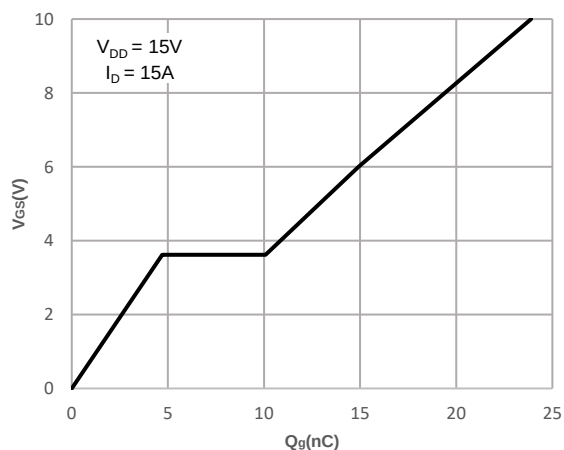
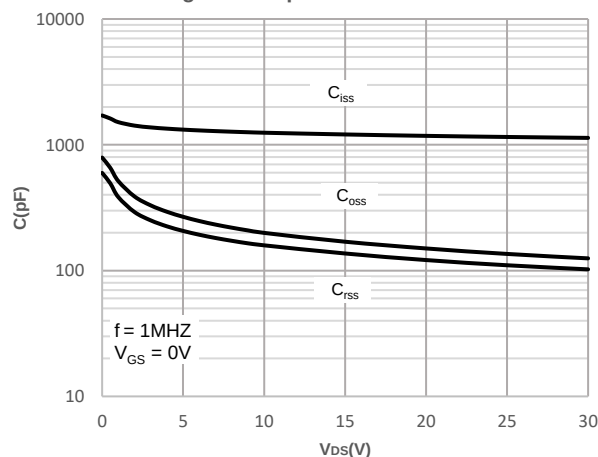


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Power De-rating

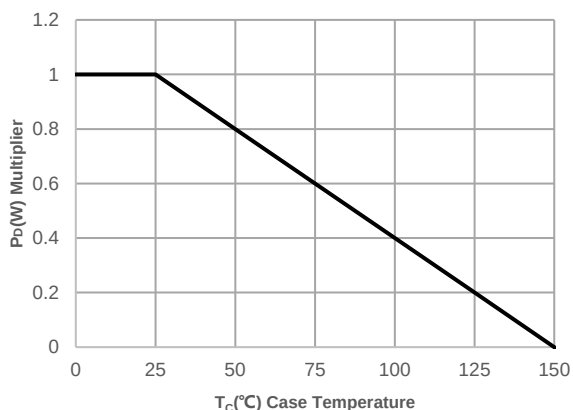


Figure 8: Current De-rating

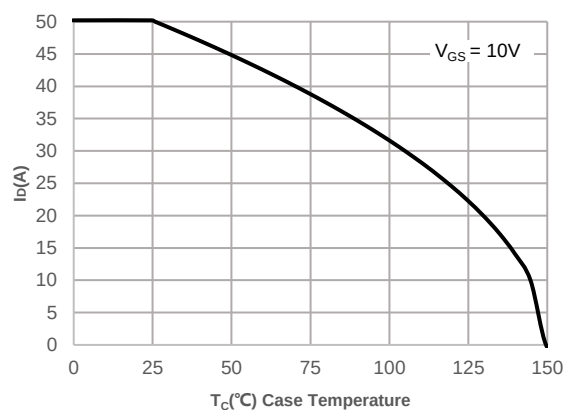


Figure 9: Normalized Maximum Transient Thermal Impedance

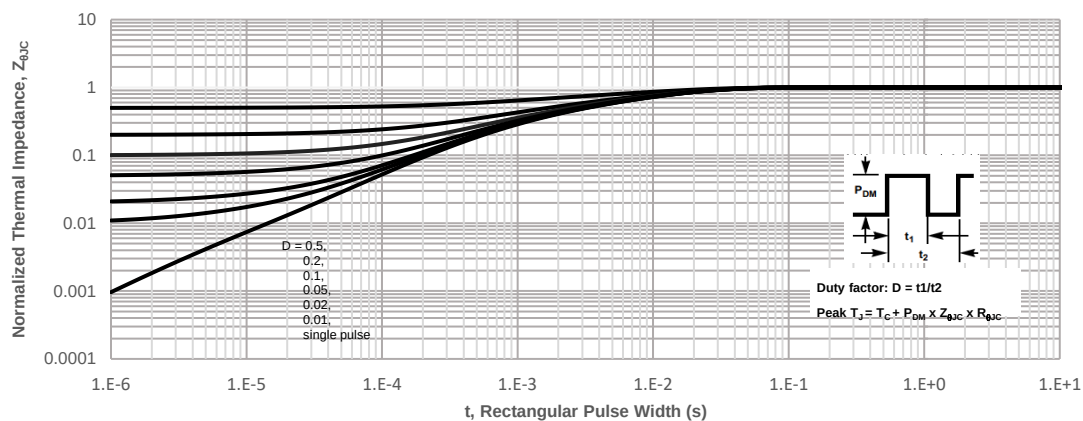
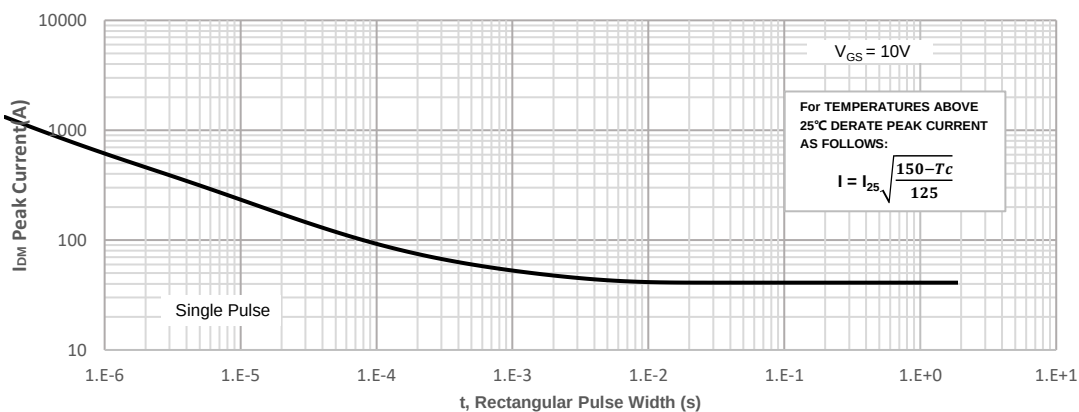
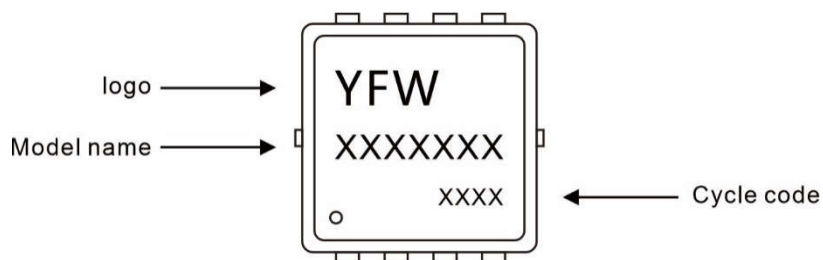


Figure 10: Peak Current Capacity



Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW55N03DF	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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