

-40V P-Channel Trench Power MOSFET

MAIN CHARACTERISTICS

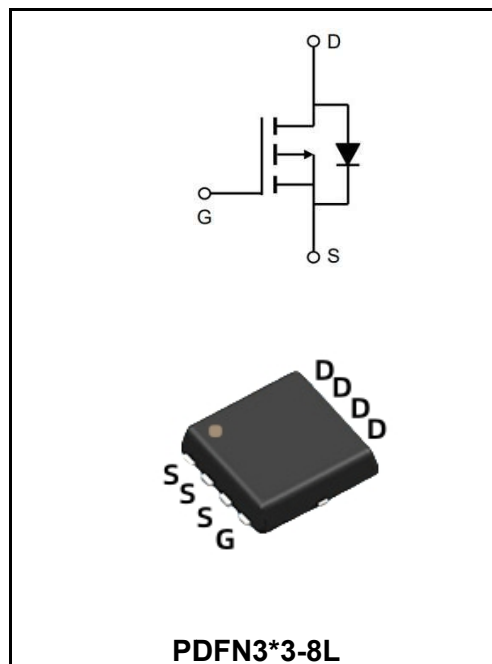
I_D	-50A
V_{DS}	-40V
$R_{DS(on)-typ}(@V_{GS}=-10V)$	$< 12m\Omega$ (Typ: 9.1mΩ)

FEATURES

- ♦Advanced Trench Technology
- ♦Excellent RDS(ON) and Low Gate Charge

APPLICATIONS

- ♦Load Switch
- ♦PWM Application
- ♦Power Management



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	I_D	-50	A
Pulsed Drain Current (note1)	I_{DM}	-160	A
Single Pulsed Avalanche Energy	E_{AS}	144	mJ
Power Dissipation	P_D	42	W
Operating Temperature Range	T_J	175	°C
Storage Temperature Range	T_{STG}	-55 to +175	°C
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	45	°C/W

Note1: Pulse test: 300 μ s pulse width, 2 % duty cycle

Electrical Characteristics 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	-	-	V
Zero Gate Voltage Drain Current	$V_{DS}=-40V, V_{GS}=0V,$	I_{DSS}	-	-	-1	μA
Gate to Body 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	-	-2.5	V
Static Drain-Source on-Resistance	$V_{GS}=-10V, I_D=-25A$	$R_{DS(ON)}$	-	9.1	12	m Ω
	$V_{GS}=-4.5V, I_D=-10A$		-	11.5	15	m Ω
Input Capacitance	$V_{DS}=-20V$ $V_{GS}=0V$ $f=1.0MHz$	C_{iss}	-	3800	-	pF
Output Capacitance		C_{oss}	-	329	-	
Reverse Transfer Capacitance		C_{rss}	-	289	-	
Turn-on Delay Time(Note2)	$V_{DS}=-20V$ $V_{GS}=-10V$ $R_G=2.4\Omega$ $I_D=-25A$	$t_{d(on)}$	-	10	-	ns
Turn-on Rise Time(Note2)		T_r	-	82	-	ns
Turn-off Delay Time(Note2)		$t_{d(OFF)}$	-	93	-	ns
Turn-off Fall Time(Note2)		t_f	-	74	-	ns
Total Gate Charge(Note2)	$V_{DS}=-20V$ $V_{GS}=-10V$ $I_D=-25A$	Q_g	-	68	-	nC
Gate to Source Charge(Note2)		Q_{gs}	-	10	-	nC
Gate to Drain Charge(Note2)		Q_{gd}	-	14	-	nC
Maximun Body-Diode Continuous Current		I_S	-	-	-50	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	-160	A
Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=-30A, T_J=25^\circ C$	V_{SD}	-	-	-1.2	V
Reverse Recovery Time	$V_{GS}=0V, I_S=-30A,$ $di/dt=100A/\mu s$	trr	-	20	-	ns
Reverse Recovery Charge		Q_{rr}	-	13	-	nC

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

RATINGS AND CHARACTERISTIC CURVES

Figure1: Output Characteristics

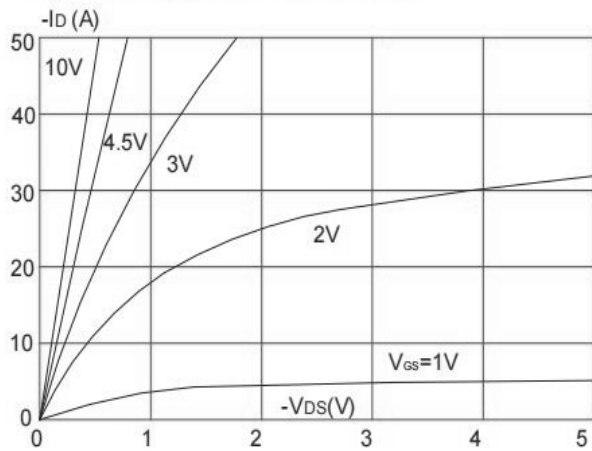


Figure 2: Typical Transfer Characteristics

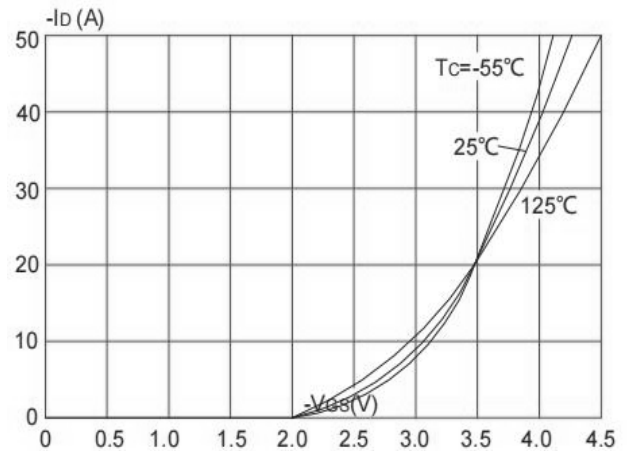


Figure 3: On-resistance vs. Drain Current

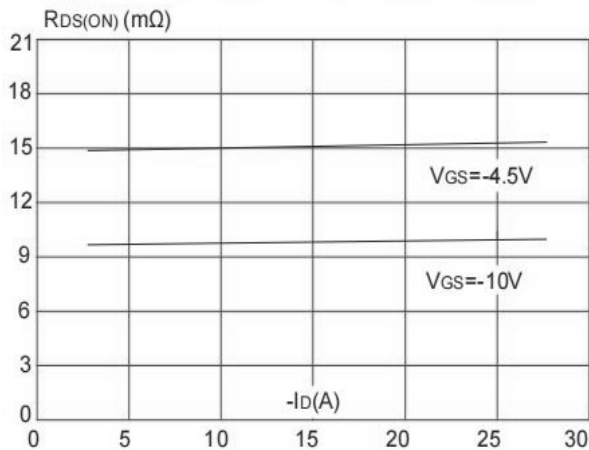


Figure 4: Body Diode Characteristics

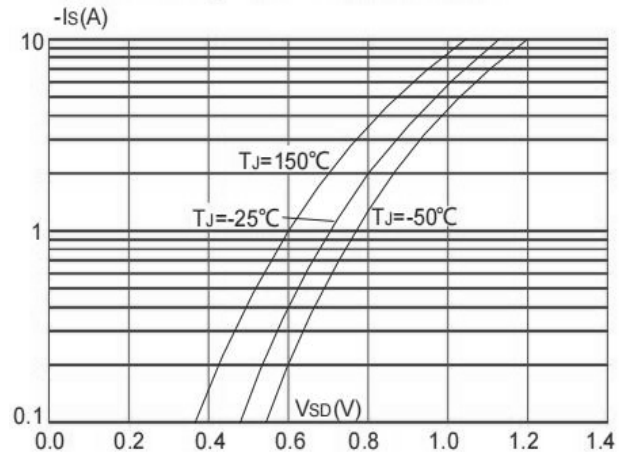


Figure 5: Gate Charge Characteristics

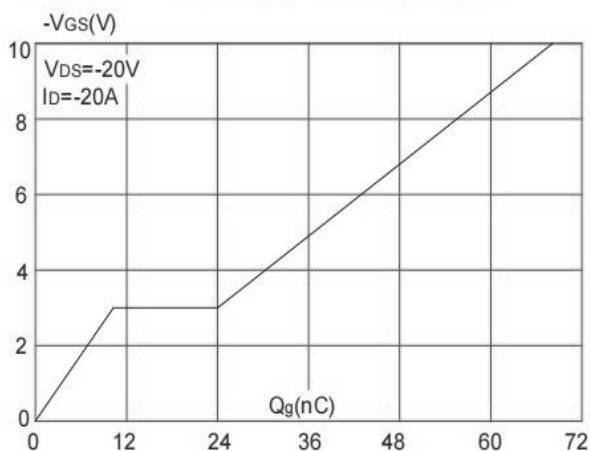
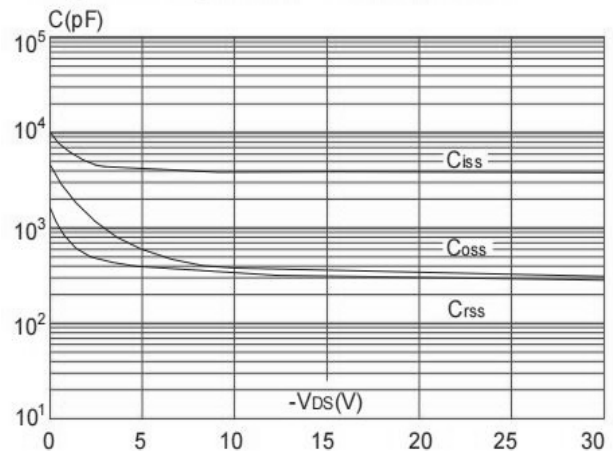


Figure 6: Capacitance Characteristics



RATINGS AND CHARACTERISTIC CURVES

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

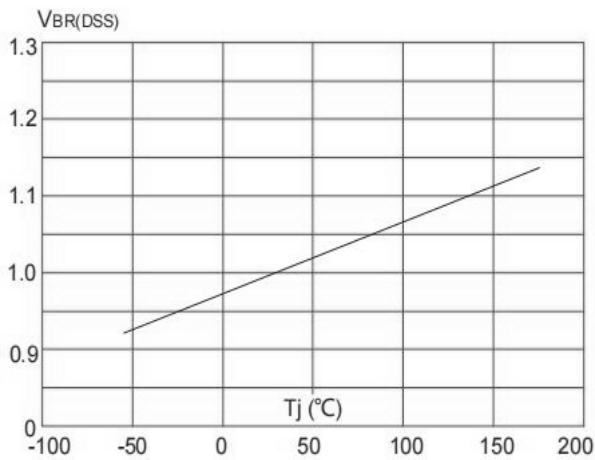


Figure 8: Normalized on Resistance vs. Junction Temperature

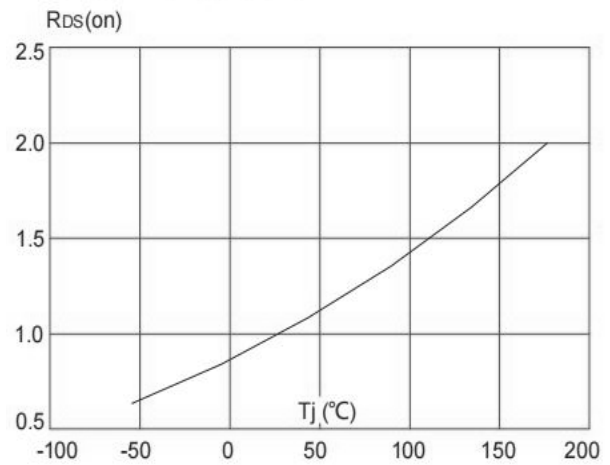


Figure 9: Maximum Safe Operating Area

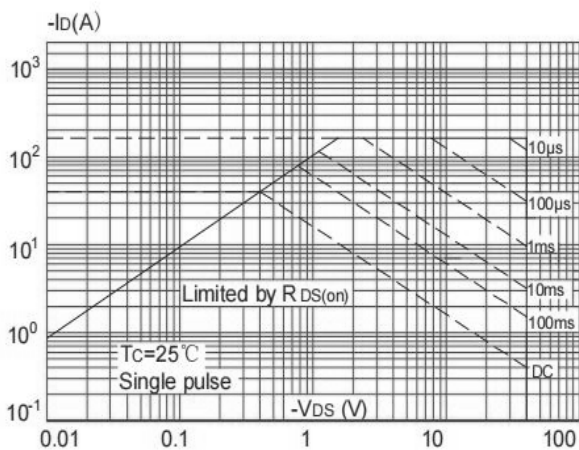


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

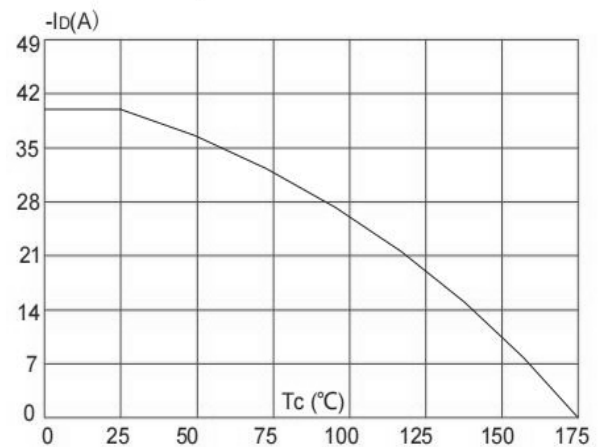
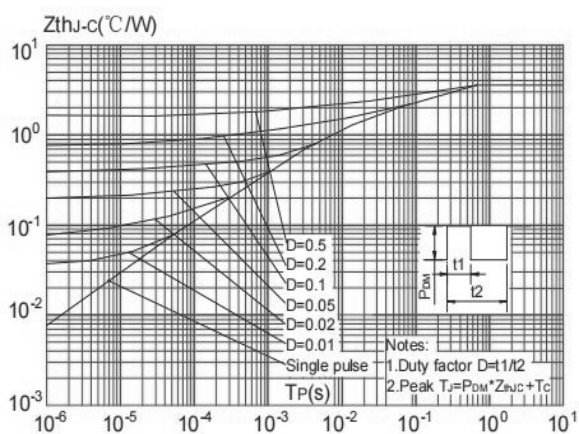
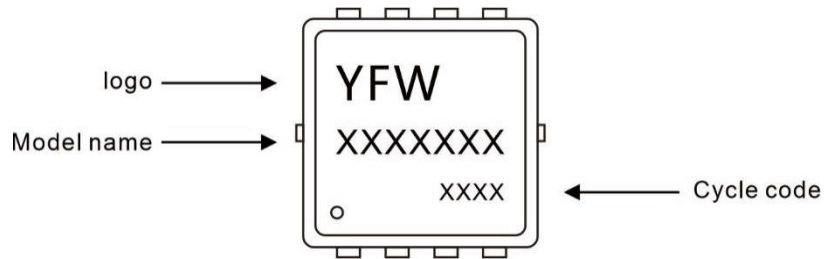


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW50P04DF	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℃

