

-100V P-Channel Enhancement Mode MOSFET

MAIN CHARACTERISTICS

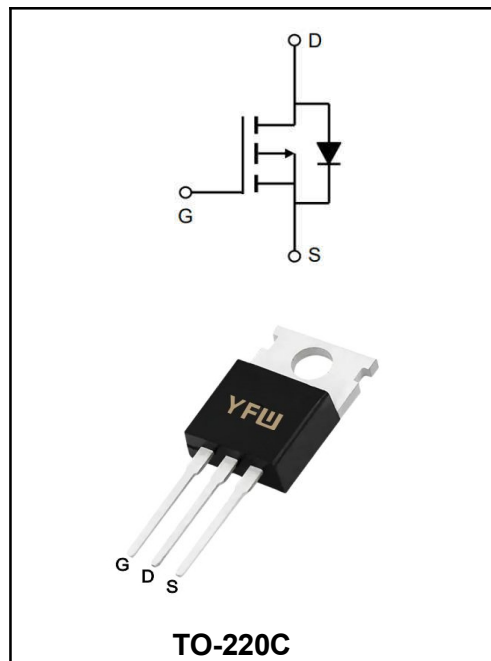
I_D	-40A
V_{DS}	-100V
$R_{DS(on)-typ}(@V_{GS}=-10V)$	$<55m\Omega$ (Typ:42mΩ)
$R_{DS(on)-typ}(@V_{GS}=-4.5V)$	$<65m\Omega$ (Typ:45mΩ)

Description

The YFW40P10AC 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.

FEATURES

- ◆Brushless motor
- ◆Load switch
- ◆Uninterruptible power supply



Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, $V_{GS} @ -10V^1 @ T_c=25^\circ\text{C}$	I_D	-40	A
Continuous Drain Current, $V_{GS} @ -10V^1 @ T_c=100^\circ\text{C}$	I_D	-22	A
Pulsed Drain Current ²	I_{DM}	-140	A
Single Pulse Avalanche Energy ³	E_{AS}	87	mJ
Avalanche Current	I_{AS}	-24.5	A
Total Power Dissipation ⁴ @ $T_c=25^\circ\text{C}$	P_D	125	W
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	1.0	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

P-Channel Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	BV_{DSS}	-100	-110	-	V
Zero Gate Voltage Drain Current	V _{DS} =-100V, V _{GS} =0V,	I_{DSS}	-	-	-1.0	μA
Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	I_{GSS}	-	-	±100	nA
Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	V_{GS(th)}	-1.0	-1.8	-2.5	V
Static Drain-Source on-Resistance	V _{GS} =-10V, I _D =-15A	R_{DS(ON)}	-	42	55	mΩ
	V _{GS} =-4.5V, I _D =-10A		-	45	65	
Input Capacitance	V _{DS} =-25V V _{GS} =0V f=1.0MHz	C_{iss}	-	9023	-	pF
Output Capacitance		C_{oss}	-	210	-	
Reverse Transfer Capacitance		C_{rss}	-	180	-	
Total Gate Charge	V _{DS} =-50V I _D =-15A V _{GS} =-10V	Q_g	-	125	-	nC
Gate-Source Charge		Q_{gs}	-	21	-	
Gate-Drain("Miller") Charge		Q_{gd}	-	25	-	
Turn-on Delay Time	V _{DD} =-50V I _D =-15A R _G =9Ω V _{GS} =-10V	t_{d(on)}	-	20	-	ns
Turn-on Rise Time		T_r	-	78	-	
Turn-off Delay Time		t_{d(OFF)}	-	43	-	
Turn-off Fall Time		t_f	-	64	-	
Maximum Continuous Drain to Source Diode Forward Current		I_S	-	-	-40	A
Maximum Pulsed Drain to Source Diode Forward Current		I_{SM}	-	-	-140	A
Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =-30A	V_{SD}	-	-	-1.2	V
Body Diode Reverse Recovery Time	T _J =25°C, I _F =-15A, dI/dt=100A/μs	t_{rr}	-	95	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}	-	145	-	nC

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z 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} =-50V, V_{GS} =-10V, L=0.5mH, I_{AS} =-24.5A
- 4、The power dissipation is limited by 150°C 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

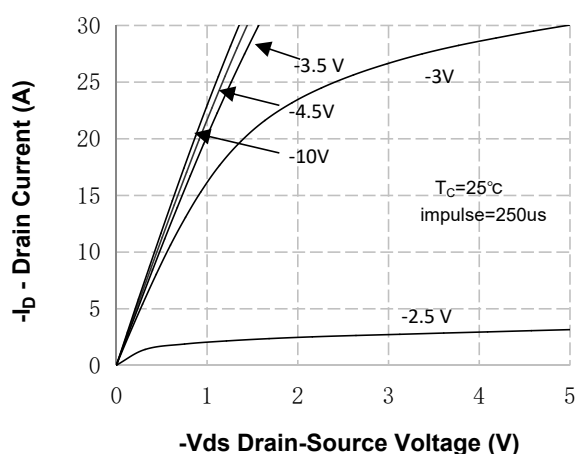


Figure 1. On-Region Characteristics

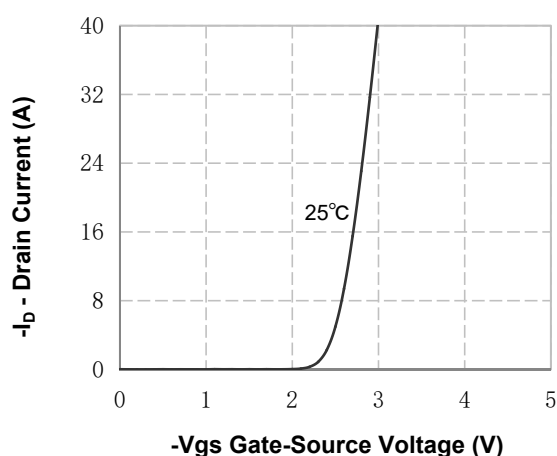


Figure 2. Transfer Characteristics

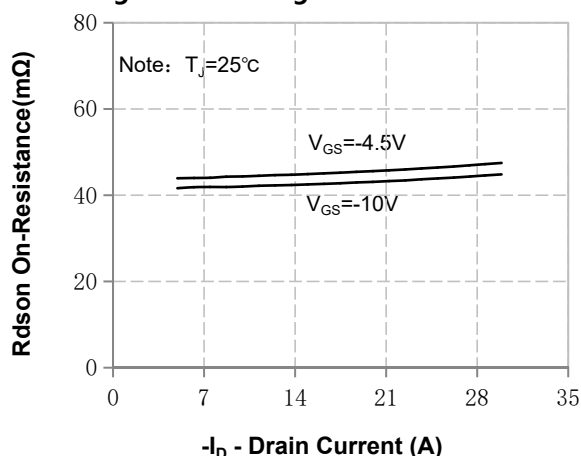


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

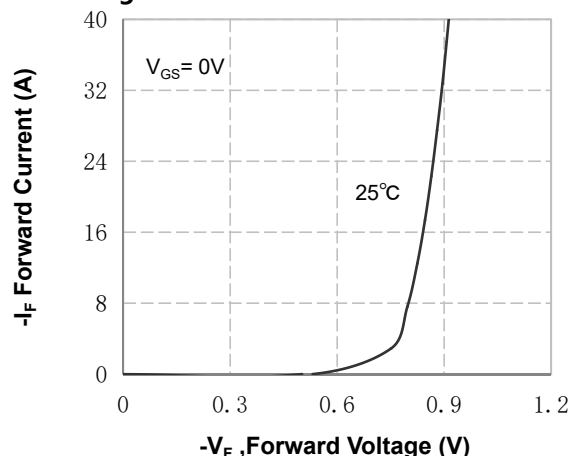


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

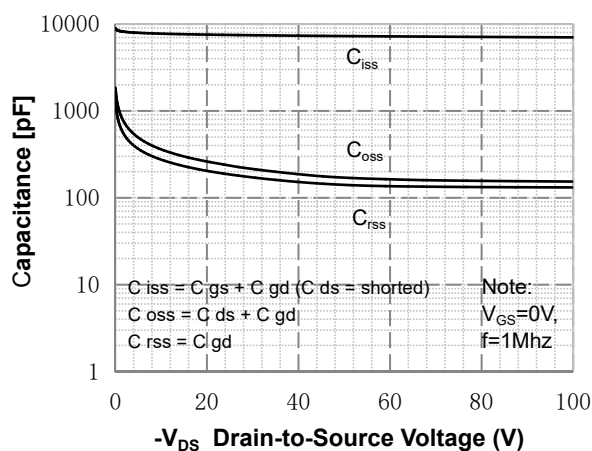


Figure 5. Capacitance Characteristics

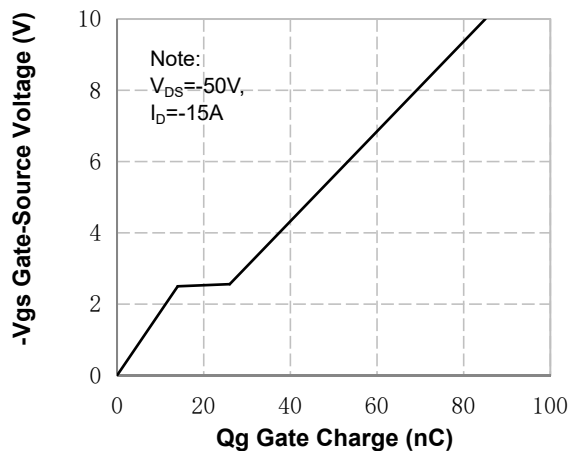


Figure 6. Gate Charge Characteristics

Typical Characteristics

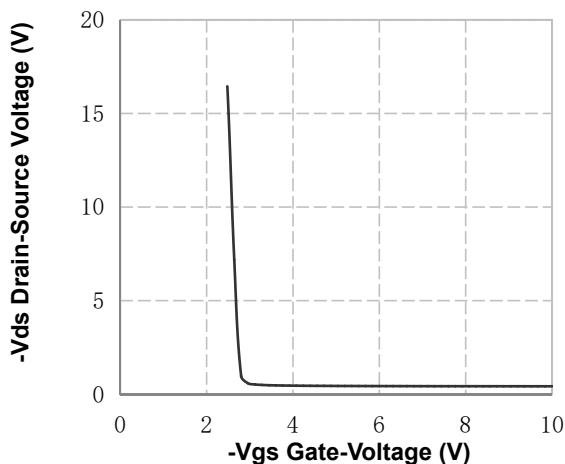


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

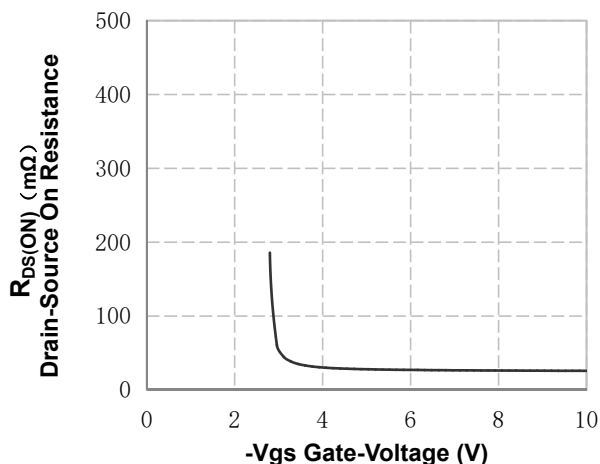


Figure 8. On-Resistance vs Gate Voltage

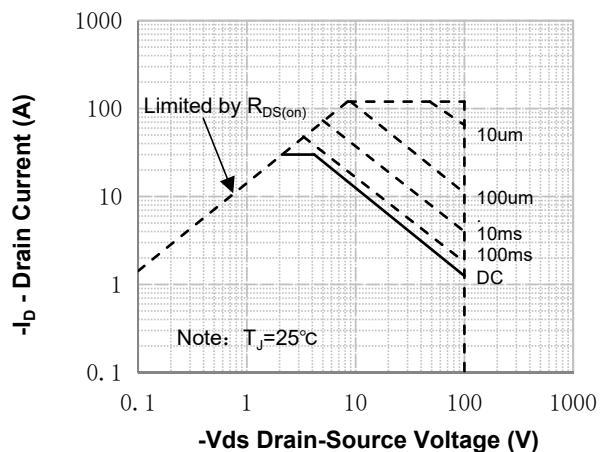


Figure 9. Maximum Safe Operating Area

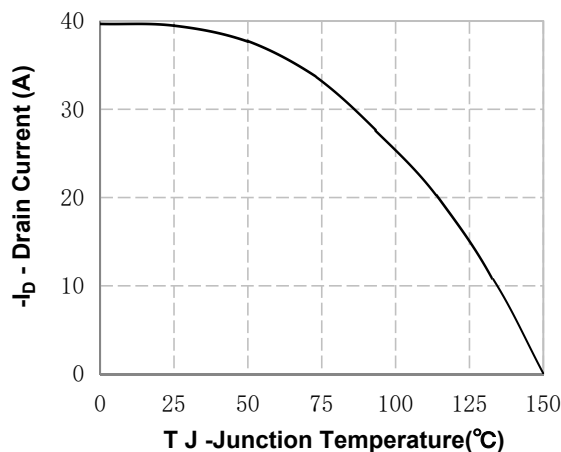


Figure 10. Maximum Continuous Drain Current vs Temperature

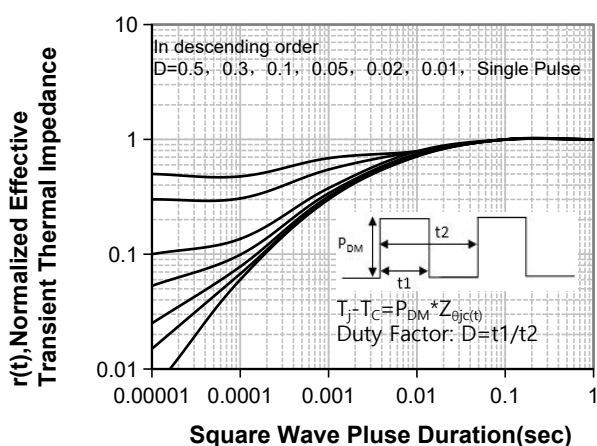
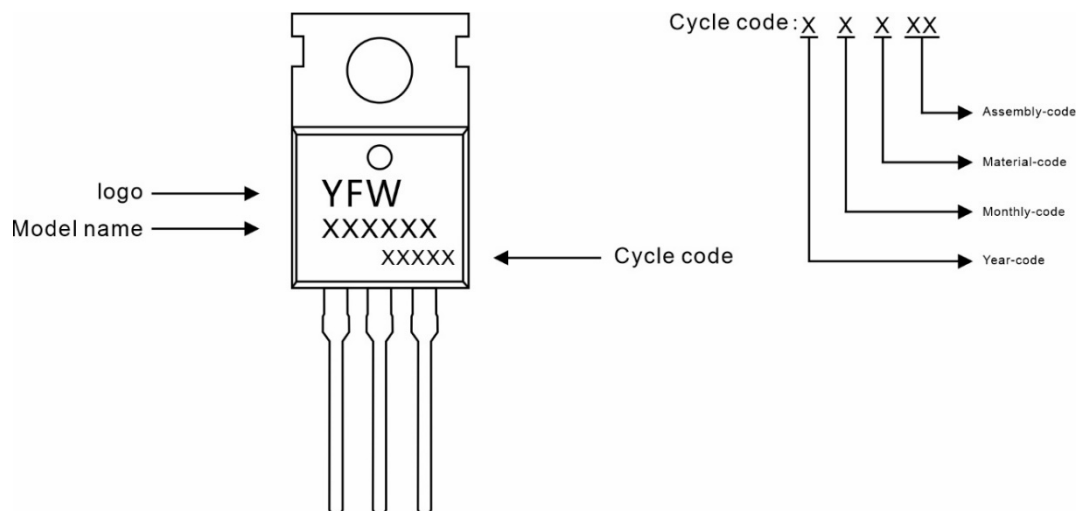


Figure 11. Transient Thermal Response Curve

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW40P10AC	TO-220C	0.07oz(1.96g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

Package Dimensions

TO-220C

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.34	4.67	0.171	0.184
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.30	0.50	0.012	0.020
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
E1	12.00	12.50	0.472	0.492
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	2.60	2.80	0.102	0.110
L	13.20	13.80	0.520	0.543
L1	3.80	4.20	0.150	0.165
Φ	3.60	3.96	0.142	0.156

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