YFW13P06AD

-60V P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	-13.5A
V_{DSS}	-60V
R_{DSON}-typ(@V_{GS}= -10V)	< 90mΩ**(Type:80 mΩ)**
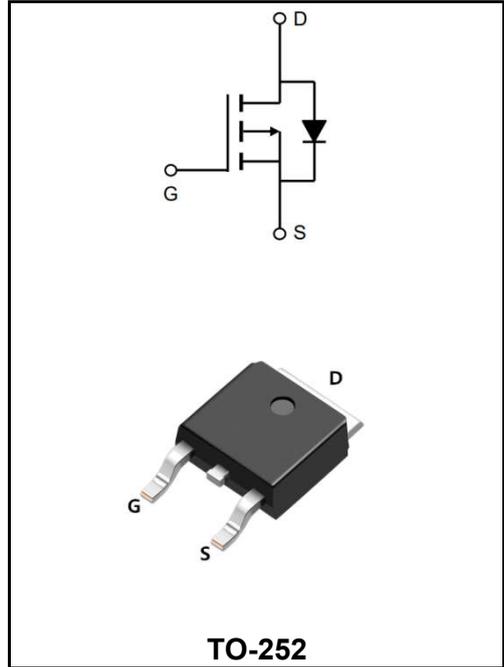
Application

♦Brushless motor

♦Load switch

♦Uninterruptible power supply

TO-252

Product Specification Classification

Part Number	Package	Marking	Pack
YFW13P06AD	TO-252	YFW 13P06AD XXXXX	2500PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-60	**V**
Gate - Source Voltage	V_{GS}	±20	**V**
Continuous Drain Current, V_{GS} @ -10V[1] @T_C=25℃	I_D	-13.5	**A**
Continuous Drain Current, V_{GS} @ -10V[1] @T_C=100℃	I_D	-8.3	**A**
Continuous Drain Current, V_{GS} @ -10V[1] @T_A=25℃	I_D	-3.3	**A**
Continuous Drain Current, V_{GS} @ -10V[1] @T_A=70℃	I_D	-2.7	**A**
Pulsed Drain Current [2]	I_{DM}	-26	**A**
Single Pulse Avalanche Energy[3]	E_{AS}	29.8	**mJ**
Avalanche Current	I_{AS}	-24.4	**A**
Total Power Dissipation[4] @T_C=25℃	P_D	31.3	**W**
Total Power Dissipation[4] @T_A=25℃	P_D	2	**W**
Storage Temperature Range	T_{STG}	-55 to +150	**°C**
Operating Junction Temperature Range	T_J	-55 to +150	**°C**
Thermal Resistance Junction-Ambient [1]	$R_{θJA}$	62	**°C/W**
Thermal Resistance Junction to Case[1]	$R_{θJC}$	4.0	**°C/W**

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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=-250uA	BV_{DSS}	-60	-	-	V
BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	$\triangle BV_{DSS/\triangle TJ}$	-	-0.03	-	V/°C
Static Drain-Source On-Resistance [2]	V_{GS}=-10V, I_D=-3A	$R_{DS(ON)}$	-	80	90	mΩ
	V_{GS}=-4.5V, I_D=-2A		-	100	115	
Gate -Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	$V_{GS(th)}$	-1.2	1.75	-2.5	V
Drain-Source Leakage Current	V_{DS}=-48V , V_{GS}=0V , T_J=25℃	I_{DSS}	-	-	-1	μA
	V_{DS}=-48V , 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=-3A	g_{fs}	-	8.5	-	S
Total Gate Charge(-4.5V)	V_{DD}=-48V V_{GS}=-4.5V I_D=-3A	Q_g	-	12.1	-	nC
Gate-Source Charge		Q_{gs}	-	2.2	-	
Gate-Drain Charge		Q_{gd}	-	6.3	-	
Turn-on delay time	V_{DD}=-15V V_{GS}=-10V I_D=-1A R_G=3.3	$t_{d(on)}$	-	9.2	-	ns
Rise Time		T_r	-	20.1	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	46.7	-	
Fall Time		t_f	-	9.4	-	
Input Capacitance	V_{DS}=-15V V_{GS}=0V f=1MHz	C_{iss}	-	1137	-	pF
Output Capacitance		C_{oss}	-	76	-	
Reverse Transfer Capacitance		C_{rss}	-	50	-	
Continuous Source Current[1.5]	V_G=V_D=0V , Force Current	I_S	-	-	-13	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	V_{SD}	-	-	-1.2	V

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 =-25V,V GS =-10V,L=0.1mH,IAS =-24A

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves
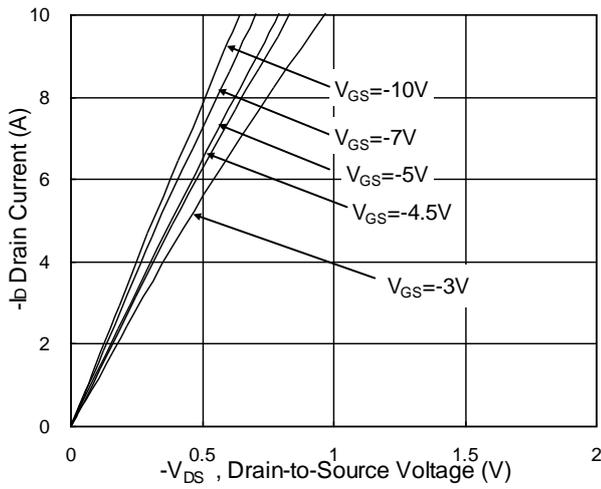
**Fig.1 Typical Output Characteristics**
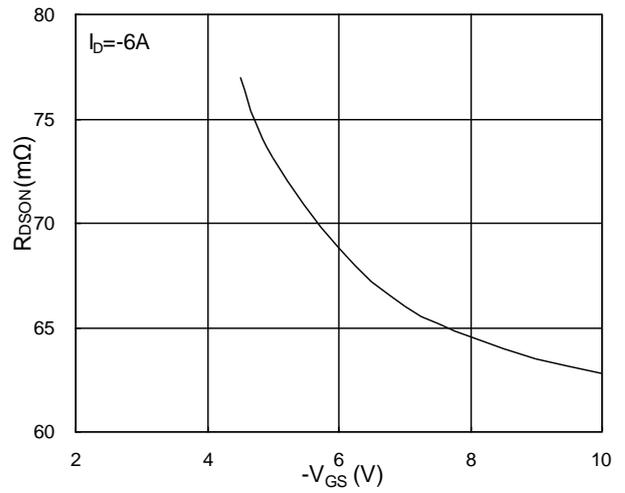

Fig.2 On-Resistance v.s Gate-Source
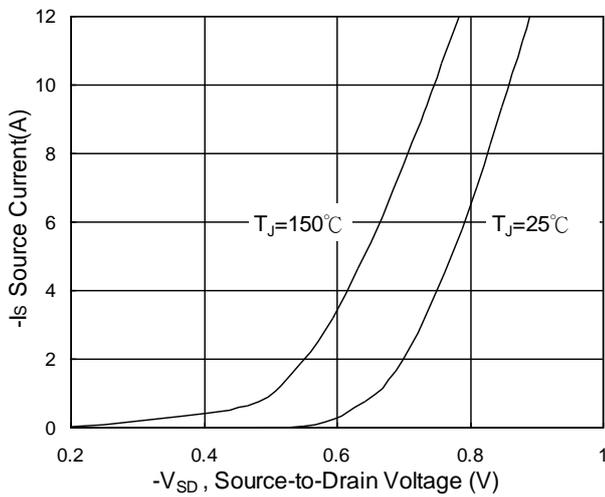
**Fig.3 Forward Characteristics of Reverse**
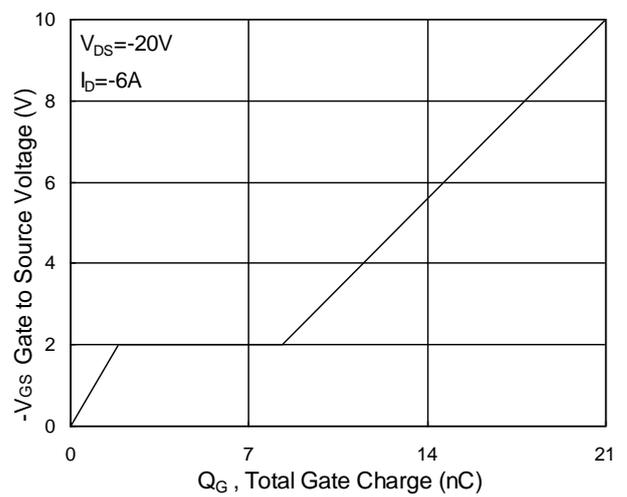
**Fig.4 Gate-Charge Characteristics**
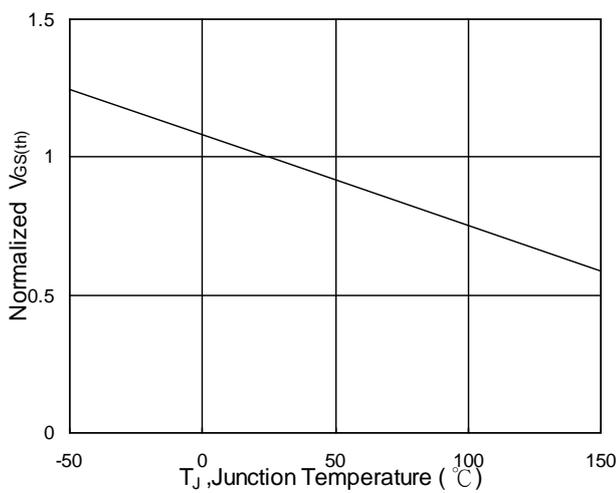
**Fig.5 Normalized V$_{GS(th)}$ v.s T$_J$**
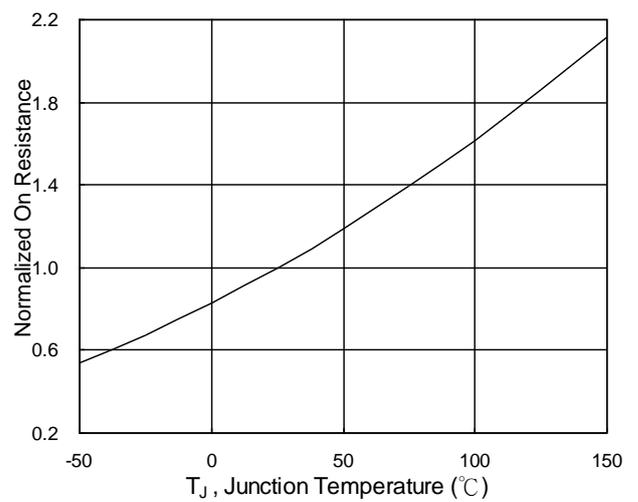
Fig.6 Normalized R$_{DSON}$ v.s T$_J$

Ratings and Characteristic Curves
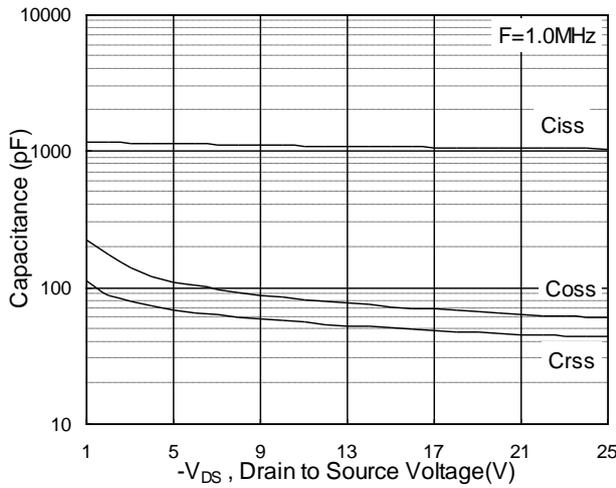
Fig.7 Capacitance
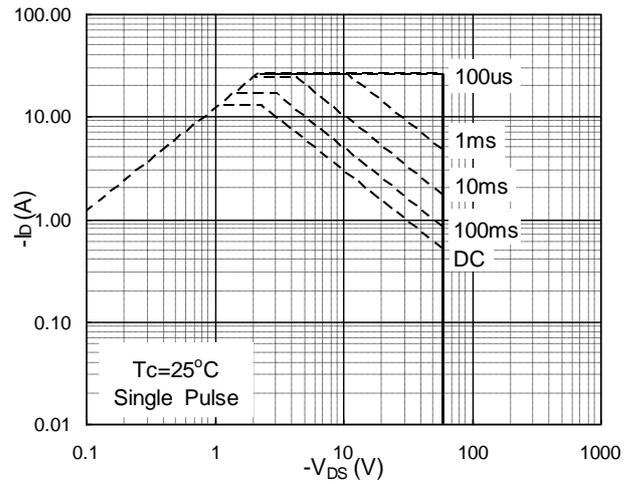
Fig.8 Safe Operating Area

$$D = T_{ON}/T$$

$$T_J peak = T_C + P_{DM} \times R_{\theta JC}$$
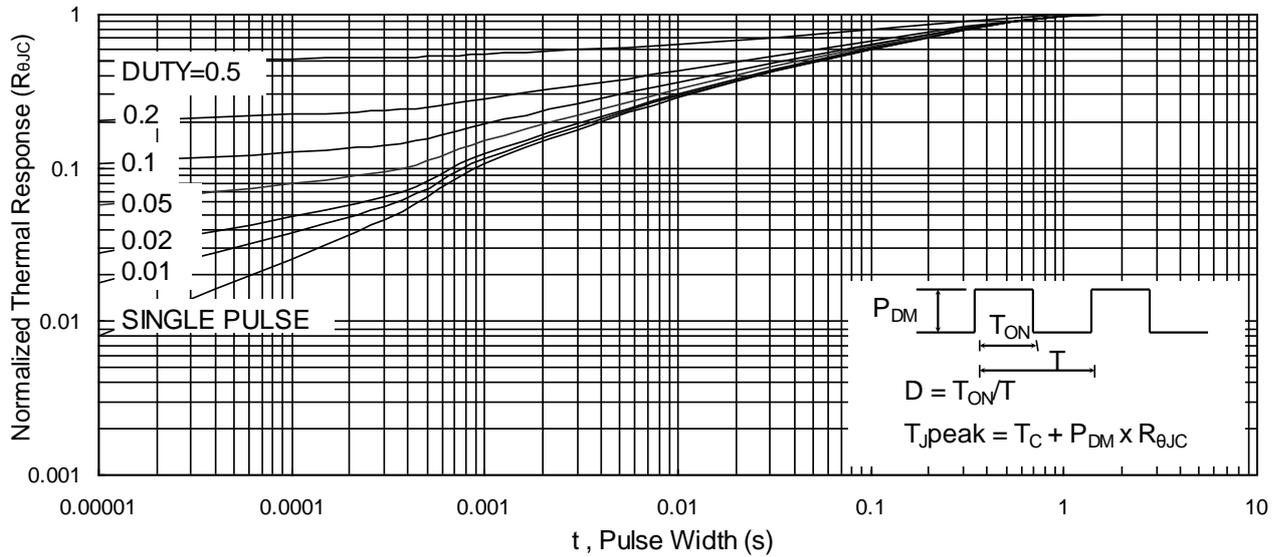
Fig.9 Normalized Maximum Transient Thermal Impedance
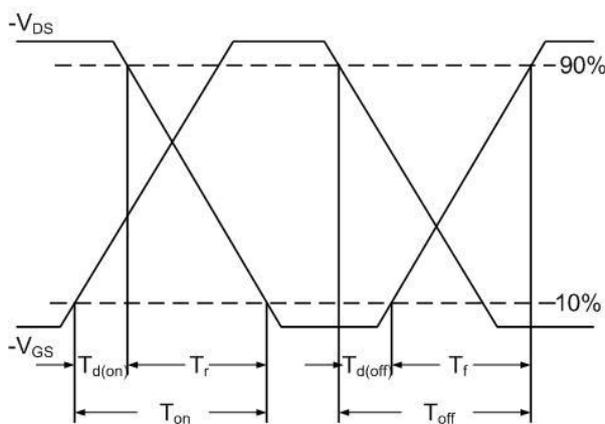
Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS}-(-V_{DD})}$$
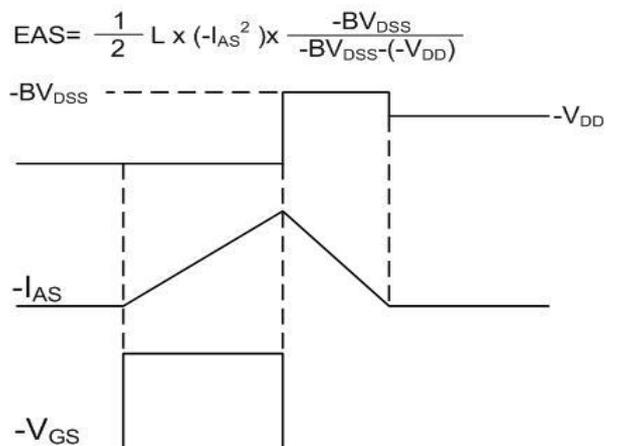
Fig.11 Unclamped Inductive Switching Waveform

Package Outline Dimensions Millimeters

TO-252

Dim.	Min.	Typ.	Max.
A	2.10	-	2.50
A2	0	-	0.10
B	0.66	-	0.86
B2	5.18	-	5.48
C	0.40	-	0.60
C2	0.44	-	0.58
D	5.90	-	6.30
D1	5.30REF		
E	6.40	-	6.80
E1	4.63	-	-
G	4.47	-	4.67
H	9.50	-	10.70
L	1.09	-	1.21
L2	1.35	-	1.65
V1	-	7°	-
V2	0°	-	6°

All Dimensions in millimeter