

-20V P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

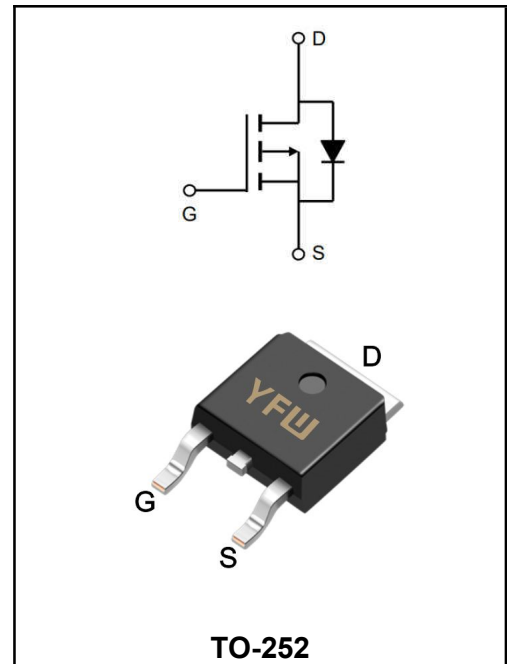
I_D	-60A
V_{DS}	-20V
$R_{DS(on)-typ}(@V_{GS}=-4.5V)$	$< 8.5m\Omega$ (Typ: 6.6mΩ)
$R_{DS(on)-typ}(@V_{GS}=-2.5V)$	$< 13m\Omega$ (Typ: 8.0mΩ)

DESCRIPTION

The YFW60P02AD uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -2.5V. This device is suitable for use as a Battery protection or in other Switching application.

Application

- ◆ 3.3V MCU Drive
- ◆ Load switch
- ◆ Uninterruptible power supply



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

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate - Source Voltage	V_{GS}	± 12	V
Continuous Drain Current, $V_{GS} @ -4.5V @ T_A=25^\circ\text{C}$	I_D	-60	A
Continuous Drain Current, $V_{GS} @ -4.5V @ T_A=70^\circ\text{C}$	I_D	-40	A
Pulsed Drain Current ¹	I_{DM}	-210	A
Single Pulsed Avalanche Energy ²	E_{AS}	147.6	mJ
Total Power Dissipation @ $T_A=25^\circ\text{C}$	P_D	78	W
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.6	$^\circ\text{C/W}$
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ\text{C}$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-20	-24	-	V
Zero Gate Voltage Drain Current	$V_{DS}= -20V, V_{GS}=0V,$	I_{DSS}	-	-	- 1.0	μA
Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	I_{GSS}	-	-	± 100	nA
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(th)}$	- 0.5	- 1.0	- 1.5	V
Static Drain-Source on-Resistance ³	$V_{GS}= - 4.5V, I_D=-20A$	$R_{DS(ON)}$	-	6.6	8.5	m Ω
	$V_{GS}= - 2.5V, I_D=-10A$		-	8.0	13	
Input Capacitance	$V_{DS}= -10V$ $V_{GS}=0V$ $f=1.0MHz$	C_{iss}	-	1458	-	pF
Output Capacitance		C_{oss}	-	238	-	
Reverse Transfer Capacitance		C_{rss}	-	212	-	
Total Gate Charge	$V_{DS}= -10V,$ $I_D=-25A,$ $V_{GS}=-4.5V$	Q_g	-	19	-	nC
Gate-Source Charge		Q_{gs}	-	3	-	
Gate-Drain(“Miller”) Charge		Q_{gd}	-	6.4	-	
Turn-on Delay Time	$V_{DS}= -10V$ $I_D= -10A$ $R_{GEN}=3\Omega$ $V_{GS}= - 4.5V$	$t_{d(on)}$	-	10	-	ns
Turn-on Rise Time		T_r	-	21	-	
Turn-off Delay Time		$t_{d(OFF)}$	-	39	-	
Turn-off Fall Time		t_f	-	19	-	
Maximum Continuous Drain to Source Diode Forward Current		I_S	-	-	- 60	A
Maximum Pulsed Drain to Source Diode Forward Current		I_{SM}	-	-	- 210	A
Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S= -30A$	V_{SD}	-	-	- 1.2	V
Body Diode Reverse Recovery Time	$IF= -20A, dI/dt=100A/\mu s$	t_{rr}	-	25	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}	-	20	-	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The test condition is $T_J=25^{\circ}\text{C}$, $V_{DD}=10V$, $V_G=4.5V$, $L=0.5mH$, $R_G=25\Omega$, $I_{AS}=12A$
- 4.The power dissipation is limited by 150°C 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.

Typical Characteristics

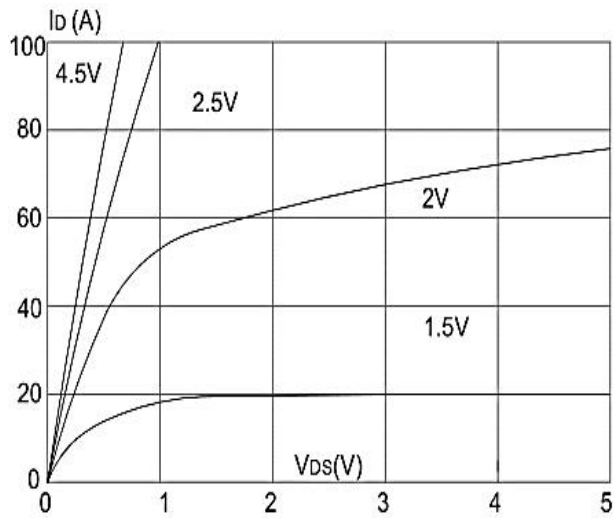


Figure1: Output Characteristics

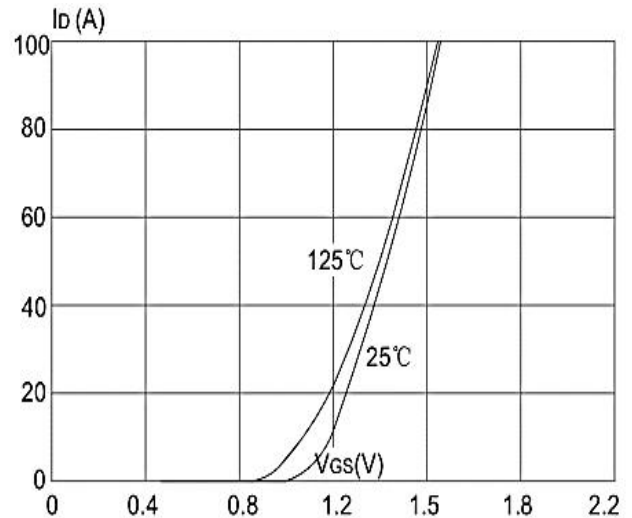


Figure 2: Typical Transfer Characteristics

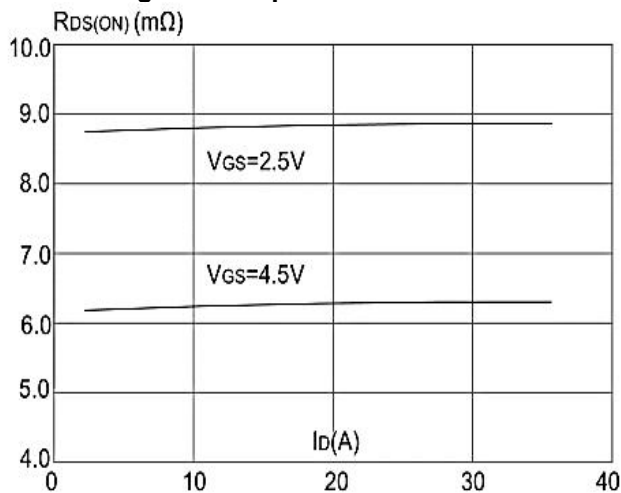


Figure 3: On-resistance vs. Drain Current

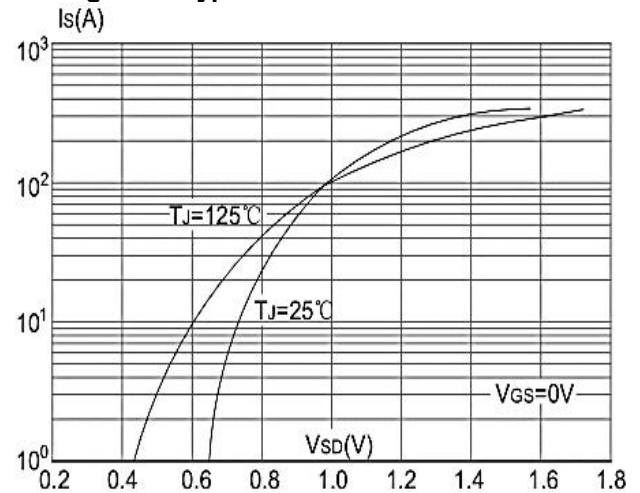


Figure 4: Body Diode Characteristics

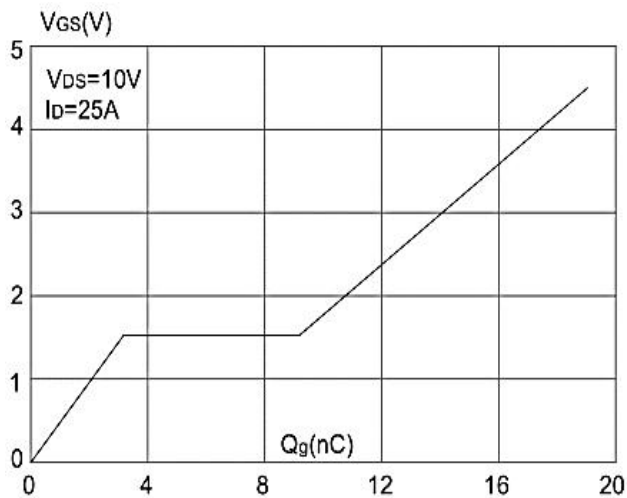


Figure 5: Gate Charge Characteristics

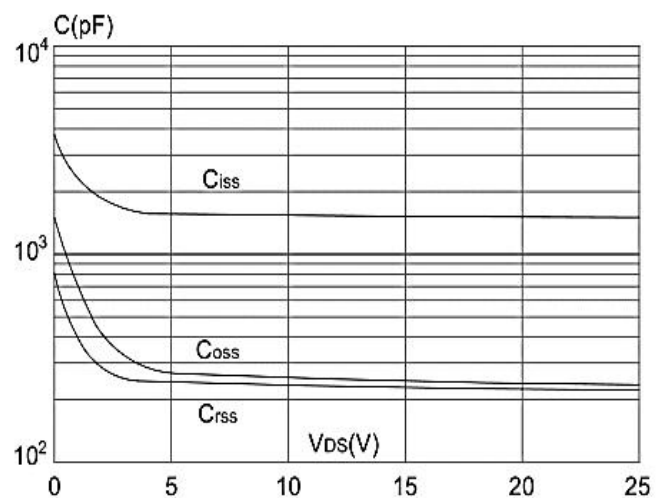


Figure 6: Capacitance Characteristics

Typical Characteristics

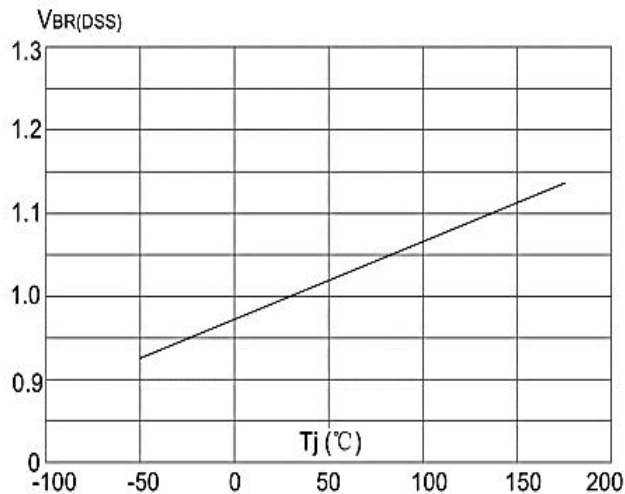


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

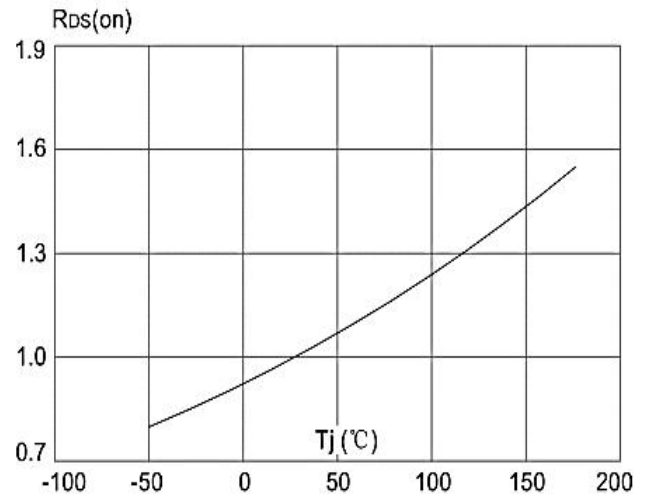


Figure 8: Normalized on Resistance vs. Junction Temperature

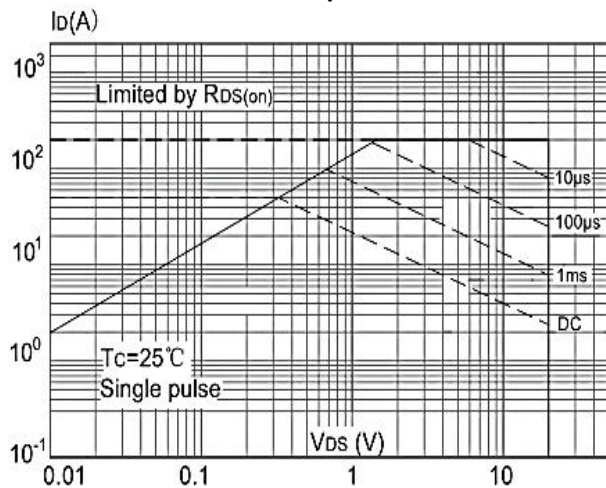


Figure 9: Maximum Safe Operating Area vs. Case Temperature

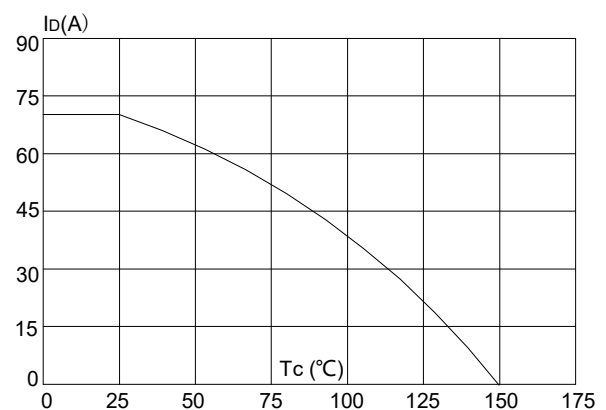


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

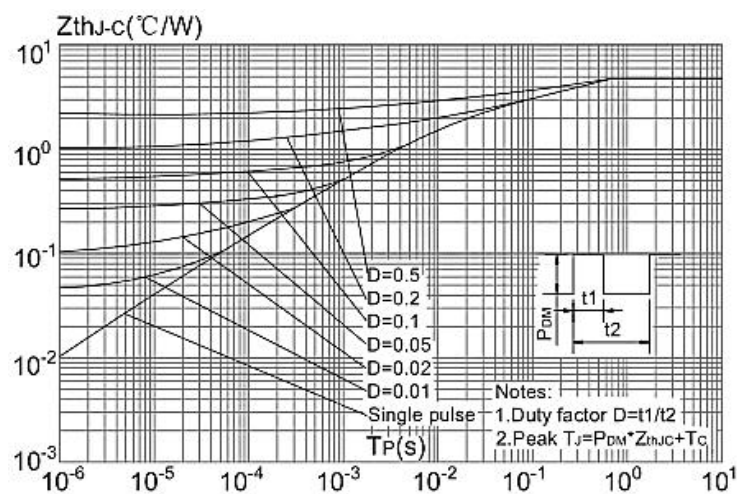
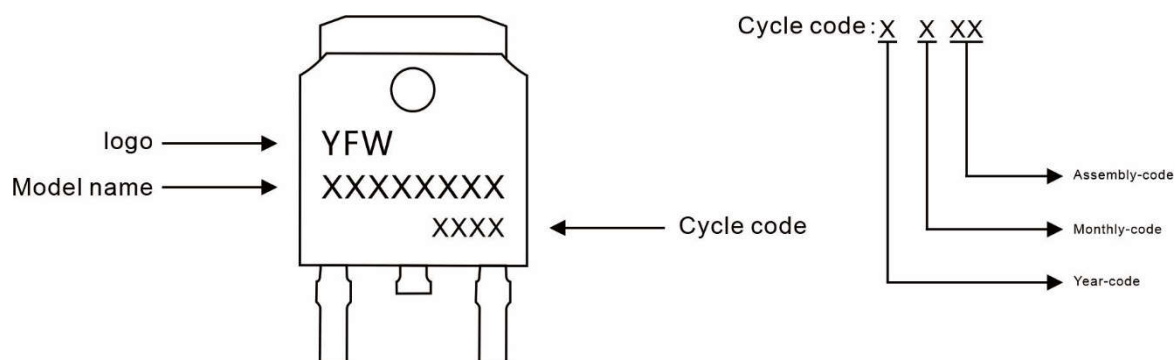


Figure.11: Maximum Effective Transient Thermal Impedance Junction-to-Case

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW60P02AD	TO-252	0.011oz(0.32g)	2500pcs/reel	5000pcs/box 25000pcs/Carton

Package Dimensions

TO-252

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.50	0.087	0.098
A1	0.00	0.12	0.000	0.005
A2	2.20	2.40	0.087	0.094
B	1.20	1.60	0.047	0.063
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
c1	0.40	0.60	0.016	0.024
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.213
E	5.40	5.70	0.213	0.224
e	2.20	2.40	0.087	0.094
e1	4.40	4.80	0.173	0.189
L	10.00	11.00	0.393	0.433
L1	2.70	3.10	0.106	0.122
L2	1.40	1.80	0.055	0.071
L3	0.90	1.50	0.035	0.059

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