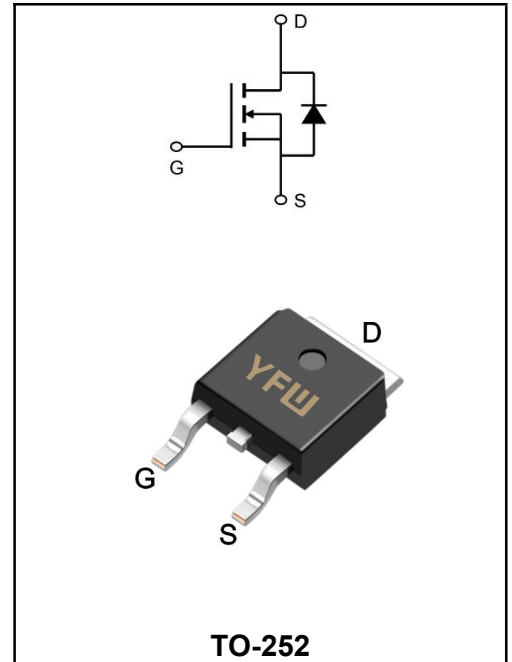


**20V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	90A
<b>V<sub>DSS</sub></b>	20V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=4.5V)</sub></b>	< 3.5mΩ ( <b>Type:2.8 mΩ</b> )



**Application**

- ◆ Battery protection
- ◆ Load switch
- ◆ Uninterruptible power supply

**Maximum Ratings at T<sub>c</sub>=25°C unless otherwise specified**

Characteristics	Symbols	Value	Units
Drain-Source Voltage	<b>V<sub>DS</sub></b>	20	<b>V</b>
Gate - Source Voltage	<b>V<sub>GS</sub></b>	±12	<b>V</b>
Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> @T <sub>c</sub> =25°C	<b>I<sub>D</sub></b>	90	<b>A</b>
Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> @T <sub>c</sub> =100°C	<b>I<sub>D</sub></b>	59	<b>A</b>
Pulsed Drain Current <sup>note1</sup>	<b>I<sub>DM</sub></b>	360	<b>A</b>
Single Pulse Avalanche Energy <sup>note2</sup>	<b>E<sub>AS</sub></b>	110	<b>mJ</b>
Power Dissipation	<b>P<sub>D</sub></b>	81	<b>W</b>
Thermal Resistance Junction to Case	<b>R<sub>θJC</sub></b>	1.85	<b>°C/W</b>
Operating and Storage Temperature Range	<b>T<sub>J</sub> , T<sub>STG</sub></b>	-55 to +175	<b>°C</b>

**Maximum Ratings at Tc=25°C unless otherwise specified**

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	<b>V(BR)DSS</b>	20	22	-	<b>V</b>
Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$	<b>I<sub>DSS</sub></b>	-	-	1	<b>μA</b>
Gate - Body Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	<b>I<sub>GSS</sub></b>	-	-	±100	<b>nA</b>
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	<b>V<sub>GS(th)</sub></b>	0.5	0.68	1.0	<b>V</b>
Static Drain-Source on-Resistance note3	$V_{GS}=4.5V, I_D=30A$	<b>R<sub>DS(ON)</sub></b>	-	2.8	3.5	<b>mΩ</b>
	$V_{GS}=2.5V, I_D=20A$		-	4	6	
Input Capacitance	$V_{DS}=10V$ $V_{GS}=0V$ $f=1.0MHz$	<b>C<sub>iss</sub></b>	-	3200	-	<b>μF</b>
Output Capacitance		<b>C<sub>oss</sub></b>	-	460	-	
Reverse Transfer Capacitance		<b>C<sub>rss</sub></b>	-	445	-	
Total Gate Charge	$V_{DS}=10V$ $I_D=30A$ $V_{GS}=4.5V$	<b>Q<sub>g</sub></b>	-	48	-	<b>nC</b>
Gate-Source Charge		<b>Q<sub>gs</sub></b>	-	3.6	-	
Gate-Drain("Miller") Charge		<b>Q<sub>gd</sub></b>	-	19	-	
Turn-on delay time	$V_{DS}=10V$ $I_D=30A$ $R_{GEN}=1.8\Omega$ $V_{GS}=4.5V$	<b>t<sub>D(on)</sub></b>	-	9.7	-	<b>ns</b>
Turn-on Rise Time		<b>T<sub>r</sub></b>	-	37	-	
Turn-Off Delay Time		<b>t<sub>d(OFF)</sub></b>	-	63	-	
Turn- Off Fall Time		<b>t<sub>f</sub></b>	-	52	-	
Maximum Continuous Drain to Source Diode Forward Current		<b>I<sub>S</sub></b>	-	-	90	<b>A</b>
Maximum Pulsed Drain to Source Diode Forward Current		<b>I<sub>SM</sub></b>	-	-	360	<b>A</b>
Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_{SD}=30A, T_J=25^\circ C$	<b>V<sub>SD</sub></b>	-	-	1.2	<b>V</b>
Reverse Recovery Time	$T_J=25^\circ C, I_F=30A, di/dt=100A/\mu s$	<b>t<sub>rr</sub></b>	-	23	-	<b>ns</b>
Reverse Recovery Charge		<b>Q<sub>rr</sub></b>	-	10	-	<b>nC</b>

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 .The EAS data shows Max. rating .
- 3、 The EAS condition:  $T_J=25^\circ C, V_{DD}=15V, V_G=4.5V, R_G=25\Omega, L=0.5mH, I_{AS}=21A$
- 4、 The power dissipation is limited by 175°C junction temperature
- 5、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

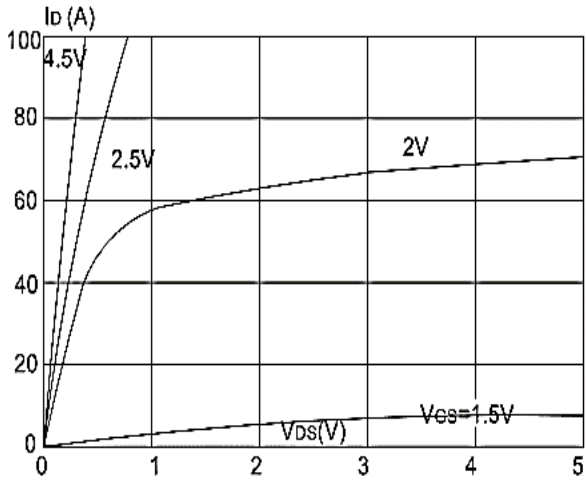


Figure 1: Output Characteristics

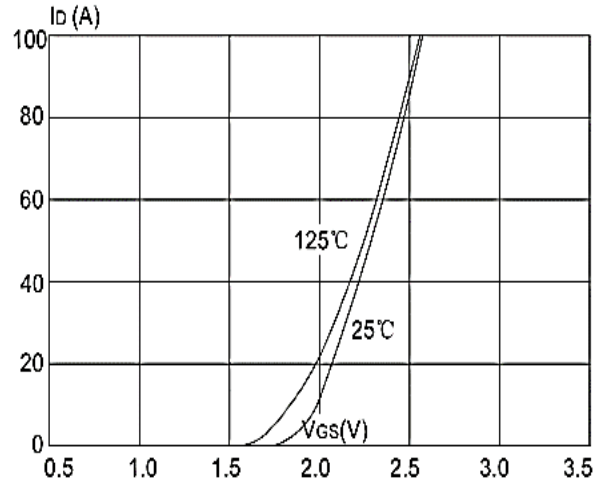


Figure 2: Typical Transfer Characteristics

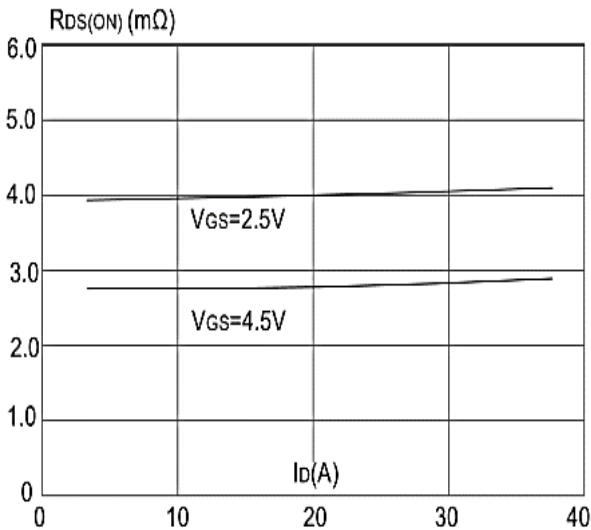


Figure 3: On-resistance vs. Drain Current

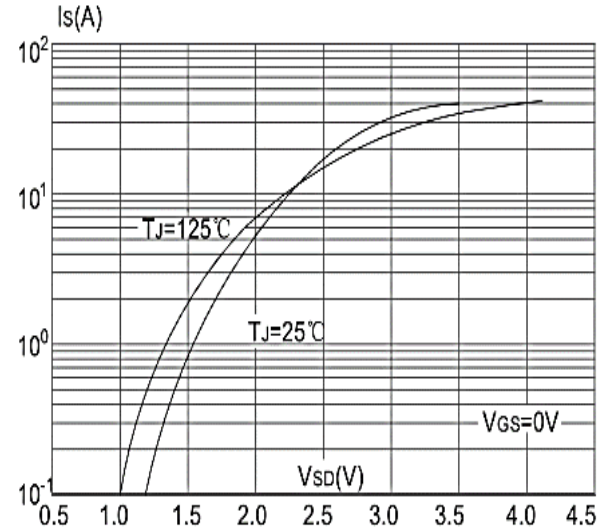
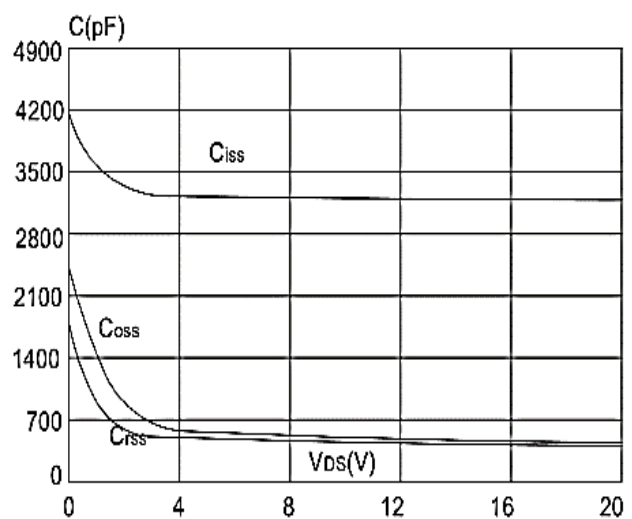
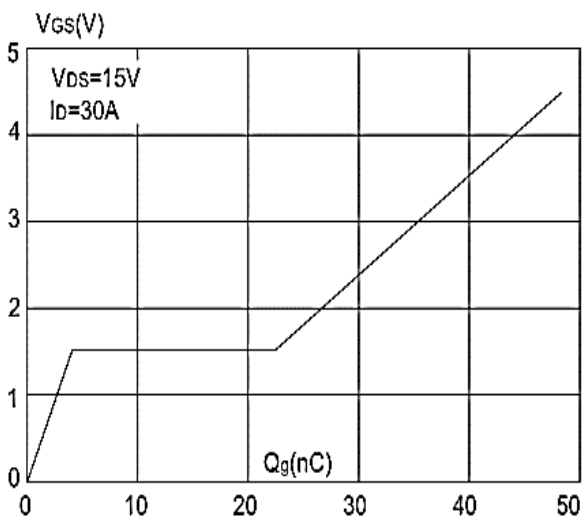
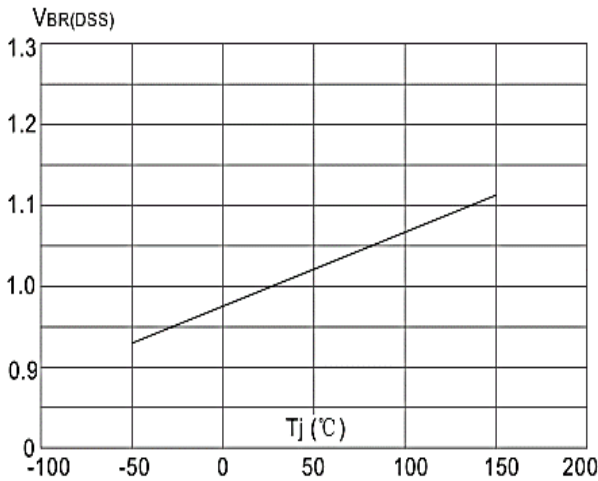


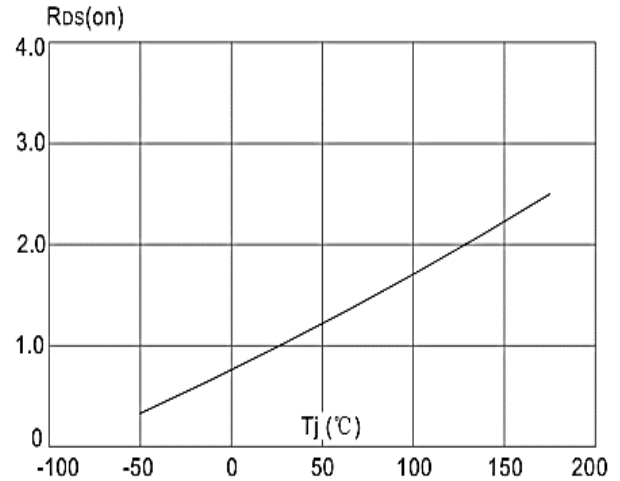
Figure 4: Body Diode Characteristics



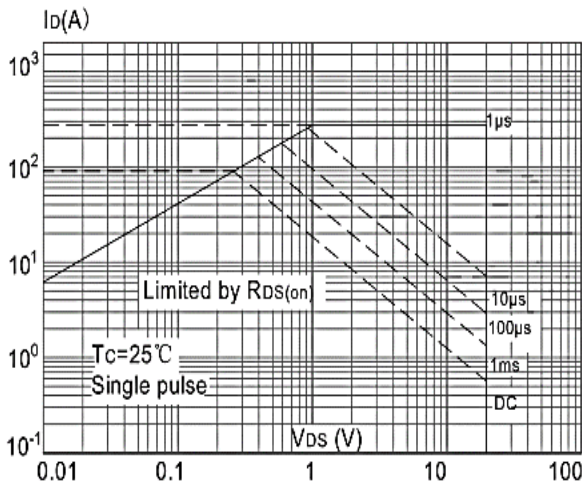
**Ratings and Characteristic Curves**



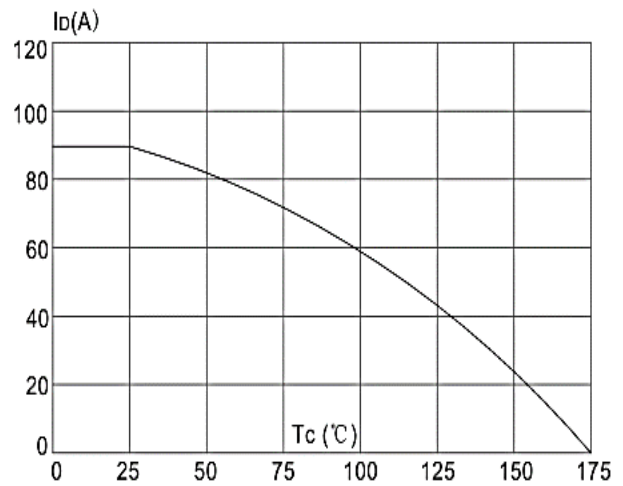
**Figure 7: Normalized Breakdown Voltage vs Junction Temperature**



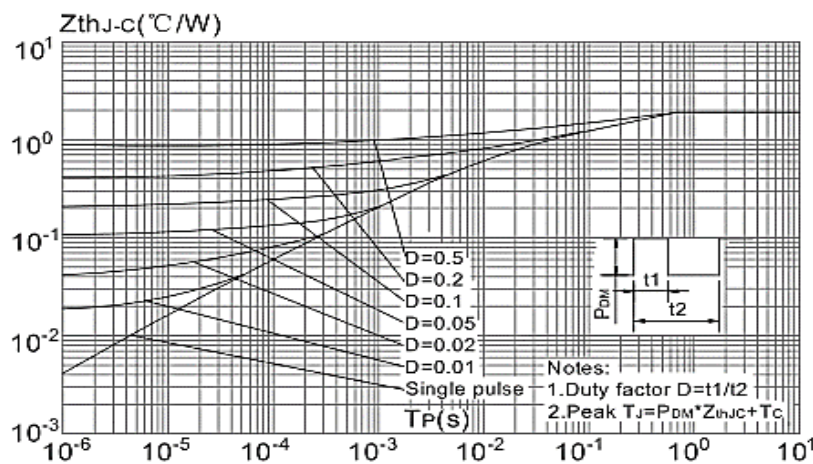
**Figure 8: Normalized on Resistance vs. Junction Temperature**



**Figure 9: Maximum Safe Operating Area**

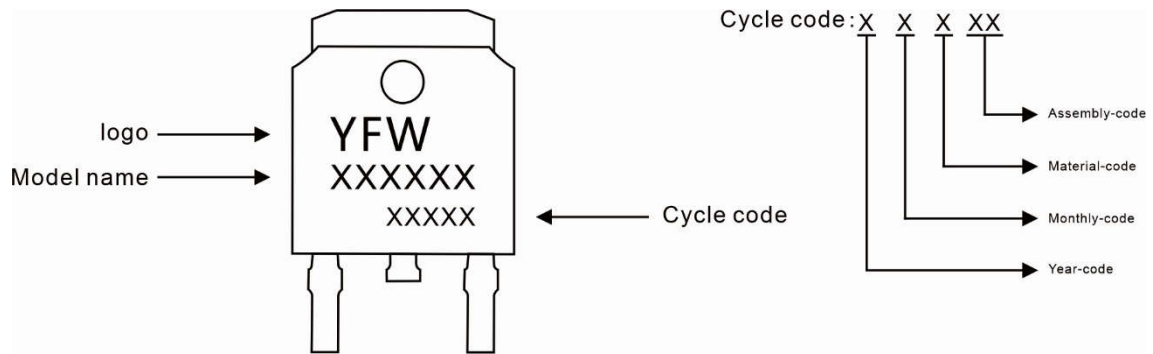


**Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature**



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

**Marking Diagram**



**Ordering information**

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW90N02AD	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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