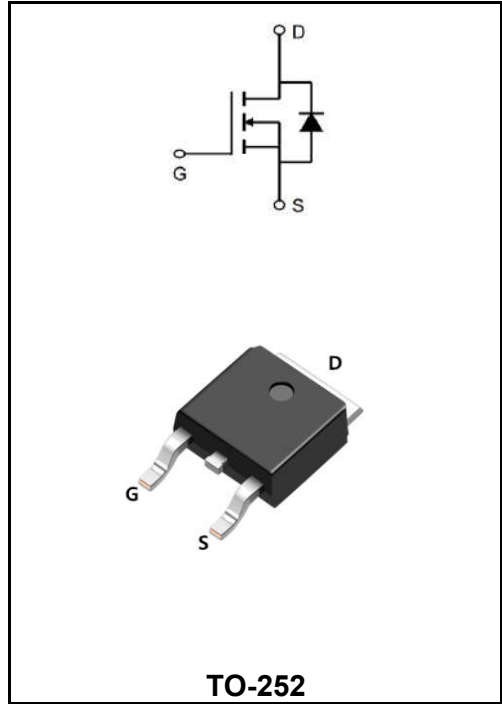


20V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	48A
V_{DSS}	20V
R_{DS(on)-typ(@V_{GS}=4.5V)}	< 8.5mΩ (Type:6.2 mΩ)



Application

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

Product Specification Classification

Part Number	Package	Marking	Pack
YFW40N02AD	TO-252	YFW 40N02AD XXXXX	2500PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

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°C	I_D	48	A
Continuous Drain Current, V _{GS} @ 4.5V @T _A =70°C	I_D	30	A
Pulsed Drain Current ^{note1}	I_{DM}	120	A
Single Pulse Avalanche Energy ^{note2}	E_{AS}	147.6	mJ
Power Dissipation @T _A =25°C	P_D	37	W
Operating Junction Temperature Range	T_J , T_{STG}	-55 to + 175	°C
Thermal Resistance Junction-Ambient ¹	R_{θJA}	62	°C/W
Thermal Resistance Junction-Case ¹	R_{θJC}	4	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	V(BR)DSS	20	24	-	V
Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$	I_{DSS}	-	-	1	μA
Gate - Body Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	I_{GSS}	-	-	±100	nA
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	V_{GS(th)}	0.4	0.7	1.1	V
Static Drain-Source on-Resistance note3	$V_{GS}=4.5V, I_D=25A$	R_{DS(ON)}	-	6.2	8.5	mΩ
	$V_{GS}=2.5V, I_D=10A$		-	8.8	13	
Input Capacitance	$V_{DS}=10V$ $V_{GS}=0V$ $f=1.0MHz$	C_{iss}	-	1458	-	μF
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	-	-	50	A
Maximum Pulsed Drain to Source Diode Forward Current		I_{SM}	-	-	200	A
Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	V_{SD}	-	-	1.2	V
Body Diode Reverse Recovery Time	$I_F=20A, di/dt=100A/\mu s$	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 $\cong 300\mu s$, duty cycle $\cong 2\%$
- 3、 The test condition is $T_J=25^\circ C$, $V_{DD}=10V$, $V_G=4.5V$, $L=0.5mH$, $R_G=25\Omega$, $I_{AS}=12A$
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

Typical Characteristics

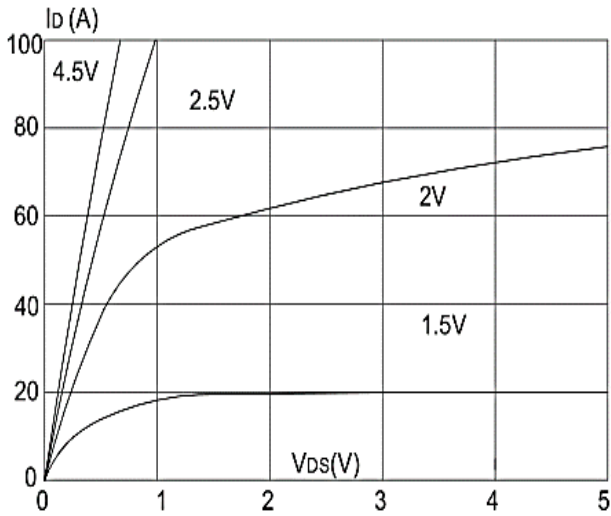


Figure 1: Output Characteristics

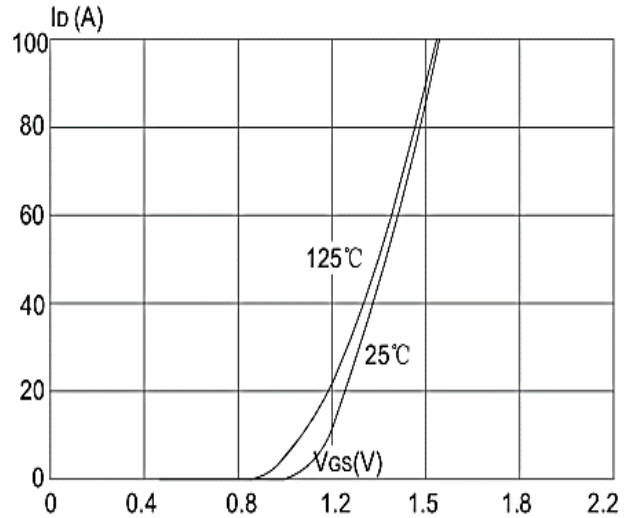


Figure 2: Typical Transfer Characteristics

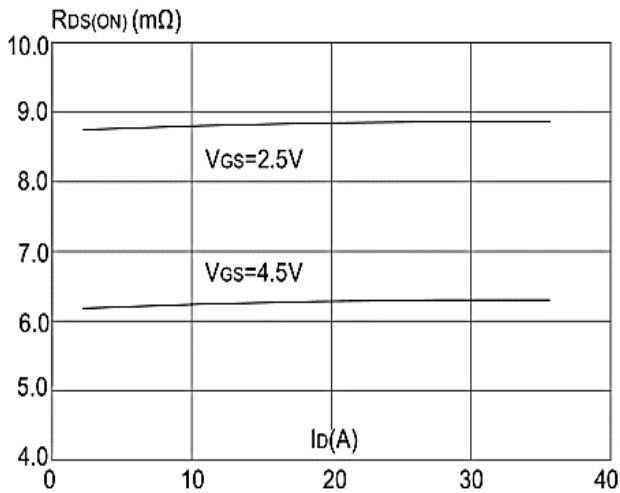


Figure 3: On-resistance vs. Drain Current

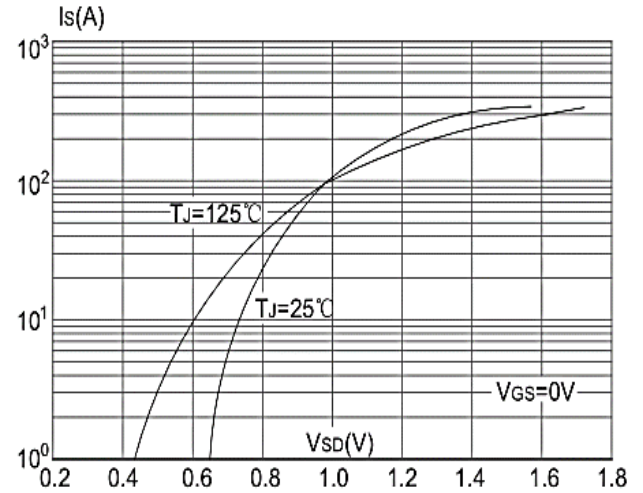


Figure 4: Body Diode Characteristics

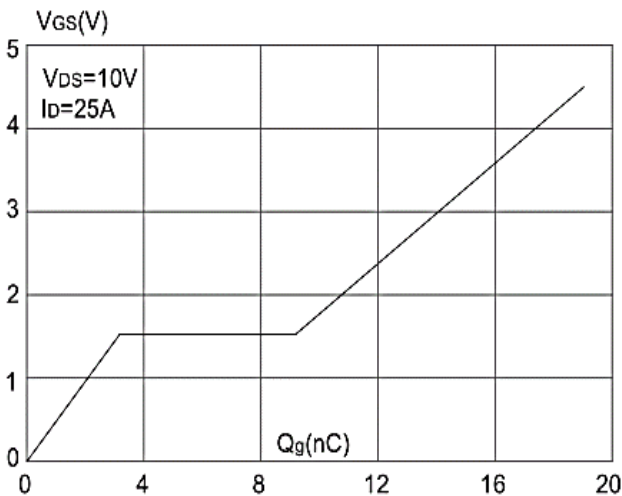


Figure 5: Gate Charge Characteristics

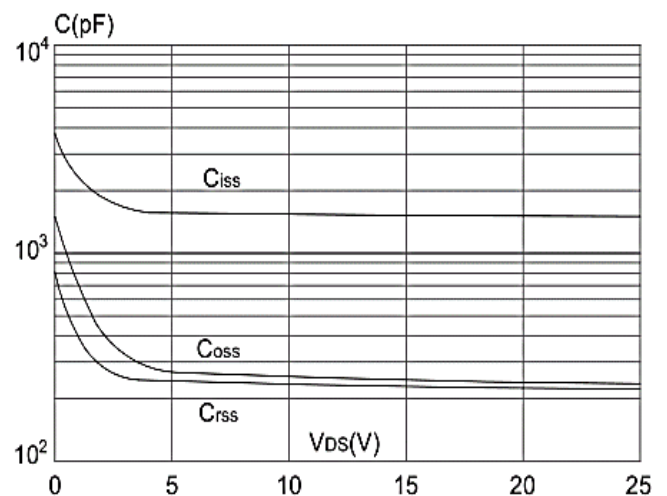


Figure 6: Capacitance Characteristics

Ratings and Characteristic Curves

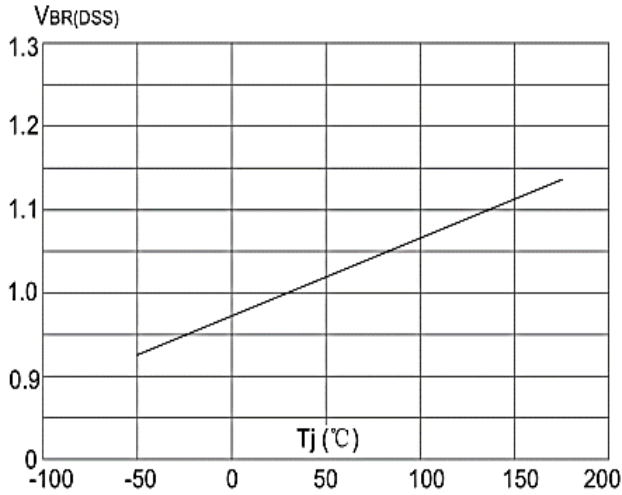


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

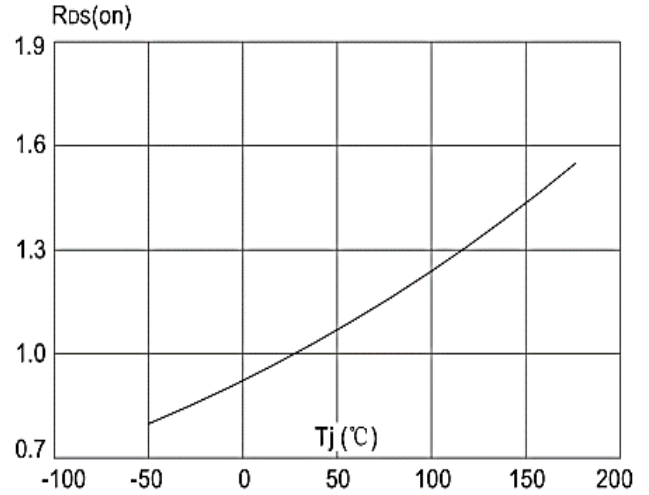


Figure 8: Normalized on Resistance vs. Junction Temperature

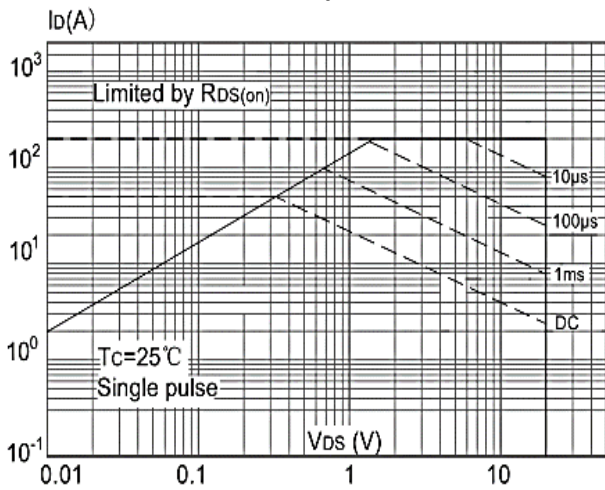


Figure 9: Maximum Safe Operating Area vs. Case Temperature

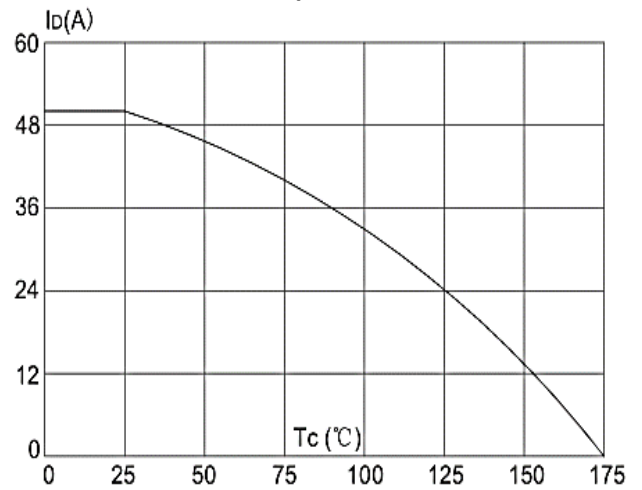


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

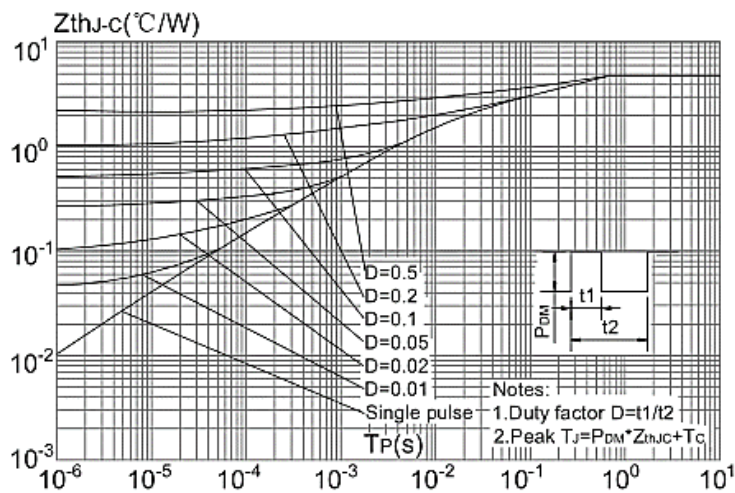


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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			

