

**85V N-Channel Enhancement Mode MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	120A
<b>V<sub>DSS</sub></b>	85V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	<5.0mΩ( <b>Type:4.5 mΩ</b> )

**Features**

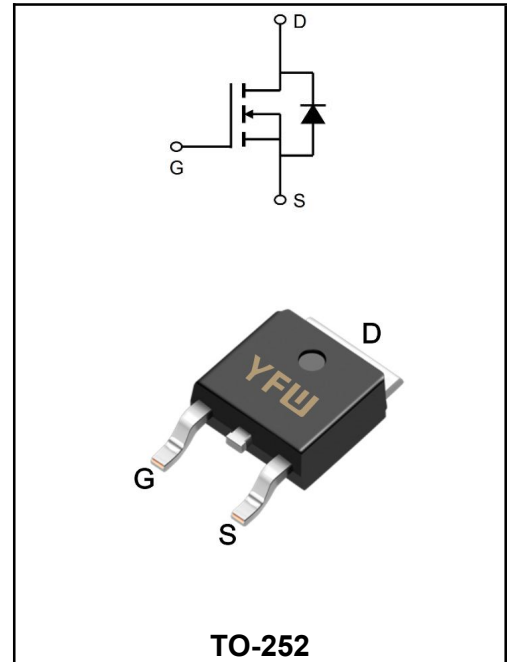
- ◆ **YFW-SGT technology**
- ◆ Ultra-low RDS(ON)
- ◆ Low Gate Charge
- ◆ 100% UIS Tested, 100% RgTested
- ◆ Pb-free Lead Plating
- ◆ Halogen-free and RoHS-compliant

**APPLICATIONS**

- ◆ Motor Driving in Power Tool, E-vehicle, Robotics
- ◆ Current Switching in DC/DC & AC/DC (SR) Sub-system
- ◆ Power Management in Telecom., Industrial Automation, CE

**Application**

- ◆ Case: Molded plastic
- ◆ Mounting Position: Any
- ◆ Molded Plastic: UL Flammability Classification Rating 94V-0
- ◆ Lead free in compliance with EU RoHS 2011/65/EU directive
- ◆ Solder bath temperature 275°C maximum, 10s per JESD 22-B106



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

Characteristics	Symbols	Value	Units
Drain-Source Voltage	<b>V<sub>DS</sub></b>	85	<b>V</b>
Gate - Source Voltage	<b>V<sub>GS</sub></b>	±20	<b>V</b>
Continuous drain current	<b>I<sub>D</sub></b>	120	<b>A</b>
Pulsed drain current(Note1)	<b>I<sub>DM</sub></b>	465	<b>A</b>
Power dissipation	<b>P<sub>D</sub></b>	208	<b>W</b>
Single Pulse Avalanche Energy(Note1)	<b>E<sub>AS</sub></b>	338	<b>mJ</b>
Operation and storage temperature	<b>T<sub>STG</sub>, T<sub>J</sub></b>	-55 to +150	<b>°C</b>
Thermal Resistance, Junction-case	<b>R<sub>θJC</sub></b>	0.6	<b>°C/W</b>
Thermal Resistance, Junction-ambient <sup>(4)</sup>	<b>R<sub>θJA</sub></b>	45	<b>°C/W</b>

Note1: Pulse test: 300 μs pulse width, 2 % duty cycle

**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><math>BV_{DSS}</math></b>	85	-	-	<b>V</b>
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	<b><math>V_{GS(th)}</math></b>	2	-	4	<b>V</b>
Drain-source on-state resistance	$V_{GS}=10V, I_D=20A$	<b><math>R_{DS(ON)}</math></b>	-	4.5	5.0	<b>mΩ</b>
Gate-Source Leakage Current	$V_{GS} = \pm 20 V, V_{DS} = 0 V$	<b><math>I_{GSS}</math></b>	-	-	$\pm 100$	<b>nA</b>
Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V$	<b><math>I_{DSS}</math></b>	-	-	1	<b>μA</b>
Forward Transconductance	$V_{DS} = 5 V, I_D = 20 A$	<b><math>g_{fs}</math></b>	-	31	-	<b>S</b>
Gate Resistance	$V_{GS} = 0V, V_{DS} = 0V, f = 1MH$	<b><math>R_G</math></b>	-	1.9	-	<b>mΩ</b>
Input Capacitance	$V_{DS}=40V, V_{GS}=0V, f=1MHz$	<b><math>C_{iss}</math></b>	-	3365	-	<b>pF</b>
Output Capacitance		<b><math>C_{oss}</math></b>	-	1264	-	
Reverse Transfer Capacitance		<b><math>C_{rss}</math></b>	-	46	-	
Turn-on delay time	$V_{GS} = 10V, V_{DS} = 40V$ $RL = 2.0\Omega, R_{GEN} = 3\Omega$	<b><math>t_{d(on)}</math></b>	-	17.6	-	<b>ns</b>
Rise Time		<b><math>T_r</math></b>	-	27	-	
Turn-Off Delay Time		<b><math>t_{d(OFF)}</math></b>	-	31	-	
Fall Time		<b><math>t_f</math></b>	-	10.8	-	
Total Gate Charge	$V_{DS}=40V$ $V_{GS}=10V, I_D=20A$	<b><math>Q_g</math></b>	-	56	-	<b>nC</b>
Gate-Source Charge		<b><math>Q_{gs}</math></b>	-	18.3	-	
Gate-Drain Charge		<b><math>Q_{gd}</math></b>	-	15	-	
Maximun Body-Diode Continuous Current		<b><math>I_S</math></b>	-	-	120	<b>A</b>
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	<b><math>V_{SD}</math></b>	-	0.7	1.0	<b>V</b>
Reverse Recovery Time	$T_J = 25^\circ C, I_F= 20A$ $di / dt = 100 A/\mu s$	<b><math>t_{rr}</math></b>	-	58	-	<b>ns</b>
Reverse Recovery Charge		<b><math>Q_{rr}</math></b>	-	95	-	<b>nC</b>

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

Ratings and Characteristic Curves

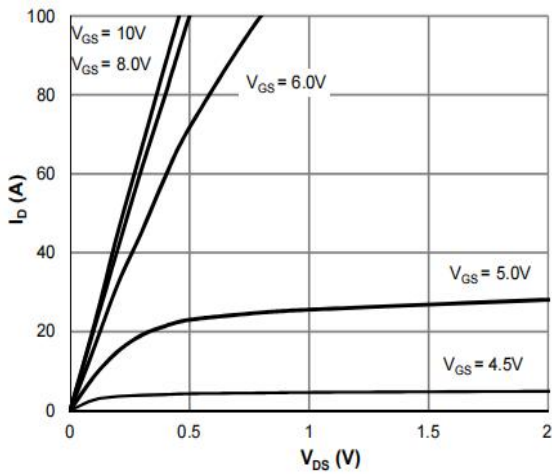


Figure 1: Saturation Characteristics

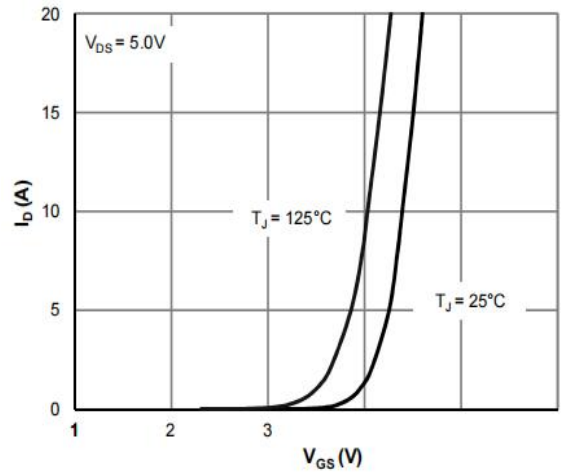


Figure 2: Transfer Characteristics

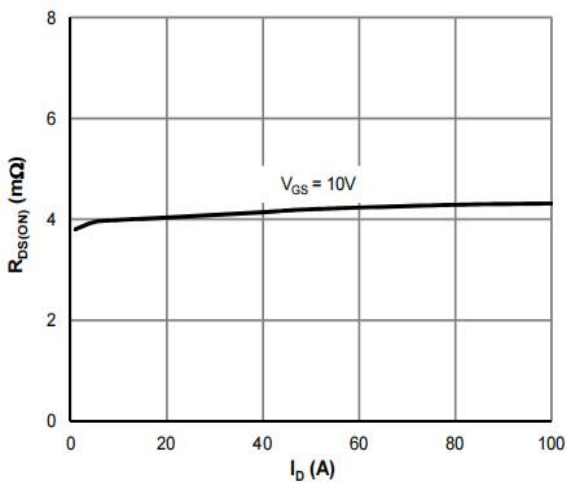


Figure 3:  $R_{DS(ON)}$  vs. Drain Current

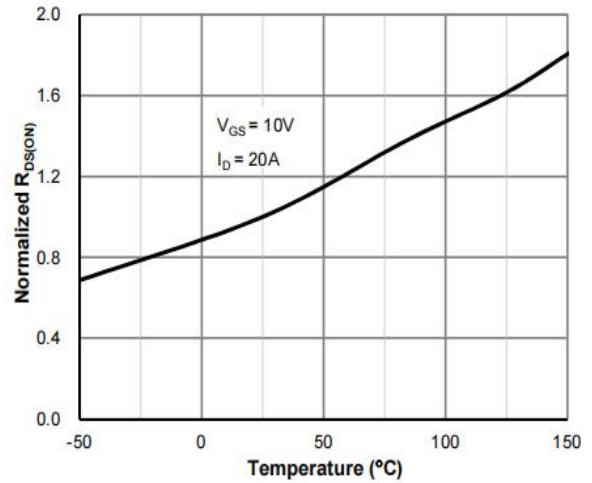


Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature

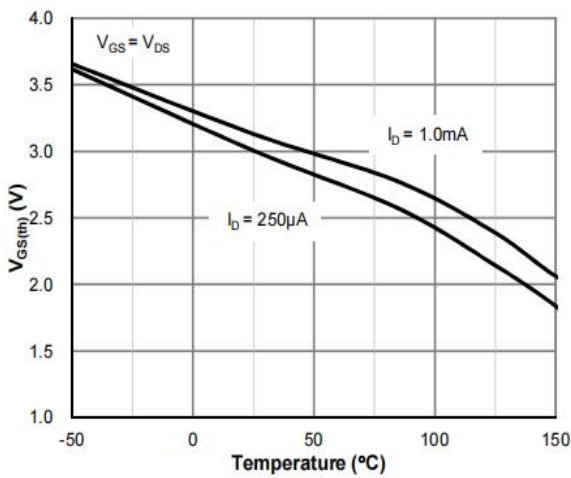


Figure 5:  $V_{GS(th)}$  vs. Junction Temperature

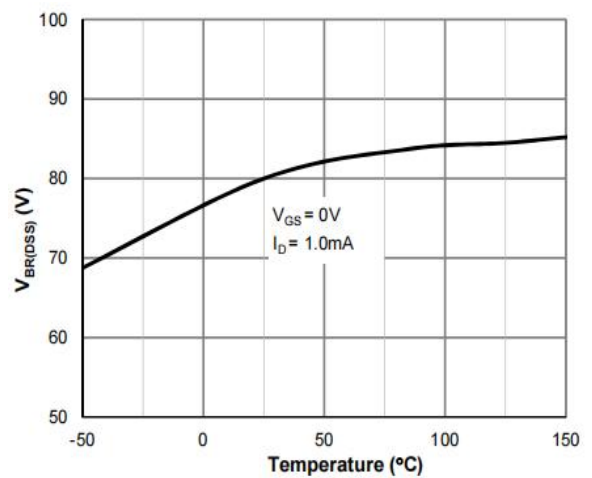


Figure 6:  $V_{BR(DSS)}$  vs. Junction Temperature

**Ratings and Characteristic Curves**

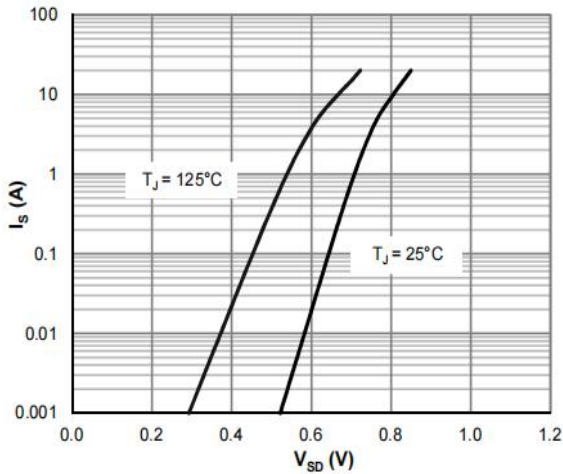


Figure 7: Body-Diode Characteristics

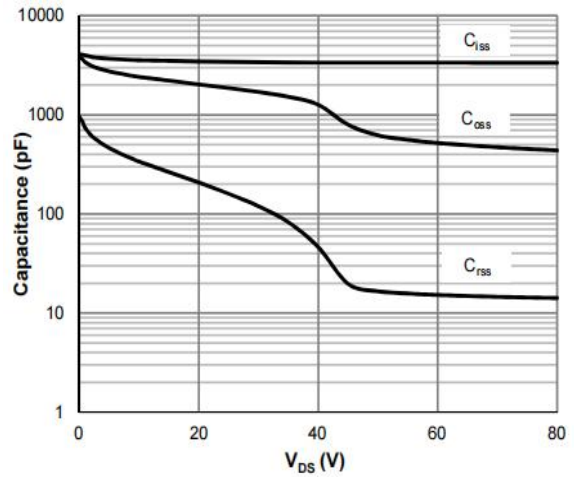


Figure 8: Capacitance Characteristics

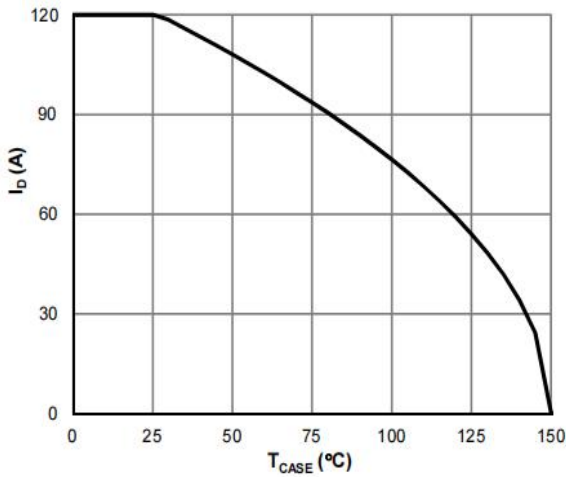


Figure 9: Current De-rating

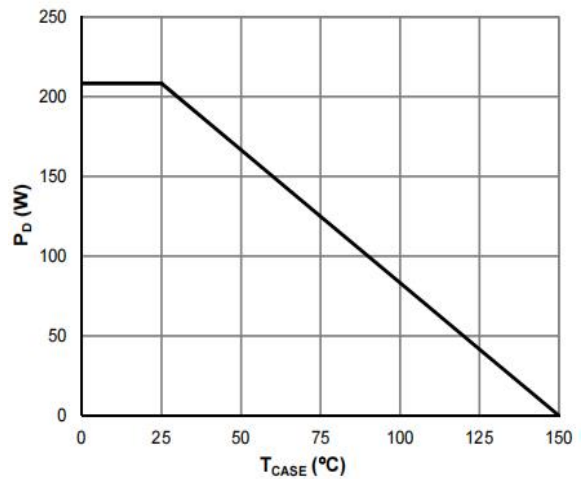


Figure 10: Power De-rating

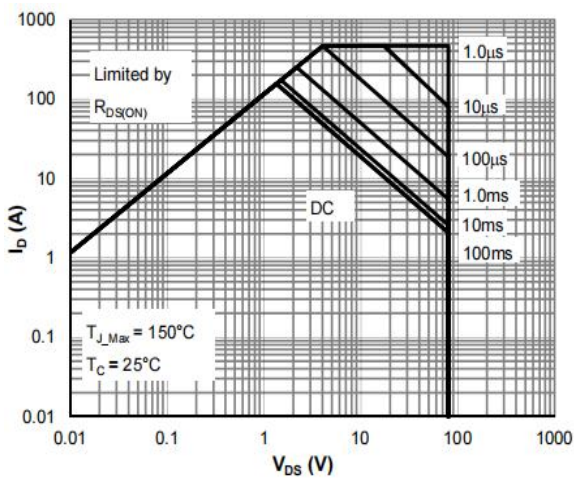


Figure 11: Maximum Safe Operating Area

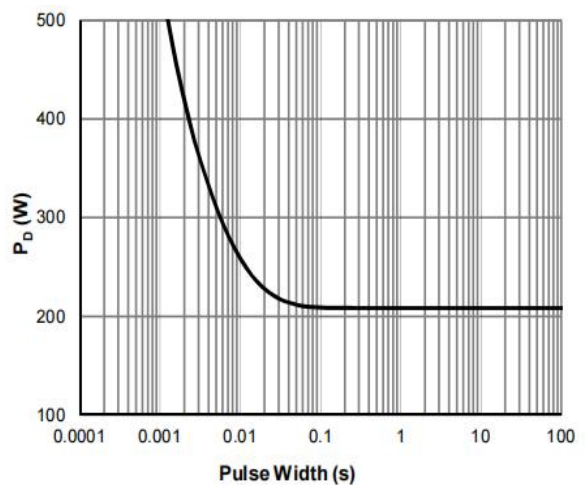
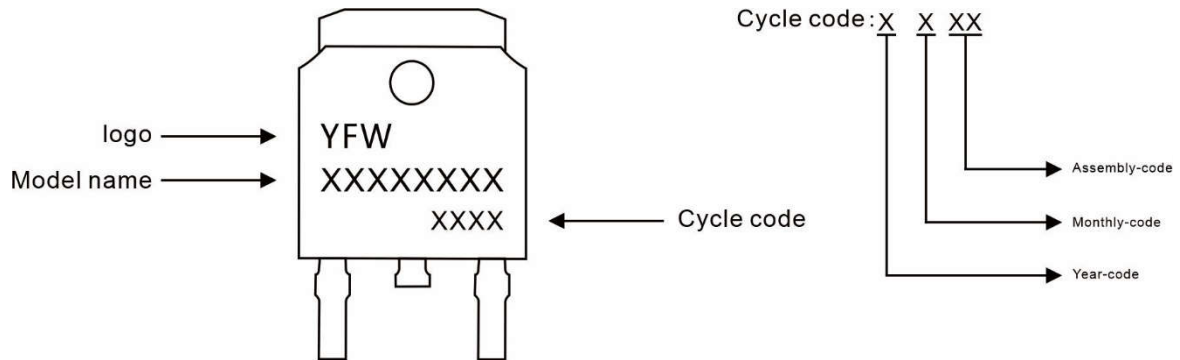


Figure 12: Single Pulse Power Rating, Junction-to-Case

**Marking Diagram**



**Ordering information**

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFWG120N085AD	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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