

85V N-Channel Enhancement Mode MOSFET

MAIN CHARACTERISTICS

I_D	120A
V_{DSS}	85V
R_{DS(on)-typ}(@V_{GS}=10V)	< 5.0mΩ (Type: 4.5 mΩ)

Features

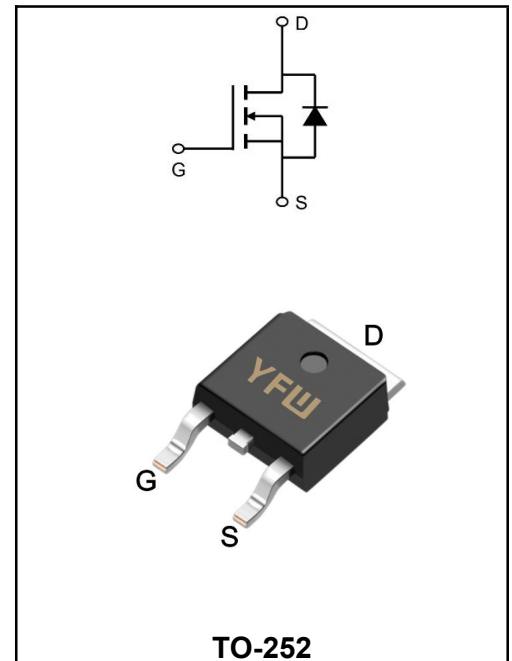
- ♦ **YFW-SGT technology**
- ♦ Ultra-low RDS(ON)
- ♦ Low Gate Charge
- ♦ 100% UIS Tested, 100% RgTested
- ♦ Pb-free Lead Plating
- ♦ Halogen-free and RoHS-compliant

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	V_{DS}	85	V
Gate - Source Voltage	V_{GS}	±20	V
Continuous drain current	I_D	120	A
Pulsed drain current(Note1)	I_{DM}	465	A
Power dissipation	P_D	208	W
Single Pulse Avalanche Energy(Note1)	E_{AS}	338	mJ
Operation and storage temperature	T_{STG}, T_J	-55 to +150	°C
Thermal Resistance, Junction-case	R_{θJC}	0.6	°C/W
Thermal Resistance, Junction-ambient ⁽⁴⁾	R_{θJA}	45	°C/W

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

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

Ratings and Characteristic Curves

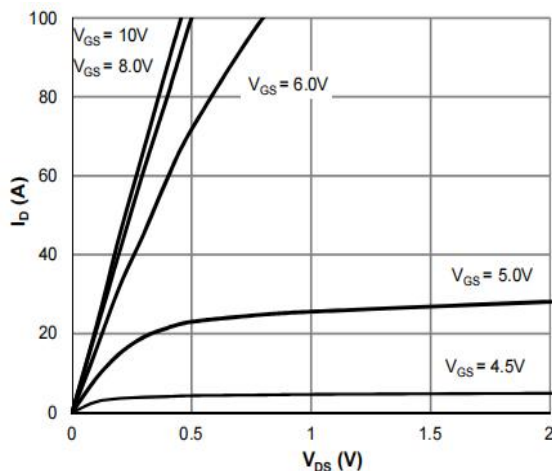


Figure 1: Saturation Characteristics

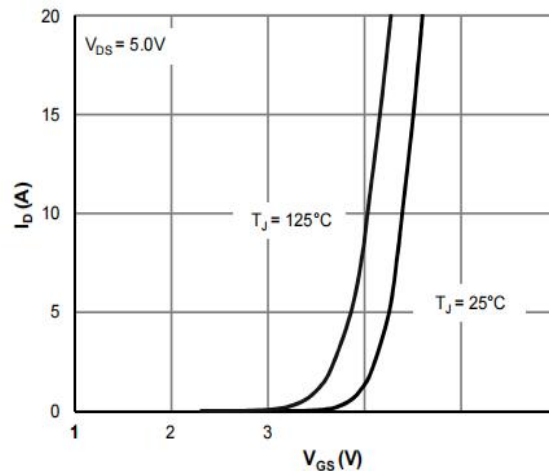


Figure 2: Transfer Characteristics

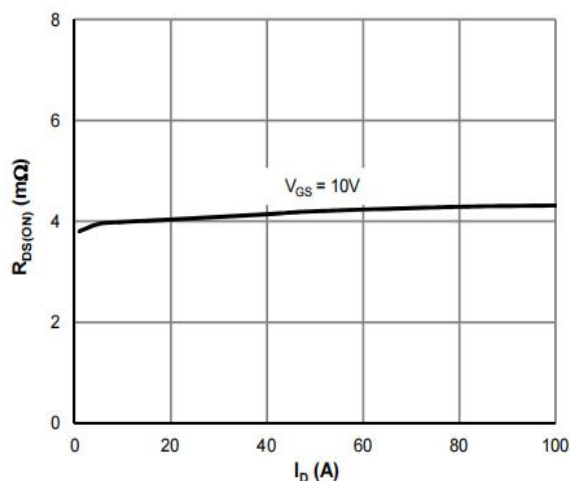


Figure 3: $R_{DS(ON)}$ vs. Drain Current

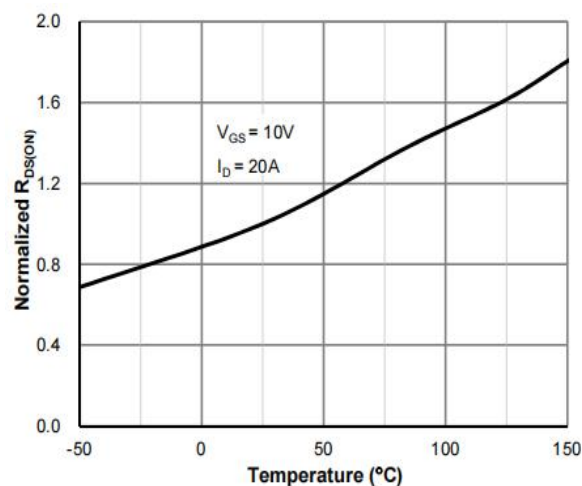


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

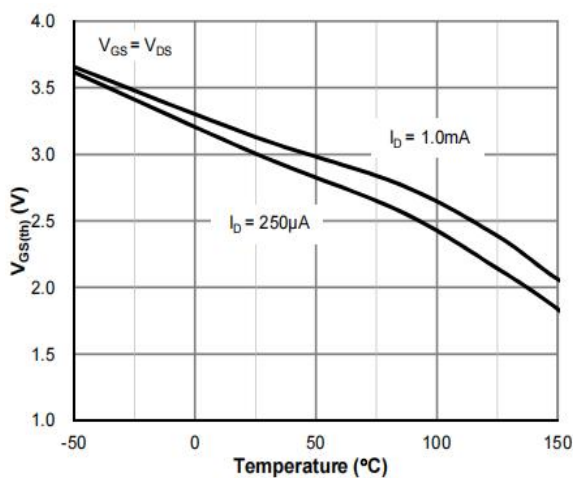


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

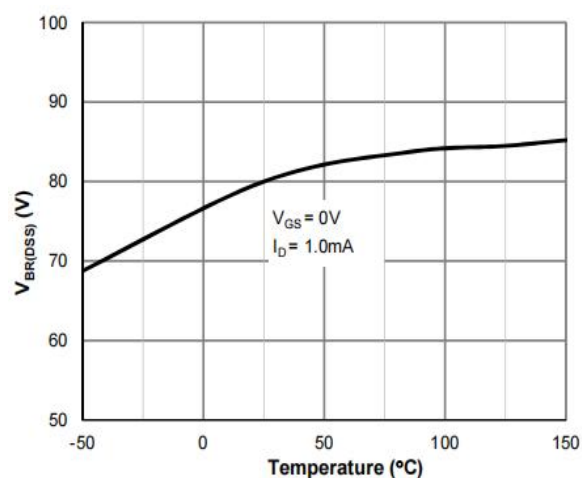


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Ratings and Characteristic Curves

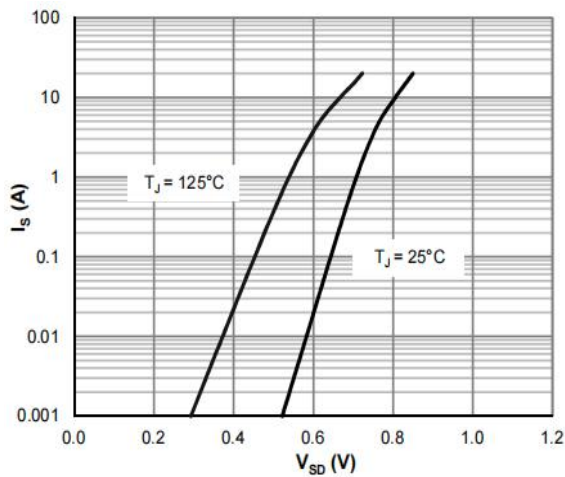


Figure 7: Body-Diode Characteristics

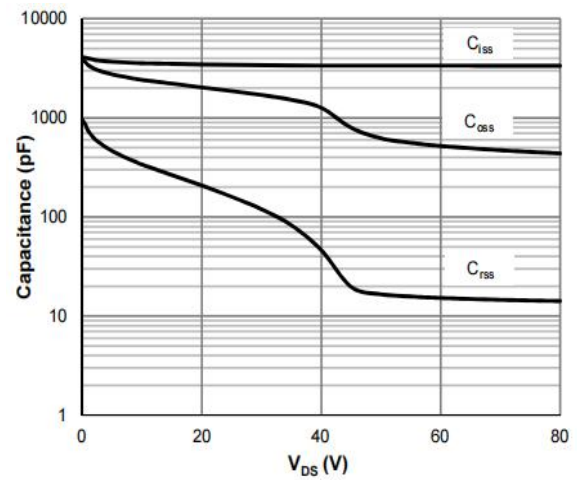


Figure 8: Capacitance Characteristics

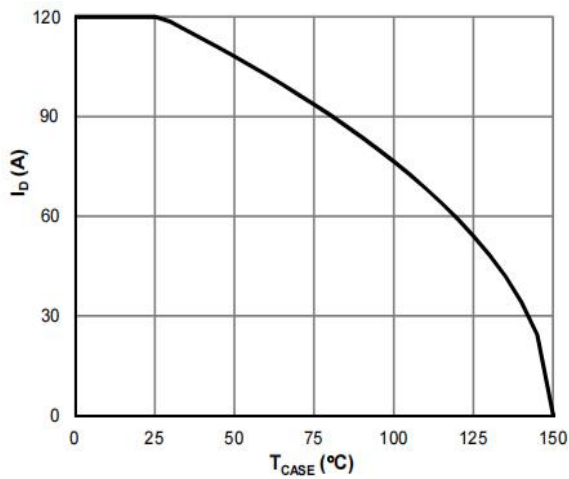


Figure 9: Current De-rating

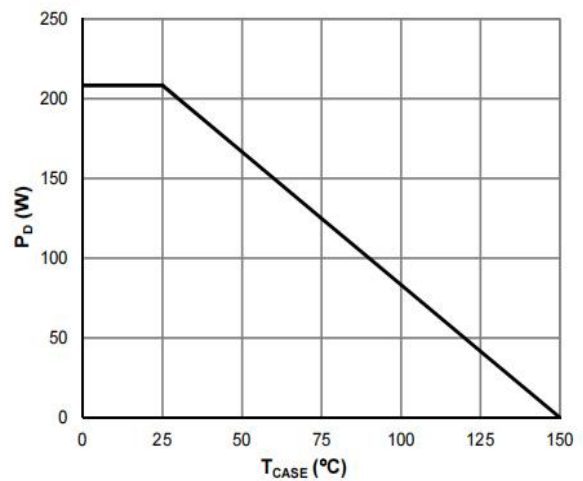


Figure 10: Power De-rating

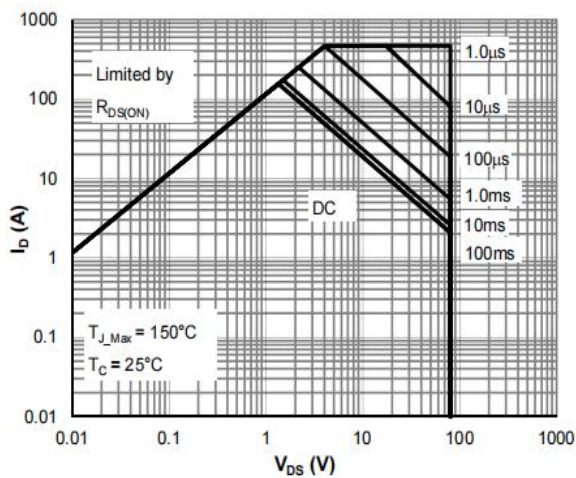


Figure 11: Maximum Safe Operating Area

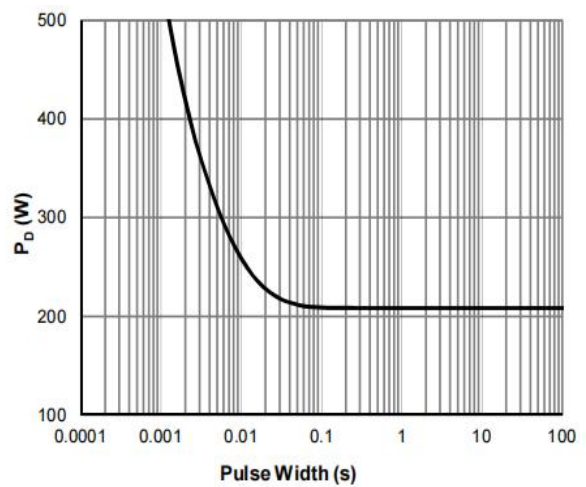
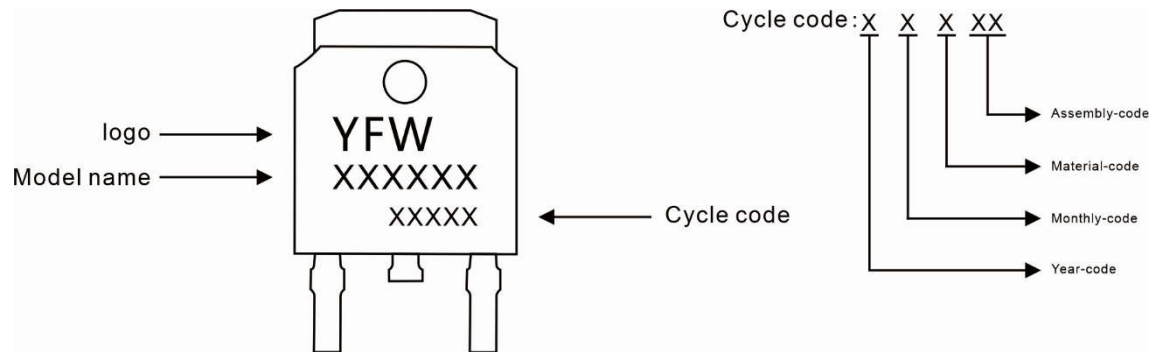


Figure 12: Single Pulse Power Rating, Junction-to-Case

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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