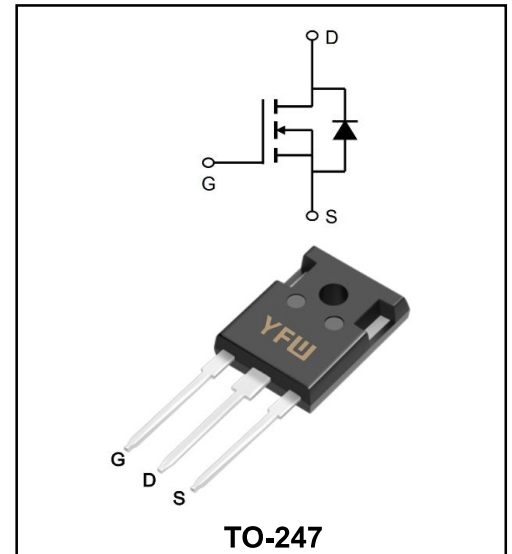


**650V N-channel Super Junction MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	20A
<b>V<sub>DSS</sub></b>	650V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	< 190mΩ (Typ: 150mΩ)



**FEATURES**

- ◆ Low RDS(on) & FM
- ◆ Extremely low switching loss
- ◆ Excellent stability and uniformity

**APPLICATIONS**

- ◆ Solar inverters
- ◆ LCD/LED/PDP TV
- ◆ Telecom/Server Power supplies
- ◆ AC-DC Power Supply

**MECHANICAL DATA**

- ◆ 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	Symbol	Value	Unit
Drain-Source Voltage	<b>V<sub>DS</sub></b>	650	<b>V</b>
Gate-Source Voltage	<b>V<sub>GS</sub></b>	±30	<b>V</b>
Continue Drain Current	<b>I<sub>D</sub></b>	20	<b>A</b>
Pulsed Drain Current (Note1)	<b>I<sub>DM</sub></b>	60	<b>A</b>
Power Dissipation	<b>P<sub>D</sub></b>	200	<b>W</b>
Single Pulse Avalanche Energy (Note1)	<b>E<sub>AS</sub></b>	650	<b>mJ</b>
Operating Temperature Range	<b>T<sub>J</sub></b>	-50 to +150	<b>°C</b>
Storage Temperature Range	<b>T<sub>STG</sub></b>	-50 to +150	<b>°C</b>
Thermal Resistance, Junction to Case	<b>R<sub>θJC</sub></b>	0.62	<b>°C/W</b>
Thermal Resistance, Junction to Ambient	<b>R<sub>θJA</sub></b>	62.5	<b>°C/W</b>

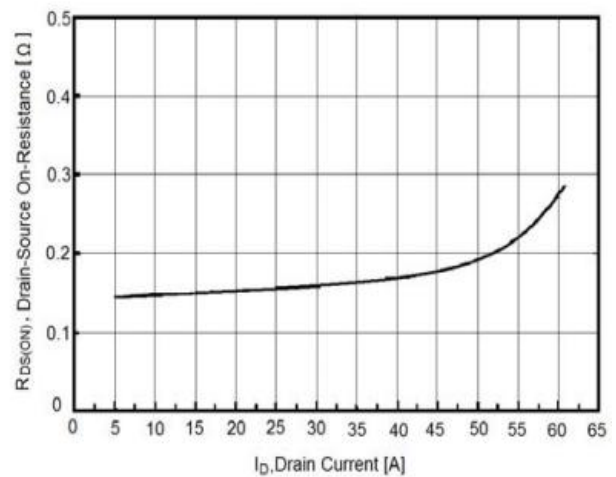
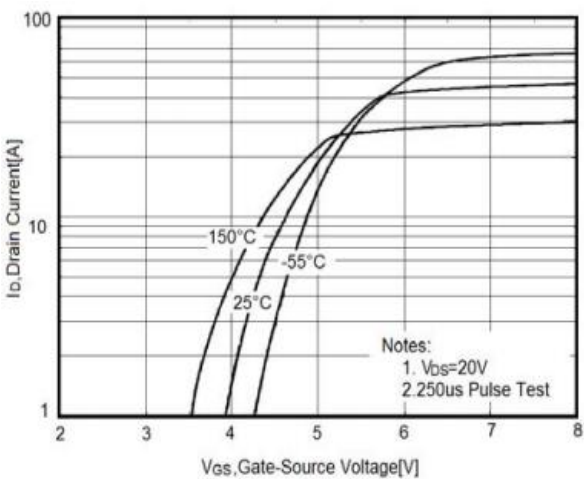
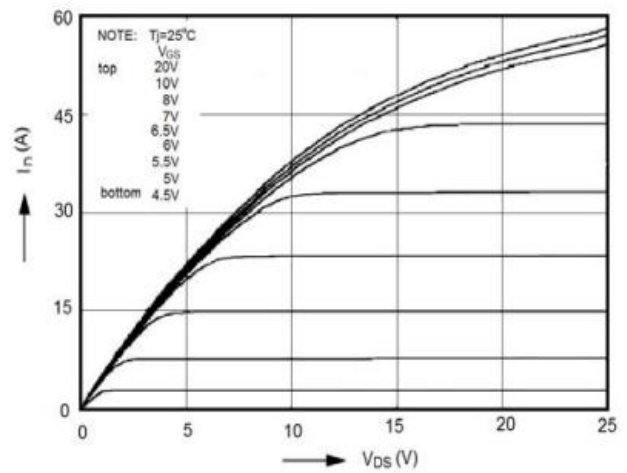
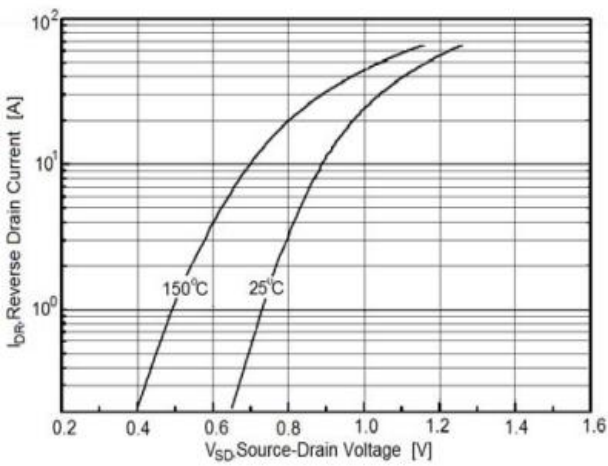
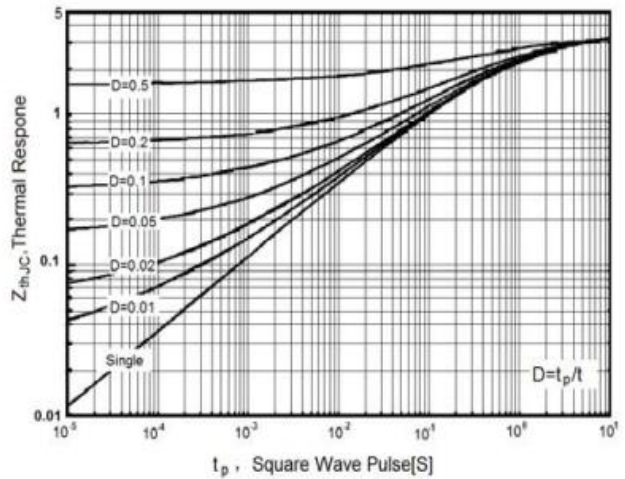
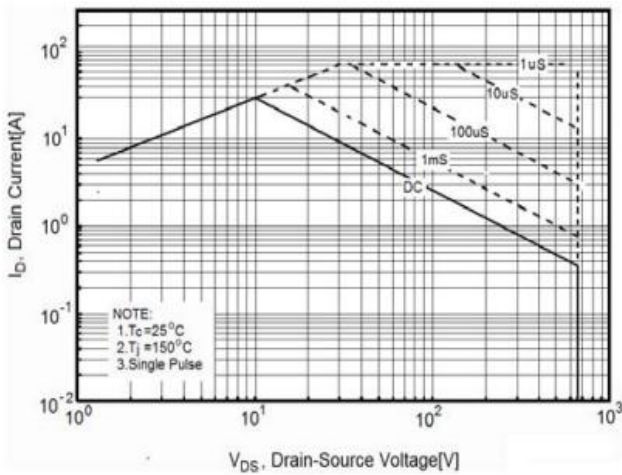
Note1: Pulse test: 300 μs pulse width, 2 % duty cycle

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

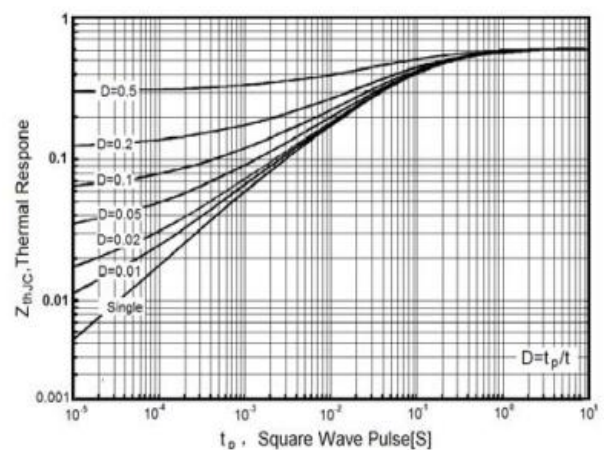
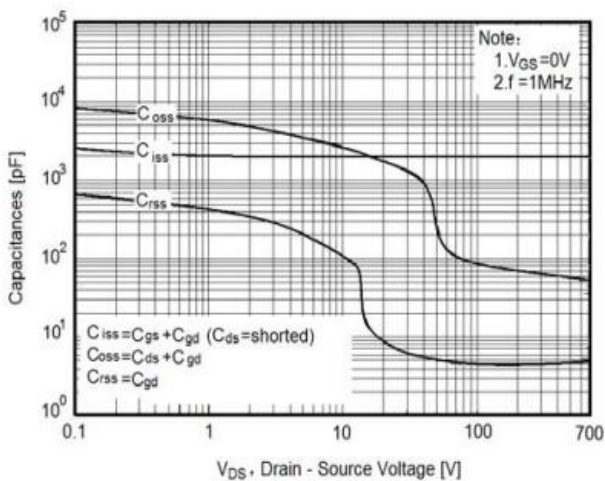
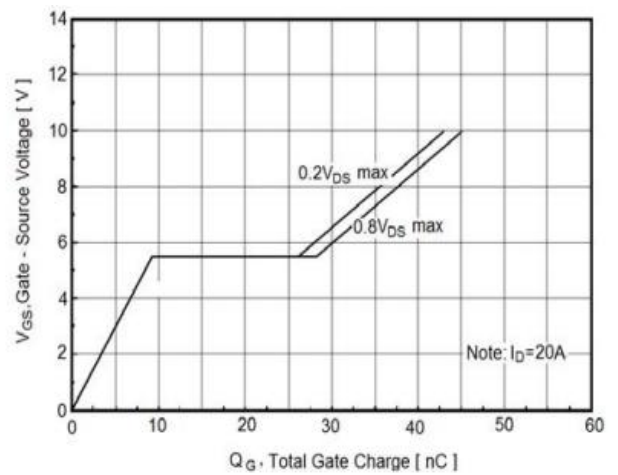
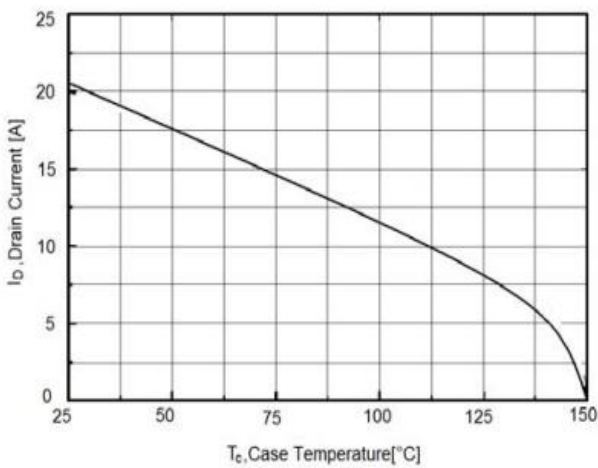
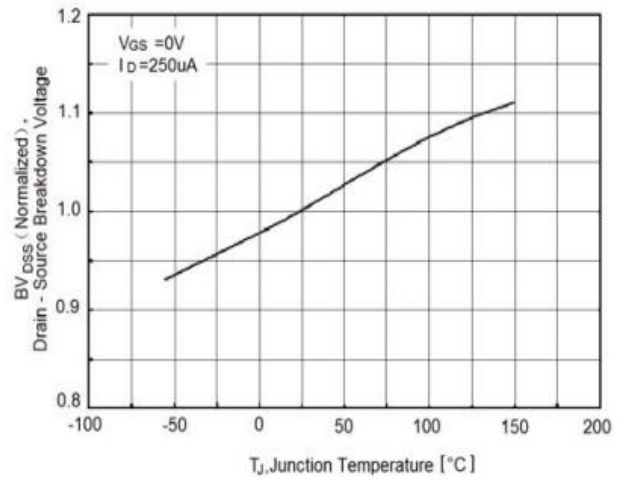
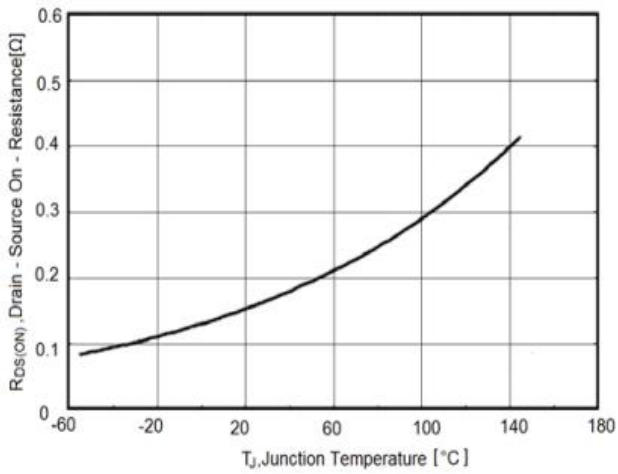
Characteristics	Test Condition	Symbo	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	<b>BV<sub>DSS</sub></b>	650	-	-	<b>V</b>
Drain-Source Leakage Current	$V_{DS} = 650V, V_{GS} = 0V$	<b>I<sub>DSS</sub></b>	-	-	1	<b>μA</b>
Gate Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$	<b>I<sub>GSS</sub></b>	-	-	±100	<b>nA</b>
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	<b>V<sub>GS(th)</sub></b>	2	-	4	<b>V</b>
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 1A$	<b>R<sub>DS(ON)</sub></b>	-	150	190	<b>mΩ</b>
Forward Transconductance	$V_{DS} = 40V, I_D = 10A$	<b>g<sub>fs</sub></b>	-	17	-	<b>S</b>
Input Capacitance	$V_{DS} = 50V$ $V_{GS} = 0V$ $f = 1.0MHz$	<b>C<sub>iss</sub></b>	-	1960	-	<b>pF</b>
Output Capacitance		<b>C<sub>oss</sub></b>	-	150	-	<b>pF</b>
Reverse Transfer Capacitance		<b>C<sub>rss</sub></b>	-	5.2	-	<b>pF</b>
Turn-on Delay Time(Note2)	$V_{DD} = 380V, I_D = 10A,$ $V_{GS} = 10V, R_G = 4\Omega$	<b>t<sub>d(on)</sub></b>	-	12	-	<b>ns</b>
Rise Time(Note2)		<b>T<sub>r</sub></b>	-	5.5	-	<b>ns</b>
Turn-Off Delay Time(Note2)		<b>t<sub>d(OFF)</sub></b>	-	60	-	<b>ns</b>
Fall Time(Note2)		<b>t<sub>f</sub></b>	-	4.5	-	<b>ns</b>
Total Gate Charge(Note2)	$V_{DS} = 480V$ $V_{GS} = 10V$ $I_D = 20A$	<b>Q<sub>G</sub></b>	-	45	-	<b>nC</b>
Gate to Source Charge(Note2)		<b>Q<sub>GS</sub></b>	-	8.6	-	<b>nC</b>
Gate to Drain Charge(Note2)		<b>Q<sub>GD</sub></b>	-	18	-	<b>nC</b>
Maximum Continuous Drain -Source Diode Forward Current		<b>I<sub>S</sub></b>	-	-	20	<b>A</b>
Maximum Pulsed Drain-Source Diode Forward Current		<b>I<sub>SM</sub></b>	-	-	60	<b>A</b>
Reverse recovery time	$T_J = 25^\circ C, I_F = 21A, di/dt = 100A/\mu s$	<b>t<sub>rr</sub></b>	-	300	-	<b>ns</b>
Reverse recovery charge		<b>Q<sub>rr</sub></b>	-	5	-	<b>uC</b>
Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 20A, T_J = 25^\circ C$	<b>V<sub>SD</sub></b>	-	-	1.3	<b>V</b>

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

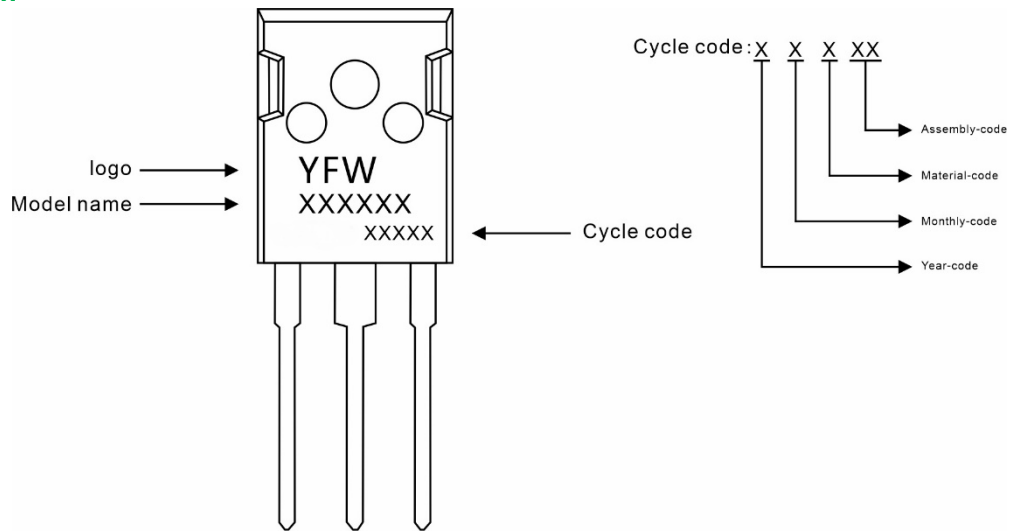
Ratings and Characteristic Curves



**Ratings and Characteristic Curves**



**Marking Diagram**



**Ordering information**

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW65R190AP	TO-247	0.209oz(5.93g)	30pcs/tube	600PCS/Box 2400PCS/Carton

**Package Dimensions**

**TO-247**

Symbol	Dimensions in mm		Dimensions in Inch	
	Min.	Max.	Min.	Max.
A	4.90	5.10	0.193	0.201
A1	1.90	2.10	0.075	0.083
A2	2.29	2.54	0.090	0.100
b	1.00	1.40	0.039	0.055
b1	2.00	2.20	0.079	0.087
b2	3.00	3.20	0.118	0.126
c	0.50	0.70	0.020	0.028
D	15.75	16.05	0.620	0.632
E	20.20	20.80	0.795	0.819
e	5.45 (BSC)		0.215 (BSC)	
e1	10.90 (BSC)		0.429 (BSC)	
F	6.05	6.25	0.238	0.246
F1	5.80	6.00	0.228	0.236
L	20.10	20.40	0.791	0.803
L1	4.05	4.35	0.159	0.171
Φ	3.50	3.70	0.138	0.146

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