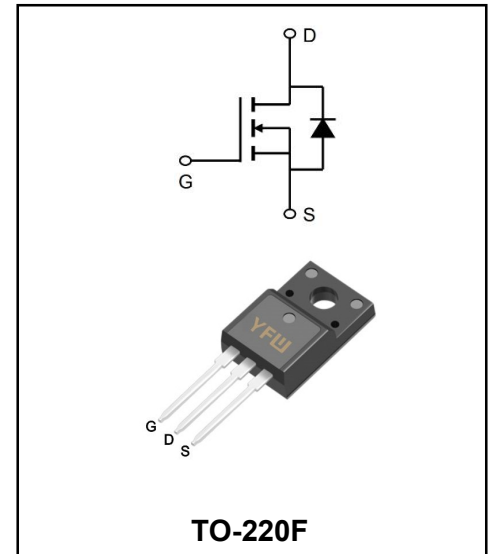


650V N-channel Super Junction MOSFET

MAIN CHARACTERISTICS

I_D	20A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$< 190m\Omega$ (Typ: 150mΩ)



FEATURES

- ♦ Low $R_{DS(on)}$ & 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: TO-220F/AF
- ♦ 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 $T_c=25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	650	V
Gate - Source Voltage	V_{GS}	± 30	V
Continue Drain Current	I_D	20	A
Pulsed Drain Current (Note1)	I_{DM}	60	A
Power Dissipation	P_D	34	W
Single Pulse Avalanche Energy (Note1)	E_{AS}	650	mJ
Operating Temperature Range	T_J	-55 to +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$
Thermal Resistance, Junction-case	$R_{\theta JC}$	3.7	$^\circ\text{C/W}$
Thermal Resistance, Junction-ambient	$R_{\theta JA}$	80	$^\circ\text{C/W}$

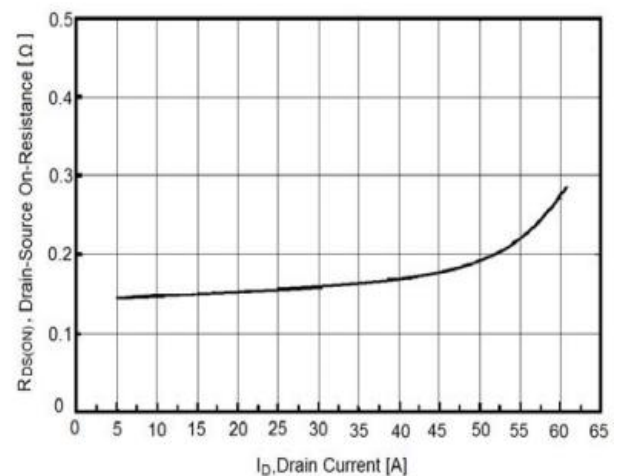
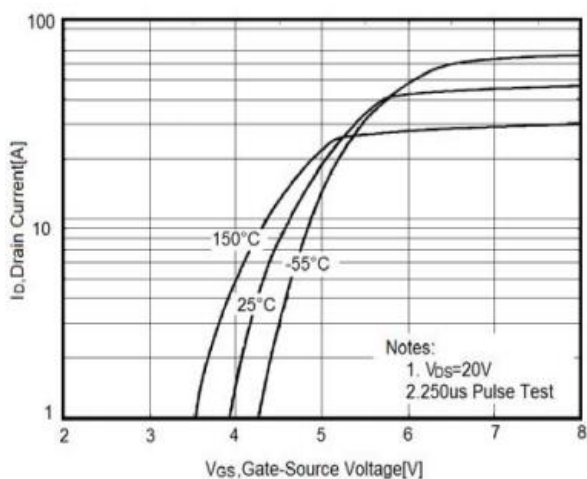
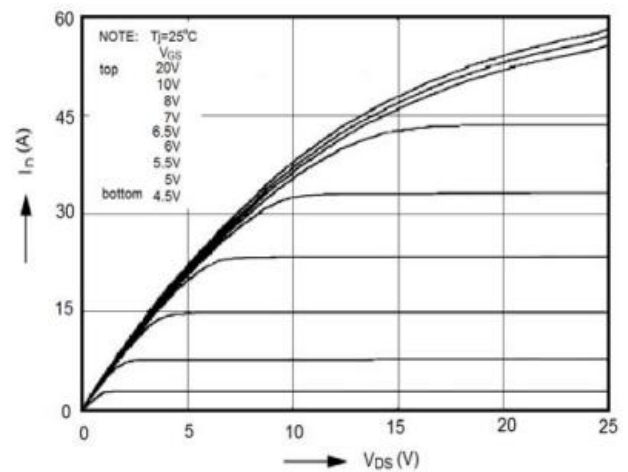
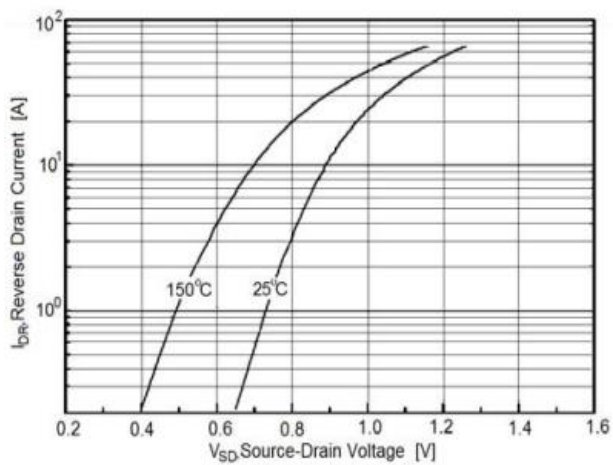
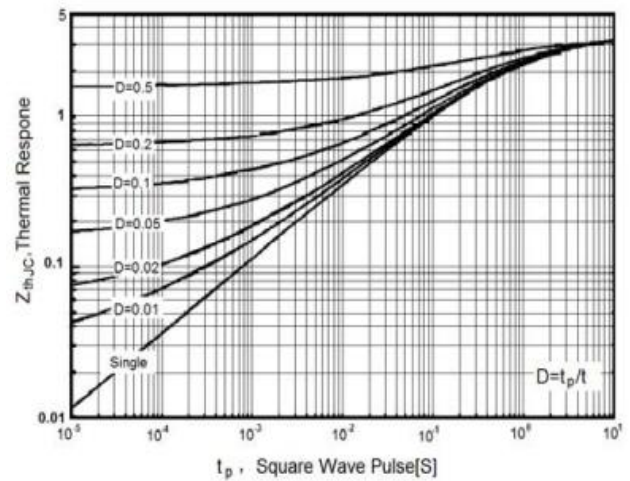
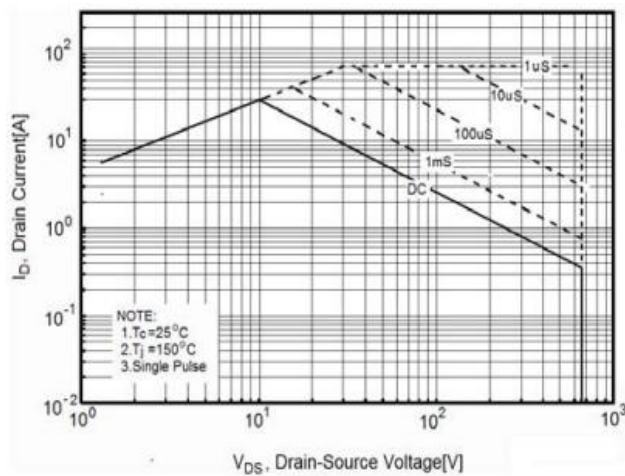
Note1: Pulse test: 300 μs pulse width, 2 % duty cycle

Electrical Characteristics at Tc=25°C unless otherwise specified

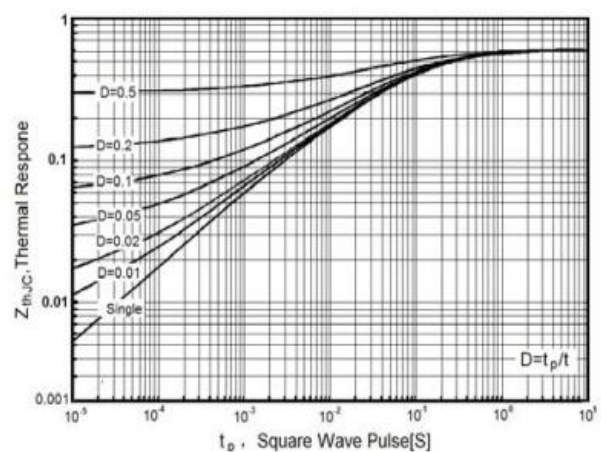
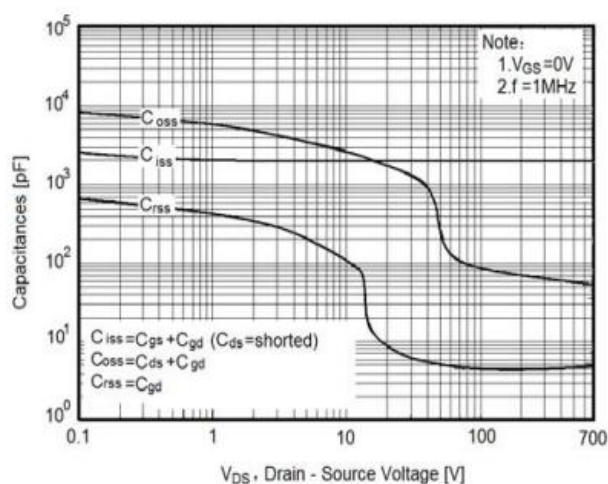
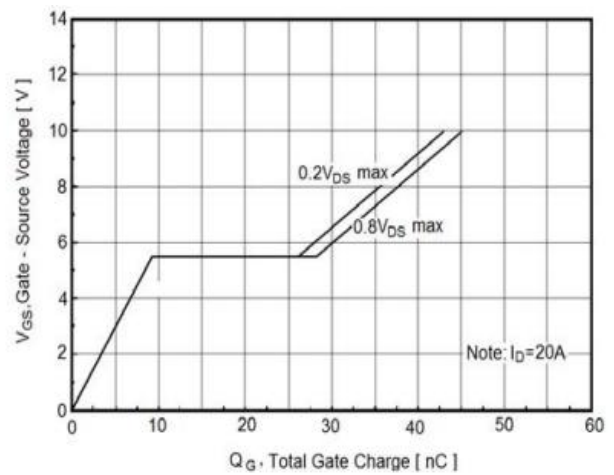
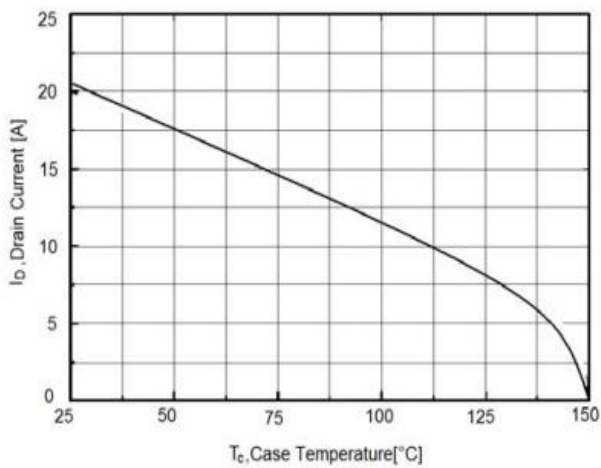
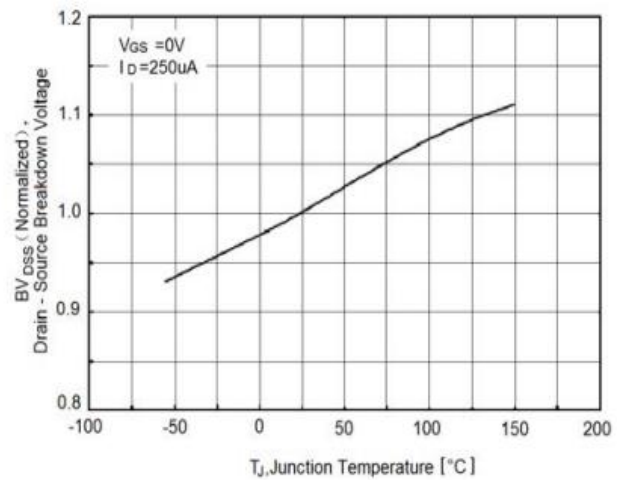
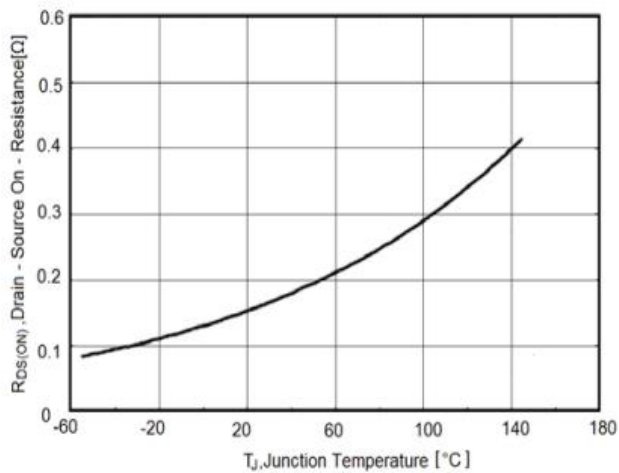
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS}=650V, V_{GS}=0V$	I_{DSS}	-	-	1	μA
Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	2	-	4	V
Drain-source on-state resistance	$V_{GS}=10V, I_D=10A$	$R_{DS(ON)}$	-	150	190	m Ω
Forward Transconductance	$V_{DS}=40V, I_D=10A$	gfs	-	17	-	S
Input Capacitance	$V_{GS}=0V$ $V_{DS}=50V$ $f=1.0MHz$	C_{iss}	-	1960	-	pF
Output Capacitance		C_{oss}	-	150	-	
Reverse Transfer Capacitance		C_{rss}	-	5.2	-	
Turn-on Delay Time(Note2)	$V_{DD}=380V$ $I_D=10A$ $V_{GS}=10V$ $R_G=4\Omega$	$t_{d(on)}$	-	12	-	ns
Rise Time(Note2)		T_r	-	5.5	-	
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	60	-	
Fall Time(Note2)		t_f	-	4.5	-	
Total Gate Charge(Note2)	$V_{DS}=480V$ $V_{GS}=10V$ $I_D=20A$	Q_g	-	45	-	nC
Gate to Source Charge(Note2)		Q_{gs}	-	8.6	-	
Gate to Source Charge(Note2)		Q_{gd}	-	18	-	
Maximum Continuous Drain -Source Diode Forward Current		I_S	-	-	20	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	-	-	60	A
Reverse Recovery Time	$T_j=25^\circ C, I_F=21A, di/dt=100A/\mu s$	t_{rr}	-	300	-	ns
Reverse Recovery Charge		Q_{rr}	-	5	-	nC
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=20A, T_j=25^\circ C$	V_{SD}	-	-	1.3	V

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

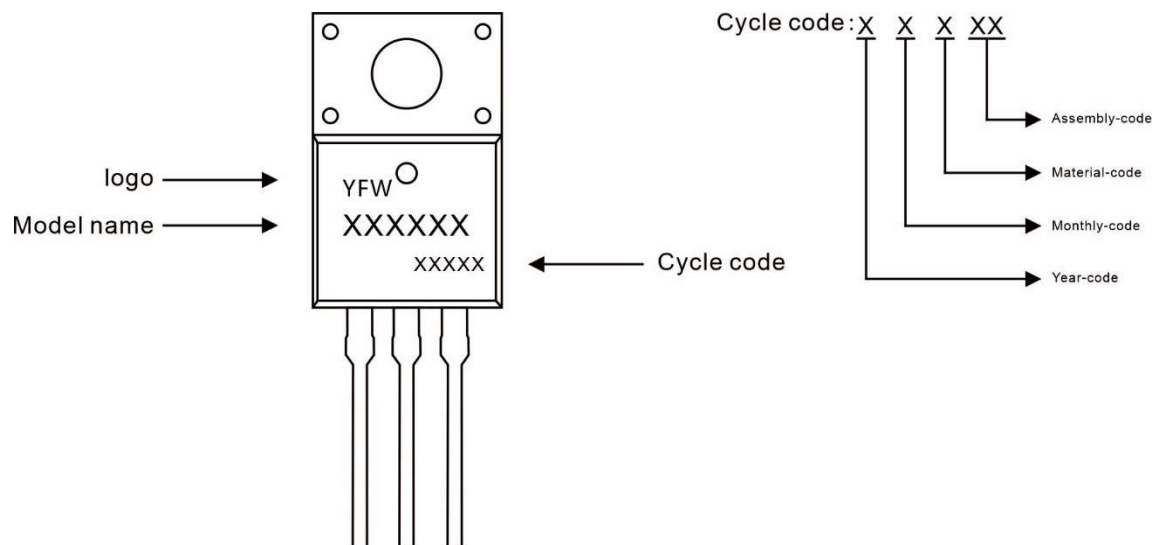
Ratings and Characteristic Curves



Ratings and Characteristic Curves



Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW65R190AF	TO-220F	0.06oz(1.74g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

Package Dimensions

TO-220F

Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.66	2.86	0.105	0.113
b	0.75	0.85	0.030	0.033
b1	1.24	1.44	0.049	0.057
c	0.40	0.60	0.016	0.024
D	10.00	10.32	0.394	0.406
E	15.75	16.05	0.620	0.632
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	3.10	3.5	0.122	0.138
L	13.50	13.90	0.531	0.547
L1	2.90	3.30	0.114	0.130
Φ	3.10	3.30	0.122	0.130

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