

650V N-Channel Enhancement Mode Power MOSFET

MAIN CHARACTERISTICS

I_D	20A
V_{DS}	650V
R_{DS(on)}-typ(@V_{GS}=10V)	<0.5 Ω (Typ:0.35 Ω)

FEATURES

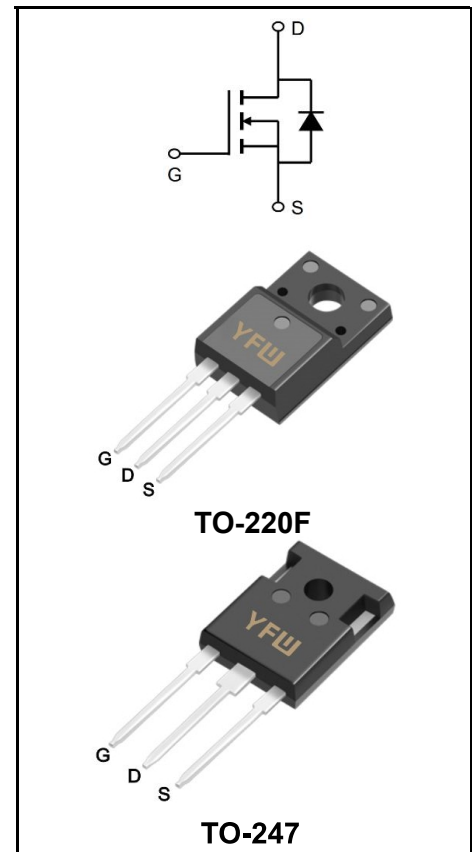
- ♦Fast Switching
- ♦Low ON Resistance
- ♦Low Gate Charge
- ♦100% Single Pulse avalanche energy Test

APPLICATION

- ♦Power switch circuit of adaptor and charge

MECHANICAL DATA

- ♦Case: TO-220F/AF TO-247/AP
- ♦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
		TO-220F	TO-247	
Drain-Source Voltage	V_{DS}	650		V
Gate - Source Voltage	V_{GS}	±30		V
Continuous Drain Current	I_D	20		A
Pulsed Drain Current(note1)	I_{DM}	80		A
Power Dissipation	P_D	85	250	W
Single Pulse Avalanche Energy(note1)	E_{AS}	550		mJ
Operating Temperature Range	T_J	150		°C
Operating Temperature Range	T_{STG}	-55 to +150		°C
Thermal Resistance, Junction-to-case	R_{θJC}	1.47	0.5	°C/W
Thermal Resistance, Junction ambient	R_{θJA}	100	40	°C/W

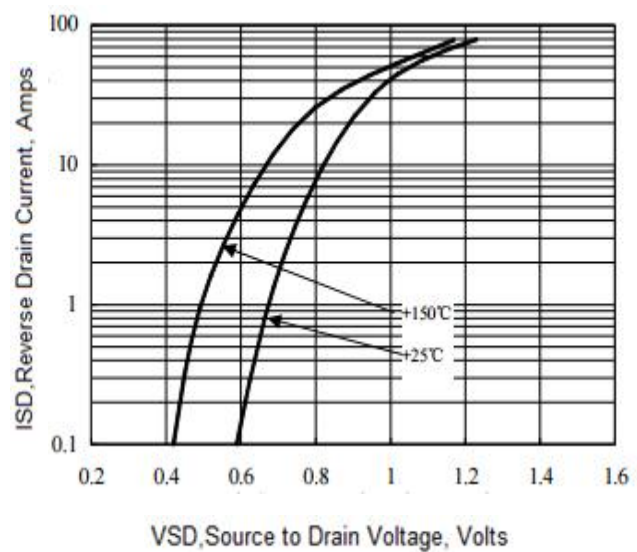
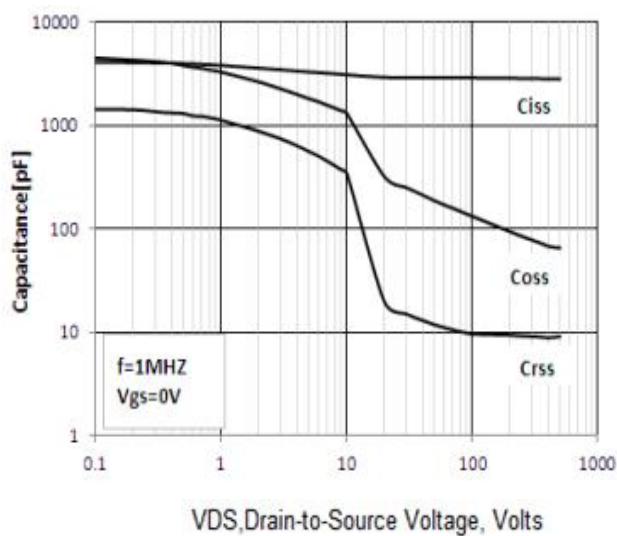
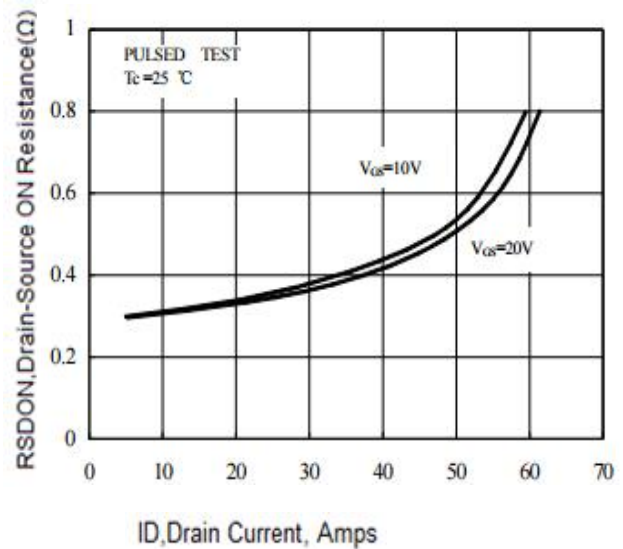
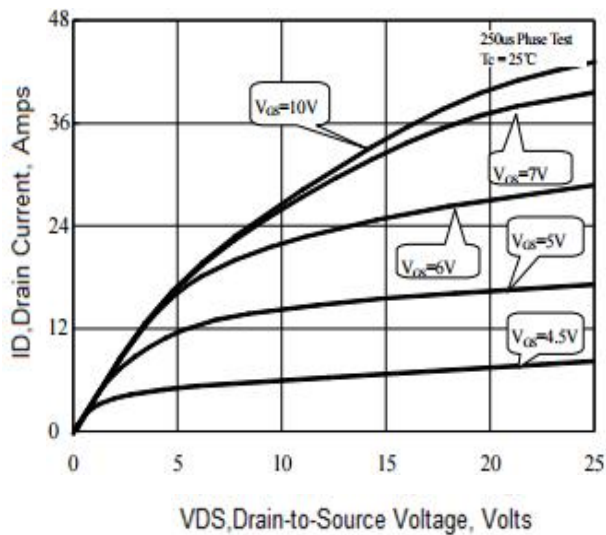
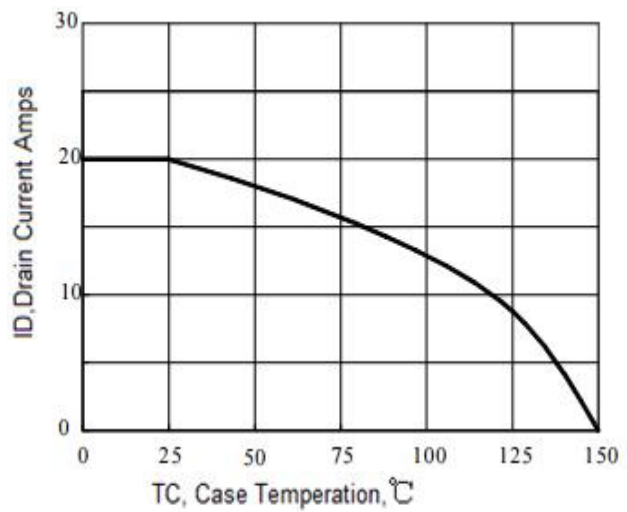
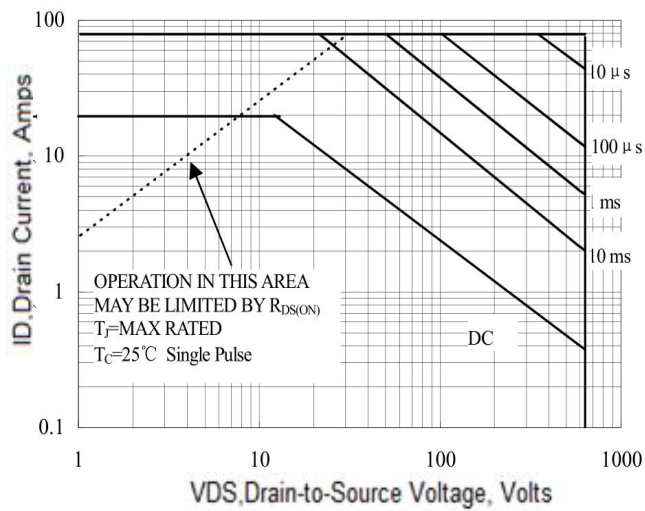
Note1:Pulse test: 300 μs pulse width, 2 % duty cycle

Maximum Ratings at Tc=25°C unless otherwise specified

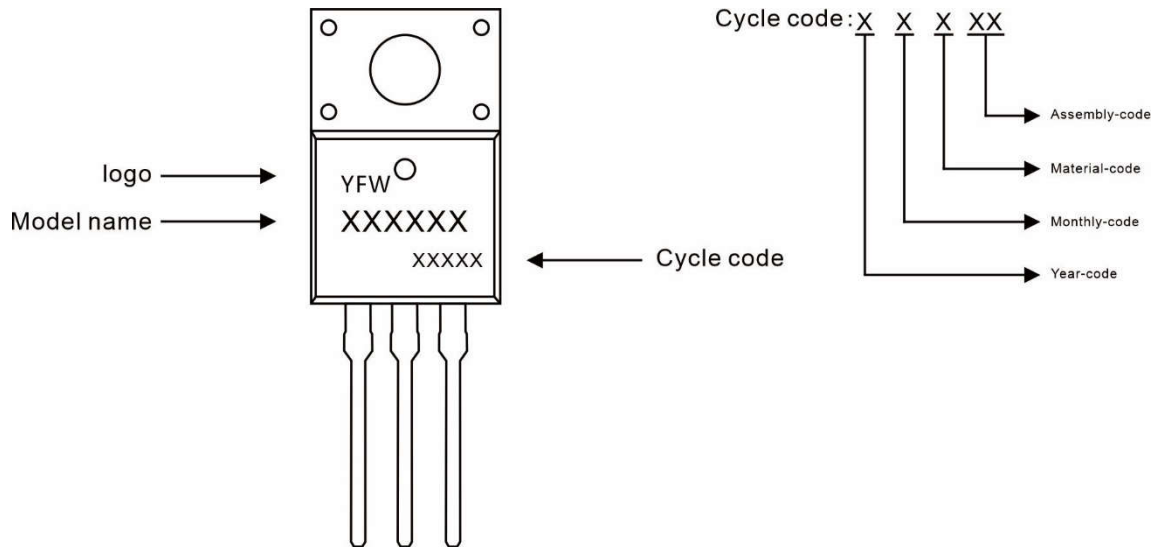
Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	BV_{DSS}	650	660	-	V
Drain-Source Leakage Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$	$R_{DS(ON)}$	-	0.35	0.5	Ω
Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 10\text{ A}$	g_{fs}	-	18	-	S
Input Capacitance	$V_{GS} = 0\text{ V},$ $V_{DS} = 2\text{ V},$ $f = 200\text{ KHz}$	C_{iss}	-	3801	-	pF
Output Capacitance		C_{oss}	-	290	-	pF
Reverse Transfer Capacitance		C_{rss}	-	20	-	pF
Turn-on Delay Time(Note2)	$I_D = 20\text{ A}$ $V_{DD} = 250\text{ V}$ $R_G = 10\text{ }\Omega$	$t_{d(on)}$	-	39	-	ns
Rise Time(Note2)		t_r	-	80	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	94	-	ns
Fall Time(Note2)		t_f	-	63	-	ns
Total Gate Charge(Note2)	$I_D = 20\text{ A}$ $V_{DD} = 400\text{ V}$ $V_{GS} = 10\text{ V}$	Q_g	-	65	-	nC
Gate to Source Charge(Note2)		Q_{gs}	-	14	-	nC
Gate to Drain Charge(Note2)		Q_{gd}	-	24	-	nC
Maximun Body-Diode Continuous Current		I_S	-	-	20	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	80	A
Drain-Source Diode Forward Voltage	$I_{SD} = 20\text{ A}$	V_{SD}	-	-	1.4	V
Reverse Recovery Time(Note2)	$I_{SD} = 20\text{ A}, V_{GS} = 0\text{ V},$ $dI_F / dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	630	-	ns
Reverse Recovery Charge(Note2)		Q_{rr}	-	7.4	-	μC

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

Ratings and Characteristic Curves



Marking Diagram



Ordering information

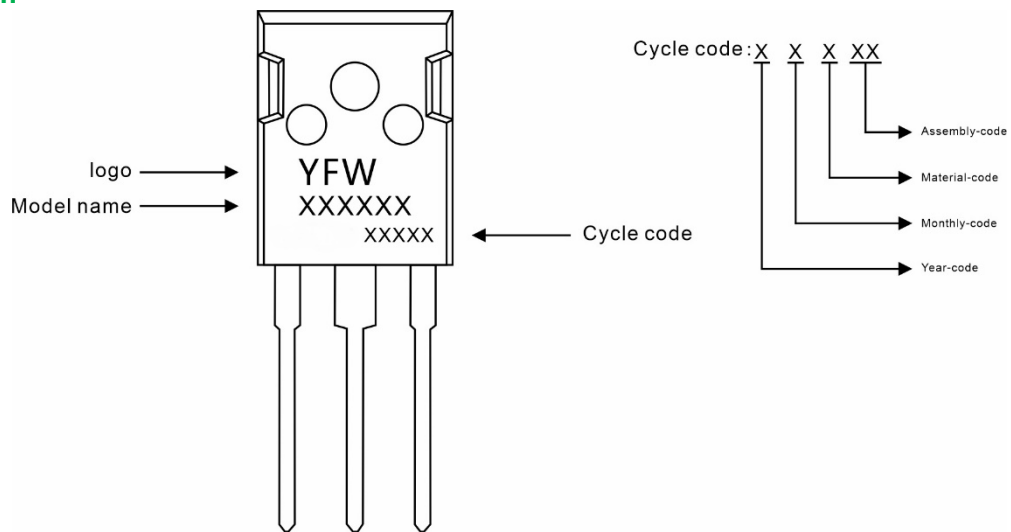
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW20N65AF	TO-220F	0.06oz(1.74g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

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

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW20N65AP	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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