

700V N-Channel Enhancement Mode Power MOSFET

MAIN CHARACTERISTICS

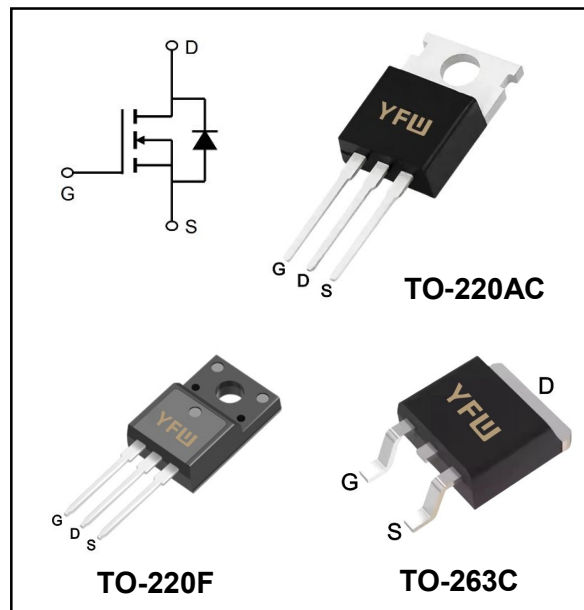
I_D	20A
V_{DSS}	700V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$<0.49\ \Omega$ (Typ: 0.45 Ω)

FEATURES

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

APPLICATIONS

- ♦LED power supplies
- ♦Cell Phone Charger
- ♦Standby Power



MECHANICAL DATA

- ♦Case: TO-220F/AF TO-220C/AC TO-263C/ASC
- ♦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
		220F	220/263C	
Drain-Source Voltage	V_{DS}	700		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	45	250	W
Single Pulse Avalanche Energy(note1)	E_{AS}	500		mJ
Operating Temperature Range	T_J	150		$^\circ\text{C}$
Operating Temperature Range	T_{STG}	-55 to +150		$^\circ\text{C}$
Thermal Resistance, Junction-to-case	$R_{\theta JC}$	2.78	0.5	$^\circ\text{C/W}$
Thermal Resistance, Junction ambient	$R_{\theta JA}$	62.5	40	$^\circ\text{C/W}$

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}	700	-	-	V
Drain-Source Leakage Current	$V_{DS}=700V, V_{GS}=0V$	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	-	3.5	V
Drain-Source On-State Resistance	$V_{GS}=10V, I_D=10A$	$R_{DS(ON)}$	-	0.45	0.49	Ω
Forward Transconductance	$V_{DS}=15V, I_D=10A$	g_{fs}	-	15	-	S
Input Capacitance	$V_{DS}=25V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	3350	-	pF
Output Capacitance		C_{oss}	-	239	-	
Reverse Transfer Capacitance		C_{rss}	-	8.5	-	
Turn-on delay time(note2)	$I_D=20A$ $V_{DD}=100V$ $R_G=25\Omega$	$t_{d(on)}$	-	40	-	nS
Rise Time(note2)		T_r	-	30	-	
Turn-Off Delay Time(note2)		$t_{d(OFF)}$	-	210	-	
Fall Time(note2)		t_f	-	56	-	
Total Gate Charge(note2)	$I_D=20A$ $V_{DD}=560V$ $V_{GS}=10V$	Q_g	-	70	-	nC
Gate-Source Charge(note2)		Q_{gs}	-	18	-	
Gate-Drain Charge(note2)		Q_{gd}	-	23	-	
Maximun Body-Diode Continuous Current		I_S	-	-	20	A
Maximun Body-Diode Continuous Current(note2)		I_{SM}	-	-	80	A
Drain-Source Diode Forward Voltage	$I_{SD}=20A$	V_{SD}	-	-	1.4	V
Reverse Recovery Time(note2)	$V_{GS}=0V, I_{SD}=20A$ $di_f/dt=100A/\mu s$	t_{rr}	-	508	-	nS
Reverse Recovery Charge(note2)		Q_{rr}	-	9.6	-	μC

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

Ratings and Characteristic Curves

Fig.1 Output characteristics

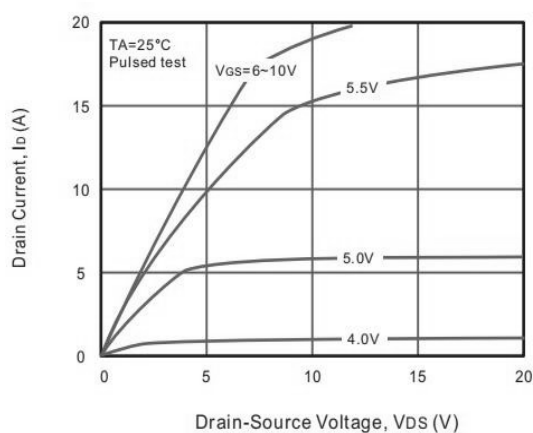


Fig.2 Power Dissipation

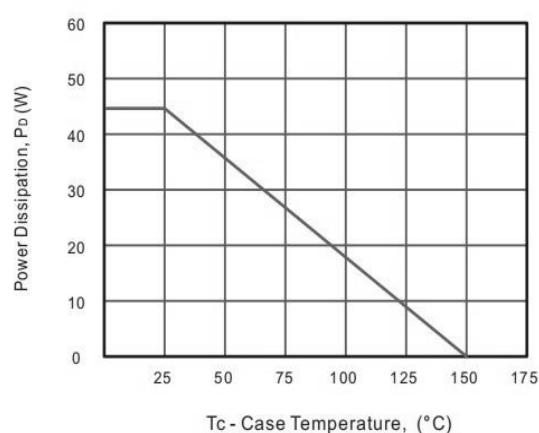


Fig.3 Drain Current Derating

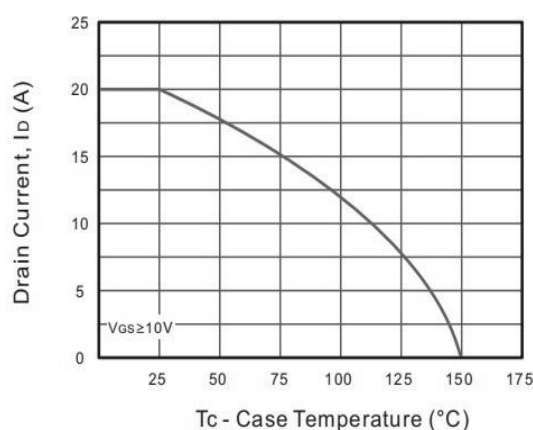


Fig.4 Drain-Source On-Resistance vs. Drain Current

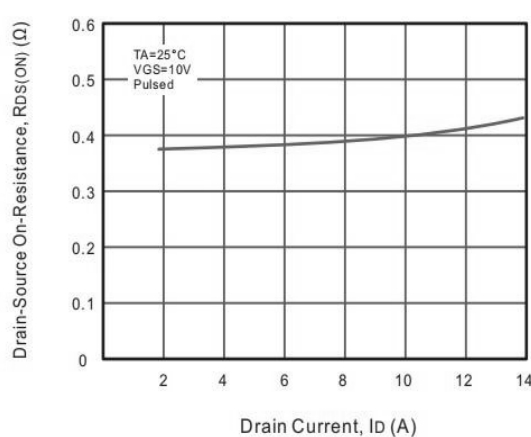


Fig.5 Gate Threshold Voltage vs. Junction Temperature

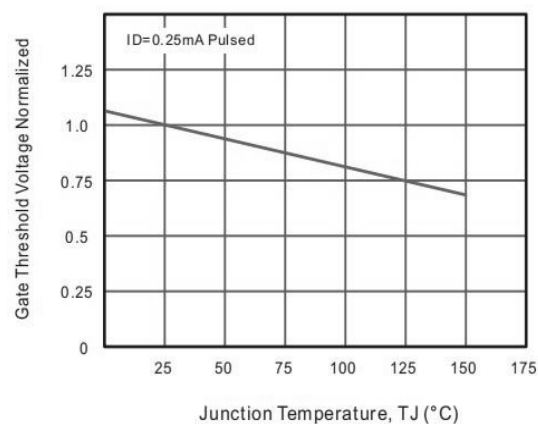
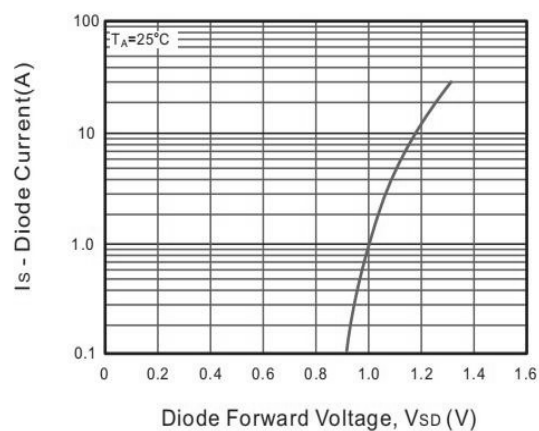


Fig.6 Body-diode Forward Characteristics



Ratings and Characteristic Curves

Fig.7 Drain-Source On-Resistance vs. Junction Temperature

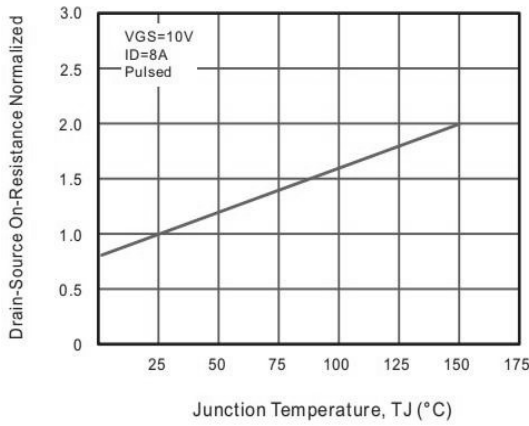


Fig.8 Breakdown Voltage vs. Junction Temperature

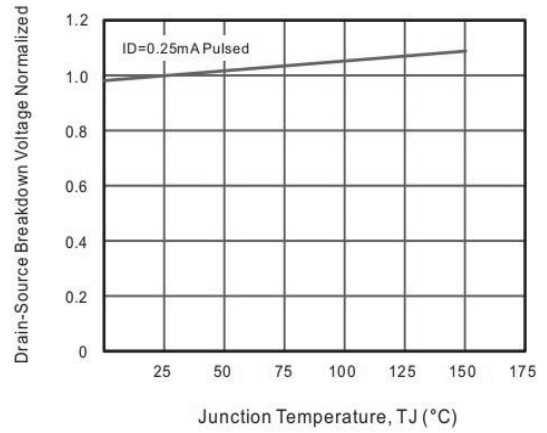


Fig.9 Capacitance Characteristics

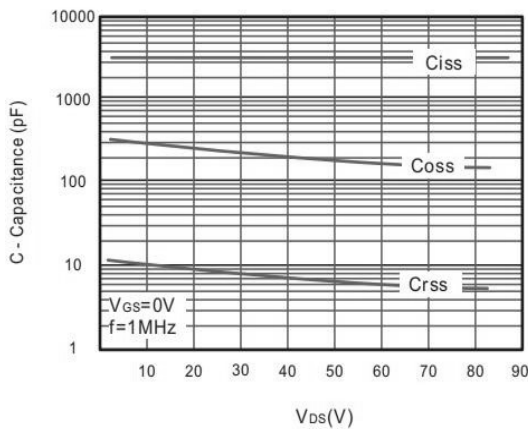


Fig.10 Gate Charge Characteristics

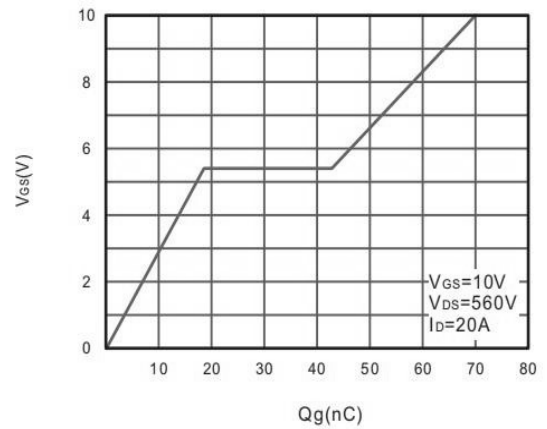
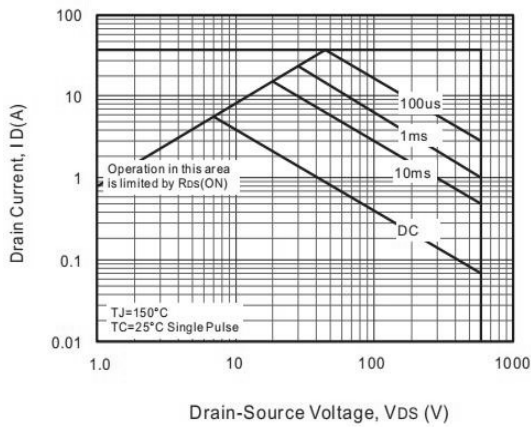
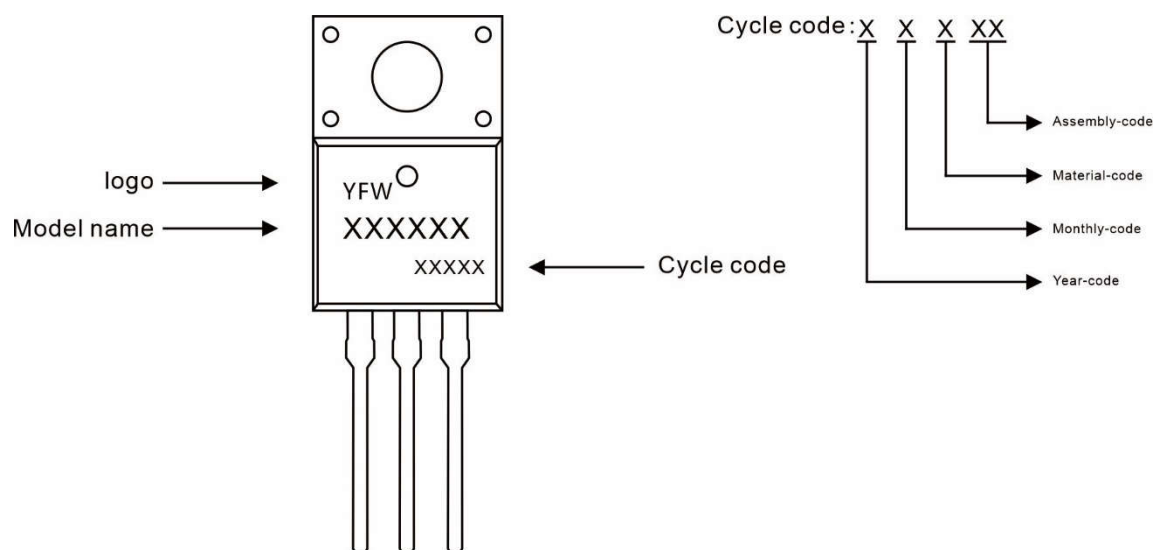


Fig.11 Safe Operating Area



Marking Diagram



Ordering information

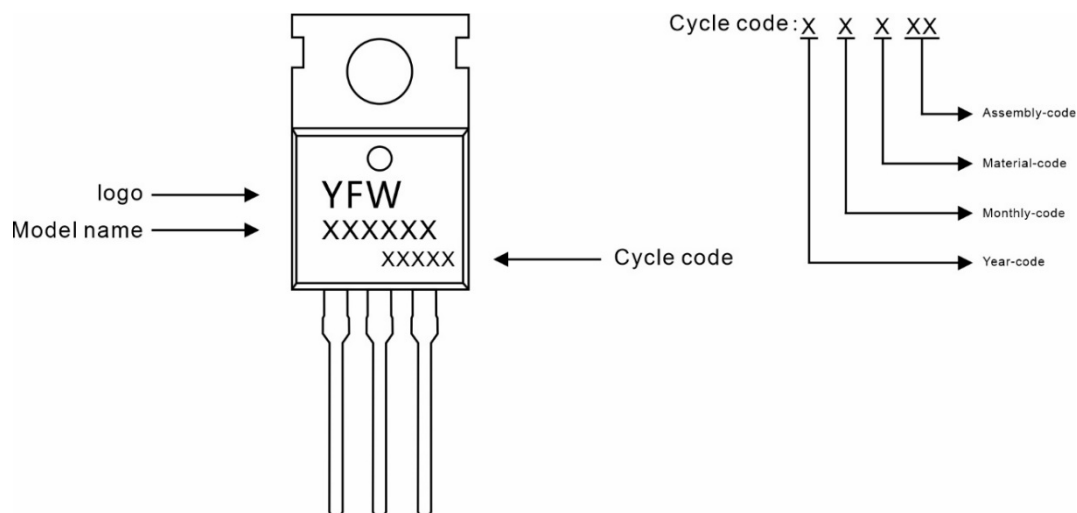
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW20N70AF	TO-220F	0.06oz(1.74g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

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

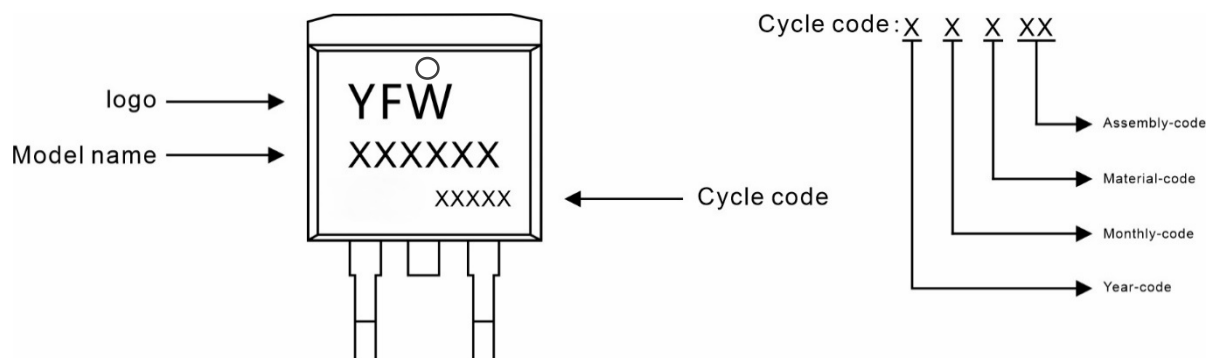
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW20N70AC	TO-220C	0.07oz(1.96g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

Package Dimensions

TO-220C

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.34	4.67	0.171	0.184
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.30	0.50	0.012	0.020
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
E1	12.00	12.50	0.472	0.492
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	2.60	2.80	0.102	0.110
L	13.20	13.80	0.520	0.543
L1	3.80	4.20	0.150	0.165
Φ	3.60	3.96	0.142	0.156

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW20N70ASC	TO-263C	0.04oz(1.16g)	800pcs/reel	1600pcs/box 8000pcs/Carton

Package Dimensions

TO-263C

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.169	0.185
A1	0.00	0.15	0.000	0.006
A2	4.30	4.55	0.169	0.179
B	1.10	1.50	0.043	0.059
b	0.70	0.90	0.028	0.035
b1	1.20	1.50	0.047	0.059
c	0.30	0.60	0.012	0.024
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
L	15.00	15.30	0.591	0.602
L1	5.20	5.40	0.205	0.213
L2	2.40	2.60	0.094	0.102
L3	1.60	1.80	0.063	0.071

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