

650V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	10A
V_{DSS}	650V
R_{DS(on)-typ(@V_{GS}=10V)}	<0.95Ω(Typ:0.79Ω)

FEATURES

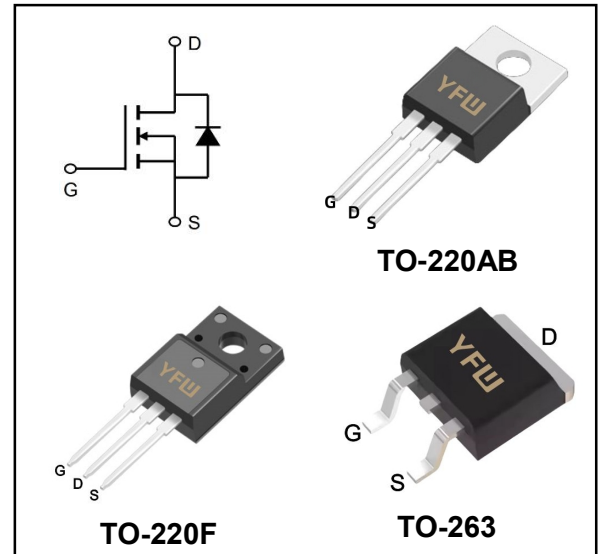
- ◆Fast Switching
- ◆Low ON Resistance
- ◆Low Gate Charge
- ◆100% Single Pulse avalanche energy Test

APPLICATIONS

- ◆Power switch circuit of adaptor and charger.

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	Symbols	Value		Units
		220F	220AB/263/262	
Drain-Source Voltage	V_{DS}	650		V
Gate - Source Voltage	V_{GS}	±30		V
Continuous Drain Current	I_D	10		A
Pulsed Drain Current(note1)	I_{DM}	40		A
Power Dissipation	P_D	31	150	W
Single Pulse Avalanche Energy(note2)	E_{AS}	845		mJ
Operating Junction and Storage Temperature Range	T_J , T_{STG}	-55 to +150		°C
Thermal Resistance, Junction-to-case	R_{θJC}	4	0.83	°C/W
Thermal Resistance, Junction ambient	R_{θJA}	62.5	62.5	°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}	650	690	-	V
Zero Gate Voltage Drain Current	$V_{DS} = 650 V, V_{GS} = 0 V$	I_{DSS}	-	-	1	μA
	$V_{DS}=520V, T_c=125^\circ C$		-	-	10	μA
Gate Source Leakage	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	2.0	-	4	V
Drain-Source On-Resistance	$V_{GS}=10V, I_D=5A$	$R_{DS(ON)}$	-	0.79	0.95	Ω
Forward Transconductance	$V_{DS} = 40V, I_D = 5 A$	gfs	-	11	-	S
Input Capacitance	$V_{DS}=25V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	1720	-	pF
Output Capacitance		C_{oss}	-	140	-	
Reverse Transfer Capacitance		C_{rss}	-	11	-	
Turn-on delay time	$V_{DD}=325V$ $I_D=10A$ $R_G=25\Omega$	$t_{d(on)}$		23		ns
Turn-on Rise Time		T_r		15		ns
Turn-Off Delay Time		$t_{d(OFF)}$		90		ns
Turn-on Fall Time		t_f		30		ns
Total Gate Charge	$V_{DD}=520V$ $I_D=10A$ $V_{GS}=10V$	Q_g	-	32	-	nC
Gate to Source Charge		Q_{gs}	-	5	-	
Gate to Drain Charge		Q_{gd}	-	16	-	
Maximun Body-Diode Continuous Current		I_S	-	-	10	A
Maximun Body-Diode Pulsed Current		I_{SM}	-	-	40	A
Body Diode Voltage	$I_{SD} = 10 A$	V_{SD}	-	-	1.4	V
Reverse Recovery Time	$V_{GS} = 0V, I_S = 10A$ $diF/dt = 100A/\mu s$	t_{rr}	-	310	-	nS
Reverse Recovery Charge		Q_{rr}	-	4.1	-	μC

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

Ratings and Characteristic Curves

Figure 1: Output Characteristics

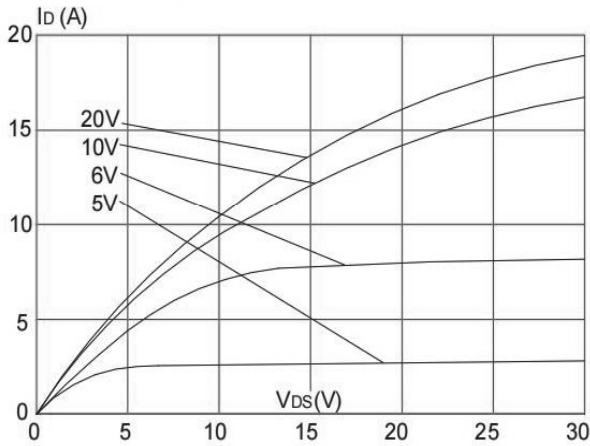


Figure 2: Typical Transfer Characteristics

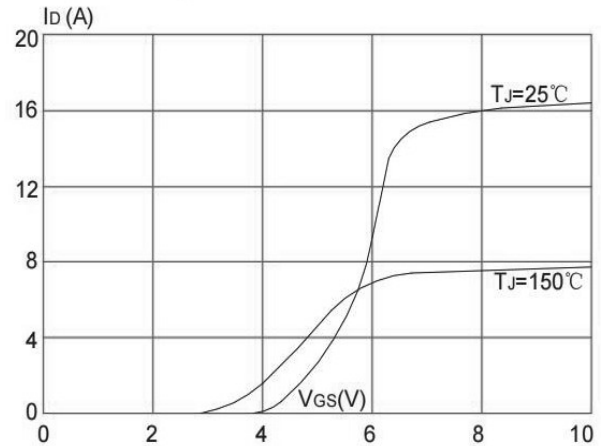


Figure 3: On-resistance vs. Drain Current

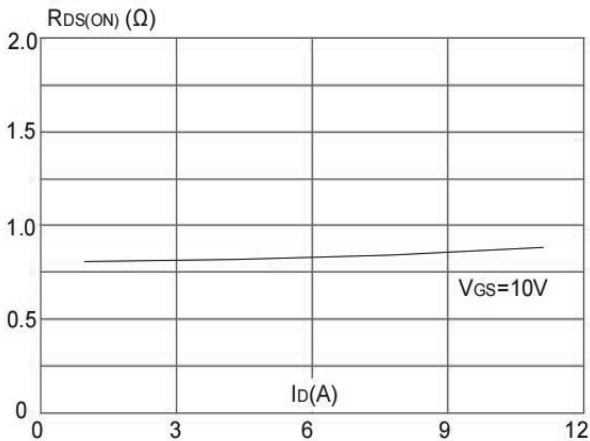


Figure 4: Body Diode Characteristics

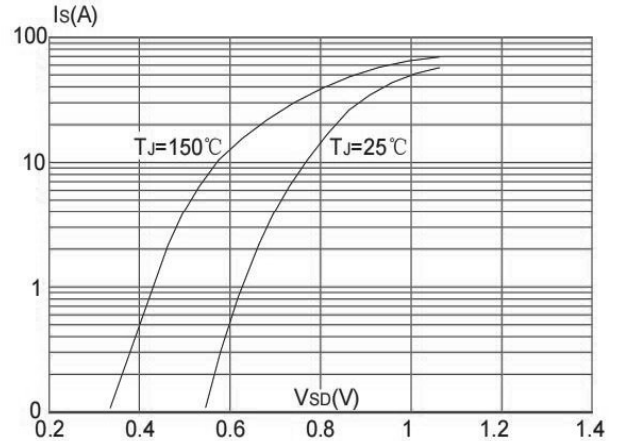


Figure 5: Gate Charge Characteristics

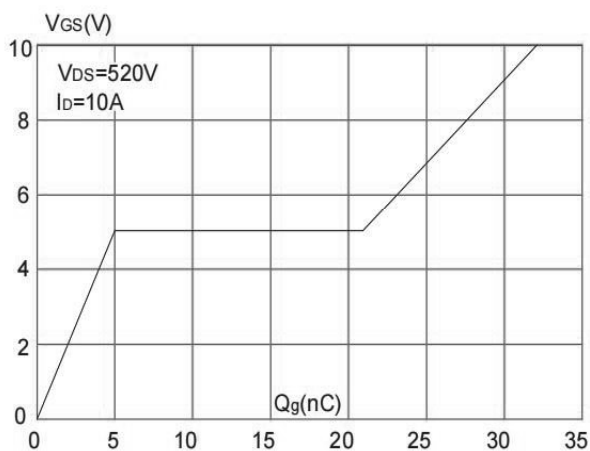
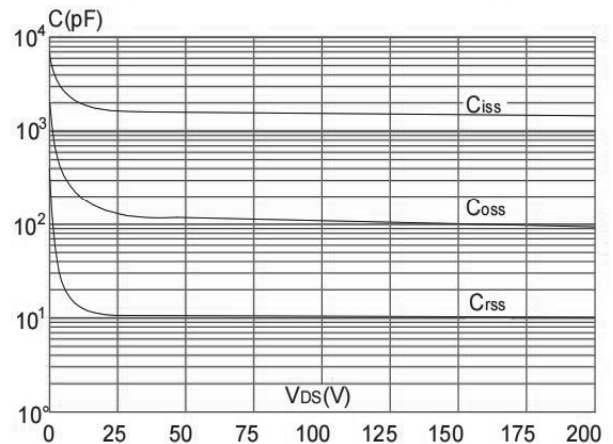


Figure 6: Capacitance Characteristics



Ratings and Characteristic Curves

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

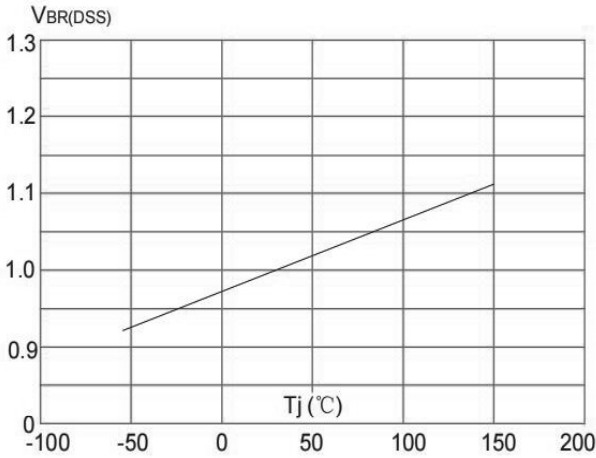


Figure 8: Normalized on Resistance vs. Junction Temperature

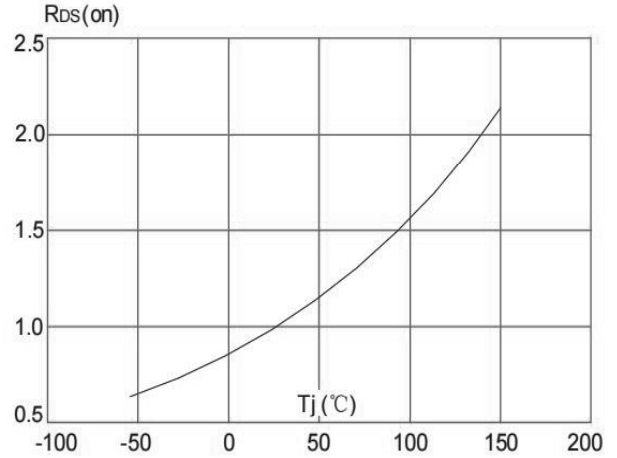


Figure 9: Maximum Safe Operating Area

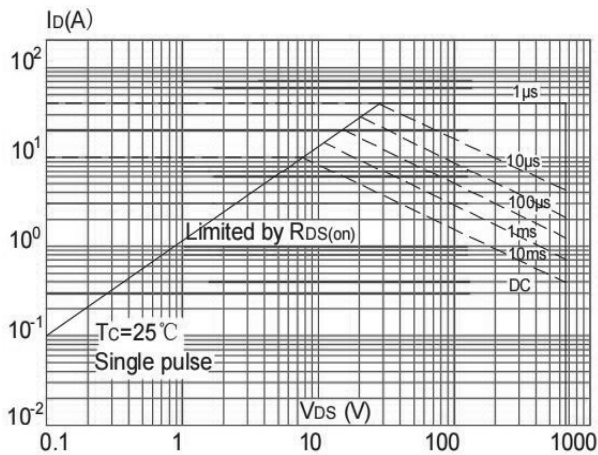


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

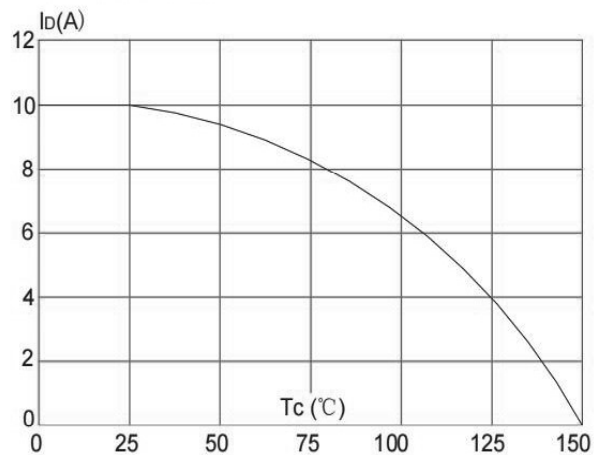
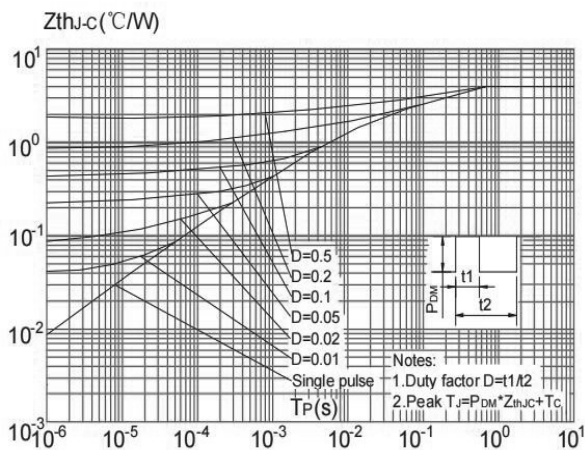
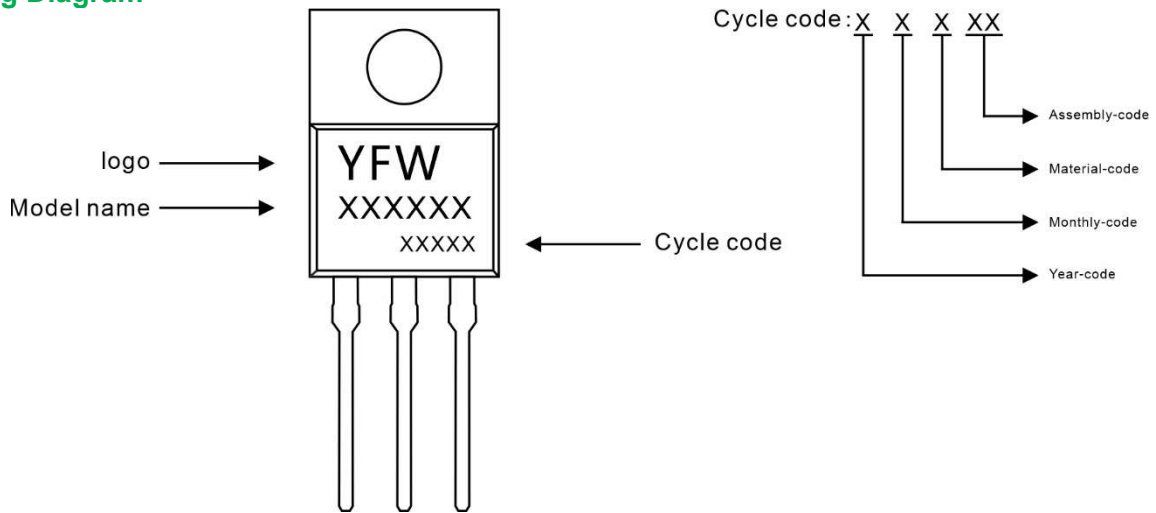


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Marking Diagram



Ordering information

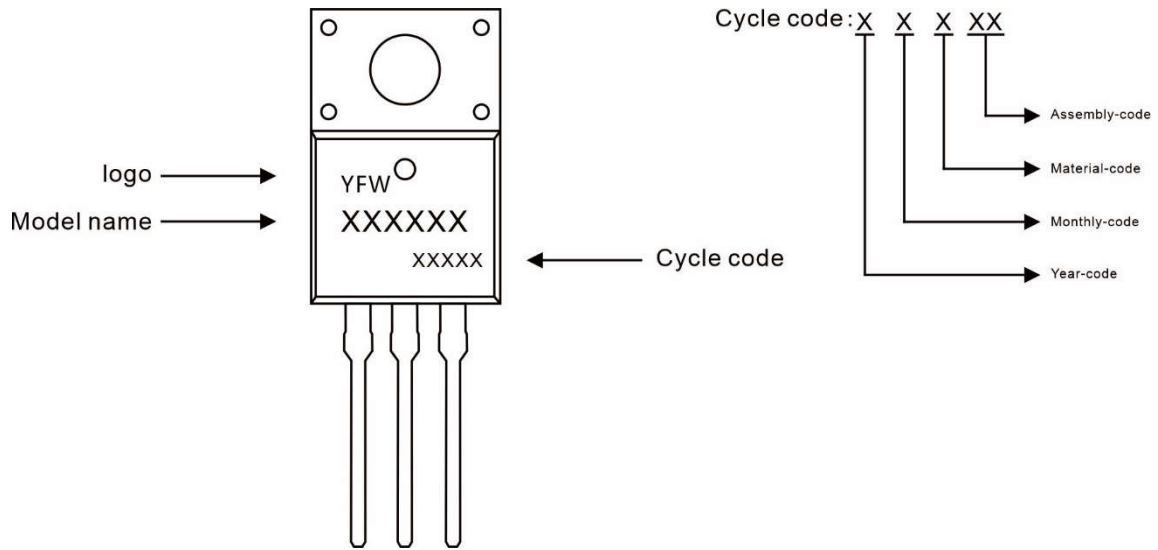
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW10N65AT	TO-220AB	0.07oz(1.96g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

Package Dimensions

TO-220AB

Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.169	0.185
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

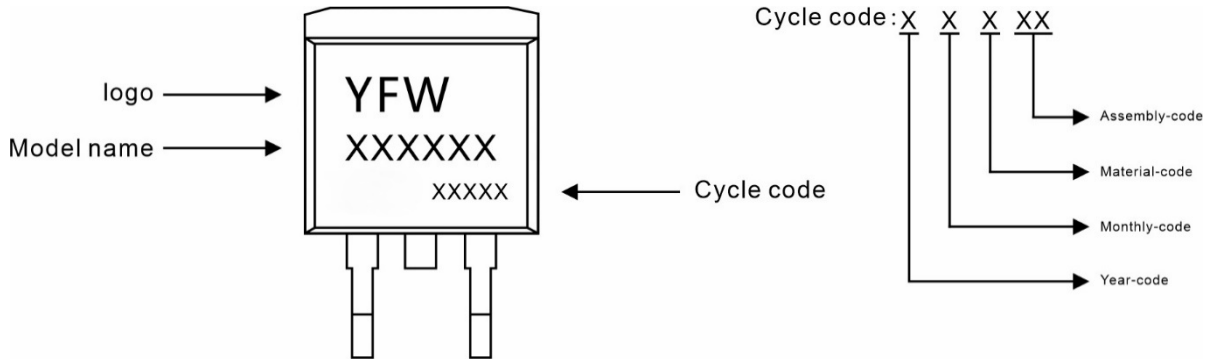
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW10N65AF	TO-220F	0.06oz(1.74g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

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
YFW10N65AS	TO-263	0.04oz(1.16g)	800pcs/reel	1600pcs/box 8000pcs/Carton

Package Dimensions

TO-263

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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