

650V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

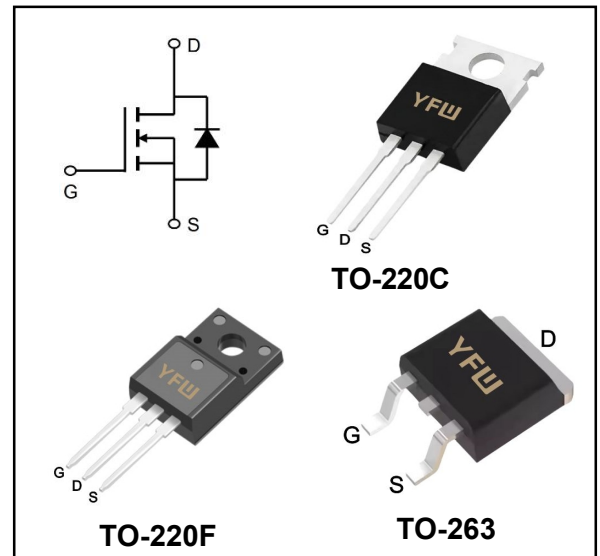
I_D	10A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$<1.0\Omega$ (Type: 0.8Ω)

Features

- ◆Fast Switching
- ◆Low ON Resistance
- ◆Low Gate Charge
- ◆100% Single Pulse avalanche energy Test
- ◆LeadfreeincomplywithEURoHS2011/65/EUdirectives

Mechanical Data

- ◆Case: Molded plastic
- ◆Mounting Position: Any
- ◆Molded Plastic: UL Flammability Classification Rating 94V-0
- ◆Solder bath temperature275℃maximum,10s per JESD22-106



Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value			Units
		220C	220F	263	
Drain-Source Voltage	V _{DS}	650			V
Gate-Source Voltage	V _{GS}	±30			V
Continue Drain Current-Continuous (TC = 25°C)	I _D	10			A
-Continuous (TC = 100°C)		6			
Pulsed Drain Current (Note1)	I _{DM}	40			A
Power Dissipation	P _D	150	50	150	W
-Derate above 25°C		1.23	0.38	1.23	W/°C
Single Pulse Avalanche Energy (Note2)	E _{AS}	690			mJ
Avalanche Current (Note 1)	I _{AR}	10			A
Repetitive Avalanche Energy (Note 1)	E _{AS}	17			mJ
Operating Temperature Range	T _J	150			°C
Storage Temperature Range	T _{STG}	-55 to +150			°C
Thermal Resistance, Junction to Case	R _{θJC}	0.96	3.13	0.96	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	62.5	62.5	62.5	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	-	-	1	μA
	$V_{DS} = 520\text{ V}, T_c = 125^\circ\text{C}$		-	-	10	
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	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	$R_{DS(on)}$	-	0.8	1.0	Ω
Forward Transconductance	$V_{DS} = 40\text{ V}, I_D = 5\text{ A}$	g_{fs}	-	9.5	-	S
Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	1692	-	pF
Output Capacitance		C_{oss}	-	128	-	
Reverse Transfer Capacitance		C_{rss}	-	7	-	
Turn-on Delay Time	$I_D = 10\text{ A}, V_{DD} = 325\text{ V}, R_G = 25\Omega(\text{Note3,4})$	$t_d(ON)$	-	27	-	nS
Rise Time		t_r	-	22	-	
Turn-Off Delay Time		$t_d(OFF)$	-	53	-	
Fall Time		t_f	-	24	-	
Total Gate Charge	$I_D = 10\text{ A}, V_{DD} = 520\text{ V}, V_{GS} = 10\text{ V}(\text{Note3,4})$	Q_G	-	35	-	nC
Gate to Source Charge		Q_{GS}	-	8	-	
Gate to Drain Charge		Q_{GD}	-	12	-	

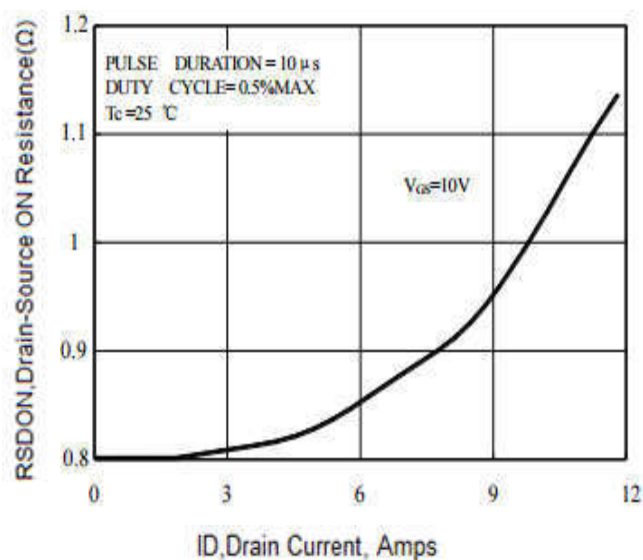
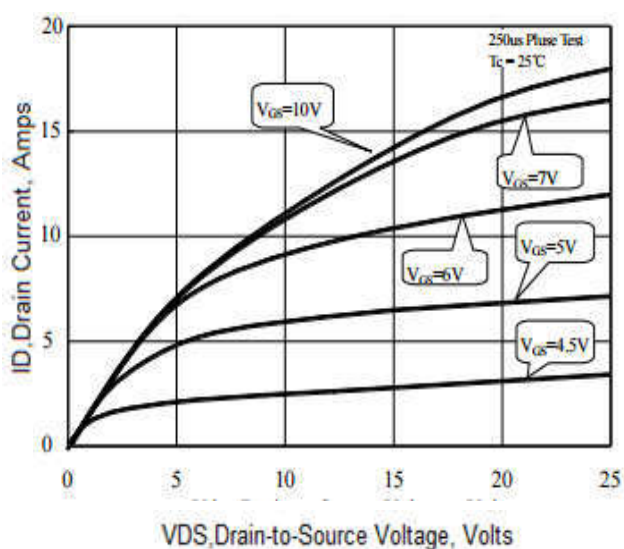
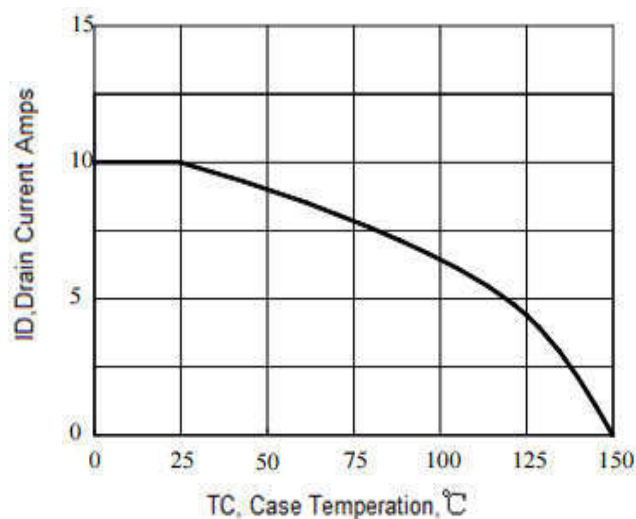
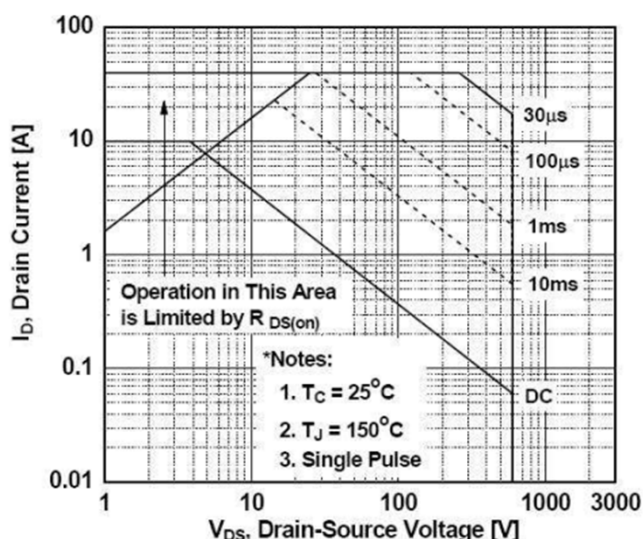
Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Maximum Body-Diode Continuous Current		I_S	-	-	10	A
Maximum Body-Diode Pulsed Current		I_{SM}	-	-	40	A
Drain-Source Diode Forward Voltage	$I_{SD} = 10\text{ A}$	V_{SD}	-	-	1.5	V
Reverse Recovery Time	$I_{SD} = 10\text{ A}, V_{GS} = 0\text{ V},$ $dI_F / dt = 100\text{ A}/\mu\text{s}$ (Note3)	t_{rr}	-	528	-	nS
Reverse Recovery Charge		Q_{rr}	-	3.22	-	uC

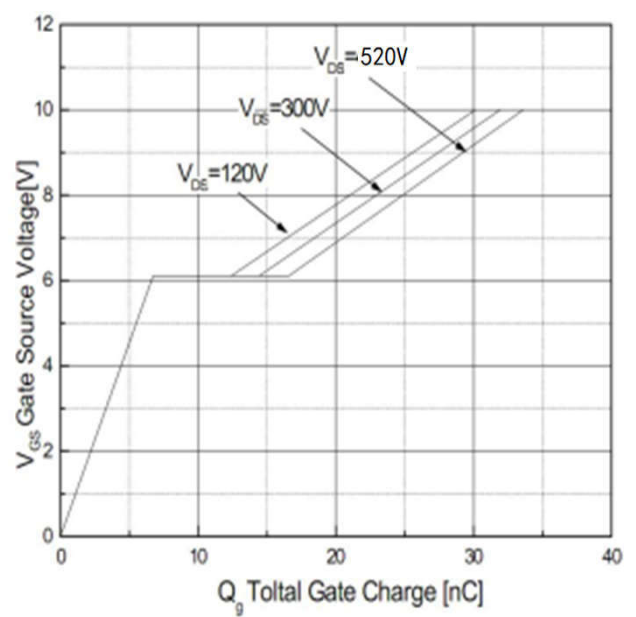
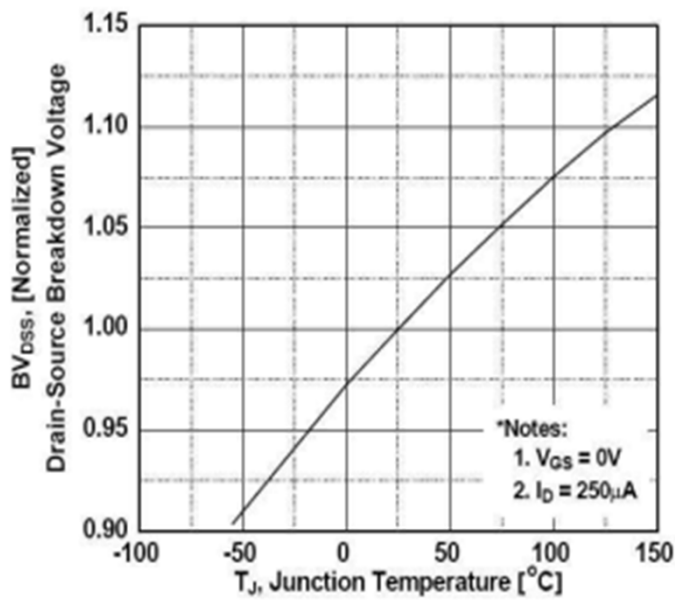
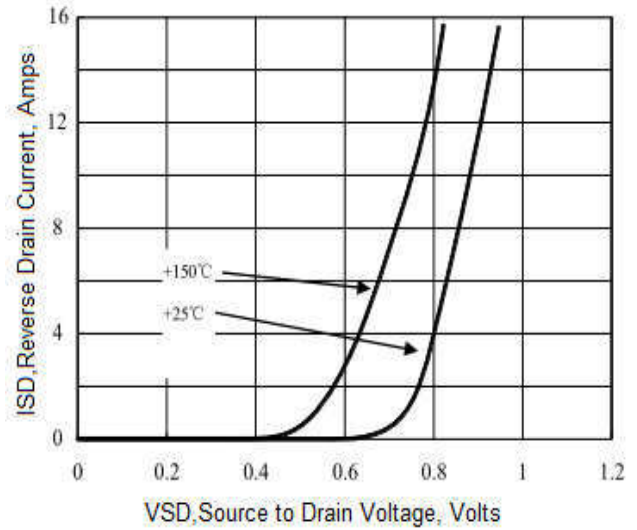
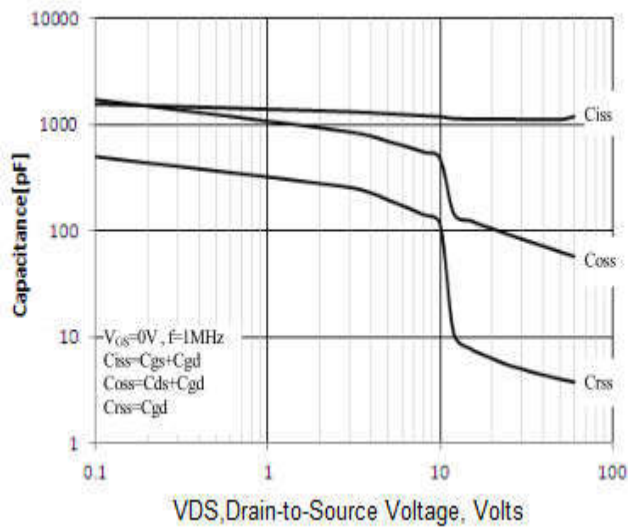
Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $I_{AS} = 10\text{ A}$, $V_{DD} = 50\text{ V}$, $L = 14\text{mH}$, $R_G = 25\Omega$, starting $T_J = 25^\circ\text{C}$.
3. ulse test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycles $\leq 2\%$.
4. Essentially Independent of Operating Temperature.

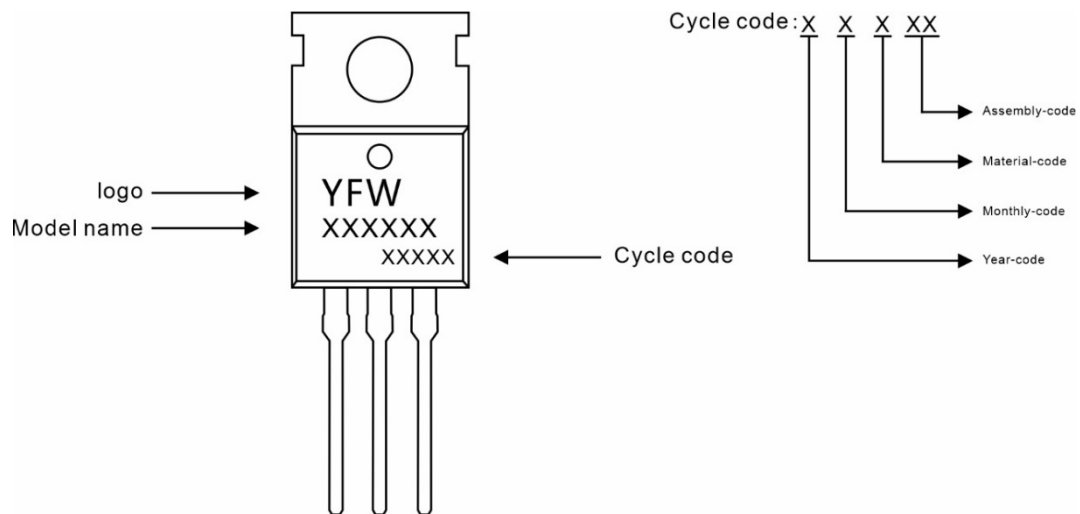
Ratings and Characteristic Curves



Ratings and Characteristic Curves



Marking Diagram



Ordering information

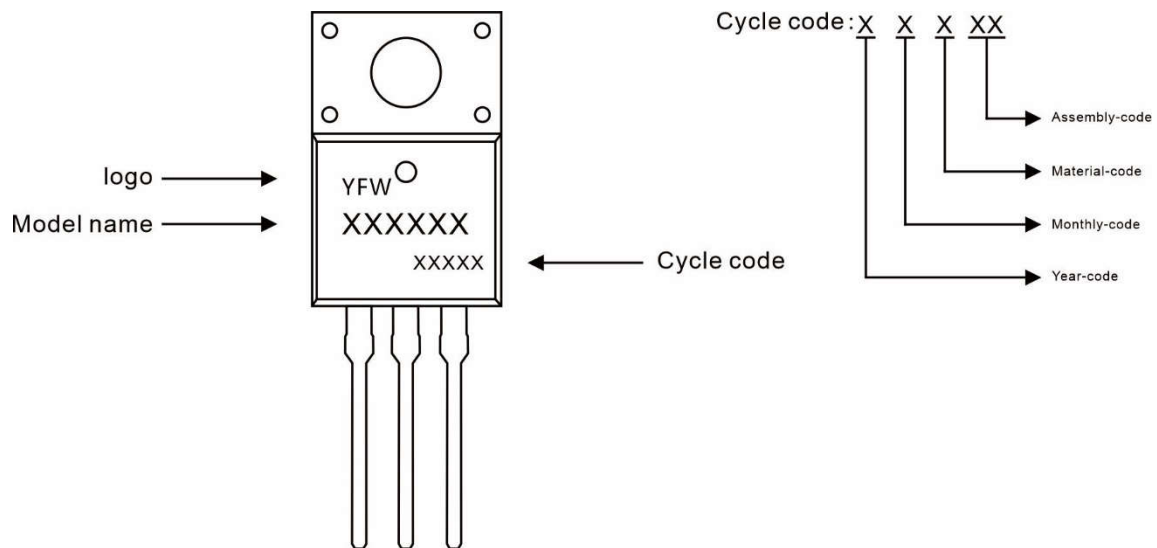
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW10N65BC	TO-220C	0.07oz(1.96g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

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

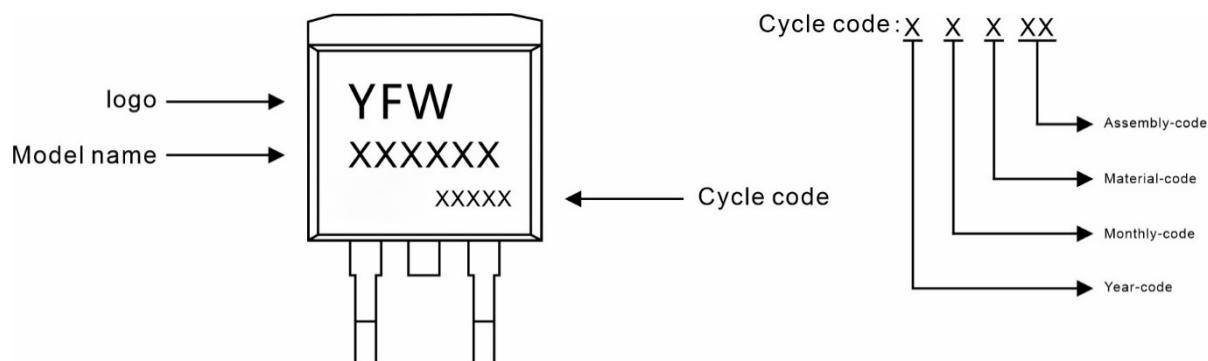
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW10N65BF	TO-220F	0.06oz(1.74g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

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
YFW10N65BS	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

Disclaimer

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