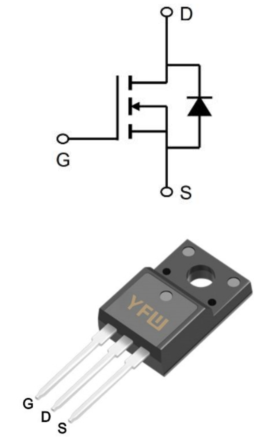
650V N-channel Super Junction MOSFET

MAIN CHARACTERISTICS

I_D	28A
V_{DSS}	650V
R_{DSON}-typ(@V_{GS}=10V)	＜120mΩ**(Typ:105mΩ)**



TO-220F

DESCRIPTION

The YFW65R120AF is Super JunctionMOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance.

YFW65R120AF is suitable for applications which require superior power density and outstanding efficiency

APPLICATION

- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS}=0V）	V_{DS}	650	V
Gate-Source Voltage (V_{DS}=0V) AC (f>1 Hz)	V_{GS}	±30	V
Continuous Drain Current at Tc=25°C	I_D	28	A
Continuous Drain Current at Tc=100°C	I_D	18	A
Pulsed drain current (Note1)	I_{DM}	112	A
Maximum Power Dissipation(Tc=25℃)	P_D	62.5	W
Single pulse avalanche energy (Note2)	E_{AS}	676	mJ
Avalanche current(Note1)	I_{AR}	5.2	A
Repetitive Avalanche energy，tAR limited by Tjmax (Note 1)	E_{AR}	3.2	mJ
Thermal Resistance，Junction-to-Case（Maximum）	$R_{\theta JC}$	2.0	°C /W
Thermal Resistance，Junction-to-Ambient （Maximum）	$R_{\theta JA}$	62	°C /W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	**BV_{DSS}**	650			**V**
Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=650V,V_{GS}=0V	**I_{DSS}**			1	**μA**
Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=650V,V_{GS}=0V	**I_{DSS}**			100	**μA**
Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	**I_{GSS}**			±100	**nA**
Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	**$V_{GS(th)}$**	3.0	3.5	4.5	**V**
Drain-Source On-State Resistance	V_{GS}=10V, I_D=14A	**$R_{DS(ON)}$**		105	120	**mΩ**
Input Capacitance	V_{DS}=50V, V_{GS}=0V, F=1.0MHz	**C_{iss}**		2070		**pF**
Output Capacitance		**C_{oss}**		120		
Reverse Transfer Capacitance		**C_{rss}**		0.5		
Total Gate Charge	V_{DS}=480V I_D=28A V_{GS}=10V	**Q_g**		37.5		**nC**
Gate-Source Charge		**Q_{gs}**		13		
Gate-Drain Charge		**Q_{gd}**		11.5		
Intrinsic gate resistance	f = 1 MHz open drain	**R_G**		10		**Ω**
Turn-on Delay Time	V_{DD}=380V,I_D=14A, R_G=2.3Ω,V_{GS}=10V	**$t_{d(on)}$**		14		**nS**
Turn-on Rise Time		**T_r**		12		
Turn-Off Delay Time		**$t_{d(OFF)}$**		65		
Turn-Off Fall Time		**t_f**		11		
Source-drain current(Body Diode)	T_C=25°C	**I_{SD}**			28	**A**
Pulsed Source-drain current(Body Diode)		**I_{SDM}**			112	**A**
Forward On Voltage	Tj=25°C,I_{SD}=28A,V_{GS}=0V	**V_{SD}**		0.9	1.2	**V**
Reverse Recovery Time	Tj=25°C,I_F=14A,di/dt=100A/μs	**t_{rr}**		350		**nS**
Reverse Recovery Charge		**Q_{rr}**		5.4		**uC**
Peak Reverse Recovery Current		**Irrm**		31		**A**

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature
2. Tj=25℃,VDD=50V,V_G=10V, R_G=25Ω

Typical Characteristics

Figure1. Safe operating area

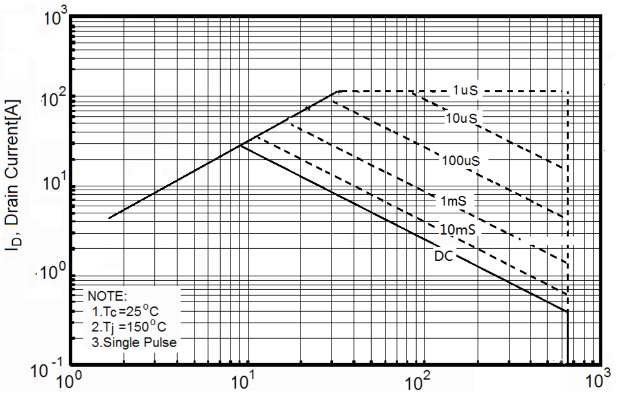


Figure2. Transient Thermal Impedance

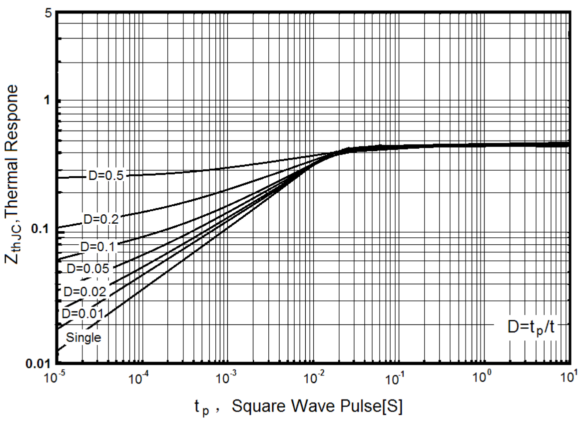


Figure3. Source-Drain Diode Forward Voltage

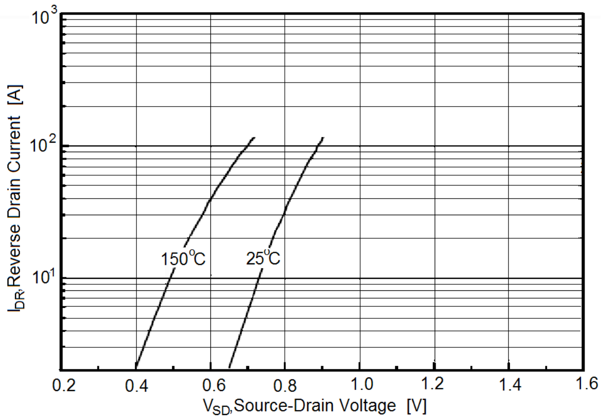


Figure4. Output characteristics

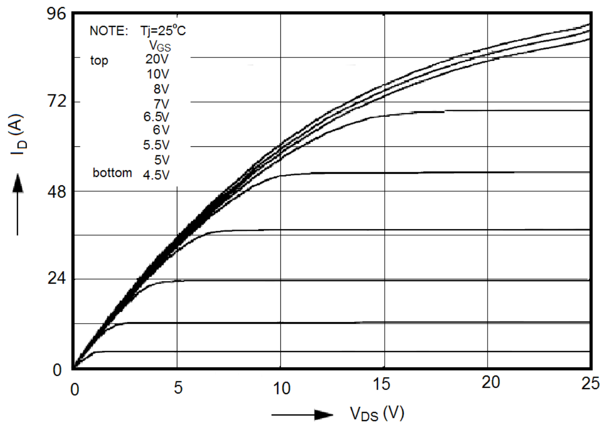


Figure5. Transfer characteristics

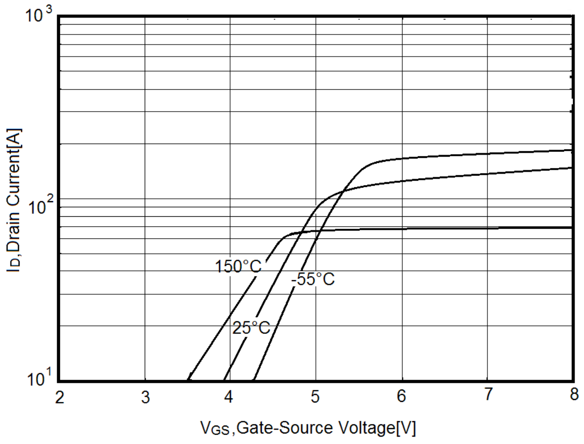
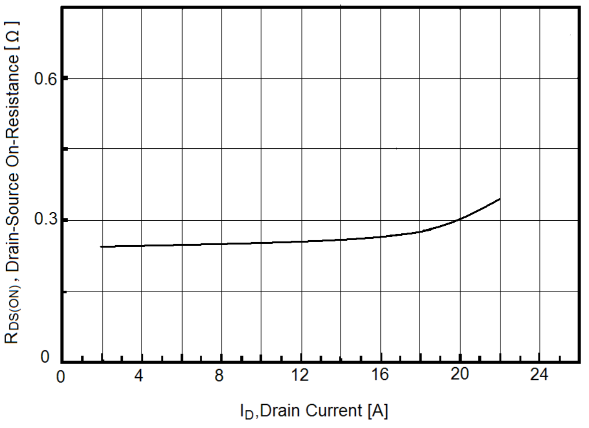


Figure6. Static drain-source on resistance



Typical Characteristics

Figure7. $R_{DS(ON)}$ vs Junction Temperature

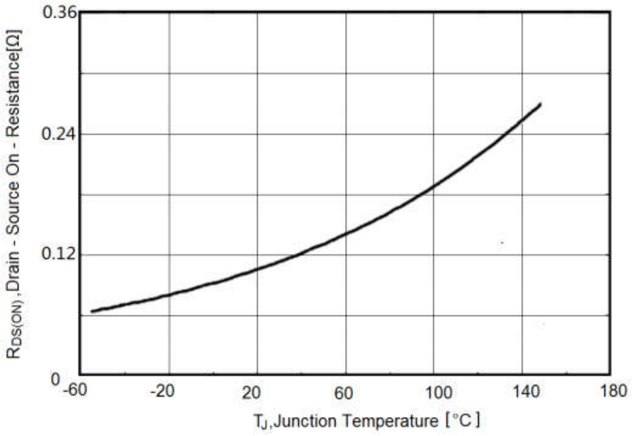


Figure8. BV_{DSS} vs Junction Temperature

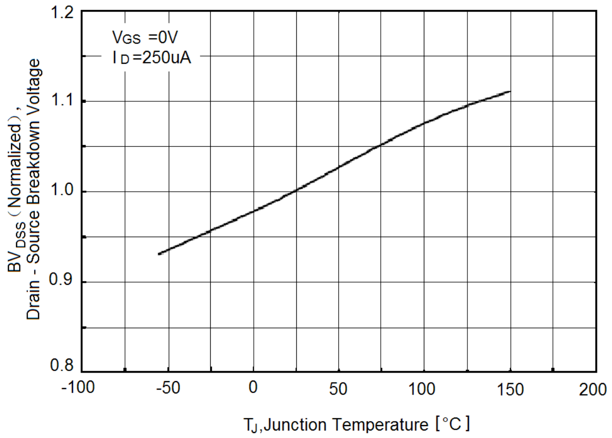


Figure9. Maximum I_D vs Junction Temperature

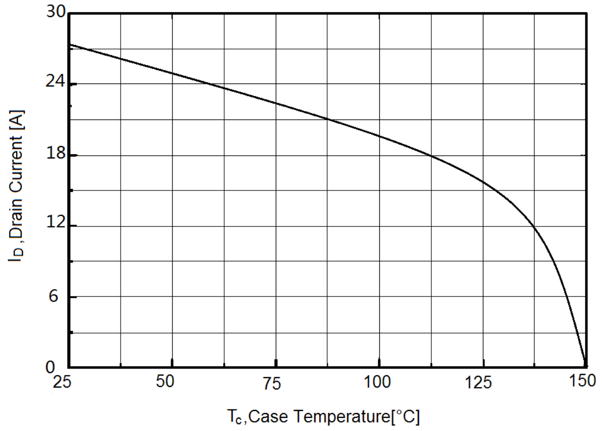


Figure10. Gate charge waveforms

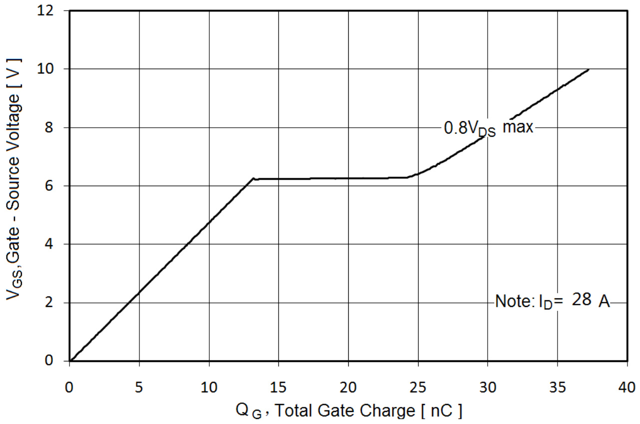
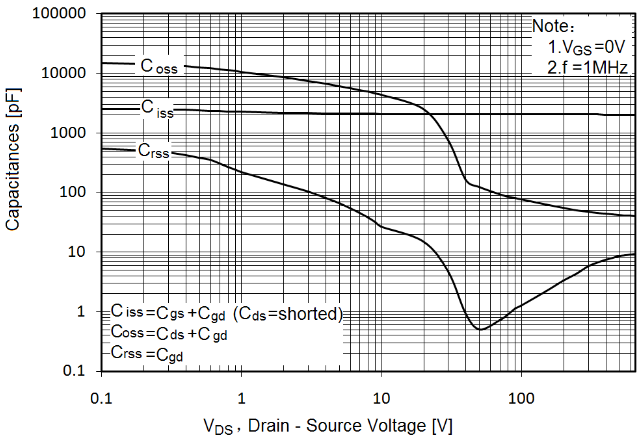
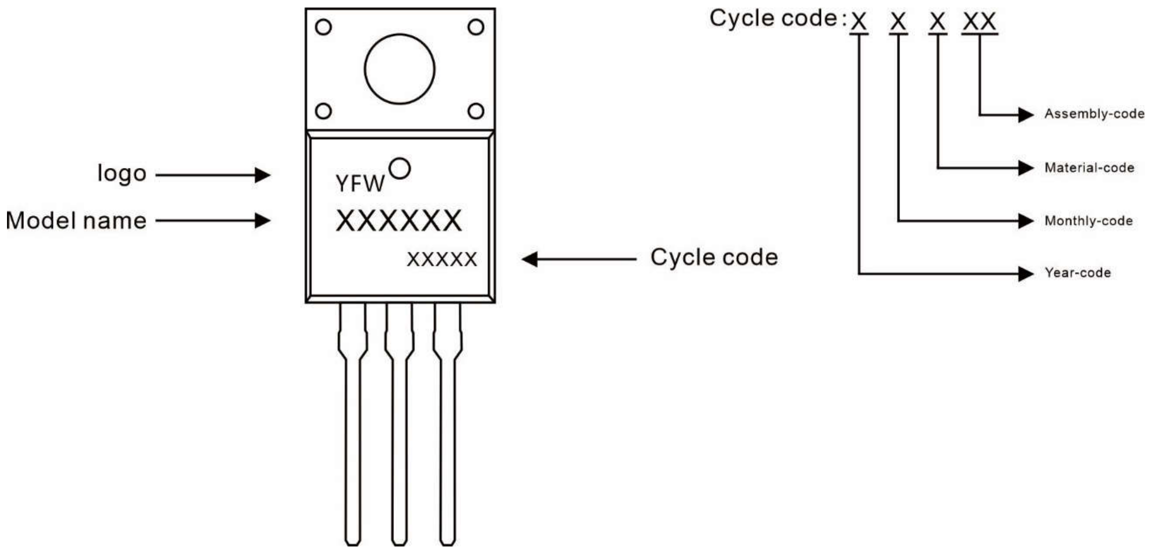


Figure11. Capacitance



Marking Diagram

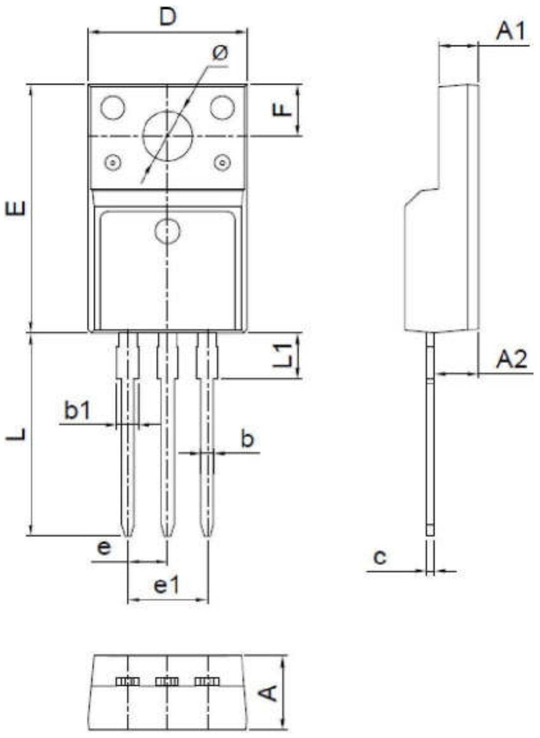


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW65R120AF	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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