

650V N-CHANNEL ENHANCEMENT MODE MOSFET

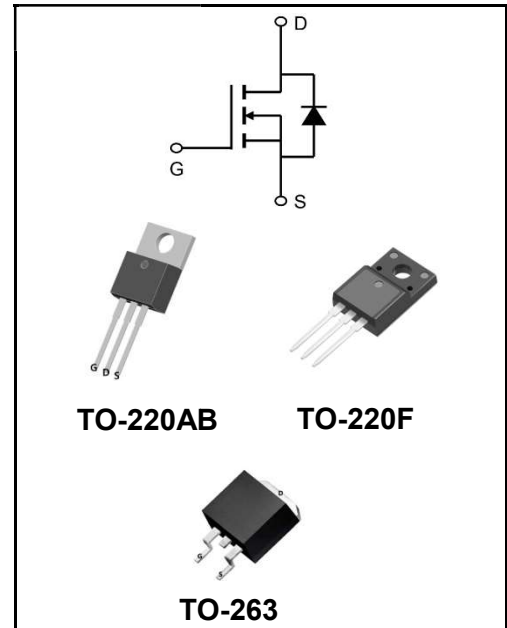
MAIN CHARACTERISTICS

I_D	12A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$< 0.72\Omega$ (Type:0.6 Ω)



Application

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



Product Specification Classification

Part Number	Package	Marking	Pack
YFW12N65AT	TO-220AB	YFW 12N65AT XXXXX	1000PCS/Tape
YFW12N65AF	TO-220F	YFW 12N65AF XXXXX	1000PCS/Tape
YFW12N65AS-R	TO-263	YFW 12N65AS XXXXX	800PCS/Tube

Maximum Ratings at $T_c=25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DS}	650	V
Continuous Drain Current	I_D	12	A
Pulsed Drain Current(note1)	I_{DM}	44	A
Gate - Source Voltage	V_{GS}	± 30	V
Single Pulse Avalanche Energy(note2)	E_{AS}	304	mJ
Avalanche Current(note1)	I_{AR}	7.7	A
Repetitive Avalanche Energy(note1)	E_{AR}	65	mJ
Power Dissipation($T_c=25^\circ\text{C}$)	P_D	32.1	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$
Thermal Resistance, Junction-to-case	$R_{\theta JC}$	1.92	$^\circ\text{C/W}$
Thermal Resistance, Junction ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	V(BR)DSS	650	685	-	V
Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	-	-	1	μA
Gate Source Leakage	$V_{GS}=\pm 30V$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	V_{GS(th)}	2.0	3.5	4	V
Drain-Source On-Resistance (Note3)	$V_{GS}=10V, I_D=5.5A$	R_{DS(ON)}	-	0.6	0.72	Ω
Input Capacitance	$V_{DS}=25V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	1528	-	pF
Output Capacitance		C_{oss}	-	147	-	
Reverse Transfer Capacitance		C_{rss}	-	16	-	
Total Gate Charge	$V_{DD}=520V$ $I_D=11A$ $V_{GS}=10V$	Q_g	-	46	-	nC
Gate-Source Charge		Q_{gs}	-	7	-	
Gate-Drain Charge		Q_{gd}	-	23	-	
Turn-on delay time	$V_{DD}=325V$ $I_D=11A$ $R_G=25\Omega$	t_{d(on)}	-	43	-	ns
Turn-on Rise Time		T_r	-	29	-	
Turn-Off Delay Time		t_{d(OFF)}	-	196	-	
Turn-on Fall Time		t_f	-	51	-	
Continuous Body Diode Current	$T_C=25^\circ C$	I_S	-	-	11	A
Pulsed Diode Forward Current		I_{SM}	-	-	44	A
Body Diode Voltage	$T_J=25^\circ C, I_{SD}=5.5A, V_{GS}=0V$	V_{SD}	-	-	1.4	V
Reverse Recovery Time	$V_{GS}=0V, I_S=11A$ $diF/dt=100A/\mu s$	t_{rr}	-	482	-	nS
Reverse Recovery Charge		Q_{rr}	-	2.85	-	uC

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2、The EAS data shows Max. rating . IAS = 11A, VDD = 50V, RG = 25 Ω, Starting TJ = 25 °C
- 3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

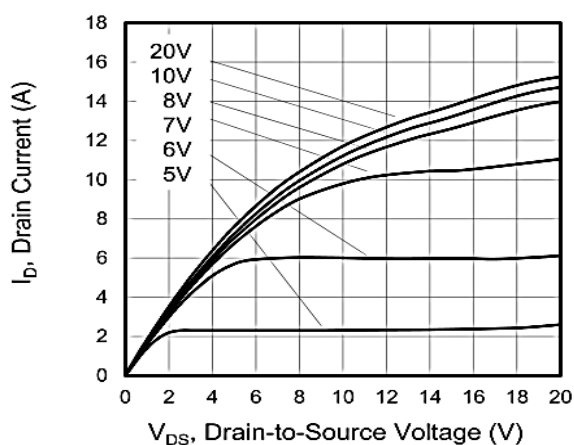


Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

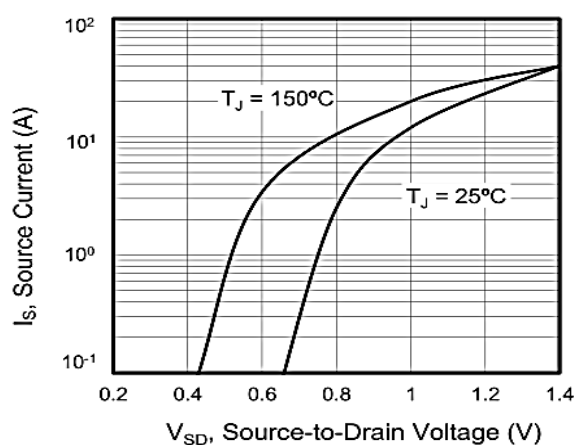


Figure 2. Body Diode Forward Voltage

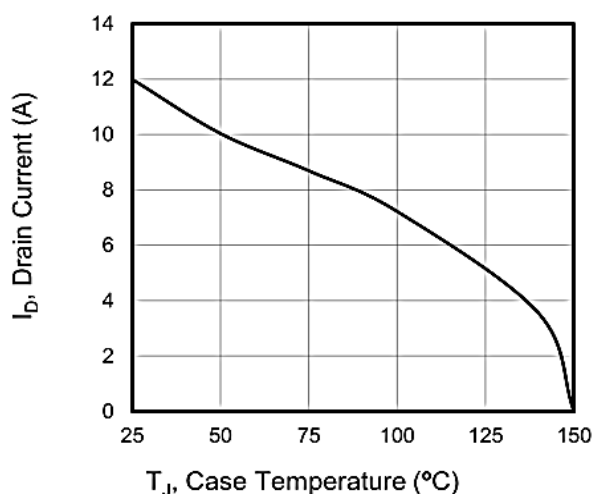


Figure 3. Drain Current vs. Temperature

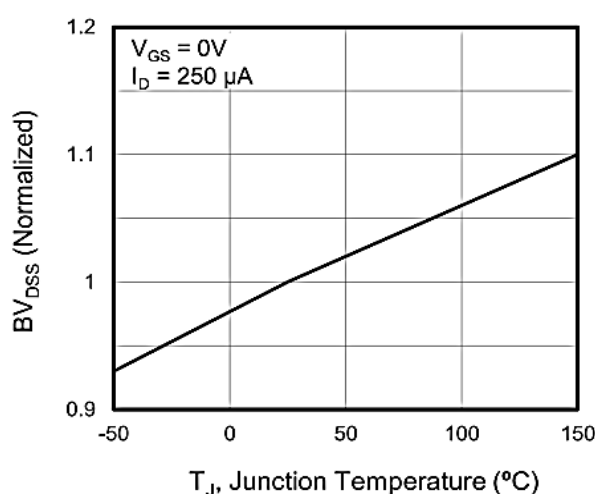


Figure 4. BV DSS Variation vs. Temperature

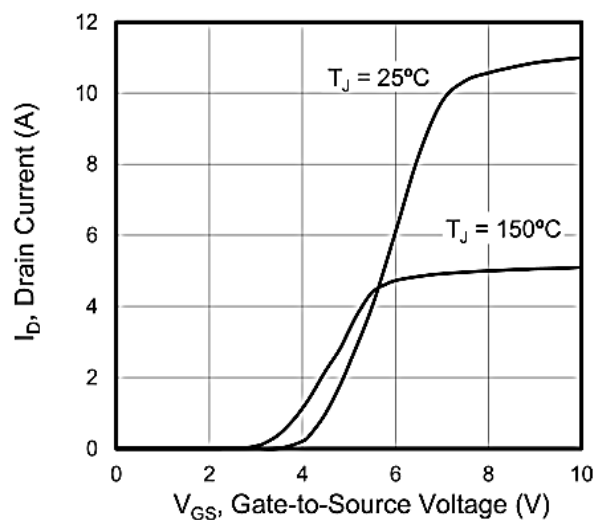


Figure 5. Transfer Characteristics

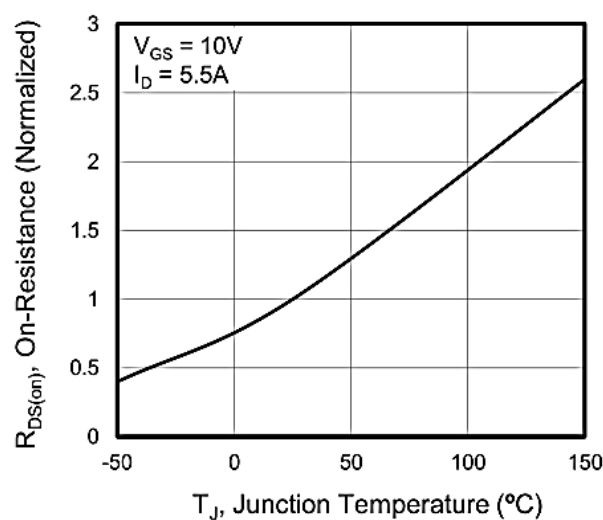


Figure 6. On-Resistance vs. Temperature

Ratings and Characteristic Curves

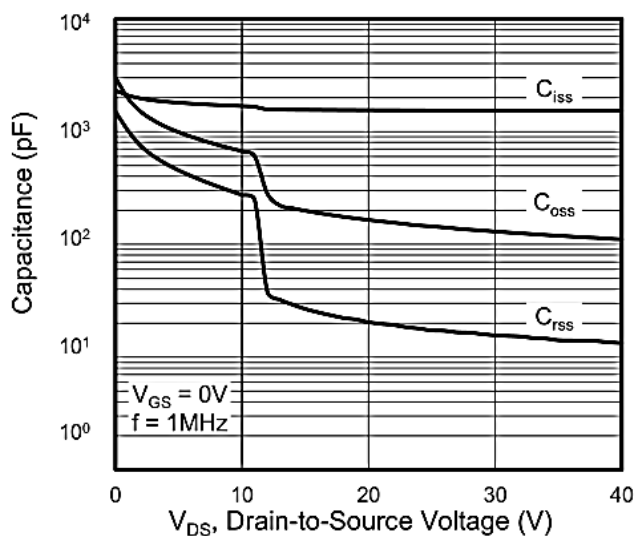
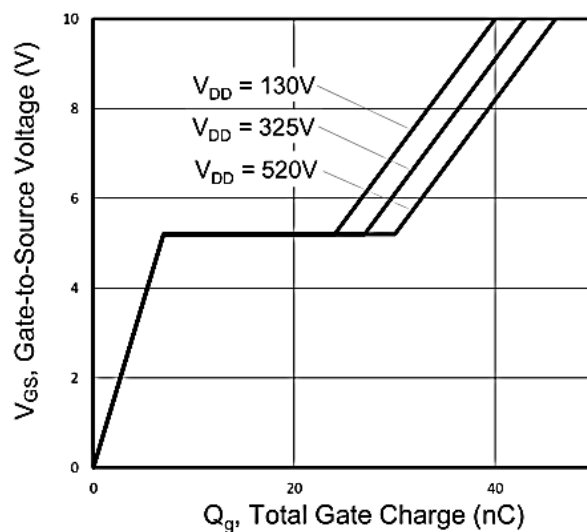


Figure 7. Capacitance Figure



8. Gate Charge

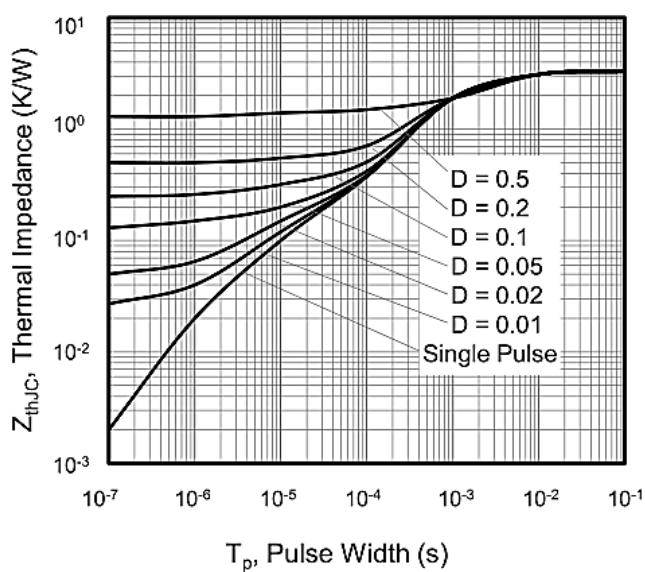
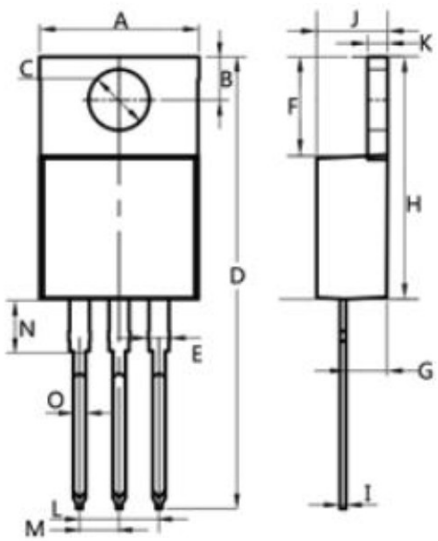


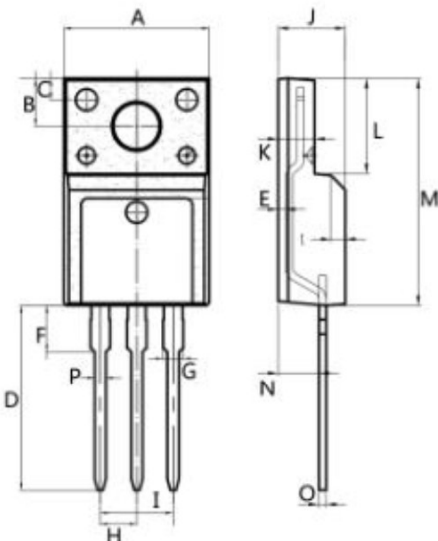
Figure 9. Transient Thermal Impedance

Package Outline Dimensions Millimeters

TO-220AB

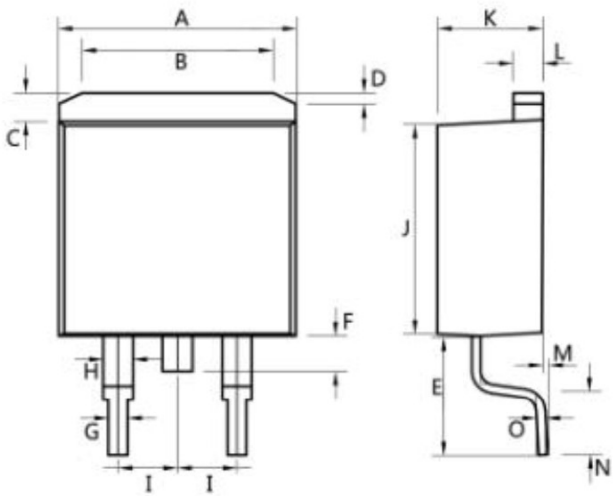
	Dim.	Min.	Max.
	A	10.15	10.35
	B	2.65	2.95
	C	3.70	3.90
	D	28.5	29.5
	E	1.30	1.45
	F	6.35	6.55
	G	2.9	3.3
	H	15.0	16.0
	I	0.38	0.42
	J	4.45	4.55
	K	1.25	1.35
	L	Typ 5.08	
	M	Typ 2.54	
	N	3.1	3.3
	O	0.76	0.84
All Dimensions in millimeter			

TO-220F

	Dim.	Min.	Max.
	A	9.95	10.25
	B	2.95	3.25
	C	1.25	1.45
	D	12.95	13.25
	E	0.50	0.65
	F	3.1	3.3
	G	1.30	1.45
	H	Typ 2.54	
	I	Typ 5.08	
	J	4.60	4.75
	K	2.50	2.65
	L	6.35	6.55
	M	15.4	16.0
	N	2.75	3.05
	O	0.48	0.52
	P	0.76	0.84
All Dimensions in millimeter			

Package Outline Dimensions Millimeters

TO-263

	Dim.	Min.	Max.
	A	10.1	10.2
	B	7.4	7.6
	C	1.3	1.5
	D	0.55	0.75
	E	5.0	6.0
	F	1.4	1.6
	G	0.78	0.86
	H	1.2	1.3
	I	Typ2.54	
	J	8.4	8.6
	K	4.45	4.55
	L	1.25	1.35
	M	0.02	0.1
	N	2.4	2.8
	O	0.36	0.40
All Dimensions in millimeter			