

650V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	20A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	<0.5Ω (Type:0.37 Ω)

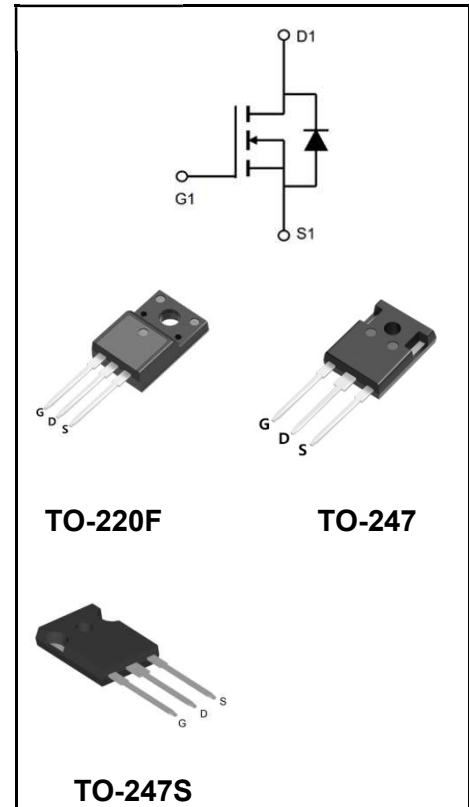
Features

- ◆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°C maximum,10s per JESD22-106



Product Specification Classification

Part Number	Package	Marking	Pack
YFW20N65AF	TO-220F	YFW 20N65AF XXXXX	50PCS/Tube
YFW20N65AP	TO-247	YFW 20N65AP XXXXX	30PCS/Tube
YFW20N65APS	TO-247S	YFW 20N65APS XXXXX	30PCS/Tube

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		220F	247/247S	
Drain-Source Voltage	V_{DS}	650		V
Gate-Source Voltage	V_{GS}	±30		V
Continue Drain Current	I_D	20		A
-Continuous (TC = 100°C)		13		
Pulsed Drain Current (Note1)	I_{DM}	80		A
Power Dissipation	P_D	85	230	W
-Derate above 25°C		0.65	0.58	W/°C
Single Pulse Avalanche Energy (Note2)	E_{AS}	1250		mJ
Avalanche Current (Note 1)	I_{AR}	20		A
Repetitive Avalanche Energy (Note 1)	E_{AS}	37		mJ
Operating Temperature Range	T_J	150		°C
Storage Temperature Range	T_{STG}	-55 to +150		°C
Thermal Resistance, Junction to Case	R_{θJC}	1.47	0.5	°C/W
Thermal Resistance, Junction to Ambient	R_{θJA}	62.5	48.5	°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 V, I _D = 250 μA	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	V _{DS} = 650 V, V _{GS} = 0 V	I_{DSS}	-	-	1	uA
	V _{DS} = 520 V, T _c = 125°C		-	-	10	
Gate Leakage Current	V _{GS} = ± 30 V, V _{DS} = 0 V	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	V_{GS(th)}	2	-	4	V
Drain-Source On-State Resistance	V _{GS} = 10 V, I _D = 10A	R_{DS(on)}	-	0.37	0.5	Ω
Forward Transconductance	V _{DS} = 40 V, I _D = 10 A	g_{fs}	-	18	-	S
Input Capacitance	V _{GS} = 0 V, V _{DS} = 25 V, f = 1MHz	C_{iss}	-	2567	-	pF
Output Capacitance		C_{oss}	-	290	-	
Reverse Transfer Capacitance		C_{rss}	-	20	-	
Turn-on Delay Time	I _D = 20, V _{DD} = 325V, R _G =10Ω(Note3,4)	td(ON)	-	39	-	nS
Rise Time		tr	-	80	-	
Turn-Off Delay Time		td(OFF)	-	94	-	
Fall Time		tf	-	63	-	
Total Gate Charge	I _D =20 A, V _{DD} = 520 V, V _{GS} = 10 V(Note3,4)	Q_G	-	65	-	nC
Gate to Source Charge		Q_{GS}	-	14	-	
Gate to Drain Charge		Q_{GD}	-	24	-	

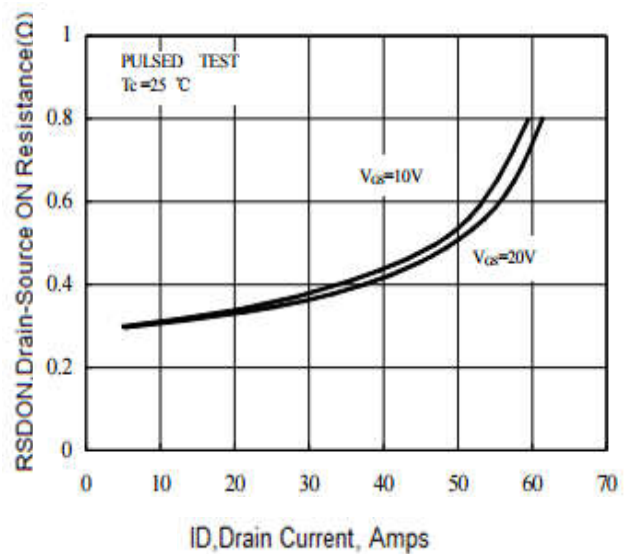
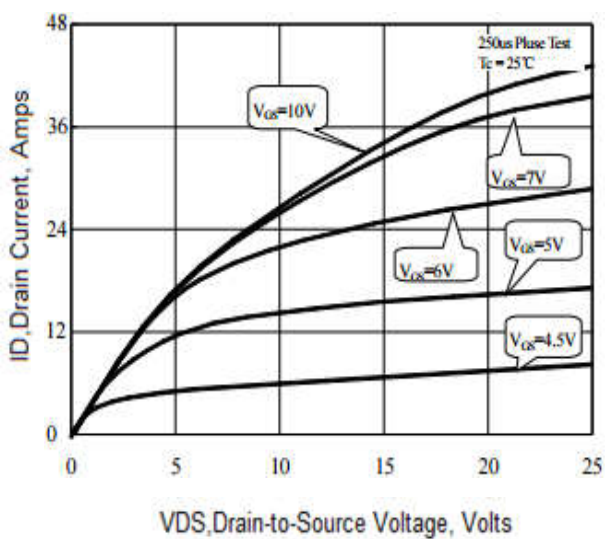
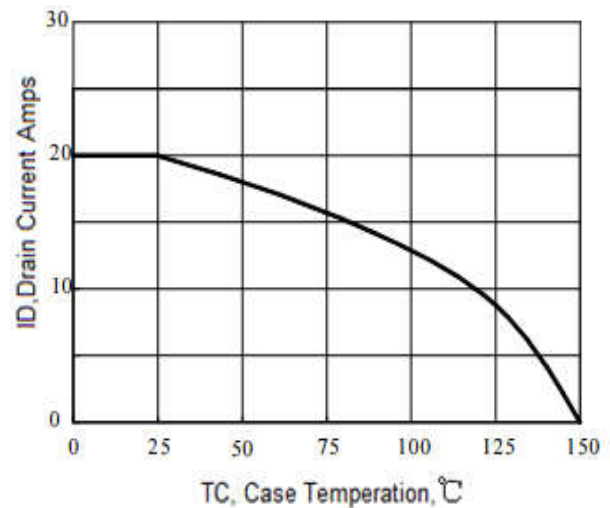
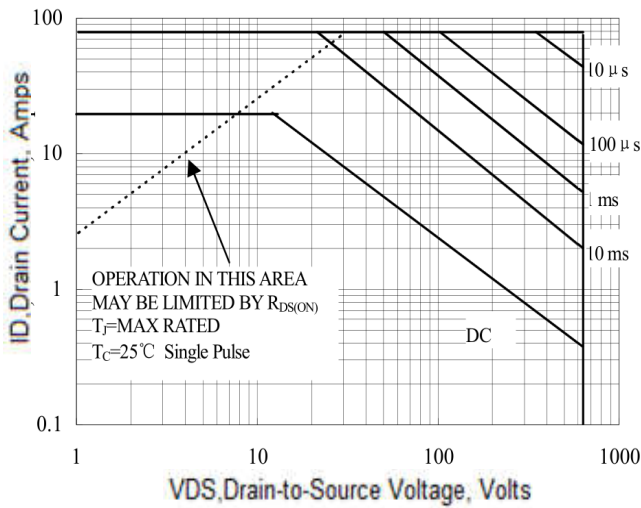
Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Maximun Body-Diode Continuous Current		I_S	-	-	20	A
Maximun Body-Diode Pulsed Current		I_{SM}	-	-	80	A
Drain-Source Diode Forward Voltage	$I_{SD} = 20A$	V_{SD}	-	-	1.4	V
Reverse Recovery Time	$I_{SD} = 20A, V_{GS} = 0V,$ $di_F / dt = 100 A/\mu s(\text{Note}3)$	trr	-	630	-	nS
Reverse Recovery Charge		Q_{rr}	-	7.4	-	uC

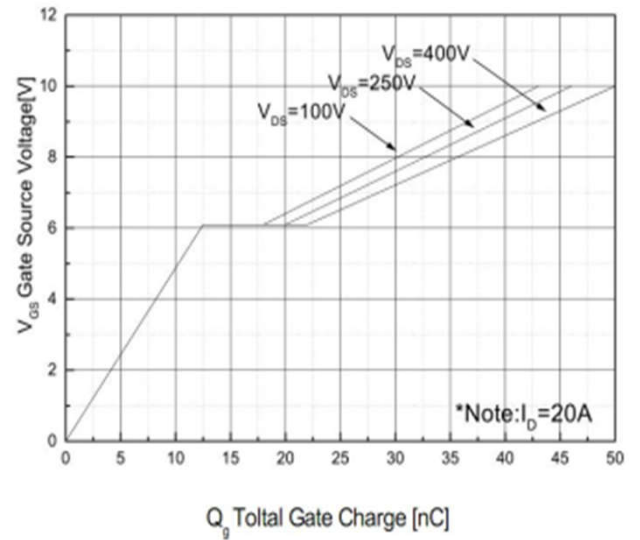
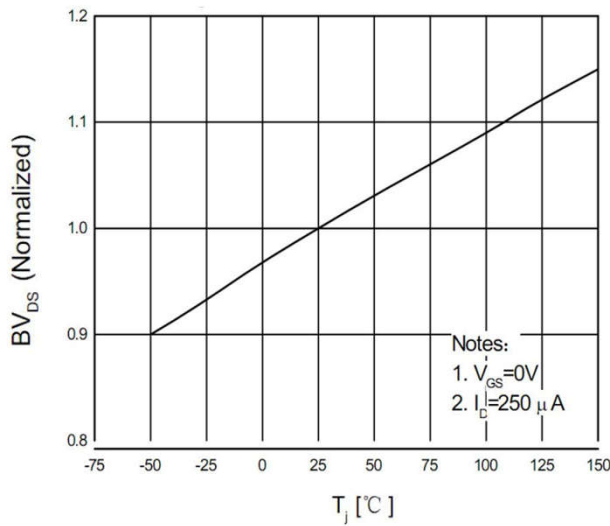
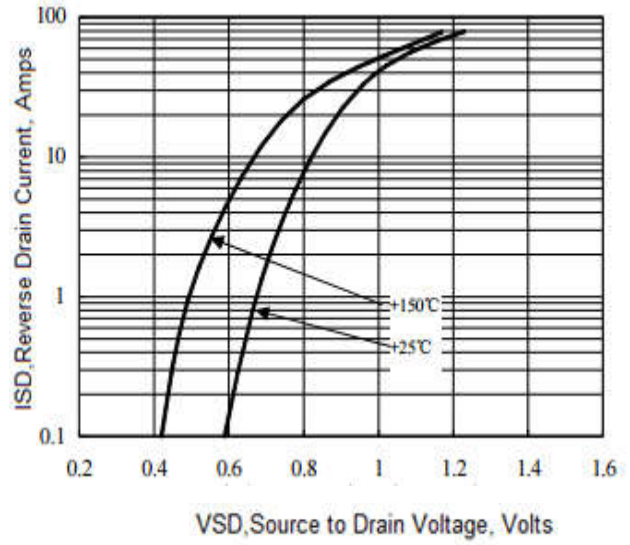
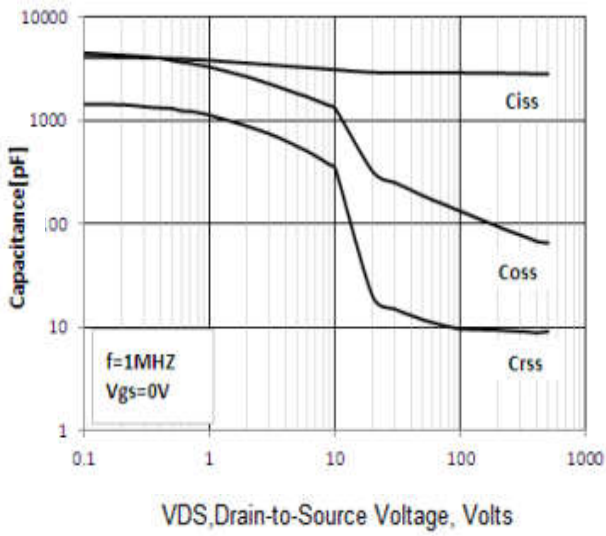
Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $I_{AS} = 20A, V_{DD} = 50V, L = 6mH, R_G = 25\Omega,$ starting $T_J = 25^\circ C.$
3. ulse test: Pulse Width $\leq 300 \mu s,$ Duty Cycle $\leq 2\%.$
4. Essentially Independent of Operating Temperature.

Ratings and Characteristic Curves



Ratings and Characteristic Curves



Package Outline Dimensions Millimeters

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		

TO-247

Dim.	Min.	Max.
A	15	16
B	20	21
C	41	42
D	5	6
E	4	5
F	2.5	3.5
G	1.75	2.5
H	3	3.5
I	8	10
J	4.9	5.1
K	1.9	2.1
L	3.5	4
M	4.75	5.25
N	2	3
O	0.55	0.75
P	Typ 5.08	
Q	1.2	1.3
All Dimensions in millimeter		

Package Outline Dimensions Millimeters

TO-247S

	Dim.	Min.	Max.
	A	15	16
	B	19.5	20.5
	C	33.5	35.5
	D	5	6
	E	3.5	4.5
	F	2.5	3.5
	G	1.75	2.5
	H	3	4
	I	9	11
	J	4.9	5.1
	K	1	1.3
	L	3.75	4.25
	M	4.75	5.25
N	1.8	2.2	
O	0.45	0.6	
P	Typ 5.08		
Q	1.2	1.3	
All Dimensions in millimeter			