

650V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

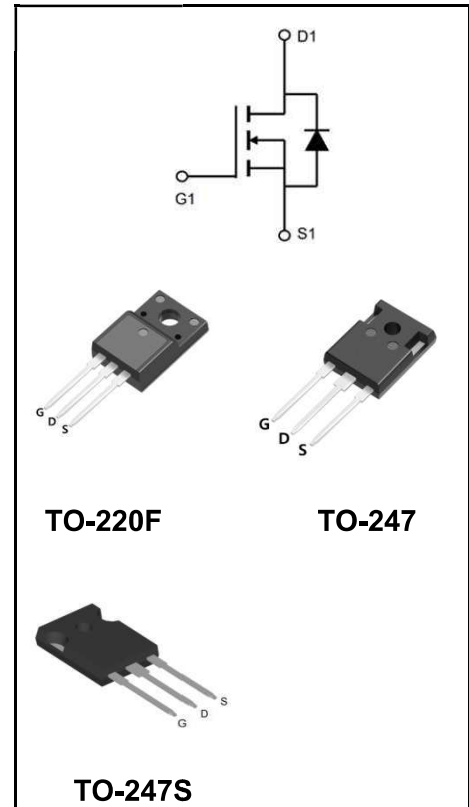
I_D	20A
V_{DSS}	650V
R_{DS(on)-typ(@V_{GS}=10V)}	<0.5Ω (Type:0.37 Ω)

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℃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	$R_{\theta JC}$	1.47	0.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	48.5	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

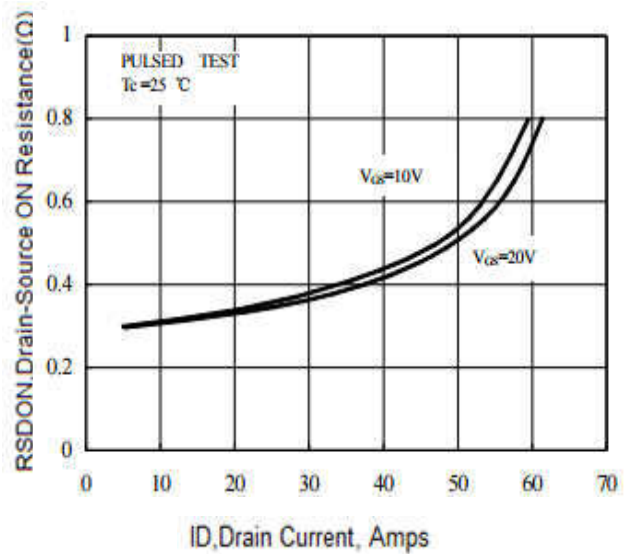
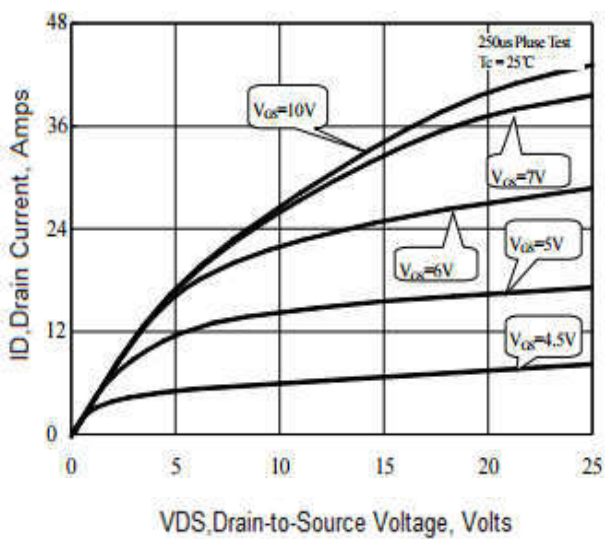
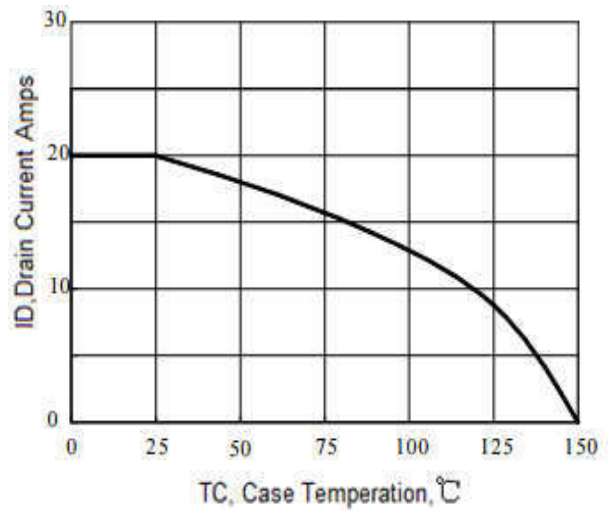
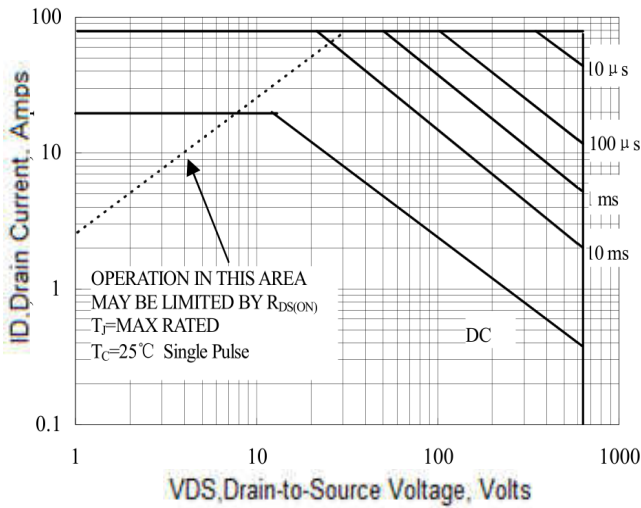
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 250 \mu A$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS} = 650 V, V_{GS} = 0 V$	I_{DSS}	-	-	1	uA
	$V_{DS} = 520 V, T_c = 125^\circ C$		-	-	10	
Gate Leakage Current	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	$V_{GS} = 10 V, I_D = 10 A$	$R_{DS(on)}$	-	0.37	0.5	Ω
Forward Transconductance	$V_{DS} = 40 V, I_D = 10 A$	g_{fs}	-	18	-	S
Input Capacitance	$V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz$	C_{iss}	-	2567	-	pF
Output Capacitance		C_{oss}	-	290	-	
Reverse Transfer Capacitance		C_{rss}	-	20	-	
Turn-on Delay Time	$I_D = 20 A, V_{DD} = 325 V, R_G = 10 \Omega (Note 3,4)$	$td(ON)$	-	39	-	nS
Rise Time		tr	-	80	-	
Turn-Off Delay Time		$td(OFF)$	-	94	-	
Fall Time		tf	-	63	-	
Total Gate Charge	$I_D = 20 A, V_{DD} = 520 V, V_{GS} = 10 V (Note 3,4)$	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

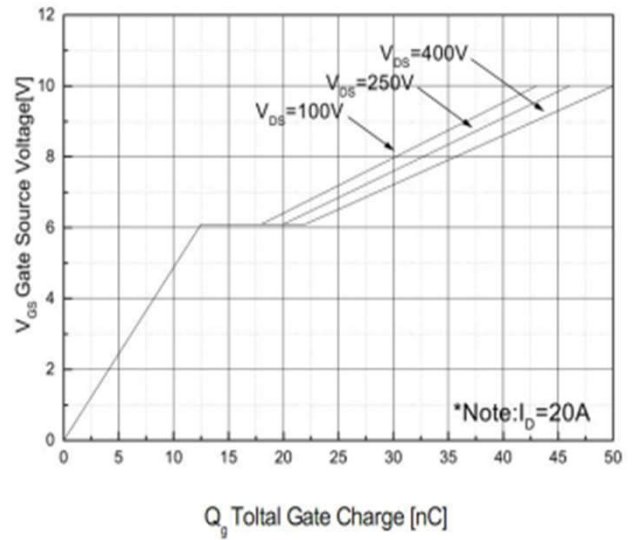
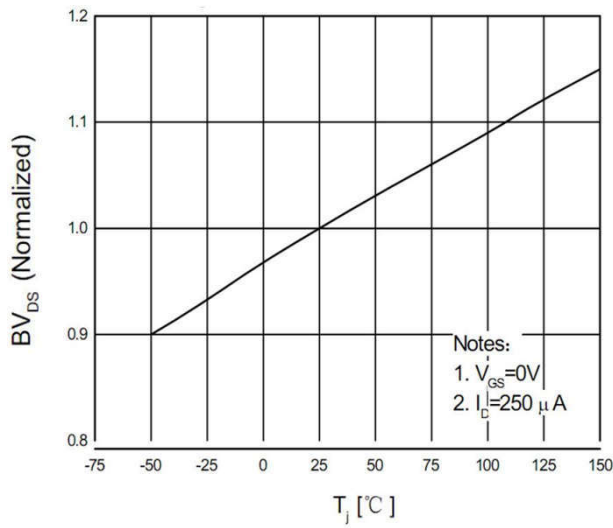
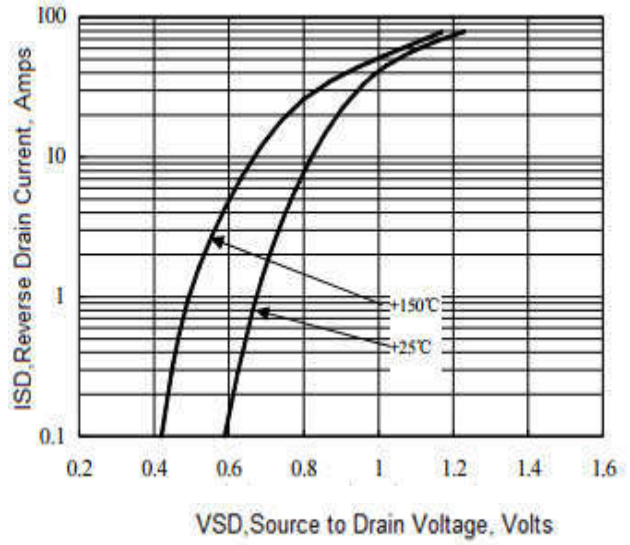
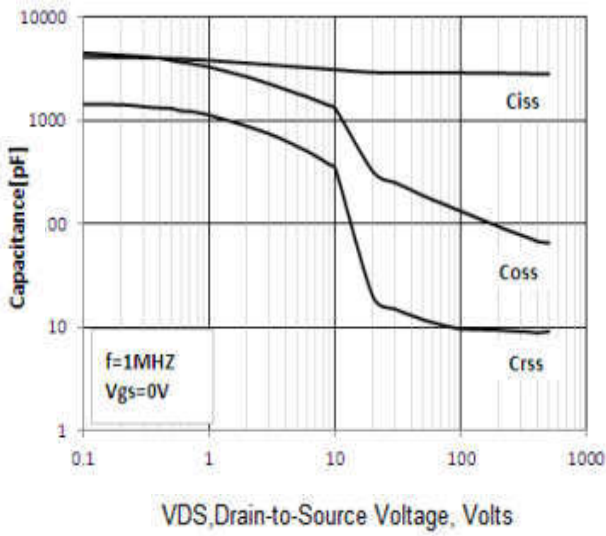
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Maximun Body-Diode Continuous Current		I_S	-	-	20	A
Maximun Body-Diode Pulsed Current		I_{SM}	-	-	80	A
Drain-Source Diode Forward Voltage	I _{SD} = 20A	V_{SD}	-	-	1.4	V
Reverse Recovery Time	I _{SD} = 20A, V _{GS} = 0 V,	trr	-	630	-	nS
Reverse Recovery Charge	dI _F / dt = 100 A/μs(Note3)	Qrr	-	7.4	-	uC

- Note:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
 2. I_{AS} = 20A, V_{DD} = 50 V, L = 6mH, R_G = 25Ω, starting T_J = 25°C.
 3. ulse test: Pulse Width ≤ 300 μ s, Duty Cycle ≤ 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			

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