

500V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

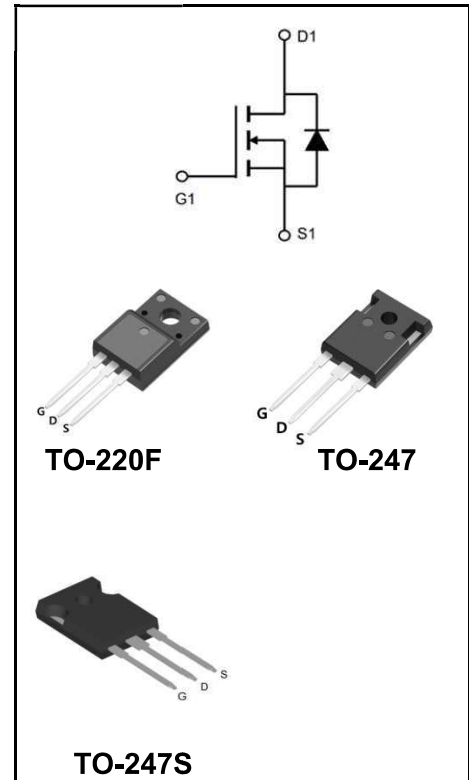
I_D	20A
V_{DSS}	500V
R_{DS(on)-typ(@V_{GS}=10V)}	<0.3Ω (Type:0.21Ω)

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
YFW20N50AF	TO-220F	YFW 20N50AF XXXXX	50PCS/Tube
YFW20N50AP	TO-247	YFW 20N50AP XXXXX	30PCS/Tube
YFW20N50APS	TO-247S	YFW 20N50APS XXXXX	30PCS/Tube

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		220F	247/247S	
Drain-Source Voltage	V_{DS}	500		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	70	240	W
-Derate above 25°C		0.56	1.85	
Single Pulse Avalanche Energy (Note2)	E_{AS}	1110		mJ
Avalanche Current (Note 1)	I_{AR}	20		A
Repetitive Avalanche Energy (Note 1)	E_{AS}	25		mJ
Operating Temperature Range	T_J	150		°C
Storage Temperature Range	T_{STG}	-55 to +150		°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.82	0.54	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	50.5	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	BV_{DSS}	500	-	-	V
Drain-Source Leakage Current	$V_{DS} = 500\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	-	-	1	uA
	$V_{DS} = 400\text{ V}, T_C = 125^\circ\text{C}$		-	-	10	
Gate Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$	$R_{DS(on)}$	-	0.21	0.3	Ω
Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 10\text{ A}$	g_{fs}	-	18	-	S
Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	2919	-	pF
Output Capacitance		C_{oss}	-	291	-	
Reverse Transfer Capacitance		C_{rss}	-	16	-	
Turn-on Delay Time	$I_D = 20, V_{DD} = 250\text{ V}, R_G = 10\ \Omega (\text{Note } 3,4)$	$td(ON)$	-	37	-	nS
Rise Time		tr	-	70	-	
Turn-Off Delay Time		$td(OFF)$	-	89	-	
Fall Time		tf	-	49	-	
Total Gate Charge	$I_D = 20\text{ A}, V_{DD} = 400\text{ V}, V_{GS} = 10\text{ V} (\text{Note } 3,4)$	Q_G	-	52	-	nC
Gate to Source Charge		Q_{GS}	-	13.2	-	
Gate to Drain Charge		Q_{GD}	-	18.7	-	

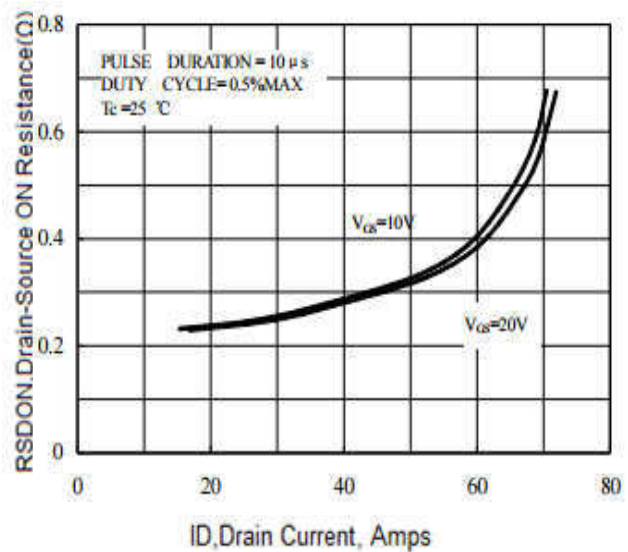
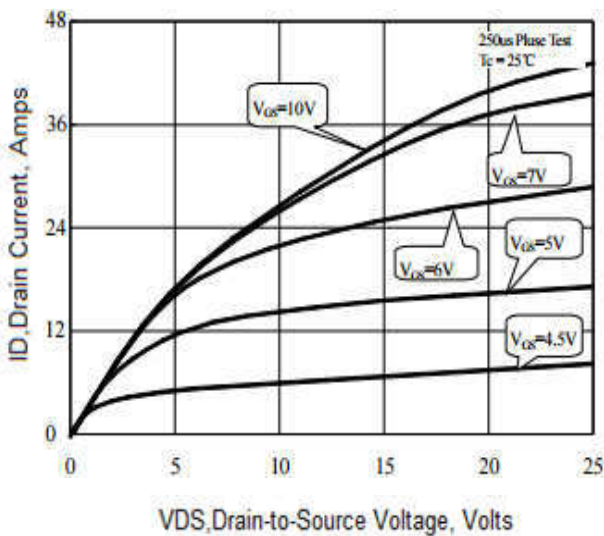
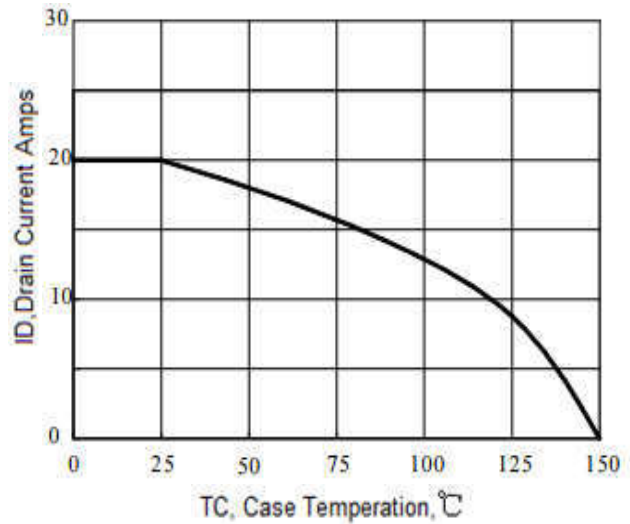
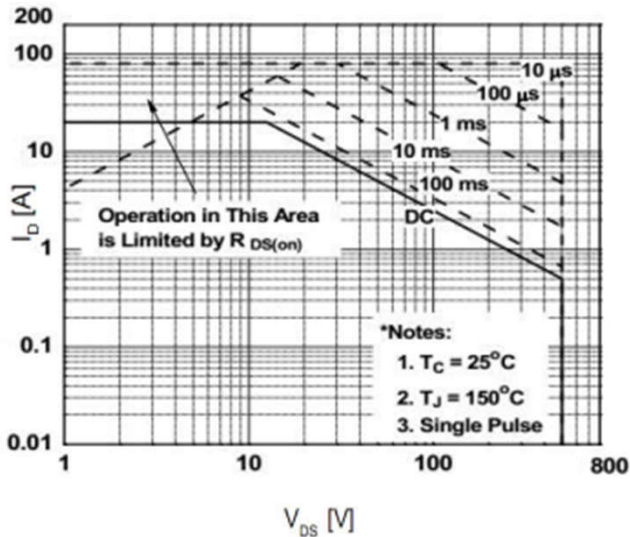
Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

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	-	542	-	nS
Reverse Recovery Charge		Q_{rr}	-	5.6	-	uC

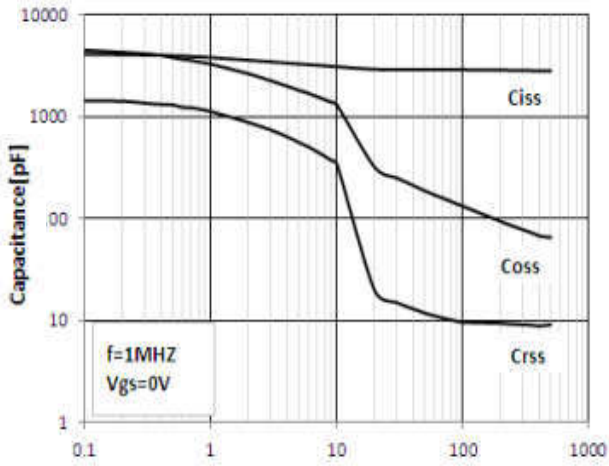
Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $I_{AS} = 20A, V_{DD} = 50V, L = 5mH, R_G = 25\Omega$, 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.

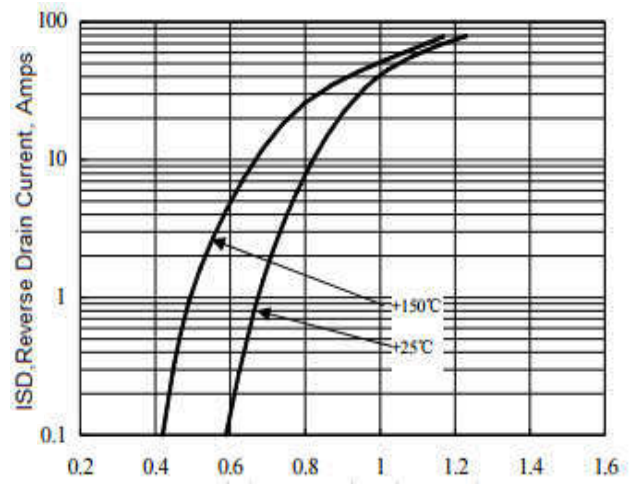
Ratings and Characteristic Curves



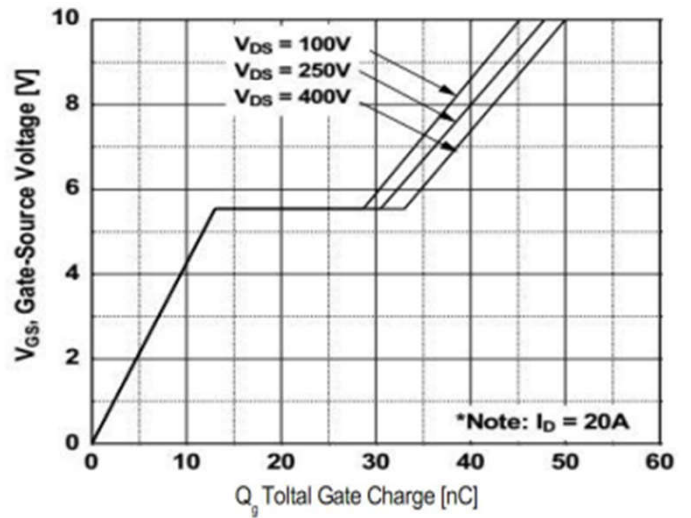
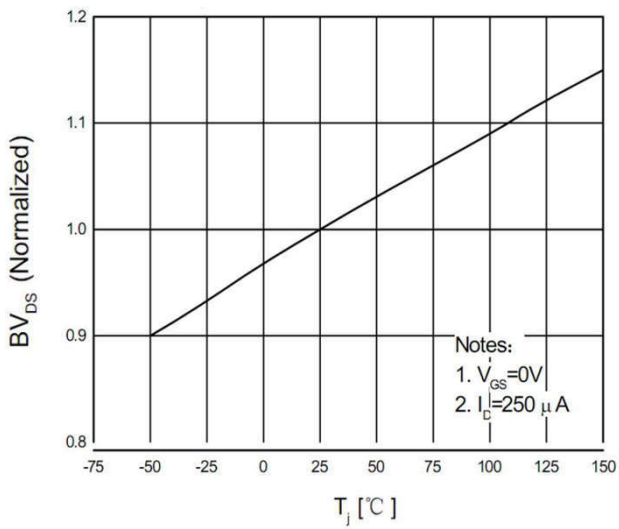
Ratings and Characteristic Curves



VDS, Drain-to-Source Voltage, Volts



VSD, Source to Drain Voltage, Volts



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			