

650V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	5A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	<2.4Ω (Type:2.0 Ω)

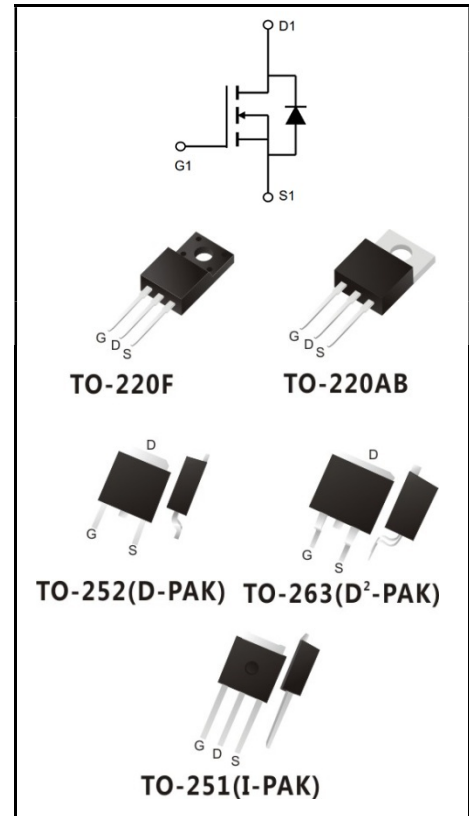


Features

- ◆ Fast Switching
- ◆ Low ON Resistance
- ◆ Low Gate Charge
- ◆ 100% Single Pulse avalanche energy Test
- ◆ Lead free in comply with EU RoHS 2011/65/EU directives

Mechanical Data

- ◆ Case: Molded plastic
- ◆ Mounting Position: Any
- ◆ Molded Plastic: UL Flammability Classification Rating 94V-0
- ◆ Solder bath temperature 275°C maximum, 10s per JESD22-106



Product Specification Classification

Part Number	Package	Marking	Pack
YFW5N65AT	TO-220AB	YFW 5N65AT XXXXX	50PCS/Tube
YFW5N65AF	TO-220F(0.5mm)	YFW 5N65AF XXXXX	50PCS/Tube
YFW5N65AS	TO-263	YFW 5N65AS XXXXX	50PCS/Tube
YFW5N65AS-R	TO-263	YFW 5N65AS XXXXX	800PCS/Tape
YFW5N65AMJ	TO-251	YFW 5N65AMJ XXXXX	80PCS/Tube
YFW5N65AD	TO-252	YFW 5N65AD XXXXX	2500PCS/Tape

Maximum Ratings At Tc=25°C Unless Otherwise Specified

Characteristics	Symbols	Value			Units
		220AB/263	220F	251/252	
Drain-Source Voltage	V_{DS}	650			V
Gate-Source Voltage	V_{GS}	±30			V
Continue Drain Current	I_D	5			A
- Continuous(Tc=100°C)		3.1			
Pulsed Drain Current (Note1)	I_{DM}	20			A
Power Dissipation	P_D	75	33	63	W
-Derate above 25°C		0.56	0.33	0.62	W/°C
Single Pulse Avalanche Energy (Note2)	E_{AS}	200			mJ
Avalanche Current (Note 1)	I_{AR}	5			A
Repetitive Avalanche Energy (Note 1)	E_{AR}	11.5			mJ
Operating Temperature Range	T_J	150			°C
Storage Temperature Range	T_{STG}	-55 to +150			°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.67	3.57	2.35	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	62.5	62.5	°C/W

Maximum Ratings At Tc=25°C Unless Otherwise Specified

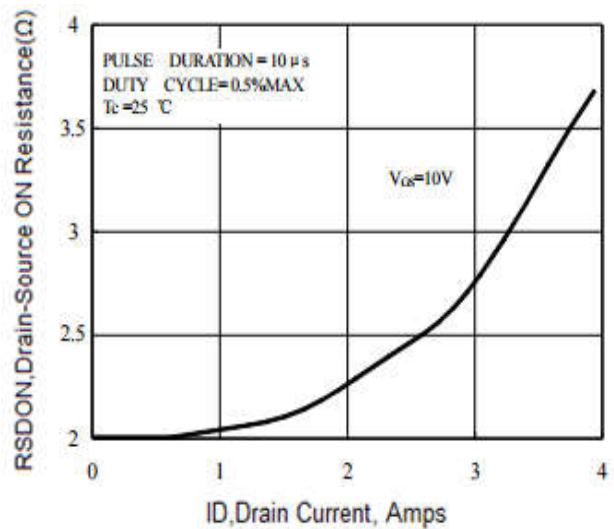
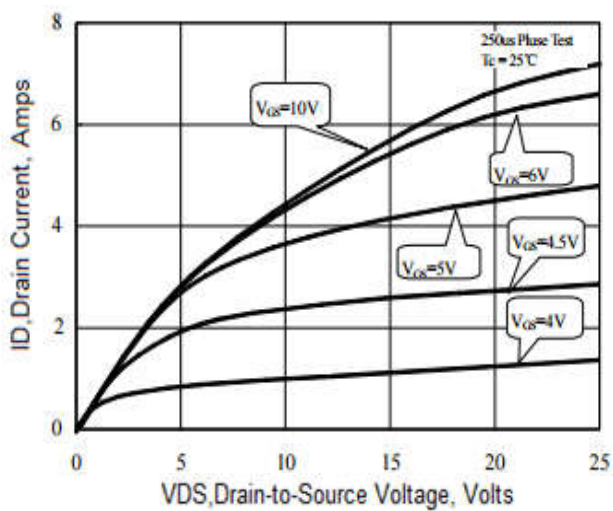
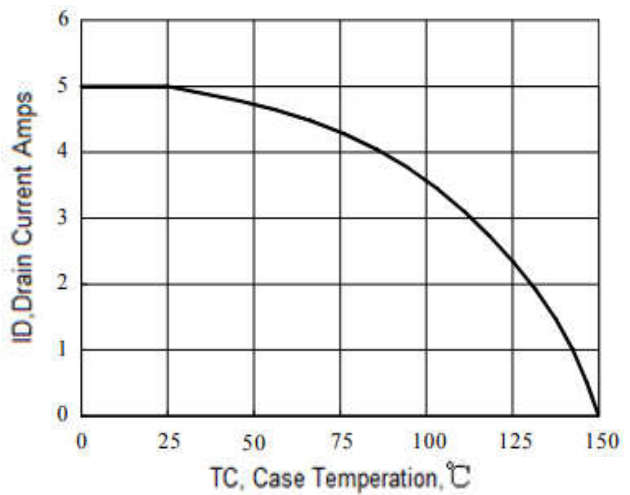
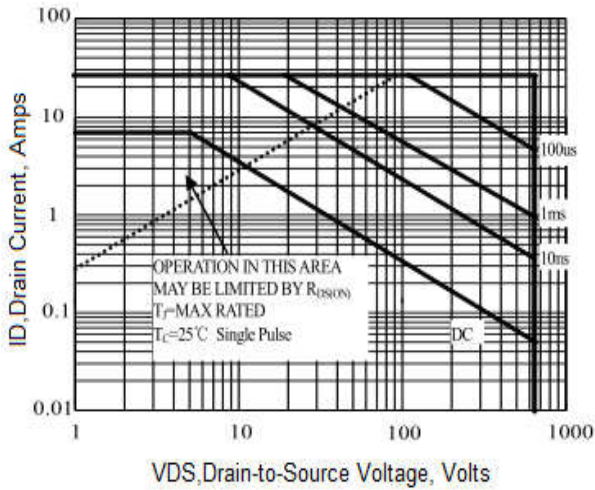
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 250 \mu A$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS} = 650 V, V_{GS} = 0 V$	I_{DSS}	-	-	1	UA
	$V_{DS}=520V, T_C=125^\circ C$		-	-	10	
Gate Leakage Current	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	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	$V_{GS} = 10 V, I_D = 2 A$	$R_{DS(on)}$	-	2.0	2.4	Ω
Forward Transconductance	$V_{DS} = 15 V, I_D = 2 A$	g_{fs}	-	3.5	-	S
Input Capacitance	$V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz$	C_{iss}	-	580	-	pF
Output Capacitance		C_{oss}	-	55	-	
Reverse Transfer Capacitance		C_{rss}	-	8.5	-	
Turn-on Delay Time	$I_D = 4 A, V_{DD} = 325 V, R_G = 10 \Omega (Note3,4)$	$td(ON)$	-	8.5	-	nS
Rise Time		tr	-	6.5	-	
Turn-Off Delay Time		$td(OFF)$	-	31	-	
Fall Time		tf	-	8.5	-	
Total Gate Charge	$I_D = 4 A, V_{DD} = 480 V, V_{GS} = 10 V (Note3,4)$	Q_G	-	15	-	nC
Gate to Source Charge		Q_{GS}	-	2.8	-	
Gate to Drain Charge		Q_{GD}	-	6.3	-	

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

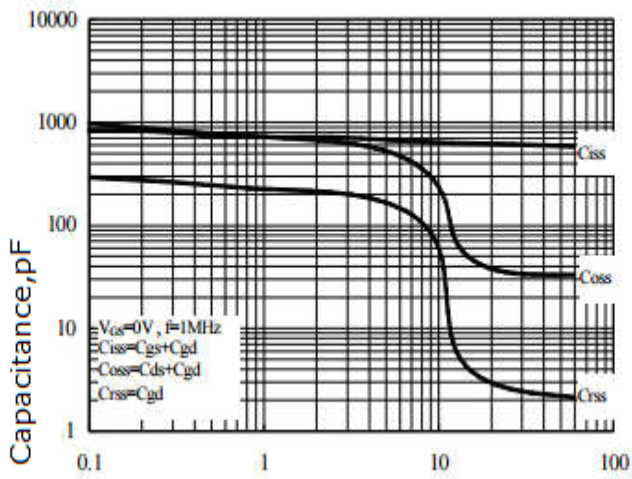
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Maximun Body-Diode Continuous Current		I_S	-	-	5	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	20	A
Drain-Source Diode Forward Voltage	$I_{SD} = 4 A$	V_{SD}	-	-	1.5	V
Reverse Recovery Time	$I_{SD} = 4 A, V_{GS} = 0 V, di_F / dt = 100 A/\mu s$	trr	-	430	-	nS
Reverse Recovery Charge		Q_{rr}	-	1.27	-	uC

- Note:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
 2. IAS = 5 A, VDD = 50 V, L = 16.5mH, RG = 25Ω, starting TJ = 25°C.
 3. ulse test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
 4. Essentially Independent of Operating Temperature.

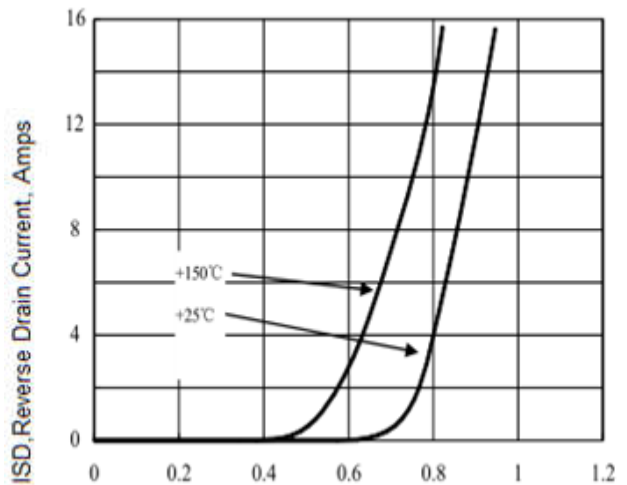
Ratings and Characteristic Curves



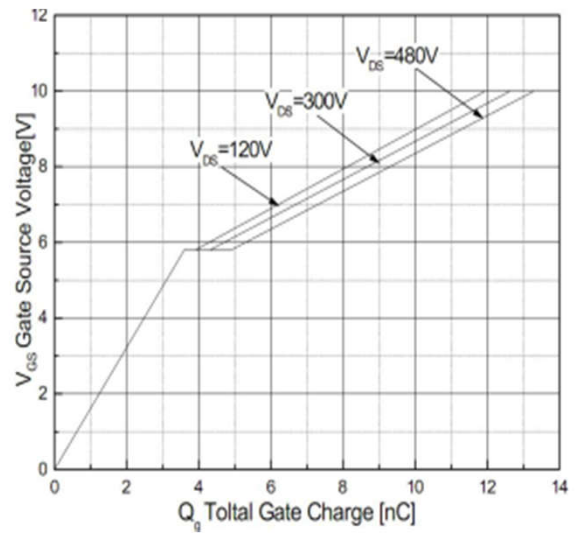
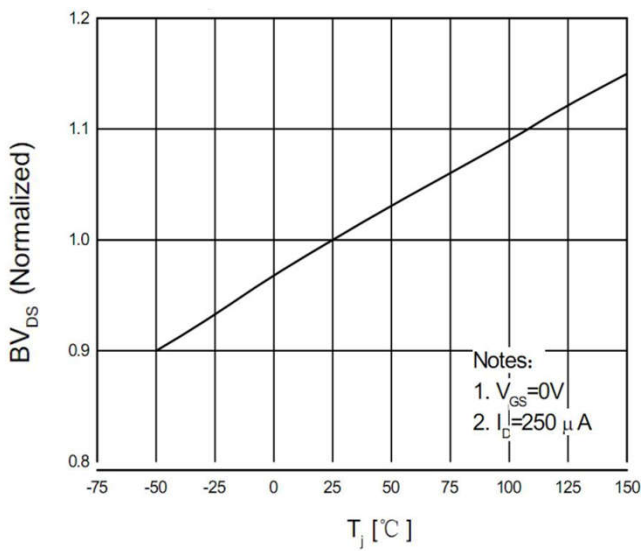
Ratings and Characteristic Curves



V_{DS}, Drain-to-Source Voltage, Volts



V_{SD}, Source to Drain Voltage, Volts



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			

TO-252

	Dim.	Min.	Typ.	Max.
	A	2.10	-	2.50
	A2	0	-	0.10
	B	0.66	-	0.86
	B2	5.18	-	5.48
	C	0.40	-	0.60
	C2	0.44	-	0.58
	D	5.90	-	6.30
	D1	5.30REF		
	E	6.40	-	6.80
	E1	4.63	-	-
	G	4.47	-	4.67
	H	9.50	-	10.70
	L	1.09	-	1.21
	L2	1.35	-	1.65
	V1	-	7°	-
V2	0°	-	6°	
All Dimensions in millimeter				

Package Outline Dimensions Millimeters

TO-251

	Dim.	Min.	Max.
	A	2.2	2.4
	A2	0.95	1.15
	A3	0.45	0.65
	b	0.65	0.85
	c	0.45	0.55
	D	6.45	6.75
	D2	5.2	5.4
	E	5.8	6
	E2	0.95	1.25
	e	Typ 2.3	
	e1	Typ 4.6	
	L	4	4.2
	L1	1.2	1.5
All Dimensions in millimeter			