

650V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	4A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	<2.8Ω (Type:2.5 Ω)

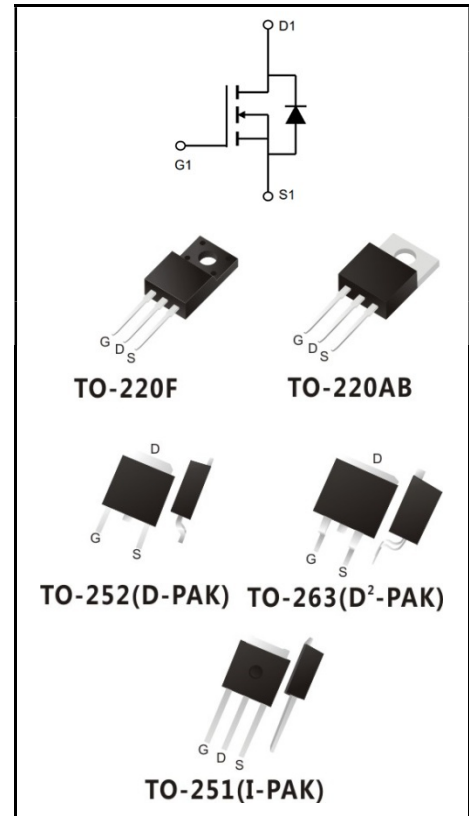


Features

- ◆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
YFW4N65AT	TO-220AB	YFW 4N65AT XXXXX	50PCS/Tube
YFW4N65AF	TO-220F(0.5mm)	YFW 4N65AF XXXXX	50PCS/Tube
YFW4N65AS	TO-263	YFW 4N65AS XXXXX	50PCS/Tube
YFW4N65AS-R	TO-263	YFW 4N65AS XXXXX	800PCS/Tape
YFW4N65AMJ	TO-251	YFW 4N65AMJ XXXXX	80PCS/Tube
YFW4N65AD	TO-252	YFW 4N65AD 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 -Continuous (TC = 25°C)	I_D	4			A
- Continuous(Tc=100°C)		2.6			
Pulsed Drain Current (Note1)	I_{DM}	16			A
Power Dissipation (TC = 25°C)	P_D	75	33	51	W
-Derate above 25°C		0.62	0.26	0.39	W/°C
Single Pulse Avalanche Energy (Note2)	E_{AS}	220			mJ
Avalanche Current (Note 1)	I_{AR}	4			A
Repetitive Avalanche Energy (Note 1)	E_{AR}	10			mJ
Operating Temperature Range	T_J	150			°C
Storage Temperature Range	T_{STG}	-55 to +150			°C
Thermal Resistance, Junction to Case	R_{θJC}	1.26	3.94	2.5	°C/W
Thermal Resistance, Junction to Ambient	R_{θJA}	62.5	62.5	83	°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} =520V, Tc=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 = 2 A	R_{DS(on)}	-	2.5	2.8	Ω
Forward Transconductance(Note3)	V _{DS} = 40 V, I _D = 2A	g_{fs}	-	3.5	-	S
Input Capacitance	V _{GS} = 0 V, V _{DS} = 25 V, f = 1KHz	C_{iss}	-	550	-	pF
Output Capacitance		C_{OSS}	-	53	-	
Reverse Transfer Capacitance		C_{rss}	-	4	-	
Turn-on Delay Time	I _D = 4 A, V _{DD} = 325 V, R _G = 25 Ω	td(ON)	-	14	-	nS
Rise Time		tr	-	16	-	
Turn-Off Delay Time		td(OFF)	-	32	-	
Fall Time		tf	-	11	-	
Total Gate Charge	I _D = 4A, V _{DD} = 520 V, V _{GS} = 10 V(Note3.4)	Q_G	-	15	-	nC
Gate to Source Charge		Q_{GS}	-	3	-	
Gate to Drain Charge		Q_{GD}	-	7	-	

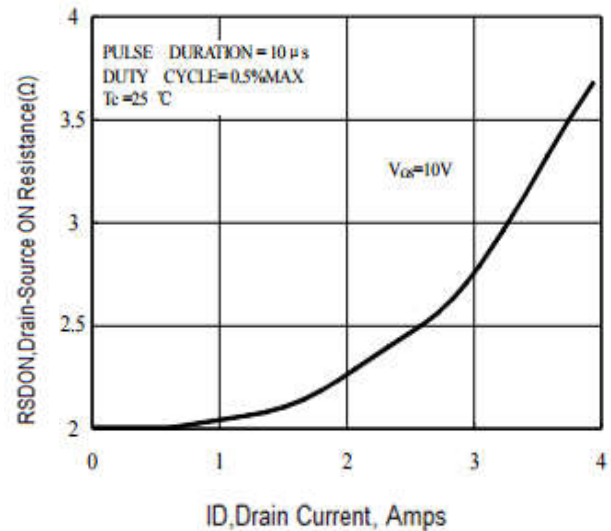
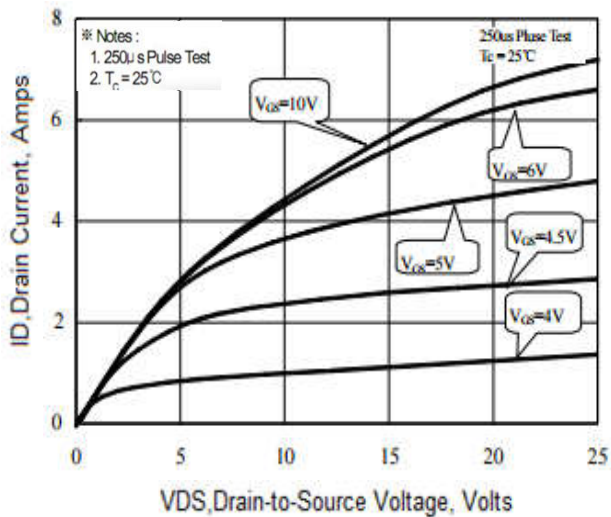
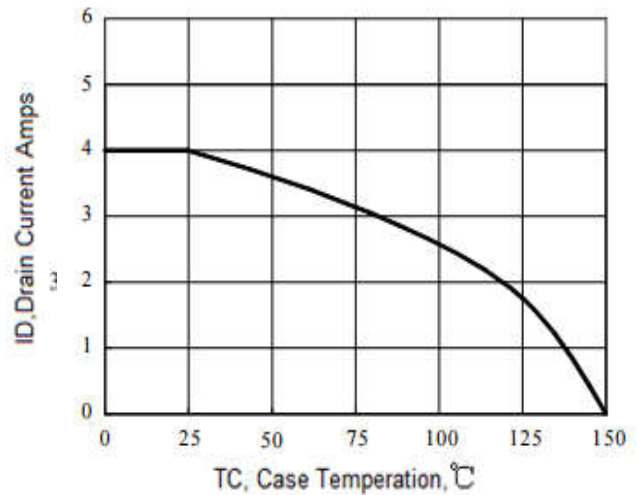
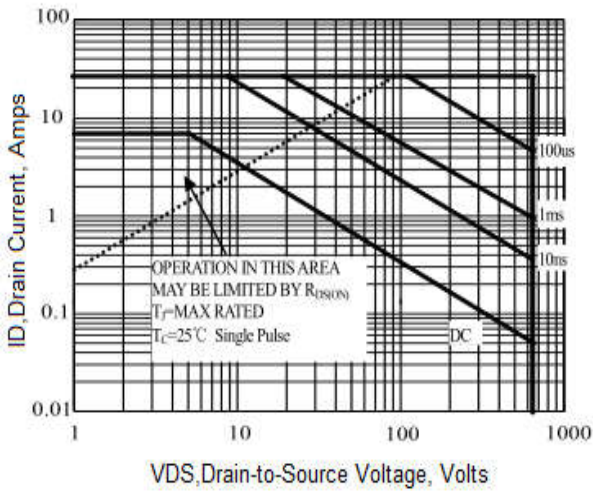
Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Maximum Continuous Drain-Source Diode Forward Current		I_S	-	-	4	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	-	-	16	A
Drain-Source Diode Forward Voltage	$I_{SD} = 4\text{ A}$	V_{SD}	-	-	1.4	V
Reverse Recovery Time	$I_{SD} = 4\text{ A}, V_{GS} = 0\text{ V},$ $dI_F / dt = 100\text{ A}/\mu\text{s}$ (Note3)	trr	-	250	-	nS
Reverse Recovery Charge		Q_{rr}	-	1.2	-	uC

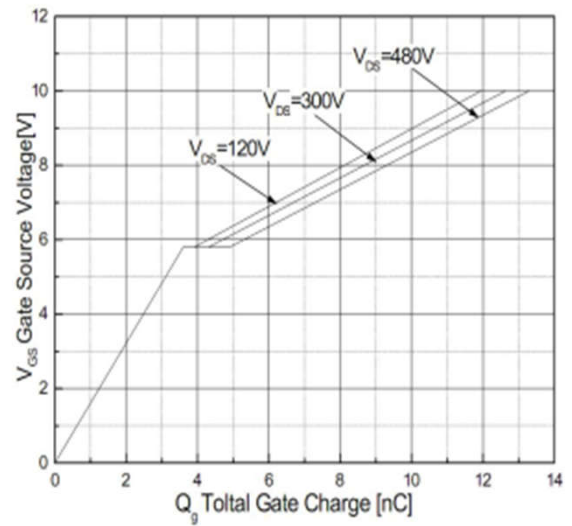
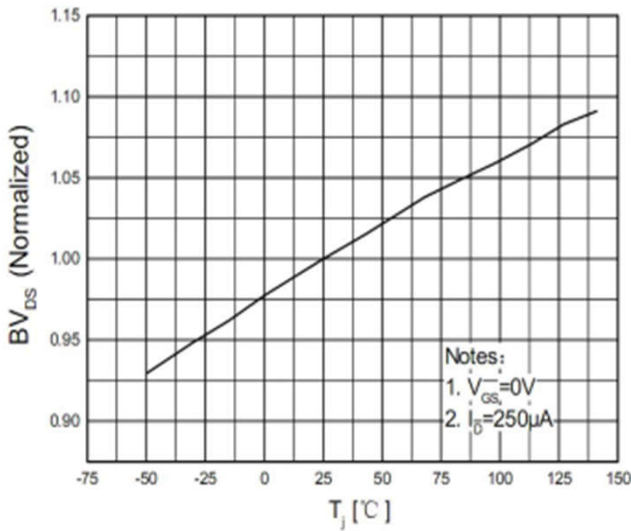
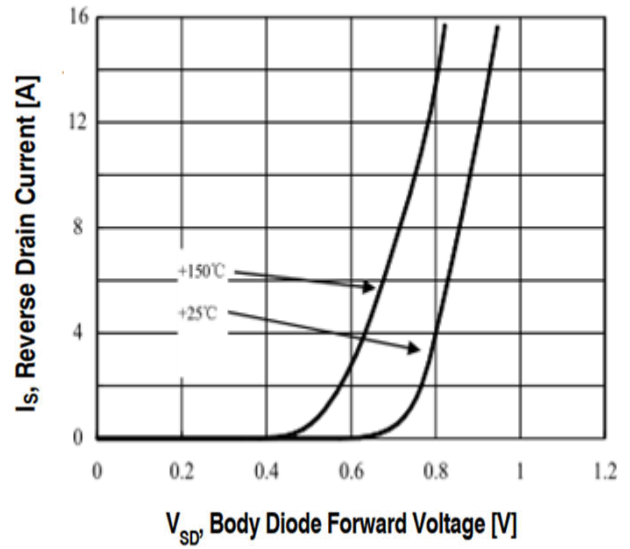
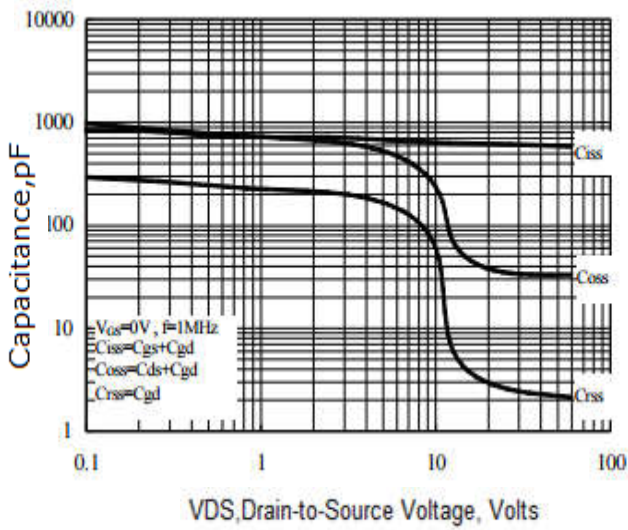
Note:

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

Ratings and Characteristic Curves



Ratings and Characteristic Curves



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			