

650V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

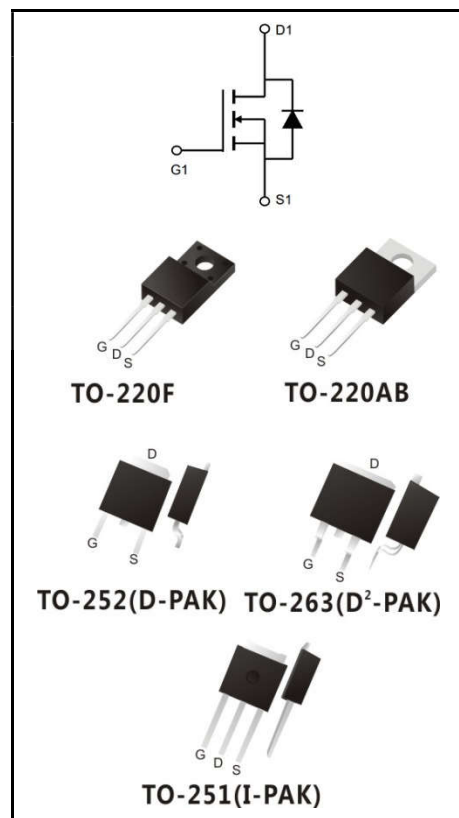
I_D	4A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$<2.8\Omega$ (Type: 2.5 Ω)

Features

- ♦Fast Switching
- ♦Low ON Resistance
- ♦Low Gate Charge
- ♦100% Single Pulse avalanche energy Test
- ♦Leadfree in compliance 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
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	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	-	-	1	uA
	$V_{DS}=520\text{ V}, T_C=125^\circ\text{C}$		-	-	10	
Gate Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 2\text{ A}$	$R_{DS(on)}$	-	2.5	2.8	Ω
Forward Transconductance(Note3)	$V_{DS} = 40\text{ V}, I_D = 2\text{ A}$	g_{fs}	-	3.5	-	S
Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ KHz}$	C_{iss}	-	550	-	pF
Output Capacitance		C_{oss}	-	53	-	
Reverse Transfer Capacitance		C_{rss}	-	4	-	
Turn-on Delay Time	$I_D = 4\text{ A}, V_{DD} = 325\text{ V}, R_G = 25\text{ }\Omega$	$td(ON)$	-	14	-	nS
Rise Time		tr	-	16	-	
Turn-Off Delay Time		$td(OFF)$	-	32	-	
Fall Time		tf	-	11	-	
Total Gate Charge	$I_D = 4\text{ A}, V_{DD} = 520\text{ V}, V_{GS} = 10\text{ V}(\text{Note3.4})$	Q_G	-	15	-	nC
Gate to Source Charge		Q_{GS}	-	3	-	
Gate to Drain Charge		Q_{GD}	-	7	-	

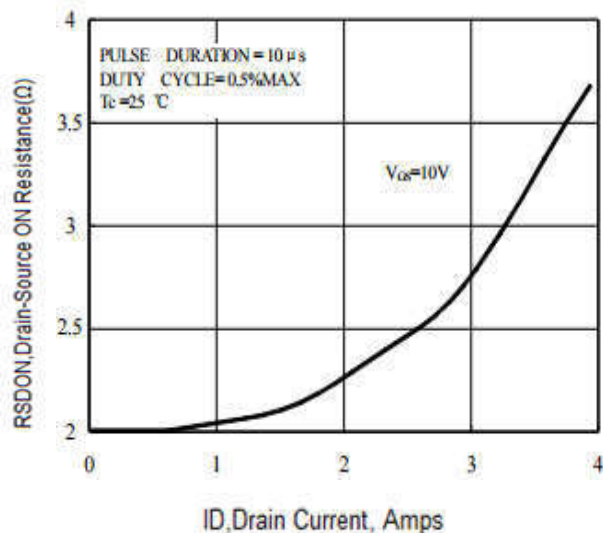
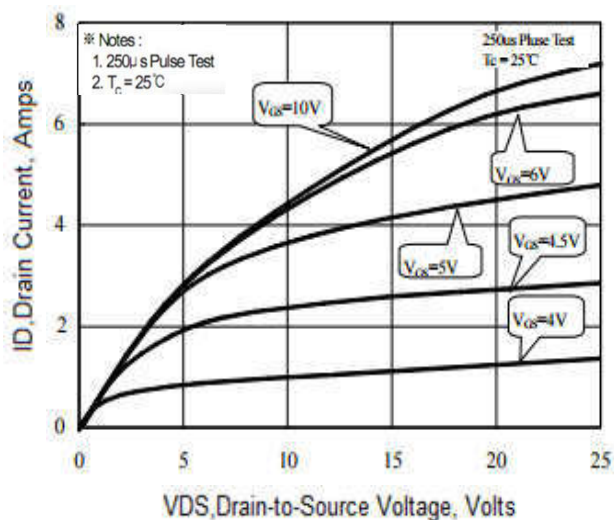
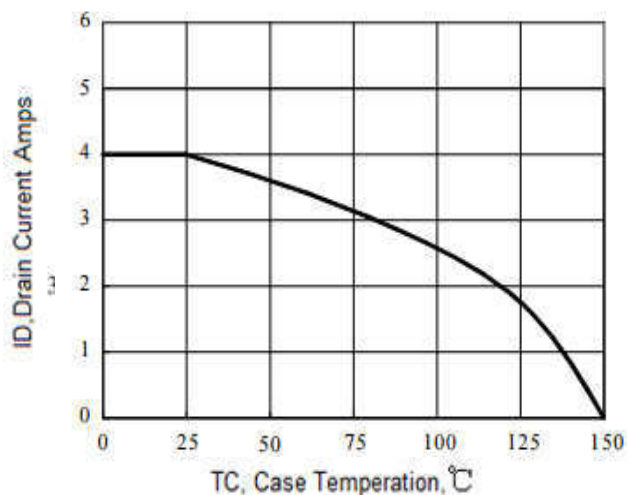
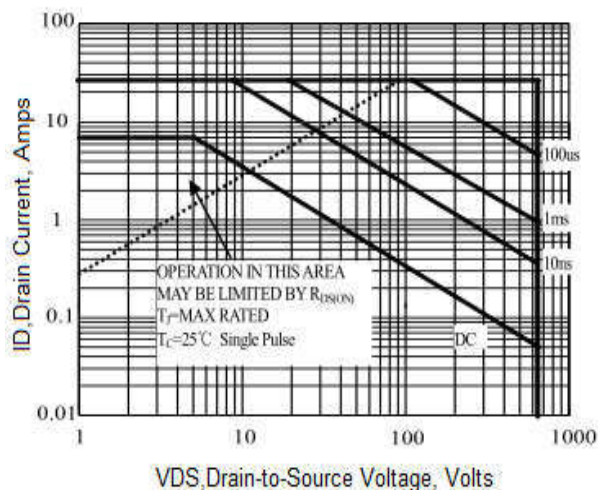
Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

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	$I_{SD} = 4\text{ A}$, $V_{GS} = 0\text{ V}$, $dl_F / dt = 100\text{ A}/\mu\text{s}$ (Note3)	t_{rr}	-	250	-	nS
Reverse Recovery Charge		Q_{rr}	-	1.2	-	uC

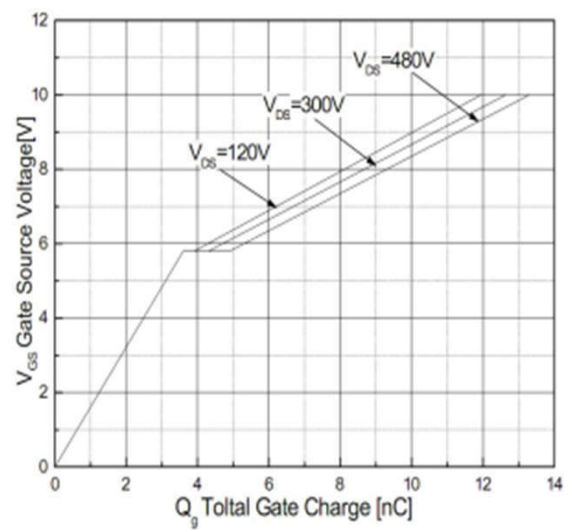
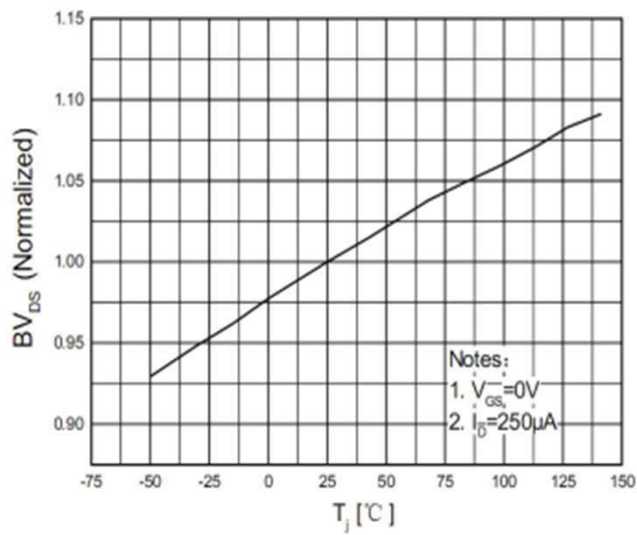
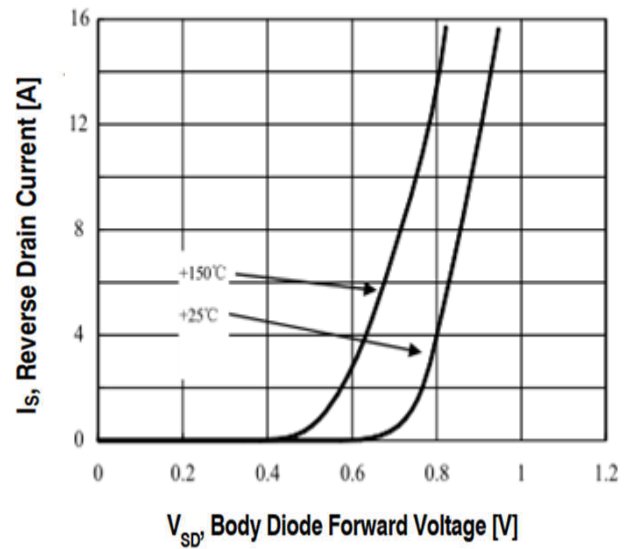
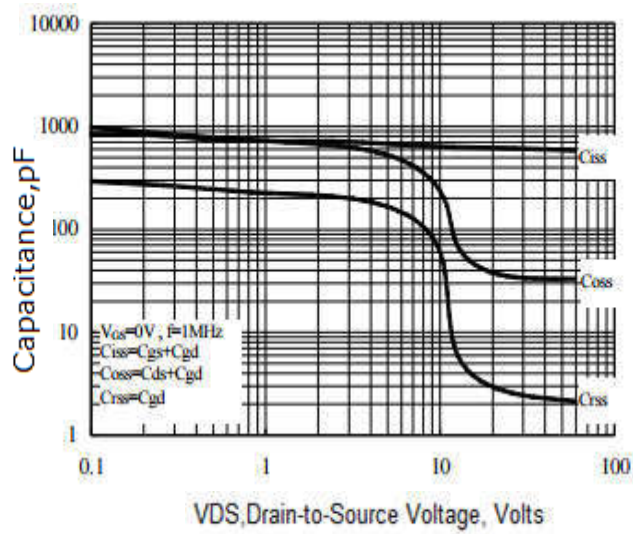
Note:

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 $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Essentially Independent of Operating Temperature.

Ratings and Characteristic Curves

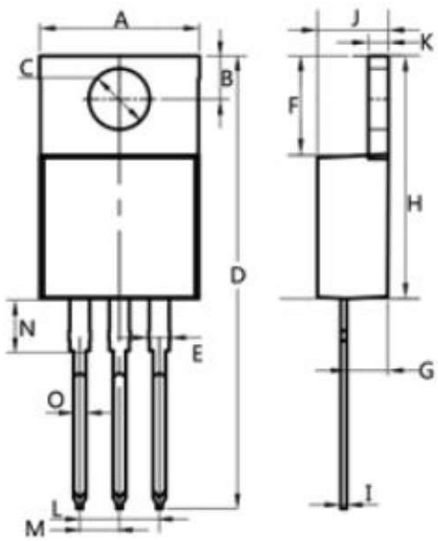


Ratings and Characteristic Curves

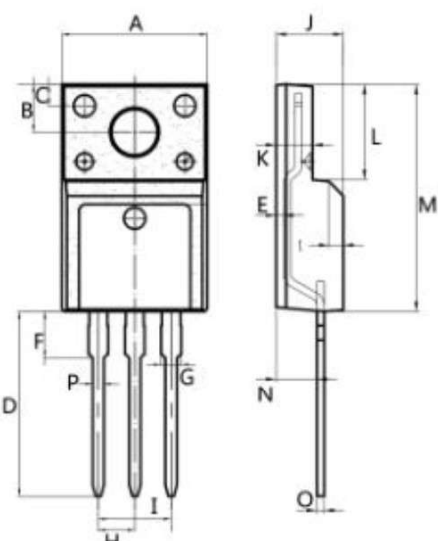


Package Outline Dimensions Millimeters

TO-220AB

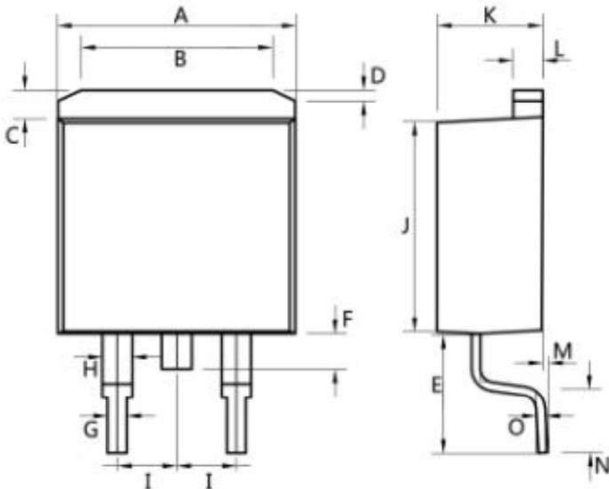
	Dim.	Min.	Max.
	A	10.15	10.35
	B	2.65	2.95
	C	3.70	3.90
	D	28.5	29.5
	E	1.30	1.45
	F	6.35	6.55
	G	2.9	3.3
	H	15.0	16.0
	I	0.38	0.42
	J	4.45	4.55
	K	1.25	1.35
	L	Typ 5.08	
	M	Typ 2.54	
	N	3.1	3.3
	O	0.76	0.84
All Dimensions in millimeter			

TO-220F

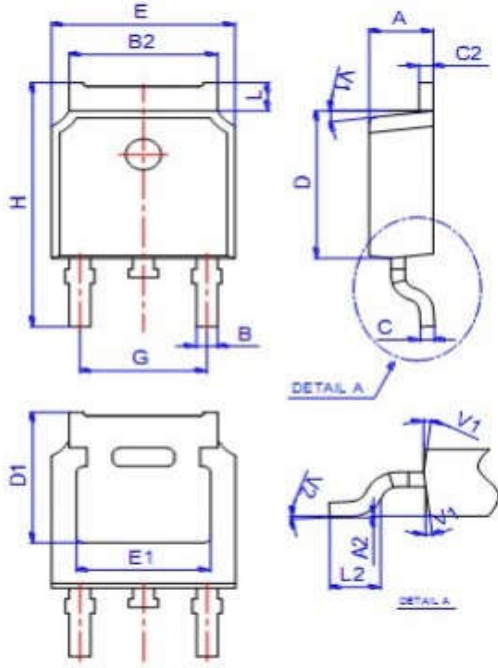
	Dim.	Min.	Max.
	A	9.95	10.25
	B	2.95	3.25
	C	1.25	1.45
	D	12.95	13.25
	E	0.50	0.65
	F	3.1	3.3
	G	1.30	1.45
	H	Typ 2.54	
	I	Typ 5.08	
	J	4.60	4.75
	K	2.50	2.65
	L	6.35	6.55
	M	15.4	16.0
	N	2.75	3.05
	O	0.48	0.52
	P	0.76	0.84
All Dimensions in millimeter			

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			