

500V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

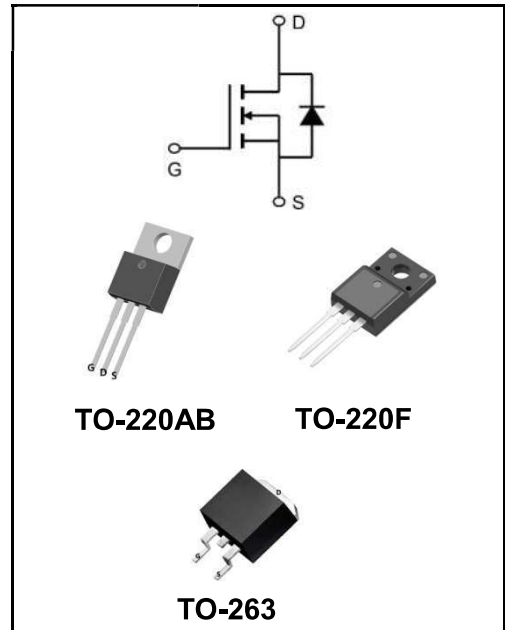
I_D	5A
V_{DSS}	500V
R_{DS(on)-typ(@V_{GS}=10V)}	< 1.2Ω(Type:1.0)

Features

- ◆High EAS
- ◆xtremely low switching loss
- ◆Excellent stability and uniformity or Invertors

Application

- ◆Switch Mode Power Supply (SMPS)
- ◆Uninterruptible Power Supply(UPS)
- ◆Power Factor Correction (PFC)



Product Specification Classification

Part Number	Package	Marking	Pack
YFW5N50AT	TO-220AB	YFW 5N50AT XXXXX	1000PCS/Box
YFW5N50AF	TO-220F	YFW 5N50AF XXXXX	1000PCS/Box
YFW5N50AS	TO-263	YFW 5N50AS XXXXX	800PCS/Reel

Maximum Ratings at T_c=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage (V _{GS} = 0V)	V _{DS}	500	V
Continuous Drain Current	I _D	5	A
Pulsed Drain Current(note1)	I _{DM}	28	A
Gate - Source Voltage	V _{GS}	±30	V
Single Pulse Avalanche Energy(note2)	E _{AS}	176	mJ
Avalanche Current(note1)	I _{AR}	4.2	A
Repetitive Avalanche Energy(note1)	E _{AR}	35	mJ
Power Dissipation(T _c =25°C)	P _D	83	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C
Thermal Resistance, Junction-to-case	R _{θJC}	2.3	°C/W
Thermal Resistance, Junction ambient	R _{θJA}	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	$V_{GS}=0V, I_D=250\mu A$	V(BR)DSS	500	-	-	V
Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	-	-	1	μA
Gate Source Leakage	$V_{GS}=\pm 30V$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	V_{GS(th)}	3	-	4	V
Drain-Source On-Resistance (Note3)	$V_{GS}=10V, I_D=3.5A$	R_{DS(ON)}	-	1	1.2	Ω
Input Capacitance	$V_{DS}=25V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	700	-	pF
Output Capacitance		C_{oss}	-	94	-	
Reverse Transfer Capacitance		C_{rss}	-	12	-	
Total Gate Charge	$V_{DD}=400V$ $I_D=7A$ $V_{GS}=10V$	Q_g	-	19	-	nC
Gate-Source Charge		Q_{gs}	-	3.7	-	
Gate-Drain Charge		Q_{gd}	-	11	-	
Turn-on delay time	$V_{DD}=250V$ $I_D=7A$ $R_G=25\Omega$	t_{d(on)}	-	13	-	ns
Turn-on Rise Time		T_r	-	20	-	
Turn-Off Delay Time		t_{d(OFF)}	-	76	-	
Turn-on Fall Time		t_f	-	40	-	
Continuous Body Diode Current	$T_C=25^\circ C$	I_S	-	-	7.0	A
Pulsed Diode Forward Current		I_{SM}	-	-	28	A
Body Diode Voltage	$T_J=25^\circ C, I_{SD}=7A, V_{GS}=0V$	V_{SD}	-	-	1.4	V
Reverse Recovery Time	$V_{GS}=0V, I_S=7A$ $diF/dt=100A/\mu s$	t_{rr}	-	260	-	nS
Reverse Recovery Charge		Q_{rr}	-	3.8	-	uC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. IAS = 4.2A, VDD = 50V, RG = 25 Ω, Starting TJ = 25 °C
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Ratings and Characteristic Curves

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

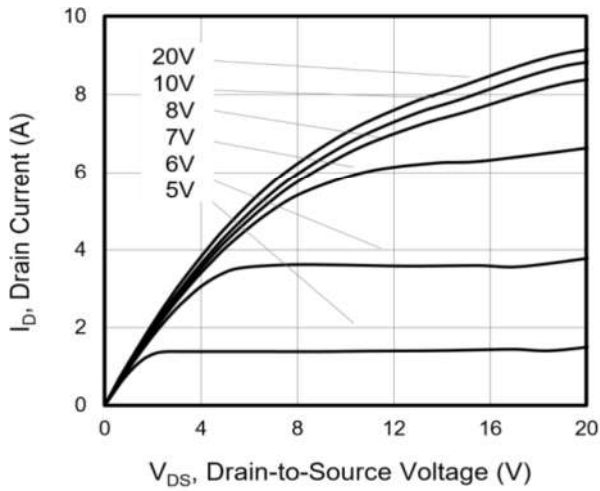


Figure 2. Body Diode Forward Voltage

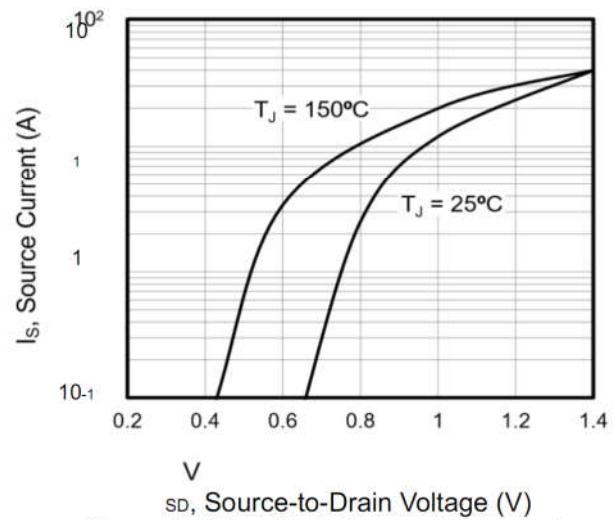


Figure 3. Drain Current vs. Temperature

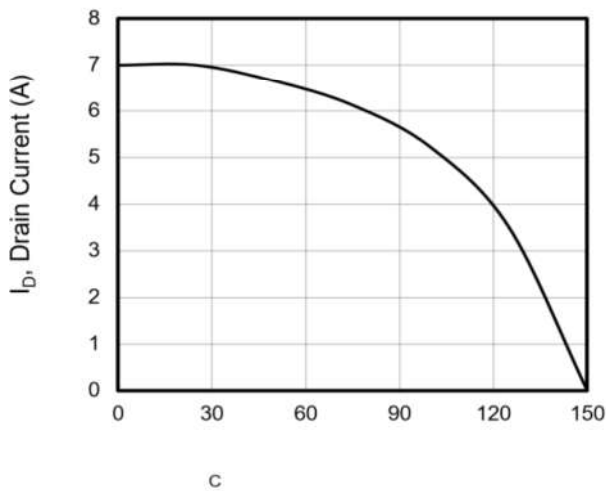


Figure 4. BV_{DSS} Variation vs. Temperature

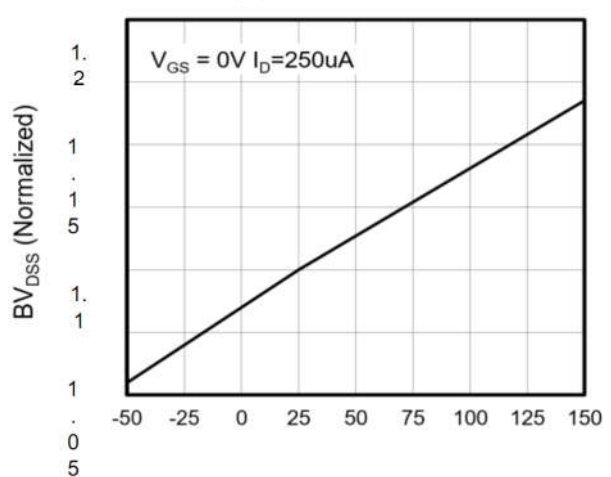


Figure 5. Transfer Characteristics

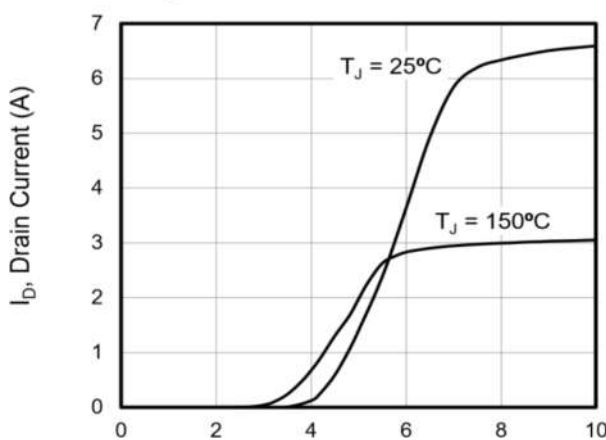
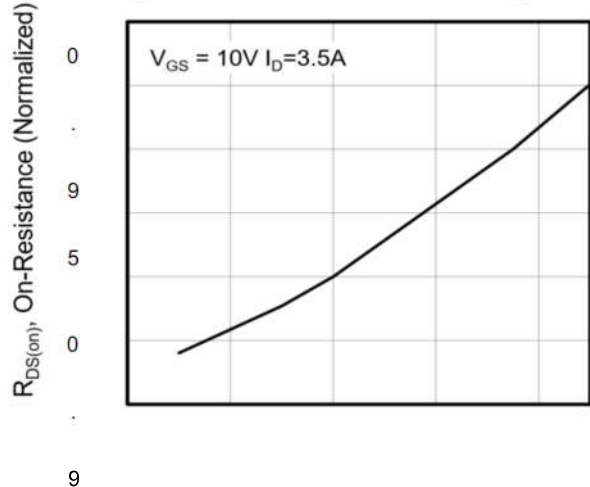


Figure 6. On-Resistance vs. Temperature



T_C , Case Temperature ($^\circ\text{C}$)

T_C , Case Temperature ($^\circ\text{C}$)

Ratings and Characteristic Curves

Figure 7. Capacitance

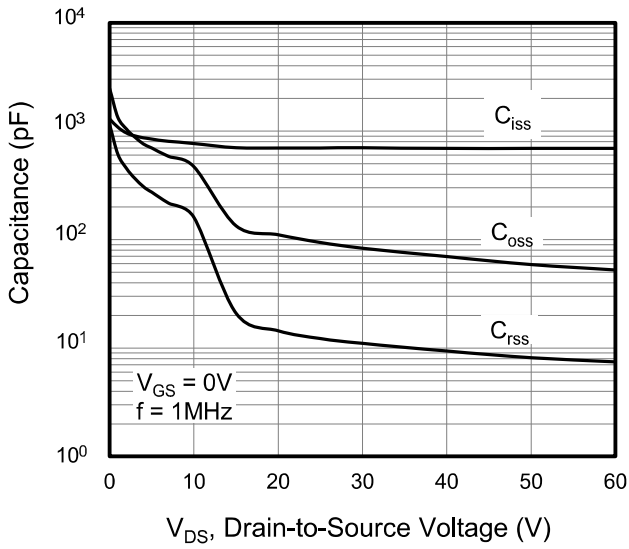


Figure 8. Gate Charge

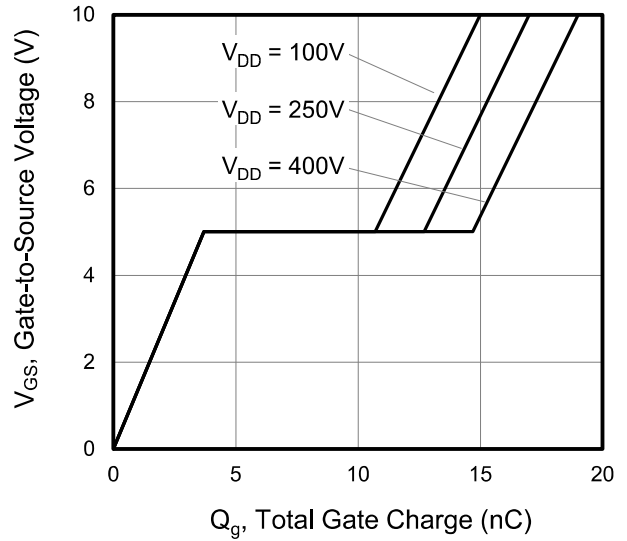


Figure 9. Transient Thermal Impedance

TO-262, TO-251, TO-252

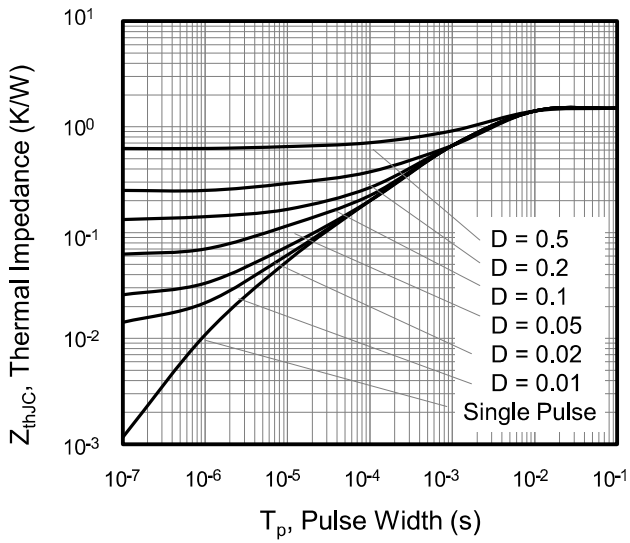
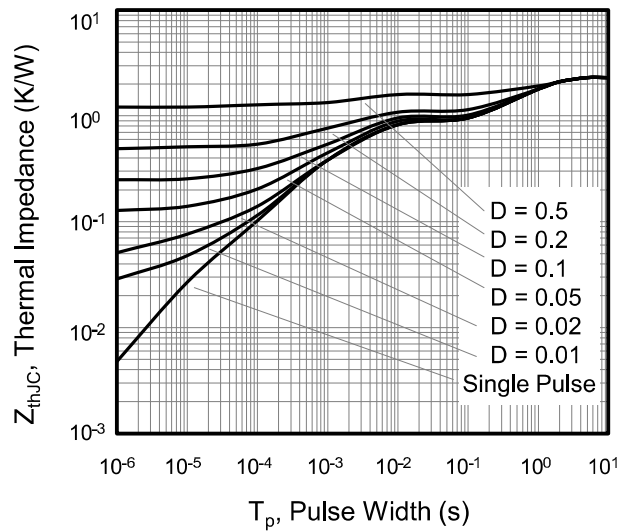


Figure 10. Transient Thermal Impedance

TO-220F



Ratings and Characteristic Curves

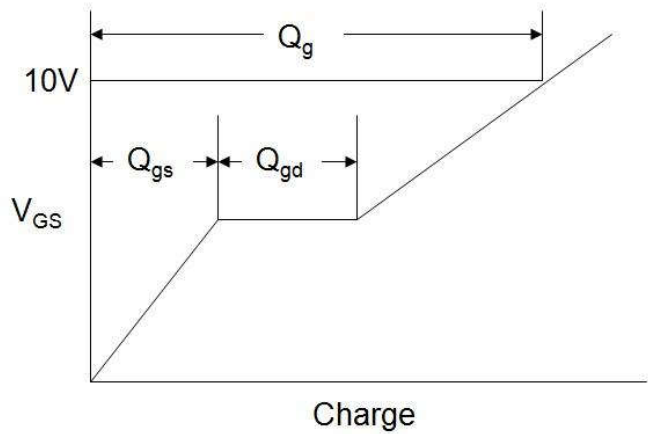
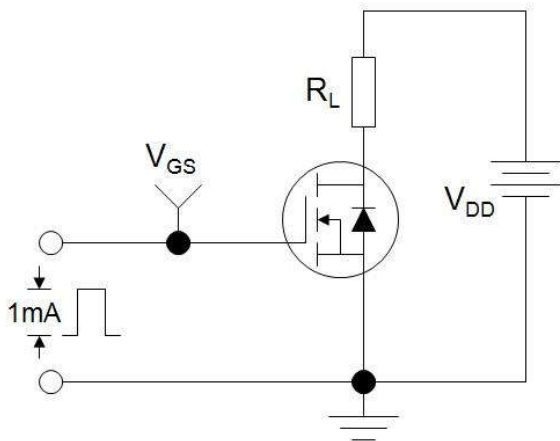


Figure B: Resistive Switching Test Circuit and Waveform

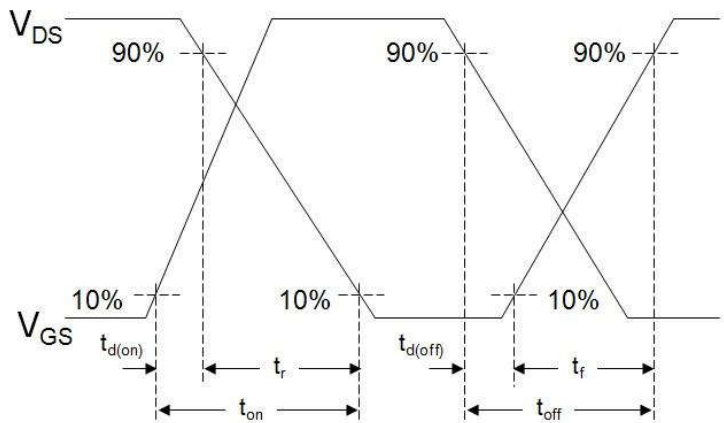
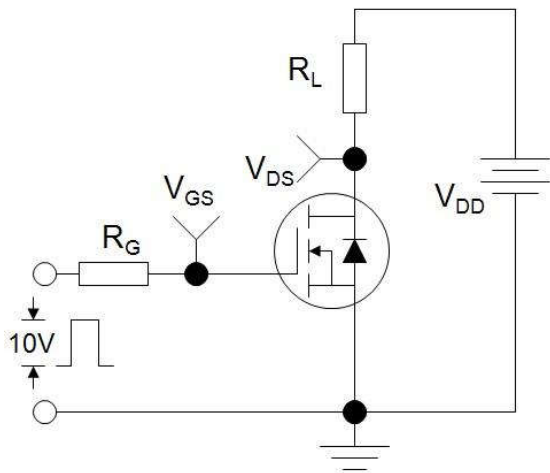
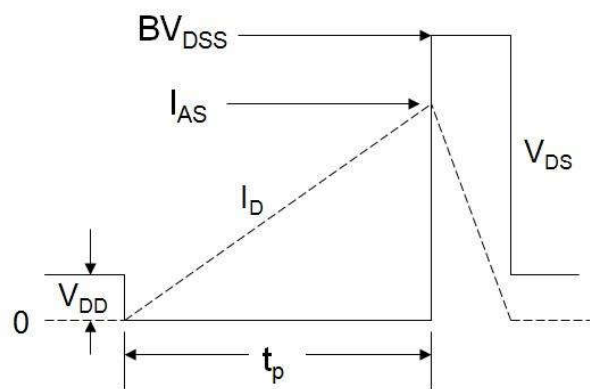
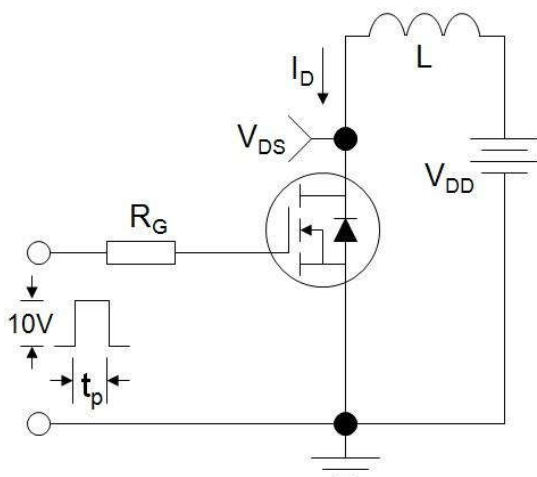


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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			