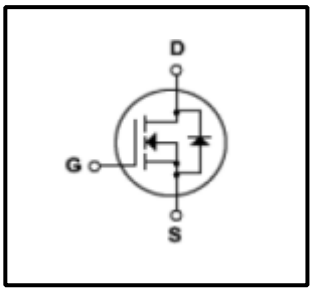
WFF20N60

Silicon N-Channel MOSFET

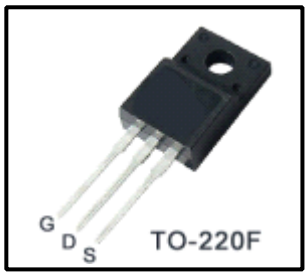
Features

- 20A,600V,$R_{DS(on)}$(Max0.39Ω)@V_{GS}=10V
- Ultra-low Gate charge(Typical 50nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150℃)



General Description

This Power MOSFET is produced using Winsemi's advancedplanar stripe,VDMOS technology.this latest technology has beenespecially designed to minimize on-state resistance, have a high rugged avalanche characteristics .This devices is specially wellsuited for AC-DC switching power supplies, DC-DC powerConverters high voltage H-bridge motor drive PWM



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		600	V
I_D	Continuous Drain Current(@Tc=25℃)		20*	A
	Continuous Drain Current(@Tc=100℃)		12.5*	A
I_{DM}	Drain Current Pulsed	(Note1)	20*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note2)	450	mJ
I_{AR}	Avalanche Current	(Note1)	20	A
E_{AR}	Repetitive Avalanche Energy	(Note1)	20.7	mJ
dv/dt	Peak Diode Recovery dv /dt	(Note3)	50	V/ ns
P_D	Total Power Dissipation(@Tc=25℃)		55	W
	-Derate above 25℃		0.31	W/℃
T_J,T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Channel Temperature		300	℃

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{\theta JC}$	Thermal Resistance , Junction -to -Case	-	-	2.27	℃/W
$R_{\theta JA}$	Thermal Resistance , Junction -to -Ambient	-	-	62.5	℃/W

Electrical Characteristics(Tc=25℃)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I_{GSS}	V_{GS}=±30V,V_{DS}=0V	-	-	±100	nA
Gate-source breakdown voltage		$V_{(BR)GSS}$	I_G=±10 μA,V_{DS}=0V	±30	-	-	V
Drain cut -off current		I_{DSS}	V_{DS}=600V,V_{GS}=0V	-	-	1	μA
			V_{DS}=480V,T_J=125℃	-	-	10	μA
Drain -source breakdown voltage		$V_{(BR)DSS}$	I_D=250μA,V_{GS}=0V	600	-	-	V
Breakdown voltage Temperature coefficient		$\triangle BV_{DSS}/\triangle T_J$	I_D=250μA,Referenced to 25℃	-	0.5	-	V/℃
Gate threshold voltage		$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	3	-	5	V
Drain -source ON resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=10A	-	0.35	0.39	Ω
Forward Transconductance		gfs	V_{DS}=40V,I_D=10A（Note4）	-	18	-	S
Input capacitance		C_{iss}	V_{DS}=25V,	-	2310	2920	pF
Reverse transfer capacitance		C_{rss}	V_{GS}=0V,	-	85	120	
Output capacitance		C_{oss}	f=1MHz	-	1270	1660	
Switching time	Turn-on Rise time	tr	V_{DD}=250V	-	130	270	ns
	Turn-on delay time	t_d(on)	I_D=20A	-	60	128	
	Turn-on Fall time	tf	R_G=25Ω （Note4,5）	-	70	145	
	Turn-off delay time	t_d(off)		-	220	445	
Total gate charge(gate-source plus gate-drain)		Qg	V_{DS}=480V,	-	50	80	nC
Gate-source charge		Qgs	V_{GS}=10V,	-	15	-	
Gate-drain("miller") Charge		Qgd	I_D=20A （Note4,5）	-	23	-	

Source-Drain Ratings and Characteristics(Ta=25℃)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	20	A
Forward voltage(diode)	V_{DSF}	I_S=20A,V_{GS}=0V	-	-	1.4	V
Reverse recovery time	trr	I_{DR}=20A,V_{GS}=0V,	-	460	-	ns
Reverse recovery charge	Qrr	dI_{DR} / dt =100 A / μs	-	5.1	-	μC

Note 1.Pulse width limited by maximum junction temperature

2.L=5.0mH,I_{AS}=20A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

3.I_{SD}≤20A,di/dt≤200a/μs,VDD ≤BV_{DSS}, Starting T_J=25℃

4.Pulse Test:Pulse Width≤300us,Duty Cycle≤2%

5. Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

Please handle with caution

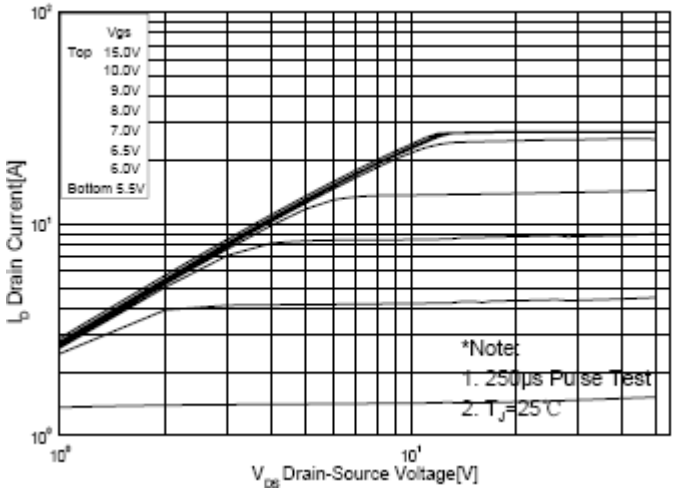


Fig.1 On Region Characteristics

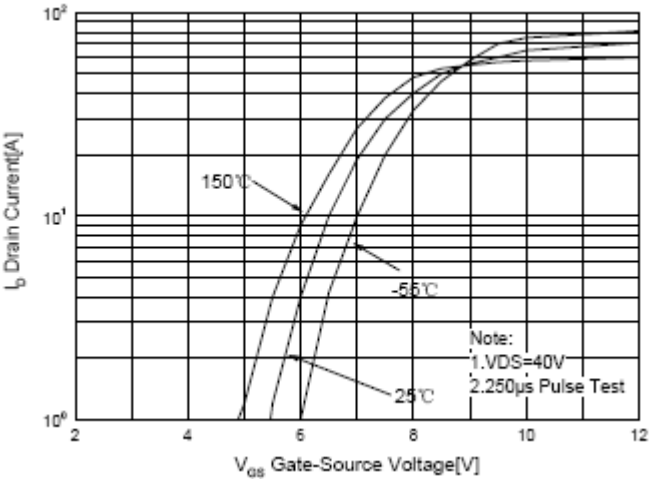


Fig.2 Transfer Characteristics

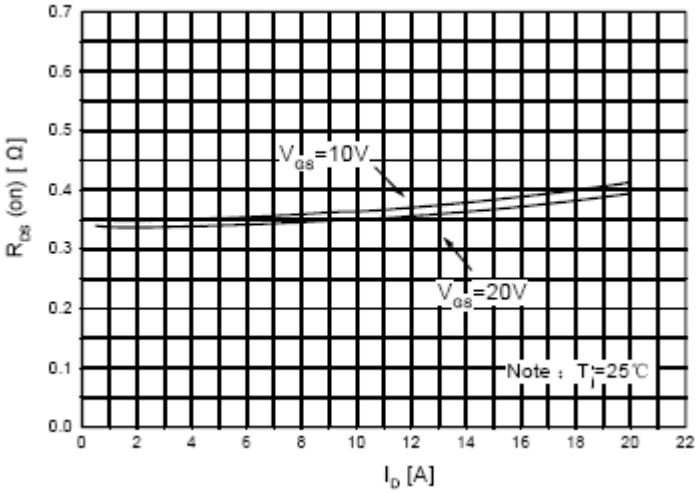


Fig.3 On-Resistance Variation vs Drain current and Gate Voltage

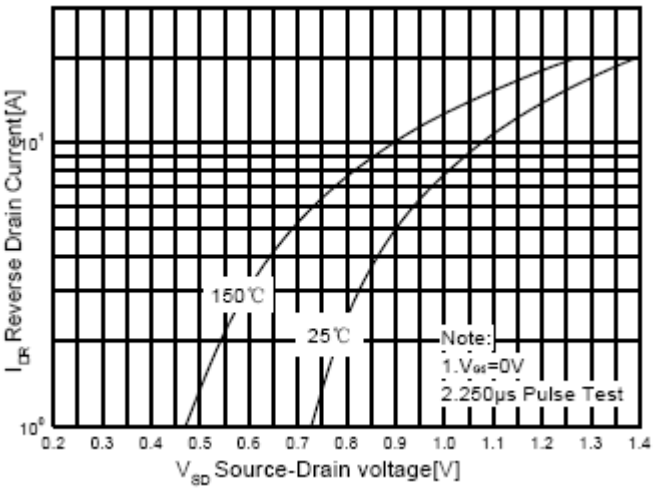


Fig.4 Body Diode Forward voltage Variation with Source Current And Temperature

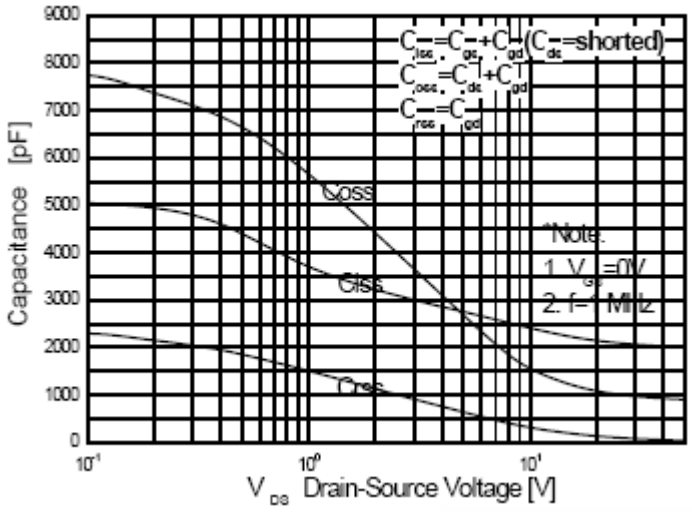


Fig.5 Capacitance Characteristics

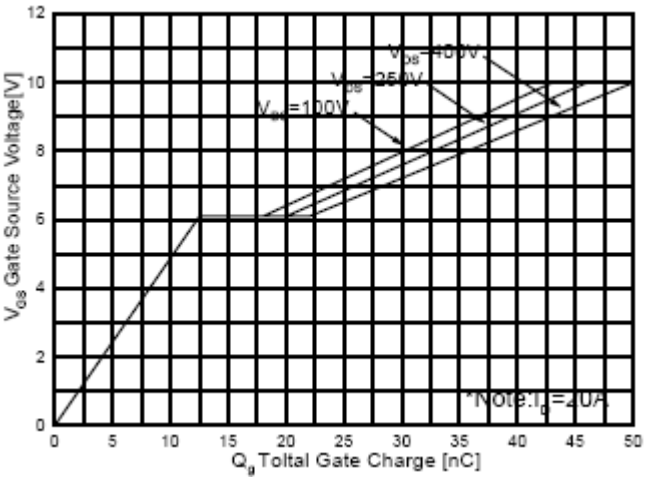


Fig.6 Gate Charge Characteristics

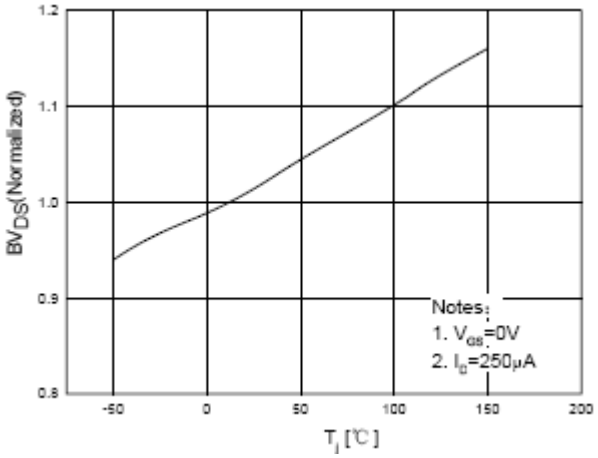


Fig.7 Breakdown Voltage Variation vs.Temperature

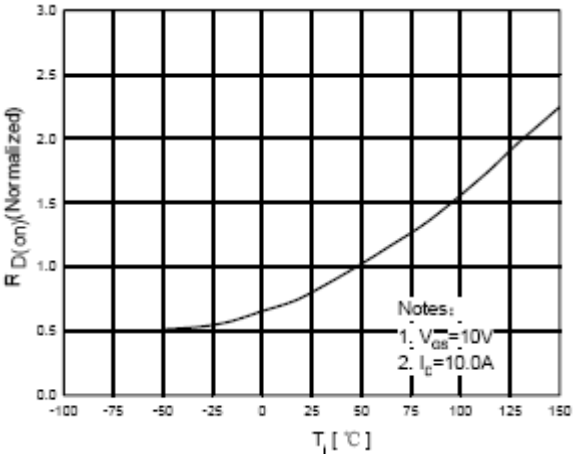


Fig.8 On-Resistance Variation vs.Temperature

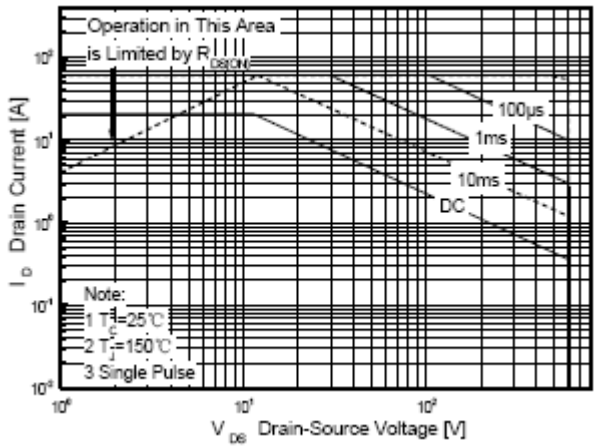


Fig.9 Maximum Safe Operation Area

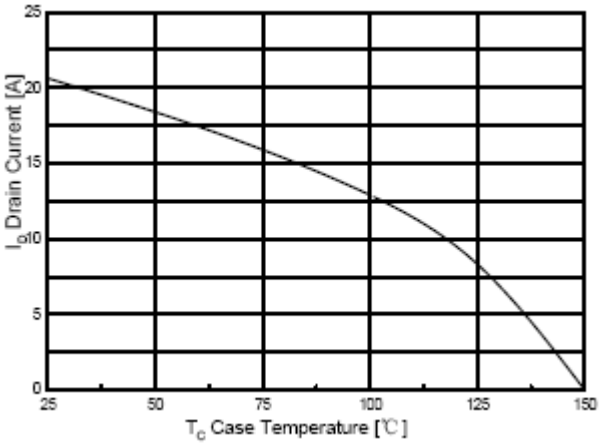


Fig.10 Maximum Drain Current vs Case temperature

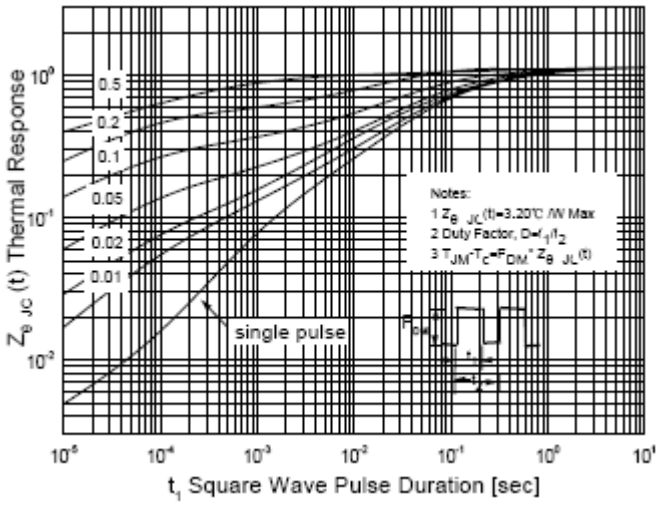


Fig.11 Transient thermal Response Curve

TO-220F Package Dimension

Unit:mm