

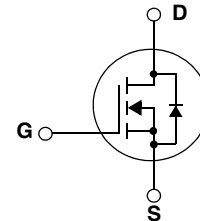
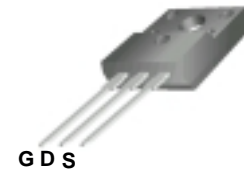


WFF5N60

600V N-Channel MOSFET

Features

- Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Extended Safe Operating Area
- Unrivalled Gate Charge : 15 nC (Typ.)
- BVDSS=600V, ID=4.5A
- Lower $R_{DS(on)}$: 2.5Ω (Max) @VG=10V
- 100% Avalanche Tested



TO-220F

G-Gate,D-Drain,S-Source

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless other wise noted

Symbol	Parameter	WFF5N60	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current -continuous ($T_c=25^\circ\text{C}$)	4.5*	A
	-continuous ($T_c=100^\circ\text{C}$)	1.8*	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Plused Avanche Energy (Note1)	240	mJ
I_{AR}	Avalanche Current (Note2)	4	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	100	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 ~ +150	$^\circ\text{C}$
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	--	3.13	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	--	62.5	$^\circ\text{C}/\text{W}$

* Drain current limited by maximum junction temperature.

Electrical Characteristics Tc=25°C unless other wise noted						
Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	ID=250 μ A, VGS=0	600	--	--	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	ID=250 μ A, Reference to 25°C	--	0.6	--	V/°C
IDSS	Zero Gate Voltage Drain Current	Vds=600V, Vgs=0V	--	--	10	μ A
		Vds=480V, Tc=125°C			100	μ A
IGSSF	Gate-body leakage Current, Forward	Vgs=+30V, Vds=0V	--	--	100	nA
IGSSR	Gate-body leakage Current, Reverse	Vgs=-30V, Vds=0V	--	--	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	Id=250uA, Vds=Vgs	2	--	4	V
R _{DS(on)}	Static Drain-Source On-Resistance	Id=2A, Vgs=10V	--	--	2.5	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=25V, VGS=0, f=1.0MHz	--	560	730	pF
Coss	Output Capacitance		--	80	100	pF
Crss	Reverse Transfer Capacitance		--	9	12	pF
Switching Characteristics						
Td(on)	Turn-On Delay Time	VDD=300V, ID=4.5A RG=25 Ω (Note 3,4)	--	13	35	nS
Tr	Turn-On Rise Time		--	45	100	nS
Td(off)	Turn-Off Delay Time		--	35	80	nS
Tf	Turn-Off Fall Time		--	40	90	nS
Qg	Total Gate Charge	VDS=480, VGS=10V, ID=4.5A (Note 3,4)	--	16	20	nC
Qgs	Gate-Source Charge		--	3.5	--	nC
Qgd	Gate-Drain Charge		--	7.8	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
IS	Maximum Continuous Drain-Source Diode Forward Current		--	--	4.5	A
ISM	Maximum Pulsed Drain-Source Diode Forward Current		--	--	18	A
VSD	Drain-Source Diode Forward Voltage	Id=4.5A	--	--	1.5	V
trr	Reverse Recovery Time	IS=4.5A, VGS=0V	--	270	--	nS
Qrr	Reverse Recovery Charge	diF/dt=100A/ μ s (Note3)	--	1.9	--	μ C
*Notes	1, L=21.7mH, IAS=4.5A, VDD=50V, RG=25Ω, Starting TJ =25°C 2, Repetitive Rating : Pulse width limited by maximum junction temperature 3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2% 4, Essentially Independent of Operating Temperature					

Typical Characteristics

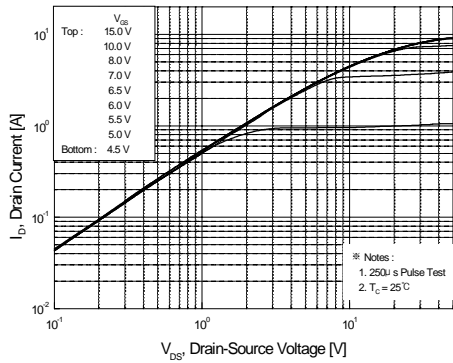


Figure 1. On-Region Characteristics

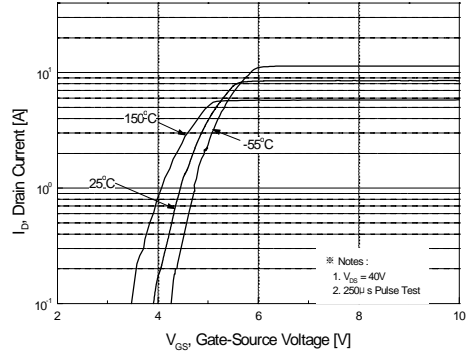


Figure 2. Transfer Characteristics

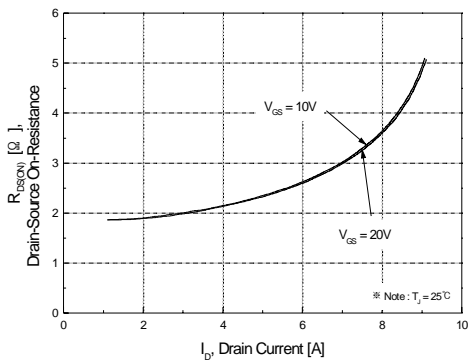


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

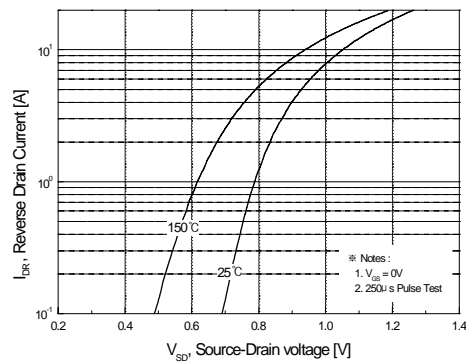


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

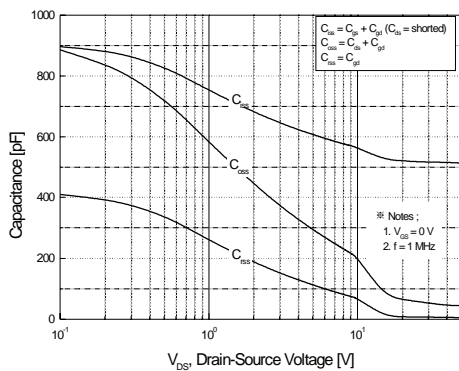


Figure 5. Capacitance Characteristics

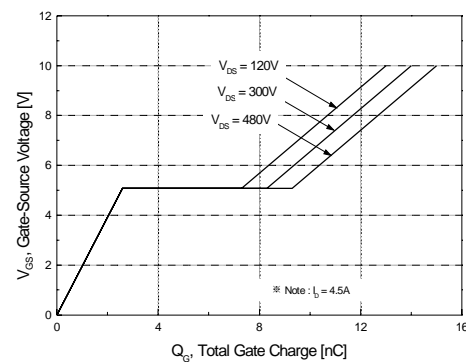


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

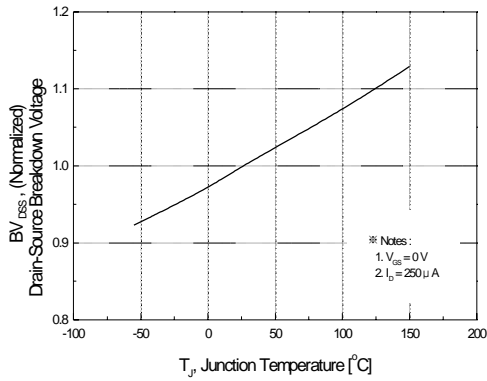


Figure 7. Breakdown Voltage Variation vs Temperature

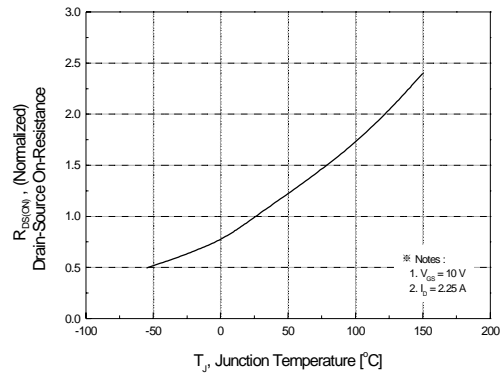


Figure 8. On-Resistance Variation vs Temperature

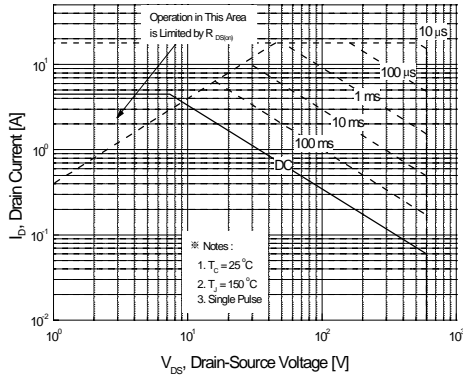


Figure 9-2. Maximum Safe Operating Area for WFF5N60

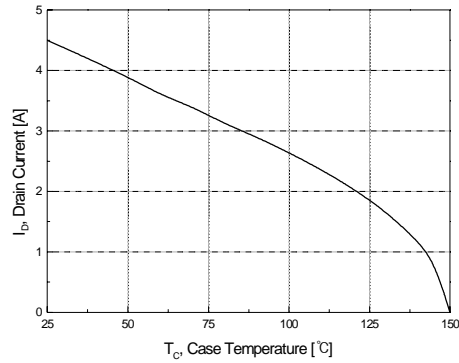


Figure 10. Maximum Drain Current vs Case Temperature

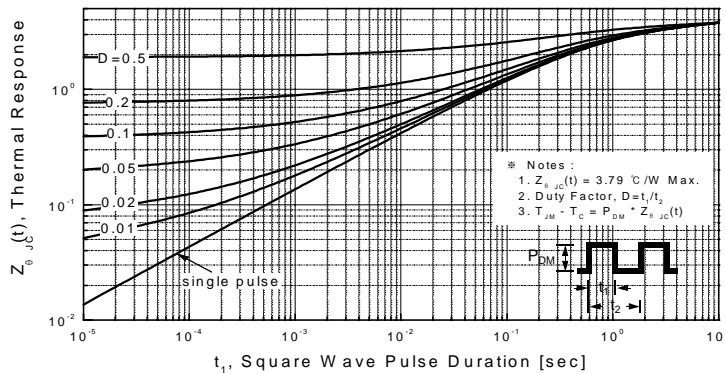
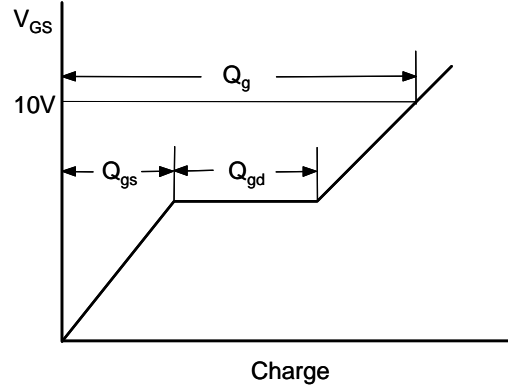
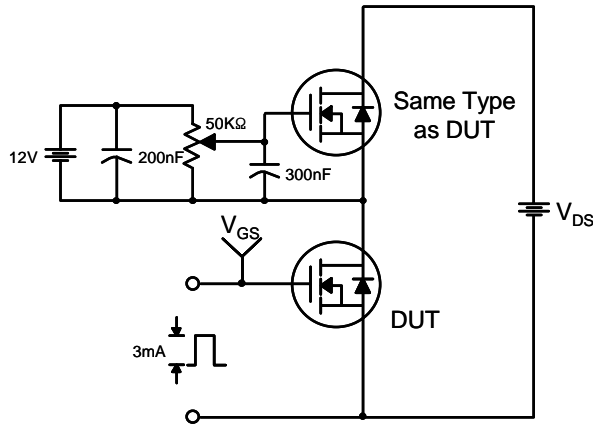
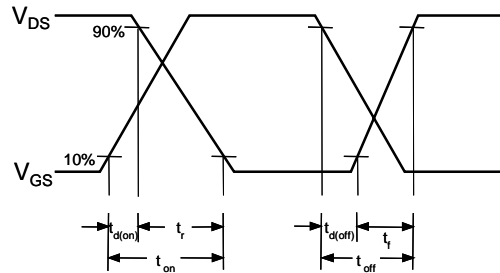
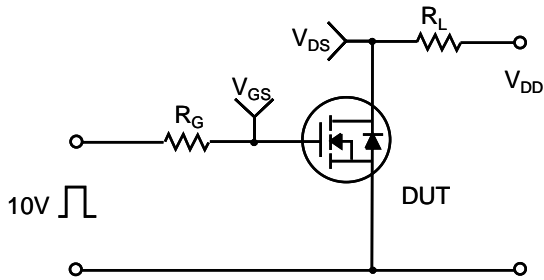


Figure 11-2. Transient Thermal Response Curve for WFF5N60

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

