

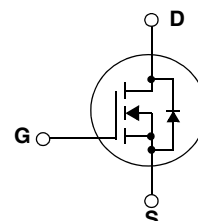
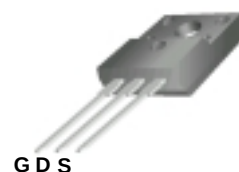


WFF10N60

600V N-Channel MOSFET

Features

- ☐ Low Intrinsic Capacitances
- ☐ Excellent Switching Characteristics
- ☐ Extended Safe Operating Area
- ☐ Unrivalled Gate Charge :Qg= 33nC (Typ.)
- ☐ BVDSS=600V,ID=10A
- ☐ $R_{DS(on)}$:0.73 Ω (Max) @VG=10V
- ☐ 100% Avalanche Tested



TO-220F

G-Gate,D-Drain,S-Source

Absolute Maximum Ratings *Tc=25 °C unless other wise noted*

Symbol	Parameter	WFF10N60	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current -continuous ($T_c=25^\circ C$)	10*	A
	-continuous ($T_c=100^\circ C$)	3.3*	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Plused Avanche Energy (Note1)	520	mJ
I_{AR}	Avalanche Current (Note2)	10	A
P_D	Power Dissipation ($T_c=25^\circ C$)	50	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 ~ +150	$^\circ C$
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	--	2.5	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	--	62.5	$^\circ C/W$

* Drain current limited by maximum junction temperature.

Electrical Characteristics $T_c=25^{\circ}\text{C}$ unless other wise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\text{ }\mu\text{A}$, $V_{GS}=0$	600	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D=250\text{ }\mu\text{A}$, Reference to 25°C	--	0.7	--	$\text{V}/^{\circ}\text{C}$
$IDSS$	Zero Gate Voltage Drain Current	$V_{DS}=600\text{V}$, $V_{GS}=0\text{V}$	--	--	1	μA
		$V_{DS}=480\text{V}$, $T_c=125^{\circ}\text{C}$			10	μA
$IGSSF$	Gate-body leakage Current, Forward	$V_{GS}=+30\text{V}$, $V_{DS}=0\text{V}$	--	--	100	nA
$IGSSR$	Gate-body leakage Current, Reverse	$V_{GS}=-30\text{V}$, $V_{DS}=0\text{V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$I_D=250\text{ }\mu\text{A}$, $V_{DS}=V_{GS}$	2	--	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$I_D=5\text{A}$, $V_{GS}=10\text{V}$	--	--	0.73	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS}=25\text{V}$, $V_{GS}=0$, $f=1.0\text{MHz}$	--	1570	2040	pF
C_{oss}	Output Capacitance		--	166	215	pF
C_{rss}	Reverse Transfer Capacitance		--	18	24	pF

Switching Characteristics

$T_d(on)$	Turn-On Delay Time	$V_{DD}=300\text{V}$, $I_D=10\text{A}$ $R_G=25\text{ }\Omega$ (Note 3,4)	--	23	55	nS
T_r	Turn-On Rise Time		--	66	150	nS
$T_d(off)$	Turn-Off Delay Time		--	144	300	nS
T_f	Turn-Off Fall Time		--	77	165	nS
Q_g	Total Gate Charge	$V_{DS}=480\text{V}$, $V_{GS}=10\text{V}$, $I_D=10\text{A}$ (Note 3,4)	--	44	57	nC
Q_{gs}	Gate-Source Charge		--	6.7	--	nC
Q_{gd}	Gate-Drain Charge			18.5	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximun Continuous Drain-Source Diode Forward Current		--	--	10	A
I _{SM}	Maximun Plused Drain-Source DiodeForwad Current		--	--	38	A
V _{SD}	Drain-Source Diode Forward Voltage	Id=10A	--	--	1.4	V
trr	Reverse Recovery Time	I _S =10A,V _{GS} =0V	--	340	--	nS
Qrr	Reverse Recovery Charge	di _F /dt=100A/ μ s (Note3)	--	3.2	--	μ C

- *Notes
- 1, $L=10.6\text{mH}$, $I_{AS}=9.5\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
 - 2, Repetitive Rating : Pulse width limited by maximum junction temperature
 - 3, Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 - 4, Essentially Independent of Operating Temperature

Typical Characteristics

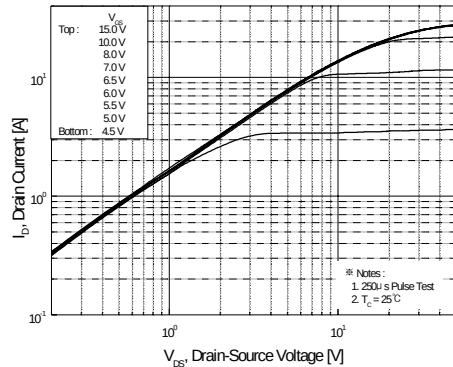


Figure 1. On-Region Characteristics

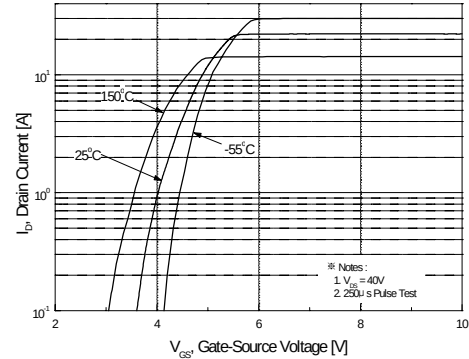


Figure 2. Transfer Characteristics

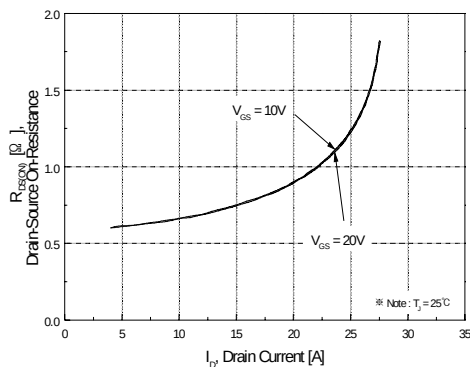


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

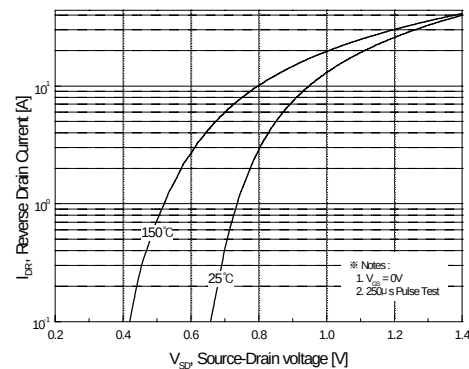


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

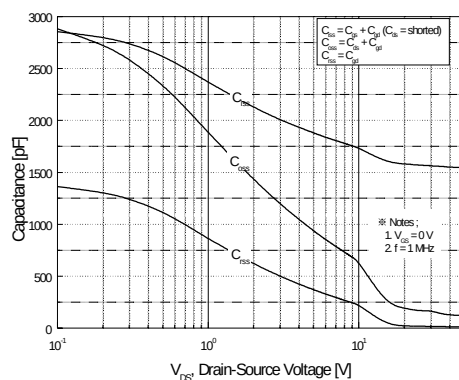


Figure 5. Capacitance Characteristics

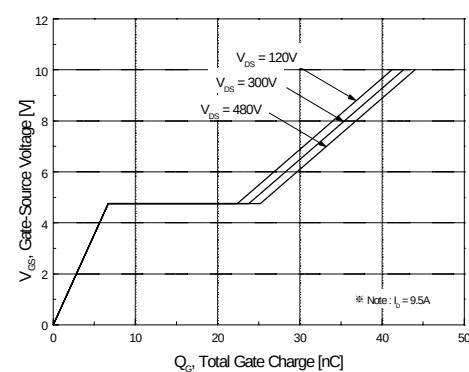


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

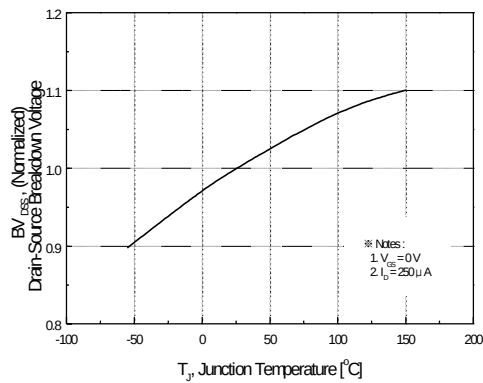


Figure 7. Breakdown Voltage Variation vs Temperature

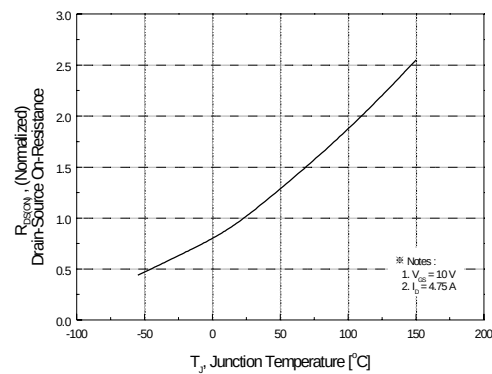


Figure 8. On-Resistance Variation vs Temperature

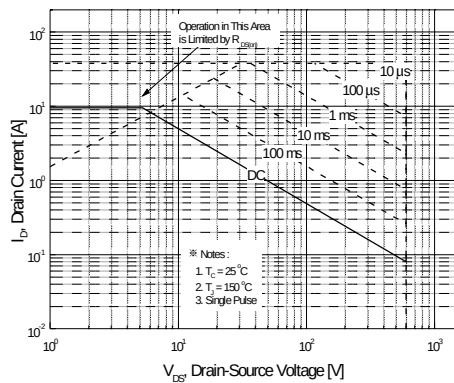


Figure 9-2. Maximum Safe Operating Area for WFF10N60

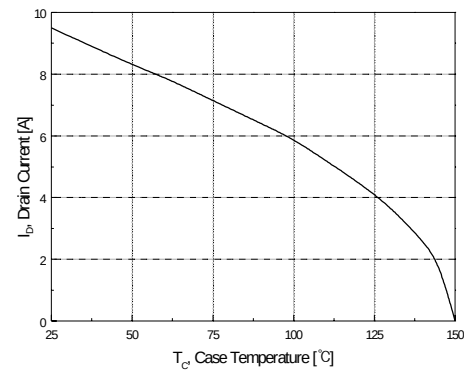


Figure 10. Maximum Drain Current vs Case Temperature

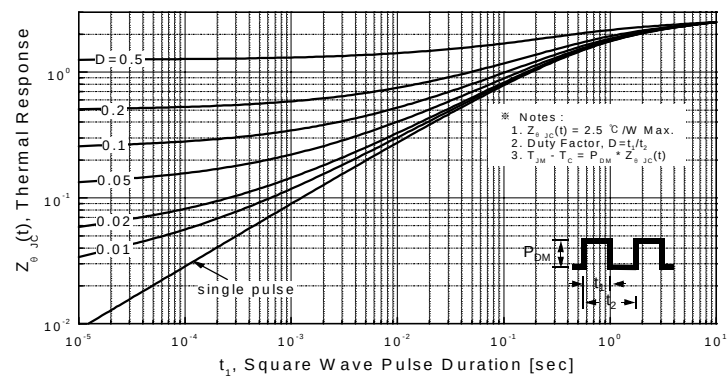
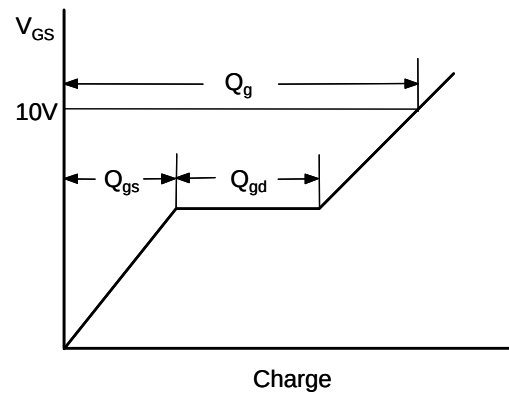
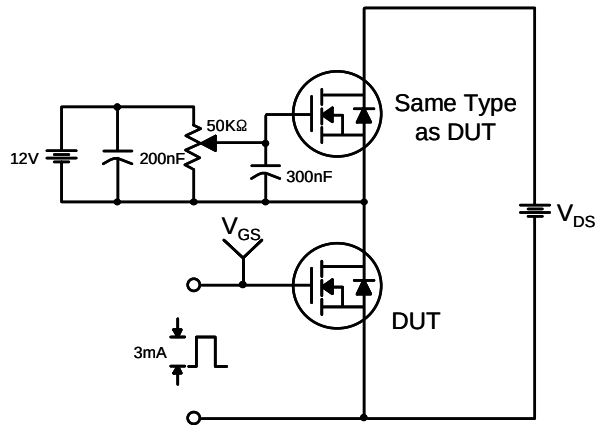
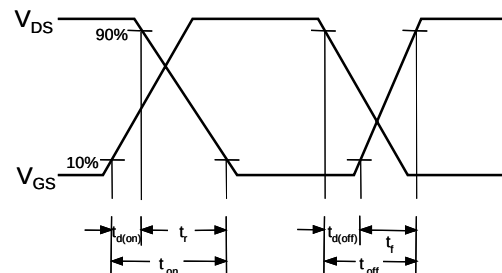
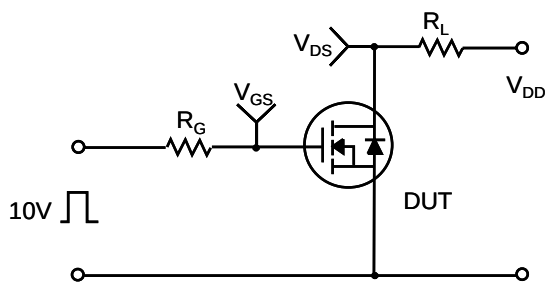


Figure 11-2. Transient Thermal Response Curve for WFF10N60

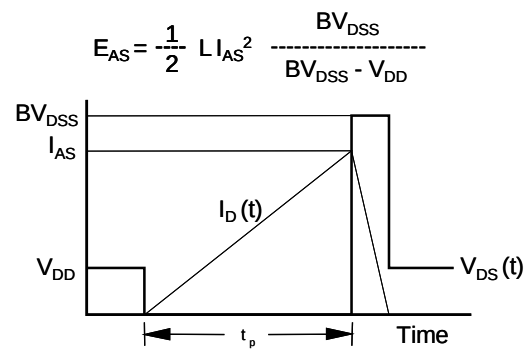
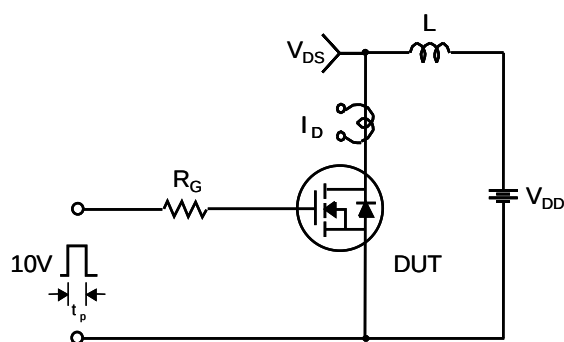
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms

