

Features

- 650V, 7A
- $R_{DS(ON)} = 0.54\Omega$ (Max.) @ $V_{GS} = 10V$, $I_D = 4A$
- Very low FOM $R_{DS(ON)}XQ_g$
- Extremely low switching loss
- Good stability and uniformity

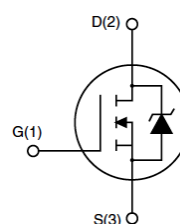
Application

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

Package

TO220F

WFF7N65SAH

**Absolute Maximum Ratings** $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		650	V
V_{GSS}	Gate-Source Voltage		± 30	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	7	A
I_{DM}	Pulsed Drain Current	note1	21	A
E_{AS}	Single Pulsed Avalanche Energy	note2	140	mJ
I_{AR}	Avalanche Current		3	A
E_{AR}	Repetitive Avalanche Energy		0.2	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	27.8	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		4.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		80	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ\text{C}$

*Drain current limited by maximum junction temperature

Electrical Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} = 0V, V _{GS} = ±30V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.5	-	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance ^{note3}	V _{GS} = 10V, I _D = 4A	-	0.46	0.54	Ω
g _{fs}	Forward Transconductance	V _{GS} = 10V, I _D = 4A	-	2.5	-	S
R _g	Forward Transconductance ^{note3}	f = 1.0MHz	-	6.5	-	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 50V, V _{GS} = 0V, f = 1.0MHz	-	450	-	pF
C _{oss}	Output Capacitance		-	82	-	pF
C _{rss}	Reverse Transfer Capacitance		-	4	-	pF
Q _g	Total Gate Charge	V _{DD} = 480V, I _D = 7A, V _{GS} = 10V	-	10	-	nC
Q _{gs}	Gate-Source Charge		-	2.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	4.5	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 300V, I _D = 7A, R _G = 25Ω	-	14	31	ns
t _r	Turn-On Rise Time		-	32	66	ns
t _{d(off)}	Turn-Off Delay Time		-	53	109	ns
t _f	Turn-Off Fall Time		-	15	32	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	7	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	21	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _F = 7A	-	-	1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _S = 7A,	-	400	-	ns
Q _{rr}	Reverse Recovery Charge	diF/dt = 100A/μs	-	1.5	-	uC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 3A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$
3. Pulse width $\leq 300\mu s$; duty cycle $\leq 1\%$.

Typical Performance Characteristics

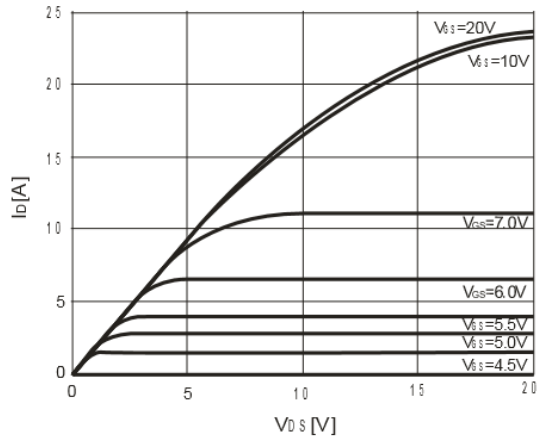


Figure 1. Output Characteristics

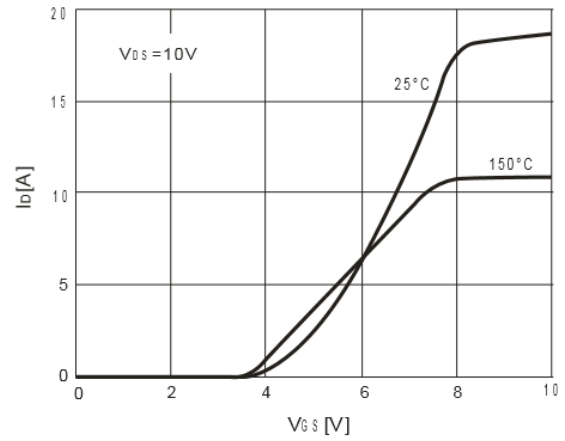


Figure 2. Transfer Characteristics

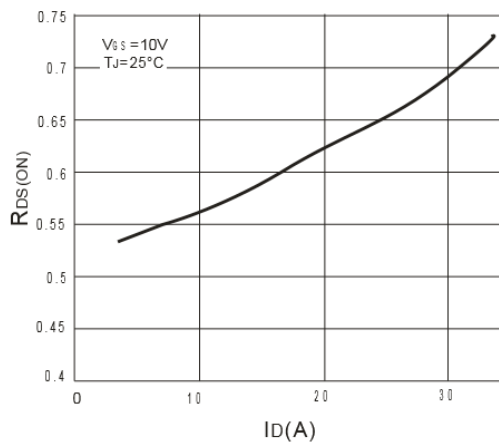


Figure 3. On-resistance vs. Drain Current

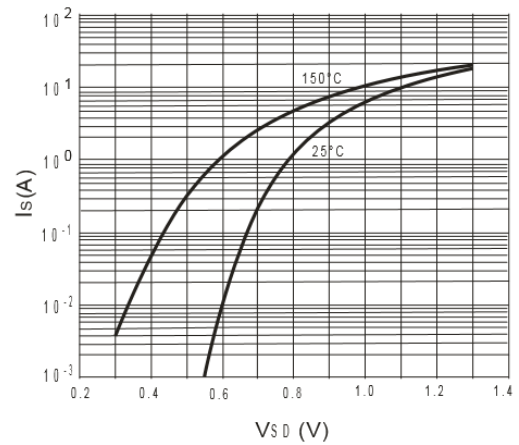


Figure 4. Body Diode Characteristics

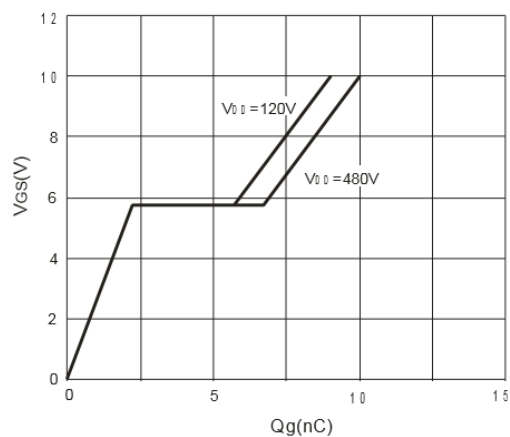


Figure 5. Gate Charge Characteristics

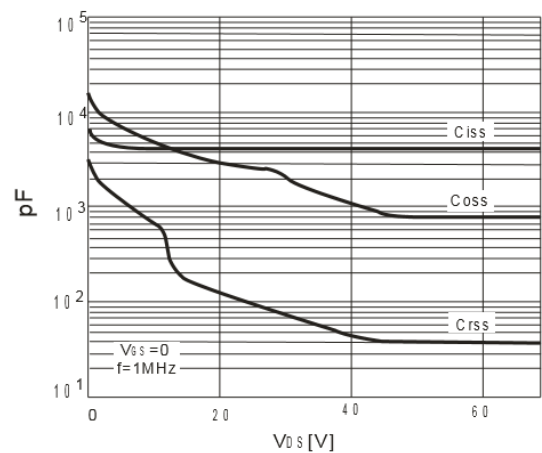
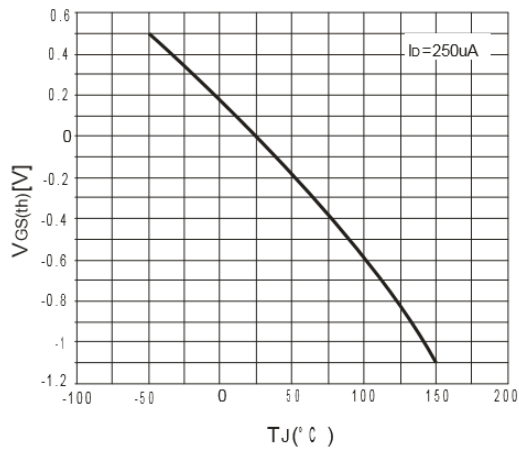
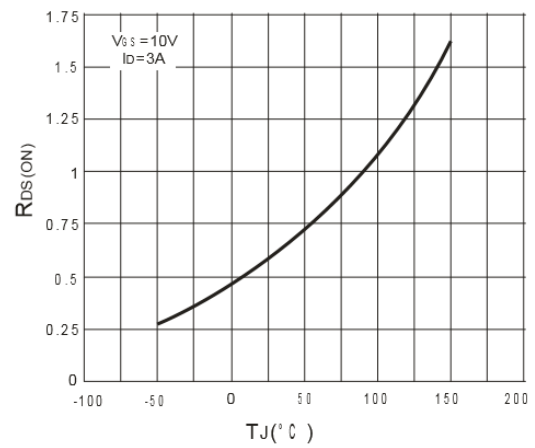


Figure 6. Capacitance Characteristic



**Figure 7. Threshold Voltage vs. Junction
Temperatur**



**Figure 8. Normalized on Resistance vs. Junction
Temperatur**

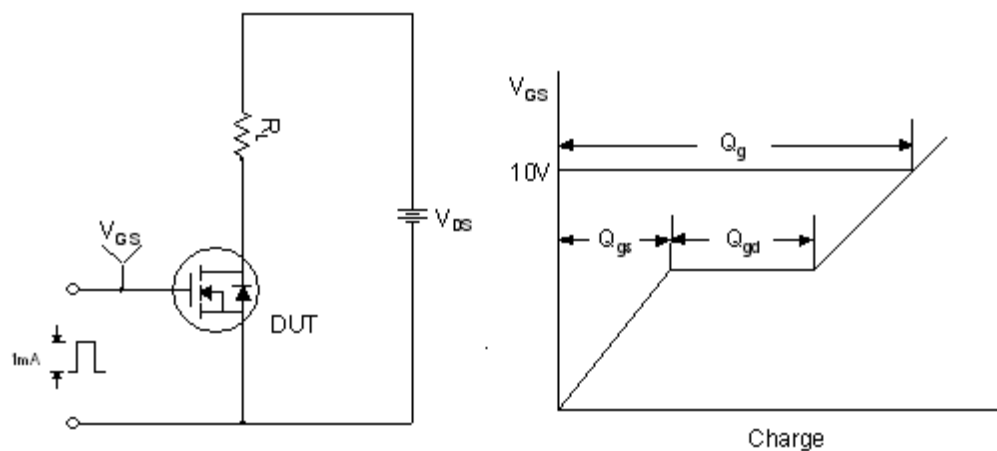


Figure 9. Gate Charge Test Circuit & Waveform

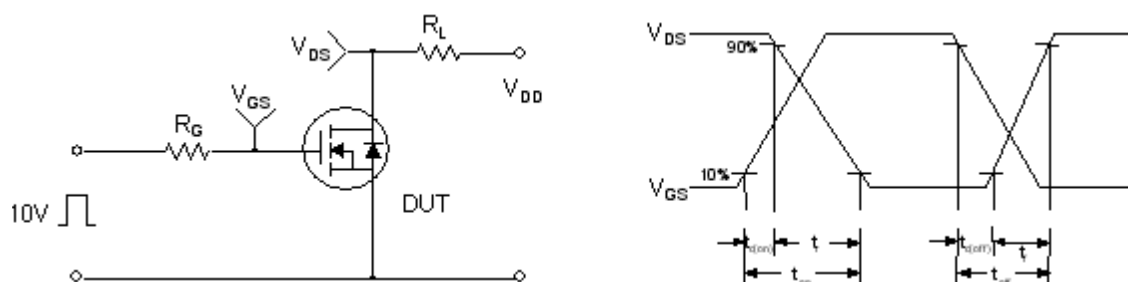


Figure 10. Resistive Switching Test Circuit & Waveforms

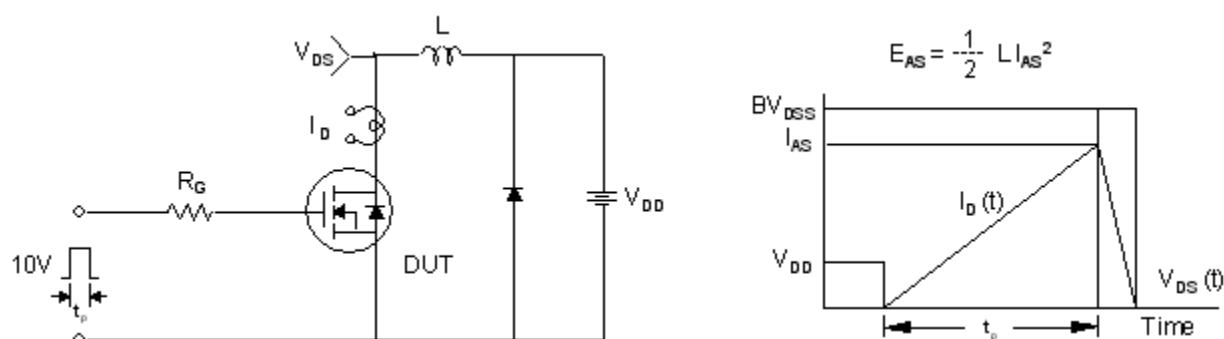
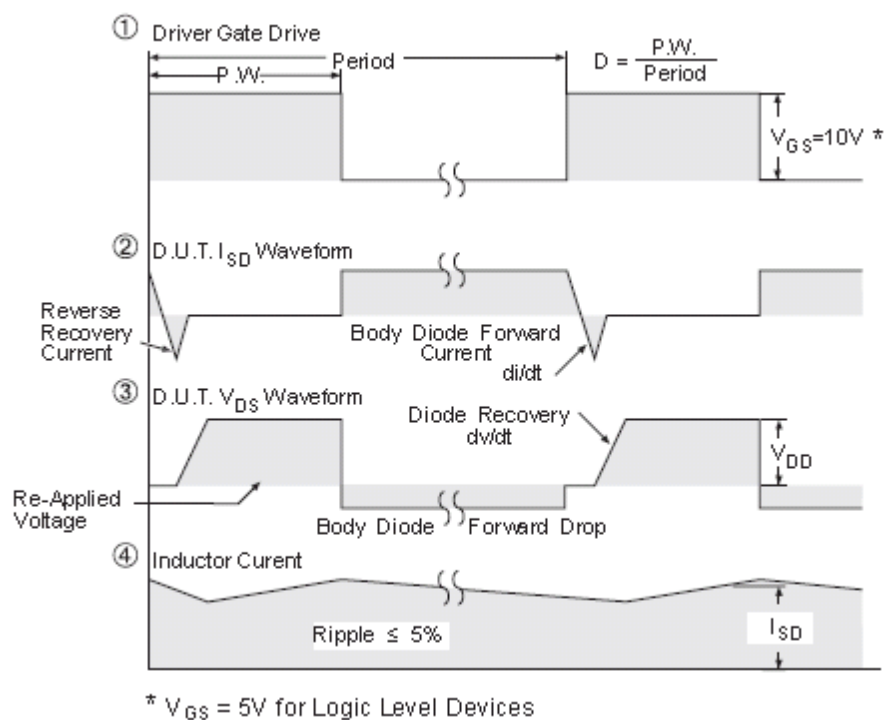
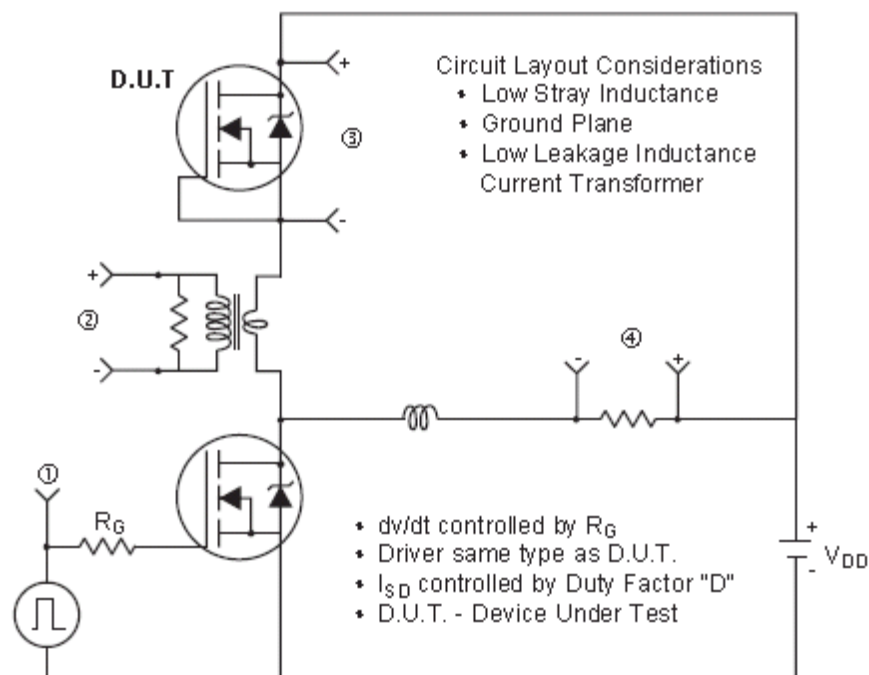
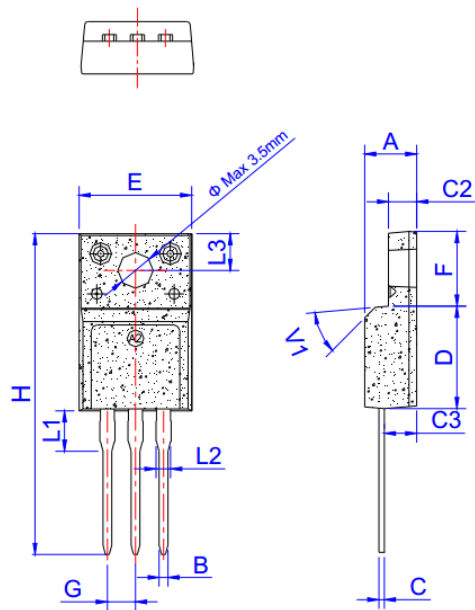


Figure 11. Unclamped Inductive Switching Test Circuit & Waveforms

Figure 12. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

Package Mechanical Data



TO-220F

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	

WFF7N65SAH Product Description

Silicon N-Channel MOSFET



NOTE:

- 1.We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
- 2.Please do not exceed the absolute maximum ratings of the device when circuit designing.
- 3.Winsemi Microelectronics Co., Ltd reserved the right to make changes in this specification sheet and is subject to change without prior notice.

CONTACT:

Winsemi Microelectronics Co., Ltd.

ADD:Room 1002, East, Phase 2, HighTech Plaza,Tian-An Cyber Park,Che gong miao, FuTian, Shenzhen, P.R. China.

Post Code : 518040

Tel : +86-755-8250 6288

FAX : +86-755-8250 6299

Web Site : www.winsemi.com