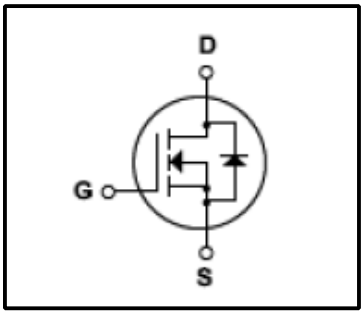
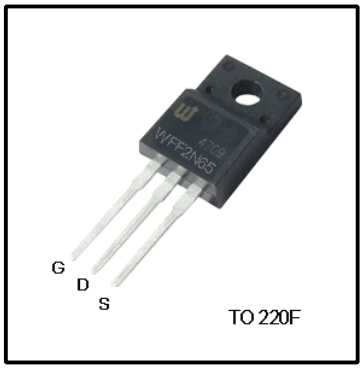
Silicon N-Channel MOSFET

Features

- 2A,650V(Type),$R_{DS(on)}$(Max 5Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 9.0nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Isolation Voltage(V_{ISO}=4000V AC)
- Maximum Junction Temperature Range(150℃)
- Halogen free(WFF2N65-HF)





General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe,VDMOS technology. This latest technology has been especially designed to minimize on -state resistance,have a high rugged avalanche characteristics. This devices is specially well suited for high efficiency switch mode power supply .

Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		650	V
I_D	Continuous Drain Current(@Tc=25℃)		2*	A
	Continuous Drain Current(@Tc=100℃)		1.3*	A
I_{DM}	Drain Current Pulsed	(Note1)	16*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note2)	240	mJ
E_{AR}	Repetitive Avalanche Energy	(Note1)	10	mJ
dv/dt	Peak Diode Recovery dv /dt	(Note3)	4.5	V/ ns
P_D	Total Power Dissipation(@Tc=25℃)		23	W
	Derating Factor above 25℃		0.26	W/℃
T_J,T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Maximum lead Temperature for soldering purposes		300	℃

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance , Junction -to -Case	-	-	5.4	℃/W
R_{QCS}	Thermal Resistance , Case-to-Sink	0.5	-	-	℃/W
R_{QJA}	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	-	-	10	μA
			V_{DS}=480V,Tc=125℃	-		100	μA
Drain -source breakdown voltage		$V_{(BR)DSS}$	I_D=250 μA,V_{GS}=0V	650	-	-	V
Break Voltage Temperature Coefficient		△BV_{DSS}/ T_J	I_D=250μA,Referenced to 25℃		0.65	-	
Gate threshold voltage		$V_{GS(th)}$	V_{DS}=10V,I_D=250 μA	2	-	4	V
Drain -source ON resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=1A	-	4.2	5	Ω
Forward Transconductance		gfs	V_{DS}=50V,I_D=1A	-	2.05	-	S
Input capacitance		C_{iss}	V_{DS}=25V,	-	380	490	pF
Reverse transfer capacitance		C_{rss}	V_{GS}=0V,	-	7.6	9.9	
Output capacitance		C_{oss}	f=1MHz	-	35	49	
Switching time	Rise time	tr	V_{DD}=300V,	-	15	42	ns
	Turn-on time	ton	I_D=2A,	-	50	108	
	Fall time	tf	R_G=25Ω,	-	40	89	
	Turn-off time	toff	(Note4,5)	-	40	89	
Total gate charge(gate-source plus gate-drain)		Qg	V_{DD}=320V,	-	9.0	19	nC
Gate-source charge		Qgs	V_{GS}=10V, I_D=2A	-	1.7	-	
Gate-drain("miller") Charge		Qgd	(Note4,5)	-	7.2	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	2	A
Pulse drain reverse current	I_{DRP}	-	-	-	6	A
Forward voltage(diode)	V_{DSF}	I_{DR}=2A,V_{GS}=0V	-	-	1.4	V
Reverse recovery time	trr	I_{DR}=2A,V_{GS}=0V,	-	200	-	ns
Reverse recovery charge	Qrr	dI_{DR} / dt =100 A / μs	-	1.3	-	μC

Note 1.Repeativity rating :pulse width limited by junction temperature

2.L=0.5mH I_{AS}=2.0A,V_{DD}=50V,R_G=0Ω ,Starting T_J=25℃

3.I_{SD}≤2.0A,di/dt≤200A/us,V_{DD}<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

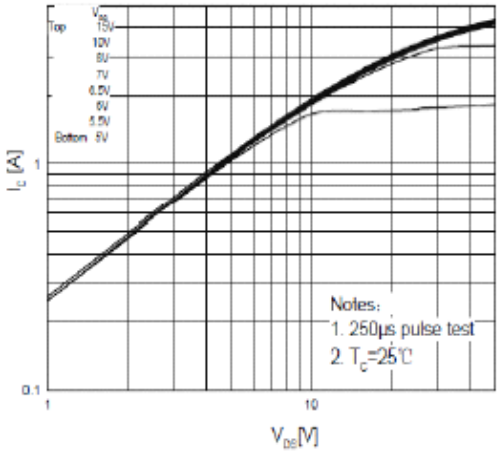


Fig.1 On-State Characteristics

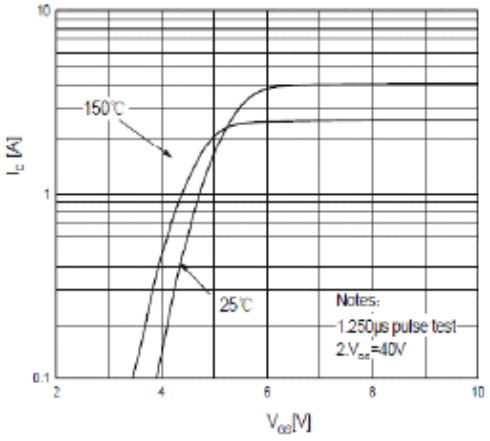


Fig.2 Transfer Current characteristics

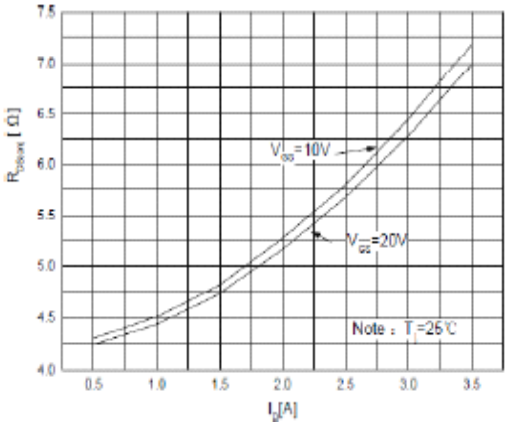


Fig.3 On Resistance variation vs Drain Current

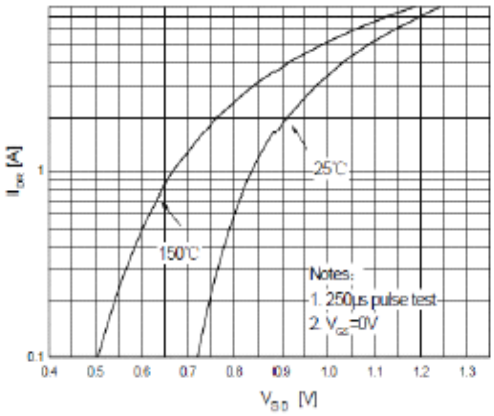


Fig.4 Body Diode Forward Voltage Variation vs Source Current And temperature

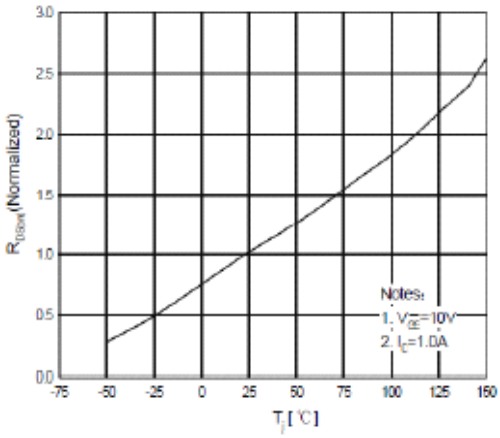


Fig.5 On-Resistance Variation vs Junction Temperature

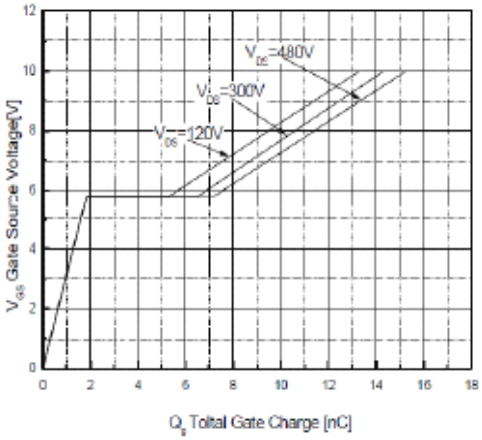


Fig.6 Gate Charge Characteristics

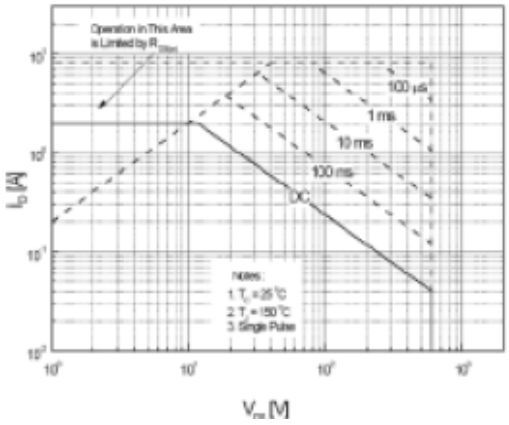


Fig.7 Maximum Safe Operation Area

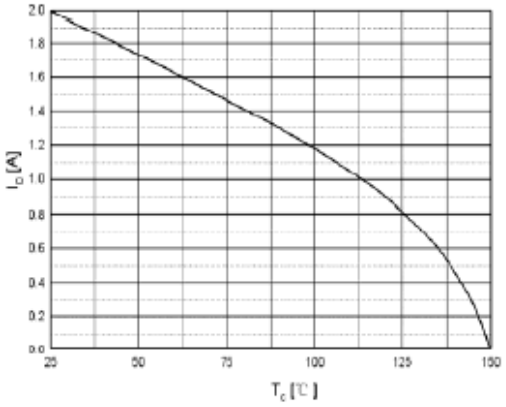


Fig.8 Maximum Drain Current vs Case Temperature

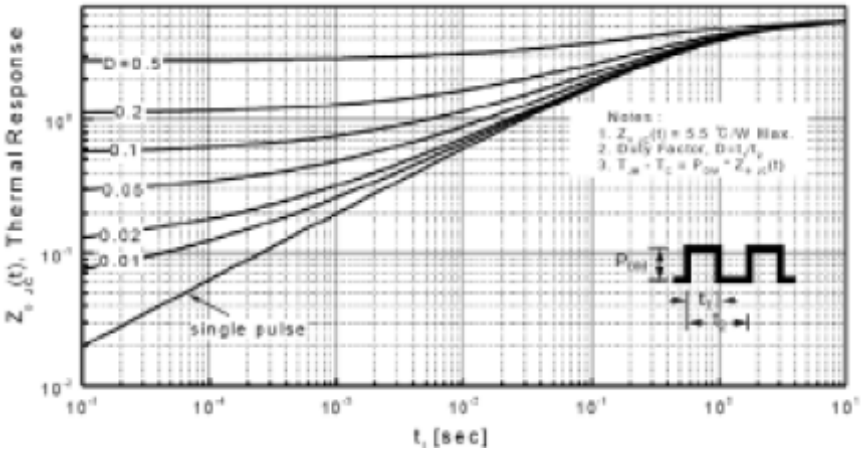


Fig.9 Transient Thermal Response curve

Marking layout

: Winsemi Semiconductor Logo

WW : Weekly code(01-52)

YY : Last two digit of calendar year

(11:2011;12:2012)

□ : HF Halogen free

Null Halogen

Δ : Chip serial number

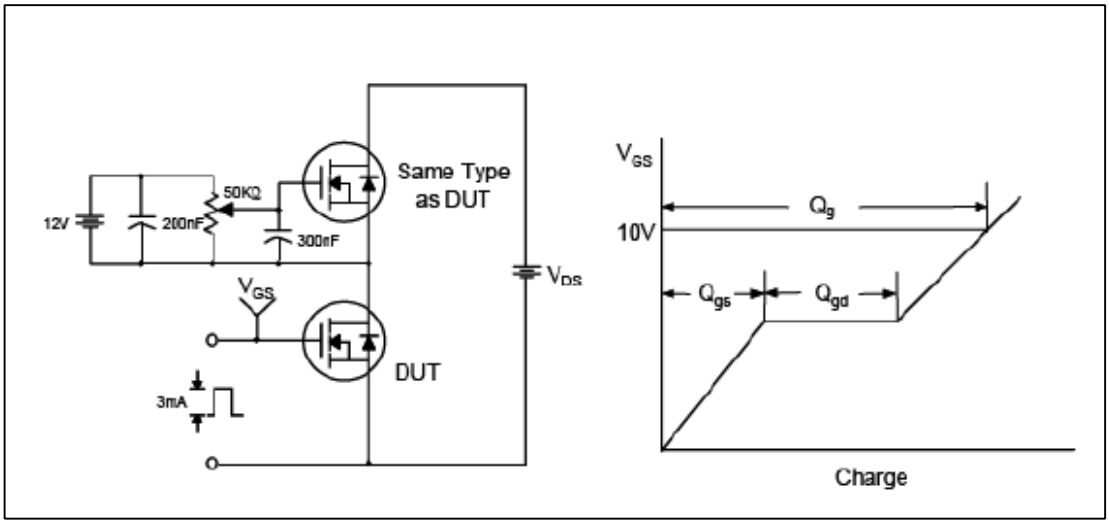


Fig.10 Gate Test circuit & Waveform

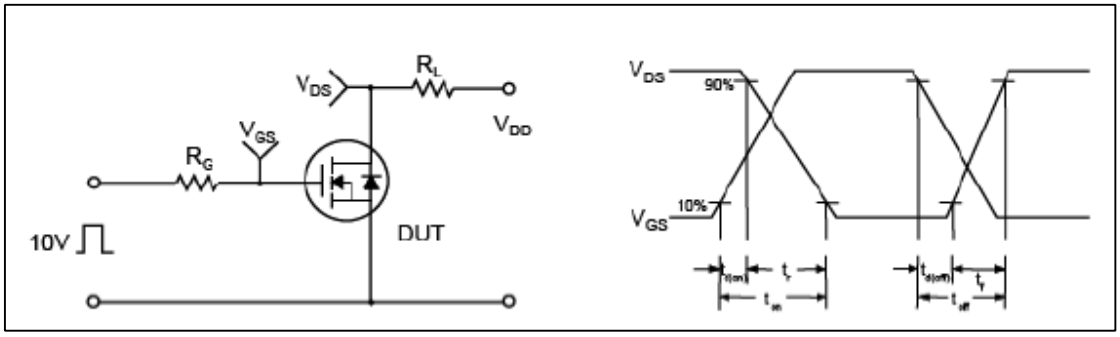


Fig.11 Resistive Switching Test Circuit & Waveform

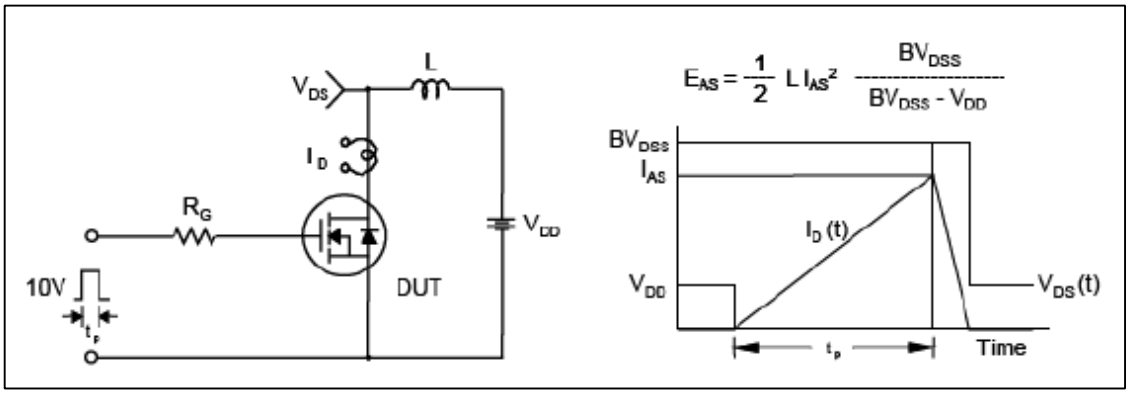


Fig.12 Uncamped Inductive Switching Test Circuit & Waveform

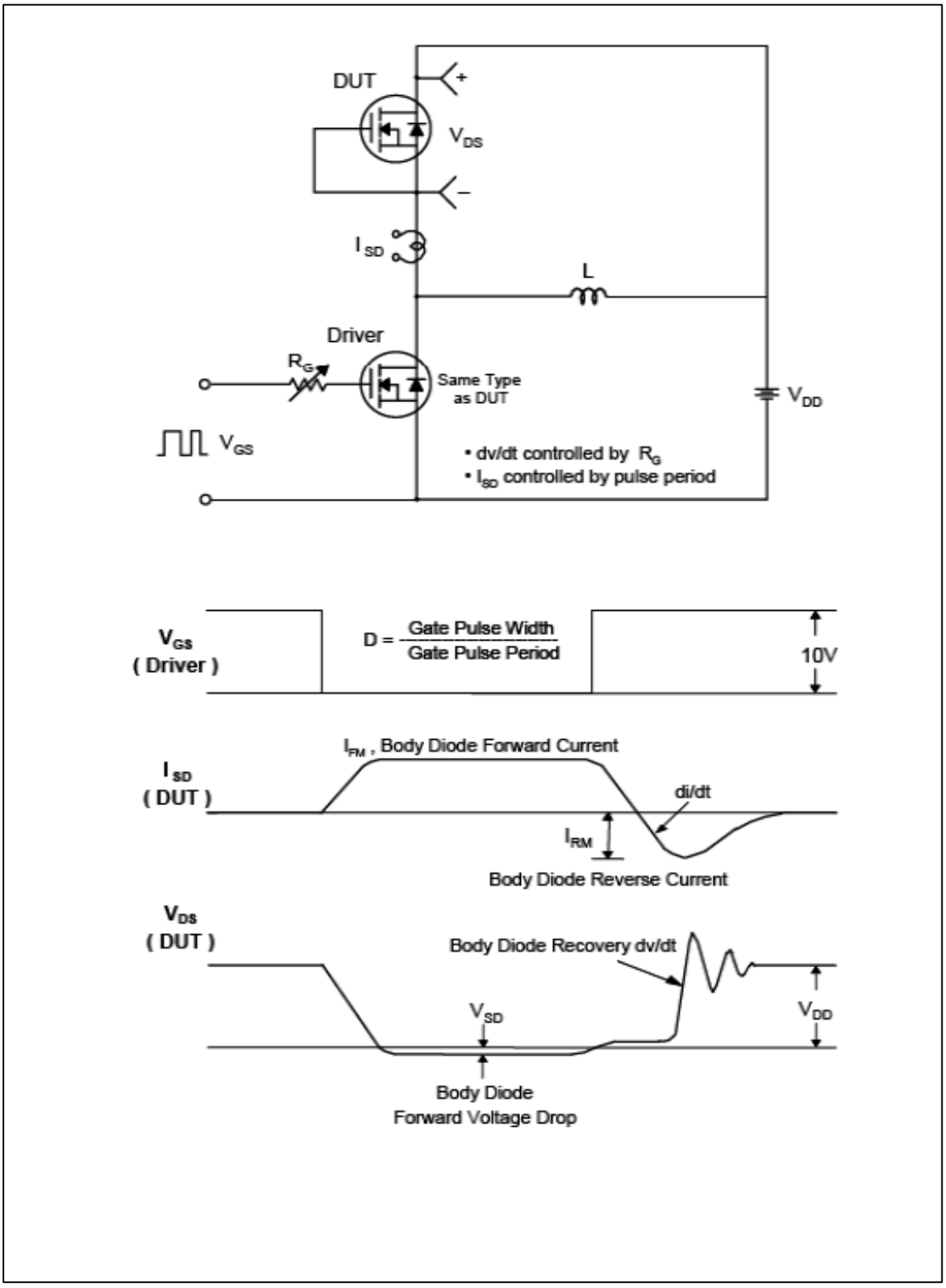


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220F Package Dimension

Unit:mm