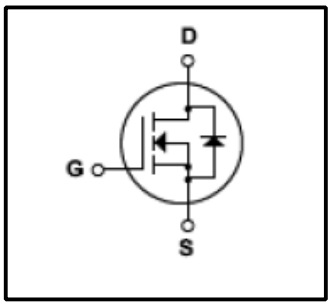
Silicon N-Channel MOSFET



Features

■5.5A,400V, $R_{DS(on)}$(Max 1.0Ω)@V_{GS}=10V

■ Ultra-low Gate Charge(Typical 32nC)

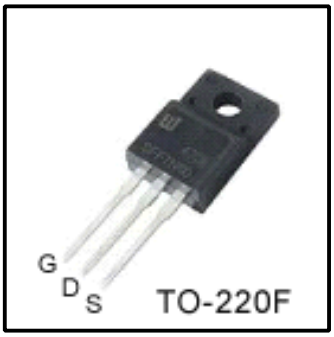
■ Fast Switching Capability

■ 100%Avalanche Tested

■ Maximum Junction Temperature Range(150℃)

General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe, DMOS 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 model power supplies, power factor correction and half bridge and full bridge resonant topology line a electronic lamp ballast.



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		400	V
I_D	Continuous Drain Current(@Tc=25℃)		5.5*	A
	Continuous Drain Current(@Tc=100℃)		2.9*	A
I_{DM}	Drain Current Pulsed	(Note1)	22*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	330	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	7.4	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		38	W
	Derating Factor above 25℃		0.3	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	-	-	3.3	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	62	℃/W

Electrical Characteristics (Tc = 25° C)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V	-	-	±100	nA
Gate−source breakdown voltage		$V_{(BR)GSS}$	I_G = ±10 μA, V_{DS} = 0 V	±30	-	-	V
Drain cut−off current		I_{DSS}	V_{DS} = 400 V, V_{GS} = 0 V	-	-	1	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	I_D = 250 μA, V_{GS} = 0 V	400	-	-	V
Break Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25℃	-	0.4	-	V/℃
Gate threshold voltage		$V_{GS(th)}$	V_{DS} = 10 V, I_D =250 μA	2	-	4	V
Drain−source ON resistance		$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 2.75A	-	0.83	1	Ω
Forward Transconductance		gfs	V_{DS} = 50 V, I_D = 2.75A	-	4.5	-	S
Input capacitance		C_{iss}	V_{DS} = 25 V,	-	550	720	pF
Reverse transfer capacitance		C_{rss}	V_{GS} = 0 V,	-	23	30	
Output capacitance		C_{oss}	f = 1 MHz	-	85	110	
Switching time	Rise time	tr	V_{DD} =200 V,	-	15	40	ns
	Turn−on time	ton	I_D =5.5A	-	55	120	
	Fall time	tf	R_G=25Ω	-	85	180	
	Turn−off time	toff	(Note4,5)	-	50	110	
Total gate charge (gate−source plus gate−drain)		Qg	V_{DD} = 320 V,	-	32	38	nC
Gate−source charge		Qgs	V_{GS} = 10 V,	-	4.3	5.7	
Gate−drain (“miller”) Charge		Qgd	I_D =5.5 A (Note4,5)	-	14	22	

Source−Drain Ratings and Characteristics (Ta = 25° C)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	5.5	A
Pulse drain reverse current	I_{DRP}	-	-	-	22	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 5.5 A, V_{GS} = 0 V	-	1.4	1.5	V
Reverse recovery time	t_{rr}	I_{DR} = 5.5 A, V_{GS} = 0 V,	-	265	530	ns
Reverse recovery charge	Q_{rr}	dI_{DR} / dt = 100 A / μs	-	2.32	-	μC

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

2.L=18.5mH,I_{AS}=5.5A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

3.I_{SD}≤5.5A,di/dt≤300A/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

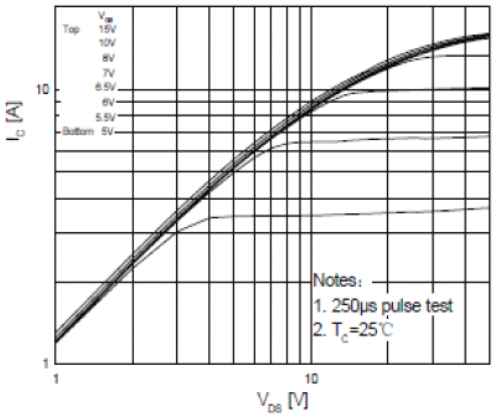


Fig. 1 On-State Characteristics

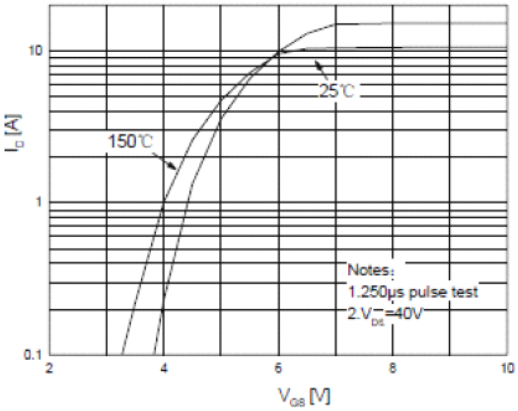


Fig.2 Transfer Characteristics

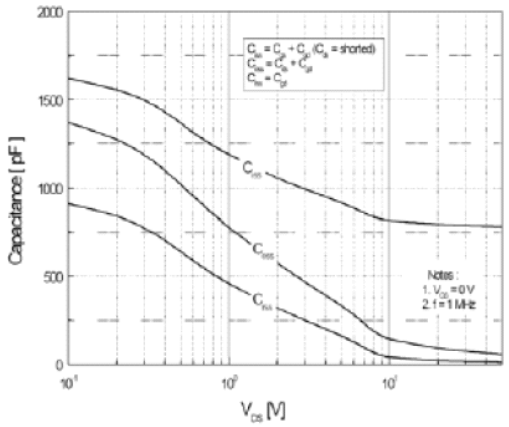


Fig.3 Capacitance Variation vs Drain Voltage

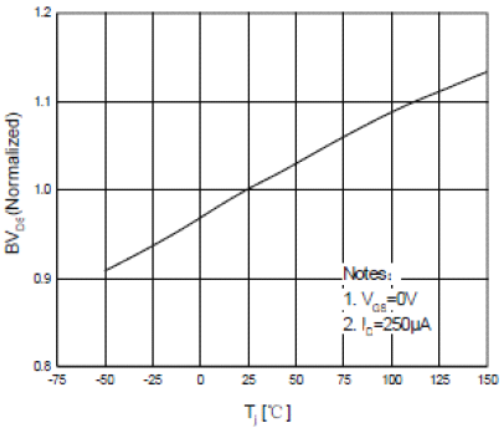


Fig.4 Breakdown Voltage Variation vs Temperature

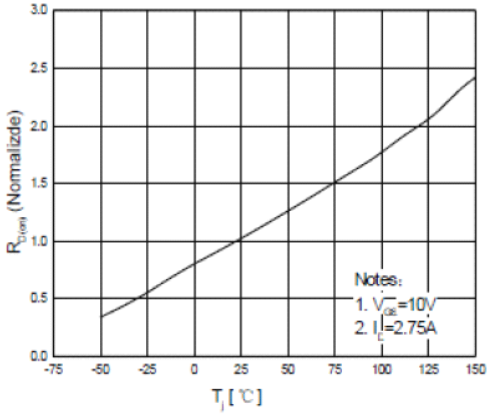


Fig.5 On-Resistance Variation vs Junction Temperature

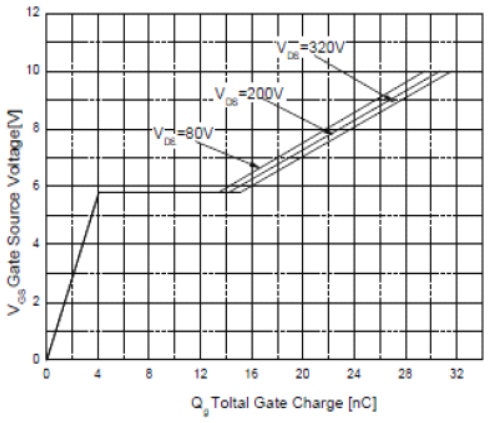


Fig.6 Gate Charge Characteristics

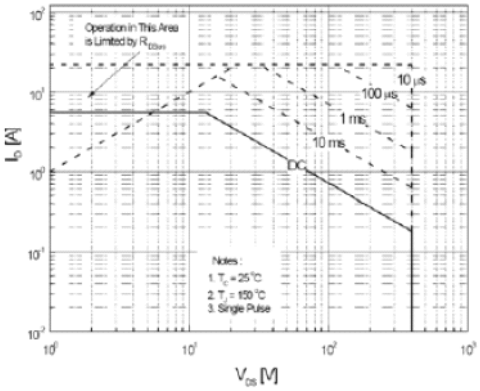


Fig.7 Maximum Safe Operation Area

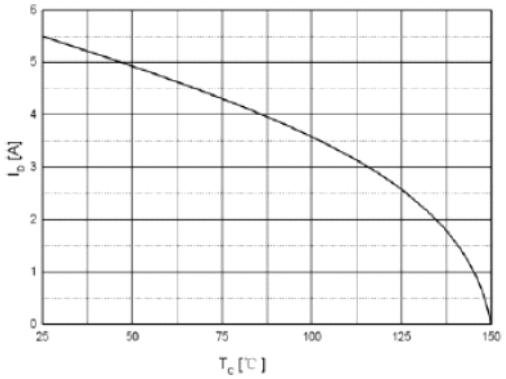


Fig.8 Maximum Drain Current vs Case Temperature

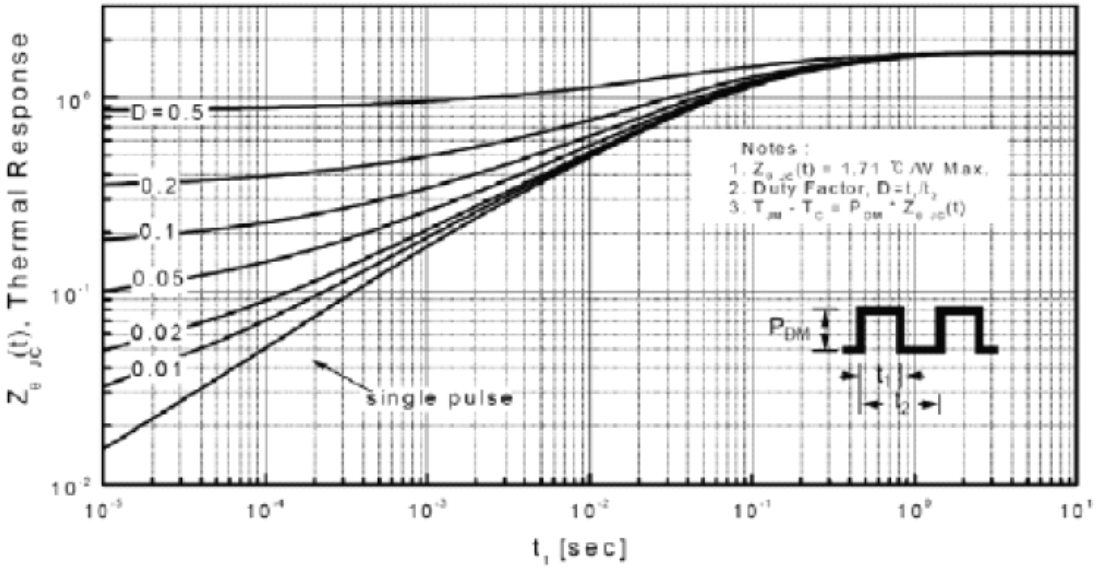


Fig.9 Transient Thermal Response Curve

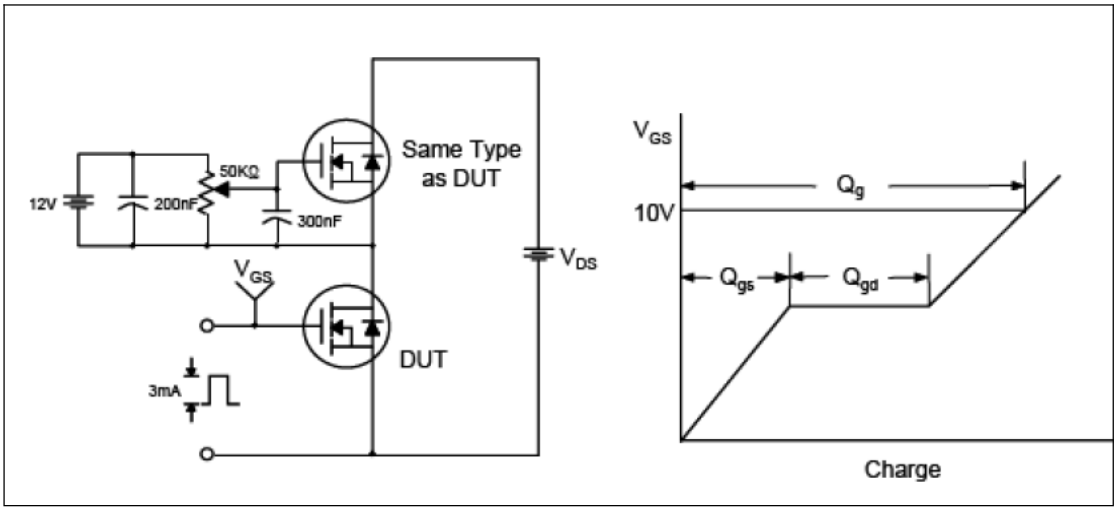


Fig.10 Gate Test Circuit & Waveform

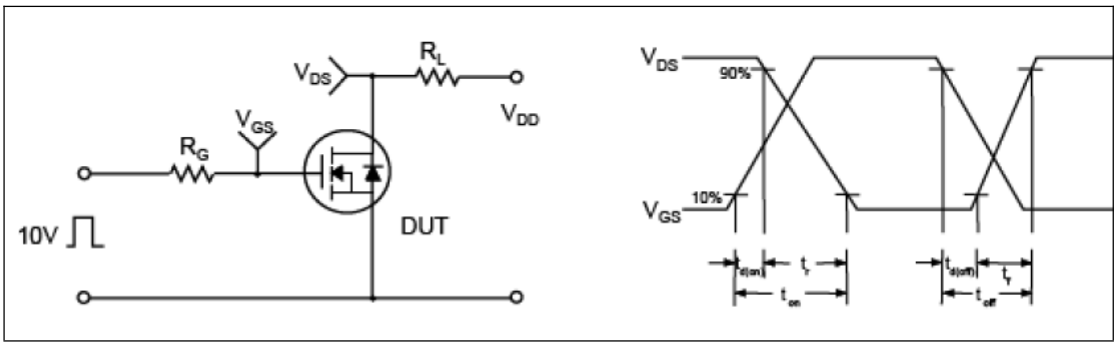


Fig.11 Resistive Switching Test Circuit & Waveform

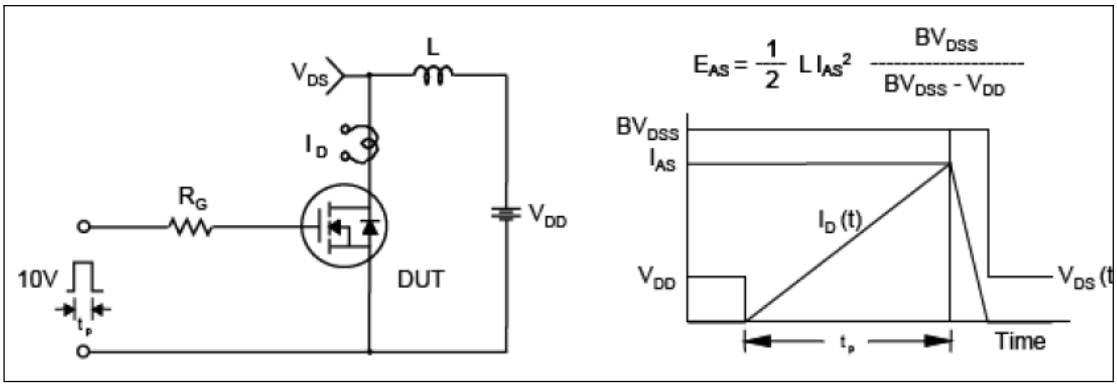


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

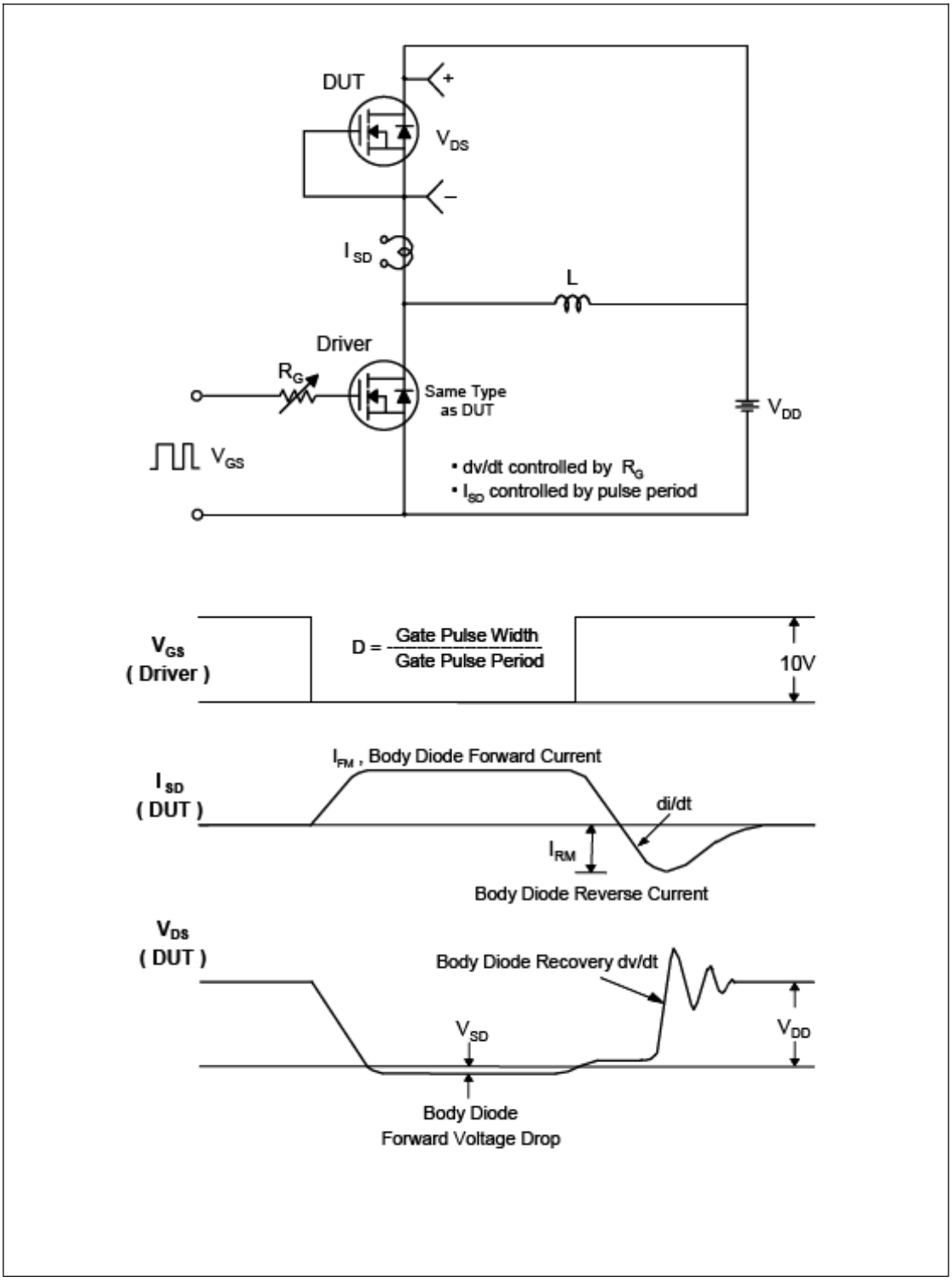


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO220F Package Dimension

Unit: mm