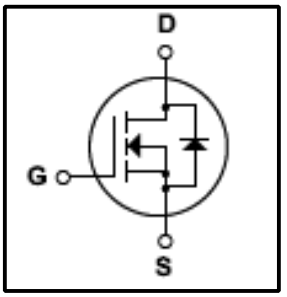
Silicon N-Channel MOSFET

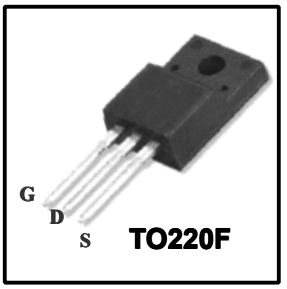
Features

- 8A,500V,$R_{DS(on)}$(Max 0.8Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 48nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Isolation Voltage (V_{ISO} = 4000V AC)
- Maximum Junction Temperature Range(150℃)



General Description

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



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		500	V
I_D	Continuous Drain Current(@Tc=25℃)		8*	A
	Continuous Drain Current(@Tc=100℃)		5.1*	A
I_{DM}	Drain Current Pulsed	(Note1)	32*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	320	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	13.4	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	3.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		44	W
	Derating Factor above 25℃		0.35	W/℃
T_J, T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Maximum lead Temperature for soldering purposes		300	℃

*Drain current limited by junction temperature

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance, Junction-to-Case	-	-	2.84	℃/W
R_{QCS}	Thermal Resistance, Case to Sink	-	0.5	-	℃/W
R_{QJA}	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}	VGS = ±30 V, VDS = 0 V	-	-	±100	nA
Gate−source breakdown voltage		$V_{(BR)GSS}$	IG = ±10 μA, VDS = 0 V	±30	-	-	V
Drain cut−off current		I_{DSS}	VDS = 400 V, VGS = 0 V	-	-	10	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	ID = 250 μA, VGS = 0 V	500	-	-	V
Break Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25℃	-	0.5	-	V/℃
Gate threshold voltage		$V_{GS(th)}$	VDS = 10 V, ID =250 μA	2	-	4	V
Drain−source ON resistance		$R_{DS(ON)}$	VGS = 10 V, ID =4.0A	-	0.65	0.80	Ω
Forward Transconductance		gfs	VDS = 40 V, ID =4.0A	-	7.3	-	S
Input capacitance		C_{iss}	VDS = 25 V, VGS = 0 V, f = 1 MHz	-	1400	1800	pF
Reverse transfer capacitance		C_{rss}		-	34	44	
Output capacitance		C_{oss}		-	145	190	
Switching time	Rise time	tr	VDD =250 V, ID =8 A, RG=9.1 Ω, RD=31 Ω (Note4,5)	-	22	55	ns
	Turn−on time	ton		-	65	140	
	Fall time	tf		-	125	260	
	Turn−off time	toff		-	75	160	
Total gate charge (gate−source plus gate−drain)		Qg	VDD = 400 V, VGS = 10 V, ID =8 A (Note4,5)	-	59	70	nC
Gate−source charge		Qgs		-	7	9	
Gate−drain (“miller”) Charge		Qgd		-	28	32	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	8	A
Pulse drain reverse current	I_{DRP}	-	-	-	32	A
Forward voltage (diode)	V_{DSF}	IDR = 8 A, VGS = 0 V	-	-	1.4	V
Reverse recovery time	trr	IDR = 8A, VGS = 0 V, dIDR / dt = 100 A / μs	-	390	-	ns
Reverse recovery charge	Qrr		-	4.2	-	μC

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

2.L=9mH,I_{AS}=8A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

3.I_{SD}≤8A,di/dt≤300A/us, V_{DD}<BV_{DSS},STARTING TJ=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

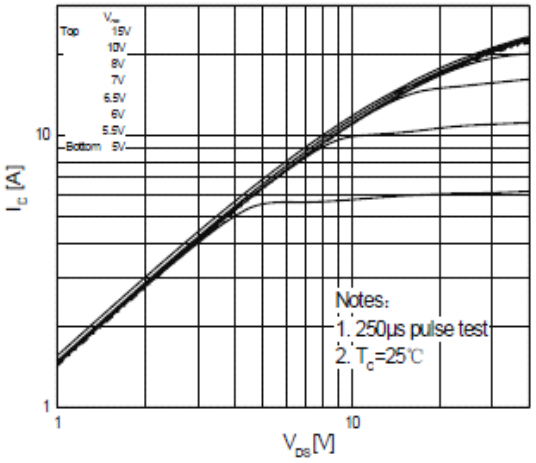


Fig. 1 On-State Characteristics

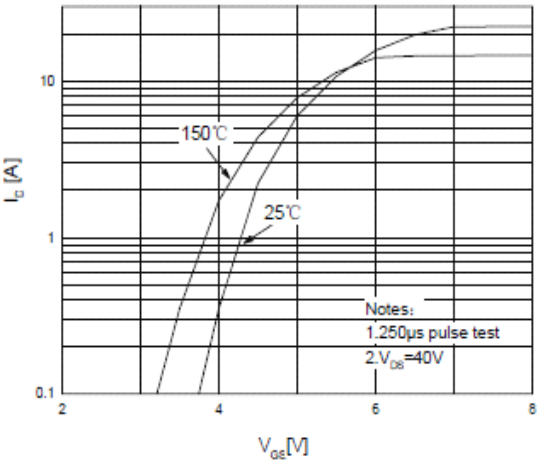


Fig.2 Transfer Characteristics

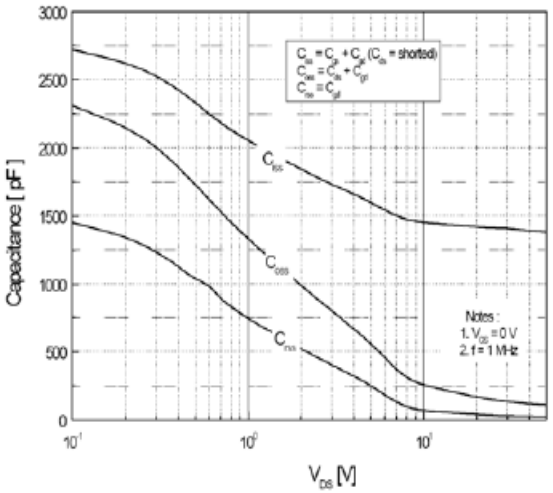


Fig.3 Capacitance Variation vs Drain Voltage

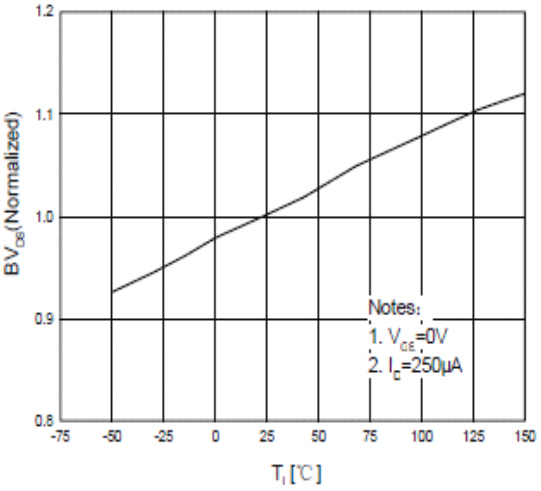


Fig.4 Maximum Avalanche Energy vs On-State Current

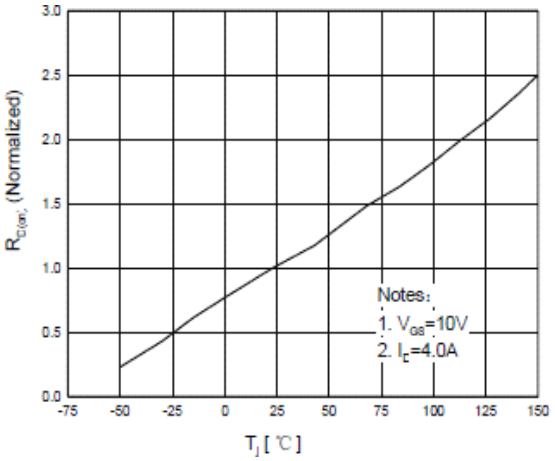


Fig.5 On-Resistance Variation vs Junction Temperature

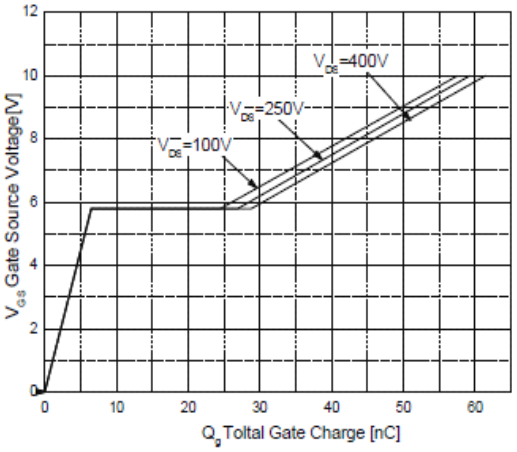


Fig.6 Gate Charge Characteristics

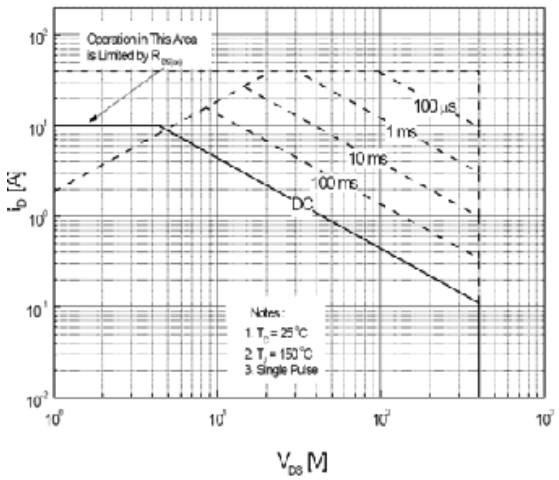


Fig.7 Maximum Safe Operation Area

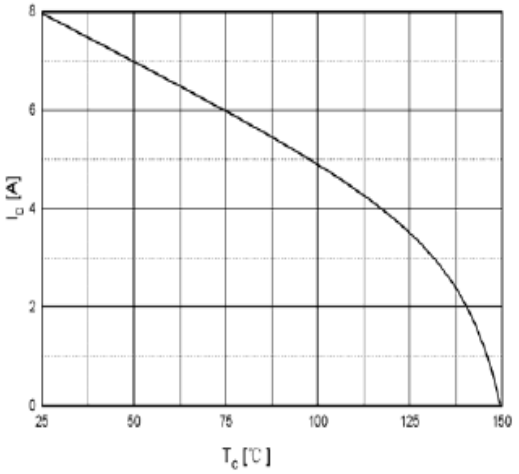


Fig.8 Maximum Drain Current vs Case Temperature

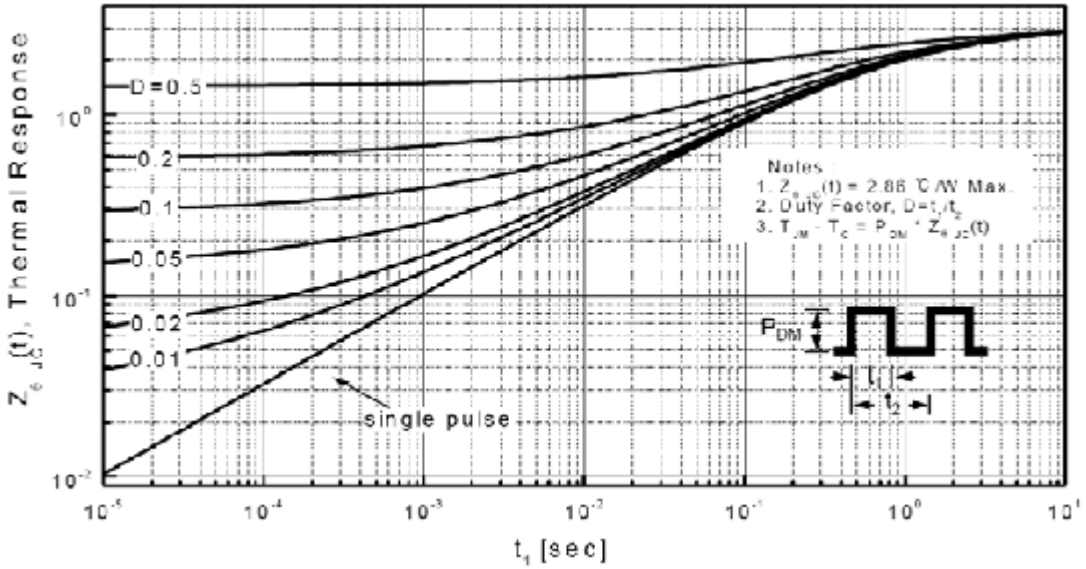


Fig.9 Transient Thermal Response Curve

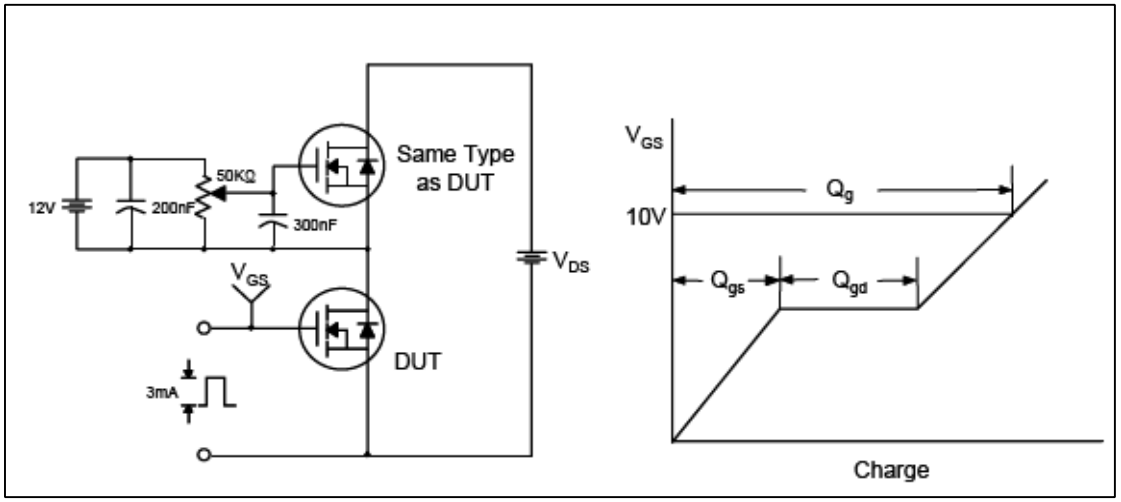


Fig.10 Gate Test Circuit & Waveform

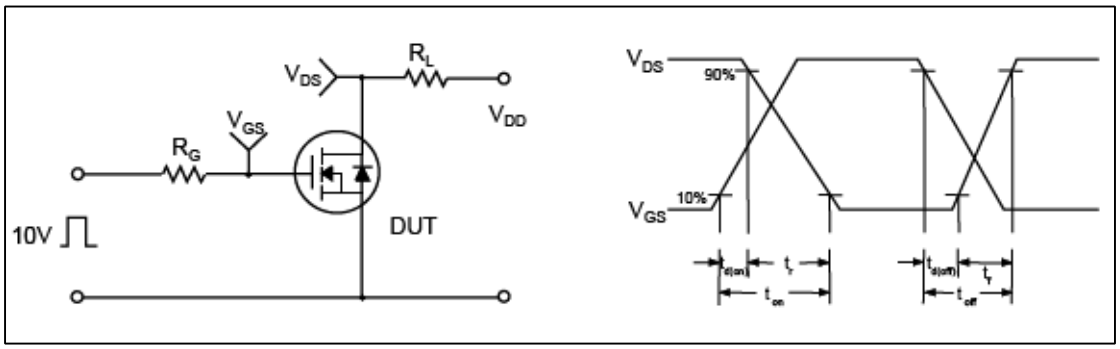


Fig.11 Resistive Switching Test Circuit & Waveform

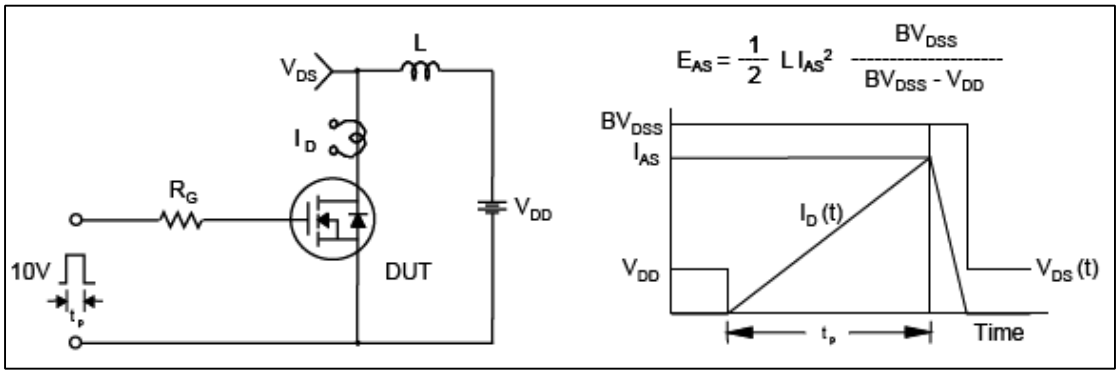


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

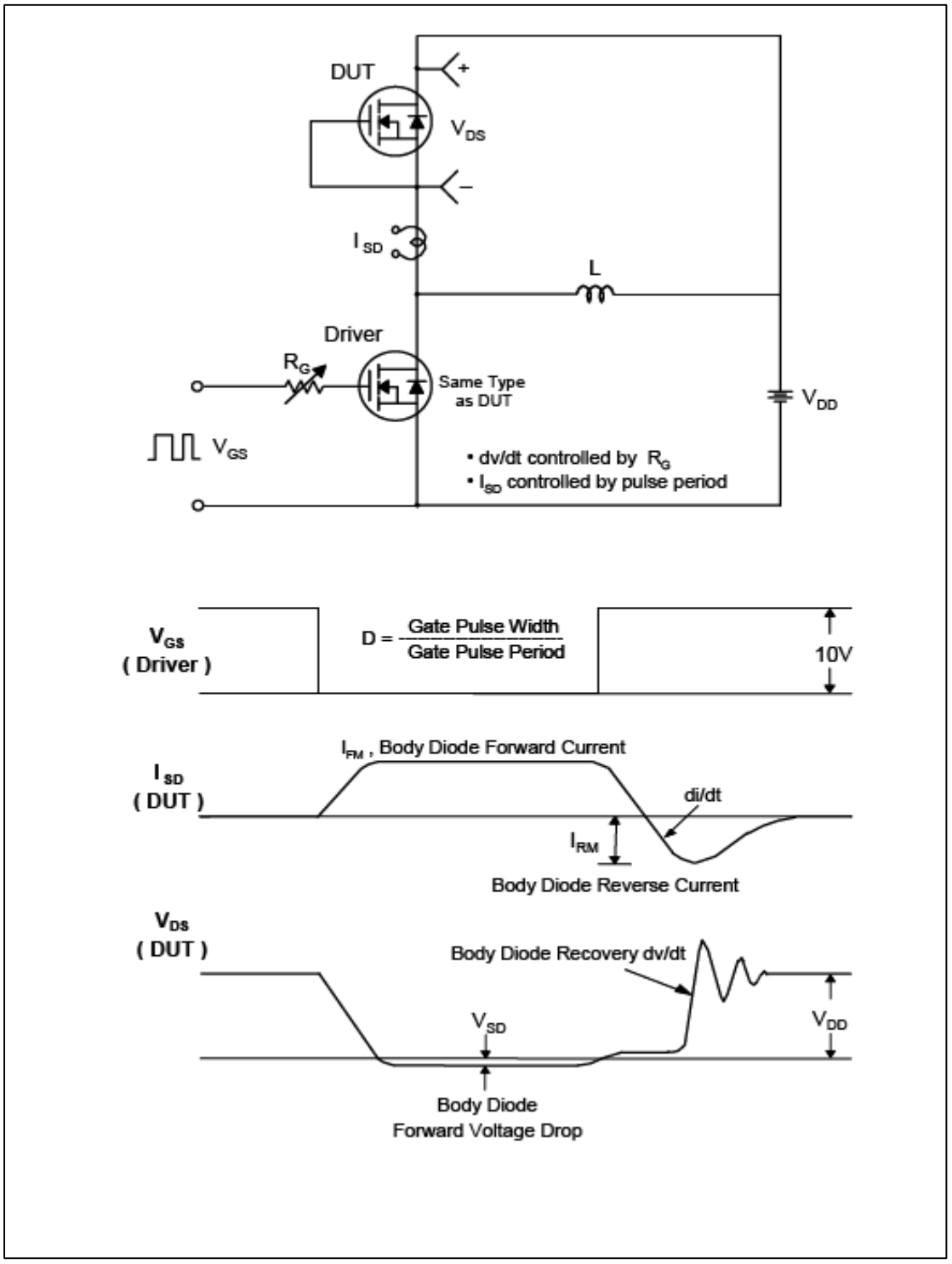


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220F Package Dimension

Unit: mm