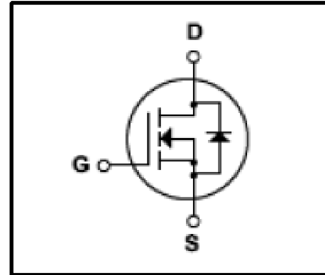
Silicon N-Channel MOSFET

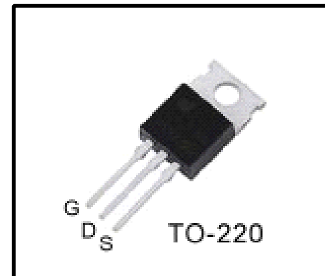
Features

- 10A,600V,$R_{DS(on)}$(Max 0.75Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 34nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Isolation Voltage(V_{ISO}=4000V AC)
- Improved dv/dt capability



General Description

This Power MOSFET is produced using Winsemi's advancedplanar stripe,VDMOS technology. This latest technology has been especially designed to minimize on -state resistance,have a highrugged avalanche characteristics. This devices is specially wellsuited for high efficiency switch mode power supplies , power factor correction, UPS and a electronic lamp ballast base on half bridge.



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		600	V
I_D	Continuous Drain Current(@Tc=25℃)		10*	A
	Continuous Drain Current(@Tc=100℃)		6.0*	A
I_{DM}	Drain Current Pulsed	(Note1)	40*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note2)	713	mJ
E_{AR}	Repetitive Avalanche Energy	(Note1)	18	mJ
dv/dt	Peak Diode Recovery dv /dt	(Note3)	4.5	V/ ns
P_D	Total Power Dissipation(@Tc=25℃)		150	W
	Derating Factor above 25℃		0.4	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_{QJC}	Thermal Resistance , Junction -to -Case	-	-	0.83	℃/W
R_{QJA}	Thermal Resistance , Junction-to -Ambient	-	-	62.5	℃/W

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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	-	-	1	μA
Drain -source breakdown voltage		$V_{(BR)DSS}$	I_D=250 μA,V_{GS}=0V	600	-	-	V
Gate threshold voltage		$V_{GS(th)}$	V_{DS}=10V,I_D=250 μA	3	-	4.5	V
Drain -source ON resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=4.75A	-	0.66	0.75	Ω
Forward Transconductance		gfs	V_{DS}=50V,I_D=4.75A	-	8.2	-	S
Input capacitance		C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz	-	1610	2065	pF
Reverse transfer capacitance		C_{rss}		-	156	210	
Output capacitance		C_{oss}		-	20	26	
Switching time	Rise time	tr	V_{DD}=300V, I_D=10A, R_G=25Ω, (Note4,5)	-	68	91	ns
	Turn-on time	ton		-	109	150	
	Fall time	tf		-	214	300	
	Turn-off time	toff		-	85	165	
Total gate charge(gate-source plus gate-drain)		Qg	V_{DD}=480V, V_{GS}=10V, I_D=10A (Note4,5)	-	34	45	nC
Gate-source charge		Qgs		-	6.9	-	
Gate-drain("miller") Charge		Qgd		-	12	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	10	A
Pulse drain reverse current	I_{DRP}	-	-	-	38	A
Forward voltage(diode)	V_{DSF}	I_{DR}=10A,V_{GS}=0V	-	1.05	1.4	V
Reverse recovery time	trr	I_{DR}=10A,V_{GS}=0V, dI_{DR} / dt =100 A / μs	-	442	633	ns
Reverse recovery charge	Qrr		-	2.16	3.24	μC

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

2.L=14.5mH I_{AS}=10A,V_{DD}=50V,R_G=0Ω ,Starting T_J=25℃

3.I_{SD}≤10A,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

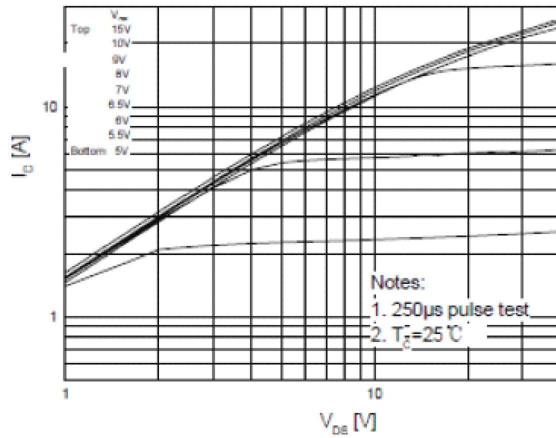

Fig.1 On-State Characteristics

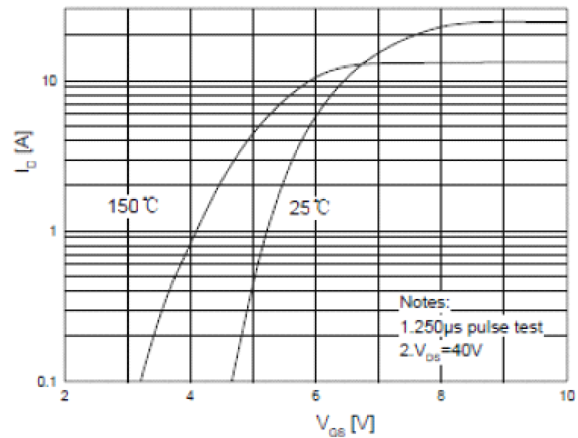

Fig.2 Transfer Characteristics

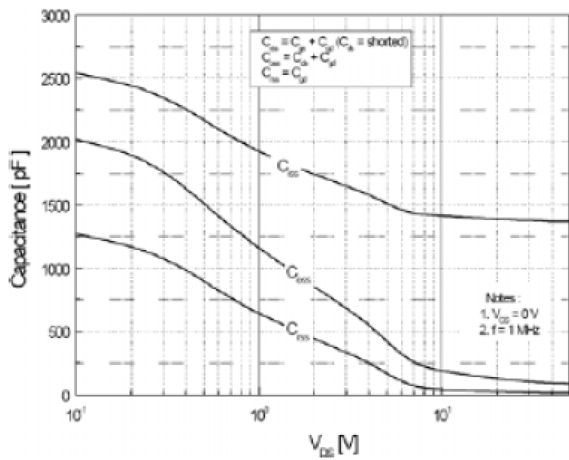

Fig.3 Capacitance Variation vs Drain voltage

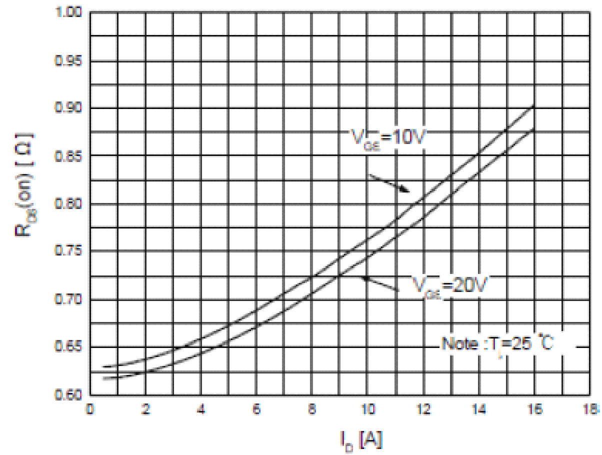

Fig.4 On-Resistance Variation Energy vs Drain current and Gate Voltage

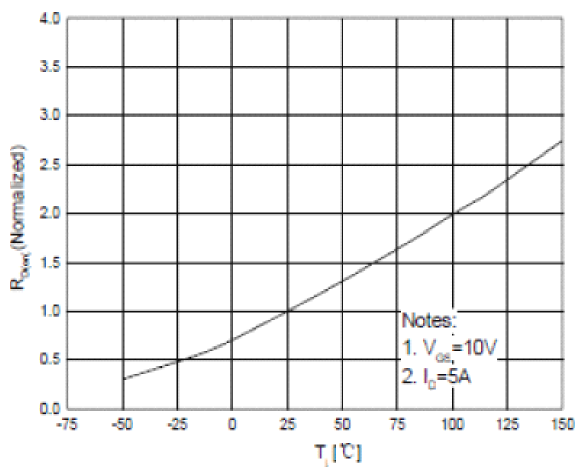

Fig.5 On-Resistance Variation vs Junction Temperature

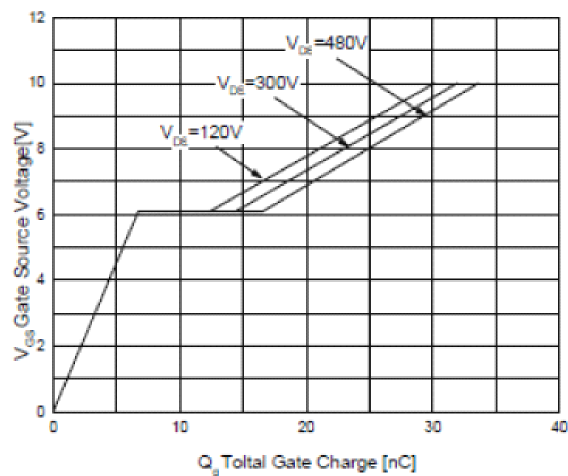

Fig.6 Gate Charge Characteristics

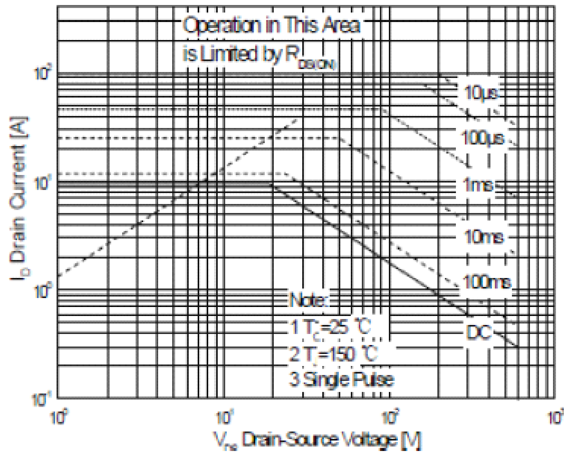

Fig.7 Maximum Safe Operation Area

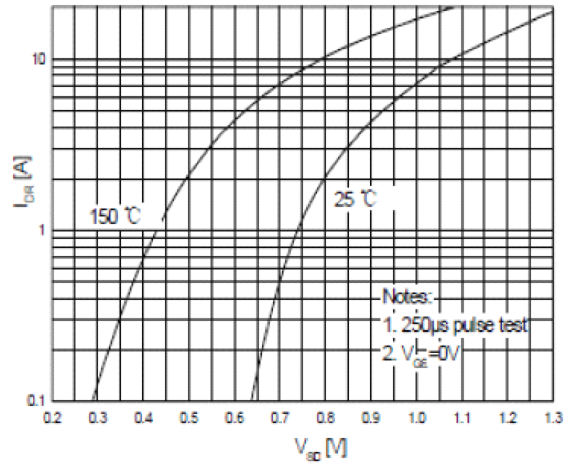

Fig.8 Diode Forward voltage Variation vs Source Current and Temperature

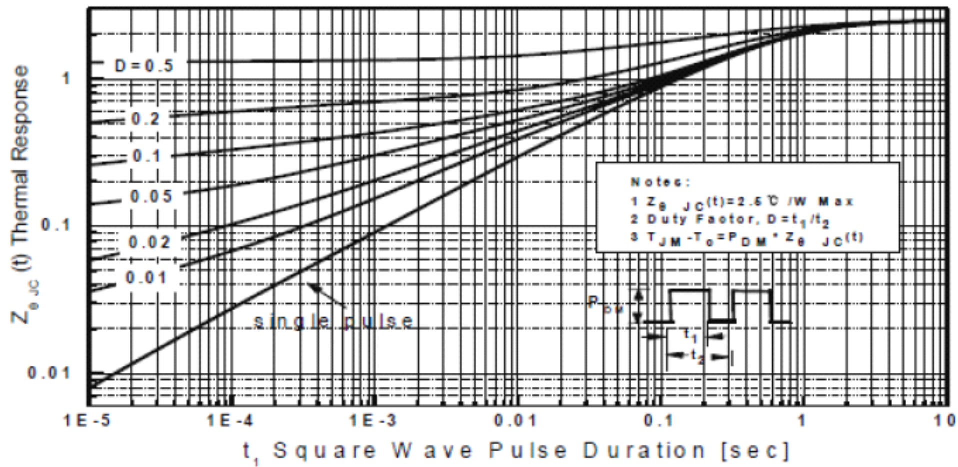

Fig.9 Transient Thermal Response curve

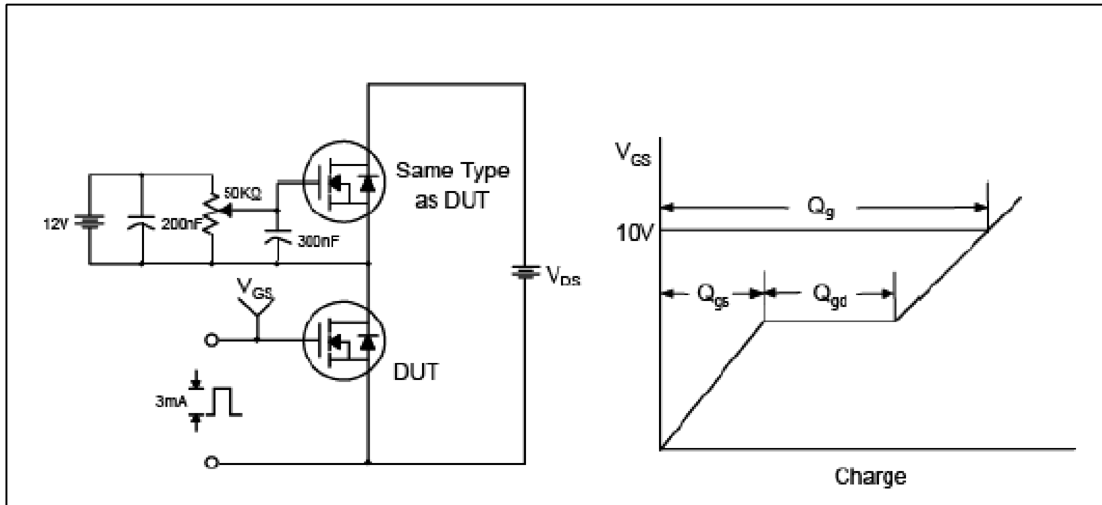

Fig.10 Gate Test circuit & Waveform

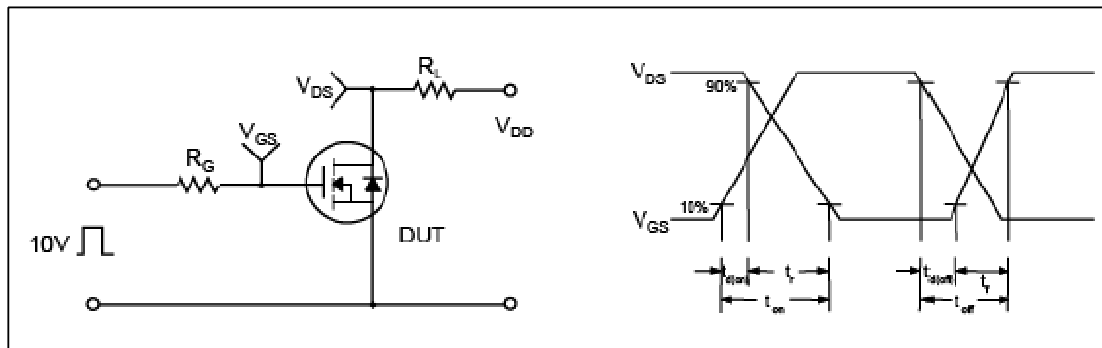

Fig.11 Resistive Switching Test Circuit & Waveform

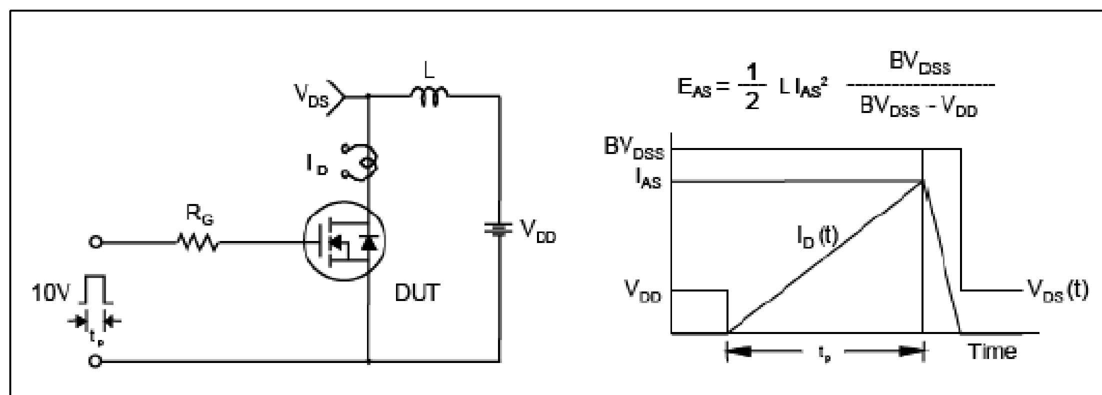

Fig.12 Uncamped Inductive Switching Test Circuit & Waveform

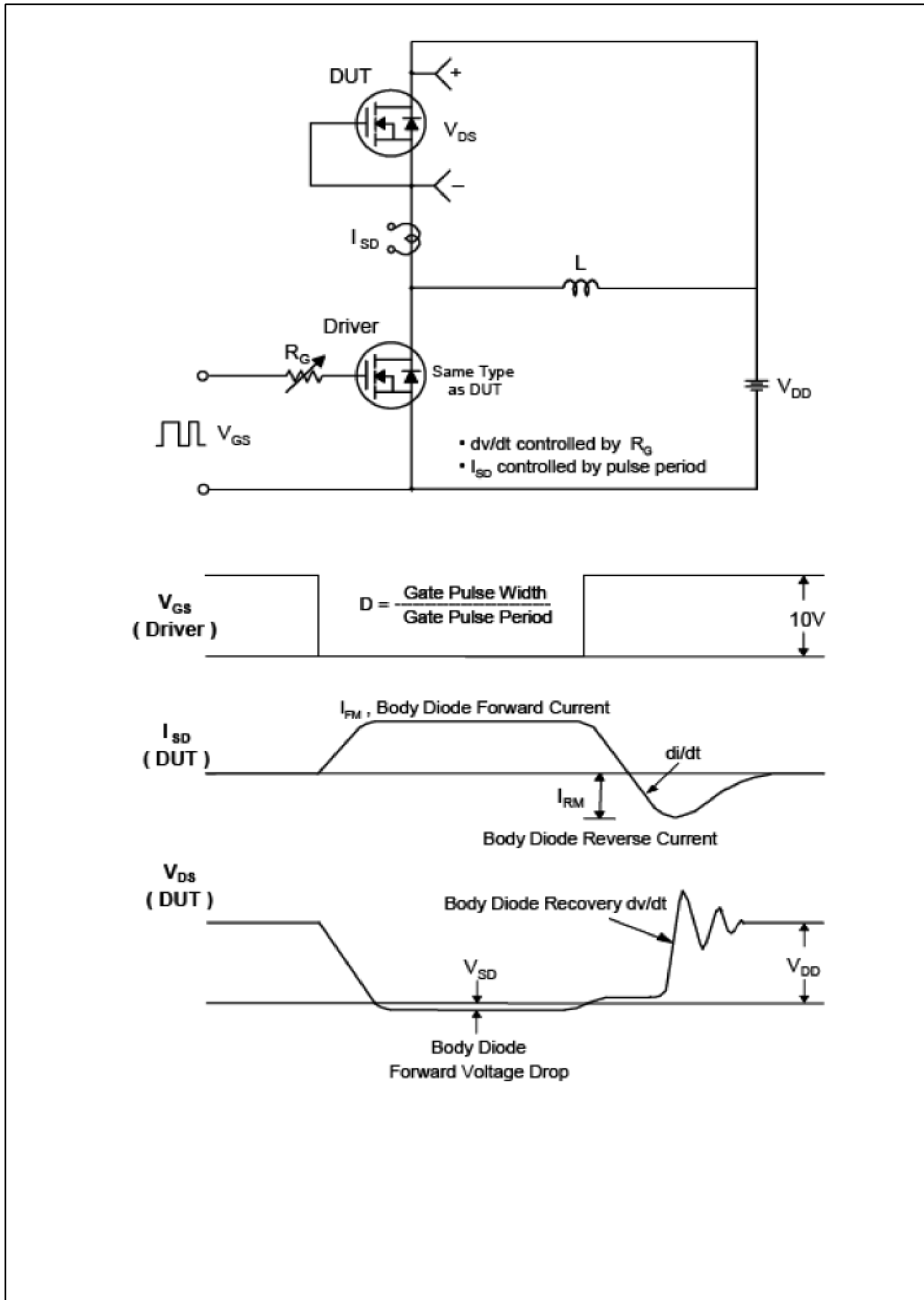

Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220 Package Dimension