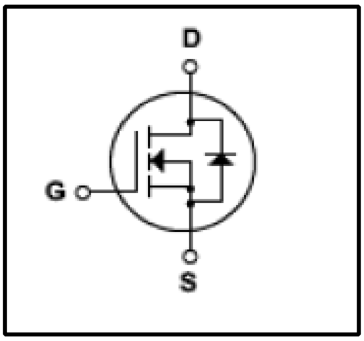
Silicon N-Channel MOSFET

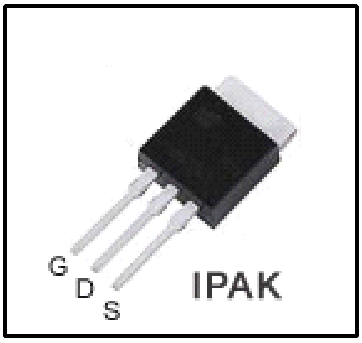
Features

- 4.5A,600V,$R_{DS(on)}$(Max2.5Ω)@V_{GS}=10V
- Ultra-low Gate charge(Typical 16nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150℃)



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 half bridge and full bridge resonant topology line a electronic lamp ballast, high efficiency switched mode power supplies, active power factor correction.



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		600	V
I_D	Continuous Drain Current(@Tc=25℃)		4.5	A
	Continuous Drain Current(@Tc=100℃)		3.0	A
I_{DM}	Drain Current Pulsed	(Note1)	20	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note2)	300	mJ
E_{AR}	Repetitive Avalanche Energy	(Note1)	12	mJ
dv/dt	Peak Diode Recovery dv /dt	(Note3)	4.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		51	W
	Derating Factor above 25℃		0.39	W/℃
T_J,T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Channel Temperature		300	℃

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance , Junction -to -Case	-	-	2.5	℃/W
R_{QJA}	Thermal Resistance , Junction-to -Ambient	-	-	83	℃/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	600	-	-	V
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=2.2A	-	2.1	2.5	Ω
Forward Transconductance		gfs	V_{DS}=50V,I_D=2.2A	-	4.0	-	S
Input capacitance		C_{iss}	V_{DS}=25V,	-	520	670	pF
Reverse transfer capacitance		C_{rss}	V_{GS}=0V,	-	9	10.5	
Output capacitance		C_{oss}	f=1MHz	-	70	90	
Switching time	Rise time	tr	V_{DD}=300V,	-	13	35	ns
	Turn-on time	ton	I_D=4.4A	-	45	100	
	Fall time	tf	R_G=25Ω	-	25	60	
	Turn-off time	toff	(Note4,5)	-	35	80	
Total gate charge(gate-source plus gate-drain)		Qg	V_{DD}=480V, V_{GS}=10V,	-	16	20	nC
Gate-source charge		Qgs	I_D=4.4A	-	3.4	-	
Gate-drain("miller") Charge		Qgd	(Note,5)	-	7	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	4.5	A
Pulse drain reverse current	I_{DRP}	-	-	-	17.6	A
Forward voltage(diode)	V_{DSF}	I_{DR}=4.4A,V_{GS}=0V	-	-	1.4	V
Reverse recovery time	trr	I_{DR}=4.4A,V_{GS}=0V,	290	-	-	ns
Reverse recovery charge	Qrr	dI_{DR} /dt =100 A /μs	2	-	-	μC

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

2.L=18.5mH I_{AS}=4.4A,V_{DD}=50V,R_G=0Ω,Starting T_J=25℃

3.I_{SD}≤4.4A,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

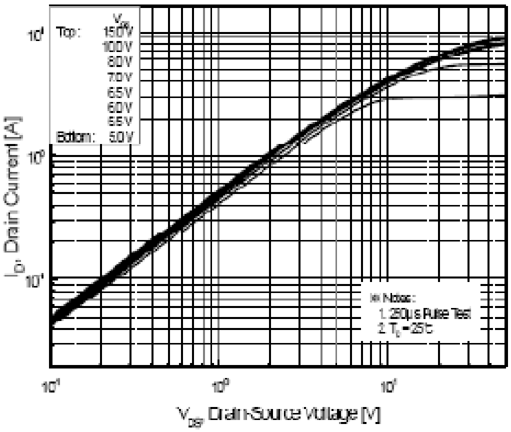


Fig.1 On-State characteristics

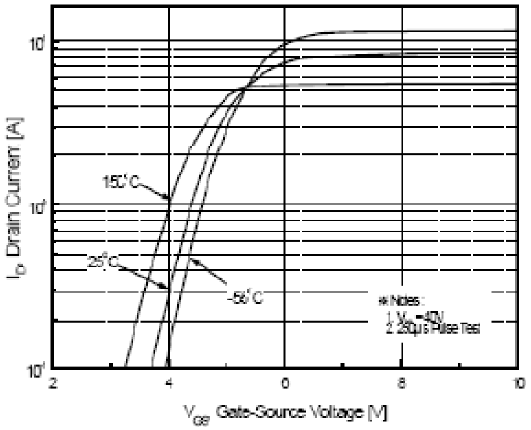


Fig.2 Transfer Current characteristics

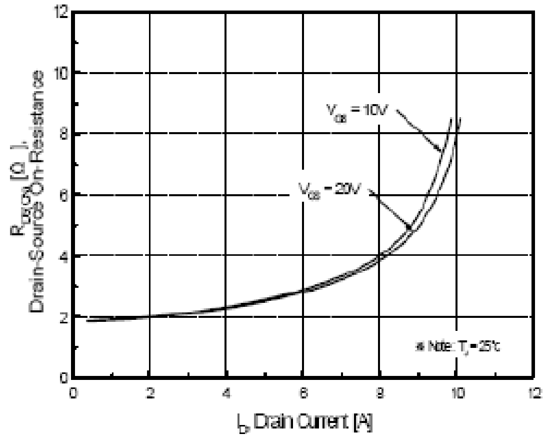


Fig.3 On-Resistance Variation vs Drain Current

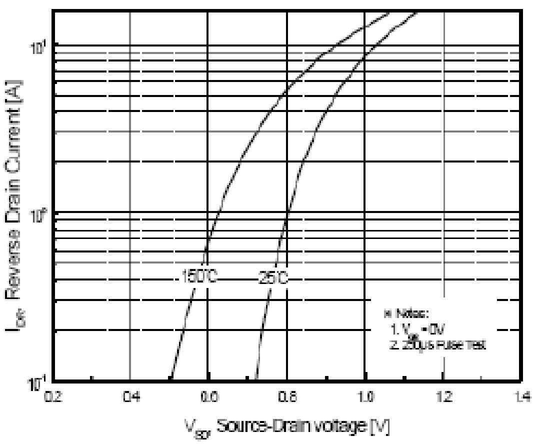


Fig.4 Body Diode Forward Voltage Variation with Source Current and Temperature

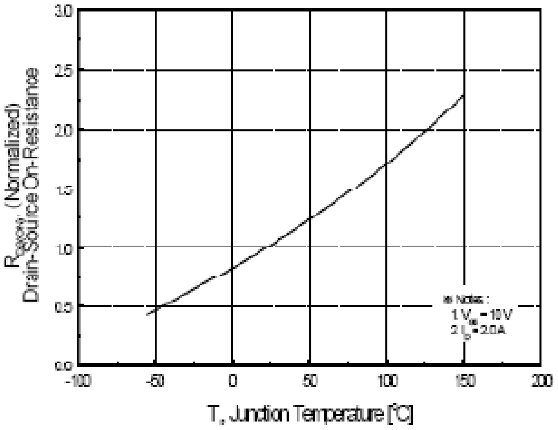


Fig.5 On-Resistance Variation vs Junction Temperature

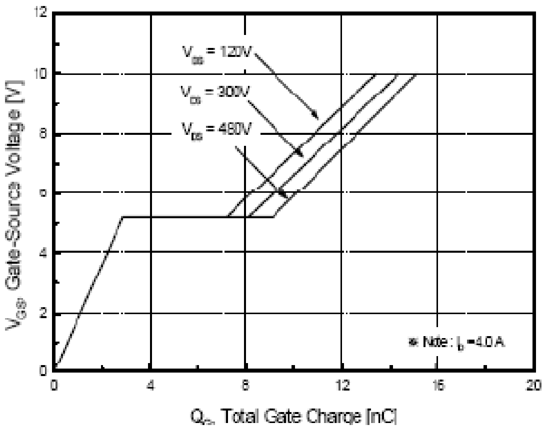


Fig.6 Gate Charge Characteristics

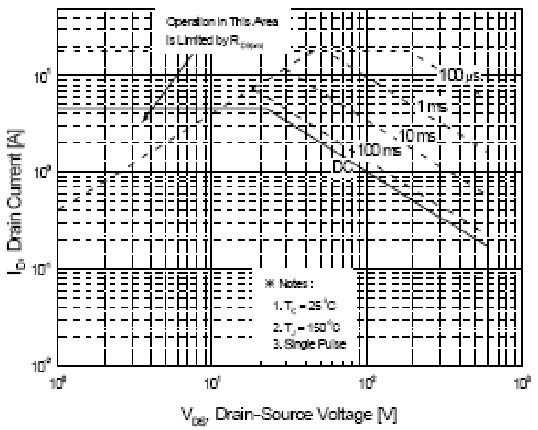


Fig.7 Maximum Safe Operation Area

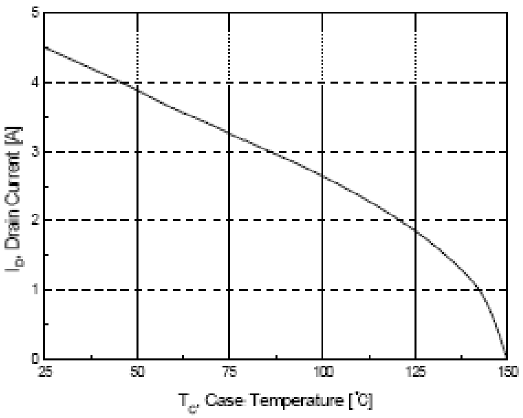


Fig.8 Maximum Drain Current vs Case Temperature

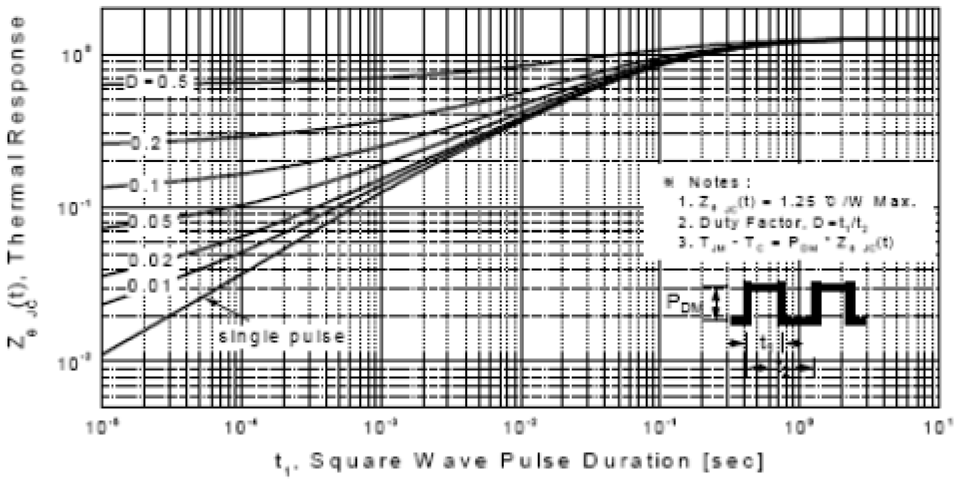


Fig.9 Transient Thermal Response Curve

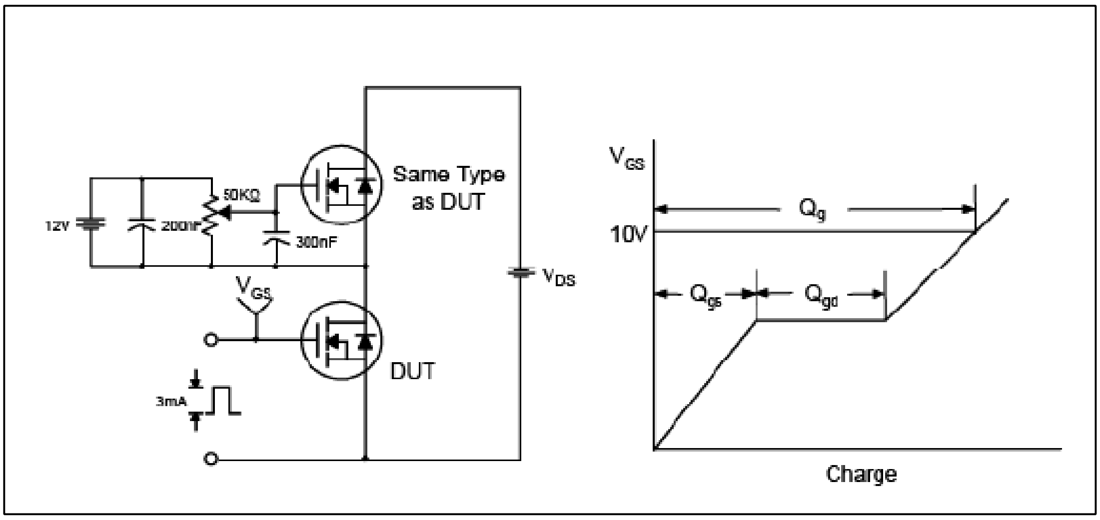


Fig.10 Gate Test Circuit & Waveform

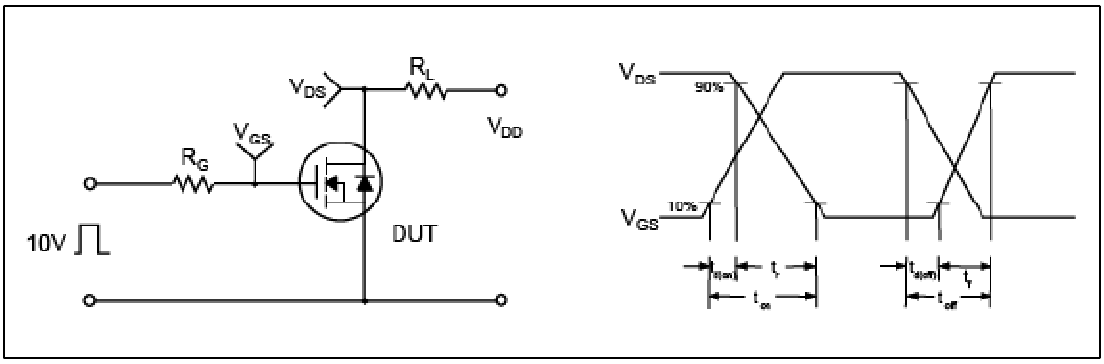


Fig.11 Resistive Switching Test Circuit & Waveform

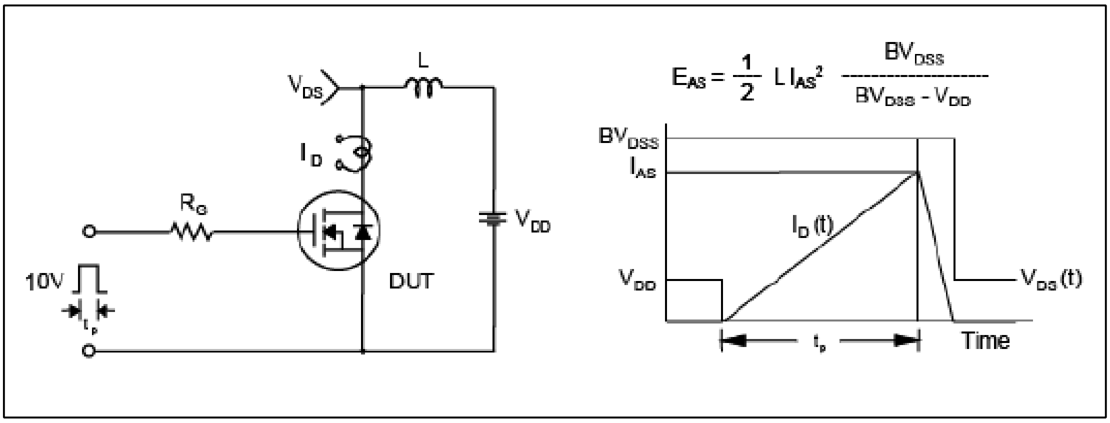


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

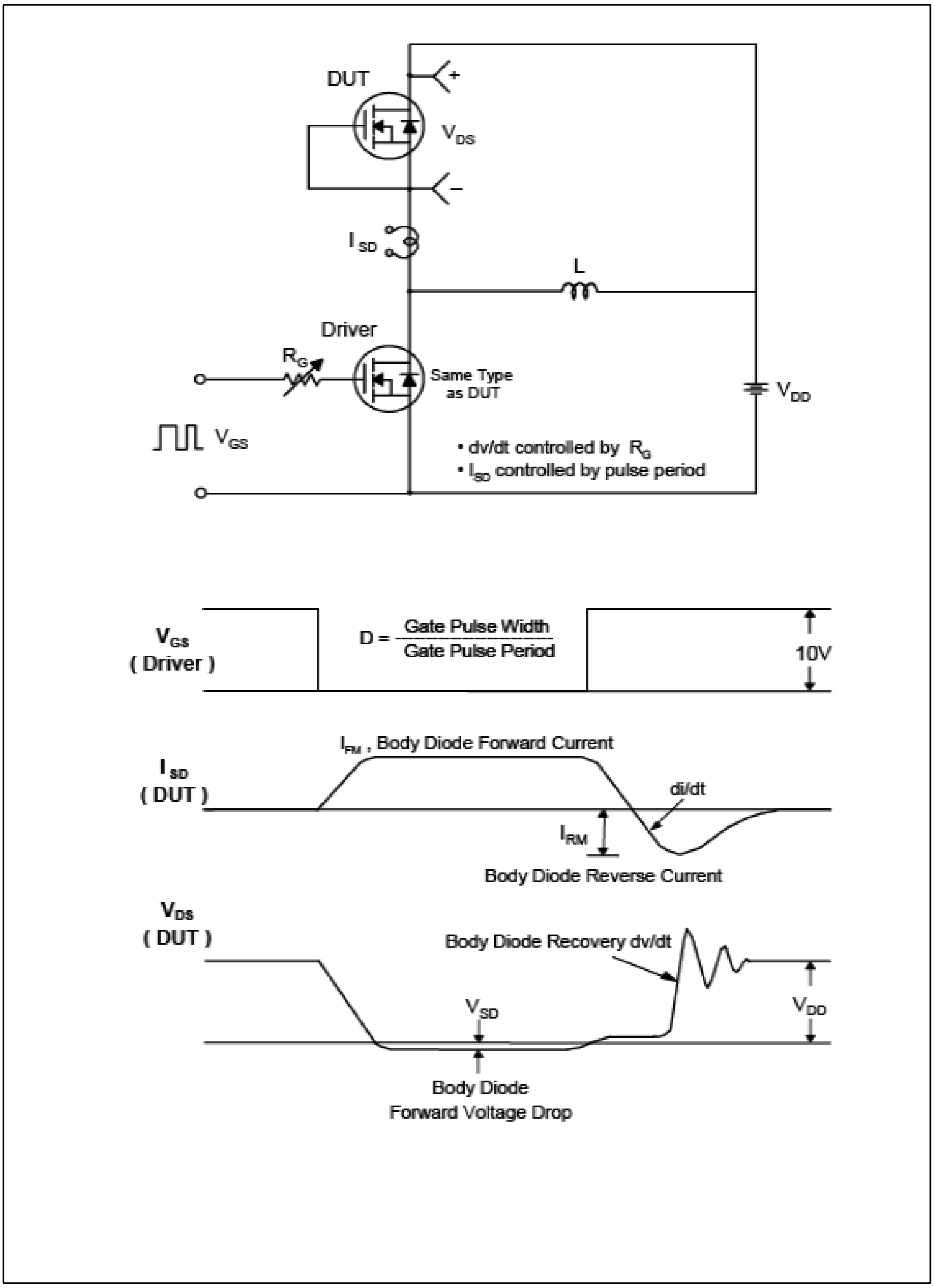


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

IPAK Package Dimension

Unit:mm