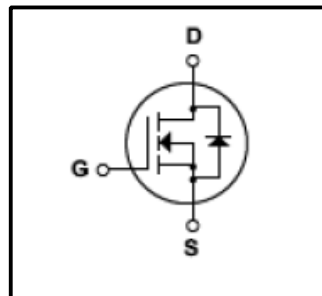


Silicon N-Channel MOSFET

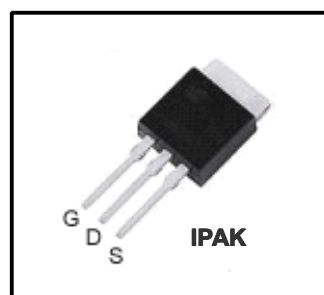
Features

- 5.5A, 400V, $R_{DS(on)}$ (Max 1.0 Ω) @ $V_{GS}=10V$
- Ultra-low Gate Charge (Typical 32nC)
- Fast Switching Capability
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150 $^{\circ}C$)



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 device is specially well suited for high efficiency switch mode 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_{DS}	Drain Source Voltage	400	V
I_D	Continuous Drain Current (@ $T_c=25^{\circ}C$)	5.5	A
	Continuous Drain Current (@ $T_c=100^{\circ}C$)	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 (@ $T_c=25^{\circ}C$)	48	W
	Derating Factor above 25 $^{\circ}C$	0.38	W/ $^{\circ}C$
T_J, T_{stg}	Junction and Storage Temperature	-55~150	$^{\circ}C$
T_L	Channel Temperature	300	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance, Junction-to-Case	-	-	2.6	$^{\circ}C/W$
R_{QJA}	Thermal Resistance, Junction-to-Ambient*	-	-	50	$^{\circ}C/W$
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	110	$^{\circ}C/W$

*When mounted on the minimum pad size recommended (PCB Mount)

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		ΔBV _{DSS} / ΔT _J	I _D =250μA, Referenced to 25°C	-	0.4	-	V/°C
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		g _{fs}	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	t _r	V _{DD} =200 V,	-	15	40	ns
	Turn-on time	t _{on}	I _D =5.5A	-	55	120	
	Fall time	t _f	R _G =25Ω	-	85	180	
	Turn-off time	t _{off}	(Note4,5)	-	50	110	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} = 320 V, V _{GS} = 10 V,	-	32	38	nC
Gate-source charge		Q _{gs}	I _D =5.5 A	-	4.3	5.7	
Gate-drain (“miller”) Charge		Q _{gd}	(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°C

3.I_{SD}≤5.5A,di/dt≤300A/us, V_{DD}<BV_{DSS},STARTING T_J=25°C

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

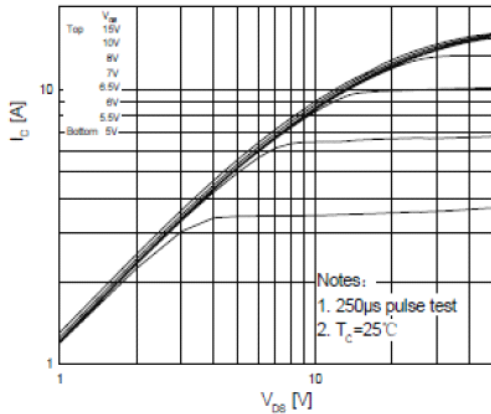


Fig. 1 On-State Characteristics

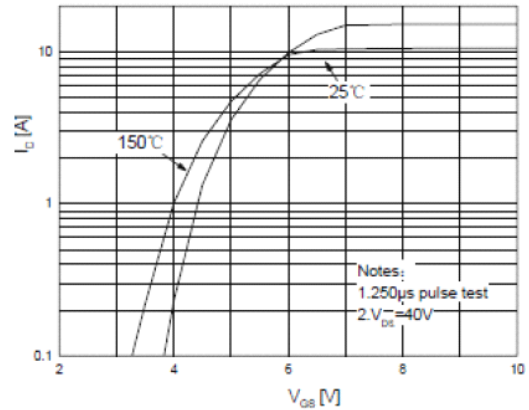


Fig. 2 Transfer Characteristics

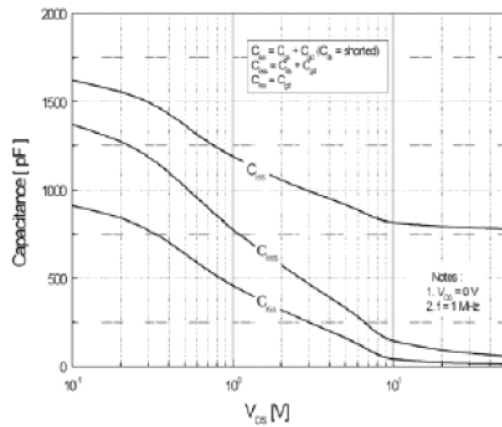


Fig. 3 Capacitance Variation vs Drain Voltage

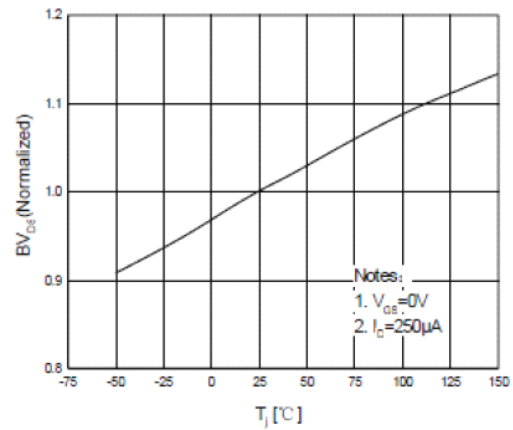


Fig. 4 Breakdown Voltage Variation vs Temperature

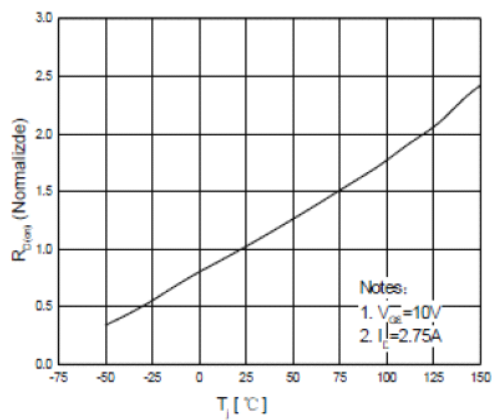


Fig. 5 On-Resistance Variation vs Junction Temperature

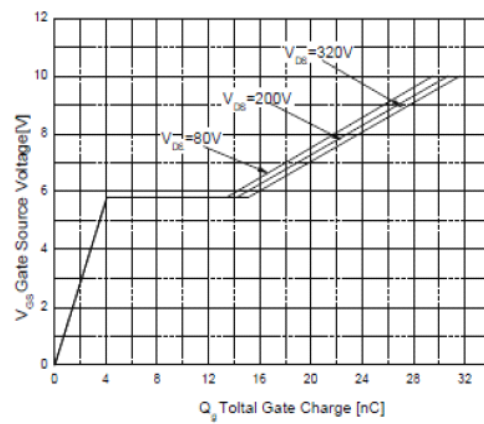


Fig. 6 Gate Charge Characteristics

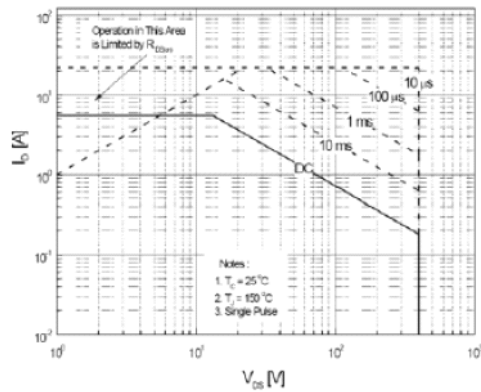


Fig.7 Maximum Safe Operation Area

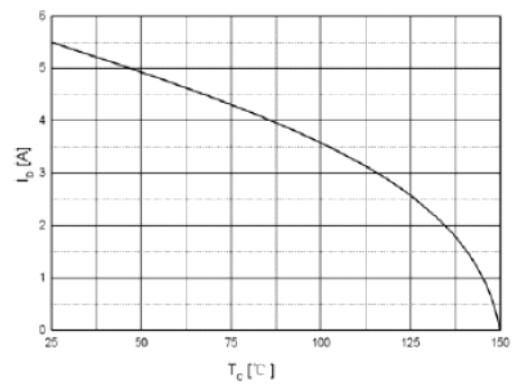


Fig.8 Maximum Drain Current vs Case Temperature

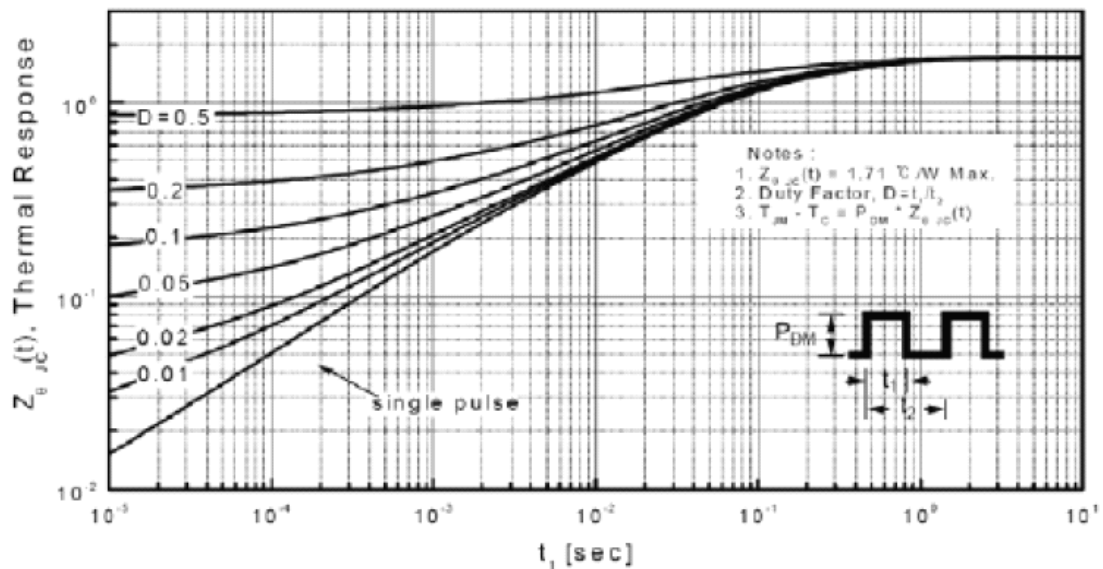


Fig.9 Transient Thermal Response Curve

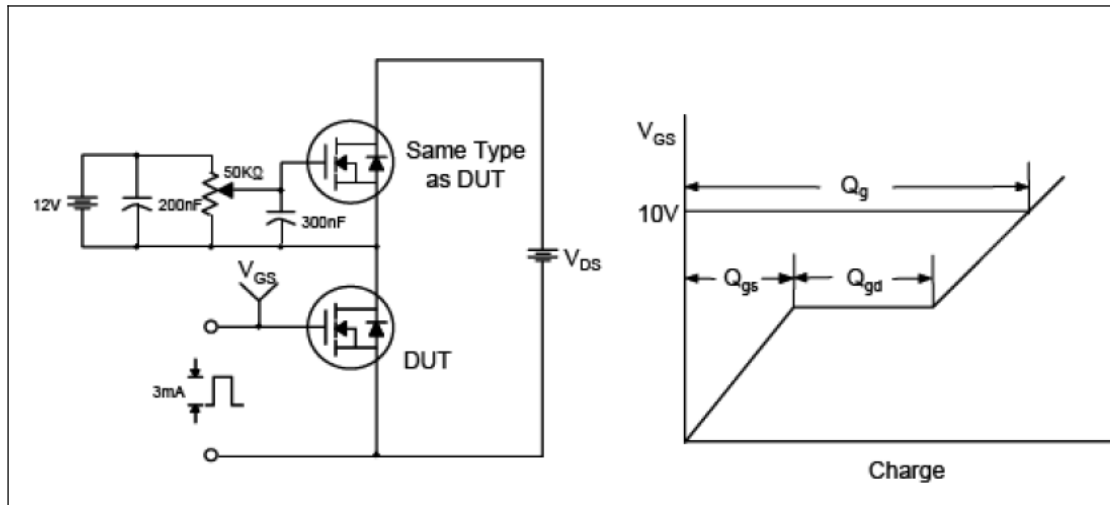


Fig.10 Gate Test Circuit & Waveform

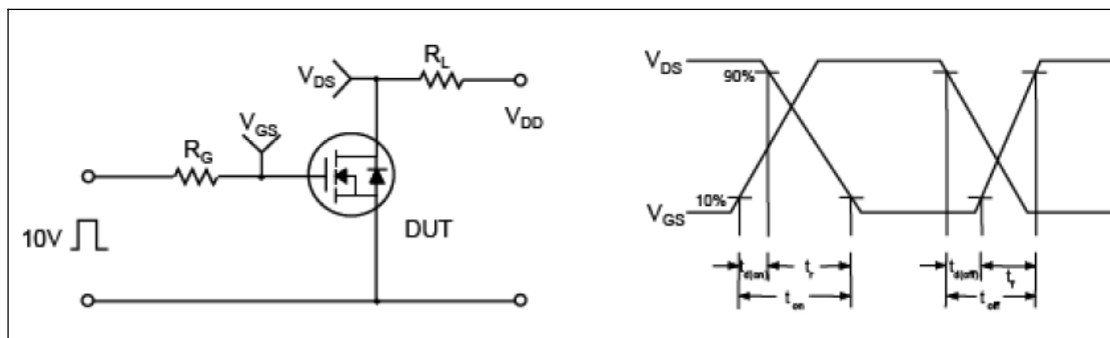


Fig.11 Resistive Switching Test Circuit & Waveform

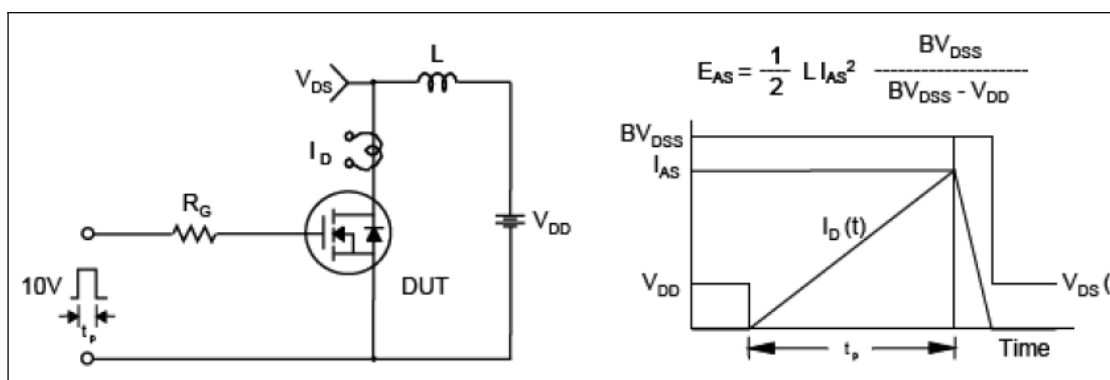


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

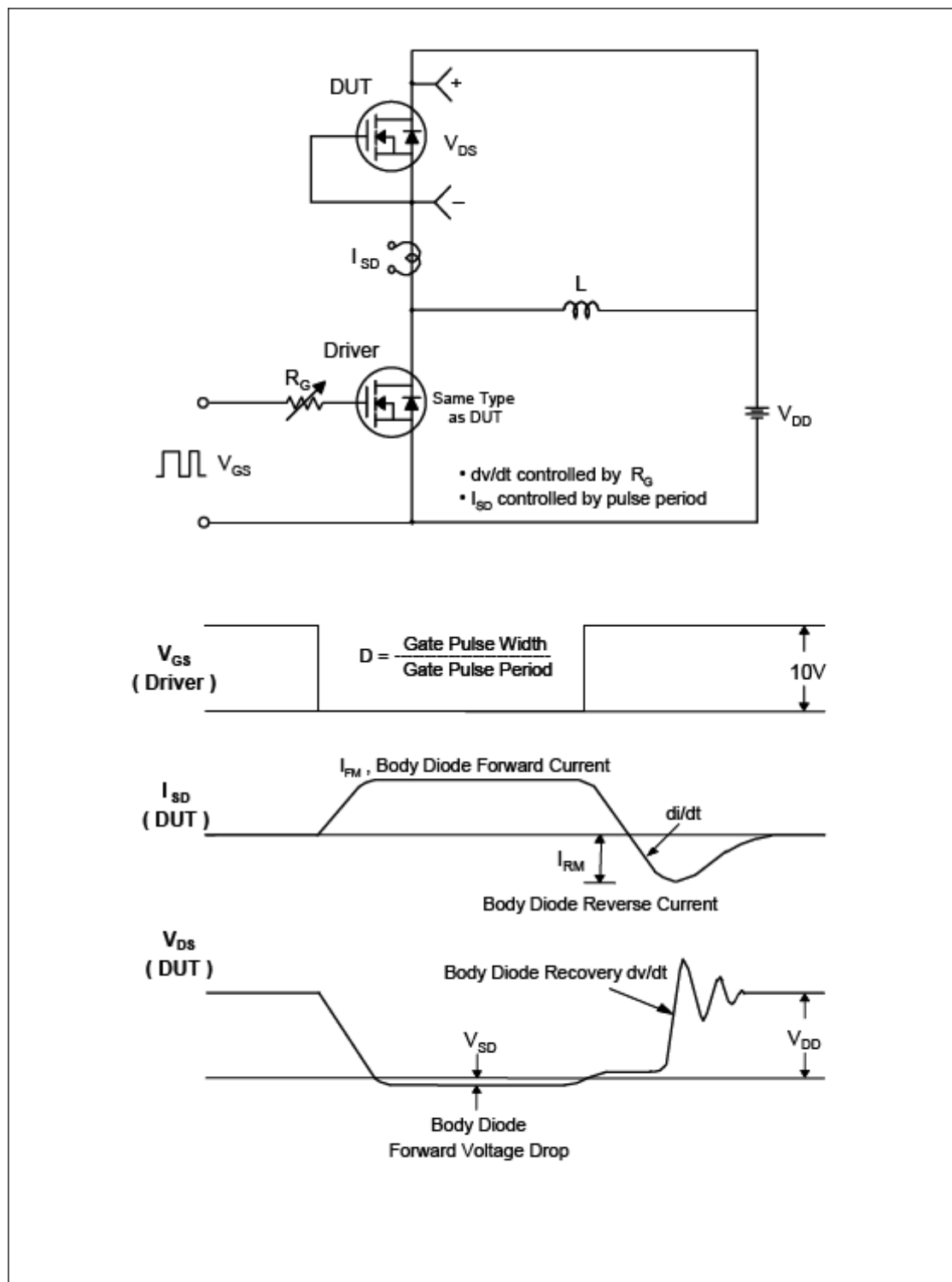


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-251 Package Dimension

Unit: mm

