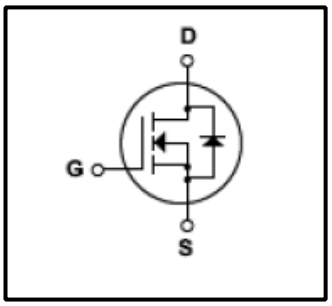
WFD4N60B

Silicon N-Channel MOSFET

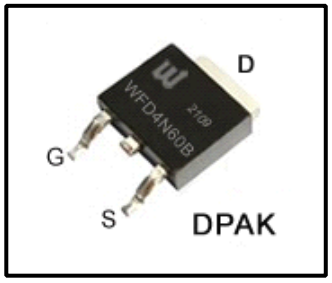
Features

- 4A,600V.$R_{DS(on)}$(Max 2.4Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 16nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Isolation Voltage (VISO = 4000V AC)
- Maximum Junction Temperature Range(150℃)



General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe, DMOS technology. This latest technology has beenespecially 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.



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		600	V
I_D	Continuous Drain Current(@Tc=25℃)		4	A
	Continuous Drain Current(@Tc=100℃)		2.5	A
I_{DM}	Drain Current Pulsed	(Note1)	16	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	240	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	10	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		80	W
	Derating Factor above 25℃		0.78	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	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	1.56	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient*			50	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	110	℃/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} = 600 V, V_{GS} = 0 V	-	-	10	μA
			V_{DS} = 480 V, Tc = 125°C	-	-	100	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	I_D = 250 μA, V_{GS} = 0 V	600	-	-	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 =2.0A	-	1.7	2.4	Ω
Input capacitance		C_{iss}	V_{DS} = 25 V,	-	490	642	pF
Reverse transfer capacitance		C_{rss}	V_{GS} = 0 V,	-	9	12	
Output capacitance		C_{oss}	f = 1 MHz	-	95	124	
Switching time	Rise time	tr	V_{DD} =300 V,	-	49	111	ns
	Turn−on time	ton	I_D = 4.0A	-	16	42	
	Fall time	tf	R_G=25 Ω	-	37	84	
	Turn−off time	toff	(Note4,5)	-	46	102	
Total gate charge (gate−source plus gate−drain)		Qg	V_{DD} = 480 V, V_{GS} = 10 V,	-	16	20	nC
Gate−source charge		Qgs	I_D =4.0A	-	3.4	-	
Gate−drain (“miller”) Charge		Qgd	(Note4,5)	-	7	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	4	A
Pulse drain reverse current	I_{DRP}	-	-	-	17.6	A
Forward voltage (diode)	V_{DSF}	I_{DR} =4.0 A, V_{GS} = 0 V	-	-	1.4	V
Reverse recovery time	trr	I_{DR} = 4.0 A, V_{GS} = 0 V,	-	390	-	ns
Reverse recovery charge	Qrr	dI_{DR} / dt = 100 A / μs	-	2.2	-	μC

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

2.L=18.5mH,I_{AS}=4.0A,V_{DD}=50V,R_G=0Ω,Starting T_J=25℃

3.I_{SD}≤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

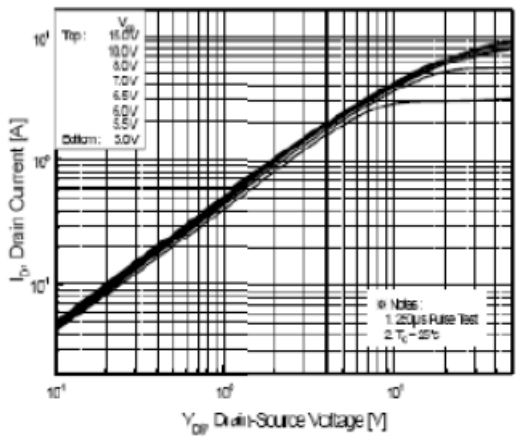


Fig.1 On-State Characteristics

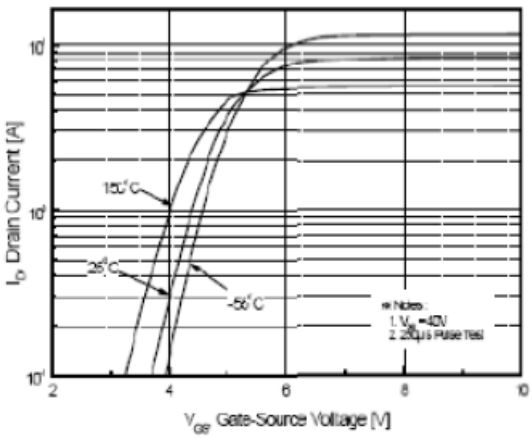


Fig.2 Transfer Current characteristics

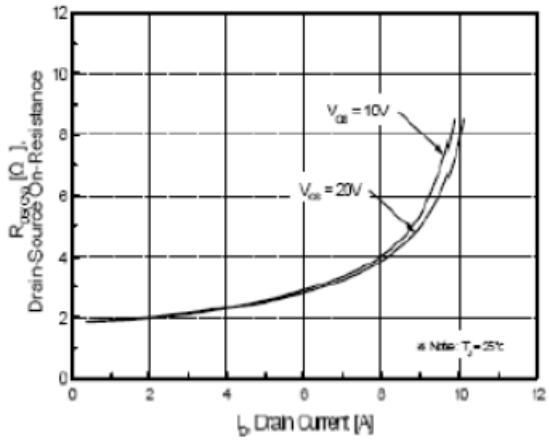


Fig3. On Resistance Variation vs Drain current

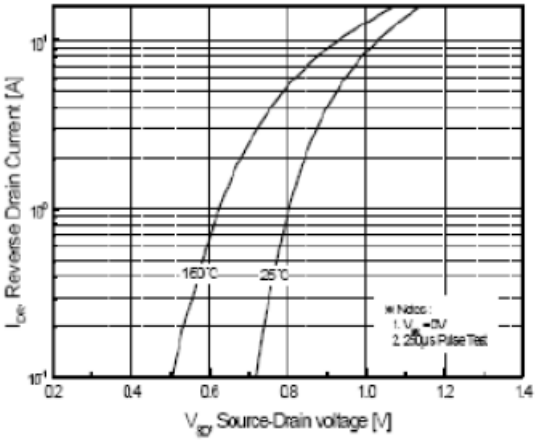


Fig.4 Body Diode Forward Voltage Variation vs Source Current and Temperature

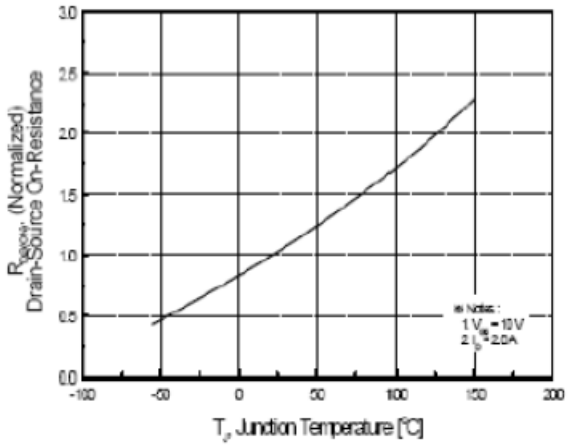


Fig.5 On-Resistance Variation vs Junction Temperature

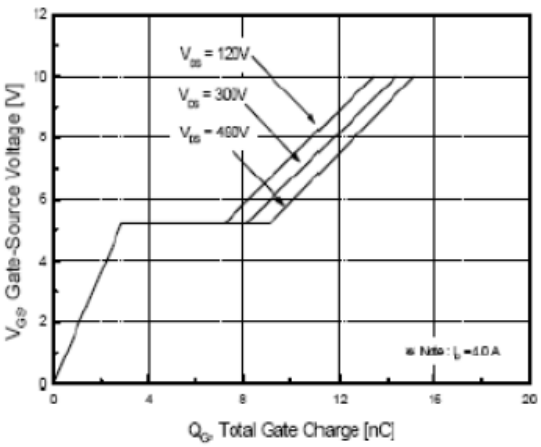


Fig.6 Gate Charge Characteristics

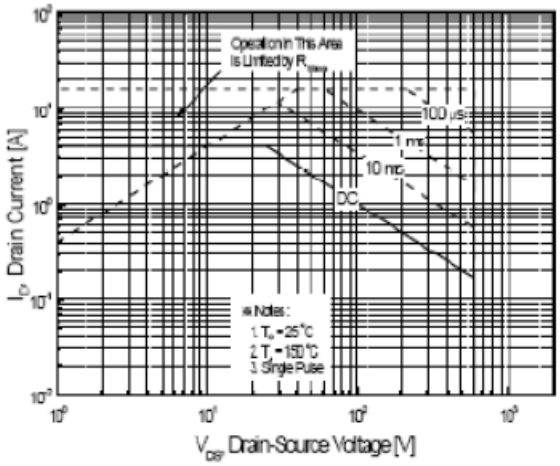


Fig.7 Maximum Safe Operation Area

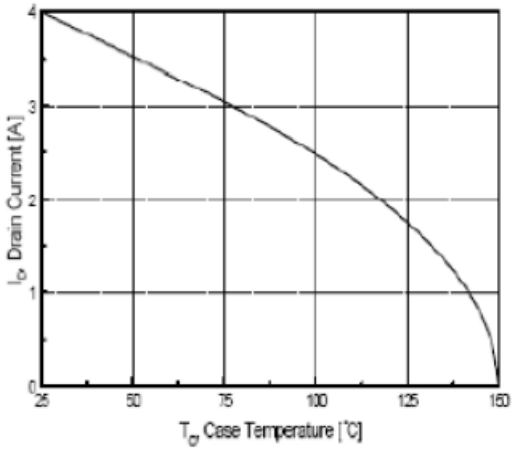


Fig.8 Maximum Drain Current vs Case Temperature

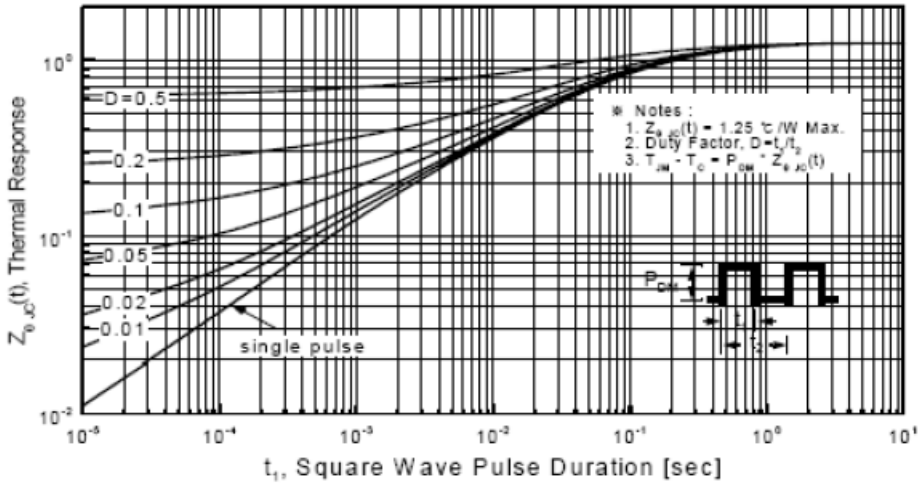


Fig.9 Transient Thermal Response curve

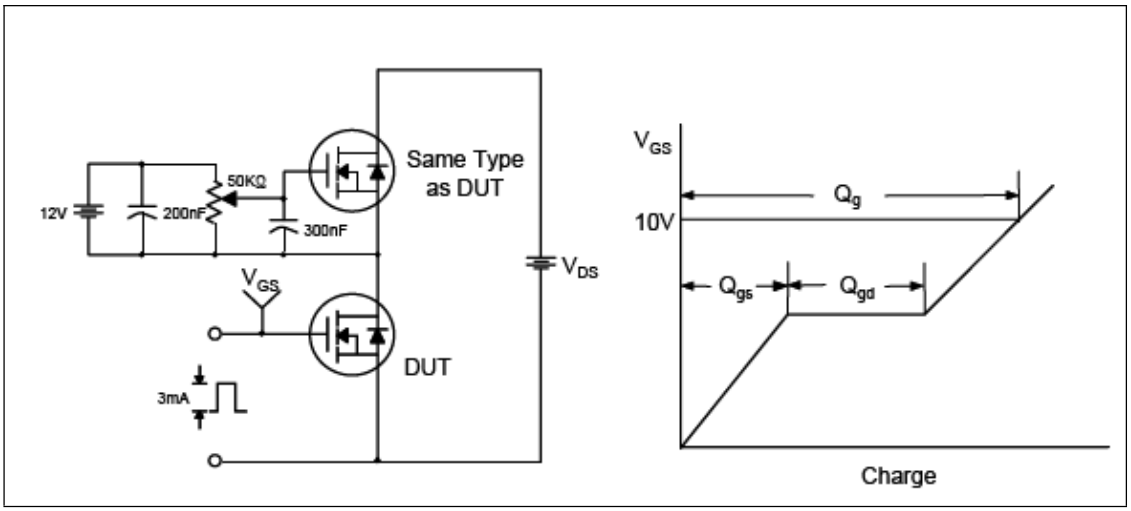


Fig.10 Gate Test Circuit & Waveform

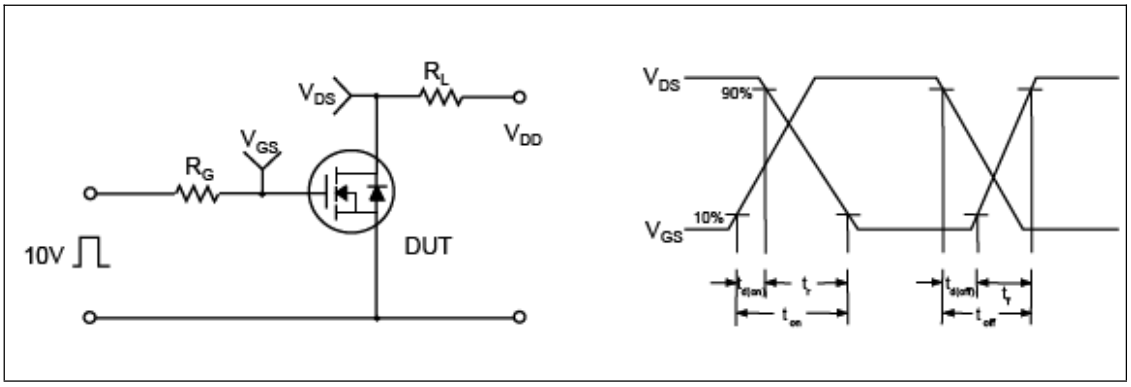


Fig.11 Resistive Switching Test Circuit & Waveform

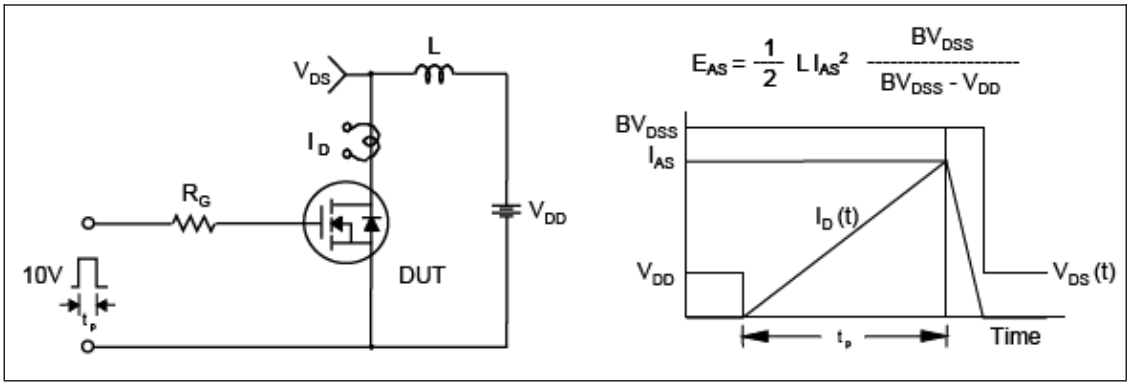


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

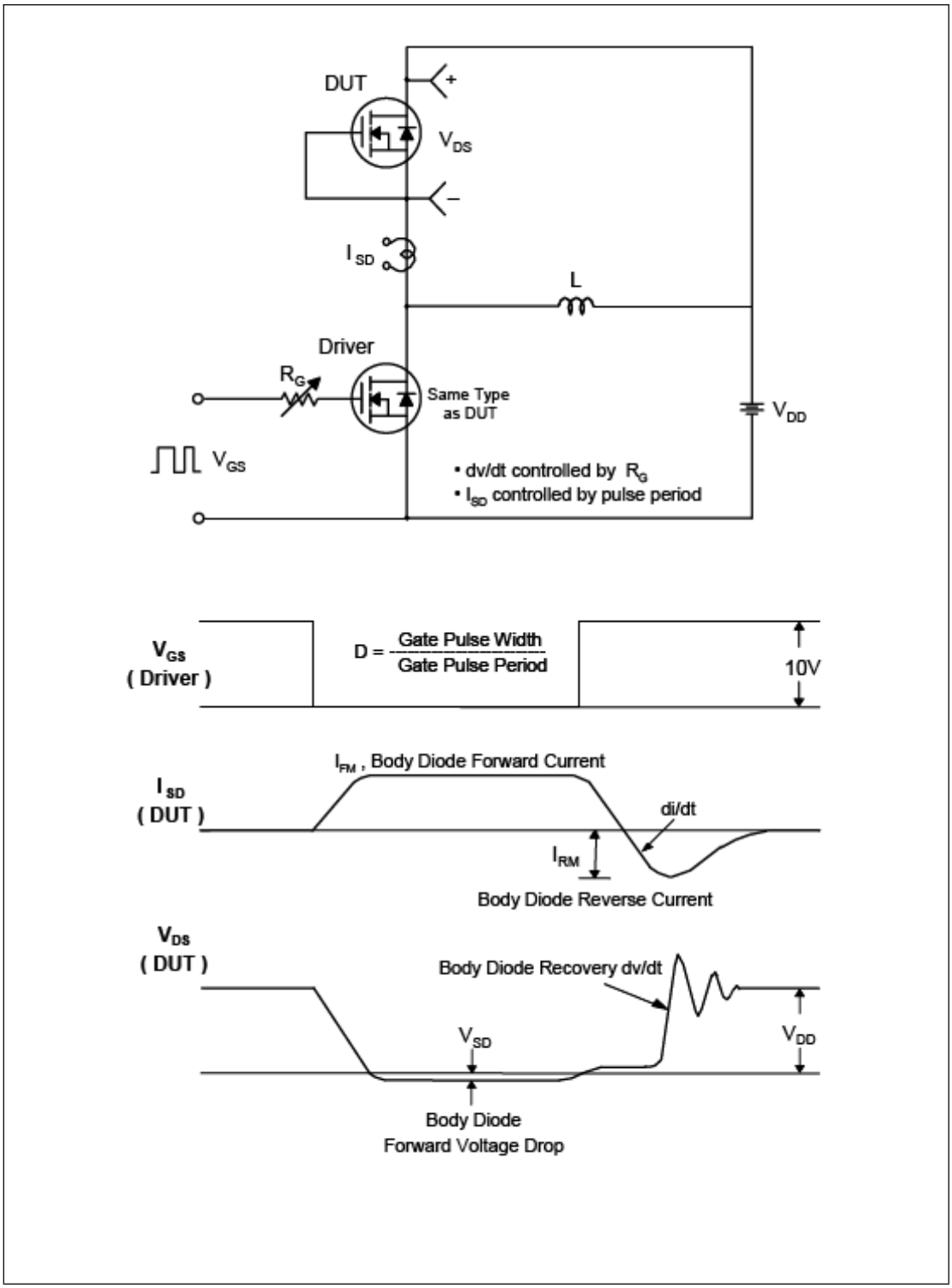


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-252 Package Dimension

Unit:mm