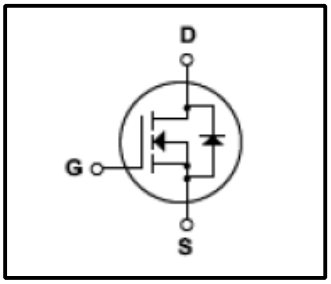
WFP12N60

Silicon N-Channel MOSFET

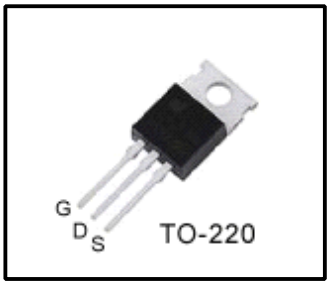
Features



- 12A, 600V,$R_{DS(on)}$(Max 0.65Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 43nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150℃)

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 devices is specially well suited for high efficiency switch model 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_{DSS}	Drain Source Voltage		600	V
I_D	Continuous Drain Current(@Tc=25℃)		12	A
	Continuous Drain Current(@Tc=100℃)		7.6	A
I_{DM}	Drain Current Pulsed	(Note1)	48	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	880	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	25	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		250	W
	Derating Factor above 25℃		2.0	W/℃
T_J, T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Maximum lead Temperature for soldering purposes		300	℃

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	0.50	℃/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink	-	0.5	-	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	62.5	℃/W

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} = 500 V, V_{GS} = 0 V	-	-	1	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	I_D = 250 μA, V_{GS} = 0 V	600	-	-	V
Break Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25℃	-	0.5	-	V/℃
Gate threshold voltage		$V_{GS(th)}$	V_{DS} = 10 V, I_D =250 μA	3	-	4.5	V
Drain−source ON resistance		$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 6.0A	-	0.37	0.65	Ω
Forward Transconductance		gfs	V_{DS} = 50 V, I_D = 6.0A	-	15	-	S
Input capacitance		C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	-	1580	2055	pF
Reverse transfer capacitance		C_{rss}		-	19	24	
Output capacitance		C_{oss}		-	180	235	
Switching time	Rise time	tr	V_{DD} =250 V, I_D =12A, R_G=9.1Ω, RD=31Ω (Note4,5)	-	25	60	ns
	Turn−on time	ton		-	100	210	
	Fall time	tf		-	130	270	
	Turn−off time	toff		-	100	210	
Total gate charge (gate−source plus gate−drain)		Qg	V_{DD} = 400 V, V_{GS} = 10 V, I_D = 1 A (Note4,5)	-	43	56	nC
Gate−source charge		Qgs		-	7.5	-	
Gate−drain (“miller”) Charge		Qgd		-	18.5	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	12	A
Pulse drain reverse current	I_{DRP}	-	-	-	48	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 12 A, V_{GS} = 0 V	-	-	1.4	V
Reverse recovery time	t_{rr}	I_{DR} = 12 A, V_{GS} = 0 V, dI_{DR} / dt = 100 A / μs	-	418	-	ns
Reverse recovery charge	Q_{rr}		-	4.85	-	μC

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

2.L=11.2mH,I_{AS}=12A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

3.I_{SD}≤12A,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

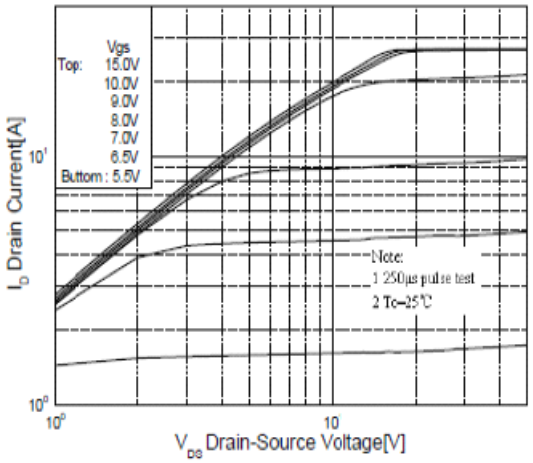


Fig.1 On-State Characteristics

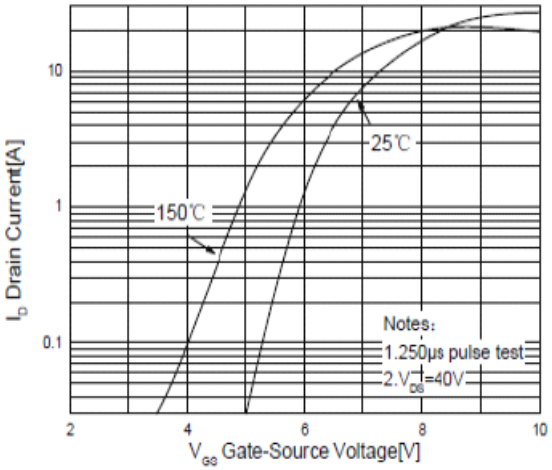


Fig.2 Transfer Characteristics

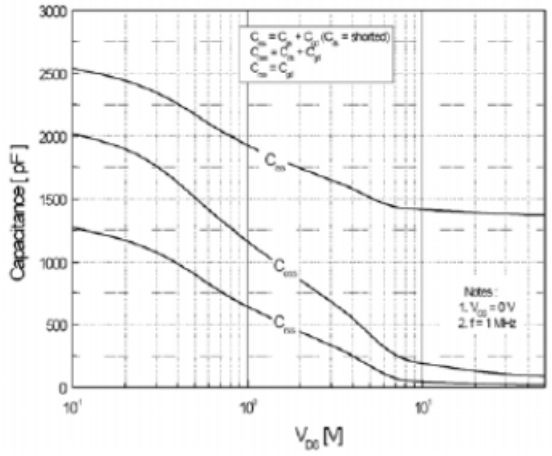


Fig.3 Capacitance Variation vs Drain voltage

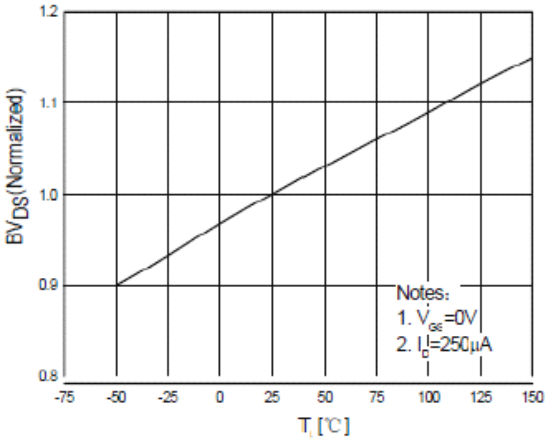


Fig.4 Breakdown Voltage Variation vs Temperature

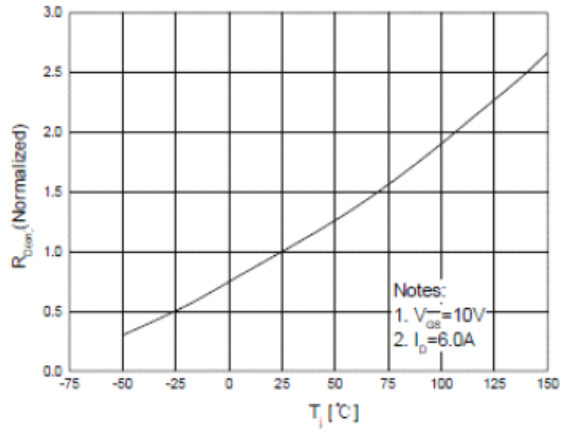


Fig.5 On-Resistance Variation vs Junction Temperature

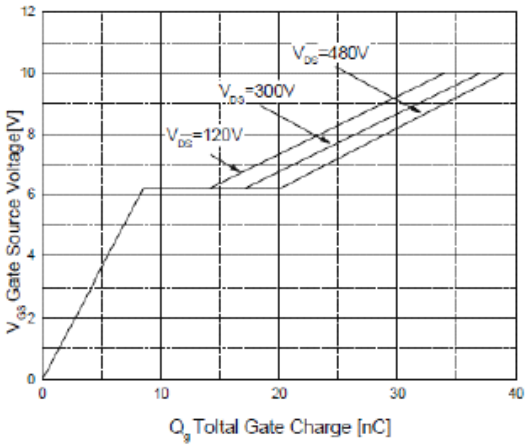


Fig.6 Gate Charge Characteristics

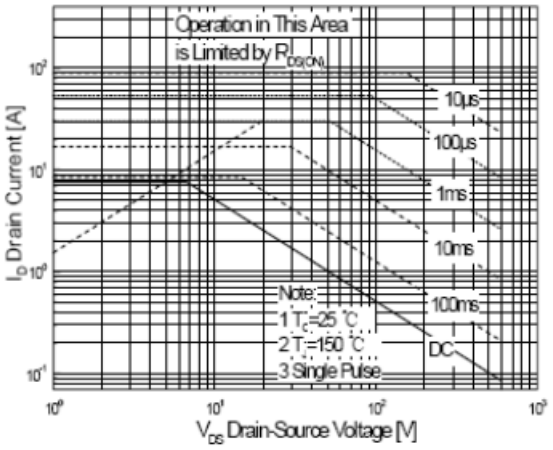


Fig.7 Maximum Safe Operation Area

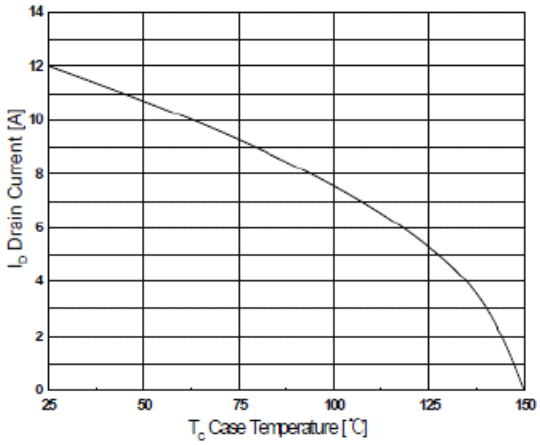


Fig.8 Maximum Drain Current vs Case Temperature

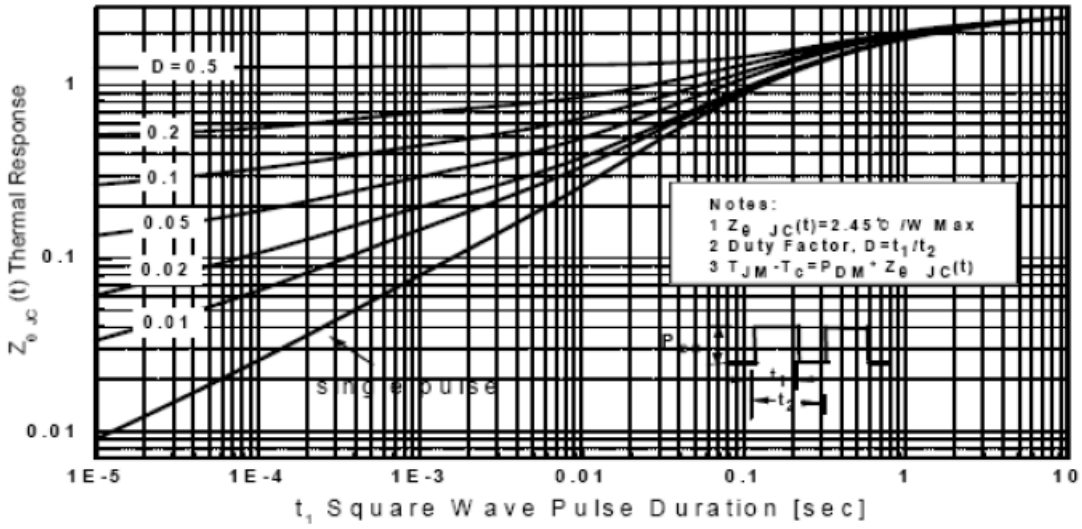


Fig.9 Transient Thermal Response curve

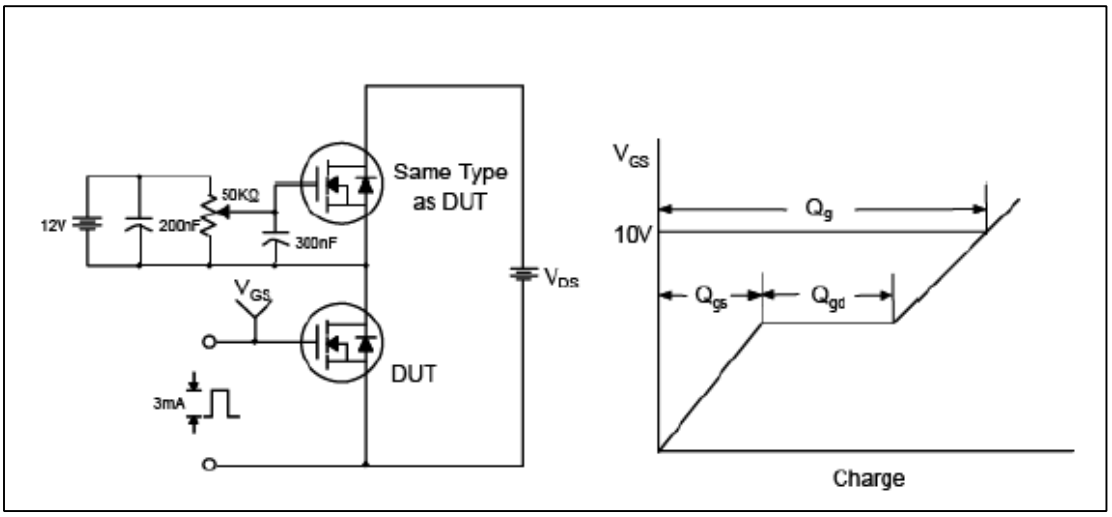


Fig.10 Gate Test circuit & Waveform

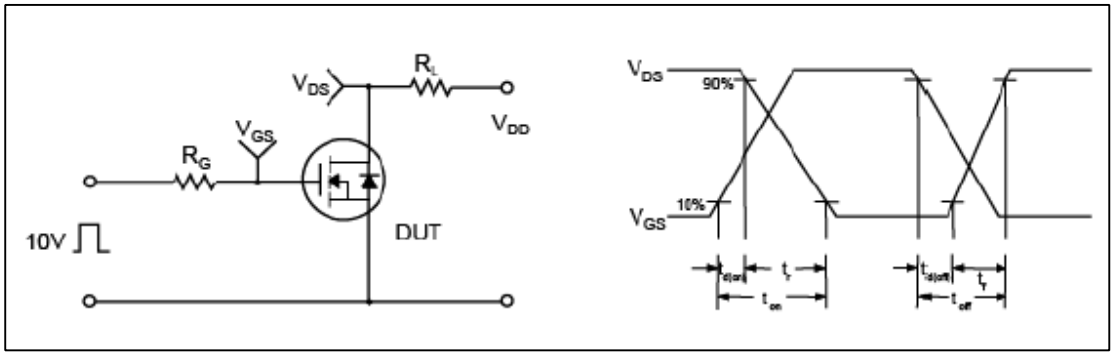


Fig.11 Resistive Switching Test Circuit & Waveform

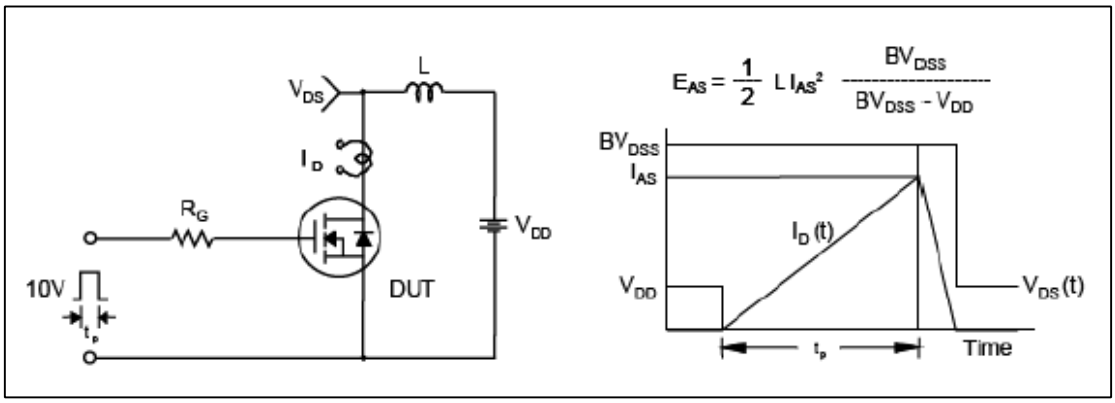


Fig.12 Uncamped Inductive Switching Test Circuit & Waveform

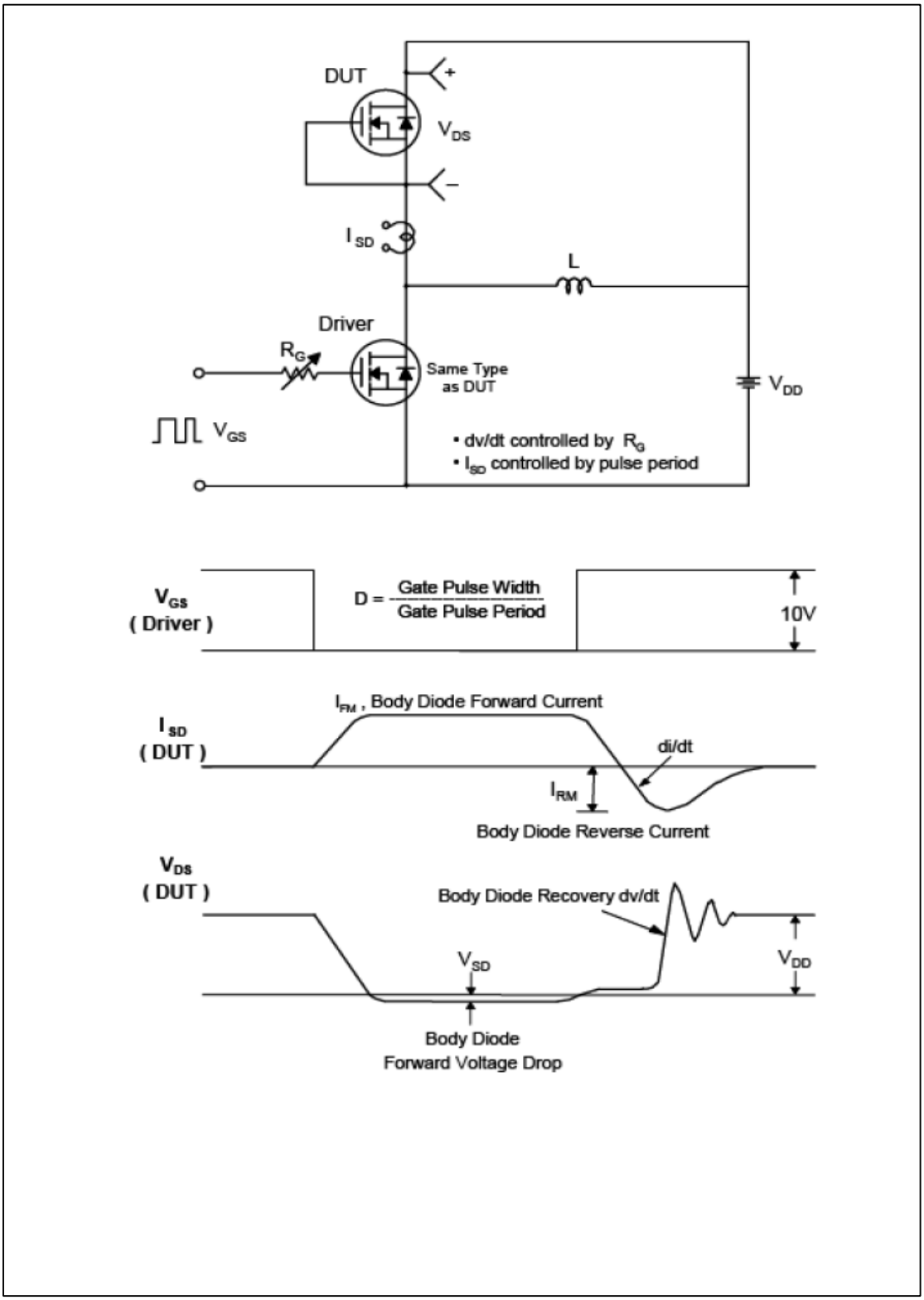


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220 Package Dimension

Unit:mm