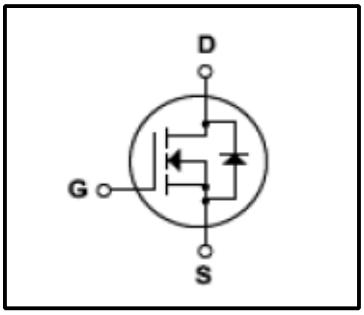
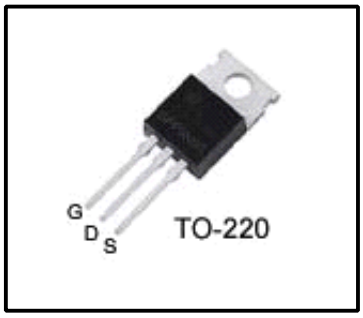
SFP12N60

Silicon N-Channel MOSFET





Features

- 12A,600V, $R_{DS(on)}$(Max0.65Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 39nC)
- 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	(Note2)	880	mJ
E_{AR}	Repetitive Avalanche Energy	(Note1)	25	mJ
dv/dt	Peak Diode Recovery dv /dt	(Note3)	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_{QJC}	Thermal Resistance , Junction -to -Case	-	-	0.50	℃/W
R_{QCS}	Thermal Resistance , Case-to-Sink	-	0.5	-	℃/W
R_{QJA}	Thermal Resistance , Junction-to -Ambient	-	-	62.5	℃/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}=500V,V_{GS}=0V	-	-	1	μA
Drain -source breakdown voltage		$V_{(BR)DSS}$	I_D=250 μA,V_{GS}=0V	600	-	-	V
Break Voltage Temperature Coefficient		△BV_{DSS}/△T_J	I_D=250μA,Referenced to 25℃	-	0.5	-	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=6.0A	-	0.37	0.65	Ω
Forward Transconductance		gfs	V_{DS}=50V,I_D=6.0A	-	15		S
Input capacitance		C_{iss}	V_{DS}=25V,	-	1580	2055	pF
Reverse transfer capacitance		C_{rss}	V_{GS}=0V,	-	180	235	
Output capacitance		C_{oss}	f=1MHz	-	20	25	
Switching time	Rise time	tr	V_{DD}=250V,	-	25	60	ns
	Turn-on time	ton	I_D=12A	-	100	210	
	Fall time	tf	R_G=9.1Ω	-	130	270	
	Turn-off time	toff	R_D=31Ω (Note4,5)	-	100	210	
Total gate charge(gate-source plus gate-drain)		Qg	V_{DD}=400V, V_{GS}=10V,	-	39	56	nC
Gate-source charge		Qgs	I_D=1A	-	7.5	-	
Gate-drain("miller") Charge		Qgd	(Note4,5)	-	18.5	-	

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

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}=12A,V_{GS}=0V	-	-	1.4	V
Reverse recovery time	trr	I_{DR}=12A,V_{GS}=0V,	-	418	-	ns
Reverse recovery charge	Qrr	dI_{DR} / dt =100 A / μs	-	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

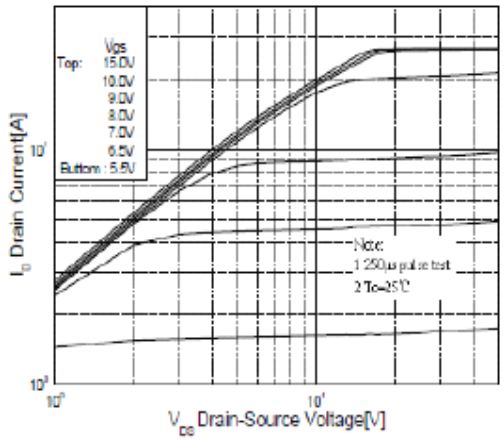


Fig.1 On -State Characteristics

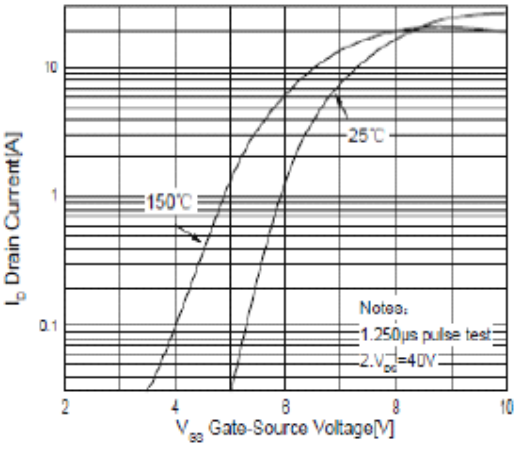


Fig.2 Transfer Characteristics

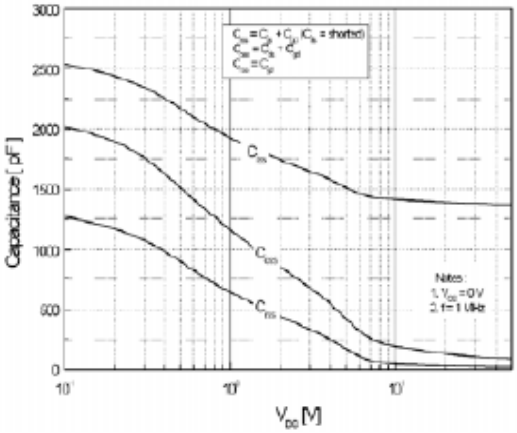


Fig.3 Capacitance Variation vs Drain Voltage

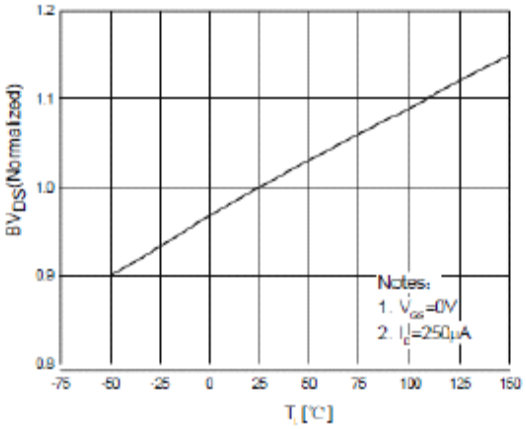


Fig.4 Breakdown Voltage Variation vs Temperature

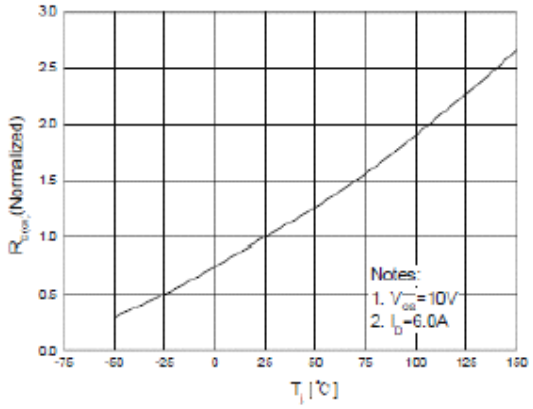


Fig.5 On -Resistance Variation vs Junction Temperature

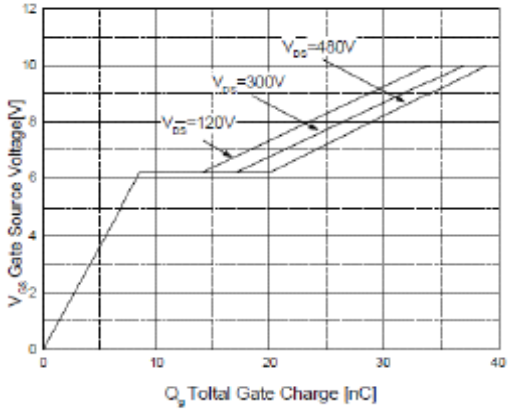


Fig.6 Gate charge Characteristics

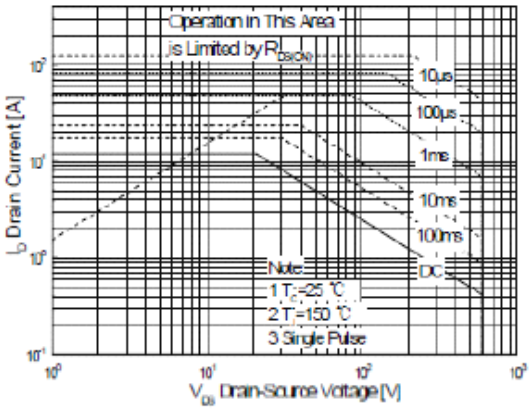


Fig.7Maximum Safe Operation Area

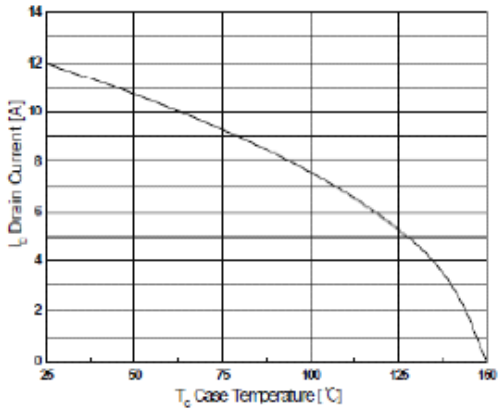


Fig.8 Maximum Drain Current vs Case Temperature

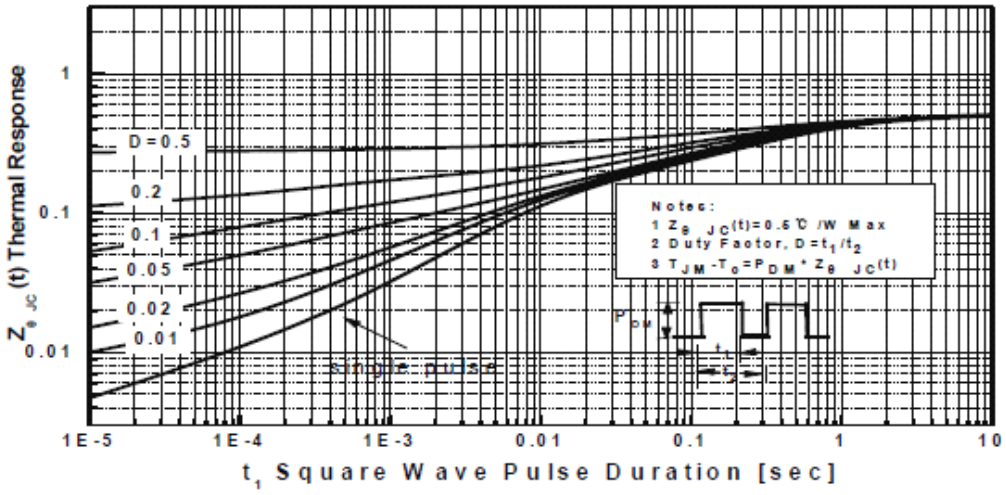


Fig.9 Transient Thermal Response Curve

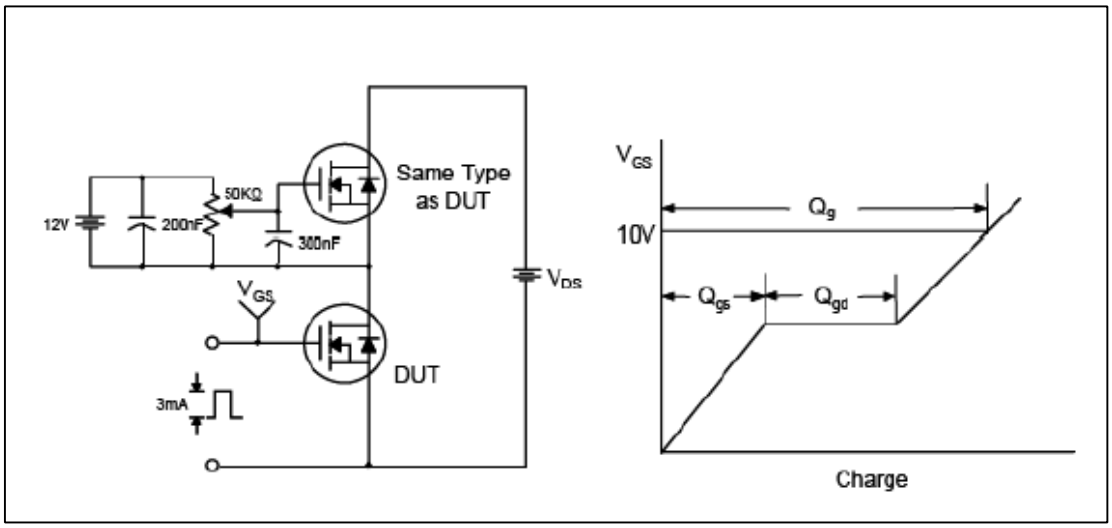


Fig.10 Gate Test Circuit & Waveform

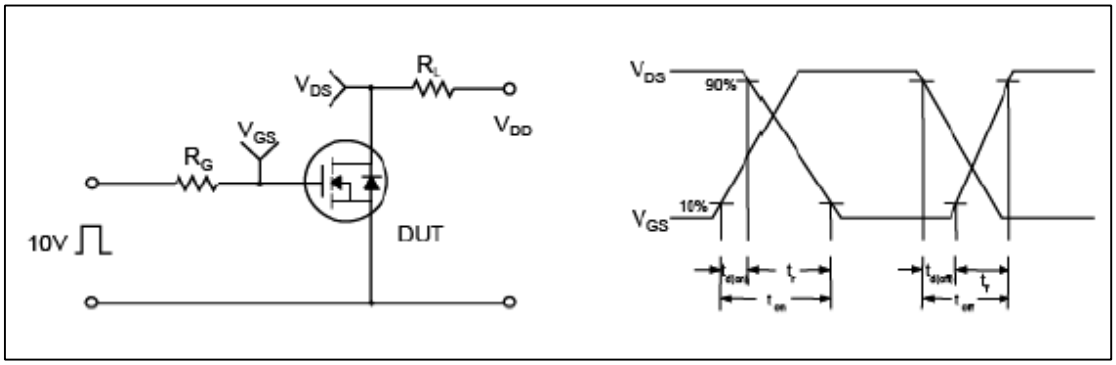


Fig.11 Resistive Switching Test Circuit & Waveform

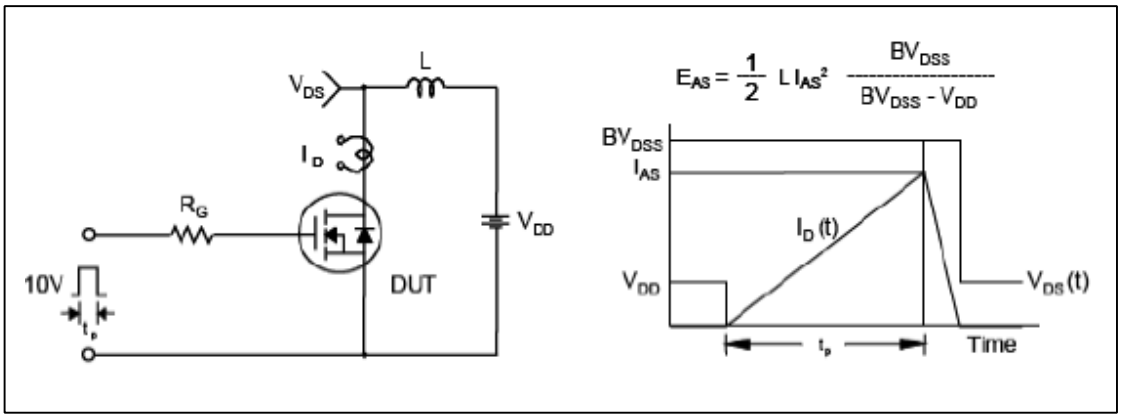


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

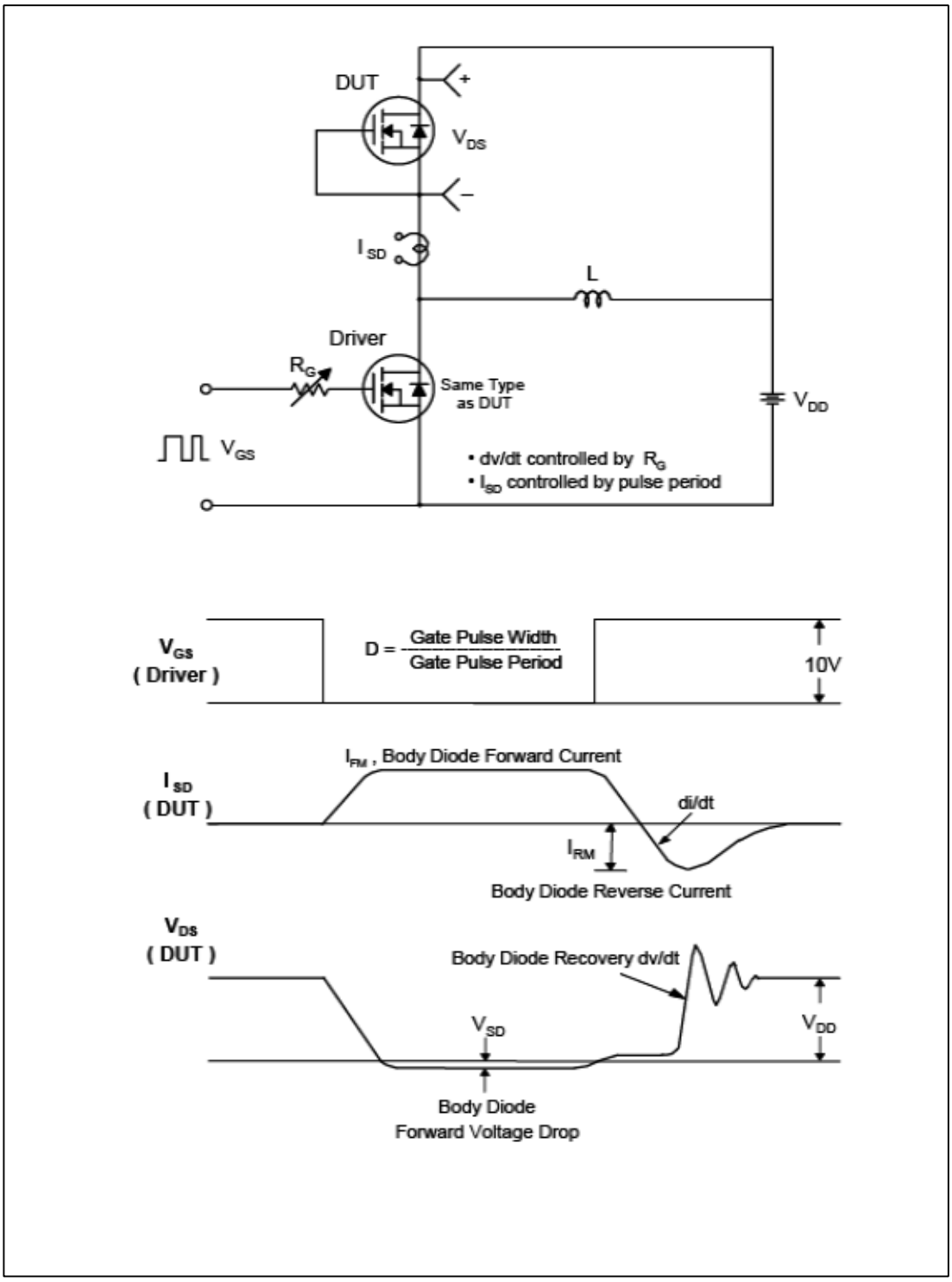


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220 Package Dimension

Unit:mm