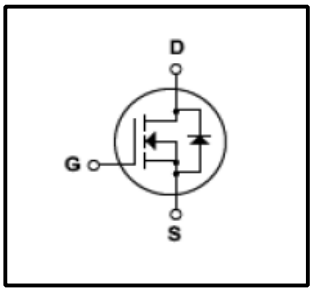
WINSEMI SEMICONDUCTOR

2SK2698

Silicon N-Channel MOSFET

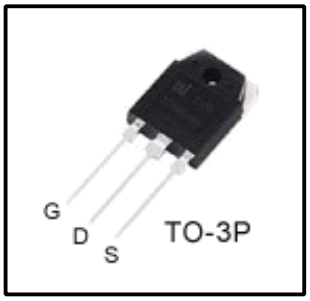
Features

- 18A,500V,$R_{DS(on)}$(Max0.265Ω)@V_{GS}=10V
- Ultra-low Gate charge(Typical 42nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150℃)



General Description

This Power MOSFET is produced using Winsemi's advancedplanar stripe,VDMOS technology.this latest technology has beenespecially designed to minimize on-state resistance, have a high rugged avalanche characteristics .This devices is specially wellsuited for AC-DC switching power supplies, DC-DC powerConverters high voltage H-bridge motor drive PWM



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		500	V
I_D	Continuous Drain Current(@Tc=25℃)		18	A
	Continuous Drain Current(@Tc=100℃)		12.7	A
I_{DM}	Drain Current Pulsed	(Note1)	80	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note2)	330	mJ
E_{AR}	Repetitive Avalanche Energy	(Note1)	27.7	mJ
dv/dt	Peak Diode Recovery dv /dt	(Note3)	4.5	V/ ns
P_D	Total Power Dissipation(@Tc=25℃)		280	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	-	-	0.45	℃/W
R_{QCS}	Thermal Resistance , Case-to-Sink	-	0.24	-	℃/W
R_{QJA}	Thermal Resistance , Junction-to -Ambient	-	-	40	℃/W

Electrical Characteristics(Tc=25℃)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I_{GSS}	V_{GS}=±25V,V_{DS}=0V	-	-	±10	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	-	-	100	μA
Drain -source breakdown voltage		$V_{(BR)DSS}$	I_D=10 mA,V_{GS}=0V	500	-	-	V
Breakdown 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=1mA	2	-	4	V
Drain -source ON resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=10A	-	0.225	0.265	Ω
Forward Transconductance		gfs	V_{DS}=40V,I_D=10A	-	16	-	S
Input capacitance		C_{iss}	V_{DS}=25V,	-	2530	3290	pF
Reverse transfer capacitance		C_{rss}	V_{GS}=0V,	-	11	14.3	
Output capacitance		C_{oss}	f=1MHz	-	300	390	
Switching time	Rise time	tr	V_{DD}=250V,	-	40	90	ns
	Turn-on time	ton	I_D=18A	-	150	310	
	Fall time	tf	R_G=25Ω	-	95	200	
	Turn-off time	toff	(Note4,5)	-	110	230	
Total gate charge(gate-source plus gate-drain)		Qg	V_{DD}=400V,	-	42	55	nC
Gate-source charge		Qgs	V_{GS}=10V,	-	12	-	
Gate-drain("miller") Charge		Qgd	I_D=18A (Note4,5)	-	14	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	18	A
Pulse drain reverse current	I_{DRP}	-	-	-	27	A
Forward voltage(diode)	V_{DSF}	I_{DR}=18A,V_{GS}=0V	-	-	-1.9	V
Reverse recovery time	trr	I_{DR}=18A,V_{GS}=0V,	-	1.6	-	ns
Reverse recovery charge	Qrr	dI_{DR} / dt =100 A / μs	-	20	-	μC

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

2.L=1.83mH I_{AS}=18A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

3.I_{SD}≤18A,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

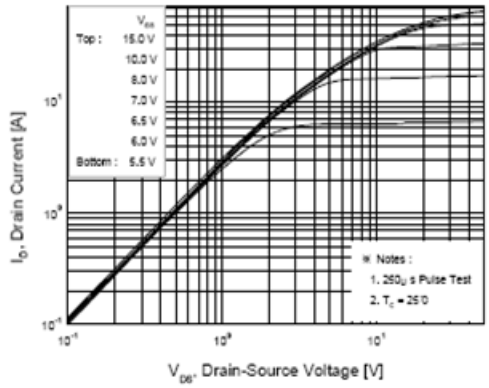


Fig.1 On State Characteristics

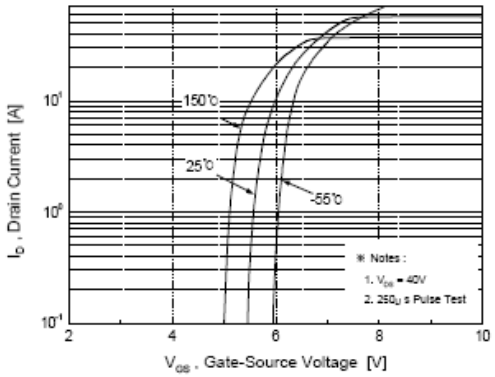


Fig.2 Transfer Current Characteristics

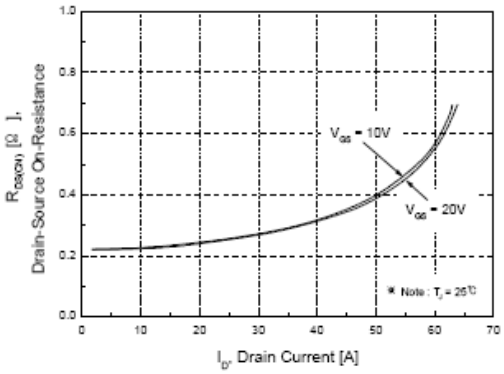


Fig.3 On-Resistance Variation vs Drain Current

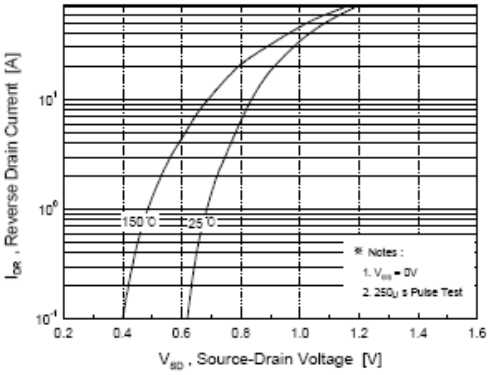


Fig.4 Body Diode Forward Voltage Variation with Source Current and Temperature

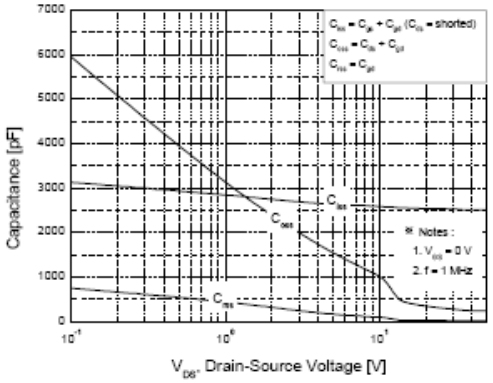


Fig.5 Capacitance Characteristics

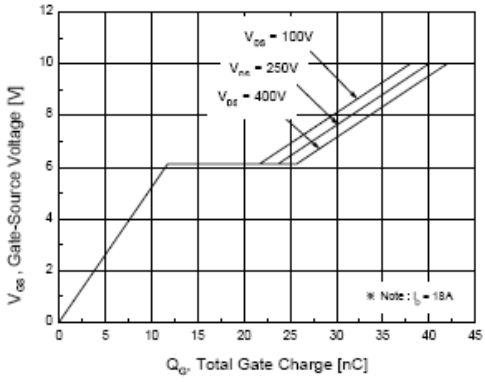


Fig.6 Gate Charge Characteristics

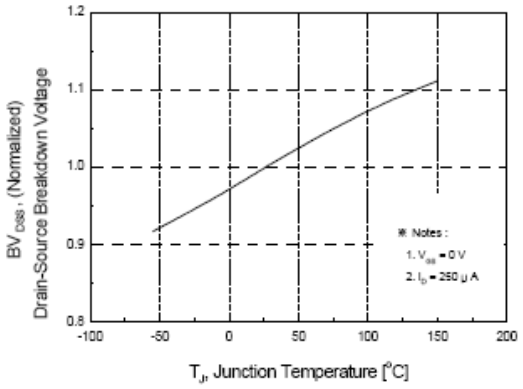


Fig.7 Breakdown Voltage Variation

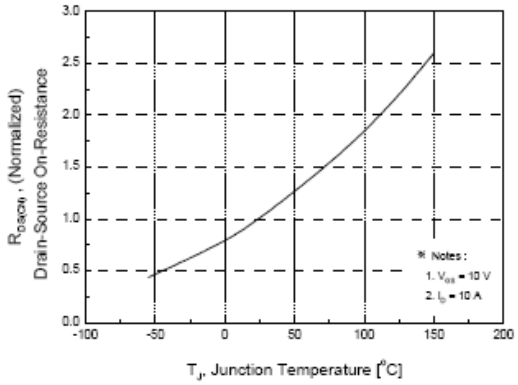


Fig.8 On-Resistance Variation vs.Temperature

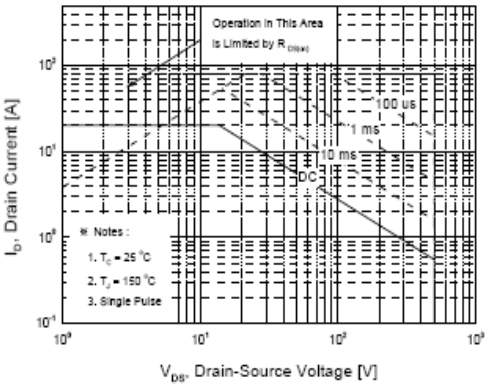


Fig.9 Maximum Safe Operation Area

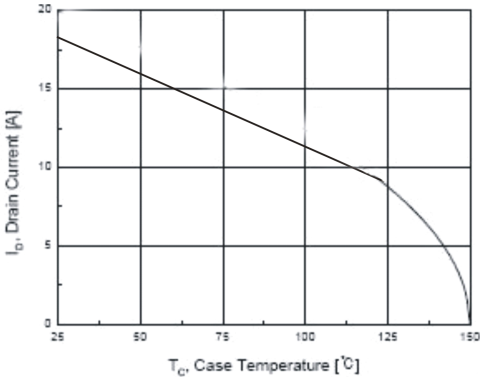


Fig.10 Maximum Drain Current vs Case Temperature

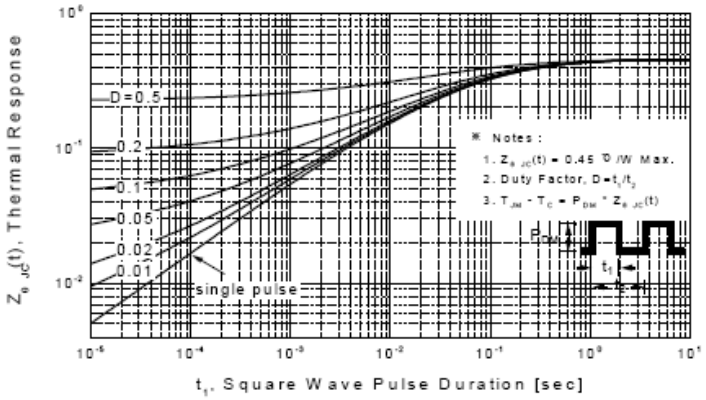


Fig.11 Transient Thermal Response Curve

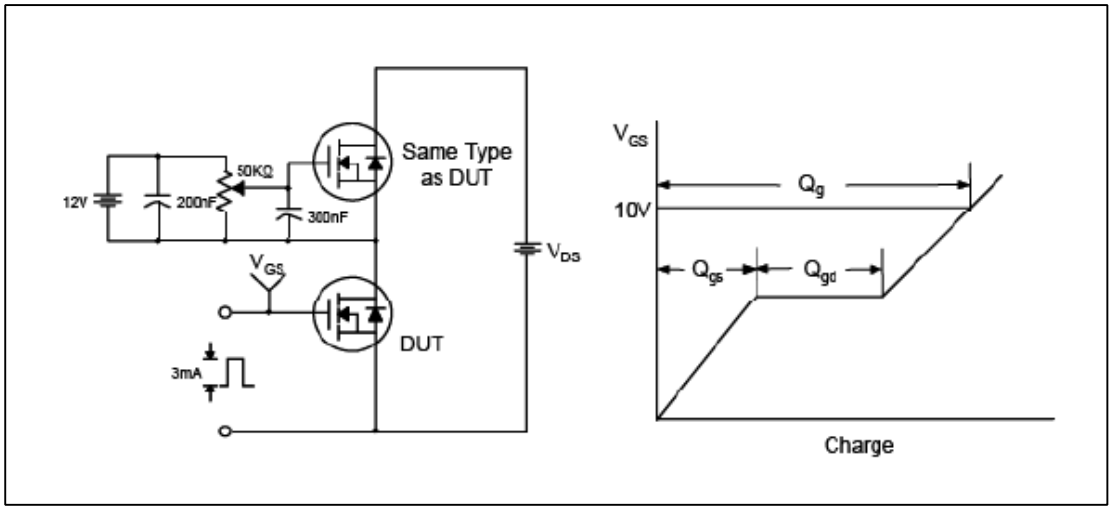


Fig.12 Gate Test Circuit & Waveform

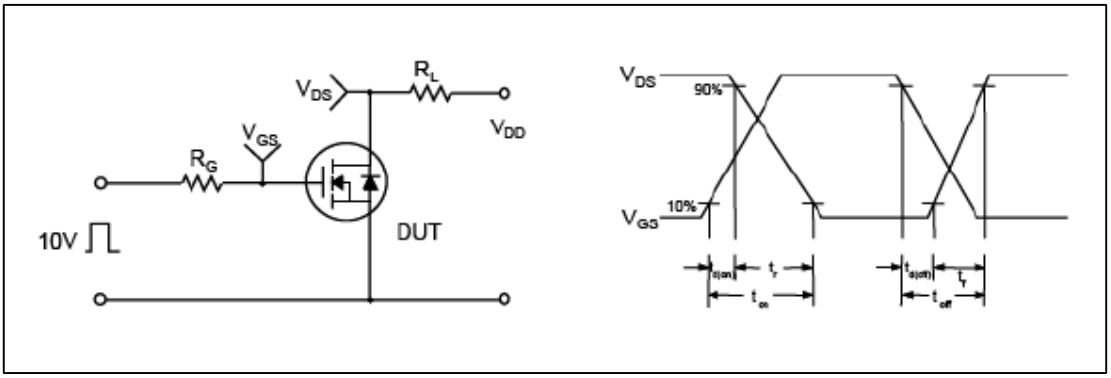


Fig.13 Resistive Switching Test Circuit & Waveform

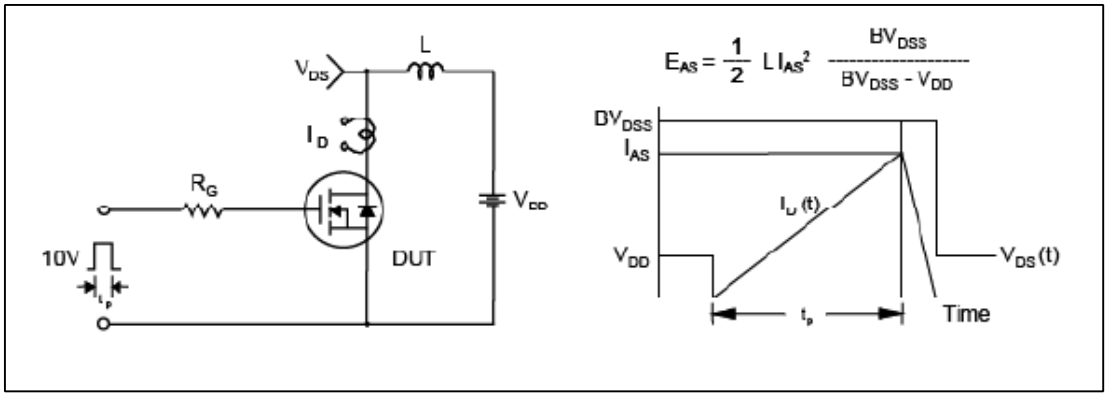


Fig.14 Unclamped Inductive Switching Test Circuit & Waveform

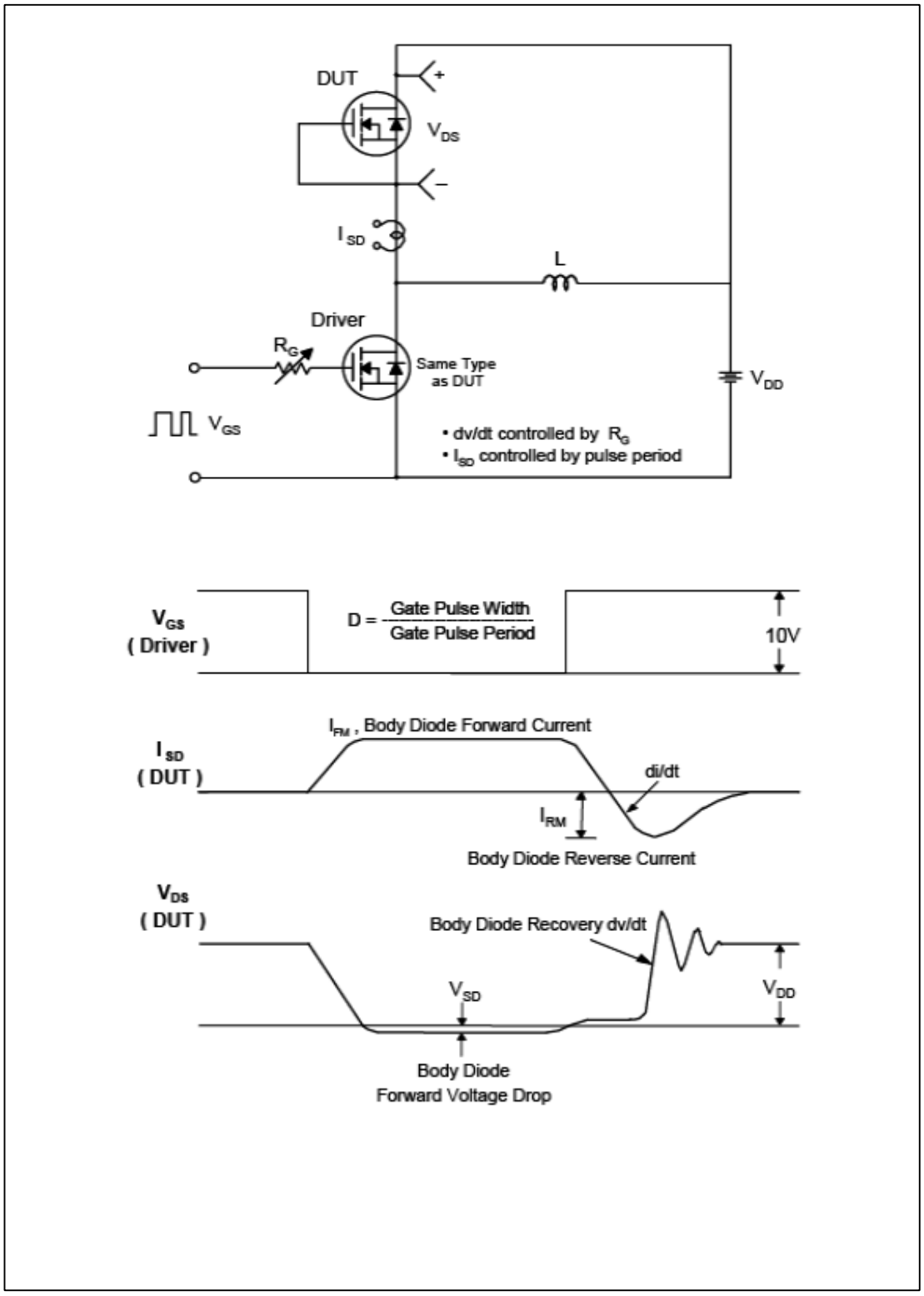


Fig.15 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-3P Package Dimension

Unit:mm