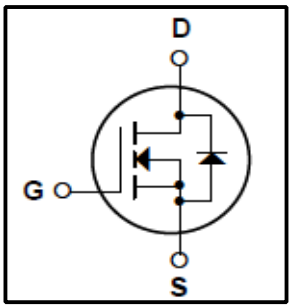
Silicon N-Channel MOSFET

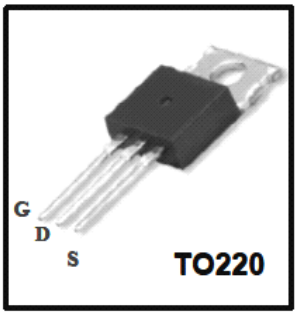


Features

- 9A, 250V, $R_{DS(on)}$(Max 0.45Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 41nC)
- 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 low voltage applications such as automotive, high efficiency switching for DC/DC converters, and DC motor control.



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		250	V
I_D	Continuous Drain Current(@Tc=25℃)		9	A
	Continuous Drain Current(@Tc=100℃)		5	A
I_{DM}	Drain Current Pulsed	(Note1)	72	A
V_{GS}	Gate to Source Voltage		±20	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	300	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	7.4	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.8	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		88	W
	Derating Factor above 25℃		0.64	W/℃
T_J, T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Channel Temperature		300	℃

***Drain current limited by junction temperature**

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	1.42	℃/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} = ±20 V, V_{DS} = 0 V	-	-	±100	nA
Gate-source breakdown voltage		$V_{(BR)GSS}$	I_G = ±10 μA, V_{DS} = 0 V	±20	-	-	V
Drain cut-off current		I_{DSS}	V_{DS} = 200 V, V_{GS} = 0 V	-	-	1	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	I_D = 250 μA, V_{GS} = 0 V	250	-	-	V
Break Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25℃	-	0.37	-	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 = 5.1A	-	-	0.45	Ω
Forward Transconductance		gfs	V_{DS} = 50 V, I_D = 5.1A	1.6	-	-	S
Input capacitance		C_{iss}	V_{DS} = 25 V,	-	1220	-	pF
Reverse transfer capacitance		C_{rss}	V_{GS} = 0 V,	-	32	-	
Output capacitance		C_{oss}	f = 1 MHz	-	130	-	
Switching time	Rise time	tr	V_{DD} =125 V,	-	9.6	-	ns
	Turn-on time	ton	I_D =5.6A	-	21	-	
	Fall time	tf	R_G=12Ω	-	42	-	
	Turn-off time	toff	(Note4,5)	-	19	-	
Total gate charge (gate-source plus gate-drain)		Qg	V_{DD} = 200 V,	-	41	51.8	nC
Gate-source charge		Qgs	V_{GS} = 10 V,	-	6.5	-	
Gate-drain ("miller") Charge		Qgd	I_D = 5.6A (Note4,5)	-	22	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	8.1	A
Pulse drain reverse current	I_{DRP}	-	-	-	32	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 8.1 A, V_{GS} = 0 V	-	1.4	2	V
Reverse recovery time	trr	I_{DR} = 5.6 A, V_{GS} = 0 V,	-	198	-	ns
Reverse recovery charge	Qrr	dI_{DR} / dt = 100 A / μs	-	1.2	2.4	μC

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

2.L=500uH,I_{AS}=9 A,V_{DD}=50V,R_G=0Ω,Starting T_J=25℃

3.I_{SD}≤9A,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

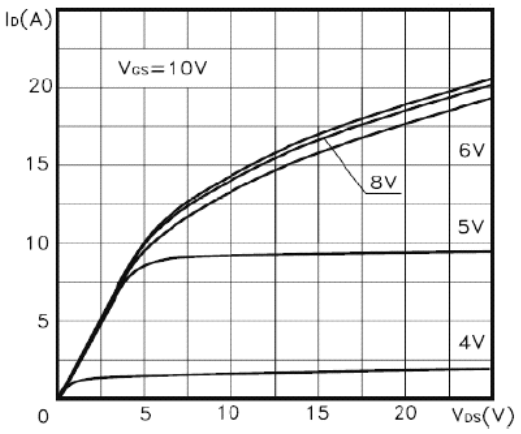


Fig. 1 On-State Characteristics

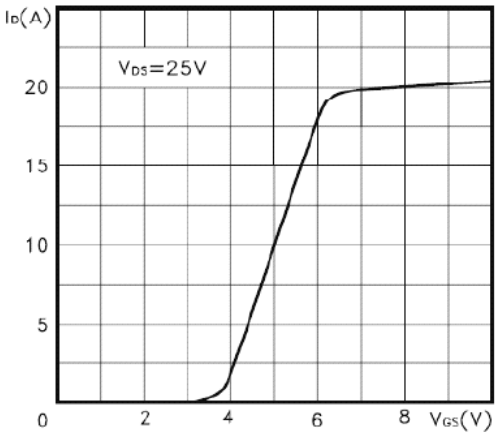


Fig.2 Transfer Characteristics

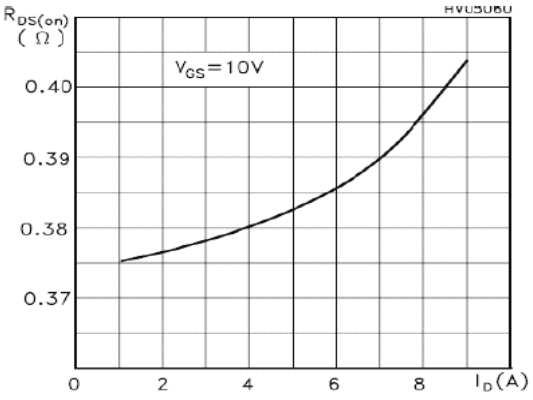


Fig.3 On-Resistance Variation vs Drain Current

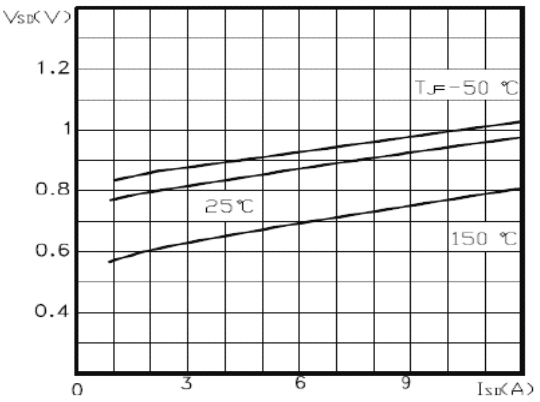


Fig.4 Body Diode Forward Voltage Variation vs. Source Current and Temperature

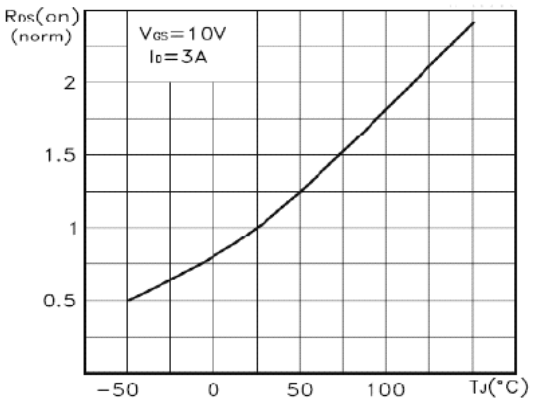


Fig.5 On-Resistance Variation vs Junction Temperature

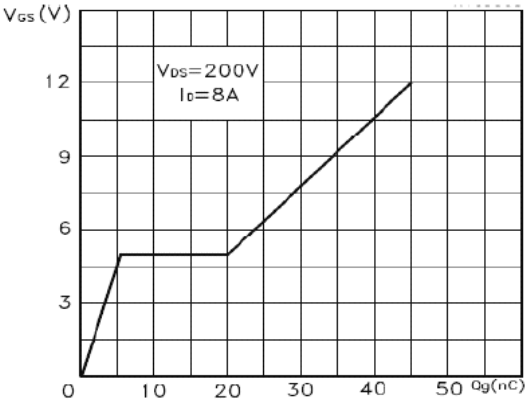


Fig.6 Gate Charge Characteristics

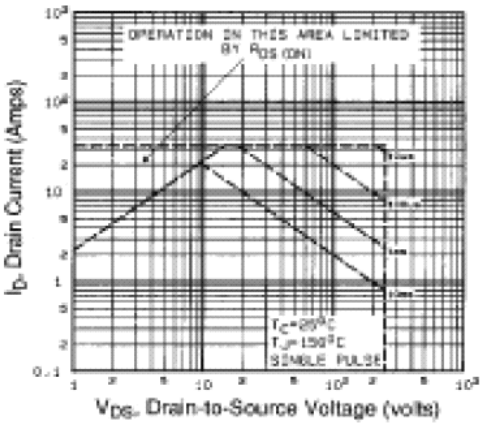


Fig.7 Maximum Safe Operation Area

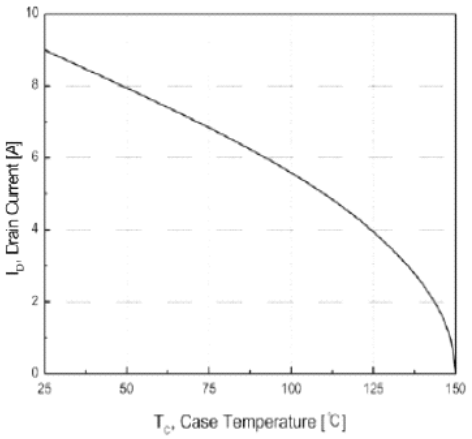


Fig.8 Maximum Drain Current vs Case Temperature

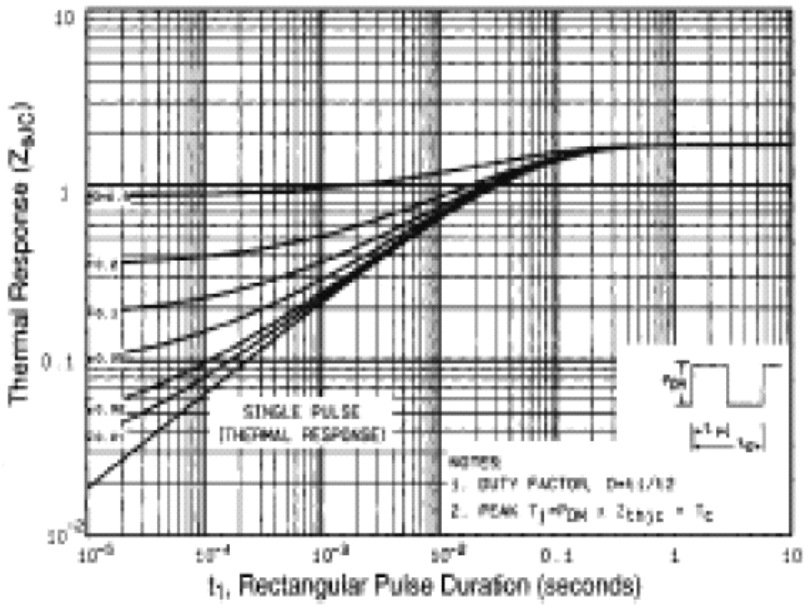


Fig.9 Transient Thermal Response Curve

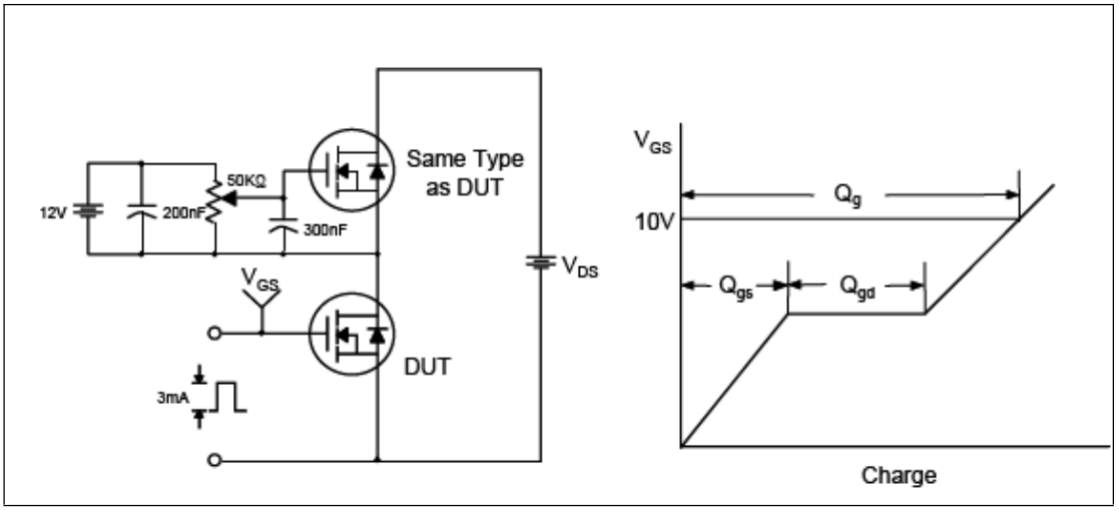


Fig.10 Gate Test Circuit & Waveform

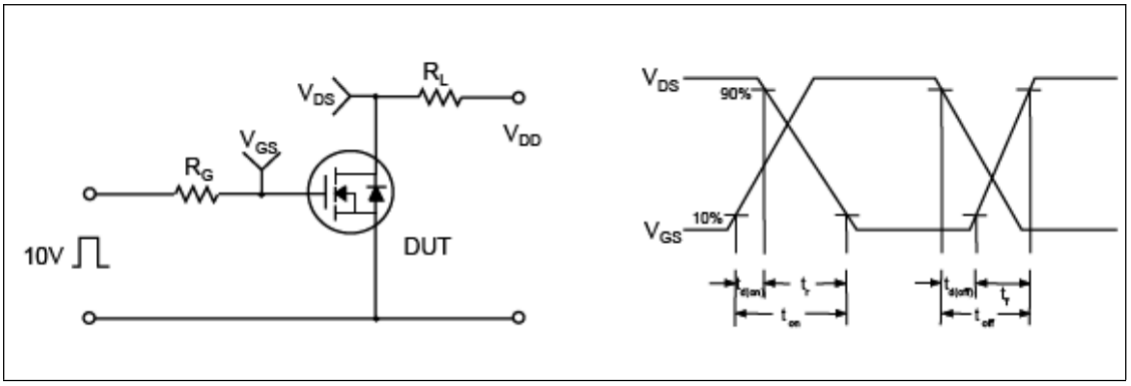


Fig.11 Resistive Switching Test Circuit & Waveform

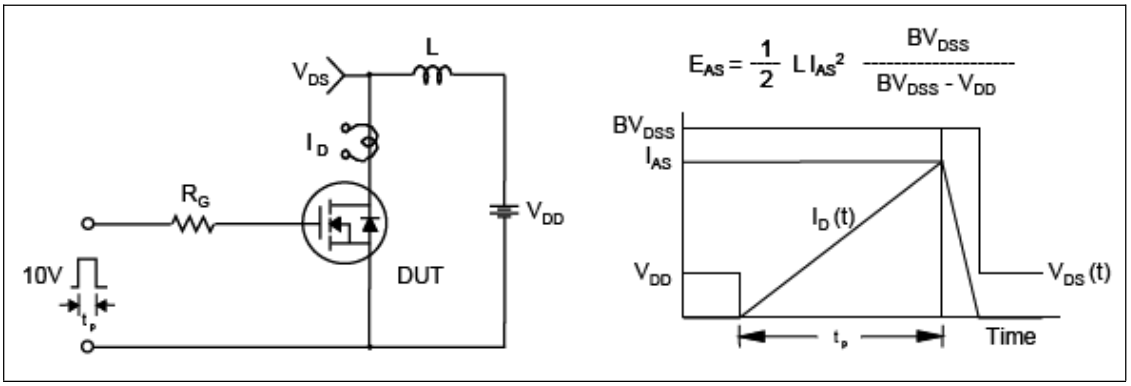


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

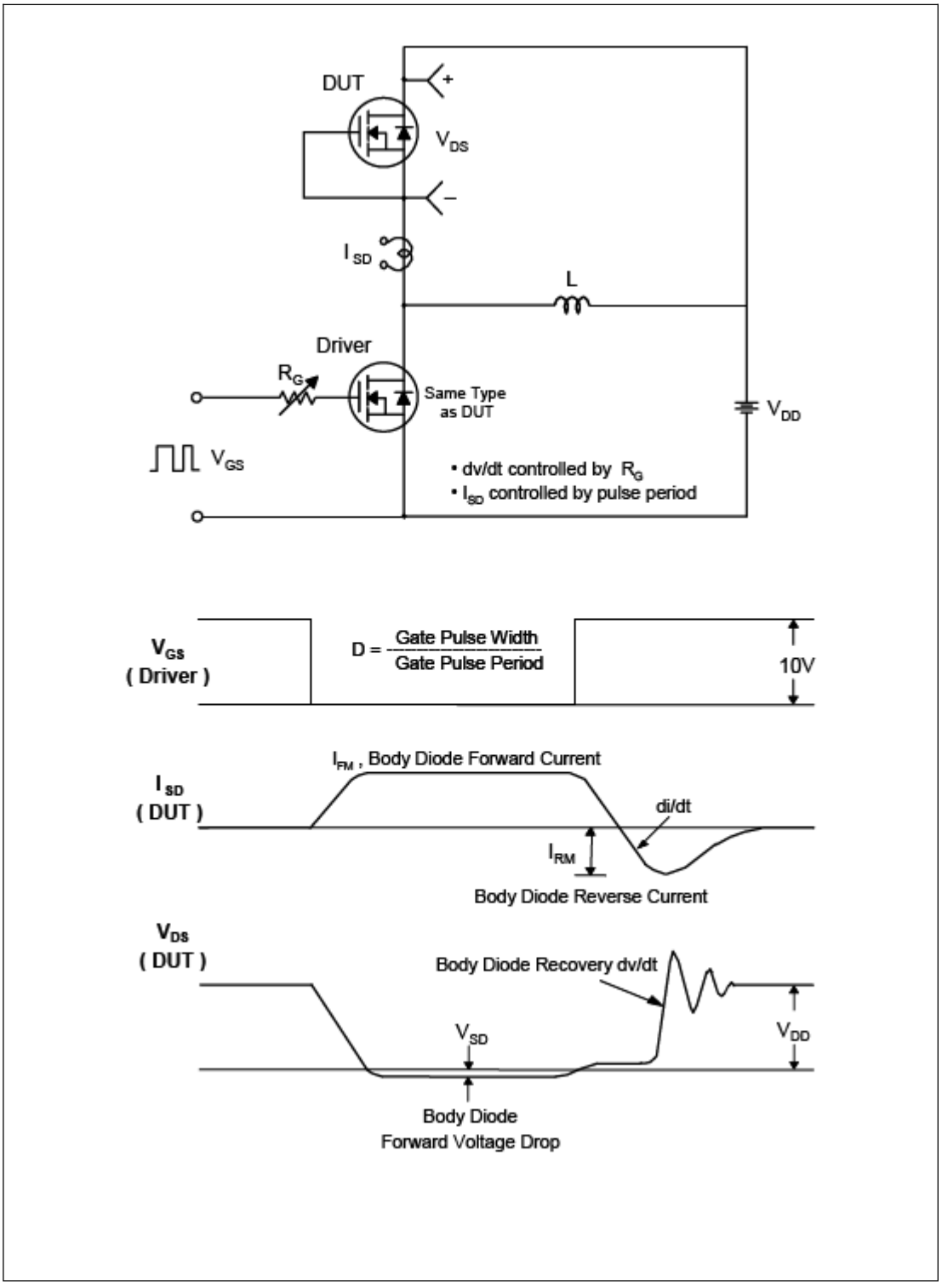


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220 Package Dimension

Unit:mm