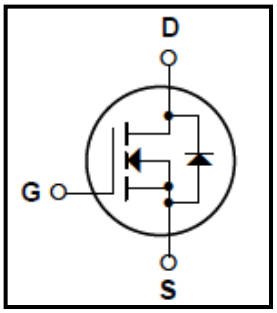
Silicon N-Channel MOSFET

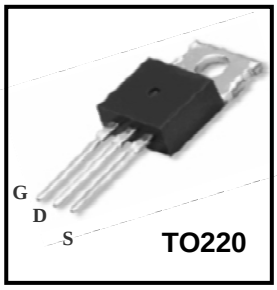


Features

- 2A,650V(Type.), $R_{DS(on)}$(Max 5Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 15nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150℃)

General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe, VDMOS 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 mode power supply.



Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		650	V
I_D	Continuous Drain Current(@Tc=25℃)		2.0	A
	Continuous Drain Current(@Tc=100℃)		1.3	A
I_{DM}	Drain Current Pulsed	(Note1)	6	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	120	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	5.4	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	5.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		54	W
	Derating Factor above 25℃		0.43	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	-	-	2.3	℃/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°C)

Characteristics		Symbol	Test Condition	Min	Typ.	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	650	-	V
Break Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25℃	-	0.65	-	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 =1A	-	4.2	5	Ω
Forward Transconductance		gfs	V_{DS} = 50 V, I_D =1A	-	2.05	-	S
Input capacitance		C_{iss}	V_{DS} = 25 V,	-	380	490	pF
Reverse transfer capacitance		C_{rss}	V_{GS} = 0 V,	-	35	49	
Output capacitance		C_{oss}	f = 1 MHz	-	7.6	9.9	
Switching time	Rise time	t_r	V_{DD} =300 V,	-	15	42	ns
	Turn−on time	t_{on}	I_D = 2 A	-	50	108	
	Fall time	t_f	R_G=25 Ω	-	40	89	
	Turn−off time	t_{off}	(Note4,5)	-	40	89	
Total gate charge (gate−source plus gate−drain)		Q_g	V_{DD} = 320 V, V_{GS} = 10 V,	-	15	19	nC
Gate−source charge		Q_{gs}	I_D = 2 A	-	1.7	-	
Gate−drain (“miller”) Charge		Q_{gd}	(Note4,5)	-	7.2	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	2	A
Pulse drain reverse current	I_{DRP}	-	-	-	6	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 2 A, V_{GS} = 0 V	-	-	1.4	V
Reverse recovery time	t_{rr}	I_{DR} = 2 A, V_{GS} = 0 V,	-	200	-	ns
Reverse recovery charge	Q_{rr}	dI_{DR} / dt = 100 A / μs	-	1.3	-	μC

Note 1.Repeativity rating :pulse width limited by junction temperature
2.L=0.5mH,I_{AS}=2.0A,V_{DD}=50V,R_G=0Ω,Starting T_J=25℃
3.I_{SD}≤2.0A,di/dt≤200A/us, V_{DD}<BV_{DSS},STARTING TJ=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

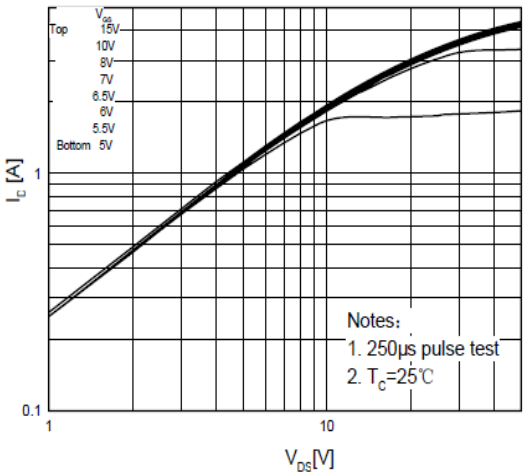


Fig. 1 On-State Characteristics

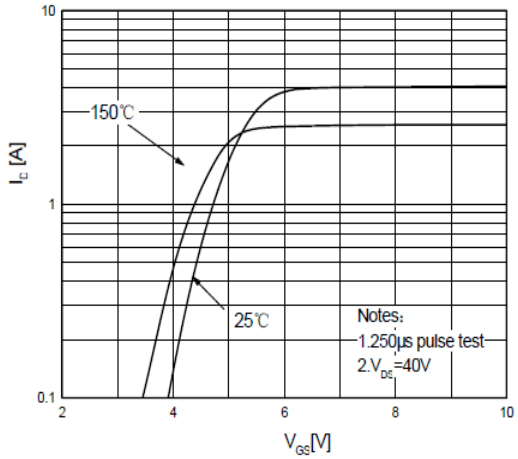


Fig.2 Transfer Current Characteristics

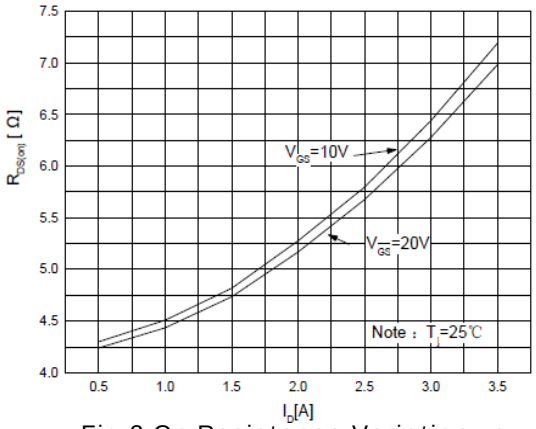


Fig.3 On-Resistance Variation vs Drain Current

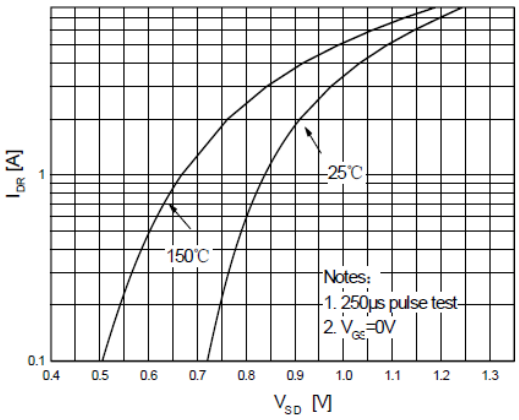


Fig.4 Body Diode Forward Voltage Variation vs. Source Current and Temperature

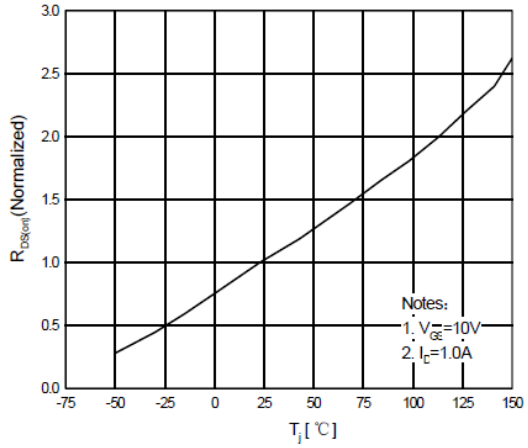


Fig.5 On-Resistance Variation vs Junction Temperature

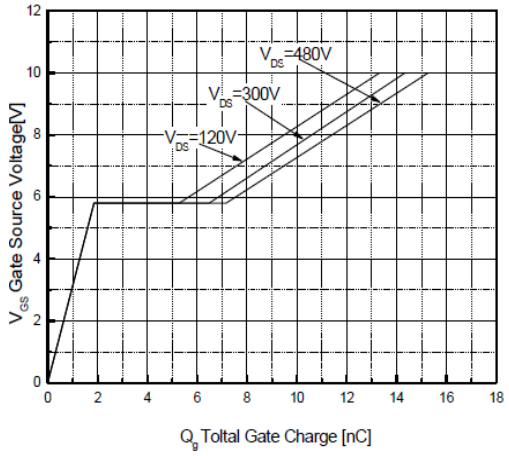


Fig.6 Gate Charge Characteristics

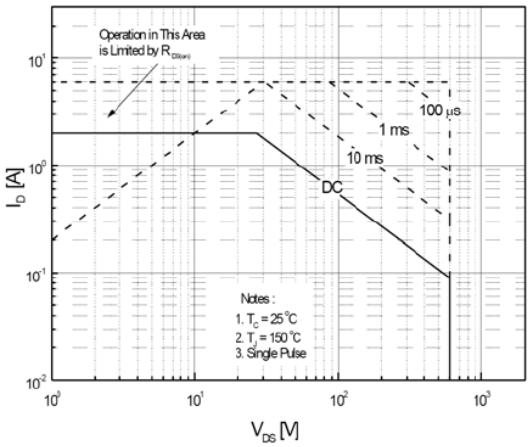


Fig.7 Maximum Safe Operation Area

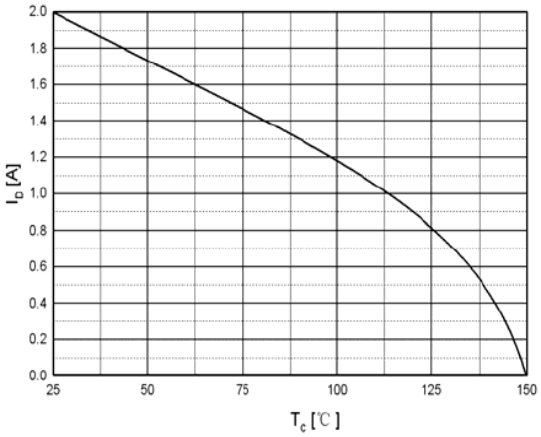


Fig.8 Maximum Drain Current vs Case Temperature

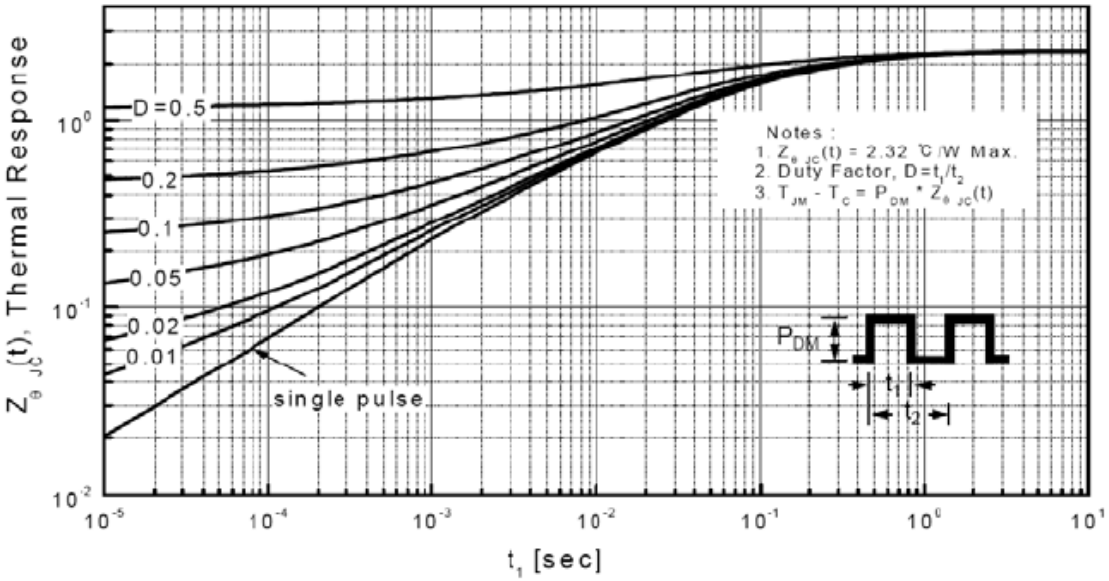


Fig.9 Transient Thermal Response Curve

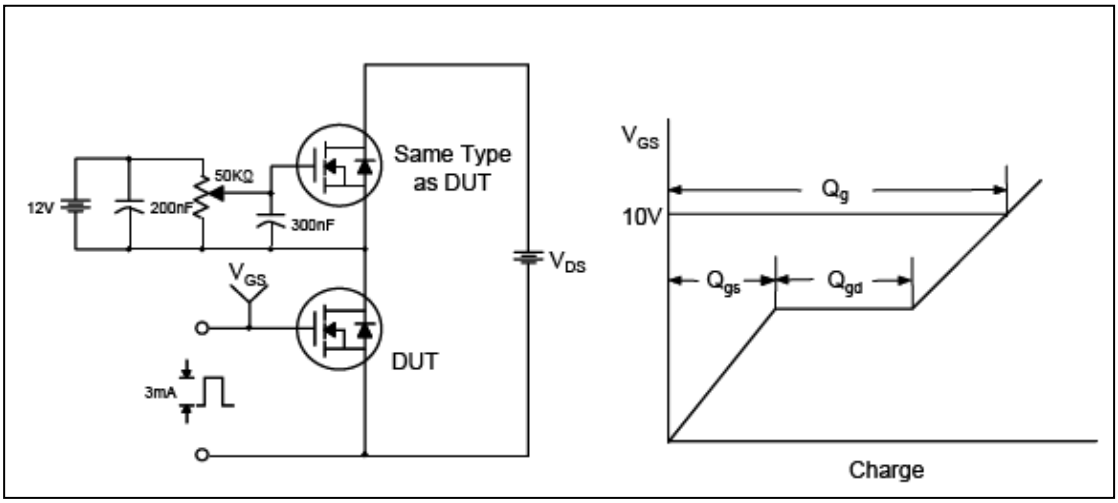


Fig.10 Gate Test Circuit & Waveform

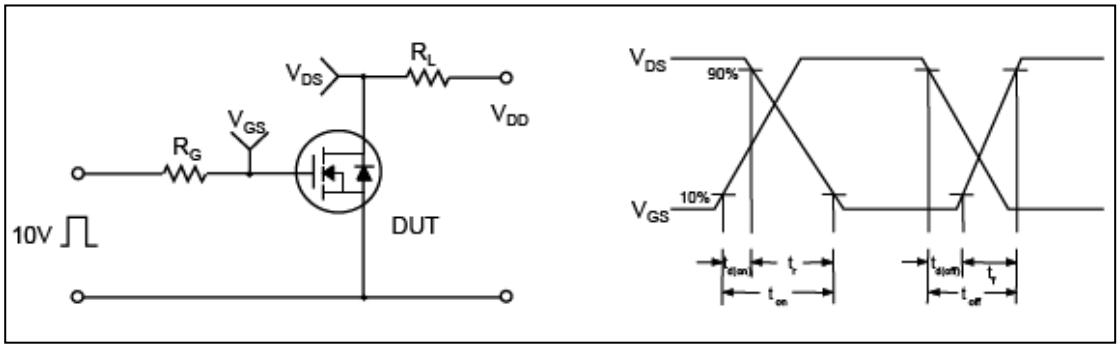


Fig.11 Resistive Switching Test Circuit & Waveform

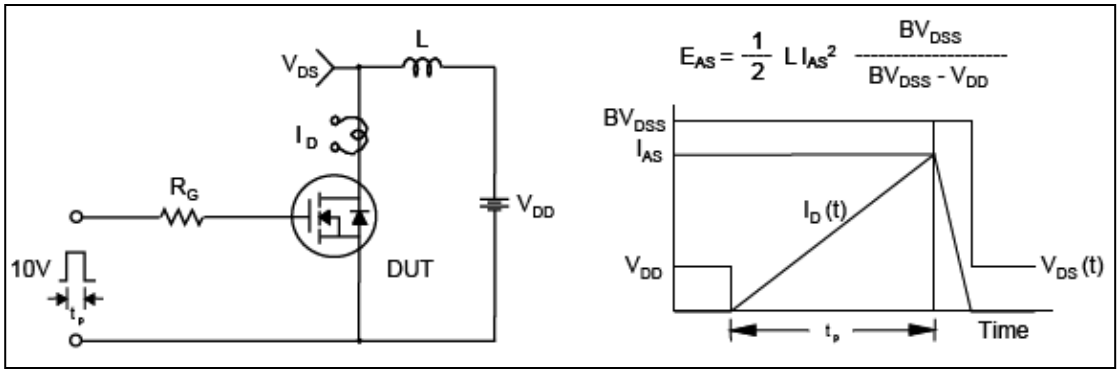


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

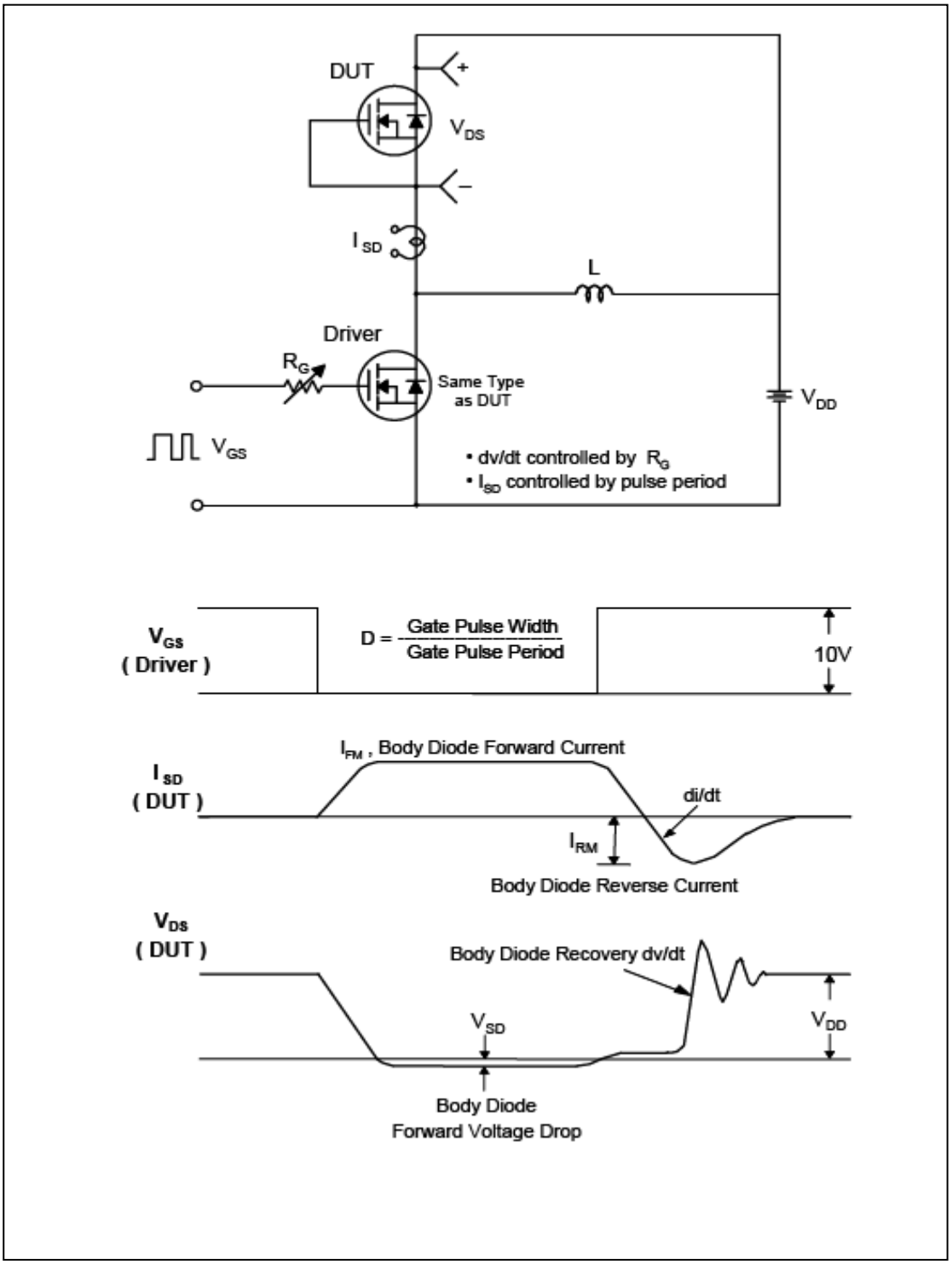


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220 Package Dimension

Unit: mm