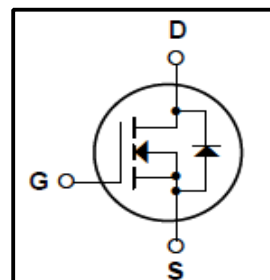


Silicon N-Channel MOSFET

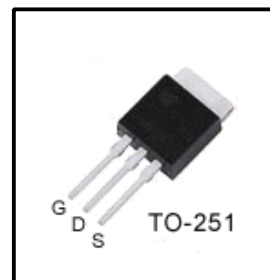
Features

- 1A, 600V, $R_{DS(on)}$ (Max 15.0 Ω) @ $V_{GS}=10V$
- Ultra-low Gate Charge (Typical 6.1nC)
- Fast Switching Capability
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150°C)



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 device is specially well suited for high efficiency switch mode power supply, electronic Lamp ballasts based on half bridge and UPS.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DS}	Drain Source Voltage	600	V
I_D	Continuous Drain Current (@ $T_c=25^\circ\text{C}$)	1.0	A
	Continuous Drain Current (@ $T_c=100^\circ\text{C}$)	0.62	A
I_{DM}	Drain Current Pulsed (Note1)	4.0	A
V_{GS}	Gate to Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	47	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	3.1	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Total Power Dissipation (@ $T_c=25^\circ\text{C}$)	30	W
	Derating Factor above 25°C	0.24	W/ $^\circ\text{C}$
T_J, T_{stg}	Junction and Storage Temperature	-55~150	$^\circ\text{C}$
T_L	Channel Temperature	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	4.16	$^\circ\text{C/W}$
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink	0.5	-	-	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	105	$^\circ\text{C/W}$

Electrical Characteristics (T_c = 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} = 600 V, V _{GS} = 0 V	-	-	10	μA
		V _{DS} = 480 V, T _c = 125°C	-	-	100	μA
Drain-source breakdown voltage	V _{(BR)DSS}	I _D = 250 μA, V _{GS} = 0 V	600	-	-	V
Break Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C	-	0.5	-	V/°C
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 = 0.5A	-	11	15	Ω
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 0.5A	-	0.8	-	S
Input capacitance	C _{iss}	V _{DS} = 25 V,	-	178	221	pF
Reverse transfer capacitance	C _{rss}	V _{GS} = 0 V,	-	4	5	
Output capacitance	C _{oss}	f = 1 MHz	-	19	27	
Switching time	Rise time	t _r	V _{DD} = 300 V,	-	15	ns
	Turn-on time	t _{on}	I _D = 1A	-	46	
	Fall time	t _f	R _G = 25Ω	-	26	
	Turn-off time	t _{off}	(Note 4,5)	-	37	
Total gate charge (gate-source plus gate-drain)	Q _g	V _{DD} = 40 V, V _{GS} = 10 V,	-	6.1	7.2	nC
Gate-source charge	Q _{gs}	I _D = 1 A	-	1.0	-	
Gate-drain ("miller") Charge	Q _{gd}	(Note 4,5)	-	3.0	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I _{DR}	-	-	-	1.0	A
Pulse drain reverse current	I _{DRP}	-	-	-	4.0	A
Forward voltage (diode)	V _{DSF}	I _{DR} = 1A, V _{GS} = 0 V	-	-	1.0	V
Reverse recovery time	t _{rr}	I _{DR} = 1A, V _{GS} = 0 V,	-	185	-	ns
Reverse recovery charge	Q _{rr}	dI _{DR} / dt = 100 A / μs	-	0.51	-	μC

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

2.L=59mH,I_{AS}=1A,V_{DD}=50V,R_G=25Ω,Starting T_J=25°C

3.I_{SD}≤1A,di/dt≤200A/us, V_{DD}<BV_{DSS},STARTING T_J=25°C

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

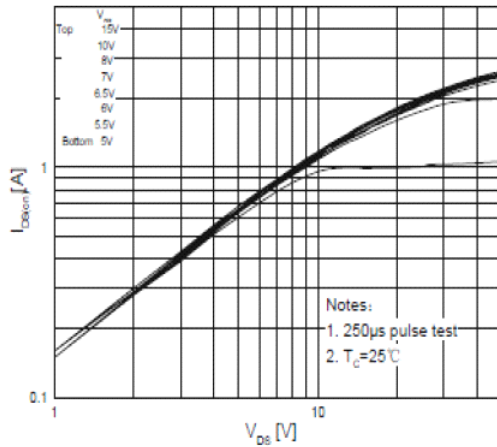


Fig. 1 On-State Characteristics

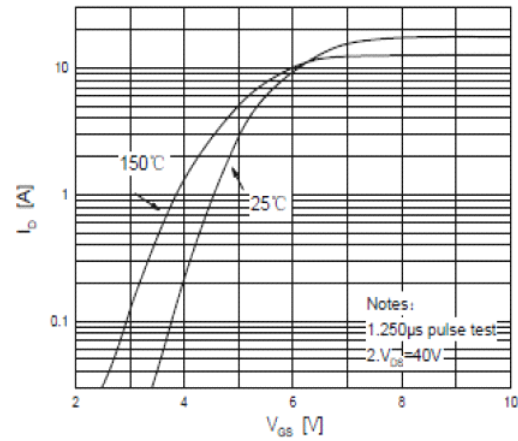


Fig.2 Transfer Current Characteristics

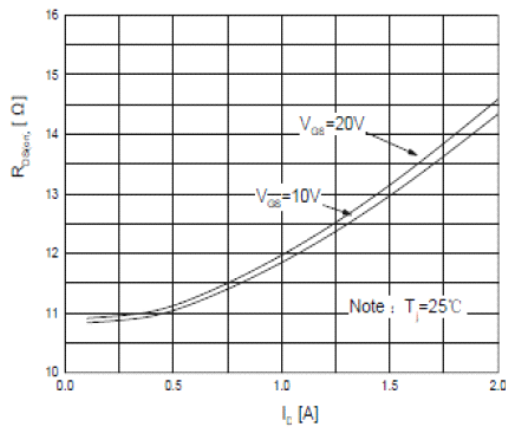


Fig.3 On-Resistance Variation vs Drain Current

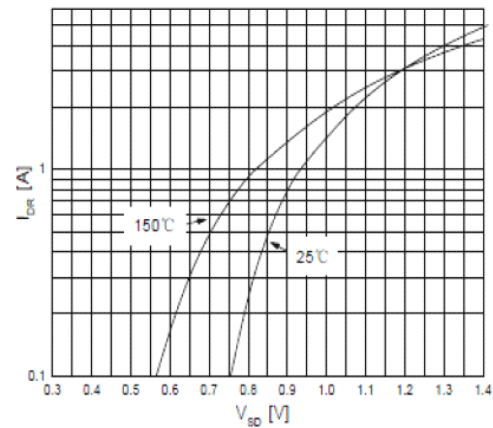


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

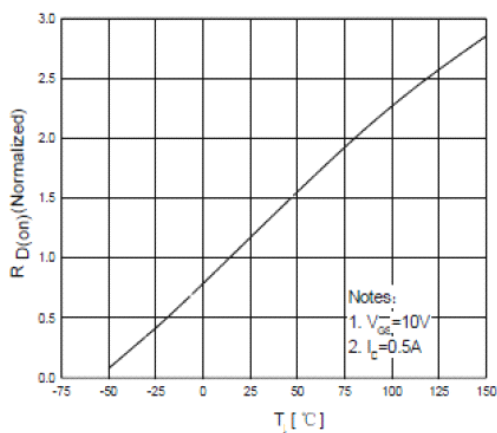


Fig.5 On-Resistance Variation vs Junction Temperature

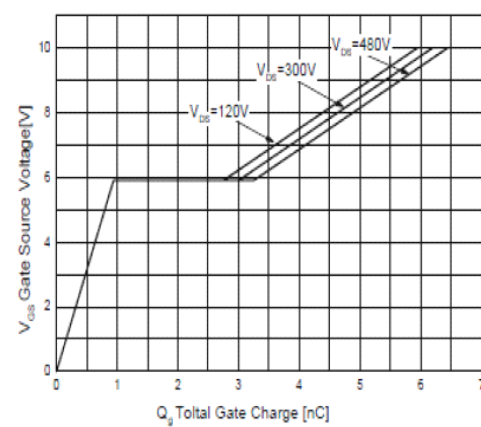


Fig.6 Gate Charge Characteristics

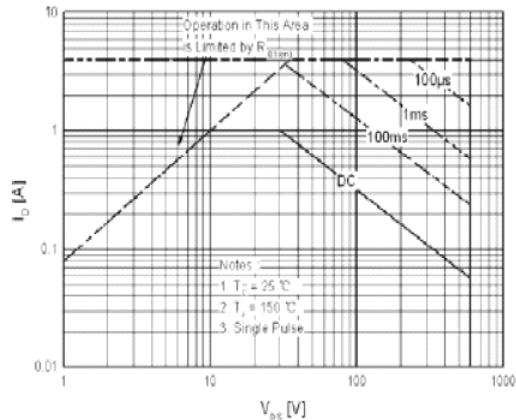


Fig.7 Maximum Safe Operation Area

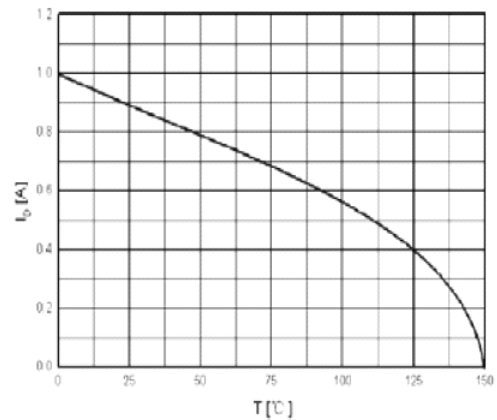


Fig.8 Maximum Drain Current vs Case Temperature

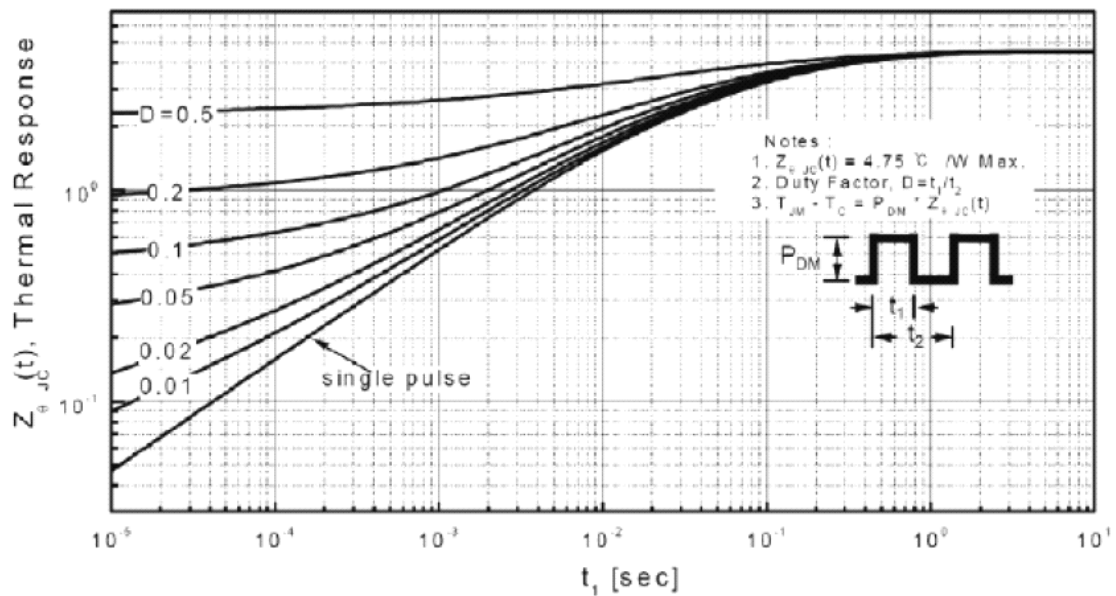


Fig.9 Transient Thermal Response Curve

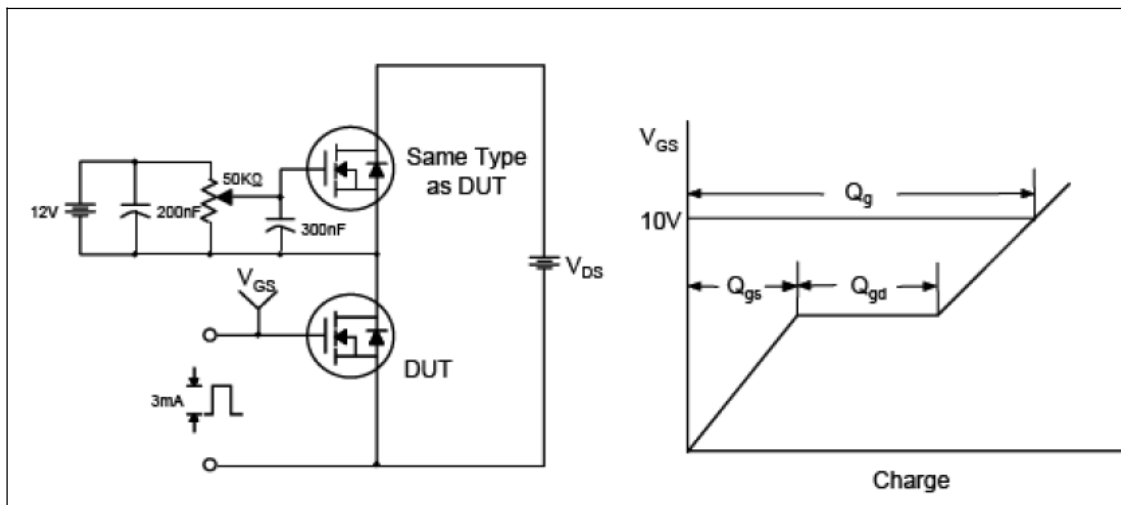


Fig.10 Gate Test Circuit & Waveform

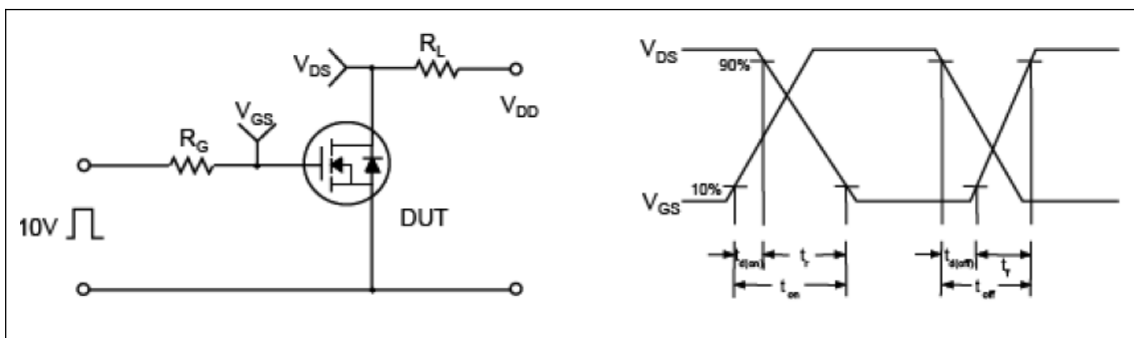


Fig.11 Resistive Switching Test Circuit & Waveform

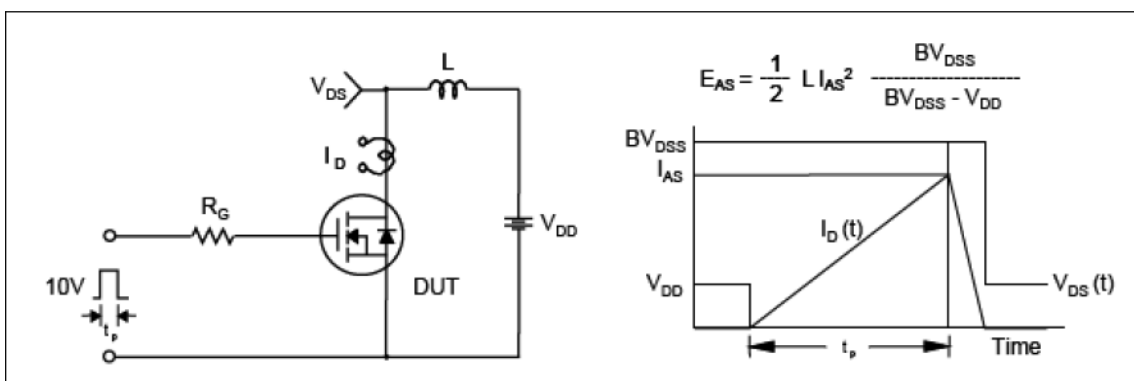


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

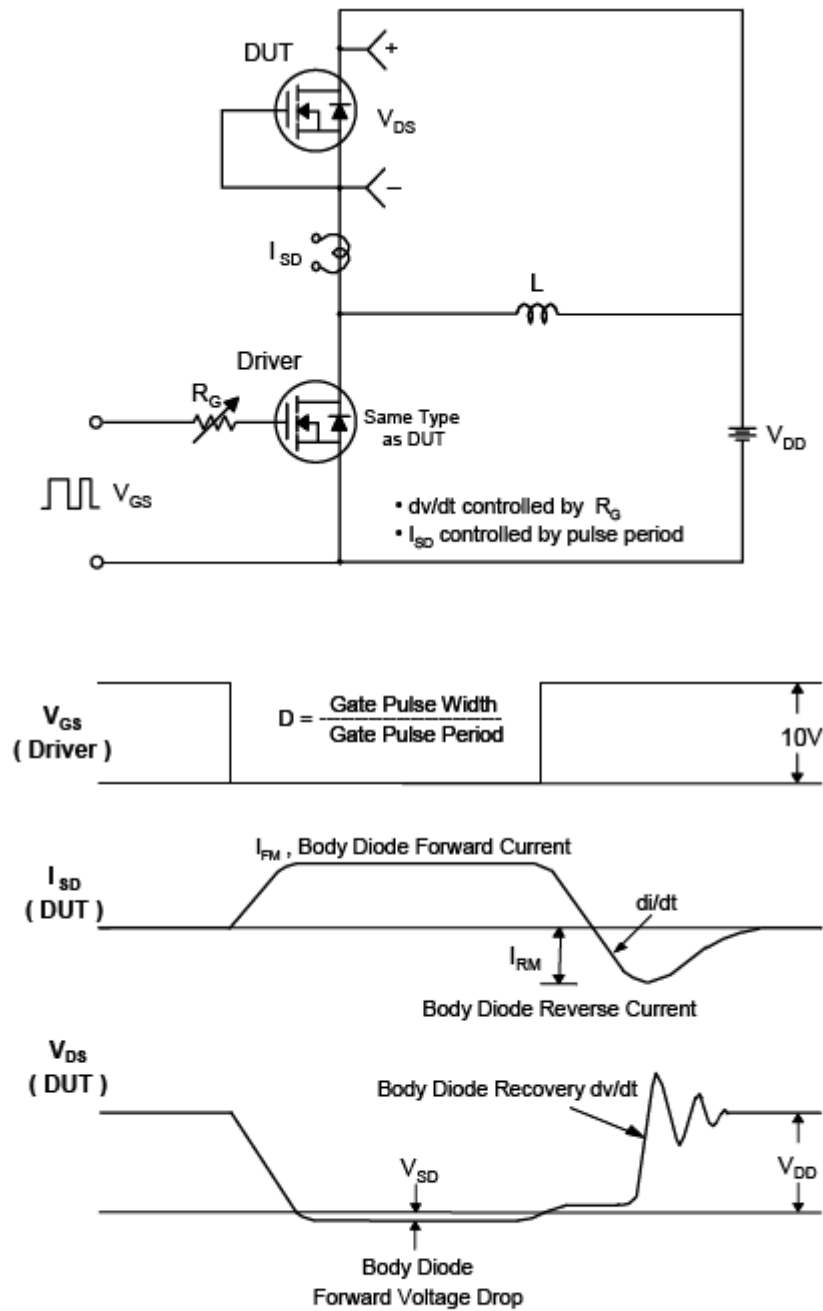


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO251 Package Dimension

Unit: mm

