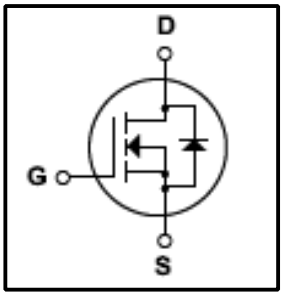
Silicon N-Channel MOSFET



Features

■2A,600V, $R_{DS(on)}$(Max 5Ω)@V_{GS}=10V

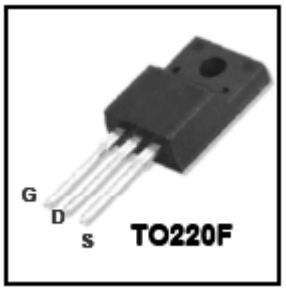
■ Ultra-low Gate Charge(Typical 9.0nC)

■ Fast Switching Capability

■ 100%Avalanche Tested

■ Isolation Voltage (V_{ISO} = 4000V AC)

■ 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		600	V
I_D	Continuous Drain Current(@Tc=25℃)		2.0*	A
	Continuous Drain Current(@Tc=100℃)		1.5*	A
I_{DM}	Drain Current Pulsed	(Note1)	9.5*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	140	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	2.8	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		23	W
	Derating Factor above 25℃		0.18	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	-	-	5.5	℃/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}	VGS = ±30 V, VDS = 0 V	-	-	±100	nA
Gate−source breakdown voltage		$V_{(BR)GSS}$	IG = ±10 μA, VDS = 0 V	±30	-	-	V
Drain cut−off current		I_{DSS}	VDS = 600 V, VGS = 0 V	-	-	10	μA
			VDS = 480 V, Tc = 125℃	-	-	100	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	ID = 250 μA, VGS = 0 V	600	-	-	V
Gate threshold voltage		$V_{GS(th)}$	VDS = 10 V, ID =250 μA	2	-	4	V
Drain−source ON resistance		$R_{DS(ON)}$	VGS = 10 V, ID =0.8A	-	4.3	5	Ω
Forward Transconductance		gfs	VDS = 50 V, ID =0.8A	-	2.0	-	S
Input capacitance		C_{iss}	VDS = 25 V,	-	270	350	pF
Reverse transfer capacitance		C_{rss}	VGS = 0 V,	-	6	8	
Output capacitance		C_{oss}	f = 1 MHz	-	40	50	
Switching time	Rise time	tr	VDD =300 V,	-	10	30	ns
	Turn−on time	ton	ID = 2.0 A	-	25	60	
	Fall time	tf	RG=25 Ω	-	20	50	
	Turn−off time	toff	(Note4,5)	-	25	60	
Total gate charge (gate−source plus gate−drain)		Qg	VDD = 320 V,	-	9.0	11	nC
Gate−source charge		Qgs	VGS = 10 V,	-	1.6	-	
Gate−drain (“miller”) Charge		Qgd	ID = 6.5 A (Note4,5)	-	4.3	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	2.0	A
Pulse drain reverse current	I_{DRP}	-	-	-	9.5	A
Forward voltage (diode)	V_{DSF}	IDR = 2 A, VGS = 0 V	-	-	1.4	V
Reverse recovery time	trr	IDR = 2.0A, VGS = 0 V,	-	180	-	ns
Reverse recovery charge	Qrr	dIDR / dt = 100 A / μs	-	0.72	-	μC

Note 1.Repeativity rating :pulse width limited by junction temperature
2.L=18.5mH,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

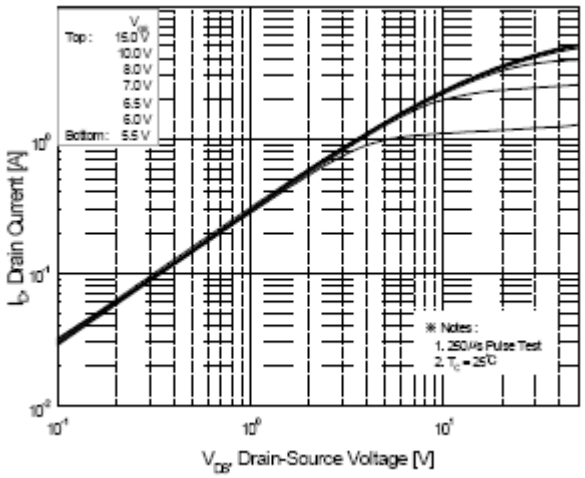


Fig. 1 On-State Characteristics

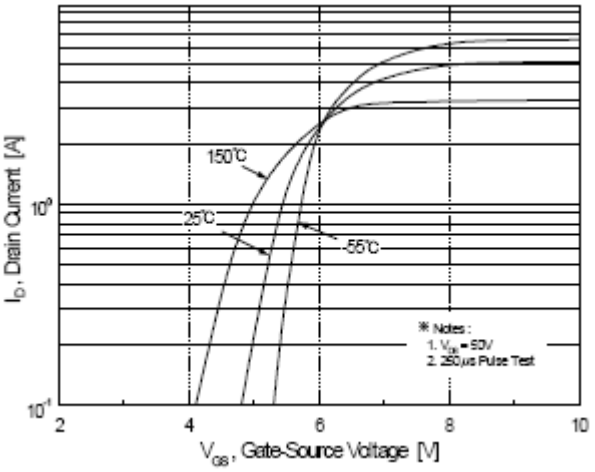


Fig.2 Transfer Current Characteristics

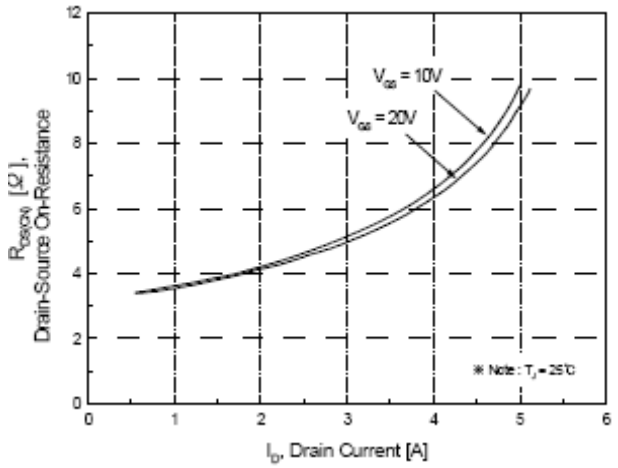


Fig.3 On-Resistance Variation vs Drain Current

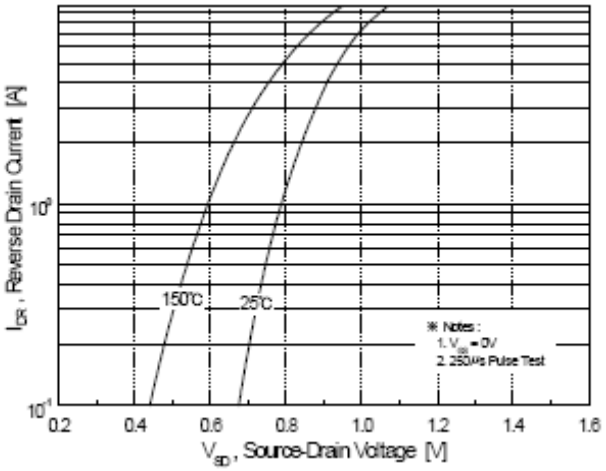


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

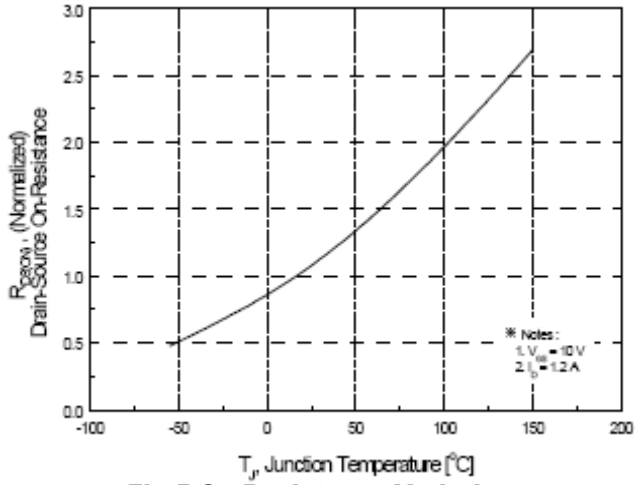


Fig.5 On-Resistance Variation vs Junction Temperature

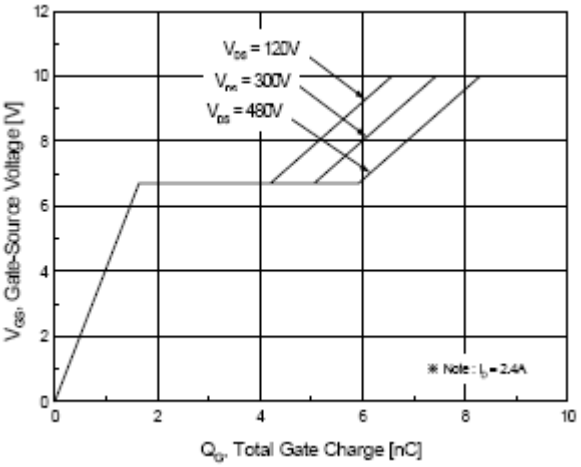


Fig.6 Gate Charge Characteristics

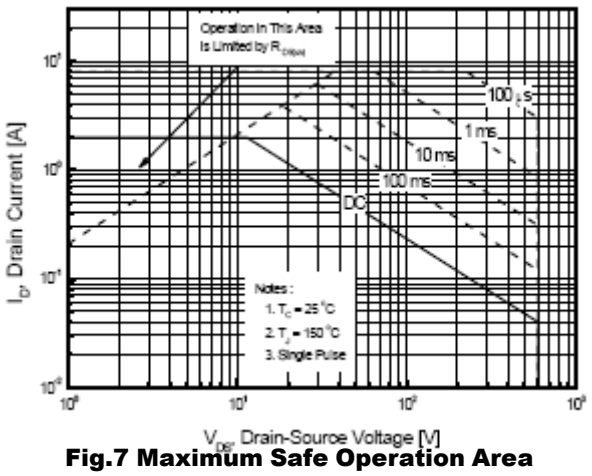


Fig.7 Maximum Safe Operation Area

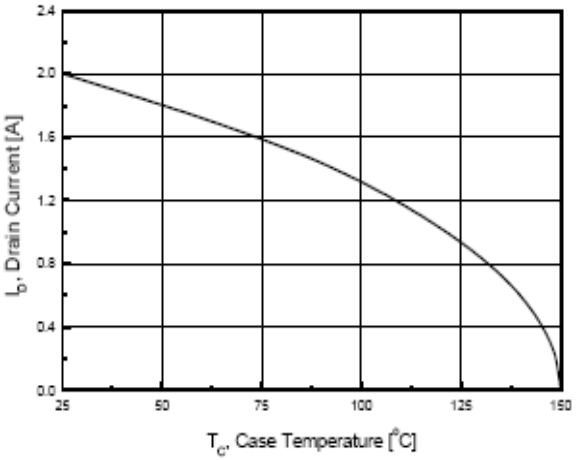


Fig.8 Maximum Drain Current vs Case Temperature

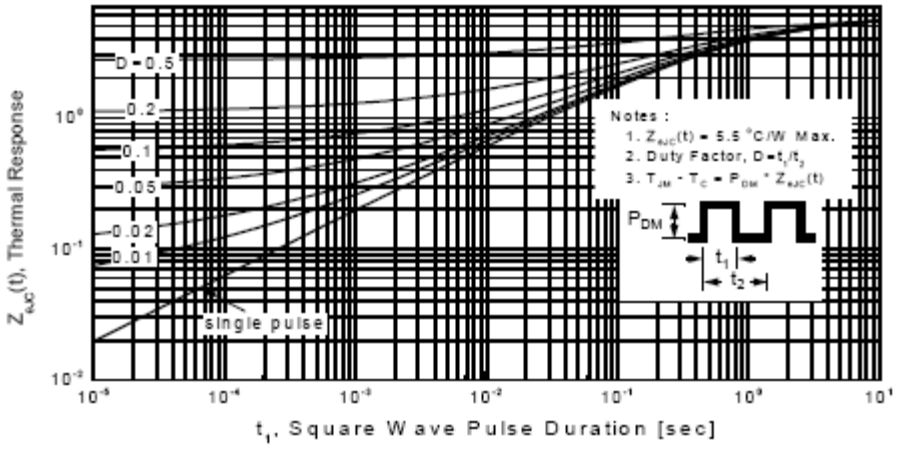


Fig.9 Transient Thermal Response Curve

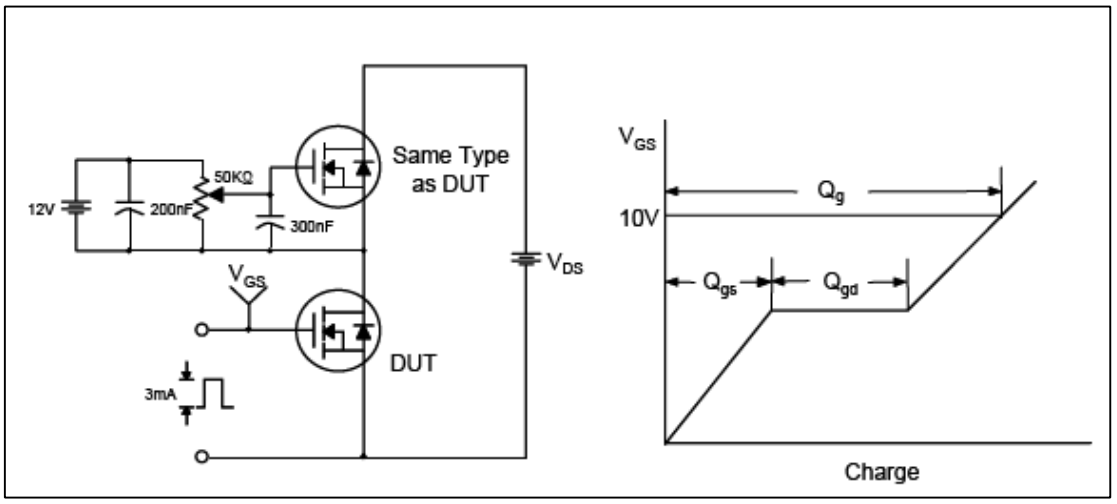


Fig.10 Gate Test Circuit & Waveform

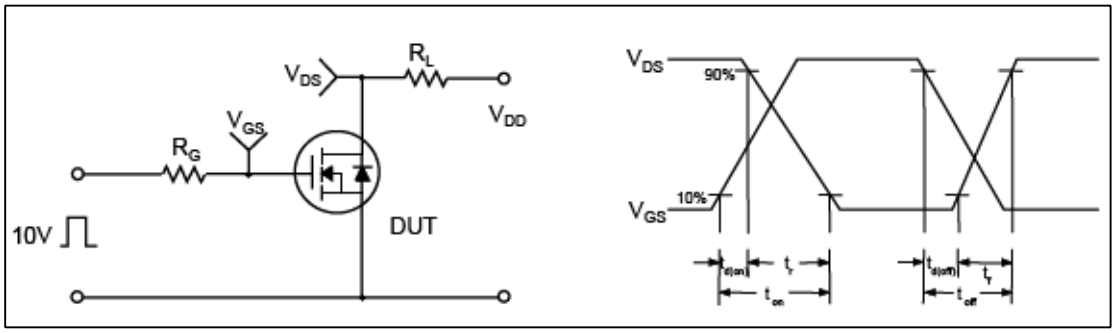


Fig.11 Resistive Switching Test Circuit & Waveform

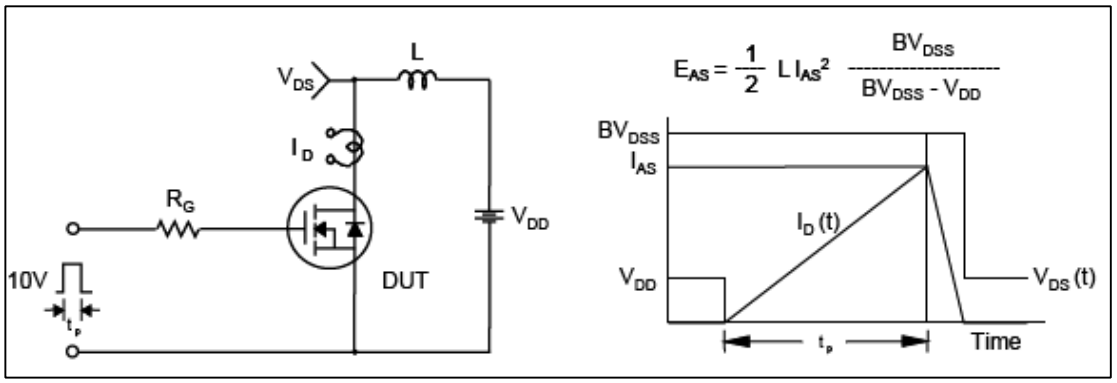


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

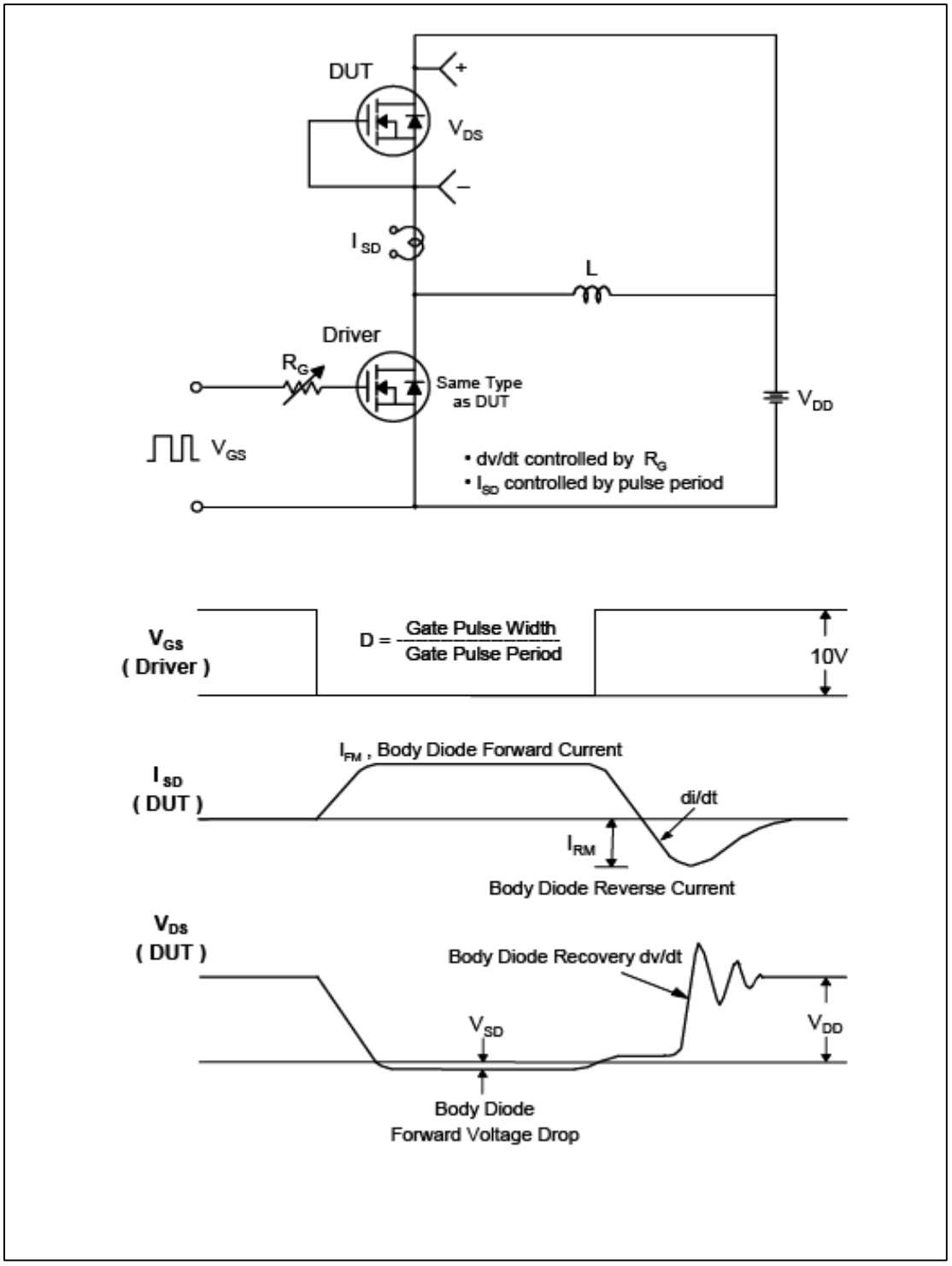


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220F Package Dimension