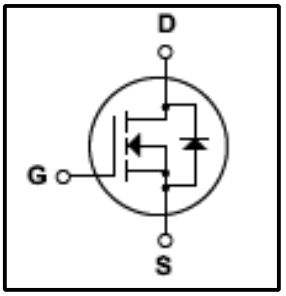
Silicon N-Channel MOSFET

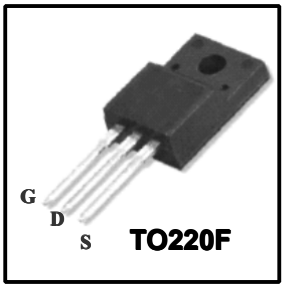
Features

- 18A,200V.$R_{DS(on)}$(Max 0.18Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 16nC)
- 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, 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		200	V
I_D	Continuous Drain Current(@Tc=25℃)		18*	A
	Continuous Drain Current(@Tc=100℃)		12*	A
I_{DM}	Drain Current Pulsed	(Note1)	72*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	258	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	13	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	5.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)		44	W
	Derating Factor above 25℃		0.35	W/℃
T_J, T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Channel Temperature		300	℃

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance, Junction-to-Case	-	-	2.85	℃/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	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 = 200 V, VGS = 0 V	-	-	10	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	ID = 250 μA, VGS = 0 V	200	-	-	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 = 9A	-	-	0.18	Ω
Forward Transconductance		gfs	VDS = 50 V, ID =9A	6.7	-	-	S
Input capacitance		C_{iss}	VDS = 25 V,	-	1300	1760	pF
Reverse transfer capacitance		C_{rss}	VGS = 0 V,	-	-	65	
Output capacitance		C_{oss}	f = 1 MHz	-	-	245	
Switching time	Rise time	tr	VDD =100 V,	-	54	-	ns
	Turn−on time	ton	ID = 18 A	-	104	-	
	Fall time	tf	RG=25 Ω	-	327	-	
	Turn−off time	toff	(Note4,5)	-	108	-	
Total gate charge (gate−source plus gate−drain)		Qg	VDD = 160 V,	-	-	70	nC
Gate−source charge		Qgs	VGS = 10 V,	-	8	13	
Gate−drain (“miller”) Charge		Qgd	ID = 18A (Note4,5)	-	22	39	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	18	A
Pulse drain reverse current	I_{DRP}	-	-	-	72	A
Forward voltage (diode)	V_{DSF}	IDR = 18 A, VGS = 0 V	-	1.4	1.5	V
Reverse recovery time	trr	IDR = 18A, VGS = 0 V,	-	195	-	ns
Reverse recovery charge	Qrr	dIDR / dt = 100 A / μs	-	1.48	-	μC

Note 1.Repeativity rating :pulse width limited by junction temperature
2.L=18.5mH,I_{AS}=18A,V_{DD}=50V,R_G=0Ω,Starting T_J=25℃
3.I_{SD}≤18A,di/dt≤300A/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

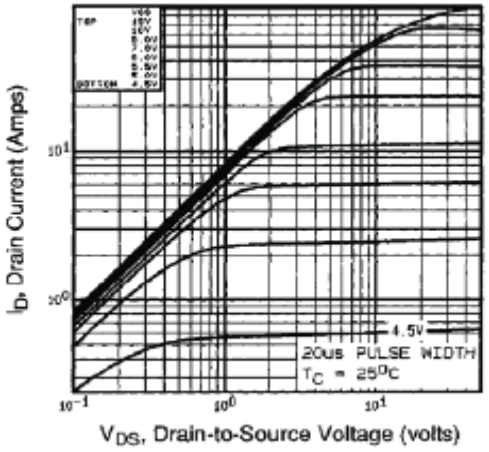


Fig. 1 On-State Characteristics

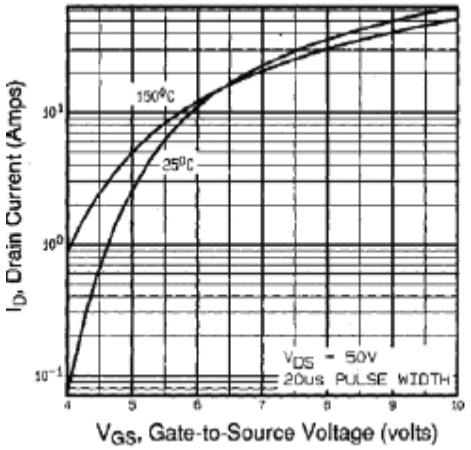


Fig.2 Transfer Characteristics

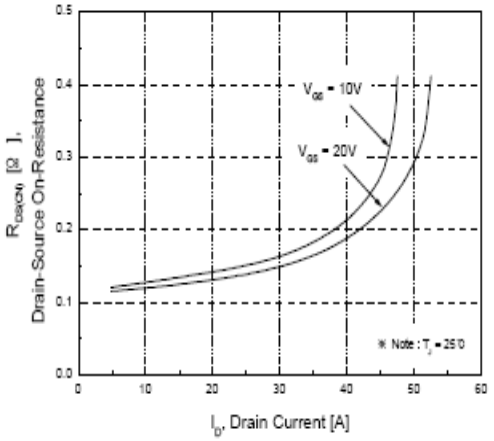


Fig.3 On-Resistance Variation vs Drain Current

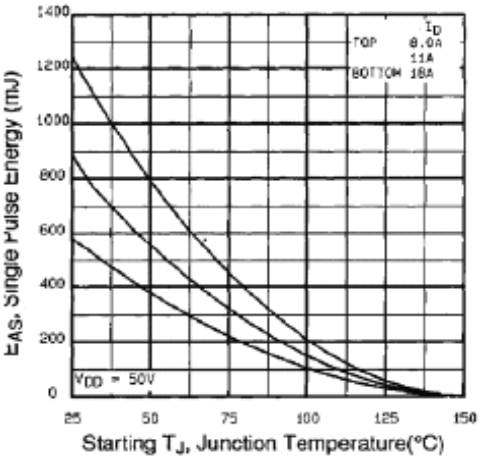


Fig.4 Maximum Avalanche Energy vs On-State Current

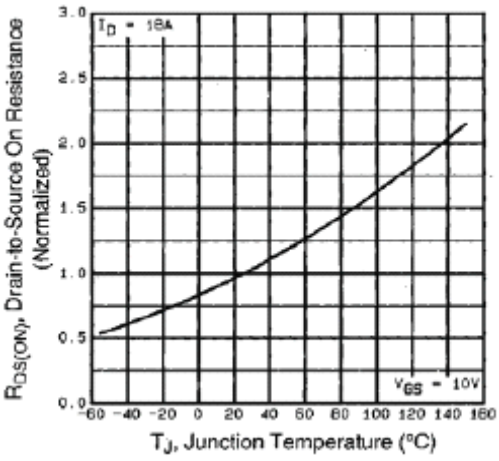


Fig.5 On-Resistance Variation vs Junction Temperature

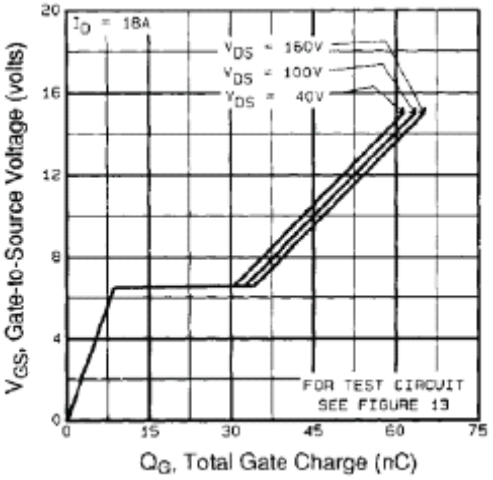


Fig.6 Gate Charge Characteristics

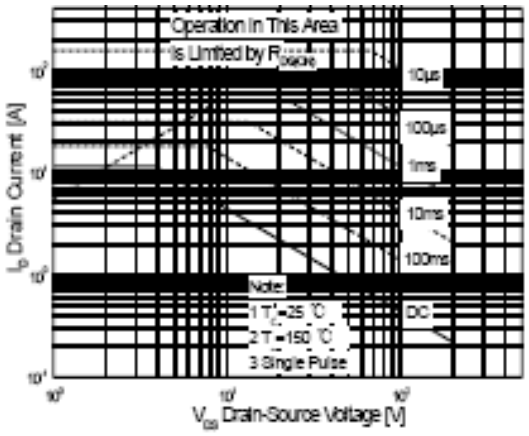


Fig.7 Maximum Safe Operation Area

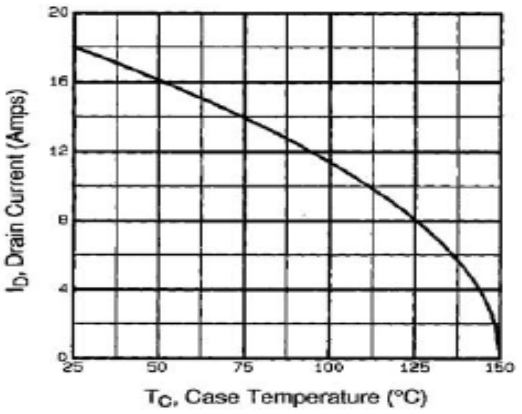


Fig.8 Maximum Drain Current vs Case Temperature

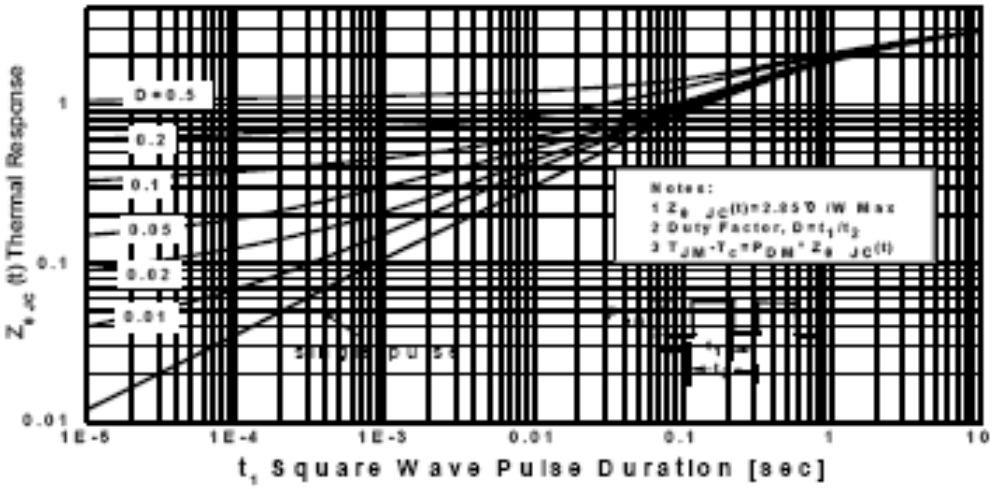


Fig.9 Transient Thermal Response Curve

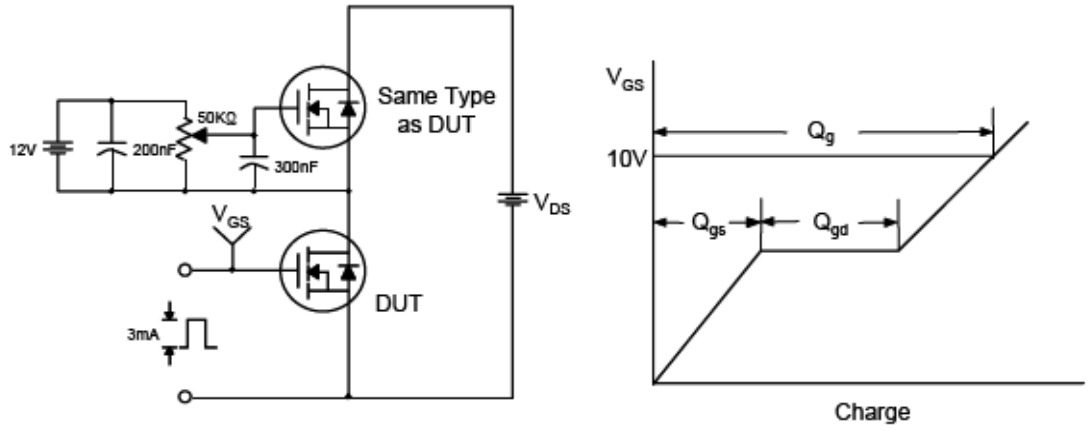


Fig.10 Gate Test Circuit & Waveform

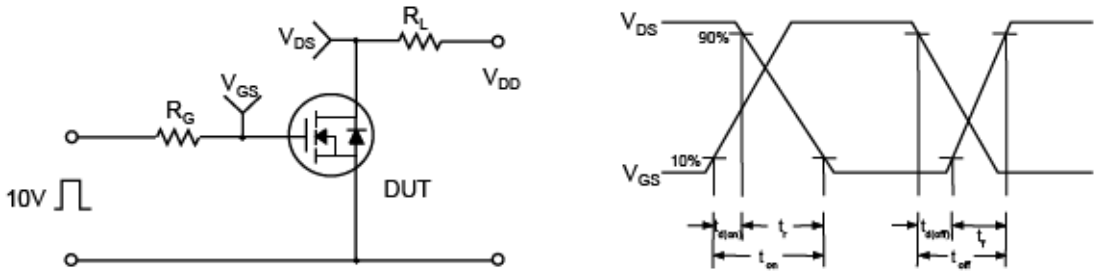


Fig.11 Resistive Switching Test Circuit & Waveform

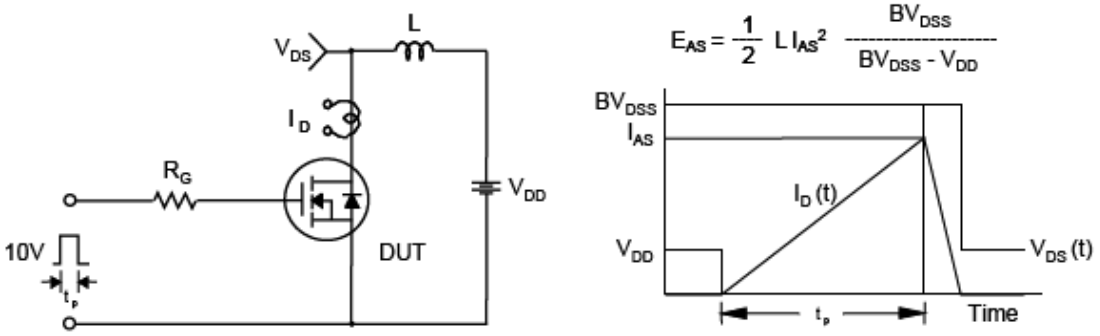


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

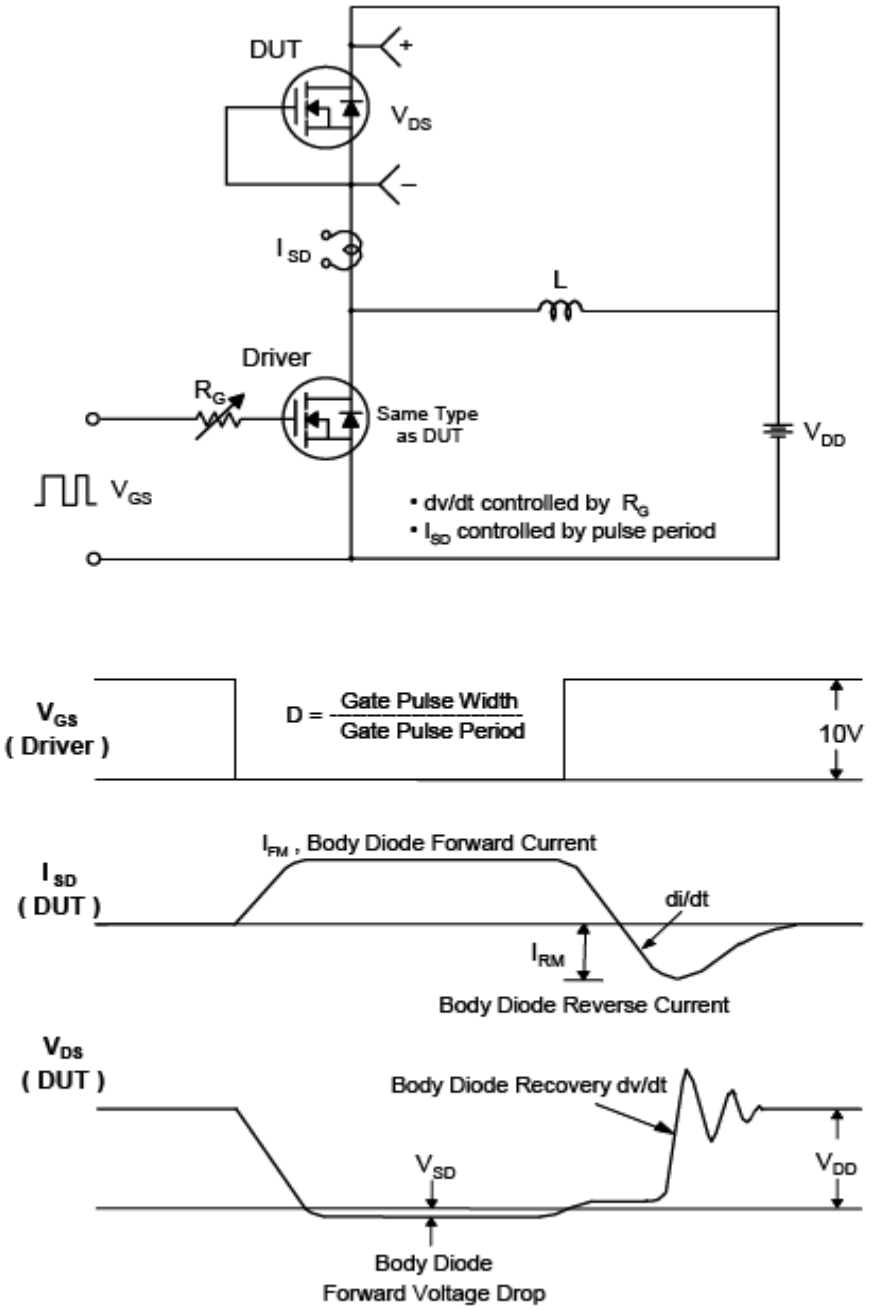


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220F Package Dimension

Unit: mm