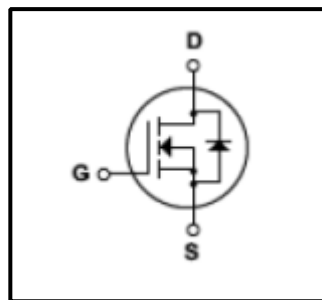
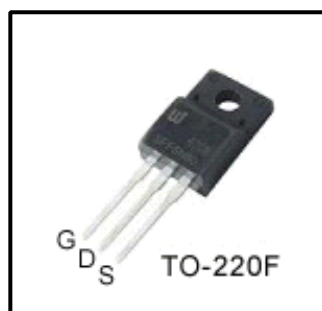


*Silicon N-Channel MOSFET*
**Features**

- 12A,650V,RDS(on)(Max0.78Ω)@VGS=10V
- Ultra-low Gate Charge(Typical 51.7nC)
- 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 AC-DCswitching power supplies, DC-DCpower converters,high voltage H-bridge motor drive PWM


**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
VDSS	Drain Source Voltage	650	V
ID	Continuous Drain Current(@Tc=25℃)	12*	A
	Continuous Drain Current(@Tc=100℃)	7.6*	A
IDM	Drain Current Pulsed (Note1)	48*	A
VGS	Gate to Source Voltage	±30	V
EAS	Single Pulsed Avalanche Energy (Note 2)	990	mJ
EAR	Repetitive Avalanche Energy (Note 1)	22	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
PD	Total Power Dissipation(@Tc=25℃)	51	W
	Derating Factor above 25℃	0.41	W/℃
TJ, Tstg	Junction and Storage Temperature	-55~150	℃
TL	Channel Temperature	300	℃

\* Drain current limited by maximum junction temperature

**Thermal Characteristics**

Symbol	Parameter	Value			Units
		Min	Typ	Max	
RQJC	Thermal Resistance, Junction-to-Case	-	-	2.45	℃/W
RQCS	Thermal Resistance, Case-to-Sink	-	-	-	℃/W
RQJA	Thermal Resistance, Junction-to-Ambient	-	-	62.5	℃/W

**Electrical Characteristics (Tc = 25° C)**

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit	
Gate leakage current	$I_{GSS}$	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	-	-	$\pm 100$	nA	
Gate-source breakdown voltage	$V_{(BR)GSS}$	$I_G = \pm 10 \mu A, V_{DS} = 0 V$	$\pm 30$	-	-	V	
Drain cut-off current	$I_{DSS}$	$V_{DS} = 650 V, V_{GS} = 0 V$	-	-	10	$\mu A$	
		$V_{DS} = 480 V, T_c = 125^\circ C$	-	-	100	$\mu A$	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 250 \mu A, V_{GS} = 0 V$	650	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10 V, I_D = 250 \mu A$	3	-	4.5	V	
Drain-source ON resistance	$R_{DS(ON)}$	$V_{GS} = 10 V, I_D = 6 A$	-	0.64	0.78	$\Omega$	
Forward Transconductance	gfs	$V_{DS} = 50 V, I_D = 6 A$	-	6.4	-	S	
Input capacitance	$C_{iss}$	$V_{DS} = 25 V,$	-	1830	-	pF	
Reverse transfer capacitance	$C_{rss}$	$V_{GS} = 0 V,$	-	2.2	-		
Output capacitance	$C_{oss}$	$f = 1 MHz$	-	155	-		
Switching time	Rise time	$t_r$	$V_{DD} = 325 V,$ $I_D = 12 A$ $R_G = 25 \Omega$  (Note4, 5)	-	50	-	ns
	Turn-on time	$t_{on}$		-	49	-	
	Fall time	$t_f$		-	310	-	
	Turn-off time	$t_{off}$		-	54	-	
Total gate charge (gate-source plus gate-drain)	$Q_g$	$V_{DD} = 520 V,$ $V_{GS} = 10 V,$ $I_D = 12 A$	-	51.7	-	nC	
Gate-source charge	$Q_{gs}$	(Note4,5)	-	9.6	-		
Gate-drain ("miller") Charge	$Q_{gd}$	(Note4,5)	-	18.6	-		

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	$I_{DR}$	-	-	-	12	A
Pulse drain reverse current	$I_{DRP}$	-	-	-	48	A
Forward voltage (diode)	$V_{DSF}$	$I_{DR} = 12 A, V_{GS} = 0 V$	-	-	1.4	V
Reverse recovery time	$t_{rr}$	$I_{DR} = 12 A, V_{GS} = 0 V,$	-	450	-	ns
Reverse recovery charge	$Q_{rr}$	$dI_{DR} / dt = 100 A / \mu s$	-	5.0	-	$\mu C$

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

2.L=14mH,IAS=12A,VDD=95V,RG=25Ω,Starting Tj=25°C

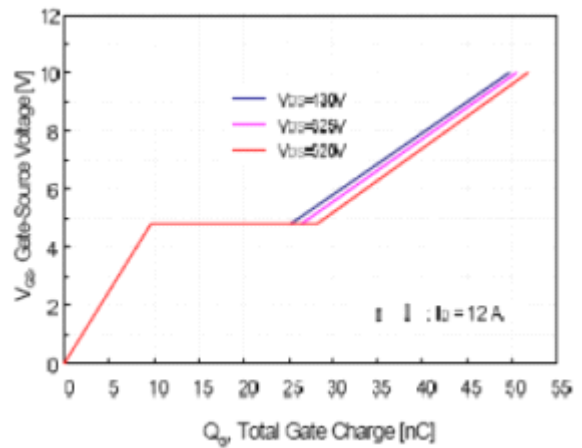
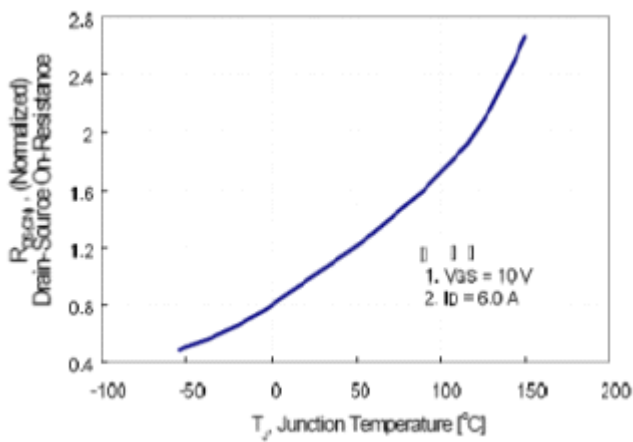
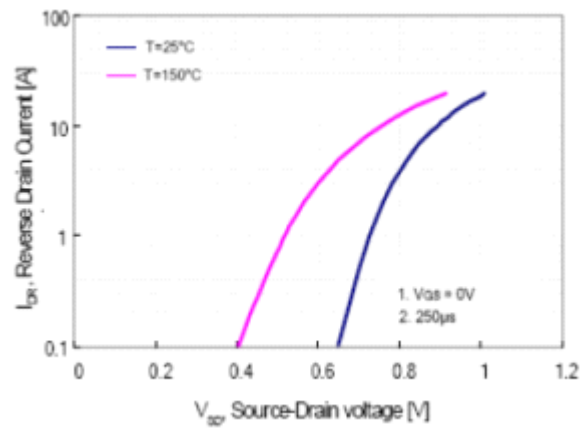
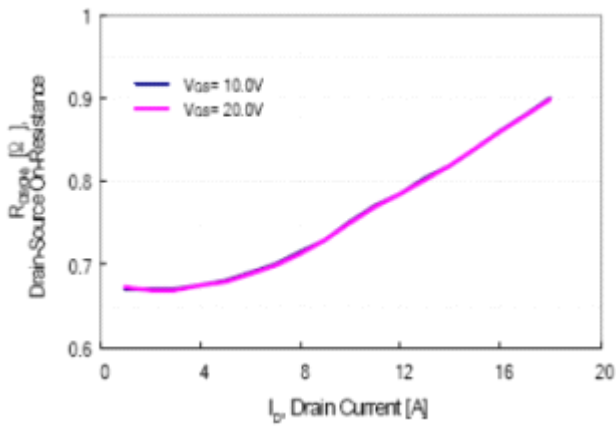
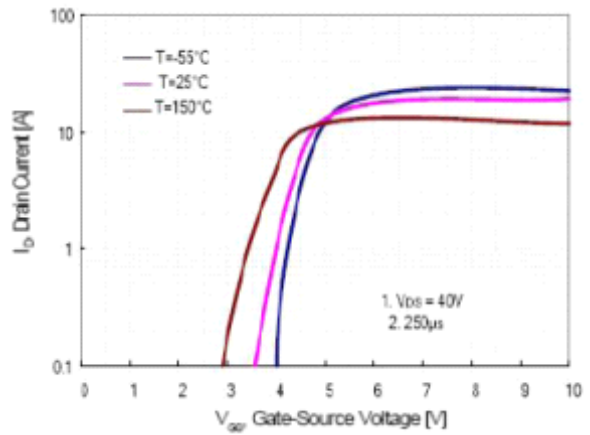
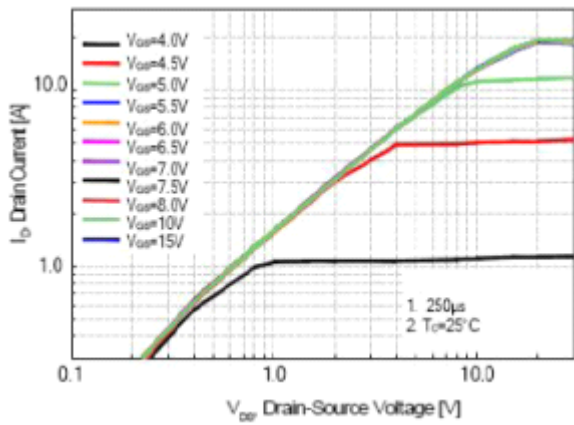
3.Isp≤12A,di/dt≤200A/μs, VDD<BV<sub>DSS</sub>,STARTING Tj=25°C

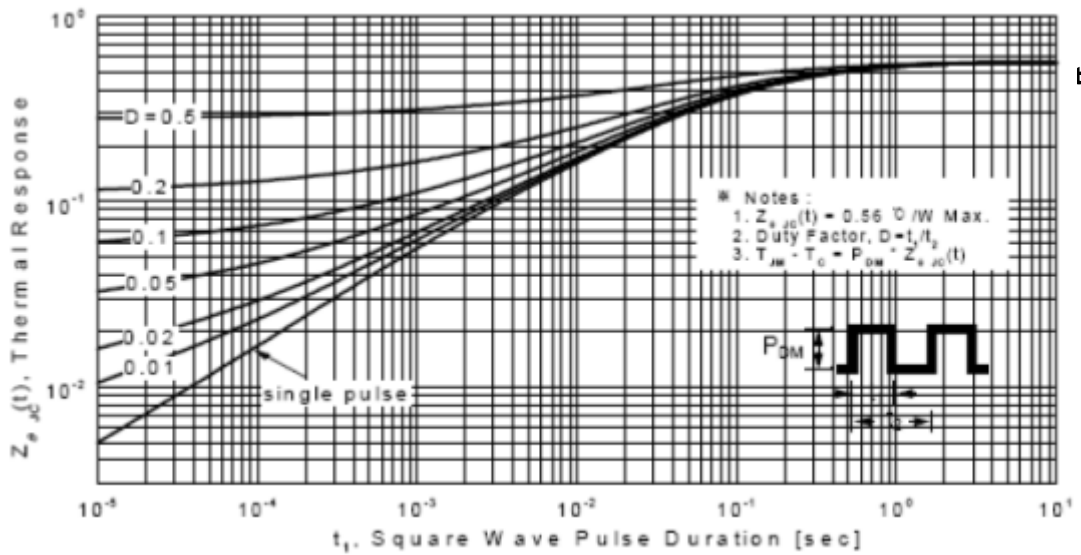
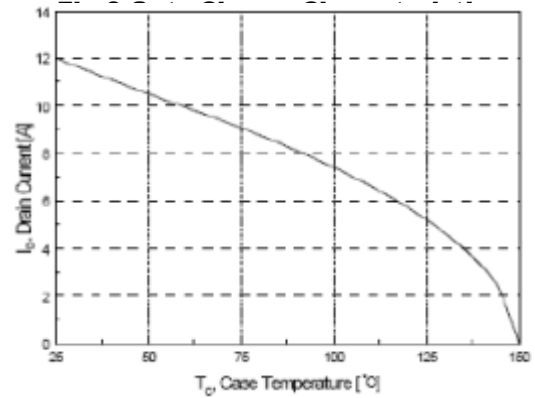
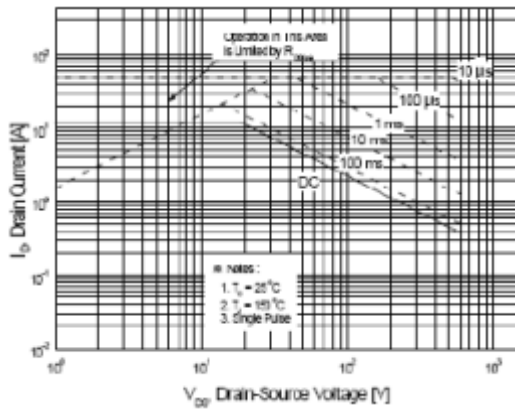
4.Pulse Test: Pulse Width≤300μs,Duty Cycles≤2%

5.Essentially independent of operating temperature.

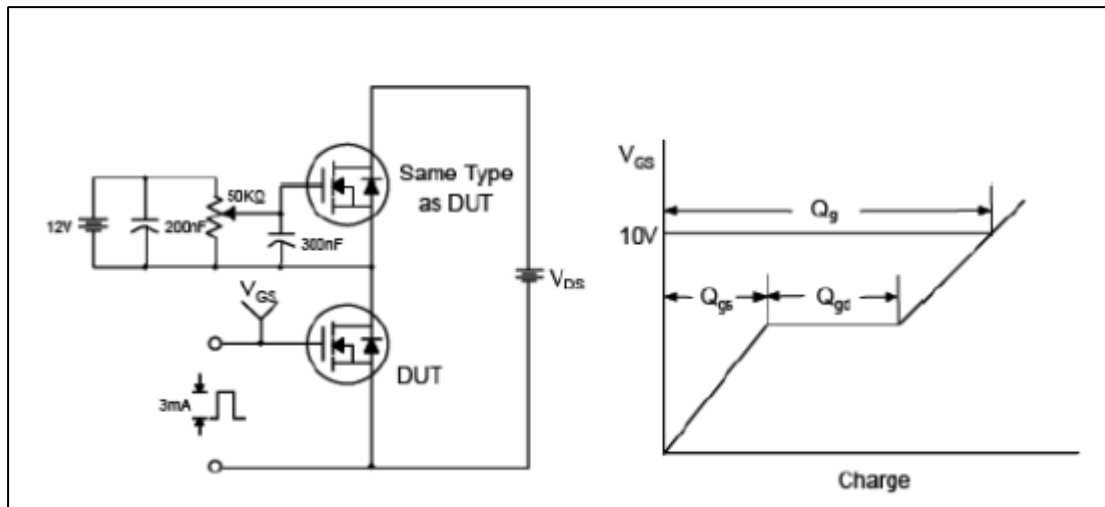
This transistor is an electrostatic sensitive device

Please handle with caution

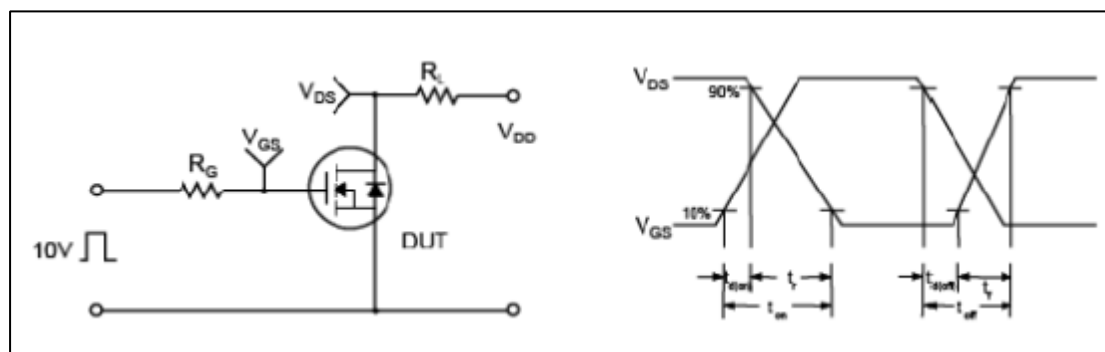




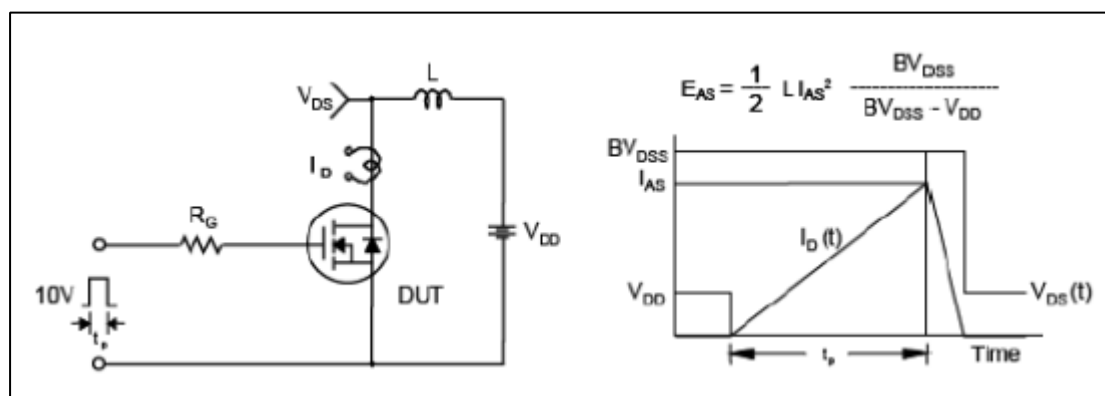
**Fig.9 Transient Thermal Response curve**



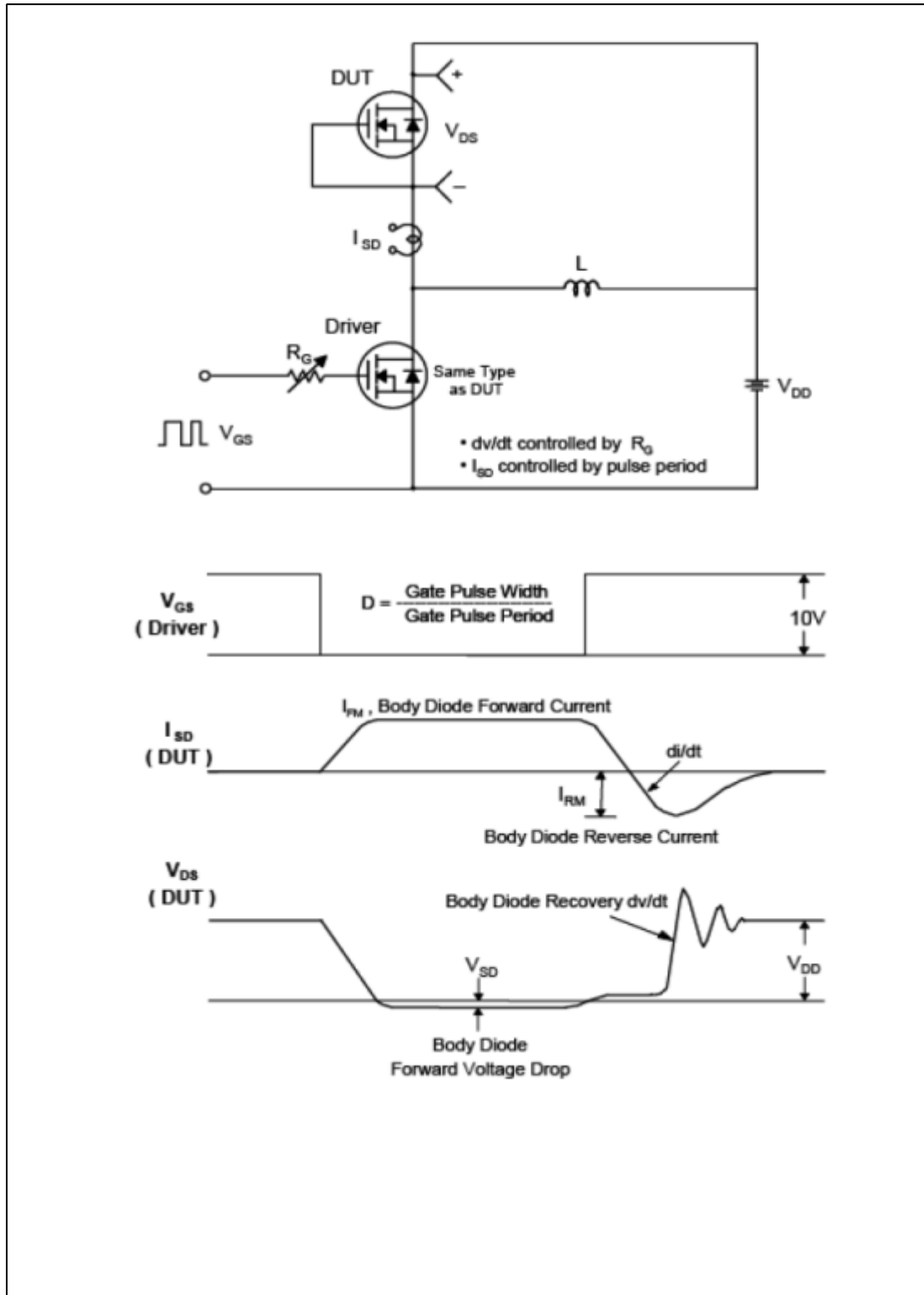
**Fig.10 Gate Test circuit & Waveform**



**Fig.11 Resistive Switching Test Circuit & Waveform**



**Fig.12 Uncamped Inductive Switching Test Circuit & Waveform**



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

**TO-220 Package Dimension**

