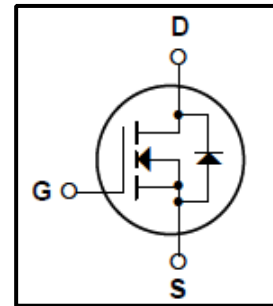


*Silicon N-Channel MOSFET*

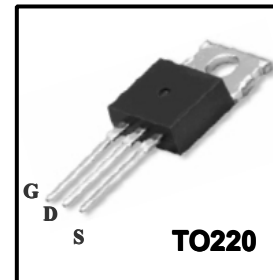
**Features**

- 9A, 200V,  $R_{DS(on)}$ (Max 0.4 $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate Charge(Typical 43nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150 $^{\circ}C$ )



**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(@ $T_c=25^{\circ}C$ )	9	A
	Continuous Drain Current(@ $T_c=100^{\circ}C$ )	5.7	A
$I_{DM}$	Drain Current Pulsed (Note 1)	36	A
$V_{GS}$	Gate to Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note 2)	160	mJ
$E_{AR}$	Repetitive Avalanche Energy (Note 1)	7.2	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.5	V/ns
$P_D$	Total Power Dissipation(@ $T_c=25^{\circ}C$ )	72	W
	Derating Factor above 25 $^{\circ}C$	0.57	W/ $^{\circ}C$
$T_J, T_{stg}$	Junction and Storage Temperature	-55~150	$^{\circ}C$
$T_L$	Maximum lead Temperature for soldering purposes	300	$^{\circ}C$

**Thermal Characteristics**

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{QJC}$	Thermal Resistance, Junction-to-Case	-	-	1.74	$^{\circ}C/W$
$R_{QCS}$	Thermal Resistance, Case to Sink	-	0.5	-	$^{\circ}C/W$
$R_{QJA}$	Thermal Resistance, Junction-to-Ambient	-	-	62.5	$^{\circ}C/W$

## Electrical Characteristics (Tc = 25°C)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit	
Gate leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0 V	-	-	±100	nA	
Gate-source breakdown voltage	V <sub>(BR)GSS</sub>	I <sub>G</sub> = ±10 μA, V <sub>DS</sub> = 0 V	±30	-	-	V	
Drain cut-off current	I <sub>DSS</sub>	V <sub>DS</sub> = 200 V, V <sub>GS</sub> = 0 V	-	-	10	μA	
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V	200	-	-	V	
Break Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I <sub>D</sub> =250μA, Referenced to 25°C	-	0.2	-	V/°C	
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 250 μA	2	-	4	V	
Drain-source ON resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.4A	-	-	0.4	Ω	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 5.4A	3.8	-	-	S	
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V,	-	800	-	pF	
Reverse transfer capacitance	C <sub>rss</sub>	V <sub>GS</sub> = 0 V,	-	240	-		
Output capacitance	C <sub>oss</sub>	f = 1 MHz	-	76	-		
Switching time	Rise time	t <sub>r</sub>	V <sub>DD</sub> = 100 V,	-	9.4	-	ns
	Turn-on time	t <sub>on</sub>	I <sub>D</sub> = 5.9 A	-	28	-	
	Fall time	t <sub>f</sub>	R <sub>G</sub> = 12 Ω	-	39	-	
	Turn-off time	t <sub>off</sub>	(Note4,5)	-	20	-	
Total gate charge (gate-source plus gate-drain)	Q <sub>g</sub>	V <sub>DD</sub> = 160 V,	-	43	-	nC	
Gate-source charge	Q <sub>gs</sub>	V <sub>GS</sub> = 10 V,	-	7	-		
Gate-drain ("miller") Charge	Q <sub>gd</sub>	I <sub>D</sub> = 5.9 A (Note4,5)	-	23	-		

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I <sub>DR</sub>	-	-	-	9	A
Pulse drain reverse current	I <sub>DRP</sub>	-	-	-	36	A
Forward voltage (diode)	V <sub>DSF</sub>	I <sub>DR</sub> = 9 A, V <sub>GS</sub> = 0 V	-	1.4	2.0	V
Reverse recovery time	t <sub>rr</sub>	I <sub>DR</sub> = 5.9A, V <sub>GS</sub> = 0 V,	-	170	340	ns
Reverse recovery charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt = 100 A / μs	-	1.1	2.2	μC

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

2.L=500uH,I<sub>AS</sub>=9 A,V<sub>DD</sub>=50V,R<sub>G</sub>=0Ω,Starting T<sub>J</sub>=25°C

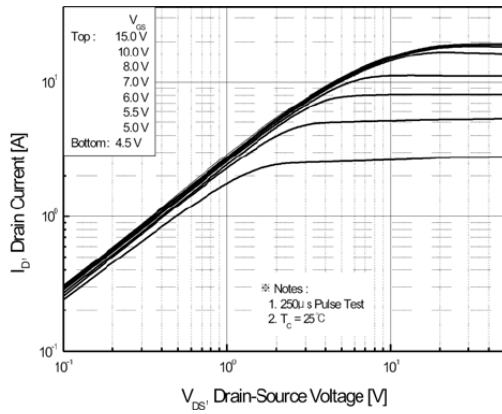
3.I<sub>SD</sub>≤9A,di/dt≤300A/us, V<sub>DD</sub><BV<sub>DSS</sub>,STARTING T<sub>J</sub>=25°C

4.Pulse Test: Pulse Width≤300us,Duty Cycle≤2%

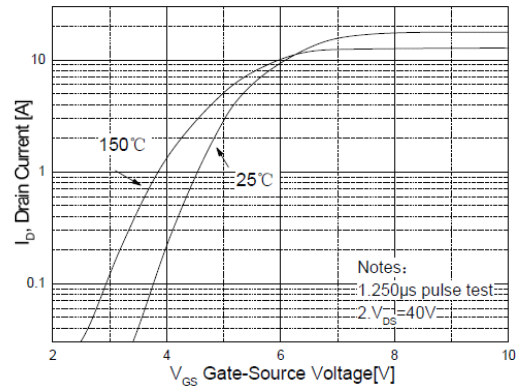
5.Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device  
Please handle with caution

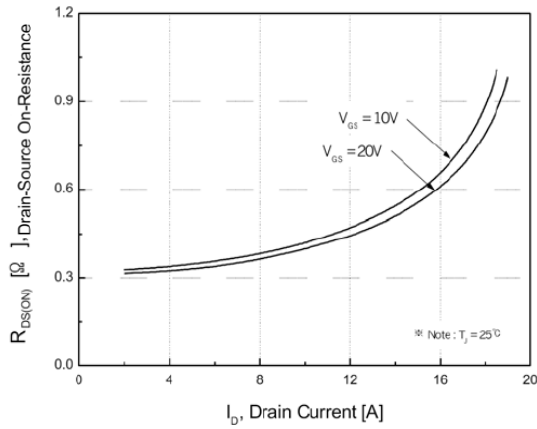




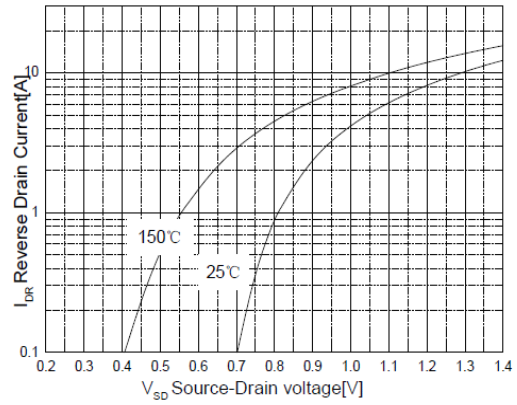
**Fig. 1 On-State Characteristics**



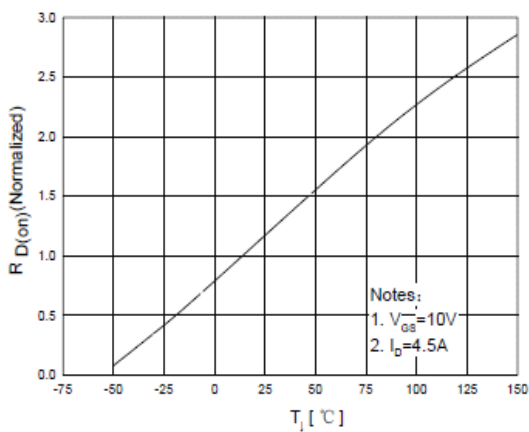
**Fig. 2 Transfer Characteristics**



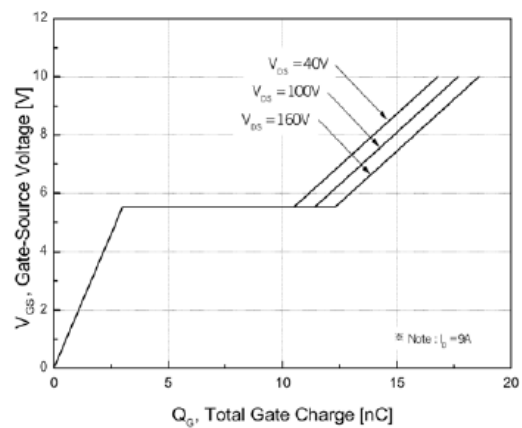
**Fig. 3 On-Resistance Variation vs Drain Current**



**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**



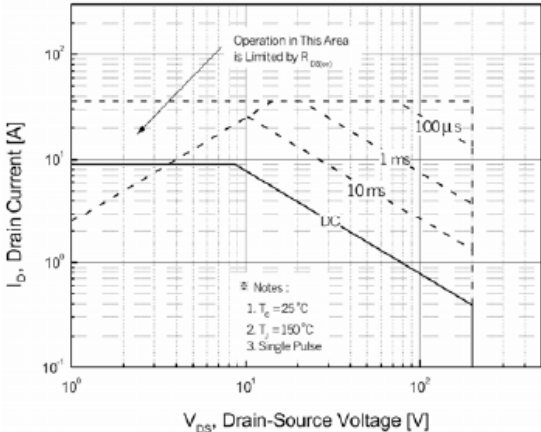


Fig.7 Maximum Safe Operation Area

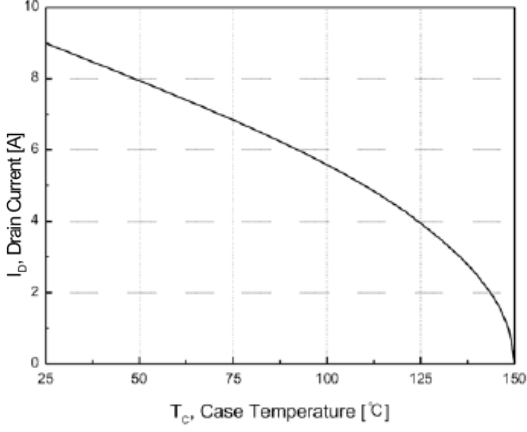


Fig.8 Maximum Drain Current vs Case Temperature

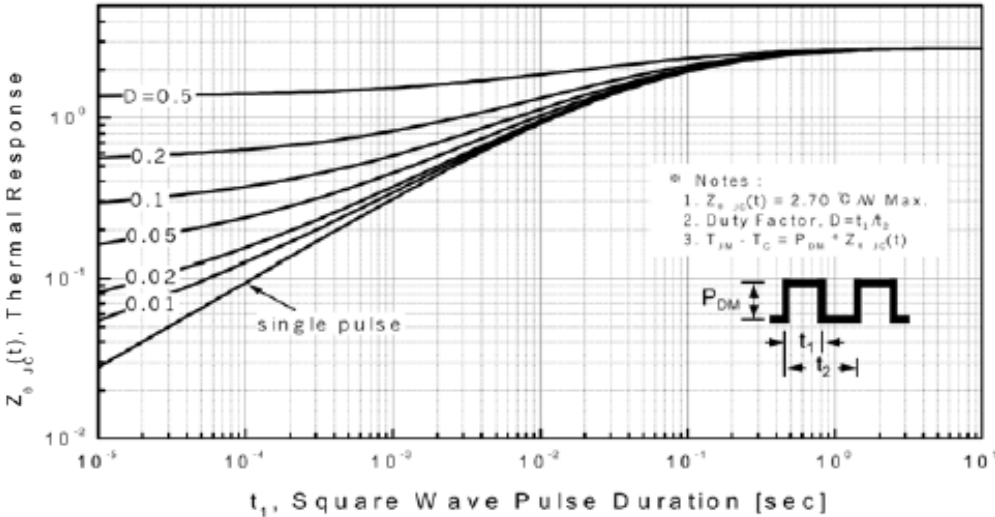
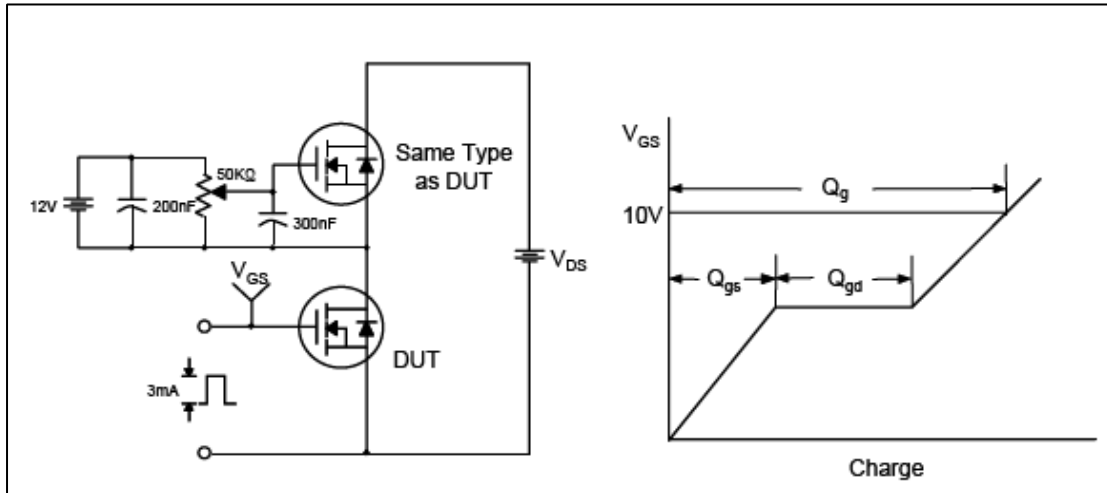
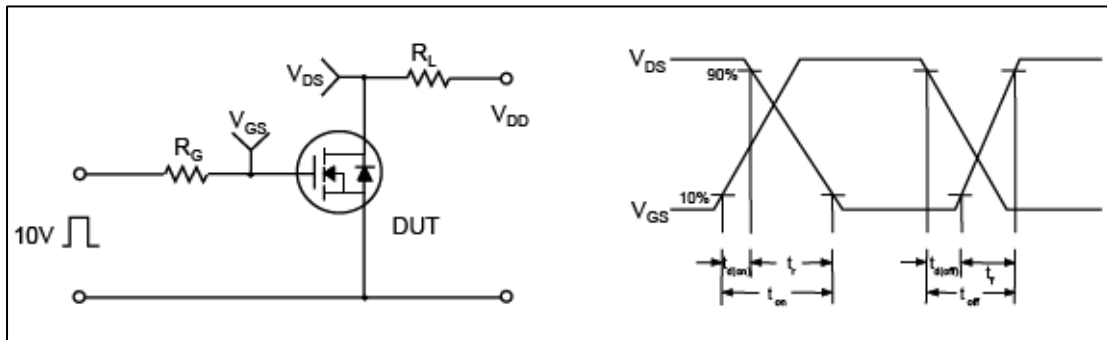


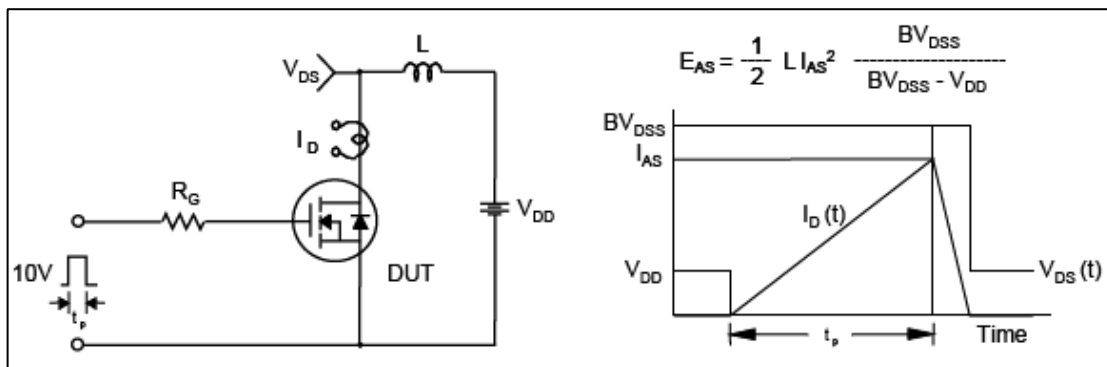
Fig.9 Transient Thermal Response Curve



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



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



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

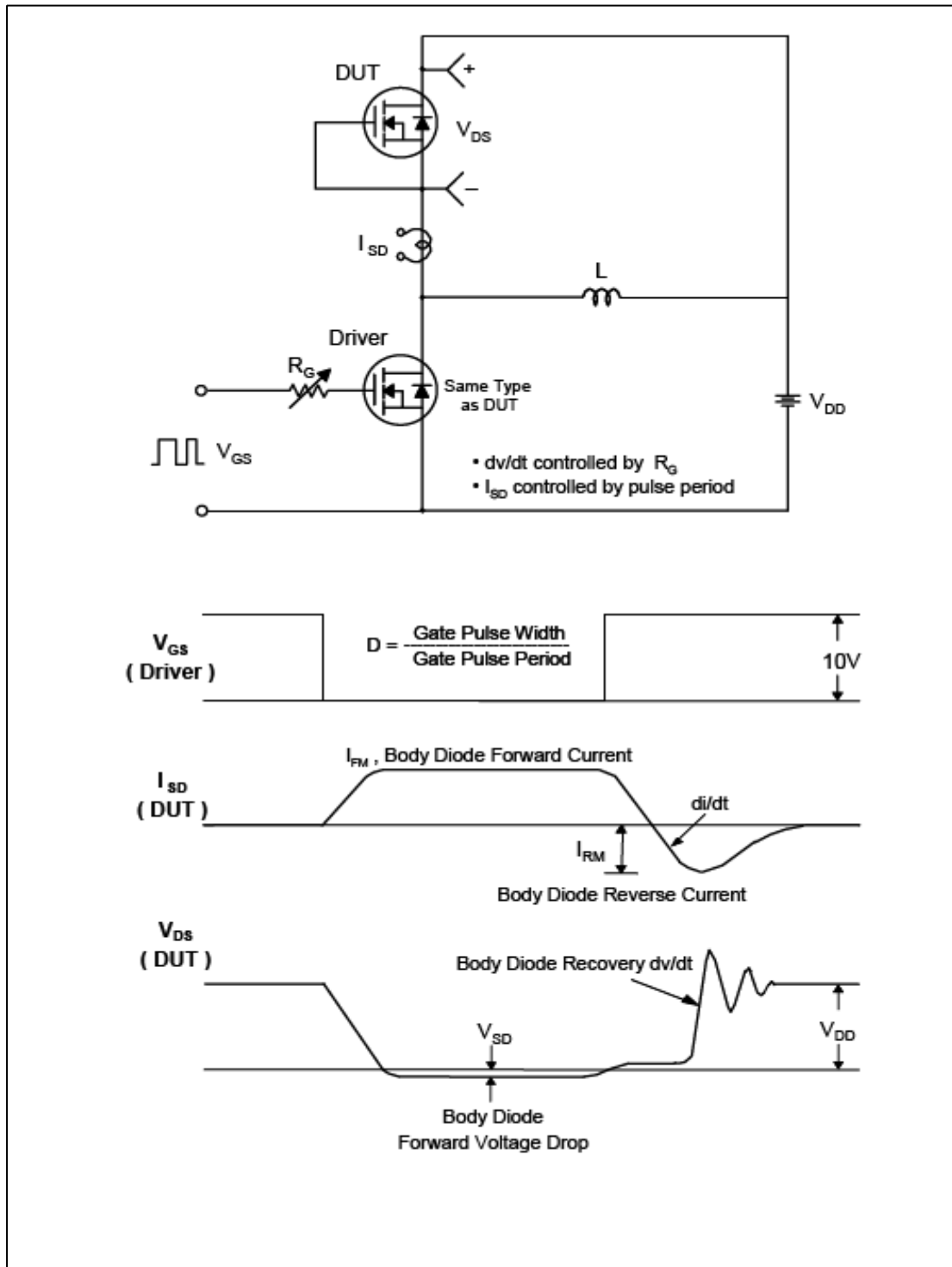


Fig.13 Peak Diode Recovery  $dv/dt$  Test Circuit & Waveform

TO-220 Package Dimension

