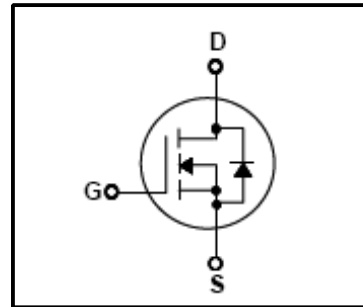


**Silicon N-Channel MOSFET**

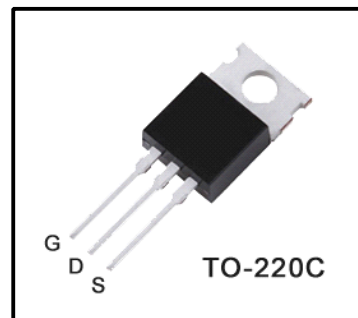
**Features**

- 9A,500V,  $R_{DS(on)}$ (Max0.75 $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate charge(Typical 28nC)
- 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 high efficiency switch model power supplies, power factor correction and half bridge and full bridge resonant topology line a electronic lamp ballast.



**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain Source Voltage	500	V
$I_D$	Continuous Drain Current(@ $T_c=25^{\circ}C$ )	9	A
	Continuous Drain Current(@ $T_c=100^{\circ}C$ )	5.4	A
$I_{DM}$	Drain Current Pulsed (Note1)	36	A
$V_{GS}$	Gate to Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note2)	360	mJ
$E_{AR}$	Repetitive Avalanche Energy (Note1)	13.5	mJ
dv/dt	Peak Diode Recovery dv /dt (Note3)	4.5	V/ ns
$P_D$	Total Power Dissipation(@ $T_c=25^{\circ}C$ )	130	W
	Derating Factor above 25 $^{\circ}C$	1.07	W/ $^{\circ}C$
$T_J, T_{stg}$	Junction and Storage Temperature	-40~150	$^{\circ}C$
$T_L$	Channel Temperature	300	$^{\circ}C$

**Thermal Characteristics**

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{QJC}$	Thermal Resistance , Junction -to -Case	-	-	0.96	$^{\circ}C/W$
$R_{QCS}$	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> =±30V,V <sub>DS</sub> =0V	-	-	±100	nA	
Gate-source breakdown voltage	V <sub>(BR)GSS</sub>	I <sub>G</sub> =±10 μA,V <sub>DS</sub> =0V	±30	-	-	V	
Drain cut -off current	I <sub>DSS</sub>	V <sub>DS</sub> =500V,V <sub>GS</sub> =0V	-	-	1	μA	
		V <sub>DS</sub> =400V,TC=125°C			10	μA	
Drain -source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> =250 μA,V <sub>GS</sub> =0V	500	-	-	V	
Breakdown voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA,Referenced to 25°C	-	0.57	-	V/°C	
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250 μA	2	-	4	V	
Drain -source ON resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V,I <sub>D</sub> =4.5A	-	-	0.75	Ω	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =40V,I <sub>D</sub> =4.5A	-	6.5	-	S	
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V,	-	790	1030	pF	
Reverse transfer capacitance	C <sub>rss</sub>	V <sub>GS</sub> =0V,	-	24	30		
Output capacitance	C <sub>oss</sub>	f=1MHz	-	130	170		
Switching time	Rise time	t <sub>r</sub>	V <sub>DD</sub> =250V,	-	65	140	ns
	Turn-on time	t <sub>on</sub>	I <sub>D</sub> =9A	-	18	15	
	Fall time	t <sub>f</sub>	R <sub>G</sub> =25Ω	-	64	125	
	Turn-off time	t <sub>off</sub>	(Note4,5)	-	93	195	
Total gate charge(gate-source plus gate-drain)	Q <sub>g</sub>	V <sub>DD</sub> =400V, V <sub>GS</sub> =10V,	-	28	35	nC	
Gate-source charge	Q <sub>gs</sub>	I <sub>D</sub> =9A	-	4	-		
Gate-drain("miller") Charge	Q <sub>gd</sub>	(Note4,5)	-	15	-		

## 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> =9A,V <sub>GS</sub> =0V	-	-	1.4	V
Reverse recovery time	t <sub>rr</sub>	I <sub>DR</sub> =9A,V <sub>GS</sub> =0V,	-	335	-	ns
Reverse recovery charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt =100 A / μs	-	2.95	-	μC

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

2.L=8mH I<sub>AS</sub>=9A,V<sub>DD</sub>=50V,R<sub>G</sub>=25Ω,Starting T<sub>J</sub>=25°C

3.I<sub>SD</sub>≤9A,di/dt≤200A/us,V<sub>DD</sub><BV<sub>DSS</sub>,STARTING T<sub>J</sub>=25°C

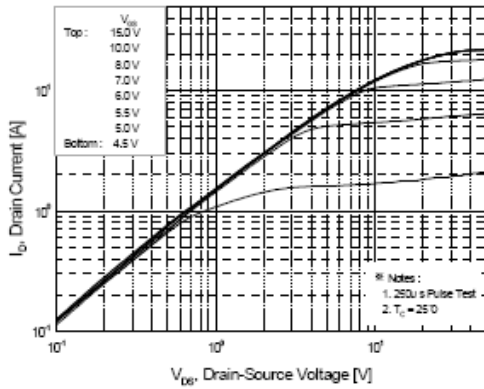
4.Pulse Test:Pulse Width≤300us,Duty Cycle≤2%

5. Essentially independent of operating temperature.

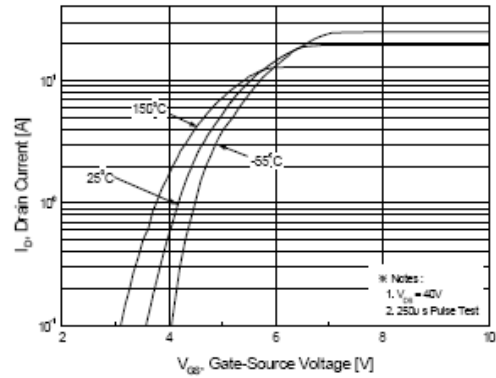
This transistor is an electrostatic sensitive device

Please handle with caution

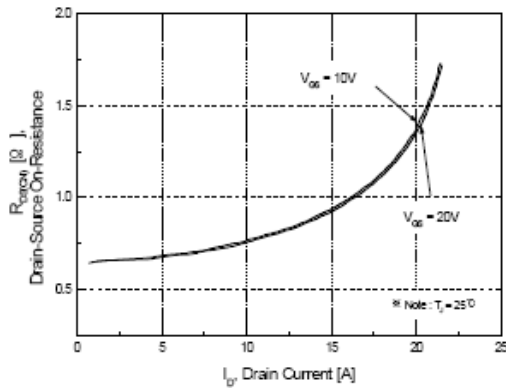




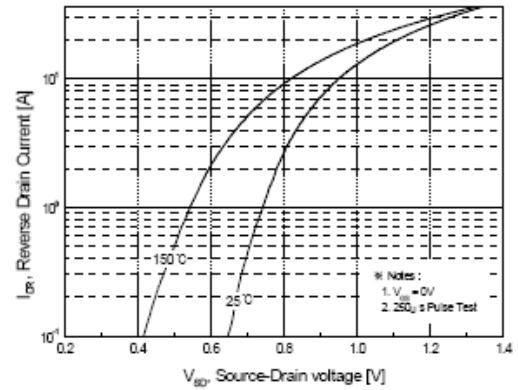
**Fig.1 On State Characteristics**



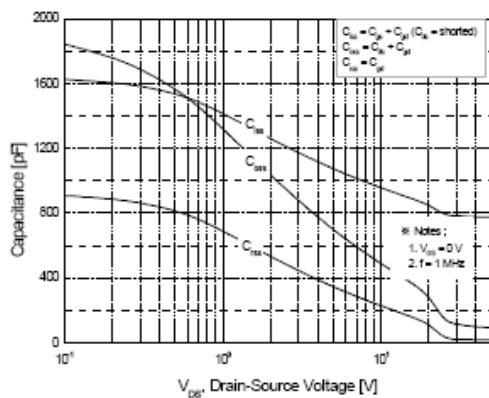
**Fig.2 Transfer Characteristics**



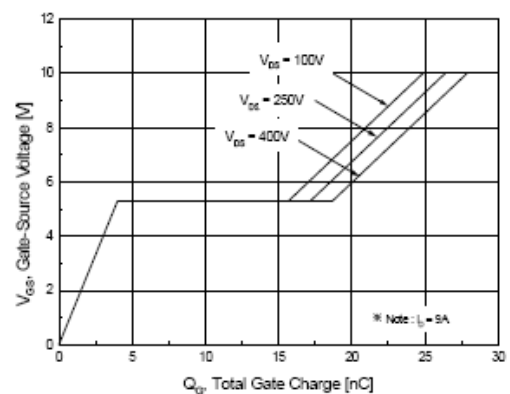
**Fig.3 On-Resistance Variation vs Drain Current And Gate Voltage**



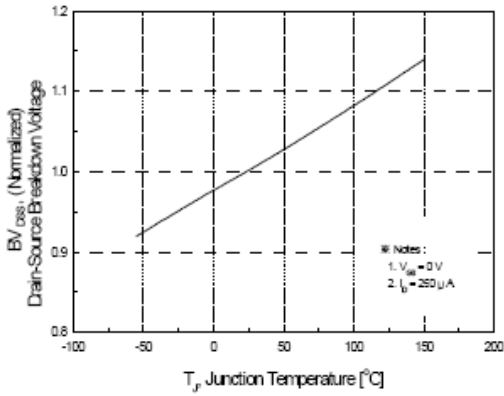
**Fig.4 Body Diode Forward Voltage Variation with Source Current and Temperature**



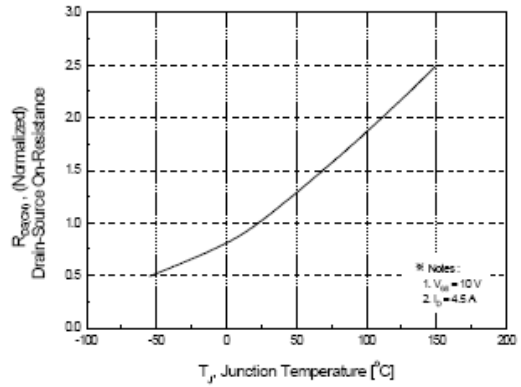
**Fig.5 Capacitance Characteristics**



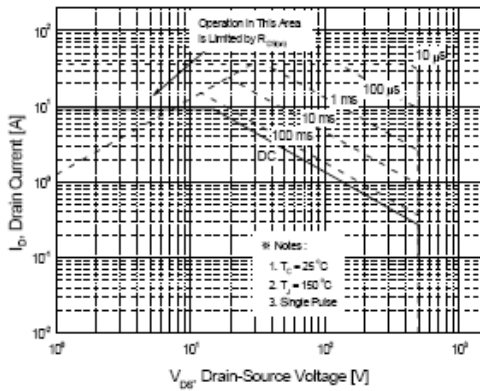
**Fig.6 Gate Charge Characteristics**



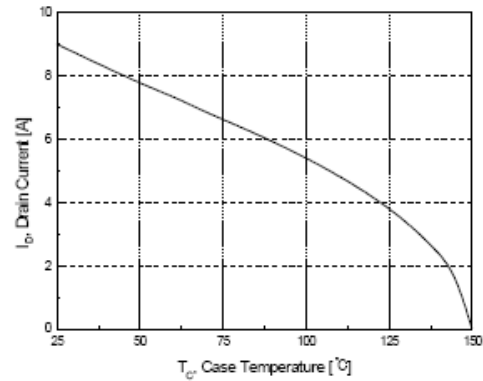
**Fig.7 Breakdown Voltage Variation Vs Temperature**



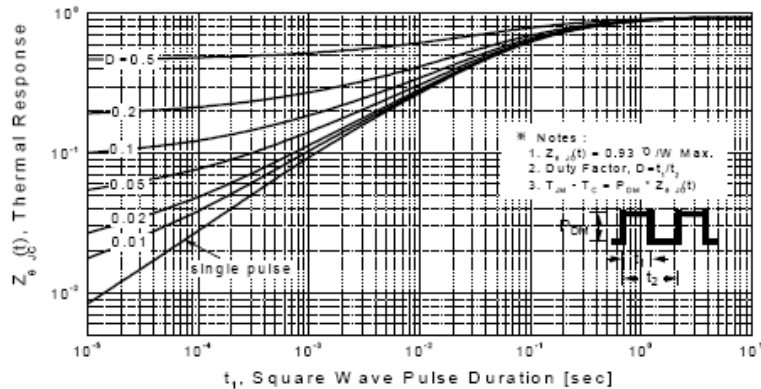
**Fig.8 On-Resistance Variation vs. Temperature**



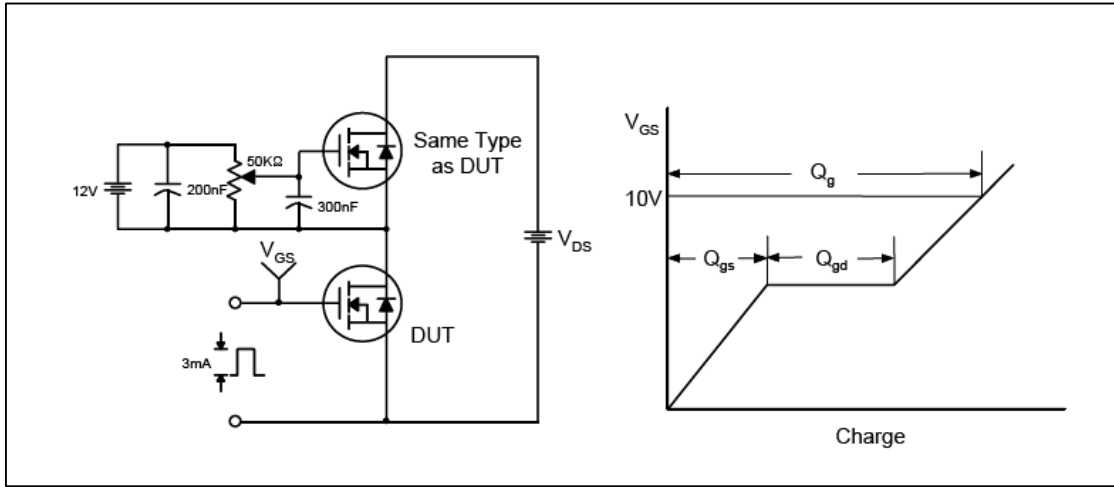
**Fig.9 Maximum Safe Operation Area**



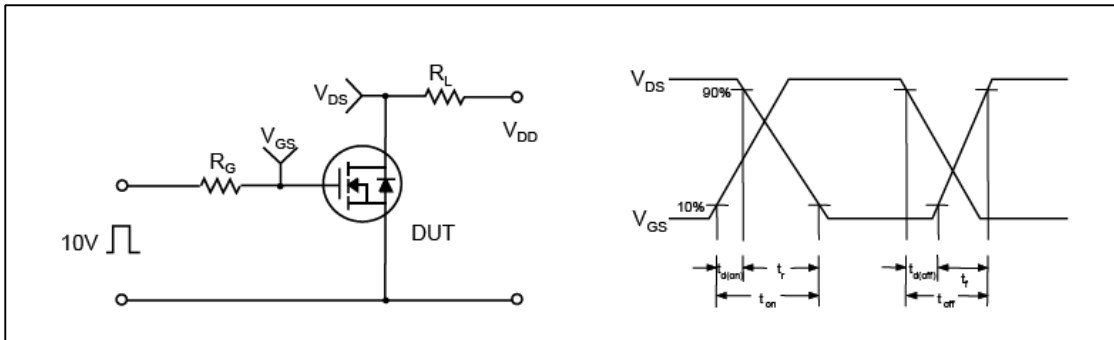
**Fig.10 Maximum Drain Current vs Case temperature**



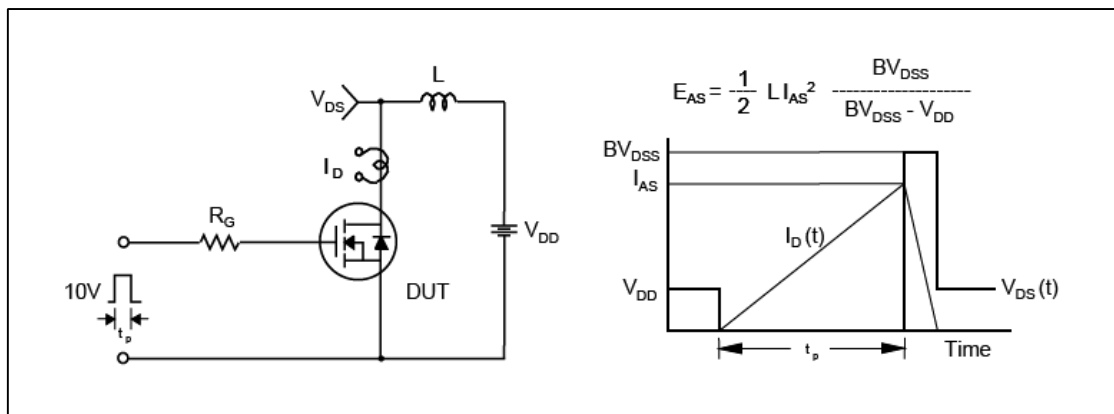
**Fig.11 Transient thermal Response Curve**



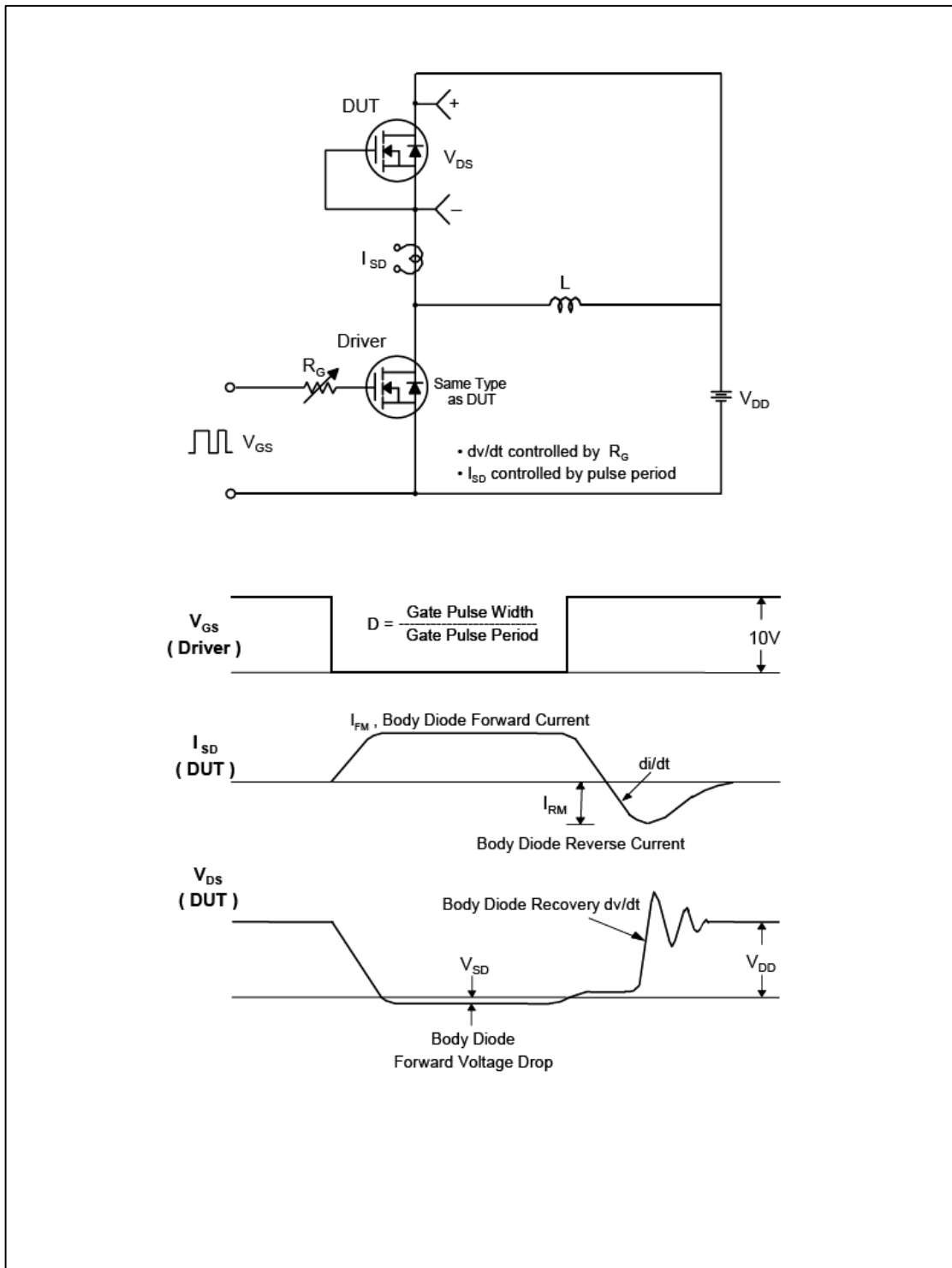
**Fig.12 Gate Test circuit & Waveform**



**Fig.13 Resistive Switching Test Circuit & Waveform**



**Fig.14 Unclamped Inductive Switching Test Circuit & Waveform**



**Fig.15 Peak Diode Recovery  $dv/dt$  Test Circuit & Waveform**

**TO-220 Package Dimension**

