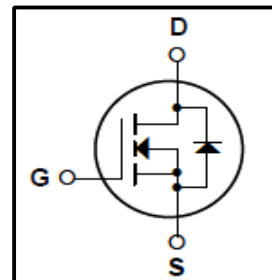


## Silicon N-Channel MOSFET

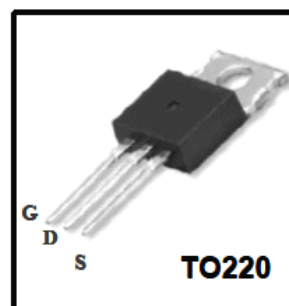
### Features

- 5.5A, 400V,  $R_{DS(on)}$ (Max 1.0 $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate Charge(Typical 32nC)
- 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	400	V
$I_D$	Continuous Drain Current(@ $T_c=25^{\circ}C$ )	5.5	A
	Continuous Drain Current(@ $T_c=100^{\circ}C$ )	2.9	A
$I_{DM}$	Drain Current Pulsed (Note1)	22	A
$V_{GS}$	Gate to Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note 2)	330	mJ
$E_{AR}$	Repetitive Avalanche Energy (Note 1)	7.4	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4	V/ns
$P_D$	Total Power Dissipation(@ $T_c=25^{\circ}C$ )	74	W
	Derating Factor above 25 $^{\circ}C$	0.59	W/ $^{\circ}C$
$T_J, T_{stg}$	Junction and Storage Temperature	-55~150	$^{\circ}C$
$T_L$	Channel Temperature	300	$^{\circ}C$

\*Drain current limited by junction temperature

### Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	1.7	$^{\circ}C/W$
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink	-	0.5	-	$^{\circ}C/W$
$R_{\theta JA}$	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> = 400 V, V <sub>GS</sub> = 0 V	-	-	1	μA	
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V	400	-	-	V	
Break Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA, Referenced to 25°C	-	0.4	-	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> = 2.75A	-	0.83	1	Ω	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 2.75A	-	4.5	-	S	
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz	-	550	720	pF	
Reverse transfer capacitance	C <sub>rss</sub>		-	23	30		
Output capacitance	C <sub>oss</sub>		-	85	110		
Switching time	Rise time	t <sub>r</sub>	V <sub>DD</sub> =200 V, I <sub>D</sub> =3.5A R <sub>G</sub> =25Ω (Note4,5)	-	15	40	ns
	Turn-on time	t <sub>on</sub>		-	55	120	
	Fall time	t <sub>f</sub>		-	85	180	
	Turn-off time	t <sub>off</sub>		-	50	110	
Total gate charge (gate-source plus gate-drain)	Q <sub>g</sub>	V <sub>DD</sub> = 320 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.5 A (Note4,5)	-	32	38	nC	
Gate-source charge	Q <sub>gs</sub>		-	4.3	5.7		
Gate-drain ("miller") Charge	Q <sub>gd</sub>		-	14	22		

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I <sub>DR</sub>	-	-	-	5.5	A
Pulse drain reverse current	I <sub>DRP</sub>	-	-	-	22	A
Forward voltage (diode)	V <sub>DSF</sub>	I <sub>DR</sub> = 5.5 A, V <sub>GS</sub> = 0 V	-	1.4	1.5	V
Reverse recovery time	t <sub>rr</sub>	I <sub>DR</sub> = 5.5 A, V <sub>GS</sub> = 0 V, dI <sub>DR</sub> / dt = 100 A / μs	-	265	530	ns
Reverse recovery charge	Q <sub>rr</sub>		-	2.32	-	μC

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

2.L=18.5mH,I<sub>AS</sub>=5.5A,V<sub>DD</sub>=50V,R<sub>G</sub>=25Ω,Starting T<sub>J</sub>=25°C

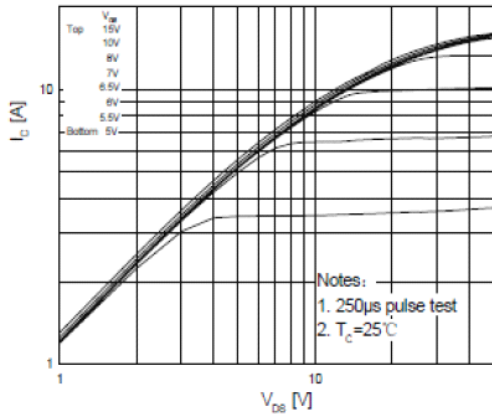
3.I<sub>SD</sub>≤5.5A,di/dt≤300A/us, V<sub>DD</sub><BV<sub>DSS</sub>,STARTING T<sub>J</sub>=25°C

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

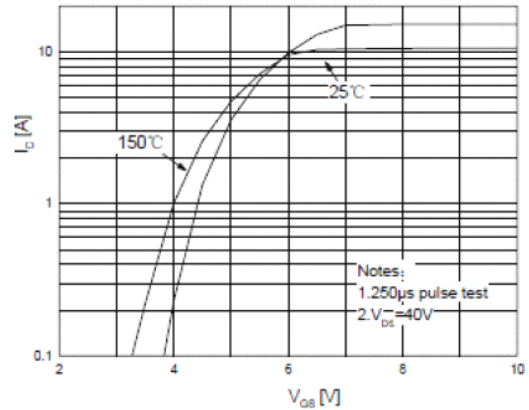
5.Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

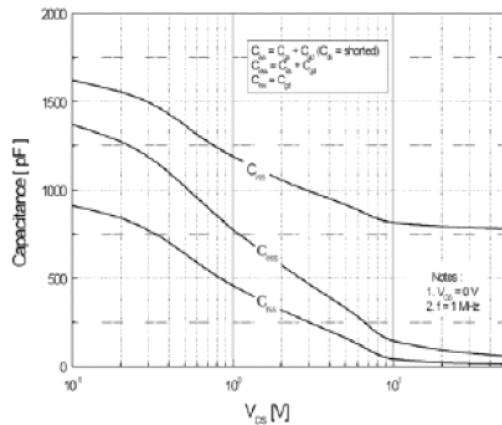
Please handle with caution



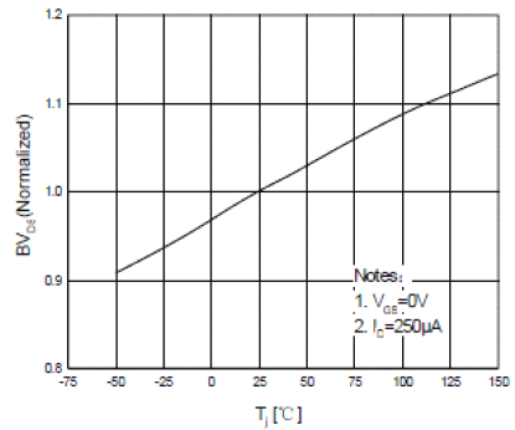
**Fig. 1 On-State Characteristics**



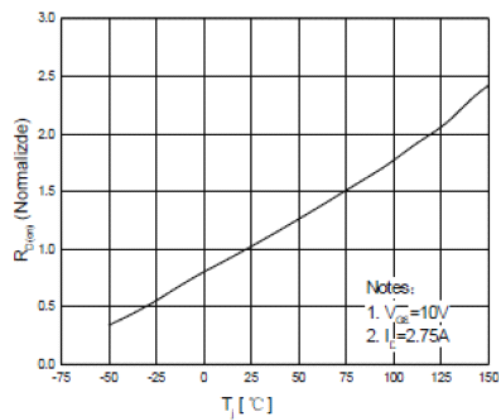
**Fig. 2 Transfer Characteristics**



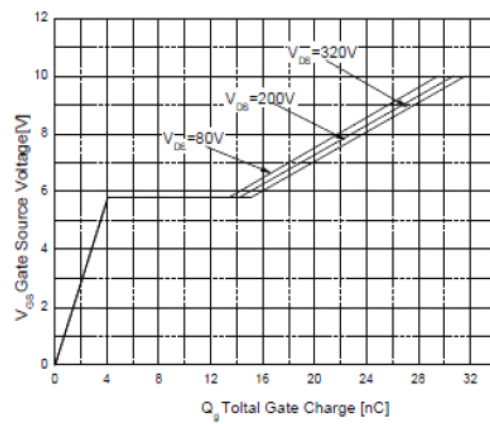
**Fig. 3 Capacitance Variation vs Drain Voltage**



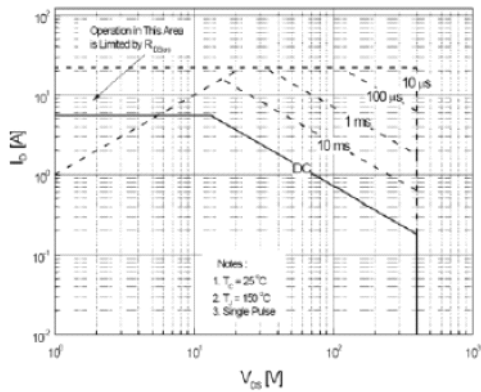
**Fig. 4 Breakdown Voltage Variation vs Temperature**



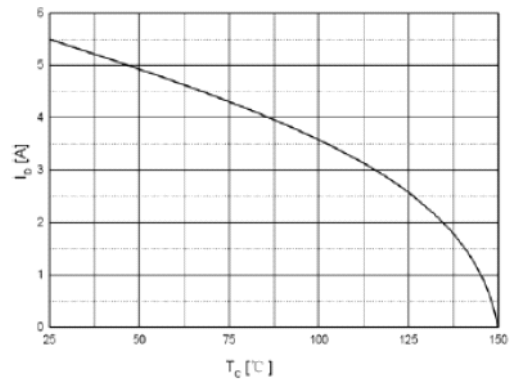
**Fig. 5 On-Resistance Variation vs Junction Temperature**



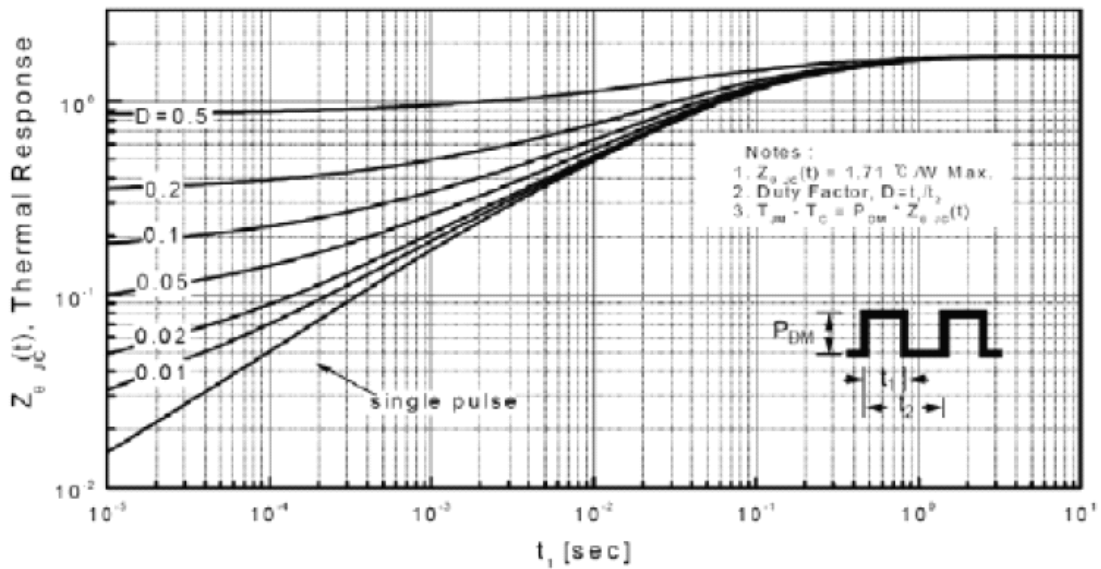
**Fig. 6 Gate Charge Characteristics**



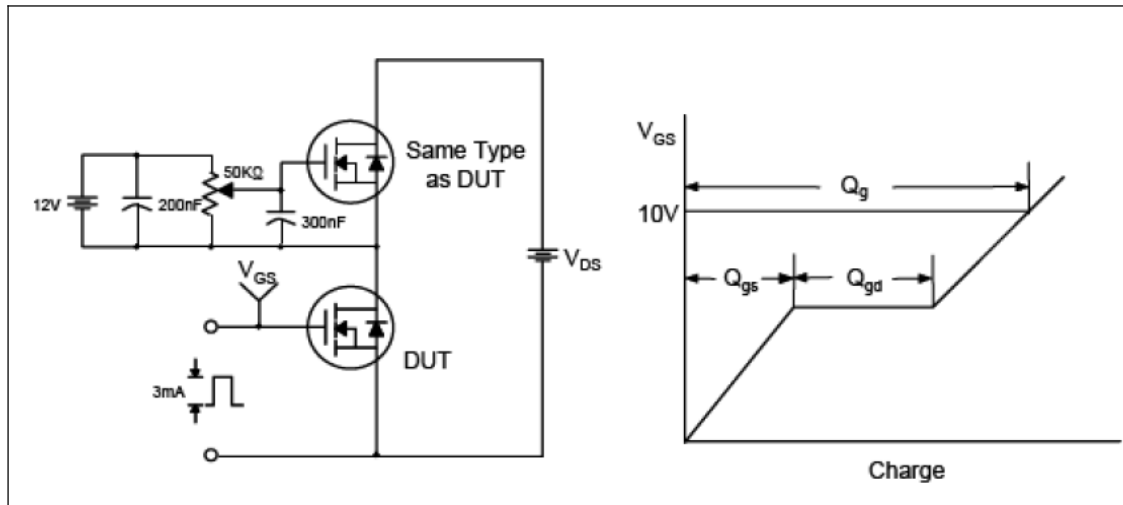
**Fig.7 Maximum Safe Operation Area**



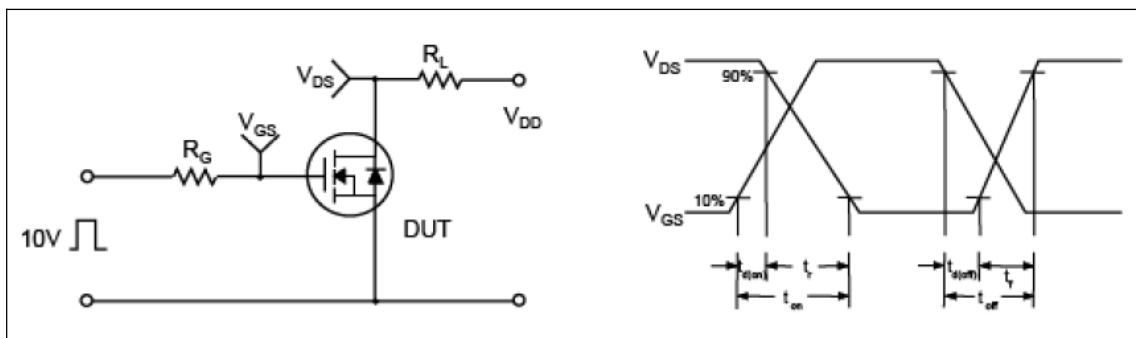
**Fig.8 Maximum Drain Current vs Case Temperature**



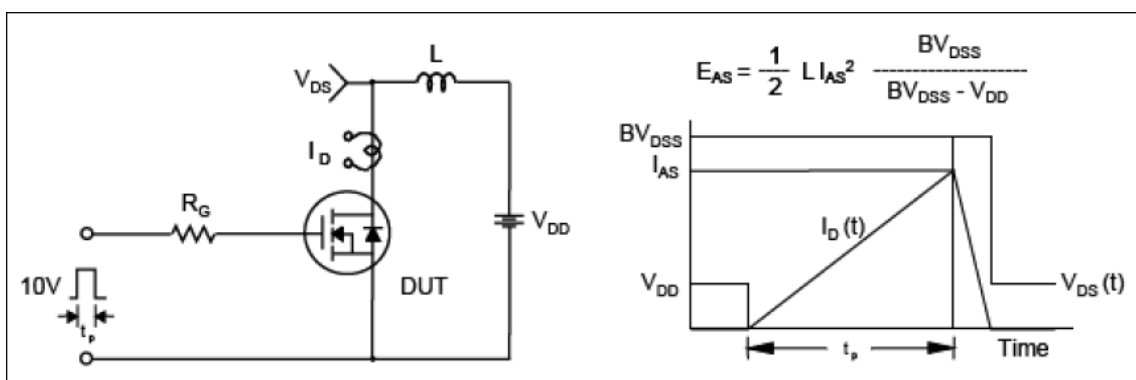
**Fig.9 Transient Thermal Response Curve**



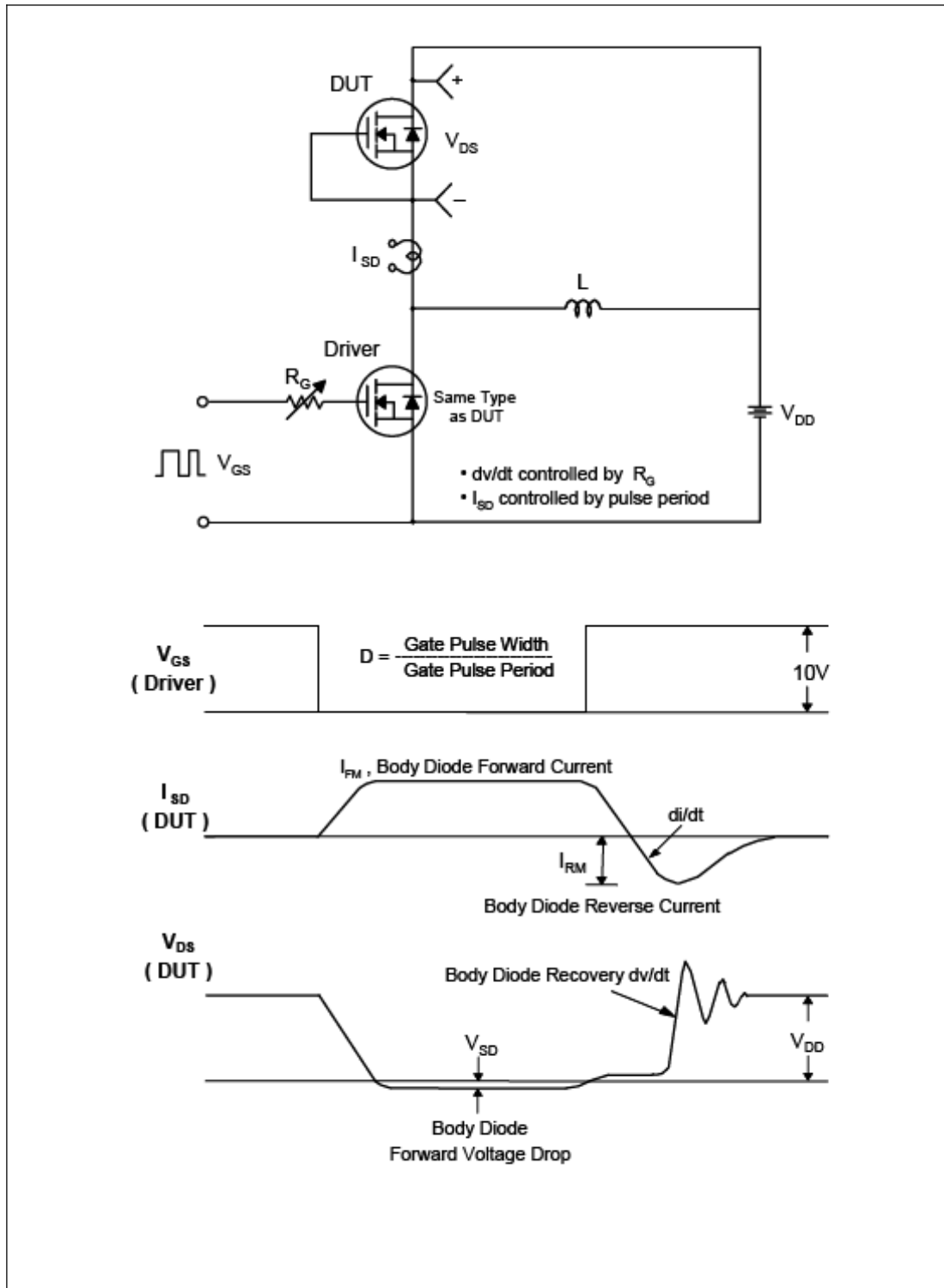
**Fig.10 Gate Test Circuit & Waveform**



**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-220C Package Dimension**

