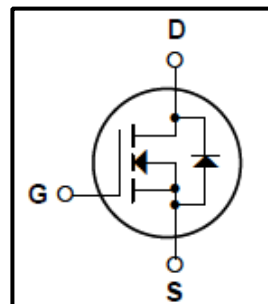


Silicon N-Channel MOSFET

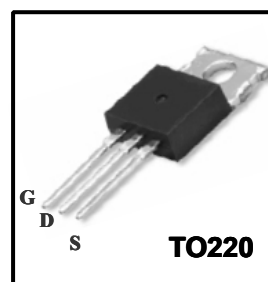
Features

- 4.5A,500V, $R_{DS(on)}$ (Max 1.5 Ω)@ $V_{GS}=10V$
- 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	500	V
I_D	Continuous Drain Current(@ $T_c=25^{\circ}C$)	4.5	A
	Continuous Drain Current(@ $T_c=100^{\circ}C$)	2.9	A
I_{DM}	Drain Current Pulsed (Note1)	18	A
V_{GS}	Gate to Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	300	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	7.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Total Power Dissipation(@ $T_c=25^{\circ}C$)	73	W
	Derating Factor above 25 $^{\circ}C$	0.55	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	-	-	1.7	$^{\circ}C/W$
R_{QCS}	Thermal Resistance, Case to Sink	-	0.5	-	$^{\circ}C/W$
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	62.5	$^{\circ}C/W$

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Electrical Characteristics (Tc = 25°C)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA	
Gate-source breakdown voltage	$V_{(BR)GSS}$	$I_G = \pm 10\ \mu\text{A}, V_{DS} = 0\text{ V}$	± 30	-	-	V	
Drain cut-off current	I_{DSS}	$V_{DS} = 500\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 250\ \mu\text{A}, V_{GS} = 0\text{ V}$	500	-	-	V	
Break Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	-	0.55	-	V/°C	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10\text{ V}, I_D = 250\ \mu\text{A}$	2	-	4	V	
Drain-source ON resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 2.25\text{A}$	-	1.16	1.5	Ω	
Forward Transconductance	g_{fs}	$V_{DS} = 40\text{ V}, I_D = 2.25\text{A}$	-	4.2		S	
Input capacitance	C_{iss}	$V_{DS} = 25\text{ V},$	-	800	1050	pF	
Reverse transfer capacitance	C_{rss}	$V_{GS} = 0\text{ V},$	-	76	100		
Output capacitance	C_{oss}	$f = 1\text{ MHz}$	-	17	22		
Switching time	Rise time	t_r	$V_{DD} = 250\text{ V},$ $I_D = 4.5\text{ A}$ $R_G = 25\ \Omega$ (Note4,5)	-	15	40	ns
	Turn-on time	t_{on}		-	40	90	
	Fall time	t_f		-	85	180	
	Turn-off time	t_{off}		-	45	100	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} = 400\text{ V},$ $V_{GS} = 10\text{ V},$ $I_D = 4.5\text{ A}$ (Note4,5)	-	32	44	nC	
Gate-source charge	Q_{gs}		-	3.7	-		
Gate-drain ("miller") Charge	Q_{gd}		-	15	-		

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	4.5	A
Pulse drain reverse current	I_{DRP}	-	-	-	18	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 4.5\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.4	V
Reverse recovery time	t_{rr}	$I_{DR} = 4.5\text{ A}, V_{GS} = 0\text{ V},$	-	305	-	ns
Reverse recovery charge	Q_{rr}	$di_{DR} / dt = 100\text{ A} / \mu\text{s}$	-	2.6	-	μC

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

2.L=24mH, $I_{AS}=4.5\text{A}, V_{DD}=50\text{V}, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

3. $I_{SD} \leq 4.5\text{A}, di/dt \leq 300\text{A}/\mu\text{s}, V_{DD} < BV_{DSS}$, STARTING $T_J=25^\circ\text{C}$

4.Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

5.Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

Please handle with caution

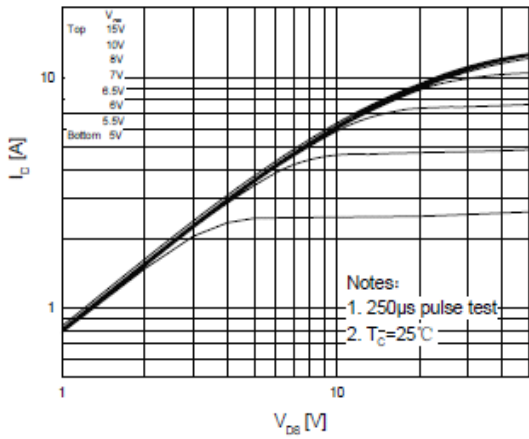


Fig. 1 On-State Characteristics

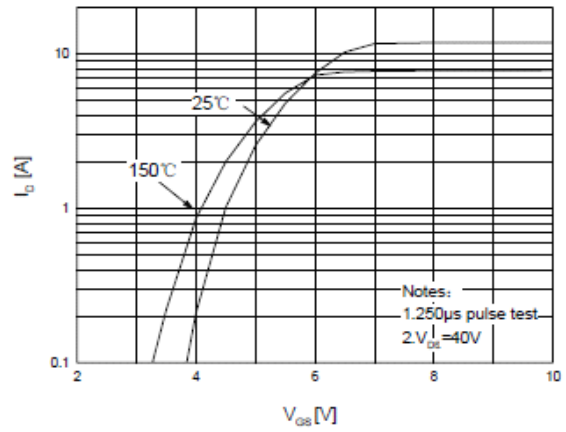


Fig. 2 Transfer Characteristics

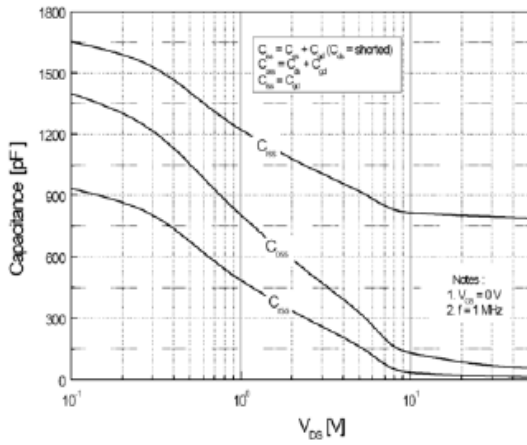


Fig. 3 Capacitance Variation vs Drain Voltage

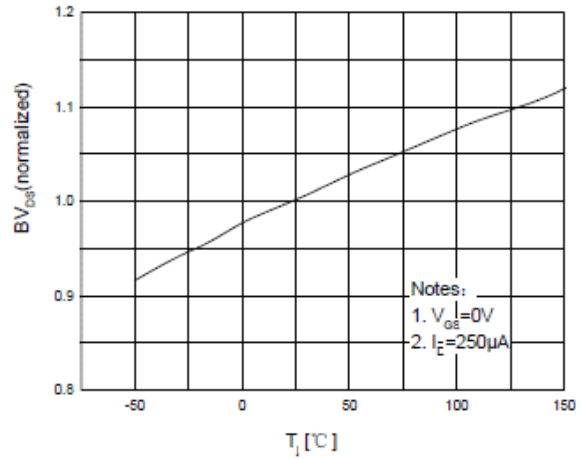


Fig. 4 Breakdown Voltage Variation vs Temperature

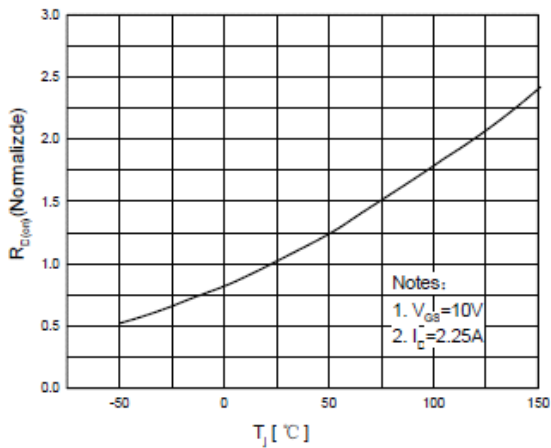


Fig. 5 On-Resistance Variation vs Junction Temperature

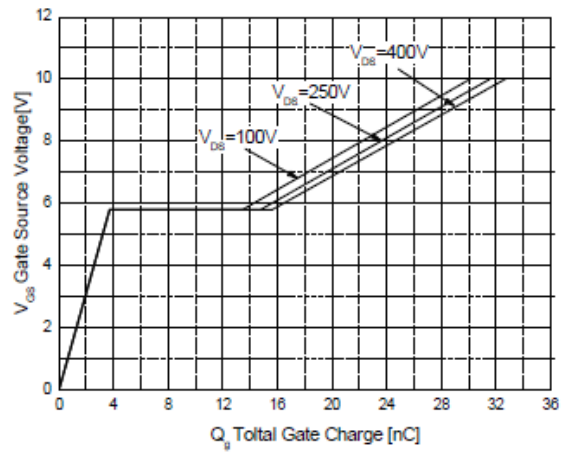


Fig. 6 Gate Charge Characteristics

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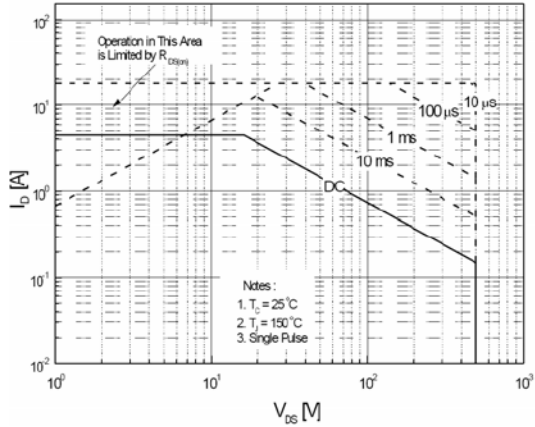


Fig.7 Maximum Safe Operation Area

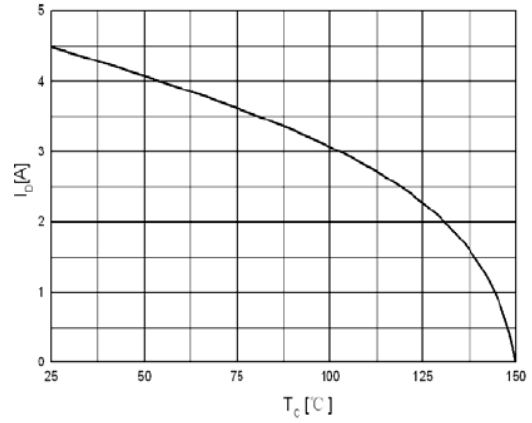


Fig.8 Maximum Drain Current vs Case Temperature

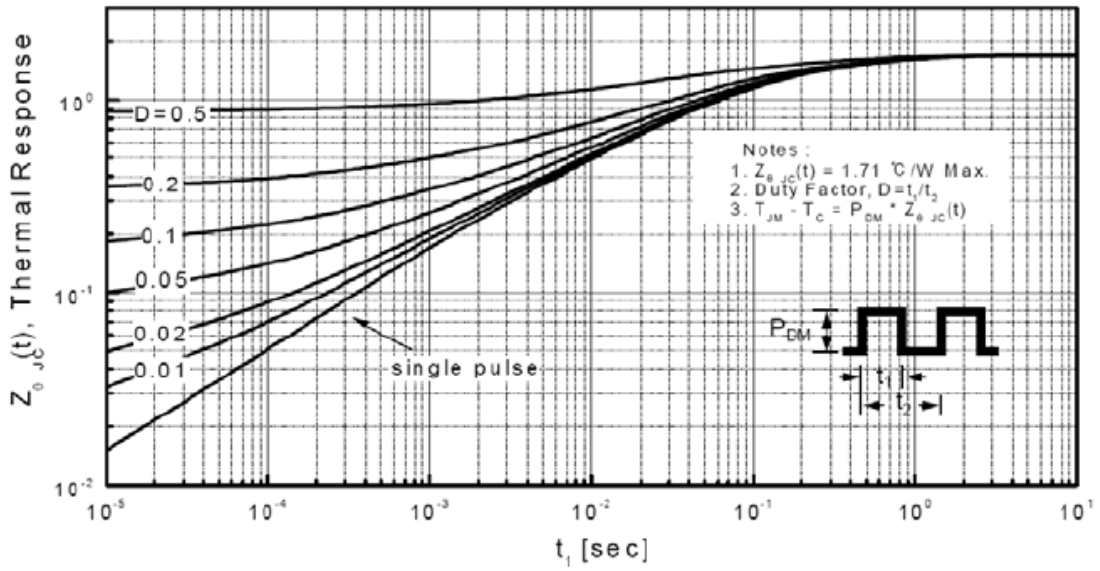


Fig.9 Transient Thermal Response Curve

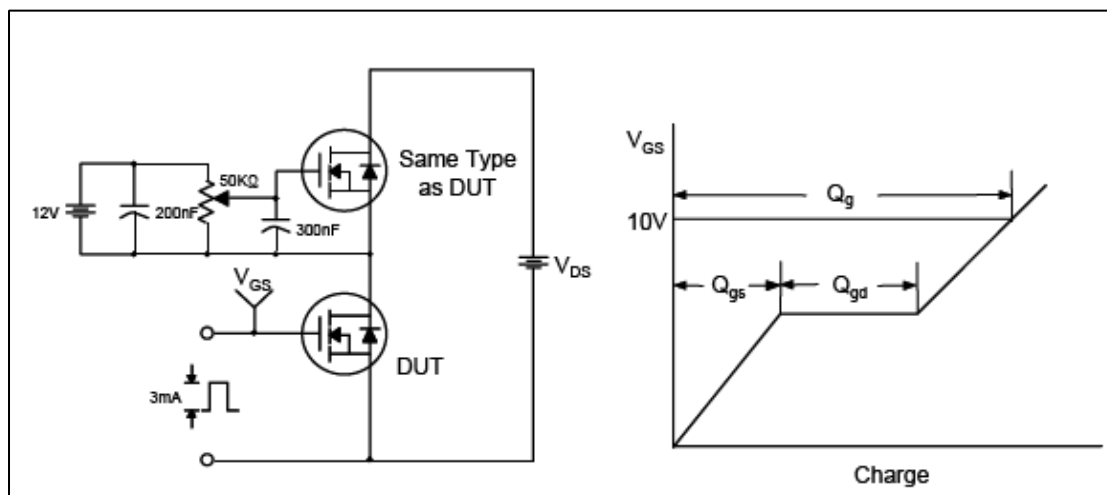


Fig.10 Gate Test Circuit & Waveform

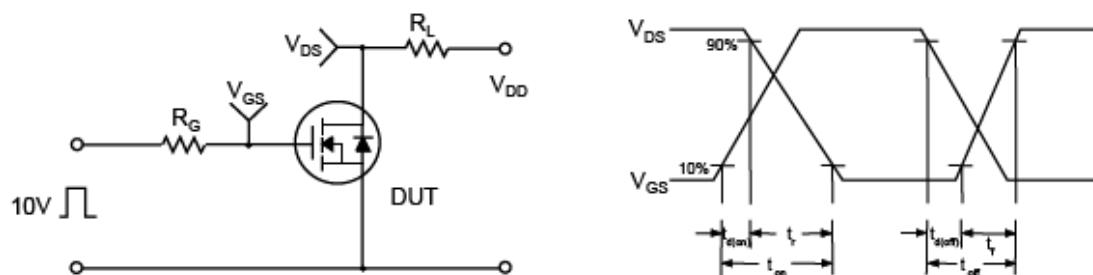


Fig.11 Resistive Switching Test Circuit & Waveform

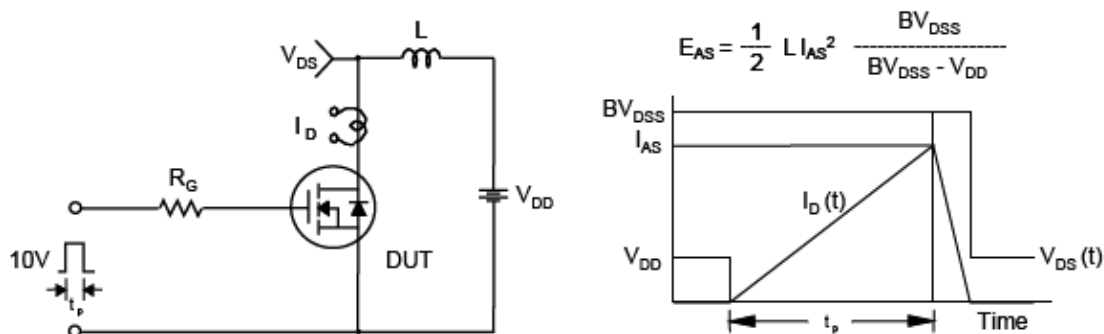


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

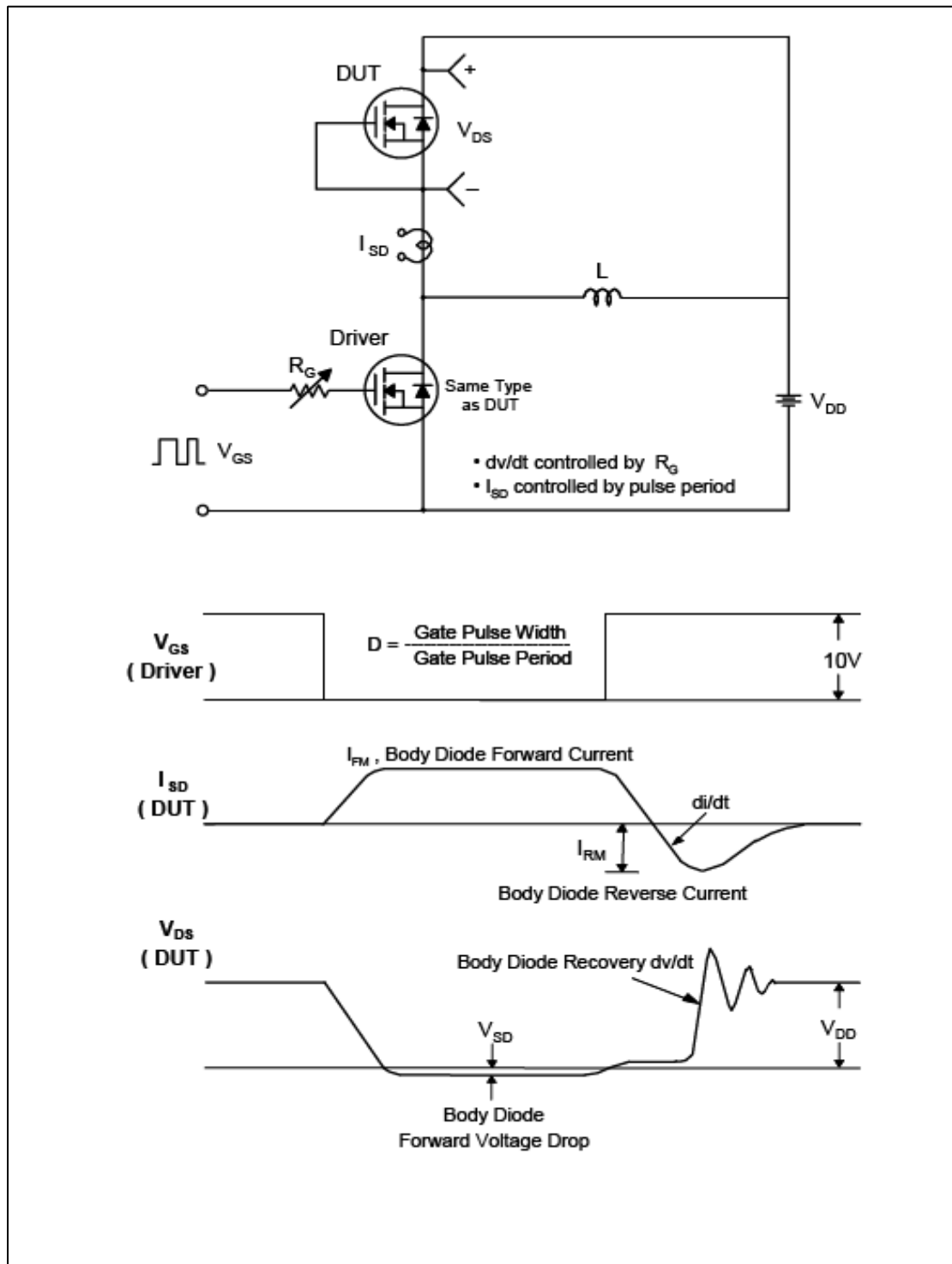


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220C Package Dimension

