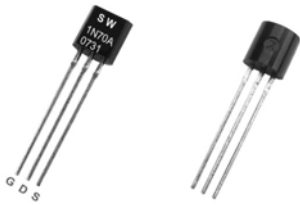


Features

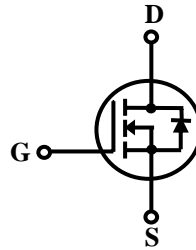
- **N-Channel MOSFET**
- **V_{DSS} (Minimum) : 700 V**
- **$R_{DS(ON)}$ (Typical) : 15 ohm**
- **I_D : 0.5 A**
- **Q_g (Typical) : 6 nc**
- **P_D (@TC=25 °C) : 5 W**

General Description

This power MOSFET is produced with advanced VDMOS technology of SAMWIN. This technology enable power MOSFET to have better characteristics, such as fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics. This power MOSFET is usually used at AC adaptors and SMPS.



TO-92
SW C 1N70A(E)



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain to Source Voltage	700	V
I_D	Continuous Drain Current (@Tc=25°C)	0.5	A
	Continuous Drain Current (@Tc=100)	0.4	A
I_{DM}	Drain Current Pulsed	2	A
V_{GS}	Gate to Source Voltage	±30	V
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns
P_D	Total Power Dissipation (@Tc=25°C)	5	W
	Derating Factor above 25°C	0.025	W/°C
T_{STG}, T_J	Operating junction temperature & Storage temperature	-55~+150	°C
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	260	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
		TO-92	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case Max	-	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink TYP.	0.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Max	120	°C/W

Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
Off Characteristics						
BV _{DSS}	Drain- Source Breakdown Voltage	V _{GS} =0V, I _D = 1mA	700	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_j}$	Breakdown Voltage Temperature coefficient	I _D =250uA, referenced to 25°C	-	0.4	-	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =700V, V _{GS} =0V	-	-	50	nA
		V _{DS} =560V, T _c =125°C				
I _{GSS}	Gate-Source Leakage Current	V _{GS} =30V, V _{DS} =0V	-	-	50	nA
	Gate-Source Leakage Reverse	V _{GS} =-30V, V _{DS} =0V	-	-	-50	nA

On Characteristics

V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2.0	-	4.0	V
R _{DS(ON)}	Static Drain-Source On-state Resistance	V _{GS} =10V, I _D =0.3A	-	15	16	ohm

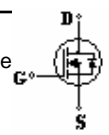
Dynamic Characteristics

C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	-	70	100	pF
C _{oss}	Output Capacitance		-	25	30	
C _{rss}	Reverse Transfer Capacitance		-	2	3	

Dynamic Characteristics

t _{d(on)}	Turn-on Delay Time	V _{DD} =350V, I _D =0.5A R _G =5ohm	-	5	20	ns
t _r	Rise Time		-	25	60	
t _{d(off)}	Turn-off Delay Time		-	7	30	
t _f	Fall Time		-	28	75	
Q _g	Total Gate Charge	V _{DS} =560V, V _{GS} =10V, I _D =0.5A	-	19	-	nC
Q _{gs}	Gate-Source Charge		-	1.2	-	
Q _{gd}	Gate-Drain Charge (Miller Charge)		-	6.0	-	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I _S	Continuous Source Current	Integral Reverse p-n Junction Diode in the MOSFET 	-	-	0.8	A
I _{SM}	Pulsed Source Current		-	-	2.4	
V _{SD}	Diode Forward Voltage	I _S =0.5A, V _{GS} =0V	-	-	1.0	V
t _{rr}	Reverse Recovery Time	I _S =0.5A, V _{GS} =0V, di _p /dt=100A/us	-	136	-	ns
Q _{rr}	Reverse Recovery Charge		-	0.3	-	uc

※NOTES

1. Repeativity rating: pulse width limited by junction temperature
2. I_{SD} ≤ 1.0A, di/dt ≤ 100A/us, V_{DD} ≤ BV_{DSS}, Starting T_J=25°C
3. Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%
4. Essentially independent of operating temperature.

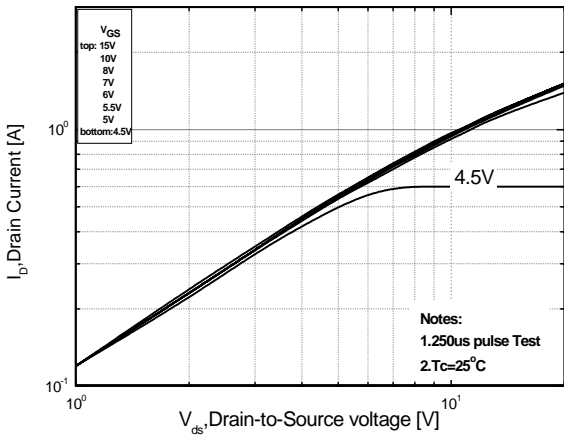


Fig 1. On-State Characteristics

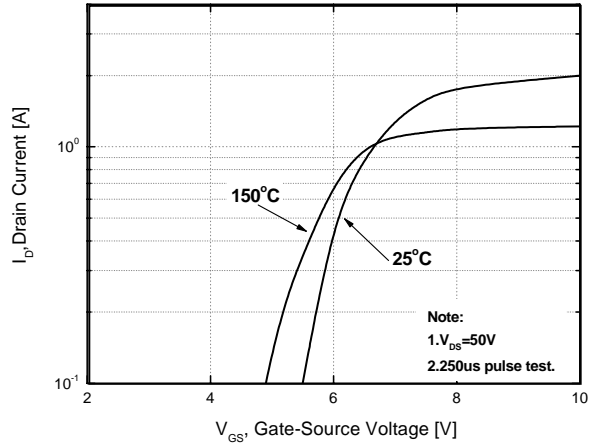


Fig 2. Transfer Characteristics

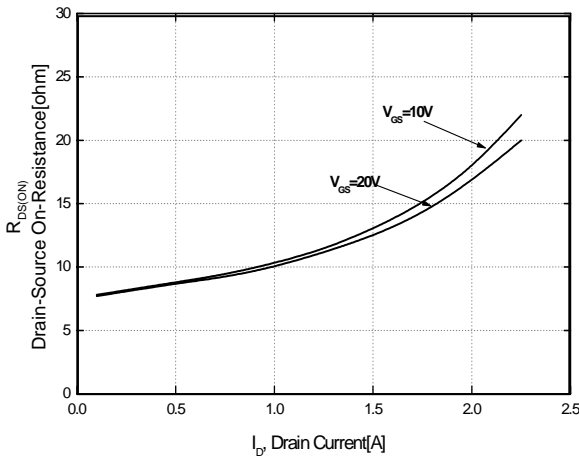


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

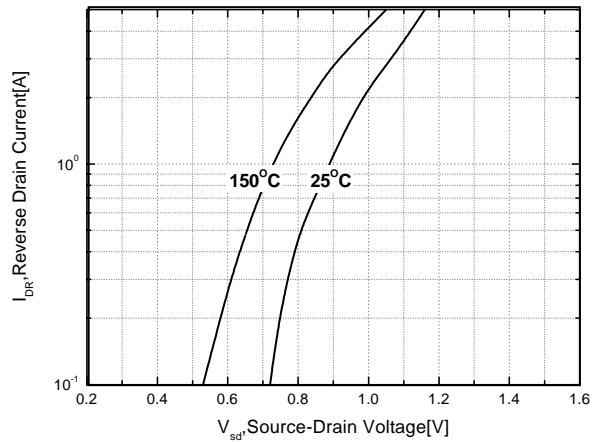


Fig 4. On State Current vs. Allowable Case Temperature

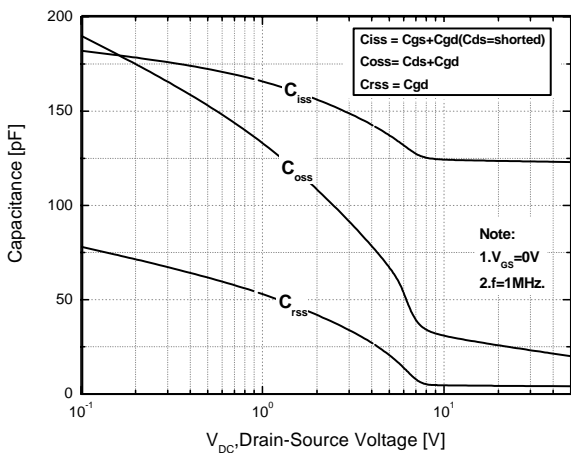


Fig 5. Capacitance Characteristics (Non-Repetitive)

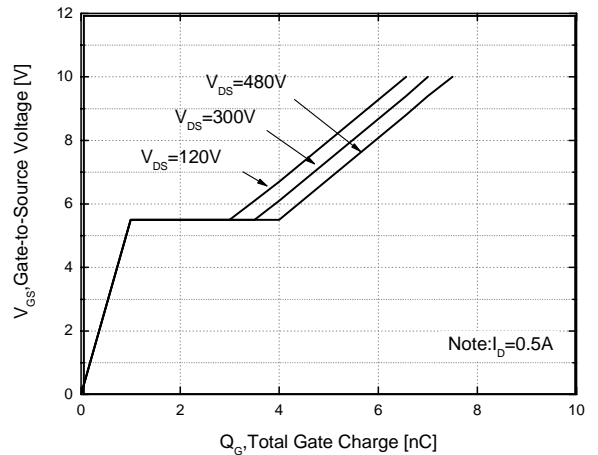


Fig 6. Gate Charge Characteristics

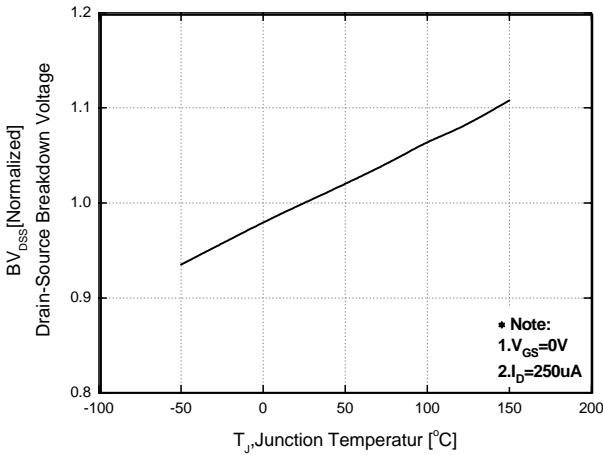


Fig 7. Breakdown Voltage Variation vs. Junction Temperature

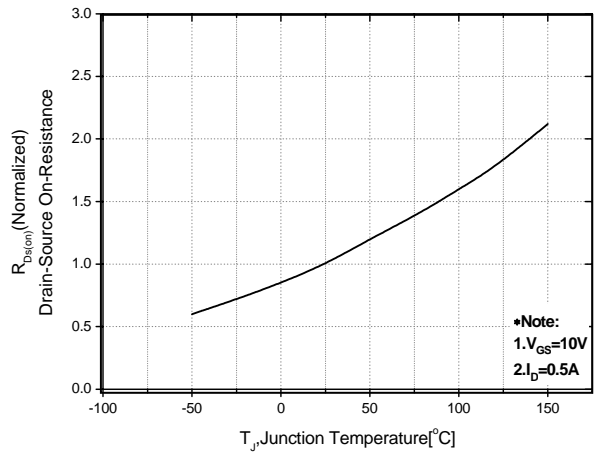


Fig 8. On-Resistance Variation vs. Junction Temperature

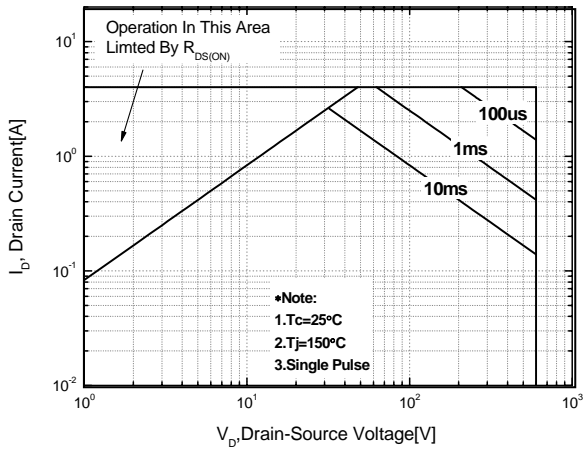


Fig 9. Maximum Safe Operating

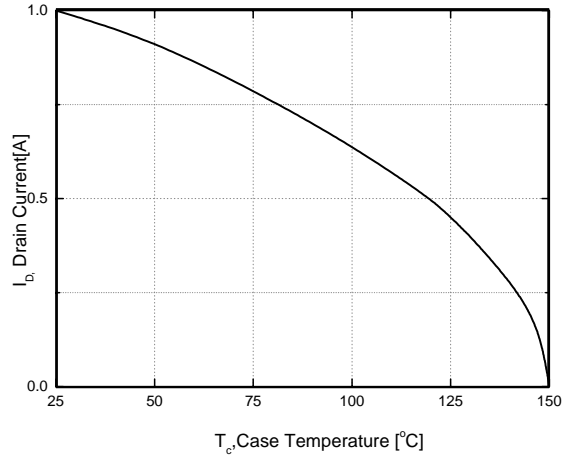


Fig 10. Maximum Drain Current Vs. Case Temperature

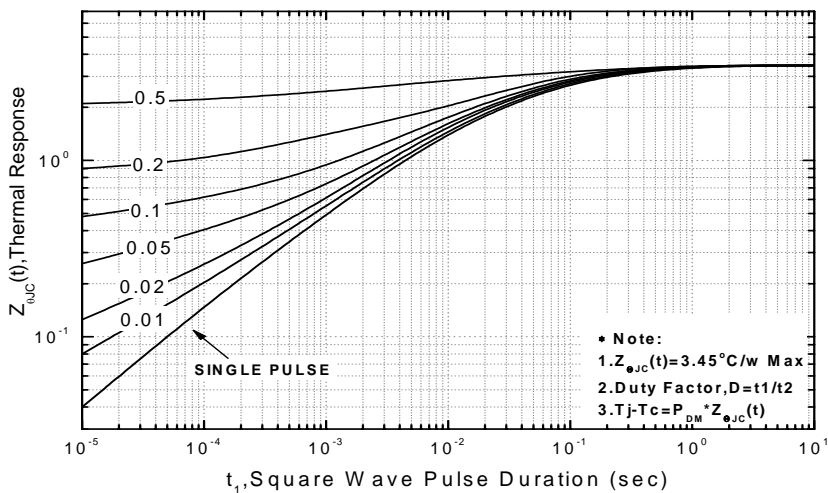


Fig 11. Transient Thermal Response Curve

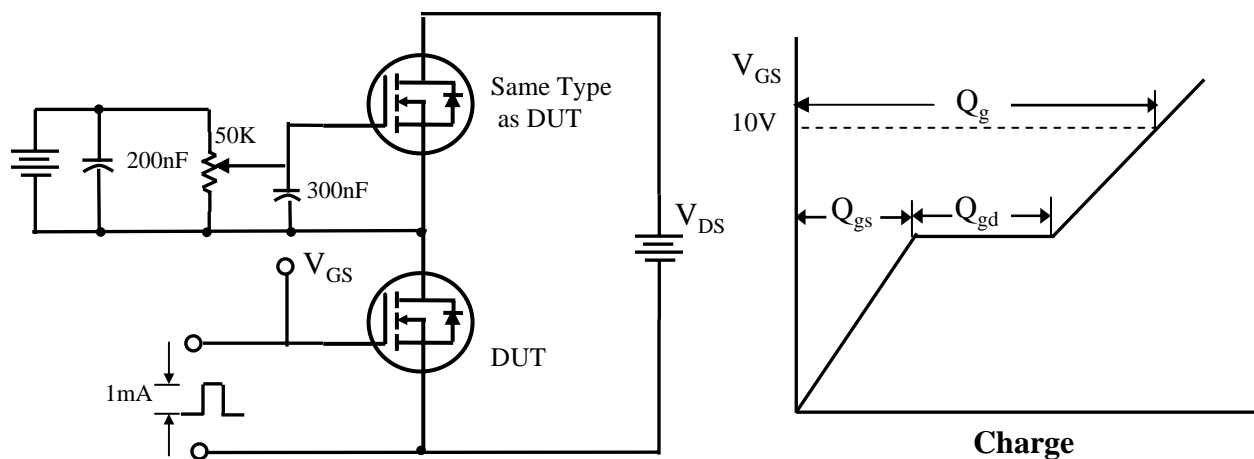


Fig 12. Gate Charge test Circuit & Waveforms

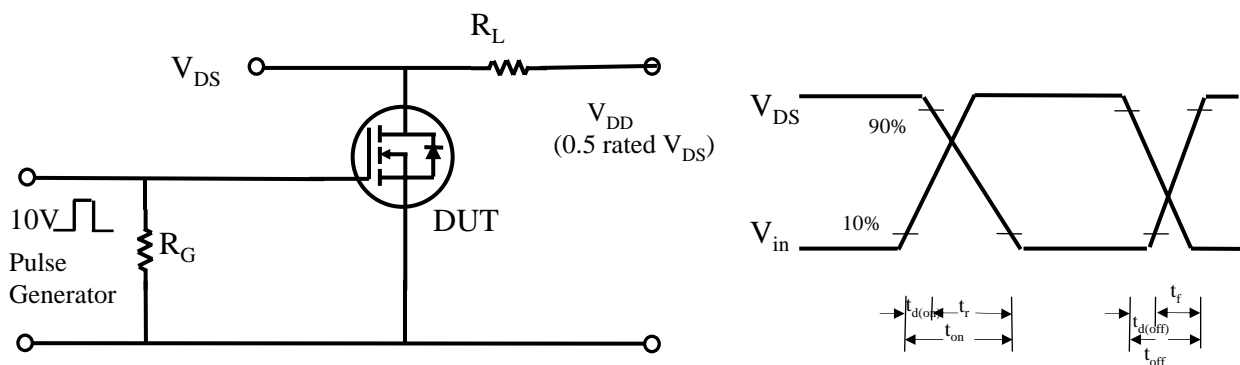


Fig 13. Switching test Circuit & Waveforms

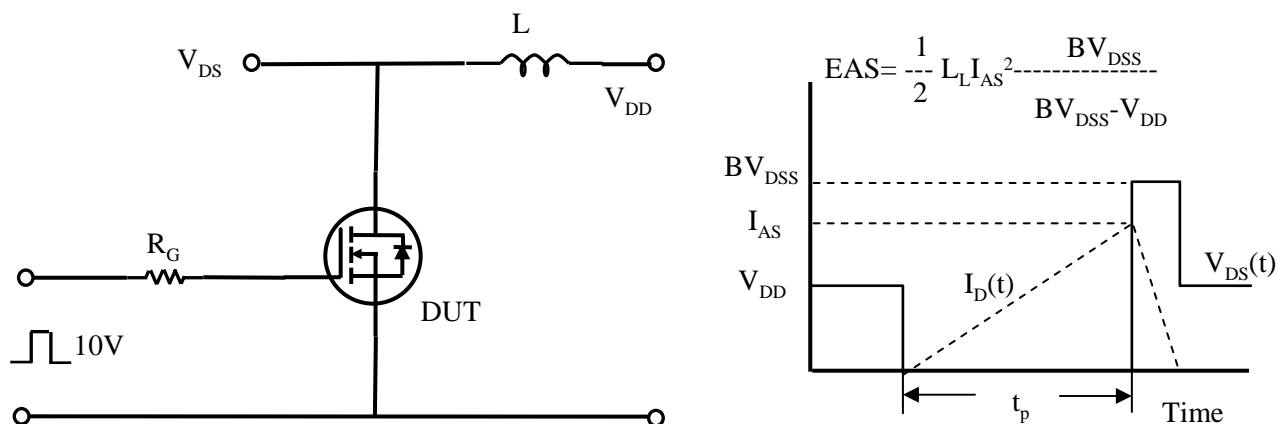


Fig 14. Unclamped Inductive Switching test Circuit & Waveforms

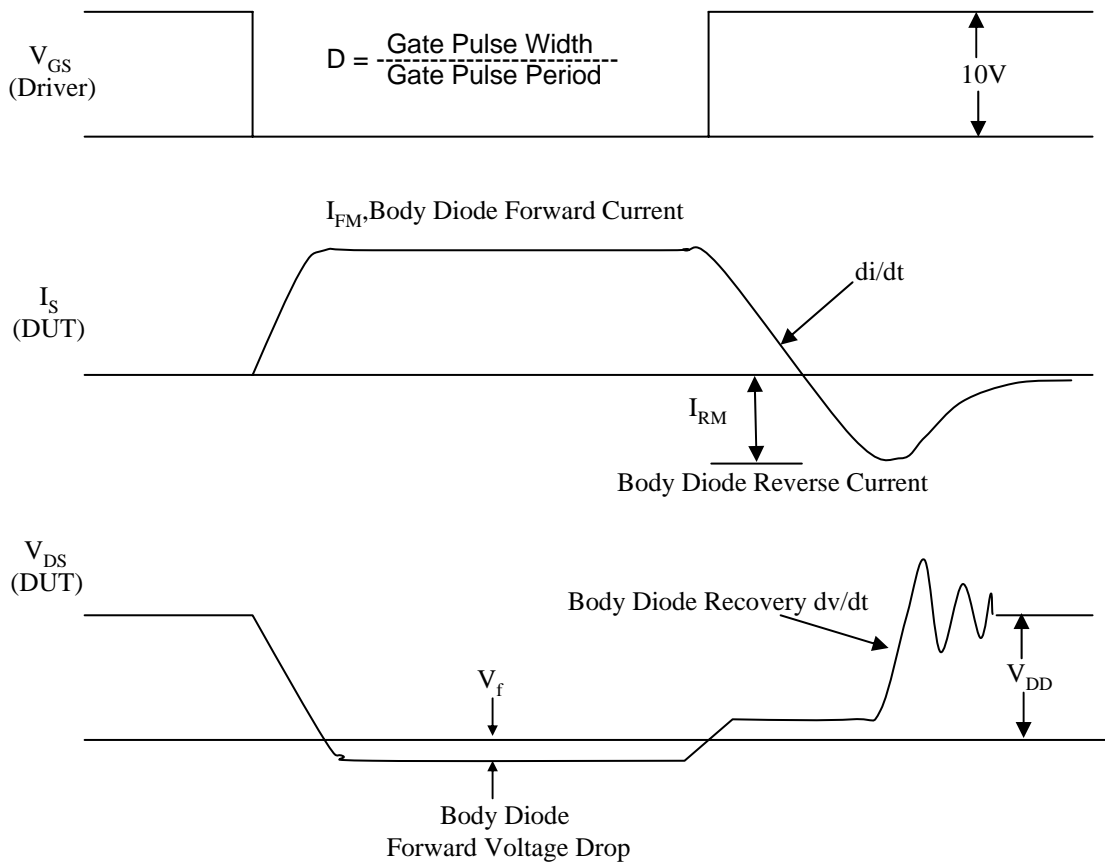
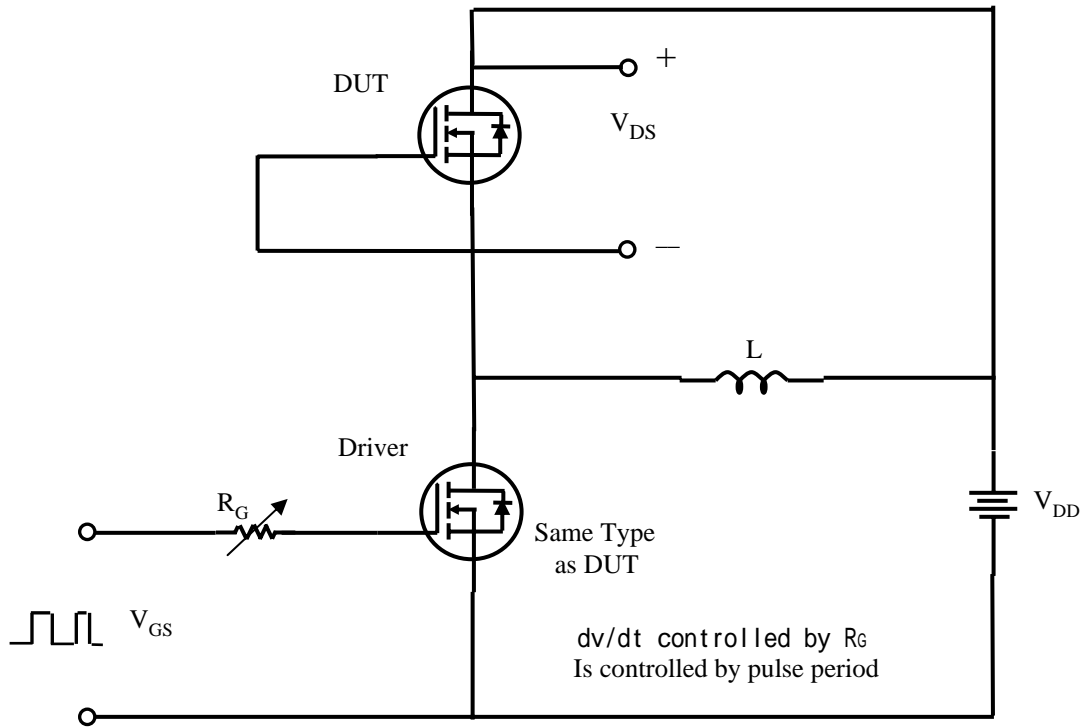
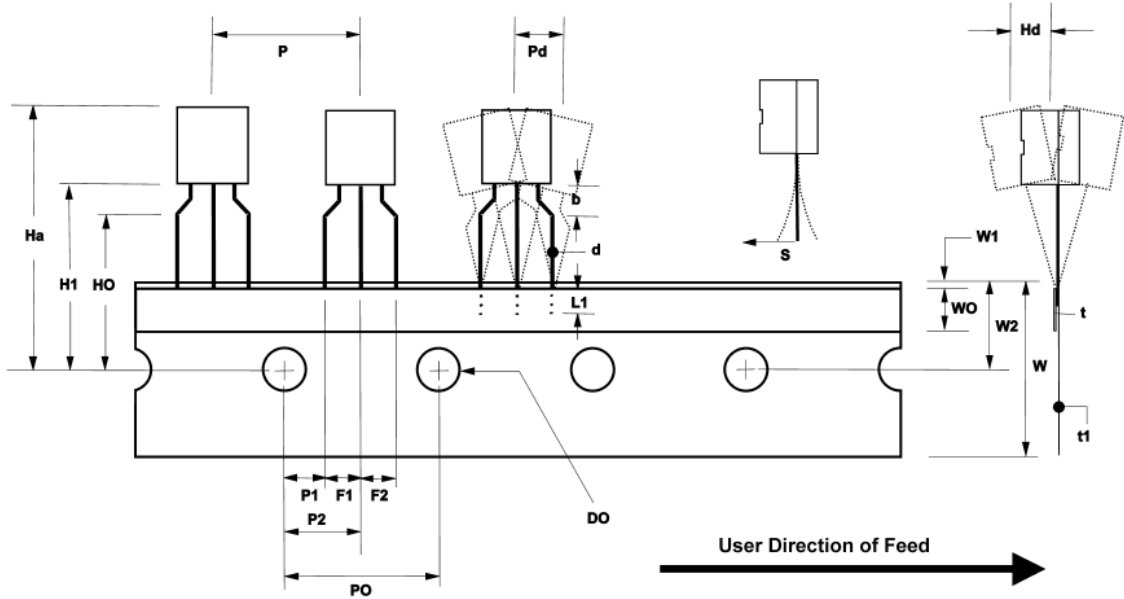


Fig 15. Peak Diode Recovery dv/dt test Circuit & Waveforms

TO-92 Tape Dimensions



Item Description	Symbol	Dimension (mm)
Base of Package to Lead Bend	b	3.00 ± 0.40
Component Height	Ha	24.00 ± 0.50
Lead Clinch Height	HO	16.00 ± 0.40
Component Base Height	H1	19.00 ± 0.40
Component Alignment (side/side)	Pd	0.80 max
Component Alignment (front/back)	Hd	1.00 max
Component Pitch	P	12.70 ± 0.60
Feed Hole Pitch	PO	12.70 ± 0.20
Hole Center to First Lead	P1	3.75 ± 0.30
Hole Center to Component Center	P2	6.35 ± 0.30
Lead Spread	F1/F2	2.60 +0.30/-0.20
Lead Thickness	d	0.45 +1.00/-0.05
Taped Lead Length	L1	2.50 max
Taped Lead Thickness	t	0.70 ± 0.20
Carrier Tape Thickness	t1	0.40 ± 0.05
Carrier Tape Width	W	18.50 ± 0.20
Hold - down Tape Width	WO	6.00 ± 0.40
Hold - down Tape position	W1	0.30 +0.20/-0.30
Feed Hole Position	W2	9.00 ± 0.40
Sprocket Hole Diameter	DO	4.00 ± 0.20
Lead Spring Out	S	0.40 max