RS4N65L

N Channel MOSFET

Lead Free Package and Finish

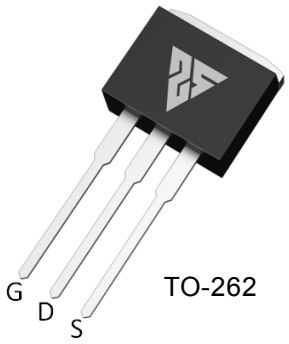
Applications:

- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)

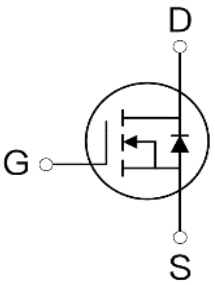
I_D	$R_{DS(ON)}$(Typ)	V_{DSS}
4A	2Ω	650V

Features:

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability



TO-262



Not to Scale

Ordering Information

Part Number	Package	Marking
RS4N65L	TO-262	RS4N65L

Absolute Maximun Ratings Tc=25℃unless otherwise specified

Symbol	Parameter	RS4N65L	Units
VDSS	Drain-to-Source Voltage	650	V
ID	Continuous Drain Current	4	A
IDM	Pulsed Drain Current (Note*1)	16	
PD	Power Dissipation	156	W
VGS	Gate-to-Source Voltage	±30	V
EAS	Single Pulse Avalanche Engergy L=10mH VDD=50V RG=25Ω TJ=25℃	80	mJ
IAS	Avalanche Current (Note*1)	4	A
EAR	Repetitive Avalanche Energy (Note*1)	0.32	mJ
TL	Maximum Temperature for Soldering	300	℃
TPKG	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds	260	
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" Table may cause permanent damage to the device.

Thermal Resistance

Symbol	Parameter	RS4N65L	Units	Test Conditions
RθJC	Junction-to-Case	0.8	℃/ W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of +150℃
RθJA	Junction-to-Ambient	62.5		1 cubic foot chamber, free air.

OFF Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-source Breakdown Voltage	650	--	--	V	V_{GS}=0V,I_D=250μA
I_{DSS}	Drain-to-Source Leakage Current	--	--	1.0	μA	V_{DS}=650V,V_{GS}=0V
I_{GSS}	Gate-to-Source Forward Leakage	--	--	100	nA	V_{GS}=30V ,V_{DS}=0V
	Gate-to-Source Reverse Leakage	--	--	-100		V_{GS}=-30V ,V_{DS}=0V

ON Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(on)}$	Static Drain-to-Source On-Resistance (Note*2)	--	2	2.4	Ω	V_{GS}=10V,I_D=2A
$V_{GS(TH)}$	Gate Threshold Voltage	3.0	--	4.0	V	V_{GS}=V_{DS},I_D=250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	36	--	nS	V_{DS}=325V I_D=4A R_G=25Ω
t_{rise}	Rise Time	--	13	--		
$t_{d(OFF)}$	Turn-OFF Delay Time	--	80	--		
t_{fall}	Fall Time	--	24	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{iss}	Input Capacitance	--	543	--	pF	V_{GS}=0V V_{DS}=25V f=1.0MHz
C_{oss}	Output Capacitance	--	53	--		
C_{rss}	Reverse Transfer Capacitance	--	4.5	--		
Q_g	Total Gate Charge	--	15	--	nC	V_{DS}=520V I_D=4A V_{GS}=10V
Q_{gs}	Gate-to-Source Charge	--	3	--		
Q_{gd}	Gate-to-Drain("Miller") Charge	--	7	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current	--	--	4	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current	--	--	16	A	
V_{SD}	Diode Forward Voltage	--	--	1.4	V	I_S=2A,V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	550	--	nS	V_{GS}=0V I_S=2A,di/dt=100A/μs
Q_{rr}	Reverse Recovery Charge	--	1.38	--	μC	

Notes:

*1. Repetitive rating; pulse width limited by maximum junction temperature.

*2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Feature curve

Figure 1. Output Characteristics (T_J = 25°C)

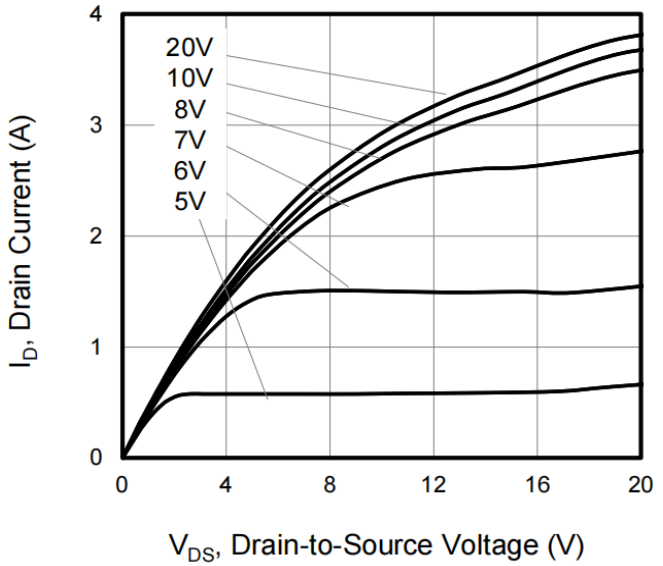


Figure 2. Body Diode Forward Voltage

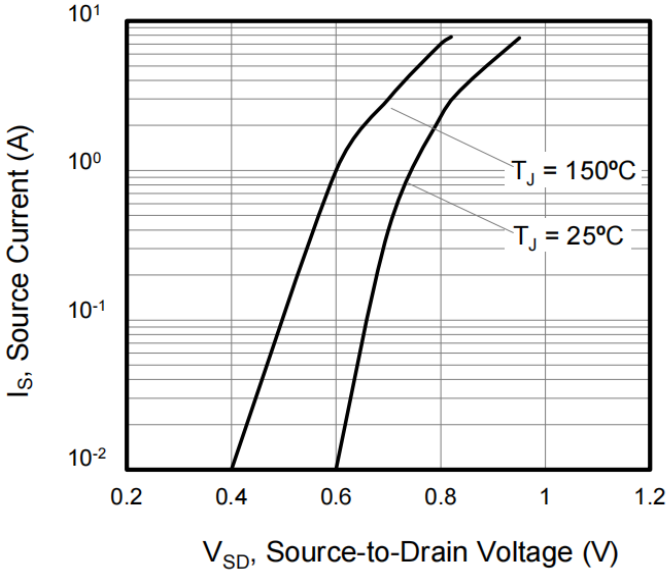


Figure 3. Drain Current vs. Temperature

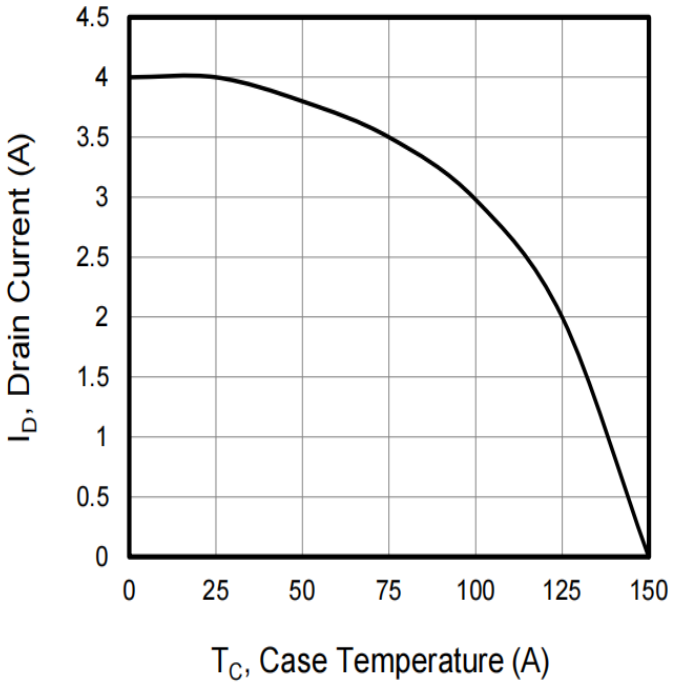


Figure 4. BV_{DSS} Variation vs. Temperature

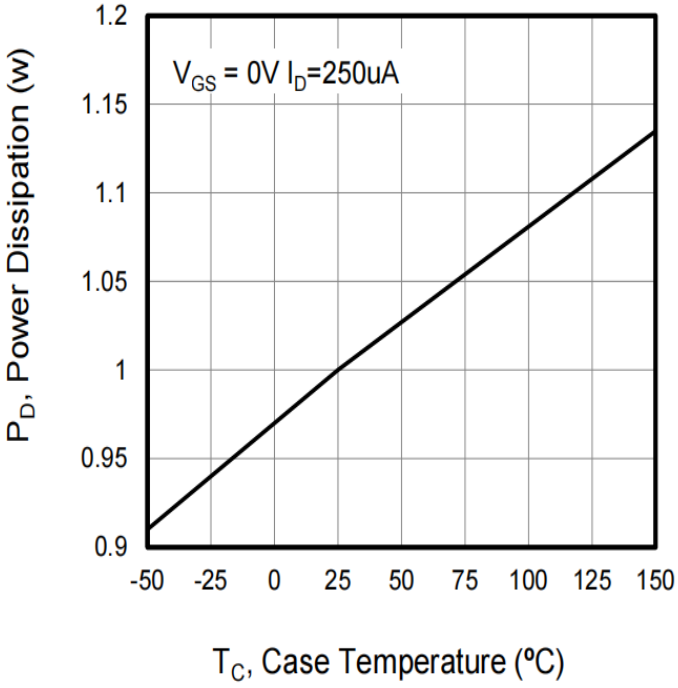


Figure 5. Transfer Characteristics

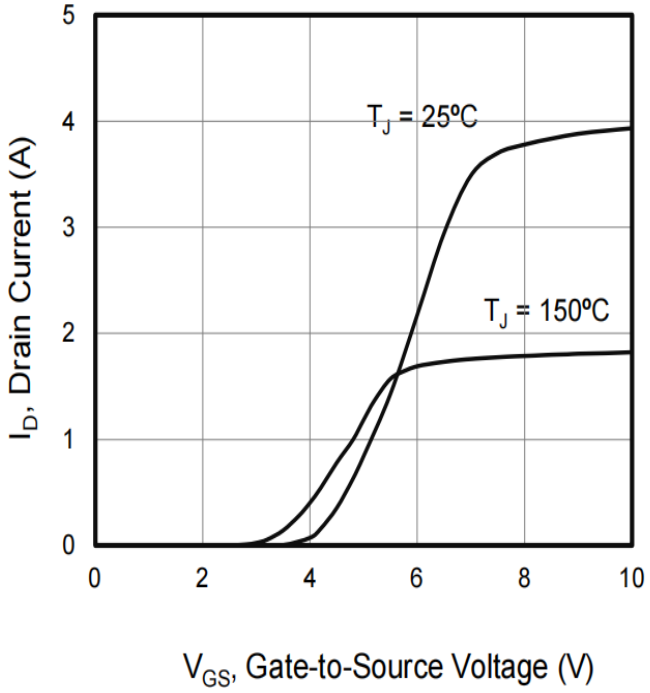


Figure 6. On-Resistance vs. Temperature

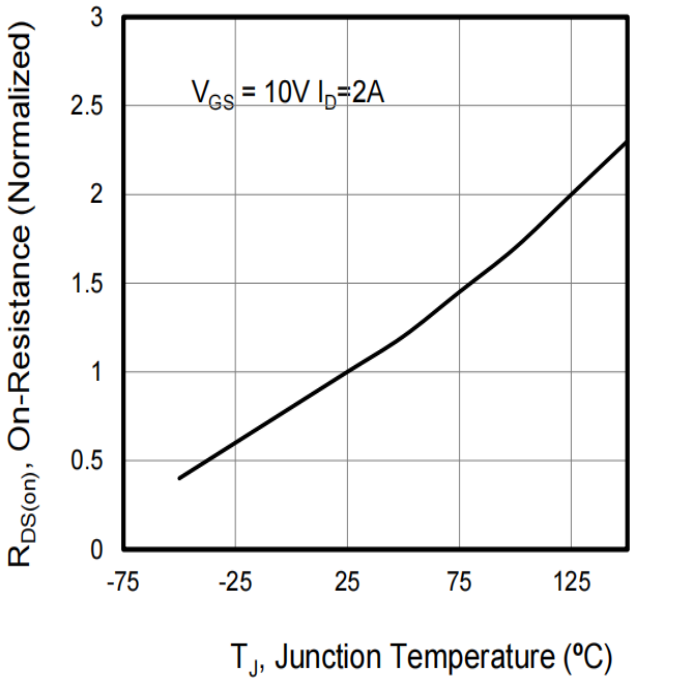


Figure 7. Capacitance

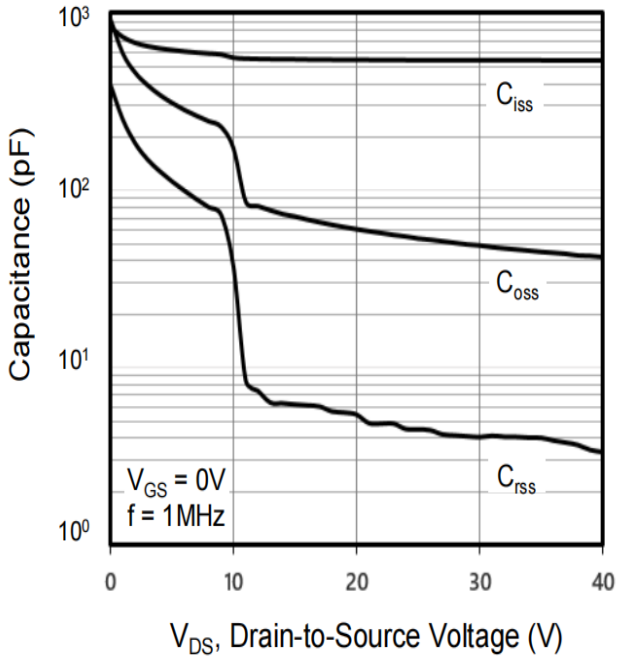


Figure 8. Gate Charge

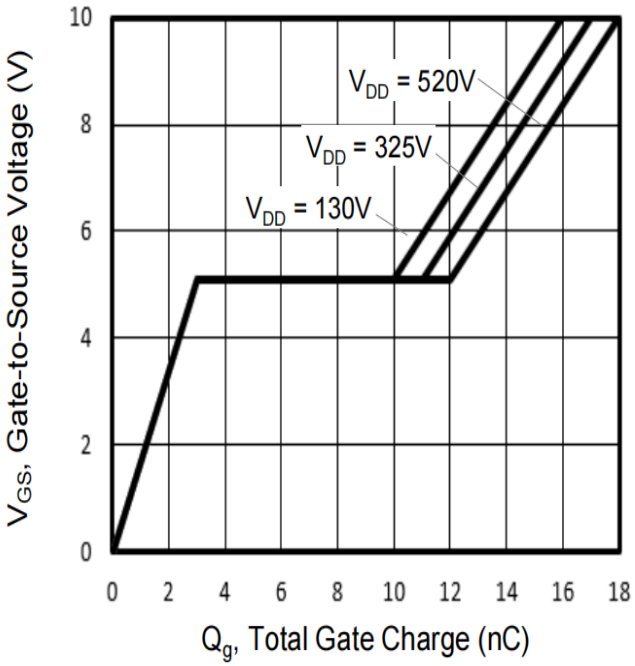
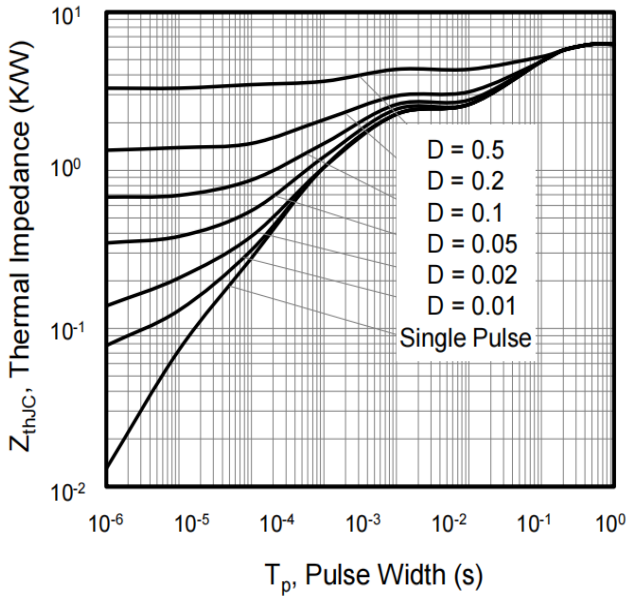


Figure 9. Transient Thermal Impedance



Test Circuits and Waveforms

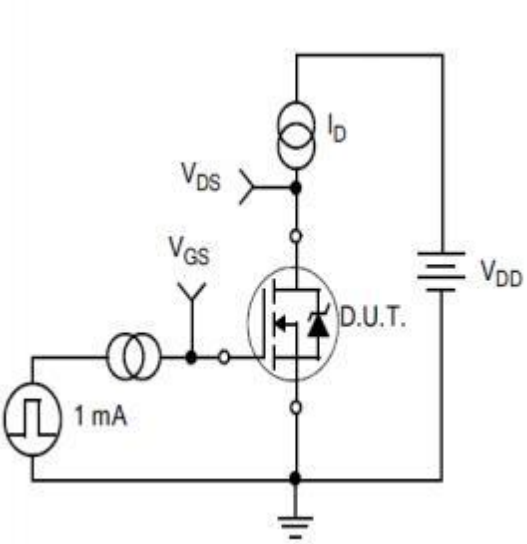


Figure12.
Gate Charge Test Circuit

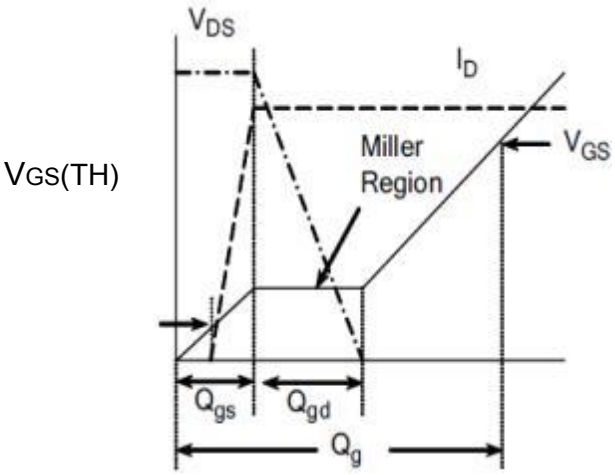


Figure13.
Gate Charge Waveform

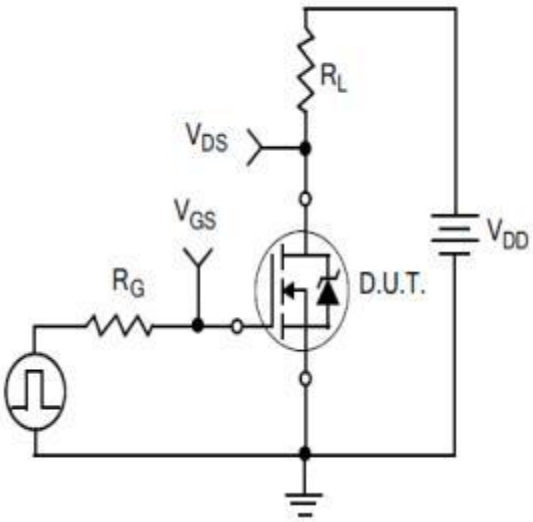


Figure14.
Resistive Switching Test Circuit

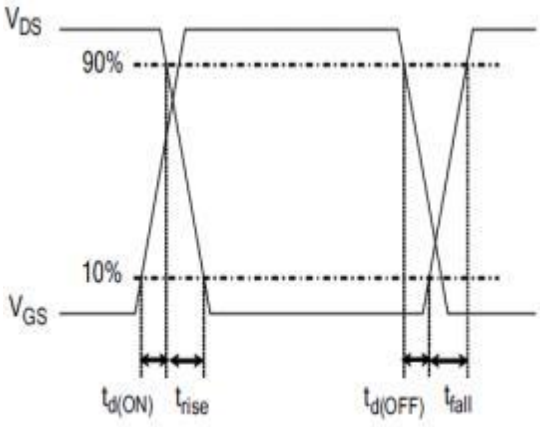


Figure15.
Resistive Switching Waveforms

Test Circuits and Waveforms

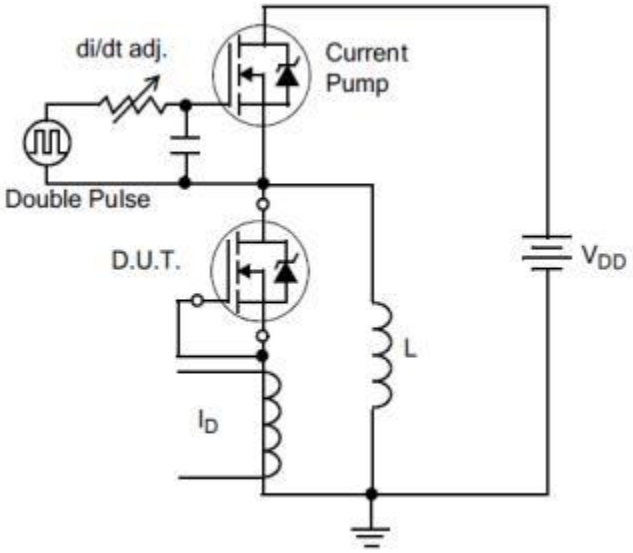


Figure16.Diode Reverse Recovery Test Circuit

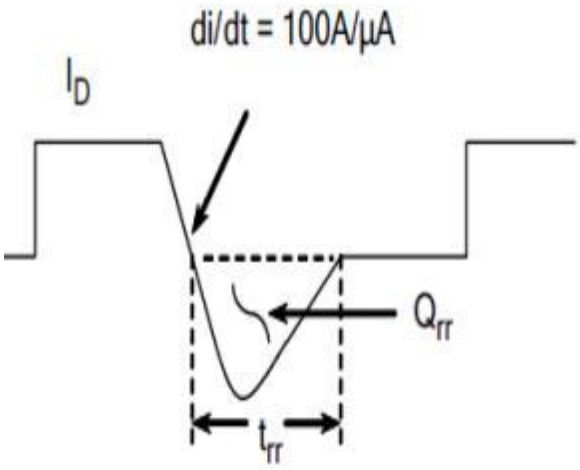


Figure17.Diode Reverse Recovery Waveform

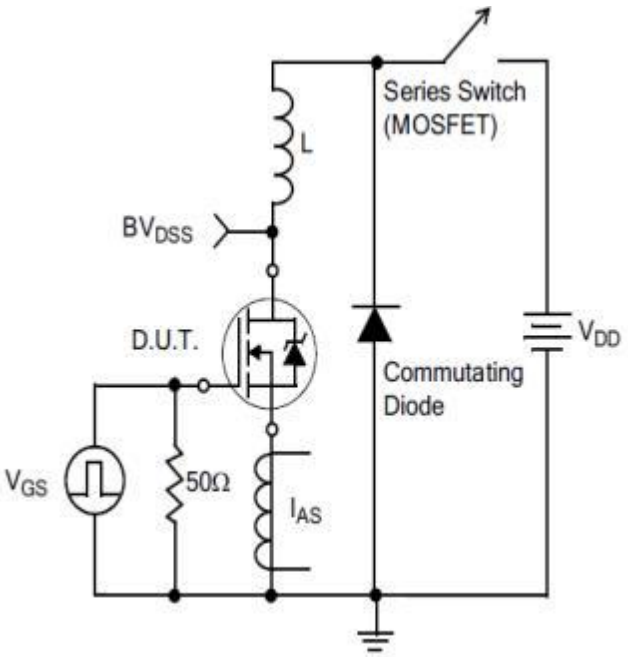
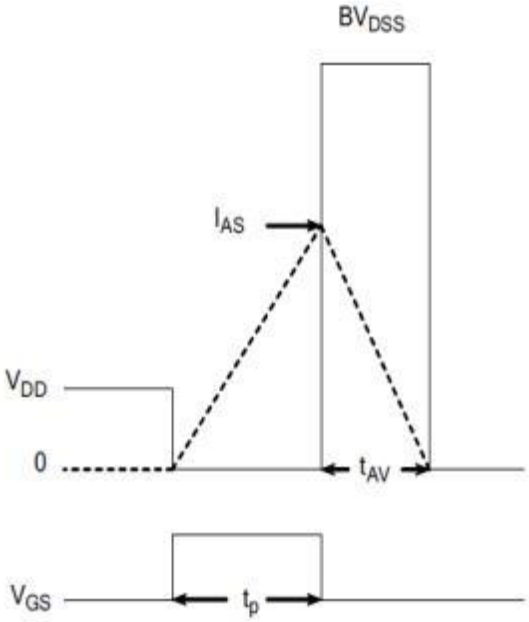


Figure18.Unclamped Inductive Switching Test Circuit

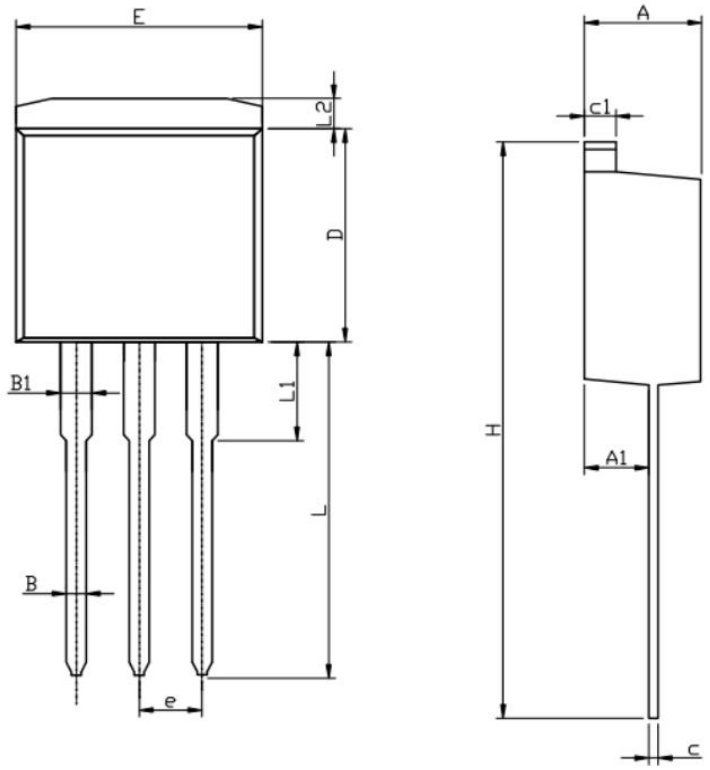


$$E_{AS}=\frac{I_{AS}^2 L}{2}$$

Figure19.Unclamped Inductive Switching Waveforms

Package outline drawing

Unit:mm



Dim.	Min.	Max.
A	4.30	4.55
A1	2.4	2.6
B	0.75	0.85
B1	1.2	1.4
C	0.35	0.42
C1	1.25	1.35
D	8.5	9.5
E	10.15	10.35
H	23	25
L	13	14
L1	2.8	3.5
L2	1.2	1.5
All Dimensions in millimeter		

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