

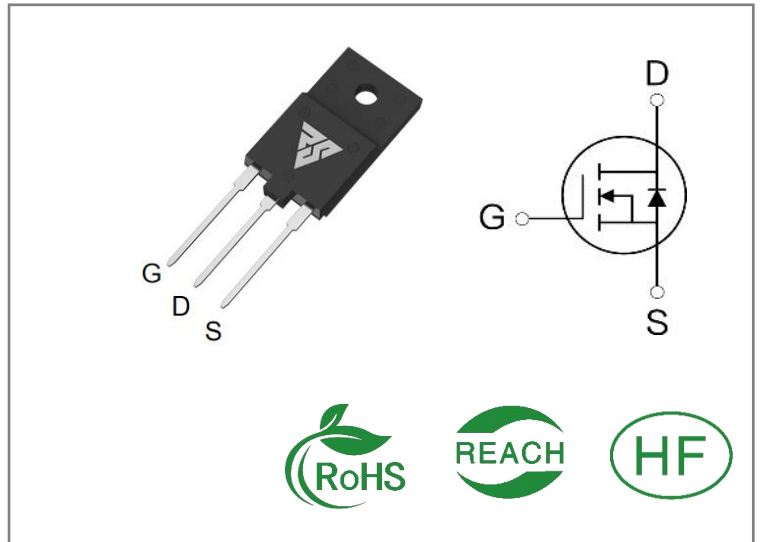
ID	R <sub>DS(ON)</sub> (Typ)	VDSS
3A	5.2Ω	1600V

**Applications:**

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

**Features:**

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


**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RS3N150PF	T0-3PF	RS3N150PF	Tube	30 PCS

**Absolute Maximum Ratings** Tc= 25°C unless otherwise specified

Symbol	Parameter	RS3N150PF	Units
VDSS	Drain-to-Source Voltage	1600	V
ID	Continuous Drain Current TC=25°C	3	A
IDM	Pulsed Drain Current (Note*1)	12	
PD	Power Dissipation	69	W
VGS	Gate- to- Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy L = 10mH, VDD = 50V, RG = 25 Ω	88	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds		
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	RS3N150PF	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	1.8	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 °C
R $\theta$ JA	Junction-to-Ambient	40		1 cubic foot chamber, free air.

**OFF Characteristics** T<sub>J</sub>= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	1600	--	--	V	VGS=0V, ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=1600V, VGS=0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=30V , VDS=0 V
	Gate- to- Source Reverse Leakage	--	--	-100		VGS=-30V , VDS=0V

**ON Characteristics** T<sub>J</sub>=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance(Note*2)	--	5.2	6.4	Ω	VGS=10V, ID=1.5 A
VGS(TH)	Gate Threshold Voltage	3	--	5	V	VGS=VDS, ID=25 0μA

**Resistive Switching Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	45	--	nS	VDS=750V ID=3A RG=25Ω
trise	Rise Time	--	22.5	--		
td(OFF)	Turn- OFF Delay Time	--	224	--		
tfall	Fall Time	--	55.5	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	1348	--	pF	VGS=0V VDS=25V f=1.0MHz
Coss	Output Capacitance	--	101	--		
Crss	Reverse Transfer Capacitance	--	15	--		
Qg	Total Gate Charge	--	54.5	--	nC	VDS=1200V ID=3A VGS=10V
Qgs	Gate- to- Source Charge	--	6.4	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	31.5	--		

**Source- Drain Diode Characteristics**

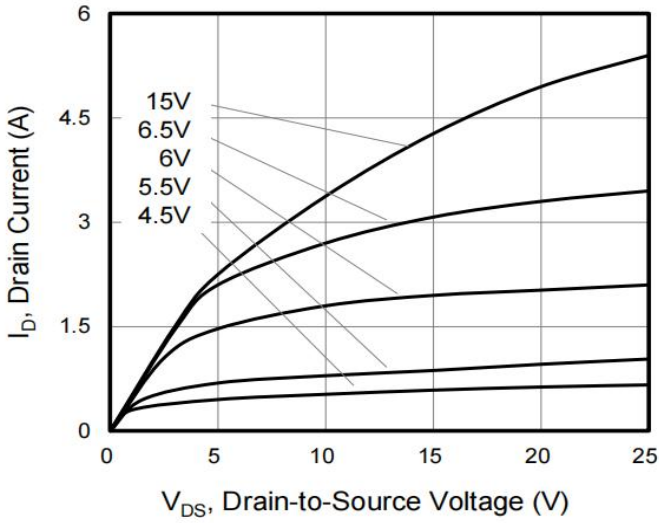
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	3	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	12	A	
VSD	Diode Forward Voltage	--	--	1.4	V	IS=1.5A,VGS=0V
trr	Reverse Recovery Time	--	647. 5	--	nS	VGS=0V IS=3A,di/dt=100A /μs
Qrr	Reverse Recovery Charge	--	0.98	--	μC	

**Notes:**

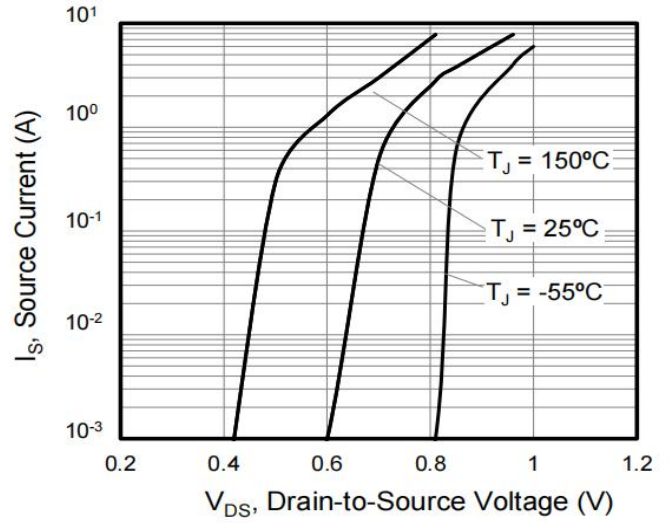
- \* 1. Repetitive rating,pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

**Typical Feature Curve**

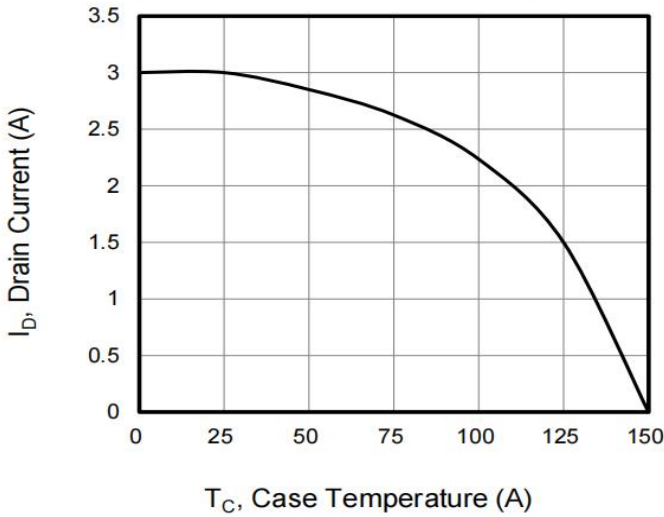
**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**



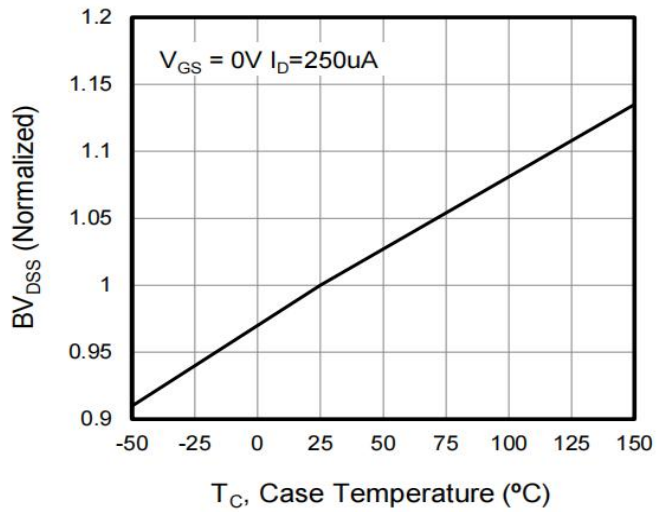
**Figure 2. Body Diode Forward Voltage**



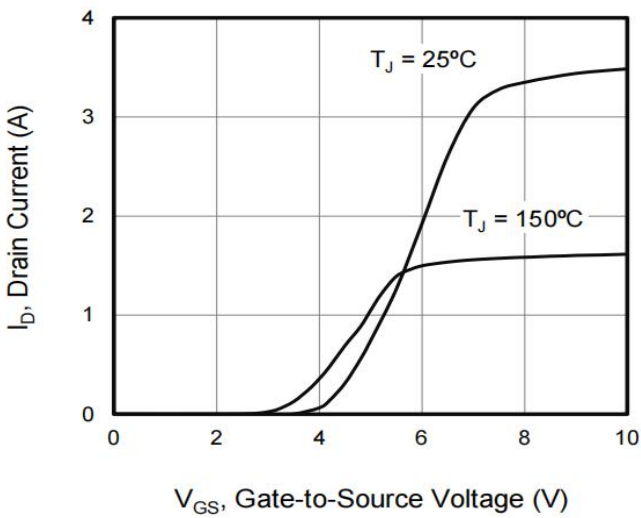
**Figure 3. Drain Current vs. Temperature**



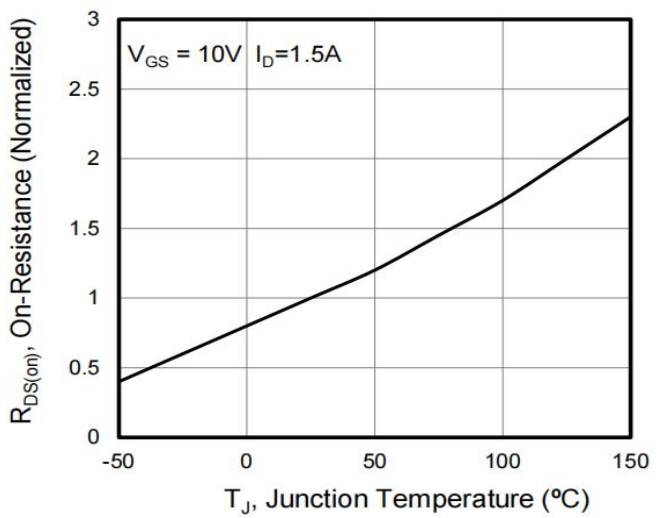
**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**



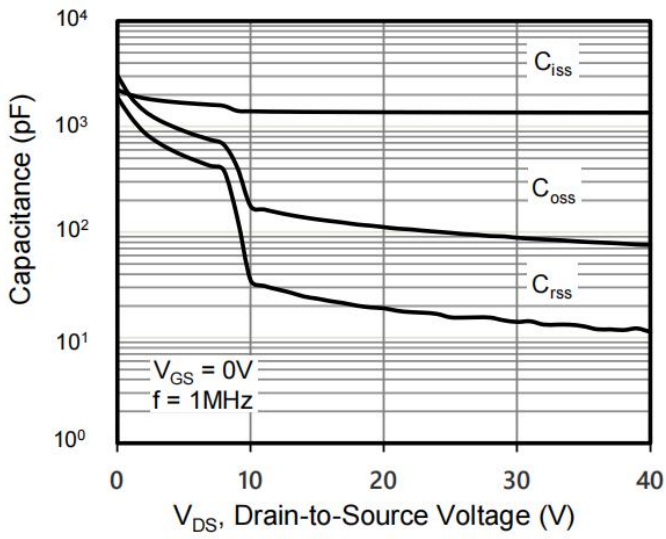
**Figure 5. Transfer Characteristics**



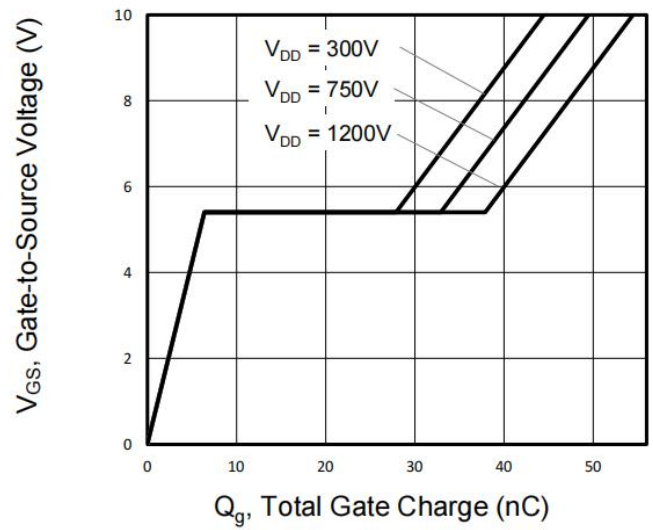
**Figure 6. On-Resistance vs. Temperature**



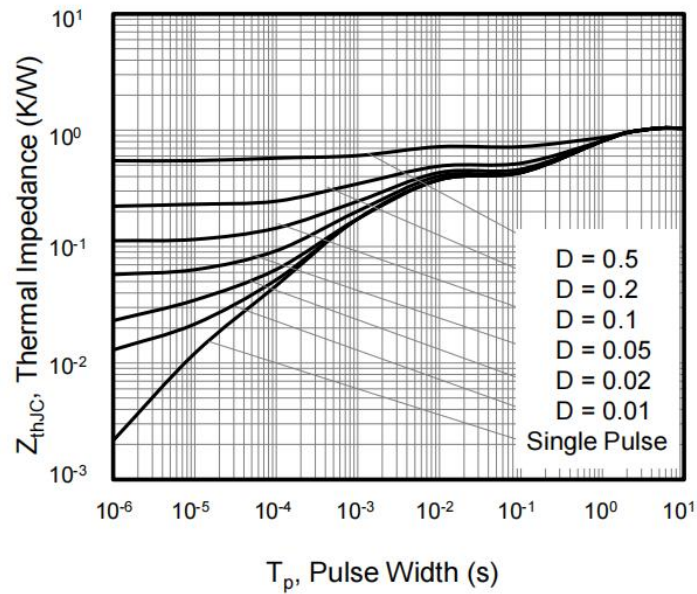
**Figure 7. Capacitance**



**Figure 8. Gate Charge**



**Figure 9. Transient Thermal Impedance**



**Test Circuits and Waveforms**

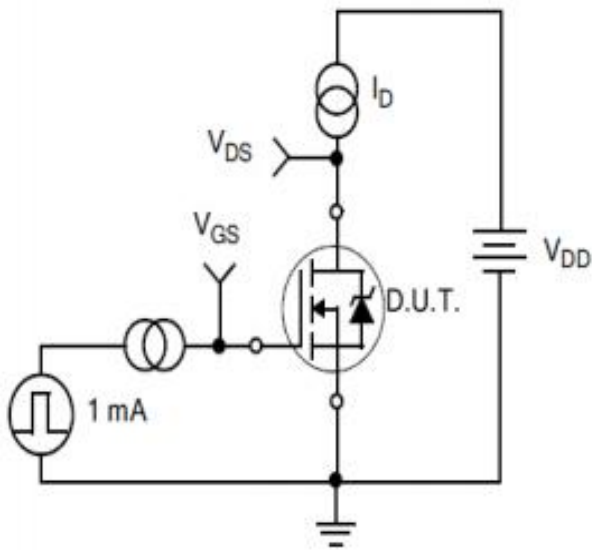


Figure10.  
Gate Charge Test Circuit

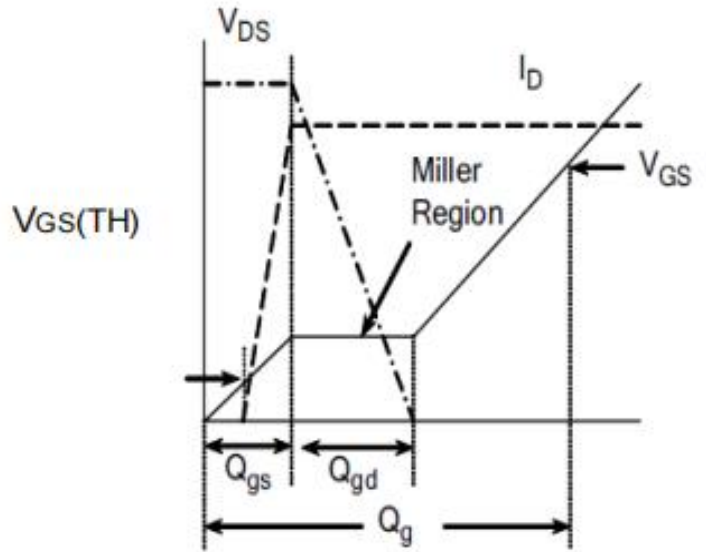


Figure11.  
Gate Charge Waveform

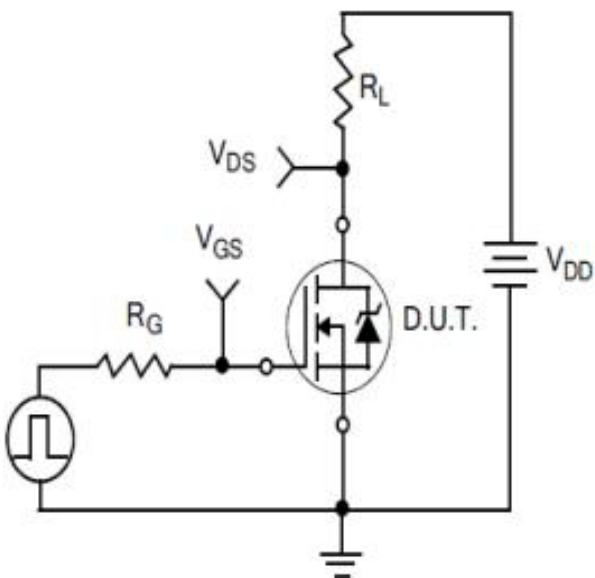


Figure12.  
Resistive Switching Test Circuit

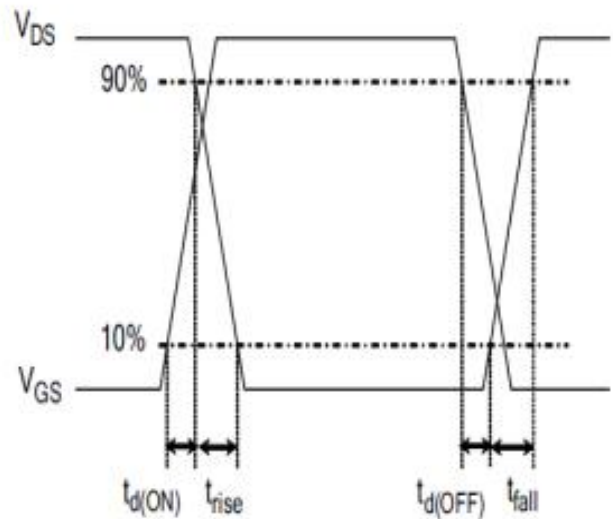


Figure13.  
Resistive Switching Waveforms

**Test Circuits and Waveforms**

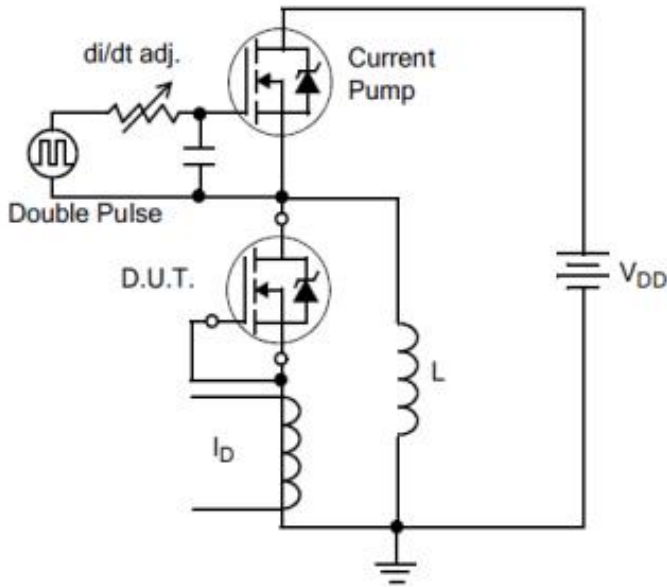


Figure 14. Diode Reverse Recovery Test Circuit

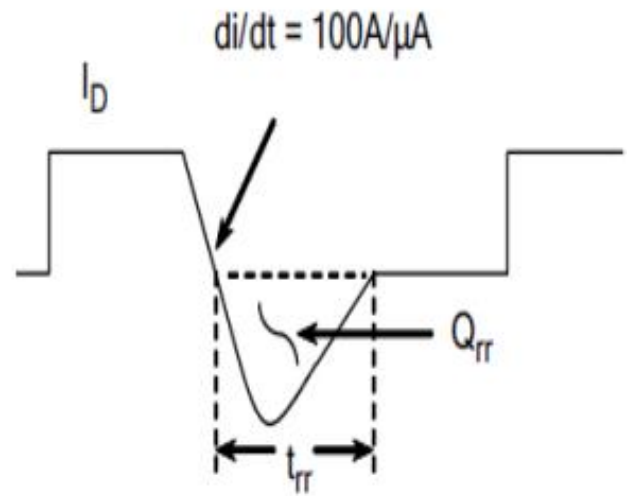


Figure 15. Diode Reverse Recovery Waveform

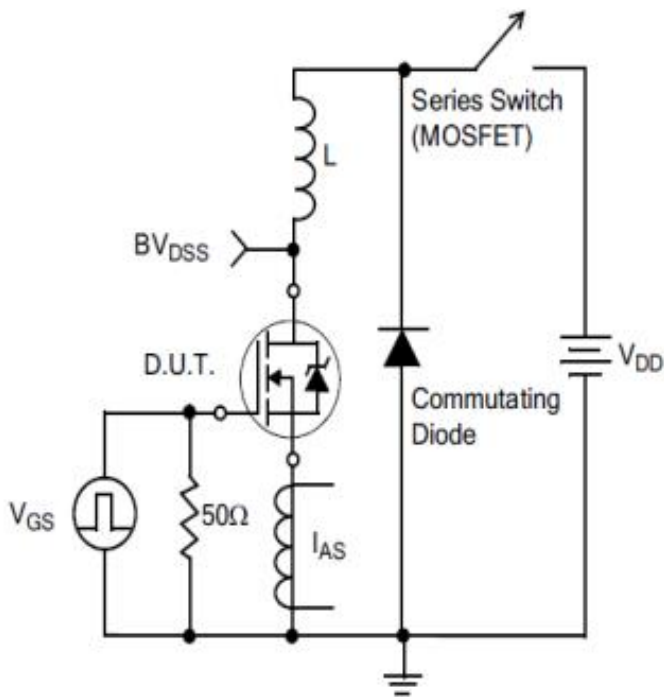
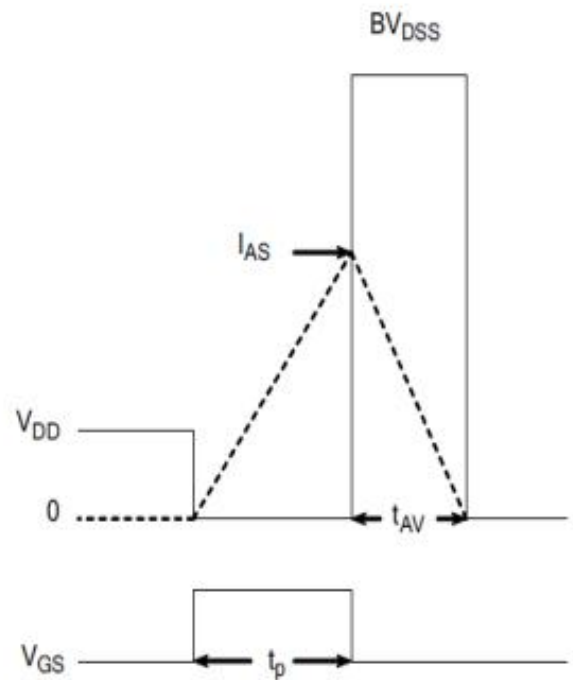


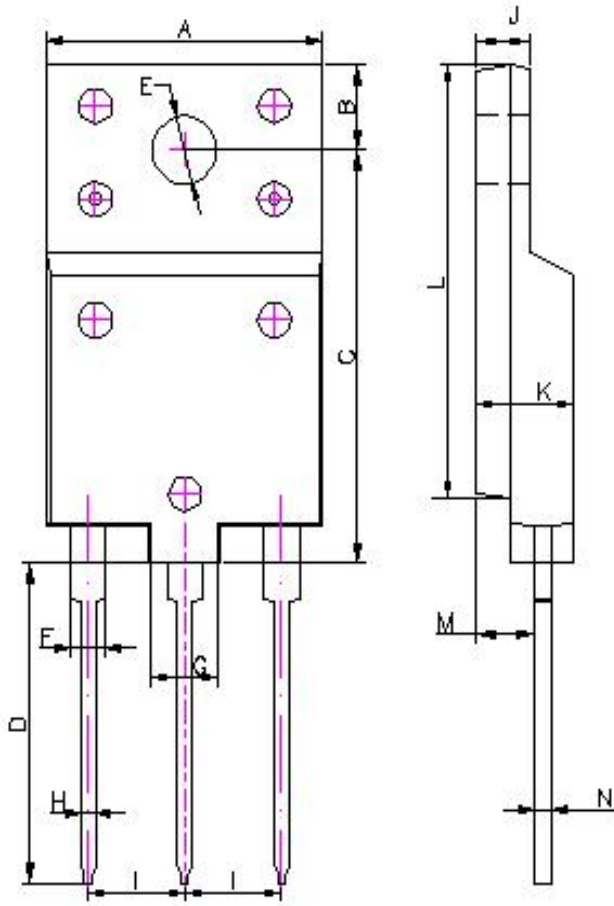
Figure 16. Unclamped Inductive Switching Test Circuit



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

Figure 17. Unclamped Inductive Switching Waveforms

Package outline drawing(TO-3PF Unit: mm )



SYMBOLS	MILLIMETERS	
	MIN	MAX
A	15.30	15.70
B	4.30	4.70
C	21.80	22.20
D	16.70	17.30
E	3.45	3.75
F	1.85	2.15
G	3.85	4.15
H	0.75	0.95
I	5.35	5.55
J	2.80	3.20
K	5.30	5.70
L	22.80	23.20
M	3.25	3.55
N	0.80	1.00
P	14.4	15.00



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