

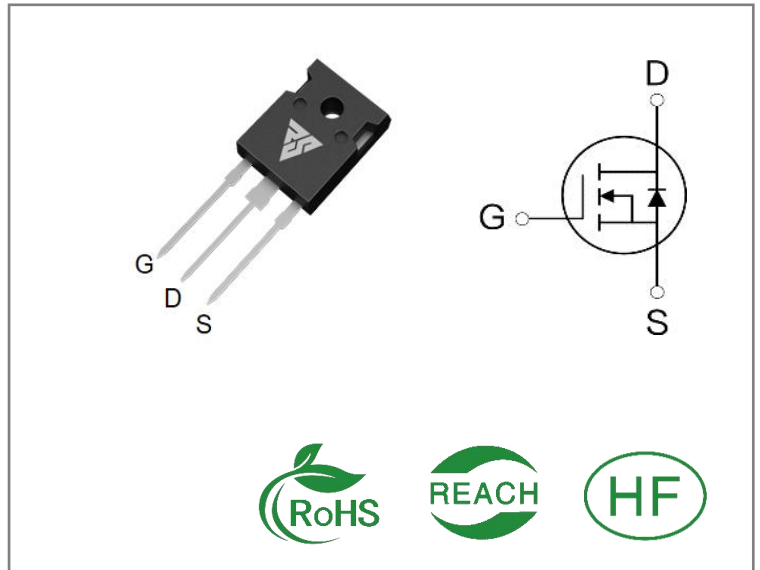
ID	R <sub>Ds(ON)</sub> (Typ)	VDSS
30A	85mΩ	500V

**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.
RS30N50W	T0-247-3	RS30N50W	Tube	30 PCS

**Absolute Maximum Ratings** T<sub>c</sub>= 25°C unless otherwise specified

Symbol	Parameter	RS30N50W	Units
VDSS	Drain-to-Source Voltage	500	V
ID	Continuous Drain Current TC=25°C	30	A
IDM	Pulsed Drain Current (Note*1)	120	
PD	Power Dissipation	320	W
VGS	Gate- to- Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy L = 10mH,,VDD = 50V, RG = 25Ω	2800	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	RS30N50W	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	0.38	°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	500	--	--	V	VGS=0V, ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=500V, VGS=0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=30V , VDS=0V
	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)	--	85	120	mΩ	VGS=10V, ID=15A
VGS(TH)	Gate Threshold Voltage	3	--	4	V	VGS=VDS, ID=250μA

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	60	--	nS	VDS=250V ID=30A RG=25Ω
trise	Rise Time	--	130	--		
td(OFF)	Turn- OFF Delay Time	--	100	--		
tfall	Fall Time	--	91	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	7850	--	pF	VGS=0V VDS=25V f=1.0MHz
Coss	Output Capacitance	--	750	--		
Crss	Reverse Transfer Capacitance	--	30	--		
Qg	Total Gate Charge	--	150	--	nC	VDS=400V ID=30A VGS=10V
Qgs	Gate- to- Source Charge	--	36	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	56	--		

**Source- Drain Diode Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	30	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	120	A	
VSD	Diode Forward Voltage	--	--	1.2	V	IS=15A,VGS=0V
trr	Reverse Recovery Time	--	500	--	nS	VGS=0V IS=30A,di/dt=100 A/μs
Qrr	Reverse Recovery Charge	--	8.3	--	μC	

**Notes:**

- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 1\%$

Typical Feature Curve

Figure 1. Output Characteristics (T<sub>J</sub> = 25°C)

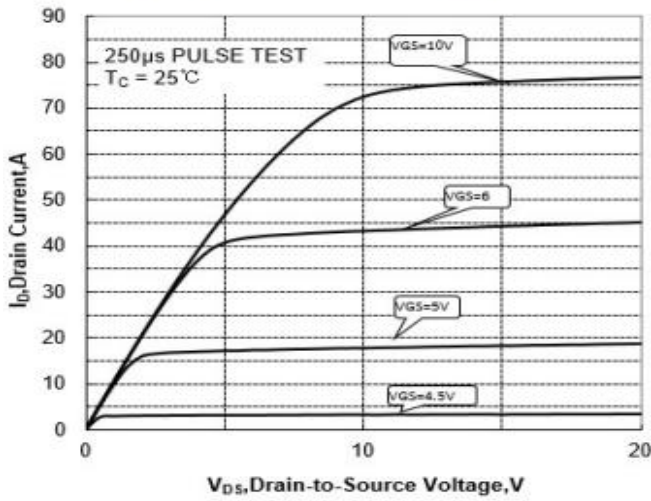


Figure 2. Safe Operating Area

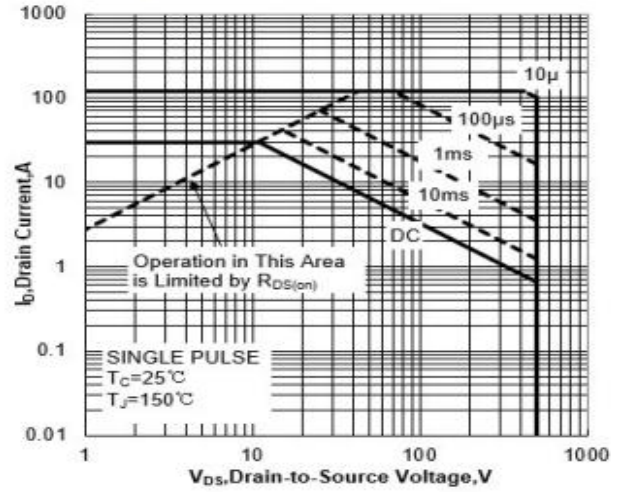


Figure 3. Drain Current vs. Temperature

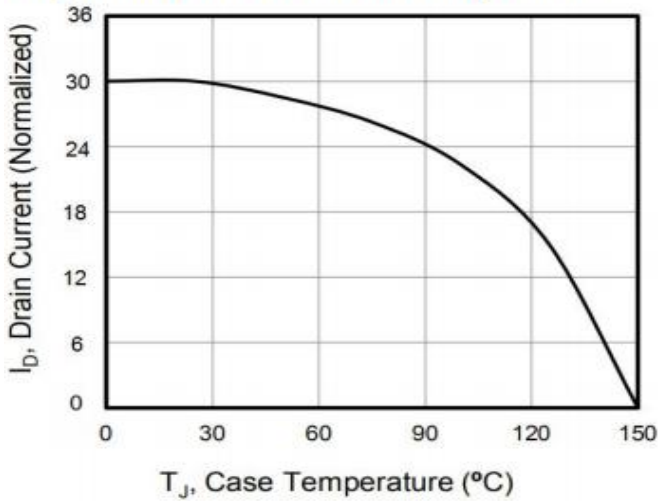


Figure 4. BVDSS Variation vs. Temperature

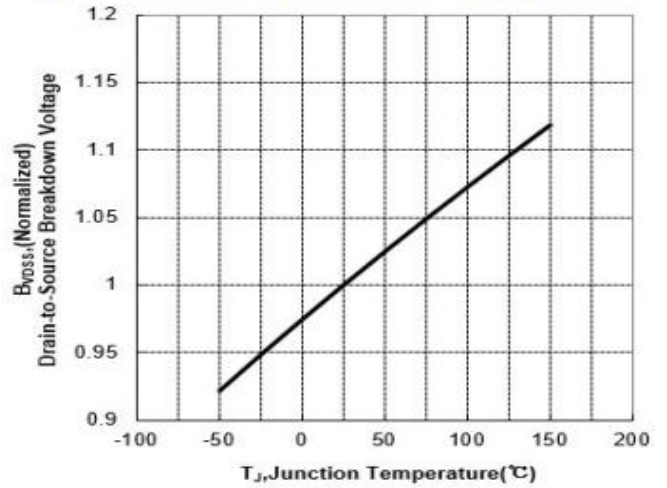


Figure 5. Transfer Characteristics

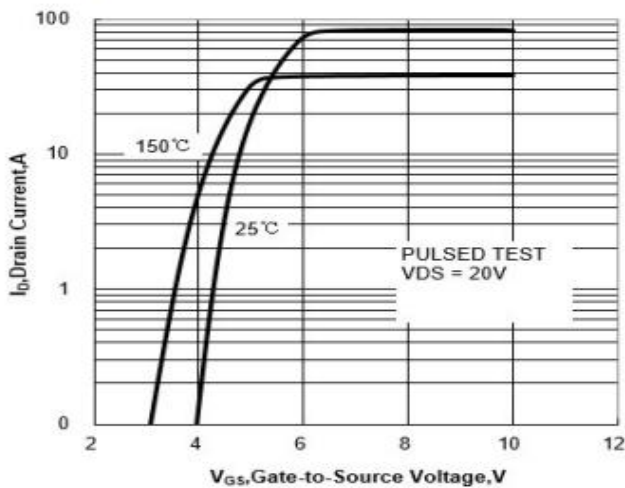
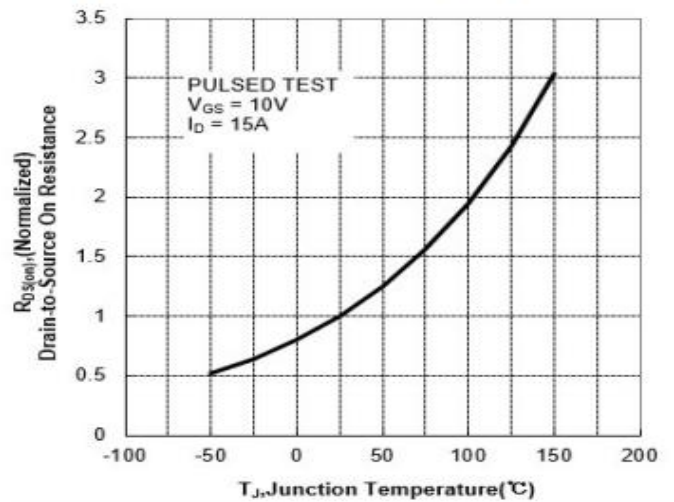
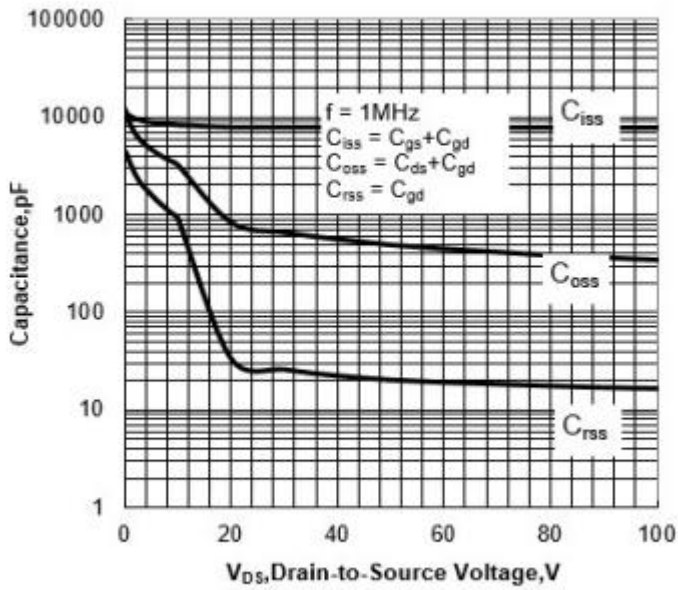


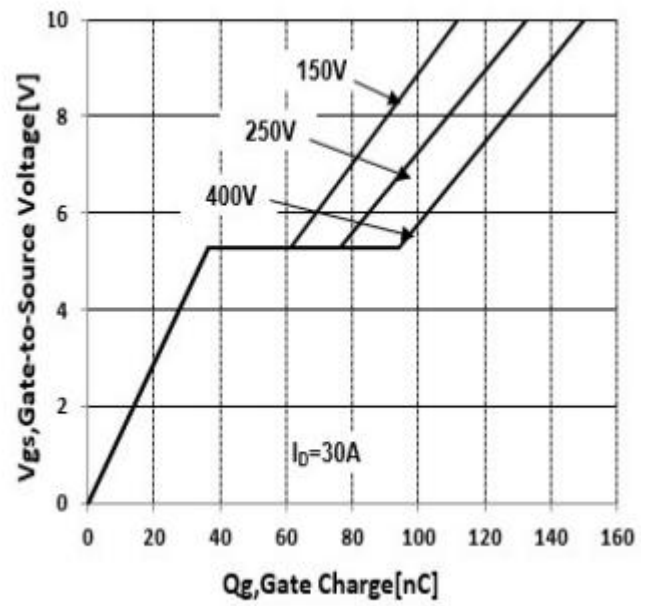
Figure 6. On-Resistance vs. Temperature



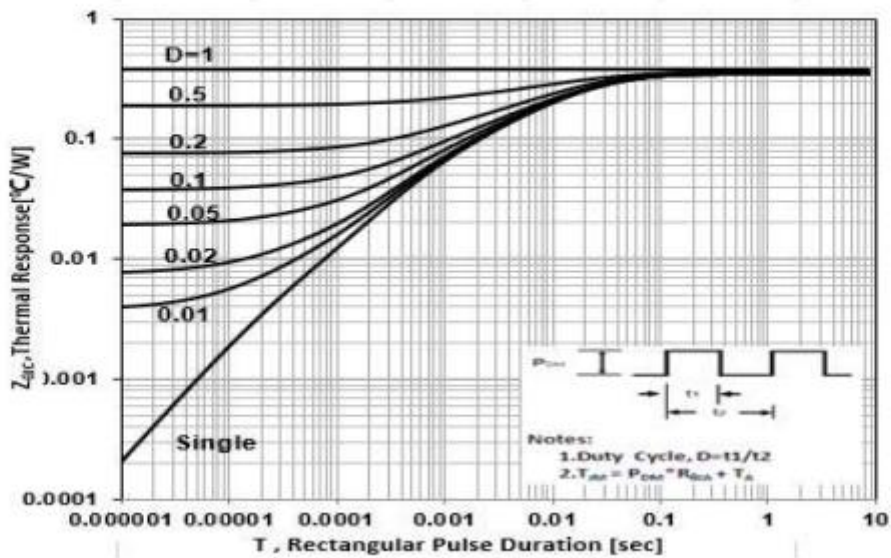
**Figure 7. Capacitance**



**Figure 8. Gate Charge**

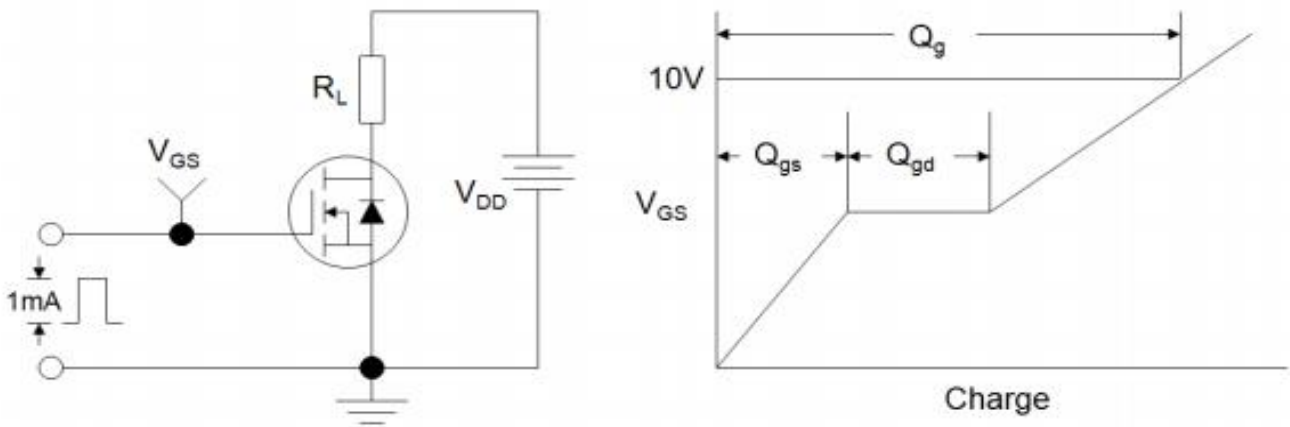


**Figure 9. Transient Thermal Impedance**

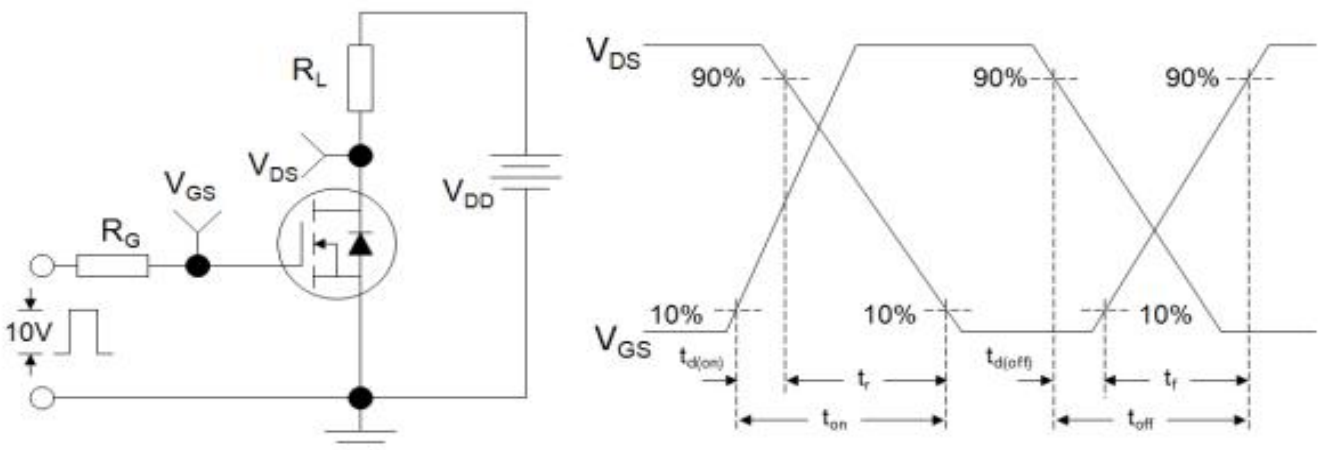


**Test Circuits and Waveforms**

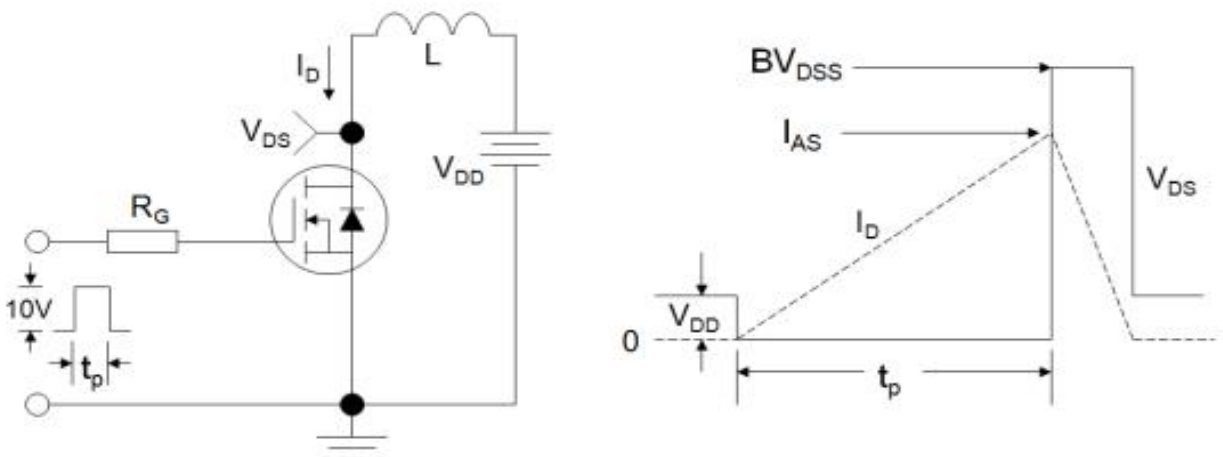
**Figure A: Gate Charge Test Circuit and Waveform**



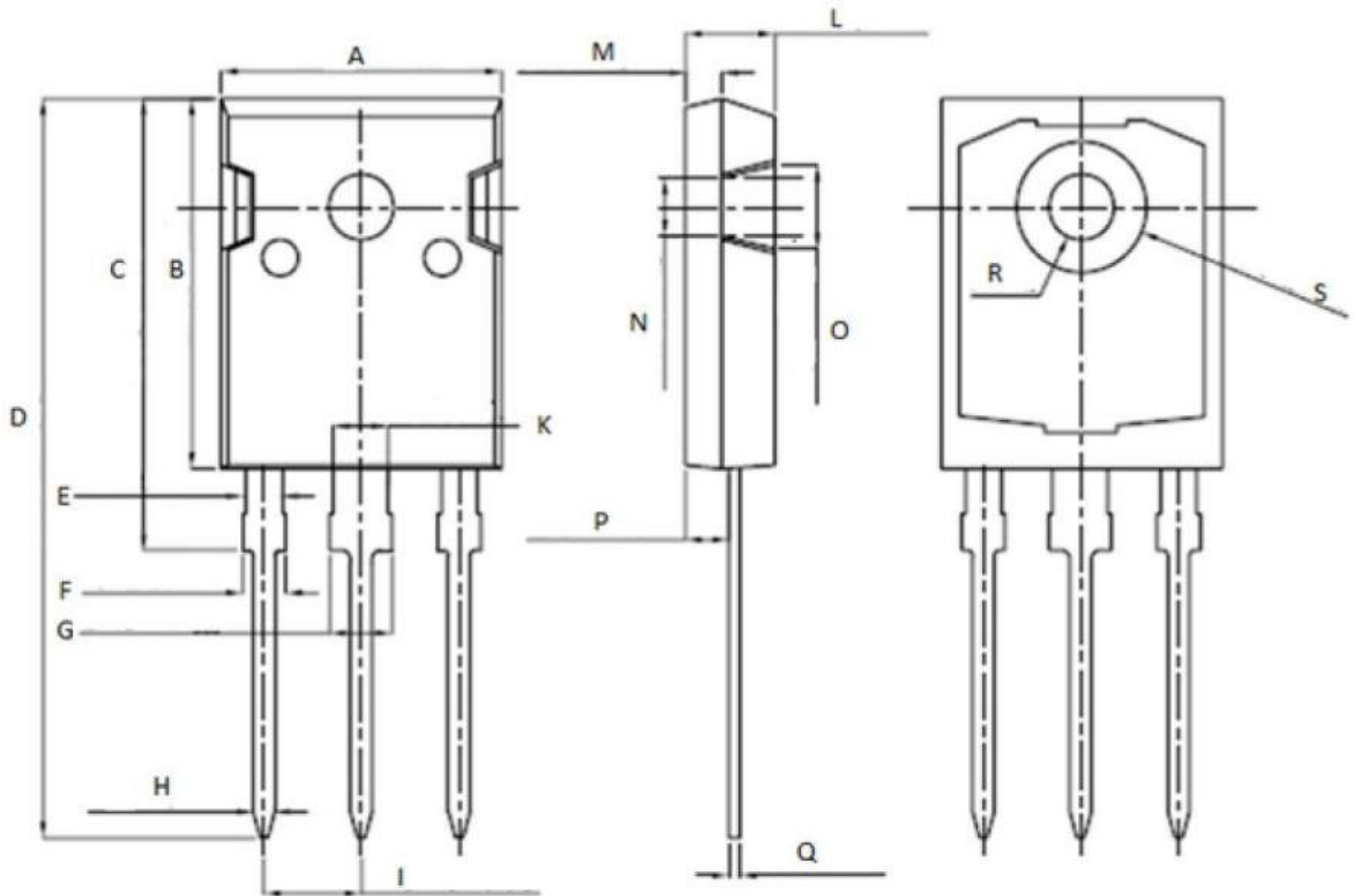
**Figure B: Resistive Switching Test Circuit and Waveform**



**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**



Package outline drawing(TO-247 Unit: mm )



Unit: mm		
Symbol	Min.	Max.
A	15.95	16.25
B	20.85	21.25
C	20.95	21.35
D	40.5	40.9
E	1.9	2.1
F	2.1	2.25
G	3.1	3.25
H	1.1	1.3
I	5.40	5.50

Unit: mm		
Symbol	Min.	Max.
K	2.90	3.10
L	4.90	5.30
M	1.90	2.10
N	4.50	4.70
O	5.40	5.60
P	2.29	2.49
Q	0.51	0.71
R	φ 3.5	φ 3.7
S	φ 7.1	φ 7.3

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