

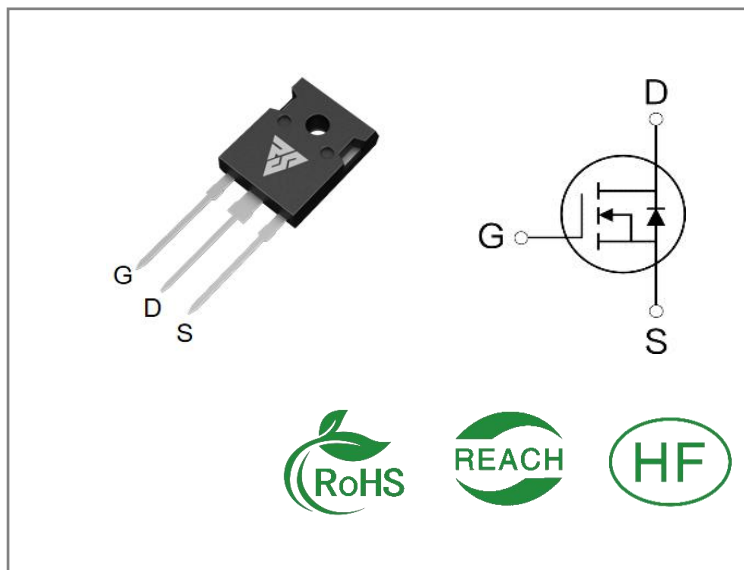
ID	$R_{DS(ON)}$ (Typ)	VDSS
45A	0.105 Ω	500V

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
- Fast Recovery Time



Ordering Information

Part Number	Package	Marking	Packing	Qty.
RSF45N50W	T0-247-3	RSF45N50W	Tube	30 PCS

Absolute Maximun Ratings $T_c = 25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	RSF45N50W	Units
VDSS	Drain-to-Source Voltage	500	V
ID	Continuous Drain Current $T_C = 25^{\circ}\text{C}$	45	A
IDM	Pulsed Drain Current (Note*1)	180	
PD	Power Dissipation	250	W
VGS	Gate- to- Source Voltage	± 30	V
EAS	Single Pulse Avalanche Engergy $L = 10\text{mH}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$	2580	mJ
TL TPKG	Maximum Temperature for Soldering	300	$^{\circ}\text{C}$
	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	RSF45N50W	Units	Test Conditions
R θ JC	Junction-to-Case	0.5	$^{\circ}\text{C} / \text{W}$	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 $^{\circ}\text{C}$
R θ JA	Junction-to- Ambient	40		1 cubic foot chamber,free air.

OFF Characteristics TJ= 25 $^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	500	--	--	V	VGS=0V,ID=250 μA
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 TJ=25 $^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance(Note*2)	--	0.105	0.12	Ω	VGS=10V,ID=22.5A
VGS(TH)	Gate Threshold Voltage	3	--	4	V	VGS=VDS,ID=250 μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	66	--	nS	VDS=250V ID=45A VGS=10V RG=25 Ω
trise	Rise Time	--	85	--		
td(OFF)	Turn- OFF Delay Time	--	370	--		
tfall	Fall Time	--	160	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	7890	--	pF	VGS=0V VDS=25V f=1.0MHz
Coss	Output Capacitance	--	678	--		
Crss	Reverse Transfer Capacitance	--	10	--		
Qg	Total Gate Charge	--	126	--	nC	VDS=400V ID=45A VGS=10V
Qgs	Gate- to- Source Charge	--	36	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	32	--		

Source- Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	45	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	180	A	
VSD	Diode Forward Voltage	--	--	1.4	V	IS=22.5A,VGS=0V
trr	Reverse Recovery Time	--	130	--	nS	VGS=0V IS=45A,di/dt=100A /μs
Qrr	Reverse Recovery Charge	--	0.57	--	μC	

Notes:

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

Typical Feature Curve

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

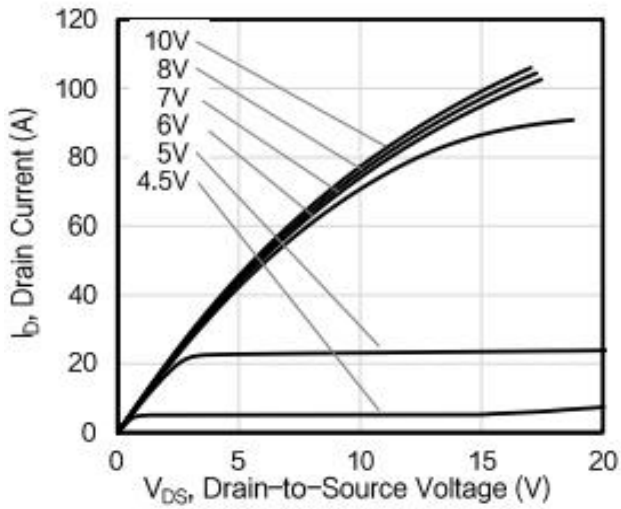


Figure 2. Body Diode Forward Voltage

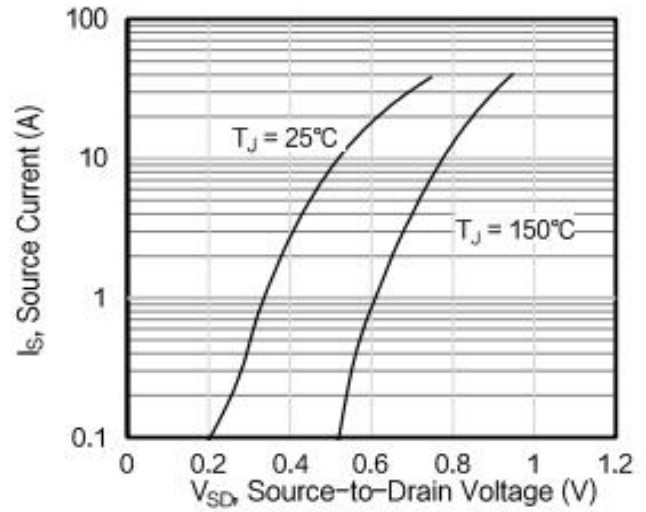


Figure 3. Drain Current vs. Temperature

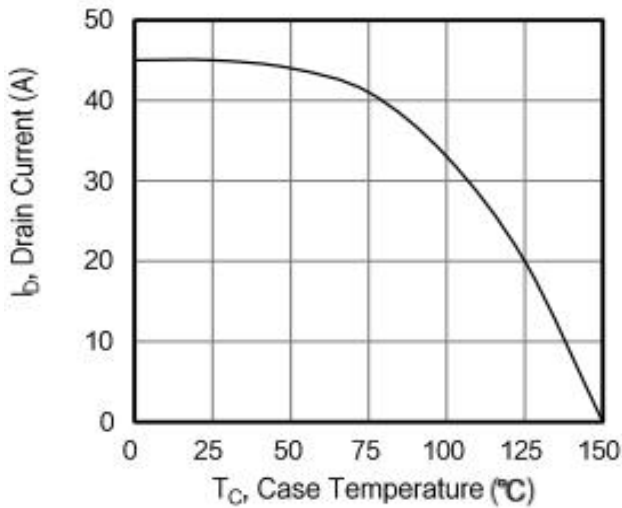


Figure 4. BV_{DSS} Variation vs. Temperature

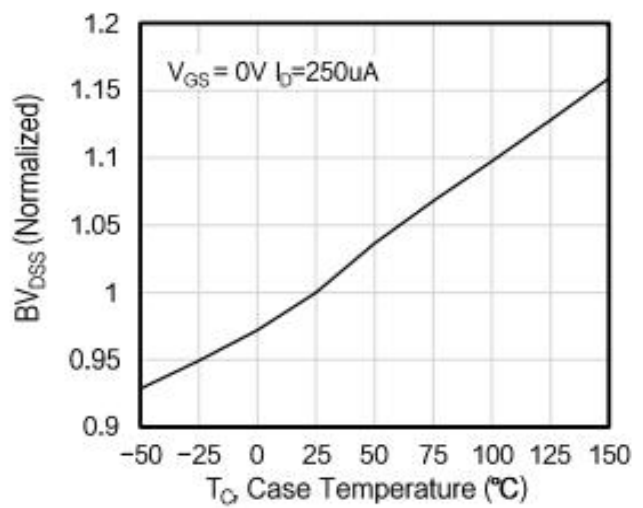


Figure 5. Transfer Characteristics

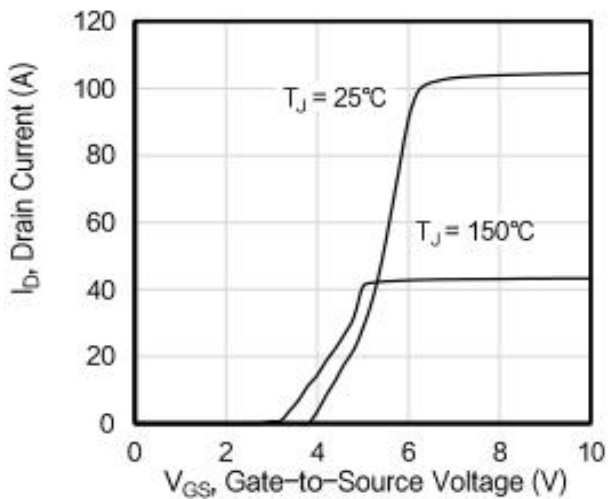


Figure 6. On-Resistance vs. Temperature

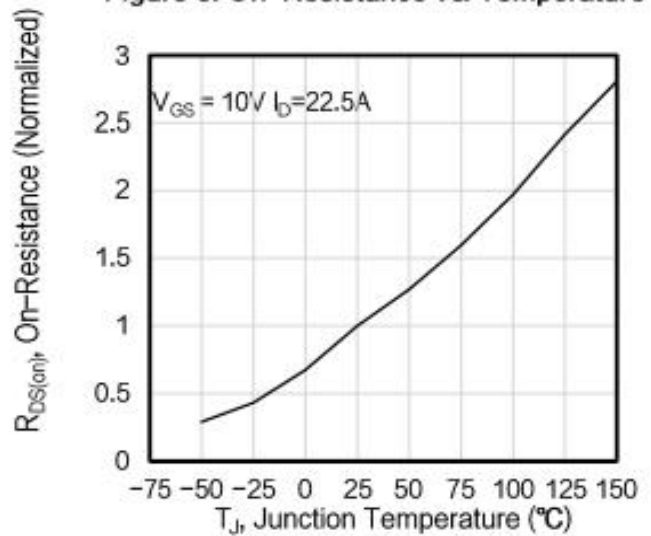


Figure 7. Capacitance

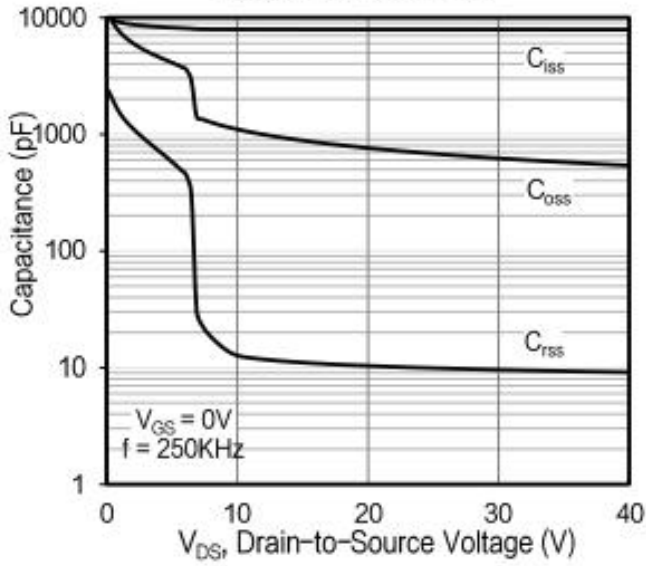


Figure 8. Gate Charge

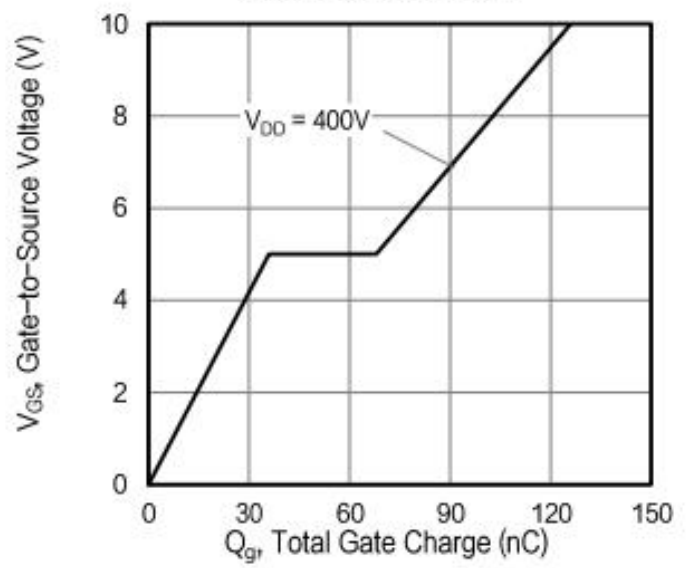
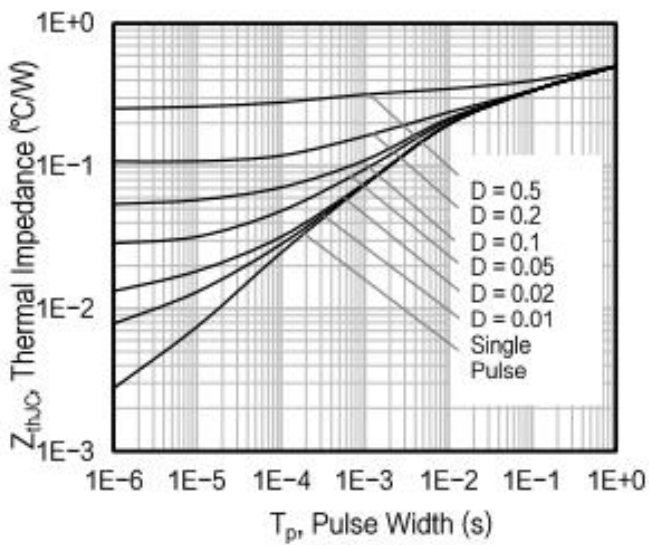


Figure 9. Transient Thermal Impedance



Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

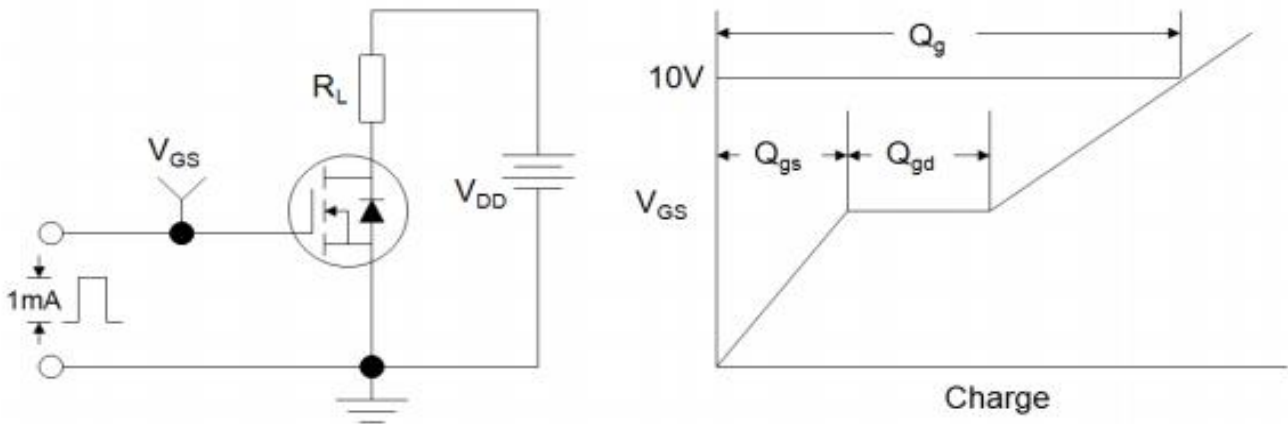


Figure B: Resistive Switching Test Circuit and Waveform

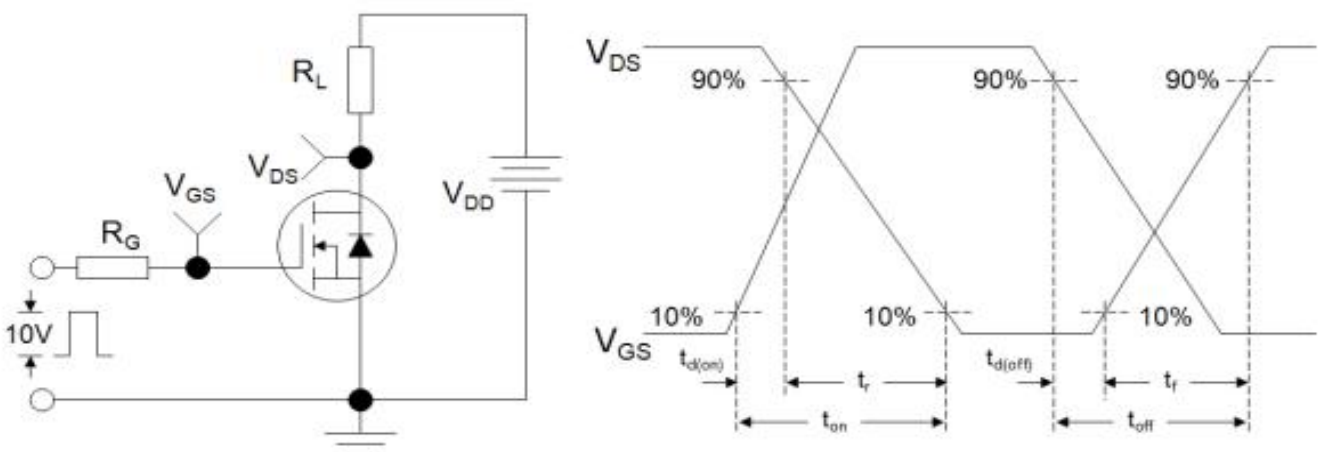
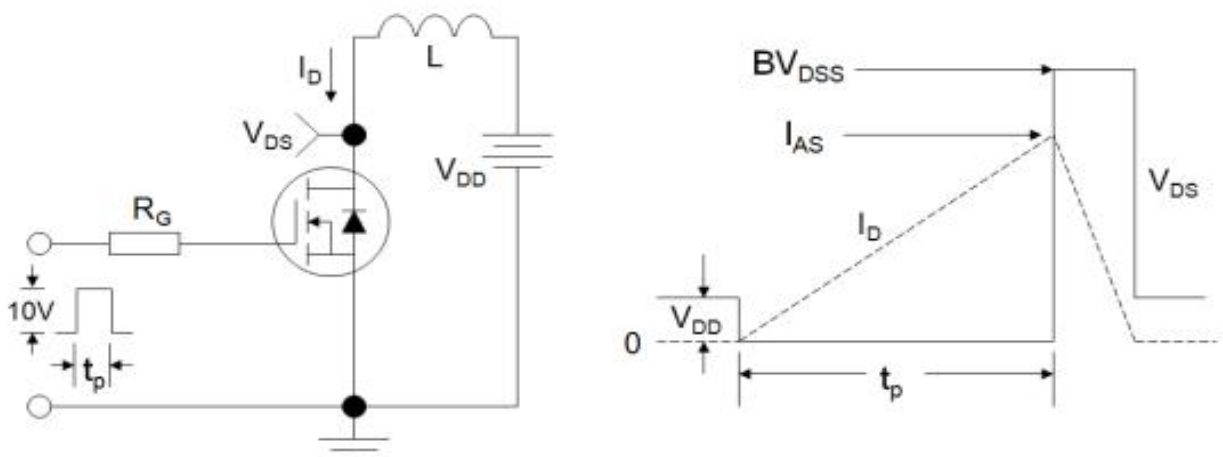
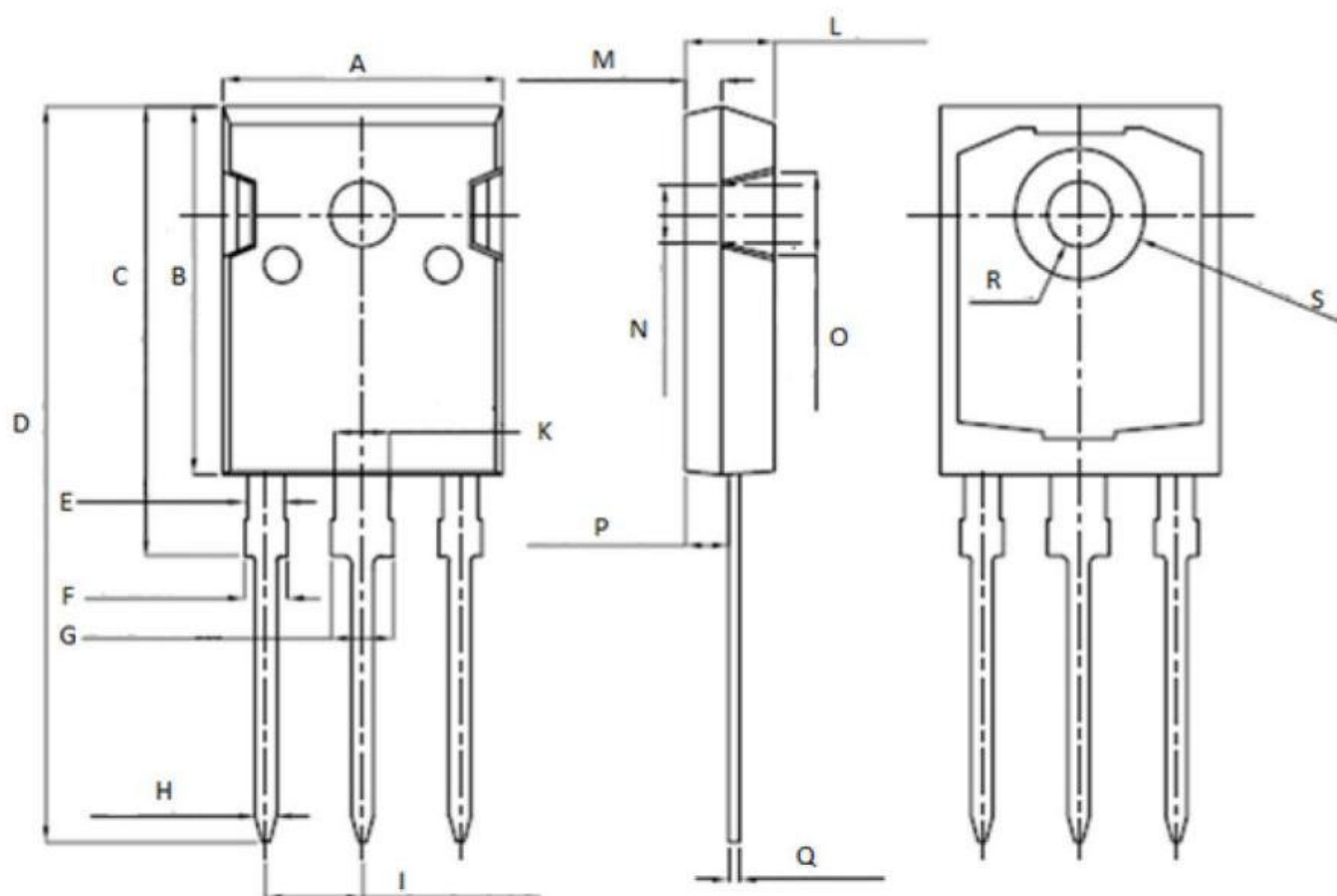


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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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