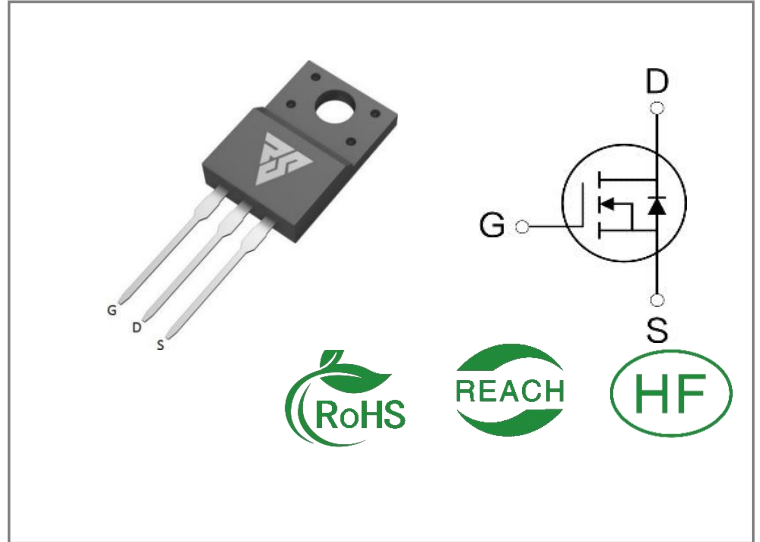


<b>ID</b>	<b>R<sub>DS(ON)</sub>(Typ)</b>	<b>VDSS</b>
20A	160mΩ	650V


**Applications:**

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

**Features:**

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

**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RS65R190F	T0-220F	RS65R190F	Tube	50 PCS

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

Symbol	Parameter	RS65R190F	Units
VDSS	Drain-to-Source Voltage	650	V
ID	Continuous Drain Current TC=25°C	20	A
ID	Continuous Drain Current TC=100°C	13	
IDM	Pulsed Drain Current (Note*1)	60	
PD	Power Dissipation	34	W
VGS	Gate- to- Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy L=10mH,VDS= 50V, RG = 25 Ω, TC=25°C	310	mJ
dv/dt	MOSFET dv/ dt ruggedness VDS = 0...400V	50	V/ns
dv/dt	Reverse diode dv/dt VDS = 0...400V, Tj = 25°C, ISD≤ID	15	V/ns
TL TPKG	Maximum Temperature for Soldering	300	°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	RS65R190F	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	3.7	°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	80		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	650	--	--	V	VGS=0V, ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=650V, VGS=0 V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=30V , VDS=0V
	Gate- to- Source Reverse Leakage	--	--	-100		VGS=-30V , VDS=0 V

**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)	--	160	190	mΩ	VGS=10V, ID=10A
VGS(TH)	Gate Threshold Voltage	2	--	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	--	23	--	nS	VDS=325V ID=20A RG=25Ω
trise	Rise Time	--	35	--		
td(OFF)	Turn- OFF Delay Time	--	113	--		
tfall	Fall Time	--	28	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	1490	--	pF	VGS=0V VDS=50V f=1.0MHz
Coss	Output Capacitance	--	101	--		
Crss	Reverse Transfer Capacitance	--	2.3	--		
Qg	Total Gate Charge	--	36	--	nC	VDS=520V ID=20A VGS=10V
Qgs	Gate- to- Source Charge	--	7.2	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	16	--		

**Source- Drain Diode Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	20	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	60	A	
VSD	Diode Forward Voltage	--	--	1.4	V	IS=20A,VGS=0V
trr	Reverse Recovery Time	--	347	--	nS	VR=100V IS=20A,di/dt=100A /μs
Qrr	Reverse Recovery Charge	--	5	--	μC	

**Notes:**

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

Typical Feature Curve

Figure1. Output Characteristics

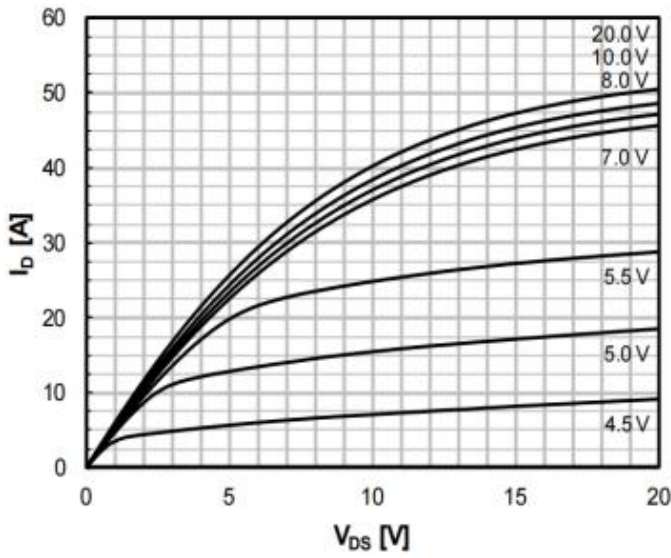


Figure2. Transfer Characteristics

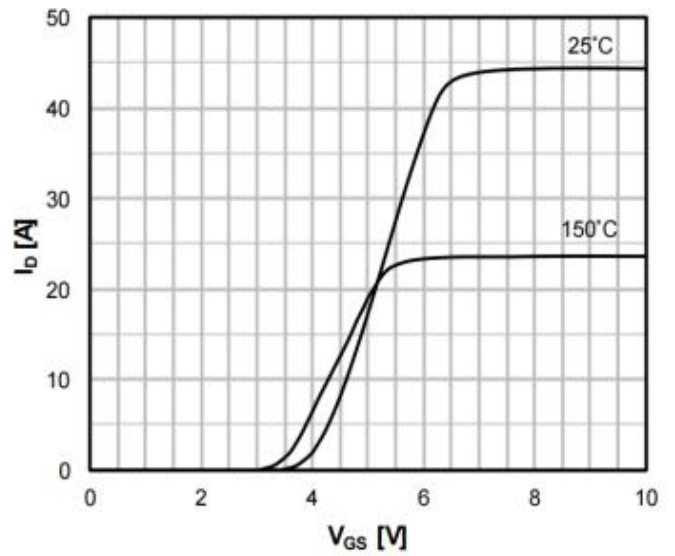


Figure 3. On-Resistance VS.Drain Current

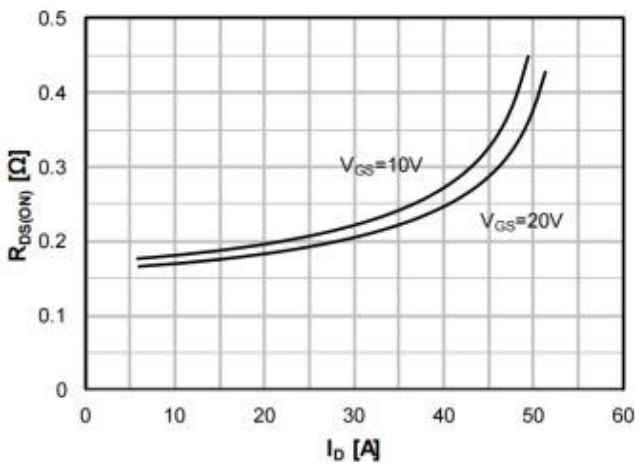


Figure 4. Capacitance

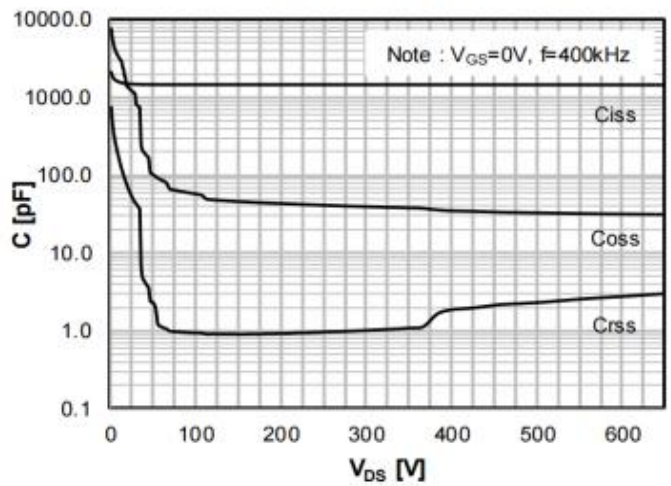


Figure 5. Gate Charge

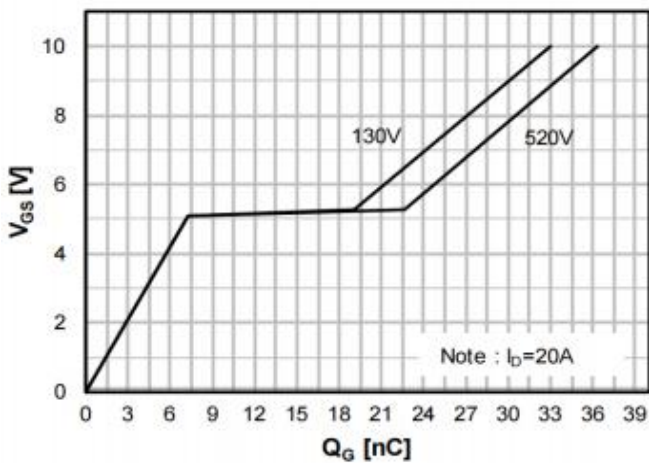
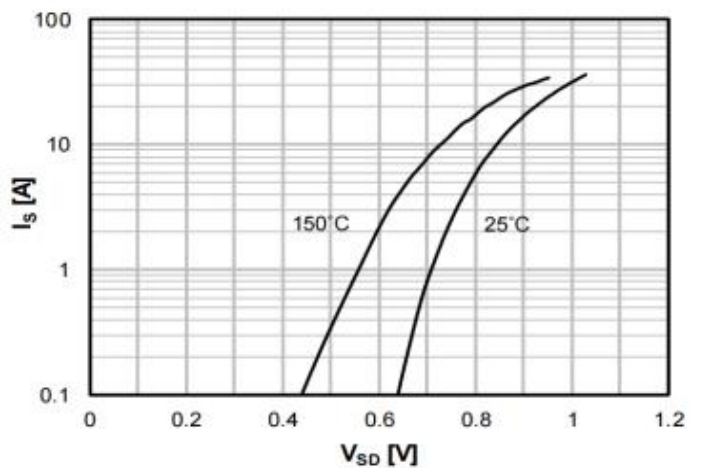
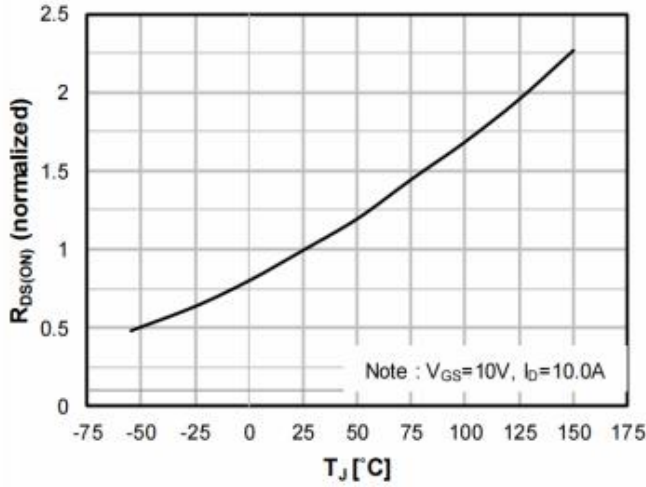


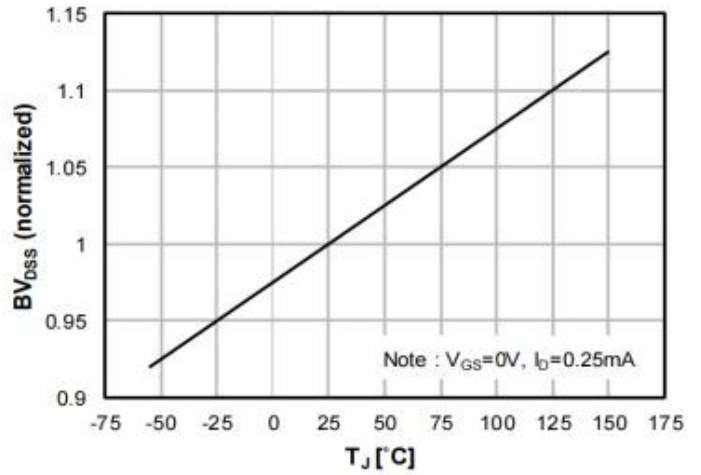
Figure 6. Body Diode Forward Voltage



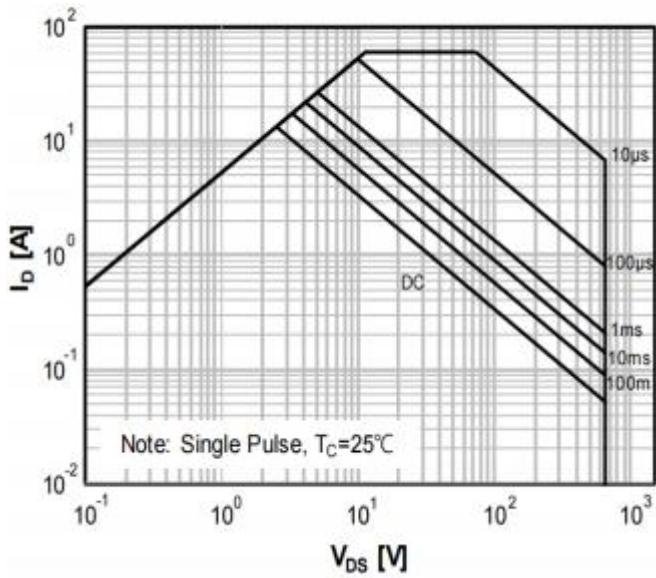
**Figure 7. On-Resistance vs. Junction Temperature**



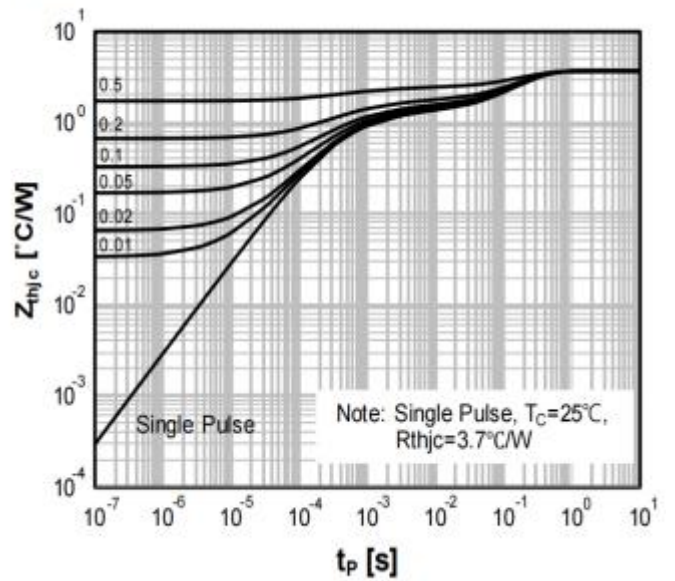
**Figure 8. Breakdown Voltage vs. Junction Temperature**



**Figure 9. Safe operation area**



**Figure 10. Transient Thermal Impedance**



Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

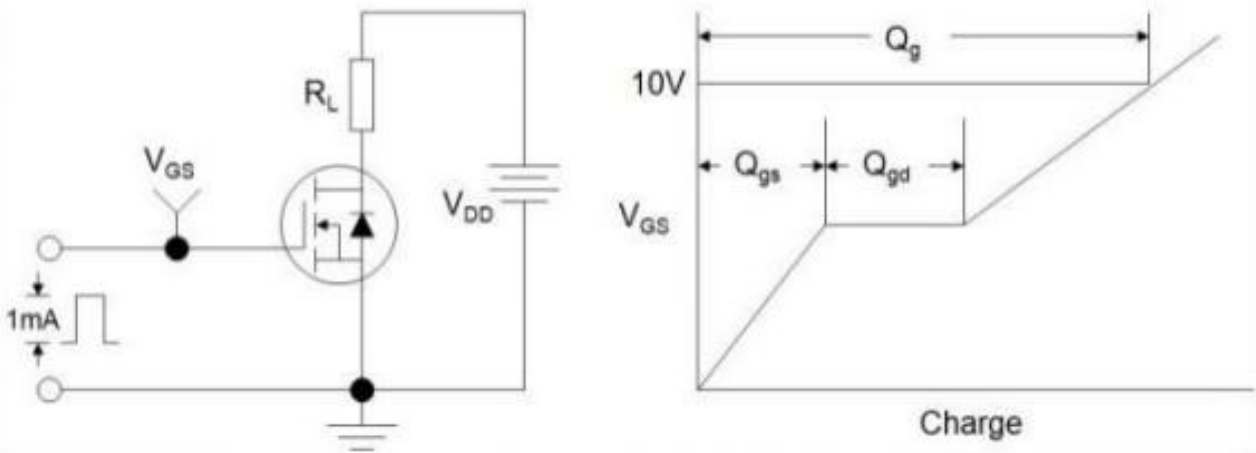


Figure B: Resistive Switching Test Circuit and Waveform

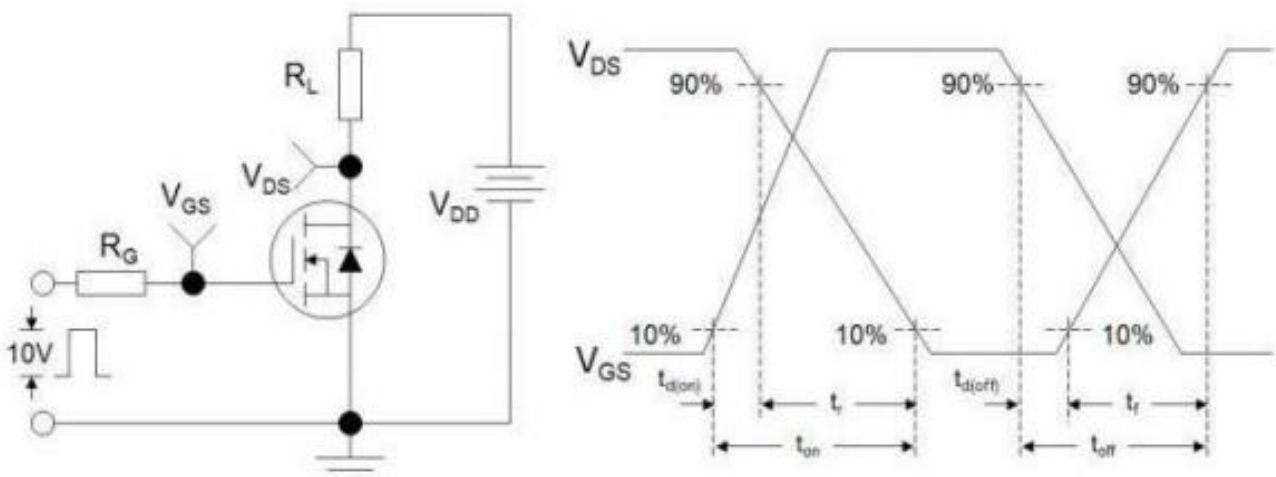
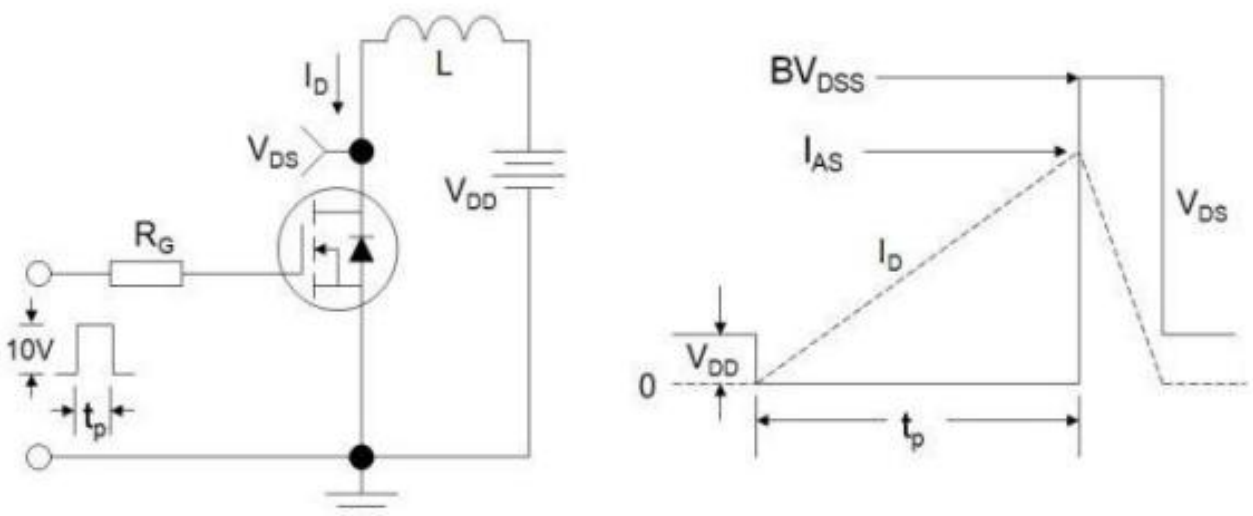
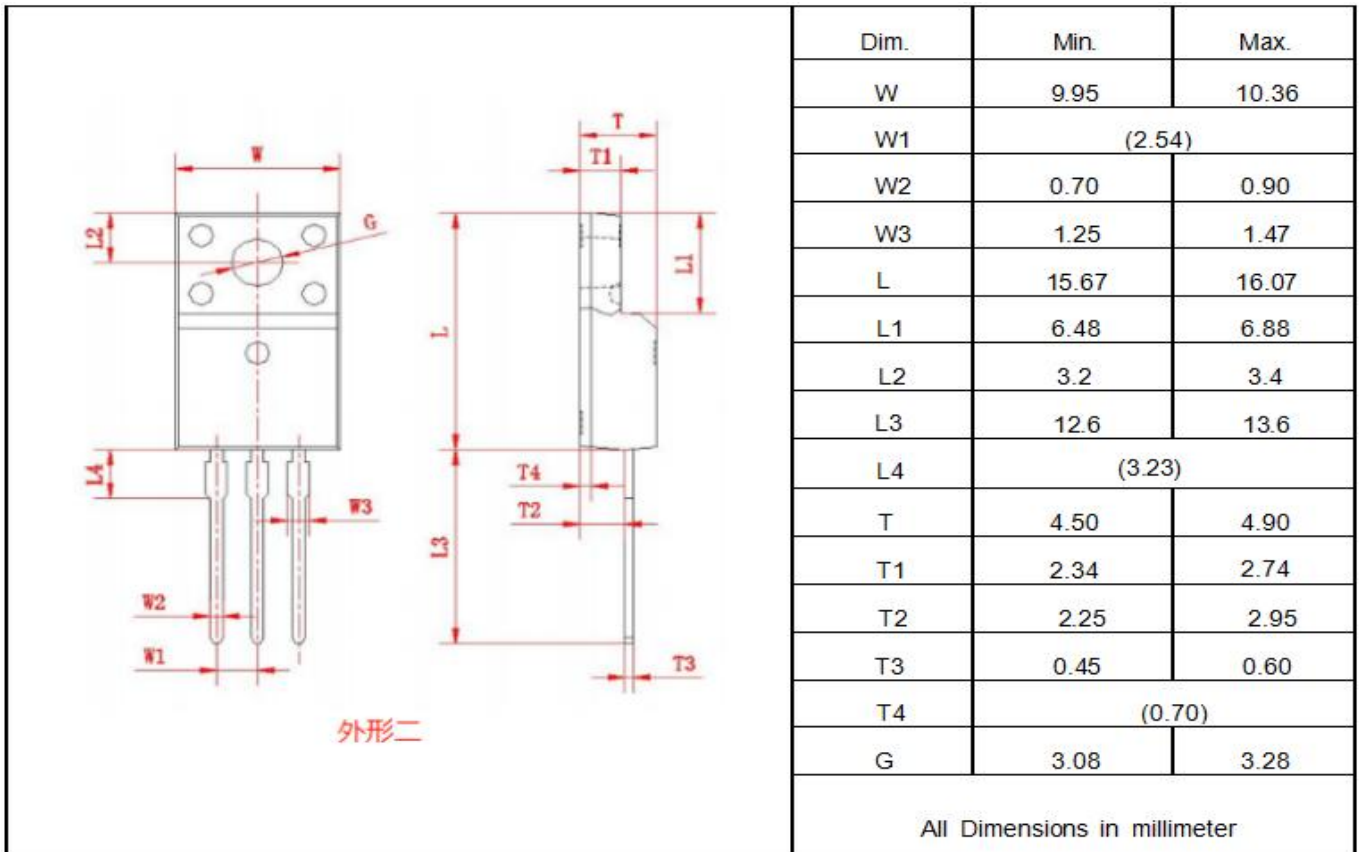
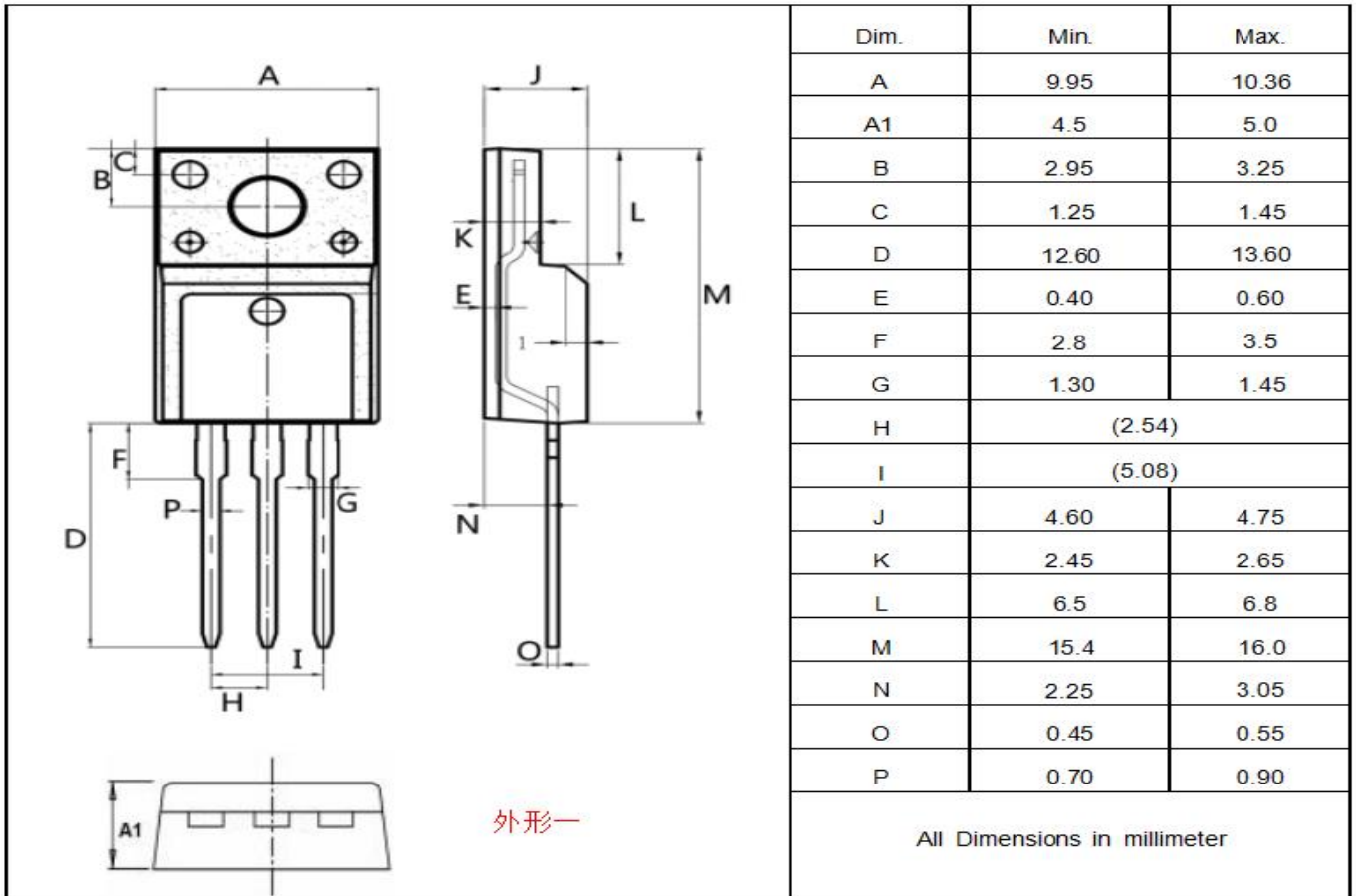


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package outline drawing (TO-220F Unit: mm)



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