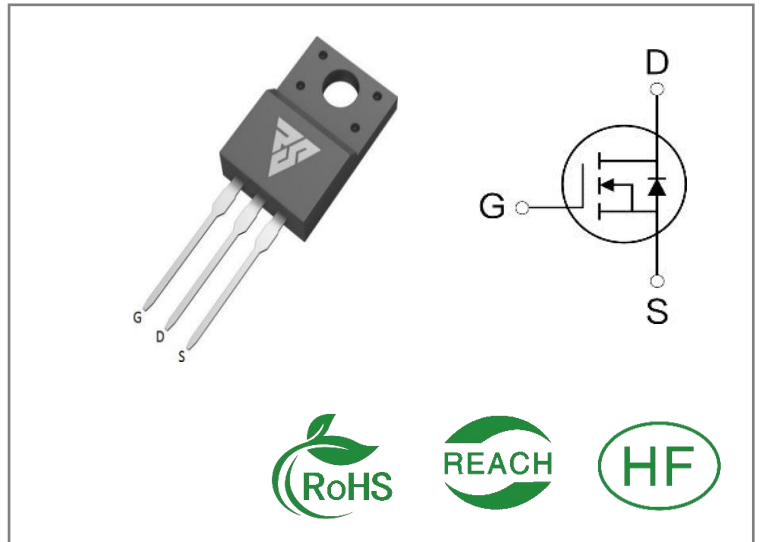


ID	R <sub>DS(ON)</sub> (Typ)	VDSS
12A	380mΩ	650V


**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.
RSU12N65F	T0-220F	RSU12N65F	Tube	50 PCS

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

Symbol	Parameter	RSU12N65F	Units
VDSS	Drain-to-Source Voltage	650	V
ID	Continuous Drain Current TC=25°C	12	A
ID	Continuous Drain Current TC=100°C	7	
IDM	Pulsed Drain Current (Note*1)	44	
PD	Power Dissipation	31	W
VGS	Gate- to- Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy L=10mH,VDS= 50V, RG = 25 Ω, TC=25°C	120	mJ
dv/dt	MOSFET dv/ dt ruggednessVDS = 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	300 260	°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	RSU12N65F	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	4	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 °C
R $\theta$ JA	Junction-to-Ambient	78		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=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)	--	380	420	mΩ	VGS=10V, ID=6A
VGS(TH)	Gate Threshold Voltage	3.5	--	4.5	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	--	21	--	nS	VDS=400V ID=6A RG=25Ω
trise	Rise Time	--	20	--		
td(OFF)	Turn- OFF Delay Time	--	51	--		
tfall	Fall Time	--	40	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	850	--	pF	VGS=0V VDS=100V f=1MHz
Coss	Output Capacitance	--	35	--		
Crss	Reverse Transfer Capacitance	--	5	--		
Qg	Total Gate Charge	--	19	--	nC	VDS=520V ID=12A VGS=10V
Qgs	Gate- to- Source Charge	--	6	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	6	--		

**Source- Drain Diode Characteristics**

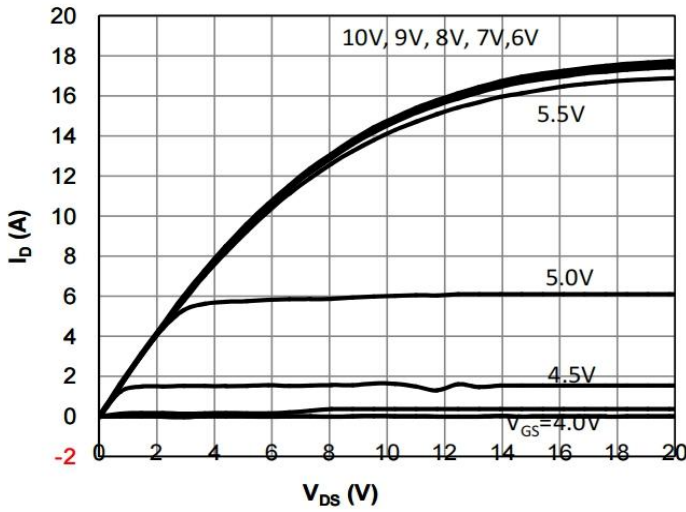
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	12	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	44	A	
VSD	Diode Forward Voltage	--	0.9	1.2	V	IS=12A,VGS=0V
trr	Reverse Recovery Time	--	212	--	nS	VR=400V IS=12A,di/dt=100 A/μs
Qrr	Reverse Recovery Charge	--	2.28	--	μC	

**Notes:**

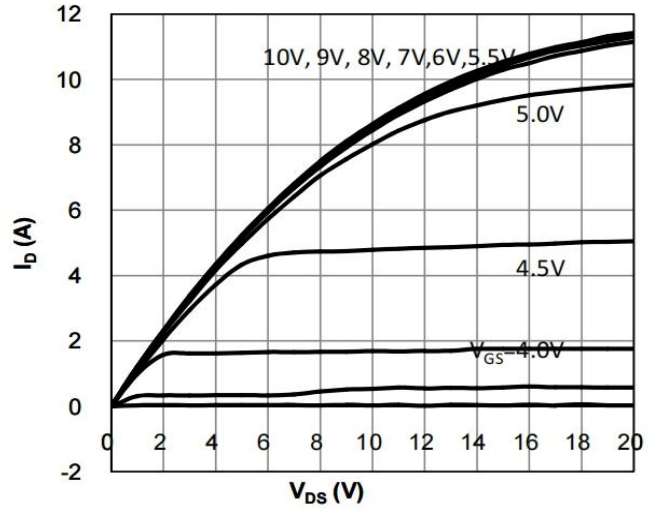
- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 1\%$

**Typical Feature Curve**

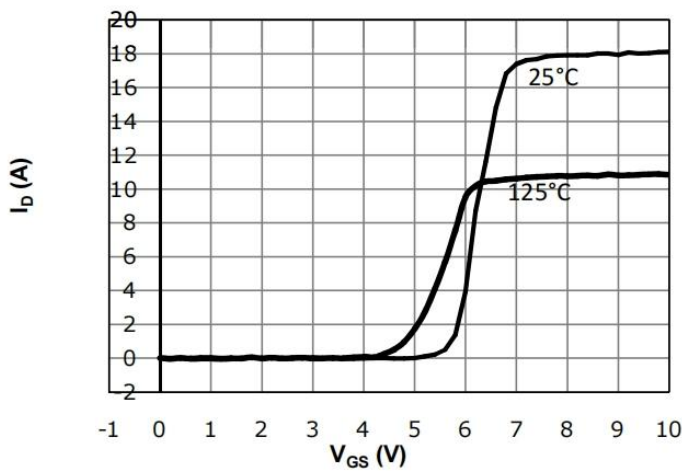
**Fig 1. Output Characteristics (Tj=25°C)**



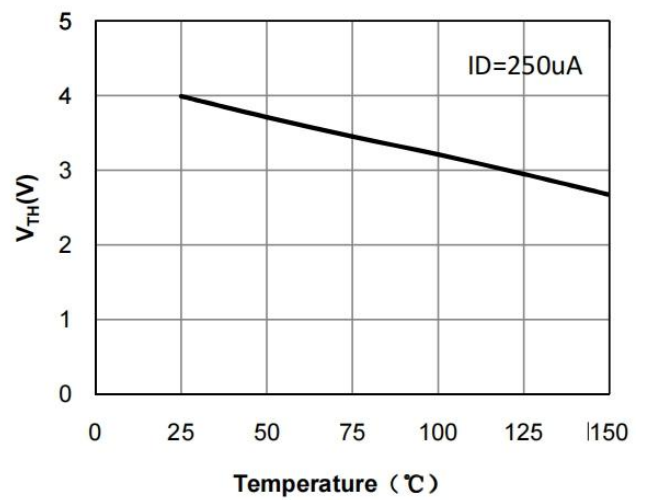
**Fig 2. Output Characteristics (Tj=125°C)**



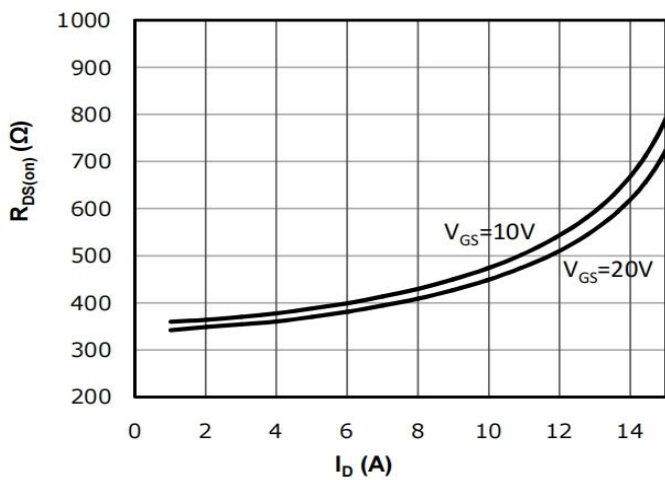
**Fig 3: Transfer Characteristics**



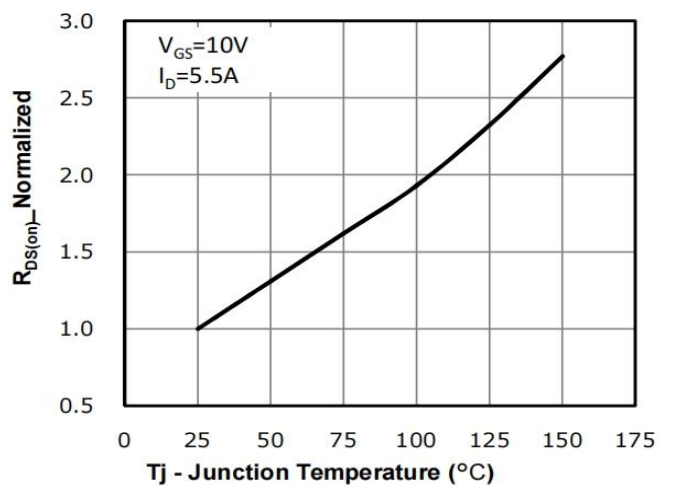
**Fig 4:  $V_{TH}$  Vs Tj Temperature Characteristics**



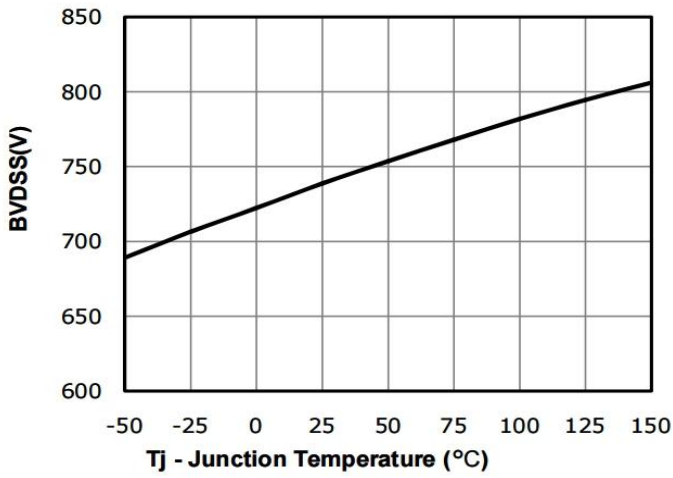
**Fig 5:  $R_{DS(on)}$  Vs  $I_{DS}$  Characteristics (Tc=25°C)**



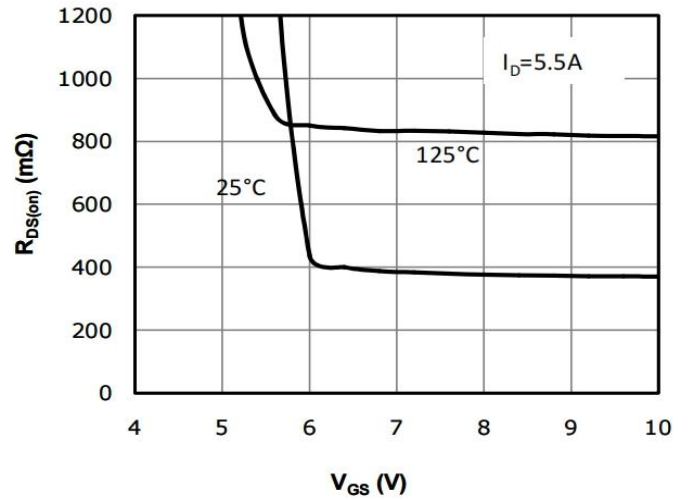
**Fig 6:  $R_{DS(on)}$  vs. Temperature**



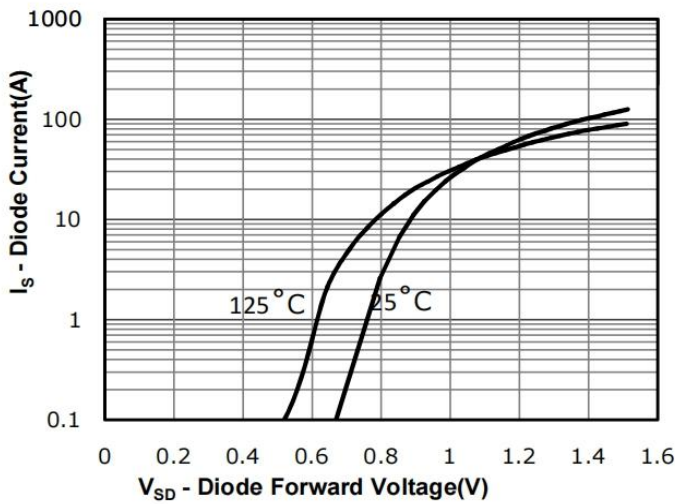
**Fig 7: BVDSS vs. Temperature Characteristics**



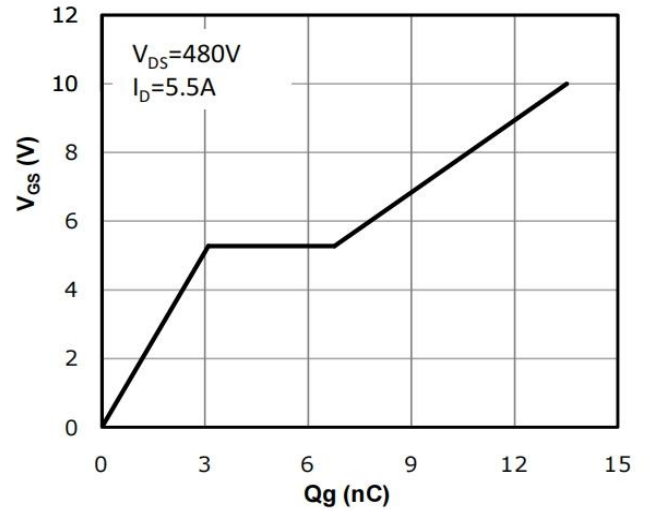
**Fig 8: Rds(on) vs Gate Voltage**



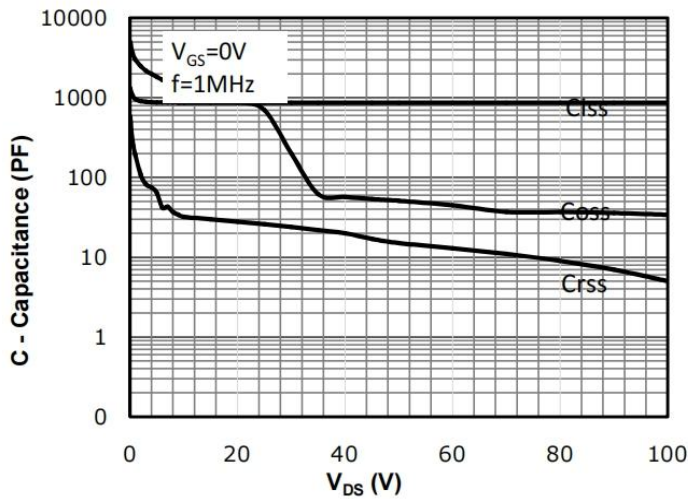
**Fig 9: Body-diode Forward Characteristics**



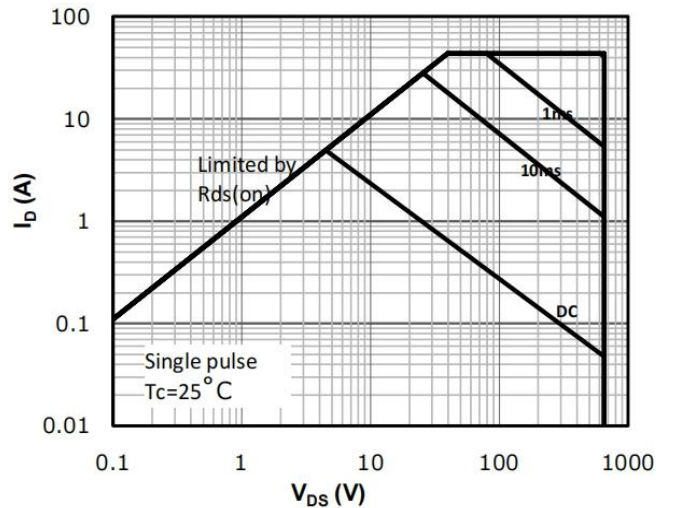
**Fig 10: Gate Charge Characteristics**



**Fig 11: Capacitance Characteristics**

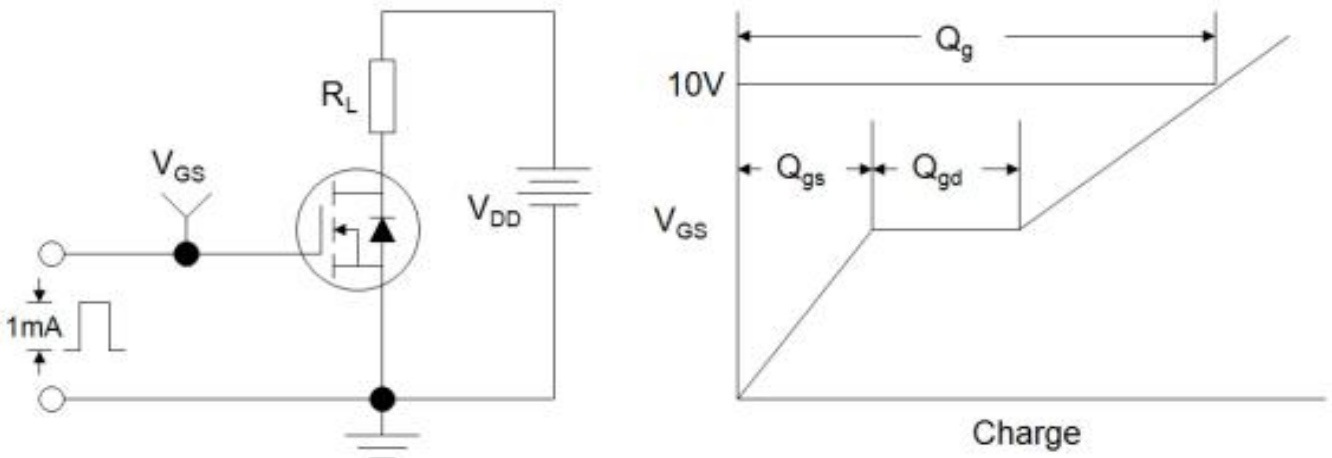


**Fig 12: Safe Operating Area**

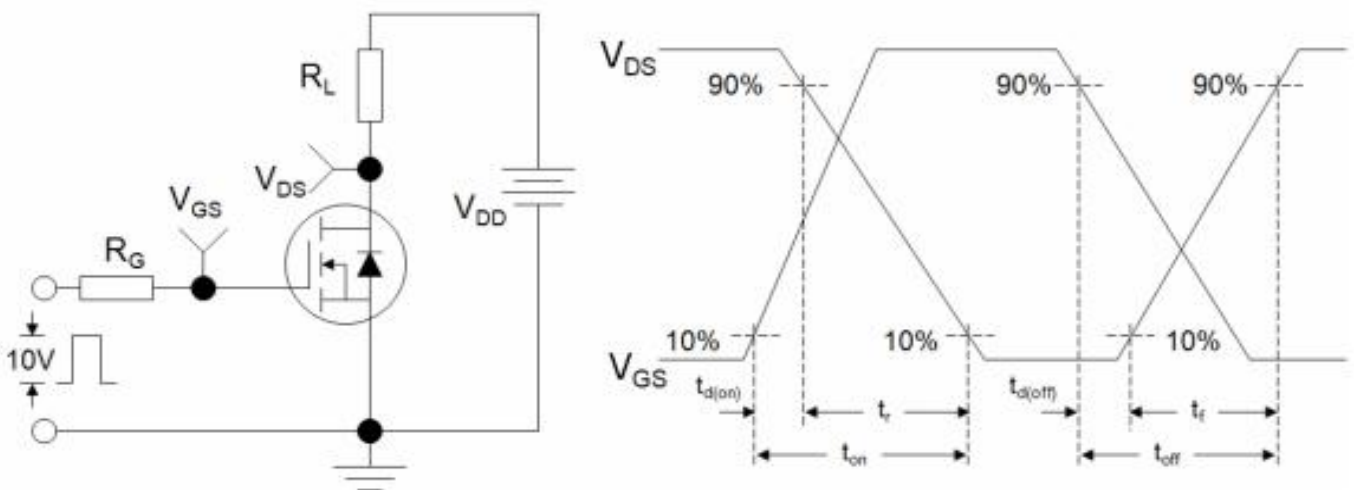


**Test Circuits and Waveforms**

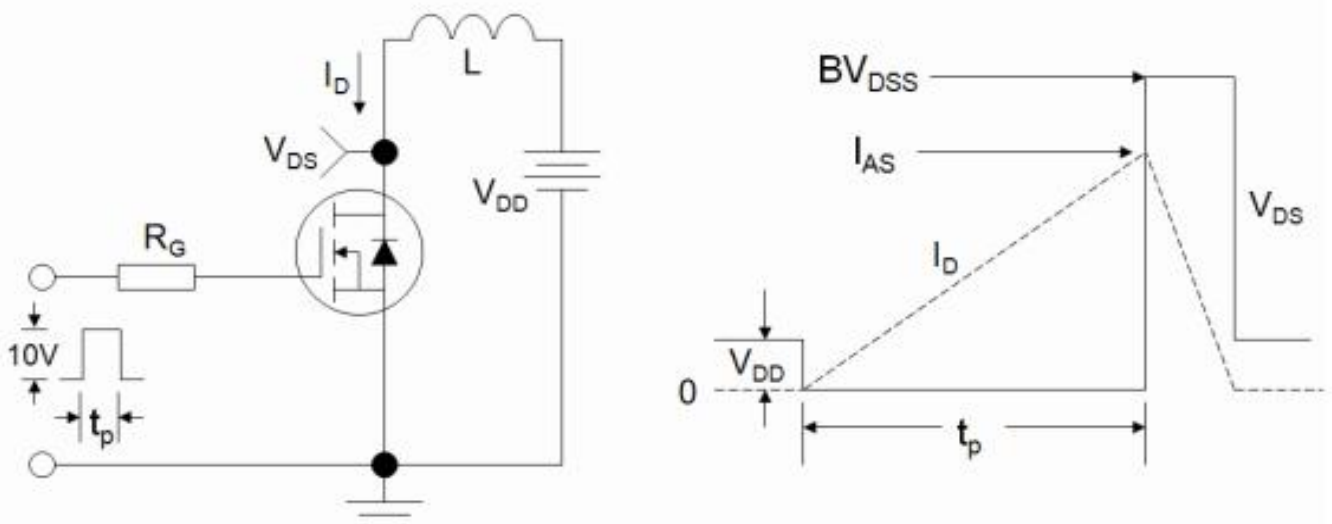
**Figure A: Gate Charge Test Circuit and Waveform**



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

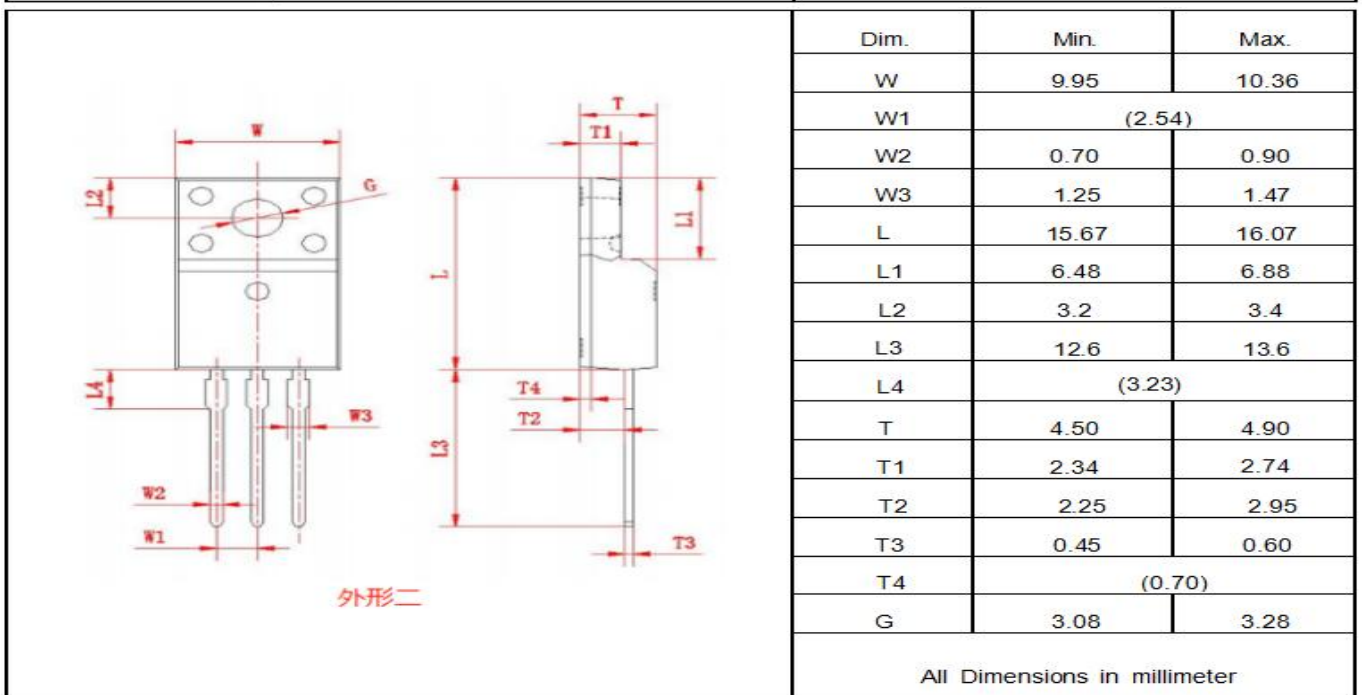
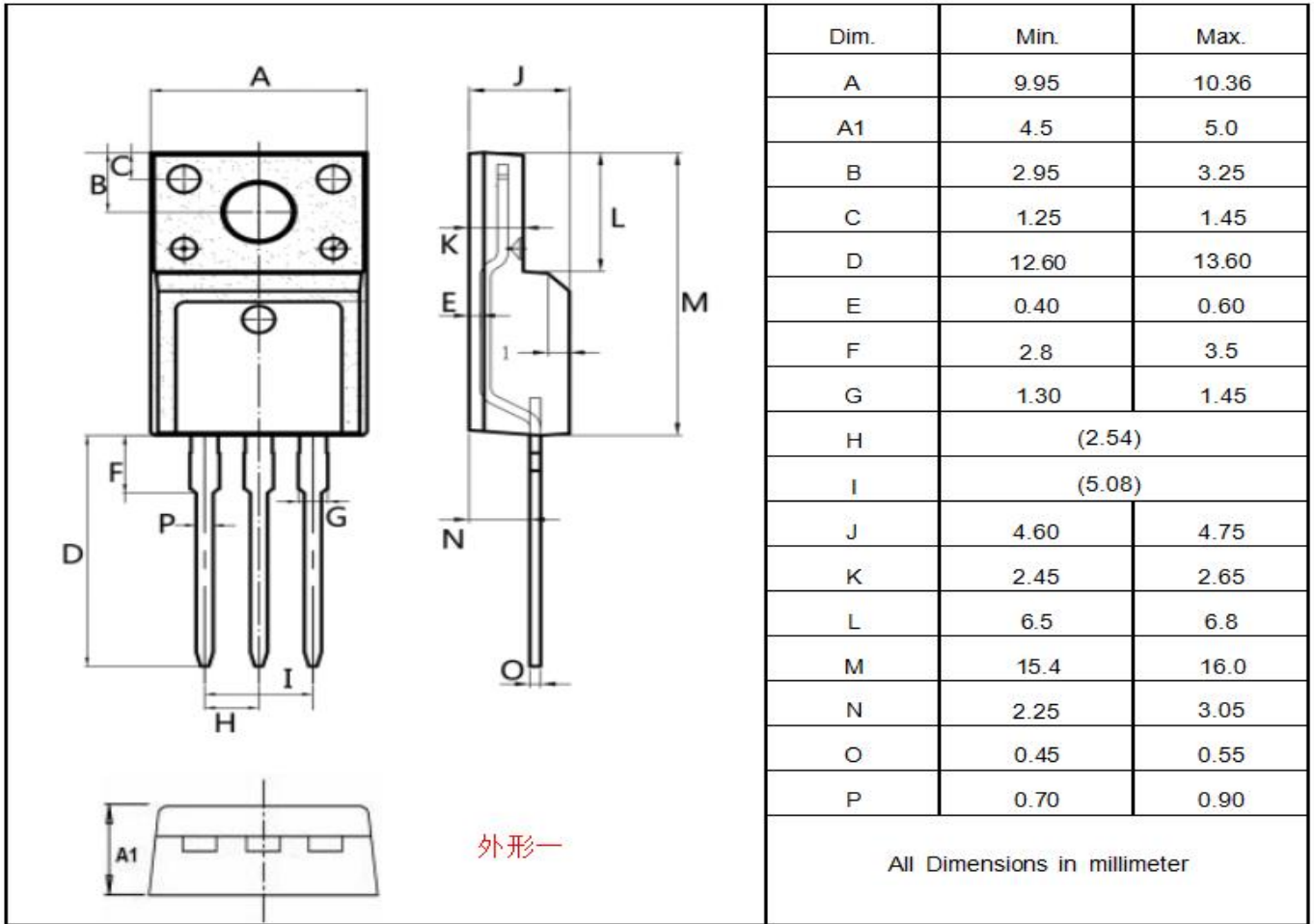


**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**





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



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