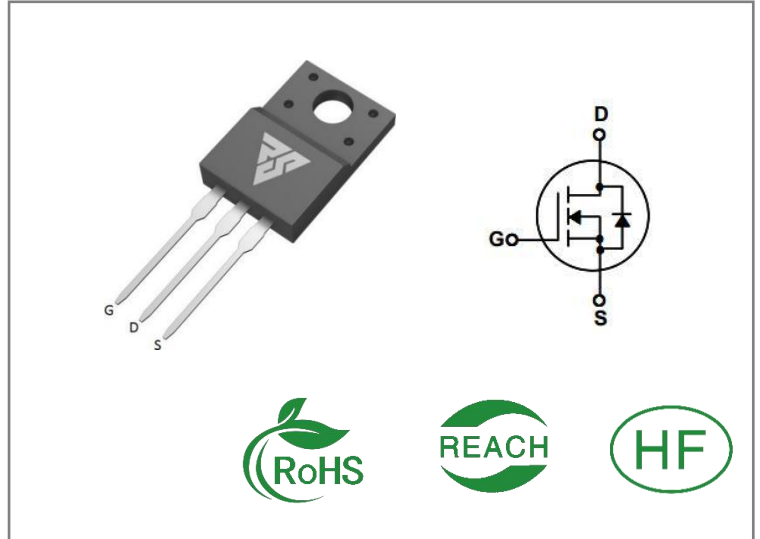


<b>ID</b>	<b>R<sub>DS(ON)</sub>(Typ)</b>	<b>VDSS</b>
20A	160mΩ	500V


**Applications:**

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

**Features:**

- Low gate charge
- Low RDS(on) per chip area(Low FOM)
- Very low switching and conduction loss
- Extremely high commutation ruggedness
- Ultra fast body diode

**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RSF50R190F	T0-220F	RSF50R190F	Tube	50 PCS

**Absolute Maximum Ratings** Tc= 2 5°C unless otherwise specified

Symbol	Parameter	RSF50R190F	Units
VDSS	Drain-to-Source Voltage	500	V
ID	Continuous Drain Current TC=25°C	20	A
ID	Continuous Drain Current TC=100°C	12.9	
IDM	Pulsed Drain Current TP=100uS	80	
PD	Power Dissipation	112	W
VGS	Gate- to- Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy L=10mH,VDS = 50V,TJ=25°C	405	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	
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	RSF50R190F	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	1.12	$^{\circ}\text{C}/\text{W}$	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 $^{\circ}\text{C}$
R $\theta$ JA	Junction-to- Ambient	40.7		1 cubic foot chamber,free air.

**OFF Characteristics** T<sub>J</sub>= 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 $\mu\text{A}$
IDSS	Drain- to- Source Leakage Current	--	--	5	$\mu\text{A}$	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 $^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance	--	160	190	m $\Omega$	VGS=10V ID=10A
VGS(TH)	Gate Threshold Voltage	3	4	5	V	VGS=VDS ID=250 $\mu\text{A}$

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	11.5	--	nS	VDS=400V ID=10A RG=2.5 $\Omega$
trise	Rise Time	--	7	--		
td(OFF)	Turn- OFF Delay Time	--	28	--		
tfall	Fall Time	--	4	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	1044	--	pF	VGS=0V VDS=100V f=1.0MHz
Coss	Output Capacitance	--	35	--		
Crss	Reverse Transfer Capacitance	--	0.42	--		
RG	Gate Resistance	--	4.5	--	Ω	VDS=0V VGS=0V f=1.0MHz
Qg	Total Gate Charge	--	25	--	nC	VDS=400V ID=10A VGS=10V
Qgs	Gate- to- Source Charge	--	6	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	11	--		

**Source- Drain Diode Characteristics**

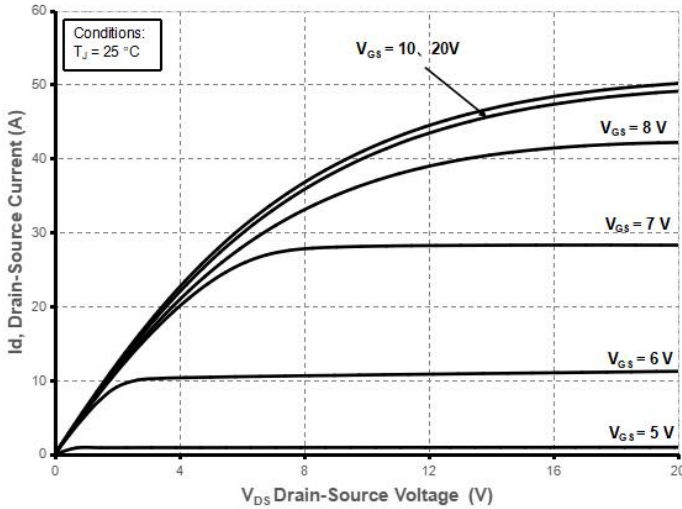
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	20	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	80	A	
VSD	Diode Forward Voltage	--	--	1.0	V	IS=20A VGS=0V
trr	Reverse Recovery Time	--	112	--	nS	VR=300V IS=20A di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	0.72	--	μC	

**Notes:**

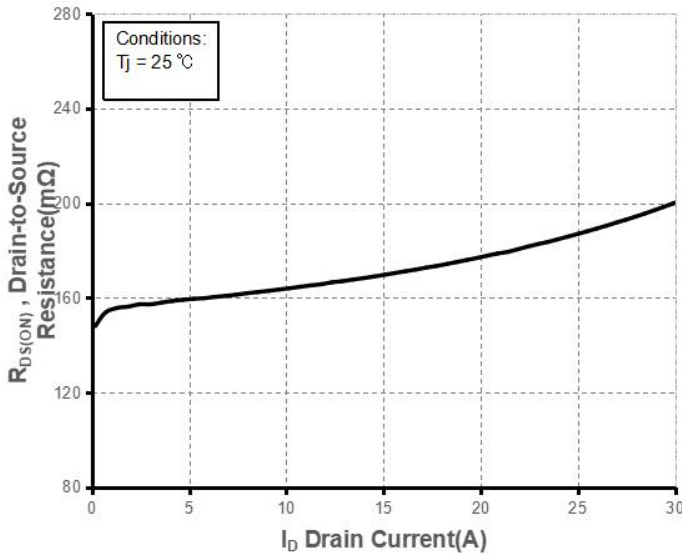
\* 1. Repetitive rating, pulse width limited by maximum junction temperature.

**Typical Feature Curve**

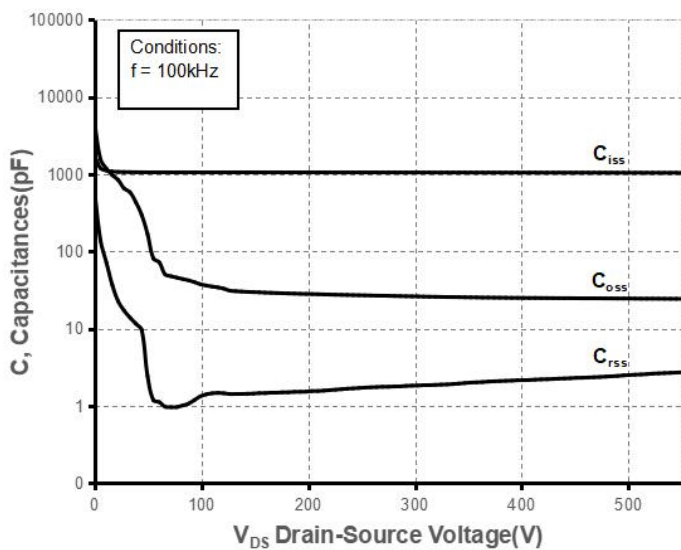
**Figure 1. Typical Output Characteristics**



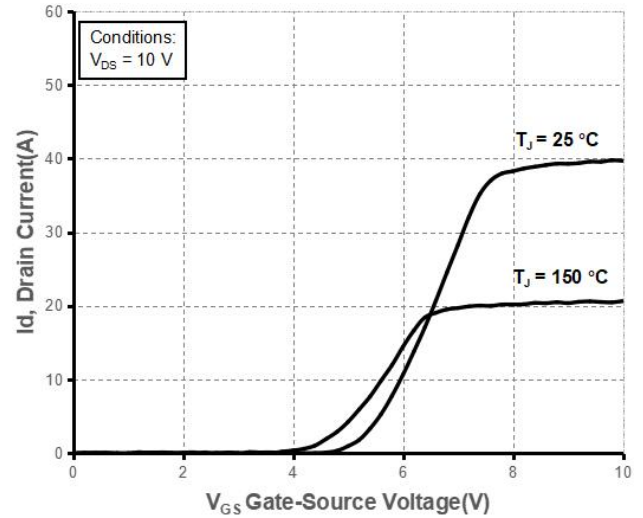
**Figure 3. On-Resistance versus Drain Current**



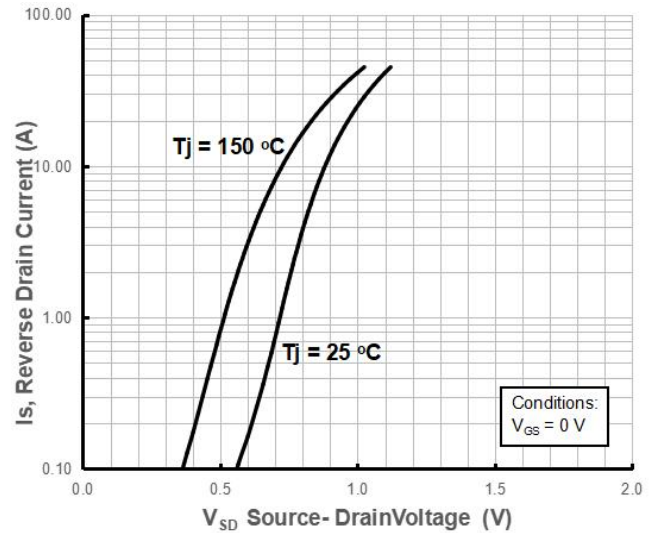
**Figure 5. Typical Capacitance versus VDS**



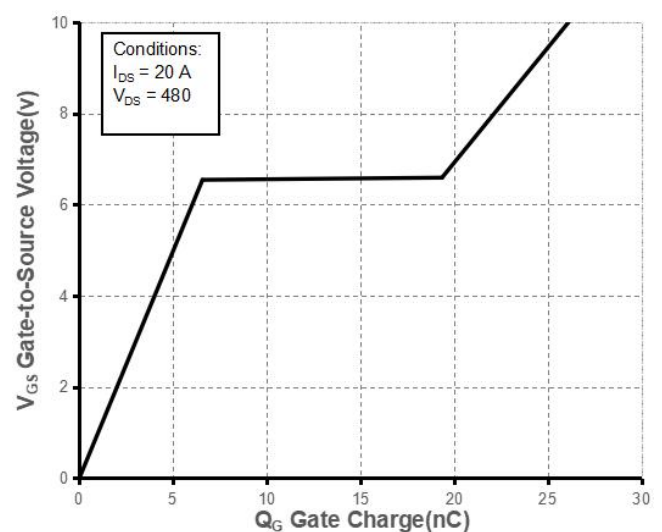
**Figure 2. Typical Transfer Characteristics**



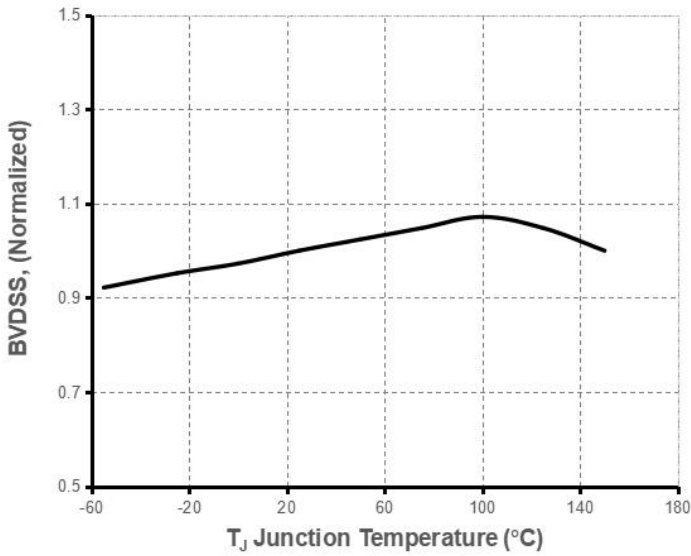
**Figure 4. Diode forward voltage versus Current**



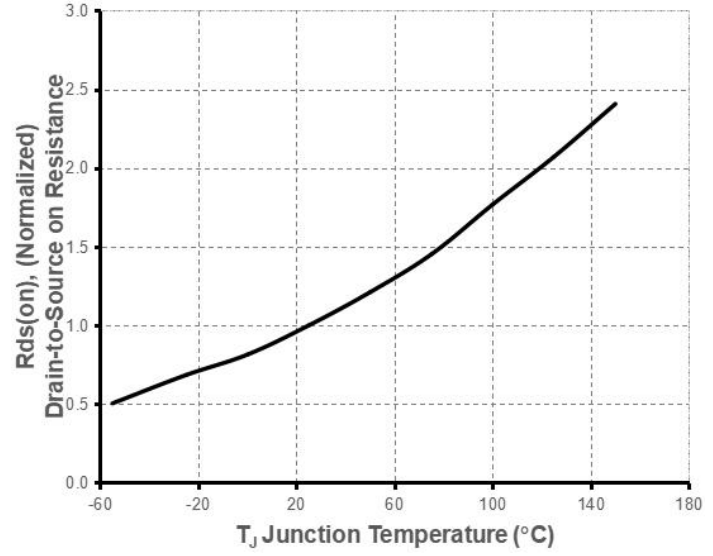
**Figure 6. Typical Gate Charge versus VGS**



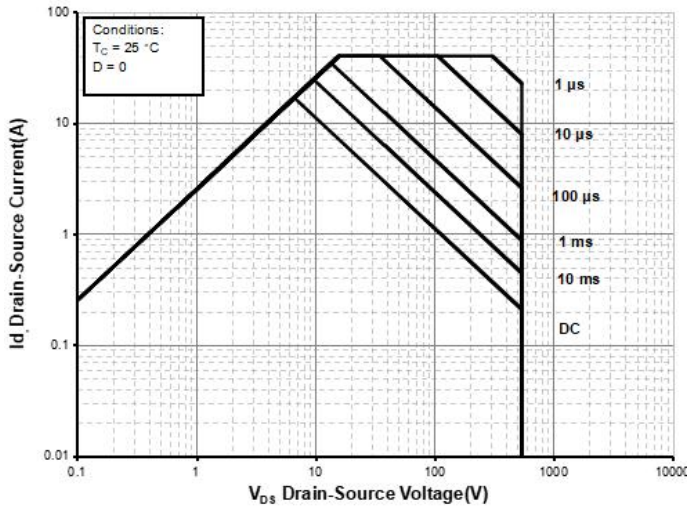
**Figure 7. BVDSS Variation with Temperature**



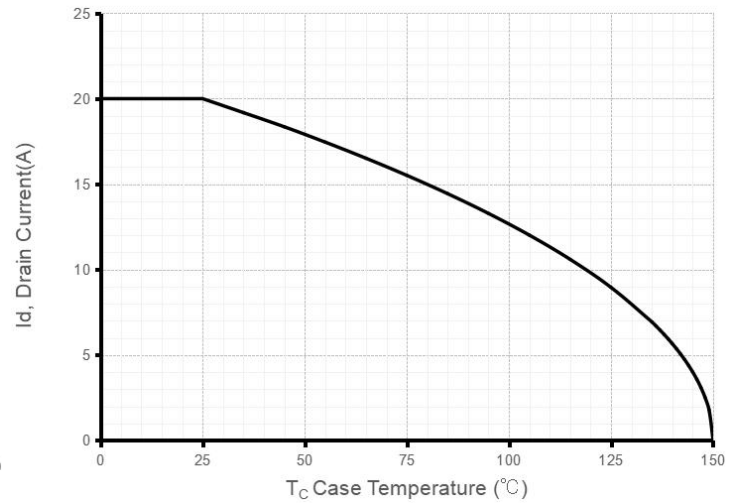
**Figure 8. On-Resistance Variation with Temperature**



**Figure 9. Maximum Safe Operating Area**

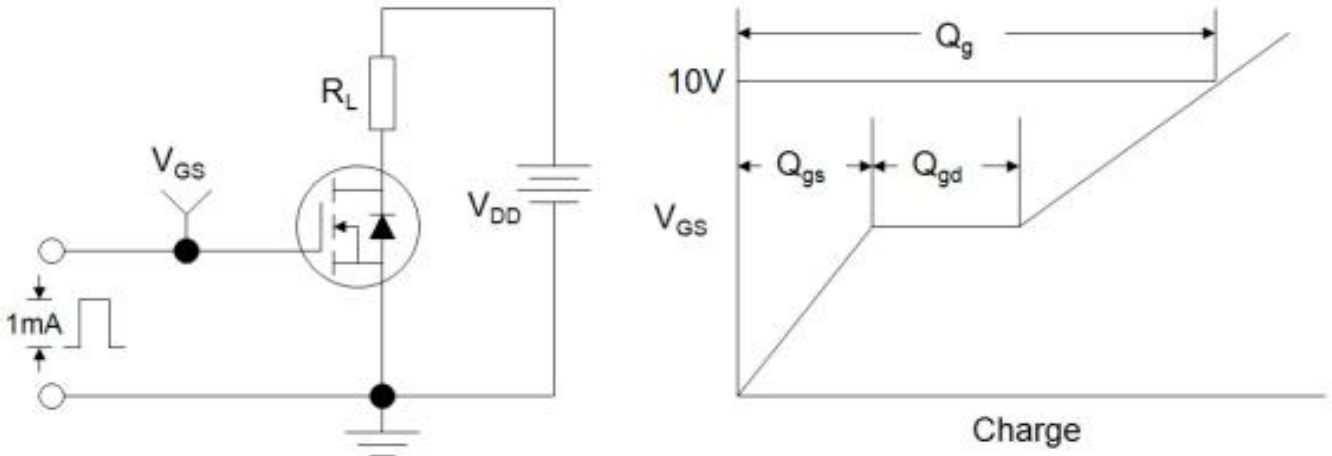


**Figure 10. Maximum Continuous Drain versus Case Temperature**

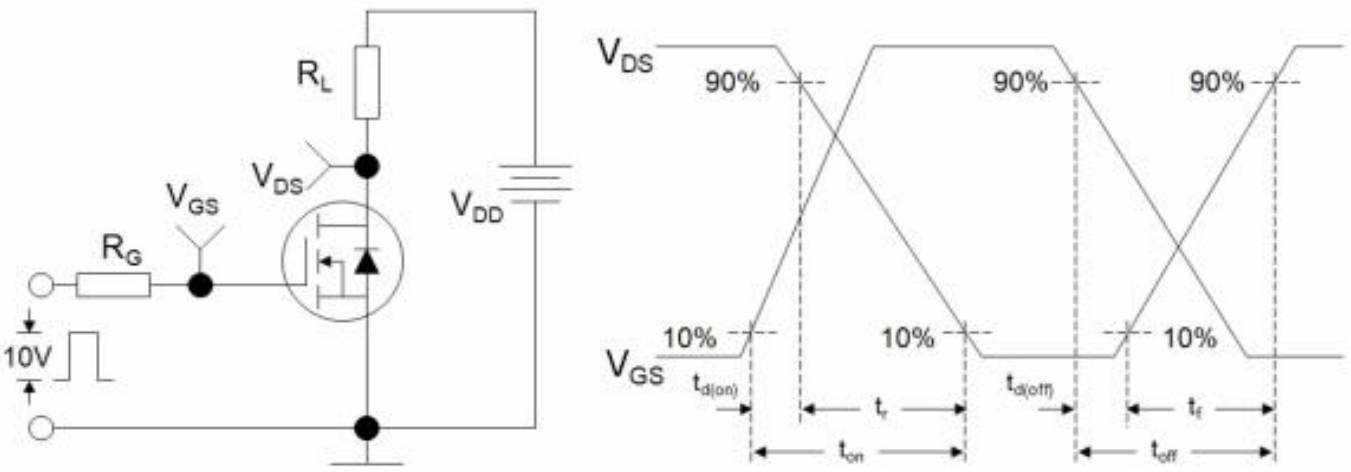


**Test Circuits and Waveforms**

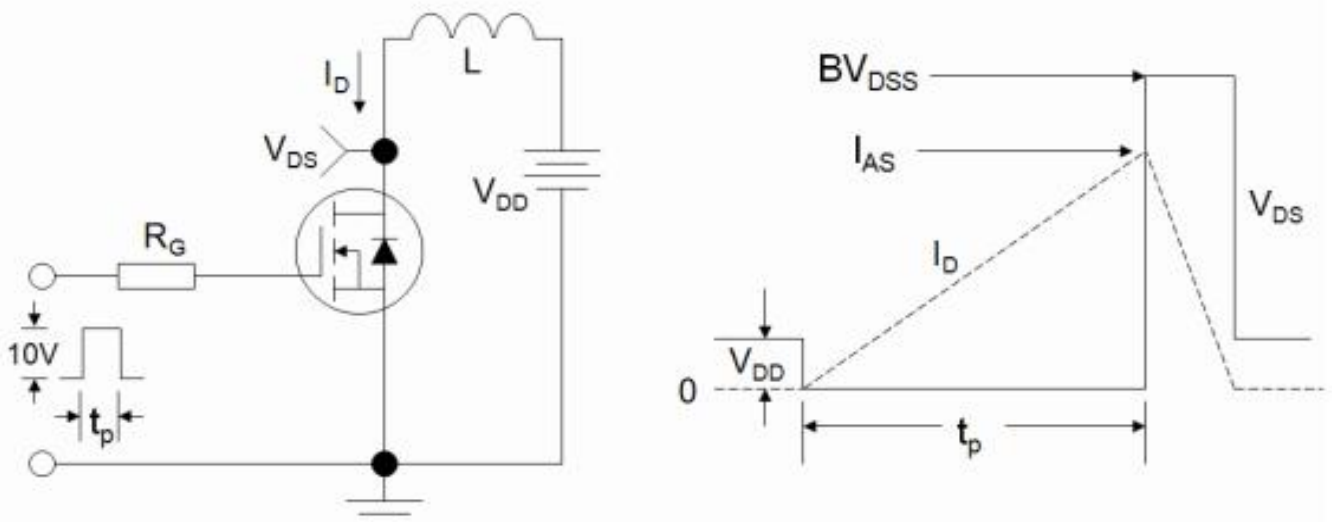
**Figure A: Gate Charge Test Circuit and Waveform**



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

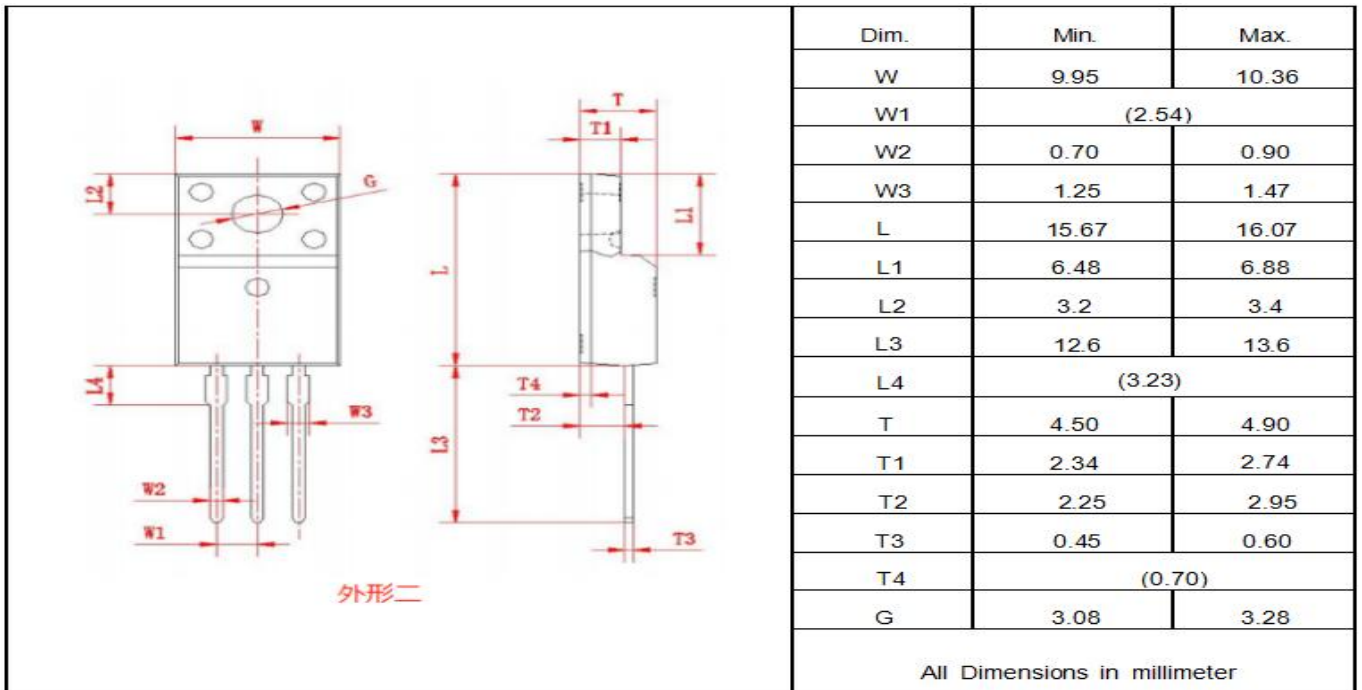
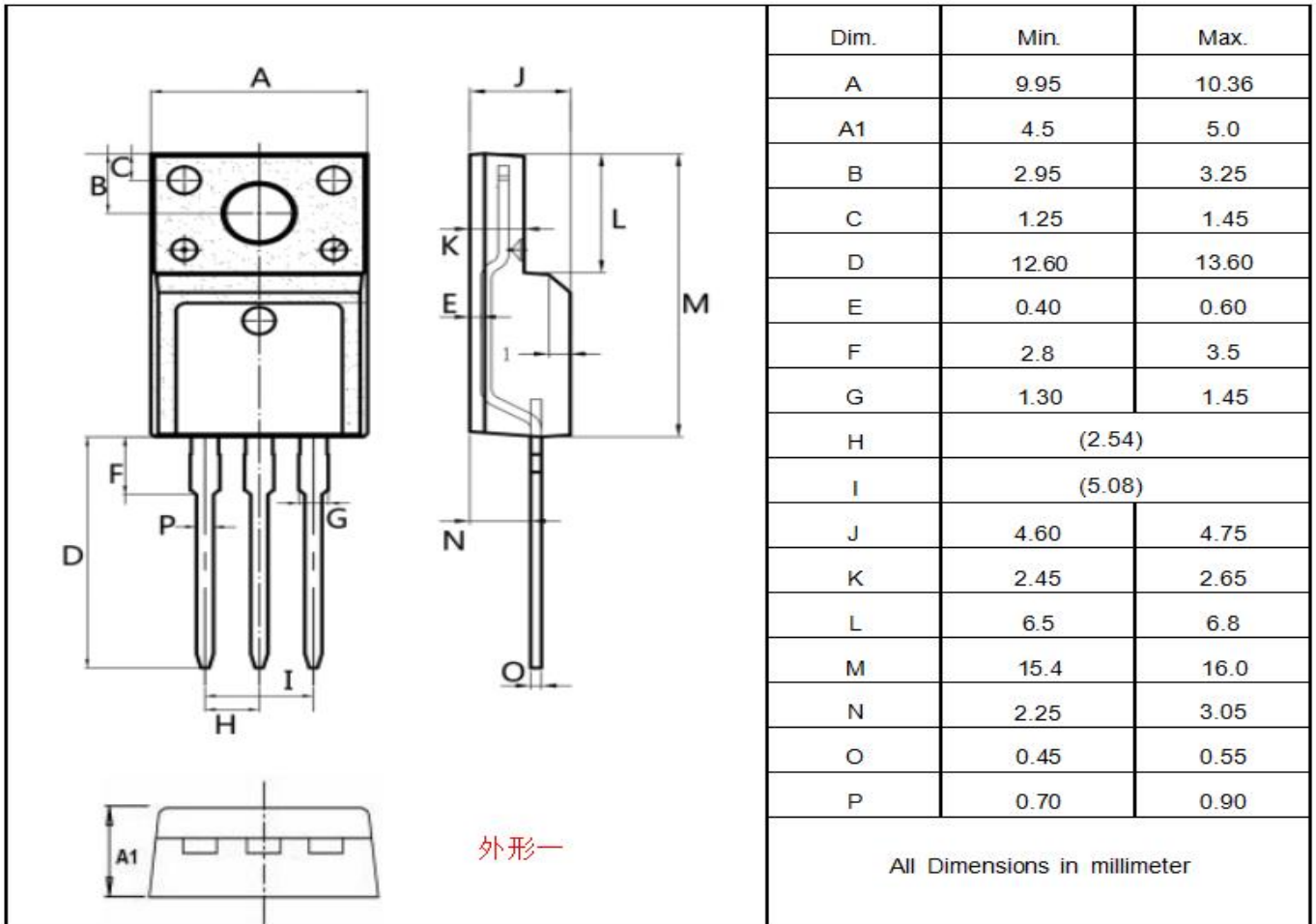


**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**





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



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