

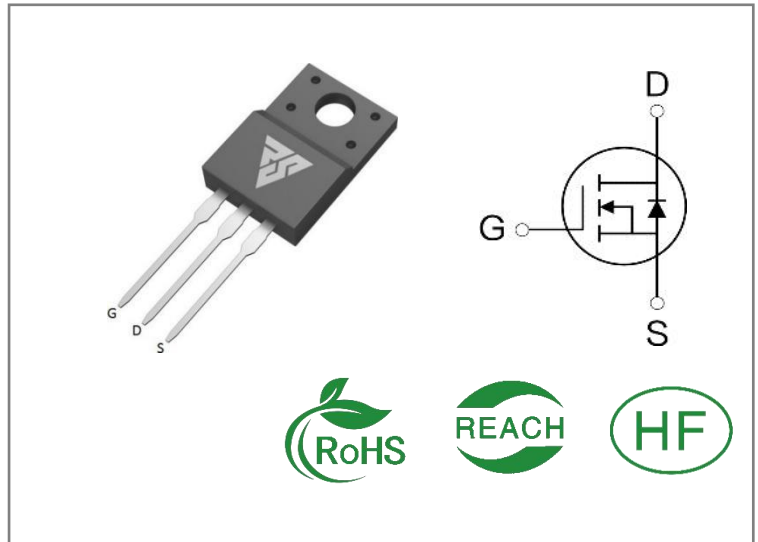
ID	$R_{DS(ON)}$ (Typ)	VDSS
7.3A	520mΩ	650V

**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.
RS65R600F	T0-220F	RS65R600F	Tube	50 PCS

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

Symbol	Parameter	RS65R600F	Units
VDSS	Drain-to-Source Voltage	650	V
ID	Continuous Drain Current $T_C=25^\circ\text{C}$	7.3	A
ID	Continuous Drain Current $T_C=100^\circ\text{C}$	4.5	
IDM	Pulsed Drain Current (Note*1)	24	
PD	Power Dissipation	28	W
VGS	Gate- to- Source Voltage	$\pm 30$	V
EAS	Single Pulse Avalanche Energy $L=10\text{mH}, V_{DS}=50\text{V}, R_G=25\Omega, T_C=25^\circ\text{C}$	129	mJ
dv/dt	MOSFET dv/ dt ruggedness $V_{DS}=0\ldots 400\text{V}$	50	V/ns
dv/dt	Reverse diode dv/dt $V_{DS}=0\ldots 400\text{V}, T_j=25^\circ\text{C}, I_{SD}\leq I_D$	15	V/ns
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	RS65R600F	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	4.5	$^{\circ}\text{C} / \text{W}$	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 $^{\circ}\text{C}$
R $\theta$ JA	Junction-to- Ambient	80		1 cubic foot chamber,free air.

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	650	--	--	V	$V_{GS}=0V, I_D=250\mu A$
IDSS	Drain- to- Source Leakage Current	--	--	1	$\mu A$	$V_{DS}=650V, V_{GS}=0V$
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	$V_{GS}=30V, V_{DS}=0V$
	Gate- to- Source Reverse Leakage	--	--	-100		$V_{GS}=-30V, V_{DS}=0V$

**ON Characteristics**  $T_J = 25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance(Note*2)	--	520	600	m $\Omega$	$V_{GS}=10V, I_D=2A$
VGS(TH)	Gate Threshold Voltage	2	--	4	V	$V_{GS}=V_{DS}, I_D=250\mu A$

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	17	--	nS	$V_{DS}=325V$ $I_D=7.3A$ $R_G=25\Omega$
trise	Rise Time	--	26	--		
td(OFF)	Turn- OFF Delay Time	--	53	--		
tfall	Fall Time	--	38	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	471	--	pF	VGS=0V VDS=50V f=400kHz
Coss	Output Capacitance	--	35	--		
Crss	Reverse Transfer Capacitance	--	1.7	--		
Qg	Total Gate Charge	--	13	--	nC	VDS=520V ID=7.3A VGS=10V
Qgs	Gate- to- Source Charge	--	2.1	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	6.9	--		

**Source- Drain Diode Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	7.3	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	24	A	
VSD	Diode Forward Voltage	--	--	1.4	V	IS=7.3A,VGS=0V
trr	Reverse Recovery Time	--	220	--	nS	VR=100V IS=7.3A,di/dt=100 A/μs
Qrr	Reverse Recovery Charge	--	2	--	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

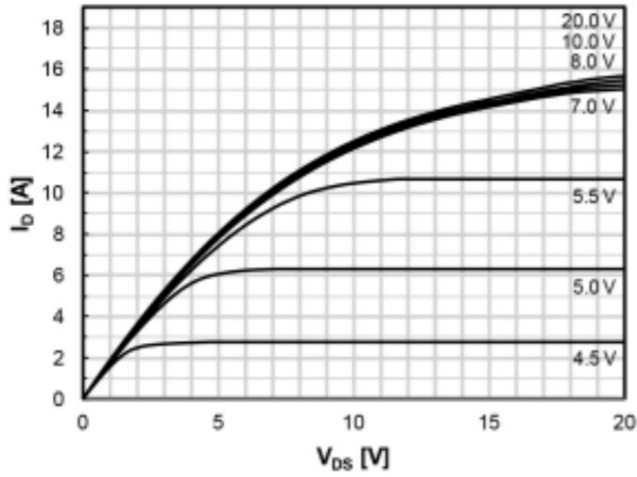


Fig. 1 Output Characteristics

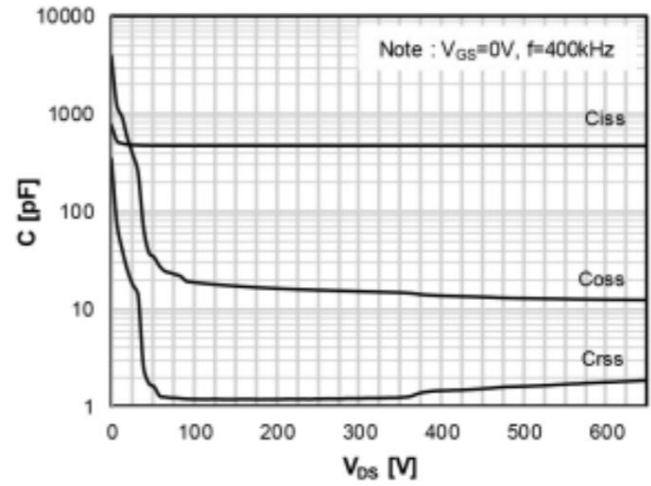


Fig. 2 Capacitances

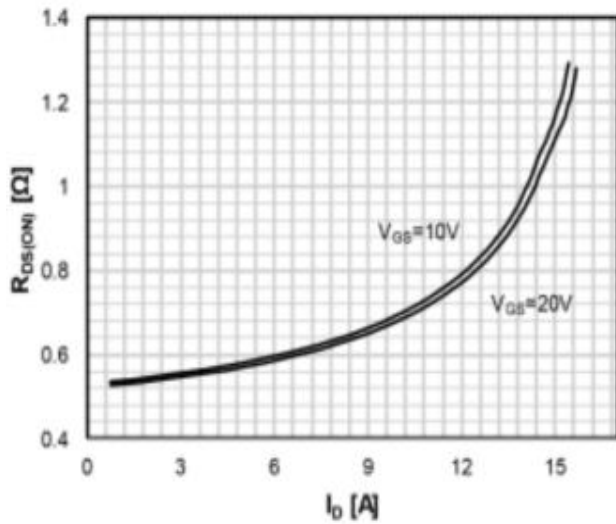


Fig. 3 On-state Resistance

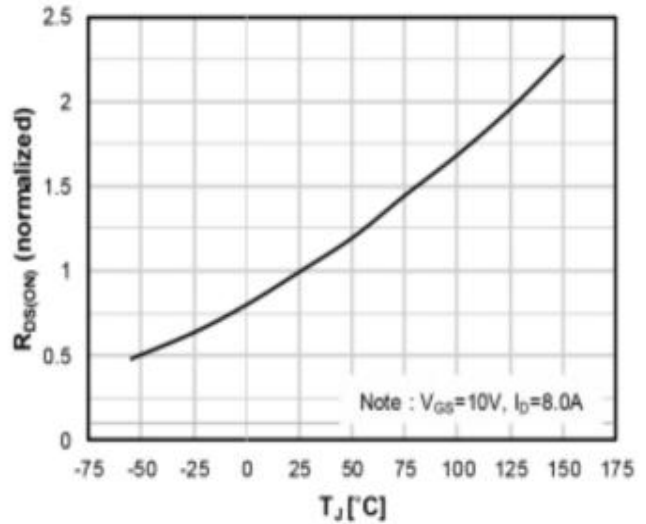


Fig. 4 On-state Resistance with Temperature

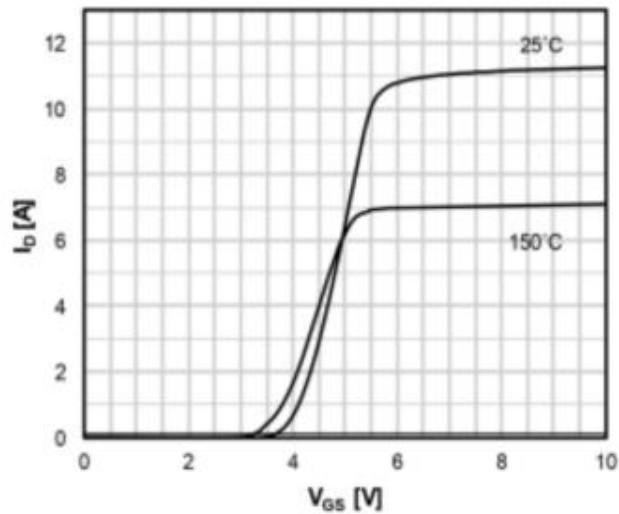


Fig. 5. Transfer Characteristics

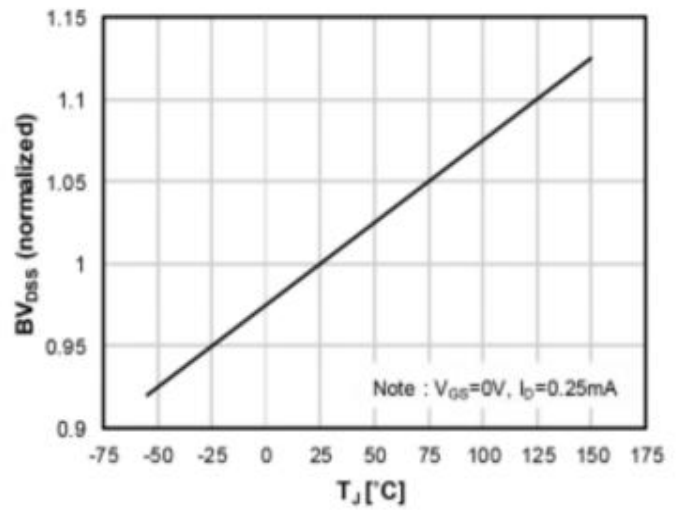
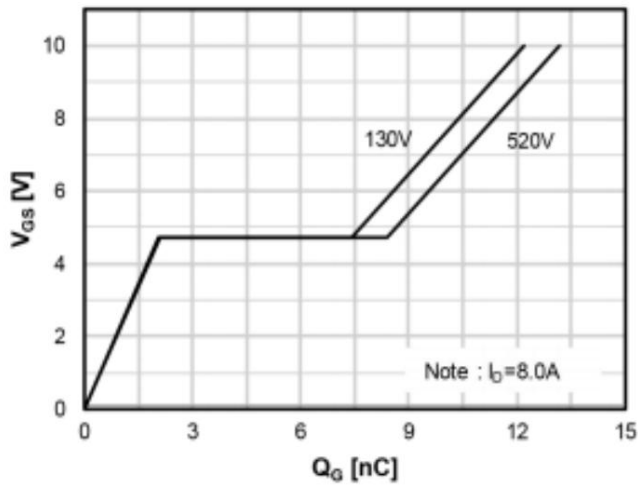
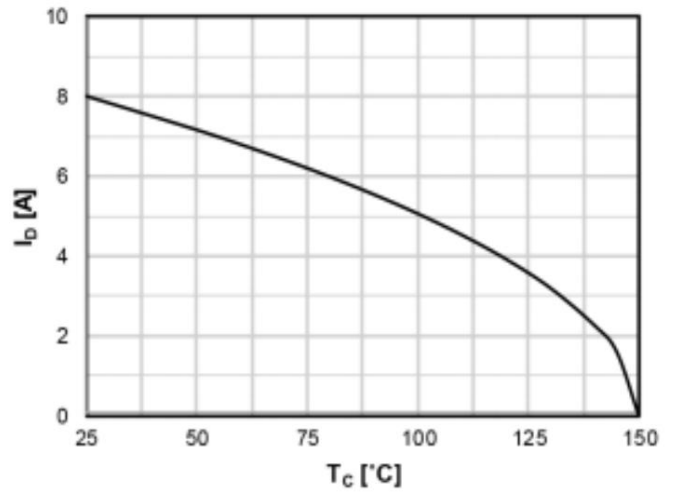


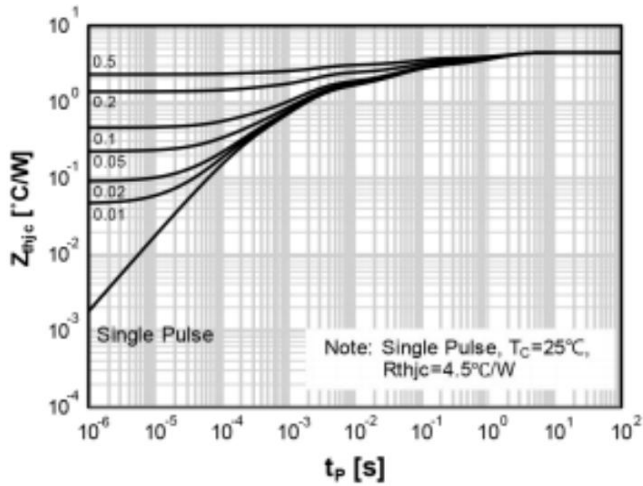
Fig. 6. Breakdown Voltage with Temperature



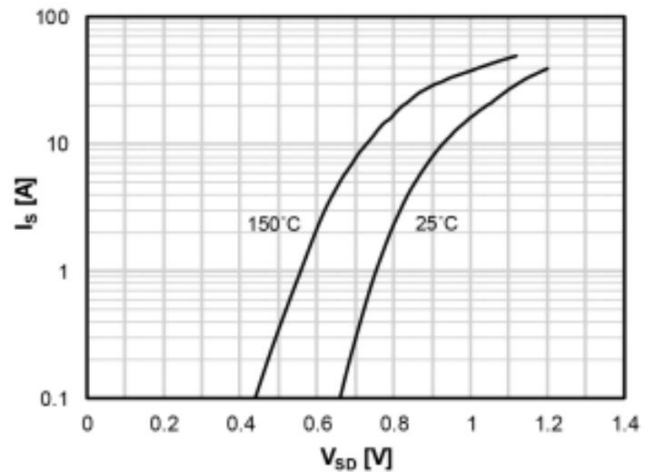
**Fig 7. Gate Charge**



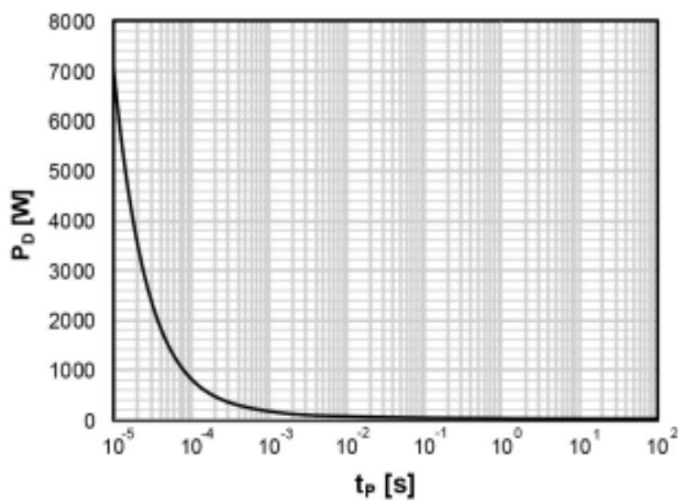
**Fig 8. Maximum Drain Current**



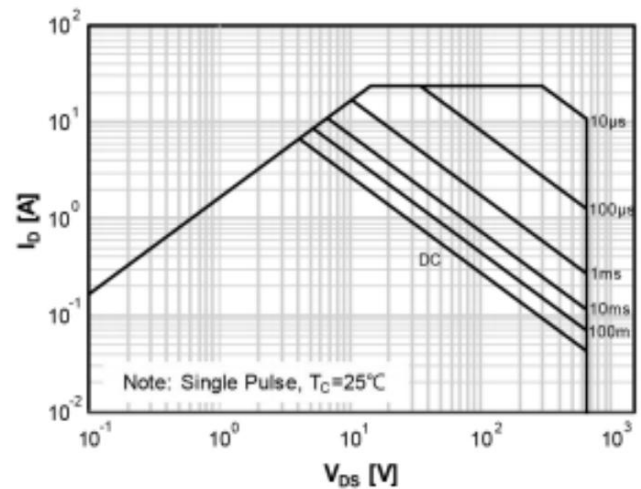
**Fig 9. Maximum Transient Thermal Characteristics**



**Fig 10. Body Diode Characteristics**



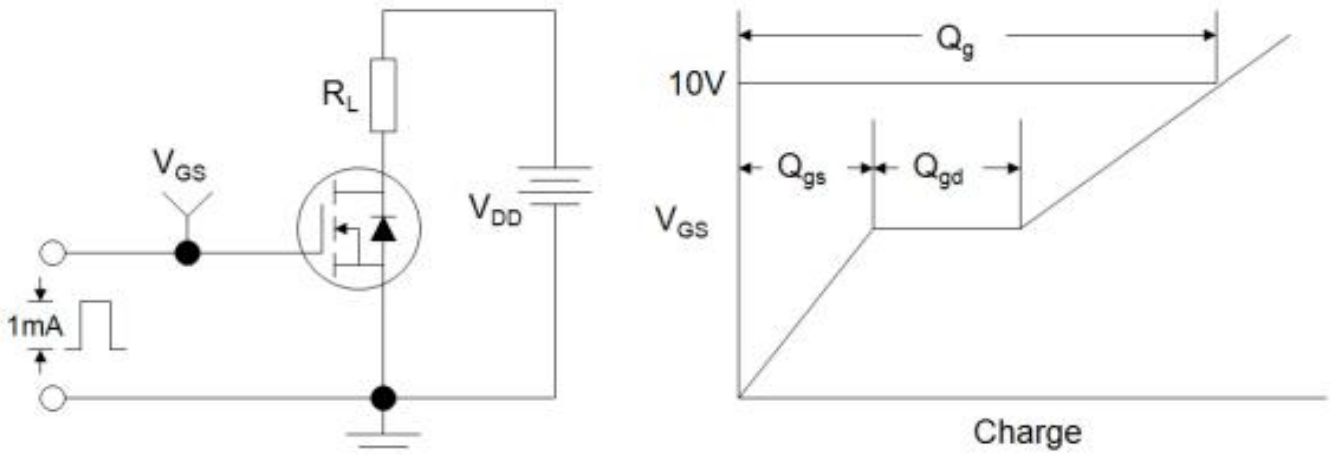
**Fig 11. Power Dissipation**



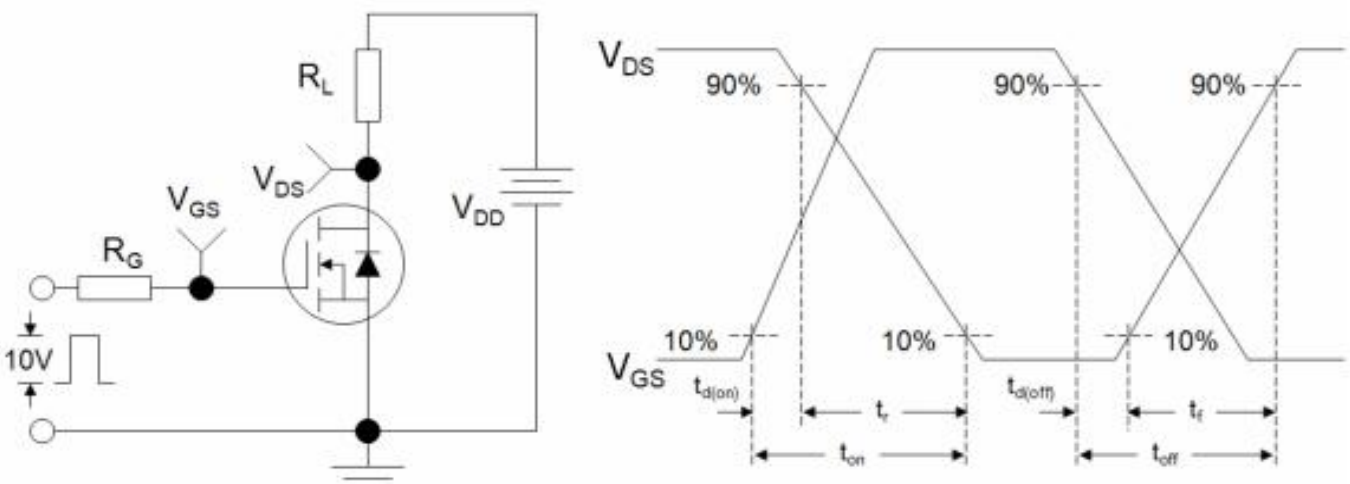
**Fig 12. Safe Operating Area**

## Test Circuits and Waveforms

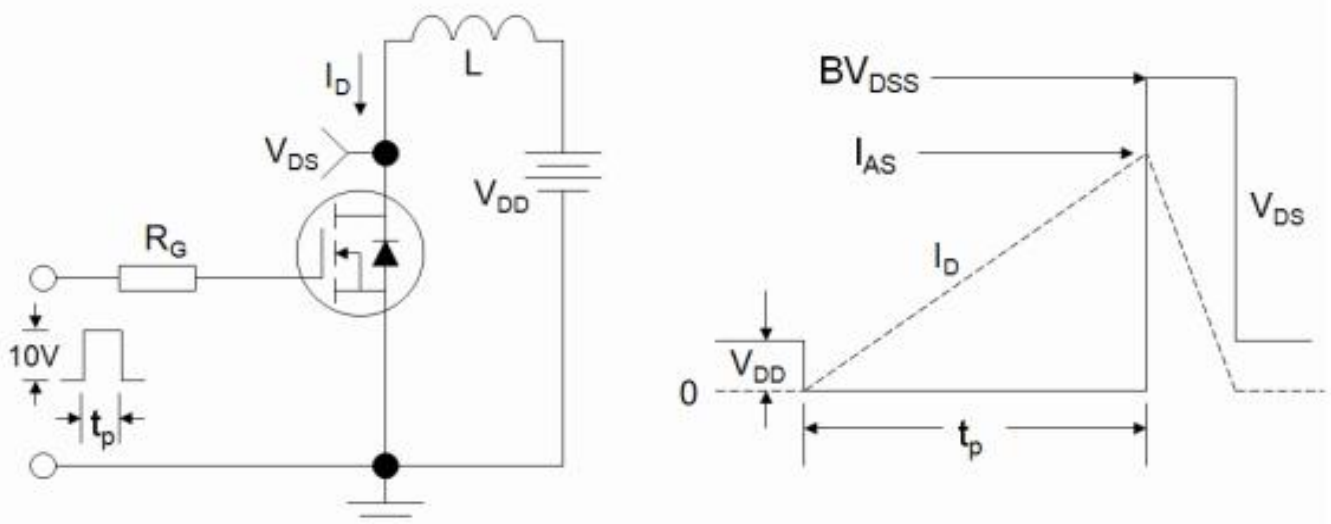
**Figure A: Gate Charge Test Circuit and Waveform**



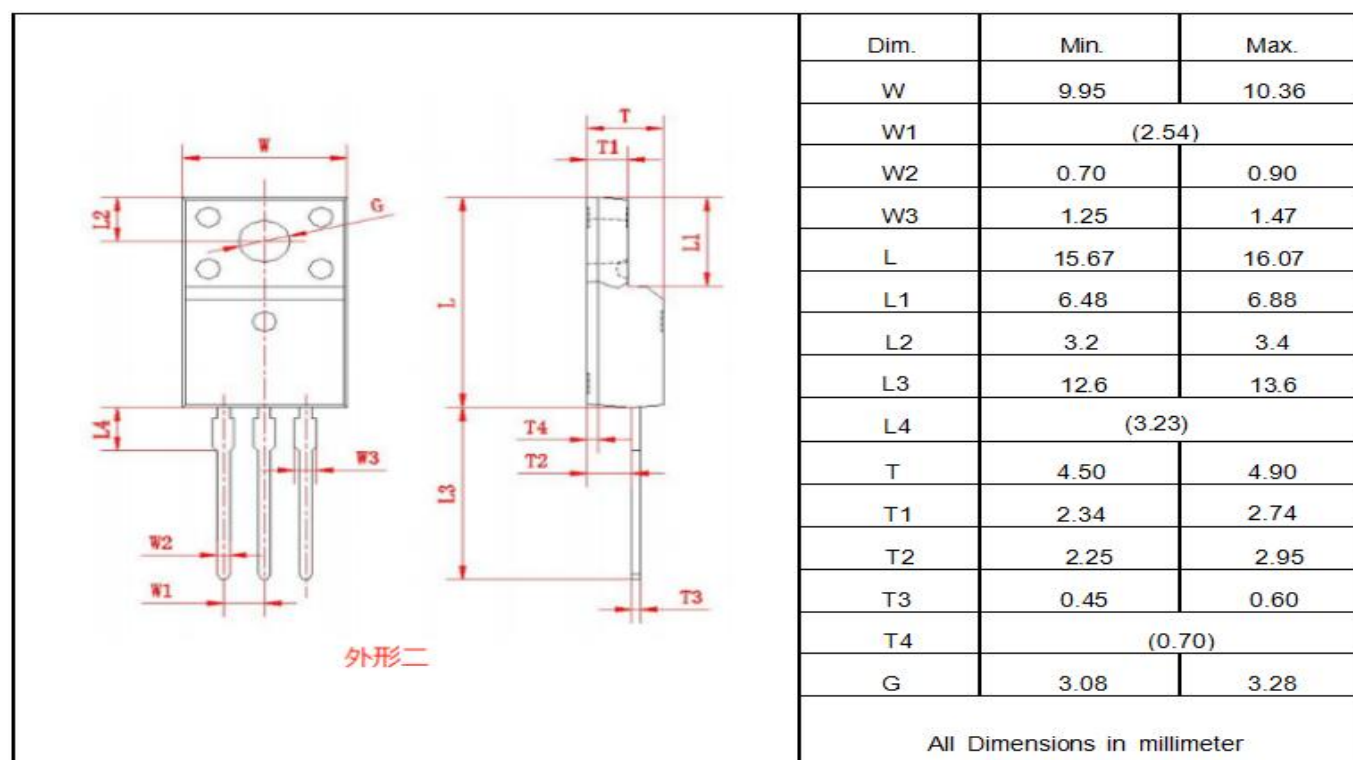
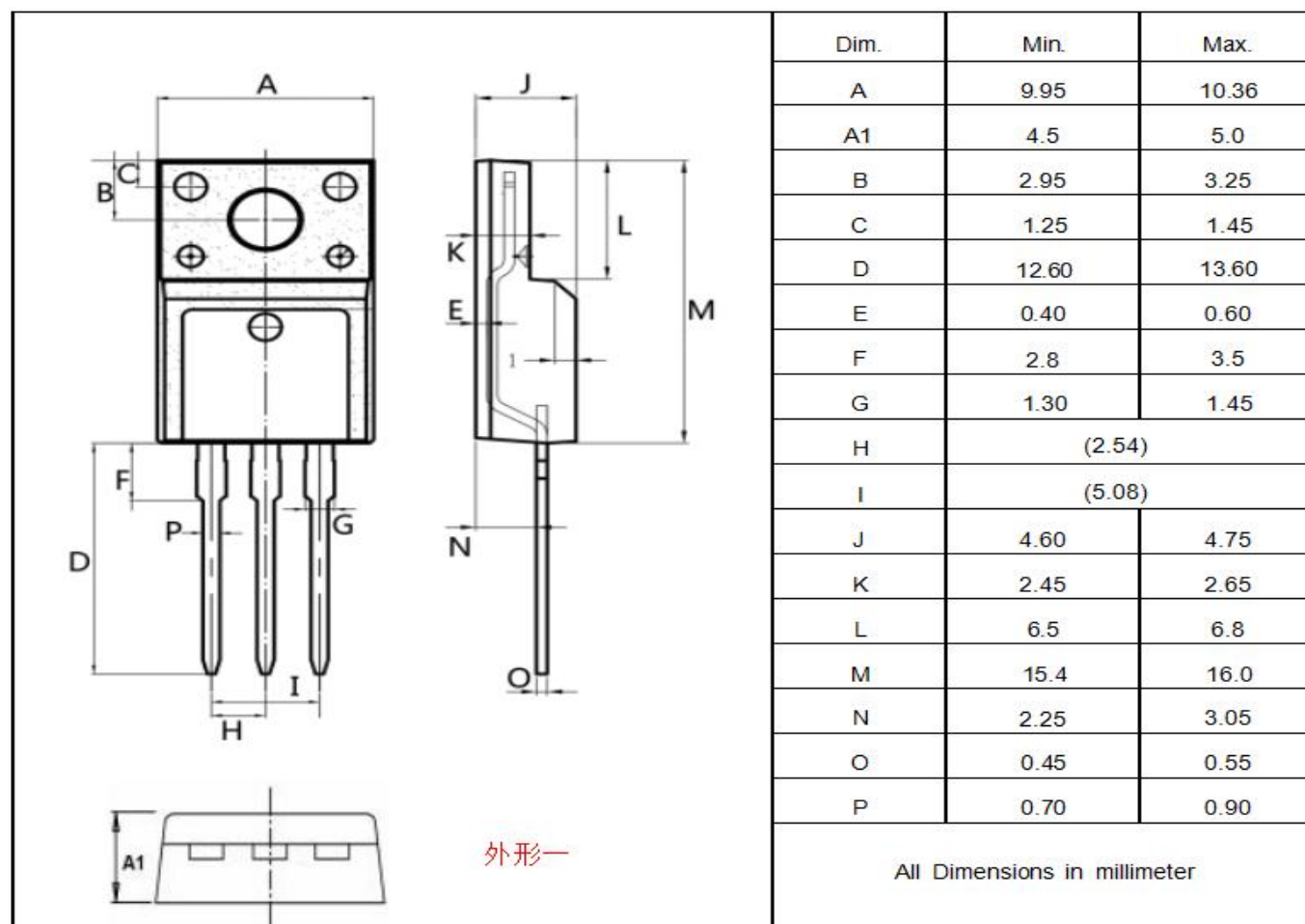
**Figure B: Resistive Switching Test Circuit and Waveform**



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





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


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