

## 700V N Channel MOSFET



Lead Free Package and Finish

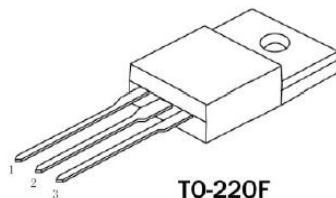
### Applications:

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

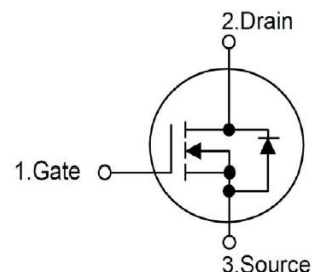
$I_D$	$R_{DS(ON)}$ (Typ.)	$V_{DSS}$
6A	1.3Ω	700V

### Features:

- improved dv/dt capability
- 100% avalanche tested
- Fast switching
- RoHS Compliant



TO-220F



Not to Scale

### Ordering Information

Part Number	Package	Marking
RS6N70F	TO-220F	RS6N70F

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

Symbol	Parameter	RS6N70F	Units
$V_{DSS}$	Drain-to-Source Voltage (Note*1)	700	V
$I_D$	Continuous Drain Current	6	A
$I_{DM}$	Pulsed Drain Current (Note*2)	24	
PD	Power Dissipation( $T_c=25^\circ\text{C}$ )	63	W
VGS	Gate-to-Source Voltage	$\pm 30$	V
EAS	Single Pulse Avalanche Energy $I_{AS}=6\text{A}$ $V_{DD}=50\text{V}$ $R_G=25\Omega$ $T_J=25^\circ\text{C}$	198	mJ
$I_{AR}$	Avalanche Current	4.5	A
EAR	Repetitive Avalanche Energy	40	mJ
$T_L$ TPKG	Maximum Temperature for Soldering	300 260	$^\circ\text{C}$
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
$T_J$ and $T_{STG}$	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	RS6N70F	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case	1.98	$^\circ\text{C}/\text{W}$	Drain lead soldered to water cooled heatsink,PD Adjusted for a peak junction temperature of $+150^\circ\text{C}$ .
$R_{\theta JA}$	Junction-to-Ambient	62.5		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
BV <sub>DSS</sub>	Drain-to-source Breakdown Voltage	700	--	--	v	V <sub>GS</sub> =0V, I <sub>D</sub> =250 $\mu$ A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	--	--	1.0	$\mu$ A	V <sub>DS</sub> =700V, V <sub>GS</sub> =0V
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	--	--	100	nA	V <sub>GS</sub> =+30V V <sub>DS</sub> =0V
	Gate-to-Source Reverse Leakage	--	--	-100		V <sub>GS</sub> =-30V V <sub>DS</sub> =0V

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	--	1.3	1.6	$\Omega$	V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A
V <sub>GS(TH)</sub>	Gate Threshold Voltage	3.0	--	4.0	V	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250 $\mu$ A

### Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
t <sub>d(ON)</sub>	Turn-on Delay Time	--	15	--	ns	V <sub>DS</sub> =350V I <sub>D</sub> =6A R <sub>G</sub> =25 $\Omega$
t <sub>rise</sub>	Rise Time	--	18	--		
t <sub>d(OFF)</sub>	Turn-OFF Delay Time	--	80	--		
t <sub>fall</sub>	Fall Time	--	35	--		

### Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C <sub>iss</sub>	Input Capacitance	--	891	--	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
C <sub>oss</sub>	Output Capacitance	--	110	--		
C <sub>rss</sub>	Reverse Transfer Capacitance	--	14	--		
Q <sub>g</sub>	Total Gate Charge	--	22	--	nC	V <sub>DS</sub> =560V I <sub>D</sub> =6A V <sub>GS</sub> =10V
Q <sub>gs</sub>	Gate-to-Source Charge	--	4.3	--		
Q <sub>gd</sub>	Gate-to-Drain("Miller") Charge	--	13	--		

## Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I <sub>S</sub>	Continuous Source Current	--	--	6	A	Integral pn-diode in MOSFET
I <sub>SM</sub>	Maximum Pulsed Current	--	--	24	A	
V <sub>SD</sub>	Diode Forward Voltage	--	--	1.4	V	I <sub>S</sub> =6A, V <sub>GS</sub> =0V T <sub>J</sub> =25°C
t <sub>rr</sub>	Reverse Recovery Time	--	300	--	nS	V <sub>GS</sub> =0V I <sub>S</sub> =6A, di/dt=100A/μs
Q <sub>rr</sub>	Reverse Recovery Charge	--	4.1	--	μC	

### Notes:

- \*1. T<sub>J</sub>=±25°C to +150°C.
- \*2. Repetitive rating; pulse width limited by maximum junction temperature.
- \*3. Pulse width ≤ 300μs; duty cycle ≤ 1%.

Typical Feature curve T<sub>J</sub>=25°C, unless otherwise noted

Figure1. Typical Output Characteristics

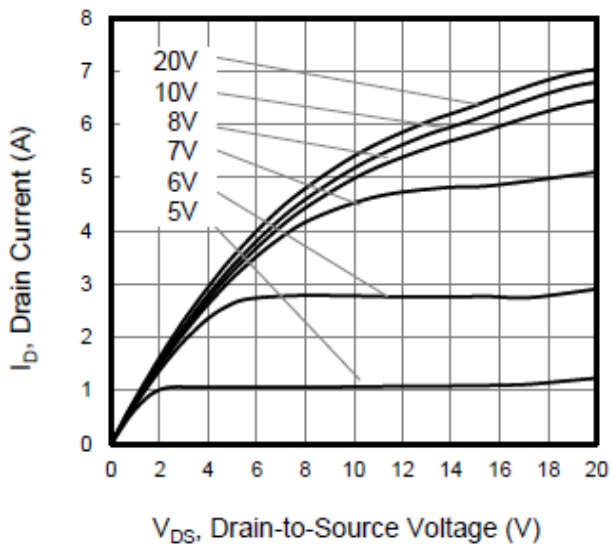
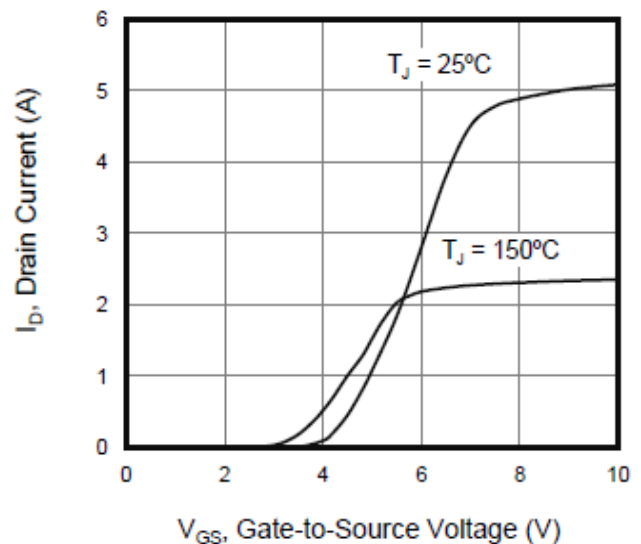
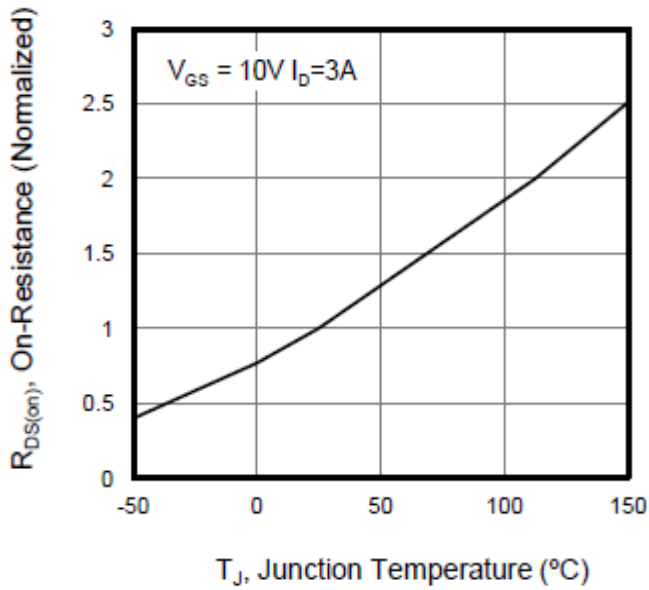


Figure2. Typical Transfer Characteristics



Figuer3. Typical ON-Resistance vs Temperature



Figuer4. Typical Body Diode Transfer Characteristics

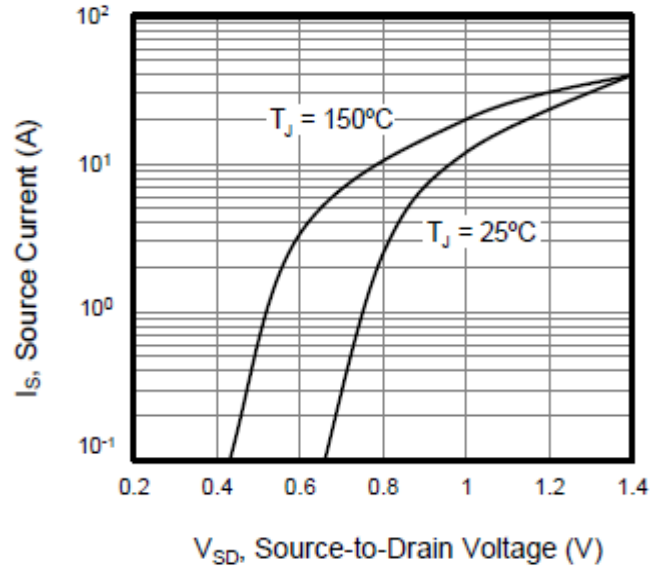


Figure5. Typical Temperature vs Drain Current

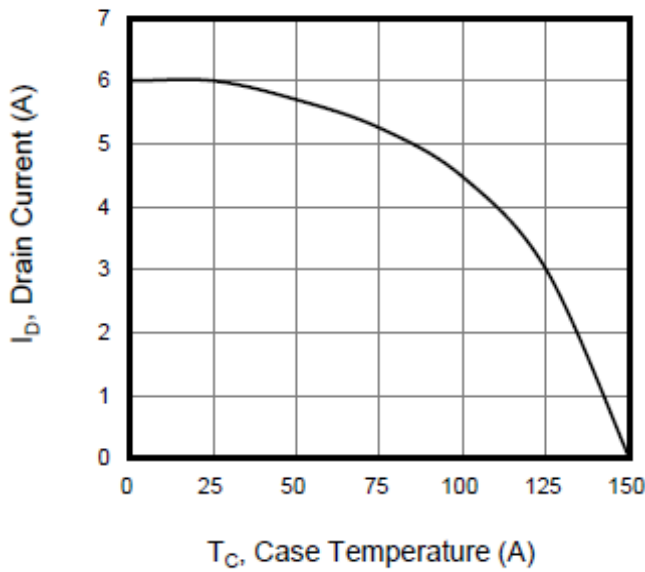


Figure6. Typical Temperature vs BVdss Variation

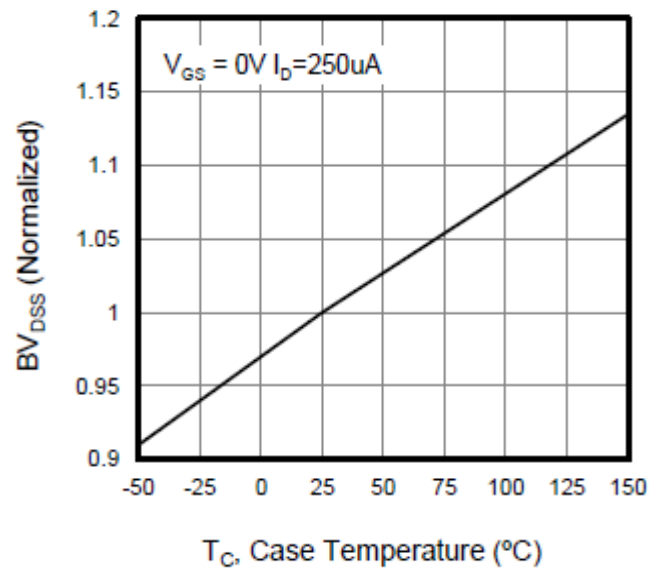


Figure7. Typical Capacitance vs Drain-to-Source Voltage

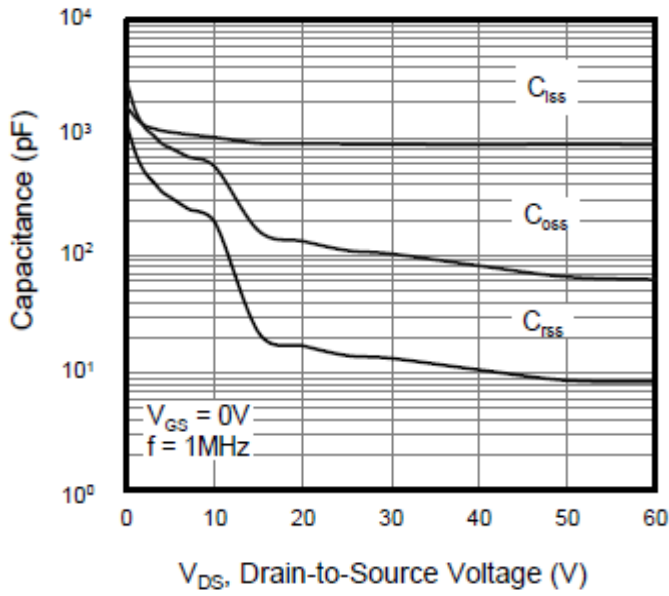


Figure8. Typical Gate Charge

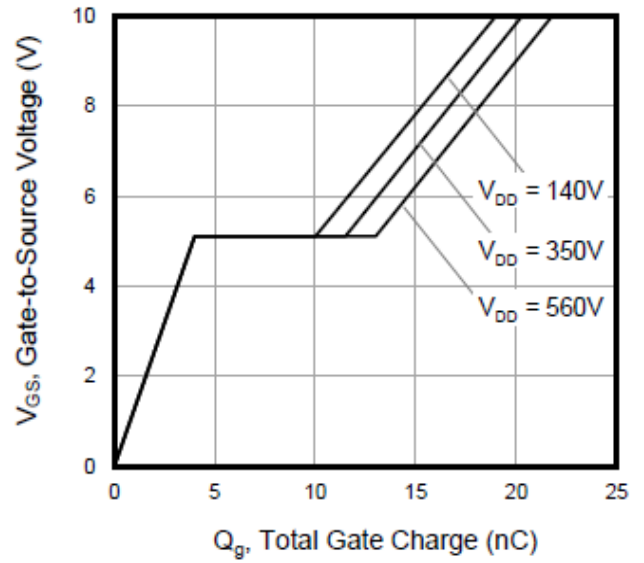
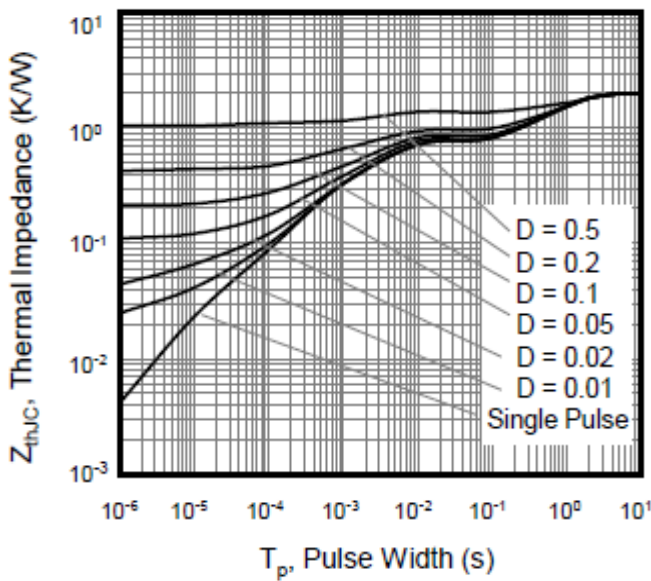


Figure9. Transient Thermal Impedance TO-220F



Test Circuits and Waveforms

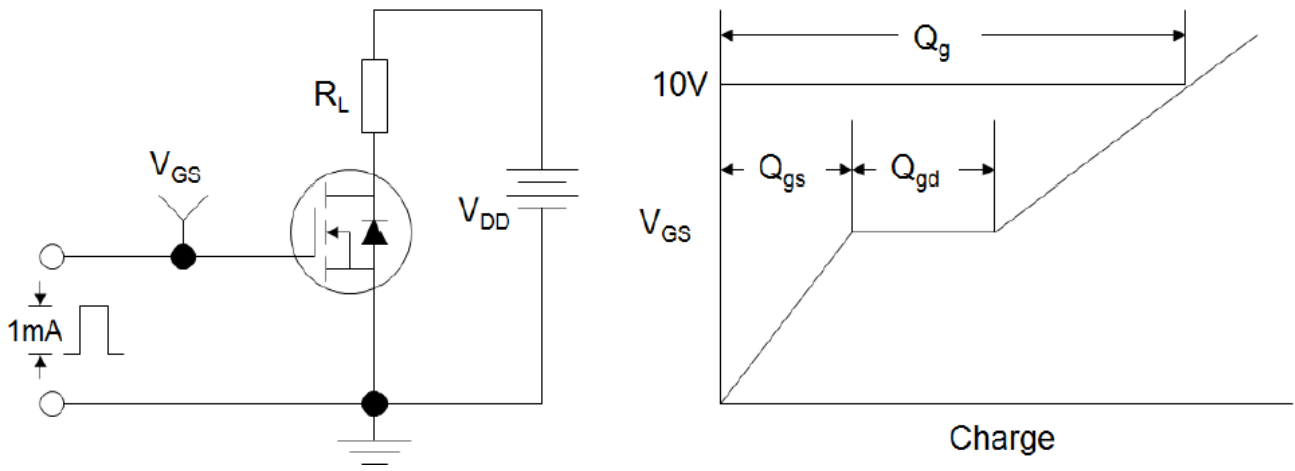


Figure10.  
Gate Charge Test Circuit and Waveform

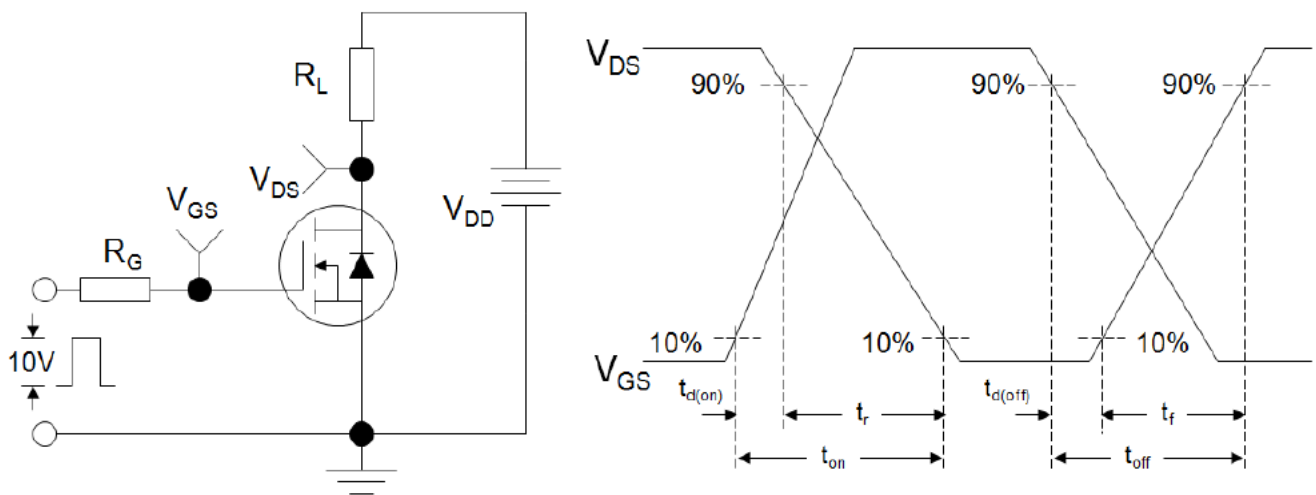


Figure11.  
Resistive Switching Test Circuit and Waveform

Test Circuits and Waveforms

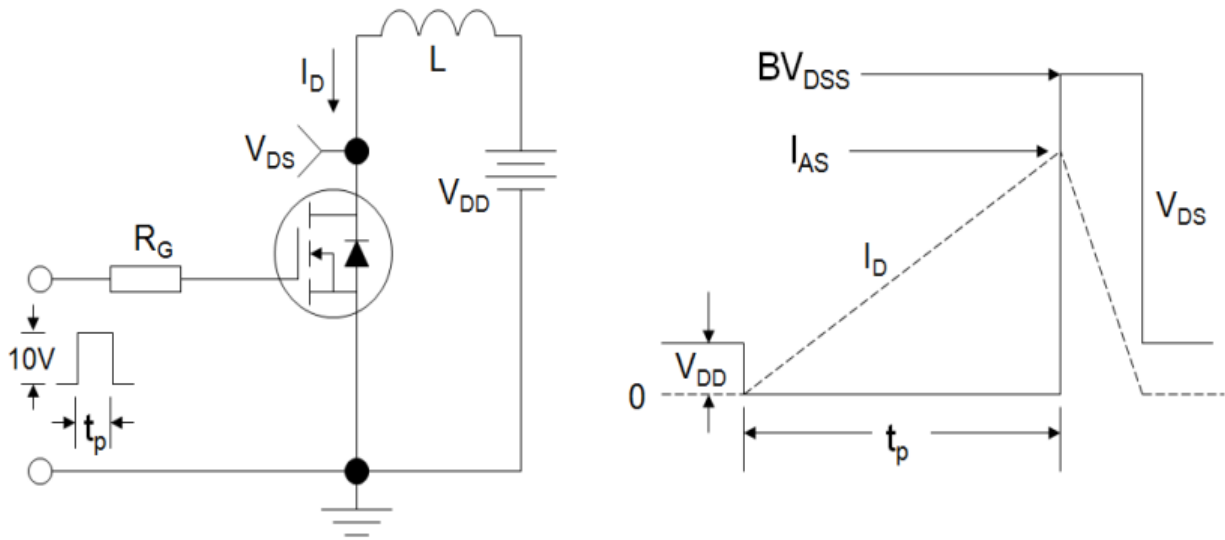
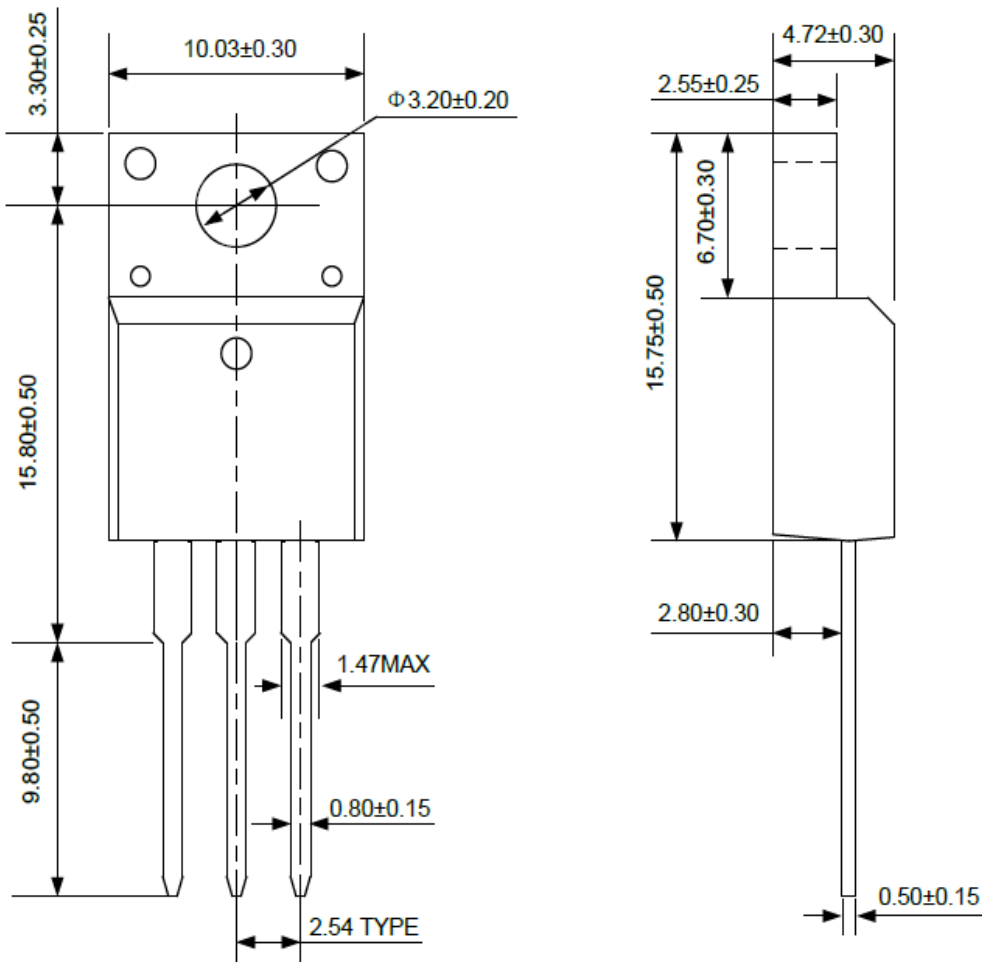


Figure12.Unclamped Inductive Switching Test Circuit and Waveform

Package outline drawing

Unit:mm



TO-220F



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