

**700V N-Channel Super Junction Power MOSFET**

**GENERAL DESCRIPTION**

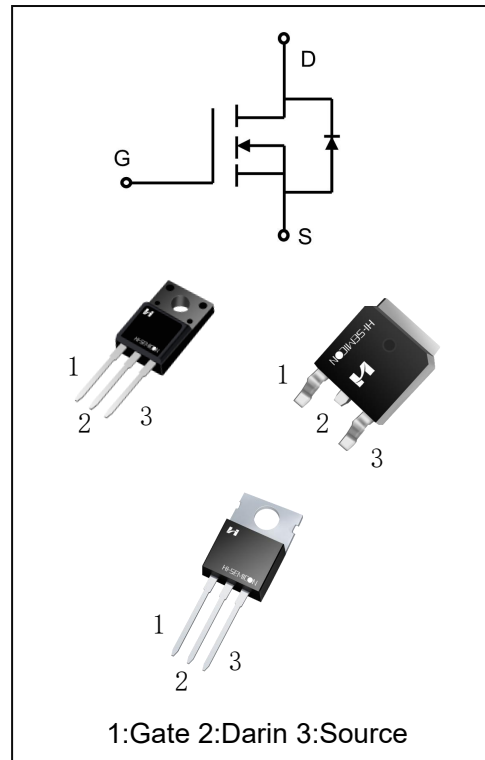
The Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

**Features**

- ◆  $V_{DS}(V)=700V, I_D=13A$
- ◆  $R_{DS(ON)}$   
 TYP:  $310m\Omega @ V_{GS}=10V, I_D=6.5A$   
 MAX:  $360m\Omega$

**Applications**

- ◆ Power factor correction (PFC)
- ◆ Switched mode power supplies (SMPS)
- ◆ Uninterruptible power supply (UPS)
- ◆ LED lighting power



**ORDERING INFORMATION**

Part No.	Package	Marking	Material	Packing
SCF70R360C	TO-220F-3L	SCF70R360C	Pb Free	Tube
SCP70R360C	TO-220-3L	SCP70R360C	Pb Free	Tube
SCD70R360C	TO-252-2L	SCD70R360C	Pb Free	Reel

## ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)

Characteristics	Symbol	Ratings		Unit
		SCF70R360C	SCD/P70R360C	
Drain-Source Voltage	V <sub>DS</sub>	700		V
Gate-Source Voltage	V <sub>GS</sub>	±30		V
Drain Current	I <sub>D</sub>	T <sub>C</sub> = 25°C		A
		T <sub>C</sub> = 100°C		
Drain Current Pulsed(Note 1)	I <sub>DM</sub>	52		A
Power Dissipation(T <sub>C</sub> =25°C) -Derate above 25°C	P <sub>D</sub>	35	87	W
		0.28	0.7	W/°C
Single Pulsed Avalanche Energy (Note 2)	E <sub>AS</sub>	403		mJ
Operation Junction Temperature Range	T <sub>J</sub>	-55~+150		°C
Storage Temperature Range	T <sub>stg</sub>	-55~+150		°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	TL	300		°C

## THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX		Unit
		SCF70R360C	SCD/P70R360C	
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	3.57	1.44	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62.5	62.5	°C/W

## ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain -Source Breakdown Voltage	B <sub>VDS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	700	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =700V, V <sub>GS</sub> =0V	--	--	1.0	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =30V, V <sub>DS</sub> =0V	--	--	100	nA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	--	--	-100	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =250μA	2.5	3.2	4.5	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =6.5A	--	310	380	mΩ
<b>Dynamic Characteristics</b>						
Gate Rresistance	R <sub>g</sub>	V <sub>GS</sub> =0V; f=1.0MHZ	--	7.5	--	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =100V V <sub>GS</sub> =0V f=1.0MHZ	--	1056	--	pF
Output Capacitance	C <sub>oss</sub>		--	45	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	1.0	--	pF

Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=350V; V_{GS}=10V$ $R_G=24\Omega I_D=13A$ (Note 3.4)	--	23	--	
Turn-on Rise Time	$t_r$		--	48	--	
Turn-off Delay Time	$t_{d(off)}$		--	64	--	
Turn-off Fall Time	$t_f$		--	36	--	
Total Gate Charge	$Q_g$	$V_{DS}=560V, I_D=13A$ $V_{GS}=10V$ (Note 3.4)	--	27	--	
Gate-Source Charge	$Q_{gs}$		--	9.0	--	
Gate-Drain Charge	$Q_{gd}$		--	7.2	--	

### SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	Integral Reverse P-N Junction Diode in the MOSFET	--	--	13	A
Pulsed Source Current	$I_{SM}$		--	--	52	
Diode Forward Voltage	$V_{SD}$	$I_S=13A, V_{GS}=0V$	--	0.88	1.4	V
Reverse Recovery Time	$T_{rr}$	$I=13A, V_{GS}=0V,$ $dI/dt=100A/\mu S$ (Note 3)	--	348	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	4.7	--	$\mu C$

NOTE:

1. Pulse width limited by maximum junction temperature
2.  $L=79mH, I_{AS}=3.0A, V_{DD}=100V, V_G=10V, R_G=25\Omega,$  starting  $T_J=25^\circ C$
3. Pulse Test: Pulse width  $\leq 300\mu s,$  Duty cycle  $\leq 2\%$
4. Essentially independent of operating temperature

Typical Performance Characteristics

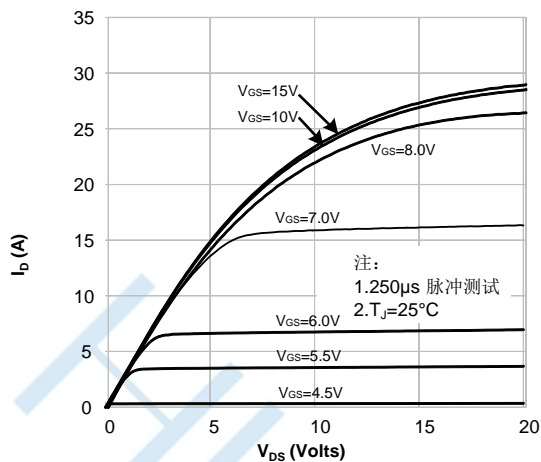


Figure 1: On-Region Characteristics (Note A)

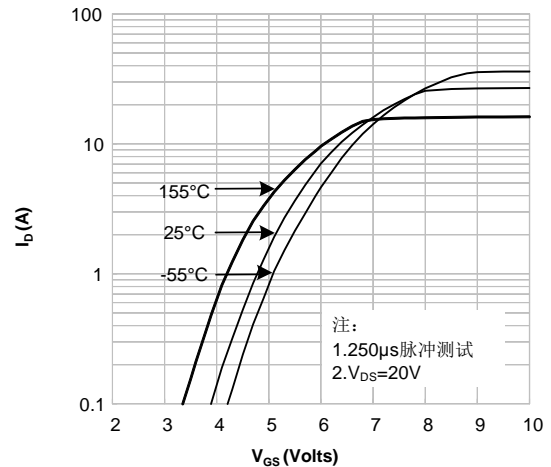


Figure 2: Transfer Characteristics (Note A)

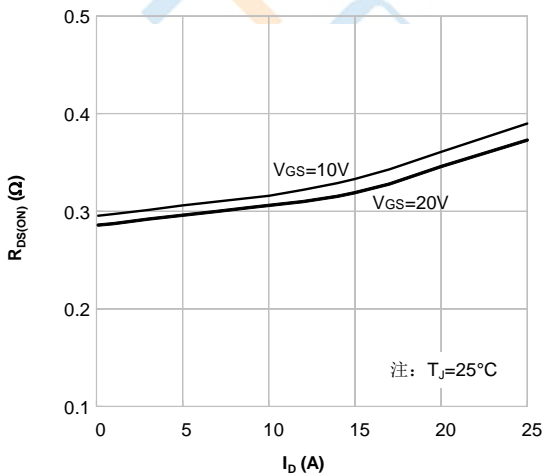


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note A)

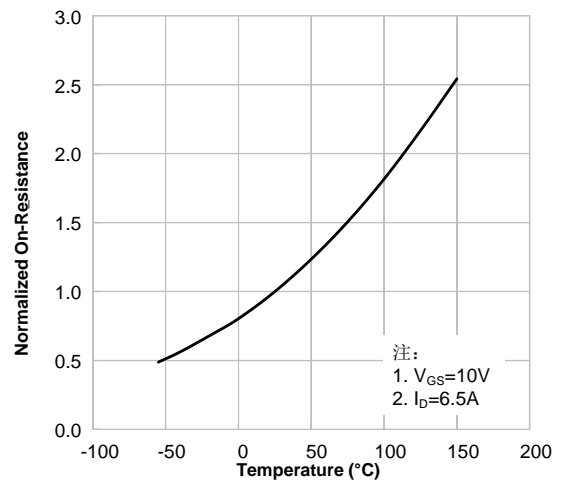


Figure 4: On-Resistance vs. Junction Temperature (Note A)

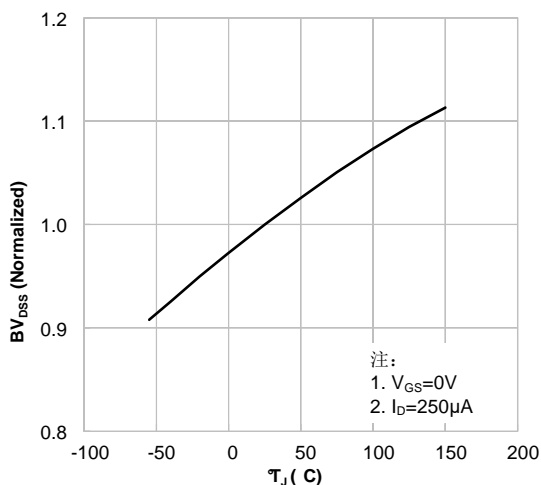


Figure 5: Break Down vs. Junction Temperature (Note A)

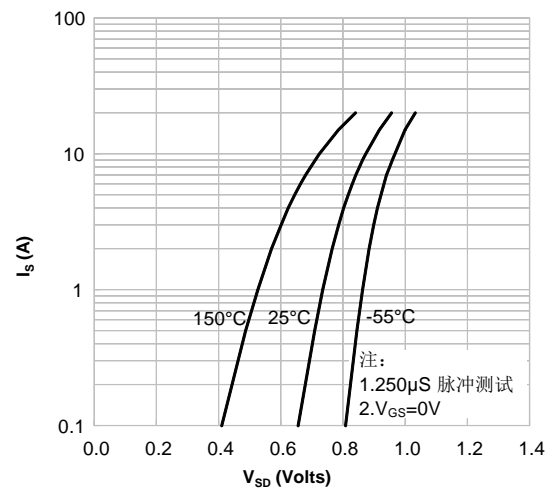
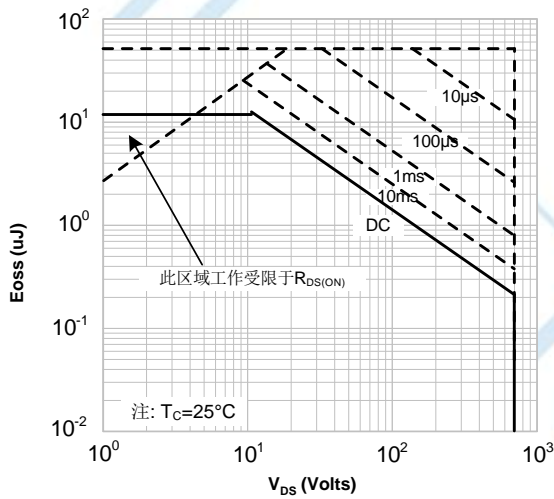
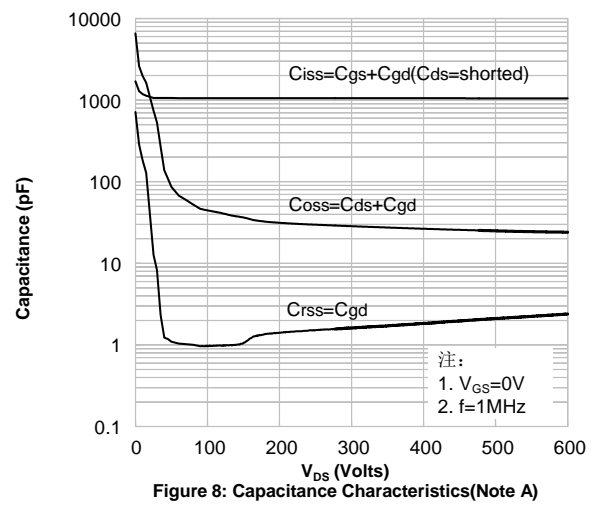
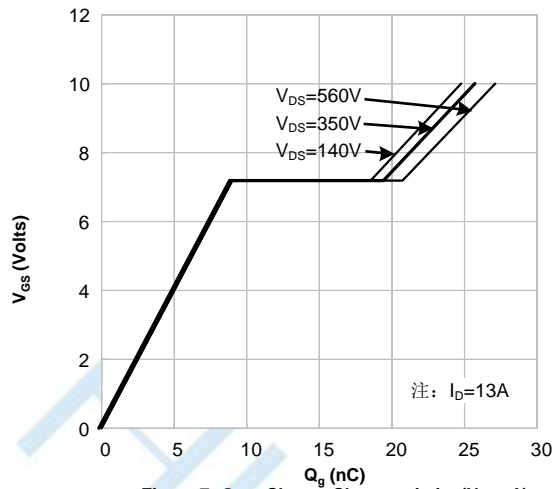
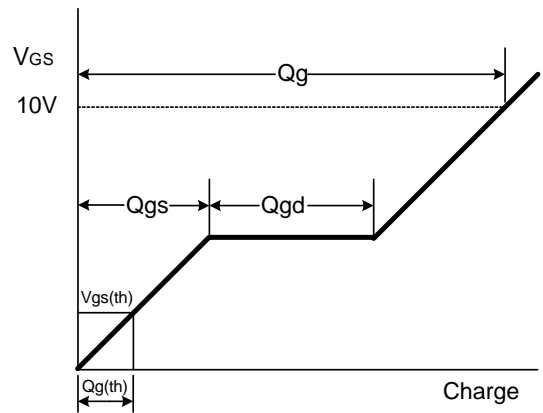
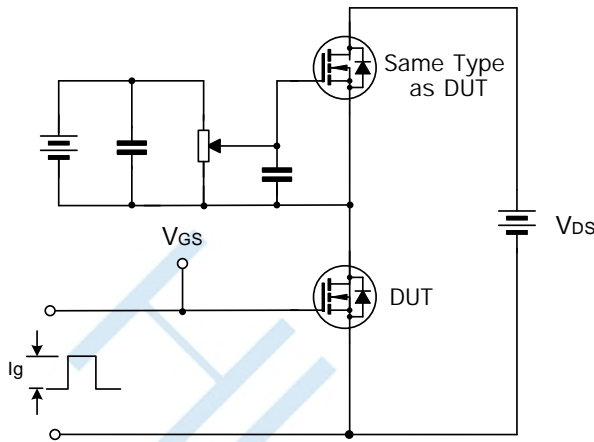


Figure 6: Body-Diode Characteristics (Note A)

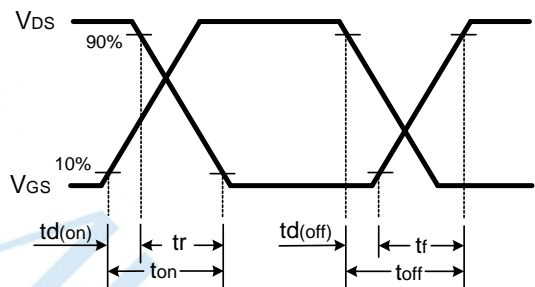
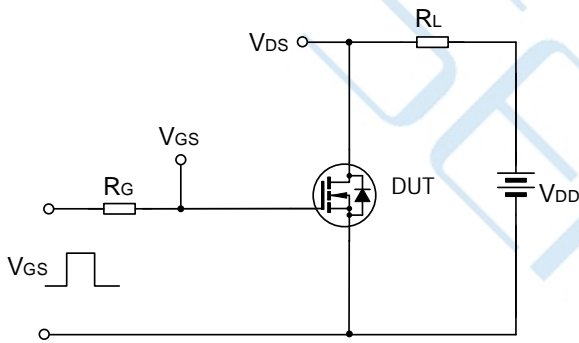
Typical Performance Characteristics



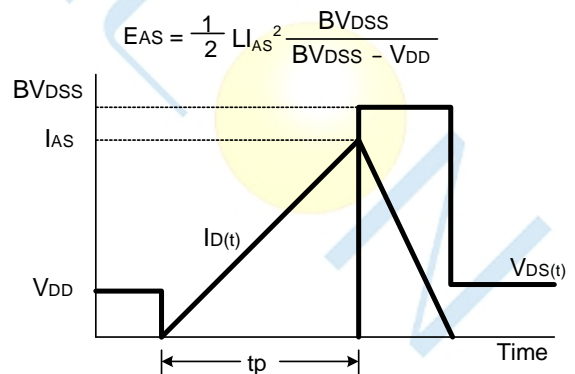
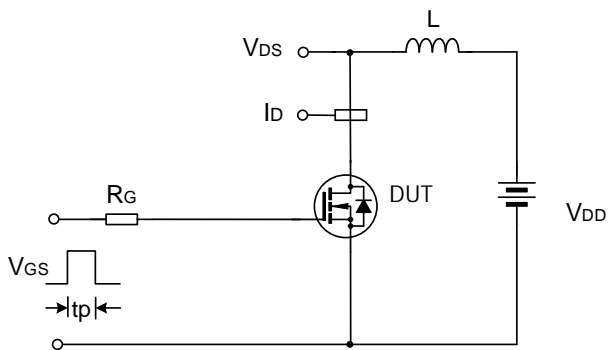
Test Circuit



Gate Charge Test Circuit & Waveform



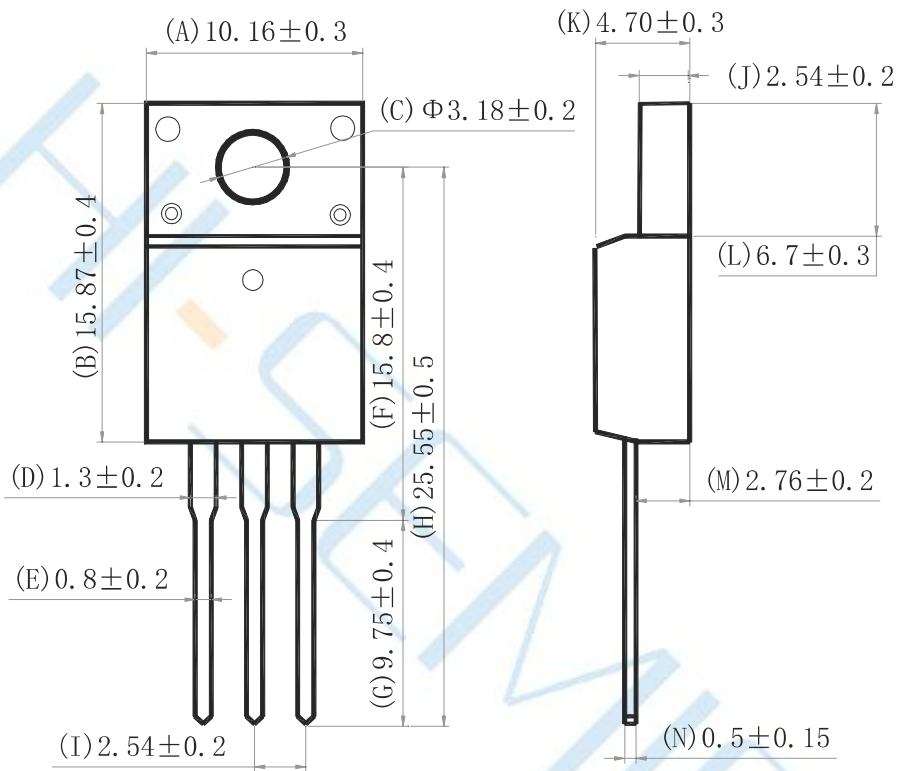
Resistive Switching Test Circuit & Waveform



EAS Test Circuit & Waveform

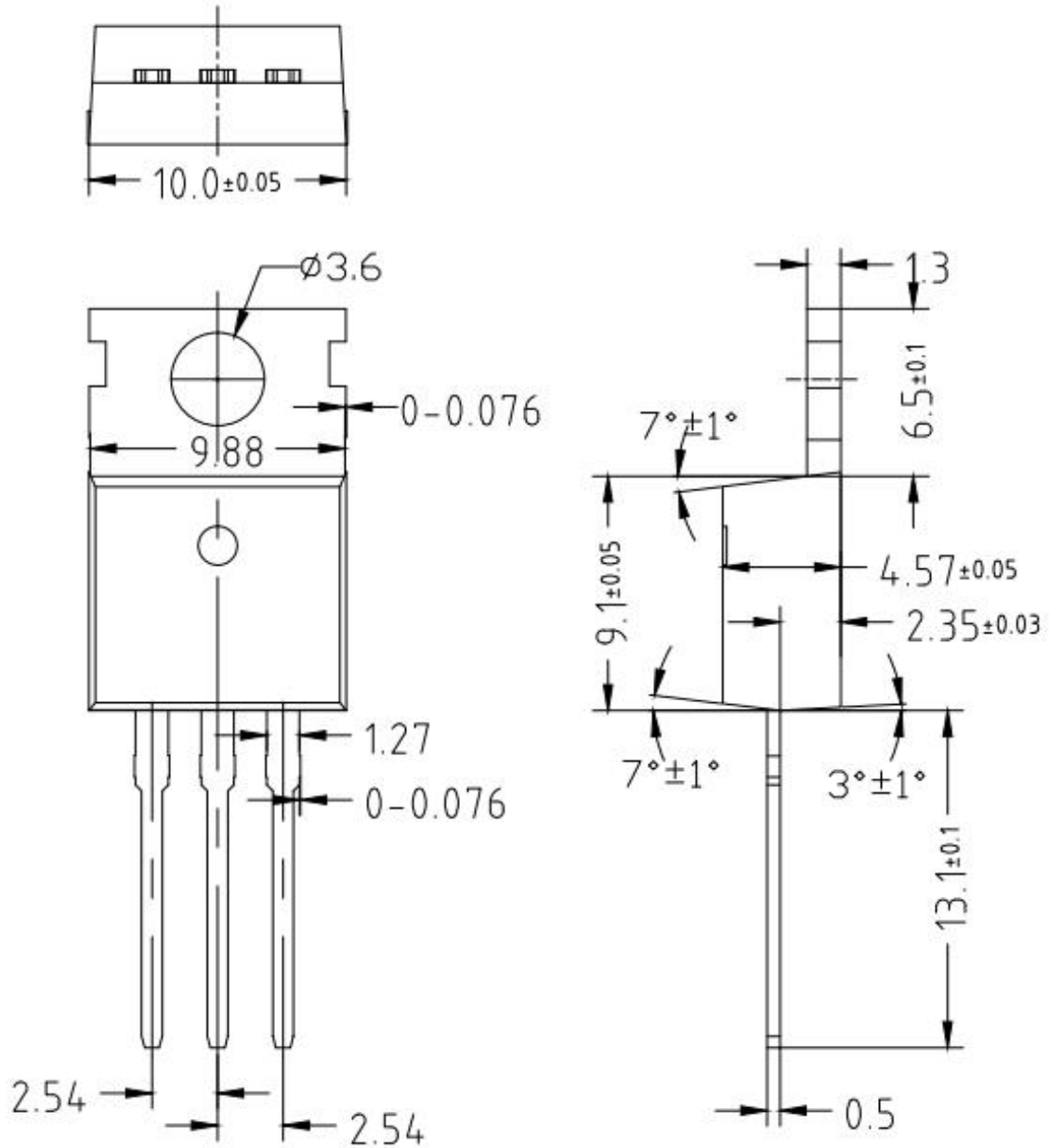
Package Dimensions of TO 220F-3L

Unit:mm



Package Dimensions of TO 220-3L

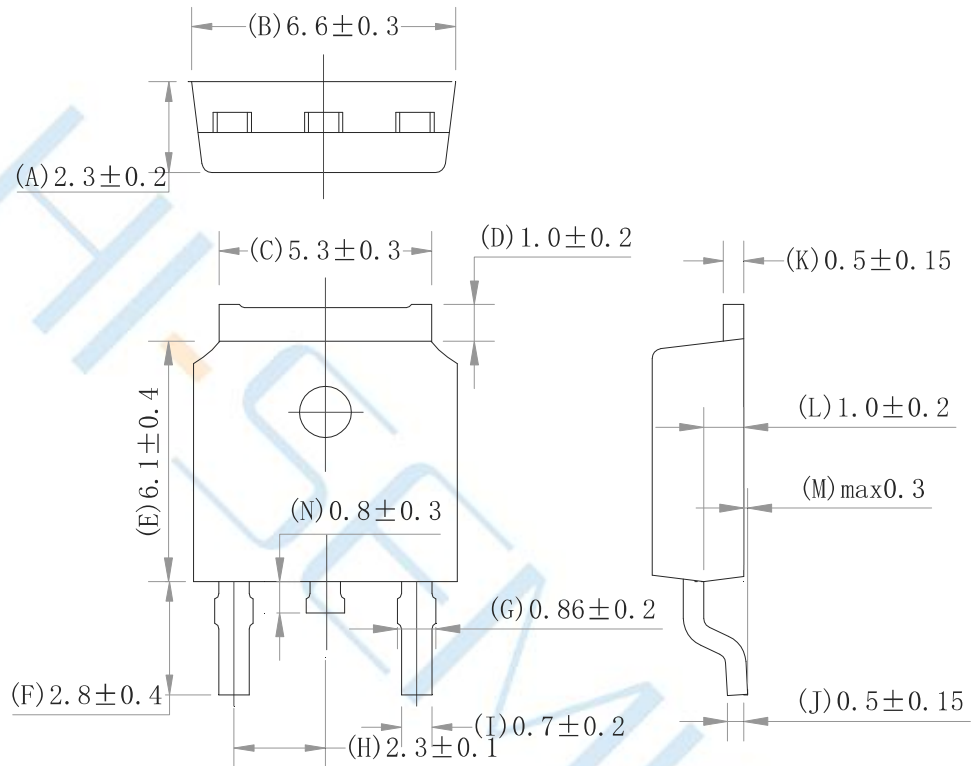
Unit:mm





Package Dimensions of TO 252-2L

Unit:mm



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