

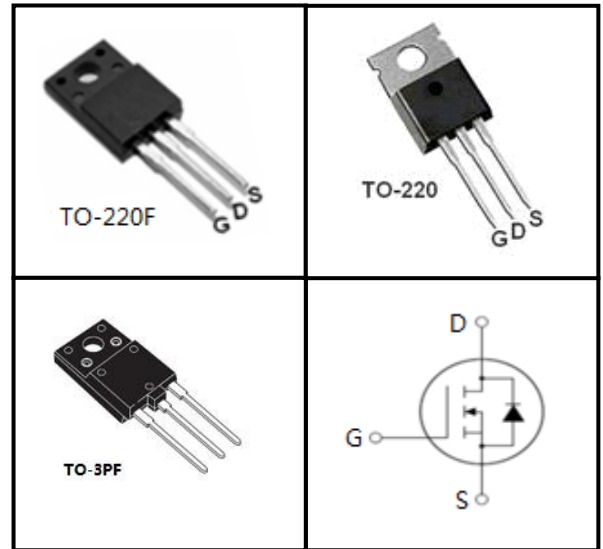
1000V N-Channel MOSFET

FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

APPLICATIONS

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



Device Marking and Package Information

Device	Package	Marking
CS5N100F	TO-220F	CS5N100F
CS5N100P	TO-220	CS5N100P
CS5N100VF	TO-3PF	CS5N100VF

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value			Unit
		TO-220F	TO-220	TO-3PF	
Drain-Source Voltage (V _{GS} = 0V)	V _{DSS}	1000			V
Continuous Drain Current	I _D	5			A
Pulsed Drain Current (note1)	I _{DM}	20			A
Gate-Source Voltage	V _{GSS}	±30			V
Single Pulse Avalanche Energy (note2)	E _{AS}	115.2			mJ
Avalanche Current (note1)	I _{AS}	4.8			A
Repetitive Avalanche Energy (note1)	E _{AR}	69.1			mJ
Power Dissipation (T _C = 25°C)	P _D	25	70		W
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~+150			°C

Thermal Resistance

Parameter	Symbol	Value			Unit
		TO-220F	TO-220	TO-3PF	
Thermal Resistance, Junction-to-Case	R _{thJC}	5	1.78		°C/W
Thermal Resistance, Junction-to-Ambient	R _{thJA}	62.5	60		

Specifications $T_J = 25^{\circ}\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	1000	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 1000V, V _{GS} = 0V, T _J = 25°C	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	3.0	--	4.0	V
Drain-Source On-Resistance (Note3)	R _{DS(on)}	V _{GS} = 10V, I _D = 2.5A	--	2.1	2.5	Ω
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz	--	1152	--	pF
Output Capacitance	C _{oss}		--	110	--	
Reverse Transfer Capacitance	C _{rss}		--	23	--	
Total Gate Charge	Q _g	V _{DD} = 800V, I _D = 5A, V _{GS} = 10V	--	47	--	nC
Gate-Source Charge	Q _{gs}		--	4.8	--	
Gate-Drain Charge	Q _{gd}		--	24	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 500V, I _D = 5A, R _G = 25 Ω	--	43	--	ns
Turn-on Rise Time	t _r		--	20	--	
Turn-off Delay Time	t _{d(off)}		--	230	--	
Turn-off Fall Time	t _f		--	47	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25 °C	--	--	5	A
Pulsed Diode Forward Current	I _{SM}		--	--	20	
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 2.5A, V _{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} = 0V,I _S = 5A, di _F /dt =100A /μs	--	628	--	ns
Reverse Recovery Charge	Q _{rr}		--	1.4	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L=10\text{mH}$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

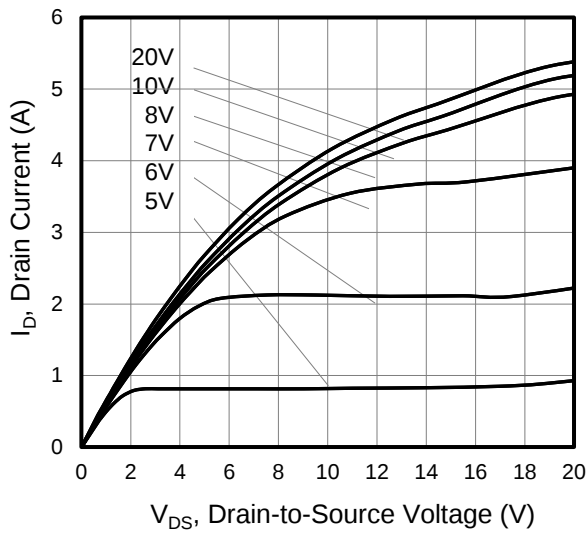


Figure 2. Body Diode Forward Voltage

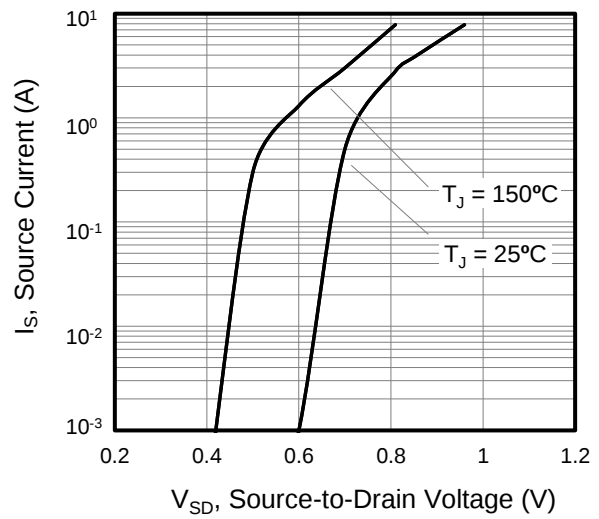


Figure 3. Drain Current vs. Temperature

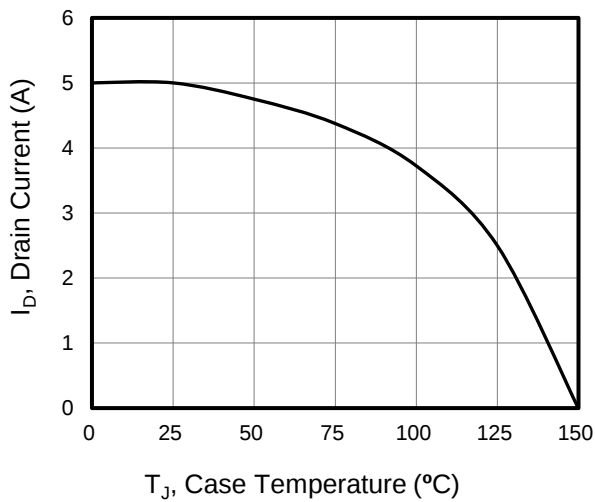


Figure 4. BV_{DSS} Variation vs. Temperature

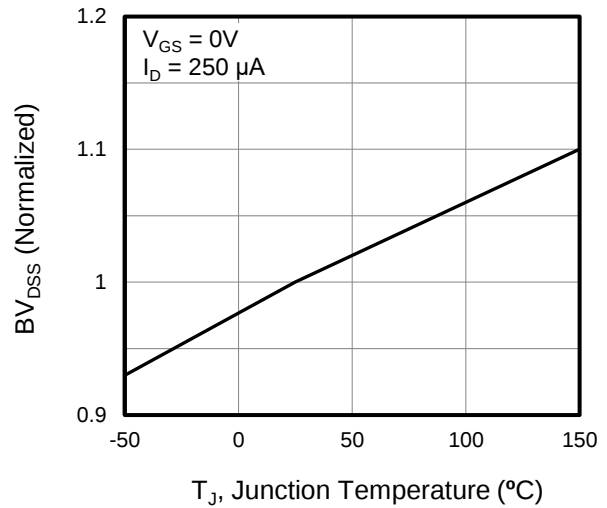


Figure 5. Transfer Characteristics

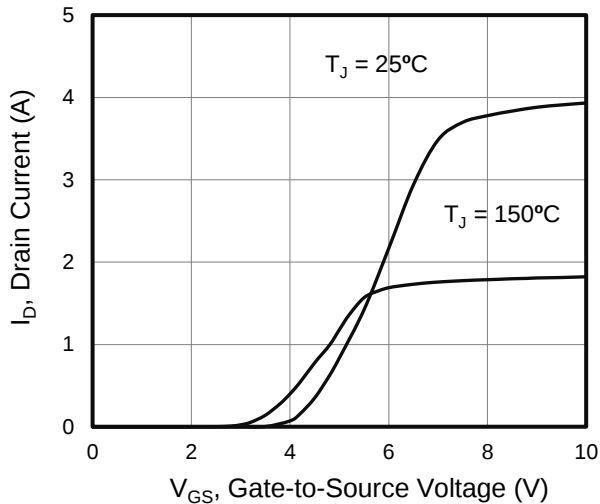
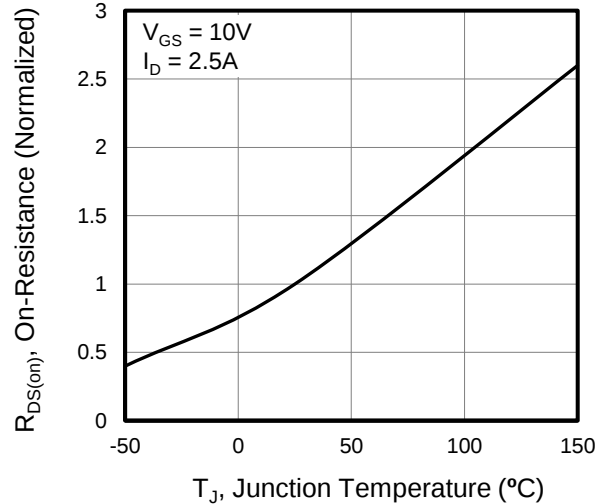


Figure 6. On-Resistance vs. Temperature



Typical Characteristics $T_j = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Capacitance

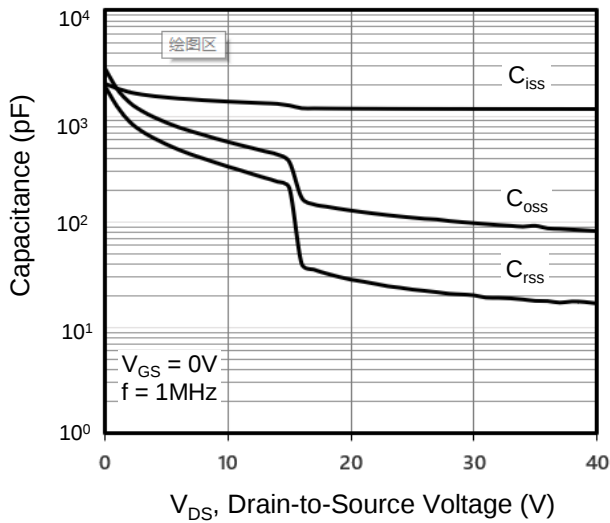


Figure 8. Gate Charge

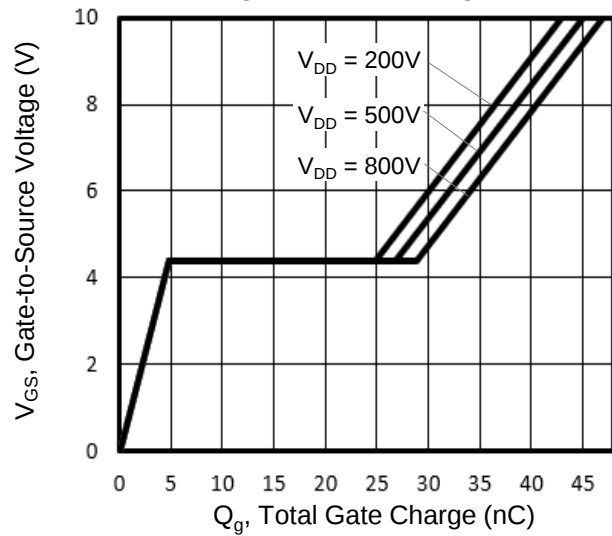


Figure 9. Transient Thermal Impedance

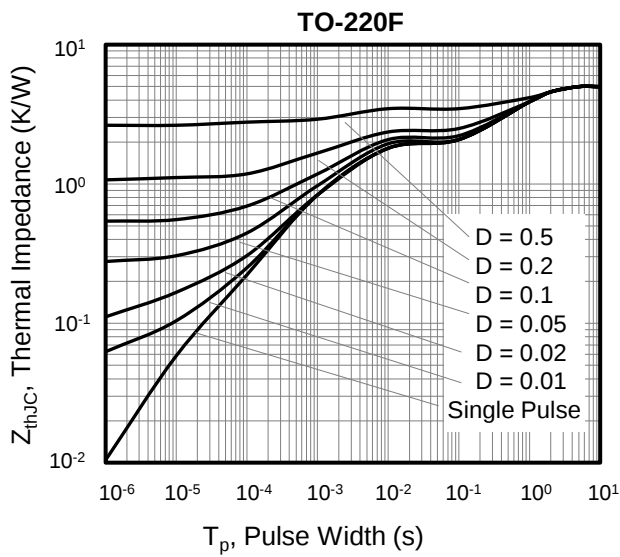


Figure 10. Transient Thermal Impedance

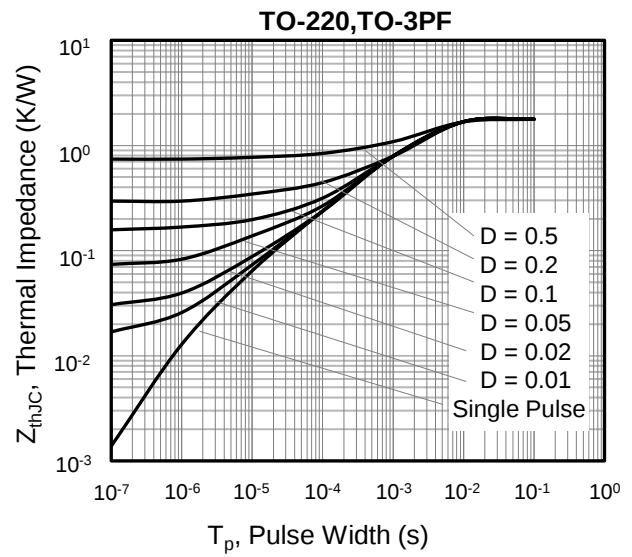


Figure A: Gate Charge Test Circuit and Waveform



Figure B: Resistive Switching Test Circuit and Waveform

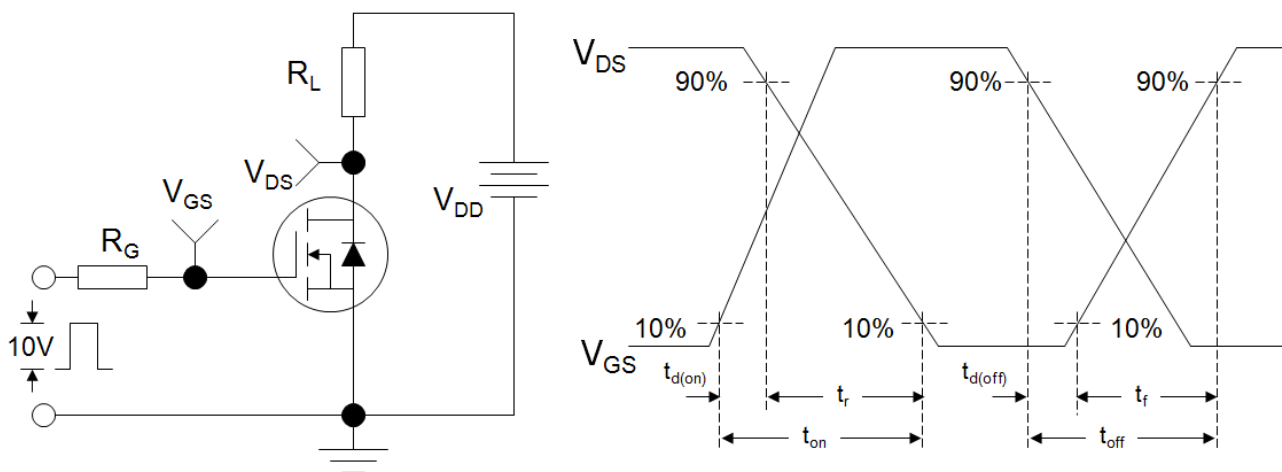
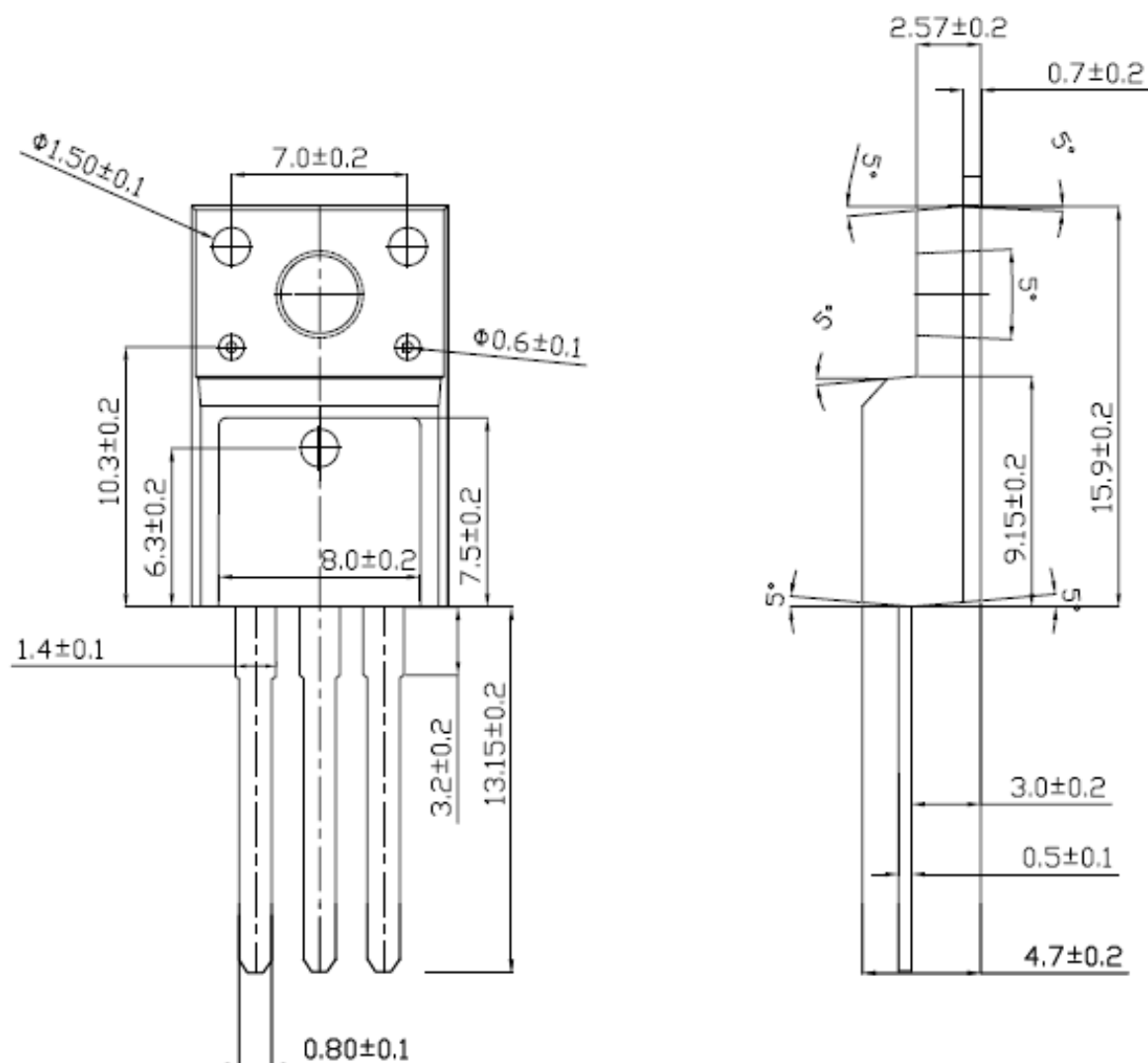


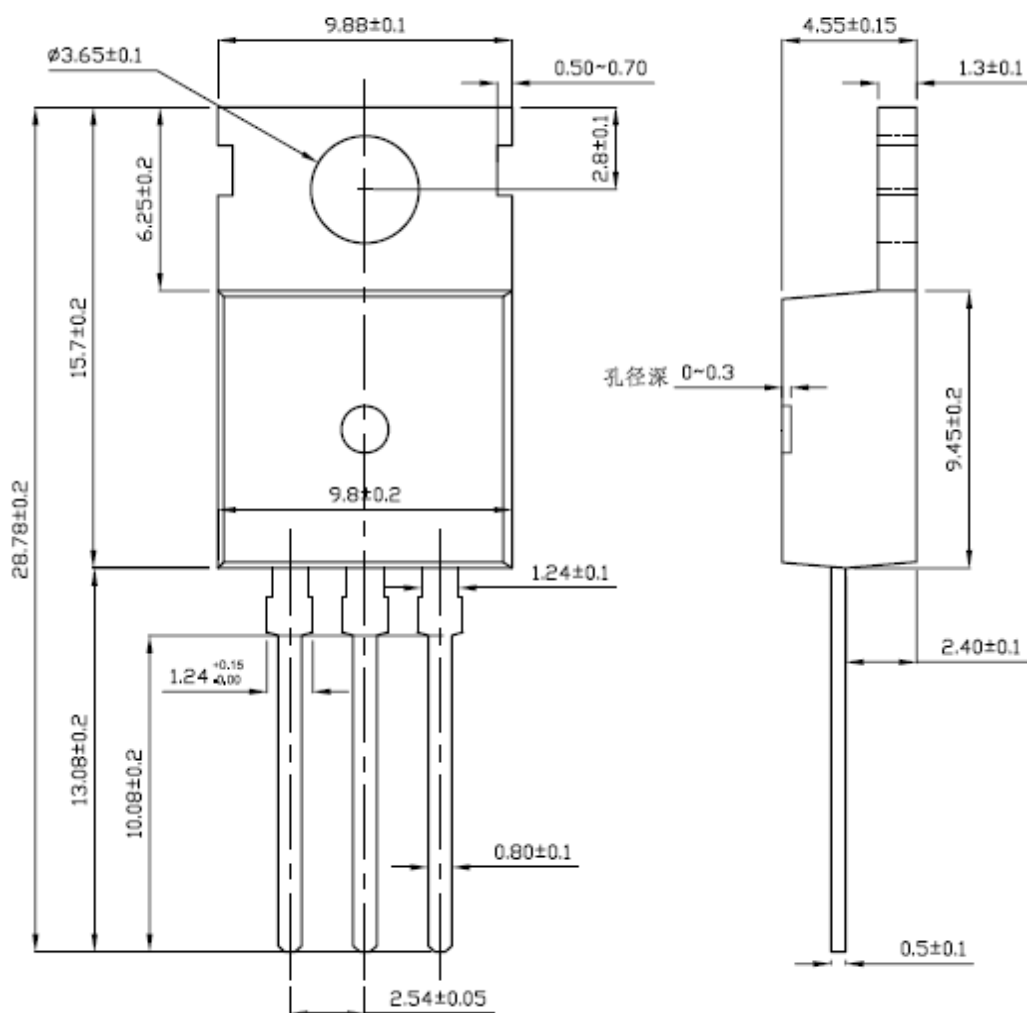
Figure C: Unclamped Inductive Switching Test Circuit and Waveform

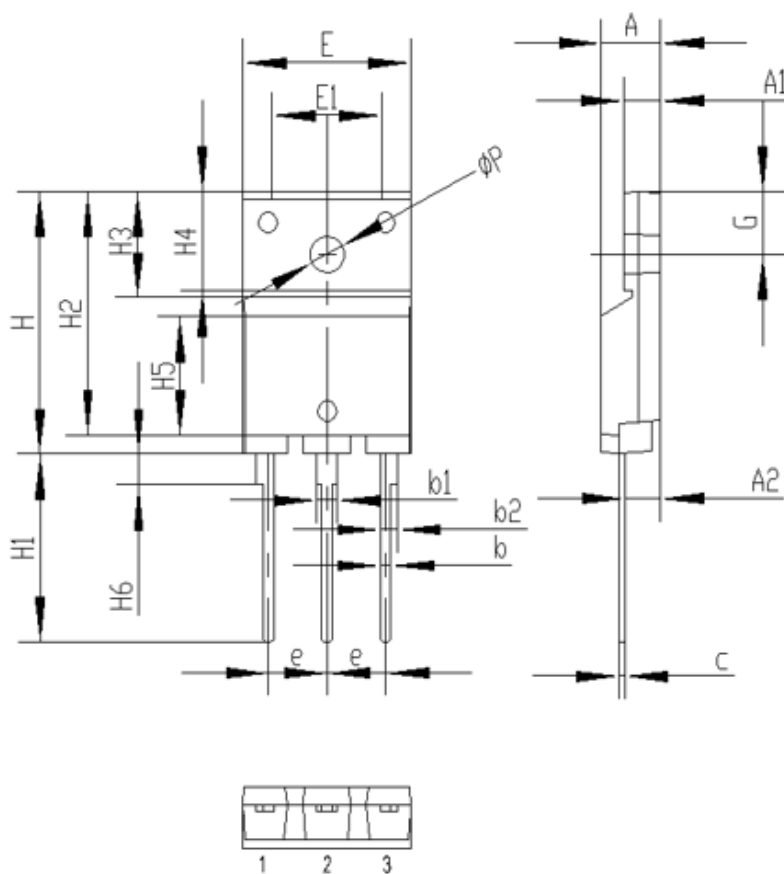


TO-220F



TO-220



TO-3PF


Symbol	单位 mm		
	Min	Nom	Max
A	5.30	5.50	5.70
A1	3.30	3.50	3.70
A2	3.20	3.40	3.60
b	0.80	1.0	1.20
b1	1.80	2.00	2.20
b2	1.40	1.60	1.80
c	0.40	0.50	0.60
e	5.25	5.45	5.65
E	15.4	15.6	15.8
E1	10.0	10.2	10.4
H	22.8	23.0	23.2
H1	16.0	16.5	17.0
H2	21.2	21.4	21.6
H3	9.10	9.30	9.50
H4	8.55	8.75	8.95
H5	10.2	10.4	10.6
H6	2.55	2.70	2.85
G	5.3	5.5	5.7
ΦP	3.00	3.20	3.40

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