

800V N-Channel MOSFET

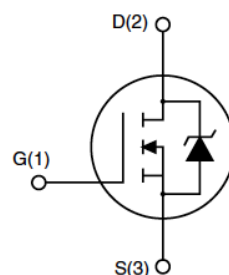
FEATURES

V _{DSS}	R _{DS ON} @ 10V (Typ)	I _D
800V	1 Ω	9 A

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

APPLICATIONS

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



Schematic diagram



TO-220



TO-220F

Ordering Information

Part Number	Marking	Case	Packaging
G9N80T	G9N80	TO-220	50pcs/Tube
G9N80F	G9N80	TO-220F	50pcs/Tube

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

Parameter	Symbol	Value		Unit
		TO-220F	TO-220	
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	800		V
Continuous Drain Current	I_D	9		A
Pulsed Drain Current (note1)	I_{DM}	36		A
Gate-Source Voltage	V_{GSS}	± 30		V
Single Pulse Avalanche Energy (note2)	E_{AS}	405		mJ
Avalanche Current (note1)	I_{AS}	9		A
Repetitive Avalanche Energy (note1)	E_{AR}	243		mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	25	70	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	$-55 \sim +150$		$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value		Unit
		TO-220F	TO-220	
Thermal Resistance, Junction-to-Case	R_{thJC}	5	1.78	K/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	800	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 800V, V _{GS} = 0V, T _J = 25°C	--	--	1	μA
		V _{DS} = 640V, V _{GS} = 0V, T _J = 125°C	--	--	100	
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 = 4.5A	--	1	1.2	Ω
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz	--	1519	--	pF
Output Capacitance	C _{oss}		--	162	--	
Reverse Transfer Capacitance	C _{rss}		--	34	--	
Total Gate Charge	Q _g	V _{DD} = 640V, I _D = 9A, V _{GS} = 10V	--	57	--	nC
Gate-Source Charge	Q _{gs}		--	24	--	
Gate-Drain Charge	Q _{gd}		--	7.5	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 400V, I _D = 9A, R _G = 25 Ω	--	45	--	ns
Turn-on Rise Time	t _r		--	17	--	
Turn-off Delay Time	t _{d(off)}		--	355	--	
Turn-off Fall Time	t _f		--	475	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25 °C	--	--	9	A
Pulsed Diode Forward Current	I _{SM}		--	--	36	
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 4.5A, V _{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} = 0V, I _S = 9A, di _F /dt =100A /μs	--	562	--	ns
Reverse Recovery Charge	Q _{rr}		--	4.399	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L=10mH, V_{DD} = 50V, R_G = 25\Omega$, 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 ($T_J = 25^\circ\text{C}$)

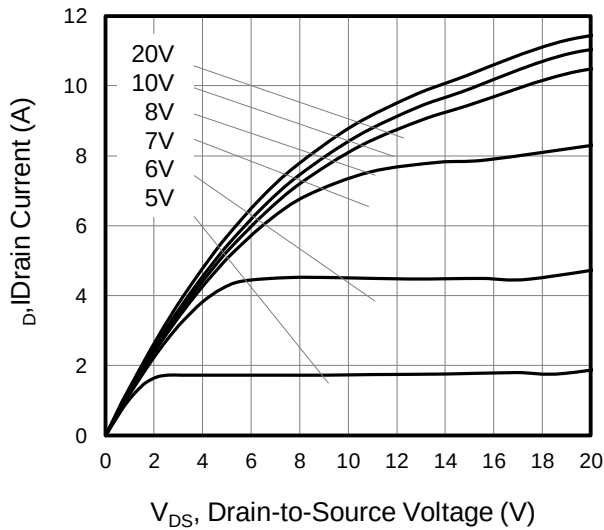


Figure 2. Body Diode Forward Voltage

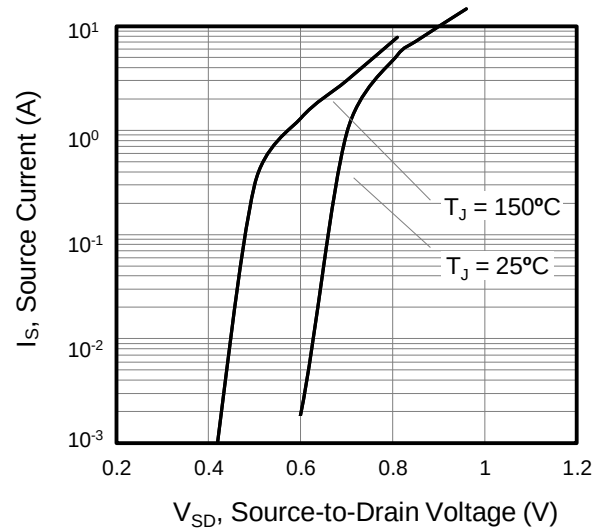


Figure 3. Drain Current vs. Temperature

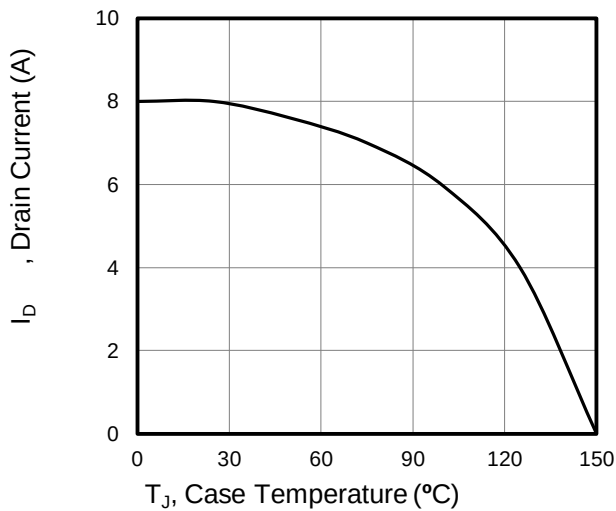


Figure 4. BV_{DSS} Variation vs. Temperature

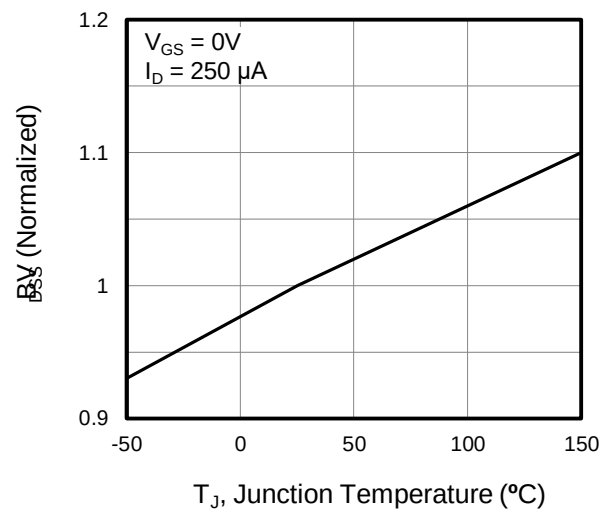


Figure 5. Transfer Characteristics

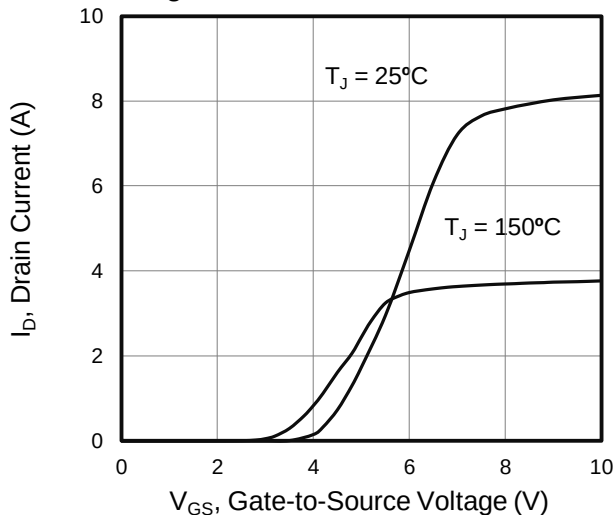
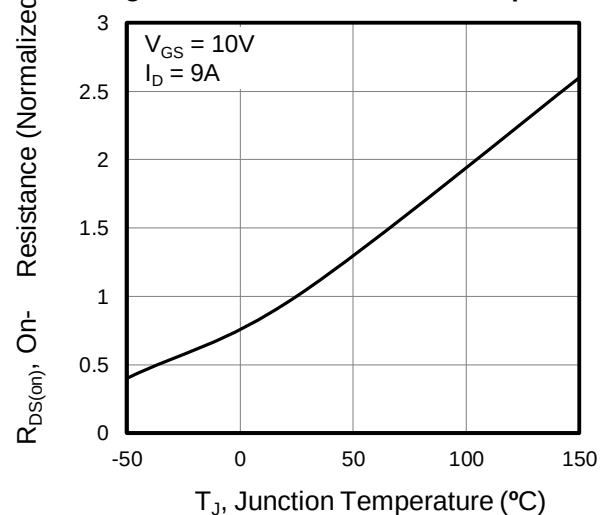


Figure 6. On-Resistance vs. Temperature



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

Figure 7. Capacitance

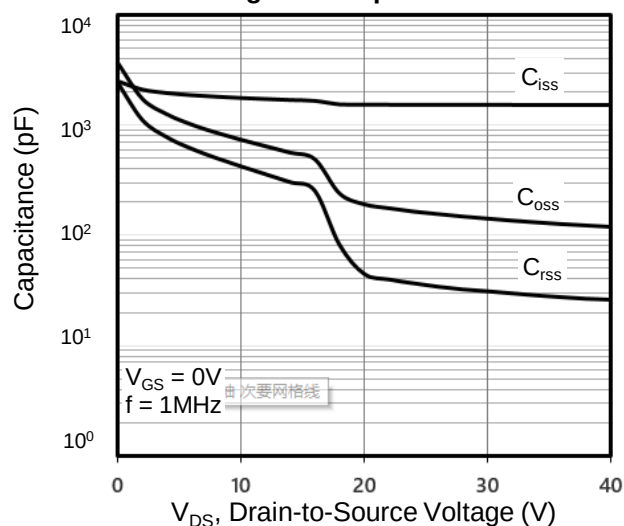


Figure 8. Gate Charge

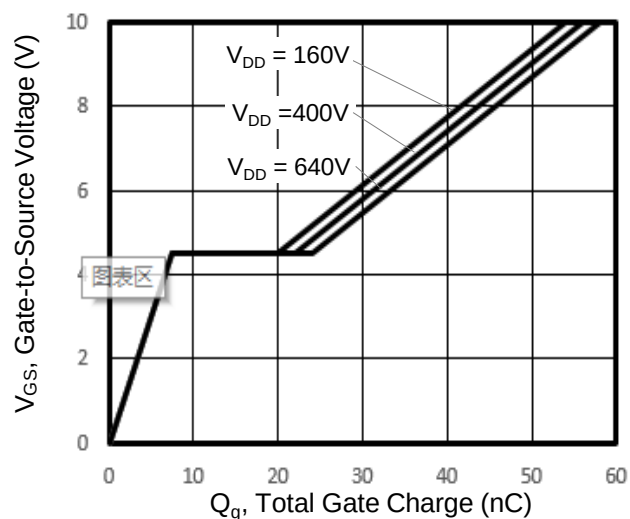


Figure 9. Transient Thermal Impedance

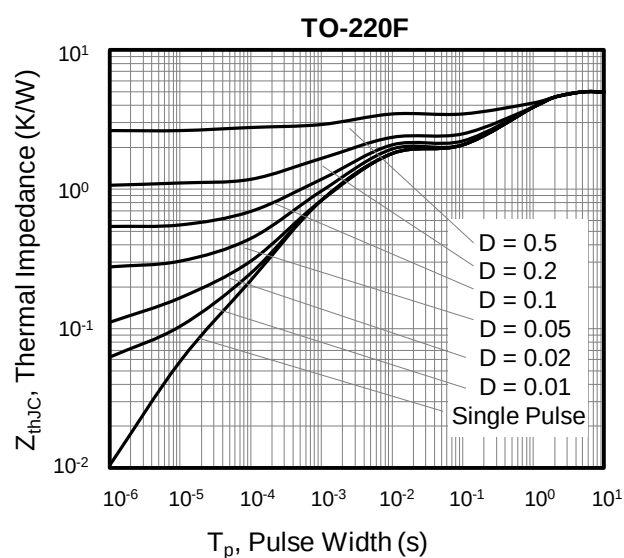


Figure 10. Transient Thermal Impedance

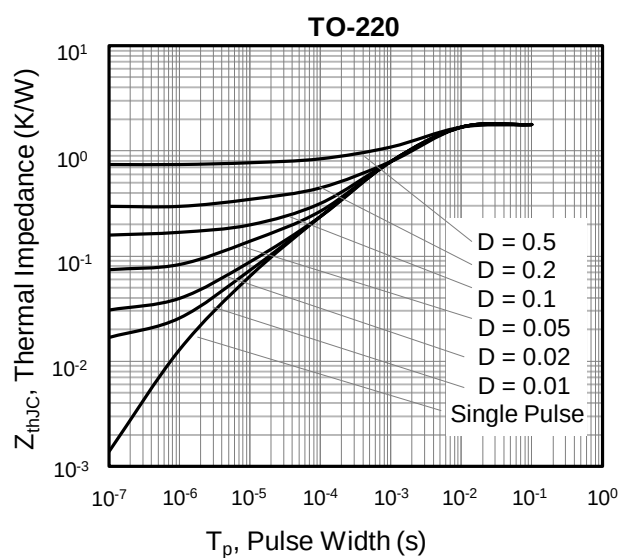


Figure A: Gate Charge Test Circuit and Waveform

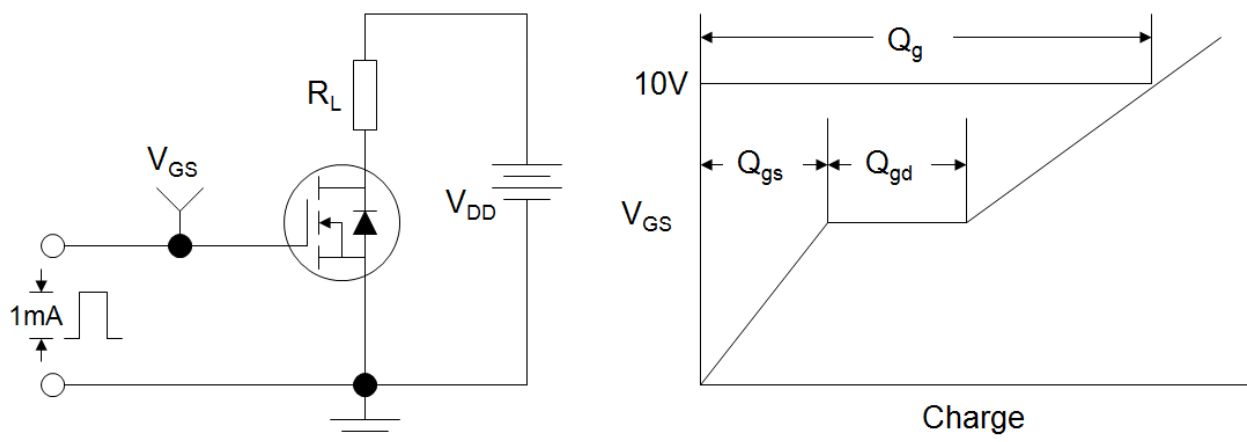


Figure B: Resistive Switching Test Circuit and Waveform

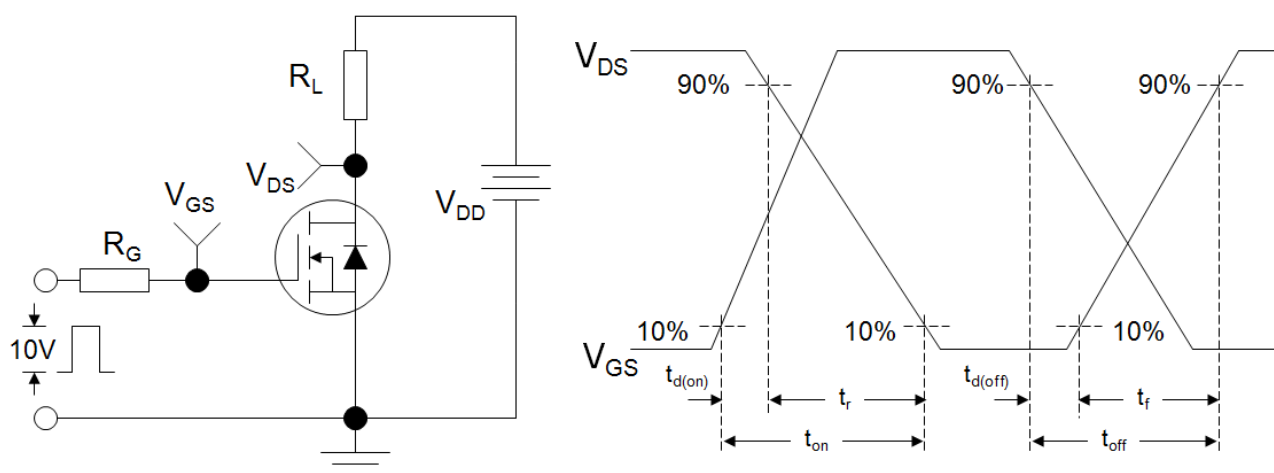
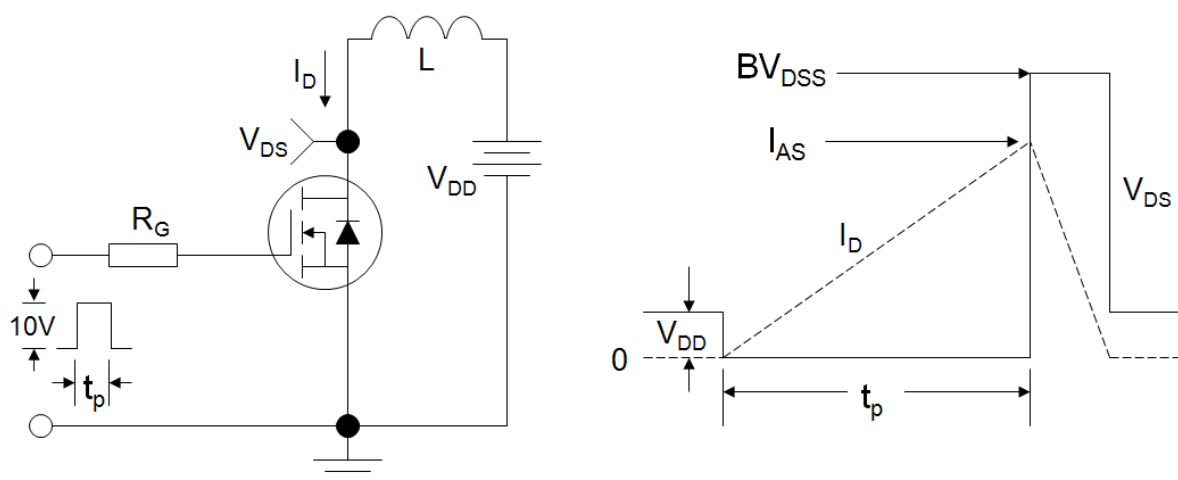
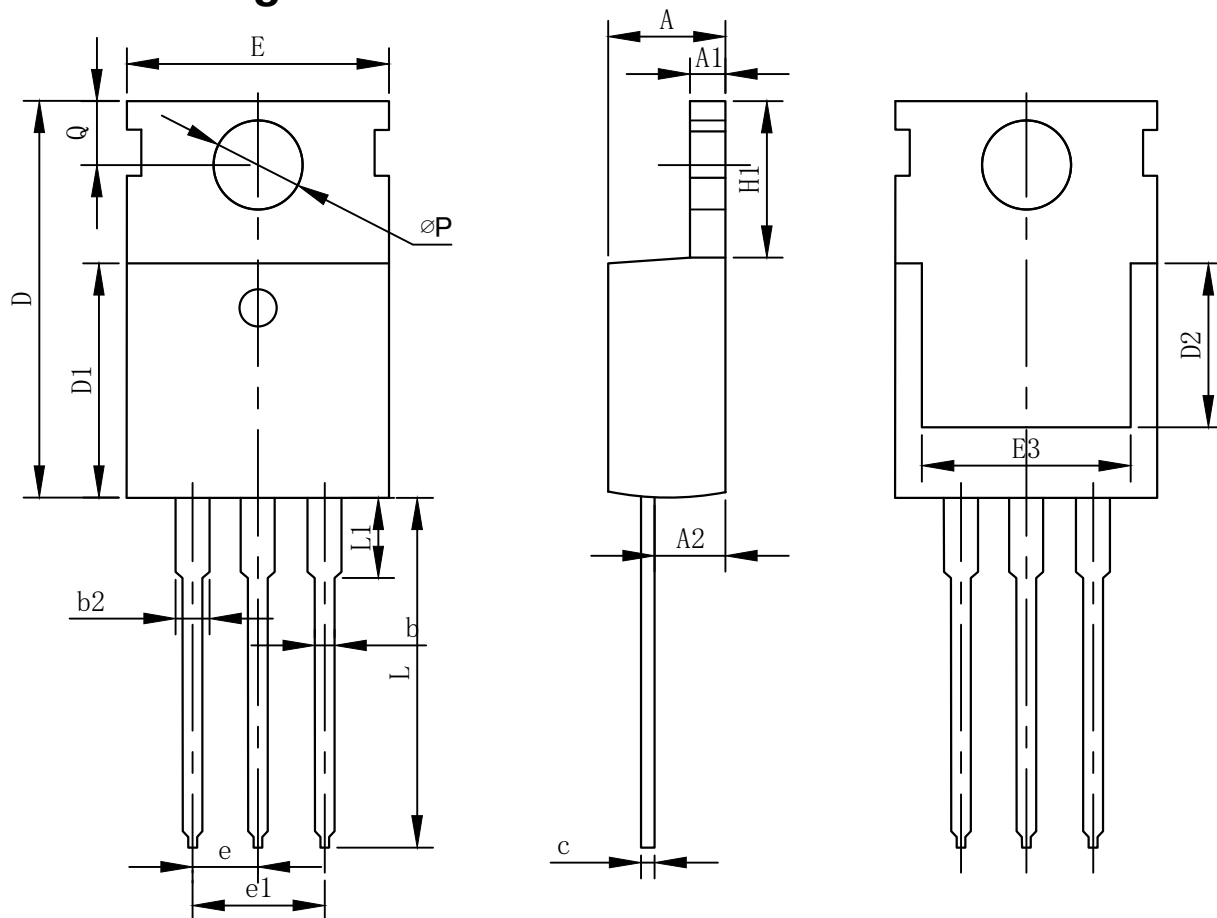


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



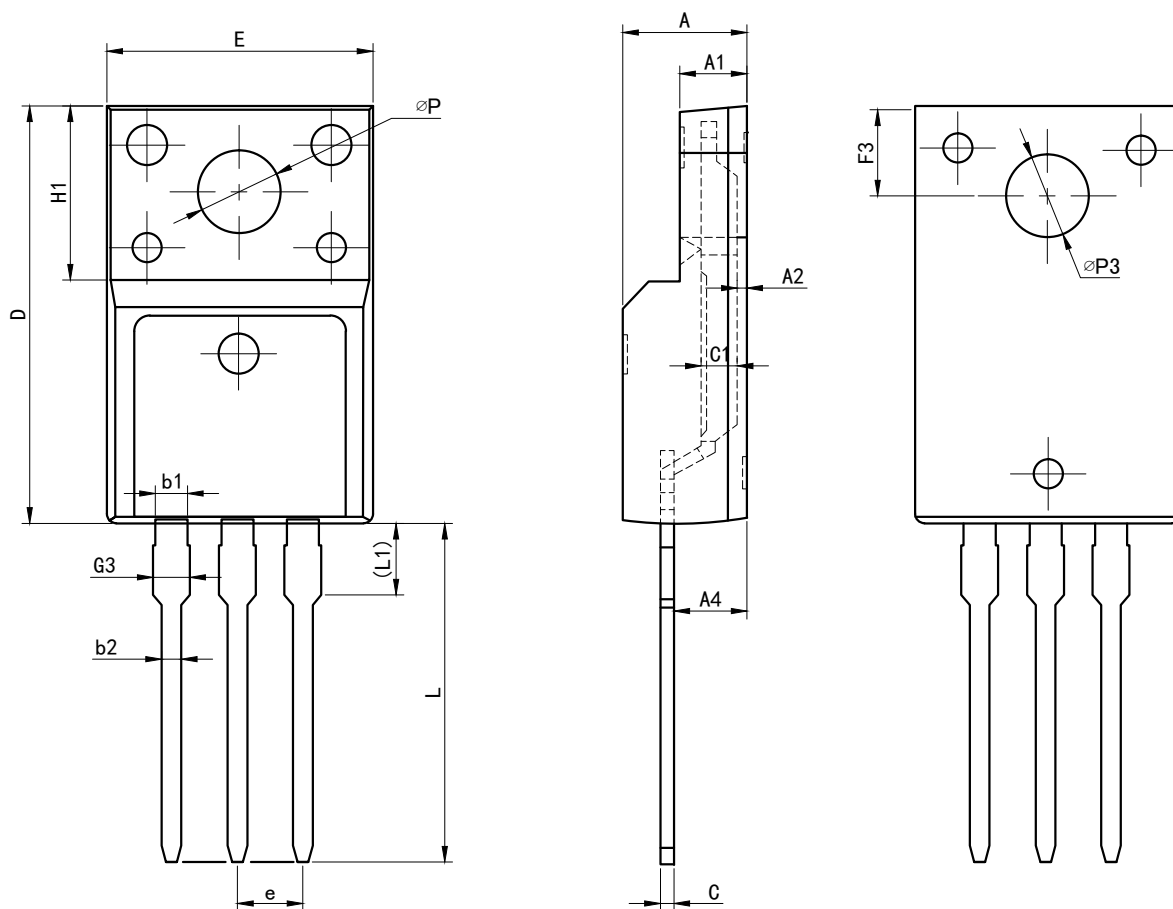
TO-220 Package information



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.70	1.27	1.47
c	0.45	0.50	0.60
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	—	—
E	9.70	10.00	10.30
E3	7.00	—	—
e	2.54BSC		
e1	5.08BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	—	3.10	3.40
øP	3.40	3.60	3.80
Q	2.60	2.80	3.00

TO-220F Package information



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
E	9.96	10.16	10.36
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2	0.30	0.45	0.60
A4	2.56	2.76	2.96
c	0.40	0.50	0.65
c1	1.20	1.30	1.35
D	15.57	15.87	16.17
H1	6.70REF		
e	2.54BSC		
L	12.68	12.98	13.28
L1	2.93	3.03	3.13
ϕP	3.03	3.18	3.38
$\phi P3$	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95