

## 800V N-Channel MOSFET

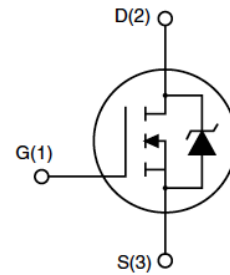
### FEATURES

V <sub>DSS</sub>	R <sub>DS(on)</sub> @ 10V (Typ)	I <sub>D</sub>
800V	1.35Ω	7 A

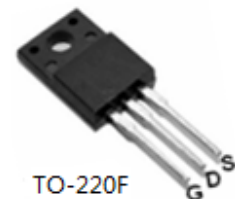
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS Compliant

### APPLICATIONS

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



Schematic diagram



### Ordering Information

Part Number	Marking	Case	Packaging
G7N80T	G7N80	TO-220	50pcs/Tube
G7N80CF	G7N80	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	$I_D$	7		A
Pulsed Drain Current (note1)	$I_{DM}$	28		A
Gate-Source Voltage	$V_{GSS}$	$\pm 30$		V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	245		mJ
Avalanche Current (note1)	$I_{AS}$	7		A
Repetitive Avalanche Energy (note1)	$E_{AR}$	147		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~+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.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	800	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 800V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
		$V_{DS} = 640V, V_{GS} = 0V, T_J = 125^\circ\text{C}$	--	--	100	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 30V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3.5A$	--	1.35	1.6	$\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$	--	1178	--	$\mu F$
Output Capacitance	$C_{oss}$		--	128	--	
Reverse Transfer Capacitance	$C_{rss}$		--	27	--	
Total Gate Charge	$Q_g$	$V_{DD} = 640V, I_D = 7A,$ $V_{GS} = 10V$	--	49	--	nC
Gate-Source Charge	$Q_{gs}$		--	6	--	
Gate-Drain Charge	$Q_{gd}$		--	26	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 400V, I_D = 7A,$ $R_G = 25\Omega$	--	43	--	ns
Turn-on Rise Time	$t_r$		--	28	--	
Turn-off Delay Time	$t_{d(off)}$		--	244	--	
Turn-off Fall Time	$t_f$		--	54	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	7	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	28	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 3.5A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_S = 7A,$ $di_F/dt = 100A/\mu s$	--	295	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	1.7	--	$\mu C$

### 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 ( $T_J = 25^\circ\text{C}$ )

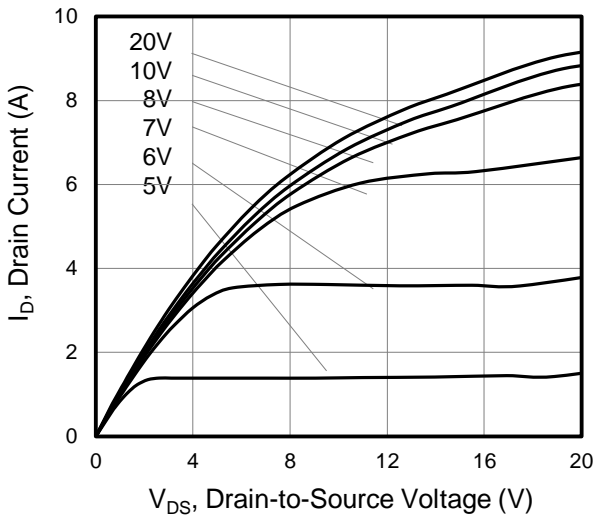


Figure 2. Body Diode Forward Voltage

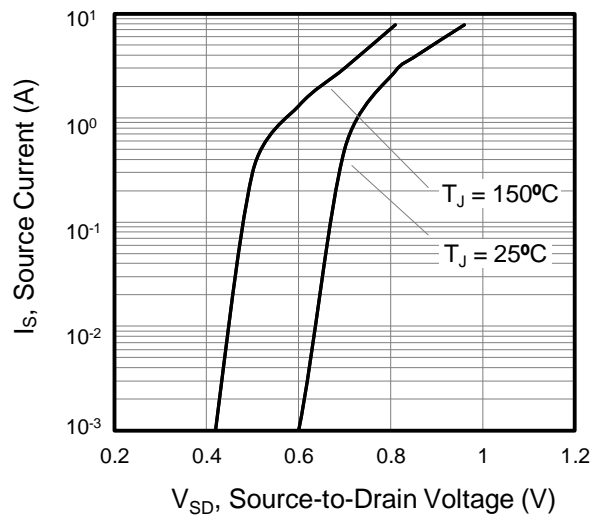


Figure 3. Drain Current vs. Temperature

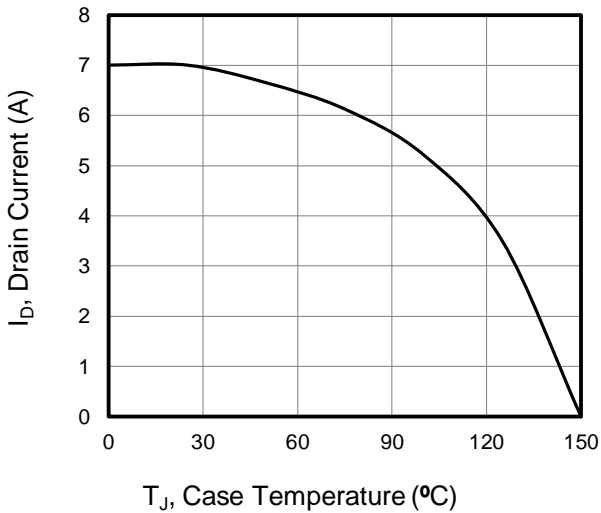


Figure 4.  $BV_{DSS}$  Variation vs. Temperature

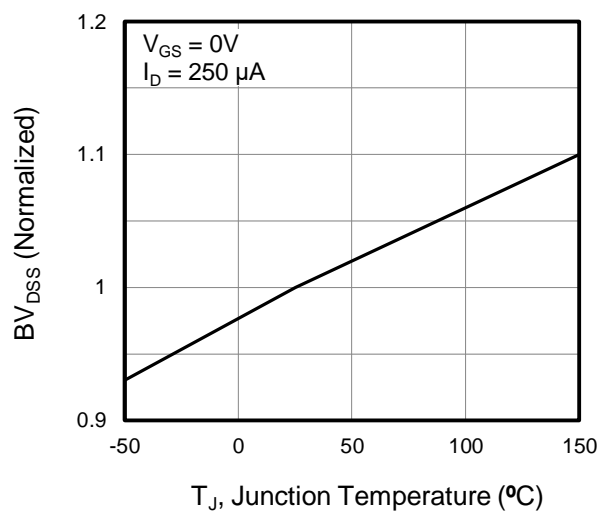


Figure 5. Transfer Characteristics

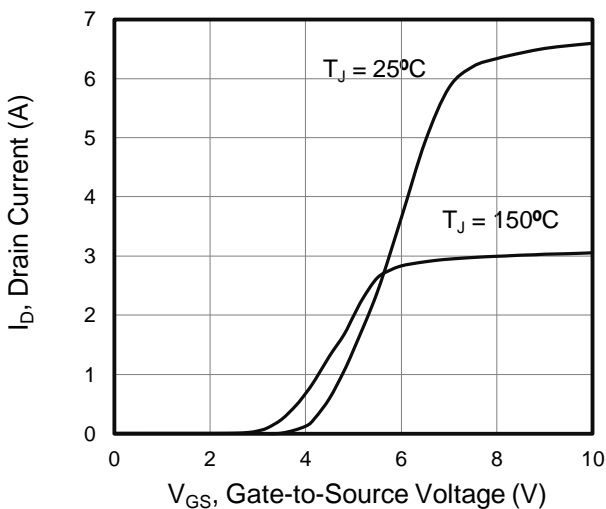
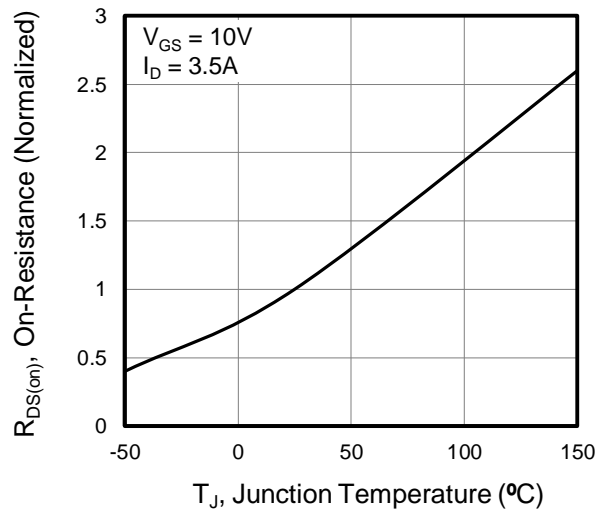


Figure 6. On-Resistance vs. Temperature



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

Figure 7. Capacitance

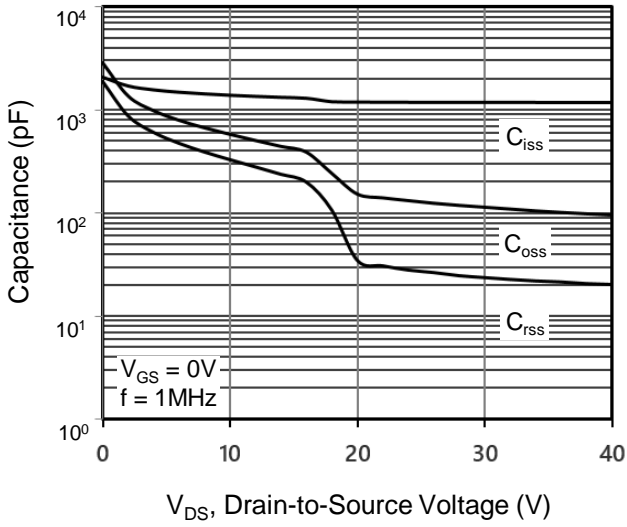


Figure 8. Gate Charge

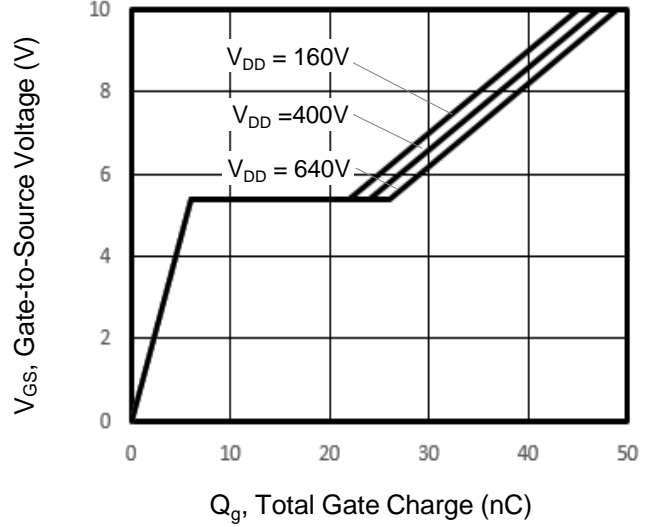


Figure 9. Transient Thermal Impedance TO-220F

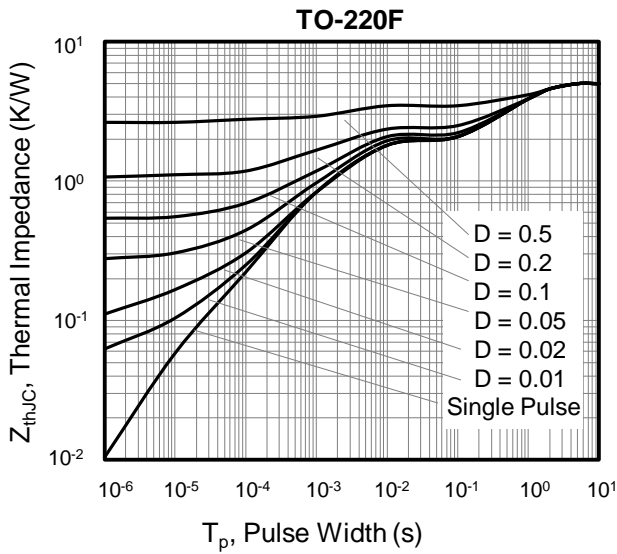


Figure 10. Transient Thermal Impedance TO-220

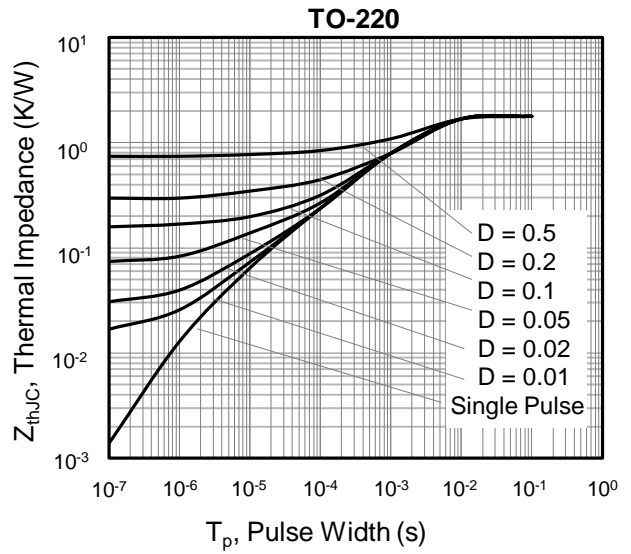


Figure A: Gate Charge Test Circuit and Waveform

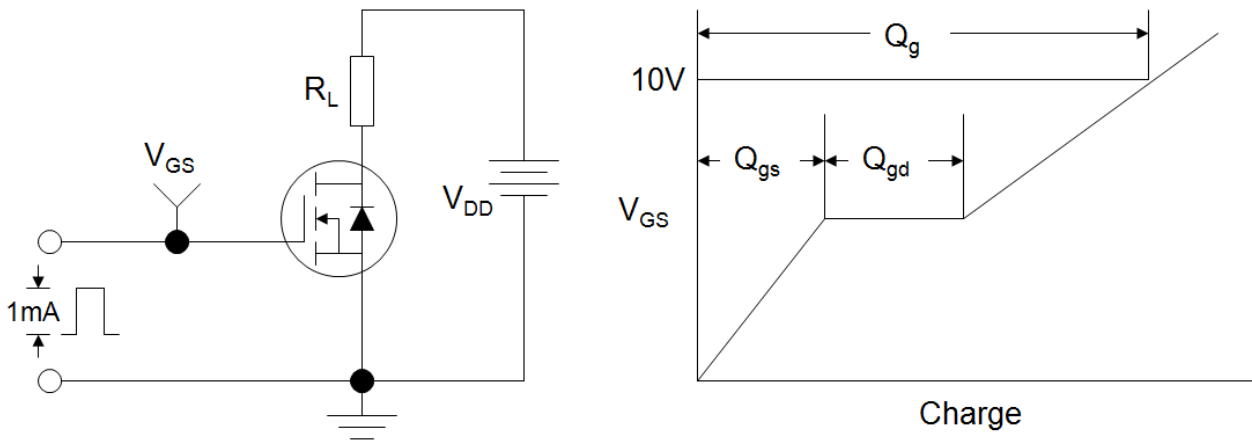


Figure B: Resistive Switching Test Circuit and Waveform

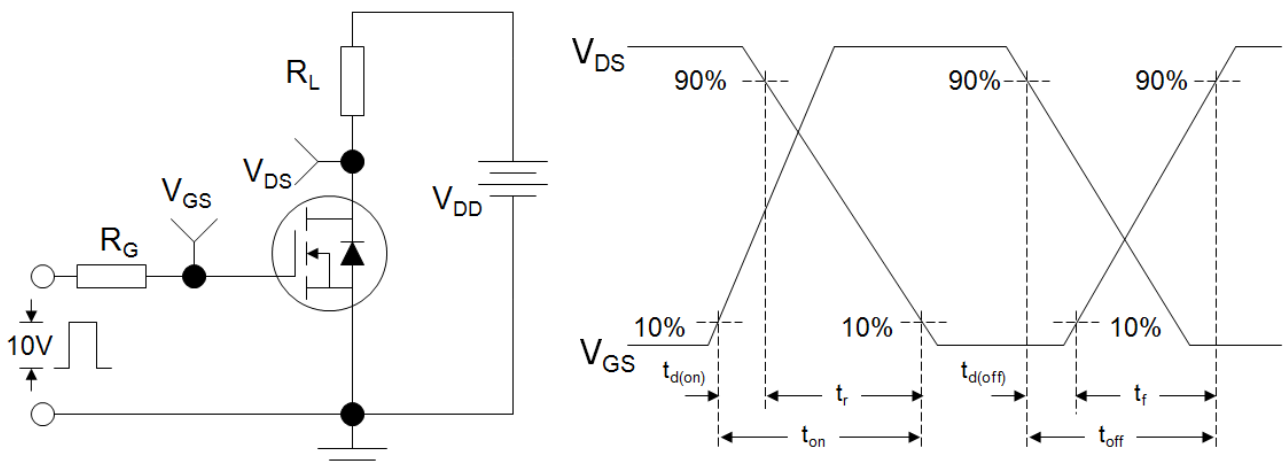
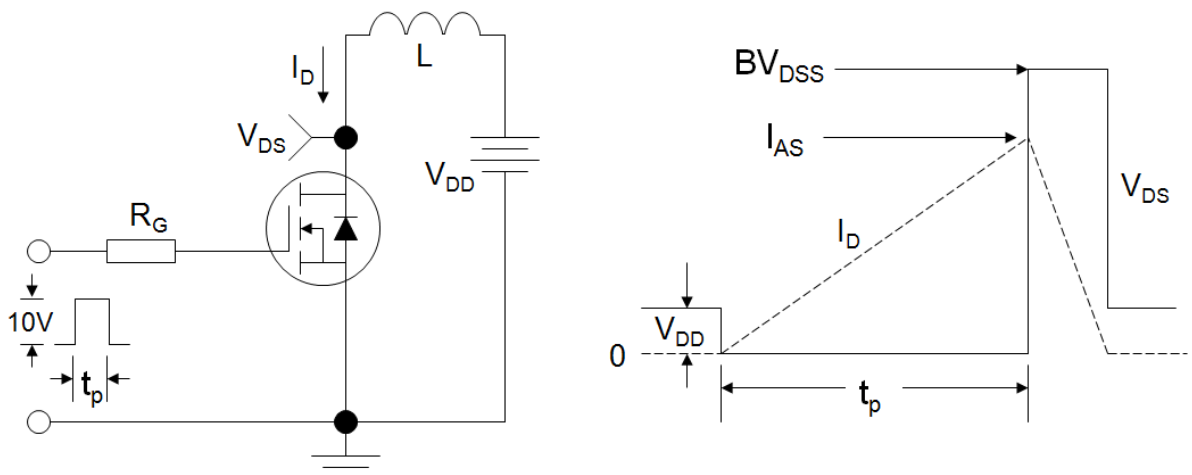
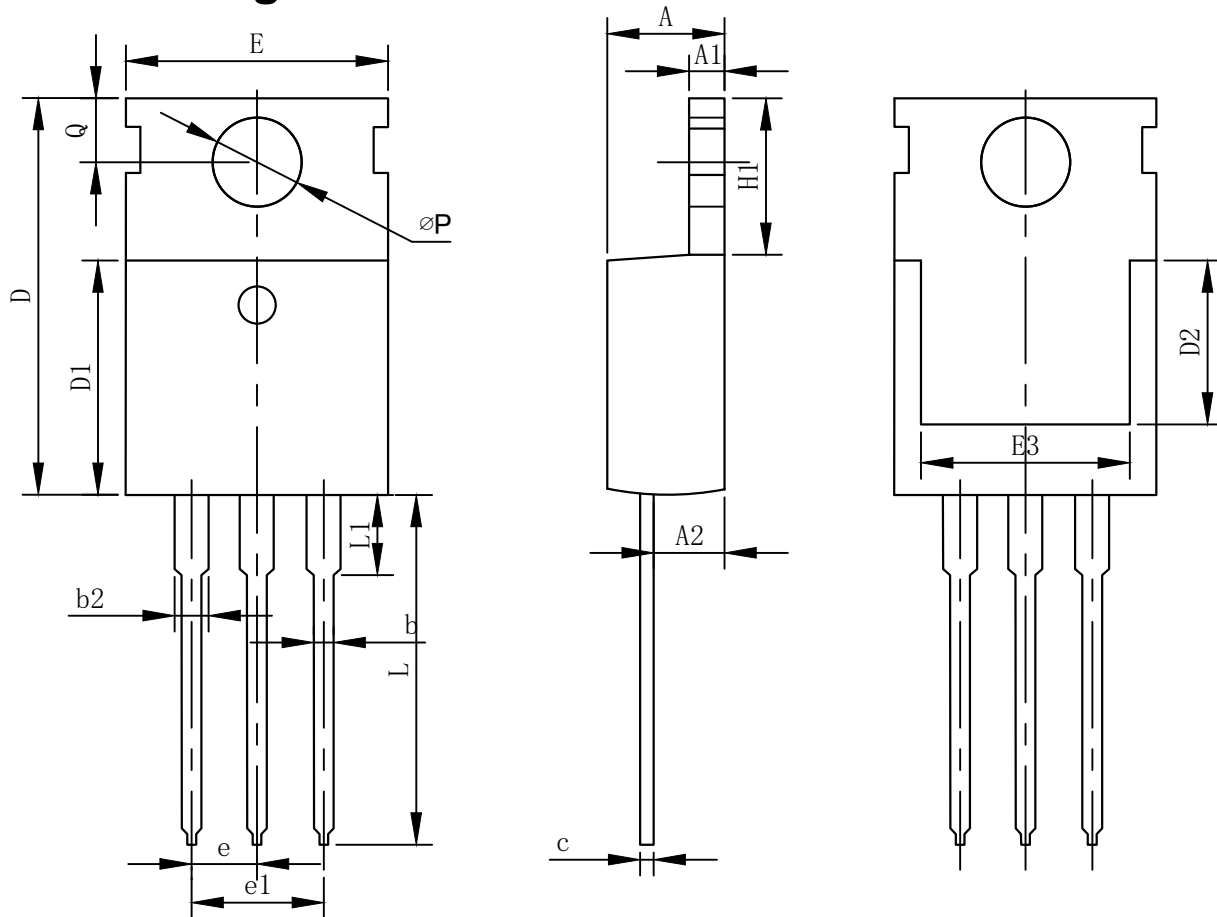


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



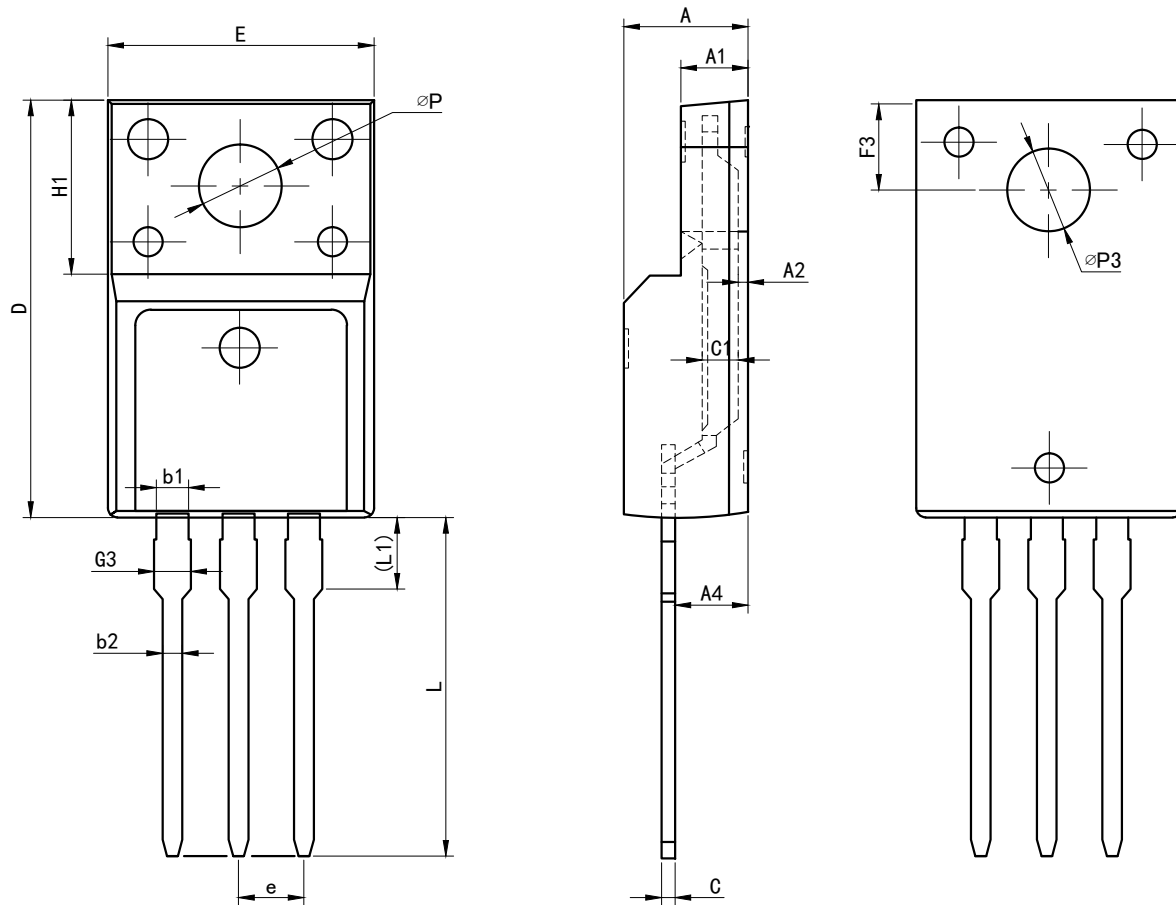
## TO-220 Package information



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
$\phi P$	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