

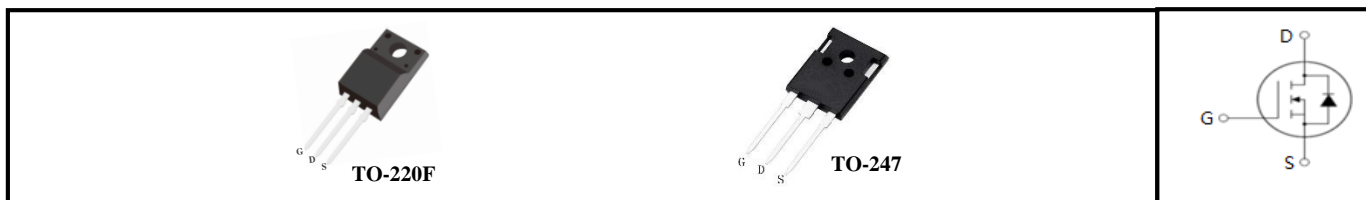


FEATURES

- $BV_{DSS}=600V, I_D=47A$
- $R_{DS(on)}:0.082\Omega(\text{Max})@V_{GS}=10V$
- Very low FOM $R_{DS(on)} \times Q_g$
- 100% avalanche tested
- RoHS compliant

APPLICATIONS

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



Device Marking and Package Information		
Ordering code	Package	Marking
MPSA60M082	TO-220F	MP60M082
MPSW60M082	TO-247	MP60M082

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted				
Parameter	Symbol	Value		Unit
		TO-220F	TO-247	
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	600		V
Continuous Drain Current	I_D	47		A
Pulsed Drain Current (note1)	I_{DM}	141		A
Gate-Source Voltage	V_{GSS}	± 30		V
Single Pulse Avalanche Energy (note2)	E_{AS}	1280		mJ
Avalanche Current (note1)	I_{AR}	10.5		A
Repetitive Avalanche Energy (note1)	E_{AR}	1.7		mJ
MOSFET dv/dt ruggedness, $V_{DS}=0\dots 400V$	dv/dt	50		V/ns
Reverse diode dv/dt, $V_{DS}=0\dots 400V, I_{SD} \leq I_D$	dv/dt	50		V/ns
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	40	391	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-247	
Thermal Resistance, Junction-to-Case	R_{thJC}	3	0.32	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	80	62	



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MPSA60M082, MPSW60M082

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	600	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	μA
		$V_{DS} = 600V, V_{GS} = 0V, T_J = 150^\circ\text{C}$	--	--	100	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 30V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1.24mA$	2.5	3.5	4.5	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 23.5A$	--	0.074	0.082	Ω
Gate Resistance	R_G	$f = 1.0MHz, \text{open drain}$	--	1.95	--	Ω
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 50V, f = 1.0MHz$	--	3680	--	pF
Output Capacitance	C_{oss}		--	390	--	
Reverse Transfer Capacitance	C_{rss}		--	15	--	
Total Gate Charge	Q_g	$V_{DD} = 480V, I_D = 47A, V_{GS} = 10V$	--	72	--	nC
Gate-Source Charge	Q_{gs}		--	14	--	
Gate-Drain Charge	Q_{gd}		--	24	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 400V, I_D = 25.8A, V_{GS} = 13V, R_G = 1.9\Omega$	--	15	--	ns
Turn-on Rise Time	t_r		--	12	--	
Turn-off Delay Time	$t_{d(off)}$		--	80	--	
Turn-off Fall Time	t_f		--	6	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	47	A
Pulsed Diode Forward Current	I_{SM}		--	--	141	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 47A, V_{GS} = 0V$	--	0.9	1.2	V
Reverse Recovery Time	t_{rr}	$V_R = 400V, I_F = 25.8A, di_F/dt = 100A/\mu s$	--	518	--	ns
Reverse Recovery Charge	Q_{rr}		--	8	--	μC
Peak Reverse Recovery Current	I_{rrm}		--	26	--	A

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 10.5A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$

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

Figure 1. Output Characteristics

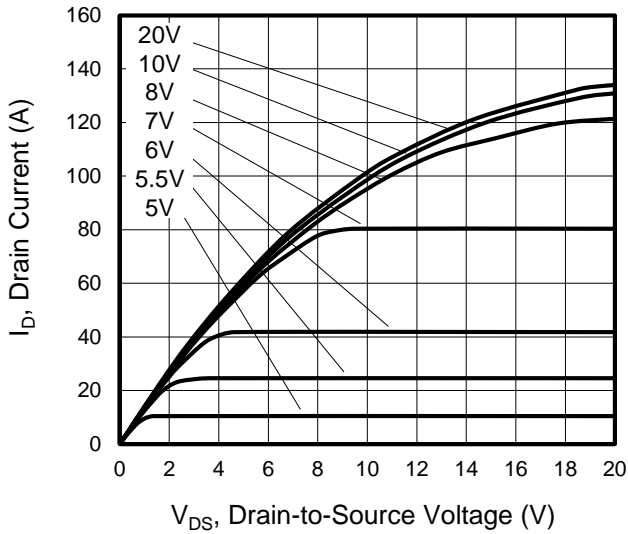


Figure 2. Transfer Characteristics

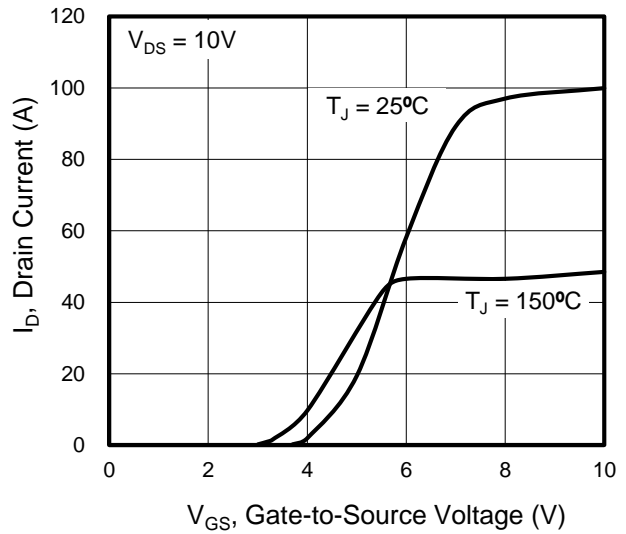


Figure 3. On-Resistance vs. Drain Current

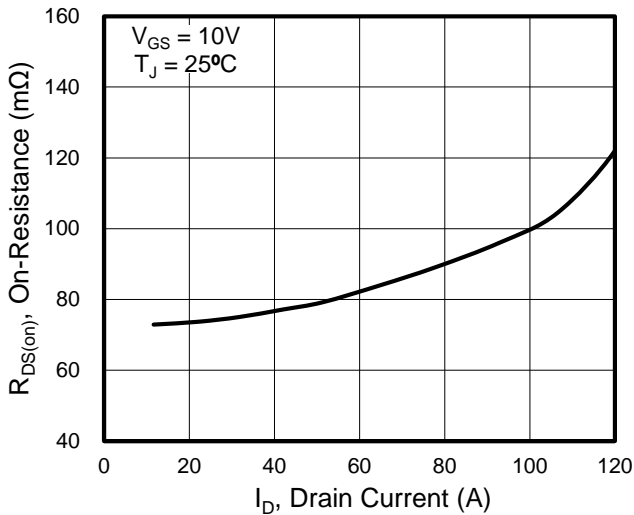


Figure 4. Capacitance

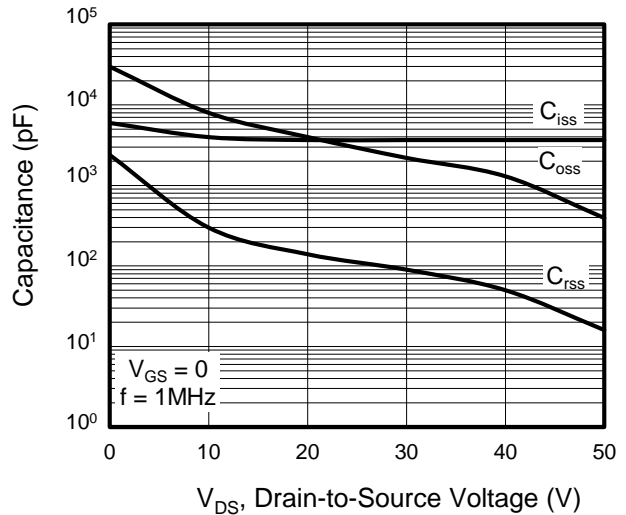


Figure 5. Gate Charge

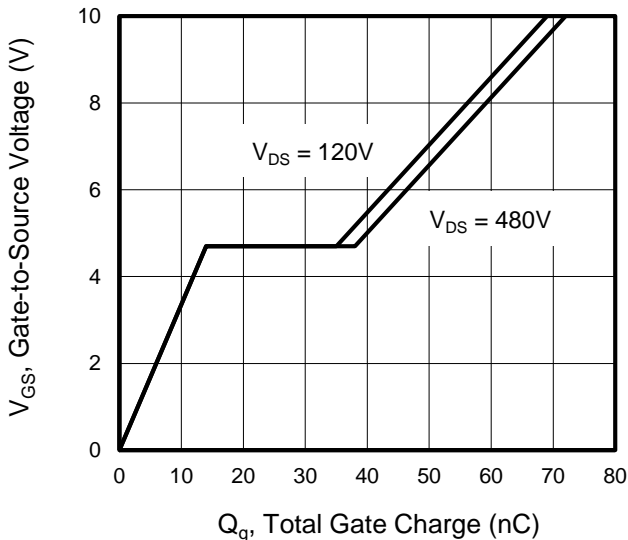
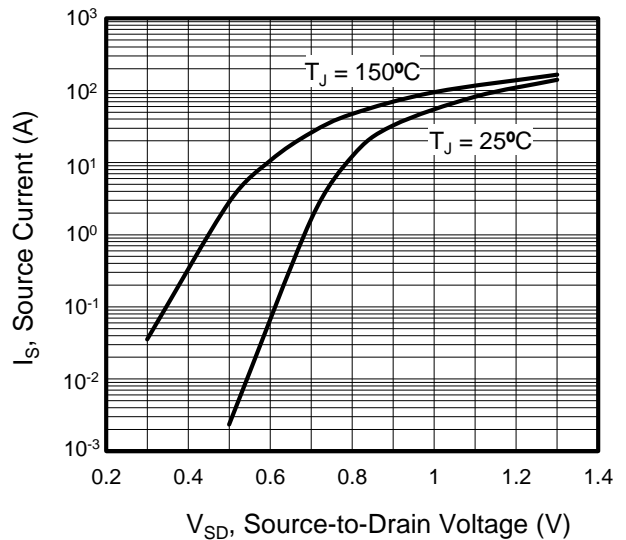


Figure 6. Body Diode Forward Voltage



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

Figure 7. On-Resistance vs. Temperature

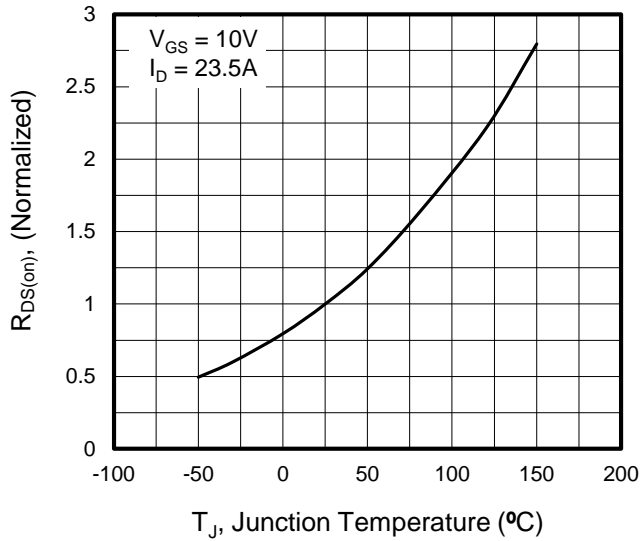


Figure 8. Threshold Voltage vs. Temperature

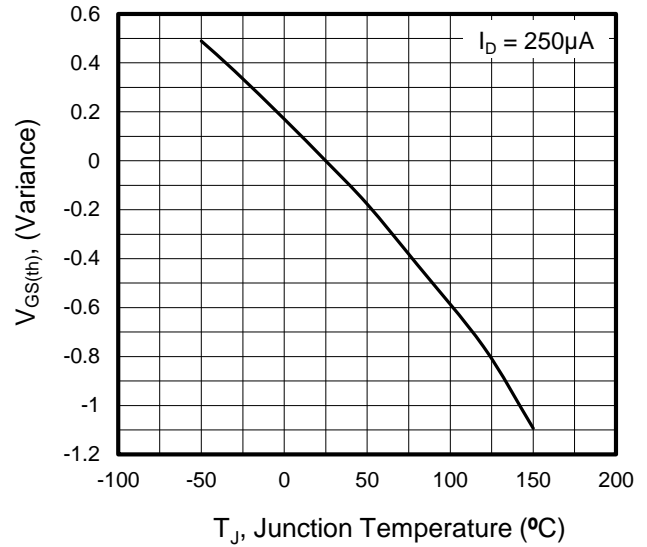


Figure 9. Transient Thermal Impedance TO-247

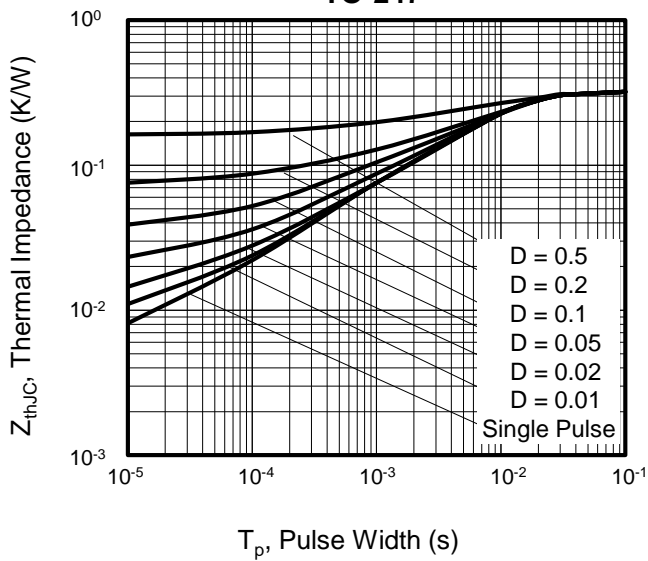


Figure 10. Transient Thermal Impedance TO-220F

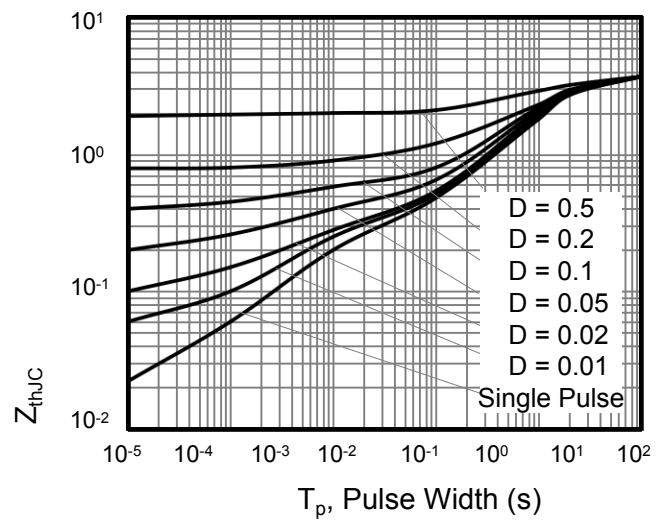


Figure A: Gate Charge Test Circuit and Waveform

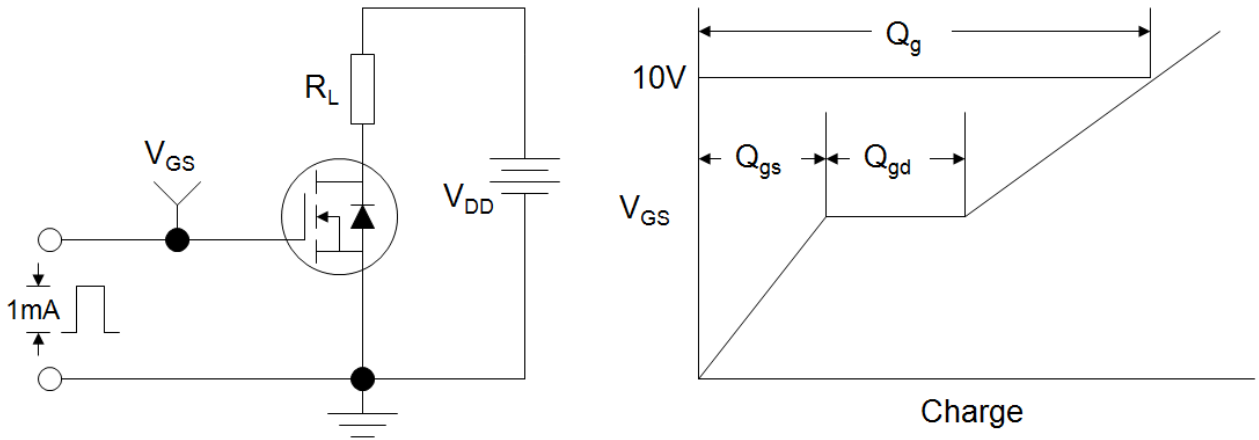


Figure B: Resistive Switching Test Circuit and Waveform

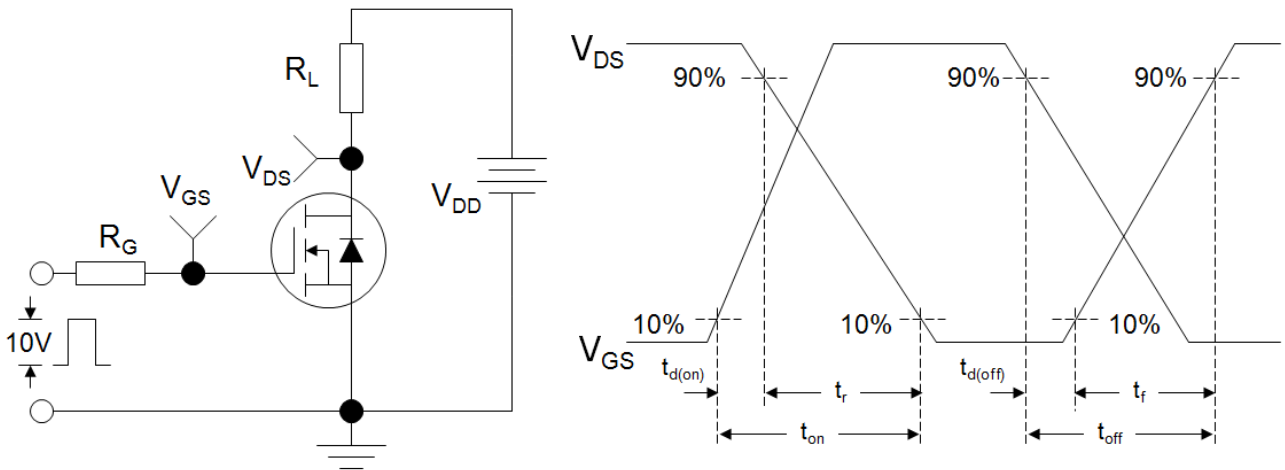
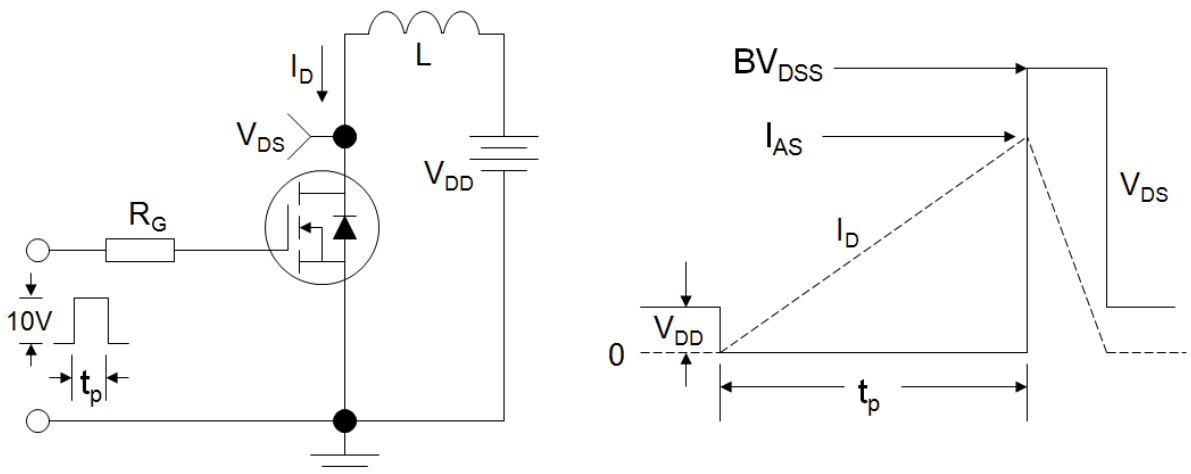
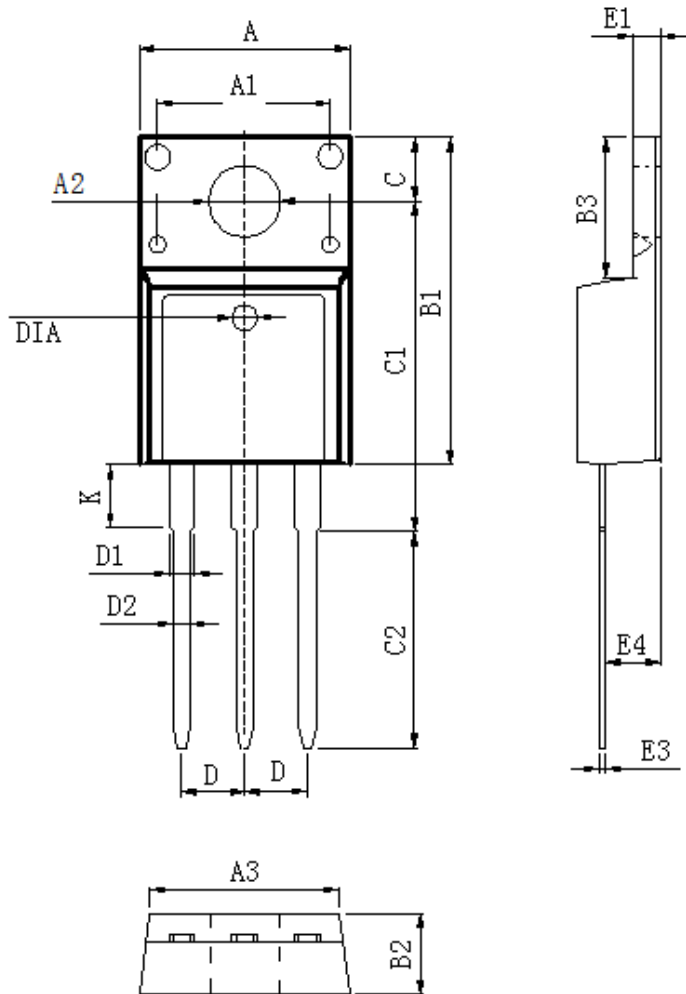


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



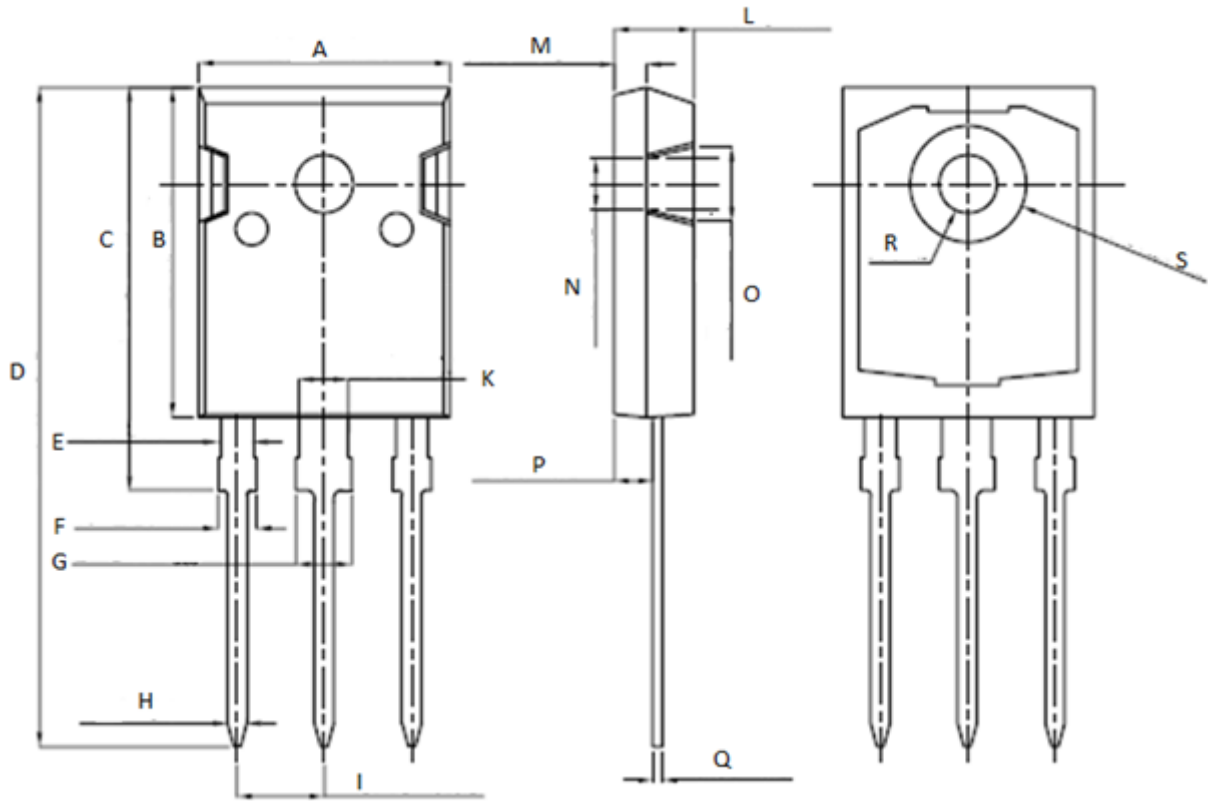
TO-220F



DIM	MILLIMETERS
A	10.16±0.3
A1	7.00±0.1
A2	3.3±0.2
A3	9.5±0.2
B1	15.87±0.3
B2	4.7±0.2
B3	6.68±0.4
C	3.3±0.2
C1	12.57±0.3
C2	10.02±0.5
D	2.54±0.05
D1	1.28±0.2
D2	0.8±0.1
K	3.1±0.3
E1	2.54±0.1
E3	0.5±0.1
E4	2.76±0.2
DIA	⊙1.5 (deep 0.2)

Unit :mm

TO-247



Unit: mm		
Symbol	Min.	Max.
A	15.95	16.25
B	20.85	21.25
C	20.95	21.35
D	40.5	40.9
E	1.9	2.1
F	2.1	2.25
G	3.1	3.25
H	1.1	1.3
I	5.40	5.50

Unit: mm		
Symbol	Min.	Max.
K	2.90	3.10
L	4.90	5.30
M	1.90	2.10
N	4.50	4.70
O	5.40	5.60
P	2.29	2.49
Q	0.51	0.71
R	φ 3.5	φ 3.7
S	φ 7.1	φ 7.3