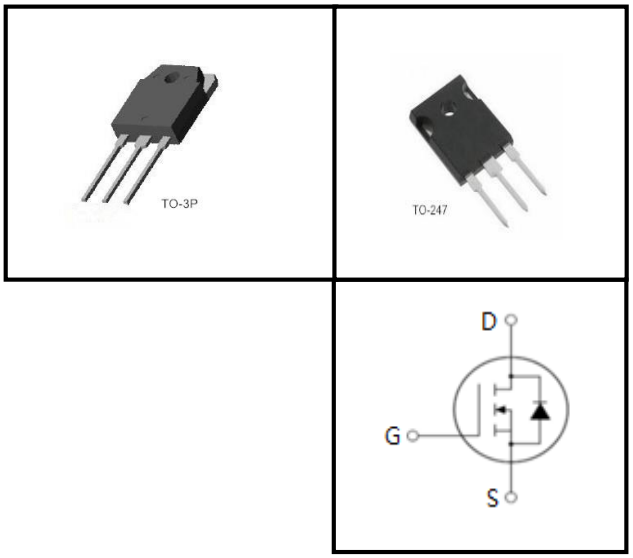
1200V N-Channel MOSFET

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**
CS8N120V	TO-3P	CS8N120V
CS8N120W	TO-247	CS8N120W

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted				
Parameter	**Symbol**	**Value**		**Unit**
		TO-247	**TO-3P**	
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	1200		V
Continuous Drain Current	I_D	8		A
Pulsed Drain Current (note1)	I_{DM}	32		A
Gate-Source Voltage	V_{GSS}	±20		V
Single Pulse Avalanche Energy (note2)	E_{AS}	180		mJ
Avalanche Current (note1)	I_{AR}	6		A
Repetitive Avalanche Energy (note1)	E_{AR}	108		mJ
Power Dissipation (T_C = 25ºC)	P_D	160	63	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150		ºC

Thermal Resistance				
Parameter	**Symbol**	**Value**		**Unit**
		TO-247	**TO-3P**	
Thermal Resistance, Junction-to-Case	R_{thJC}	0.78	2	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	50	

Specifications T_J = 25ºC, 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	1200	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 1200V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D = 250μA	3.0	--	5.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 4.0A	--	1.3	1.6	Ω
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	3364	--	pF
Output Capacitance	C_{oss}		--	265	--	
Reverse Transfer Capacitance	C_{rss}		--	43	--	
Total Gate Charge	Q_g	V_{DD} = 960V, I_D = 8.0A, V_{GS} = 10V	--	120	--	nC
Gate-Source Charge	Q_{gs}		--	14	--	
Gate-Drain Charge	Q_{gd}		--	63	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 600V, I_D =8.0A, R_G = 25 Ω	--	66	--	ns
Turn-on Rise Time	t_r		--	41	--	
Turn-off Delay Time	$t_{d(off)}$		--	521	--	
Turn-off Fall Time	t_f		--	78	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	8	A
Pulsed Diode Forward Current	I_{SM}		--	--	32	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 4.0A, V_{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,I_S = 8.0A, di_F/dt =100A /μs	--	369	--	ns
Reverse Recovery Charge	Q_{rr}		--	1.6	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 10.0mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics (T_J = 25ºC)

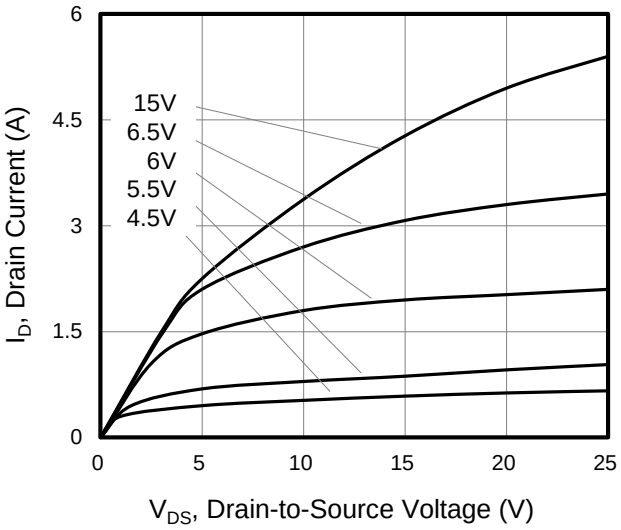


Figure 2. Forward Bias Safe Operating Area

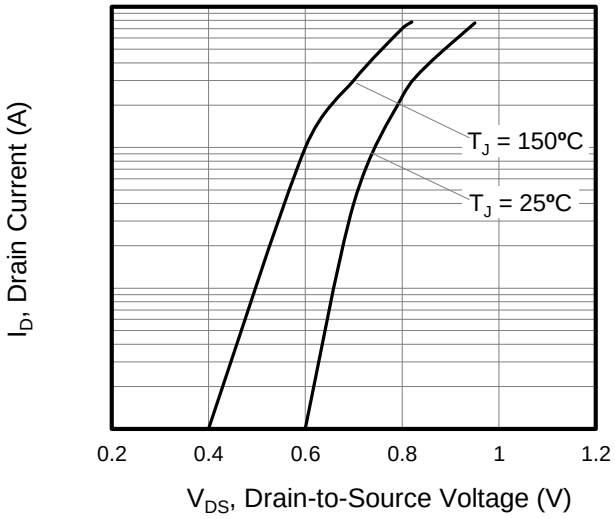


Figure 3. Drain Current vs. Temperature

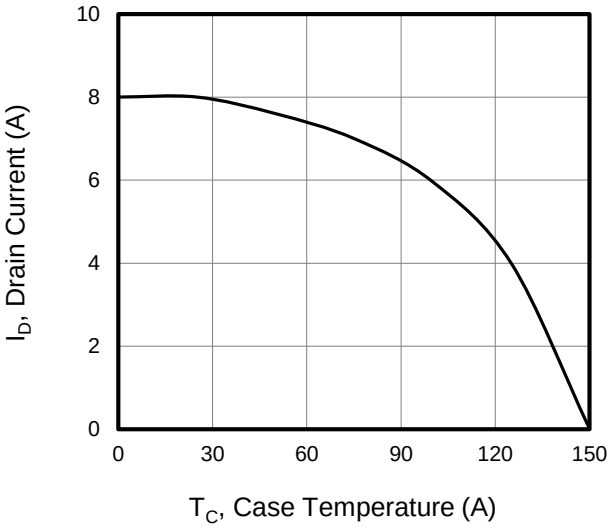


Figure 4. Power Dissipation vs. Temperature

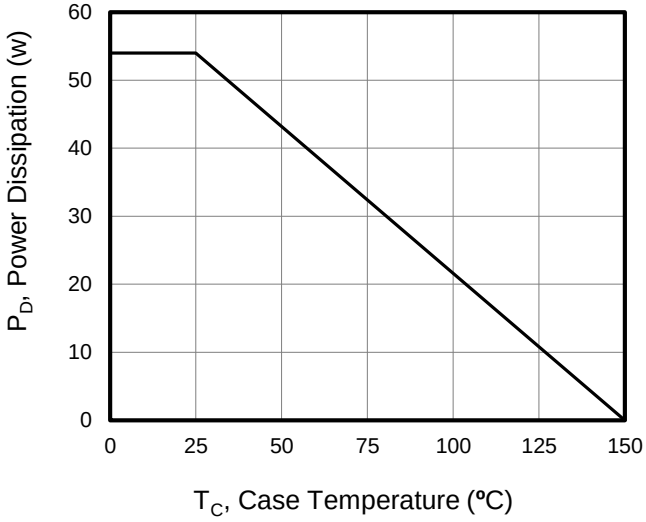


Figure 5. Transfer Characteristics

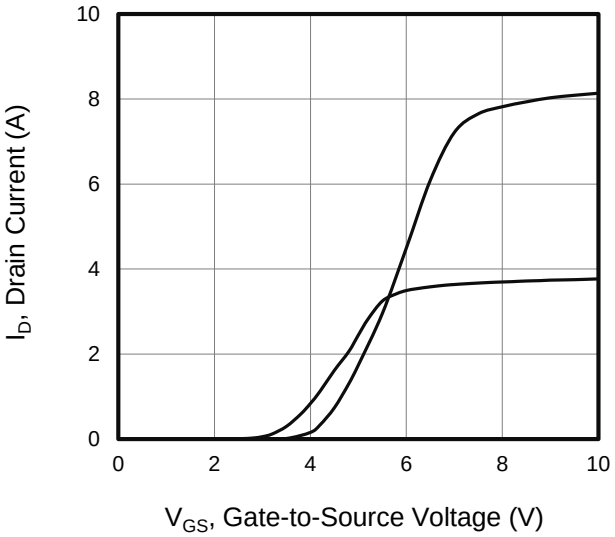
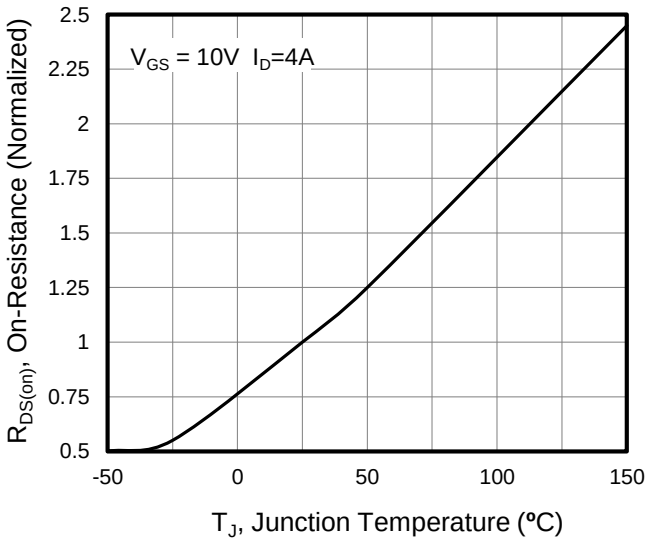


Figure 6. On-Resistance vs. Temperature



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Capacitance

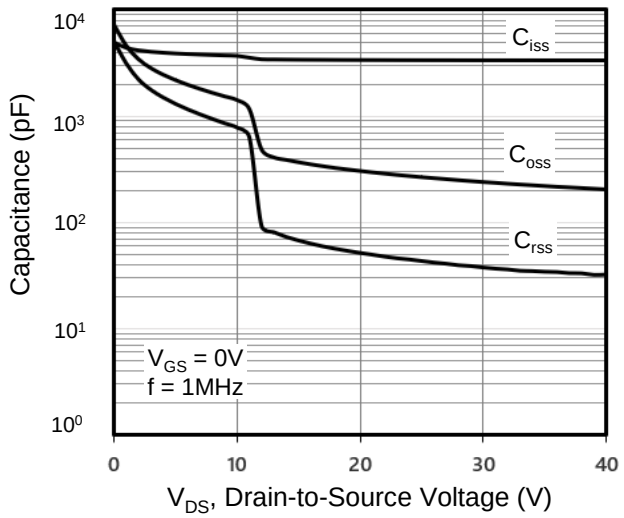


Figure 8. Gate Charge

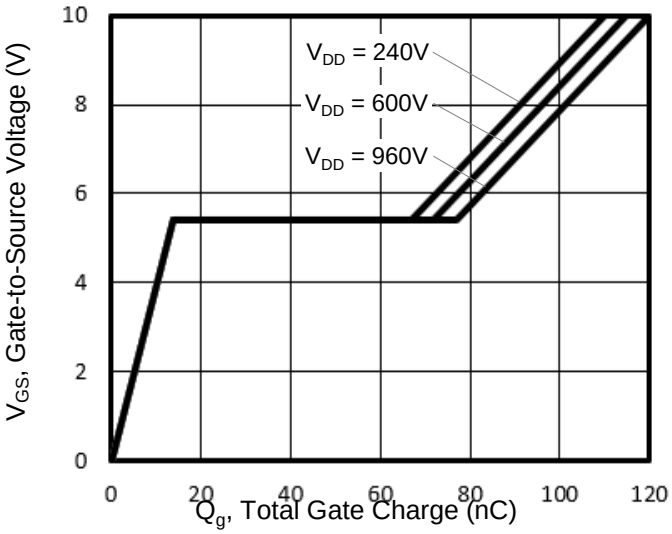


Figure 9. Transient Thermal Impedance TO-3P

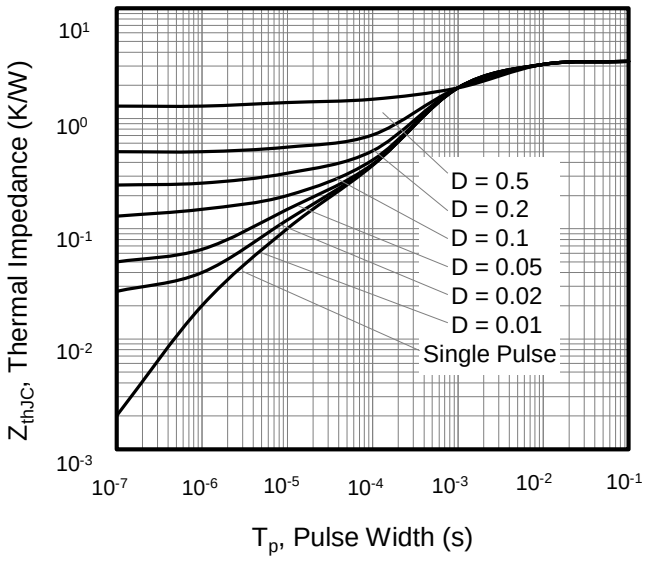


Figure 10. Transient Thermal Impedance TO-247

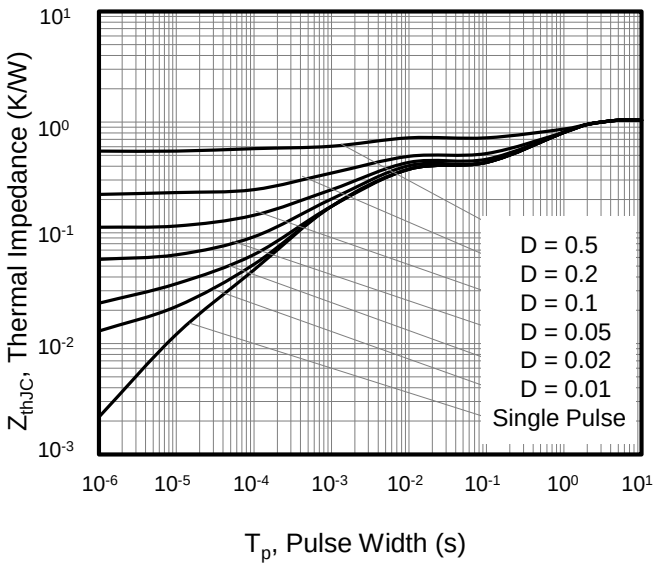


Figure A：Gate Charge Test Circuit and Waveform

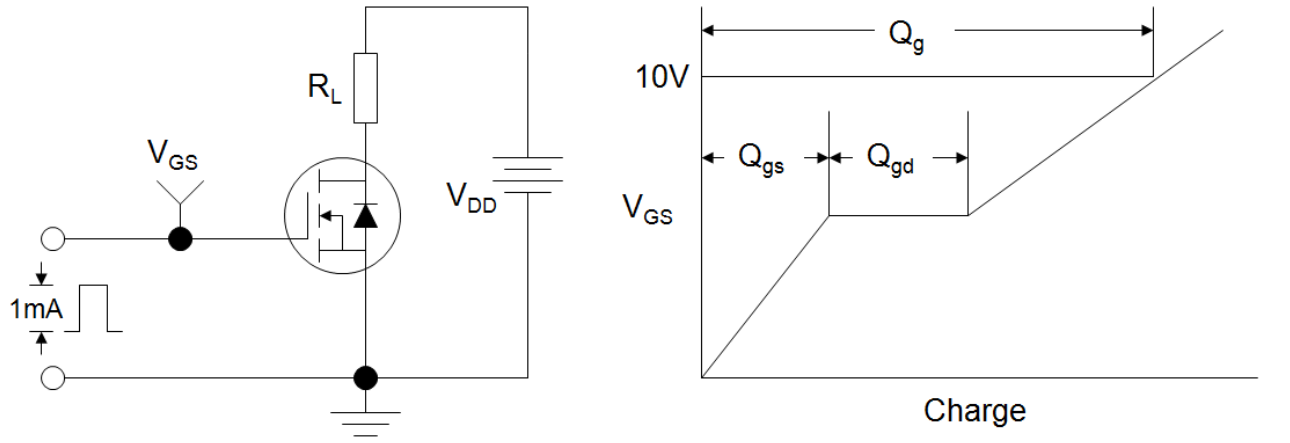


Figure B：Resistive Switching Test Circuit and Waveform

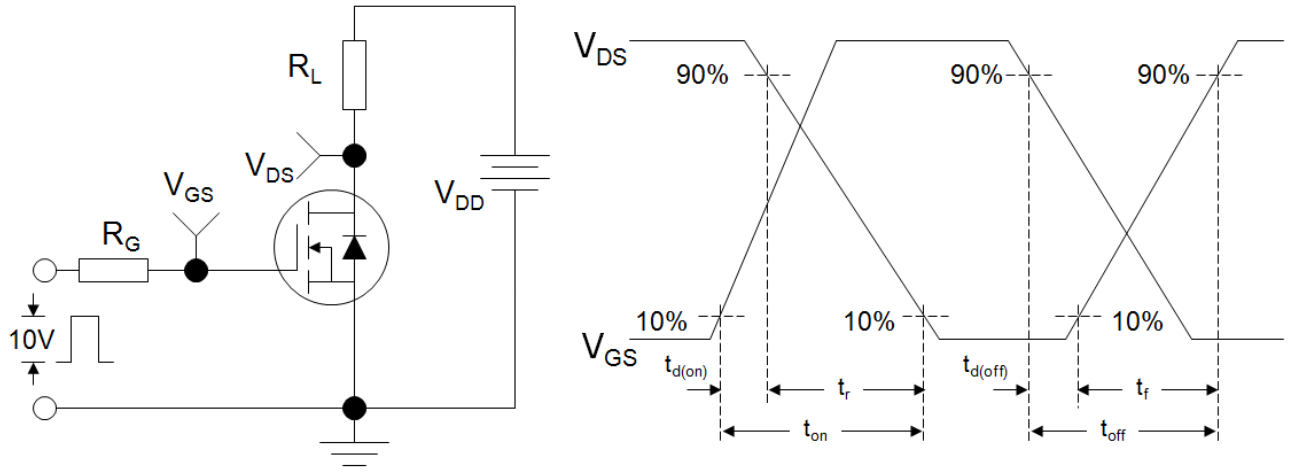
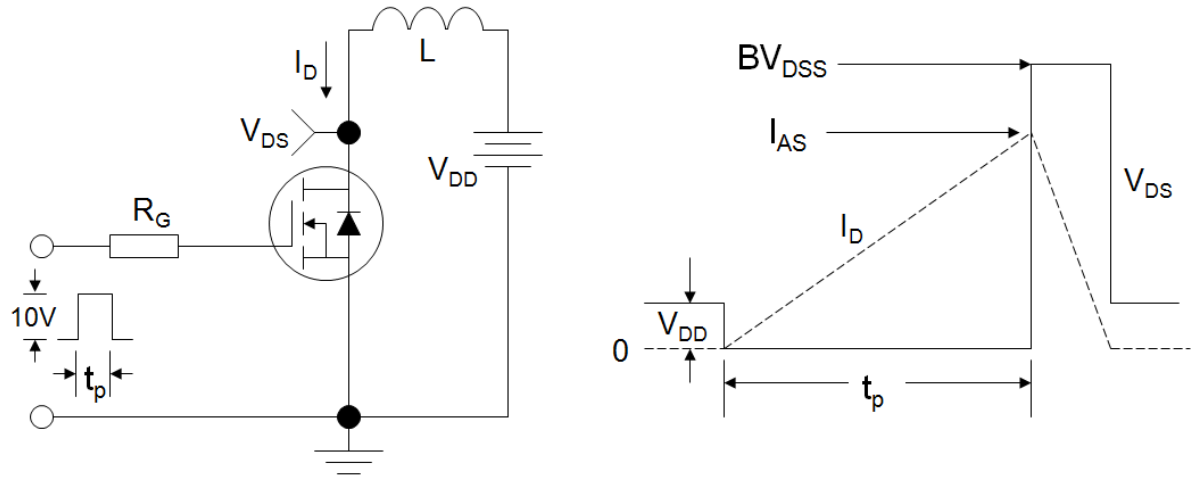
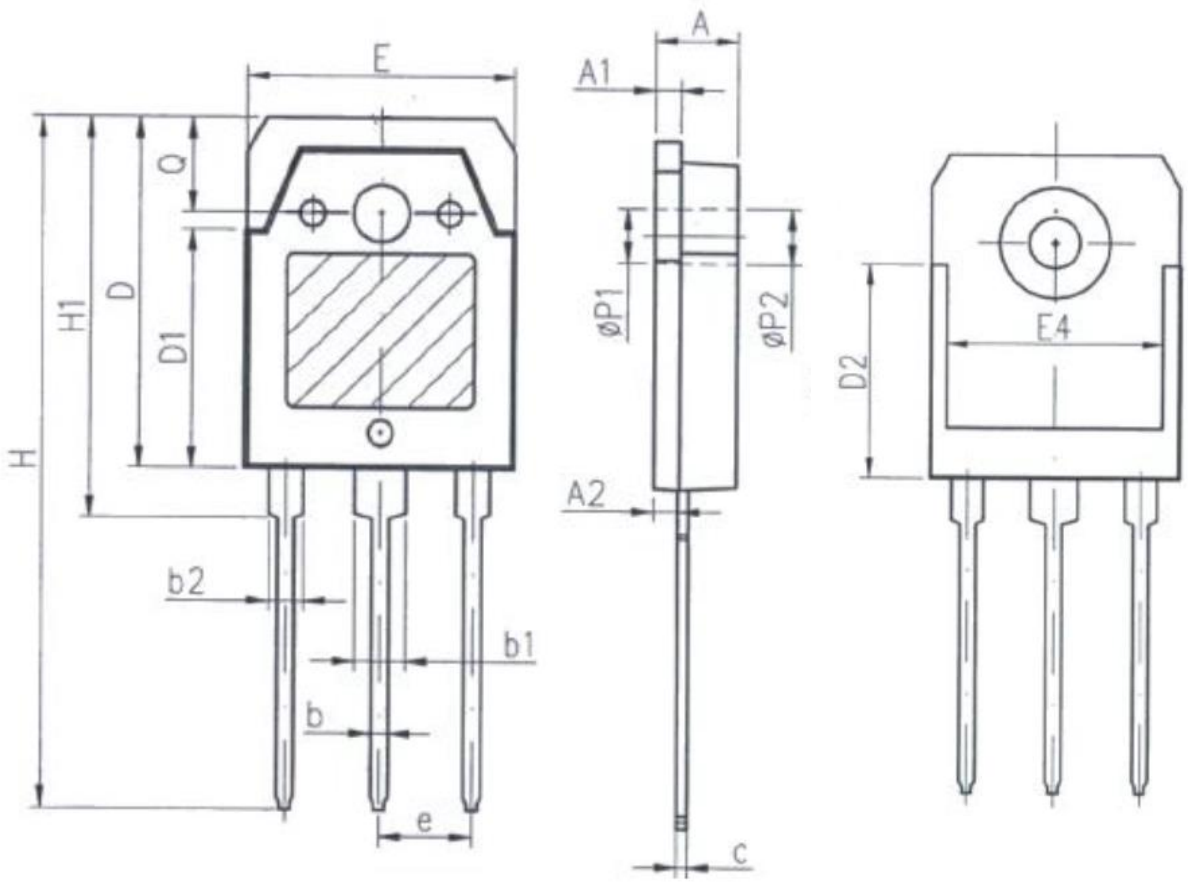


Figure C：Unclamped Inductive Switching Test Circuit and Waveform

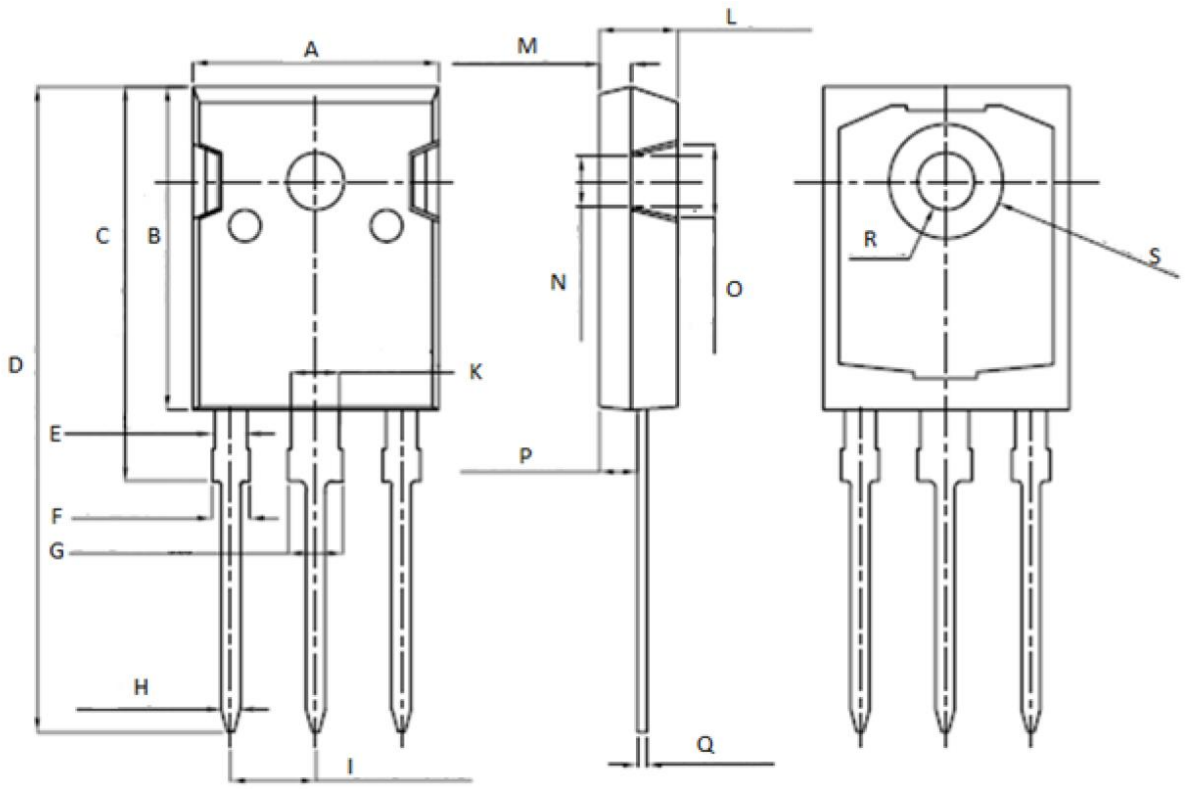


TO-3P



Unit:mm		
Symbol	Min.	Max.
A	4.6	5
A1	1.4	1.65
A2	1.18	1.58
b	0.8	1.2
b1	2.8	3.2
b2	1.8	2.2
c	0.5	0.75
D	19.6	20.2
D1	13.55	14.25
D2	12.9REF	
E	15.35	15.85
E4	12.6	-
e	5.45TYP	
H	40.1	40.9
H1	23.15	23.65
P1	3.2REF	
P2	3.5REF	

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	ϕ3.5	ϕ3.7
S	ϕ7.1	ϕ7.3

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