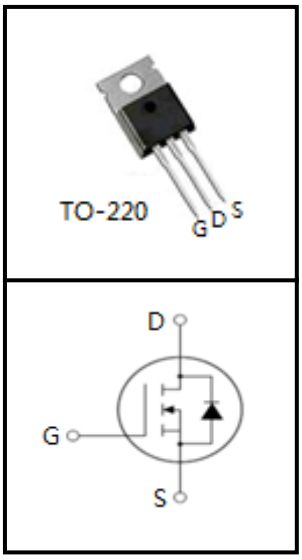
68V N-Channel Trench MOSFET

FEATURES

- Trench Power MOSFET Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized For Fast-switching Applications



APPLICATIONS

- DC/DC Converters
- Synchronous Rectification

Device Marking and Package Information

Device	Package	Marking
CTP06N6P8	TO-220	CTP06N6P8

RoHS

Absolute Maximum Ratings at T_j= 25ºC unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	68	V
Continuous Drain Current T_C = 25ºC (note2)	I_D	115	A
Continuous Drain Current T_C = 100ºC (note2)		85	A
Pulsed Drain Current (note1)	I_{DM}	460	A
Gate Source Voltage	V_{GSS}	±20	V
Single Pulse Avalanche Energy (note1)	E_{AS}	487	mJ
Avalanche Current	I_{AS}	57	A
Power Dissipation T_C = 25ºC (note3)	P_D	158	W
Power Dissipation T_C = 100ºC (note3)		79	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+175	ºC

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.95	ºC/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	64	

Electrical Characteristics T_j= 25ºC unless otherwise specified						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	68	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 68V, V_{GS} = 0V, T_J = 25ºC	--	--	1	uA
		V_{DS} = 68V, V_{GS} = 0V, T_J = 100ºC	--	--	25	uA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	3	4	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A	--	5.4	6.8	mΩ
Forward Transconductance	gfs	V_{DS} = 5V, I_D = 20A	--	30	--	S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 30V, f = 1.0MHz	--	5094	--	pF
Output Capacitance	C_{oss}		--	332	--	
Reverse Transfer Capacitance	C_{rss}		--	282	--	
Total Gate Charge	Q_g	V_{DS} = 30V, I_D = 30A, V_{GS} = 10V	--	87	--	nC
Gate-Source Charge	Q_{gs}		--	23	--	
Gate-Drain Charge	Q_{gd}		--	22	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 30V, I_D = 30A, R_G = 2.5Ω, V_{GS} = 10V	--	23	--	ns
Turn-on Rise Time	t_r		--	18	--	
Turn-off Delay Time	$t_{d(off)}$		--	67	--	
Turn-off Fall Time	t_f		--	30	--	
Body Diode Characteristics						
Source-Drain Current(Body Diode)	I_{SD}	T_C = 25ºC	--	--	115	A
Pulsed Source-Drain Current(Body Diode)	I_{SDM}		--	--	460	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 30A, V_{GS} = 0V	--	--	1	V
Reverse Recovery Time	t_{rr}	I_F = 30A di_F/dt = 100A/μs	--	33	--	ns
Reverse Recovery Charge	Q_{rr}		--	122	--	nC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS} = 30A, V_{DD} = 50V,L=0.3mH, R_G = 25Ω, Starting T_J = 25°C
3. The power dissipation PD is based on TJ(MAX)=175° C, using junction-to-case thermal resistance.

Typical Characteristics T_J = 25ºC, unless otherwise noted

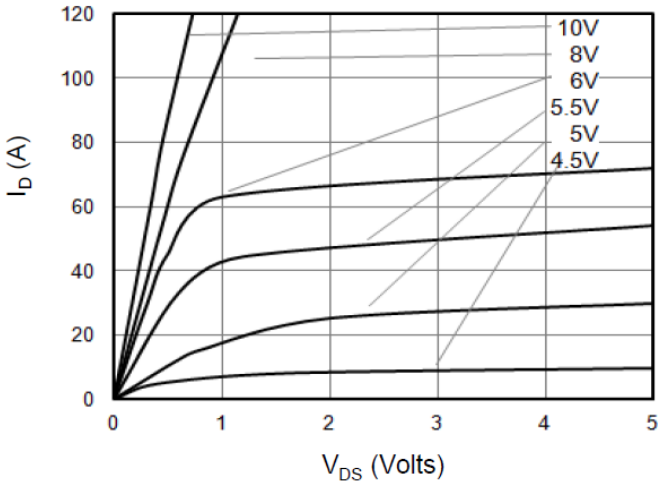


Figure 1: On-Region Characteristics

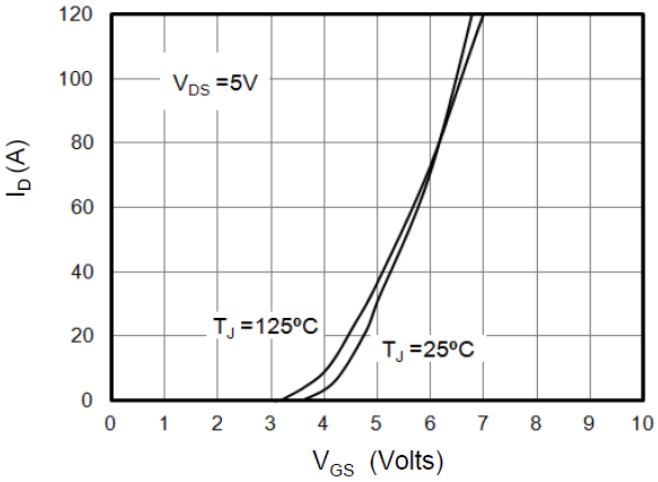


Figure 2: Transfer Characteristics

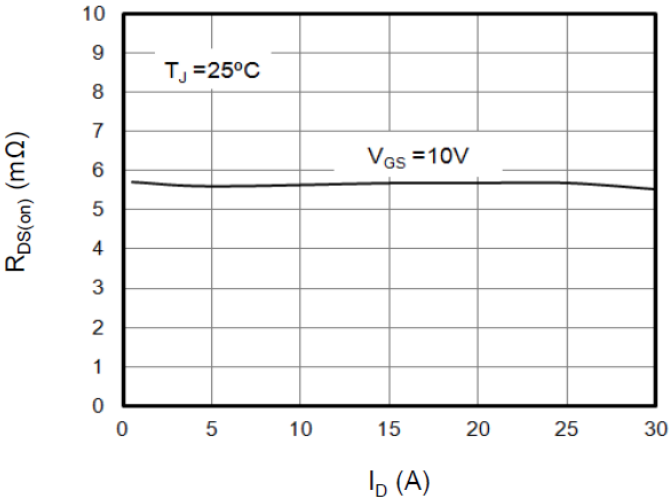


Figure 3: On-Resistance vs. Drain Current

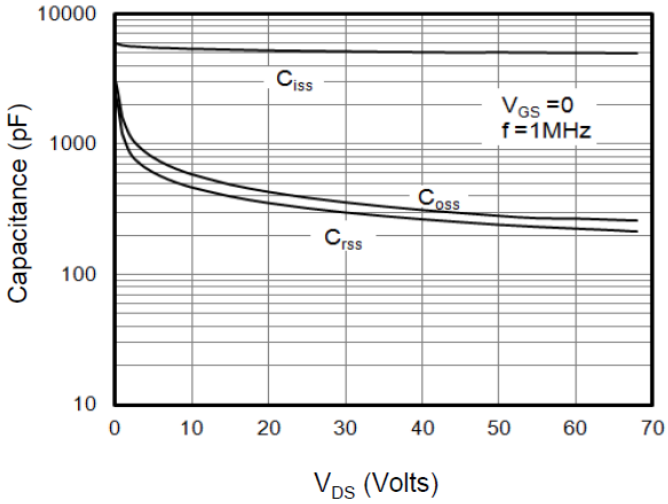


Figure 4: Capacitance Characteristics

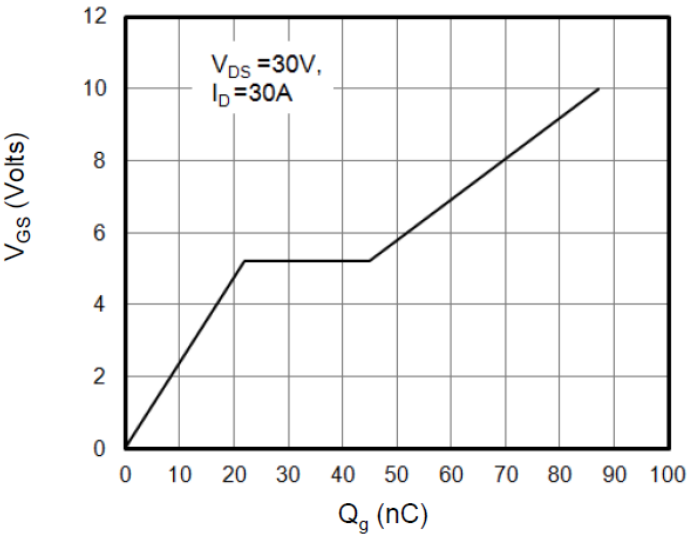


Figure 5: Gate Charge Characteristics

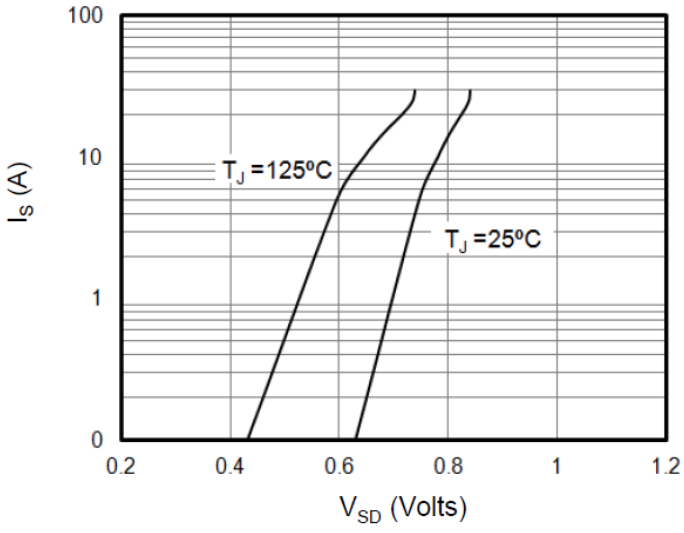


Figure 6: Body Diode Forward Voltage

Typical Characteristics T_J = 25ºC, unless otherwise noted

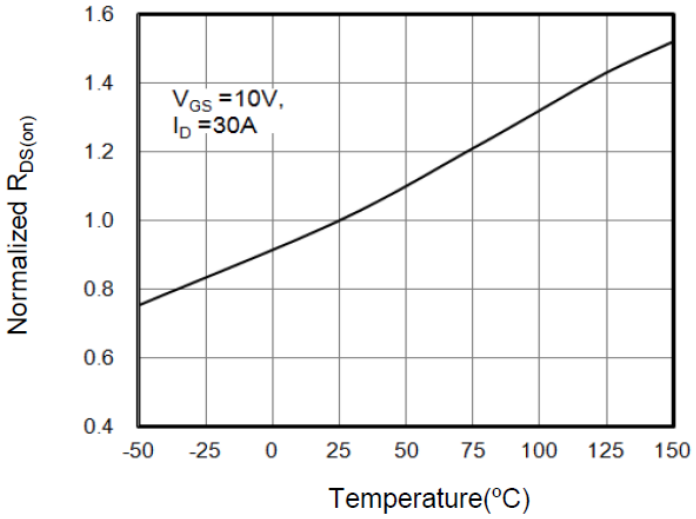


Figure 7: On-Resistance vs. Junction Temperature

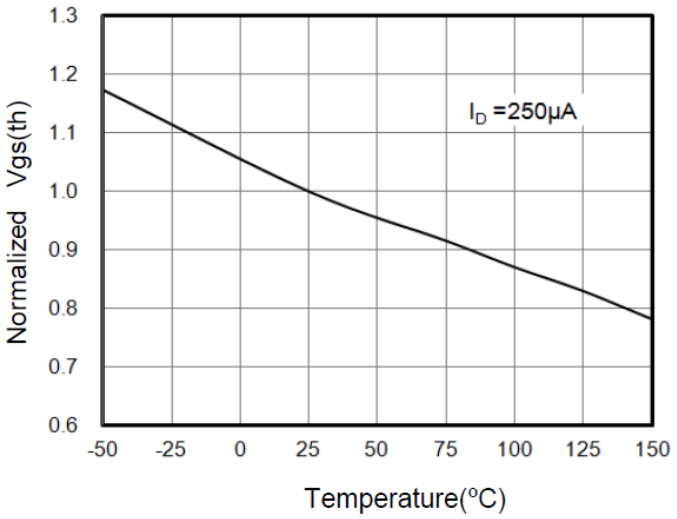


Figure 8: Vgs(th) vs. Junction Temperature

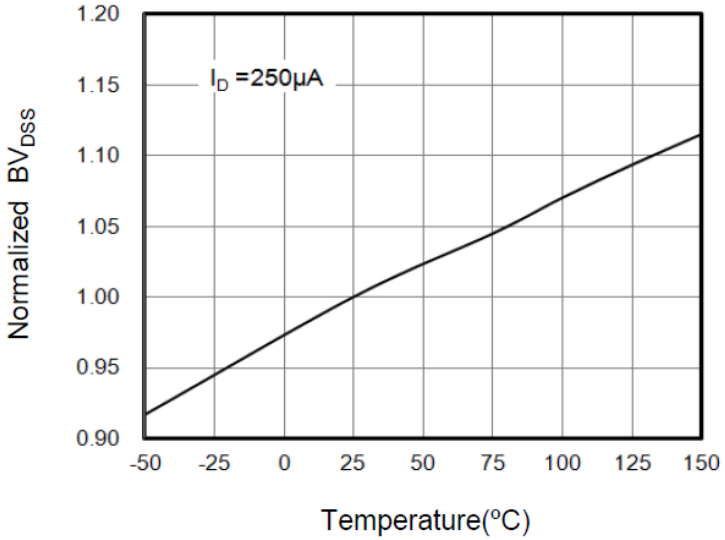


Figure 9: BV_{DSS} vs. Junction Temperature

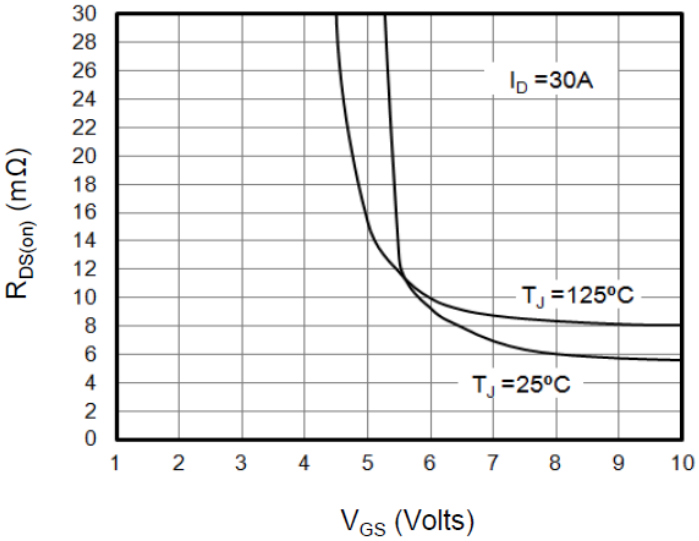


Figure 10: On-Resistance vs. Gate-Source Voltage

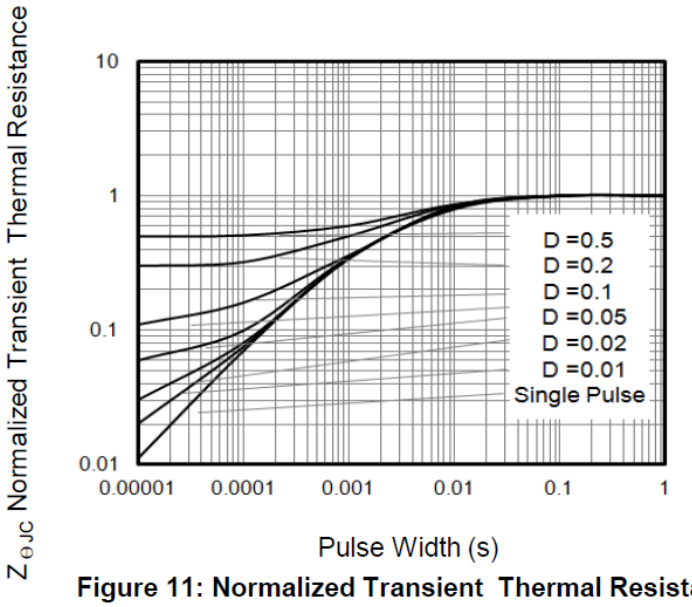


Figure 11: Normalized Transient Thermal Resistance

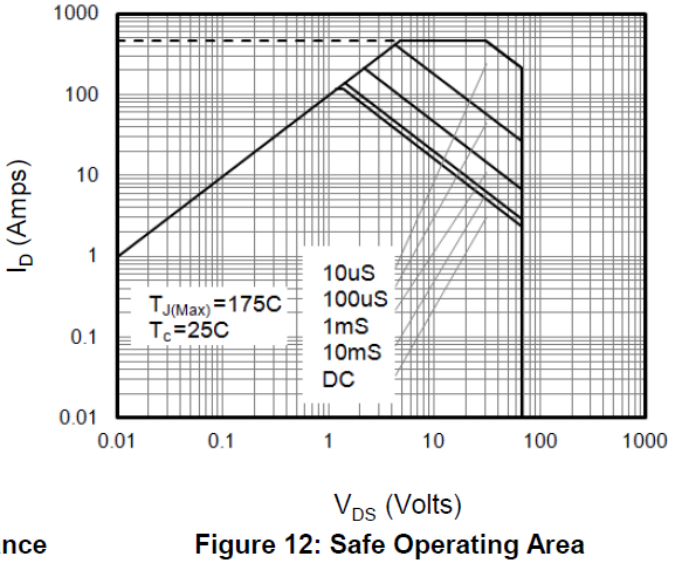


Figure 12: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveform

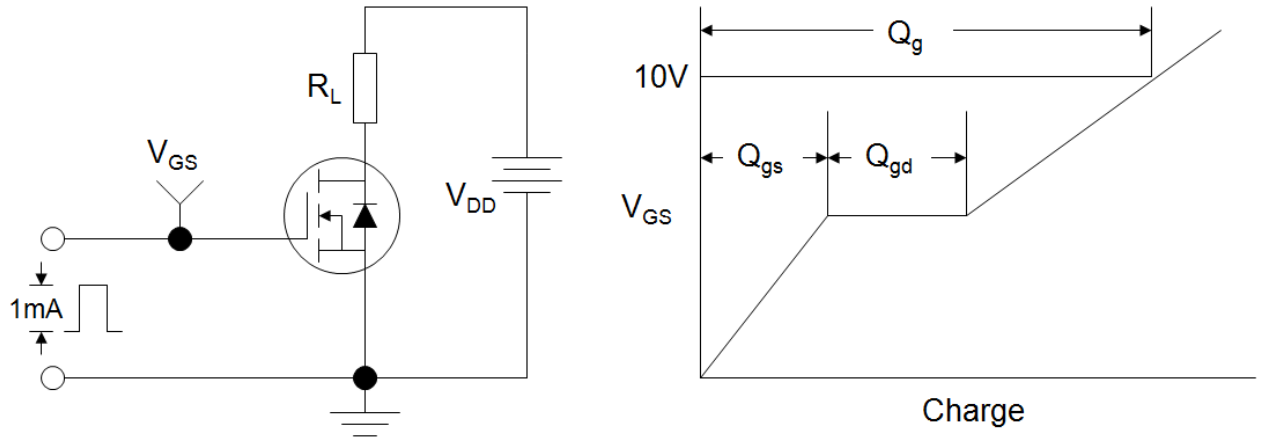


Figure B：Resistive Switching Test Circuit and Waveform

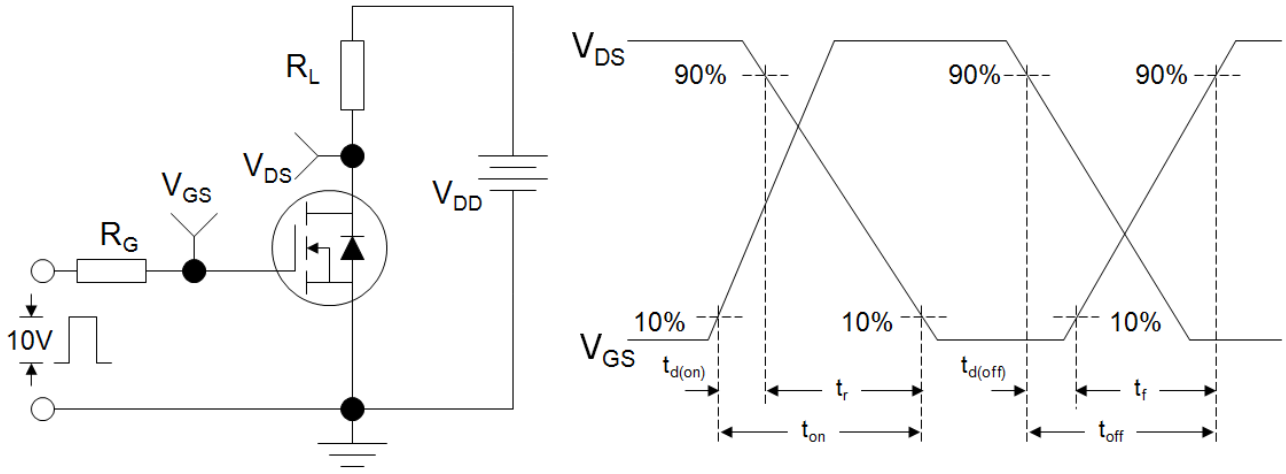
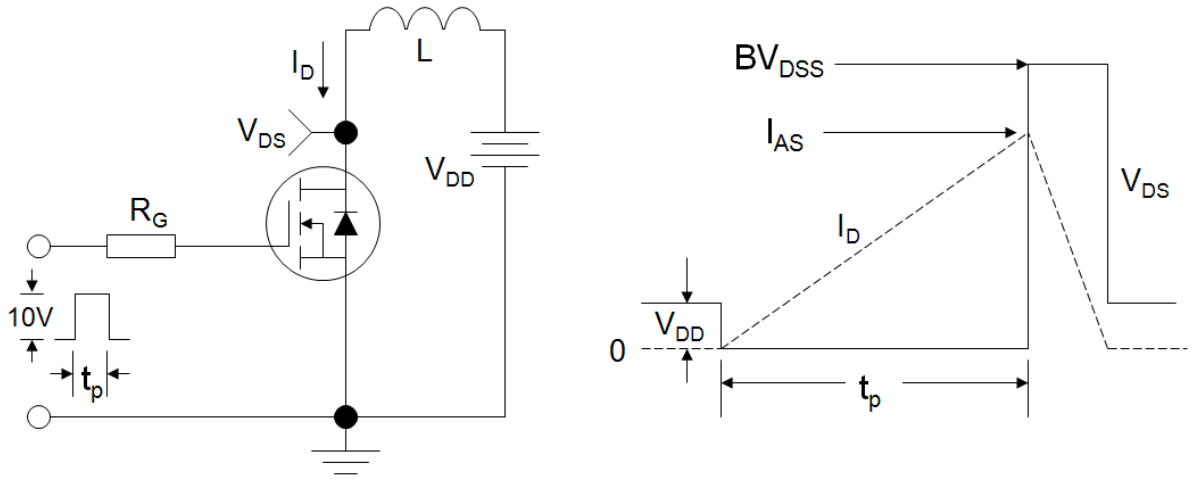
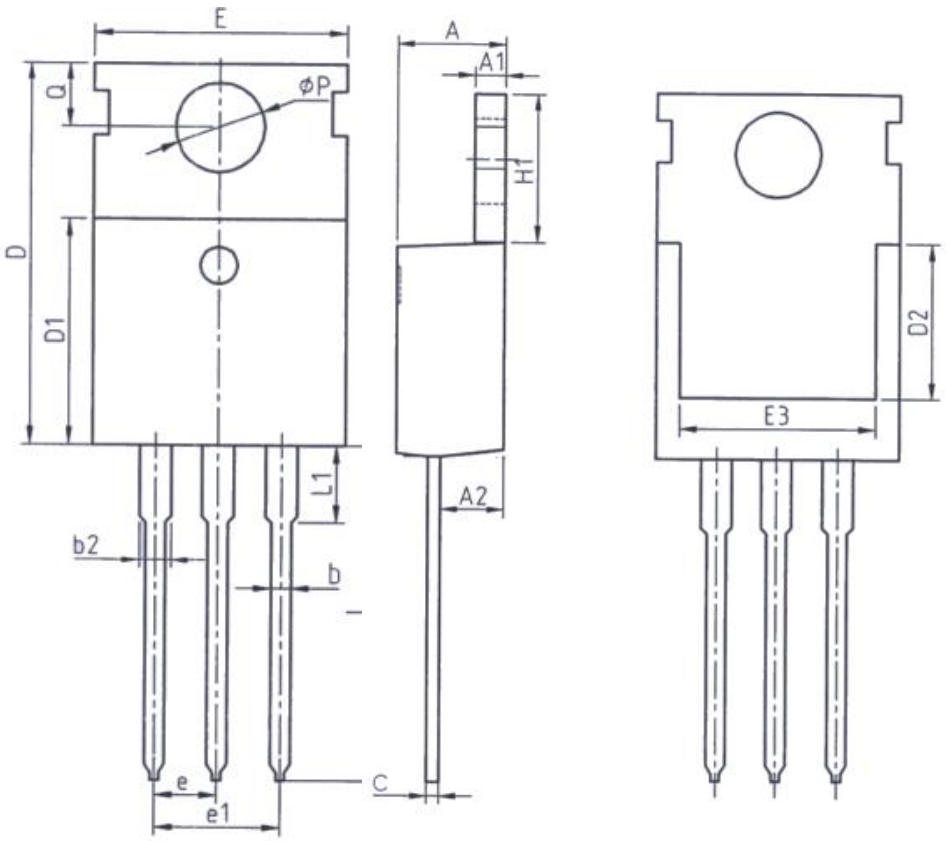


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



TO-220



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	–

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	–
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	–	3.40
P	3.40	3.80
Q	2.60	3.00

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