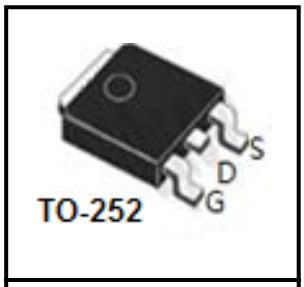
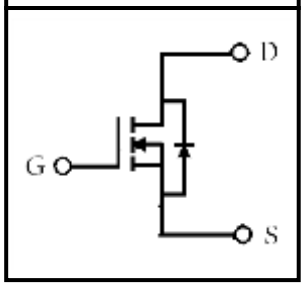
20V N-Channel Trench MOSFET

FEATURES

- Super Low Gate Charge
- 100% EAS Guaranteed
- RoHS compliant
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology





APPLICATIONS

- Load Switch
- Hard switched and high frequency circuits
- Uninterruptible Power Supply (UPS)

Device Marking and Package Information

Device	Package	Marking
CTD02N007	TO-252	CTD02N007

Absolute Maximum Ratings at T_j= 25ºC unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	20	V
Continuous Drain Current T_C = 25ºC (note1)	I_D	30	A
Continuous Drain Current T_C = 100ºC (note1)		24	A
Pulsed Drain Current (note2)	I_{DM}	120	A
Gate Source Voltage	V_{GSS}	±12	V
Single Pulse Avalanche Energy (note3)	E_{AS}	15	mJ
Power Dissipation T_C = 25ºC (note4)	P_D	38	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+175	ºC

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-Case (note1)	$R_{\theta JC}$	3.9	ºC/W

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	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V, T_J = 25ºC	--	--	1	uA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 100ºC	--	--	5	uA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±12V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.5	--	1	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 15A	--	5.1	7	mΩ
		V_{GS} = 2.5V, I_D = 10A	--	6.5	10	mΩ
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	--	1216	--	pF
Output Capacitance	C_{oss}		--	196	--	
Reverse Transfer Capacitance	C_{rss}		--	186	--	
Internal Gate Resistance	Rg		--	1.3	--	Ω
Total Gate Charge （10V）	Q_g	V_{DD} = 16V, I_D = 15A, V_{GS} = 4.5V	--	39	--	
Total Gate Charge （4.5V）	Q_g		--	28	--	nC
Gate-Source Charge	Q_{gs}		--	13	--	
Gate-Drain Charge	Q_{gd}		--	12	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 10V, ID=30A, V_{GS} = 10V,R_G = 25Ω	--	34	--	ns
Turn-on Rise Time	t_r		--	6	--	
Turn-off Delay Time	$t_{d(off)}$		--	227	--	
Turn-off Fall Time	t_f		--	98	--	
Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	30	A
Pulsed Diode Forward Current	I_{SM}		--	--	120	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 1A, V_{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t_{rr}	TJ=25℃ I_F=30A, di/dt=100A/μs	--	25	--	nS
Reverse Recovery Charge	Q_{rr}		--	13	--	nC

Notes

1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width≦300us , duty cycle≦2%
3. The EAS data shows Max. rating . The test condition is VDD =15V,VGS =10V,L=0.1mH
4. The power dissipation is limited by 175℃ junction temperature
5. The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics T_J = 25ºC, unless otherwise noted

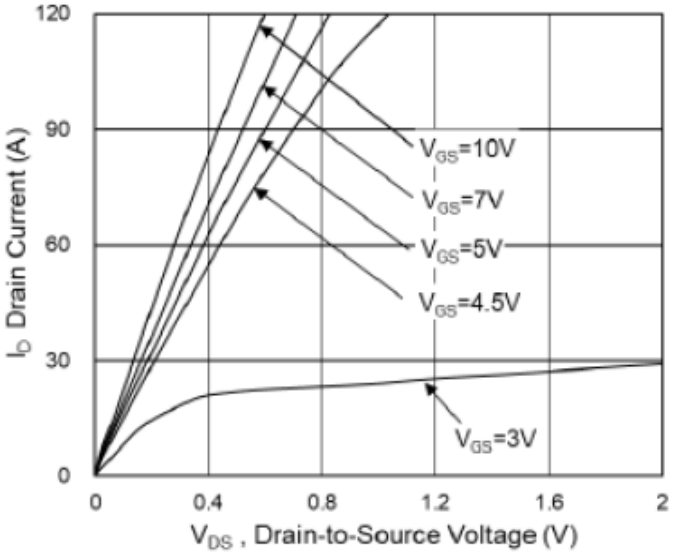


Fig.1 Typical Output Characteristics

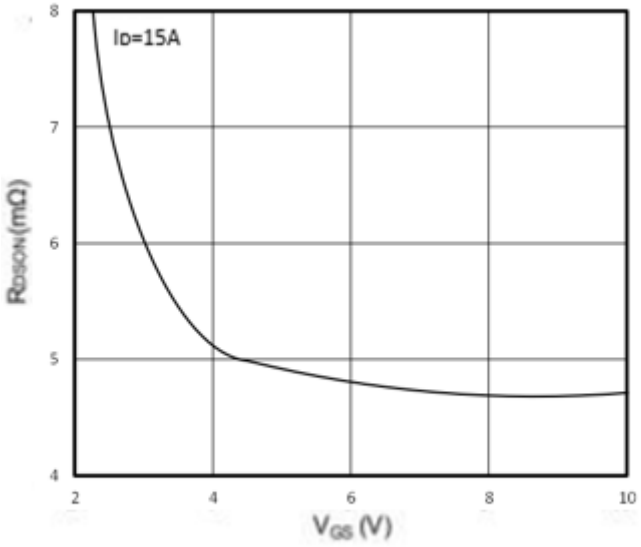


Fig.2 On-Resistance vs. G-S Voltage

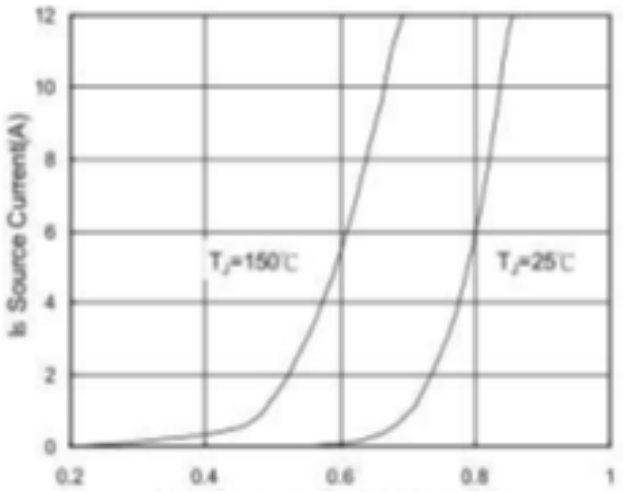


Fig.3 Forward Characteristics of Reverse Diode

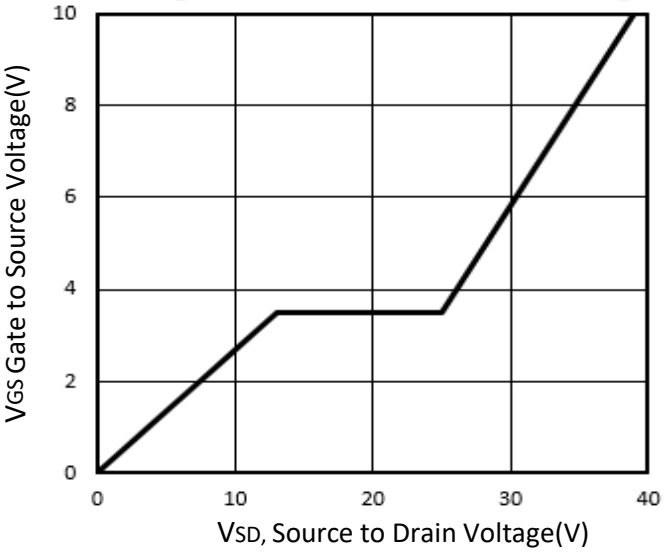


Fig.4 Gate-Charge Characteristics

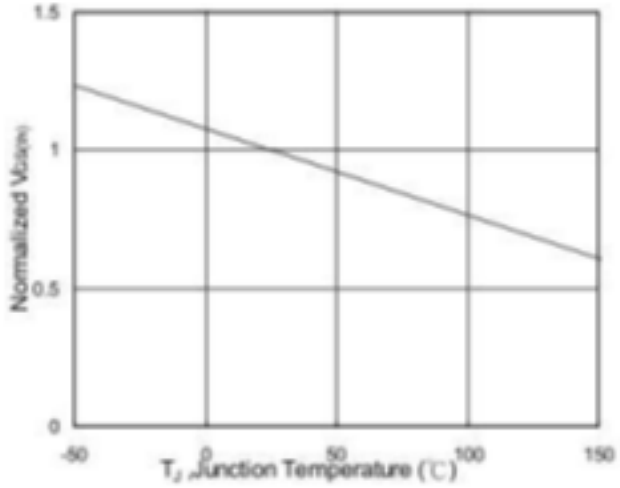


Fig.5 Normalized VGS(th) vs. TJ

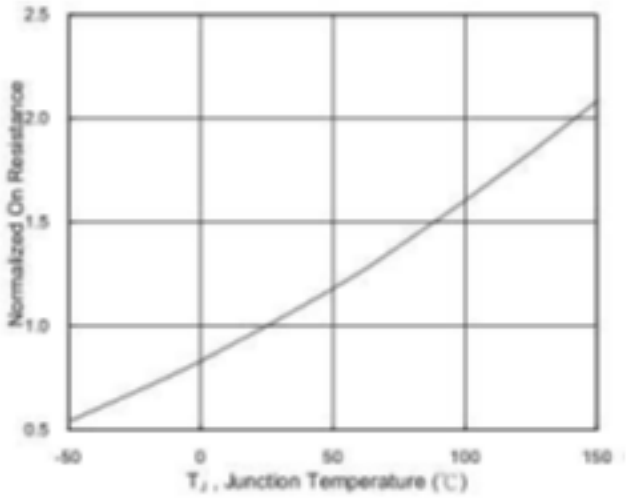


Fig.6 Normalized RDSON vs. TJ

Typical Characteristics T_J = 25ºC, unless otherwise noted

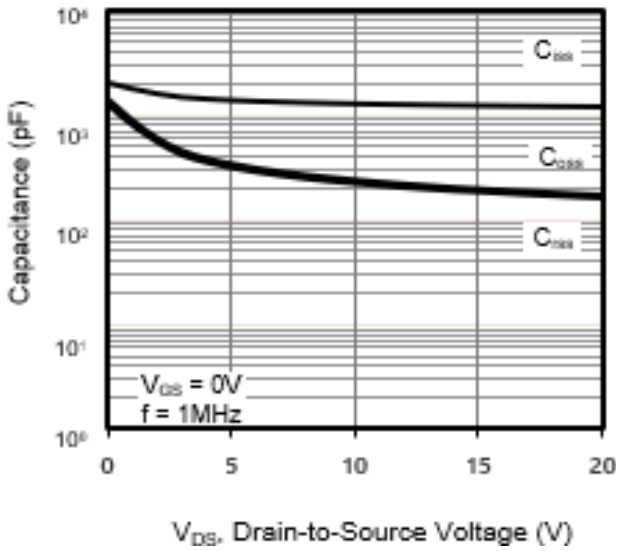


Fig.7 Capacitance

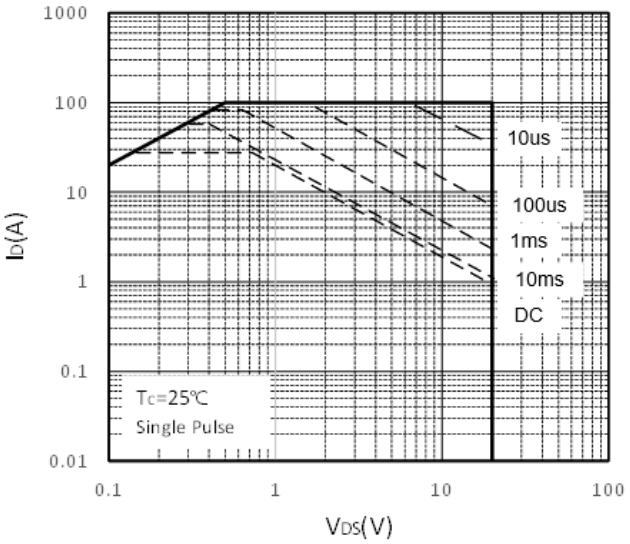


Fig.8 Safe Operating Area

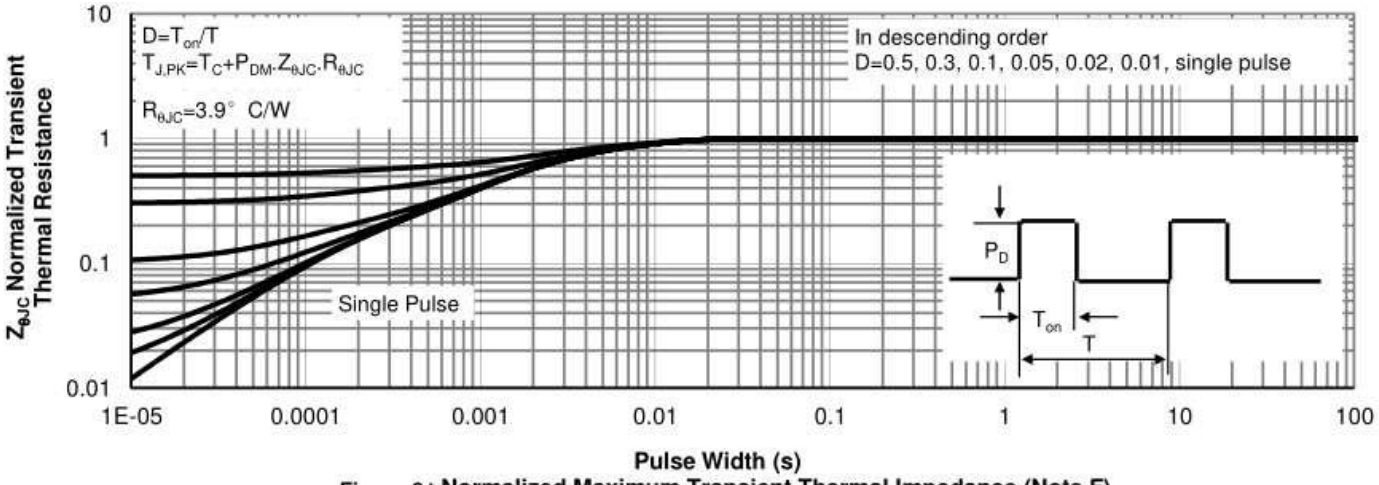


Figure 9: Normalized Maximum Transient Thermal Impedance (Note F)

Figure A：Gate Charge Test Circuit and Waveform

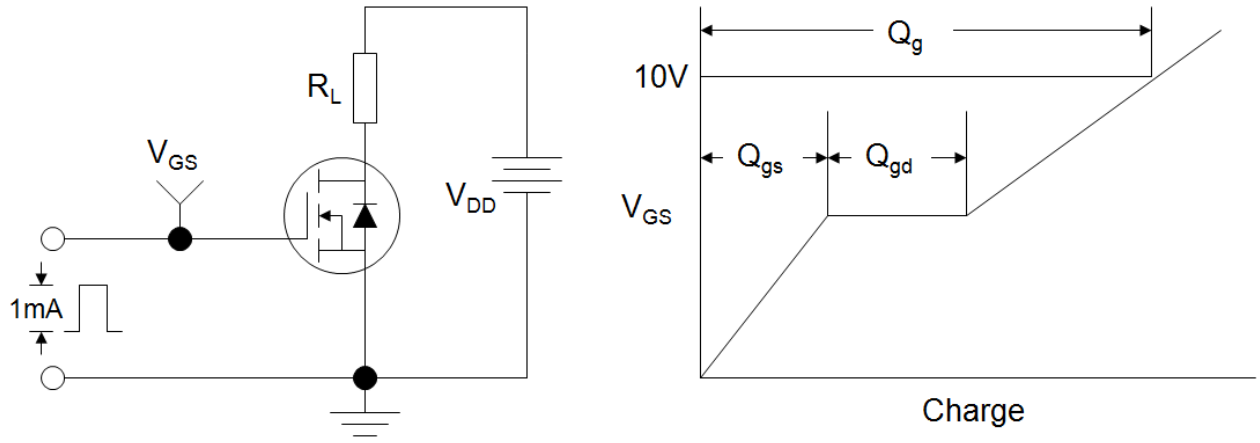


Figure B：Resistive Switching Test Circuit and Waveform

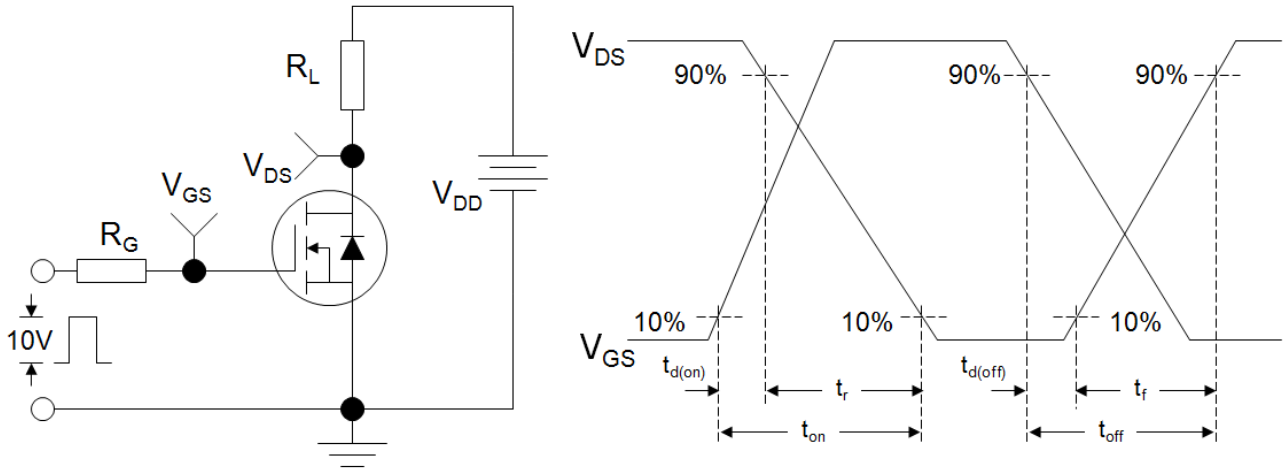
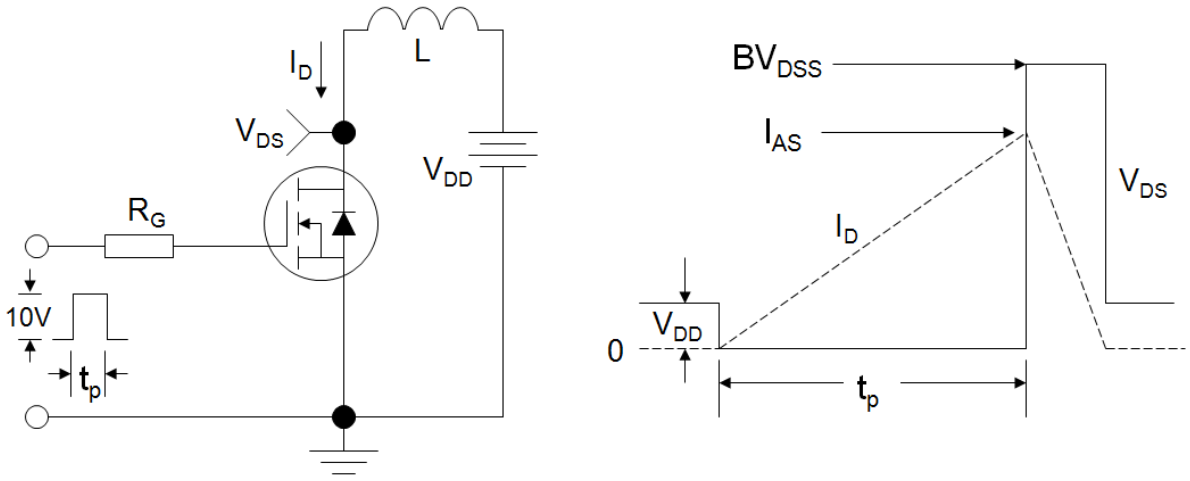
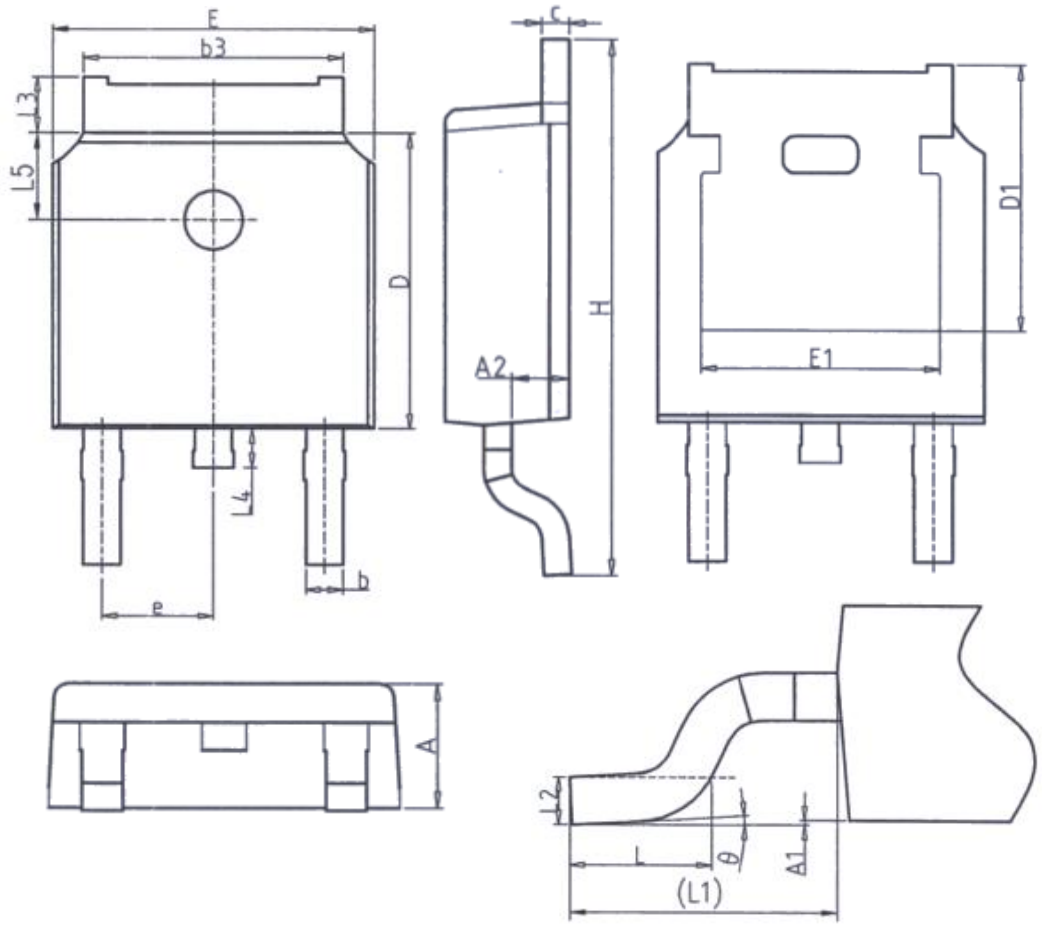


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



TO-252



Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	–

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	–	1.00
L5	1.65	1.95
θ	0°	8°

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