



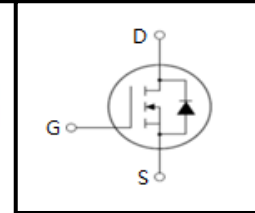
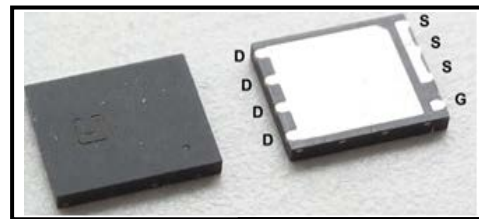
30V N-Channel Trench MOSFET

FEATURES

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

APPLICATIONS

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial



Device Marking and Package Information		
Device	Package	Marking
TTG90N03AT	DFN5×6	90N03AT

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0\text{V}$)	V_{DSS}	30	V
Continuous Drain Current	I_D	90	A
Pulsed Drain Current (note1)	I_{DM}	360	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	72	mJ
Avalanche Current (note1)	I_{AS}	22	A
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	90.6	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.38	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	60	



Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	μA
		$V_{DS} = 30V, V_{GS} = 0V, T_J = 150^\circ\text{C}$	--	--	100	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 12V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	1.7	2.4	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	--	3.6	5	$\text{m}\Omega$
		$V_{GS} = 4.5V, I_D = 30A$	--	5	7	$\text{m}\Omega$
Forward Transconductance (Note3)	g_{fs}	$V_{DS} = 10V, I_D = 20A$	--	21.6	--	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 15V,$ $f = 1.0\text{MHz}$	--	4184	--	pF
Output Capacitance	C_{oss}		--	416	--	
Reverse Transfer Capacitance	C_{rss}		--	331	--	
Total Gate Charge	Q_g	$V_{DD} = 15V, I_D = 30A,$ $V_{GS} = 10V$	--	62	--	nC
Gate-Source Charge	Q_{gs}		--	7	--	
Gate-Drain Charge	Q_{gd}		--	13	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 30A,$ $R_G = 3\Omega$	--	13	--	ns
Turn-on Rise Time	t_r		--	17	--	
Turn-off Delay Time	$t_{d(off)}$		--	42	--	
Turn-off Fall Time	t_f		--	13	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	90	A
Pulsed Diode Forward Current	I_{SM}		--	--	360	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 30A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 30A,$ $di_F/dt = 100A/\mu\text{s}$	--	40	--	ns
Reverse Recovery Charge	Q_{rr}		--	88	--	nC

Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2. $V_{DD} = 30V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$



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

Figure 1. Output Characteristics

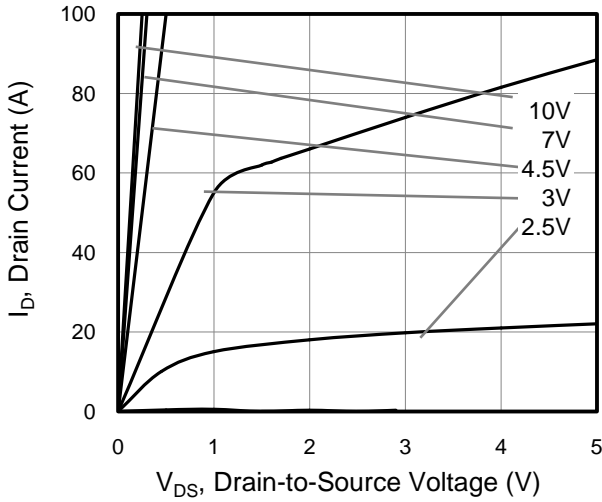


Figure 2. Transfer Characteristics

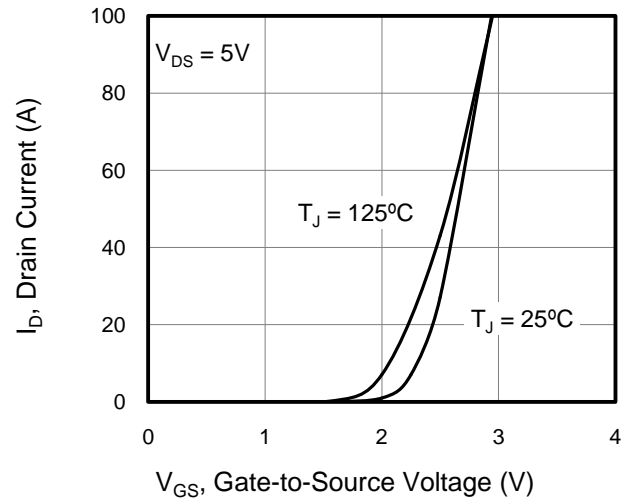


Figure 3. On-Resistance vs. Drain Current

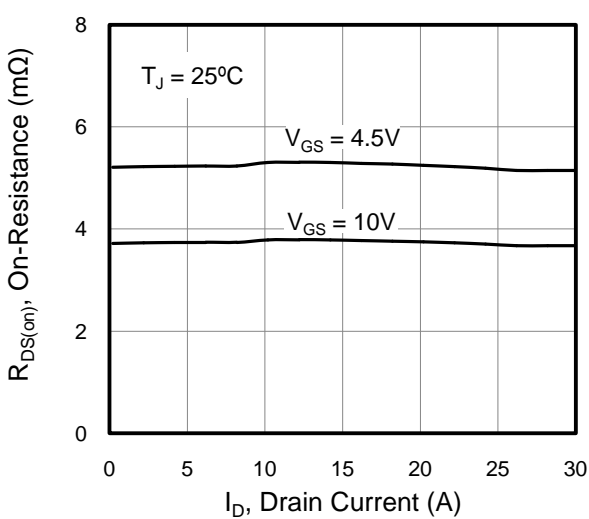


Figure 4. Capacitance

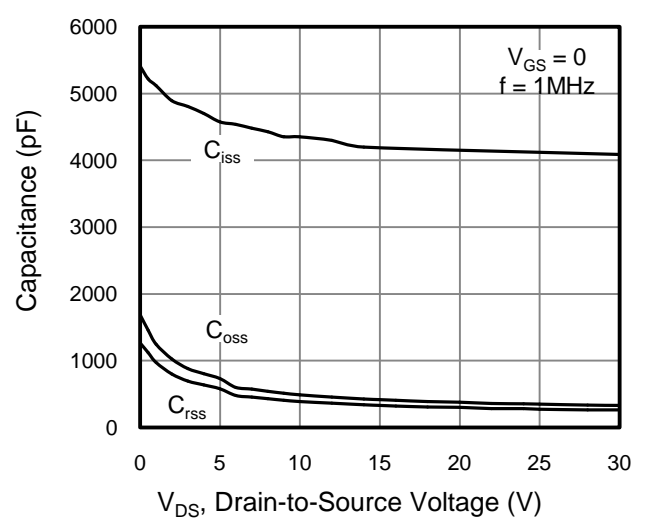


Figure 5. Gate Charge

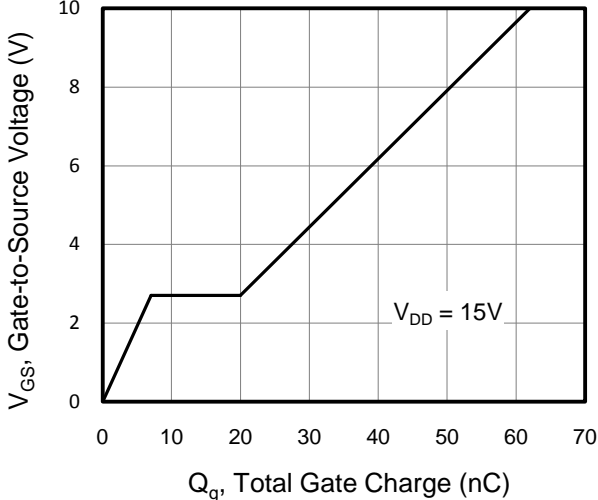
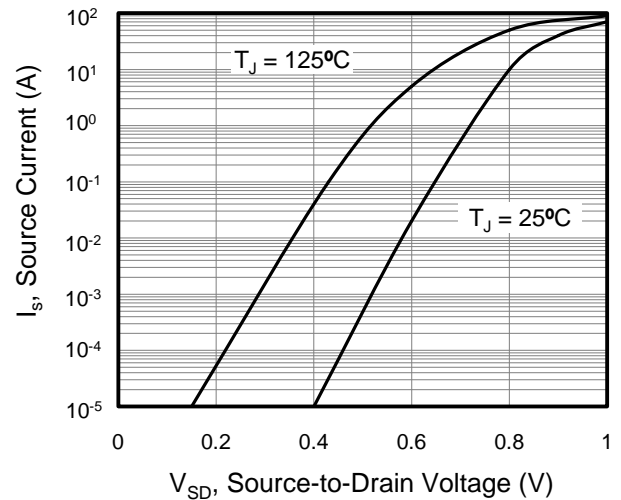


Figure 6. Body Diode Forward Voltage





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

Figure 7. On-Resistance vs. Junction Temperature

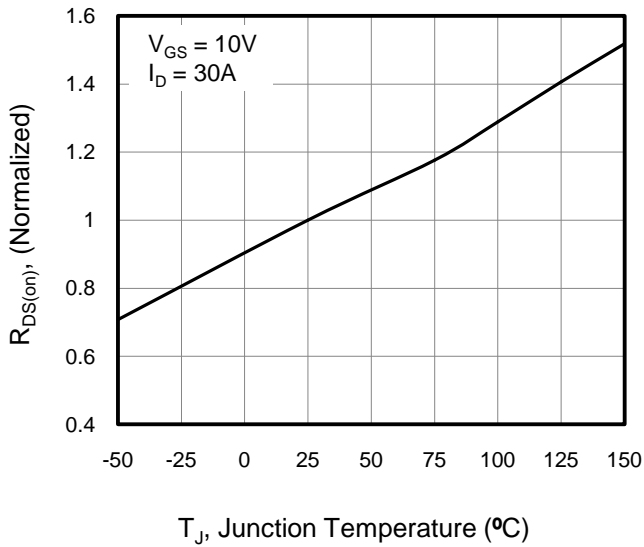


Figure 8. Threshold Voltage vs. Junction Temperature

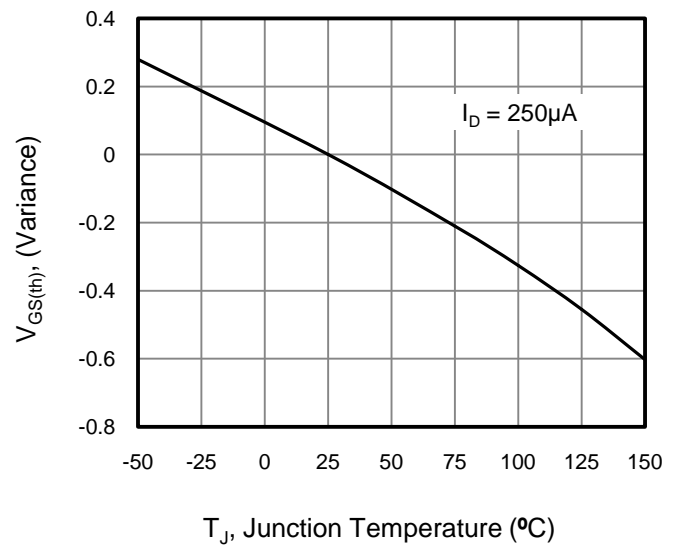


Figure 9. Transient Thermal Impedance

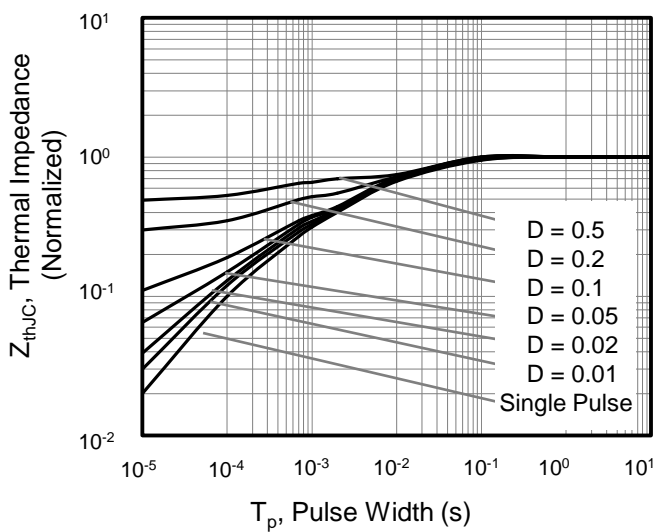


Figure 10. Safe operation area for

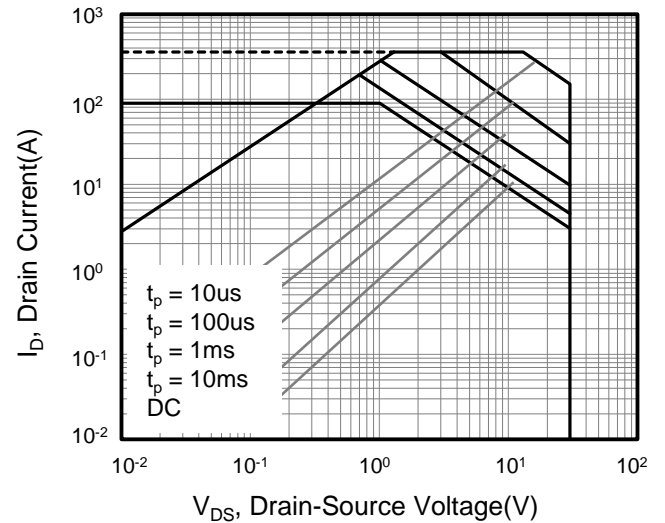




Figure A: Gate Charge Test Circuit and Waveform

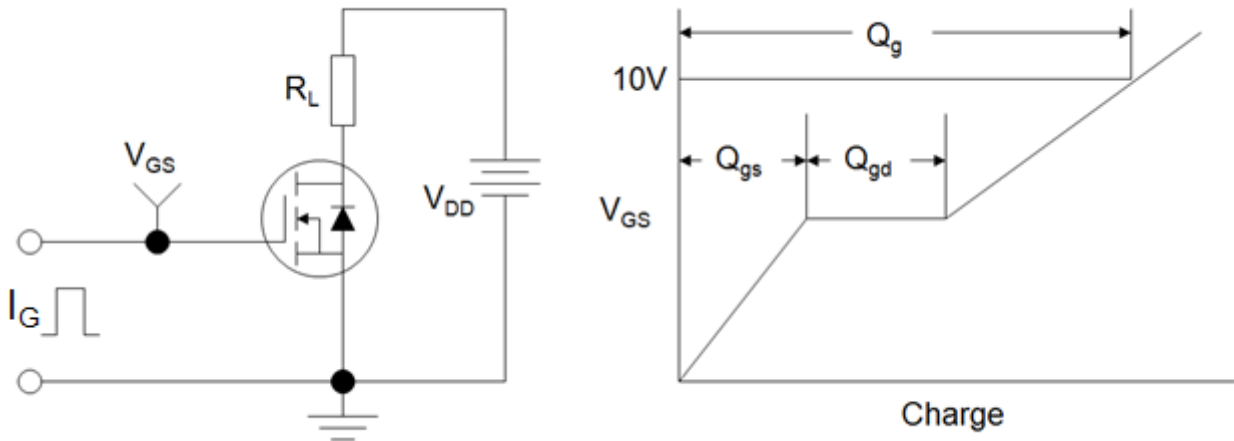


Figure B: Resistive Switching Test Circuit and Waveform

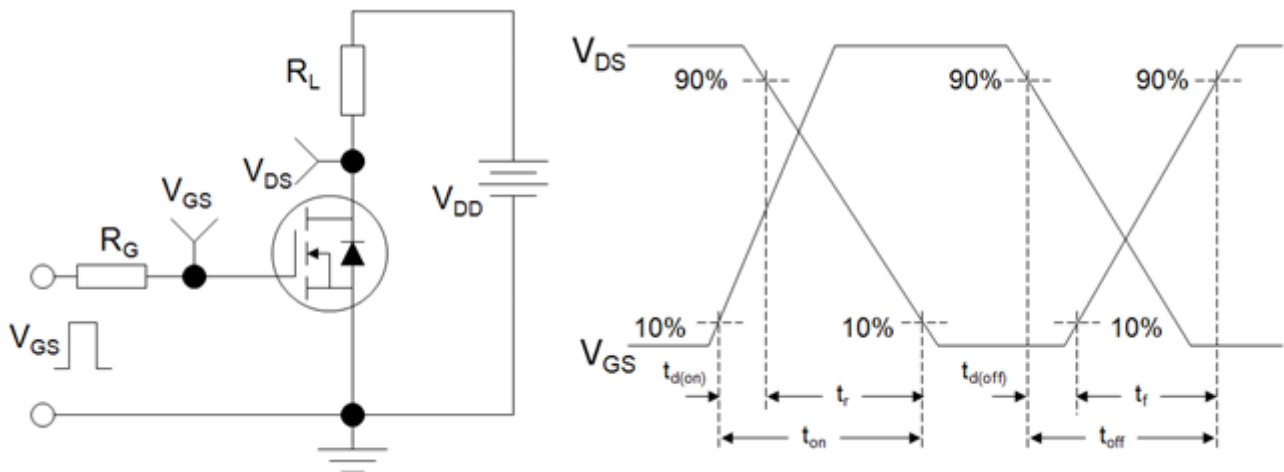
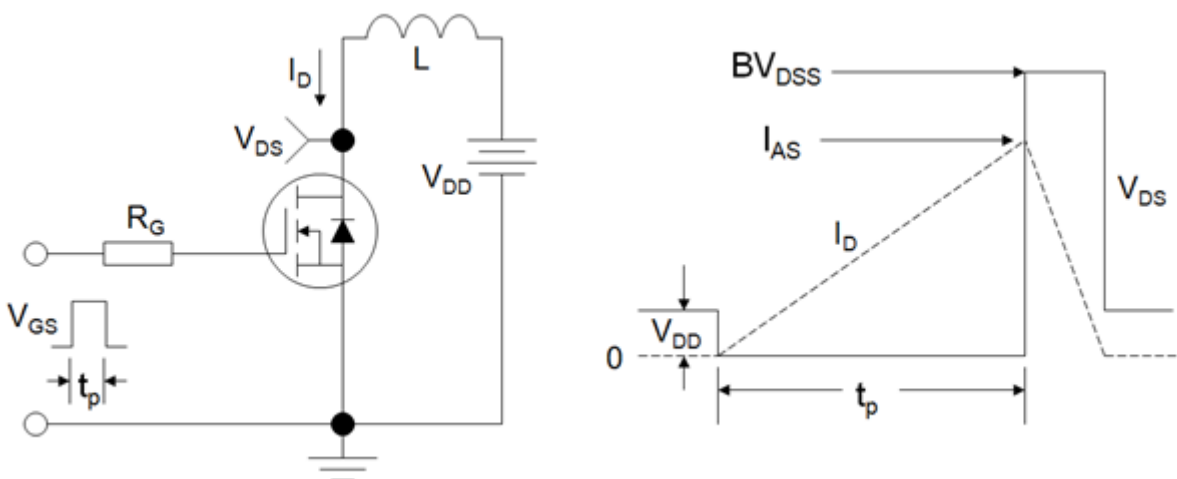
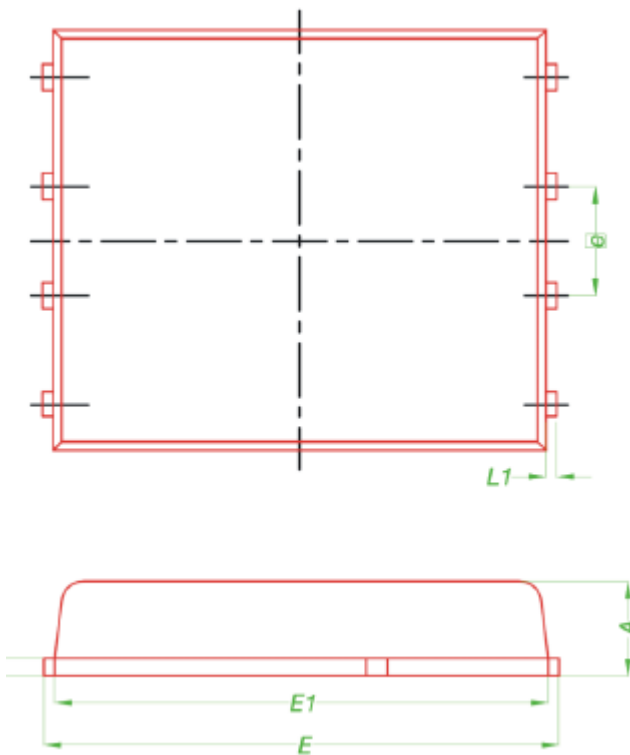
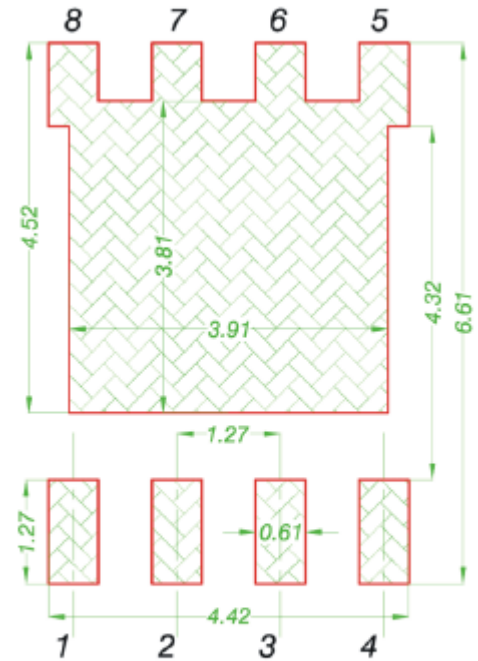
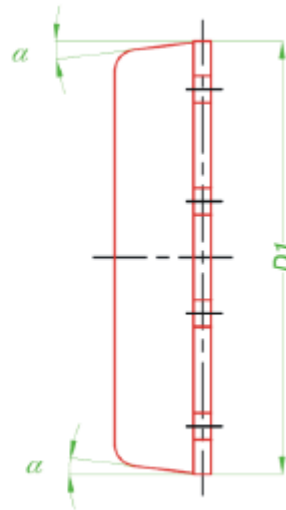
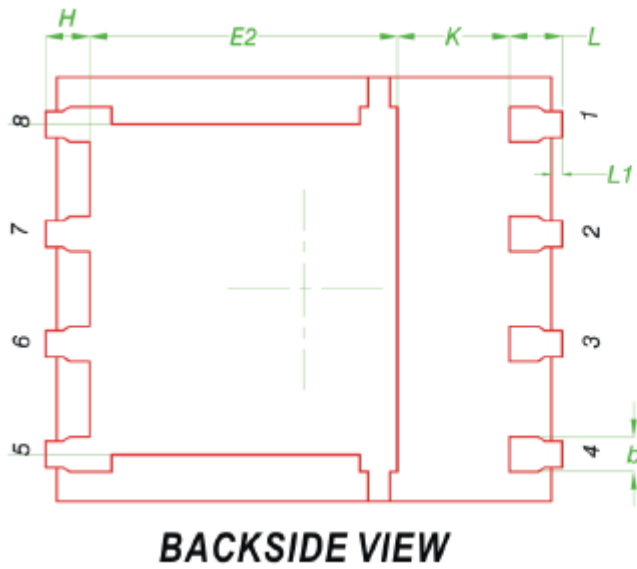


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





DFN5×6



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°



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