
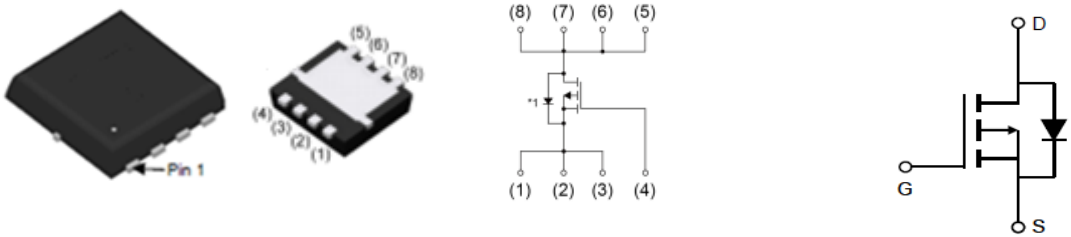




# 30V P-Channel Trench MOSFET

<p><b>Features</b></p> <ul style="list-style-type: none"> <li>● Trench Power Technology</li> <li>● Low <math>R_{DS(ON)}</math></li> <li>● Low Gate Charge</li> <li>● Optimized for Fast-switching Applications</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>● Synchronous Rectification in DC/DC and AC/DC Converters</li> <li>● Isolated DC/DC Converters in Telecom and Industrial</li> </ul>	<p><b>Product Summary</b></p> <p><math>V_{DS}</math> -30V</p> <p><math>R_{DS(ON)}</math> (at <math>V_{GS}=10V</math>) &lt; 7.5m<math>\Omega</math></p> <p><math>R_{DS(ON)}</math> (at <math>V_{GS}=4.5V</math>) &lt; 12m<math>\Omega</math></p> <p><math>I_D</math> (at <math>V_{GS}=10V</math>) -90A</p> <p>100% UIS Tested</p> 	
		
<b>Device</b>	<b>Package</b>	<b>Marking</b>
TTG90P03AT3	DFN3x3	90P03AT

<b>Absolute Maximum Ratings</b> $T_C = 25^{\circ}C$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage ( $V_{GS} = 0V$ )	$V_{DSS}$	-30	V
Continuous Drain Current	$I_D$	$T_C = 25^{\circ}C$	-90
		$T_C = 100^{\circ}C$	-63
Pulsed Drain Current (note1)	$I_{DM}$	-360	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	135	mJ
Avalanche Current	$I_{AS}$	-30	A
Power Dissipation (note3)	$P_D$	$T_C = 25^{\circ}C$	79
		$T_C = 100^{\circ}C$	39.5
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+175	$^{\circ}C$

<b>Thermal Resistance</b>			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	1.9	$^{\circ}C/W$
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.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	-1	$\mu A$
		$V_{DS} = -30V, V_{GS} = 0V, T_J = 100^\circ\text{C}$	--	--	-25	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.7	-2.4	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -20A$	--	6.3	7.5	$m\Omega$
		$V_{GS} = -4.5V, I_D = -20A$	--	10	12	$m\Omega$
Forward Transconductance (Note3)	$g_{fs}$	$V_{DS} = -5V, I_D = -20A$	30	--	--	S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = -15V,$ $f = 1.0\text{MHz}$	--	4942	--	$pF$
Output Capacitance	$C_{oss}$		--	473	--	
Reverse Transfer Capacitance	$C_{rss}$		--	461	--	
Total Gate Charge	$Q_g$	$V_{DD} = -15V, I_D = -20A,$ $V_{GS} = -10V$	--	82	--	nC
Gate-Source Charge	$Q_{gs}$		--	14	--	
Gate-Drain Charge	$Q_{gd}$		--	16	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -15V, I_D = -20A,$ $R_G = 2.5\Omega$	--	182	--	ns
Turn-on Rise Time	$t_r$		--	262	--	
Turn-off Delay Time	$t_{d(off)}$		--	13	--	
Turn-off Fall Time	$t_f$		--	9.8	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	-90	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	-360	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = -15A, V_{GS} = 0V$	--	--	-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = -15A,$ $di_F/dt = 100A/\mu s$	--	34	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	79	--	nC

**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS} = -30A, L=0.3mH, V_{DD} = 30V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
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

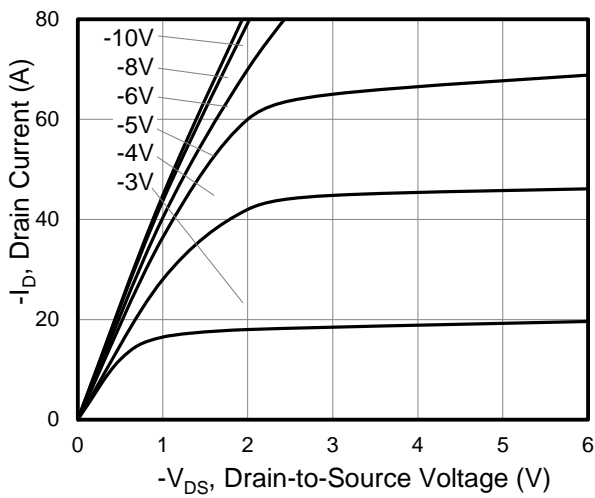


Figure 2. Transfer Characteristics

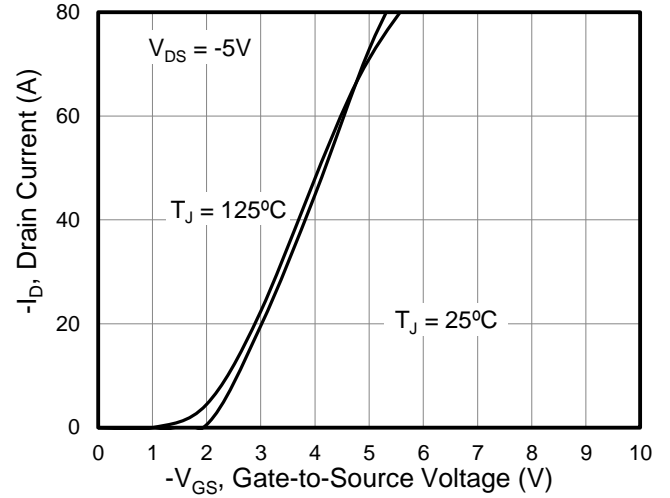


Figure 3. On-Resistance vs. Drain Current

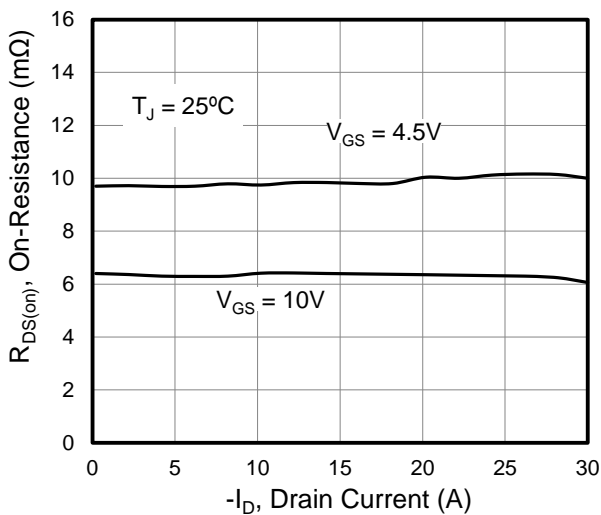


Figure 4. Capacitance

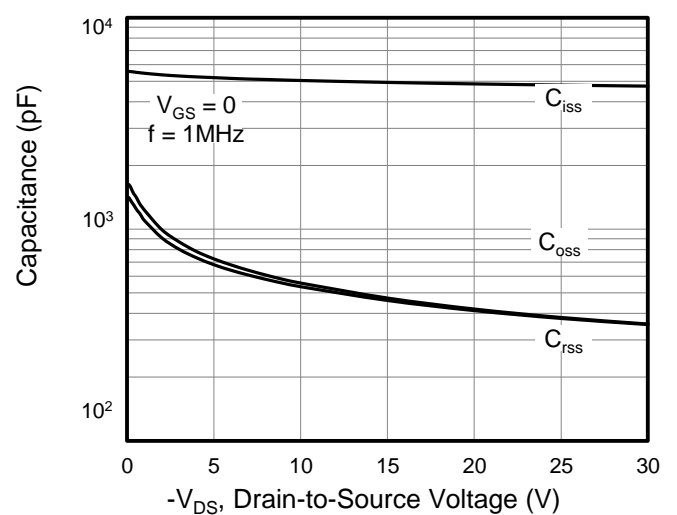


Figure 5. Gate Charge

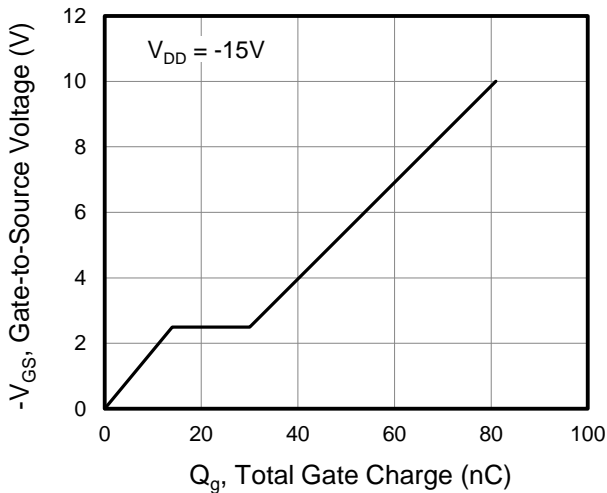
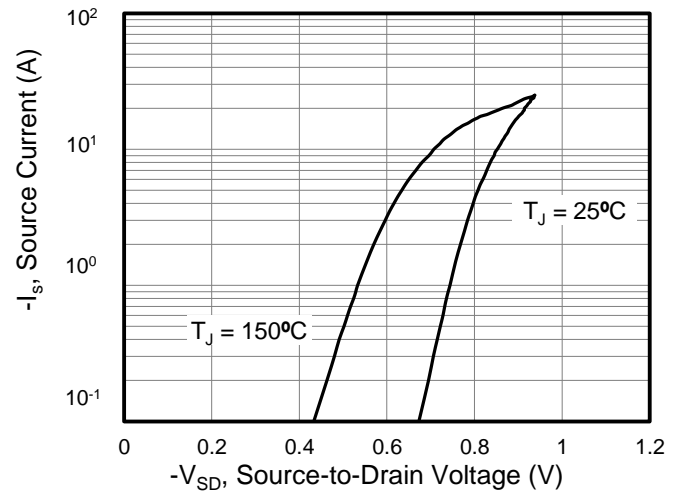


Figure 6. Body Diode Forward Voltage





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

Figure 7. On-Resistance vs. Junction Temperature

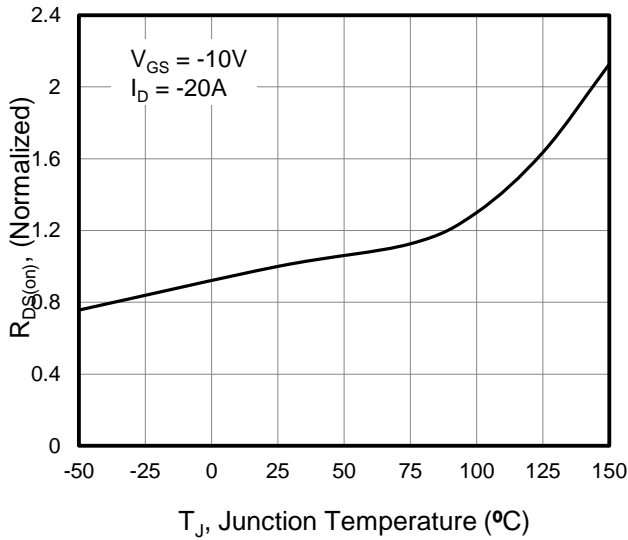


Figure 8. Threshold Voltage vs. Junction Temperature

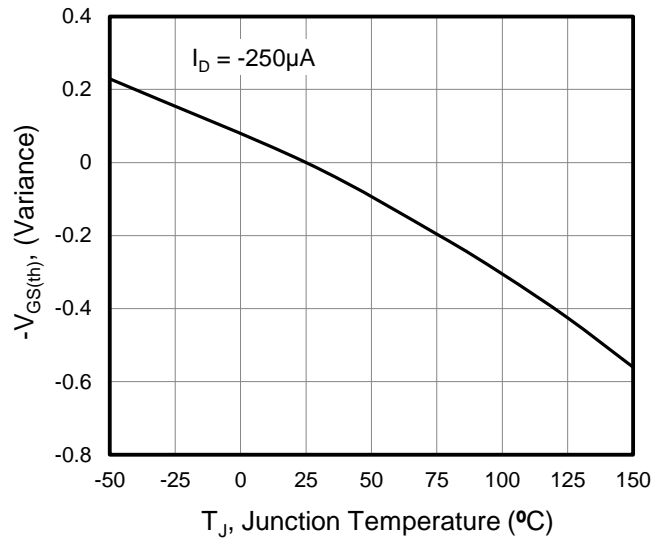


Figure 9. Transient Thermal Impedance

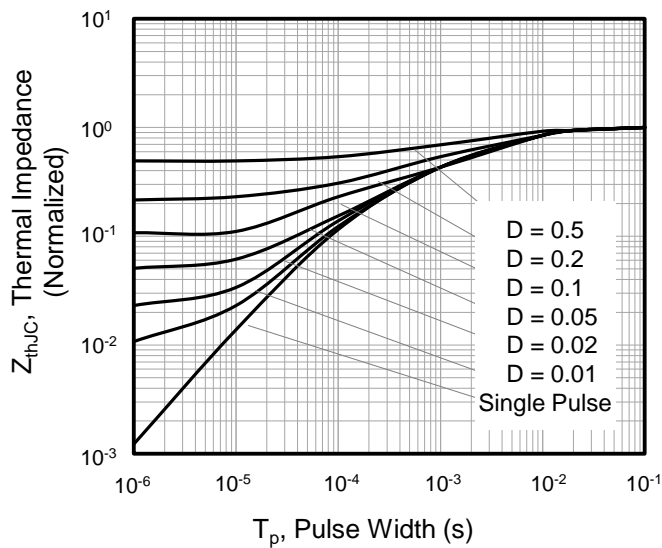


Figure 10. Safe operation area

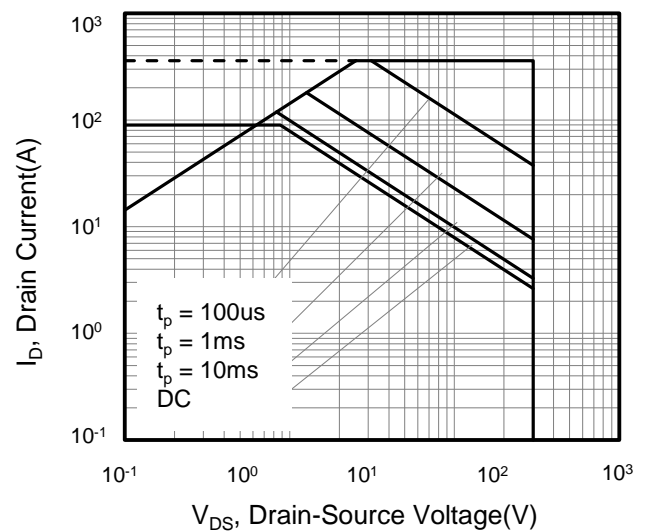




Figure A: Gate Charge Test Circuit and Waveform

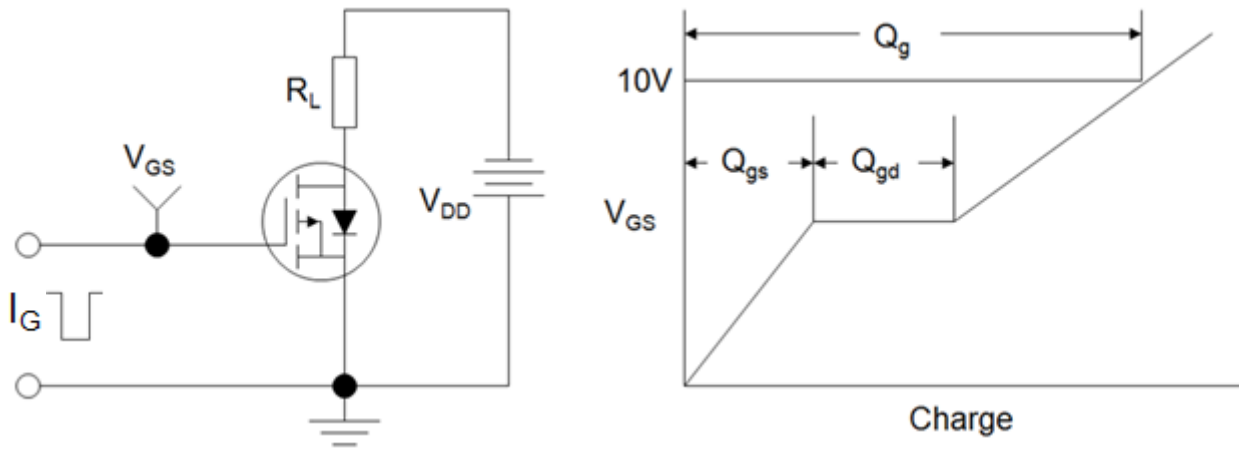


Figure B: Resistive Switching Test Circuit and Waveform

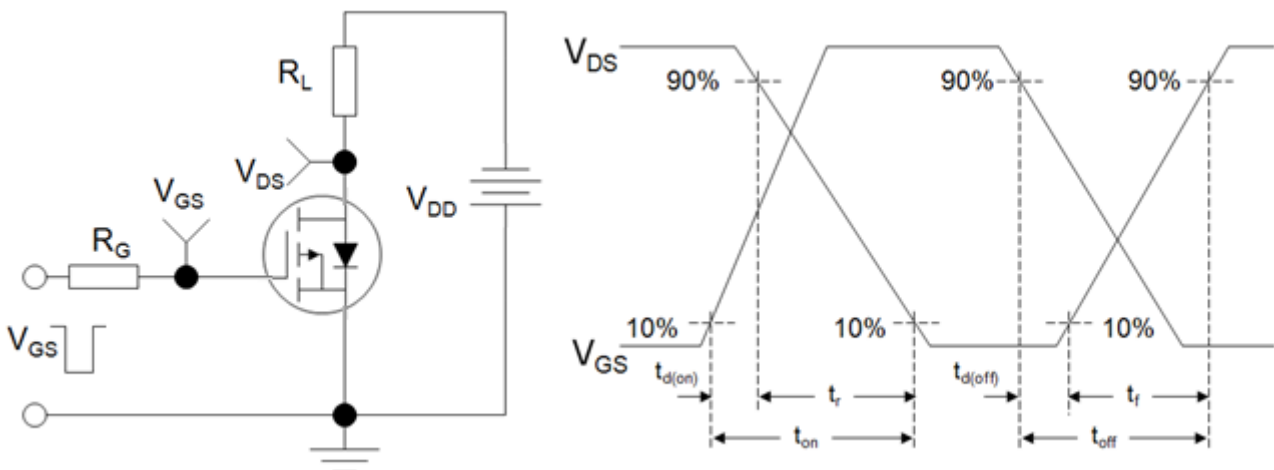
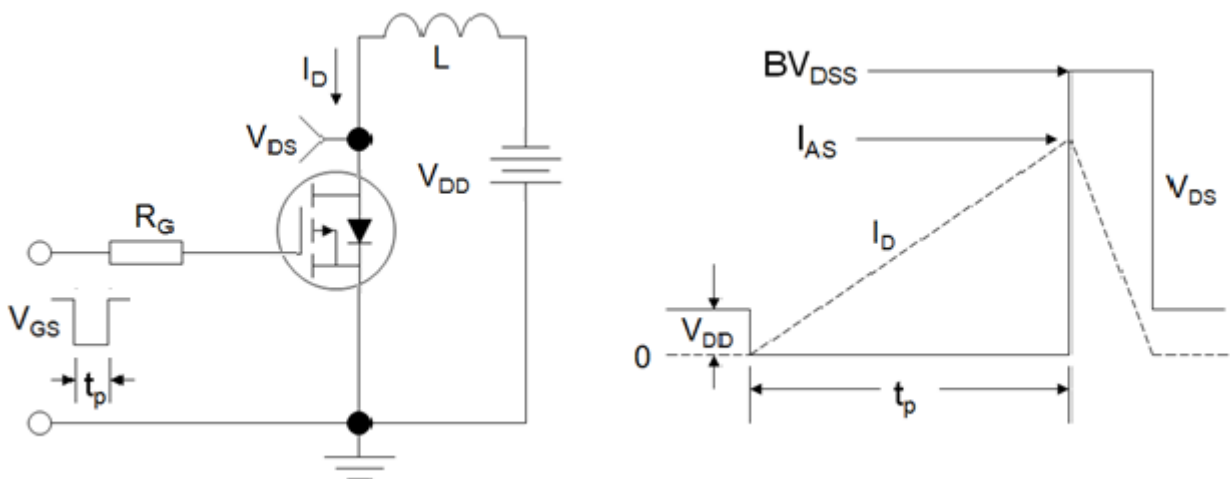
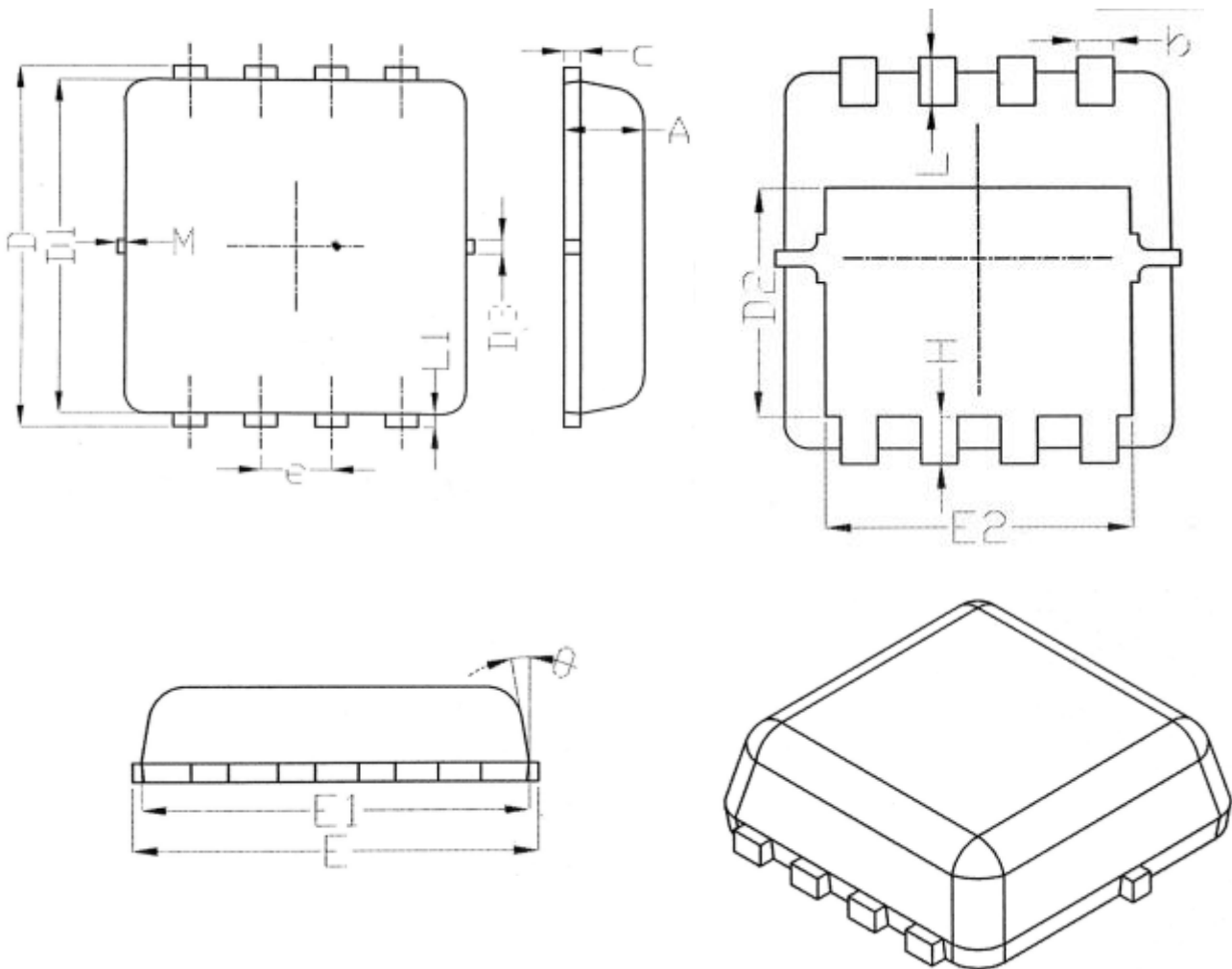


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

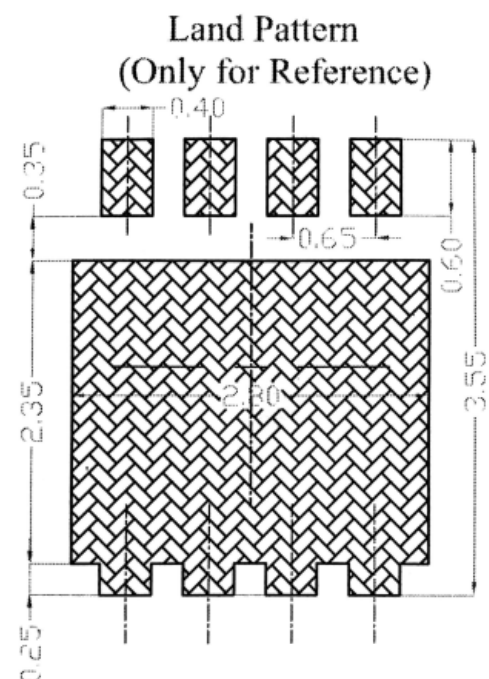




### DFN3x3



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
$\theta$	---	10°	12°
M	*	*	0.15
* Not specified			





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