

FH1906TL4

N-Channel Trench Power MOSFET

Description

The FH1906TL4 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

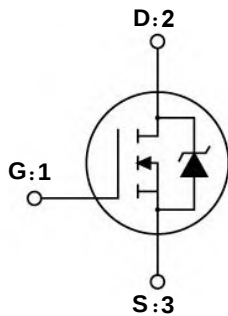
Application

- Load Switch
- PWM Application
- Battery Management

Features

Parameter	Typ.	Unit
BV_{DSS}	60	V (Min)
$V_{GS(th)}$	3.0	V (Typ)
I_D (@ $V_{GS} = 10V$)	85	A
$R_{DS(ON)}$ (@ $V_{GS} = 10V$)	5.3	mΩ (Typ)

- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge



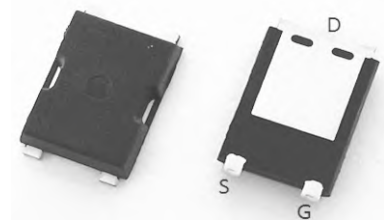
Schematic diagram

Top view



Marking and pin assignment

TOLL-4L



Top view

Bottom View

Absolute Maximum Ratings (T_c=25°C unless otherwise specified)

Symbol	Parameter		Value	Units
V _{DSS}	Drain-Source Voltage		60	V
V _{GSS}	Gate-Source Voltage		±20	V
I _D	Continuous Drain Current	T _C = 25°C	85	A
		T _C = 100°C	55	A
I _{DM}	Pulsed Drain Current ^{note1}		255	A
E _{AS}	Single Pulsed Avalanche Energy ^{note2}		400	mJ
P _D	Power Dissipation	T _C = 25°C	65	W
R _{θJC}	Thermal Resistance, Junction to Case		1.9	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +150	°C

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, V _{GS} = 0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	2	3	4	V
R _{DS(on)}	Static Drain-Source on-Resistance	V _{GS} =10V, I _D =20A	-	5.3	6.9	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A	-	20	-	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f = 1.0MHz	-	5910	-	pF
C _{oss}	Output Capacitance		-	384	-	pF
C _{rss}	Reverse Transfer Capacitance		-	252	-	pF
R _g	Gate resistance	-	-	2.2	-	Ω
Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} =30V, I _D =20A, V _{GS} =10V	-	101	-	nC
Q _{gs}	Gate-Source Charge		-	22	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	28	-	nC
V _{plateau}	Gate plateau voltage		-	4.5	-	V
t _{d(on)}	Turn-on Delay Time	V _{DS} =30V, V _{GS} =10V RL=1.5Ω, R _{GEN} =3Ω,	-	19.7	-	ns
t _r	Turn-on Rise Time		-	43.7	-	ns
t _{d(off)}	Turn-off Delay Time		-	63	-	ns
t _f	Turn-off Fall Time		-	23.4	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	85	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	255	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S =10A	-	-	1.2	V

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=30V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5\text{mH}$ 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

Figure 1: On-Region Characteristics

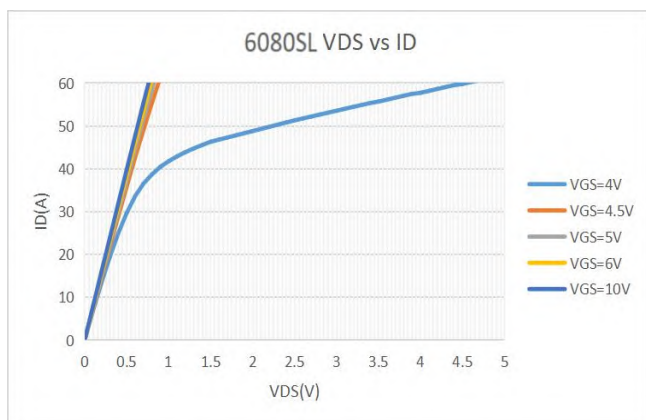


Figure 2: Transfer Characteristics

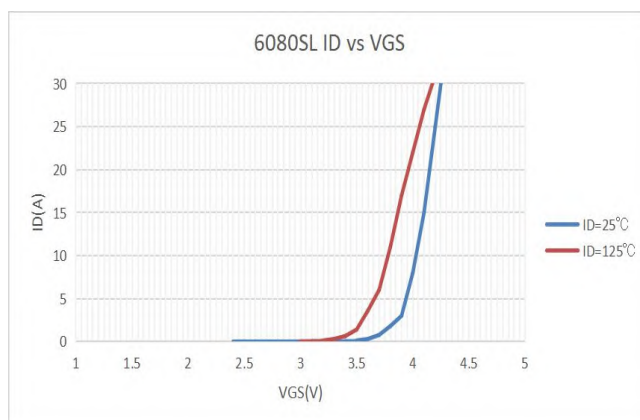


Figure 3: On-resistance vs. Drain Current and Gate Voltage

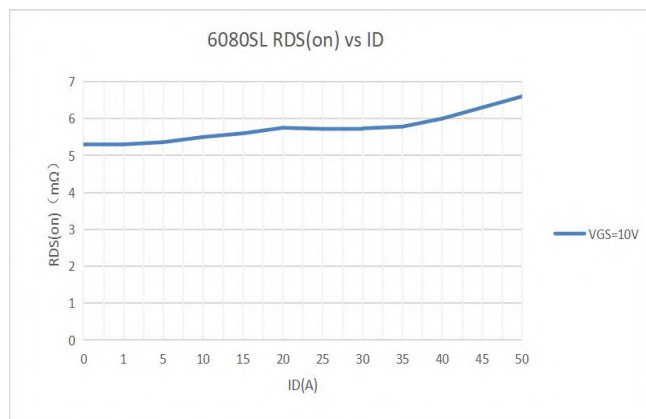


Figure 4: On-Resistance vs. Gate-Source Voltage

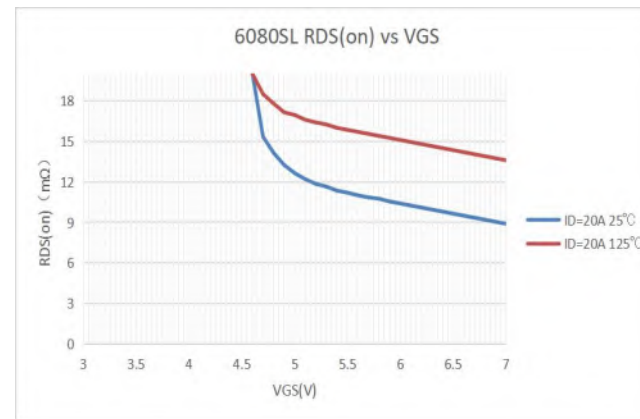


Figure 5: On-Resistance vs. Junction Temperature

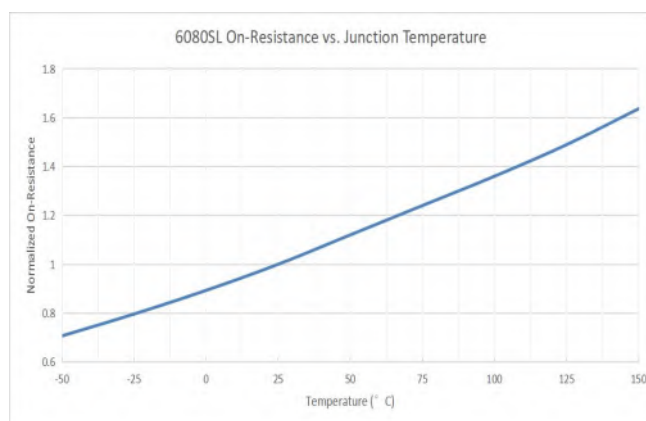
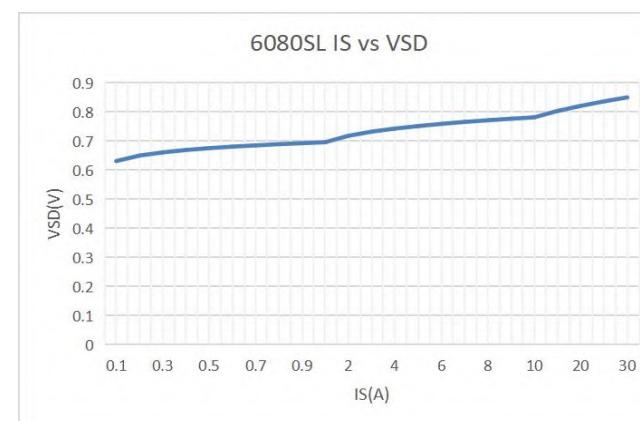


Figure 6: Body-Diode Characteristics



Typical Performance Characteristics

Figure7: Capacitance Characteristics C(pF)

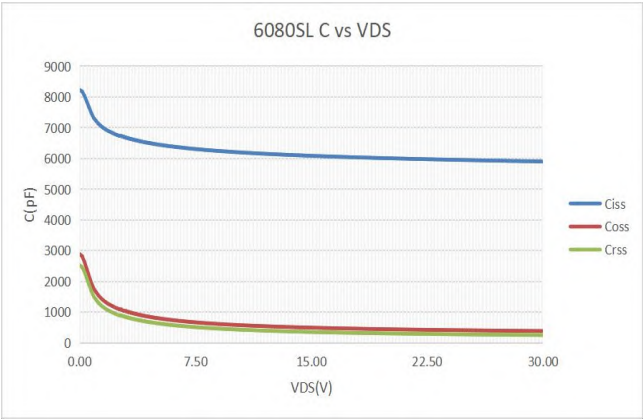


Figure 8: Gate-Charge Characteristics

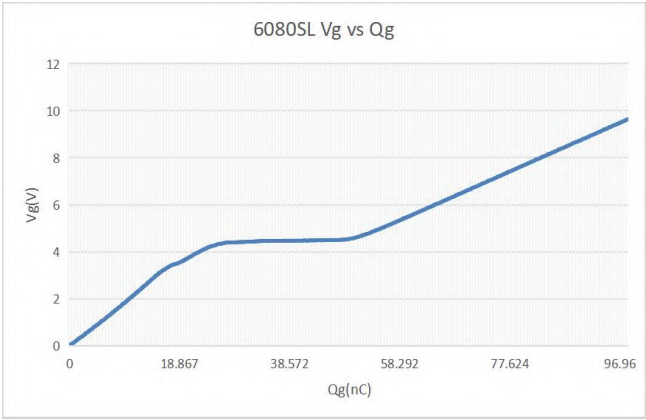


Figure9: Maximum Forward Biased Safe Operating Area

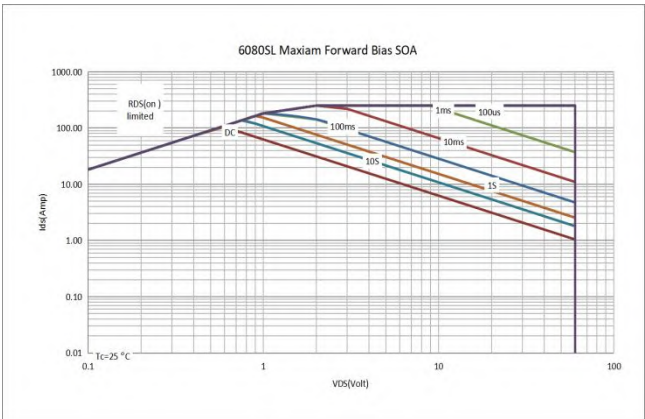
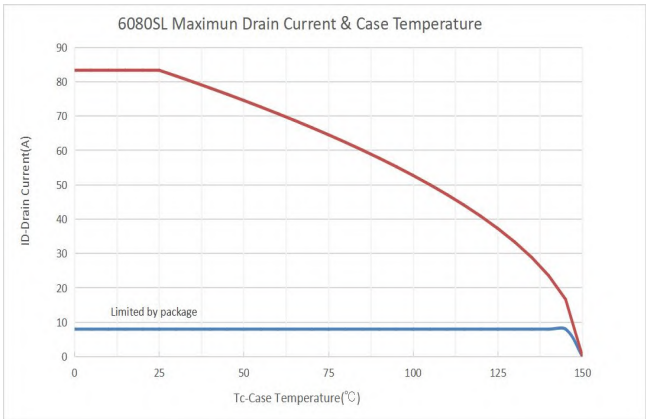


Figure10: Current De-rating



Test Circuit

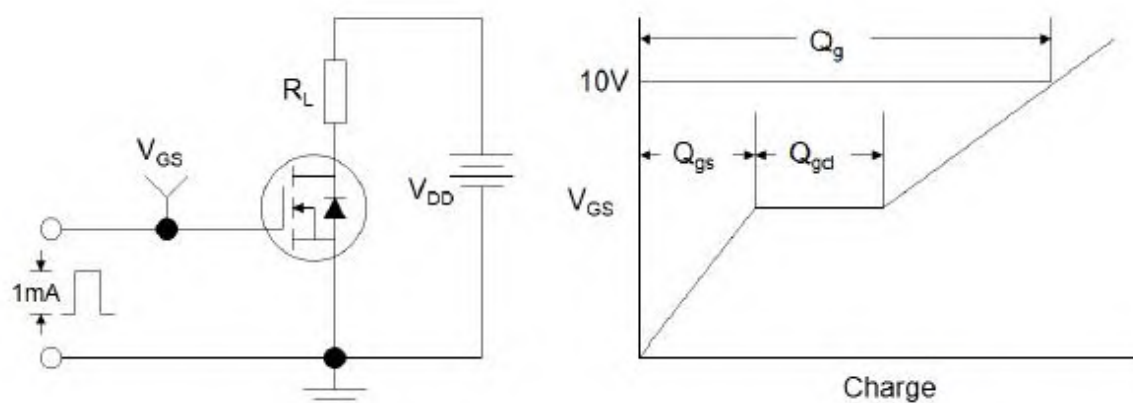


Figure1:Gate Charge Test Circuit & Waveform

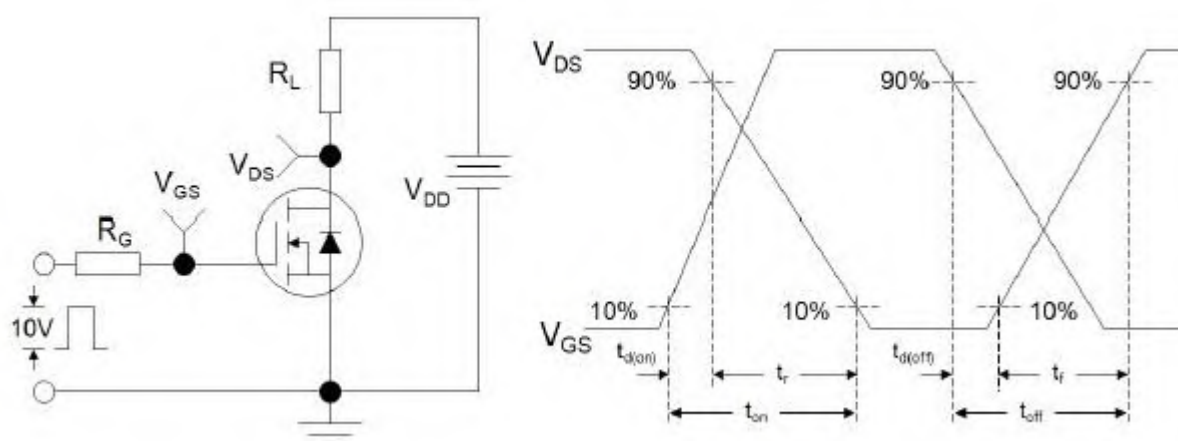


Figure 2: Resistive Switching Test Circuit & Waveforms

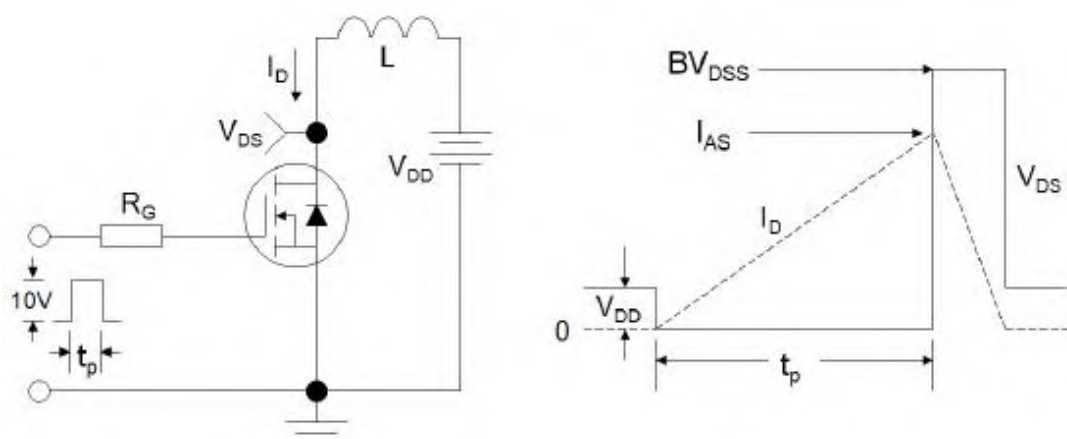
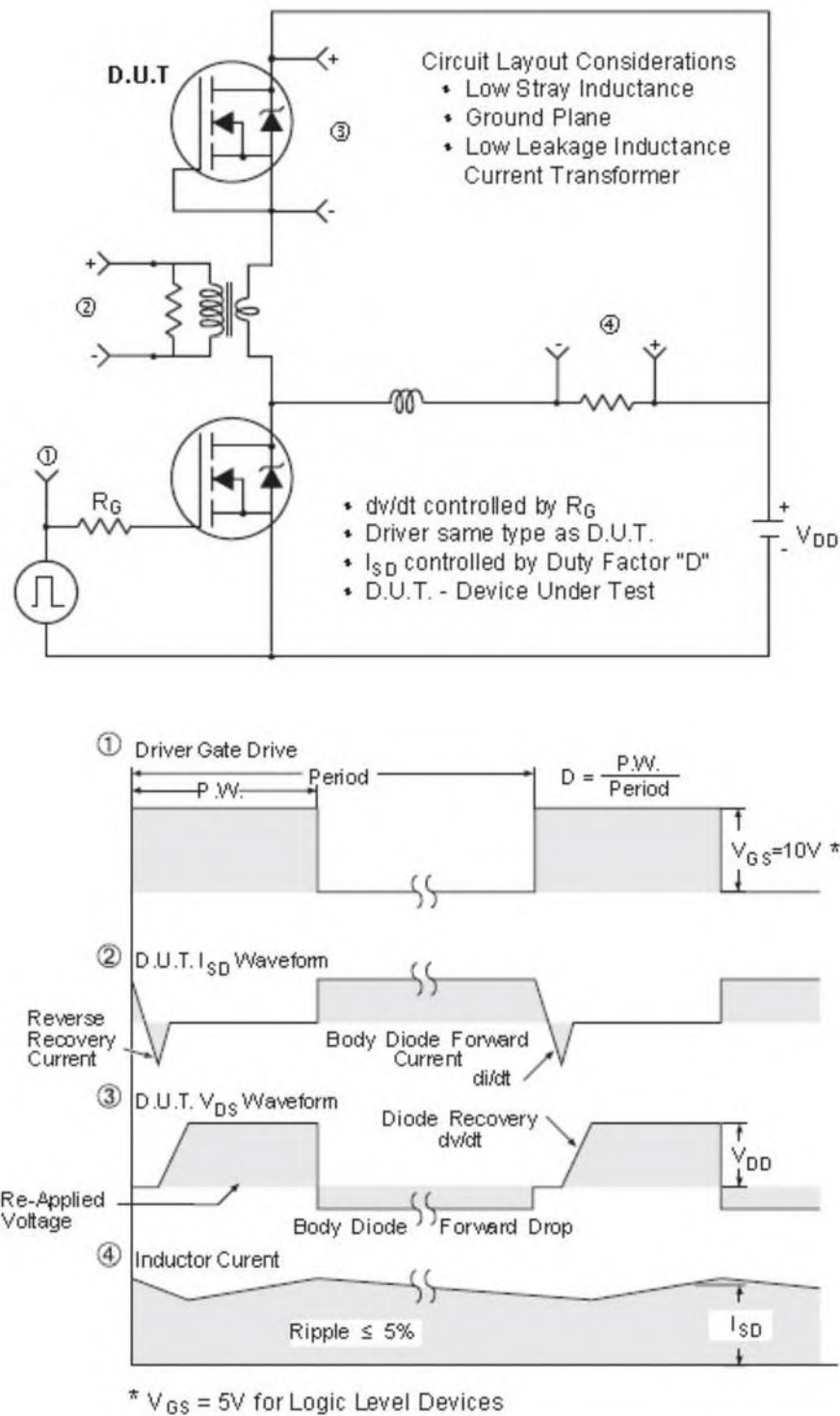
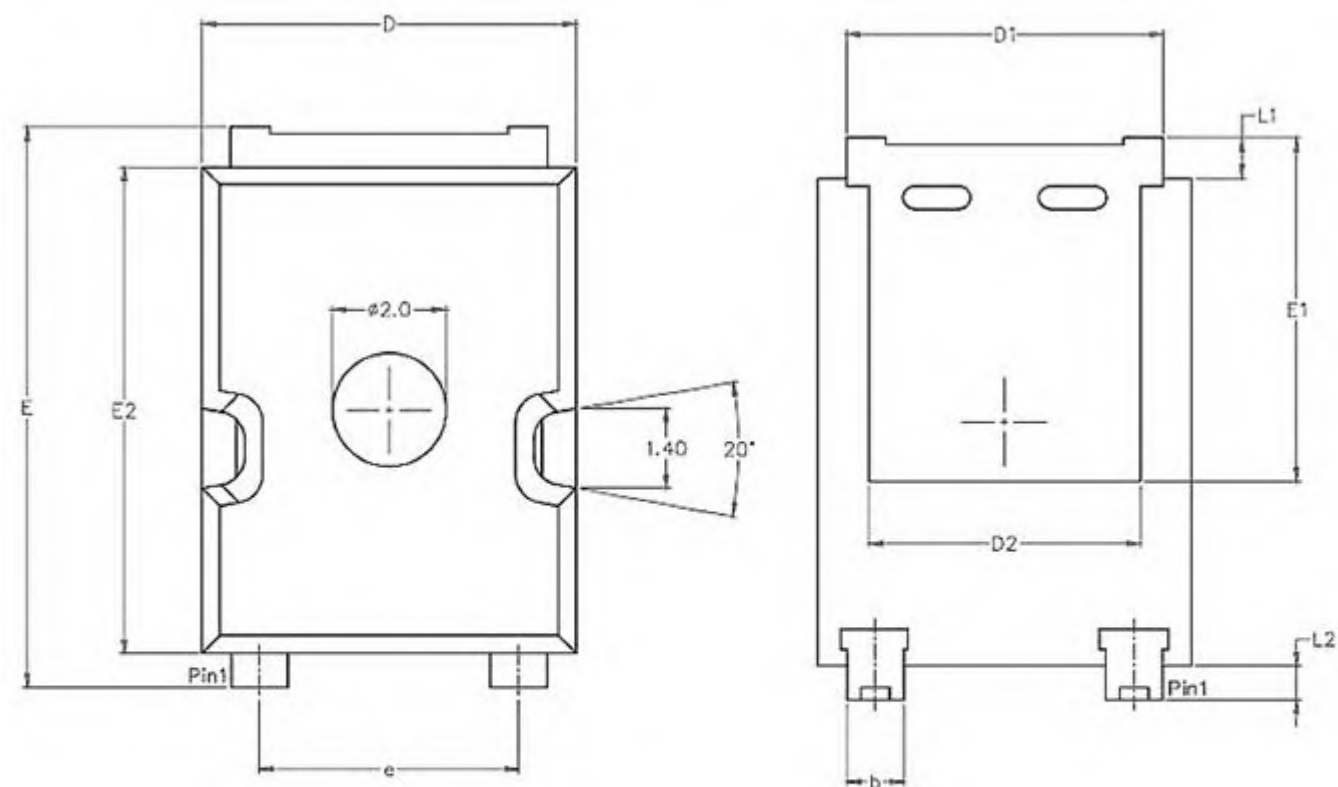


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Figure 4: Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

Package Information:TOLL-4L



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.95	2.00	2.05
A1	0.45	0.50	0.55
A2	1.45	1.50	1.55
b	0.95	1.00	1.05
D	6.55	6.60	6.65
E	9.85	9.90	9.95
D1	5.55	5.60	5.65
D2	4.75	4.80	4.85
E1	6.00	6.05	6.10
E2	8.55	8.60	8.65
e	4.54	4.57	4.60
L1	0.65	0.70	0.75
L2	0.55	0.60	0.65