Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

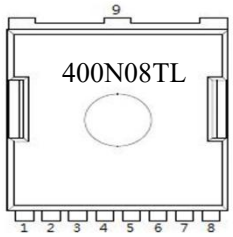
Bvdss	Rdson	ID
80V	1.05mΩ	400A

Application

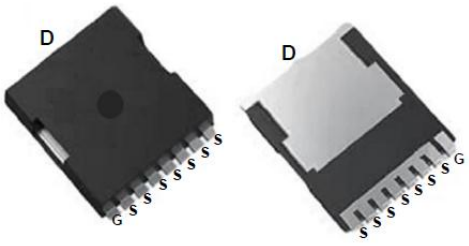
RoHS

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

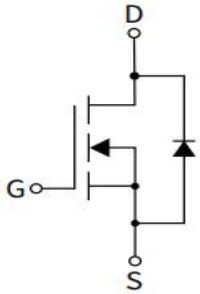
Package



Marking and pin assignment



TOLL-8L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
400N08TL	S400N08TL	TOLL-8L	2000

Absolute Maximum Ratings (T_C=25℃unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{Gs}	±20	V
Continuous Drain Current	T_C = 25℃	I_D	400	A
	T_C = 100℃	I_D	253	A
Pulsed Drain Current[1]		I_{DM}	1600	A
Power Dissipation	T_C = 25℃	P_D	468.8	W
Single Pulse Avalanche Energy[2]		EAS	1280	mJ
Junction Temperature		T_J	-55~+175	℃
Storage Temperature		T_{STG}	-55~+175	℃

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient[3]	$R_{\theta JA}$	39	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	2.5	℃/W

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLS400N08TL	TOLL-8	1	9	2,3,4,5,6,7,8	Tape Reel

Electrical Characteristics (T_j=25℃unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	80	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_C = 25℃	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V	-	-	1	μA
Zero Gate Voltage Drain Current	T_C =100℃	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V	-	-	100	μA
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} =V_{GS} , I_D = 250μA	2	3	4	V
Drain-Source On-Resistance[4]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	-	1.05	1.35	mΩ
Forward Trans-conductance[4]		gfs	V_{GS} = 10V, I_D = 20A	--	62	-	S
Input Capacitance		C_{ISS}	V_{DS} = 40V,V_{GS} =0V, f =1MHz	-	13085	-	pF
Output Capacitance		C_{OSS}		-	2615	-	
Reverse Transfer Capacitance		C_{RSS}		-	120	-	
Gate Resistance		R_g	f =1MHz	-	3.1	-	Ω
Total Gate Charge		Q_g	V_{DS} = 40V,I_D = 20A, V_{GS} = 10V	-	243.6	-	nC
Gate-Source Charge		Q_{gs}		-	64.2	-	
Gate-Drain Charge		Q_{gd}		-	58.8	-	
Turn-On Delay Time		$T_{d(on)}$	V_{DD} = 40V, I_D = 20A,R_{GEN} = 3Ω, V_{GS} = 10V	-	44.8	-	ns
Rise Time		T_R		-	86.8	-	
Turn-Off Delay Time		$T_{d(off)}$		-	164	-	
Fall Time		T_F		-	94	-	
Continuous Source Current		I_S	T_C=25℃	-	-	400	A
Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=20A	-	-	1.2	V
Reverse Recovery time		T_{rr}	IF=20A, dI/dt=100A/μs	-	128	-	ns
Reverse Recovery Charge		Q_{rr}		-	140.8	-	nC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=175° C.

2. The test condition is V_{DD}= 25V, V_{GS}= 10V, L= 0.4mH, IAS= 80A.

3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the

user's specific board design.

4. The data tested by pulsed, pulse width ≤ 300us , duty cycle ≤ 2%.

5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

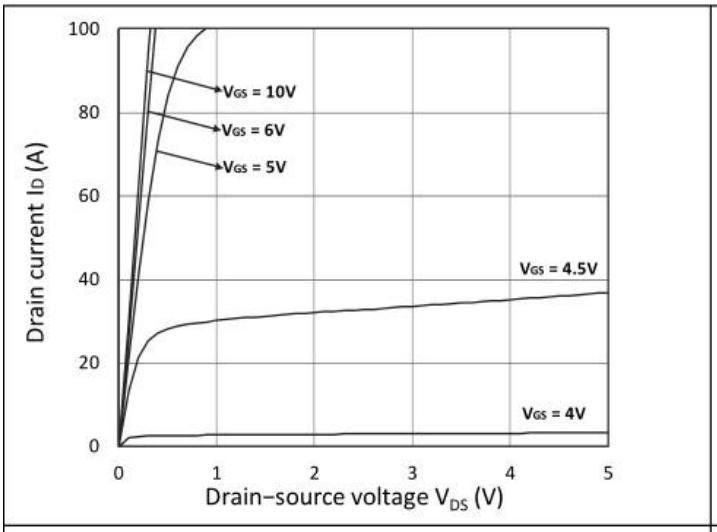


Figure 1. Output Characteristics

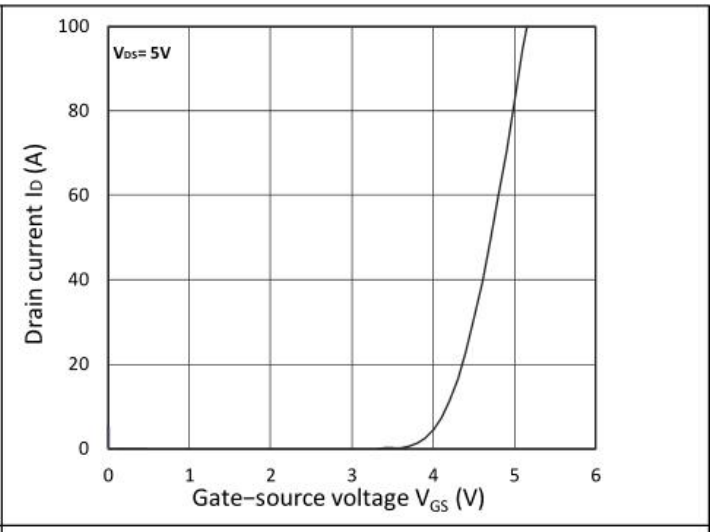


Figure 2. Transfer Characteristics

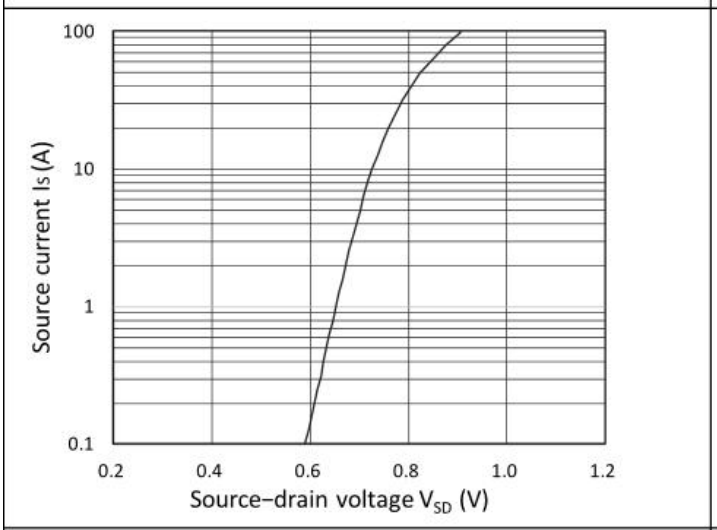


Figure 3. Forward Characteristics of Reverse

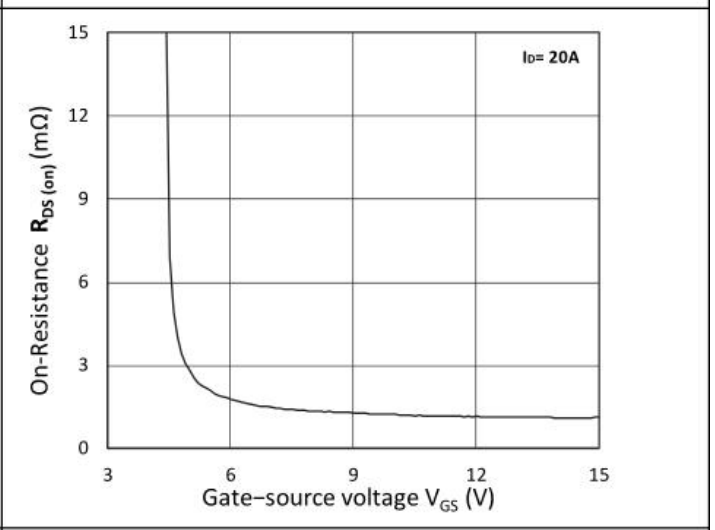


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

Typical Characteristics

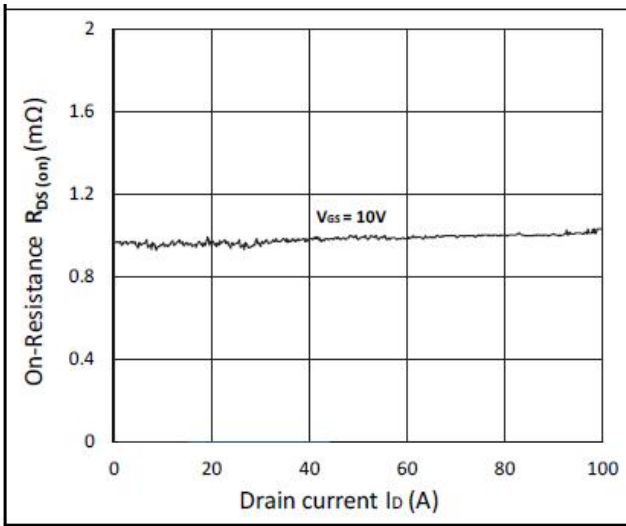


Figure 5. $R_{DS(ON)}$ vs. I_D

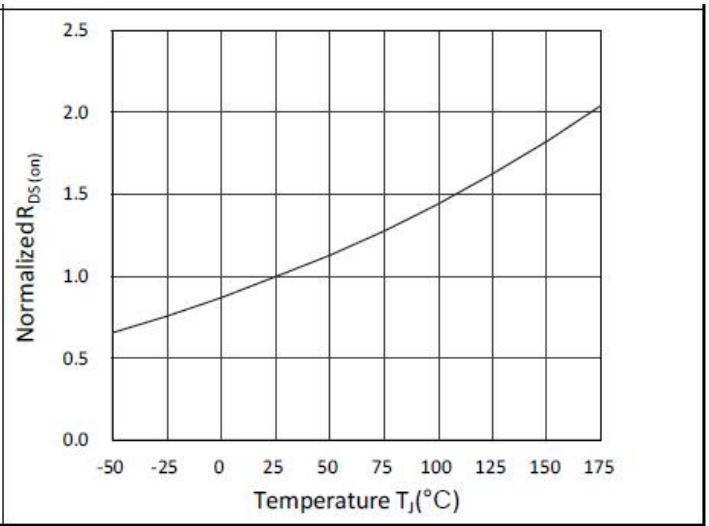


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

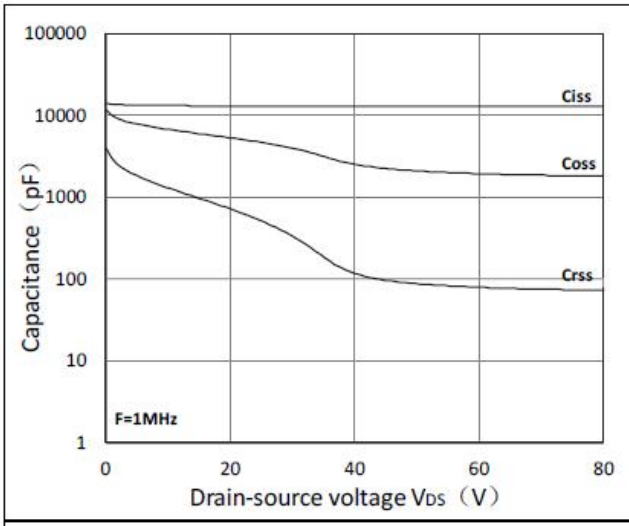


Figure 7. Capacitance Characteristics

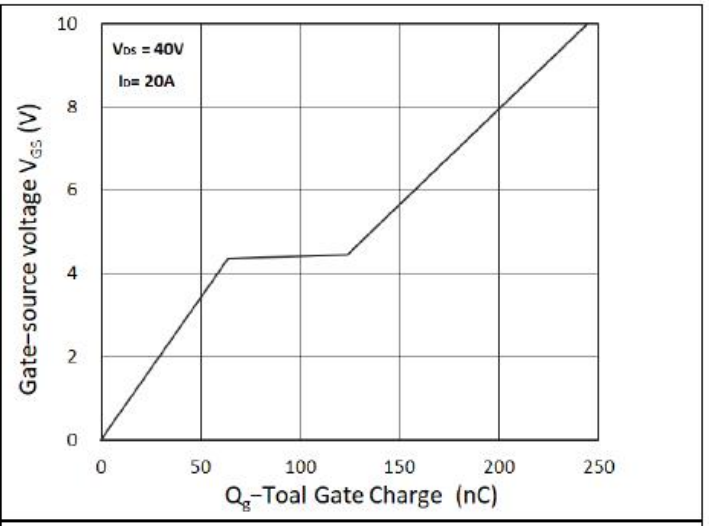


Figure 8. Gate Charge Characteristics

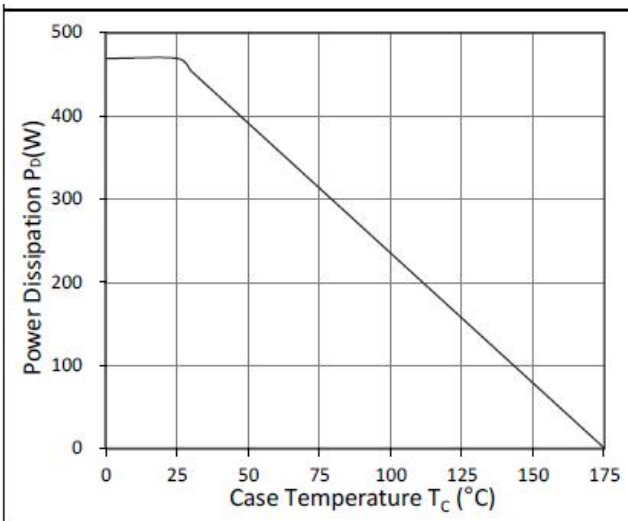


Figure 9. Power Dissipation

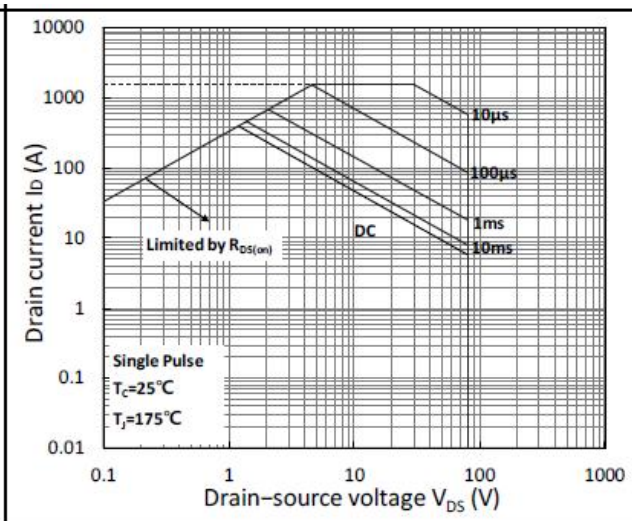


Figure10. Safe Operating Area

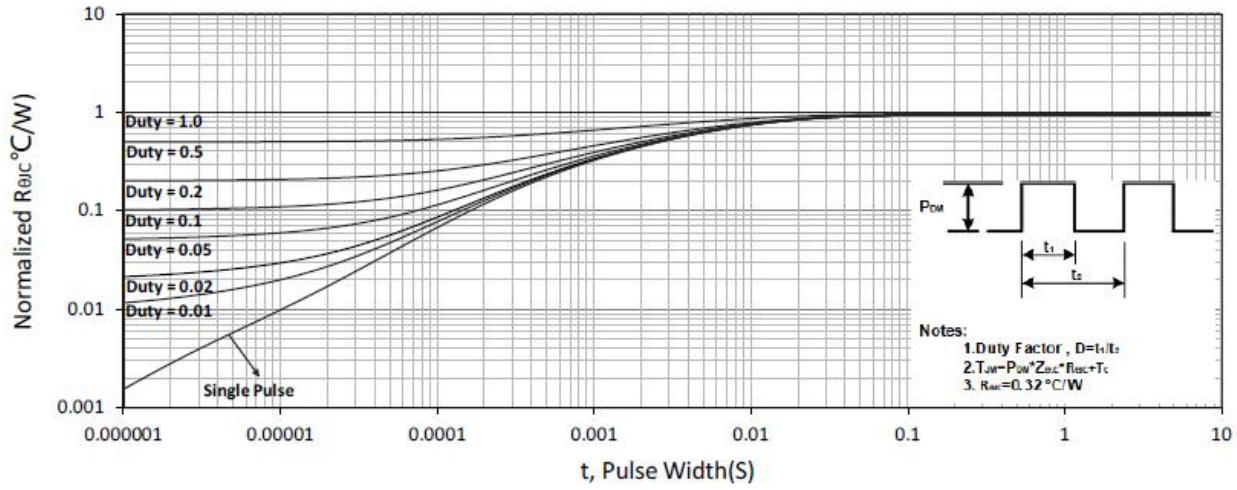


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

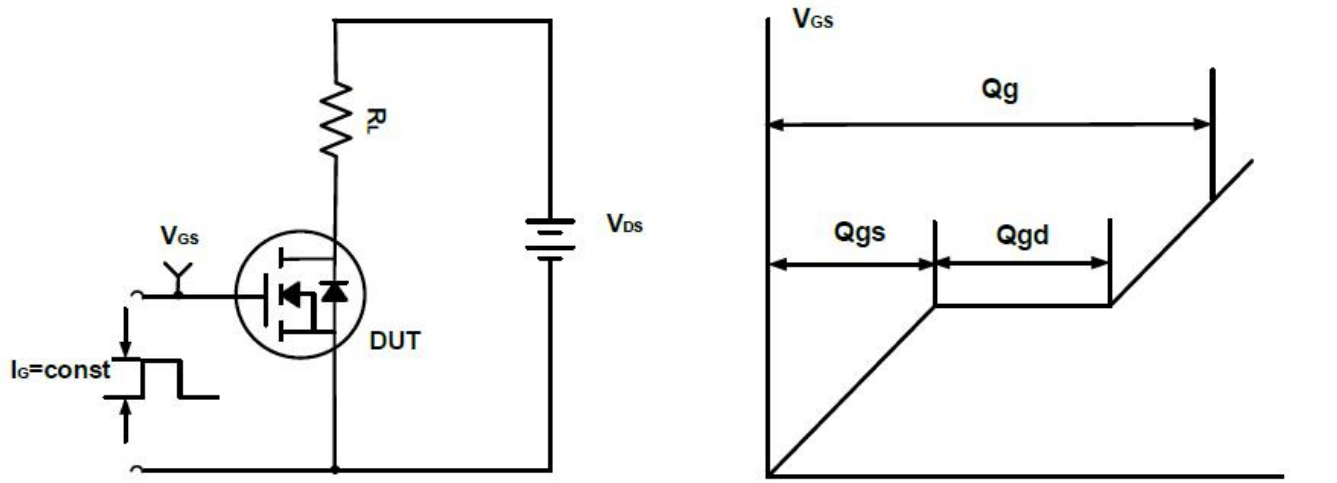


Figure A. Gate Charge Test Circuit & Wave forms

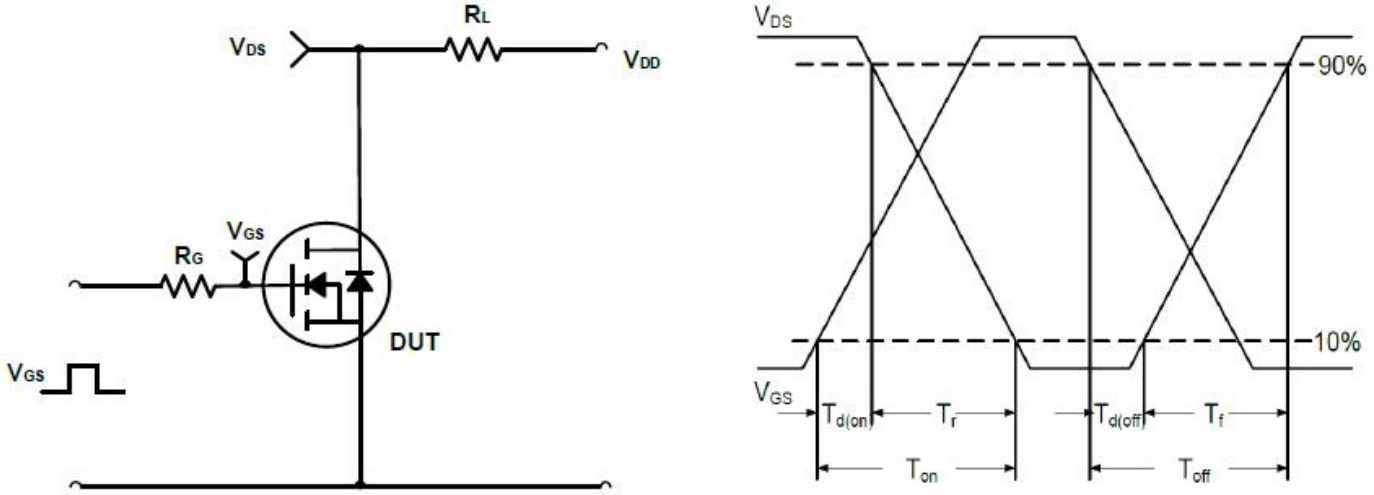


Figure B. Switching Test Circuit & Wave forms

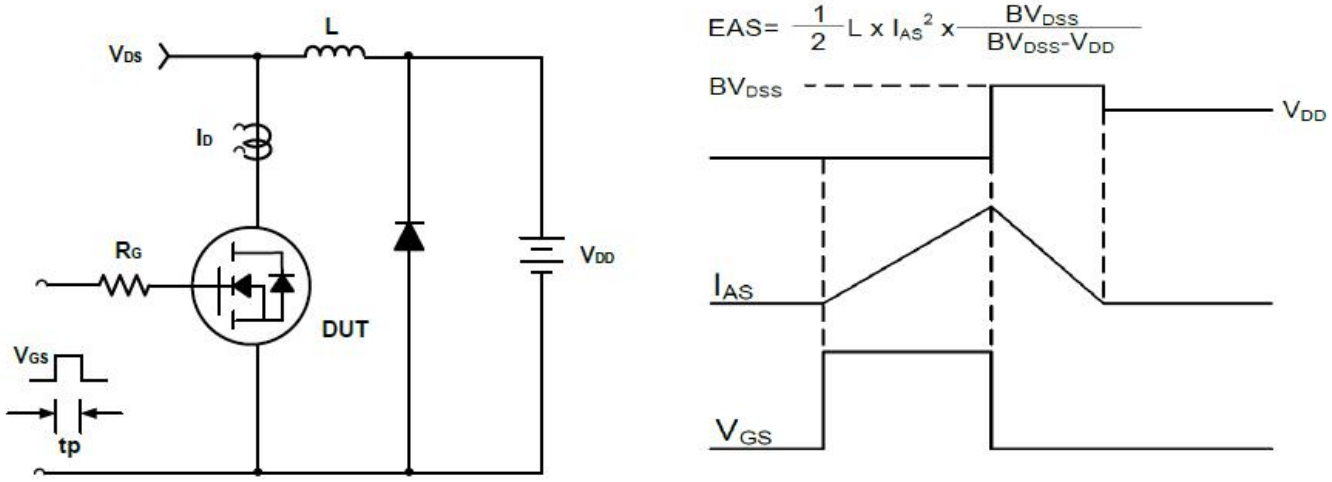
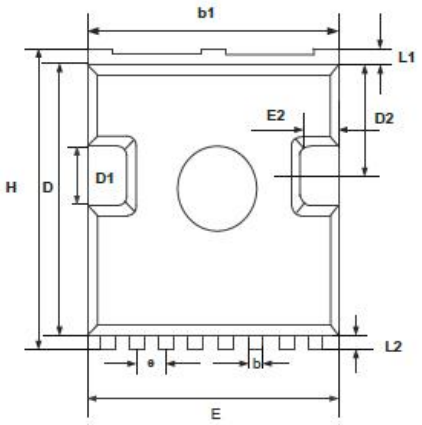
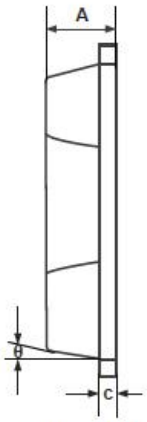


Figure C. Unclamped Inductive Switching Circuit & Wave forms

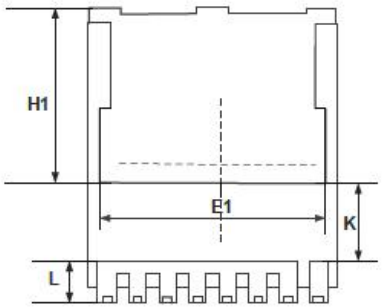
Package Dimensions TOLL-8L



TOP VIEW



SIDE VIEW



BOTTTOM VIEW

COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	2.20	2.40
b	0.60	0.90
b1	9.70	9.90
c	0.40	0.60
D	10.20	10.60
D1	3.10	3.50
D2	4.45	4.75
E	9.70	10.10
E1	7.80BSC	
E2	0.50	0.70
e	1.200 BSC	
H	11.45	11.90
H1	6.75 BSC	
K	3.10 REF	
L	1.70	2.10
L1	0.60	0.80
L2	0.50	0.70
θ	10° REF	

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