N-Ch 120V Fast Switching MOSFETs

Features

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

Product Summary

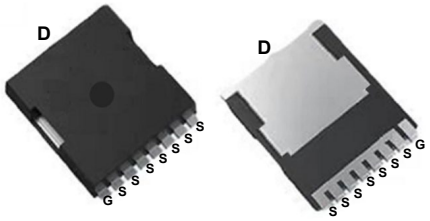
Green

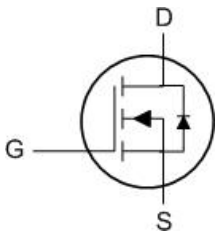
BVDSS	RDSON	ID
120V	2.1mΩ	250A

Applications

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

TOLL-8L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	250	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	158	A
I_{DM}	Pulsed Drain Current[2]	1000	A
EAS	Single Pulse Avalanche Energy[3]	1468	mJ
I_{AS}	Avalanche Current	---	A
P_D@T_C=25°C	Total Power Dissipation[4]	278	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	50	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	0.45	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	120	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10 V, I_D=98A	---	2.1	2.7	mΩ
		V_{GS}=4.5V , I_D=98A	---	---	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.0	3.0	4.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V, V_{GS}=0V , T_J=125℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=98A	---	222.6	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.6	---	Ω
Q_g	Total Gate Charge	V_{DS}=60V , V_{GS}=10V , I_D=98A	---	148.9	---	nC
Q_{gs}	Gate-Source Charge		---	61	---	
Q_{gd}	Gate-Drain Charge		---	28.9	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD} =60V, R_{G_ext}= 2.7Ω, V_{GS}=10V	---	45.3	---	ns
T_r	Rise Time		---	84.7	---	
$T_{d(off)}$	Turn-Off Delay Time		---	96.8	---	
T_f	Fall Time		---	47.4	---	
C_{iss}	Input Capacitance	V_{DS}=60V , V_{GS}=0V , f=1MHz	---	9847	---	pF
C_{oss}	Output Capacitance		---	1216	---	
C_{rss}	Reverse Transfer Capacitance		---	36	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	250	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=98A , T_J=25℃	---	---	1.4	V
t_{rr}	Reverse Recovery Time	IF=98A ,di/dt=100A / μs , T_J= 2 5 ℃	---	90.2	---	nS
Q_{rr}	Reverse Recovery Charge		---	276	---	nC

Typical Performance Characteristics

Fig 1: Output Characteristics

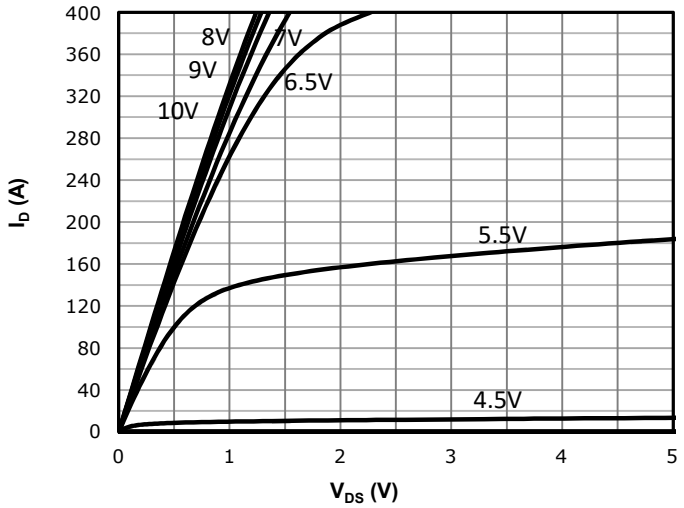


Fig 2: Transfer Characteristics

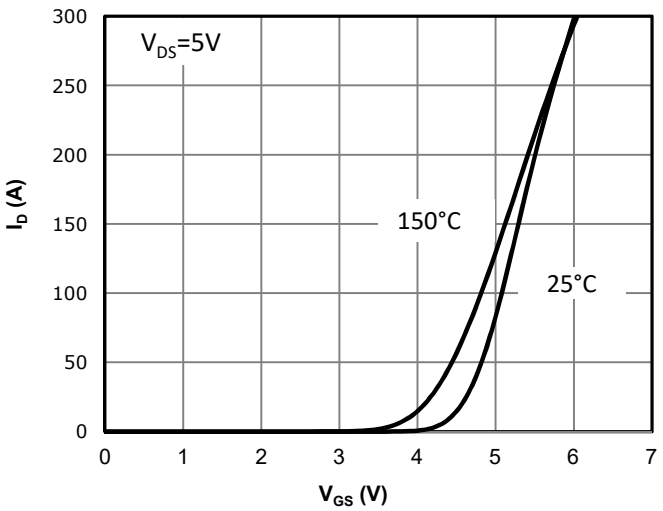


Fig 3: Rds(on) vs Drain Current and Gate Voltage

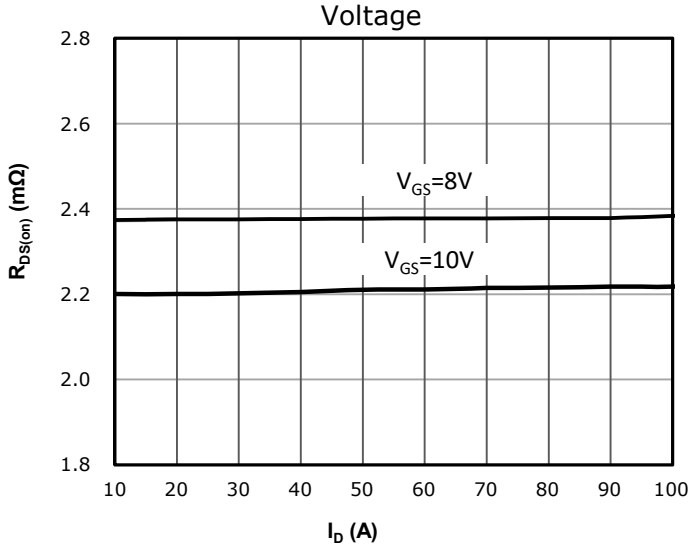


Fig 4: Rds(on) vs Gate Voltage

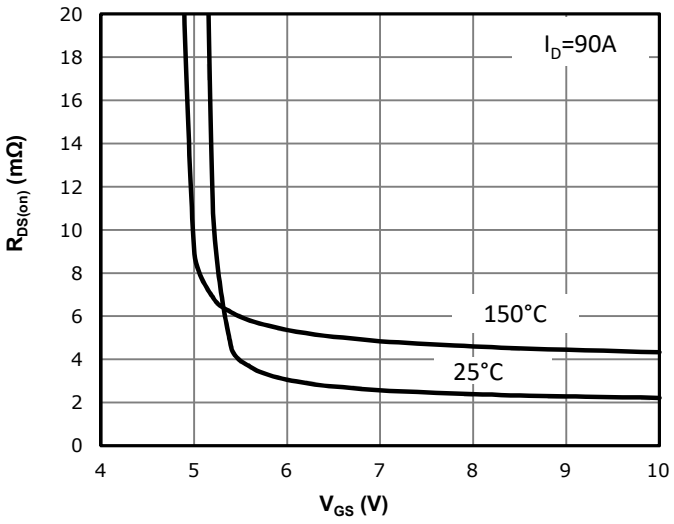


Fig 5: Rds(on) vs. Temperature

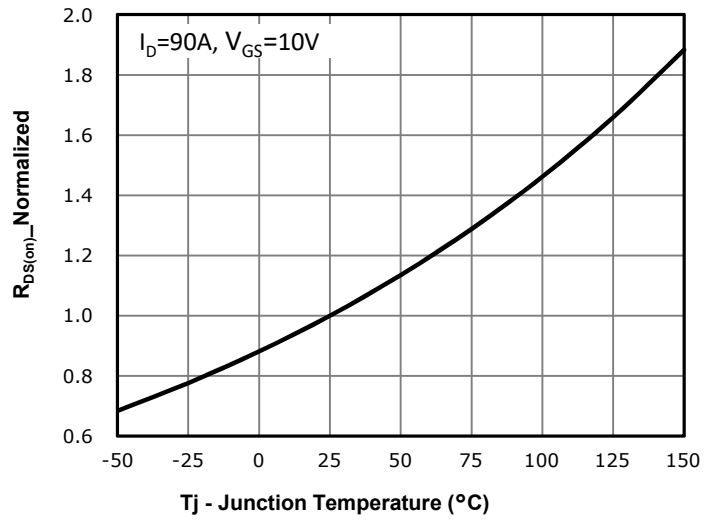


Fig 6: Vgs(th) vs. Temperature

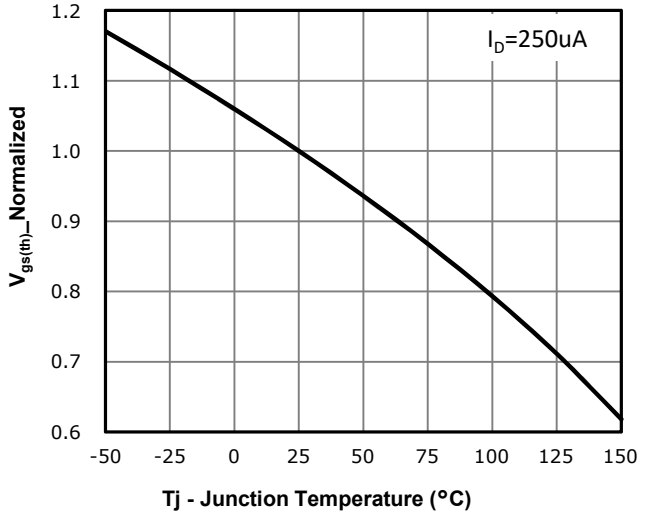


Fig 7: BVdss vs. Temperature

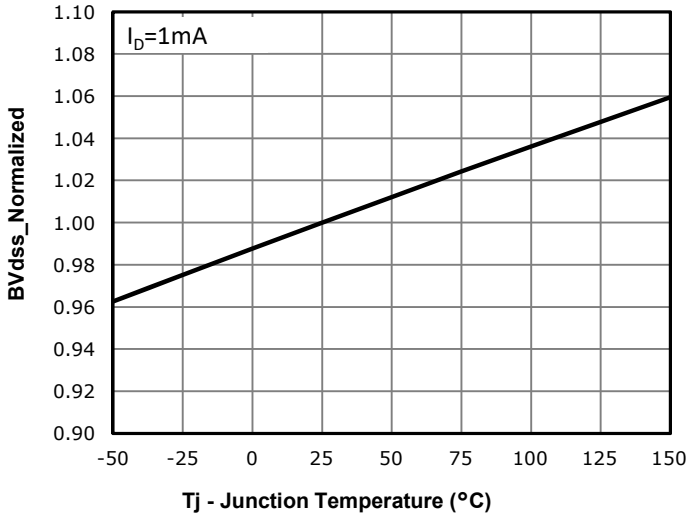


Fig 8: Capacitance Characteristics

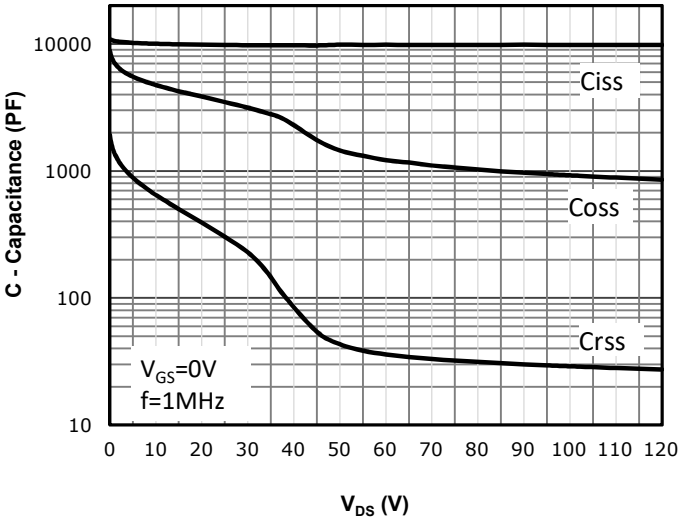


Fig 9: Gate Charge Characteristics

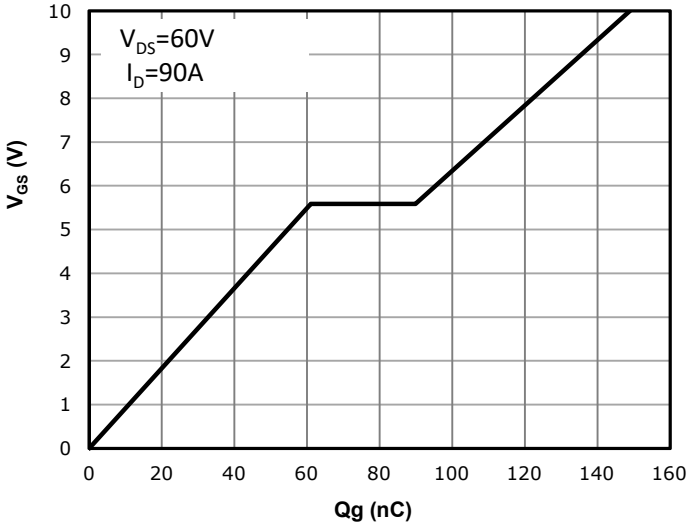


Fig 10: Body-diode Forward Characteristics

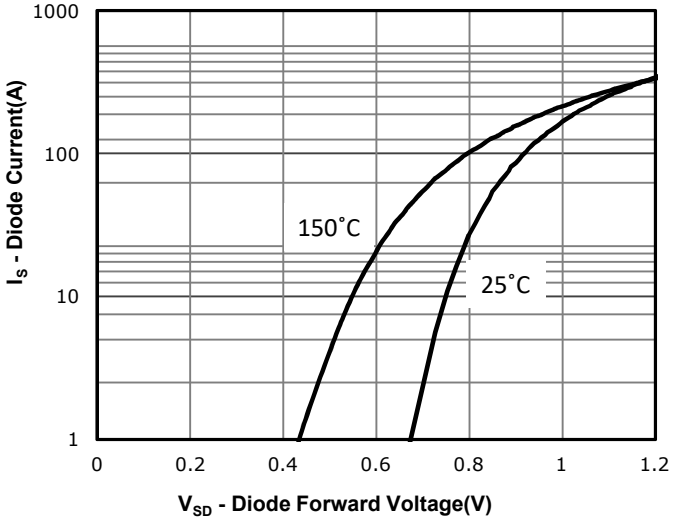


Fig 11: Power Dissipation

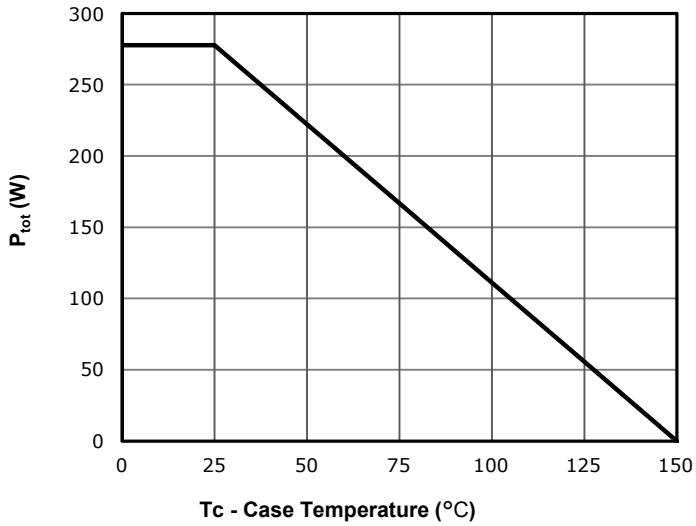


Fig 12: Drain Current Derating

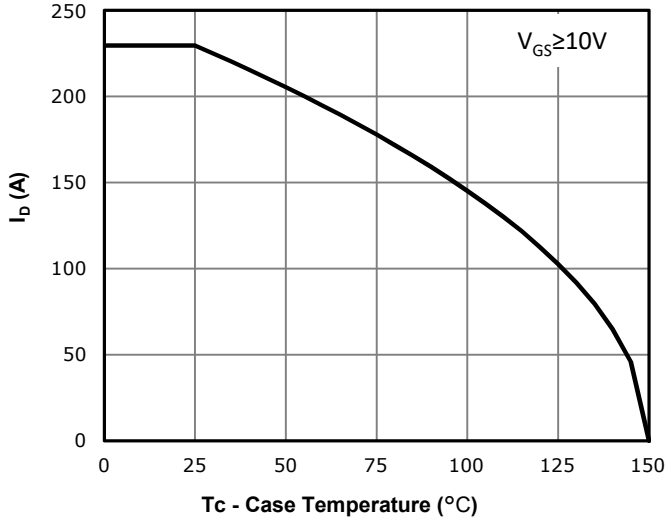


Fig 13: Safe Operating Area

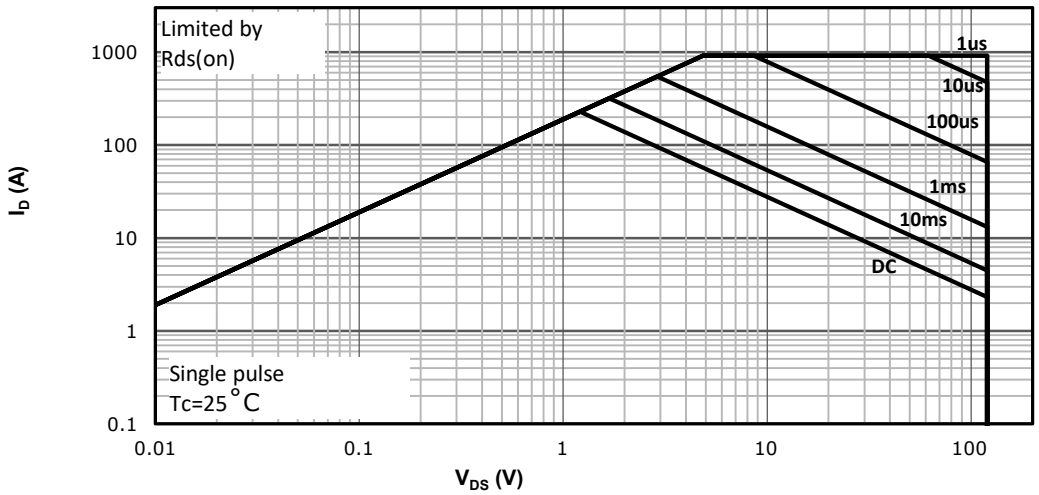
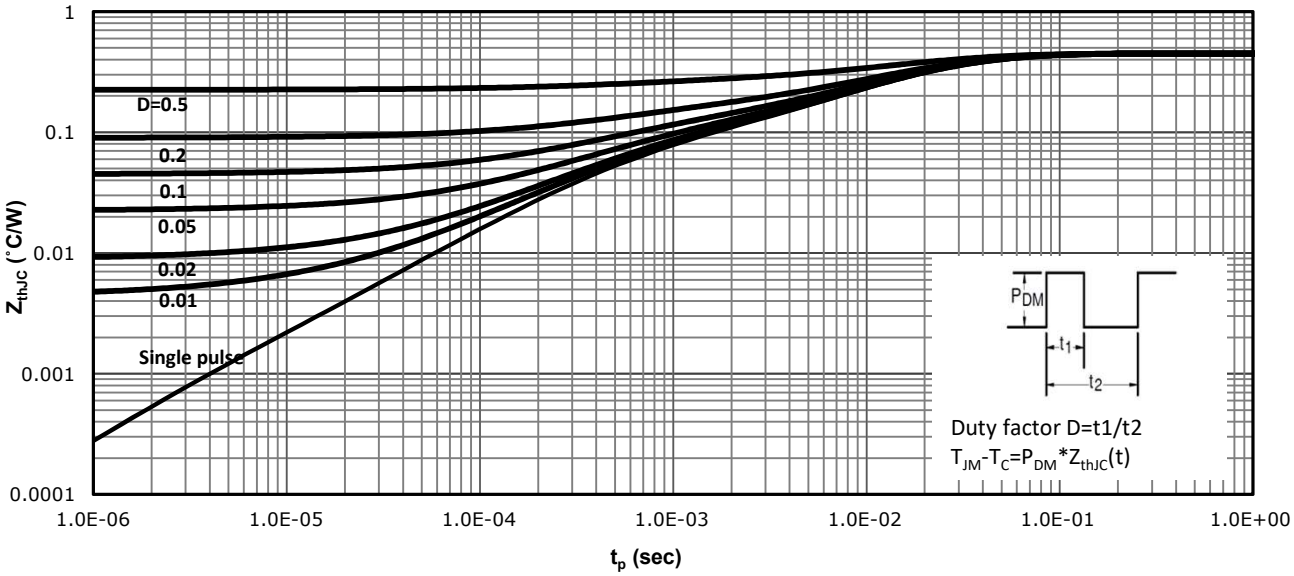
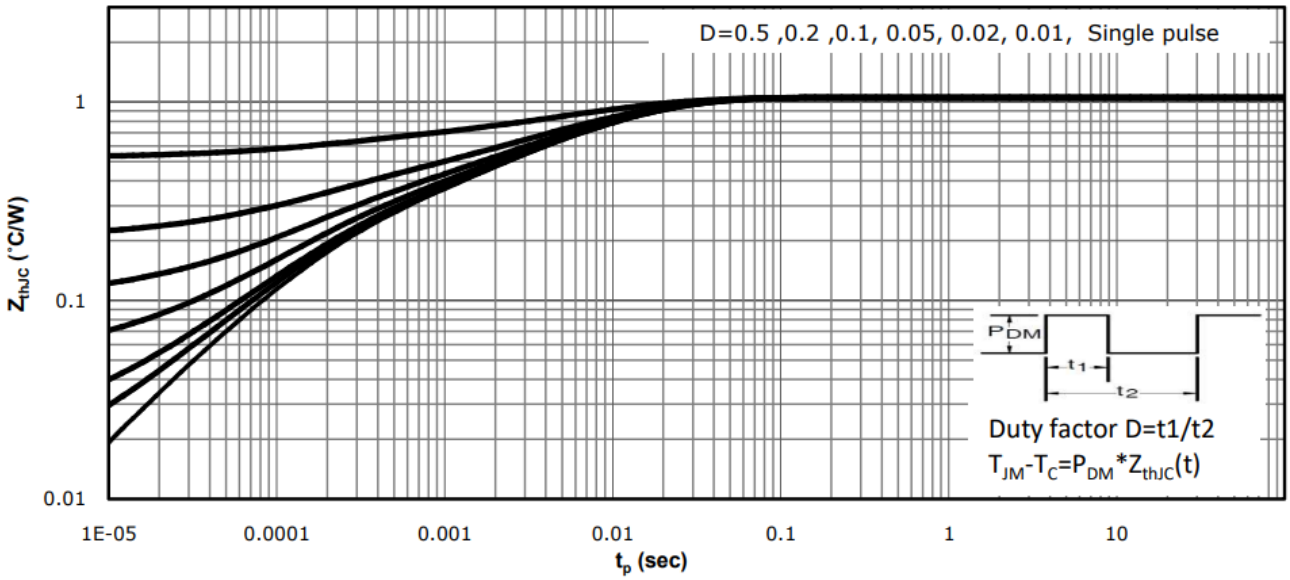


Fig 14: Max. Transient Thermal Impedance



Max. transient thermal impedance

$Z_{thJC}=f(t_p)$



Test Circuit

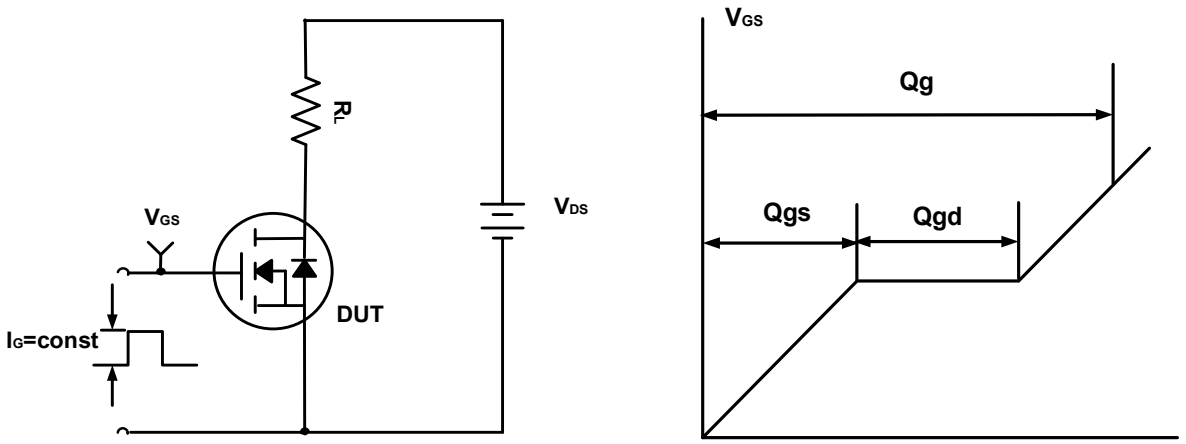


Figure A. Gate Charge Test Circuit & Waveforms

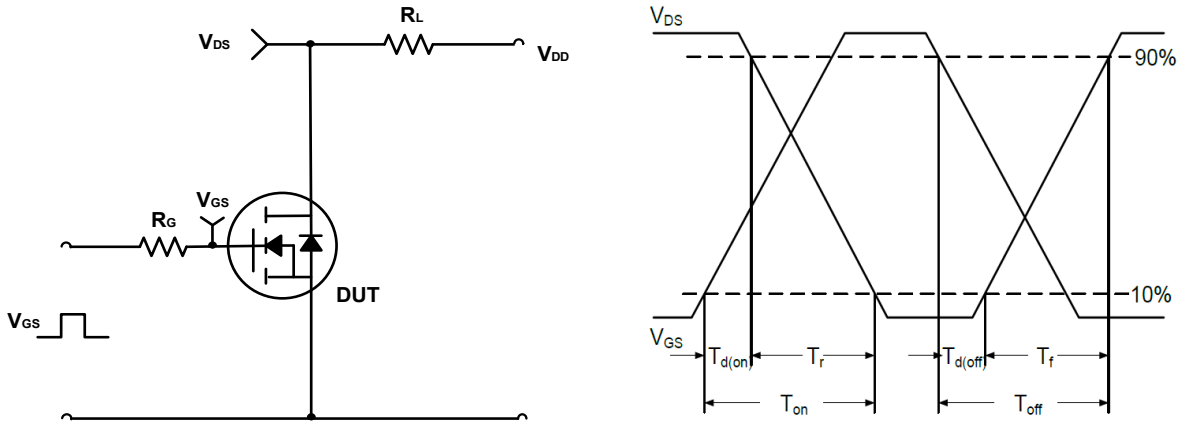


Figure B. Switching Test Circuit & Waveforms

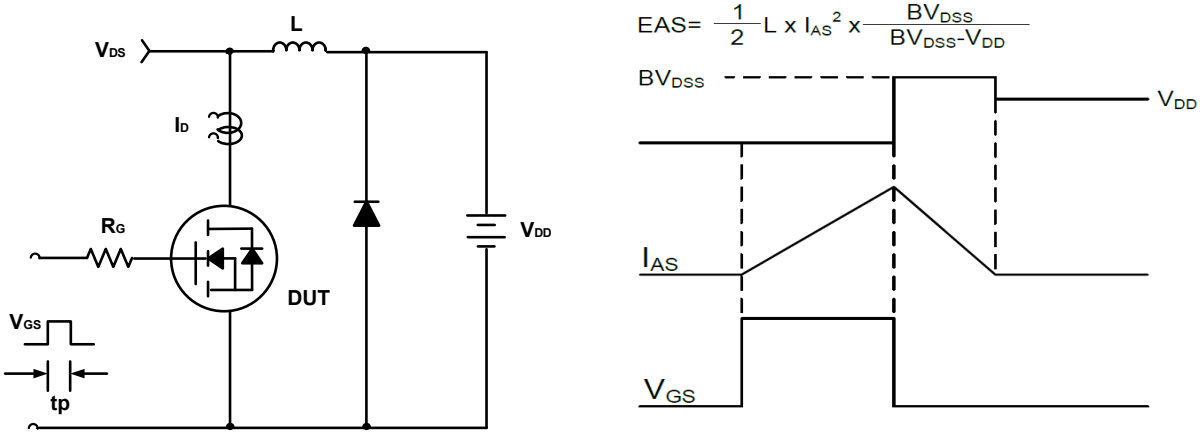
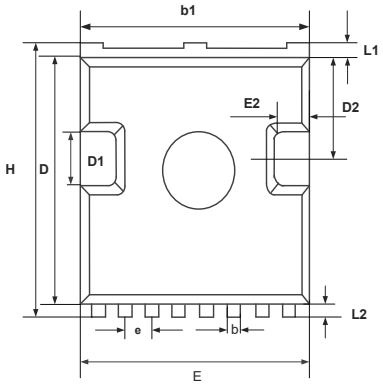
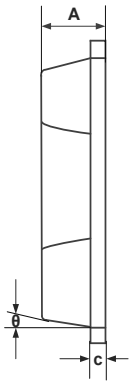


Figure C. Unclamped Inductive Switching Circuit & Waveforms

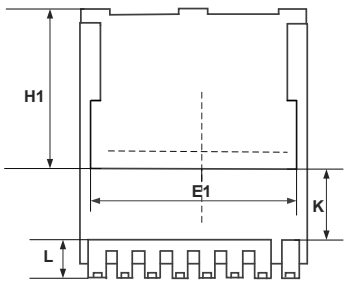
Mechanical Dimensions for TOLL-8L



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	