

### Features

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

### Product Summary

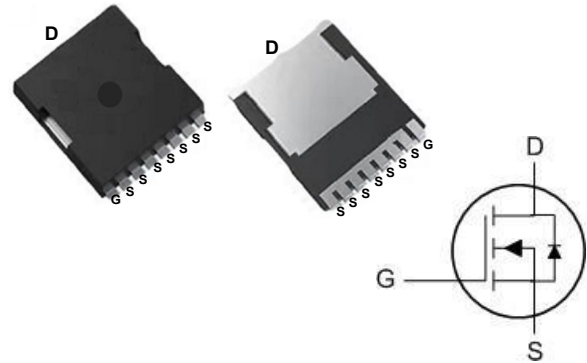


BVDSS	RDSON	ID
150V	3.2mΩ	200A

### 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	150	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	200	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	125	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	800	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	1155	mJ
$I_{AS}$	Avalanche Current	68	A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	340	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	60	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	0.36	$^\circ C/W$

### Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	150	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	---	---	V/°C
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =90A	---	3.2	4.0	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2	3	4	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	---	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =150V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =150V, V <sub>GS</sub> =0V, T <sub>J</sub> =100°C	---	---	100	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =90A	---	145.7	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	4	---	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =75V, V <sub>GS</sub> =10V, I <sub>D</sub> =90A	---	19.9	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	32.1	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	19	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =10V, V <sub>DD</sub> =75V, R <sub>G</sub> =2.7Ω, I <sub>D</sub> =60A	---	24.6	---	ns
T <sub>r</sub>	Rise Time		---	111.1	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	58.3	---	
T <sub>f</sub>	Fall Time		---	109.5	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =75V, V <sub>GS</sub> =0V, f=1MHz	---	4930	---	pF
C <sub>oss</sub>	Output Capacitance		---	722	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	21	---	

### Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,4</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	200	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =60A, T <sub>J</sub> =25°C	---	---	1.4	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =90A, di/dt=100A/μs	---	97.9	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge	μs, T <sub>J</sub> =25°C	---	326.0	---	nC

#### Notes:

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C
2. The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=75V, V<sub>GS</sub>=10V, L=0.5mH, I<sub>AS</sub>=68A.
3. The data tested by surface mounted on a 1 inch<sup>2</sup> 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 Performance Characteristics

Fig 1: Output Characteristics

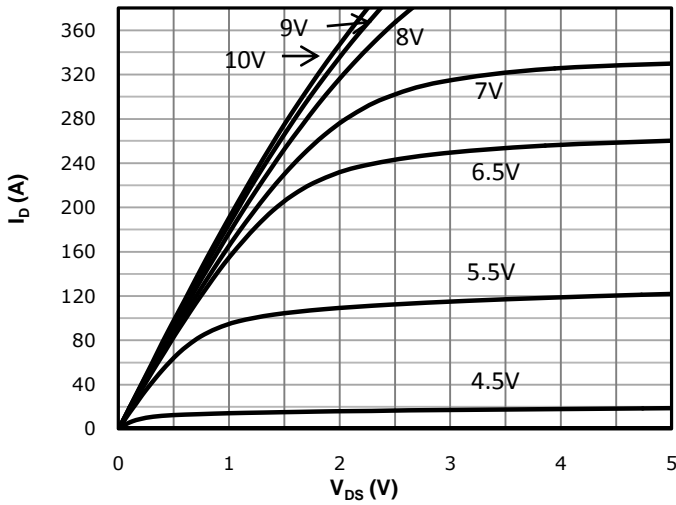


Fig 2: Transfer Characteristics

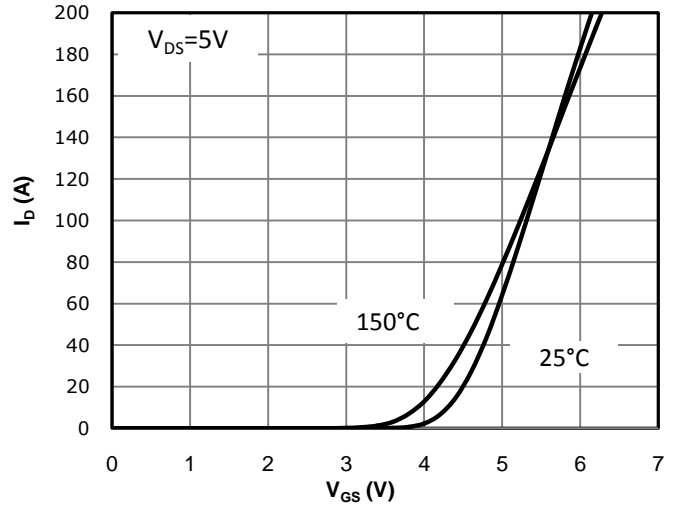


Fig 3:  $R_{DS(on)}$  vs Drain Current and Gate Voltage

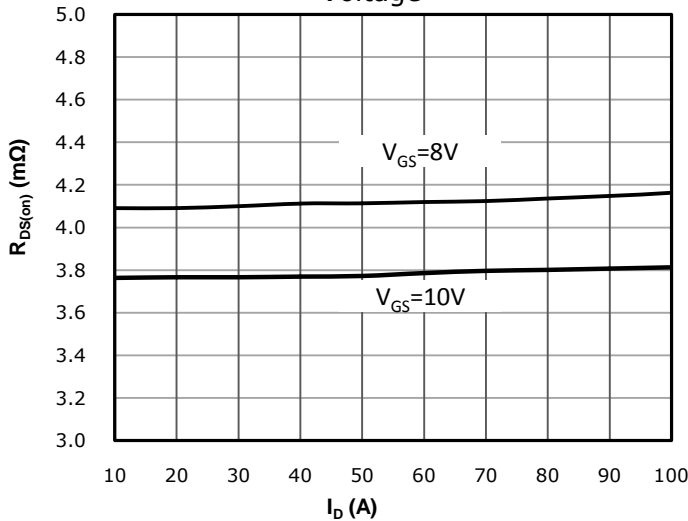


Fig 4:  $R_{DS(on)}$  vs Gate Voltage

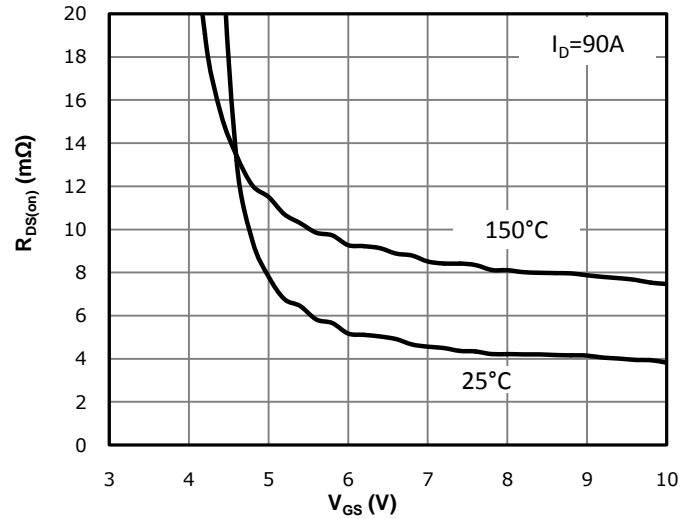


Fig 5:  $R_{DS(on)}$  vs. Temperature

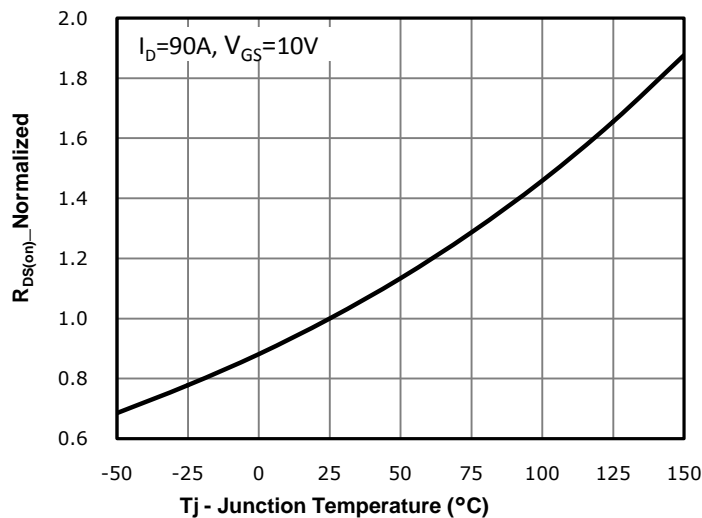


Fig 6:  $V_{GS(th)}$  vs. Temperature

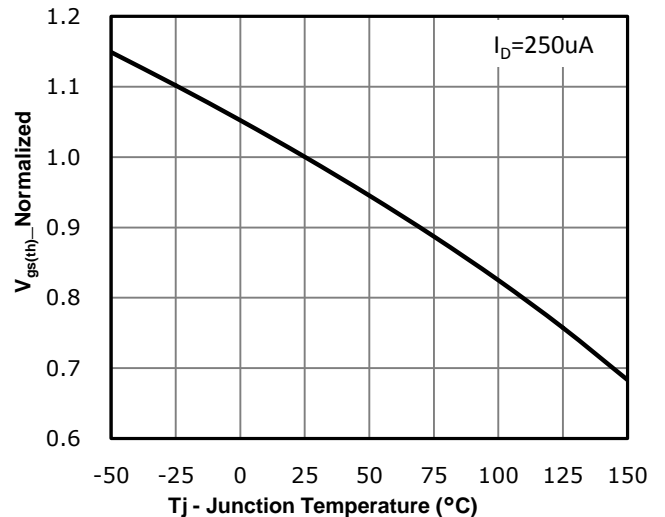


Fig 7: BVdss vs. Temperature

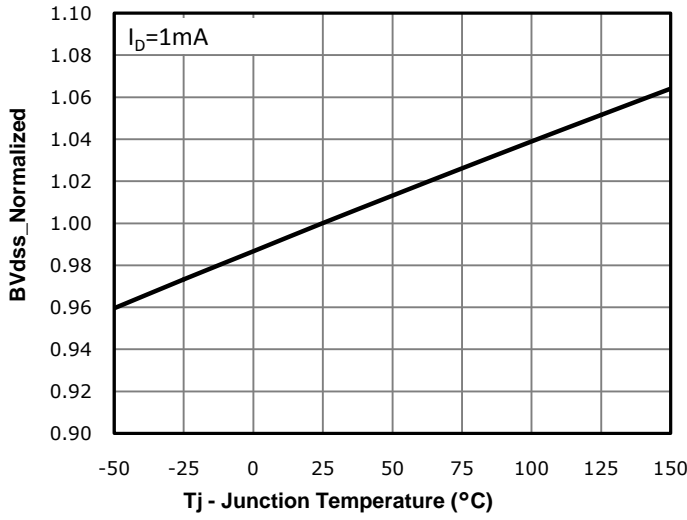


Fig 8: Capacitance Characteristics

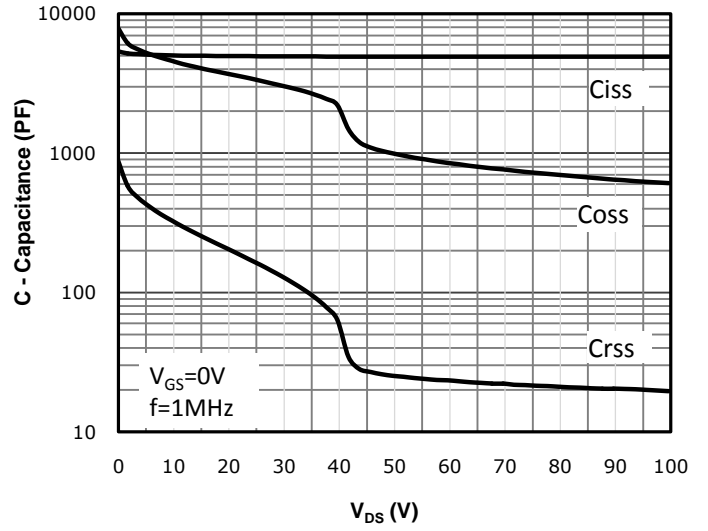


Fig 9: Gate Charge Characteristics

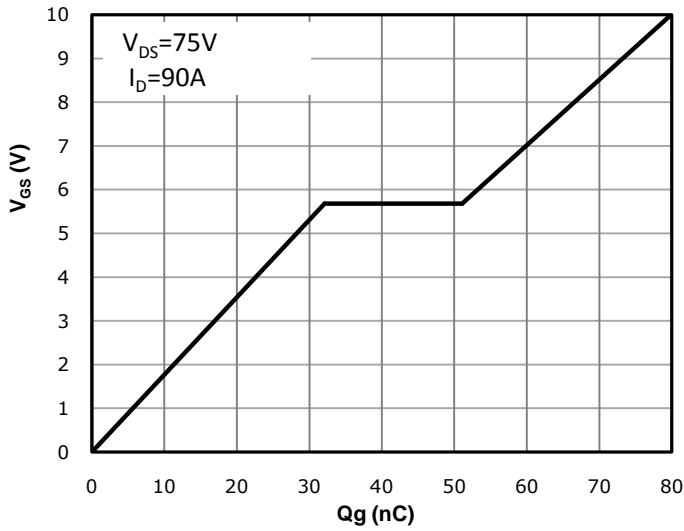


Fig 10: Body-diode Forward Characteristics

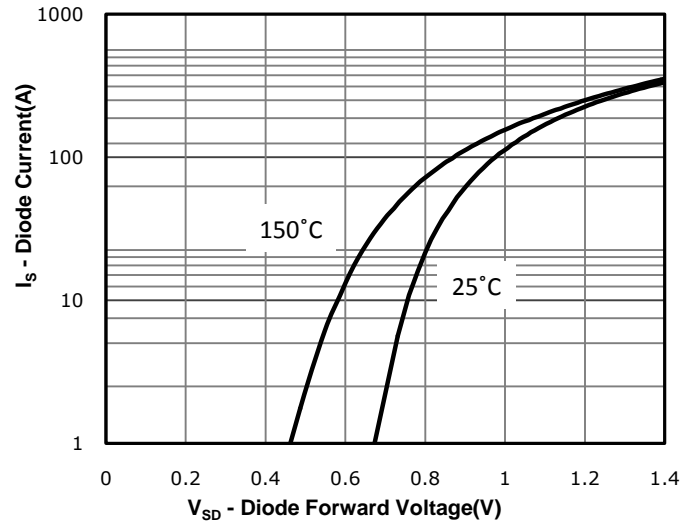


Fig 11: Power Dissipation

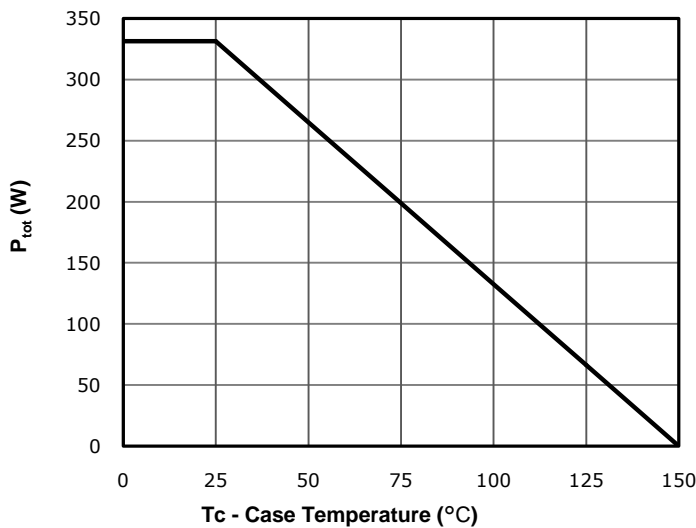


Fig 12: Drain Current Derating

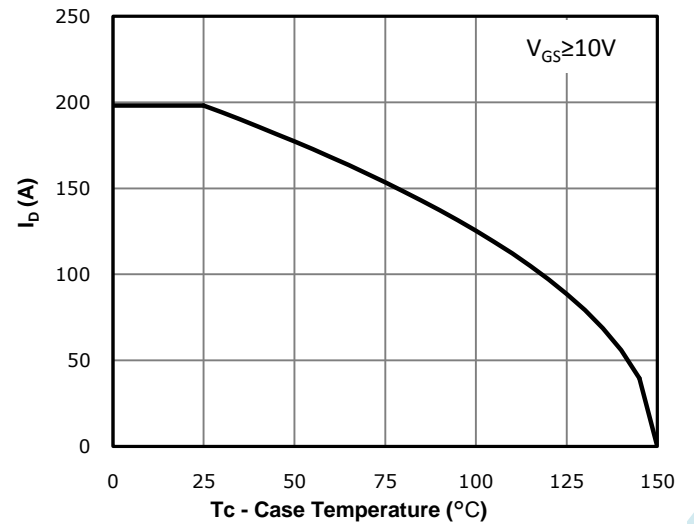


Fig 13: Safe Operating Area

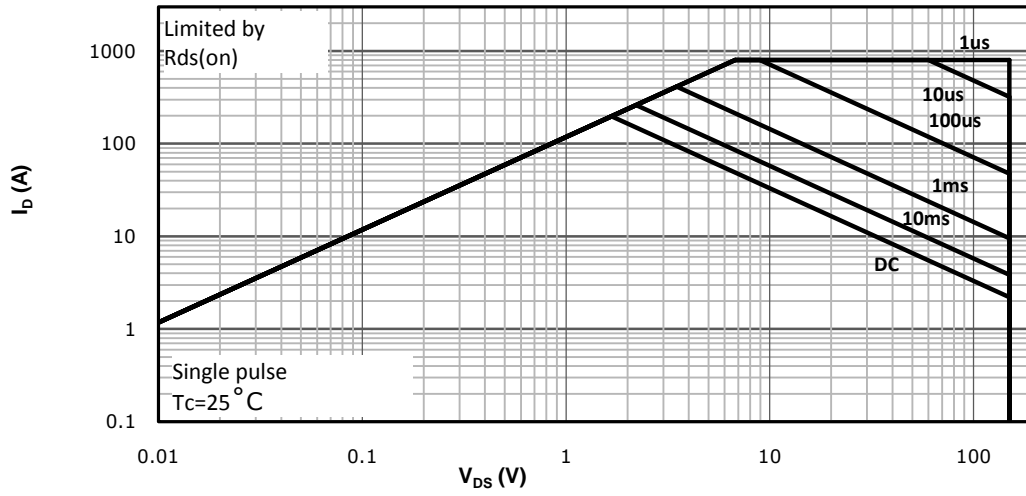
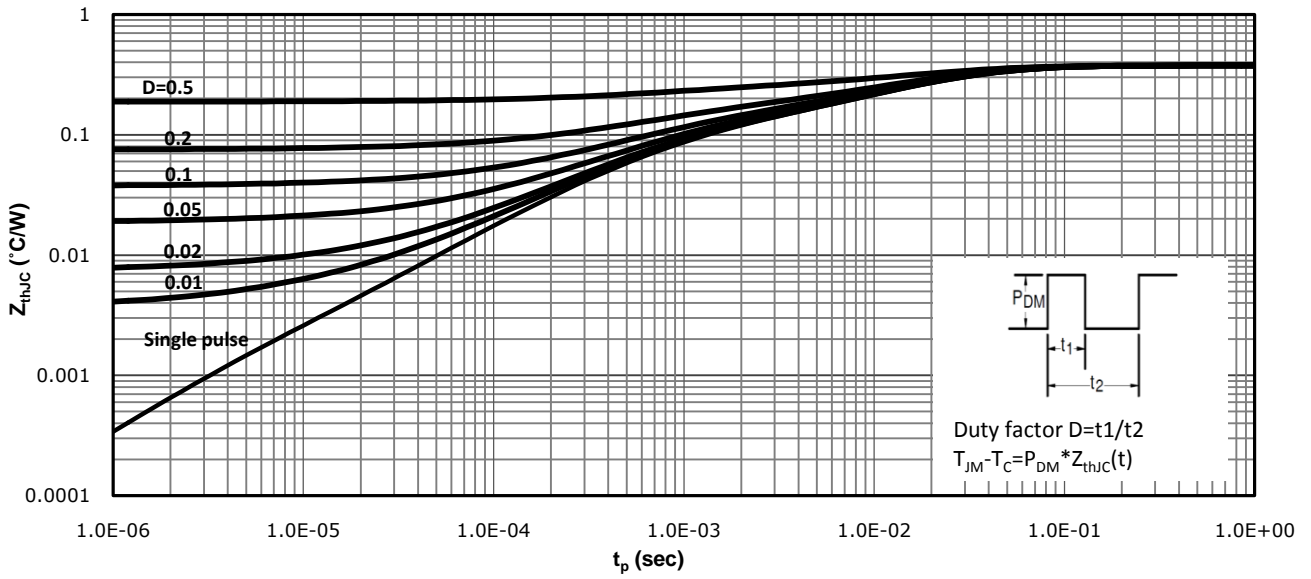
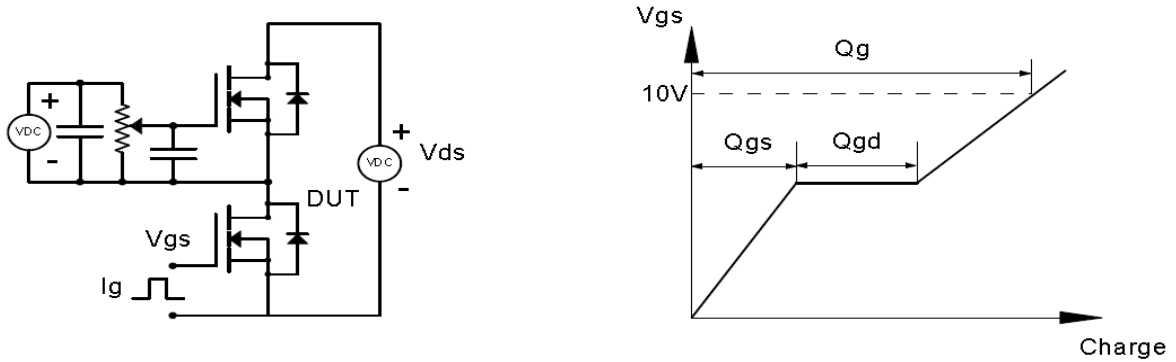


Fig 14: Max. Transient Thermal Impedance

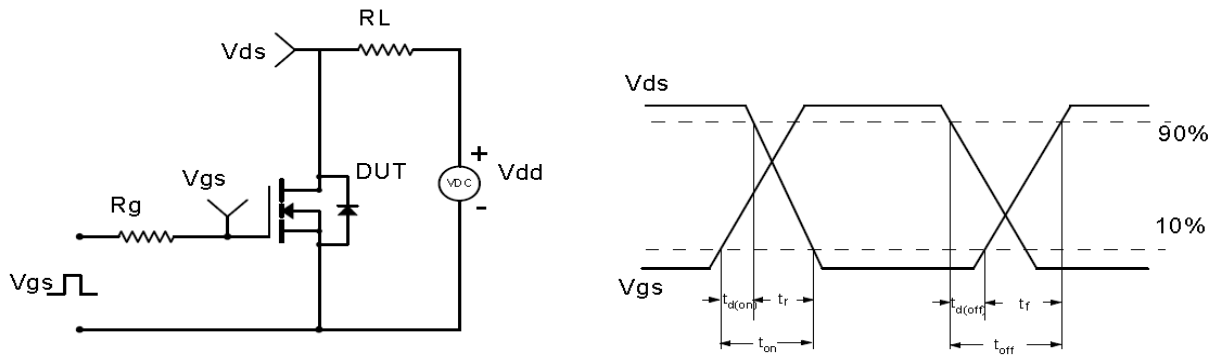


### Test Circuit & Waveform

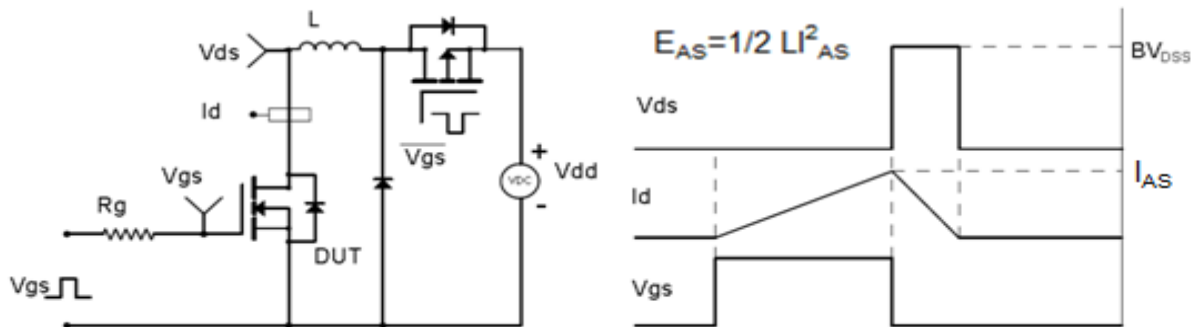
Gate Charge Test Circuit & Waveform



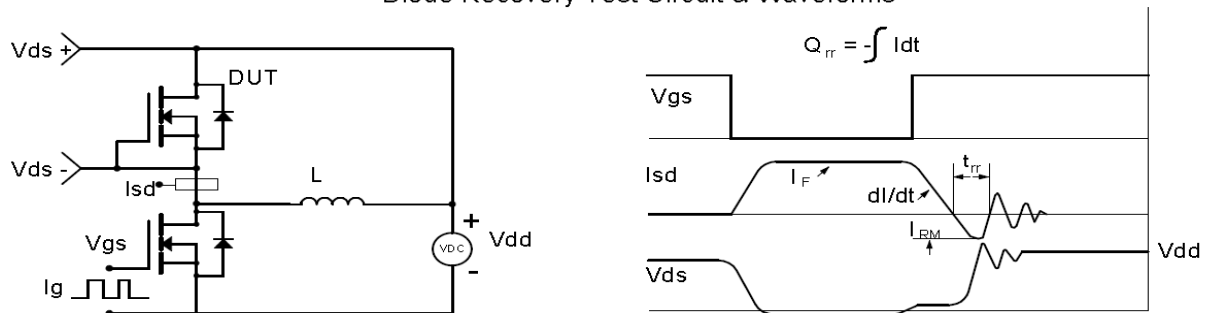
Resistive Switching Test Circuit & Waveforms



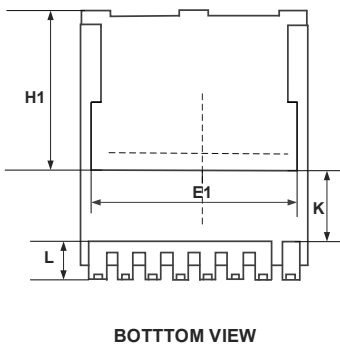
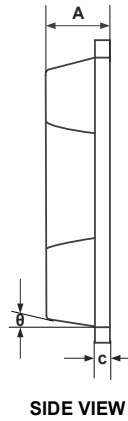
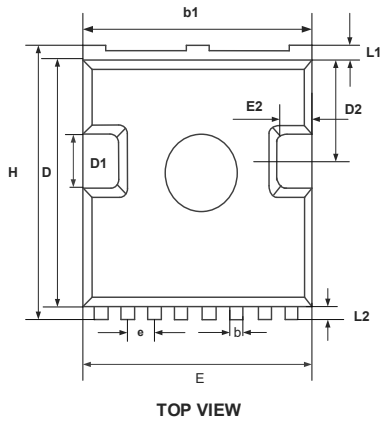
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



### Mechanical Dimensions for TOLL-8L



### COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	2.20	2.40
b	0.60	0.90
$b_1$	9.70	9.90
c	0.40	0.60
D	10.20	10.60
$D_1$	3.10	3.50
$D_2$	4.45	4.75
E	9.70	10.10
$E_1$	7.80BSC	
$E_2$	0.50	0.70
e	1.200 BSC	
H	11.45	11.90
$H_1$	6.75 BSC	
K	3.10 REF	
L	1.70	2.10
$L_1$	0.60	0.80
$L_2$	0.50	0.70
$\theta$	10° REF	