

Features

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

Applications

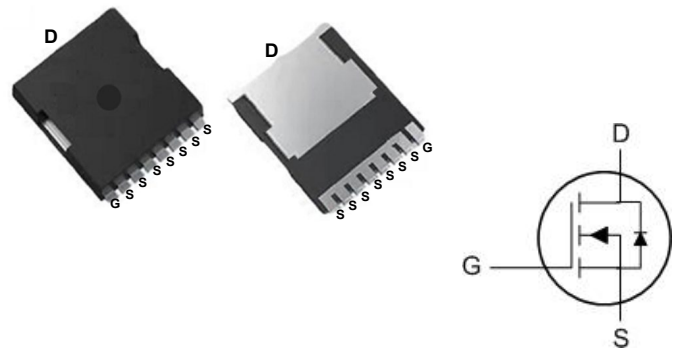
- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

Product Summary



BVDSS	RDSON	ID
80V	1.6mΩ	320A

TOLL-8L Pin Configuration



■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	320	A
	$T_C=100^\circ\text{C}$		196	
Pulsed Drain Current ¹		I_{DM}	1240	A
Single Pulse Avalanche Energy ²		E_{AS}	625	mJ
Total Power Dissipation	$T_C=25^\circ\text{C}$	P_D	347.2	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	$R_{\theta JA}$	40	$^\circ\text{C/W}$
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	0.36	$^\circ\text{C/W}$

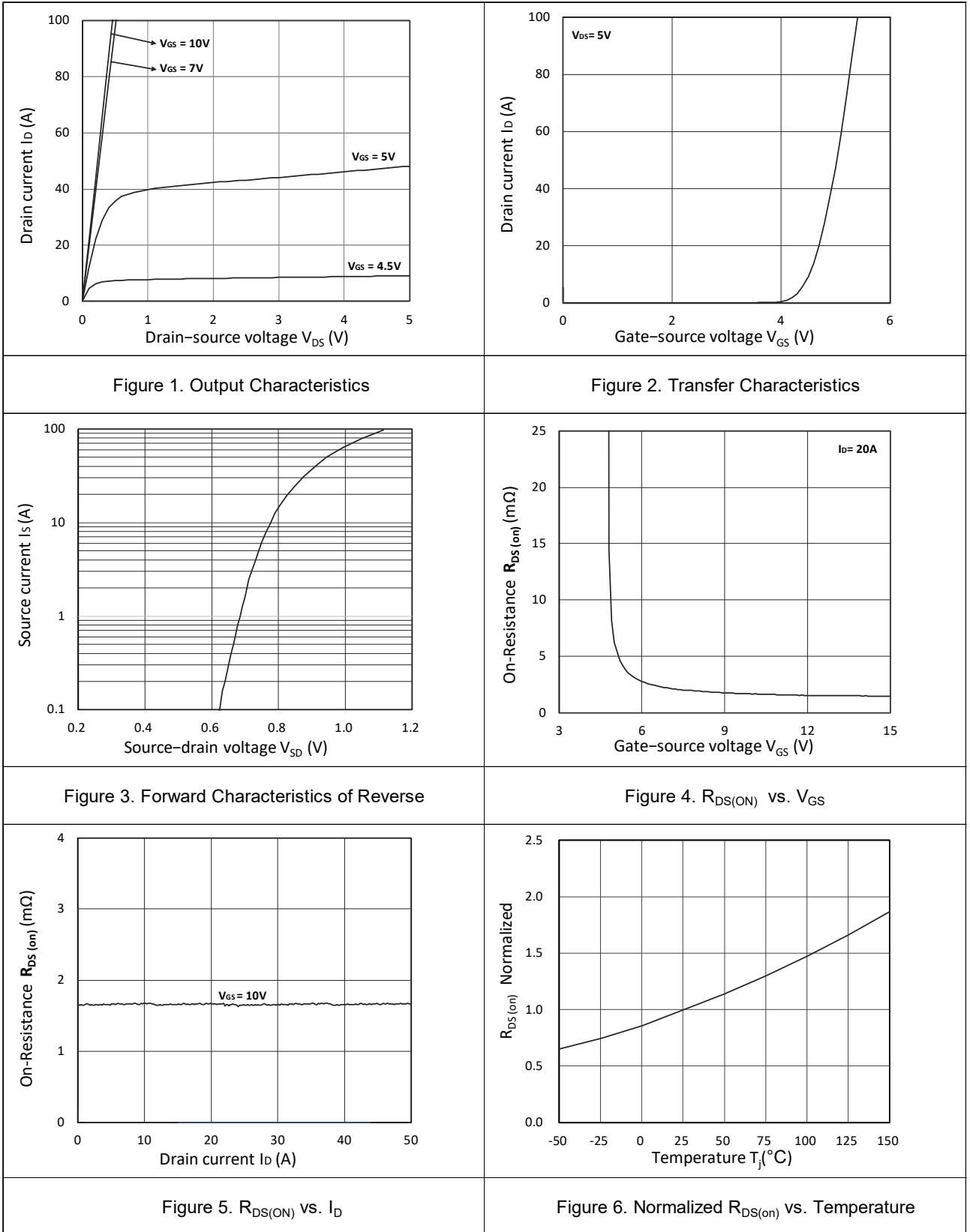
Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	80	-	-	V
Gate-body Leakage current		I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^{\circ}C$	I_{DSS}	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	μA
	$T_J=100^{\circ}C$			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source on-Resistance ⁴		$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	1.6	2	m Ω
Forward Transconductance ⁴		g_{fs}	$V_{DS} = 10V, I_D = 20A$	-	70	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C_{iss}	$V_{DS} = 40V, V_{GS} = 0V, f = 1MHz$	-	8980	-	pF
Output Capacitance		C_{oss}		-	1560	-	
Reverse Transfer Capacitance		C_{rss}		-	90	-	
Gate Resistance		R_g	f=1MHz	-	2.4	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q_g	$V_{GS} = 10V, V_{DS} = 40V, I_D = 20A$	-	140	-	nC
Gate-Source Charge		Q_{gs}		-	37.5	-	
Gate-Drain Charge		Q_{gd}		-	37.5	-	
Turn-on Delay Time		$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 40V, R_G = 3\Omega, I_D = 20A$	-	27.5	-	ns
Rise Time		t_r		-	82	-	
Turn-off Delay Time		$t_{d(off)}$		-	85	-	
Fall Time		t_f		-	52	-	
Body Diode Reverse Recovery Time		t_{rr}	$I_F = 20A, di/dt = 100A/\mu s$	-	98	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	166	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V_{SD}	$I_S = 20A, V_{GS} = 0V$	-	-	1.2	V
Continuous Source Current	$T_C = 25^{\circ}C$	I_S	-	-	-	320	A

Note:

- The maximum current rating is package limited.
- Repetitive rating; pulse width limited by max. junction temperature.
- $V_{DD} = 32V, R_G = 25\Omega, L = 0.5mH$, starting $T_J = 25^\circ\text{C}$.
- P_D is based on max. junction temperature, using junction-case thermal resistance.
- The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a = 25^\circ\text{C}$.

Typical Characteristics



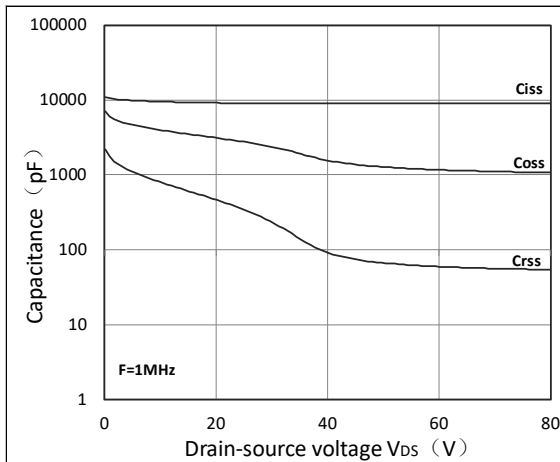


Figure 7. Capacitance Characteristics

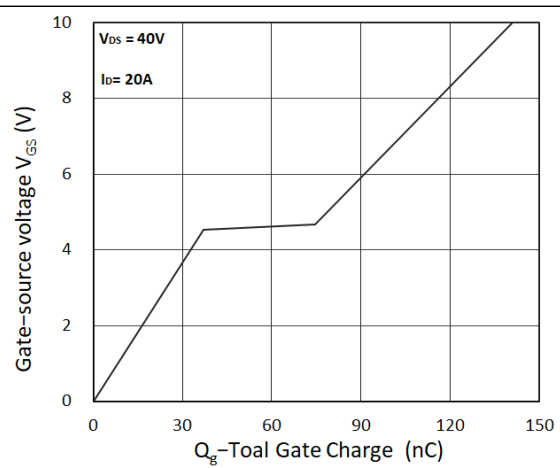


Figure 8. Gate Charge Characteristics

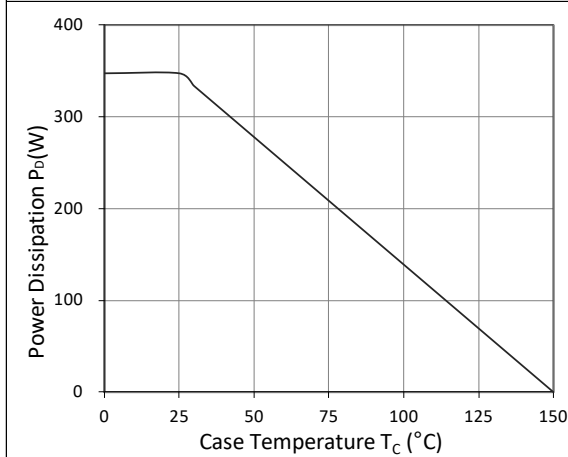


Figure 9. Power Dissipation

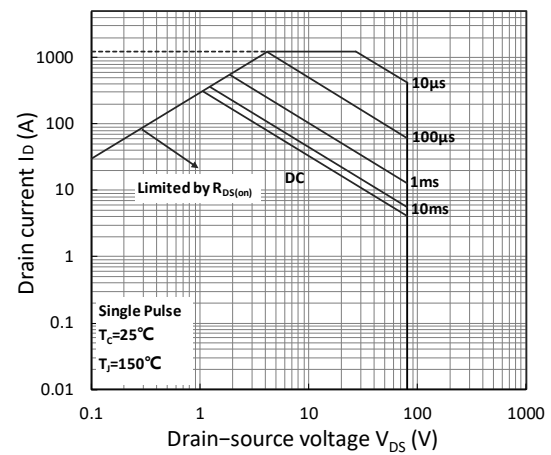


Figure 10. Safe Operating Area

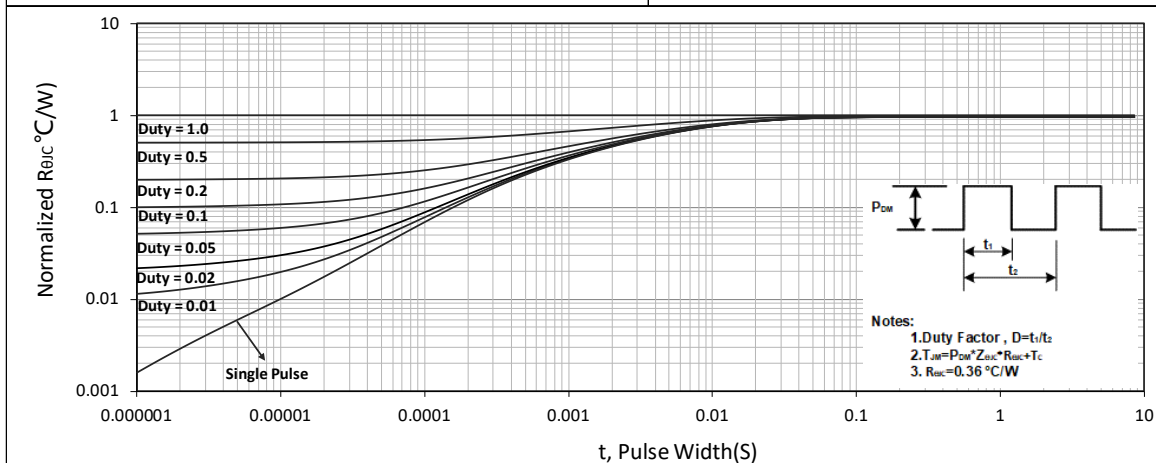


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

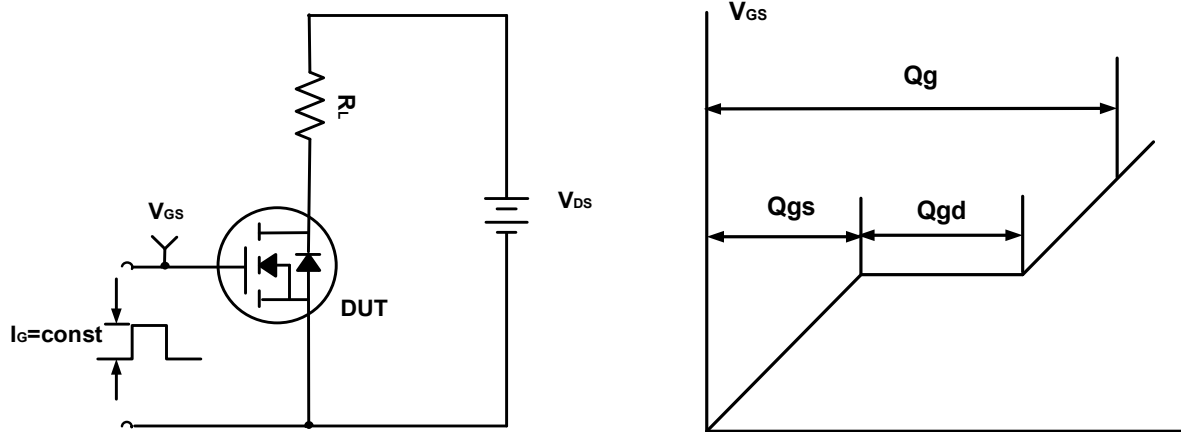


Figure A. Gate Charge Test Circuit & Waveforms

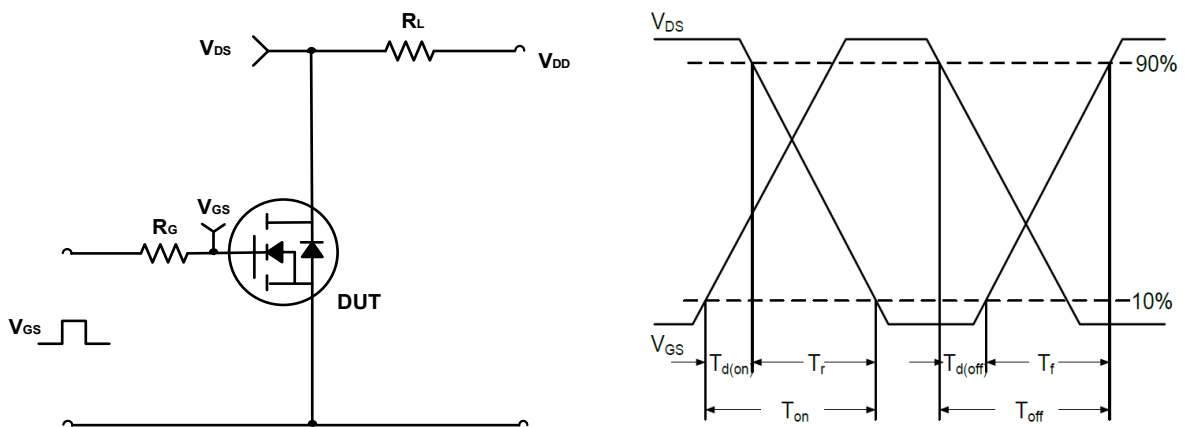


Figure B. Switching Test Circuit & Waveforms

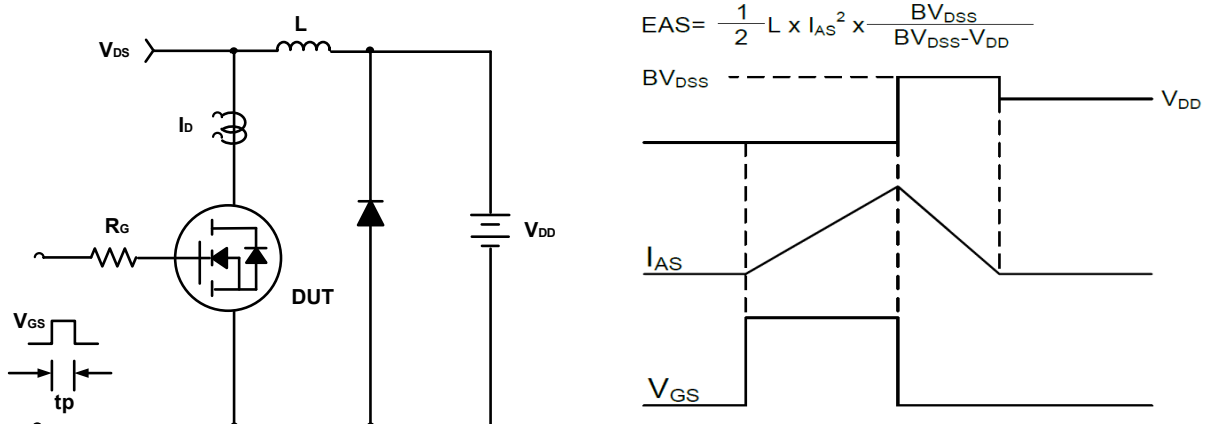
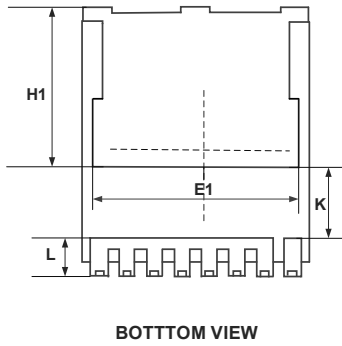
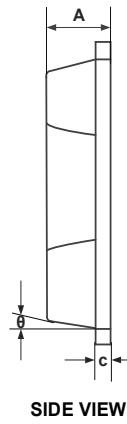
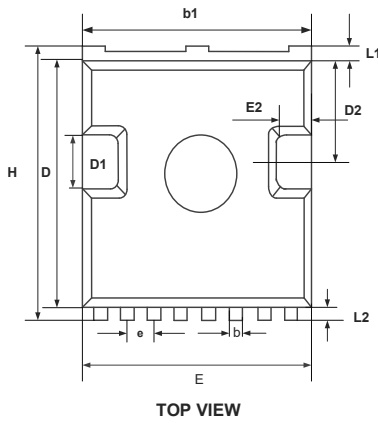


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for TOLL-8L



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	