Features

★ Split Gate Trench MOSFET technology
★ Excellent package for heat dissipation
★ High density cell design for low RDS(ON)

Product Summary

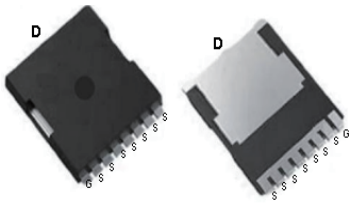
RoHS

BVDSS	RDSON	ID
40V	1.0mΩ	300A

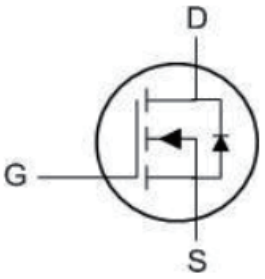
Applications

★ DC-DC Converters
★ Power management functions
★ Power management functions

TOLL Pin Configuration



TOLL



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current （Silicon limited）	300	A
I_D@T_C=25℃	Continuous Drain Current[1]	200	A
I_D@T_C=100℃	Continuous Drain Current[1]	82	A
I_{DM}	Pulsed Drain Current[2]	690	A
EAS	Single Pulse Avalanche Energy[3]	500	mJ
P_D	Total Power Dissipation[4]	220	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	35	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.0	℃/W

Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
	TOLL-8L				20000	

Electrical Characteristics (T_J =25 °C unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Static Parameter						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_D=250μA	40	48	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V,V_{GS}=0V	---	---	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}= ±20V, V_{DS}=0V	---	---	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.2	1.8	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}= 10V, I_D=20A	---	1.0	1.4	mΩ
		V_{GS}= 4.5V, I_D=20A	---	1.6	2.3	
R_g	Gate Resistance	V_{GS}=0V,V_{DS} Open,f=1MHZ	---	2.7	---	Ω
I_S	Maximum Body-Diode Continuous Current		---	---	300	A
Dynamic Parameters						
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V,f=300KHZ	---	8300	---	pF
C_{oss}	Output Capacitance		---	1510	---	
C_{rss}	Reverse Transfer Capacitance		---	130	---	
Switching Parameters						
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=32V,I_D=20A	---	127	---	nC
Q_{gs}	Gate-Source Charge		---	35	---	
Q_{gd}	Gate-Drain Charge		---	26	---	
Q_{rr}	Reverse Recovery Chrage	I_F=25A, di/dt=100A/us	---	163	---	
t_{rr}	Reverse Recovery Time		---	100	---	ns
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V,V_{DD}=20V,I_D=25A R_{GEN}=2Ω	---	22.5	---	
t_r	Turn-on Rise Time		---	6.7	---	
$t_{d(off)}$	Turn-off Delay Time		---	80.3	---	
t_f	Turn-off fall Time		---	26.9	---	

Notes:
1.A.The maximum current rating is package limited.
2.Repetitive rating; pulse width limited by max. junction temperature.
3.V_{DD}=32 V, RG=25 Ω, L=0.5mH, starting T_j=25 °C.
4.PD is based on max. junction temperature, using junction-case thermal resistance.
5.The value of RθJA is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with Ta=25 °C.

Typical Electrical and Thermal Characteristics (Curves)

Figure1: Output Characteristics

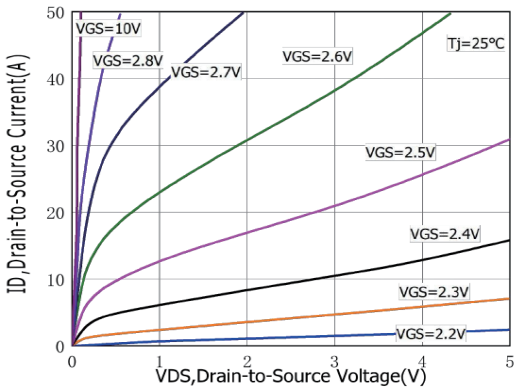


Figure 2: TypicalGateChargevsGatetoSou

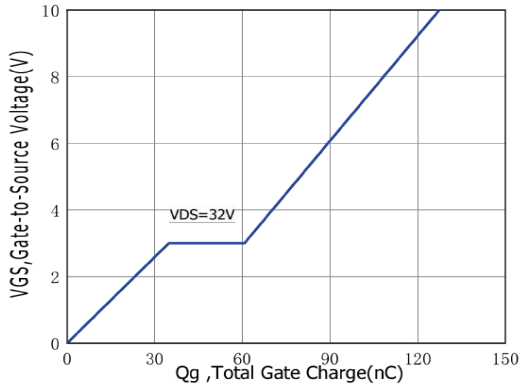


Figure 3:TypicalBodyDiodeTransferChara

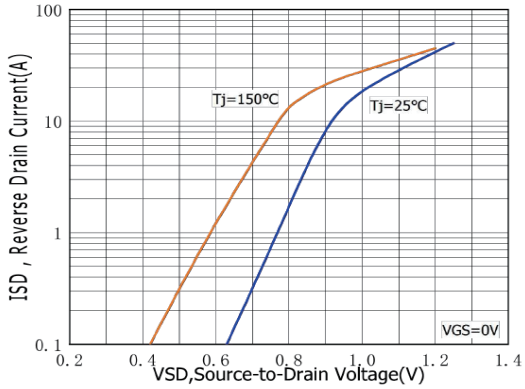


Figure 4: TypicalCapacitancevsDraintoSo

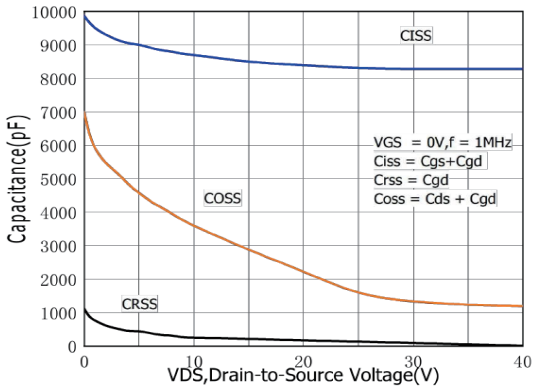


Figure 5: TypicalBreakdownVoltagevsJu Temperature

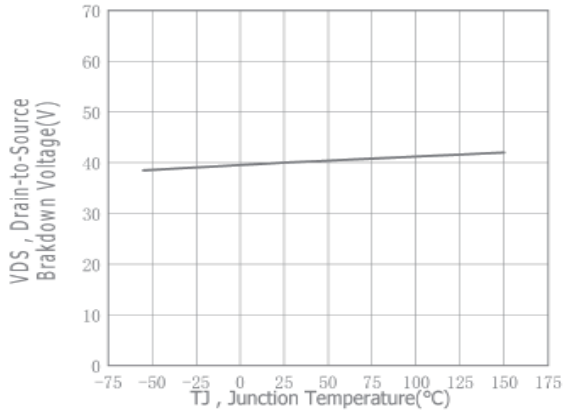
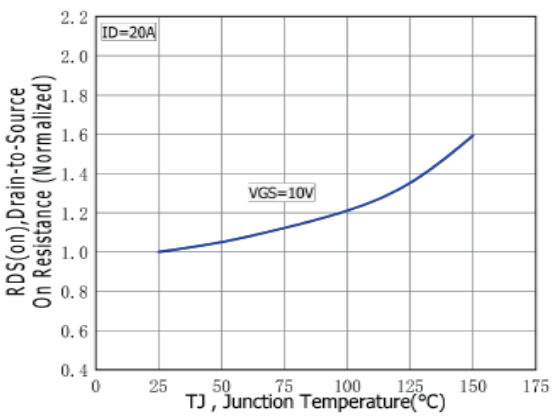


Figure 6:TypicalDraintoSourceonResistan vsJunctionTemperature



Typical Performance Characteristics

Figure 7:MaximumForwardBiasSafeOper

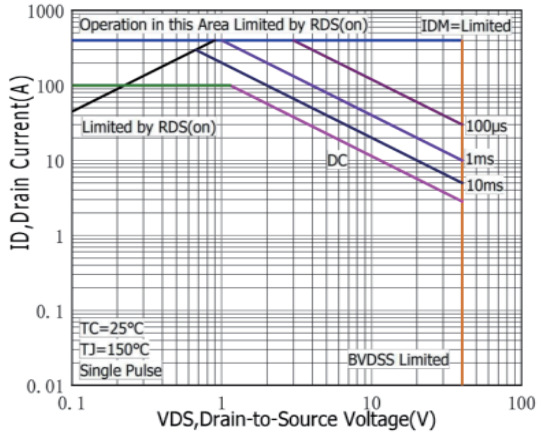


Figure 8:TypicalDraintoSourceONResista

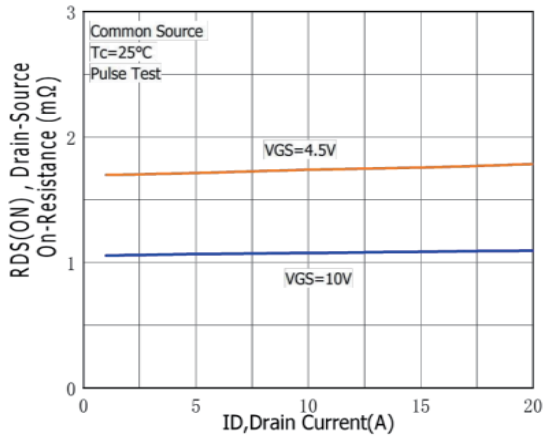


Figure 9:MaximumEASvsChannelTemper

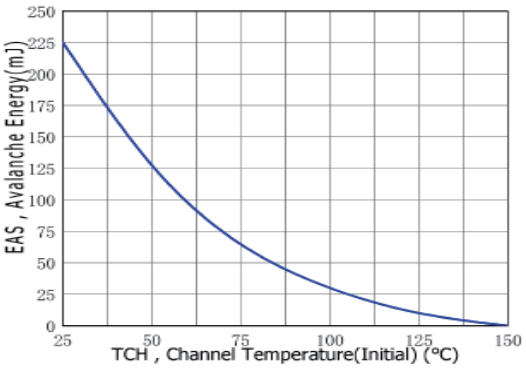


Figure 10:TypicalThresholdVoltagevsCa

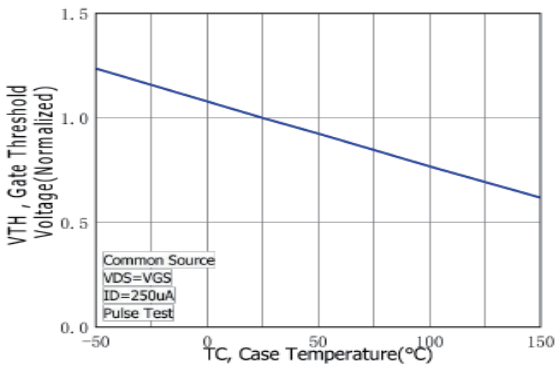


Figure 11:TypicalTransferCharacteristics

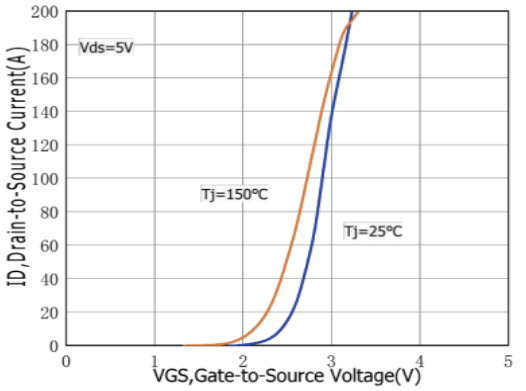
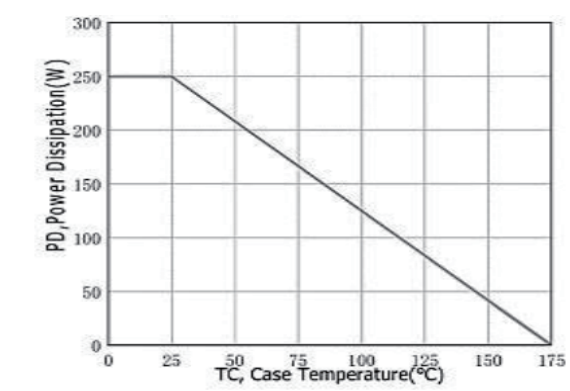
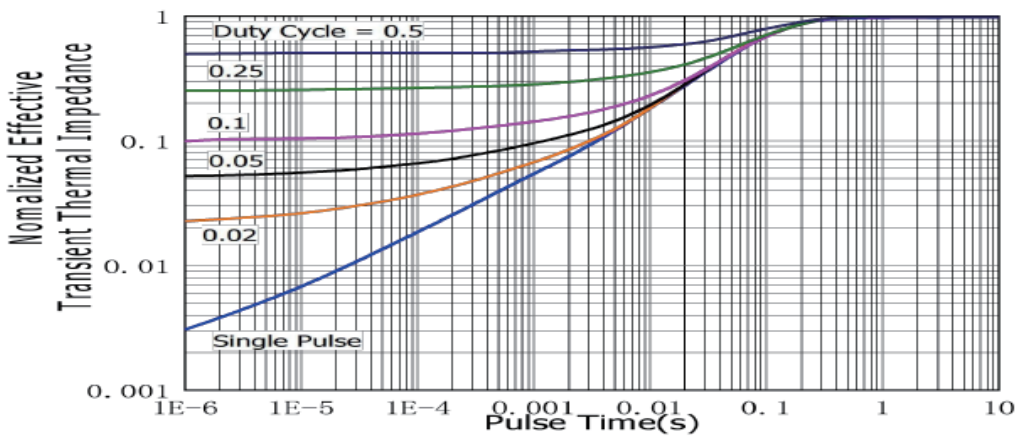


Figure 12: MaximumPowerDissipation



Typical Performance Characteristics

Figure 13:MaximumEffectiveThermalImp



Test circuits and waveforms

Figure A: Gate Charge Test Circuit & Waveforms

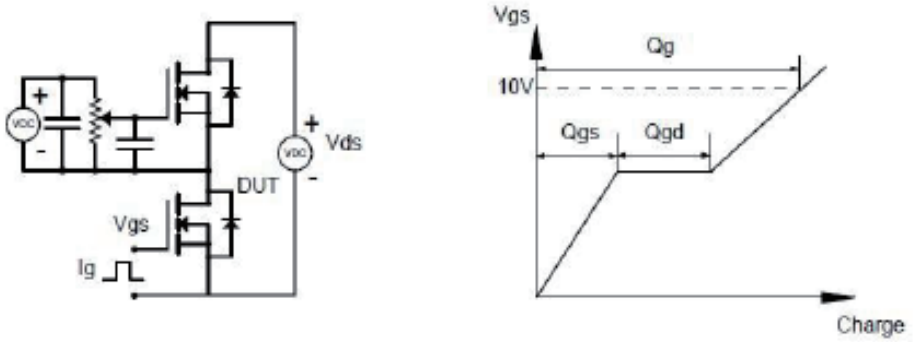


Figure B: Resistive Switching Test Circuit & Waveforms

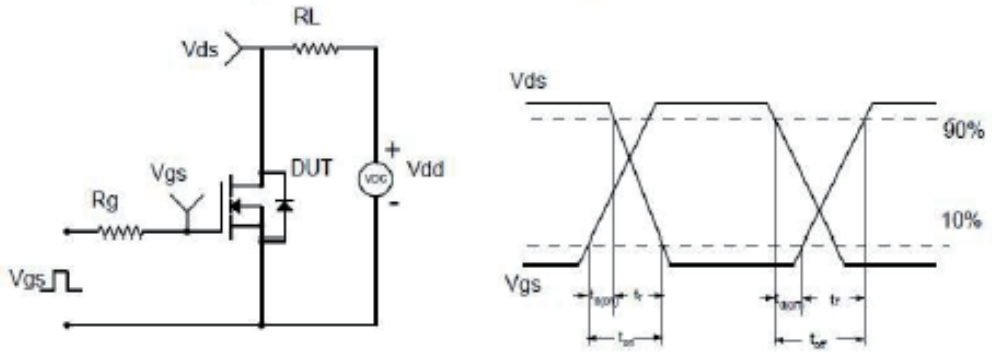


Figure C: Unclamped Inductive Switching (UIS) Test

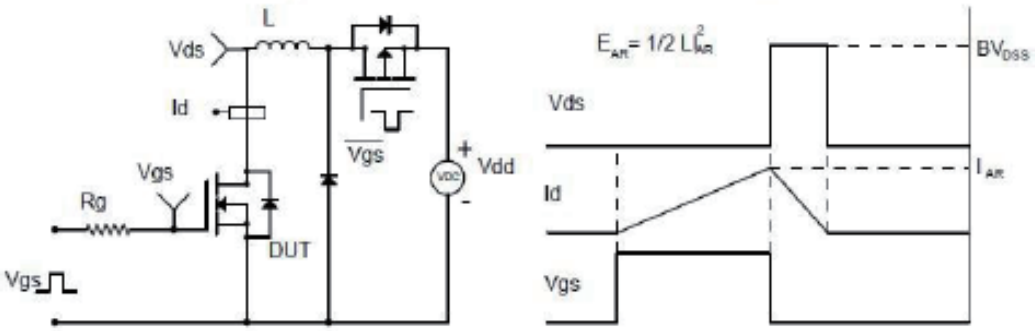
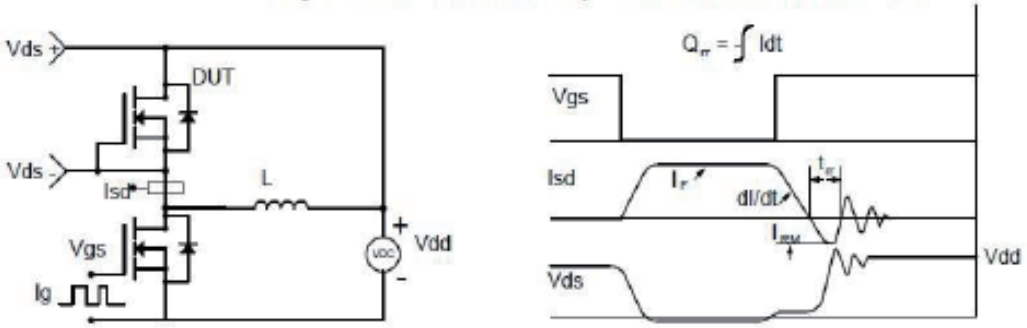
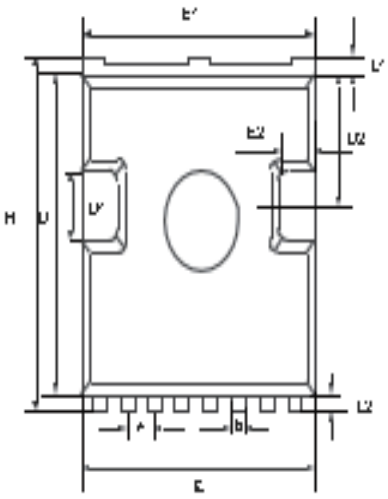


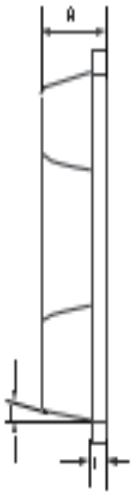
Figure D: Diode Recovery Test Circuit & Waveforms



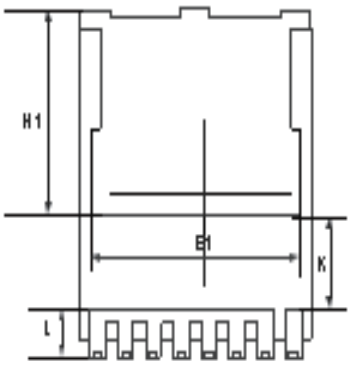
Mechanical Dimensions for TOLL-8L



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	

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