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
80V	1.05mΩ	400A

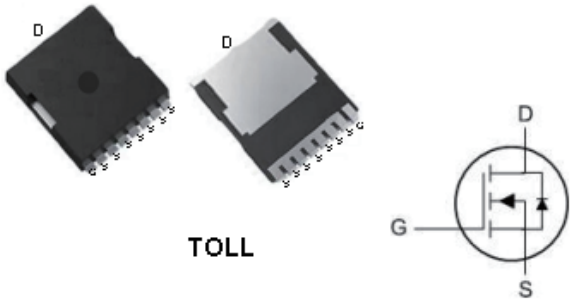
Description

★ DC-DC Converters

★ Power management functions

★ Synchronous-rectification applications

TOLL Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter		Max.	Unit
V_{DSS}	Drain-Source Voltage		80	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25℃	400	A
		T_C = 100℃	253	A
I_{DM}	Pulsed Drain Current note1		1600	A
E_{AS}	Single Pulsed Avalanche Energy note2		1280	mJ
P_D	Power Dissipation	T_C = 25℃	468.8	W
$R_{\theta JA}$	Thermal Resistance from Junction-to-Ambient3		39	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.5	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

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

Symbol	Parameter		Test condition	Min.	Typ.	Max.	Units
Static Characteristics							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		V_{GS} = 0V, I_D = 250μA	80	-	-	V
I_{GSS}	Gate-body Leakage current		V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	T_J=25°C	V_{DS} = 80V, V_{GS} = 0V	-	-	1	μA
		T_J=100°C		-	-	100	
$V_{GS(th)}$	Gate-Threshold Voltage		V_{DS} = V_{GS}, I_D = 250μA	2	3	4	V
$R_{DS(on)}$	Drain-Source on-Resistance[4]		V_{GS} = 10V, I_D = 20A	-	1.05	1.35	mΩ
g_{fs}	Forward Transconductance[4]		V_{DS}=10V, I_D=20A	-	62	-	S
Dynamic Characteristics[5]							
C_{iss}	Input Capacitance		V_{DS} = 40V, V_{GS} =0V, f =1MHz	-	13085	-	pF
C_{oss}	Output Capacitance			-	2615	-	
C_{rss}	Reverse Transfer Capacitance			-	120	-	
R_g	Gate Resistance		f =1MHz	-	3.1	-	Ω
Switching Characteristics[5]							
Q_g	Total Gate Charge		V_{GS} = 10V, V_{DS} = 40V, I_D=20A	-	243.6	-	nC
Q_{gs}	Gate-Source Charge			-	64.2	-	
Q_{gd}	Gate-Drain Charge			-	58.8	-	
$t_{d(on)}$	Turn-on Delay Time		V_{GS} =10V, V_{DD} =40V, R_G = 3Ω, I_D= 20A	-	44.8	-	ns
t_r	Rise Time			-	86.8	-	
$t_{d(off)}$	Turn-off Delay Time			-	164	-	
t_f	Fall Time			-	94	-	
t_{rr}	Body Diode Reverse Recovery Time		I_F = 20A, dI/dt=100A/μs	-	128	-	
Q_{rr}	Body Diode Reverse Recovery Charge			-	140.8	-	nC
Drain-Source Body Diode Characteristics							
V_{SD}	Diode Forward Voltage[4]		I_S = 20A, V_{GS} = 0V	-	-	1.2	V
I_S	Continuous Source Current	T_C=25°C	-	-	-	400	A

Notes:

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

2.The EAS data shows Max. rating . 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 Electrical and Thermal Characteristics (Curves)

Figure1: Output Characteristics

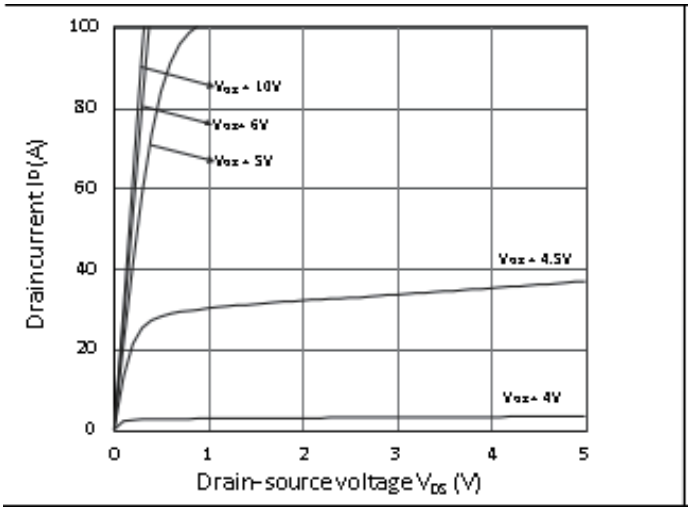


Figure 2: Typ. Transfer Characteristics

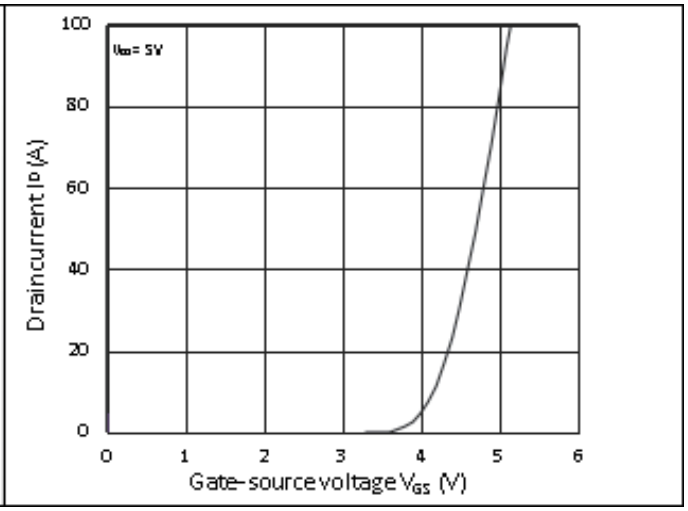


Figure 3: Forward Characteristics of Reve

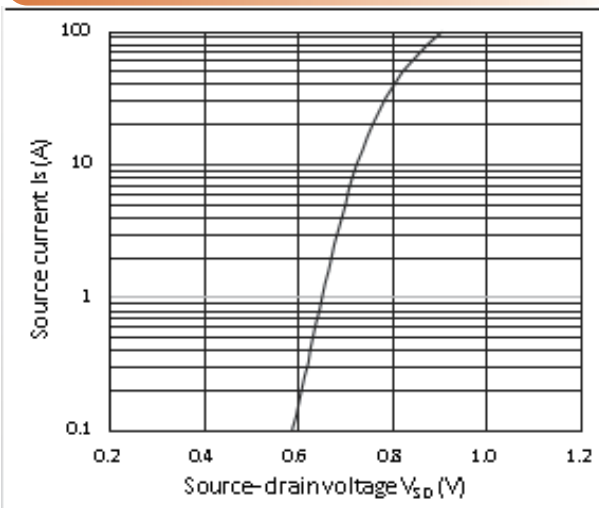


Figure 4: RDS(ON) vs. VGS

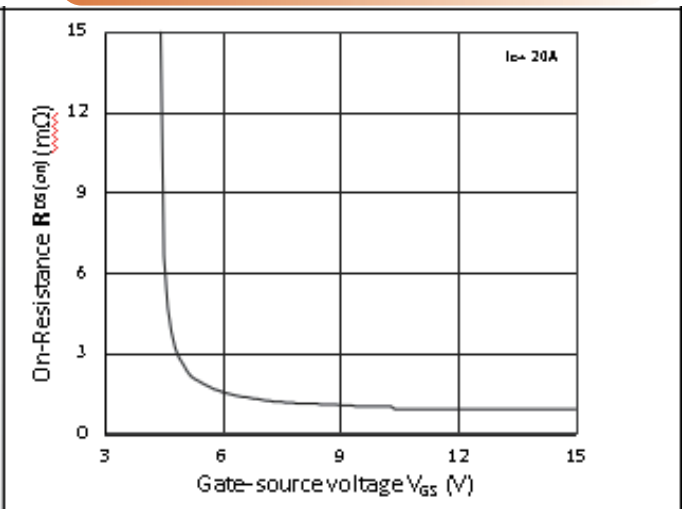


Figure 5: RDS(ON) vs. ID

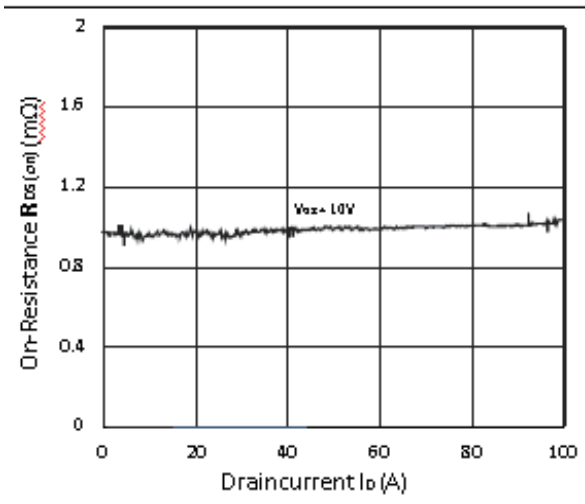
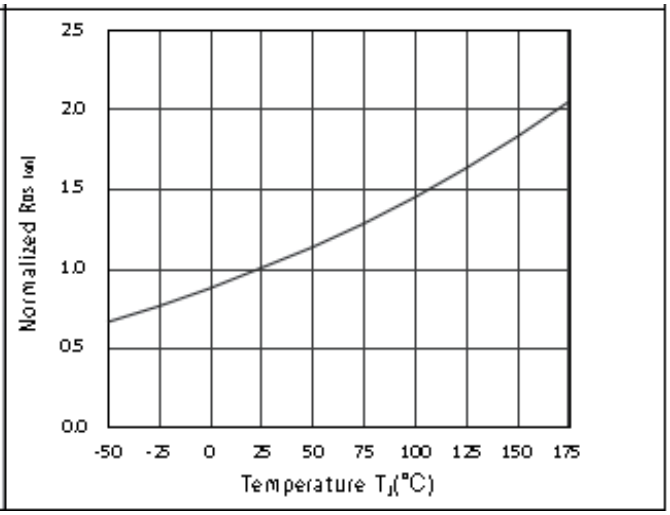


Figure 6: Normalized RDS(on) vs. Temper



Typical Performance Characteristics

Figure 7:Capacitance Characteristics

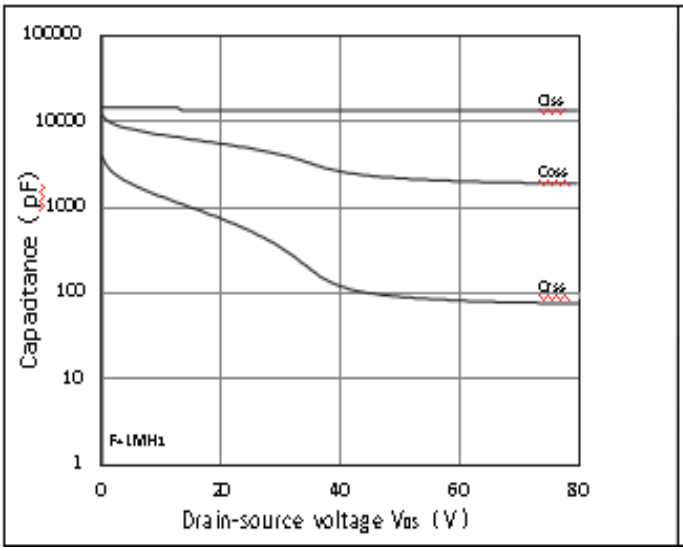


Figure 8:Gate Charge Characteristics

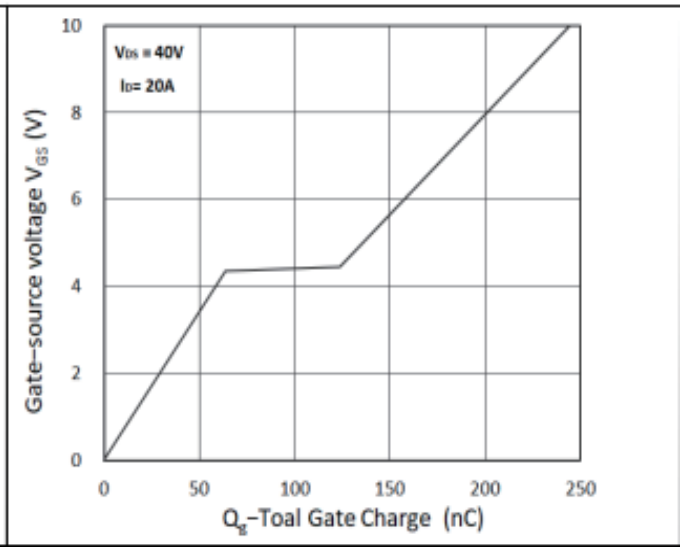


Figure 9:Power Dissipation

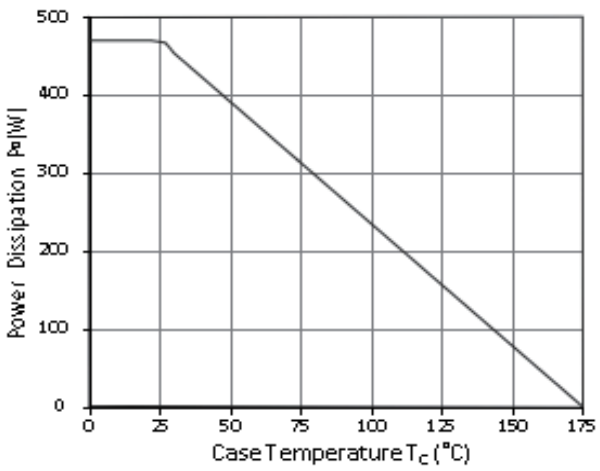


Figure 10:Safe Operating Area

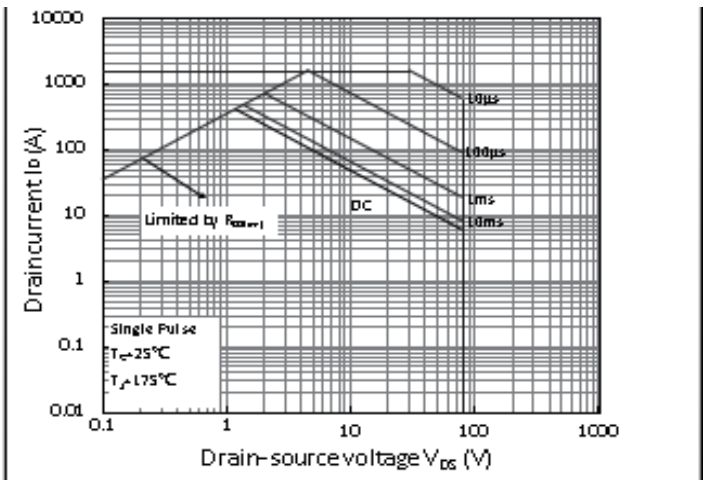
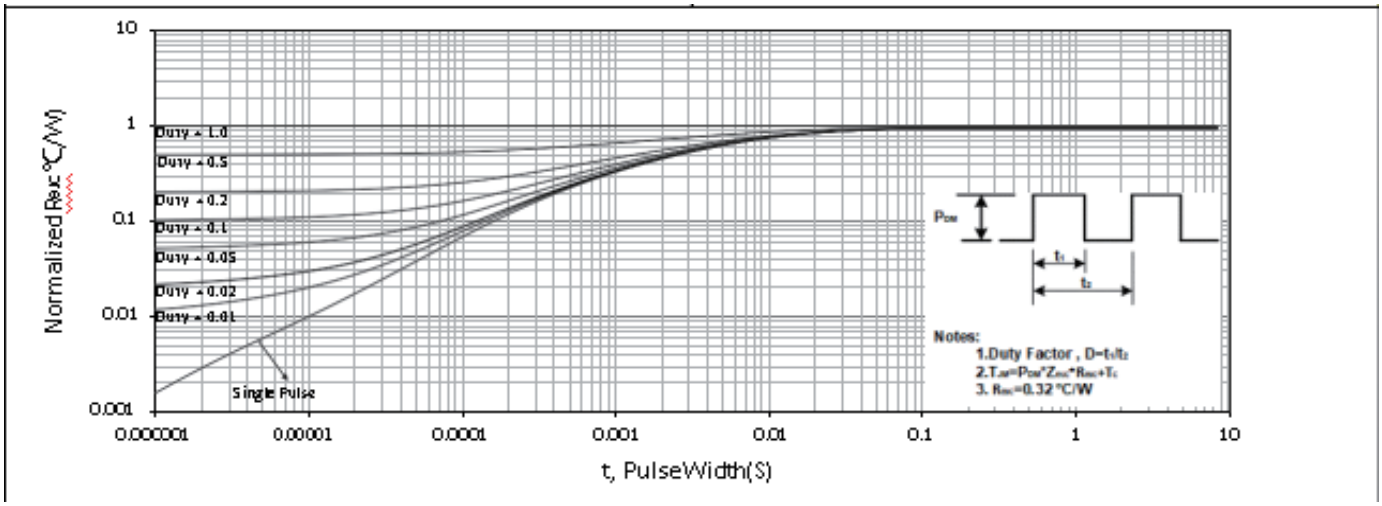


Figure 11: Normalized Maximum Transien



Test Circuit and Waveform

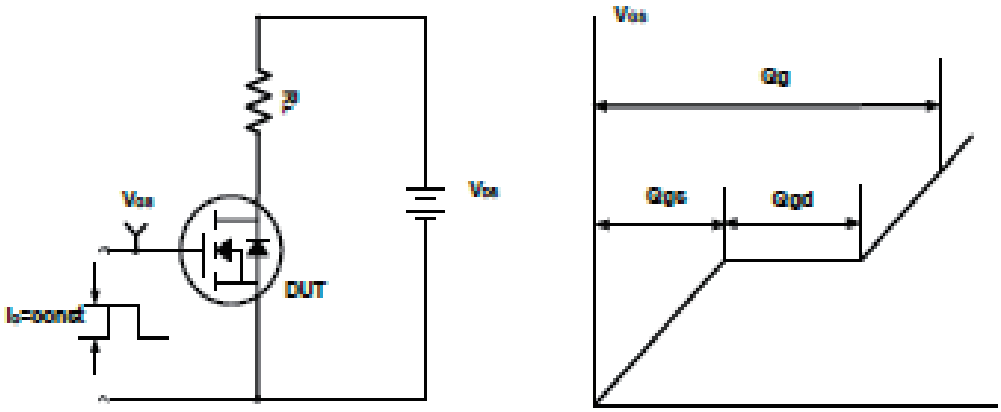


Figure A. Gate Charge Test Circuit & Waveforms

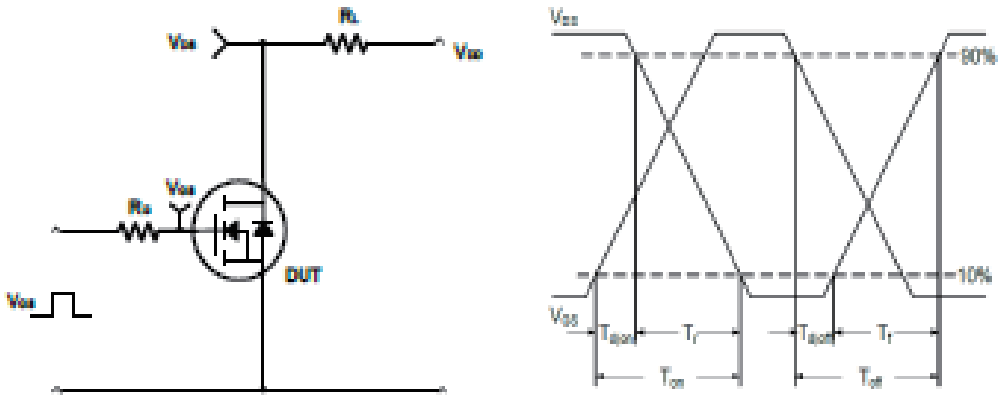


Figure B. Switching Test Circuit & Waveforms

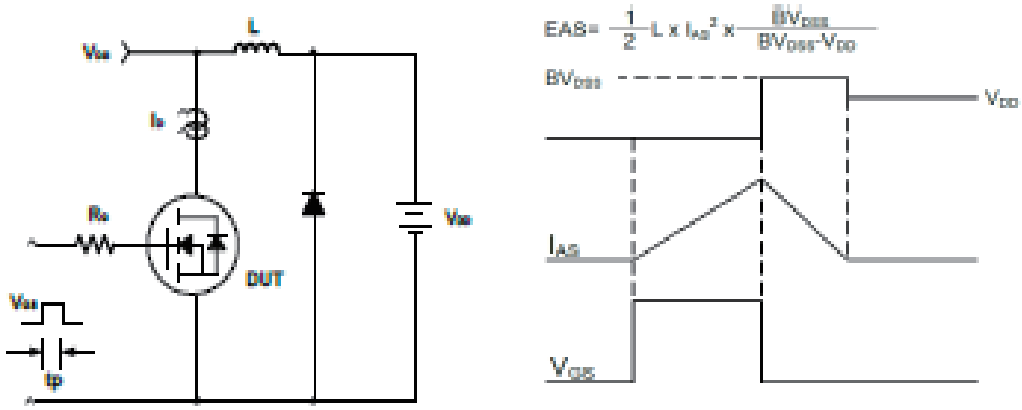
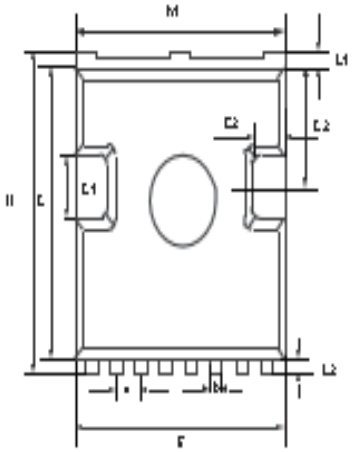
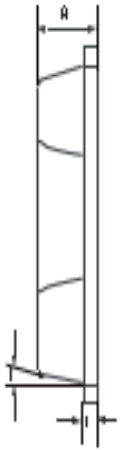


Figure C. Unclamped Inductive Switching Circuit & Waveforms

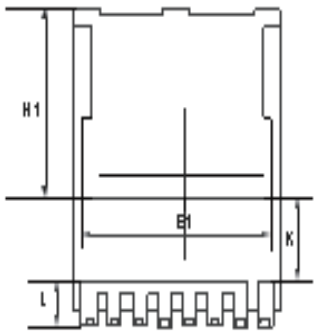
Mechanical Dimensions for TOLL-8L



TOP VIEW



SIDE VIEW



BOTTOM 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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