Lonten N-channel 100V, 418A,1.35mΩ Power MOSFET

Description

These N-channel enhancement mode power field effect transistors are using **shielded gate trench** DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance,provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- 100V,418A,$R_{DS(on).max}$=1.35mΩ@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

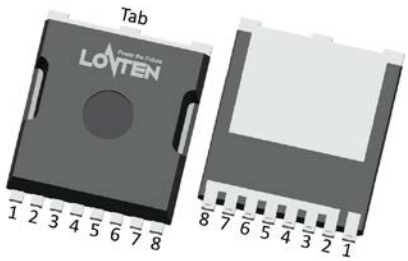
Applications

- Motor Drives
- UPS
- DC-DC Converter
- SR
- BMS

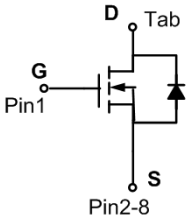
Product Summary

V_{DSS}	100V
$R_{DS(on).typ}$@ V_{GS}=10V	1.05mΩ
I_D	418A

Pin Configuration



TOLL



N-channel MOSFET

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Continuous drain current [1] (T_C = 25°C ,Silicon limit)	I_D	418	A
(T_C = 25°C, Package limit)		420	A
(T_C = 100°C,Silicon limit)		265	A
Pulsed drain current [2]	I_{DM}	1672	A
Gate-Source voltage	V_{GS}	±20	V
Avalanche energy [3]	E_{AS}	1764	mJ
Power Dissipation	P_D	485	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.26	°C/W
Thermal Resistance, Junction-to-Ambient, minimal footprint [4]	$R_{\theta JA}$	62	°C/W
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	°C

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Reel
LSGT10R013	TOLL	LSGT10R013	2000

Electrical Characteristics

T_J = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=250uA	100	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2	2.87	4	V
Drain-source leakage current	I_{DSS}	V_{DS}=100V, V_{GS}=0V, T_J = 25°C	---	---	1	μA
		V_{DS}=100V, V_{GS}=0V, T_J = 150°C	---	---	100	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=20V, V_{DS}=0V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=50 A， T_J = 25°C	---	1.05	1.35	mΩ
		T_J = 150°C	---	2.15	---	
Forward transconductance	g_{fs}	V_{DS} =20V , I_D=50A	---	161.8	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} =50V, V_{GS} = 0V, f = 100kHz	---	16020	---	pF
Output capacitance	C_{oss}		---	1980	---	
Reverse transfer capacitance	C_{rss}		---	72.6	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50V, V_{GS} =10V, I_D = 50A, Rg = 10Ω	---	133.1	---	ns
Rise time	t_r		---	161.1	---	
Turn-off delay time	$t_{d(off)}$		---	239	---	
Fall time	t_f		---	101.9	---	
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.34	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=50V, I_D=50A, V_{GS}= 10V	---	67.4	---	nC
Gate to drain charge	Q_{gd}		---	65.2	---	
Gate charge total	Q_g		---	252.9	---	
Gate plateau voltage	$V_{plateau}$		---	4.6	---	V
Output Charge	Q_{oss}	V_{DS}=50V,V_{GS}= 0V	---	258	---	nC
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	418	A
Pulsed Source Current	I_{SM}		---	---	1672	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=50A, T_J=25℃	---	---	1.1	V
Peak reverse recovery current	I_{rrm}	I_S=50A, di/dt=100A/us, T_J=25℃	---	4.29	---	A
Reverse Recovery Time	t_{rr}		---	84.4	---	ns
Reverse Recovery Charge	Q_{rr}		---	213.6	---	nC

Notes:

1. Limited by maximum junction temperature and duty cycle.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=84A, Starting T_J=25℃.
4. The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

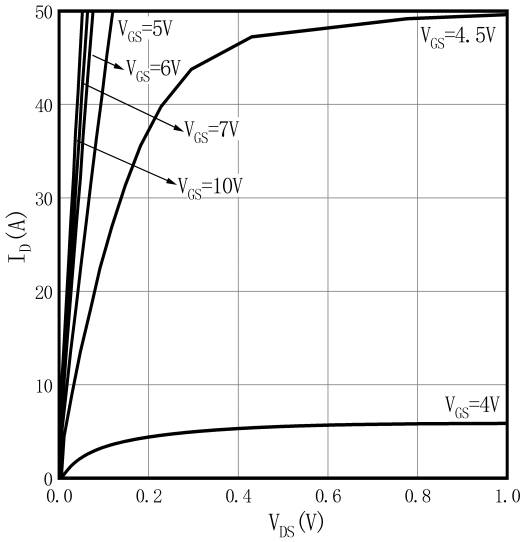


Figure 2. Transfer Characteristics

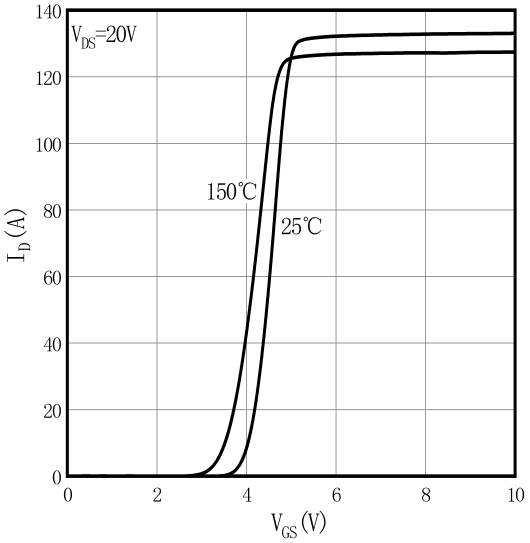


Figure 3. On-Resistance vs. Drain Current

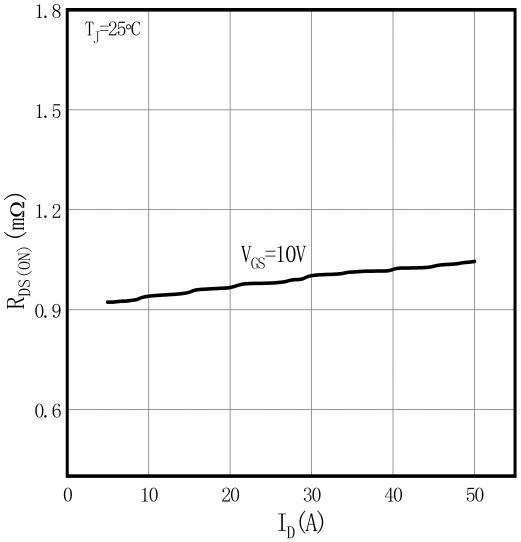


Figure 4.On-Resistance vs.Temperature

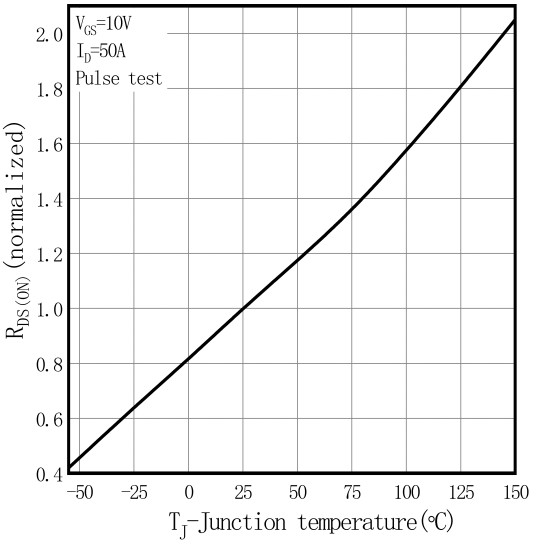


Figure 5.Breakdown Voltage vs.Temperature

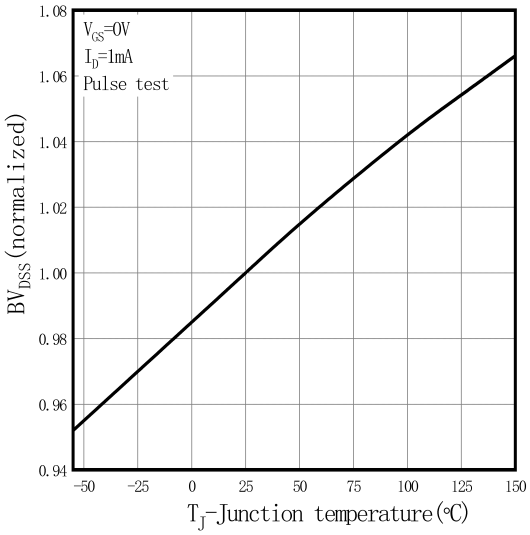


Figure 6.Threshold Voltage vs.Temperature

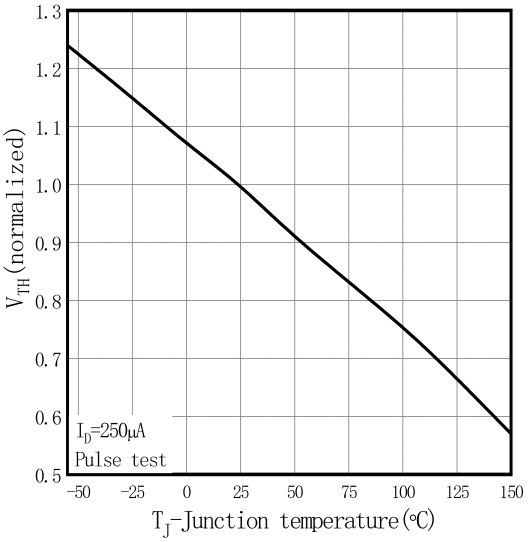


Figure 7.Rds(on) vs. Gate Voltage

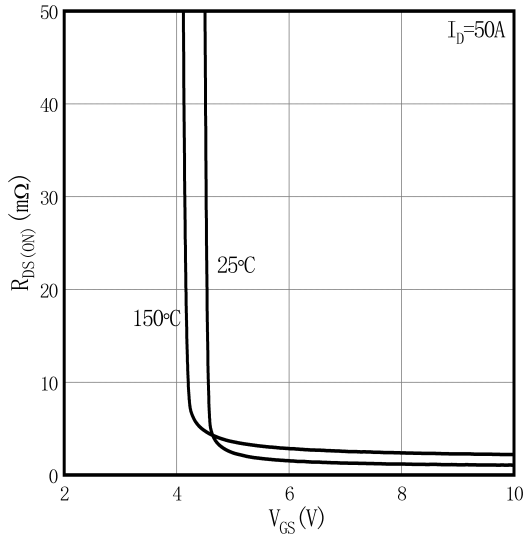


Figure 8.Body-Diode Characteristics

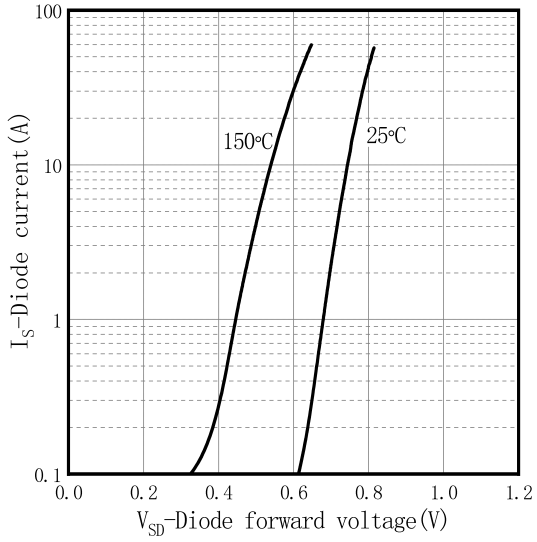


Figure 9.Capacitance Characteristics

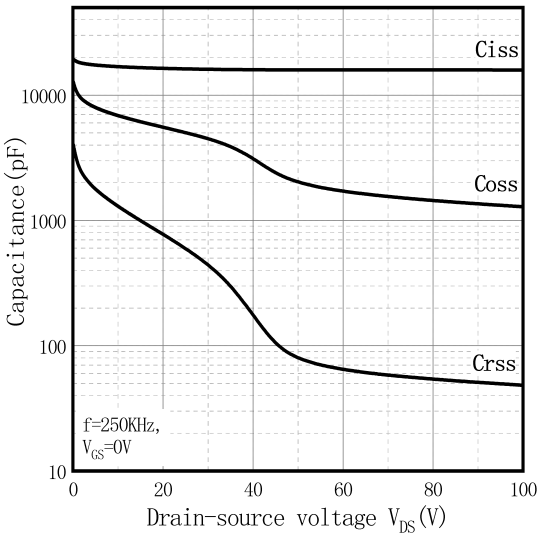


Figure 10.Gate Charge Characteristics

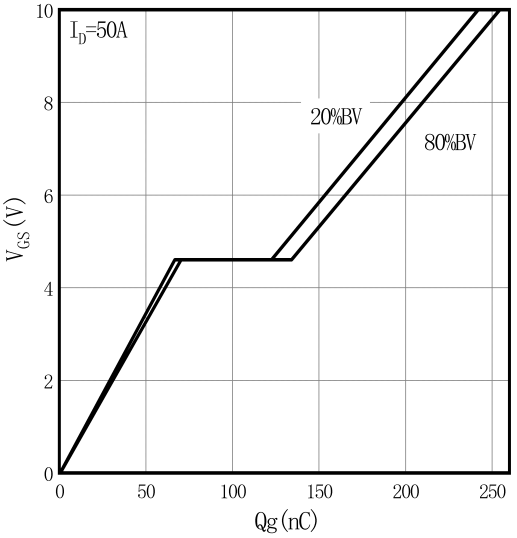


Figure 11.Drain Current Derating

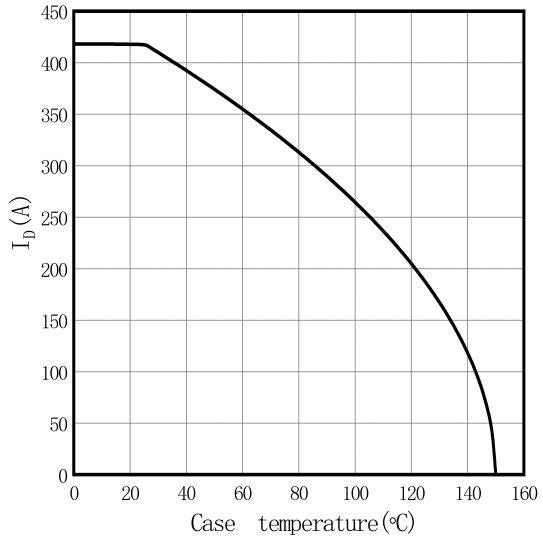


Figure 12.Power Dissipation vs.Temperature

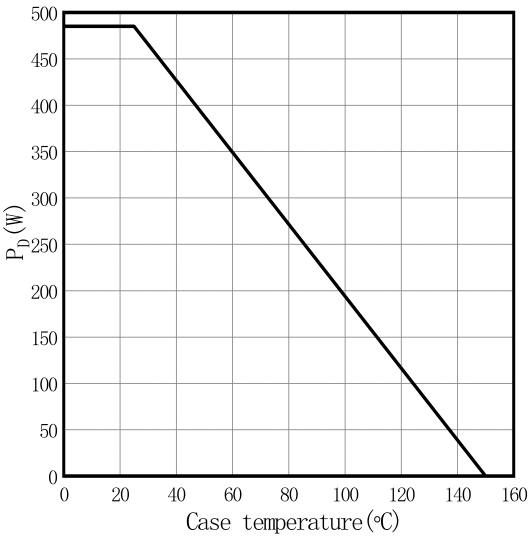


Figure 13. Safe Operating Area

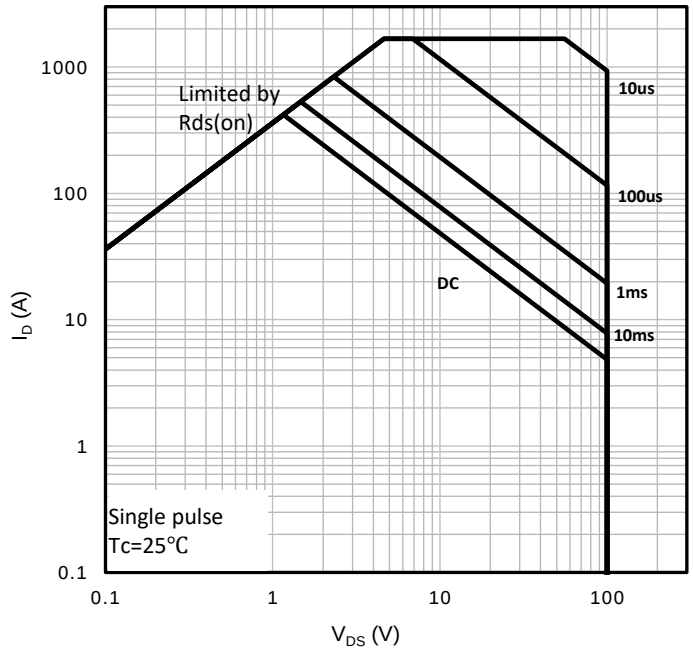
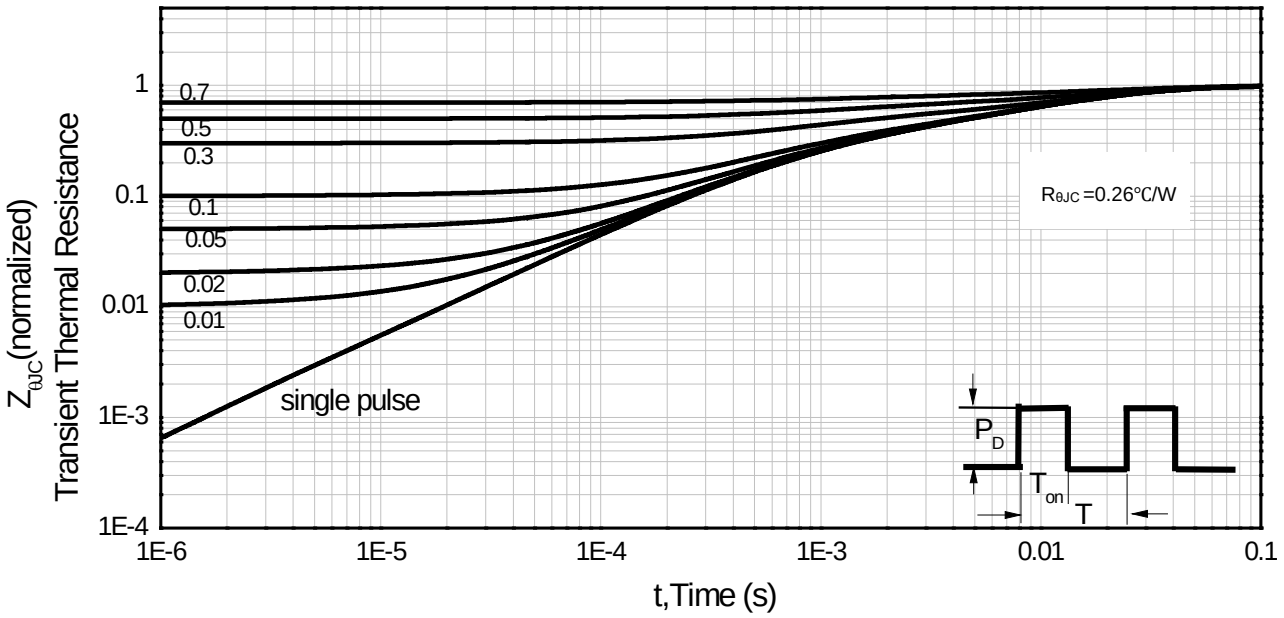
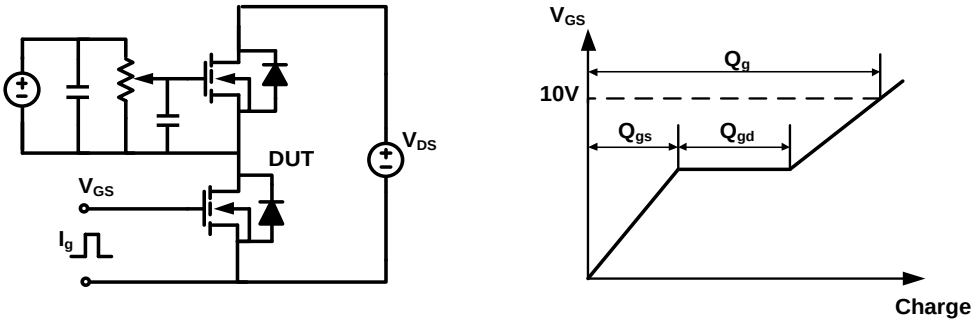


Figure 14. Normalized Maximum Transient Thermal Impedance (R_{thJC})

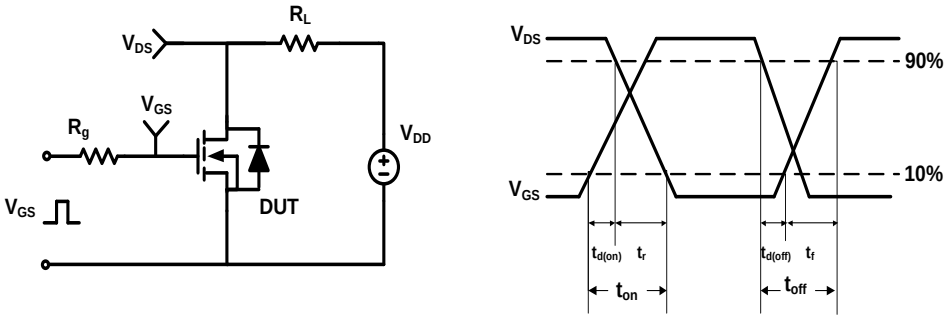


Test Circuit & Waveforms

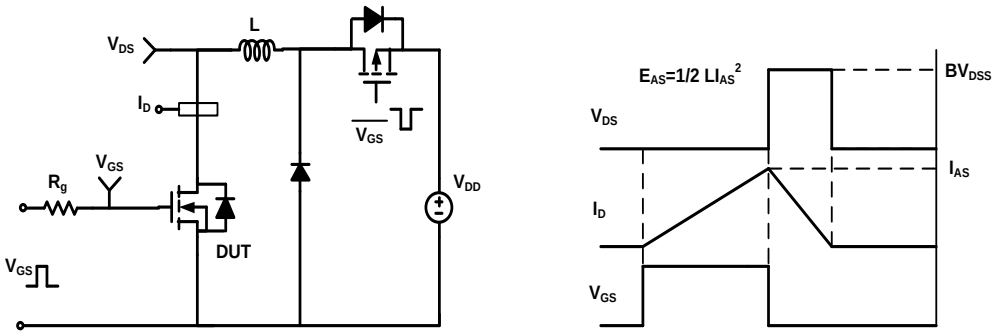
Gate Charge Test Circuit & Waveform



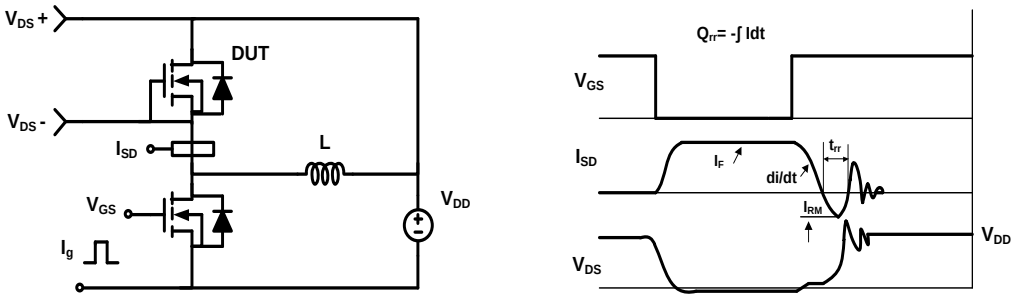
Resistive Switching Test Circuit & Waveform



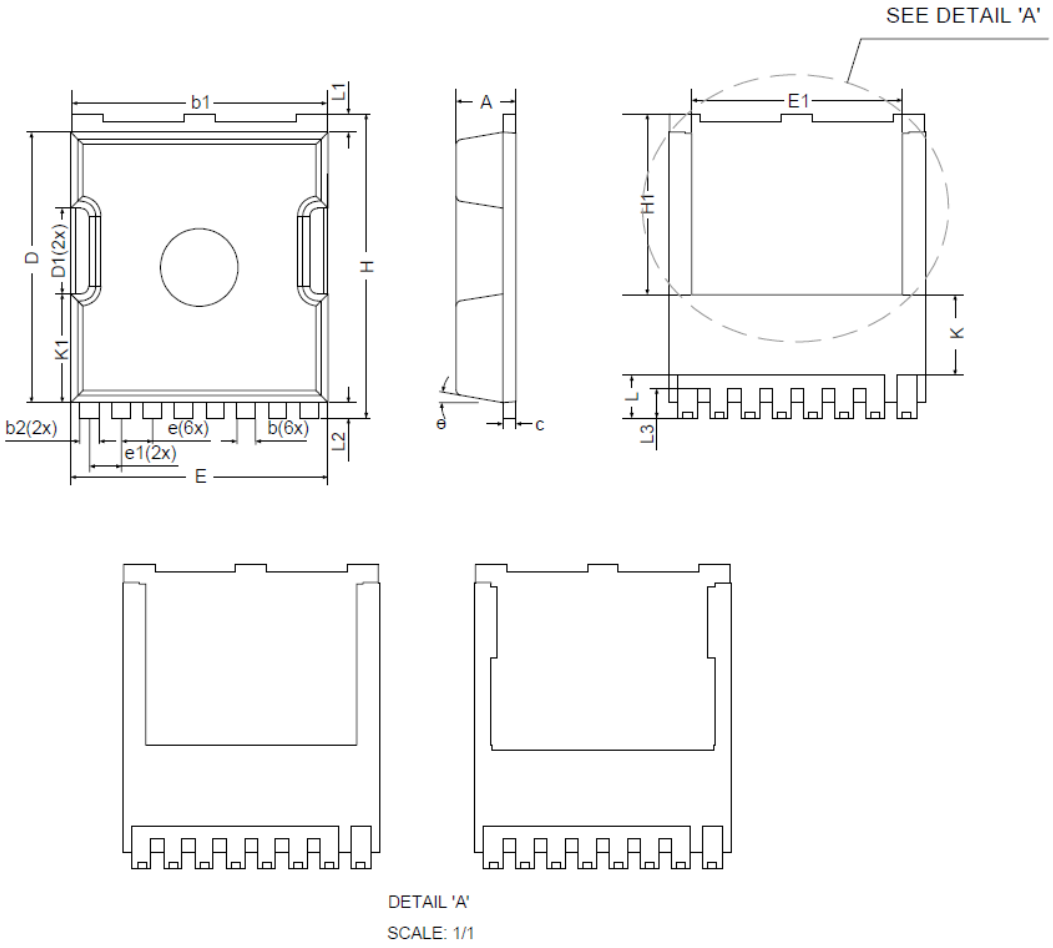
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TOLL



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.15	2.45	0.085	0.096
b	0.60	0.90	0.024	0.035
b1	9.65	9.95	0.380	0.392
b2	0.65	0.90	0.026	0.035
c	0.40	0.60	0.016	0.024
D	10.18	10.58	0.401	0.417
D1	3.15	3.45	0.124	0.136
E	9.70	10.10	0.382	0.398
E1	7.90	8.40	0.311	0.331
e	1.10	1.30	0.043	0.051
e1	1.10	1.30	0.043	0.051
H	11.48	11.88	0.452	0.468
H1	6.75	7.30	0.266	0.287
K	2.45	3.33	0.096	0.131
K1	4.03	4.33	0.159	0.170
L	1.50	2.10	0.059	0.083
L1	0.50	0.90	0.020	0.035
L2	0.45	0.75	0.018	0.030
L3	1.00	1.30	0.039	0.051
θ	10° REF		10° REF	

Revision History

LSGT10R013
Revision 1.0

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