Lonten N-channel 100V, 360A, 1.55mΩ 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,360A,$R_{DS(on)}$.max=1.55mΩ@VGS = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

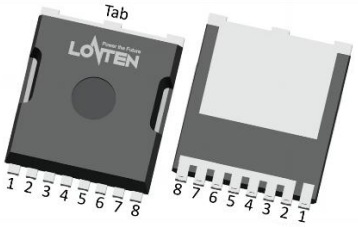
Applications

- Motor Drives
- UPS
- DC-DC Converter
- Telecom
- Battery management

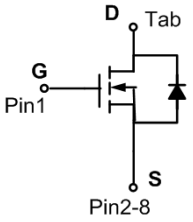
Product Summary

V_{DSS}	100V
$R_{DS(on).typ}$@V_{GS}=10V	1.2mΩ
I_D	360A

Pin Configuration



TOLL



N-Channel MOSFET

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Continuous drain current[1] (T_C = 25°C ,Silicon limit)	I_D	416	A
(T_C = 25°C, Package limit)		360	A
(T_C = 100°C,Silicon limit)		263	A
Pulsed drain current [2]	I_{DM}	1440	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy [3]	E_{AS}	2056	mJ
Power Dissipation	P_D	481	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 [4]	$R_{\theta JA}$	58.18	°C/W
Soldering temperature, wavesoldering 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
LSGT10R015	TOLL	LSGT10R015	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}=0V, I_D=250uA	100	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.5	---	4.5	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	---	---	10	mA
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}=10 V, I_D=50 A, T_J=25°C T_J=150°C	 --- ---	 1.2 2.1	 1.55 ---	mΩ
Forward transconductance	g_{fs}	V_{DS}=5V , I_D=50A	---	150.9	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}=50 V, V_{GS}=0V, f=100kHz	---	21761	---	pF
Output capacitance	C_{oss}		---	4016	---	
Reverse transfer capacitance	C_{rss}		---	63	---	
Turn-on delay time	$t_{d(on)}$	V_{DD}=50V,V_{GS}=10V, I_D=50 A, R_g=10Ω	---	224	---	ns
Rise time	t_r		---	179	---	
Turn-off delay time	$t_{d(off)}$		---	270	---	
Fall time	t_f		---	98	---	
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.5	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=50V, I_D=50A, V_{GS}=10V	---	100	---	nC
Gate to drain charge	Q_{gd}		---	55	---	
Gate charge total	Q_g		---	293	---	
Gate plateau voltage	$V_{plateau}$		---	4.9	---	V
Output Charge	Q_{oss}	V_{DS}=50V,V_{GS}=0V	---	338	---	nC
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	360	A
Pulsed Source Current	I_{SM}		---	---	1440	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=50A, T_J=25℃	---	---	1.1	V
Reverse Recovery Time	t_{rr}	I_S=50A, di/dt=200A/us, T_J=25℃	---	79	---	ns
Reverse Recovery Charge	Q_{rr}		---	361	---	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}=90.7A , 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

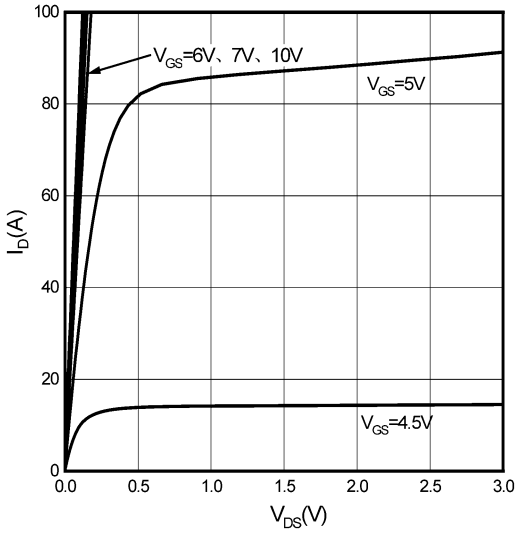


Figure 2. Transfer Characteristics

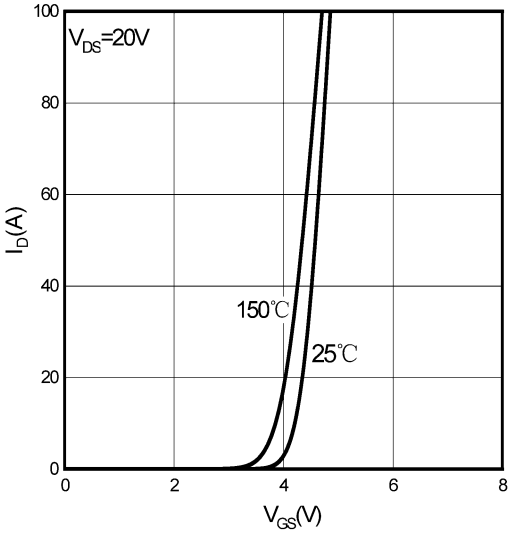


Figure 3. On-Resistance vs. Drain Current

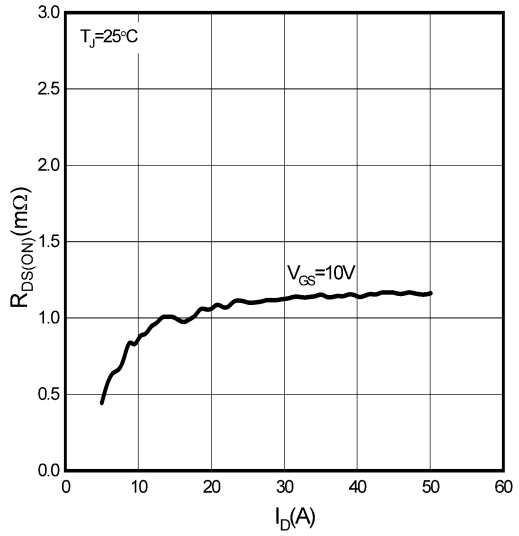


Figure 4.On-Resistance vs.Temperature

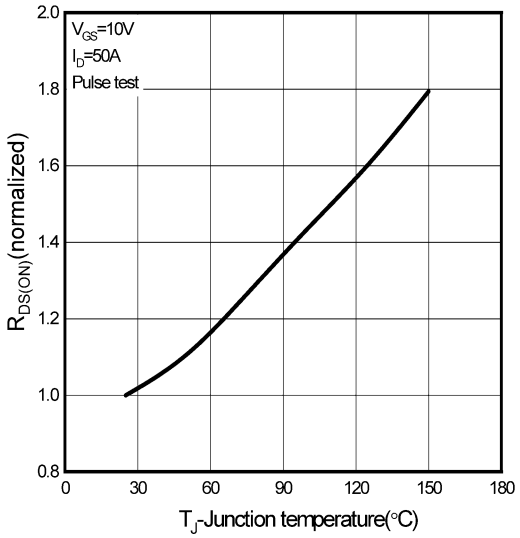


Figure 5.Breakdown Voltage vs.Temperature

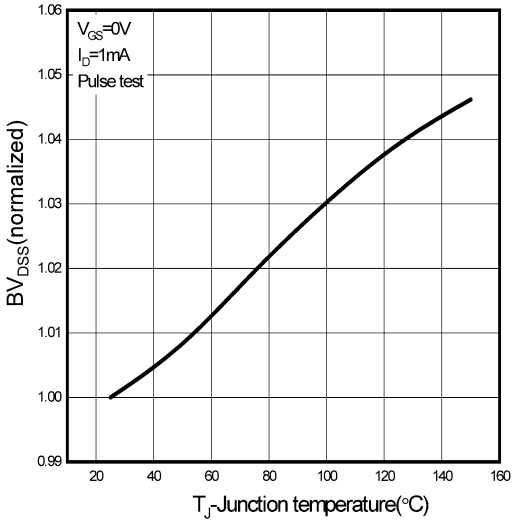


Figure 6.Threshold Voltage vs.Temperature

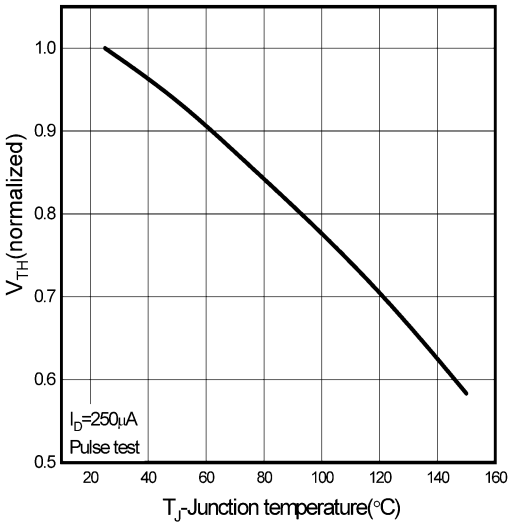


Figure 7.Rds(on) vs. Gate Voltage

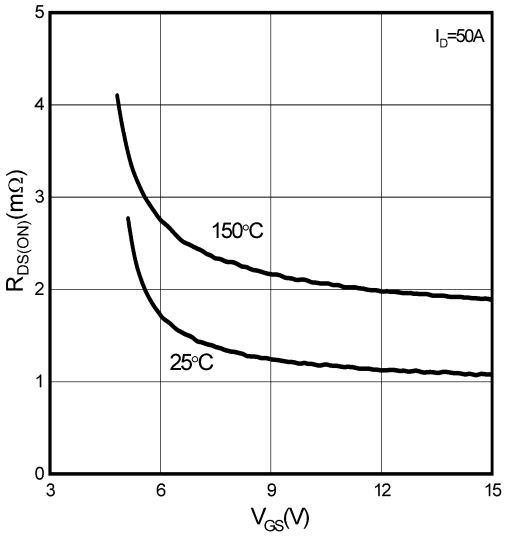


Figure 8.Body-Diode Characteristics

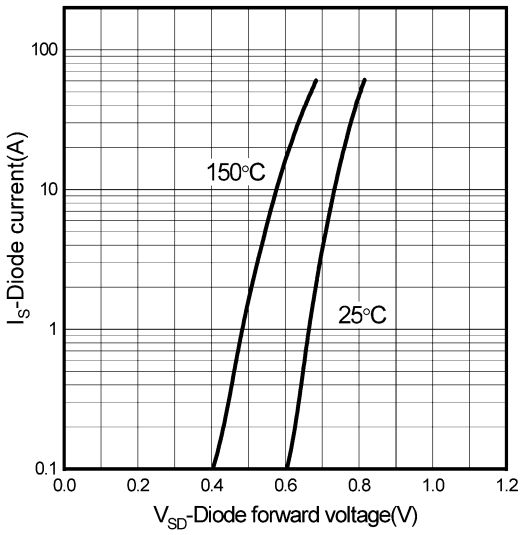


Figure 9.Capacitance Characteristics

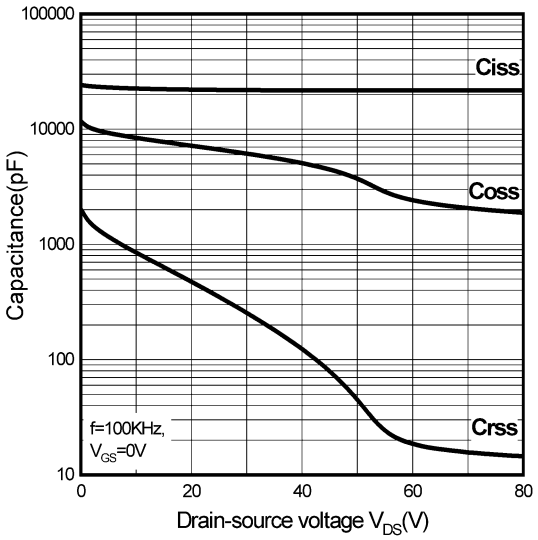


Figure 10.Gate Charge Characteristics

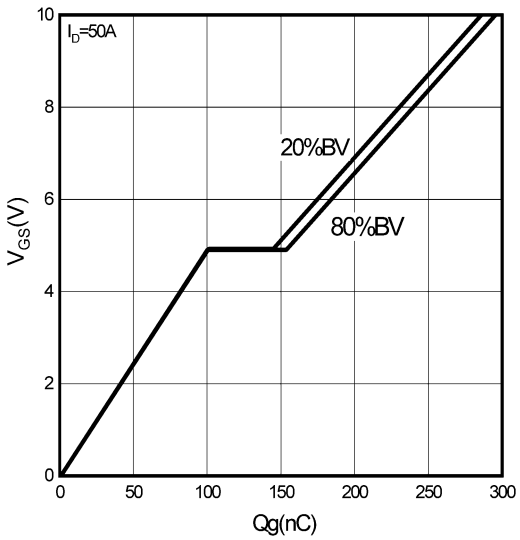


Figure 11.Drain Current Derating

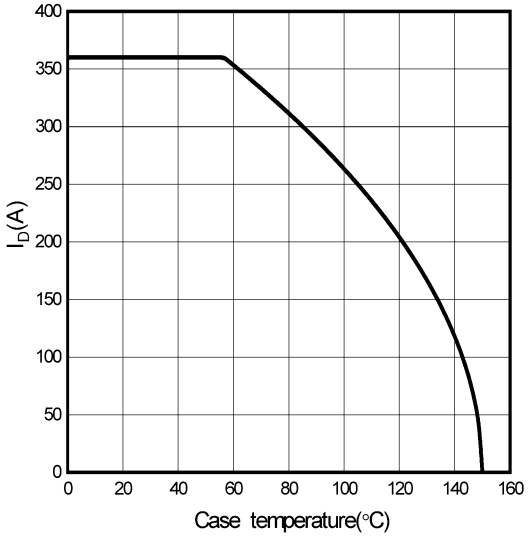


Figure 12.Power Dissipation vs.Temperature

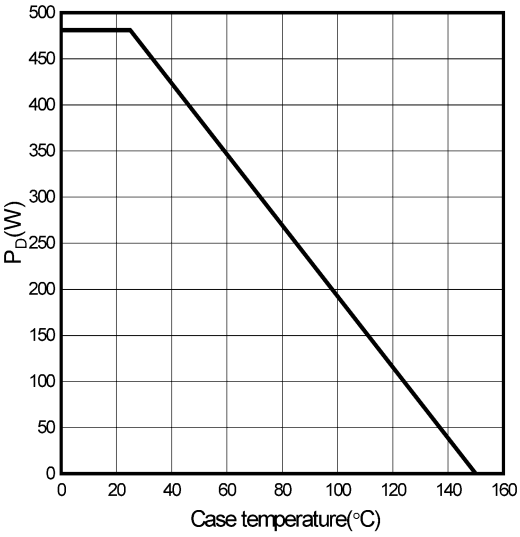


Figure 13. Safe Operating Area

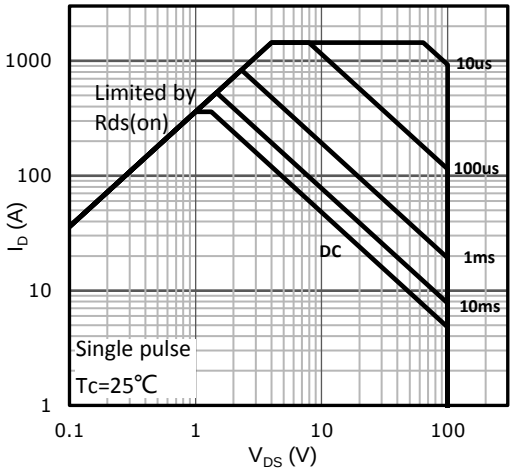
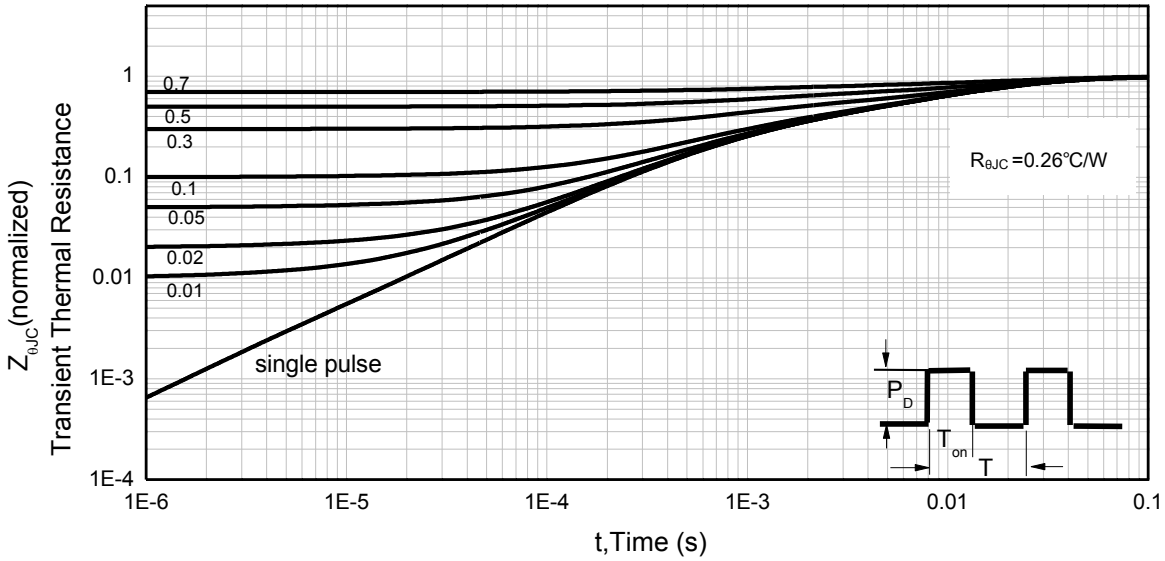
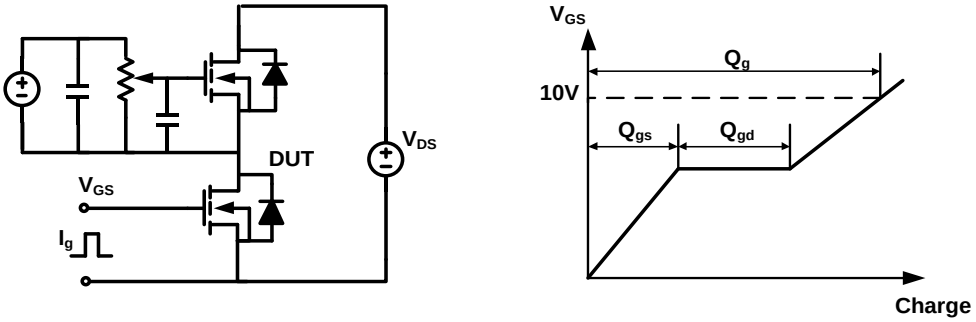


Figure 14. Normalized Maximum Transient Thermal Impedance (R_{thJC})

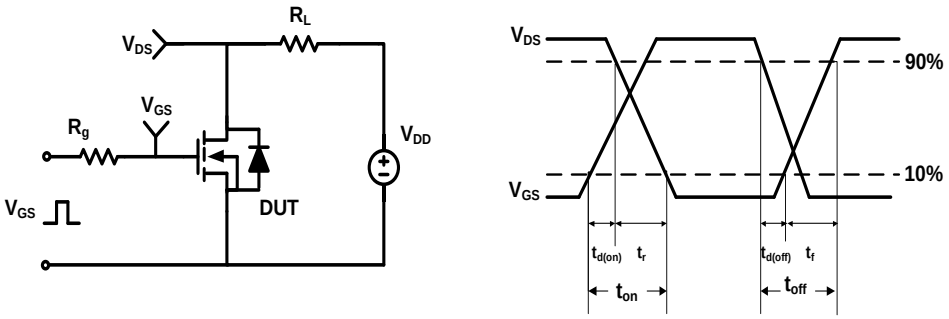


Test Circuit & Waveforms

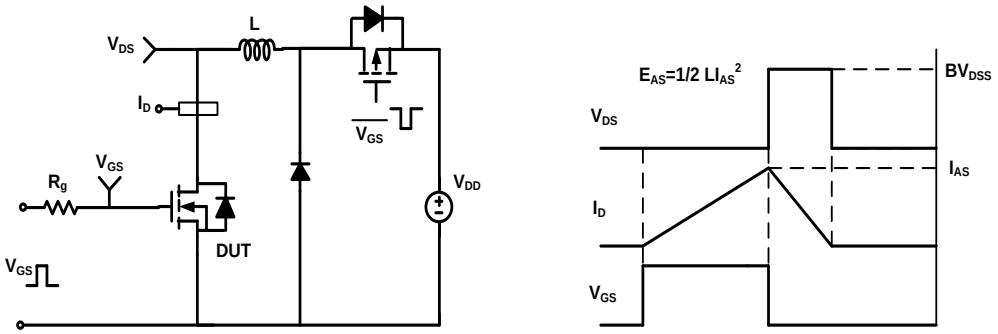
Gate Charge Test Circuit & Waveform



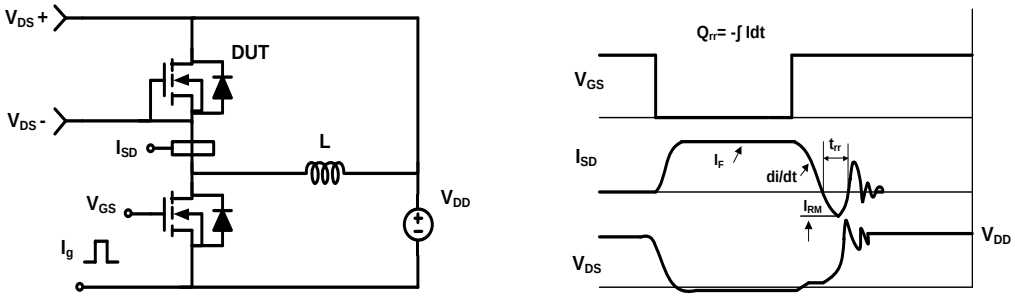
Resistive Switching Test Circuit & Waveform



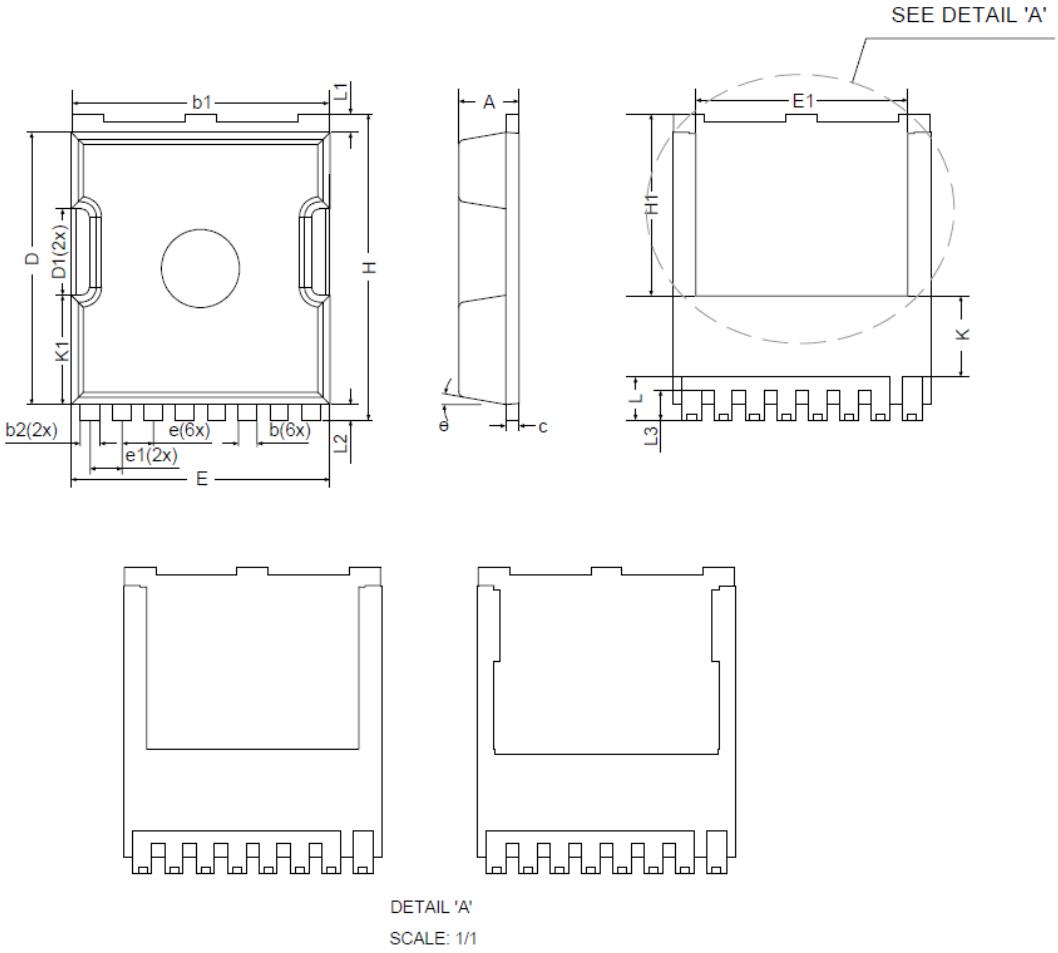
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



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

LSGT10R015

Revision 1.3

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