Lonten N-channel 100V, 310A,1.8mΩ 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,310A,$R_{DS(on).max}$=1.8mΩ@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

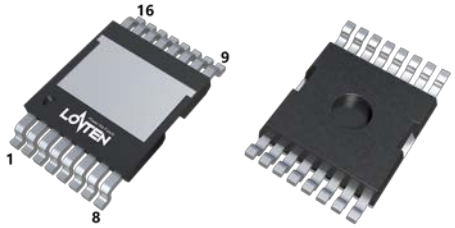
Applications

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

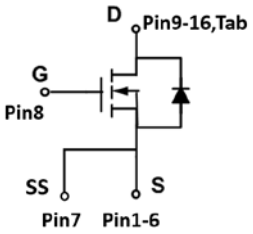
Product Summary

V_{DSS}	100V
$R_{DS(on).typ}$@ V_{GS}=10V	1.39mΩ
I_D	310A

Pin Configuration



TOLT



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	338	A
(T_C = 25°C, Package limit)		310	A
(T_C = 100°C,Silicon limit)		214	A
Pulsed drain current [2]	I_{DM}	1240	A
Gate-Source voltage	V_{GS}	±20	V
Avalanche energy [3]	E_{AS}	1681	mJ
Power Dissipation	P_D	410	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	$R_{\theta JC}$	0.30	°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
LSGTT10R018	TOLT	LSGTT10R018	1200

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	---	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	---	1.39	1.8	mΩ
		T_J = 150°C	---	2.7	---	
Forward transconductance	g_{fs}	V_{DS} =20V , I_D=50A	---	136.7	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} =50V, V_{GS} = 0V, f = 100kHz	---	12004	---	pF
Output capacitance	C_{oss}		---	3359	---	
Reverse transfer capacitance	C_{rss}		---	51	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50V, V_{GS} =10V, I_D = 50A, Rg = 10Ω	---	128.4	---	ns
Rise time	t_r		---	138	---	
Turn-off delay time	$t_{d(off)}$		---	178.5	---	
Fall time	t_f		---	67.5	---	
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.49	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=50V, I_D=50A, V_{GS}= 10V	---	55.7	---	nC
Gate to drain charge	Q_{gd}		---	42.2	---	
Gate charge total	Q_g		---	182.2	---	
Gate plateau voltage	$V_{plateau}$		---	5	---	V
Output Charge	Q_{oss}	V_{DS}=50V,V_{GS}= 0V	---	290	---	nC
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	310	A
Pulsed Source Current	I_{SM}		---	---	1240	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℃	---	3.38	---	A
Reverse Recovery Time	t_{rr}		---	77.8	---	ns
Reverse Recovery Charge	Q_{rr}		---	166	---	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}=82A, 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

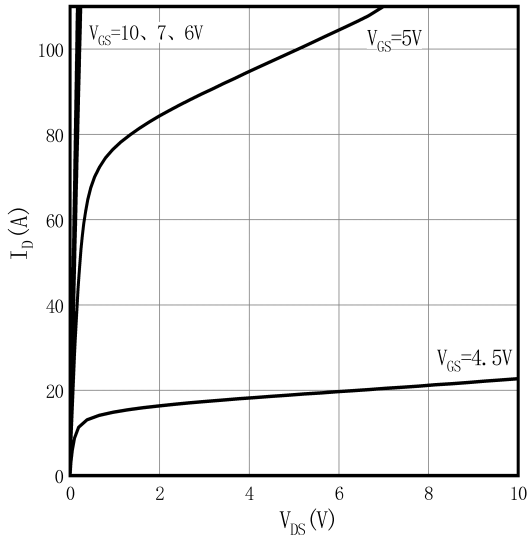


Figure 2. Transfer Characteristics

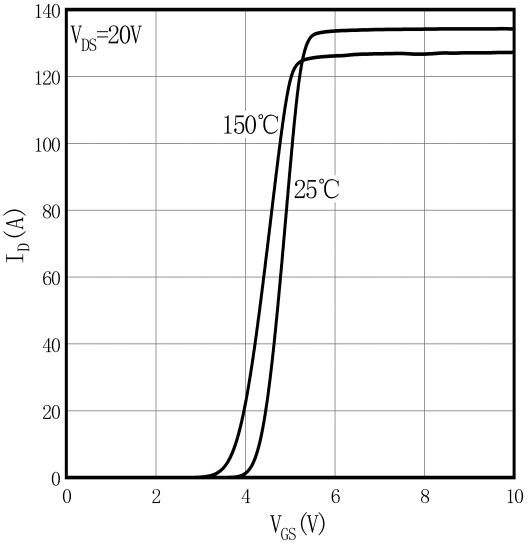


Figure 3. On-Resistance vs. Drain Current

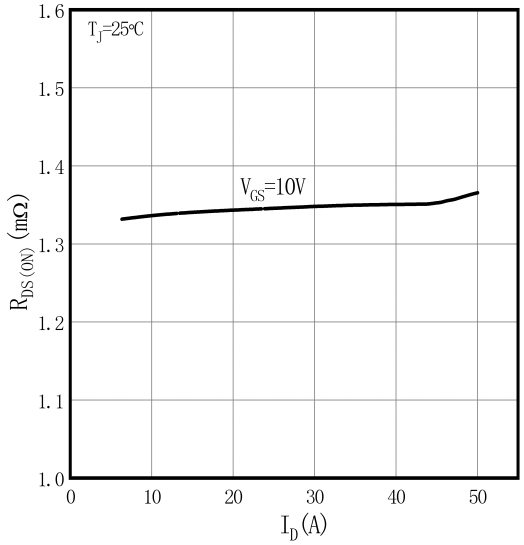


Figure 4.On-Resistance vs.Temperature

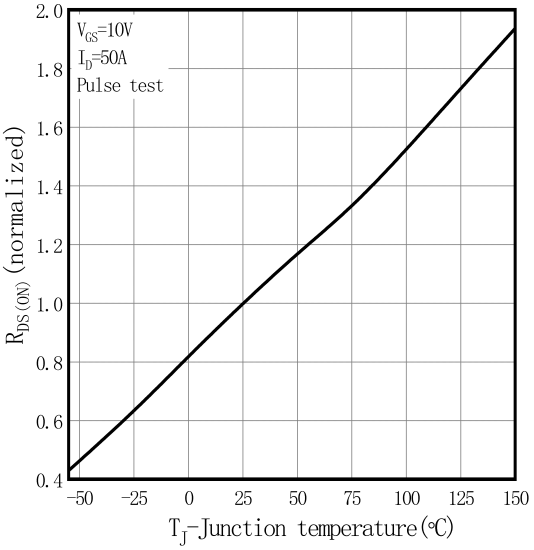


Figure 5.Breakdown Voltage vs.Temperature

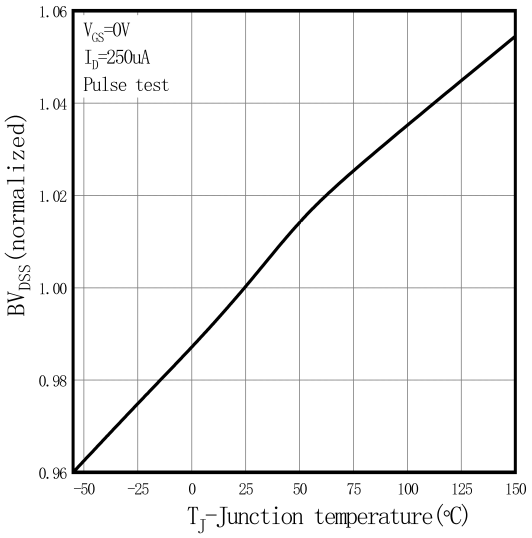


Figure 6.Threshold Voltage vs.Temperature

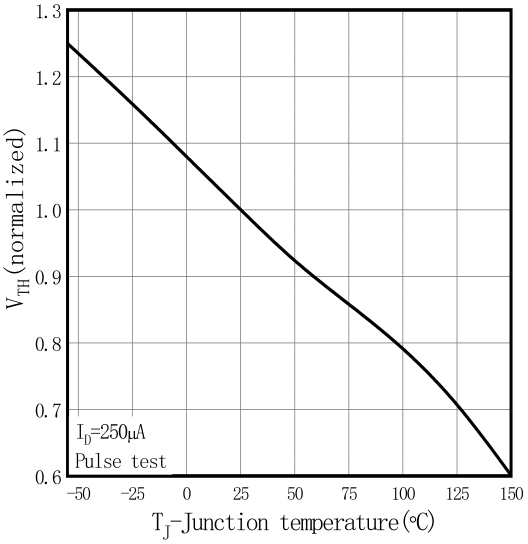


Figure 7.Rds(on) vs. Gate Voltage

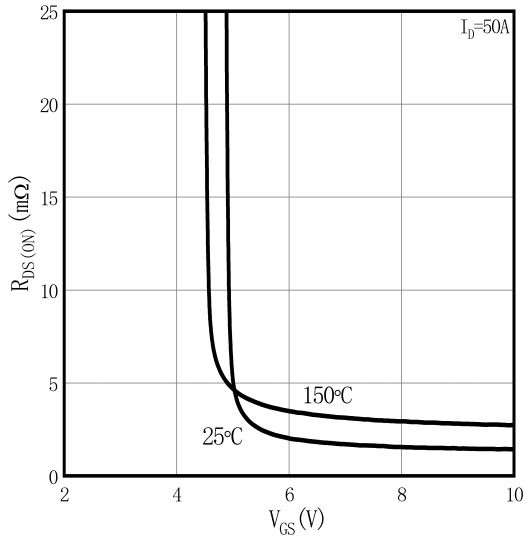


Figure 8.Body-Diode Characteristics

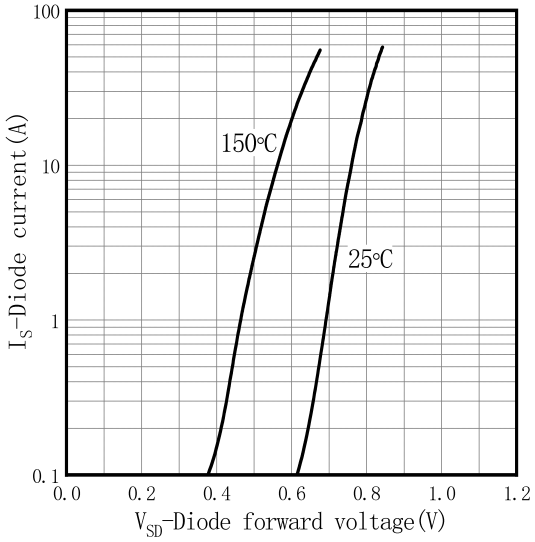


Figure 9.Capacitance Characteristics

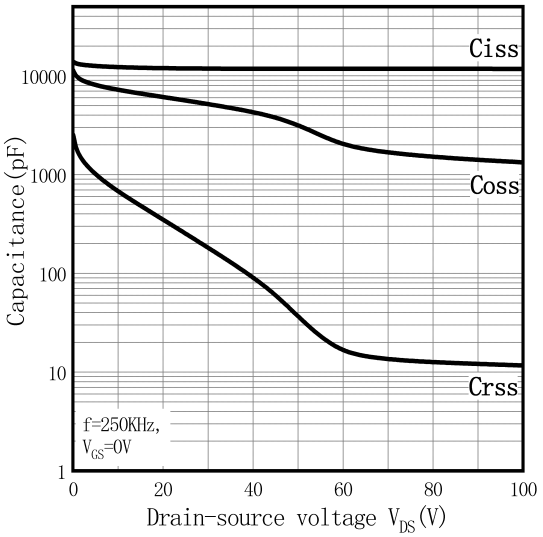


Figure 10.Gate Charge Characteristics

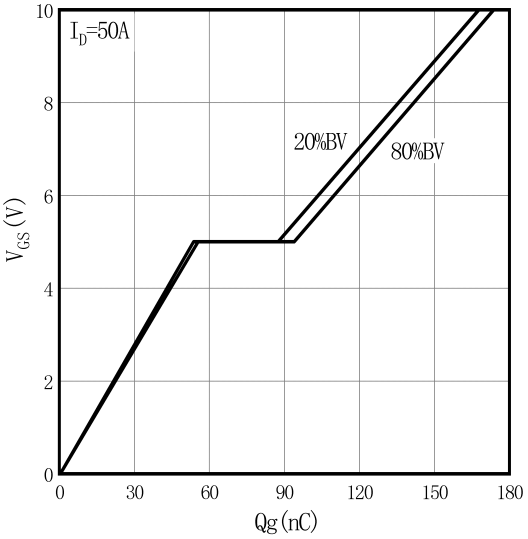


Figure 11.Drain Current Derating

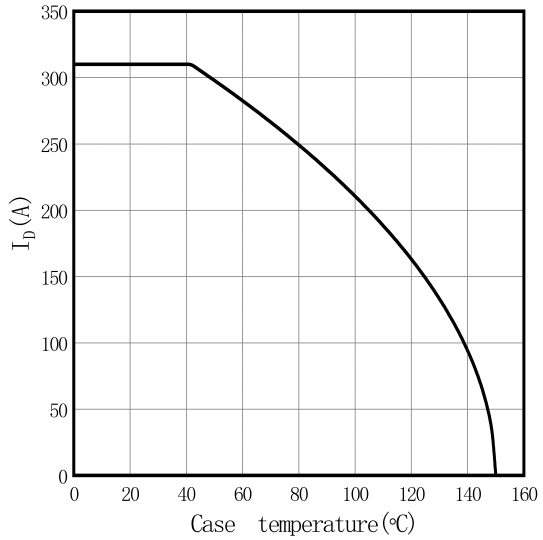


Figure 12.Power Dissipation vs.Temperature

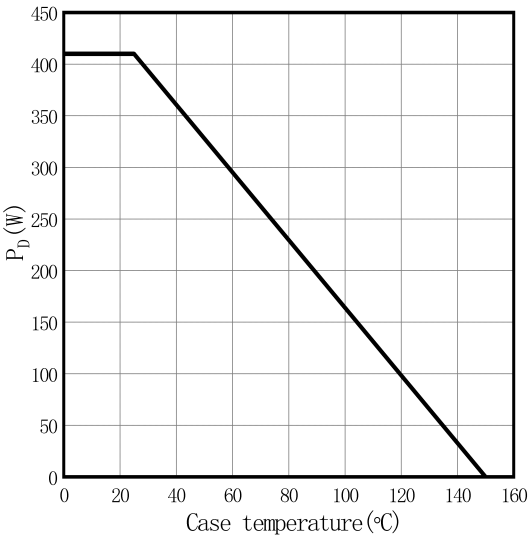


Figure 13. Safe Operating Area

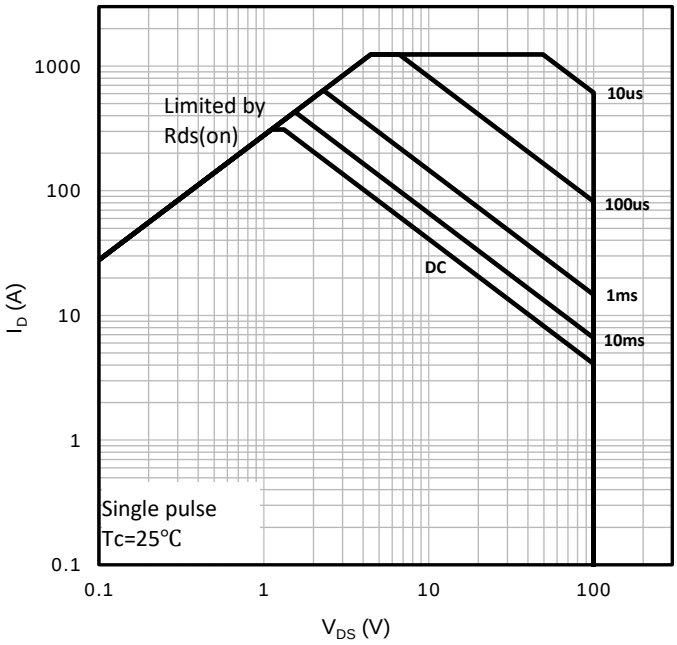
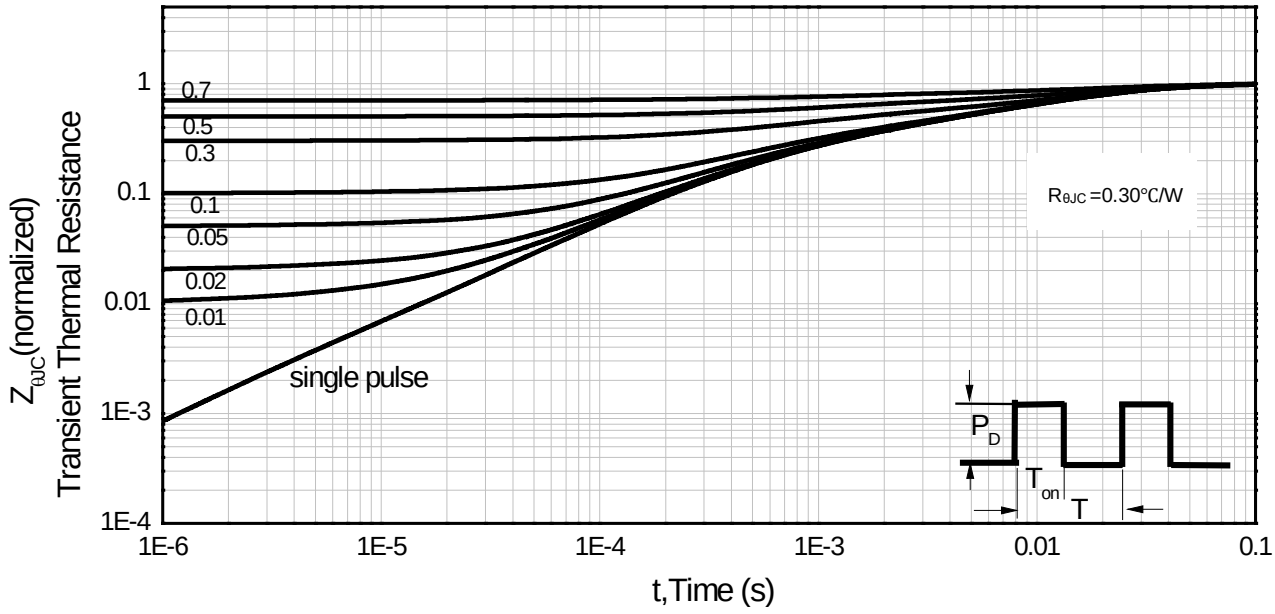
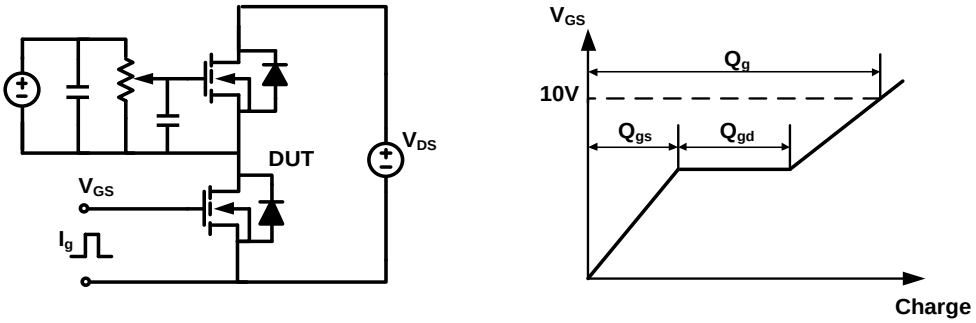


Figure 14. Normalized Maximum Transient Thermal Impedance (R_{thJC})

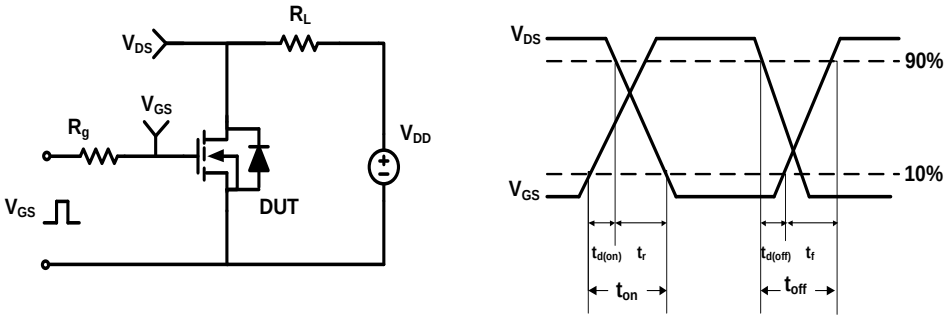


Test Circuit & Waveforms

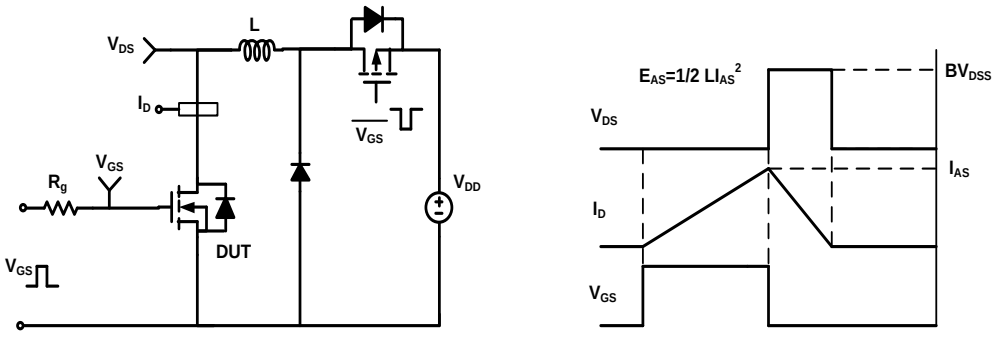
Gate Charge Test Circuit & Waveform



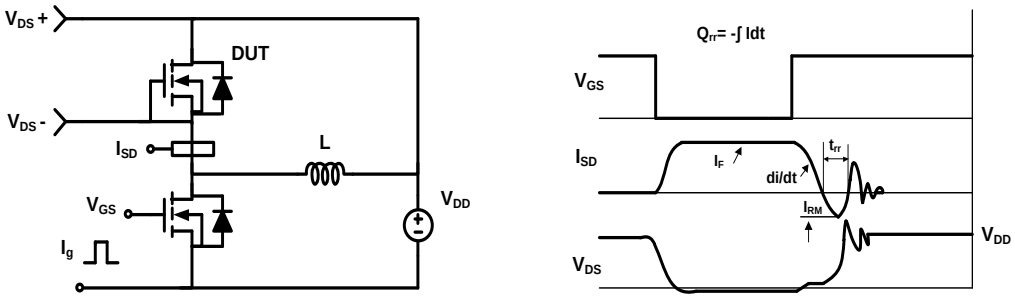
Resistive Switching Test Circuit & Waveform



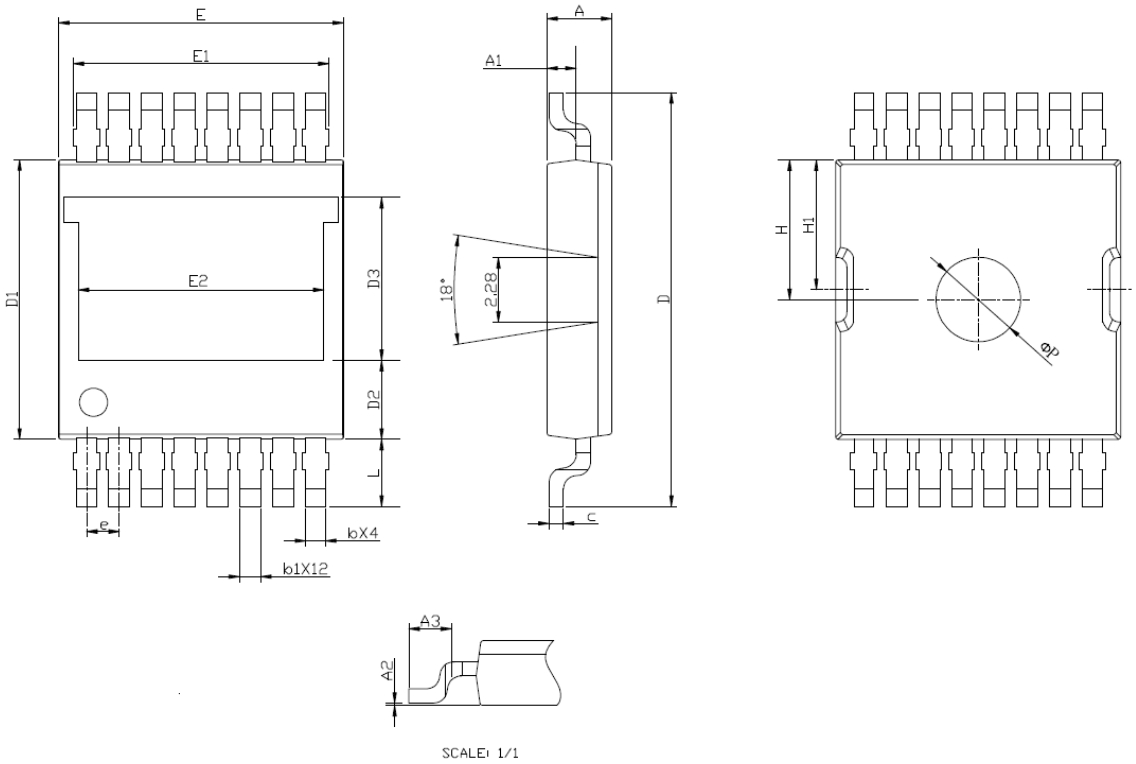
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TOLT



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.25	2.35	0.089	0.093
A1	1.00	1.08	0.039	0.043
A2	0.01	0.16	0.000	0.006
A3	1.50REF		0.059REF	
b	0.73	0.79	0.029	0.031
b1	0.68	0.74	0.027	0.029
c	0.45	0.55	0.018	0.022
D	14.80	15.20	0.583	0.598
D1	10.00	10.30	0.394	0.406
D2	2.60	3.00	0.102	0.118
D3	5.77REF		0.227REF	
E	9.70	10.10	0.382	0.398
E1	9.46REF		0.372REF	
E2	8.70REF		0.343REF	
e	1.18	1.22	0.046	0.048
H	5.00	5.40	0.197	0.213
H1	4.40	4.80	0.173	0.189
L	2.40	2.50	0.094	0.098
ΦP	2.80	3.20	0.110	0.126

Revision History

LSGTT10R018

Revision 1.1

Disclaimer

The content specified herein is for the purpose of introducing LONTEN's products (hereinafter "Products"). The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

LONTEN does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of the Products or technical information described in this document.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). LONTEN shall bear no responsibility in any way for use of any of the Products for the above special purposes.

Although LONTEN endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a LONTEN product.

The content specified herein is subject to change for improvement without notice. When using a LONTEN product, be sure to obtain the latest specifications.