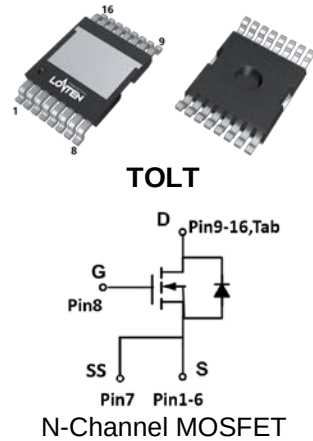


Lonten N-channel 600V, 45A, 69mΩ LonFET™ Power MOSFET

Description LonFET™ Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency. Features ● Ultra low $R_{DS(on)}$ ● Ultra low gate charge (typ. $Q_g = 75.1nC$) ● 100% UIS tested ● RoHS compliant Applications ● Power factor correction (PFC). ● Switched mode power supplies (SMPS). ● Uninterruptible power supply (UPS).	Product Summary <table> <tr> <td>V_{DS}</td><td>600V</td></tr> <tr> <td>$R_{DS(on), max}$</td><td>69mΩ</td></tr> <tr> <td>I_{DM}</td><td>135A</td></tr> <tr> <td>$Q_{g,typ}$</td><td>75.1nC</td></tr> </table> Pin Configuration  TOLT D Pin9-16,Tab G Pin8 SS Pin7 S Pin1-6 N-Channel MOSFET	V_{DS}	600V	$R_{DS(on), max}$	69mΩ	I_{DM}	135A	$Q_{g,typ}$	75.1nC
V_{DS}	600V								
$R_{DS(on), max}$	69mΩ								
I_{DM}	135A								
$Q_{g,typ}$	75.1nC								

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	600	V
Continuous drain current ($T_C = 25^{\circ}C$)	I_D	45	A
($T_C = 100^{\circ}C$)		28	A
Pulsed drain current ¹⁾	I_{DM}	135	A
Gate-Source voltage	V_{GSS}	± 30	V
Avalanche energy, single pulse ²⁾	E_{AS}	1009	mJ
Power Dissipation	P_D	338	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}C$
Continuous diode forward current	I_S	45	A
Diode pulse current	$I_{S,pulse}$	135	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.37	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient, minimal footprint ³⁾	$R_{\theta JA}$	62	$^{\circ}C/W$
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{solder}	260	$^{\circ}C$

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Reel
LSTT60R069GF	TOLT	LSTT60R069GF	1200

Electrical Characteristics

 $T_c = 25^\circ\text{C}$ 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	600	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =0.9mA	3	3.83	5	V
Drain cut-off current	I _{DSS}	V _{DS} =600V, V _{GS} =0 V, T _J =25°C	-	-	10	μA
Gate leakage current, Forward	I _{GSSF}	V _{GS} =30 V, V _{DS} =0 V	-	-	100	nA
Gate leakage current, Reverse	I _{GSSR}	V _{GS} =-30 V, V _{DS} =0 V	-	-	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =59A T _J = 25°C T _J = 150°C	- - -	 61.86 149.7	 69 -	 mΩ
Gate resistance	R _G	f=1 MHz, open drain	-	1.32	-	Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =100V, V _{GS} =0V, f=250kHz	-	3291	-	pF
Output capacitance	C _{oss}		-	129	-	
Reverse transfer capacitance	C _{rss}		-	3.75	-	
Turn-on delay time	t _{d(on)}	V _{DD} =400V, I _D =23A R _G = 10Ω, V _{GS} =10V	-	71.1	-	ns
Rise time	t _r		-	9.8	-	
Turn-off delay time	t _{d(off)}		-	92.1	-	
Fall time	t _f		-	5.4	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =480V, I _D =23A, V _{GS} =0 to 10 V	-	18	-	nC
Gate to drain charge	Q _{gd}		-	30.9	-	
Gate charge total	Q _g		-	75.1	-	
Gate plateau voltage	V _{plateau}		-	5.6	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0V, I _F =23A	-	-	1.1	V
Reverse recovery time	t _{rr}	V _R =400V, I _F =23A, dI _F /dt=100 A/μs	-	147.7	-	ns
Reverse recovery charge	Q _{rr}		-	1080.9	-	nC
Peak reverse recovery current	I _{rrm}		-	13.4	-	A

Notes:

- Limited by maximum junction temperature, maximum duty cycle is 0.75.
- $I_{AS}=5.8A, L=60mH, V_{DD}=60V$, Starting $T_j=25^\circ\text{C}$.
- 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

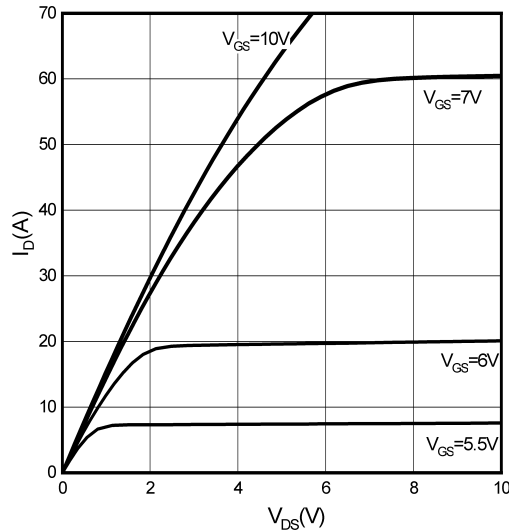


Figure 2. Transfer Characteristics

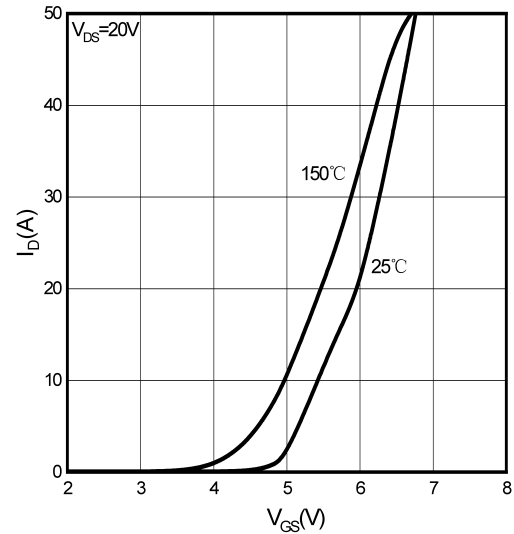


Figure 3. On-Resistance vs. Drain Current

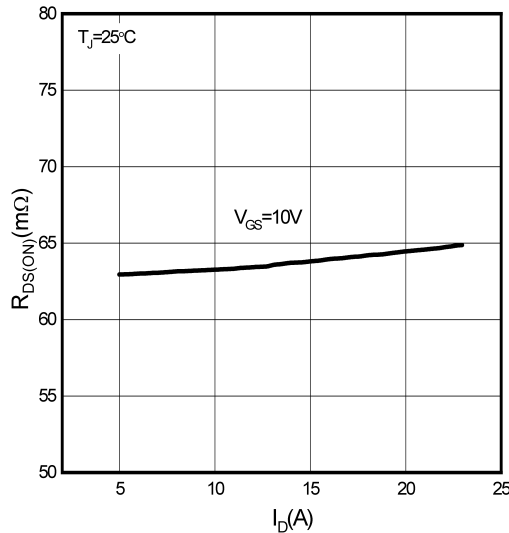


Figure 4. On-Resistance vs. Temperature

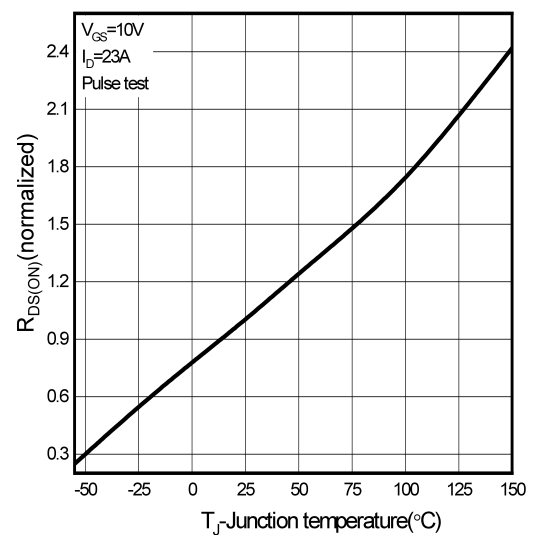


Figure 5. Breakdown Voltage vs. Temperature

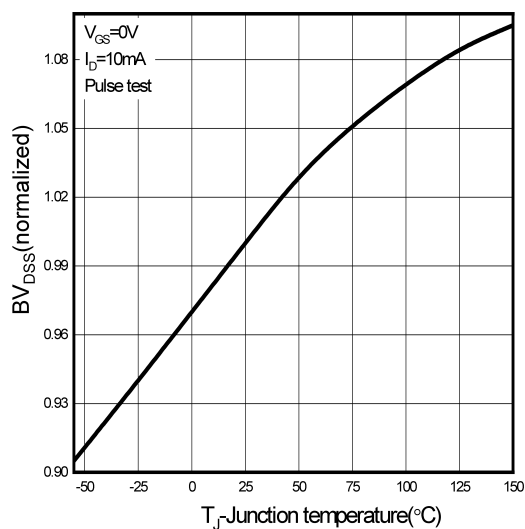


Figure 6. Threshold Voltage vs. Temperature

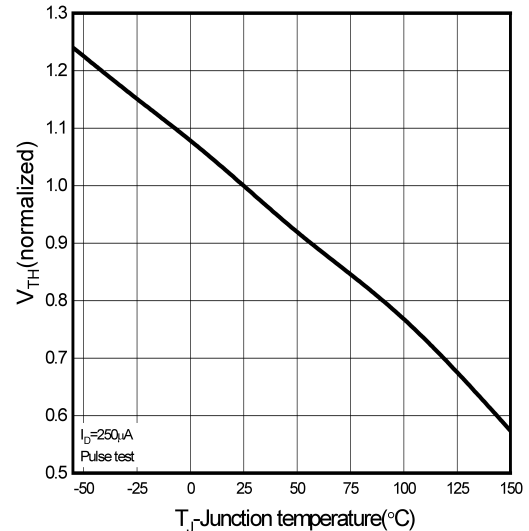


Figure 7.Body-Diode Characteristics

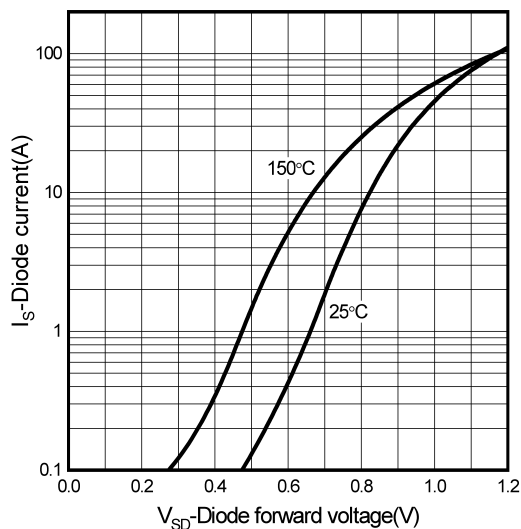


Figure 8.Capacitance Characteristics

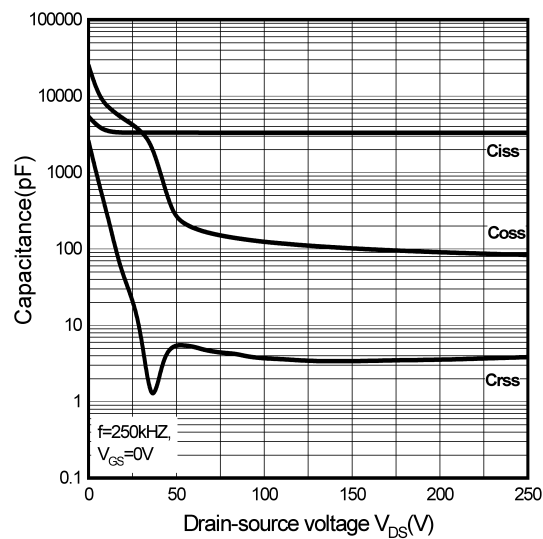


Figure 9.Gate Charge Characteristics

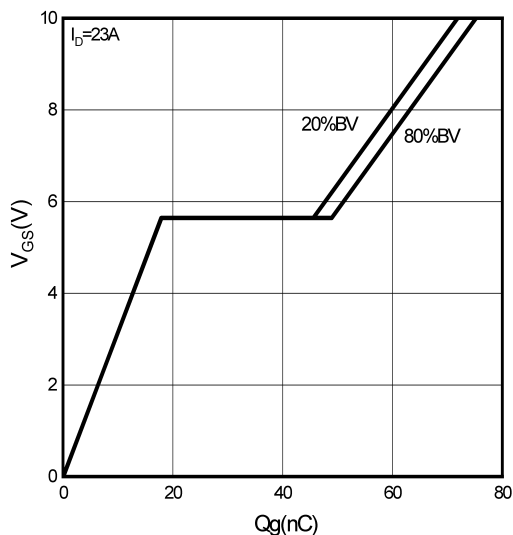


Figure 10.Drain Current Derating

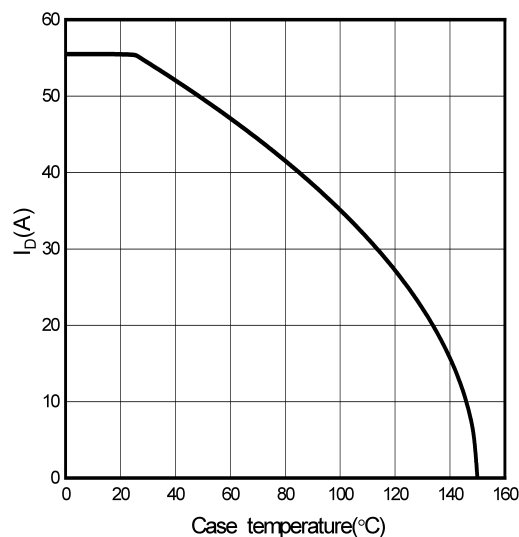


Figure 11.Power Dissipation vs.Temperature

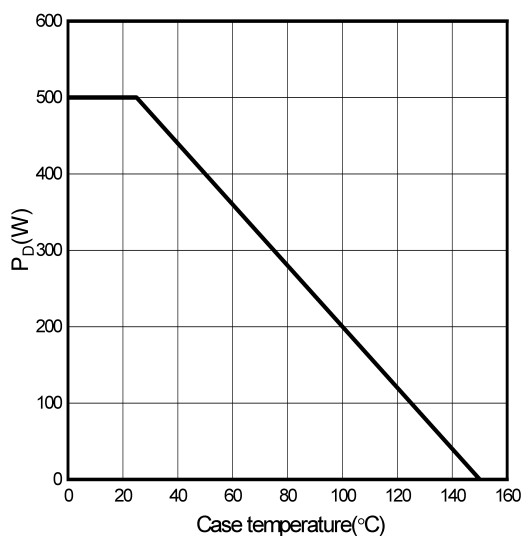


Figure 12. Safe Operating Area

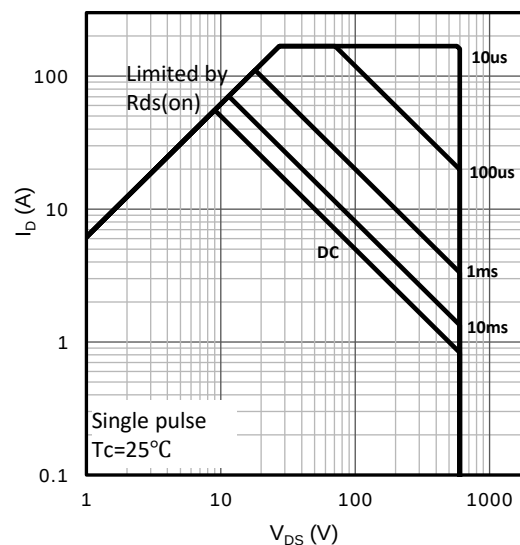
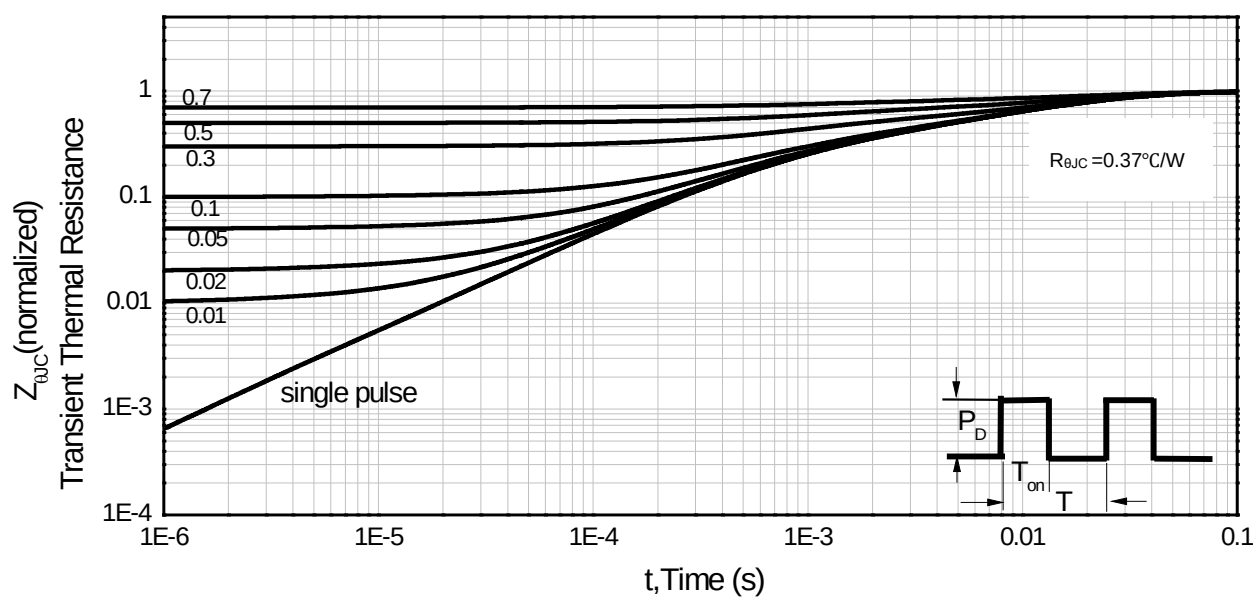
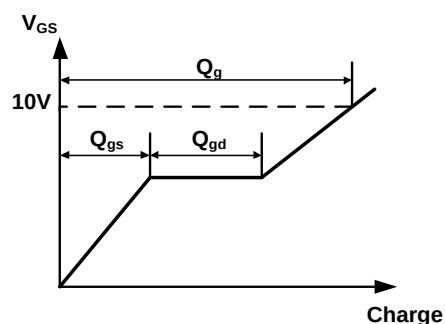
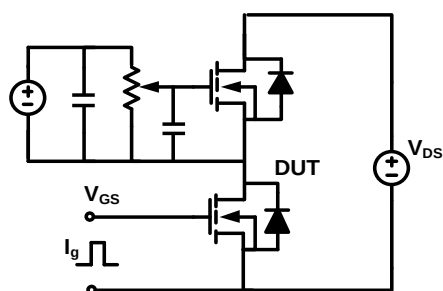


Figure 13. Normalized Maximum Transient Thermal Impedance (R_{thJC})

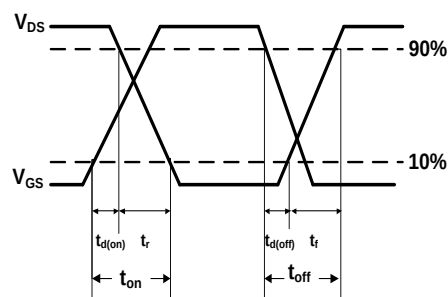
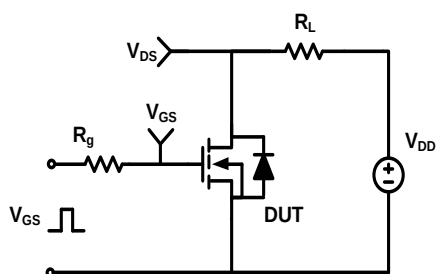


Test Circuit & Waveforms

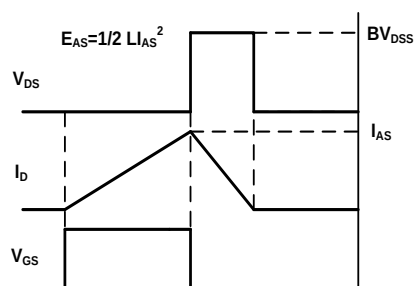
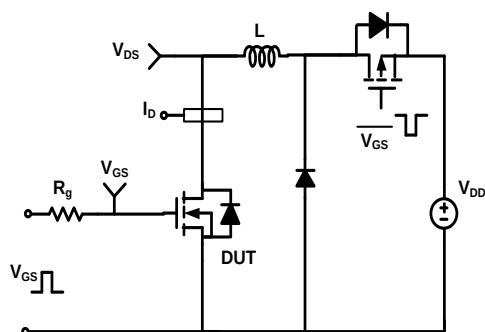
Gate Charge Test Circuit & Waveform



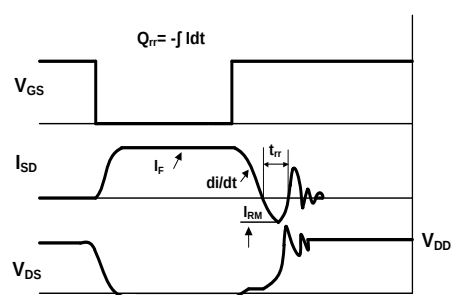
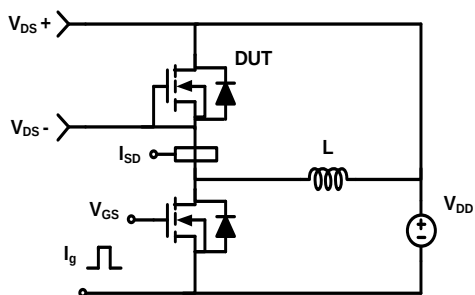
Resistive Switching Test Circuit & Waveform



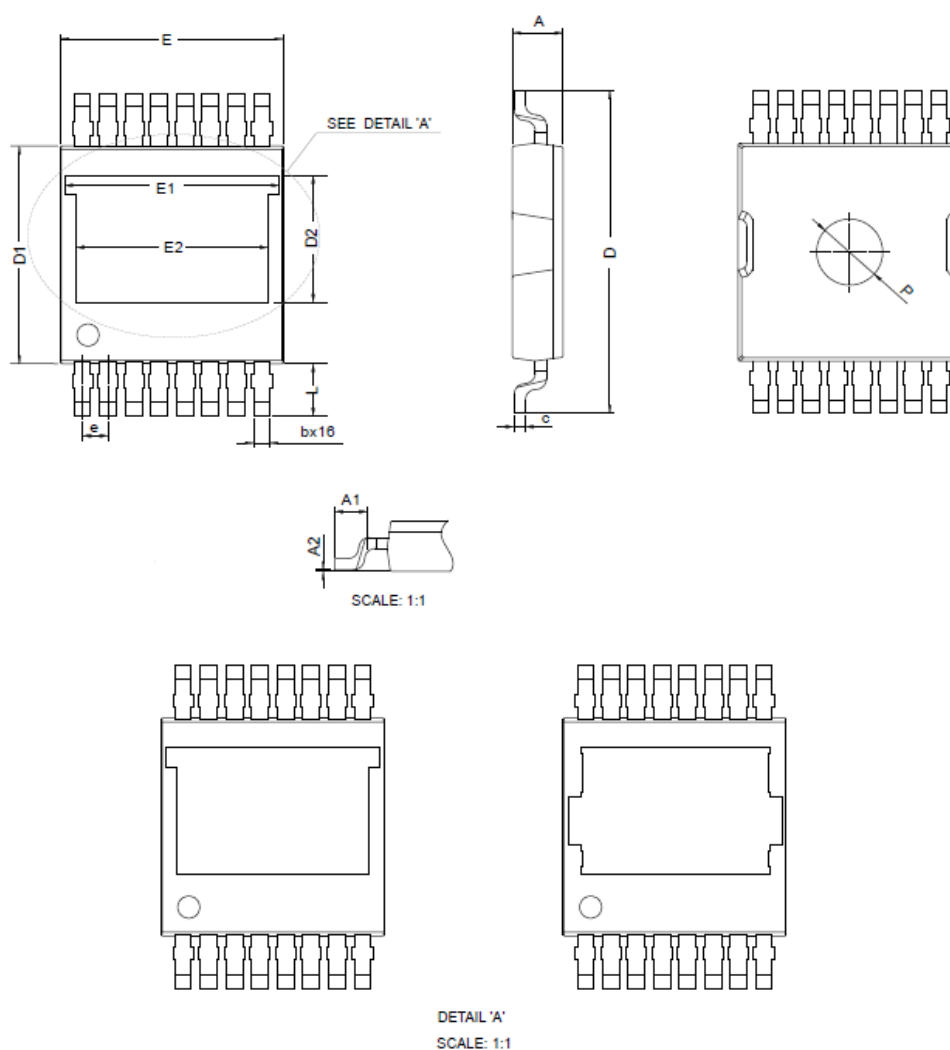
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



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	1.40	1.60	0.055	0.063
A2	0.01	0.16	0.000	0.006
b	0.60	0.80	0.024	0.031
c	0.40	0.60	0.016	0.024
D	14.80	15.20	0.583	0.598
D1	10.00	10.30	0.394	0.406
D2	5.57	5.77	0.219	0.227
E	9.70	10.10	0.382	0.398
E1	8.70	9.46	0.343	0.372
E2	8.25	8.50	0.325	0.335
e	1.18	1.22	0.046	0.048
L	2.35	2.55	0.093	0.100
P	2.80	3.20	0.110	0.126

Version Information

LSTT60R069GF

Revision 1.0

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