Lonten N-channel 650V, 7.2A, 0.65Ω 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=14nC)
- 100% UIS tested
- RoHS compliant

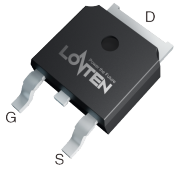
Applications

- Power factor correction (PFC).
- Switched mode power supplies (SMPS).
- Uninterruptible power supply (UPS).

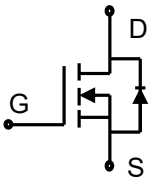
Product Summary

V_{DS}	650V
$R_{DS(on),\ max}$	0.65Ω
I_{DM}	21.6A
$Q_{g,typ}$	14nC

Pin Configuration



TO-252



N-Channel MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current [1] (T_C = 25°C)	I_D	7.2	A
(T_C = 100°C)		4.5	A
Pulsed drain current [2]	I_{DM}	21.6	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [3]	E_{AS}	158.7	mJ
Power Dissipation	P_D	80	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	7.2	A
Diode pulse current	$I_{S,pulse}$	21.6	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.56	°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
LSG65R650GMB	TO-252	LSG65R650GMB	2500

Electrical Characteristics

T_c = 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	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.5	3.5	4.5	V
Drain cut-off current	I_{DSS}	V_{DS}=650V, V_{GS}=0 V,T_j =25°C	-	-	1	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=3.5A T_j = 25°C T_j = 150°C	- - -	 0.57 1.378	 0.65 -	Ω
Gate resistance	R_G	f=1 MHz, open drain	-	6.03	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} =100V, V_{GS}=0V, f=250kHz	-	565	-	pF
Output capacitance	C_{oss}		-	21.55	-	
Reverse transfer capacitance	C_{rss}		-	0.77	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} =400V, I_D=3.5A R_G = 10Ω, V_{GS}=10V	-	36.8	-	ns
Rise time	t_r		-	9.8	-	
Turn-off delay time	$t_{d(off)}$		-	27.9	-	
Fall time	t_f		-	15.6	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=520V, I_D=3.5A, V_{GS}=0 to 10 V	-	2.9	-	nC
Gate to drain charge	Q_{gd}		-	6.3	-	
Gate charge total	Q_g		-	14	-	
Gate plateau voltage	$V_{plateau}$		-	5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=3.5A	-	-	1.1	V
Reverse recovery time	t_{rr}	V_R=400V, I_F=3.5A, dI_F/dt=100 A/μs	-	198.1	-	ns
Reverse recovery charge	Q_{rr}		-	1123.7	-	nC
Peak reverse recovery current	I_{rrm}		-	12.74	-	A

Notes:

1. Limited by maximum junction temperature and duty cycle.
2. Limited by maximum junction temperature, maximum duty cycle is 0.75.
3. I_{AS}=2.3A, L=60mH, V_{DD}=60V, Starting Tj= 25°C.
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

Fig 1: Output Characteristics

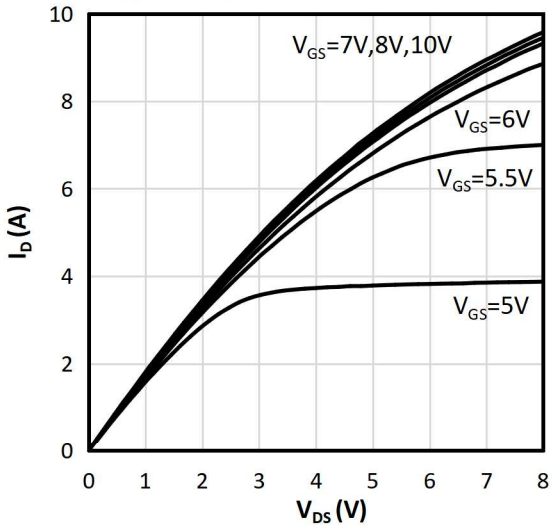


Fig 2: Transfer Characteristics

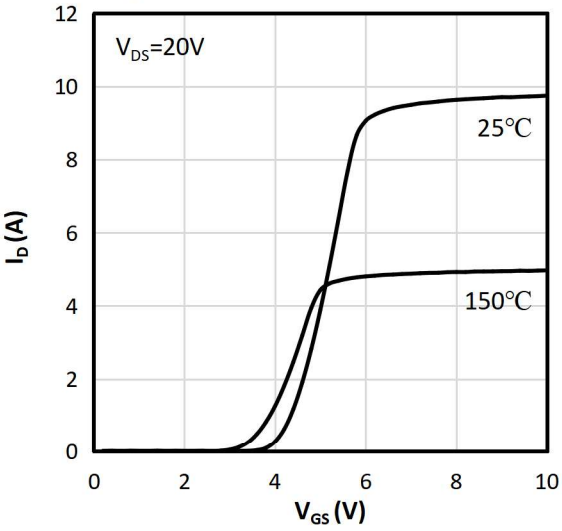


Fig 3: Rds(on) vs Drain Current

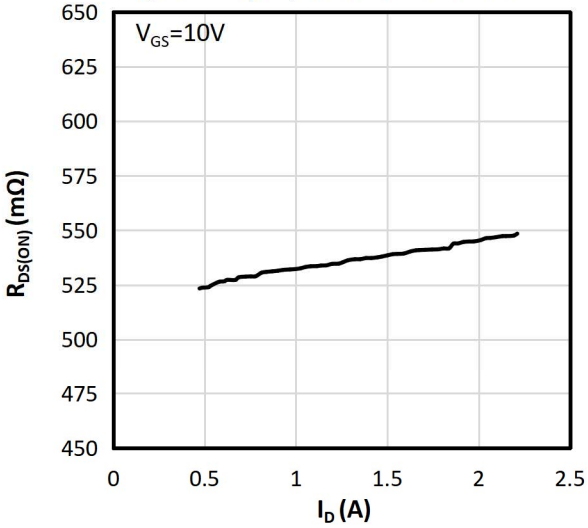


Fig 4: Rds(on) vs. Temperature

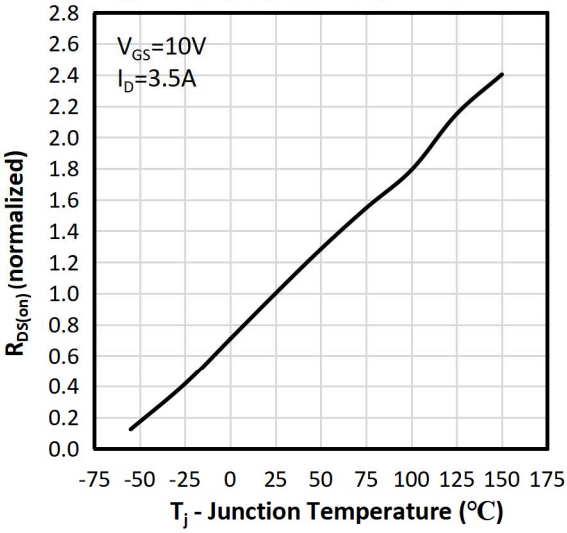


Fig 5: Breakdown Voltage vs. Temperature

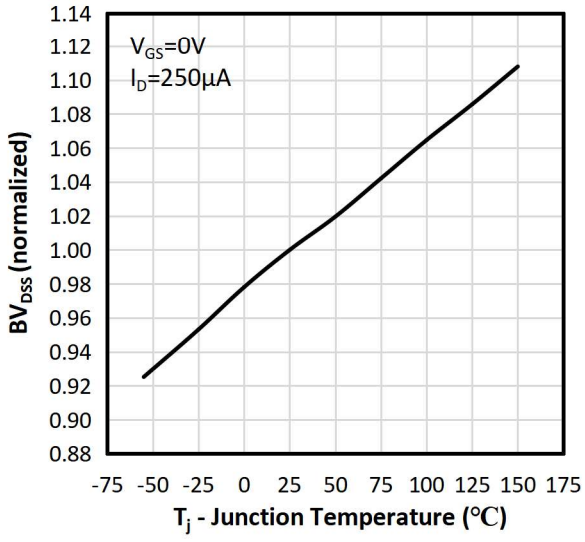


Fig 6: Threshold voltage vs. Temperature

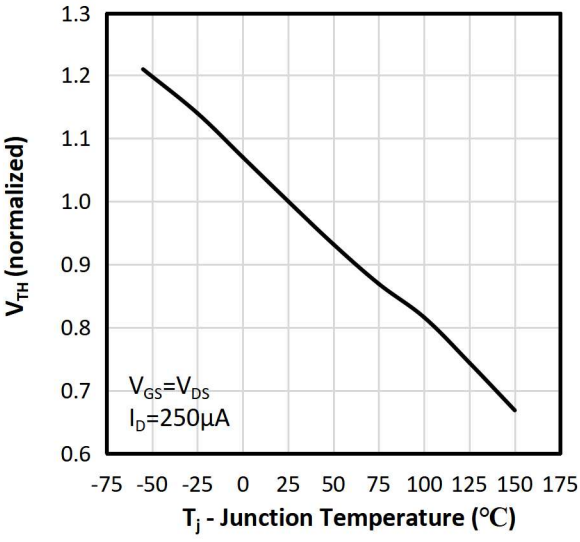


Fig 7: Body-Diode Characteristics

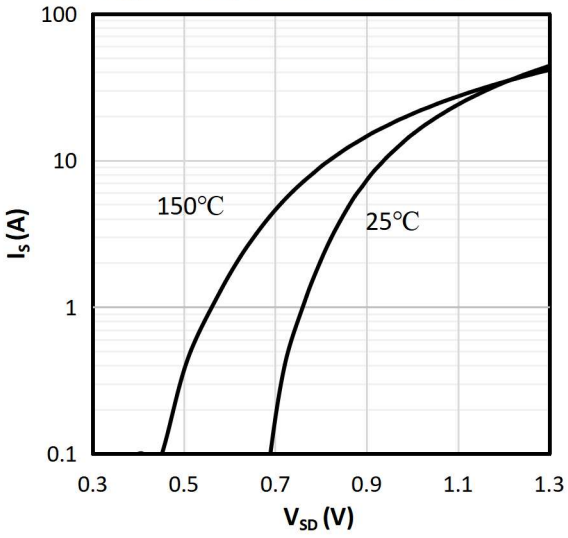


Fig 8: Capatitance Characteristics

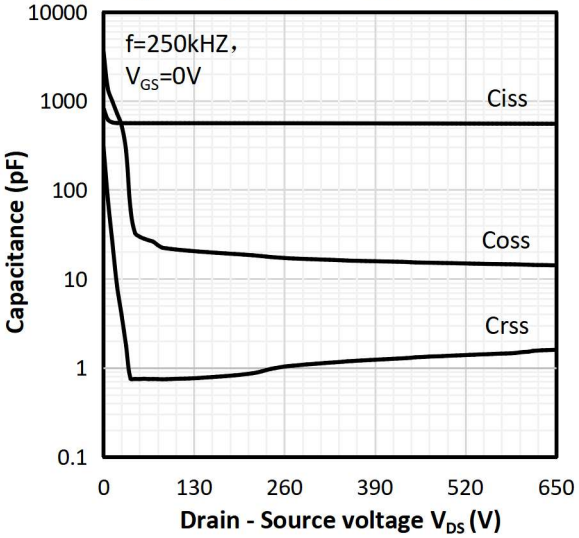


Fig 9: Gate charger Characteristics

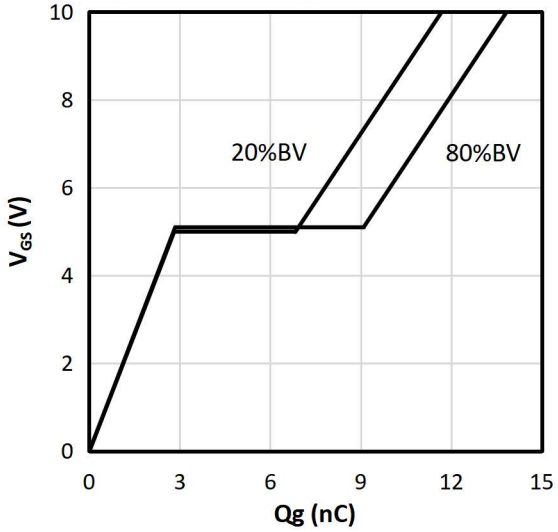


Fig 10: Drain Current Derating

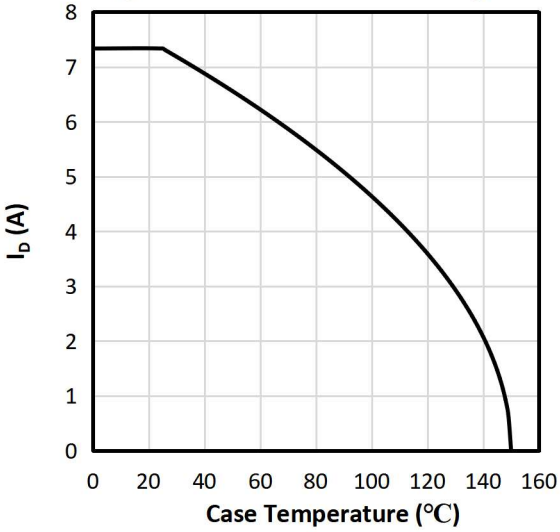


Fig 11: Power Dissipation vs.Temperature

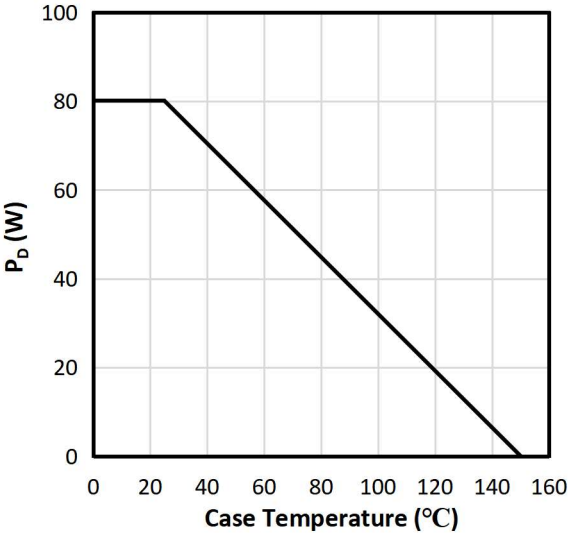


Fig 12: Safe Operating Area

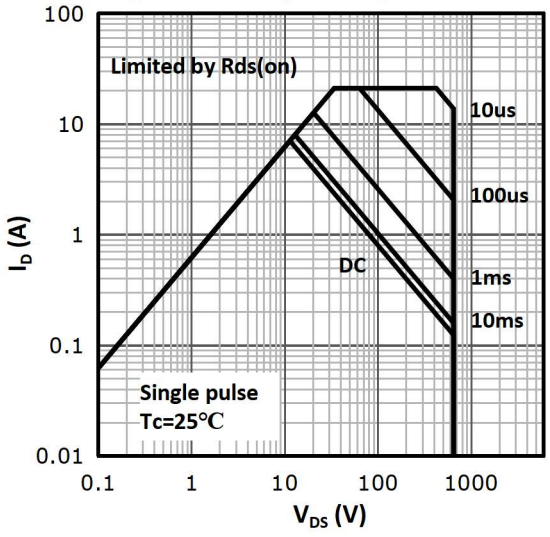
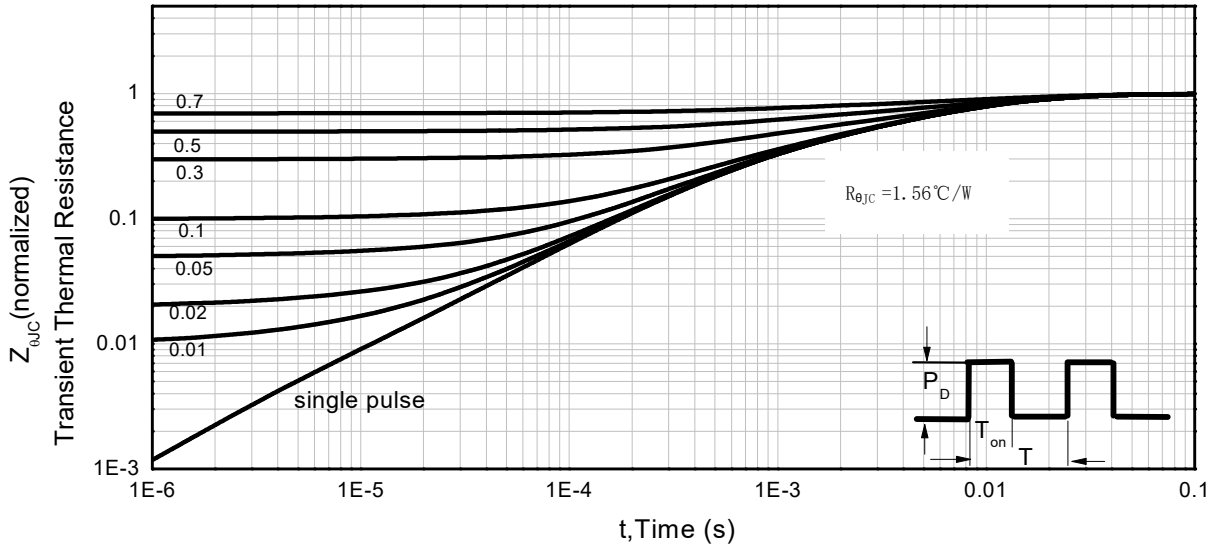
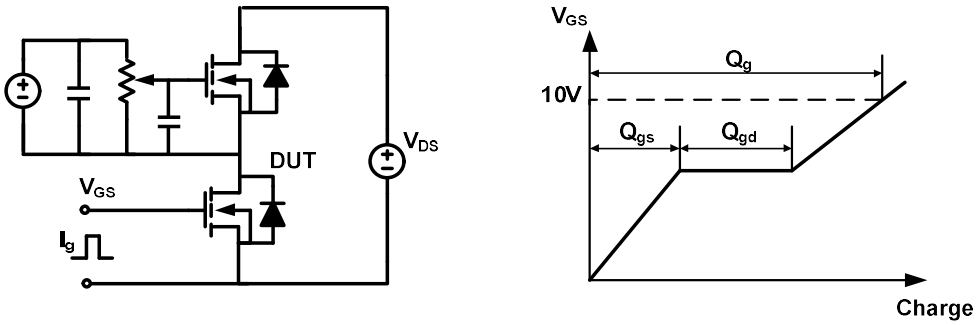


Figure 13. Normalized Maximum Transient Thermal Impedance (R_{thJC})

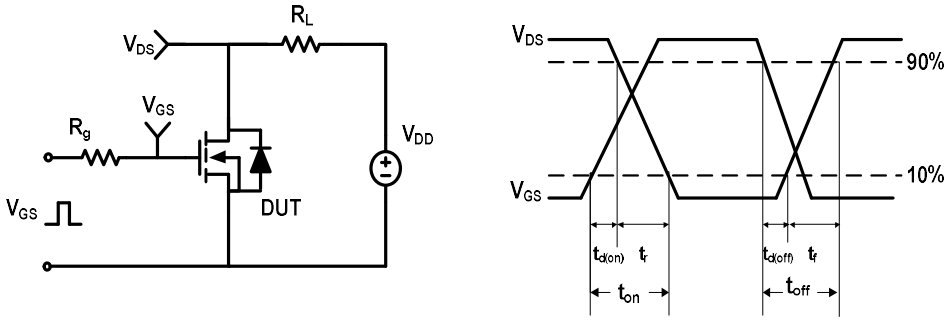


Test Circuit & Waveforms

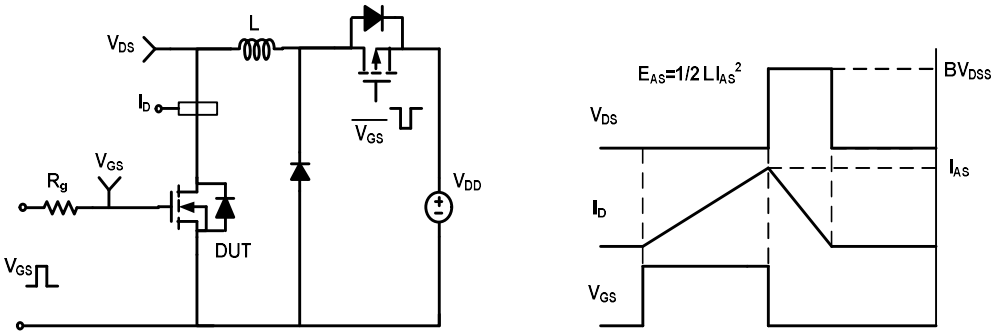
Gate Charge Test Circuit & Waveform



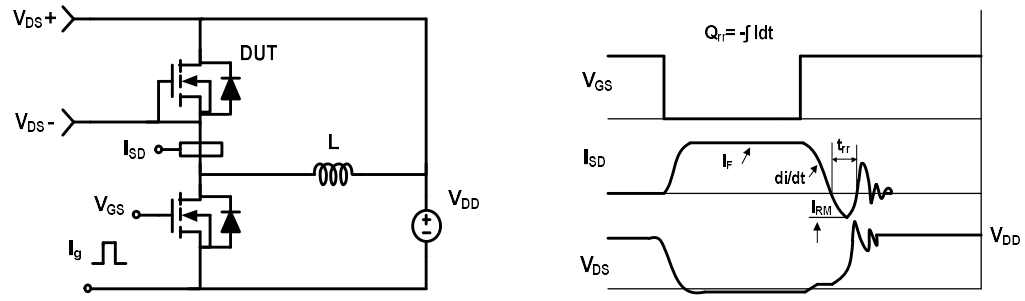
Resistive Switching Test Circuit & Waveform



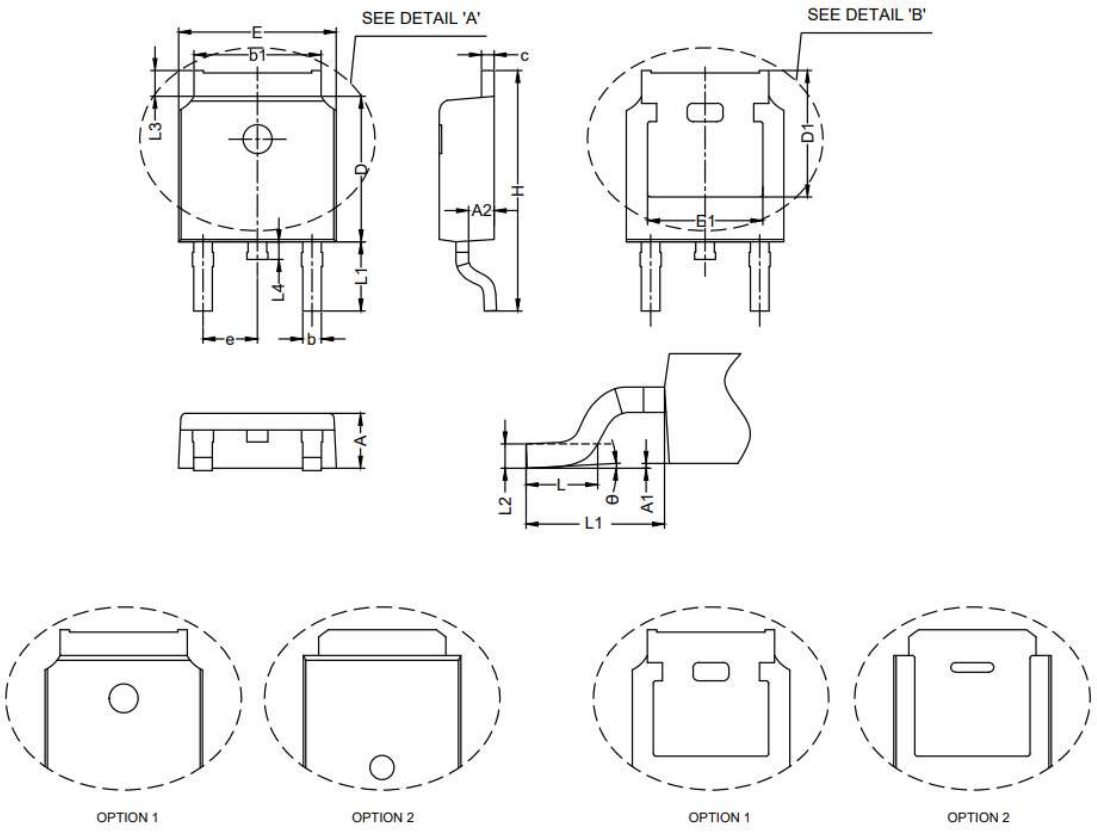
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TO-252



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.10	2.50	0.083	0.098
A1	0.00	0.20	0.000	0.008
A2	0.85	1.17	0.033	0.046
b	0.60	0.90	0.024	0.035
b1	4.95	5.48	0.195	0.216
c	0.41	0.61	0.016	0.024
D	5.95	6.35	0.234	0.250
D1	5.21	-	0.205	-
E	6.35	6.80	0.250	0.268
E1	4.32	-	0.170	-
e	2.286 BSC		0.090 BSC	
H	9.40	10.50	0.370	0.413
L	0.95	1.78	0.037	0.070
L1	2.90 REF		0.114 REF	
L2	0.51 BSC		0.020 BSC	
L3	0.88	1.28	0.035	0.050
L4	-	1.02	-	0.040
θ	0°	10°	0°	10°

Version Information

LSG65R650GMB
Revision 1.1

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