Lonten N-channel 650V, 7A, 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 = 10.2nC)
- 100% UIS tested
- RoHS compliant

Applications

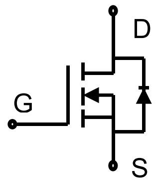
- Power factor correction (PFC).
- Switched mode power supplies (SMPS).
- Uninterruptible power supply (UPS).

Product Summary

V_{DS} @ $T_{j,max}$	700V
$R_{DS(on),max}$	0.65Ω
I_{DM}	21A
$Q_{g,typ}$	10.2 nC

Pin Configuration

TO-252



N-Channel MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current (T_C = 25°C)	I_D	7	A
(T_C = 100°C)		4.4	A
Pulsed drain current 1)	I_{DM}	21	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse 2)	E_{AS}	120	mJ
Power Dissipation	P_D	69	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	7	A
Diode pulse current	$I_{S,pulse}$	21	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.8	°C/W
Thermal Resistance, Junction-to-Ambient 3)	$R_{\theta JA}$	130	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Reel
LSG65R650HT	TO-252	LSG65R650HT	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}=0 V, I_D=0.25 mA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25mA	2.5	3.5	4.5	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V,T_j = 25°C	-	-	0.6	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=3.5 A	-			Ω
		T_j = 25°C	-	0.55	0.65	
		T_j = 150°C	-	1.22	-	
Gate resistance	Rg	f=1 MHz,open drain	-	7.5	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V, f = 250 kHz	-	484	-	pF
Output capacitance	C_{oss}		-	23.4	-	
Reverse transfer capacitance	C_{rss}		-	0.83	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 400V, I_D = 3.5A R_G = 10Ω, V_{GS}=15V	-	15.3	-	ns
Rise time	t_r		-	32.6	-	
Turn-off delay time	$t_{d(off)}$		-	42	-	
Fall time	t_f		-	9.4	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=520 V, I_D=3.5A, V_{GS}=0 to 10 V	-	1.9	-	nC
Gate to drain charge	Q_{gd}		-	3.5	-	
Gate charge total	Q_g		-	10.2	-	
Gate plateau voltage	$V_{plateau}$		-	4	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=3.5A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=400 V, I_F=3.5A, dI_F/dt=100 A/μs	-	190	-	ns
Reverse recovery charge	Q_{rr}		-	1.5	-	μC
Peak reverse recovery current	I_{rrm}		-	15.7	-	A

Notes:

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

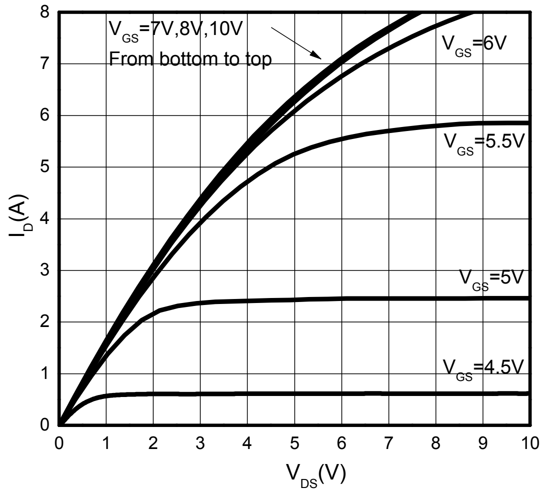


Figure 2. Transfer Characteristics

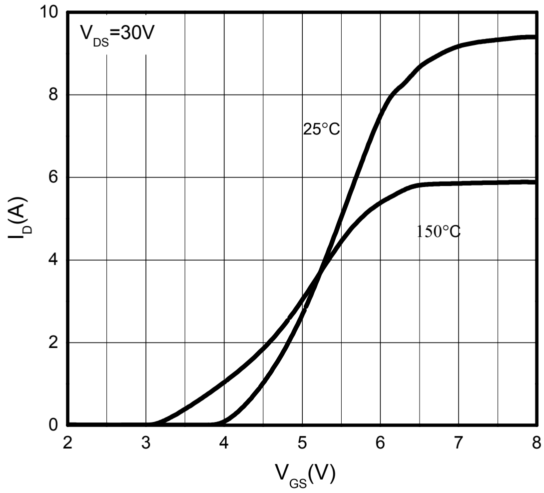


Figure 3. On-Resistance vs. Drain Current

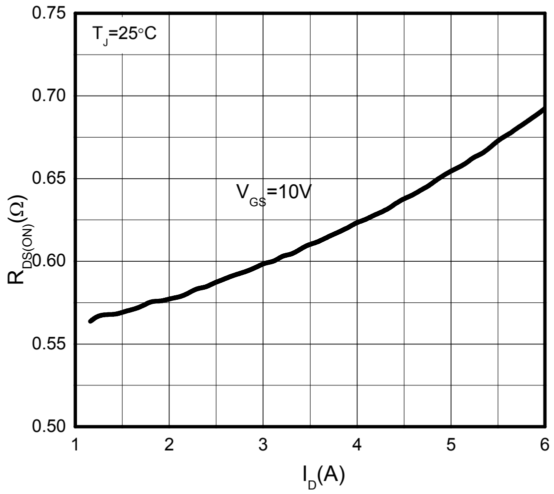


Figure 4.On-Resistance vs.Temperature

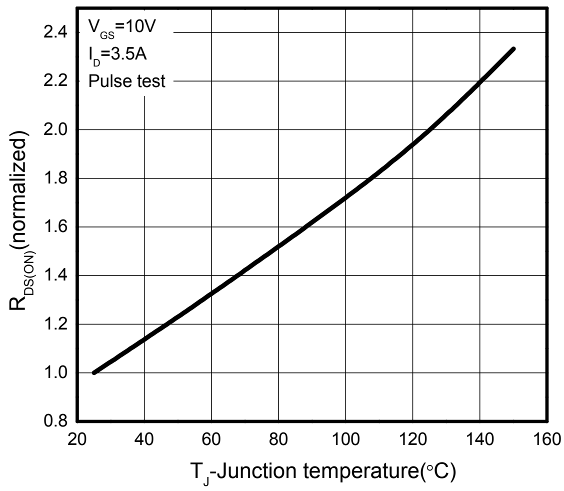


Figure 5.Breakdown Voltage vs.Temperature

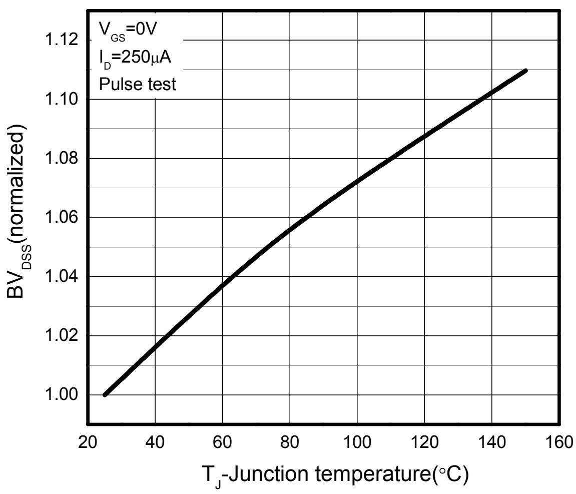


Figure 6.Threshold Voltage vs.Temperature

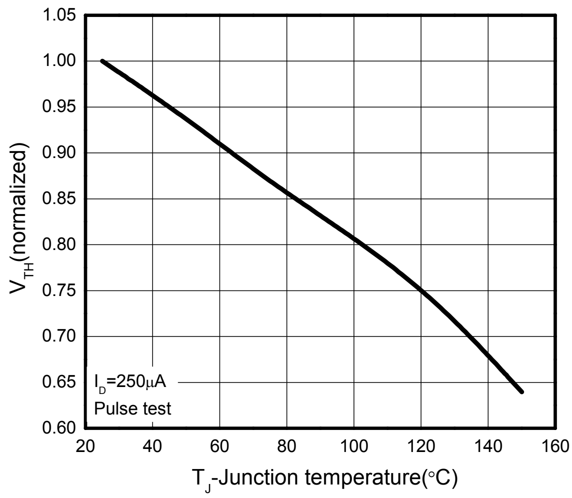


Figure 7.Body-Diode Characteristics

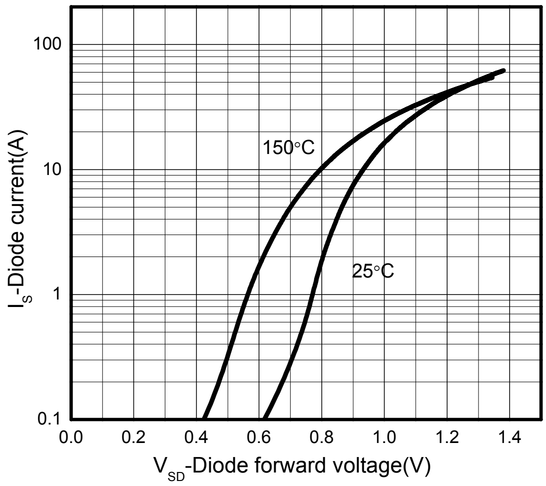


Figure 8.Capacitance Characteristics

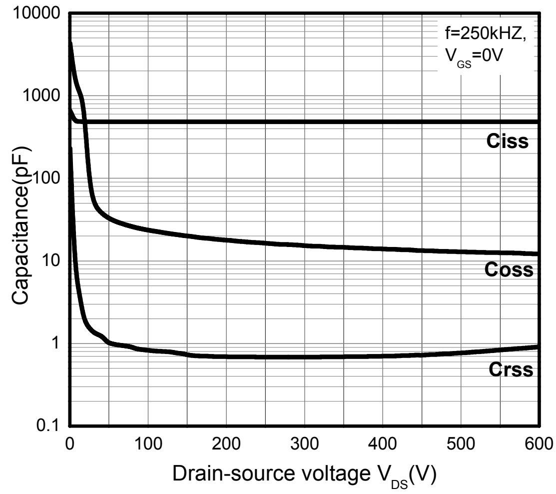


Figure 9.Gate Charge Characteristics

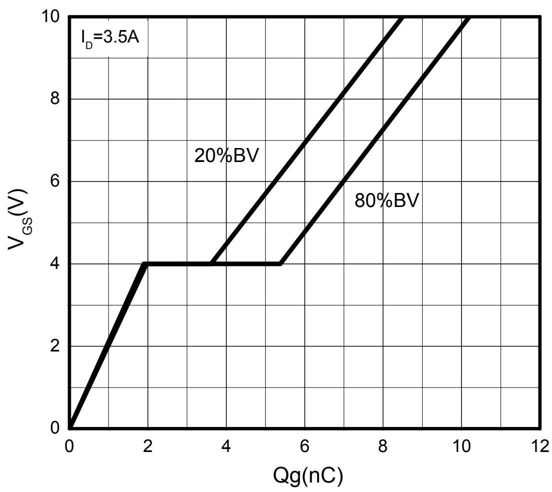


Figure 10.Drain Current Derating

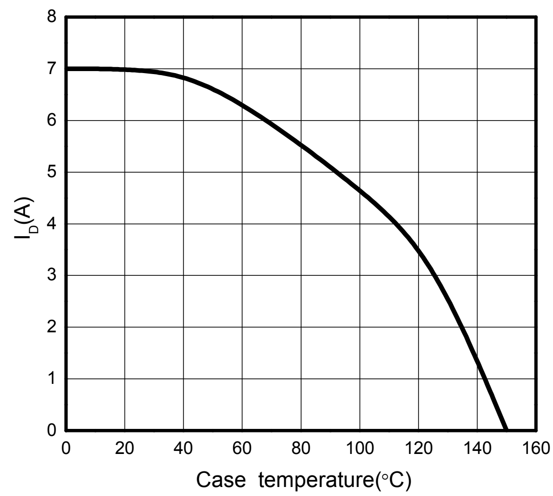


Figure 11.Power Dissipation vs.Temperature

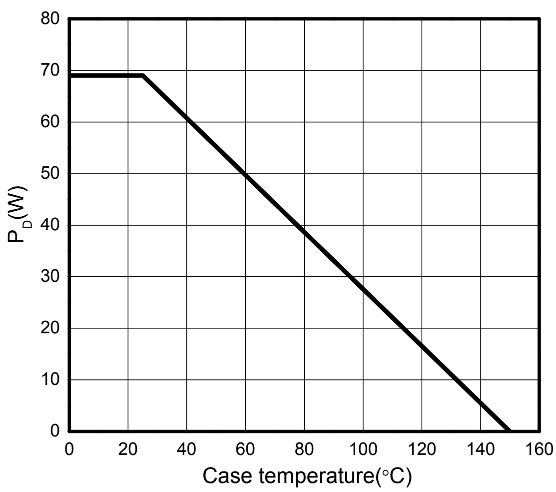


Figure 12: Safe Operating Area

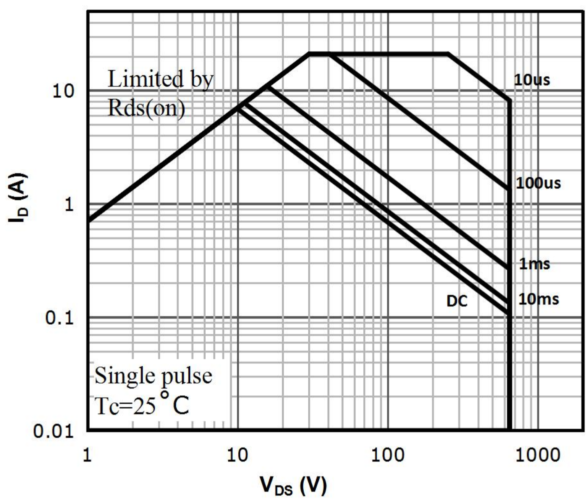
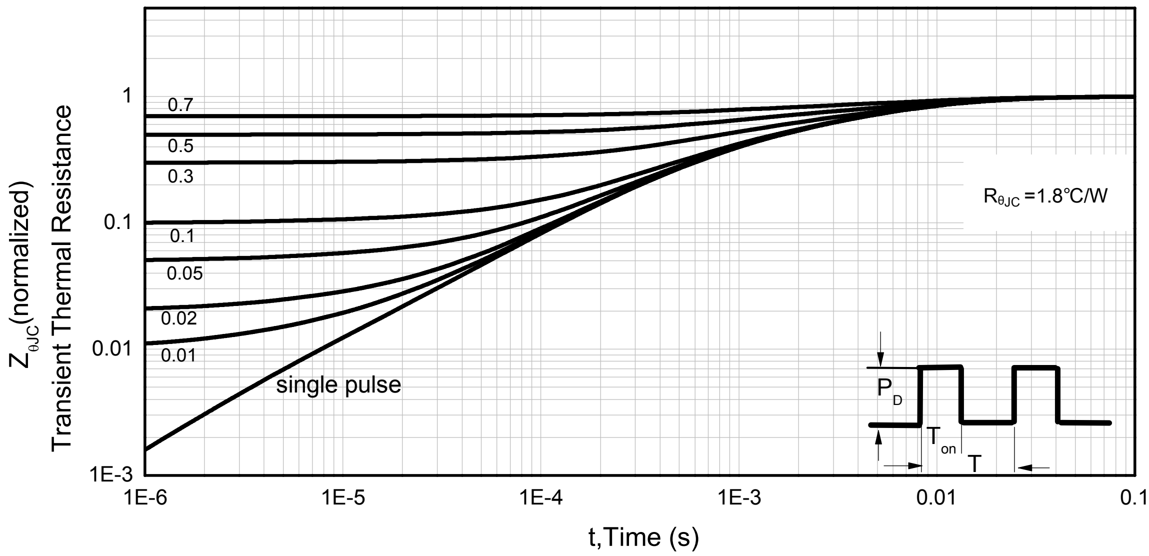
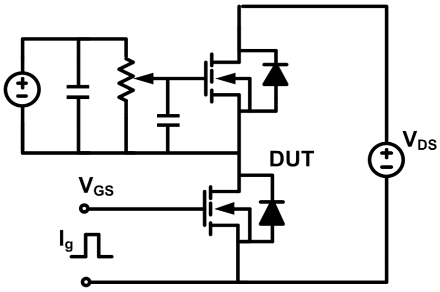


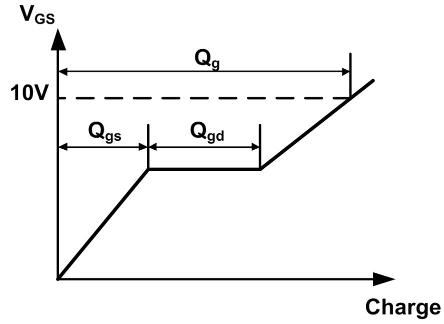
Figure 13. Normalized Maximum Transient Thermal Impedance (RthJC)



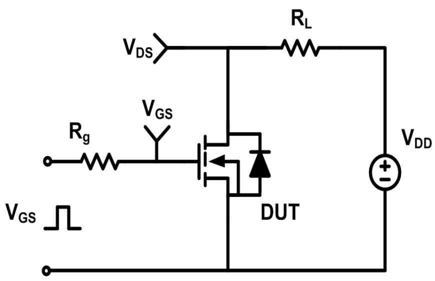
Test Circuit & Waveforms

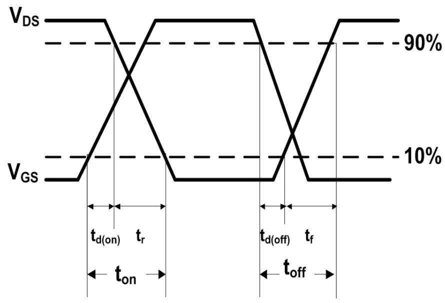
Gate Charge Test Circuit & Waveform



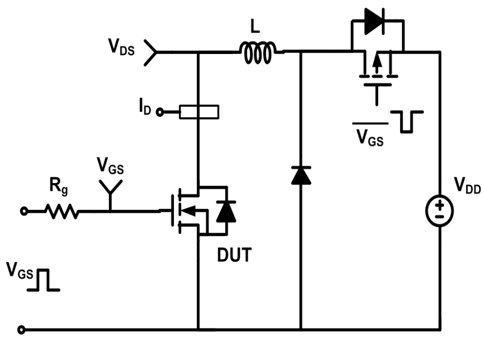


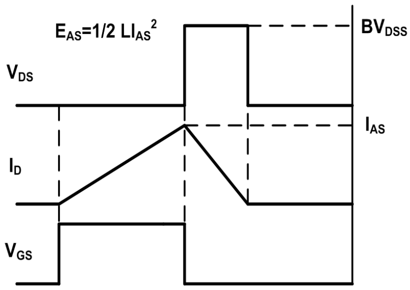
Resistive Switching Test Circuit & Waveform



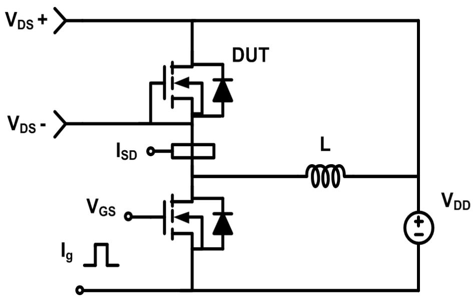


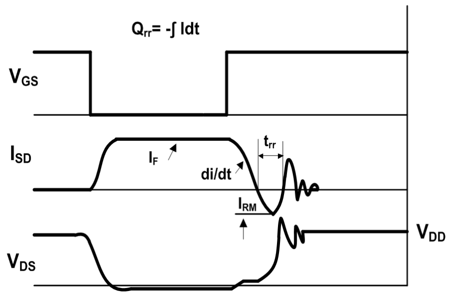
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



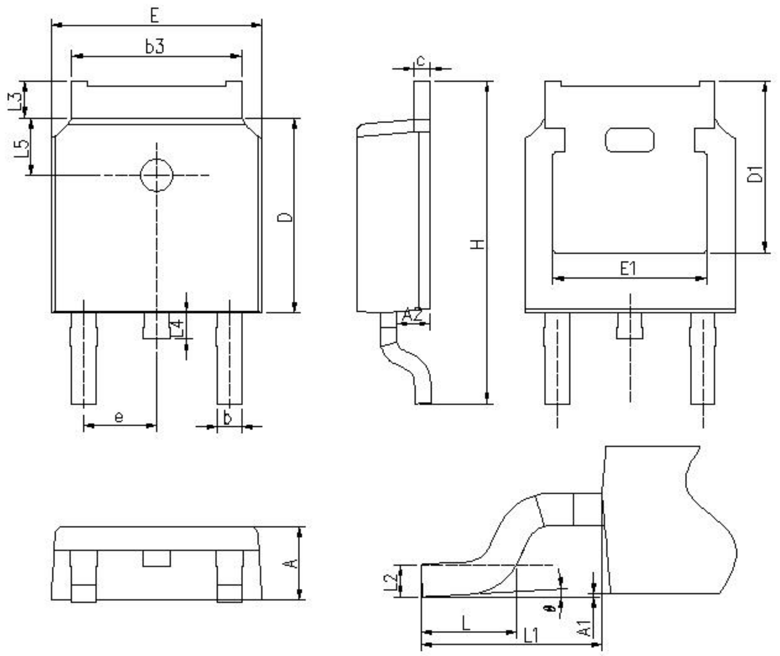


Diode Recovery Test Circuit & Waveform





Mechanical Dimensions for TO-252



DIMENSIONS IN MILLITMETERS		
SYMBOL	MIN	MAX
A	2.18	2.4
A1	-	0.2
A2	0.9	1.17
b	0.65	0.9
b3	4.95	5.5
c	0.43	0.89
D	5.97	6.22
D1	5.21	-
E	6.35	6.8
E1	4.32	-
e	2.286BSC	
H	9.4	10.5
L	0.38	1.78
L1	2.90BSC	
L2	0.51BSC	
L3	0.88	1.28
L4	-	1.02
L5	1.65	1.95
θ	0°	10°

Version Information

LSG65R650HT

Revision:2021-08-30,Rev 1.0

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