Lonten N-channel 550V, 23A[1], 0.14Ω 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 = 40nC)
- 100% UIS tested
- RoHS compliant

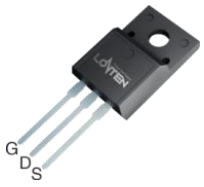
Applications

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

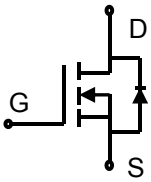
Product Summary

V_{DS} @ $T_{j,max}$	600V
$R_{DS(on),max}$	0.14Ω
I_{DM}	30A
$Q_{g,typ}$	40 nC

Pin Configuration



TO-220F



N-Channel MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	550	V
Continuous drain current (T_C = 25°C)	I_D	10	A
(T_C = 100°C)		6.3	A
Pulsed drain current [2]	I_{DM}	30	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [3]	E_{AS}	600	mJ
Power Dissipation	P_D	34	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	10	A
Diode pulse current	$I_{S,pulse}$	30	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.7	°C/W
Thermal Resistance, Junction-to-Ambient [4]	$R_{\theta JA}$	60	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube
LSD55R140GF	TO-220F	LSD55R140GF	50

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	550	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25mA	2.5	3.5	5.0	V
Drain cut-off current	I_{DSS}	V_{DS}=550 V, V_{GS}=0 V,T_j = 25°C	-	-	5	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=11.5 A	-			
		T_j = 25°C	-	0.11	0.14	Ω
		T_j = 150°C	-	0.26	-	
Gate resistance	R_G	f=1 MHz, open drain	-	5.3	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V,	-	1703	-	pF
Output capacitance	C_{oss}	f = 250kHz	-	78	-	
Reverse transfer capacitance	C_{rss}		-	2.8	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 400V, I_D = 11.5A	-	70	-	ns
Rise time	t_r	R_G = 5Ω, V_{GS}=15V	-	14	-	
Turn-off delay time	$t_{d(off)}$		-	72	-	
Fall time	t_f		-	7.7	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=440 V, I_D=11.5A,	-	9	-	nC
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	16.5	-	
Gate charge total	Q_g		-	40	-	
Gate plateau voltage	$V_{plateau}$		-	5.7	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=23A	-	-	1.1	V
Reverse recovery time	t_{rr}	V_R=400 V, I_F=11.5A,	-	166	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	1.17	-	μC
Peak reverse recovery current	I_{rrm}		-	14.1	-	A

Notes:

1.The value reference TO-247 package.

2.Limited by maximum junction temperature, maximum duty cycle is 0.75.

3. I_{AS} = 5A, L=48mH,V_{DD} = 60V, Starting T_j= 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

Figure 1. Typ. Output Characteristics

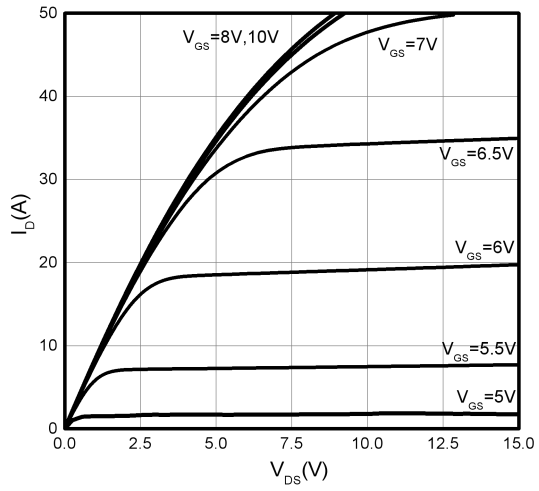


Figure 2. Transfer Characteristics

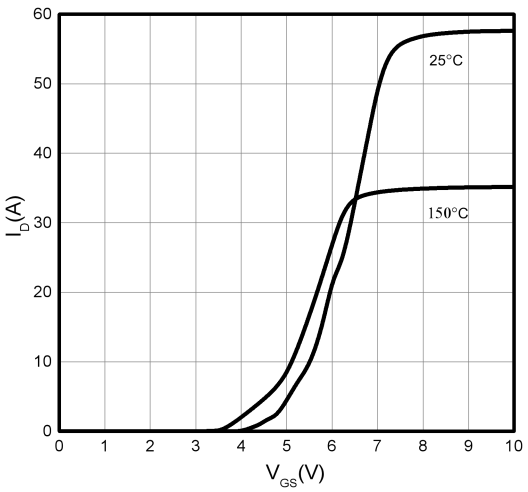


Figure 3. On-Resistance vs. Drain Current

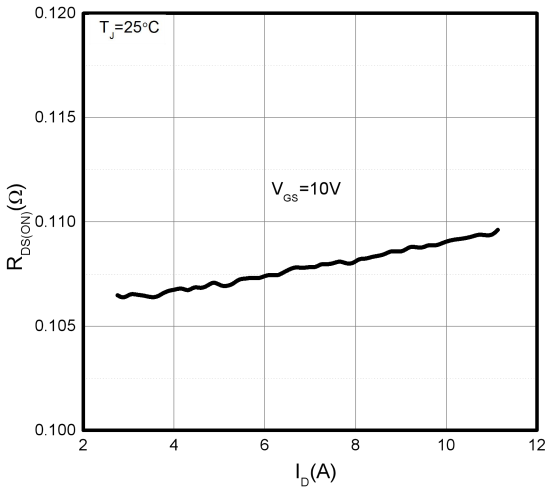


Figure 4.On-Resistance vs.Temperature

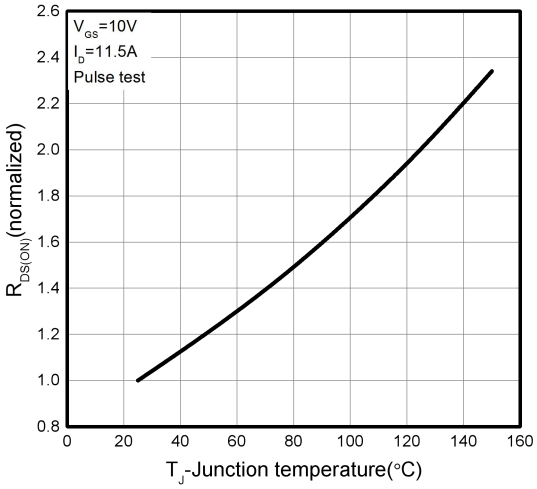


Figure 5.Breakdown Voltage vs.Temperature

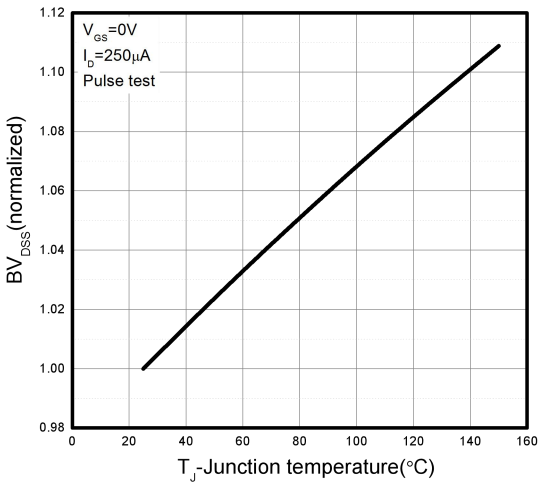


Figure 6.Threshold Voltage vs.Temperature

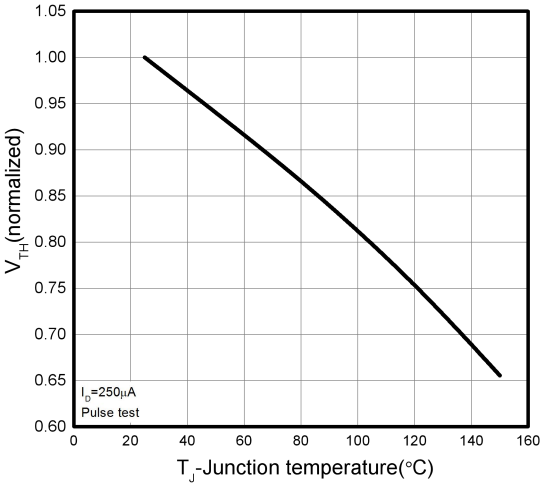


Figure 7.Body-Diode Characteristics

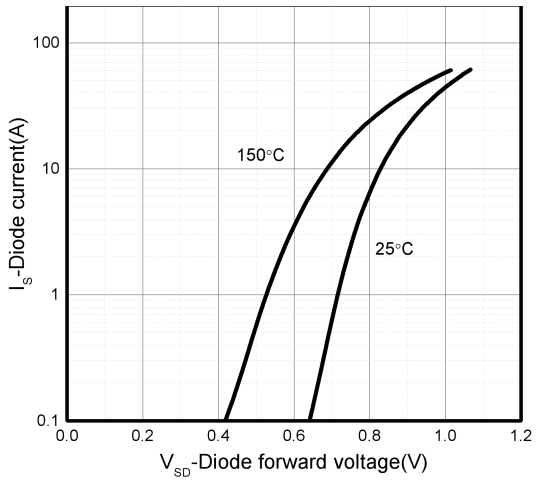


Figure 8.Capacitance Characteristics

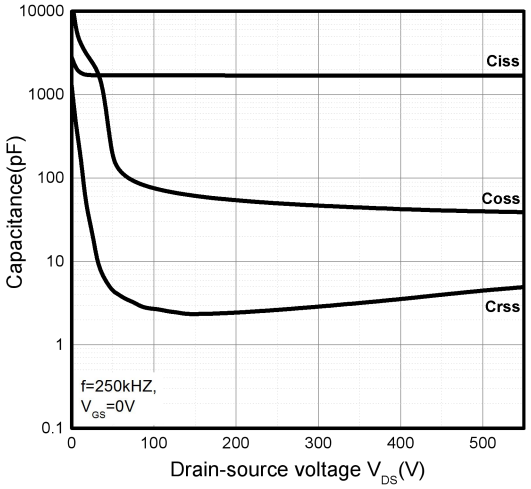


Figure 9.Gate Charge Characteristics

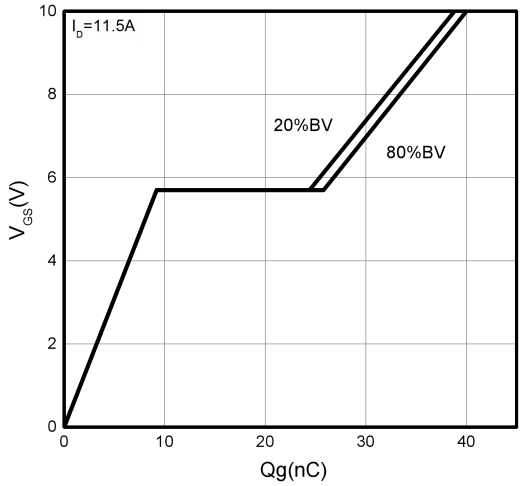


Figure 10.Drain Current Derating

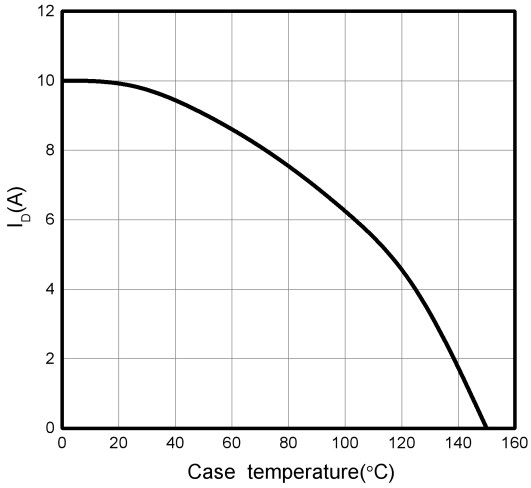


Figure 11.Power Dissipation vs.Temperature

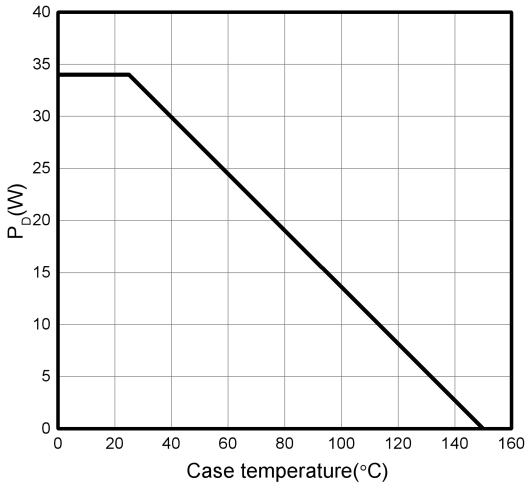


Figure 12: Safe Operating Area

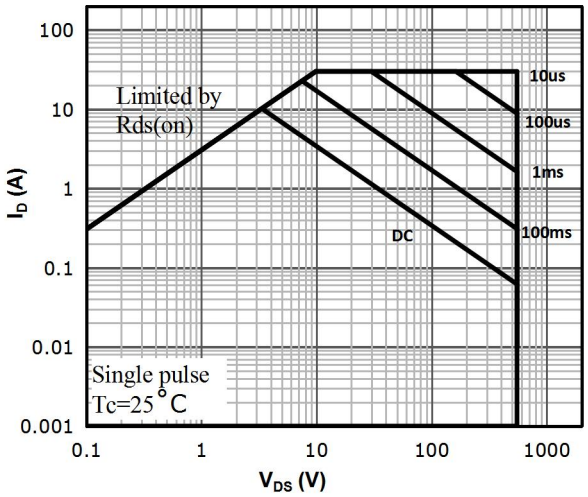
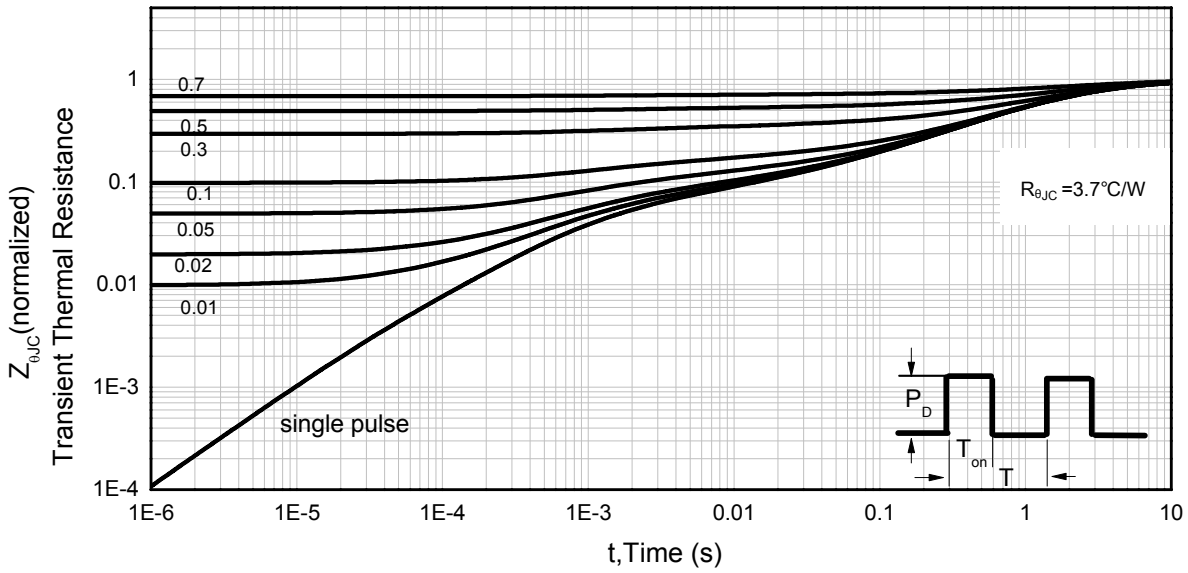
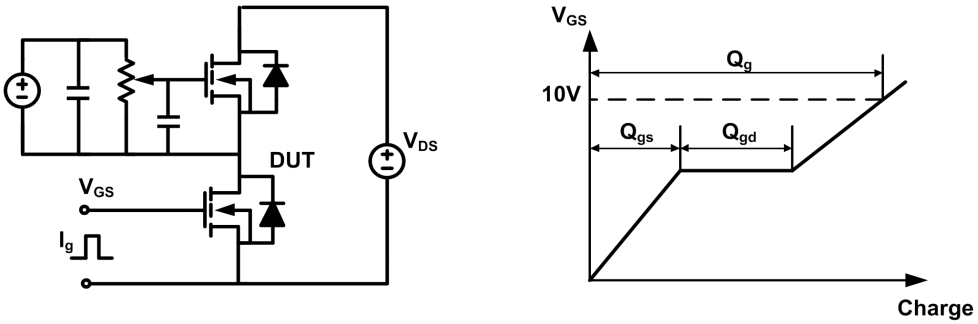


Figure 13. Normalized Maximum Transient Thermal Impedance (RthJC)

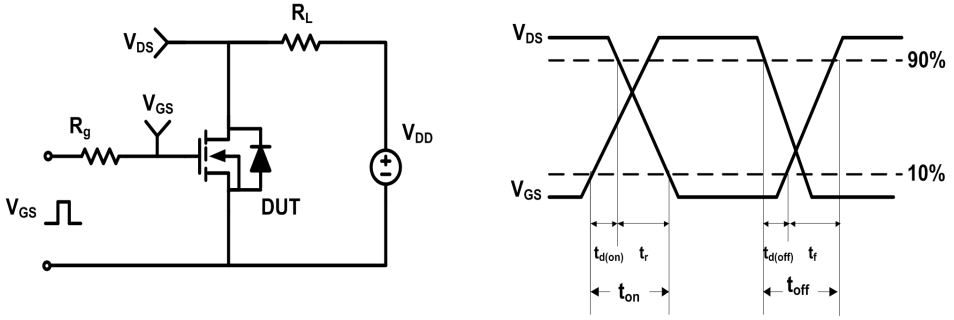


Test Circuit & Waveforms

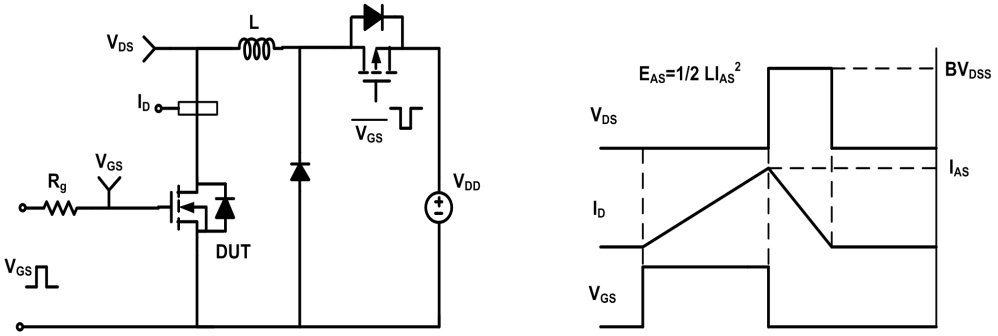
Gate Charge Test Circuit & Waveform



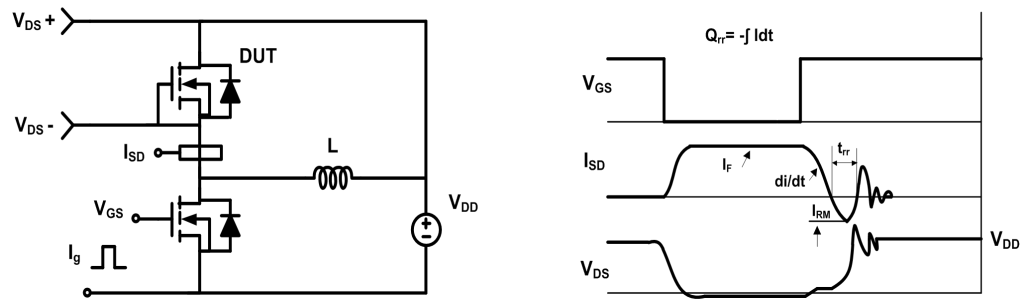
Resistive Switching Test Circuit & Waveform



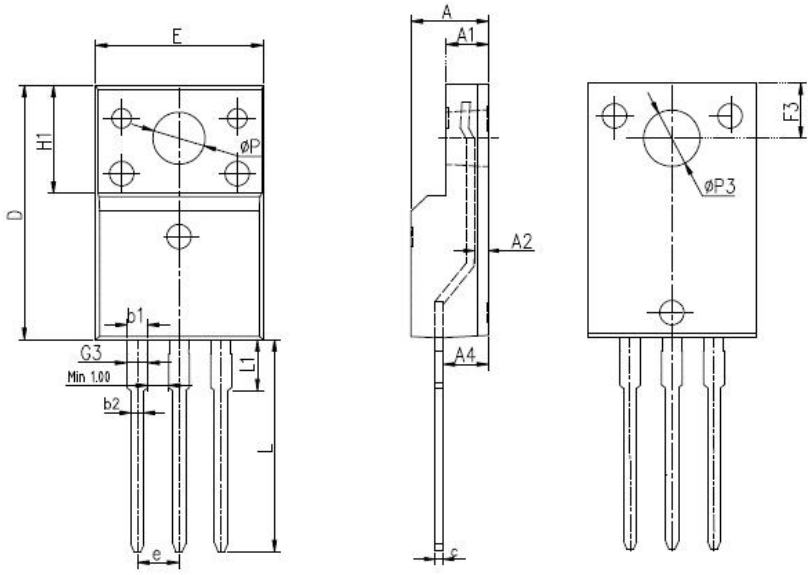
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TO-220F



DIMENSIONS IN MILLITMETERS		
SYMBOL	MIN	MAX
A	4.4	4.9
A1	2.34	2.74
A2	0.3	0.7
A4	2.5	2.96
c	0.4	0.7
D	15.57	16.4
E	9.96	10.4
H1	6.48	6.95
e	2.54BSC	
L	12.68	14.2
L1	2.88	3.6
ΦP	3	3.38
ΦP3	3.15	3.65
F3	3.15	3.45
G3	1.15	1.58
b1	1.18	1.43
b2	0.7	1

Version Information

LSD55R140GF
Revision:2022-5-12,Rev 1.0

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