Lonten N-channel 60V, 104A, 4.6mΩ Power MOSFET

Description

These N-Channel enhancement mode power field effect transistors are using split 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

- 60V,104A, $R_{DS(on),max}$ =4.6mΩ@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

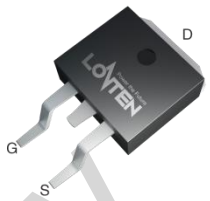
Applications

- Motor Drives
- UPS
- DC-DC Converter

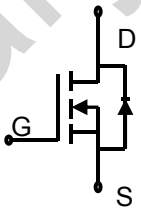
Product Summary

V_{DSS}	60V
$R_{DS(on),max}$@ V_{GS}=10V	4.6mΩ
I_D	104A

Pin Configuration



TO-263



N-Channel MOSFET

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Continuous drain current (T_C = 25°C)	I_D	104	A
(T_C = 100°C)		65	A
Pulsed drain current[1)]	I_{DM}	312	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy[2)]	E_{AS}	28	mJ
Power Dissipation	P_D	89	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	$R_{\theta JC}$	1.4	°C/W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	55	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Reel
LSGE06R046HWB	TO-263	E06R046HWB	800

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	60	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.0	3.0	4.0	V
Drain-source leakage current	I_{DSS}	V_{DS}=60 V, V_{GS}=0V	---	---	1	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=20 V, V_{DS}=0 V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-20 V, V_{DS}=0 V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=20 A	---	3.6	4.6	mΩ
Forward transconductance	g_{fs}	V_{DS} =5V , I_D=20A	---	66	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 30 V, V_{GS} = 0 V, F = 1MHz	---	3511	---	pF
Output capacitance	C_{oss}		---	1176	---	
Reverse transfer capacitance	C_{rss}		---	67	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 30V,V_{GS}=10V, I_D = 20A R_G=3Ω	---	20.3	---	ns
Rise time	t_r		---	9.6	---	
Turn-off delay time	$t_{d(off)}$		---	61	---	
Fall time	t_f		---	15.2	---	
Gate resistance	Rg	V_{GS}=0 V,V_{DS}=0 V, F=1MHz	---	1.1	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=30V, I_D=20A, V_{GS}= 10 V	---	15.5	---	nC
Gate to drain charge	Q_{gd}		---	9.5	---	
Gate charge total	Q_g		---	48	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	74	A
Pulsed Source Current[3)]	I_{SM}		---	---	222	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=20A, T_J=25℃	---	---	1.2	V
Reverse recovery time	t_{rr}	I_F=20A,dI_F/dt=100 A/μs	---	24	---	ns
Reverse recovery charge	Q_{rr}		---	85	---	nC

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

2: V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=24A, Starting T_J=25℃.

3: Pulse Test：Pulse Width ≤300μs, Duty Cycle≤2%.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

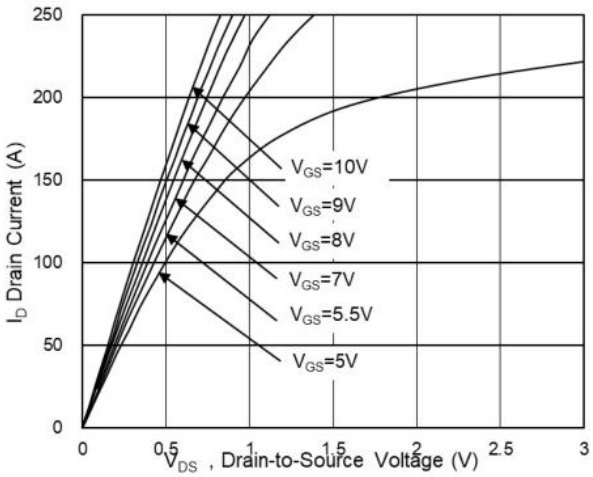


Figure 2. Transfer Characteristics

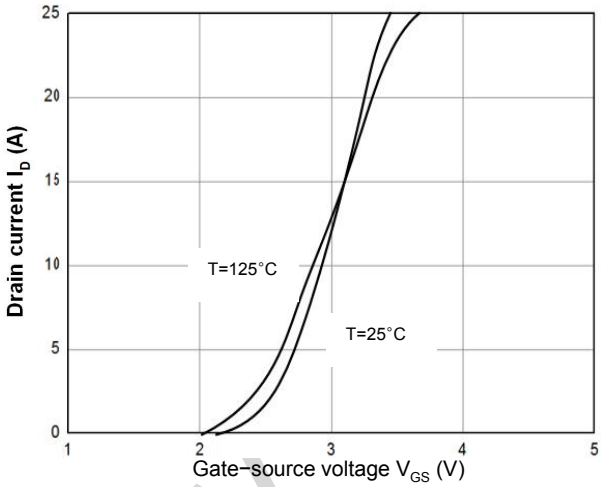


Figure 3. Capacitance Characteristics

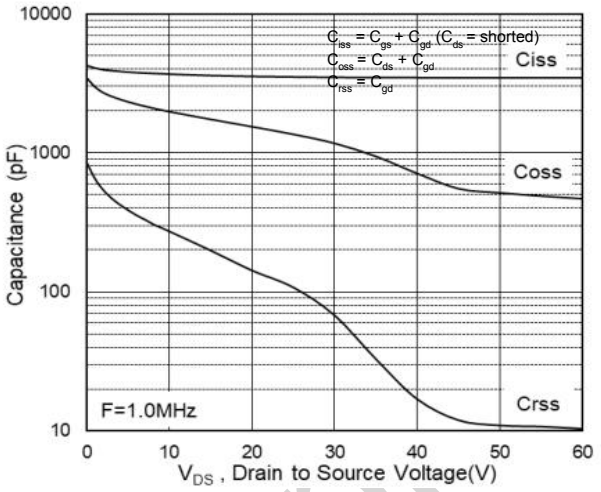


Figure 4. Gate Charge Waveform

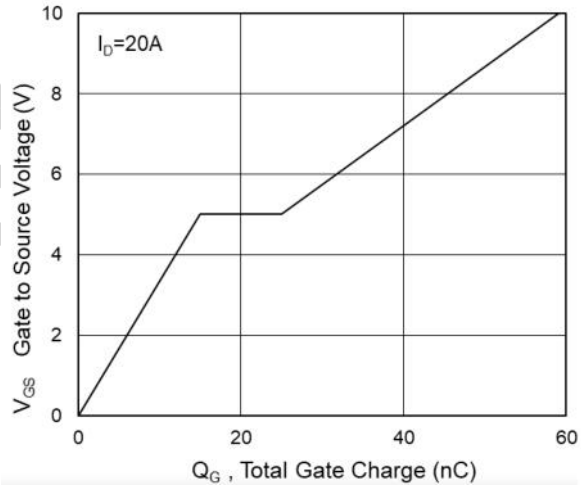


Figure 5. Body-Diode Characteristics

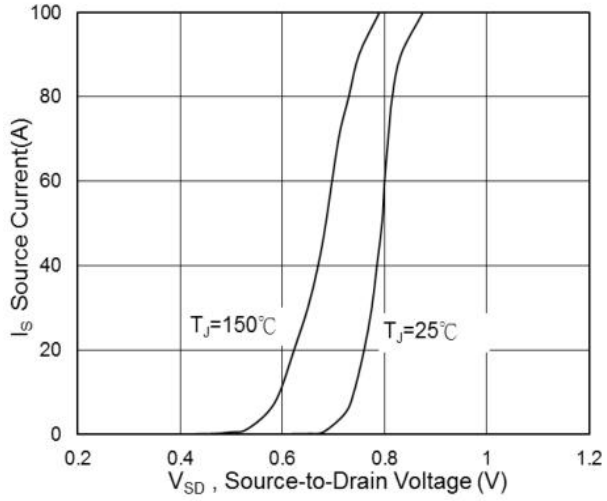


Figure 6. Rdson-Drain Current

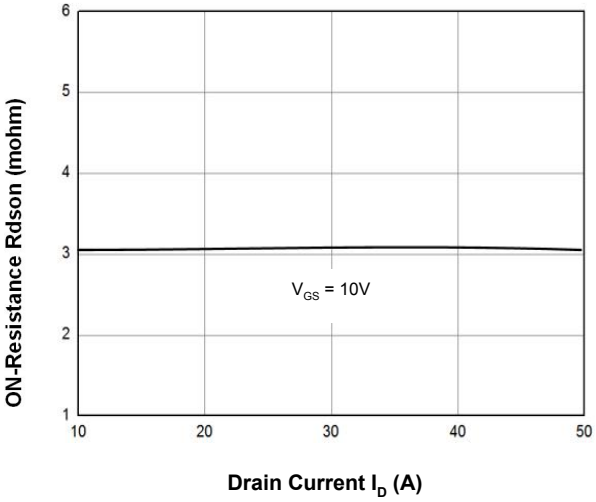


Figure 7. Rdson-Junction Temperature

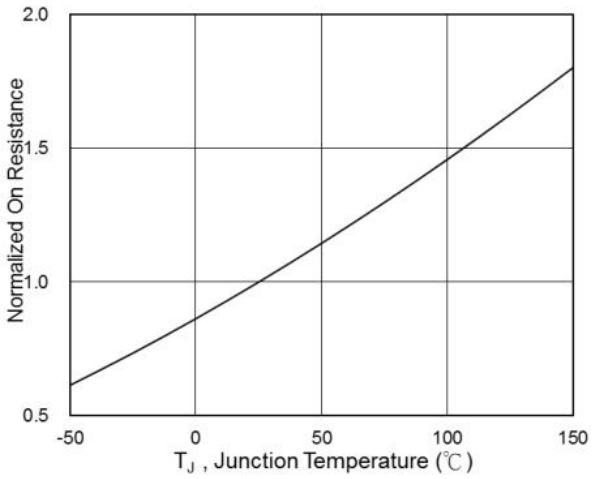


Figure 8. $V_{GS(th)}$-Junction Temperature

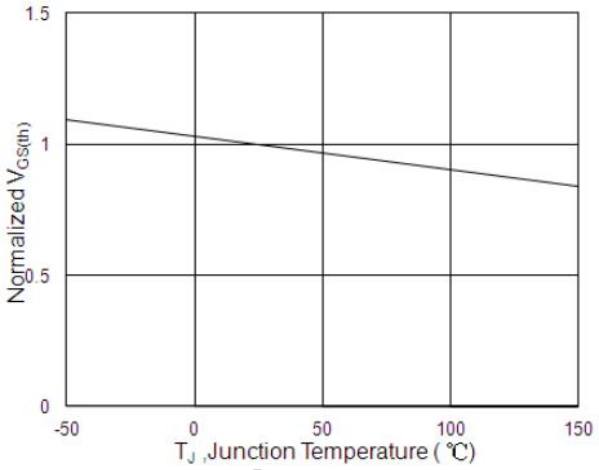


Figure 9. On-Resistance vs. Gate-to-Source voltage

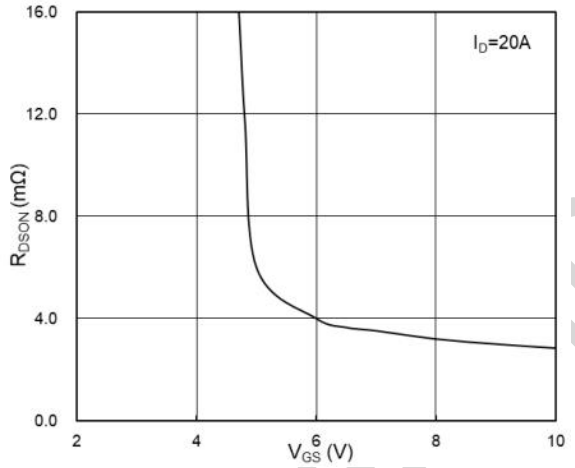


Figure 10: Safe Operating Area

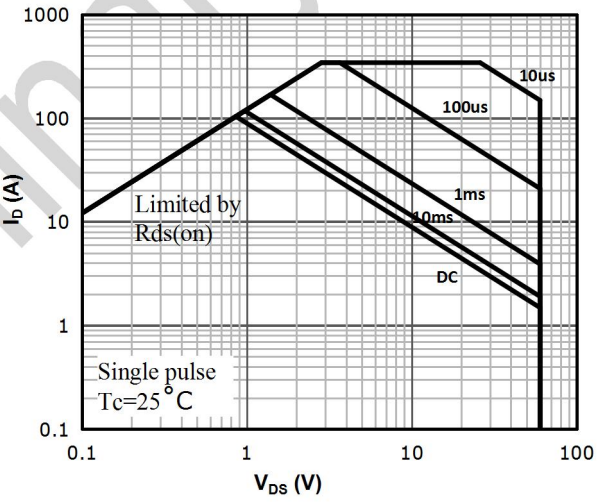
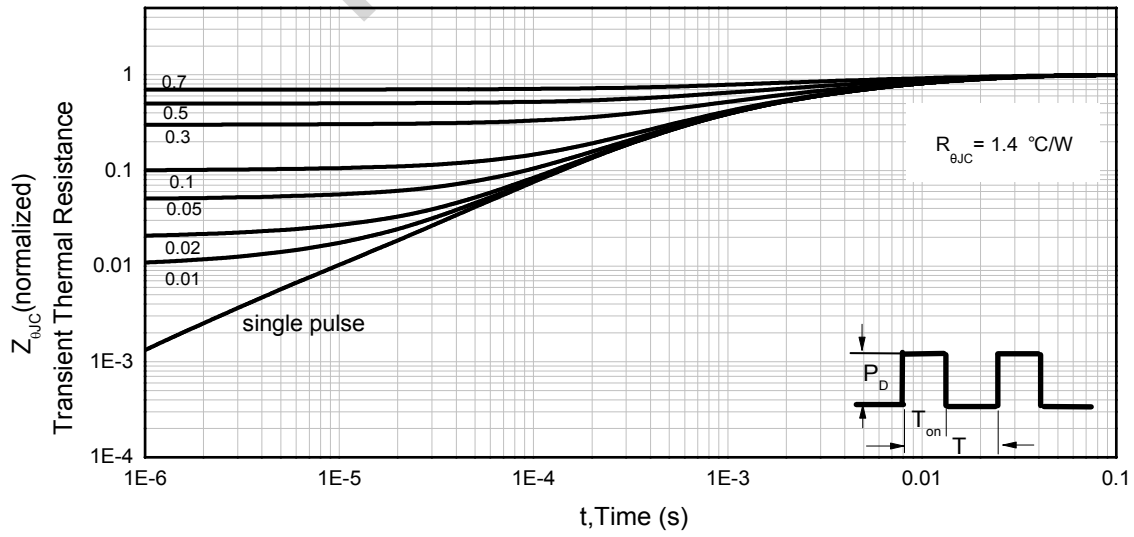
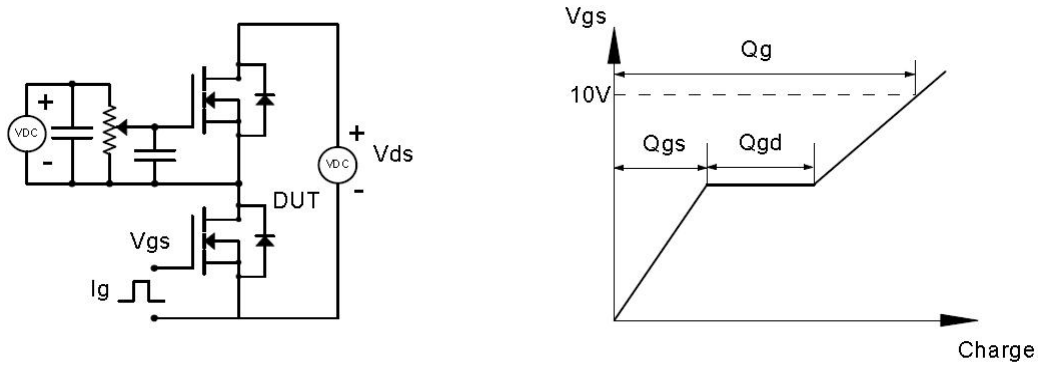


Figure 11. Normalized Maximum Transient Thermal Impedance (RthJC)

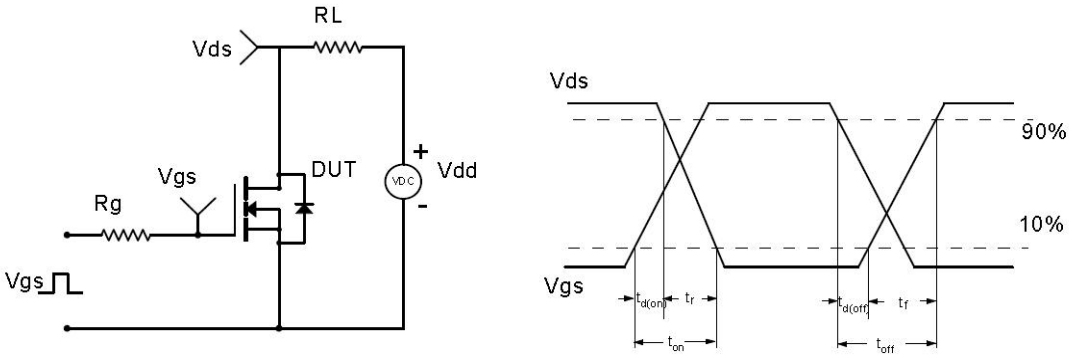


Test Circuit & Waveform

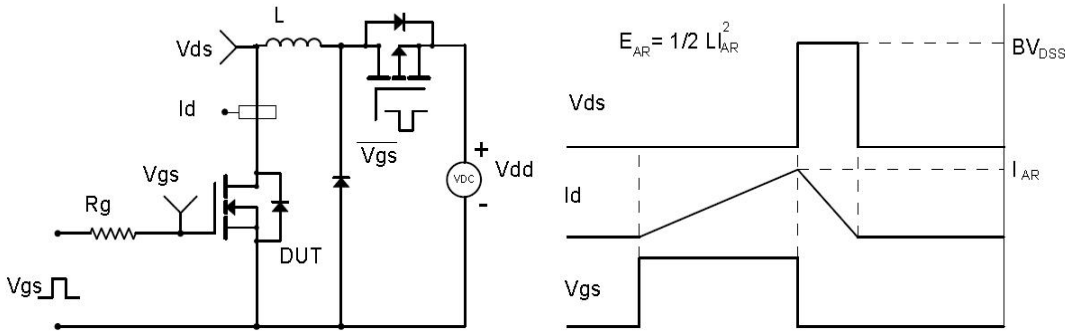
Gate Charge Test Circuit & Waveform



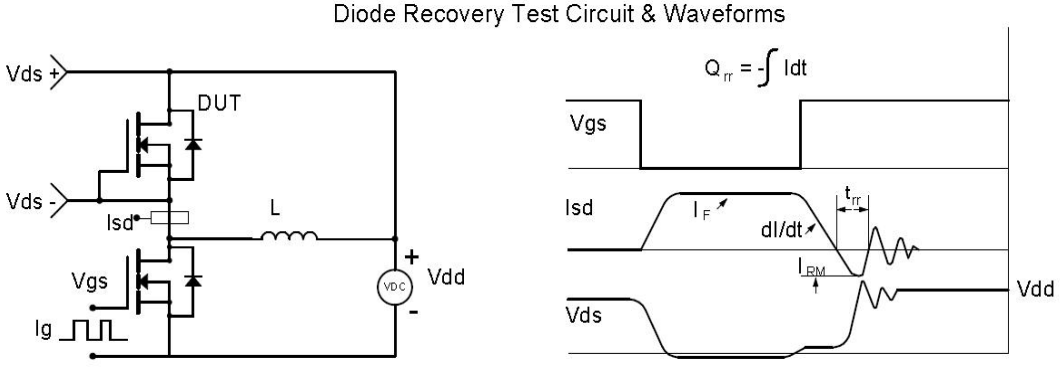
Resistive Switching Test Circuit & Waveforms



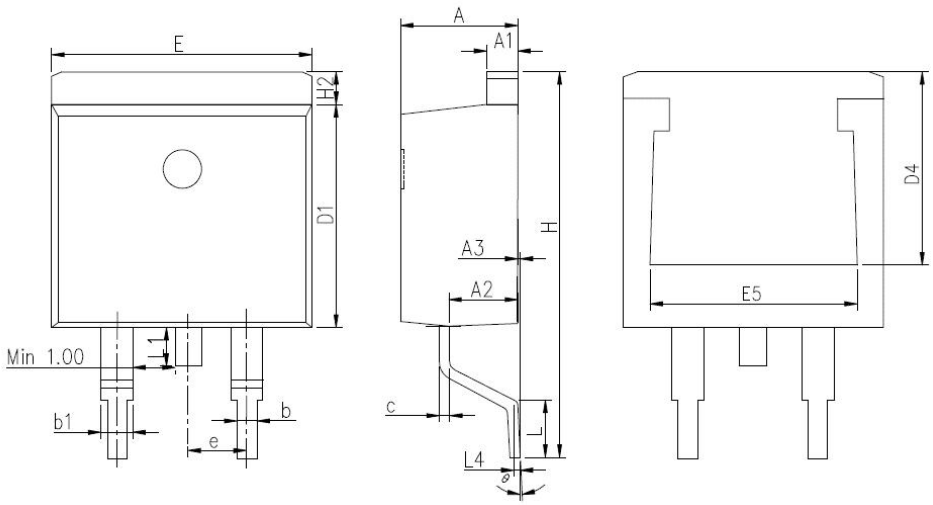
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Mechanical Dimensions for TO-263



DIMENSIONS IN MILLITMETERS			DIMENSIONS IN INCHES	
SYMBOL	MIN	MAX	MIN	MAX
A	4.36	4.8	0.172	0.189
A1	1.19	1.42	0.047	0.056
A2	2.2	2.96	0.087	0.117
A3	0	0.25	0	0.010
b	0.7	0.96	0.028	0.038
b1	1.17	1.47	0.046	0.058
c	0.3	0.69	0.012	0.027
D1	8.5	9.5	0.335	0.374
D4	6.6	-	0.260	-
E	9.8	10.55	0.386	0.415
E5	7.06	8.7	0.278	0.343
e	2.54BSC		0.1BSC	
H	14.7	15.7	0.579	0.618
H2	0.95	1.65	0.037	0.065
L	1.9	2.8	0.075	0.110
L1	-	1.78	-	0.070
L4	0.25BSC		0.01BSC	
θ	0°	9°	0°	9°

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