Lonten N-channel 20V, 4A, 42mΩ Power MOSFET

Description

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

- 20V,4A,$R_{DS(ON).max}$=42mΩ@V_{GS}=4.5V
- Improved dv/dt capability
- Fast switching
- Green device available

Applications

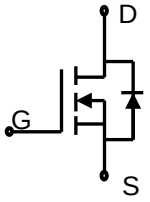
- Battery protection
- Load switch
- Power management

Product Summary

V_{DSS}	20V
$R_{DS(on).max}$@ V_{GS}=4.5V	42mΩ
I_D	4A

Pin Configuration

SOT-23



N-Channel MOSFET

Absolute Maximum Ratings

T_A = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	20	V
Continuous drain current (T_A = 25°C)	I_D	4	A
Continuous drain current (T_A = 100°C)		2.5	A
Pulsed drain current[1)]	I_{DM}	16	A
Gate-Source voltage	V_{GSS}	±12	V
Power Dissipation (T_A = 25°C)	P_D	1	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-Ambient	$R_{\theta JA}$	125	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking
LNSC2302	SOT-23	2302

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	20	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	0.4	0.75	1.2	V
Drain-source leakage current	I_{DSS}	V_{DS}=20 V, V_{GS}=0 V, T_J = 25°C	---	---	1	μA
		V_{DS}=16 V, V_{GS}=0 V, T_J = 125°C	---	---	10	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=12 V, V_{DS}=0 V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-12 V, V_{DS}=0 V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=4.5 V, I_D=3 A	---	27	42	mΩ
		V_{GS}=2.5 V, I_D=2.5 A	---	33	55	mΩ
Forward transconductance	g_{fs}	V_{DS} =5 V , I_D=3A	---	10	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, F = 1MHz	---	327	---	pF
Output capacitance	C_{oss}		---	50	---	
Reverse transfer capacitance	C_{rss}		---	42.8	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 10V,V_{GS}=4.5V, I_D =3 A	---	7	---	ns
Rise time	t_r		---	12	---	
Turn-off delay time	$t_{d(off)}$		---	48	---	
Fall time	t_f		---	20	---	
Gate resistance	R_g	V_{GS}=0V,V_{DS}=0V,f=1MHz	---	3.6	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=10V, I_D=3A, V_{GS}= 4.5V	---	8	---	nC
Gate to drain charge	Q_{gd}		---	0.7	---	
Gate charge total	Q_g		---	3.2	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	4	A
Pulsed Source Current[2)]	I_{SM}		---	---	16	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=3A, T_J=25℃	---	---	1.2	V

Notes:

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

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

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

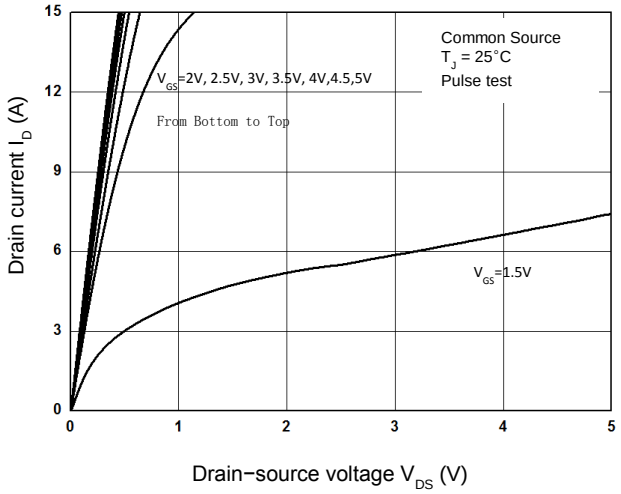


Figure 2. Transfer Characteristics

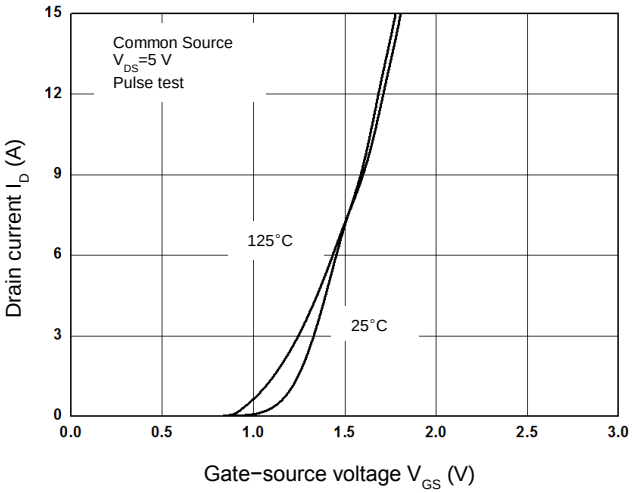


Figure 3. Capacitance Characteristics

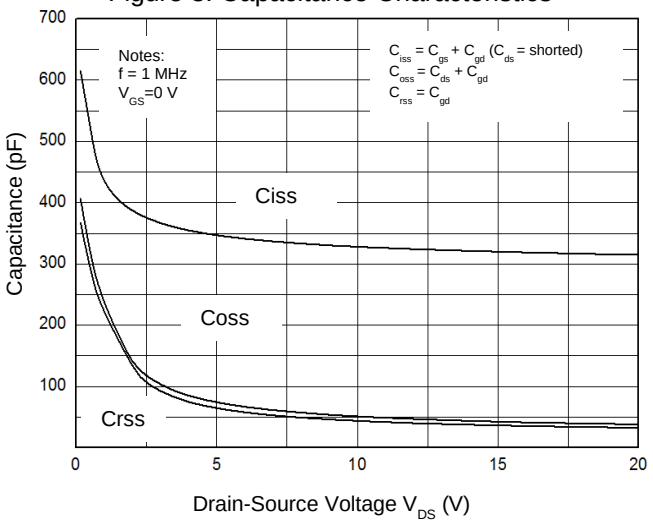


Figure 4. Gate Charge Waveform

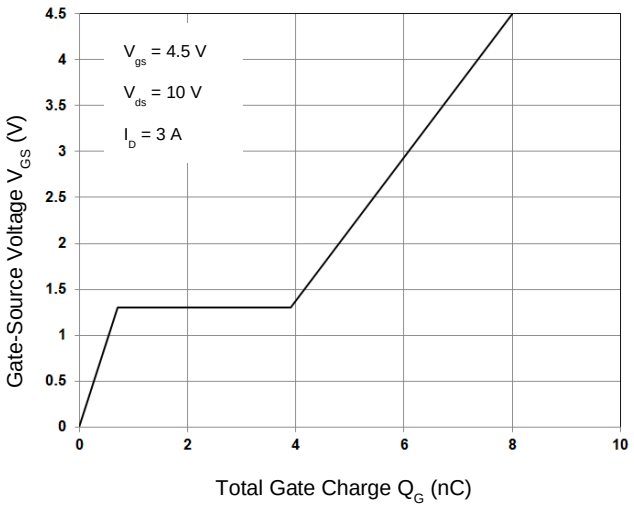


Figure 5. Body-Diode Characteristics

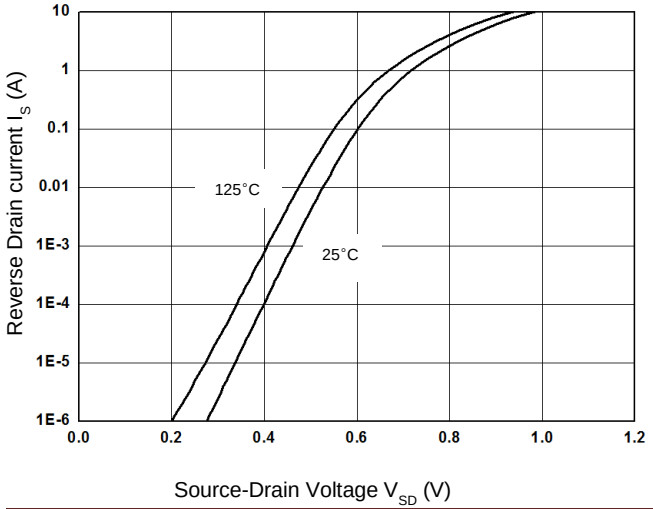


Figure 6. Rdson-Drain Current

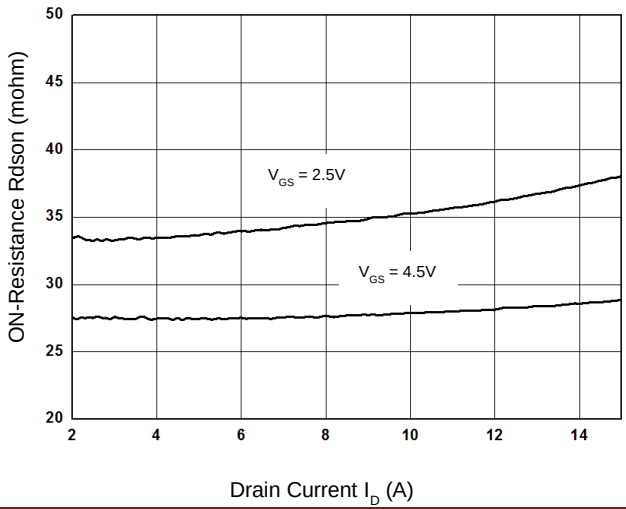


Figure 7. Rdson-Junction Temperature(℃)

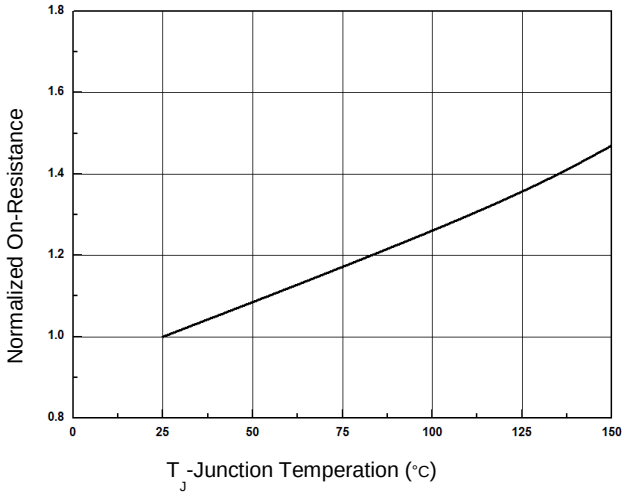


Figure 8. Maximum Safe Operating Area

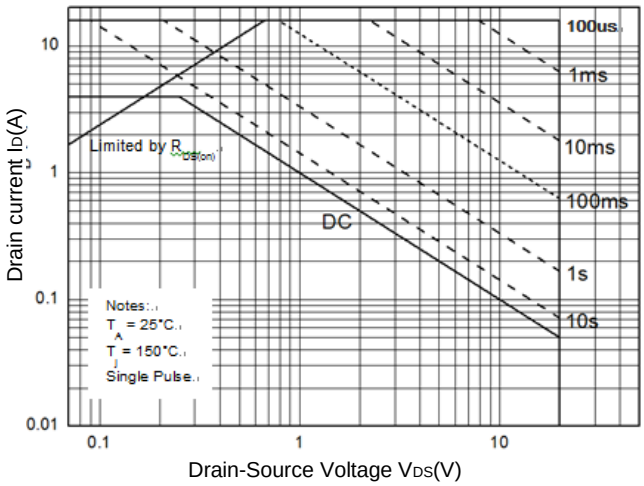
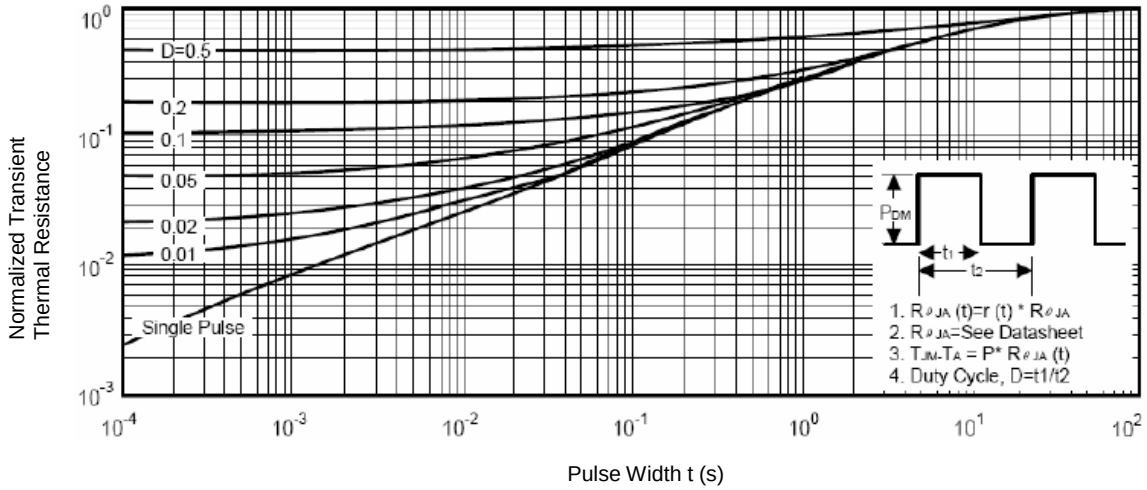


Figure 6. Normalized Maximum Transient Thermal Impedance (RthJA)



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

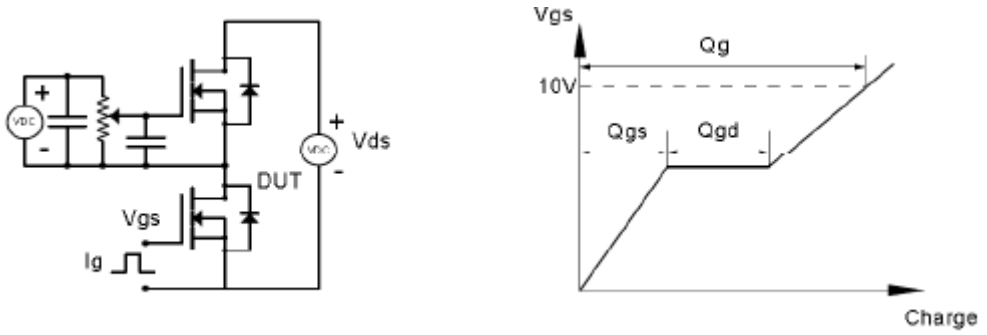


Figure 9. Resistive Switching Test Circuit & Waveforms

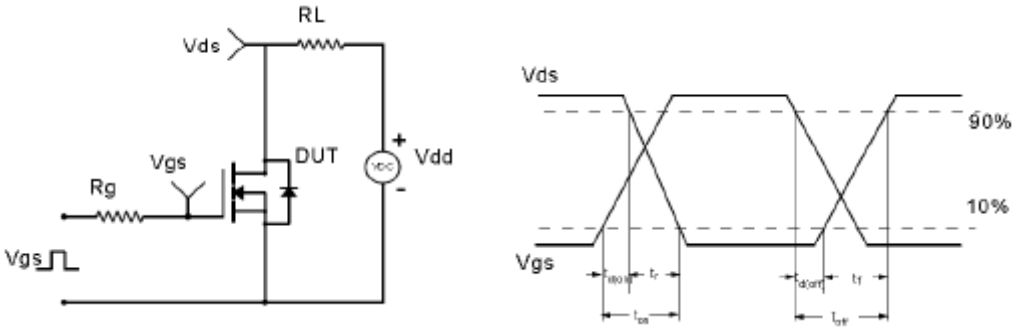


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

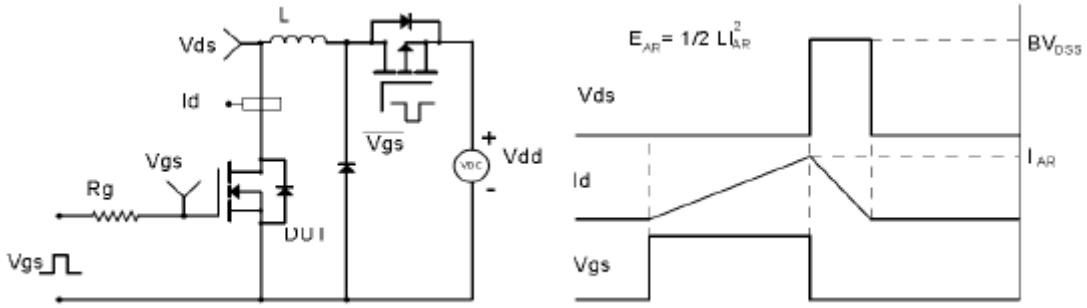
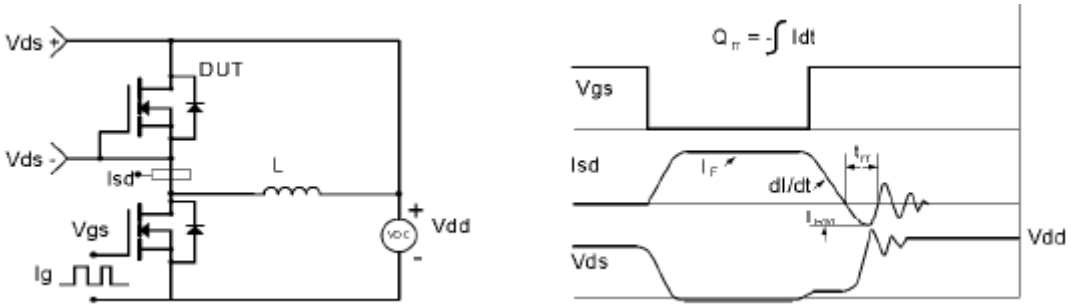
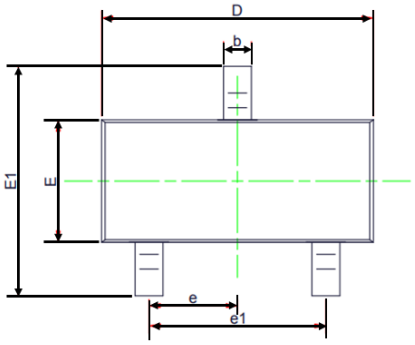


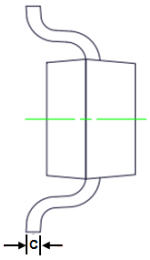
Figure 11. Diode Recovery Circuit & Waveform



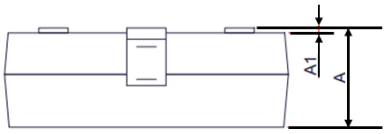
Mechanical Dimensions for SOT-23



TOP VIEW



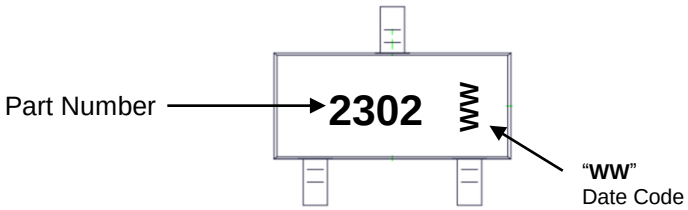
SIDE VIEW



SIDE VIEW

COMMON DIMENSIONS				
SYMBOL	MILLIMETERS		INCHS	
	MIN	MAX	MIN	MAX
A	0.95	1.40	0.037	0.055
A1	0.01	0.10	0.000	0.004
b	0.35	0.50	0.014	0.020
c	0.08	0.19	0.003	0.007
D	2.70	3.10	0.106	0.122
E	1.20	1.65	0.047	0.065
E1	2.20	3.00	0.087	0.118
e	0.95 TYP.		0.037 TYP.	
e1	1.78	2.04	0.070	0.080

SOT-23 Part Marking Information



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