
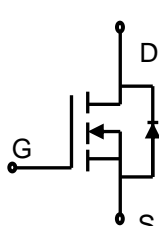


Lonten P-channel -20V, -2A, 110mΩ Power MOSFET

<p>Description These P-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.</p> <p>Features</p> <ul style="list-style-type: none"> ◆ -20V,-2A,$R_{DS(ON).max}=110m\Omega@V_{GS}=-4.5V$ ◆ Improved dv/dt capability ◆ Fast switching ◆ Green device available <p>Applications</p> <ul style="list-style-type: none"> ◆ PWM applications ◆ Load switch ◆ Portable Equipment 	<p>Product Summary</p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px 10px;">V_{DSS}</td> <td style="padding: 2px 10px;">-20V</td> </tr> <tr> <td style="padding: 2px 10px;">$R_{DS(on).max}@V_{GS}=-4.5V$</td> <td style="padding: 2px 10px;">110mΩ</td> </tr> <tr> <td style="padding: 2px 10px;">I_D</td> <td style="padding: 2px 10px;">-2A</td> </tr> </table> <p>Pin Configuration</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">SOT-23</p> <p style="text-align: center;">P-Channel MOSFET Pb</p>	V_{DSS}	-20V	$R_{DS(on).max}@V_{GS}=-4.5V$	110mΩ	I_D	-2A
V_{DSS}	-20V						
$R_{DS(on).max}@V_{GS}=-4.5V$	110mΩ						
I_D	-2A						

Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-20	V
Continuous drain current ($T_A = 25^\circ\text{C}$)	I_D	-2	A
Continuous drain current ($T_A = 100^\circ\text{C}$)		-1.4	A
Pulsed drain current ¹⁾	I_{DM}	-10	A
Gate-Source voltage	V_{GSS}	± 12	V
Power Dissipation ($T_A = 25^\circ\text{C}$)	P_D	0.78	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JA}$	160	$^\circ\text{C/W}$

Package Marking and Ordering Information

Device	Device Package	Marking
LPSC2301	SOT-23	2301

Electrical Characteristics
 $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=-250\mu\text{A}$	-20	---	---	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-0.4	-0.75	-1	V
Drain-source leakage current	I_{DSS}	$V_{DS}=-20\text{ V}, V_{GS}=0\text{ V}, T_J = 25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-16\text{ V}, V_{GS}=0\text{ V}, T_J = 125^\circ\text{C}$	---	---	-10	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=12\text{ V}, V_{DS}=0\text{ V}$	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-12\text{ V}, V_{DS}=0\text{ V}$	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-4.5\text{ V}, I_D=-2\text{ A}$	---	80	110	$\text{m}\Omega$
		$V_{GS}=-2.5\text{ V}, I_D=-1.5\text{ A}$	---	100	130	$\text{m}\Omega$
Forward transconductance	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -2\text{ A}$	---	6	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V},$ $F = 1\text{ MHz}$	---	406	---	pF
Output capacitance	C_{oss}		---	51.7	---	
Reverse transfer capacitance	C_{rss}		---	44.1	---	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -2\text{ A}$	---	10	---	ns
Rise time	t_r		---	5.3	---	
Turn-off delay time	$t_{d(off)}$		---	32	---	
Fall time	t_f		---	8	---	
Gate resistance	R_g	$V_{GS}=0\text{ V}, V_{DS}=0\text{ V}, f=1\text{ MHz}$	---	20	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DS}=-10\text{ V}, I_D=-2\text{ A},$ $V_{GS}=-4.5\text{ V}$	---	1.5	---	nC
Gate to drain charge	Q_{gd}		---	1.2	---	
Gate charge total	Q_g		---	8.2	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	-2	A
Pulsed Source Current ²⁾	I_{SM}		---	---	-10	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{ V}, I_S=-2\text{ A}, T_J=25^\circ\text{C}$	---	---	-1.2	V

Notes:

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

 2: Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

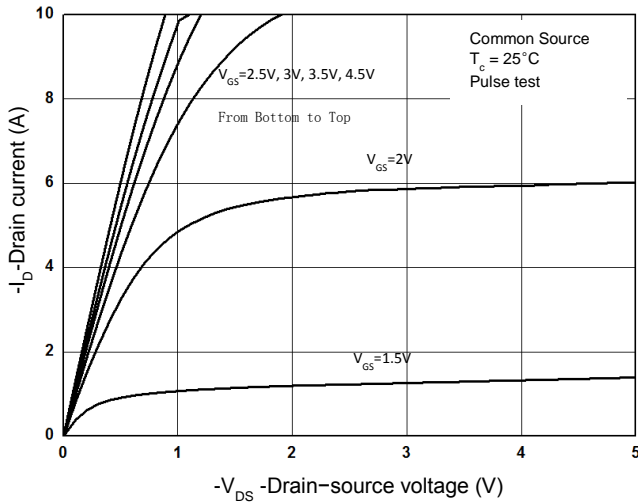


Figure 2. Transfer Characteristics

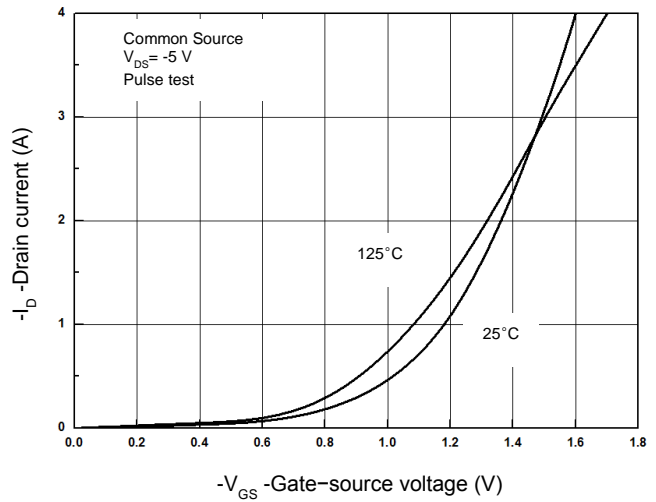


Figure 3. Capacitance Characteristics

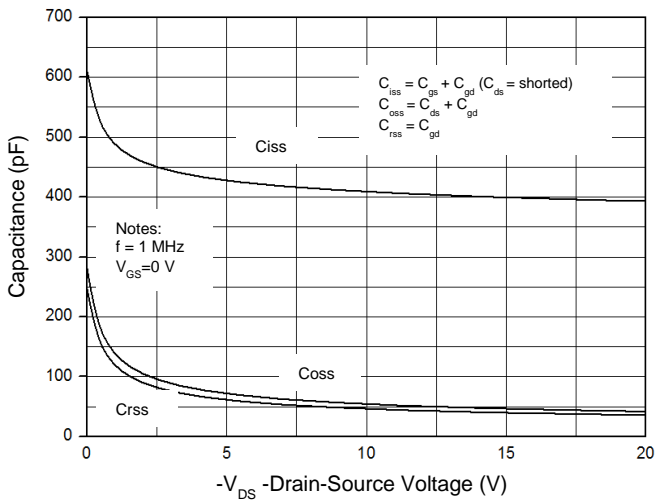


Figure 4. Gate Charge Waveform

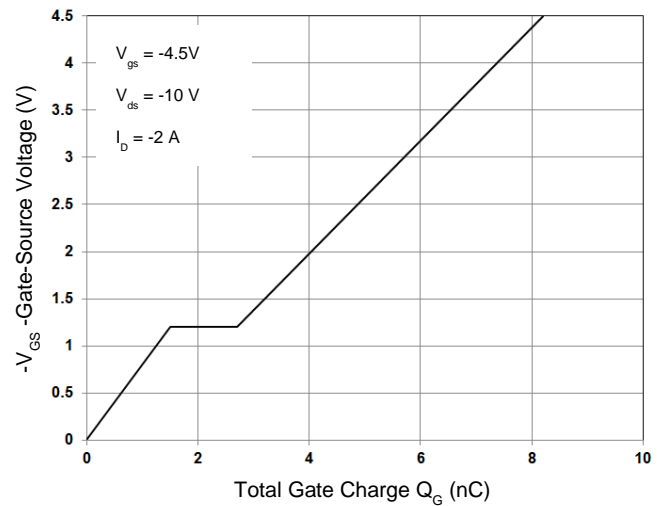


Figure 5. Body-Diode Characteristics

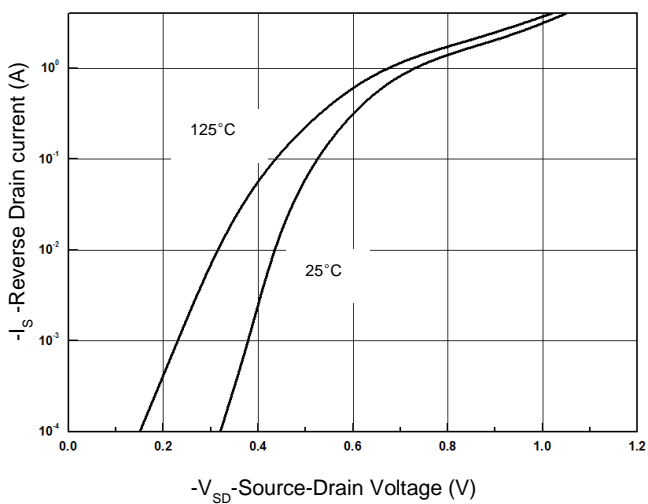


Figure 6. Rdson-Drain Current

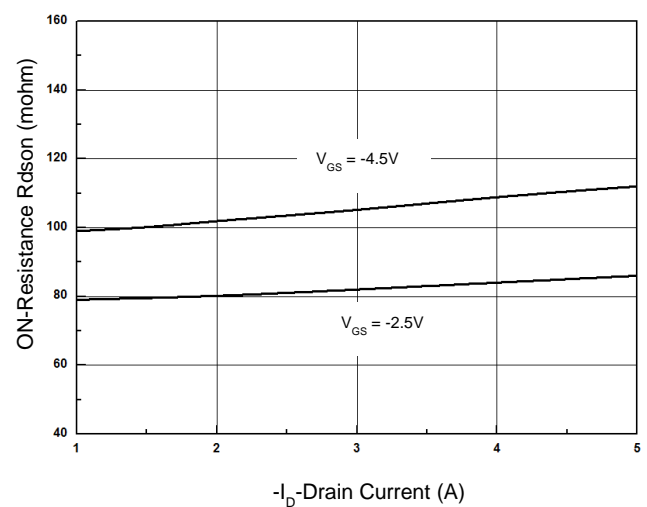


Figure 7. R_{ds(on)}-Junction Temperature(°C)

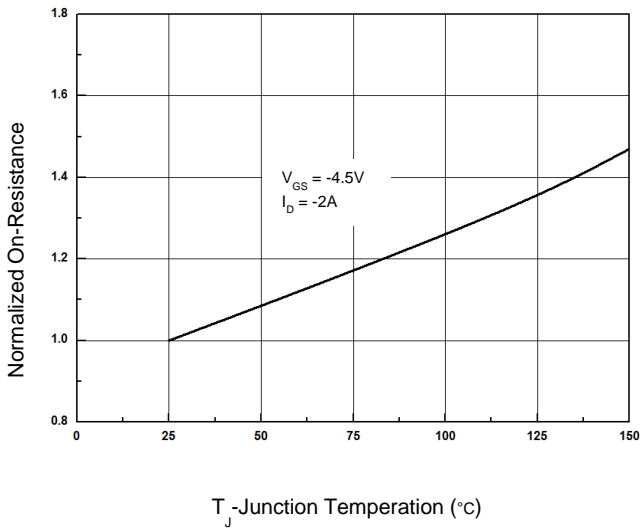


Figure 8. Maximum Safe Operating Area

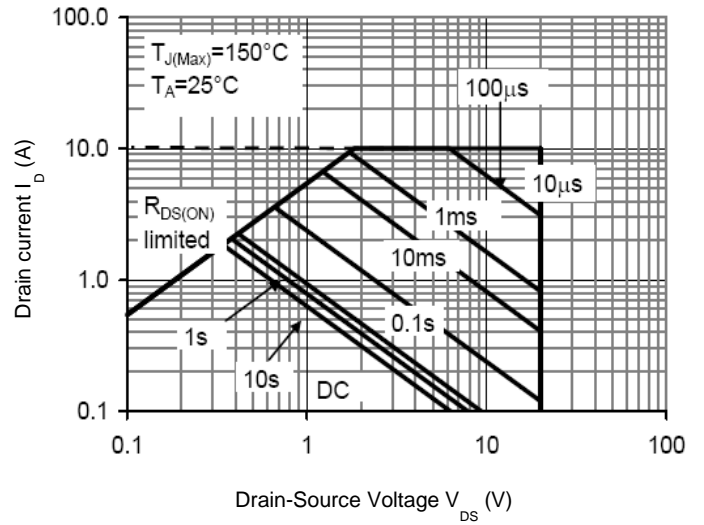
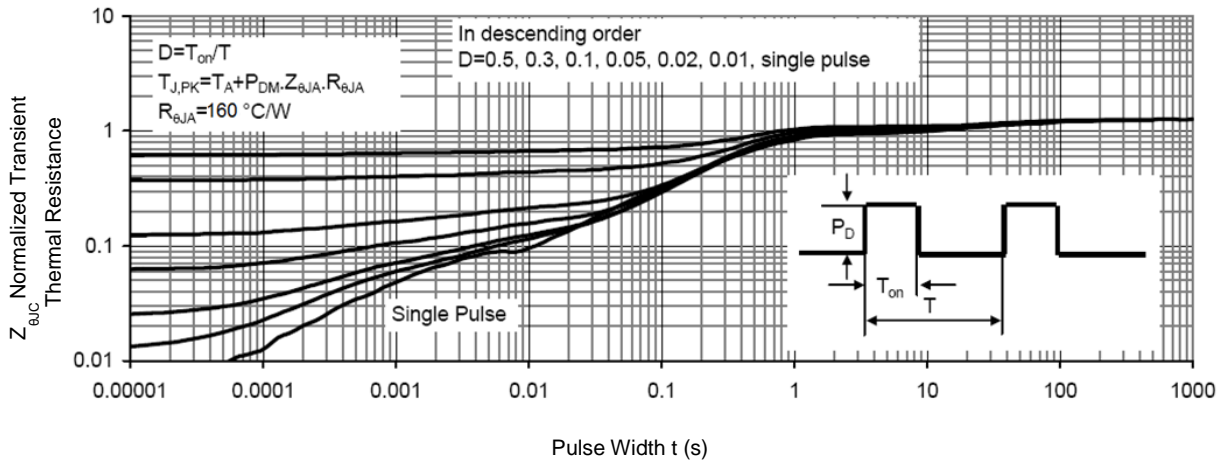


Figure 6. Normalized Maximum Transient Thermal Impedance (R_{thJA})



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

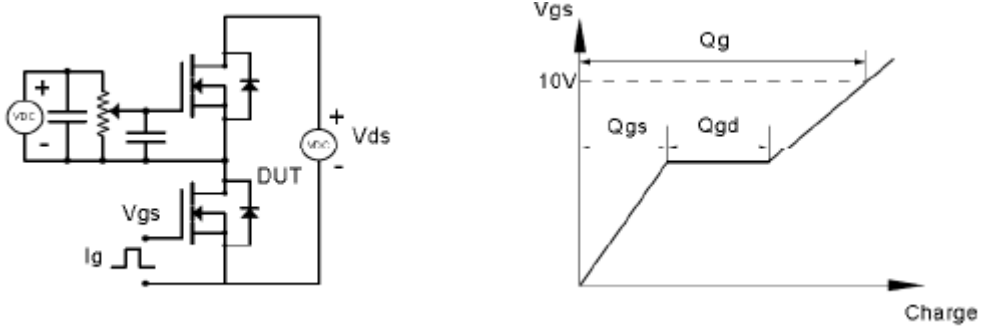


Figure 9. Resistive Switching Test Circuit & Waveforms

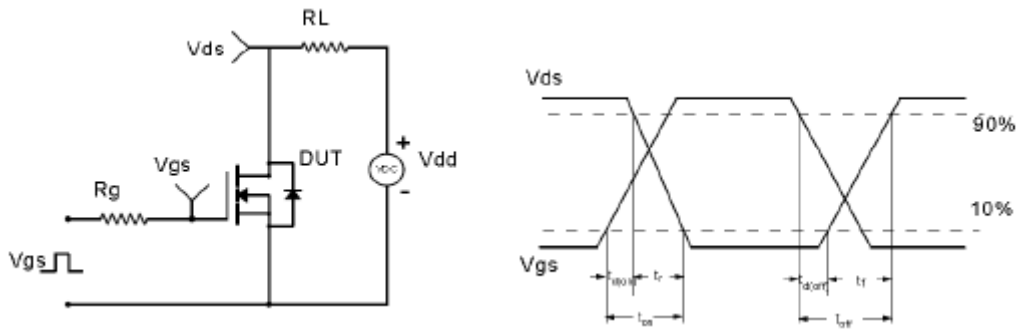


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

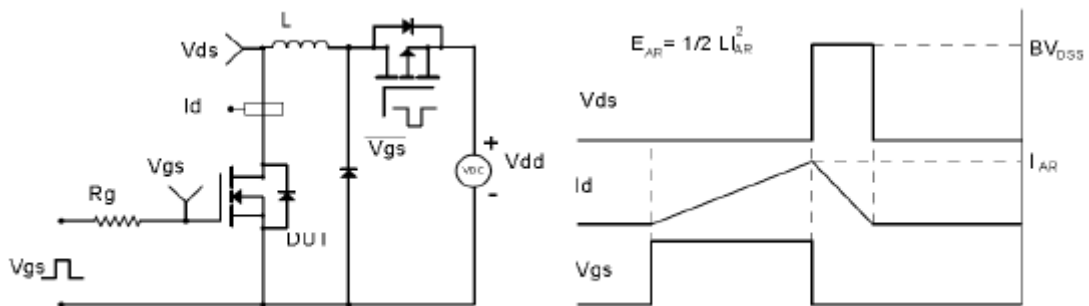
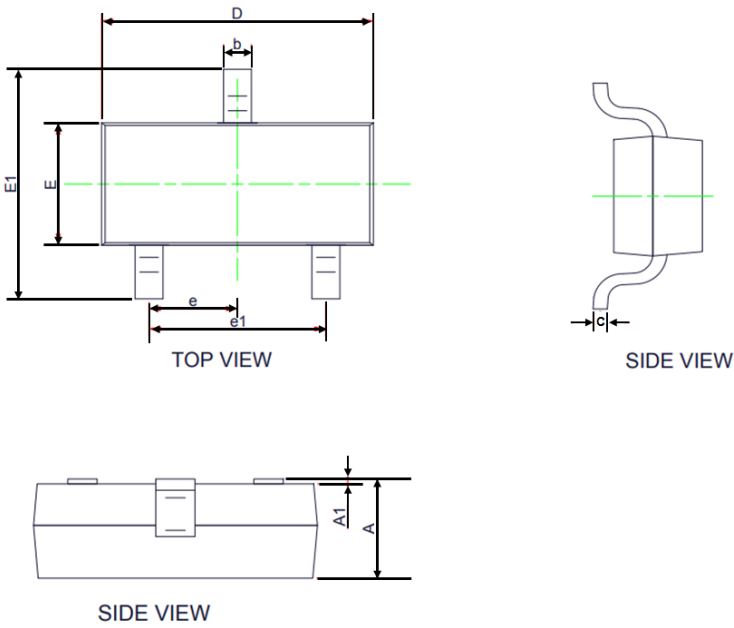


Figure 11. Diode Recovery Circuit & Waveform

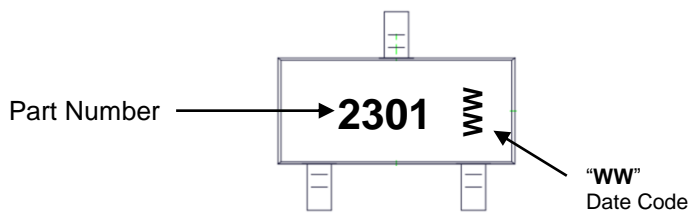


Mechanical Dimensions for SOT-23



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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