LMTL5P02

-20V P-Channel Enhancement Mode MOSFET

Description

The LMTL5P02 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

Dimensions SOT-23

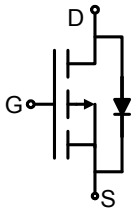


General Features

V_{DS} = −20V I_D =−4.9A

$R_{DS(ON)}$ < 38mΩ @ V_{GS}=−4.5V

Pin Configuration



Application

- Battery protection
- Load switch
- Uninterruptible power supply

Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
LMTL5P02	A5SHB	SOT-23	Ø180mm	8 mm	3000 units

Absolute Maximum Ratings (TC=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-4.9	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-3.9	A
I_{DM}	Pulsed Drain Current[2]	-14	A
P_D@T_A=25°C	Total Power Dissipation[3]	1.31	W
P_D@T_A=70°C	Total Power Dissipation[3]	0.84	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	120	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	95	°C/W

Download from alldatasheet.com

Electrical Characteristics (TJ=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.014	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-4.9A	---	32	38	mΩ
		V_{GS}=-2.5V , I_D=-3.4A	---	45	55	
		V_{GS}=-1.8V , I_D=-2A	---	65	85	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.4	---	-1.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3.95	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-16V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-16V , V_{GS}=0V , T_J=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-3A	---	12.8	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-3A	---	10.2	14.3	nC
Q_{gs}	Gate-Source Charge		---	1.89	2.6	
Q_{gd}	Gate-Drain Charge		---	3.1	4.3	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V , V_{GS}=-4.5V , R_G=3.3 , I_D=-3A	---	5.6	11.2	ns
T_r	Rise Time		---	40.8	73	
$T_{d(off)}$	Turn-Off Delay Time		---	33.6	67	
T_f	Fall Time		---	18	36	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	857	1200	pF
C_{oss}	Output Capacitance		---	114	160	
C_{rss}	Reverse Transfer Capacitance		---	108	151	
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-4.9	A
I_{SM}	Pulsed Source Current[2,4]		---	---	-14	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V
t_{rr}	Reverse Recovery Time	IF=-3A , di/dt=100A/μs , T_J=25℃	---	21.8	---	nS
Q_{rr}	Reverse Recovery Charge		---	6.9	---	nC

Note :

1 .The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%

3.The power dissipation is limited by 150℃ junction temperature

4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Download from alldatasheet.com

Typical Characteristics

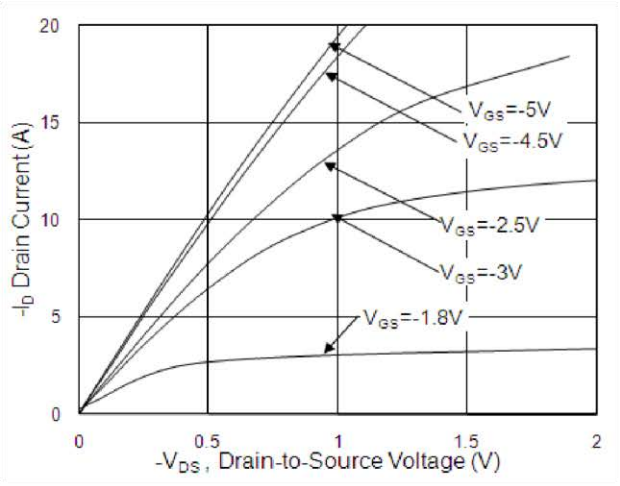


Fig.1 Typical Output Characteristics

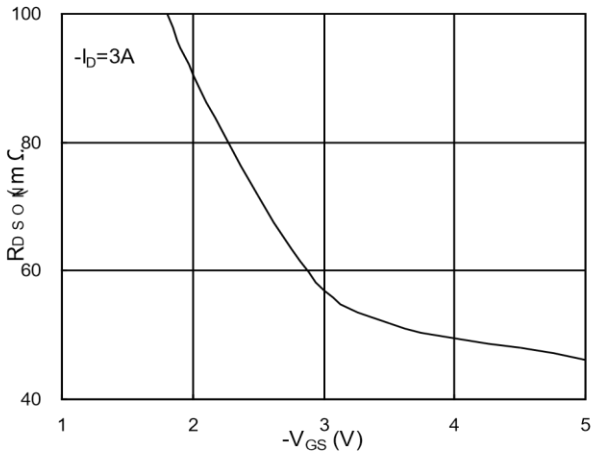


Fig.2 On-Resistance vs. G-S Voltage

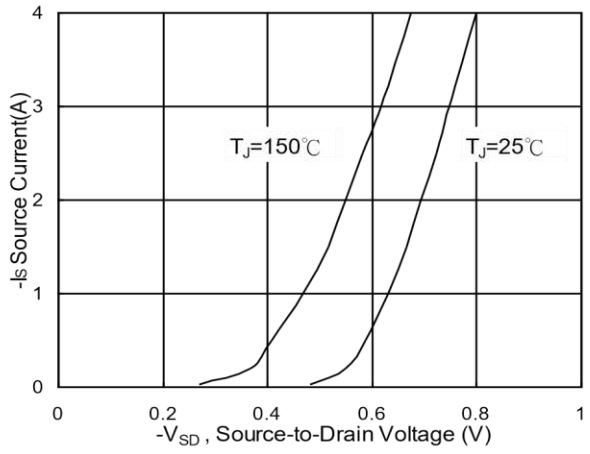


Fig.3 Forward Characteristics of Reverse

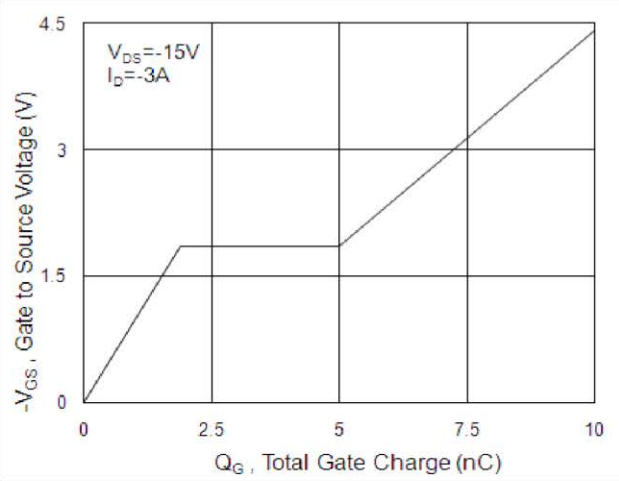


Fig.4 Gate-charge Characteristics

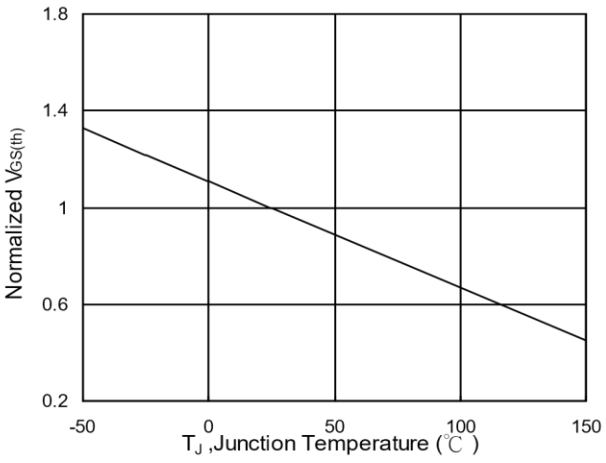


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

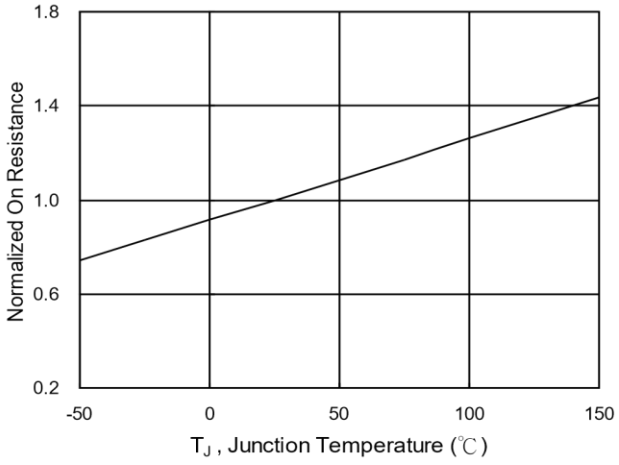


Fig.6 Normalized R_{DSON} vs. T_J

Download from alldatasheet.com

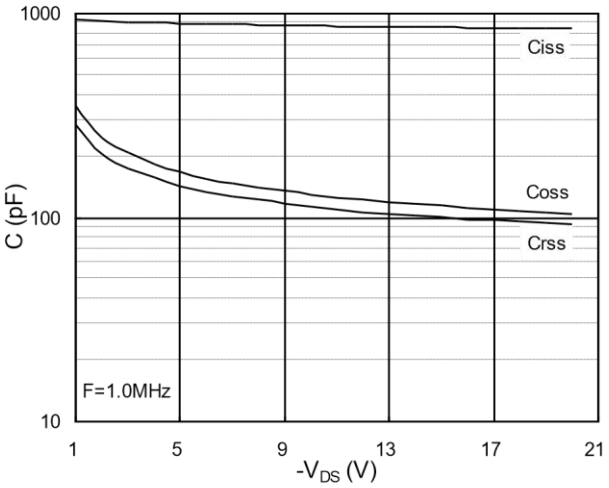


Fig.7 Capacitance

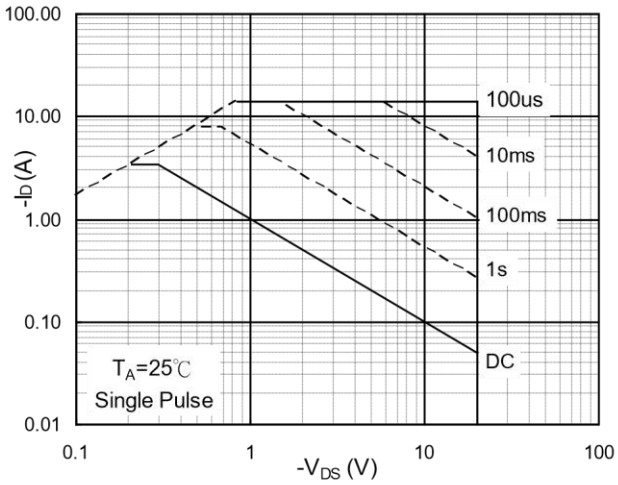


Fig.8 Safe Operating Area

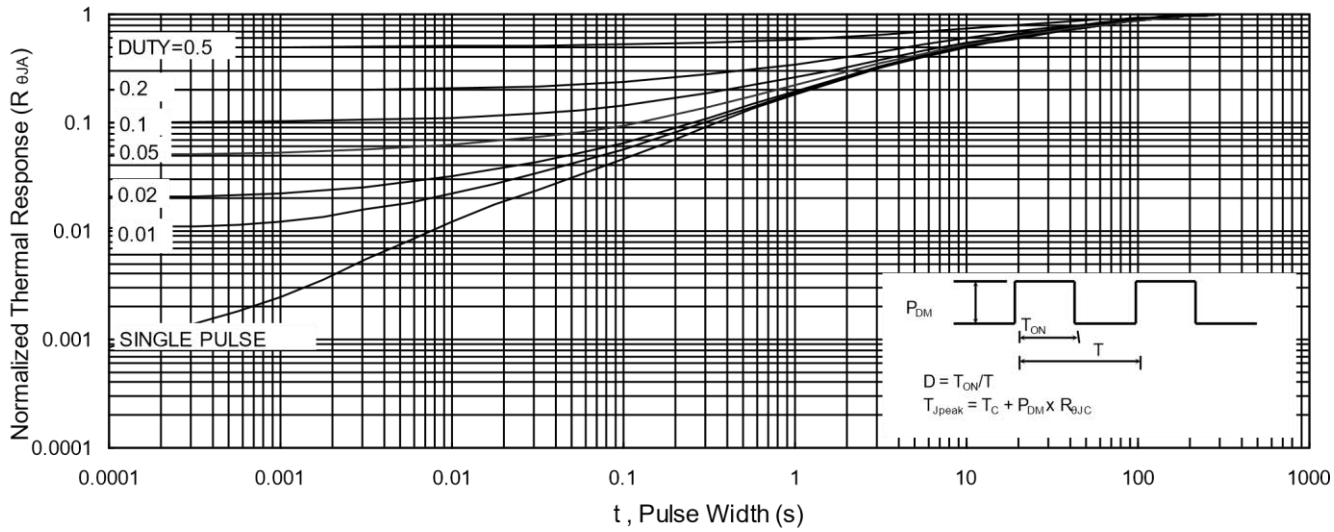


Fig.9 Normalized Maximum Transient Thermal Impedance

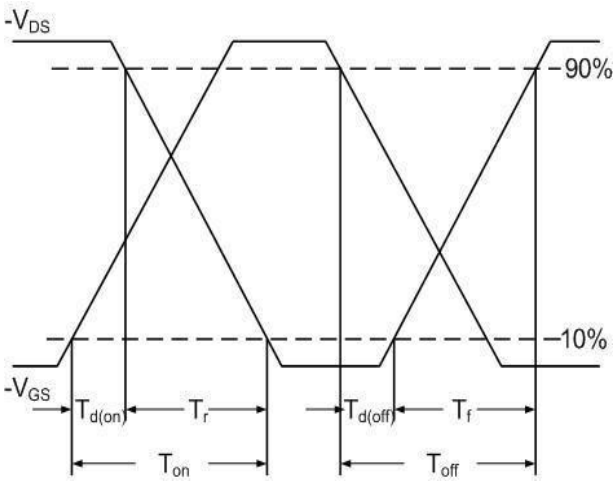


Fig.10 Switching Time Waveform

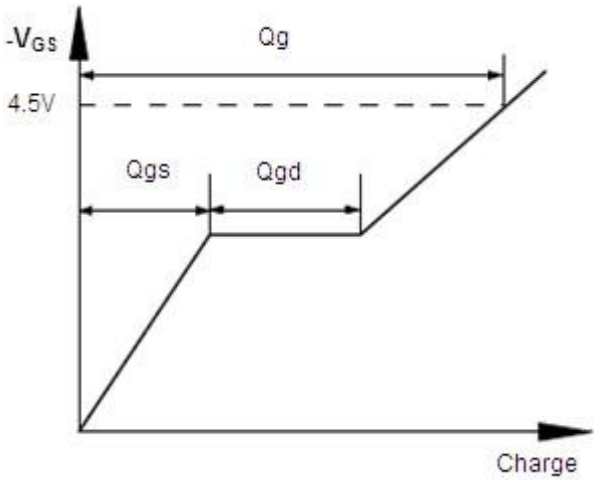
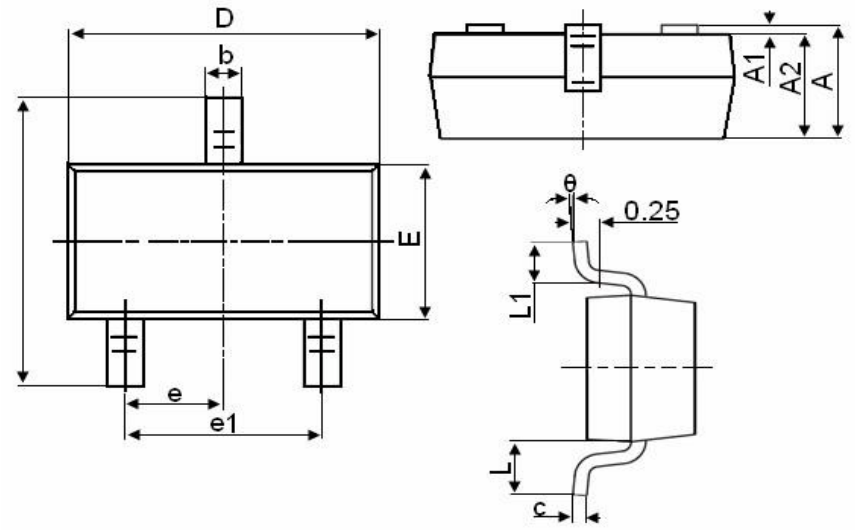


Fig.11 Gate Charge Waveform

Download from alldatasheet.com

Package Mechanical Data-SOT-23



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Shanghai Leiditech Electronic Co.,Ltd
Email: sale1@leiditech.com
Tel : +86- 021 50828806
Fax : +86- 021 50477059

Download from alldatasheet.com