

P-Channel 20V(D-S) Mosfet

Features

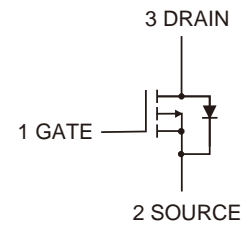
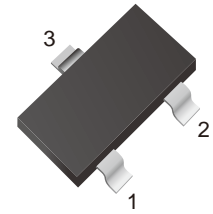
- Low $R_{DS(on)}$ @ $V_{GS} = -4.5V$
- TrenchFET Power MOSFET
- High Current Handling Capability
- Surface Mount Package
- Lead free in comply with EU RoHS 2011/65/EU directives

Mechanical Data

- Case: SOT-23
- Approx. Weight: 8.1mg

Applications

- DC/DC Converter for Portable Devices
- High-side Load Switch
- High Speed Line Driver



Ordering Information

Part Number	Marking	Shipping	Reel
LT2301S-TR3	A1SHB	3000PCS Tape&Reel	7 inchs
LT2301S-TR12	A1SHB	12000PCS Tape&Reel	13 inchs

Product Summary

V_{DS}	$R_{DS(on)MAX}$
-20V	140m Ω @ $V_{GS} = -4.5V$
	210m Ω @ $V_{GS} = -2.5V$

Maximum Ratings and Thermal Characteristics ($T_a = 25$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	- 20	V
Gate-Source Voltage	V_{GS}	± 10	
Continuous Drain Current	I_D	-2.3	A
Pulsed Drain Current (note1)	I_{DM}	-9	
Maximum Power Dissipation	P_D	1	W
Thermal Resistance from Junction to Ambient (note 2)	$R_{\theta JA}$	125	$^{\circ}C/W$
Operation Junction and Storage Temperature Range	T_J, T_{STG}	-50 ~+150	$^{\circ}C$

Electrical Characteristics ($T_a=25$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Gate-threshold voltage(note 3)	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D = -250\mu A$	-0.4	-0.6	-1.0	
Gate-body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 10V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$			-1	μA
Drain-source on-resistance(note 3)	$r_{DS(on)}$	$V_{GS}=-4.5V, I_D=-2A$		0.125	0.14	Ω
		$V_{GS}=-3.3V, I_D=-1A$		0.14	0.17	
		$V_{GS}=-2.5V, I_D=-1A$		0.17	0.21	
Diode forward voltage (note 3)	V_{SD}	$I_S=-1A, V_{GS}=0V$		-0.83	-1.2	V
Dynamic						
Input capacitance	C_{iss}	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		177		μF
Output capacitance	C_{oss}			30		
Reverse transfer capacitance	C_{rss}			25		
Switching (note 4)						
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-10V, I_D=-2A, R_G=3.3\Omega, V_{GS}=-4.5V$		11		ns
Turn-on rise time	t_r			32		
Turn-off delay time	$t_{d(off)}$			25		
Turn-off fall time	t_f			38		
Total gate charge	Q_g	$V_{DS}=-10V, I_D=-2A, V_{GS}=-4.5V$		5.3		nC
Gate-source charge	Q_{gs}			0.7		
Gate-drain charge	Q_{gd}			1.4		

*Notes :

1. Repetitive rating: Pulse width limited by maximum junction temperature
2. Surface Mounted on FR4 board, $t \leq 10$ sec.
3. Pulse test : Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production.

Characteristic Curves

Fig1. Typical Output Characteristics

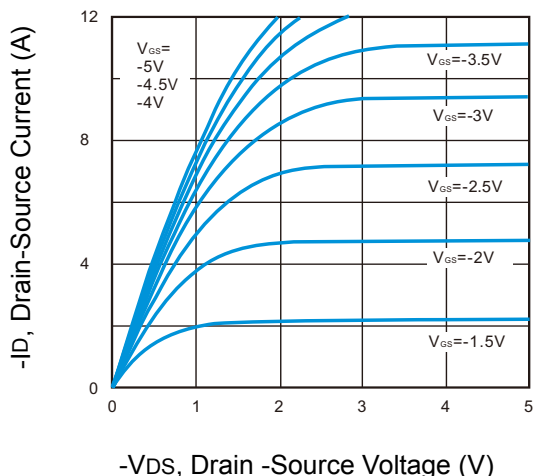


Fig2. Normalized Threshold Voltage Vs Temperature

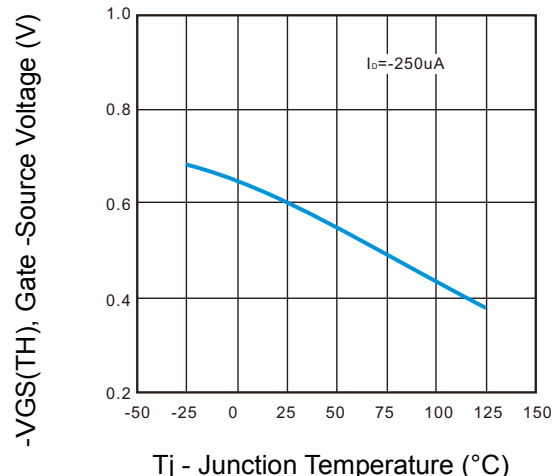




Fig3. Typical Transfer Characteristics

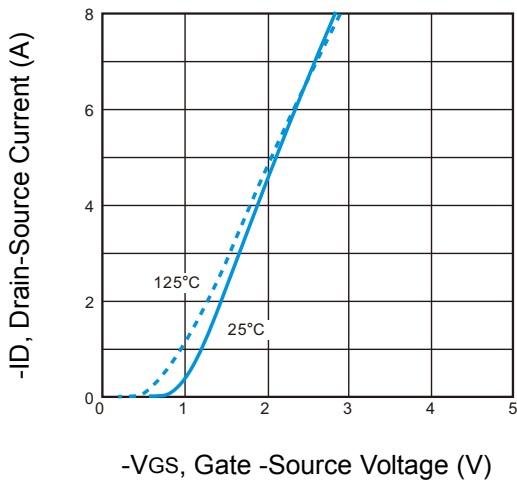


Fig4. Drain-Source Voltage vs Gate-Source Voltage

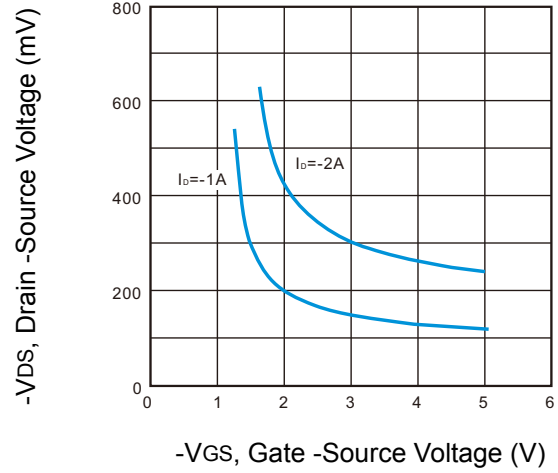


Fig5. Typical Source-Drain Diode Forward Voltage

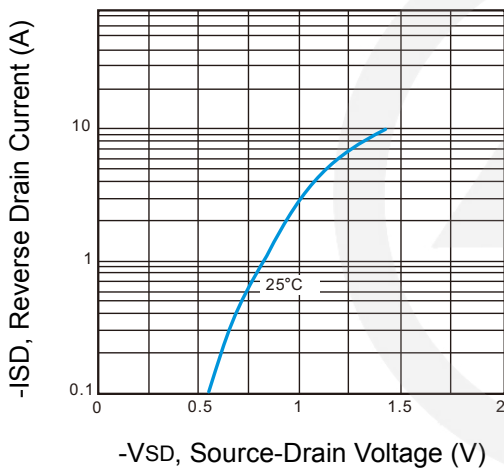


Fig6. Maximum Safe Operating Area

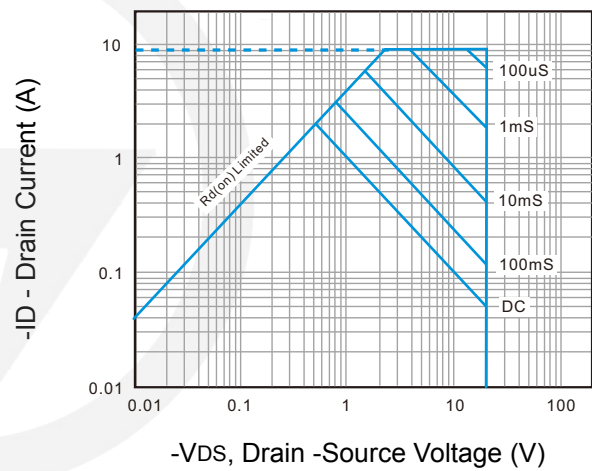


Fig7. Typical Capacitance Vs Drain-Source Voltage

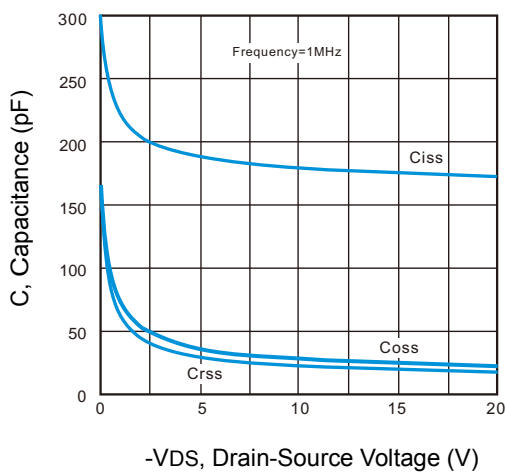
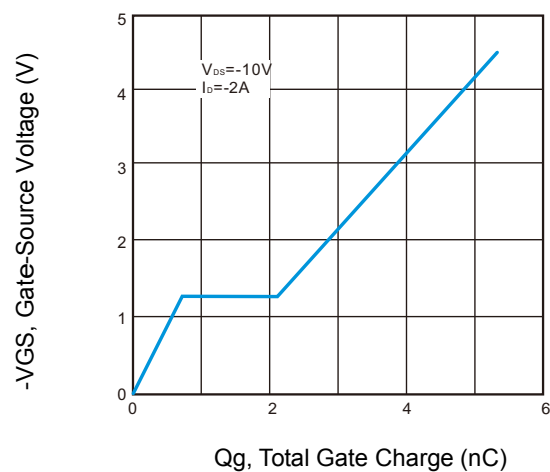
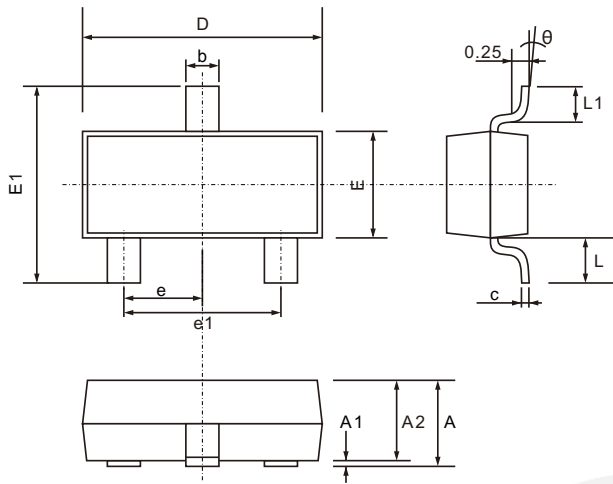


Fig8. Typical Gate Charge Vs Gate-Source Voltage



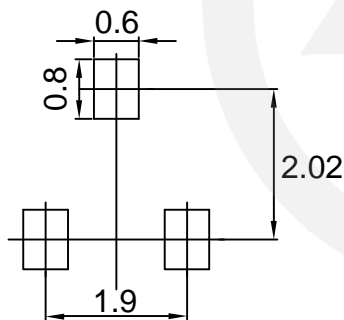
SOT-23 Package Outline

Unit: mm

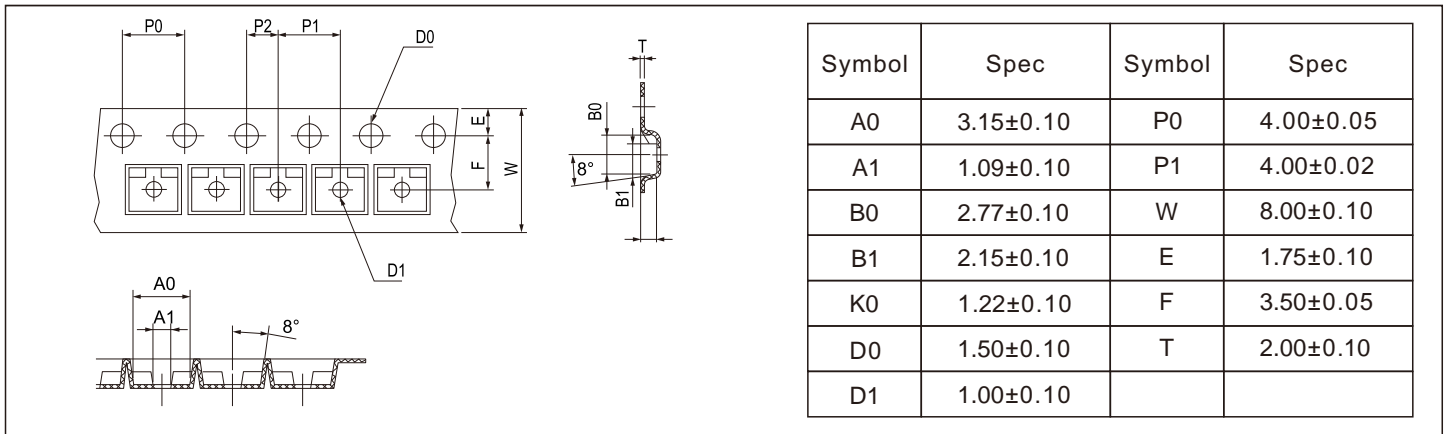
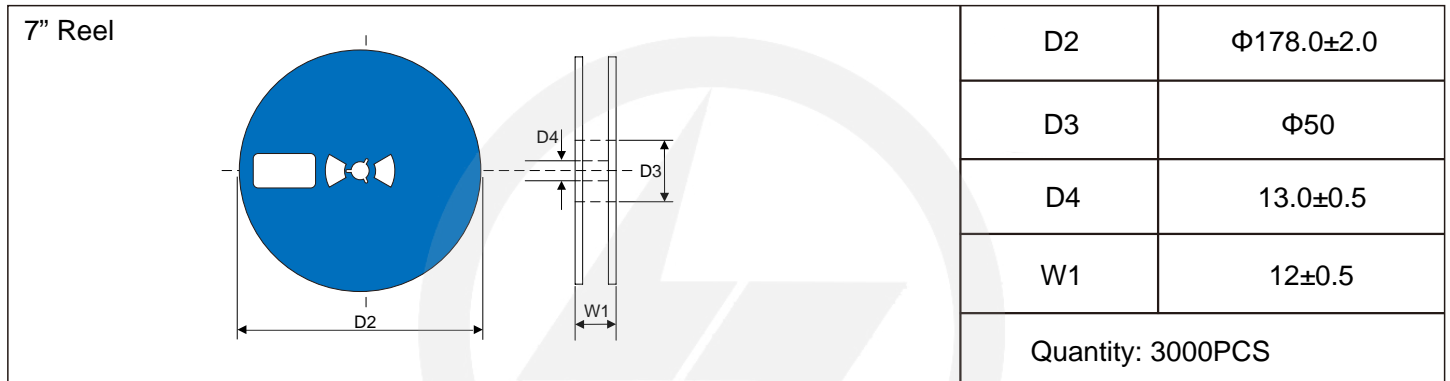
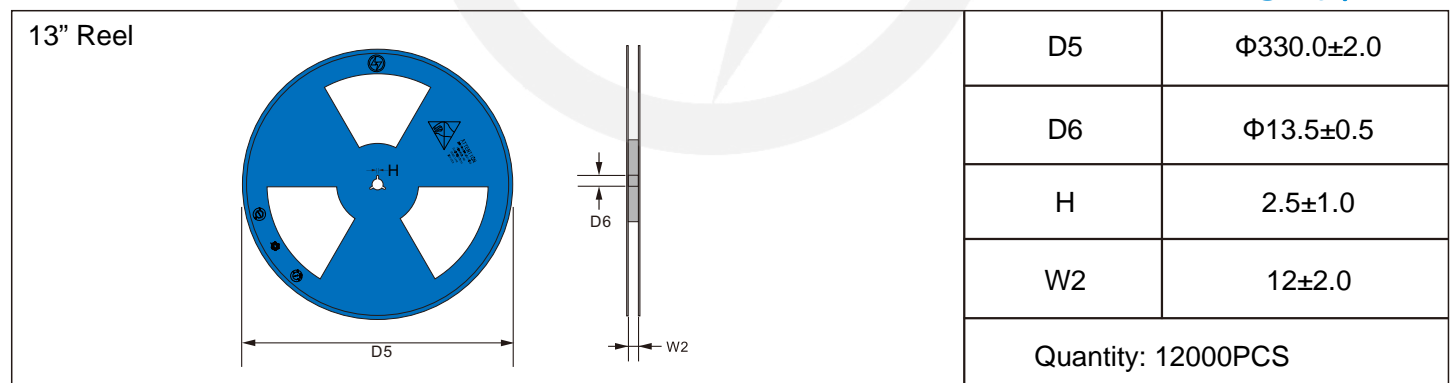
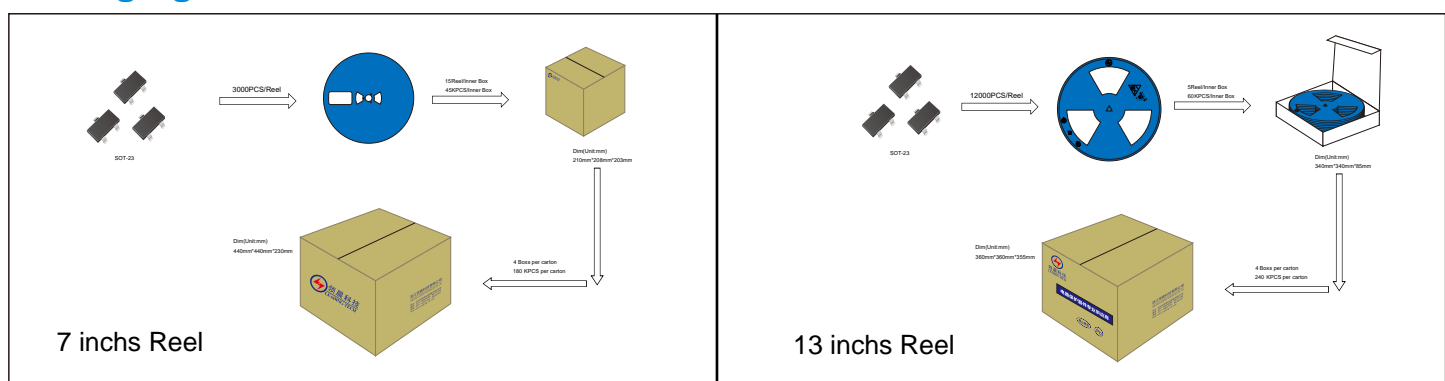


SYMBOL	DIMENSIONS	
	MIN.	MAX.
A	0.900	1.200
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.200
D	2.700	3.100
E	1.200	1.400
E1	2.200	2.600
e	0.950 TYP.	
e1	1.750	2.050
L	0.550 TYP.	
L1	0.300	0.500
θ	0°	8°

SOT-23 Suggested Pad Layout

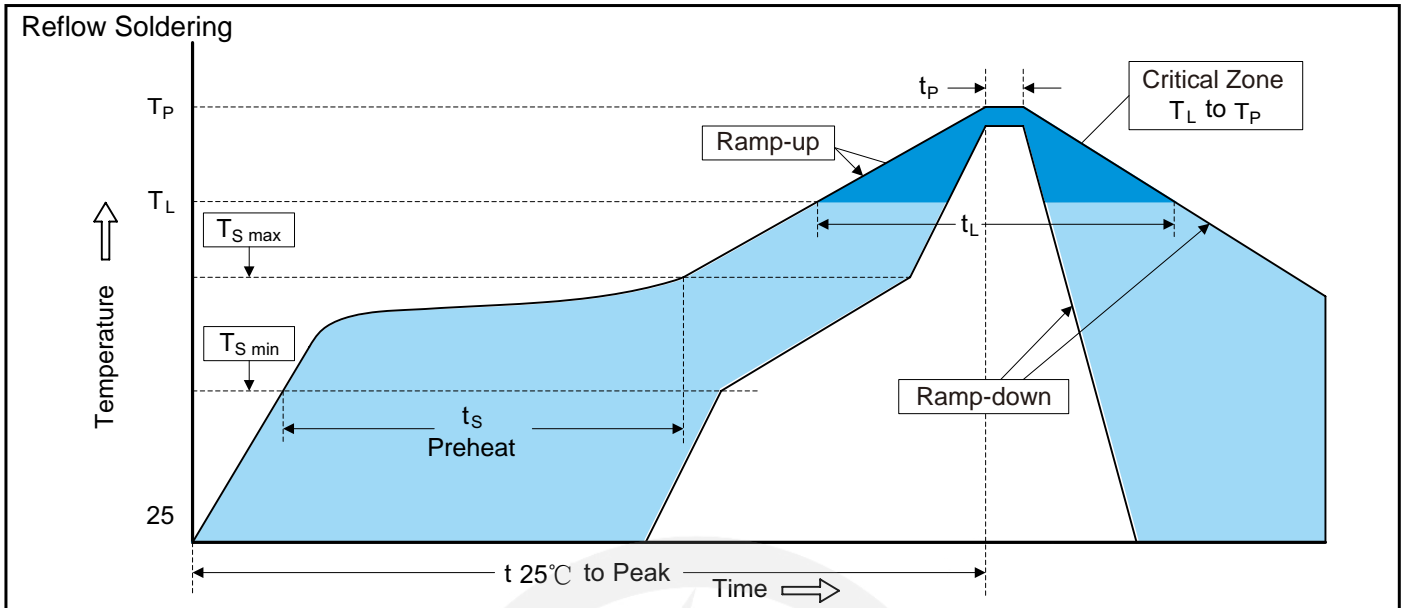


Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$
 3. The pad layout is for reference purpose only.

Carrier Tape Dimensions
Unit : mm

Reel Dimensions
Unit : mm

Reel Dimensions
Unit : mm

Packaging




Recommended Soldering Conditions



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T _L to T _P)	3°C/second max.
Preheat	
-Temperature Min (T _{S min})	150°C
-Temperature Max (T _{S max})	200°C
-Time (min to max) (t _s)	60-180 seconds
T _{S max} to T _L	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature (T _L)	217°C
-Time (t _L)	60-150 seconds
Peak Temperature (T _P)	260°C
Time within 5°C of actual Peak Temperature (t _p)	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

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Version Update Information

Series NO.	Enactment/Revision Date	Effective Date	Version	Revision Content	Revision Reason	Revision Person	Note
01	2024.03.20	2024.03.20	3.0	New file	/	Ding	
02	2025.06.11	2025.06.11	3.1	Update packaging information	/	Ding	
03	2026.03.05	2026.03.05	3.2	Package outline E1(max)=2.6mm	/	Ding	