

N-Channel 20-V(D-S) Mosfet

Features

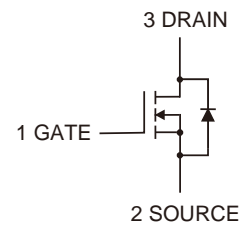
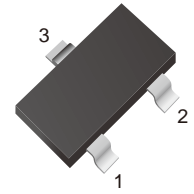
- Low $R_{DS(on)}$ @ $V_{GS}=4.5V$
- TrenchFET Power MOSFET
- High Current Handling Capability
- Surface Mount Package
- Lead free in comply with EU RoHS 2011/65/EU directives

Mechanical Data

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

Applications

- DC/DC Converter for Portable Devices
- Switching Circuits
- LED Driver



Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$
20V	60m Ω @4.5V
	80m Ω @2.5V

Ordering Information

Part Number	Marking	Shipping	Reel
LT2302S-TR3	A2SHB	3000PCS Tape&Reel	7 inches
LT2302S-TR12	A2SHB	12000PCS Tape&Reel	13 inches

Maximum Ratings ($T_a=25$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	
Continuous Drain Current	I_D	3.2	A
Pulsed Drain Current (note1)	I_{DM}	12.8	
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 (Ta=25 unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
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	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)	$r_{DS(on)}$	$V_{GS} = 4.5V, I_D = 3A$		0.048	0.060	Ω
		$V_{GS} = 3.3V, I_D = 2A$		0.055	0.070	
		$V_{GS} = 2.5V, I_D = 1A$		0.066	0.080	
Diode forward voltage (note 3)	V_{SD}	$I_S = 1A, V_{GS} = 0V$		0.82	1.2	V
Dynamic						
Input capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$		160		pF
Output capacitance	C_{oss}			30		
Reverse transfer capacitance	C_{rss}			25		
Switching (note 4)						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 10V, I_D \approx 2A, V_{GS} = 4.5V, R_g = 3.3\Omega$		8		ns
Rise time	t_r			30		
Turn-off delay time	$t_{d(off)}$			19		
Fall time	t_f			28		
Total gate charge	Q_g	$V_{DS} = 10V, V_{GS} = 5V, I_D = 3A$		4.0		nC
Gate-source charge	Q_{gs}			0.4		
Gate-drain charge	Q_{gd}			1.2		

***Notes :**

- 1.Repetitive rating: Pluse 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.

Characteristics Curves

Fig1. Typical Output Characteristics

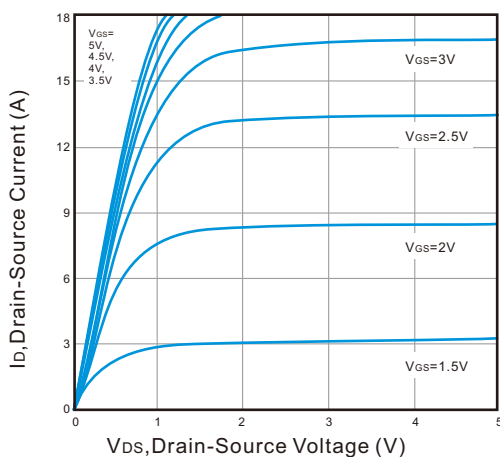


Fig2. Normalized Threshold Voltage vs. Temperature

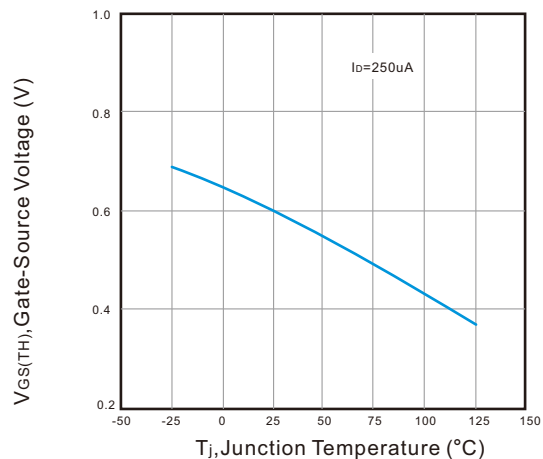




Fig 3. Typical Transfer Characteristics

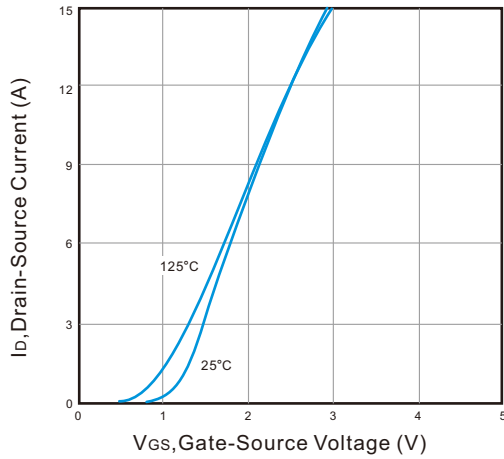


Fig 4. Drain-Source Voltage vs Gate-Source Voltage

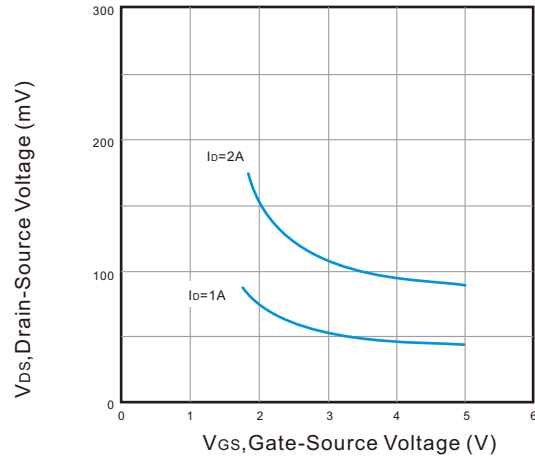


Fig 5. Typical Source-Drain Diode Forward Voltage

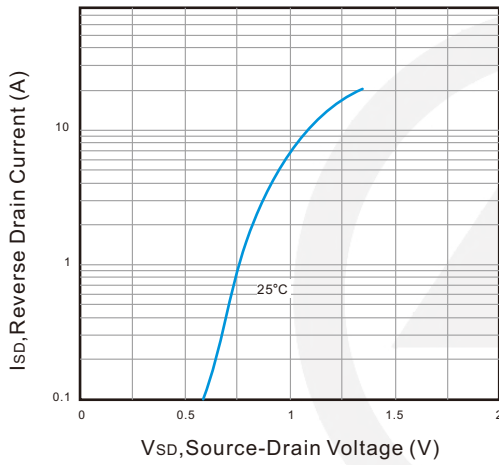


Fig 6. Maximum Safe Operating Area

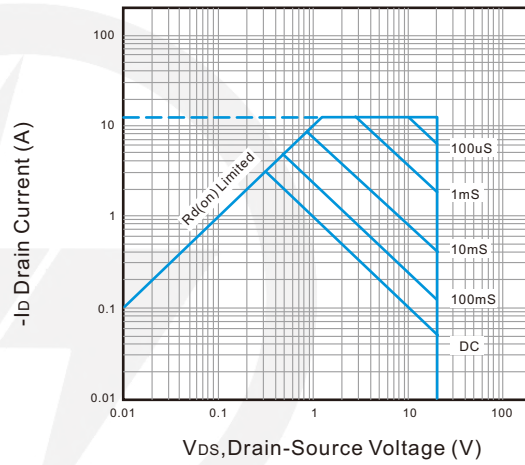


Fig 7. Typical Capacitance vs. Drain-Source Voltage

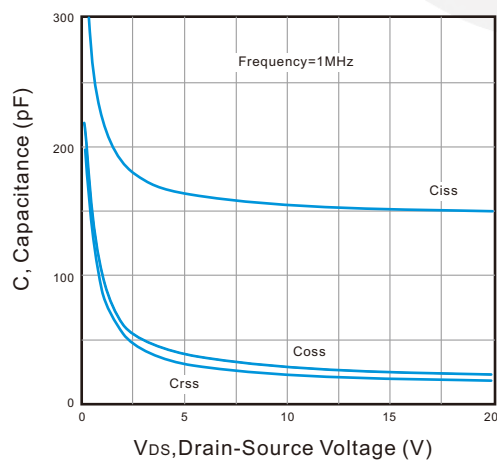
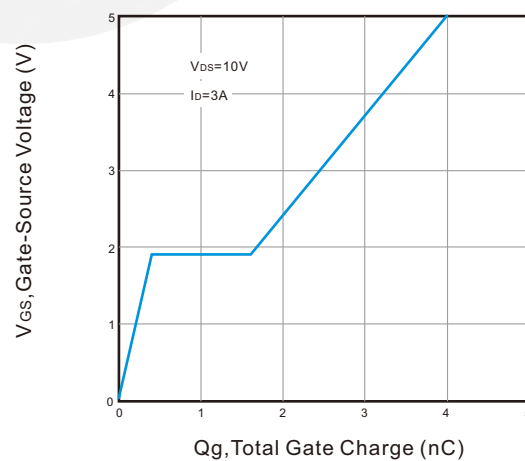
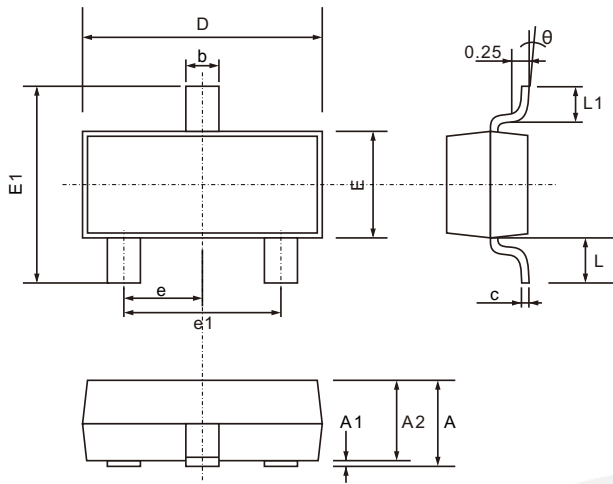


Fig 8. Typical Gate Charge vs. Gate-Source Voltage



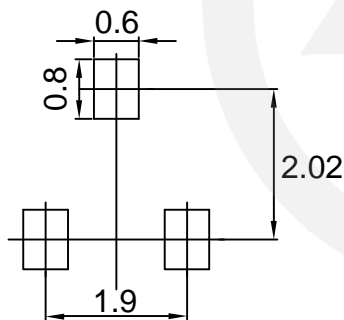
SOT-23 Package Outline

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°

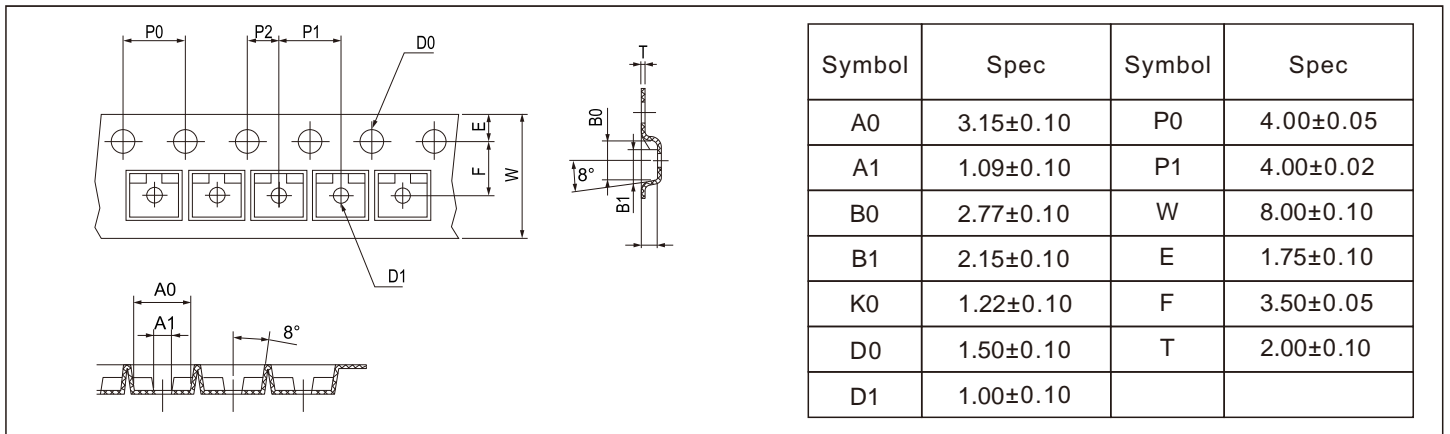
SOT-23 Suggested Pad Layout



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

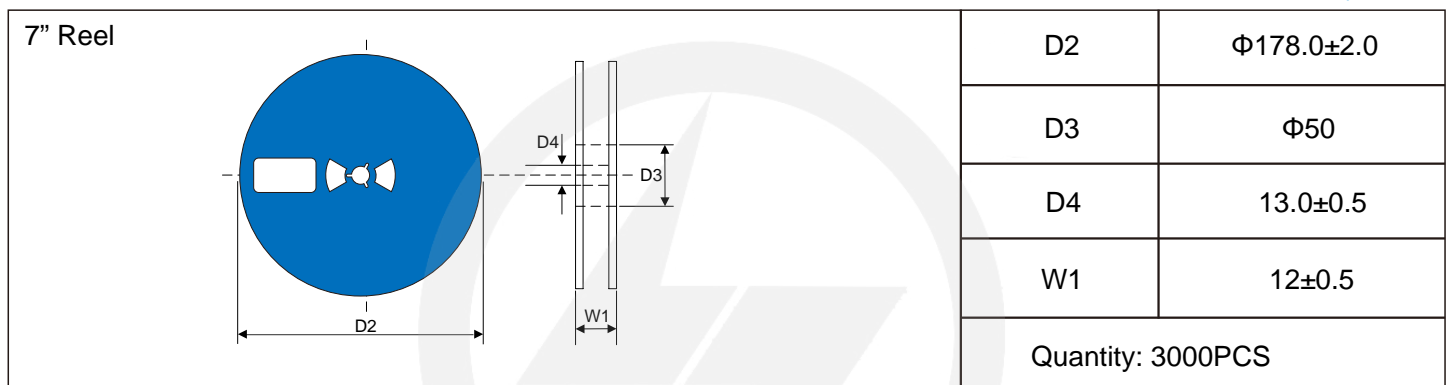
Carrier Tape Dimensions

Unit : mm



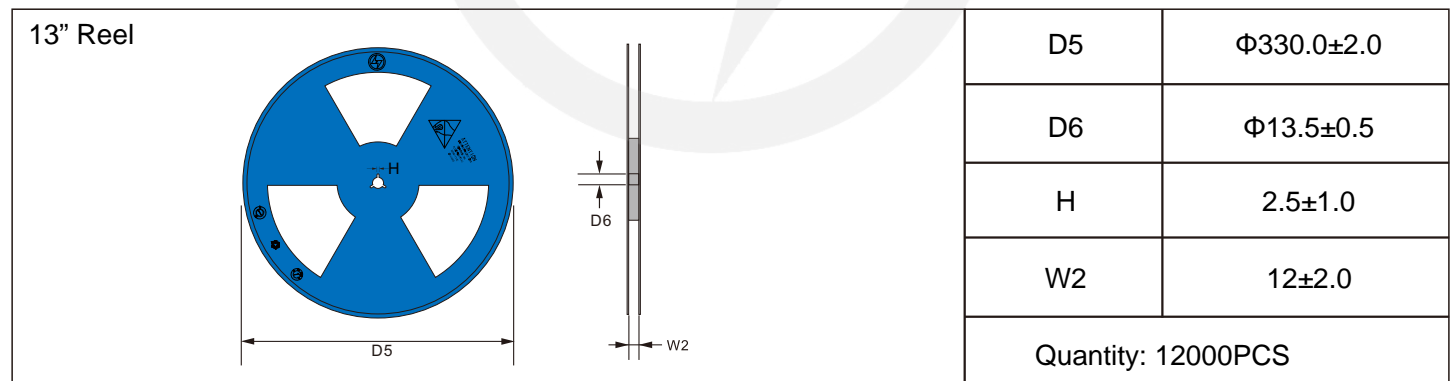
Reel Dimensions

Unit : mm

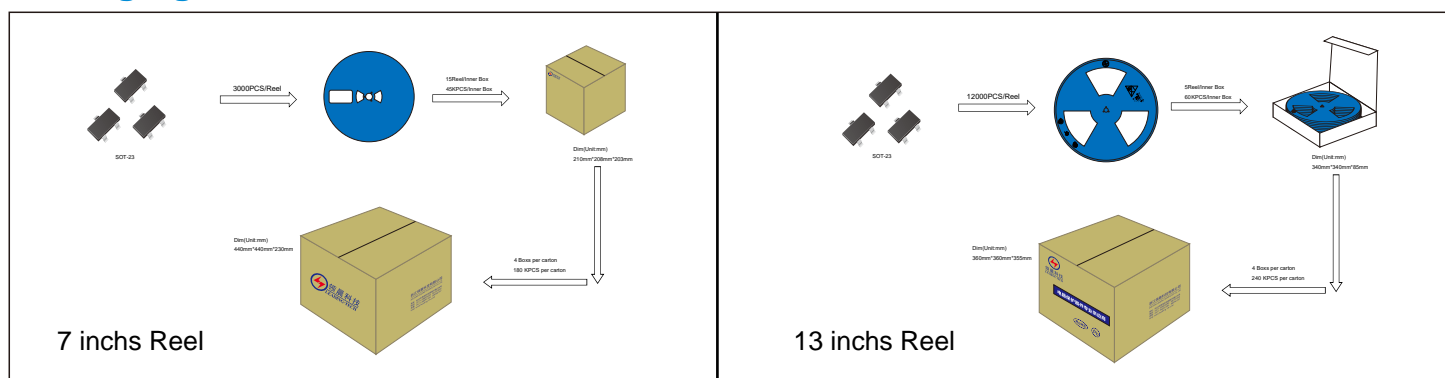


Reel Dimensions

Unit : mm

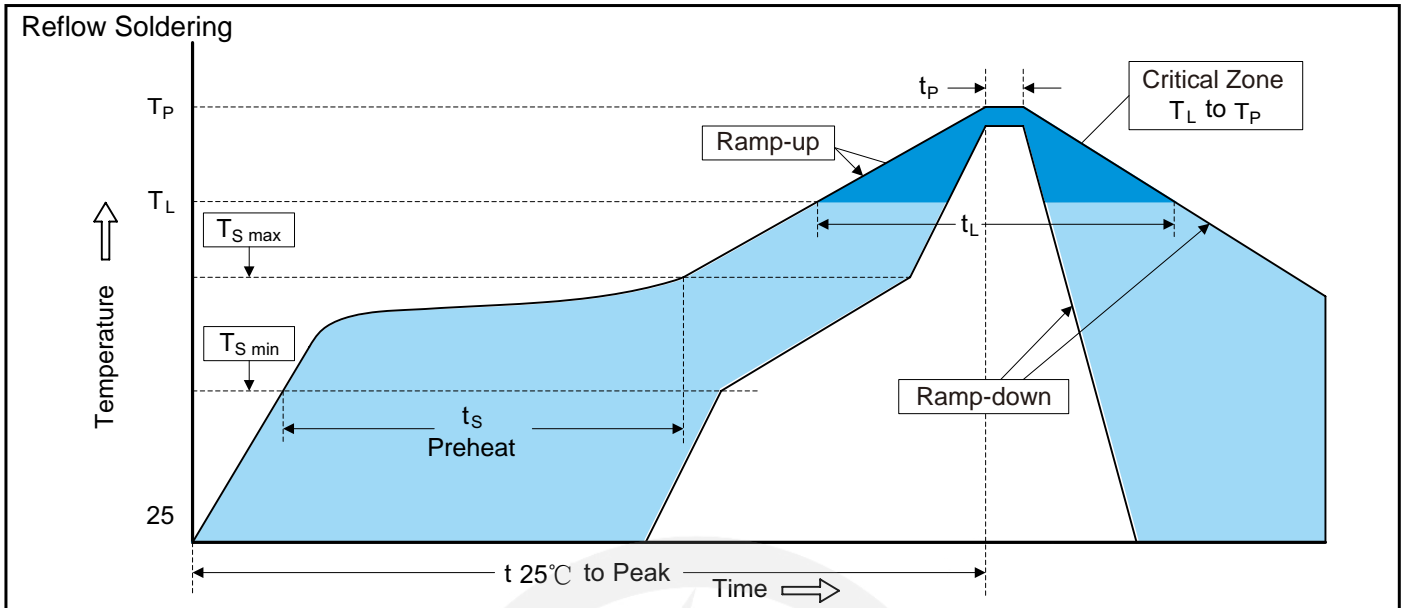


Packaging





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	2025.03.29	2025.03.29	3.0	New file	/	Ding	
02	2026.03.05	2026.03.05	3.1	Package outline E1(max)=2.6mm	/	Ding	