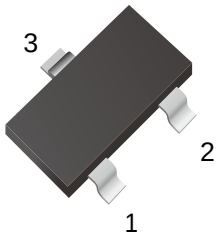
LTM2309P

P-channel Enhancement Mode Power MOSFET

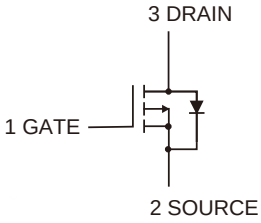
Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free in comply with EU RoHS 2011/65/EU directives



Mechanical Data

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



Application

- PWM Applications
- Load Switch
- Power Management

Ordering Information

Part Number	Marking	Shipping	Reel
LTM2309P-TR3	9HP	3000PCS Tape&Reel	7 inchs
LTM2309P-TR12	9HP	12000PCS Tape&Reel	13 inchs

Maximum Ratings (Ta=25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	Tamb=25°C	I_D	-1.9	A
	Tamb=70°C		-1.5	A
Pulsed Drain Current		I_{DM}	-7.6	A
Power Dissipation	Tamb=25°C	P_D	1.4	W
	Tamb=70°C		0.9	
Thermal Resistance-Junction to Ambient (Note1)	t≤10s	$R_{\theta JA}$	170	°C/W
	Steady State		225	
Thermal Resistance-Junction to Case (Note1)		$R_{\theta JC}$	90	°C/W
Junction Temperature		T_j	150	°C
Storage Temperature		T_{stg}	-55 to +150	°C

Notes:(1) The device mounted on 1in ² FR4 board with 2 oz copper
(2) Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%

Electrical Characteristics (Ta=25°C unless otherwise noted)

Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = -250μA	-60			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} = -60V,V_{GS} = 0V			-10	μA
Gate- Source Leakage Current	I_{GSS}	V_{GS} = ±20V,V_{DS} = 0V			±100	nA
On Characteristics(Note2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS},I_D = -250μA	-1		-3	V
Static Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = -10V,I_D = -1.8A		170	215	mΩ
		V_{GS} = -4.5V,I_D = -1.4A		200	260	
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS} = 30V V_{GS} = 0V f =1MHz		373		pF
Output Capacitance	C_{OSS}			24.2		
Reverse Transfer Capacitance	C_{RSS}			17.4		
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = -48V V_{GS} = -4.5V I_D = -1A		4.06		nC
Gate-Source Charge	Q_{gs}			1.04		
Gate-Drain Charge	Q_{gd}			2.1		
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=-30V, R_G=3.1Ω, V_{GS}=-10V, I_D=-1A, R_L=30Ω		3.6		ns
Turn-On Rise Time	t_{rr}			3.6		
Turn-Off Delay Time	$t_{d(off)}$			16.7		
Turn-Off Fall Time	t_f			2.9		
Body Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	I_S = -1.2A,V_{GS} = 0V			-1.2	V
Gate-Resistance	R_G	V_{GS} = 0 V, V_{DS}=0V,f=1MHz		6.5		Ω

Typical Performance Characteristics

Fig.1 Safe Operating Area

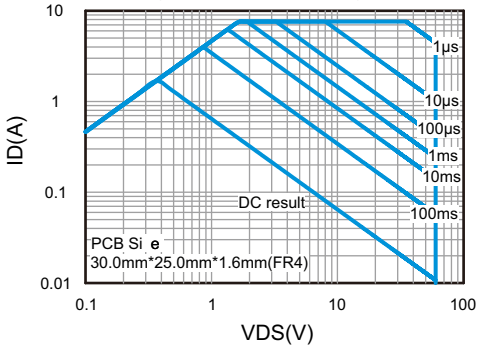
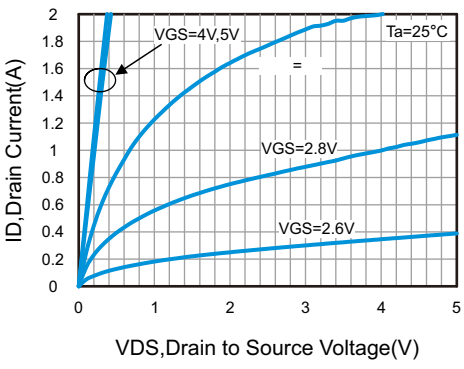


Fig.2 ID vs. VDS



Typical Performance Characteristics

Fig.3 ID vs. VGS

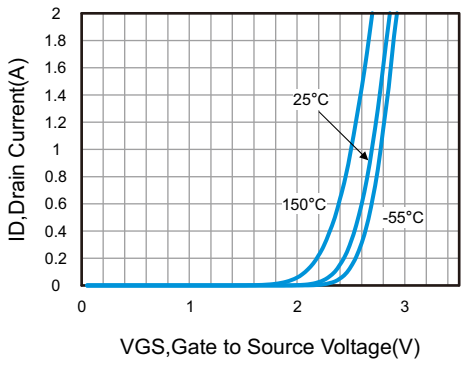


Fig.4 IS vs. VSD

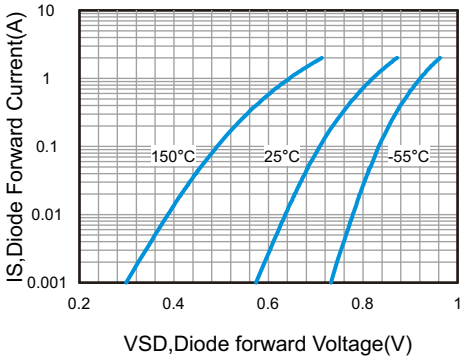


Fig.5 RDS(on) vs. ID

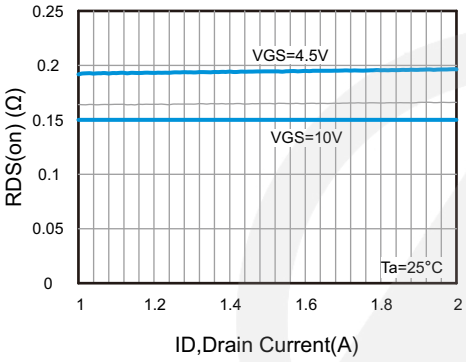


Fig.6 RDS(on) vs. VGS

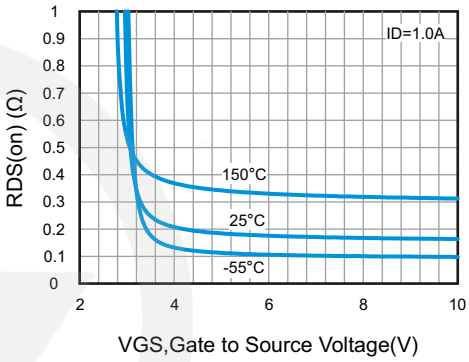


Fig.7 RDS(on) vs. Tj

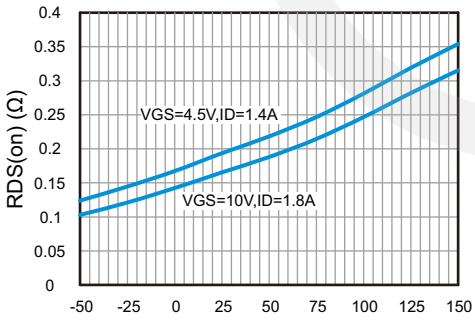


Fig.8 VGSTH vs. Tj

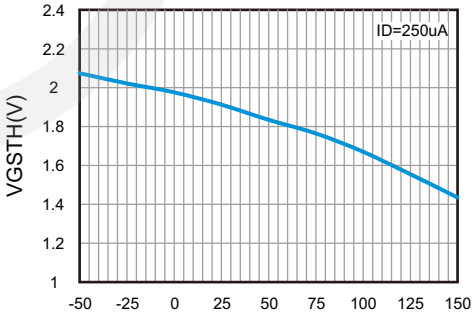
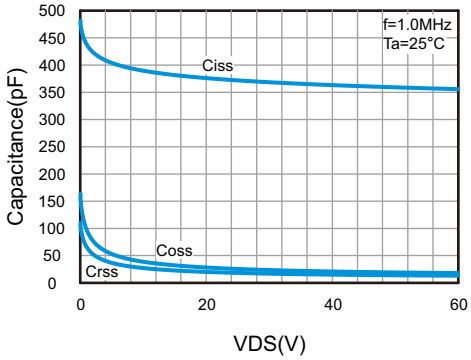
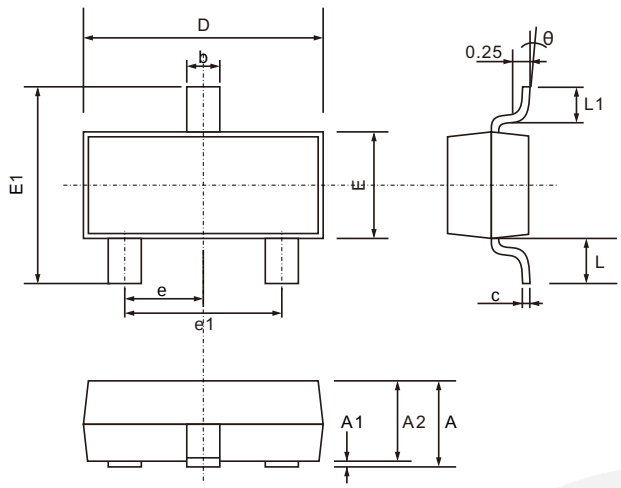


Fig.9 Capacitance



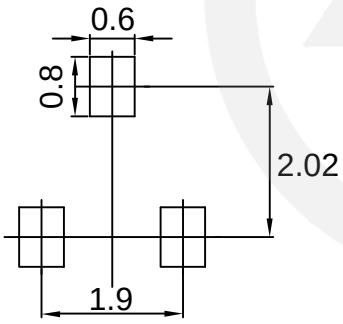
SOT-23 Package Outline



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°

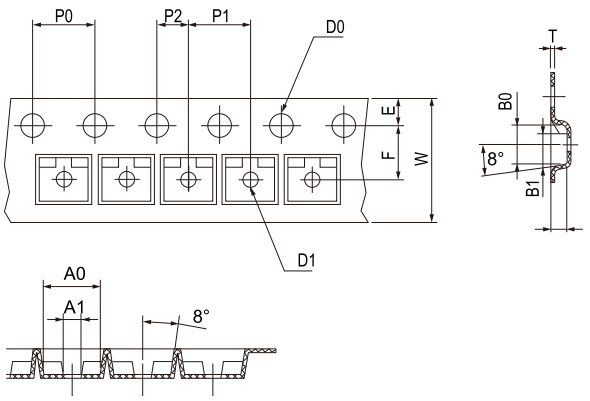
SOT-23 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm
3.The pad layout is for reference purpose only.

Carrier Tape Dimensions

Unit：mm

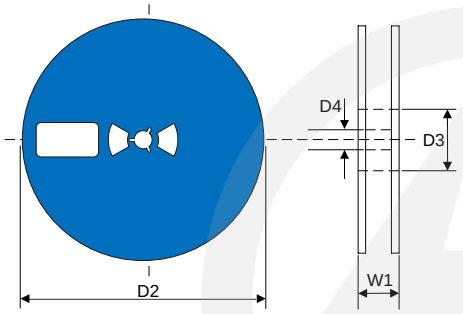


Symbol	Spec	Symbol	Spec
A0	3.15±0.10	P0	4.00±0.05
A1	1.09±0.10	P1	4.00±0.02
B0	2.77±0.10	W	8.00±0.10
B1	2.15±0.10	E	1.75±0.10
K0	1.22±0.10	F	3.50±0.05
D0	1.50±0.10	T	2.00±0.10
D1	1.00±0.10		

Reel Dimensions

Unit：mm

7” Reel

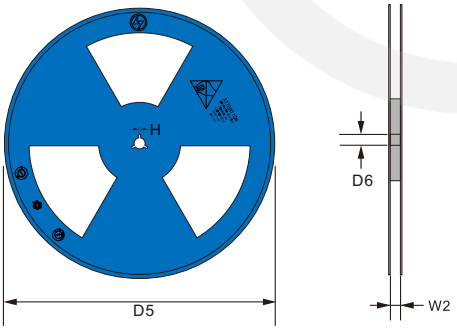


D2	Φ178.0±2.0
D3	Φ50
D4	13.0±0.5
W1	12±0.5
Quantity: 3000PCS	

Reel Dimensions

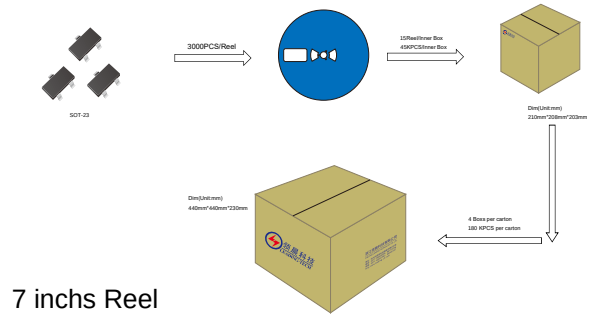
Unit：mm

13” Reel

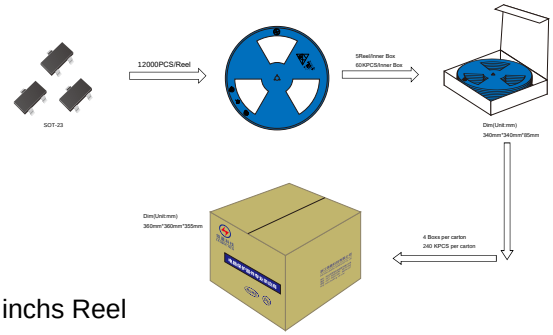


D5	Φ330.0±2.0
D6	Φ13.5±0.5
H	2.5±1.0
W2	12±0.5
Quantity: 12000PCS	

Packaging



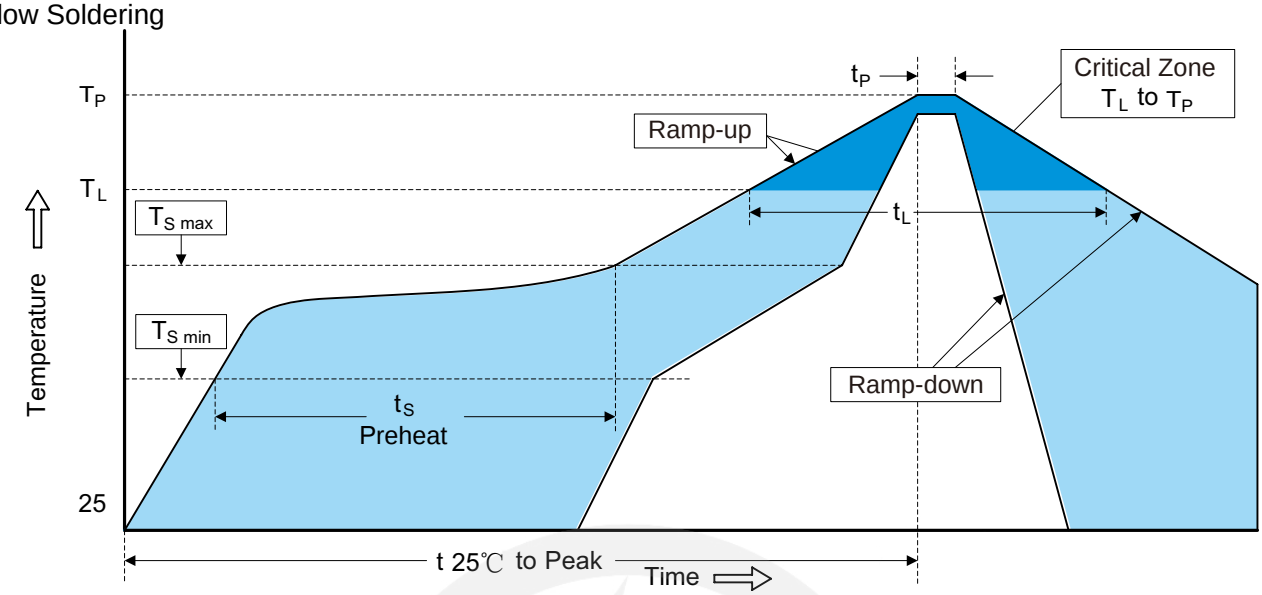
7 inchs Reel



13 inchs Reel

Recommended Soldering Conditions

Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3℃/second max.
Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_S)	 150℃ 200℃ 60-180 seconds
$T_{S\ max}$ to T_L -Ramp-up Rate	 3℃/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	 217℃ 60-150 seconds
Peak Temperature (T_P)	260℃
Time within 5℃ of actual Peak Temperature (t_P)	20-40 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ 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	2024.03.18	2024.03.18	3.0	New file	/	Ding	
02	2025.06.17	2025.06.17	3.1	Update packaging information	/	Ding	
03	2026.03.05	2026.03.05	3.2	Package outline E1(max)=2.6mm	/	Ding	