

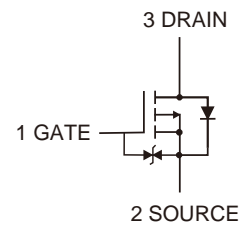
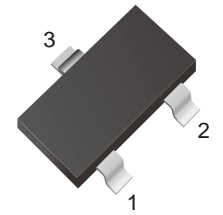
P-Channel Mosfet

Features

- Epoxy Meets UL 94 V-0 Flammability Rating
- High Density Cell Design For Low $R_{DS(ON)}$
- Voltage Controlled Small Signal Switch
- Rugged And Reliable
- Lead free in comply with EU RoHS 2011/65/EU directives

Mechanical Data

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



Ordering Information

Part Number	Marking	Shipping	Reel
LTM3415PA-TR3	3415	3000PCS Tape&Reel	7 inchs
LTM3415PA-TR12	3415	12000PCS Tape&Reel	13 inchs

Maximum Ratings ($T_a = 25^\circ\text{C}$)

Symbol	Parameter	Value	Unit
V_{DS}	Drain - Source Voltage	- 20	V
V_{GS}	Gate - Source Voltage	± 10	V
I_D	Drain Current Continuous	- 4.0	A
I_{DM}	Pulsed Drain Current*1	- 30	A
P_d	Total Power Dissipation	1.40	W
T_J	Junction Temperature	- 55 to 150	$^\circ\text{C}$
T_{stg}	Storage Temperature	- 55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	89.3	$^\circ\text{C/W}$

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



Electrical Characteristics (T_a = 25°C)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V _{(BR)DSS}	Drain - Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-20			V
V _{GS(th)}	Gate Threshold Voltage ^{*2}	V _{DS} =V _{GS} , I _D = -250μA	-0.35	-0.55	-0.9	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±10V			±10	μA
I _{DSS}	Drain Leakage Current	V _{DS} =-20V, V _{GS} =0V			-1	μA
R _{DS(ON)}	On- State Resistance ^{*2}	V _{GS} =- 4.5V, I _D =- 4A		34	45	mΩ
		V _{GS} =- 2.5V, I _D =- 4A		44	60	
g _{FS}	Forward Tranconductance ^{*2}	V _{DS} =-5V, I _D = - 4.0A	8			S
I _S	Diode Forward Current ^{*3}				-4	S
V _{SD}	Diode Forward Voltage ^{*2}	V _{GS} =0V, I _S = - 4A			-1.2	V

Dynamic Characteristics^{*4}

C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-10V, f=1MHz		950		pF
C _{oss}	Output Capacitance			165		
C _{rss}	Reverse Transfer Capacitance			120		
Q _g	Total Gate Charge	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-4A		12		nC
Q _{gs}	Gate - Source Chage			1.4		
Q _{gd}	Gage- Drain Charge			3.6		
t _{d(on)}	Turn - On Delay Time	V _{DD} =-10V, V _{GS} =-4.5V, R _L =2.5Ω, R _G =3Ω		12		nS
t _r	Turn - On Rise Time			10		
t _{d(off)}	Turn - Off Delay Time			19		
t _f	Turn - Off Fall Time			25		

*2 Pulse Test: Pulse Width≤ 300μs, Duty Cycle≤2%.

*3 Surface Mounted on FR4 Board, t ≤ 10 sec.

*4 Guaranteed by Design, Not Subject to Production Testing.



Characteristic Curves

Fig.1 Typical Output Characteristics

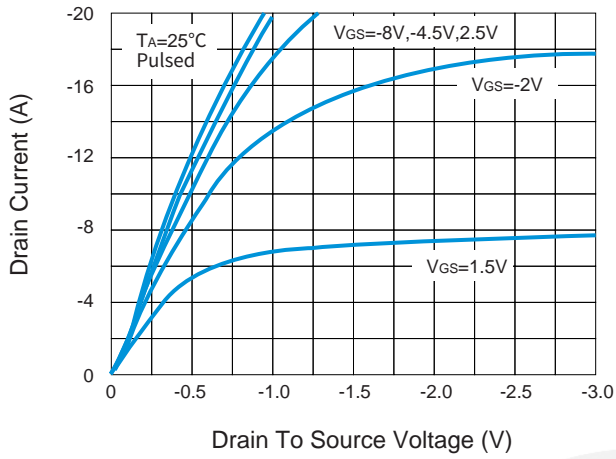


Fig.2 Transfer Characteristics

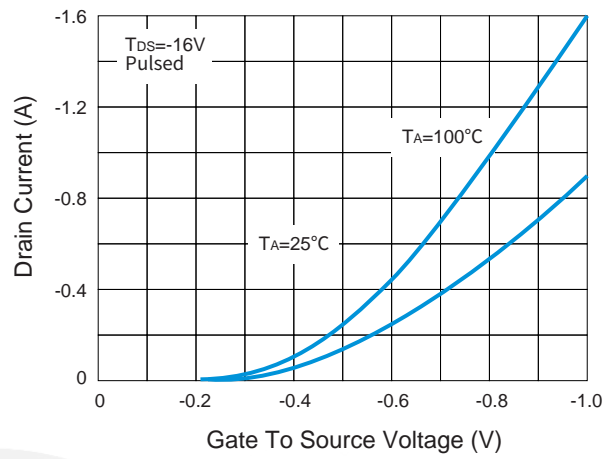


Fig.3 $R_{DS(ON)}-I_D$

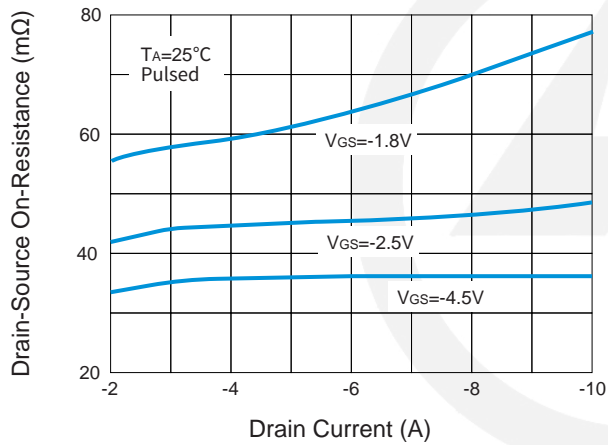


Fig.4 $R_{DS(ON)}-V_{GS}$

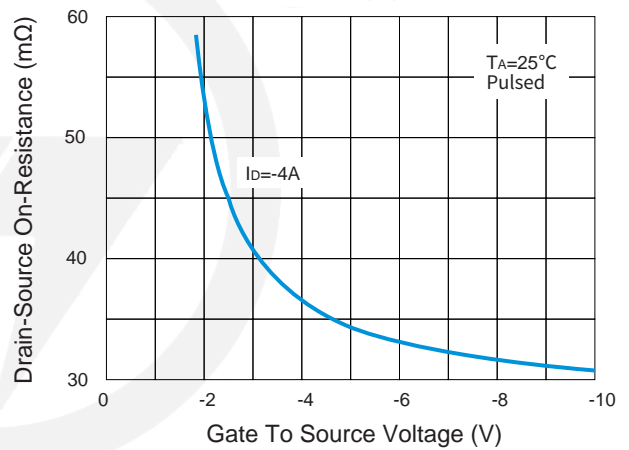


Fig.5 I_S-V_{SD}

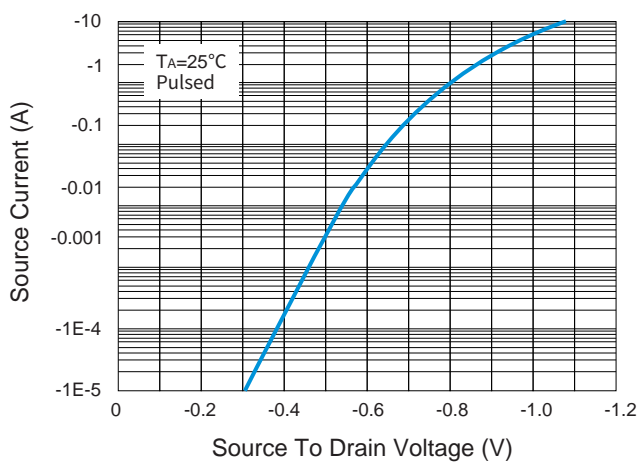
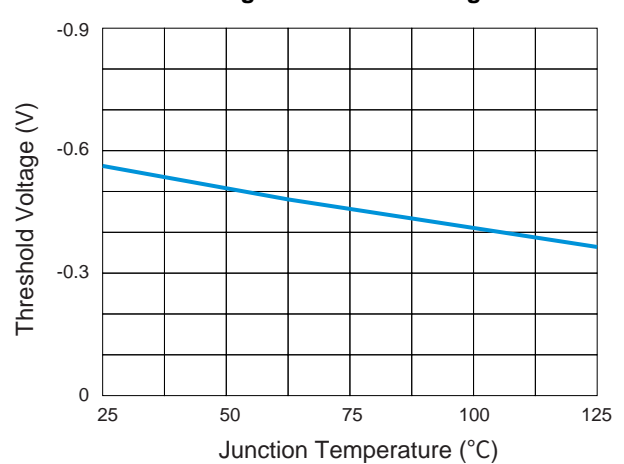
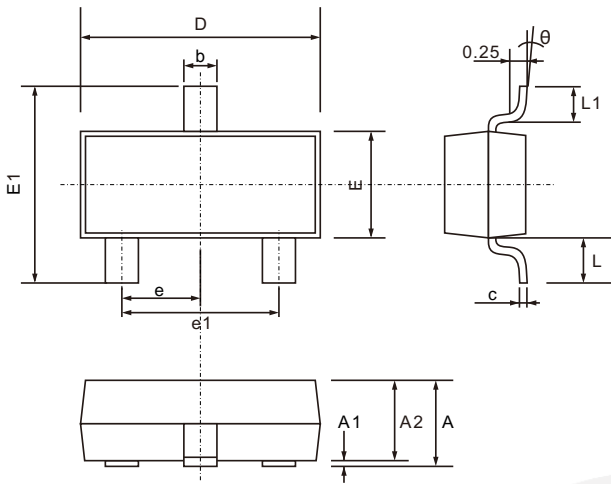


Fig.6 Threshold Voltage



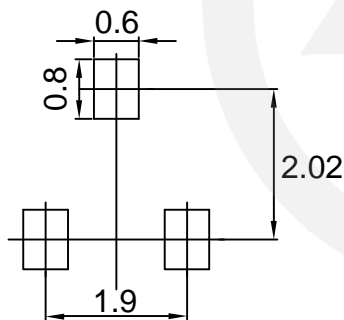
SOT-23 Package Outline

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°

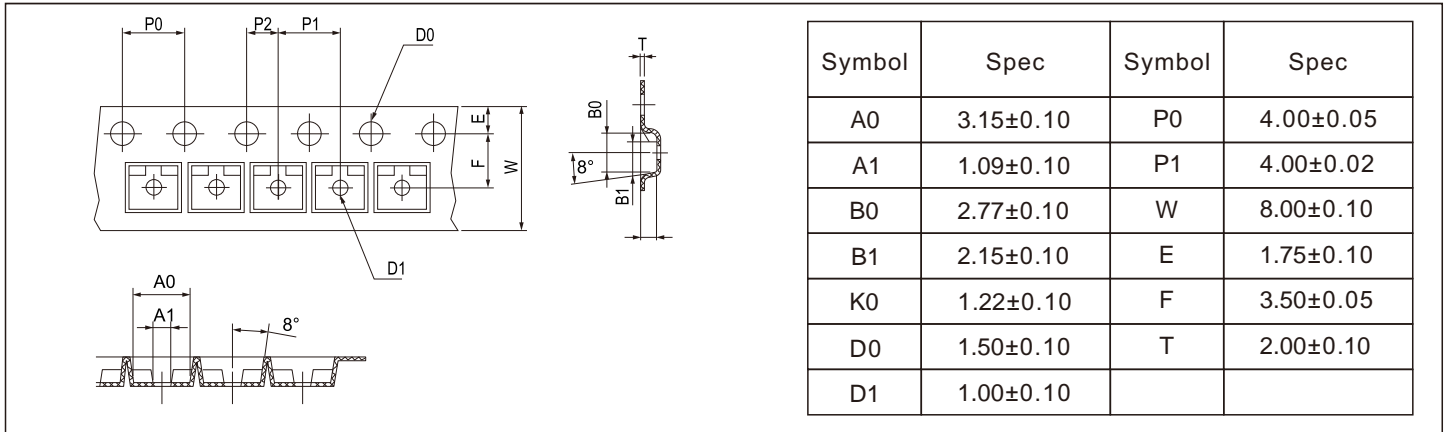
SOT-23 Suggested Pad Layout



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

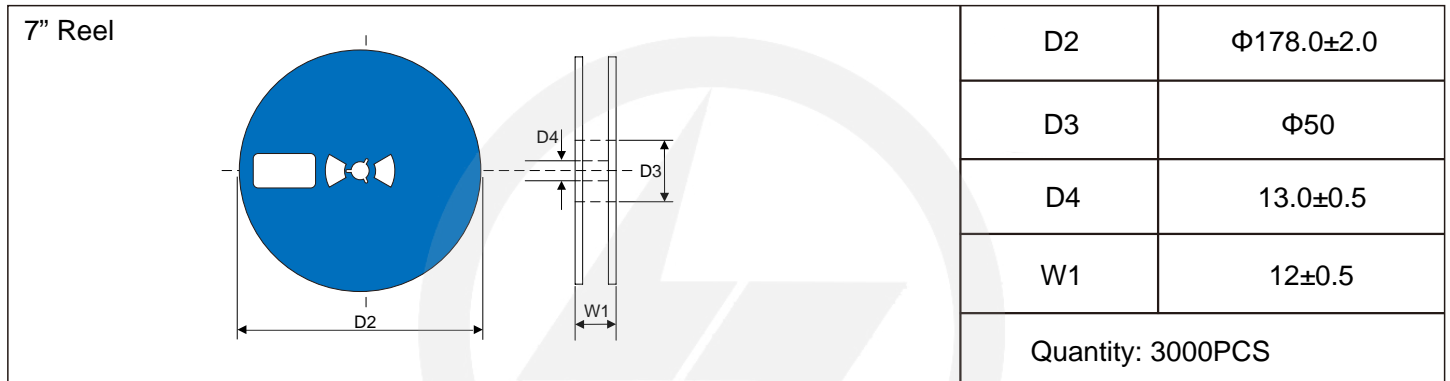
Carrier Tape Dimensions

Unit : mm



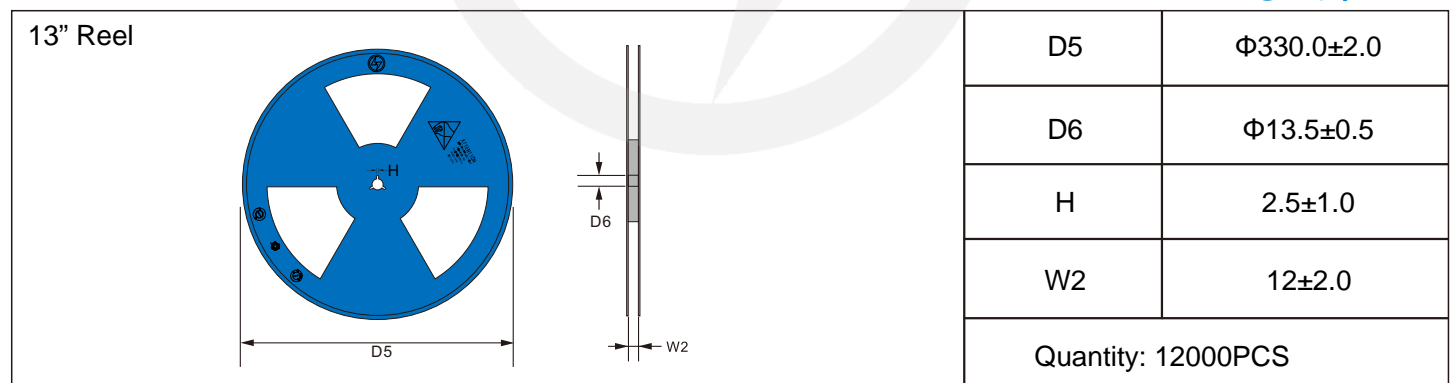
Reel Dimensions

Unit : mm

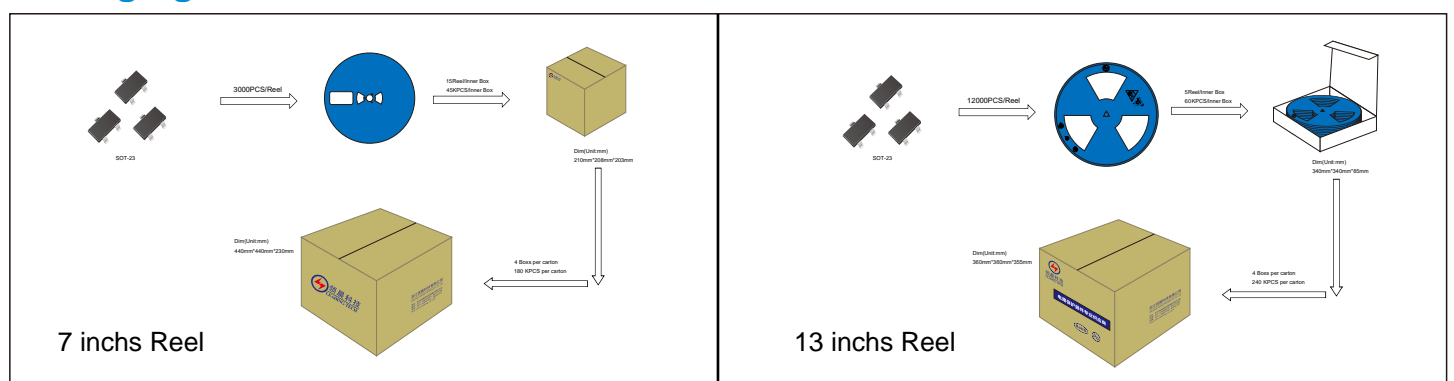


Reel Dimensions

Unit : mm

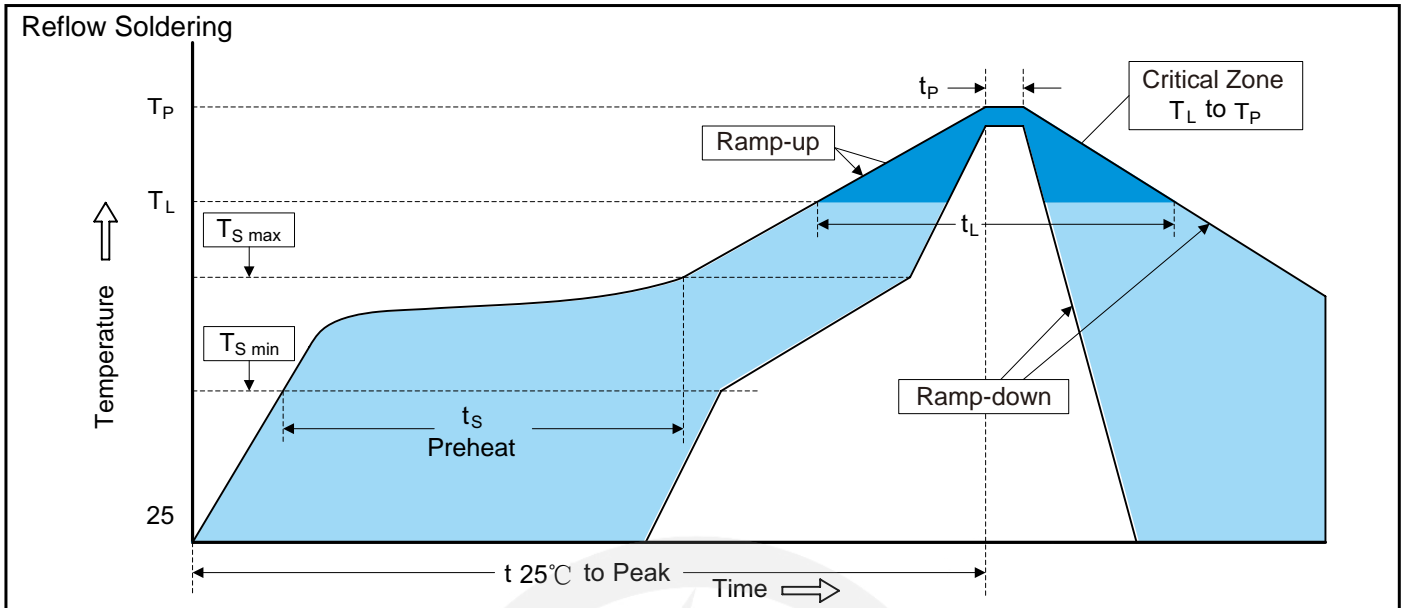


Packaging





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	2025.06.16	2025.06.16	3.1	Update packaging information	/	Ding	
03	2026.03.05	2026.03.05	3.2	Package outline E1(max)=2.6mm	/	Ding	