

## P-Channel Mosfet

### Features

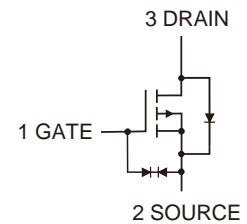
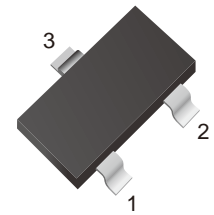
- Surface Mount Package
- P-Channel Switch with Low  $R_{DS(on)}$
- Operated at Low Logic Level Gate Drive
- Lead free in comply with EU RoHS 2011/65/EU directives

### Applications

- Load/Power Switching
- Interfacing, Logic Switching
- Battery Management for Ultra Small Portable Electronics

### Ordering Information

Part Number	Marking	Shipping	Reel
LTM3139P-TR3	39K	3000PCS Tape&Reel	7 inchs
LTM3139P-TR12	39K	12000PCS Tape&Reel	13 inchs



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

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current	-0.5	A
$I_{DM}$	Pulsed Drain Current ( $t_p=10s$ )	-1.2	A
$P_D$	Power Dissipation	350	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient ( $t \leq 5s$ )	350	$^\circ\text{C/W}$
$T_J, T_{stg}$	Operation Junction And Storage Temperature Range	-55 ~ +150	$^\circ\text{C}$

### Electrical Characteristics ( $T_a=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
<b>Static</b>						
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS}=0, I_D=250\mu\text{A}$	-20			V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-0.35		-1.2	V
$I_{GSS}$	Gate-body leakage current	$V_{DS}=0, V_{GS}=\pm 10V$		$\pm 1.5$	$\pm 10$	$\mu\text{A}$
$I_{DSS}$	Zero gate voltage drain current	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu\text{A}$
$R_{DS(on)}$	Drain-source on-resistance <sup>a</sup>	$V_{GS}=-4.5V, I_D=-0.5A$		580	700	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.5A$		900	1200	m $\Omega$
		$V_{GS}=-1.8V, I_D=-0.5A$		1400	1600	m $\Omega$
$V_{SD}$	Diode forward voltage	$I_S=-0.5A, V_{GS}=0V$		-0.95	-1.2	V
<b>Dynamic</b>						
$C_{iss}$	Input capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1\text{MHZ}$		71		pF
$C_{oss}$	Output capacitance			20		
$C_{rss}$	Reverse transfer capacitance <sup>b</sup>			15		
<b>Switching<sup>b</sup></b>						
$t_{d(on)}$	Turn-on delay time	$V_{GS}=-4.5V, V_{DD}=-10V,$ $R_L=2.5\Omega, R_{GEN}=3\Omega$		4		nS
$t_r$	Rise time			19		
$t_{d(off)}$	Turn-off delay time			16		
$t_f$	Fall time			25		

Note:

a. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

b. Guaranteed by design, not subject to producing.



Characteristics Curves

Fig.1 Output Characteristics

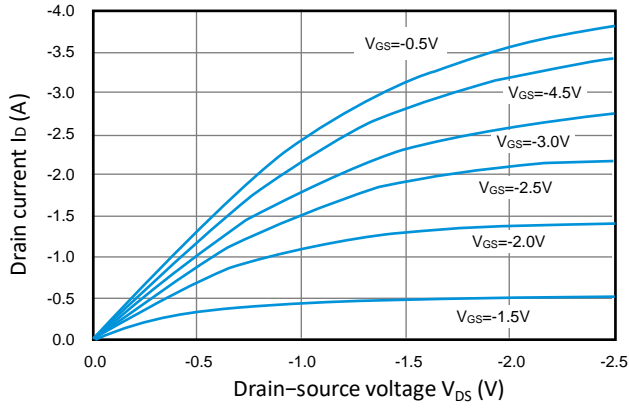


Fig.2 Transfer Characteristics

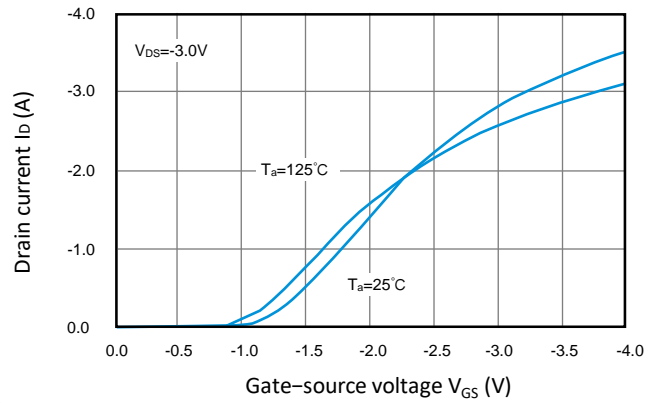


Fig.3 Capacitance Characteristics

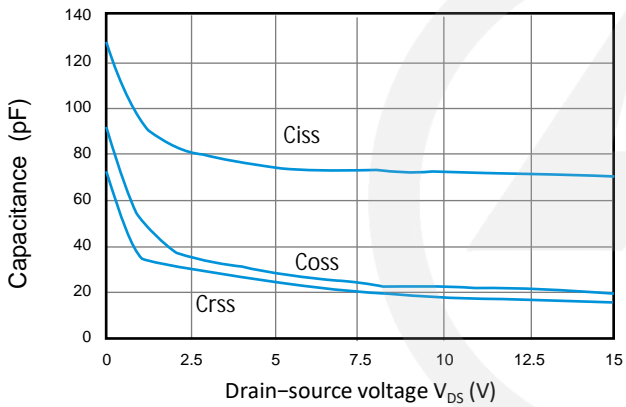


Fig.4 Gate Charge

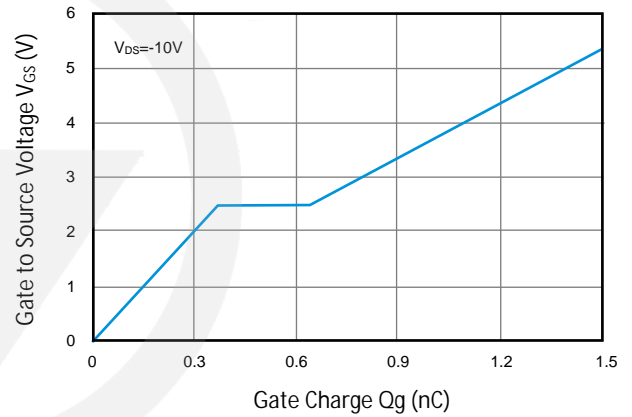


Fig.5 Drain-Source on Resistance

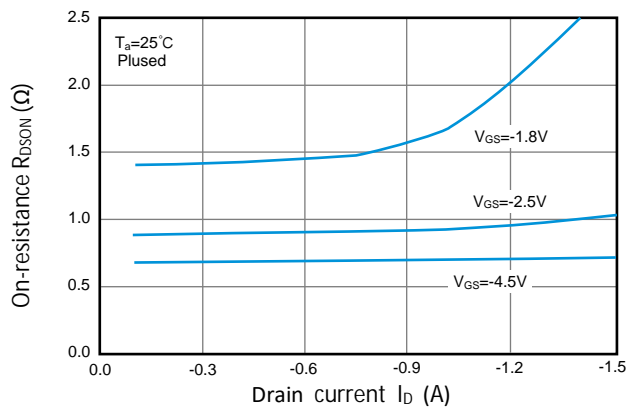
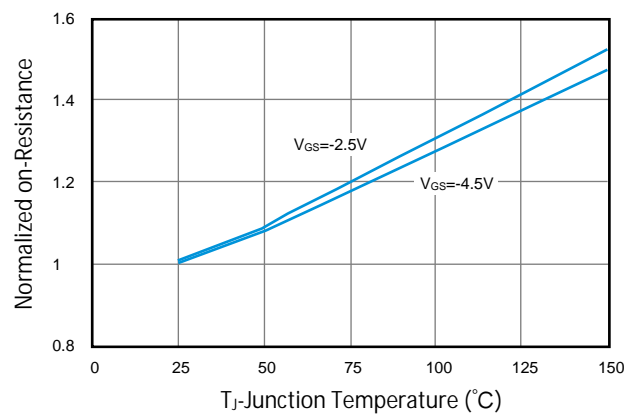
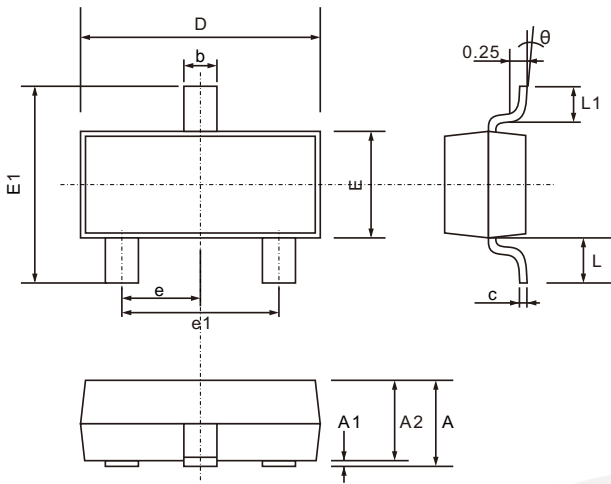


Fig.5 Drain-Source on Resistance



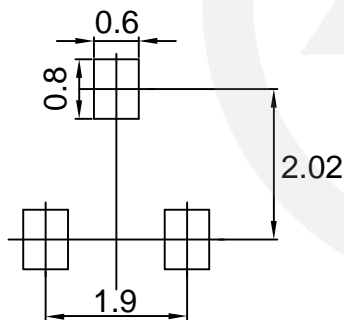
**SOT-23 Package Outline**

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
$\theta$	0°	8°

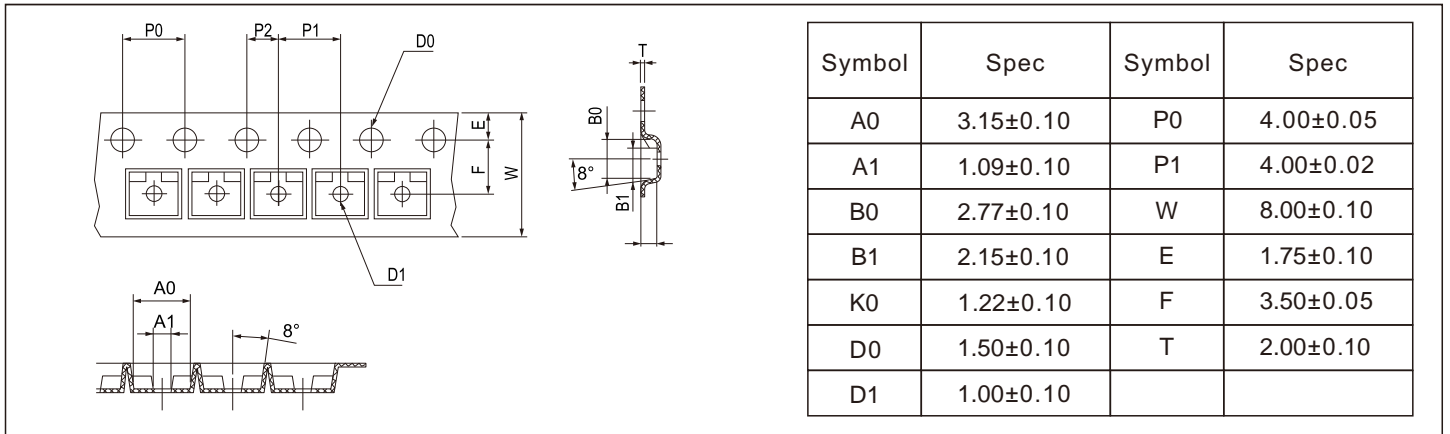
**SOT-23 Suggested Pad Layout**



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

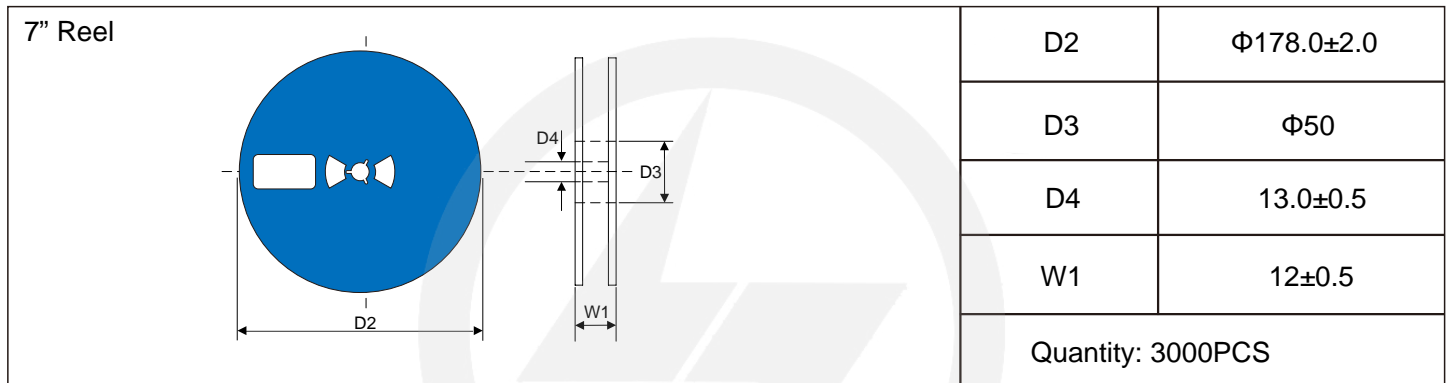
**Carrier Tape Dimensions**

Unit : mm



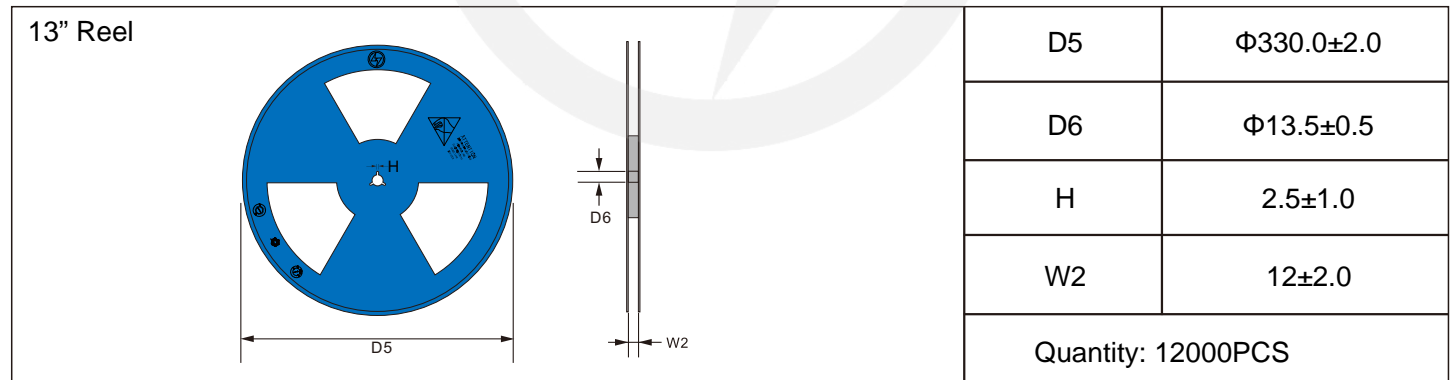
**Reel Dimensions**

Unit : mm

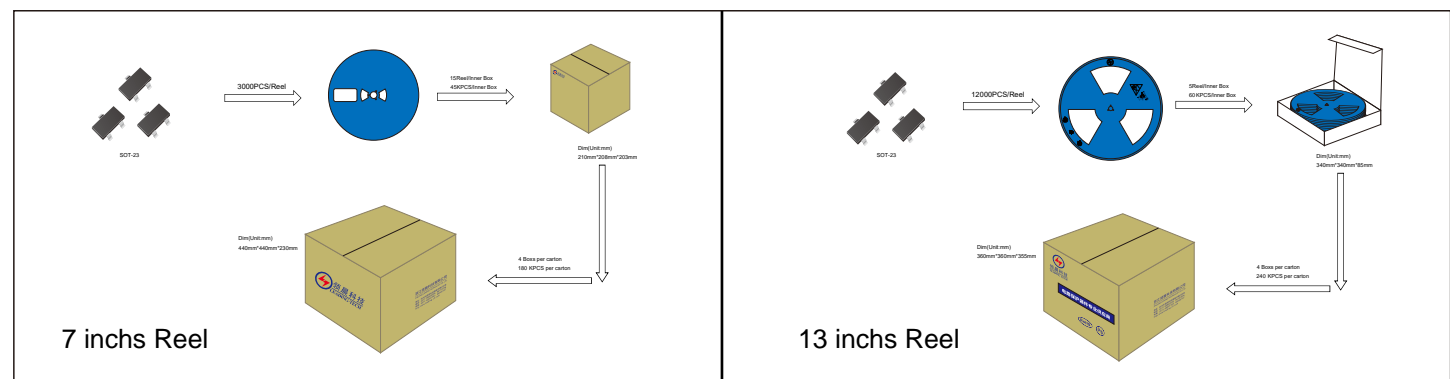


**Reel Dimensions**

Unit : mm



**Packaging**





Recommended Soldering Conditions



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T <sub>L</sub> to T <sub>P</sub> )	3°C/second max.
Preheat	
-Temperature Min (T <sub>S min</sub> )	150°C
-Temperature Max (T <sub>S max</sub> )	200°C
-Time (min to max) (t <sub>s</sub> )	60-180 seconds
T <sub>S max</sub> to T <sub>L</sub>	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature (T <sub>L</sub> )	217°C
-Time (t <sub>L</sub> )	60-150 seconds
Peak Temperature (T <sub>P</sub> )	260°C
Time within 5°C of actual Peak Temperature (t <sub>p</sub> )	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	2025.02.21	2025.02.21	3.0	New file	/	Ding	
02	2026.03.05	2026.03.05	3.1	Package outline E1(max)=2.6mm	/	Ding	