



# PJM2301PSA

## P- Enhancement Mode Field Effect Transistor

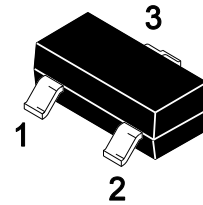
### Features

- ◆ High power and current handling capability
- ◆ Halogen free product is acquired
- ◆ Surface mount package

### Applications

- ◆ Battery protection
- ◆ Load switch
- ◆ Power management

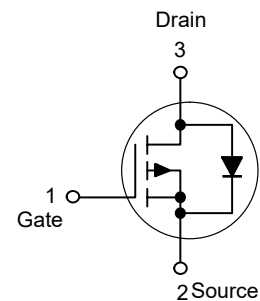
SOT-23



1. Gate 2. Source 3. Drain

Marking: M01

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at  $T_A = 25^\circ\text{C}$  unless otherwise specified.

Parameter	Symbol	Value	Units
Drain-Source Voltage	$-V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$-I_D$	2.8	A
Pulsed Drain Current <sup>Note1</sup>	$-I_{DM}$	10	
Power Dissipation	$P_D$	1.25	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	150, -55 to 150	$^\circ\text{C}$

### Thermal Characteristics

Parameter	Symbol	Typ.	Units
Maximum Junction-to-Ambient <sup>Note2</sup>	$R_{\theta JA}$	100	$^\circ\text{C/W}$



**Electrical Characteristics**

T<sub>A</sub>=25°C unless otherwise noted

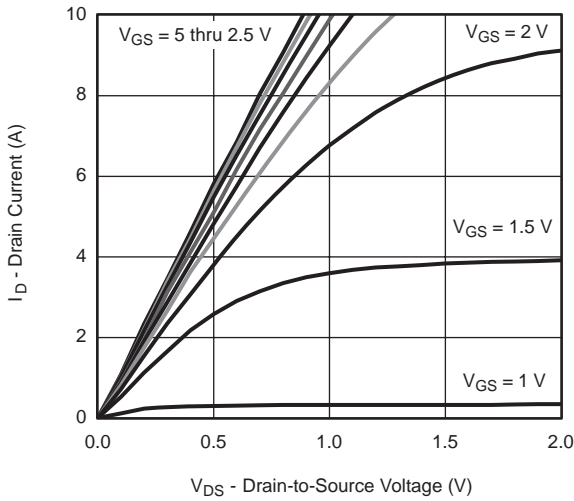
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	-V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = - 250 μA	20			V
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 8 V			±100	nA
Zero Gate Voltage Drain Current	-I <sub>DSS</sub>	V <sub>DS</sub> = - 20 V, V <sub>GS</sub> = 0 V			1	μA
Gate-Source Threshold Voltage <sup>Note3</sup>	-V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = - 250 μA	0.4		1	V
Drain-Source On-State Resistance <sup>Note3</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 2.8 A		90	110	mΩ
		V <sub>GS</sub> = - 2.5 V, I <sub>D</sub> = - 2 A		110	140	
Forward Transconductance <sup>Note3</sup>	g <sub>FS</sub>	V <sub>DS</sub> = - 5 V, I <sub>D</sub> = - 2.8 A		2		S
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = - 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz		405		pF
Output Capacitance	C <sub>oss</sub>			75		
Reverse Transfer Capacitance	C <sub>rss</sub>			55		
<b>Switching Characteristics</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.8A		5.5	10	nC
		V <sub>DS</sub> = - 10 V, V <sub>GS</sub> = - 2.5 V, I <sub>D</sub> = - 2.8 A		3.3	6	
Gate-Source Charge	Q <sub>gs</sub>			0.7		
Gate-Drain Charge	Q <sub>gd</sub>		1.3			
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = - 10 V, R <sub>L</sub> = 10 Ω I <sub>D</sub> = - 1 A, V <sub>GEN</sub> = - 4.5 V, R <sub>G</sub> = 1 Ω		11	20	ns
Rise Time	t <sub>r</sub>			35	60	
Turn-Off Delay Time	t <sub>d(off)</sub>			30	50	
Fall Time	t <sub>f</sub>			10	20	
<b>Source-Drain Diode characteristics</b>						
Continuous Source-Drain Diode Current	-I <sub>S</sub>				1.3	A
Pulse Diode Forward Current <sup>Note1</sup>	-I <sub>SM</sub>				10	
Body Diode Voltage	-V <sub>SD</sub>	I <sub>S</sub> = - 1 A	0.5		1.2	V

**Notes:**

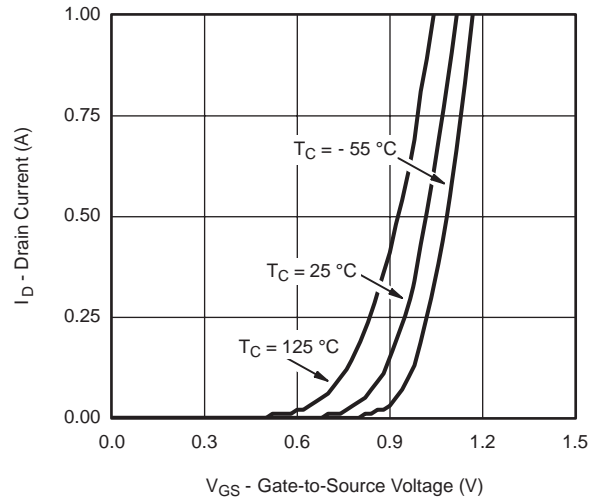
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.



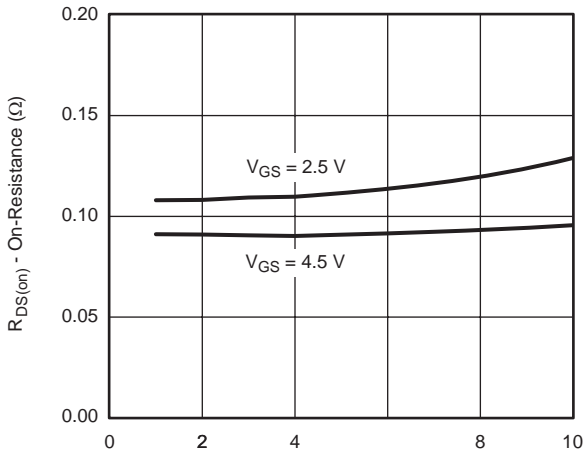
Typical Characteristics Curves



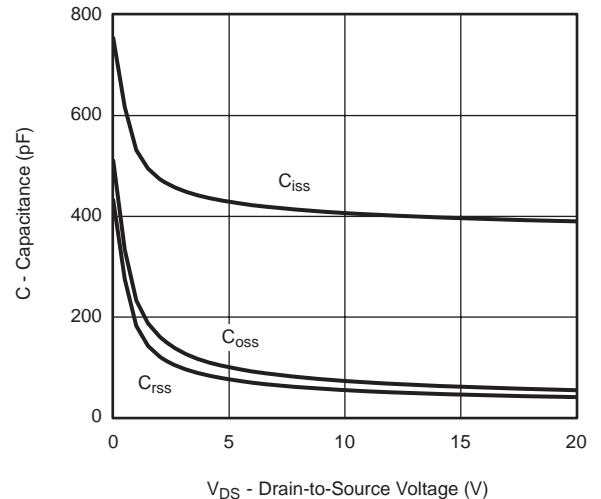
Output Characteristics



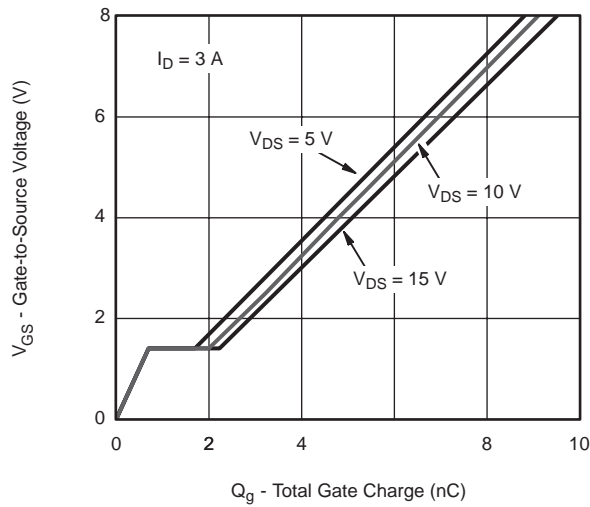
Transfer Characteristics



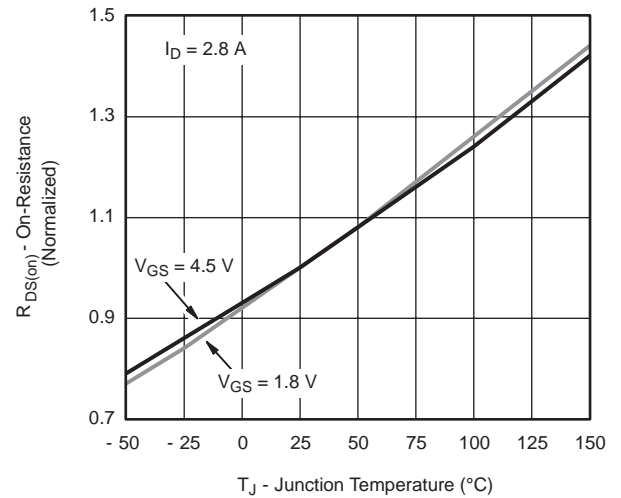
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

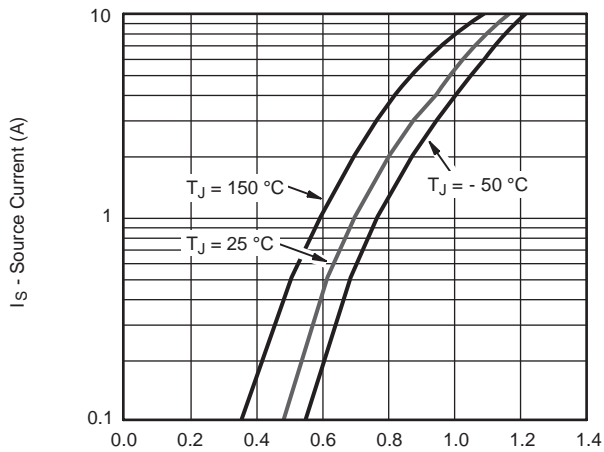


On-Resistance vs. Junction Temperature

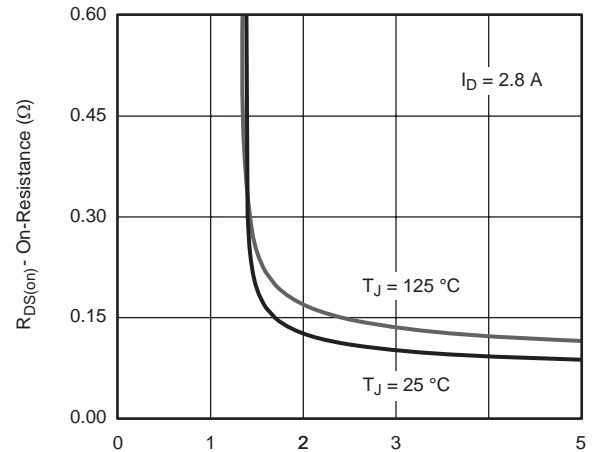


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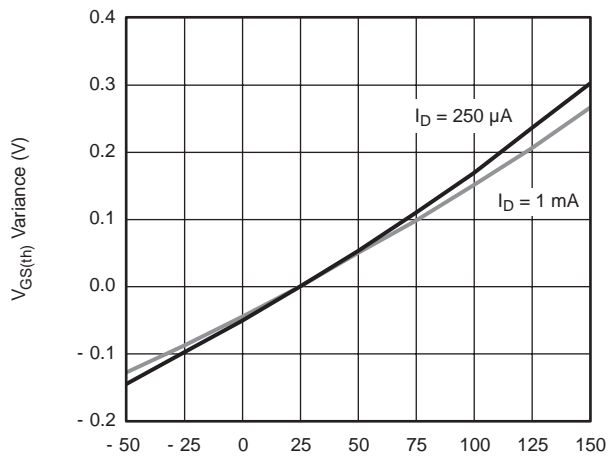
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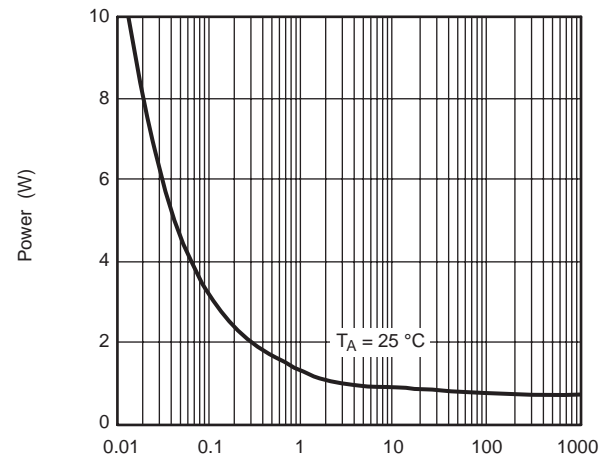
Source-Drain Diode Forward Voltage



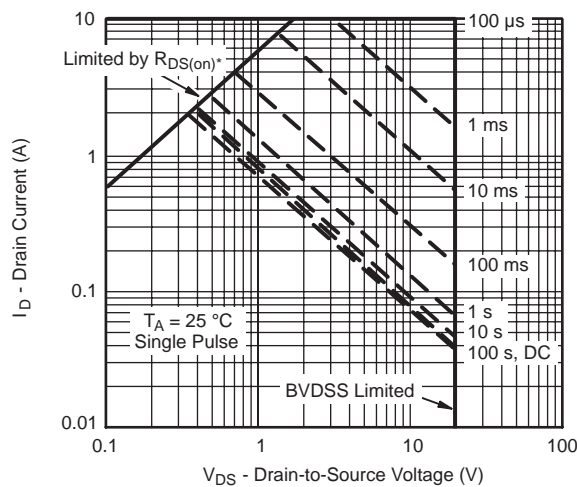
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power

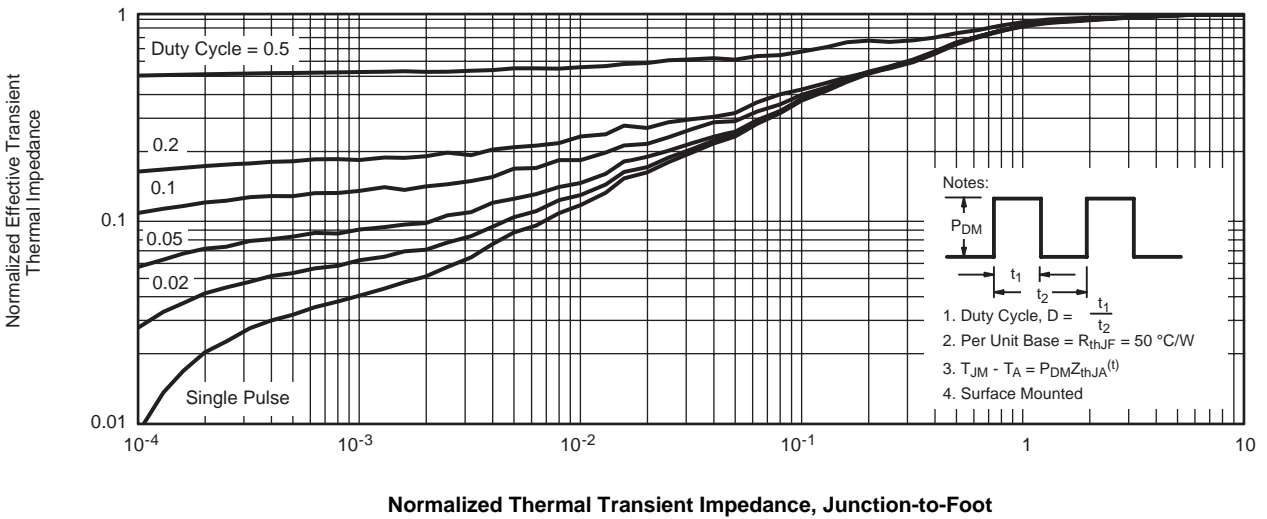
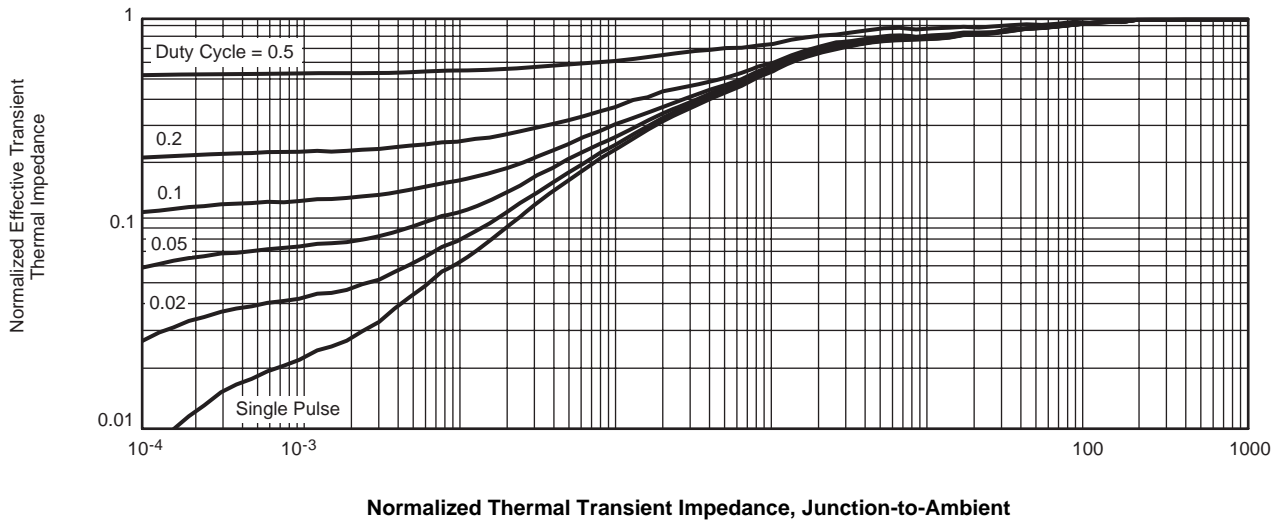


Safe Operating Area



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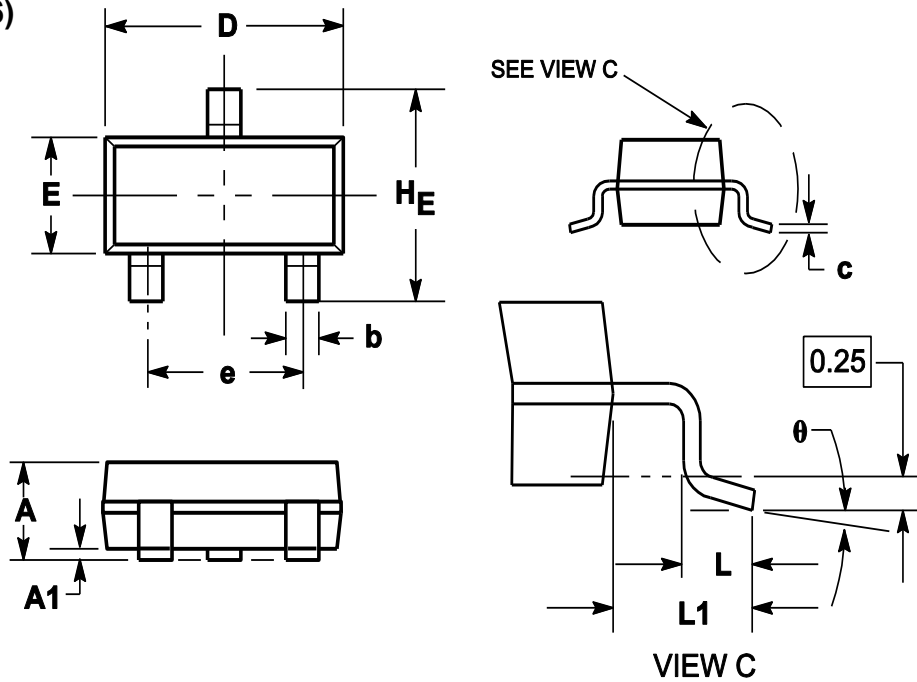
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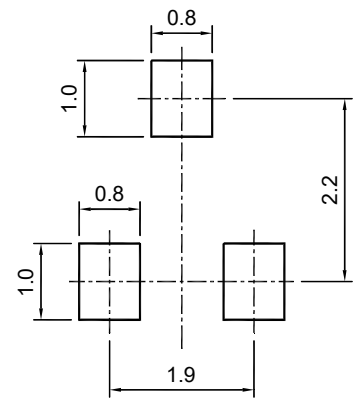


**Package Outline**

**SOT-23 (TO-236)**



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.900	1.025	1.150
A1	0.000	0.050	0.100
b	0.300	0.400	0.500
c	0.080	0.115	0.150
D	2.800	2.900	3.000
E	1.200	1.300	1.400
HE	2.250	2.400	2.550
e	1.800	1.900	2.000
L1	0.550REF		
L	0.300		0.500
θ	0°		8°



SOT-23 (TO-236)

**Recommended soldering pad**

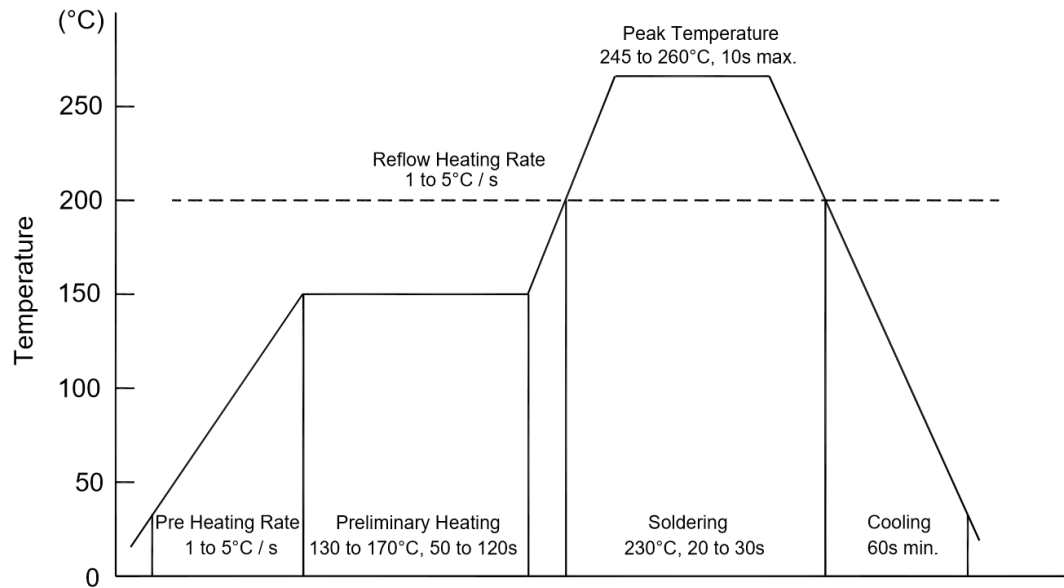
**Ordering Information**

Device	Package	Shipping
PJM2301PSA	SOT-23	3000/Reel&Tape(7inch)



### Conditions of Soldering And Storage

#### ◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245 °C. If peak temperature is below 245 °C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

#### ◆ Conditions of hand soldering

- Temperature: 370 °C
- Time: 3s max.
- Times: one time

#### ◆ Storage conditions

- **Temperature**  
5 to 40 °C
- **Humidity**  
30 to 80% RH
- **Recommended period**  
One year after manufacturing

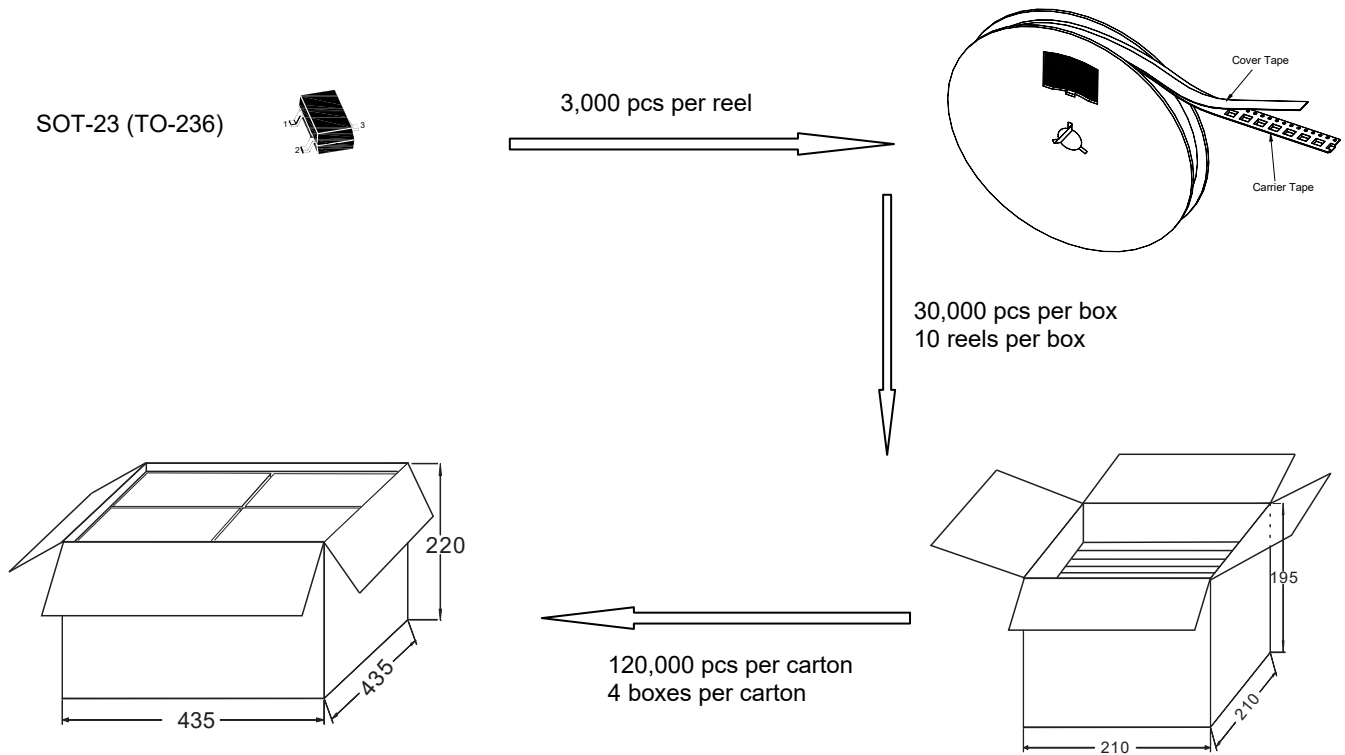


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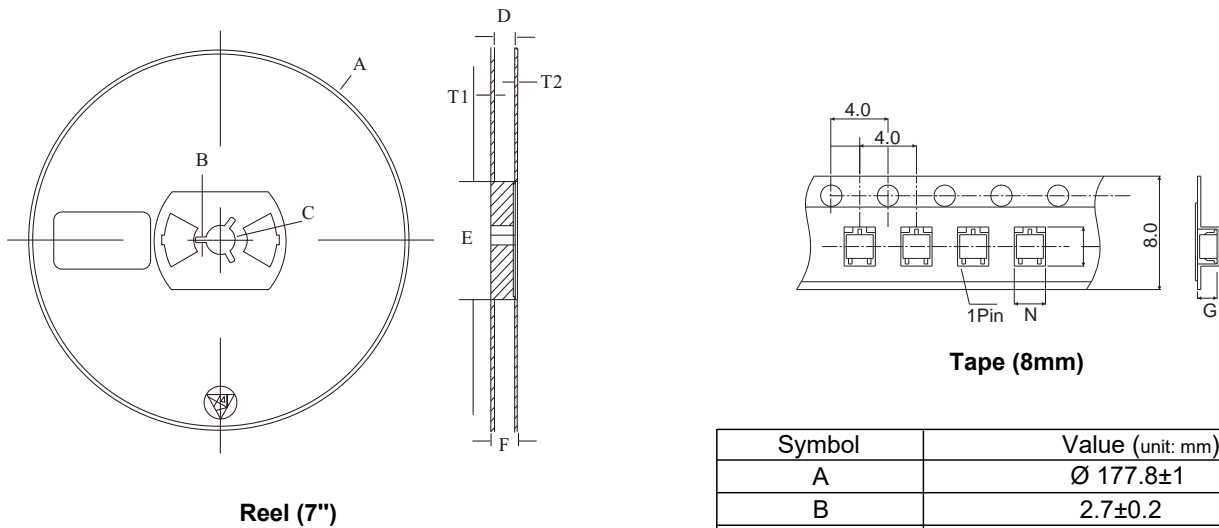
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### Package Specifications

#### ◆ The method of packaging



#### ◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2
N	3.15±0.1
G	1.25±0.1