



PJM2302NSA

N- Enhancement Mode Field Effect Transistor

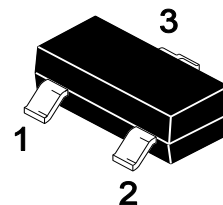
Features

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- High power and current handling capability

Applications

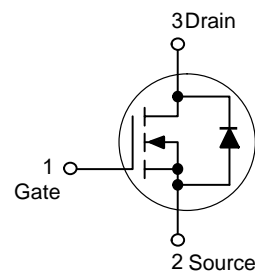
- Battery protection
- Load switch
- Power management

SOT-23



1. Gate 2. Source 3. Drain
Marking: M22

Schematic diagram



Absolute Maximum Ratings

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	V
Drain Current-Continuous	I_D	3.3	A
Drain Current-Pulsed ^{Note 1}	I_{DM}	16	A
Maximum Power Dissipation	P_D	0.9	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient ^{Note 2}	$R_{\theta JA}$	139	$^\circ\text{C/W}$



Electrical Characteristics

T_A=25°C unless otherwise noted

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	20	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±8V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage ^{Note3}	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.5	0.75	1.2	V
Drain-Source On-State Resistance ^{Note3}	R _{DS(ON)}	V _{GS} =2.5V, I _D =2.8A	-	35	60	mΩ
		V _{GS} =4.5V, I _D =3A	-	29	45	mΩ
Forward Transconductance ^{Note3}	g _{FS}	V _{DS} =5V, I _D =3A	-	8	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1.0MHz	-	300	-	pF
Output Capacitance	C _{oss}		-	120	-	pF
Reverse Transfer Capacitance	C _{rss}		-	80	-	pF
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, I _D =3A V _{GS} =4.5V, R _{GEN} =6Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	50	-	nS
Turn-Off Delay Time	t _{d(off)}		-	17	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =3A, V _{GS} =4.5V	-	4	-	nC
Gate-Source Charge	Q _{gs}		-	0.7	-	nC
Gate-Drain Charge	Q _{gd}		-	1.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^{Note 3}	V _{SD}	V _{GS} =0V, I _S =3.3A	-	0.75	1.2	V
Diode Forward Current ^{Note 2}	I _S		-	-	3.3	A

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

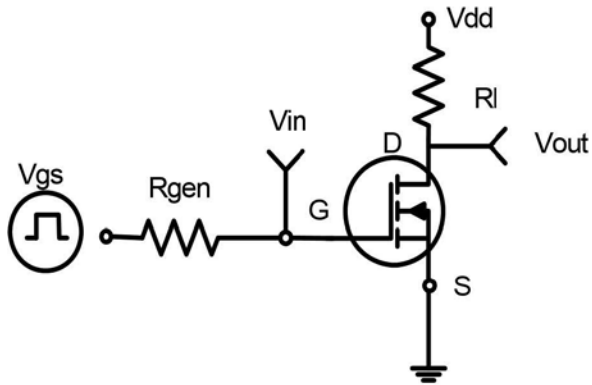


Figure 1: Switching Test Circuit

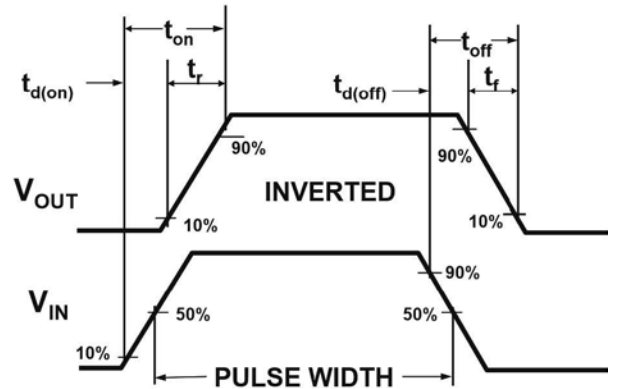


Figure 2: Switching Waveforms

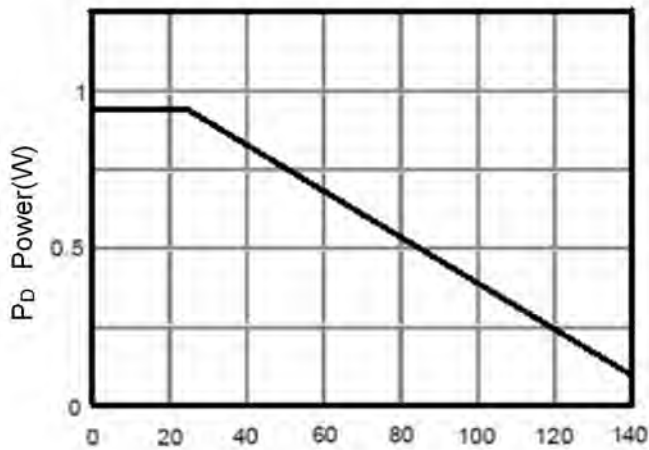


Figure 3 Power Dissipation

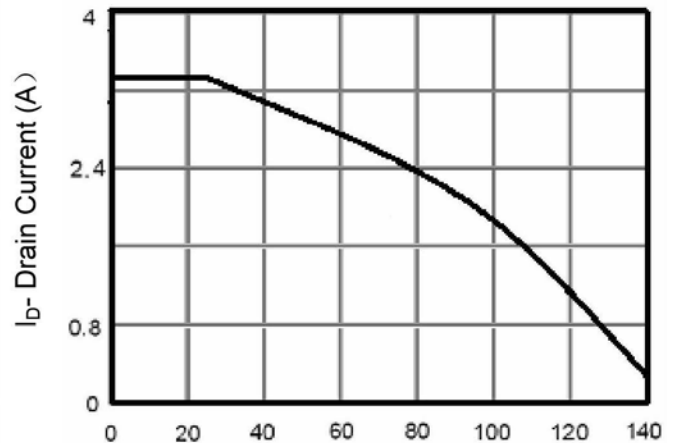


Figure 4 Drain Current

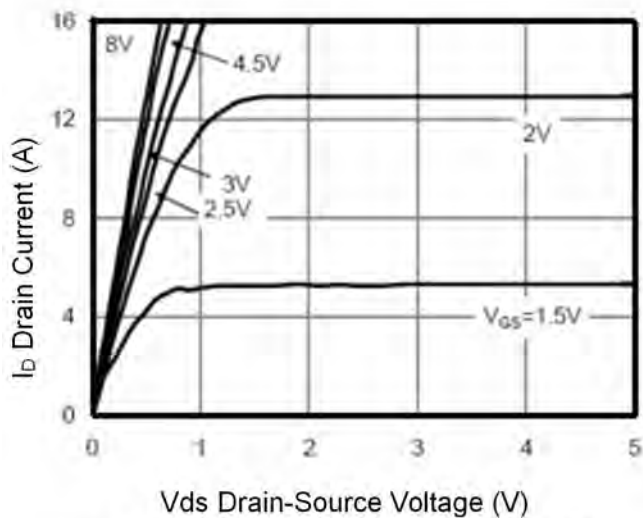


Figure 5 Output Characteristics

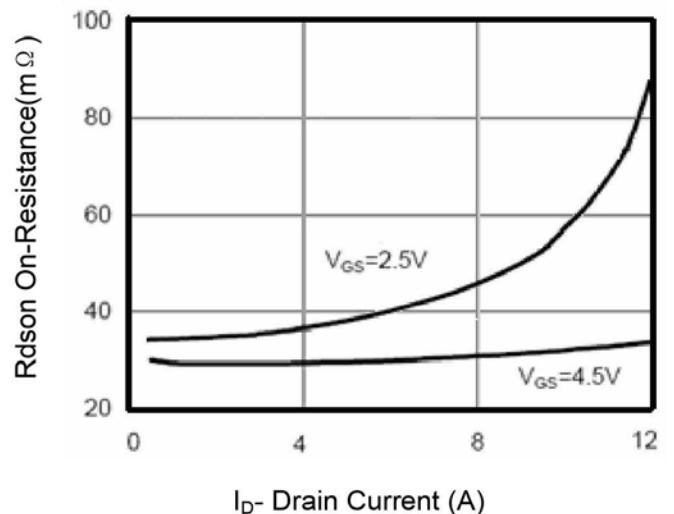


Figure 6 Drain-Source On-Resistance

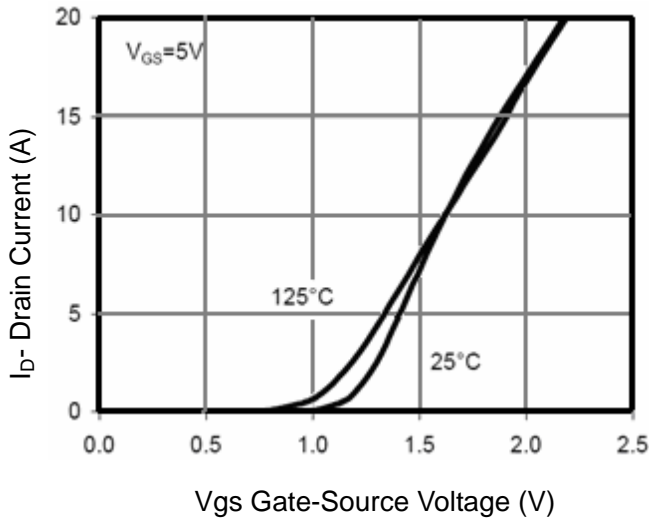


Figure 7 Transfer Characteristics

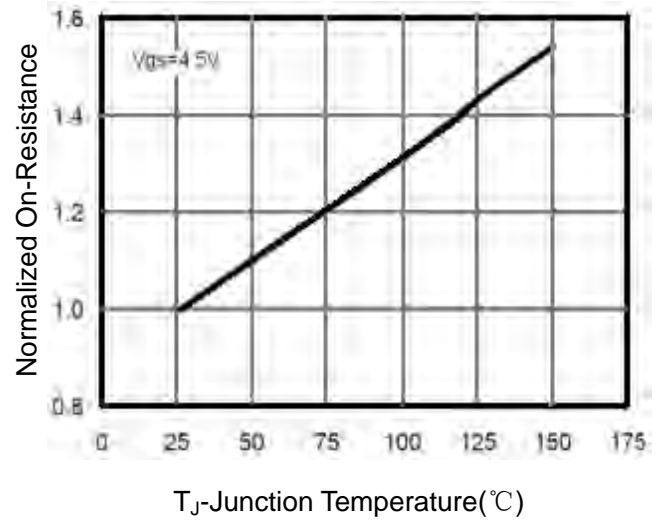


Figure 8 Drain-Source On-Resistance

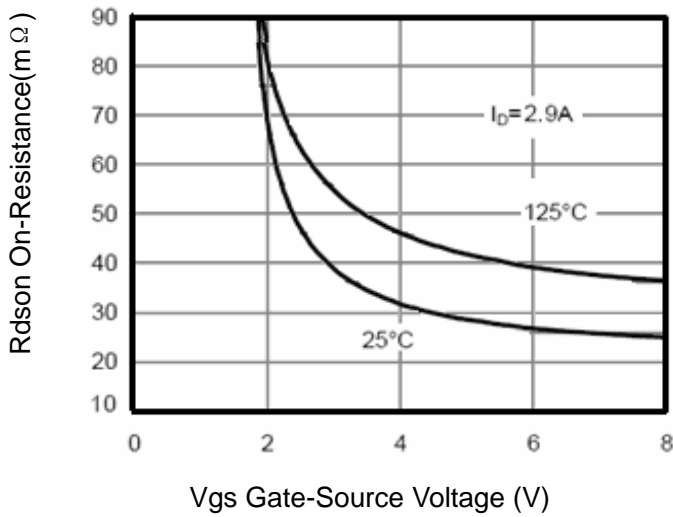


Figure 9 Rdson vs Vgs

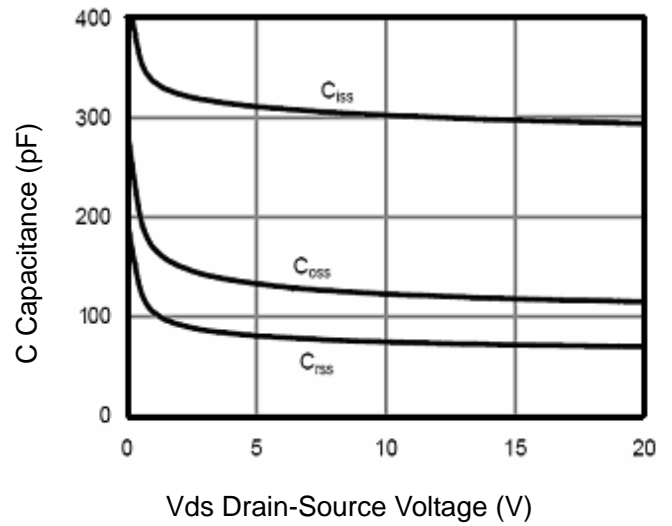


Figure 10 Capacitance vs Vds

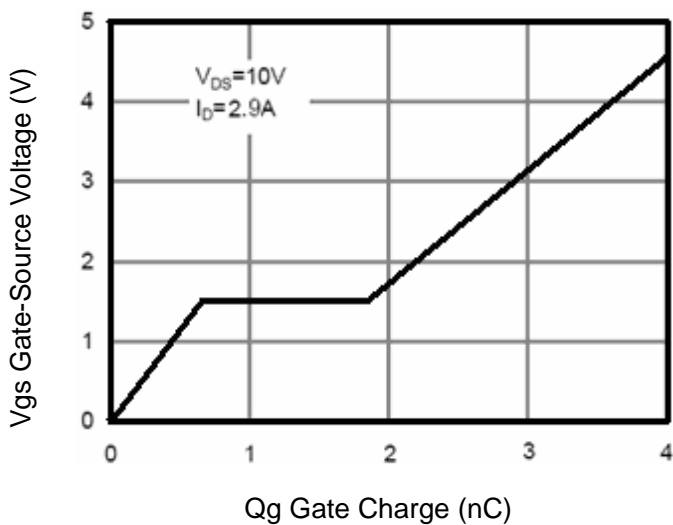


Figure 11 Gate Charge

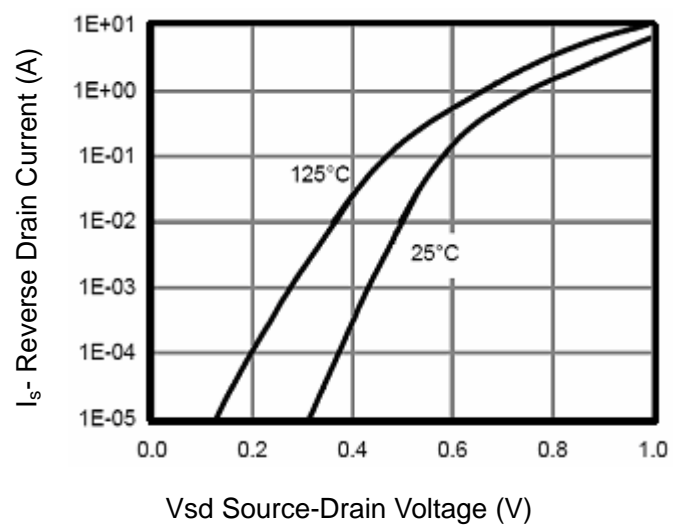


Figure 12 Source- Drain Diode Forward

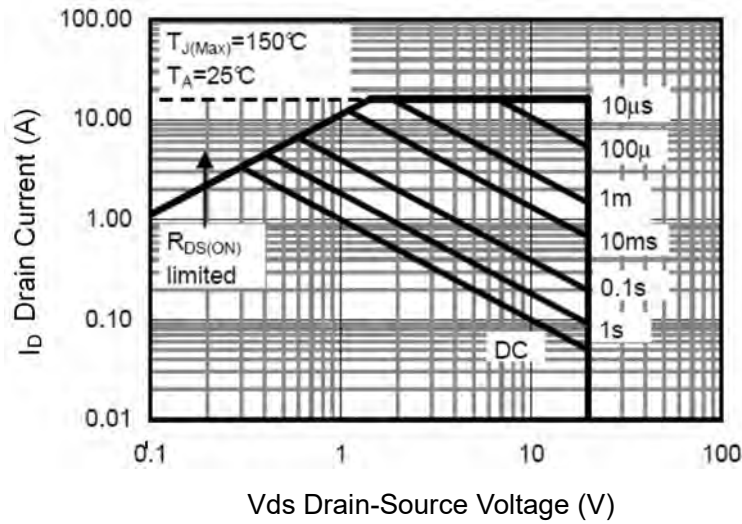


Figure 13 Safe Operation Area

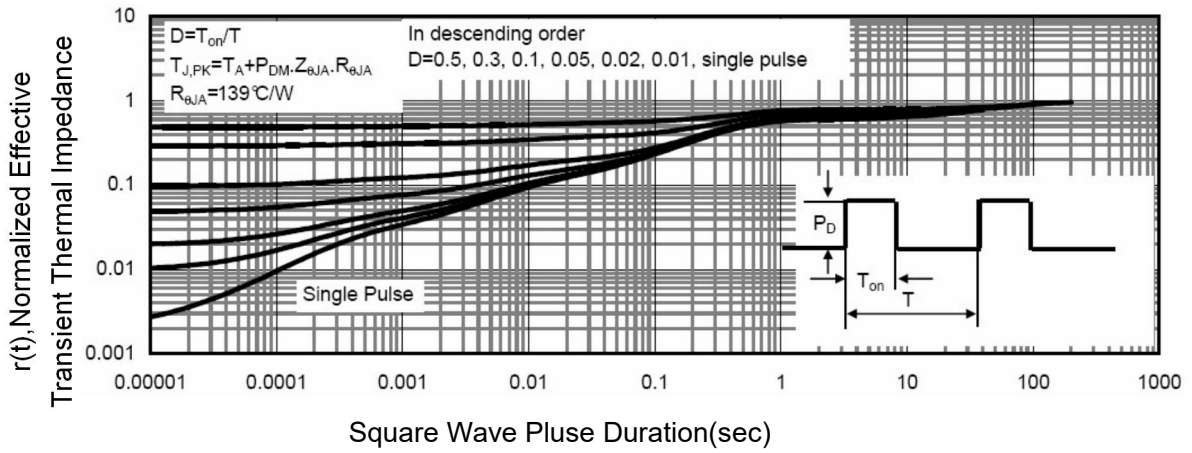


Figure 14 Normalized Maximum Transient Thermal Impedance

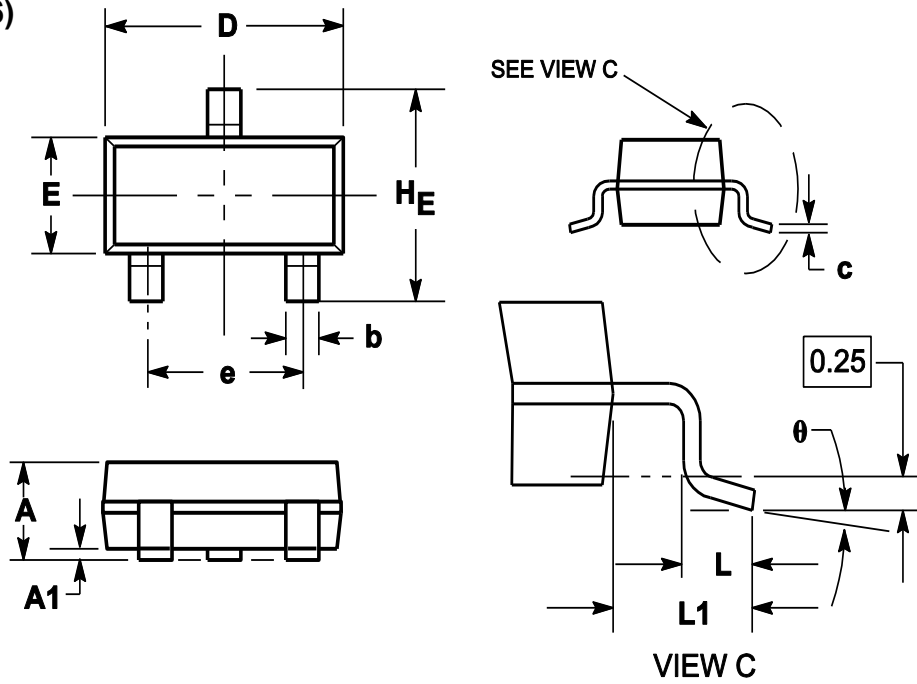


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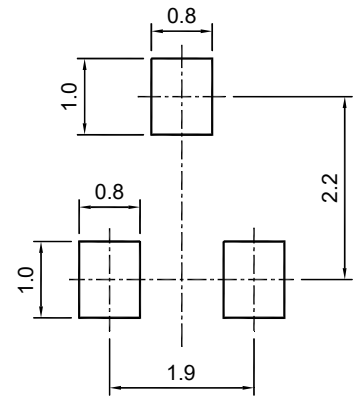
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Package Outline

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°

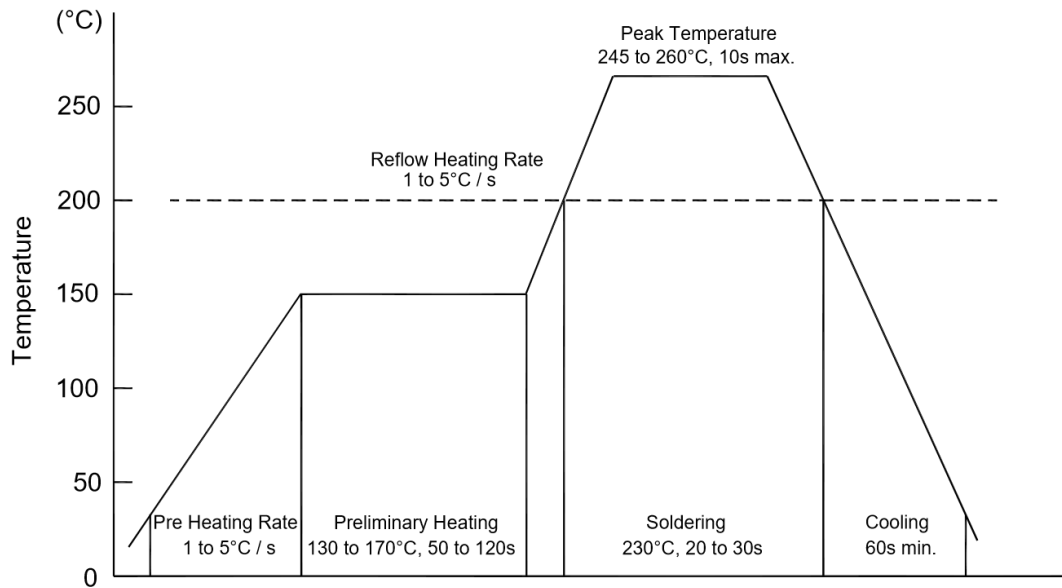


SOT-23 (TO-236)

Recommended soldering pad

Ordering Information

Device	Package	Shipping
PJM2302NSA	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

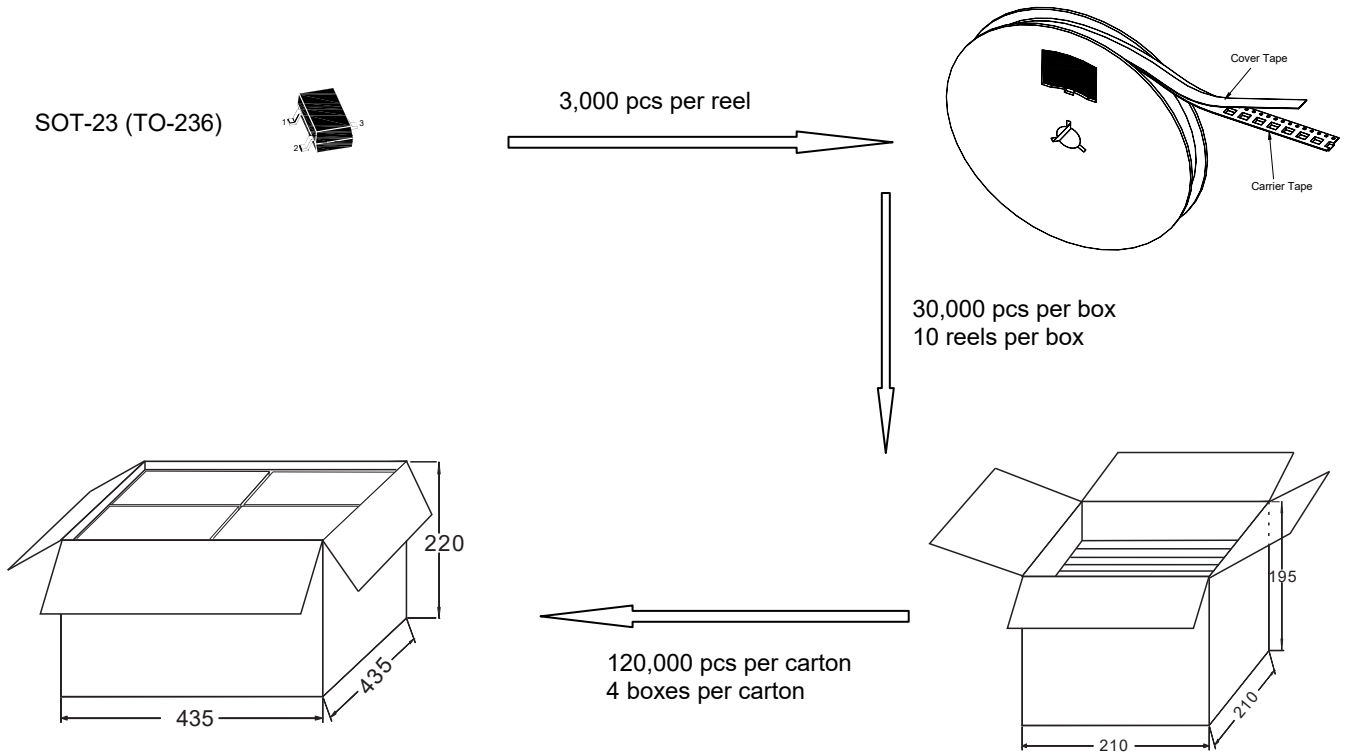


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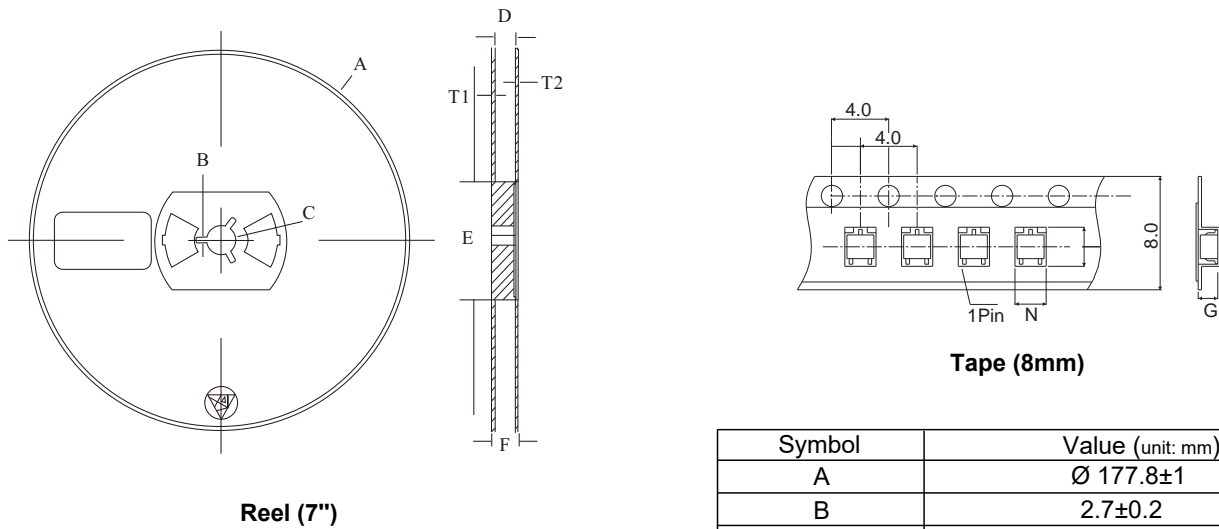
N- Enhancement Mode Field Effect Transistor

Package Specifications

◆ The method of packaging



◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	∅ 177.8±1
B	2.7±0.2
C	∅ 13.5±0.2
E	∅ 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

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