



PJM2302NSA

N- Enhancement Mode Field Effect Transistor

DESCRIPTION

The PJM2302NSA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

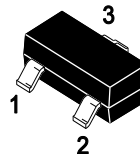
FEATURES

- ◆ $V_{DS} = 20V, I_D = 3.3A$
 - $R_{DS(ON)} < 60m\Omega @ V_{GS}=2.5V$
 - $R_{DS(ON)} < 45m\Omega @ V_{GS}=4.5V$
- ◆ High power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

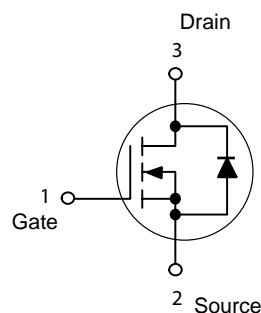
APPLICATIONS

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

SOT-23



Schematic diagram



ABSOLUTE MAXIMUM RATINGS

$T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	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	$^\circ C$

THERMAL CHARACTERISTIC

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

**ELECTRICAL CHARACTERISTICS**T_A=25°C unless otherwise noted

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DS}	V _{GS} =0V I _D =250μA	20	22	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.5	0.75	1.2	V
Drain-Source On-State Resistance	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	g _{FS}	V _{DS} =5V, I _D =3A	-	8	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{ISS}	V _{DS} =10V, V _{GS} =0V, F=1.0MHz	-	260	-	PF
Output Capacitance	C _{OSS}		-	48	-	PF
Reverse Transfer Capacitance	C _{rss}		-	27	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, R _L =3.3Ω V _{GS} =4.5V, R _{GEN} =6Ω	-	2.5	-	nS
Turn-on Rise Time	t _r		-	3.2	-	nS
Turn-Off Delay Time	t _{d(off)}		-	21	-	nS
Turn-Off Fall Time	t _f		-	3	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =3A, V _{GS} =4.5V	-	2.9	5	nC
Gate-Source Charge	Q _{gs}		-	0.4	-	nC
Gate-Drain Charge	Q _{gd}		-	0.6	-	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%.
4. Guaranteed by design, not subject to production



TYPICAL CHARACTERISTICS CURVES

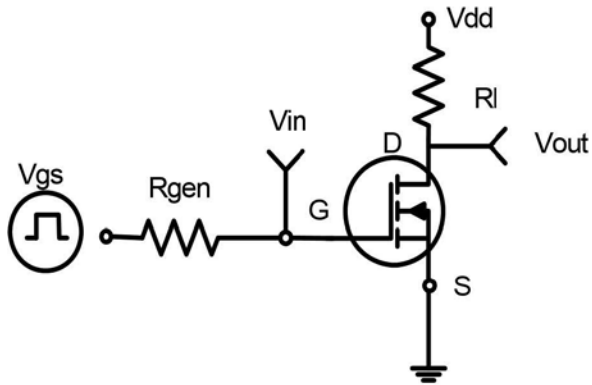


Figure 1: Switching Test Circuit

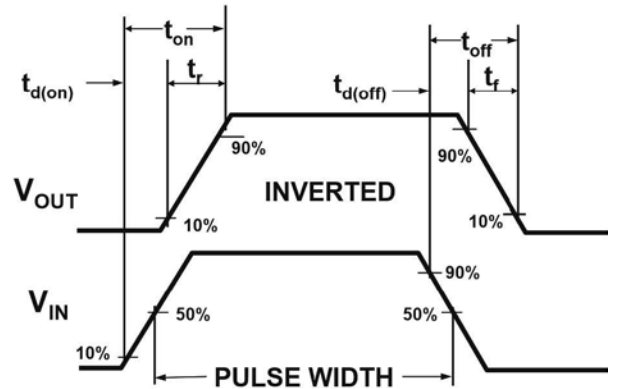


Figure 2: Switching Waveforms

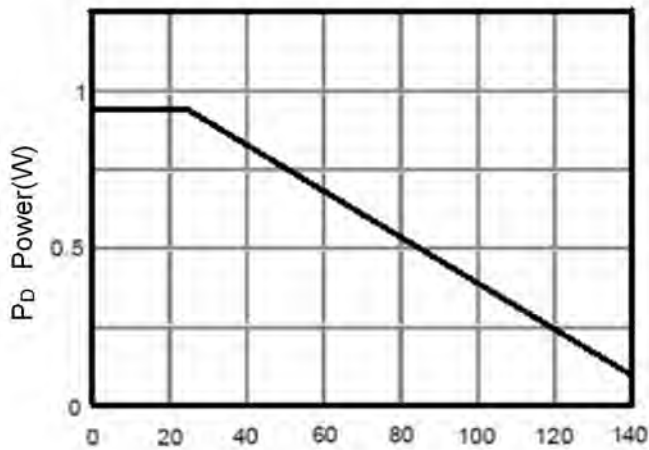


Figure 3 Power Dissipation

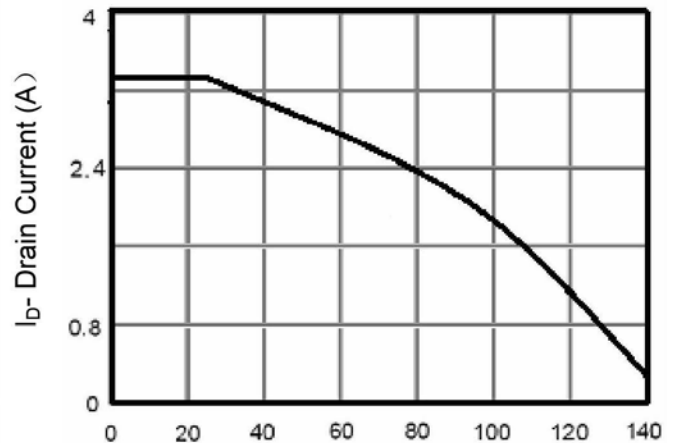


Figure 4 Drain Current

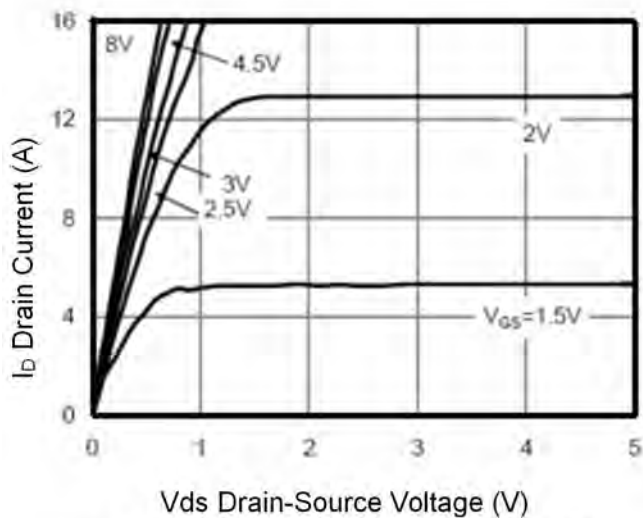


Figure 5 Output Characteristics

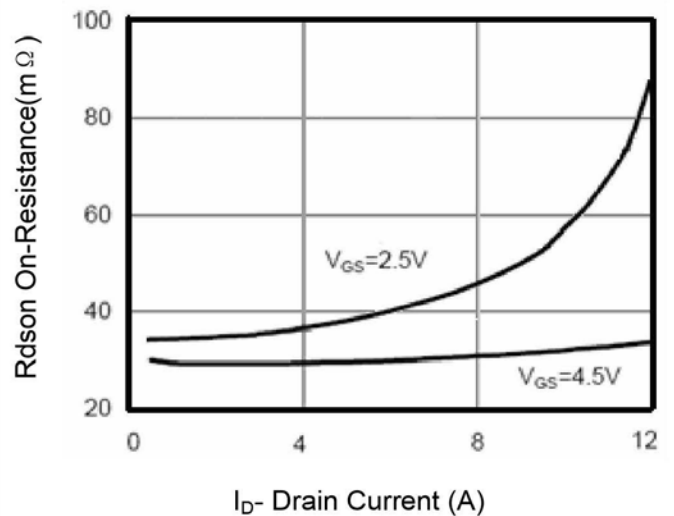


Figure 6 Drain-Source On-Resistance

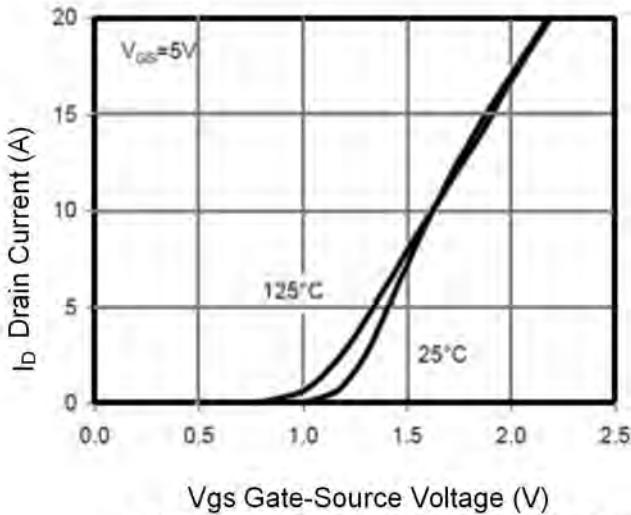


Figure 7 Transfer Characteristics

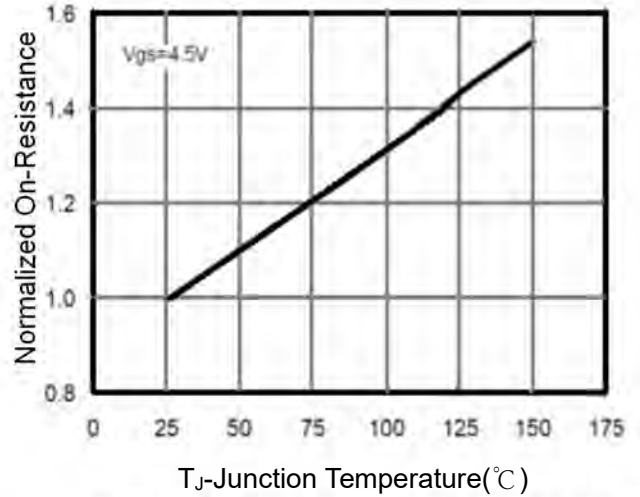


Figure 8 Drain-Source On-Resistance

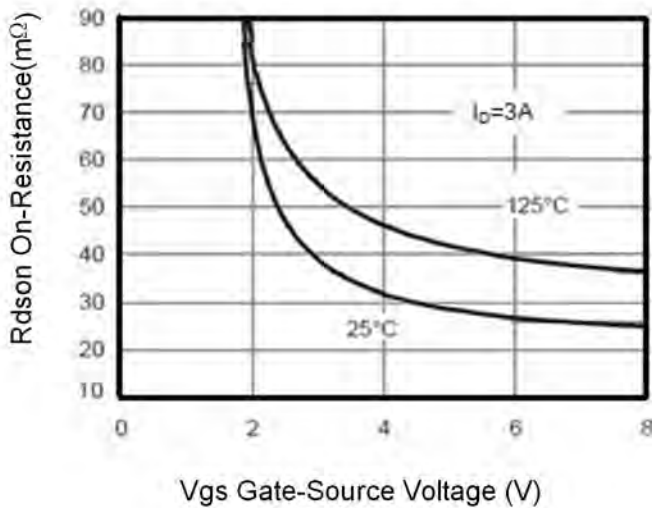


Figure 9 Rdson vs Vgs

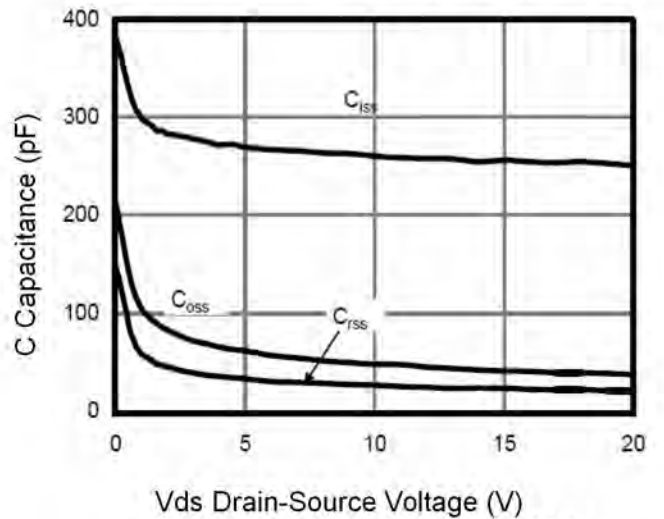


Figure 10 Capacitance vs Vds

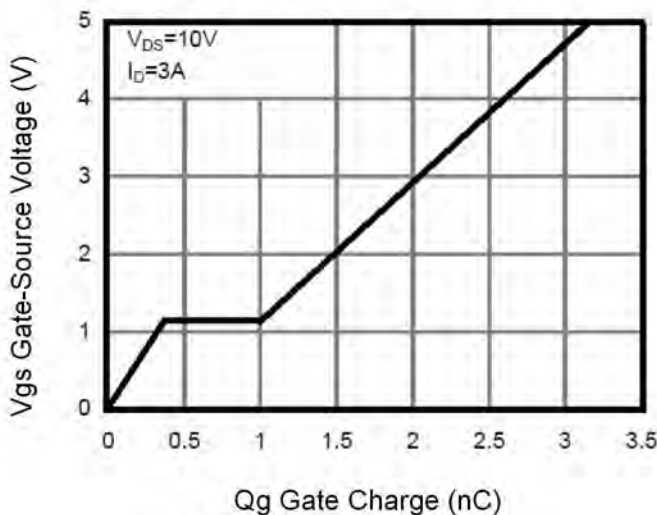


Figure 11 Gate Charge

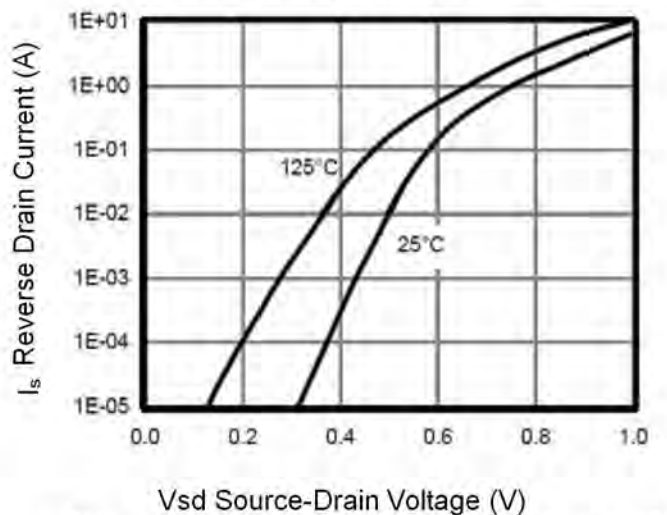


Figure 12 Source- Drain Diode Forward

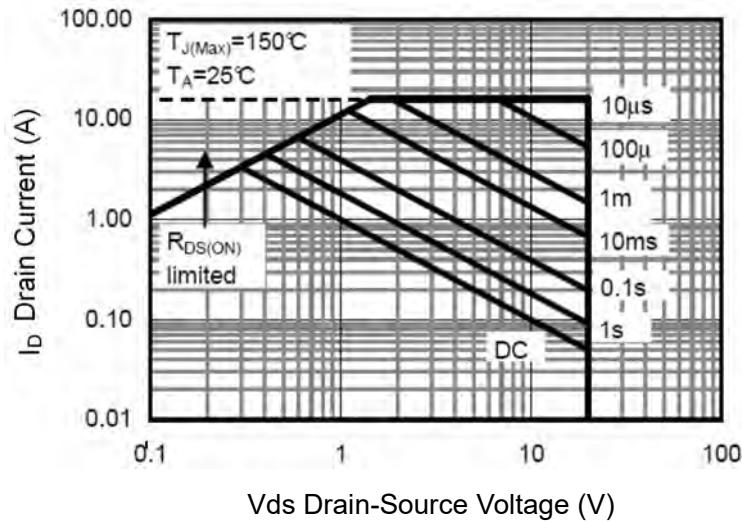


Figure 13 Safe Operation Area

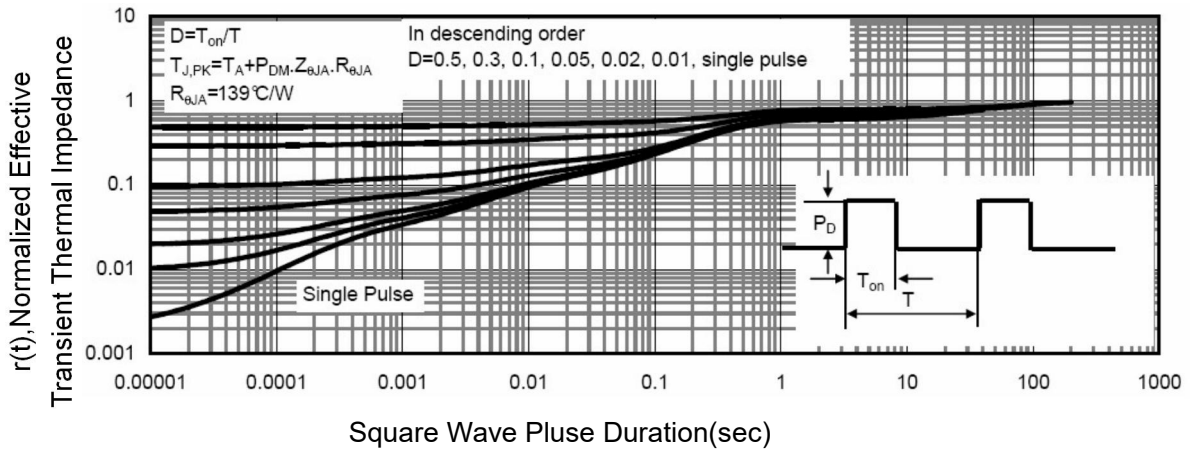
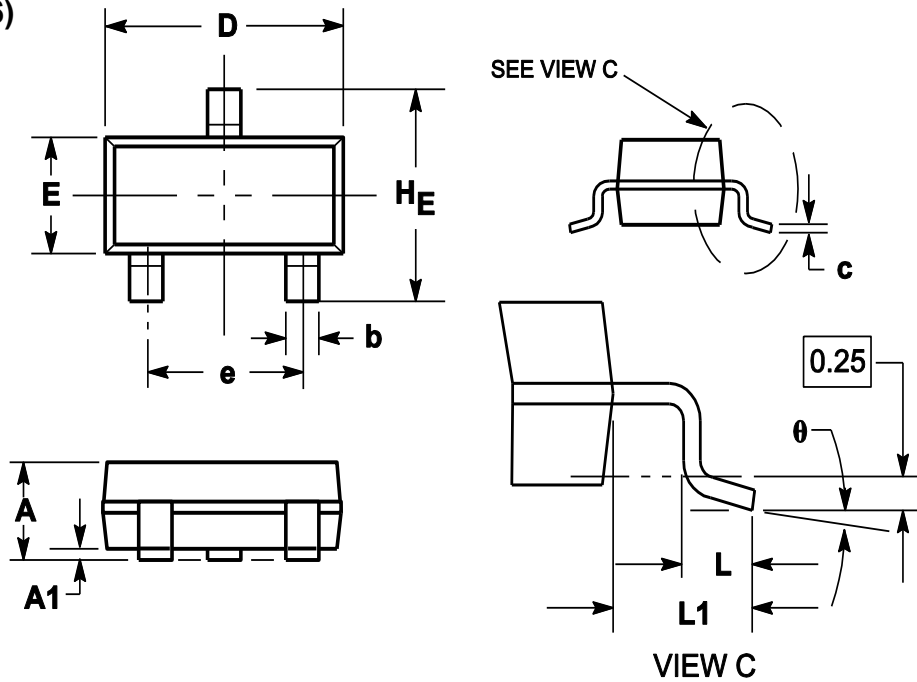


Figure 14 Normalized Maximum Transient Thermal Impedance

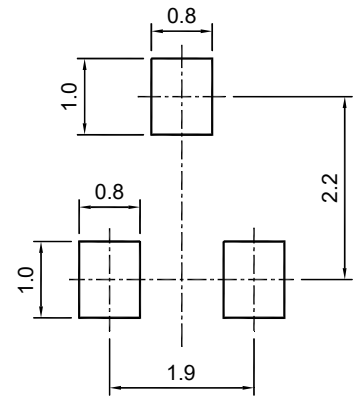


PACKAGE OUTLINE

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°

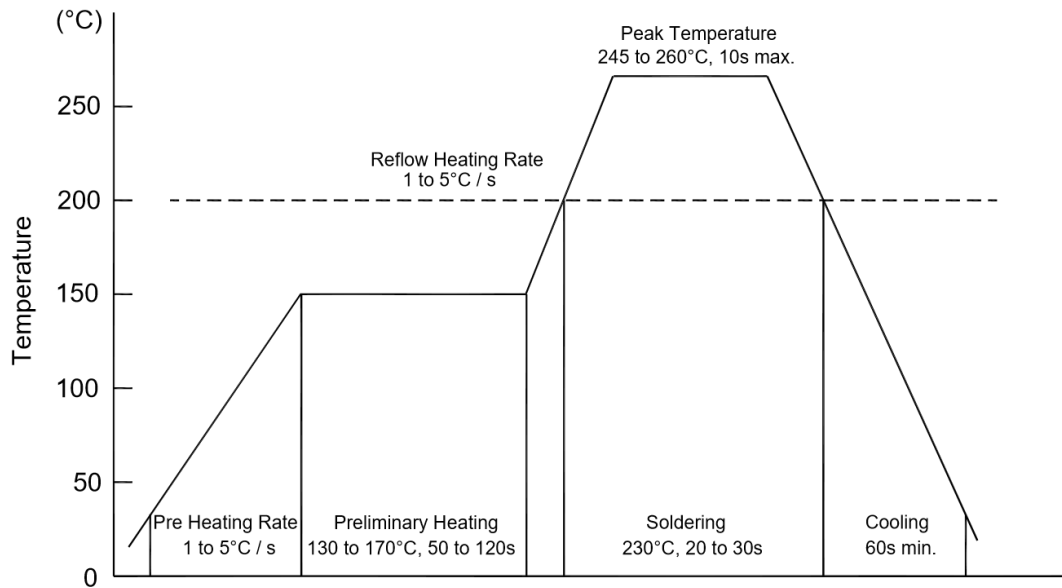


SOT-23 (TO-236)

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

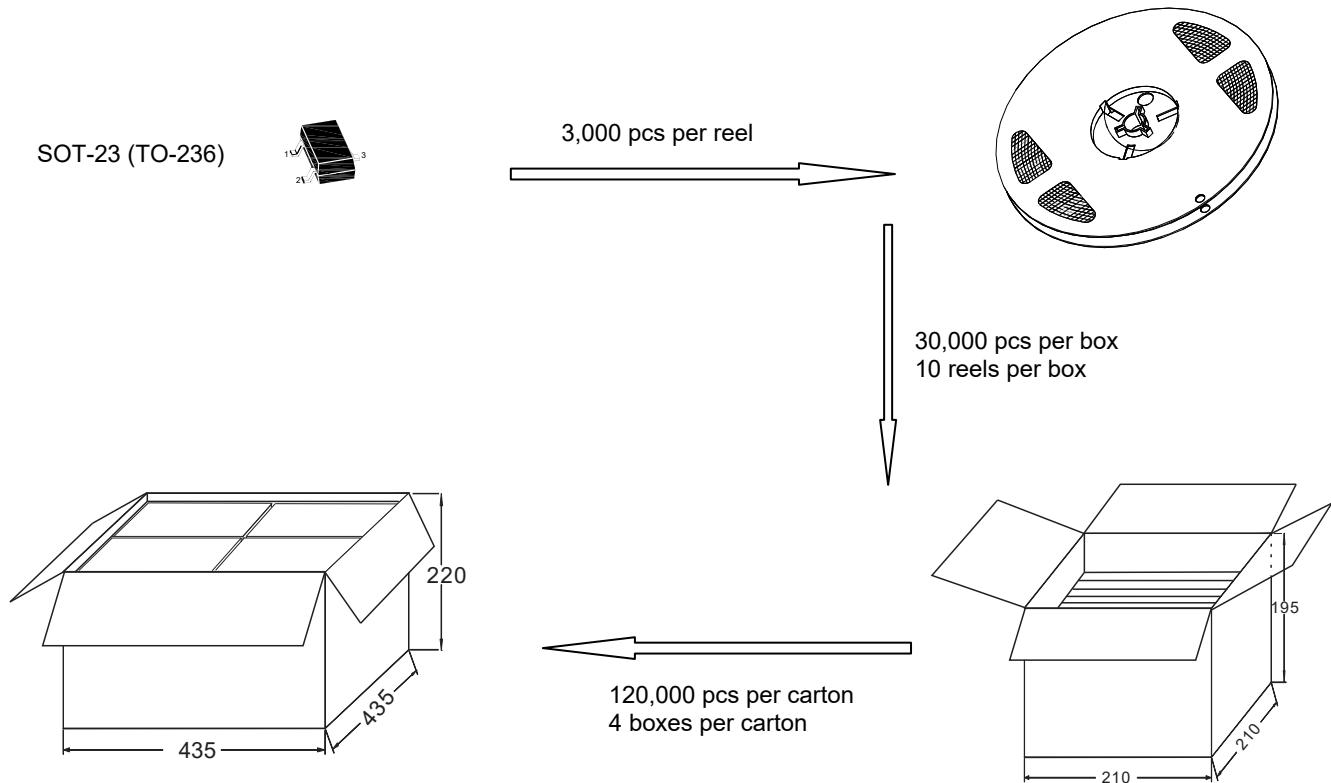


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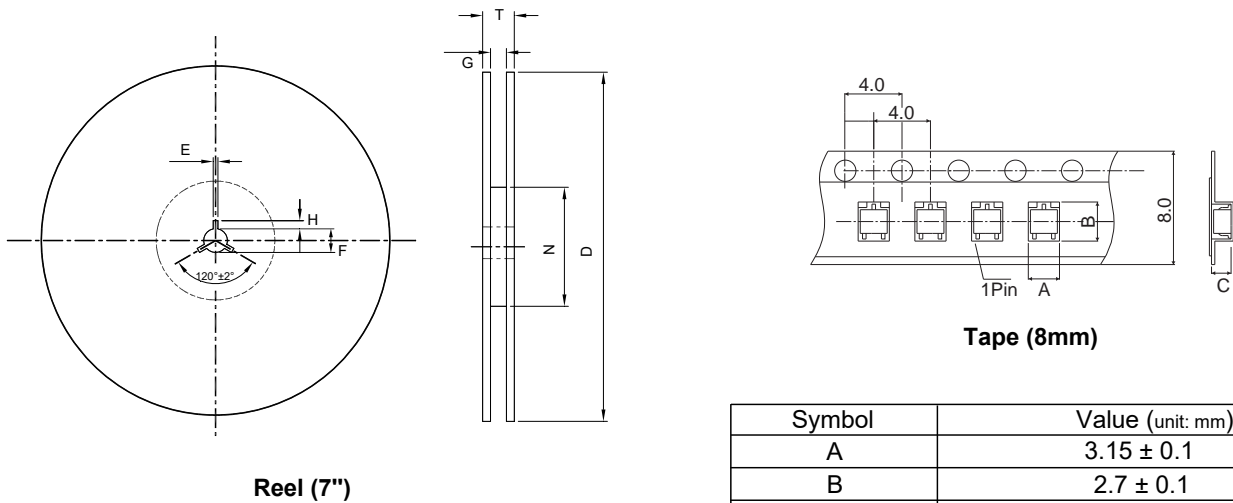
N- Enhancement Mode Field Effect Transistor

PACKAGE SPECIFICATIONS

◆ The method of packaging



◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	3.15 ± 0.1
B	2.7 ± 0.1
C	1.25 ± 0.1
E	2 ± 0.5
F	13 ± 0.5
D	178 ± 2.0
G	8.4 ± 1.5
H	4 ± 0.5
N	60
T	< 14.9