

ATM3401APSA

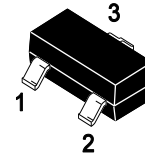
P-Channel Enhancement Mode Field Effect Transistor

Drain-Source Voltage: -30V Drain Current: -4.2A

DESCRIPTIONS

The ATM3401APSA 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 load switch or in PWM applications.

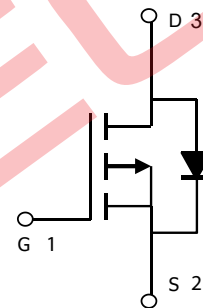
SOT-23



FEATURES

- ◆ $V_{DS(V)} = -30V$ $I_D = -4.2A$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 55m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 75m\Omega$ ($V_{GS} = -4.5V$)
- $R_{DS(ON)} < 90m\Omega$ ($V_{GS} = -2.5V$)

Schematic diagram



ABSOLUTE MAXIMUM RATINGS

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

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	-4.2	A
Pulsed Drain Current ¹	I_{DM}	-30	A
Power Dissipation	P_D	1.2	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Units
Thermal Resistance, Junction-to-Ambient ²	$R_{\theta JA}$	104	$^\circ C/W$

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ELECTRICAL CHARACTERISTICS

T_A=25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
STATIC PARAMETERS ³						
Drain-Source Breakdown Voltage	V _{(BR)DS}	I _D =-250μA, V _{GS} =0V	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V			-1	μA
Gate-Body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±10V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} I _D =-250μA	-0.7	-1	-1.3	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-4.2A		48	55	mΩ
		V _{GS} =-4.5V, I _D =-4A		56	75	mΩ
		V _{GS} =-2.5V, I _D =-1A		72	90	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-4.2A		10		S
Diode Forward Voltage ³	V _{SD}	I _S =-4.2A, V _{GS} =0V			-1.2	V
DYNAMIC PARAMETERS ⁴						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-15V, f=1MHz		880		pF
Output Capacitance	C _{oss}			105		pF
Reverse Transfer Capacitance	C _{rss}			65		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _g	V _{GS} =-4.5V, V _{DS} =-15V, I _D =-4.2A		8.5		nC
Gate Source Charge	Q _{gs}			1.8		nC
Gate Drain Charge	Q _{gd}			2.7		nC
Turn-On DelayTime	t _{d(on)}	V _{GS} =-10V, V _{DS} =-15V, I _D =-4.2A, R _{GEN} =6Ω		7		ns
Turn-On Rise Time	t _r			3		ns
Turn-Off DelayTime	t _{d(off)}			30		ns
Turn-Off Fall Time	t _f			12		ns

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 productio

TYPICAL CHARACTERISTICS CURVES

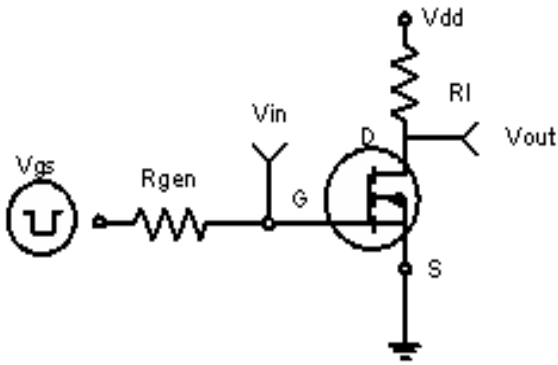


Figure 1: Switching Test Circuit

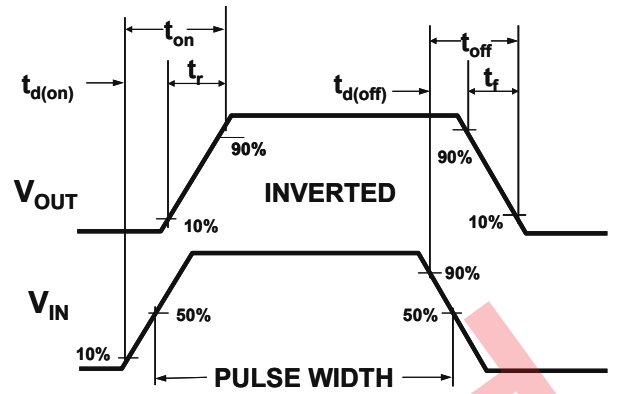


Figure 2: Switching Waveforms

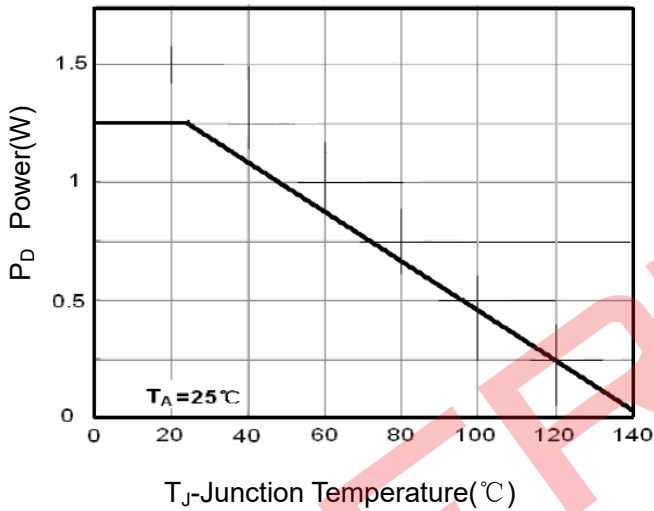


Figure 3 Power Dissipation

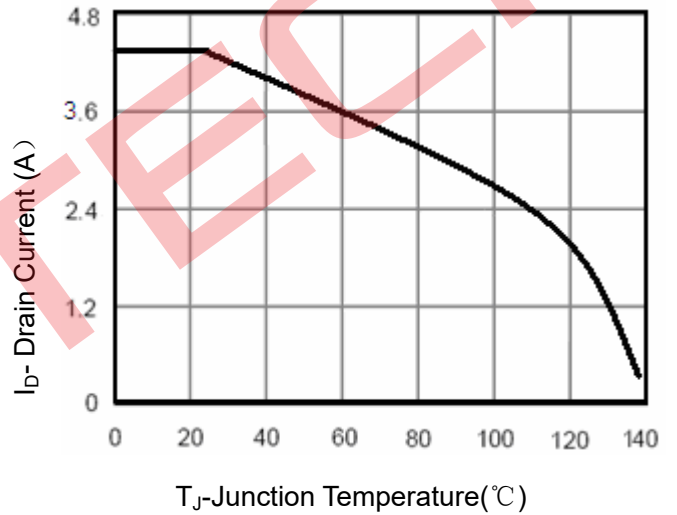


Figure 4 Drain Current

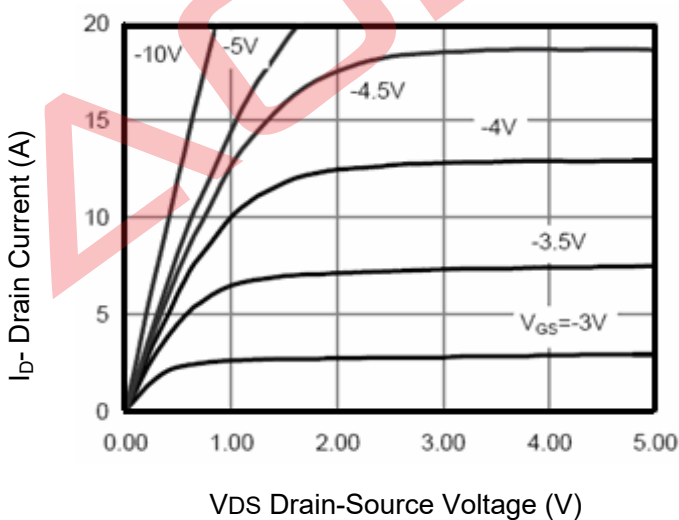


Figure 5 Output Characteristics

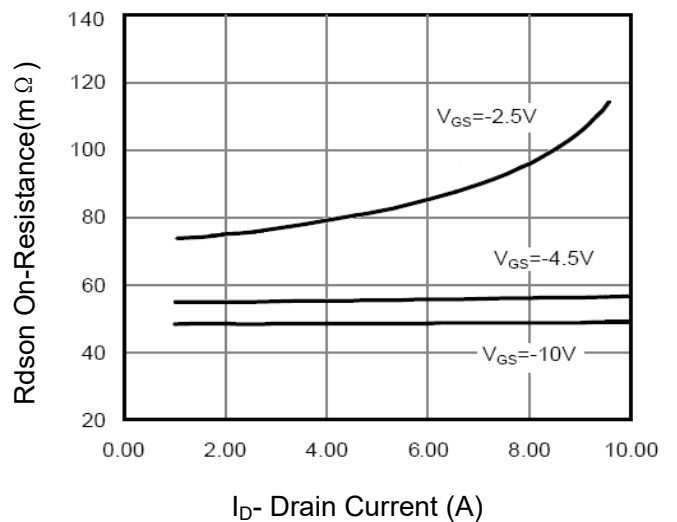


Figure 6 Drain-Source On-Resistance

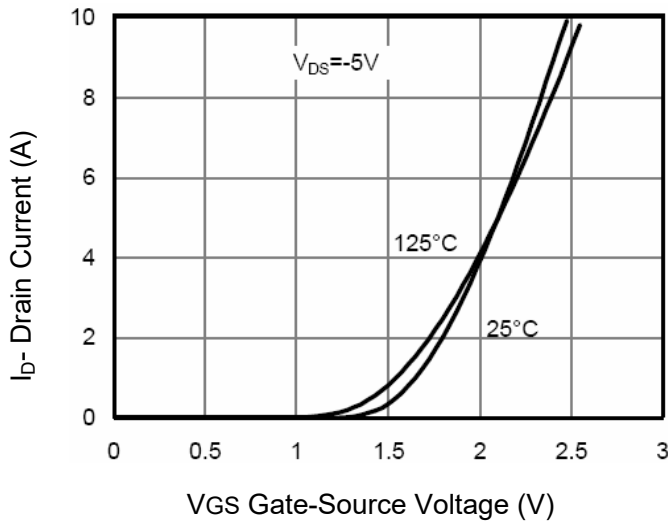


Figure 7 Transfer Characteristics

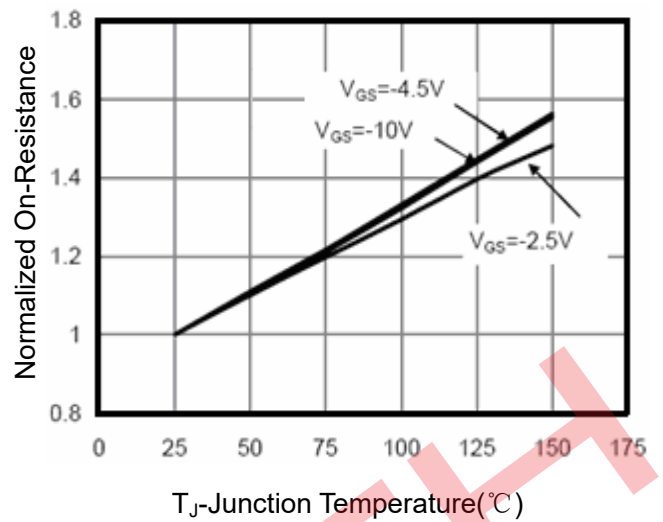


Figure 8 Drain-Source On-Resistance

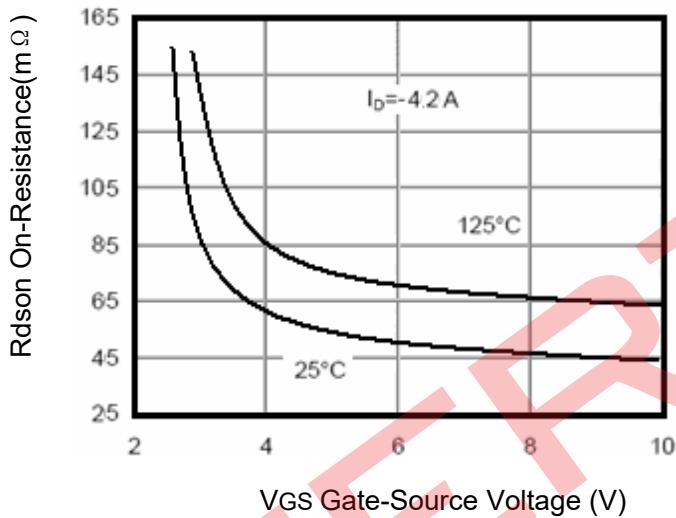


Figure 9 Rdson vs V_GS

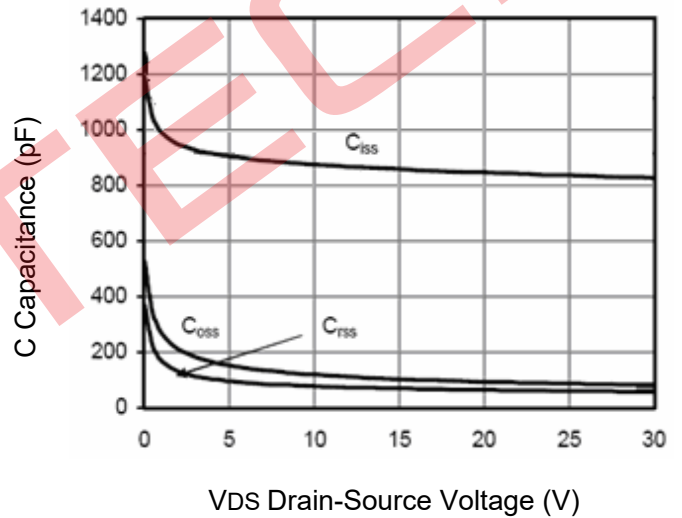


Figure 10 Capacitance vs V_DS

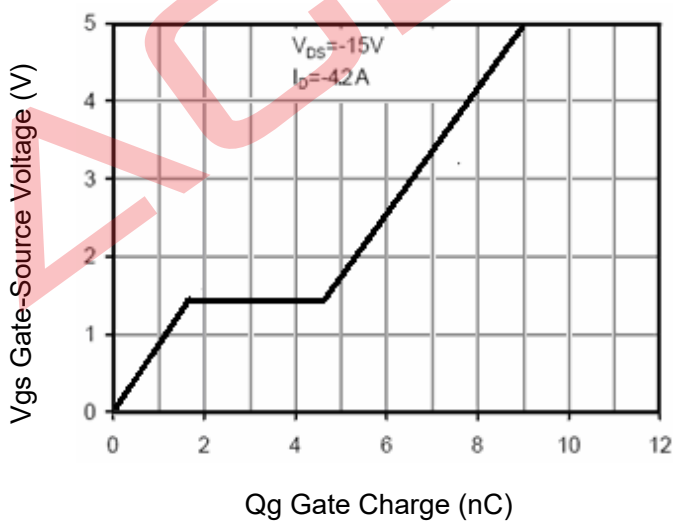


Figure 11 Gate Charge

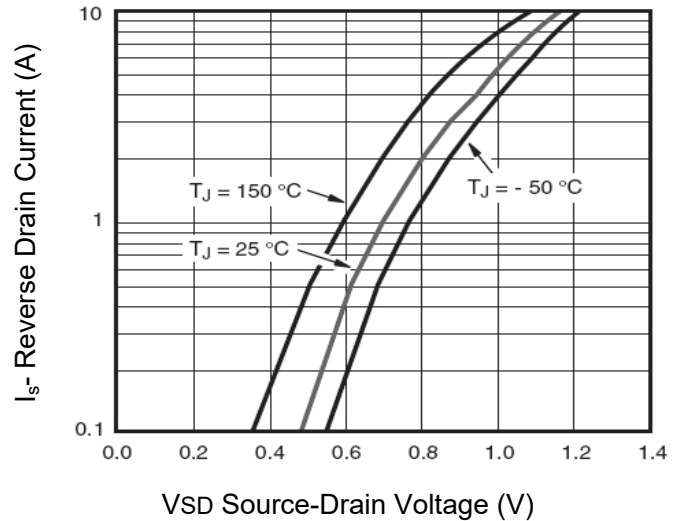


Figure 12 Source-Drain Diode Forward

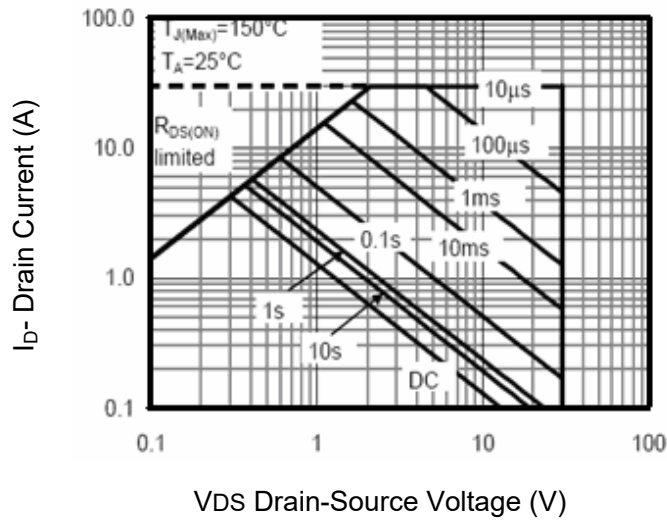


Figure 13 Safe Operation Area

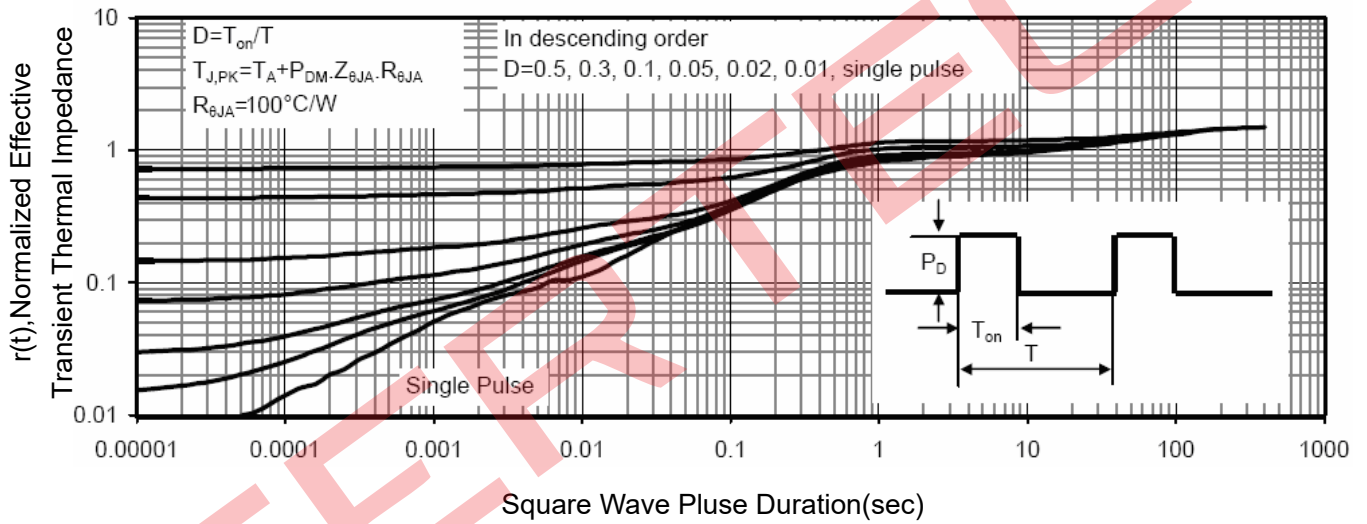
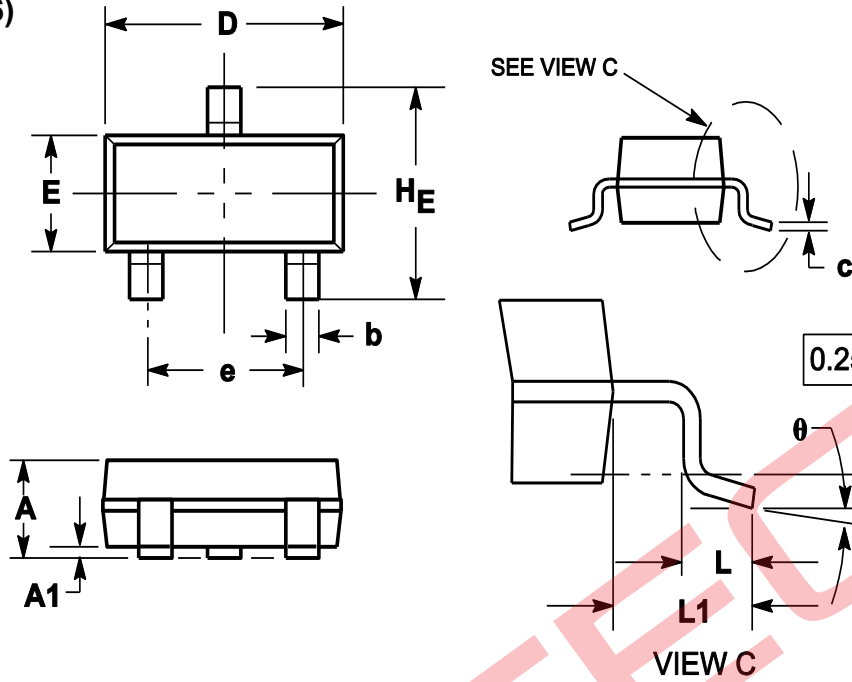


Figure 14 Normalized Maximum Transient Thermal Impedance

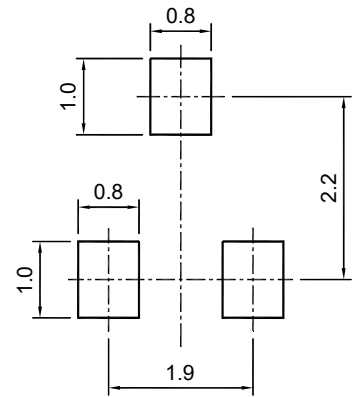
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PACKAGE OUTLINE

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°



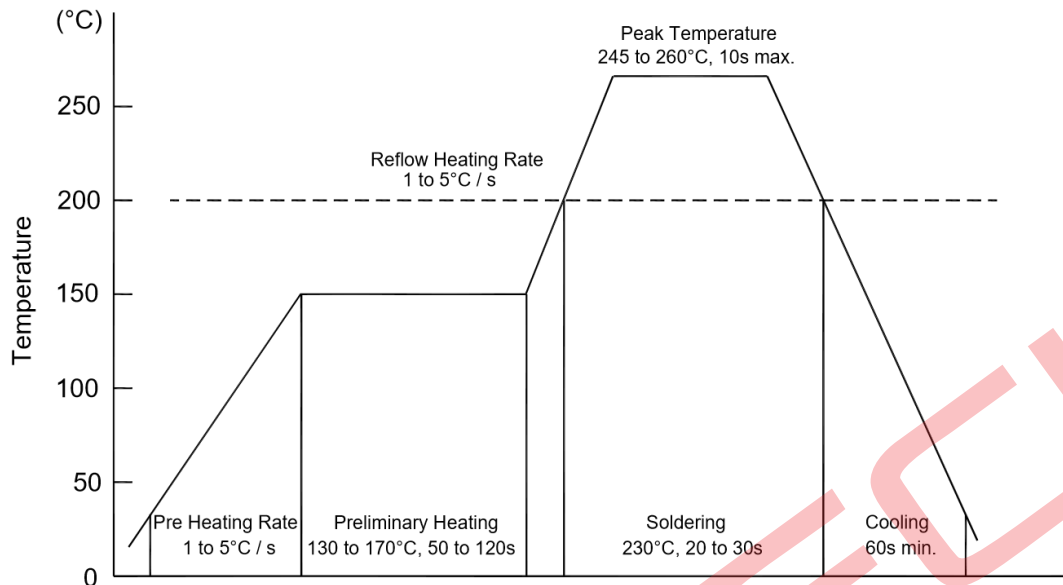
SOT-23 (TO-236)

Recommended soldering pad

ORDERING INFORMATION

Device	Package	Shipping
ATM3401APSA	SOT-23	3000/Reel&Tape(7inch)

◆ 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

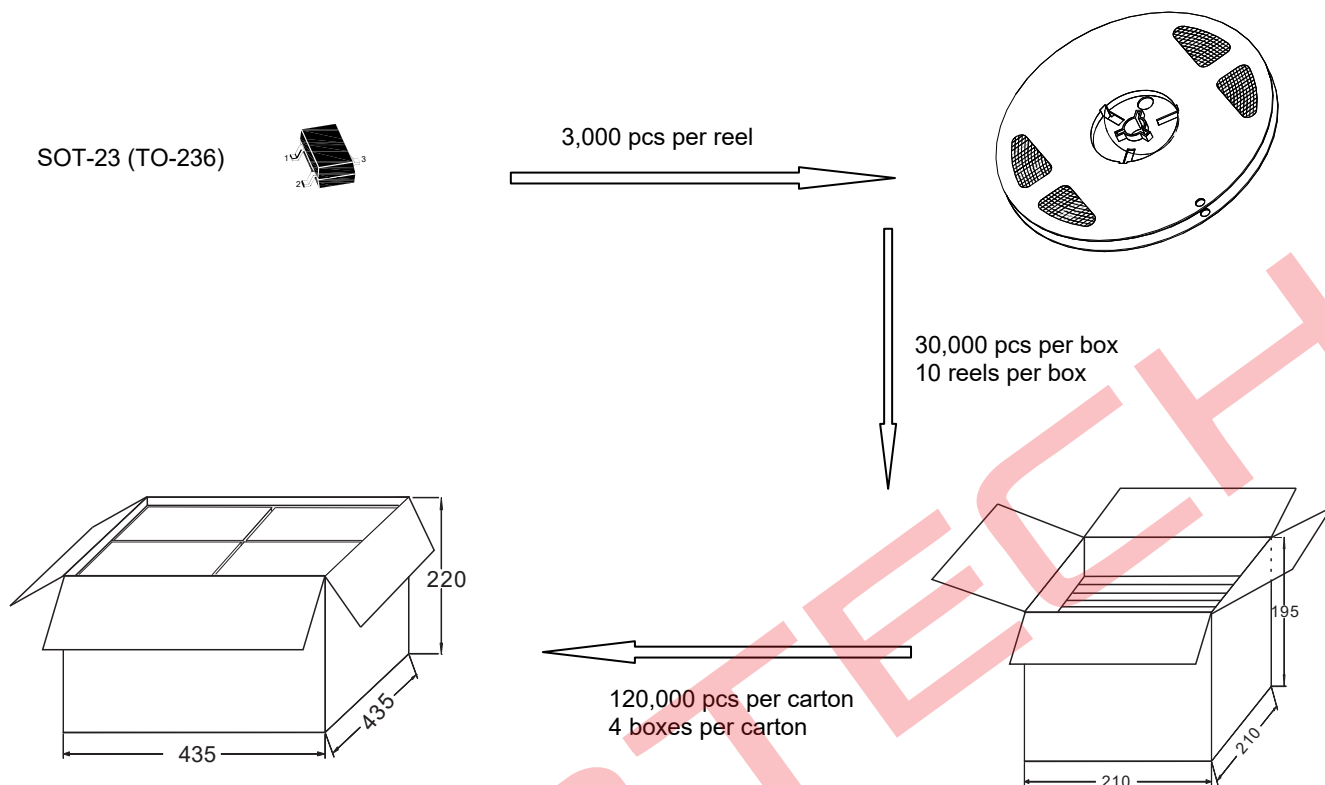
◆ Storage conditions

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

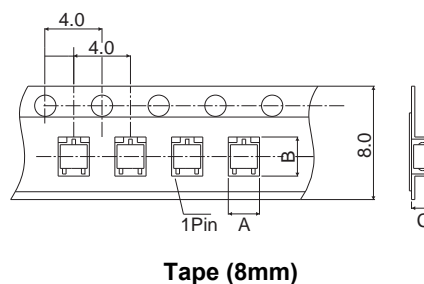
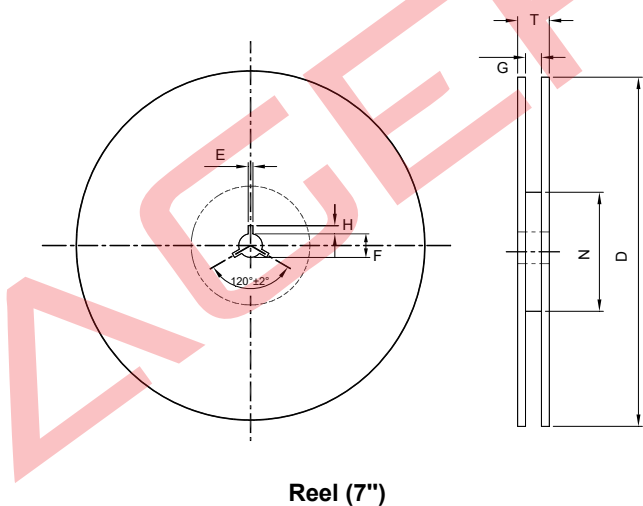
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PACKAGE SPECIFICATIONS

◆ 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