

ATM2312NSA

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

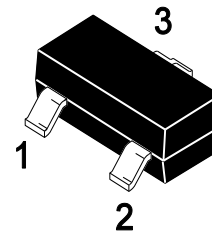
Drain-Source Voltage: 20V

Continuous Drain Current: 5.0A

FEATURES

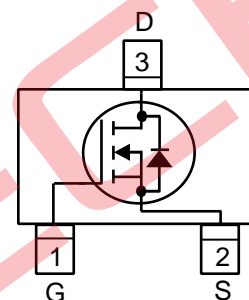
- ◆ Small Package: SOT-23
- ◆ $V_{DS}=20V, I_D=5A$
 $R_{DS(ON)} \leq 31.8m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)} \leq 35.6m\Omega @ V_{GS}=2.5V$
- ◆ Advanced Trench Technology

SOT-23



APPLICATIONS

- ◆ Load Switching for portable Application
- ◆ DC/DC Converter



Schematic diagram

ABSOLUTE MAXIMUM RATINGS

($T_A=25^\circ C$, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|------------|--------------|
| Drain-Source Voltage | V_{DS} | 20 | V |
| Gate-Source Voltage | V_{GS} | ± 8.0 | V |
| Continuous Drain Current | I_D | 5 | A |
| Pulsed Drain Current | I_{DM} | 20 | |
| Continuous Source-Drain Diode Current | I_S | 1.04 | |
| Maximum Power Dissipation | P_D | 0.35 | W |
| Junction-to-Ambient Thermal Resistance | $R_{\theta JA}$ | 357 | $^\circ C/W$ |
| Junction Temperature | T_J | 150 | $^\circ C$ |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^\circ C$ |

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ELECTRICAL CHARACTERISTICS

(T_A=25°C, unless otherwise noted)

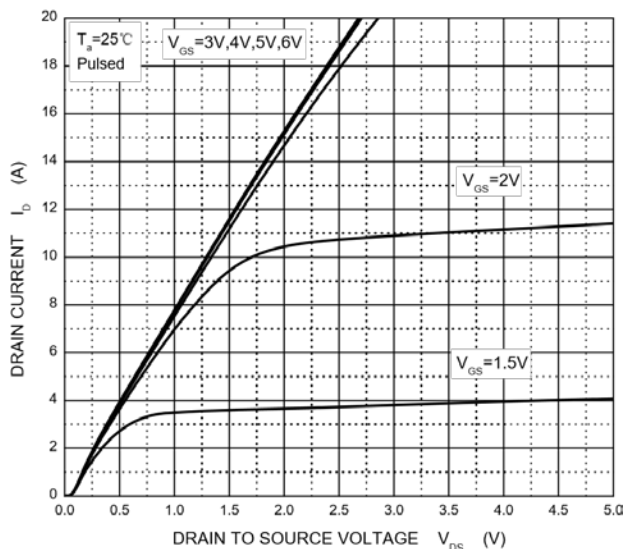
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|----------------------|---|------|------|------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0V, I _D = 250μA | 20 | - | - | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250μA | 0.45 | 0.7 | 1.0 | V |
| Gate Leakage Current | I _{GSS} | V _{DS} = 0V, V _{GS} = ±8V | - | - | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 20V, V _{GS} = 0V | - | - | 1 | μA |
| Drain-Source On-Resistance ^{Note1} | R _{DS(on)} | V _{GS} = 4.5V, I _D = 5.0A | - | 18 | 31.8 | mΩ |
| | | V _{GS} = 2.5V, I _D = 4.7A | - | 23 | 35.6 | |
| | | V _{GS} = 1.8V, I _D = 4.3A | - | 30 | 41.4 | |
| Forward transconductance | g _{fs} | V _{DS} = 10V, I _D = 5.0A | - | 6 | - | S |
| Dynamic | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} = 10V, V _{GS} = 0V, f = 1MHz | - | 865 | - | pF |
| Output Capacitance | C _{oss} | | - | 105 | - | |
| Reverse Transfer Capacitance | C _{rss} | | - | 55 | - | |
| Gate Resistance | R _g | f=1MHz | 0.5 | - | 4.8 | Ω |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = 10V, R _L = 2.2Ω R _G = 1Ω, V _{GEN} = 5V I _D = 4A | - | - | 10 | ns |
| Turn-On Rise Time | t _r | | - | - | 20 | |
| Turn-Off Delay Time | t _{d(off)} | | - | - | 32 | |
| Turn-Off Fall Time | t _f | | - | - | 12 | |
| Drain-source Body Diode | | | | | | |
| Forward Diode Voltage | V _{SD} | V _{GS} = 0V, I _S = 4A | - | 0.75 | 1.2 | V |

Notes:1. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.

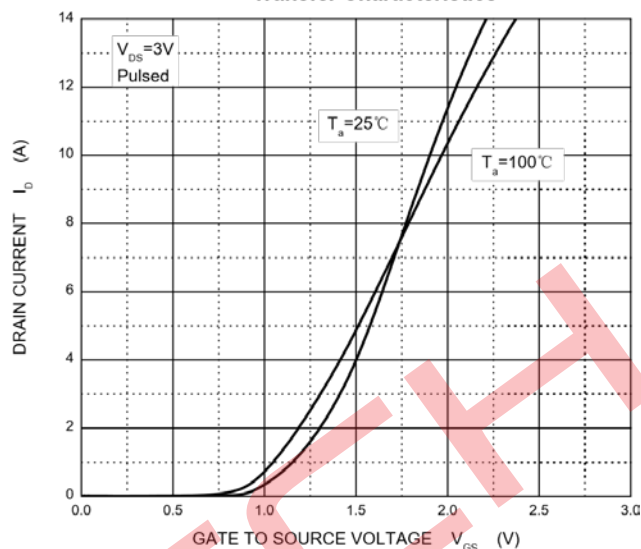
RATINGS AND CHARACTERISTIC CURVES

($T_A=25^\circ\text{C}$, unless otherwise noted)

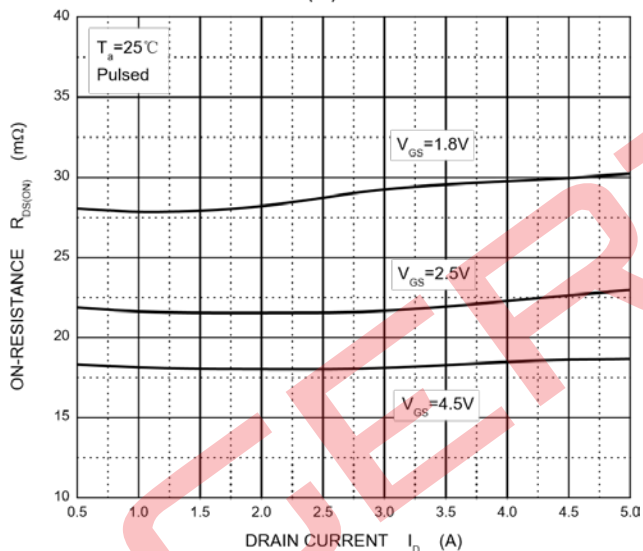
Output Characteristics



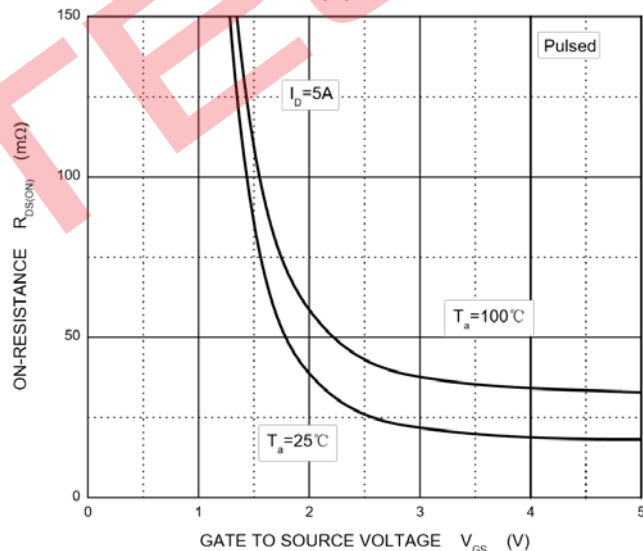
Transfer Characteristics



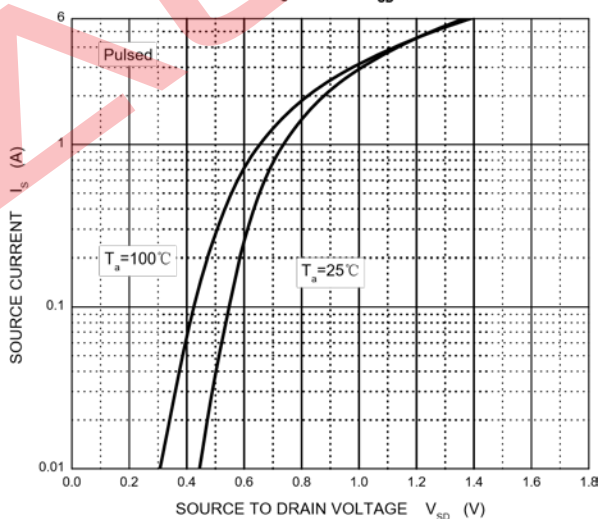
$R_{DS(ON)}$ — I_D



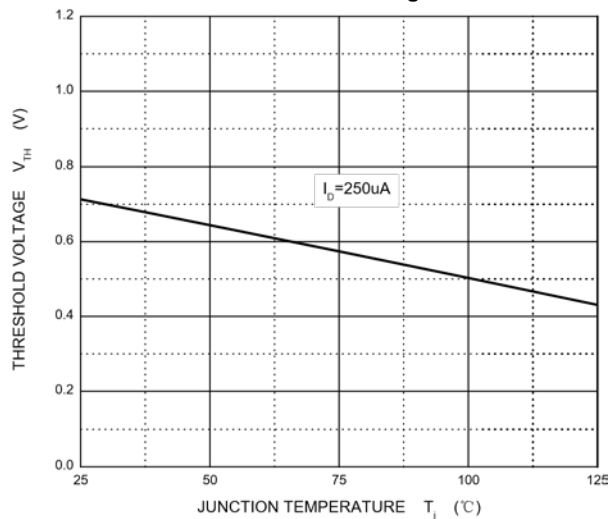
$R_{DS(ON)}$ — V_{GS}



I_S — V_{SD}



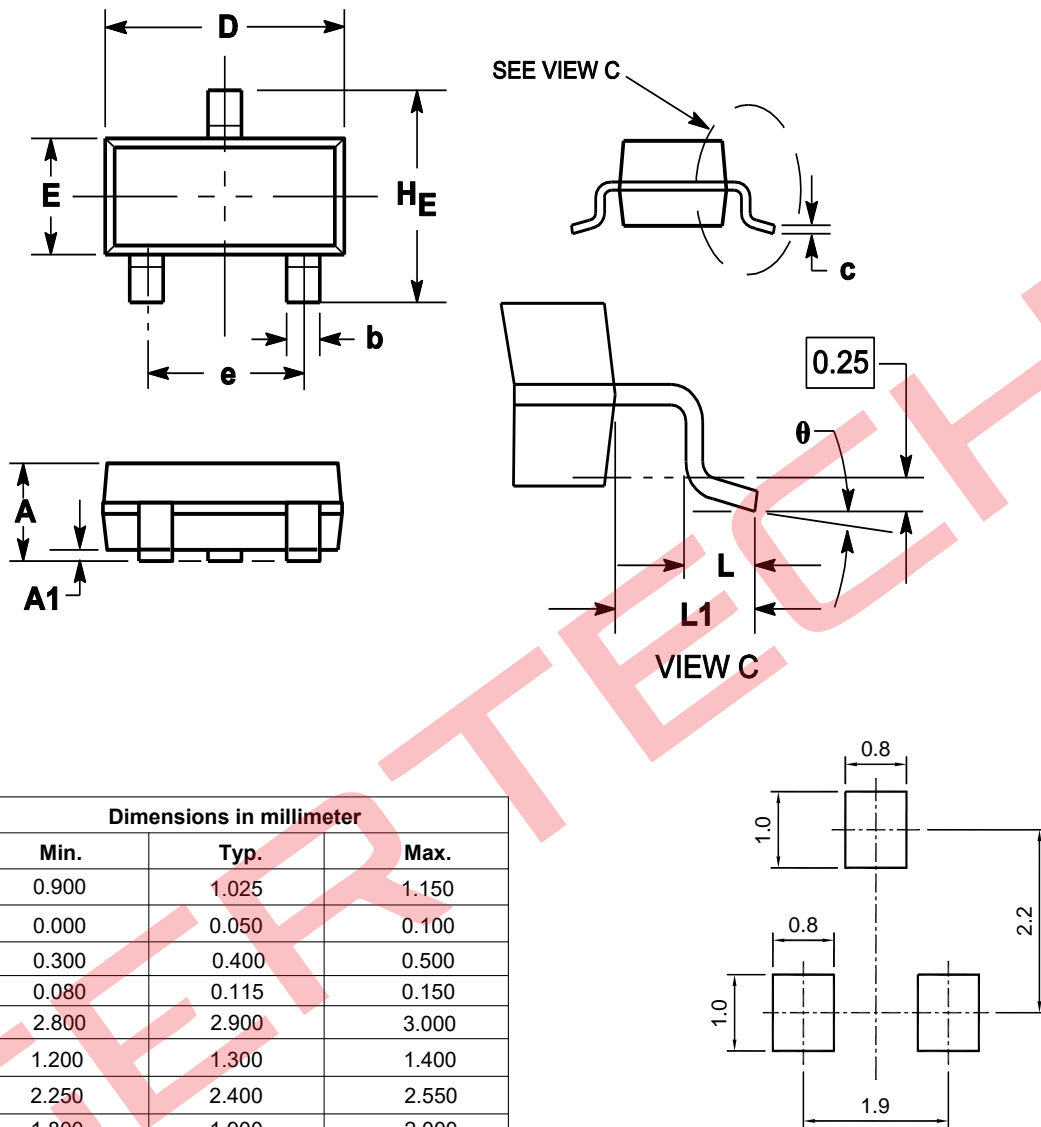
Threshold Voltage



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PACKAGE OUTLINE

SOT-23



| 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° |

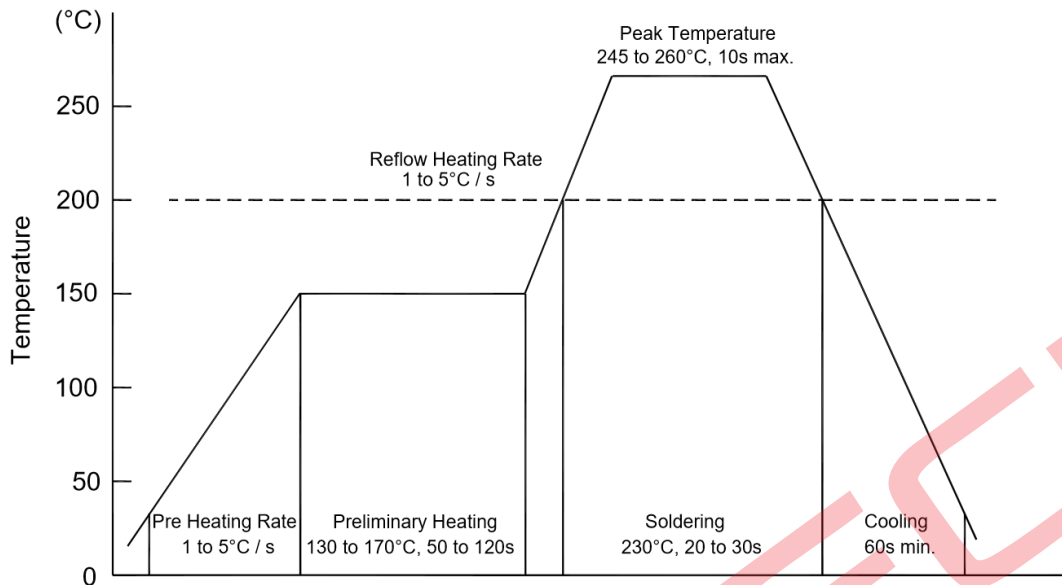
SOT-23
Recommended soldering pad

ORDERING INFORMATION

| Device | Package | Shipping |
|------------|---------|-----------------------|
| ATM2312NSA | 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

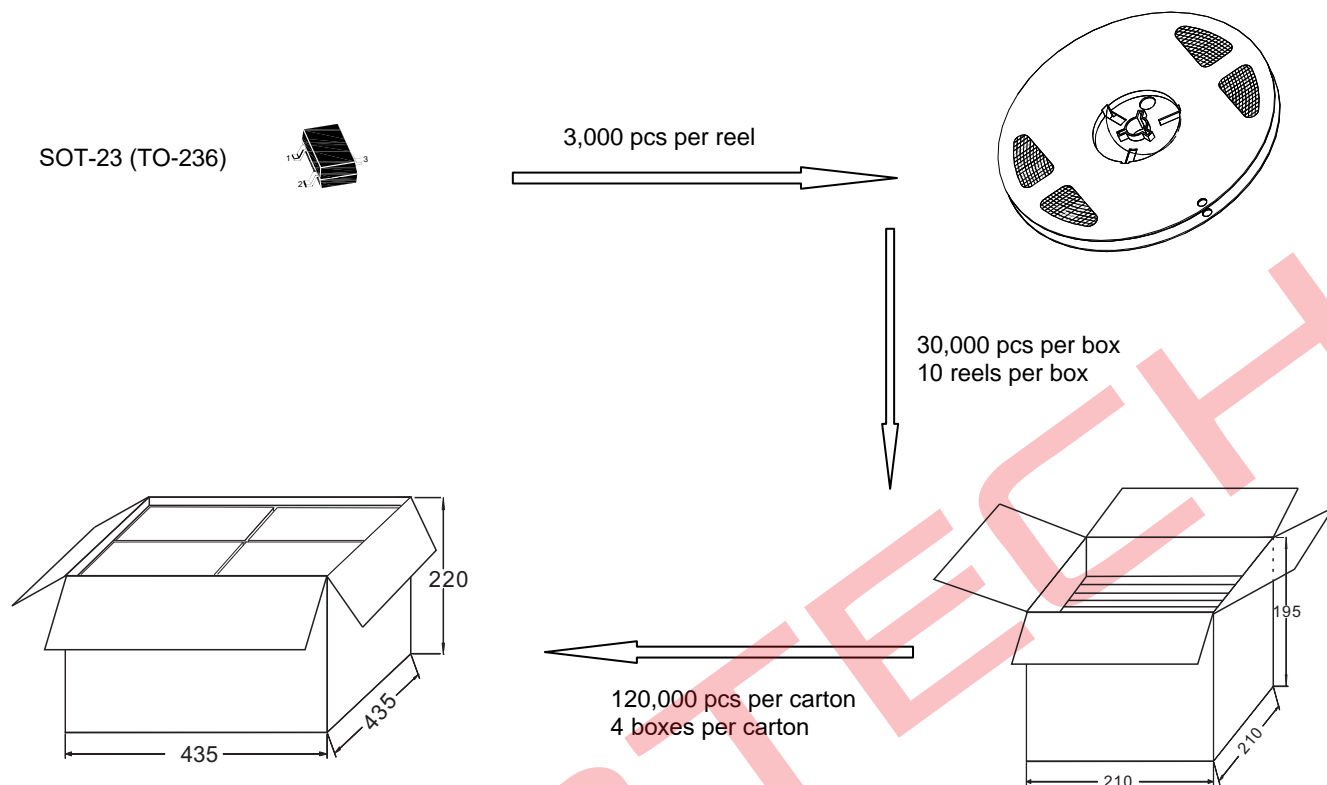
◆ Storage conditions

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

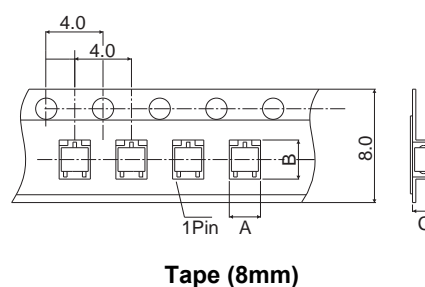
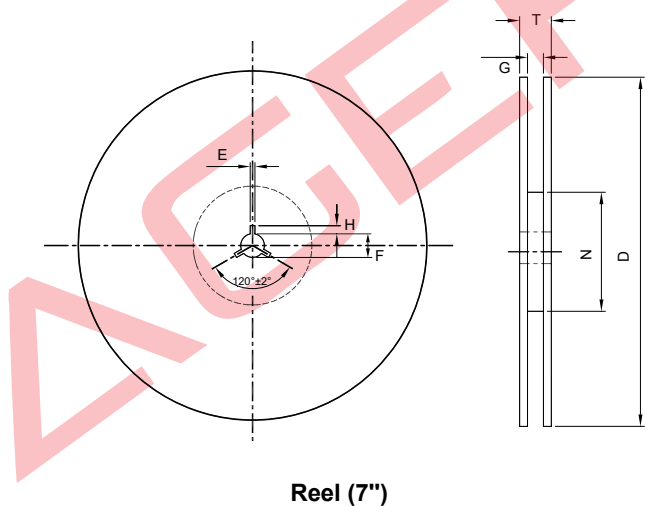
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PACKAGE SPECIFICATIONS

◆ 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 |