

# LL032AT23

## List

|                                                         |   |
|---------------------------------------------------------|---|
| List.....                                               | 1 |
| Package outline.....                                    | 2 |
| Features.....                                           | 2 |
| Mechanical data.....                                    | 2 |
| Maximum ratings .....                                   | 2 |
| Electrical characteristics.....                         | 2 |
| Rating and characteristic curves.....                   | 3 |
| Pinning information.....                                | 4 |
| Marking.....                                            | 4 |
| Suggested solder pad layout.....                        | 4 |
| Package Information.....                                | 5 |
| Reel packing.....                                       | 6 |
| Suggested thermal profiles for soldering processes..... | 6 |

# LL032AT23

## Surface Mount TVS For Ultra Low Capacitance ESD Protection Diode - 3.3V

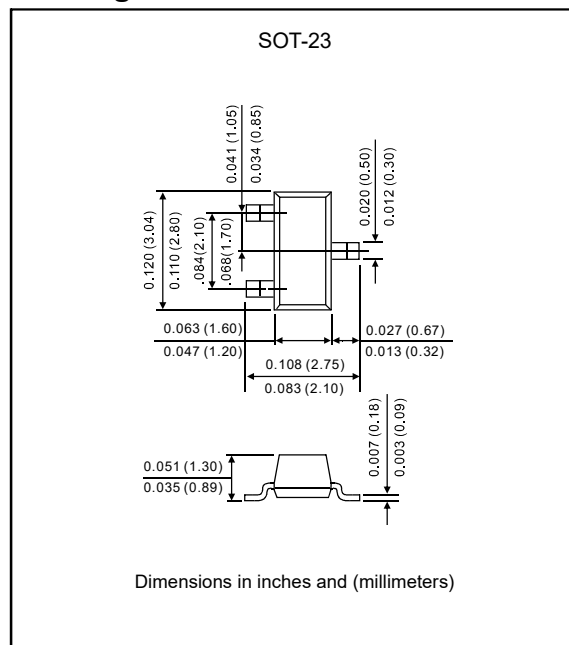
### Features

- Ultra low capacitance: 0.3pF typical
- Ultra low leakage: nA level
- Operating voltage: 3.3V
- Low clamping voltage
- Up to 2-line protects.
- Complies with following standards :
  - IEC 61000-4-2 (ESD) immunity test - Air discharge:  $\pm 25\text{kV}$ .
  - Contact discharge:  $\pm 20\text{kV}$ .
  - IEC61000-4-5 (Lightning) 5A (8/20 $\mu\text{s}$ ).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.LL032AT23-H.

### Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

### Package outline



### Maximum ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

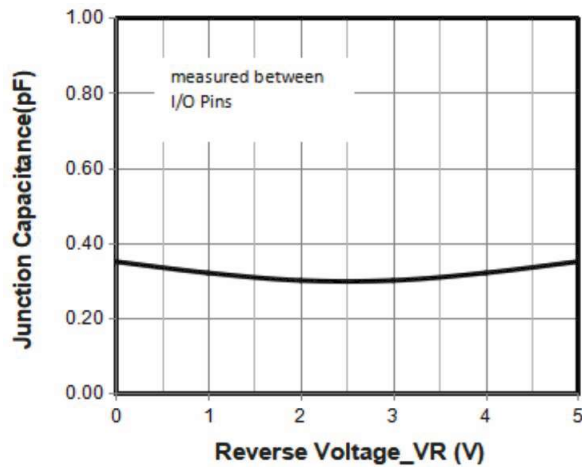
| Parameter                                | Symbol    | Value       | Unit             |
|------------------------------------------|-----------|-------------|------------------|
| Peak pulse power (8/20 $\mu\text{s}$ )   | $P_{PK}$  | 80          | W                |
| Peak pulse current (8/20 $\mu\text{s}$ ) | $I_{PP}$  | 5           | A                |
| ESD Per IEC 61000-4-2 (Air)              | $V_{ESD}$ | $\pm 25$    | KV               |
| ESD Per IEC 61000-4-2 (Contact)          |           | $\pm 20$    |                  |
| Operating temperature                    | $T_J$     | -55 ~ +125  | $^\circ\text{C}$ |
| Storage temperature                      | $T_{STG}$ | -55 to +150 | $^\circ\text{C}$ |

### Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

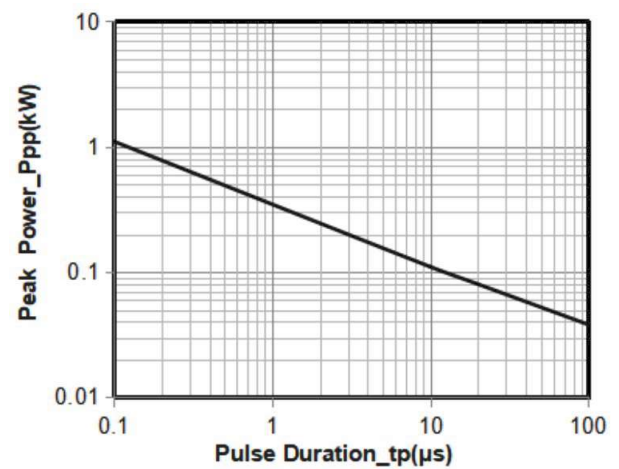
| Parameter               | Symbol    | Conditions                                                            | Min. | Typ. | Max. | Unit          |
|-------------------------|-----------|-----------------------------------------------------------------------|------|------|------|---------------|
| Reverse working voltage | $V_{RWM}$ |                                                                       |      |      | 3.3  | V             |
| Breakdown voltage       | $V_{BR}$  | $I_T = 1\text{mA}$                                                    | 5.0  |      |      | V             |
| Reverse leakage current | $I_R$     | $V_{RWM} = 3.3\text{V}$                                               |      | 0.01 | 0.5  | $\mu\text{A}$ |
|                         | $V_C$     | $I_{PP} = 1\text{A}$ (8 / 20 $\mu\text{s}$ Pulse)                     |      |      | 9    | V             |
| Clamping voltage        | $V_C$     | $I_{PP} = 5\text{A}$ (8 / 20 $\mu\text{s}$ Pulse)                     |      |      | 16   | V             |
| Junction capacitance    | $C_J$     | $V_R = 0\text{V}$ , $f = 1\text{MHz}$ (Between Pin1 and Pin2)         |      | 0.3  | 0.4  | pF            |
|                         |           | $V_R = 0\text{V}$ , $f = 1\text{MHz}$ (Between Pin1 and Pin2 to Pin3) |      |      | 0.8  |               |

# LL032AT23

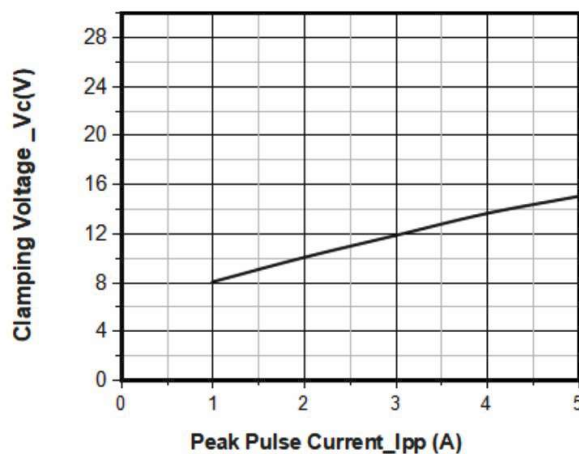
## Rating and characteristic curves



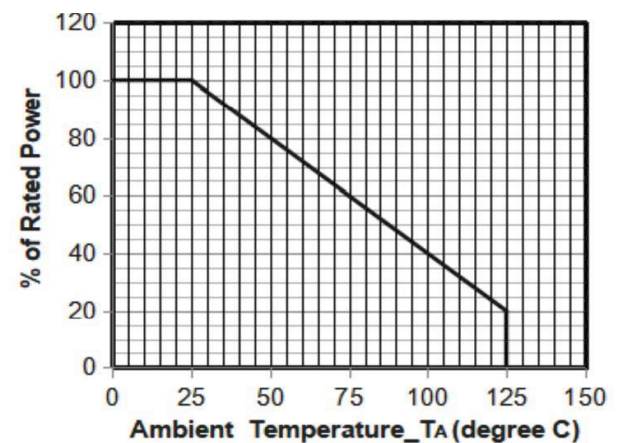
Junction Capacitance vs. Reverse Voltage



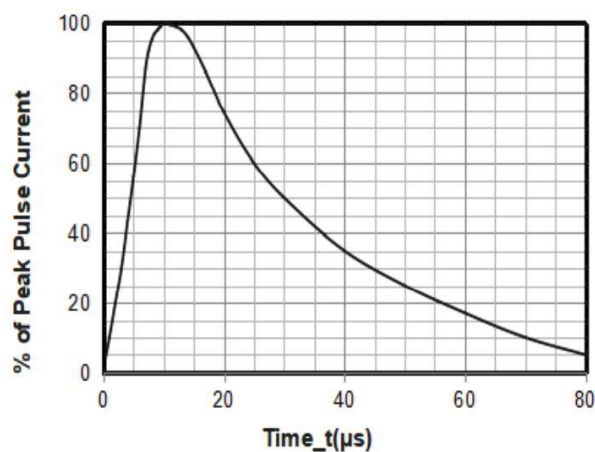
Peak Pulse Power vs. Pulse Time



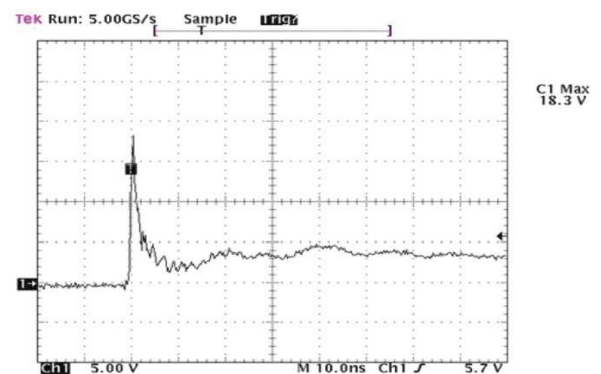
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8 X 20μs Pulse Waveform



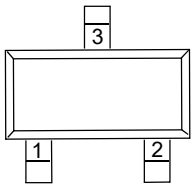
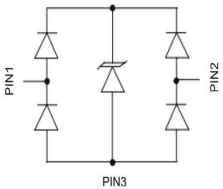
Note: Data is taken with a 10x attenuator

ESD Clamping Voltage

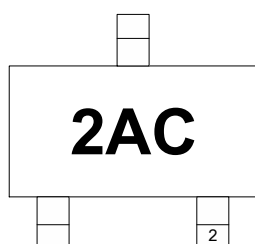
8 kV Contact per IEC61000-4-2

# LL032AT23

## Pinning information

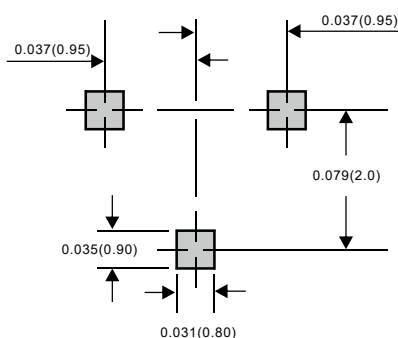
| Pin Configuration               | Simplified outline                                                                | Symbol                                                                              |
|---------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Pin 1, 2 Cathode<br>Pin 3 Anode |  |  |

## Marking



## Suggested solder pad layout

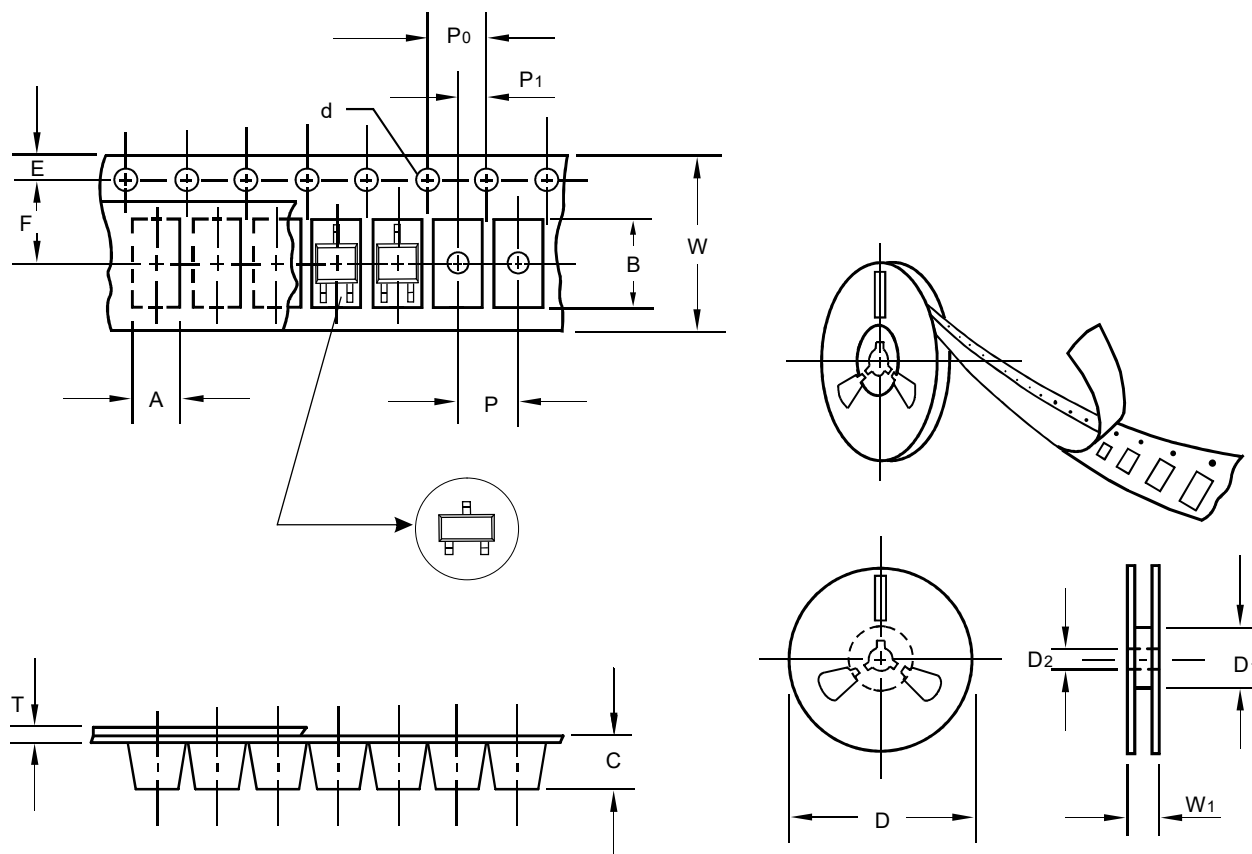
SOT-23



Dimensions in inches and (millimeters)

## LL032AT23

## Packing information



unit:mm

| Item                      | Symbol | Tolerance | SOT-23 |
|---------------------------|--------|-----------|--------|
| Carrier width             | A      | 0.1       | 3.15   |
| Carrier length            | B      | 0.1       | 2.77   |
| Carrier depth             | C      | 0.1       | 1.22   |
| Sprocket hole             | d      | 0.1       | 1.50   |
| 13" Reel outside diameter | D      | 2.0       | -      |
| 13" Reel inner diameter   | D1     | min       | -      |
| 7" Reel outside diameter  | D      | 2.0       | 178.00 |
| 7" Reel inner diameter    | D1     | min       | 55.00  |
| Feed hole diameter        | D2     | 0.5       | 13.00  |
| Sprocket hole position    | E      | 0.1       | 1.75   |
| Punch hole position       | F      | 0.1       | 3.50   |
| Punch hole pitch          | P      | 0.1       | 4.00   |
| Sprocket hole pitch       | P0     | 0.1       | 4.00   |
| Embossment center         | P1     | 0.1       | 2.00   |
| Overall tape thickness    | T      | 0.1       | 0.23   |
| Tape width                | W      | 0.3       | 8.00   |
| Reel width                | W1     | 1.0       | 12.0   |

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

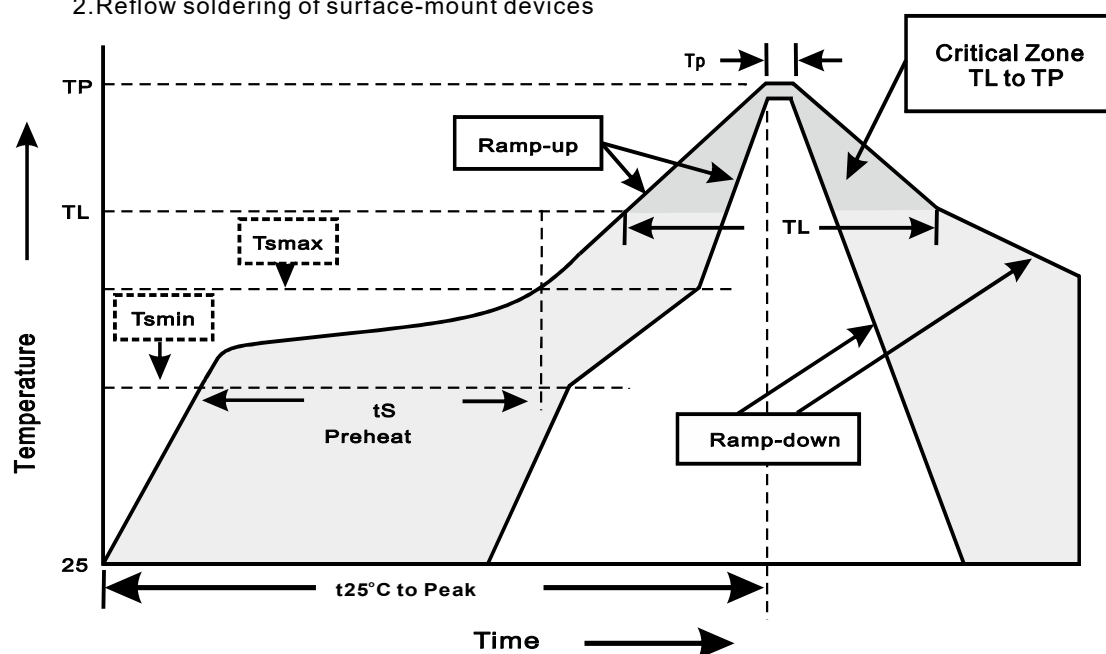
# LL032AT23

## Reel packing

| PACKAGE | REEL SIZE | REEL (pcs) | COMPONENT SPACING (m/m) | BOX (pcs) | INNER BOX (m/m) | REEL DIA, (m/m) | CARTON SIZE (m/m) | CARTON (pcs) | APPROX. GROSS WEIGHT (kg) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| SOT-23  | 7"        | 3,000      | 4.0                     | 30,000    | 183*123*183     | 178             | 382*257*387       | 240,000      | 11.6                      |

## Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



### 3.Reflow soldering

| Profile Feature                                                                                                         | Soldering Condition             |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Average ramp-up rate( $T_L$ to $T_P$ )                                                                                  | $<3^{\circ}\text{C}/\text{sec}$ |
| Preheat<br>-Temperature Min( $T_{\text{smín}}$ )<br>-Temperature Max( $T_{\text{smáx}}$ )<br>-Time(min to max)( $t_S$ ) | 150°C<br>200°C<br>60~120sec     |
| $T_{\text{smáx}}$ to $T_L$<br>-Ramp-upRate                                                                              | $<3^{\circ}\text{C}/\text{sec}$ |
| Time maintained above:<br>-Temperature( $T_L$ )<br>-Time( $t_L$ )                                                       | 217°C<br>60~260sec              |
| Peak Temperature( $T_P$ )                                                                                               | 255°C-0/+5°C                    |
| Time within 5°C of actual Peak Temperature( $t_P$ )                                                                     | 10~30sec                        |
| Ramp-down Rate                                                                                                          | $<6^{\circ}\text{C}/\text{sec}$ |
| Time 25°C to Peak Temperature                                                                                           | $<6\text{minutes}$              |