

# AQ3130 Series

## 0.3pF 10 kV Bidirectional Discrete TVS


**AUTOMOTIVE GRADE**

**HF**

**RoHS**

**Pb**

**GREEN**


### Additional Information



Resources

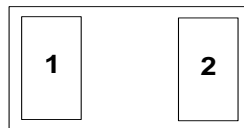


Accessories



Samples

### Pinout



### Functional Block Diagram



### Description

The AQ3130 includes back-to-back TVS diodes fabricated in a proprietary silicon avalanche technology to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes up to the maximum level specified in IEC 61000-4-2 international standard without performance degradation. These back-to-back components provide symmetric protection with or without AC being present.

### Features & Benefits

- ESD protection of  $\pm 10\text{kV}$  contact discharge,  $\pm 15\text{kV}$  air discharge, (IEC 61000-4-2)
- EFT protection, IEC 61000-4-4, 40A ( $t_p=5/50\text{ns}$ )
- Lightning, 2A (8/20 as defined in IEC 61000-4-5 2nd edition)
- PPAP capable
- Low capacitance of 0.3pF @ VR=0V
- Low leakage current of 50nA (max) at 28V
- Space efficient SOD882 footprint
- AEC-Q101 qualified
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level(MSL -1)

### Applications

- Tablets
- Ultrabook
- eReader
- Smart Phones
- Digital Cameras
- MP3/ PMP
- Set Top Boxes
- Portable Medical
- NFC and FeliCa
- Automotive applications

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### Absolute Maximum Ratings

| Symbol     | Parameter                        | Value      | Units |
|------------|----------------------------------|------------|-------|
| $I_{PP}$   | Peak Current ( $t_p=8/20\mu s$ ) | 2.0        | A     |
| $T_{OP}$   | Operating Temperature            | -40 to 150 | °C    |
| $T_{STOR}$ | Storage Temperature              | -55 to 150 | °C    |

**Caution:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

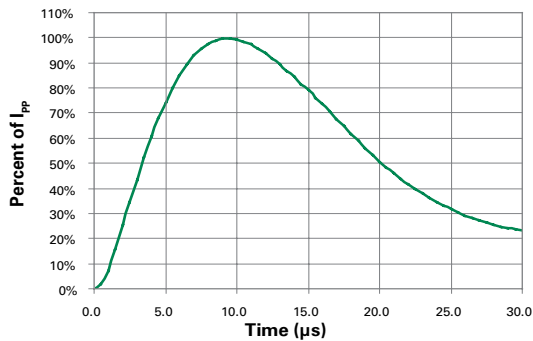
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

| Parameter                          | Symbol        | Test Conditions                     | Min      | Typ | Max  | Units    |
|------------------------------------|---------------|-------------------------------------|----------|-----|------|----------|
| Reverse Standoff Voltage           | $V_{RWM}$     | $I_R=1\mu A$                        | -        | -   | 28   | V        |
| Reverse Leakage Current            | $I_{LEAK}$    | $V_R=28V$ with 1 pin at GND         | -        | 1   | 50   | nA       |
| Clamp Voltage <sup>1</sup>         | $V_C$         | $I_{PP}=1A$ , $t_p=8/20\mu s$ , Fwd | -        | 39  | 44   | V        |
|                                    |               | $I_{PP}=2A$ , $t_p=8/20\mu s$ , Fwd | -        | 42  | 48   | V        |
| ESD Withstand Voltage <sup>1</sup> | $V_{ESD}$     | IEC 61000-4-2 (Contact)             | $\pm 10$ | -   | -    | kV       |
|                                    |               | IEC 61000-4-2 (Air)                 | $\pm 15$ | -   | -    | kV       |
| Dynamic Resistance <sup>2</sup>    | $R_{DYN}$     | TLP, $t_p=100ns$ , I/O to GND       | -        | 1.0 | -    | $\Omega$ |
| Diode Capacitance <sup>1</sup>     | $C_{I/O-I/O}$ | Reverse Bias=0V, $f=1$ MHz          | -        | 0.3 | 0.45 | pF       |

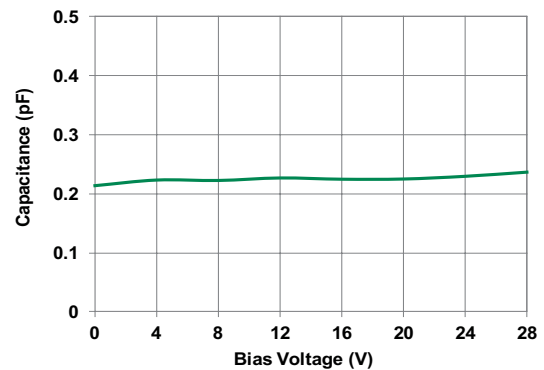
**Note:** 1. Parameter is guaranteed by design and/or component characterization.

2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window  $t_1=70ns$  to  $t_2=90ns$

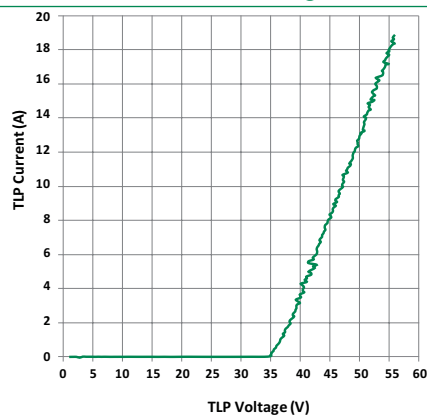
#### 8/20 $\mu s$ Pulse Waveform



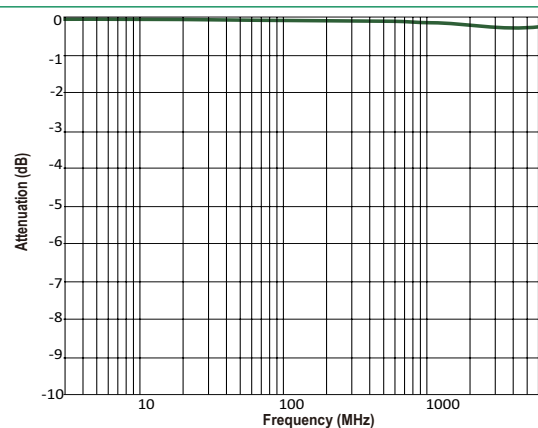
#### Capacitance vs. Reverse Bias



#### Transmission Line Pulsing (TLP) Plot



#### Insertion Loss (S21)

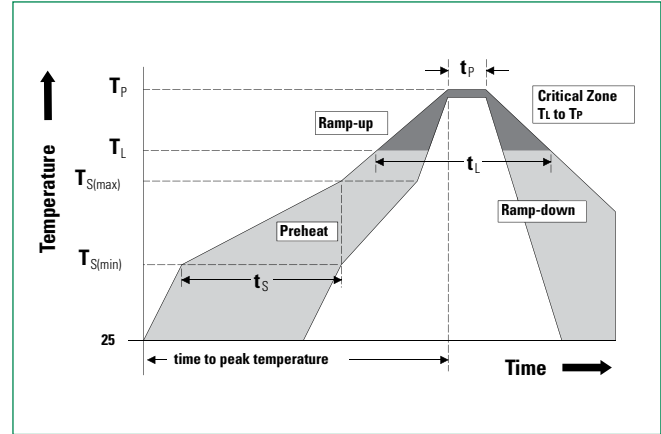


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## 0.3pF 10 kV Bidirectional Discrete TVS

### Soldering Parameters

|                                                                        |                                    |                         |
|------------------------------------------------------------------------|------------------------------------|-------------------------|
| <b>Reflow Condition</b>                                                |                                    | Pb – Free assembly      |
| <b>Pre Heat</b>                                                        | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|                                                                        | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|                                                                        | - Time (min to max) ( $t_s$ )      | 60 – 180 secs           |
| <b>Average ramp up rate (Liquidus) Temp (<math>T_L</math>) to peak</b> |                                    | 3°C/second max          |
| <b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>      |                                    | 3°C/second max          |
| <b>Reflow</b>                                                          | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|                                                                        | - Temperature ( $t_L$ )            | 60 – 150 seconds        |
| <b>Peak Temperature (<math>T_p</math>)</b>                             |                                    | 260 <sup>+0/-5</sup> °C |
| <b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>   |                                    | 20 – 40 seconds         |
| <b>Ramp-down Rate</b>                                                  |                                    | 6°C/second max          |
| <b>Time 25°C to peak Temperature (<math>T_p</math>)</b>                |                                    | 8 minutes Max.          |
| <b>Do not exceed</b>                                                   |                                    | 260°C                   |



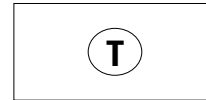
### Product Characteristics

|                           |                                                        |
|---------------------------|--------------------------------------------------------|
| <b>Lead Plating</b>       | Pre-Plated Frame                                       |
| <b>Lead Material</b>      | Copper Alloy                                           |
| <b>Substrate material</b> | Silicon                                                |
| <b>Body Material</b>      | Molded Compound                                        |
| <b>Flammability</b>       | UL Recognized compound meeting flammability rating V-0 |

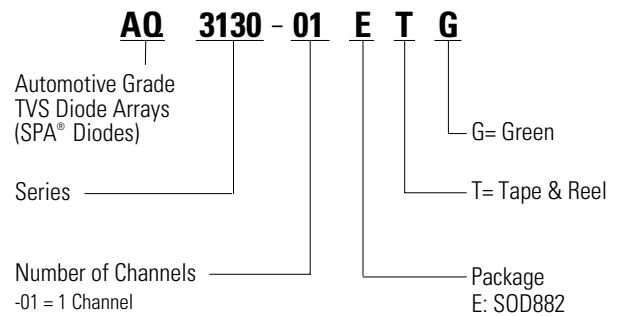
### Ordering Information

| Part Number  | Package | Min. Order Qty. |
|--------------|---------|-----------------|
| AQ3130-01ETG | SOD882  | 10000           |

### Part Marking System



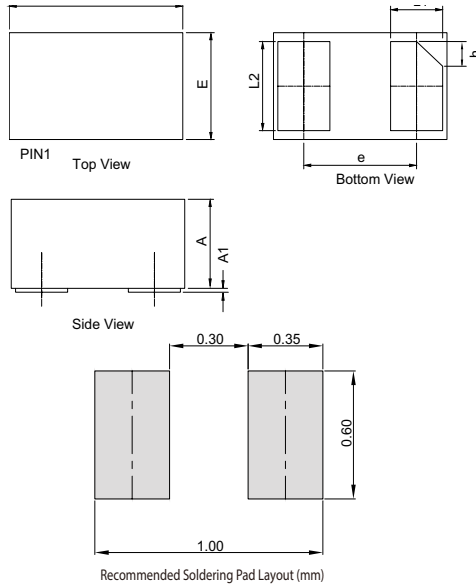
### Part Numbering System



# AQ3130 Series

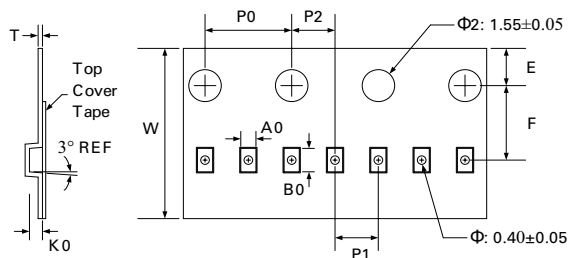
## 0.3pF 10 kV Bidirectional Discrete TVS

### Package Dimensions — SOD882

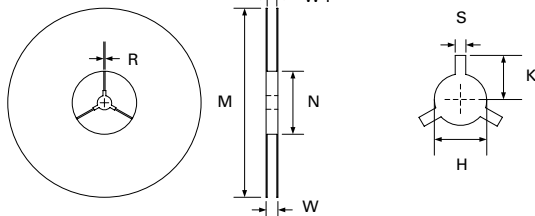


| Symbol | Dimensions |      |      |
|--------|------------|------|------|
|        | Min        | Nor. | Max  |
| A      | 0.45       | 0.50 | 0.55 |
| A1     | 0.00       | 0.02 | 0.05 |
| L1     | 0.20       | 0.25 | 0.30 |
| L2     | 0.45       | 0.50 | 0.55 |
| D      | 0.95       | 1.00 | 1.05 |
| E      | 0.55       | 0.60 | 0.65 |
| e      | 0.65BSC    |      |      |
| h      | 0.07       | 0.12 | 0.17 |

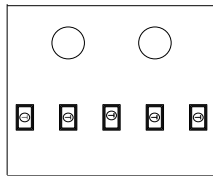
### Embossed Carrier Tape & Reel Specification — SOD882



#### Reel Size 7 Inch



#### Device Orientation in Tape



| Symbol | Tape Dimensions |      |
|--------|-----------------|------|
|        | Millimetres     |      |
|        | Min             | Max  |
| A0     | 0.65            | 0.75 |
| B0     | 1.10            | 1.20 |
| K0     | 0.50            | 0.60 |
| E      | 1.65            | 1.85 |
| F      | 3.45            | 3.55 |
| P0     | 3.90            | 4.10 |
| P1     | 1.90            | 2.10 |
| P2     | 1.95            | 2.05 |
| T      | 1.95            | 2.05 |
| W      | 7.90            | 8.10 |

| Symbol | Reel Dimensions (Size Φ178) |       |
|--------|-----------------------------|-------|
|        | Millimetres                 |       |
|        | Min                         | Max   |
| M      | 177.0                       | 179.0 |
| N      | 59.0                        | 61.0  |
| W      | 11.0                        | 12.0  |
| W1     | 8.5                         | 9.5   |
| H      | 12.5                        | 13.5  |
| S      | 1.9                         | 2.1   |
| K      | 10.8                        | 11.2  |
| R      | 0.95                        | 1.05  |

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