

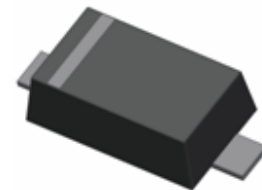
## SOD-523 SURFACE MOUNT

### Very Small Outline Flat Lead Plastic Package

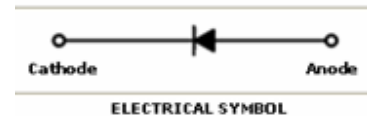
### Transient Voltage Suppressors

### ESD Protection Diodes

Green Product



SOD-523 Flat Lead



#### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol                 | Parameter                                                 | Value                | Units   |
|------------------------|-----------------------------------------------------------|----------------------|---------|
| <b>V<sub>pp</sub></b>  | IEC61000-4-2(ESD) Air Contact                             | $\pm 30$<br>$\pm 30$ | KV      |
| <b>ESD</b>             | Per Human Body Model<br>Per Machine Model                 | 16<br>400            | KV<br>V |
| <b>P<sub>D</sub></b>   | Power Dissipation (Note 1)                                | 150                  | mW      |
| <b>T<sub>STG</sub></b> | Storage Temperature Range                                 | -55 to +150          | °C      |
| <b>T<sub>J</sub></b>   | Operating Junction Temperature                            | +150                 | °C      |
| <b>T<sub>L</sub></b>   | Max Lead Solder Temperature range<br>(10 Second Duration) | 260                  | °C      |

These ratings are limiting values above which the serviceability of the diode may be impaired.  
Note 1. FR-5 = 1.0 x 0.75 x 0.62 in.

#### Specification Features:

- Stand-off Voltage: 3.3V, 5.0V & 7.0V
- Low Leakage
- Response Time is Typically < 1ns
- IEC61000-4-2 Level 4 ESD Protection
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish
- Band Indicates Cathode

#### DEVICE MARKING CODES:

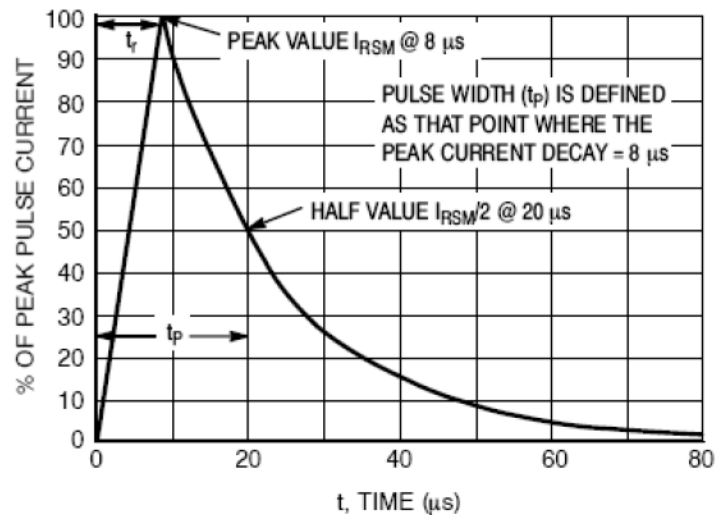
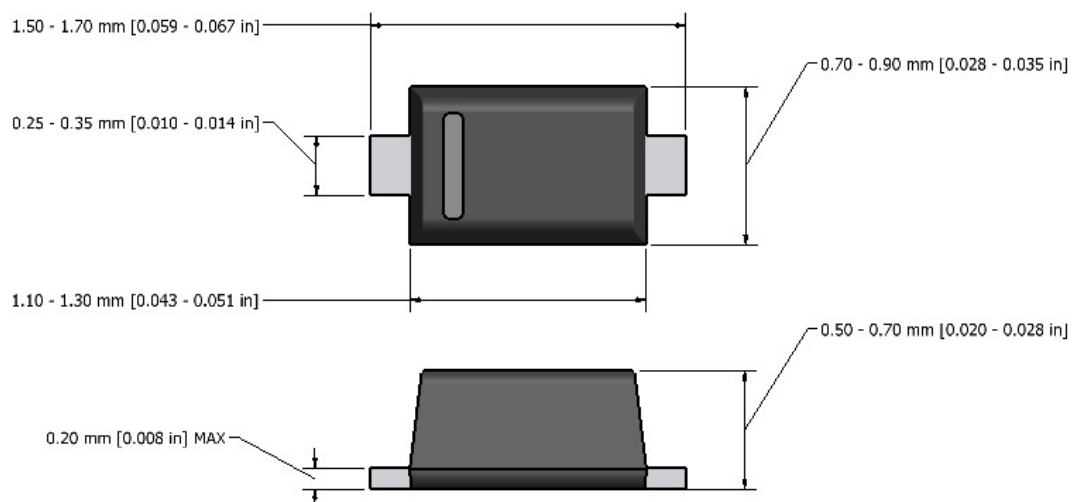
| Device Type | Device Marking |
|-------------|----------------|
| ESD5Z3V3    | ZE             |
| ESD5Z5V0    | ZF             |
| ESD5Z7V0    | ZH             |

#### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.9\text{V}$ Max. @ $I_F = 10\text{mA}$ for all types)

| Device Type | $V_{RWM}$<br>(Volts) | $I_R$ @ $V_{RWM}$<br>( $\mu\text{A}$ ) | $V_{BR}$ @ $I_T$<br>(Note 2)<br>(Volts) | $I_T$<br>(mA) | $V_C$ @ $I_{PP+} = 5\text{A}$<br>(Volts) | $I_{PP+}$<br>(A) | $V_C$ @ Max $I_{PP+}$<br>(Volts) | $P_{PK+}$<br>(W) | C @<br>$V_R = 0\text{V}$ , $f = 1\text{MHz}$<br>(pF) |
|-------------|----------------------|----------------------------------------|-----------------------------------------|---------------|------------------------------------------|------------------|----------------------------------|------------------|------------------------------------------------------|
|             | Max                  | Max                                    | Min                                     |               | Typ.                                     | Max              | Max                              | Max              | Typ.                                                 |
| ESD5Z3V3    | 3.3                  | 1                                      | 5.0                                     | 1.0           | 8.4                                      | 11.2             | 14.1                             | 158              | 105                                                  |
| ESD5Z5V0    | 5.0                  | 1                                      | 6.2                                     | 1.0           | 11.6                                     | 9.4              | 18.6                             | 174              | 80                                                   |
| ESD5Z7V0    | 7.0                  | 1                                      | 7.5                                     | 1.0           | 13.5                                     | 8.8              | 22.7                             | 200              | 65                                                   |

+ Surge current waveform per Figure 1.

Note 2:  $V_{BR}$  is measured with a pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .

**SURGE CURRENT WAVEFORM:**

**Figure 1. 8 x 20 μs Pulse Waveform**
**Flat Lead SOD-523 Package Outline**


**Note:** Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

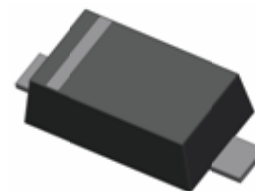
## SOD-523 SURFACE MOUNT

### Very Small Outline Flat Lead Plastic Package

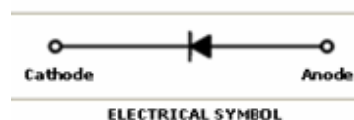
### Transient Voltage Suppressors

### ESD Protection Diodes

**Green Product**



SOD-523 Flat Lead



#### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol                 | Parameter                                              | Value               | Units |
|------------------------|--------------------------------------------------------|---------------------|-------|
| <b>V<sub>pp</sub></b>  | IEC61000-4-2(ESD) Air Contact                          | $\pm 15$<br>$\pm 8$ | KV    |
| <b>ESD</b>             | Per Human Body Model                                   | 16                  | KV    |
| <b>P<sub>D</sub></b>   | Power Dissipation (Note 1)                             | 150                 | mW    |
| <b>T<sub>STG</sub></b> | Storage Temperature Range                              | -55 to +150         | °C    |
| <b>T<sub>J</sub></b>   | Operating Junction Temperature                         | +150                | °C    |
| <b>T<sub>L</sub></b>   | Max Lead Solder Temperature range (10 Second Duration) | 260                 | °C    |

These ratings are limiting values above which the serviceability of the diode may be impaired.

Note 1. FR-5 = 1.0 x 0.75 x 0.62 in.

#### Specification Features:

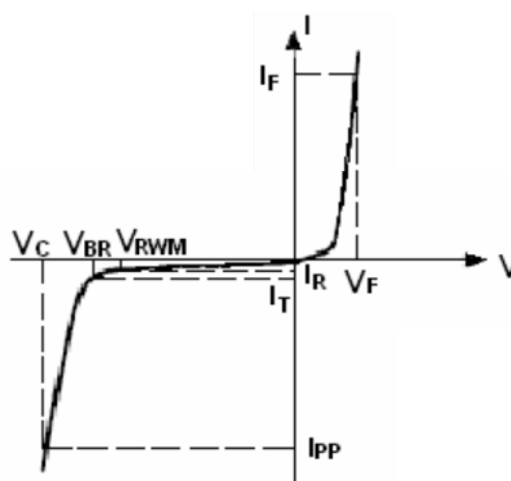
- Stand-off Voltage: 12V
- Low Leakage
- Response Time is Typically < 1ns
- IEC61000-4-2 Level 4 ESD Protection
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish
- Band Indicates Cathode

#### DEVICE MARKING CODES:

| Device Type | Device Marking |
|-------------|----------------|
| ESD5Z12V    | ZM             |

#### Electrical Parameters

| Symbol                 | Parameter                                          |
|------------------------|----------------------------------------------------|
| <b>I<sub>PP</sub></b>  | Maximum Reverse Peak Pulse Current                 |
| <b>V<sub>C</sub></b>   | Clamping Voltage @ I <sub>PP</sub>                 |
| <b>V<sub>RWM</sub></b> | Working Peak Reverse Voltage                       |
| <b>I<sub>R</sub></b>   | Maximum Reverse Leakage Current @ V <sub>RWM</sub> |
| <b>I<sub>T</sub></b>   | Test Current                                       |
| <b>V<sub>BR</sub></b>  | Breakdown Voltage @ I <sub>T</sub>                 |
| <b>I<sub>F</sub></b>   | Forward Current                                    |
| <b>V<sub>F</sub></b>   | Forward Voltage @ I <sub>F</sub>                   |



**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 0.9\text{V}$  Max. @  $I_F = 10\text{mA}$  for all types)

| Device Type | $V_{RWM}$<br>(Volts) | $I_R$ @ $V_{RWM}$<br>( $\mu\text{A}$ ) | $V_{BR}$ @ $I_T$<br>(Note 2)<br>(Volts) | $I_T$<br>(mA) | $I_{PP+}$<br>(A) | $V_C$ @ Max $I_{PP+}$<br>(Volts) | $P_{PK+}$<br>(W) | C @<br>$V_R = 0\text{V}$ , $f = 1\text{MHz}$<br>(pF) |
|-------------|----------------------|----------------------------------------|-----------------------------------------|---------------|------------------|----------------------------------|------------------|------------------------------------------------------|
|             | Max                  | Max                                    | Min                                     |               | Max              | Max                              | Max              | Typ.                                                 |
| ESD5Z12V    | 12                   | 1                                      | 13.5                                    | 1.0           | 5                | 30                               | 95               | 55                                                   |

+ Surge current waveform per Figure 1.

Note 2:  $V_{BR}$  is measured with a pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .

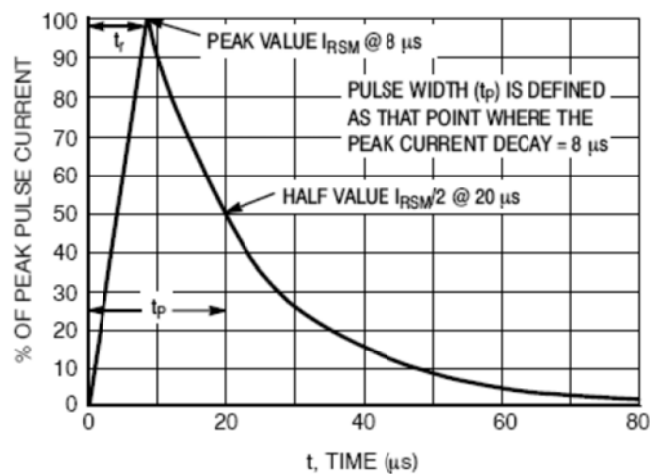
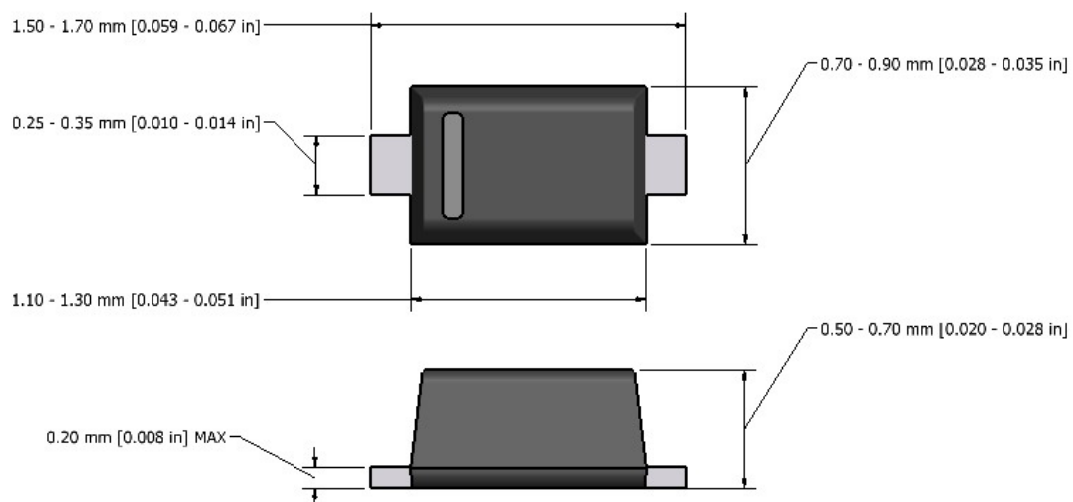
**SURGE CURRENT WAVEFORM:**


Figure 1.  $8 \times 20 \mu\text{s}$  Pulse Waveform

**Flat Lead SOD-523 Package Outline**


**Note:** Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

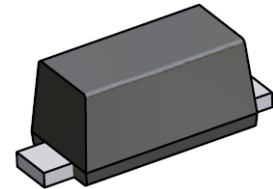
## SOD-523 SURFACE MOUNT

### Very Small Outline Flat Lead Plastic Package

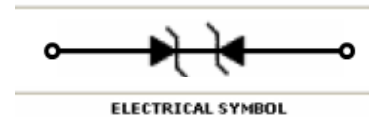
### Transient Voltage Suppressors

### ESD Protection Diodes

**Green Product**



SOD-523 Flat Lead



#### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol                 | Parameter                                              | Value               | Units |
|------------------------|--------------------------------------------------------|---------------------|-------|
| <b>V<sub>pp</sub></b>  | IEC61000-4-2(ESD) Air Contact                          | $\pm 15$<br>$\pm 8$ | KV    |
| <b>ESD</b>             | Per Human Body Model                                   | 16                  | KV    |
| <b>P<sub>D</sub></b>   | Power Dissipation (Note 1)                             | 150                 | mW    |
| <b>T<sub>STG</sub></b> | Storage Temperature Range                              | -55 to +150         | °C    |
| <b>T<sub>J</sub></b>   | Operating Junction Temperature                         | +150                | °C    |
| <b>T<sub>L</sub></b>   | Max Lead Solder Temperature range (10 Second Duration) | 260                 | °C    |

These ratings are limiting values above which the serviceability of the diode may be impaired.  
Note 1. FR-5 = 1.0 x 0.75 x 0.62 in.

#### Specification Features:

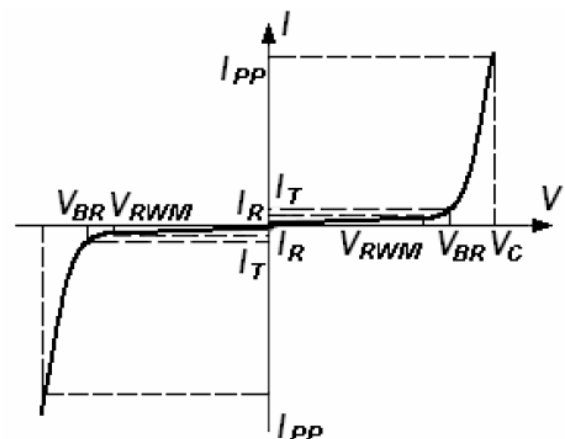
- Stand-off Voltage: 5V0
- Low Leakage
- Response Time is Typically < 1ns
- IEC61000-4-2 Level 4 ESD Protection
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish

#### DEVICE MARKING CODES:

| Device Type | Device Marking |
|-------------|----------------|
| ESD5Z5V0C   | 5C             |

#### Electrical Parameter

| Symbol                 | Parameter                                          |
|------------------------|----------------------------------------------------|
| <b>I<sub>PP</sub></b>  | Maximum Reverse Peak Pulse Current                 |
| <b>V<sub>C</sub></b>   | Clamping Voltage @ I <sub>PP</sub>                 |
| <b>V<sub>RWM</sub></b> | Working Peak Reverse Voltage                       |
| <b>I<sub>R</sub></b>   | Maximum Reverse Leakage Current @ V <sub>RWM</sub> |
| <b>I<sub>T</sub></b>   | Test Current                                       |
| <b>V<sub>BR</sub></b>  | Breakdown Voltage @ I <sub>T</sub>                 |



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

| Device Type | $V_{RWM}$<br>(Volts) | $I_R$ @ $V_{RWM}$<br>( $\mu\text{A}$ ) | $V_{BR}$ @ $I_T$<br>(Note 2)<br>(Volts) |     | $I_T$<br>(mA) | $I_{PP+}$<br>(A) | $V_C$ @ Max $I_{PP+}$<br>(Volts) | $P_{PK+}$<br>(W) | C @<br>$V_R = 0V$ , $f = 1\text{MHz}$<br>(pF) |
|-------------|----------------------|----------------------------------------|-----------------------------------------|-----|---------------|------------------|----------------------------------|------------------|-----------------------------------------------|
|             | Max                  | Max                                    | Min                                     | Max |               | Max              | Max                              | Max              | Typ.                                          |
| ESD5Z5V0C   | 5.0                  | 1                                      | 5.6                                     | 7.8 | 1.0           | 4                | 12                               | 48               | 15                                            |

+ Surge current waveform per Figure 1.

Note 2:  $V_{BR}$  is measured with a pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .

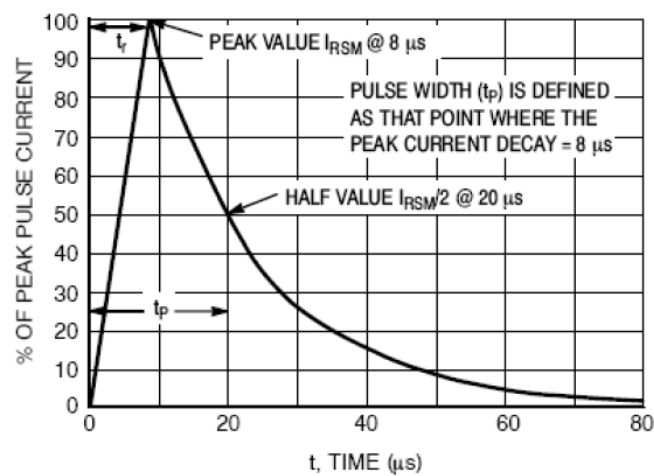
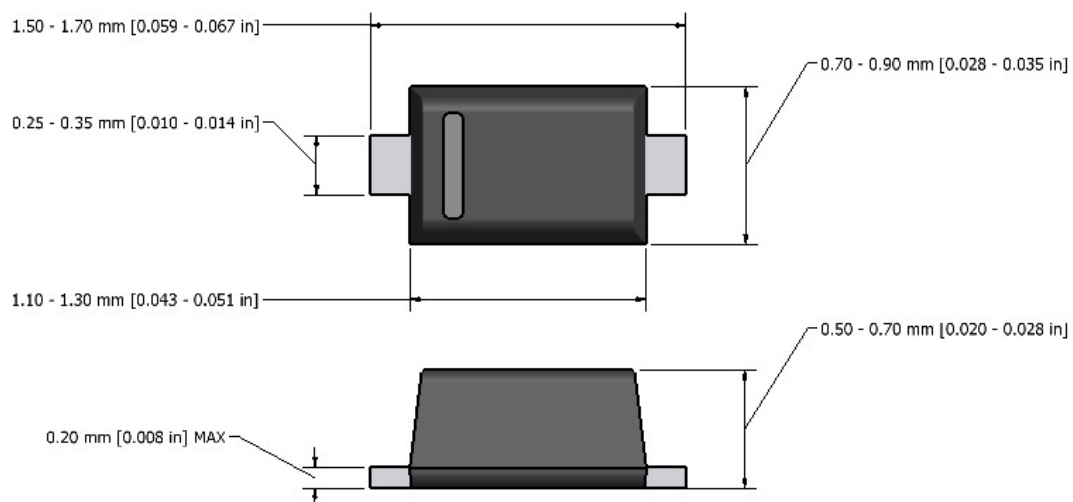
**SURGE CURRENT WAVEFORM:**


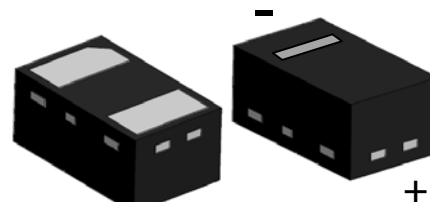
Figure 1. 8 x 20  $\mu\text{s}$  Pulse Waveform

**Flat Lead SOD-523 Package Outline**


**Note:** Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

## SOD882 Plastic Package Transient Voltage Suppressors ESD Protection Diode

**Green Product**



SOD882 Package



### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol    | Parameter                                                 | Value               | Units            |
|-----------|-----------------------------------------------------------|---------------------|------------------|
| PD        | Total Power Dissipation on FR-5 Board                     | 150                 | mW               |
| $T_L$     | Max Lead Solder Temperature range<br>(10 Second Duration) | 260                 | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature Range                                 | -55 to +150         | $^\circ\text{C}$ |
| $T_J$     | Junction Temperature                                      | +150                | $^\circ\text{C}$ |
| ESD       | IEC61000-4-2 Air Discharge<br>Contact Discharge           | $\pm 15$<br>$\pm 8$ | KV               |
| EFT       | IEC61000-4-4                                              | 40                  | A                |
| ESD       | Per Human Body Model                                      | 16                  | KV               |

These ratings are limiting values above which the serviceability of the diode may be impaired.

### Specification Features:

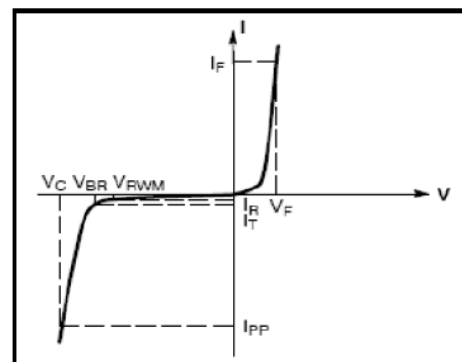
- Ultra Low Capacitance <0.9pF
- Low Clamping Voltage
- Small Body Outline Dimensions
- Low Leakage Current
- Response Time is Typically < 1ns
- ESD Rating of Class 3 (>16kV) per Human Body Model
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish
- Band Indicates Cathode
- Weight: approx. 0.001g

### DEVICE MARKING CODES:

| Device Type | Marking | Shipping           |
|-------------|---------|--------------------|
| ESD8LL5V0   | L       | 10,000/Tape & Reel |

### Electrical Parameter:

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $I_{PP}$  | Peak Pulse Current                  |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{RWM}$ | Reverse Standoff Voltage            |
| $V_F$     | Forward Voltage @ $I_F$             |
| $I_F$     | Forward Current                     |



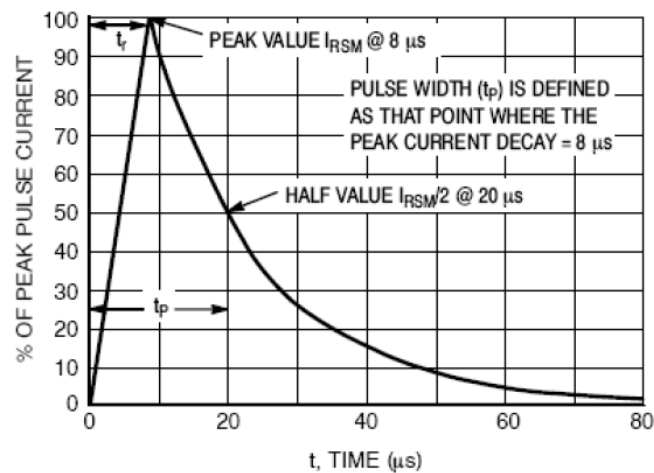
V-I characteristics for a uni-directional TVS

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

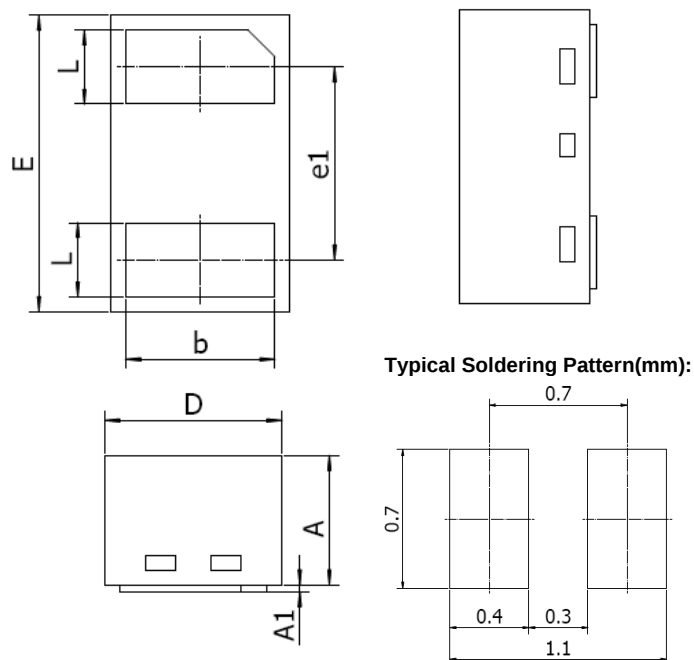
| Device Type | $V_{RWM}$<br>(Volts) | $I_R @ V_{RWM}$<br>( $\mu\text{A}$ ) | $V_{BR} @ I_T$<br>(Note 1)<br>(Volts) |     | $I_T$<br>(mA) | $V_C @ I_{PP}^* = 1\text{A}$<br>(Volts) | $V_C @ \text{Max } I_{PP}^*$ | $I_{PP}^*$<br>(A) | C @<br>$V_R = 0\text{V}, f = 1\text{MHz}$<br>(pF) |
|-------------|----------------------|--------------------------------------|---------------------------------------|-----|---------------|-----------------------------------------|------------------------------|-------------------|---------------------------------------------------|
|             | Max                  | Max                                  | Min                                   | Max |               | Typ.                                    | Max                          | Max               | Max                                               |
| ESD8LL5V0   | 5.0                  | 1                                    | 5.4                                   | --- | 1.0           | 1.8                                     | 20                           | 4                 | 0.65                                              |

\* Surge current waveform per Figure 1.

Note 1:  $V_{BR}$  is measured with a pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .

**SURGE CURRENT WAVEFORM:**


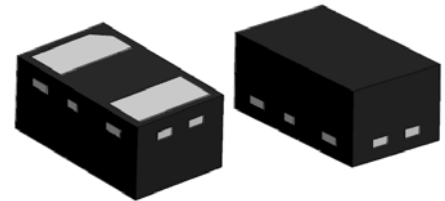
**Figure 1. 8 x 20  $\mu\text{s}$  Pulse Waveform**

**SOD882 Package Outline**


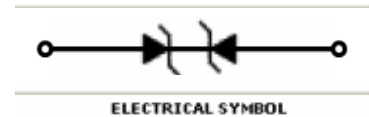
| DIM | MILLIMETERS |      | INCHES     |       |
|-----|-------------|------|------------|-------|
|     | MIN         | MAX  | MIN        | MAX   |
| A   | 0.46        | 0.50 | 0.018      | 0.020 |
| A1  | ---         | 0.03 | ---        | 0.001 |
| b   | 0.45        | 0.55 | 0.018      | 0.022 |
| D   | 0.55        | 0.65 | 0.022      | 0.026 |
| E   | 0.95        | 1.05 | 0.037      | 0.041 |
| e1  | Typ. 0.65   |      | Typ. 0.026 |       |
| L   | 0.20        | 0.30 | 0.008      | 0.012 |

## SOD882 Plastic Package Transient Voltage Suppressors ESD Protection Diode

**Green Product**



SOD882 Package



### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol    | Parameter                                                 | Value               | Units            |
|-----------|-----------------------------------------------------------|---------------------|------------------|
| PD        | Total Power Dissipation on FR-5 Broad                     | 150                 | mW               |
| $T_L$     | Max Lead Solder Temperature range<br>(10 Second Duration) | 260                 | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature Range                                 | -55 to +150         | $^\circ\text{C}$ |
| $T_J$     | Junction Temperature                                      | +150                | $^\circ\text{C}$ |
| ESD       | IEC61000-4-2 Air Discharge<br>Contact Discharge           | $\pm 15$<br>$\pm 8$ | KV               |
| EFT       | IEC61000-4-4                                              | 40                  | A                |
| ESD       | Per Human Body Model                                      | 16                  | KV               |

These ratings are limiting values above which the serviceability of the diode may be impaired.

### Specification Features:

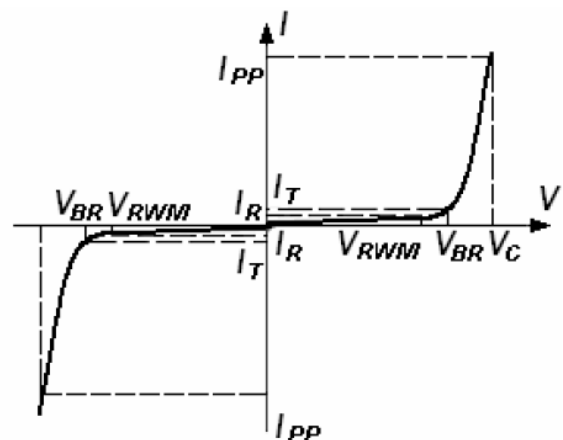
- Ultra Low Capacitance <0.9pF
- Low Clamping Voltage
- Small Body Outline Dimensions
- Low Leakage Current
- Response Time is Typically < 1ns
- ESD Rating of Class 3 (>16kV) per Human Body Model
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish
- Weight: approx. 0.001g

### DEVICE MARKING CODES:

| Device Type | Marking | Shipping           |
|-------------|---------|--------------------|
| ESD8L5V0C   | N       | 10,000/Tape & Reel |

### Electrical Parameter

| Symbol    | Parameter                                   |
|-----------|---------------------------------------------|
| $I_{PP}$  | Maximum Reverse Peak Pulse Current          |
| $V_C$     | Clamping Voltage @ $I_{PP}$                 |
| $V_{RWM}$ | Working Peak Reverse Voltage                |
| $I_R$     | Maximum Reverse Leakage Current @ $V_{RWM}$ |
| $I_T$     | Test Current                                |
| $V_{BR}$  | Breakdown Voltage @ $I_T$                   |

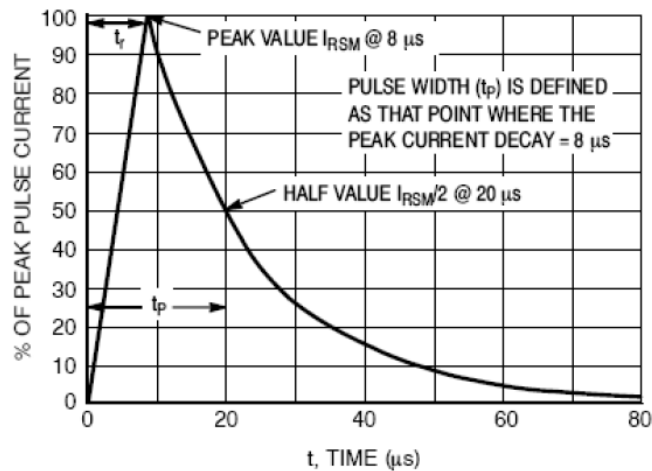


**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

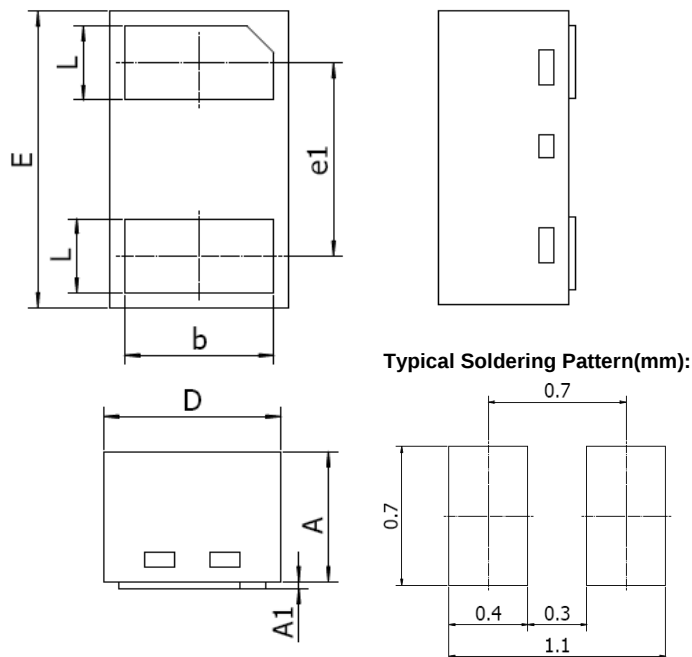
| Device Type | $V_{RWM}$<br>(Volts) | $I_R @ V_{RWM}$<br>( $\mu\text{A}$ ) | $V_{BR} @ I_T$<br>(Note 1)<br>(Volts) |     | $I_T$<br>(mA) | $V_C @ \text{Max } I_{PP}$<br>(Volts) | $I_{PP}^*$<br>(A) | C @<br>$V_R = 0V, f = 1\text{MHz}$<br>(pF) |
|-------------|----------------------|--------------------------------------|---------------------------------------|-----|---------------|---------------------------------------|-------------------|--------------------------------------------|
|             | Max                  | Max                                  | Min                                   | Max |               | Max                                   | Max               | Max                                        |
| ESD8L5V0C   | 5.0                  | 1                                    | 5.4                                   | --- | 1.0           | 12.9                                  | 1                 | 0.9                                        |

\* Surge current waveform per Figure 1.

Note 1:  $V_{BR}$  is measured with a pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .

**SURGE CURRENT WAVEFORM:**


**Figure 1. 8 x 20  $\mu\text{s}$  Pulse Waveform**

**SOD882 Package Outline**


| DIM | MILLIMETERS |      | INCHES     |       |
|-----|-------------|------|------------|-------|
|     | MIN         | MAX  | MIN        | MAX   |
| A   | 0.46        | 0.50 | 0.018      | 0.020 |
| A1  | ---         | 0.03 | ---        | 0.001 |
| b   | 0.45        | 0.55 | 0.018      | 0.022 |
| D   | 0.55        | 0.65 | 0.022      | 0.026 |
| E   | 0.95        | 1.05 | 0.037      | 0.041 |
| e1  | Typ. 0.65   |      | Typ. 0.026 |       |
| L   | 0.20        | 0.30 | 0.008      | 0.012 |