

**ULTRA LOW CAPACITANCE ESD PROTECTION COMPONENT****DESCRIPTION**

The P0603V24 is an ultra low capacitance ESD component designed to protect very high-speed data interfaces. The device has a typical capacitance of only 0.05pF (I/O to GND) and is compatible with the ESD immunity requirements of IEC61000-4-2.

**FEATURES**

- Compatible with IEC 61000-4-2 (ESD): Air 15kV, Contact 8kV
- Low Leakage Current: 0.10μA
- Fast Response Time
- Protects One Bidirectional Line
- Ultra Low Capacitance: 0.05 pF (Typical)
- RoHS Compliant
- REACH Compliant

**APPLICATIONS**

- HDMI
- DVI
- Display Port
- Unified Display Interface (UDI)
- Mobile Display Digital Interface (MDDI)
- Gigabit Ethernet
- USB2.0 & USB3.0
- IEEE 1394 Interface

**MECHANICAL CHARACTERISTICS**

- 0603 Package
- Approximate Weight: 0.44 milligrams
- Lead-Free Plating
- Solder Reflow Temperature:
  - Lead-Free - Sn/Ag/Cu, 96/3.5/0.5: 260-270°C
- 8mm Tape and Reel Per EIA Standard 481
- Flammability Rating UL 94V-0

**PIN CONFIGURATION**

## TYPICAL DEVICE CHARACTERISTICS

### MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

| PARAMETER                | SYMBOL    | VALUE      | UNITS |
|--------------------------|-----------|------------|-------|
| Operating Temperature    | $T_A$     | -40 to 90  | °C    |
| Storage Temperature      | $T_{STG}$ | -55 to 125 | °C    |
| Solder Temperature - 10s | $T_L$     | 260        | °C    |

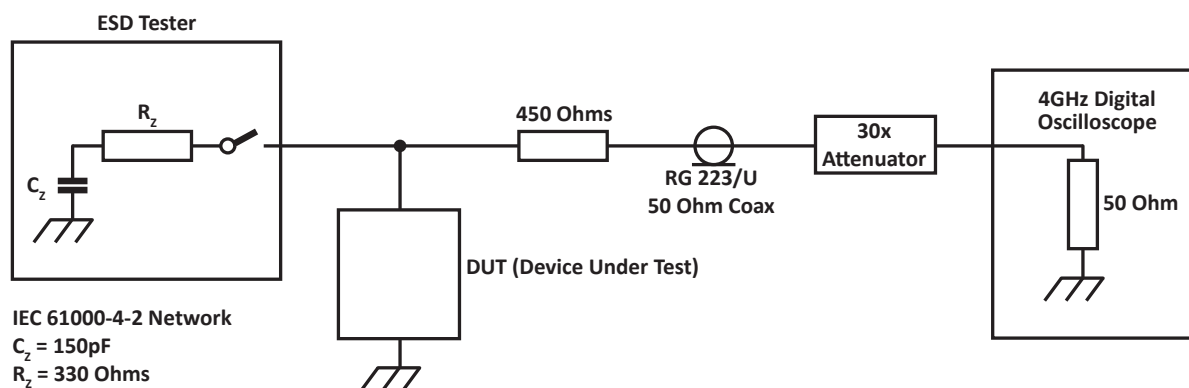
### ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER | RATED STAND-OFF VOLTAGE<br><br>$V_{WM}$<br>VOLTS | TYPICAL TRIGGER VOLTAGE (Note 1)<br><br>$V_T$<br>VOLTS | TYPICAL CLAMPING VOLTAGE (Note 1)<br><br>$V_C$<br>VOLTS | MAXIMUM LEAKAGE CURRENT (Note 2)<br><br>@ $V_{WM}$<br>$I_D$<br>$\mu A$ | TYPICAL CAPACITANCE<br><br>@ 0V, 1MHz<br>$C_I$<br>pF |
|-------------|--------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------|
| P0603V24    | 24.0                                             | 350                                                    | 35.0                                                    | 0.10                                                                   | 0.05                                                 |

#### NOTES

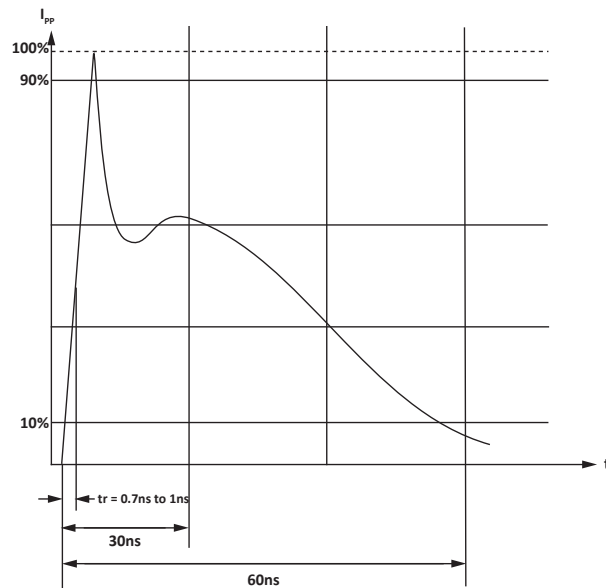
1. Trigger and Clamping Voltage are measured per IEC 61000-4-2, 8kV contact discharge method.
2. After reliability tests such as high temperature storage, temp cycle, continuous ESD strikes, the maximum leakage current is less than 10 $\mu A$ .

**FIGURE 1**  
**ESD CLAMPING TEST**

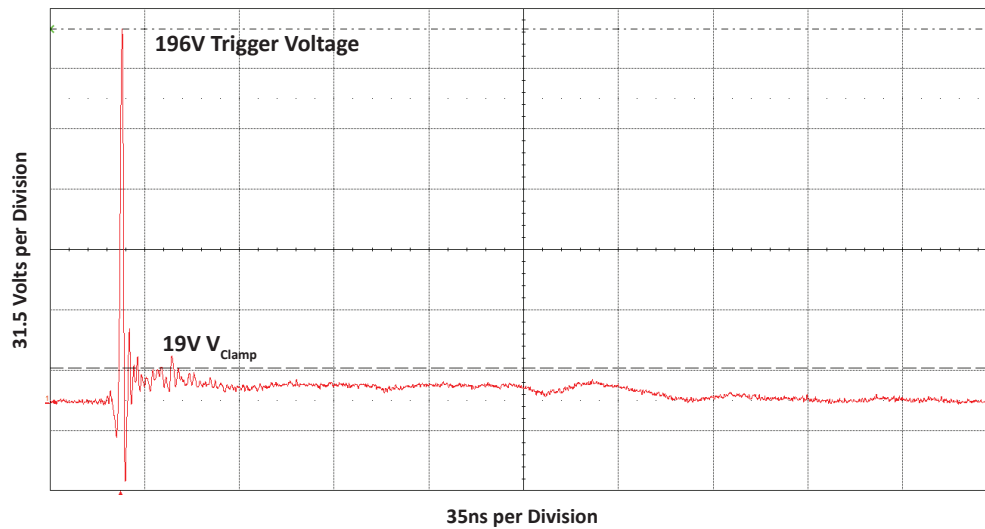


## TYPICAL DEVICE CHARACTERISTICS

**FIGURE 2**  
**TYPICAL ESD WAVEFORM**

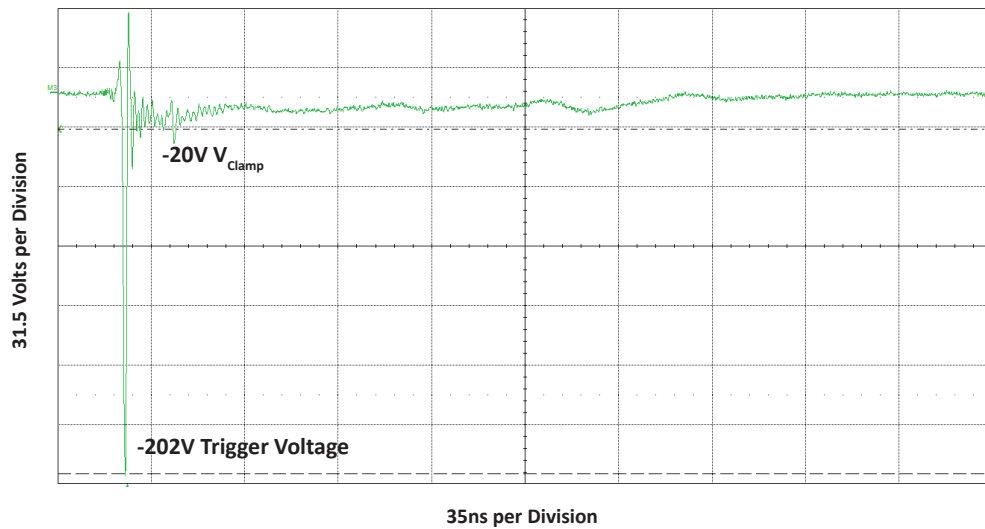


**FIGURE 3**  
**8kV POSITIVE CLAMPING WAVEFORM**



**TYPICAL DEVICE CHARACTERISTICS**

**FIGURE 3**  
**8kV NEGATIVE CLAMPING WAVEFORM**



## SOLDER REFLOW INFORMATION

| PRINTED CIRCUIT BOARD RECOMMENDATIONS                         |                              |
|---------------------------------------------------------------|------------------------------|
| PARAMETER                                                     | VALUE                        |
| Pad Size on PCB                                               | 0.275mm                      |
| Pad Shape                                                     | Rectangular                  |
| Pad Definition                                                | Non-Solder Mask Defined Pads |
| Solder Mask Opening                                           | 0.325mm                      |
| Solder Stencil Thickness                                      | 0.150mm                      |
| Solder Stencil Aperture Opening (Laser cut, 5% tapered walls) | 0.330mm                      |
| Solder Paste Type                                             | No Clean                     |
| Pad Protective Finish                                         | OSP (Entek Cu Plus 106A)     |
| Tolerance - Edge To Corner Ball                               | ±50µm                        |
| Solder Ball Side Coplanarity                                  | ±20µm                        |
| Maximum Dwell Time Above Liquidous (183°C)                    | 60 seconds                   |
| Soldering Maximum Temperature                                 | 270°C                        |

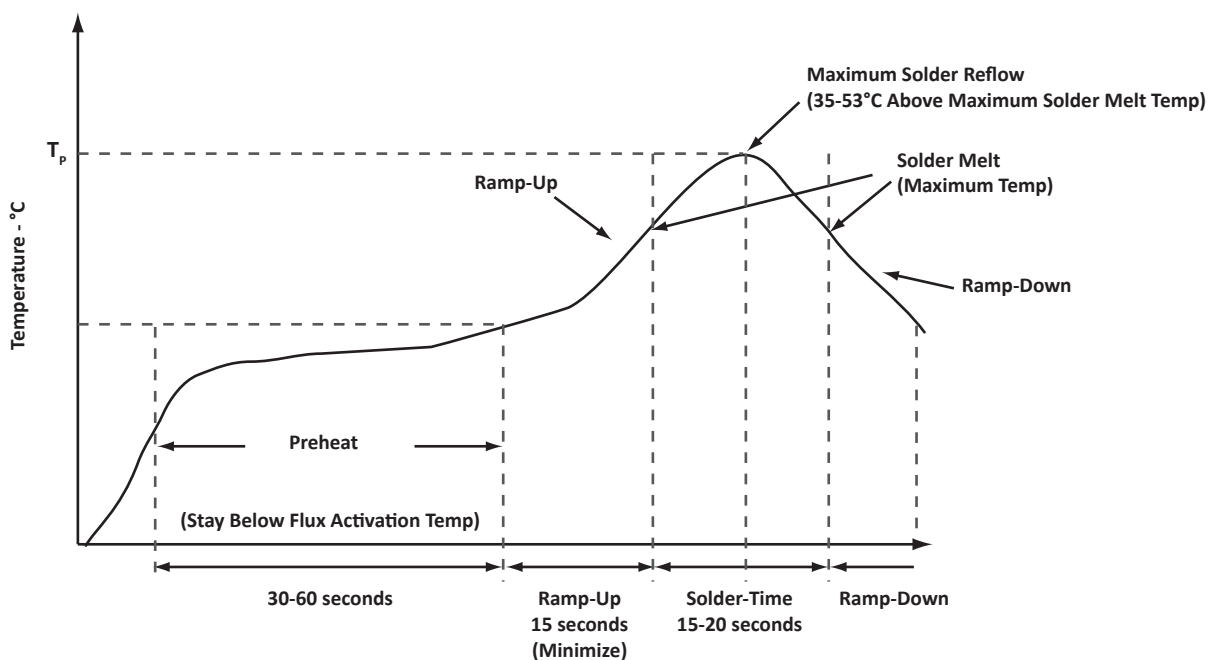
### REQUIREMENTS

Temperature:

$T_p$  for Lead-Free (Sn/Ag/Cu): 260-270°C

$T_p$  for Tin-Lead: 240-245°C

Preheat time and temperature depends on solder paste and flux activation temperature, component size, weight, surface area and plating.

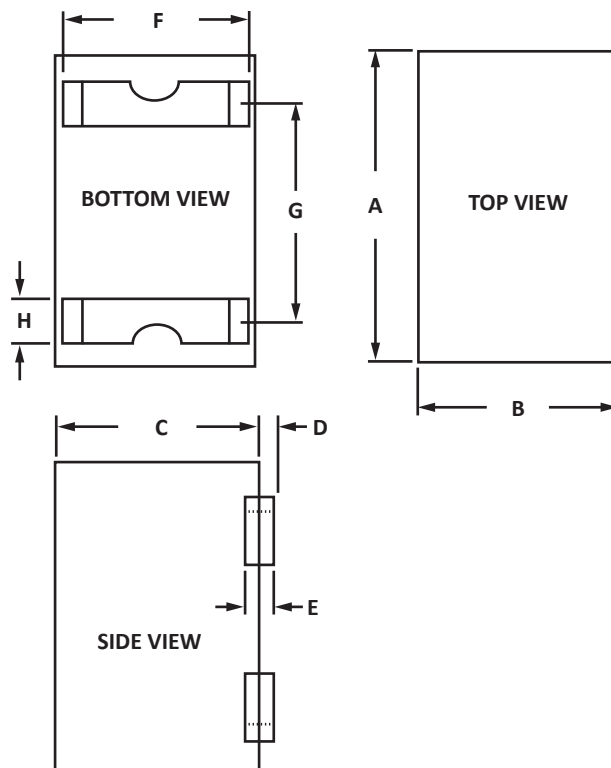


**0603 PACKAGE INFORMATION**
**OUTLINE DIMENSIONS**

| DIM | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 1.45        | 1.75 | 0.057     | 0.079 |
| B   | 0.70        | 0.95 | 0.028     | 0.037 |
| C   | 0.43        | 0.63 | 0.017     | 0.025 |
| D   | 0.00        | 0.05 | 0.00      | 0.002 |
| E   | 0.125 REF   |      | 0.005 REF |       |
| F   | 0.70        | 0.80 | 0.028     | 0.031 |
| G   | 1.30 BSC    |      | 0.051 BSC |       |
| H   | 0.45        | 0.55 | 0.018     | 0.022 |

**NOTES**

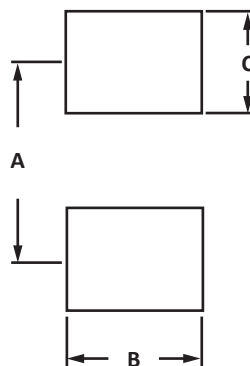
1. Controlling dimension: millimeters.


**PAD LAYOUT DIMENSIONS**

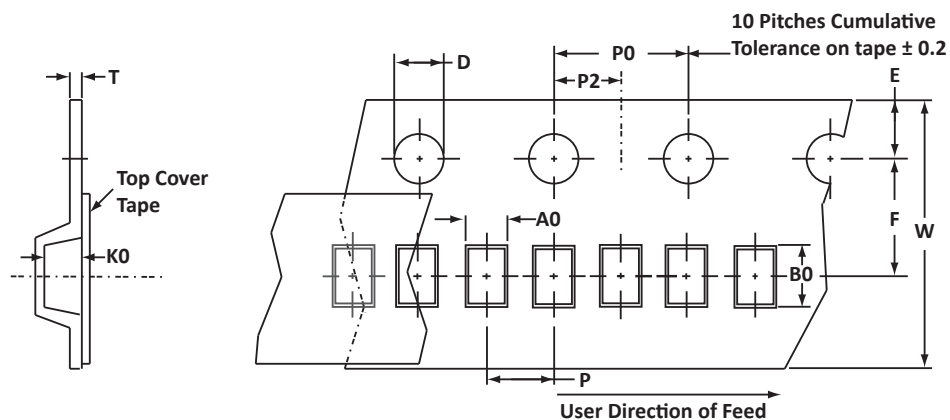
| DIM | MILLIMETERS | INCHES |
|-----|-------------|--------|
|     | NOM         | NOM    |
| A   | 1.35        | 0.053  |
| B   | 0.95        | 0.037  |
| C   | 0.65        | 0.026  |

**NOTES**

1. Controlling dimension: millimeters



## TAPE AND REEL



### SPECIFICATIONS

| REEL DIA.  | TAPE WIDTH | A0              | B0              | K0              | D               | E               | F               | W               | P0              | P2              | P               | tmax |
|------------|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|
| 178mm (7") | 8mm        | $1.10 \pm 0.05$ | $1.90 \pm 0.10$ | $0.70 \pm 0.05$ | $1.55 \pm 0.10$ | $1.75 \pm 0.10$ | $3.50 \pm 0.05$ | $8.00 \pm 0.30$ | $4.00 \pm 0.10$ | $2.00 \pm 0.05$ | $2.00 \pm 0.05$ | 0.25 |

#### NOTES

- Dimensions are in millimeters.
- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix - T75 = 7" Reel - 5,000 pieces per 8mm tape.

### ORDERING INFORMATION

| BASE PART NUMBER | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------|-----------------|-------------|----------|-----------|----------|
| P0603V24         | N/A             | -T75        | 5,000    | 7"        | N/A      |

This device is only available in a Lead-Free configuration.

## COMPANY INFORMATION

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### COMPANY PROFILE

In business more than 20 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electro-magnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers high performance interface and linear products. They include analog switches; multiplexers; LED drivers; LED wafer die for ESD protection; audio control ICs; RF and related high frequency products.

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