ULTRA LOW CAPACITANCE ESD PROTECTION COMPONENT

DESCRIPTION

The P0402V Series is an ultra low capacitance ESD component designed to protect very high-speed data interfaces. These devices have a typical capactiance 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 (Typical), 25kV(Max)
- Compatible with IEC 61000-4-2 (ESD): Contact 8kV (Typical), 15kV(Max)
- 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

- Molded Ceramic 0402 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

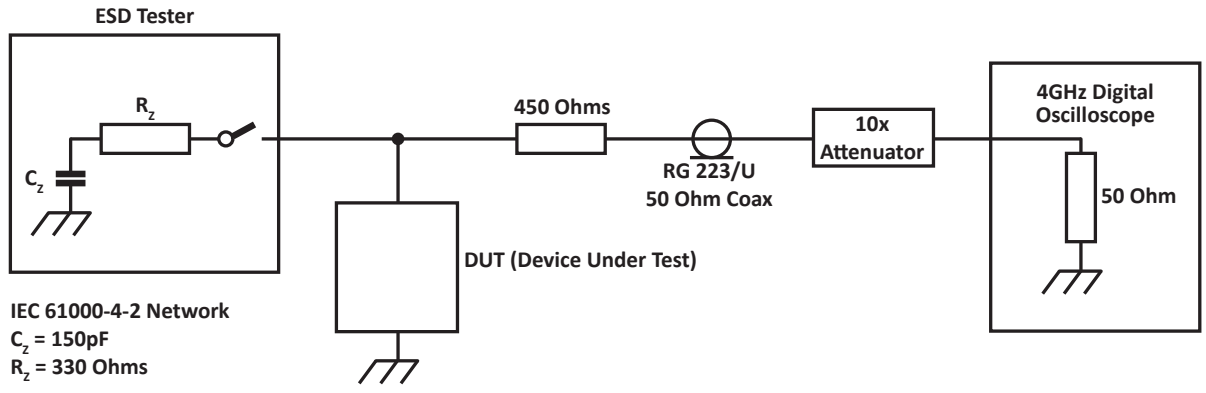
TYPICAL DEVICE CHARACTERISTICS

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 V_{WM} VOLTS	TYPICAL TRIGGER VOLTAGE (Note 1) V_T VOLTS	TYPICAL CLAMPING VOLTAGE (Note 1) V_C VOLTS	MAXIMUM LEAKAGE CURRENT (Note 2) @V_{WM} I_D µA	TYPICAL CAPACITANCE @0V, 1MHz C_J pF
P0402V05	5.0	350	35.0	0.10	0.15
P0402V15	15.0	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 10µA.

FIGURE 1
ESD CLAMPING TEST



TYPICAL DEVICE CHARACTERISTICS

FIGURE 2
TYPICAL ESD WAVEFORM

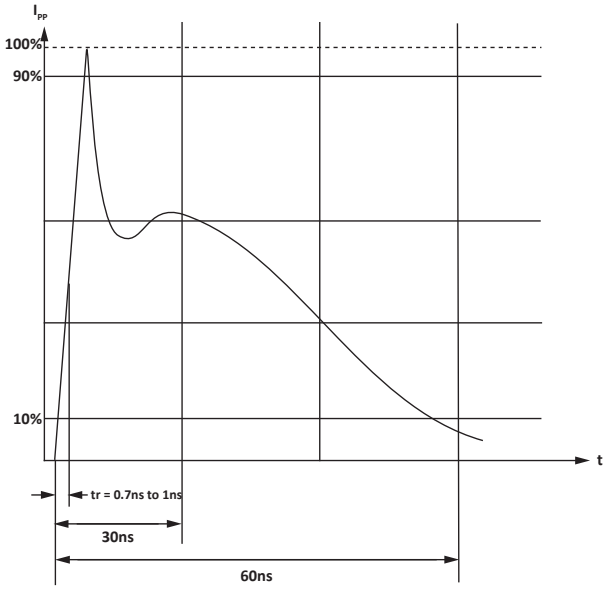
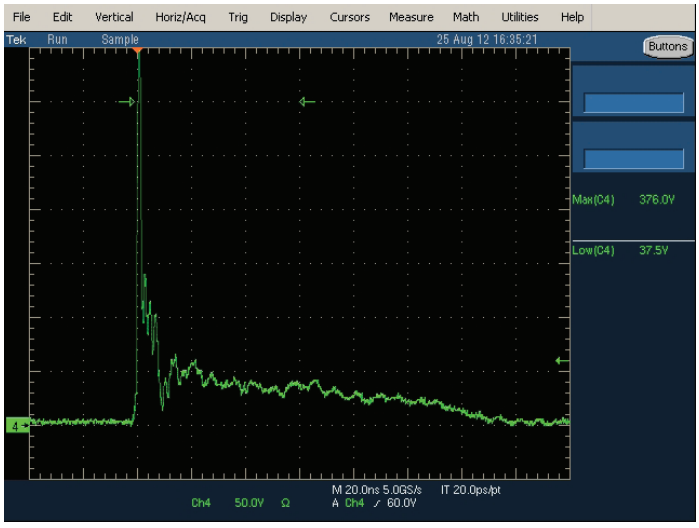
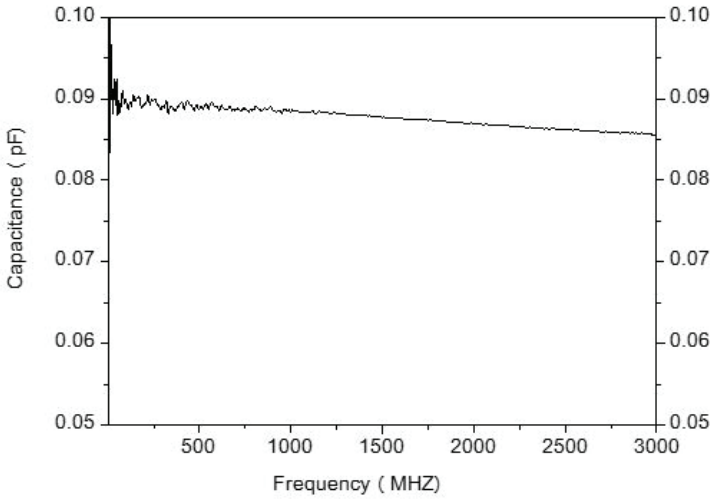


FIGURE 3
ESD WAVE AFTER CLAMPING



TYPICAL DEVICE CHARACTERISTICS

FIGURE 4
CAPACITANCE VS FREQUENCY



SOLDER REFLOW INFORMATION

PRINTED CIRCUIT BOARD RECOMMENDATIONS	
PARAMETER	**VALUE**
Pad Size on PCB	0.275mm
Pad Shape	Round
Pad Definition	Non-Solder Mask Defined Pads
Solder Mask Opening	0.325mm Round
Solder Stencil Thickness	0.150mm
Solder Stencil Aperture Opening (Laser cut, 5% tapered walls)	0.330mm Round
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

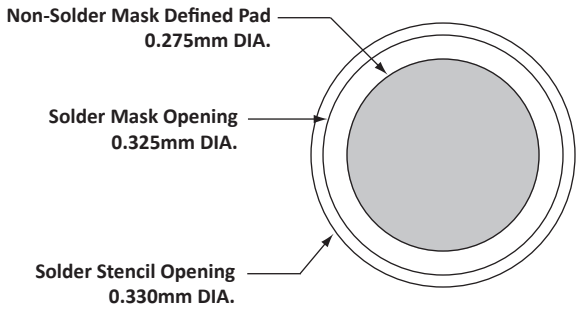
Temperature:

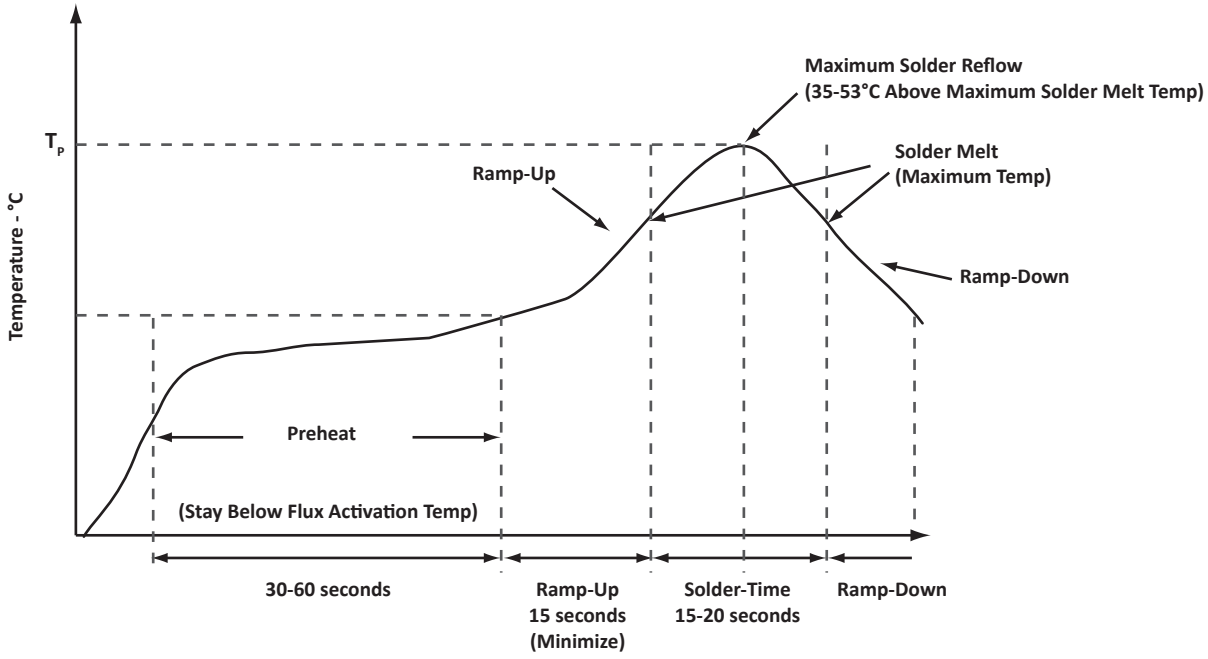
T_p for Lead-Free (Sn/Ag/Cu): 260-270°C

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.

RECOMMENDED NON-SOLDER MASK DEFINED PAD ILLUSTRATION

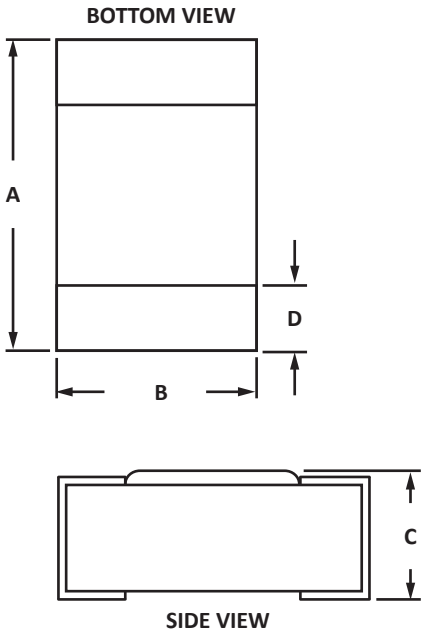




C0402 PACKAGE INFORMATION

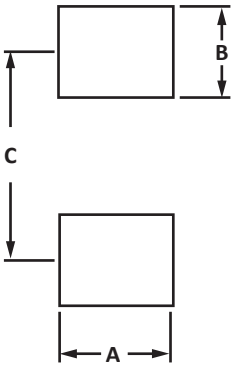
OUTLINE DIMENSIONS				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.20	0.035	0.047
B	0.45	0.65	0.018	0.026
C	0.26	0.46	0.010	0.018
D	0.15	0.35	0.006	0.014

NOTES
1. Controlling dimension: millimeters.

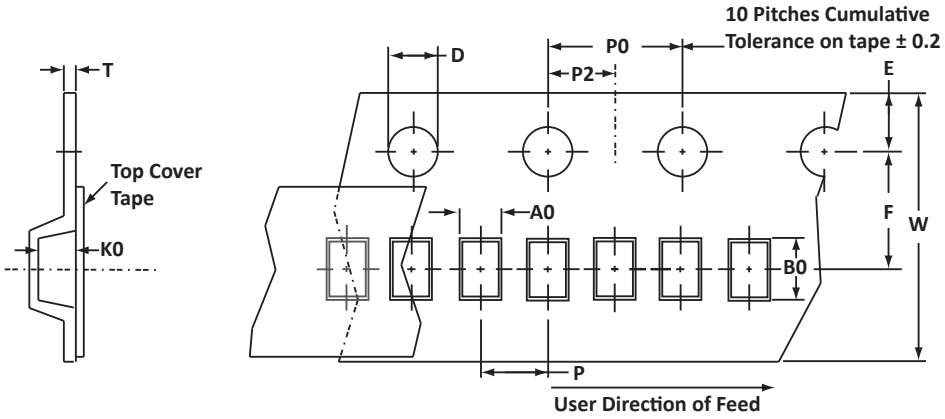


PAD LAYOUT DIMENSIONS		
DIM	MILLIMETERS	INCHES
	NOM	NOM
A	0.6	0.024
B	0.50	0.020
C	0.90	0.035

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	0.75 ± 0.05	1.22 ± 0.10	0.56 ± 0.05	1.55 ± 0.10	1.75 ± 0.10	3.50 ± 0.05	8.00 ± 0.30	4.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	0.25

NOTES
1. Dimensions are in millimeters.
2. Surface mount product is taped and reeled in accordance with EIA-481.
3. Suffix - T710 = 7" Reel - 10,000 pieces per 8mm tape.

ORDERING INFORMATION					
BASE PART NUMBER	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
P0402Vxx	N/A	-T710	10,000	7"	N/A
This device is only available in a Lead-Free configuration.					

COMPANY INFORMATION

COMPANY PROFILE

In business more than 25 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 electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers LED wafer die for ESD protection and related high frequency products. ProTek Devices is ISO 9001:2015 certified.

CONTACT US

Corporate Headquarters
2929 South Fair Lane
Tempe, Arizona 85282
USA

By Telephone
General: 602-431-8101
Sales: & Marketing: 602-414-5109
Customer Service: 602-414-5114
Product Technical Support: 602-414-5107

By Fax
General: 602-431-2288

By E-mail:
Asia Sales: asiasales@protekdevices.com
Europe Sales: europesales@protekdevices.com
U.S. Sales: ussales@protekdevices.com
Distributor Sales: distysales@protekdevices.com
Customer Service: service@protekdevices.com
Technical Support: support@protekdevices.com

ProTek Devices (Asia Pacific) Pte. Ltd.
8 Ubi Road 2, #06-19
Zervex
Singapore - 408538
Tel: +65-67488312
Fax: +65-67488313

Web
www.protekdevices.com