Ultal Low Capacitance ESD Protection Diode in 0603

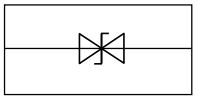
Feature

- ESD protection for high speed data lines to IEC61000-4-2
- ESD contact discharge , max 30KV
- ESD air discharge , max 30KV
- Surface mount
- Extremely low capacitance, 0.05pF typical
- Very low leakage current
- Low-clamping voltage
- Fast response time (< 1ns)
- Bi-directional ESD protection
- Lead free solder termination
- The best ESD protection for high frequency, low voltage applications
- AEC-Q200 Compliant

Description

This device is an ultra low capacitance ESD product Designed to protect very high speed data interfaces. **KPESD2463U005Q-V** has a typical capacitance of only 0.05pF and it can be used to meet the ESD immunity requirements of IEC61000-4-2 (30KV air, 30KV contact discharge).

0603



Schematic Diagram

Application

- High Definition Multi-Media Interface (HDMI)
- Digital Visual Interface (DVI)
- Unified Display Interface (UDI)
- Mobile Display Digital Interface (MDDI)
- HDTV Hardware
- USB4.0
- Computer Peripherals
- Network Hardware
- Digital Camera

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Maximum Contact discharge voltage Per IEC61000-4-2	---	30KV	V
Maximum Air discharge voltage Per IEC61000-4-2	---	30KV	V
Maximum Operating temperature	T_{OPER}	-55 to +125	℃
Maximum Storage temperature	T_{STG}	-55 to +150	℃
Maximum lead temperature for soldering during 10s	T_L	260	℃

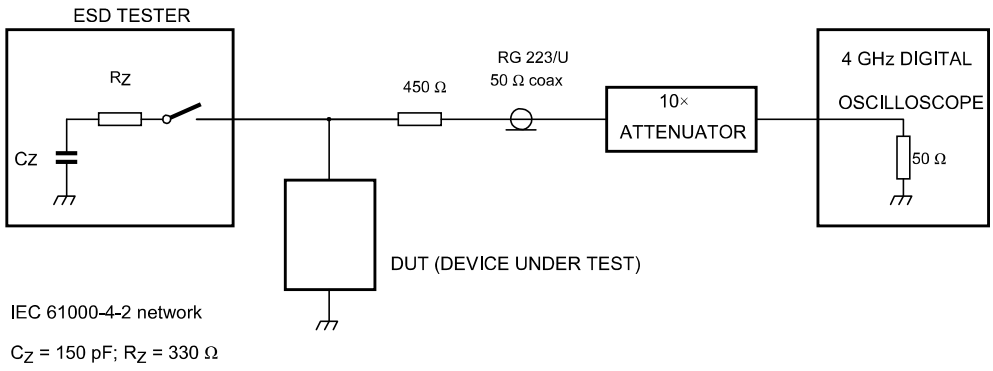
Electrical Characteristics

(T_A = 25 °C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Rated Voltage	V_R	---			24	V
Trigger voltage	V_T	IEC61000-4-2 8KV contact discharge		400		V
Clamping voltage	V_C	IEC61000-4-2 8KV contact discharge		30		V
Leakage current	I_L	DC 24V shall be applied on component			0.10	uA
Capacitance	C_P	V_R = 0V, f = 1MHz		0.05	0.08	pF

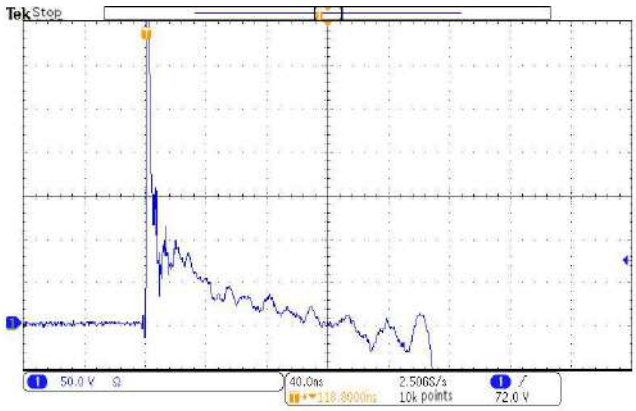
Note: ＊1 The ESD clamping voltage was measured by ISO 10605 (ESD) ±25KV.
＊2 The leakage current was measured at V_{DC}.
＊3 The maximum ESD clamping voltage at 30ns can be within 100V.
＊4 The components shall be employed within 1 year, in the nitrogen condition.

ESD Clamping Test

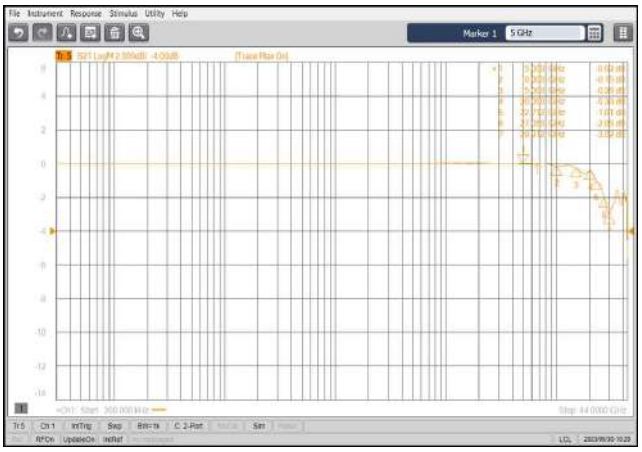


Rating and Characteristic Curves

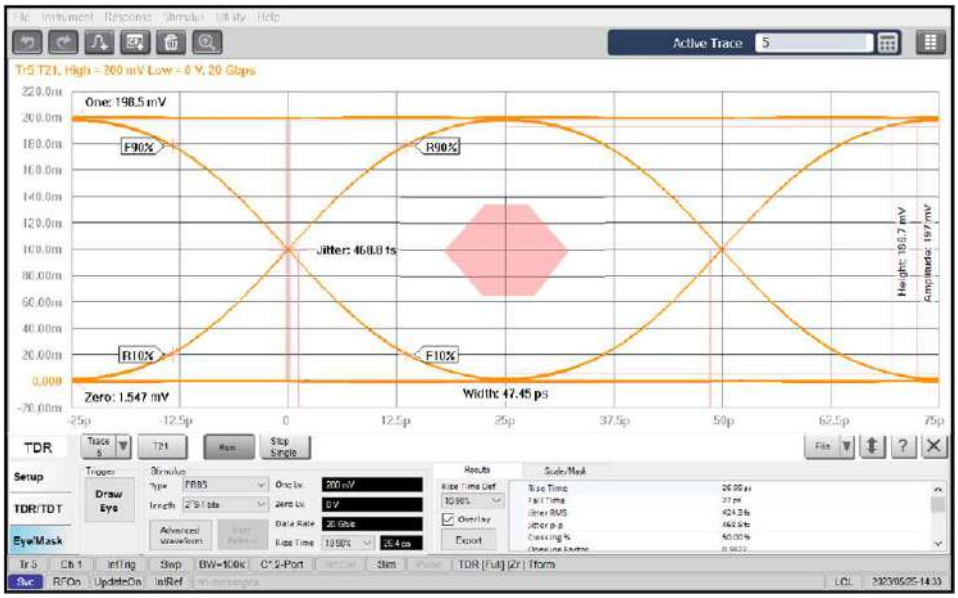
ESD 8KV Clamping



Insertion Loss

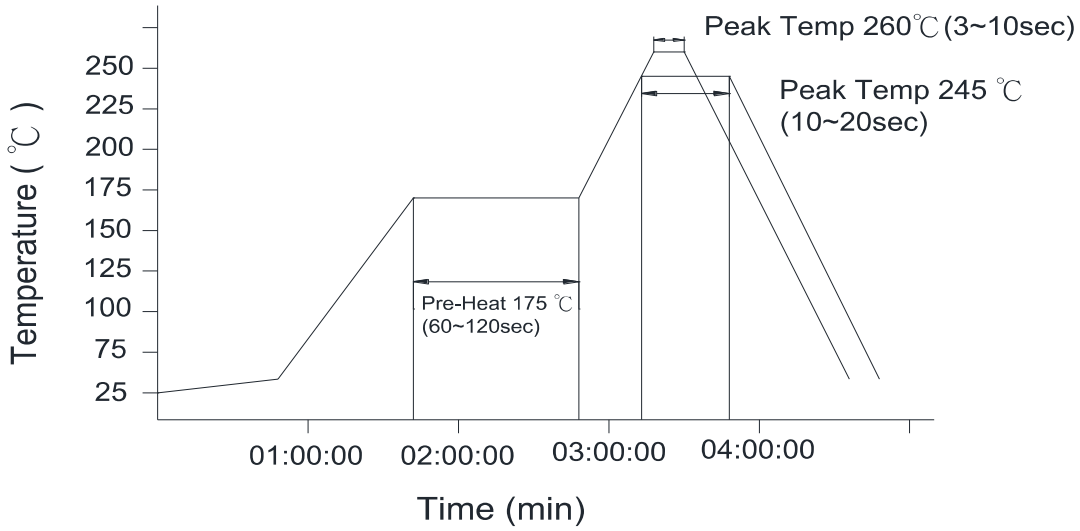


Eye Pattern (20Gbps)



Soldering Recommendations

1. The IR reflow and temperature of soldering for Pb free process



☆ **IR reflow Pb free process suggestion profile**

(1) The solder recommend is Sn96.5/Ag3.5 of 80 to 130μm
(2) Ramp-up rate (217℃ to peak) +3℃/second max.
(3) Temp. maintain at 175±25℃ 180 seconds max.
(4) Temp. maintain above 217℃ 60~150 seconds
(5) Peak temperature range 245 +20/-10℃ within 5℃ of actually peak temperature (t_p) 10~20 seconds
(6) Ramp down rate -6℃/second max.
(7) Steel plate thickness 0.08~0.1mm

2. Hand soldering

In hand soldering of the STA devices, large temperature gradient between preheated the STA devices and the tip of soldering iron may cause electrical failures and mechanical damages such as cracking or breakings of the devices. The soldering shall be carefully controlled and carried out, so that the temperature gradient is kept minimum with following recommended conditions for hand soldering.

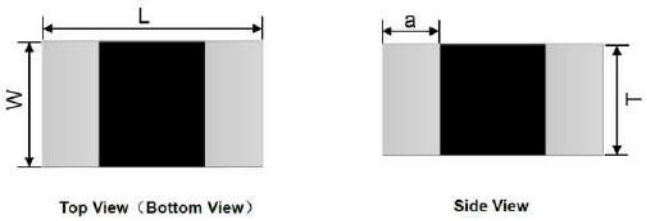
2.1 Recommended soldering condition 1 (with preheating)

(1) Solder
0.12~0.18mm thread solder (Sn96.5:Ag3.5) with soldering flux in the core rosin-based and non-activated flux is recommended.
(2) Preheating
The STA devices shall be preheated so that temperature gradient between the devices and the tip of soldering iron is 150℃ or below.
(3) Soldering iron
Rated power of 20W max. with 3mm soldering tip in diameter
Temperature of soldering iron tip **300℃ max. 3-5sec** (The required amount of solder shall be melted in advance on the soldering tip.)
(4) Cooling
After soldering, the STA devices shall be cooled gradually at room ambient temperature.

2.2 Recommended soldering condition 2 (without preheating)

(1) Temperature of soldering iron tip **300℃ max. 3-5sec**
(2) Solder iron tip shall not directly touch to STA devices.
(3) Solder iron tip shall be fully preheated before soldering while soldering iron tip to the external electrode of STA devices

Product Dimension

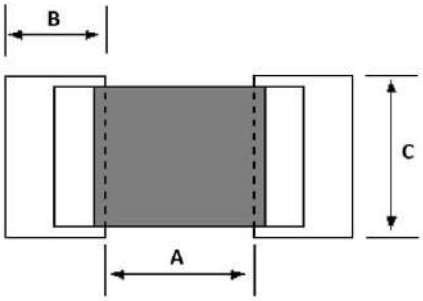


Top View（Bottom View）　　Side View

(unit : mm)

Model	0603
Length(L)	1.60±0.10
Width(W)	0.80±0.10
Thickness(T)	0.60±0.10
Termination(a)	0.30±0.10

Pad Dimensions



(Unit : mm)

	A	B	C
0603	0.9~1.2	0.9~1.2	0.8~1.0

Order Information

Order code	Package	Packaging option	Base quantity
KPESD2463U005Q-V	0603	Tape and reel	5000pcs / reel