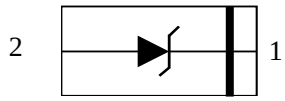
**1-Line, Uni-directional, Transient Voltage Suppressors**

## Descriptions

The ESD1V8H401TR is a uni-directional TVS (Transient Voltage Suppressor). It is specifically designed to protect sensitive electronic components that may be subjected to ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning. It is particularly well-suited for cellular phones, portable device, digital cameras, power supplies and many other portable applications because of its small package

The ESD1V8H401TR may be used to provide ESD protection up to ±30KV Air, ±30KV contact compliance to IEC61000-4-2, and withstand peak pulse current up to 60 A (8/20μs) according to IEC61000-4-5.






**DFN1610-2L**

## Features

- Stand-off voltage: 1.8V Max
- Transient protection for each line according to
  IEC61000-4-2 (ESD): ±30KV Air, ±30KV contact
  IEC61000-4-5 (Surge): 60 A (8/20μs)
- Solid-state silicon technology
- Low leakage current

## Order information

| Device | Marking | Shipping |
|---|---|---|
| ESD1V8H201TR | HT4 | 3000/Tape&Reel |

## Applications

- Cell phone handsets and accessories
- Personal Digital Assistants (PDAs)
- Notebooks, Desktops, and Serves
- Portable Instrumentation
- Digital Cameras
- CAR/MID DVD/MP3/MP4/PMP Players

## Absolute maximum ratings

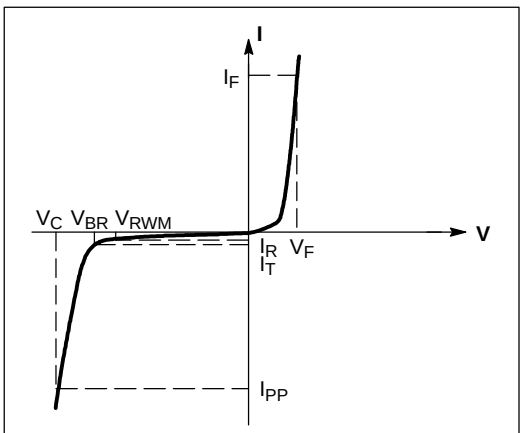
| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Peak pulse current ($t_p$ = 8/20μs) | $I_{PP}$ | 60.0 | A |
| ESD according to IEC61000-4-2 air discharge | $V_{ESD}$ | ±30 | kV |
| ESD according to IEC61000-4-2 contact discharge | | ±30 | |
| Operating temperature | $T_{OP}$ | -40~125 | °C |
| Operation junction temperature | $T_J$ | 125 | °C |
| Lead temperature | $T_L$ | 260 | °C |
| Storage temperature | $T_{STG}$ | -55~150 | °C |

## Electrical characteristics (TA=25 °C ,unless otherwise noted)

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Reverse Working Voltage | $V_{RWM}$ | | | 1.8 | V | $I_R$ =0.5μA |
| Breakdown Voltage | $V_{BR}$ (PIN 1 TO PIN 2) | 2.0 | | | V | $I_T$ = 1mA |
| Reverse Leakage Current | $I_R$ | | | 0.5 | μA | $V_R$=1.8V |
| Forward Voltage | $V_F$ (PIN 2 TO PIN 1) | | 0.7 | | V | $I_F$ = 10mA |
| Clamping Voltage | $V_C$ (PIN 1 TO PIN 2) | | 4.0 | | V | $I_{PP}$ =1A(8/20us pulse) |
| | | | 6.0 | | V | $I_{PP}$ =60A(8/20us pulse) |

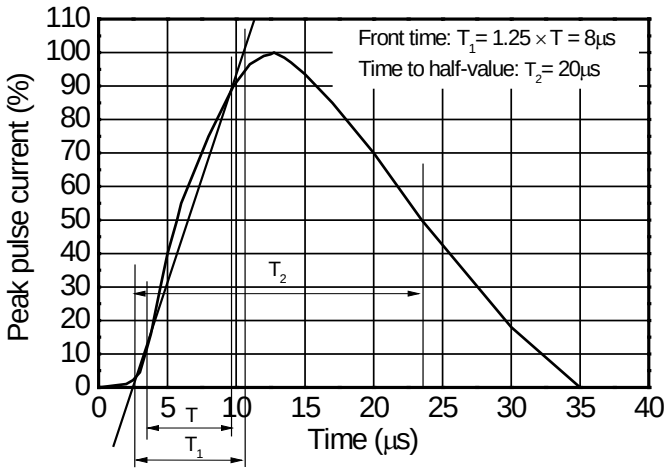
## Electrical performance curve

| Symbol | Parameter |
|---|---|
| $V_{RWM}$ | Peak Reverse Working Voltage |
| $I_R$ | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$ | Breakdown Voltage @ $I_T$ |
| $I_T$ | Test Current |
| $I_{PP}$ | Maximum Reverse Peak Pulse Current |
| $V_C$ | Clamping Voltage @ $I_{PP}$ |
| $P_{PP}$ | Peak Pulse Power |
| $C_J$ | Junction Capacitance |
| $I_F$ | Forward Current |
| $V_F$ | Forward Voltage @ $I_F$ |

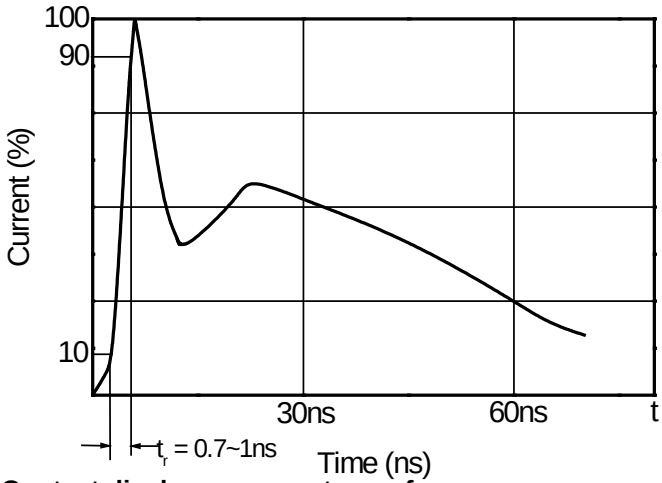



**Uni−Directional TVS**

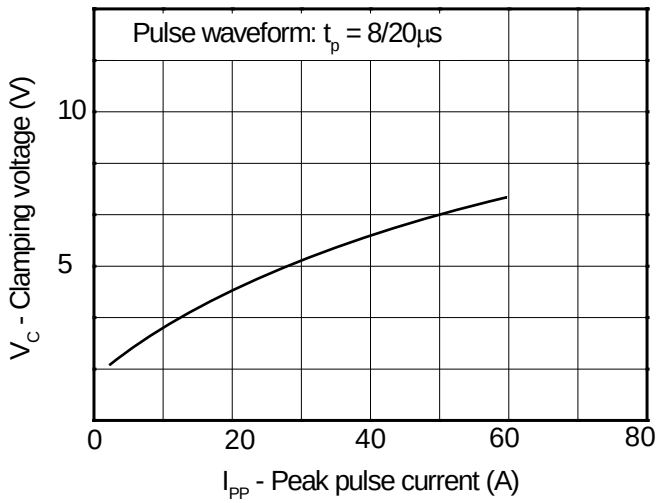
## Typical characteristics ($T_A$=25°C, unless otherwise noted)



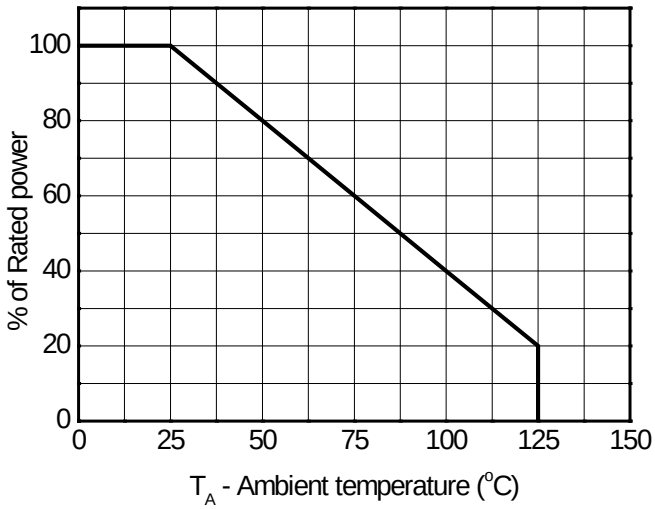

**8/20μs waveform per IEC61000-4-5**



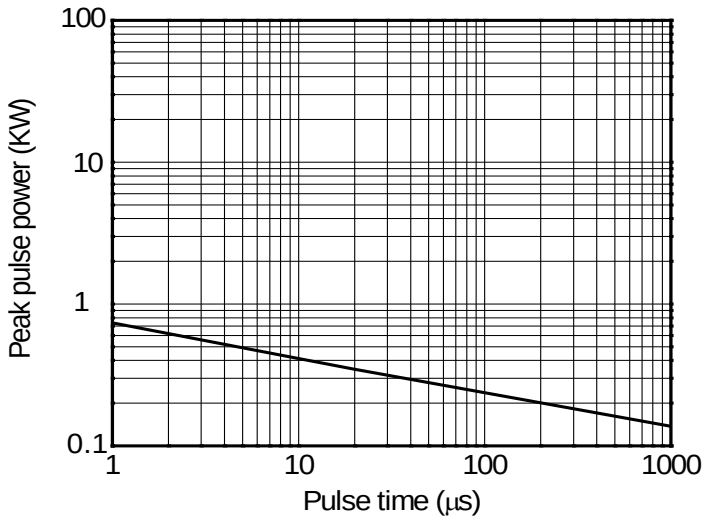

**Contact discharge current waveform per IEC61000-4-2**




**Clamping voltage vs. Peak pulse current**

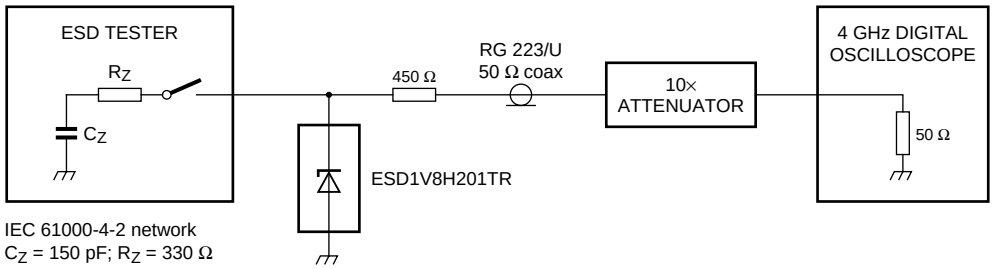



**Power derating vs. Ambient temperature**

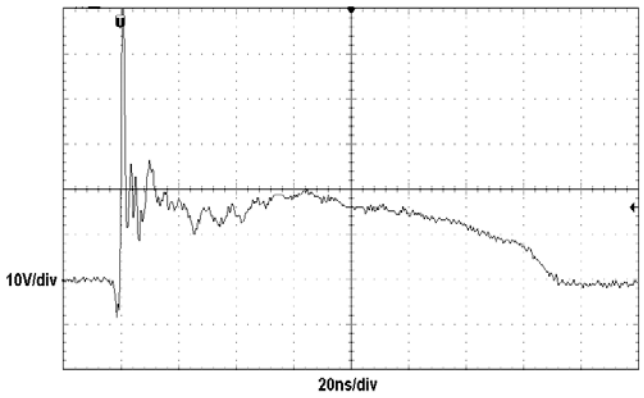



**Non-repetitive peak pulse power vs. Pulse time**

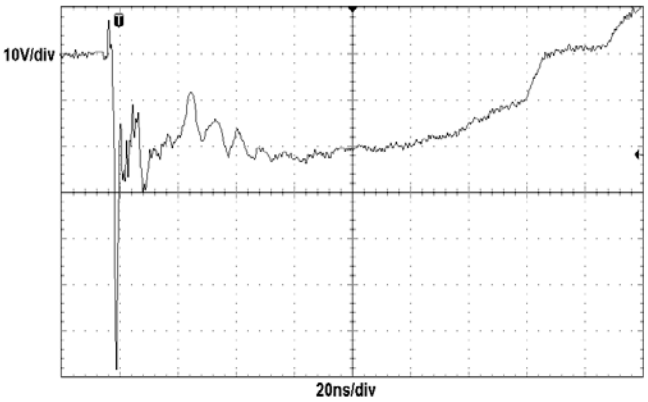
## ESD clamping test setup and waveforms




IEC 61000-4-2 network
$C_Z$ = 150 pF; $R_Z$ = 330 Ω



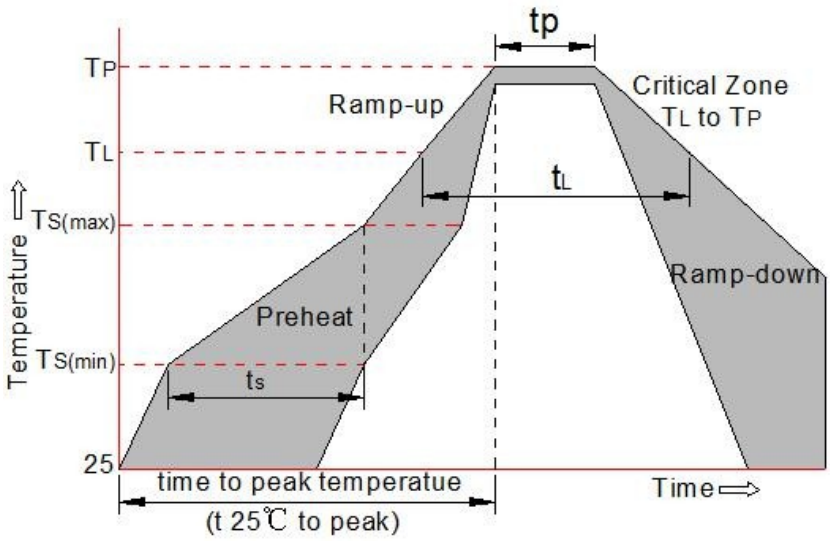

**ESD clamping**
**(+8kV contact discharge per IEC61000-4-2)**




**ESD clamping**
**(-8kV contact discharge per IEC61000-4-2)**

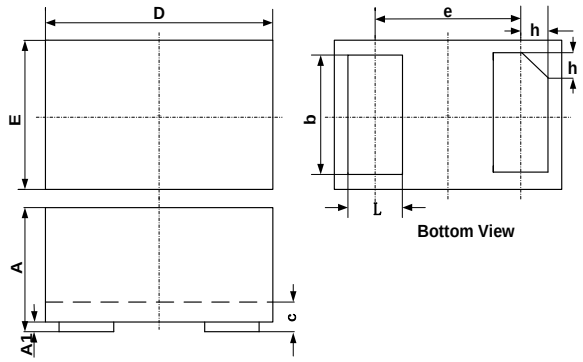
Soldering Parameters

| Reflow Condition | | Pb-Free assembly (see as bellow) |
|---|---|---|
| Pre Heat | -Temperature Min ($T_{s(min)}$) | +150℃ |
| | -Temperature Max($T_{s(max)}$) | +200℃ |
| | -Time (Min to Max) (ts) | 60-180 secs. |
| Average ramp up rate (Liquid us Temp ($T_L$) to peak) | | 3℃/sec. Max |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate | | 3℃/sec. Max |
| Reflow | -Temperature($T_L$) (Liquid us) | +217℃ |
| | -Temperature($t_L$) | 60-150 secs. |
| Peak Temp ($T_p$) | | +260(+0/-5)℃ |
| Time within 5℃ of actual Peak Temp ($t_p$) | | 30 secs. Max |
| Ramp-down Rate | | 6℃/sec. Max |
| Time 25℃ to Peak Temp ($T_P$) | | 8 min. Max |
| Do not exceed | | +260℃ |



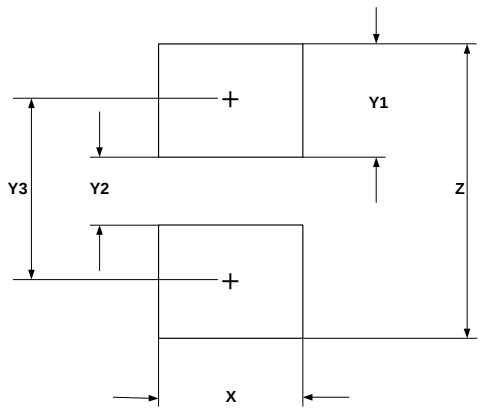
## DFN1610-2L Package Outline Drawing

# DFN1610




| SYM | DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|
| | MILLIMETERS | | | INCHES | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.45 | 0.50 | 0.55 | 0.018 | 0.020 | 0.022 |
| A1 | 0.00 | 0.02 | 0.05 | 0.000 | 0.001 | 0.002 |
| b | 0.75 | 0.80 | 0.85 | 0.030 | 0.032 | 0.034 |
| c | 0.10 | 0.15 | 0.20 | 0.004 | 0.006 | 0.008 |
| D | 1.55 | 1.60 | 1.65 | 0.062 | 0.064 | 0.066 |
| e | 1.10 BSC | | | 0.044 BSC | | |
| E | 0.95 | 1.00 | 1.05 | 0.038 | 0.040 | 0.042 |
| L | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| h | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |

## Suggested Land Pattern




| SYM | DIMENSIONS | |
|---|---|---|
| | MILLIMETERS | INCHES |
| X | 1.00 | 0.040 |
| Y1 | 0.62 | 0.025 |
| Y2 | 0.60 | 0.024 |
| Y3 | 1.22 | 0.049 |
| Z | 1.85 | 0.074 |