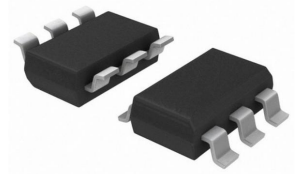


### Descriptions

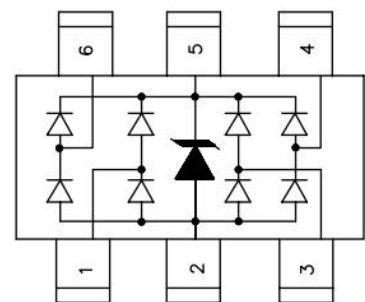
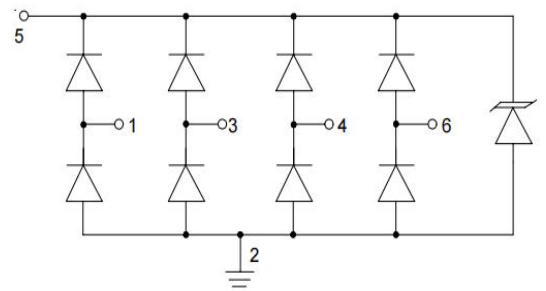
The UP1.5P236A05P04 is surge rated diode to provide protection for high speed data interfaces and sensitive components which are connected transmission lines from over-voltage caused by ESD,CDE(Cable Discharge Events), EFT(Electrical Fast Transient). The unique design incorporates surge rated,low capacitance steering diodes and a TVS diode in a single package. This robust device can safely absorb repetitive ESD strikes above the maximum level specified in the IEC61000-4-2 international standard ( $\pm 15\text{KV}$  Air ,  $\pm 8\text{kV}$  contact discharge) without performance degradation.



### Features

- ◆ Transient protection for high-speed data lines to IEC 61000-4-2(ESD)  $\pm 15\text{kV}$ (air),  $\pm 8\text{kV}$ (contact)  
IEC 61000-4-4(EFT) 40A (5/50ns)
- ◆ Array of surge rated diodes with internal TVS Diode
- ◆ Small package saves board space
- ◆ Protects up four I/O lines & power line
- ◆ Low capacitance( $< 3\text{PF}$ ) for high-speed interfaces
- ◆ No insertion loss to 2.0GHz
- ◆ Lower leakage current and clamping voltage
- ◆ Low operating voltage:5.0V
- ◆ Solid-state silicon-avalanche technology
- ◆ Case: JEDEC SOT-23 6L
- ◆ Nominal Dimensions:  $2.9 \times 2.8\text{mm}$
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Meets RoHS compliant

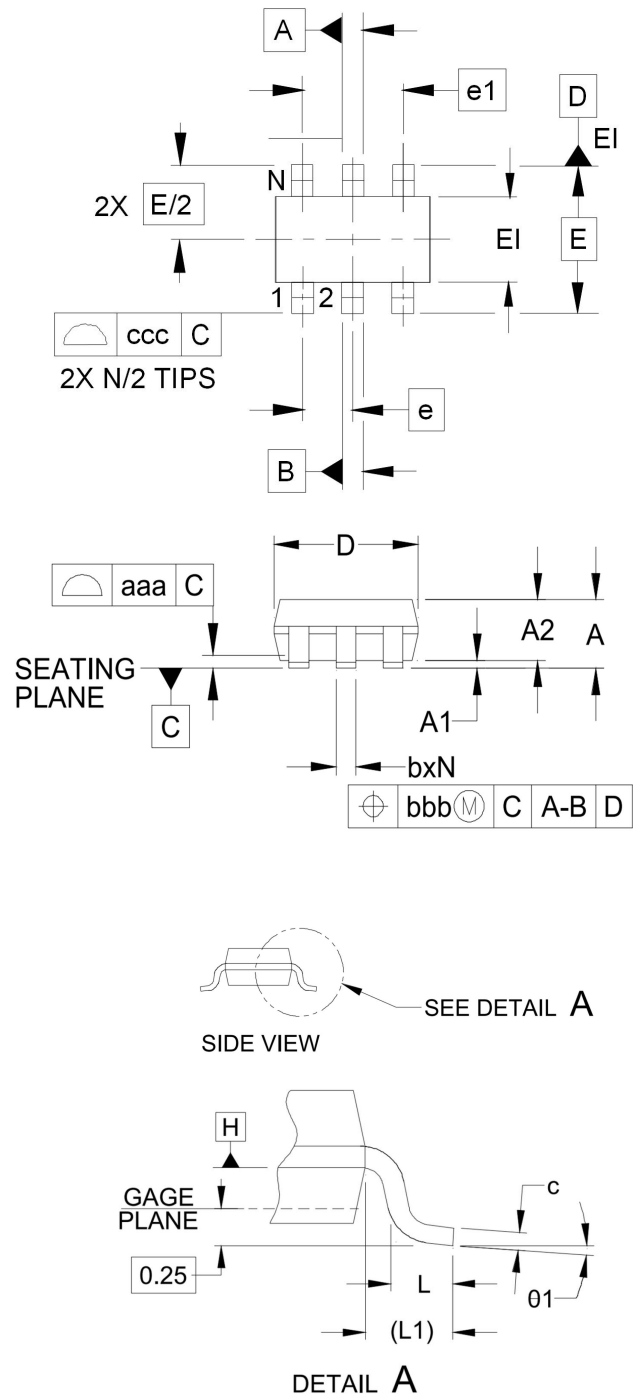
### Schematic



### Applications

- ◆ USB 2.0
- ◆ USB OTG
- ◆ Monitors and Flat panel displays
- ◆ Digital Visual Interface (DVI)
- ◆ Gigabit Ethernet
- ◆ IEEE 1394 Firewire ports

Dimensions (SOT-23-6L)



| Symbol     | Dimension   |      |           |       |
|------------|-------------|------|-----------|-------|
|            | Millimeters |      | Inches    |       |
|            | Min.        | Max. | Min.      | Max.  |
| A          | 0.90        | 1.45 | 0.035     | 0.057 |
| A1         | 0.00        | 0.15 | 0.000     | 0.006 |
| A2         | 0.90        | 1.30 | 0.035     | 0.051 |
| b          | 0.25        | 0.50 | 0.010     | 0.020 |
| c          | 0.08        | 0.22 | 0.003     | 0.009 |
| D          | 2.80        | 3.10 | 0.110     | 0.122 |
| E1         | 1.50        | 1.75 | 0.060     | 0.069 |
| E          | 2.80 BSC    |      | 0.110 BSC |       |
| e          | 0.95 BSC    |      | 0.037 BSC |       |
| e1         | 1.90 BSC    |      | 0.075 BSC |       |
| L          | 0.30        | 0.60 | 0.012     | 0.024 |
| L1         | (0.60)      |      | (0.024)   |       |
| N          | 6           |      | 6         |       |
| $\theta_1$ | 0°          | 10°  | 0°        | 10°   |
| aaa        | 0.10        |      | 0.004     |       |
| bbb        | 0.20        |      | 0.008     |       |
| ccc        | 0.20        |      | 0.008     |       |

**Maximum Rating and Characteristics at 25°C ambient temperature unless otherwise Noted.**

| Rating                          | Symbol           | Value       | Unit |
|---------------------------------|------------------|-------------|------|
| Peak Pulse Power (tp = 8/20μs)  | P <sub>PP</sub>  | 150         | W    |
| ESD voltage (Contact discharge) | V <sub>ESD</sub> | 8           | KV   |
| ESD voltage (Air discharge)     |                  | 15          |      |
| Operating Temperature           | T <sub>J</sub>   | -55 to +125 | °C   |
| Storage Temperature             | T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

| Parameter                      | Symbol           | Condition                      | Min. | Typ. | Max. | Unit |
|--------------------------------|------------------|--------------------------------|------|------|------|------|
| Reverse stand-off voltage      | V <sub>RWM</sub> |                                |      |      | 5    | V    |
| Reverse breakdown voltage      | V <sub>BR</sub>  | I <sub>BR</sub> =1.0mA         | 6.0  |      |      | V    |
| Reverse leakage current        | I <sub>R</sub>   | V <sub>R</sub> =5V             |      |      | 3    | μA   |
| Clamping voltage (tp=8/20μs)   | V <sub>C</sub>   | I <sub>PP</sub> =1.0A          |      |      | 15   | V    |
| Clamping voltage (tp=8/20μs)   | V <sub>C</sub>   | I <sub>PP</sub> =6.0A          |      |      | 25   | V    |
| Peak Pulse Current(tp=8/20μs)  | I <sub>PP</sub>  |                                |      |      | 6    | A    |
| Off state junction capacitance | C <sub>J</sub>   | 0Vdc,f=1MHz<br>Any Pin to Pin2 |      | 3    |      | pF   |
| Off state junction capacitance | C <sub>J</sub>   | 0Vdc,f=1MHz<br>Between I/O Pin |      | 1.5  |      | pF   |

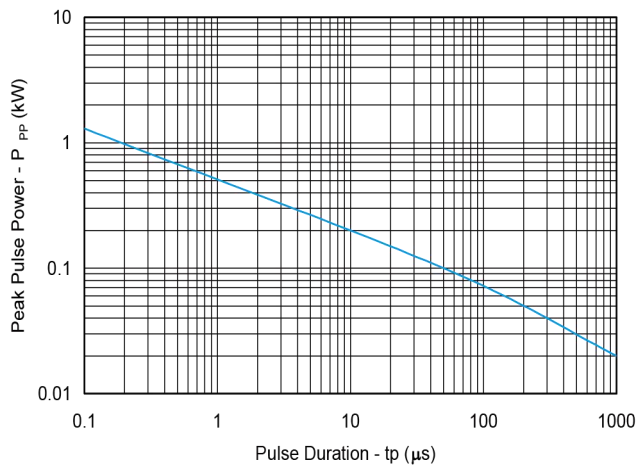
Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)Figure 1. Non-Repetitive Peak Pulse Power vs.  $t_p$ 

Figure 2. Power Derating Curve

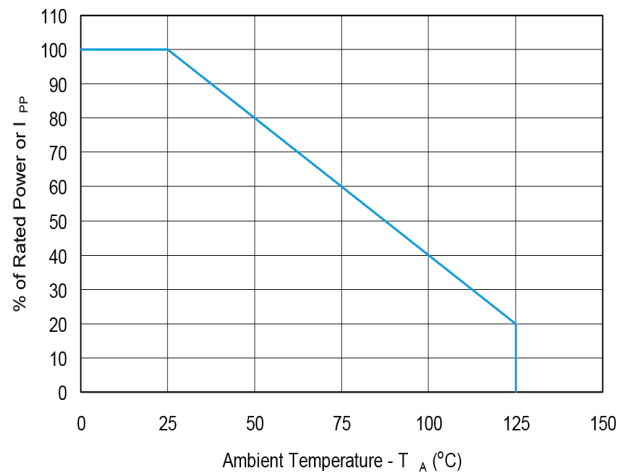


Figure 3. Pulse Waveform

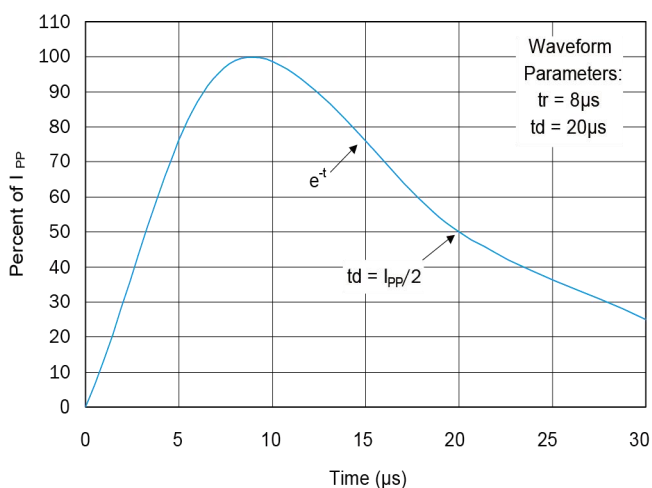


Figure 4. Clamping Voltage vs. Pulse Current

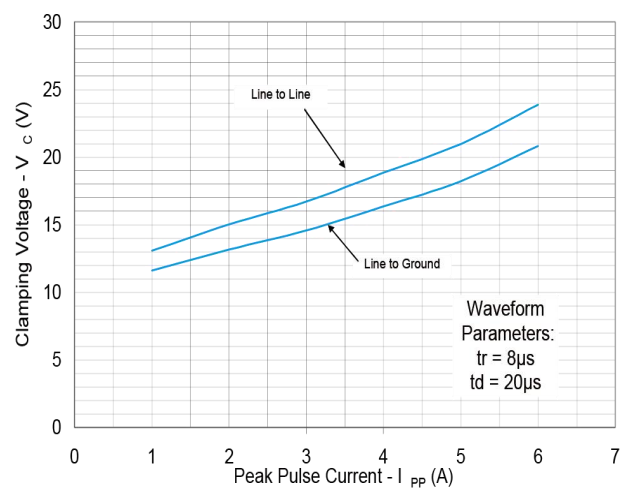


Figure 5. Forward Voltage vs. Peak pulse Current

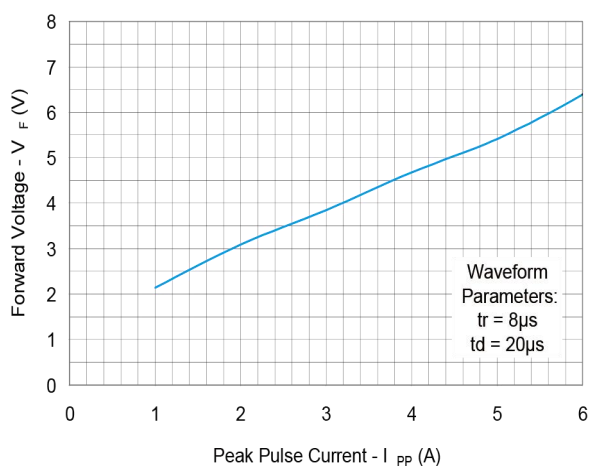


Figure 6. Normalized Capacitance vs. Reverse Voltage

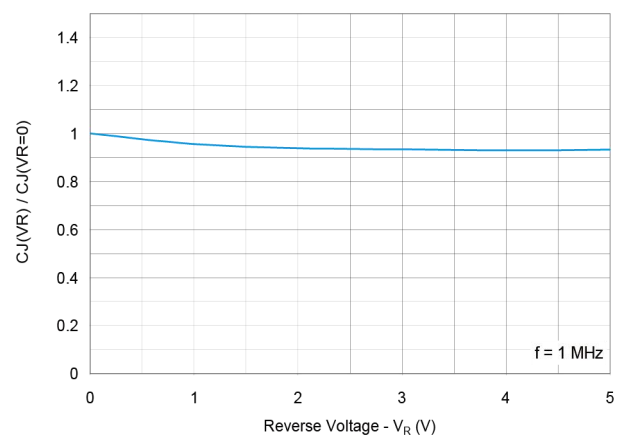


Figure 7. Insertion Loss S21(I/O to Pin 2)

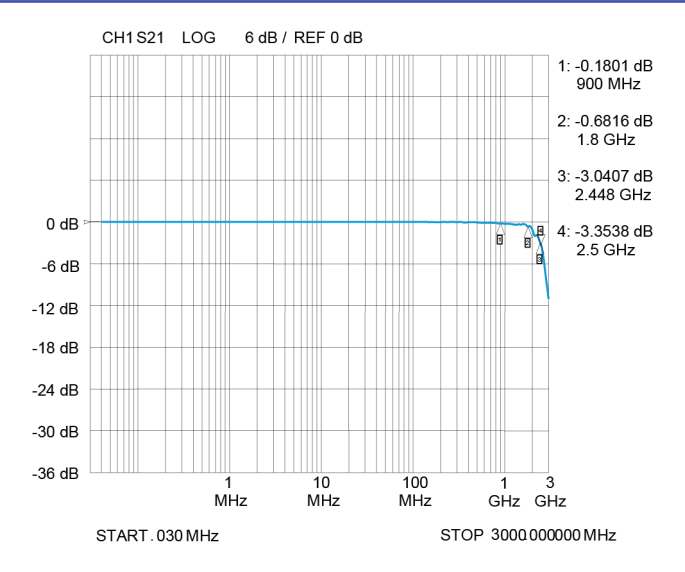


Figure 8. Insertion Loss S21(I/O to I/O)

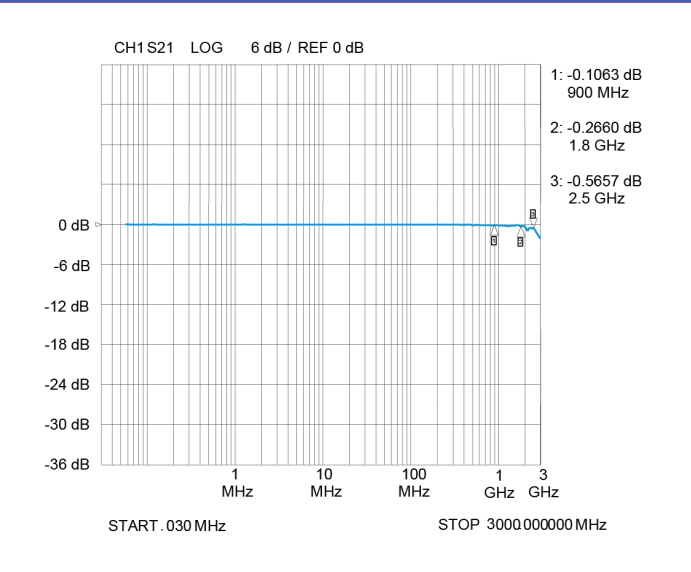


Figure 9. Analog Crosstalk

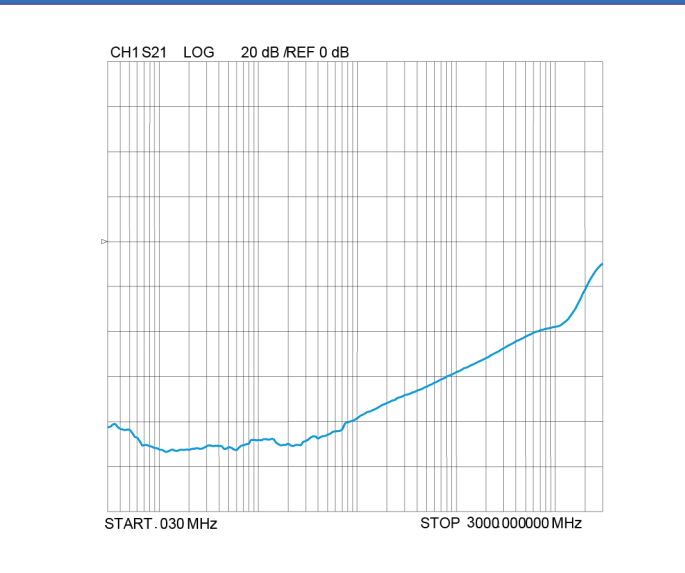
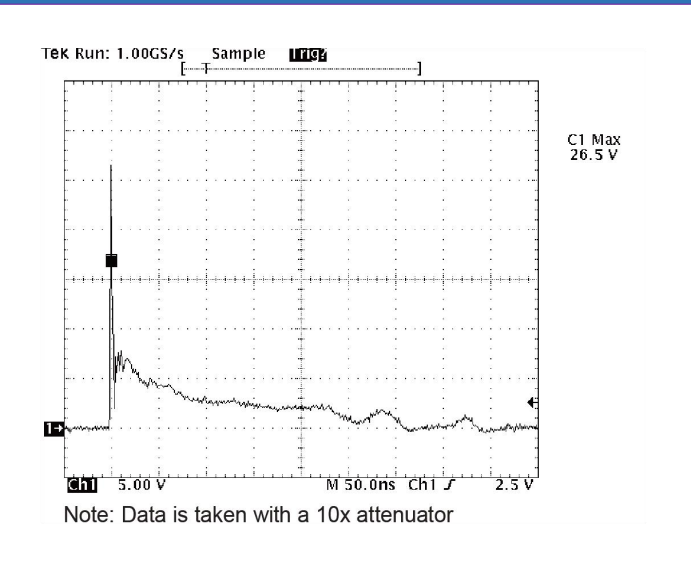
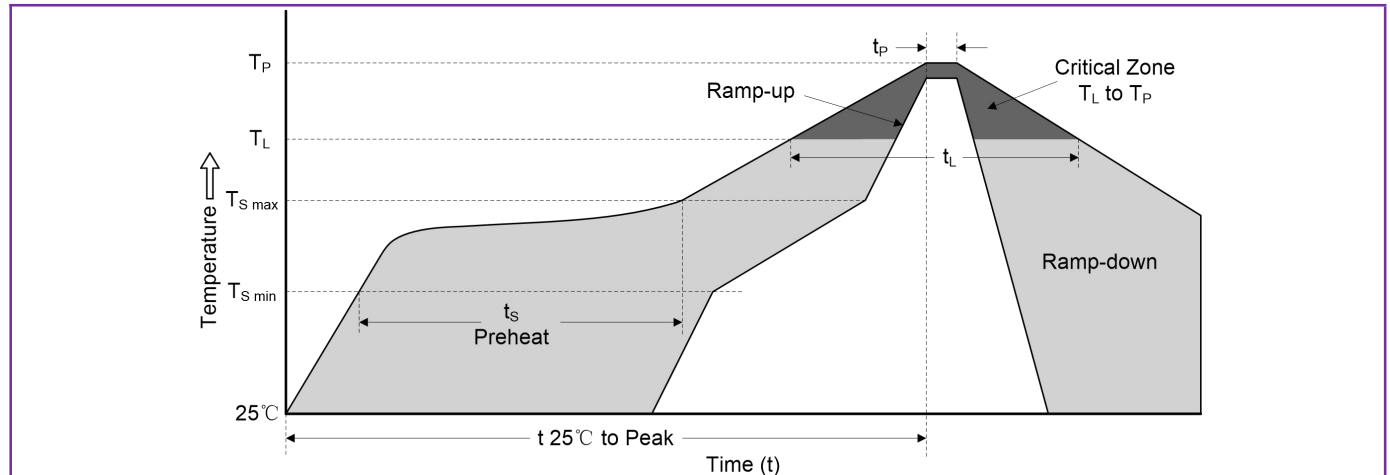


Figure 10.ESD Clamping  
(+8kV Contact per IEC 61000-4-2)



## Reflow Soldering Parameters



| Reflow Condition                                     |                                   | Lead-free Assembly |
|------------------------------------------------------|-----------------------------------|--------------------|
| Pre heat                                             | -Temperature Min ( $T_{S\ min}$ ) | 150°C              |
|                                                      | -Temperature Max ( $T_{S\ max}$ ) | 200°C              |
|                                                      | -Time (min to max) ( $t_s$ )      | 60-180 seconds     |
| Average ramp-up rate ( $T_L$ to $T_P$ )              |                                   | 3°C/second max.    |
| $T_{S\ max}$ to $T_L$ -Ramp-up Rate                  |                                   | 3°C/second max.    |
| Reflow                                               | -Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                      | -Time (min to max) ( $t_s$ )      | 60-150 seconds     |
| Peak Temperature ( $T_P$ )                           |                                   | 260(+0/-5)°C       |
| Time within 5°C of actual Peak Temperature ( $t_P$ ) |                                   | 20-40 seconds      |
| Ramp-down Rate                                       |                                   | 6°C/second max.    |
| Time 25°C to Peak Temperature( $T_P$ )               |                                   | 8 minutes max.     |
| Do not exceed                                        |                                   | 260°C              |

## Package

| Part number     | QTY/Reel | Reel Size |
|-----------------|----------|-----------|
| UP1.5P236A05P04 | 3000PCS  | 7Inch     |