

ElectroStatic Discharged Protection Devices (ESD) Data Sheet

Description

The LBQ02C05L01 of Transient Voltage Suppressors (TVS) are designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, MP3 player and digital cameras. They offer superior electrical characteristics such as lower clamping voltage and no device degradation when compared to MLVs. They are designed to protect sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD), lightning, electrical fast transients (EFT), and cable discharge events (CDE).

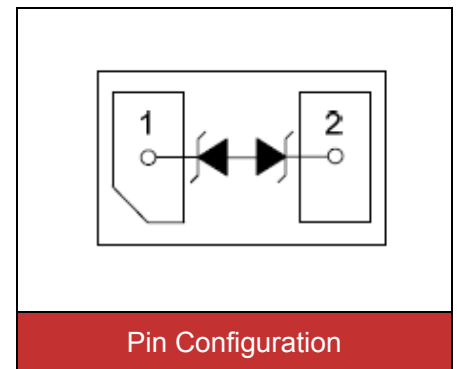


Contact : $\pm 8\text{kV}$
Air : $\pm 15\text{kV}$



Features

- IEC61000-4-2 ESD 15KV Air, 8KV contact compliance
- 0201 surface mount package
- Working voltage: 5V
- Low leakage current
- Low operating and clamping voltages
- Solid-state silicon avalanche technology
- Lead Free/RoHS compliant
- Solder reflow temperature: Pure Tin-Sn, 260-270°C
- Flammability rating UL 94V-0
- Meets MSL level 1, per J-STD-020
- Marking: D5



Maximum Ratings

| Rating | Symbol | Value | Unit |
|--|----------------|----------|------|
| Peak pulse current ($t_p=8/20\mu\text{s}$) | I_{PP} | 5 | A |
| ESD voltage (Contact discharge) | V_{ESD} | ± 8 | kV |
| ESD voltage (Air discharge) | | ± 15 | |
| Lead soldering temperature | T_L | 260 | °C |
| Storage & operating temperature range | T_{STG}, T_J | -50~+150 | °C |

Electrical Characteristics ($T_J=25^{\circ}\text{C}$)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|--|-----------|------------------------------|------|------|------|---------------|
| Reverse stand-off voltage | V_{RWM} | | | | 5.0 | V |
| Reverse breakdown voltage | V_{BR} | $I_{BR}=1.0\text{mA}$ | 6.0 | | | V |
| Reverse leakage current | I_R | $V_R=5.0\text{V}$ | | | 1.0 | μA |
| Clamping voltage ($t_p=8/20\mu\text{s}$) | V_C | $I_{PP}=3\text{A}$ | | 10 | | V |
| Off state junction capacitance | C_J | $0\text{Vdc}, f=1\text{MHz}$ | | 8 | | pF |

Typical Characteristics Curves

Figure 1. Pulse Waveforms

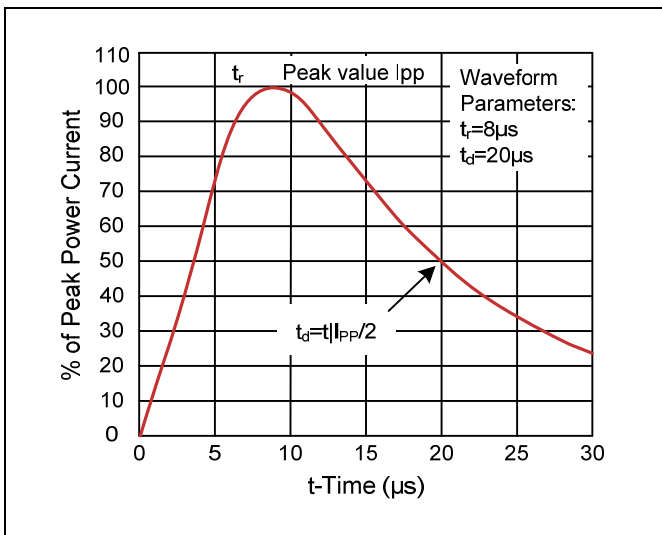


Figure 2. Clamping Voltage vs. Peak Pulse Current

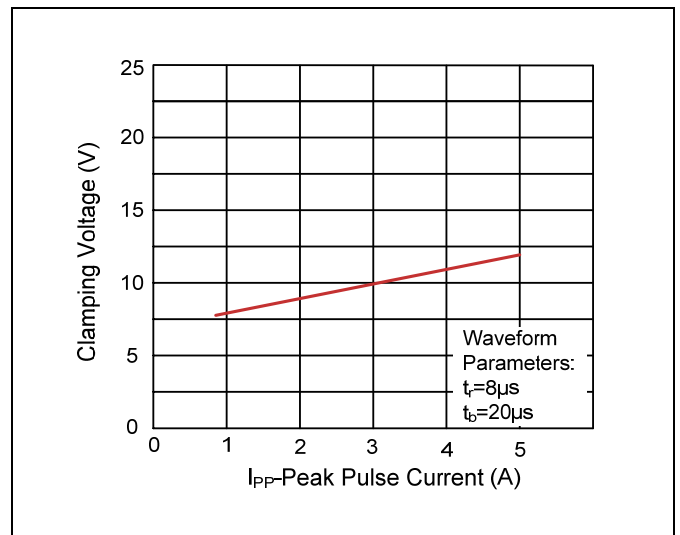


Figure 3. Capacitance vs. Reverse Voltage

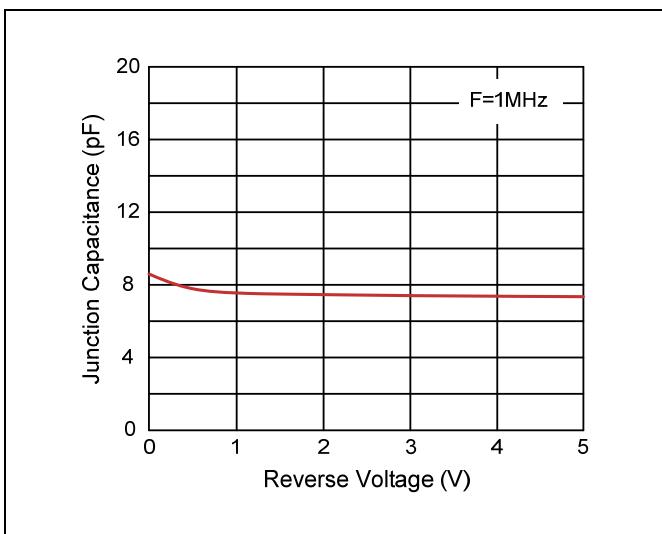
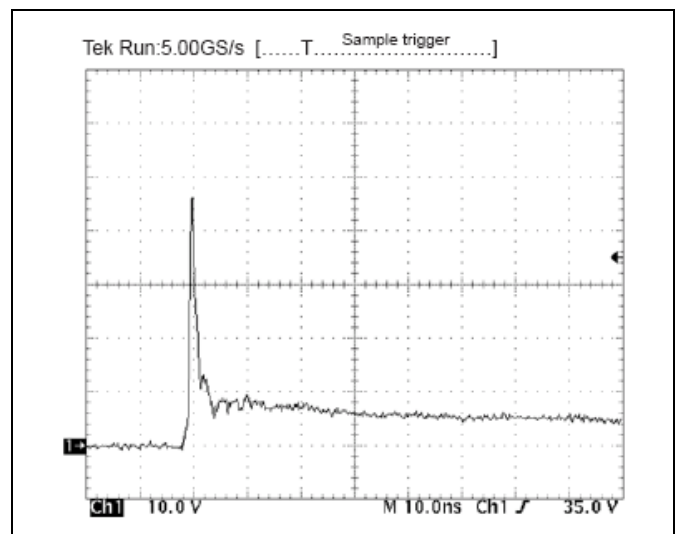
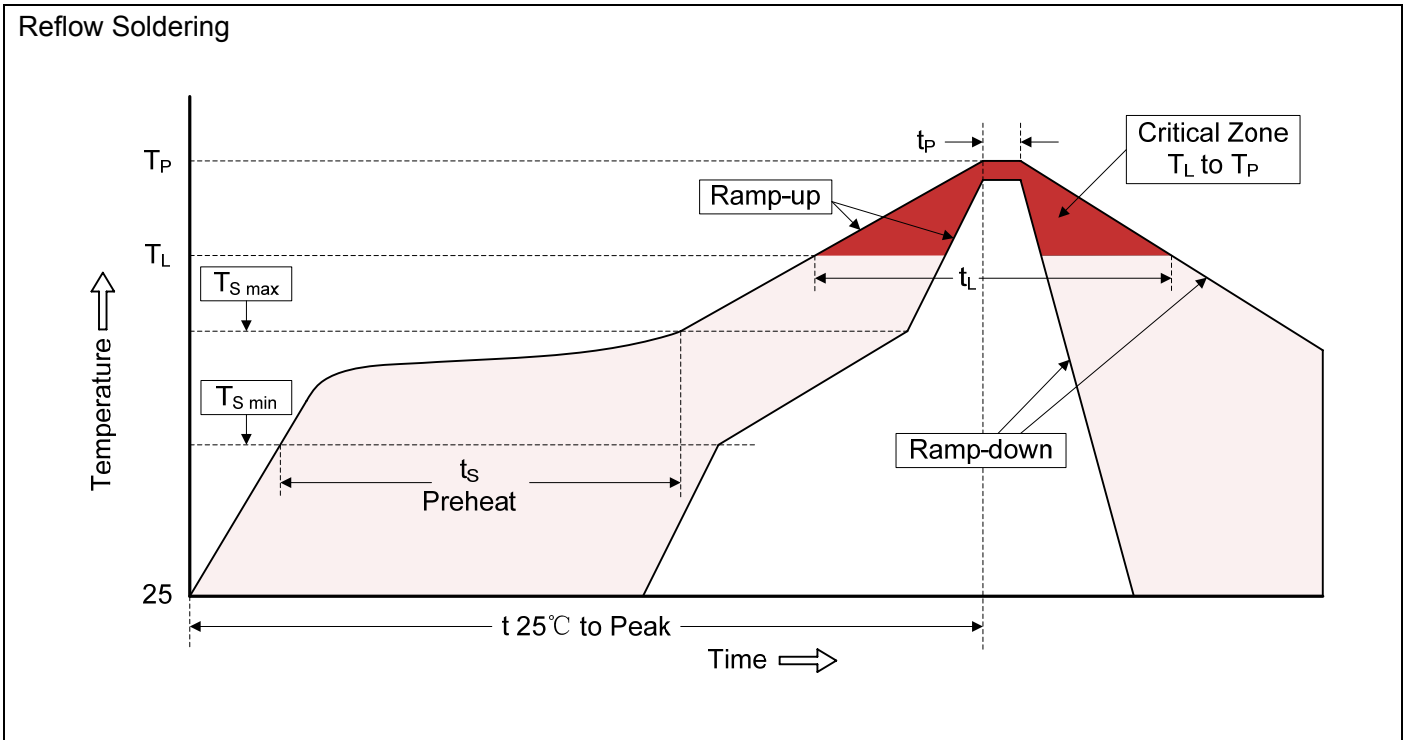


Figure 4. ESD Clamping(8kV Contact IEC61000-4-2)



Recommended Soldering Conditions



Recommended Conditions

| Profile Feature | Pb-Free Assembly |
|---|----------------------------------|
| Average ramp-up rate (T_L to T_P) | 3°C/second max. |
| Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_s) | 150°C 200°C 60-180 seconds |
| $T_{S\ max}$ to T_L -Ramp-up Rate | 3°C/second max. |
| Time maintained above: -Temperature (T_L) -Time (t_L) | 217°C 60-150 seconds |
| Peak Temperature (T_P) | 260°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 | 8 minutes max. |

Dimensions (DFN0603/QFN-0201)

| Symbol | Dimension (mm) | | | |
|--------|----------------|------|--------|--------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 0.57 | 0.63 | 0.022 | 0.025 |
| B | 0.27 | 0.33 | 0.011 | 0.013 |
| C | 0.22 | 0.28 | 0.009 | 0.011 |
| D | 0.12 | 0.18 | 0.005 | 0.007 |
| E | 0.40 | | 0.016 | |
| F | 0.24 | 0.30 | 0.009 | 0.012 |
| G | - | 0.01 | - | 0.0004 |

Packaging

| Tape | | Symbol | Dimension (mm) |
|------|--|--------------------|----------------|
| | | W | 8.00±0.30 |
| | | P0 | 4.00±0.10 |
| | | P1 | 2.00±0.10 |
| | | P2 | 2.00±0.10 |
| | | D0 | Φ1.55±0.10 |
| | | D1 | Φ0.20±0.05 |
| | | E | 1.75±0.10 |
| | | F | 3.50±0.10 |
| | | A | 0.50±0.10 |
| | | B | 0.75±0.10 |
| | | K | 0.40±0.05 |
| | | t | 0.20±0.05 |
| | | Reel | |
| | | D2 | Φ13.0 |
| | | W1 | 9.5 |
| | | Quantity: 10000PCS | |