

ElectroStatic Discharged Protection Devices (ESD) Data Sheet

Description

The LAQ02AXXL01 series 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).

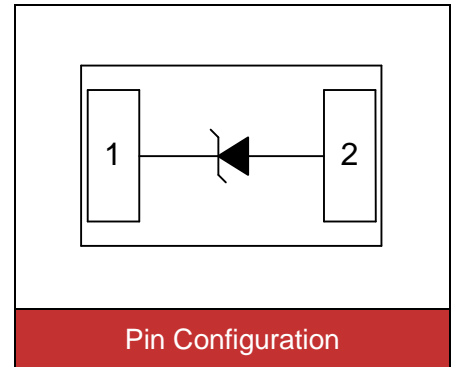


Contact : $\pm 20\text{kV}$
Air : $\pm 20\text{kV}$



Features

- IEC61000-4-2 ESD 20KV Air, 20KV contact compliance
- 0201 surface mount package
- Working voltage: 5V, 12V
- 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: V5



Maximum Ratings

Rating	Symbol	Value	Unit
ESD voltage (Contact discharge)	V_{ESD}	± 20	kV
ESD voltage (Air discharge)		± 20	
Storage & operating temperature range	T_{STG}, T_J	-55~+150	°C

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

LAQ02A05L01(Marking: V5)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				5	V
Reverse breakdown voltage	V_{BR}	$I_{BR}=1\text{mA}$	6			V
Reverse leakage current	I_R	$V_R=5\text{V}$			1	μA
Clamping voltage ($t_p=8/20\mu\text{s}$)	V_C	$I_{PP}=1\text{A}$			10	V
Clamping voltage ($t_p=8/20\mu\text{s}$)	V_C	$I_{PP}=3\text{A}$			15	V
Peak Pulse Current($t_p=8/20\mu\text{s}$)	I_{PP}				3	A
Off state junction capacitance	C_J	0Vdc,f=1MHz		30	40	pF

LAQ02A12L01(Marking: 2V)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				12	V
Reverse breakdown voltage	V_{BR}	$I_{BR}=1\text{mA}$	13			V
Reverse leakage current	I_R	$V_R=12\text{V}$			1	μA
Clamping voltage ($t_p=8/20\mu\text{s}$)	V_C	$I_{PP}=1\text{A}$			20	V
Clamping voltage ($t_p=8/20\mu\text{s}$)	V_C	$I_{PP}=2.5\text{A}$			25	V
Peak Pulse Current($t_p=8/20\mu\text{s}$)	I_{PP}				2.5	A
Off state junction capacitance	C_J	0Vdc,f=1MHz		15	20	pF

Typical Characteristics Curves

Figure 1. Pulse Waveforms

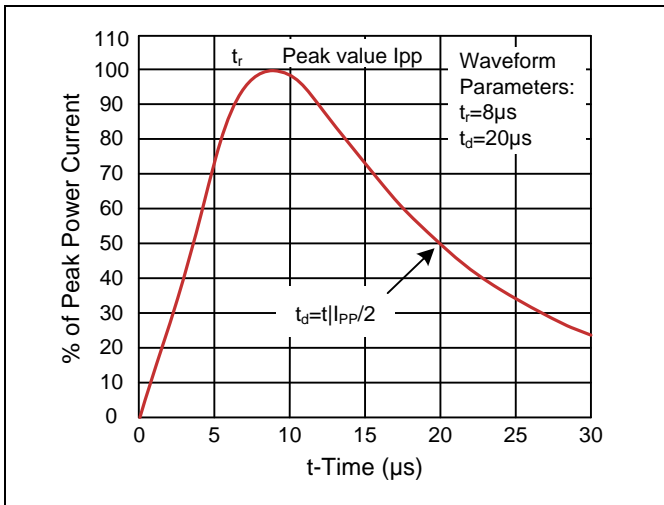


Figure 2. Capacitance vs. Reverse Voltage

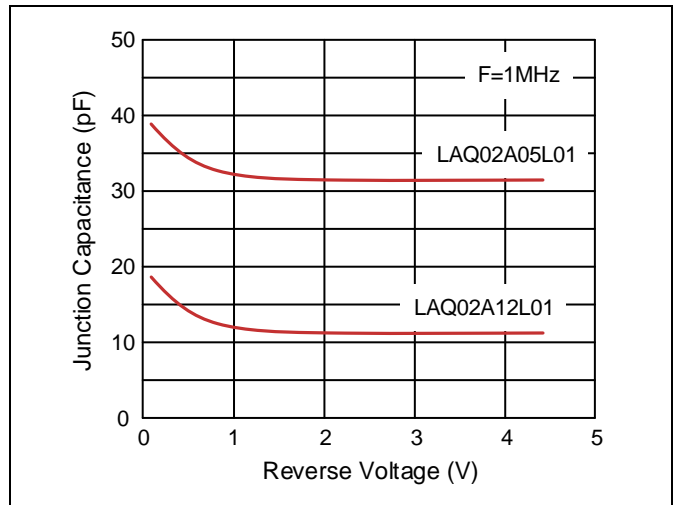


Figure 3. Clamping Voltage vs. Peak Pulse Current

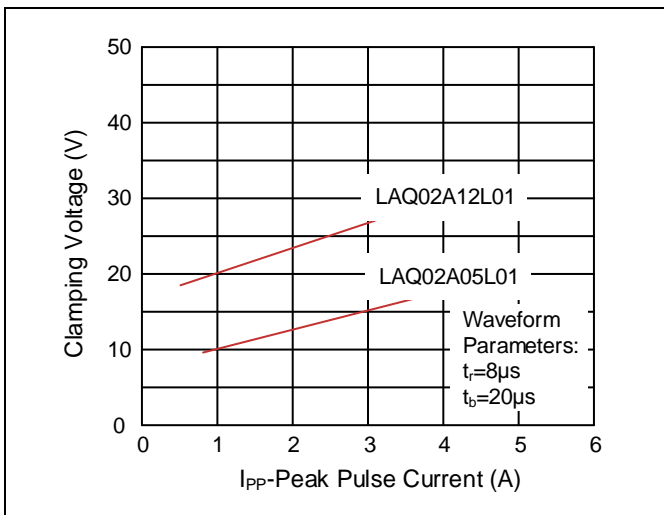
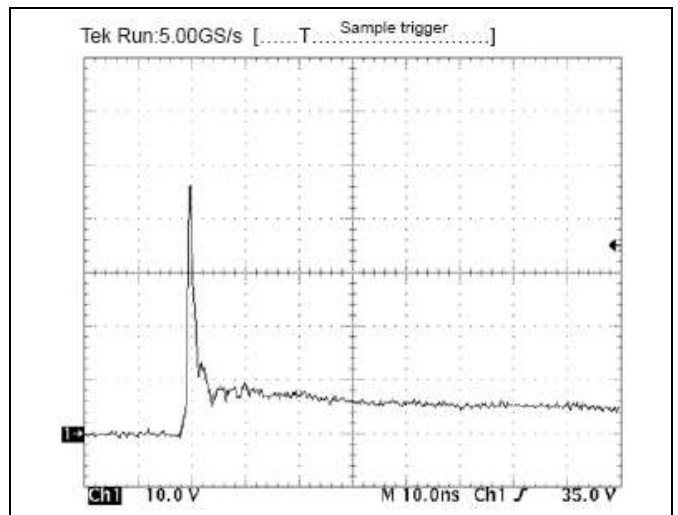
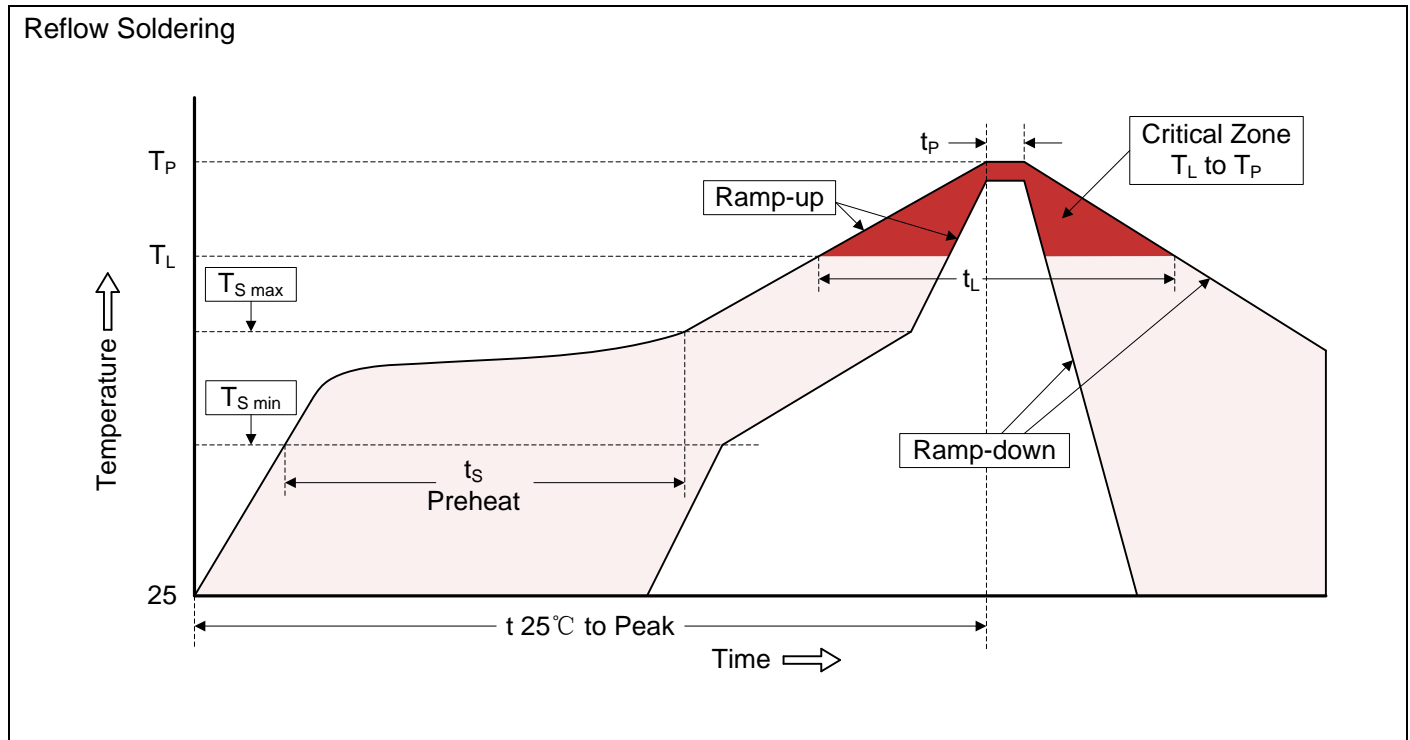


Figure 4. ESD Clamping(8kV Contact IEC61000-4-2)



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 (0201)

	Dimension (mm)				
	Symbol	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

<p>Tape</p>	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
<p>Reel</p>	D	Φ178.0±2.0
	D2	Φ13.0
	W1	9.5
	Quantity: 10000PCS	