Electrostatic Discharged Protection Devices (ESD) Data Sheet

Description

The series of STD22AXXL01 is designed to protect power port and the chip Vbus interfaces. It has been specifically designed to protect sensitive components which are connected to power lines from overvoltage caused by electrostatic discharge (ESD),cable discharge events (CDE) and lightning.

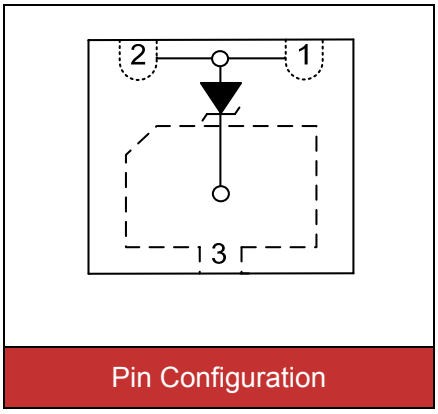
These devices integrate a high power transient voltage suppressor(TVS) and small package. It features solid-state silicon-avalanche technology for unmatched transient protection without device degradation. It offers superior electrical characteristics including fast response time ,low clamping voltage and no device degradation. This allows the designer maximum flexibility and reduces parts count.

The series devices may be used to meet the immunity requirements of IEC61000-4-2 (ESD), IEC61000-4-4 (EFT) , IEC61000-4-5 (Surge).

Contact : ±30kV
Air : ±30kV

Features

- IEC61000-4-2 ESD 30KV Air, 30KV contact compliance
- DFN2020 surface mount package
- Protects power line
- Working voltage: 5V,7V,10V,12V,15V,18V,24V,36V,
- Low leakage current
- Low clamping voltage
- Solid-state silicon avalanche technology
- RoHS compliant
- Solder reflow temperature: Pure Tin-Sn, 260~270℃
- Flammability rating UL 94V-0
- Meets MSL level 1, per J-STD-020



Pin Configuration

Applications

- Power port
- I^2C bus protection

Maximum Ratings

Rating	Symbol	Value	Unit
Peak pulse power (tp=10/1000μs waveform)	Ppp	400	W
Peak pulse power (tp=8/20μs waveform)	Ppp	4000	W
ESD voltage (Contact discharge)	V_{ESD}	±30	kV
ESD voltage (Air discharge)		±30	
Storage & operating temperature range	T_{STG} ,T_J	-55~+150	℃

Electrical Characteristics (T_J=25℃)

STD22A05L01 (Marking: T05　002)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				5	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	6			V
Reverse leakage current	I_R	V_R=5V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=185A		30		V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		730	1000	pF

STD22A07L01 (Marking: T07　002)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				7	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	7.3			V
Reverse leakage current	I_R	V_R=7V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=1A			15	V
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=180A			35	V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		2500	2800	pF

STD22A10L01 (Marking: T10　002)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				10	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	11			V
Reverse leakage current	I_R	V_R=10V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=180A		40		V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		1300	1600	pF

STD22A12L01 (Marking: T12　002)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				12	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	13.0			V
Reverse leakage current	I_R	V_R=12V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=1A			25	V
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=130A			45	V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		1200	2000	pF

STD22A15L01 (Marking: T18　002)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				15	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	16			V
Reverse leakage current	I_R	V_R=15V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=120A		50		V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		950	1200	pF

STD22A18L01 (Marking: T18： 018)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				18	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	19			V
Reverse leakage current	I_R	V_R=18V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=110A		55		V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		860	1200	pF

STD22A24L01 (Marking: T24 002)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				24	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	25			V
Reverse leakage current	I_R	V_R=24V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=60A		70		V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		650	800	pF

STD22A36L01 (Marking: T36 002)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				36	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	40			V
Reverse leakage current	I_R	V_R=36V			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=50A		85		V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND		440	700	pF

Typical Characteristics Curves

Figure 1. Power Derating Curve

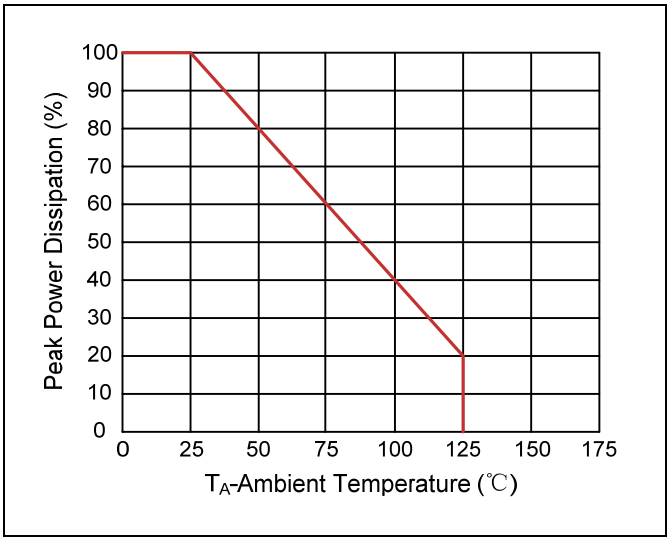


Figure 2. 8/20μs Pulse Waveforms

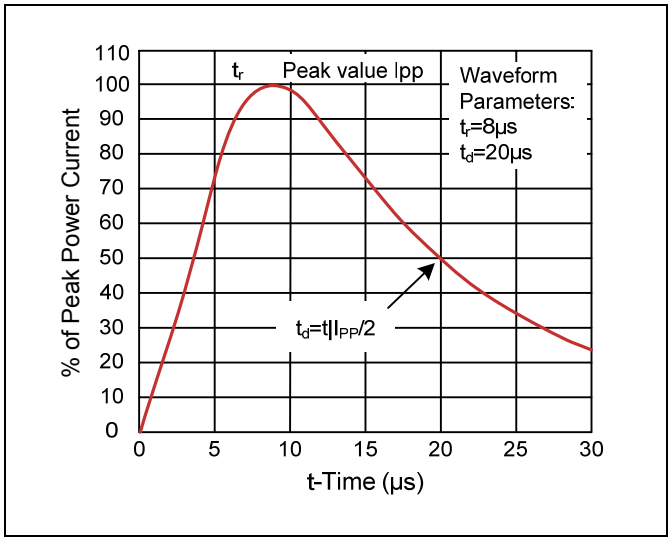


Figure 3. Clamping Voltage vs. Peak Pulse Current

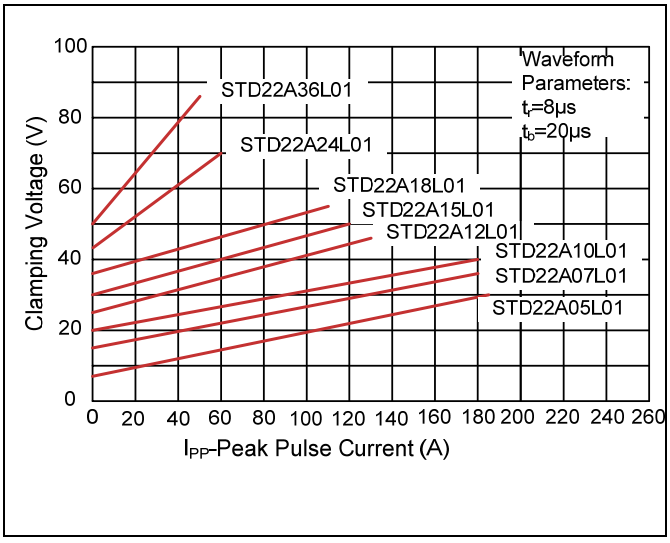


Figure 4. ESD Clamping (8kV Contact IEC61000-4-2)

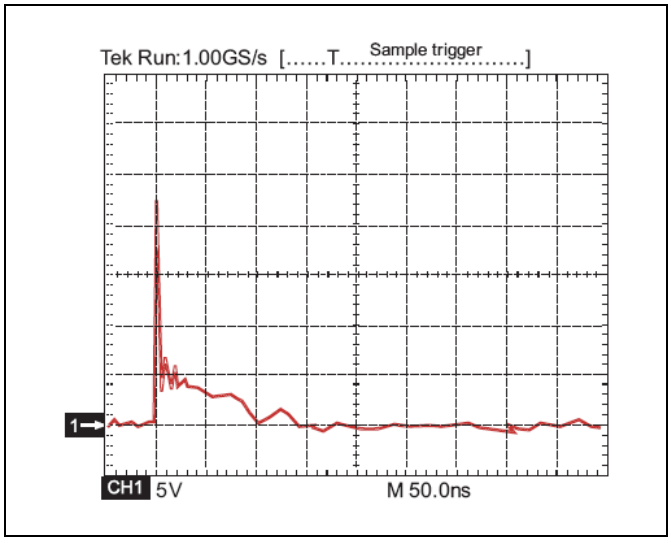


Figure 5. 10/1000μs Pulse Waveform

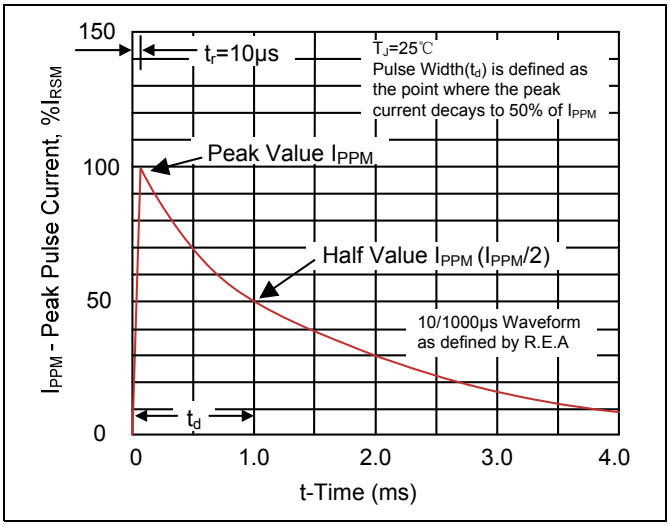
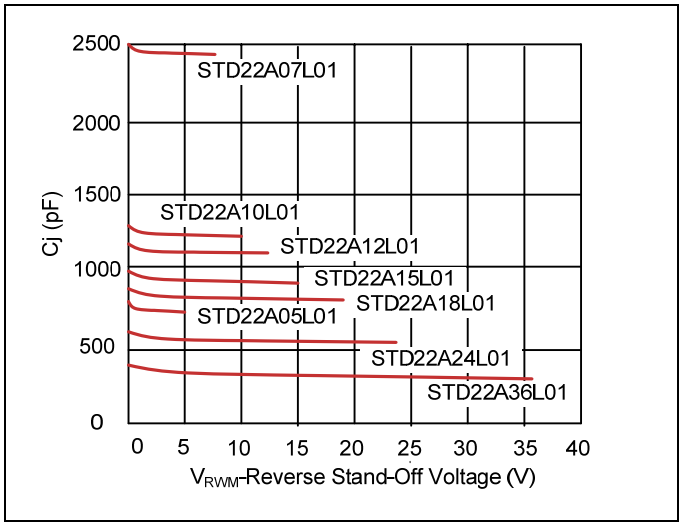
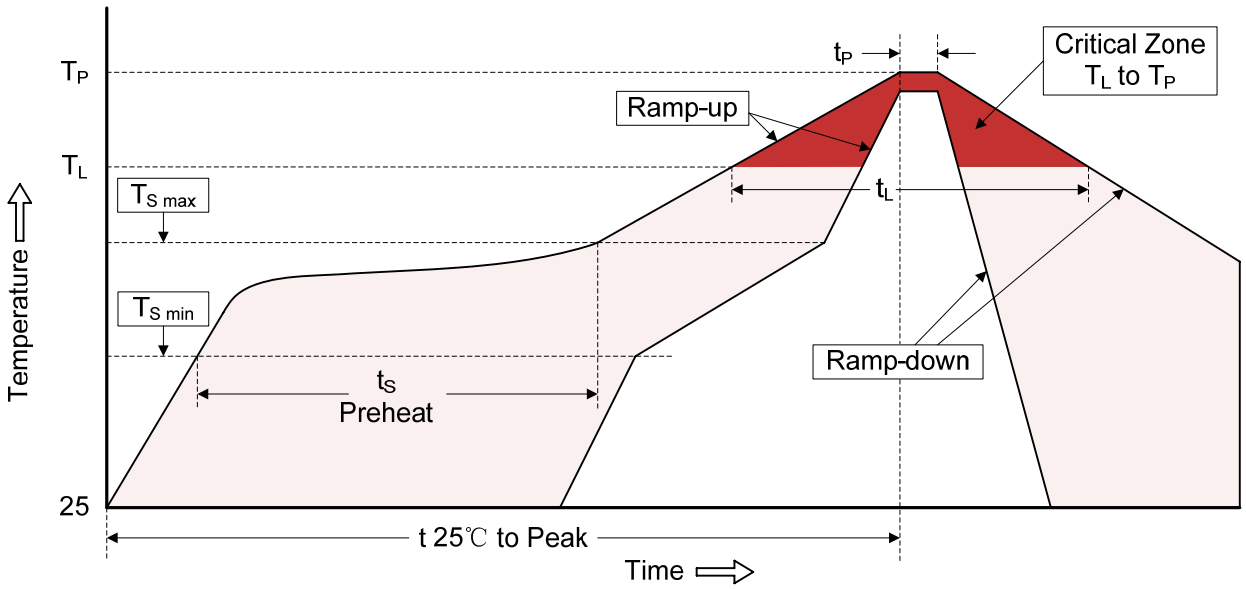


Figure 6. Typical Junction Capacitance



Recommended Soldering Conditions

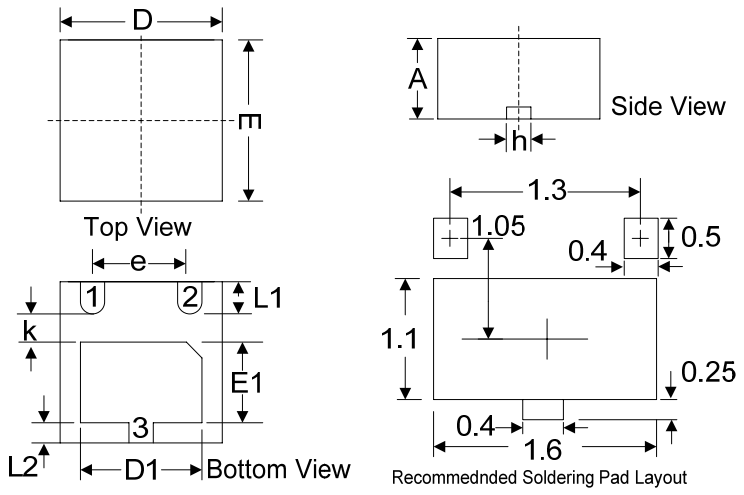
Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3℃/second max.
Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (ts)	 150℃ 200℃ 60-180 seconds
$T_{S\ max}$ to T_L -Ramp-up Rate	 3℃/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	 217℃ 60-150 seconds
Peak Temperature (T_P)	260℃
Time within 5℃ of actual Peak Temperature (t_P)	20-40 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8 minutes max.

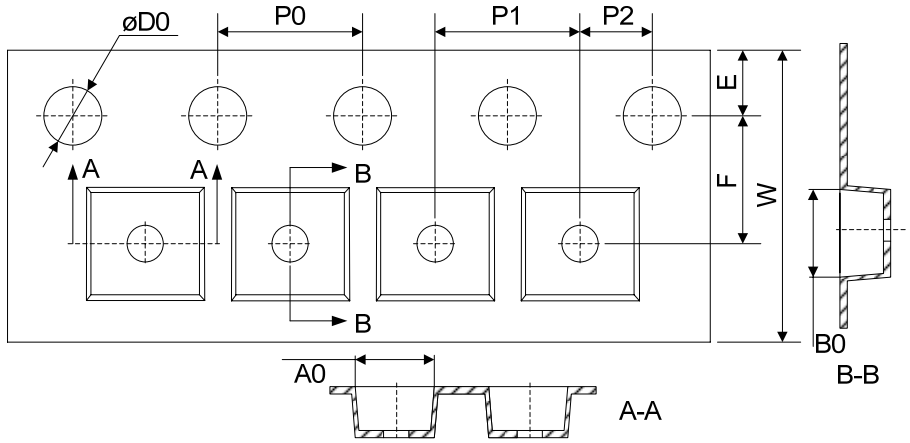
Dimensions (DFN2020)



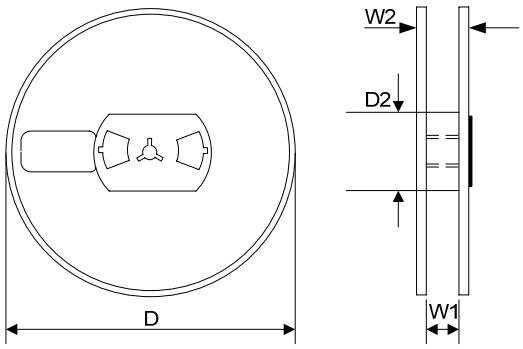
Symbol	Dimension			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.50	0.60	0.020	0.024
D	1.90	2.10	0.075	0.083
D1	1.40	1.60	0.055	0.063
E	1.90	2.10	0.075	0.083
E1	0.90	1.15	0.035	0.045
e	1.30 BSC		0.051 BSC	
L1	0.324	0.476	0.013	0.019
L2	0.20	0.30	0.008	0.012
k	0.20	0.45	0.008	0.018
h	0.30 BSC		0.012 BSC	

Packaging

Tape



Reel



Symbol	Dimension (mm)
W	8.00±0.30
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
D0	Φ1.50±0.10
E	1.75±0.10
F	3.50±0.10
A0	2.25±0.1
B0	2.25±0.1
D	Φ178.0±2.0
D2	Φ54.50±1
W1	9.5±2
W2	Φ12.30±1.5
Quantity: 3000PCS	