

STN254033UL33 and STN254033UL50

TVS Diode array ESD suppressor



Product features

- Solid-state silicon-avalanche technology
- Up to four I/O lines of protection
- Low operating and clamping voltage
- Ultra low capacitance
- Low leakage current
- Moisture sensitivity level (MSL): 3
- Molding compound flammability rating: UL 94V-0
- Termination finish: Ni/Pd/Au

Applications

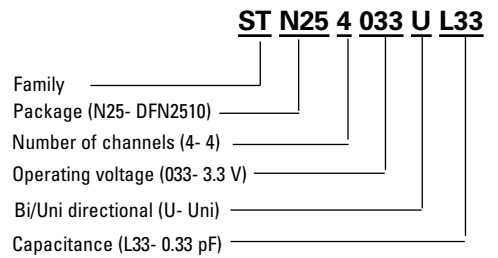
- Serial ATA
- PCI express
- Desktops, servers and notebooks
- MDDI ports
- USB 2.0, 3.0 and 3.1
- Display ports
- HDMI 1.3, 1.4 and 2.0
- Digital visual interfaces (DVI)

Environmental compliance and general specifications

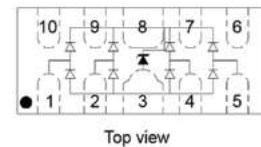
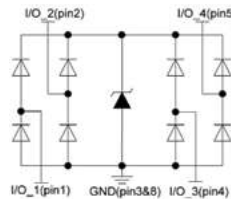
- IEC61000-4-2 (ESD)
 - Up to ±15 kV (air)
 - Up to ±15 kV (contact)
- IEC61000-4-5 (Lightning) Up to 7 A (8/20 μs)



Ordering part number



Pin out/functional diagram



Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value		Unit
		STN254033UL33	STN254033UL50	
Peak pulse power dissipation on 8/20 μ s waveform	P _{pp}	30	70	W
ESD per IEC 61000-4-2 (Air)	V _{ESD}	+/-15	+/-15	kV
ESD per IEC 61000-4-2 (Contact)		+/-8	+/-15	
Lead soldering temperature	T _L	+260 (10 seconds)	+260 (10 seconds)	°C
Operating junction temperature range	T _J	-55 to +125	-55 to +125	°C
Storage temperature range	T _{STG}	-55 to +150	-55 to +150	°C

Electrical characteristics

(+25 °C)

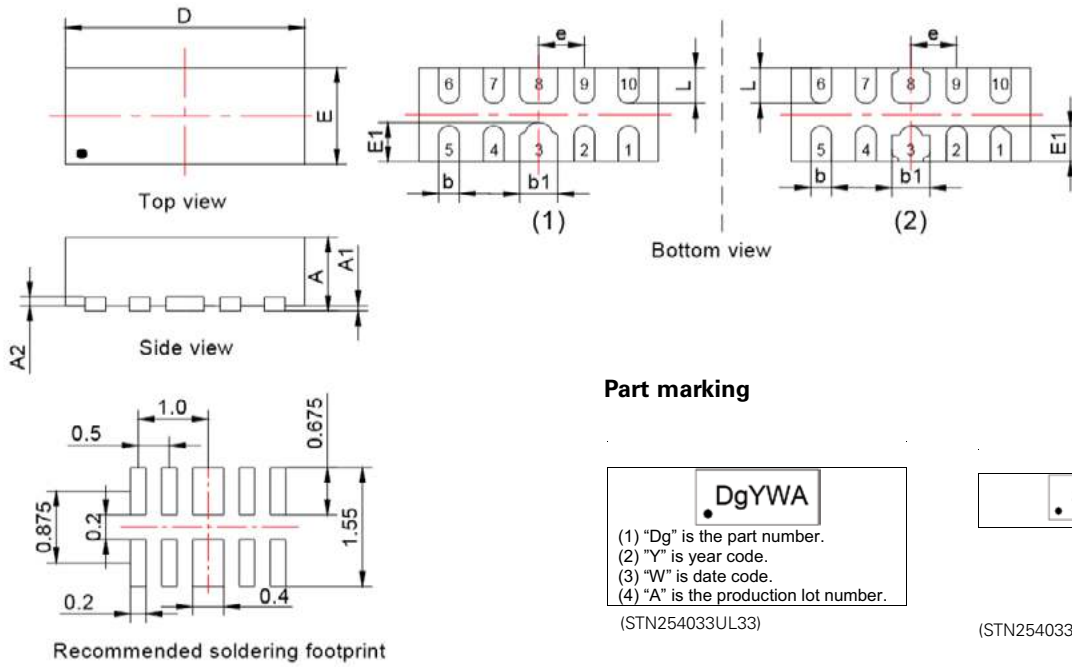
STN254033UL33

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	I/O to GND	-	-	3.3	V _{RWM} (V)
Reverse leakage current	I/O to GND V _{RWM} = 3.3 V	-	0.1	1.0	I _R (μ A)
Reverse triggering voltage	I/O to GND I _{tt} = 1 μ A	3.8		-	V _{tt} (V)
Reverse holding voltage	I/O to GND I _{hi} = 50 mA	3.5	5.5	-	V _h (V)
Clamping voltage	I _{pp} = 1 A, t _p = 8/20 μ s	-	8	9	V _C (V)
		I _{pp} = 3 A, t _p = 8/20 μ s	-	10	11
Junction capacitance	V _{RWM} = 3.3 V, f = 1 MHz I/O pin to GND	-	0.33	0.39	C _J (pF)
	V _{RWM} = 3.3 V, f = 1 MHz Between I/O pins	-	0.2	0.3	C _J (pF)

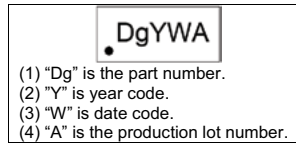
STN254033UL50

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)	
Reverse working voltage	I/O to GND	-	-	3.3	V _{RWM} (V)	
Reverse leakage current	I/O to GND V _{RWM} = 3.3 V	0.1	-	-	I _R (μ A)	
Reverse breakdown voltage	I/O to GND I _t = 1 mA	4.0		10	V _{BR} (V)	
Clamping voltage	I _{pp} = 1 A, t _p = 8/20 μ s	-	5.5	6.5	V _C (V)	
		I _{pp} = 5.0 A, t _p = 8/20 μ s	-	7.5	8.5	V _C (V)
		I _{pp} = 7.0 A, t _p = 8/20 μ s	-	9	10.5	V _C (V)
Junction capacitance	V _{RWM} = 0 V, f = 1 MHz I/O pin to GND	-	0.5	0.6	C _J (pF)	
	V _{RWM} = 0 V, f = 1 MHz Between I/O pins	-	0.25	0.35	C _J (pF)	

Mechanical parameters, pad layout- mm

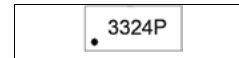


Part marking



- (1) "Dg" is the part number.
- (2) "Y" is year code.
- (3) "W" is date code.
- (4) "A" is the production lot number.

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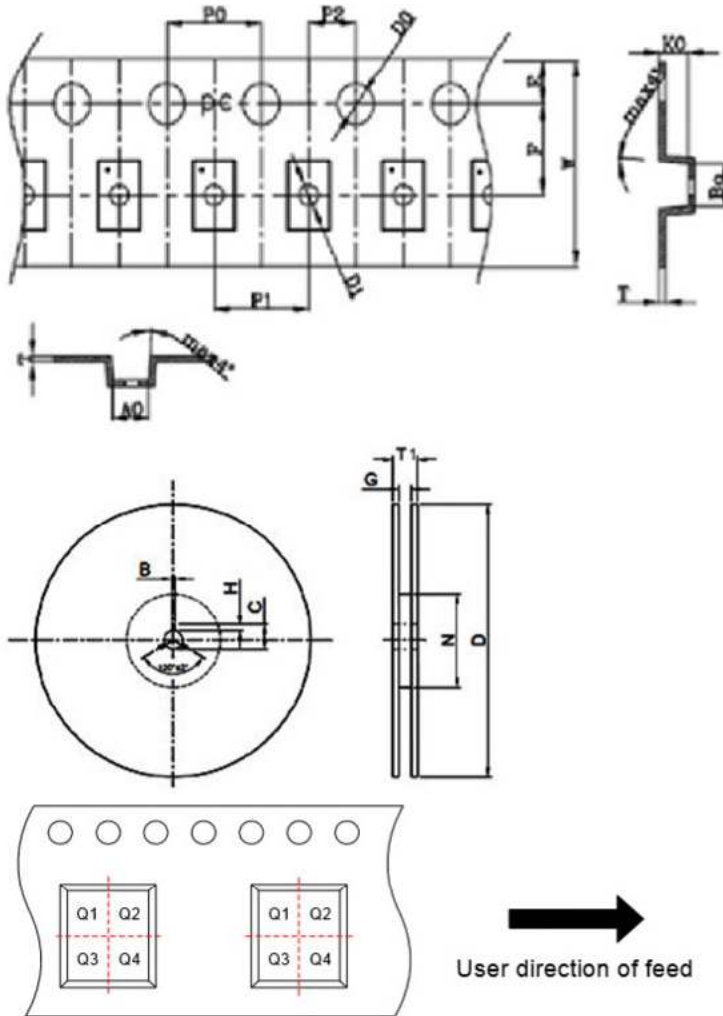
(STN254033UL50)

Dimension	Millimeters			Inches		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	0.45	-	0.65	0.018	-	0.026
A1	0.00	-	0.05	0.000	-	0.002
A2		0.15 REF			0.006 REF	
b	0.15	0.20	0.25	0.006	0.008	0.010
b1	0.35	0.40	0.45	0.014	0.016	0.018
D	2.45	2.50	2.55	0.096	0.098	0.100
E	0.95	1.00	1.05	0.037	0.039	0.041
E1	0.30	0.455	0.61	0.012	0.018	0.024
e		0.50 BSC			0.020 BSC	
L	0.33	-	0.45	0.013	-	0.018

Packaging information mm/inches

Drawing not to scale.

Supplied in tape and reel packaging, 3,000 parts per 7" diameter reel (EIA-481 compliant)

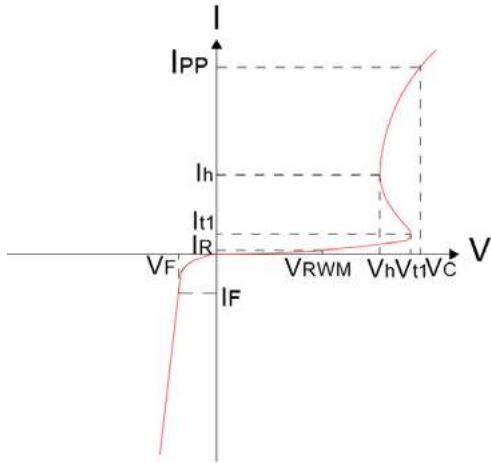


Pin 1 quadrant: Q1

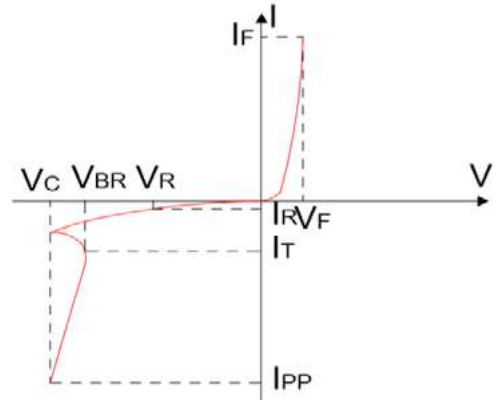
Symbol	Dimensions	
	Millimeters	Inches
A0	1.15±0.05	0.045±0.002
B0	2.70±0.05	0.106±0.002
K0	0.59±0.05	0.023±0.002
P0	4.00±0.10	0.157±0.004
P1	4.00±0.10	0.157±0.004
P2	2.00±0.05	0.079±0.002
T	0.20±0.02	0.008±0.001
E	1.75±0.10	0.069±0.004
F	3.50±0.05	0.138±0.002
D0	1.55±0.05	0.061±0.002
D1	0.60±0.10	0.024±0.004
W	8.0±0.10	0.315±0.004
B	2.0±0.5	0.079±0.020
H	4.0±0.5	0.157±0.020
C	13.0±0.5	0.512±0.020
G	8.4±1.5	0.331±0.059
T1	14.9(max)	0.587(max)
N	60	2.362
D	178±2.0	7±0.079

Ratings and V-I characteristic curves (+25 °C unless otherwise noted)

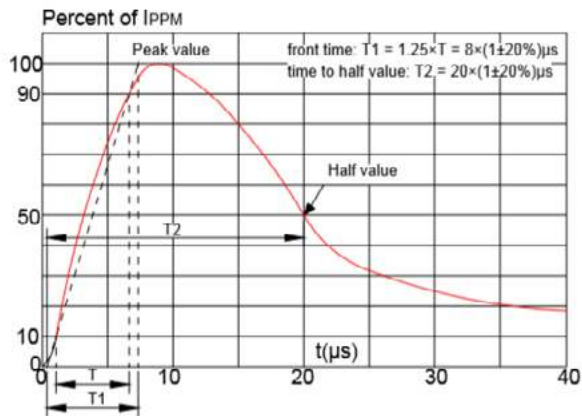
V- I curve characteristics (Uni-directional)
STN254033UL33



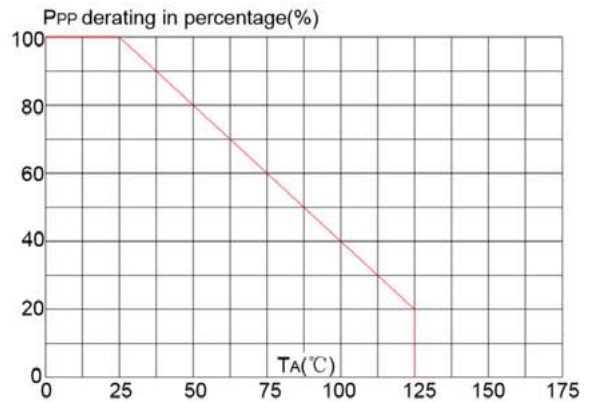
V- I curve characteristics (Uni-directional)
STN254033UL50



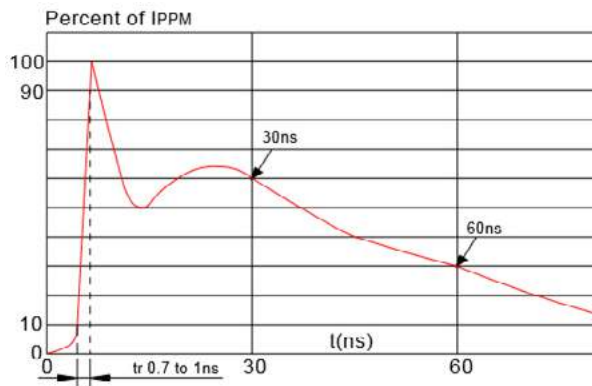
Pulse waveform (8/20 μs)



Pulse derating curve



ESD waveform



Solder reflow profile

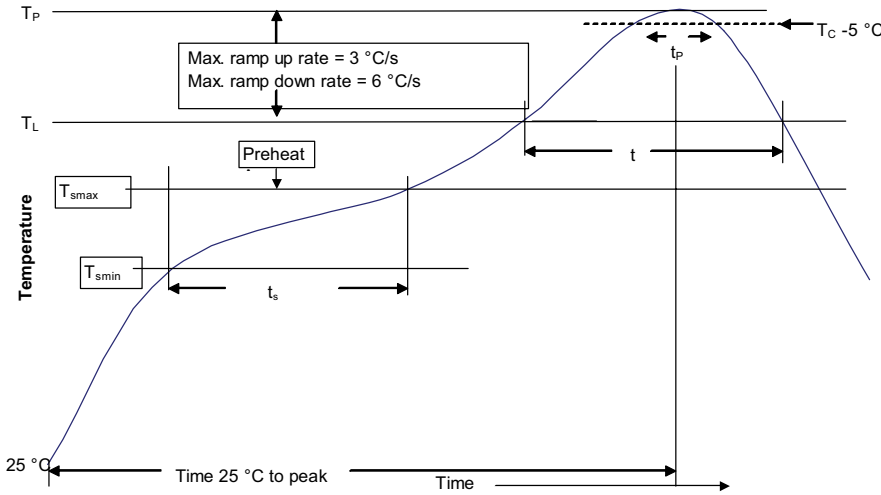


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm ³ <350	Volume mm ³ 350 - 2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Reference J-STD-020

Profile feature	Standard SnPb solder	Lead (Pb) free solder
Preheat and soak	<ul style="list-style-type: none"> Temperature min. (T_{smin}) Temperature max. (T_{smax}) Time (T_{smin} to T_{smax}) (t_s) 	<ul style="list-style-type: none"> 100 °C 150 °C 60-120 seconds
Ramp up rate T_L to T_p	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	<ul style="list-style-type: none"> 183 °C 60-150 seconds 	<ul style="list-style-type: none"> 217 °C 60-150 seconds
Peak package body temperature (T_p)*	Table 1	Table 2
Time (t_p)* within 5 °C of the specified classification temperature (T_C)	20 seconds*	30 seconds*
Ramp-down rate (T_p to T_L)	6 °C/ second max.	6 °C/ second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

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Publication No. 11136 BU-MC20118
September 2020

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