

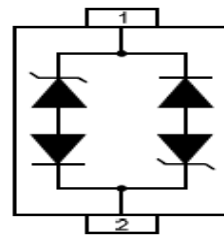


TVS Protection Array TPA323HL

- SOD323
- 350W

Features

- 350W peak pulse power (8/20 μ s)
- Ultra low capacitance: 1.0pF typical
- Ultra low leakage: nA level
- Low operating voltage:
3.3V, 5V, 8V, 12V, 15V, 18V, 24V, 30V
- Low clamping voltage
- Case Material: "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Protects one power line or data line
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test Air discharge: ± 30 kV
 - Contact discharge: ± 30 kV
 - IEC61000-4-4 (EFT) 40A (5/50ns)
 - RoHS Compliant



Applications

- USB Ports
- Smart Phones
- Wireless Systems
- Ethernet 10/100/1000 Base T

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Maximum Ratings

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	P _{pp}	350	W
Peak Pulse Current (t _p = 8/20μs)	I _{pp}	22 through 6	A
ESD per IEC 61000-4-2 (Air)	V _{ESD}	±30	KV
ESD per IEC 61000-4-2 (Contact)		±30	
Junction Temperature Range	T _J	-40~85	°C
Storage Temperature Range	T _{STG}	-55~150	°C

Note: 1. Ratings at 25°C ambient temperature unless otherwise specified.

Product Marking

Part Number	Marking
TPA323HL03	CC
TPA323HL05	AC
TPA323HL08	BC
TPA323HL12	DC
TPA323HL15	EC
TPA323HL18	FC
TPA323HL24	HC
TPA323HL30	GC

Electrical Characteristics

TPA323HL03

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			3.3	V	
Breakdown Voltage	V _{BR}	4		6	V	I _T = 1mA
Reverse Leakage Current	I _R			0.1	uA	V _{RWM} = 3.3V
Clamping Voltage	V _C			5	V	I _{pp} = 1A (8 x 20μs pulse)
Clamping Voltage	V _C			16	V	I _{pp} = 22A (8 x 20μs pulse)
Junction Capacitance	C _J		1		pF	V _R = 0V, f = 1MHz

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TPA323HL05

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			5	V	
Breakdown Voltage	V_{BR}	6		8	V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.1	uA	$V_{RWM} = 5\text{V}$
Clamping Voltage	V_C			9	V	$I_{PP} = 1\text{A}$ (8 x 20μs pulse)
Clamping Voltage	V_C			19	V	$I_{PP} = 18\text{A}$ (8 x 20μs pulse)
Junction Capacitance	C_J		1		pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$

TPA323HL08

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			8	V	
Breakdown Voltage	V_{BR}	8.5			V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.1	uA	$V_{RWM} = 8\text{V}$
Clamping Voltage	V_C			13	V	$I_{PP} = 1\text{A}$ (8 x 20μs pulse)
Clamping Voltage	V_C			19.5	V	$I_{PP} = 18\text{A}$ (8 x 20μs pulse)
Junction Capacitance	C_J		1		pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$

TPA323HL12

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			12	V	
Breakdown Voltage	V_{BR}	13.3			V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.1	uA	$V_{RWM} = 12\text{V}$
Clamping Voltage	V_C			18	V	$I_{PP} = 1\text{A}$ (8 x 20μs pulse)
Clamping Voltage	V_C			29	V	$I_{PP} = 12\text{A}$ (8 x 20μs pulse)
Junction Capacitance	C_J		1		pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$

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TPA323HL15

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			15	V	
Breakdown Voltage	V_{BR}	16.7			V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.1	uA	$V_{RWM} = 15\text{V}$
Clamping Voltage	V_C			22	V	$I_{PP} = 1\text{A}$ (8 x 20μs pulse)
Clamping Voltage	V_C			32	V	$I_{PP} = 10\text{A}$ (8 x 20μs pulse)
Junction Capacitance	C_J		1		pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$

TPA323HL18

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			18	V	
Breakdown Voltage	V_{BR}	20			V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.1	uA	$V_{RWM} = 18\text{V}$
Clamping Voltage	V_C			26	V	$I_{PP} = 1\text{A}$ (8 x 20μs pulse)
Clamping Voltage	V_C			35	V	$I_{PP} = 10\text{A}$ (8 x 20μs pulse)
Junction Capacitance	C_J		1		pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$

TPA323HL24

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			24	V	
Breakdown Voltage	V_{BR}	26.7			V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.1	uA	$V_{RWM} = 24\text{V}$
Clamping Voltage	V_C			43	V	$I_{PP} = 1\text{A}$ (8 x 20μs pulse)
Clamping Voltage	V_C			55	V	$I_{PP} = 8\text{A}$ (8 x 20μs pulse)
Junction Capacitance	C_J		1		pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$

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TPA323HL30

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			30	V	
Breakdown Voltage	V_{BR}	33.3			V	$I_T = 1mA$
Reverse Leakage Current	I_R			0.1	μA	$V_{RWM} = 30V$
Clamping Voltage	V_C			50	V	$I_{PP} = 1A$ (8 x 20 μs pulse)
Clamping Voltage	V_C			75	V	$I_{PP} = 6A$ (8 x 20 μs pulse)
Junction Capacitance	C_J		1		pF	$V_R = 0V, f = 1MHz$

Symbol	Parameter	Explanation
(1) I_{PP}	Peak pulse current	The maximum surge current that flows though the TVS
(2) V_{BR}	Breakdown voltage	The Voltage that flows though the TVS at a specified test current (I_T)
(3) I_T	Test current	A specified test current that flows though the TVS
(4) V_{RWM}	Stand-off voltage	Maximum voltage that can be applied to the TVS without operation
(5) I_R	Leakage current @ V_R	Current measured at V_R
(6) V_C	Clamping voltage	Peak voltage measured across the suppressor at a specified I_{PP} (peak impulse current)

Figure 1. Pulse Waveform (8/20 μs)

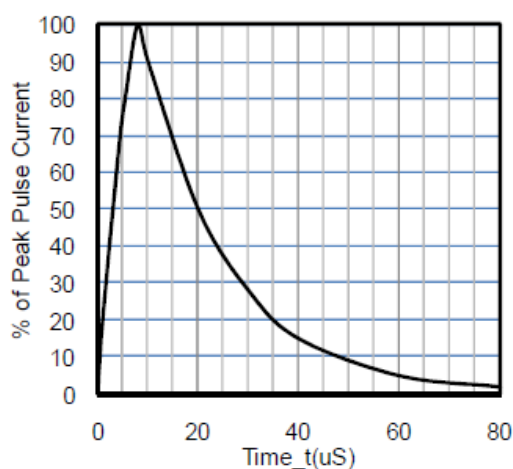
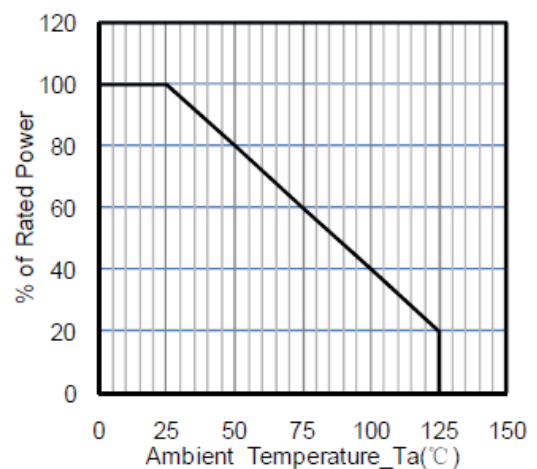


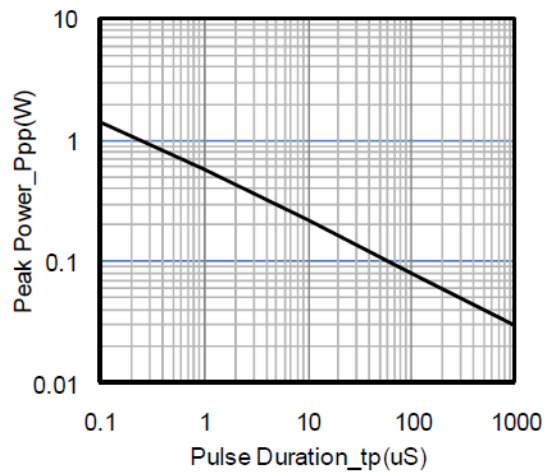
Figure 2. Power Derating Curve



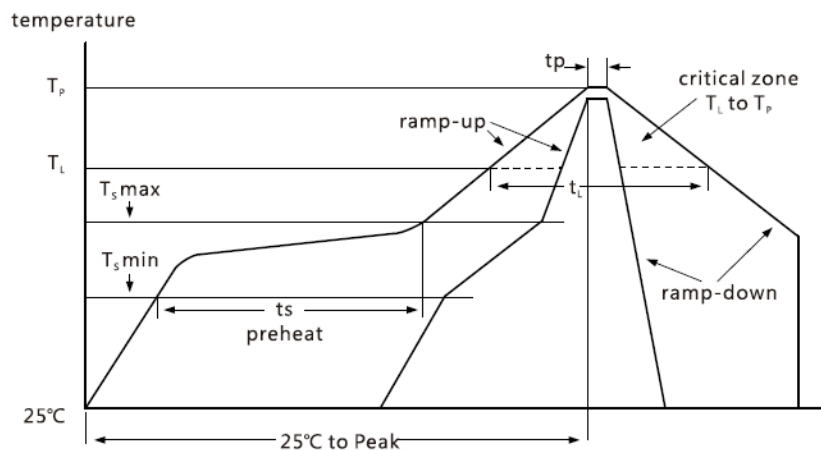
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Figure 3. Peak Pulse Power Rating Curve



Reflow Soldering Profile

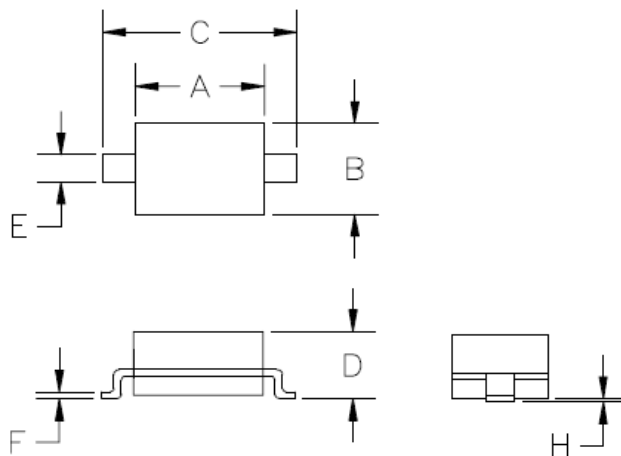


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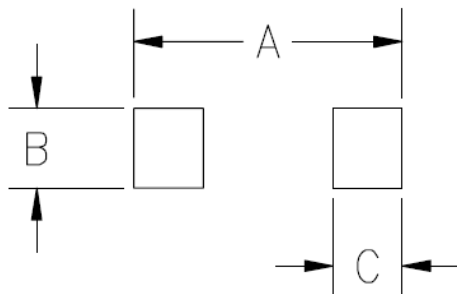
Reflow Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (T_{max} to T_{D})	3°C/sm axi um	3°C/sm axi um
Preheat		
Temperature minimum (T_{min})	100°C	150°C
Temperature maximum (T_{max})	150°C	200°C
Time (T_{min} to T_{max})	60 s to 120 s	60 s to 180 s
Time maintained above		
Temperature (T_{L})	183°C	217°C
Time (t_{L})	60 s to 150 s	60 s to 150 s
Peak/classification temperature (T_{P})	235°C	260°C
Number of allowed reflow cycles	3	3
Time within 5°C of actual peak temperature (t_{P})	10 s to 30 s	10 s to 30 s
Ramp-down rate	6°C/sm axi um	6°C/sm axi um
Time 25°C to peak temperature	6 minutes maximum	8 minutes maximum

Package Dimension (SOD323) Unit: mm



SYM	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.50	1.80	0.060	0.071
B	1.20	1.40	0.045	0.054
C	2.30	2.70	0.090	0.107
D	-	1.10	-	0.043
E	0.30	0.40	0.012	0.016
F	0.10	0.25	0.004	0.010
H	-	0.10	-	0.004

Layout Dimension Unit: mm



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
A	3.15	0.120
B	0.80	0.031
C	0.80	0.031

Packaging

Part	Component Package	Quantity	Packaging Option
TPA323HL	SOD-323	3kpcs	Tape & Reel