ESD73111CZ

1-Line, Bi-directional, Ultra-low Capacitance Transient Voltage Suppressor
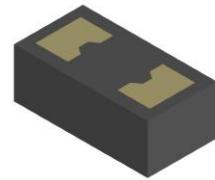
Descriptions

The ESD73111CZ is an ultra-low capacitance TVS (Transient Voltage Suppressor) designed to protect high speed data interfaces. It has been specifically designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by ESD (Electrostatic Discharge).

The ESD73111CZ incorporates one pair of ultra-low capacitance diodes.

The ESD73111CZ may be used to provide ESD protection up to ±10kV (contact discharge) according to IEC61000-4-2, and withstand peak pulse current up to 6A (8/20μs) according to IEC61000-4-5.

The ESD73111CZ is available in DWN0603-2L package. Standard products are Pb-free and Halogen-free.

DWN0603-2L (Bottom View)
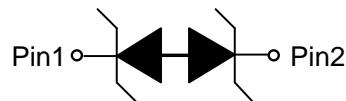
Pin configuration
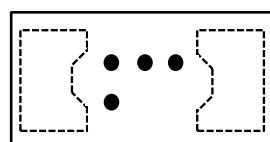
⋮ Device code

Marking (Top View)

Features

- Stand-off voltage: ±5.0V Max.
- Transient protection for each line according to
  IEC61000-4-2 (ESD): ±10kV (contact discharge)
  : ±15kV (air discharge)
  IEC61000-4-5 (surge): 6A (8/20μs)
- Low capacitance: C_J = 0.15pF typ.
- Low leakage current
- Low clamping voltage: V_{CL} = 8.0V typ. @ I_{PP} = 16A (TLP)
- Solid-state silicon technology

Order information

Device	Package	Shipping
ESD73111CZ-2/TR	DWN0603-2L	10000/Tape&Reel

Applications

- USB 3.0 and USB3.1
- HDMI 1.4 and HDMI 2.0
- Thunderbolt
- Cellular handsets

Absolute maximum ratings

| Parameter	Symbol	Rating	Unit
Peak pulse power (t_p = 8/20µs)	P_{pk}	30	W
Peak pulse current (t_p = 8/20µs)	I_{PP}	6	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	±15	kV
ESD according to IEC61000-4-2 contact discharge		±10	
Junction temperature	T_J	125	^{o}C
Operating temperature	T_{OP}	-40~85	^{o}C
Lead temperature	T_L	260	^{o}C
Storage temperature	T_{STG}	-55~150	^{o}C

Electrical characteristics (T_A=25 ^{o}C, unless otherwise noted)

V_{RWM}	Reverse stand-off Voltage
I_R	Reverse leakage current
V_{CL}	Clamping voltage
I_{PP}	Peak pulse current

V_{TRIG}	Reverse trigger voltage
I_{TRIG}	Reverse trigger current
V_{BR}	Reverse breakdown voltage
I_{BR}	Reverse breakdown current
V_{HOLD}	Reverse holding voltage
I_{HOLD}	Reverse holding current
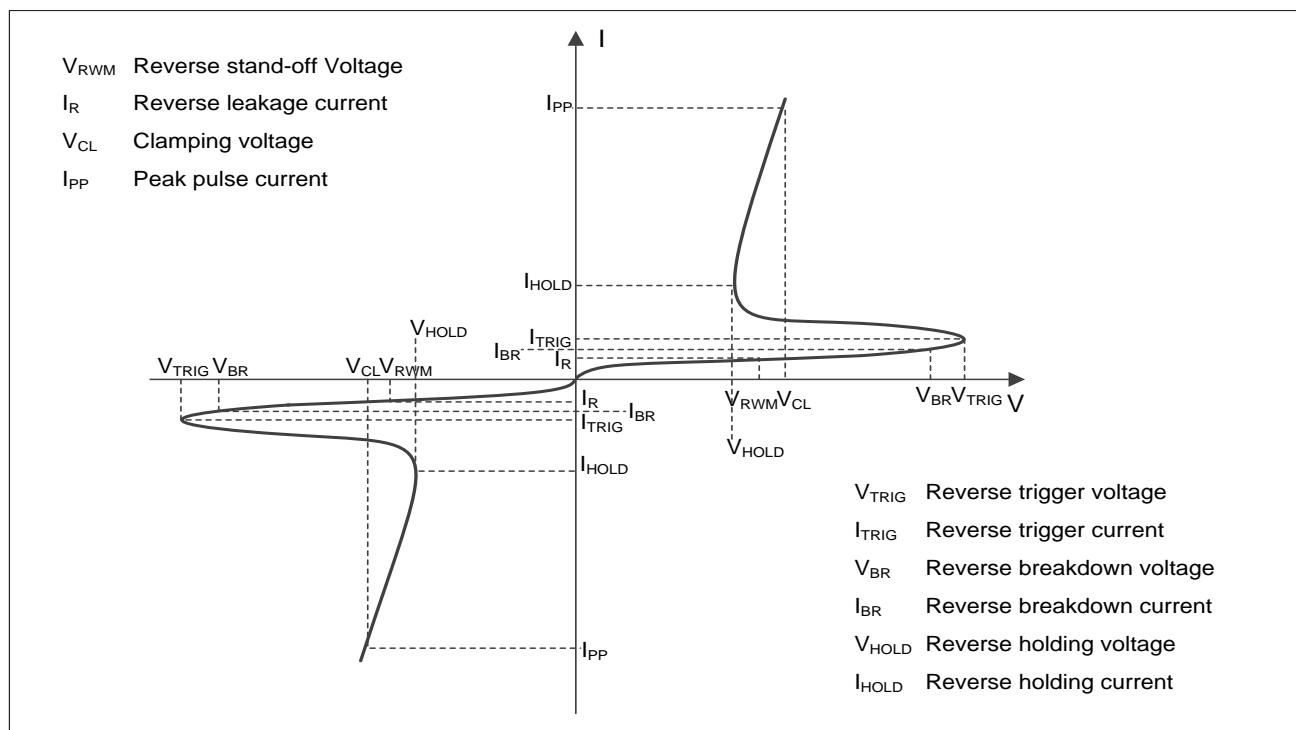
Definitions of electrical characteristics

Electrical characteristics (T$_A$=25 ^{o}C, unless otherwise noted)

| Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	V$_{RWM}$				±5.0	V
Reverse leakage current	I$_R$	V$_{RWM}$ = 5.0V			1.0	μA
Reverse breakdown voltage	V$_{BR}$	I$_T$ = 1mA	9.5	11	12.5	V
Clamping voltage [1]	V$_{CL}$	I$_{PP}$ = 16A, t$_p$ = 100ns		8.0		V
Dynamic resistance [1]	R$_{DYN}$			0.34		Ω
Clamping voltage [2]	V$_{CL}$	V$_{ESD}$ = 8kV		8.0		V
Clamping voltage [3]	V$_{CL}$	I$_{PP}$ = 1A, t$_p$ = 8/20μs		3.0	3.5	V
		I$_{PP}$ = 6A, t$_p$ = 8/20μs		5.5	6.5	V
Junction capacitance	C$_J$	V$_R$ = 1.5V, f = 1MHz		0.15	0.20	pF

Notes:

1) *TLP parameter: Z$_0$ = 50Ω, t$_p$ = 100ns, t$_r$ = 2ns, averaging window from 60ns to 80ns. R$_{DYN}$ is calculated from 4A to 16A.*

2) *Contact discharge mode, according to IEC61000-4-2.*

3) *Non-repetitive current pulse, according to IEC61000-4-5.*

Typical characteristics (T$_A$=25°C, unless otherwise noted)

Front time: T$_1$= 1.25 × T = 8µs
Time to half-value: T$_2$= 20µs

Peak pulse current (%)

Time (µs)

T$_2$

T$_1$

T
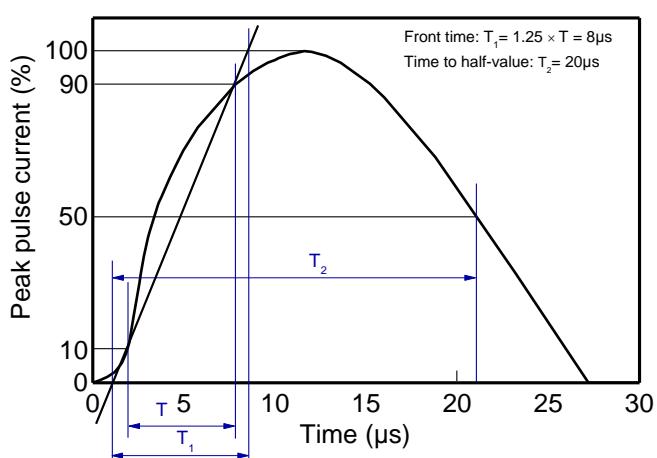
8/20µs waveform per IEC61000-4-5

Current (%)

t$_r$ = 0.7~1ns

Time (ns)

30ns   60ns   t
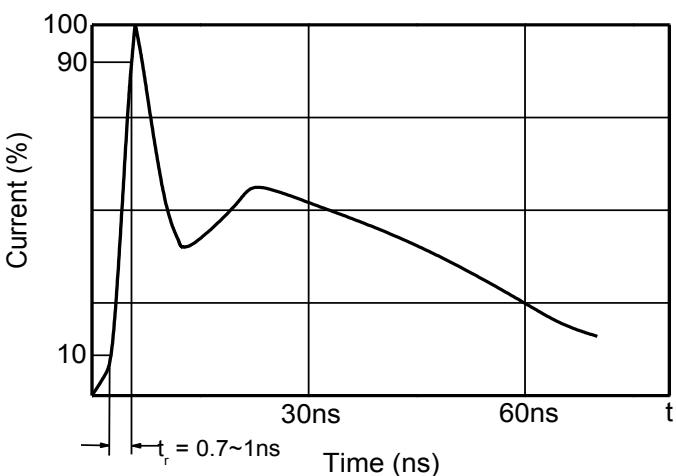
Contact discharge current waveform per IEC61000-4-2

Pulse waveform: t$_p$ = 8/20µs

V$_C$ - Clamping voltage (V)

I$_{PP}$ - Peak pulse current (A)
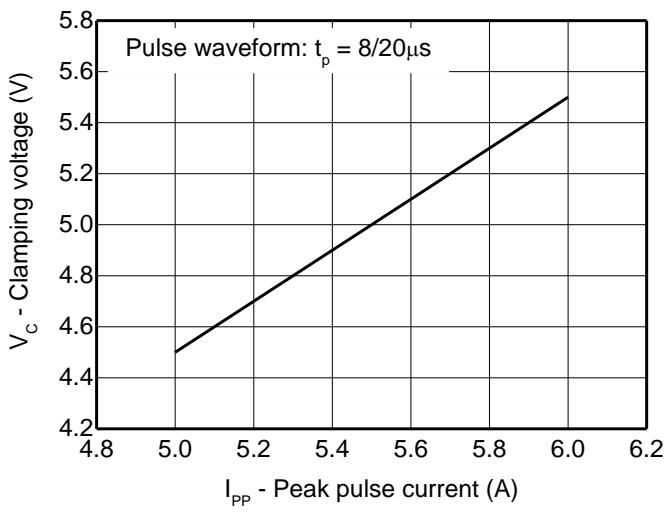
Clamping voltage vs. Peak pulse current

f = 1MHz
V$_{AC}$ = 50mV

C$_J$ - Junction capacitance (pF)

V$_R$ - Reverse voltage (V)
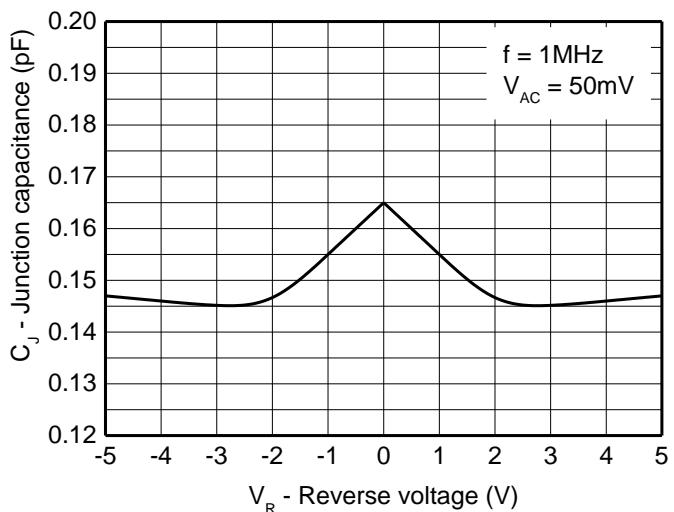
Capacitance vs. Reverse voltage

Peak pulse power (W)
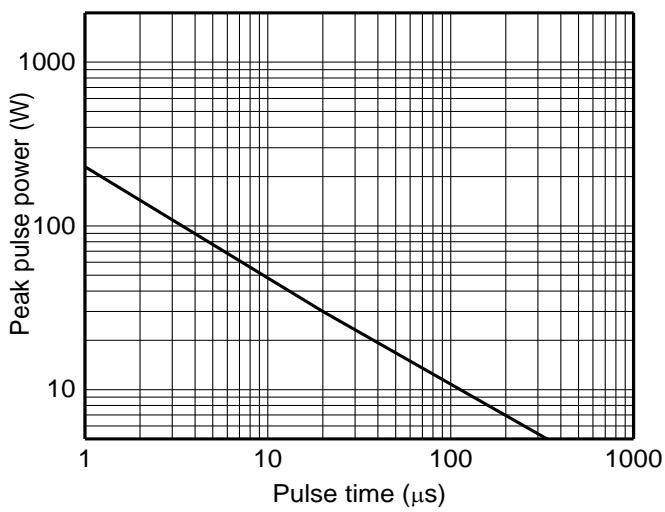
Pulse time (µs)

Non-repetitive peak pulse power vs. Pulse time

% of Rated power

T$_A$ - Ambient temperature (^{o}C)
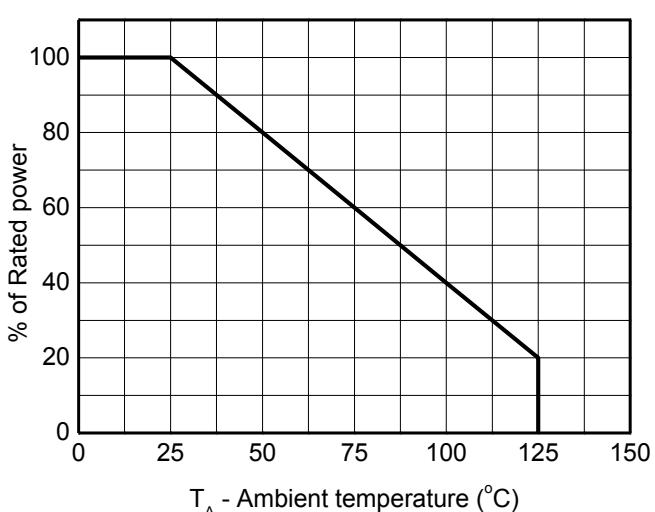
Power derating vs. Ambient temperature

## Typical characteristics (T$_A$ = 25 ^{o}C, unless otherwise noted)
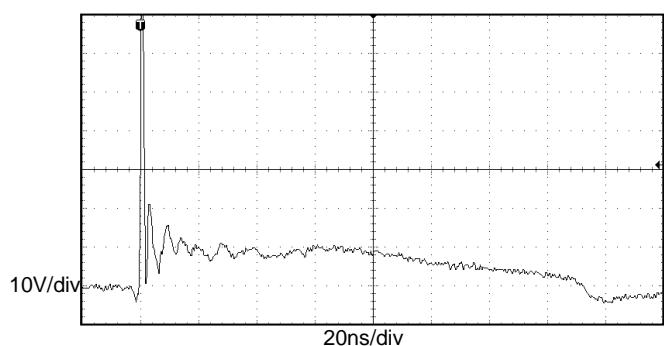
ESD clamping

**(+8kV contact discharge per IEC61000-4-2)**

**ESD clamping**

(-8kV contact discharge per IEC61000-4-2)

$Z_0 = 50\Omega$

$t_r = 2ns$

$t_p = 100ns$
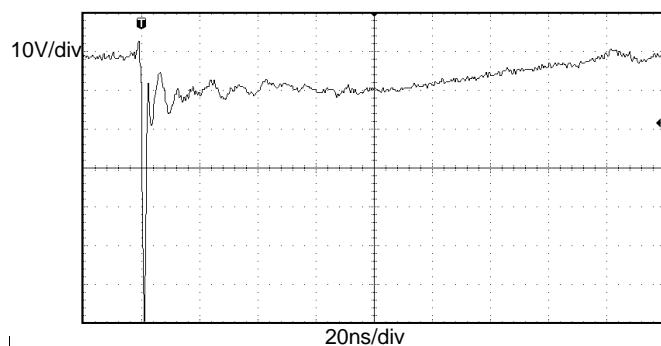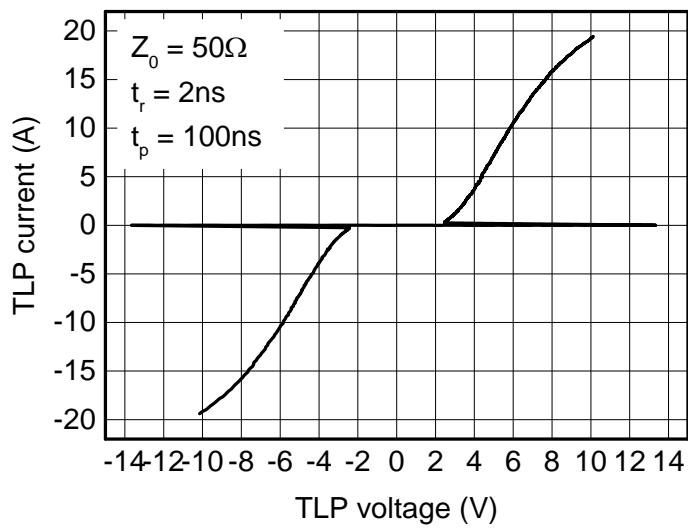
TLP Measurement

PACKAGE OUTLINE DIMENSIONS

DWN0603-2L

D

E

TOP VIEW

W

H

P

BOTTOM VIEW

A
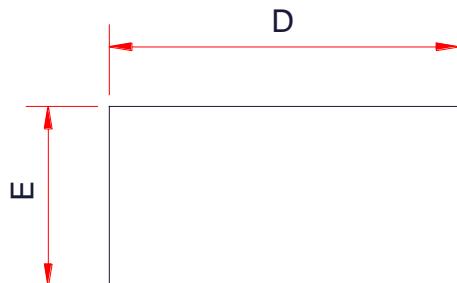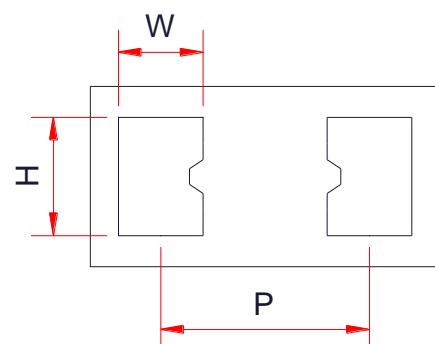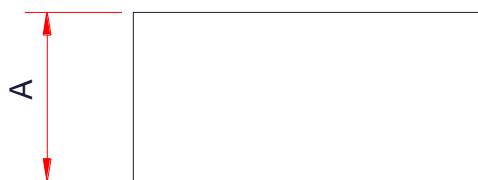
SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.29	0.31	0.34
E	0.29	0.32	0.35
D	0.59	0.62	0.65
W	0.15Ref		
H	0.21Ref		
P	0.38Ref		

Recommend land pattern (Unit: mm)

0.18   0.20

0.25

0.38

0.58
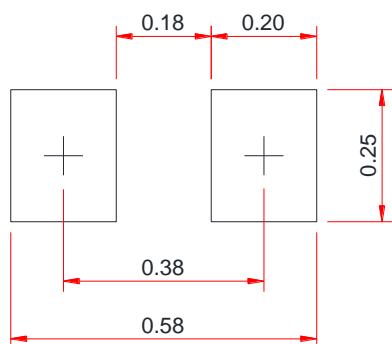
Notes:

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

TAPE AND REEL INFORMATION

Reel Dimensions
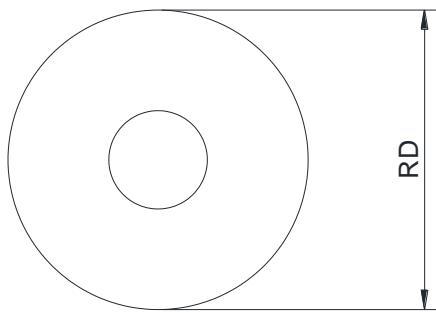
Tape Dimensions
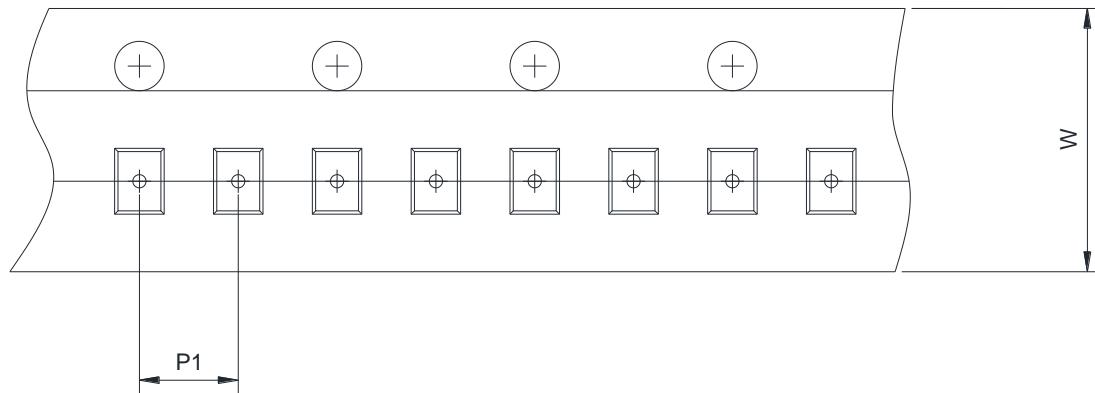
Quadrant Assignments For PIN1 Orientation In Tape

User Direction of Feed
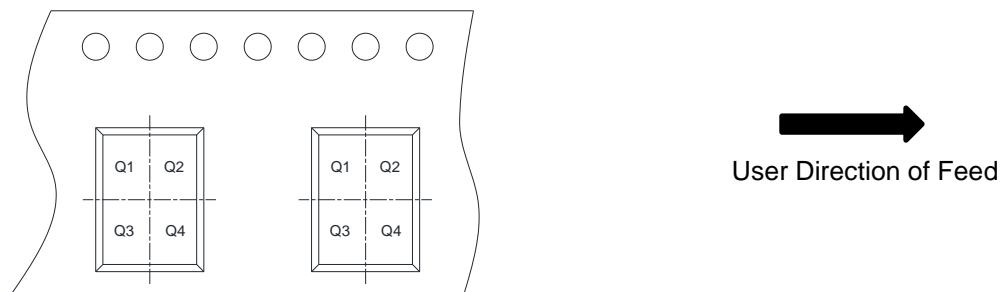
RD	Reel Dimension	☑ 7inch	☐ 13inch	
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm
P1	Pitch between successive cavity centers	☑ 2mm	☐ 4mm	☐ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☑ Q2	☐ Q3	☐ Q4

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