

## Description

The UE050603ULCBD is an ultra-low capacitance TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive data and power line. The UE050603ULCBD complies with the IEC 61000-4-2 (ESD) standard with  $\pm 15\text{kV}$  air and  $\pm 10\text{kV}$  contact discharge. It is assembled into an ultra-small lead-free DWN package. Standard products are Pb-free and Halogen-free.

## Features

- ◆ Low capacitance
- ◆ Low leakage current
- ◆ Operating voltage: 5V
- ◆ Low clamping voltage
- ◆ Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test  
Air discharge:  $\pm 15\text{kV}$   
Contact discharge:  $\pm 10\text{kV}$
  - IEC61000-4-5 (Lightning) 6A (8/20 $\mu\text{s}$ )
- ◆ RoHS Compliant

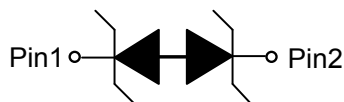
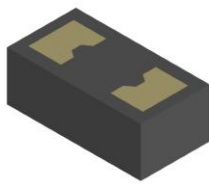
## Mechanical Characteristics

- ◆ Package: DWN0603-2L
- ◆ Case Material: “Green” Molding Compound.
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

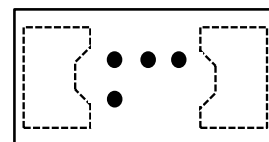
## Applications

- ◆ USB 3.0 and USB 3.1
- ◆ HDMI 1.4 and HDMI 2.0
- ◆ Thunderbolt
- ◆ Cellular Handsets

## Dimensions and Pin Configuration



## Marking Information



••• = Device Marking code

DWN0603-2L (Bottom View)    Circuit and Pin Schematic

## Ordering Information

Part Number	Marking	Packaging	Reel Size
UE050603ULCBD	•••	10000/Tape & Reel	7 inch

**Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20μs)	P <sub>pk</sub>	30	W
Peak Pulse Current(8/20μs)	I <sub>pp</sub>	6	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	±15	kV
ESD per IEC 61000-4-2 (Contact)		±10	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +125	°C

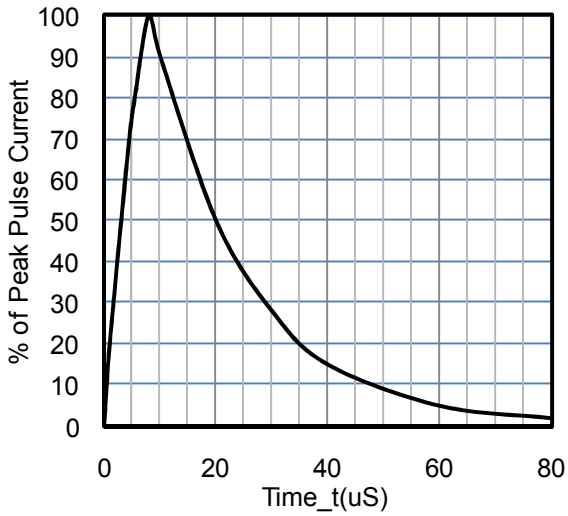
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	V <sub>RWM</sub>				±5.0	V
Reverse leakage current	I <sub>R</sub>	V <sub>RWM</sub> = 5.0V			1.0	μA
Reverse breakdown voltage	V <sub>BR</sub>	I <sub>T</sub> = 1mA	9.5	11	12.5	V
Clamping voltage <sup>1)</sup>	V <sub>CL</sub>	I <sub>PP</sub> = 16A, t <sub>p</sub> = 100ns		8.0		V
Dynamic resistance <sup>1)</sup>	R <sub>DYN</sub>			0.34		Ω
Clamping voltage <sup>2)</sup>	V <sub>CL</sub>	V <sub>ESD</sub> = 8kV		8.0		V
Clamping voltage <sup>3)</sup>	V <sub>CL</sub>	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs		3.0	3.5	V
		I <sub>PP</sub> = 6A, t <sub>p</sub> = 8/20μs		5.5	6.5	V
Junction capacitance	C <sub>J</sub>	V <sub>R</sub> = 1.5V, f = 1MHz		0.15	0.20	pF

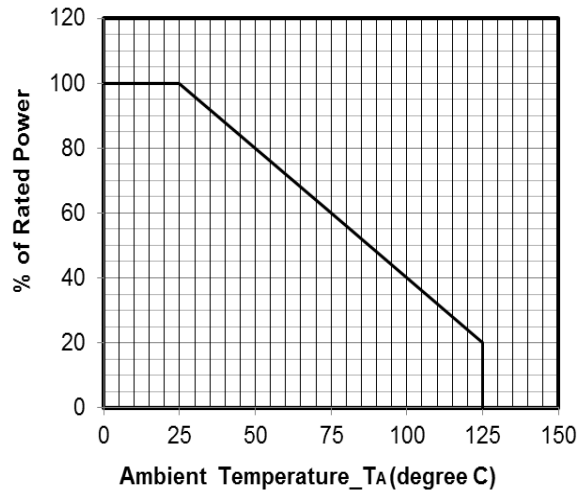
Notes:

- 1) TLP parameter: Z<sub>0</sub> = 50Ω, t<sub>p</sub> = 100ns, t<sub>r</sub> = 2ns, averaging window from 60ns to 80ns. R<sub>DYN</sub> 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.

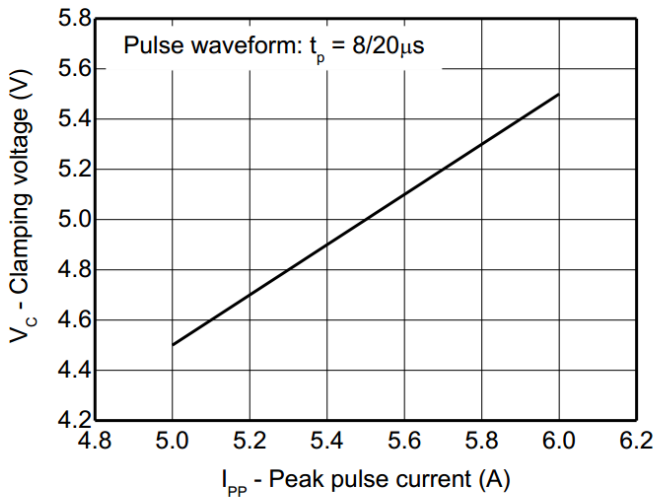
**Typical Performance Characteristics (TA=25°C unless otherwise Specified)**



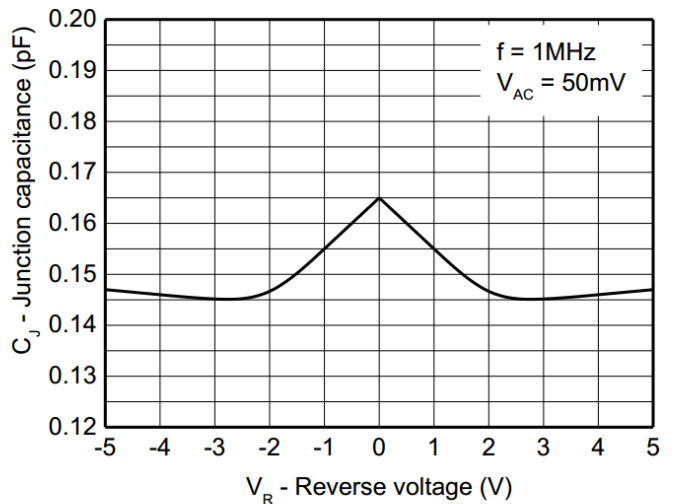
**8 X 20µs Pulse Waveform**



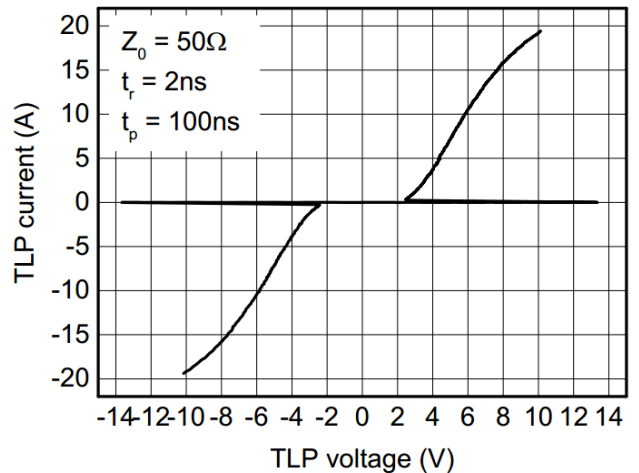
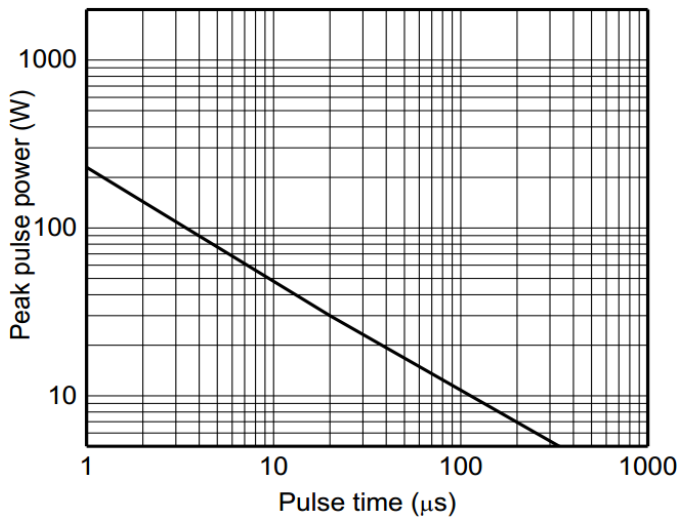
**Power Derating Curve**



**Clamping voltage vs. Peak pulse current**

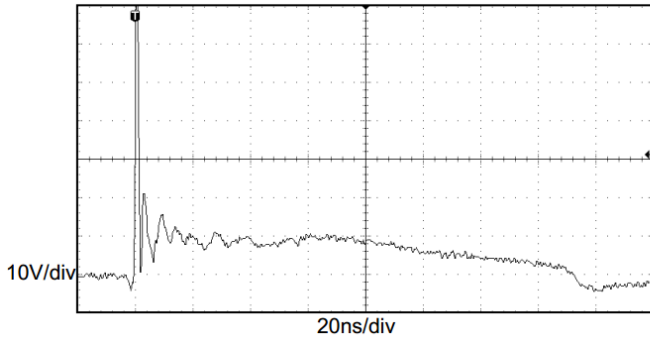


**Capacitance vs. Reverse voltage**

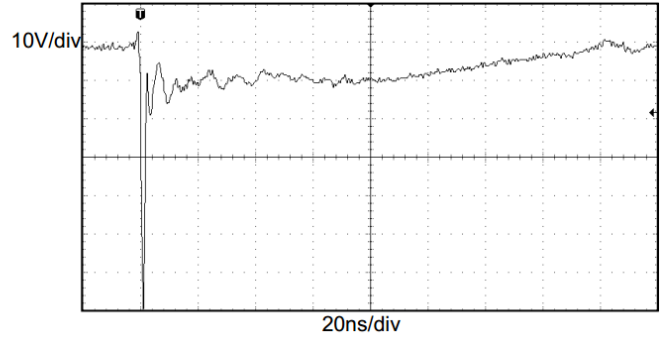


**TLP Measurement**

**Typical Performance Characteristics (TA=25°C unless otherwise Specified)**

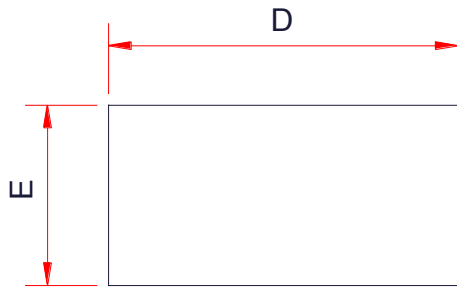


**ESD clamping  
(+8kV contact discharge per IEC61000-4-2)**

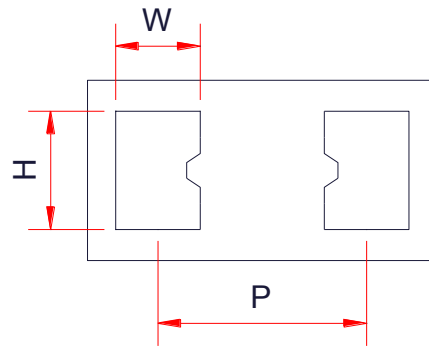


**ESD clamping  
(-8kV contact discharge per IEC61000-4-2)**

**DWN0603-2L Package Outline Drawing**



TOP VIEW



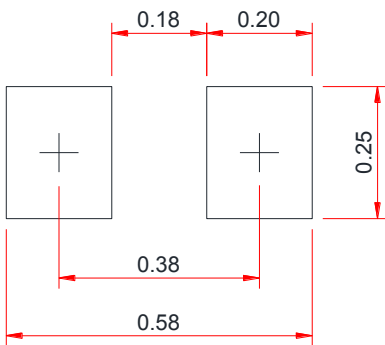
BOTTOM VIEW



SIDE VIEW

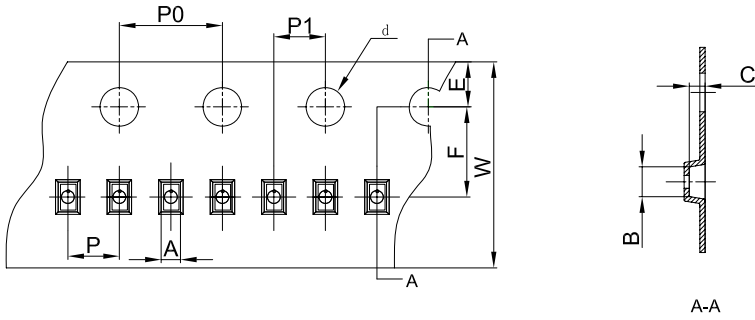
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.29	0.31	0.34
E	0.29	0.32	0.35
D	0.59	0.62	0.65
W	0.15Ref		
H	0.21Ref		
P	0.38Ref		

**Suggested Land Pattern**



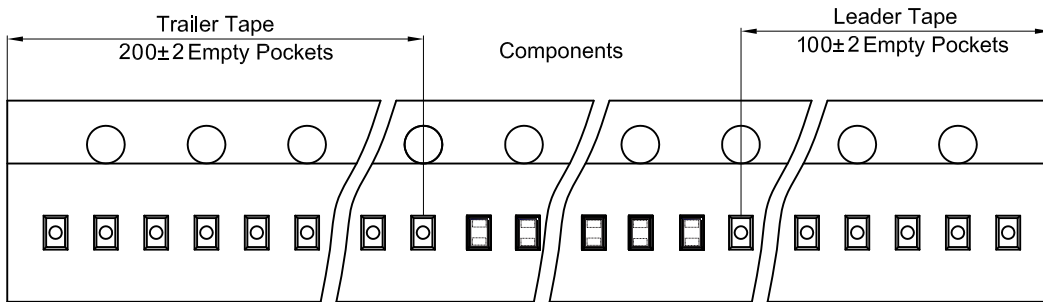
**TAPE AND REEL INFORMATION**

DWN0603-2L Embossed Carrier Tape

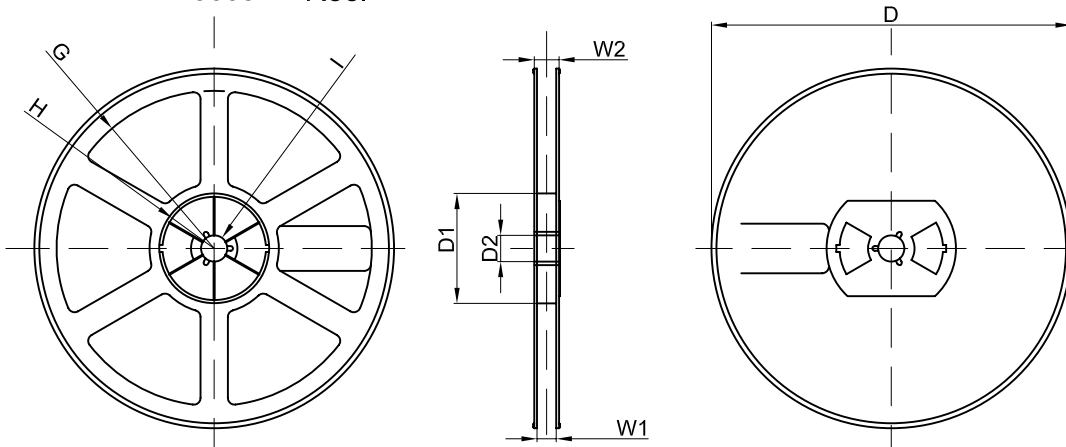


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
	0.38	0.68	0.34	Ø1.5	1.75	3.50	4.00	2.00	2.00	8.00

DWN0603-2L Tape Leader and Trailer



DWN0603-2L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø178.00	54.00	13.20	R79.00	R25.75	R6.60	9.50	12.60

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
10,000 pcs	7 inch	150,000 pcs	203×203×195	600,000 pcs	438×438×220	