

1-Line Ultra Low Capacitance Bi-directional TVS Diode
FEATURES

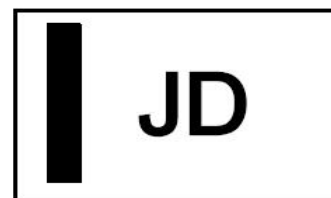
- Ultra small package: 0.6x0.3x0.3mm
- Ultra low capacitance: 0.15pF typical
- Ultra low leakage: nA level
- Operating voltage: 5V
- Low clamping voltage
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 25\text{kV}$
 - Contact discharge: $\pm 20\text{kV}$
 - IEC61000-4-5 (Lightning) 4A (8/20 μs)
- RoHS Compliant

APPLICATIONS

- Cellular Handsets and Accessories
- Display Ports
- MDDI Ports
- USB Ports
- Digital Visual Interface (DVI)
- PCI Express and Serial SATA Ports

MECHANICAL DATA

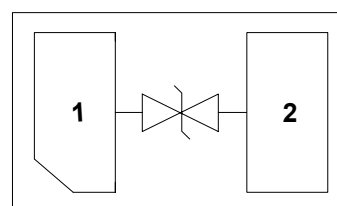
- Package: DFN0603-2 (0.6x0.3x0.3mm)
- Case Material: "Green" Molding Compound.
- Terminal Connections: See Diagram Below
- Marking Information: See Below



JD= Device code

Marking (Top View)

DFN0603-2 PACKAGE

SCHEMATIC & PIN CONFIGURATION

DESCRIPTION

The SESD05DLCBW is a bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast re-sponse time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The SESD05DLCBW has an ultra-low capacitance with a typical value at 0.15pF, and complies with the IEC 61000-4-2 (ESD) standard with $\pm 25\text{kV}$ air and $\pm 20\text{kV}$ contact discharge. It is assembled into an ul-tra-small 0.6x0.3x0.3mm lead-free DFN package. The small size, ultra-low capacitance and high ESD surge protection make SESD05DLCBW an ideal choice to protect cell phone, digital video interfaces, HDMI, DVI, USB2.0, USB3.0, and other high speed ports.



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Maximum ratings(Temp=25°C Unless Otherwise Specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	Ppk	100	W
Peak Pulse Current (8/20μs)	I _{PP}	4	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V _{ESD}	±25 ±20	KV
Operating Temperature Range	T _J	-55 to +125	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C

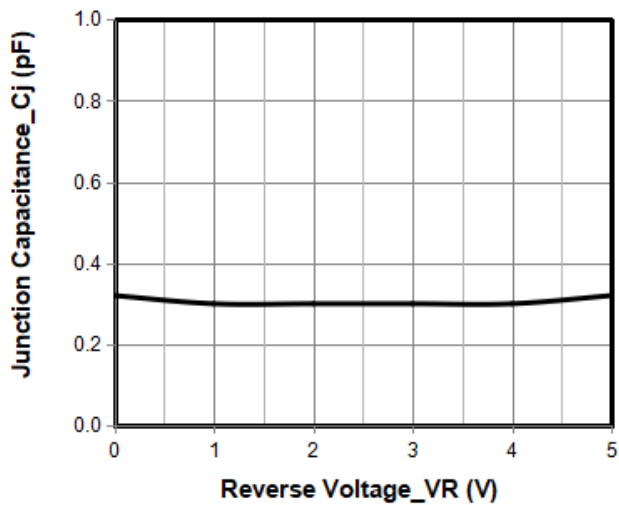
Electrical characteristics(Temp=25°C Unless Otherwise Specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}		5		V	
Breakdown Voltage	V _{BR}	6.5		9.5	V	I _T = 1mA
Reverse Leakage Current	I _R			0.2	μA	V _{RWM} = 5V
Clamping Voltage	V _C			12	V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V _C			25	V	I _{PP} = 4A (8 x 20μs pulse)
Junction Capacitance	C _J		0.15		pF	V _R = 0V, f = 1MHz

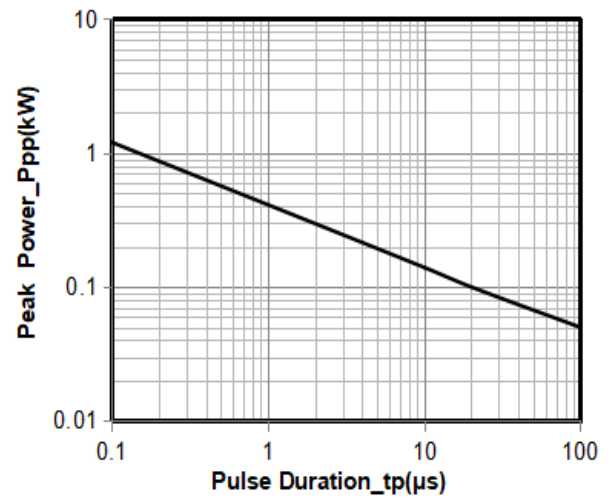


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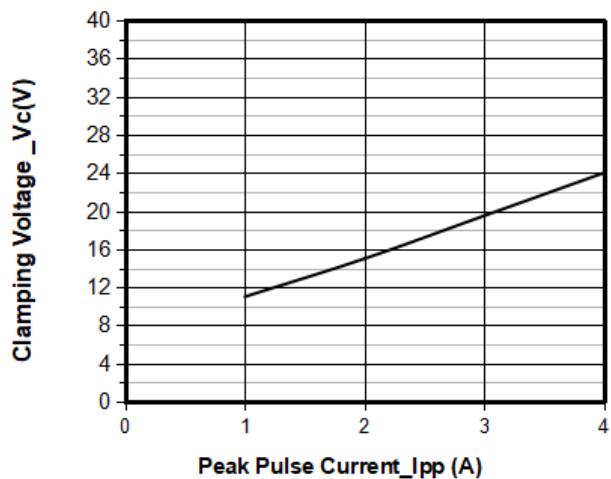
Typical Performance Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise Specified)



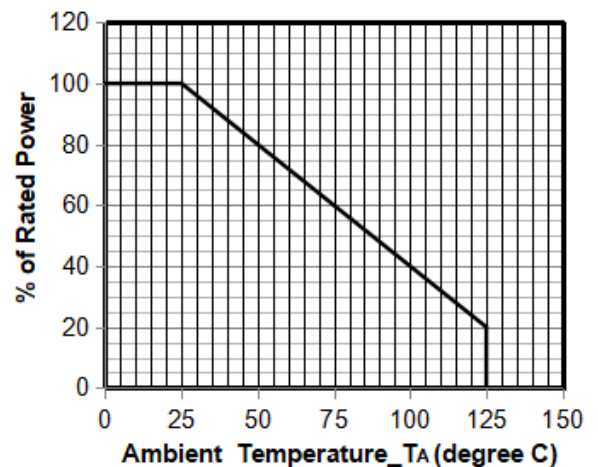
Junction Capacitance vs. Reverse Voltage



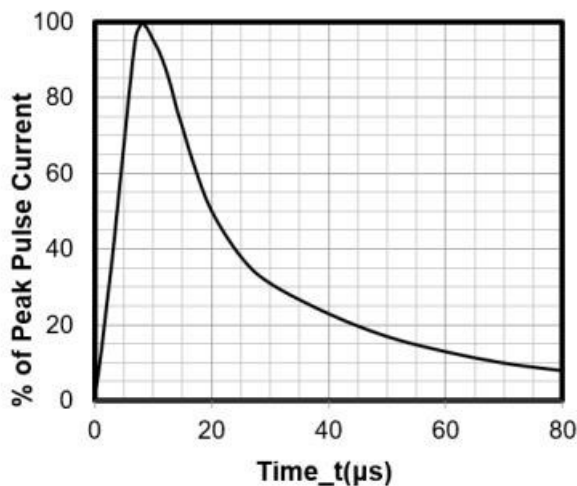
Peak Pulse Power vs. Pulse Time



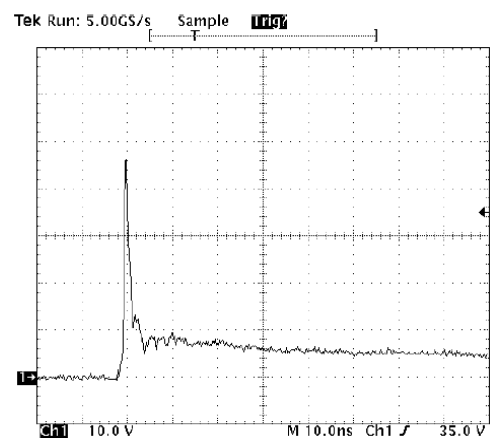
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8 X 20 μs Pulse Waveform



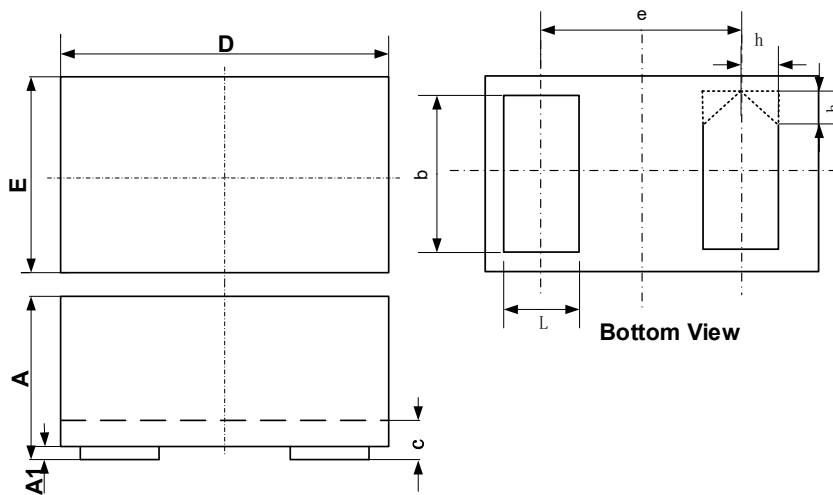
ESD Clamping Voltage

8 kV Contact per IEC61000-4-2



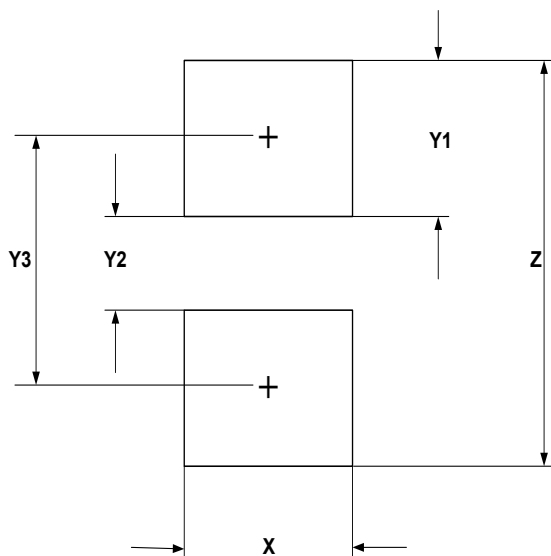
1-Line Ultra Low Capacitance Bi-directional TVS Diode

DFN0603-2 Package Outline Drawing



SYM	DIMENSIONS		
	MILLIMETERS		
	MIN	NOM	MAX
A	0.230		0.330
A1	0.000	0.020	0.050
b	0.215	0.245	0.275
c	0.120	0.150	0.180
D	0.550	0.600	0.650
e	0.355 BSC		
E	0.250	0.300	0.350
L	0.160	0.190	0.220
h	0.079 BSC		

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X	0.30	0.012
Y1	0.25	0.010
Y2	0.15	0.006
Y3	0.40	0.016
Z	0.65	0.026

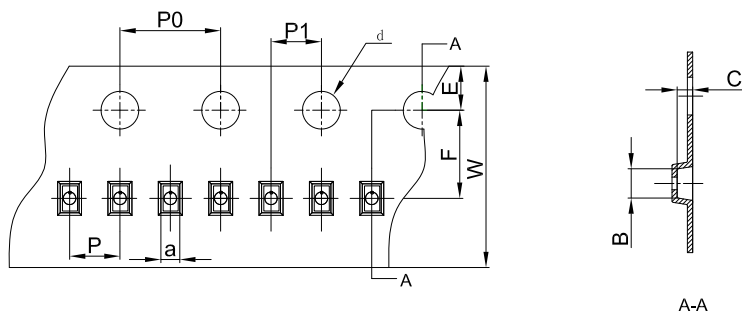


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TAPE AND REEL INFORMATION

DFN0603-2

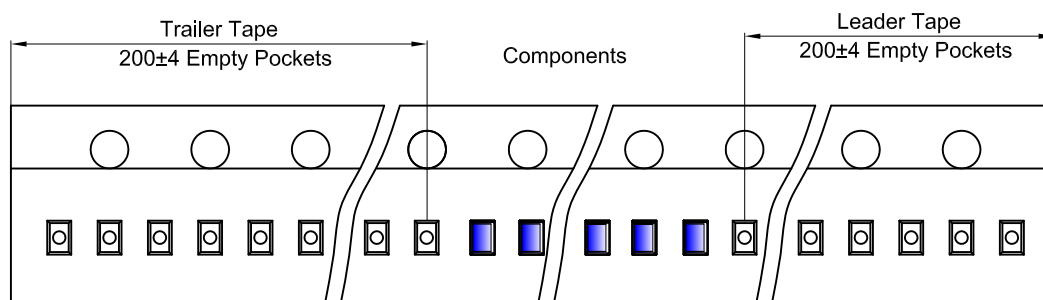
Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
DFN0603-2L	0.41	0.70	0.38	Ø1.50	1.75	3.50	4.00	2.00	2.00	8.00

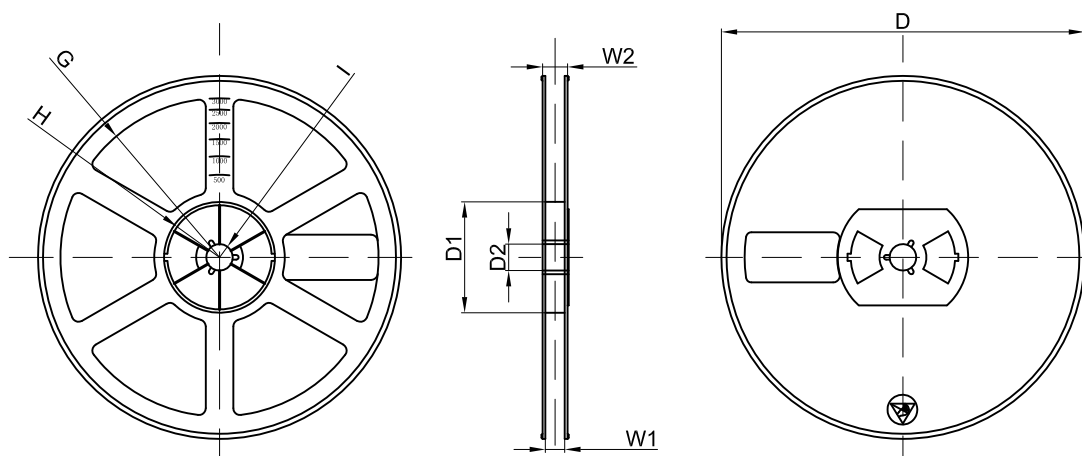
DFN0603-2

Tape Leader and Trailer



DFN0603-2

Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
10,000 pcs	7 inch	100,000 pcs	203×203×195	400,000 pcs	438×438×220	



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Ordering Information:

Device PN	Marking ⁽⁴⁾	Packing
SESD05DLCBW -T ⁽¹⁾ H ⁽²⁾ -WS ⁽³⁾	JD	Tape&Reel: 15 Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) Packing code suffix "G" for RoHS product ; Packing code Suffix "H" for halogen free product.
All materials and products supplied comply with the U.S. Toxic Substances Control Act statement, PBT Chemicals.

(3) Willas brand abbreviation, Label Type does not display.

(4) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

Disclaimer

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This is the preliminary specification. WILLAS products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of WILLAS. Customers using or selling WILLAS components for use in such applications do so at their own risk and shall agree to fully indemnify WILLAS Inc and its subsidiaries harmless against all claims, damages and expenditures.

◆Mounting and Storage Conditions

Willas has set the following requirements for the heat resistance of components.

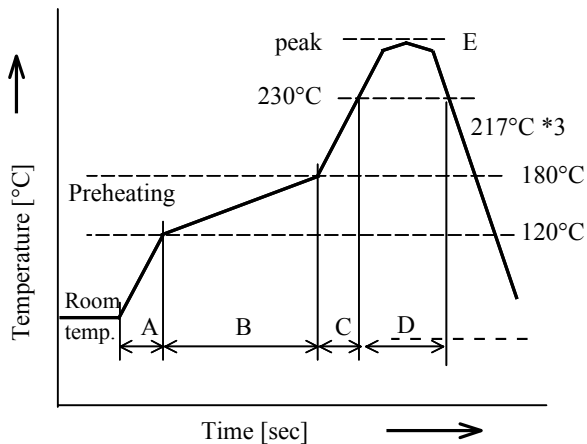
[Assumption] Moisture absorption prior to the reflow/flow soldering of components in dry pack.

With components in dry pack, reflow/flow soldering shall be completed within 168 hours after unpacking

(Storage environment:30°C 70%RH)

1.Reflow soldering

Temperature profile



Conditions

	Components size ^{*1}	☐ 28mm or less	☐ Over 28mm	Unit
A	Temp. rise gradient ^{*2}	1 - 3		°C/sec
B	Heating time	50 - 150		sec
	Heating temperature	120 - 180		°C
C	Temp. rise gradient ^{*2}	1 - 3		°C/sec
D	Time over 230°C	90	70	sec
	Peak temperature	260	250	°C
	Peak-temp. hold time	1-10	1-10	sec
Soldering		2		times

*1.Length or width, whichever is the greater outside dimension (length for a rectangular component)

*2.Temperatures and time for A through E in the table above shall be measured on the top surface of the components size.

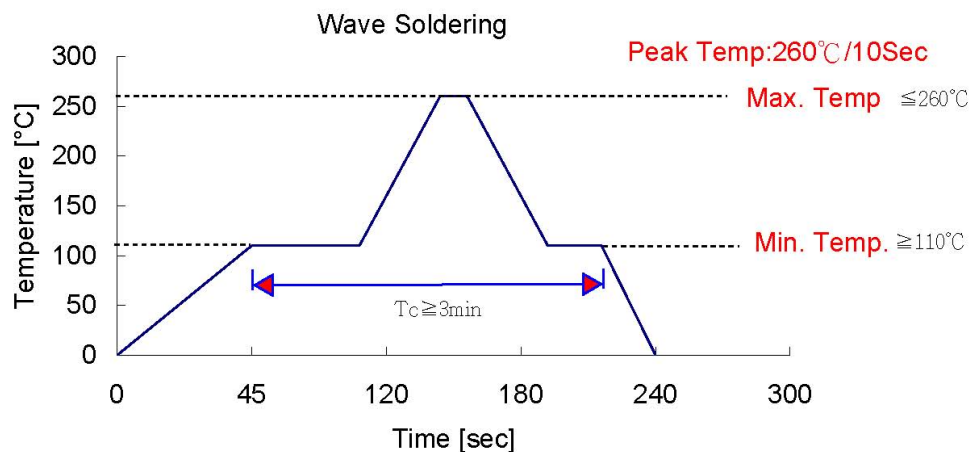
*3.Time over 217 °C be 90-150 seconds .

2.Flow (wave) soldering (solder dipping)

Peak temperature	260°C
Dipping time	10 sec
Soldering	1 time

SMD : Dipping the entire component

component for Insertion :Dipping to the lead joint of component



3. Hand soldering / touchup

Soldering iron tip temperature	380°C
Soldering time	3 sec



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Moisture Sensitivity Level (MSL)

If devices are not handled correctly, in accordance with their MSL conditions, then they will start to naturally absorb moisture. When heated rapidly during reflow soldering, the moisture turns to steam. If it cannot escape quickly enough the pressure built up may damage the component by cracking the package moulding, an effect known as “Popcorning”.

IPC/JEDEC J-STD-020C also defines device MSLs as part of the specification. MSL Level 1 is used for products supplied without moisture proof packaging. The products of Willas have an MSL Level of 1.

The Table below details the MSL Levels and conditions defined by J-STD-020C

MSL	Floor Life Time	Floor Conditions
1	Unlimited	$\leq 30^{\circ}\text{C}/ 85\% \text{ RH}$
2	1 Year	$\leq 30^{\circ}\text{C}/ 60\% \text{ RH}$
2a	4 Weeks	$\leq 30^{\circ}\text{C}/ 60\% \text{ RH}$
3	168 Hours	$\leq 30^{\circ}\text{C}/ 60\% \text{ RH}$
4	72 Hours	$\leq 30^{\circ}\text{C}/ 60\% \text{ RH}$
5	48 Hours	$\leq 30^{\circ}\text{C}/ 60\% \text{ RH}$
5a	24 Hours	$\leq 30^{\circ}\text{C}/ 60\% \text{ RH}$
6	Time on Label	$\leq 30^{\circ}\text{C}/ 60\% \text{ RH}$