Transient Voltage Suppressor

Features

- Small Body Outline Dimensions
- Only Protects one I/O
- Low Capacitance
- Working Voltage: 5.0V
- Low Leakage Current

IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) ±30kV (air), ±30kV (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 10A (8/20μs)

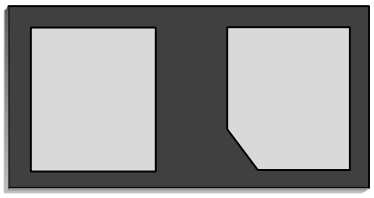
Mechanical Characteristics

- DFN0603-2L package
- Marking : Marking Code
- Packaging : Tape and Reel
- RoHS Compliant & HF
- Device meets MSL1 requirement

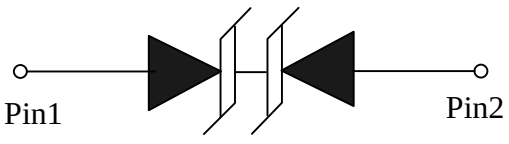
Applications

- USB 2.0 and USB 3.0 and USB4.0
- HDMI 1.3/1.4 and HDMI 2.0/2.1
- SATA and ESATA
- DVI
- IEEE 1394
- PCI Express
- Notebooks
- Portable Electronics

Schematic & PIN Configuration



DFN0603-2L

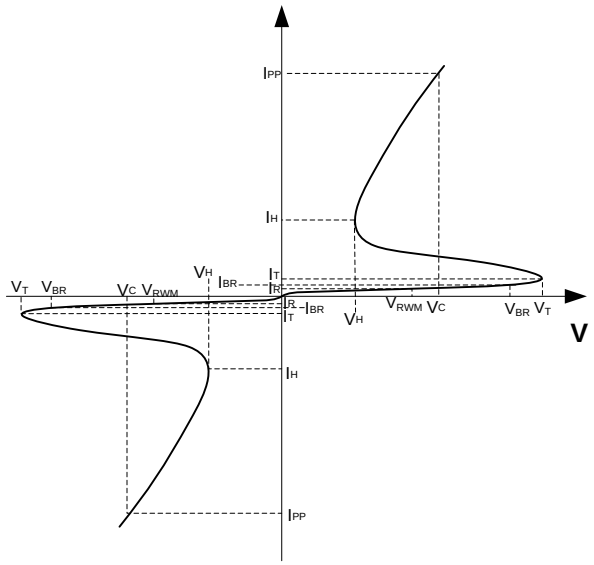


Absolute Maximum Rating

Parameter	Symbol	Value	Unit
Peak Pulse Power (t_p = 8/20μs)	P_{PP}	75	Watts
Peak Pulse Current (t_p = 8/20μs)	I_{PP}	10	A
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Parameters

Symbol	Parameter
I_{PP}	Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Reverse Stand-Off Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_{BR}
I_{BR}	Reverse Breakdown Current @ V_{BR}
V_T	Test Voltage
I_T	Test Current
V_H	Holding Voltage
I_H	Holding Current



Electrical Characteristics(T=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Stand-Off Voltage	V_{RWM}				5.0	V
Reverse Breakdown Voltage	V_{BR}	I_{BR}=1mA	5.6			V
Reverse Leakage Current	I_R	V_{RWM}=5.0V			200	nA
Holding Current	I_H	T=25°C		11		mA
Clamping Voltage	V_C	I_{PP}=10A, t_p=8/20μs		6.3	7.5	V
ESD Clamping Voltage (1)	V_C	I_{PP} = 4A, tp = 0.2/100ns (TLP)		3.7		V
ESD Clamping Voltage (1)	V_C	I_{PP} = 16A, tp = 0.2/100ns (TLP)		6.6		V
Dynamic Resistance (1) (2)	R_{DYN}	TLP=0.2/100ns		0.25		Ω
Junction Capacitance	C_j	V_R = 2.5V, f= 1MHz		0.2	0.3	pF

Note1.TLP Setting:t_p=100ns, t_r=0.2ns, I_{TLP} and V_{TLP} sample window:t_1=70ns to t_2=90ns.

Note2.Dynamic resistance calculated from I_{PP}=4A to I_{PP}=16A using “Best Fit”.

Typical Characteristics

Figure 1: Peak Pulse Power Vs Pulse Time

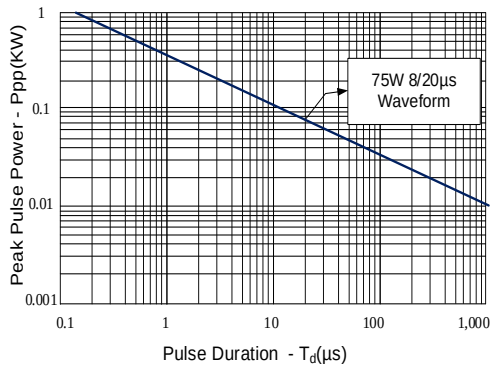


Figure 2: Power Derating Curve

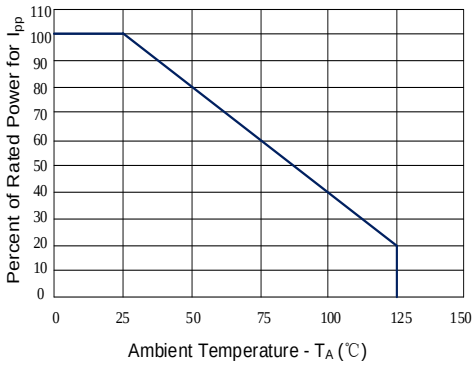


Figure 3: Clamping Voltage vs. Peak Pulse Current

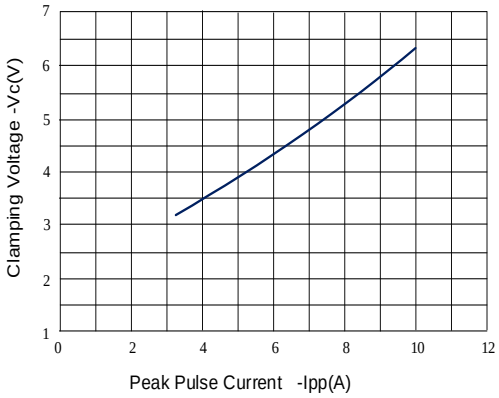


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

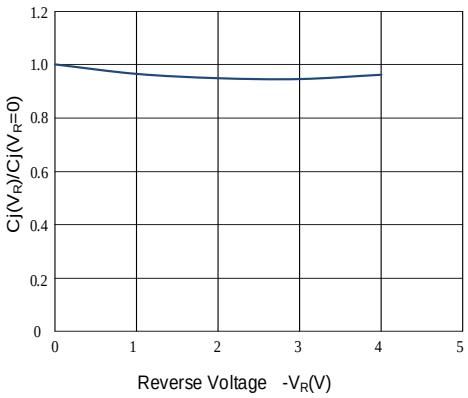


Figure 5: TLP Positive I-V Curve

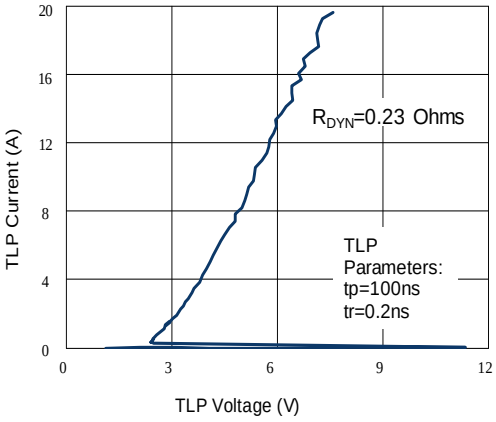
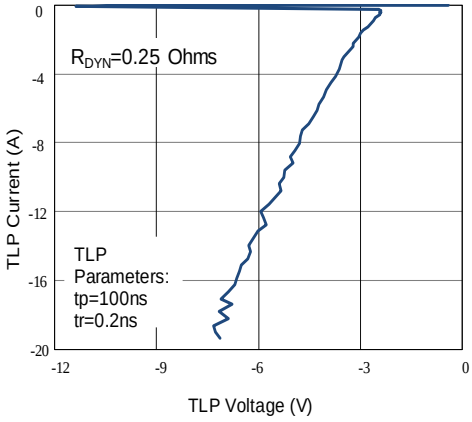
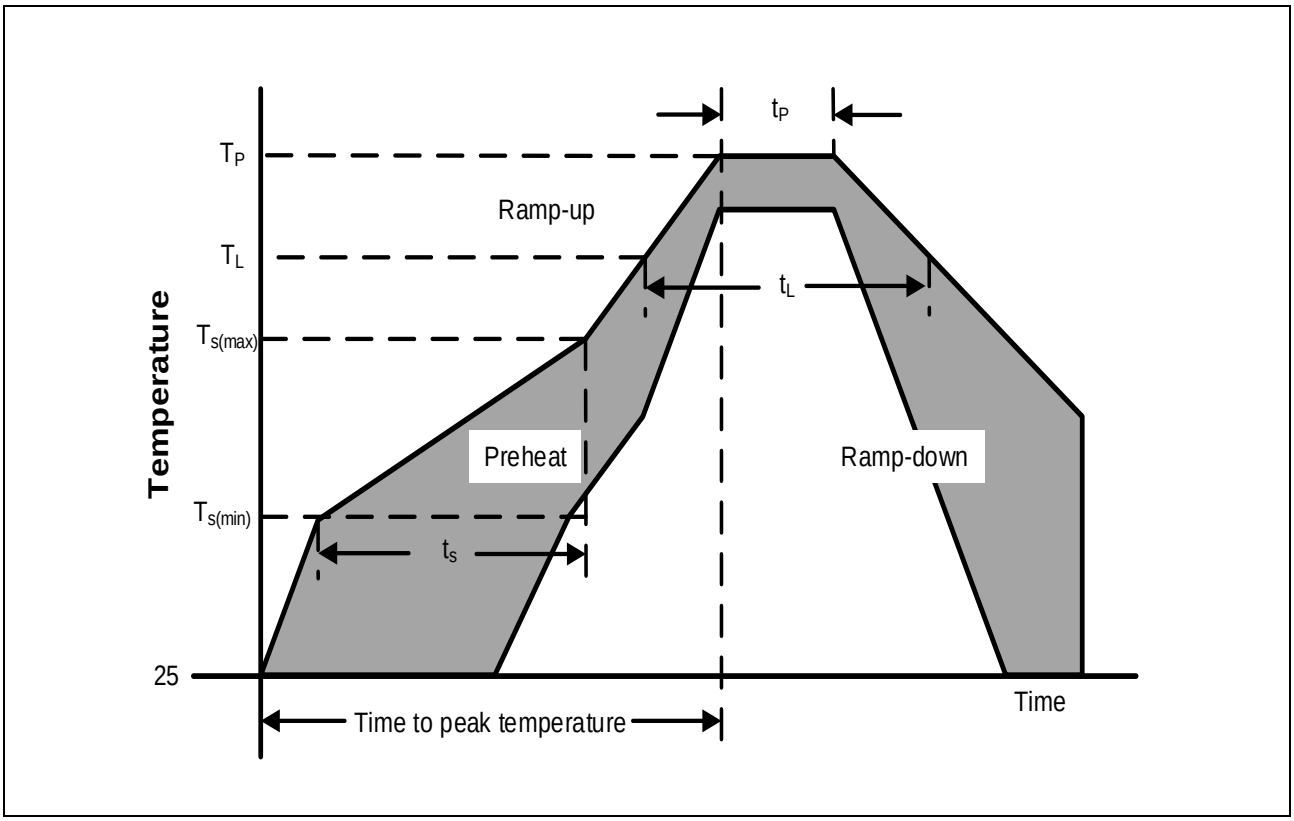


Figure 6: TLP Negative I-V Curve



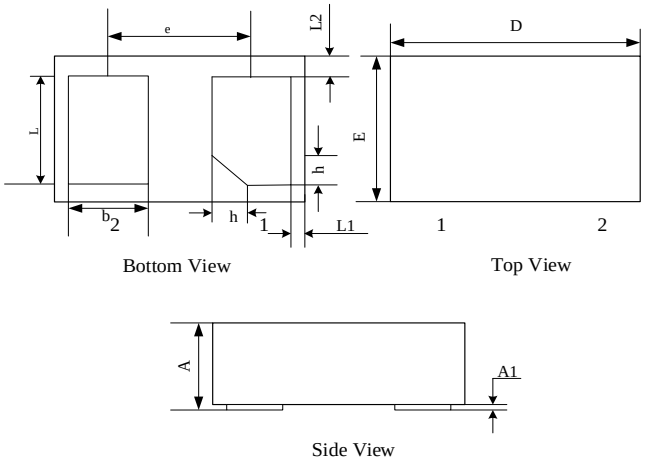
Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	Temperature Min ($T_{S(min)}$)	150°C
	Temperature Max ($T_{S(max)}$)	200°C
	Time (min to max) (t_S)	60 – 190 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L——Ramp-up Rate		5°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260+0/-5 °C
Time within actual peak Temperature (t_P)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



Package Dimension

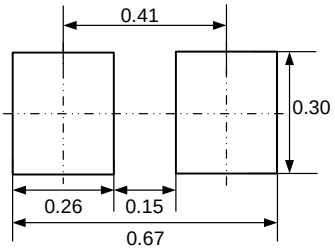
PACKAGE OUTLINE



DFN0603-2L

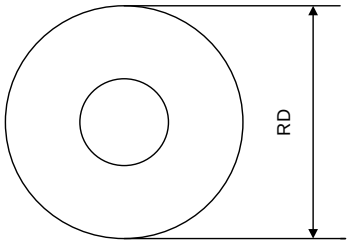
SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.280	0.300	0.320
A1	--	--	0.050
D	0.590	0.620	0.640
E	0.290	0.320	0.340
b	0.155	0.180	0.205
L	0.215	0.240	0.265
h	0.050	--	0.100
L1	0.040REF		
L2	0.040REF		
e	0.360BSC		

Land Pattern

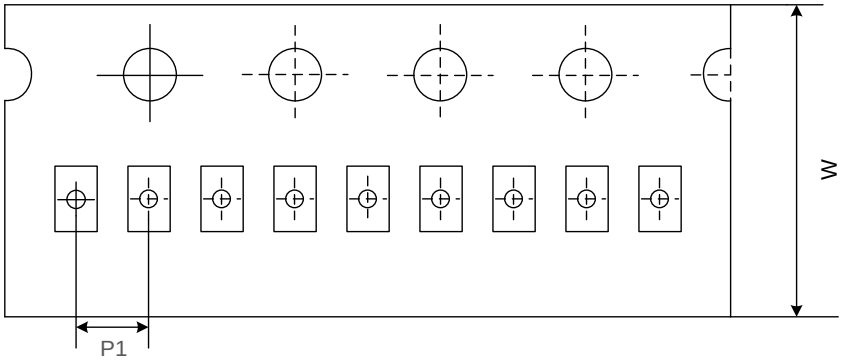


Tape And Reel Information

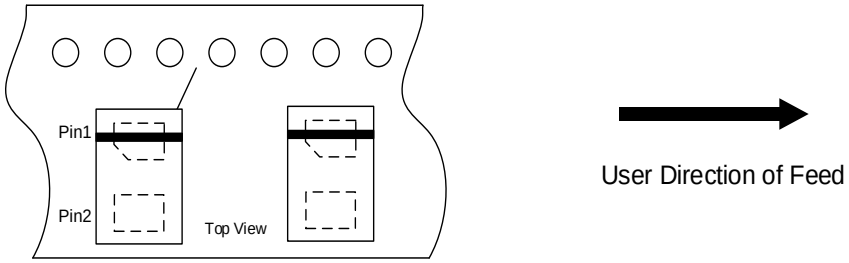
Reel Dimensions



Tape Dimensions

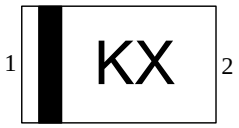


Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimensions	7 inch
W	Overall width of the carrier tape	8 mm
P1	Pitch between successive cavity centers	2 mm

Ordering Information

Part	Package	Marking	Packing Information
ES05DTGMSBH	DFN0603-2L	 K=Specific Device Code X=Month Code	15k/Reel

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2022-05-16	Released Version	Chen Zu Xiong	Qi Shu Kun	Liu Jia Ying