

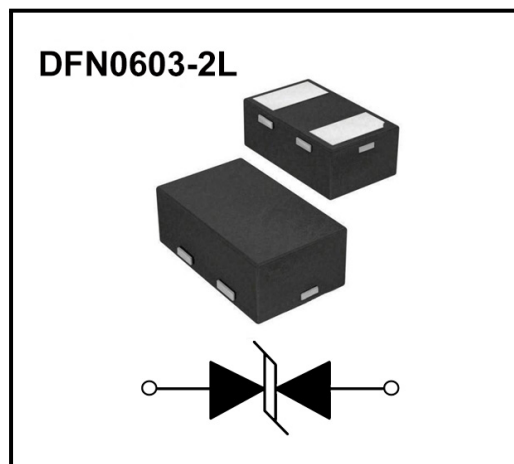
BNTPD1E01B04DPLR

ESD Protection Diode

Features

- 40Watts peak pulse power ($t_p = 8/20\mu s$)
- Snap-Back technology
- Low clamping voltage
- Low leakage current
- Ultra low capacitance (0.25pF typical)
- ESD Protection for high-speed data lines
- IEC 61000-4-2 $\pm 10kV$ contact $\pm 12kV$ air
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 5A (8/20 μs)
- RoHS compliant

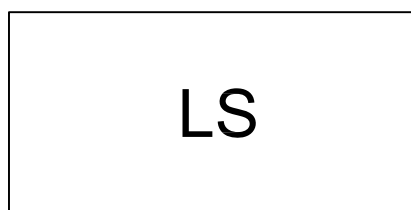
Package



Applications

- USB 3.0, USB 2.0, MHL
- HDMI 2.0, Display Port 1.3, eSATA
- Unified Display Interface (UDI)
- Digital Visual Interface (DVI)
- 1G/2.5G/5G/10G Ethernet

Marking



Ordering information

Device	Package	Carrier	Quantity	HSF Status
BNTPD1E01B04DPLR	DFN0603-2L	Tape & Reel (7")	10000pcs / Ree	Rohs Compliant

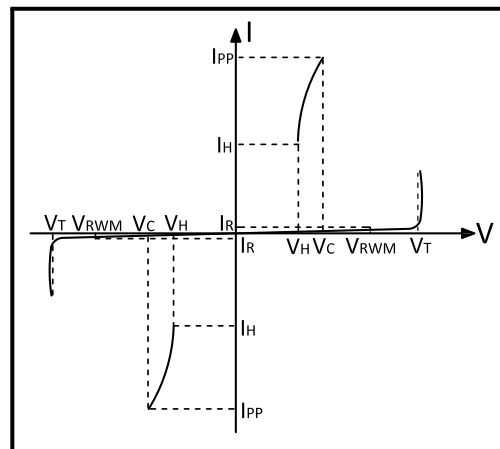


BNTPD1E01B04DPLR

ESD Protection Diode

Electrical Parameters ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Peak Reverse Working Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_T	Trigger voltage
I_T	Test Current
V_H	Holding voltage
I_H	Holding Current



Note: 8/20us pulse Waveform.

Absolute Maximum Rating

Rating	Symler	Value	Units
Peak Pulse Power ($t_p = 8/20\mu\text{s}$)	P_{PP}	40	Watts
Peak Pulse Current ($t_p = 8/20\mu\text{s}$)	I_{PP}	5	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 12	KV
ESD per IEC 61000-4-2 (Contact)		± 10	
Junction Temperature	T_J	-55 to + 150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to + 150	$^\circ\text{C}$

Electrical Characteristics($T_A = 25^\circ\text{C}$, Unless otherwise specified.)

Parameter	Symler	Conditions	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V_{RWM}	—	—	—	3.3	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1\text{mA}$	5.5	6.8	12	V
Trigger voltage	V_T	$I_{PP} = 5\text{A}, t_p = 8/20\mu\text{s}$	—	9.0	—	V
Reverse Leakage Current	I_R	$V_{RWM} = 3.3\text{V}$	—	0.01	0.1	μA
Peak Pulse Current	I_{PP}	$t_p = 8/20\mu\text{s}$	—	—	5	A
Clamping Voltage	V_C	$I_{PP} = 5\text{A}, t_p = 8/20\mu\text{s}$	—	6.5	8.0	V
Clamping Voltage(TLP 8A)		IEC 61000-4-2 Level 2 ($\pm 4\text{ kV}$ Contact, $\pm 4\text{ kV}$ Air)	—	4.5	—	
Clamping Voltage(TLP 16A)		IEC 61000-4-2 Level 4 ($\pm 8\text{ kV}$ Contact, $\pm 8\text{ kV}$ Air)	—	6.0	—	
Dynamic resistance	R_{dyn}	$0\text{A} \leq I_R \leq 30\text{ A}; t_p = \text{TLP}$	—	0.25	—	Ω
Junction Capacitance	C_J	$V_R = 0\text{V}, f = 1\text{MHz}$	—	0.25	0.35	pF

**BORN SEMICONDUCTOR, INC. ALL
RIGHT RESERVED**

Specifications are subject to change without notice.

Please refer to <http://www.born-tw.com> for current information.

Revision: 2022-Jan-1-A



Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

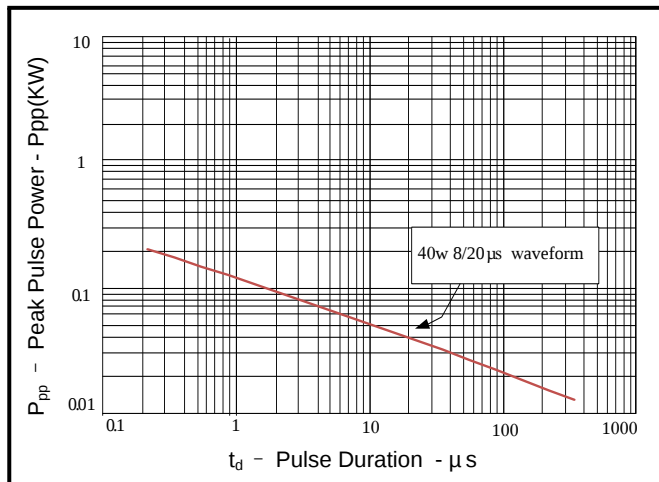


Figure 2: Power Derating Curve

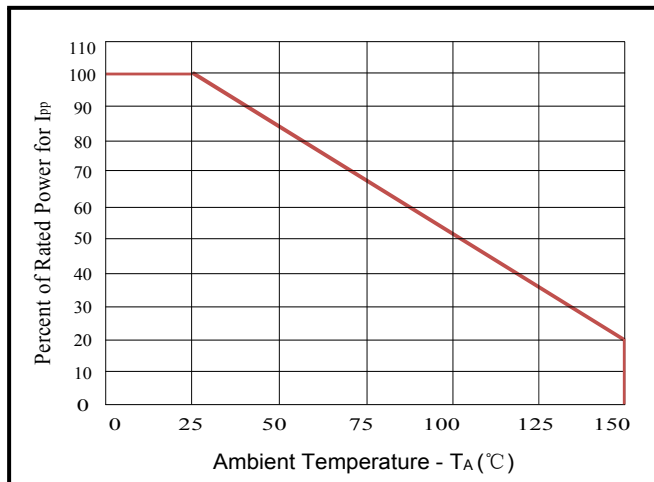


Figure 3: Pulse Waveform

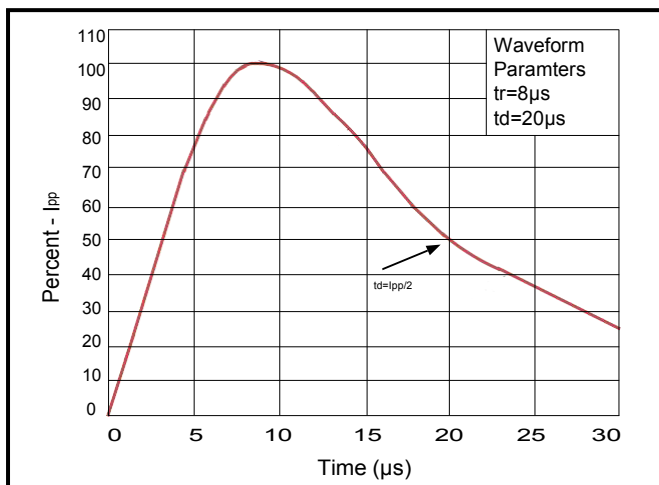
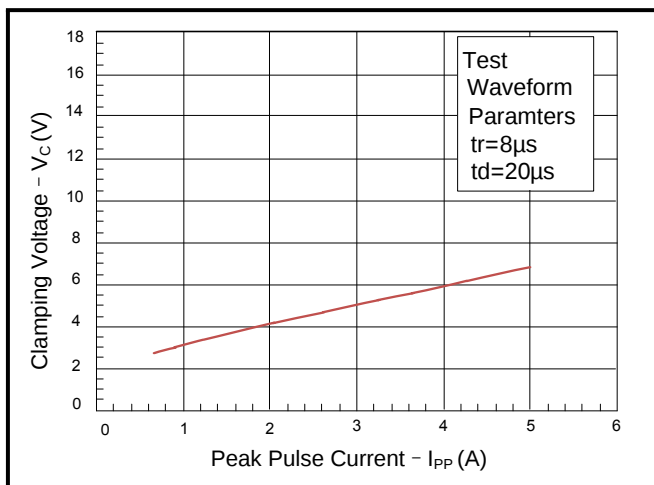
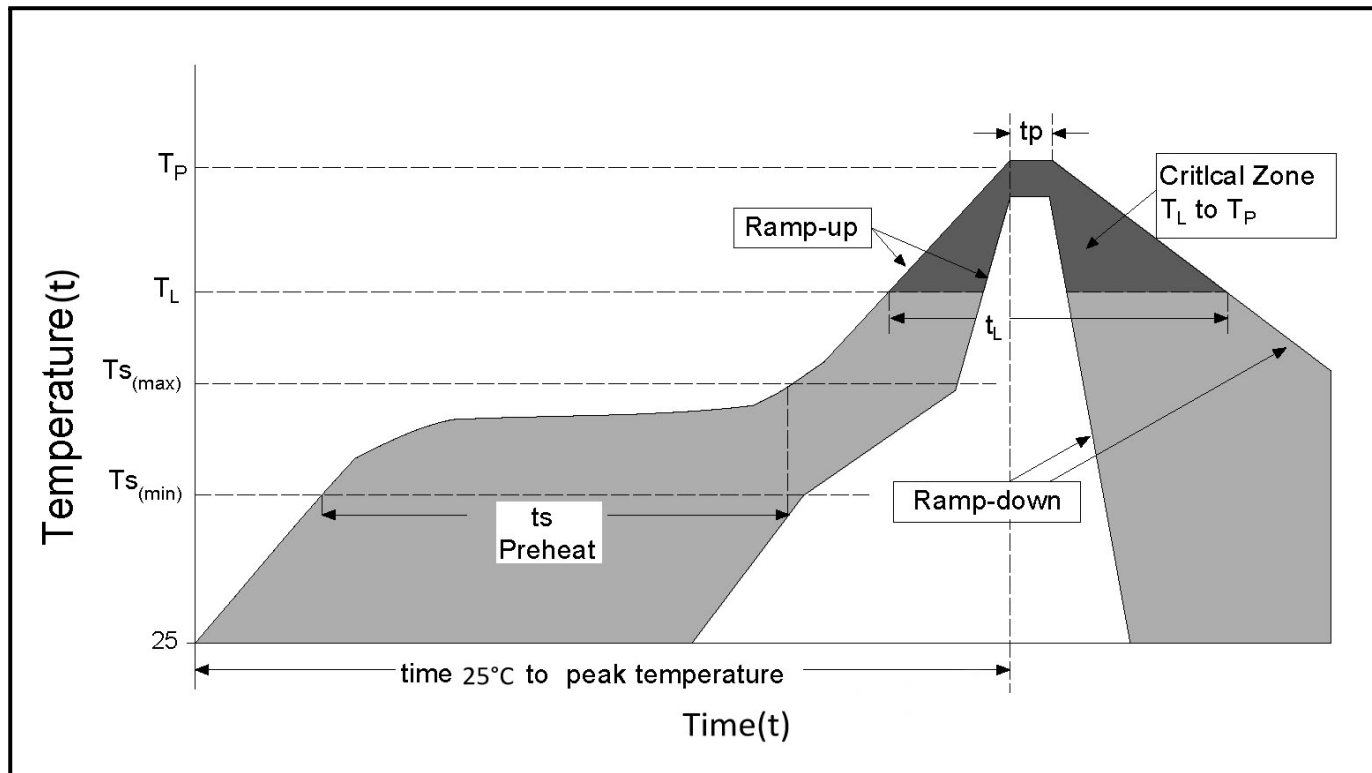


Figure 4: Clamping Voltage vs. Ipp



Soldering Parameters



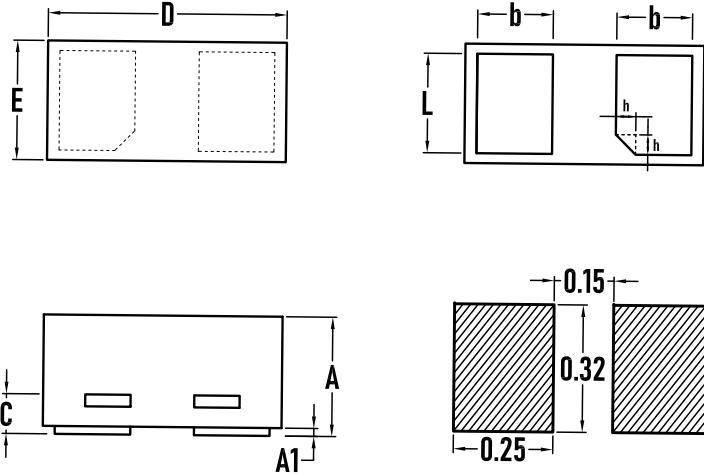
Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_S(\min)$)	150°C
	- Temperature Max ($T_S(\max)$)	200°C
	- Time (min to max) (t_s)	60 - 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_S(\max)$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (t_L)	60 - 150 secs
Peak Temperature (T_P)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		20 - 40 secs
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (t)		8 minutes Max.
Do not exceed		260°C



BNTPD1E01B04DPLR

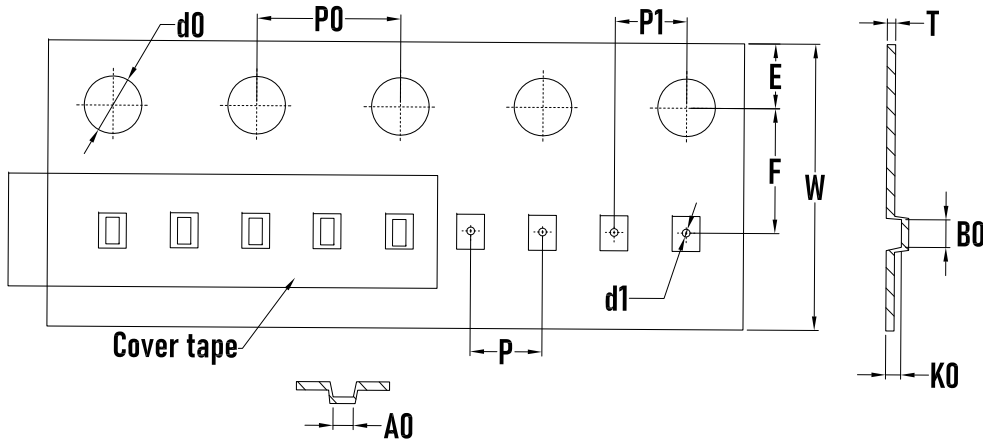
ESD Protection Diode

Outline Drawing – DFN0603-2L



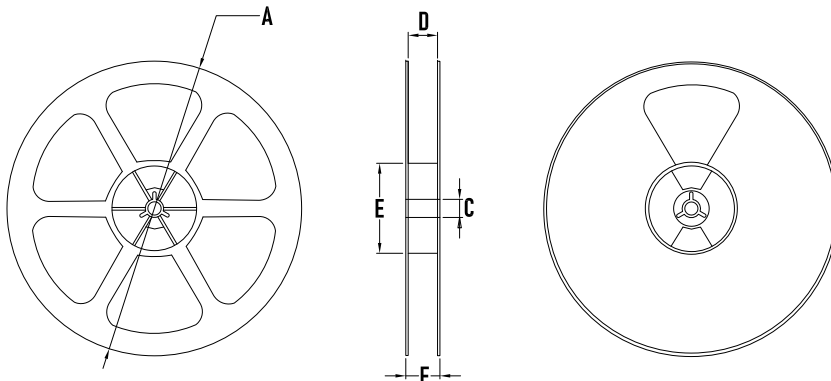
SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.28	0.30	0.32
A1	0.00	0.02	0.05
C	0.05	0.10	0.15
D	0.55	0.60	0.65
E	0.25	0.30	0.35
b	0.14	0.19	0.24
L	0.20	0.25	0.30
h	–	0.05	0.10

Packaging Tape – DFN0603-2L



SYMBOL	MILLIMETER
A0	0.39±0.03
B0	0.70±0.03
d0	1.55±0.05
d1	0.20±0.05
E	1.75±0.10
F	3.50±0.04
K0	0.37 ^{+0.03} _{-0.02}
P	2.00±0.10
P0	4.00±0.10
P1	2.00±0.05
W	8.00±0.10
T	0.18±0.03

Packaging Reel



SYMBOL	MILLIMETER
A	178±2
C	13.0 ^{+0.5} _{-0.2}
D	9.5
E	55±5
F	14.4 max.
Quantity	10000PCS

**BORN SEMICONDUCTOR, INC. ALL
RIGHT RESERVED**

Specifications are subject to change without notice.

Please refer to <http://www.born-tw.com> for current information.

Revision: 2022-Jan-1-A

