

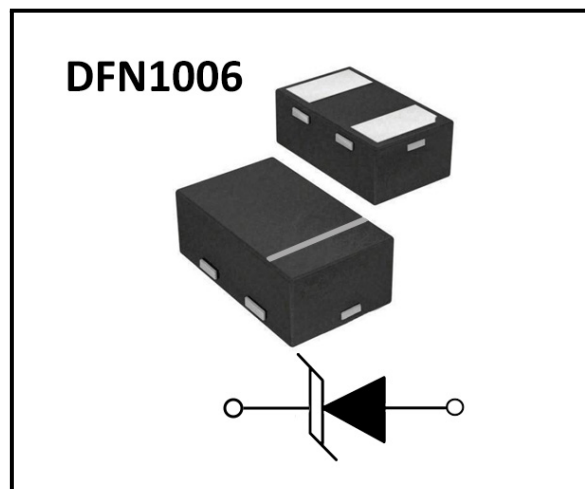
BNESD351DPYR

ESD Protection Diode

Features

- Unidirectional configurations
- Extremely low diode capacitance ($C_j = 1.0 \text{ pF}$)
- Extremely low clamping voltage to protect sensitive I/Os
- Extremely low inductance protection path to ground
- IEC 61000-4-2 $\pm 10\text{KV}$ contact $\pm 15\text{KV}$ air
- IEC 61000-4-4(EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 10A (8/20 μs)
- RoHS Compliant

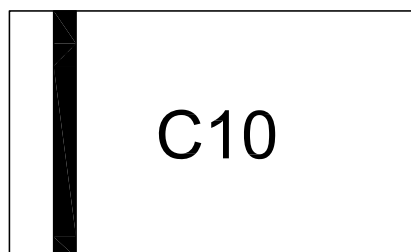
Package



Applications

- USB 3.0, USB 2.0, MHL
- HDMI 2.0, Display Port 1.3, eSATA
- Unified Display Interface (UDI)
- Digital Visual Interface (DVI)
- High speed serial interfaces

Marking



Ordering information

Device	Package	Carrier	Quantity	HSF Status
BNESD351DPYR	DFN1006	Tape & Reel (7")	10000pcs / Reel	RoHS Compliant

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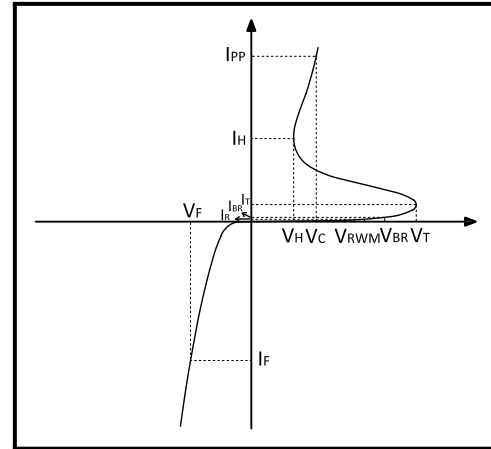


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ESD Protection Diode

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
V_{BR}	Reverse Breakdown 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}	60	Watts
Peak Pulse Current ($t_p = 8/20\mu\text{s}$)	I_{PP}	10	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 15	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}	$I_R = 1\text{mA}$	5	6.5	8.5	V
Trigger voltage	V_T	$I_{PP} = 10\text{A}, t_p = 8/20\mu\text{s}$	—	8.0	10	V
Reverse Leakage Current	I_R	$V_{RWM} = 3.3\text{V}$	—	0.01	0.1	μA
Clamping Voltage	V_C	$I_{PP} = 10\text{A}, t_p = 8/20\mu\text{s}$	—	4.5	6.0	V
Clamping Voltage(TLP 8A)		IEC 61000-4-2 Level 2 ($\pm 4\text{ kV}$ Contact, $\pm 4\text{ kV}$ Air)	—	6.3	—	
Clamping Voltage(TLP 16A)		IEC 61000-4-2 Level 4 ($\pm 8\text{ kV}$ Contact, $\pm 8\text{ kV}$ Air)	—	7.8	—	
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	$V_R = 0\text{V}, f = 1\text{MHz}$	—	1.0	1.5	pF



Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

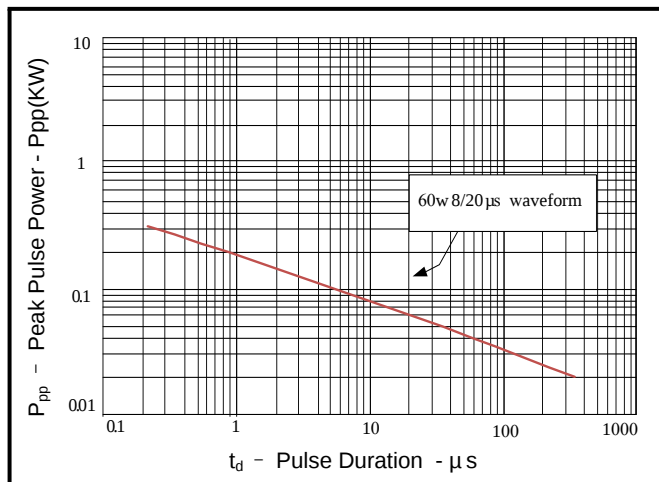


Figure 2: Power Derating Curve

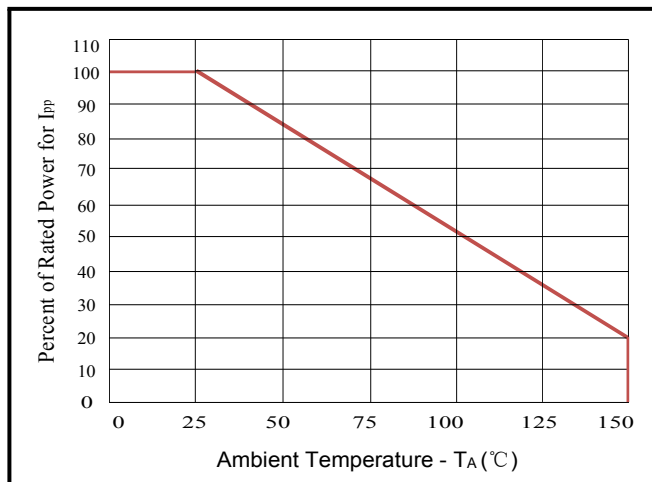


Figure 3: Pulse Waveform

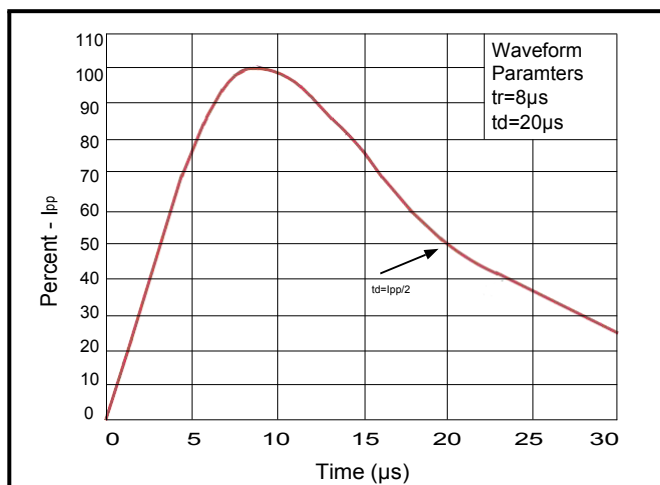
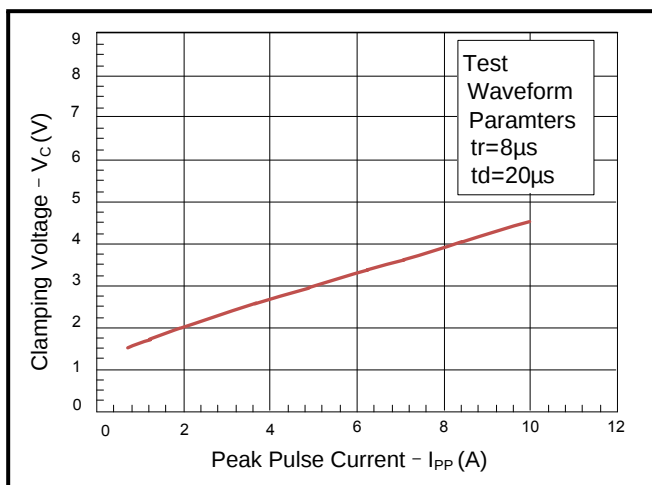
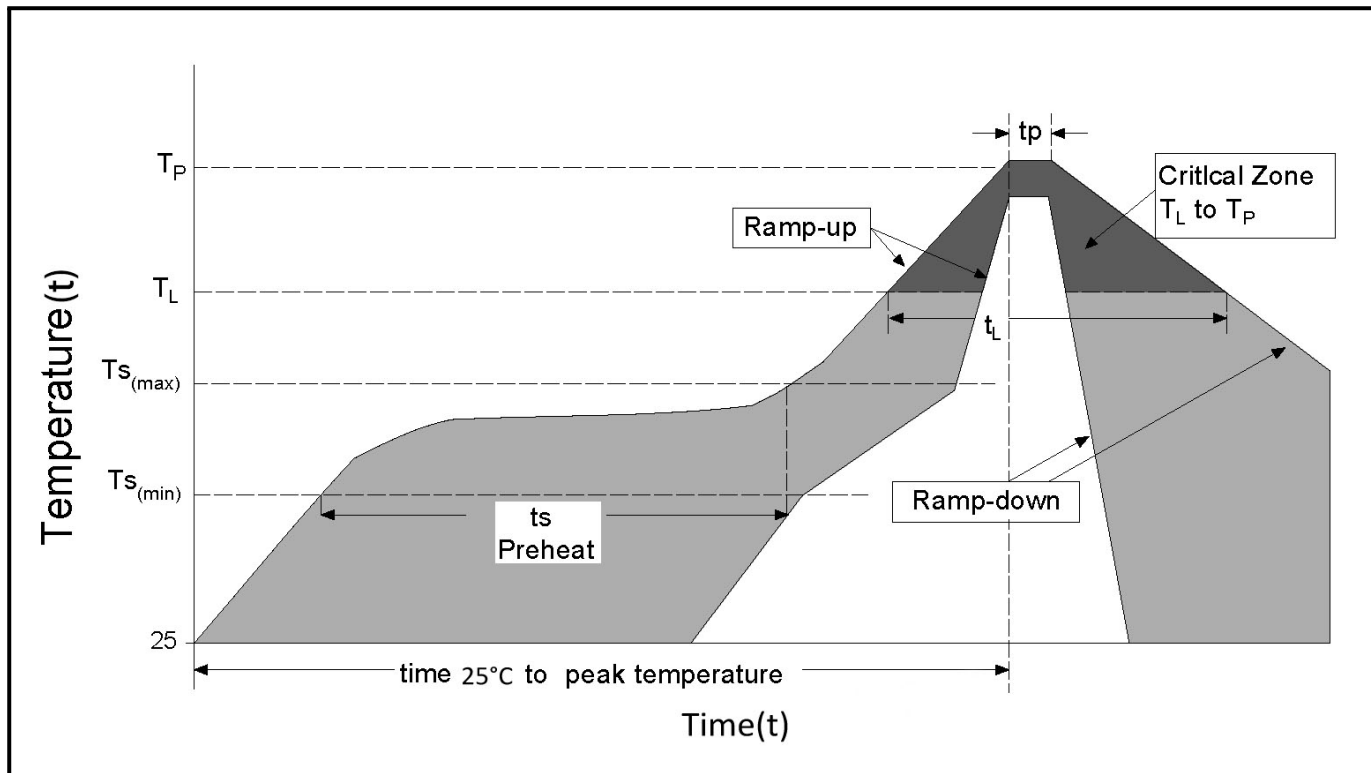


Figure 4: Clamping Voltage vs. I_{pp}



Soldering Parameters



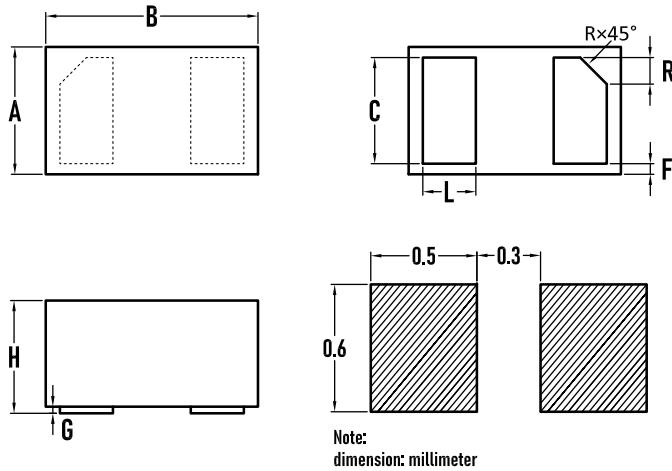
Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 - 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (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



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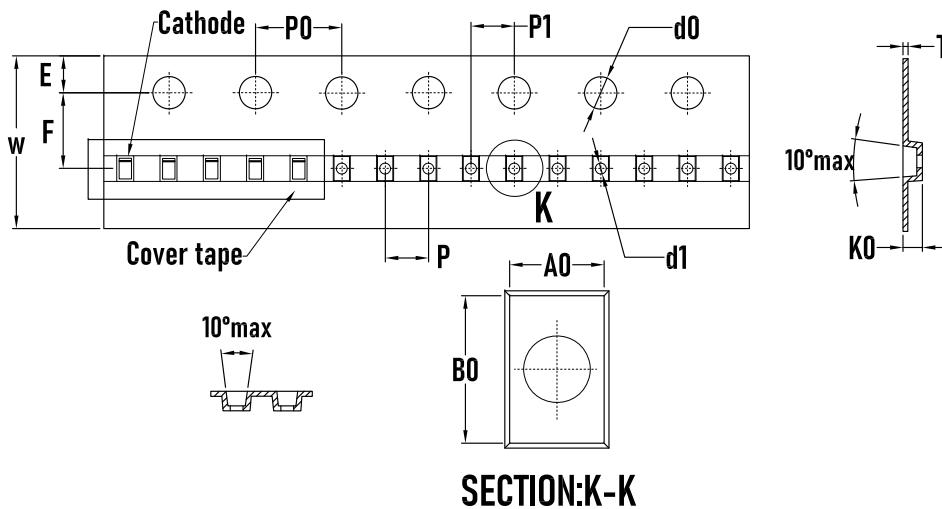
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Outline Drawing – DFN1006



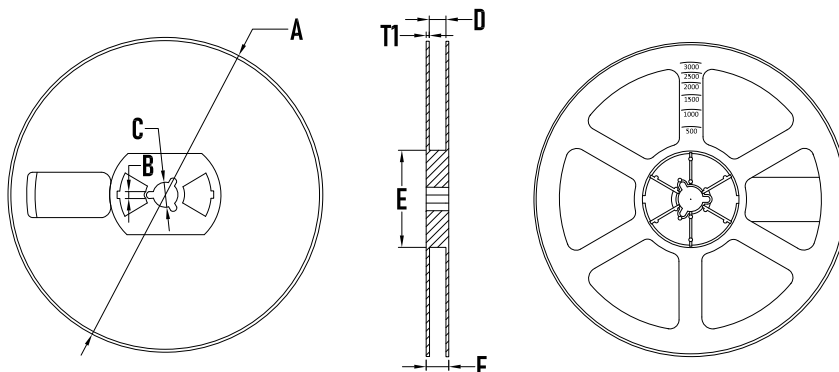
SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.55	0.60	0.65
B	0.95	1.00	1.05
C	0.45	0.50	0.55
L	0.20	0.25	0.30
F	0.05REF		
G	0.00	0.02	0.05
H	0.45	0.50	0.55
R	0.07	0.12	0.17

Packaging Tape - DFN1006



SYMBOL	MILLIMETER
A0	0.71±0.05
B0	1.11±0.05
d0	1.5 ^{+0.1} ₋₀
d1	0.50±0.05
E	1.75±0.10
F	3.50±0.05
K0	0.56±0.05
P	2.00±0.05
P0	4.00±0.10
P1	2.00±0.05
W	8.00 ^{+0.03} _{-0.01}
T	0.2±0.015

Packaging Reel



SYMBOL	MILLIMETER
A	178±1
B	3.5±0.2
C	14.3±0.2
D	9.8 ⁺² ₋₁
E	54.5±0.5
F	12.4±0.2
T1	1.0±0.2
Quantity	10000PCS

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