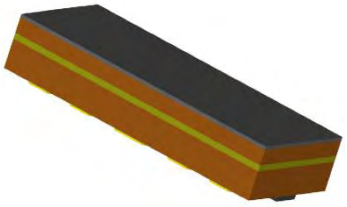
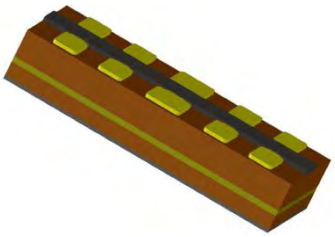
ESD Protection Devices

Description

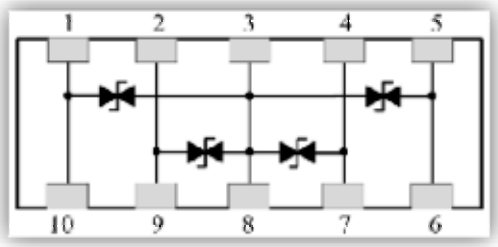
■ This device is an ultra low capacitance ESD product designed to protect very high speed data interfaces. PE12A-2510 has a typical capacitance of only 0.05pf (I/O to GND), and it can be used to meet the ESD immunity requirements of IEC61000-4-2 (15KV air, 8KV contact discharge).





Feature

■ ESD protection for high speed data lines to IEC61000-4-2
■ ESD contact discharge typical 8KV, max 15KV
■ ESD air discharge typical 15KV, max 25KV
■ Surface mount
■ Extremely low capacitance
■ Very low leakage current
■ Fast response time
■ Bi-directional ESD protection
■ Lead free solder termination
■ The best ESD protection for high frequency, low voltage applications



Schematic Diagram

Application

■ High Definition Multi-Media Interface (HDMI)
■ Digital Visual Interface (DVI)
■ Display Port Interface (DP)
■ Unified Display Interface (UDI)
■ Mobile Display Digital Interface (MDDI)
■ Gigabit Ethernet
■ USB2.0 and USB3.0
■ IEEE1394 interface

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Maximum Contact discharge voltage Per IEC61000-4-2	---	15KV	V
Maximum Air discharge voltage Per IEC61000-4-2	---	25KV	V
Maximum Operating temperature	T_{OPER}	-55 to +125	℃
Maximum Storage temperature	T_{STG}	-25 to +35	℃
Maximum lead temperature for soldering during 10s	T_L	260	℃

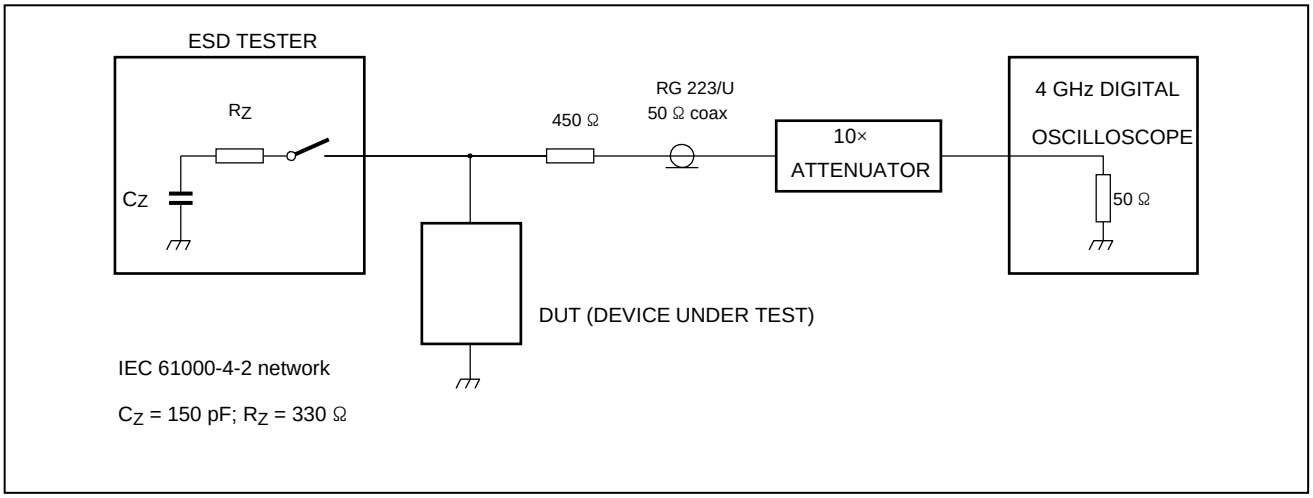
Electrical Characteristics(T_A=25℃)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Rated Voltage	V_R	---	---	---	12	V
Trigger voltage	V_T	IEC61000-4-2 8KV contact discharge	---	300	---	V
Clamping voltage	V_C	IEC61000-4-2 8KV contact discharge	---	35	---	V
Leakage current	I_L	DC 12V shall be applied on component	---	0.01	0.10	uA
Capacitance	C_P	V_R = 0V, f = 1MHz	---	0.2		pF

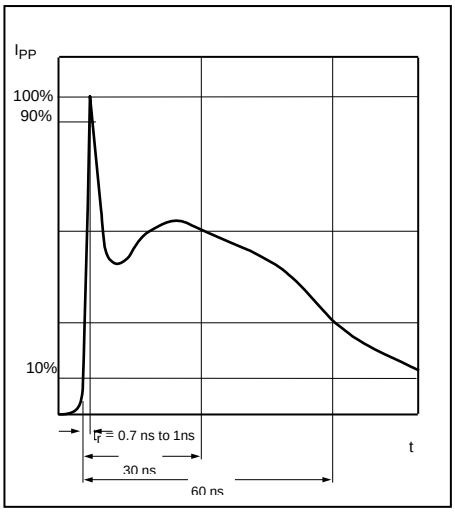
Note: 1 Trigger and clamping voltage are measured per IEC 61000-4-2, 8KV contact discharge method.

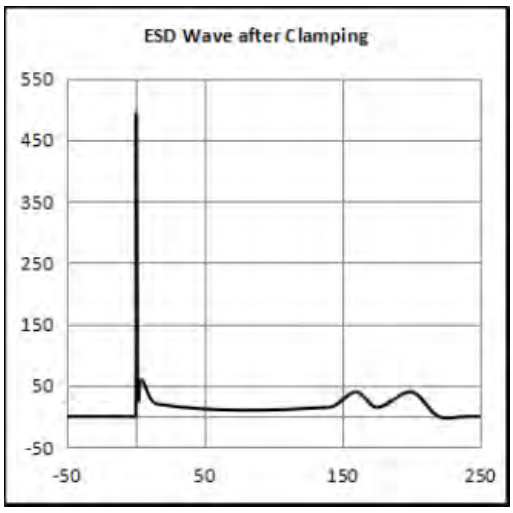
2 After reliability tests such as high temp storage, temp cycles, continuous ESD strike etc, the maximum leakage current is less than 10uA.

ESD Clamping Test



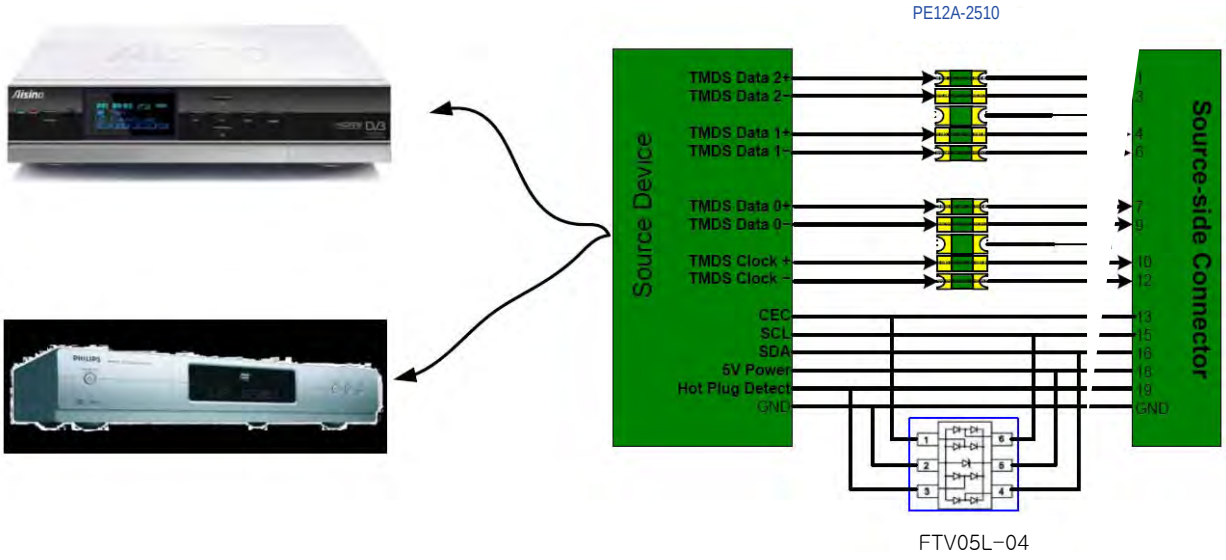
Typical PESD clamping for +8KV pulse per IEC61000-4-2





Design Recommendations for HDMI

For HDMI Source Device



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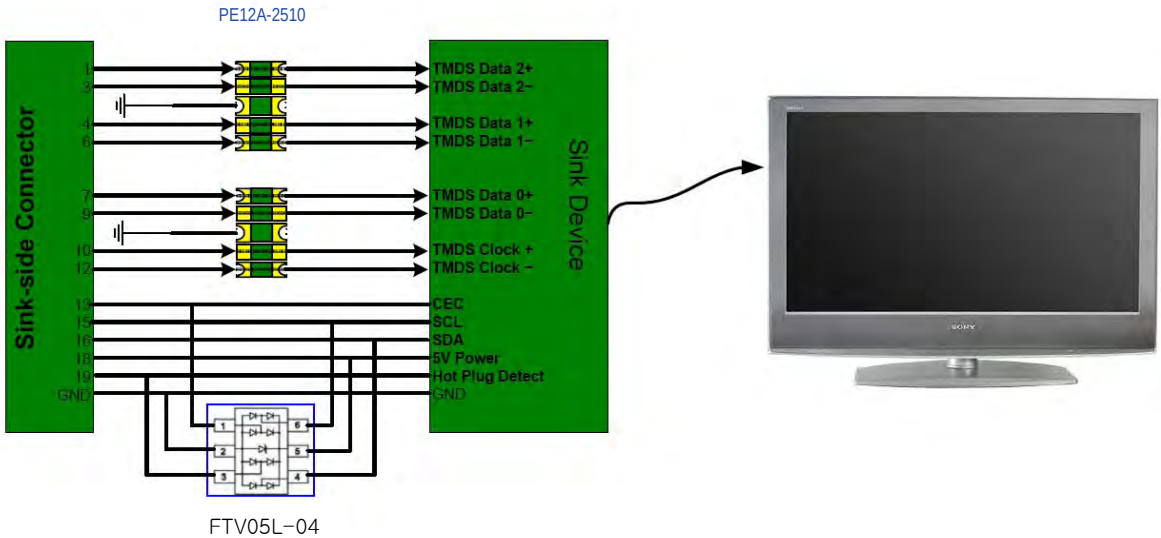
For HDMI Sink Device



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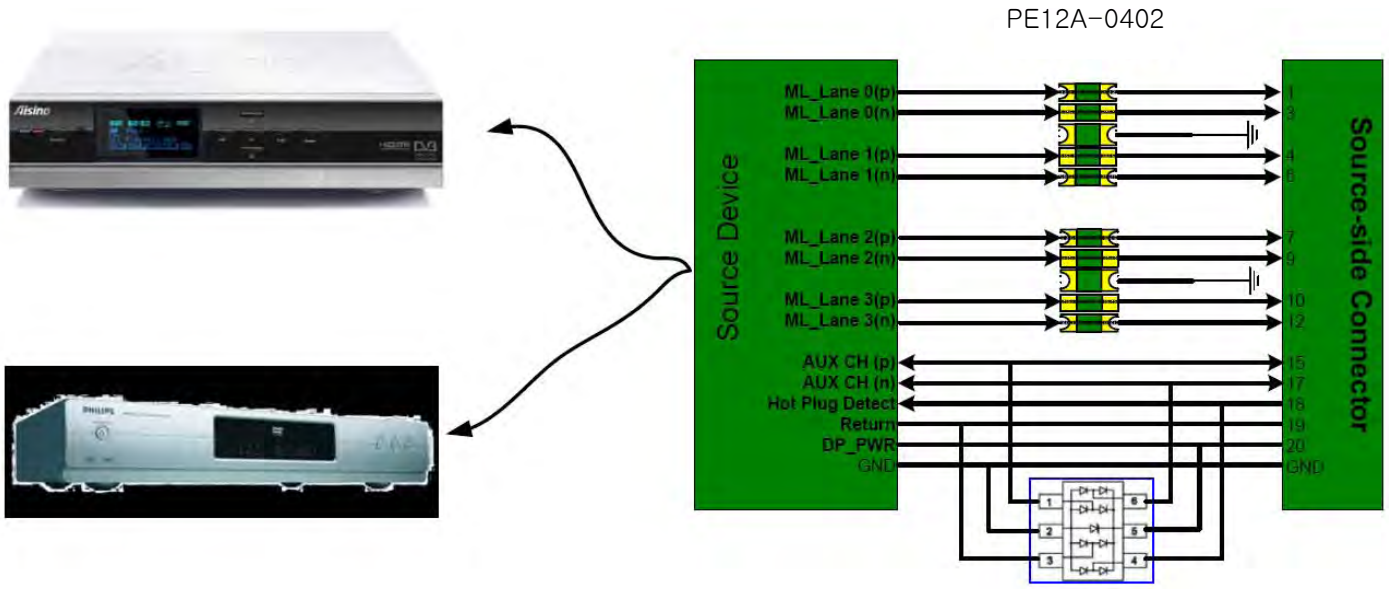
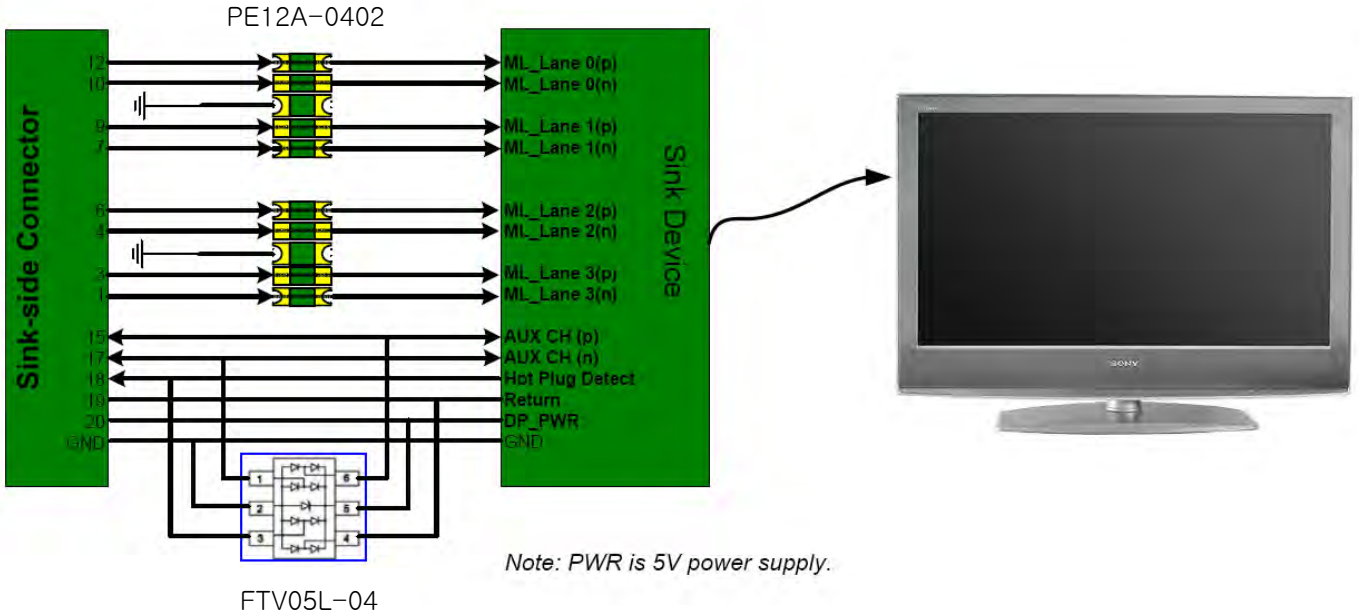
Design Recommendations for Display Port

For Display Port Source Device

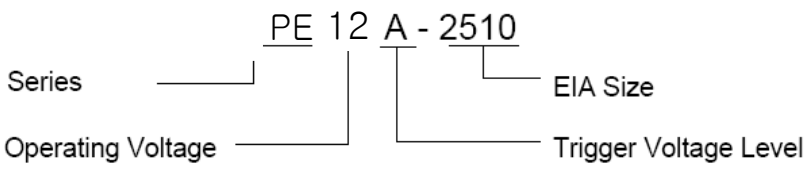


For Display Port Sink Device

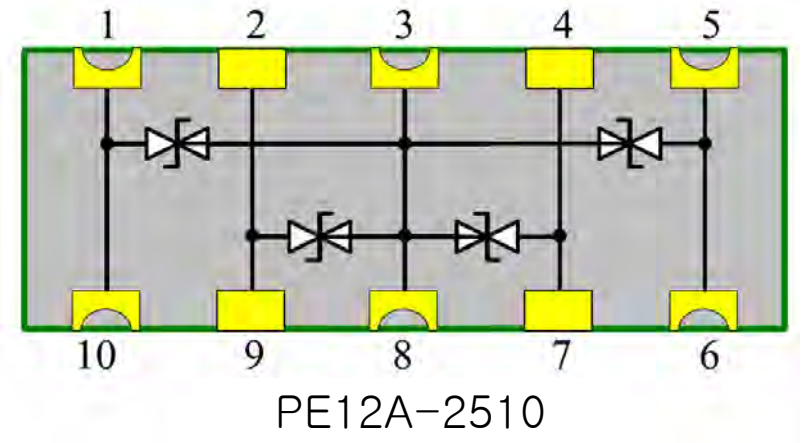


Note: PWR is 5V power supply.

Part Numbering

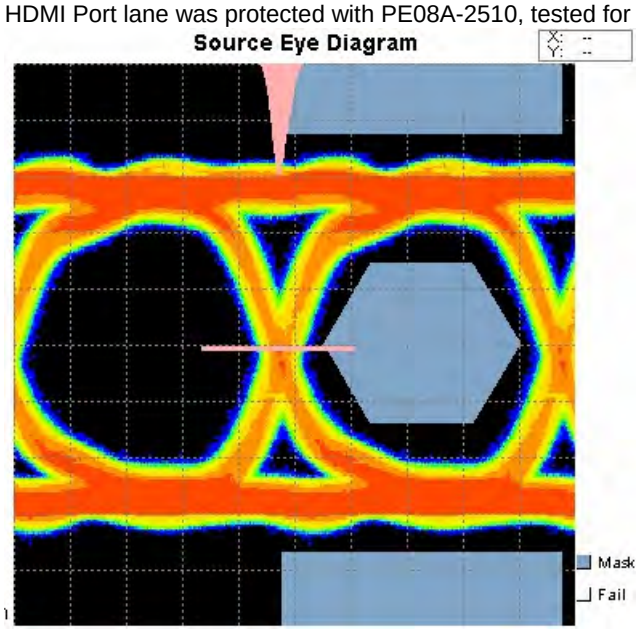


Circuit diagram

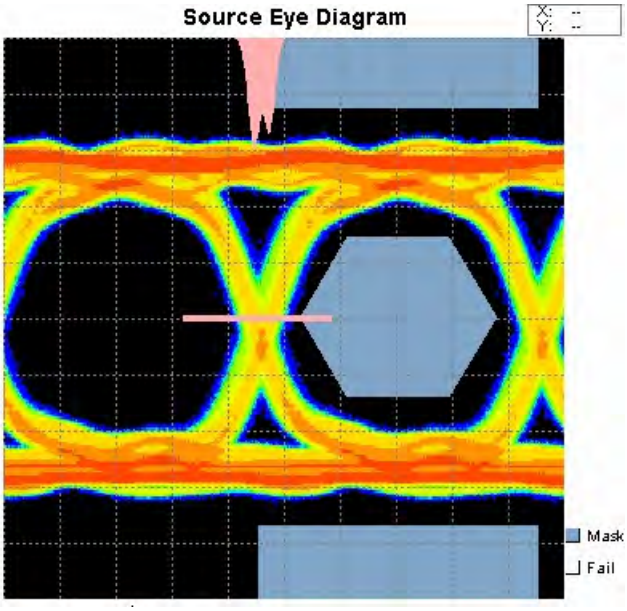


Eye Pattern Test

HDMI Port lane was protected with PE08A-2510, tested for 2.25G bps



HDMI Port without PE12A-2510



HDMI Port with PE12A-2510

Environmental Specifications

Operation temperature: -40~125℃

Moisture Resistance, Steady state: MIL-STD-833, Method 1004.7, 85% RH,85 ,1000hrs ℃

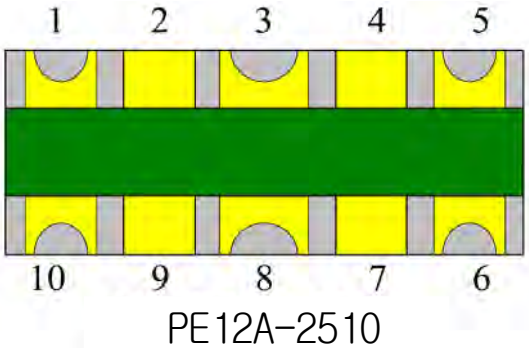
Thermal Shock: MIL-STD-202, Method 107G,-55℃to150℃,30 min cycle,10 cycles.

V 10HZ, 1 min. cycle, 2hrs each in X-Y-Z) STD-202F, Method 201A, (10 to 55 to

Chemical Resistance: ASTM D-543, 4hrs @40℃, 3 solutions (H_2O, detergent solution, deluxer)

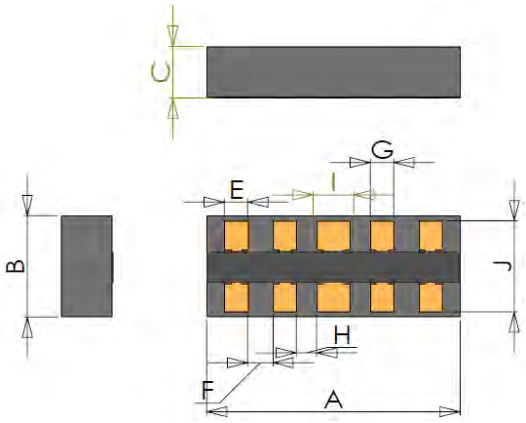
Solder leach resistance and terminal adhesion: Per EIA-576 test

Pin configuration



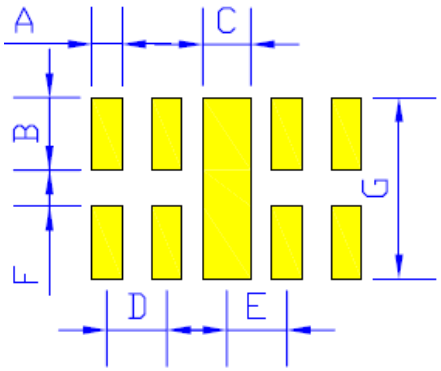
Pin	Identification
1, 2, 4, 5	Input lines
6, 7, 9,10	Output lines
3, 8	Ground

Product Dimensions (mm)



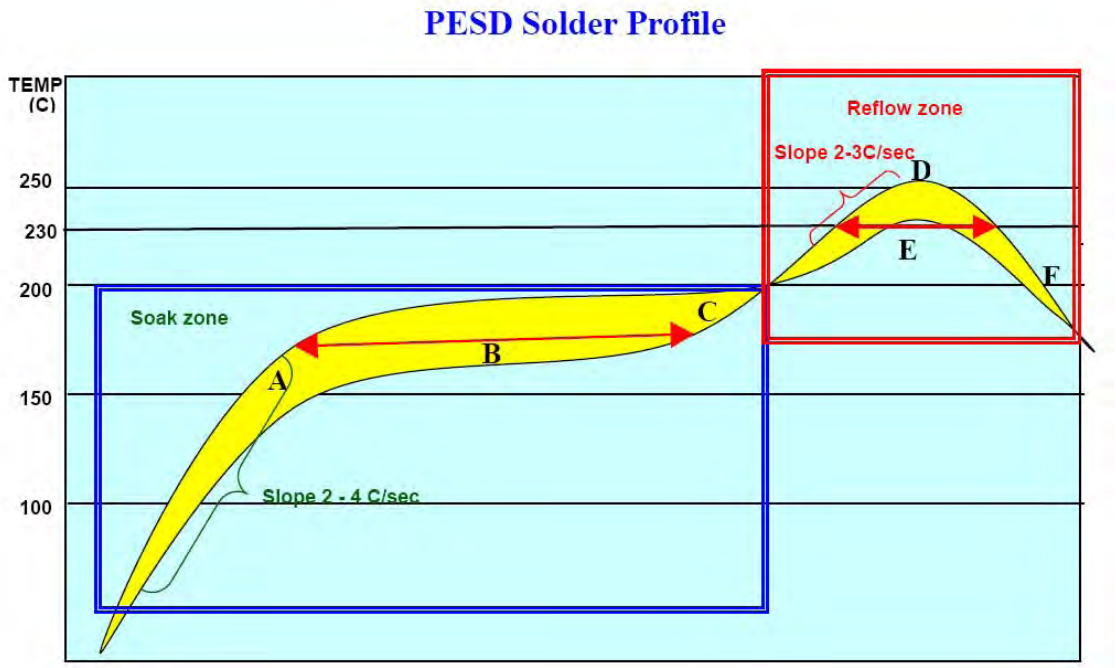
Symbol	Dimension			Unit
	Min	Typ	Max	
A	2.40	2.50	2.60	mm
B	0.90	1.00	1.10	
C	0.40	0.50	0.60	
E	0.21	0.23	0.25	
F	0.23	0.25	0.27	
G	0.21	0.23	0.25	
H	0.18	0.20	0.22	
I	0.315	0.335	0.355	
J	0.89	0.91	0.93	

Solder Pad Layouts



A		B		C		D		Unit
Min	Max	Min	Max	Min	Max	Min	Max	
0.20	0.30	0.55	0.65	0.35	0.45	0.45	0.55	mm
E		F		G				Unit
Min	Max	Min	Max	Min	Max			
0.45	0.55	0.25	0.35	1.4	1.6			mm

Solder Reflow Recommendation



Item	Process	Description	Reach Temp.	Time or Rate
A	Soak Start	From ambient to soak temperature and soak start	150℃ - 180℃	2℃ - 4℃ / sec
B	Soak time	Soak time	---	60s - 120s
C	Soak end	Soak end	180℃ - 200℃	---
D	Peak Temp.	From soak temperature to Peak temperature	260℃	2℃ - 3℃ / sec
E	Time above	Main heating time	230℃ - 260℃	40s - 60s
F	Cooling	From main heating temperature to 100℃	100℃	Max. 4℃ / sec

Notes:

1* Peak temperature can be high to 260℃, and the recommendation time is as below

at 230℃	40s ~ 60s
at 240℃	30s ~ 40s
at 260℃	5s ~ 10s

2* Recommended reflow methods: IR, Vapor phase oven, hot air oven, wave solder.
3* Devices can be cleaned using standard industry methods and solvents.
4* Component can withstand 270℃ 10 sec.
5* If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Package Information

Tape & Reel: 3000pcs per reel.