

PEP01-5841

Power over Ethernet power supply protection

Datasheet - production data



Features

- Peak pulse power: up to 2.7 kW (8/20 µs)
- Stand-off voltage: 58 V
- 4 unidirectional Transils[™] and 4 decoupling capacitances
- Low clamping voltage: 100 V
- Low leakage current:
- 0.2 µA at 25 °C
- 1 µA at 85 °C
- Operating T_i max: 150 °C
- JEDEC registered package outline

Complies with the following standards

- IEC61000-4-2 level 4
 - 15 kV (air discharge)
 - 8 kV (contact discharge)
- IEC61000-4-5 level 2
 - ±1 kV 42 Ω
- IEEE 802.3af-2003
- IEEE 802.3at-2008

Description

The PEP01-5841 has been designed to protect power over Ethernet PSE equipment against line overvoltages. It embeds 4 decoupling capacitors to stabilize power supplies.

It is compatible with IEEE 802.3af-2003 and IEEE 802.3at-2008 requirements and it allows PoE based systems to be protected against both electrical overstress (EOS) and electrostatic discharges (ESD) according to IEC61000-4-5 and IEC61000-4-2.

The low clamping voltage (100 V) makes it compatible with PMOS and PSE controller technologies. Developed in Planar technology, it provides high reliability level.

Packaged in SO-8, this minimizes PCB consumption (footprint in accordance with the IPC 7531 standard).

Figure 1. Functional diagram



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This is information on a product in full production.

1 Characteristics

Table 1. Abs	solute ratings (T _{amb}	= 25 °C)
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Symbol	Parameter	Value	Unit
V _{PP}	Peak pulse voltage (IEC61000-4-2 contact di	30	kV
P _{PP}	Peak pulse power dissipation	2700	W
T _{stg}	Storage temperature range	-65 to + 150	°C
Тj	Operating junction temperature range	-55 to + 150	°C
ΤL	Maximum lead temperature for soldering duri	260	°C





Table 2. Electrical	characteristics - val	lues (T = 25 °C)
		1000 (1amb - 20 0)

I _{RM} max @ V _{RM}		V @L ⁽¹⁾			8/20 µs							
Type	'RM '		▼RM	V _{BR} @I _R ⁽¹⁾			V _{CL} @I _{PP} R _D ⁽²⁾		С	αT ⁽³⁾		
Туре	25 °C	85 °C		min.	typ.	max.		max.			typ.	max.
	μA	μA	v	v			mA	v	Α	Ω	pF	10 ⁻⁴ °C
PEP01-5841	0.2	1	58	64.4	67.8	71.2	1	100	24	1.2	55	10.4

1. Pulse test: t_p < 50 ms

2. To calculate maximum clamping voltage at other surge level, use the following formula: $V_{CLmax} = R_D x I_{PP} + V_{BRmax}$

3. To calculate V_{BR} versus junction temperature, use the following formula: V_{BR @ TJ} = V_{BR @ 25 °C} x (1 + α T x (T_J - 25))













Figure 6. Clamping voltage versus peak pulse current (exponential waveform, maximum values)







100.0

10.0

1.0



Figure 8. Peak forward voltage drop versus peak forward current (typical values)



Figure 10. Leakage current versus junction temperature (typical values)





2 Application



Figure 11. Typical application circuit with PMOS integrated in PSE controller





Figure 12. Typical application circuit with external PMOS

Figure 11 and *Figure 12* show typical application schematics of PoE network. Power sourcing equipment (PSE) allows communication and power sourcing for several power devices (PD). The number of ways is generally a multiple of 4, this optimizes the PEP01-5841 for track layout and crosstalk, as well as PCB surface occupation. This protection device has been studied to comply with the latest IEEE 802.3af-2003 requirements and to withstand the surge defined in the IEC 61000-4-5 level 2 requirements.



3 Package information

- Case: JEDEC SO-8 molded plastic over planar junction
- Terminals: solder plated, solderable according to MIL-STD-750, Method 2026
- Flammability: epoxy is rated UL94V-0
- RoHS package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: *www.st.com.* ECOPACK[®] is an ST trademark.



Figure 13. SO-8 dimension definitions

Table 3. SO-8 dimension values

			Dime	nsions				
Ref.		Millimeters		Inches				
	Min.	Тур.	Max.	Min.	Тур.	Max.		
А	-	-	1.75	-	-	0.069		
A1	0.1	-	0.25	0.004	-	0.010		
A2	1.25	-	-	0.049	-	-		
b	0.28	-	0.48	0.011	-	0.019		
С	0.17	-	0.23	0.007	-	0.009		
D	4.80	4.90	5.00	0.189	0.193	0.197		
Е	5.80	6.00	6.20	0.228	0.236	0.244		
E1	3.80	3.90	4.00	0.150	0.154	0.157		
е	-	1.27	-	-	0.050	-		
h	0.25	-	0.50	0.010	-	0.020		
L	0.40	-	1.27	0.016	-	0.050		
L1	-	1.04	-	-	0.041	-		
k	0°	-	8°	0°	-	8°		
ррр	-	-	0.10	-	-	0.004		



Figure 15. Footprint recommendation for



Figure 14. Footprint recommendation dimensions in mm (inches)



4 Ordering information

Figure 17. Ordering information scheme



Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
PEP01-5841	58E1	SO-8	78 mg	2000	Tape and reel

5 Revision history

Date	Revision	Changes
06-May-2009	1	Initial release.
14-May-2009	2	Standards compliance updated.
17-Jan-2013	3	Added note on GND pins in <i>Figure 1</i> and added <i>Figure 15</i> .
13-Nov-2013	4	Updated level 4 to level 2 under <i>Figure 12</i> .

Table 5. Document revision history



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