

ESP PCB/D and PCB/TN Series



LPZ $0_A \rightarrow 3$	FULL MODE Bonding + Equipment Protection
SIGNAL/ TELECOM TEST CAT D + C + B	ENHANCED Low let-through voltage
LOW INLINE 9.4Ω RESISTANCE	CURRENT 300mA RATING

Combined Category D, C, B tested protector (to BS EN 61643-21) for “through hole” mounting directly onto the PCB of data communication, signal or telephone equipment. Available for working voltages of up to 110V. ESP TN suitable for Broadband, POTS, dial-up, T1/E1, lease line and *DSL telephone applications. For use at boundaries up to LPZ 0_A to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Suitable for wave soldering
- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all lines – Full Mode protection
- ✓ Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Low in-line resistance minimises unnecessary reductions in signal strength
- ✓ 2 pin clean end and 3 pin line end to ensure correct insertion
- ✓ ESP PCB/TN is suitable for telecommunication applications in accordance with Telcordia and ANSI Standards (see Application Note AN005)

Installation

Connect in series, soldering pins direct onto PCB. Tracks to line and earth pins should be as wide as practical (see Furse Application Note AN003).

Electrical specification

	ESP PCB/06D	ESP PCB/15D	ESP PCB/30D	ESP PCB/50D	ESP PCB/110D	ESP PCB/TN
Nominal voltage¹	6V	15V	30V	50V	110V	-
Maximum working voltage U_c^2	7.79V	19V	37.1V	58V	132V	296V
Current rating (signal)	300mA					
In-line resistance (per line ±10%)	9.4Ω	9.4Ω	9.4Ω	9.4Ω	9.4Ω	4.4Ω
Bandwidth (-3dB 50Ω system)	800kHz	2.5MHz	4MHz	6MHz	9MHz	20MHz

¹ Nominal voltage (DC or AC peak) measured at <5µA (ESP PCB/15D, ESP PCB/30D, ESP PCB/50D, ESP PCB/110D) and <200µA (ESP PCB/06D).

² Maximum working voltage (DC or AC peak) measured at <1mA leakage (ESP PCB/15D, ESP PCB/30D, ESP PCB/50D, ESP PCB/110D), <10mA (ESP PCB/06D) and <10µA (ESP PCB/TN).

Transient specification

	ESP PCB/06D	ESP PCB/15D	ESP PCB/30D	ESP PCB/50D	ESP PCB/110D	ESP PCB/TN
Let-through voltage (all conductors)¹ Up						
C2 test 4kV 1.2/50µs, 2kA 8/20µs to BS EN/EN/IEC 61643-21	12.0V	25.0V	44.0V	78.0V	155V	395V
C1 test 1kV, 1.2/50µs, 0.5kA 8/20µs to BS EN/EN/IEC 61643-21	11.5V	24.5V	43.5V	76.0V	150V	390V
B2 test 4kV 10/700µs to BS EN/EN/IEC 61643-21	10.0V	23.0V	42.5V	73.0V	145V	298V
5kV, 10/700µs ²	10.5V	23.8V	43.4V	74.9V	150V	300V
Maximum surge current³						
D1 test 10/350µs to BS EN/EN/IEC 61643-21						
– per signal wire / per pair	2.5kA/5kA					
8/20µs to ITU (formerly CCITT), BS 6651:1999 Appendix C						
– per signal wire / per pair	10kA/20kA					

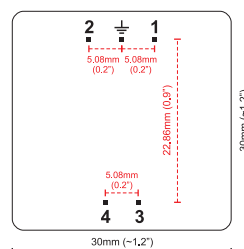
¹ The maximum transient voltage let-through the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time <10ns.

² Test to BS 6651:1999 Appendix C, Cat C-High, IEC 61000-4-5:1995, ITU-T (formerly CCITT) K.20, K.21 and K.45, Telcordia GR-1089-CORE, Issue 2:2002, ANSI TIA/EIA/IS-968-A:2002 (formerly FCC Part 68).

³ The installation and connections external to the protector may limit the capability of the protector.

Mechanical specification

	ESP PCB/D & PCB/TN Series
Temperature range	-25 to +70°C
Connection type	0.64mm (0.025”) square PCB pins, 1.2mm diameter PCB holes recommended
Case material	ABS UL94 V-0
Dimensions	



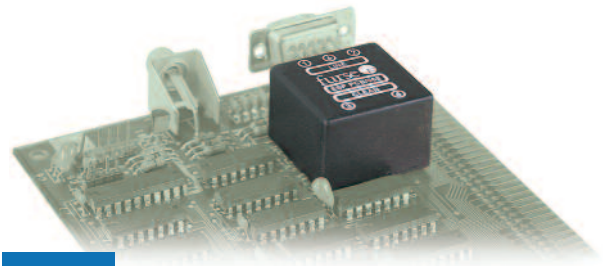
Depth=20mm (~0.8”)
Weight=35g
Pins are centrally positioned
Pin 1 connects through to pin 3
Pin 2 connects through to pin 4
(Underside pin view)

Combined Category D, C, B tested protector (to BS EN 61643-21) for "through hole" mounting directly onto the PCB of data communication, signal or telephone equipment which require a lower in-line resistance, an increased current or a higher bandwidth than the PCB/**D Series. Available for working voltages of up to 110V for AC & DC power applications up to 1.25A. For use at boundaries up to LPZ 0_A to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Installation

Connect in series, soldering pins direct onto PCB. Tracks to line and earth pins should be as wide as practical (see Furse Application Note AN003).

LPZ 0 _A → 3	FULL MODE Bonding + Equipment Protection
SIGNAL/ TELECOM TEST CAT D + C + B	e ENHANCED Low let-through voltage
LOW INLINE 1Ω RESISTANCE	CURRENT 1.25A RATING
	HIGH BANDWIDTH



Features and benefits

- ✓ Suitable for wave soldering
- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all lines – Full Mode protection
- ✓ Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Very low (1Ω) in-line resistance for resistance critical applications
- ✓ High (1.25A) maximum running current
- ✓ Higher bandwidth enables higher frequency data communications
- ✓ 2 pin clean end and 3 pin line end to ensure correct insertion

Electrical specification

	ESP PCB/06E	ESP PCB/15E	ESP PCB/30E	ESP PCB/50E	ESP PCB/110E
Nominal voltage ¹	6V	15V	30V	50V	110V
Maximum working voltage U_c ²	7.79V	16.7V	36.7V	56.7V	132V
Current rating (signal)			1.25A		
In-line resistance (per line ±10%)			1.0Ω		
Bandwidth (-3dB 50Ω system)	1.5MHz	85MHz	85MHz	85MHz	85MHz

¹ Nominal voltage (DC or AC peak) measured at <10µA (ESP PCB/15E, ESP PCB/30E, ESP PCB/50E, ESP PCB/110E) and <200µA (ESP PCB/06E).

² Maximum working voltage (DC or AC peak) measured at <5mA leakage (ESP PCB/15E, ESP PCB/30E, ESP PCB/50E, ESP PCB/110E), <10mA (ESP PCB/06E).

Transient specification

	ESP PCB/06E	ESP PCB/15E	ESP PCB/30E	ESP PCB/50E	ESP PCB/110E
Let-through voltage (all conductors) ¹ U _p					
C2 test 4kV 1.2/50µs, 2kA 8/20µs to BS EN/EN/IEC 61643-21	17.0V	39.0V	60.0V	86.0V	180V
C1 test 1kV, 1.2/50µs, 0.5kA 8/20µs to BS EN/EN/IEC 61643-21	11.5V	28.0V	49.0V	73.5V	170V
B2 test 4kV 10/700µs to BS EN/EN/IEC 61643-21	10.5V	25.5V	43.5V	65.0V	160V
5kV, 10/700µs ²	10.8V	26.2V	44.3V	65.8V	165V
Maximum surge current ³					
D1 test 10/350µs to BS EN/EN/IEC 61643-21					
– per signal wire / per pair			2.5kA/5kA		
8/20µs to ITU (formerly CCITT), BS 6651:1999 Appendix C					
– per signal wire / per pair			10kA/20kA		

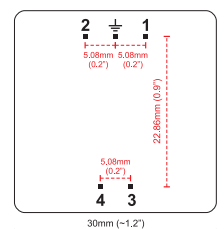
¹ The maximum transient voltage let-through the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time <10ns.

² Test to BS 6651:1999 Appendix C, Cat C-High, IEC 61000-4-5:1995, ITU-T (formerly CCITT) K.20, K.21 and K.45, Telcordia GR-1089-CORE, Issue 2:2002, ANSI TIA/EIA/IS-968-A:2002 (formerly FCC Part 68).

³ The installation and connections external to the protector may limit the capability of the protector.

Mechanical specification

	ESP PCB/E Series
Temperature range	-25 to +70°C
Connection type	0.64mm (0.025") square PCB pins, 1.2mm diameter PCB holes recommended
Case material	ABS UL94 V-0
Dimensions	



Depth=20mm (~0.8")
 Weight=35g
 Pins are centrally positioned
 Pin 1 connects through to pin 3
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(Underside pin view)