

PBR 5110/1

LPC Line Resistor Network

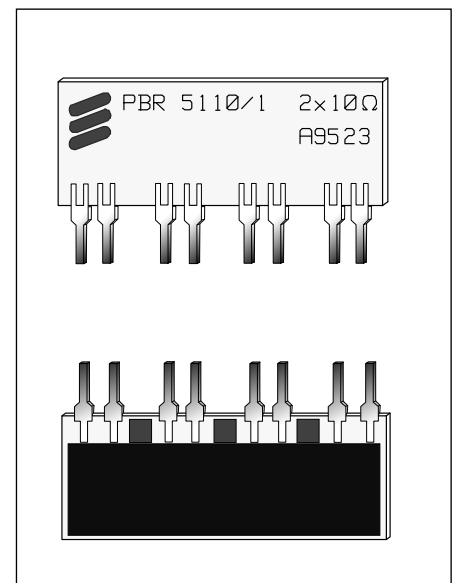
Description

The Line Protection Resistor Network (LPC) PBR 5110/1 consists of a ratio matched pair of thickfilm resistors on a ceramic substrate. PBR 5110/1 is used in telephone line interface overvoltage protection networks, where the LPC resistors limit the current flow through voltage clamping devices such as diodes, tranzorbs, silicon thyristor diode transient suppressors etc.

The resistors will withstand multiple voltage/current surges of either polarity without failure and with only a negligible change inside specified values. If exposed to destructive power cross conditions, the LPC will act as a fuse depending on the applied condition. The PBR 5110/1 meets requirements set forth in ITU-T k17/k20, UL94-V0 and UL 1459.

Key Features

- Two matched resistors in a single-in-line package
- Ratio match maintained after multiple surges
- Ratio match maintained after multiple non destructive power cross
- Fuse function for destructive power cross
- Non-flammable materials
- Auto insertable
- Low mechanical profile.



Line Resistor Network PBR 5110/1.

Absolute Maximum Ratings

T_{amb} = +25 ± 2 °C unless otherwise stated.

Parameter	Symbol	Min	Max.	Unit
Temperature				
Storage temperature range	T _{stg}	-55	+125	°C
Operating temperature range	T _{amb}	-40	+ 85	°C
Power Dissipation, T_{amb} = + 85 °C				
Per resistor	P _{diss}		1	W
Per component	P _{diss}		2	W
Surge Voltage 10/700 μs, 1500 V (note 1, 2, 4)				
Change in resistance after 10 surges CM - DM	ΔR1, ΔR2	-2	+2	%
Change in ratio (matching) after 10 surges (CM - DM)	Δ(R1/R2)	-1	+1	%
Surge Voltage 10/1000 μs, 286 V (note 1, 3)				
Change in resistance after 10 surges CM - DM	ΔR1, ΔR2	-2	+2	%
Change in ratio (matching) after 10 surges (CM - DM)	Δ(R1/R2)	-1	+1	%
Surge Voltage 1/2 μs, 450 V (note 1, 3)				
Change in resistance after 10 surges CM - DM	ΔR1, ΔR2	-2	+2	%
Change in ratio (matching) after 10 surges (CM - DM)	Δ(R1/R2)	-1	+1	%
Surge Voltage 2/10 μs, 450 V (note 1, 3)				
Change in resistance after 20 surges CM - DM	ΔR1, ΔR2	-2	+2	%
Change in ratio (matching) after 20 surges (CM - DM)	Δ(R1/R2)	-1	+1	%
Power Induction 600 VAC, 600 Ω (note 1, 4)				
Duration of Voltage	t _{on}		1,0	s
Change in resistance after 60 applications CM - DM (60 s pulse to pulse)	ΔR1, ΔR2	-2	+2	%
Change in ratio (matching) after 60 applications (CM - DM)	Δ(R1/R2)	-1	+1	%
Power Induction 220 VAC, 600 Ω (note 1, 4)				
Duration of Voltage	t _{on}		15	min
Change in resistance after 1 application CM	ΔR1, ΔR2	-2	+2	%
Change in ratio (matching) after 1 application (CM)	Δ(R1/R2)	-1	+1	%
Power Contact 220 VAC Destructive, ≤ 10 Ω (note 1, 5)				
Duration of Voltage	t _{on}		15	min
Power Contact Destructive, ≤ 3 Ω (note 1, 5)				
Duration of Voltage	t _{on}		15	min
Voltage	U	100	600	VAC

Electrical Characteristics

T_{amb} = +25 ± 2 °C unless otherwise stated.

Parameter	Condition	Min	Typical	Max.	Unit
Resistance/Ratio					
Resistor R1, R2		9,5	10	10,5	Ω
Ratio R1/R2		0,99	1,0	1,01	-
R1, R2: Resistance Vs Temperature	T _{amb} = -40 to + 85 °C	9,8	10,0	10,3	Ω
Tracking R1 - R2	T _{amb} = -40 to + 85 °C	0,995	1,00	1,005	-
Insulation					
Insulation R1 - R2	U = 500 VDC	1000			MΩ

Notes

Note 1: Common Mode (CM) and Differential Mode (DM) are applied if stated. DM equals R1 or R2 tested, CM R1 and R2 simultaneously

Note 2: Surge voltage shape measured according to IEC 60-2, section 4. Surge

voltage, peak voltage, shape and schematics according to ITU-T rec. k17. The surge peak voltage over the resistors: 300 V.

Note 3: Surge voltage shape measured according to IEC 60-2, section 4. Surge voltage pulse shape over the resistor.

Note 4: Reference: ITU-T k20

Note 5: For the test, the requirements are:

- The line resistor is not to start to burn with open flame
- No induction of fire of the surroundings

Pin Description

Figure 1: Circuit diagram Pin 1 is the leftmost pin on the side with marking. Pin 4, 5 and 7,8 are named a and b and equal the outgoing line). All other combinations of placing of a and b are less severe than above stated due to the design of the line resistor.

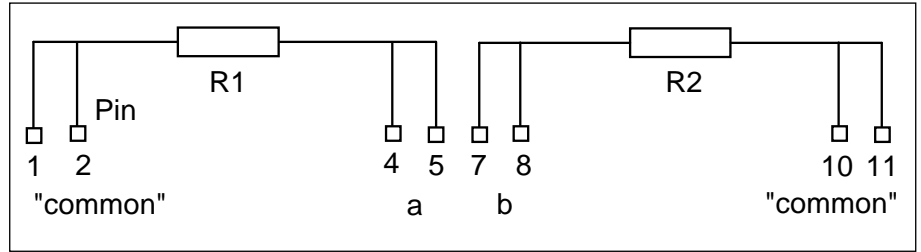


Figure 1. Circuit diagram

Functional Description

General

The Line Protection Resistor Network consists of two thickfilm resistors screenprinted onto a ceramic substrate. The LPC is designed to break open when exposed to power cross conditions; i.e. to act as a fuse. It is also designed to fulfil surge voltage requirements set forth in ITU-T k17/k20 and Bellcore.

High voltage characteristics

For high voltages, i.e. surge voltage and power cross test, the resistance of the LPC is not lower than 9,4 ohms and not higher than 10,7 ohms.

Break open characteristics

The LPC has the following break open-characteristics:

Common Mode (CM) and Differential Mode (DM) are applied if stated. DM equals R1 or R2 tested, CM R1 and R2 simultaneously.

For currents up to 0,5 A in DM and 1,0 A in CM the LPC will not break open. Max. temperature is 200 °C depending on design of PCB. Peak temperature is reached after three minutes.

For currents 0,5 - 2,0 A in DM and 1,0 - 4,0 A in CM the LPC will not break open. High temperature, i.e. above 200 °C, is reached within 30 s. If the break open time is more than 1 s, high temperatures might be reached.

Note: In DM, the LPC will not break both the "a"- and "b" branch open; i.e. if the voltage is applied to "a", only R1 will break open within stated time.

See also diagram 1

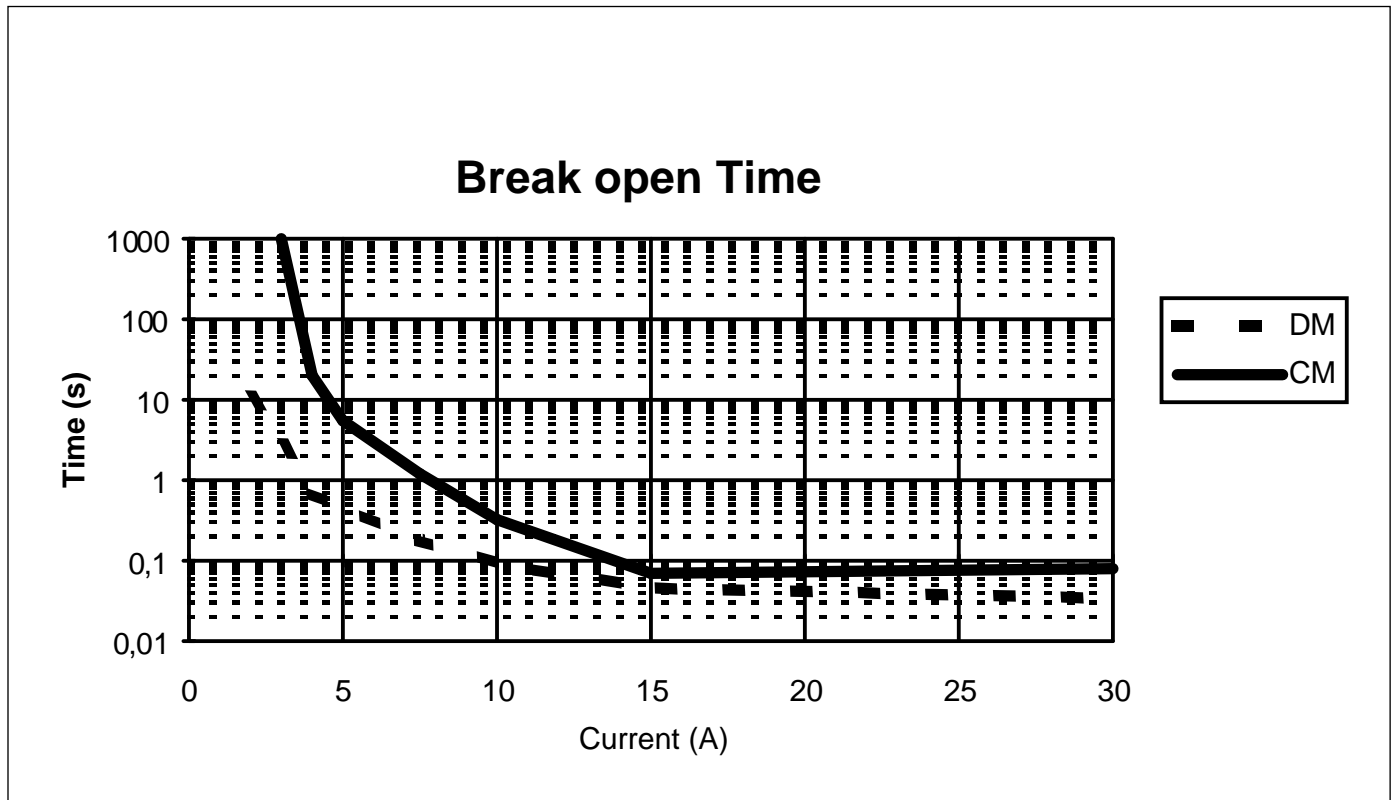


Figure 2. Diagram 1 Break open Time.

Mechanical Outline

Quality Specifications

The LPC is delivered at the following AQL:

Resistance, Ratio:

AQL 0,4, Level II

Surge Voltage, Power Cross:

AQL 1,0, Level S-3

according to

IEC 410, MIL STD 105.

Pin types and Package

Three different pins are available:

Type A: Non-preformed lead for 0,8-1,0 mm through-hole-mounting

Type B: (On Request) Pre-formed lead for 1,0 mm through-hole-mounting

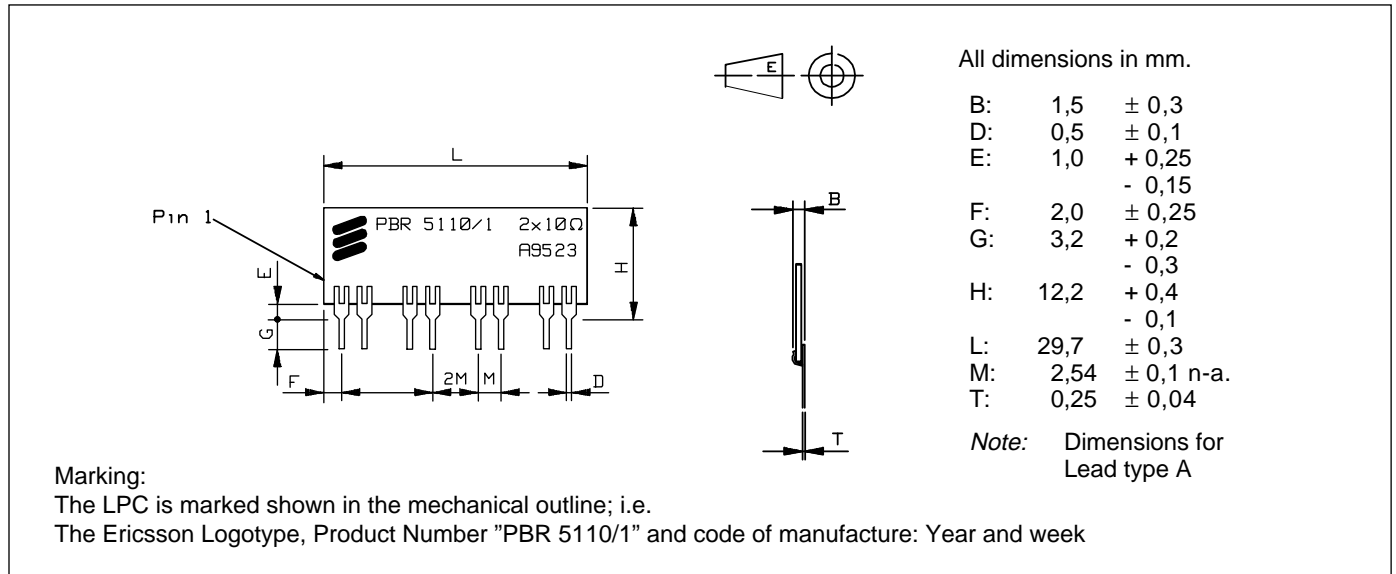
Type C: (On Request) Pre-formed lead for 0,8 mm through-hole-mounting

Two types of packages are available:

Bulk: with the LPC's individually fixed in a carrier

Taped: (On Request)

with the LPC's placed on a tape as described in IEC 286-2.



Marking:

The LPC is marked shown in the mechanical outline; i.e.

The Ericsson Logotype, Product Number "PBR 5110/1" and code of manufacture: Year and week

Figure. 3 Mechanical outline.

Ordering Information

The LPC may be ordered as:

PBR 5110/1 AK, PBR 5110/1 BK and PBR 5110/1 CK for Bulk

PBR 5110/1 AT, PBR 5110/1 BT and PBR 5110/1 CT for Taped

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