PBR 530 01/1
LPC Line Resistor Network

Description

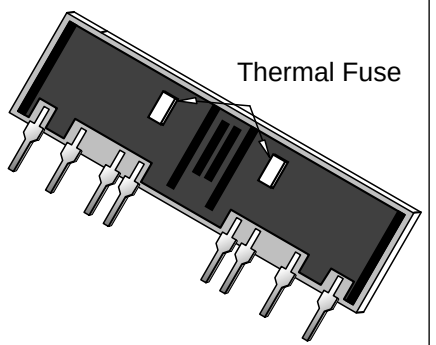
The Line Protection Resistor Network (LPC) PBR 530 01/1 consists of a ratio matched pair of thick film resistors in series with a thermal fuse on a ceramic substrate. PBR 530 01/1 is used in telephone line interface over voltage protection networks, where the LPC resistors limit the current flow through 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 power cross conditions, the included thermal fuses will open depending on the applied condition. The PBR 530 01/1 meets requirements set forth in Bellcore TR-NWT 001089 and UL 1459.

Key Features

- Two matched resistors in a single-in-line package
- Ratio match maintained after multiple lightning surges
- Ratio match maintained after multiple power cross (first level)
- Safe fuse function for destructive power cross (second level)
- Non-flammable materials
- Auto insertable

Patent pending!



Line Resistor Network PBR 530 01/1.

Absolute Maximum Ratings

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

Parameter	Symbol	Min	Max.	Unit
Temperature				
Operating temperature range	T_{amb}	-40	+85	°C
Power Dissipation, Tamb = + 85 °C				
Per resistor	P_{diss}		1	W
Per component	P_{diss}		2	W
Surge Voltage 10/1000 µs, 1000 V (note 1, 2)				
Change in resistance after 100 surges CM - DM	ΔR1, ΔR2	-1	+1	%
Change in ratio (matching) after 100 surges (CM - DM)	Δ(R1/R2)	-0,25	+0,25	%
Surge Voltage 2/10 µs, 2500 V (note 1, 2)				
Change in resistance after 20 surges CM - DM	ΔR1, ΔR2	-1	+1	%
Change in ratio (matching) after 20 surges (CM - DM)	Δ(R1/R2)	-0,25	+0,25	%
Power Cross 600 VAC, 600 Ω (note 1, 3)				
Duration of Voltage	t_{on}		1,0	s
Change in resistance after 60 applications CM - DM	ΔR1, ΔR2	-1	+1	%
Change in ratio (matching) after 60 applications (CM - DM)	Δ(R1/R2)	-0,25	+0,25	%
Power Cross 50 VAC, 150 Ω (note 1, 4)				
Duration of Voltage	t_{on}		15	min
Change in resistance after 1 applications CM - DM	ΔR1, ΔR2	-1	+1	%
Change in ration (matching) after 1 applications (CM - DM)	Δ(R1/R2)	-0,25	+0,25	%
Power Cross Destructive, (note 1, 5)				
Duration	t_{on}		15	min
Voltage	U		600	VAC

Electrical Characteristics

Tamb = +25 ± 2 °C unless otherwise stated.

Parameter	Condition(s)	Min.	Typical	Max.	Unit
Resistance/Ratio					
Resistor R1, R2		49	50	51	Ω
Ratio R1/R2		0,995	1,0	1,005	-
Temperature coefficient (TCR) Absolute	T_{amb} = - 40 to + 85 °C	-100		400	ppm/K
Temperature coefficient (TC) Tracking	T_{amb} = - 40 to + 85 °C	-50		+50	ppm/K
Insulation					
Insulation R1 - R2	U = 2500 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 (reference: TR-NWT 001089)

Note 2: Surge voltage shape measured according to IEC 60-2, section 4. Surge voltage, peak voltage, shape and schematics according to TR-NWT 001089, ¶ 4.5. The surge peak voltage over the resistors are: 870 V for DM and 700 V for CM

Note 3: Reference: TR-NWT 001089, ¶ 4.5; Duration 1 s, 60 s between each application

Note 4: Reference: TR-NWT 001089, ¶ 4.5;: Duration 15 min. The test is dependent on used cooling of the resistor network.

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
- No operating of circuit included fuse's (wire simulator fuse)

Conditions (Reference: TR-NWT 001089, ¶ 4.5, Second level tests):

a) max. 600 VAC, Rs = 20 per lead, CM, Initial current 0,5 A, Current increased not more than 20 % per 15 min period.

b) 600 VAC, Rs = 20 , CM

c) 600 VAC, Rs = 600 , CM

Pin Description

Figure 1: Circuit diagram Pin 1 is the leftmost pin on the side with marking. Pin 3 and 13 are named a and b and equals the outgoing line. This is the recommended use of the LPC.

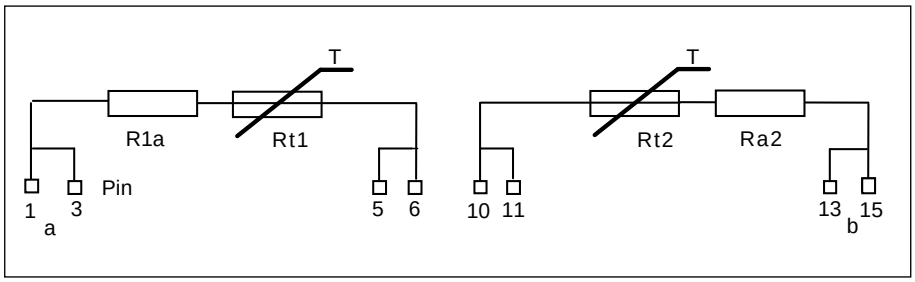


Figure 1. Circuit diagram.

Functional Description

General

The Line Protection Resistor Network consists of two thick film resistors with thermal fuses in series.

Fuse Function of the LPC

For destructive power cross, the LPC will break open (either the substrate or the thermal fuse). The thermal fuse is activated at low currents which only heats the resistor network and the substrate will break open at high currents. The thermal fuse will operate when temperature within the LPC is more than 240 °C for 20 s. The thermal fuse will then safely open and stop the current flow and therefore protect the PCB from high temperatures. The actual power required for operating the fuse depends on the cooling of the resistor network. The cooling is dependent on the design of the PCB (number of layers, area of metal layer etc.) and the air cooling (forced air cooling, convection etc.). For destructive power cross, the LPC will break open (either the substrate or the Thermal 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 48,5 ohms and not higher than 51,5 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.

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.

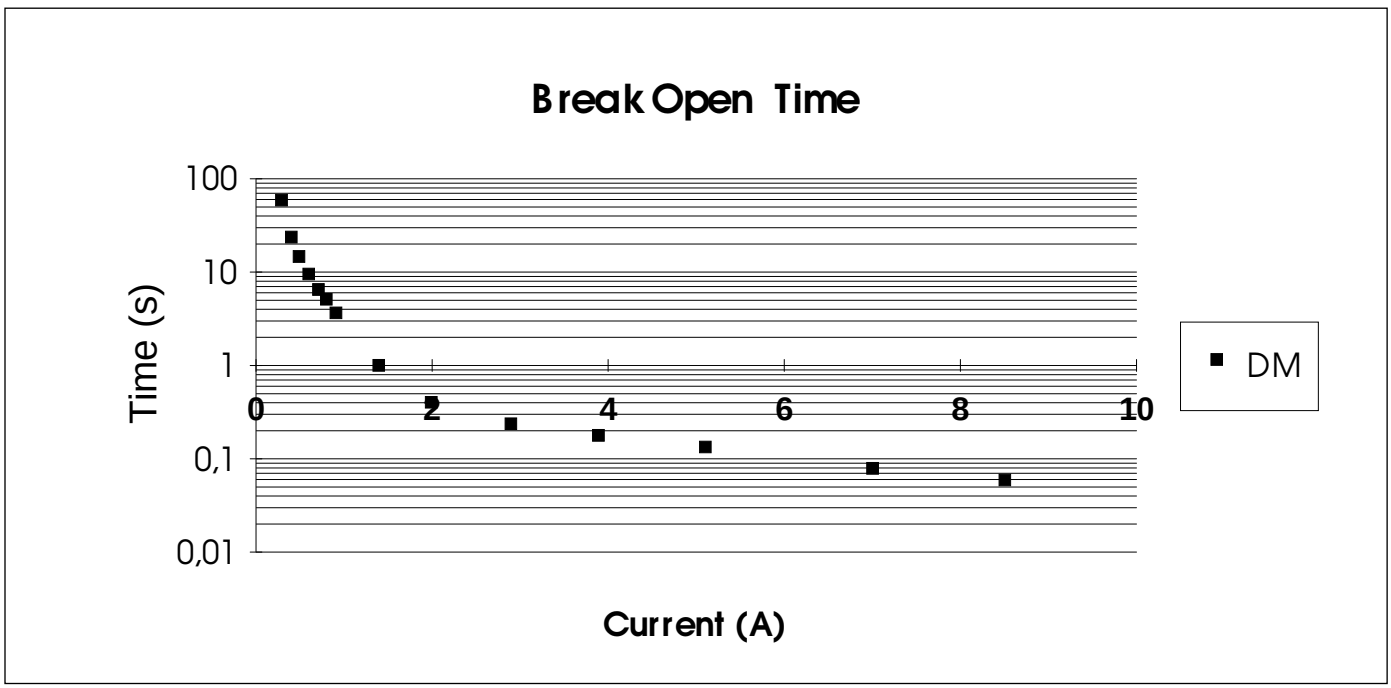


Figure 2. Diagram 1 Break open Time.

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

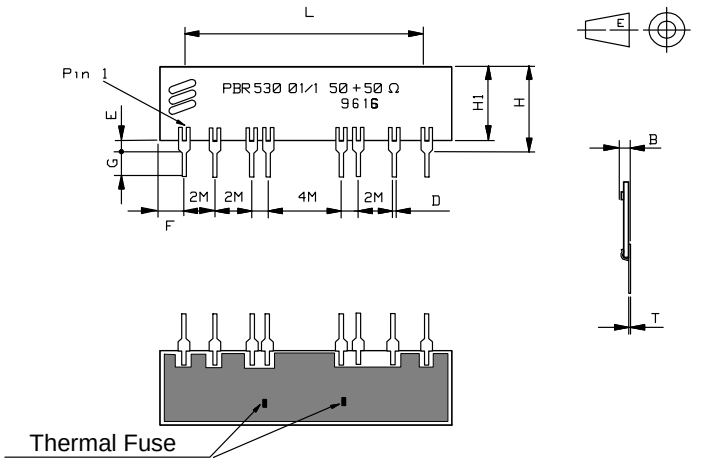
Three different pins are available:

Type A: (Standard) 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 possible:

Bulk: with the LPC's individually fixed on a carrier.

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



All dimensions in mm.

B:	2.5	± 0.5
D:	0.5	± 0.1
E:	1.0	+ 0.25 - 0.15
F:	5.08	+ 0.15
G:	3.2	+ 0.2 - 0.3
H:	12.2	+ 0.4 -0.6
L:	45.7	± 0.3
M:	2.54	± 0.1
T:	0.25	± 0.04

Note: *Dimensions for lead type A*

Marking:
The LPC is marked shown in the mechanical outline; i.e.
The Ericsson Logotype, Product Number "PBR 530 01/1 and code of manufacture: Year and week

Figure 3. Mechanical outline.

Ordering Information

The LPC may be ordered as:

PBR 530 01/1 AK, PBR 530 01/1 BK and PBR 530 01/1 CK for Bulk

PBR 530 01/1 AT, PBR 530 01/1 BT and PBR 530 01/1 CT for Taped

1522-PBR 530 01/1 Uen Rev. A

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