PBR 520 05/1
LPM Line Protection Module

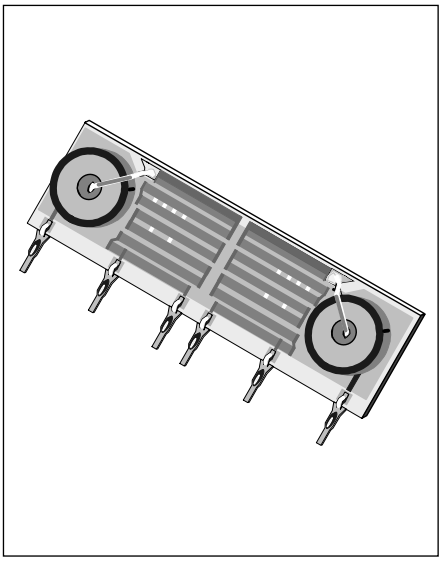
Description

The Line Protection Module (LPM) PBR 520 05/1 consists of a ratio matched line resistor pair including thermistors (PTC's) on a ceramic substrate. PBR 520 05/1 is used in telephone line interface overvoltage protection networks, where the LPM resistors limit the current flow through voltage clamping devices such as diodes, tranzorbs or other transient suppressors.

The resistors 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 PTC's will switch and decrease the current or act as a fuse depending on the applied condition. When the conditions are back to normal and the LPC (substrate or PTC) has not fused, the resistor will resume values close to the initial. The PBR 520 05/1 consists of non-organic materials and meets requirements according to ITU-T K17/K20 and UL 1459.

Key Features

- Two matched line resistors in a single-in-line package
- Ratio match maintained after multiple surges
- Ratio match maintained after multiple non-destructive power cross
- Resettable fuse function for non-destructive power cross
- Fuse function for destructive power cross
- Non-flammable materials
- Auto insertable
- Low mechanical profile
- PTC protects the line resistors
- Does not significantly decrease in resistor value during fast surge voltage conditions



Line Protection Module PBR 520 05/1.

Absolute Maximum Ratings

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

Parameter	Symbol	Min.	Max.	Unit
Temperature				
Storage temperature range	T_{stg}	-40	+125	°C
Operating temperature range	T_{amb}	0	+70	°C
Power Dissipation, T_{amb} = + 70 °C				
Per resistor	P_{diss}		1	W
Per component	P_{diss}		2	W
Surge Voltage 10/700 µs, 1500 V (open circuit) (note 1, 2, 3)				
Change in resistance after 10 surges (CM, DM)	ΔR1, ΔR2	-3	+3	%
Change in ratio (matching) after 10 surges (CM, DM)	Δ(R1/R2)	-2	+2	%
Power Induction 600 VAC, 600 Ω (note 1, 3)				
Duration of Voltage	t_{on}		1.0	s
Change in resistance after 60 pulses (CM) (pause between pulses 60 s)	ΔR1, ΔR2	-3	+3	%
Change in ratio (matching) after 60 pulses (CM)	Δ(R1/R2)	-2	+2	%
Power Contact 240 VAC, 600 Ω (note 1, 3)				
Duration of Voltage	t_{on}		15	min
Change in resistance after 1 pulse (CM)	ΔR1, ΔR2	-3	+3	%
Change in ratio (matching) after 1 pulse (CM)	Δ(R1/R2)	-2	+2	%
Power Contact 240 VAC, > 10 Ω (note 1)				
Duration of Voltage	t_{on}		3	min
Change in resistance after 5 pulses (CM) (pause between pulses 180 s)	ΔR1, ΔR2	-3	+3	%
Change in ratio (matching) after 5 pulses (CM)	Δ(R1/R2)	-2	+2	%
Power Contact 240 VAC Destructive, ≤ 10 Ω (note 1, 3, 4)				
Duration of Voltage (CM)	t_{on}		15	min

Electrical Characteristics

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

Parameter	Condition(s)	Min.	Typical	Max.	Unit
Resistance/Ratio					
Resistor R1, R2 (R_{25})	T_{amb} = +25 ± 0,5°C	39	40	41	Ω
Ratio R1/R2 (K_{25})		0,98	1,0	1,02	-
R1, R2: Resistance vs Temperature	T_{amb} = 0 to + 70 °C	35	40	55	Ω
Ratio R1/R2 ($K \neq K_{25}$)	T_{amb} = 0 to + 70°C	0,96	1,00	1,04	-
Switched value					
Resistance at switched condition of PTC	U = 100 VDC	3	4	6	kΩ
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 equals 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. K.17.

Note 3: Reference: ITU-T K.20.

Note 4: 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 the PTC's. Pin 1 and 14 are named ”a” and ”b” and equals the outgoing line. This is the recommended use of the LPM.

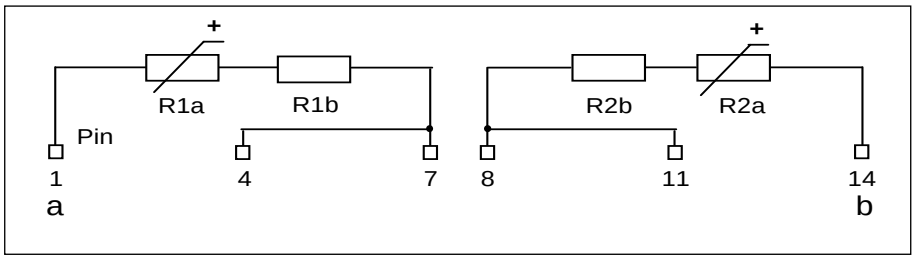


Figure 1. Circuit diagram.

Functional Description

General

The Line Protection Module consists of two thickfilm resistors screen-printed onto a ceramic substrate. The PTC acts as a resettable fuse for non-destructive power cross conditions. The PTC switches and is high-ohmic as long as the high voltage condition lasts. When the overvoltage is removed and the LPM (substrate or PTC) has not fused, the resistor values will return to values close to the initial. For destructive power cross, the LPM will break open (either the substrate or the PTC).It is also designed to fulfil surge voltage requirements according to ITU-T K17/ K20. Pin 1 and 14 are recommended as outgoing line (”a” and ”b”) due to the short flash over distance between pin 7 and 8.

High voltage characteristics

For high voltages, i.e. surge voltage and power cross test, the resistance of the LPM is typically 35 ohms.

Switch characteristics

The LPM’s switch characteristics are according to diagram 1. Common Mode (CM) and Differential Mode (DM) are applied if stated. DM equals R1 or R2 tested, CM equals R1 and R2 tested simultaneously.

Max. temperature is 130 °C (max. temperature of the PTC). The recovery time; i.e. the time until the LPM returns within stated values (see page 2), is less than 12 hours. For CM, the ratio will be ’better’ than stated in page 2 because both PTC’s are switched.

Note: In DM, the LPM will not switch both the ”a”- and ”b” branch open; i.e. if the voltage is applied to ”a”, only R1 will switch within stated time.
See also diagram 1.

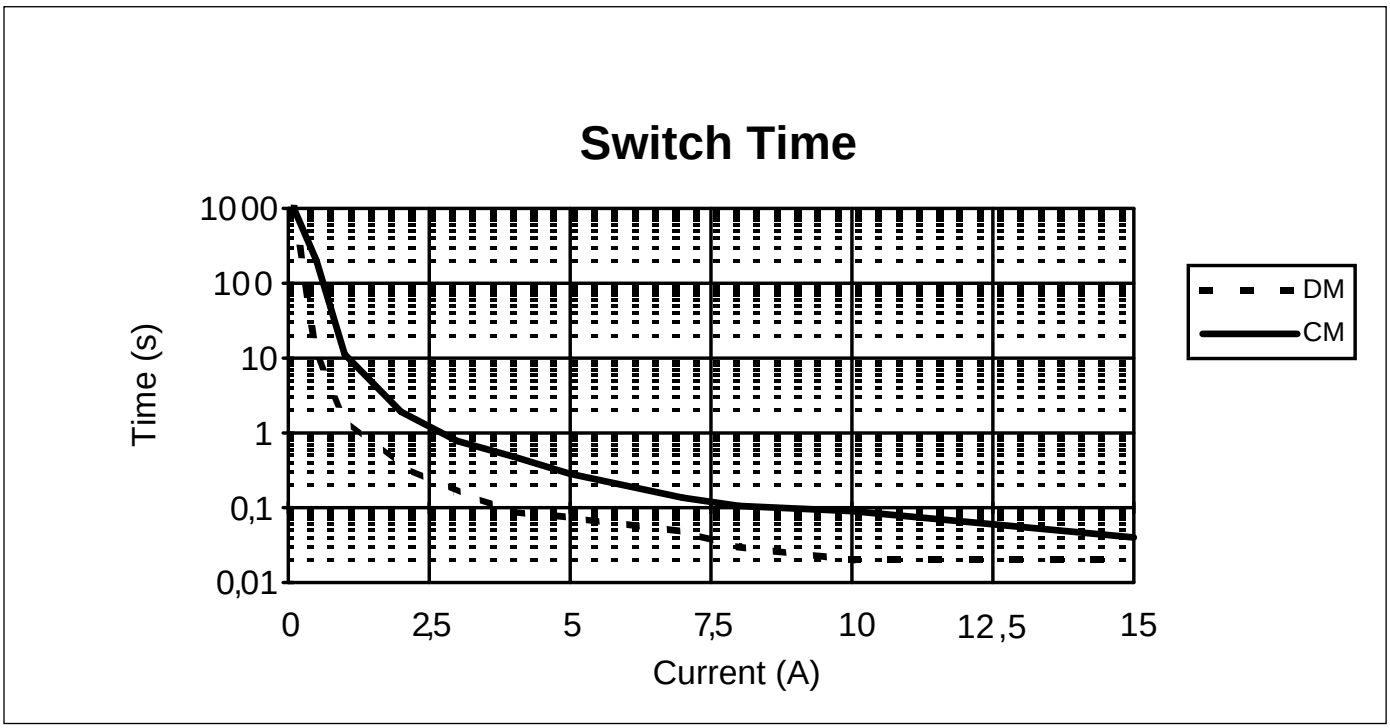


Figure 2. Diagram 1 Switch Time.

Quality Specifications

The LPM 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

Two different pins are available:

Type B: (On Request)

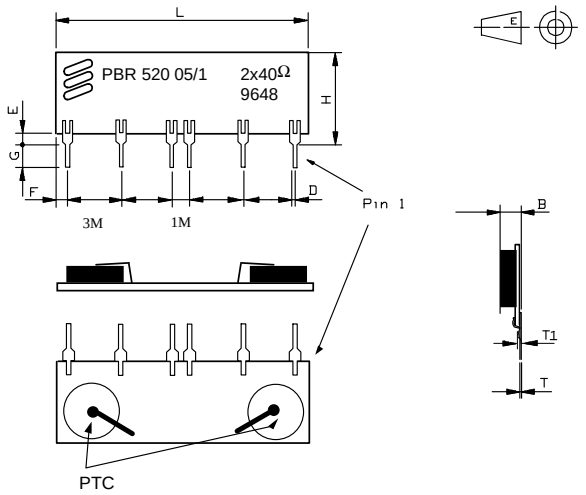
Pre-formed lead for 1.0 mm through-hole-mounting

Type C: (Recommended) Pre-formed lead for 0.8 mm through-hole-mounting.

Two types of packages are possible:

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

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



All dimensions in mm.

B:	4.0	± 0.5
D:	0.5	± 0.1
E:	1.0	+ 0.25 - 0.15
F:	2.54	+ 0.15 - 0.45
G:	3.2	+ 0.2 - 0.3
H:	13.2	+ 0.4 -0.1
L:	38.1	± 0.3
M:	2.54	± 0.1
T:	0.25	± 0.04
T1:	0.67	± 0.03

Note: *Dimensions for lead type C*

Marking:
The LPM is marked shown in the mechanical outline; i.e.
The Ericsson Logotype, Product Number "PBR 520 05/1 and code of manufacture: Year and week

Figure. 3 Mechanical outline.

Ordering Information

The LPM may be ordered as:

PBR 520 05/1 BK and PBR 520 05/1 CK for Bulk

PBR 520 05/1 BT and PBR 520 05/1 CT for Taped

1522-PBR 520 05/1 Uen Rev. A

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Ericsson Components AB
S-164 81 Kista-Stockholm, Sweden
Telephone: (08) 757 50 00