

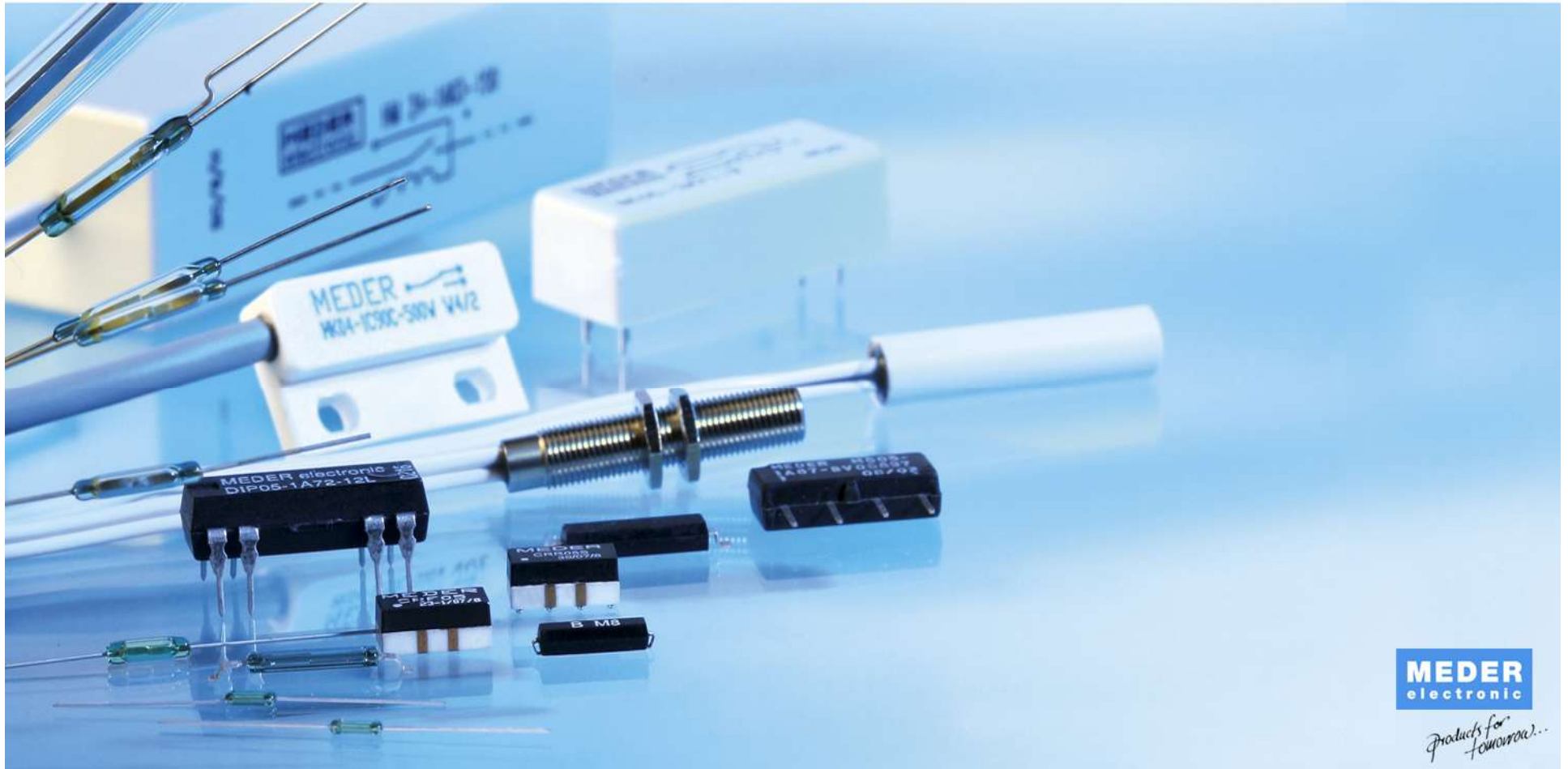
REED SWITCHES

REED SENSORS

REED RELAYS



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*Products for
Tomorrow...*

Relays for RF applications II

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04/06/2010

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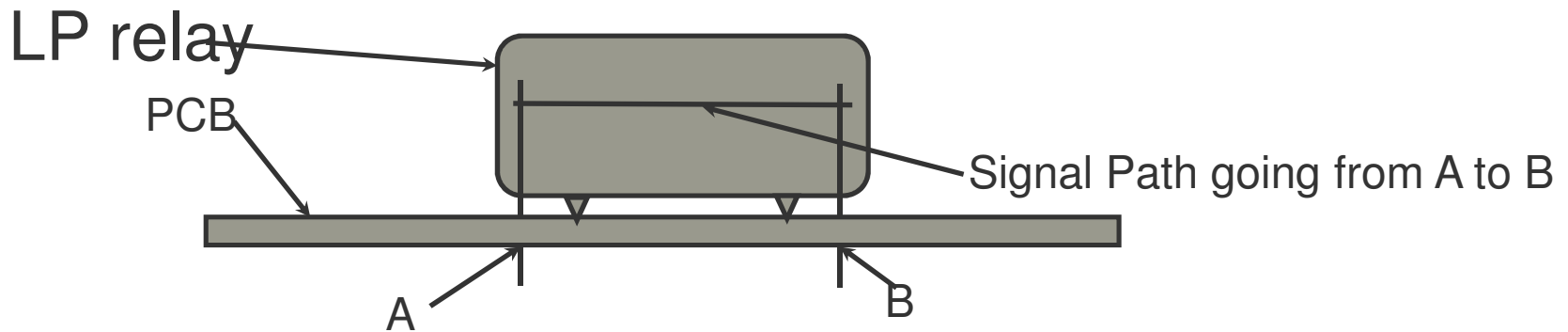
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Ways to improve RF performance

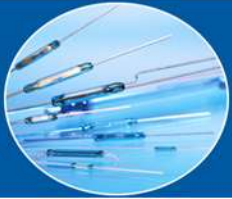
- Controlling the impedance path through the relay maintaining 50 ohms
- Shortening the signal path length by making a smaller relay (length wise)



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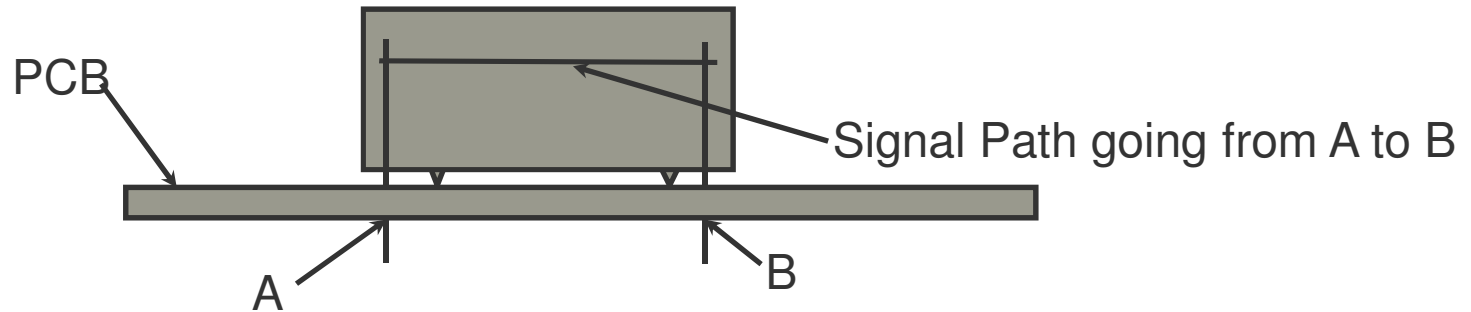
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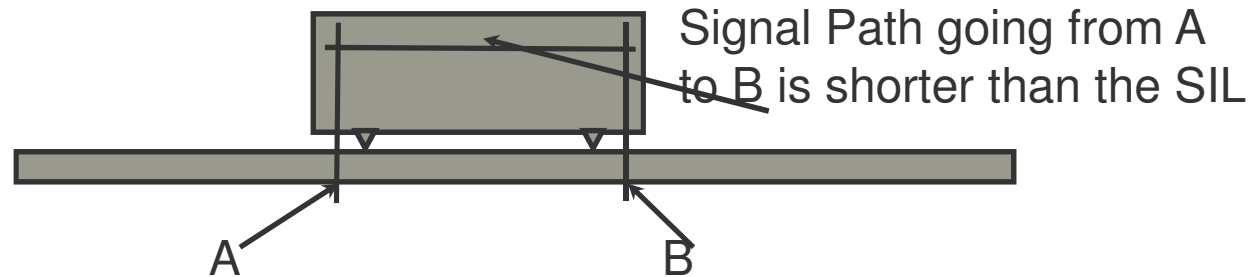


Shortening the signal paths

SIL relay



MS relay



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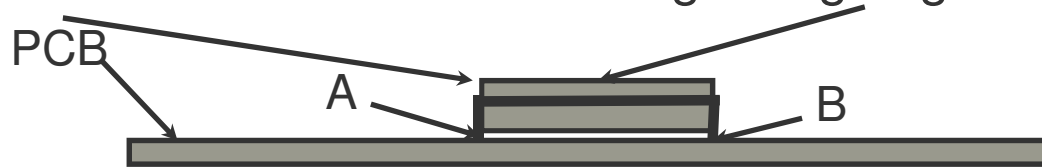
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Shortening the signal paths

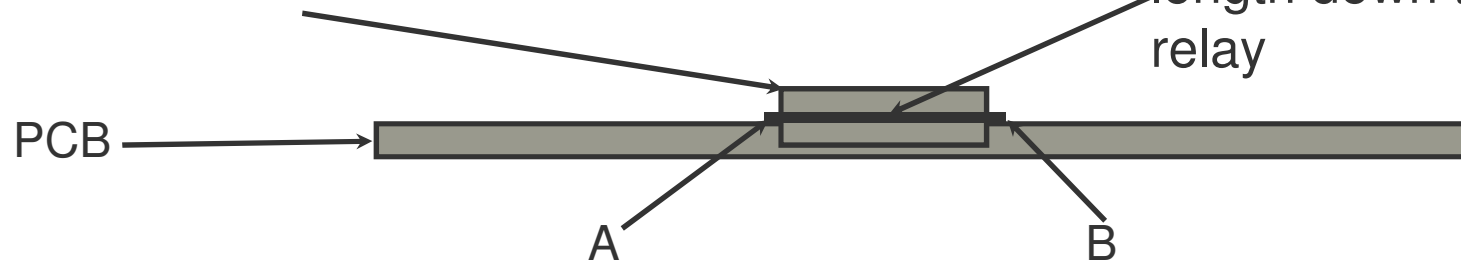
CRF relay

Signal Path going from A to B showing a dramatic reduction in signal path eliminating the double length of going through the PCB



SRF relay

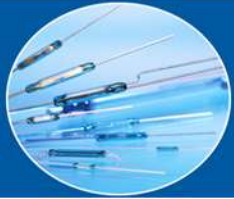
Signal Path going from A to B eliminating the path length down the side of the relay



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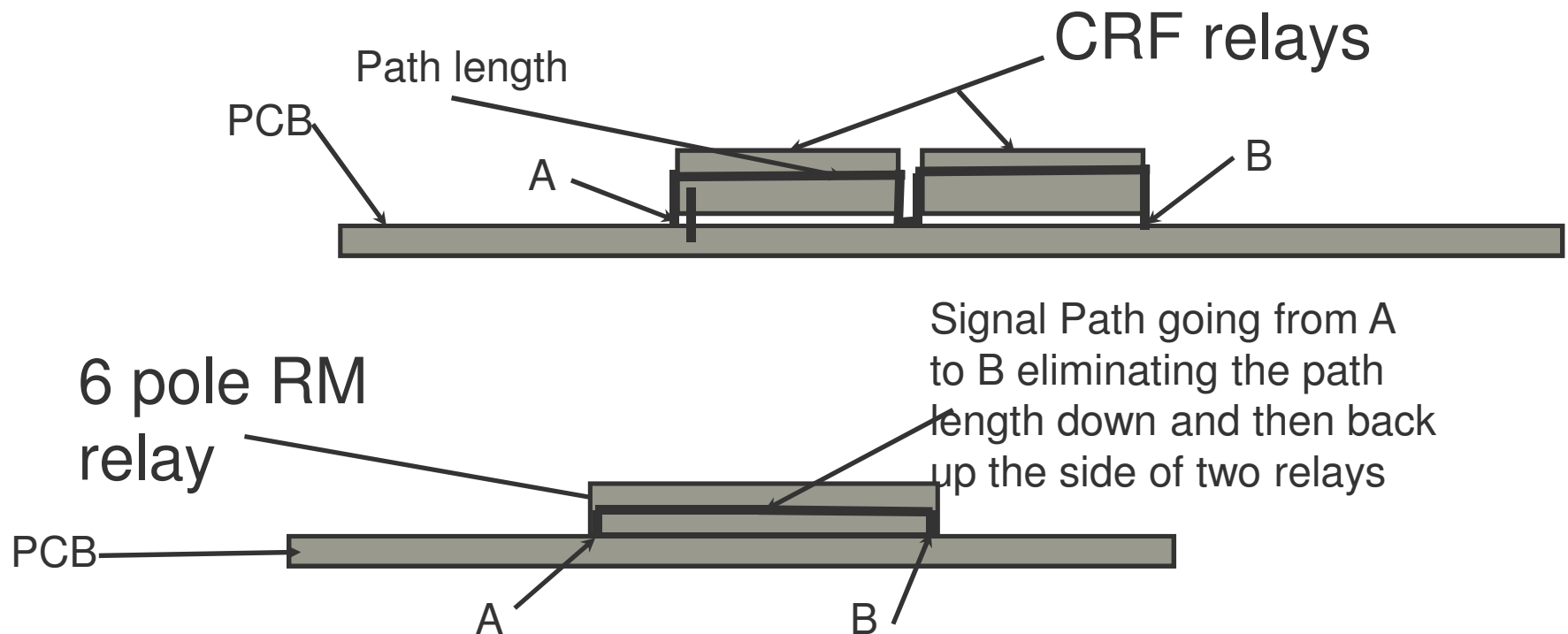
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Shortening the signal paths

- An example of how the RM 6 pole eliminates signal path length by avoiding going out the relay and down the side of the package to the PCB and then going over the PCB to a new relay, then having to go up and into the second relay



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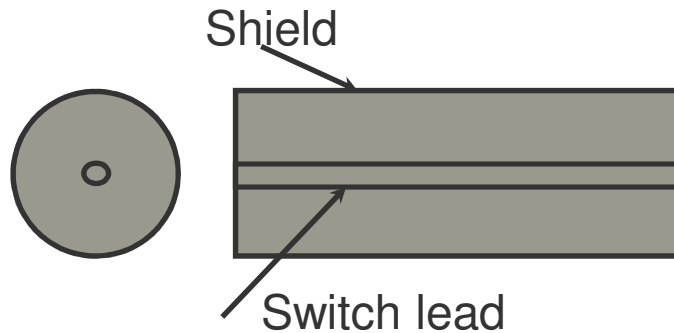
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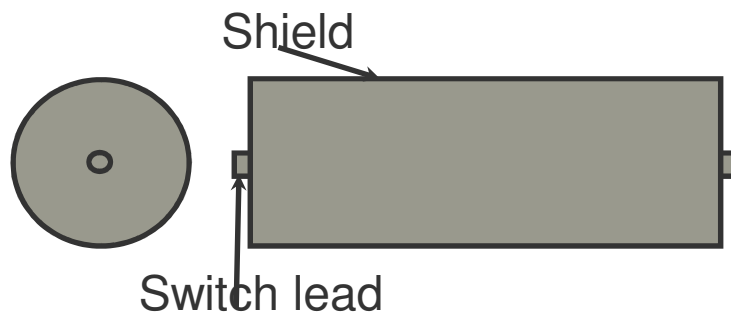


Ways to improve RF performance

- Minimize geometric changes to the signal path.



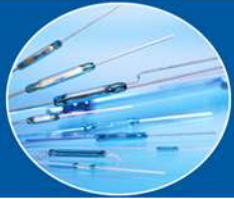
- Minimize the overmolding or eliminate it and or only have a short stub of the switch available



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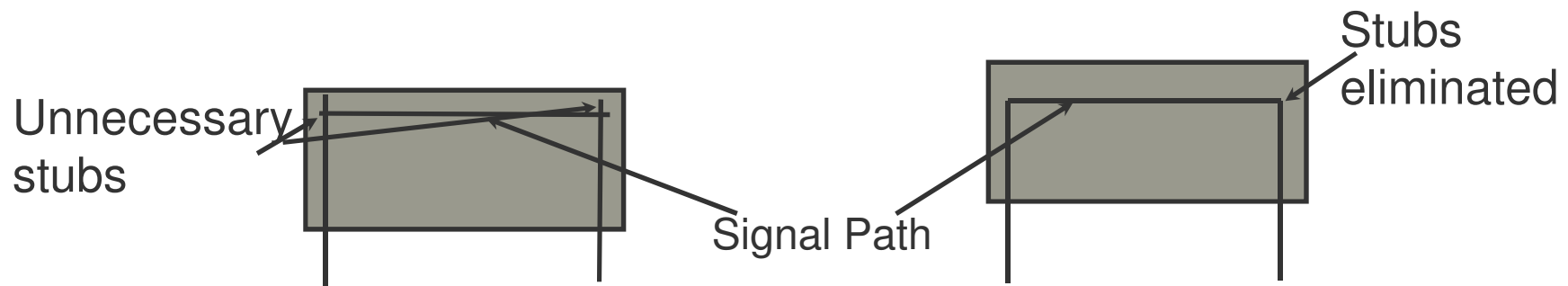
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Ways to improve RF performance

- Reduce or eliminate any sharp corners in the signal path.
- Eliminate any unnecessary metal stubs attached to the signal path.
- Design a packaged relay Matrix, for example our RM-6-pole



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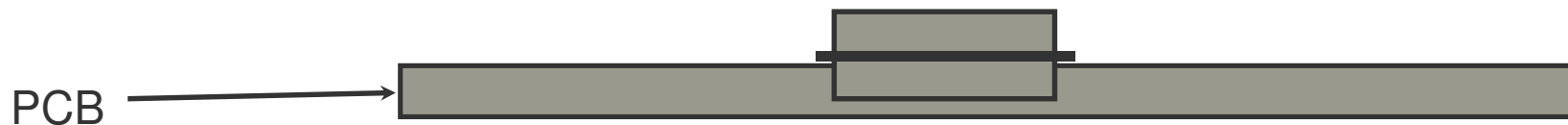
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Ways to improve insertion loss

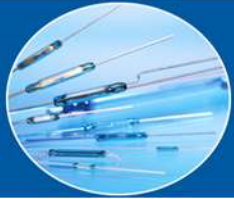
- Match the impedance in and out of the relay with the PCB (customer)
- Surface mount is much better than thru hole
- Place the surface mount relay axially into a PCB cutout





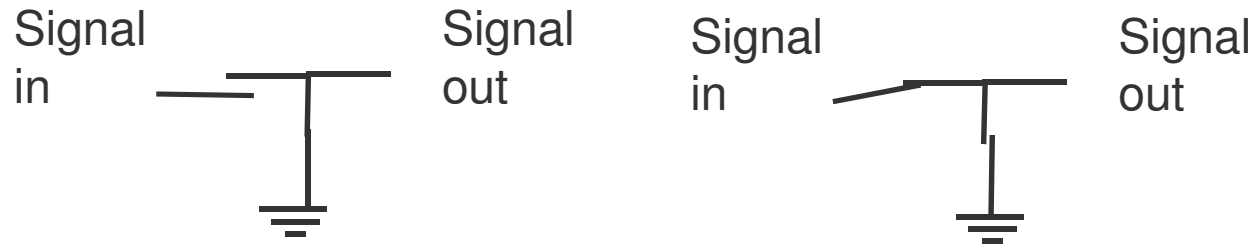
Ways to improve isolation

- Using higher AT switches works to a limit, where the sacrifice of increased coil power becomes too big a drain.
- Using a 'T' or 1/2 'T' switching arrangement will increase isolation.
- The 'T' switch basically has two relays in series (both in the open state) and at their junction a third relay is connected to ground (this relay is normally closed).
- Any signal leaking thru the first relay in series will be theoretically shunted to ground.
- The second relay in series will further isolate any signal that is left at the junction of the three relays

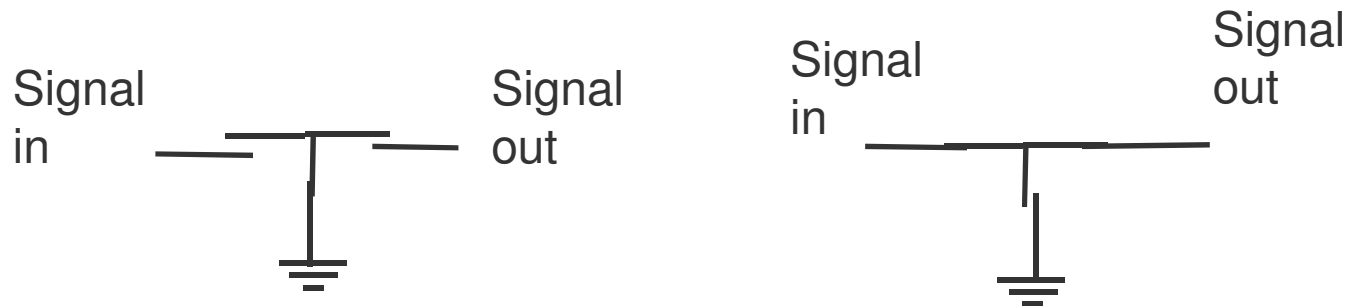


Ways to improve isolation

1/2 T Switching



Full 'T' Switching



- As can be seen the 1/2T and T switch will improve the isolation, but what also can be seen in transmission mode, the path length has increased and we have added stubs
- So the insertion loss and frequency response will suffer.

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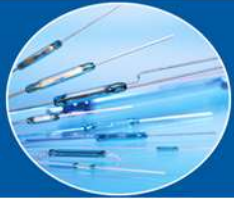
Grounding the start wire

- The start wire and its subsequent turns covering the first wound layer on the coil form essentially make up the shield.
- This first layer looks like a cylinder surrounding the switch
- Therefore grounding the start wire will act very efficiently as the signal ground
- So the cylinder coupled with the reed switch make up a coaxial cable giving good RF performance
- This allows us to use the LP, SIL and MS series as RF relays

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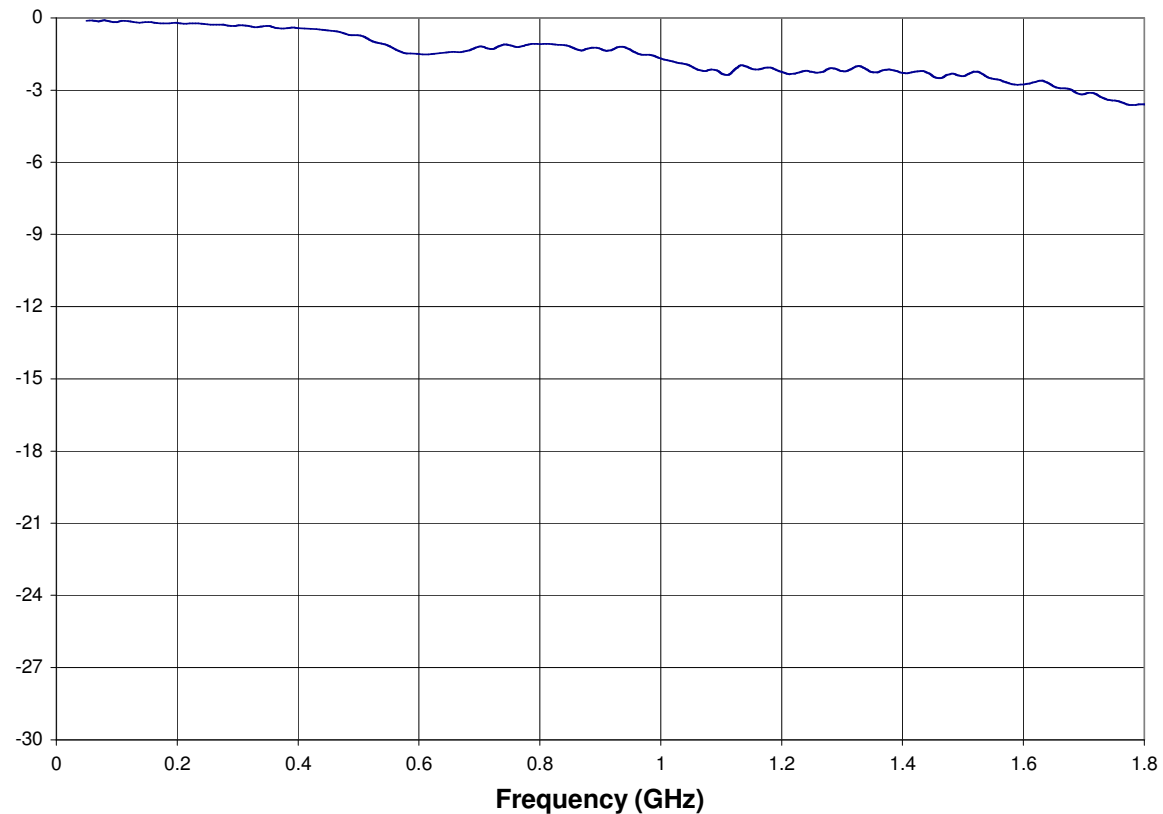
REED RELAYS



MEDER Relays for RF applications

- LP Series - DC to 500 MHz

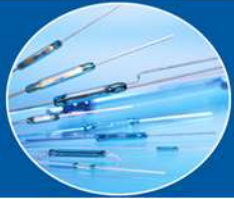
LP05-1C90 Insertion Loss with start-wire grounded



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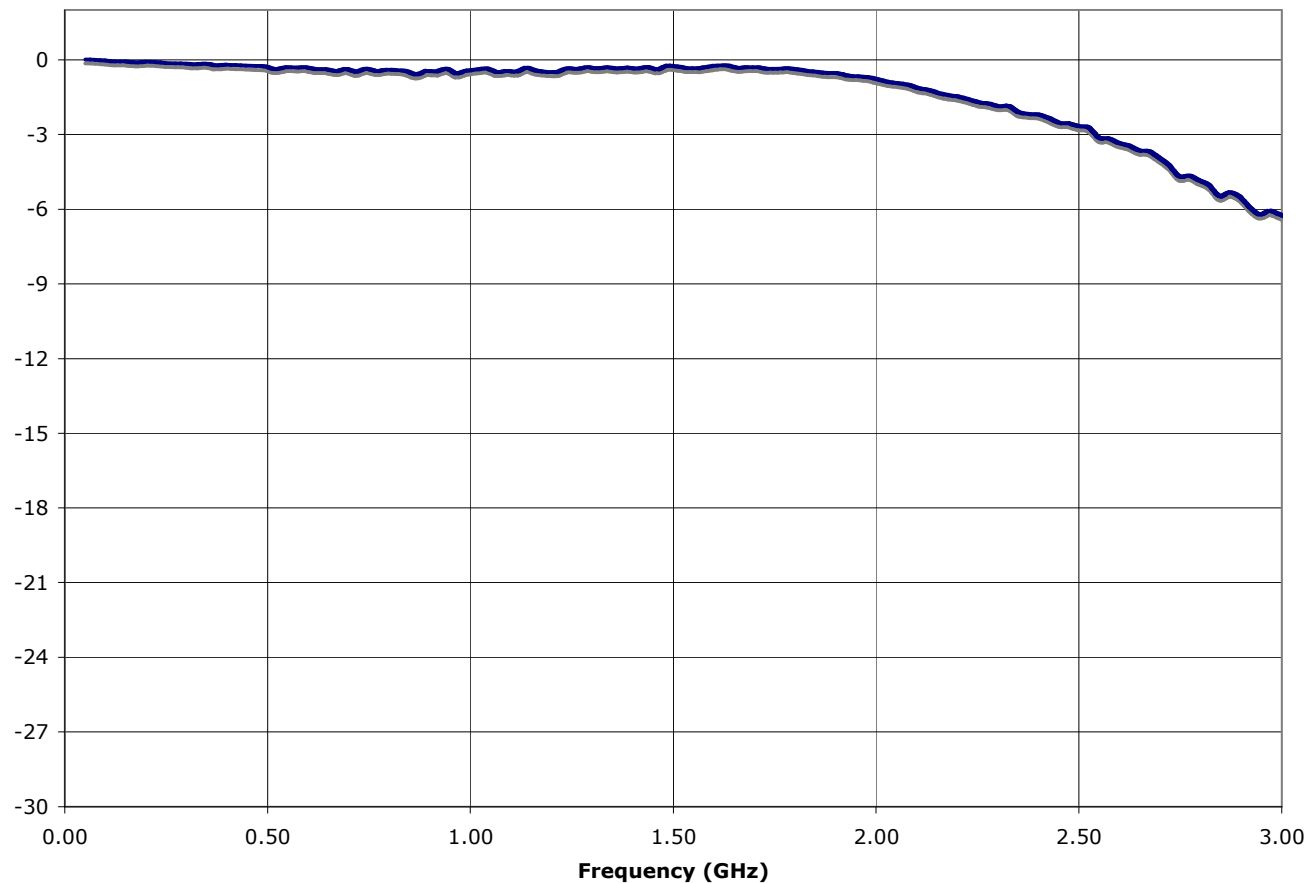
REED RELAYS



MEDER Relays for RF applications

- SIL Series - DC to 800 GHz

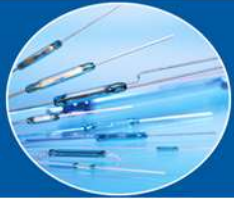
SIL05-1A72 Insertion Loss with start-wire grounded



REED SWITCHES

REED SENSORS

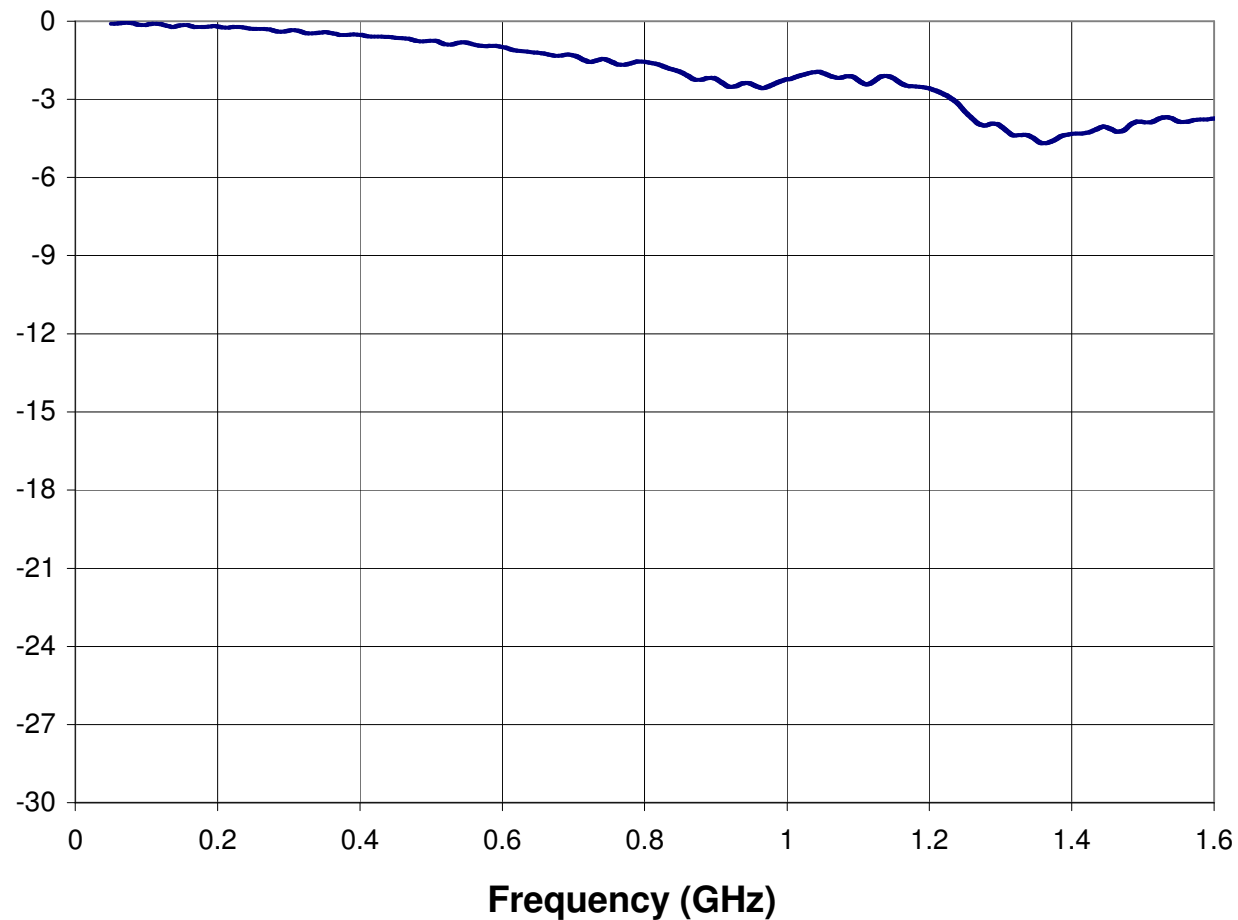
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MEDER Relays for RF applications

- MS Series - DC to 1.5 GHz

MS05-1A87 Insertion Loss with start-wire grounded



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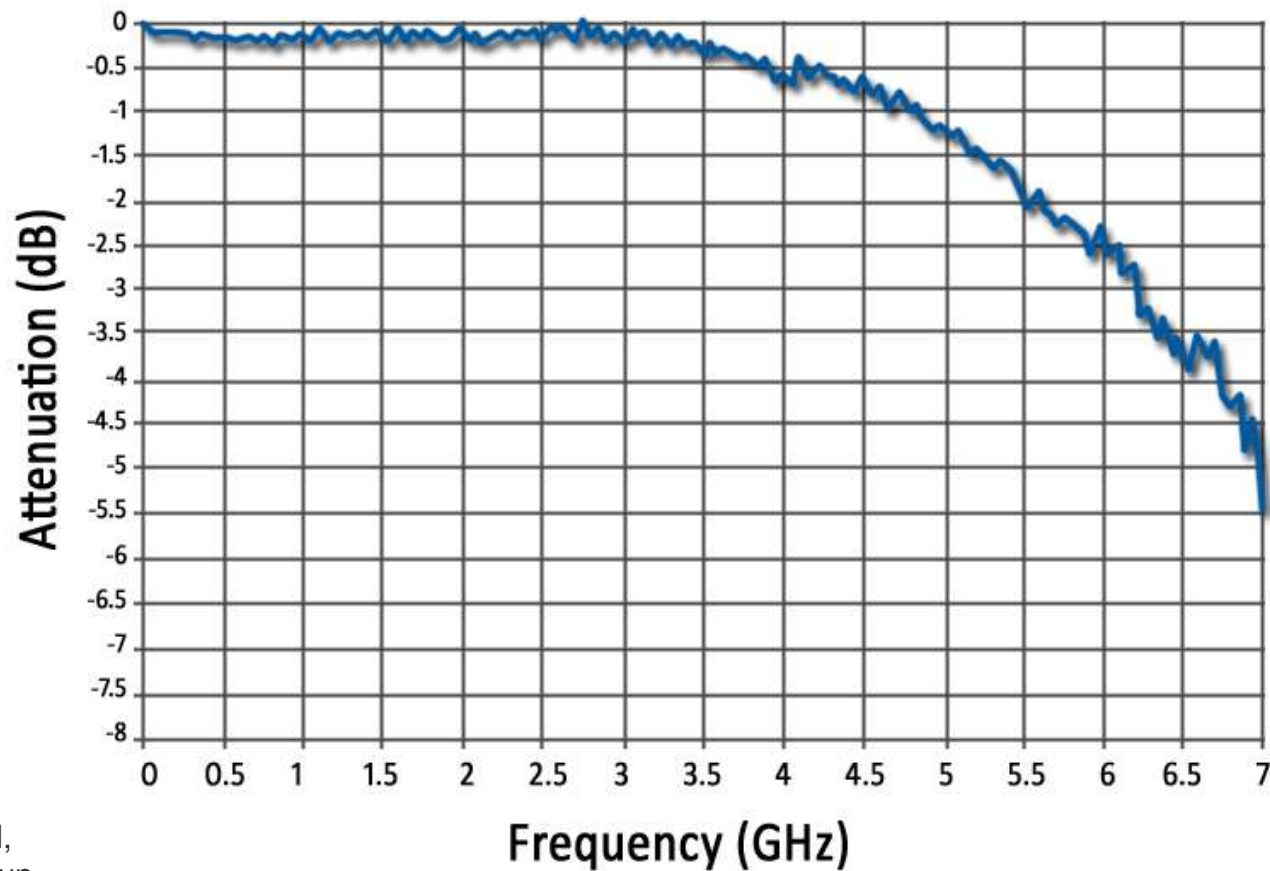
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MEDER Relays for RF applications

- CR Series - DC to 7 GHz

CRF Insertion Loss



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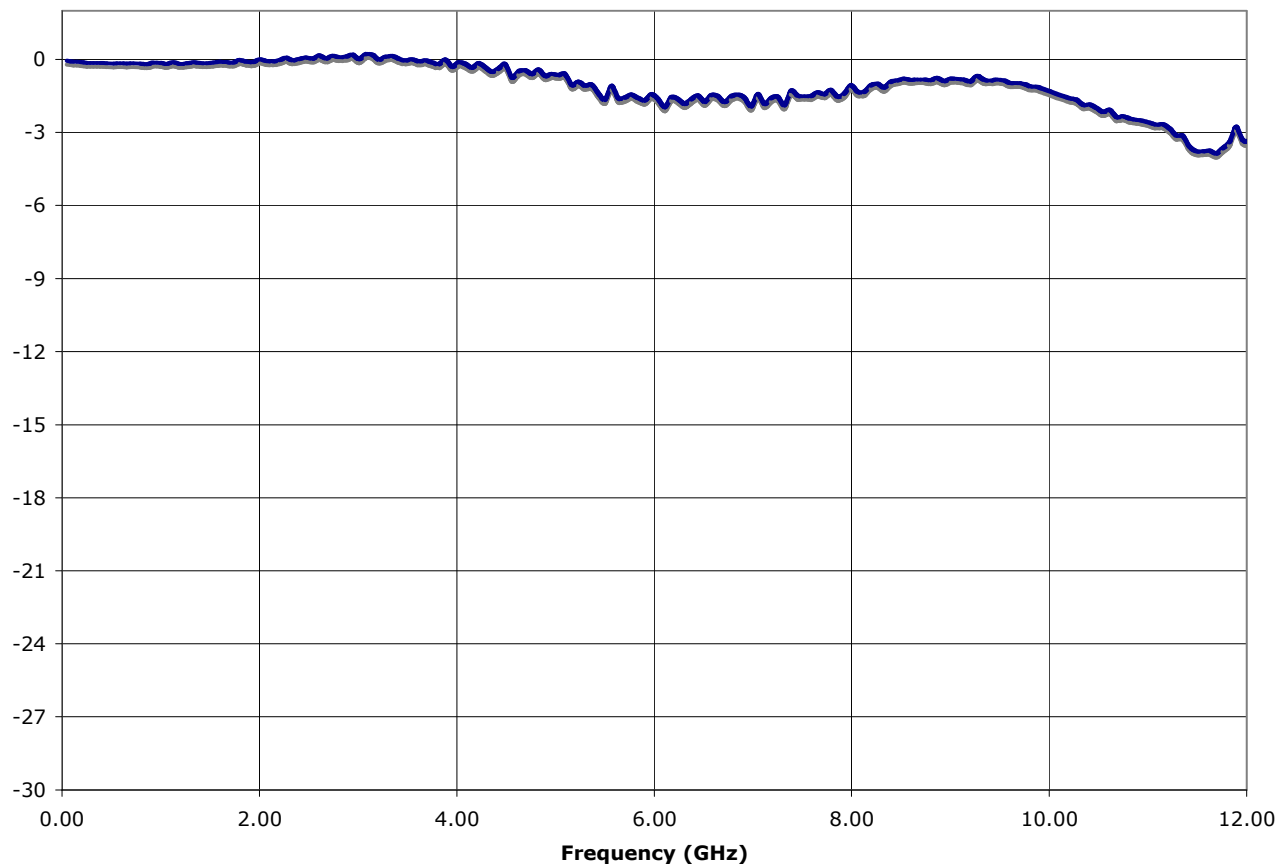
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MEDER Relays for RF applications

- DRF Series - DC to 12 GHz

DRF Insertion Loss



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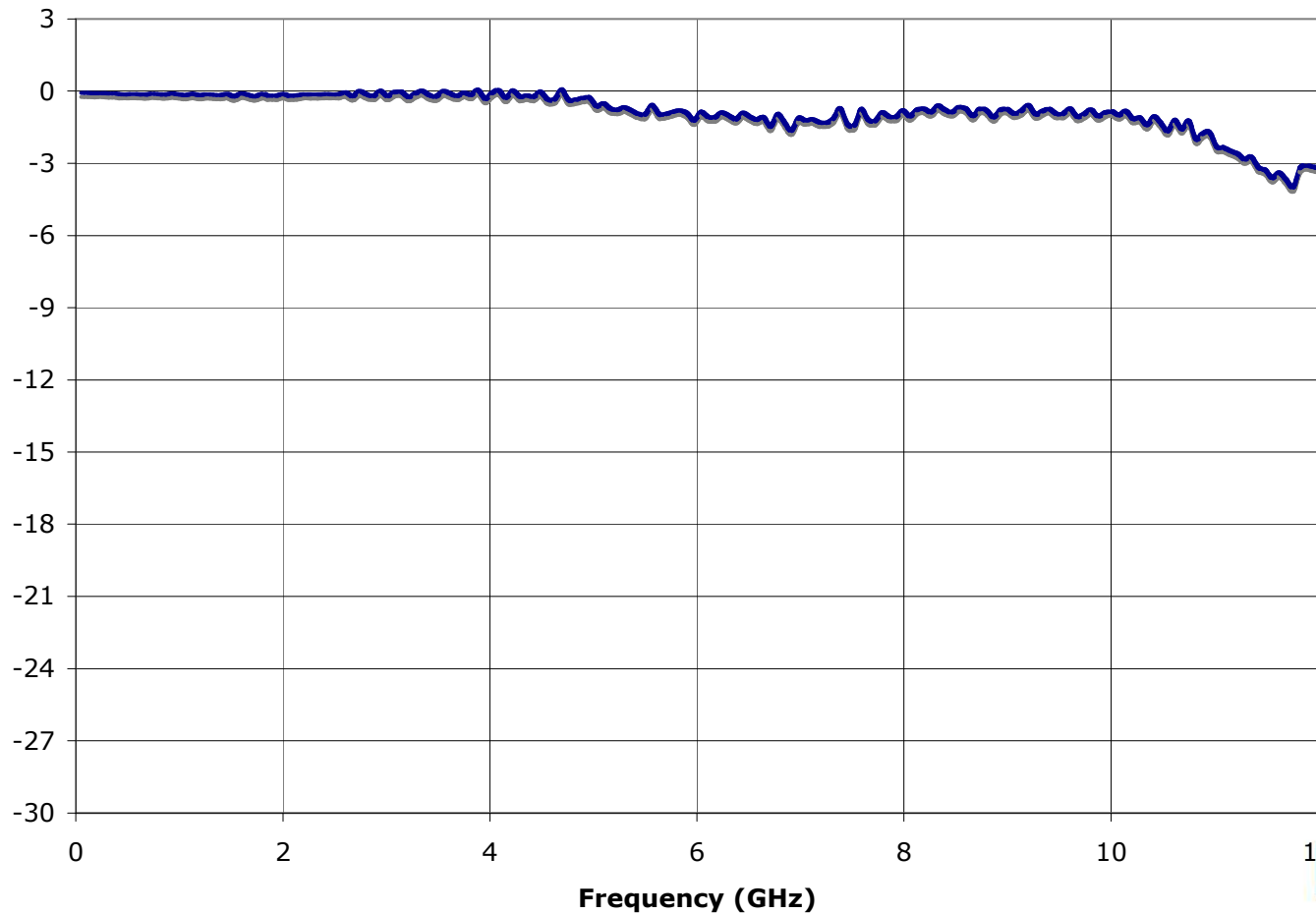
REED RELAYS



MEDER Relays for RF applications

- SRF Series - DC to 16 GHz

SRF Insertion Loss



REED SWITCHES

REED SENSORS

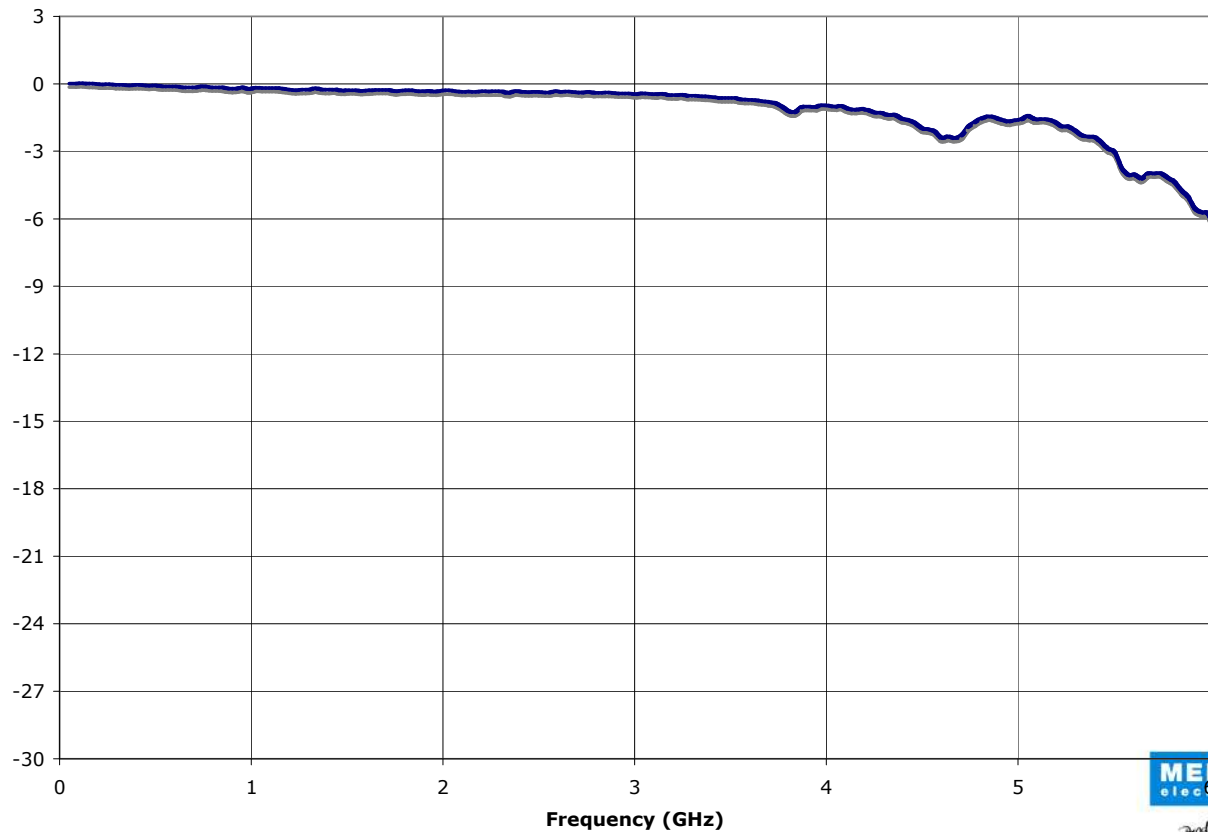
REED RELAYS



MEDER Relays for RF applications

- RM 6 pole - DC to 3.5 GHz
- RM 4 pole - DC to 5.5 GHz
 - 4 inputs and 4 outputs
 - 4 inputs and 2 outputs

RM05-4AS-4/4 Insertion Loss



REED SWITCHES

REED SENSORS

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Reed Switch Basics

- **End of part II**

Form B and Latching Reed Relays and Sensors:

- What are the key features of Form B and latching Relays and Sensors?
- Why is the magnet so important?
- Why is the coil so important?
- The hysteresis of the reed switch – the best way to understand Form B and latching action