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# HL967x Series Wilkinson Power Dividers (to 67 GHz)

## Features and Technical Specifications[1] (HL9677 shown)

### PRODUCT SUMMARY

The HL967x series are 2-way Wilkinson power dividers that provide outstanding amplitude and in-phase power division or combining from 1 GHz to beyond 67 GHz.

This product is designed using concatenated quarter-wavelength transformers resulting in low loss outputs that are ideally attenuated to 3 dB, when all ports are impedance-matched to 50 Ohms.

The advantage of a Wilkinson power divider is the high isolation between the output ports that is extremely advantageous in power combining applications.

Applications include test and measurement, high-speed data communications, and power combining.

### DEPLOYMENT NOTES

The Wilkinson can also be used to combine two equal phase signals.

### MODELS & OPTIONS

The following models are available:

- ***HL9674***, 40 GHz
- ***HL9675***, 50 GHz
- ***HL9677***, 67 GHz

The following connector options are available:

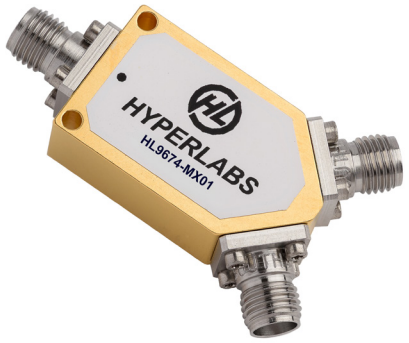
- ***-JJJ,*** 3 x jack (standard)

Extra cost options:

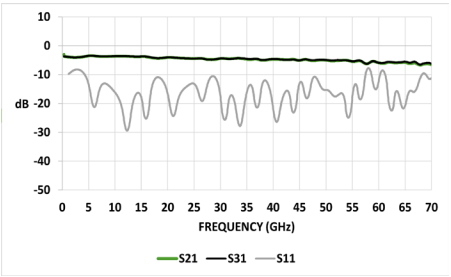
- ***-JPP***, jack/plug/plug
- ***-PJJ***, plug/jack/jack
- ***-PPP***, 3 x plug

| | |
|---|---|
| Bandwidth (-3 dB) | 1 to 67 GHz |
| Insertion Loss (AC) | 4 dB |
| Nominal Phase Shift | 0° |
| Amplitude Match | ± 0.1 dB<br>See *Fig. 6* |
| Phase Match | ± 1°, f ≤ 50 GHz<br>± 2°, f > 50 GHz<br>*See Fig. 5* |
| Return Loss | > 20 dB, f ≤ 35 GHz, output ports<br>> 15 dB, f > 35 GHz, output ports<br>> 10 dB, f ≤ 67 GHz, common port<br>*See Fig. 3* |
| Isolation | 15 dB<br>*See Fig. 2* |
| Rise Time | 5 ps |
| Insertion (Group) Delay | 260 ps, all ports<br>See *Fig. 4* |
| Max Input Power | +30 dBm |
| Impedance | 50 Ω |
| Connectors | 1.85 mm, 3x jack/female |
| Dimensions (L x W x H) | 1.81" x 1.17" x 0.40"<br>46.0 x 29.7 x 10.16 mm<br>*See Fig. 6* |
| Temperature Limits | -40° to +70° C, operating |
| RoHS Compliant | Yes, assembled with lead-free solder |
| REACH Compliant | Yes |
| Warranty | 1 year, see website |

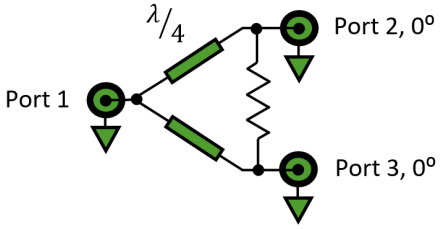
NOTE 1 - Unless otherwise noted, the specifications in this table are typical for Model Number HL9677 using the standard connector configuration (-JJJ; 3 x jack). Full specifications for this and related models are available on page 2 of this datasheet.




*HL9674, other models similar*




*Typical HL9677 Insertion and Return Loss*




*HL967x Schematic and Port Assignments*

## HL967x Full Specifications

| Parameter | HL9674 | HL9675 | HL9677 | Comments |
|---|---|---|---|---|
| Upper Frequency Limit | 40 GHz | 50 GHz | 67 GHz | |
| Lower Frequency Limit | 1 GHz | | | |
| Insertion Loss (AC)<br>*See Fig. 1* | 4 dB | | | Typical, nominal |
| Nominal Phase Shift | 0° | | | |
| Return Loss<br>*See Fig. 3* | > 20 dB, f ≤ 35 GHz<br>> 15 dB, f > 35 GHz | | | Typical, output ports |
| Return Loss<br>*See Fig. 3* | > 10 dB, f ≤ 67 GHz | | | Typical, common port |
| Amplitude Match<br>*See Fig. 6* | ± 0.1 dB | | | Typical, between output ports |
| Isolation<br>*See Fig. 2* | 15 dB | | | Typical |
| Phase Match<br>*See Fig. 5* | ± 1° | ± 1° | ± 1°, f ≤ 50 GHz<br>± 2°, f > 50 GHz | Typical, between output ports |
| Rise Time | 8.75 ps | 7 ps | 5.2 ps | Typical |
| Insertion (Group) Delay<br>*See Fig. 4* | 260 ps | | | Typical, all ports |
| Max Input Power | +30 dBm | | | |
| Impedance | 50 Ω | | | All ports |
| Connectors | 2.92 mm, 3x jack/female | 2.4 mm, 3x jack/female | 1.85 mm, 3x jack/female | Plug/male connectors available at extra cost |
| Dimensions<br>(L x W x H) | 1.81” x 1.17” x 0.40<br>46.0 x 29.7 “x 10.16 mm | | | Will vary slightly based on connectors |
| Weight | 18 g (0.63 oz.) | | | |
| Operating Temperature | -40° to +70° C | | | Case temperature |
| RoHS Compliant | Yes, assembled with lead-free solder | | | |
| REACH Compliant | Yes | | | |
| Warranty | 1 year, repair or replacement; see website for details | | | |

Note: All specifications are based on test results using the standard connector configuration (3 x jack). Specifications may vary slightly for other configurations.

## HL9677 Plot Diagrams

Figures 1-6 show the typical S-parameter characteristics of an HL9677. Other models show similar performance within their respective specified bandwidths.

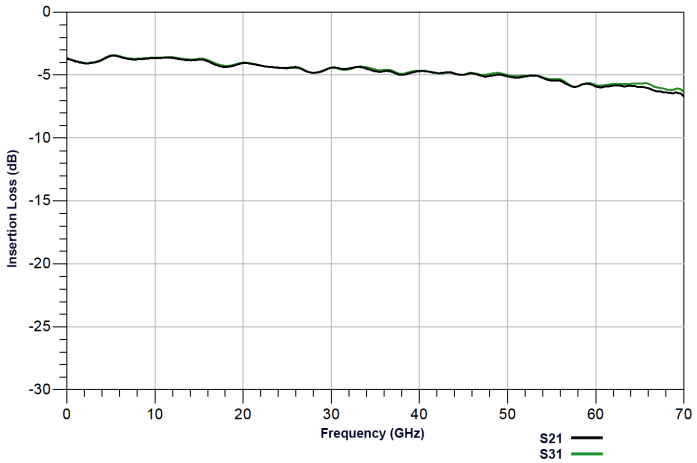



*Figure 1: HL9677 Insertion Loss*

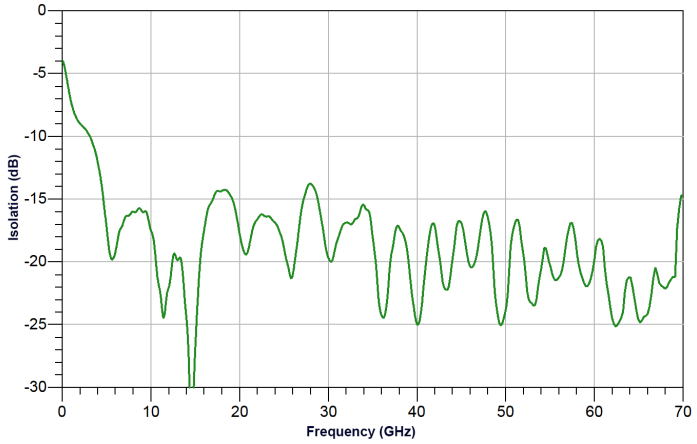



*Figure 2: HL9677 Isolation*

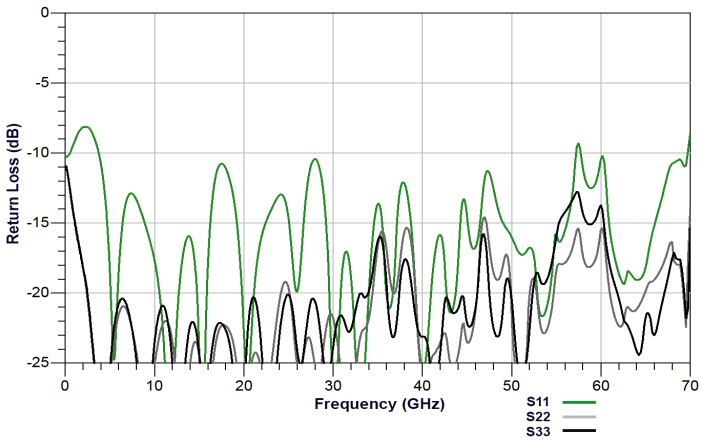



*Figure 3: HL9677 Return Loss*

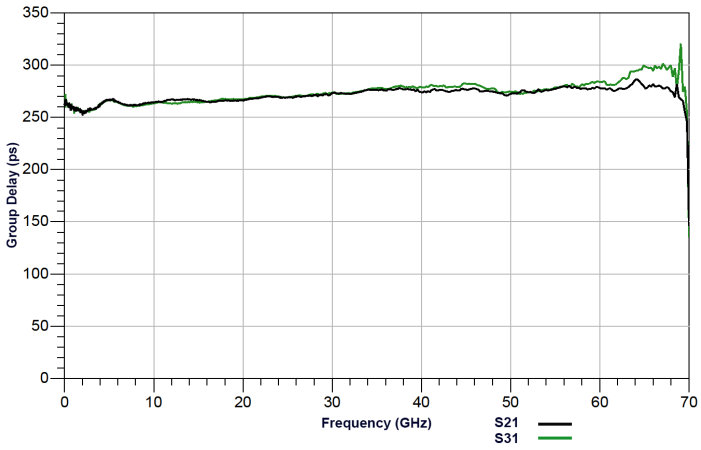



*Figure 4: HL9677 Group Delay*

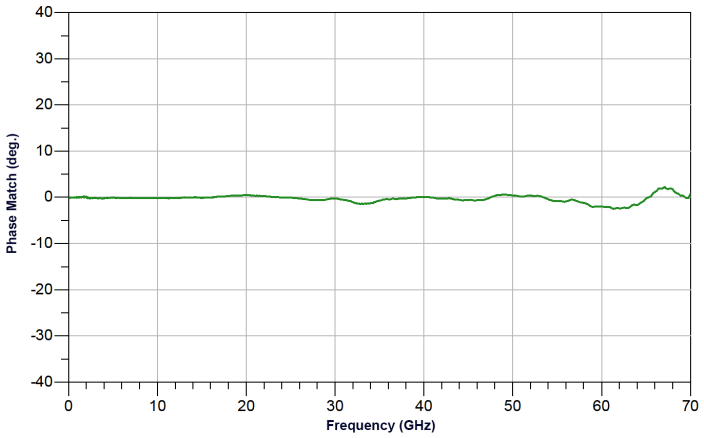



*Figure 5: HL9677 Phase Match*

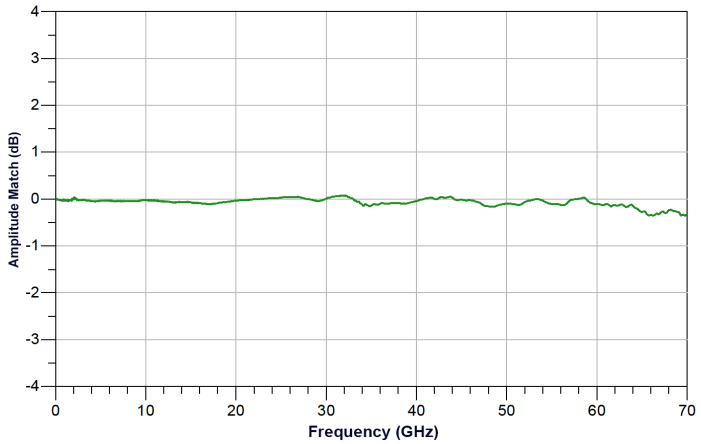



*Figure 6: HL9677 Amplitude Match*

## HL967x Dimensional Drawing

*Figure 7* shows a mechanical drawing of an HL9677. Unless otherwise noted, all units are shown in inches. Other models vary in length and width based on connectors.

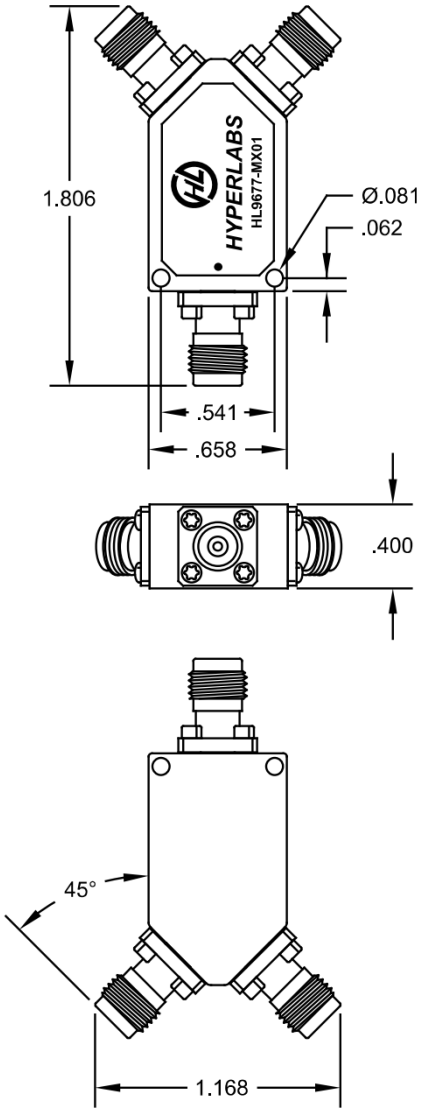



*Figure 7: HL9677 Mechanical Drawing*