TLC'S KA-BAND SWITCHES (33 TO 38 GHz)

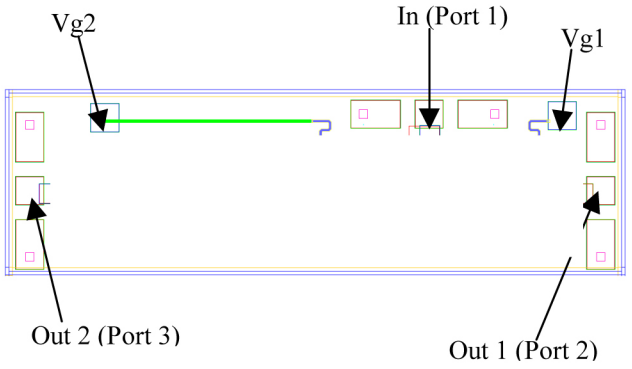


Fig. 1 TLC's Ka-band switch, Y4 98B

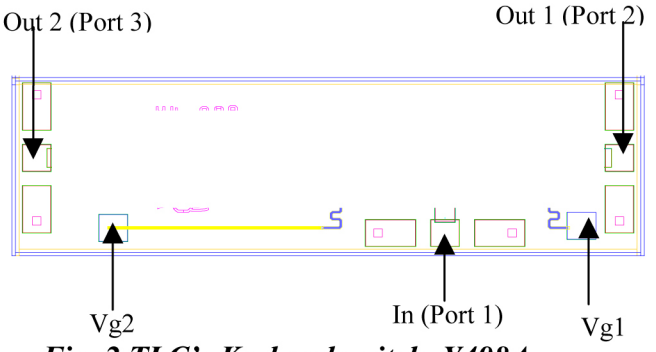
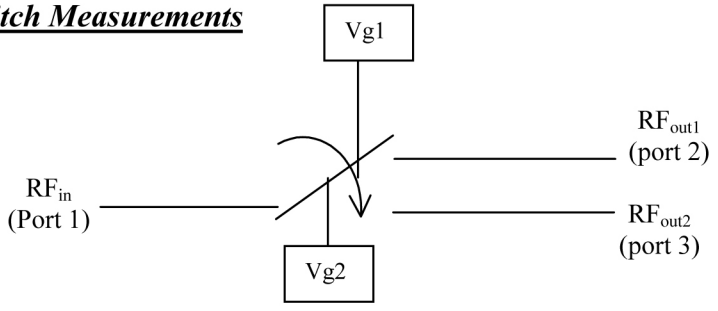


Fig. 2 TLC's Ka-band switch, Y498A

Ka-band Switch Measurements



Required Measurements on Network analyzer: Freq. range 18-40 GHz

Frequency Range : 33-38 GHz

Vg1(V)	*Vg2(V)*	*Port2*	*Port3*	*Port 1- Port 2*	*Port 1- Port 3*
-3	**-3**	**Off**	**Off**	**>15 dB Isolation**	**>10 dB Isolation**
0	**-3**	**On**	**Off**	**~0.2 dB Ins. loss**	**>10 dB Isolation**
-3	**0**	**Off**	**On**	**>15 dB Isolation**	**~0.2dB Ins. loss**
0	**0**	**On**	**On**	**~0.2dB Ins. loss**	**~0.2dB Ins. loss**

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Ka Band Switch Testing Procedures

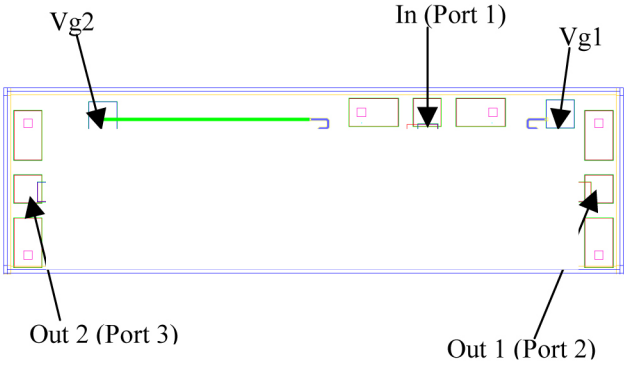

Fig. 1 TLC's Ka-band switch, Y4 98B

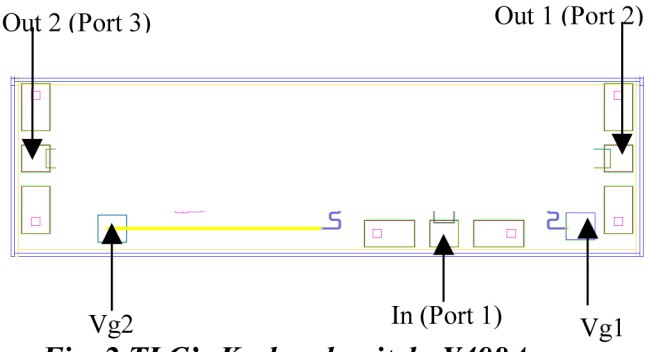

Fig. 2 TLC's Ka-band switch, Y498A

Step 1: Setup the Test station with three RF and two DC probes to be able to contact the RF and DC pads of the switch, as shown in Fig. 1.

Step 2: Connect Port 1 of the Vector Network Analyzer (VNA) to the RF probe going to In port (Port 1).

Step 3: Connect Port 2 of VNA to the RF probe going to the Out1 port (Port 2).

Step 4: Calibrate Network Analyzer for 18 – 40 GHz using the 90 degrees calibration standards on the calibration substrate.
Note: The calibration substrate might have to be rotated. Use the Vacuum off switch on the Auto station to release the vacuum and rotate the calibration substrate.

Step 5: Setup and monitor dual negative voltage sources; connect the –ive power sources to two DC probes, to provide negative voltage supply to Vg1 and Vg2.

Step 6: Terminate the RF probe going to the Out 2 port (Port 3).

Step 7: Align the Ka Band switch properly on chuck so that the appropriate pads on the chip are in line with the appropriate RF probes, and apply vacuum. Lower the RF probes until they contact the RF pads. Lower the DC probes to contact the Vg1 and Vg2 pads. Set the contact point. From now on, during the experiment, do not adjust the 'Z' position (height) of the DC probes.

Step 8: Apply –3V slowly to both the gate pads (Vg1 and Vg2). Now the switch is in off position. No RF path is closed. Measure and Plot S_{21}. The plot should indicate the isolation (~ 15dB) around the operating frequency (usually around 35-40 GHz).

Step 9: Turn the gate supply Vg1 to 0V slowly. Now the switch is in the ON position between Port 1 and Port 2. Measure and record S_{21}. This is the insertion loss of the switch. Measure and record S_{11} and S_{22} (Input and Output reflection coefficients) in this position.

Step 10: Turn Vg1 to –3V and Vg2 to 0V. Now, the switch is in the ON position between port 1 and port 3. Measure and record S_{21}. This is the isolation of Port 2 when the other arm of the switch is ON.

Step 11: Remove the RF cable on Port 2 and termination on Port 3. Connect port 2 of the VNA to Port 3 (out2) of the Switch using the RF cable. Terminate Out1 (port 2) with 50Ω load.

Step 12: Repeat steps 7 – 11 to measure insertion loss and isolation on the second arm of the switch.

Step 13: Lower chuck, turn the vacuum off and remove Ka Band Switches.