Application Note

SURFACE MOUNTING GRF100 AND GRF103 RELAYS

Application Note T0130 provides suggested surface mounting information and printed circuit board [PCB] artwork for circuit traces and RF ground plane configurations. Suggested information provided is intended for use with Teledyne Relays' GRF100 and GRF103 surface mountable, ultraminiature, Centigrid® relays.

The following pages give information for a printed circuit board layout and assembly process that will allow the the GRF100 and GRF103 to be tested in a manner similar to tests performed at Teledyne Relays and give a base line for production lay out.

Introduction

The GRF100 and GRF103 are surface mount, RF, non latching relays that employ a butt lead attachment scheme. Normally this form of attachment method does not allow for easy grounding of the relay case which is very important as frequencies increase. To allow for surface mount and proper relay grounding, Teledyne Relays has developed the ground shield. The ground shield not only allows the relay to be easily grounded, it protects against inadvertent misalignment of the leads as well as isolates the leads from one another after mounting them to the board. To optimize the ground shield connection the following is presented to facilitate testing and layout for use in production:

RF characterization data presented in the GRF100/GRF103 data sheet is de-embedded from the RF circuit test board.

RF Test Boards

RF performance characteristics of the GRF100 and GRF103 was obtained by mounting them on test boards developed by Teledyne Relays. To the test boards 6 female, 2 hole panel mount, solder cup contact SMA connectors were carefully soldered to the signal traces and the bodies soldered to the back side ground plane.

Figure 1 shows the component side of the RF test board.

Layout details for the ground attachment pad and the signal traces are on the following pages.

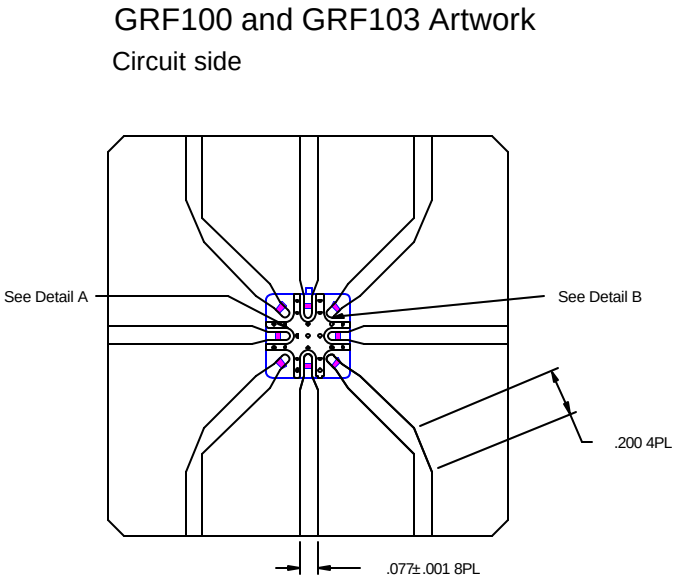


Figure 1

Figure 2 shows the ground plane side of the test board. There are 21 plated through vias connecting the ground trace on the component side of the board to the ground plane.

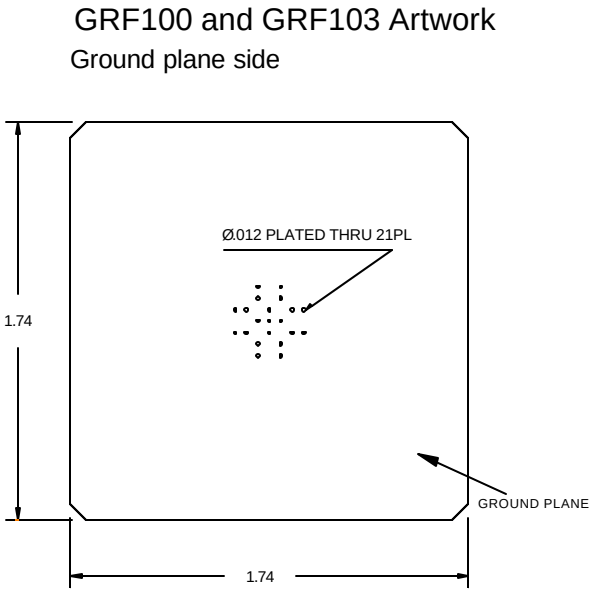
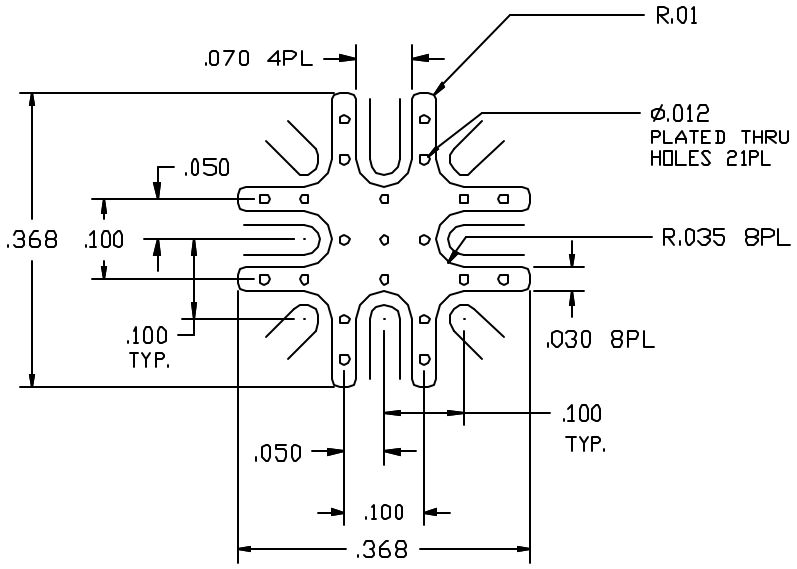
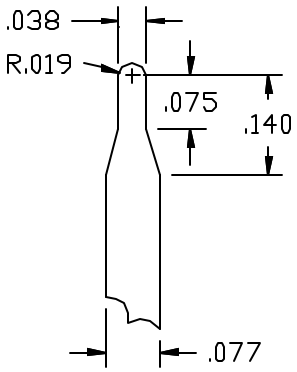


Figure 2



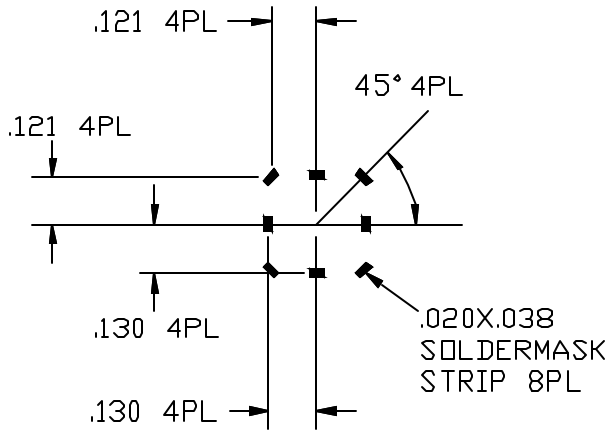
Detail A

Detail A
Detail A defines the ground pad layout that will interface with the GRF100 and GRF103 ground shield. Also defined are the GRF100 and GRF103 relay pin connections as well as the relation ship of the vias connecting the ground pad to the ground plane on the opposite side of the board. Via details are given in Figure 4.



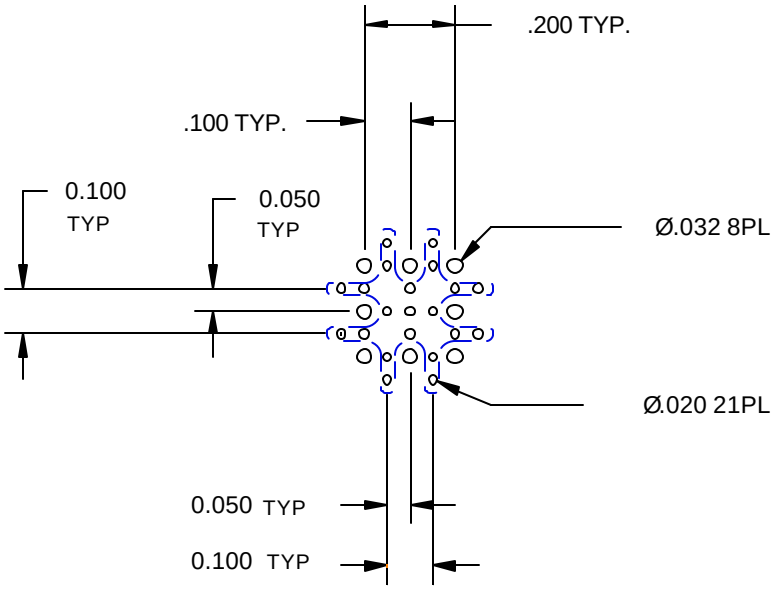
Detail B

Detail B
Detail B defines the connection and trace width for the GRF100 and GRF103 signal pins. This is the definition of the trace that was used for RF performace characterization by Teldyne Relays.



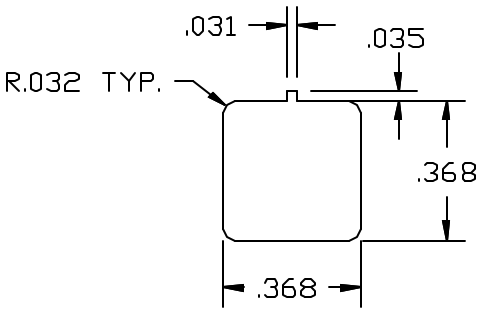
Solder Mask

Figure 3



Stencil and Aperature Size

Figure 4



Relay Outline

Figure 5

General Notes

GRF100 and GRF103 Printed Circuit Test Board Details

a. Material: RT/duroid®6002 [RT/duroid®6002 is a registered trademark of Rogers Corporation]
b. Thickness: 0.030”
c. Copper foil thickness: 0.00134”
d. All hole dimensions are after plate

• Suggested solder stencil thickness : 0.008”

• Trace configurations, board material, outline, size, etc. may require changes per user’s application requirements.

• GRF100 and GRF103 relays may be subjected to solder reflow peak temperatures of 260°C maximum, for 1 minute, 3 times.

• Solder bottom of RF ground shield to PCB component side RF ground plane for best RF performance.

• Check with solder supplier for recommended solder reflow temperature profile for selected solderpaste and specific application requirements.

Reference data:

The following web site may be usefull to those unfamiliar with SMT technology:

http://www.pegasustech.com/gems/sm.htm

http://www.national.com/ms/MO/MOUNTING_OF_SURFACE_MOUNT_COMPONENTS-MISC.pdf