

# Working With Fill Areas F-Type Polygons

October 29, 2013



## Introduction

We are frequently asked about how to create filled regions using our software. This application note gives you a very brief introduction on how to work with F-Type outlines to create filled regions.

A simple Gerber file is displayed below:

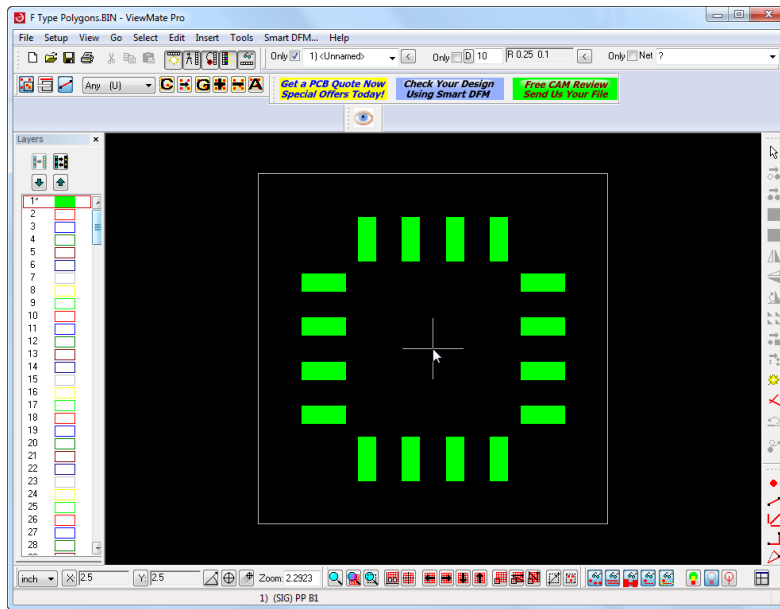


Figure 1 – A simple Gerber File

In this application note, we'll show you how to create the following results:

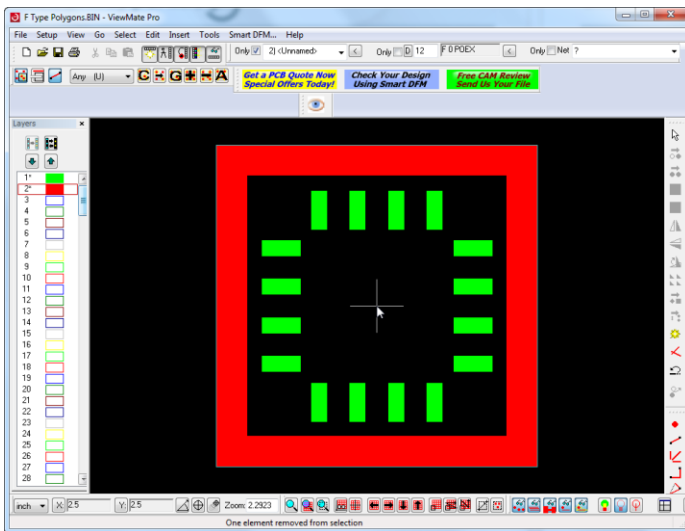


Figure 2a – First Fill Result

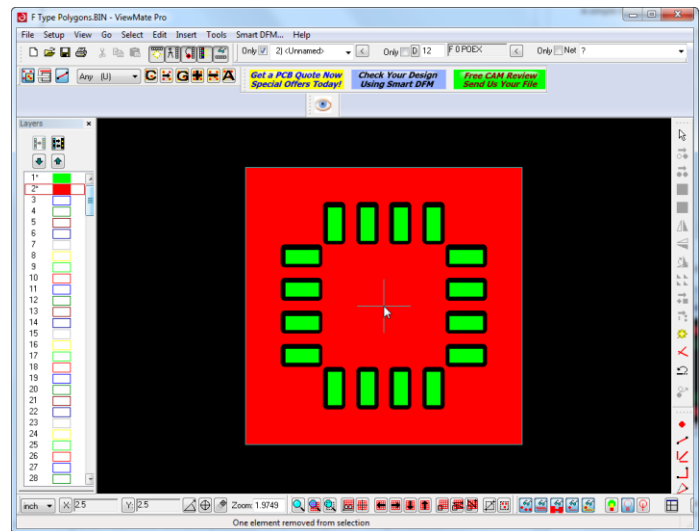
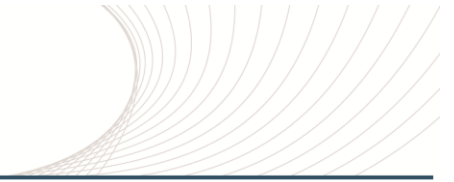


Figure 2b – Second Fill Result

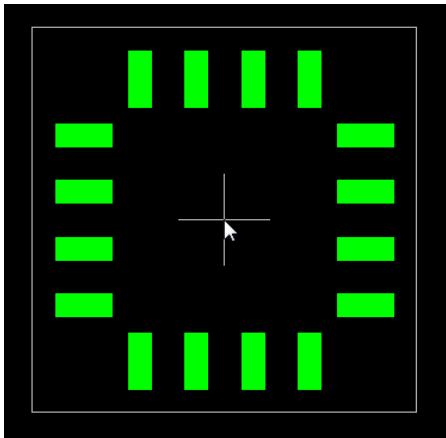


## Creating the First Fill Result

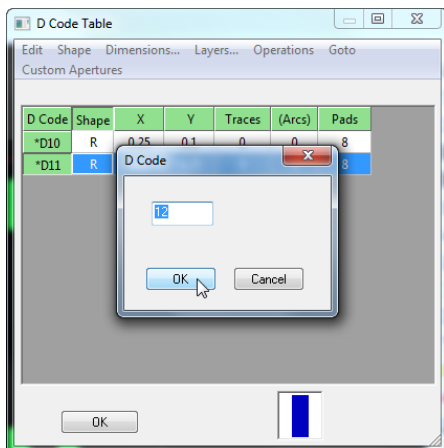
To create fill areas, we use a nested series of F-Type outlines. An F-Type D Code has zero width. When you define a closed boundary using an F-Type D Code then, you can select the boundary and use “Edit->Edit Selection->Polygons->F to Polygons...” to convert the outline to a polygon. The polygon will be filled. If you want one or more holes inside the filled area, you simply create additional F-Type outlines inside the original outline. If you map the D Codes of the inner and outer polygons to the same D Code, then the inner contours will become holes in the outer polygon once you perform the “F to Polygons...” conversion.

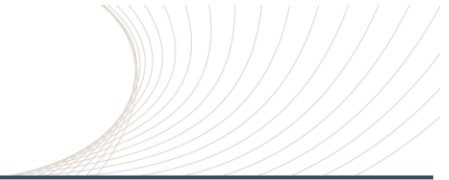
Starting with the data in layer 1 . . .

1. Ensure that layer 1 is active.
2. Press “Ctrl+W” to create a window around the pads. Enter a suitable distance for X and Y margins. The size of the resulting frame will determine the size of the inside cutout area shown in figure 2a. Enter 0.1 for both X and Y and press “OK”. Your screen should be shown as below:

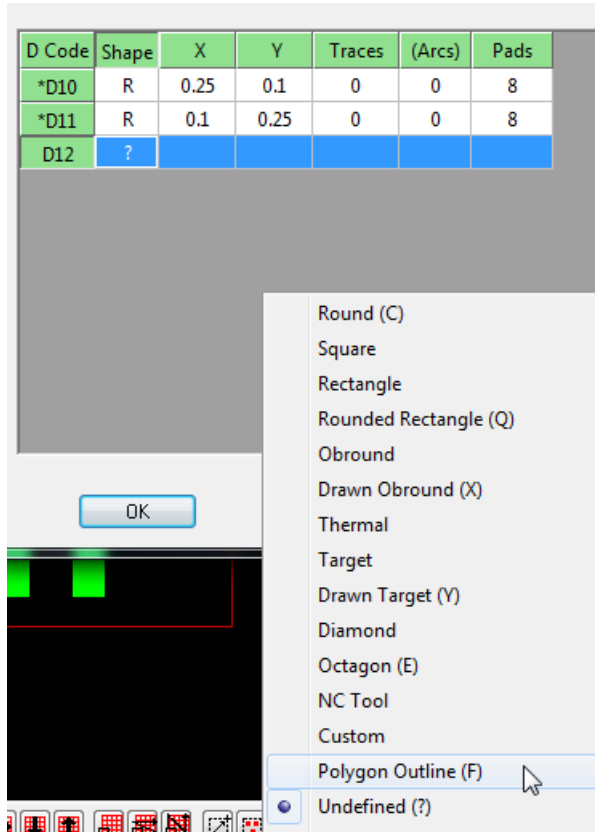


3. Now, insert an F-Type D Code. Press “F5” to display the “D Code Table”. Click on “Edit->Insert” and then click on “OK” to insert D12.

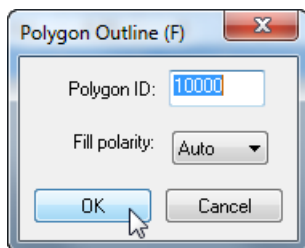




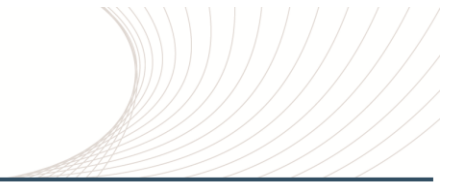
- Click on the “Polygon Outline (F)” menu item.



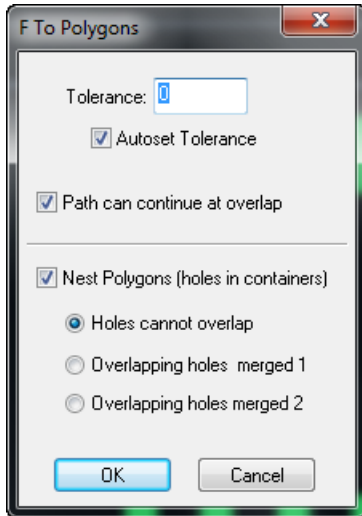
- Leave the default values and click on “OK”.



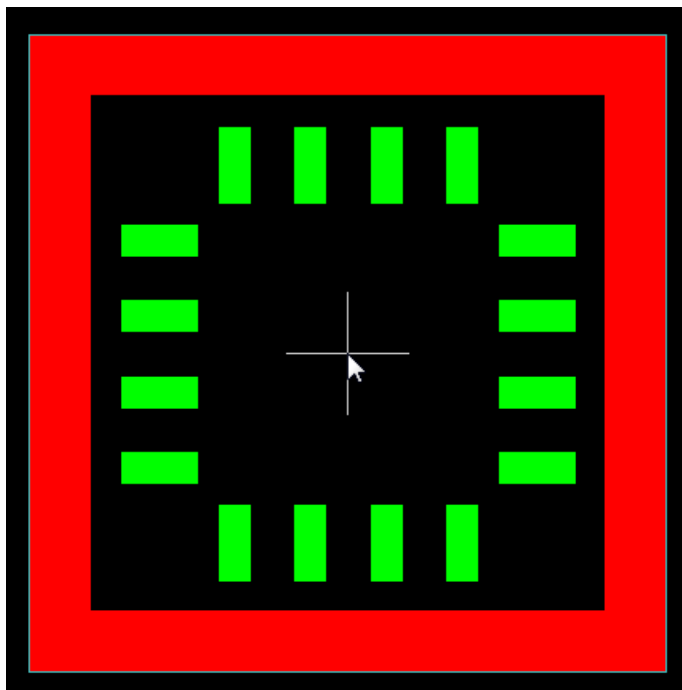
- Click on “2” to activate layer number 2.
- Select “Insert->Frame Sized Contour”. Four lines mapped to D Code 12 are inserted at the Frame boundary.
- Press “Ctrl+W” to draw a new frame. Enter “0.2” for both X and Y.
- Repeat step 7. You now have two contours that are both mapped to the F-Type D Code (D12).

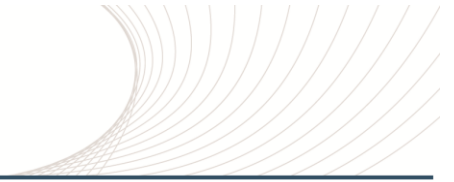


10. Finally, select everything on layer 2 (Press “V”) and then click on “Edit->Edit Selection->Polygons->F to Polygons...”. Use the default values in the resulting dialog. Click on “OK” to perform the conversion.



11. Press “Ctrl+U” to clear the resulting selection. The result should be as shown in the figure below:

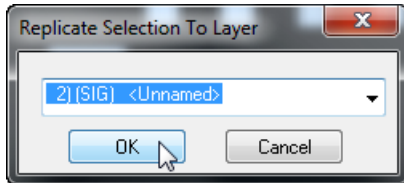




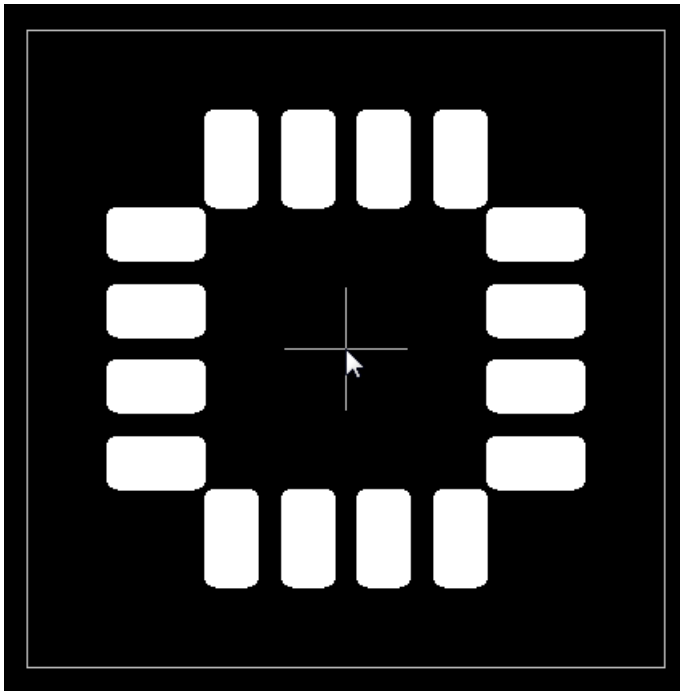
## Creating the Second Fill Result

Starting with the data on layer 1 . . .

1. Select all the pads on layer 1 (Press the “V” key).
2. Replicate the pads to layer number 2 (Press “Ctrl+J”, then enter “2” and click on “OK”).



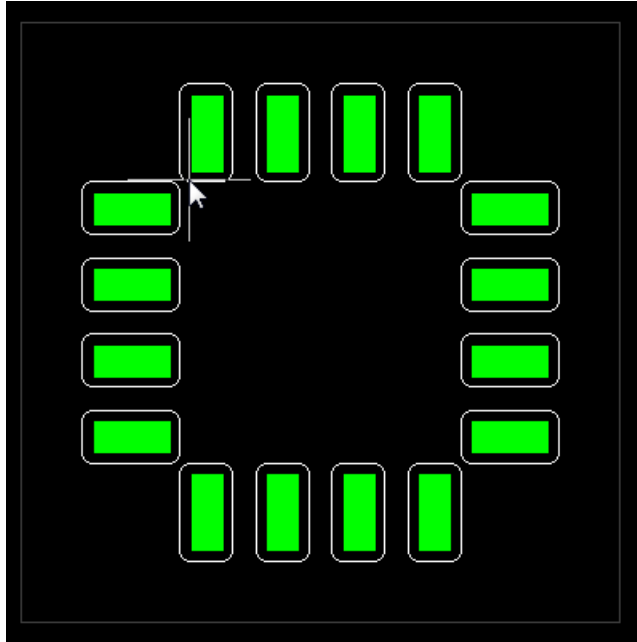
3. Click on “2” to activate layer 2. Press “V” to select all of the pads on layer 2.
4. Select “Edit->Edit Selection->Convert to Polygons”. We now have 16 polygons on layer 2.
5. Swell the polygons using “Edit->Edit Selection->Swell”. Enter “0.075” for both X and Y. The result should be as shown below:



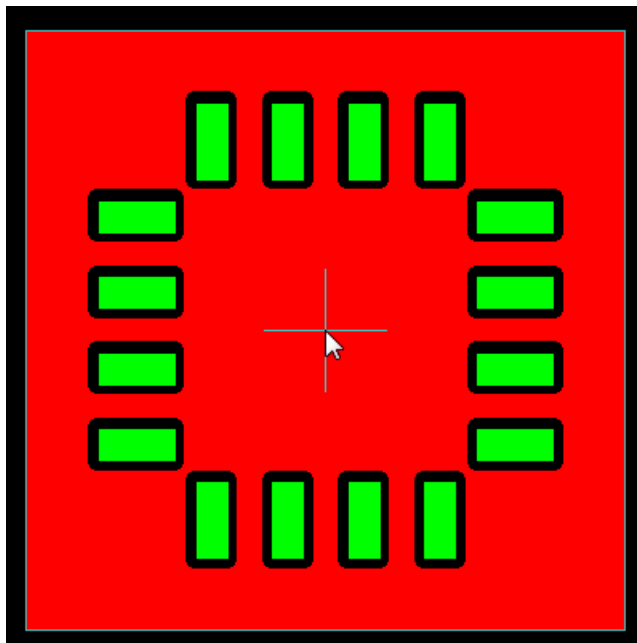
6. Select “Edit->Edit Selection->Polygons->Polygons to F...”. Map the resulting D Code to an F-Type D Code. If you performed the previous exercise, then you can just use D12 without modifying it.
7. Press “Ctrl+W” and enter “0.2” for both X and Y. Click on “OK” to draw the new frame.
8. Click on “Insert->Frame Sized->Contour” to insert 4 traces at the frame boundary.



9. Press “V” to select all of the elements on layer 2. Your screen should appear as shown below:



10. Finally, select “Edit->Edit Selection->Polygons->F to Polygons...”. Press “Ctrl+U” to clear the selection. Your final result should be as shown below:



## Summary

This brief application note has shown you how to fill areas using F-Type outlines.

In general, you can convert back and forth between polygons and F-Type outlines to edit filled areas. For example, if you have a polygon that you want to edit . . . select the polygon . . . convert it to an F-Type contour . . . then edit the vertices of the contour . . . when you're finished, select everything and convert it back to a polygon.

Please contact PentaLogix at [support@pentalogix.com](mailto:support@pentalogix.com) for further help.