Question 21

Q: Can Femtet analyze the impact test ?

A: Yes, Femtet can do it with the transient analysis of the stress solver.

Acceleration boundary* is set for the analysis.

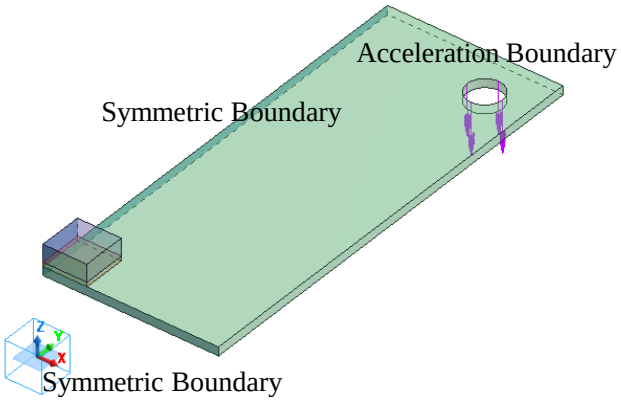
* It is different from [Acceleration] in [Options] in the [Analysis Condition Setting] dialog box.

Impact Test Analysis

General

- The impact test applies impact acceleration for a very short term.
- Femtet can use the time-dependent acceleration boundary in the stress-transient analysis to perform the analysis with impact acceleration taken into account.
- This example uses a simple model where the impact acceleration above is set.

Model



The model is a quarter-symmetric model of a substrate with a component mounted at the center.

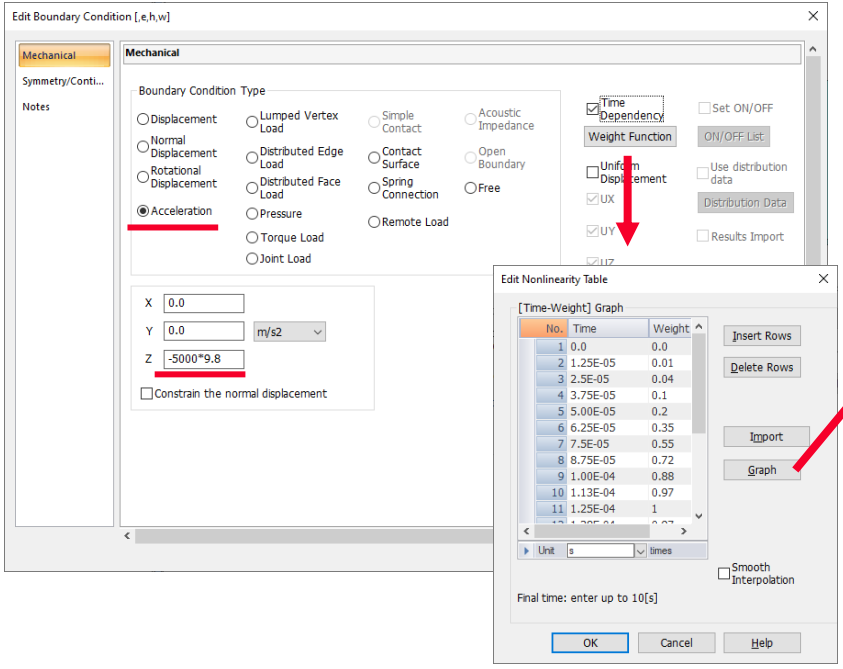
The symmetric face is set with a symmetric boundary condition (Fix).

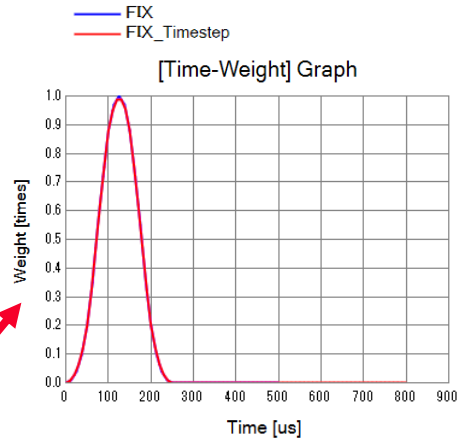
Acceleration boundary is set to the inner surface of the hole located at the corner of the substrate.

See the next slides for more information.

Boundary Condition (Acceleration)

Murata Software

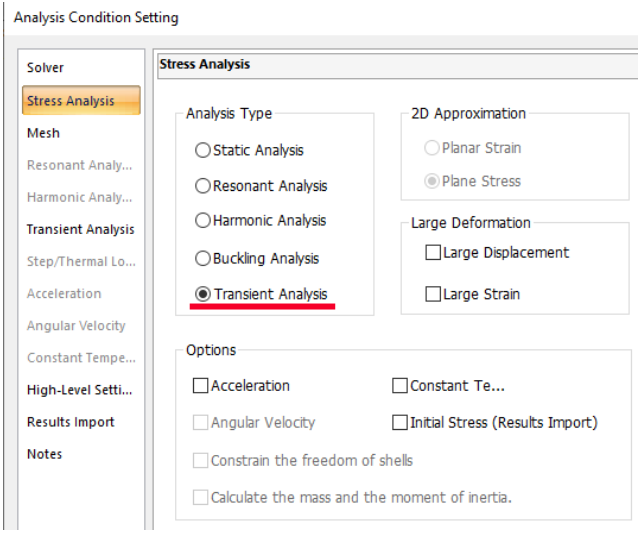


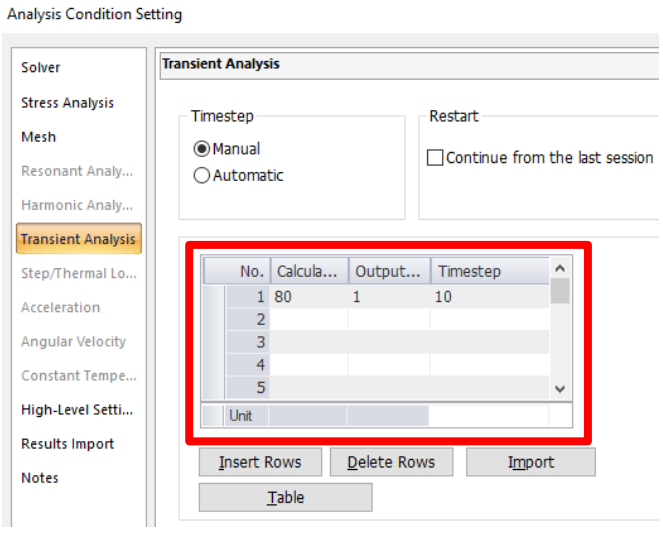


The time dependency weight is set such that an impact acceleration peak of 500 G for 250 us is generated.

Analysis Condition (Stress-Transient Analysis)

Murata Software



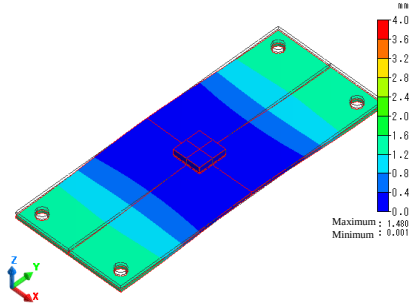


Timestep and calculation steps are set to 10us and 80, respectively.
The total time is as follows.

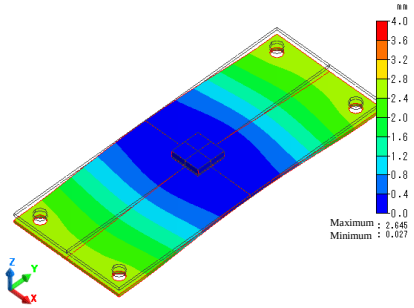
80 x 10 us = 800 us

Results (Displacement + Z Displacement Contour)

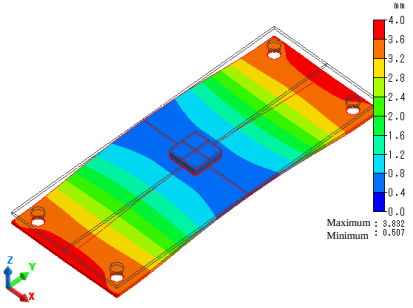
Murata Software



40us



60us

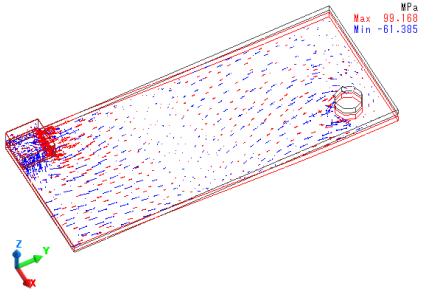


80us

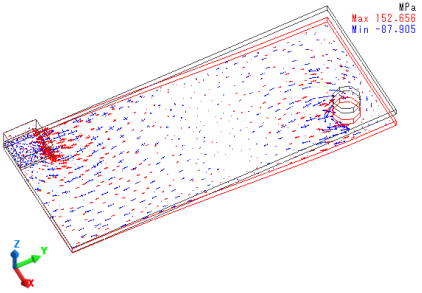
The impact acceleration applied to the holes at the four corners causes deformation in the surrounding portions of the substrate. However, due to the low rigidity of the substrate, the part mounted in the center remains at its original position with less substrate deformation.

Result（Displacement + Principal Stress）

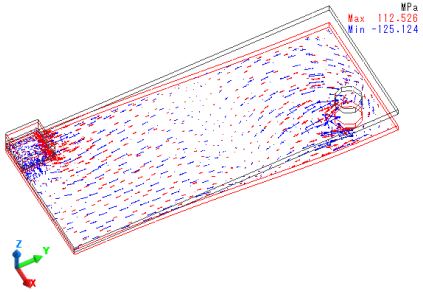
Murata Software



40us



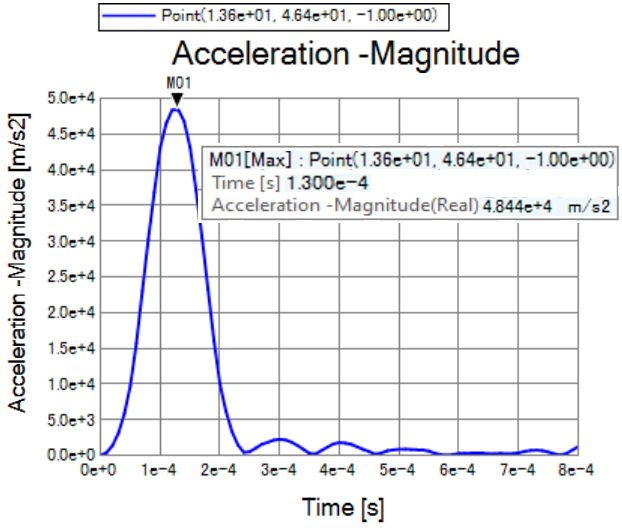
60us



80us

Large tensile stress is generated around the centrally mounted part in the longitudinal direction.

Acceleration at Acceleration Boundary



The graph indicates the peak acceleration is about 500 G.