SAB35403

PCB DESIGN

LAB 3

Design 1: Surface-Mount Footprint Design

Design 2: Through-Hole Footprint Design

LECTURER: DR REZAL BIN MOHAMED

NO	STUDENT NAME	STUDENT ID
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Objectives:

- Design and simulate a surface-mount footprint using OrCAD, with a focus on optimizing component placement and solder pad geometries for efficient PCB assembly.

- Develop a comprehensive understanding of key parameters in surface-mount footprint creation.

- Apply principles of through-hole footprint design in OrCAD, emphasizing proper lead spacing, hole sizing, and alignment for robust mechanical and electrical connections.

- Employ OrCAD simulation tools to assess the electrical characteristics of the through-hole footprint, considering factors such as signal integrity, parasitic capacitance, and inductance.

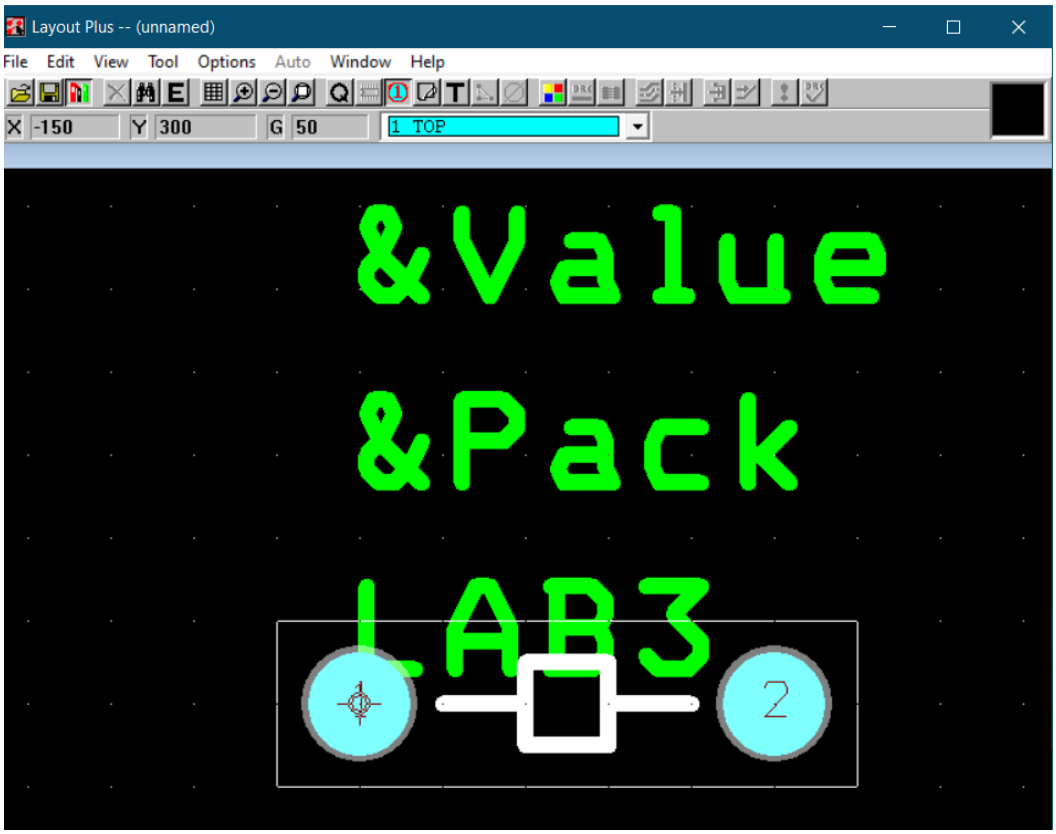
- Document the design process, simulation results, and critical decisions in a clear and organized manner within the lab report.

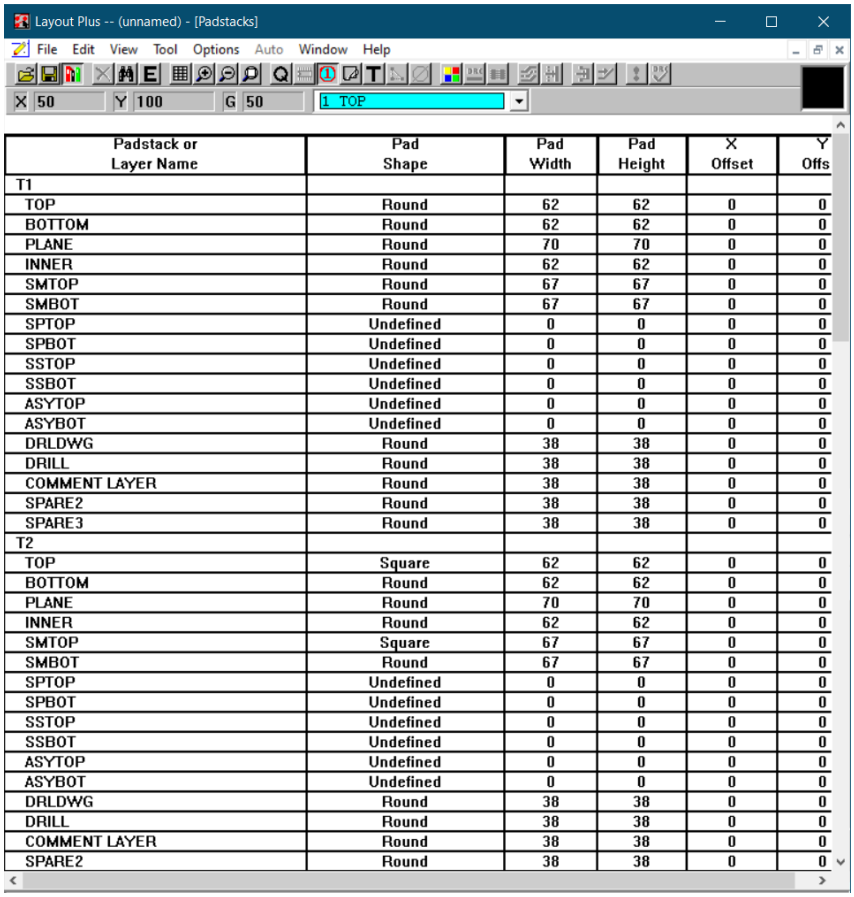
Procedure:

By using OrCAD Layout plus software, please refer to lab 8b,8c,8d published in Vle by Dr Rezal.

Simulation results:

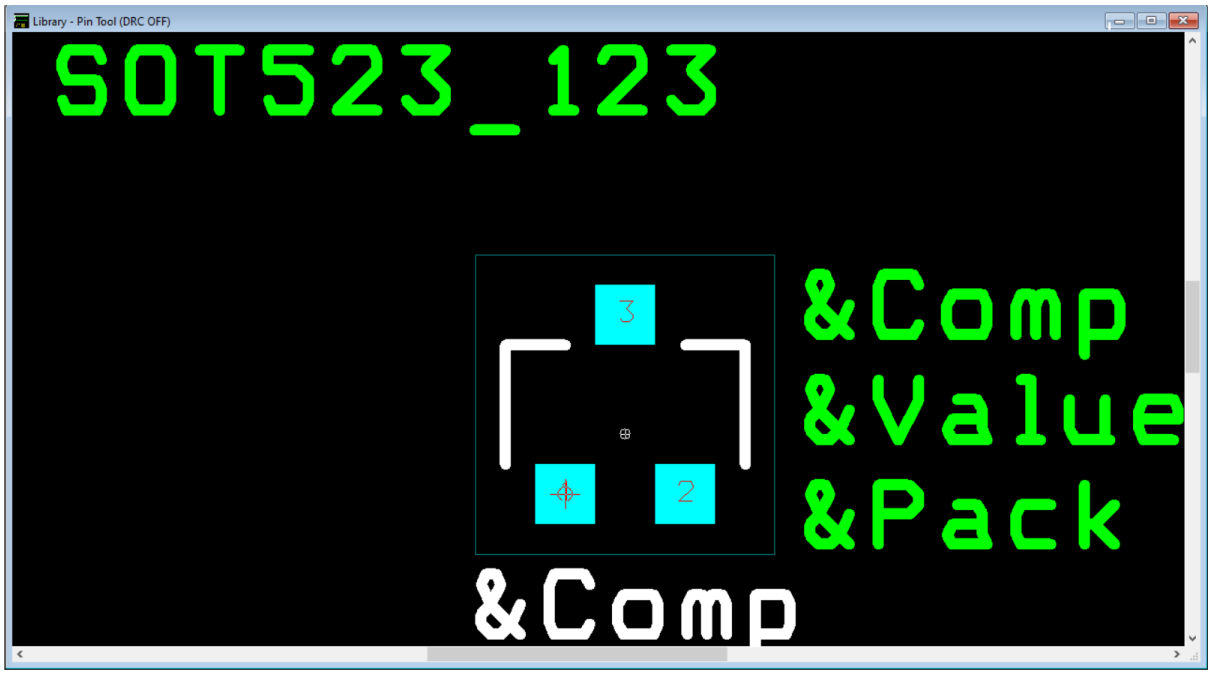
Result for 8b

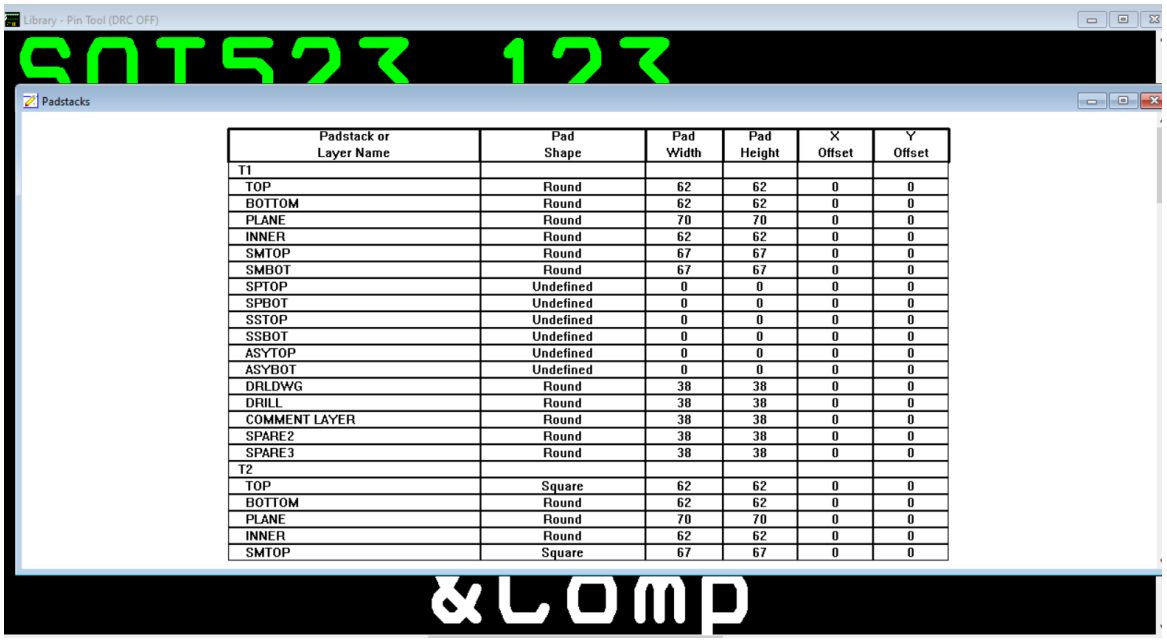




Padstack or Layer Name	Pad Shape	Pad Width	Pad Height	X Offset	Y Offs
T1					
TOP	Round	62	62	0	0
BOTTOM	Round	62	62	0	0
PLANE	Round	70	70	0	0
INNER	Round	62	62	0	0
SMTOP	Round	67	67	0	0
SMBOT	Round	67	67	0	0
SPTOP	Undefined	0	0	0	0
SPBOT	Undefined	0	0	0	0
SSTOP	Undefined	0	0	0	0
SSBOT	Undefined	0	0	0	0
ASYTOP	Undefined	0	0	0	0
ASYBOT	Undefined	0	0	0	0
DRLDWG	Round	38	38	0	0
DRILL	Round	38	38	0	0
COMMENT LAYER	Round	38	38	0	0
SPARE2	Round	38	38	0	0
SPARE3	Round	38	38	0	0
T2					
TOP	Square	62	62	0	0
BOTTOM	Round	62	62	0	0
PLANE	Round	70	70	0	0
INNER	Round	62	62	0	0
SMTOP	Square	67	67	0	0
SMBOT	Round	67	67	0	0
SPTOP	Undefined	0	0	0	0
SPBOT	Undefined	0	0	0	0
SSTOP	Undefined	0	0	0	0
SSBOT	Undefined	0	0	0	0
ASYTOP	Undefined	0	0	0	0
ASYBOT	Undefined	0	0	0	0
DRLDWG	Round	38	38	0	0
DRILL	Round	38	38	0	0
COMMENT LAYER	Round	38	38	0	0
SPARE2	Round	38	38	0	0

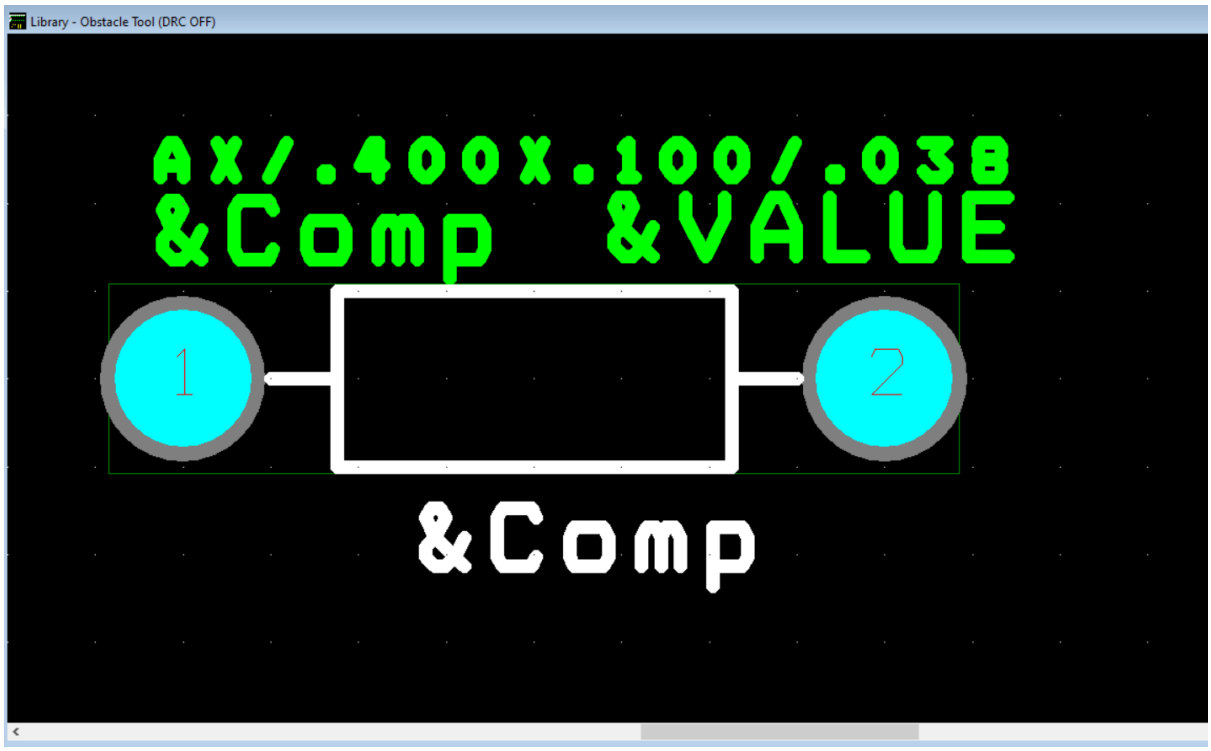
Result for 8c

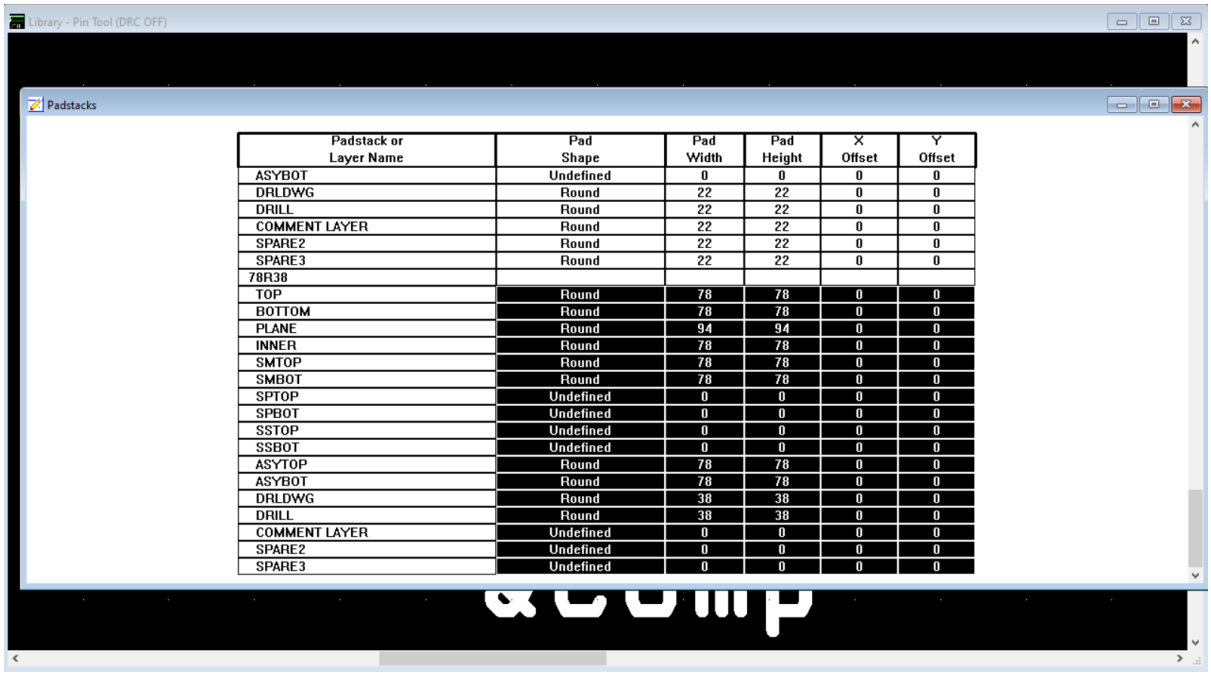




Padstack or Layer Name	Pad Shape	Pad Width	Pad Height	X Offset	Y Offset
T1					
TOP	Round	62	62	0	0
BOTTOM	Round	62	62	0	0
PLANE	Round	70	70	0	0
INNER	Round	62	62	0	0
SMTOP	Round	67	67	0	0
SMBOT	Round	67	67	0	0
SPTOP	Undefined	0	0	0	0
SPBOT	Undefined	0	0	0	0
SSTOP	Undefined	0	0	0	0
SSBOT	Undefined	0	0	0	0
ASYTOP	Undefined	0	0	0	0
ASYBOT	Undefined	0	0	0	0
DRLDWG	Round	38	38	0	0
DRILL	Round	38	38	0	0
COMMENT LAYER	Round	38	38	0	0
SPARE2	Round	38	38	0	0
SPARE3	Round	38	38	0	0
T2					
TOP	Square	62	62	0	0
BOTTOM	Round	62	62	0	0
PLANE	Round	70	70	0	0
INNER	Round	62	62	0	0
SMTOP	Square	67	67	0	0

Result for 8d





Padstack or Layer Name	Pad Shape	Pad Width	Pad Height	X Offset	Y Offset
ASYBOT	Undefined	0	0	0	0
DRLDWG	Round	22	22	0	0
DRILL	Round	22	22	0	0
COMMENT LAYER	Round	22	22	0	0
SPARE2	Round	22	22	0	0
SPARE3	Round	22	22	0	0
78R38					
TOP	Round	78	78	0	0
BOTTOM	Round	78	78	0	0
PLANE	Round	94	94	0	0
INNER	Round	78	78	0	0
SMTOP	Round	78	78	0	0
SMBOT	Round	78	78	0	0
SPTOP	Undefined	0	0	0	0
SPBOT	Undefined	0	0	0	0
SSTOP	Undefined	0	0	0	0
SSBOT	Undefined	0	0	0	0
ASYTOP	Round	78	78	0	0
ASYBOT	Round	78	78	0	0
DRLDWG	Round	38	38	0	0
DRILL	Round	38	38	0	0
COMMENT LAYER	Undefined	0	0	0	0
SPARE2	Undefined	0	0	0	0
SPARE3	Undefined	0	0	0	0

Conclusion:

In summary, the conclusion highlights the significance of employing OrCAD simulation tools for the design and analysis of Surface-Mount and Through-Hole footprints in PCBs. The systematic exploration of key parameters enhanced our understanding of manufacturing processes. The simulation results emphasized the critical role of optimized component placement and solder pad geometries in achieving efficient PCB assembly and ensuring system reliability.

The application of OrCAD simulation to Through-Hole footprint design provided insights into the impact of design choices on manufacturing techniques and the electrical characteristics of components. The comparison between Surface-Mount and Through-Hole designs revealed trade-offs in space utilization, assembly ease, and overall reliability, empowering designers to make informed decisions based on project-specific requirements.