User's Manual

Loss Simulator v1.0
Document version 1.0

INTRODUCTION

The Loss Simulator is an application intended to estimate power losses of Power Modules, IPM. The software computes this power loss values using 3 sections of inputs.

1. Module/Device Parameter
2. Circuit Algorithm
3. User Input Conditions/Parameters

When computation finished, the software will provide 2 outputs

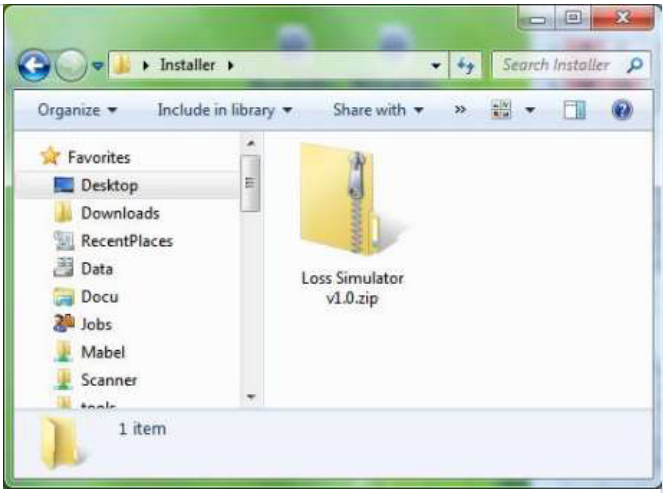
1. Power Loss Result display
2. CSV export of step by step computation

RECOMMENDED SYSTEM REQUIREMENTS

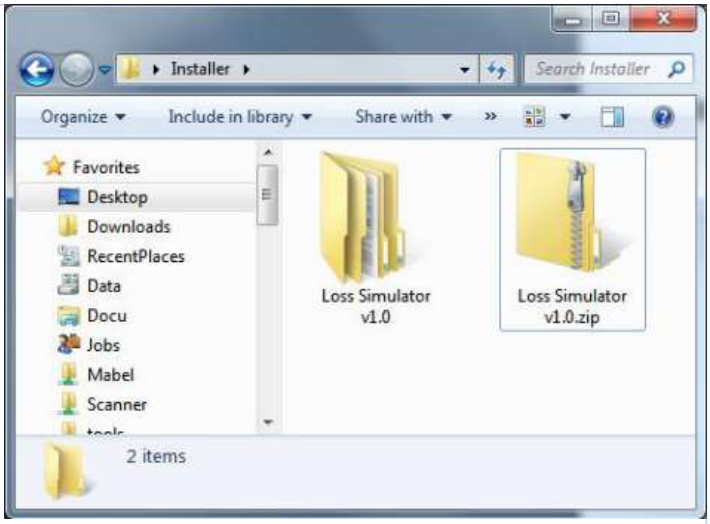
Operating System	Microsoft Windows XP, Microsoft Windows Vista, Microsoft Windows 7 32-bit & 64-bit, Microsoft Windows 8 32-bit & 64-bit
Memory	1GB or better
Screen Resolution	At least 800 x 600

EASY INSTALLATION

1. Copy and Paste the zip file to the target directory



2. Unzip the file

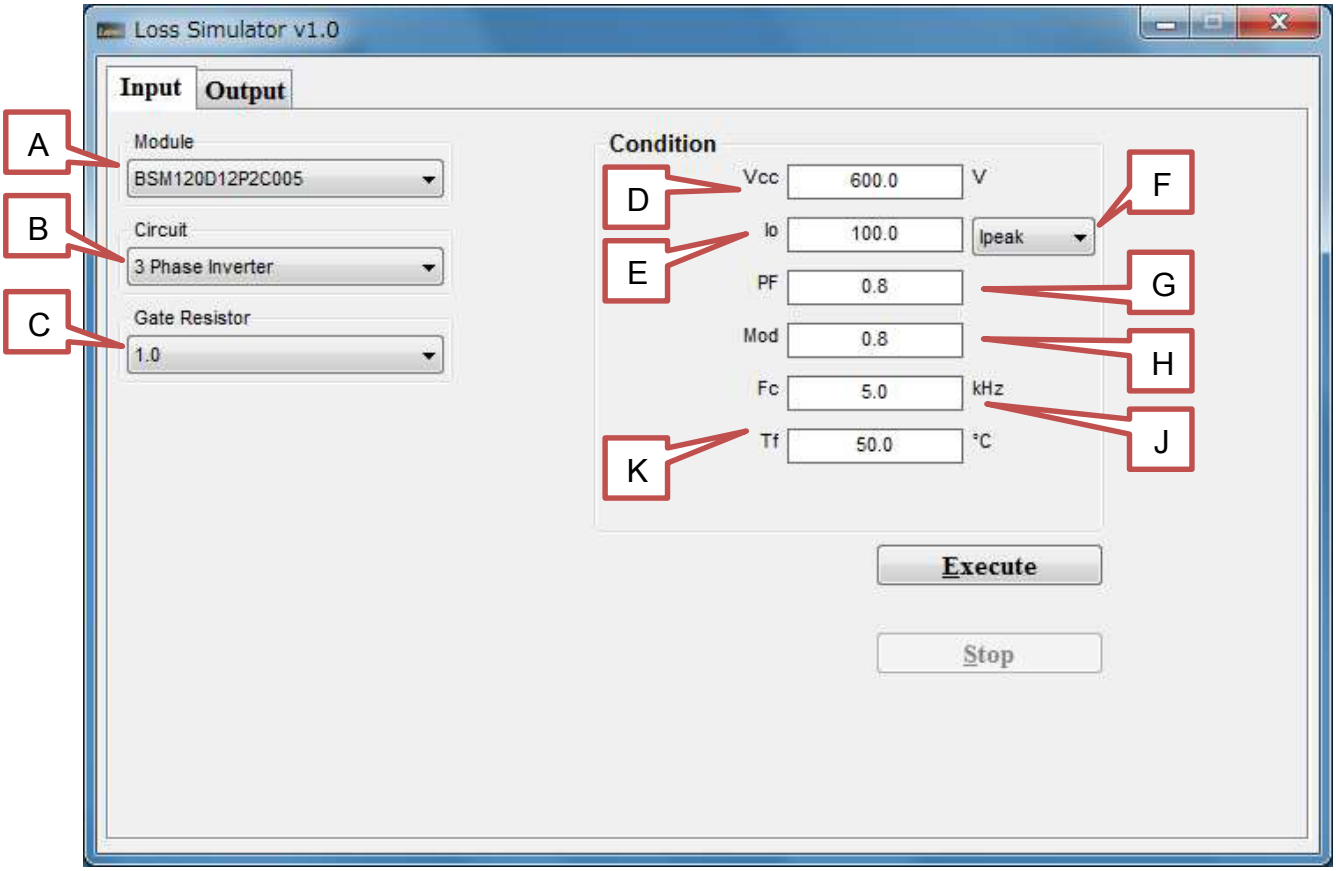


3. Open the folder and run the Loss Simulator Application

NOTE: Simply delete the whole folder of the application to remove/uninstall the software.

USING THE SOFTWARE

Input Window



A. Module/Device
   - Select a Module or Device to be estimated
   - If no Module is selected, computation is not available.

B. Circuit
   - Select a type of circuit to be used for the selected device
   - If no Circuit is selected, computation is not available

C. Gate Resistor
   - Select the gate resistor of the device to be used
   - If no Gate resistor is selected, the default gate resistor of the module/device will be used.

D. V_{CC} (P-N Voltage)
   - Used by recommended operation conditions although it is calculated.

- Value must be greater than or equal to Zero only ($V_{CC} \geq 0$).

E. I_O (Output Current)
   - Used by recommended operation conditions although it is calculated.
   - Value must be greater than or equal to Zero only ($I_O \geq 0$).

F. Current Setup
   a. I_{PEAK}
   b. A_{RMS}

G. PF (Power Factor)
   - Value is ranging from -1 to 1 only ($-1 \leq PF \leq 1$).

H. Mod (Modulation Ratio)
   - Available only for 3-Phase Inverter
   - Value is ranging from 0 to 1 only ($0 \leq Mod \leq 1$).

I. Duty (Duty Cycle)
   - Available only for Chopper
   - Value is ranging from 0 to 100 only ($0 \leq Duty \leq 100$).

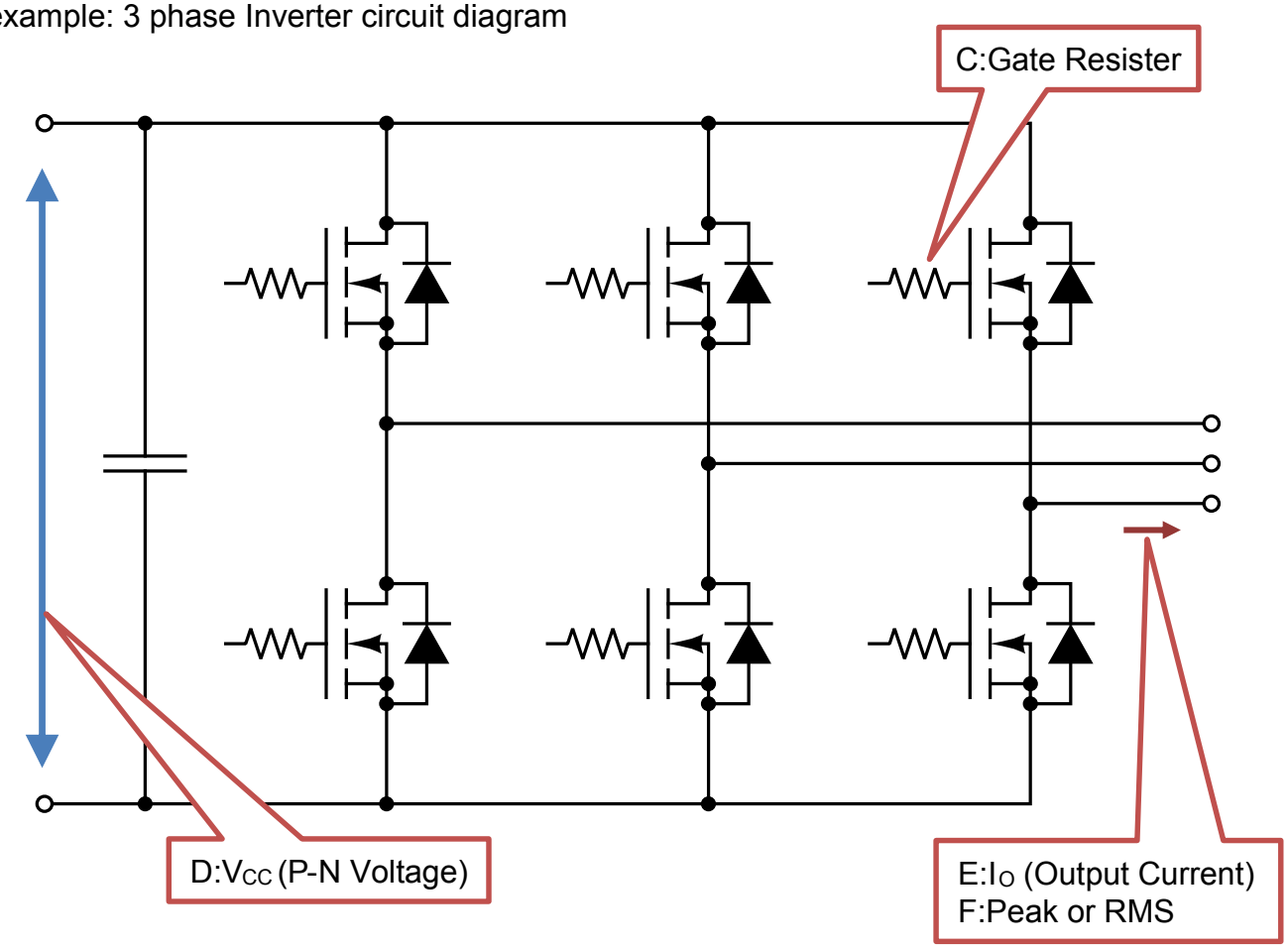
J. F_C (Carrier Frequency)
   - Value must be greater than or equal to One only ($F_C \geq 1$).

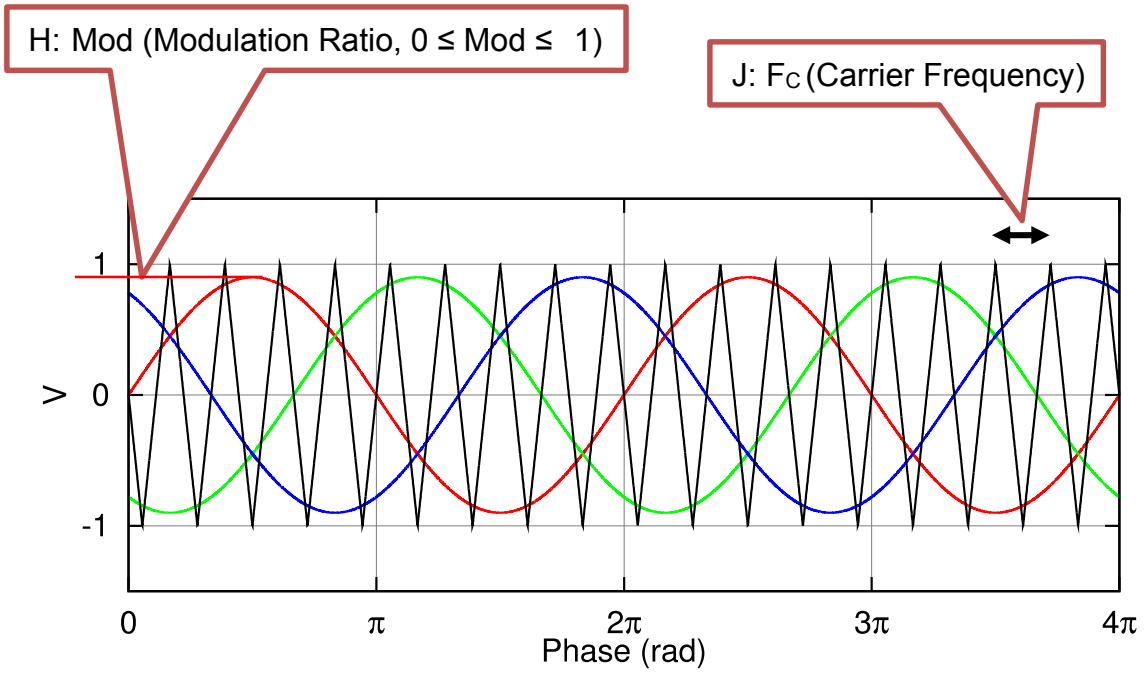
K. T_F (Heat Sink Temperature)
   - Used by module case temperature although it is calculated
   - Error message will appear if Tj is over Junction Temperature

L. Execute
   - Start the computation
   - Software can't exit during computation.

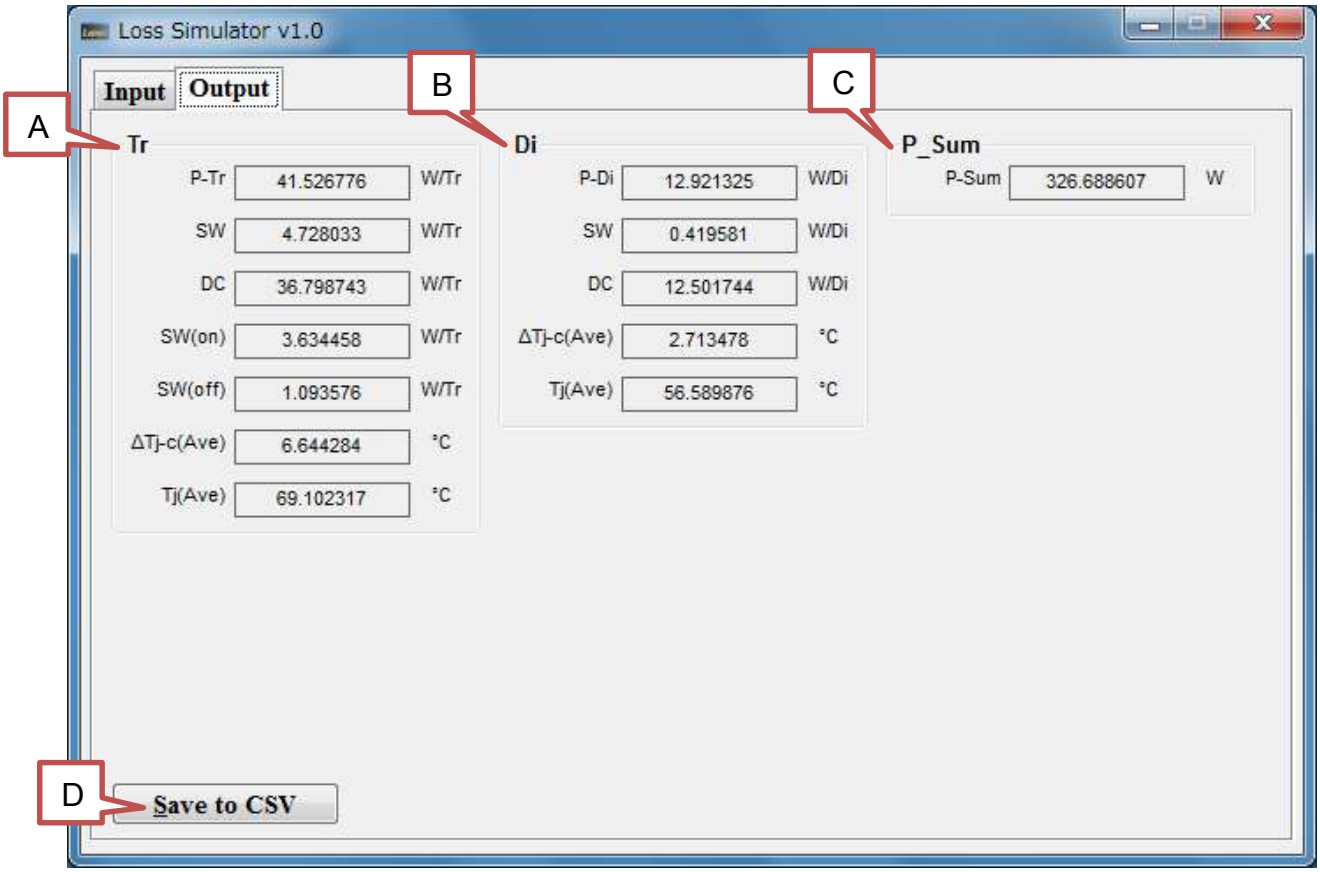
M. Stop
   - Stop the ongoing computation
   - All controls will be disabled aside from "Stop" Button during computation

example: 3 phase Inverter circuit diagram





Output Window



A. Tr (Transistor)

i. P-Tr

- Transistor Total Power Loss per Transistor

ii. SW

- SW(on) + SW(off) of Transistor

iii. DC

- DC Power Loss of the Transistor
- Displays the value of IGBT Power Loss.
- If no computation of IGBT Power Loss it will display a blank result

iv. SW(on)

- Switch On Power Loss
- Displays the value of Switch On Power Loss.
- If no computation of Switch On Power Loss it will display a blank result

v. SW(off)
- Switch Off Power Loss
- Displays the value of Switch Off Power Loss.
- If no computation of Switch Off Power Loss it will display a blank result

vi. ΔTj-c (Ave)
- Difference between Junction Temperature and Case Temperature of Transistor

vii. Tj (Ave)
- Junction Temperature of Transistor
- Displays the value of IGBT Temperature.
- If no computation of IGBT Temperature it will display a blank result
- If IGBT Temperature exceeded the maximum Junction temperature of a device/module, a warning message will be prompt

B. Di (Diode)

i. P-Di
- Diode Total Power Loss per Diode

ii. SW
- Recovery Power Loss
- Displays the value of Recovery Power Loss.
- If no computation of Re covery Power Loss it will display a blank result

iii. DC
- DC Power Loss of the Diode
- Displays the value of FWD Power Loss.
- If no computation of FWD Power Loss it will display a blank result

iv. ΔTj-c (Ave)
- Difference between Junction Temperature and Case Temperature of Diode

v. Tj (Ave)
- Junction Temperature of Diode
- Displays the value of FWD Temperature.
- If no computation of FWD Temperature it will display a blank result
- If FWD Temperature exceeded the maximum Junction temperature of a device/module, a warning message will be prompt

C. P-Sum
- Total Power Loss
- For Chopper, P-Sum = P-Tr + P-Di
- For 3-Phase-Inverter, P-Sum = 6×(P-Tr + P-Di)

D. Save To CSV
- Saves Computation to CSV
- Saves the Display Power Loss Result, Module/Device Constant, User Input Parameters and Computation.
- No CSV data will be generated if error occurs during computation

Release Note

2015 / 04 / 10	v 1.0	First release

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications :

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
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