

TB7107FN

Evaluation Board Manual

This document provides the usage considerations for the evaluation board of DC-DC converter IC TB7107FN.

Safety Precautions

This manual important precautions which users of semiconductor devices (and anyone else) should observe in order to avoid injury to human body and damage to property, and to ensure safe and correct use of our products. Please be sure that you understand the meanings of the labels and graphic symbols described below before you move on to the detailed descriptions of the precautions, and comply with the precautions stated.

⚠ CAUTION	
 Prohibited	Do not touch the device and its heat sink while the device is on or immediately after the device has been turned off. Devices and Heat sinks become hot. Contact to the heat sink may result in a burn.
 Prohibited	Do not touch the lead tips of a device. Some devices have leads with sharp tips. Contact to sharp tips may result in a puncture wound.

Summary

This is the evaluation circuit board which mounted DC-DC converter IC TB7107FN. Inductor, capacitor and resistor required in order to operate IC are mounted. And it can operate such as DC-DC converter, if input voltage (V_{IN}) is impressed. Moreover, the thing for which an input-and-output filter capacitor is added and operation is checked, and the soft-start time can be extended by adding an external capacitor (C_{SS}).

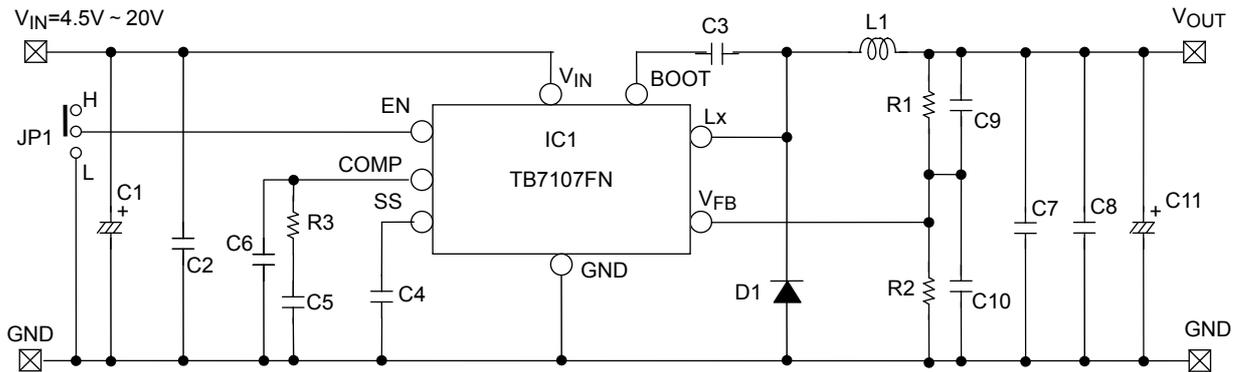
Board Specification

Content	Specification
Board size	50mm × 50mm × 1.6mm
Copper foil	Double-sided board 35 μ m
Quality of the material	Glass epoxy (FR-4)

Usage Precautions

- The input voltage, output voltage, output current and temperature conditions should be considered when selecting capacitors, inductors and resistors. These components should be evaluated on an actual system prototype for best selection.
- Parts of this product in the surrounding are examples of the representative, and the supply might become impossible. Please confirm latest information when using it.

Evaluation Board Schematic



Directions for Use

- Connect the V_{IN} and GND pins to an electric source.
- Connect the V_{OUT} and GND pins to electric load.
- When EN pin is opened (applies H-level pin), the TB7107FN provides output voltage.
- When soft-start time should be adjusted, connect the capacitor (C4) of arbitrary capacity between SS and GND pins.

Component List

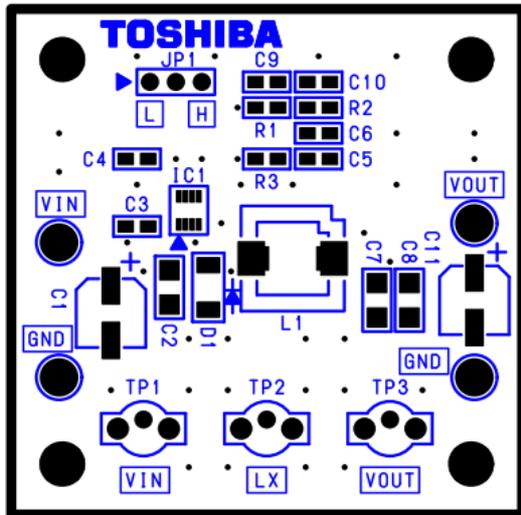
Description	Ref	Manufacturer	Part Number	Value
DC-DC Converter IC	IC1	TOSHIBA	TB7107FN	–
Schottky Barrier Diode	D1	TOSHIBA	CRS30I30A	–
Input Filter Capacitor C_{IN}	C1	–	–	–
Input Filter Capacitor C_{IN}	C2	Murata	GRM31CR71E106K	10 μ F
Bootstrap Capacitor C_{BOOT}	C3	Murata	GRM188R71H104J	0.1 μ F
Soft-Start Capacitor C_{SS}	C4	–	–	–
Phase Compensation Capacitor C_P	C5	Murata	GRM1886C1H222J	2200pF *2
Phase Compensation Capacitor C_{P1}	C6	–	–	–
Output Filter Capacitor C_{OUT}	C7	Murata	GRM31CR71E106K	10 μ F
Output Filter Capacitor C_{OUT}	C8	Murata	GRM31CR71E106K	10 μ F
Feedback Capacitor C_{FB1}	C9	–	–	–
Feedback Capacitor C_{FB2}	C10	–	–	–
Output Filter Capacitor C_{OUT}	C11	–	–	–
Feedback Resistor R_{FB1}	R1	KOA	RK73H1E	*1
Feedback Resistor R_{FB2}	R2	KOA	RK73H1E	*1
Phase Compensation Resistor R_P	R3	KOA	RK73H1E	33k Ω *2
Inductor L	L1	TDK	SLF7055T-100M2R5-3PF	10 μ H

*1 : A Feedback Resistor changes with setting values of output voltage. Refer to the following table(Page3).

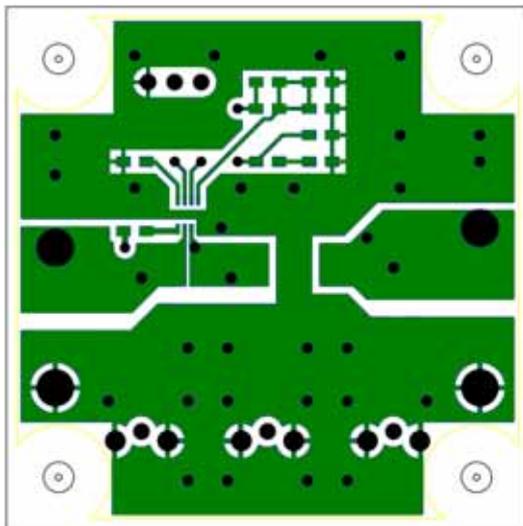
*2 : A Phase Compensation Capacitor and Resistor changes with setting values of output voltage.

Refer to the following table(Page 3).

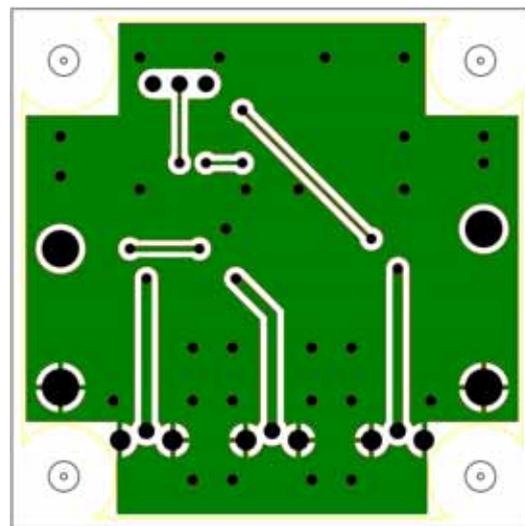
Board Layout



Top Silk Layer



Top Layer



Bottom Layer

Example of Component Values (For Reference Only)

Output Voltage	Inductor	Input Filter Capacitor	Output Filter Capacitor	Feedback Resistor	Feedback Resistor	Phase Compensation Capacitance	Phase Compensation Resistor
V_{OUT}	L	C_{IN}	C_{OUT}	$R_{FB1}(R1)$	$R_{FB2}(R2)$	C_p	R_p
1.2 V	10 μ H	10 μ F	20 μ F	7.5 k Ω	15 k Ω	4700pF	10k Ω
1.51 V	10 μ H	10 μ F	20 μ F	16 k Ω	18 k Ω	4700pF	10k Ω
1.8 V	10 μ H	10 μ F	20 μ F	15 k Ω	12 k Ω	2200pF	15k Ω
2.5 V	10 μ H	10 μ F	20 μ F	5.1 k Ω	2.4 k Ω	2200pF	22k Ω
3.3 V	10 μ H	10 μ F	20 μ F	7.5 k Ω	2.4 k Ω	2200pF	27k Ω
5.0 V	10 μ H	10 μ F	20 μ F	27 k Ω	5.1 k Ω	2200pF	33k Ω

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