The product specifications described in this book are subject to change without notice for the product which is currently under development. At the final stage of your design, purchasing, or use of the product, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

User's Guide for Evaluation Board

Part No.	AN30185A-EVB

Automotive & Industrial Systems Company
Panasonic Corporation

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1 Introduction

This user's guide contains background information for the

AN30185A : General-purpose power management LSI

As well as support documentation for the AN30185A Evaluation Board (AN30185A-EVB). Also included are schematic, the test setup ,the bill of materials and the Board Layout for the Evaluation Board.

1.1 Overview

AN30185A is a power management LSI which has DC-DC step down regulators (2-ch) that employs hysteretic control system. By this system, when load current changes suddenly, it responds at high speed and minimizes the changes of output voltage. Since it is possible to use capacitors with small capacitance and it is unnecessary to use parts for phase compensation, this IC realizes downsizing of set and reducing in the number of external parts.

Output voltages are 1.0 V and 1.8 V. Each maximum current is 0.8 A.

This LSI has a LDO circuit, external Pch-MOSFET gate drive circuits and a reset circuit of input power supply voltage.

1.2 Features

—High-speed response step-down DC-DC step down regulator circuit that employs hysteretic control system
: 2-ch (1.0 V, 0.8 A / 1.8 V, 0.8 A)
—LDO : 1-ch (0.9 V, 10 mA)
— Input voltage range : 2.9V to 5.5V
—Built-in external Pch MOSFET gate drive circuits
—Built-in Reset function
—Built-in Under Voltage Lockout function (UVLO)
— high efficiency over a wide load current area by DCM (discontinuous conductive mode) operation at light loads, CCM (continuous conductive mode) operation in heavy loads those two modes can be automatically switched
— Switching frequency of 1.2MHz during CCM.
—100% duty operation when input voltage goes down to output voltage.

Table 1. Input Voltage and Output Current Summary

Evaluation Board	Input Voltage Range	Output Current Range
EVB-AN30185A	AVIN = PVIN1 = PVIN2 = 2.9V to 5.5V	1.0V 0.8A 1.8V 0.8A

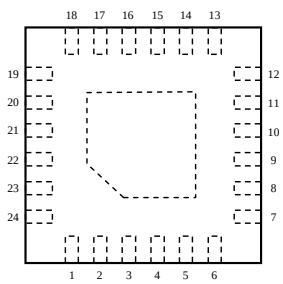
1.3 Typical Applications

—Portable appliance, etc

1.4 Package

— 24pin Plastic Quad Flat Non-leaded Package Heat Slug Down (QFN Type)
(Size : 4 4 mm, 0.5 mm pitch)

Top View



1.5 Type

—Bi-CMOS IC

Note: The parameters above is subject to change for improvement without notice.

1.6 Block Diagram

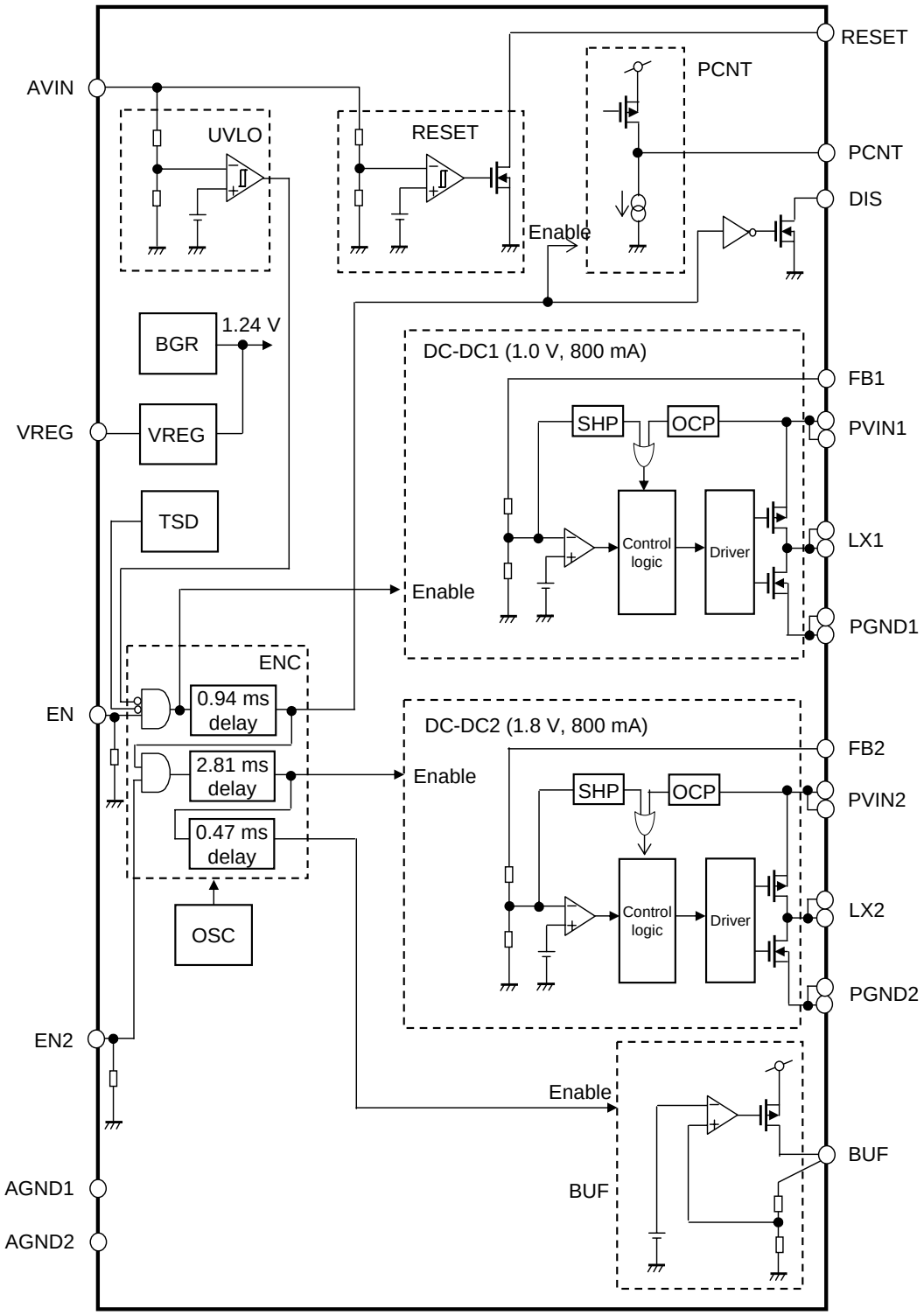


Figure 1. Block Diagram

Note: The parameters above is subject to change for improvement without notice.

2 Evaluation Board

2.1 Appearance

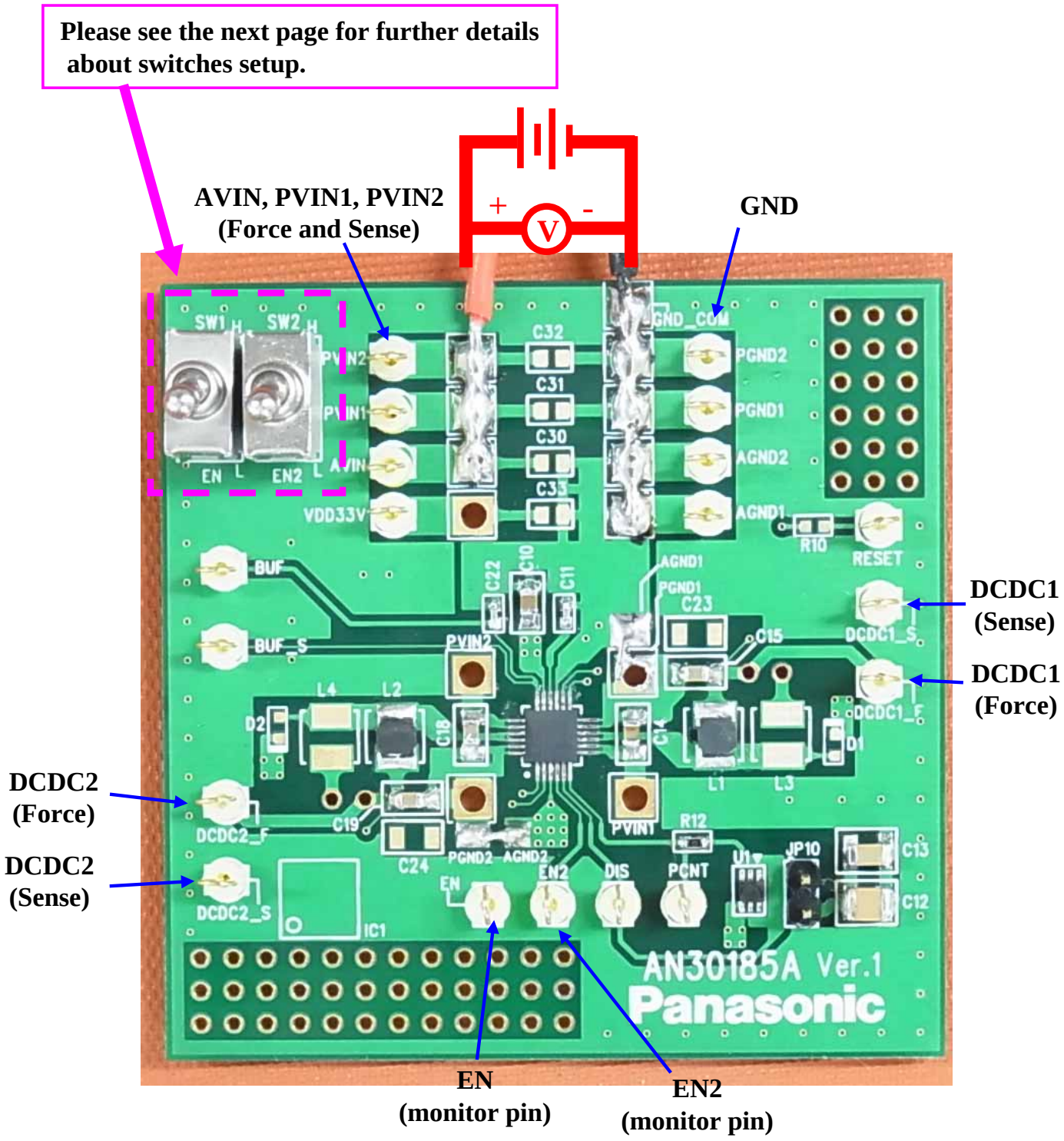


Figure 2. Appearance of Evaluation Board

Note: The parameters above is subject to change for improvement without notice.

2.2 Switches Setup

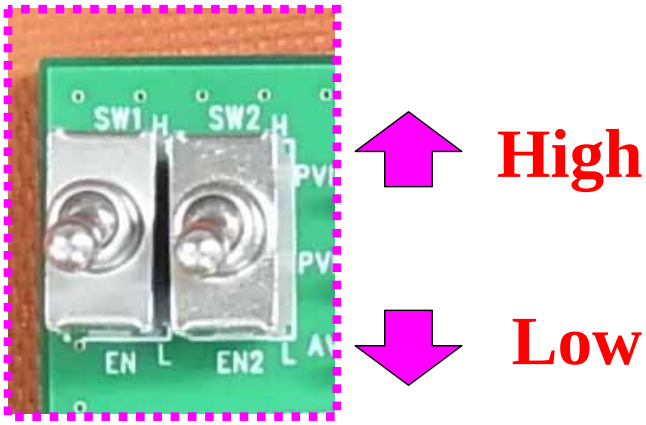


Figure 3. Appearance of SW1 and SW2

Table 2. Control enable/disable setting

EN pin	High		Low
EN2 pin	High	Low	High/Low
DCDC1(1.0 V)	ON	ON	OFF
External Pch-MOSFET gate control circuit	ON	ON	OFF
DCDC2(1.8 V)	ON	OFF	OFF
BUF(0.9 V)	ON	OFF	OFF

Note: The parameters above is subject to change for improvement without notice.

2.3 Start / Stop Sequence

Start / Stop control of AN30181A is performed by EN pin and EN2 pin.
The start / stop sequence is as follows.

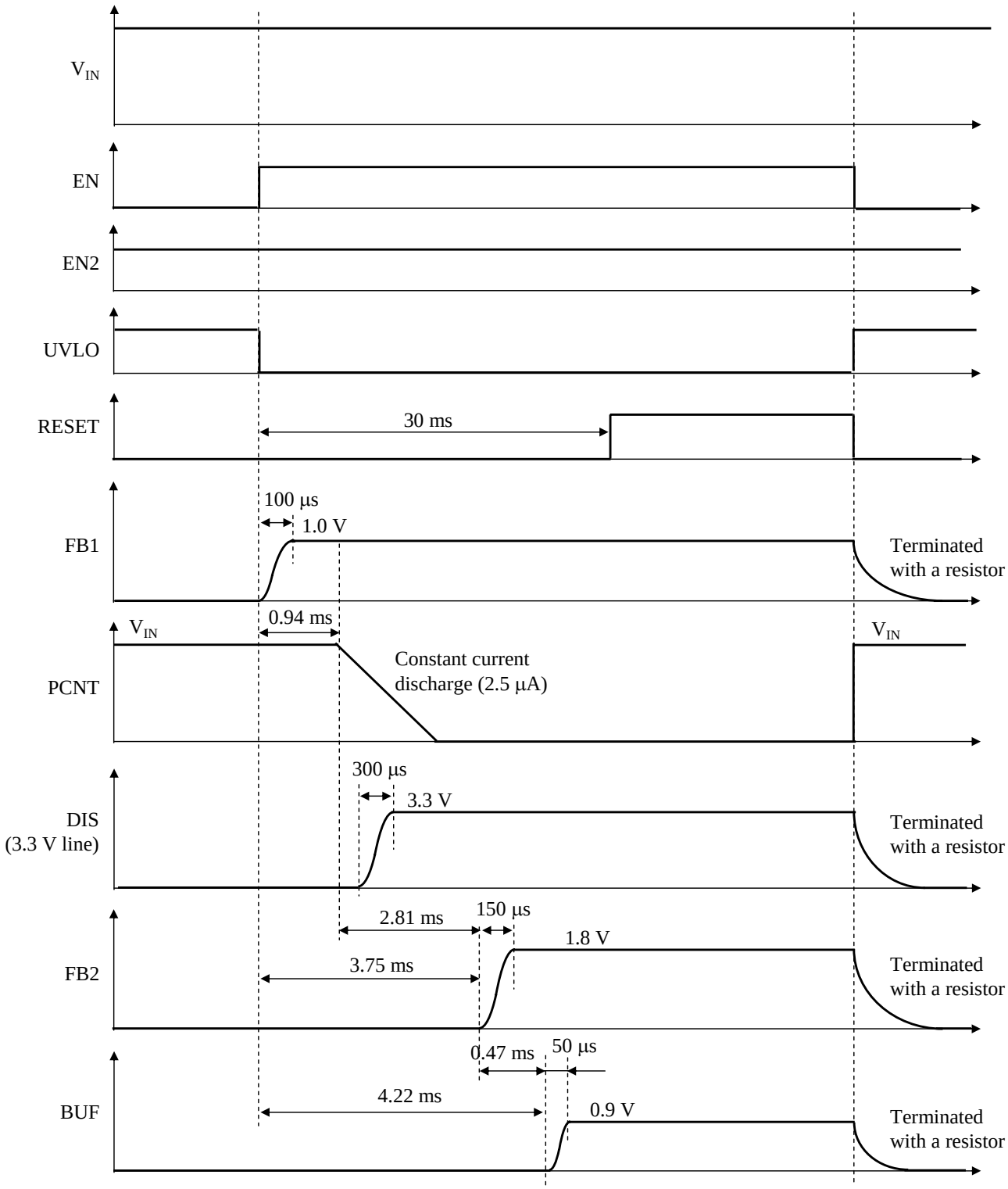
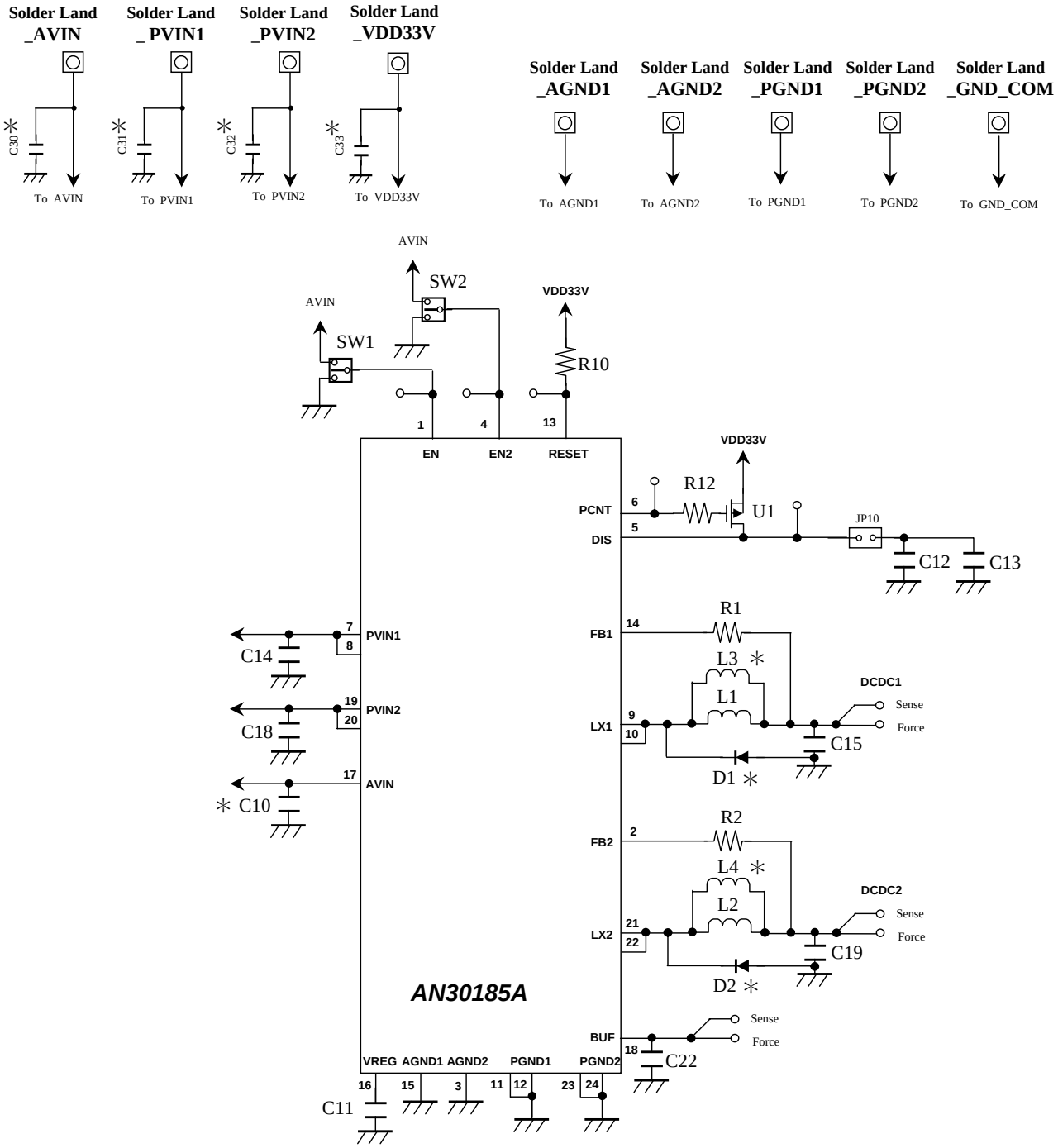


Figure 4. Start / Stop Sequence

Note) All values given in the above figure are typical values.

Note: The parameters above is subject to change for improvement without notice.

3 Schematic



∗ : Not Installed

Figure 5. Evaluation Board Schematic

Note: The parameters above is subject to change for improvement without notice.

5 Bill of Materials

Table 3 presents the bill of materials for the Evaluation Board.

Table 3. Evaluation Board Bill of Materials

Reference Designator	QTY	Value	Description	Size *1	Manufacturer	Part Number
R10	1	10K	Resistor, Chip, 0.1W, 5%	0603	Panasonic	ERA3ARW103V
R12,R15,R20	2	0	Resistor, Chip, 0.1W	0603	Panasonic	ERJ3GEY0R00V
C11,C22	2	1uF	Capacitor, Ceramic, 10V, B, +-10%	0402	Murata	GRM155B31A105KE15D
C12	1	47uF	Capacitor, Ceramic, 10V, B, +-10%	1210	Murata	GRM32EB31A476KE20L
C13	1	22uF	Capacitor, Ceramic, 10V, B, +-10%	1206	Murata	GRM31CB31A226KE19L
C14,C18	2	4.7uF	Capacitor, Ceramic, 10V, B, +-10%	0805	Murata	GRM21BB31A475KA74L
C15,C19	1	10uF	Capacitor, Ceramic, 10V, B, +-10%	0805	Murata	GRM21BB31A106KE18L
C10,C30-33	-	-	-	-	-	-
L1,L2	2	2.2uH	Inductor, 1.1A	3.0 x 3.0 x1.2 mm	TAIYO _YUDEN	NR3012T2R2M
L3,L4	-	-	-	-	-	-
D1,D2	-	-	-	-	-	-
JP10	-	-	-	-	-	-
U1	1	-	Pch MOSFET	1.7 x 2.0 x0.7 mm	Panasonic	MTM76111
SW1,SW2	2	-	2stateSW_(with_Mid-point)	-	FUJISOKU	ATE1E-2M3-10-Z

*1 : These values comply with EIA standards.

Note: The parameters above is subject to change for improvement without notice.

6 Board Layout

The board layout for the evaluation board is shown in Figure 6 through Figure 11.

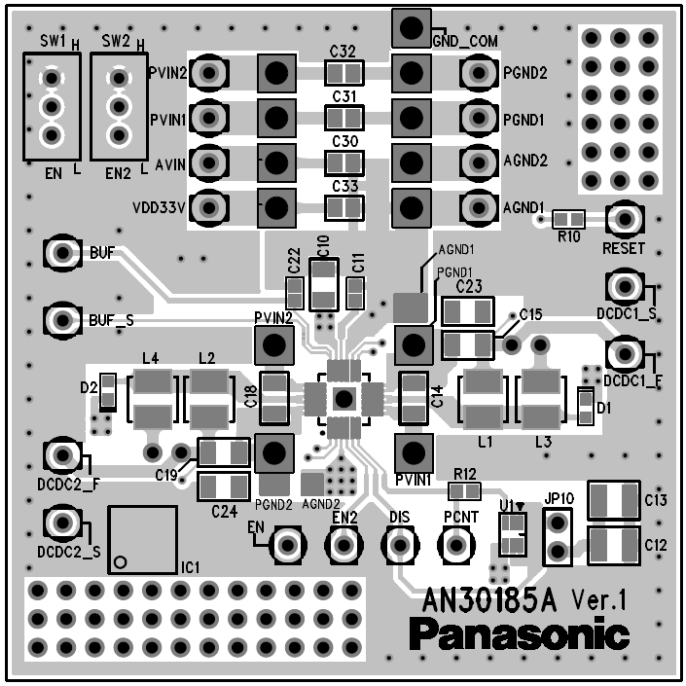


Figure 6. Top Layer with silk screen (Top View)

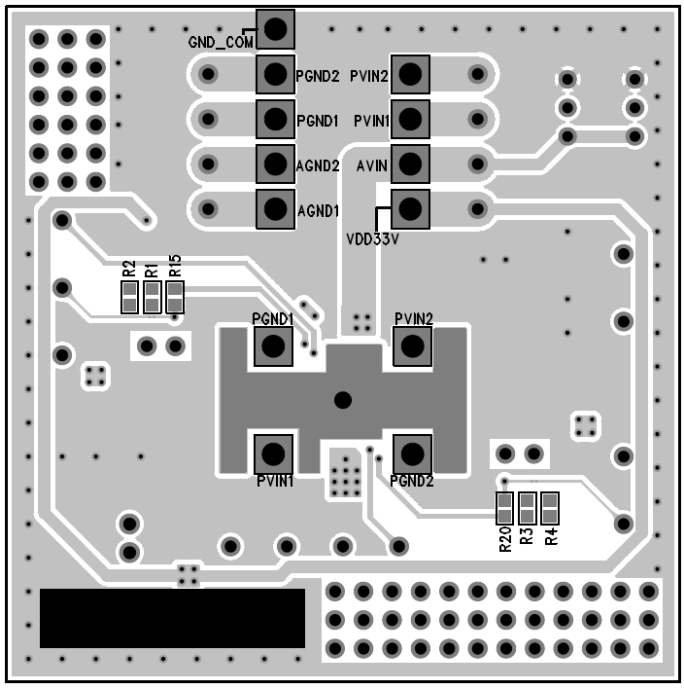


Figure 7. Bottom Layer with silk screen (Bottom View)

Note: The parameters above is subject to change for improvement without notice.

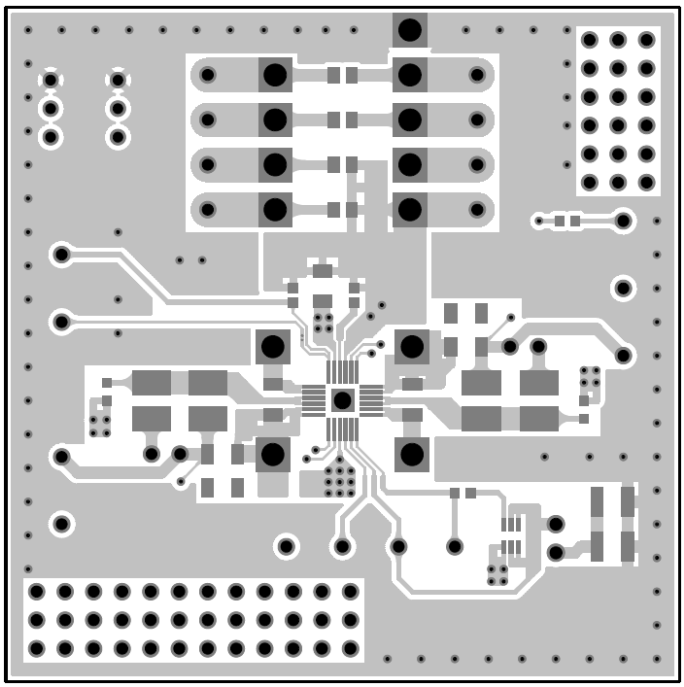


Figure 8. Top Layer (Top View)

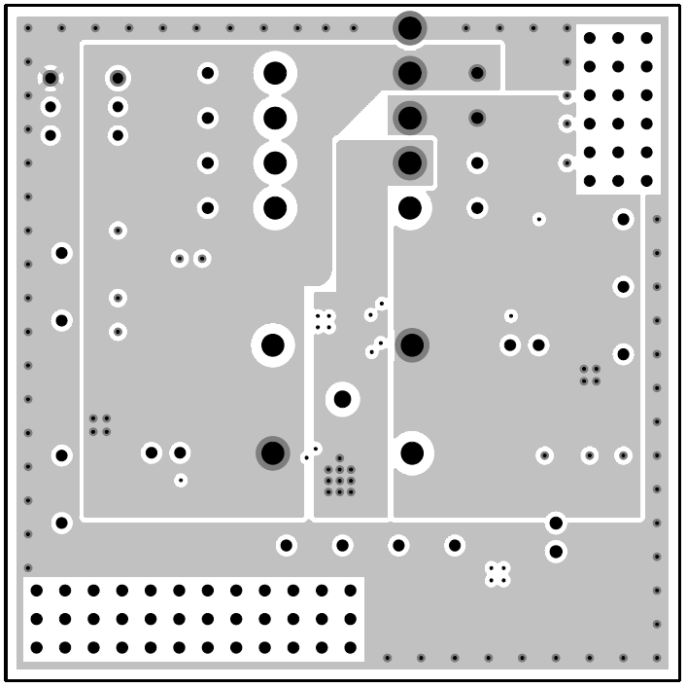


Figure 9. Layer 2 (Top View)

Note: The parameters above is subject to change for improvement without notice.

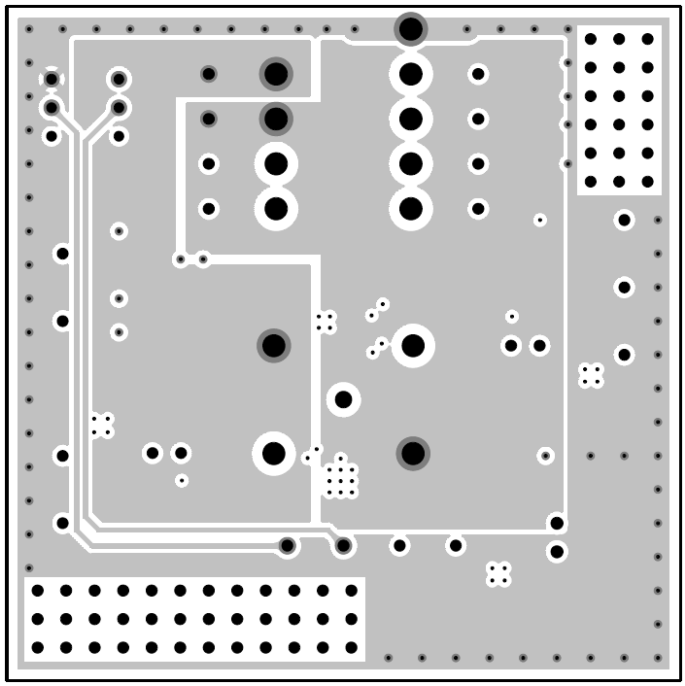


Figure 10. Layer 3 (Top View)

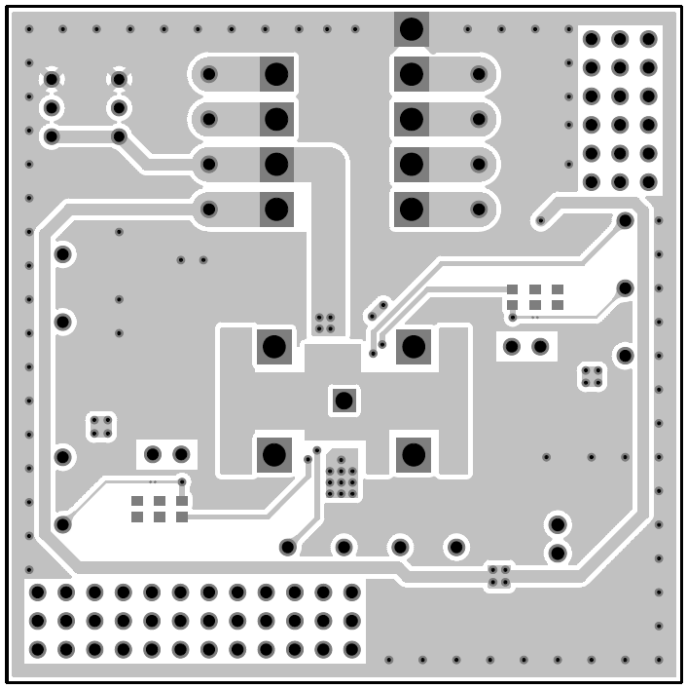


Figure 11. Bottom Layer (Top View)

Note: The parameters above is subject to change for improvement without notice.

IMPORTANT NOTICE

1. When using the IC for new models, verify the safety including the long-term reliability for each product.
2. When the application system is designed by using this IC, please confirm the notes in this book.
   Please read the notes to descriptions and the usage notes in the book.
3. This IC is intended to be used for general electronic equipment.
   Consult our sales staff in advance for information on the following applications: Special applications in which exceptional quality and reliability are required, or if the failure or malfunction of this IC may directly jeopardize life or harm the human body.
   Any applications other than the standard applications intended.
   (1) Space appliance (such as artificial satellite, and rocket)
   (2) Traffic control equipment (such as for automotive, airplane, train, and ship)
   (3) Medical equipment for life support
   (4) Submarine transponder
   (5) Control equipment for power plant
   (6) Disaster prevention and security device
   (7) Weapon
   (8) Others : Applications of which reliability equivalent to (1) to (7) is required
   Our company shall not be held responsible for any damage incurred as a result of or in connection with the IC being used for any special application, unless our company agrees to the use of such special application.
   However, for the IC which we designate as products for automotive use, it is possible to be used for automotive.
4. This IC is neither designed nor intended for use in automotive applications or environments unless the IC is designated by our company to be used in automotive applications.
   Our company shall not be held responsible for any damage incurred by customers or any third party as a result of or in connection with the IC being used in automotive application, unless our company agrees to such application in this book.
5. Please use this IC in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Our company shall not be held responsible for any damage incurred as a result of our IC being used by our customers, not complying with the applicable laws and regulations.
6. Pay attention to the direction of the IC. When mounting it in the wrong direction onto the PCB (printed-circuit-board), it might be damaged.
7. Pay attention in the PCB (printed-circuit-board) pattern layout in order to prevent damage due to short circuit between pins. In addition, refer to the Pin Description for the pin configuration.
8. Perform visual inspection on the PCB before applying power, otherwise damage might happen due to problems such as solder-bridge between the pins of the IC. Also, perform full technical verification on the assembly quality, because the same damage possibly can happen due to conductive substances, such as solder ball, that adhere to the IC during transportation.
9. Take notice in the use of this IC that it might be damaged when an abnormal state occurs such as output pin-VCC short (Power supply fault), output pin-GND short (Ground fault), or output-to-output-pin short (load short). Safety measures such as installation of fuses are recommended because the extent of the above-mentioned damage will depend on the current capability of the power supply.
10. The protection circuit is for maintaining safety against abnormal operation. Therefore, the protection circuit should not work during normal operation.
    Especially for the thermal protection circuit, if the area of safe operation or the absolute maximum rating is momentarily exceeded due to output pin to VCC short (Power supply fault), or output pin to GND short (Ground fault), the IC might be damaged before the thermal protection circuit could operate.
11. Unless specified in the product specifications, make sure that negative voltage or excessive voltage are not applied to the pins because the IC might be damaged, which could happen due to negative voltage or excessive voltage generated during the ON and OFF timing when the inductive load of a motor coil or actuator coils of optical pick-up is being driven.
12. Product which has specified ASO (Area of Safe Operation) should be operated in ASO
13. Verify the risks which might be caused by the malfunctions of external components.
14. Connect the metallic plate (fin) on the back side of the LSI to the GND. The thermal resistance and the electrical characteristics are guaranteed only when the metallic plate (fin) is connected with the GND potential.

Request for your special attention and precautions in using the technical information and semiconductors described in this book

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Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

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