DATA SHEET

Part No.	AN34070A
Package Code No.	SSMINI-5DA

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Contents

AN34070A

Integrated load switch with soft start implemented

■ Overview

The AN34070A is a low power load switch with output short to ground protection.

■ Features

- Miniature package
- Low ON-resistance of 0.45 Ω
- Output short to ground protection
- Soft start capability controllable by external capacitor

■ Applications

- Memory card slot for camera

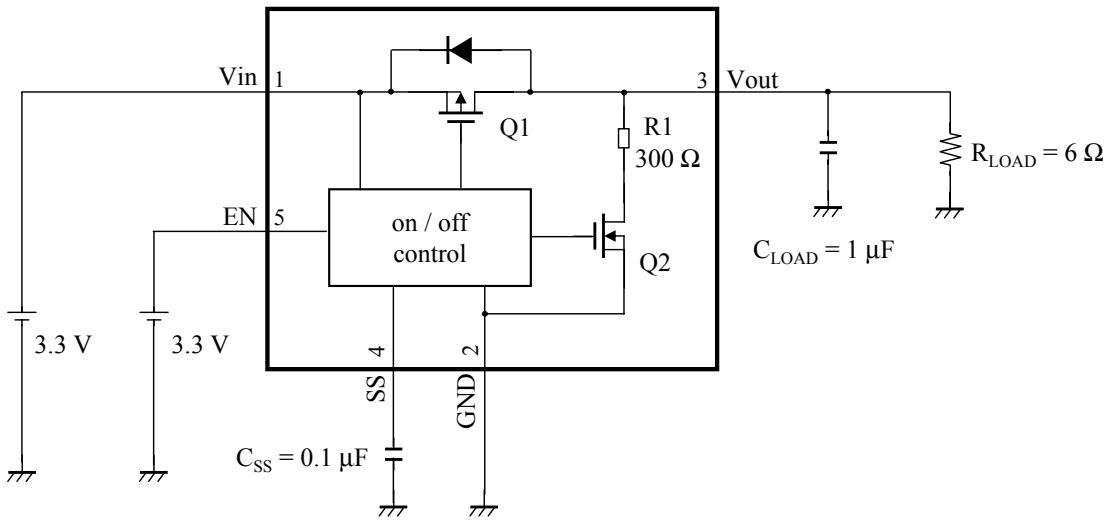
■ Package

- 5 pin plastic small surface mount package (SMINI type)

■ Type

- Bi-CMOS IC

■ Application Circuit Example (Block Diagram)



■ Pin Descriptions

Pin No.	Pin name	Type	Description
1	Vin	Power supply	Input voltage of 3.3 V typical
2	GND	Ground	Signal ground
3	Vout	Output	Signal output
4	SS	Input	Connect to soft start capacitor
5	EN	Input	Input voltage of 3.3 V typical

■ Absolute Maximum Ratings

A No.	Parameter	Symbol	Rating	Unit	Note
1	Supply voltage	V_{CC}	3.8	V	*1
2	Supply current	I_{CC}	500	mA	—
3	Power dissipation	P_D	60	mW	*2
4	Operating ambient temperature	T_{opr}	–25 to +75	°C	*3
5	Storage temperature	T_{stg}	–55 to +125	°C	*3

Note) *1: The range under absolute maximum ratings, power dissipation.

*2: Power dissipation shows the value of only package at T_a = 75°C.
When using this IC, refer to the • P_D – T_a diagram in the ■ Technical Data and use under the condition not exceeding the allowable value.

*3: Expect for the storage temperature and operating ambient temperature, all ratings are for T_a = 25°C.

■ Operating Supply Voltage Range

Parameter	Symbol	Range	Unit	Note
Supply voltage range	V_{CC}	2.7 to 3.6	V	—

Note) The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

■ Electrical Characteristics at C_{SS} = 0.1 µF, R_{LOAD} = 6 Ω, V_{IN} = EN = 3.3 V

Note) T_a = 25°C±2°C unless otherwise specified.

B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
ON characteristic								
1	Quiescent current	I_Q	No load	—	—	100	µA	—
2	Load current	I_L	$V_{IN} - V_{OUT}$ = 0.3 V	0.5	—	—	A	—
3	ON resistance	R_{ON}	I_L = 500 mA, $V_{OUT} \geq V_{IN} - 0.3$ V	—	0.45	0.6	Ω	—
4	EN high threshold	V_{ENH}	$V_{OUT} \geq 3$ V	2	—	—	V	—
5	EN low threshold	V_{ENL}	$V_{OUT} \leq 0.2$ V	—	—	0.5	V	—
6	Discharge impedance	R_{DIS}	No load	270	330	390	Ω	—
OFF characteristic								
7	Standby current	I_{STB}	EN = 0 V, No load	—	—	1	µA	—

■ Electrical Characteristics (Reference values for design) at C_{SS} = 0.1 µF, R_{LOAD} = 6 Ω, V_{IN} = EN = 3.3 V

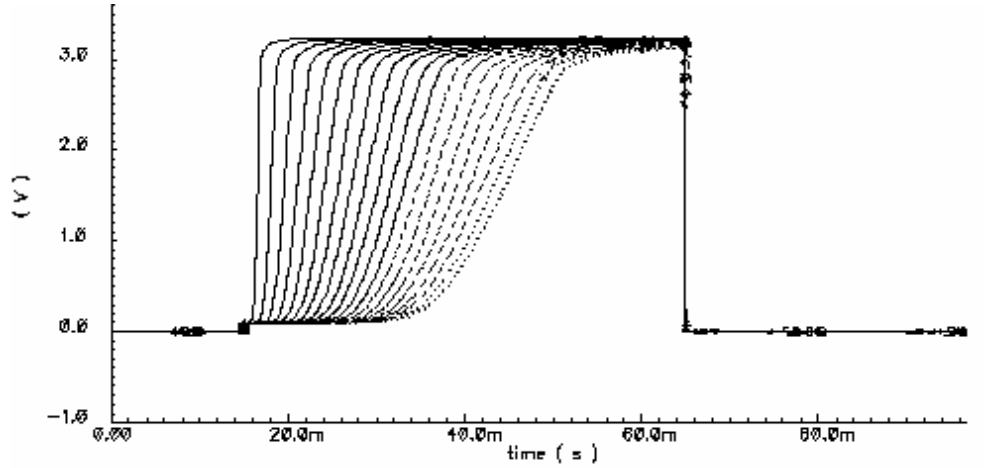
Note) T_a = 25°C±2°C unless otherwise specified.
The characteristics listed below are reference values for design of the IC and are not guaranteed by inspection.
If a problem does occur related to these characteristics, Panasonic will respond in good faith to user concerns.

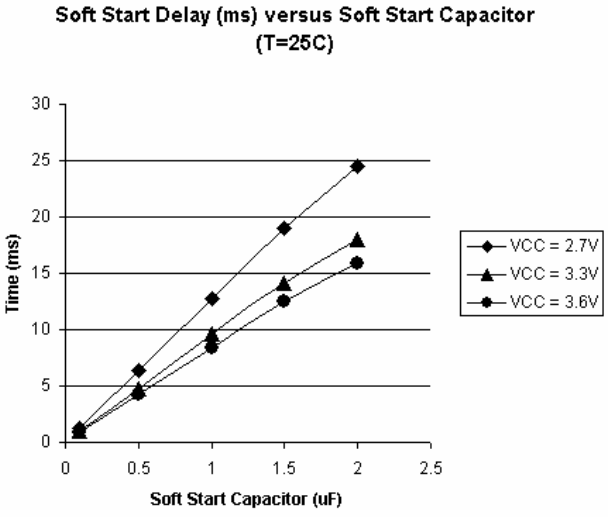
B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
Soft start characteristic								
8	Soft start	t_R	—	—	1	—	ms	—
9	Soft start delay	t_D	—	—	1	—	ms	—

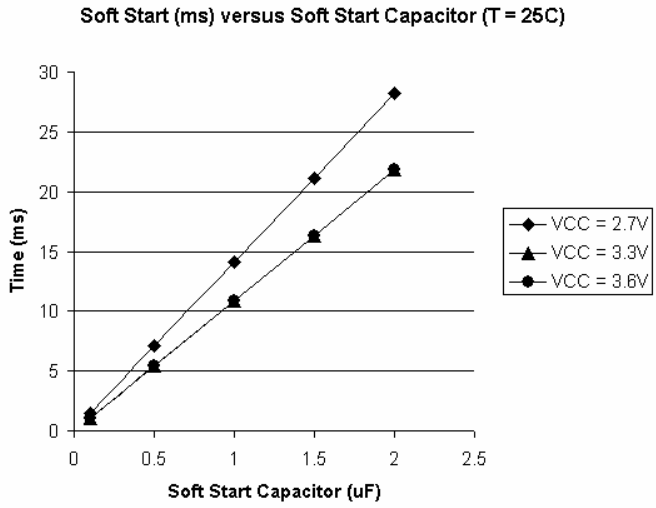
■ Electrical Characteristics (Reference values for design) at C_{SS} = 0.1 µF, R_{LOAD} = 6 Ω, V_{IN} = EN = 3.3 V (continued)

Note) T_a = 25°C±2°C unless otherwise specified.
The characteristics listed below are reference values for design of the IC and are not guaranteed by inspection.
If a problem does occur related to these characteristics, Panasonic will respond in good faith to user concerns.

Soft start characteristic with soft start capacitor





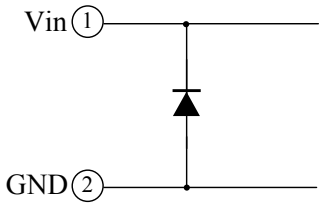
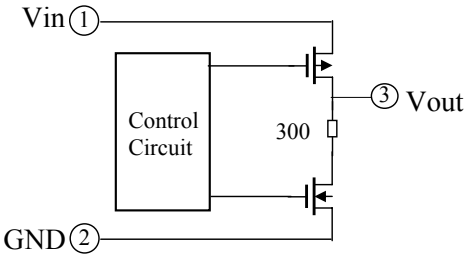
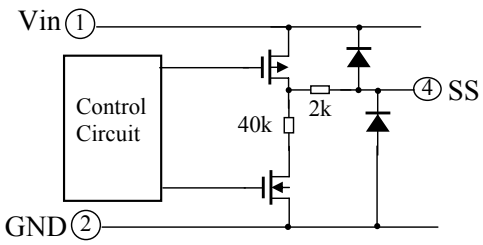
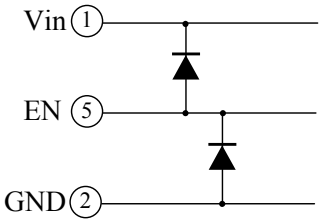


Note) Δt = Time delay between V_{CC} (= Vin) and EN. (eg. V_{CC} have to be on first before EN)
Minimum recommended time for Δt is 20 ms in order to accommodate 2 µF of soft start capacitor.
It is possible to reduce Δt to 1 ms with 0.1 µF of soft start capacitor.

■ Technical Data

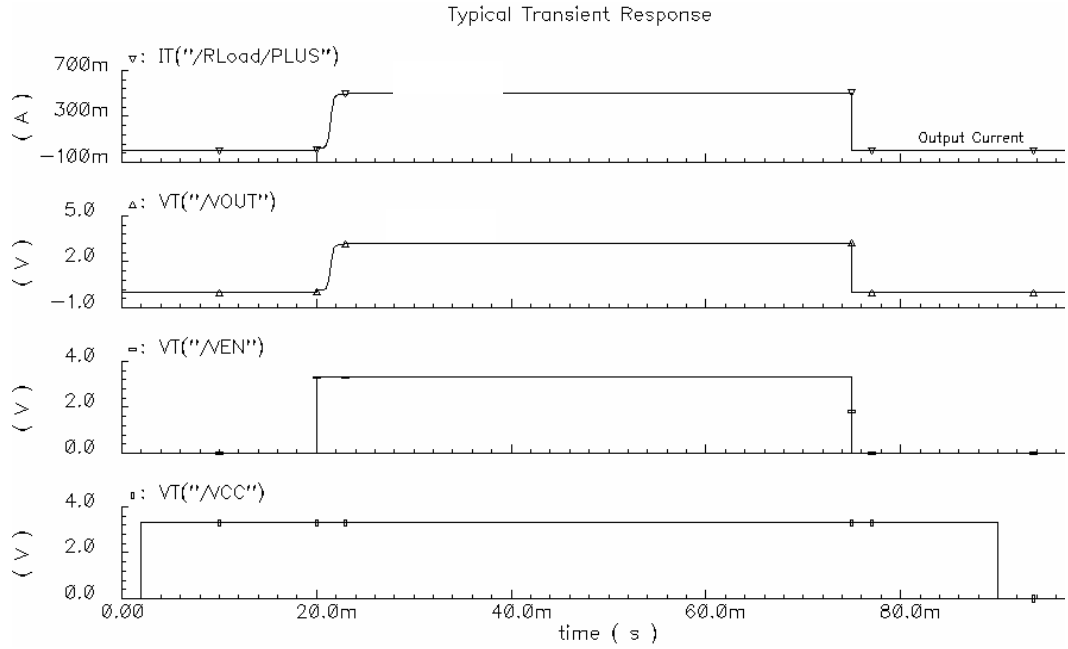
- I/O block circuit diagrams and pin function descriptions

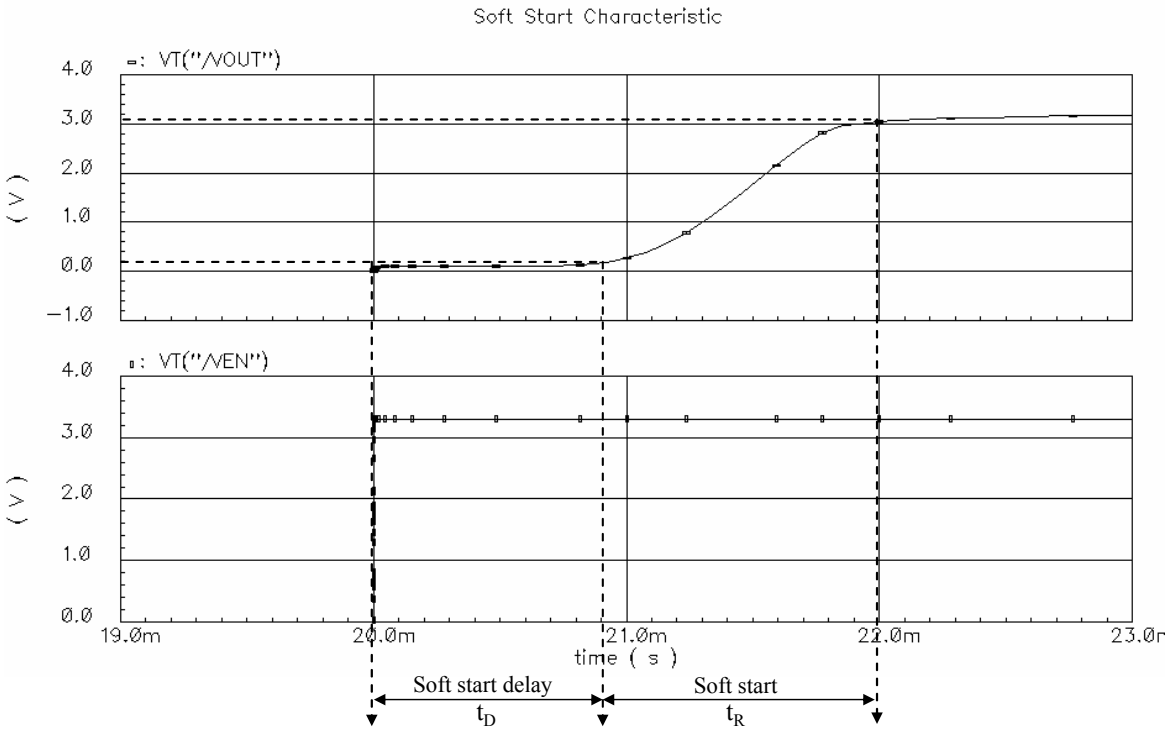
Note) The characteristics listed below are reference values based on the IC design and are not guaranteed.

Pin No.	Waveform and voltage	Internal circuit	Impedance	Description
1	Vin (Typ. 3.3 V)		—	Power supply of the IC. To provide current for the load.
2	GND		—	IC ground.
3	Vout		to 330 Ω (Discharge impedance)	Output of the IC. To be connected to external load.
4	SS		to 42 kΩ (when EN is High)	To provide soft start characteristic to the output pin. To be connected to external capacitor to ground. Typical value of capacitor is 0.1 µF.
5	EN (Typ. 3.3 V)		—	EN is enable signal. To provide control to the output signal.

■ Technical Data (continued)

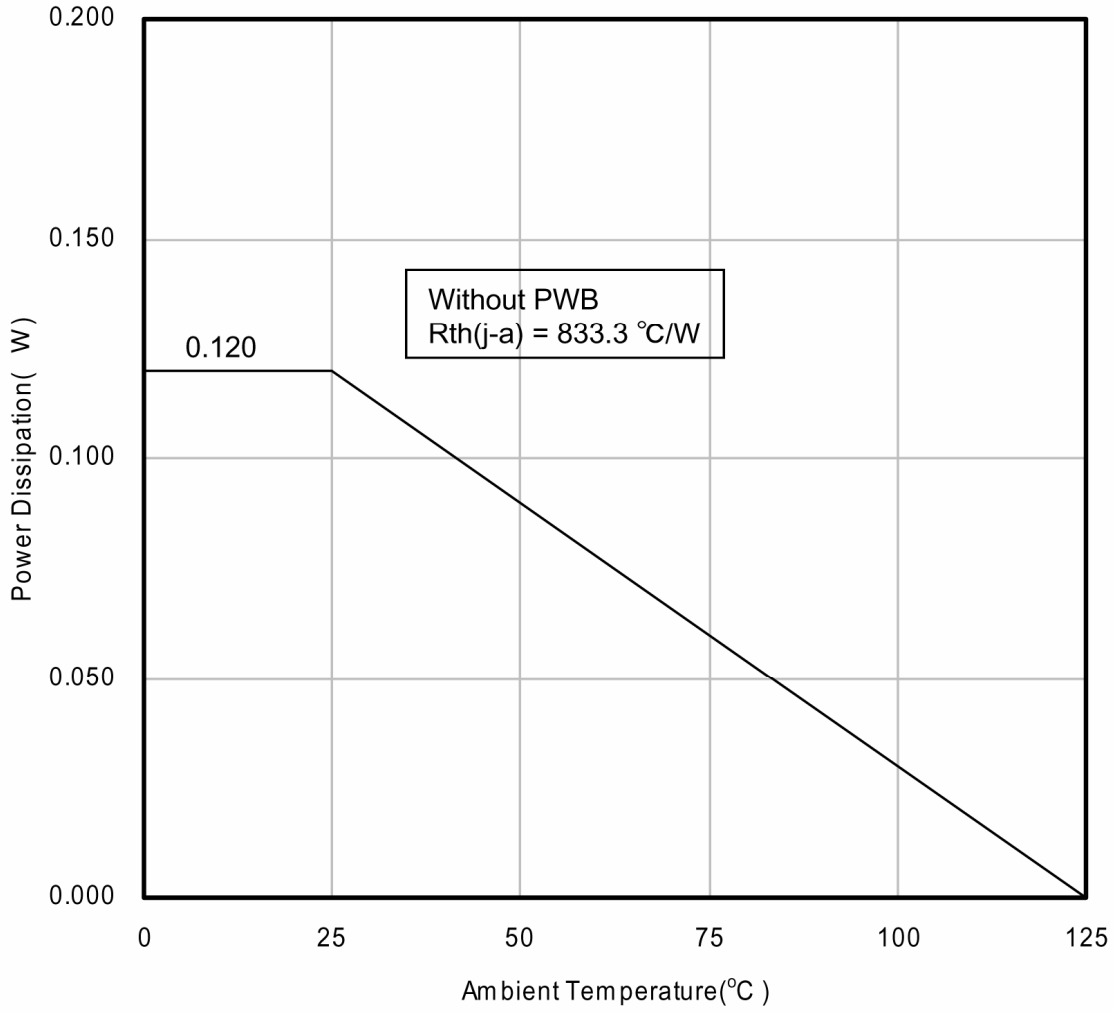
- Input and output timing chart





■ Technical Data (continued)

• P_D — T_a diagram



■ Usage Notes

1. Pay attention to the PCB (Printed-Circuit-Board) pattern layout in order to prevent damage due to short circuit between pins. In addition, for the pin configuration, refer to the pin functional description diagram.

2. Unless specified in the product specifications, make sure that negative voltage or excessive voltage are not applied to the pins because the device might be damaged.

3. Carry out visual inspection on the PCB (Printed-Circuit-Board) before applying the power, otherwise damage might happen due to problems such as solder-bridge between the pins of the semiconductor device. Also, perform a full technical verification on the assembly quality, because the same damage may happen due to conductive substances, such as solder ball, that adhere to the LSI during transportation.

4. ake notice in the use of this product that it might be damaged or occasionally emit smoke when an abnormal state occurs such as output pin-Vcc short, output-to-output-pin short (load short), pin to pin short or pin to pin leakage current. (And safety measures such as an installation of fuses are recommended because the extent of the above-mentioned damage and smoke emission will depend on the current capability of the power supply.)

5. Carry out thermal design with sufficient margin such that the power dissipation will not be exceeded under the necessary conditions of power supply voltage, load impedance and ambient temperature

6. When carrying out derivative product expansion or when the product is going to be used in a new set, verify the safety including the long-term reliability for each set.

7. Check the risk that is caused by the failure of external components.

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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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