



SANYO Semiconductors

DATA SHEET

LA5692D, 5692S LA5692M

Monolithic Linear IC
With Watchdog Timer
Voltage Regulator Driver

Overview

The LA5692 is a single-chip voltage regulator for microcomputer system monitor use that performs the functions of 5V output voltage control, watchdog timer, and voltage detector. Since the LA5692 can hold the reset output, it is especially suited for use in peripheral control and monitor output applications (example : valves used in refrigeration equipment, hot water supply system).

Applications

- Microcomputer system for car equipment, refrigeration/heating equipment, office automation equipment.

Features

- An external PNP transistor can be used to provide a low saturation voltage regulator.
- CK input with edge detector.
- Variable detection voltage.
- The watchdog time can be made longer.

Functions

- Output voltage 5V control.
- Watchdog timer.
- Reset generation at power-ON mode.
- Reset hold output [RES (2)] (Cleared with CK re-input).

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

61808 MS JK/D0597HA (KT)/8099YT/8037TA, TS No.2770-1/7

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Control pin voltage	V _{CONT} max	1s	60	V
Control pin voltage	V _{CONT} max		41	V
Control pin current	I _{CONT} max	V _{CC} ≥ 6V *	11	mA
CK input voltage	V _{CK} max		25	V
Reset pin voltage	V _{RES} (1) max, V _{RES} (2) max		41	V
Allowable power dissipation	Pd max	LA5692D, 5692S	500	mW
		LA5692M	370	mW
Operating temperature	T _{opr}		-40 to +85	°C
Storage temperature	T _{stg}		-55 to +150	°C

* : A PNP transistor is connected to the LA5692D, 5692S externally to provide a low-saturation voltage regulator.

Therefore, I_{CONT} = 100mA will flow, as starting current, in the V_{CC} range where the output cannot be regulated.

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Control pin voltage	V _{CONT}		6 to 40	V
Control pin current	I _{CONT} max		10	mA
Reset output current	I _{RES} (1) max, I _{RES} (2) max	External R pull-up	8	mA
Reset detection voltage	V _S min		4	V

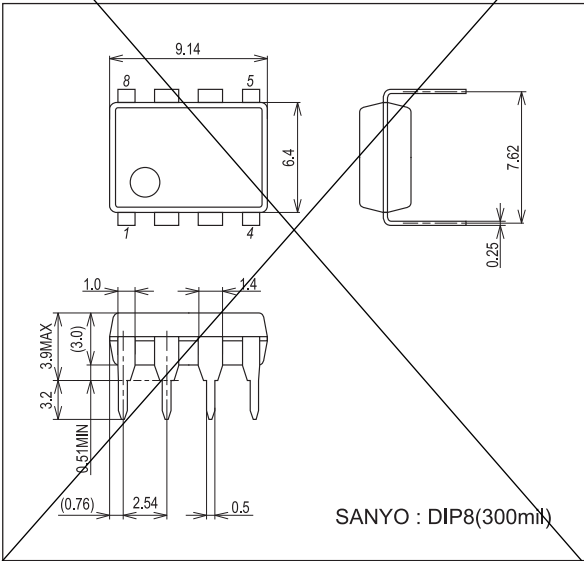
Electrical Characteristics at Ta = 25°C, V_{CC} = 14V, I_O = 50mA, unless otherwise specified.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V _O		4.8	5.0	5.2	V
Line regulation1	ΔV _{OLN1}	9V ≤ V _{CC} ≤ 16V		2	10	mV
Line regulation2	ΔV _{OLN2}	6V ≤ V _{CC} ≤ 40V		4	30	mV
Load regulation	ΔV _{OLD}	1mA ≤ I _O ≤ 50mA		4	30	mV
Current dissipation	I _{CC}	I _O = 0		4.4	6.5	mA
Output noise voltage	V _{NO}	10Hz ≤ f ≤ 100kHz, V _{CK} = 0		150		μV
Temperature coefficient of output voltage	ΔV _O /ΔTa	I _O = 5mA, -40°C ≤ Ta ≤ +85°C		±0.2		mV/°C
Reference voltage	V _{REF}		1.13	1.18	1.23	V
'H'-level CK input voltage	V _{IH}		2			V
'L'-level CK input voltage	V _{IL}				0.8	V
'H'-level CK input current	I _{IH}	V _{CK} = 5V		0.3	0.7	mA
'L'-level CK input current	I _{IL}	V _{CK} = 0V	-1.0	-0.1		μA
'H'-level reset output voltage	V _{ORH} (1) V _{ORH} (2)	$\overline{\text{RES}}$ (2) : 10KΩ pull-up	4.8	5.0	5.2	V
'L'-level reset output voltage1	V _{ORL} (1) 1 V _{ORL} (2) 1	$\overline{\text{RES}}$ (2) : 10KΩ pull-up		40	200	mV
'L'-level reset output voltage2	V _{ORL} (1) 2 V _{ORL} (2) 2	$\overline{\text{RES}}$ (1) = I _{RES} (2) = 8mA		0.16	0.8	V
CK input pulse width	t _{CKW}	V _{CK} = 5V	3			μs
Reset output delay time	t _d	C _t = 1μF	7.5	10	12.5	ms
Watchdog time	t _{WD}	C _t = 1μF	30	40	50	ms
Watchdog reset time	t _{WR}	C _t = 1μF	0.1	0.25	0.4	ms
Reset hysteresis voltage	V _{hys}	V _S = 4.5V	100	200	300	mV

Package Dimensions

unit : mm (typ)
3001D

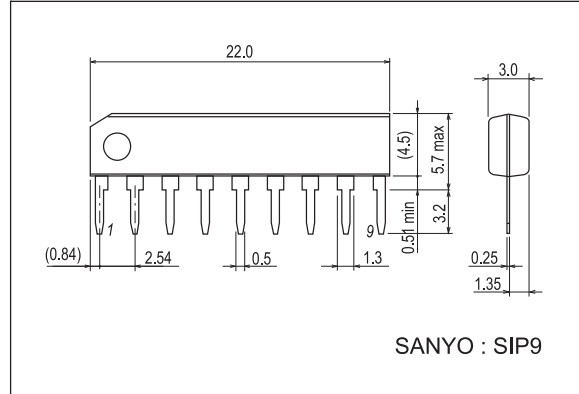
[LA5692D]



Package Dimensions

unit : mm (typ)
3017D

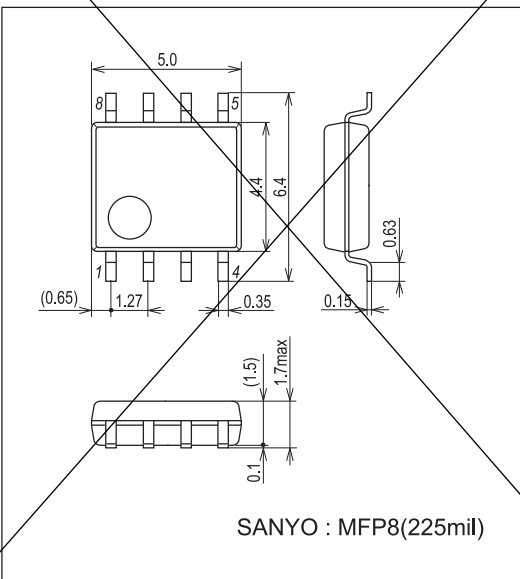
[LA5692S]



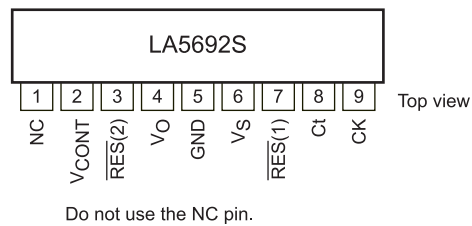
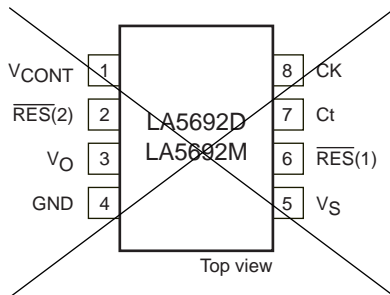
Package Dimensions

unit : mm (typ)
3032D

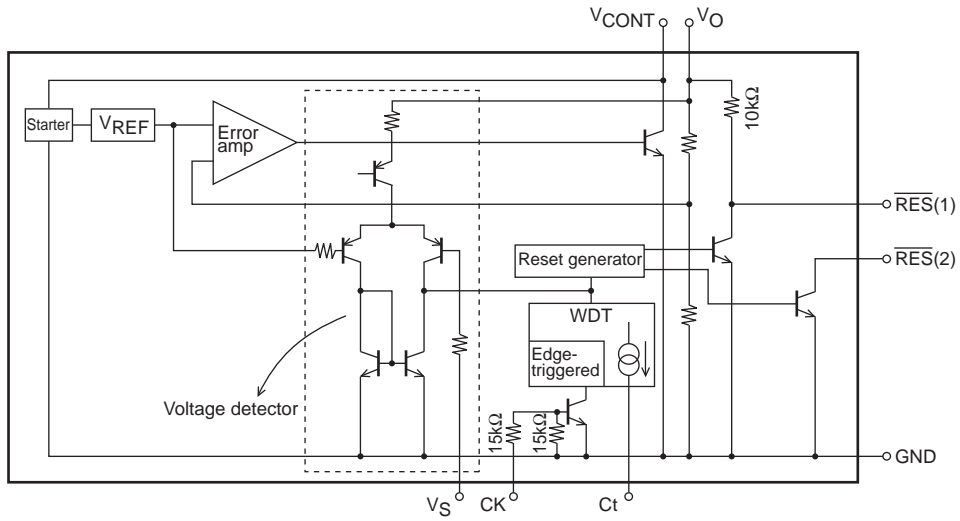
[LA5692M]



Pin Assignment

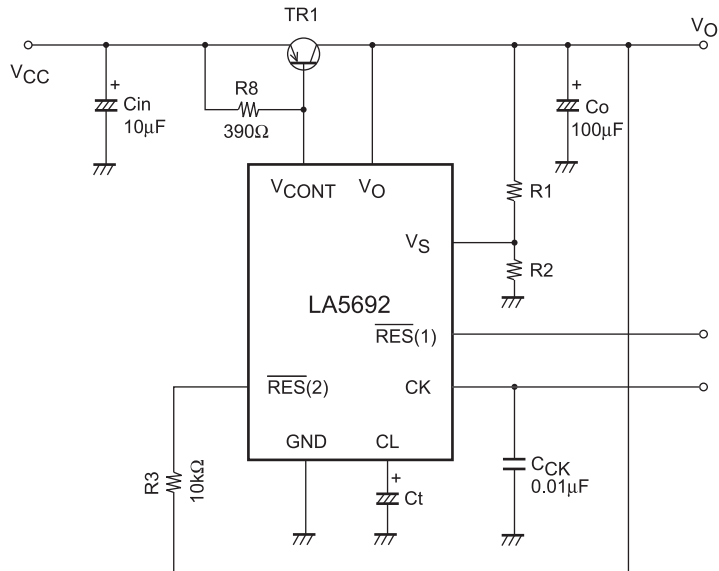


Block Diagram

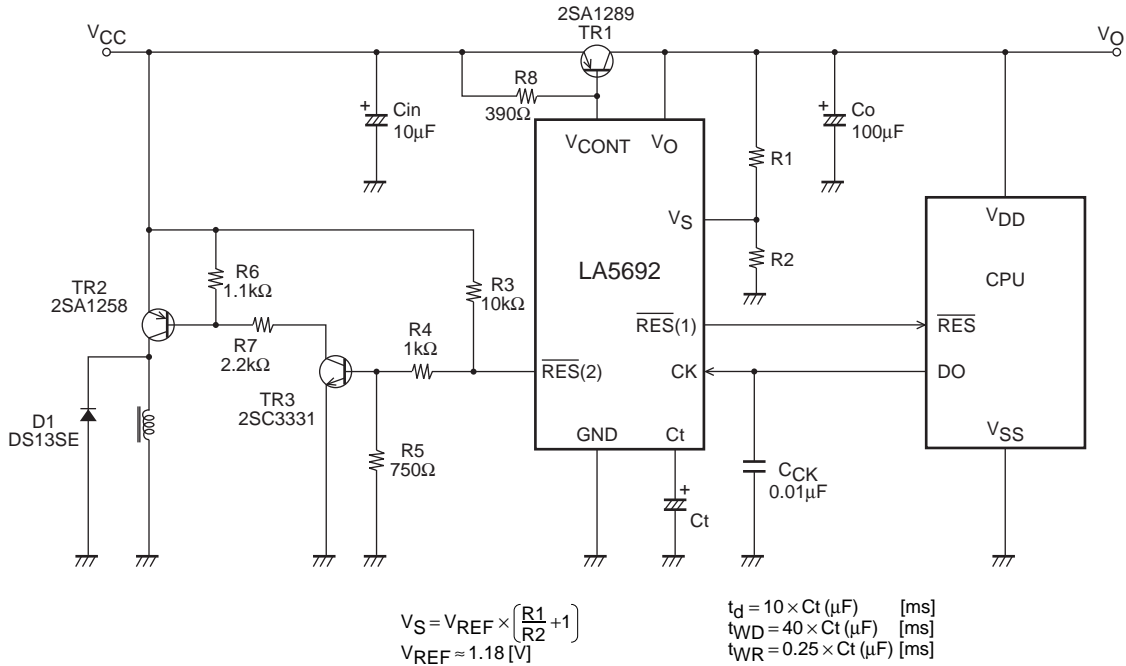


* RES(1) : Contains a pull-up resistor of 10kΩ.
 RES(2) : Open collector

Test Circuit



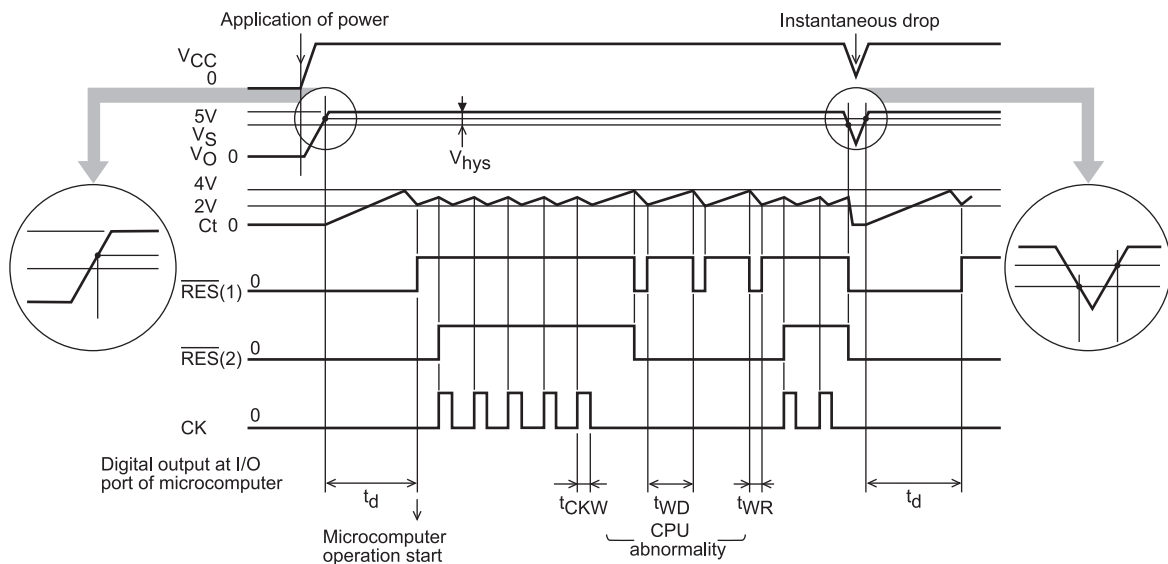
Sample Application Circuit



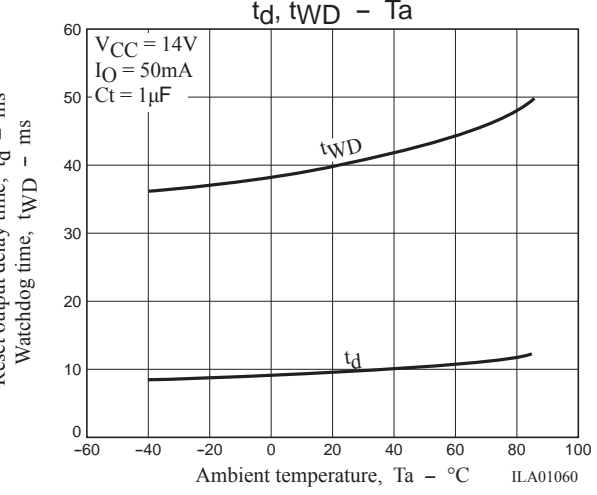
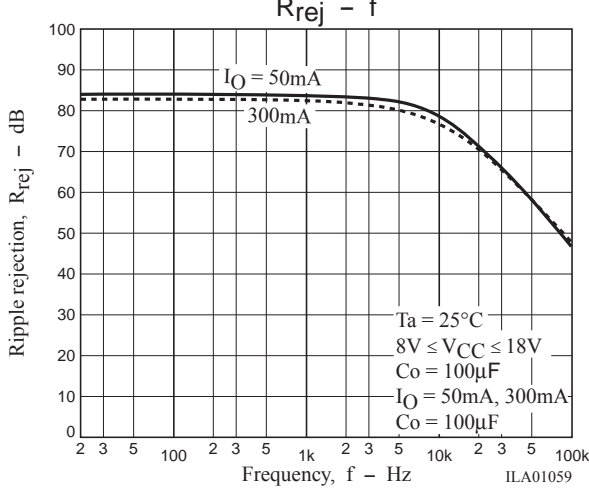
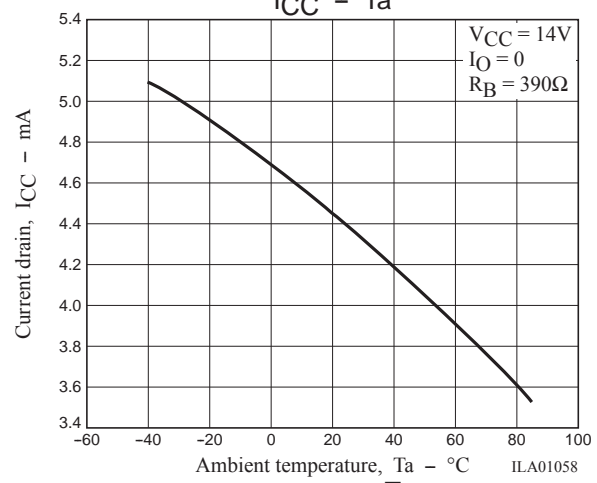
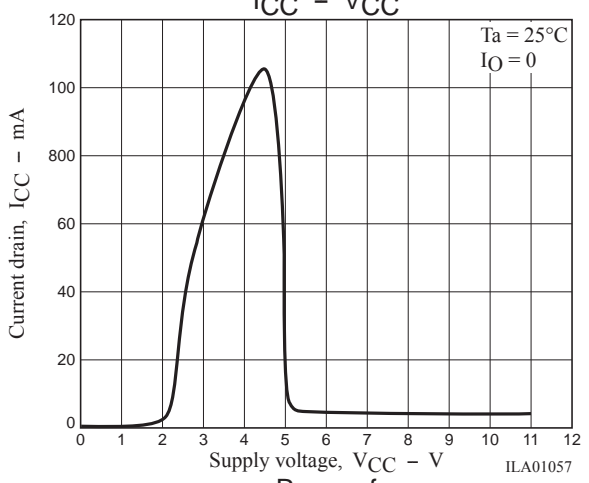
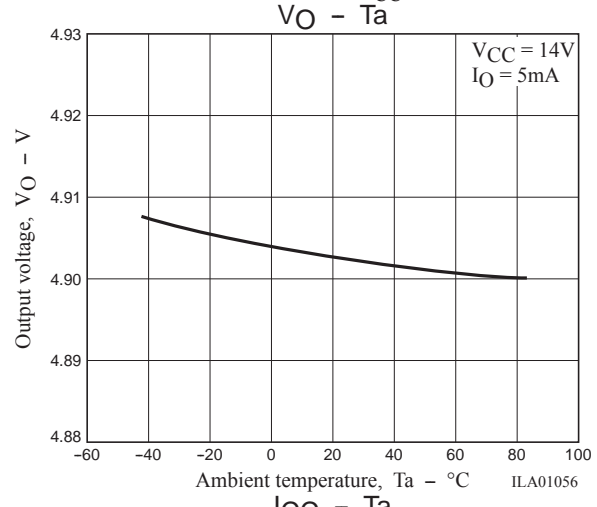
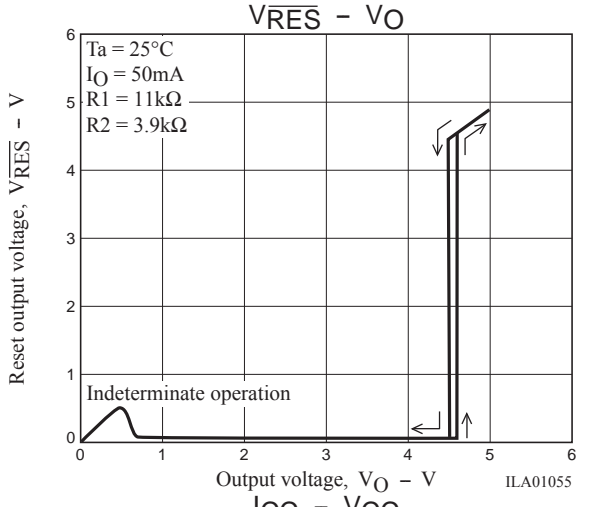
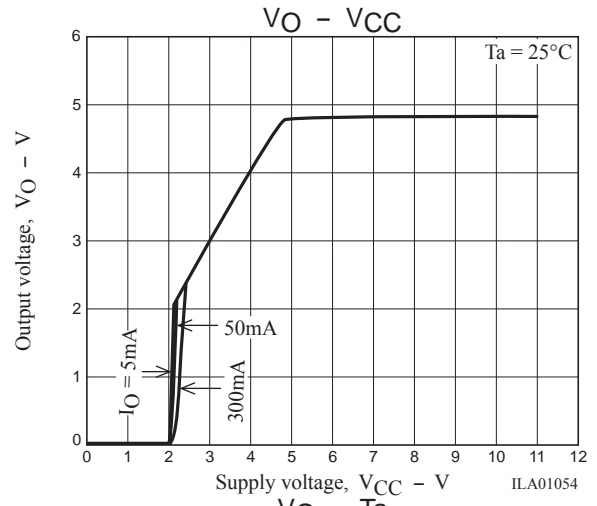
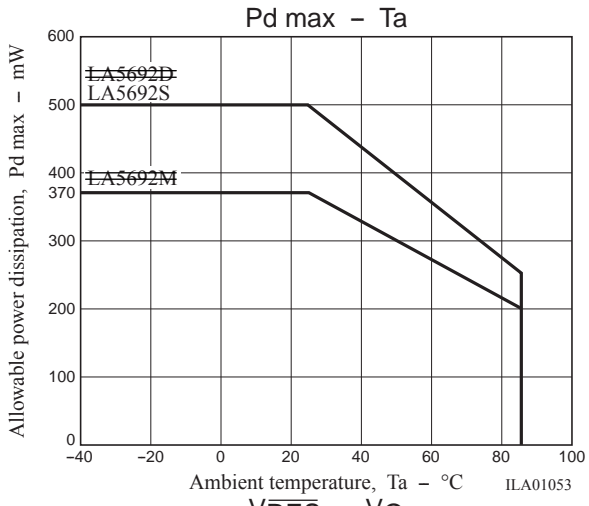
Note on application

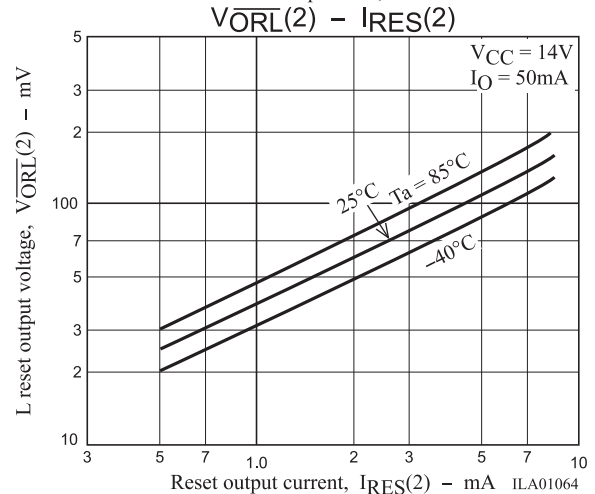
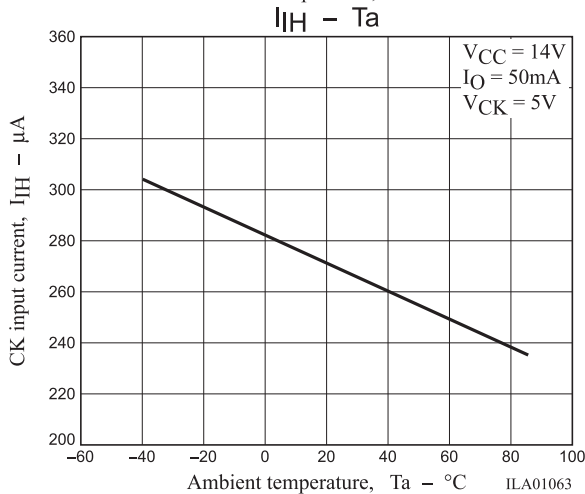
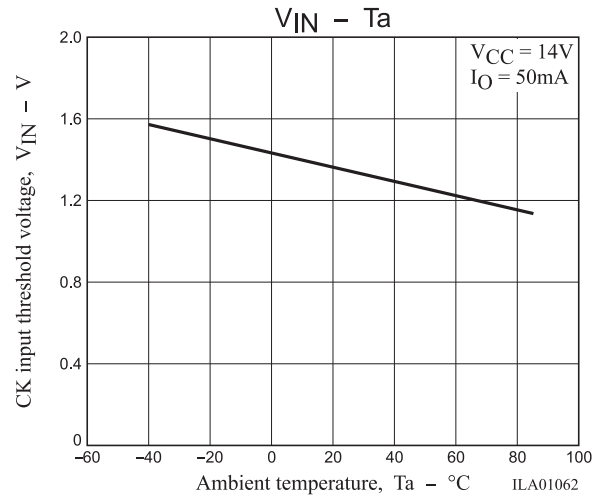
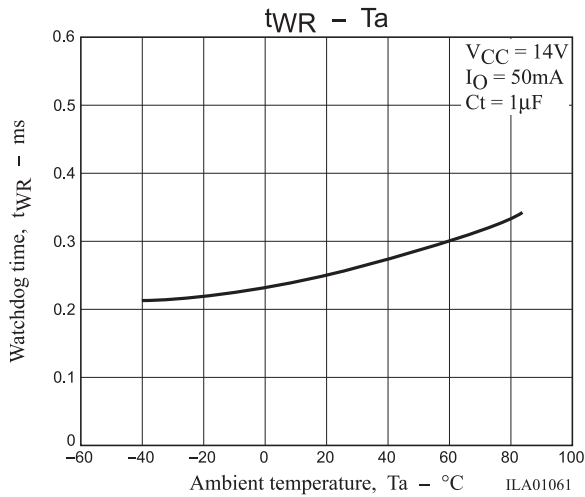
1. For stable operation, place C_{in} , C_O , and TR1 as near to the IC as possible.
2. When used in 0°C or below it, a capacitor of which impedance at high-frequency operation is low and has a good temperature characteristic (such as SANYO OS-CON capacitor or others) should be used to prevent oscillation.
3. Set V_S to the output voltage level where the circuit will be reset using external resistors R1 and R2. V_S should be set to 4V or greater due to internal circuit operation.
4. C_{CK} must be inserted to cut the high range element of clock noise to prevent it from becoming a reset output noise.
5. For C_t , a capacitor which less varies the capacitance according to the temperature should be used.

Timing Chart



Note : Edge-triggered at the point indicated by the arrow of C_K signal.





- SANYO Semiconductor Co.,Ltd. assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written consent of SANYO Semiconductor Co.,Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor Co.,Ltd. product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of June, 2008. Specifications and information herein are subject to change without notice.