

SANYO**LA7698****Color-Difference Signal
Correction IC for Color TVs****Overview**

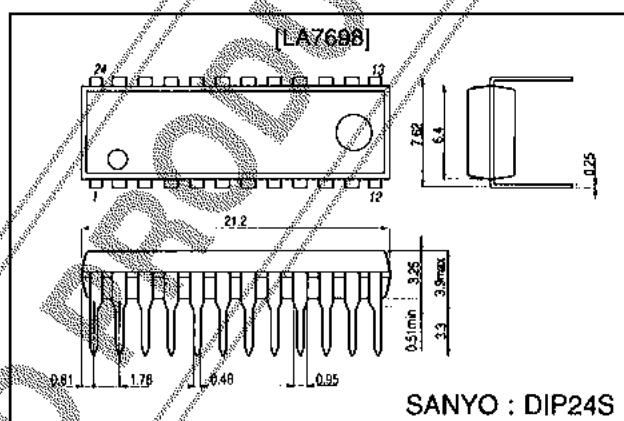
The LA7698 performs flesh-tone correction and green enhancement for color TV color-difference signals, and includes a color limiter function that prevents color saturation on the screen and color noise reduction (CNR) circuitry that eliminates color-difference output noise.

Functions and Features

- Flesh-tone correction, green enhancement, color limiter and CNR.
- The center axis of flesh-tone correction can be adjusted.
- Because green detection is performed through R-Y and B-Y detection, OSD green is not enhanced.
- The demo mode switch makes it possible to turn flesh-tone correction and green enhancement on and off for the left and right sides of the screen independently.
- The effectiveness of CNR can be adjusted through an external capacitor.

Package Dimensions

unit: mm

3067-DIP24S**Specifications****Maximum Ratings at Ta = 25°C**

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CCmax}		13	V
Allowable power dissipation	$Pd\ max$	$T_a \leq 65^\circ C$	700	mW
Operating temperature	T_{opr}		-15 to +65	°C
Storage temperature	T_{stg}		-55 to +150	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		9	V
Operating supply voltage range	V_{CCop}		8 to 10	V

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO 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 products described or contained herein.

SANYO Electric Co.,Ltd. Semiconductor Company

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

51595TH (II) No.3797-1/5

Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 9\text{ V}$

Parameter	Symbol	Conditions	min	typ	max	Unit	Note
Current consumption	I_{CC}		19	27	41	mA	*1,2
Output voltage	V_O	Pin 9 (H-BLK IN) = 2 V	5	5.25	5.5	V	*1,2
Output voltage difference	ΔV_O	Pin 9 (H-BLK IN) = 2 V		0	50	mV	*1,2
Output voltage variation	ΔV_{O-H}	INPUT C = 1 μF	-1	-0.1	0	mV	*1,2
Input/output gain	G_O	INPUT = Sin : 100 kHz	0.70	-0.35	-0.05	dB	*1,2
Input/output gain difference	ΔG_O	INPUT = Sin : 100 kHz		0	0.15	dB	*1,2
Frequency characteristics	F_O	Assuming 100 kHz as 0 dB, the frequency where a 3 dB decrease results	5			MHz	*1,2
Maximum output amplitude	E_{max}		4.1	4.7		Vp-p	*1,2
BLK threshold voltage	TH_{BLK}		1.0	1.4	1.6	V	*1,2
BLK minus allowable voltage	$-V_{BL}$		-0.7			V	*1,2
DEMO threshold voltage	TH_{DEMO}		3.5	3.7	3.9	V	*1,2
Color difference input voltage	$V_{IN, C-Y}$	Pin 9 (H-BLK IN) = 2 V	6.15	6.40	6.65	V	*1,2
Output voltage temperature characteristic	$\alpha V_O / \alpha T$	Pin 9 (H-BLK IN) = 2 V		0		mV/°C	*1,2
Variation for no green enhancement input	ΔV_{C-YG}	No input pin 11, 0 V/9 V	-10	0	+10	mV	*1
Maximum green enhancement level	ΔV_{G-YGM}	$P_{IN} = 227^\circ$, $E_{B-Y} = 2\text{ Vp-p}$, pin 11 = 9 V	200	225	245	mV	*1
	ΔV_{R-YGM}	$P_{IN} = 227^\circ$, $E_{B-Y} = 2\text{ Vp-p}$, pin 11 = 9 V	-245	-225	-200	mV	*1
Green enhancement range + 1	ΔV_{G-YG+}	$P_{IN} = 180^\circ$, $E_{B-Y} = 2\text{ Vp-p}$, pin 11 = 9 V	9	16	26	mV	*1
Green enhancement range + 2	ΔV_{R-YG+}	$P_{IN} = 180^\circ$, $E_{B-Y} = 2\text{ Vp-p}$, pin 11 = 9 V	-26	-16	-9	mV	*1
Green enhancement range - 1	ΔV_{C-YG-}	$P_{IN} = 270^\circ$, $E_{B-Y} = 2\text{ Vp-p}$, pin 11 = 9 V	5	10	18	mV	*1
Green enhancement range - 2	ΔV_{R-YG-}	$P_{IN} = 270^\circ$, $E_{B-Y} = 2\text{ Vp-p}$, pin 11 = 9 V	-18	-10	-5	mV	*1
Green enhancement starting amplitude	E_{B-YGS}	$P_{IN} = 227^\circ$, pin 11 = 9 V $\Delta V_{G-Y, G} = 5\text{ mV}$	0.36	0.45	0.75	Vp-p	*1
G OSD variation during green enhancement	ΔV_{GOSD}	Only G-Y $\pm 2\text{ V}$, pin 7 = 9 V		0	50	mV	*1
Flash-tone correction voltage variation	ΔV_{C-YF}	No input pin 12, 0 V/9 V	-10	0	+10	mV	*1
Flash-tone correction phase	$PAF-1$	$P_{IN} = 120^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	117	120	123	deg	*1
	$PAF-2$	$P_{IN} = 105^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = 1 V, pin 12 = 9 V	102	105	108	deg	*1
	$PAF-3$	$P_{IN} = 138^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = 6 V, pin 12 = 9 V	135	138	141	deg	*1
Maximum correction level + 1	ΔV_{B-YFM+}	$P_{IN} = 135^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	68	85	103	mV	*1
Maximum correction level + 2	ΔV_{R-YFM+}	$P_{IN} = 135^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	21	26	31	mV	*1
Maximum correction level - 1	ΔV_{B-YFM-}	$P_{IN} = 105^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	-120	-100	-80	mV	*1
Maximum correction level - 2	ΔV_{R-YFM-}	$P_{IN} = 105^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	-10	0	+10	mV	*1
Flash-tone correction range + 1	ΔV_{B-YF+}	$P_{IN} = 50^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	-10	0	+10	mV	*1
Flash-tone correction range - 1	ΔV_{B-YF-}	$P_{IN} = 200^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	-10	0	+10	mV	*1
Flash-tone correction range - 2	ΔV_{R-YF-}	$P_{IN} = 200^\circ$, $E_{B-Y} = 1\text{ Vp-p}$, pin 14 = open, pin 12 = 9 V	-10	0	+10	mV	*1
Flash-tone correction starting amplitude	E_{B-YFS}	$P_{IN} = 105^\circ$, pin 14 = open $\Delta V_{B-Y, F} = 5\text{ mV}$	0.1	0.2	0.35	Vp-p	*1
Limiter red detection level	E_{B-YRD}	$P_{IN} = 104^\circ$, pin 13 = 9 V, pin 15 = open	2.6	3.0	3.4	Vp-p	*1
Limiter magenta detection level	E_{B-YMD}	$P_{IN} = 61^\circ$, pin 13 = 9 V, pin 15 = open	1.7	2.0	2.3	Vp-p	*1

Continued on next page.

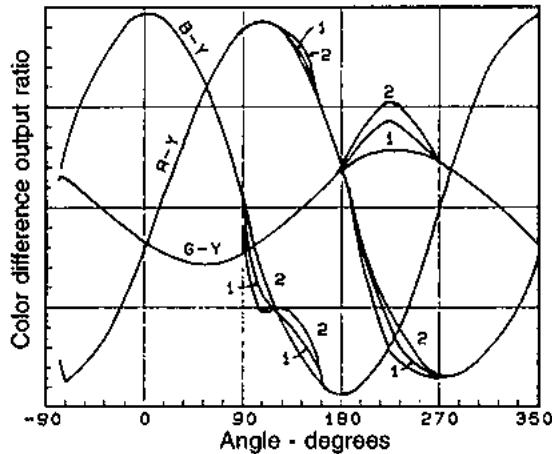
Continued from preceding page.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Note
Tracking magenta detection	$E_{B-Y} MDT$	$P_{IN} = 61^\circ$, pin 13 = 9 V, pin 15 = 3.4 V	2.9	3.3	3.7	Vp-p	*1
Limiter switch off voltage	$V_{CL OFF}$	$P_{IN} = 61^\circ$, $E_{B-Y} = 3$ Vp-p, pin 15 = open	0.4	0.6	0.8	V	*1
Green enhancement release voltage	$V_{GL OPEN}$	pin 11 open level	6.6	7.0	7.2	V	*1
Flesh-tone correction release voltage	$V_{FL OPEN}$	pin 12 open level	6.6	7.0	7.2	V	*1
Flesh-tone phase release voltage	$V_{FP OPEN}$	pin 14 open level	3.3	3.5	3.7	V	*1
CNR-ON voltage variation	$\Delta V_{C-Y CNR}$	No input pin 1 0 V/9 V	-10	0	+10	mV	
Maximum limiter amount	R-Y	$V_{CNR} = 9$ V, pin 23 = GND, pin 24 = 7 V V2 (+100 μ A) - V2 (-100 μ A)	600	715	785	mV	
	G-Y	$V_{CNR} = 9$ V, pin 23 = GND, pin 24 = 7 V V3 (+100 μ A) - V3 (-100 μ A)	285	340	370	mV	
	B-Y	$V_{CNR} = 9$ V, pin 23 = GND, pin 24 = 7 V V4 (+100 μ A) - V4 (-100 μ A)	600	715	785	mV	
Minimum limiter amount	R-Y	$V_{CNR} = 0$ V, pin 23 = GND, pin 24 = 7 V V2 (+100 μ A) - V2 (-100 μ A)		0		mV	
	G-Y	$V_{CNR} = 0$ V, pin 23 = GND, pin 24 = 7 V V3 (+100 μ A) - V3 (-100 μ A)		0		mV	
	B-Y	$V_{CNR} = 9$ V, pin 23 = GND, pin 24 = 7 V V4 (+100 μ A) - V4 (-100 μ A)		0		mV	
Maximum limiter level	G_{R-Ymax}	INPUT = 500 kHz, 2 Vp-p, $V_{CNR} = 9$ V, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-4.2		dB	
	G_{G-Ymax}	INPUT = 500 kHz, 1 Vp-p, $V_{CNR} = 9$ V, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-3.5		dB	
	G_{B-Ymax}	INPUT = 500 kHz, 2 Vp-p, $V_{CNR} = 9$ V, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-4.2		dB	
Minimum limiter level	G_{R-Ymin}	INPUT = 500 kHz, 0.2 Vp-p, $V_{CNR} = 0$ V, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-0.5		dB	
	G_{G-Ymin}	INPUT = 500 kHz, 0.1 Vp-p, $V_{CNR} = 0$ V, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-0.5		dB	
	G_{B-Ymin}	INPUT = 500 kHz, 0.2 Vp-p, $V_{CNR} = 0$ V, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-0.5		dB	
Normal limiter level	G_{R-Ytyp}	INPUT = 50 kHz, 2 Vp-p, $V_{CNR} =$ open, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-1.2		dB	
	G_{G-Ytyp}	INPUT = 50 kHz, 1 Vp-p, $V_{CNR} =$ open, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-0.6		dB	
	G_{B-Ytyp}	INPUT = 50 kHz, 2 Vp-p, $V_{CNR} =$ open, pin 23 = GND, pin 24 = 7 V, pin 1 = 9 V		-1.2		dB	
Color edge detection sensitivity	ΔV_{SCE}	Voltage difference between open voltage of pins 21 and 22 and edge detection	± 60	± 85	± 110	mV	
Y edge detection sensitivity	ΔV_{SYE}	Voltage difference between open voltage of pin 23 and edge detection	± 130	± 160	± 190	mV	
Y level detection voltage	V_{Ymin}	No edge detection $V_{CNT} = 9$ V	0.9	1.2	1.5	V	
Y level detection voltage	V_{Ymax}	No edge detection $V_{CNT} = 9$ V	3.6	3.9	4.2	V	
Limiter level control	V_{LCNT1}	Control voltage at which limiter amount is 50 mV	4.5	4.75	5.0	V	
Limiter level control	V_{LCNT2}	Control voltage which is -50 mV from maximum limiter amount	7.0	7.25	7.5	V	
Color edge filter voltage	$V_{EF OPEN}$	Open DC voltage of pins 21 and 22	4.65	4.9	5.15	V	
-Y differential input voltage	$V_{dY OPEN}$	Open DC voltage of pin 23	3.7	3.9	4.1	V	
Limiter control voltage	$V_{CNT OPEN}$	Open DC voltage of pin 1	5.8	6.0	6.2	V	
Limiter filter voltage	$V_{LF OPEN}$	Open DC voltage of pins 2, 3 and 4	3.95	4.2	4.45	V	

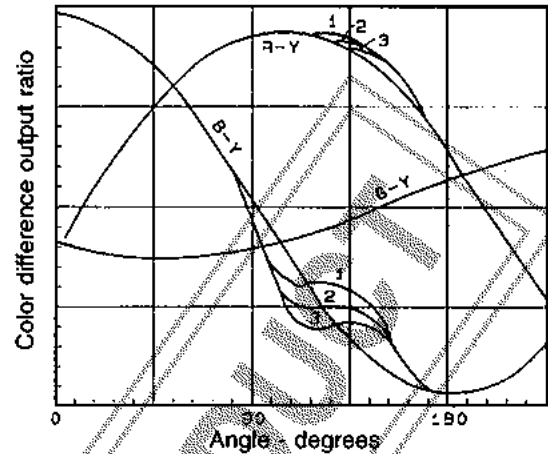
Notes: *1) When the CNR limiter level is at a minimum (pin 1 = 0 V)

*2) When both the green enhancement level and flesh-tone correction level are both at a minimum
(pin 11 = 0 V; pin 12 = 0 V)

Flesh-tone correction and green enhancement characteristics



Flesh-tone center adjustment



- Specifications of any and all SANYO 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 Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or 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 products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining 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 permission of SANYO Electric 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 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. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of May, 1995. Specifications and information herein are subject to change without notice.