

M52045FP

PAL Video Chroma Signal Processor

REJ03F0181-0201

Rev.2.01

Mar 31, 2008

Description

The M52045FP is a semiconductor integrated circuit for video signal processing that has been developed for PAL system liquid crystal (LCD) color TV. This IC has a built-in luminance signal processing circuit and color signal processing circuit, which is employed to convert a composite video signal to an RGB signal.

Features

- Low voltage and low power dissipation design
- Built-in Y/C separation circuit and external chroma trap switchable (f_c is nearly equal to 1.5 MHz)
- Built-in sync separation circuit
- Provided with Y-signal blanking function by HD pulse
- R.G.B. signal output
- Tint, contrast, picture quality and color control linearly adjustable
- 24-pin, shrink pitch, flat package employed
- Same package as in NTSC system video chroma IC M52042FP, pins perfectly compatible

Application

LCD color TV and LCD color view finder

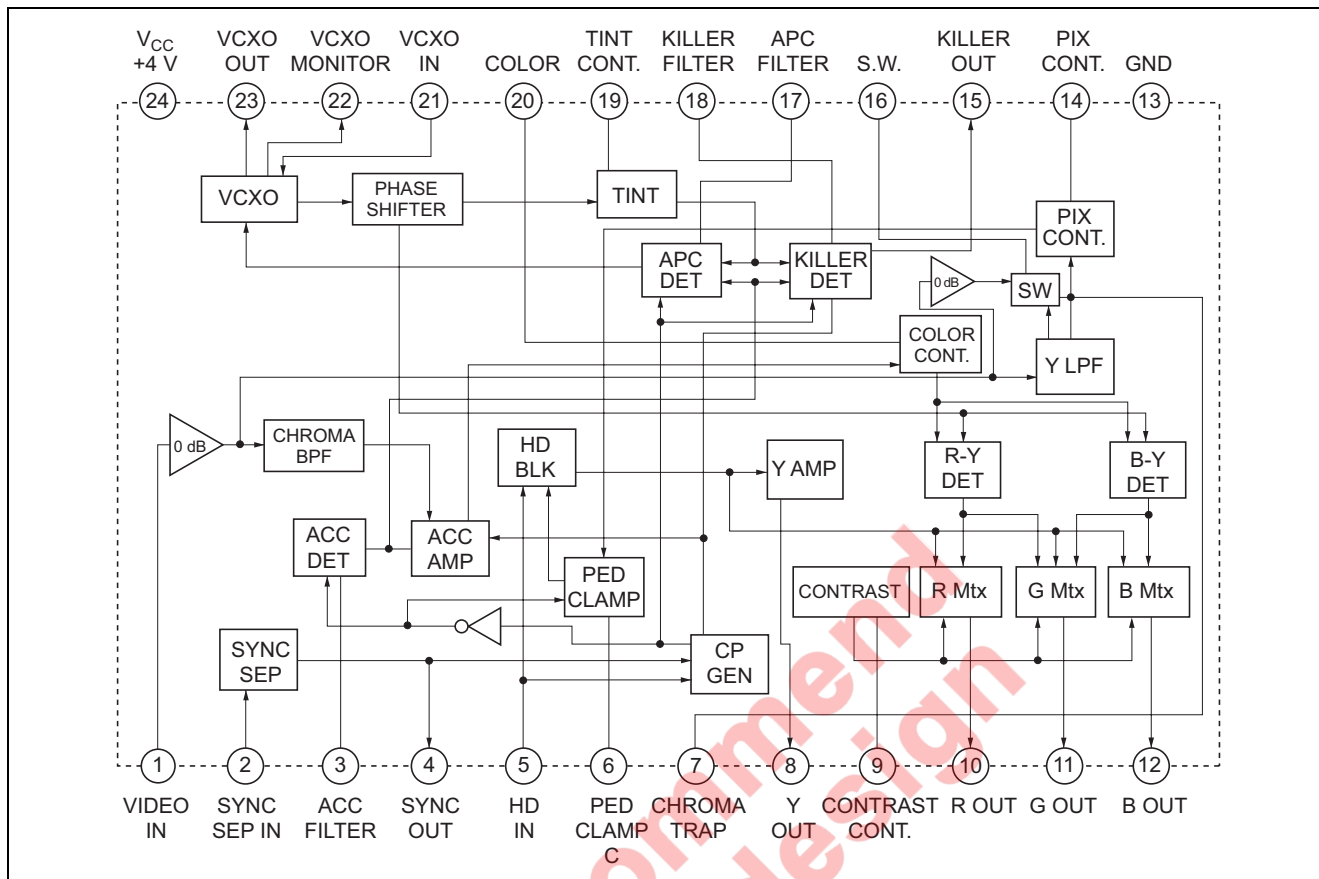
Recommended Operating Condition

Supply voltage range: 3.8 to 4.2 V

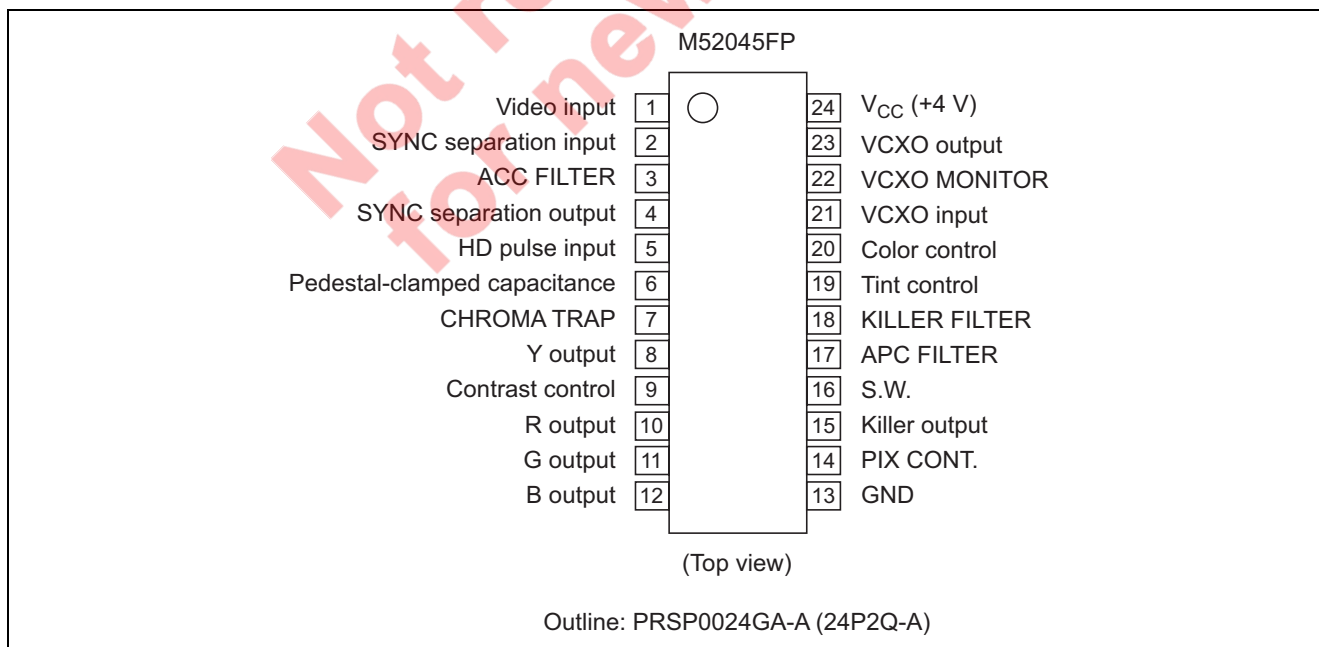
Rated supply voltage: 4.0 V

Not recommended
for new design

Block Diagram



Pin Arrangement



INTER	
UT (separation output)	

Pin No.	Name	Peripheral Circuit of Pins
6	PED CLAMP C (Pedestal-clamped capacitance)	
7	CHROMA TRAP	
8	Y OUT (Y output)	
9	CONTRAST CONT. (Contrast control)	
10	R OUT (R output)	
11	G OUT (G output)	
12	B OUT (B output)	
13	GND (Grounding)	—
24	V _{CC} +4 V (Power supply)	—

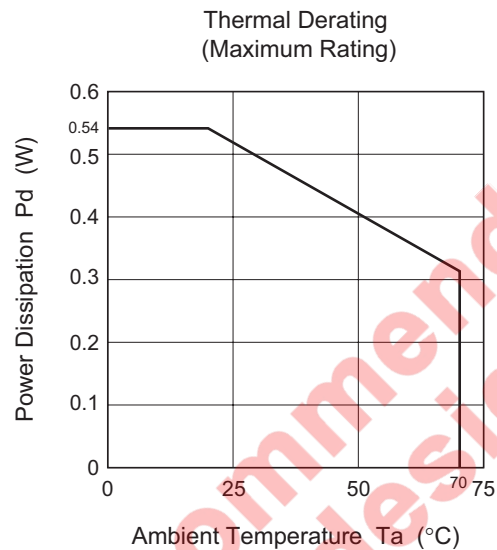
Pin No.	Name	Peripheral Circuit of Pins
16	S.W. (Selector switch)	
22	VCXO MONITOR	
14	PIX CONT. (Picture quality control)	
15	KILLER OUT (Killer output)	
17	APC FILTER	

Pin No.	Name	Peripheral Circuit of Pins
18	KILLER FILTER	
19	TINT CONT. (Tint control)	
20	COLOR (Color control)	
21	VCXO IN (VCXO input)	
23	VCXO OUT (VCXO output)	

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	4.5	V
Power dissipation	P_d	680	mW
Operating temperature	T_{opr}	-10 to 70	°C
Storage temperature	T_{stg}	-45 to 120	°C
Thermal derating	$K\theta$	5.4	mW/°C
Electrostatic capacity	V_{max}	$\pm 200^*$	V

Note: Charging capacitance: 200 pF

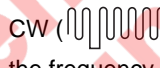


Electrical Characteristics

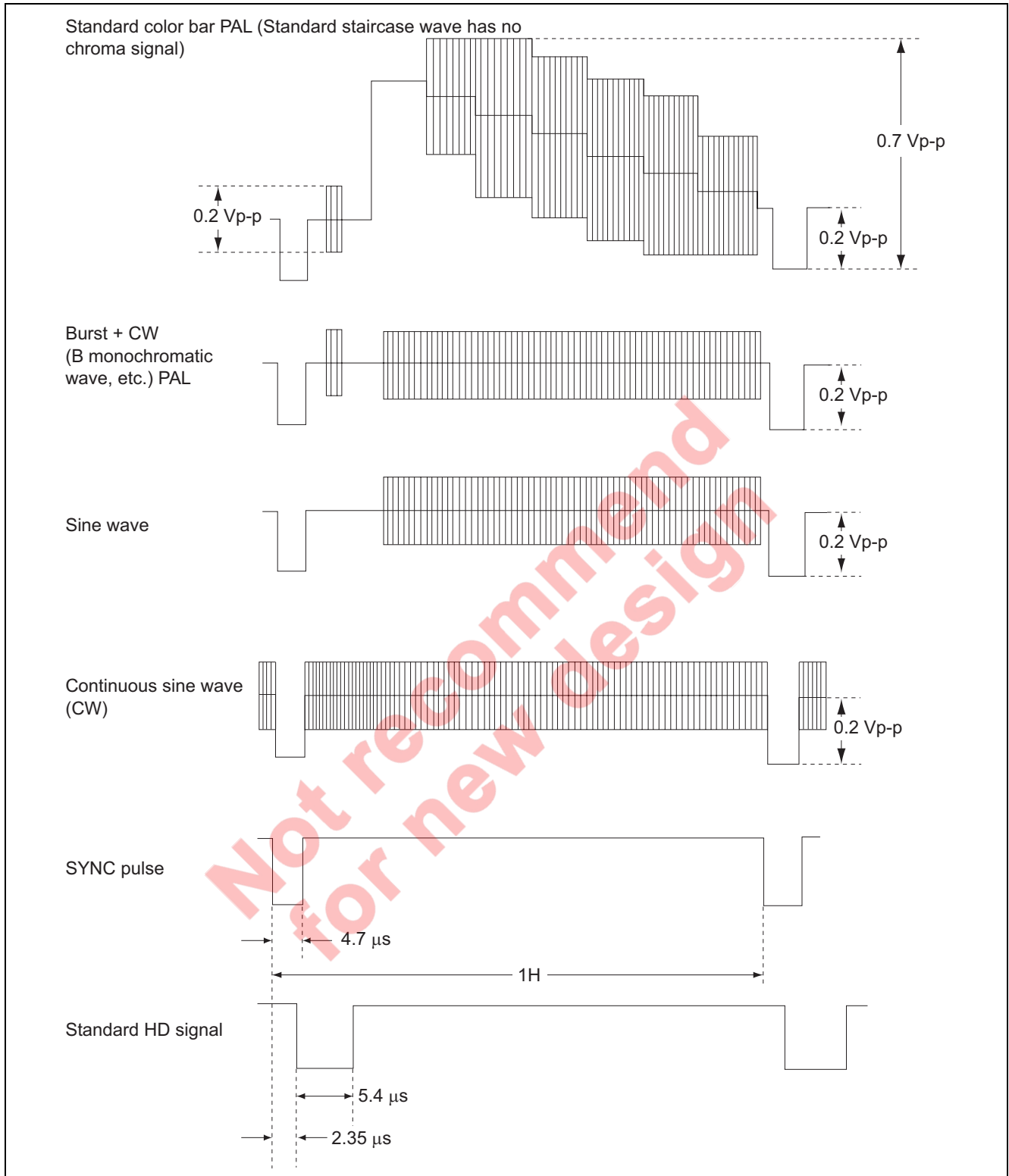
(Ta = 25°C, unless otherwise noted)

Item	Symbol	Min	Typ	Max	Unit	Test No.	Test Conditions
Circuit current	I _{cc}	—	17	21	mA	1	Input standard color bar signal of V _{CC} = 4 V.
SYNC SEP section							
SYNC tip voltage	Vsync 1	2.20	2.30	2.40	V	2	Measure each output signal SYNC tip voltage at pins (1), (7) when standard color bar signal of 0.7 Vp-p is input.
	Vsync 7	1.25	1.40	1.50			
SYNC output amplitude	Vsync H	2.7	3.1	3.4	Vp-p	3	Input only SYNC pulse of pulse width 4.7μs to pin (1). Measure the output amplitude at pin (4) when the input SYNC pulse amplitudes are 0.2 and 0.05 Vp-p.
	Vsync L	2.7	3.1	3.4			
SYNC output pulse width	Tsync H	3.7	4.7	5.7	μs	4	Input only SYNC pulse of pulse width 4.7μs to pin (1). Measure the output amplitude at pin (4) when the input SYNC pulse amplitudes are 0.2 and 0.05 Vp-p.
	Tsync L	3.7	4.7	5.7			
SYNC output pulse delay	Dsync H	3.7	4.7	6.0	μs	5	Input only SYNC pulse of pulse width 4.7μs to pin (1). Measure the pulse width + delay time when the input SYNC pulse amplitudes are 0.2 and 0.05 Vp-p.
	Dsync L	3.7	4.7	6.0			
Video section							
YLPF frequency characteristics (Pin (7))	VLPF (L)	1.45	1.55	—	MHz	6	Measure the frequency at which the sine wave output amplitude is -3 dB when the input signal ( 0.2 Vp-p) 0.2 Vp-p is input. Also measure the output gain at input sine wave 3.58 MHz.
	VLPF (H)	-30	-24	-21	dB		
Maximum output	Ymax	1.1	1.4	1.7	Vp-p	7	Input standard staircase wave of 0.7 Vp-p. Measure the output amplitude at pin (12) when V9 is 0 V.
Video amplifier gain	GYmax	4.0	6.0	8.0	dB	8	Input standard staircase wave of 0.7 Vp-p. Calculate the ratio between the output amplitude at pin (12) and input amplitude when V9 is 1.7 V.
Contrast control characteristics	Yctrast (1)	1.20	2.45	4.50	dB	9	Input standard staircase wave of 0.7 Vp-p, and calculate the ratio of the input amplitude to the output amplitude in Test No.8 above when V9 is changed to 1 V, 2.5 V and 3.5 V.
	Yctrast (2, 5)	-7.3	-5.0	-2.7			
	Yctrast (3, 5)	—	-30	-17			
PIX control characteristics	XPIX (4)	-3.5	-2.0	-0.5	dB	10	Input 1.5 MHz sine wave of 0.2 Vp-p to the input. Measure the output amplitude at pin (12) when V9 is 1.7 V, and V14 is charged to 2, 4 and 0 V and calculate the ratio between the input resectively and the output amplitude when V14 = 2 V.
	XPIX (0)	10.0	12.0	14.0	dB		
Y AMP gain	GYamp	9.1	11.0	12.6	dB	11	Input standard staircase wave of 0.7 Vp-p and calculate the ratio between the output amplitudes at pin (8) and input amplitude.
PED offset level	Vped	0.00	0.05	0.06	—	12	With input SYNC pulse at 0.2 Vp-p, measure pin (12) output pedestal offset and calculate ratio of the offset to that when 0.7 Vp-p standard staircase is input.

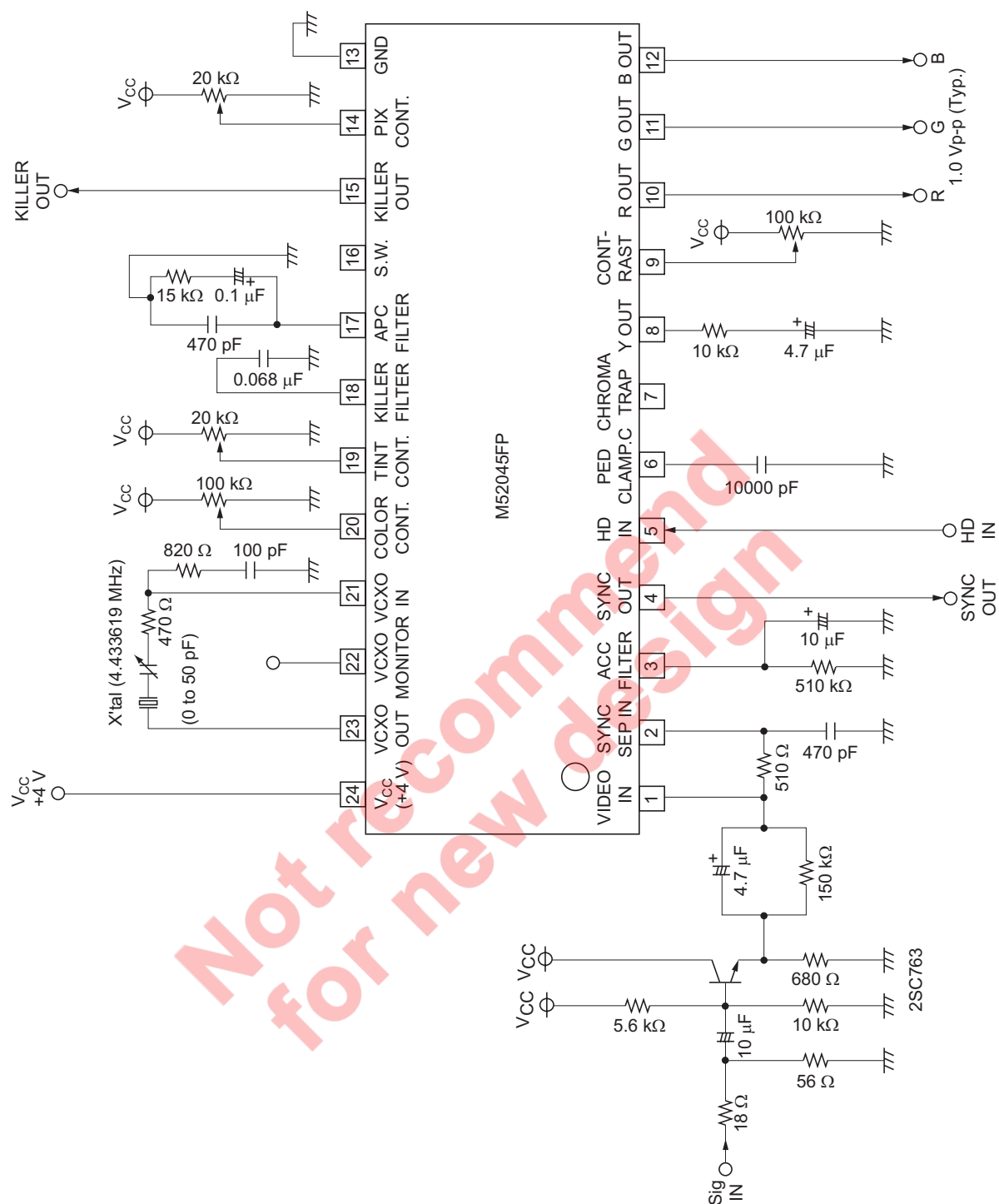
Electrical Characteristics (cont.)

Item	Symbol	Min	Typ	Max	Unit	Test No.	Test Conditions
Chroma section							
Acc control characteristics	Cacc (+4)	0	0.7	1.5	dB	14	Input burst 0.2 Vp-p + CW 4.33 MHz shall be 0 dB. Measure the output at pin (12) when the input is changed to +4 dB and -20 dB, and calculate the ratio of the measured amplitude to the output amplitude at 0 dB.
	Cacc (-20)	-6.0	-2.0	0			
Killer operation	Ckilor	-54	-50	-42	dB	15	Input a chroma signal of 0.2 Vp-p to the input. Reduce the amplitude and measure the amplitude ratio when the voltage at pin (15) exceeds 2.5 V.
Color control characteristics	Cast (4)	2.0	2.2	4.5	dB	16	Input burst 0.2 Vp-p + CW 4.33 MHz, change V20 to 2 V, 4 V, 3 V, 1 V and 0.5 V to measure each output (100 kHz beat) amplitude at pin (12), and calculate the ratio between the measured amplitude and the output amplitude at V20 = 1 V.
	Cast (3)	1.5	2.0	4.0			
	Cast (1)	-8.5	-6	-4			
	Cast (0, 5)	-17	-13	-10			
APC pull-in range	Δ fapc	+350	+600	—	Hz	17	Input only SYNC, and after adjusting free run, input 0.2 Vp-p CW ( , then change the frequency. Measure the frequency when VCXO oscillator is placed in a locked condition from the free-run condition.
		—	-600	-400			
B demodulator sensitivity	DB	0.8	1.2	1.6	Vp-p	18	Input CW 4.33 MHz of 0.2 Vp-p to the input, and measure the output amplitude at pin (12) when V20 = 1 V.
Demodulated out put voltage ratio	R (R/B)	0.46	0.52	0.60	—	19	Input CW 4.33 MHz of 0.2 Vp-p to the input, measure the output amplitude at pins (10), (11) when V20 = 1 V, and calculate the ratio of the measured amplitude to the output amplitude in Test No.18 above.
	R (G/B)	0.20	0.30	0.40			
Killer output voltage H	Vkiller H	2.5	3.2	—	V	21	Measure DC voltage at pin (15) when 0 V and 4 V are applied to pin (18).
Killer output voltage L	Vkiller L	—	0.20	0.40			
HD for chroma delay	Dhd	—	2.0	2.2	μ s	22	Apply B monochromatic wave 0.4 Vp-p and burst 0.2 Vp-p to the input. Measure the delay time from HD pulse rise to the chroma rise of pin (12) output.
IDENT characteristics	ID	—	—	—	—	23	The IDENT (identification) characteristics should be not higher than the killer level.

Input Signal

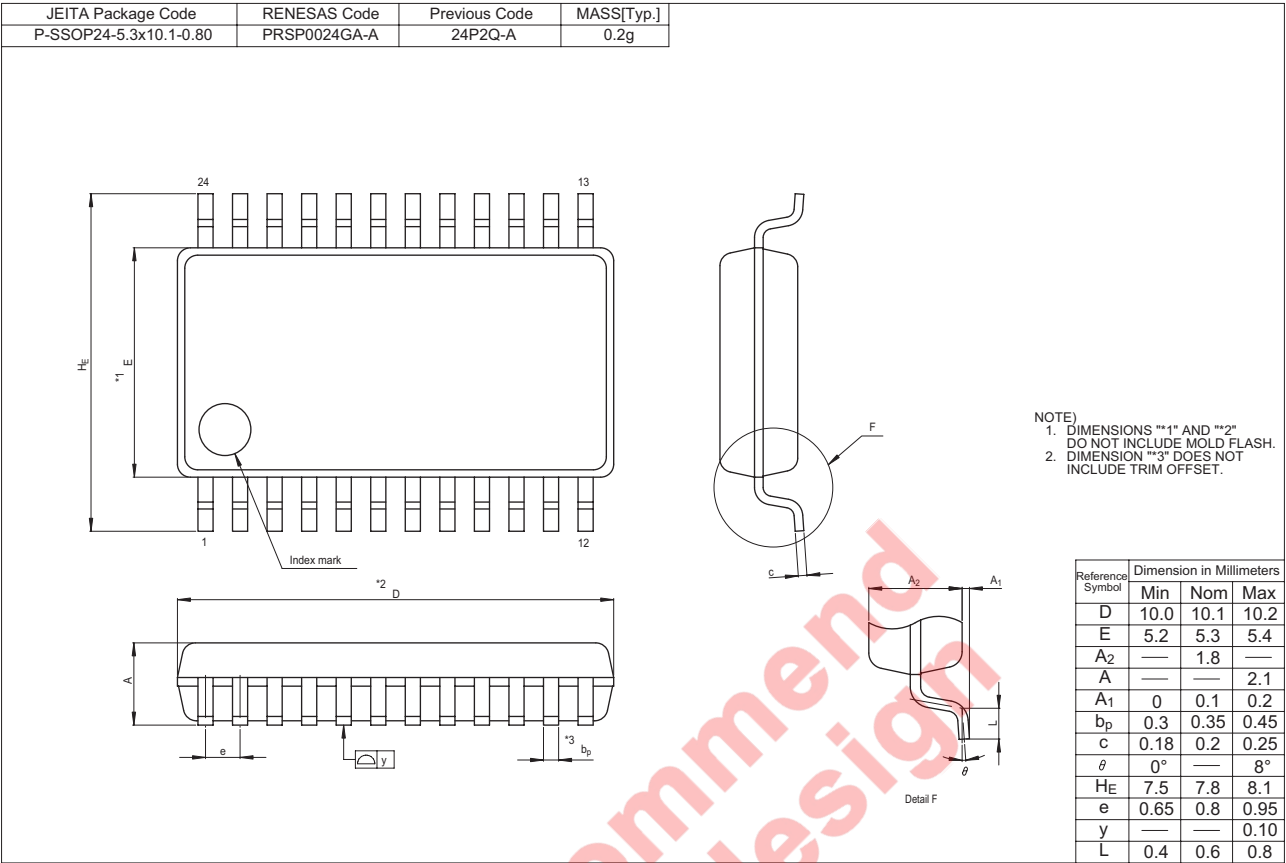


Test Circuit



Note : The evaluation of the above application circuit should be performed with great care, because APC characteristics, etc. differ considerably according to crystal characteristics and board pattern.

Package Dimensions



Notes:

1. This document is provided for reference purposes only so that Renesas customers may select the appropriate Renesas products for their use. Renesas neither makes warranties or representations with respect to the accuracy or completeness of the information contained in this document nor grants any license to any intellectual property rights or any other rights of Renesas or any third party with respect to the information in this document.
2. Renesas shall have no liability for damages or infringement of any intellectual property or other rights arising out of the use of any information in this document, including, but not limited to, product data, diagrams, charts, programs, algorithms, and application circuit examples.
3. You should not use the products or the technology described in this document for the purpose of military applications such as the development of weapons of mass destruction or for the purpose of any other military use. When exporting the products or technology described herein, you should follow the applicable export control laws and regulations, and procedures required by such laws and regulations.
4. All information included in this document such as product data, diagrams, charts, programs, algorithms, and application circuit examples, is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas products listed in this document, please confirm the latest product information with a Renesas sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas such as that disclosed through our website. (<http://www.renesas.com>)
5. Renesas has used reasonable care in compiling the information included in this document, but Renesas assumes no liability whatsoever for any damages incurred as a result of errors or omissions in the information included in this document.
6. When using or otherwise relying on the information in this document, you should evaluate the information in light of the total system before deciding about the applicability of such information to the intended application. Renesas makes no representations, warranties or guarantees regarding the suitability of its products for any particular application and specifically disclaims any liability arising out of the application and use of the information in this document or Renesas products.
7. With the exception of products specified by Renesas as suitable for automobile applications, Renesas products are not designed, manufactured or tested for applications or otherwise in systems the failure or malfunction of which may cause a direct threat to human life or create a risk of human injury or which require especially high quality and reliability such as safety systems, or equipment or systems for transportation and traffic, healthcare, combustion control, aerospace and aeronautics, nuclear power, or undersea communication transmission. If you are considering the use of our products for such purposes, please contact a Renesas sales office beforehand. Renesas shall have no liability for damages arising out of the uses set forth above.
8. Notwithstanding the preceding paragraph, you should not use Renesas products for the purposes listed below:
 - (1) artificial life support devices or systems
 - (2) surgical implantations
 - (3) healthcare intervention (e.g., excision, administration of medication, etc.)
 - (4) any other purposes that pose a direct threat to human lifeRenesas shall have no liability for damages arising out of the uses set forth in the above and purchasers who elect to use Renesas products in any of the foregoing applications shall indemnify and hold harmless Renesas Technology Corp., its affiliated companies and their officers, directors, and employees against any and all damages arising out of such applications.
9. You should use the products described herein within the range specified by Renesas, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas shall have no liability for malfunctions or damages arising out of the use of Renesas products beyond such specified ranges.
10. Although Renesas endeavors to improve the quality and reliability of its products, IC products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other applicable measures. Among others, since the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
11. In case Renesas products listed in this document are detached from the products to which the Renesas products are attached or affixed, the risk of accident such as swallowing by infants and small children is very high. You should implement safety measures so that Renesas products may not be easily detached from your products. Renesas shall have no liability for damages arising out of such detachment.
12. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written approval from Renesas.
13. Please contact a Renesas sales office if you have any questions regarding the information contained in this document, Renesas semiconductor products, or if you have any other inquiries.



RENESAS SALES OFFICES

<http://www.renesas.com>

Refer to "<http://www.renesas.com/en/network>" for the latest and detailed information.

Renesas Technology America, Inc.

450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

Renesas Technology Hong Kong Ltd.

7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2377-3473

Renesas Technology Taiwan Co., Ltd.

10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

Renesas Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510