

Notification about the transfer of the semiconductor business

The semiconductor business of Panasonic Corporation was transferred on September 1, 2020 to Nuvoton Technology Corporation (hereinafter referred to as "Nuvoton"). Accordingly, Panasonic Semiconductor Solutions Co., Ltd. became under the umbrella of the Nuvoton Group, with the new name of Nuvoton Technology Corporation Japan (hereinafter referred to as "NTCJ").

In accordance with this transfer, semiconductor products will be handled as NTCJ-made products after September 1, 2020. However, such products will be continuously sold through Panasonic Corporation.

Publisher of this Document is NTCJ.

If you would find description "Panasonic" or "Panasonic semiconductor solutions", please replace it with NTCJ.

※ Except below description page

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

Nuvoton Technology Corporation Japan

DATA SHEET

Part No.	MN34595PL
Package Code No.	WQFN042-C-0809A

Contents

- Overview 3
- Features 3
- Applications 3
- Device Parameters 4
- Device Structure 4
- Pin Arrangement 5
- Pin Descriptions 6
- Electrical Characteristics 7

MN34595PL

CCD Image Sensor

■ Overview

This MN34595PL is a Type-1/2.33" 16.2 mega pixel CCD image sensor suitable for applications such as image input of high resolution digital still cameras systems.

R,G, B primary color mosaic filters are used as the color filters, and at the same time high sensitivity are achieved through the adoption.

■ Features

- Type-1 / 2.33" 16.2 mega pixel CCD image sensor
- Image size : Type 1/2.33
- Unit cell size : 1.335 μm \times 1.335 μm
- Effective pixels : 4.656 \times 3.480
- Horizontal drive frequency : 45.0 MHz
- Aspect : 4:3
- Principle incident ray angle: -4° (Designed value)
- Readout modes

Frame readout mode1	: 8 field readout and horizontal 4-division transfer method	: 1.85 frame/s
Monitor mode2	: Vertical 2/8-line readout 4-pixels mixing and horizontal 2-pixels mixing	: 30.0 frame/s
Monitor mode3	: Vertical 2/16-line readout 2-pixels mixing and horizontal 4-pixels mixing	: 60.1 frame/s
Monitor mode4 (Low Power)	: Vertical 4/8-line readout 4-pixels mixing and horizontal 2-pixels mixing	: 30.0 frame/s , 22.5 MHz
8PD mix mode (monitor/720p)	: Vertical 4-pixels mixing and horizontal 2-pixels mixing	: 30.0 frame/s
8PD mix mode(still)	: Vertical 4-pixels mixing and horizontal 2-pixels mixing	: 26.68 frame/s
4PD mix still mode	: 4 field readout vertical 2-pixels mixing and horizontal 2-pixels mixing	: 6.89 frame/s

■ Applications

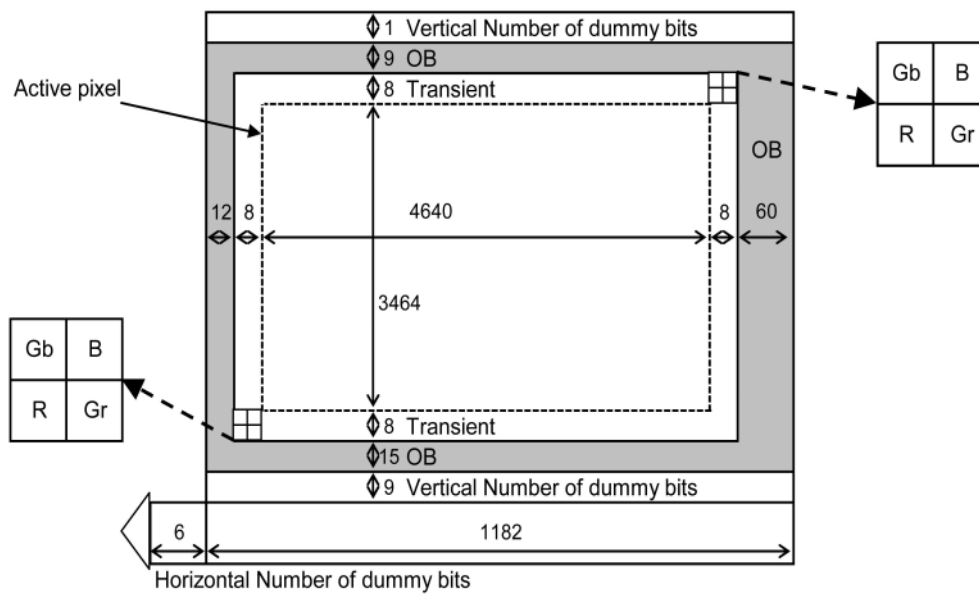
- Digital still camera

■ Device Parameters

Item	Value	Unit	Notes
Total number of pixels	4,728 (H) × 3,504 (V) = 16,566,912	pixels	—
Number of effective pixels	4,656 (H) × 3,480 (V) = 16,202,880	pixels	—
Number of active pixels	4,640 (H) × 3,464 (V) = 16,072,960	pixels	—
Number of recommend recording pixels	4,632 (H) × 3,456 (V) = 16,008,192	pixels	—
Optical black	Horizontal (H) direction: Front 12 pixels, rear 60 pixels Vertical (V) direction: Front 15 pixels, rear 9 pixels	—	—
Number of dummy bits	Horizontal (H) direction: Front 6 pixels Vertical (V) direction: Front 9 pixels, rear 9 pixels	—	—
Unit cell size	1.335 (H) × 1.335 (V)	μm ²	—
Actual imaging area dimensions	6.194 (H) × 4.624 (V)	mm ²	—
Image size	7.730	mm	—

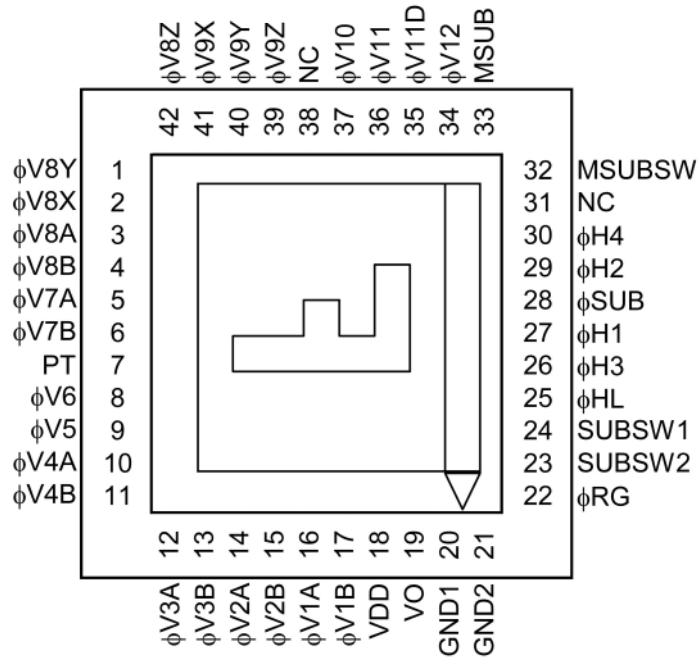
Note) Please do not use contiguity optical black 3bits. (an effective pixel side.)

■ Device Structuer



■ Pin Arrangement

(Top view)



■ Pin Descriptions

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	ϕ V8Y	Vertical CCD	22	ϕ RG	Reset gate
2	ϕ V8X	Vertical CCD	23	SUBSW2	Sub control 2
3	ϕ V8A	Vertical CCD	24	SUBSW1	Sub control 1
4	ϕ V8B	Vertical CCD	25	ϕ HL	Last horizontal CCD *1
5	ϕ V7A	Vertical CCD	26	ϕ H3	Horizontal CCD
6	ϕ V7B	Vertical CCD	27	ϕ H1	Horizontal CCD *1
7	PT	Protecting P well	28	ϕ SUB	Substrate
8	ϕ V6	Vertical CCD	29	ϕ H2	Horizontal CCD
9	ϕ V5	Vertical CCD	30	ϕ H4	Horizontal CCD
10	ϕ V4A	Vertical CCD	31	N.C.	— *2
11	ϕ V4B	Vertical CCD	32	MSUBSW	MSUB sub control
12	ϕ V3A	Vertical CCD	33	MSUB	Substrate output for pixel mix mode
13	ϕ V3B	Vertical CCD	34	ϕ V12	Vertical CCD
14	ϕ V2A	Vertical CCD	35	ϕ V11D	Vertical CCD
15	ϕ V2B	Vertical CCD	36	ϕ V11	Vertical CCD
16	ϕ V1A	Vertical CCD	37	ϕ V10	Vertical CCD
17	ϕ V1B	Vertical CCD	38	N.C.	— *2
18	VDD	Power supply	39	ϕ V9Z	Vertical CCD
19	VO	Video output	40	ϕ V9Y	Vertical CCD
20	GND1	GND	41	ϕ V9X	Vertical CCD
21	GND2	GND	42	ϕ V8Z	Vertical CCD

Note) *1: Please supply ϕ HL and ϕ H1 from the independent driver circuit.

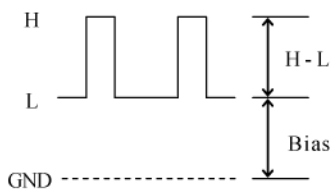
*2: Please fix to GND (0V) when not making it to OPEN in the circuit configuration.

■ Electrical Characteristics

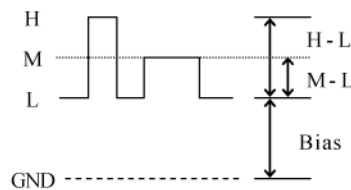
Symbols		Operating conditions			Unit	Notes
		Min	Typ	Max		
VDD		12.7	13.0	13.3	V	—
PT		-6.3	-6.0	-5.7	V	—
GND1, GND2		—	0.0	—	V	—
φRG	H - L	3.14	3.3	3.46	V	*1
	Bias	(Internal bias)			V	
φSUB	Bias	(Internal bias)			V	*2
	H - L	22.4	—	24.5	V	
	M - L	(Internal bias) (*5)			V	
SUBSW1, SUBSW2 MSUBSW	H	1.72	—	3.46	V	*3
	L	-0.2	0.0	0.2	V	
φHL	H	3.14	3.3	3.46	V	
	L	-0.2	0.0	0.2	V	
φH1, φH2, φH3, H4	H	1.94	2.0	3.46	V	
	L	-0.2	0.0	0.2	V	
φV1A, φV1B, φV2A, φV2B φV3A, φV3B, φV4A, φV4B φV5, φV6, φV7A, φV7B φV8A, φV8B, φV11D	H	12.7	13.0	13.3	V	*4
	M	-0.2	0.0	0.2	V	
	L	-6.3	-6.0	-5.7	V	
φV8X, φV8Y, φV8Z φV9X, φV9Y, φV9Z φV10, φV11, φV12	M	-0.2	0.0	0.2	V	
	L	-6.3	-6.0	-5.7	V	

Note) Driving voltage value of the above table indicates the voltage value in each terminal of the image sensor.

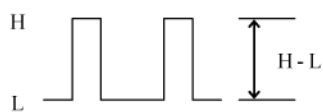
*1: Reset gate (φRG)



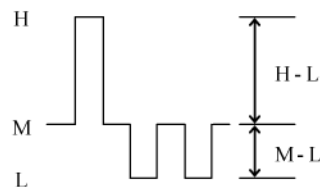
*2: φSUB, MSUB



*3: Horizontal CCD (φHL, φH1, φH2, φH3, φH4)
SUBSW1, SUBSW2
MSUBSW



*4: Vertical CCD (φV1 to φV12)



*5: The φSUB (M - L) is made by VMSUB - VL. Please set to VL = -6.0 V.

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

- (1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.
- (2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation, Nuvoton Technology Corporation Japan or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information de-scribed in this book.
- (3) The products described in this book are intended to be used for general applications (such as office equipment, communications equipment, measuring instruments and household appliances), or for specific applications as expressly stated in this book.
Please consult with our sales staff in advance for information on the following applications, moreover please exchange documents separately on terms of use etc.: Special applications (such as for in-vehicle equipment, airplanes, aerospace, automotive equipment, traffic signaling equipment, combustion equipment, medical equipment and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
Unless exchanging documents on terms of use etc. in advance, it is to be understood that our company shall not be held responsible for any damage incurred as a result of or in connection with your using the products described in this book for any special application.
- (4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
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. We do not guarantee quality for disassembled products or the product re-mounted after removing from the mounting board.
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.
- (7) When reselling products described in this book to other companies without our permission and receiving any claim of request from the resale destination, please understand that customers will bear the burden.
- (8) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of our company.