

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

Send any inquiries to <http://www.renesas.com/inquiry>.

Notice

1. All information included in this document 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 Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
 - "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
 - "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
 - "Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics 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 appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

M56710FP

F2F Magnetic Stripe Encoding Card Reader

REJ03F0175-0201

Rev.2.01

Mar 31, 2008

Description

The M56710FP is a semiconductor integrated circuit of Bi-CMOS structure having an F2F demodulator function for magnetic card reader.

Features

- Low current dissipation (0.7 mA when on standby as a standard)
- Provided with glance-over selection input (4, 8, and 16 bits)
- Provided with output polarity ("L" active or "H" active) switching input
- Miniature mini-mold package
- Wide operating temperature range $T_a = -20$ to 75°C

Application

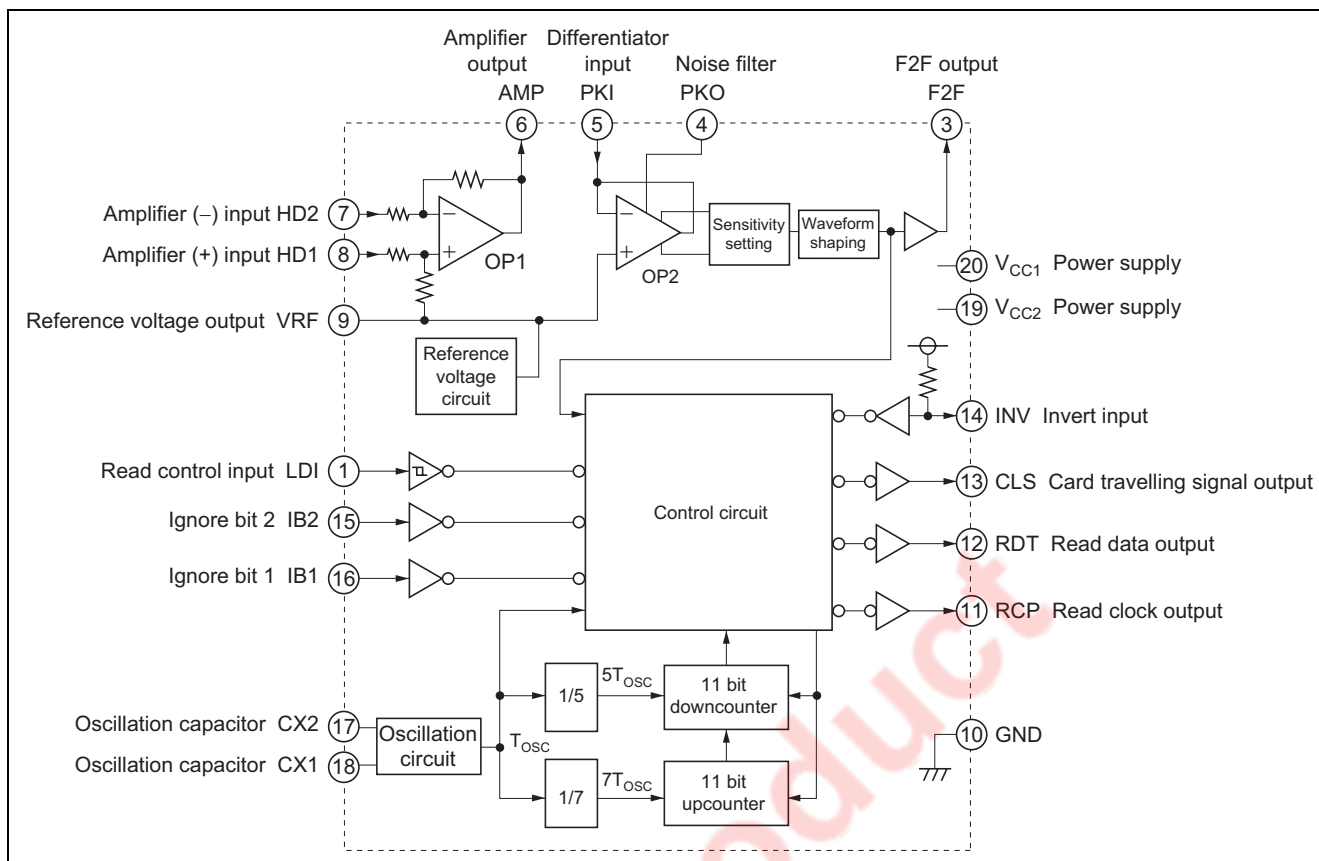
Magnetic card reader

Functional Description

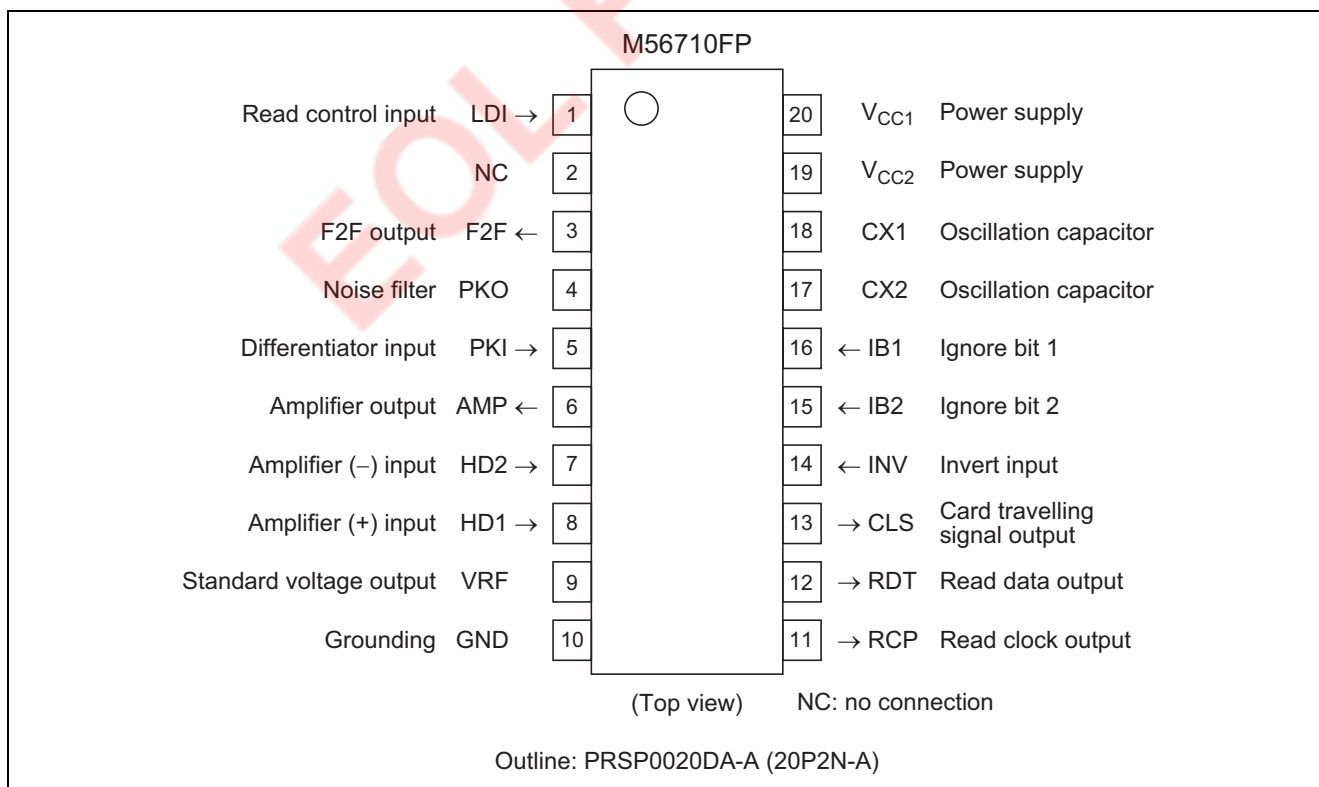
Data signal which is read from magnetic card via magnetic head is input from HD2 and HD1 pins., and converted into F2F pattern signal by analog processing in amplifier OP1, differentiator OP2, sensitivity setting circuit and waveform shaping circuit. If F2F signal is input, the logic section glances over the prescribed number of bits set by IB1 and IB2 input before performing digital processing, and then outputs card reading signal CLS, read clock signal RCP, and read data signal RDT. INV turning to "L" switches each output of CLS. RCP and RDT from "L" active to "H" active.

- Standard Bits:
Let the number of glance-over bits set by IB1 and IB2 be M.
Let the Mth FC (flux change) through M+1st FC after LDI input is turned from "L" to "H" be a standard bit with a time width of T_{B0} .
I/O is discriminated from the next bit to this standard bit as a data bit.
- I/O discrimination
Let the data bit time width of a data bit be T_{Bn} , and if there is one next FC between the FC at the end of that bit (i.e. the beginning of the next bit) to $5/7T_{Bn}$, let the next bit (B_{n+1}) be data "1", and, if there is no FC, be data "0".
- Output signal time width
When letting the oscillation cycle of oscillation circuit be T_{OSC} .
— RCP output pulse width TOW: about $16 T_{OSC}$
— RCP delay time to RDT: about $8 T_{OSC}$

Block Diagram

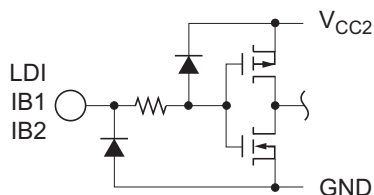


Pin Arrangement

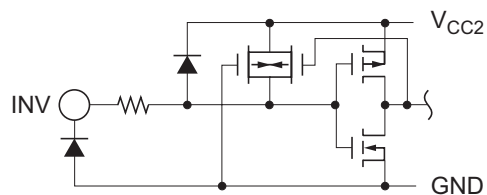


I/O Circuit

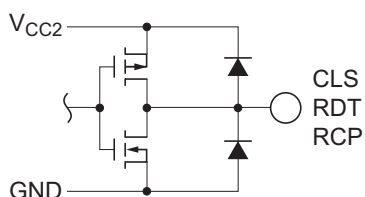
1. LDI, IB1, IB2 input circuit



2. INV input circuit



3. CLS, RDT, RCP output circuit



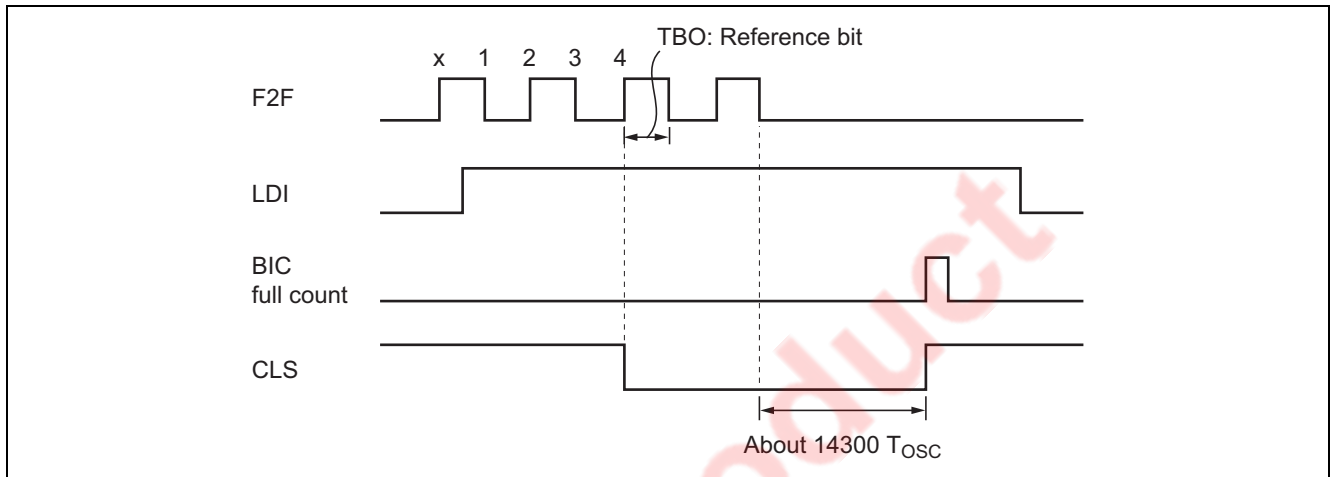
Pin Function Description

Pin No.	Pin Name	Name	Function
1	LDI	Read control input	Schmidt trigger input. At "L", reset the internal digital circuit. At "H", F2F modulation is possible.
3	F2F	F2F output	F2F signal output that has amplified, differentiated and further waveform-shaped the magnetic head signal.
4	PKO	Noise filter	Connect noise removing capacitor CNF between PKI and PKO.
5	PKI	Differentiator input	Refer to PKO and AMP.
6	AMP	Amplifier output	Connect resistor RPK and capacitor CPK between AMP and PKI.
7	HD2	Amplifier (-) input	Connect magnetic head between HD1 and HD2.
8	HD1	Amplifier (+) input	Connect magnetic head between HD1 and HD2.
9	VRF	Reference voltage output	Reference voltage output of V_{CC} 1/2
10	GND	Grounding	
11	RCP	Read clock output	Clock pulse output after F2F modulation
12	RDT	Read data output	Data output after F2F modulation
13	CLS	Card travelling signal output	Signal output indicating that card is travelling
14	INV	Invert input	CLS, RDT and RCP output becomes "L" active at "H" (OPEN), and "H" active at "L".
15	IB2	Ignore bit 2	Glance-over bit setting pin
16	IB1	Ignore bit 1	Glance-over bit setting pin
17	CX2	Oscillation capacitor	Connect capacitor C_{OSC} between CX1 and CX2 to set oscillation frequency.
18	CX1	Oscillation capacitor	Connect capacitor C_{OSC} between CX1 and CX2 to set oscillation frequency.
19	V_{CC2}	Power supply	Digital circuit section power supply pin. Supply voltage is V_{CC} .
20	V_{CC1}	Power supply	Analog circuit section power supply pin. Supply voltage is V_{CC} (same voltage as V_{CC2}).

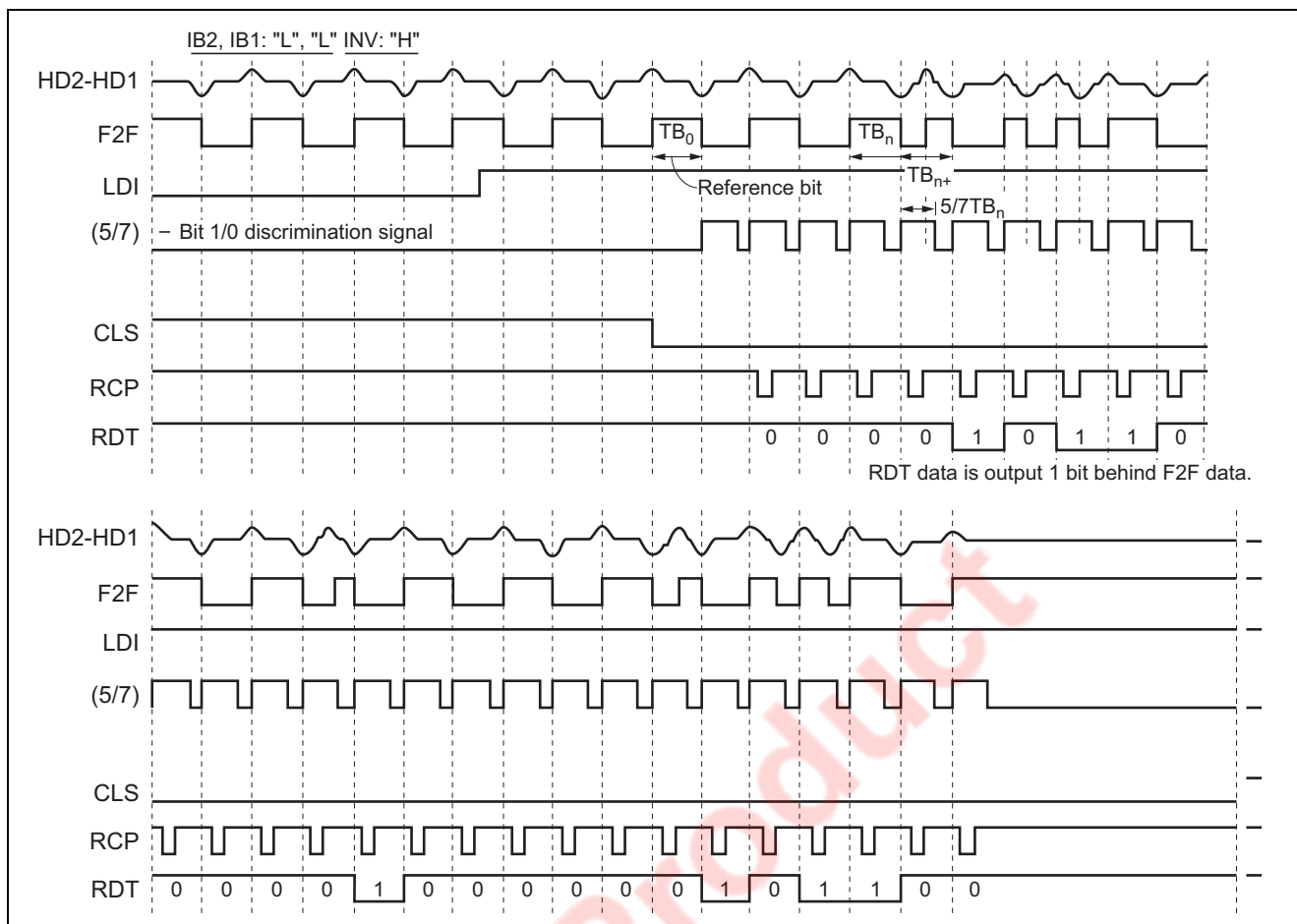
Glance-Over Bit Setting and Timing By IB1 and IB2

IB2 input	IB1 input	Number of glance-over bits	Description
L	L	4	Internal digital circuit is reset with LDI input at "L". LDI input may be at "H" at all times. CLS output turns to "L" after counting the flux change FC (change in the status of F2F) of the number of glance-over bits, and returns to "H" when BIC (bit interval counter) has fully counted. (At "L" active).
L	H	8	
H	L	16	
H	H	—	

Note: IB2, IB1 : "L", "L"



Operating Timing Diagram



Absolute Maximum Ratings

(Ta = -20 to 75°C, unless otherwise noted)

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V _{CC}	-0.3 to +6.5	V	V _{CC1} , V _{CC2}
Input voltage	V _I	-0.3 to V _{CC} +0.3	V	LDI, IB1, IB2, INV
Input voltage	V _I	-0.3 to V _{CC} +0.3	V	HD1, HD2
Output voltage	V _O	-10 to +10	mA	CLS, RDT, RCP
Differential input voltage	V _{ID}	-1.2 to +1.2	V	Between HD2 and HD1 pins
Operating temperature	T _{opr}	-20 to 75	°C	
Storage temperature	T _{stg}	-55 to 125	°C	

Notes: 1. Voltage is based on GND pin of the circuit (0 V), unless otherwise noted.

2. Direction of the current flowing into the circuit is represented by "positive" (without code) and that flowing out of the circuit by "negative" (-code).

Recommended Operating Conditions

(Ta = -20 to 75°C, unless otherwise noted)

Item		Symbol	Limits			Unit	Test Conditions
			Min	Typ	Max		
Supply voltage	V _{CC1} , V _{CC2}	V _{CC}	4.0	5	5.5	V	V _{CC1} and V _{CC2} shall have the identical voltage.
Input voltage	LDI	V _I	0	—	V _{CC}	V	
“H” input voltage	IB1, IB2, INV	V _{IH}	0.8V _{CC}	—	V _{CC}	V	
“L” input voltage	IB1, IB2, INV	V _{IL}	0	—	0.2V _{CC}	V	
“H” output current	CLS, RDT, RCP	I _{OH}	-0.5	—	0	mA	
“L” output current	CLS, RDT, RCP	I _{OL}	0	—	5	mA	
Differential input voltage	HD2-HD1	V _{IN}	3	—	80	mVp-p	
Input frequency	HD2-HD1	f _{IN}	0.3	—	15	kHz	
Oscillation frequency		f _{OSC}	0.2	—	2	MHz	f _{OSC} = 1/T _{OSC}
External capacitor	CX1, CX2	C _{OSC}	25	—	100	pF	f _{OSC} ∝ 1/C _{OSC}
External capacitor	CX1, CX2	C _{OSC}	—	33	—	pF	Reference value when corresponding to 210BPI
External resistor	AMP	R _{PK}	—	470	—	Ω	Reference value when corresponding to 210BPI
External capacitor	PKI	C _{PK}	—	0.033	—	μF	Reference value when corresponding to 210BPI
External capacitor	PKI, PKO	C _{NF}	—	220	—	pF	Reference value
External resistor	PKI, F2F	R _{PF}	—	4.7	—	MΩ	Reference value
External capacitor	V _{CC1} , V _{CC2}	C _{VC}	—	0.1	—	μF	Reference value
External capacitor	VRF	C _{VR}	0.8	1	2	μF	Reference value

Electrical Characteristics

(Ta = -20 to 75°C, V_{CC} = 5 V, unless otherwise noted)

Item		Symbol	Test Circ uit	Limits			Unit	Test Conditions
				Min	Typ	Max		
Threshold voltage	IB1, IB2, INV	V _{TH}	—	0.3V _{CC}	—	0.7V _{CC}	V	V _{CC} = 4 to 5.5 V
“L” output voltage	CLS, RDT, RCP	V _{OL}	2	—	—	0.2	V	V _{CC} = 4 V I _{OL} = 10 μA
			2	—	—	0.4	V	
“H” output voltage	CLS, RDT, RCP	V _{OH}	2	3.8	—	—	V	V _{CC} = 4 V I _{OH} = -10 μA
			2	3.2	—	—	V	
“L” input current	LDI, IB1, IB2	I _{IL}	2	-10	—	+10	μA	V _{CC} = 5.5 V, V _I = 0 V
“L” input current	INV	I _{IL}	2	-80	—	-10	mA	V _{CC} = 5.5 V, V _I = 0 V
“H” input current	LDI, IB1, IB2, INV	I _{IH}	2	-10	—	+10	μA	V _{CC} = 5.5 V, V _I = 5.5 V
Positive threshold current	INV	I _{IT+}	2	-250	—	-50	μA	V _{CC} = 5.5 V, V _I = V _{TH}
Reference voltage	VRF	VREF	1	2.3	2.5	2.7	V	V _{IN} = 0 mVp-p
Voltage gain 1	OP1	GV11	3	18	20	24	Double	f _{IN} = 1 kHz V _{IN} = 80 mVp-p sine wave
Voltage gain 2	OP1	GV21	3	18	20	24	Double	f _{IN} = 15 kHz V _{IN} = 80 mVp-p sine wave
Input resistance	OP1	RIN1	3	7	10	14	kΩ	f _{IN} = 1 kHz V _{IN} = 80 mVp-p sine wave
Maximum output voltage	OP1	VOPP1	3	2	—	—	Vp-p	f _{IN} = 1 kHz sine wave THD AMP = 5%
“L” sensitivity current	PKI – F2F	I _{IL2}	4	—	—	-0.3	μA	V _M , F2F < 0.5 V
“H” sensitivity current	PKI – F2F	I _{IH2}	4	0.3	—	—	μA	V _M , F2F > 4.5 V
Positive threshold voltage	PKI – F2F	V _{TH+2}	5	0.2	0.45	0.7	V	On the VRF basis
Negative threshold voltage	PKI – F2F	V _{TH-2}	5	-0.7	-0.45	-0.2	V	On the VRF basis
Threshold differential voltage	PKI – F2F	V _{THD2}	—	-0.15	—	0.15	V	(V _{TH+2}) – V _{TH-2}
Pin voltage range	PKO	V _{PKO}	4	-1.2	—	1.2	V	On the VRF basis PK = 1 mA – +1 mA
“L” output voltage	F2F	V _{OL3}	5	—	—	0.5	V	V _{PKI} = 0 V, I _{F2F} = 0.5 mA
“H” output voltage	F2F	V _{OH3}	5	4.5	—	—	V	V _{PKI} = 5 V, I _{F2F} = -0.5 mA
Positive threshold voltage	LDI	V _{TH+4}	6	2.5	—	3.5	V	

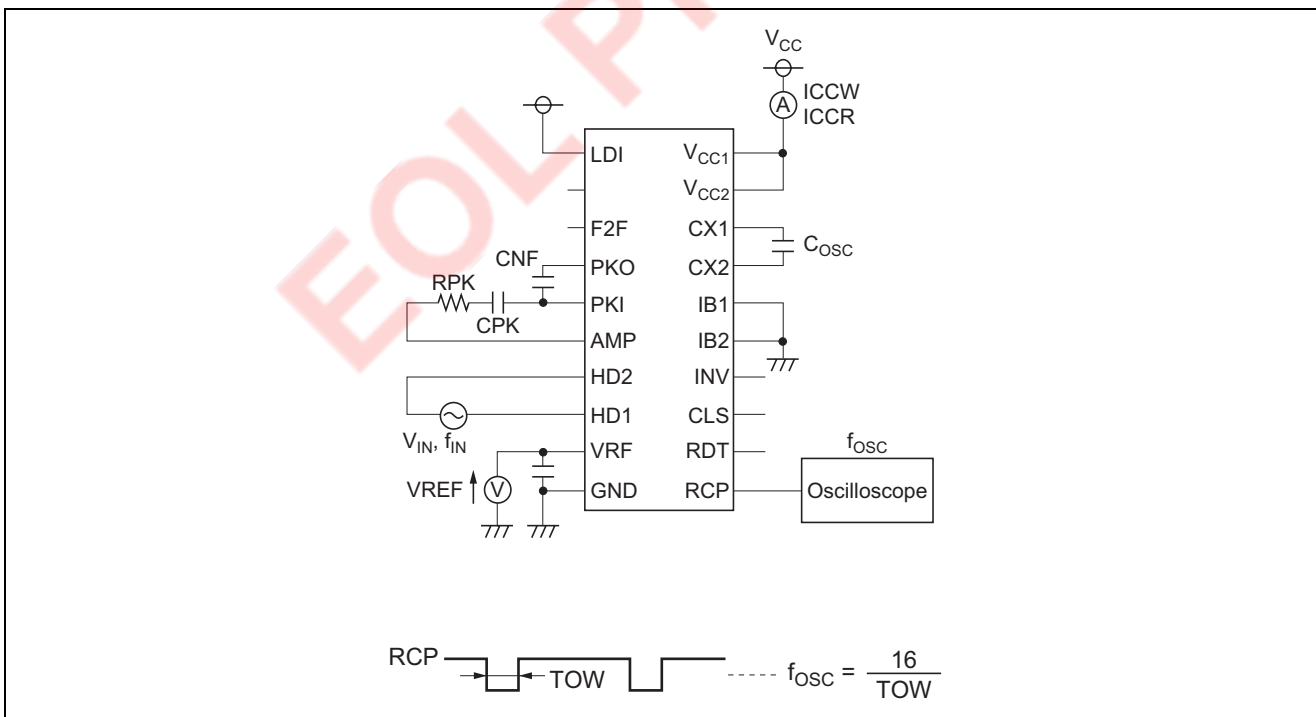
(Ta = -20 to 75°C, V_{CC} = 5 V, unless otherwise noted)

Item	Symbol	Test Circ uit	Limits			Unit	Test Conditions
			Min	Typ	Max		
Negative threshold voltage	LDI	VTH-4	6	1.5	—	2.7	V
Hysteresis width	LDI	VHY4	—	0.5	—	1.5	V (VTH+4) – (VTH-4)
Standby circuit current	V _{CC1} , V _{CC2}	ICCW	1	—	0.7	1.0	mA V _{IN} = 0 mVp-p
Operating circuit current	V _{CC1} , V _{CC2}	ICCR	1	—	1.9	2.4	mA f _{IN} = 8.2 kHz V _{IN} = 68 mVp-p sine wave f _{OSC} = 1 MHz
Oscillation frequency	RCP	f _{OSC}	1	0.75	—	1.5	MHz C _{OSC} = 33 pF
Output pulse width	RCP	TOW	7	15	16	17	μs f _{OSC} = 1 MHz
Intra-output delay time	RDT, RCP	TOD	7	7	8	9	μs f _{OSC} = 1 MHz
Input noise width	INV	TNW	7	0.5	—	—	μs

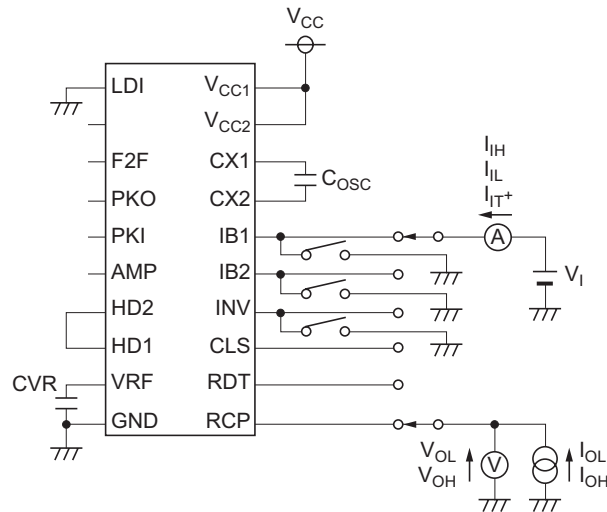
Note: 1. Min. and max. limits do not represent absolute values.

2. Typ. limits represent standard values when Ta = 25°C and V_{CC} = 5V.

Test Circuit

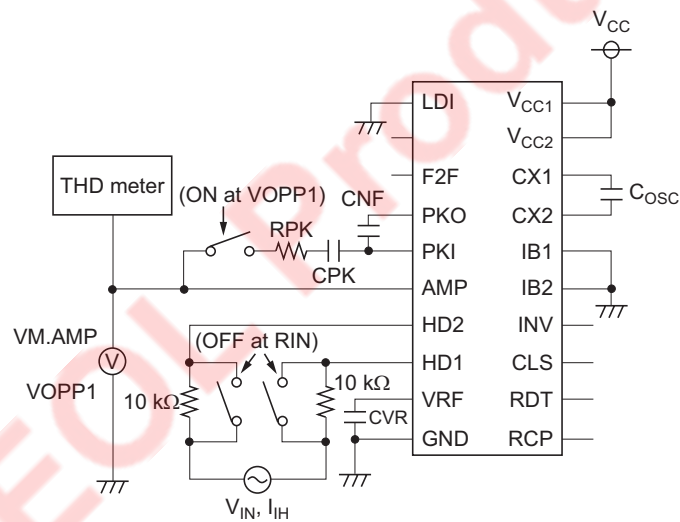
On the following drawing, C_{OSC} = 33 pF, RPK = 470 Ω, CPK = 0.033 μF, CNF = 470 pF, CVR = 1 μF1. Testing of VREF, ICCW, ICCR, f_{osc}

2. Testing of V_{OL} , V_{OH} , I_{IL} , I_{IH} , I_{IT+}



Note: Short the IB1 and IB2 to the GND when those pins are not used for testing.

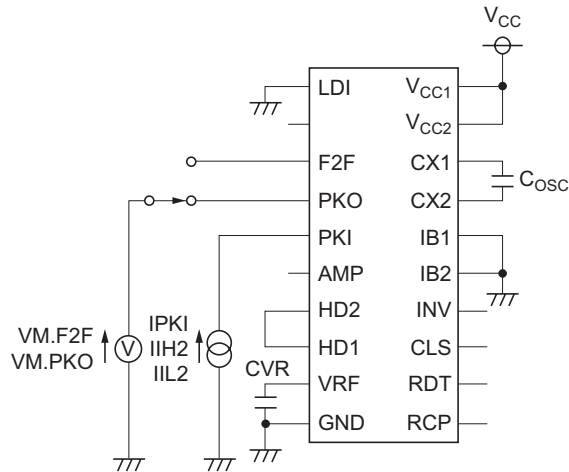
3. Testing of GV11, GV21, RIN1, VOPP1



$$GV11 = \frac{VM.AMP}{V_{IN}}$$

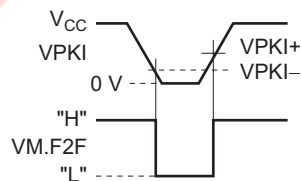
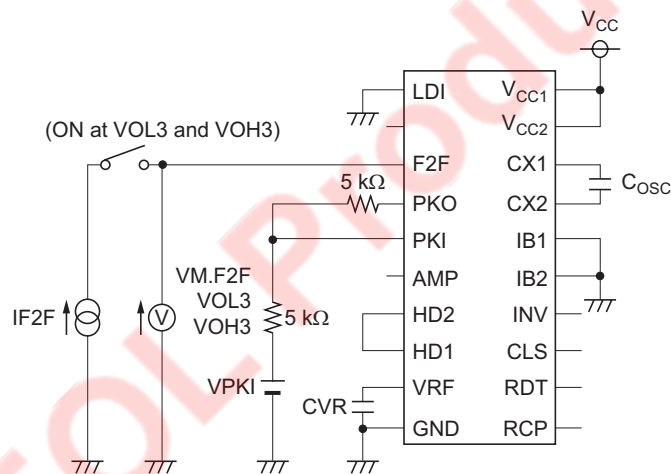
$$RIN1 = \frac{2VM.AMP}{GV11 \cdot V_{IN} - VM.AMP} \times 10 (k\Omega)$$

4. Testing of I_{IH2}, I_{IL2}, V_{PKO}



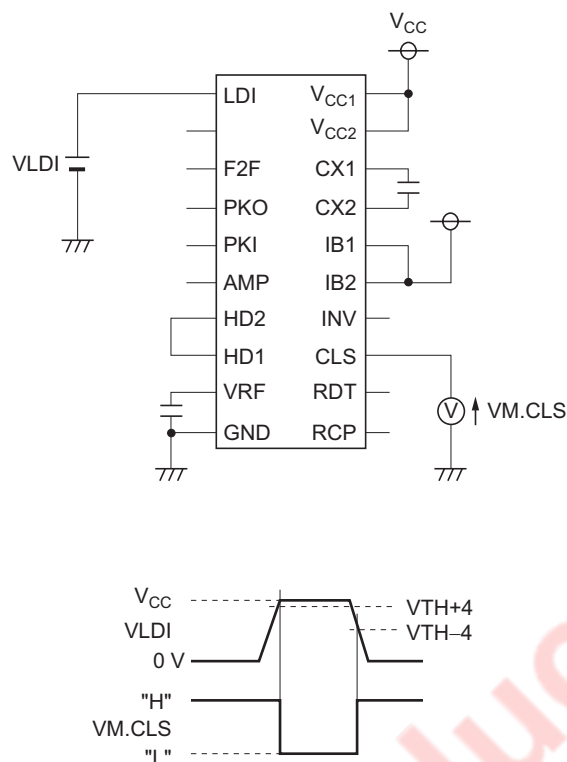
Note: I_{IL2} is PKI input current providing VM.F2F < 0.5 V.
 I_{IH2} is PKI input current providing VM.F2F > 4.5 V.
 V_{PKO} = VM.PKO – V_{REF}

5. Testing of V_{TH+2}, V_{TH-2}, V_{OL3}, V_{OH3}

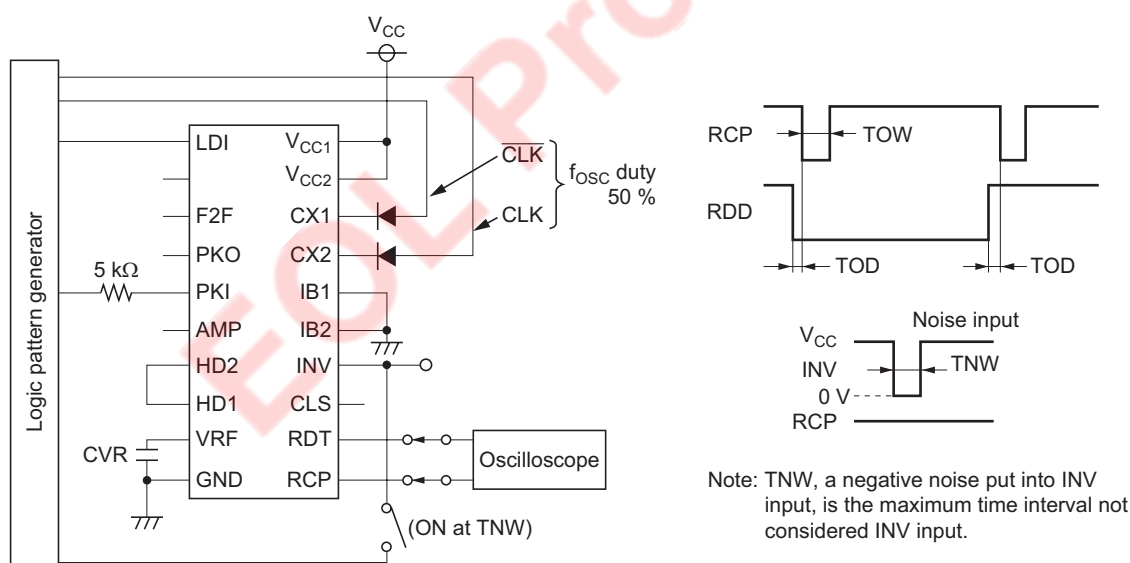


$$V_{TH+2} = V_{REF} - V_{PKI-}$$

$$V_{TH-2} = V_{REF} - V_{PKI+}$$

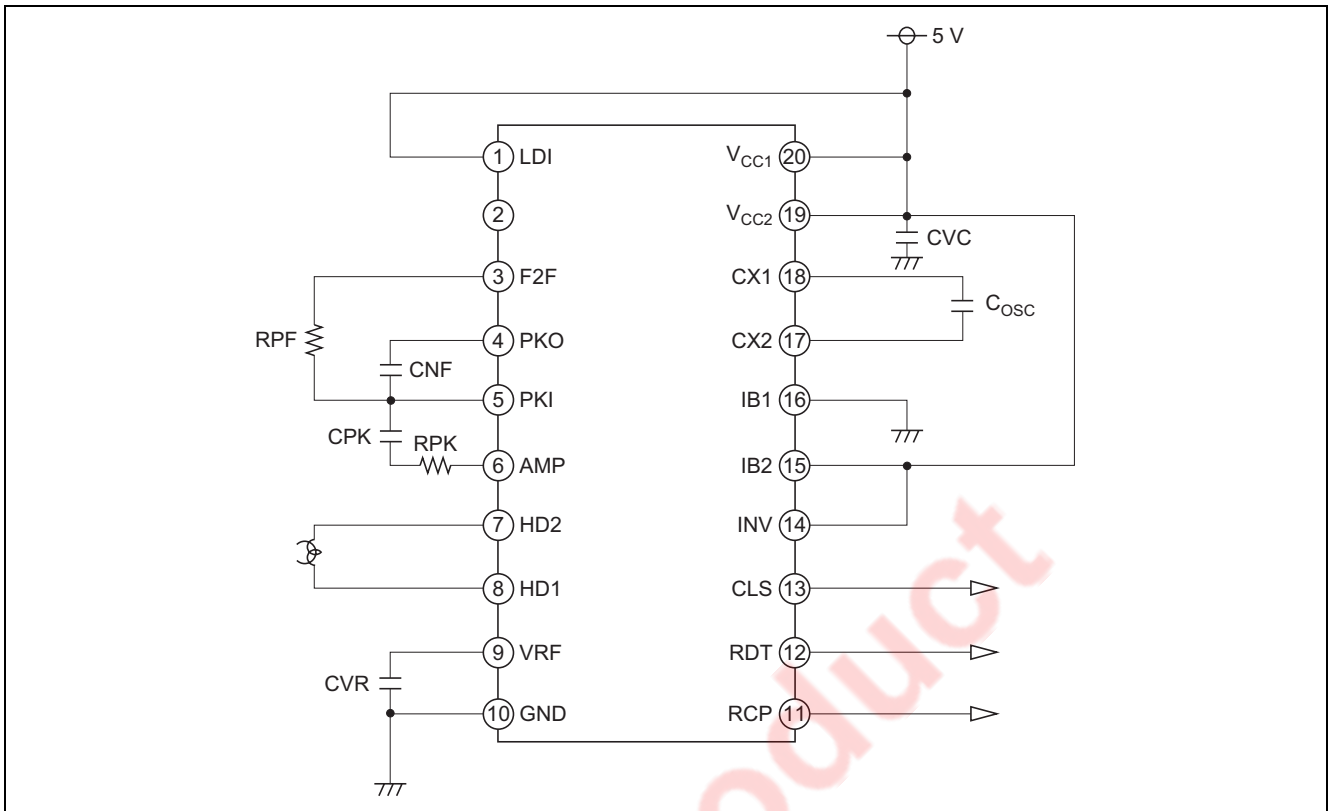


7. Testing of TOW, TOD, TNW

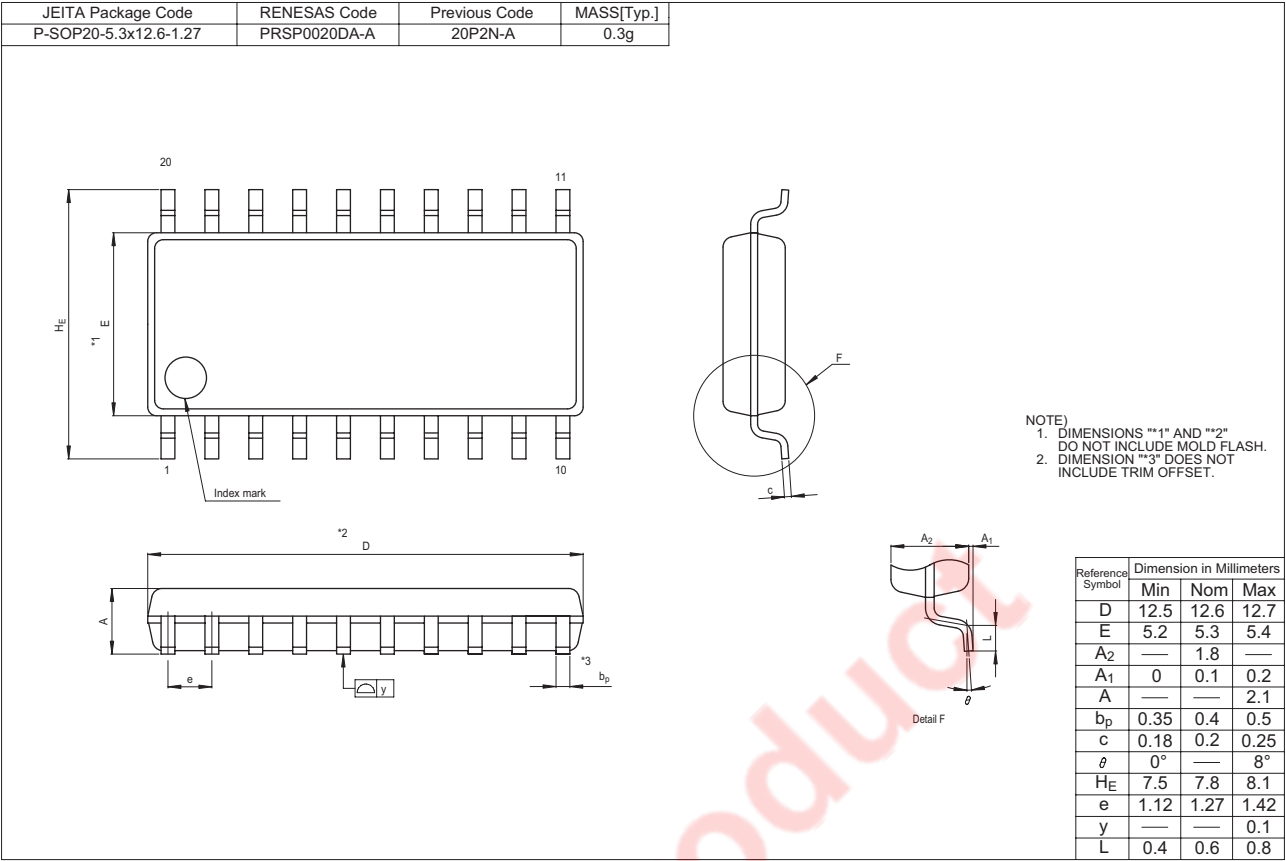


Application Example

When setting the glance-over bit to 16 bits to let it be “L” active output



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