M52959FP

PSD ON CHIP DISTANCE DETECTION SIGNAL PROCESSOR

DESCRIPTION

M52959FP is a semiconductor integrated circuit built-in PSD(Position Sensitive Device) and distance detection signal processor for 3V supply voltage.
This device transforms each signal current(I1 and I2) from PSD sensor to the voltage, and outputs it as the 4 Zone data after doing calculation of I1/(I1+I2).

FEATURES

- PSD on chip (Sensor size=0.5mm x 0.7mm)
- Wide operating supply voltage range Vcc=2.0V to 5.5V
- Built-in clamp circuit

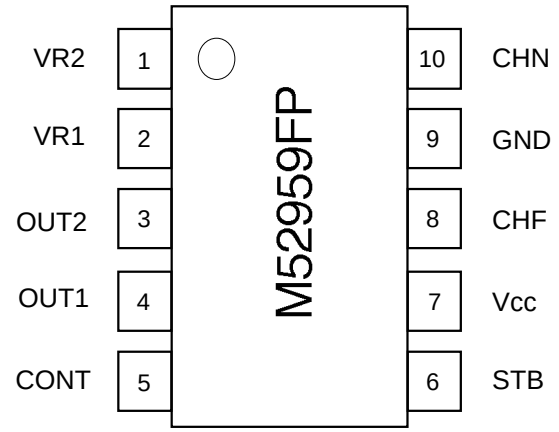
APPLICATION

Auto focus control for the CAMERA
Sensor for short distance etc

RECOMMENDED OPERATING CONDITION

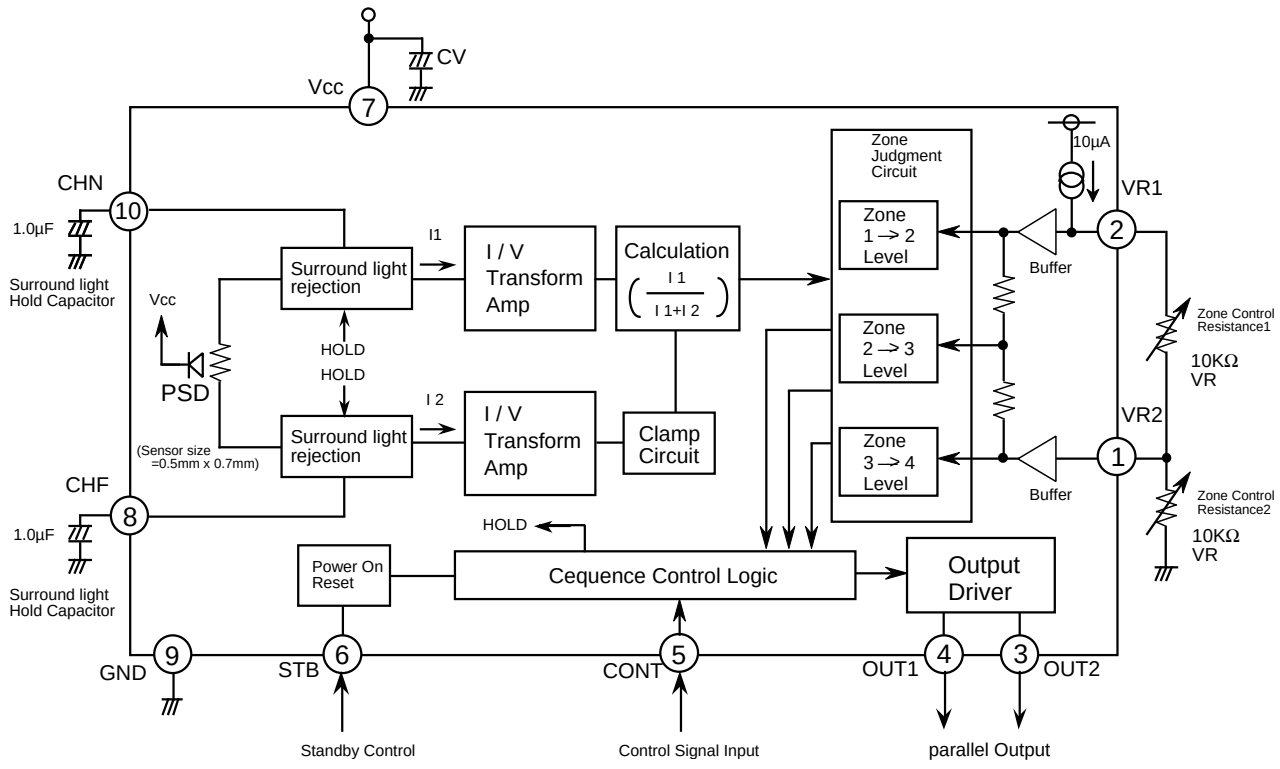
Supply voltage ••••••••••••••••• 2.0 to 5.5V
Rated suooly voltage ••••••••••••••••• 3.0V

PIN CONFIGURATION (TOP VIEW)



10Pin Clear Plastic Mold Package (10C2F) or
10Pin Infrared Permeation Plastic Mold Package (10B2F)

BLOCK DIAGRAM

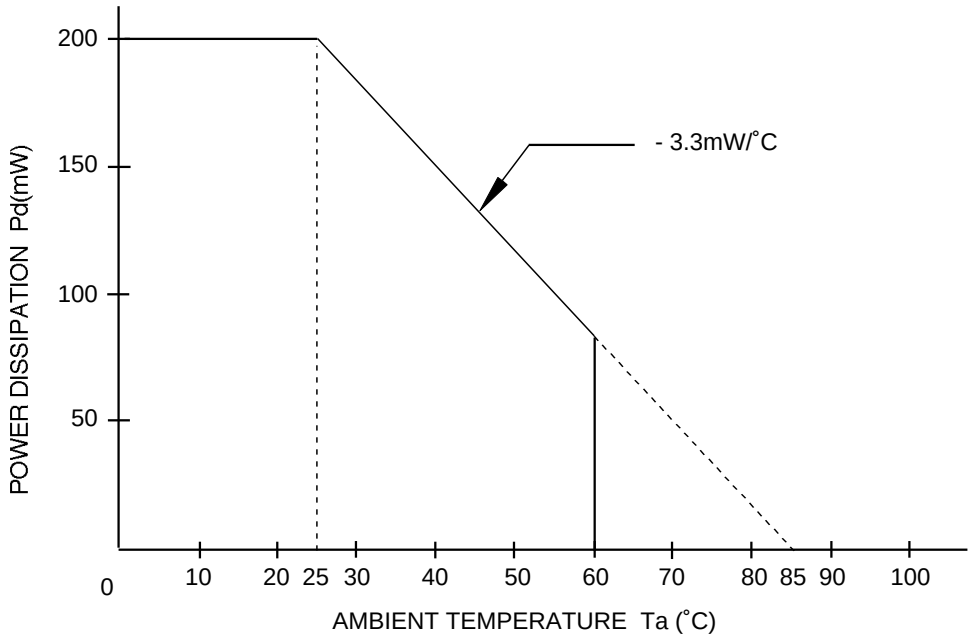


ABSOLUTE MAXIMUM RATINGS (Ta=25˚C ,unless noted)

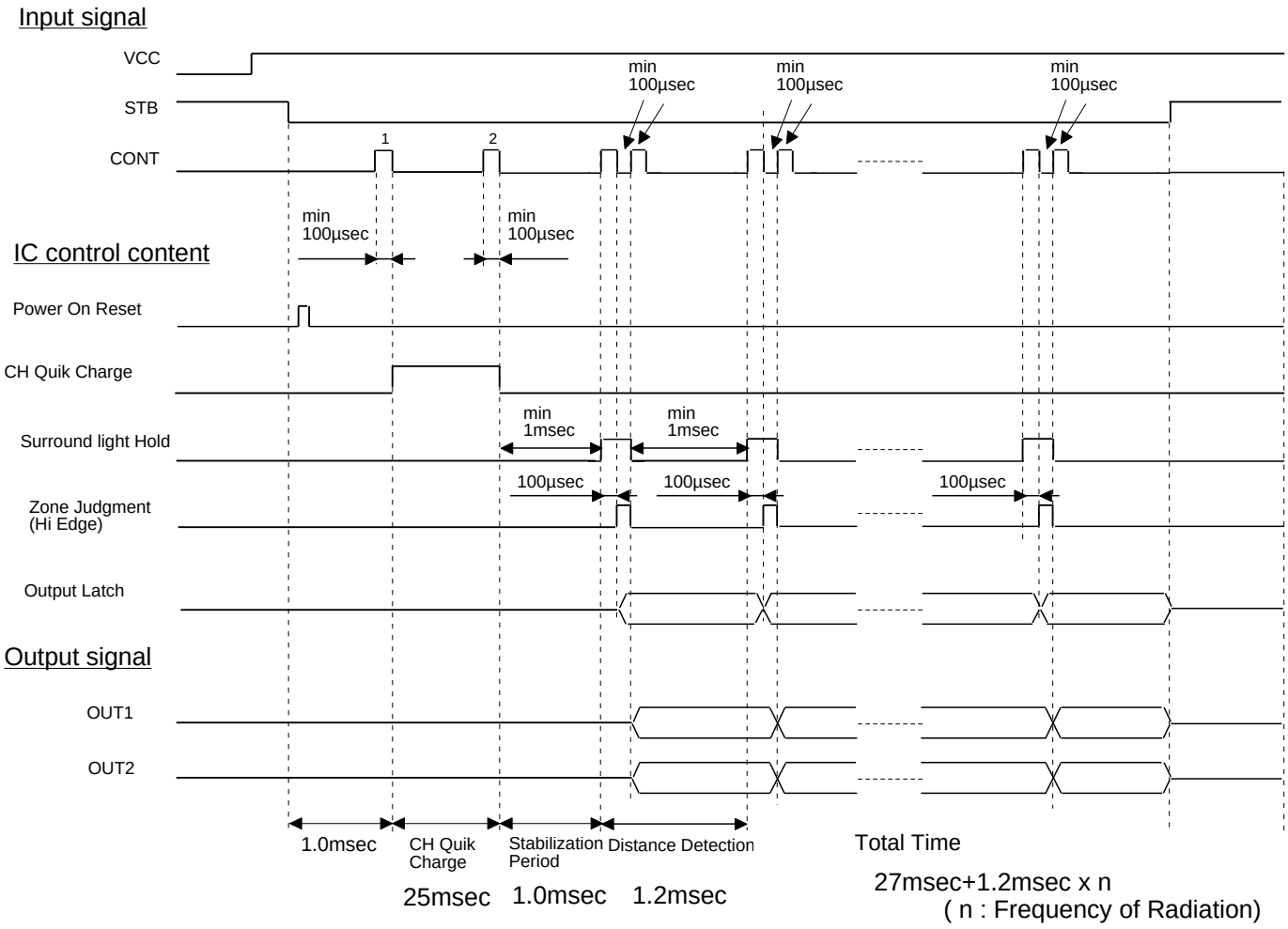
Parameter	Symbol	Ratings	Unit	Remark
Supply voltage	Vcc	7.0	V	note 1
Power dissipation	Pd	200	mW	Ta = 25˚C
Thermal derating	Kθ	3.3	mW/˚C	Ta ≥ 25˚C
Pin input voltage	VIF	7.0	V	Pin3,4,5,6
Another pin input voltage	VI/O	- 0.3 to Vcc+0.3	V	note 2
Output pin inflow current	Isout	0.5	mA	NPN open collector
Operating temperature	Topr	- 10 to 60	˚C	
Storage temperature	Tstg	- 30 to 85	˚C	
Surge voltage	Vsurge	±1000V over		C=100PF R=1.5KΩ

note 1 : As a principle,do not provide a supply voltage reversely.
note 2 : As a principle,do not provide over supply voltage or under ground voltage.

THERMAL DERATING (MAXIMUM RATING)



SEQUENTIAL TIME CHART EXAMPLE



Controls

1. First,STB terminal set Low,then Power On Reset circuit operate.This Power On Reset circuit resets Built-in logic circuits.

2. After Power On Reset circuit stoped,Surround light Hold Capacitor quik charge between the first CONT pulse edge from High to Low and second CONT pulse edge from High to Low.

3. After quik charge,set Stabilization Period for about 1ms.

4. After quik charge,Surround light hold between the first CONT pulse edge from Low to High and second CONT pulse edge from Low to High.

5, After quik charge,Zone judges at the first CONT pulse edge from High to Low and output the Zone Data to OUT1,OUT2 terminals by 2bit at next CONT pulse edge from Low to High.

6. It can repeat distance detection by continuing control of 4 and 5.

7. It needs the signal synchronized with timing of Surround light hold as radiation control signal of IRED.

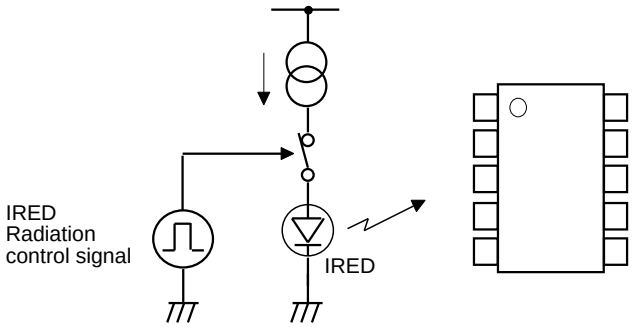
ELECTRICAL CHARACTERISTICS (Ta=25˚C , Vcc=3.0V , dark situation , unless otherwise noted)

Classfication	Parameter	Symbol	Test condition	Limit			Unit	Note
				Min.	Typ.	Max.		
	Operating supply voltage range	VCC		2.0	3.0	5.5	V	
Consuming current	Usual consuming current	ICC		–	6.0	8.0	mA	*1
	While Quick charge consuming current	ICCQC	While CH Quick charge cunsuming current	–	10.0	13.0	mA	*1
	While STAND BY consuming current	ICCS		–	–	1.0	µA	*1
CONT terminal	CONT "H" input voltage	VCOH		1.1	–	7.0	V	
	CONT "L" input voltage	VCOL		0	–	0.3	V	
	CONT "H" input current	ICOH	VIH=5.5V	–	–	1.0	µA	
	CONT "L" input current	ICOL	VIL=0V	-78	-60	-42	µA	
STB terminal	STB "H" input voltage	VSTH		VCC -0.3	–	7.0	V	
	STB "L" input voltage	VSYL		0	–	0.3	V	
	STB "H" input current	ISTH	VIH=5.5V	–	–	3.0	µA	
	STB "L" input current	ISTL	VIL=0V	-150	-100	-50	µA	
Surround light Hold Capacitor	CH Quick charge current	ICHQC	VCH=0V	-1200	-800	-400	µA	*1
	CH stationary charge current	ICHC	VCH=0V	-30	-20	-10	µA	*1
	CH stationary discharge current	ICHD	VCH=1.5V	10	20	30	µA	*1
Output circuit	OUT leak current	IOUT	VIN=5.5V	–	–	1.0	µA	*1
	OUT saturationt voltage	VOUT	IOUT=500µA	–	–	0.3	V	*1
	VR output current	IVR	VVR=0V	-13	-10	-7	µA	*1
AF characteristics	Far diatance detection characteristics	ST1	No Signal		Nearest zone			*2
	Near distance detection characteristics	ST2	Signal = 100nA		Farther zone			*3
	Clamp level	ICLAM		0.25	0.5	0.75	nA	*4
	PSD resistance value	RPSD		84	140	196	KΩ	*4

*1 Set up the logic control terminal, correspond to the parameter.

*2 This measuring have to put DUT box under dark condition.

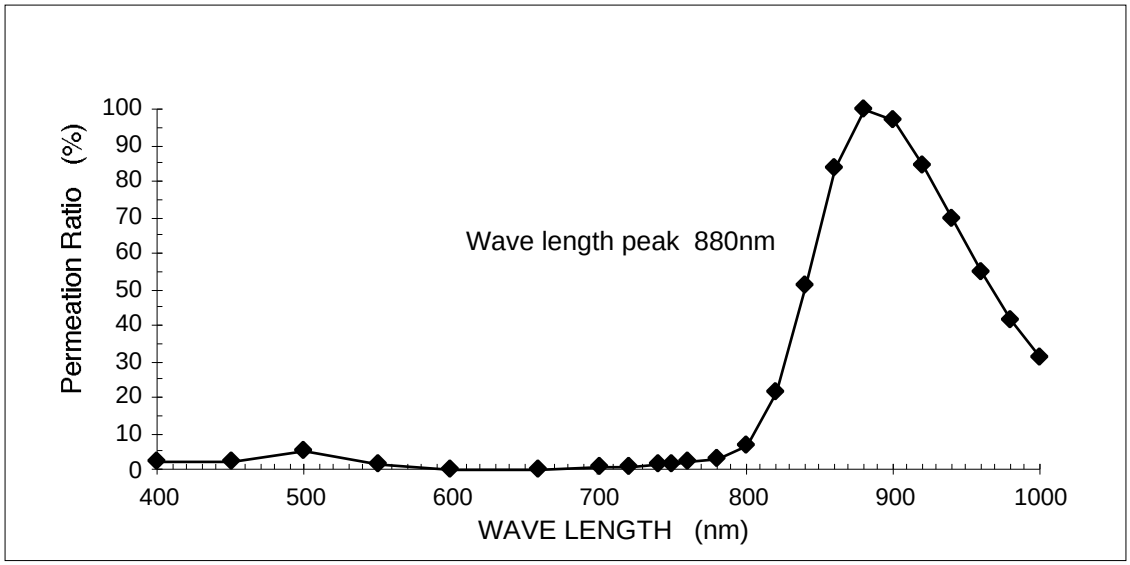
*3 Regulate IRED driving current so that PSD output will become equivalent to 100nA and irradiate IC with synchronizing IRED radiation.
Set zone resistance VR1 = VR2 = 2KΩ



*4 Reference value

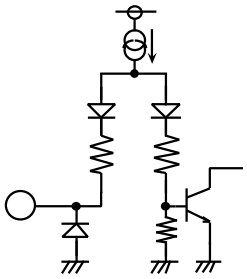
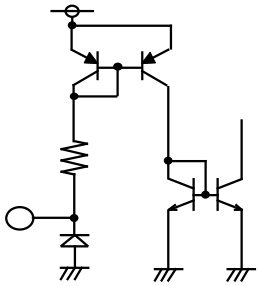
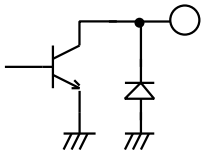
PSD SPECTRAL RESPONSIVITY CHARACTERISTICS

Characteristic at using Infrared Permeation Plastic Mold Package



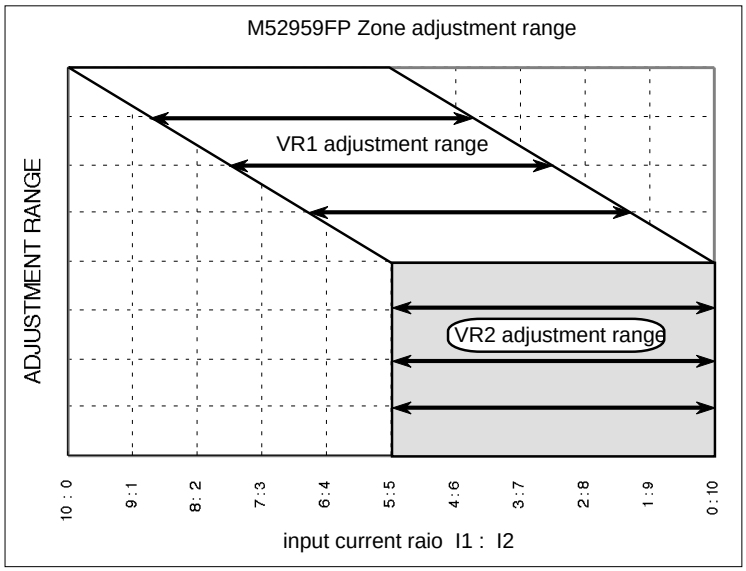
Interface

Ta=25˚C, VCC=3.0V , dark condition

Terminal name	Circuit diagram	Parameter	Limit			Unit	Test conditions and note
			Min.	Typ.	Max.		
CONT		"H" input voltage	1.1	—	7.0	V	
		"L" input voltage	0	—	0.3		
		"H" input current	—	—	1.0	µA	VIH=5.5V
		"L" input current	-78	-60	-42		VIL=0V
STB		"H" input voltage	VCC -0.3	—	7.0	V	
		"L" input voltage	0	—	0.3		
		"H" input current	—	—	3.0	µA	VIH=5.5V
		"L" input current	-150	-100	-50		VIL=0V
OUT		"L" output current	—	—	0.3	V	IOL=500µA
		"H" leak current	—	—	1.0	µA	VIN=5.5V

ADJUSTMENT RANGE OF ZONE SETTING RESISTANCE AND OUTPUT FUNCTION

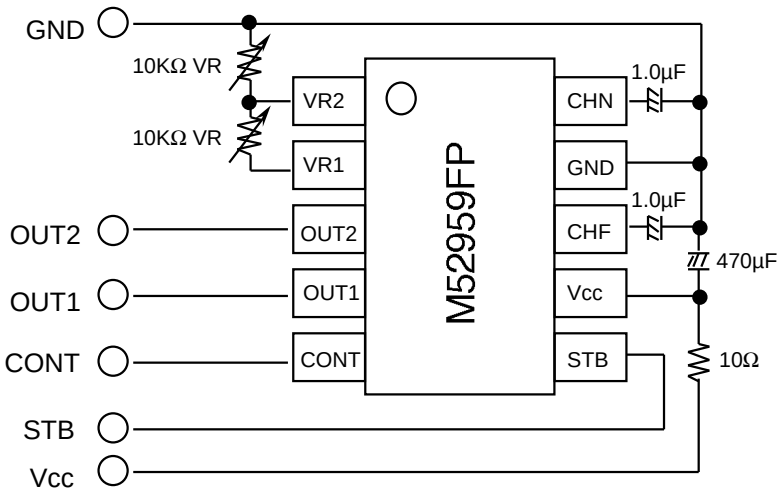
In case of using volume 10KΩ for the setting resistance VR1 and VR2 , the adjustment range becomes the bottom figure.



Zone Decision result is outputted as mentioned in the bottom figure by the digital style from OUT1 and OUT2.

		OUT1	OUT2
near	Zone 1	L	L
	Zone 2	H	L
	Zone 3	L	H
far	Zone 4	H	H

APPLICATION EXAMPLE



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