

IS1622

OPIC Light Detector for Recorder Type MD (Mini Disk) RF Signal Detection

■ Features

- OPIC light detector for RF signal detection
(6-division PIN type photodiode and amplifier IC integrated onto single chip)
- Low operating voltage design (Operating voltage : 2.7 to 5.5V)
- Sensitivity switching between playback mode and recording mode
- Compact and thin transparent package
(Package dimensions : 3.7 x 6.1 x 1.5 mm)

■ Applications

- Optical pickup for recorder type MD players

■ Recommended Operating Conditions

The switching circuit operates according to H and L voltage of the MR/R terminals.

Mode	MR/R terminal voltage	SW state	Gain resistance
Playback mode	L	OFF	R1
Recording mode	H	ON	R1R2/(R1+R2)

■ Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	-0.5to+6.0	V
Cathode terminal voltage	V _K	-0.5to+6.0	V
Mode switching terminal voltage	V _{MP/R}	-0.5toV _{CC}	V
*1 Output voltage	V _O	-0.5toV _{CC}	V
*2 Power dissipation	P	150	mW
Operating temperature	T _{opr}	-20to+70	°C
Storage temperature	T _{stg}	-40to+85	°C
*3 Soldering temperature	T _{sol}	+260	°C

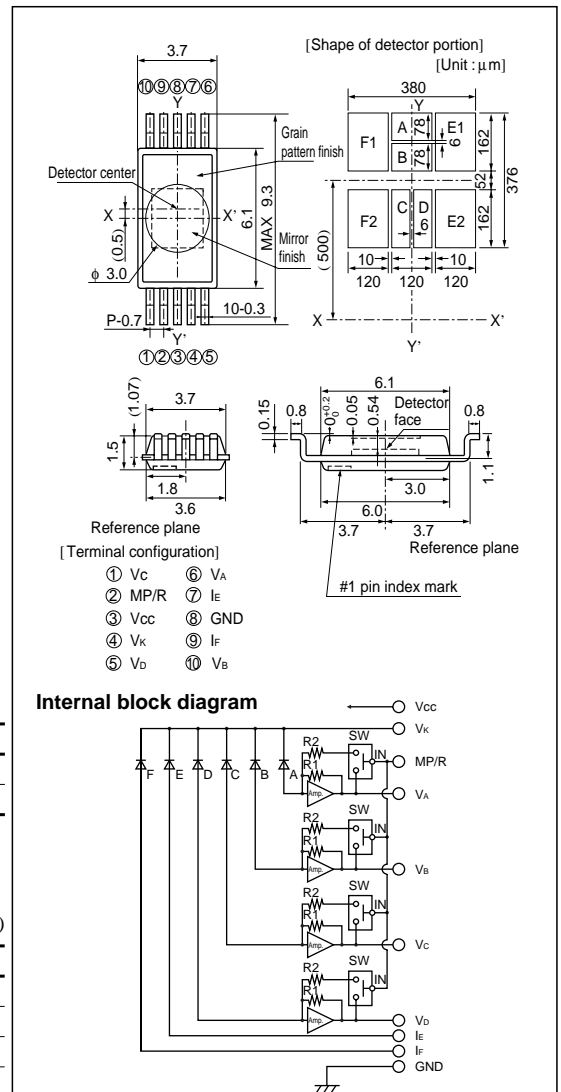
*1 To apply to individual terminals of V_A, V_B, V_C, V_D, I_E and I_F.

*2 To decrease at the rate of 2mW/°Cat Ta>=25°C.

*3 For MAX. 3 seconds in the soldering area

■ Outline Dimensions

(Unit : mm)



* OPIC (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Recommended Operating Conditions

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating supply voltage range	V _{CC1}	2.7	3.0	5.5	V
Cathode terminal voltage	V _K	2.7	3.0	5.5	V
*4 Playback mode incident light quantity range 1	φ P1	1	6	17	μ W
*5 Playback mode incident light quantity range 2	φ P2	0.5	3	6	μ W
*4 Recording mode incident light quantity range 1	φ R1	15	50	130	μ W
*5 Recording mode incident light quantity range 2	φ R2	7	17	36	μ W

*4 The incident light quantity range applies to individual photodiodes of A, B, C and D and is specified in the incident light quantity per single photodiode.

*5 The incident light quantity range applies to individual photodiodes of E and F and is specified in the incident light quantity per single photodiode.

■ Electro-optical Characteristics (Current flowing out of terminal : +, Current flowing into terminal : -)

(Ta=25°C, V_{CC}=V_K=3.0V)

	Parameter	Symbol	Conditions *8	MIN.	TYP.	MAX.	Unit	Application
Playback mode	Supply current	I _{CCP}	-	2.0	5.2	9.0	mA	V _{CC}
	Dark output voltage	V _{odP}	-	1.1	1.4	1.6	V	V _A , V _B , V _C , V _D
	Dark output differential voltage	V _{odPS}	-	-25	0	25	mV	V _A , V _B , V _C , V _D
	*6 Sensitivity	R _{pP}	-	13	22.5	34	mV/μ W	V _A , V _B , V _C , V _D
	Sensitivity temperature coefficient	R _{pPt}	Ta=-20to+70°C	-	+ 7 000	-	ppm/°C	V _A , V _B , V _C , V _D
	Response frequency	f _{CP}	-3dB	3.0	5.3	-	MHz	V _A , V _B , V _C , V _D
Recording mode	Output noise level	V _{nP}	f = 720kHz, BW = 10kHz	-	-90	-80	dBm	V _A , V _B , V _C , V _D
	Supply current	I _{CCR}	-	3.0	5.6	10.0	mA	V _{CC}
	Dark output voltage	V _{odR}	-	1.1	1.35	1.6	V	V _A , V _B , V _C , V _D
	Dark output difference voltage	V _{odRS}	-	-25	0	25	mV	V _A , V _B , V _C , V _D
	*7 Sensitivity	R _{pR}	-	1.3	2.8	4.9	mV/μ W	V _A , V _B , V _C , V _D
	Sensitivity temperature coefficient	R _{pRt}	Ta=-20to+70°C	-	+ 7 000	-	ppm/°C	V _A , V _B , V _C , V _D
Common to both modes	Response frequency	f _{CR}	-3dB	1.8	3.8	-	MHz	V _A , V _B , V _C , V _D
	Output noise level 1	V _{nR1}	f=22kHz, BW=1kHz	-	-100	-90	dBm	V _A , V _B , V _C , V _D
	Output noise level 2	V _{nR2}	f=720kHz, BW=10kHz	-	-90	-80	dBm	V _A , V _B , V _C , V _D
	Sensitivity	R _{pE} , R _{pF}	-	0.28	0.37	0.52	μ A/μ W	I _E , I _F
	Output current	I _O	-	240	430	700	μ A	V _A , V _B , V _C , V _D
	Dark current	I _{dE} , I _{dF}	-	-	-	10	nA	I _E , I _F
	Terminal capacitance	C _{AK}	-	-	(20)	-	pF	I _E , I _F
	Mode switching terminal voltage 1	V _{MR}	-	V _{CC} - 0.5	-	V _{CC}	V	MP/R
	Mode switching terminal voltage 2	V _{MP}	-	0	-	0.4	V	MP/R
	Mode switching terminal current 1	I _{MR}	-	-	-	230	μ A	MP/R
Mode switching terminal current 2	I _{MP}	-	-	-	-0.5	μ A	MP/R	
Charac. after mode switching	Sensitivity response	R _{pRP}	*9	11.7	22.5	35.7	mV/μ W	V _A , V _B , V _C , V _D
	Sensitivity response	R _{pRP}	*9	1.2	2.8	5.2	mV/μ W	V _A , V _B , V _C , V _D

*6 6μ W DC light is radiated to the center of each photodiode at 50μ m φ.

Assuming the then output voltage as V_{pP} and the dark output voltage as V_{odP}, sensitivity R_{pP} is defined according to the following formula.

$$R_{pP} = |V_{pP} - V_{odP}| / 6 \mu W$$

*7 50μ W DC light is radiated to the center of each photodiode at 50μ m φ.

Assuming the then output voltage as V_{pR} and the dark output voltage as V_{odR}, sensitivity V_{pP} is defined according to the following formula.

$$R_{pR} = |V_{pR} - V_{odR}| / 50 \mu W$$

*8 Take measurement assuming the mode switching terminal voltage on V_{MP/R}=0V in the playback mode and V_{MP/R}=V_{CC} in the recording mode.

*9 Sensitivity response characteristics after mode switching between the playback and recording modes is specified in the sensitivity in 20μ s after change of the mode switching terminal voltage. Take measurement with 20μ W DC light radiated to the center of each photodiode at 50μ m φ.

Assuming the then output as V_p and dark output voltage as V_{od}, sensitivity R_p is defined according to the following formula.

$$R_p = |V_p - V_{od}| / 20 \mu W$$

● Please refer to the chapter "Precautions for Use". (Page 78 to 93)