

# PNA4U23F (Tentative)

## Photodiode with amplifier functions

For optical control systems

### ■ Features

- Small package, × 52 speed
- Reflow soldering possible

### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Operating supply voltage	$V_{CC}$	6	V
Power dissipation	$P_D$	250	mW
Operating ambient temperature	$T_{opr}$	-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-40 to +85	$^\circ\text{C}$

### ■ Operating Condition

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating supply voltage	$V_{CC}$		4.5	5.0	5.5	V
Reference voltage	$V_{REF}$		1.55	1.65	1.75	V

### ■ Electrical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$ , $R_L = 10\text{ k}\Omega$ , $C_L = 20\text{ pF}$ , $V_R = 300\ \Omega$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
SW change voltage range	$V_{SW1}$	CD Gain1 / Gain2 → Gain1	2.4	—	$V_{CC}$	V
	$V_{SW2}$	DVD Gain1 / Gain2 → Gain2	0	—	0.99	V
Output offset voltage	$V_{OFF}$	$[V_{OP} - V_{ON}]$ No signal condition	-20	0	20	mV
Maximum output voltage *2	$V_{OM}$	$[V_{OP} - V_{ON}]$ Max. Reference to GND	2.0	2.2	—	V
Maximum output voltage (+) *3	$V_{OM+}$	$[V_{OP} - V_{ON}]$ Max. Reference to GND	1.0	1.1	—	V
Maximum output voltage (-) *3	$V_{OM-}$	$[V_{OP} - V_{ON}]$ Max. Reference to GND	-1.0	-1.1	—	V
Output sensitivity *1	Gain1	$[V_{OP} - V_{ON}]$ $\lambda = 780\text{ nm}$	2.1	2.8	3.5	V/mW
	Gain2	$[V_{OP} - V_{ON}]$ $\lambda = 650\text{ nm}$	3.3	4.4	5.5	V/mW
Supply current	$I_{CC}$	No signal condition	—	26.0	29.9	mA
Cutoff frequency	$f_{C(-3dB)}$	CD Gain1 $20 \log (V_O(f_C \text{ MHz}) / V_O(1 \text{ MHz})) = -3$	80	90	—	MHz
		DVD Gain2 $20 \log (V_O(f_C \text{ MHz}) / V_O(1 \text{ MHz})) = -3$	70	80	—	MHz
Rise time	$t_r$	CD $V_{OP} - V_{ON} = 2\text{ V[p-p]}$ , 10% to 90%, Gain1	—	5	—	ns
		DVD $V_{OP} - V_{ON} = 2\text{ V[p-p]}$ , 10% to 90%, Gain2	—	5	—	ns
Fall time	$t_f$	CD $V_{OP} - V_{ON} = 2\text{ V[p-p]}$ , 10% to 90%, Gain1	—	5	—	ns
		DVD $V_{OP} - V_{ON} = 2\text{ V[p-p]}$ , 10% to 90%, Gain2	—	5	—	ns

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7031 measuring methods for diodes.

2. \*1: Standard voltage level;  $V_{REF}$  (Exclude output offset voltage)

\*2: Full saturation value

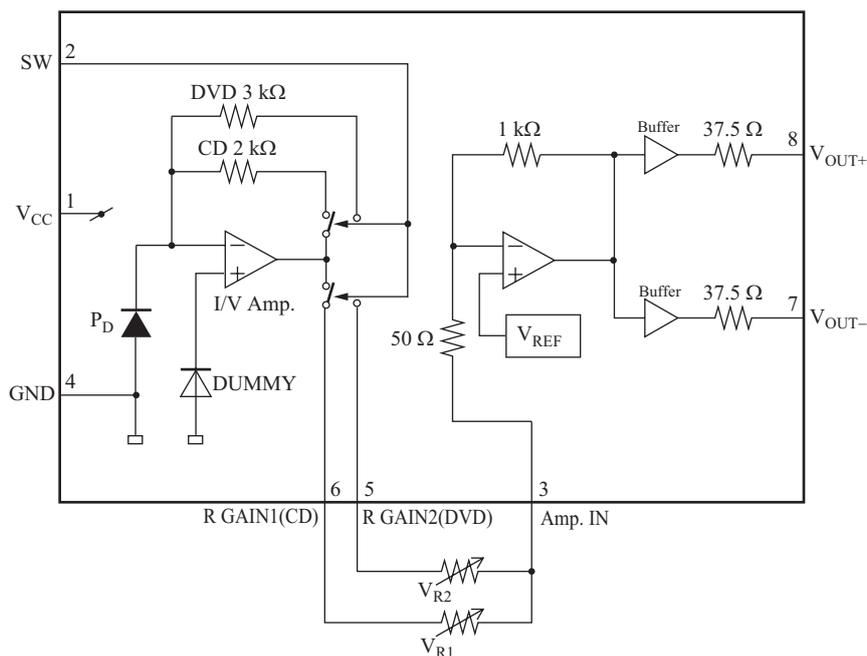
\*3: Linearity < 1%

■ Electrical Characteristics (Continued)  $T_a = 25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ,  $V_{CC} = 5.0\text{ V}$ ,  $R_L = 10\text{ k}\Omega$ ,  $C_L = 20\text{ pF}$ ,  $V_R = 300\ \Omega$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Slew rate	SR		200	300	—	V/ $\mu\text{s}$
Settling time	$t_{\text{set}}$	CD $V_{OP} - V_{ON} = 2\text{ V[p-p]}$ at Gain1, $\pm 3\%$	—	12	—	ns
		DVD $V_{OP} - V_{ON} = 2\text{ V[p-p]}$ at Gain2, $\pm 3\%$	—	14	—	ns
Mode selecting time	$t_{\text{sel}}$	Gain-high $\leftrightarrow$ Sleep $\leftrightarrow$ Low	—	150	200	ns

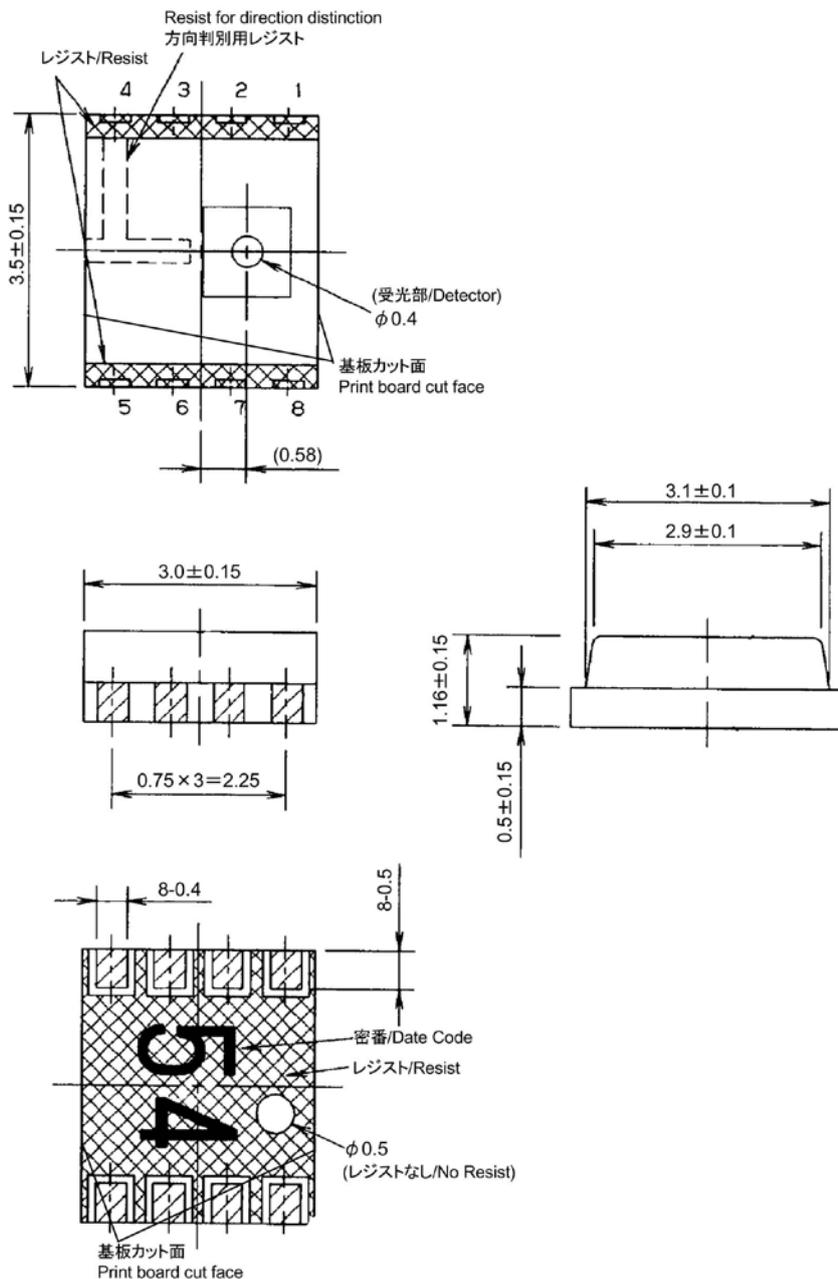
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7031 measuring methods for diodes.

■ Block Diagram



■ Package (Unit: mm)

KPTFTN6K0004



• Pin name

- 1: V<sub>CC</sub>
- 2: SW
- 3: Amp.IN
- 4: GND
- 5: R GAIN2
- 6: R GAIN1
- 7: V<sub>OUT-</sub>
- 8: V<sub>OUT+</sub>

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