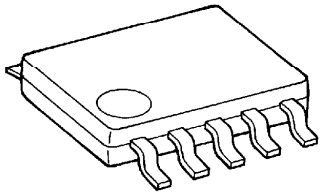
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8573FN

High-Frequency Modulation IC for Laser Diode

The TA8573FN is a high frequency modulation IC for laser diode. This product is designed for PUH (Pick Up Head) of optical disc drive.



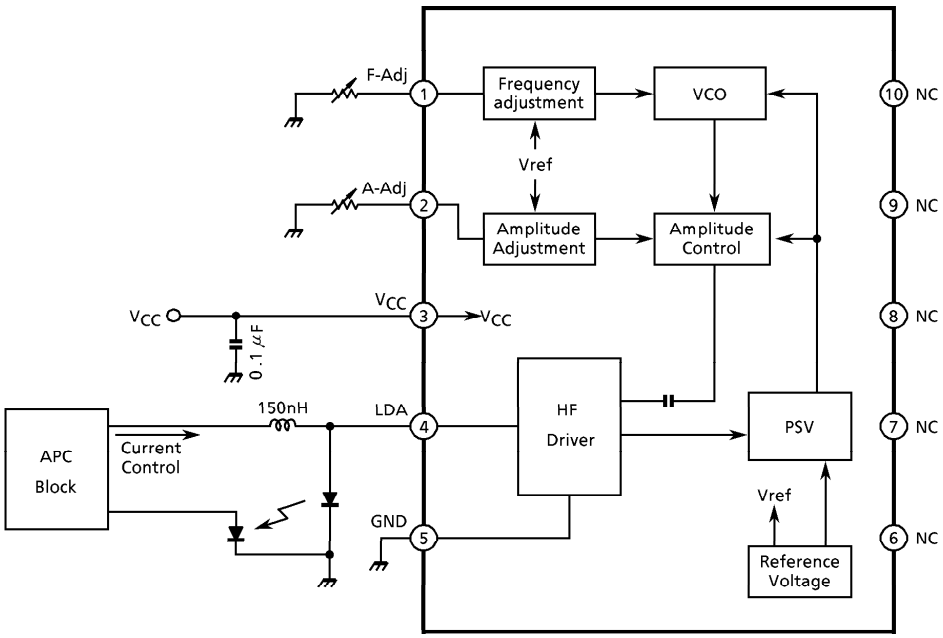
SSOP10-P-0.65A

Weight : 0.04g (Typ.)

FEATURES

- The TA8573FN operates with a single 5V power supply.
- The TA8573FN is suitable to connect with a cathode-common laser diode.
- Modulation frequency is adjustable from 150MHz to 400MHz.
- Modulation amplitude is adjustable from 0mAp-p to 50mAp-p.
- The TA8573FN can drive until 30mAp-p.
- The TA8373FN monitors LD-pin connection. When LD voltage is lower than 1.25V, power save mode is selected (I_{CC} = 3.5mA (Typ.)).
- Low current consumption = 7mA (Typ.).
- The TA8573FN is suitable to design a PUH circuit with a few external parts.
- Small package : SSOP10-P-0.65A

BLOCK DIAGRAM



DESCRIPTION

1. High frequency modulation

   - The TA8573FN suppress a laser diode noise by high frequency current.
     So this high frequency current is supplied from APC block, a lower consumption system of high frequency modulation is realized.
   - The frequency of modulation is adjustable by an external resistor (R F-Adj).
     Adjustable range of $f_{(HFM)}$ = 150MHz~400MHz
     Accuracy of setting frequency ≦ ±20%
   - The amplitude of modulation is adjustable by an external resistor (R A-Adj).
     Adjustable range of $I_{(HFM)}$ = 0~50mAp-p

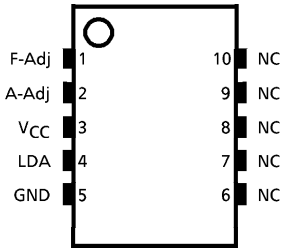
2. Power save mode

   The TA8573FN monitors a laser diode voltage (LDA-pin voltage).
   When this voltage is lower than 1.25V, VCO circuit function stops and power save mode is selected. (I_{CC} = 3.5mA (Typ.))

PIN FUNCTION

PIN No.	PIN NAME	FUNCTION
1	F-Adj	Frequency of modulation adjusting pin (An external resistor is connected between this pin and ground.)
2	A-Adj	Amplitude of modulation adjusting pin (An external resistor is connected between this pin and ground.)
3	V_{CC}	Power supply pin
4	LDA	Output pin (Anode of laser diode is connecting with this pin.)
5	GND	Ground pin
6	NC	Non connection pin
7	NC	Non connection pin
8	NC	Non connection pin
9	NC	Non connection pin
10	NC	Non connection pin

PIN ASSIGNMENT (TOP VIEW)



MAXIMUM RATING (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	7	V
Input Pin Voltage	V_{IN}	$-0.3 \sim V_{CC}+0.3$	V
Output Drive Current (LDA)	I_{OUT}	30	mA
Consumption Current	I_{CC}	9	mA
Storage Temperature	T_{STG}	$-55 \sim 150$	°C

RECOMMENDED OPERATION CONDITION

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	4.5~5.5	V
Operating Temperature	T_{OPR}	$-20 \sim 85$	°C

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V_{CC} = 5V, Ta = 25°C)

1. Current Consumption

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current (Active Mode)	I_{CC}	1	V_{LDA} = 2.3V		7	9	mA
Power Supply Current (Power Save Mode)	I_{PSV}	2	V_{LDA} = 1.0V		3.5	5	mA

2. Output Block

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
DC Current of HFM	$I_{osc\,(DC)}$	3	V_{LDA} = 2.3V	−13	−22	−30	mA
*Current Amplitude of Modulation	I_{osc}	—	$R_{A\text{-}Adj} = 5k\Omega$	20			mAp-p
*Output Voltage of LDA Pin	V_{op}	—		1.9	2.3	2.7	V

3. Oscillator Block

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
*Frequency Adjustable Rang	f_{osc}	—		150		400	MHz
Accuracy of Setting Frequency	T_{fosc}	4	215MHz ($R_{F\text{-}Adj} = 20k\Omega$) 300MHz ($R_{F\text{-}Adj} = 11k\Omega$) 350MHz ($R_{F\text{-}Adj} = 9.1k\Omega$)	−20		+ 20	%

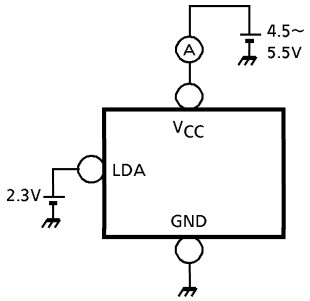
4. Power Save Block

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Monitoring Voltage of LDA pin	V_{ref}	5		1.0	1.25	1.5	V

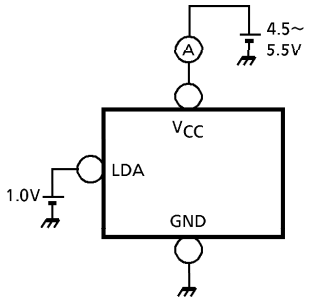
The data marked by an asterisk (*) are shown for only reference purpose.

TEST CIRCUIT

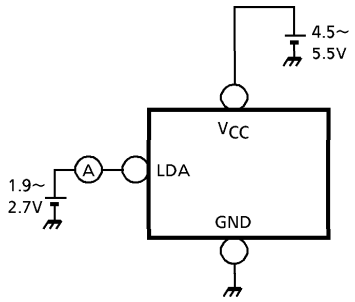
(1) Power Supply Current
(Active Mode)



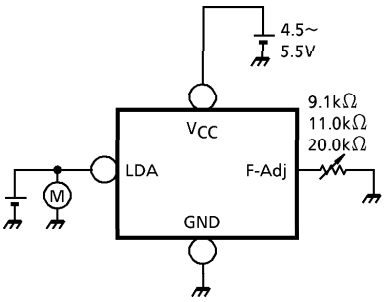
(2) Power Supply Current
(Power Save Mode)



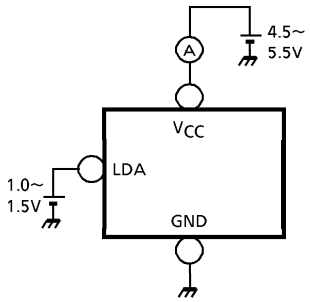
(3) DC Current of HFM



(4) Accuracy of Setting Frequency



(5) Monitoring Voltage of LDA Pin



HFM CHARACTERISTICS

* Reference Data

Frequency Adjustable Characteristic

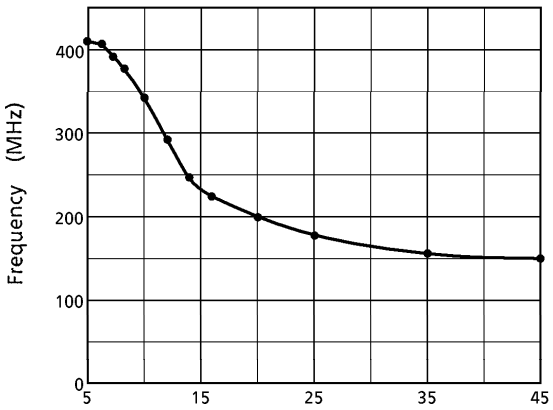


Fig.1 External Resistor (R F-Adj) (kΩ)

Amplitude Adjustable Characteristic

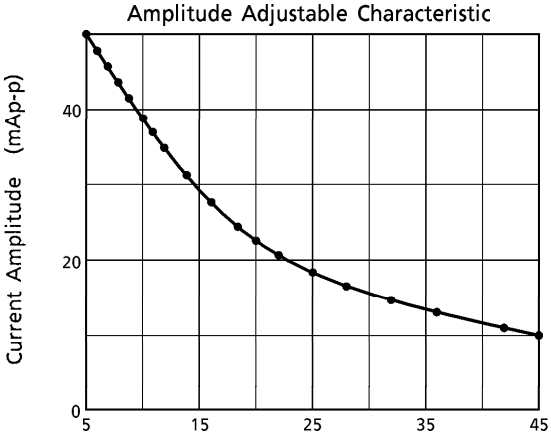
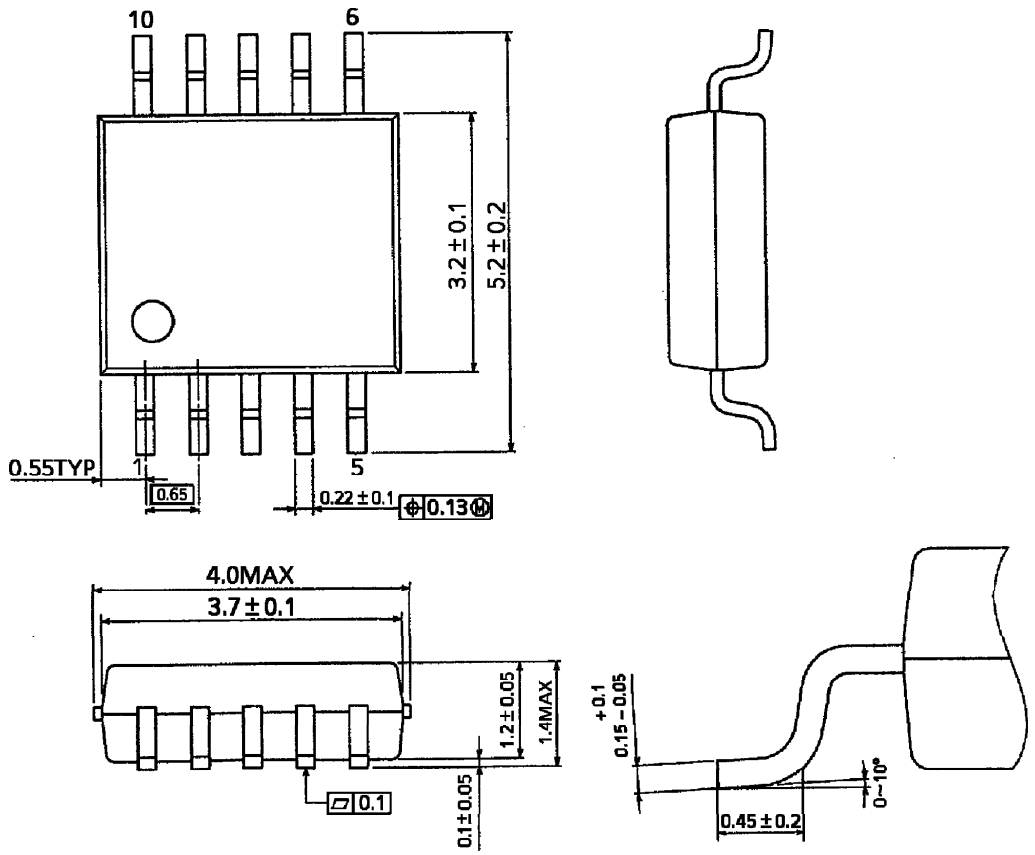


Fig.2 External Resistor (R A-Adj) (kΩ)

OUTLINE DRAWING

SSOP10-P-0.65A

Unit : mm



Weight : 0.04g (Typ.)