

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

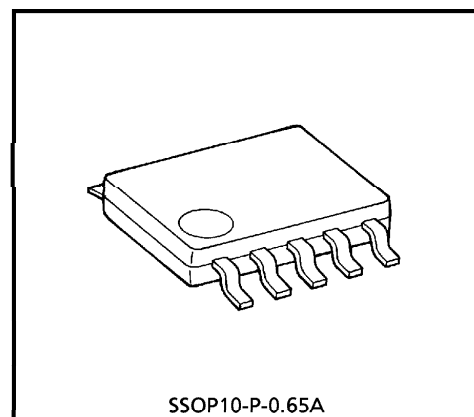
# TA8573FN

## 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.

### 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 0mA<sub>p-p</sub> to 50mA<sub>p-p</sub>.
- The TA8573FN can drive until 30mA<sub>p-p</sub>.
- The TA8573FN monitors LD-pin connection. When LD voltage is lower than 1.25V, power save mode is selected ( $I_{CC} = 3.5\text{mA}$  (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

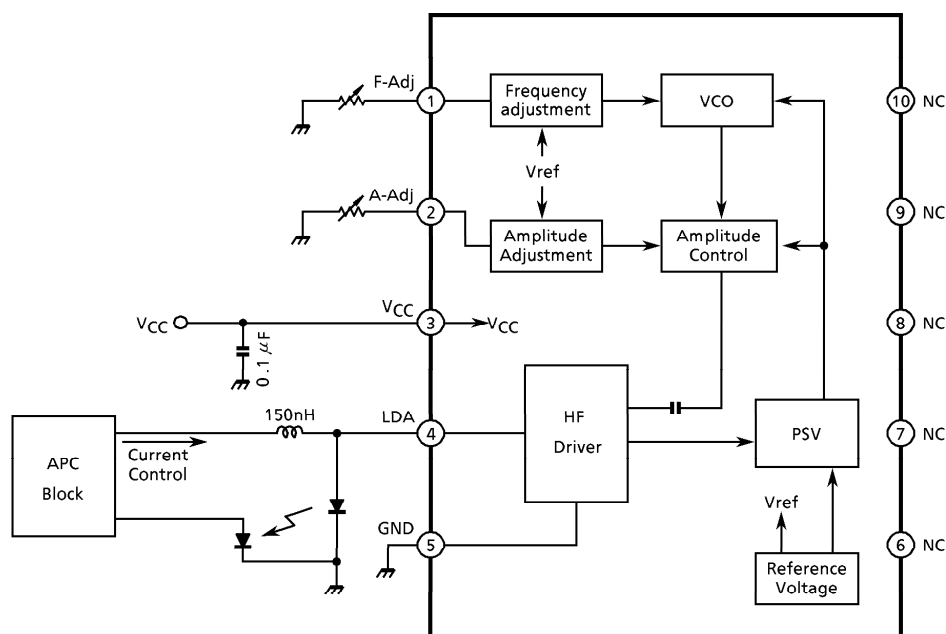


Weight : 0.04g (Typ.)

980910EBA1

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury, or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

## 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  $f_{(HFM)} = 150\text{MHz} \sim 400\text{MHz}$   
Accuracy of setting frequency  $\leq \pm 20\%$
- The amplitude of modulation is adjustable by an external resistor (R A-Adj).  
Adjustable range of  $I_{(HFM)} = 0 \sim 50\text{mA}_{p-p}$

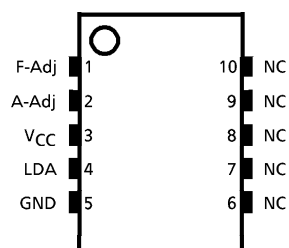
## 2. Power save mode

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. ( $I_{CC} = 3.5\text{mA}$  (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 <sub>CC</sub>	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 <sub>CC</sub>	7	V
Input Pin Voltage	V <sub>IN</sub>	-0.3~V <sub>CC</sub> +0.3	V
Output Drive Current (LDA)	I <sub>OUT</sub>	30	mA
Consumption Current	I <sub>CC</sub>	9	mA
Storage Temperature	T <sub>STG</sub>	-55~150	°C

**RECOMMENDED OPERATION CONDITION**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V <sub>CC</sub>	4.5~5.5	V
Operating Temperature	T <sub>OPR</sub>	-20~85	°C

**ELECTRICAL CHARACTERISTICS** (Unless otherwise specified, V<sub>CC</sub> = 5V, Ta = 25°C)

## 1. Current Consumption

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current (Active Mode)	I <sub>CC</sub>	1	V <sub>LDA</sub> = 2.3V		7	9	mA
Power Supply Current (Power Save Mode)	I <sub>PSV</sub>	2	V <sub>LDA</sub> = 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 <sub>osc</sub> (DC)	3	V <sub>LDA</sub> = 2.3V	-13	-22	-30	mA
*Current Amplitude of Modulation	I <sub>osc</sub>	—	R <sub>A-Adj</sub> = 5kΩ	20			mAp-p
*Output Voltage of LDA Pin	V <sub>op</sub>	—		1.9	2.3	2.7	V

## 3. Oscillator Block

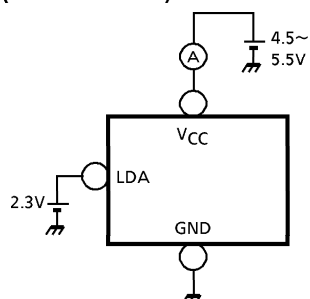
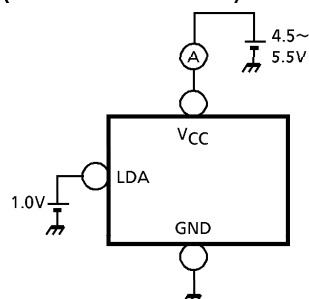
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
*Frequency Adjustable Rang	f <sub>osc</sub>	—		150		400	MHz
Accuracy of Setting Frequency	T <sub>fosc</sub>	4	215MHz (R <sub>F-Adj</sub> = 20kΩ) 300MHz (R <sub>F-Adj</sub> = 11kΩ) 350MHz (R <sub>F-Adj</sub> = 9.1kΩ)	-20		+20	%

## 4. Power Save Block

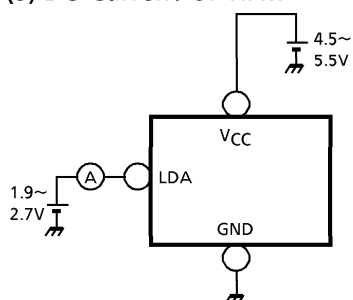
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Monitoring Voltage of LDA pin	V <sub>ref</sub>	5		1.0	1.25	1.5	V

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

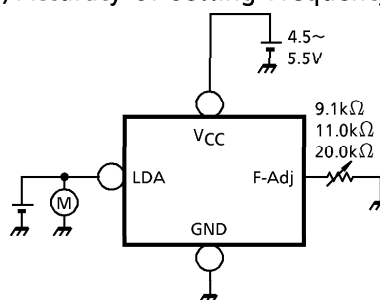
## TEST CIRCUIT

(1) Power Supply Current  
(Active Mode)(2) Power Supply Current  
(Power Save Mode)

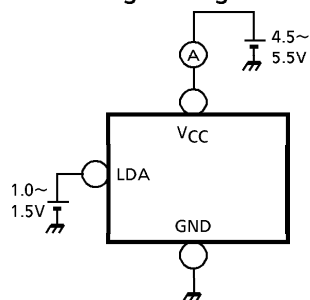
(3) DC Current of HFM



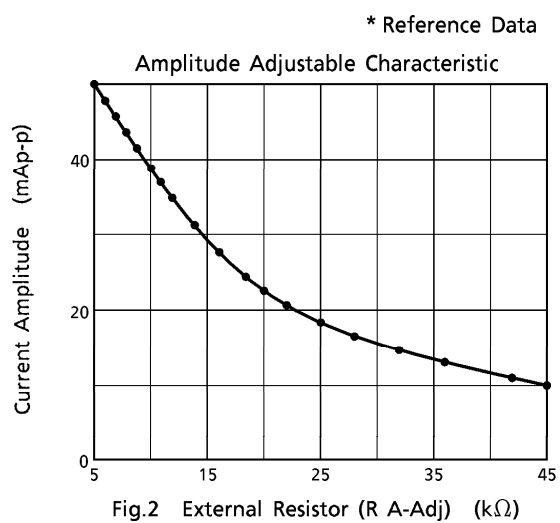
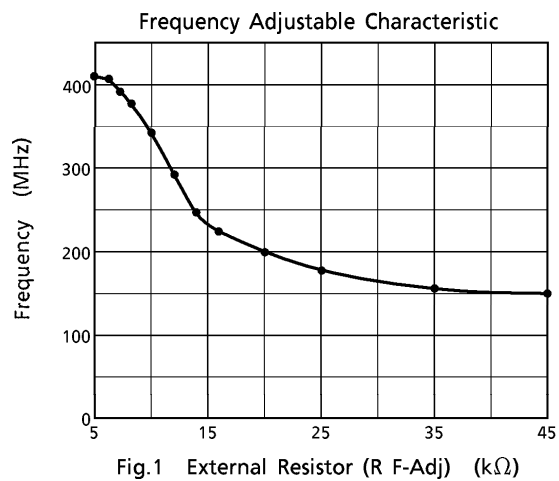
(4) Accuracy of Setting Frequency



(5) Monitoring Voltage of LDA Pin

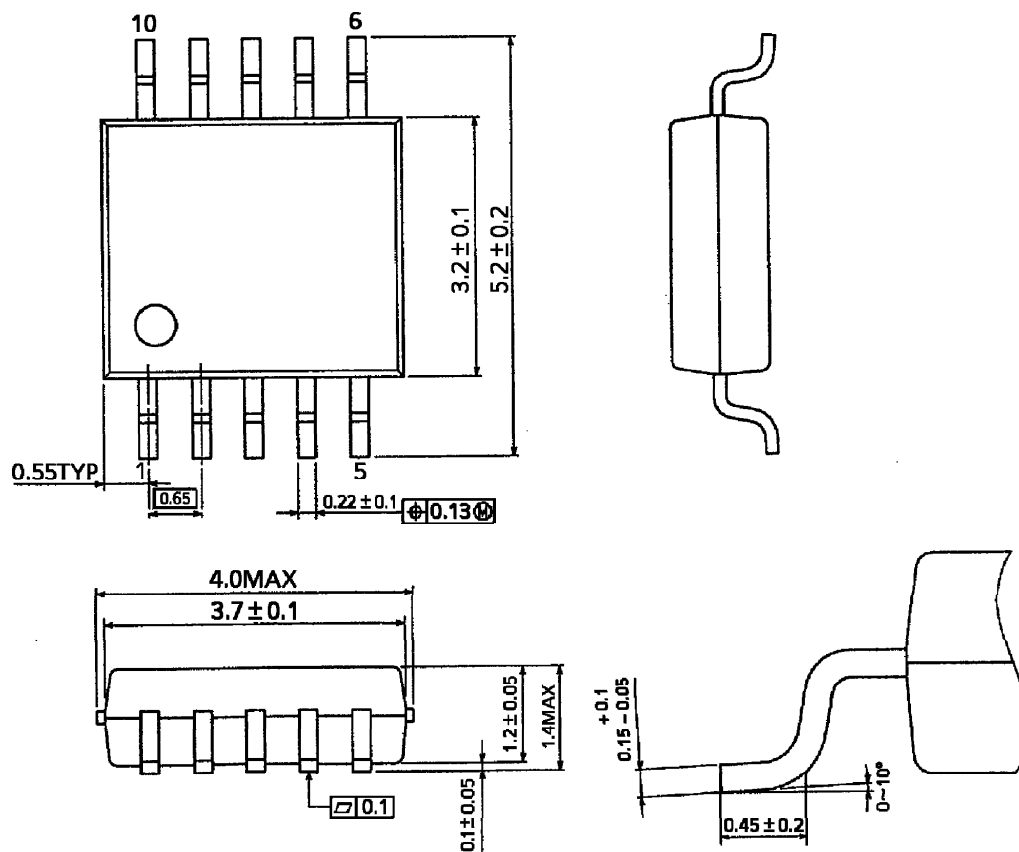


## HFM CHARACTERISTICS



**OUTLINE DRAWING**  
SSOP10-P-0.65A

Unit : mm



Weight : 0.04g (Typ.)