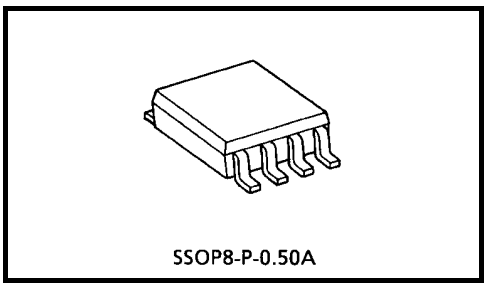
TOSHIBA Bipolar Linear Integrated Circuit

TAH8N401K

4-Channel Constant Current Driver IC

This IC is including 4-channel constant current drive circuit.
Use only one resistor for setting drive current.
Suitable for parallel White - LED driving circuit.

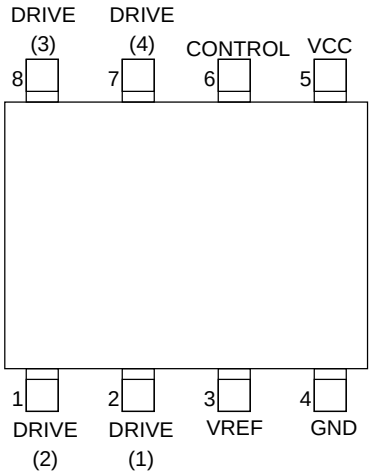


Weight: 0.01 g (Typ)

Features

- Including reference voltage for stable current drive
- Good current pairing performance
- Including high temperature current derating circuit
- Need only one resistor for current setting

Terminal Layout (top view)



Marking

2DF3

Maximum Ratings (Ta = 25°C)

Item	Symbol	Rating	unit
Supply Voltage	V_{CC}	7	V
Drive Current	I_{DRIVE}	100 (*1)	mA
Power Dissipation	P_D	200 (*2)	mW
		400 (*3)	
Operation Tempareture	T_{opr}	-40~85	°C
Storage Tempareture	T_{stg}	-55~150	°C

*1: 4-Channel Total

*2: Unit Rating

*3: Mounted on a glass epoxy circuit board of 30 × 30 mm Pad dimension of 70 mm^2

Recommended Operation Condition (Ta = 25°C)

Item	Symbol	Conditon	Unit
Supply Voltage	V_{CC}	2.5~4.5	V
Drive Current	I_{DRIVE}	80 (*4)	mA

*4: 4-Channel Total。

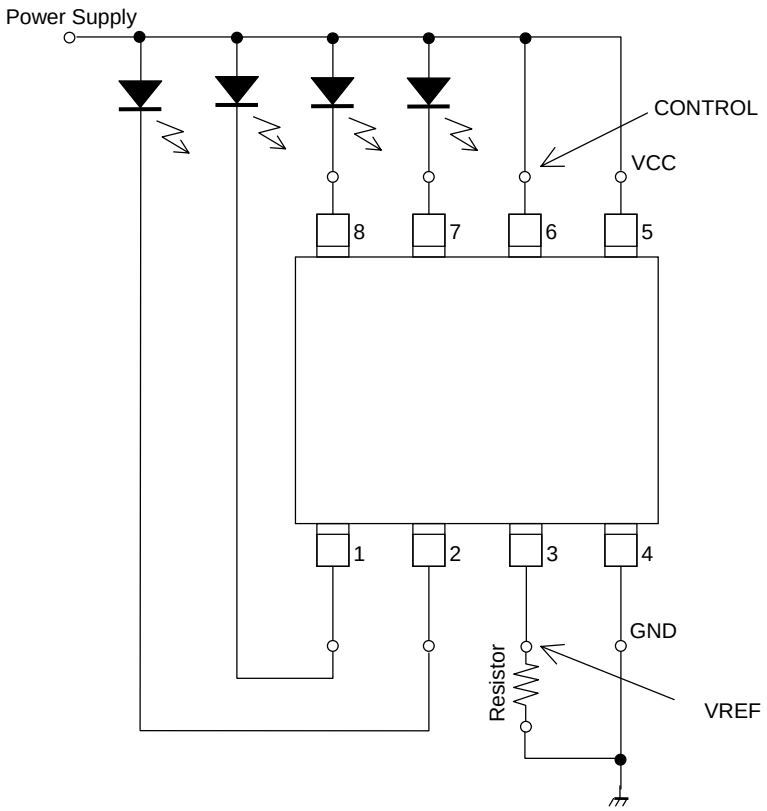
Our recommendation is 20mA each circuit based on V_{CC} = 3.6V

Electrical Characteristics (Unless otherwise specified, V_{CC} = 4.5V, T_a = 25°C)

Item	Symbol	Condition	Min	Typ	Max	unit
Supply Current	I_{CC}	I_{DRIVE} = 80mA (4-channel Total)	---	1.5	4	mA
OFF Leak Current	I_{LEAK}	CONTROL OFF	---	1	10	μA
Drive current (each)	I_{DRIVE}	V_{CC} = 3.6V, V_{LOAD} = 3.4V, $I_{CURRENT}$ = 0.2mA	18	20	22	mA
Current Difference	ΔI_{DRIVE}	I_{DRIVE} (MAX) - I_{DRIVE} (MIN)	---	----	2	mA
Saturate Voltage	V_{DRIVE}(SAT)	I_{DRIVE} = 20mA		0.1	0.2	V
REF Terminal Voltage	V_{REF}	---	1.07	1.17	1.27	V
Control Voltage(ON)	$V_{CT\ (ON)}$	---	2.0	---	V_{CC}	V
Control Voltage(OFF)	$V_{CT\ (OFF)}$	---	---	---	0.3	V

Application Note (4-Channel White LED Drive Circuit)

1. Example of Application Circuit



2. Notice of using application note

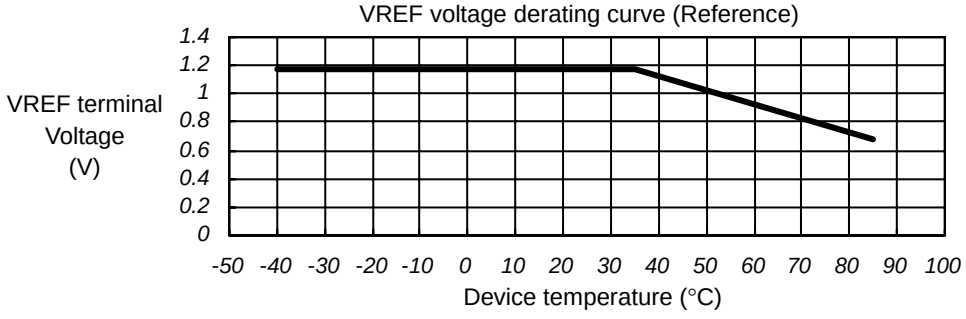
The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.

When use this device, please care ambient condition, precision of peripheral parts and safety margin.

3. Operation of IC

This device is high precision 4-Channel constant current driver with only one external resistor for drive current setting. Internal reference voltage is output on VREF terminal. Output current is setting by resister value between VREF terminal and GND.

This device has high temperature derating circuit. VREF terminal voltage falls gradually due to the device temperature for protecting white-LEDs. Below is reference derating curve of VREF terminal voltage.



4. External resister setting

Below is external resistor calculation expression.

On the occasion of a resistance setup, we recommend a setup with the margin which can drive current value needed at worst after confirming the standard of each item by the electrical characteristics. In addition, please use it not to exceed the maximum rating in any cases.

External resistor = VREF terminal voltage / (Drive current / 100)

5. Calculation example

When minimum each channel 15mA is needed, it is necessary to read the minimum value of VREF terminal voltage in a data sheet first.

VREF terminal voltage minimum is 1.07V

Resistance is calculated using this minimum voltage.

1.07V / (15mA / 100) = 7.13kΩ

Next, you have to take the accuracy of drive current into consideration. Since 10% of variation can be read in a data sheet, in the case of the resistance calculated by the above-mentioned calculation, only 18mA can be driven in a worst case. Then, it is necessary to make resistance small by 10% of margin.

7.13 kΩ / 1.1 = 6.48 kΩ

If it is this resistance, it will become possible to drive 20mA current. Furthermore, it verifies about the case where current becomes large most with this resistance, for a safety operation. It is as follows if a specification is read and calculated from a data sheet.

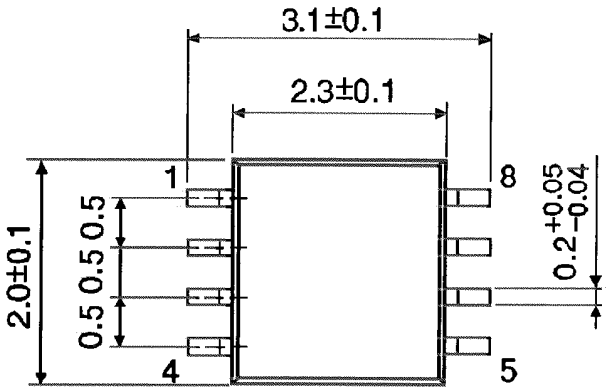
Drive current maximum = (1.27 / 6.48 kΩ) x 100 = 19.6mA

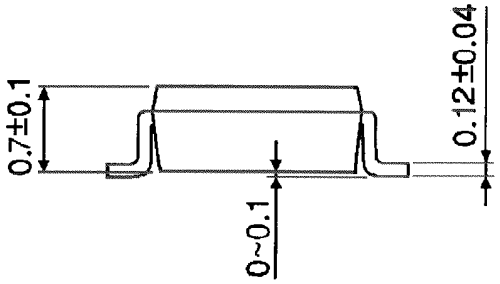
Since the calculation result has become less than the maximum rating, it turns out that there is no problem in use with this resistance. The design which took external factors, such as variation in resistance, ambient temperature, and product temperature, into consideration besides product variation is required.

Package Outline

SSOP8-P-0.50A

Unit : mm





Weight: 0.01 g (Typ.)