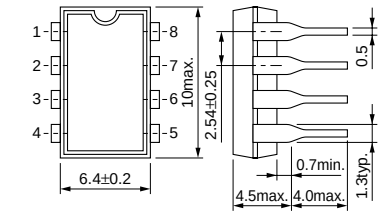
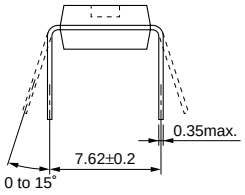
# GN8061

## GaAs IC

For semiconductor laser drive

Unit : mm




1 : GND
2 : $V_{Ib1}$
3 : $V_{Ib2}$
4 : OUT
5 : $V_{IP}$
6 : $V_{DD}$
7 : $V_{IN}$
8 : $V_{SS}$

8-Lead Plastic DIL Package

## ■ Features

- High-speed switching
- High output
- Pulse current and DC bias current can be controlled.

## ■ Absolute Maximum Ratings (Ta = 25˚C)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Power supply voltage | $V_{DD}$ | 6 | V |
| | $V_{SS}$ | – 6 | V |
| Pin voltage | $V_{Ib1}$ * 1 | 6 | V |
| | $V_{Ib2}$ | 0.5 | V |
| | $V_{IN}$ | – 0.5 to $V_{DD}$ –1.5 | V |
| | $V_{Ip}$ * 5 | 1.5 to 6 | V |
| | $V_{OUT}$ * 1 | 6 | V |
| Power current | $I_{DD}$ * 4 | 55 | mA |
| | $I_{SS}$ | 40 | mA |
| Output current | $I_{OUT}$ | 225 | mA |
| Allowable power dissipation | $P_D$ * 2 | 700 | mW |
| Channel temperature | $T_{ch}$ | 150 | ˚C |
| Storage temperature | $T_{stg}$ | – 55 to +150 | ˚C |
| Operating ambient temperature | $T_{opr}$ * 3 | –10 to + 75 | ˚C |

* 1 Do not apply the voltage higher than the set $V_{DD}$.
* 2 Guaranteed for the unit in the natural atmosphere.
* 3 IC circuit functioning range. Note however that the electrical characteristics shown at Ta= 25˚C is not guaranteed.
* 4 $I_{DD}$ is a current when the pulse output current and bias output current are zero.
* 5 Voltage when the constant current source has been connected.

## ■ Electrical Characteristics (Ta = 25˚C)

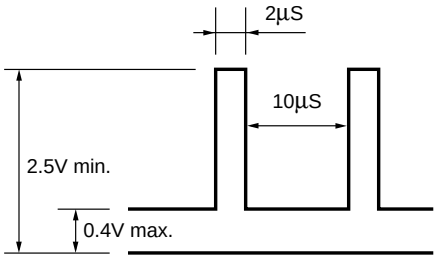
| Parameter | Symbol | Test circuit | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Pulse output current | $I_{pmax.}$ | 1 | $V_{IN}$= 2.0V, $V_{Ib2}$= – 5V | 100 | 120 | | mA |
| | $I_{pmin.}$ | 1 | $V_{IN}$= 0.4V, $V_{Ib2}$= – 5V | | 1 | 5 | mA |
| Bias output current | $I_{bmax.}$ | 2 | $I_P$= 0, $V_{Ib1}$= 5V, $V_{Ib2}$= 0 | 80 | 100 | | mA |
| | $I_{bmin.\ 1}$ | 2 | $I_P$= 0, $V_{Ib1}$= 0, $V_{Ib2}$= 0 | | 1 | 5 | mA |
| | $I_{bmin.\ 2}$ | 2 | $I_P$= 0, $V_{Ib1}$= 5V, $V_{Ib2}$= – 5V | | 0.05 | 0.1 | mA |
| Supply current | $I_{DD}$ * 1 | 2 | $V_{Ib1}$= 5V, $V_{Ib2}$= – 5V, $V_{IN}$= 0.4V | | 35 | 55 | mA |
| | $I_{SS}$ | 2 | $I_P$= 0 | | 25 | 40 | mA |
| Input voltage | $V_{IH}$ | | | 2.5 | | | V |
| | $V_{IL}$ | | | | | 0.4 | V |
| Rise time | $t_r$ * 2 | 3 | $V_{Ib1}$= 0, $V_{Ib2}$ – 5V, $I_P$ =100mA | | | 7 | ns |
| Fall time | $t_f$ * 2 | 3 | | | | 5 | ns |

Note : Following condition is applied unless otherwise specified: $V_{DD}$= 5V, $V_{SS}$= – 5V, $V_{Ib1}$= 0V, $V_{Ib2}$= 0V
Set the supply current of constant current source to $I_P$=120mA and load resistance to $R_L$=10Ω

* 1 The current value to be supplied from the 5V power supply is a total sum of this value plus the pulse output current and bias output current.

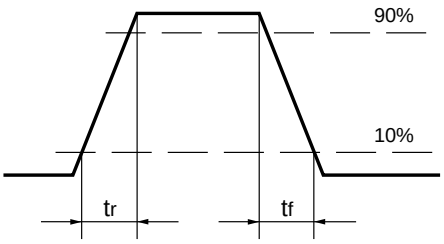
* 2 Waveform of input and output signals

Input signal



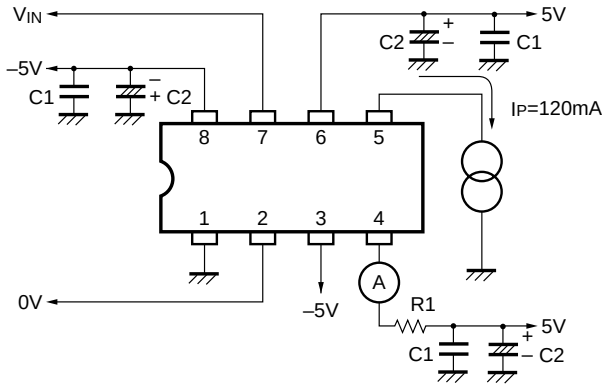

* The rise/fall time of the input signal is 2ns (10 to 90%)

Output waveform

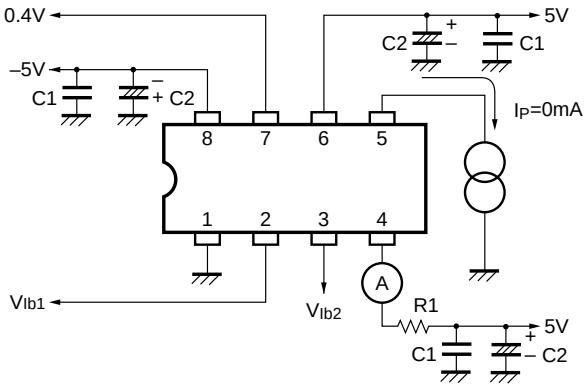



tr ··· 10% to 90%
tf ··· 90% to 10%

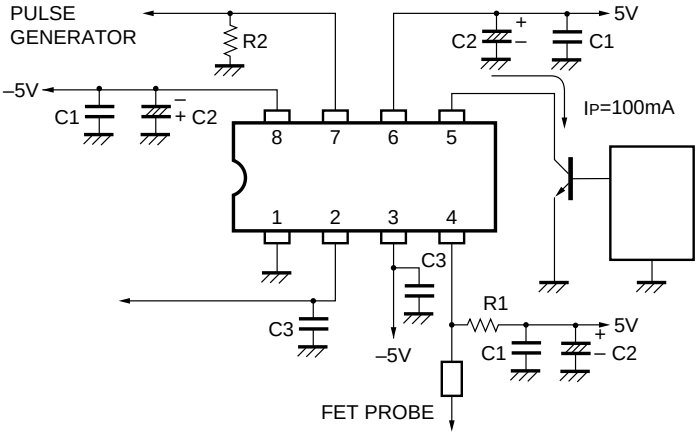
## Test circuit 1




## Test circuit 2

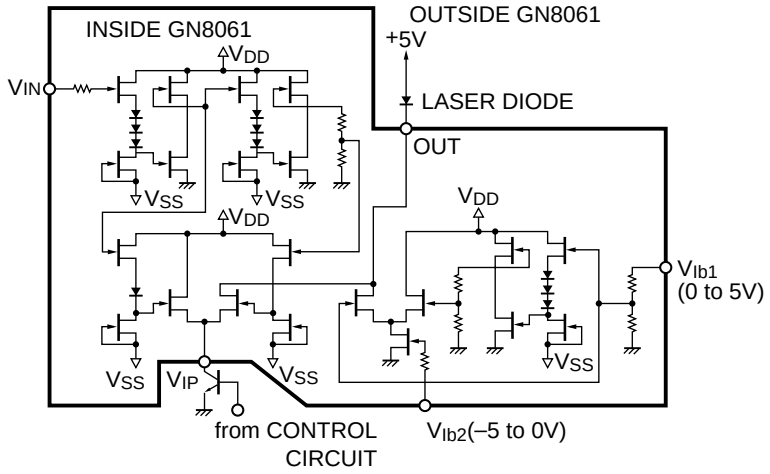



## Test circuit 3



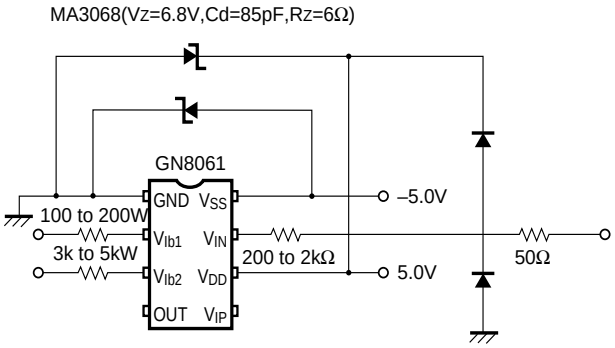

$C_1$ : 0.1µF
$C_2$ : 3.3µF
$C_3$ : 2200pF
$R_1$ : 10Ω
$R_2$ : 50Ω

## ■ Block Diagram

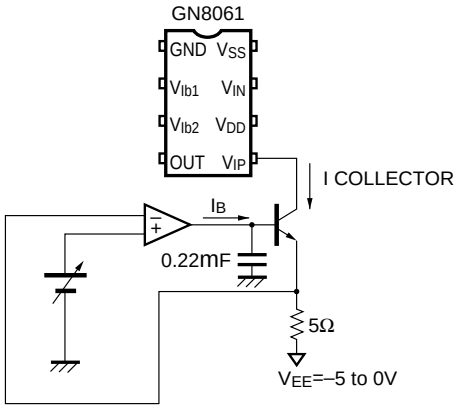



## ■ Caution for Handling

1) The recommended $V_{IN}$ voltage is 2.5 to 3V for [H] and 0 to 0.4V for [L].
2) Do not apply $V_{IN}$ while the power supply is OFF.
3) For the current source to be connected to the $V_{IP}$ pin, use a Si bipolar transistor as shown in the circuit diagram.
   (Example: 2SD874)
   To connect a resistor to the emitter or collector, use a resistor of a few ohm. The use of higher resistor may cause large change in the voltage at the $V_{IP}$ pin, and may make the output waveform distortion. (See the pulse output current control example).
   To use another current control circuit, set so that the $V_{IP}$ pin voltage becomes around 2V.
4) When mounting, minimize the connection distance between the semiconductor laser and IC, and use the chip parts (C, R) of less parasitic effects.
5) Attention to damage by the power surge (see the example connection of the pin protection circuit).
   During handling, take care to ground the human body and solder iron tip.
6) The current value of the current source connected to the $V_{IP}$ pin should be zero to protect the semiconductor laser when the power supply is turned ON and OFF.
   When the power supply is ON, make $V_{SS}$ to rise earlier than $V_{DD}$. When the power supply is OFF, make $V_{DD}$ to fall earlier than $V_{SS}$. When $V_{DD}$= 5V, $V_{SS}$= 0 even transitionary, the current of about 30mA flows through the semiconductor laser.
7) Pay attention to release the heat.

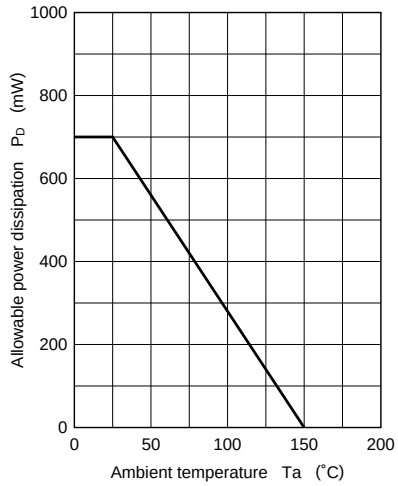



Connection example of pin protection circuit

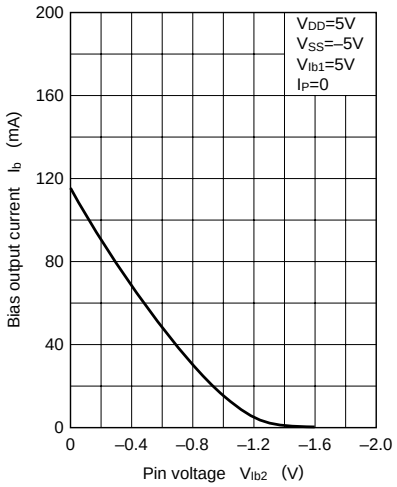



Example of pulse output current control circuit

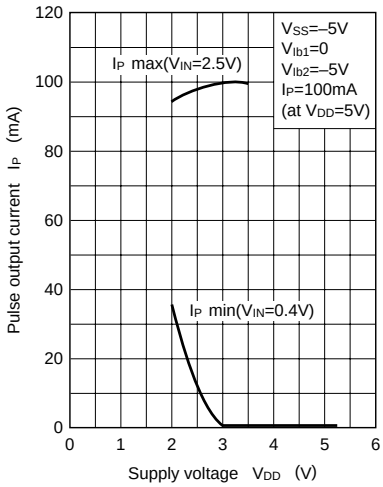
$P_D - Ta$



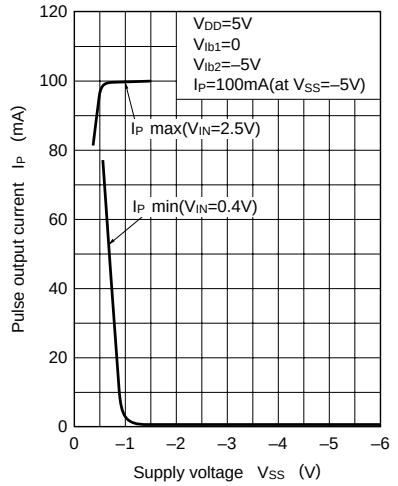

$Ib - V_{lb2}$



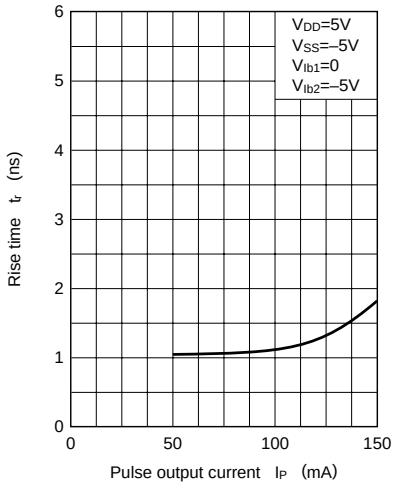

$I_P - V_{DD}$



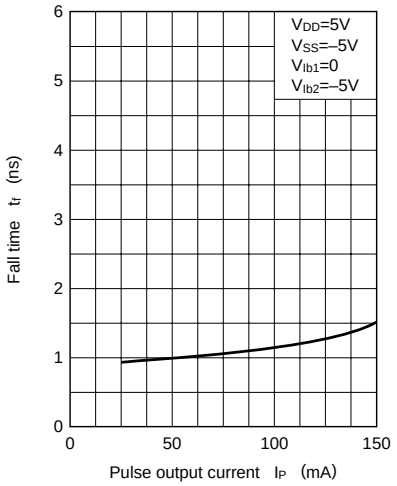

$I_P - V_{SS}$



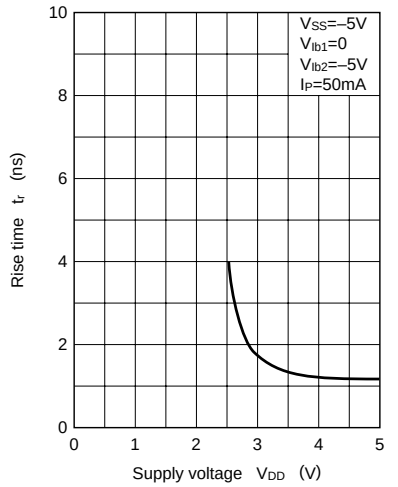

$t_r - I_P$



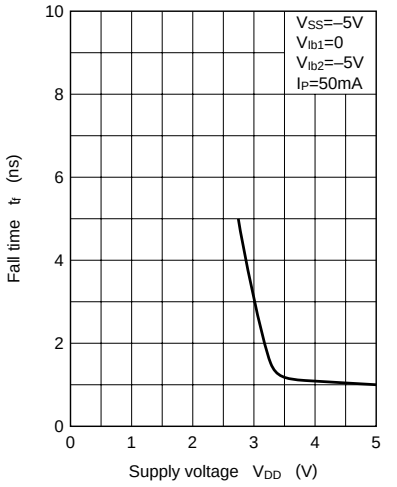

$t_f - I_P$



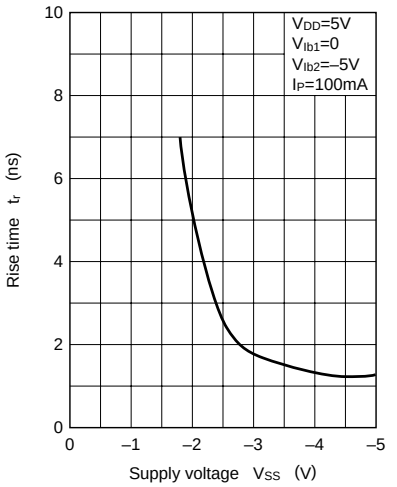

$t_r - V_{DD}$



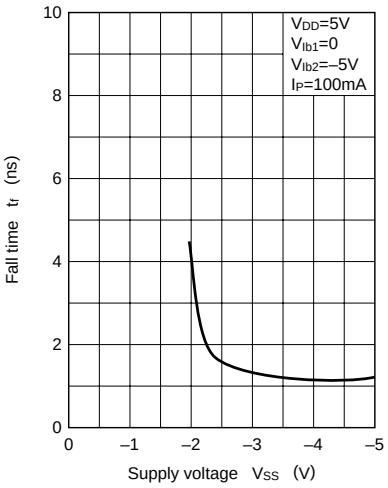

$t_f - V_{DD}$




$t_r - V_{SS}$



$t_f - V_{SS}$


10
8
6
4
2
0
0
–1
–2
–3
–4
–5
VDD=5V
Vlb1=0
Vlb2=–5V
IP=100mA
Fall time tf (ns)
Supply voltage VSS (V)