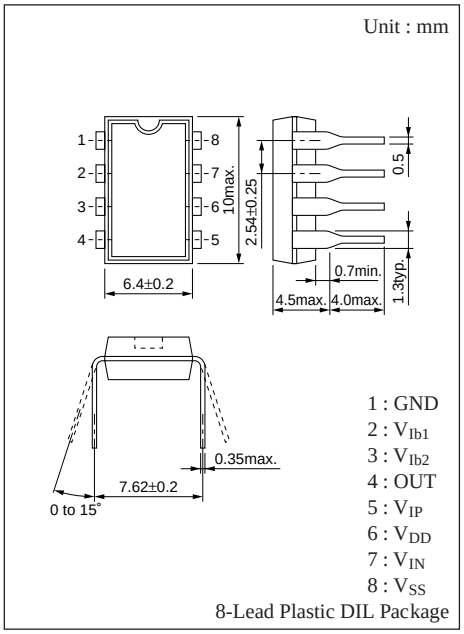
GN8061

GaAs IC

For semiconductor laser drive



■ 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)

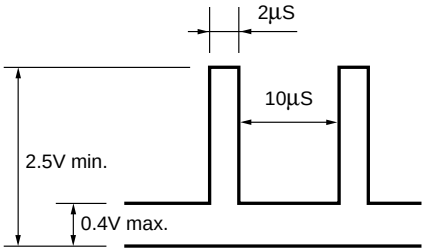
Parameter	Symbol	Test circuit	Condition	Min	Typ	Max	Unit
Pulse output current	$I_{pmax.}$	1	V_{IN}= 2.0V, V_{Ib2}= – 5V	100	120		mA
	$I_{pmin.}$	1	V_{IN}= 0.4V, V_{Ib2}= – 5V		1	5	mA
Bias output current	$I_{bmax.}$	2	I_P= 0, V_{Ib1}= 5V, V_{Ib2}= 0	80	100		mA
	$I_{bmin.\ 1}$	2	I_P= 0, V_{Ib1}= 0, V_{Ib2}= 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.

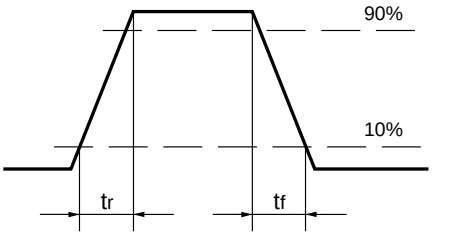
* 2 Waveform of input and output signals

Input signal



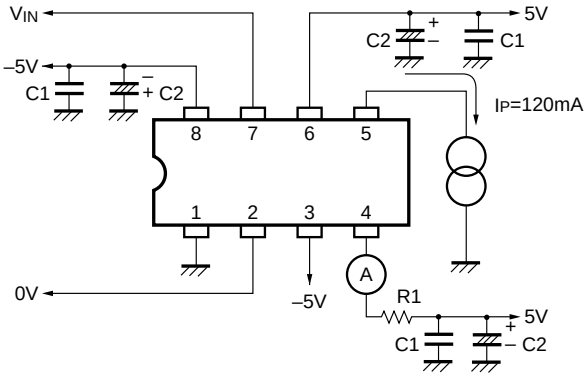
✻ The rise/fall time of the input signal is 2ns (10 to 90%)

Output waveform

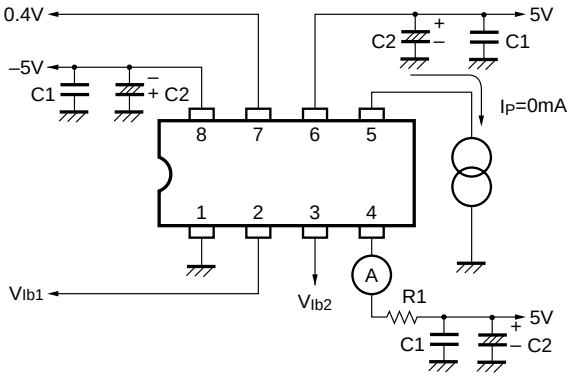


tr ··· 10% to 90%
tf ··· 90% to 10%

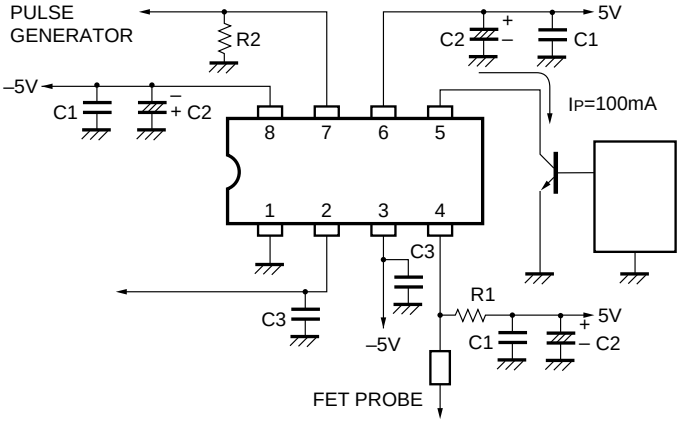
Test circuit 1



Test circuit 2

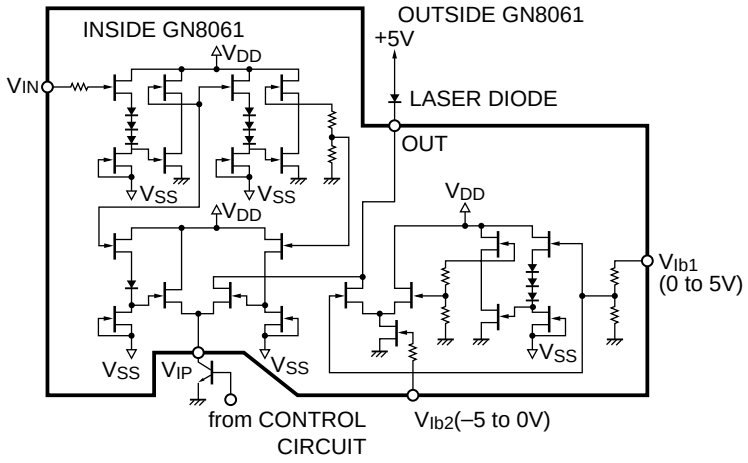


Test circuit 3



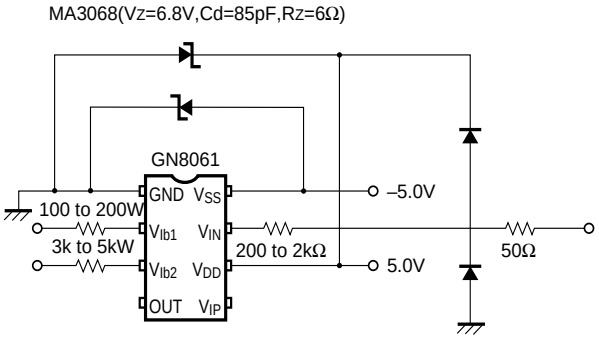
C_1 : 0.1µF
C_2 : 3.3µF
C_3 : 2200pF
R_1 : 10Ω
R_2 : 50Ω

■ Block Diagram

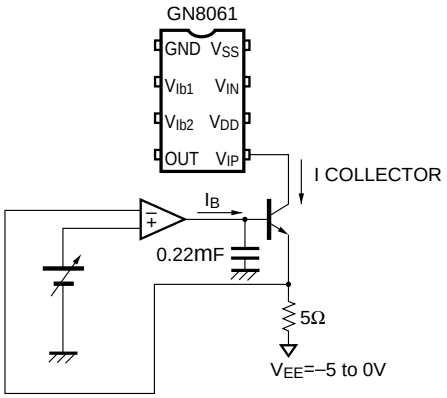


■ Caution for Handling

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.

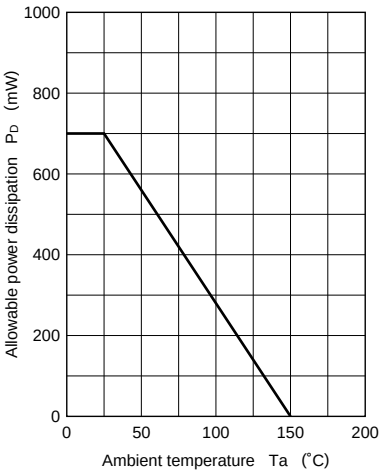


Connection example of pin protection circuit

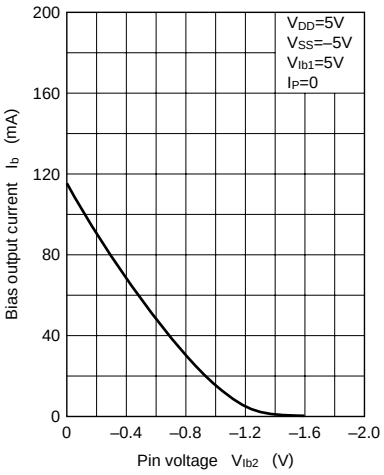


Example of pulse output current control circuit

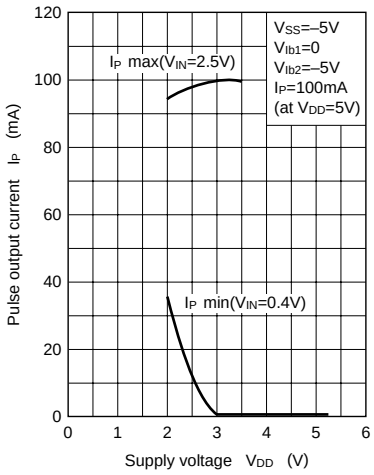
$P_D - Ta$



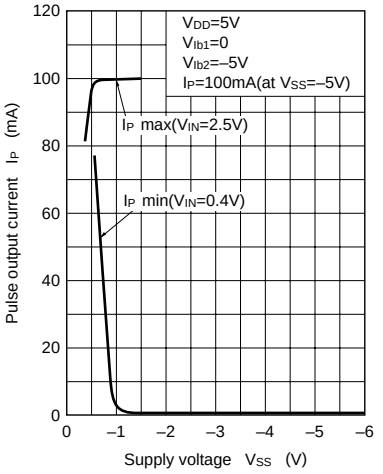
$Ib - V_{lb2}$



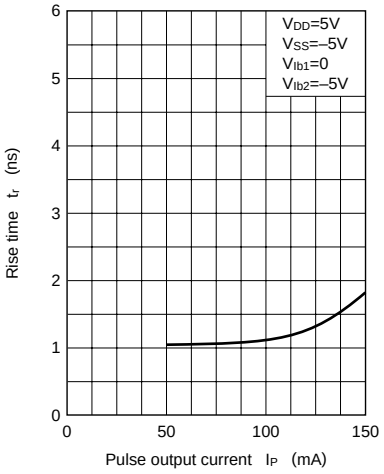
$I_P - V_{DD}$



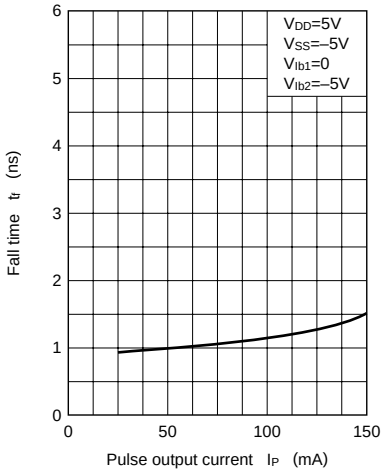
$I_P - V_{SS}$



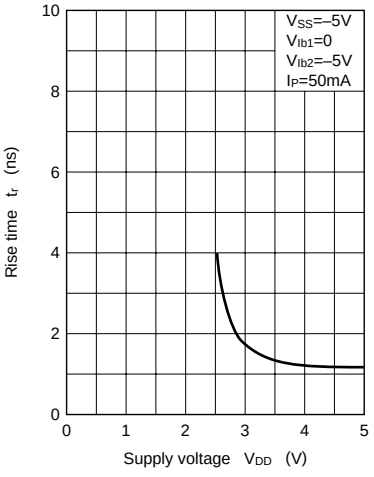
$t_r - I_P$



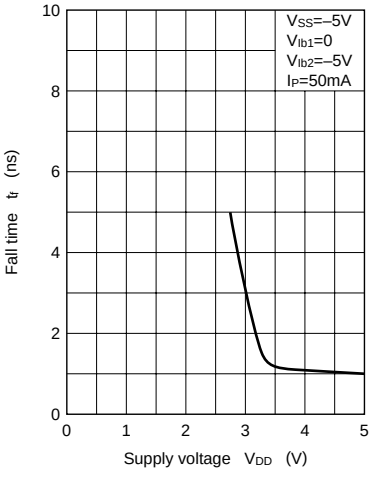
$t_f - I_P$



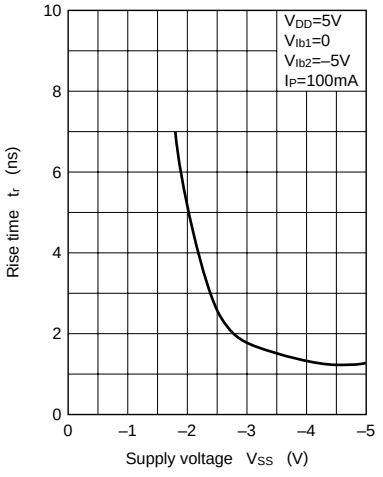
$t_r - V_{DD}$



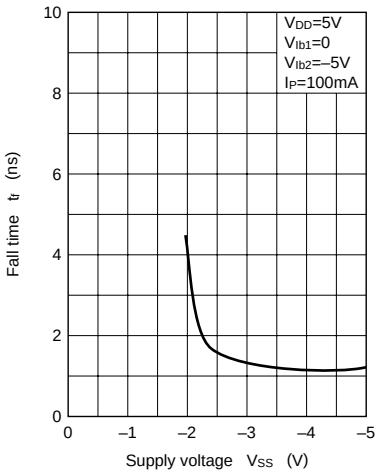
$t_f - V_{DD}$



$t_r - V_{SS}$



$t_f - V_{SS}$


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