

PREAMPLIFIER FOR REMOTE CONTROL USE

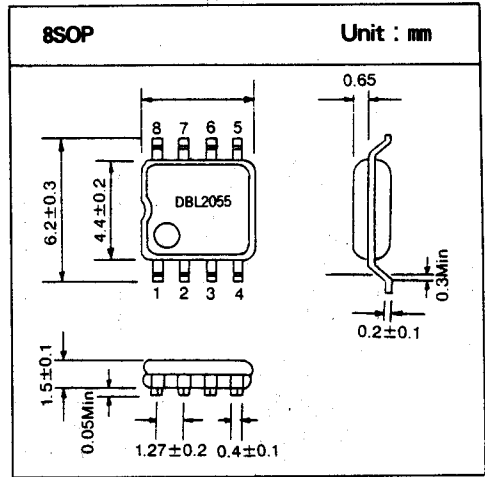
The DBL2055 is a bipolar IC for receiving preamplifier of infrared remote control system. It consists of a head amplifier, a limiter, a band pass filter, a signal waveform detector, and a waveform rectifier, etc.

□ FEATURES

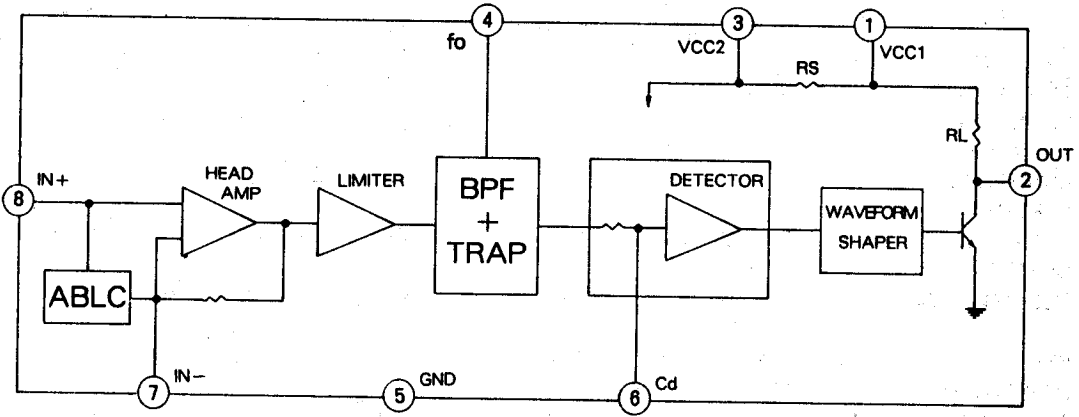
- Built-in filter enable to vary center frequency by an external resistance.
($f_0 = 30\text{kHz}$ to 80kHz , 38kHz typ.)
- Possible to direct connection to a photo diode.
- Open collector output (directly connectable to TTL and CMOS)
- Internal pull-up resistance and power filter resistance (low-capacitance)
- Less chances of malfunction associated with a high frequency lighting floure internal trap circuit

□ MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
SUPPLY VOLTAGE	V_{cc}	17	V
INPUT VOLTAGE	V_{in}	5	Vp-p
OPERATING TEMPERATURE	T_{ope}	$-20 \sim 75$	$^\circ\text{C}$
STORAGE TEMPERATURE	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$
ALLOWABLE POWER DISSIPATION	P_d	270	mW



BLOCK DIAGRAM



PIN DESCRIPTION

Pin No.	Symbol	Pin Voltage	Description
1	Vcc1	5.0	The Power Supply Voltage
2	Out	5.0	Active Low Output Terminal and an Open Collector Output
3	Vcc2		The Power Output Voltage
4	fo	1.4	Setting the Center Frequency of the Built-in BPF
5	GND	—	Ground
6	Cd	1.5	The Detection Capacitor for the most Output Pulse Width Variation and Noise Reduction
7	IN-	2.5	Setting the Frequency Characteristics and Gain of the Head Amplifier
8	IN+	2.5	The Input Signal Internal Impedance : 75k Ω (typ.)

ELECTRICAL CHARACTERISTICS (V_{cc}=5V, T_a=25°C)

Item	Symbol	Test Condition		Test Pin	Rating			Unit	Remark
		Input Signal	ON-SW		Min.	Typ.	Max.		
INPUT PIN VOL.1	V _{in1}		1	8	2.0	2.5	3.1	V	
INPUT PIN VOL. 2	V _{in2}	I _{in} =300μA	1,4,6	8	0.8	0.9	1.7	V	
OUTPUT VOLTAGE (LOW LEVEL)	V _{OL}	V _{F6} =1V	3,5	2	—	0.2	0.4	V	
CONSUMPTION CURRENT	I _{cc}		1,5	1	1.0	1.9	2.8	mA	
INPUT IMPEDANCE	Z _{in}	f _{in} =38kHz, CW, V _{in} =0.2V _{PP}	1,4,8	8	45	75	125	kΩ	Note1
VOLTAGE GAIN	A _v	f _{in} =38kHz, V _{in} =30μV _{PP}	2,4,7,8	6	68	—	82	dB	
BPF BANDWIDTH	f _{BW}	-3dB BANDWIDTH V _{in} =30μV _{PP}	2,4,7,8	6	1.0	—	2.0	KHz	
DETECTING ABILITY(1)	T _{PW1}	f _{in} =38kHz V _{in} =60μV _{PP} , BURST WAVE	1,4,7,8	2	440	540	770	μSec	Note 2
DETECTING ABILITY(2)	T _{PW2}	f _{in} =38kHz V _{in} =50mV _{PP} , BURST WAVE	1,4,7,8	2	440	660	770	μSec	Note2

Note)

$$1. Z_{in} = \frac{75}{(V_i/V_x) - 1}$$

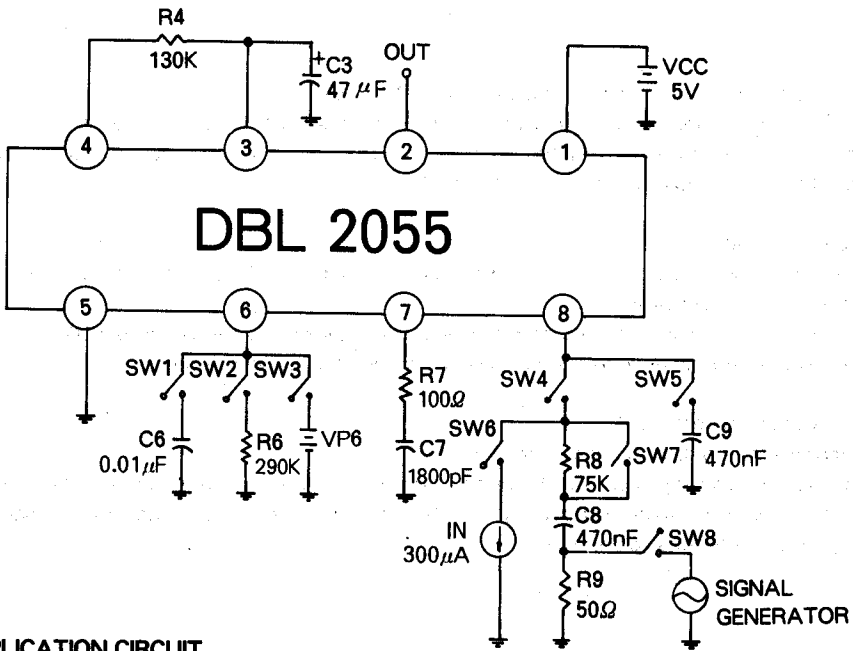
V_i : INPUT LEVEL,

V_x : MEASURED VALUE

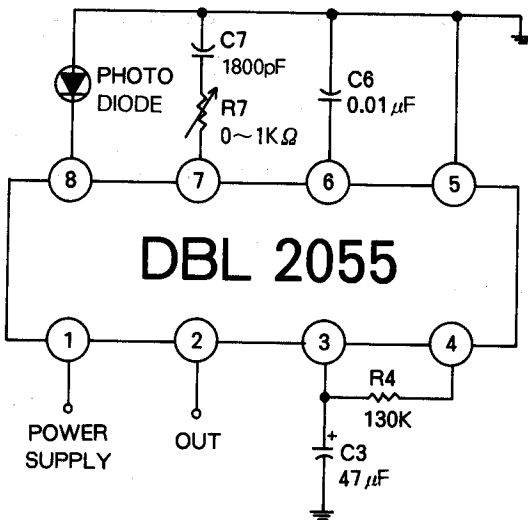
2. INPUT A BURST WAVE SIGNAL OF 1.2mSec CYCLE, 38kHz

DBL 2055

TEST CIRCUIT



APPLICATION CIRCUIT



□ TERMINAL FUNCTIONS

IN+ (input pin)

Connect a photodiode with pin structure between the pin8 and GND.

An ABLC (Automatic Bias Level Control) circuit is built into the input section to prevent the input level from being saturated by the external disturbing lights, such that this circuit is actuated by a strong external disturbing light to fix the bias level of the input terminal.

IN- (headamplifier gain setting pin)

Connect a resistor and a capacitor in series between the pin7 and GND for setting the frequency characteristics and gain of the headamplifier.

Increasing the value of a resistor or decreasing the value of a capacitor, the gain becomes small.

When the capacitance is large the sensitivity is lowered against the transient response.

Cd (detector capacitor connector pin)

Connect the capacitor to detect between the pin6 to GND.

When capacitance is large detected value is closer to the average, when it is small detected value is closer to the peak and output pulse width becomes large. so that the most proper output pulse width variation and noise reduction characteristics can be obtained.

GND (ground pin)

fo (BPF central or frequency setting pin)

Connect a resistor between the pin3(Vcc2) and the pin4

When the resistance is large, the central frequency of the built-in is BPF is lowered.

Vcc2 (power output pin)

As the power is output to pin3 through the internal power filter resistance, connect an electrolytic capacitor to pin3

OUT (output pin)

Open collector output with pull-up resistance.

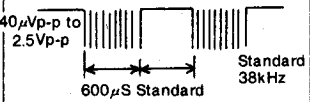
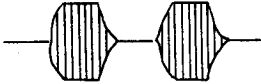

Its capability to drive a CMOS or TTL makes for easy connection with a receiving microcomputer.

The DBL2055 has an active low output.

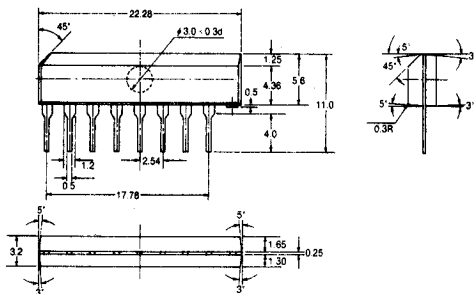
Vcc1 (power supply pin)

Supply voltage of $5V \pm 10\%$ is applied to this terminal

□ I/O WAVEFORMS DESCRIPTION

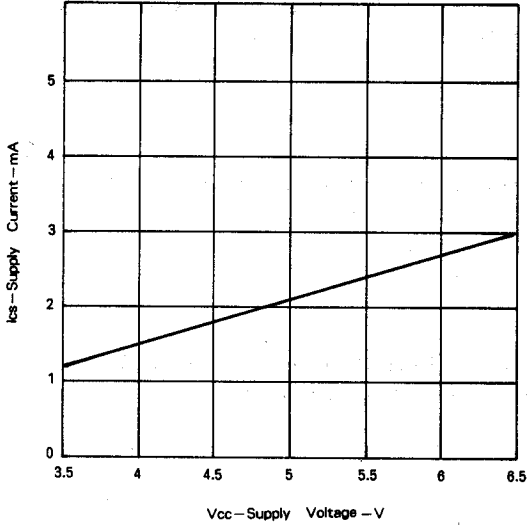
I/O Pin	Waveform	Operation
Input (Pin 8)		Converts the Signal Current of Photodiode into Voltage and amplifies it.
BPF Output (Pin 6)		Suppresses the Noise Component with BPF
Output (Pin 2)		Integrates the Signal Component and make it as Rectangular Wave Output from Comparator

□ OUTPUT DIMENSION (8SIP)

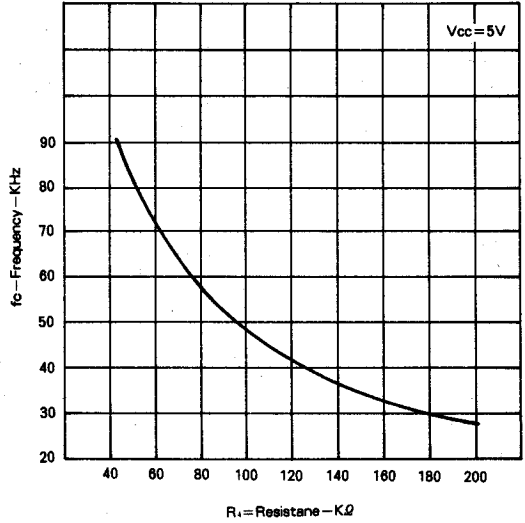


□ TYPICAL CHARACTERISTICS

Supply Current VS. Supply Voltage



Frequency VS Resistance (R_i)



Voltage Gain VS. Input Frequency

