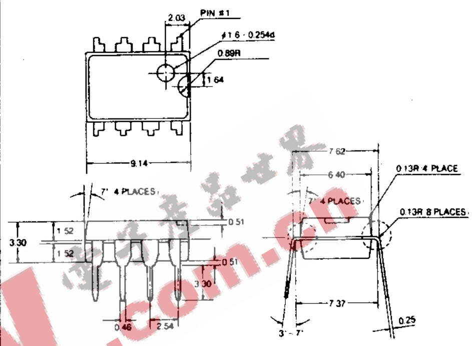
DBL 567

TONE DECODER

The DBL567 is general purpose tone decoders designed to provide a saturated transistor switch to ground when an input signal is present within the passband.

8DIP Unit: mm



☐ FEATURES

- ○ Logic compatible output with 100mA current sinking capability
- ○ 20 to 1 frequency range with an external resistor
- ○ Bandwidth adjustable from 0 to 14%
- ○ High rejection of out of band signals and noise
- ○ Immunity to false signals.
- ○ Highly stable center frequency
- ○ Center frequency adjustable from 0.01Hz to 500KHz

☐ APPLICATIONS

- ○ Touch tone decoding
- ○ Precision oscillator
- ○ Frequency monitoring and control
- ○ Wide band FSK demodulation
- ○ Ultrasonic controls
- ○ Carrier current remote controls
- ○ Communications paging decoders

☐ MAXIMUM RATINGS

Characteristic	Rating	Unit
Supply Voltage	10	V
Power Dissipation*	300	mW
V_8	15	V
V_3	−10	V
V_3	V_8+0.5	V
Storage Temperature	−55～+150	°C

* The maximum junction temperature is 150°C. The device must be derated based on a thermal resistance of 187°C/W, junction to ambient.

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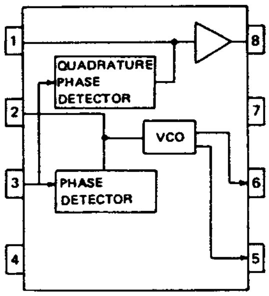
☐ BLOCK DIAGRAM



1. OUTPUT FILTER
2. LOOP FILTER
3. INPUT
4. Vcc
5. TIMING RESISTOR
6. TIMING CAPACITOR
7. GND
8. OUTPUT

☐ ELECTRICAL CHARACTERISTICS (AC Test Circuit, Ta = 25°C, V_{CC} = 5V)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage Range	V_{CC}	—	4.75	5	9	V
Power Supply Current Quiescent	I_{CCQ}	R_L = 20KΩ	—	6	8	mA
Power Supply Current Activated	I_{CC}	R_L = 20KΩ	—	11	13	mA
Input Resistance	R_{IN}	—	15	20	25	KΩ
Smallest Detectable Input Voltage	V_{IN-1}	I_L = 100mA, f = fo	—	20	25	mV_{rms}
Largest No Output Input Voltage	V_{IN-2}	I_C = 100mA, f = fo	10	15	—	mV_{rms}
Largest Simultaneous Outband Signal to Inband Signal Ratio	S_I/S_O	—	—	6	—	dB
Minimum Input Signal to Wideband Noise Ratio	S/N	B_n = 140KHz	—	-6	—	dB
Largest Detection Bandwidth	B.W	—	10	14	18	%of fo
Largest Detection Bandwidth Skew	$B.W_S$	—	—	2	3	%of fo
Largest Detection Bandwidth Variation with Temperature	$B.W_T$	—	—	±0.1	0.25	%1°C
Largest Detection Bandwidth Variation with Supply voltage	$B.W_V$	4.75V~6.75V	—	±1	±2	%/V
Highest Center Frequency	$f_{O\text{-}H}$	—	100	500	—	KHz
Center Frequency Stability	$f_{O\text{-}S}$	0°C < Ta < 70°C	—	35±60	—	ppm/°C
		−55°C < Ta < +125°C	—	35±140	—	ppm/°C
Center Frequency shift with supply voltage	$f_{O\text{-}V}$	4.75V~6.75V	—	0.5	2	%/V
Fastest ON-OFF Cycling Rate	$CR_{ON\text{-}OFF}$	—	—	fo/20	—	—
Output Leakage Current	I_{LEAK}	V_8 = 15V	—	0.01	25	μA
Output Saturation Voltage	V_{SAT}	V_{IN} = 25mV_{rms}, I_8 = 30mA	—	0.2	0.4	V
		V_{IN} = 25mV_{rms}, I_8 = 100mA	—	0.6	1	V
Output Fall Time	t_F	—	—	30	—	nS
Output Rise Time	t_R	—	—	150	—	nS

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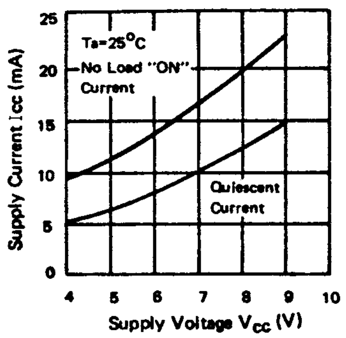
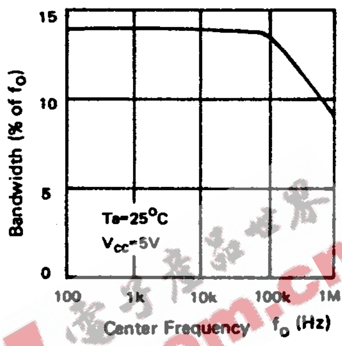
☐ TYPICAL PERFORMANCE CHARACTERISTICS

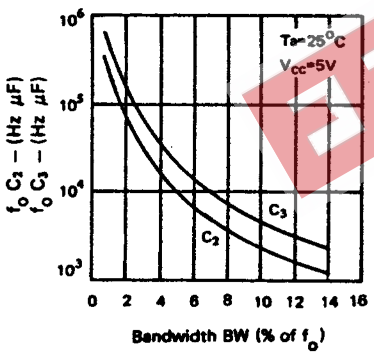
Icc – Vcc



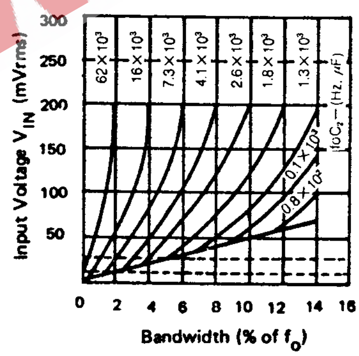
BW – f_o



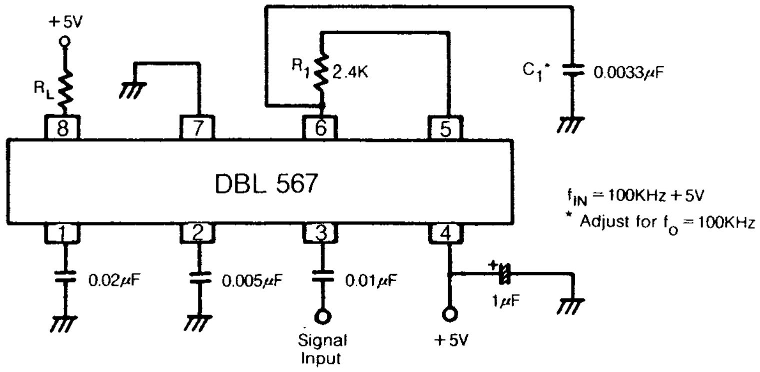
BW (C_2, C_3 Function)



V_{IN} – BW



☐ TEST CIRCUIT

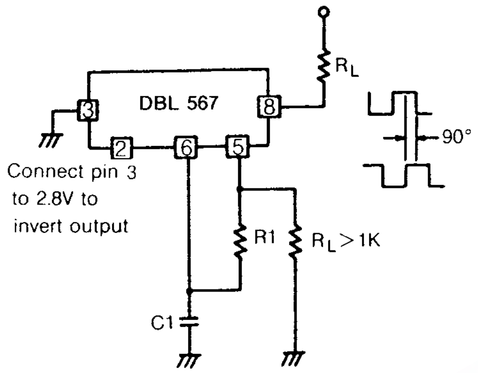


f_{IN} = 100KHz + 5V

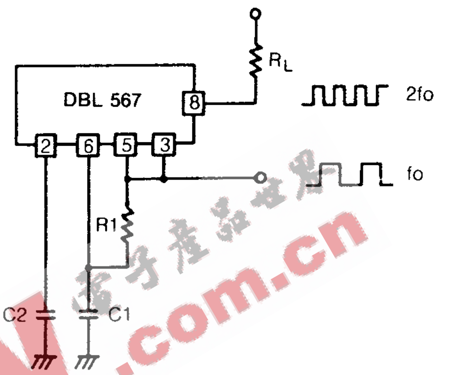
* Adjust for f_o = 100KHz

☐ APPLICATIONS

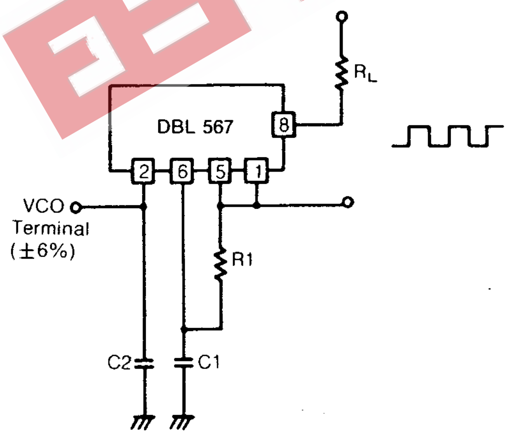
1. Oscillator with Quadrature Output



2. Oscillator with Double Frequency Output



3. Precision Oscillator to switch 100mA Loads



* The center frequency of the tone decoder is equal to the free running frequency of the VCO. This is given by

$$fo \simeq \frac{1}{1.1R_1C_1}$$

The bandwidth of the filter may be found from the approximation

$$B.W = 1070\sqrt{\frac{V_{IN}}{f_O C_2}} \text{ in \% of fo}$$

where

V_{IN} = Input voltage(volts rms), $V_{IN} \leqq 200mV_{rms}$

C_2 = Capacitance at Pin 2(μF)