



Hybrid Power Oscillator

OSC1758

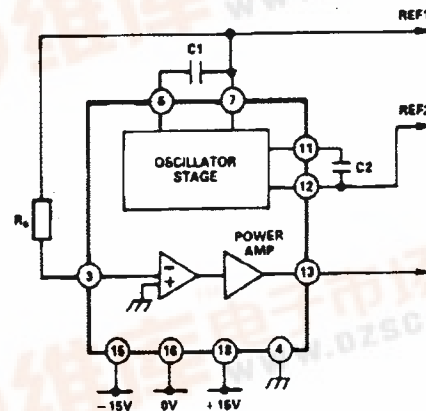
FEATURES

Full Military Temperature Range
Hybrid Construction
18-Pin DIL Package
0-10kHz Frequency Range
In-Phase and Quadrature Outputs

APPLICATIONS

Synchro Resolver, and Inductosyn[®] Excitation
LVDT Drive

FUNCTIONAL BLOCK DIAGRAM



GENERAL DESCRIPTION

The OSC1758 is a hybrid sine/cosine power oscillator which can provide a maximum power output of 1.5 watts, over 0 to 10kHz.

The device comprises two independent parts—an oscillator and a power amplifier.

The oscillator stage has two signal outputs, one 90° in phase advance with respect to the other.

The oscillator frequency is programmable in the range of 0 to 10kHz by two identical external capacitors.

The power amplifier stage is externally short circuit protected and has a gain of $2.8 \pm 1\%$. The maximum output current this stage can produce is 215mA rms (at 7V rms).

Connecting either of the oscillator stage outputs to the power amplifier input, using an external link, will give a nominal output of 7 volts rms. Lower voltages can be obtained by connecting an external resistor in series with the amplifier's inputs.

The OSC1758 is housed in an hermetically-sealed 18-pin DIL metal case, and operates over full military temperature range (-55°C to $+125^{\circ}\text{C}$), as well as the industrial (0 to $+70^{\circ}\text{C}$) temperature range.

MODELS AVAILABLE

The OSC1758 is available in both industrial and military temperature ranges. For details of how to specify the required part, see "Ordering Information".

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OSC1758—SPECIFICATIONS (typical @ +25°C with ±15V power supplies unless otherwise noted.)

Model	OSC1758/500	OSC1758/400
FREQUENCY RANGE	0-10kHz	*
FREQUENCY STABILITY ^{1,2}	± 5%	*
REFERENCE 1 OUTPUT ¹	2.5V rms ± 5% @ 3mA rms	*
REFERENCE 2 OUTPUT ¹	2.5V rms ± 5% @ 3mA rms 90° Phase Advanced with Respect to Ref. 1 Output	*
AMPLIFIER OUTPUT ³	7V rms @ 215mA max	*
CAPACITIVE LOAD	10nF (max)	*
AMPLIFIER GAIN ¹	2.8 ± 1%	*
AMPLIFIER INPUT RESISTANCE	5.35kΩ ± 1%	*
POWER DISSIPATION	4.0 Watts (max)	*
POWER SUPPLY ⁴	± 15V 60mA (max) No Load 160mA (max) Full Load	* *
TEMPERATURE RANGE		
Operating	0 to +70°C	-55°C to +125°C
Storage	-65°C to +150°C	*
SIZE	0.975" × 0.775" × 0.175" (24.8mm × 19.7mm × 4.5mm)	*
WEIGHT	0.25 ozs. 7 grams	*

NOTES

¹Over full operating temperature range.

²See section on "Stability".

³Derated to 5V rms @ 215mA if using ± 12 volt power supply.

⁴Will operate with ± 12 volt power supply with derated output voltage.

*Specifications same as OSC1758/500

Specifications subject to change without notice.

ABSOLUTE MAXIMUM VALUES WITH RESPECT TO SUPPLY GROUND

+V_S -0.3V to +18V
-V_S +0.3V to -18V

CONNECTING THE OSC1758

Figure 1 shows two alternative output range connections. Figure 1a shows the output configuration if only the oscillator stage is required, whereas Figure 1b shows the connections required for a power output.

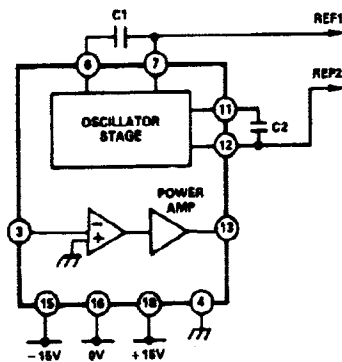


Figure 1a.

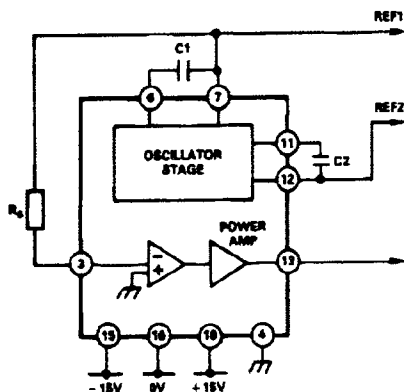


Figure 1b.

The frequency of oscillation for the OSC1758 in Figure 1a and Figure 1b is determined by the two identical capacitors C1 and C2. For the frequency required, the value of C1 and C2 should be calculated using the following equation.

$$C_1 = C_2 = \frac{1}{F_{OSC} \times 10^5} \text{ Farads}$$

Where F_{OSC} = Frequency of oscillation in Hz.

For a reduced output from the configuration in Figure 1b a series resistor, R_s , must be added.

For the required output voltage R_s should be calculated as follows:

$$R_s = \frac{37.5 \times 10^3}{V_{OUT} (rms)} - 5350 \text{ Ohms}$$

STABILITY

To ensure stability of both frequency and voltage level outputs it is essential that good quality external capacitors are used, e.g., Silver Mica or Polystyrene.

The tolerance quoted in the specification applies if high grade Silver Mica capacitors, with a temperature coefficient of less than 50ppm/°C, and a low loss factor, are used.

POWER DISSIPATION

The thermal dissipation characteristics for the OSC1758 are as follows:

- $\theta_{\text{junction - case}} = 15^\circ\text{C/W}$
- $\theta_{\text{junction - ambient}} = 40^\circ\text{C/W}$
- $\theta_j (\text{max}) = 150^\circ\text{C}$

Figure 2 shows a graph of power dissipation against temperature for the OSC1758.

Total Power Dissipation =

$$(V_{SUPPLY} \times I_{SUPPLY}) - (V_{OUT} \times I_{OUT} \times \cosine \phi)$$

where ϕ = load phase angle

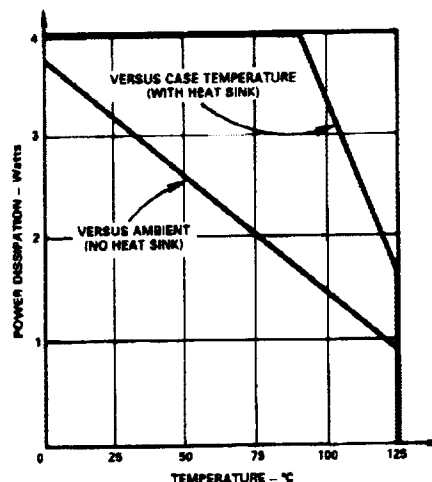


Figure 2. Power Dissipation vs. Temperature

NOTE: Although the power amplifier stage has internal short circuit protection, a heat sink should be employed for protection against continuous short circuit conditions.

MEAN TIME BETWEEN FAILURES (MTBF)

The use of hybrid manufacturing techniques and computer aided design for the OSC1758, ensures high reliability. MTBF figures for this hybrid have been calculated using the "Part Stress Analysis Prediction" method according to MIL-HDBK-217E.

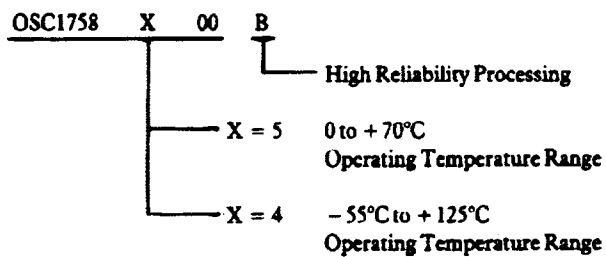
An example of the figures calculated is given below:

MTBF for OSC1758 under NS environment conditions at a case temperature of 55°C = 609 thousand hours or 69 years.

Please consult the factory if further MTBF calculations are required.

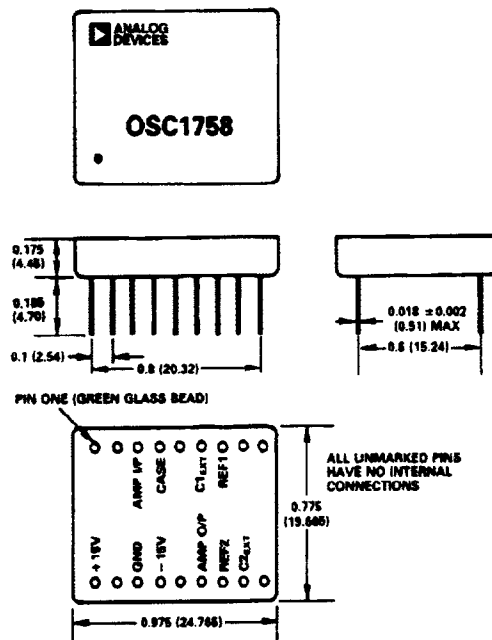
OSC1758

ORDERING INFORMATION



OUTLINE DIMENSIONS

Dimensions shown in inches and (mm)



TOLERANCES ±0.005 (0.13mm) UNLESS OTHERWISE STATED

C824a-5-3:90

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