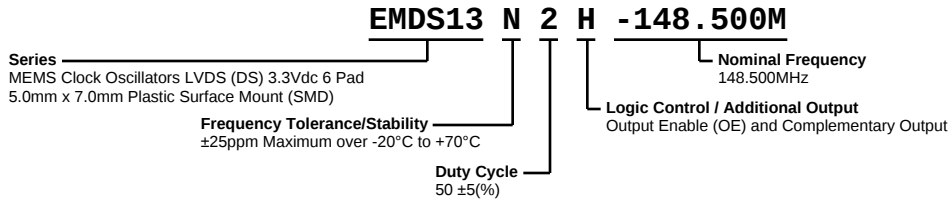


EMDS13N2H-148.500M



ELECTRICAL SPECIFICATIONS

Nominal Frequency	148.500MHz
Frequency Tolerance/Stability	$\pm 25\text{ppm}$ Maximum over -20°C to $+70^{\circ}\text{C}$ (Inclusive of all conditions: Calibration Tolerance at 25°C , Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C , Reflow, Shock, and Vibration)
Aging at 25°C	$\pm 1\text{ppm}$ First Year Maximum
Supply Voltage	$+3.3\text{Vdc} \pm 0.3\text{Vdc}$
Input Current	80mA Maximum (Excluding Load Termination Current)
Output Voltage Logic High (Voh)	1.425Vdc Typical
Output Voltage Logic Low (Vol)	1.075Vdc Typical
Differential Output Voltage (Vod)	247mVdc Minimum, 350mVdc Typical, 454mVdc Maximum
Offset Voltage (Vos)	1.125V Minimum, 1.250V Typical, 1.375V Maximum
Rise/Fall Time	225pSec Typical, 325pSec Maximum (Measured over 20% to 80% of waveform)
Differential Output Error (dVod)	50mVdc Maximum
Duty Cycle	$50 \pm 5(\%)$ (Measured at 50% of waveform)
Offset Error (dVos)	50mVdc Maximum
Load Drive Capability	100 Ohms Between Output and Complementary Output
Output Logic Type	LVDS
Logic Control / Additional Output	Output Enable (OE) and Complementary Output
Output Control Input Voltage	Vih of 70% of Vdd Minimum or No Connect to Enable Output and Complementary Output, Vil of 30% of Vdd Maximum to Disable Output and Complementary Output (High Impedance)
Output Enable Current	75mA Maximum (Without Load)
Period Jitter (Deterministic)	0.2pSec Typical
Period Jitter (Random)	2.0pSec Typical
Period Jitter (RMS)	1.8pSec Typical, 2.5pSec Maximum
Period Jitter (pk-pk)	25pSec Typical, 30pSec Maximum
RMS Phase Jitter (Fj = 637kHz to 10MHz; Random)	1.7pSec Typical
RMS Phase Jitter (Fj = 1MHz to 20MHz; Random)	1.2pSec Typical
RMS Phase Jitter (Fj = 1.875MHz to 20MHz; Random)	0.7pSec Typical
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to $+125^{\circ}\text{C}$

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

ESD Susceptibility	MIL-STD-883, Method 3015, Class 2, HBM 2000V
Flammability	UL94-V0
Mechanical Shock	MIL-STD-883, Method 2002, Condition G, 30,000G
Moisture Resistance	MIL-STD-883, Method 1004
Moisture Sensitivity Level	J-STD-020, MSL 1
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition K
Resistance to Solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-883, Method 2003 (Six I/O Pads on bottom of package only)
Temperature Cycling	MIL-STD-883, Method 1010, Condition B

EMDS13N2H-148.500M



Thermal Shock	MIL-STD-883, Method 1011, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A, 20G

EMDS13N2H-148.500M

MECHANICAL DIMENSIONS (all dimensions in millimeters)

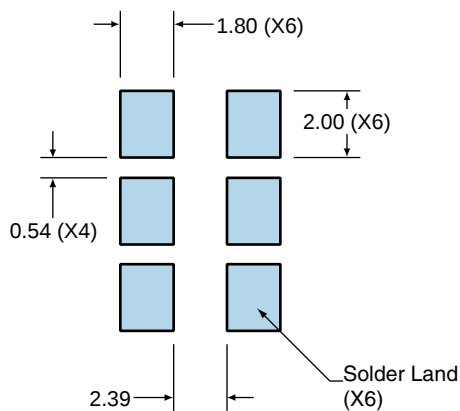


PIN	CONNECTION
1	Output Enable (OE)
2	No Connect
3	Case Ground
4	Output
5	Complementary Output
6	Supply Voltage

LINE	MARKING
1	XXXX or XXXXX XXXX or XXXXX=Ecliptek Manufacturing Identifier

Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are ±0.1

EMDS13N2H-148.500M

OUTPUT WAVEFORM & TIMING DIAGRAM



EMDS13N2H-148.500M

OUTPUT WAVEFORM & TIMING DIAGRAM



ECLIPTEK®
CORPORATION

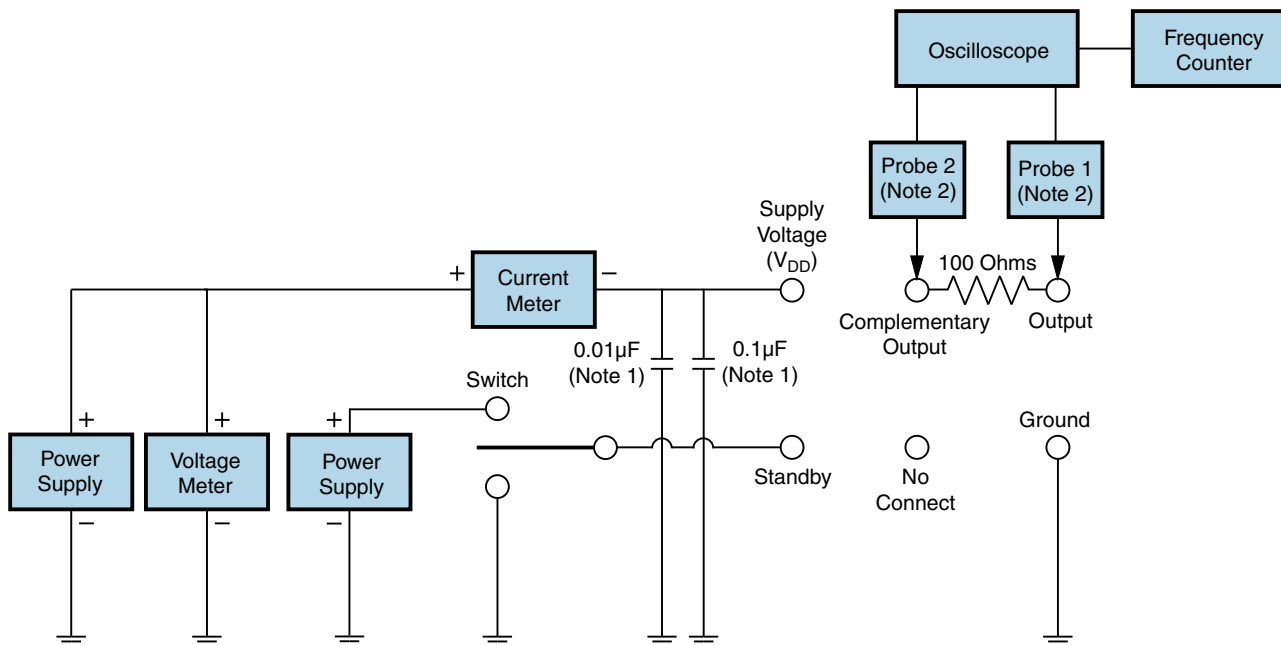
The schematic diagram illustrates the test setup for the 74VHC04 inverter. It includes the following components and connections:

- Power Supplies:** Three power supplies are shown. The first two are connected to the input of the inverter (pin 1 and pin 2). The third power supply is connected to the output of the inverter (pin 3) through a switch.
- Voltage Meter:** Connected across the input of the inverter to measure the input voltage.
- Current Meter:** Connected in series with the input of the inverter to measure the input current.
- Switch:** A switch is used to connect the output of the inverter to the output of the test setup.
- Resistor:** A 100 Ohm resistor is connected between the output of the inverter and the output of the test setup.
- Output Enable:** A terminal labeled "Output Enable" is shown, which is connected to the output of the inverter.
- Measurement Equipment:** An oscilloscope and a frequency counter are connected to the output of the inverter to measure the output signal.

Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.

EMDS13N2H-148.500M

Test Circuit for Standby and Complementary Output



Note 1: An external $0.01\mu\text{F}$ ceramic bypass capacitor in parallel with a $0.1\mu\text{F}$ high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

Note 2: A low capacitance ($<12\text{pF}$), 10X attenuation factor, high impedance ($>10\text{Mohms}$), and high bandwidth ($>500\text{MHz}$) passive probe is recommended.

Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.

Recommended Solder Reflow Methods



High Temperature Infrared/Convection

TS MAX to TL (Ramp-up Rate)	3°C/second Maximum
------------------------------------	--------------------

Preheat

- Temperature Minimum (TS MIN)	150°C
- Temperature Typical (TS TYP)	175°C
- Temperature Maximum (TS MAX)	200°C
- Time (ts MIN)	60 - 180 Seconds

Ramp-up Rate (TL to TP)	3°C/second Maximum
--------------------------------	--------------------

Time Maintained Above:

- Temperature (TL)	217°C
- Time (tL)	60 - 150 Seconds

Peak Temperature (TP)	260°C Maximum for 10 Seconds Maximum
------------------------------	--------------------------------------

Target Peak Temperature (TP Target)	250°C +0/-5°C
--	---------------

Time within 5°C of actual peak (tp)	20 - 40 seconds
--	-----------------

Ramp-down Rate	6°C/second Maximum
-----------------------	--------------------

Time 25°C to Peak Temperature (t)	8 minutes Maximum
--	-------------------

Moisture Sensitivity Level	Level 1
-----------------------------------	---------

Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

T_S MAX to T_L (Ramp-up Rate) 5°C/second Maximum

Preheat

- Temperature Minimum (T_S MIN) N/A
 - Temperature Typical (T_S TYP) 150°C
 - Temperature Maximum (T_S MAX) N/A
 - Time (t_s MIN) 60 - 120 Seconds

Ramp-up Rate (T_L to T_P) 5°C/second Maximum

Time Maintained Above:

- Temperature (T_L) 150°C
 - Time (t_L) 200 Seconds Maximum

Peak Temperature (T_P) 240°C Maximum

Target Peak Temperature (T_P Target) 240°C Maximum 2 Times / 230°C Maximum 1 Time

Time within 5°C of actual peak (t_P) 10 seconds Maximum 2 Times / 80 seconds Maximum 1 Time

Ramp-down Rate 5°C/second Maximum

Time 25°C to Peak Temperature (t) N/A

Moisture Sensitivity Level Level 1

Low Temperature Manual Soldering

185°C Maximum for 10 seconds Maximum, 2 times Maximum.

High Temperature Manual Soldering

260°C Maximum for 5 seconds Maximum, 2 times Maximum.