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NTE7063

Integrated Circuit

CRT Display Synchronization Deflection Circuit

Description:

The NTE7063 is a sync-deflection circuit IC dedicated to CRT display use. It can be connected to the NTE1773, NTE1797, or the NTE1855 (for vertical output use) to form a sync-deflection circuit that meets every requirement for CRT use.

So far, ICs for color TV use have been applied to the sync-deflection circuit for CRT display use and general purpose ICs such as one-shot multivibrators, inverters, and a lot of transistors have been used to form the peripherals such as sync input interface, horizontal phase shifter. The NTE7063 contains these peripherals on chip and adopts a stable circuit for horizontal oscillation from 15kHz to 100kHz aiming at improving the characteristics required for CRT display use.

The NTE7063 has independent GND pins for the horizontal block and vertical block, thus facilitating pattern layout for applications where the NTE7063 is used at high frequencies.

Features:

- The Vertical Pull-In Range is Approximately 10Hz at $f_v = 60\text{Hz}$.
- The Horizontal Oscillation Frequency can be Adjusted Stably from 15kHz to 100kHz.
- The Horizontal Display can be Shifted Right/Left.
- The Horizontal/Vertical Sync Input can be Used Intact Regardless of the Difference in Pulse Polarity and Pulse Width.
- The AFC Feedback Sawtooth Wave can be Obtained by Simply Applying a Flyback Pulse to the IC as a Trigger Pulse.
- Any Duty of the Horizontal Pulse can be Set.
- Good Vertical Linearity because DC Bias at Vertical Output Stage is Subjected to Sampling Control Within Retrace Time.
- Excellent Interlace and Vertical Jitter Characteristics on the High-Definition Display Because of Independent GND Pins for the Horizontal Block and Vertical Block.

On-Chip Functions:

Horizontal Block

- AFC
- Horizontal OSC
- X-Ray Protector
- Horizontal Phase Shifter
- AFC Sawtooth Wave Generator
- Horizontal Pulse Duty Setting

Vertical Block

- Vertical OSC
- Vertical Sawtooth Wave Generator
- Sampling Type DC Voltage Control

Absolute Maximum Ratings: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

| | |
|--|-------------------------------------|
| Maximum Supply Voltage, V_{11} , V_{22} | 14V |
| Allowable Power Dissipation ($T_A \leq +65^\circ\text{C}$), P_{dmax} | 780mW |
| Operating Temperature Range, T_{opr} | -20° to $+85^\circ\text{C}$ |
| Storage Temperature Range, T_{stg} | -65° to $+125^\circ\text{C}$ |

Operating Conditions: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

| | |
|--|-----------------|
| Recommended Supply Voltage, V_{11} , V_{22} | 12V |
| Operating Voltage Range, V_{11} , V_{22} | 9 to 13.5V |
| Recommended Vertical Pulse Input Peak Value, V_{PULSE} | $5V_{P-P}$ |
| Operating Vertical Pulse Input Peak Value Range, V_{PULSE} | 2 to $6V_{P-P}$ |
| Recommended Horizontal Pulse Input Peak Value, H_{PULSE} | $5V_{P-P}$ |
| Operating Horizontal Pulse Input Peak Value Range, H_{PULSE} | 2 to $6V_{P-P}$ |

Electrical Characteristics: ($T_A = +25^\circ\text{C}$, V_{11} , $V_{22} = 12\text{V}$ unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|-----------------|--|--------|-----|-------|----------------------|
| V_{CC11} Current Dissipation | I_{11} | | 12 | – | 30 | mA |
| V_{CC22} Current Dissipation | I_{22} | | 5 | – | 12 | mA |
| Vertical Frequency Pull-In Range | V_{PIN} | Vertical Sync 60Hz | 10 | – | 12 | Hz |
| Vertical Free-Running Frequency | f_V | f_V center 55Hz | 50 | – | 60 | Hz |
| Increased/Reduced Voltage Characteristic of Vertical Frequency | Δf_{VV} | $V_{22} = 12\text{V} \pm 1\text{V}$, 55Hz at 12V | -0.1 | – | 0.1 | Hz |
| Midpoint Control Threshold Level | | | 3.8 | – | 4.4 | V |
| Vertical OSC Start Voltage | F_{vst} | | – | – | 4.0 | V |
| Temperature Characteristic of Vertical Frequency | | $T_A = -10^\circ$ to $+60^\circ\text{C}$ | -0.028 | – | 0.028 | Hz/ $^\circ\text{C}$ |
| Vertical Driver | G_V | | 12 | – | 18 | dB |
| Amplification Factor Horizontal AFC DC Loop Gain | I_{AFC+} | | +0.85 | – | +1.6 | mA |
| | I_{AFC-} | | -1.6 | – | -0.85 | mA |
| Horizontal Free-Running Frequency | f_H | f_H center 15.734kHz | -750 | – | 750 | Hz |
| Horizontal OSC Start Voltage | f_{Hst} | | – | – | 4.0 | V |
| Increased/Reduced Voltage Characteristic of Horizontal Frequency | Δf_{HV} | $V_{11} = 12\text{V} \pm 1\text{V}$, 15.734kHz at 12V | -50 | – | +50 | Hz |
| Horizontal OSC Warm-Up Drift | Δf_H | 5sec to 30min after application of power | -50 | – | +50 | Hz |
| Temperature Characteristic of Horizontal Frequency | | $T_A = -10^\circ$ to $+60^\circ\text{C}$ | -2.9 | – | +2.9 | Hz/ $^\circ\text{C}$ |
| Horizontal Output Drive Current | I_{13} | | 6 | – | 12 | mA |
| Increased/Reduced Voltage Characteristic of Phase Shifter Delay Time | | $V_{11} = 12\text{V} \pm 1\text{V}$ | -0.5 | – | 0.5 | %/V |
| Temperature Characteristic of Phase Shifter Delay Time | | $T_A = -10^\circ$ to $+60^\circ\text{C}$ | -0.1 | – | 0.1 | %/ $^\circ\text{C}$ |
| Increased/Reduced Voltage Characteristic of Phase Shifter Delay Time | | $V_{11} = 12\text{V} \pm 1\text{V}$ | -1.0 | – | 1.0 | %/V |
| Temperature Characteristic of Phase Shifter Pulse Width | | $T_A = -10^\circ$ to $+60^\circ\text{C}$ | -0.13 | – | 0.13 | %/ $^\circ\text{C}$ |

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$, V_{11} , $V_{22} = 12\text{V}$ unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|----------|--|------|-----|------|---------------|
| AFC Phase Compensation Center Time | | 15.734kHz after F.P.B. input | 9.9 | – | 11.5 | μs |
| Increased/Reduced Voltage Characteristic of AFC Phase Comparison Center Time | | $V_{11} = 12\text{V} \pm 1\text{V}$ | -1.5 | – | 1.5 | %/V |
| Temperature Characteristic of AFC Phase Comparison Center Time | | $T_A = -10^\circ$ to $+60^\circ\text{C}$ | -0.2 | – | 0.2 | %/°C |
| Comparison Waveform Generating Input Operation Voltage | V_5 | | 0.6 | – | 0.9 | V |
| Pin14 Voltage at Hold-Down Operation Start | V_{14} | | 0.5 | – | 0.8 | V |

Pin Connection Diagram

