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NTE1670 Integrated Circuit Air Core Meter Driver

Description:

The NTE1670 is a function generator/driver for air-core (moving-magnet) meter movements in a 14-Lead DIP type package. A Norton amplifier and an NPN transistor are included on chip for signal conditioning as required. Driver outputs are self-centering and develop $\pm 4.5V$ swing at 20mA. Better than 2% linearity is guaranteed over a full 305-degree operating range.

Features:

- Self-Centering 20mA Outputs
- 12V Operation
- Norton Amplifier
- Function Generator

Applications:

- Air-Core Meter Driver
- Tachometers
- Ruggedized Instruments

Absolute Maximum Ratings:

Supply Voltage (Pin13), V_{CC} 20V
 Power Dissipation (Note 1), P_D 1300mW
 Collector-Emitter Breakdown Voltage, $V_{(BR)CEO}$ $20V_{MIN}$
 Operating Temperature Range, T_{opr} $-40^{\circ}C$ to $+85^{\circ}C$
 Storage Temperature Range, T_{stg} $-65^{\circ}C$ to $-150^{\circ}C$
 Lead Temperature (During soldering, 10sec Max), T_L $+260^{\circ}C$

Note 1 For operation above $+25^{\circ}C$, the NTE1670 must be derated based upon a $+125^{\circ}C$ maximum junction temperature and a thermal resistance of $+76^{\circ}C/W$ which applies for the device soldered in a printed circuit board and operating in a still-air ambient.

Electrical Characteristics: ($V_{CC} = 13.1V$ $T_A = +25^{\circ}C$ unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|-------------------------------------|-----------|--------------------------|-----|------|-----|----------|
| Supply Current (Pin13) | I_S | Zero Input Frequency | – | – | 65 | mA |
| Regulator Voltage (Pin11) | V_{REG} | $I_{REG} = 0mA$ | 8.1 | 8.5 | 8.9 | V |
| Regulator Output Resistance (Pin11) | | $I_{REG} = 0mA$ to $3mA$ | – | 13.5 | – | Ω |

Electrical Characteristics (Cont'd): ($V_{CC} = 13.1V$ $T_A = +25^\circ C$ unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|-----------|---------------------------------|-----------|-----------|-----------|------------|
| Reference Voltage (Pin4) | V_{REF} | $I_{REF} = 0mA$ | 1.9 | 2.1 | 2.3 | V |
| Reference Output Resistance (Pin4) | | $I_{REF} = 0\mu A$ to $50\mu A$ | – | 5.3 | – | $k\Omega$ |
| Norton Amplifier Mirror Gain(Pin5, Pin6) | | $I_{BIAS} \cong 20\mu A$ | 0.9 | 1.0 | 1.1 | |
| NPN Transistor DC Gain (Pin9, Pin10) | h_{FE} | | – | 125 | – | |
| Function Generator Feedback Bias Current (Pin1) | | $V_1 = 5.1V$ | – | 1.0 | – | mA |
| Drive Voltage Extremes, Sine and Cosine (Pin2, Pin12) | | $I_{LOAD} = 20mA$ | ± 4.0 | ± 4.5 | – | V |
| Sine Output Voltage with Zero Input (Pin2) | | $V_8 = V_{REF}$ | –350 | 0 | +350 | mV |
| Function Generator Linearity | | FSD = 305° | – | – | ± 1.7 | %FSD |
| Function Generator Gain | k | Meter Deflection/ ΔV_8 | 50.75 | 53.75 | 56.75 | $^\circ/V$ |

Pin Connection Diagram

