

General Description

The LTA4580L is a dual operational amplifier, specially designed for improving the tone control, which is most suitable for the audio application.

Featuring noiseless, higher gain bandwidth, high output current and low distortion ratio, and it is most suitable not only for acoustic electronic parts of audio pre-amp and active filter, but also for the industrial measurement tools. It is also suitable for the headphone amp at higher output current, and further more, it can be applied for the handy type set operational amplifier of general purpose in application of low voltage single supply type which is properly biased of the low voltage source.

LTA4580L (dual) is available in both SOP-8L, MSOP-8L, and TSSOP-8L packages.

Features and Benefits

- Operating Voltage: $\pm 2V$ to $\pm 18V$
- Low Input Noise Voltage: $0.7\mu V_{rms}$ Typical (RIAA)
- Wide GBW: 15MHz (Typical)
- Low Distortion: 0.0005% (Typical)
- Slew Rate: $7V/\mu s$ (Typical)
- Bipolar Technology
- Drop-In Replacement for NJM4580, NE5532, RC4580, NJM4560/2/5, and LM833
- Temperature Range: $-40^{\circ}C$ to $+85^{\circ}C$

Applications

- Audio Preamplifiers
- Active Filters
- Pro Audio Mixers
- Headphone Amplifiers
- Multichannel Video Transcoders
- Industrial Measurement Equipment
- Transducer Amplifier

Equivalent Circuit

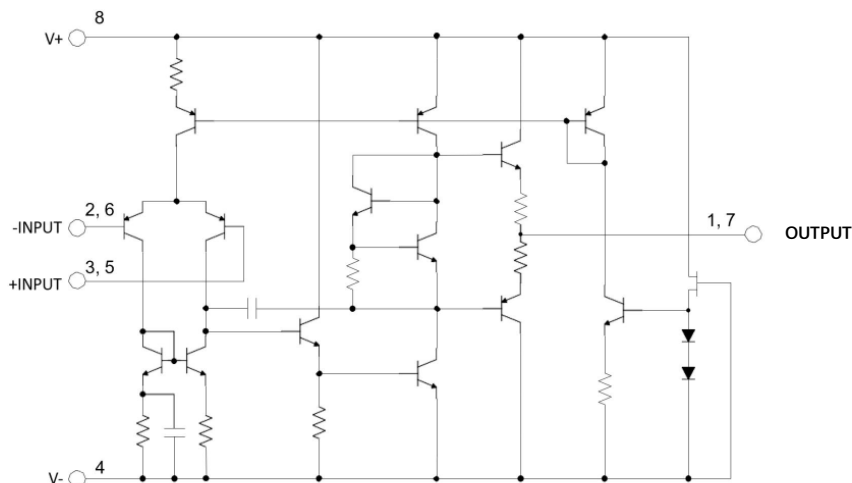


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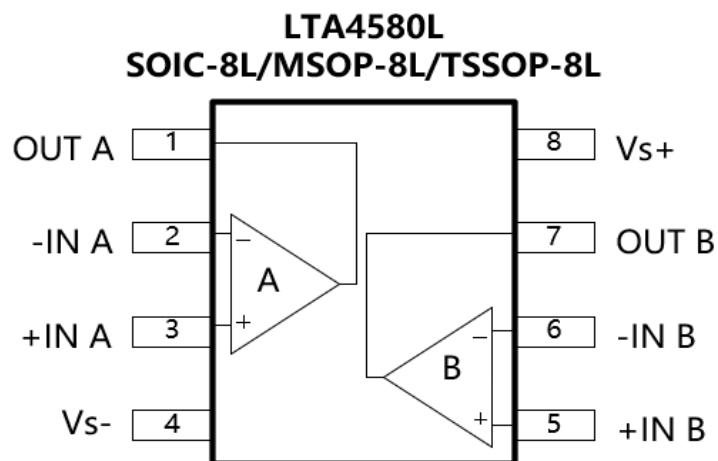
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Ordering Information

| Part Number | Package Type | Package Size | Package Quantity | ECO Class | Mark Code |
|----------------|--------------|-------------------|----------------------|-------------------------|-----------|
| LTA4580LYS8/R8 | SOIC-8L | 4.90 mm * 3.92 mm | Tape and Reel, 4 000 | Green (RoHS & no Sb/Br) | X4580 |
| LTA4580LYT8/R8 | TSSOP-8L | 4.40 mm * 3.00 mm | Tape and Reel, 4 000 | Green (RoHS & no Sb/Br) | X4580 |
| LTA4580LYV8/R6 | MSOP-8L | 3.00 mm * 3.00 mm | Tape and Reel, 3 000 | Green (RoHS & no Sb/Br) | X4580 |

Pin Configuration (Top View)



| PIN Name | SOIC-8L, MSOP-8L, TSSOP-8L | Description |
|-----------------|----------------------------------|--|
| OUT A | 1 | Amplifier output A. |
| -IN A | 2 | Inverting input of the amplifier A. |
| +IN A | 3 | Non-inverting input of the amplifier A. |
| V _{S-} | 4 | Negative power supply. It is normally tied to ground. It can also be tied to a voltage other than ground as long as the voltage between V _{S+} and V _{S-} is from 4 V to 36 V. |
| +IN B | 5 | Non-inverting input of the amplifier B. |
| -IN B | 6 | Inverting input of the amplifier B. |
| OUT B | 7 | Amplifier output B. |
| V _{S+} | 8 | Positive power supply. The voltage is from 4 V to 36 V. Split supplies are possible as long as the voltage between V _{S+} and V _{S-} is from 4 V to 36 V. |

Limiting Value

| Parameter | Absolute Maximum Rating |
|---|-------------------------|
| Supply Voltage, V_{S+} to V_{S-} | 40 V (± 20 V) |
| Input Voltage | ± 15 V |
| Signal Differential Input Voltage | ± 30 V |
| Storage Temperature Range, T_{stg} | -65 °C to $+150$ °C |
| Junction Temperature, T_j | 150 °C |
| Lead Temperature Range (Soldering 10 sec) | 260 °C |

ESD Ratings

| Parameter | Level | UNIT |
|--|------------|------|
| Human body model (HBM), per ANSI/ESDA/JEDEC JS-001 | ± 1800 | V |
| Charged device model (CDM), per ANSI/ESDA/JEDEC JS-002 | ± 2000 | V |

Thermal Information

| Thermal Metric | Package | Level | Unit |
|----------------|----------|-------|------|
| θ_{JA} | SOIC-8L | 125 | °C/W |
| | MSOP-8L | 216 | |
| | TSSOP-8L | 160 | |

36V, Low Noise, Dual Operational Amplifier

Electrical Characteristics

Unless otherwise noted, $T_A = 25^\circ\text{C}$, $V_S = \pm 15.0\text{ V}$

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|--------------|---|----------|------------|------|------------------------|
| DC PERFORMANCE | | | | | | |
| Input Offset Voltage | V_{OS} | $R_S \leq 10\text{ k}\Omega$ | | 0.5 | 3 | mV |
| Input Bias Current | I_B | $V_{CM} = 0\text{ V}$ | | 150 | 500 | nA |
| Input Offset Current | I_{OS} | $V_{CM} = 0\text{ V}$ | | 5 | 100 | nA |
| Large Signal voltage gain | A_{VOL} | $R_L = 2\text{ k}\Omega$, $V_O = 20\text{ V}_{p-p}$ | 90 | 110 | | dB |
| NOISE and DISTORTION PERFORMANCE | | | | | | |
| Equivalent Input Noise Voltage | E_N | RIAA $R_S = 50\Omega$, 30kHz LPF | | 0.7 | | μV_{rms} |
| Total Harmonic Distortion | THD | $A_V = 20\text{ dB}$, $V_O = 5\text{ V}$, $R_L = 2\text{ k}\Omega$, $f = 1\text{ kHz}$ | | 0.0005 | | % |
| INPUT CHARACTERISTICS | | | | | | |
| Input Common Mode Voltage Range | V_{CM} | | ± 12 | ± 13.5 | | V |
| Common Mode Rejection Rate | CMRR | $V_{CM} = 0\text{ V to } V_{CC} - 1.5\text{ V}$, $R_S \leq 10\text{ k}\Omega$ | 80 | 110 | | dB |
| DYNAMIC PERFORMANCE | | | | | | |
| Gain-Bandwidth Product | GBP | $R_L = 2\text{ k}\Omega$, $f = 10\text{ kHz}$ | | 15 | | MHz |
| Slew Rate | SR | $R_L \geq 2\text{ k}\Omega$ | | 7 | | $\text{V}/\mu\text{s}$ |
| OUTPUT CHARACTERISTICS | | | | | | |
| Short-circuit Current | I_{source} | $V_{in} = \pm 1\text{ V}$, $V_O = 2\text{ V}$ | | 45 | | mA |
| | I_{sink} | | | 80 | | |
| POWER SUPPLY | | | | | | |
| Operating Supply Voltage | V_S | $T_A = -40\text{ to } +85^\circ\text{C}$ | 4 | | 36 | V |
| Power Supply Rejection Ratio | PSRR | $R_L \leq 10\text{ k}\Omega$ | 80 | 110 | | dB |
| Quiescent Current | I_Q | No Load | | 3 | 7 | mA |

Typical Characteristics

At $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$, unless otherwise noted.

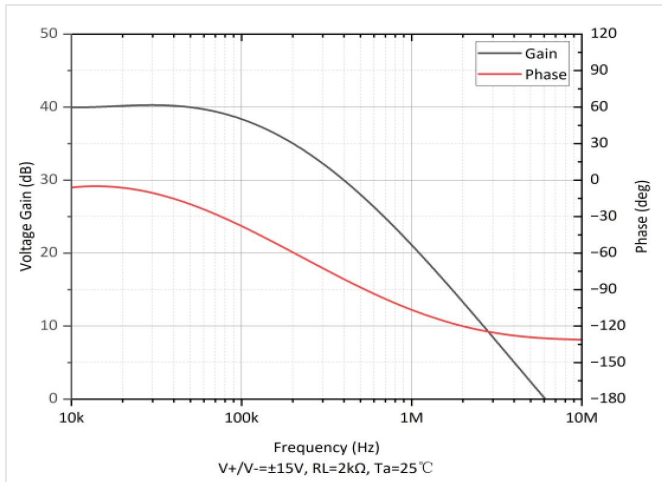


Figure 1. 40 dB Gain/Phase vs. Frequency

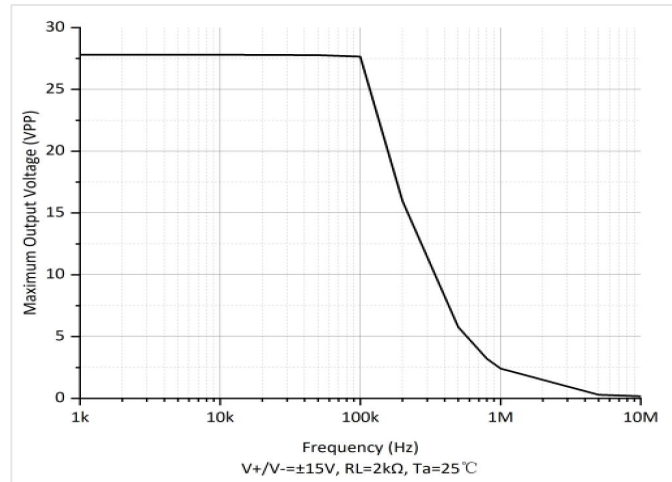


Figure 2. Maximum Output Voltage vs. Frequency

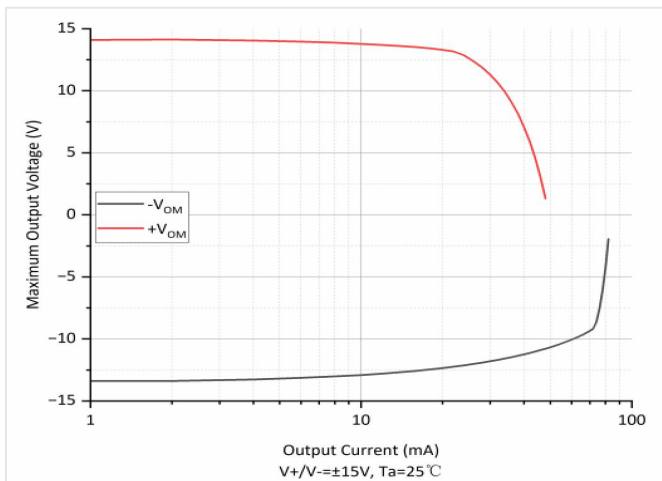


Figure 3. Maximum Output Voltage vs. Output Current

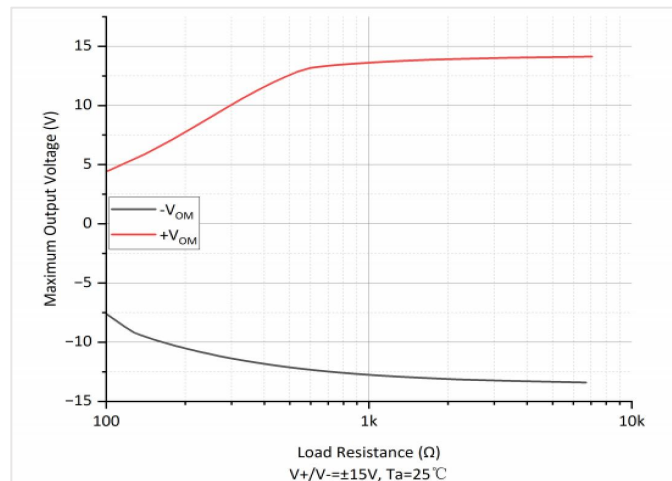


Figure 4. Maximum Output Voltage vs. Load Resistance

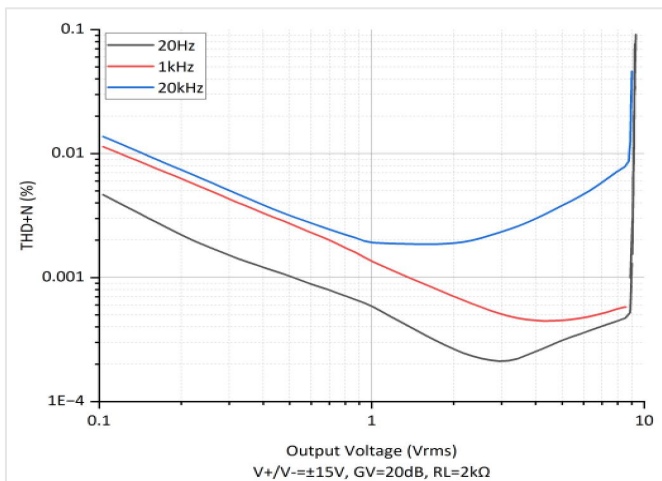


Figure 5. THD vs. Output Voltage

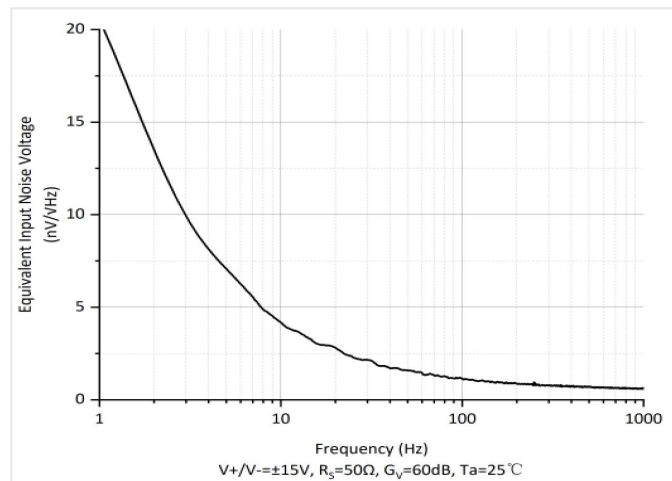


Figure 6. Voltage Noise vs. Frequency

Typical Characteristics

At $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{ V}$, unless otherwise noted.

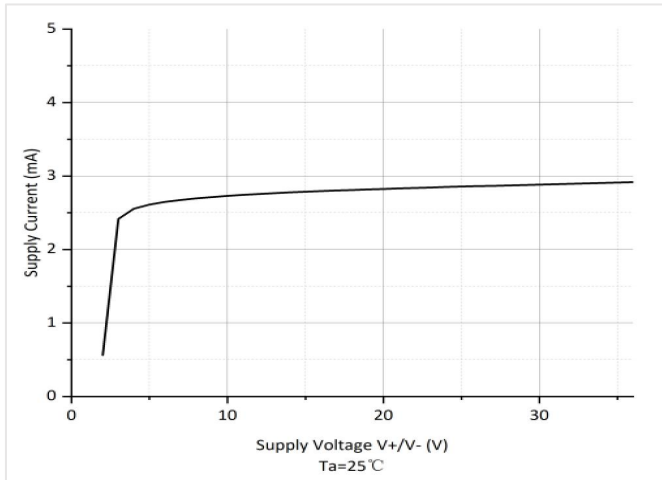


Figure 7. Supply Current vs. Supply Voltage

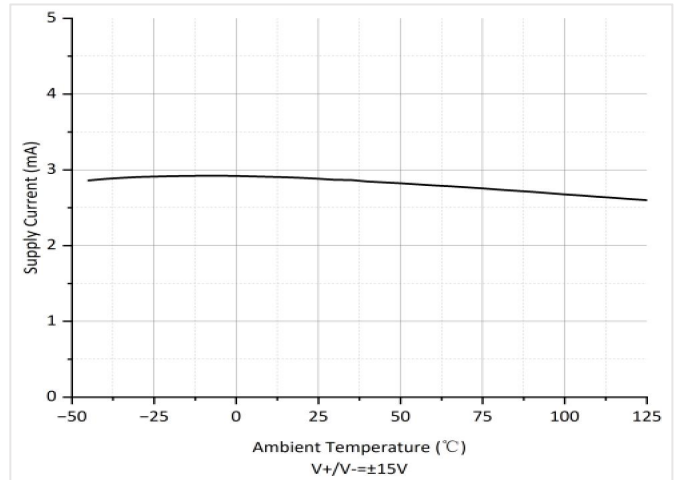


Figure 8. Supply Current vs. Temperature

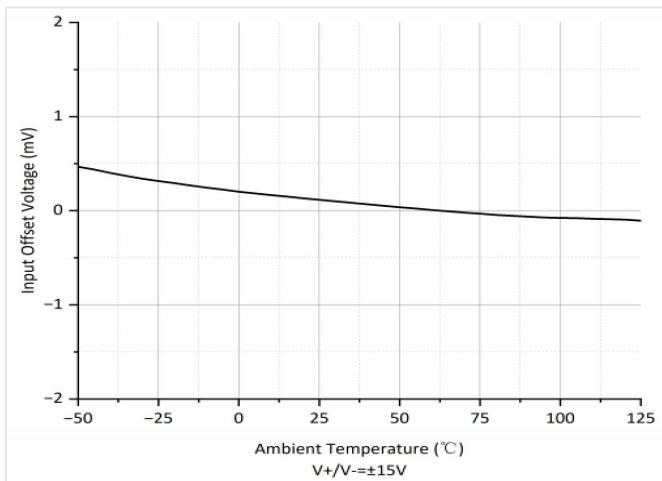


Figure 9. Input Offset Voltage vs. Temperature

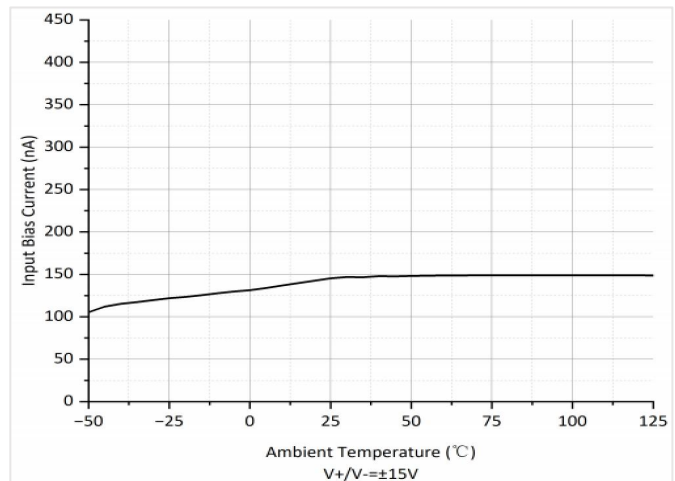


Figure 10. Input Bias Current vs. Temperature

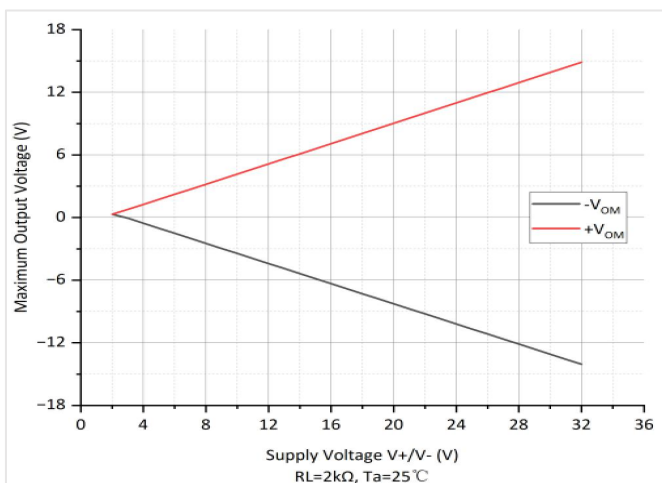


Figure 11. Maximum Output Voltage vs. Supply Voltage

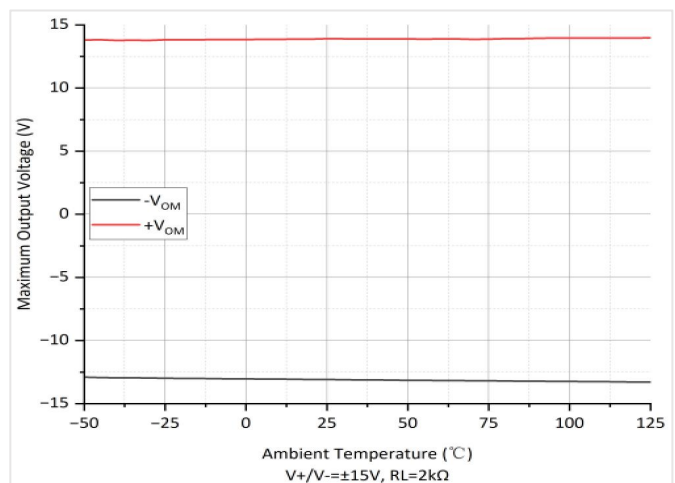


Figure 12. Maximum Output Voltage vs. Temperature

Application Notes

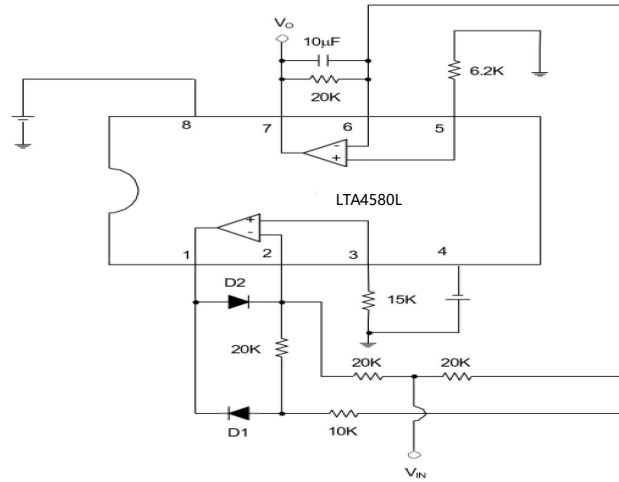


Figure 13 Application of LTA4580L in an AC/DC Converter

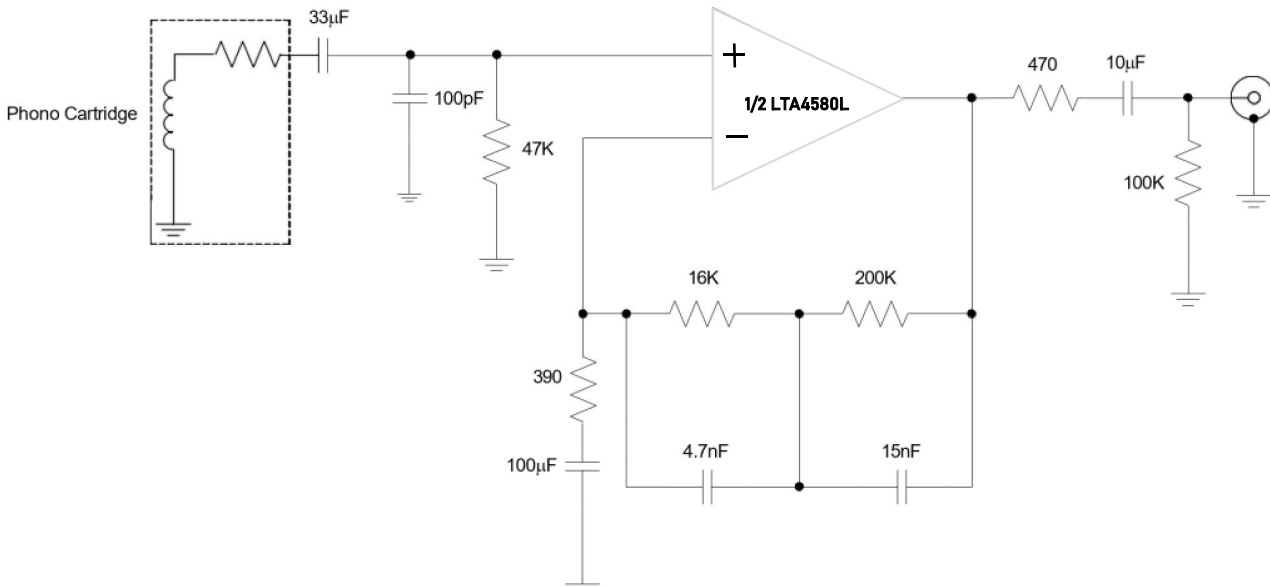


Figure 14 Application of LTA4580L in a RIAA Pre-Amp

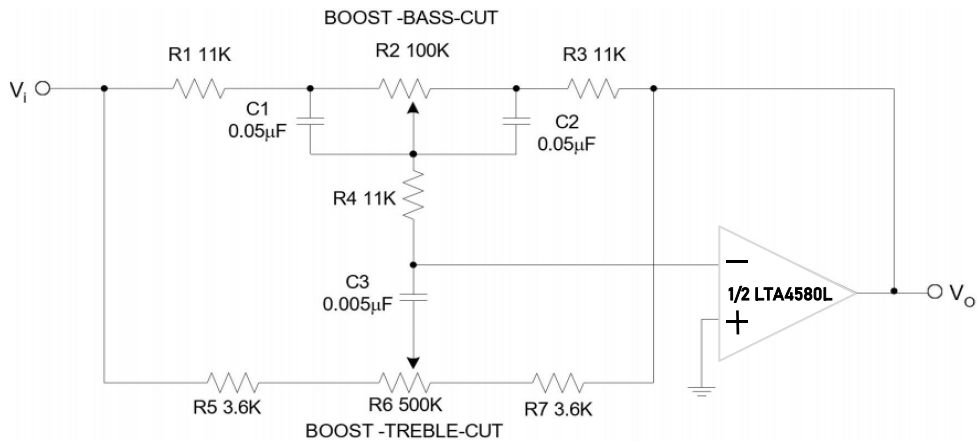
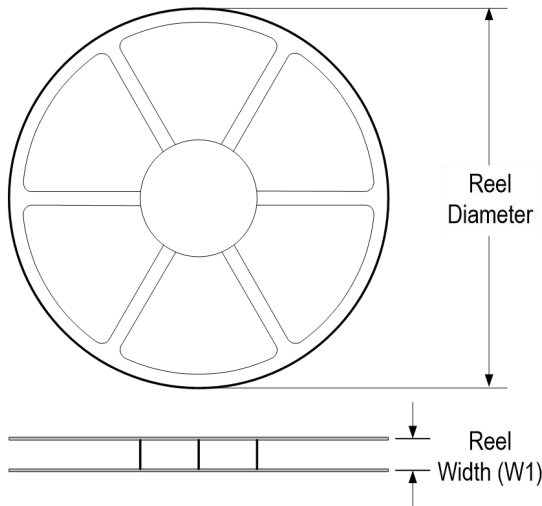


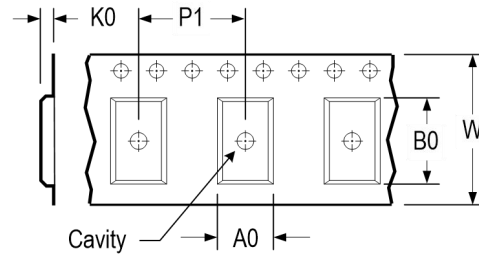
Figure 15 Application of LTA4580L in Tone Control

Tape and Reel Information

REEL DIMENSIONS

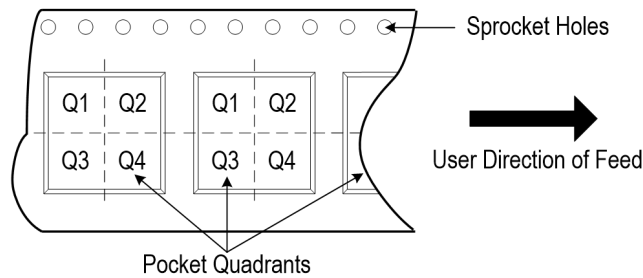


TAPE DIMENSIONS



| | |
|----|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

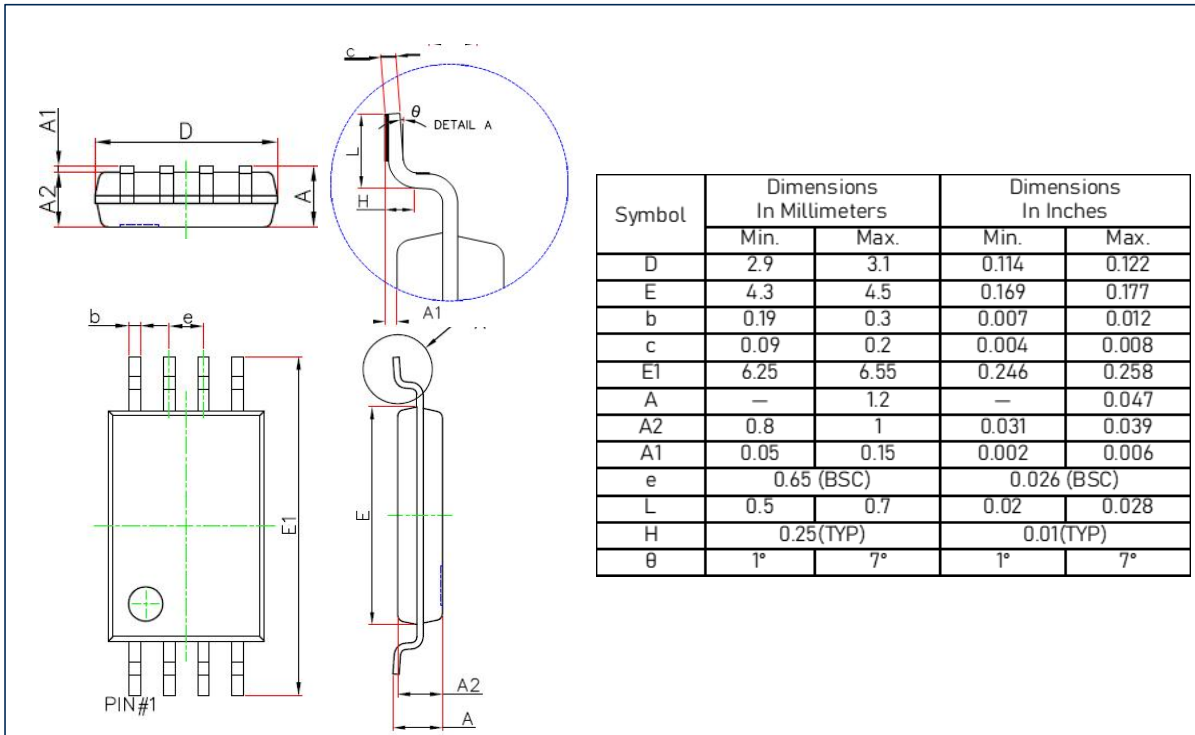


* All dimensions are nominal

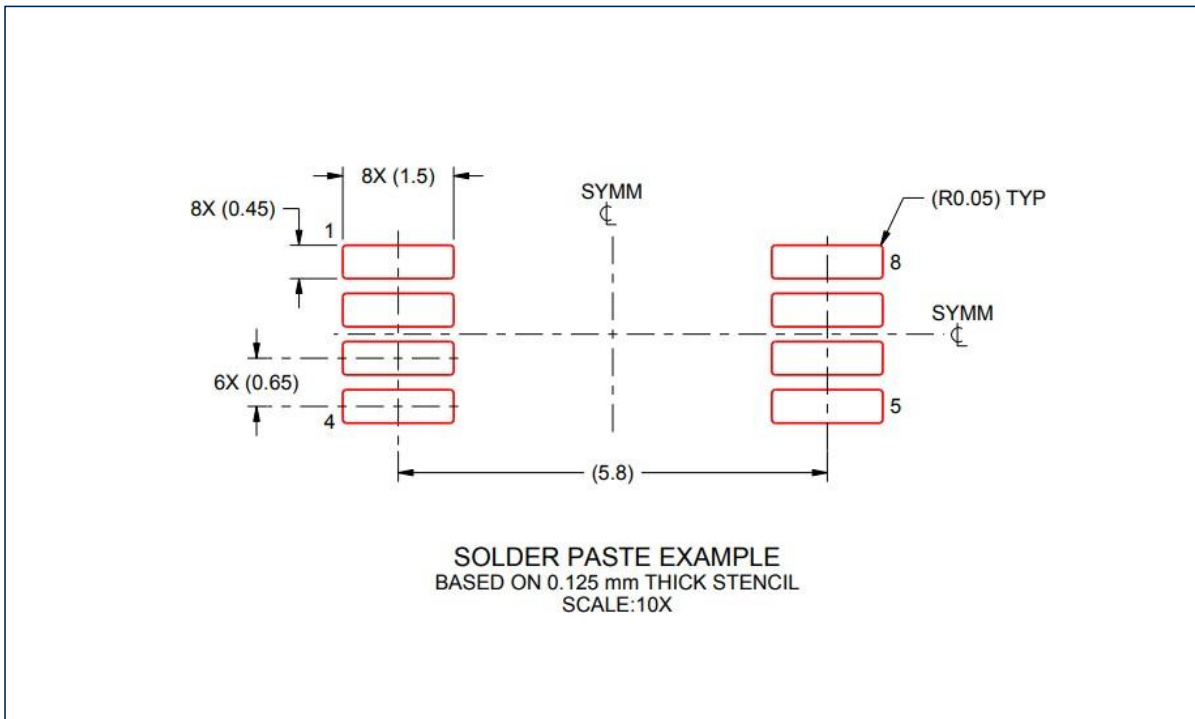
| Device | Package Type | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin 1 Quadrant |
|----------------|--------------|------|-------|--------------------|--------------------|---------|---------|---------|---------|--------|----------------|
| LTA4580LYS8/R8 | SOIC | 8 | 4 000 | 330 | 12.4 | 6.6 | 5.3 | 2.0 | 8.0 | 12.0 | Q1 |
| LTA4580LYT8/R8 | TSSOP | 8 | 4 000 | 330 | 12.4 | 6.5 | 4.0 | 1.2 | 8.0 | 12.0 | Q1 |
| LTA4580LYV8/R6 | MSOP | 8 | 3 000 | 330 | 12.4 | 5.0 | 3.5 | 2.0 | 8.0 | 12.0 | Q1 |

Package Outlines

DIMENSIONS, TSSOP-8L

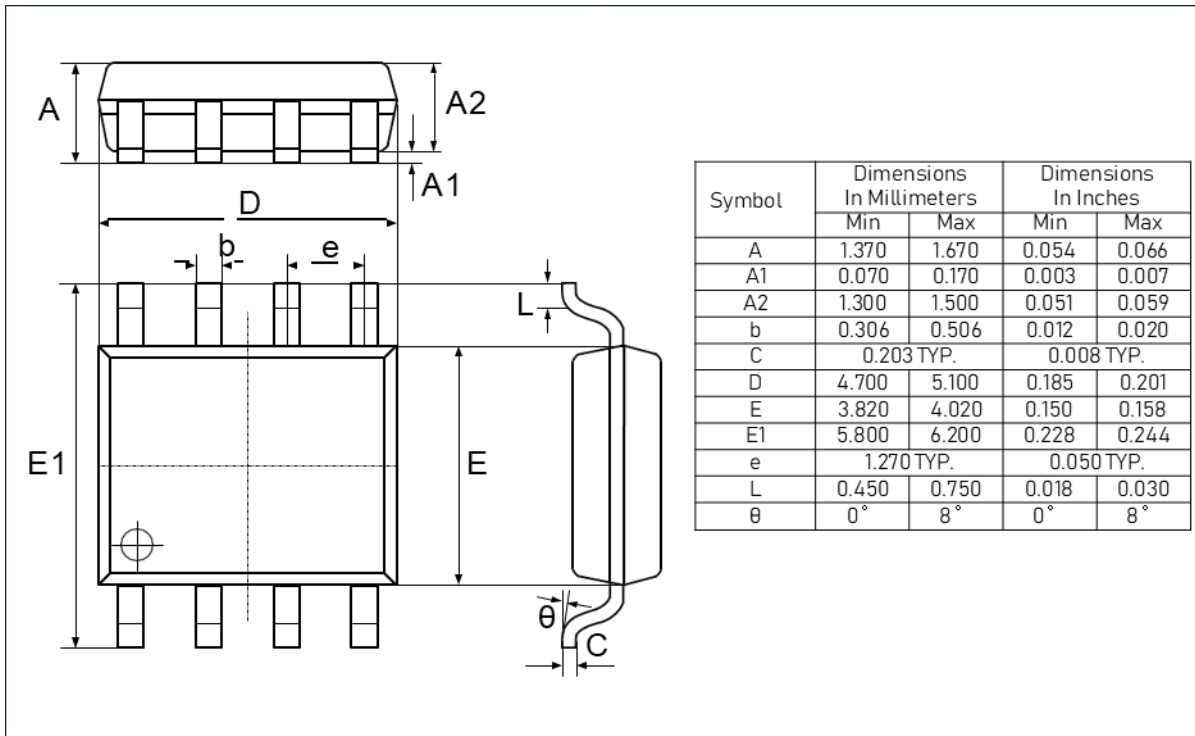


RECOMMENDED SOLDERING FOOTPRINT, TSSOP-8L

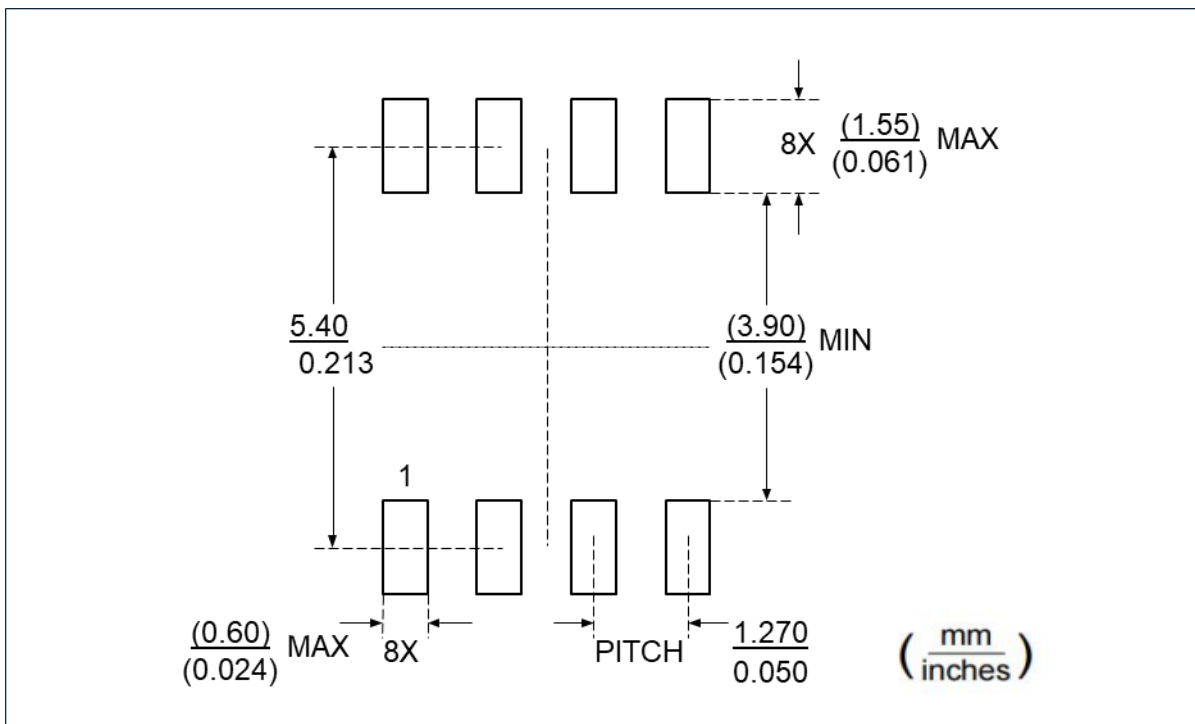


Package Outlines (cont.)

DIMENSIONS, SOIC-8L

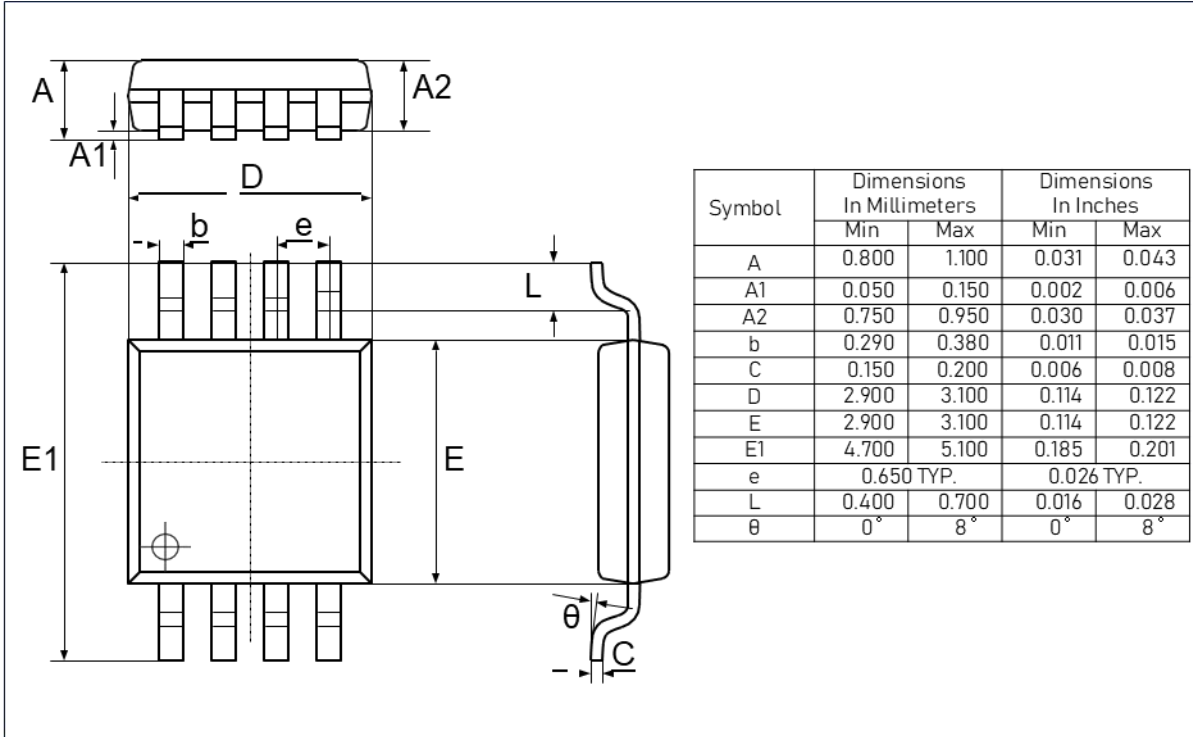


RECOMMENDED SOLDERING FOOTPRINT, SOIC-8L

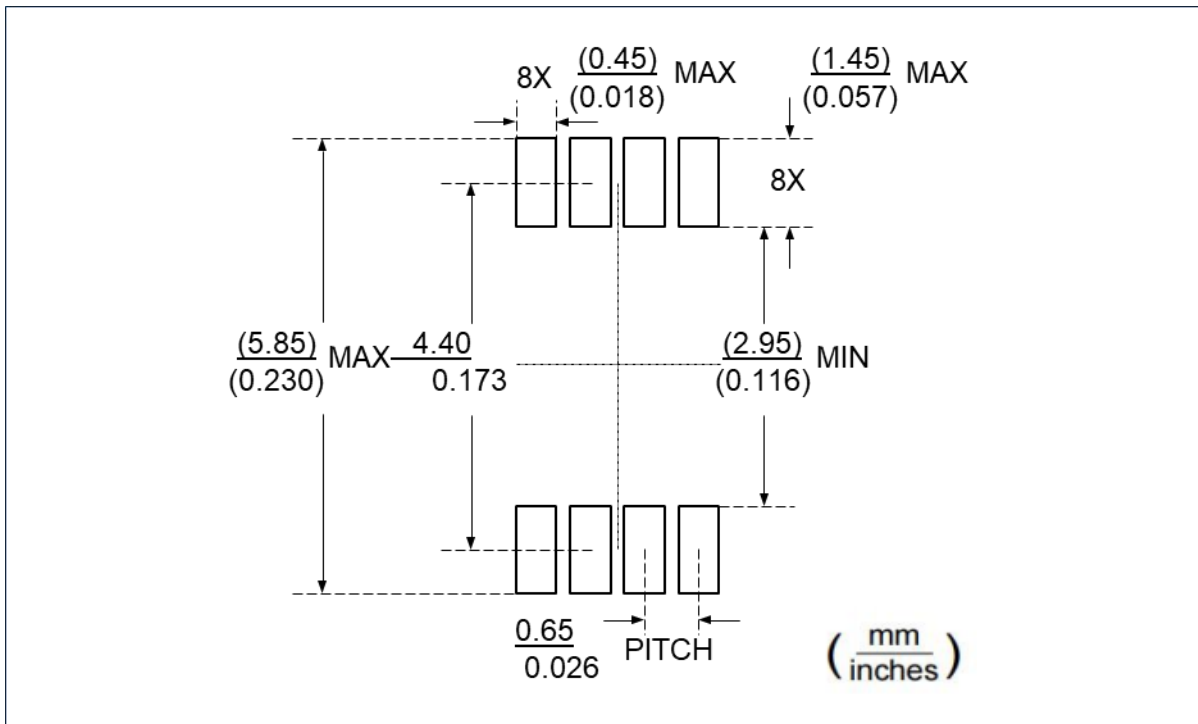


Package Outlines (cont.)

DIMENSIONS, MSOP-8L



RECOMMENDED SOLDERING FOOTPRINT, MSOP-8L



36V, Low Noise, Dual Operational Amplifier

Important Notice

Linearin is a global fabless semiconductor company specializing in advanced high-performance high-quality analog/mixed-signal IC products and sensor solutions. The company is devoted to the innovation of high performance, analog-intensive sensor front-end products and modular sensor solutions, applied in multi-market of medical & wearable devices, smart home, sensing of IoT, intelligent industrial & smart factory (industry 4.0), and automotives. Linearin's product families include widely-used standard catalog products, solution-based application specific standard products (ASSPs) and sensor modules that help customers achieve faster time-to-market products. Go to <http://www.linearin.com> for a complete list of Linearin product families.

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