

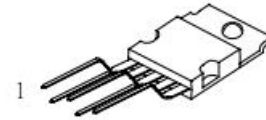


## General Description

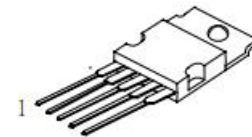
The LM1875T is a monolithic power amplifier offering very low distortion and high quality performance for consumer audio applications.

The LM1875T delivers 20 watts into a 4  $\Omega$  or 8  $\Omega$  load on +25V supplies. Using an 8  $\Omega$  load and +30V supplies, over 30 watts of power may be delivered. The amplifier is designed to operate with a minimum of external components. Device overload protection consists of both internal current limit and thermal shutdown.

The LM1875T design takes advantage of advanced circuit techniques and processing to achieve extremely low distortion levels even at high output power levels. Other outstanding features include high gain, fast slew rate and a wide power bandwidth, large output voltage swing, high current capability, and a very wide supply range. The amplifier is internally compensated and stable for gains of 10 or greater.



TO-220B



TO-220-5  
TO-220-5(Forming))

1: +IN 2: -IN 3: -VEE  
4: Output 5: Vcc

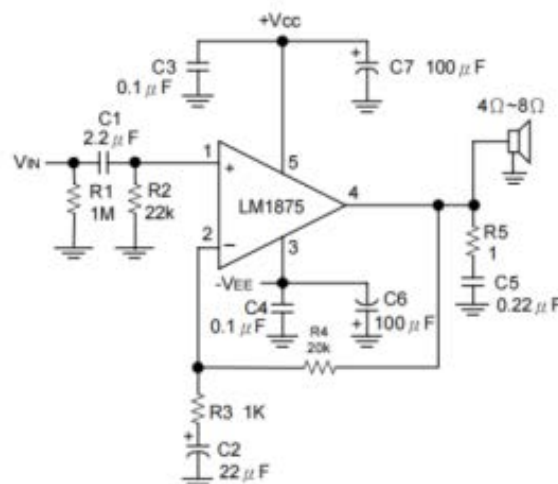
## Features

- Up to 30 watts output power
- Avo typically 90 dB
- Low distortion: 0.015%, 1kHz, 20W
- Wide power bandwidth: 70kHz
- Protection for AC and DC short circuits to ground
- Thermal protection with parole circuit
- High current capability: 4A
- Wide supply range 16V-60V
- Internal output protection diodes
- 94 dB ripple rejection

## Applica Tions

- High performance audio systems
- Bridge amplifiers
- Stereo phonographs
- Servo amplifiers
- Instrument systems

## Typical Applications





## Absolute Maximum Ratings

| PARAMETER                              | SYMBOL           | RATING                             | UNIT |
|----------------------------------------|------------------|------------------------------------|------|
| Supply Voltage                         | V <sub>s</sub>   | 60                                 | V    |
| Input Voltage                          | V <sub>IN</sub>  | -V <sub>EE</sub> ~ V <sub>CC</sub> | V    |
| Storage Temperature                    | T <sub>stg</sub> | -65 ~ +150                         | °C   |
| Junction Temperature                   | T <sub>J</sub>   | 150                                | °C   |
| Lead Temperature(Soldering,10 seconds) | T <sub>L</sub>   | 260                                | °C   |

## Thermal Data

| DESCRIPTION                          | SYMBOL        | RATING | UNIT |
|--------------------------------------|---------------|--------|------|
| Thermal Resistance, Junction-case    | $\theta_{JC}$ | 3      | °C/W |
| Thermal Resistance, Junction-ambient | $\theta_{JA}$ | 73     | °C/W |

## Electrical Characteristics

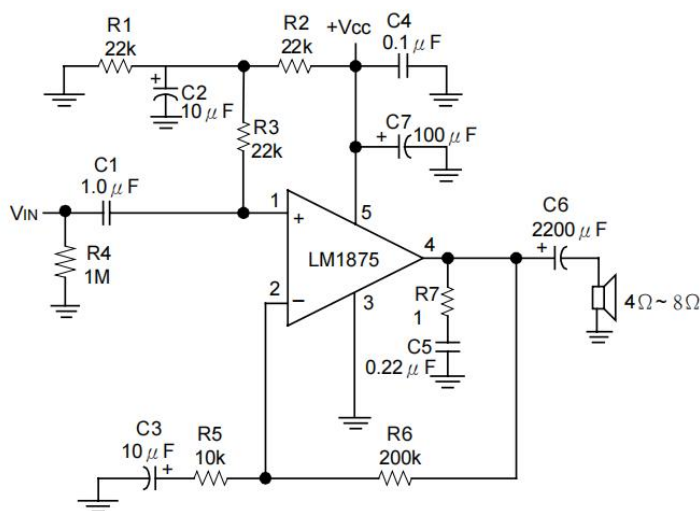
V<sub>CC</sub>=+25V, -V<sub>EE</sub>=-25V, T<sub>AMBIENT</sub>=25°C, R<sub>L</sub>=8Ω, A<sub>v</sub>=20(26dB), f<sub>o</sub>=1kHz, unless otherwise

| PARAMETER                          | SYMBOL           | TEST CONDITIONS                                                                                                                                                                                                                    | MIN | TYP                            | MAX        | UNIT              |
|------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------------------------|------------|-------------------|
| Supply Current                     | V <sub>s</sub>   | P <sub>OUT</sub> =0W                                                                                                                                                                                                               |     | 70                             | 100        | mA                |
| Output Power(Note 1)               | P <sub>o</sub>   | THD=1%                                                                                                                                                                                                                             |     | 25                             |            | W                 |
| Total Harmonic Distortion (Note 1) | THD              | P <sub>OUT</sub> =20W, f <sub>o</sub> =1kHz<br>P <sub>OUT</sub> =20W, f <sub>o</sub> =20kHz<br>P <sub>OUT</sub> =20W, R <sub>L</sub> =4Ω, f <sub>o</sub> =1kHz<br>P <sub>OUT</sub> =20W, R <sub>L</sub> =4Ω, f <sub>o</sub> =20kHz |     | 0.015<br>0.05<br>0.022<br>0.07 | 0.4<br>0.6 | %                 |
| Offset Voltage                     | V <sub>os</sub>  |                                                                                                                                                                                                                                    |     | ±1                             | ±15        | mV                |
| Input Bias current                 | I <sub>ib</sub>  |                                                                                                                                                                                                                                    |     | ±0.2                           | ±2         | μA                |
| Input Offset Current               | I <sub>io</sub>  |                                                                                                                                                                                                                                    |     | 0                              | ±0.5       | μA                |
| Gain-Bandwidth Product             | GBW              | F <sub>o</sub> =20kHz                                                                                                                                                                                                              |     | 5.5                            |            | MHz               |
| Open Loop Gain                     | G <sub>v</sub>   | DC                                                                                                                                                                                                                                 |     | 90                             |            | dB                |
| Power Supply Rejection Ratio       | PSRR             | V <sub>CC</sub> , 1kHz, 1 V <sub>rms</sub><br>V <sub>EE</sub> , 1kHz, 1 V <sub>rms</sub>                                                                                                                                           |     | 95<br>83                       | 52<br>52   | dB                |
| Max Slew Rate                      | SR               | 20W, 8Ω, 70kHz BW                                                                                                                                                                                                                  |     | 8                              |            | V/μs              |
| Current Limit                      | I <sub>lim</sub> | V <sub>OUT</sub> =V <sub>SUPPLY</sub> - 10V                                                                                                                                                                                        |     | 4                              | 3          | A                 |
| Equivalent Input Noise Voltage     | e <sub>n</sub>   | R <sub>s</sub> =600Ω, CCIR                                                                                                                                                                                                         |     | 3                              |            | μV <sub>rms</sub> |

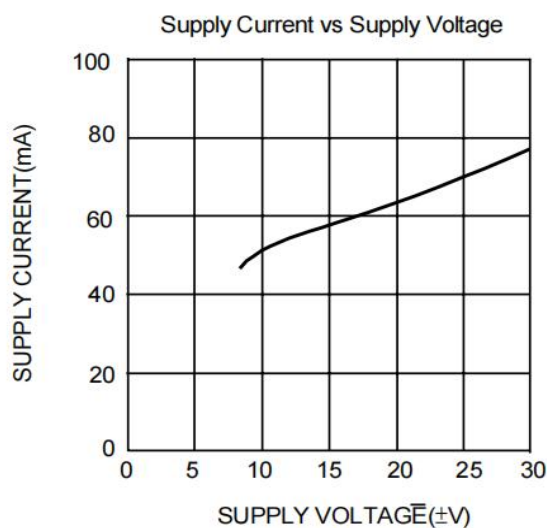
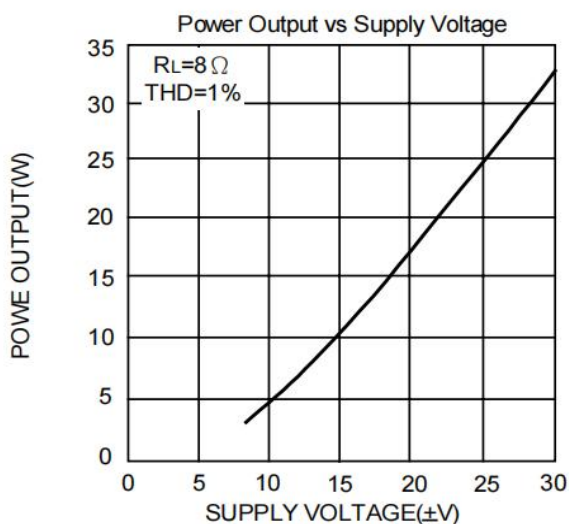
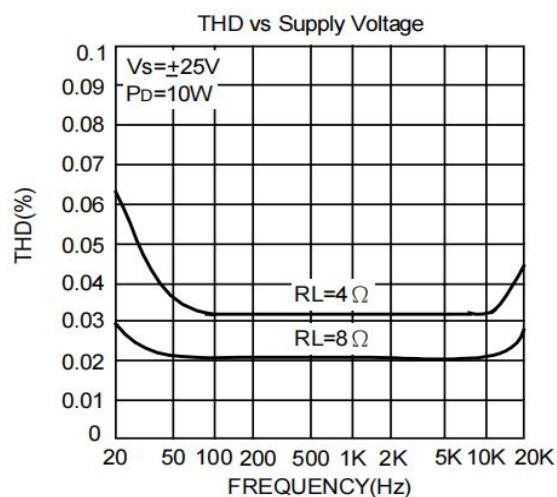
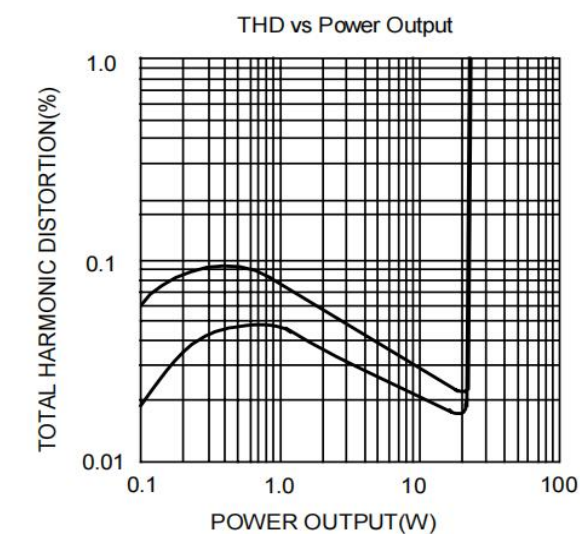
Note 1: Assumes the use of a heat sink having a thermal resistance of 1°C/W and no insulator with an ambient temperature of 25°C. Because the output limiting circuitry has a negative temperature coefficient, the maximum output power delivered to a 4Ω load may be slightly reduced when the tab temperature exceeds 55°C.

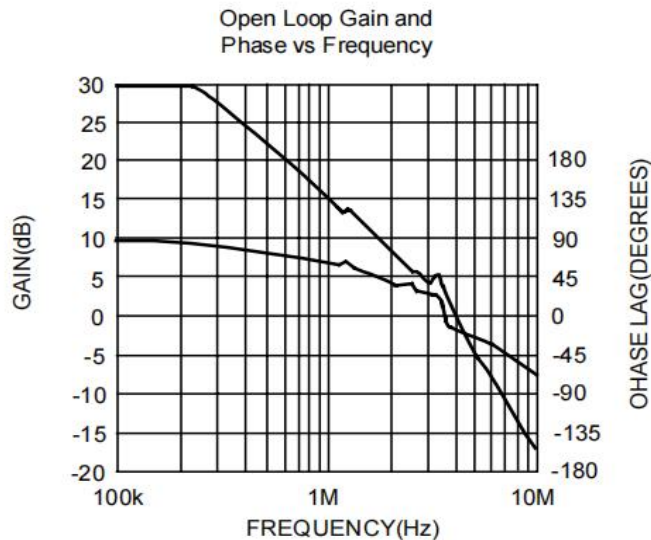
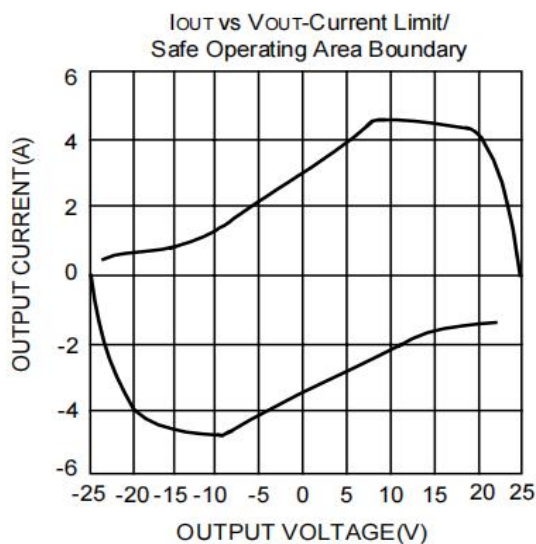
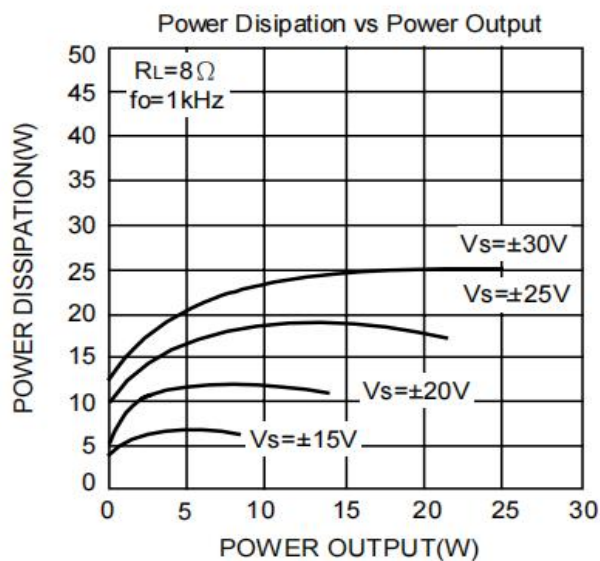
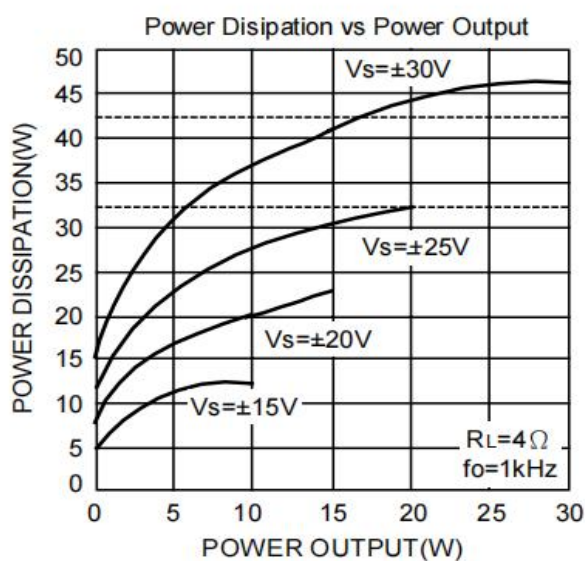
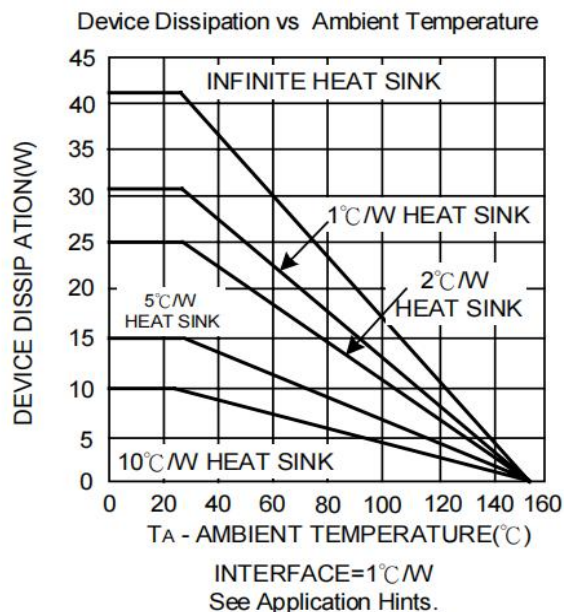
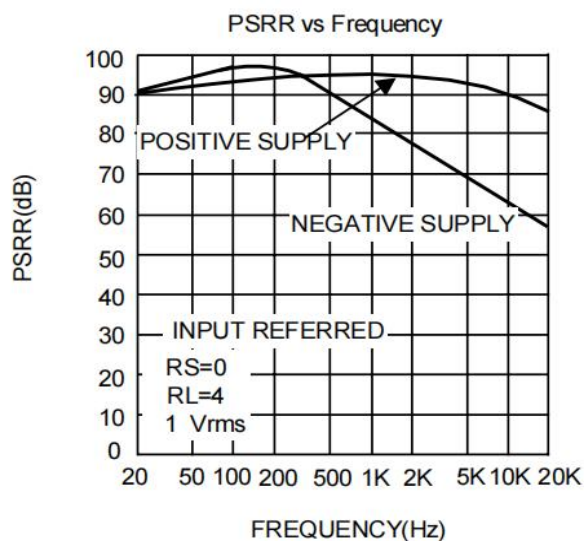


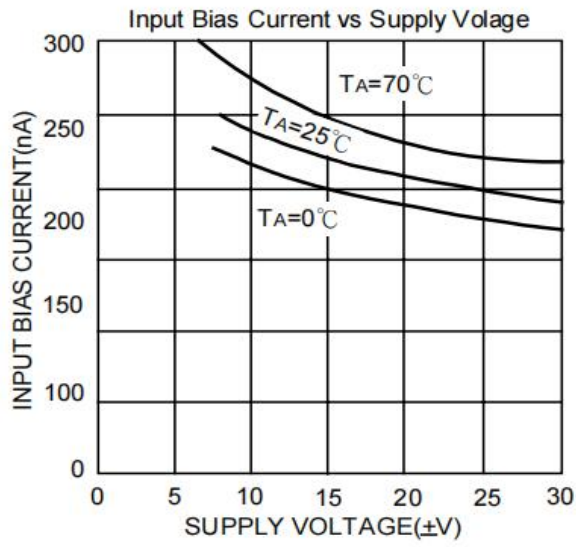
## Typical Applications(Continued)



## Typical Performance Characteristics



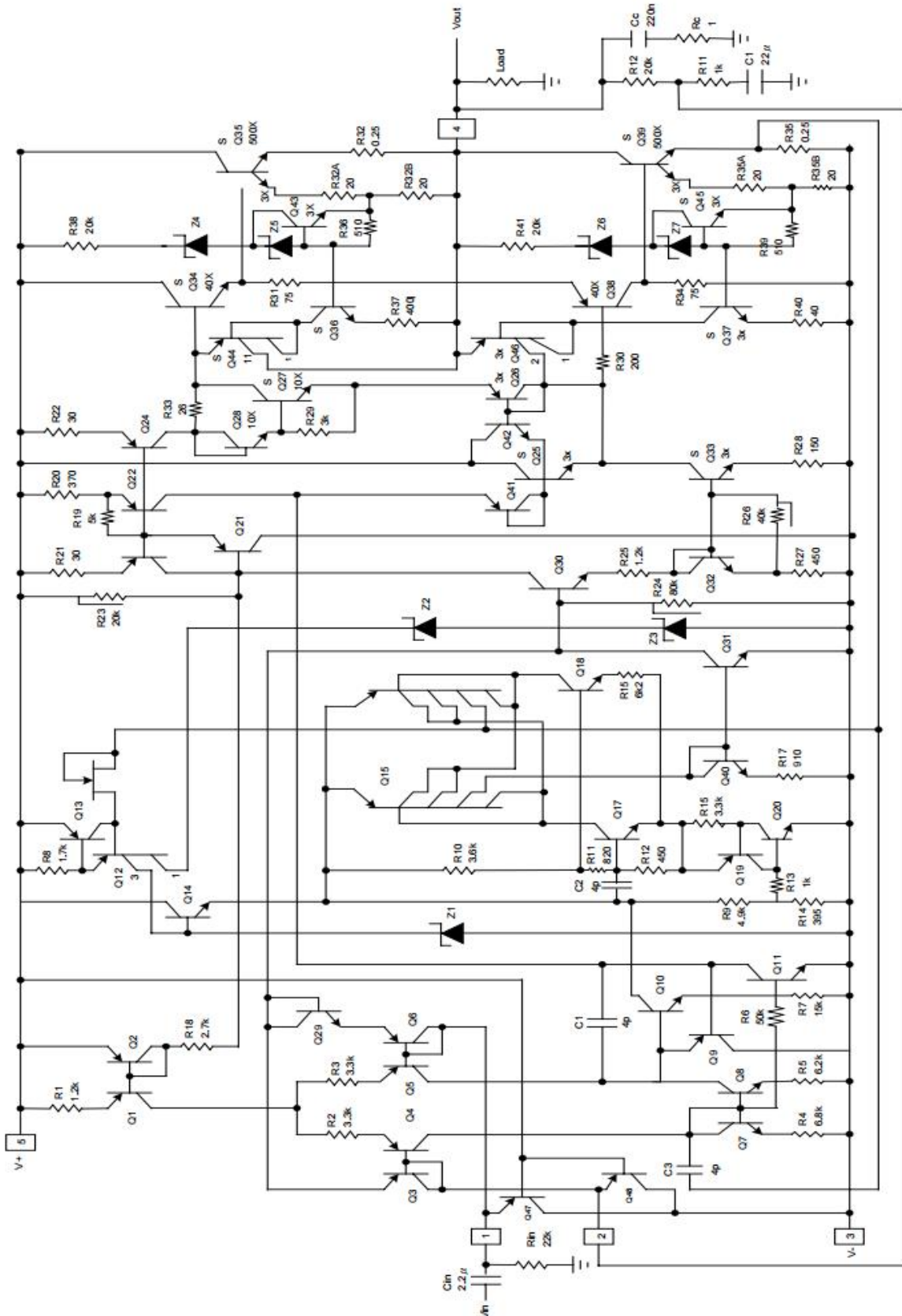




\* Thermal shutdown with infinite heat sink  
\*\*Thermal shutdown with  $1^{\circ}\text{C}/\text{W}$  heat sink



## Block Diagram





# LM1875T

## 20W Audio Power Amplifier

Unit: mm



| DIM. | mm    |       |            | Inch  |       |       |
|------|-------|-------|------------|-------|-------|-------|
|      | MIN.  | TYP.  | MAX.       | MIN.  | TYP.  | MAX.  |
| A    |       |       | 4.8        |       |       | 0.189 |
| C    |       |       | 1.37       |       |       | 0.054 |
| D    | 2.4   |       | 2.8        | 0.094 |       | 0.11  |
| D1   | 1.2   |       | 1.35       | 0.047 |       | 0.053 |
| E    | 0.35  |       | 0.55       | 0.014 |       | 0.022 |
| E1   | 0.76  |       | 1.19       | 0.030 |       | 0.047 |
| F    | 0.8   |       | 1.05       | 0.031 |       | 0.041 |
| F1   | 1.0   |       | 1.4        | 0.039 |       | 0.055 |
| G    | 3.2   | 3.4   | 3.6        | 0.126 | 0.134 | 0.142 |
| G1   | 6.6   | 6.8   | 7.0        | 0.260 | 0.268 | 0.276 |
| H2   |       |       | 10.4       |       |       | 0.409 |
| H3   | 10.05 |       | 10.4       | 0.396 |       | 0.409 |
| L    | 17.55 | 17.85 | 18.15      | 0.691 | 0.703 | 0.715 |
| L1   | 15.55 | 15.75 | 15.95      | 0.612 | 0.620 | 0.628 |
| L2   | 21.2  | 21.4  | 21.6       | 0.831 | 0.843 | 0.850 |
| L3   | 22.3  | 22.5  | 22.7       | 0.878 | 0.886 | 0.894 |
| L4   |       |       | 1.29       |       |       | 0.051 |
| L5   | 2.6   |       | 3.0        | 0.102 |       | 0.118 |
| L6   | 15.1  |       | 15.8       | 0.594 |       | 0.622 |
| L7   | 6.0   |       | 6.6        | 0.236 |       | 0.260 |
| L9   | 2.1   |       | 2.7        | 0.008 |       | 0.106 |
| L10  | 4.3   |       | 4.8        | 0.17  |       | 0.189 |
| M    | 4.23  | 4.5   | 4.75       | 0.167 | 0.178 | 0.187 |
| M1   | 3.75  | 4.0   | 4.25       | 0.148 | 0.157 | 0.167 |
| V4   |       |       | 40' (typ.) |       |       |       |
| V5   |       |       | 90' (typ.) |       |       |       |
| Dia  | 3.65  |       | 3.85       | 0.144 |       | 0.15  |



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