



## LM1875

## LINEAR INTEGRATED CIRCUIT

### 20W AUDIO POWER AMPLIFIER

#### DESCRIPTION

The UTC **LM1875** is a monolithic power amplifier offering very low distortion and high quality performance for consumer audio applications. It delivers 20W into a 4Ω or 8Ω load on ±25V supplies. Using an 8Ω load and ±30V supplies, over 30W 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 UTC **LM1875** design utilizes 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.

#### FEATURES

- \*Up to 30W 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

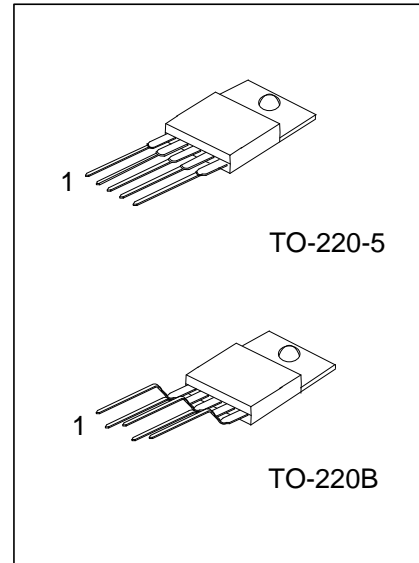
#### APPLICATIONS

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

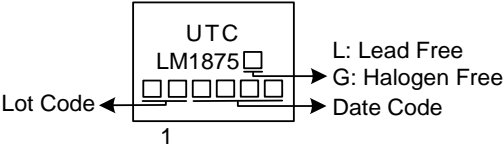
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
LM1875L-TA5-T	LM1875G-TA5-T	TO-220-5	+IN	-IN	-V <sub>EE</sub>	OUT	V <sub>CC</sub>	Tube
LM1875L-TB5-T	LM1875G-TB5-T	TO-220B	+IN	-IN	-V <sub>EE</sub>	OUT	V <sub>CC</sub>	Tube

<p>LM1875G-TA5-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TA5: TO-220-5, TB5: TO-220B (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V <sub>CC</sub>	60	V
Input Voltage	V <sub>IN</sub>	-V <sub>EE</sub> ~ V <sub>CC</sub>	V
Junction Temperature	T <sub>J</sub>	+150	°C
Storage Temperature	T <sub>STG</sub>	-40 ~ +150	°C

Note Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

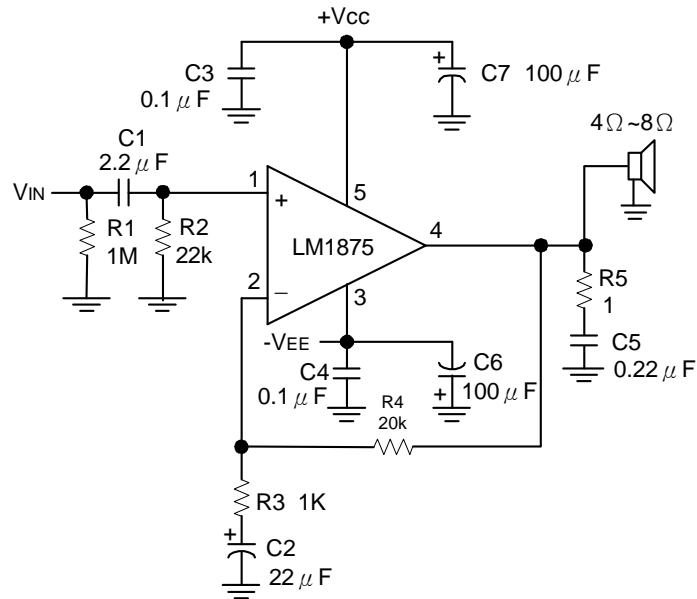
### ■ ELECTRICAL CHARACTERISTICS

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

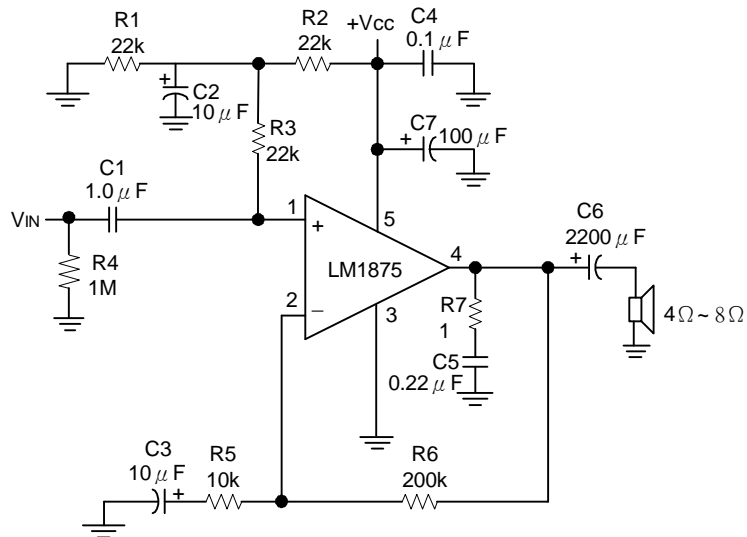
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current	I <sub>CC</sub>	P <sub>OUT</sub> =0W		70	100	mA
Output Power(Note)	P <sub>OUT</sub>	THD=1%		25		W
Total Harmonic Distortion (Note)	THD	P <sub>OUT</sub> =20W, f <sub>o</sub> =1kHz		0.015		%
		P <sub>OUT</sub> =20W, f <sub>o</sub> =20kHz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

Note: Assumes the use of a heat sink having a thermal resistance of 1°C/W and no insulator with an T<sub>a</sub>=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.

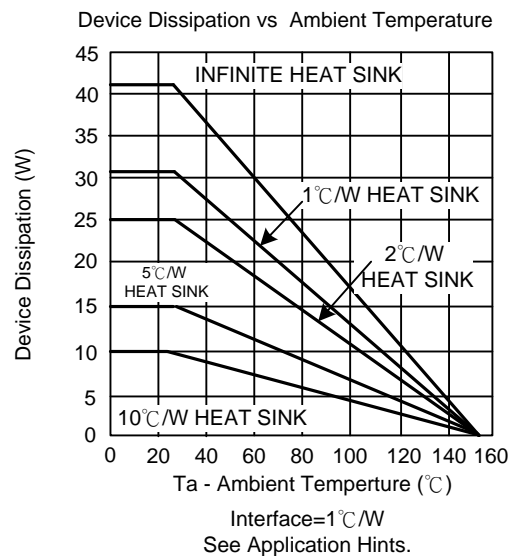
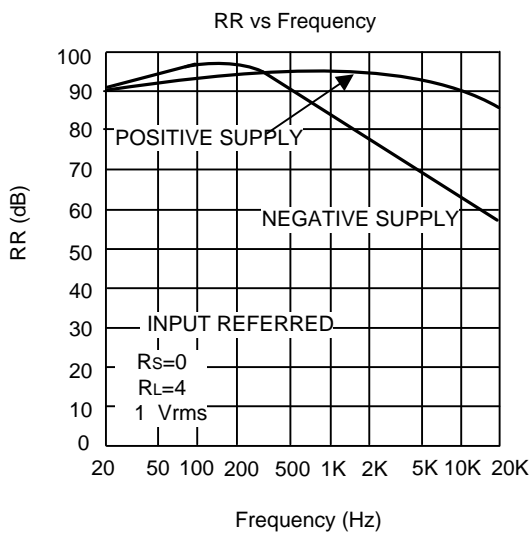
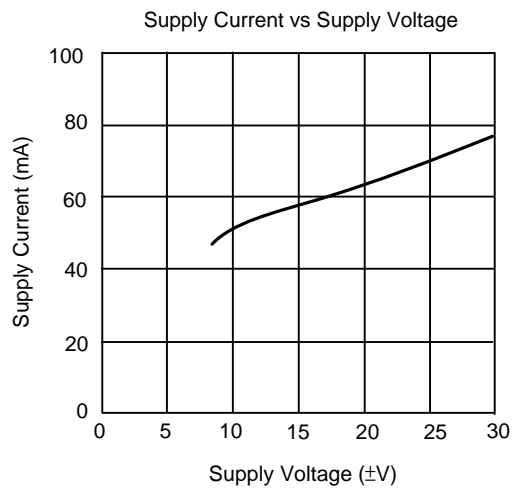
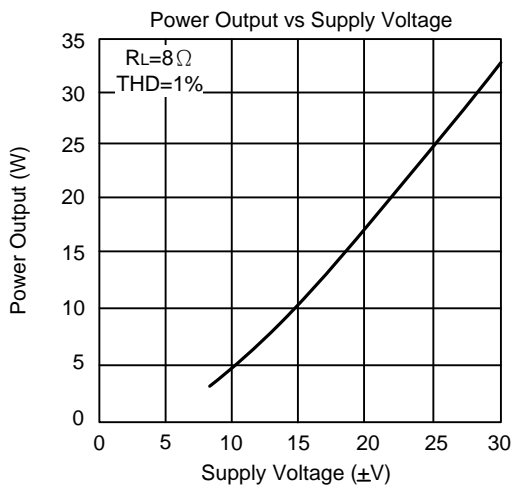
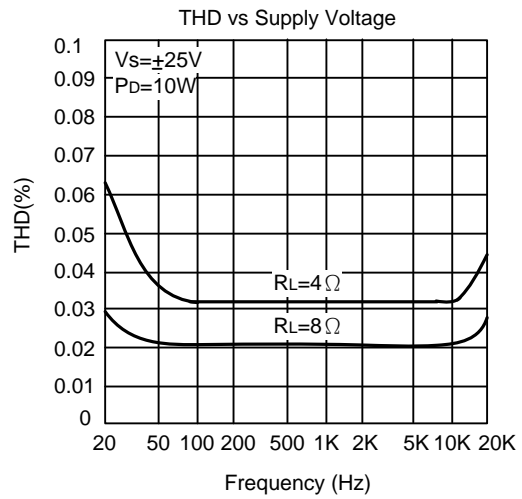
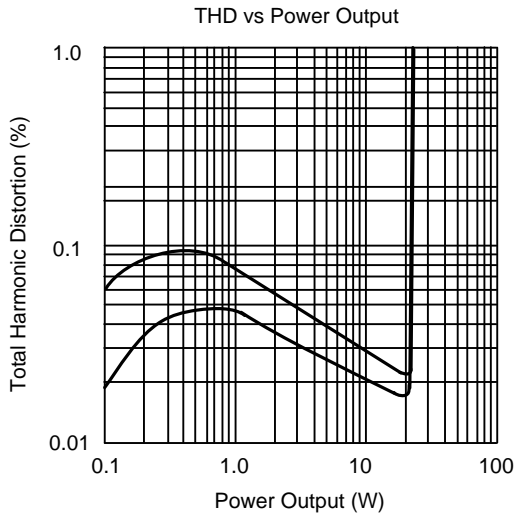
## ■ TYPICAL APPLICATION CIRCUIT



## ■ TYPICAL SINGLE SUPPLY OPERATION

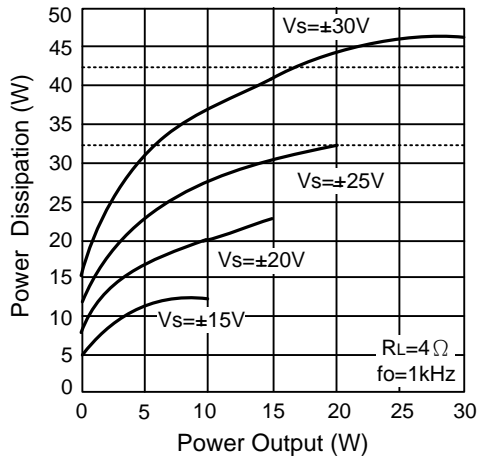


## TYPICAL CHARACTERISTICS

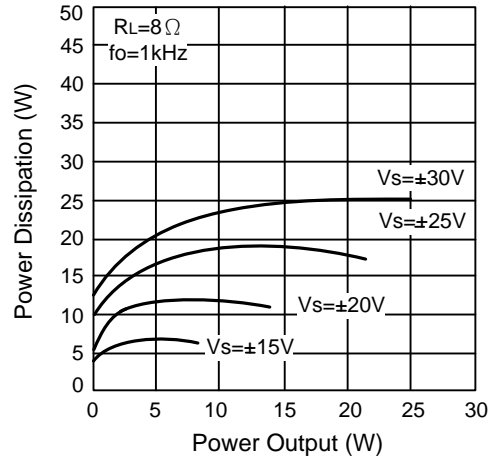


## ■ TYPICAL CHARACTERISTICS (Cont.)

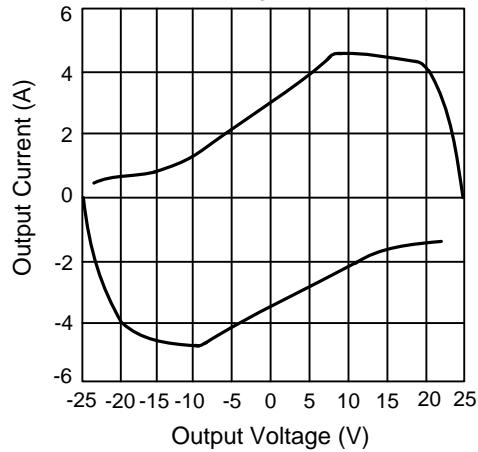
Power Dissipation vs Power Output



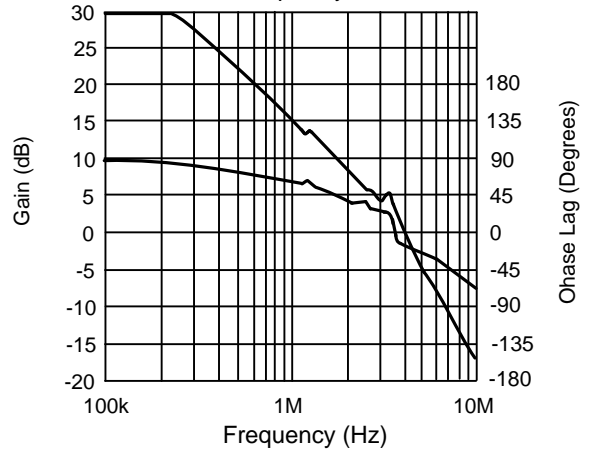
Power Dissipation vs Power Output



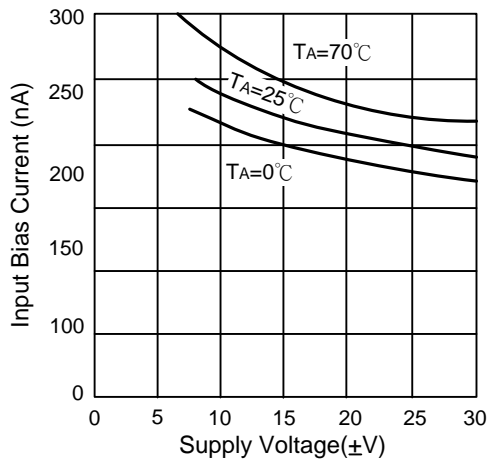
$I_{OUT}$  vs  $V_{OUT}$ -Current Limit/  
Safe Operating Area Boundary



Open Loop Gain and Phase vs  
Frequency



Input Bias Current vs Supply Voltage



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



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