



## PA1517

### LINEAR INTEGRATED CIRCUIT

## 2 × 6 W STEREO POWER AMPLIFIER

### DESCRIPTION

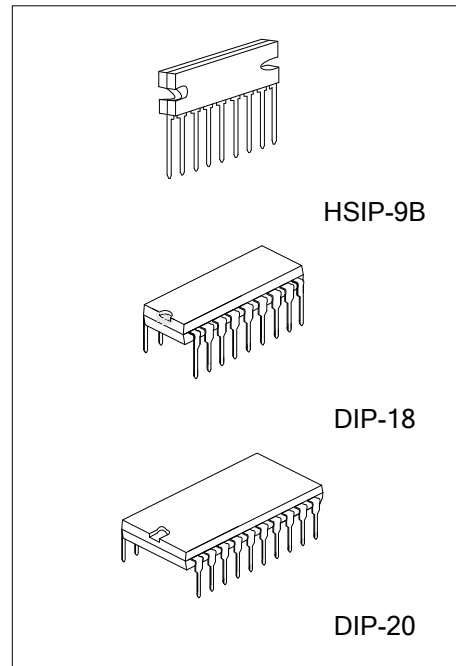
The UTC **PA1517** is an integrated class-B dual output amplifier. It is mainly using for multi-media applications.

### FEATURES

- \* Needs very few external components
- \* High output power
- \* Fixed gain
- \* Very good ripple rejection
- \* Mute/standby switch
- \* AC and DC short-circuit safe to ground and  $V_{CC}$
- \* Thermally protected
- \* Reverse polarity safe
- \* Can handle high energy on outputs ( $V_{CC} = 0V$ )
- \* Have no switch-on/switch-off plop
- \* Electrostatic discharge protection.

### ORDERING INFORMATION

| Ordering Number |                 | Package | Packing |
|-----------------|-----------------|---------|---------|
| Lead Free       | Halogen Free    |         |         |
| PA1517L-H09-B-T | PA1517G-H09-B-T | HSIP-9B | Tube    |
| -               | PA1517G-D18-T   | DIP-18  | Tube    |
| PA1517L-D20-T   | PA1517G-D20-T   | DIP-20  | Tube    |

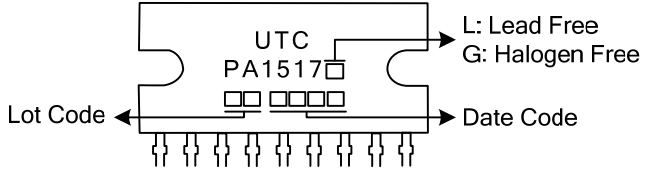
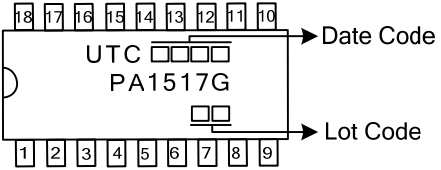
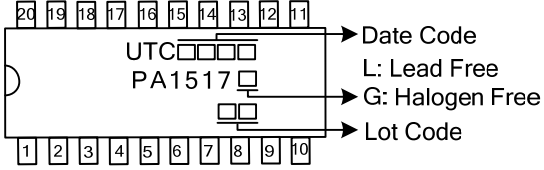


|                        |  |   |
|------------------------|--|---|
| <p>PA1517L-H09-B-T</p> | <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p> | <p>(1) T: Tube</p> <p>(2) H09-B: HSIP-9B, D18: DIP-18, D20: DIP-20</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p> |
|------------------------|--|---|

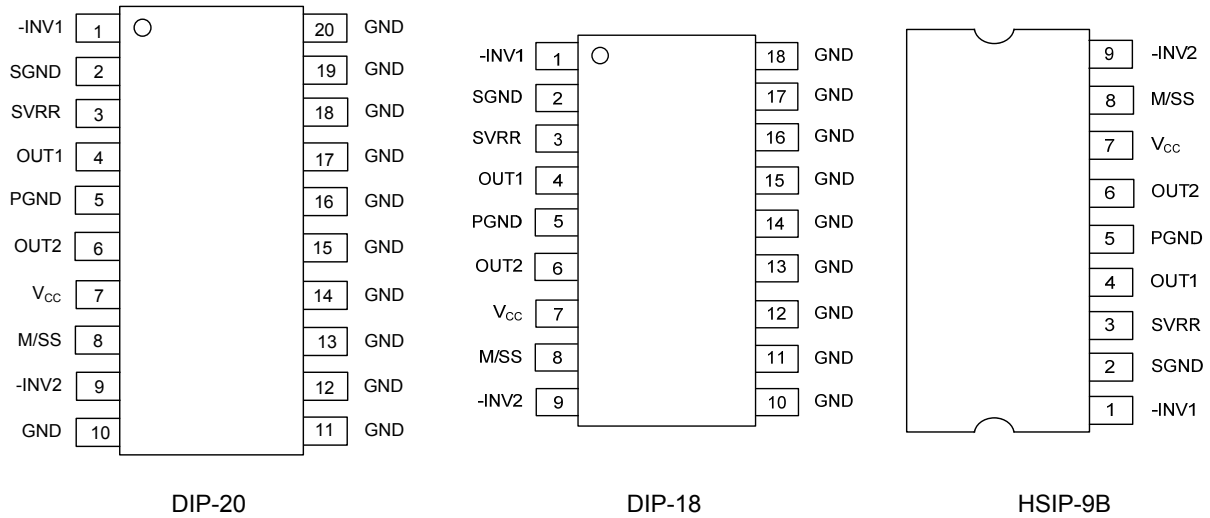
# PA1517

## LINEAR INTEGRATED CIRCUIT

### MARKING

| PACKAGE | MARKING  |
|---------|--|
| HSIP-9B |  <p>Diagram showing the marking on the HSIP-9B package. The marking includes 'UTC', 'PA1517', and a date code (four digits). The package is lead-free (L) and halogen-free (G). The date code is located on the right side, and the lot code is on the left side.</p>  |
| DIP-18  |  <p>Diagram showing the marking on the DIP-18 package. The marking includes 'UTC', 'PA1517G', and a date code (four digits). The date code is located on the top right, and the lot code is on the bottom right. Pin numbers 1 through 9 are shown along the bottom edge.</p>  |
| DIP-20  |  <p>Diagram showing the marking on the DIP-20 package. The marking includes 'UTC', 'PA1517', and a date code (four digits). The date code is located on the top right, and the lot code is on the bottom right. The package is lead-free (L) and halogen-free (G). Pin numbers 1 through 10 are shown along the bottom edge.</p> |

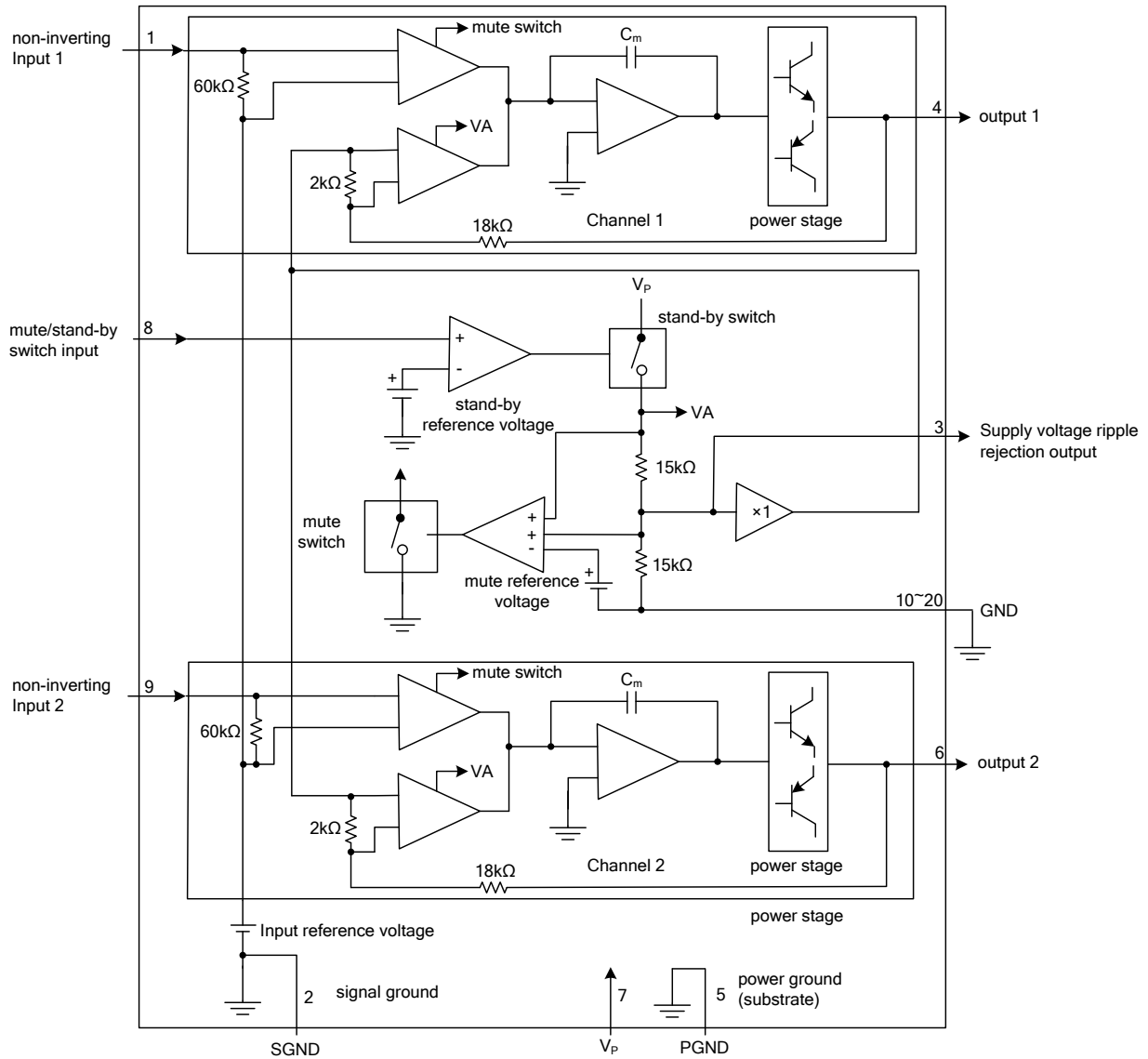
### ■ PIN CONFIGURATION



### ■ PIN DESCRIPTIONS

| PIN NO. | PIN NAME        | PIN FUNCTION                              |
|---------|-----------------|---|
| 1       | -INV1           | Non-inverting input 1                     |
| 2       | SGND            | Signal ground                             |
| 3       | SVRR            | Output of supply voltage ripple rejection |
| 4       | OUT1            | Output 1                                  |
| 5       | PGND            | Power ground                              |
| 6       | OUT2            | Output 2                                  |
| 7       | V <sub>CC</sub> | Supply voltage input                      |
| 8       | M/SS            | Input of mute/standby switch              |
| 9       | -INV2           | Non-inverting input 2                     |
| 10      | GND             | GND                                       |
| 11      | GND             | GND                                       |
| 12      | GND             | GND                                       |
| 13      | GND             | GND                                       |
| 14      | GND             | GND                                       |
| 15      | GND             | GND                                       |
| 16      | GND             | GND                                       |
| 17      | GND             | GND                                       |
| 18      | GND             | GND                                       |
| 19      | GND             | GND                                       |
| 20      | GND             | GND                                       |

## ■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER   |                | SYMBOL       | RATINGS    | UNIT       |
|---|----------------|--------------|------------|------------|
| Supply Voltage  | Operating      | $V_{CC}$     | 18         | V          |
|   | No Signal      |              | 20         | V          |
| AC and DC Short-Circuit Safe Voltage                    |                | $V_{CC(SC)}$ | 18         | V          |
| Reverse Polarity  |                | $V_{CC(R)}$  | 6          | V          |
| Energy Handling Capability at Outputs ( $V_{CC} = 0V$ ) |                | $ERG_O$      | 200        | mJ         |
| Peak Output Current                                     | Non-Repetitive | $I_{OSM}$    | 4          | A          |
|   | Repetitive     |              | 2.5        | A          |
| Power Dissipation ( $T_a = 25^\circ C$ )                | DIP-18/HSIP-9B | $P_D$        | 2.5        | W          |
|   | DIP-20         |              | 2.85       | W          |
| Junction Temperature                                    |                | $T_J$        | 150        | $^\circ C$ |
| Operating Temperature                                   |                | $T_{OPR}$    | -40 ~ +85  | $^\circ C$ |
| Storage Temperature                                     |                | $T_{STG}$    | -55 ~ +150 | $^\circ C$ |

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.

### ■ THERMAL DATA

| PARAMETER           |                | SYMBOL        | MIN | TYP  | MAX | UNIT         |
|---------------------|----------------|---------------|-----|------|-----|--------------|
| Junction to Ambient | DIP-18/HSIP-9B | $\theta_{JA}$ |     | 50   |     | $^\circ C/W$ |
|                     | DIP-20         |               |     | 43.9 |     | $^\circ C/W$ |

### ■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER                        | SYMBOL        | TEST CONDITIONS                           | MIN | TYP  | MAX  | UNIT       |
|----------------------------------|---------------|---|-----|------|------|------------|
| Supply Voltage                   | $V_{CC}$      |   | 6.0 | 14.4 | 18.0 | V          |
| Repetitive Peak Output Current   | $I_{ORM}$     |   |     |      | 2.5  | A          |
| Total Quiescent Current          | $I_Q$         |   |     | 40   | 80   | mA         |
| Standby Current                  | $I_{SB}$      |   |     | 0.1  | 100  | $\mu A$    |
| Switch-on Current                | $I_{SW}$      |   |     |      | 40   | $\mu A$    |
| Input Impedance                  | $ Z_i $       |   | 50  |      |      | k $\Omega$ |
| Output Power                     | $P_{OUT}$     | $R_L = 4 \Omega$ ; THD = 0.5%             |     | 5    |      | W          |
|                                  |               | $R_L = 4 \Omega$ ; THD = 10%              |     | 6    |      | W          |
| Supply Voltage Ripple Rejection  | SVRR          | $f_i = 100 \text{ Hz to } 10 \text{ kHz}$ | 48  |      |      | dB         |
| Channel Separation               | $\alpha_{CS}$ |   | 40  |      |      | dB         |
| Closed Loop Voltage Gain         | $G_V$         |   | 19  | 20   | 21   | dB         |
| Noise Output Voltage (RMS Value) | $V_{NO(RMS)}$ |   |     | 50   |      | $\mu V$    |

### ■ ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ C$ ; unless otherwise specified)

| PARAMETER   | SYMBOL       | TEST CONDITIONS   | MIN | TYP  | MAX  | UNIT    |
|---|--------------|---|-----|------|------|---------|
| <b>DC ELECTRICAL CHARACTERISTICS (<math>V_{CC} = 14.4 \text{ V}</math>)</b> |              |   |     |      |      |         |
| <b>SUPPLY</b>   |              |   |     |      |      |         |
| Supply Voltage  | $V_{CC}$     | Note 1  | 6.0 | 14.4 | 18.0 | V       |
| Total Quiescent Current   | $I_{Q(TOT)}$ |   |     | 40   | 80   | mA      |
| DC Output Voltage   | $V_{OUT}$    |   |     | 6.95 |      | V       |
| <b>MUTE/STAND-BY SWITCH</b>   |              |   |     |      |      |         |
| Switch-on Voltage Level   | $V_8$        |   | 8.5 |      |      | V       |
| <b>MUTE CONDITION</b>   |              |   |     |      |      |         |
| Output Signal in Mute Position  | $V_{OUT}$    | $V_{I(MAX)} = 1V; f_i = 20 \text{ Hz to } 15 \text{ kHz}$ |     |      | 2    | mV      |
| <b>STAND-BY CONDITION</b>   |              |   |     |      |      |         |
| DC Current in Standby Condition   | $I_{SB}$     |   |     |      | 100  | $\mu A$ |
| Switch-on Current   | $I_{SW}$     |   |     | 12   | 40   | $\mu A$ |

### ■ ELECTRICAL CHARACTERISTICS

| PARAMETER  |          | SYMBOL         | TEST CONDITIONS           | MIN | TYP | MAX | UNIT             |
|--|----------|----------------|---------------------------|-----|-----|-----|------------------|
| <b>AC ELECTRICAL CHARACTERISTICS</b> ( $V_{CC} = 14.4\text{ V}$ ; $R_L = 4\Omega$ ; $f = 1\text{ kHz}$ ) |          |                |                           |     |     |     |                  |
| Output Power   |          | $P_{OUT}$      | THD = 0.5%; Note 1        | 4   | 5   |     | W                |
|  |          |                | THD = 10%; Note 1         | 5.5 | 6.0 |     | W                |
| Total Harmonic Distortion  |          | THD            | $P_{OUT} = 1\text{ W}$    |     | 0.1 |     | %                |
| Low Frequency Roll-Off   |          | $f_{LR}$       | at -3 dB; Note 2          |     | 45  |     | $\text{Hz}$      |
| High Frequency Roll-Off  |          | $f_{HR}$       | at -1dB                   | 20  |     |     | $\text{kHz}$     |
| Closed Loop Voltage Gain   |          | $G_V$          | Untrimmed                 | 19  | 20  | 21  |                  |
| Supply Voltage Ripple Rejection  | On       | SVRR           | Note 3                    | 48  |     |     | dB               |
|  | Mute     |                |                           | 48  |     |     | dB               |
|  | Stand-by |                |                           | 80  |     |     | dB               |
| Input Impedance  |          | $ Z_{IN} $     |                           | 50  | 60  | 75  | $\text{k}\Omega$ |
| Noise Output Voltage   | On       | $V_{NO}$       | $R_S = 0\Omega$ ; Note 4  |     | 50  |     | $\mu\text{V}$    |
|  | On       |                | $R_S = 10\Omega$ ; Note 4 |     | 70  | 100 | $\mu\text{V}$    |
|  | Mute     |                | Note 5                    |     | 50  |     | $\mu\text{V}$    |
| Channel Separation   |          | $\alpha_{CS}$  | $R_S = 10\Omega$          | 40  |     |     | dB               |
| Channel Unbalance  |          | $ \Delta G_V $ |                           |     | 0.1 | 1   | dB               |

Notes: 1. Output power is measured at the output pins of the IC.

2. Frequency response externally fixed.

3. Ripple rejection measured at the output with a source impedance of  $0\Omega$ , maximum ripple amplitude of 2 V(p-p) and a frequency between 100 Hz and 10 kHz.

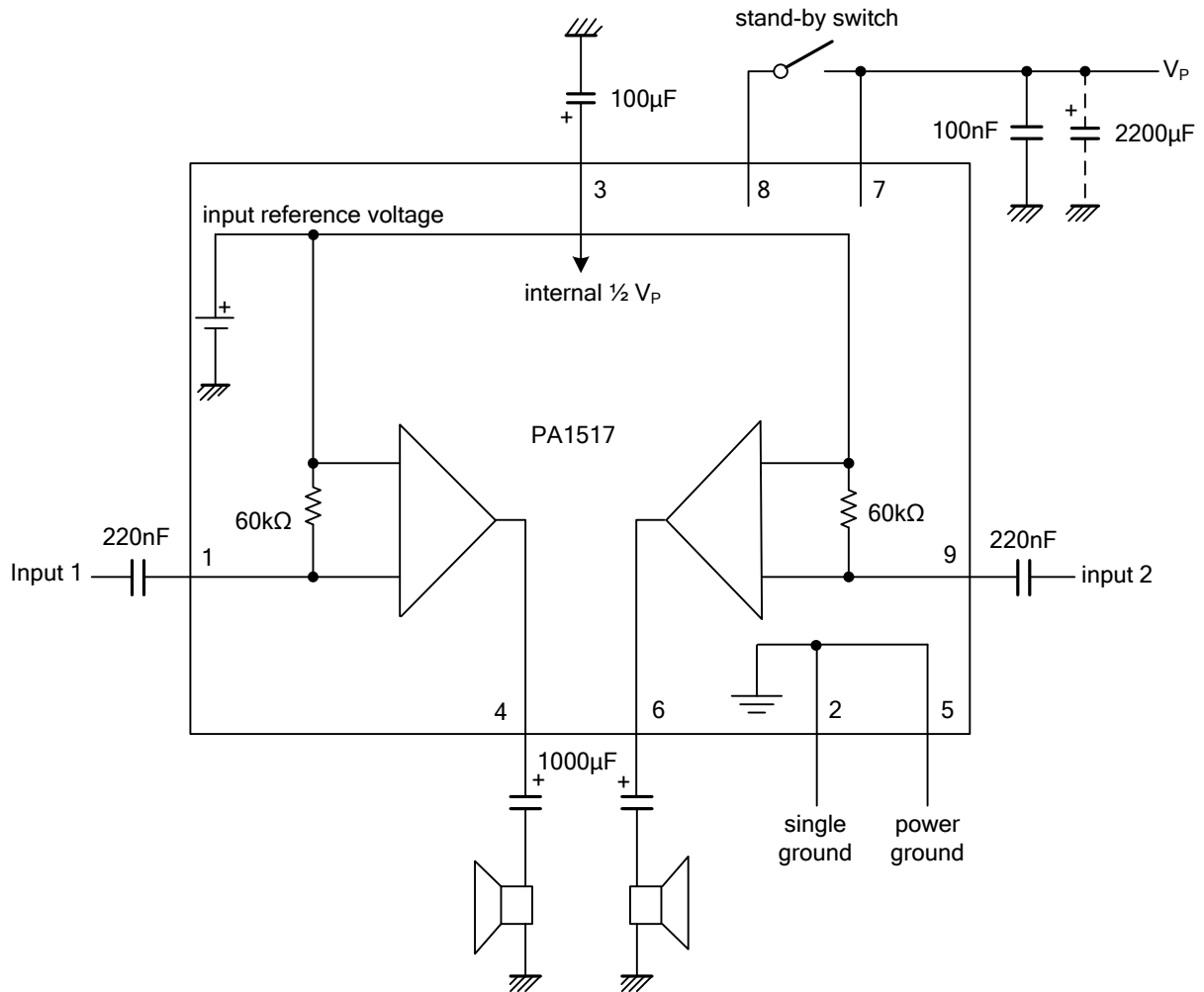
4. Noise voltage measured in a bandwidth of 20 Hz to 20 kHz.

5. Noise output voltage independent of  $R_S$  ( $V_{IN} = 0\text{ V}$ ).

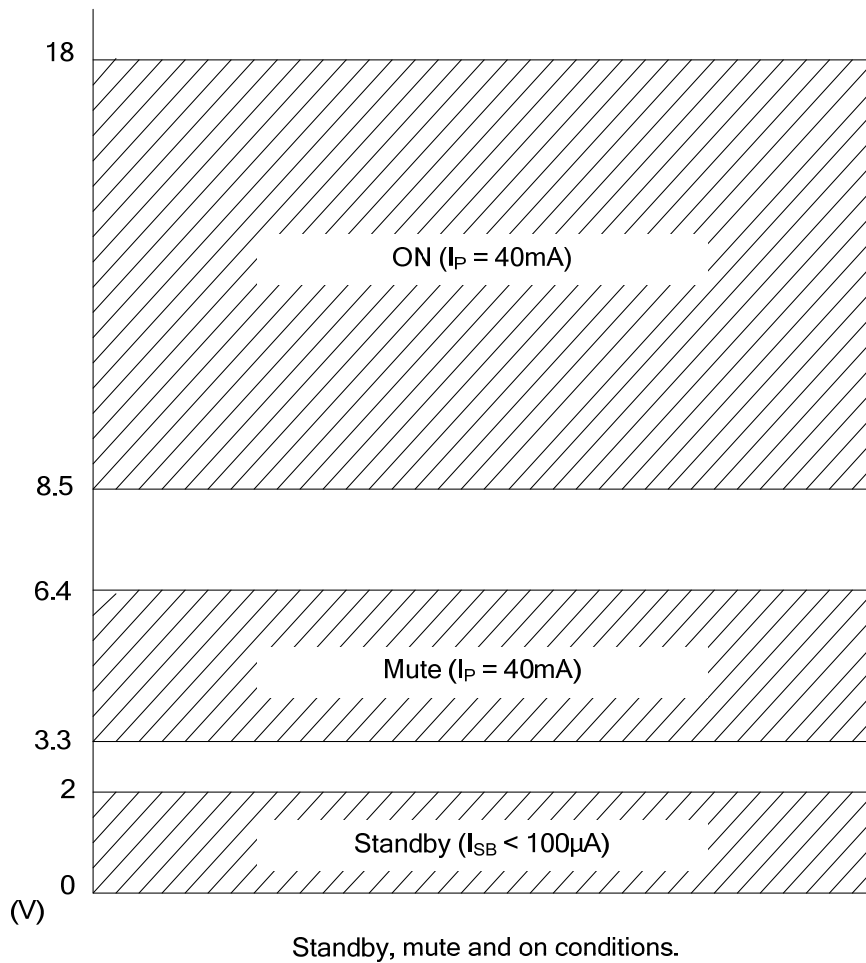
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## LINEAR INTEGRATED CIRCUIT

### ■ TYPICAL APPLICATION

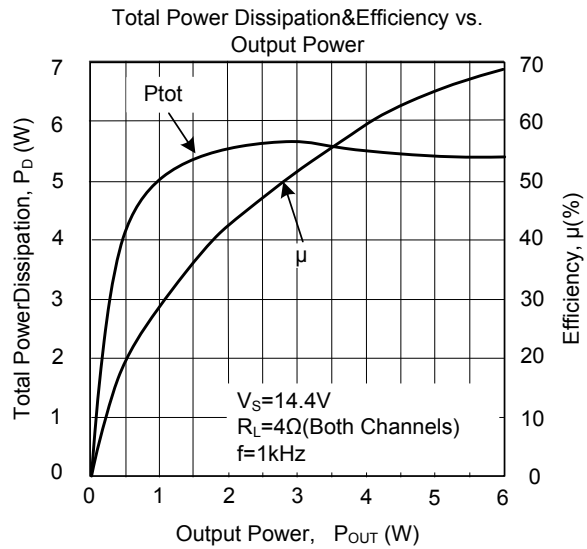
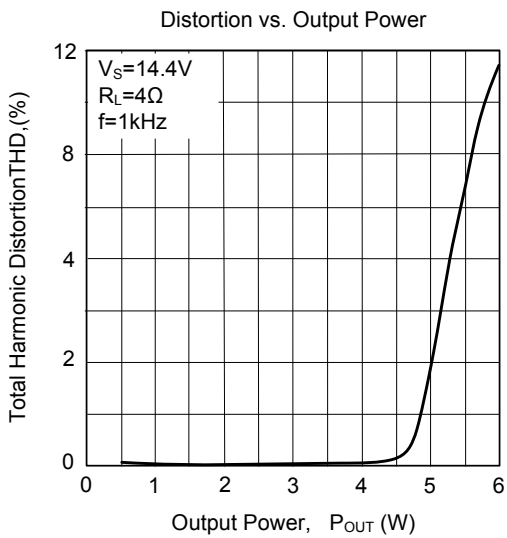
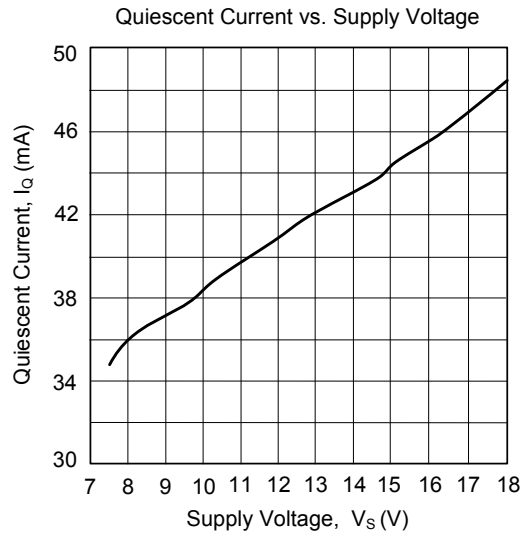
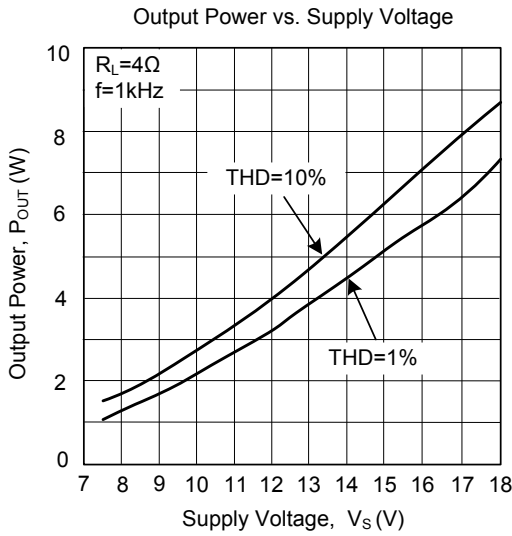


■ TYPICAL APPLICATION





## TYPICAL CHARACTERISTICS



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