

|          |  |  |            |       |
|----------|--|--|------------|-------|
| Prepared |  | <b>Product Specifications</b><br><br><b>AN7586</b> | Ref No.    | A - 1 |
| Checked  |  |  | Total Page | 12    |
| Approved |  |  | Page No.   | 1     |

|             |   |
|-------------|---|
| Structure   | Silicon Monolithic Bipolar IC   |
| Appearance  | SIL-7 Pins Plastic Package<br>(Power Type With Fin)   |
| Application | Low Frequency Amplifier   |
| Function    | Mono 10W Audio Power Amplifier, with<br>standby circuit and incorporating protection circuits |

| A   | Absolute Maximum Ratings        |        |   |                           |      |
|-----|---------------------------------|--------|---|---------------------------|------|
| No. | Item                            | Symbol | Ratings   | Unit                      | Note |
| 1   | Storage Temperature             | Tstg   | -55 ~ +150  | ° C                       | 1    |
| 2   | Operating Ambient Temperature   | Topr   | -25 ~ +75   | ° C                       | 1    |
| 3   | Operating Ambient Pressure      | Popr   | $1.013 \times 10^5 \pm 0.61 \times 10^5$<br>(1.0 ± 0.6) | Pa<br>(atm)               |      |
| 4   | Operating Constant Acceleration | Gopr   | 9,810<br>(1,000)  | m / s <sup>2</sup><br>(G) |      |
| 5   | Operating Shock                 | Sopr   | 4,900<br>(500)  | m / s <sup>2</sup><br>(G) |      |
| 6   | Power Supply Voltage            | Vcc    | 35.0  | V                         |      |
| 7   | Power Supply Current            | Icc    | 2.0   | A                         |      |
| 8   | Power Dissipation               | PD     | 18.7  | W                         | 2    |

|                                |     |                 |
|--------------------------------|-----|-----------------|
| Operating Supply Voltage Range | Vcc | 10.0 V ~ 32.0 V |
|--------------------------------|-----|-----------------|

Note : 1) Except these items, all other measurements are taken at Ta = 25 °C.

2) Ta = 75 °C with infinite heat sink.

|             |           |           |           |  |
|-------------|-----------|-----------|-----------|--|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |  |
| 11-Feb-1999 |           |           |           |  |

|          |  |  |            |     |
|----------|--|--|------------|-----|
| Prepared |  | <b>Product Specifications</b><br><br><b>AN7586</b> | Ref No.    | A-2 |
| Checked  |  |  | Total Page | 12  |
| Approved |  |  | Page No.   | 2   |

| A   | Absolute Maximum Ratings |                |             |      |      |
|-----|--------------------------|----------------|-------------|------|------|
| No. | Item                     | Symbol         | Ratings     | Unit | Note |
| 1   | Pin Voltage (Pin 3)      | V <sub>3</sub> | -0.3 ~ +3.0 | V    |      |

Note) For the above mentioned terminals do not apply a voltage or current that is outside the described range.

|             |           |           |           |  |
|-------------|-----------|-----------|-----------|--|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |  |
| 11-Feb-1999 |           |           |           |  |

|          |  |  |            |       |
|----------|--|--|------------|-------|
| Prepared |  | <b>Product Specifications</b><br><br><b>AN7586</b> | Ref No.    | B - 1 |
| Checked  |  |  | Total Page | 12    |
| Approved |  |  | Page No.   | 3     |

| No. | Item                      | Symbol   | Test Cct. | Condition                     | Limit   |      |     | Unit | Note |
|-----|---------------------------|----------|-----------|-------------------------------|---|------|-----|------|------|
|     |                           |          |           |                               | Min   | Typ  | Max |      |      |
|     |                           |          |           |                               | <b>B</b> Electrical Characteristics<br>(Ambient temperature is 25°C±2°C unless otherwise specified) |      |     |      |      |
| 1   | Quiescent Current         | Icq      |           | Vin=0mV                       | -   | 30   | 60  | mA   |      |
| 2   | Output End Noise Voltage  | Vno      |           | No input, Rg=10k              | -   | 0.22 | 0.4 | mV   | 2    |
| 3   | Voltage Gain              | Gv       |           | Vin=57mV                      | 32  | 34   | 36  | dB   |      |
| 4   | Total Harmonic Distortion | THD      |           | Vin=57mV                      | -   | 0.2  | 0.4 | %    |      |
| 5   | Maximum Output Power      | Po       |           | Vcc=26V,<br>THD=10%           | 8.0   | 10.0 | -   | W    |      |
| 6   | Ripple Rejection Ratio    | RR       |           | Vr=1 Vrms,<br>fr=120Hz,Rg=10k | 45  | 55   | -   | dB   | 2    |
| 7   | Stand-by On Voltage       | Vstb-on  |           | No input<br>Icc ≤ 0.1mA       | -   | -    | 5.0 | V    |      |
| 8   | Stand-by Off Voltage      | Vstb-off |           | No input<br>Icc ≥ 9.5mA       | 8.5   | -    | -   | V    |      |

Note : 1) f=1kHz, RL=8Ω, Vcc=26V, unless otherwise stated

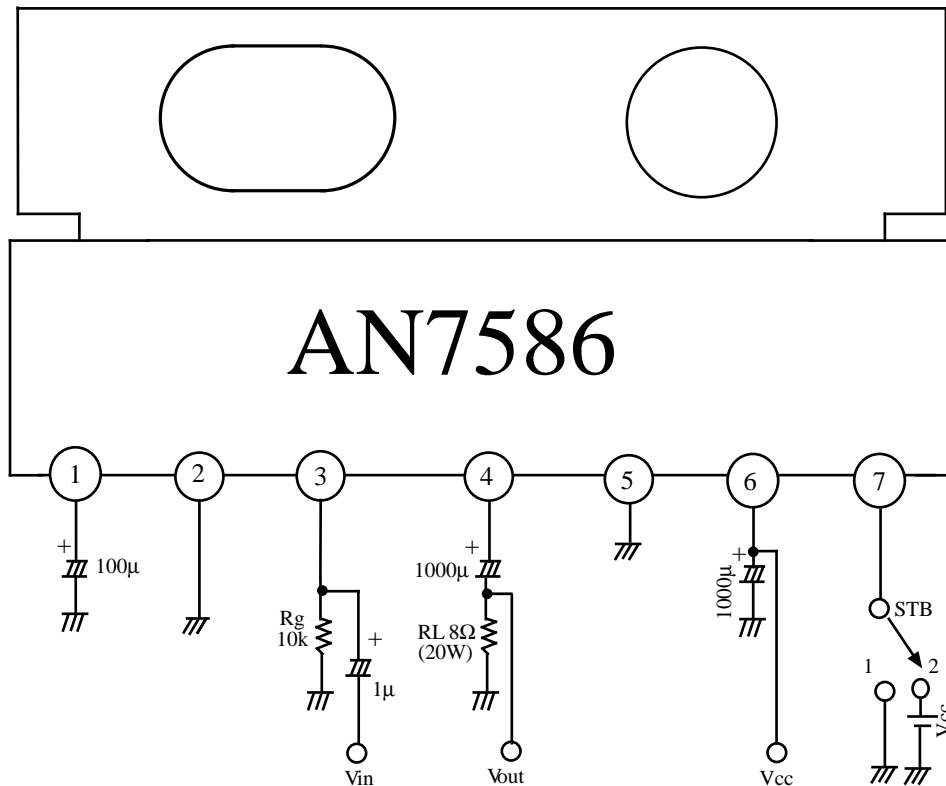
2) For this measurement, use the 20Hz~20kHz (12dB/OCT) filter.

|             |           |           |           |  |
|-------------|-----------|-----------|-----------|--|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |  |
| 11-Feb-1999 |           |           |           |  |

|          |  |  |            |       |
|----------|--|--|------------|-------|
| Prepared |  | <b>Product Specifications</b><br><br><b>AN7586</b> | Ref No.    | C - 1 |
| Checked  |  |  | Total Page | 12    |
| Approved |  |  | Page No.   | 4     |

Description of Test Circuits and Test Methods

Test Circuit :

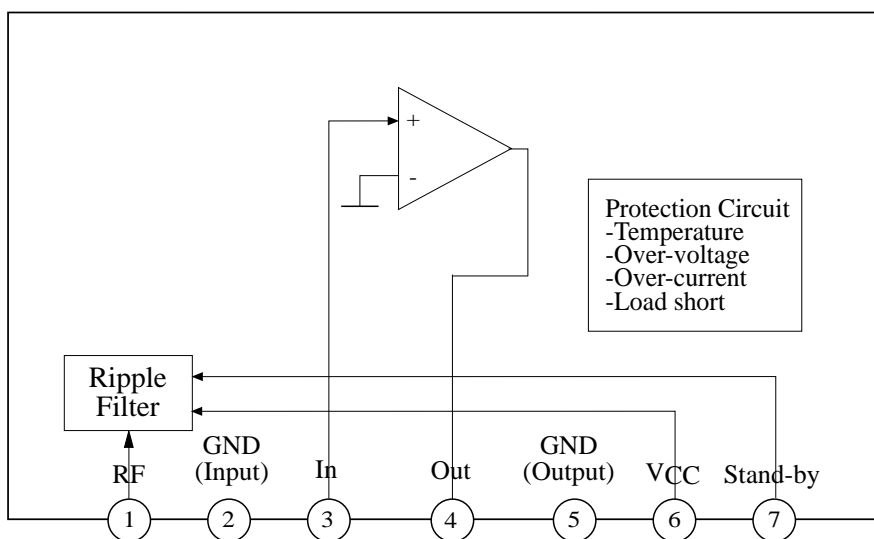


Note:  
For ' OPERATIONAL MODE ', connect STB to Vcc.

|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |

|          |  |  |            |       |
|----------|--|--|------------|-------|
| Prepared |  | <b>Product Specifications</b><br><br><b>AN7586</b> | Ref No.    | D - 1 |
| Checked  |  |  | Total Page | 12    |
| Approved |  |  | Page No.   | 5     |

### Circuit Function Block Diagram



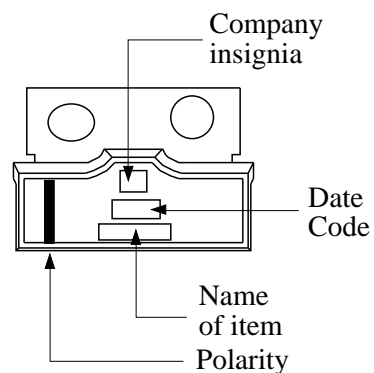
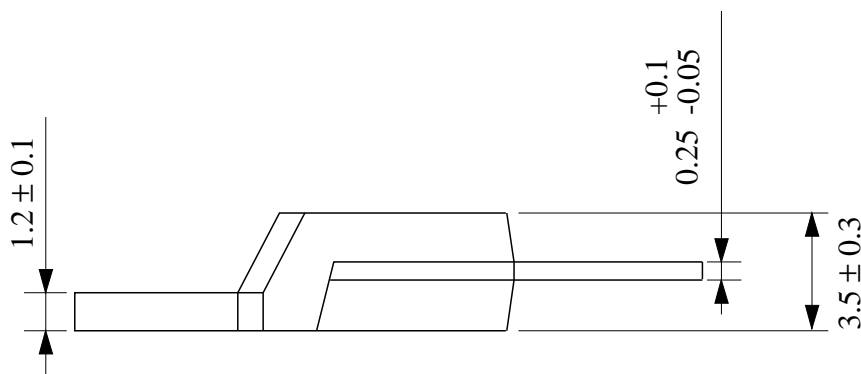
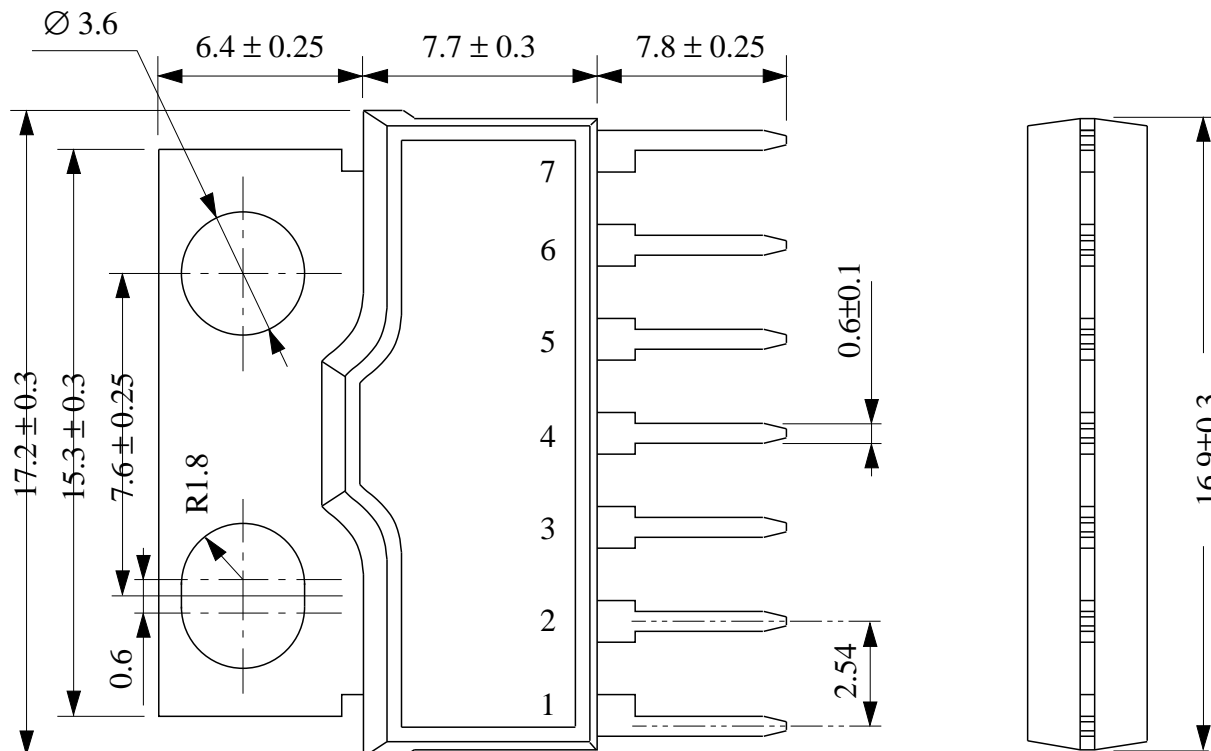
### Pin Descriptions

| Pin No. | Pin Descriptions | Pin No. | Pin Descriptions |
|---------|------------------|---------|------------------|
| 1       | Ripple Filter    | 5       | GND (output)     |
| 2       | GND (input)      | 6       | Vcc              |
| 3       | Input            | 7       | Standby          |
| 4       | Output           |         |                  |

|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |

|          |  |  |              |         |
|----------|--|--|--------------|---------|
| Prepared |  | <b>Product Specifications</b><br><b>AN7586</b> | Ref No.      | E-1     |
| Checked  |  |  | Total Page   | 12      |
| Approved |  |  | Page No.     | 6       |
|          |  |  | Package Name | FP - 7S |

Unit : mm



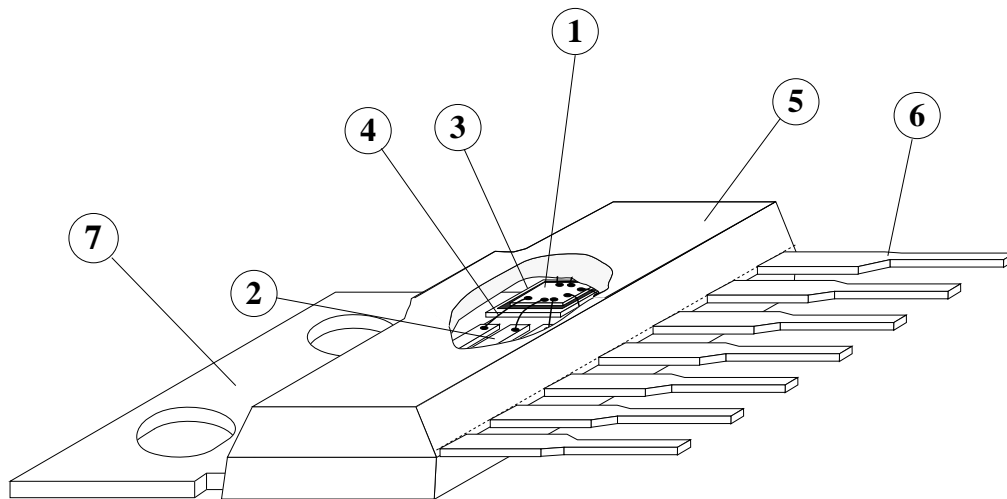
|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |

|          |  |  |            |    |
|----------|--|--|------------|----|
| Prepared |  | <b>Product Specifications</b><br><b>AN7586</b> | Ref No.    | F  |
| Checked  |  |  | Total Page | 12 |
| Approved |  |  | Page No.   | 7  |

**(Structure Description)**

|                            |                       |                    |            |            |   |
|----------------------------|-----------------------|--------------------|------------|------------|---|
| Chip surface passivation   | SiN,                  | PSG,               | Others ( ) | ①          |   |
| Lead frame material        | Fe group,             | Cu group,          | Others ( ) | ②, ⑥       |   |
| Inner lead surface process | Ag plating,           | Au plating,        | Others ( ) | ②          |   |
| Outer lead surface process | Solder plating,       | Solder dip,        | Others ( ) | ⑥          |   |
| Chip mounting method       | Ag paste,             | Au-Si alloy,       | Solder,    | Others ( ) | ③ |
| Wire bonding method        | Thermalsonic bonding, |                    | Others ( ) | ④          |   |
| Wire material              | Au,                   | Diameter 38 μm     | Others ( ) | ④          |   |
| Mold material              | Epoxy,                |                    | Others ( ) | ⑤          |   |
| Molding method             | Transfer mold,        | Multiplunger mold, | Others ( ) | ⑤          |   |
| Heat Fin Material          | Fe group,             | Cu group,          | Others ( ) | ⑦          |   |

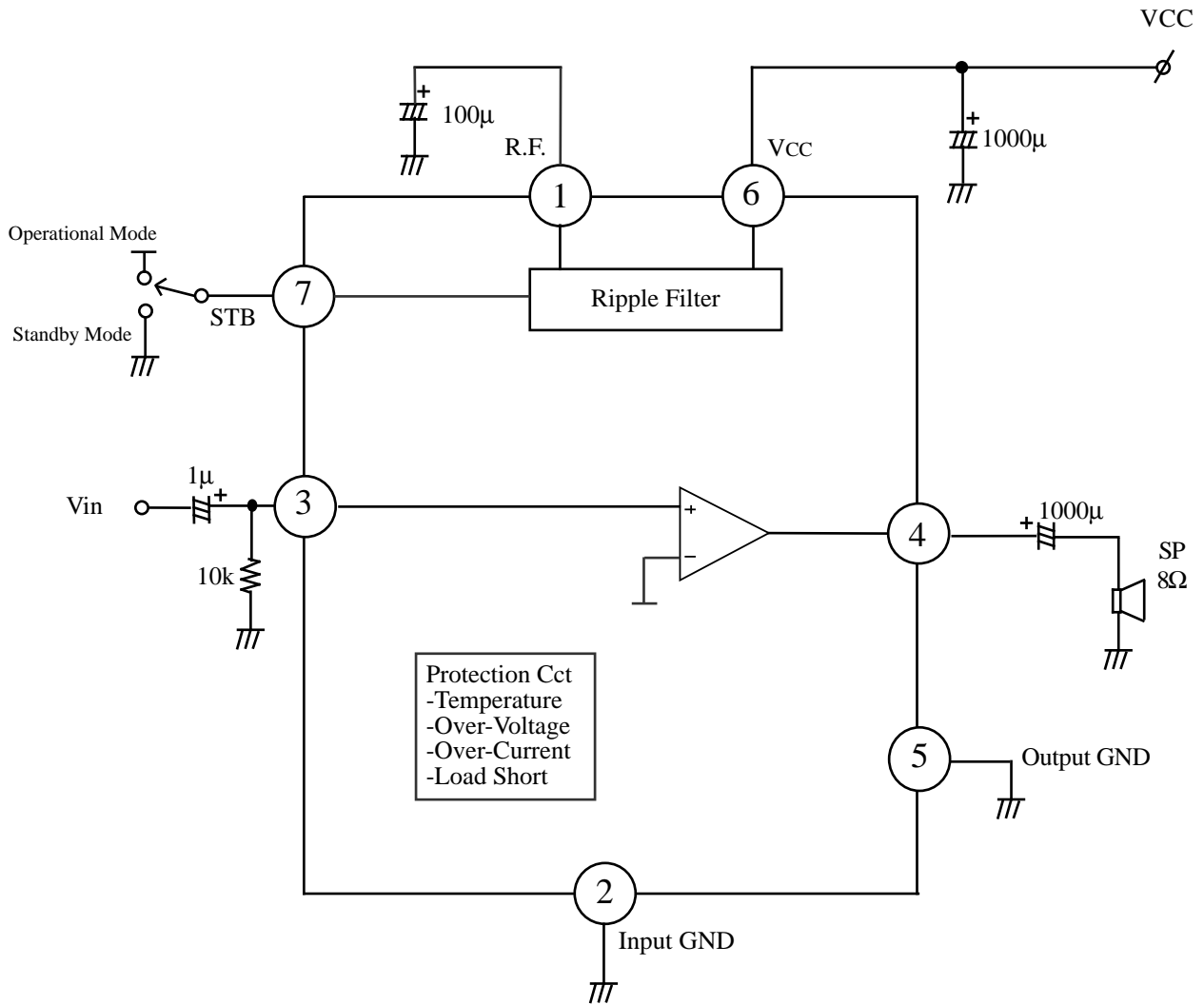
**Package FP-7S**



|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |

|          |  |  |            |       |
|----------|--|--|------------|-------|
| Prepared |  | <b>Product Specifications</b><br><br><b>AN7586</b> | Ref No.    | G - 1 |
| Checked  |  |  | Total Page | 12    |
| Approved |  |  | Page No.   | 8     |

Application Circuit



|                  |     |
|------------------|-----|
| Operational Mode | VCC |
| Standby Mode     | 0V  |

|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |



|          |  |  |            |       |
|----------|--|--|------------|-------|
| Prepared |  | <b>Product Specifications</b><br>(Technical Data)<br><b>AN7586</b> | Ref No.    | G - 2 |
| Checked  |  |  | Total Page | 12    |
| Approved |  |  | Page No.   | 9     |

| Pin No. | Function      | Adjacent Circuitry | Pins Description / Signal  | DC Bias (V)            |
|---------|---------------|--------------------|--|------------------------|
| 1       | Ripple Filter |                    | This is the pin to connect the positive terminal of a ripple filter capacitor. | Vcc-1.5V <sub>BE</sub> |
| 2       | Input GND     |                    | Input ground pin.  | 0V                     |
| 3       | Input         |                    | This is the amplifier input pin.   | 0V                     |

|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |

|          |  |  |            |       |
|----------|--|--|------------|-------|
| Prepared |  | <b>Product Specifications</b><br>(Technical Data)<br><b>AN7586</b> | Ref No.    | G - 2 |
| Checked  |  |  | Total Page | 12    |
| Approved |  |  | Page No.   | 10    |

| Pin No. | Function   | Adjacent Circuitry | Pins Description / Signal  | DC Bias (V) |
|---------|------------|--------------------|--|-------------|
| 4       | Output     |                    | Output pin   | $V_{cc}/2$  |
| 5       | Output Gnd |                    | Output ground.   | 0V          |
| 6       | Vcc        |                    | This is the power supply pin.  | Typ: 26V    |
| 7       | Standby    |                    | Standby control pin.<br>Standby Mode = 0 V<br>Operational Mode = Vcc |             |

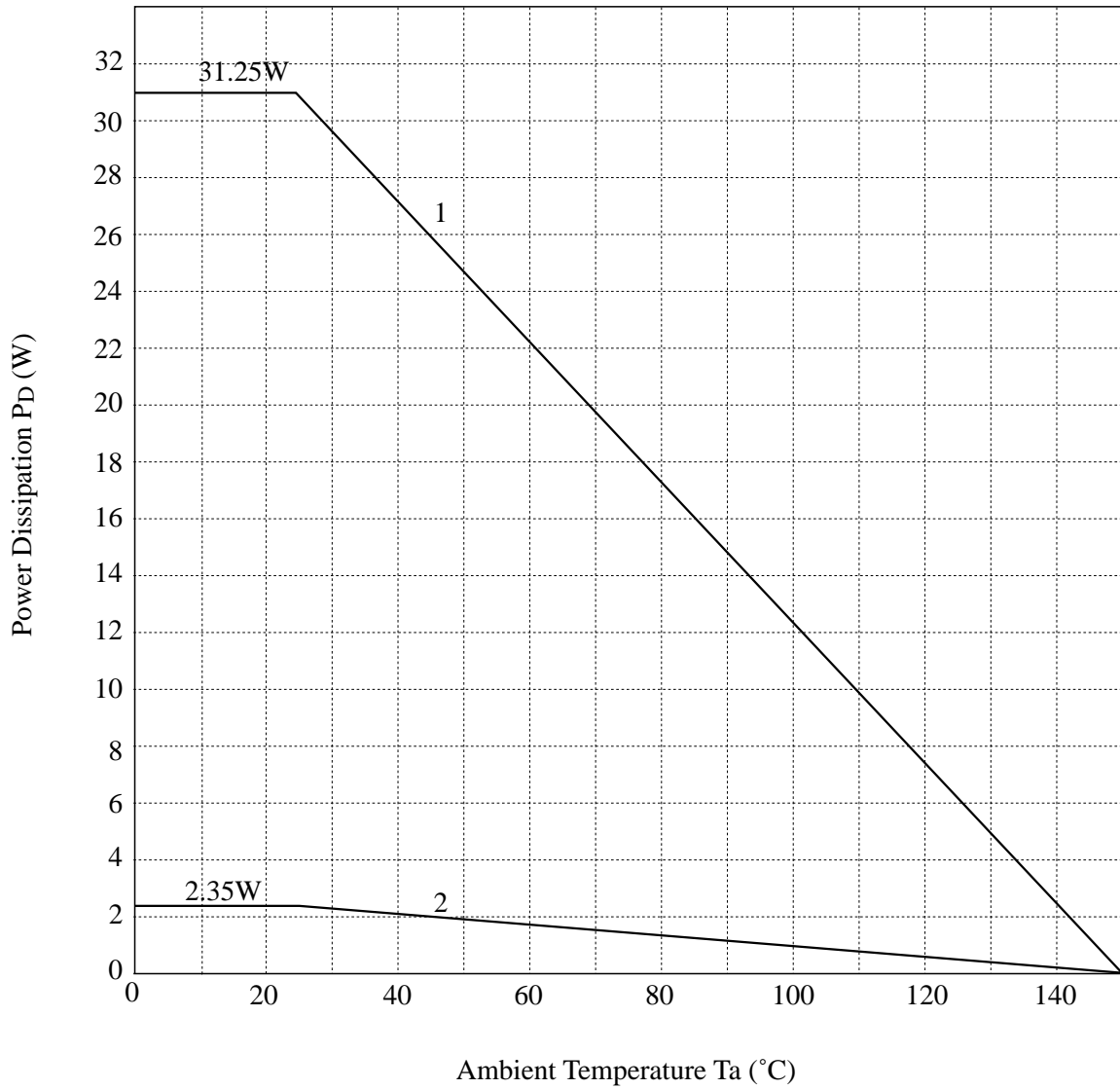
|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |

|          |  |                               |            |     |
|----------|--|-------------------------------|------------|-----|
| Prepared |  | <b>Product Specifications</b> | Ref No.    | G-3 |
| Checked  |  |                               | Total Page | 12  |
| Approved |  |                               | Page No.   | 11  |

# AN7586

## FP-7S Power Dissipation vs. Ambient Temperature

- 1 Infinity Heat Sink :  $R_{th(j-c)} = 4 \text{ } ^\circ\text{C/W}$
- 2 No Heat Sink :  $R_{th(j-a)} = 53.2 \text{ } ^\circ\text{C/W}$



|             |           |           |           |
|-------------|-----------|-----------|-----------|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |
| 11-Feb-1999 |           |           |           |

|          |  |  |            |    |
|----------|--|--|------------|----|
| Prepared |  | <b>Product Specifications</b><br><b>AN7586</b> | Ref No.    | H  |
| Checked  |  |  | Total Page | 12 |
| Approved |  |  | Page No.   | 12 |

### Application's Precautions

- (1) External heatsink is needed when used. External heatsink should be fixed to the chassis.
- (2) Fin of the IC can be connected to GND.
- (3) Please prevent "Output to VCC short", "Output to GND short", "Pin Shift" in direction of Pin 7 and "Reverse Insertion" to avoid damaging the IC.
- (4) The temperature protection circuit will operate at Tj around 150°C. However, if temperature decrease, the protection circuit will automatically be deactivated and resume normal operation.

|             |           |           |           |  |
|-------------|-----------|-----------|-----------|--|
| Eff. Date   | Eff. Date | Eff. Date | Eff. Date |  |
| 11-Feb-1999 |           |           |           |  |