

2-CH AUDIO POWER AMPLIFIER(2W X 2)

DESCRIPTION

The SA7496L is a monolithic two channels power amplifier, it is a stereo 2W+2W class AB output stage in the DIP20 and SOP20 package, specially designed for high quality sound, TV applications.

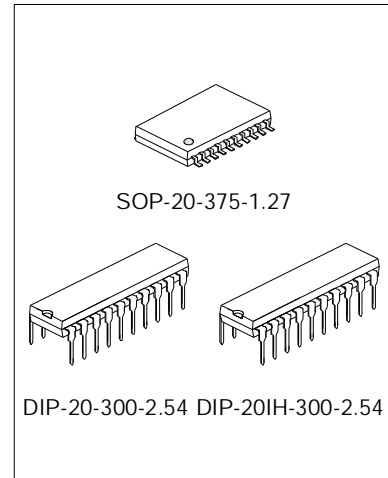
It also has the features of linear volume control, stand-by and mute functions.

FEATURES

- * Max output power: 2W+2W(RL=8Ω)
- * ST-BY & MUTE functions
- * Linear volume control DC Coupled with power OP.AMP
- * Short circuit protection
- * Thermal overload protection
- * Internally fixed gain
- * Variable output after volume control circuit

APPLICATIONS

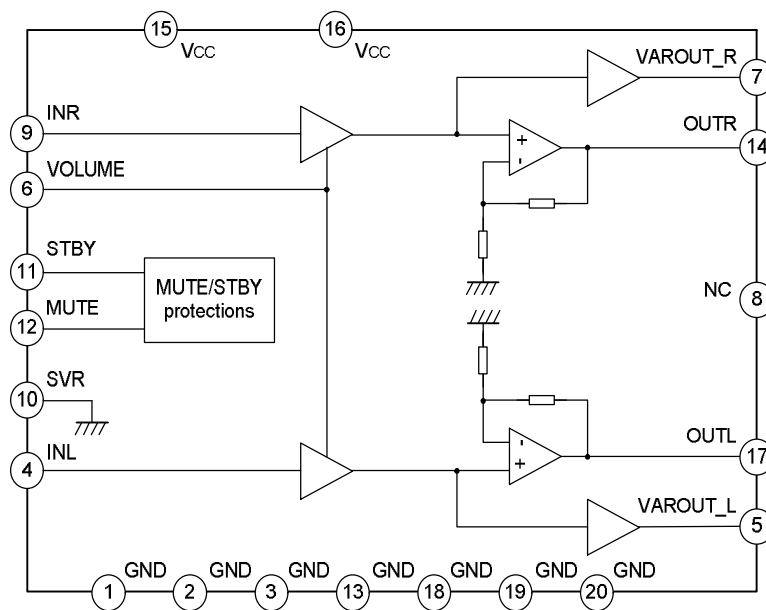
- * Quality sound
- * TV applications
- * PC Speakers
- * Sound processors
- * Mini and micro audio receivers



ORDERING INFORMATION

| Device | Package |
|----------|-------------------|
| SA7496 | DIP-20IH-300-2.54 |
| SA7496L | DIP-20-300-2.54 |
| SA7496LS | SOP-20-375-1.27 |

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Characteristics | | Symbol | Ratings | Unit |
|---------------------------|----------|-----------------------|------------|-----------------|
| DC Supply Voltage | | V _{CC} | 26 | V |
| Maximum Input Voltage | | V _{IN} | 8 | V _{PP} |
| Operating Temperature | | T _{opr} | 0 ~ + 70 | °C |
| Storage Temperature | | T _{stg} | -40 ~ +150 | °C |
| Junction Temperature | | T _j | -40 ~ +150 | °C |
| Volume Control DC Voltage | | V ₆ | 7 | V |
| Thermal Resistance | SA7496 | R _{th(j-a)1} | 50 | °C/W |
| | SA7496L | R _{th(j-a)2} | 70 | °C/W |
| | SA7496LS | R _{th(j-a)3} | 80 | °C/W |

ELECTRICAL CHARACTERISTICS

 (Unless otherwise specified, V_{CC} =14V, R_L=8Ω, R_g =50Ω, f=1KHz, T_{amb}=25°C)

| Characteristics | Symbol | Test condition | Min. | Typ. | Max. | Unit |
|--|----------------------|---|------|------|------|------|
| Supply Voltage Range | V _{CC} | SA7496L/SA7496LS | 10 | -- | 16 | V |
| | | SA7496* | 10 | -- | 18 | V |
| Supply Current | I _{CC} | Class AB | -- | 25 | 50 | mA |
| Output DC Offset Referred to SVR Potential | DCV _{os} | No input Signal | -- | 200 | -- | mV |
| Quiescent Output Voltage | V _O | -- | -- | 7 | -- | V |
| Output Power | P _O | THD=10%; R _L =8Ω | 1.6 | 2 | -- | W |
| | | THD=1%; R _L =8Ω | -- | 1.3 | -- | W |
| Closed Loop Gain | G _v | Vol Ctrl > 4.5V | 28.5 | 30 | 31.5 | dB |
| Monitor Out Gain | G _{vline} | Vol Ctrl > 4.5V; Z _{load} >30kΩ | -1.5 | 0 | 1.5 | dB |
| Attenuation at Minimum Volume | A _{min Vol} | Vol Ctrl <0.5V | 80 | -- | -- | dB |
| Total Harmonic Distortion | THD | G _v =30dB; P _o =1W; f=1KHz | -- | -- | 0.4 | % |
| Output Peak Current | I _{peak} | (Internally limited) | 0.7 | 0.9 | -- | A |
| Bandwidth | BW | -- | -- | 0.6 | -- | MHz |
| Slew Rate | SR | -- | 5 | 8 | -- | V/us |
| Input Resistance | R _i | -- | 22.5 | 30 | -- | kΩ |
| Variable Output Resistance | R _{var out} | -- | -- | 30 | 100 | Ω |
| Thermal Muting | TM | -- | -- | 150 | -- | °C |
| Thermal Shut-down | TS | -- | -- | 160 | -- | °C |
| Supply Voltage Rejection | SVR | f= 1kHz; max volume CSVR=470μF; V _{RIP} =1V _{rms} | 35 | 39 | -- | dB |
| | | f= 1kHz; max attenuation CSVR=470μF; V _{RIP} =1V _{rms} | 55 | 65 | -- | dB |

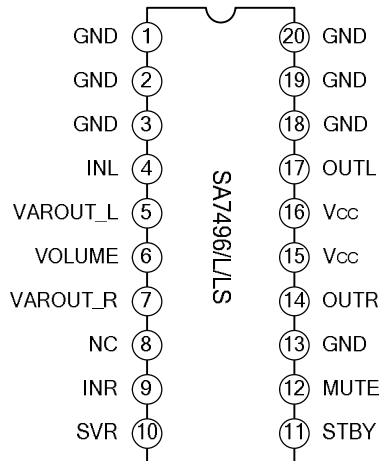
(To be continued)

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| Characteristics | Symbol | Test condition | Min. | Typ. | Max. | Unit |
|---|-----------|--|------|------|------|------|
| Total Output Noise | eN | f=20Hz ~22KHz Play, max volume | -- | 500 | 800 | μV |
| | | f=20Hz ~22KHz Play, max attenuation | -- | 100 | 250 | μV |
| | | f=20Hz ~22KHz, Mute | -- | 60 | 150 | μV |
| MUTE STAND-BY & INPUT SELECTION FUNCTIONS | | | | | | |
| Stand-by ON Threshold | VST ON | -- | 3.5 | -- | -- | V |
| Stand-by OFF Threshold | VST OFF | -- | -- | -- | 1.5 | V |
| Mute ON Threshold | VM ON | -- | 3.5 | -- | -- | V |
| Mute OFF Threshold | VM OFF | -- | -- | -- | 1.5 | V |
| Mute Attenuation | AMUTE | -- | 50 | 65 | -- | dB |
| Quiescent Current @ Stand-by | IqST-BY | -- | -- | 0.6 | 1 | mA |
| Mute Bias Current | ImuteBIAS | Mute | -- | 1 | 5 | μA |
| | | Play | -- | 0.2 | 2 | μA |
| Standby Bias Current | ImuteBIAS | Standby on VST-BY=5V, VMUTE=5V | -- | 1 | 5 | μA |
| | | Play or Mute | -- | 0.2 | 2 | μA |

* Because the heat dispersion of package DIP-20IH-300-2.54 is better the other two, the maximum operating voltage of SA7496 is higher than that of SA7496L/SA7496LS. But it is advisable not over 18V advisable.

PIN CONFIGURATION



PIN DESCRIPTION

| Pin No. | Pin name | Description |
|---------|----------|-------------|
| 1 | GND | Ground |
| 2 | GND | Ground |
| 3 | GND | Ground |

(To be continued)

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| Pin No. | Pin name | Description |
|---------|----------|--------------------------|
| 4 | INL | Left input |
| 5 | VAROUT_L | Left output_1 |
| 6 | VOLUME | Volume control |
| 7 | VAROUT_R | Left output_2 |
| 8 | NC | Not connect |
| 9 | INR | Right input |
| 10 | SVR | Supply voltage rejection |
| 11 | STBY | Stand by pin |
| 12 | MUTE | MUTE pin |
| 13 | GND | Ground |
| 14 | OUTR | Right output |
| 15 | Vcc | Supply voltage |
| 16 | Vcc | Supply voltage |
| 17 | OUTL | Left output |
| 18 | GND | Ground |
| 19 | GND | Ground |
| 20 | GND | Ground |

FUNCTION DESCRIPTION

The SA7496L is a semiconductor integrated circuit consisting of two channel power amplifiers, which is a stereo class AB power amplifier, specially designed for high quality sound, TV applications, which include linear volume control, stand-by and mute functions.

There are the MUTE and STAND-BY turn on and off conversion circuit in order to eliminate the plops noise. When the both voltages are low and the operation will be normal. While the STAND-BY is high, the circuit will turn off the bias current, so it will be the stand-by state. Also when the STAND-BY is low and the MUTE is high, the circuit will be the mute state, in this operation, the bias current of the signal channels will be shutdown.

The SA7469L built-in a DC volume control circuit. While the voltage of pin6 is 0, the output voltage will be 0; and the gain will be increased as the pin6's voltages go up.

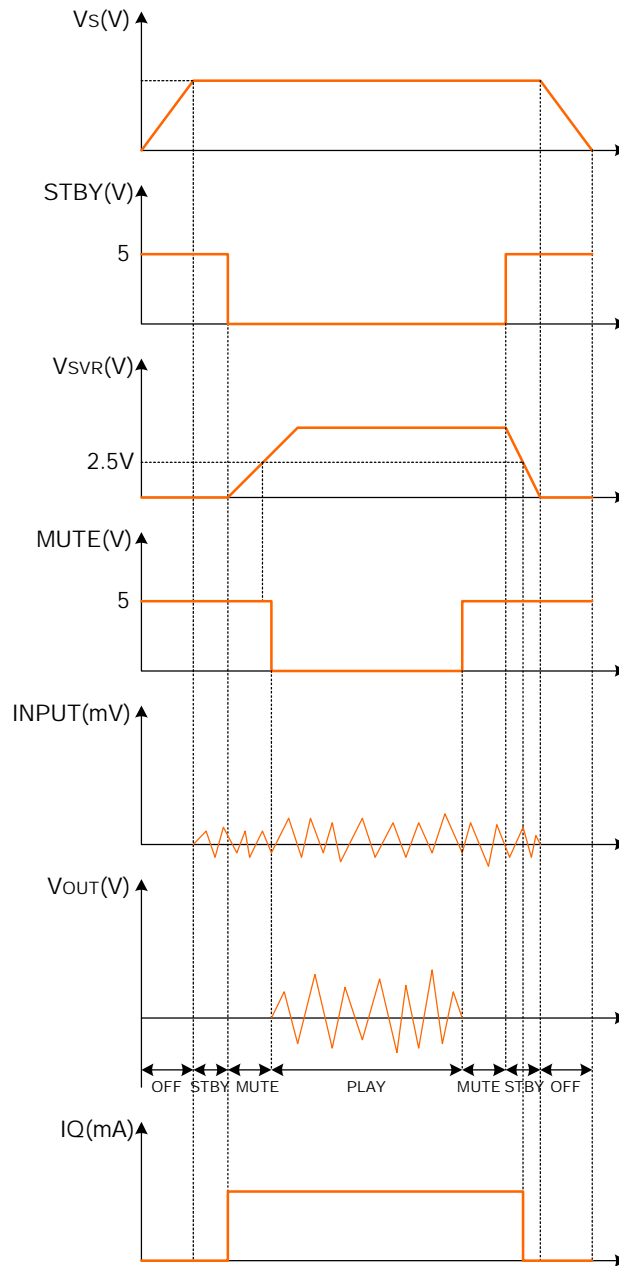
In this circuit, as the operation temperature's increase, the transistor's threshold limit value will decrease, when the temperature up to 150 °C, the thermal protection circuit will turn on and the signal channel will be shutdown.

MUTE & STAND-BY TRUTH TABLE

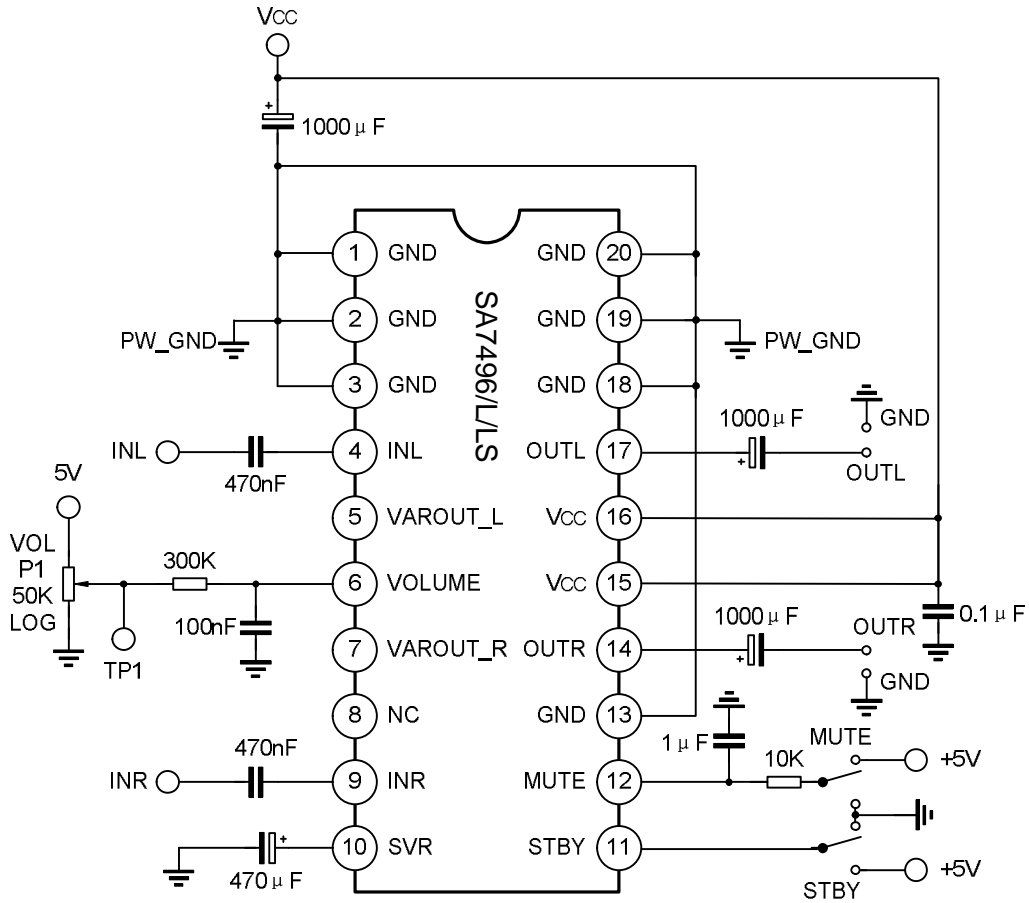
| MUTE | ST-BY | Operating State |
|------|-------|-----------------|
| H | H | STANDBY |
| L | H | STANDBY |
| H | L | MUTE |
| L | L | PLAY |

Note: "H" denotes the voltage is larger than 3.5V, and "L" denotes the voltage is lower than 1.5V.

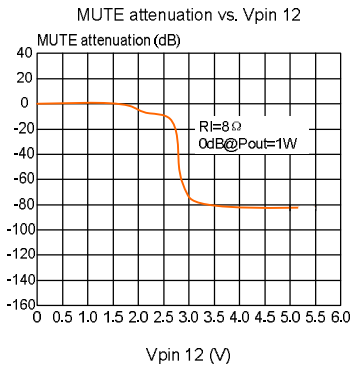
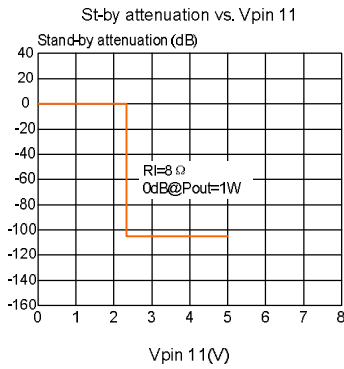
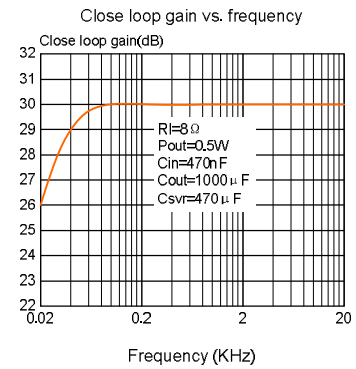
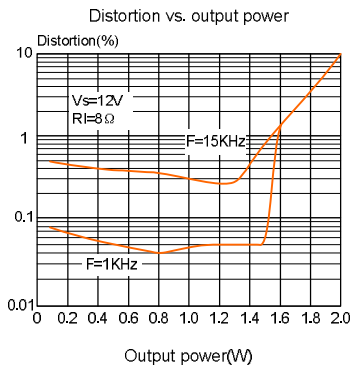
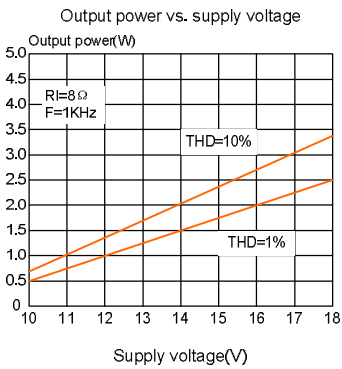
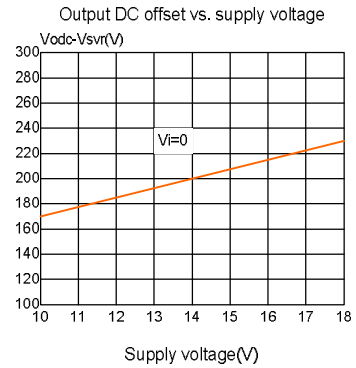
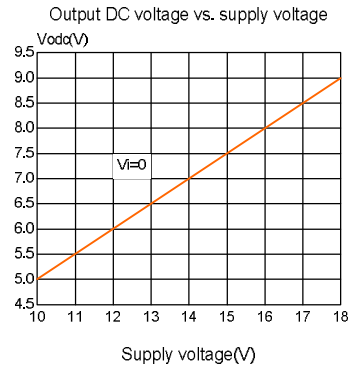
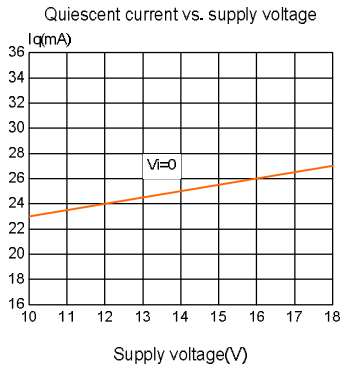
STAND-BY AND MUTE FUNCTIONS DIAGRAM



TYPICAL APPLICATION CIRCUIT



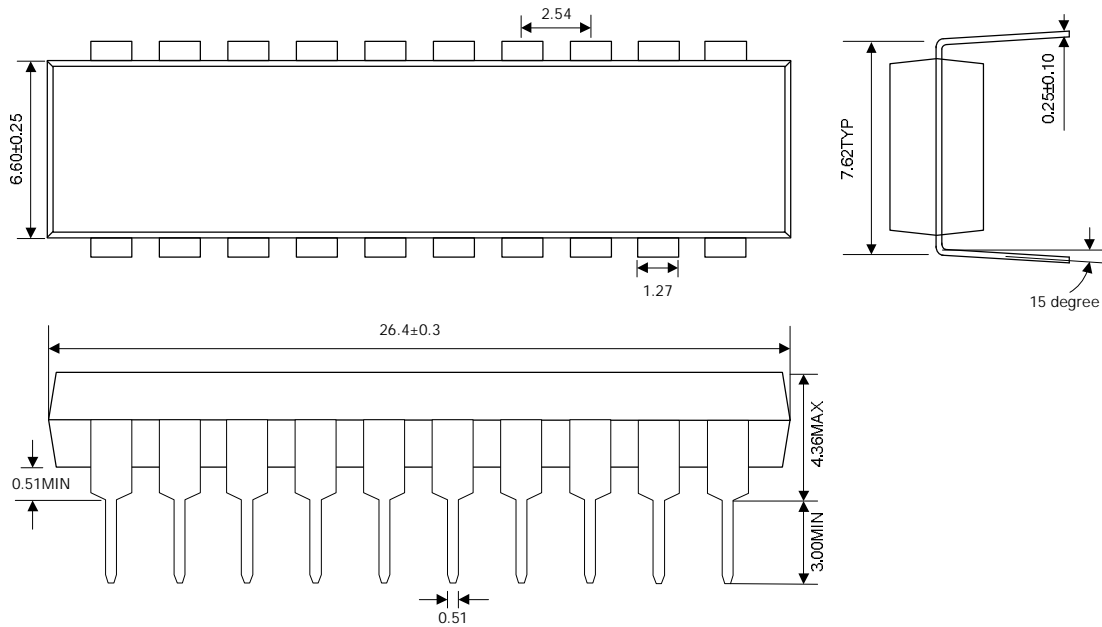
ELECTRICAL CHARACTERISTICS CURVES



PACKAGE OUTLINE

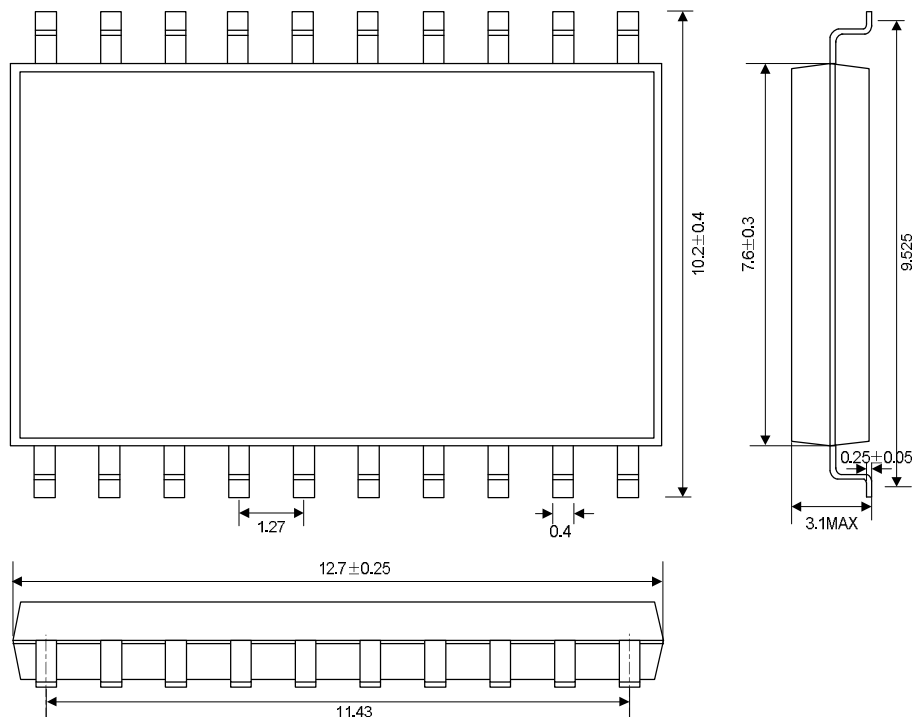
DIP-20-300-2.54

Unit: mm



SOP-20-375-1.27

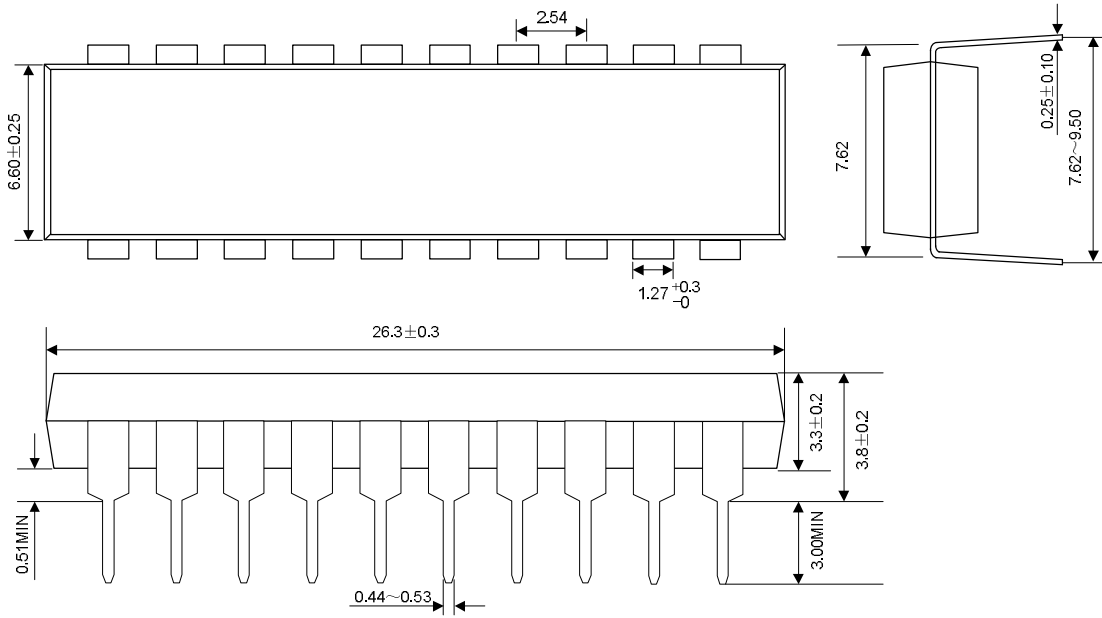
Unit: mm



PACKAGE OUTLINE Continued)

DIP-20IH-300-2.54

Unit: mm



ATTACHMENT

Revision History

| Data | REV | Description | Page |
|------------|-----|--|------|
| 2006.03.02 | 1.0 | Original | |
| 2006.07.24 | 1.1 | Modify the "ELECTRICAL CHARACTERISTICS" | |
| 2006.12.31 | 1.2 | Modify the "ABSOLUTE MAXIMUM RATINGS" Modify the "ELECTRICAL CHARACTERISTICS" Add the package of "DIP-20IH-300-2.54" | |