

7.5 NS TRIPLE HIGH VOLTAGE VIDEO AMPLIFIER

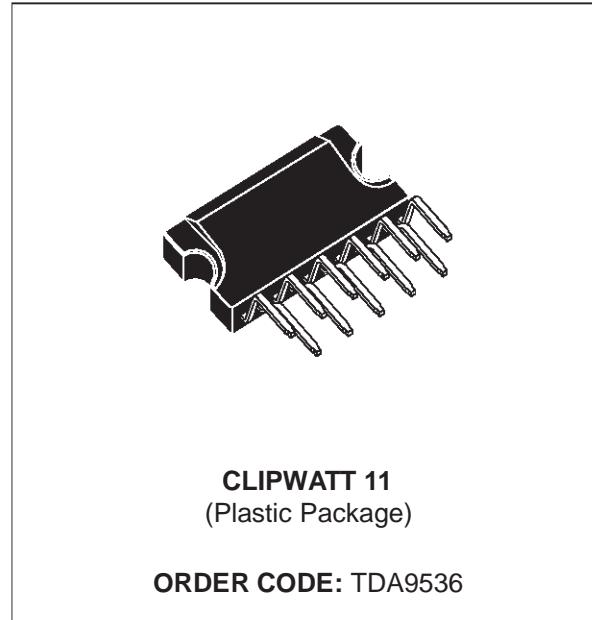
PRELIMINARY DATA

FEATURE

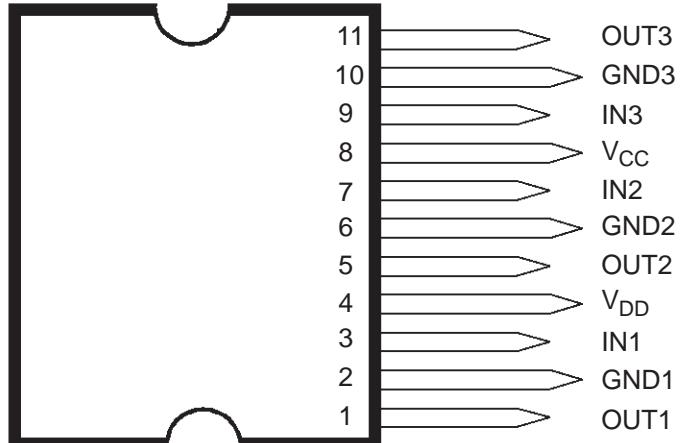
- TRIPLE CHANNEL VIDEO AMPLIFIER
- SUPPLY VOLTAGE: 110V TYPICAL
- RISE AND FALL TIMES: 7.5ns TYPICAL
- BANDWIDTH: 50Mhz TYPICAL
- 80 VOLTS OUTPUT DYNAMIC RANGE
- LOW POWER CONSUMPTION
- WELL MATCHED WITH TDA9210 PREAMP
- FULL PIN COMPATIBILITY WITH TDA9535

DESCRIPTION

The TDA9536 is a triple video amplifier with high voltage Bipolar/CMOS/DMOS technology (BCD) for use in color monitor application. Used with TDA9210 preamp in DC coupled mode, it provides for a low component, high performance and cost effective system solution. Other features include 1024 x 768 displays, pixelclock frequencies up to 100MHz, and DC or AC coupling designs.



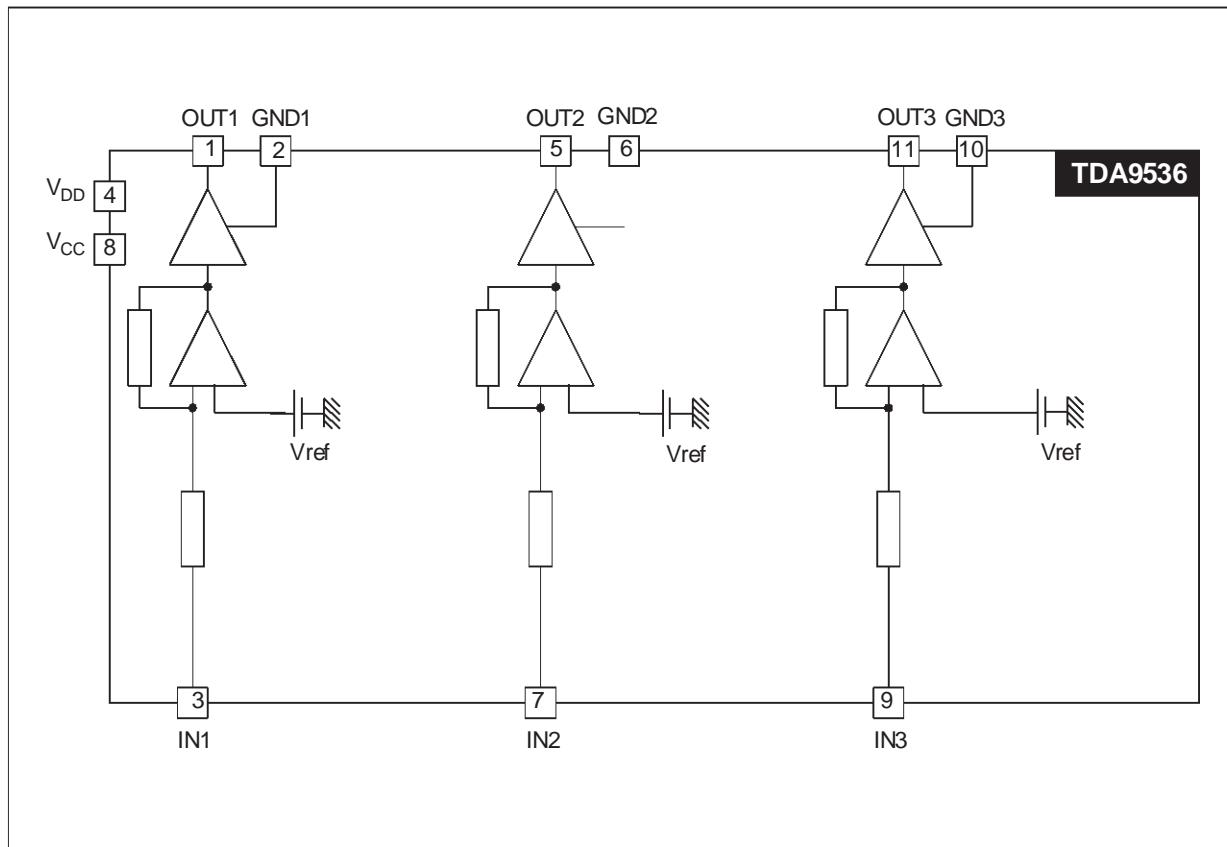
PIN CONNECTIONS



Version 3.2

TDA9536

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|------------------|--|-----------|---------|
| V_{DD} | High Supply Voltage | 120 | V |
| V_{CC} | Low Supply Voltage | 17 | V |
| V_{ESD} | ESD Susceptibility Human Body Model, 100pF. Discharge through 1.5KΩ EIAJ Norm, 200pF. Discharge through 0Ω | 2 250 | kV V |
| I_{OD} | Output Source Current (pulsed < 50μs) | 80 | mA |
| I_{OG} | Output Sink Current (pulsed < 50μs) | 80 | mA |
| $V_I\text{ Max}$ | Maximum Input Voltage | 15 | V |
| $V_I\text{ Min}$ | Minimum Input Voltage | - 0.5 | V |
| T_J | Junction Temperature | 150 | °C |
| T_{STG} | Storage Temperature | -20 + 150 | °C |

THERMAL DATA

| Symbol | Parameter | Value | Unit |
|---------------|--|-------|------|
| $R_{th(j-c)}$ | Junction-Case Thermal Resistance (Max.) | 3 | °C/W |
| $R_{th(j-a)}$ | Junction-Ambient Thermal Resistance (Typ.) | 35 | °C/W |

ELECTRICAL CHARACTERISTICS

(VCC = 12V, VDD = 110V, Tamb = 25 °C)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|------------------------------------|---|--|-----|----------------------|-----|----------|
| V_{DD} | High Supply Voltage (Pin 4) | | | 110 | 115 | V |
| V_{CC} | Low Supply Voltage (Pin 8) | | 10 | 12 | 15 | V |
| I_{DD} I_{CC} | High Voltage Supply Internal DC Current Low Voltage Supply Internal DC Current | $V_{OUT} = 50V$ | | 25 60 | | mA mA |
| dV_{OUT}/dV_{DD} | High Voltage Supply Rejection | $V_{OUT} = 50V$ | | 0.5 | | % |
| dV_{OUT}/dT | Output Voltage Drift Versus Temperature for any Channel | $V_{OUT} = 80V$ | | 15 | | mV/°C |
| $V_{OUT\ SATH}$ $V_{OUT\ SATL}$ | Max. Output Voltage Min. Output Voltage | $I_0 = -60mA, (1)$ $I_0 = 60mA, (1)$ | | $V_{DD} - 6.5$ 11 | | V V |
| A_{VR} | Typical Video Gain | $V_{OUT} = 50V$ | | 20 | | |
| E_{lin} | Linearity Error | $17 < V_{OUT} < V_{DD} - 15V$ | | 5 | 8 | % |
| OS | Overshoot | | | 5 | | % |
| $L_f \Delta g/g$ | Low Frequency Gain Matching | $V_{OUT} = 50V, f = 1MHz$ | | | 5 | % |
| R_{IN} | Video Input Resistor | $V_{OUT} = 50V$ | | 2 | | KΩ |
| BW | Bandwidth at -3dB | $V_{OUT}=50V, C_{LOAD}=8pF, R_p=200\Omega, \Delta V_{OUT}=20V$ | | 50 | | MHz |
| t_R, t_F | Rise and Fall Time | $V_{OUT}=50V, C_{LOAD}=8pF, R_p=200\Omega, \Delta V_{OUT}=40V$ | | 7.5 | | ns |
| $L_f CT$ $H_f CT$ | Low Frequency Crosstalk High Frequency Crosstalk | $V_{OUT}=50V, C_{LOAD}=8pF, R_p=200\Omega, \Delta V_{OUT}=20V$ $f = 1 MHz$ $f = 20MHz$ | | 50 32 | | dB dB |

Note: 1 Pulsed current width < 50μs

TYPICAL APPLICATION

PC Board Lay-out

The best performance is obtained with a carefully designed HF PC board, especially for the output and input capacitors.

Rise/fall time and bandwidth are measured on a 10pF load. The best rise/fall time and bandwidth results will be obtained with low R_p resistor value while the best CRT arcing protection will be obtained by a high R_p resistor value. Finally a value between 150 and 200 Ω is a good compromise.

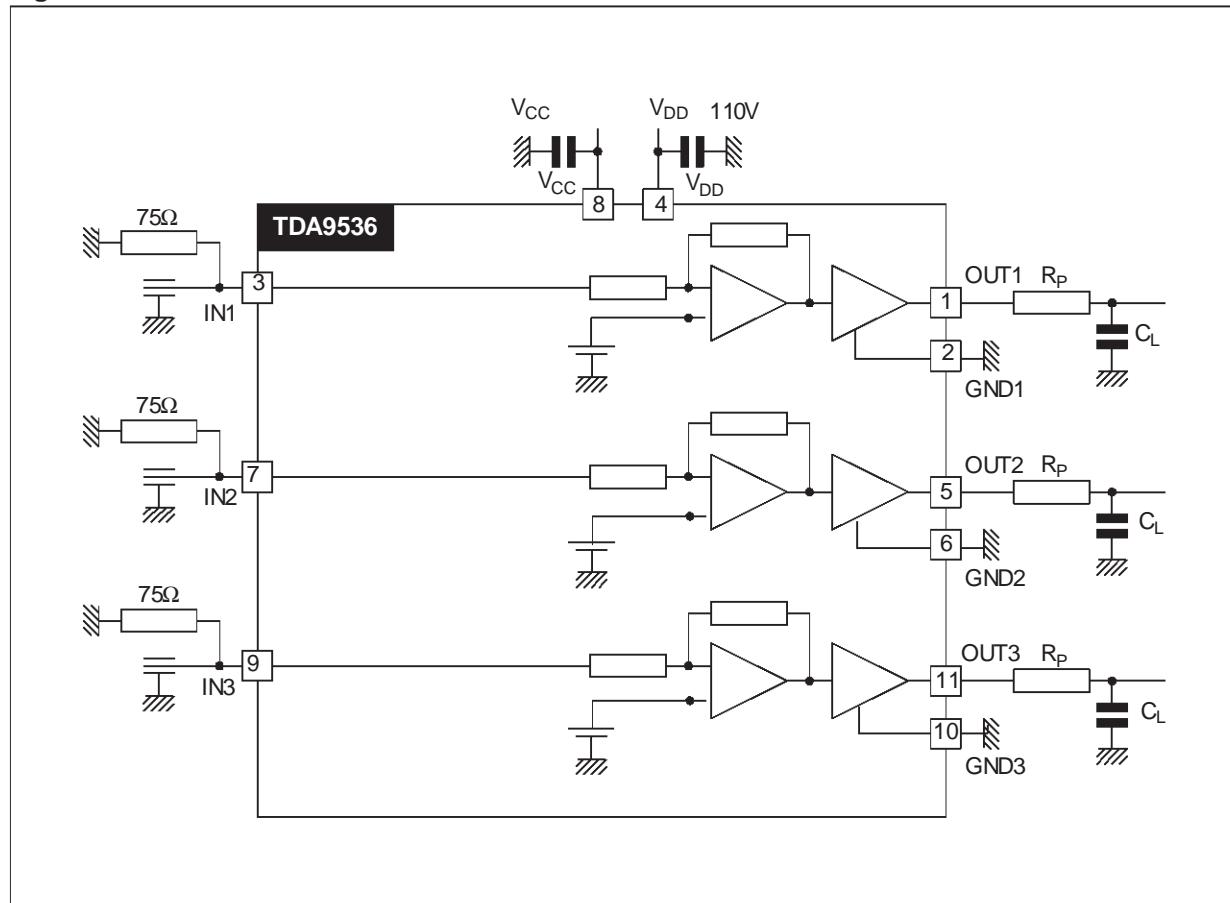
Power Dissipation

The power dissipation is the sum of the DC and the dynamic dissipation.

As the feedback resistors are integrated, the DC power dissipation (capacitive load) can be estimated by:

$$P_{\text{STAT}} = V_{\text{DD}} \cdot I_{\text{DD}} + V_{\text{CC}} \cdot I_{\text{CC}}$$

Figure 1.



The dynamic dissipation in worst case (full bandwidth and black pixel/white pixel picture - Note 2) is:

$$P_{\text{DYN}} = 3 V_{\text{DD}} \cdot C_L \cdot V_{\text{OUT(PP)}} \cdot f \cdot K$$

where f is the video frequency and K the active line duration / total duration.

Example:

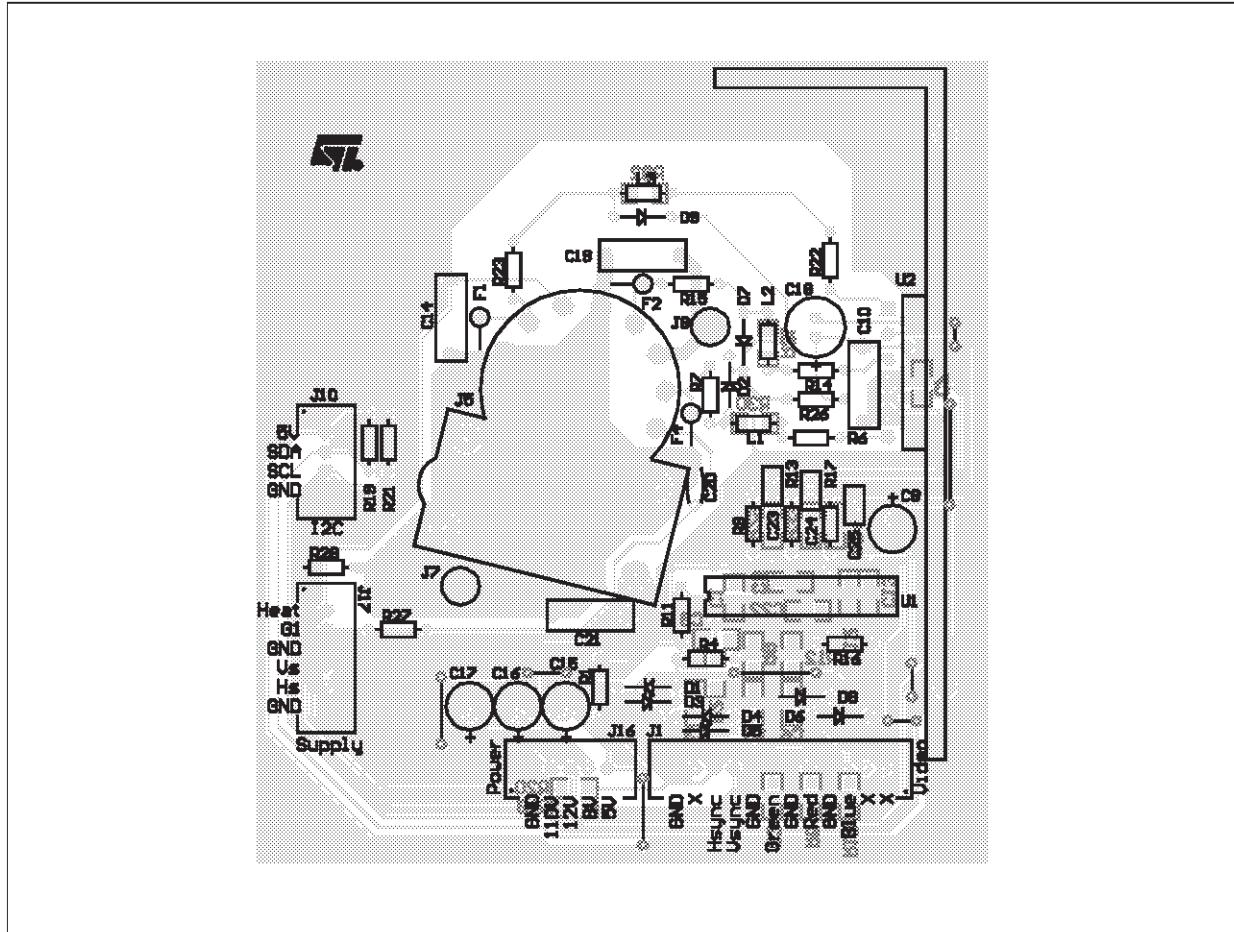
for $V_{\text{DD}} = 110\text{V}$, $V_{\text{CC}} = 12\text{V}$, $V_{\text{OUT}} = 40\text{V}_{\text{PP}}$, $I_{\text{DD}} = 25\text{mA}$, $I_{\text{CC}} = 60\text{mA}$, $f_{\text{VIDEO}} = 40\text{MHz}$, $C_L = 8\text{pF}$ and $K = 0.72$.

We have: $P_{\text{STAT}} = 3.47\text{W}$ and $P_{\text{DYN}} = 3.04\text{W}$

Therefore: $P_{\text{tot}} = 6.51\text{W}$.

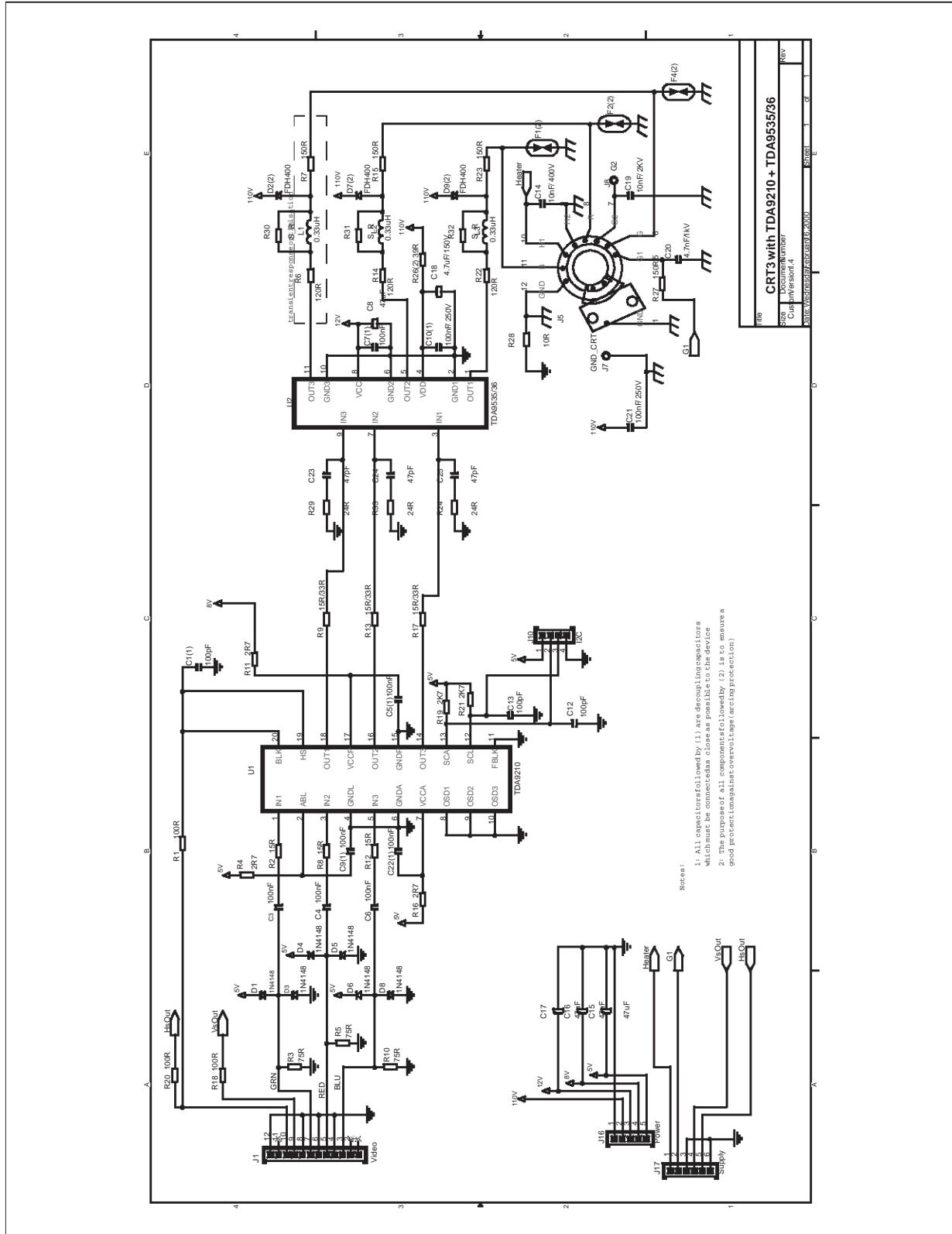
Note: 2 This worst thermal case must be considered only for T_{Jmax} calculation. Nevertheless, during the average life of the circuit, the conditions are very close to the white picture conditions.

Figure 2. TDA9535/9536 - TDA9210 - Demonstration Board: Silk Screen and Trace (scale 1:1)



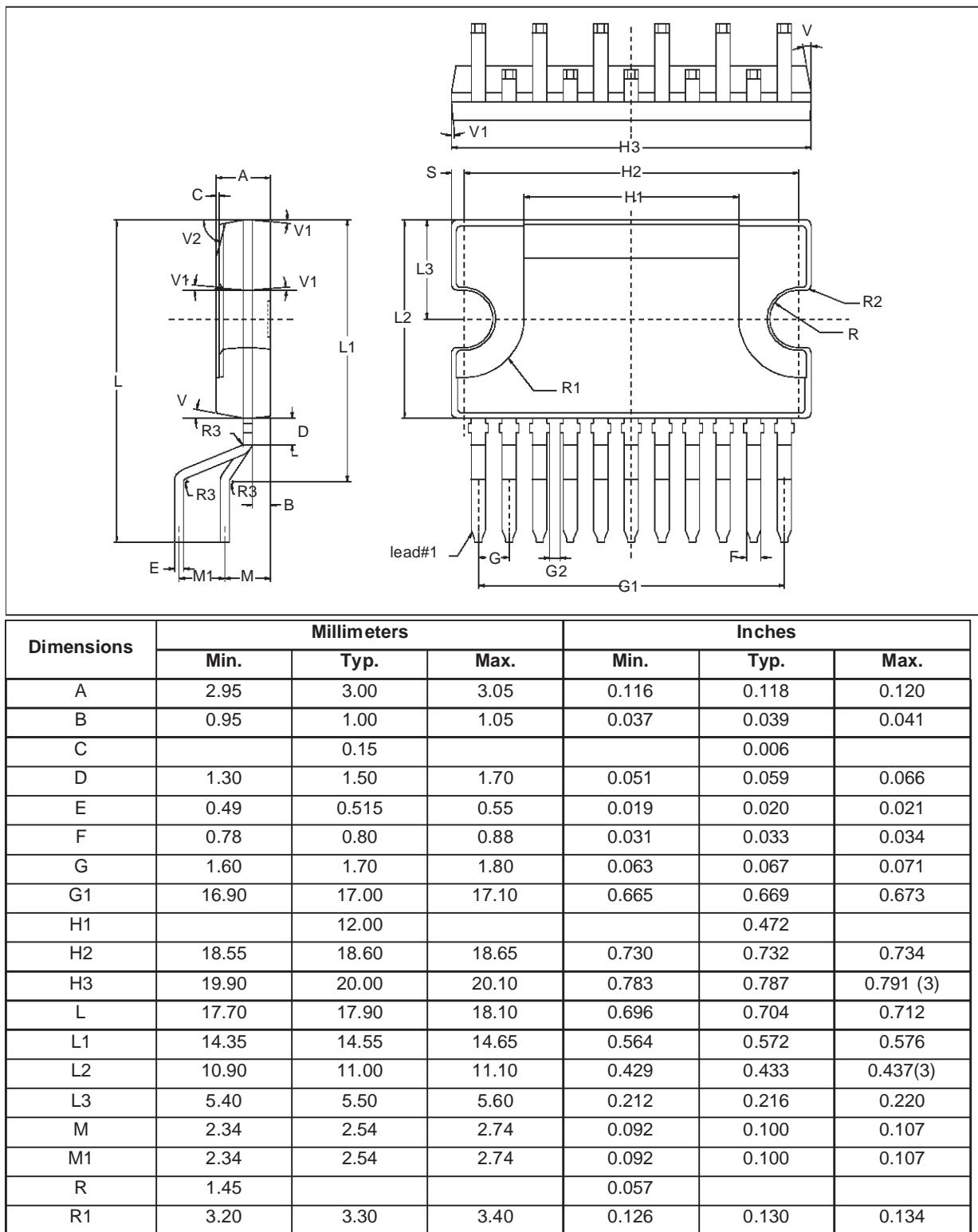
TDA9536

Figure 3. TDA9535/9536 - TDA9210 - Demonstration Board Schematic



PACKAGE MECHANICAL DATA

11 PIN - CLIPWATT



TDA9536

| Dimensions | Millimeters | | | Inches | | |
|------------|-------------|--------|------|--------|--------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| R2 | | 0.30 | | | 0.012 | |
| R3 | | 0.50 | | | 0.019 | |
| S | 0.65 | 0.70 | 0.75 | 0.025 | 0.027 | 0.029 |
| V | | 10deg. | | | 10deg. | |
| V1 | | 5deg. | | | 5deg. | |
| V2 | | 75deg. | | | 75deg. | |

Note: 3 "H3 and L2" do not include mold flash or protrusions
Mold flash or protrusions shall not exceed 0.15mm per side.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics.

© 2000 STMicroelectronics - All Rights Reserved

Purchase of I²C Components of STMicroelectronics, conveys a license under the Philips I²C Patent.
Rights to use these components in a I²C system, is granted provided that the system conforms to the I²C
Standard Specifications as defined by Philips.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The
Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>

