TDA9533

7.5NS TRIPLE HIGH VOLTAGE VIDEO AMPLIFIER

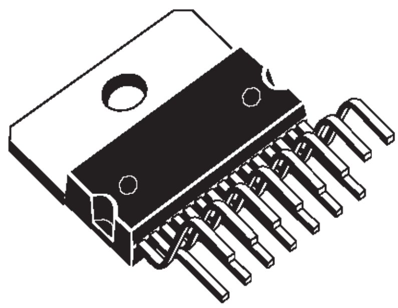
PRELIMINARY DATA

FEATURE

- TRIPLE CHANNEL VIDEO AMPLIFIER
- SUPPORTS DC OR AC COUPLING APPLICATIONS
- BUILT IN VOLTAGE GAIN: 20
- RISE AND FALL TIMES: 7.5ns TYPICAL
- BANDWIDTH: 50MHz TYPICAL
- SUPPLY VOLTAGE: 110V
- ADDITIONAL CUT-OFF INPUT CONTROL

DESCRIPTION

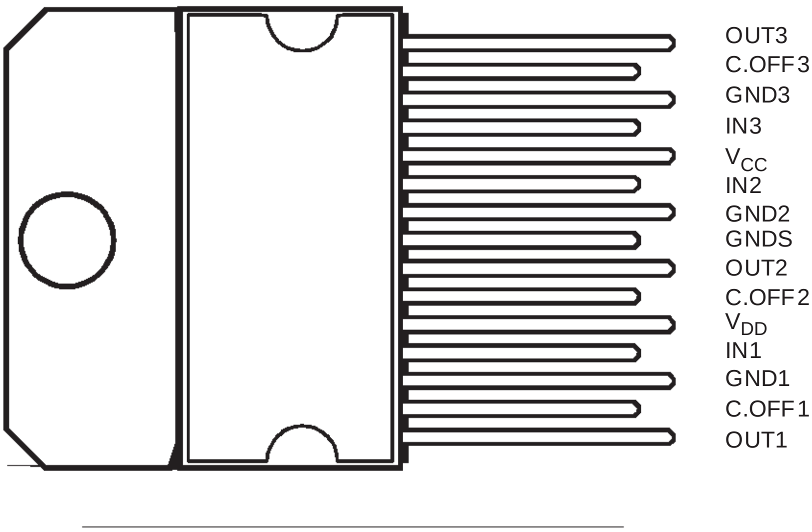
The TDA9533 is a triple video amplifier with high voltage Bipolar/CMOS/DMOS technology (BCD). It can drive the 3 cathodes of a monitor CRT in DC or AC coupling mode. A DC coupling application is obtained by connecting a triple DC controlled circuit either on the input pin or on the cut-off pin.



MULTIWATT 15
(Plastic Package)

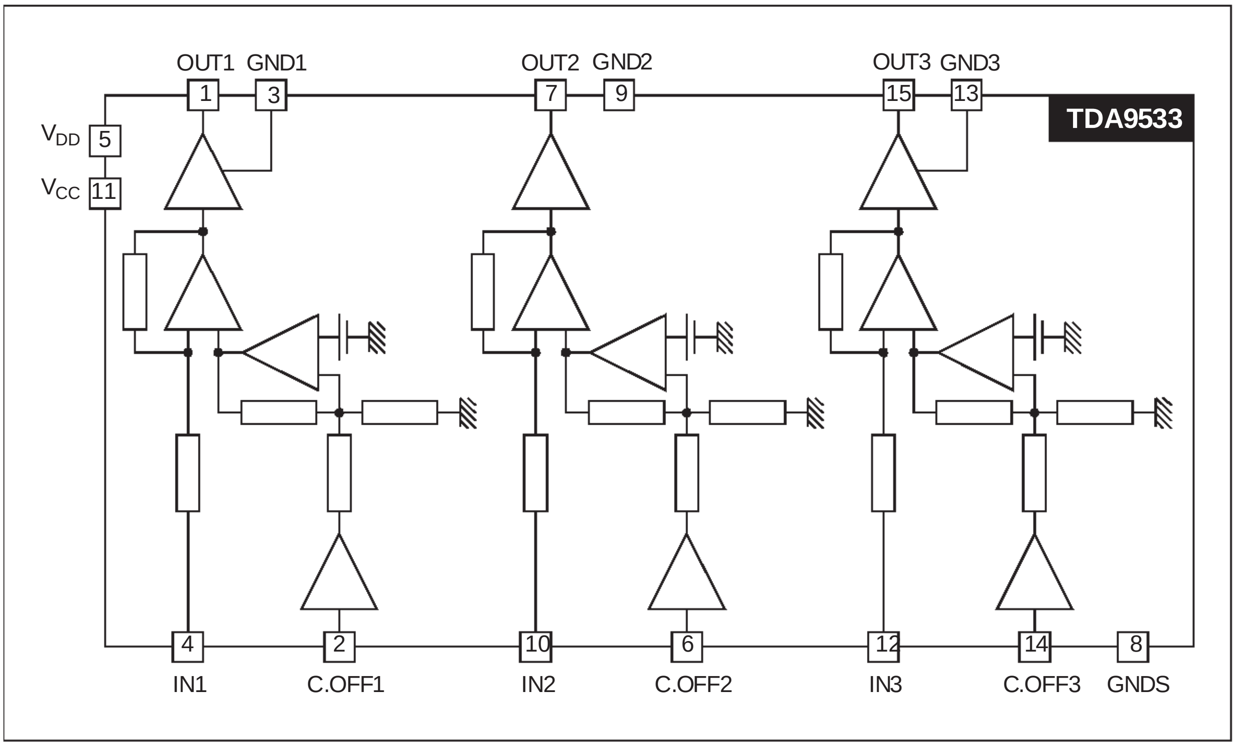
ORDER CODE: TDA9533

PIN CONNECTIONS



Version 3.2

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	 2 300	 kV V
I_{OD}	Output Source Current (pulsed < 50µs)	80	mA
I_{OG}	Output Sink Current (pulsed < 50µs)	80	mA
$V_{I\ Max}$	Maximum Input Voltage	15	V
$V_{I\ Min}$	Minimum Input Voltage	- 0.5	V
$V_{IC\ OFF\ Max}$	Maximum C. off Input Voltage	V_{CC} + 0.5	V
$V_{IC\ OFF\ Min}$	Minimum C. off 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, VC OFF = 2.5V, VDD = 110V, Tamb = 25 °C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{DD}	High Supply Voltage (Pin 5)		20	110	115	V
V_{CC}	Low Supply Voltage (Pin 11)		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}/d_{θ}	Output Voltage Drift Versus Temperature for any Channel	V_{OUT} = 80V		15		mV/°C
$d\Delta V_{OUT}/d_{\theta}$	Differential Output Voltage Offset Drift Versus Temperature	V_{OUT} = 80V		5		mV/°C
$\Delta V_{OUT}/\Delta V_{C.OFF}$	Cut-Off Control Gain	V_{OUT} = 80V 1V < $V_{C\ OFF}$ < 4V		14		
$I_{BC\ .OFF}$	Cut-Off Control Bias Current	V_{OUT} = 80V			10	µA
$V_{OUT\ SATH}$ $V_{OUT\ SATL}$	Max. Output Voltage Min. Output Voltage	I_0 =-60mA, (1) I_0 =60mA, (1)		V_{DD} - 6.5 11		V V
AV_R	Typical Video Gain	V_{OUT} = 50V		20		
E_{lin}	Linearity Error	17<V_{OUT}<V_{DD}-15V		5	8	%
OS	Overshoot			5		%
$Lf_{\Delta g/g}$	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=200Ω, ΔV_{OUT}=20V		50		MHz
t_R, t_F	Rise and Fall Time	V_{OUT}=50V,C_{LOAD}=8pF R_P=200Ω, ΔV_{OUT}=40V		7.5		ns
t_{SET}	2.5% Settling Time	V_{OUT}=50V,C_{LOAD}=8pF R_P=200Ω, ΔV_{OUT}=40V		15		ns
Lf CT Hf CT	Low Frequency Crosstalk High Frequency Crosstalk	V_{OUT}=50V,C_{LOAD}=8pF R_P=200 Ω,ΔV_{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 8pF load (including a PC board parasitical, socket and a CRT capacitor).

The input voltage range for the cut-off adjustment pins is from 1 to 4 volts and a 10 nF to 47 nF bypass capacitor is recommended on these pins.

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:

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

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

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

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

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

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

Therefore: P_{tot} = 6.51W.

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

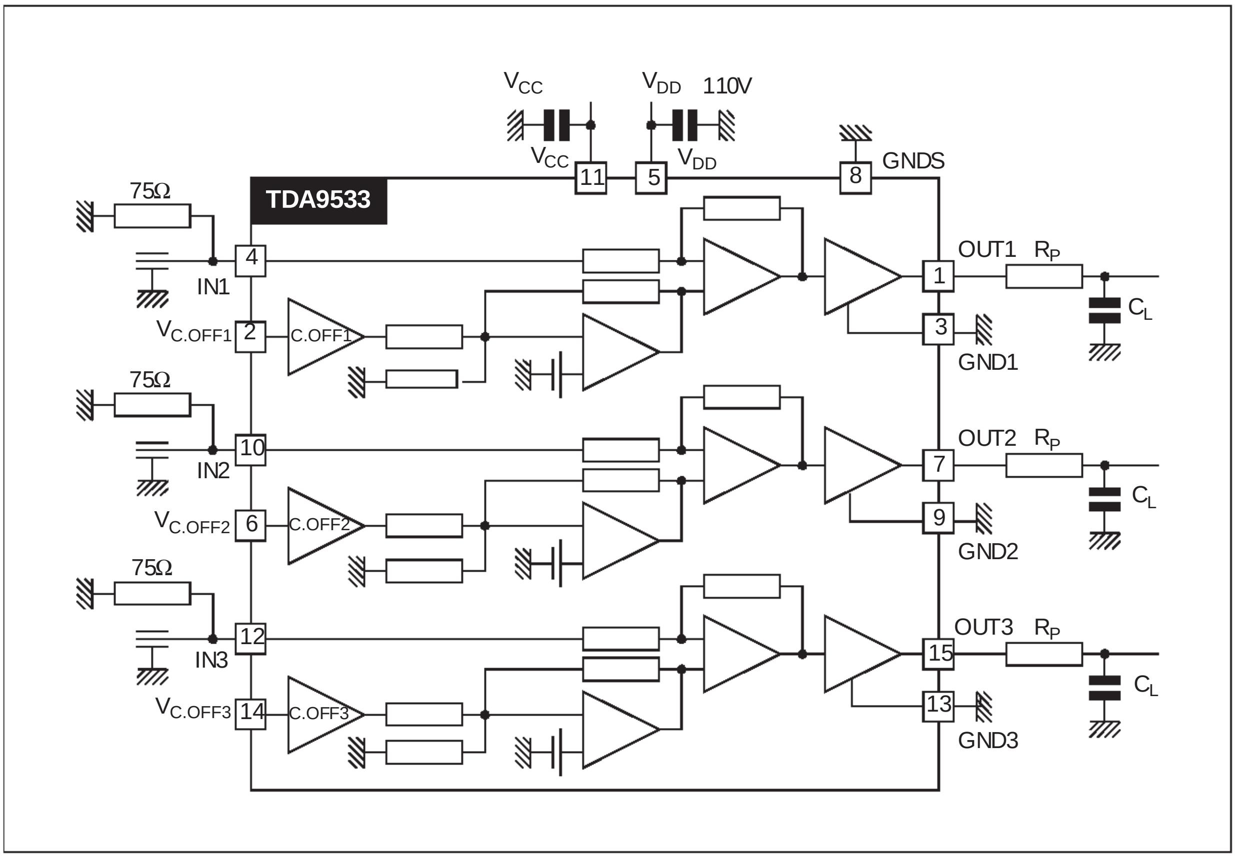


Figure 1. TDA9207/9209 - TDA9533/9530 Demonstration Board: Silk Screen and Trace (scale 1:1)

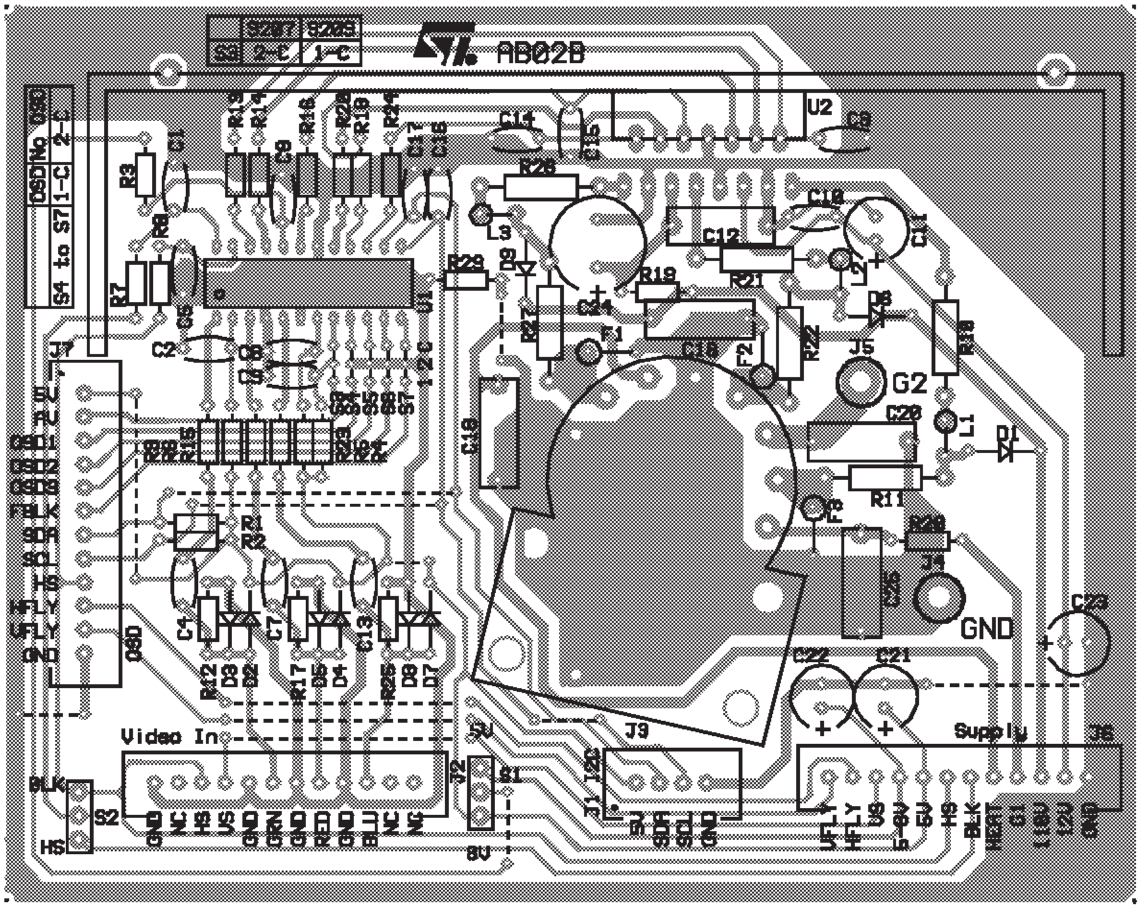
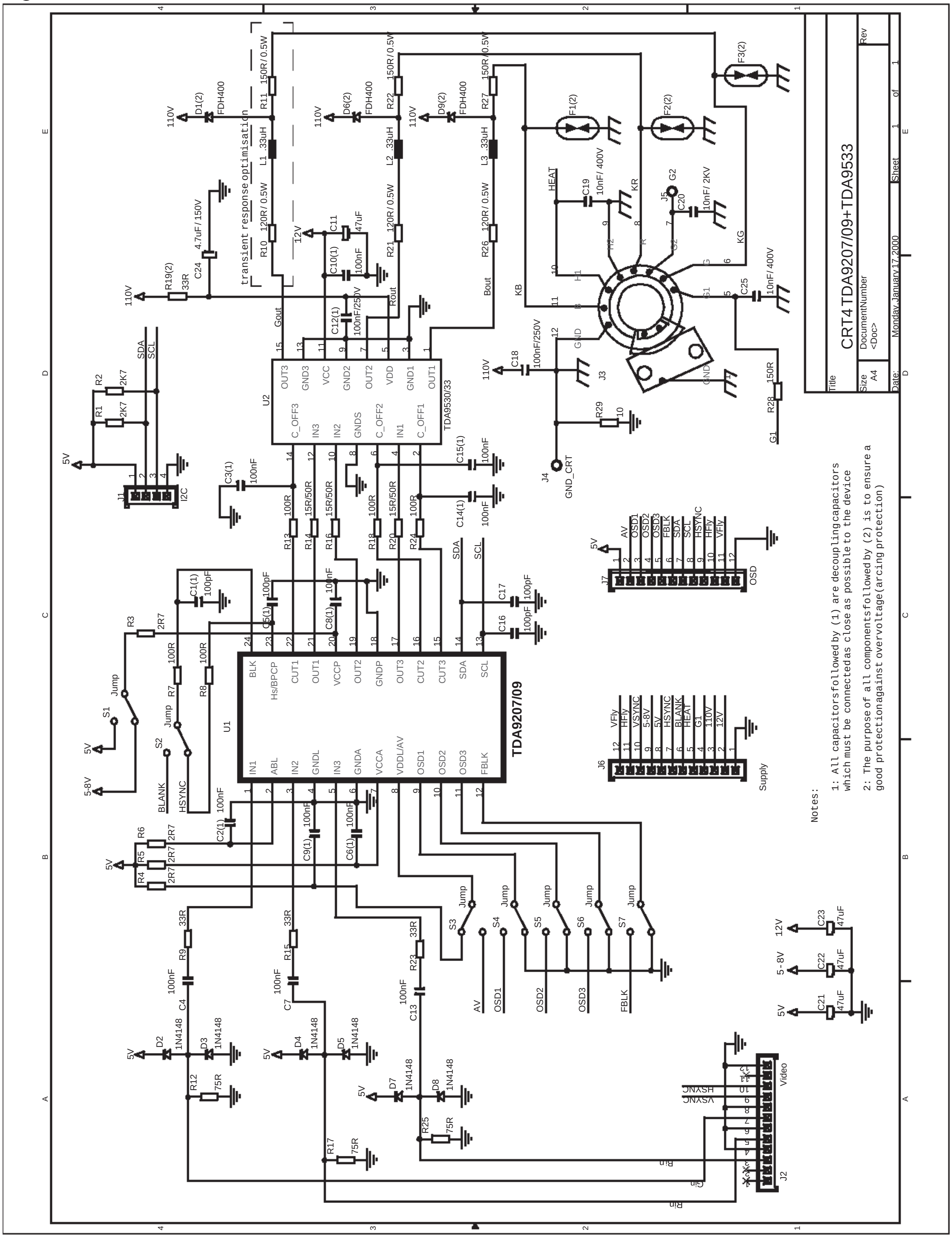
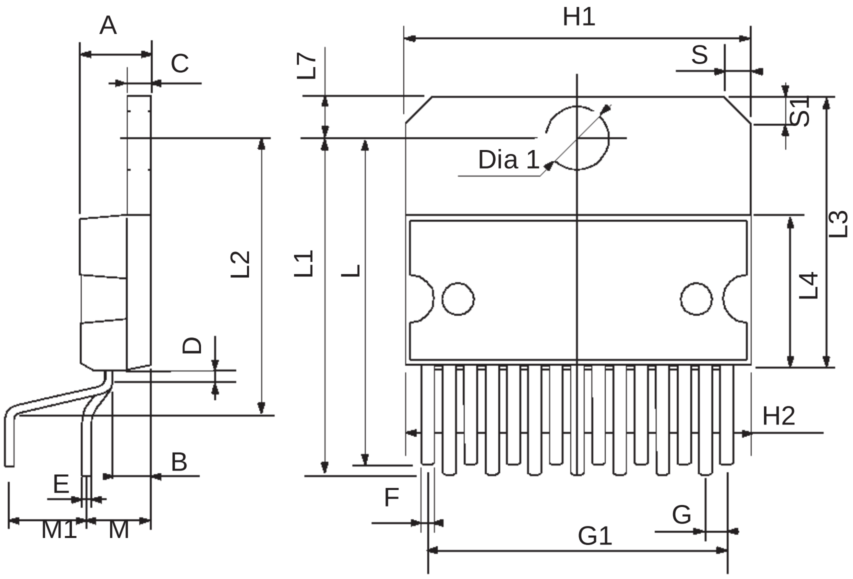


Figure 2. TDA9207/9209 - TDA9533/9530 Demonstration Board Schematic



PACKAGE MECHANICAL DATA

15 PIN - PLASTIC MULTIWATT



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5			0.197
B			2.65			0.104
C			1.6			0.063
D		1			0.039	
E	0.49		0.55	0.019		0.022
F	0.66		0.75	0.026		0.030
G	1.02	1.27	1.52	0.040	0.050	0.060
G1	17.53	17.78	18.03	0.690	0.700	0.710
H1	19.6			0.772		
H2			20.2			0.795
L	21.9	22.2	22.5	0.862	0.874	0.886
L1	21.7	22.1	22.5	0.854	0.870	0.886
L2	17.65		18.1	0.695		0.713
L3	17.25	17.5	17.75	0.679	0.689	0.699
L4	10.3	10.7	10.9	0.406	0.421	0.429
L7	2.65		2.9	0.104		0.114
M	4.25	4.55	4.85	0.167	0.179	0.191
M1	4.63	5.08	5.53	0.182	0.200	0.218
S	1.9		2.6	0.075		0.102
S1	1.9		2.6	0.075		0.102
Dia. 1	3.65		3.85	0.144		0.152