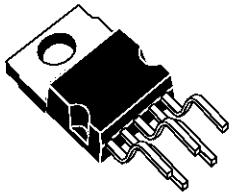
SGS-THOMSON MICROELECTRONICS

TDA9501

AC COUPLING HIGH VOLTAGE VIDEO AMPLIFIER

ADVANCE DATA

- BANDWIDTH : 40MHz TYPICAL
- RISE AND FALL TIME : 9ns TYPICAL
- SUPPLY VOLTAGE : 90V
- FLASH-OVER PROTECTION
- POWER DISSIPATION : 2.3W
- ESD PROTECTED



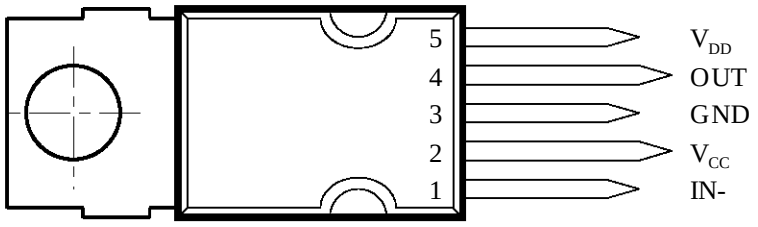
PENTAWATT
(Plastic Package)

ORDER CODE : TDA9501

DESCRIPTION

The TDA9501 includes a video amplifier designed with a high voltage bipolar/CMOS/DMOS technology (BCD). It drives directly one cathode of a monitor and is protected against flashovers. It is available in pentawatt package.

PIN CONNECTIONS



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PIN CONFIGURATION

Pin N	Symbol	Function
1	IN-	Input of the amplifier
2	VCC	Low Voltage Power Supply
3	GND	Also connected to the heatsink
4	OUT	Output driving the cathode
5	VDD	High Voltage Power Supply

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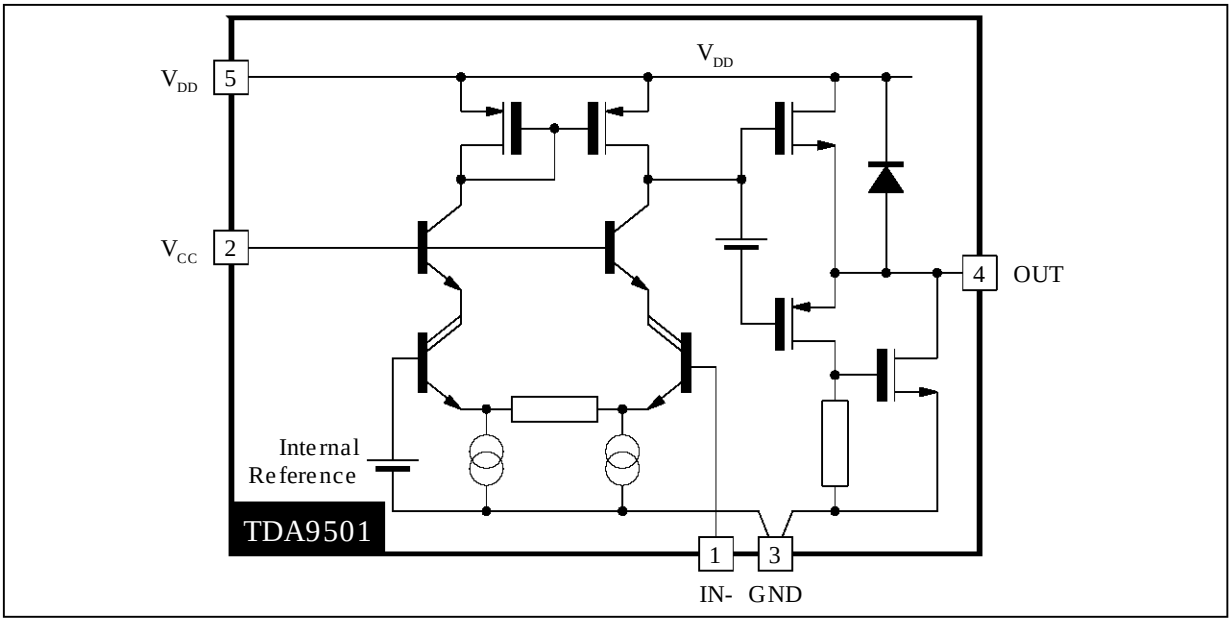
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{OUT}, V_{DD}	Supply High Voltage (Pins 4-5)	100	V
V_{CC}	Supply Low Voltage (Pin 2)	20	V
I_{OD} I_{OG}	Output Current to V_{DD} (Pin 4) Output Current to Ground (Pin 4)	protected 80	mA
I_j	Input Current (Pin 1)	50	mA
T_j	Junction Temperature	150	°C
T_{oper}	Operating Ambient Temperature	0, +70	°C
T_{stg}	Storage Temperature	-20, +150	°C

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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.	70	°C/W

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ELECTRICAL CHARACTERISTICS (V_{CC} = 12V, V_{DD} = 90V, T_{amb} = 25°C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{DD}	High Supply Voltage (Pin 5)		20		90	V
V_{CC}	Low Supply Voltage (Pin 2)		10	12	15	V
I_{DD}	High Voltage Supply Internal DC Current (without current due to the feedback network)	V_{OUT} = 50V		8	TBD	mA
I_{CC}	Low Voltage Supply Internal DC Current			7.5		mA
V_{BG}	Internal Reference	See Figure 1		3.5		V
dV_{BG}/dV_{CC}	Drift of Reference Voltage versus V_{CC}				TBD	%
dV_{BG}/dT	Drift of Reference Voltage versus Temperature	See Figure 1			TBD	mV/°C
V_{SATH}	High Output Saturation Voltage (Pin 4)	I_O= -60mA		V_{DD} - 6.5		V
V_{SATL}	Low Output Saturation Voltage (Pin 4)	I_O= 60mA		17		V
BW	Bandwidth at -3dB	Measured on CRT cathodes. C_{LOAD} = 10pF, Rprotect = 10Ω, V_{OUT}= 50V, ΔV_{OUT} = $40V_{PP}$, Feedback gain = 20		40		MHz
t_R, t_F	Rise and Fall Time	Measured between 10% & 90% of output pulse, C_{LOAD} = 10pF, Rprotect = 10Ω, V_{OUT} = 50V, ΔV_{OUT} = $40V_{PP}$		9		ns
G_O	Open Loop Gain		TBD			dB
I_{IB}	Input Bias Current (Pin 1)	V_{OUT} = 50V		10		µA
R_{IN}	Input Resistance		TBD	200		kΩ

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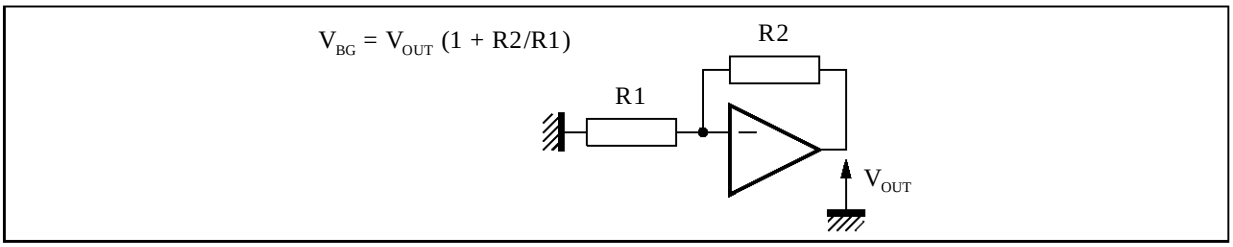
Figure 1 : Measurement of Internal Reference Voltage



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TYPICAL APPLICATION

The TDA9501 is composed of different parts :

- A differential amplifier, the gain of which is fixed by external feedback resistors ;
- An integrated voltage reference designed with a bandgap ;
- A protection diode against CRT arc discharges.

PC board lay-out

The best performances of the high voltage video amplifier will be obtained only with a carefully designed PC board. Output to input capacitances are of particular importance.
For a single amplifier, the input-output capacitance, in parallel with the relatively high feedback resistance, creates a pole in the closed-loop transfer function.
A low parasitic capacitance (0.3pF) feedback resistor and HF isolated printed wires are necessary.

Power dissipation

The power dissipation consists of a static part and a dynamic part. The static dissipation varies with the output voltage and the feedback resistor. The dynamic power dissipation increases with the pixel frequency.

For a signal frequency of 40MHz and $40V_{PP}$ output signal, the typical power dissipation is about 2.3W, for V_{DD} = 90V.

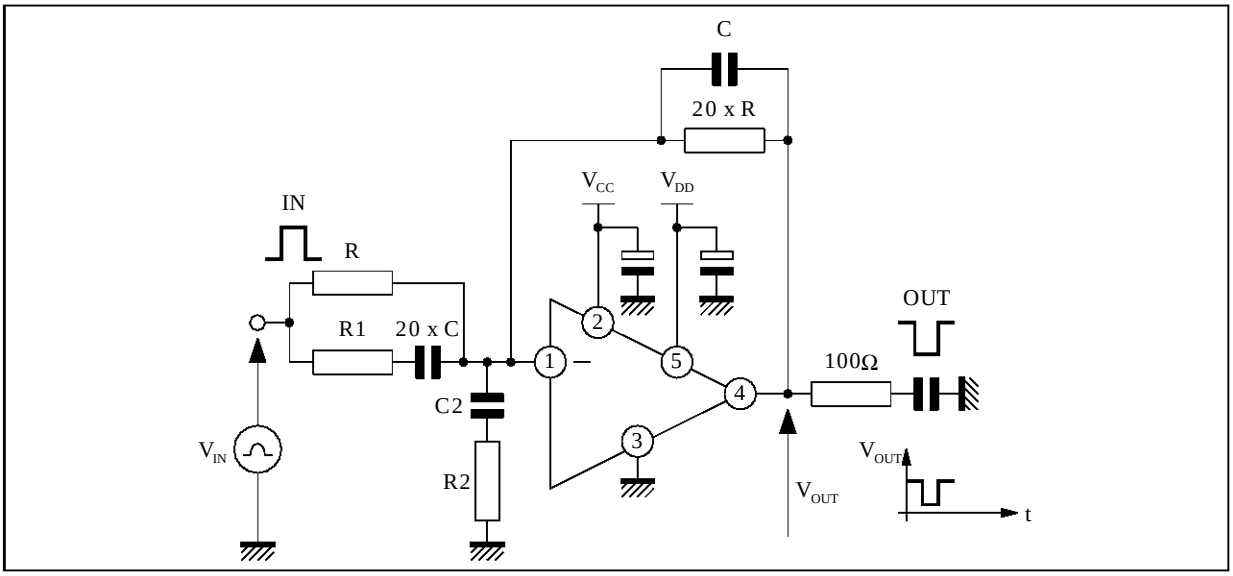
In first approximation, the dynamic dissipation is :

$$P_D = V_{DD} * C_{LOAD} * \Delta V_{OUT} * f$$

and the total dissipation is :

$$P = V_{DD} * C_{LOAD} * \Delta V_{OUT} * f + V_{DD} * I_{DD} + V_{CC} * I_{CC} - (V_{DD} - \overline{V_{OUT}}) \frac{\overline{V_{OUT}}}{R_{FEEDBACK}}$$

with f = pixel frequency



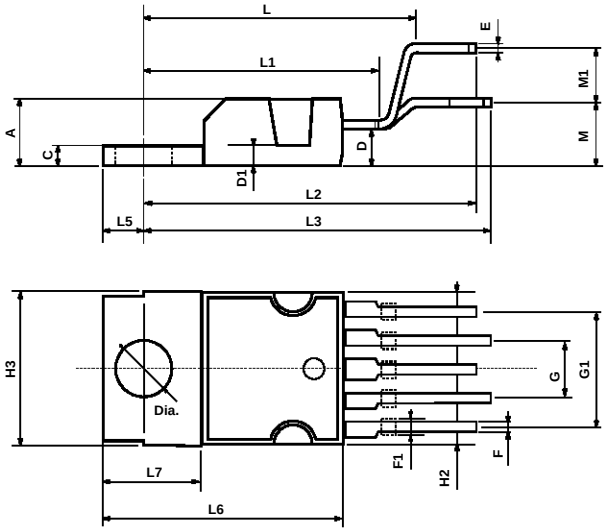
R1 and R2 are in the range of some hundreds ohms.

C2 is in the range of some tens pF.

R is in the range of 1kΩ.

The DC feedback gain is from 15 to 30.

PACKAGE MECHANICAL DATA : 5 PINS - PLASTIC PENTAWATT



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Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			4.8			0.189
C			1.37			0.054
D	2.4		2.8	0.094		0.110
D1	1.2		1.35	0.047		0.053
E	0.35		0.55	0.014		0.022
F	0.8		1.05	0.031		0.041
F1	1		1.4	0.039		0.055
G		3.4		0.126	0.134	0.142
G1		6.8		0.260	0.268	0.276
H2			10.4			0.409
H3	10.05		10.4	0.396		0.409
L		17.85			0.703	
L1		15.75			0.620	
L2		21.4			0.843	
L3		22.5			0.886	
L5	2.6		3	0.102		0.118
L6	15.1		15.8	0.594		0.622
L7	6		6.6	0.236		0.260
M		4.5			0.177	
M1		4			0.157	
Dia	3.65		3.85	0.144		0.152

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