**Bipolar IC**

| Type | Ordering code | Package |
|---|---|---|
| TDA 5820 | Q67000-A1776 | DIP 22 |

The TDA 5820 contains a 4-stage broadband amplifier with controllable gain, a limiter, a synchronous demodulator for AM, a phase-switchable FM demodulator for generating the AFC voltage, and an AGC generator for the IF amplifier and tuner. The video amplifier is switchable for positive or negative modulation. Sync-pulse keyed AGC is used for negative modulation, black level keyed AGC with positive modulation.

### Features

- Switchable to accomodate German and French standards
- Switchable AFC
- Fast control
- Positive and negative video outputs

### Maximum ratings

| | | | |
|---|---|---|---|
| Supply voltage | $V_S$ | 16.5 | V |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature range | $T_{stg}$ | −40 to 125 | °C |
| Thermal resistance (system-air) | $R_{th\,SA}$ | 70 | K/W |

### Operating range

| | | | |
|---|---|---|---|
| Supply voltage | $V_S$ | 10 to 15.8 | V |
| Ambient temperature | $T_A$ | 0 to 70 | °C |

## Characteristics

$V_S = 13$ V; $T_A = 25$ °C

| | | min | typ | max | |
|---|---|---|---|---|---|
| Current consumption | $I_{16}$ | 38 | 60 | 90 | mA |
| Stab. reference voltage | $V_{14/1}$ | 5.7 | 6.0 | 6.95 | Vdc |
| Tuner control current<br>$V_{17} = 0.5\ V_{16}$ | $I_{17}$ | 3.0 | 4.0 | 6.2 | mA |
| Tuner AGC threshold | $V_{18/1}$ | 0 | | 5.0 | Vdc |
| Gating pulse voltage (see pulse diagram) | $V_{2\,pos}$ | 4.0 | 3.0 | $V_{16}-1$ | V |
| | $V_{2\,neg}$ | −10.0 | −4.0 | −3.0 | V |
| Input voltage at $G_{max}$<br>$V_{5\,pp} = 3$ V | $V_{22/21}$ | | | 100 | μV |
| AGC range | $\Delta G$ | | 60 | | dB |
| IF control voltage for max. gain | $V_{3/1}$ | 0 | | | Vdc |
| IF control voltage for min. gain | $V_{3/1}$ | | | 5.0 | Vdc |
| IF control voltage for video switch off | $V_{3/1}$ | 8.0 | | $V_{16}$ | Vdc |
| AFC output current | $I_9$ | | ± 1.0 | | mA |
| AFC switch OFF<br>$V_{11} = V_{12}$; $R = 10$ kΩ | $V_{11/1}$ | 0 | | 4.0 | Vdc |
| AFC switch ON<br>$V_{11} = V_{12}$; $R = \infty$ | $V_{11/1}$ | | 5.3 | | Vdc |
| AFC characteristics<br>$di/df > 0$ | $V_{15/1}$ | 4.0 | | $V_{16}$ | Vdc |
| AFC characteristics<br>$di/df < 0$ | $V_{15/1}$ | 0 | | 1.0 | Vdc |
| Standard switchover neg. modul. (G-standard) | $V_{7/1}$ | 4.0 | | $V_{16}$ | Vdc |
| Standard switchover pos. modul. (L-standard) | $V_{7/1}$ | 0 | | 1.0 | Vdc |
| Video output voltage pos. ($R_L = \infty$) | $V_{q\,5\,pp}$ | 2.3 | 3.0 | 3.5 | V |
| Sync pulse level neg. modulation | $V_{5/1}$ | 1.25 | 2.0 | 2.5 | Vdc |
| Black level for pos. modulation<br>DC voltage<br>$V_3 = 5$ V, $V_{22/21} = 0$ neg. modulation | $V_{5/1}$ | 2.15<br>4.0 | 2.9<br>5.3 | 3.65<br>6.6 | Vdc<br>Vdc |
| DC voltage<br>$V_3 = 5$ V, $V_{22/21} = 0$ pos. modulation | $V_{5/1}$ | 1.5 | 2.0 | 2.8 | Vdc |
| Output current<br>to ground across $R$ | $I_{q\,5}$ | | −5.0 | | mA |
| Output current<br>to +, $V_S = 6$ V | $I_{q\,5}$ | 0.9 | 2.0 | 2.7 | mA |
| Sync pulse level/max.<br>White level<br>residual carrier ≤ 6% pos. modulation | $V_5$ | | 6.0 | 9.0 | % |
| Video output voltage neg. ($R_L = \infty$) | $V_{q\,6\,pp}$ | 2.3 | 3.0 | 3.5 | V |
| Sync pulse level neg. modulation | $V_{6/1}$ | $V_{16}-3.4$ | $V_{16}-2.0$ | $V_{16}-0.4$ | Vdc |
| Black level for pos. modulation<br>DC voltage<br>$V_3 = 5$ V, $V_{22/21} = 0$ neg. modulation | $V_{6/1}$ | $V_{16}-4.5$<br>$V_{16}-7.2$ | $V_{16}-2.9$<br>$V_{16}-5.3$ | $V_{16}-1.5$<br>$V_{16}-3.4$ | Vdc<br>Vdc |
| DC voltage<br>$V_3 = 5$ V, $V_{22/21} = 0$ pos. modulation | $V_{6/1}$ | $V_{16}-3.6$ | $V_{16}-2.0$ | $V_{16}-0.6$ | Vdc |
| Output current<br>to ground across $R$ | $I_{q\,6}$ | | −5.0 | | mA |
| Output current<br>to +, $V_6 = 12.3$ V | $I_{q\,6}$ | 0.5 | 1.0 | 1.6 | mA |

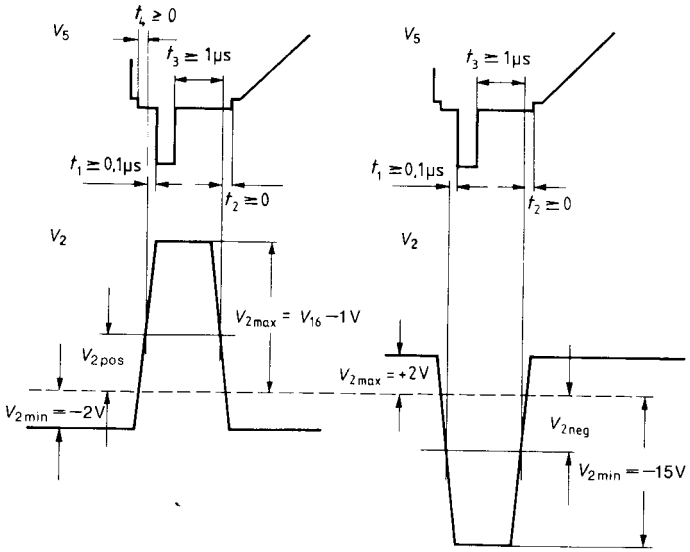
**Additional application data**
(not measured)

| | | min | typ | max | |
|---|---|---|---|---|---|
| Input impedance | $Z_{22/21}$ | | 1.8/2 | | kΩ/pF |
| Output impedance | $Z_{10/13}$ | | 6.6/2 | | kΩ/pF |
| AFC input impedance | $Z_{11/12}$ | | 20 | | kΩ |
| Output resistance | $R_{q5}$ | | 150 | | Ω |
| Output resistance | $R_{q6}$ | | 150 | | Ω |
| IF frequency range | $f_{IF}$ | 15 | | 75 | MHz |
| Residual IF (basic frequency) | $V_5; V_6$ | | 10 | | mV |
| Video bandwidth (−3 dB) | $B_{video}$ | | 6.0 | | MHz |
| Intermodulation ratio referred to $f_{CC}$ (sound color beat frequency) | $a$ | | 45 | | dB |

**Pin description**

| Pin | Function |
|---|---|
| 1 | GND |
| 2 | Gating pulse |
| 3 | Time constant for control voltage; programming VTR recording/playback |
| 4 | White level adjustment |
| 5 | Video output, positive |
| 6 | Video output, negative |
| 7 | G/L standard switchover |
| 8 | GND |
| 9 | AFC output |
| 10 | Tank circuit |
| 11 | AFC tank circuit |
| 12 | AFC tank circuit |
| 13 | Tank circuit |
| 14 | Stab. reference voltage |
| 15 | Programmable AFC polarity |
| 16 | Supply voltage + |
| 17 | Delayed tuner control |
| 18 | Tuner AGC threshold |
| 19 | Operating point adjustment |
| 20 | Operating point adjustment |
| 21 | Video IF input |
| 22 | Video IF input |

## Pulse diagram

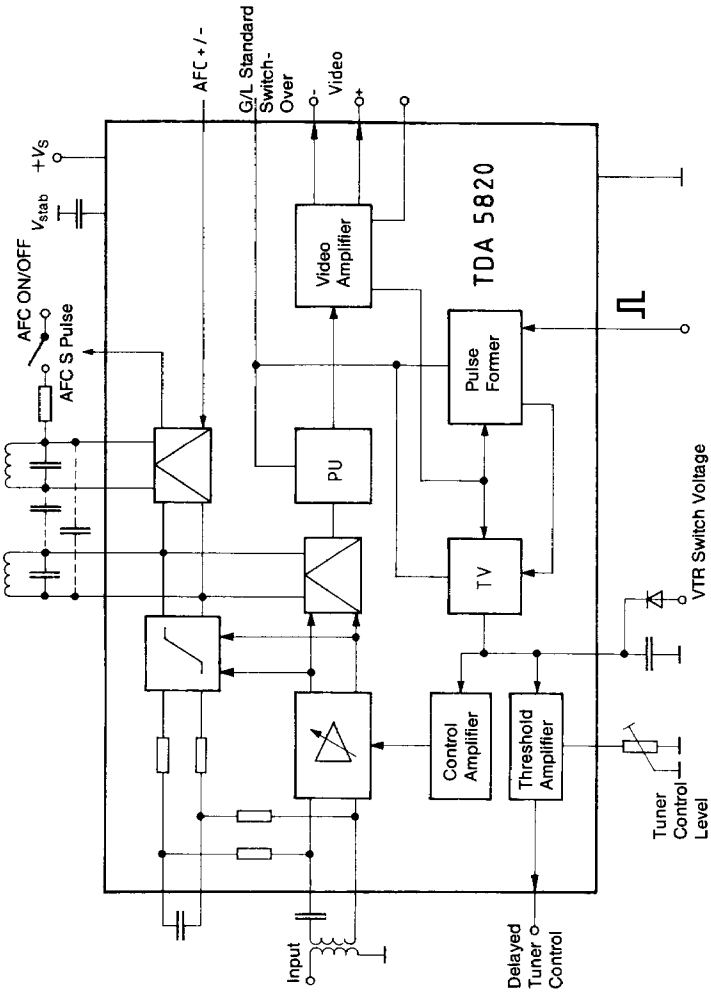



Pos. Gating Pulse

Neg. Gating Pulse

$t_1 \geq 0.5\ \mu s$
$t_2 \geq 0\ \ \mu s$
$t_3 \geq 2.5\ \mu s$
$t_4 \geq 0\ \ \mu s$

**Block diagram and measurement circuit**



## Application circuit