

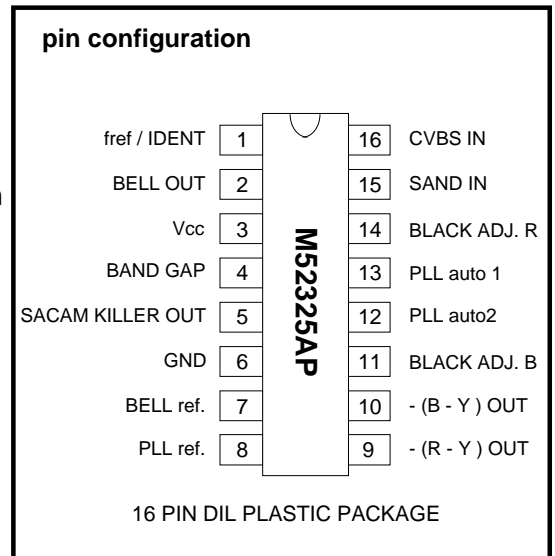
# M52325AP

SECAM DECODER

[GENERAL DESCRIPTION]

The M52325AP is designed for SECAM chrominance decoding. The IC should preferably be used in conjunction with PAL / NTSC signal processor M52340SP and the switched capacitor baseband delay line.

It consists of a bell filter, a demodulator and an identification circuit. The IC needs no adjustment and few external components are required. A signal with highly stable reference frequency is required for the calibration, and a three - level sandcastle pulse for blanking and burst gating.



[FEATURES]

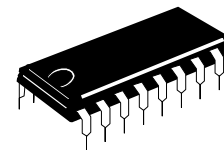
- Fully integrated filters
- No adjustment
- Few external components
- Used with a switched capacitor baseband delay line

[STRUCTURE]

Bipolar Silicon Monolithic IC

[APPLICATION]

SECAM Color Television



16 PIN DIL PLASTIC PACKAGE

[QUICK REFERENCE DATA]

| SYMBOL           | PARAMETER  | MIN. | TYP. | MAX. | UNIT             |
|------------------|--|------|------|------|------------------|
| V <sub>CC</sub>  | positive power supply<br>pin3                                  | 7.5  | 8.0  | 8.5  | V                |
| I <sub>CC</sub>  | supply current<br>pin3   | 18   | 24   | 30   | mA               |
| V <sub>DR</sub>  | input dynamic range<br>pin16                                   | -    | 1.0  | 1.4  | V <sub>p-p</sub> |
| V <sub>R-Y</sub> | -(R-Y) output voltage amplitude<br>(peak to peak value) ;pin9  | 0.85 | 1.00 | 1.15 | V <sub>p-p</sub> |
| V <sub>B-Y</sub> | -(B-Y) output voltage amplitude<br>(peak to peak value) ;pin10 | 1.10 | 1.24 | 1.43 | V <sub>p-p</sub> |

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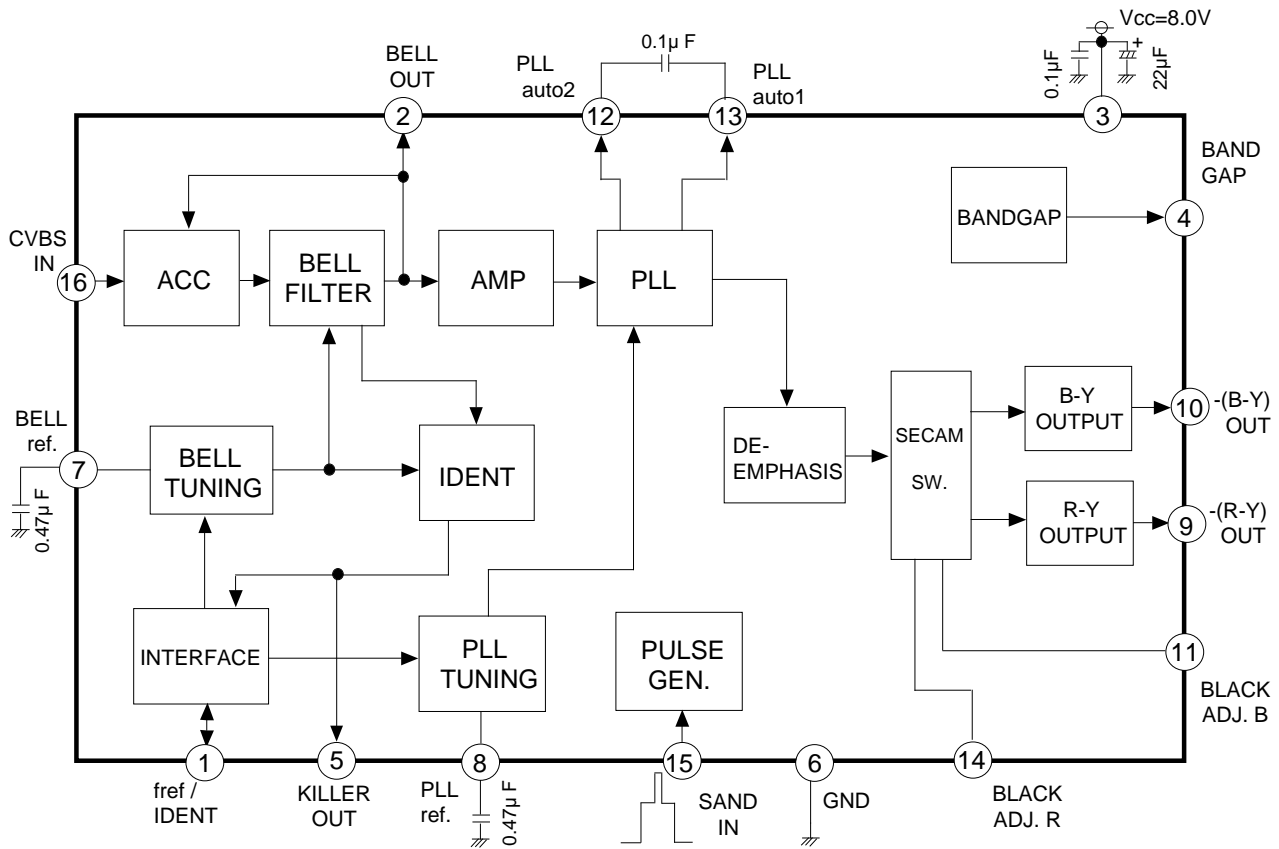


fig.1 M52325AP block diagram

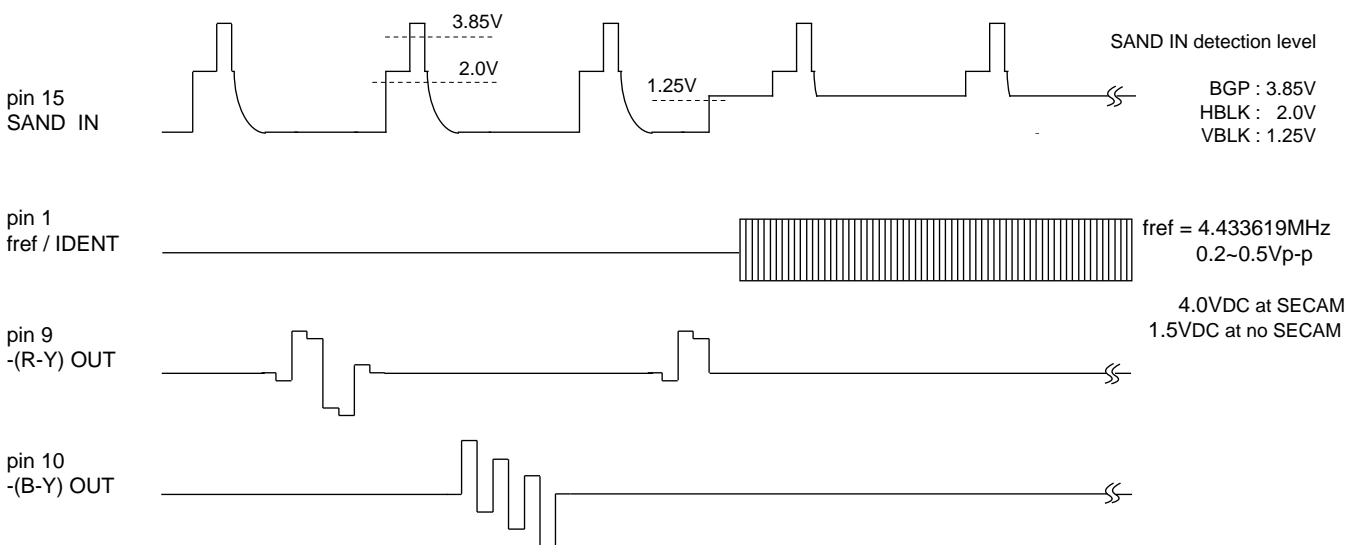


fig.2 timing waveforms

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## [Absolute Maximum Rating]

(unless otherwise specified Ta = 25°C, surge capacitor is 200pF)

| SYMBOL | PARAMETER                           | MIN. | MAX. | UNIT |
|--------|-------------------------------------|------|------|------|
| Vcc    | positive power supply               | -    | 11   | V    |
| Pd     | total power dissipation             | -    | 1.09 | W    |
| Topr   | operating ambient temperature range | -20  | +75  | °C   |
| Tstg   | storage temperature range           | -40  | +125 | °C   |
| Vsurge | surge voltage                       | ±200 | -    | V    |

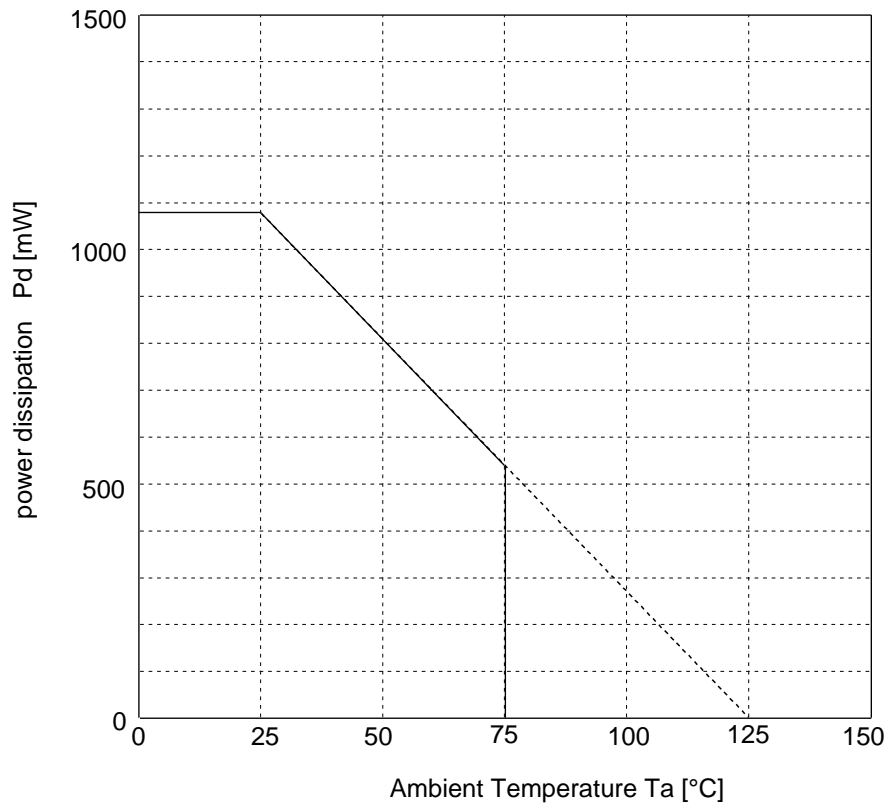


fig.3 package thermal derating curve ( maximum rating )

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## [Note to Electrical Characteristics Measurement]

This IC needs a three - level sandcastle pulse at pin 15. (see fig.4 ,fig5)  
 And the reference signal should be highly stable for frequency and amplitude during the vertical blanking period.

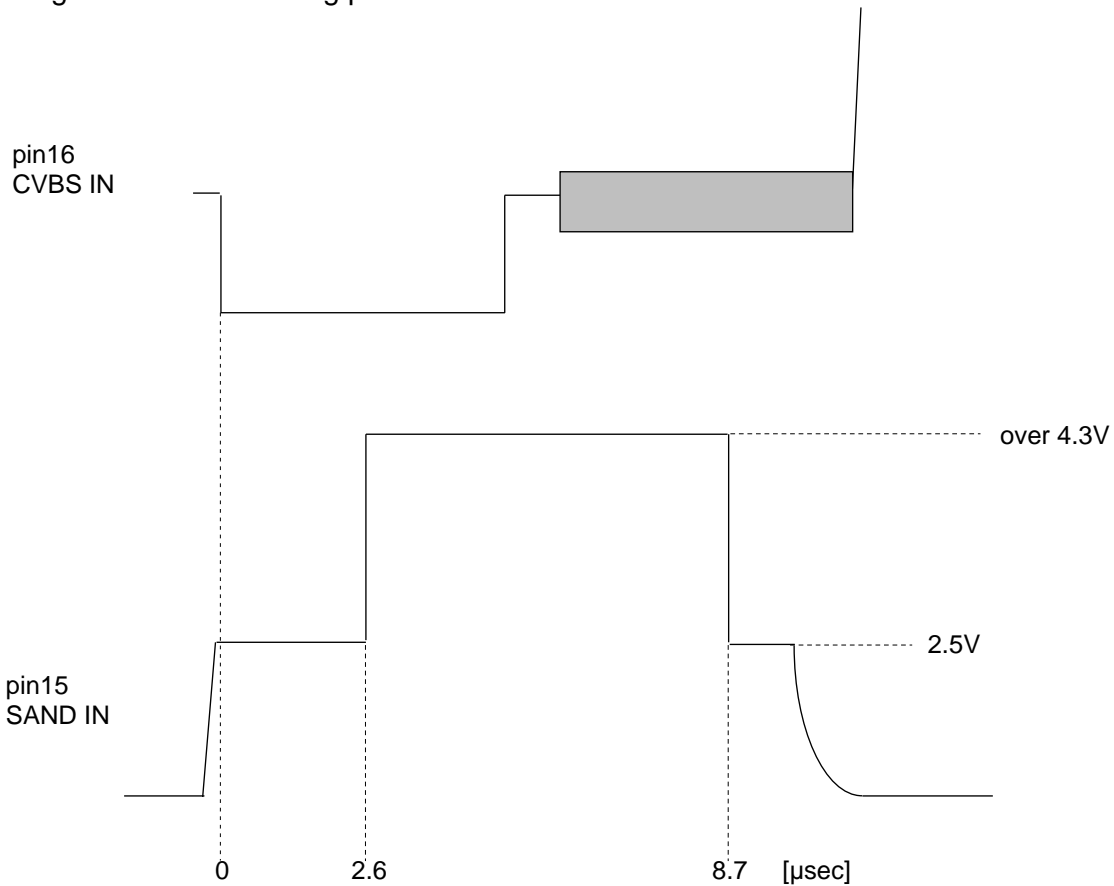


fig.4 sandcastle pulse

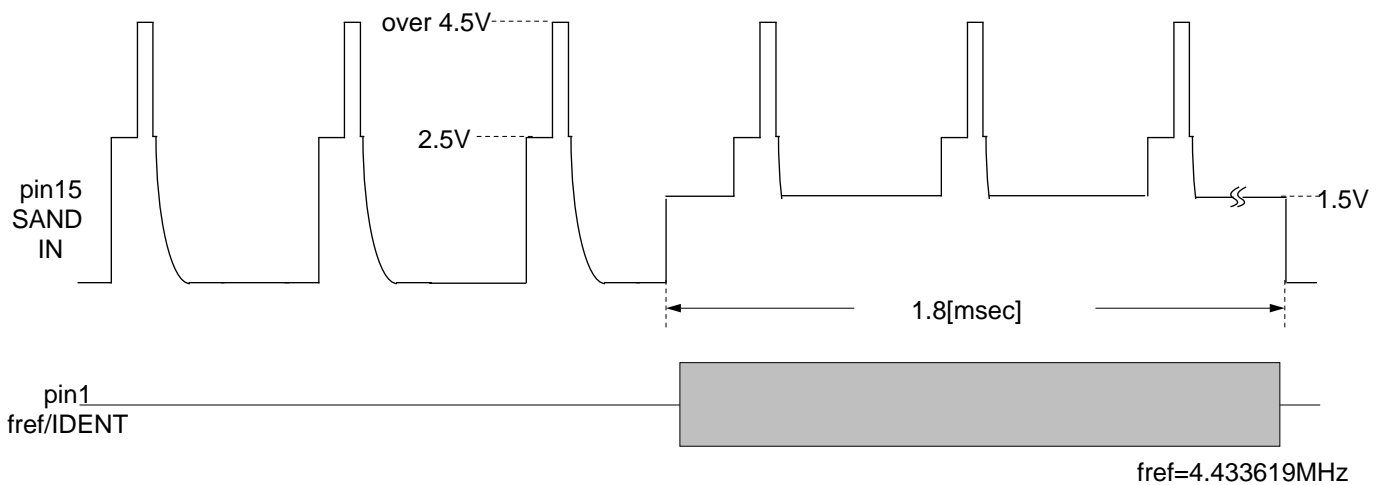


fig.5 sandcastle pulse and fref signal

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## SECAM DECODER

### [Electrical Characteristics]

note a) unless otherwise specified ; Vcc=8.0V Ta = 25°C  
 note b) unless otherwise specified ; input fref signal ,  
 pin 1 is HIGH(Vext1 = 4.75V), Vext16 = 4V

| PARAMETER   | SYMBOL                             | CONDITIONS                         | TEST PIN | MIN.  | TYP.  | MAX.  | UNIT  |
|---|------------------------------------|------------------------------------|----------|-------|-------|-------|-------|
| positive power supply                                 | Vcc                                |                                    | ③        | 7.5   | 8.0   | 8.5   | V     |
| supply current  | Icc                                | A: SG1                             | ③        | 18    | 24    | 30    | mA    |
| DC voltage pin2                                       | V2                                 |                                    | ②        | 1.4   | 1.8   | 2.2   | V     |
| DC voltage pin4                                       | V4                                 |                                    | ④        | 4.1   | 4.27  | 4.5   | V     |
| DC voltage pin11                                      | V11                                |                                    | ⑪        | 3.9   | 4.13  | 4.35  | V     |
| DC voltage pin12                                      | V12                                |                                    | ⑫        | 4.5   | 4.9   | 5.5   | V     |
| DC voltage pin13                                      | V13                                |                                    | ⑬        | 4.5   | 4.9   | 5.5   | V     |
| DC voltage pin14                                      | V14                                |                                    | ⑭        | 4.0   | 4.20  | 4.4   | V     |
| CVBS in   |                                    |                                    |          |       |       |       |       |
| composite video input voltage (peak to peak value)*   | V16in                              |                                    | ⑯        | -     | 1.0   | 1.4   | Vp-p  |
| chrominance input voltage(peak to peak value) *       | VCL                                | note1                              | ⑯        | -     | 167   | 300   | mVp-p |
| input impedance                                       | Zin                                | over f=4MHz<br>note2               | ⑯        | -     | 8     | -     | K     |
| BELL FILTER   |                                    |                                    |          |       |       |       |       |
| resonance frequency                                   | fBO                                | A: SG0<br>Vcc = 7.5~9.0 V<br>note3 | ②        | 4.236 | 4.286 | 4.336 | MHz   |
| band width  | fBW                                | A: SG0                             | ②        | 250   | 320   | 368   | KHz   |
| DEMODULATOR   |                                    |                                    |          |       |       |       |       |
| linearity   | V <sub>LIN</sub>                   | A: SG1<br>note4                    | ⑩        | 2.6   | 2.9   | 3.2   |       |
| output voltage amplitude (peak to peak value): -(R-Y) | V <sub>R-Y</sub>                   | A: SG1                             | ⑨        | 0.85  | 1.00  | 1.15  | Vp-p  |
| output voltage amplitude (peak to peak value): -(B-Y) | V <sub>B-Y</sub>                   | A: SG1                             | ⑩        | 1.05  | 1.24  | 1.43  | Vp-p  |
| ratio of - ( B-Y ) / - ( R-Y )                        | V <sub>B-Y</sub> /V <sub>R-Y</sub> | calculated                         | -        | 1.10  | 1.24  | 1.36  |       |
| black level error - ( R-Y )                           | V <sub>RB</sub>                    | A: SG2<br>note5                    | ⑨        | -15   | -     | +15   | mV    |
| black level error - ( B-Y )                           | V <sub>BB</sub>                    | A: SG2<br>note5                    | ⑩        | -50   | -     | +20   | mV    |

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| PARAMETER  | SYMBOL          | CONDITIONS                                  | TEST PIN | MIN. | TYP.   | MAX. | UNIT             |
|--|-----------------|---|----------|------|--------|------|------------------|
| output DC voltage during blanking                | $V_o$           |   | ⑨ ⑩      | 2.1  | 2.8    | 3.5  | V                |
| signal to noise ratio *                          | S/N             | A: SG1                                      | ⑩        | 40   | -      | -    | dB               |
| output bandwidth *                               | BW <sub>o</sub> |   | ⑩        | -    | 1.5    | -    | MHz              |
| pole frequency of de-emphasis LPF *              | $f_p$           |   |          | 72   | 85     | 98   | KHz              |
| ratio of pole and zero frequency *               | $f_p/f_o$       |   |          | -    | 3      | -    |                  |
| residual harmonic voltage (peak to peak value) * | $V_{hc}$        | A: SG2                                      | ⑩        | -    | 5.2    | 15   | mV               |
| output impedance at SECAM *                      | $Z_{o1}$        | pin 1 HIGH ( $V_{ext1} = 4.75V$ )           | ⑨ ⑩      | -    | 200    | 600  |                  |
| output impedance at no SECAM *                   | $Z_{o2}$        | PIN1 LOW ( $V_{ext1} = 2.25V$ )             | ⑨ ⑩      | 1    | -      | -    | M                |
| <b>SANDCASTLE PULSE</b>                          |                 |   |          |      |        |      |                  |
| vertical blanking detection level                | $V_{VB}$        |   | ⑮        | 1.0  | 1.25   | 1.4  | V                |
| horizontal blanking detection level              | $V_{HB}$        |   | ⑮        | 1.75 | 2.0    | 2.25 | V                |
| burst gate detection level                       | $V_{BG}$        |   | ⑮        | 3.5  | 3.85   | 4.2  | V                |
| rising edge of internal burst gate pulse *       | $T_r$           | note 6                                      |          | 4.2  | 4.5    | 4.8  | μsec             |
| falling edge of internal burst gate pulse *      | $T_f$           | note 7                                      |          | 0    | 0.2    | 0.5  | μsec             |
| <b>REFERENCE / IDENTIFICATION</b>                |                 |   |          |      |        |      |                  |
| reference frequency                              | $f_{ref}$       | note 8                                      | ①        | -    | 4.4336 | -    | MHz              |
| reference voltage amplitude (peak to peak value) | $V_{ref}$       | note 8                                      | ①        | 0.20 | -      | 0.57 | V <sub>p-p</sub> |
| system switches detection level at SECAM         | $V_{TH1}$       | $V_{ext1} =$ attenuate DC voltage           | ①        | -    | 2.9    | 3.3  | V                |
| system switches detection level at no SECAM      | $V_{TH2}$       | $V_{ext1} =$ attenuate DC voltage<br>note 9 | ①        | 1.5  | 2.0    | -    | V                |
| sink current at SECAM                            | $I_s$           | $V_{ext5} = 1.5V$<br>sw5 : on               | ①        | 125  | 180    | 235  | μA               |
| pin5 voltage at SECAM                            | $V_{5S}$        | A: SG1                                      | ⑤        | 2.4  | 3.1    | 3.6  | V                |
| pin5 voltage at no SECAM                         | $V_{5NS}$       | A: -  | ⑤        | -    | -      | 0.2  | V                |
| sensitivity of identification and killer         | I / K           | A: SG1 attenuate amplitude<br>note10        | ⑤        | -46  | -38    | -32  | dB               |

note \* : These characteristics are for reference , and not guaranteed the limiting value.

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**[Input Signals]**

| SG No. | signal   | conditions   |
|--------|--|--|
| SG0    | f = 4.0~5.0MHz<br>sweep signal                 | amplitude : 20 mVp-p                                     |
| SG1    | 100/75 color bar                               | B-Y burst signal $f_{OB}$<br>amplitude : 167 mVp-p = 0dB |
| SG2    | black/white signal                             | B-Y burst signal $f_{OB}$<br>amplitude : 167 mVp-p = 0dB |
| SCP    | three - level sandcastle<br>pulse              | see fig4 , fig5  |
| fref   | f = 4.433619MHz<br>during vertical<br>blinking | see fig4 , fig5<br>amplitude : 300mVp-p                  |

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## [Note to the characteristics]

1. If measured in the burst period of a blue line.
2. Pin 16 is AC - coupled. Defined the impedance over  $f = 4\text{MHz}$ .
3. Measure except during the vertical blanking and burst gate pulse.  
An use of an active probe is advised for low capacitive loading.
4. Defined as  $V_{LIN} = b / a$  ; see fig.6
5. Measure the difference voltage between the blanking( $V_1$ ) and the black( $V_2$ ) level .  
Defined as  $V_{RB} ( V_{BB} ) = V_2 - V_1$  ; see fig.7
6. Defined as the time from rising edge detection of PAL burst gate pulse at pin15.(internal)
7. Defined as the time from falling edge detection of PAL burst gate pulse at pin15.(internal)
8. The reference signal should be stable during the vertical blanking.
9. The external supply voltage at pin1 should be exceed 0.5V.
10. Defined as the ratio between  $V_k$  (i.e. the peak to peak value of the burst period of a blue line) when LOW (0.2 V) at pin5, and 167 mVp-p the peak to peak value of the burst period of a blue line.

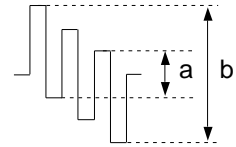


fig.6

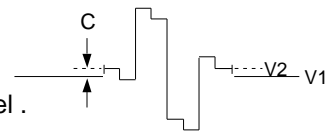


fig.7

$$I / K = 20 * \log_{10} (V_k / 167 \text{ mVp-p}) \quad (\text{dB})$$



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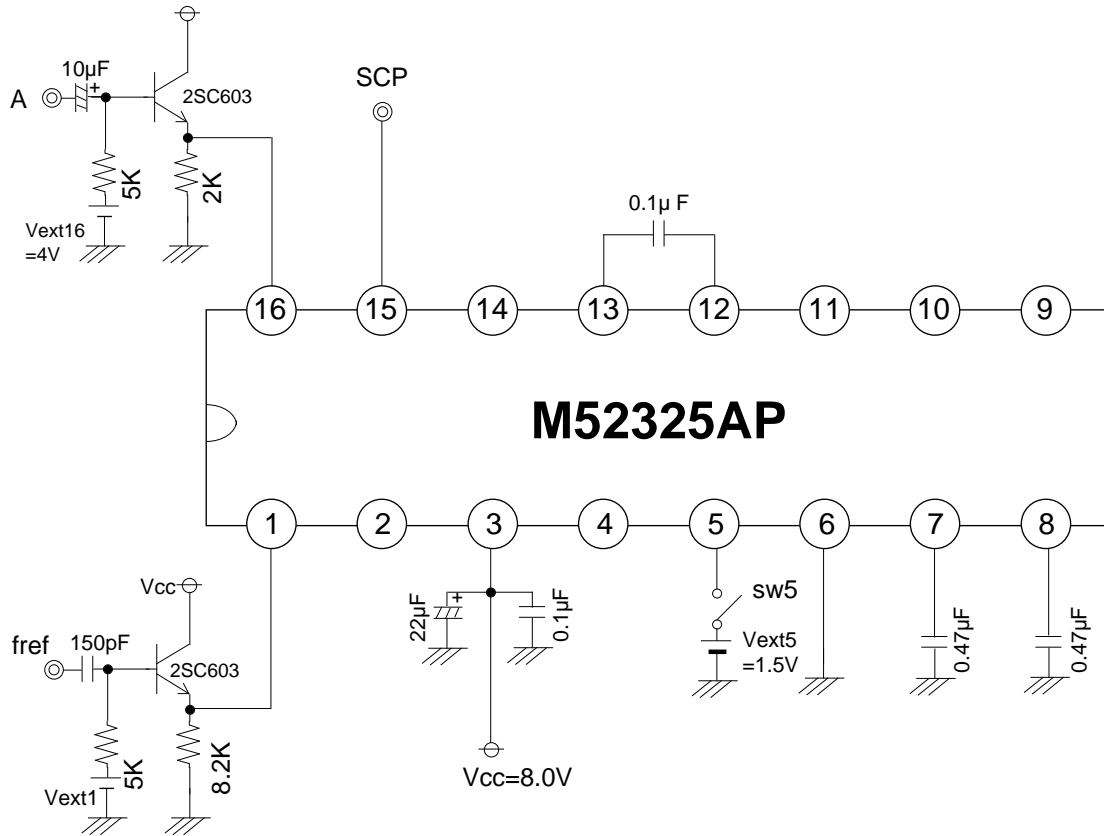


fig.8 measurement circuit diagram

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SECAM DECODER

## [Terminal Description]

| PIN NUMBER | SYMBOL       | DESCRIPTION   | DC VOLTAGE | EQUIVALENT CIRCUIT |
|------------|--------------|---|------------|--------------------|
| 1          | fref / IDENT | for the reference input, PAL system identification input, and SECAM killer signal output.<br><br>SECAM killer<br>180 $\mu$ A typ. at SECAM<br>0 $\mu$ A typ. at no SECAM<br><br>system switches<br>detection level ; 2.9V | -          |                    |
| 2          | BELL out     | bell filter output  | 1.7V       |                    |
| 3          | Vcc          | positive power supply   | 8V         |                    |
| 4          | BAND GAP     | band gap reference voltage output   | 4.3V       |                    |
| 5          | KILLER OUT   | SECAM killer output<br>3.1V at SECAM<br>0V at no SECAM  | -          |                    |
| 6          | GND          | ground  |            |                    |

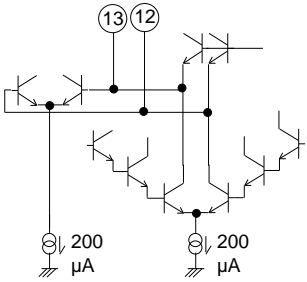
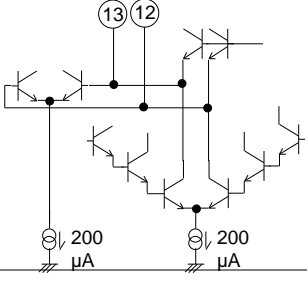
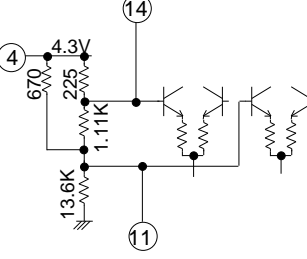
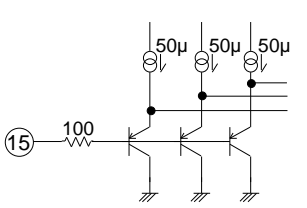
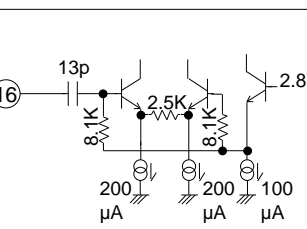
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| PIN NUMBER | SYMBOL         | DESCRIPTION  | DC VOLTAGE | EQUIVALENT CIRCUIT |
|------------|----------------|--|------------|--------------------|
| 7          | BELL ref.      | <p>bell reference filter</p> <p>The capacitor should be connected to the ground pin as close as possible to the package.</p> | 3.3V       |                    |
| 8          | PLL ref.       | <p>PLL reference filter</p> <p>The capacitor should be connected to the ground pin as close as possible to the package.</p>  | 4.3V       |                    |
| 9          | -( R - Y ) OUT | <p>-(R-Y) output</p> <p>1.00Vp-p at 100/75 color bar</p>   | 2.8V       |                    |
| 10         | -( B - Y ) OUT | <p>-(B-Y) output</p> <p>1.24Vp-p at 100/75 color bar</p>   | 2.8V       |                    |
| 11         | BLACK ADJ. B   | <p>black level reference for -(B-Y)</p> <p>Black level error can be adjusted by external dc voltage.</p>                     | 4.16V      |                    |

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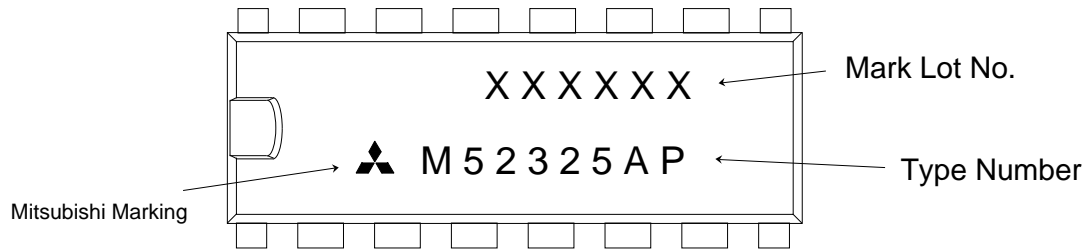
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| PIN NUMBER | SYMBOL       | DESCRIPTION   | DC VOLTAGE   | EQUIVALENT CIRCUIT  |
|------------|--------------|---|--------------|---|
| 12         | PLL auto2    | PLL adjust voltage output2<br>Capacitor between pin 12 and pin13 improves color S/N.<br>Value of Capacitor is 0.1uFtyp. | 5.0V         |    |
| 13         | PLL auto1    | PLL adjust voltage output1<br>Capacitor between pin 12 and pin13 improves color S/N.<br>Value of Capacitor is 0.1uFtyp. | 5.0V         |   |
| 14         | BLACK ADJ. B | black level reference for -(R-Y)<br>Black level error can be adjusted by external dc voltage.                           | 4.28V        |  |
| 15         | SAND IN      | three - level sandcastle pulse input  | -            |  |
| 16         | CVBS IN      | chrominance signal input  | -<br>(2.05V) |  |

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SECAM DECODER

## [Marking]



## [Material of Terminals and Package]

### Terminals

Material : copper alloy

Plating : solder

### Package

Material : epoxy resin

## [Weight of IC]

1.0g

## [Notice]

- 1) Filters and demodulator are tuned during vertical blanking.  
So pin7 and pin8 are very sensitive to current leakage .  
The capacitor of pin 7 and pin8 should be low leakage and low drift type,  
and should be connected as close as possible to the ground pin of the package.
- 2) Black level error can be adjusted by tuning of variable resistors between pin 4  
(or Vcc ,ground) to pin 11 and between pin4 (or Vcc ,ground) to pin 14.