

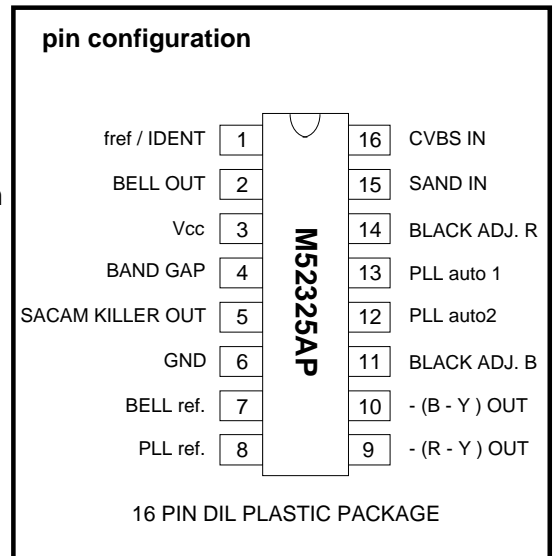
M52325AP

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]

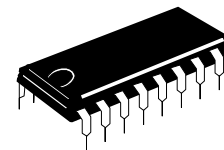
- Fully integrated filters
- No adjustment
- Few external components
- Used with a switched capacitor baseband delay line

[STRUCTURE]

Bipolar Silicon Monolithic IC

[APPLICATION]

SECAM Color Television



16 PIN DIL PLASTIC PACKAGE

[QUICK REFERENCE DATA]

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

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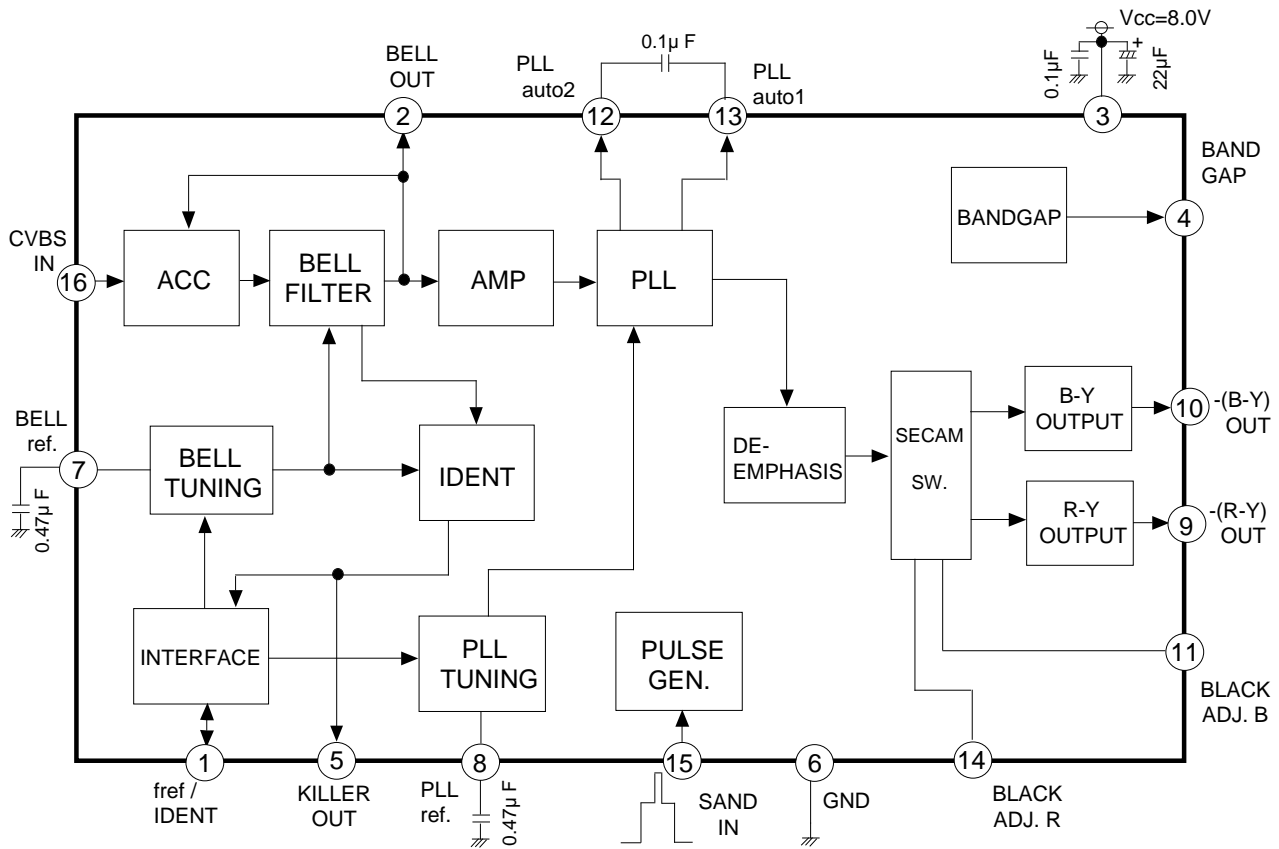


fig.1 M52325AP block diagram

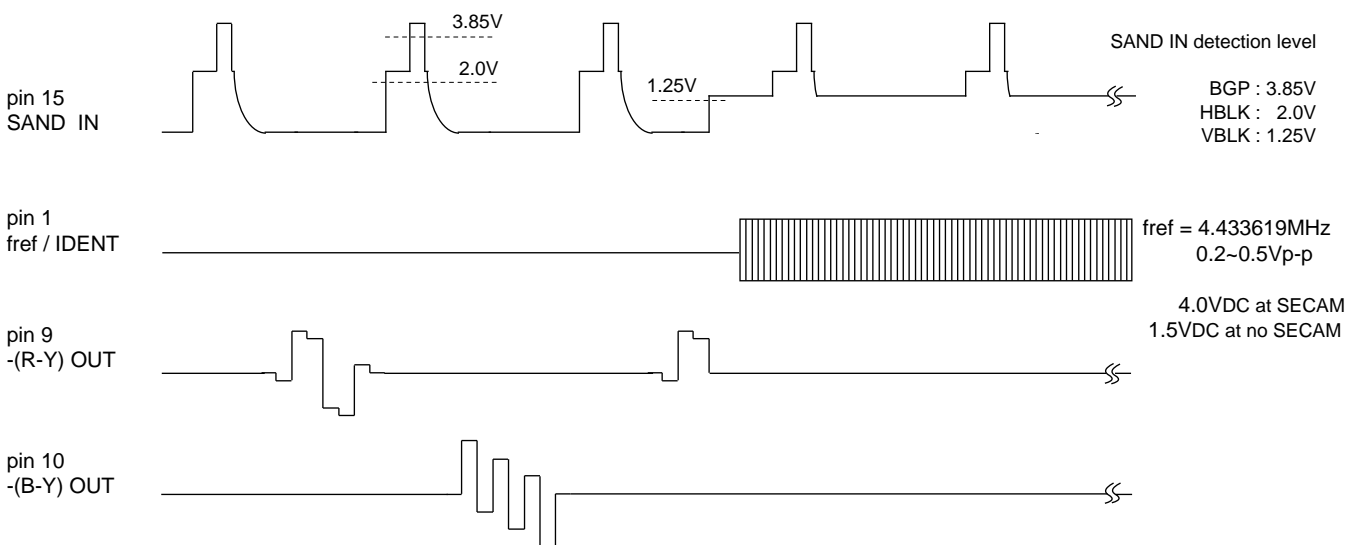


fig.2 timing waveforms

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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

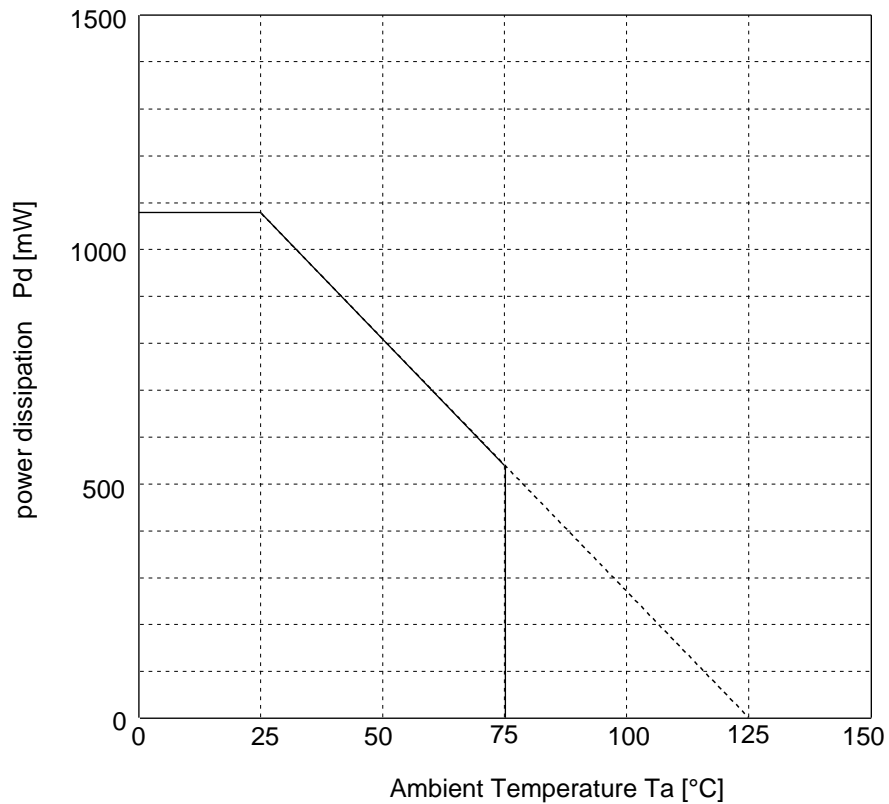


fig.3 package thermal derating curve (maximum rating)

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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.

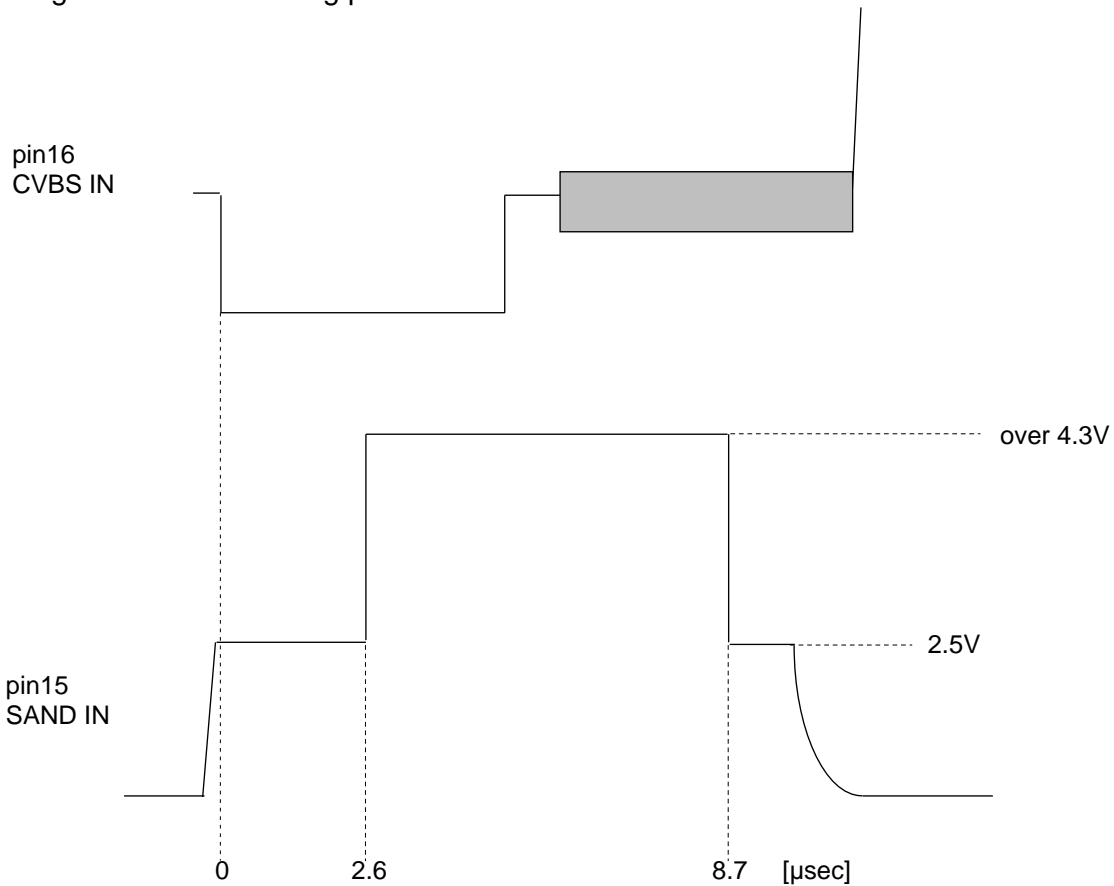


fig.4 sandcastle pulse

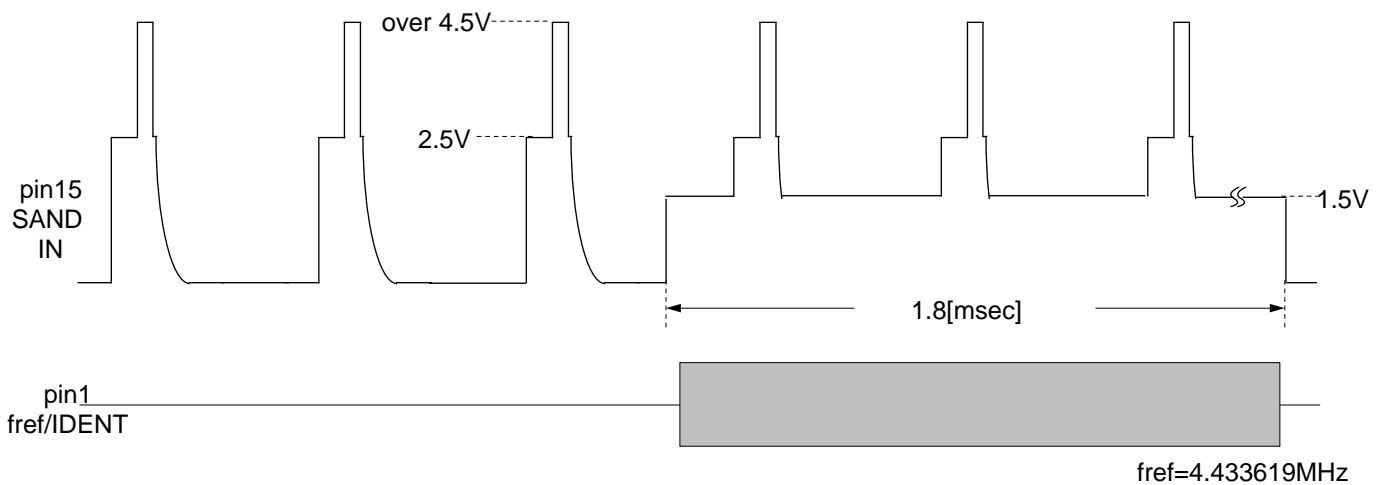


fig.5 sandcastle pulse and fref signal

fref=4.433619MHz

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[Electrical Characteristics]

note a) unless otherwise specified ; $V_{CC}=8.0V$ $T_a = 25^{\circ}C$
 note b) unless otherwise specified ; input freq signal ,
 pin 1 is HIGH($V_{ext1} = 4.75V$), $V_{ext16} = 4V$

PARAMETER	SYMBOL	CONDITIONS	TEST PIN	MIN.	TYP.	MAX.	UNIT
positive power supply	V_{CC}		③	7.5	8.0	8.5	V
supply current	I_{CC}	A: SG1	③	18	24	30	mA
DC voltage pin2	V_2		②	1.4	1.8	2.2	V
DC voltage pin4	V_4		④	4.1	4.27	4.5	V
DC voltage pin11	V_{11}		⑪	3.9	4.13	4.35	V
DC voltage pin12	V_{12}		⑫	4.5	4.9	5.5	V
DC voltage pin13	V_{13}		⑬	4.5	4.9	5.5	V
DC voltage pin14	V_{14}		⑭	4.0	4.20	4.4	V
CVBS in							
composite video input voltage (peak to peak value)*	V_{16in}		⑯	-	1.0	1.4	V_{p-p}
chrominance input voltage(peak to peak value) *	V_{CL}	note1	⑯	-	167	300	mV_{p-p}
input impedance	Z_{in}	over $f=4MHz$ note2	⑯	-	8	-	K
BELL FILTER							
resonance frequency	f_{BO}	A: SG0 $V_{CC} = 7.5-9.0 V$ note3	②	4.236	4.286	4.336	MHz
band width	f_{BW}	A: SG0	②	250	320	368	KHz
DEMODULATOR							
linearity	V_{LIN}	A: SG1 note4	⑩	2.6	2.9	3.2	
output voltage amplitude (peak to peak value): -(R-Y)	V_{R-Y}	A: SG1	⑨	0.85	1.00	1.15	V_{p-p}
output voltage amplitude (peak to peak value): -(B-Y)	V_{B-Y}	A: SG1	⑩	1.05	1.24	1.43	V_{p-p}
ratio of - (B-Y) / - (R-Y)	V_{B-Y}/V_{R-Y}	calculated	-	1.10	1.24	1.36	
black level error - (R-Y)	V_{RB}	A: SG2 note5	⑨	-15	-	+15	mV
black level error - (B-Y)	V_{BB}	A: SG2 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 _o		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
SANDCASTLE PULSE							
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
REFERENCE / IDENTIFICATION							
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 _{p-p}
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 note 9	①	1.5	2.0	-	V
sink current at SECAM	I_s	$V_{ext5} = 1.5V$ 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 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 sweep signal	amplitude : 20 mVp-p
SG1	100/75 color bar	B-Y burst signal f_{OB} amplitude : 167 mVp-p = 0dB
SG2	black/white signal	B-Y burst signal f_{OB} amplitude : 167 mVp-p = 0dB
SCP	three - level sandcastle pulse	see fig4 , fig5
fref	f = 4.433619MHz during vertical blinking	see fig4 , fig5 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.

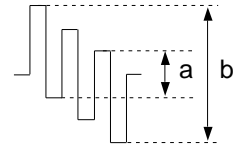


fig.6

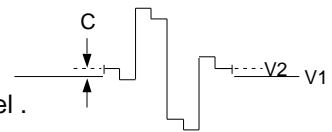


fig.7

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

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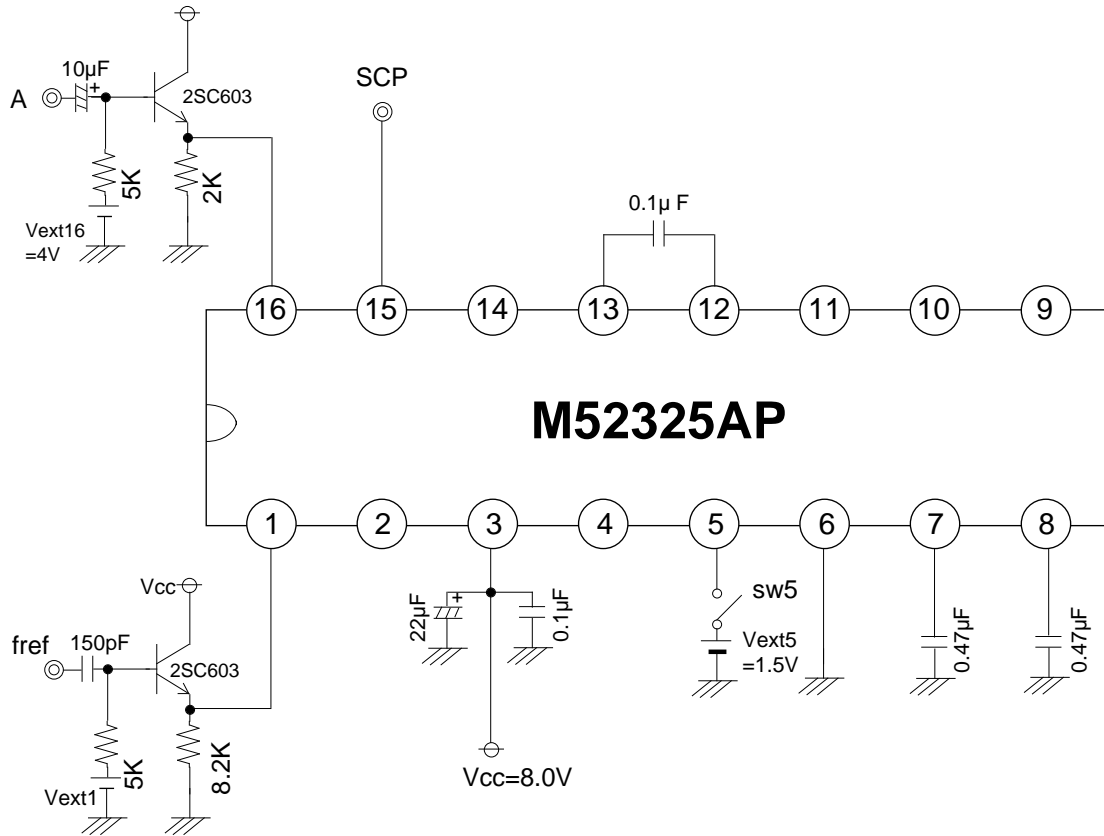


fig.8 measurement circuit diagram

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[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. SECAM killer 180 μ A typ. at SECAM 0 μ A typ. at no SECAM system switches 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 3.1V at SECAM 0V at no SECAM	-	
6	GND	ground		

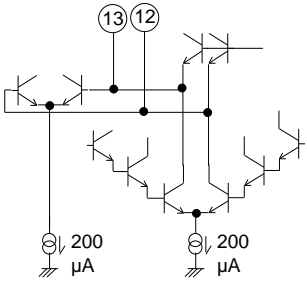
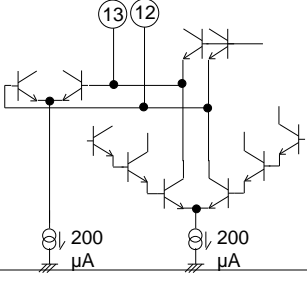
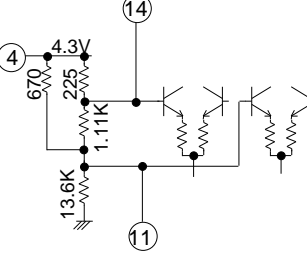
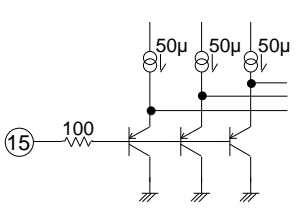
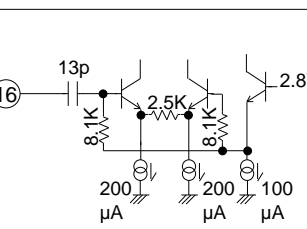
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PIN NUMBER	SYMBOL	DESCRIPTION	DC VOLTAGE	EQUIVALENT CIRCUIT
7	BELL ref.	<p>bell reference filter</p> <p>The capacitor should be connected to the ground pin as close as possible to the package.</p>	3.3V	
8	PLL ref.	<p>PLL reference filter</p> <p>The 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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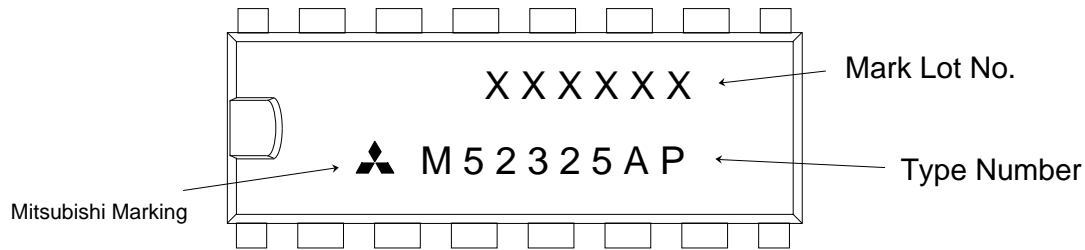
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PIN NUMBER	SYMBOL	DESCRIPTION	DC VOLTAGE	EQUIVALENT CIRCUIT
12	PLL auto2	PLL adjust voltage output2 Capacitor between pin 12 and pin13 improves color S/N. Value of Capacitor is 0.1uFtyp.	5.0V	
13	PLL auto1	PLL adjust voltage output1 Capacitor between pin 12 and pin13 improves color S/N. Value of Capacitor is 0.1uFtyp.	5.0V	
14	BLACK ADJ. B	black level reference for -(R-Y) 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	- (2.05V)	

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[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.