M5186P/AP

TV VIDEO IF SIGNAL PROCESSOR

DESCRIPTION

The M5186P/AP is a semiconductor integrated circuit designed to serve as a TV video IF signal processing circuit. The circuit consists of a video IF amplifier, video detector, video amplifier, audio IF detector, AFT circuit, AFT switching circuit, IF AGC circuit (peak-type) and RF AGC circuits. These circuits are housed in a 22-pin plastic DIL package.

FEATURES

- Audio IF detector circuits and video detector circuits are separated
- Forward, reverse and RF AGC outputs are availables.
- Synchronous video and audio detection system
- Quadrature detection type AFT circuit
- Excellent AGC characteristics with broad control range
- Peak-type AGC circuit

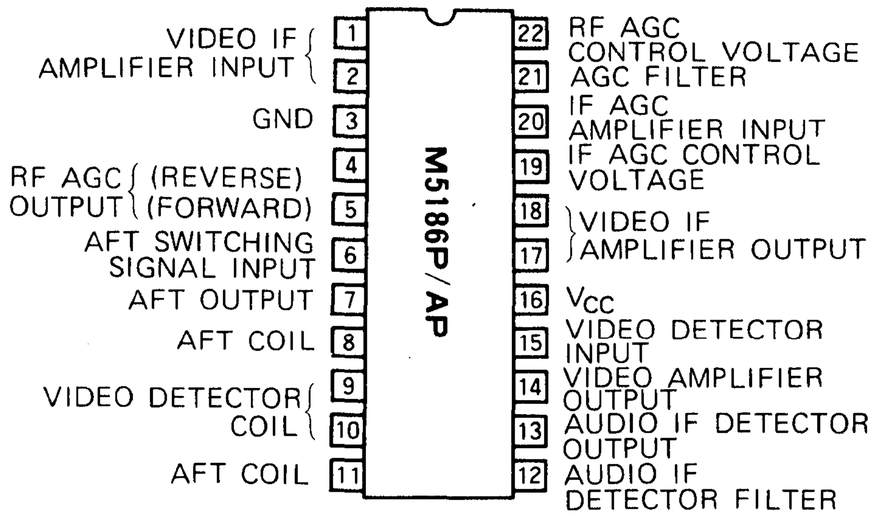
APPLICATION

TV video IF signal processing

RECOMMENDED OPERATING CONDITIONS

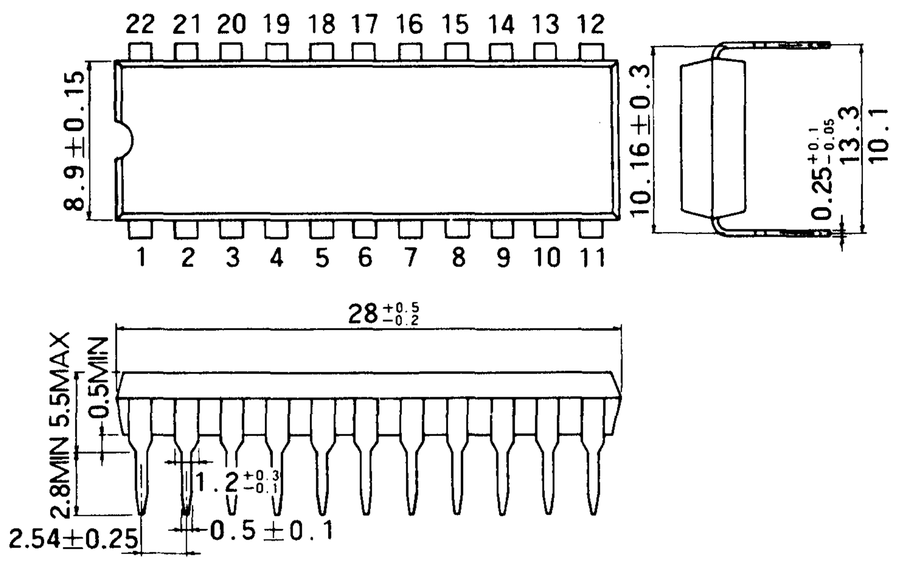
Supply voltage ..... 11~13V
Rated supply voltage 12.0V

PIN CONFIGURATION (TOP VIEW)



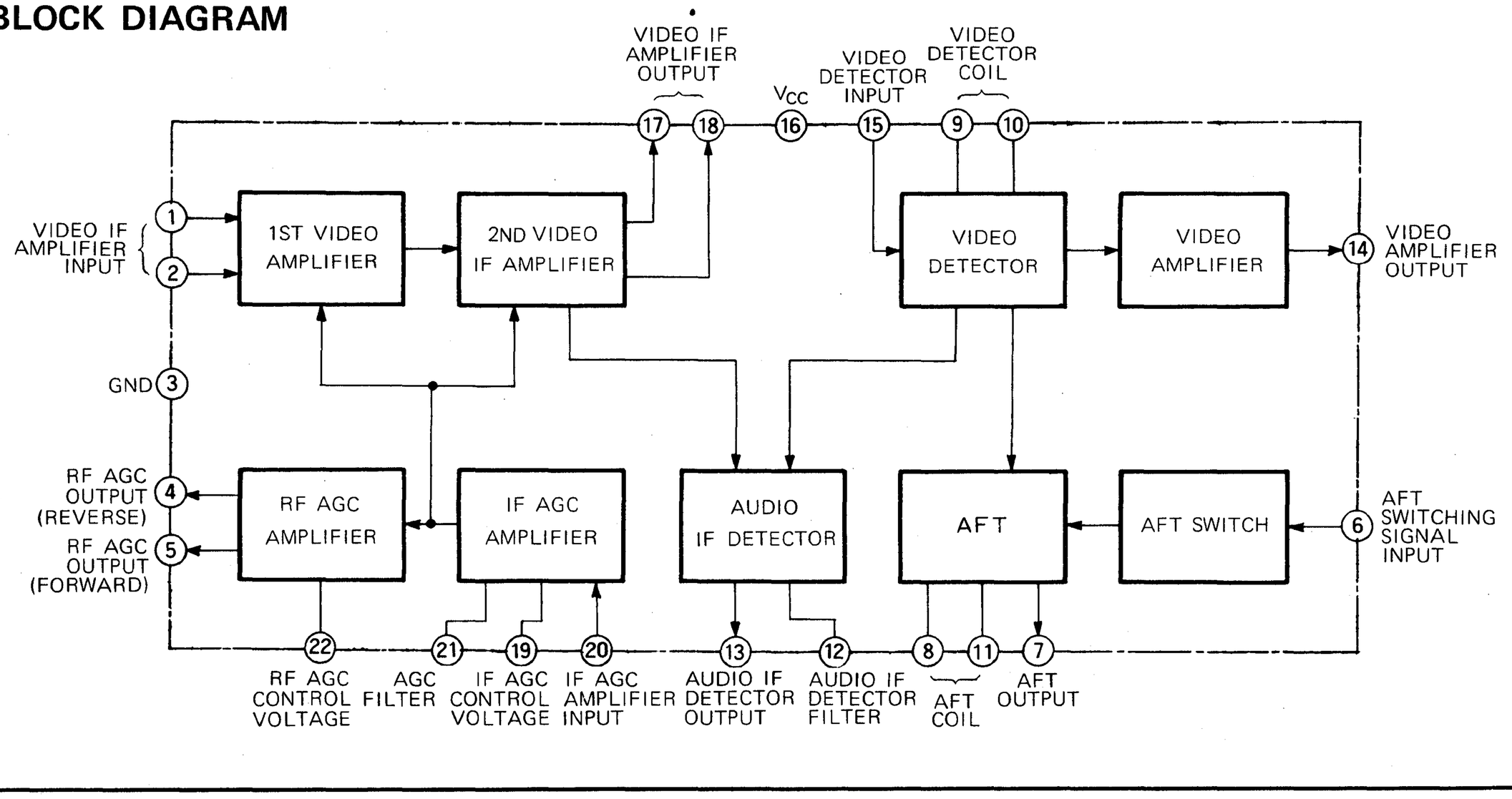
PACKAGE OUTLINE

Dimensions in mm



22-pin plastic DIL package

BLOCK DIAGRAM



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TV VIDEO IF SIGNAL PROCESSOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		16.0	V
P_d	Power dissipation		1.4	W
$K\theta$	Derating	Ta ≧ 25℃	14	mW/℃
Topr	Operating temperature		−20 ~ +75	℃
Tstg	Storage temperature		−40 ~ +125	℃

ELECTRICAL CHARACTERISTICS (Ta = 25℃, V_{CC} = 12.0V)

Symbol	Parameter	Test conditions	Test circuit	Limits			Unit
				Min	Typ	Max	
I_{CC}	Circuit current		(a)	36	50	70	mA
$V_{⑭}$	Video amplifier output DC voltage		(a)	4.8	6.0	7.2	V
$V_{⑦}$	AFT output DC voltage		(a)	4.3	5.5	7.0	V
$G_{V(IF)}$	Video IF amplifier maximum voltage gain		(a)	36	41	46	dB
GR	IF AGC control range		(a)	58			dB
$V_{O(DET)}$	Video amplifier output signal voltage		(a)	250	350	500	mVrms
$THD_{(DET)}$	Video amplifier output distortion		(a)			6	%
$V_{O(SIF)}$	Audio IF detector output signal voltage		(a)	30	70	120	mVrms
Δf	AFT detector sensitivity	$V_{⑦}$ = 3 ~ 10V	(a)		130	180	kHz
V_L	AFT switch control range		(a)	1.5	1.8	2.1	V
V_H			(a)	6.2	6.6	7.0	
$V_{④}$-L	RF AGC control range		(a)			0.5	V
$V_{④}$-H			(a)	9.5			
$V_{⑤}$-L			(a)			0.5	
$V_{⑤}$-H			(a)	9.5			
Rin	Video IF amplifier input resistance		(b)		1		kΩ
Cin	Video IF amplifier input capacitance		(b)		7		pF
DG	Video detector differentiation gain response		(c)			7	%
DP	Video detector differentiation phase response		(c)			7	°
fc	Video amplifier frequency response		(c)		7		MHz

INPUT SIGNALS (levels measured into 50Ω terminations)

SG 1	f_O = 58.75MHz, V_i = 1mVrms, unmodulated
SG 2	f_O = 58.75MHz, V_i = 100mVrms, unmodulated
SG 3	f_C = 58.75MHz, V_i = 20mVrms, f_m = 1kHz, 40% AM modulated
SG 4	f_1 = 58.75MHz, V_i = 20mVrms, f_2 = 54.25MHz, V_i = 2 mVrms, } signals added
SG 5	f = 58.75MHz ± 5MHz sweep signal, V_i = 20mVrms
SG 6	f_c = 58.75MHz, f_m = 3.58MHz overlayed stepped waveform } modulated signal, V_i=variable
SG 7	f_1 = 58.75MHz, V_i = 20mVrms, f_2 = 58.75MHz − 10MHz sweep signal, V_i = 2mVrms } Signals added

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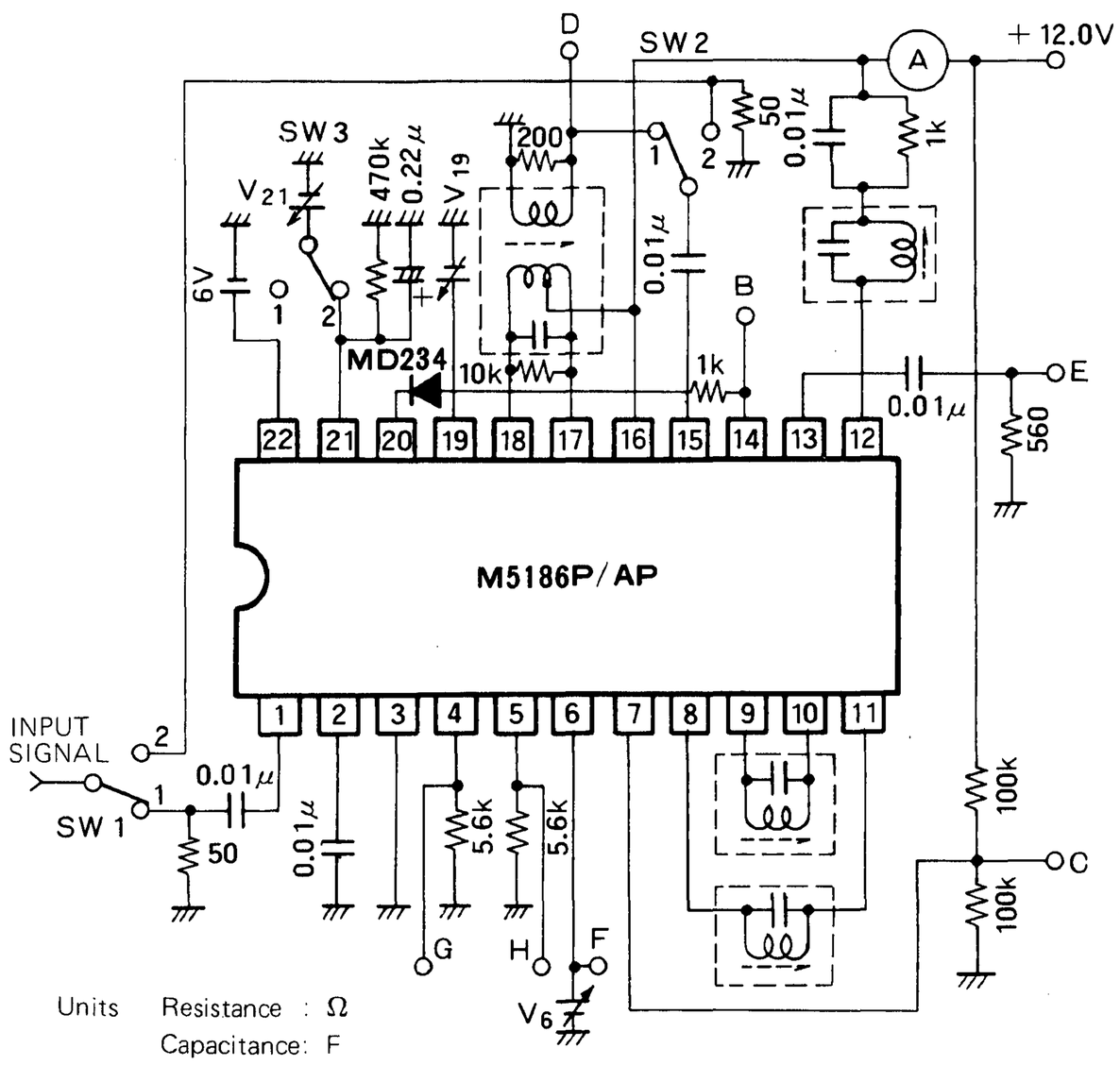
TV VIDEO IF SIGNAL PROCESSING CIRCUIT

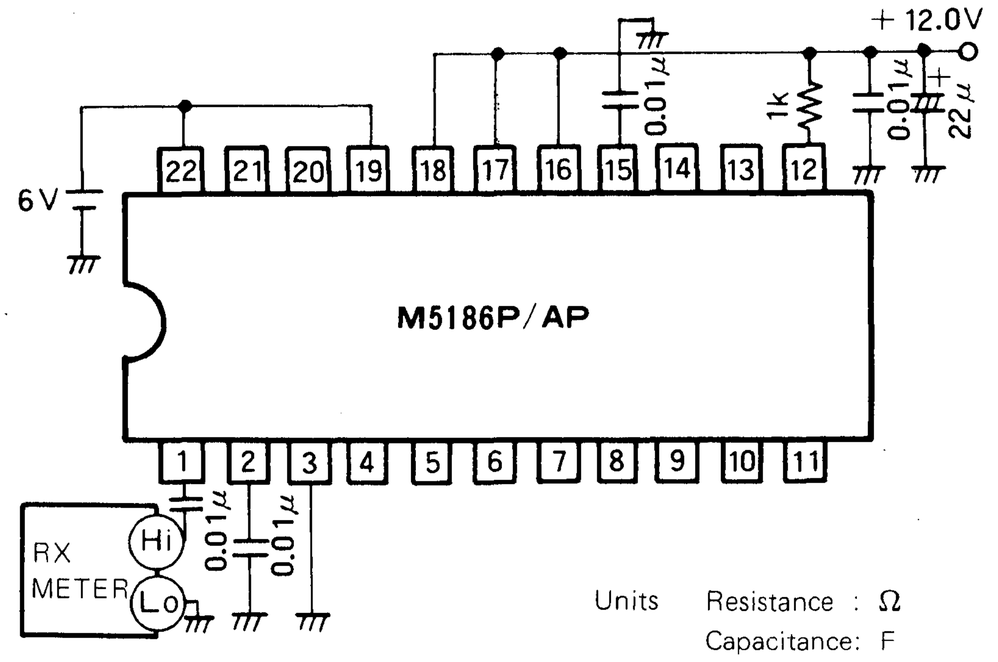
TEST CIRCUITS

(a)



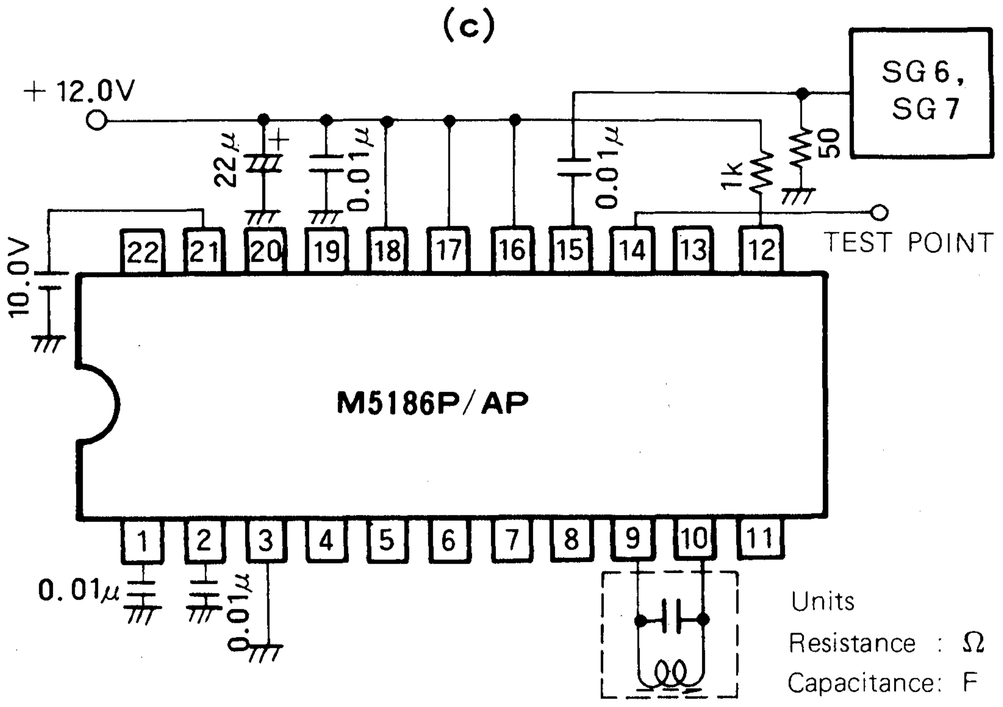
Units Resistance : Ω
Capacitance: F

(b)



Units Resistance : Ω
Capacitance: F

(c)



Units
Resistance : Ω
Capacitance: F

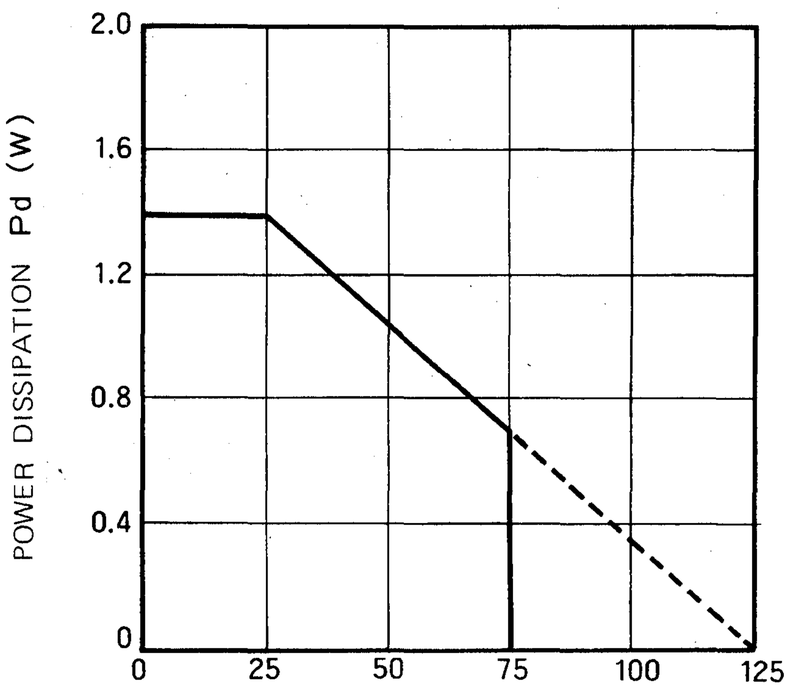
TEST METHODS

Symbol	Input signal	$V_{⑥}$(V)	$V_{⑲}$(V)	$V_{㉑}$(V)	SW1	SW2	SW3	Test point
I_{CC}	OFF	5.0	10.0		1	1	1	A
$V_{⑭}$								B
$V_{⑦}$								C
$G_{V(IF)}$	SG1	5.0	10.0	4.0	1	2	2	D
GR	SG2			10.0				
$V_{O(DET)}$	SG3	5.0	10.0	10.0	2	2	2	B
$THD_{(DET)}$								
$V_{O(SIF)}$	SG4	5.0	4.0		1	1	1	E
Δf	SG5	5.0	10.0	10.0	2	2	2	C
V_L	SG5	Variable	10.0	10.0	2	2	2	F
V_H								
$V_{④}$-L	OFF	5.0	10.0	10.0	1	1	2	G
$V_{④}$-H				4.0				
$V_{⑤}$-L				4.0				H
$V_{⑤}$-H				10.0				
Rin			6.0					
Cin								
DG	SG6			10.0				
DP								
f_C	SG7			10.0				

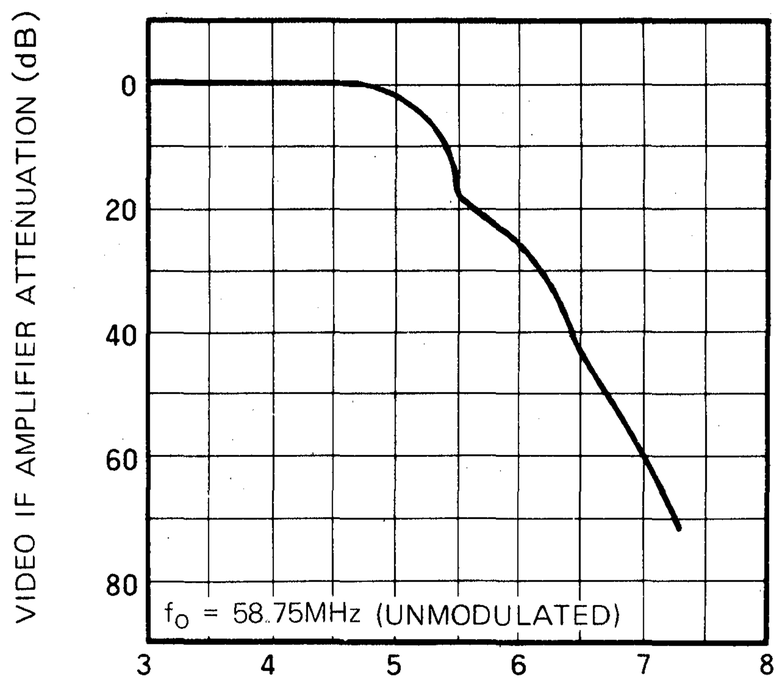
TV VIDEO IF SIGNAL PROCESSING CIRCUIT

TYPICAL CHARACTERISTICS (T_a = 25℃, V_{CC} = 12.0V, unless otherwise noted)

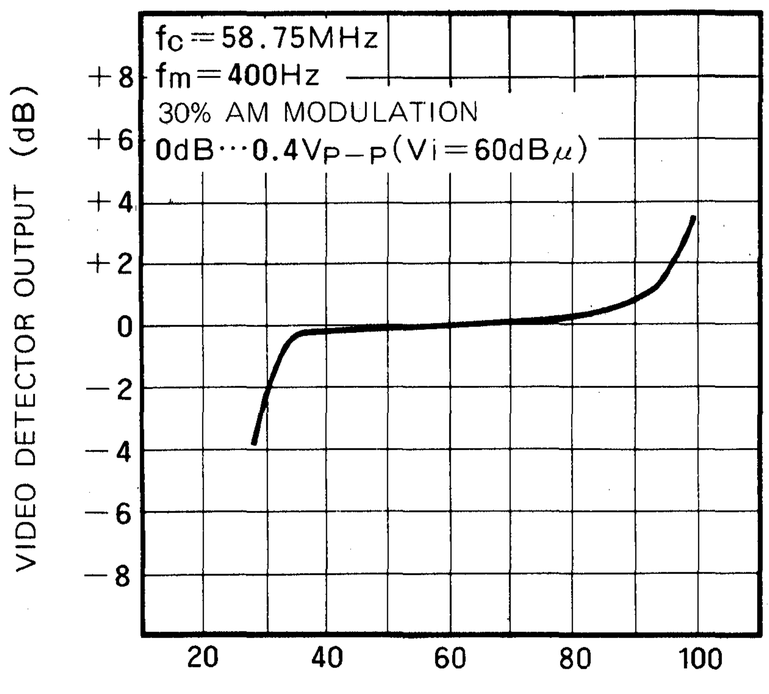
THERMAL DERATING (MAXIMUM RATING)



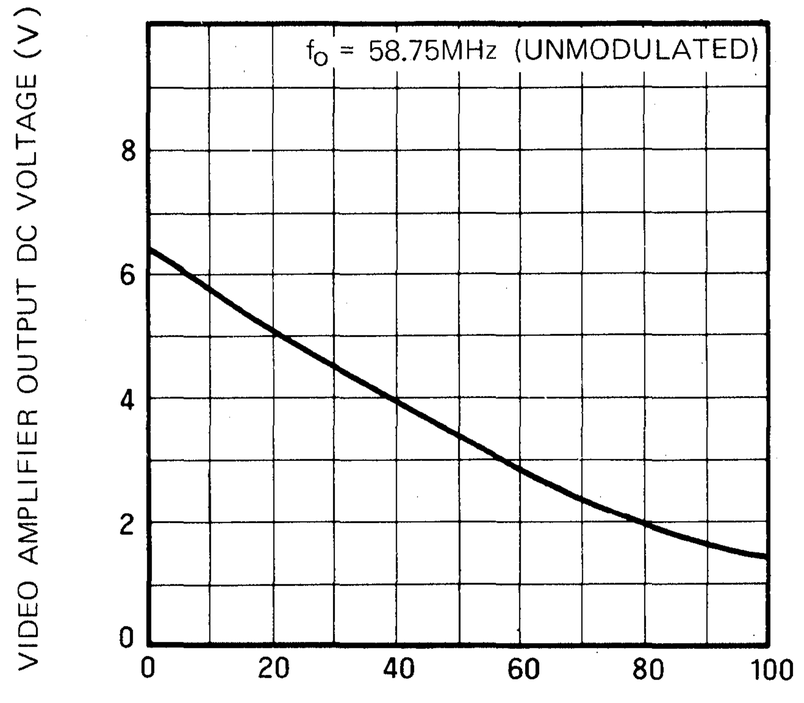
AGC CHARACTERISTICS



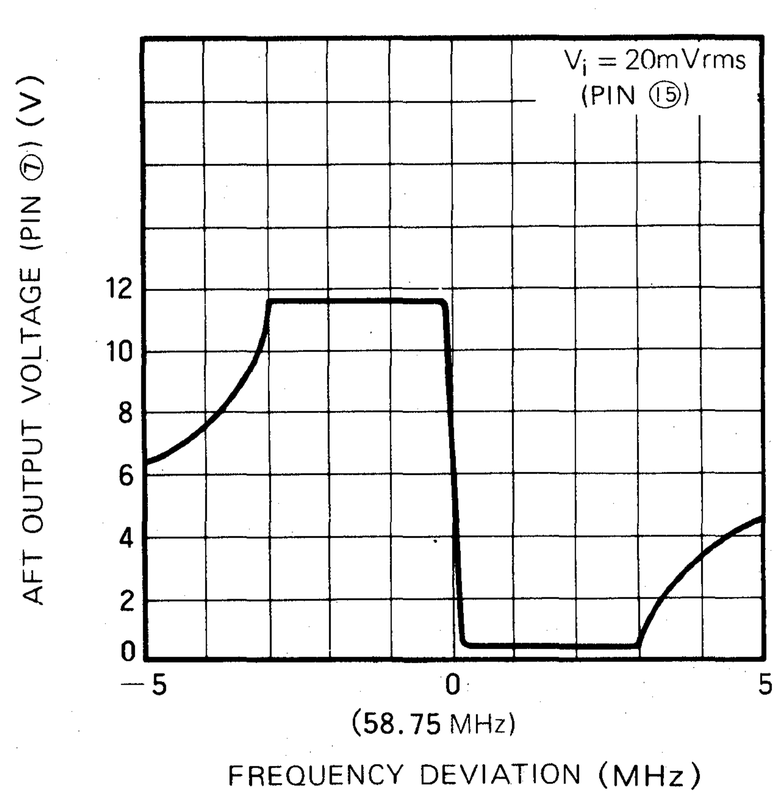
AGC CHARACTERISTICS



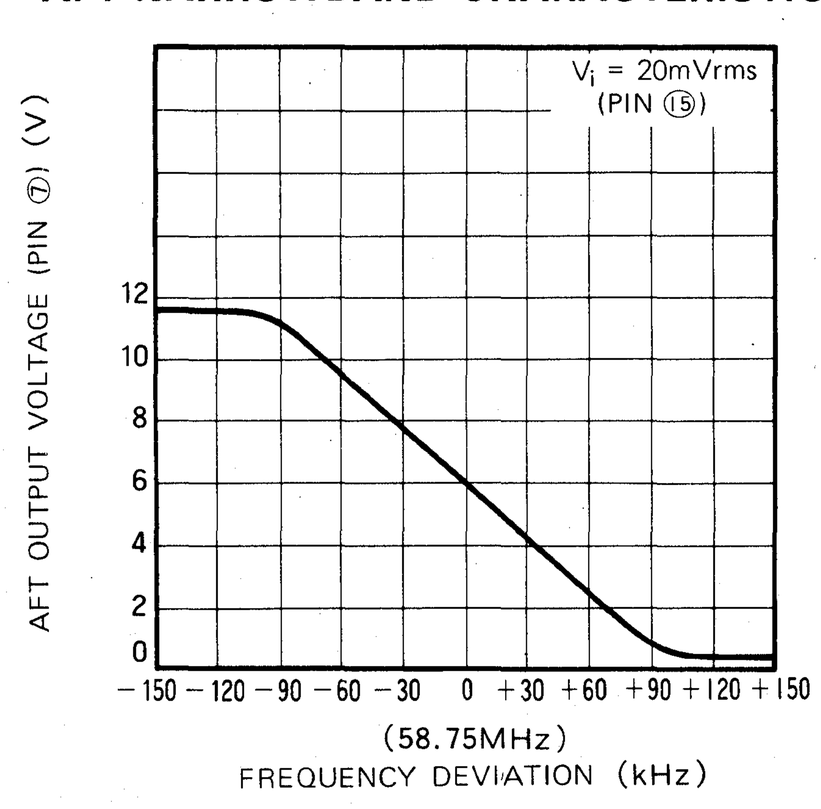
VIDEO DETECTOR LINEARITY



AFT WIDEBAND CHARACTERISTICS



AFT NARROWBAND CHARACTERISTICS



MITSUBISHI ELECTRIC