VTR VIDEO SIGNAL PROCESS

DESCRIPTION

The M51450P is a semiconductor integrated circuit designed for use in VTR video signal processing. It consists of a double limiter, FM demodulator, noise filter, Y/C mixer, sync clamp circuit, white clipper, squelch, playback video amplifier, video AGC, EE amplifier, recording video amplifier, E-E/V-V switch, and sync separation circuit.

FEATURES

- Packaged in a 30-pin DIL shrink package to minimize required PC board space
- Built-in double limiter
- To prevent misoperation of the TV set sync separation circuit, FM demodulator outputs below the sync level are shifted to white and clipped using a built-in circuit.
- Peak-type video AGC circuit
- Used in conjunction with the M51451P, all major VTR video signal processing functions may be performed.

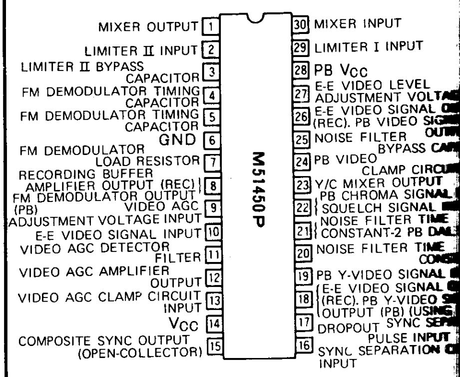
APPLICATIONS

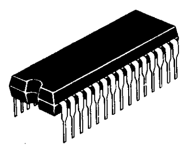
VTR Video signal processing

RECOMMENDED OPERATING CONDITIONS

Supply voltage range .... 8~10V
Rated supply voltage 9V

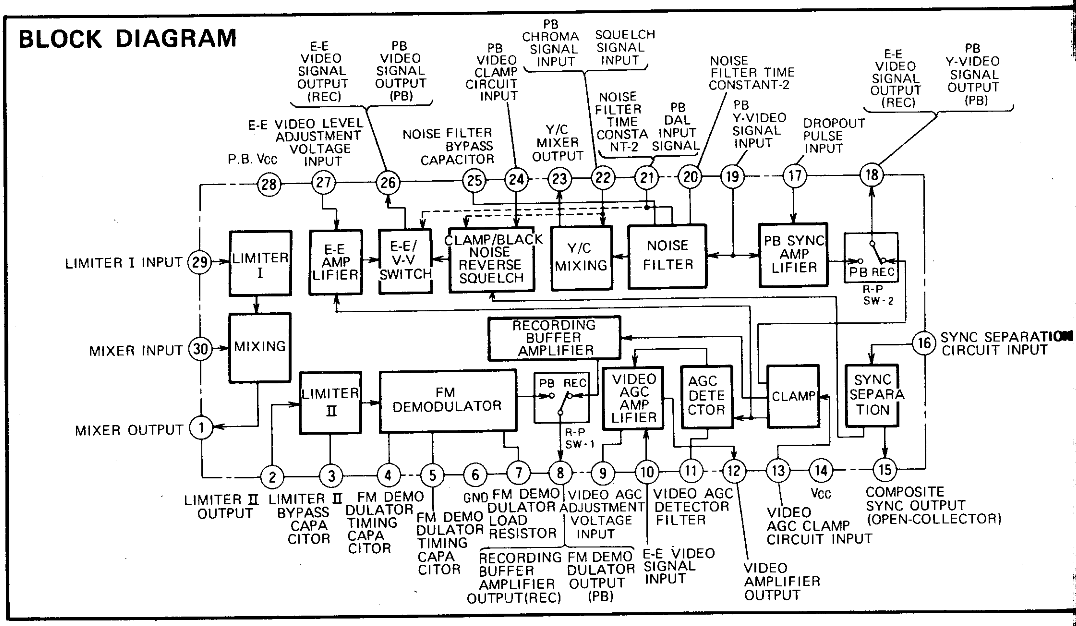
PIN CONFIGURATION (TOP VIEW)





30-pin molded plastic DIL (shrink)

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

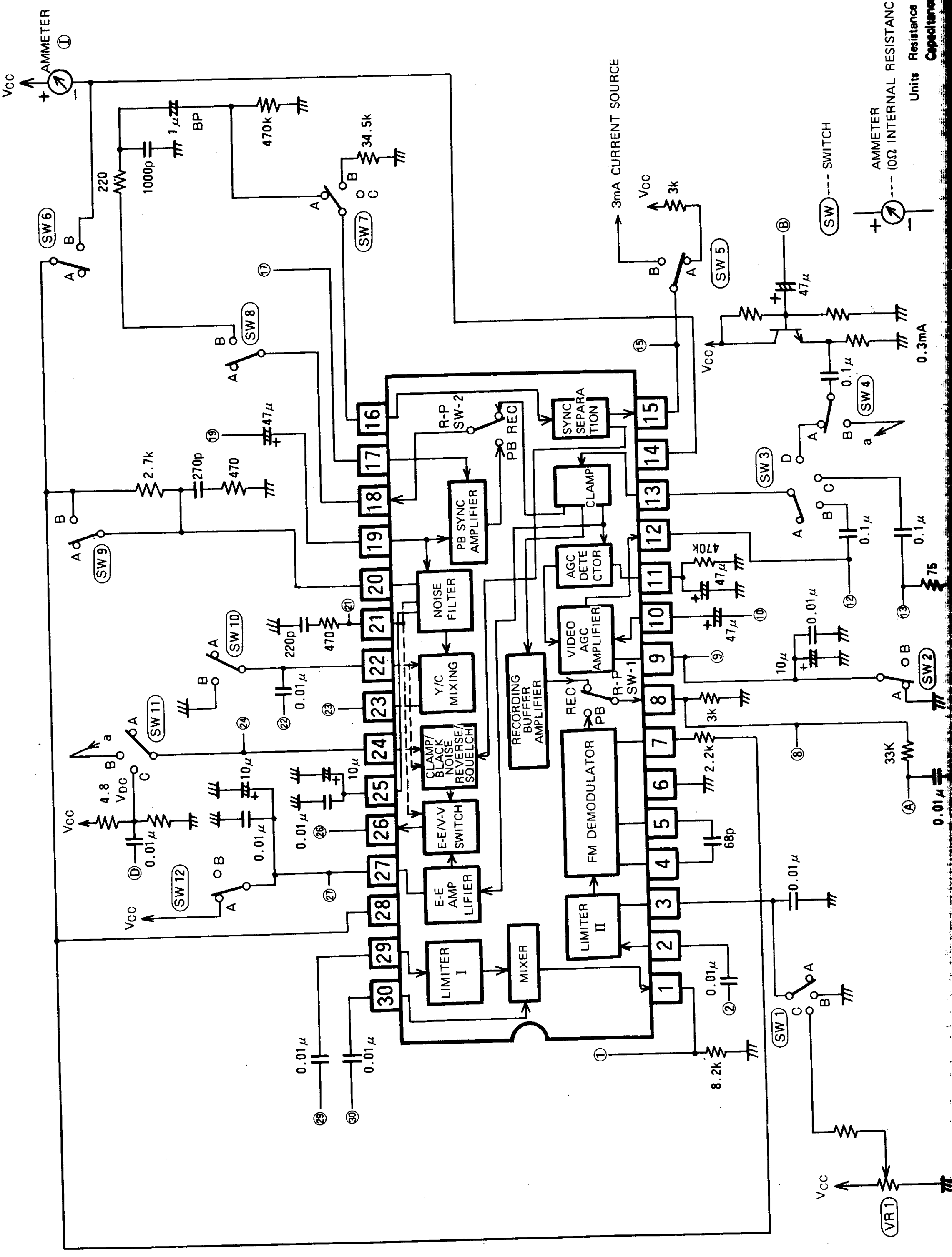
[illegible]SOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise noted)

Symbol	Parameter	conditions	Limits	Unit
[illegible]	Supply voltage		14	V
[illegible]	Power dissipation		1250	mW
[illegible]	Operating temperature		−20∼+75	°C
[illegible]	Storage temperature		−40∼+125	°C
[illegible]	Derating (Ta≧+25°C)		12.5	mW/°C

[illegible]LECTRICAL CHARACTERISTICS (Ta=25°C, V_{CC}=9.0V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits Min	Limits Typ	Limits Max	Unit
[illegible]	Recording circuit current		24	38	52	mA
[illegible]	Playback circuit current		44	66	88	mA
[illegible]	Limiter I output amplitude	f=4MHz, V_{in}=800mV_{P-P}	0.95	1.10	1.25	V_{P-P}
[illegible]	Limiter I gain	f=4MHz, V_{in}=20mV_{P-P}	14.5	17.5	20.5	dB
[illegible]	Limiter I output second harmonic distortion	f=4MHz, V_{in}=400mV_{P-P}	—	—	−36	dB
[illegible]	Limiter I mixing signal attenuation	f=1MHz, V_{in}=400mV_{P-P}	−3	—	—	dB
[illegible]	FM Demodulation sensitivity	f=3.4MHz, 4.4MHz, V_{in}=1V_{P-P}	125	150	175	mV/MHz
[illegible]	Carrier leakage	f=4MHz, V_{in}=1V_{P-P}	—	—	40	dB
[illegible]	Pin ② minimum input voltage	f=4MHz	—	—	0.01	V_{P-P}
[illegible]	Playback sync amplifier gain	f=500kHz, V_{in}=200mV_{P-P}	1.2	2.2	3.2	dB
[illegible]	DO Pulse high-level input voltage	High level minimum, V=2.4V	0	—	5	mV
[illegible]	DO Pulse low-level input voltage	Low level maximum, V=0.4V	—	—	−40	dB
[illegible]	Y Amplifier gain	f=500kHz, V_{in}=200mV_{P-P}	1.2	2.2	3.2	dB
[illegible]	Noise filter characteristic 1	f=250kHz, V_{in}=30mV_{P-P}	−4.5	−3.5	−2.5	dB
[illegible]	Noise filter characteristic 2	f=250kHz, V_{in}=300mV_{P-P}	−1.5	−1.0	−0.5	dB
[illegible]	Noise filter characteristic 3	f=2MHz, V_{in}=30mV_{P-P}	−9.6	−7.6	−5.6	dB
[illegible]	Noise filter characteristic 4	f=2MHz, V_{in}=300mV_{P-P}	−1.5	−1.0	−0.5	dB
[illegible]	C Amplifier gain	f=3.58MHz, V_{in}=100mV_{P-P}	4.2	5.2	6.2	dB
[illegible]	Playback video amplifier gain	f=500kHz, V_{in}=200mV_{P-P}	5.4	6.4	7.4	dB
[illegible]	Playback Video amplifier input/output linearity	V_A=200mV_{P-P}, 1.4V_{P-P}	−5	—	5	%
[illegible]	Pin ㉒ squelch low-level voltage		—	—	1.05	V
[illegible]	Dropout white clipping level		0.52	0.57	0.62	V
[illegible]	Sync low-level output voltage	I_{OL}=3mA	0	—	0.4	V
[illegible]	Sync output rising edge delay	V_B=280mV_{P-P}	0	0.6	1.0	μs
[illegible]	Sync output pulse width	V_B=280mV_{P-P}	4.8	5.2	5.6	μs
[illegible]	Sync separation operation 1	V_C=140mV_{P-P}	8.4	—	9.0	V_{P-P}
[illegible]	Sync separation operation 2	V_D=490mV_{P-P}	4.8	—	5.6	μs
[illegible]	Video AGC amplifier maximum gain	f=500kHz, V_{in}=200mV_{P-P}	3.6	4.6	5.6	dB
[illegible]	AGC Characteristic 1	V_D=300mV_{P-P}	0.37	0.47	0.57	V_{P-P}
[illegible]	AGC Characteristic 2	V_D=500mV_{P-P}	0.60	0.70	0.80	V_{P-P}
[illegible]	AGC Characteristic 3	V_D=2000mV_{P-P}	1.14	1.24	1.34	V_{P-P}
[illegible]	Recording buffer amplifier gain	f=500kHz, V_{in}=20mV_{P-P}	7.6	9.6	11.6	dB
[illegible]	E-E Amplifier maximum gain	f=500kHz, V_{in}=200mV_{P-P}	7.7	9.7	11.7	dB
[illegible]	Gain control characteristic 1	f=500kHz, V_{in}=200mV_{P-P}	−10	−6	−2	dB
[illegible]	Gain control characteristic 2	f=500kHz, V_{in}=200mV_{P-P}	—	—	−40	dB
[illegible]	E-E/V-V Switching operation 1	f=500kHz, V_{in}=200mV_{P-P}	—	—	−40	dB
[illegible]	E-E/V-V Switching operation 2	High level minimum, V=7.5V f=500kHz, V_{in}=50mV_{P-P}	—	—	−38	dB

TEST CIRCUIT



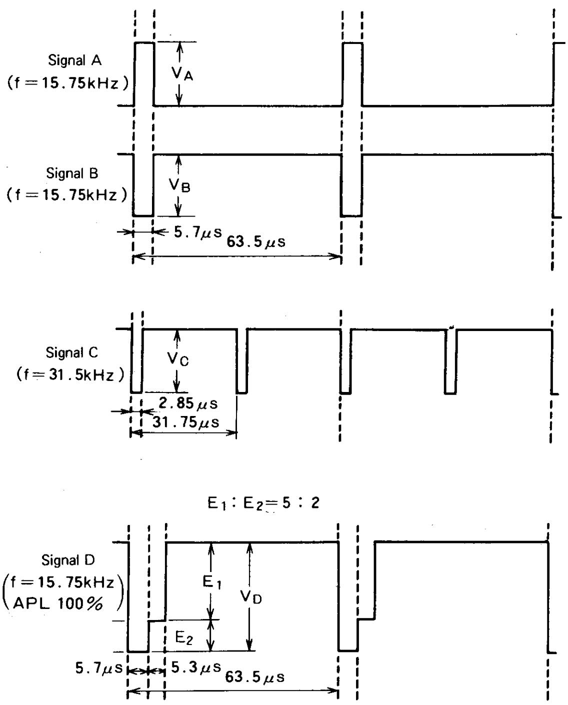
ST METHODS (Switch is A, unless otherwise noted)

Symbol	Test point	Switch conditions	Pin	Pin conditions	Test methods
…LV	①	1,6 : B	㉙	4MHz, 800mV$_{P-P}$ input	Measure the output amplitude at point ①
…LV	①	1,6 : B	㉙	4MHz, 20mV$_{P-P}$ input	Measure the output amplitude at point ①, and determine the gain with respect to the input signal
…D LIM	①	1,6 : B	㉙	4MHz, 400mV$_{P-P}$ input	Measure the second harmonic distortion at point ①
…ATT	①	1,6 : B	㉚	1MHz, 400mV$_{P-P}$ input	Measure the output amplitude at point ① and determine the attenuation with respect to the input signal.
…DEV	Ⓐ	6 : B	②	3.4MHz, 4.4MHz } 1V$_{P-P}$	Measure the DC voltage at point Ⓐ, with input signal of 3.4 MHz (V_1) and that of 4.4 MHz (V_2). $S_{DEM}=(V_2-V_1)/2$
…CL	⑧	1 : C 6 : B	②	4MHz, 1V$_{P-P}$	Adjust VR1 so that the carrier leakage at point ⑧ is minimum. Measure the carrier leakage after adjustment.
…Z T…	Ⓐ ②	6 : B	②	4MHz	Reduce the input signal level at point ② to a small value and measure the input amplitude at point ② just before the DC voltage at point Ⓐ changes.
…PS	⑱	1,6 : B	⑲	500kHz, 200mV$_{P-P}$	Measure the output amplitude at point ⑱ and determine the gain with respect to the input signal.
…IHC	⑱	1,6 : B	⑰	8V, 2.4V	Measure the DC voltage at point ⑱ with 8V at point ⑰ (V_3) and 2.4V at point ⑰ (V_4). $V_{IHD}=\|V_4-V_3\|$
…ILC	⑱	1,6 : B	⑲ ⑰	500kHz, 1.6V$_{P-P}$ 8V, 0.4V	Measure the output amplitude at point ⑱ and determine the output amplitude ratio between applying 8V and 0.4V at point ⑰.
…	㉓	1,6,9 : B	⑲	500kHz, 200mV$_{P-P}$	Measure the output amplitude at point ㉓ and determine the gain with respect to the input signal.
…F1	㉓	1,6 : B 9 : A•B	⑲	250kHz, 30mV$_{P-P}$	Measure the output amplitude at point ㉓, and determine the output amplitude ratio between SW9 poisitions A and B.
…F2	㉓	1,6 : B 9 : A•B	⑲	250kHz, 300mV$_{P-P}$	
…F3	㉓	1,6 : B 9 : A•B	⑲	2MHz, 30mV$_{P-P}$	
…F4	㉓	1,6 : B 9 : A•B	⑲	2MHz, 300mV$_{P-P}$	
…C	㉓	1,6 : B	㉒	3.58MHz, 100mV$_{P-P}$	Measure the output amplitude at point ㉓, and determine the gain with respect to the input signal.
…P	㉖	1,6 : B 11 : C	㉔	500kHz, 200mV$_{P-P}$	Measure the output amplitude at point ㉖, and determine the gain with respect to the input signal.
…LP	㉖	1,4,6,8, 11 : B	⑲ ㉔	Signal B : 200mV$_{P-P}$ Signal A : 200mV$_{P-P}$, 1.4V$_{P-P}$	Measure the output amplitude at point ㉖, with input signal A of 200 mV$_{P-P}$ (V_5), and that of 1.4V$_{P-P}$ (V_6). $L_{PV}=(V_6/7\times V_5)\times100$ (%)
…L SO	㉖	1,6 : B	㉔ Ⓒ	$V_{24SYNC}-1.4V$ Applied DC voltage	With switch SW7 in the B position, and point ㉔ open, let the DC voltages at point ㉔ and point ㉖ be V_{24sync} and V_{26sync}, respectively. With switch SW7 in the A position, apply $V_{24sync}-1.4V$ to point ㉔, and gradually decrease the voltage applied to point Ⓒ from 2V. Determine the voltage applied to point Ⓒ at the time that the DC voltage at point ㉖ just falls below V_{26sync}.
…CL	㉖	1,6 : B	㉔	$V_{24SYNC}+0.5V$	Measure the DC voltage at point ㉖ and let this be V_7. $WCL=V_7-V_{26sync}/G_{pv}$
…SL	⑮	5 : B 7 : C	⑮	3mA	Measure the DC voltage at point ⑮
…SC	Ⓑ ⑮	3 : D 8 : B	Ⓑ	Signal B : 280mV$_{P-P}$	Measure the pulse delay time from the point Ⓑ to the point ⑮
…S…	⑮	3 : D 8 : B	Ⓑ	Signal B : 280mV$_{P-P}$	Measure the pulse width at point ⑮
…H1	⑮	3 : D 8 : B	Ⓑ	Signal C : 140mV$_{P-P}$	Measure the output amplitude at point ⑮
…H2	⑮	3 : D 8 : B	Ⓑ	Signal D : 490mV$_{P-P}$	Measure the pulse width at point ⑮
…1	⑫		⑩	500kHz, 200mV$_{P-P}$	Measure the output amplitude at point ⑫, and determine the gain with respect to the input signal.
…AGC1 …AGC2 …AGC3	⑫	2,3 : B	⑨ ⑩	Applied DC voltage Signal D : 300mV$_{P-P}$ (V_{AGC1}) 500mV$_{P-P}$ (V_{AGC2}) 2000mV$_{P-P}$ (V_{AGC3})	With a signal D of 1V$_{P-P}$ input to point ⑩, adjust the DC voltage applied to point ⑨ so that the output amplitude at point ⑫ is 1V$_{P-P}$ (V_{P9}). Measure the output amplitude at point ⑫ with respect to the various input signals.
…EC	⑧	3 : C	⑬	500kHz, 200mV$_{P-P}$	Measure the output amplitude at point ⑧, and determine the gain with respect to the input signal.

TEST METHODS (Switch is A, unless otherwise noted)

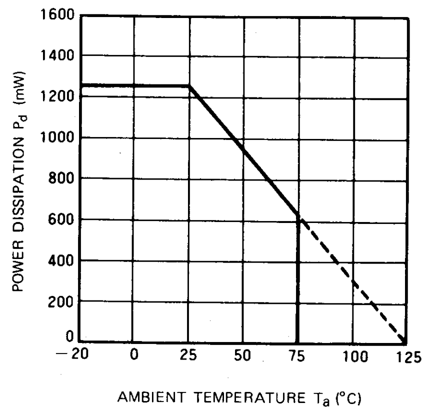
Symbol	Test point	Switch conditions	Pin	Pin conditions	Test method
G_{EE}	㉖	3 : C	⑬ ㉑	500kHz, 200mVp-p 9 V	Measure the output amplitude at point ㉖, and determine the gain with respect to the input signal.
G_{C1}	㉖	3 : C 12 : B	⑬ ㉗	500kHz, 200mVp-p 4.1V	Measure the output amplitude at point ㉖ and determine the gain with respect to the input signal.
G_{C2}	㉖	3 : C 12 : B	⑬ ㉗	500kHz, 200mVp-p 1.8V	Measure the output amplitude at point ㉖, and determine the gain with respect to the input signal.
EV_1	㉖	3 : C 7 : B	⑬ ㉑	500kHz, 500mVp-p DC Voltage applied	Measure the output amplitude at point ㉖, and determine the output amplitude ratio between the output when DC Voltage (point ㉑ open V + 1V) is applied to point ㉑ and that when 9V is applied to point ㉖
EV_2	㉖	1,6 : B 11 : C	Ⓓ ㉑	500kHz, 500mVp-p Open, 7.5V	Measure the output amplitude at point ㉖, and determine the output amplitude ratio of the output when point ㉑ is open to that when 7.5V is applied to point ㉑.
I_{REC}	Ⓘ		㉑	9 V	Measure the current at ammeter Ⓘ
I_{PB}	Ⓘ	6 : B			Measure the current at ammeter Ⓘ

Waveforms for Signal A, B, C, and D



TYPICAL CHARACTERISTICS

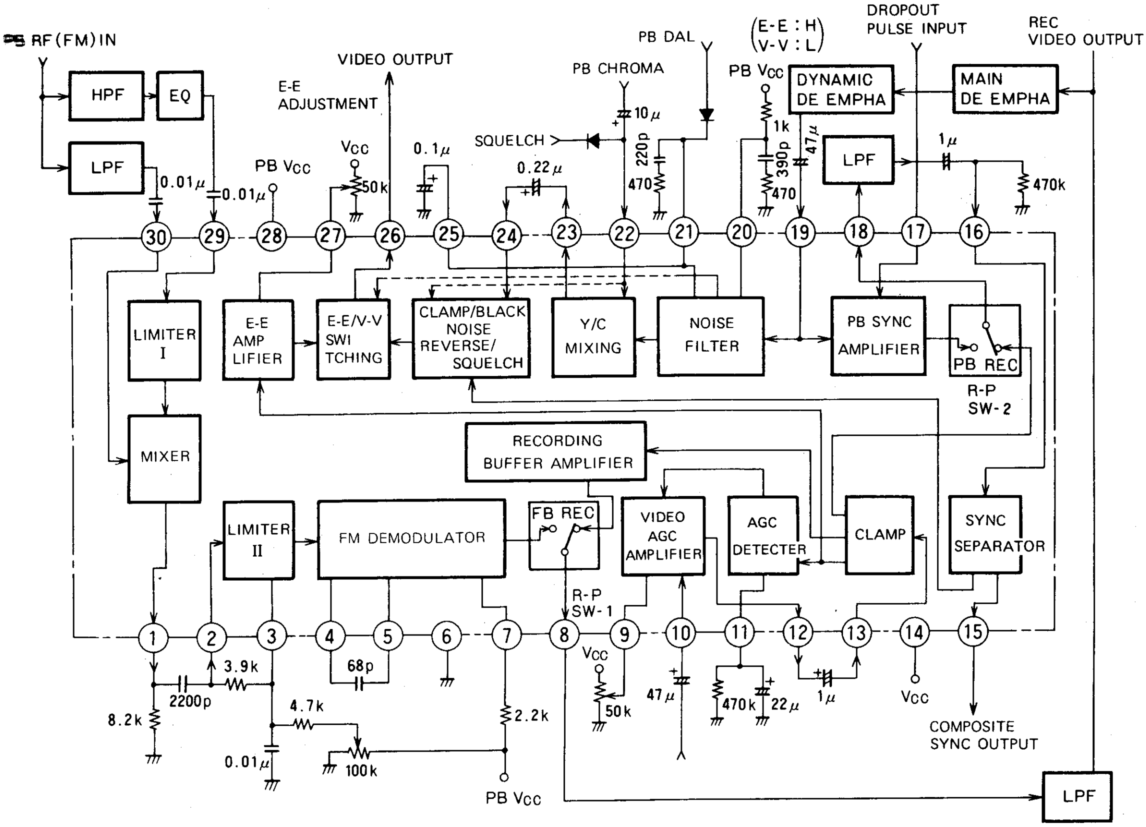
THERMAL DERATING (MAXIMUM RATINGS)



Standard Input Signal Levels

Pin	Signal	Standard l
②	RF(FM)	1.05Vp-p
⑩	E-E Video	1.0Vp-p
⑬	E-E Video	1.0Vp-p
⑲	PB Y-Video	0.74Vp-p
㉒	PB Chroma	0.32Vp-p
㉔	PB Video	0.96Vp-p
㉙	RF(FM)········· high frequency	0.4Vp-p
㉚	RF(FM)········· low frequency	0.4Vp-p

APPLICATION EXAMPLE



Units Resistance : Ω
Capacitance : F

M51451AP

VTR FM SIGNAL PROCESSOR

DESCRIPTION

The M51451AP is a semiconductor integrated circuit designed for use in VTR FM signal processing. It consists of preamplifiers (channel 1 and channel 2), FM AGC circuit, dropout compensator, sync clamp circuit, non-linear pre-emphasis circuit, main pre-emphasis circuit, white/dark clipping circuit, and FM modulator.

FEATURES

- Packaged in a 30-pin DIL shrink package to minimize required PC board space
- Uses a low-noise, high-gain preamplifier circuit
- Built-in non-linear pre-emphasis circuit
- Used in conjunction with the M51450P, all major VTR video signal processing functions may be performed.

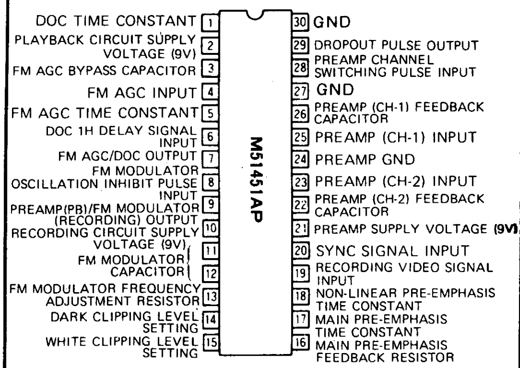
APPLICATION

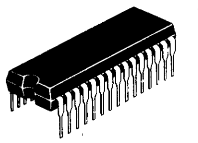
VTR FM signal processing

RECOMMENDED OPERATING CONDITIONS

Supply voltage range .... 8~10V
Rated supply voltage 9V

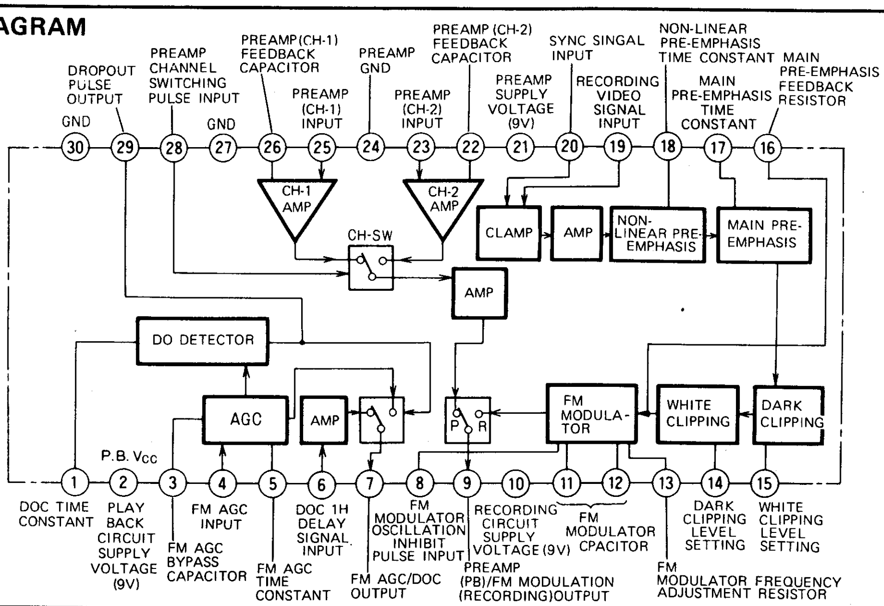
PIN CONFIGURATION (TOP VIEW)





30-pin molded plastic DIL (shrink)

BLOCK DIAGRAM



VTR FM SIGNAL PROCESSOR

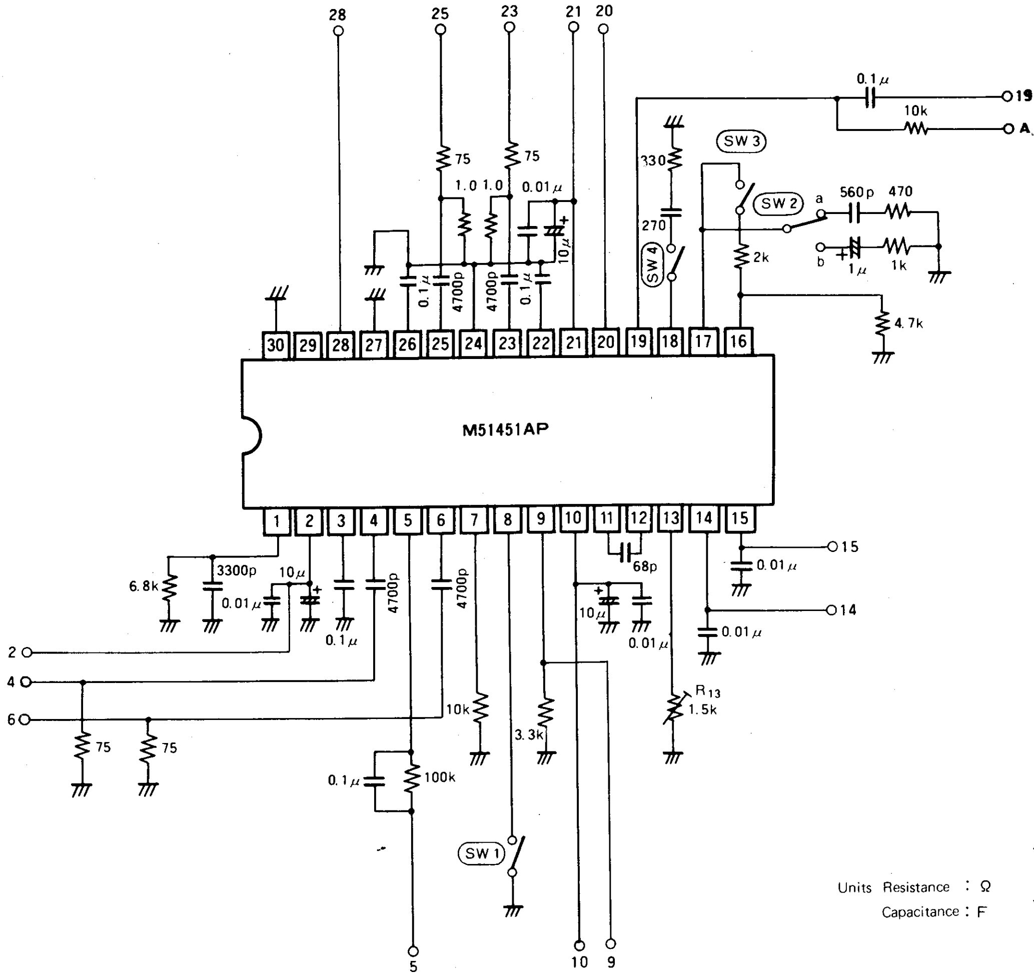
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
[illegible]	Supply voltage		14	V
[illegible]	Power dissipation		1250	mW
[illegible]	Operating temperature		−20 ~ +75	°C
[illegible]	Storage temperature		−40 ~ +125	°C
[illegible]	Derating (Ta ≧ +25°C)		12.5	mW/deg

ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{CC} = 9V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
[illegible]	Preamplifier circuit current		3.7	5.5	7.3	mA
[illegible]	Playback circuit current		14.8	19.8	24.8	mA
[illegible]	Recording circuit current		12.6	18.0	23.4	mA
[illegible]	Preamplifier (CH-1) voltage gain	f = 4MHz, Vin = 400μV_{P-P}	57.3	60.3	63.3	dB
[illegible]	Preamplifier (CH-2) voltage gain	f = 4MHz, Vin = 400μV_{P-P}	57.3	60.3	63.3	dB
[illegible]	Preamp channel-to-channel voltage gain difference	f = 4MHz, Vin = 400μV_{P-P}	−2	—	2	dB
[illegible]	Preamplifier (CH-1) noise voltage	f_N = 1MHz, Δf_N = 120kHz	—	—	2	μV
[illegible]	Preamplifier (CH-2) noise voltage	f_N = 1MHz, Δf_N = 120kHz	—	—	2	μV
[illegible]	AGC Amplifier voltage gain	f = 4MHz, Vin = 50mV_{P-P}	11.3	14.3	17.3	dB
[illegible]	AGC Output voltage	f = 4MHz, Vin = 400mV_{P-P}	300	600	900	mV_{P-P}
[illegible]	Dropout detection level	f = 4MHz, 0dB : V_O = 600mV_{P-P}	−25	−22	−19	dB
[illegible]	DOC Hysteresis	f = 4MHz, with the dropout detector output at 0 dB.	1.5	4.0	6.5	dB
[illegible]	Delayed signal amplifier voltage gain	f = 4MHz, Vin = 90mV_{P-P}	11.8	14.8	17.8	dB
[illegible]	Recording video signal input amplitude		210	280	350	mV
[illegible]	FM Modulator output voltage	f = 4MHz	0.8	1.0	1.2	V_{P-P}
[illegible]	Non-linear pre-emphasis characteristic 1	Ratio of outputs at 10 kHz and 500 kHz Vin = 30mV_{P-P}	4.5	6.0	7.5	dB
[illegible]	Non-linear pre-emphasis characteristic 2	Ratio of outputs at 10 kHz and 2 MHz Vin = 280mV_{P-P}	0	2.0	4.0	dB
[illegible]	Non-linear pre-emphasis characteristic 3	Ratio of outputs at 10 kHz and 2 MHz Vin = 90mV_{P-P}	2.5	4.5	6.5	dB
[illegible]	Non-linear pre-emphasis characteristic 4	Ratio of outputs at 10 kHz and 2 MHz Vin = 30mV_{P-P}	4.5	6.5	8.5	dB
[illegible]	Main pre-emphasis characteristic 1	Ratio of outputs at 10 kHz and 500 kHz Vin = 50mV_{P-P}	9.3	10.3	11.3	dB
[illegible]	Main pre-emphasis characteristic 2	Ratio of outputs at 10 kHz and 3 MHz Vin = 50mV_{P-P}	12.3	13.8	15.3	dB

TEST CIRCUIT



MITSUBISHI ELECTRIC

TEST METHODS

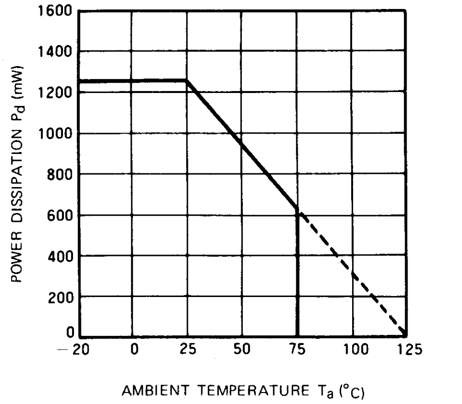
Symbol	Switch settings	Pin conditions 2	4	5	6	10	14	15	19	20	21	23	25	28	A	Test method
I_{PA}		9V		9V							9V					Measure current at pin ㉑
I_{PB}		9V		9V							9V					Measure current at pin ②
I_{REC}	1,3 : ON					9V	1V	8V		9V						Adjust the value of R_{13} so that the output at pin ⑨ is 3.4 MHz, measure the current at pin ⑩ and the voltage at Ⓐ (the DC voltage at Ⓐ is V_{19sync})
G_{PA1}		9V		9V							9V	0V	4MHz 30.4 mVP-P	0V		Measure the output signal amplitude at pin ⑨. Determine the gain with respect to the input signal (400 $\mu V_{P\text{-}P}$)
G_{PA2}		9V		9V							9V	4MHz 30.4 mVP-P	0V	9V		
GD_{PA}																$GD_{PA}=G_{PA2}-G_{PA1}$
V_{N-PA1}		9V		9V							9V	0V	0V	0V		Connect a filter with an equivalent noise bandwidth of 120 kHz to pin ⑨ and measure the rms noise voltage at the filter output.
V_{N-PA2}		9V		9V							9V	0V	0V	9V		
G_{AGC}		9V	4MHz 50mVP-P	9V							9V					Measure the output signal amplitude at pin ⑦ Determine the gain with respect to the input signal.
V_{O-AGC}		9V	4MHz 400mVP-P	9V							9V					Measure the output signal amplitude at pin ⑦.
DOC_{DET}		9V	4MHz	9V							9V					Decrease the input signal at pin ④ gradually from 400m$V_{P\text{-}P}$ and measure the output signal amplitude at pin ⑦ at the point at which pin ㉙ (open-collector SW output) turns on. Ratio of the reference output level of 600m$V_{P\text{-}P}$.
DOC_{HYS}		9V	4MHz	9V							9V					Increase the input signal level at pin ④ gradually from 0 and measure the output signal amplitude at pin ⑦ at the point at which pin ㉙ (open-collector SW output) turns off, determining the ratio of this level to the DOC_{det} amplitude.
G_{DL1}		9V	0V	9V	4MHz 90mVP-P						9V					Measure the output signal amplitude at pin ⑦ Determine the gain with respect to the input signal.
V_{O-VCO}	1,3 : ON					9V	1V	8V		0V					Applied DC Voltage	Gradually increase the applied DC voltage at Ⓐ from V_{19sync}. Measure the output signal amplitude when the output signal frequency at pin ⑨ is 4.0 MHz.
Δf_{REC}																$f_{SYNC}=3.4MHz$ $f_{WHITE}=4.4MHz$
G_{E1}	1 : OFF 2 : b 3,4 : ON					9V	1V	8V	10kHz 500kHz 30mVP-P	0V					V_{19SYNC} +0.14V	Measure the output signal amplitude at pin ⑬. Determine the output ratios for 500 kHz, 2 MHz, and 3 MHz, with respect to an input signal of 10 kHz.
G_{E2}						9V	1V	8V	10kHz 2MHz 280mVP-P	0V					V_{19SYNC} +0.14V	
G_{E3}						9V	1V	8V	10kHz 2MHz 90mVP-P	0V					V_{19SYNC} +0.14V	
G_{E4}						9V	1V	8V	10kHz 2MHz 30mVP-P	0V					V_{19SYNC} +0.14V	

TEST METHODS

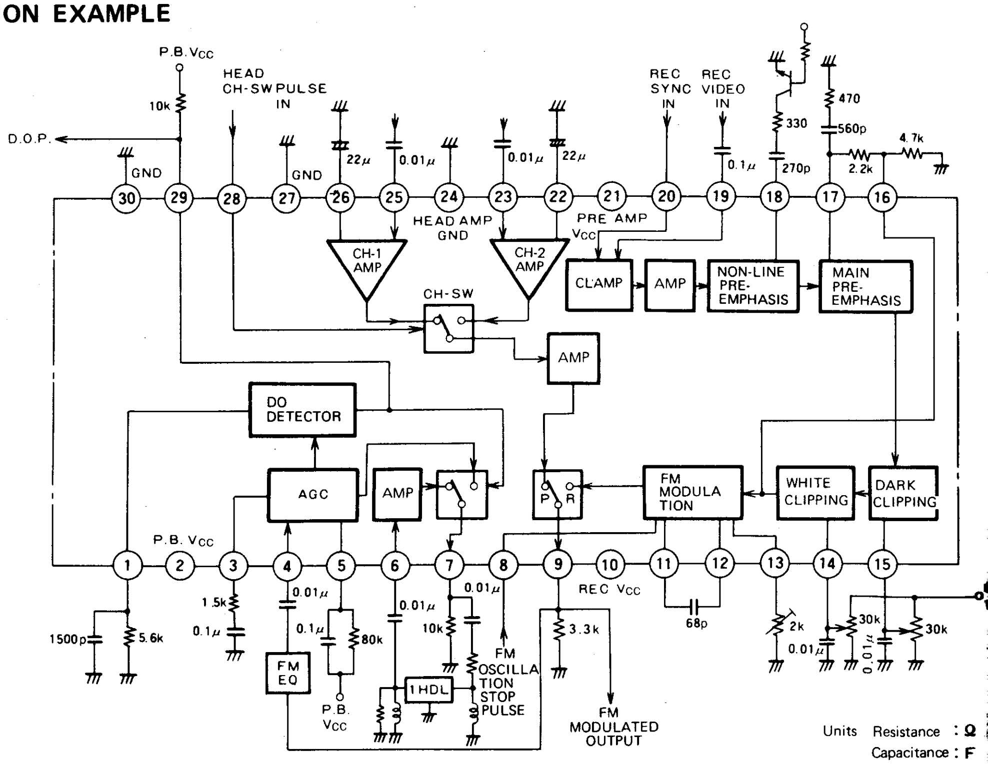
Symbol	Switch settings	Pin conditions														Test method
		2	4	5	6	10	14	15	19	20	21	23	25	28	A	
G_{MPE1}	1,4 : OFF 2 : a 3 : ON					9V	1V	8V	10kHz 500kHz 50mV$_{P-P}$	0V					V_{19SYNC} +0.14V	Measure the output signal amplitude at pin ⑬. Determine the output ratios for 500 kHz, 2 MHz, and 3 MHz, with respect to an input signal of 10 kHz.
G_{MPE2}						9V	1V	8V	10kHz 3MHz 50mV$_{P-P}$	0V					V_{19SYNC} +0.14V	

TYPICAL CHARACTERISTICS

THERMAL DERATING (MAXIMUM RATING)



APPLICATION EXAMPLE



Units Resistance : Ω
Capacitance : F

MITSUBISHI ELECTRIC

M51453P

VIDEO SIGNAL NOISE CANCELER

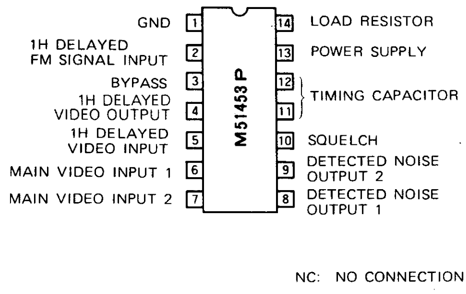
DESCRIPTION
The M51453P is a semiconductor integrated circuit designed to cancel out the noise in VTR video signals. It consists of a limiter, FM demodulator, comparator and clipper.

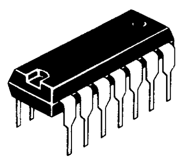
FEATURES
- Main video input pins with dual polarity
- Detected noise output provided with dual polarity
- Great improvement in S/N ratio (3dB typ)

APPLICATION
VTR video signal noise cancellation

RECOMMENDED OPERATING CONDITIONS
Supply voltage range .... 8~10V
Rated supply voltage 9V

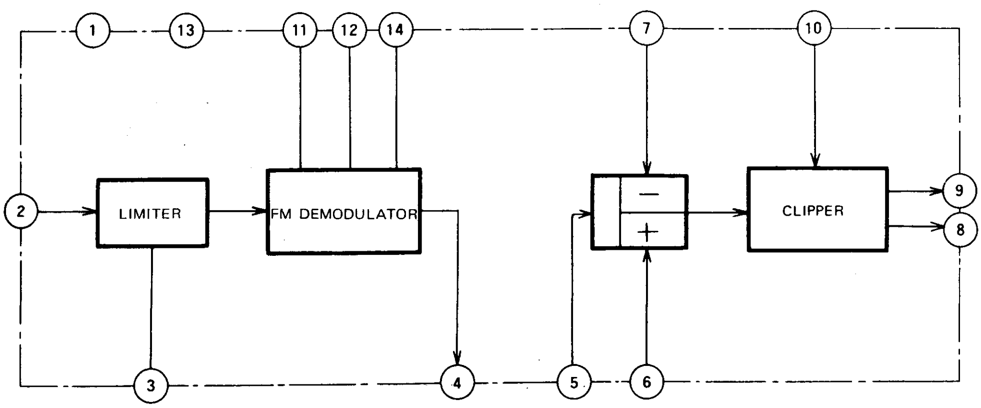
PIN CONFIGURATION (TOP VIEW)





14-pin molded plastic DIL

BLOCK DIAGRAM



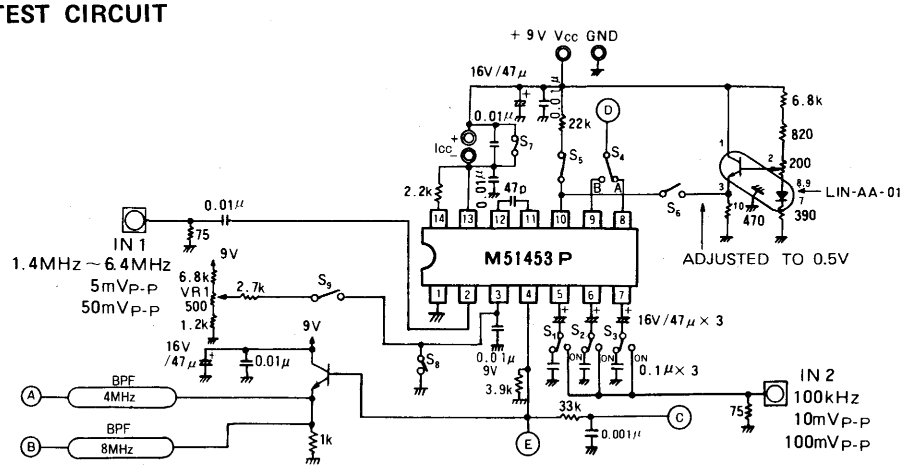
ABSOLUTE MAXIMUM RATINGS (T_a=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		14	V
P_d	Power dissipation		950	mW
T_{opg}	Ambient temperature		−20～+75	°C
T_{stg}	Storage temperature		−40～+125	°C
K_θ	Thermal derating ($T_a \geq +25$°C)		9.5	mW/°C

ELECTRICAL CHARACTERISTICS (T_a=25°C, V_{CC}=9V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
S_{DEM}	FM demodulation sensitivity	Pin ③ input level 100mV_{P-P} f=3.4MHz, 4.4MHz	95	115	135	mV/MHz
L_{DEM-1}	FM demodulation linearity 1	f=6.4MHz	−5	0	5	%
L_{DEM-2}	FM demodulation linearity 2	f=1.4MHz	−5	0	5	%
CL	Carrier leakage	f= 4 MHz			−40	dB
S_{RF}	RF sensitivity	Potential difference at Ⓒ point between pin ② input 100mV_{P-P} and 10mV_{P-P} (f=4MHz)	−5	0	5	mV
G_{V-1}	Gain 1	Pin ⑤ input 10mV_{P-P} (100kHz)	13	16	19	dB
G_{V-2}	Gain 2	Pin ⑥ input 10mV_{P-P} (100kHz)	13	16	19	dB
G_{V-3}	Gain 3	Pin ⑦ input 10mV_{P-P} (100kHz)	13	16	19	dB
R_{CLP}	Clipping capacity	Output ratio between pin ⑤ input 50mV_{P-P} and 100mV_{P-P} (100kHz)	75	85	95	%
G_{OFS-1}	Gain offset 1	100mV_{P-P} (100kHz) input simultaneously at pins ⑤ and ⑦			50	mV_{P-P}
G_{OFS-2}	Gain offset 2	100mV_{P-P} (100kHz) input simultaneously at pin ⑥ and ⑦			50	mV_{P-P}
SQ	Squelch capacity	Pin ⑤ input 100mV_{P-P} (100kHz), +0.5V at pin ⑩			10	mV_{P-P}
G_{F-1}	Frequency response 1	Output ratio between pin ⑤ input 10mV_{P-P}, 100kHz and 6MHz	−2		0	dB
G_{F-2}	Frequency response 2	Output ratio between pin ⑥ input 10mV_{P-P}, 100kHz and 6MHz	−2		0	dB
G_{G-3}	Frequency response 3	Output ratio between pin ⑦ input 10mV_{P-P}, 100kHz and 6MHz	−2		0	dB
I_{CC-1}	Supply current 1	Pin ⑩ open	9.3	12.5	15.6	mA
I_{CC-2}	Supply current 2		10.8	14.4	18	mA

TEST CIRCUIT



Units Resistance : Ω
Capacitance : F

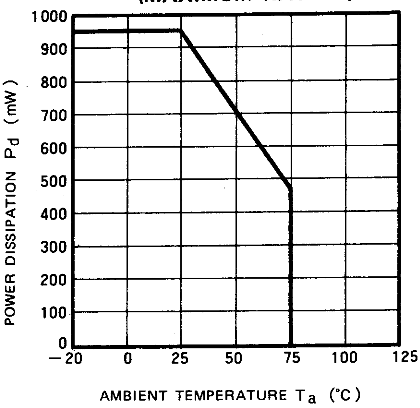
MITSUBISHI ELECTRIC

TEST METHODS (V_{CC} = 9V, T_a = 25°C, unless otherwise noted)

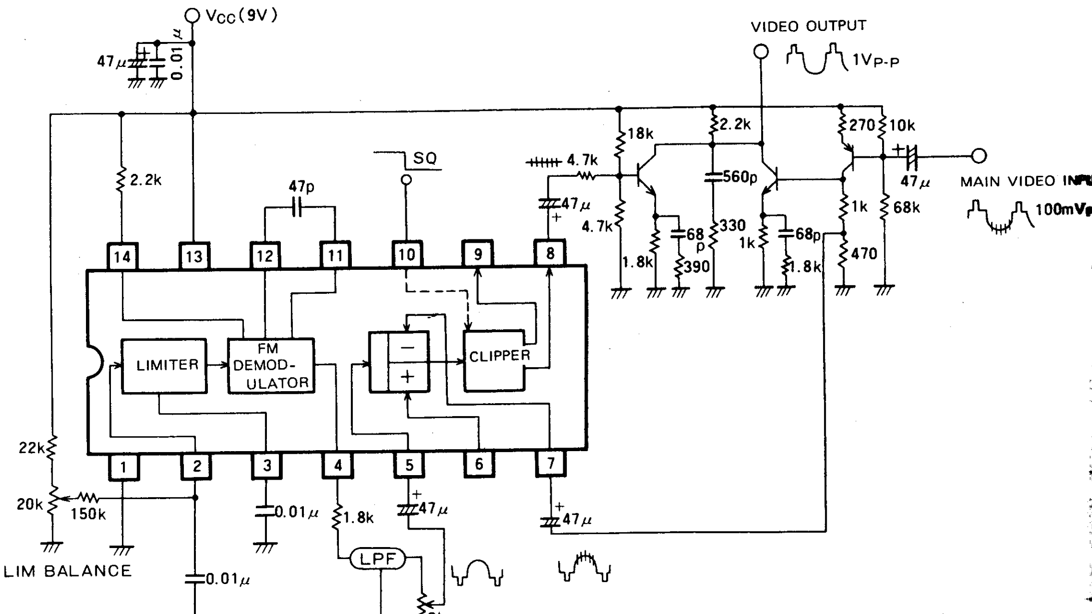
Symbol	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	Method
S_{DEM}	OFF	OFF	OFF	—	ON	OFF	ON	OFF	OFF	If pin ② 3.4MHz, 4.4MHz, 100mV_{P-P} input, point (C) output voltages are made V_1 and V_2, respectively: $S_{DEM}=(V_2-V_1)\times 1000/2$ (mV/MHz)
L_{DEM-1}	OFF	OFF	OFF	—	ON	OFF	ON	OFF	OFF	If pin ② 6.4MHz, 100V_{P-P} input, point (C) output voltage is made V_3: $L_{DEM-1}=\left\{\frac{V_3-V_2}{2(V_2-V_1)}-1\right\}\times 100$ (%)
L_{DEM-2}	OFF	OFF	OFF	—	ON	OFF	ON	OFF	OFF	If pin ② 1.4MHz, 100mV_{P-P} input, point (C) output voltage is made V_4: $L_{DEM-2}=\left\{\frac{V_1-V_4}{2(V_2-V_1)}-1\right\}\times 100$ (%)
[illegible]	OFF	OFF	OFF	—	ON	OFF	ON	OFF	ON	Pin ② 4 MHz, 100mV_{P-P} (less than −50dB second harmonic level) input, point (E) of pin ④ observed on spectrum analyzer, VR1 adjusted for minimum 4MHz component level, 8MHz : 4MHz component ratio read in decibels
S_{RF}	OFF	OFF	OFF	—	ON	OFF	ON	OFF	OFF	If pin ② 4MHz, 100mV_{P-P}, 10mV_{P-P} input, point (C) output voltages are made V_7 and V_8, respectively: $S_{RF}=(V_7-V_8)\times 1000$ (mV)
G_{V-1}	ON	OFF	OFF	A / B	ON	OFF	ON	ON	OFF	If pin ⑤ 100kHz, 10mV_{P-P} input, point (D) signal voltage is made V_2(mV_{P-P}): $G_{V-1}=20\log_{10}\frac{V_1}{10}$ (dB)
G_{V-2}	OFF	ON	OFF	A / B	ON	OFF	ON	ON	OFF	If pin ⑥ 100kHz, 10mV_{P-P} input, point (D) signal voltage is made V_2(mV_{P-P}): $G_{V-2}=20\log_{10}\frac{V_2}{10}$ (dB)
G_{V-3}	OFF	OFF	ON	A / B	ON	OFF	ON	ON	OFF	If pin ⑦ 100kHz, 10mV_{P-P} input, point (D) signal voltage is made V_3(mV_{P-P}): $G_{V-3}=20\log_{10}\frac{V_3}{10}$ (dB)
R_{CLP}	ON	OFF	OFF	A / B	ON	OFF	ON	ON	OFF	If pin ⑤ 100kHz, 50mV_{P-P}, 100mV_{P-P} input, point (D) output voltages are made V_4 and V_5, respectively: $R_{CLP}=\frac{V_4}{V_5}\times 100$ (%)
[illegible]	ON	OFF	ON	A / B	ON	OFF	ON	ON	OFF	Simultaneous pin ⑤ and pin ⑦ 100kHz, 100mV_{P-P} input, point (D) output voltage measured
[illegible]	OFF	ON	ON	A / B	ON	OFF	ON	ON	OFF	Simultaneous pin ⑥ and pin ⑦ 100kHz, 100mV_{P-P} input, point (D) output voltage measured
[illegible]	ON	OFF	OFF	A / B	OFF	ON	ON	ON	OFF	If pin ⑤ 100kHz, 100mV_{P-P} input, DC+0.5V applied to pin ⑩, point (D) output voltage measured
G_{F-1}	ON	OFF	OFF	A / B	ON	OFF	ON	ON	OFF	If pin ⑤ 100kHz, 6MHz, 10mV_{P-P} input, point (D) output voltages are made V_6 and V_7, respectively: $G_{F-1}=20\log_{10}\frac{V_7}{V_6}$ (dB)
G_{F-2}	OFF	ON	OFF	A / B	ON	OFF	ON	ON	OFF	If pin ⑥ 100kHz, 6MHz, 10mV_{P-P} input, point (D) output voltages are made V_8 and V_9, respectively: $G_{F-2}=20\log_{11}\frac{V_9}{V_8}$ (dB)
G_{F-3}	OFF	OFF	ON	A / B	ON	OFF	ON	ON	OFF	If pin ⑦ 100kHz, 6MHz, 10mV_{P-P} input, point (D) output voltages are made V_{10} and V_{11} respectively: $G_{F-3}=20\log_{10}\frac{V_{11}}{V_{10}}$ (dB)
[illegible]	OFF	OFF	OFF	—	OFF	OFF	OFF	OFF	OFF	Pin ⑩ open, pin ⑬ current measured
[illegible]	OFF	OFF	OFF	—	ON	OFF	OFF	OFF	OFF	22kΩ connected across pin ⑩ and V_{CC}

TYPICAL CHARACTERISTICS (Ta = 25°C, unless otherwise noted)

THERMAL DERATING (MAXIMUM RATING)



APPLICATION EXAMPLE



Units Resistance: Ω
Capacitance: F

M51454L

VIDEO SIGNAL NOISE CANCELER

ESCRIPTION

M51454L is a semiconductor integrated circuit designed cancel out the noise in VTR video signals. It consists of a ter, FM demodulator, comparator, clipper and adder.

ATURES

- Housed in a 16-pin ZIL package and so takes up very little room on the pcb
- Limiter balance adjustments not required
- Minimal number of external parts
- Great improvement in S/N ratio (3dB typ)

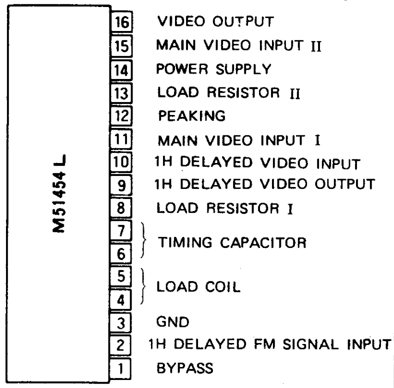
PLICATION

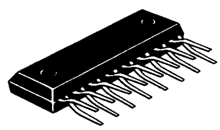
R video signal noise cancellation

COMMENDED OPERATING CONDITIONS

ply voltage range . . . . 8~10V
ed supply voltage 9V

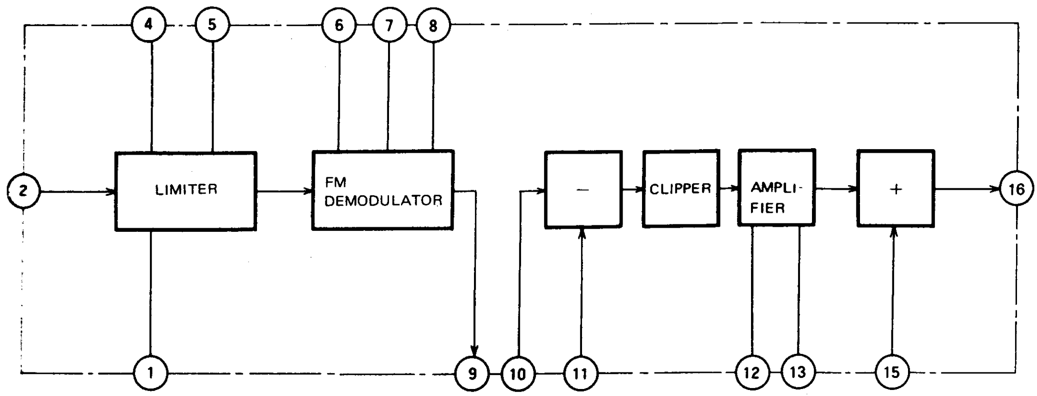
PIN CONFIGURATION (TOP VIEW)





16-pin molded plastic ZIL

LOCK DIAGRAM



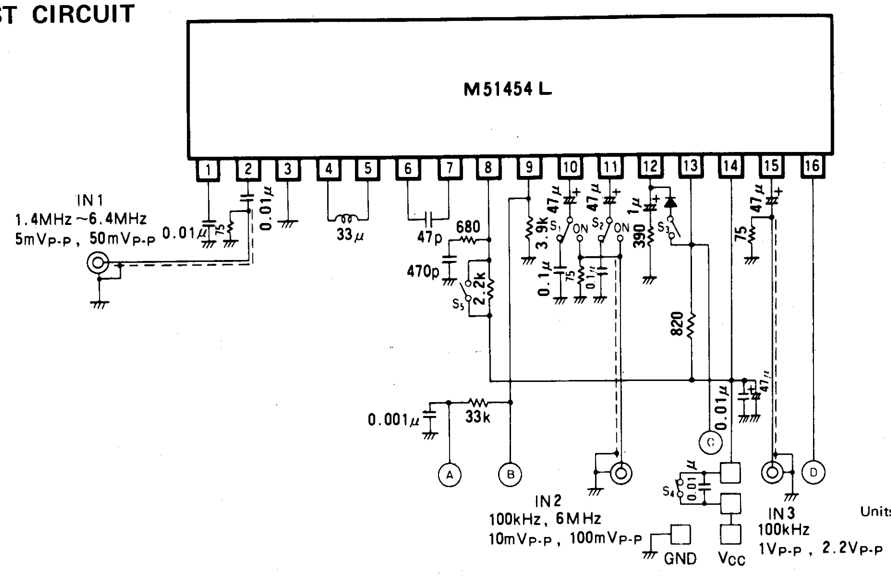
ABSOLUTE MAXIMUM RATINGS (T_a=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Un
V_{CC}	Supply voltage		14	V
P_d	Power dissipation		800	mW
Topg	Ambient temperature		−20～+75	°C
Tstg	Storage temperature		−40～+125	°C
K_θ	Thermal derating ($T_a \geqq +25°C$)		8	mW/

ELECTRICAL CHARACTERISTICS

記号	Parameter	Test conditions	Limits			Un
			Min	Typ	Max	
S_{DEM}	FM demodulation sensitivity	f=3.4MHz, 4.4MHz	95	115	135	mV/M
L_{DEM-1}	FM demodulation linearity 1	f=6.4MHz	−5	0	5	%
L_{DEM-2}	FM demodulation linearity 2	f=1.4MHz	−5	0	5	%
CL	Carrier leakage	f=4MHz		−34	−26	dB
S_{RF}	RF sensitivity	f=4MHz	−5	0	5	mV
G_{V-1}	Gain 1	Pin ⑩ input 10mVP-P (100kHz)	12.5	15.5	18.5	dB
G_{V-2}	Gain 2	Pin ⑪ input 10mVP-P (100kHz)	12.5	15.5	18.5	dB
R_{CLP}	Clipping capacity	Output ratio between pin ⑩ input 50mVP-P and 100mVP-P (100kHz)	75	85	95	%
G_{OFS}	Gain offset	100mVP-P (100kHz) input simultaneously at pins ⑩ and ⑪			20	mVp
G_{F-1}	Frequency response 1	Output ratio between pin ⑩ input 10mVP-P, 100kHz and 6MHz	−3	0	0	dB
G_{F-2}	Frequency response 2	Output ratio between pin ⑪ input 10mVP-P, 100kHz and 6MHz	−3	0	0	dB
SQ	Squelch function	Pin ⑩ input 100mVP-P (100kHz)			10	mVp
G_{V-3}	Gain 3	Pin ⑮ input 1VP-P (100kHz)	−1	0	1	dB
DR	Dynamic range	Pin ⑮ input 2.2VP-P (100kHz)	−5	0	5	%
I_{CC}	Supply current	Including current (1.9mA) of pin ⑨ external resistor (3.9kΩ)	12.5	16.7	20.1	mA

TEST CIRCUIT



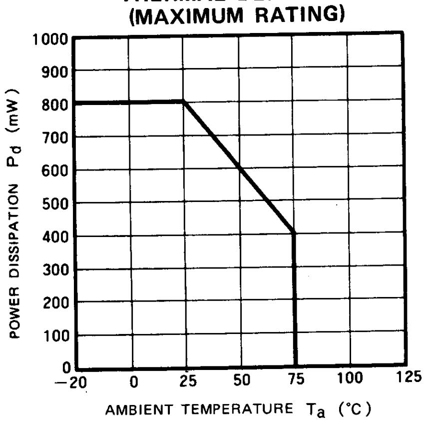
Units Resistance: Ω
Capacitance: F
Inductance: H

EST METHODS (T_a=25°C, V_{CC}=9V, unless otherwise noted)

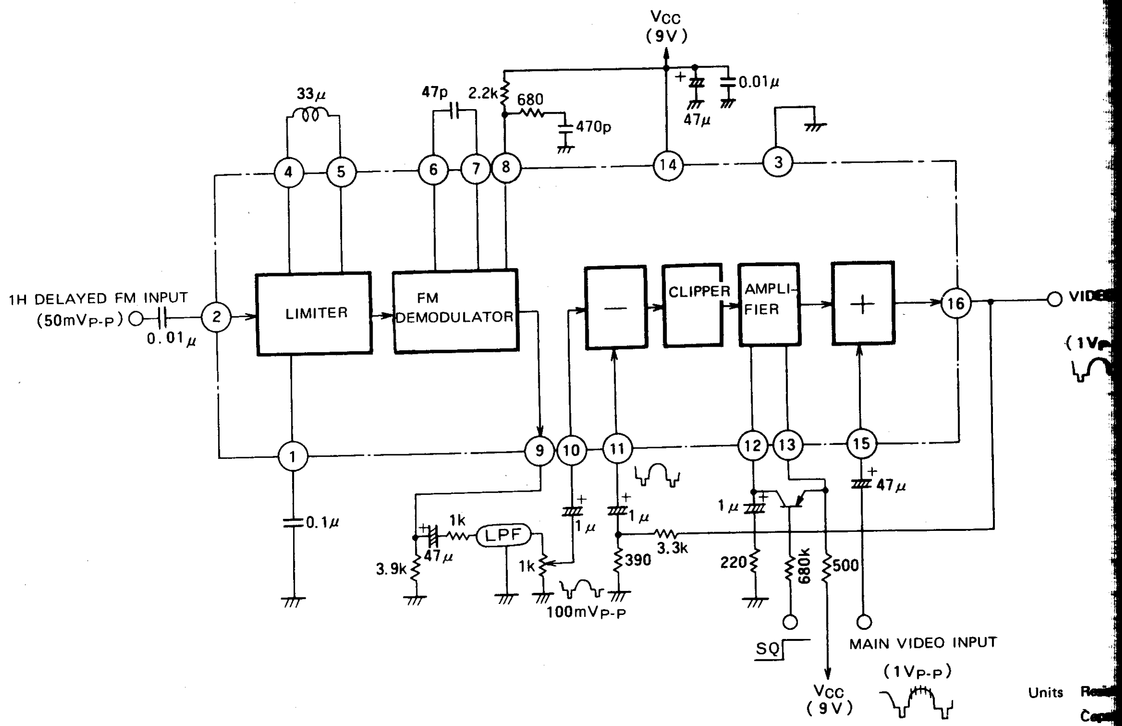
Symbol	S_1	S_2	S_3	S_4	S_5	Method
S_{DEM}	OFF	OFF	ON	ON	OFF	If pin ② 3.4MHz, 4.4MHz, 50mVP-P input, point Ⓐ output voltages are made V_1 and V_2, respectively: $S_{DEM}=(V_2-V_1)\times1000/2$ (mV/MHz)
L_{DEM-1}	OFF	OFF	ON	ON	OFF	If pin ② 6.4MHz, 50mVP-P input, point Ⓐ output voltage is made V_3: $L_{DEM\text{-}1}=\left\{\frac{V_3-V_2}{2(V_2-V_1)}-1\right\}\times100$ (%)
L_{DEM-2}	OFF	OFF	ON	ON	OFF	If pin ② 1.4MHz, 50mVP-P input, point Ⓐ output voltage is made V_4: $L_{DEM\text{-}2}=\left\{\frac{V_1-V_4}{2(V_2-V_1)}-1\right\}\times100$ (%)
[illegible]	OFF	OFF	ON	ON	OFF	Pin ② 4MHz, 50mVP-P (less than −50dB second harmonic level) input, point Ⓑ observed on spectrum analyzer, 8MHz : 4MHz ratio read in decibels
[illegible]	OFF	OFF	ON	ON	OFF	If pin ② 4MHz, 10mVP-P, 100mVP-P input, point Ⓐ output voltages are made V_5 and V_6, respectively: $S_{RF}=(V_5-V_6)\times1000$ (mV)
[illegible]	ON	OFF	OFF	ON	ON	If pin ⑩ 100kHz, 10mVP-P input, point Ⓓ signal voltage is made V_1: $G_{V-1}=20\log_{10}\frac{V_1}{10}$ (dB)
[illegible]	OFF	ON	OFF	ON	ON	If pin ⑪ 100kHz, 10mVP-P input, point Ⓓ signal voltage is made V_2: $G_{V\text{-}2}=20\log_{10}\frac{V_2}{10}$ (dB)
[illegible]	ON	OFF	OFF	ON	ON	If pin ⑩ 100kHz, 50mVP-P, 100mVP-P input, point Ⓓ signal voltages are made V_3 and V_4, respectively: $R_{CLP}=\frac{V_3}{V_4}\times100$ (%)
[illegible]	ON	ON	OFF	ON	ON	Pin ⑩, pin ⑪ 100kHz, 100mVP-P input, point Ⓓ output signal voltage
[illegible]	ON	OFF	OFF	ON	ON	If pin ⑩ 100kHz, 6MHz, 10mVP-P input, point Ⓓ output voltages are made V_5 and V_6, respectively: $G_{F\text{-}1}=20\log_{10}\frac{V_6}{V_5}$ (dB)
[illegible]	OFF	ON	OFF	ON	ON	If pin ⑪ 100kHz, 6MHz, 10mVP-P input, point Ⓓ output voltages are made V_7 and V_8, respectively: $G_{F\text{-}2}=20\log_{10}\frac{V_8}{V_7}$ (dB)
[illegible]	ON	OFF	ON	ON	ON	Pin ⑩ 100kHz, 100mVP-P input, point Ⓓ output voltage
[illegible]	OFF	OFF	ON	ON	ON	If pin ⑮ 100kHz, 1VP-P input, point Ⓓ output voltage is made V_1: $G_{V\text{-}3}=20\log_{10}V_1$
[illegible]	OFF	OFF	ON	ON	ON	If pin ⑮ 100kHz, 2.2VP-P input, point Ⓓ output voltage is made V_2: $DR=\left(1-\frac{V_2}{2.2V_1}\right)\times100$ (%)
[illegible]	OFF	OFF	OFF	OFF	OFF	

CAL CHARACTERISTICS (T_a=25°C, V_{CC}=14V, unless otherwise noted)

THERMAL DERATING (MAXIMUM RATING)



APPLICATION EXAMPLE



MITSUBISHI
ELECTRIC