M51551

DUAL 2-MODE ELECTRONIC SWITCH

DESCRIPTION

The M51551P/M51551FP is an integrated circuit consisting of dual channels two-mode electronic switch. It can select the both channel input signal at the same time by means of forcing DC voltage at control terminal. And it consists of LED driver for displaying the selected input mode. M51551P is housed in 14-pin plastic molded DIL package. M51551FP is housed in 14-pin plastic molded FLAT package.

FEATURES

- Dual channel two-mode electronic switch
- Mode changeable by means of forcing DC voltage
- Built-in output circuit for mode display
- Low distortion transmission characteristics because of bipolar process ····· 0.006% (typ.)
- Single power supply and dual power supply are available for power supply
- Positive logic control

APPLICATION

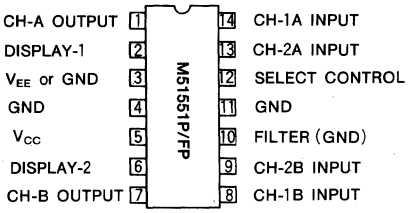
Signal switch, stereo radio cassette recorder, radio receiver

RECOMMENDED OPERATING CONDITIONS

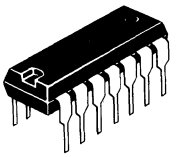
(T_a=25℃)

Dual power supply
Operating supply voltage ····· ±6~±10V
Rated supply voltage ····· ±8V
Single power supply
Operating supply voltage ····· 6~20V
Rated supply voltage ····· 15V

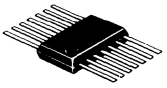
PIN CONFIGURATION (TOP VIEW)



Outline 14P4 M51551P
Outline 14P2 M51551FP

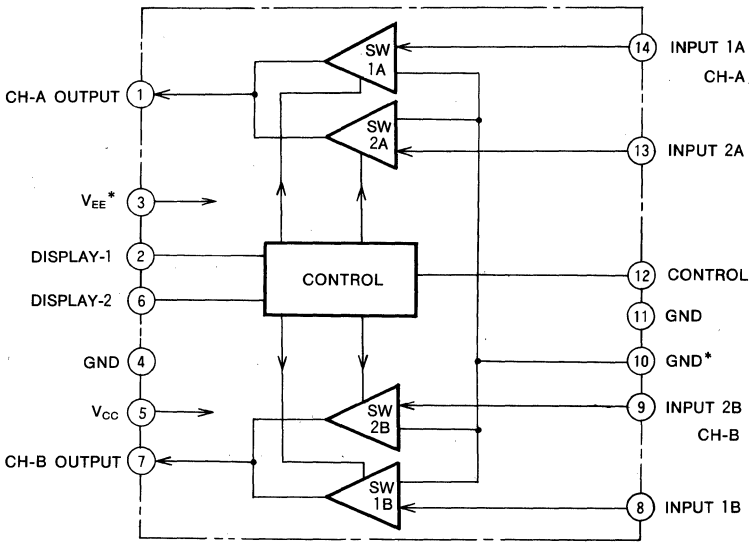


14-pin molded plastic DIL



14-pin molded plastic FLAT

BLOCK DIAGRAM



* : Terminal meaning

	Dual power supply	Single power supply
pin③	V_{EE}	GND
pin⑩	GND	Filter

MITSUBISHI ELECTRIC

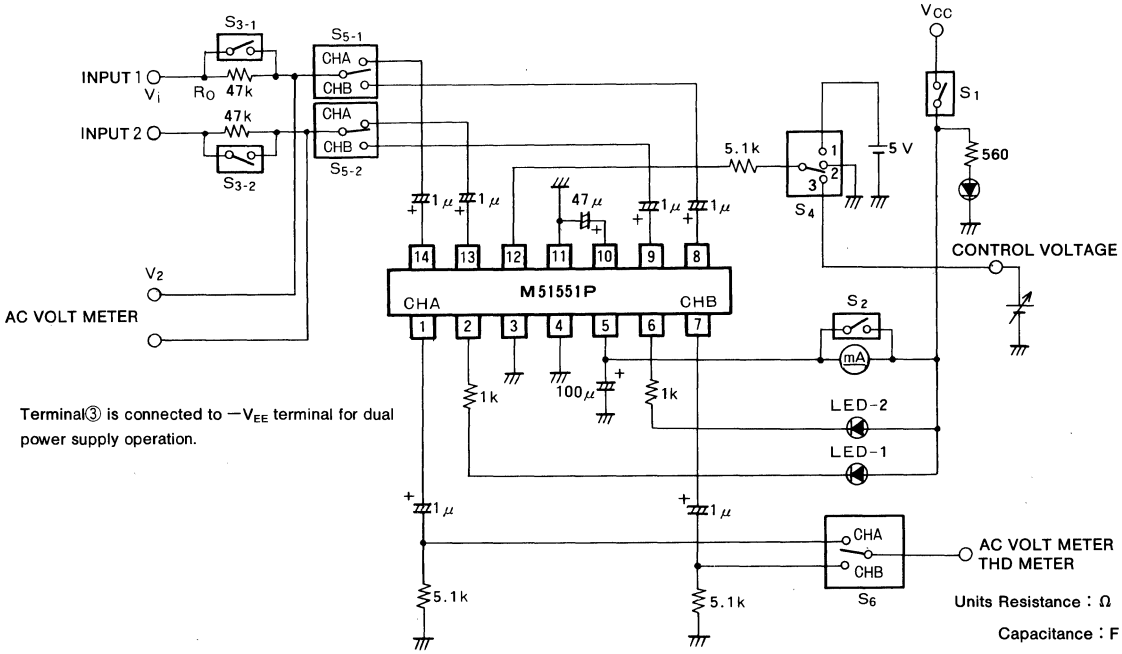
ABSOLUTE MAXIMUM RATINGS (T_a=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage	At zero signal (between pin⑤ to ③)	24	V
I_{CC}	Circuit current	Not including pin②, ⑥ current	30	mA
I_{CC}②, ⑥	Display current	Pin②, ⑥	40	mA
P_d	Power dissipation		620	mW
K_θ	Thermal derating above 25℃	$T_a \geqq 25$℃	6.2	mW/℃
T_{opr}	Operating temperature		−20～+75	℃
T_{stg}	Storage temperature		−40～+125	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃, V_{CC}=15V, V_i=1.5Vrms, f=1kHz, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Circuit current	Not including pin②, ⑥ current		12	16	mA
V_{CNTL1}	Input 1select control voltage	Control voltage when input 1 is selected.	2.0			V
V_{CNTL-2}	Input 2select control voltage	Control voltage when input 2 is selected.			0.7	V
R_i	Input resistance	V_i=1.5V_{rms}, f=1kHz, R_o=47kΩ	30	47		kΩ
G_v	Voltage gain	V_i=1.5V_{rms}, f=1kHz	−1	0	1	dB
$V_{O(max)}$	Maximum output voltage.	Output level as output THD=1%	4.0	4.5		Vrms
THD	Total harmonic distortion	V_O=1.0V_{rms}		0.006	0.017	%
N_O	Noise output	Zero-signal, input pin short to GND		5.5	10	μV_{rms}
C.T.	Cross talk	Leakage ratio of input 1 to input 2	52	58		dB
C.L.	Channel leakage	Leakage ratio of channel A to channel B	77	83		dB
C.B.	Channel balance	Voltage gain ratio of channel A to channel B	−0.5	0	0.5	dB

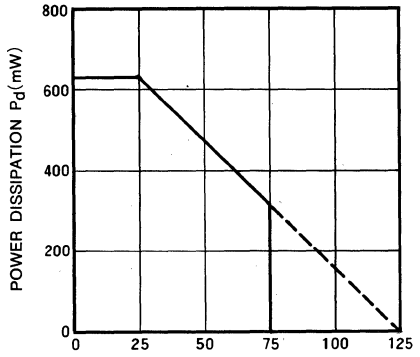
TEST CIRCUIT (for single power supply)



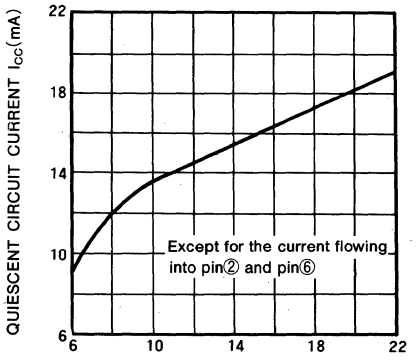
Symbol	Switch							Method
	S_1	S_2	S_3	S_4	S_{5-1}	S_{5-2}	S_6	
I_{CC}	ON	OFF	ON	½				Zero signal, measure circuit current
V_{CNTL1}	ON	ON	ON	3				Measure Pin⑫ DC supply voltage as input signal 1 is output
V_{CNTL2}	ON	ON	ON	3				Measure Pin⑫ DC supply voltage as input signal 2 is output
R_i	ON	ON	OFF	½	CHA	CHA		$R_i=\frac{V_2 \times R_0}{V_1-V_2}$, $V_1=1.5V_{rms}$, $R_0=47k\Omega$, Measure input level at V_2 point
					CHB	CHB		
G_V	ON	ON	ON	½	CHA	CHA	CHA	$G_V=20\log\frac{V_0}{V_1}$ (dB), $V_1=1.5V_{rms}$, V_0=output level
					CHB	CHB	CHB	
$V_{O(max)}$	ON	ON	ON	½	CHA	CHA	CHA	Measure output level as output THD is 1.0%
					CHB	CHB	CHB	
THD	ON	ON	ON	½	CHA	CHA	CHA	Measure output THD as output level is $1.0V_{rms}$
					CHB	CHB	CHB	
N_O	ON	ON	ON	½			CHA	Input pin short to GND.
							CHB	Measure the output noise level, BPF 20Hz~20kHz
C.T.	ON	ON	ON	1⇄2	CHA		CHA	C.T. $=20\log\left(\frac{V_O(S_4\to1)}{V_O(S_4\to2)}\right)$ (dB)
					CHB		CHB	
C.L.	ON	ON	ON	1	CHA	CHA	CHA ↓↑ CHB	C.L. $=20\log\left(\frac{V_O(CHA)}{V_O(CHB)}\right)$ (dB)
C.B.	ON	ON	ON	1	CHA	CHA	CHA	C.B. $=20\log\left(\frac{V_O(CHA)}{V_O(CHB)}\right)$ (dB)
					CHB	CHB	CHB	

TYPICAL CHARACTERISTIC (T_a=25℃, V_{CC}=15V, unless otherwise noted)

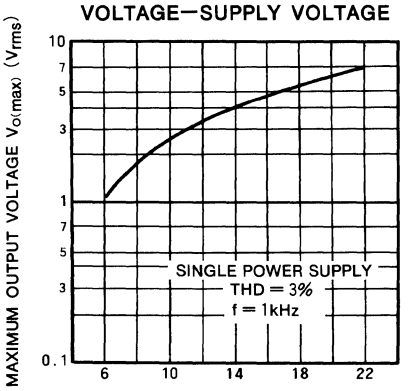
THERMAL DERATING (MAXIMUM RATING)



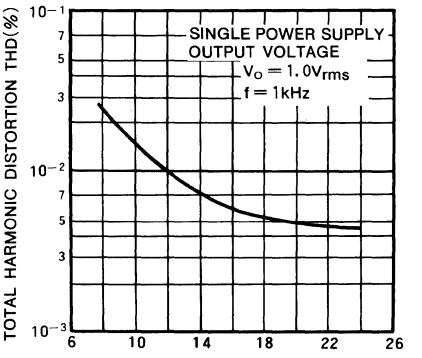
QUIESCENT CIRCUIT CURRENT—SUPPLY VOLTAGE



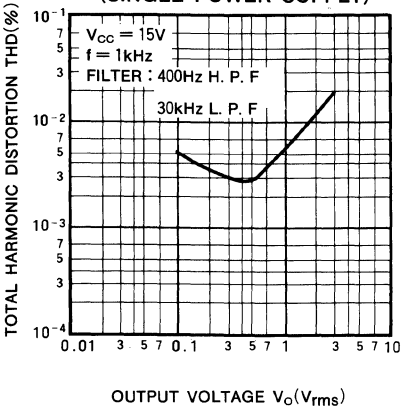
MAXIMUM OUTPUT VOLTAGE—SUPPLY VOLTAGE



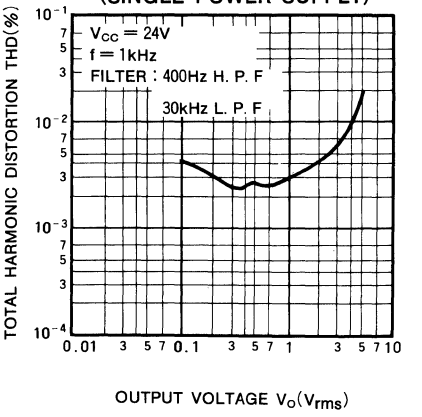
TOTAL HARMONIC DISTORTION SUPPLY VOLTAGE



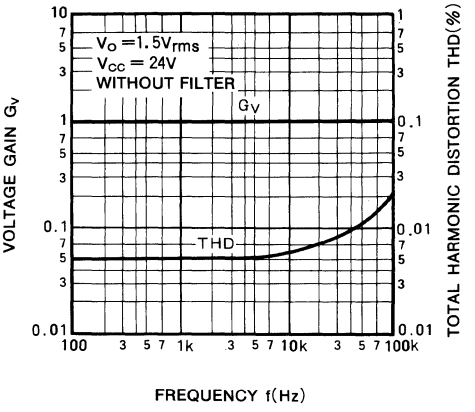
TRANCE CONDUCTANCE CHARACTERISTICS (V_{CC}=15V) (SINGLE POWER SUPPLY)



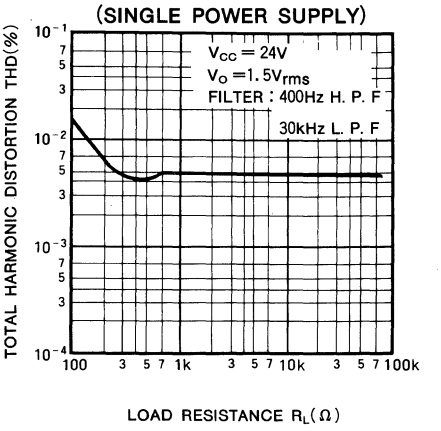
TRANCE CONDUCTANCE CHARACTERISTICS (V_{CC}=24V) (SINGLE POWER SUPPLY)



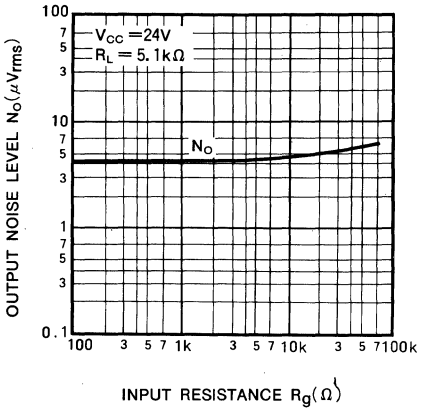
FREQUENCY RESPONCE (SINGLE POWER SUPPLY)



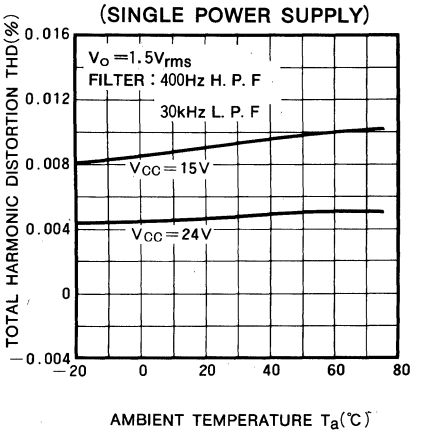
TOTAL HARMONIC DISTORTION—LOAD RESISTANCE (SINGLE POWER SUPPLY)



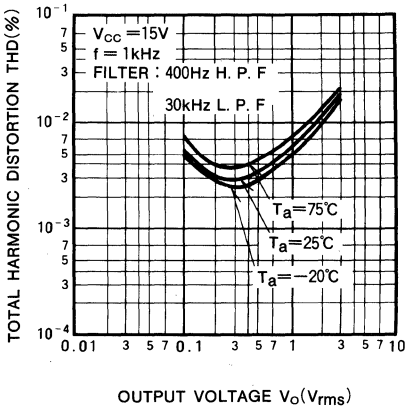
INPUT RESISTANCE—OUTPUT NOISE LEVEL (SINGLE POWER SUPPLY)



TOTAL HARMONIC DISTORTION—AMBIENT TEMPERATURE (SINGLE POWER SUPPLY)

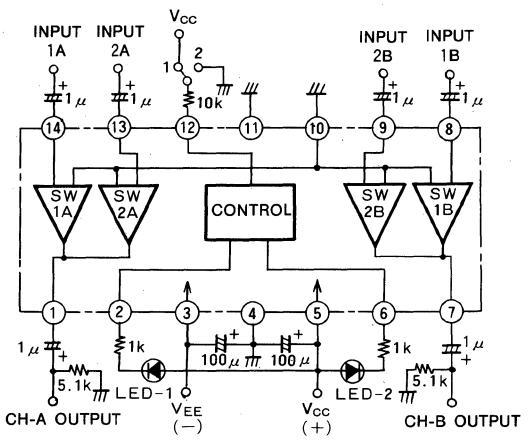


TRANCE CONDUCTANCE—AMBIENT TEMPERATURE (SINGLE POWER SUPPLY)



APPLICATION CIRCUIT

DUAL POWER SUPPLY OPERATION



SINGLE POWER SUPPLY OPERATION