TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA1217AN, TA1217AF

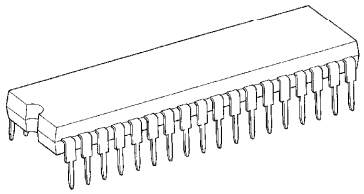
TV-SOUND PROCESSOR

TA1217AN incorporates the following circuits :

- Four sound processor circuit channels
  - Sound processor circuit for left channel of stereo
  - Sound processor circuit for right channel of stereo
  - Sound processor circuit for center channel of stereo
  - Sound processor circuit for woofer channel of stereo
- I/O ports for controlling multiplex sound demodulation IC
- I/O ports for controlling sound IC

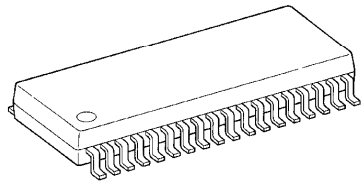
The IC comes in a 36-pin shrink DIP.

TA1217AN



SDIP36-P-500-1.78

TA1217AF



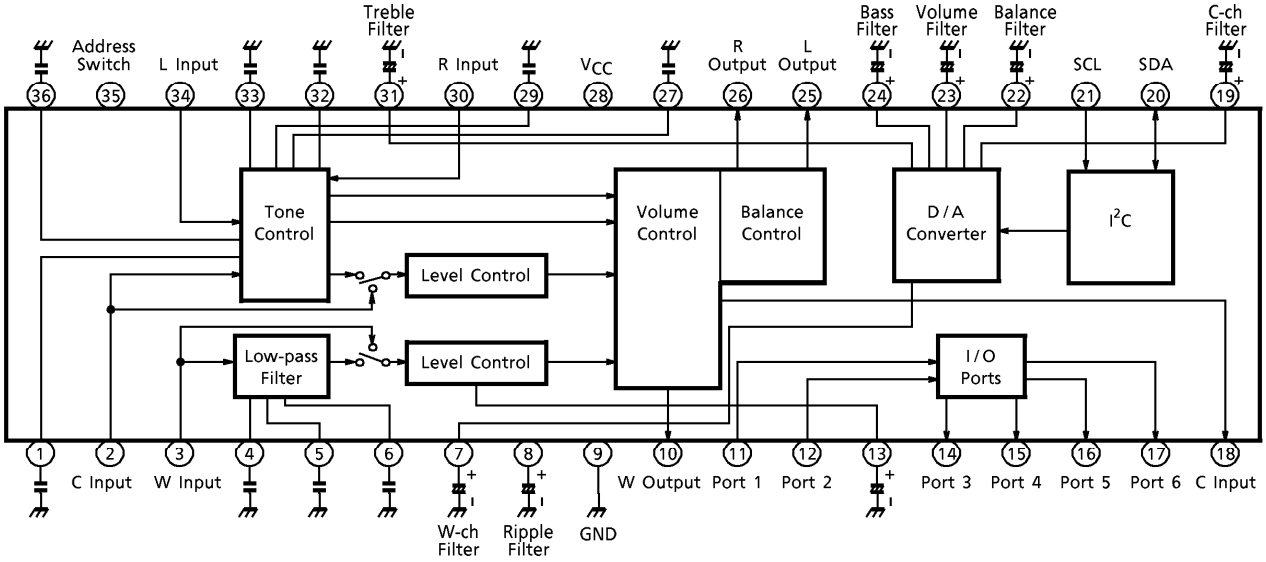
SSOP36-P-375-1.00

Weight
SDIP36-P-500-1.78 : 2.98 g (Typ.)
SSOP36-P-375-1.00 : 0.72 g (Typ.)

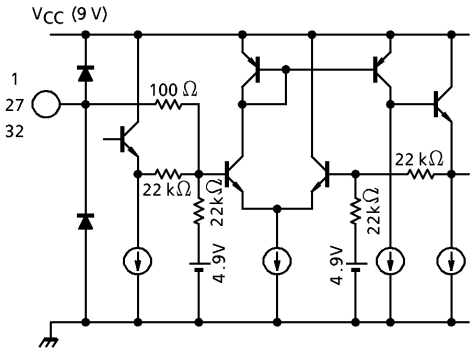
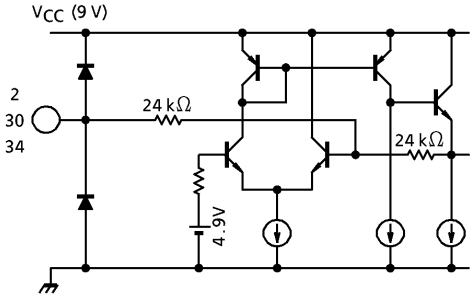
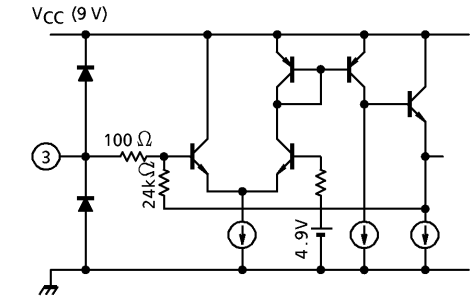
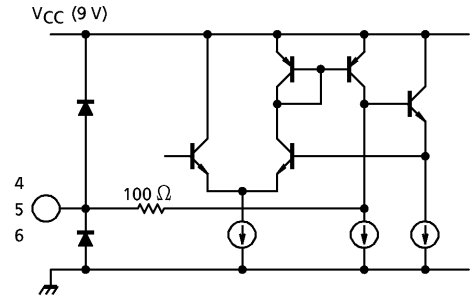
FEATURES

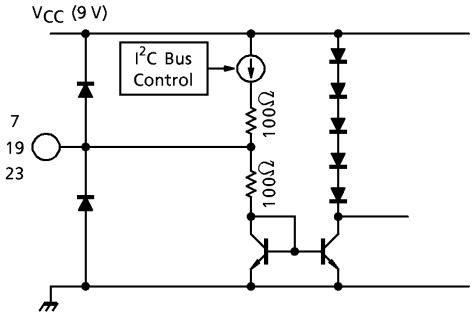
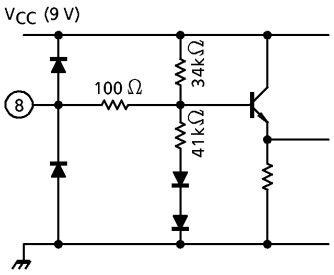
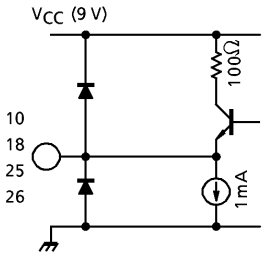
- Sound processor :
  - Volume control
  - Balance adjustment
  - Bass adjustment
  - Treble adjustment
  - Built-in woofer low-pass filter
- I/O port circuits :
  - Circuit for controlling IC used to demodulate
  - I^2C bus line
    multiplex sound
  - Adjusts filters using bus line method
  - Circuit for controlling sound IC

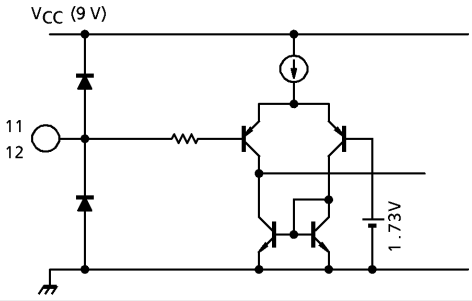
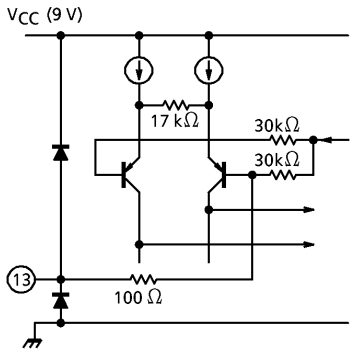
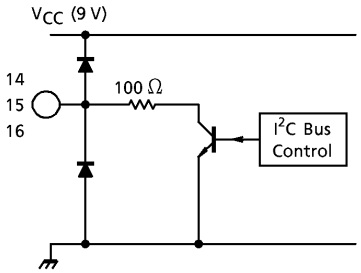
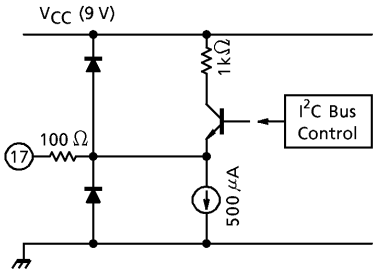
BLOCK DIAGRAM

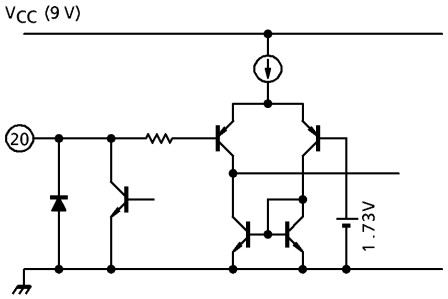
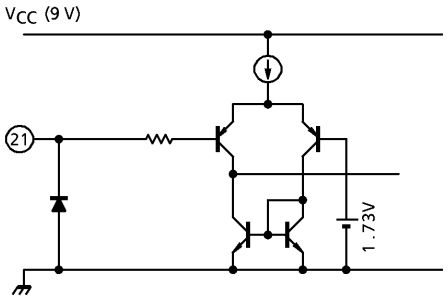
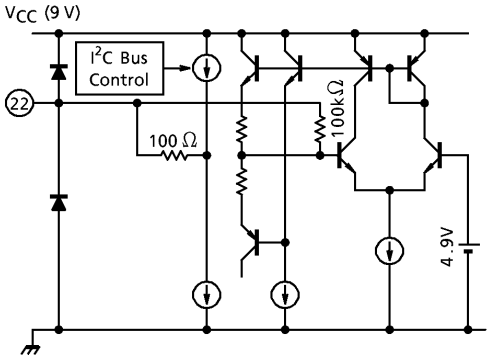
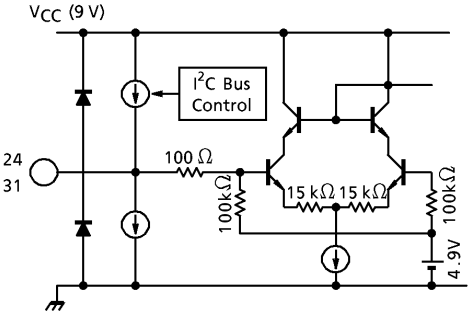


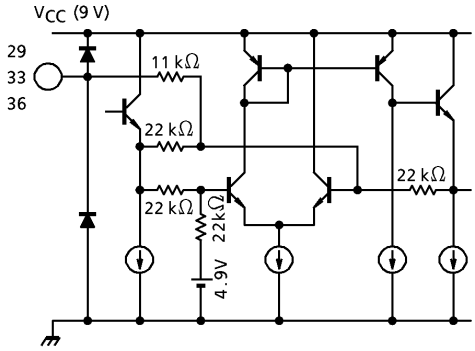
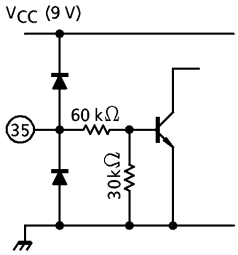
TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
1	C-ch LPF	Capacitor connecting pin for LPF for center channel bass. Connect capacitor between this pin and GND.	
27	R-ch LPF	Capacitor connecting pin for LPF for right channel bass. Connect capacitor between this pin and GND.	
32	L-ch LPF	Capacitor connecting pin for LPF for left channel bass. Connect capacitor between this pin and GND.	
2	C-ch Input	Input pin for center channel signal.	
30	R-ch Input	Input pin for right channel signal.	
34	L-ch Input	Input pin for left channel signal.	
3	W-ch Input	Input pin for woofer channel signal. Connect 1000pF capacitor between this pin and GND. Capacitor is for preventing oscillation.	
4 5 6	W-ch LPF	Input pins for woofer channel LPF. Connect capacitors between pin 4 and GND, 5 and GND, and 6 and GND.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
7	W-ch Filter	Capacitor connecting pin for controlling current waveform smoothing. Connect capacitor between this pin and GND. Current on this pin is used to adjust woofer channel.	
19	C-ch Filter	Capacitor connecting pin for control current waveform smoothing. Connect capacitor between this pin and GND. Current on this pin is used to adjust center channel.	
23	Volume Filter	Capacitor connecting pin for control current waveform smoothing. Connect capacitor between this pin and GND. Current on this pin is used to adjust volume filter.	
8	Ripple Filter	Capacitor connecting pin used to reject ripples in supply voltage (9 V). Connect capacitor between this pin and GND.	
9	GND	GND pin	
10	W-ch Output	Output pin for woofer channel signal.	
18	C-ch Output	Output pin for center channel signal.	
25	L-ch Output	Output pin for left channel signal.	
26	R-ch Output	Output pin for right channel signal.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
11 12	Port 1 Port 2	Input pins (input ports) for peripheral IC control signals (digital signals). Apply (supply) to this pin output returned from peripheral ICs which are controlled by microcontroller via this IC. The return output contains data on operating status of peripheral ICs controlled by microcontroller (eg, operating status and operating mode set by microcontroller).	
13	W-ch Offset	Rejects offset of woofer channel direct current bias voltage. Connect capacitor between this pin and GND.	
14 15 16	Port 3 Port 4 Port 5	Output pins (output ports) for peripheral IC control signals (digital signals). Output microcontrol signals (I^2C bus line signals) to peripheral ICs from these pins. Microcontroller sets operating status (eg, operating mode) of peripheral ICs using these output signals. Pins are open-collector ; output levels are H and L.	
17	Port 6	Functions same as port 3 (pin 14), port 4 (pin 15) and port 5 (pin 16). Output levels are H, M and L.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
20	SDA	Input / output pin for I²C bus line (SDA)	
21	SCL	Input pin for I²C bus line (SCL)	
22	Balance Filter	Capacitor connecting pin for controlling current waveform smoothing. Connect capacitor between this pin and GND. Current on this pin adjusts balance.	
24	Bass Filter	Capacitor connecting pin for control current waveform smoothing. Connect capacitor between this pin and GND. Current on this pin adjusts bass filter.	
31	Treble Filter	Capacitor connecting pin for control current waveform smoothing. Connect capacitor between this pin and GND. Current on this pin adjusts treble filter.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
28	V_{CC}	Power supply pin. Apply (supply) externally direct voltage of 9 V ± 0.9 V.	
36	C-ch HPF	Capacitor connecting pin for HPF for center channel treble. Connect capacitor between this pin and GND.	
29	R-ch HPF	Capacitor connecting pin for HPF for right channel treble. Connect capacitor between this pin and GND.	
33	L-ch HPF	Capacitor connecting pin for HPF for left channel treble. Connect capacitor between this pin and GND.	
35	Address Switch	Input pin for slave address switch signal. Slave addresses of this IC are 80H and 82H. To set slave address to 80H, connect this pin to GND or leave pin open (not connected). To set slave address to 82H, connect this pin to V_{CC}.	

I²C BUS LINE CONTROL SIGNAL MAP

Listed below is a map of IC control signals transmitted from microcontroller via I²C bus line.

Control signal map in write mode

The control signals used to write (transmit) control data to this IC from the microcontroller are as mapped below.

SLAVE ADDRESS	SUB ADDRESS	CONTROL SIGNAL ARRAY CONTENTS								INITIAL VALUE
		7	6	5	4	3	2	1	0	
80H (pin 35 = L) or 82H (pin 35 = H)	00H	*	Bass adjustment							32H (center of adjustment range)
	01H	*	Treble adjustment							32H (center of adjustment range)
	02H	*	Volume adjustment							00H (smallest in adjustment range)
	03H	*	C-ch volume level adjustment							00H (smallest in adjustment range)
	04H	*	W-ch volume level adjustment							00H (smallest in adjustment range)
	05H	*	Right and left volume balance adjustment							32H (center of adjustment range)
	06H	*	*	Port 6		Port 5	Port 4	Port 3	*	20H
	07H	*	*	WFC		CTS	WLS	MT2	MT1	10H

* : Unusable, H : hexadecimal

Details of sub addresses 06H and 07H

SYMBOL IN ABOVE TABLE	CONTROLLED DATA	CONTROL SIGNAL (SLAVE ADDRESS : 80H OR 82H)								
		SUB ADDRESS	CONTROL SIGNAL ARRAY CONTENTS							
			7	6	5	4	3	2	1	0
Port 3	Port 3 (pin 14) output = L	06H	*	*					1	*
	Port 3 (pin 14) output = H		*	*					0	*
Port 4	Port 4 (pin 15) output = L		*	*				1		*
	Port 4 (pin 15) output = H		*	*				0		*
Port 5	Port 5 (pin 16) output = L		*	*			1			*
	Port 5 (pin 16) output = H		*	*			0			*
Port 6	Port 6 (pin 17) output = 2.5 V		*	*	0	1				*
	Port 6 (pin 17) output = 0.5 V		*	*	1	0				*
	Port 6 (pin 17) output = 5.0 V		*	*	1	1				*
WFC	Woofer fo control : fo = 60 Hz	07H	*	*	0	0				
	Woofer fo control : fo = 80 Hz		*	*	0	1				
	Woofer fo control : fo = 100 Hz		*	*	1	0				
	Woofer fo control : fo = 120 Hz		*	*	1	1				

SYMBOL IN ABOVE TABLE	CONTROLLED DATA	CONTROL SIGNAL (SLAVE ADDRESS : 80H OR 82H)								
		SUB ADDRESS	CONTROL SIGNAL ARRAY CONTENTS							
			7	6	5	4	3	2	1	0
CTS	Center channel tone control off	07H	*	*			1			
	Center channel tone control on		*	*			0			
WLS	Woofer LPF off		*	*				1		
	Woofer LPF on		*	*				0		
MT1	All-channel mute		*	*						1
	All-channel mute off		*	*						0
MT2	Center-channel mute Woofer-channel mute		*	*					1	
	Center-channel mute off Woofer-channel mute off		*	*					0	

* : Unusable

CONTROL SIGNAL MAP IN READ MODE

The control signals used to return operating status (eg, operating mode) of the peripheral ICs to the microcontroller are as mapped below.

SLAVE ADDRESS	SUB ADDRESS	CONTROL SIGNAL ARRAY CONTENTS								INITIAL VALUE
		7	6	5	4	3	2	1	0	
81H (pin 35 = L) or 83H (pin 35 = H)		POR	*	*	*	*	*	Port 2	Port 1	

* : Unusable

SYMBOL IN ABOVE TABLE	DATA TO BE TRANSMITTED	CONTROL SIGNAL (SLAVE ADDRESS : 80H OR 82H)								
		SUB ADDRESS	CONTROL SIGNAL ARRAY CONTENTS							
			7	6	5	4	3	2	1	0
POR	Power-on-reset		1	*	*	*	*	*		
Port 2	Port 2 (pin 12) output = H			*	*	*	*	*	0	
	Port 2 (pin 12) output = L			*	*	*	*	*	1	
Port 1	Port 1 (pin 11) output = H			*	*	*	*	*		0
	Port 1 (pin 11) output = L			*	*	*	*	*		1

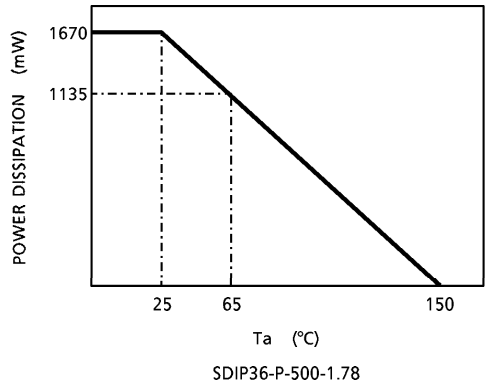
* : Unusable

MAXIMUM RATINGS (TA1217AN)

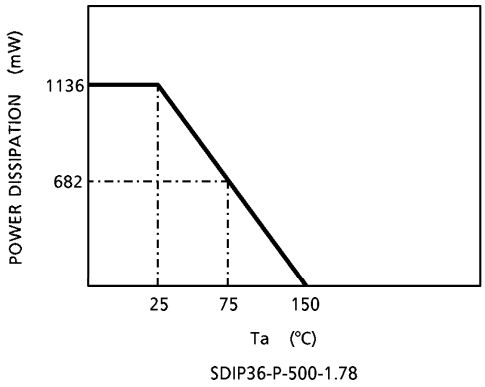
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CCMax.}$	14.0	V
Power Dissipation	P_D	1670	mW
Operating Temperature	T_{opr}	−20~65	°C
Storage Temperature	T_{stg}	−55~150	°C

MAXIMUM RATINGS (TA1217AF)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CCMax.}$	14.0	V
Power Dissipation	P_D	1136	mW
Operating Temperature	T_{opr}	−20~75	°C
Storage Temperature	T_{stg}	−55~150	°C



SDIP36-P-500-1.78



SDIP36-P-500-1.78

RECOMMENDED OPERATING CONDITIONS (pin 28)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Supply Voltage	V_{CC}	8.9	9.0	9.9	V	—
Current Consumption	I_{CC}	35	48	65	mA	At power-on-reset
Power Consumption	P_C	315	434	585	mW	At power-on-reset

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS

Pin voltage

PIN No.	PIN NAME	SYMBOL	TEST CIR-CUIT	MIN.	TYP.	MAX.	UNIT	REMARK
1	C-ch LPF	V1	—	4.4	4.9	5.4	V	—
2	C-ch Input	V2	—	4.4	4.9	5.4		—
3	Woofer Input	V3	—	4.4	4.9	5.4		—
4	W-ch LPF	V4	—	5.1	5.6	6.1		—
5	W-ch LPF	V5	—	5.1	5.6	6.1		—
6	W-ch LPF	V6	—	5.1	5.6	6.1		—
7	Woofer Filter	V7	—	—	0.0	—		When W-ch level = 00H
8	Ripple Filter	V8	—	5.1	5.6	6.1		—
9	GND	V9	—	—	—	—		—
10	Woofer Output	V10		3.7	4.2	4.7		At power-on-reset
11	Port 1	V11	—	—	—	—		—
12	Port 2	V12	—	—	—	—		—
13	W-ch Offset Filter	V13	—	4.4	4.9	5.4		—
14	Port 3	V14	—	—	—	—		Open-collector output
15	Port 4	V15	—	—	—	—		Open-collector output
16	Output Port	V16	—	—	—	—		Open-collector output
17	Output Port	V17	—	—	—	0.5		3-value output (at low output)
18	C-ch Output	V18	—	3.7	4.2	4.7		At power-on-reset
19	C-ch Filter	V19	—	—	0.0	—		When C-ch level = 00H
20	SDA	V20	—	—	—	—		—
21	SCL	V21	—	—	—	—		—
22	Balance Filter	V22	—	4.4	4.9	5.4		When balance = 32H
23	Volume Filter	V23	—	—	0.0	—		When volume = 00H
24	Bass Filter	V24	—	4.4	4.9	5.4		When bass = 32H
25	L-ch Output	V25	—	3.7	4.2	4.7		At power-on-reset
26	R-ch Output	V26	—	3.7	4.2	4.7		At power-on-reset
27	R-ch LPF	V27	—	4.4	4.9	5.4		—
28	V_{CC}	V28	—	—	9.0	—		—
29	R-ch HPF	V29	—	4.4	4.9	5.4		—
30	R-ch Input	V30	—	4.4	4.9	5.4		—
31	Treble Filter	V31	—	4.4	4.9	5.4		When treble = 32H
32	L-ch LPF	V32	—	4.4	4.9	5.4		—
33	L-ch HPF	V33	—	4.4	4.9	5.4		—
34	L-ch Input	V34	—	4.4	4.9	5.4		—
35	Address Switch	V35	—	—	—	—		Slave address switching pin
36	C-ch HPF	V36	—	4.4	4.9	5.4		—

AC CHARACTERISTICS

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	TEST PIN	MIN.	TYP.	MAX.	UNIT
Gain		Gv.L	2	(Note 1)	Pin 25	– 0.2	1.8	3.8	dB
		Gv.R			Pin 26				
		Gv.C			Pin 18				
		Gv.W			Pin 10	9.0	12.0	15.0	
Total Harmonic Distortion		THD.L	2	(Note 2)	Pin 25	—	0.25	1.1	%
		THD.R			Pin 26				
		THD.C			Pin 18				
		THD.W			Pin 10				
S / N		SN.L	2	(Note 3)	Pin 25	—	—	– 70	dB
		SN.R			Pin 26				
		SN.C			Pin 18				
		SN.W			Pin 10				
Residual Noise		V_{NO}.L	2	(Note 4)	Pin 25	—	—	50	μV_{p-p}
		V_{NO}.R			Pin 26				
		V_{NO}.C			Pin 18				
		V_{NO}.W			Pin 10				
Frequency Characteristic (100 Hz)		FC_L.L	2	(Note 5)	Pin 25	– 2	0	2	dB
		FC_L.R			Pin 26				
		FC_L.C			Pin 18				
Frequency Characteristic (10 kHz)		FC_H.L	2	(Note 6)	Pin 25	– 2	0	2	dB
		FC_H.R			Pin 26				
		FC_H.C			Pin 18				
LPF Frequency Characteristic (160Hz)	fc = 60 Hz	FCo.W1	2	(Note 7)	Pin 10	– 11	– 7	– 4	dB
	fc = 80 Hz	FCo.W2				– 8	– 5	– 2	
	fc = 100 Hz	FCo.W3				– 7	– 4	– 1	
	fc = 120 Hz	FCo.W4				– 16	– 9	– 1	
Balance Center		ΔV_{L-R}	2	(Note 8)	Pin 25, Pin 26	– 2	0	2	dB
Balance Minimum		V_{LMIN}	2	(Note 9)	Pin 25	—	—	– 60	dB
		V_{RMIN}			Pin 26				
Treble Maximum		$V_{TMAX}{}^L$	2	(Note 10)	Pin 25	6.0	8.0	10.0	dB
		$V_{TMAX}{}^R$			Pin 26				
		$V_{TMAX}{}^C$			Pin 18				
Treble Minimum		$V_{TMIN}{}^L$	2	(Note 11)	Pin 25	– 10.0	– 8.0	– 6.0	dB
		$V_{TMIN}{}^R$			Pin 26				
		$V_{TMIN}{}^C$			Pin 18				

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	TEST PIN	MIN.	TYP.	MAX.	UNIT
Bass Maximum	$V_{BMAX}{}^{L}$	2	(Note 12)	Pin 25	6.0	8.0	10.0	dB
	$V_{BMAX}{}^{R}$			Pin 26				
	$V_{BMAX}{}^{C}$			Pin 18				
Bass Minimum	$V_{BMIN}{}^{L}$	2	(Note 13)	Pin 25	− 10.0	− 8.0	− 6.0	dB
	$V_{BMIN}{}^{R}$			Pin 26				
	$V_{BMIN}{}^{C}$			Pin 18				
Volume Center	$V_{VCEN}{}^{L}$	2	(Note 14)	Pin 25	− 18	− 16	− 13	dB
	$V_{VCEN}{}^{R}$			Pin 26				
	$V_{VCEN}{}^{C}$			Pin 18				
	$V_{VCEN}{}^{W}$			Pin 10				
Level Center	$V_{LCEN}{}^{C}$	2	(Note 15)	Pin 18	− 9.0	− 7.0	− 5.0	dB
	$V_{LCEN}{}^{W}$			Pin 10				
Residual Noise	$V_{M}.^{L}$	2	(Note 16)	Pin 25	—	—	100	μV_{p-p}
	$V_{M}.^{R}$			Pin 26				
	$V_{M}.^{C}$			Pin 18				
	$V_{M}.^{W}$			Pin 10				
Cross Talk	CR_{L-R}	2	(Note 17)	Pin 26	—	—	80	dB
	CR_{R-L}			Pin 25				
	CR_{L-C}			Pin 18				
	CR_{R-C}			Pin 18				
	CR_{C-L}			Pin 25				
	CR_{C-R}			Pin 26				
	CR_{L-W}			Pin 10				
	CR_{R-W}			Pin 10				
	CR_{C-W}			Pin 10	—	—	60	
	CR_{W-L}			Pin 25	—	—	80	
	CR_{W-R}			Pin 26				
	CR_{W-C}			Pin 18				
Ripple Rejection Ratio (Minimum Volume)	RR.L	2	(Note 18)	Pin 25	—	—	− 30	dB
	RR.R			Pin 26				
	RR.C			Pin 18				
Ripple Rejection Ratio (Maximum Volume)	RR′.L	2	(Note 19)	Pin 25	—	—	− 30	dB
	RR′.R			Pin 26				
	RR′.C			Pin 18				
Output Dynamic Range	$V_{OUT}.^{L}$	2	(Note 20)	Pin 25	6.5	—	—	V
	$V_{OUT}.^{R}$			Pin 26				
	$V_{OUT}.^{C}$			Pin 18				
	$V_{OUT}.^{W}$			Pin 10				

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	TEST PIN	MIN.	TYP.	MAX.	UNIT
Input Dynamic Range	$V_{IN}.L$	2	(Note 21)	Pin 34	5.0	5.4	—	V
	$V_{IN}.R$			Pin 30				
	$V_{IN}.C$			Pin 2				
	$V_{IN}.W$			Pin 3	3.5	4.4	—	
Offset	ΔV_{BAS}	2	(Note 22)	Pin 25, Pin 26	—	110	350	mV
	ΔV_{TRB}							
	ΔV_{VCL}							
	ΔV_{CL}			Pin 18				
	ΔV_{WL}			Pin 10				
	ΔV_{BAL}			Pin 25, Pin 26				
Mute Residual Sound	MU.M	2	(Note 23)	Pin 25	—	—	100	μV_{p-p}
	MU.C			Pin 18				
	MU.W			Pin 10				
LPF Off Mode	$SW._{L-}$	2	(Note 24)	Pin 10	−2	0	2	dB
Port 1, Port 2 Low-Level Input Voltage	V_{1L}	2	(Note 25)	Pin 11	—	—	1.0	V
				Pin 12				
Port 1, Port 2 High-Level Input Voltage	V_{1H}	2	(Note 26)	Pin 11	3.5	—	V_{CC}	V
				Pin 12	—	—	—	
Port 6 Low-Level Output Voltage	V_{6Lo}	2	(Note 27)	Pin 17	—	—	0.5	V
Port 6 Medium-Level Output Voltage	V_{6Mid}	2	(Note 28)	Pin 17	2.0	2.5	3.0	V
Port 6 High-Level Output Voltage	V_{6Hi}	2	(Note 29)	Pin 17	4.5	5.0	—	V
Port 6 Source Current	I_{HiP6}	2	(Note 30)	Pin 17	—	—	2	mA
Port 6 Sink Current	I_{LoP6}	2	(Note 31)	Pin 17	—	—	300	μA
Port 3, Port 4, Port 5 Sink Current	I_{Lo}	2	(Note 32)	Pin 14, Pin 15 Pin 16	—	—	1	mA

TEST CONDITION

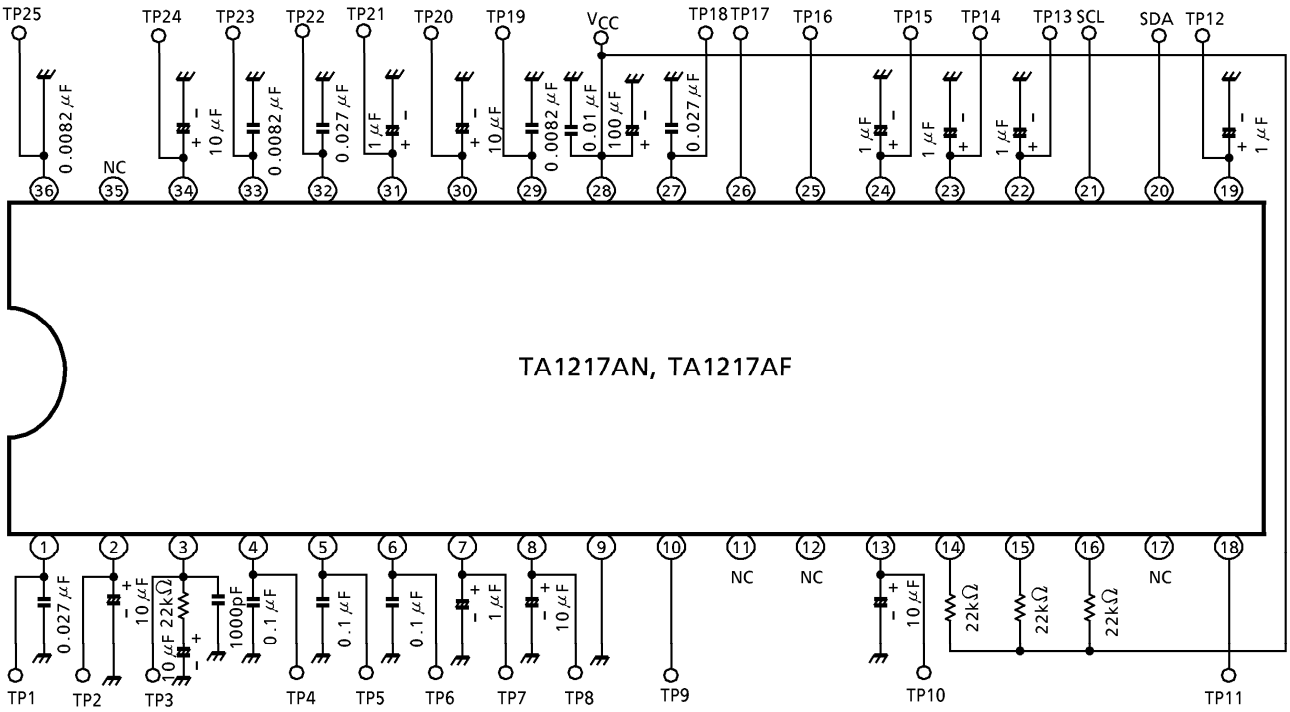
NOTE No.	CHARACTERISTIC		SET VALUE OF CONTROL DATA FROM I²C BUS LINE								INPUT SIGNAL	TEST METHOD
			00H	01H	02H	03H	04H	05H	06H	07H		
1	Gain	L-ch	32H	32H	64H	64H	64H	32H	20H	10H	1 kHz, 500 mV	Measure gain between input and output.
		R-ch										
		C-ch										
		W-ch									80 Hz, 500 mV	
2	Total Harmonic Distortion	L-ch	↑	↑	↑	↑	↑	↑	↑	↑	1 kHz, 500 mV	Measure distortion ratio.
		R-ch										
		C-ch										
		W-ch									80 Hz, 500 mV	
3	S / N	L-ch	↑	↑	↑	↑	↑	↑	↑	↑	1kHz, 500mV	When signal level is A and non-signal level is B, determine 20 ℓog (A / B).
		R-ch										
		C-ch										
		W-ch									80 Hz, 500 mV	Use 15 kHz LPF.
4	Residual Noise	L-ch	↑	↑	↑	↑	00H	↑	↑	↑	AC ground (non-signal)	Use LPF of 15 kHz, noise level at minimum volume.
		R-ch										
		C-ch										
		W-ch										
5	Frequency Characteristic (100 Hz)	L-ch	↑	↑	↑	↑	64H	↑	↑	↑	100 Hz, 500 mV	Output level is 0dB when 1 kHz signal is input.
		R-ch										
		C-ch										
6	Frequency Characteristic (10 kHz)	L-ch	↑	↑	↑	↑	↑	↑	↑	↑	10 kHz, 500 mV	Ditto
		R-ch										
		C-ch										
7	LPF Frequency Char-acteristic (160 Hz)	fc = 60 Hz	↑	↑	↑	↑	↑	↑	↑	00H	500 mV	Difference from fo = 80 Hz
		fc = 80 Hz								10H		Difference from fo = 100 Hz
		fc = 100 Hz								20H		Difference from fo = 120 Hz
		fc = 120 Hz								30H		Difference from LPF off
8	Balance Center		↑	↑	↑	↑	↑	↑	↑	10H	1 kHz, 500 mV	Measure gain difference between L and R.
9	Balance Minimum	L-ch	↑	↑	↑	↑	↑	64H	↑	↑	1 kHz, 500 mV	Measure residual sound at minimum balance. Use 1 kHz BPF.
		R-ch						00H				

NOTE No.	CHARACTERISTIC		SET VALUE OF CONTROL DATA FROM I^2C BUS LINE								INPUT SIGNAL	TEST METHOD
			00H	01H	02H	03H	04H	05H	06H	07H		
10	Treble Maximum	L-ch	↑	64H	↑	↑	↑	32H	↑	↑	10 kHz, 500 mV	Output level is 0dB when 1 kHz signal is input with tone flat.
		R-ch										
		C-ch										
11	Treble Minimum	L-ch	32H	00H	64H	64H	64H	32H	20H	10H	10 kHz, 500 mV	Output level is 0dB when 1 kHz signal is input with tone flat.
		R-ch										
		C-ch										
12	Bass Maximum	L-ch	64H	32H	↑	↑	↑	↑	↑	↑	100 Hz, 500 mV	Ditto
		R-ch										
		C-ch										
13	Bass Minimum	L-ch	00H	↑	↑	↑	↑	↑	↑	↑	100 Hz, 500 mV	Ditto
		R-ch										
		C-ch										
14	Volume Center	L-ch	32H	↑	32H	↑	↑	↑	↑	↑	80 Hz, 500 mV	0 dB at maximum volume.
		R-ch										
		C-ch									80 Hz, 500 mV	
		W-ch										
15	Level Center	C-ch	↑	↑	64H	32H	32H	↑	↑	↑	1 kHz, 500 mV	0 dB at maximum level.
		W-ch										
16	Residual Noise	L-ch	↑	↑	00H	00H	00H	↑	↑	↑	80 Hz, 500 mV	Measure output amplitude at minimum volume.
		R-ch										
		C-ch										
		W-ch										
17	Cross Talk	L→R	↑	↑	64H	64H	64H	↑	↑	↑	1 kHz, 500 mV	R output at L input
		R→L										L output at R input
		L→C										C output at L input
		R→C									80 Hz, 500 mV	C output at R input
		C→L										L output at C input
		C→R										R output at C input
		L→W										W output at L input
		R→W										W output at R input
		C→W										W output at C input
		W→L										L output at W input
		W→R										R output at W input
		W→C										C output at W input
18	Ripple Rejection Ratio (Minimum Volume)	L-ch	↑	↑	↑	↑	↑	↑	↑	↑	60 Hz, 500 mV	Apply V_{CC} via 51 Ω and input signal from pin 28.
		R-ch										
		C-ch										

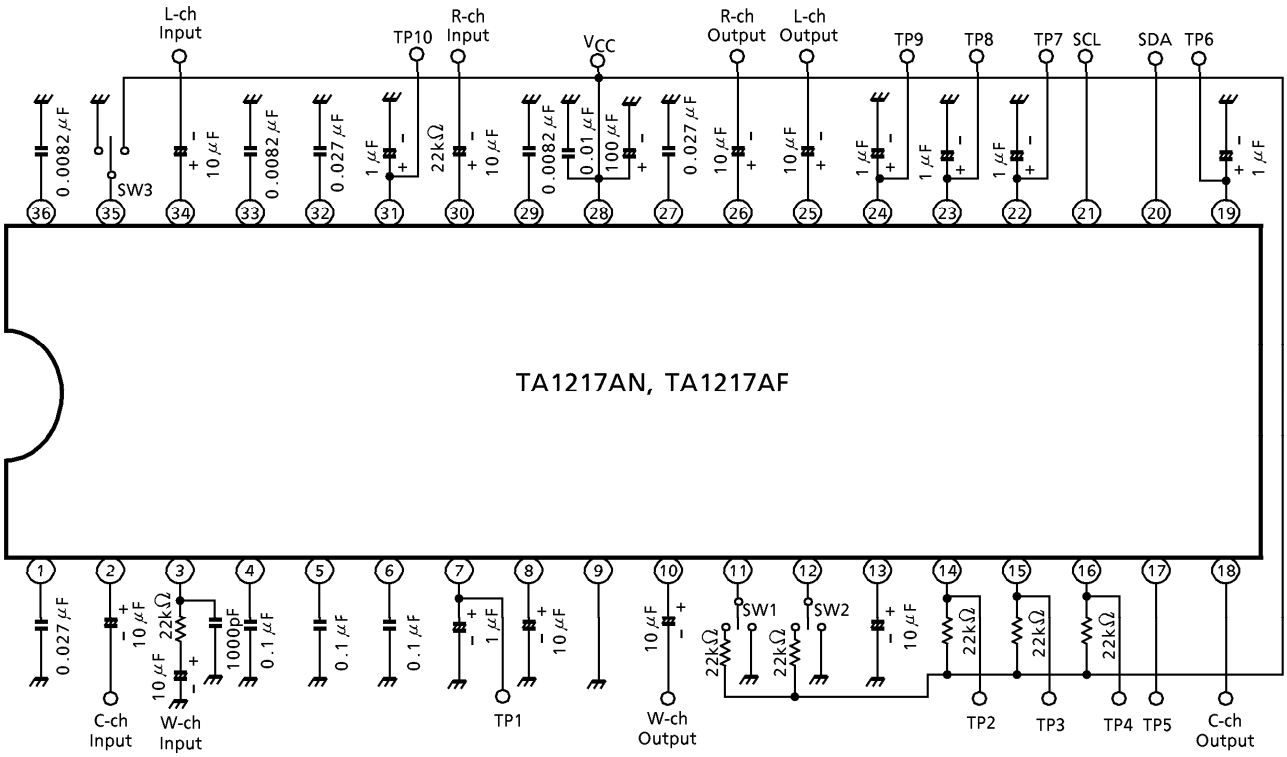
NOTE No.	CHARACTERISTIC		SET VALUE OF CONTROL DATA FROM I^2C BUS LINE								INPUT SIGNAL	TEST METHOD
			00H	01H	02H	03H	04H	05H	06H	07H		
19	Ripple Rejection Ratio (Maximum Volume)	L-ch	32H	32H	64H	64H	64H	32H	20H	10H	60 Hz, 500 mV	Apply V_{CC} via 51 Ω and input signal from pin 28.
		R-ch										
		C-ch										
		W-ch										
20	Output Dynamic Range	L-ch	64H	64H	↑	↑	↑	↑	↑	↑	100 Hz, 10 kHz	Output amplitude at output distortion (THD = 1%)
		R-ch										
		C-ch										
		W-ch									80 Hz	
21	Input Dynamic Range	L-ch	32H	32H	32H	↑	↑	↑	↑	↑	1 kHz	Input amplitude at output distortion (THD = 1%)
		R-ch										
		C-ch										
		W-ch									80 Hz	
22	Offset	BAS	*						↑	↑	AC ground	DC change according to bass control. * : Arbitrary data
		TRB		*								
		VOL			*							
		C LEV				*						
		W LEV					*					
		BAL						*				
23	Mute Residual Sound	L-ch	32H	32H	64H	64H	64H	32H	↑	11H	1 kHz, 500 mV	—
		C-ch								12H		
		W-ch									80 Hz, 500 mV	
24	LPF Off Mode	W-ch	↑	↑	↑	↑	↑	↑	↑	14H	1 kHz, 500 mV	—
25	Port 1, Port 2 Low-Level Input Voltage		—	—	—	—	—	—	—	—	—	—
26	Port 1, Port 2 High-Level Input Voltage		—	—	—	—	—	—	—	—	—	—
27	Port 6 Low-Level Output Voltage		—	—	—	—	—	—	20H	—	—	—
28	Port 6 Medium-Level Output Voltage		—	—	—	—	—	—	10H	—	—	—
29	Port 6 High-Level Output Voltage		—	—	—	—	—	—	30H	—	—	—
30	Port 6 Source Current		—	—	—	—	—	—	20H	—	—	—
31	Port 6 Sink Current		—	—	—	—	—	—	20H	—	—	—
32	Port 3, Port 4, Port 5 Sink Current		—	—	—	—	—	—	1FH	—	—	—

TEST CIRCUIT

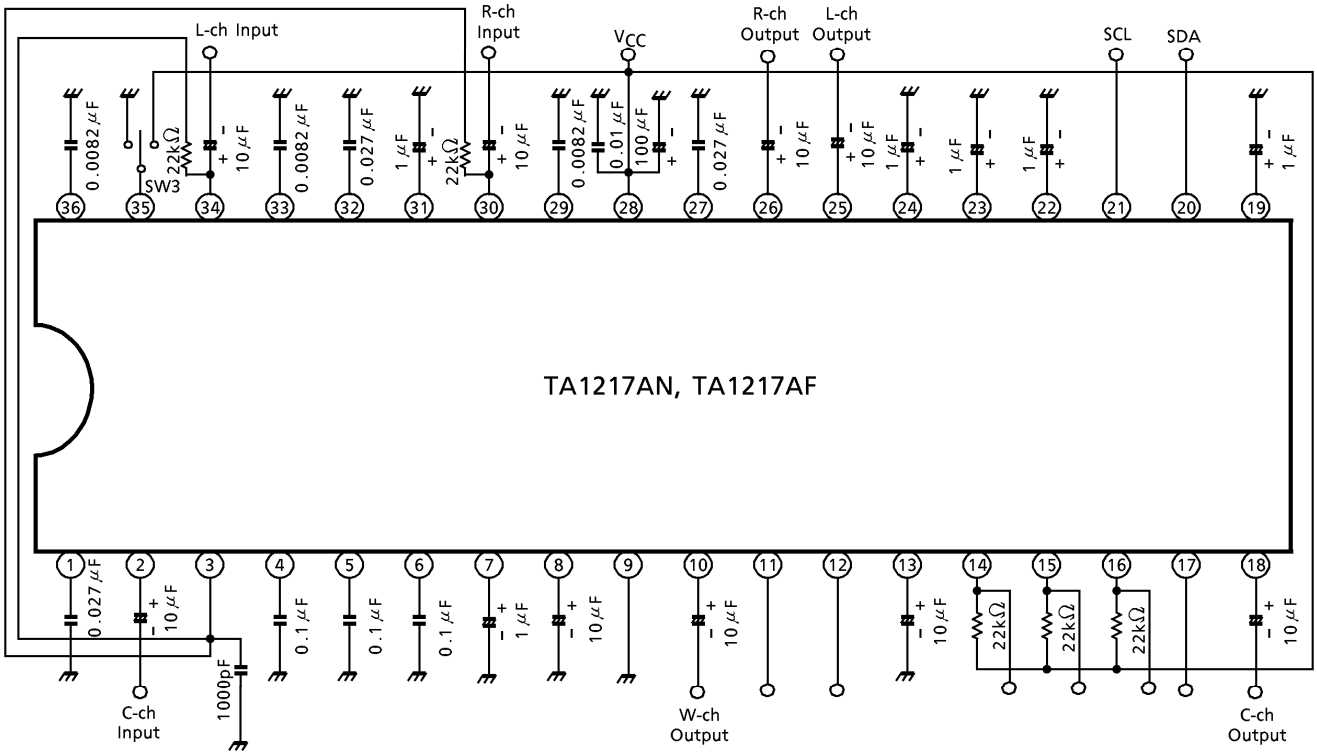
DC Characteristic



AC Characteristic

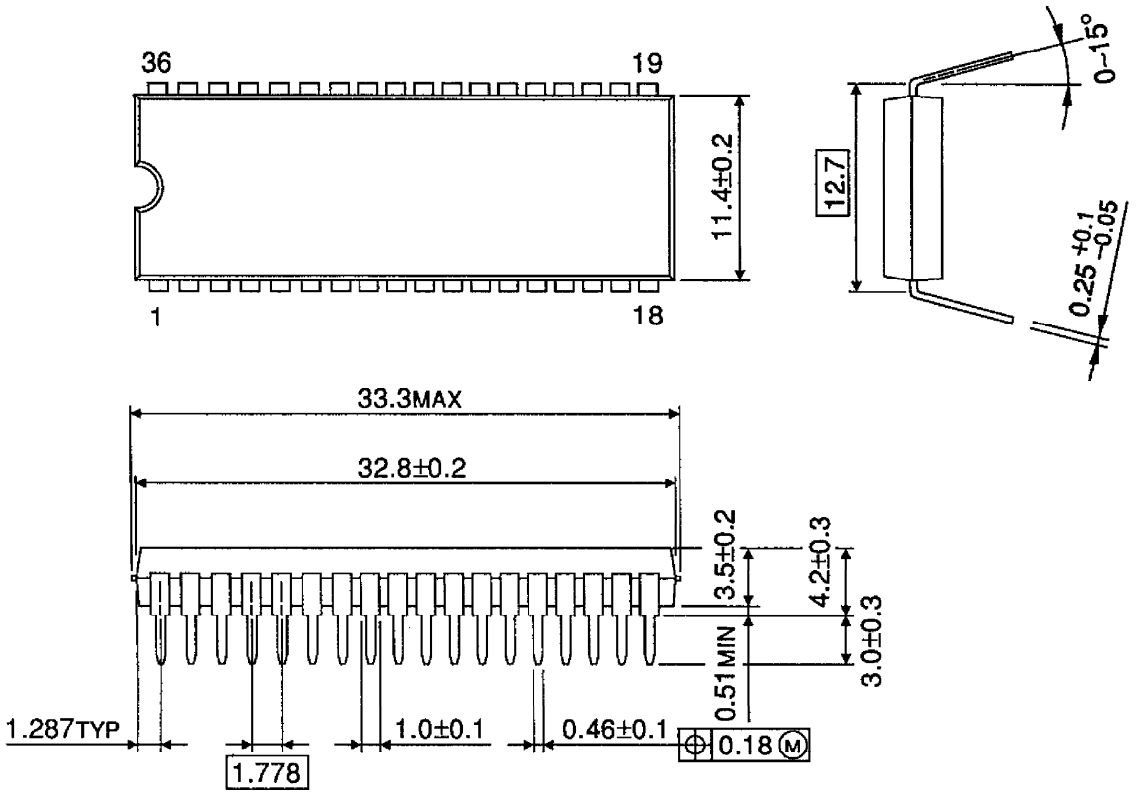


APPLICATION CIRCUIT



PACKAGE DIMENSIONS

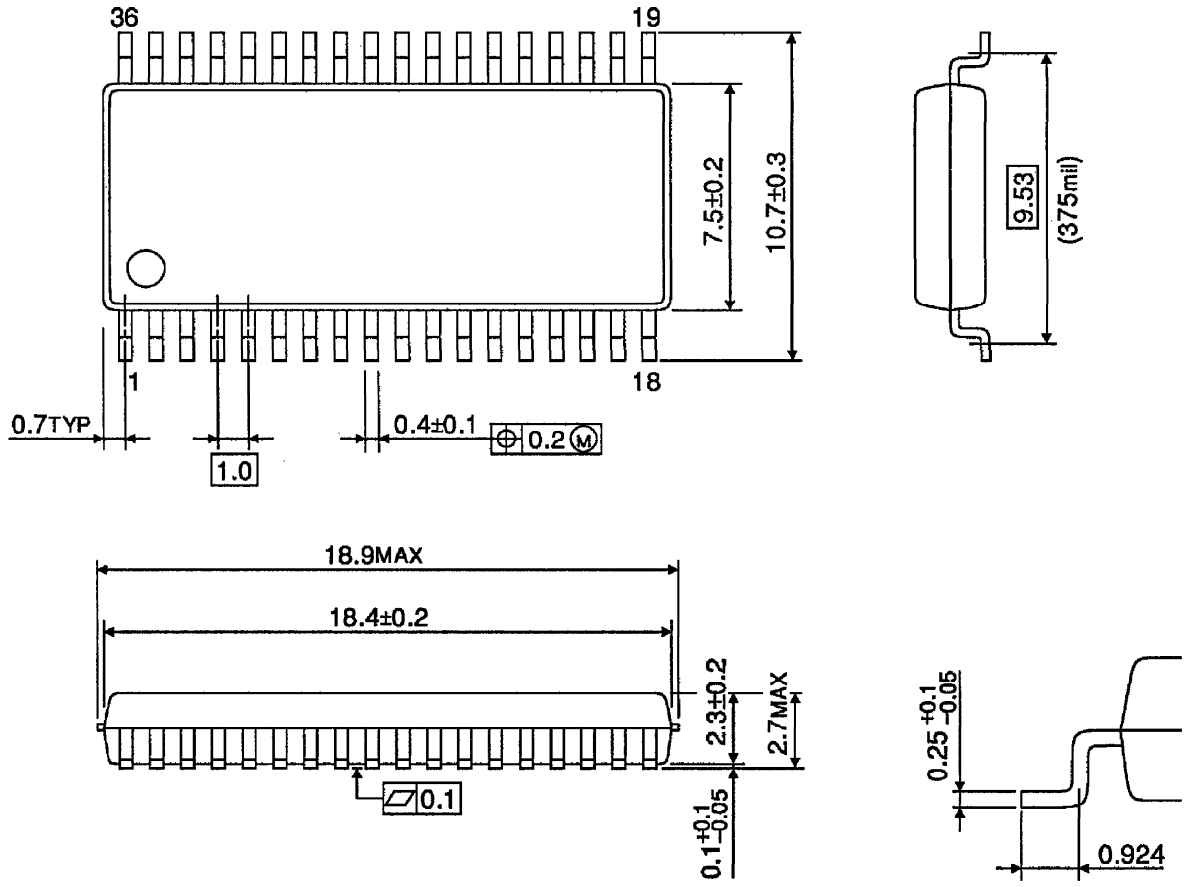
SDIP36-P-500-1.78 Unit : mm



Weight : 2.98 g (Typ.)

PACKAGE DIMENSIONS

SSOP36-P-375-1.00 Unit : mm



Weight : 0.72 g (Typ.)