

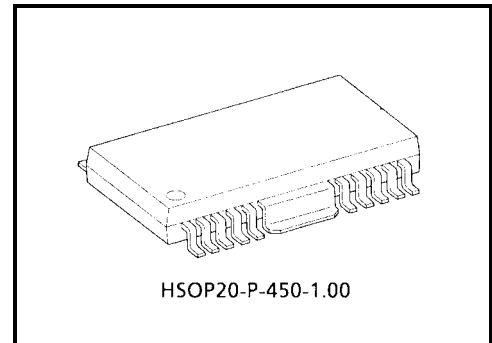
TA2058F

Power Driver IC for CD Player

TA2058F is a power driver IC developed for CD players. This IC have built-in 4 channel BTL power amplifiers which drives focus-coil and tracking coil for 3-beam pick-up head, disc motor and feed motor.

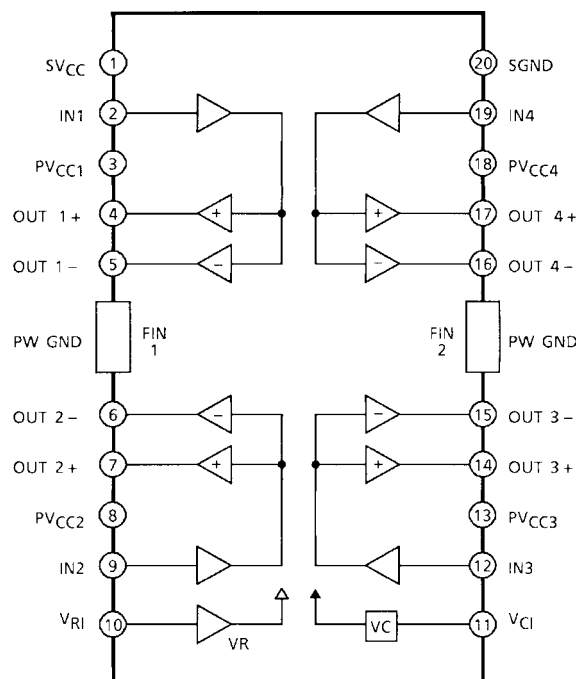
Features

- 4 channel BTL linear drivers
- Few external parts
- Fixed voltage gain
: $G_v = 15\text{dB}$ (typ.)
- High output power
: $V_{OM1} = 5\text{ V}_{p-p}$ (typ.) $V_{CC} = 5\text{ V}$, $R_L = 5\ \Omega$
: $V_{OM2} = 6\text{ V}_{p-p}$ (typ.) $V_{CC} = 6\text{ V}$, $R_L = 5\ \Omega$
- Thermal shut down protector
- Input reference voltage short protector
- Small Package
: Power-flat package 1 mm pitch 20 pins
- Operation Supply Voltage Range
: $V_{CC}(\text{opr}) = 4.0\sim 10.0\text{ V}$ ($T_a = 25^\circ\text{C}$)



Weight: 0.8 g (typ.)

Block Diagram



Terminal Explanation

Terminal No.	Symbol	Function	Equivalent Circuit
1	SV _{CC}	Supply terminal of small signal	
2	IN1	Input for CH1 <ul style="list-style-type: none"> Not biased inside. 	
3	PV _{CC1}	Supply terminal of output stage for CH1 <ul style="list-style-type: none"> Supply terminal of output stage are not connected to other channel terminal. 	
4	OUT1+	Non-inverted output for CH1	
5	OUT1-	Inverted output for CH1	
FIN1	PGND	Power GND <ul style="list-style-type: none"> Connected to FIN2 and substrate. 	
6	OUT2-	Inverted output for CH2	
7	OUT2+	Non-inverted output for CH2	Same as CH1
8	PV _{CC2}	Supply terminal of output stage for CH2	Same as CH1
9	IN2	Input for CH2	Same as CH1
10	V _{RI}	Input reference voltage <ul style="list-style-type: none"> Under condition of V_{RI} ≤ 1.8 V, internal bias circuit is shut off. 	
11	V _{CI}	Output reference voltage <ul style="list-style-type: none"> V_{OUT} = V_{CI} = (V_{CC} - V_F) / 2 	
12	IN3	Input for CH3	Same as CH1
13	PV _{CC3}	Supply terminal of output stage for CH3	Same as CH1
14	OUT3+	Non-inverted output for CH3	Same as CH1
15	OUT3-	Inverted output for CH3	Same as CH1
FIN2	PGND	Power GND	Connected to FIN1
16	OUT4-	Inverted output for CH4	Same as CH1
17	OUT4+	Non-inverted output for CH4	Same as CH1
18	PV _{CC4}	Supply terminal of output stage for CH4	Same as CH1
19	IN4	Input for CH4	Same as CH1
20	SGND	Small signal GND	

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	14	V
Power dissipation	P _D (Note 1)	2 (Note 2)	W
Operating temperature	T _{opr}	-30~85	°C
Storage temperature	T _{stg}	-55~150	°C

Note 1: Mounted on 50 mm × 50 mm × 1.6 mm size board with copper area 60% over.

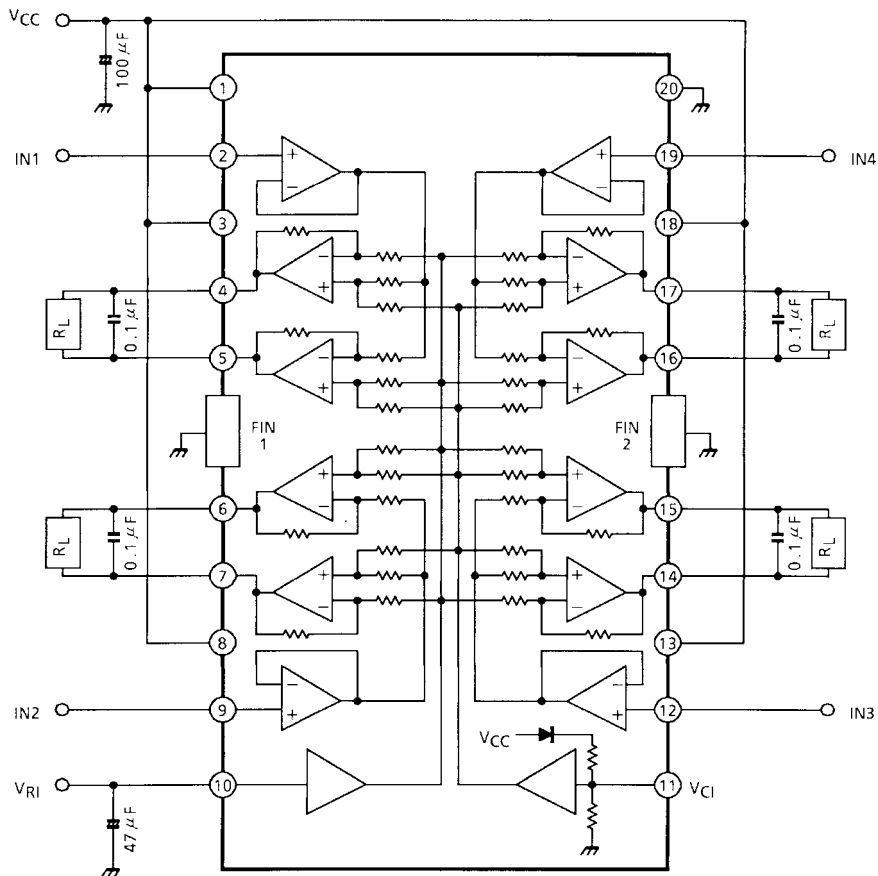
Note 2: Derated above Ta = 25°C, in the proportion of 62.5 mW/°C.

Electrical Characteristics

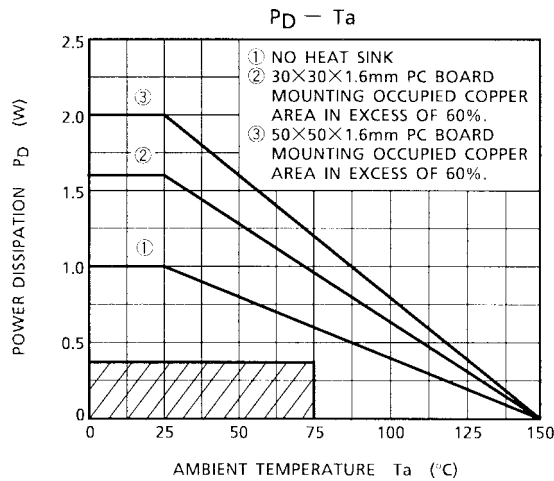
(unless otherwise specified, V_{CC} = 5 V, R_L = 5 Ω, R_g = 620 Ω, V_{RI} = 2.1 V, f = 1 kHz, Ta = 25°C)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Operating voltage	V _{CC}	—		4.0	—	10.0	V
Quiescent current	I _{CCQ}	—	V _{in} = 0, R _L = OPEN	20	35	60	mA
Input offset current	I _{IN}	—	V _{IN} = 2.1 V	—	250	800	nA
V _{RI} terminal offset current	I _{I0}	—	V _{RI} = 2.1 V	—	35	120	μA
Output offset voltage	V _{O OS1}	—	V _{CC} = 5 V, R _g = 0 Ω	-30	—	30	mV
	V _{O OS2}	—	V _{CC} = 8 V, R _g = 0 Ω	-50	—	50	
	V _{O OS3}	—	V _{CC} = 12 V, R _g = 0 Ω	-100	—	100	
Reference output voltage	V _{OUT}	—		—	2.1	—	V
Maximum output voltage	V _{OM1}	—	V _{CC} = 5 V	4.0	5.0	—	V _{p-p}
	V _{OM2}	—	V _{CC} = 6 V	5.0	6.0	—	
Voltage gain	G _v	—	V _{in} = 100 mVrms	14.5	15.5	16.5	dB
Frequency response	f _c	—	V _{in} = 100 mVrms	—	100	—	kHz
Total harmonic distortion	THD	—	V _{in} = 100 mVrms	—	-50	—	dB
Slew rate	S. R.	—	V _{out} = 2 V _{p-p}	—	1.0	—	V/μs
Cross talk	C. T.	—	V _{out} = 1 Vrms	—	-60	—	dB
Ripple rejection ratio	R. R.	—	f _{rip} = 100 Hz, V _{rip} = 100 mVrms	—	-60	—	dB
Thermal shut down temperature	T _{TSD}	—	Chip temperature	—	150	—	°C
V _{RI} -GND short protection voltage	V _{RI OFF}	—		1.4	1.6	1.8	V

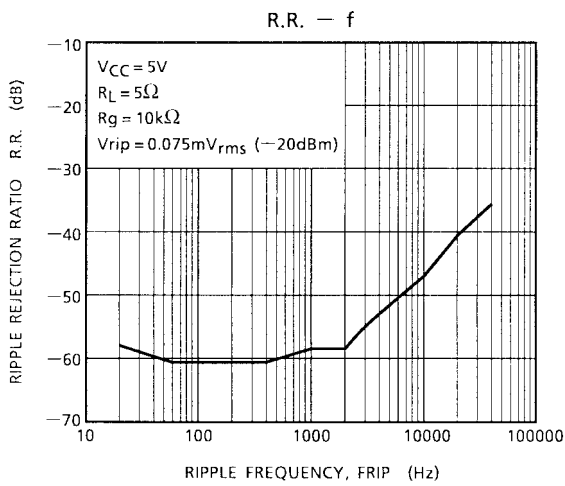
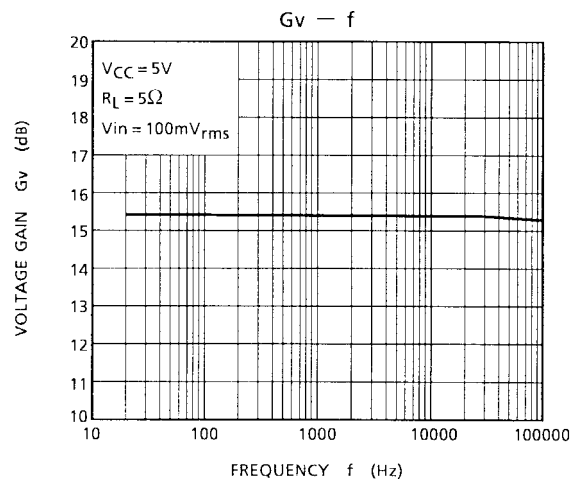
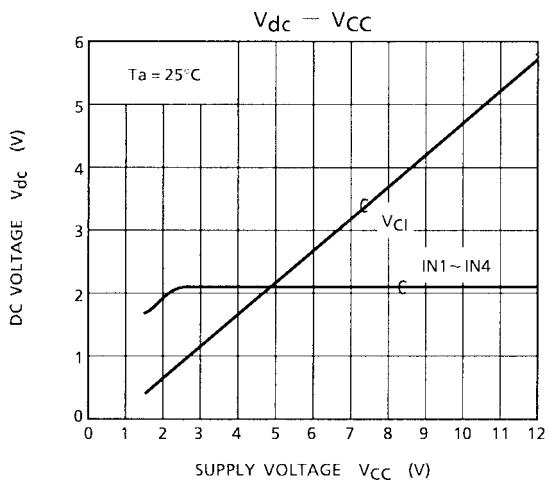
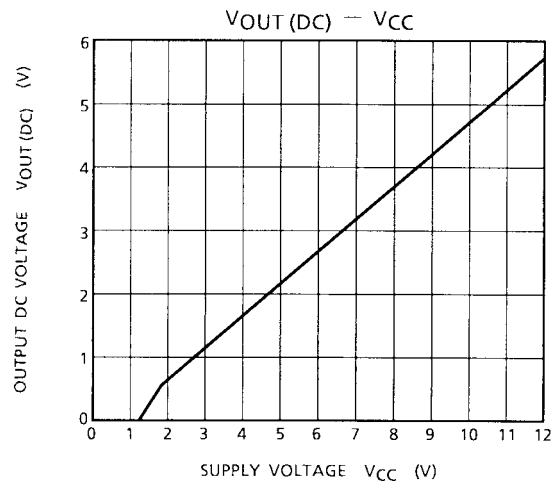
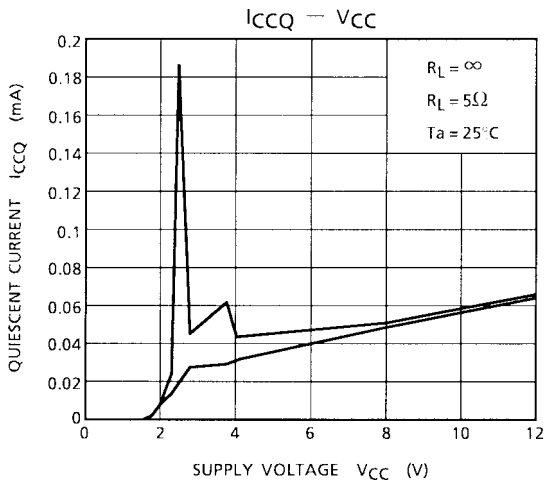
Test Circuit

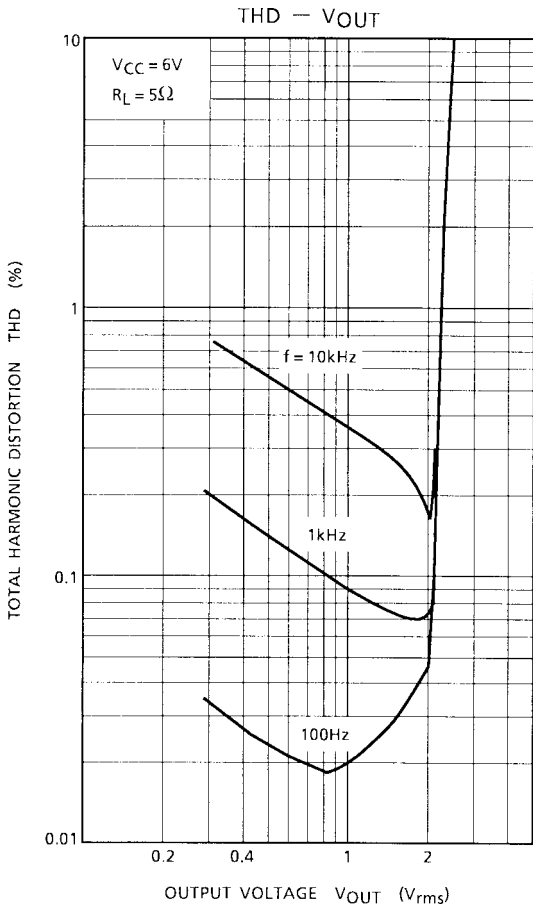
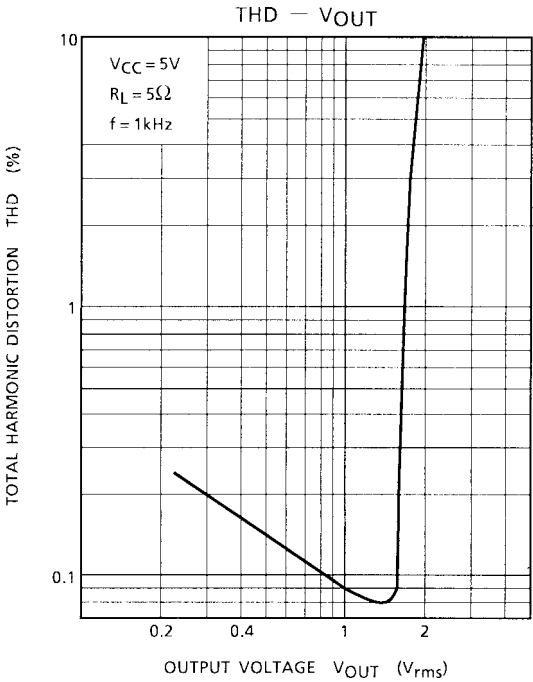


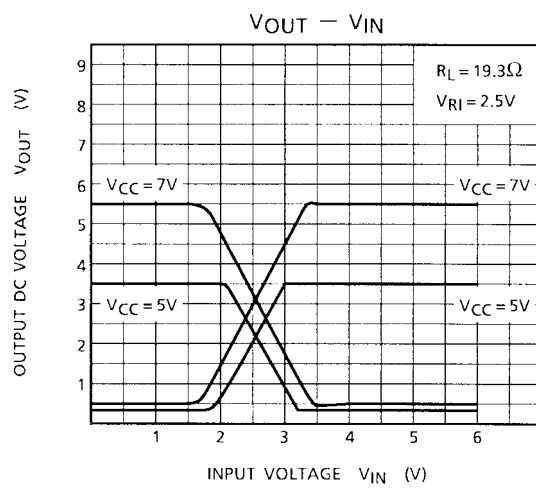
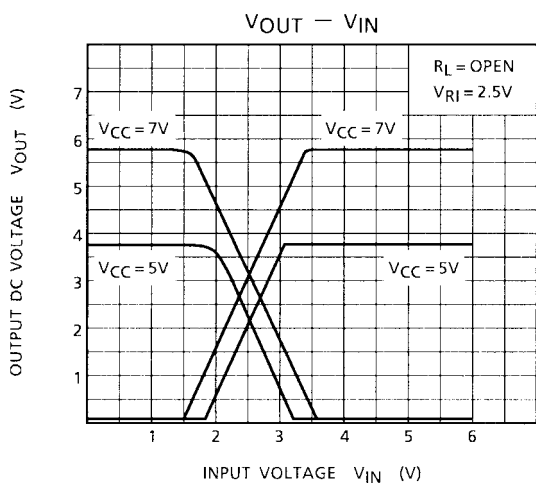
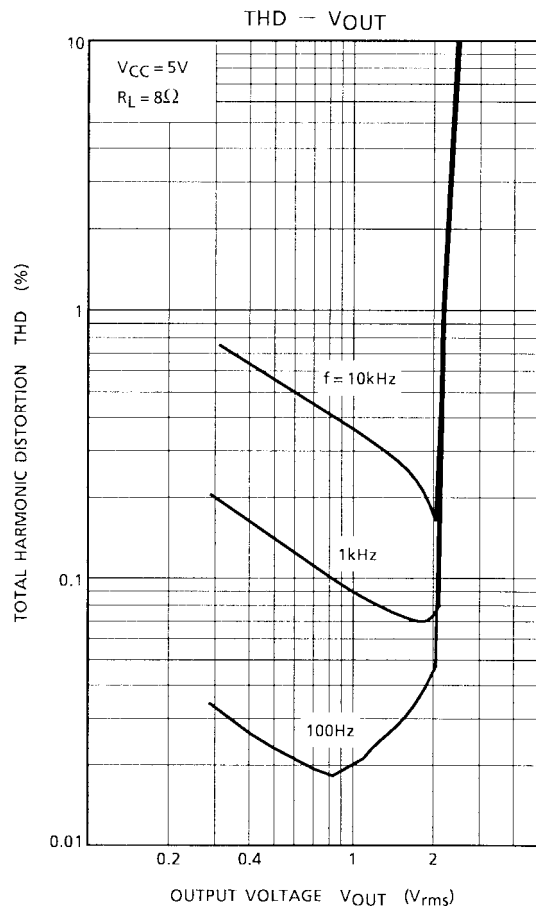
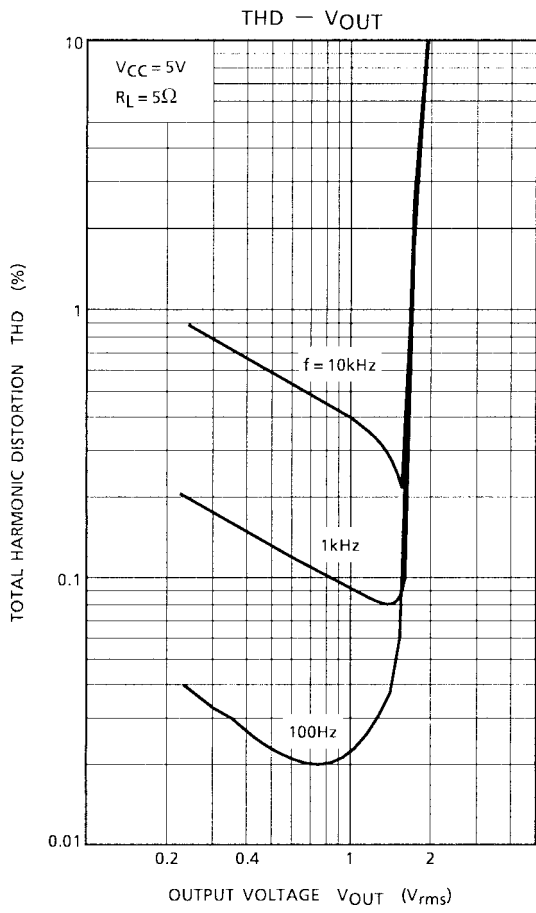
HSOP 20 Power Dissipation

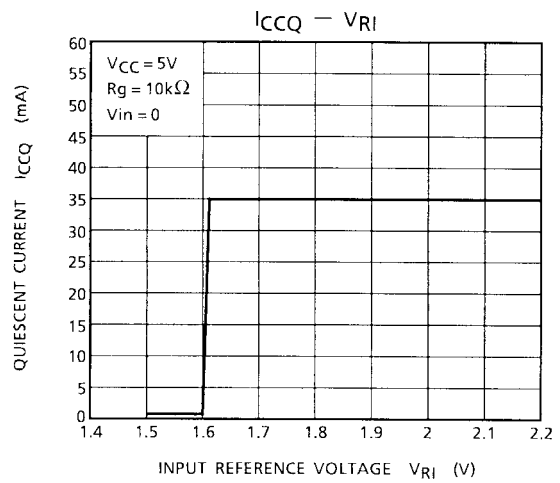
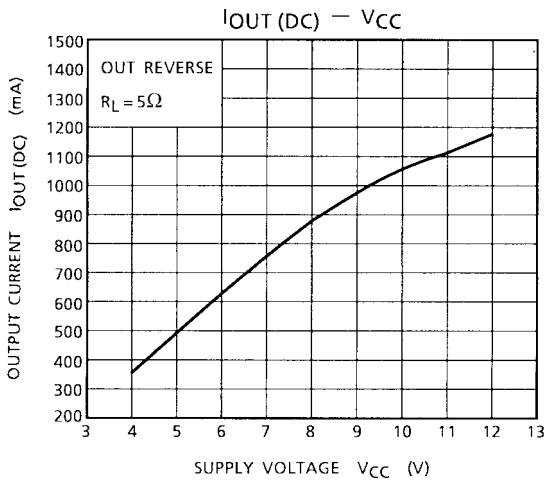
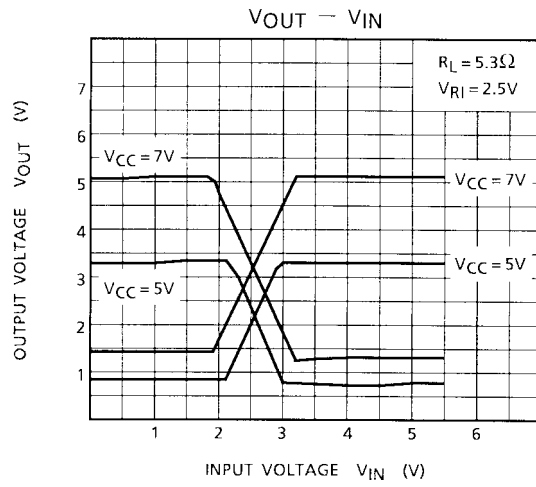
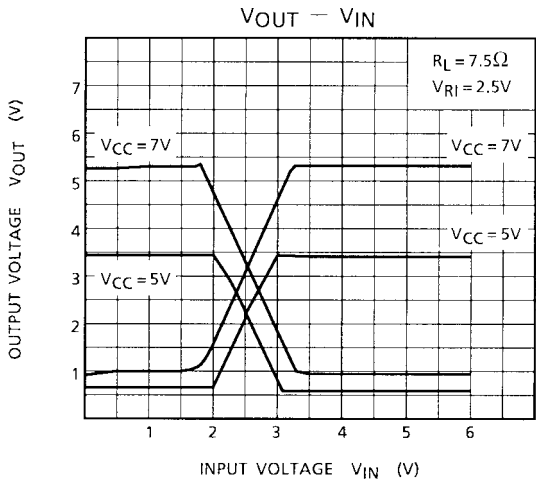


Note: In case of normal use, power dissipation of IC only is oblique line portion.









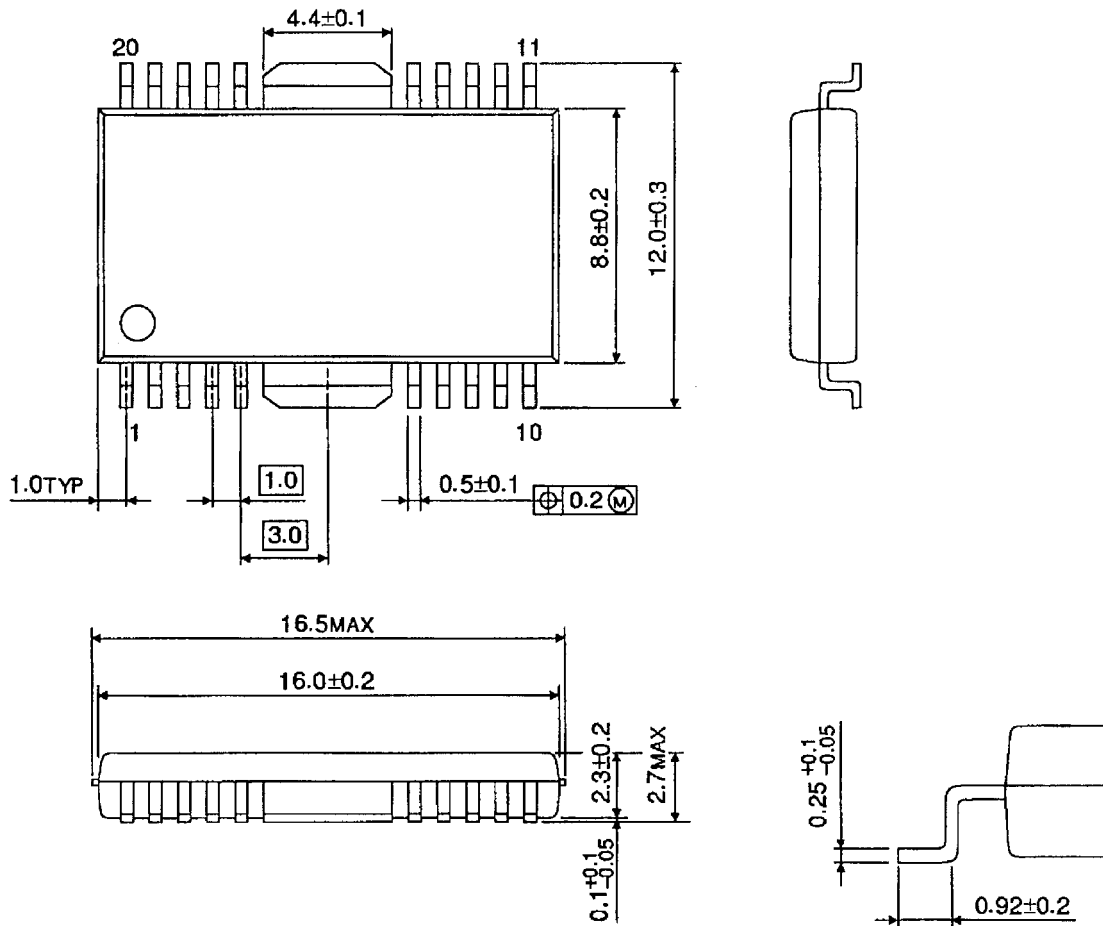
Precaution Use

- Input stage
 - Input stages are consisted of differential circuit of NPN Tr, and have built-in IB compensation circuit.
- Built-in Driver
 - Each channel driver consists of BTL configuration linear amplifier.
 - Voltage gain is fixed: $G_V = 15.5\text{dB}$ (typ.)
 - Voltage loss for output stage is $2 V_{BE} + V_{CE}(\text{sat})$ for positive cycle, $V_{CE}(\text{sat})$ for negative cycle, because of no-bootstrap circuit. So, output DC voltage is designed as less than $1/2 V_{CC}$.
- VRI Terminal
 - VRI is reference voltage terminal for input signal.
 - If reference voltage from servo IC drop less than 1.8 V, protection circuit operates and shut off bias circuit inside. This operation is to prevent load from moving undesirably in case of VRI drop for accident or some reason.
- VCI Terminal
 - Output DC voltage is determined by circuit of this terminal inside as ;
 $V_{CI} = V_{OUT}(\text{DC}) = (V_{CC} - V_F) / 2$
 - Output signal dynamic range is depend on V_{CC} . On the other hand, input signal dynamic range is determined by VRI as mentioned and voltage gain is fixed inside. So, maximum output voltage does not increase as V_{CC} increases.
 - Because of BTL configuration, Ripple Rejection Ratio does not improve not much when capacitor is connected to VCI terminal to GND.
- GND
 - Large signal GND is for output stage and small signal GND is for stages from input circuit to pre-output stage.
 - These GND pins are not connected inside.
 - Phin1 and Phin2 are connected to Bedflame, and it is connected to substrate.
 - It is advised that you make a Printed Board layout of small signal GND and large signal GND should be isolated each other.
- Oscillation preventive capacitor
 - We recommend to use the capacitor of 0.1 μF , between each output terminals. But perform the temperature test to check the oscillation allowance, since the oscillation allowance is varied according to the causes described below.
 - 1) Supply voltage
 - 2) Ambient temperature
 - 3) Load impedance
 - 4) Capacity value of condenser
 - 5) Kind of condenser
 - 6) Layout of Printed board
 - We recommend to connect Pass-condenser, which is about 10 to 100 μF between VRI terminal and GND.
 - VCI terminal is recommend to use "OPEN".

Package Dimensions

HSOP20-P-450-1.00

Unit : mm



Weight: 0.8 g (typ.)

RESTRICTIONS ON PRODUCT USE

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