

M56749FP

4 CHANNEL ACTUATOR MOTOR DRIVER

DESCRIPTION

The M56749FP is a semiconductor integrated circuit designed for a CD-ROM actuator driver.

This device can function 4 channel actuators by 1 chip due to include 4 channel BTL drivers.

Also, this device include a mute circuit, a Vcc check circuit and TSD function.

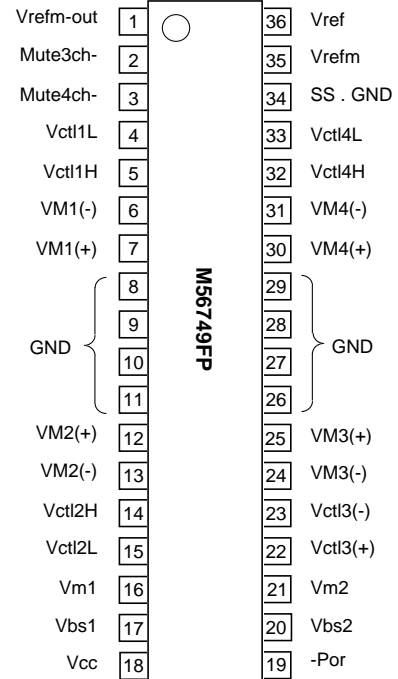
FEATURES

- Lower saturation voltage.
(typical 1.35V at load current 500mA)
- Wide supply voltage range.
(4.5V to 13.2V)
- Lower cross-over distortion.

APPLICATION

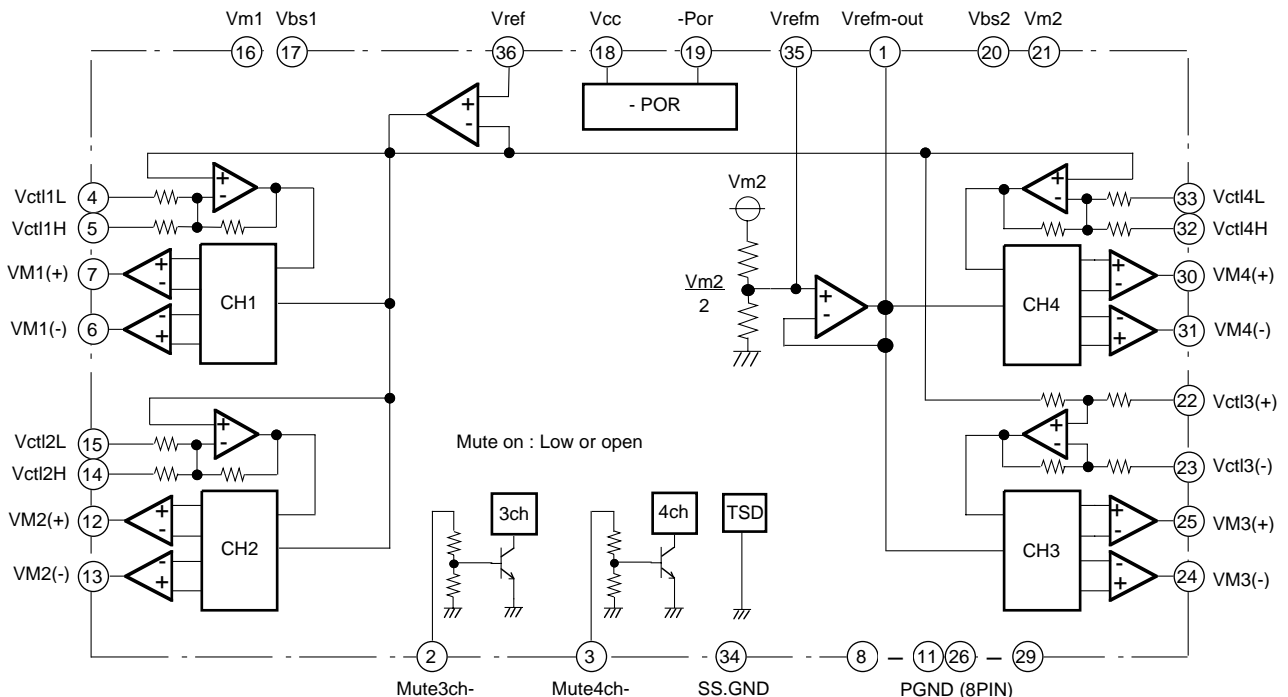
CD-ROM

PIN CONFIGURATION (TOP VIEW)



Outline 36P2R-D

BLOCK DIAGRAM



PIN DESCRIPTION

Pin No.	Symbol	Function	Pin No.	Symbol	Function
①	Vrefm-out	Vm2 middle voltage output	⑱	-Por	Vcc check signal output
②	Mute3ch-	3th channel mute terminal	⑳	Vbs2	Bootstrap power supply-2
③	Mute4ch-	4th channel mute terminal	㉑	Vm2	Motor power supply-2
④	Vctl1L	1st channel Low gain input	㉒	Vctl3(+)	3th channel non-inverted amp. input
⑤	Vctl1H	1st channel High gain input	㉓	Vctl3(-)	3th channel inverted amp. input
⑥	VM1(-)	1st channel inverted amp. output	㉔	VM3(-)	3th channel inverted amp. output
⑦	VM1(+)	1st channel non-inverted amp. output	㉕	VM3(+)	3th channel non-inverted amp. output
⑧ to ⑪	GND	GND	㉖ to ㉙	GND	GND
⑫	VM2(+)	2nd channel non-inverted amp. output	⑳	VM4(+)	4th channel non-inverted amp. output
⑬	VM2(-)	2nd channel inverted amp. output	㉑	VM4(-)	4th channel inverted amp. output
⑭	Vctl2H	2nd channel High gain input	㉒	Vctl4H	4th channel High gain input
⑮	Vctl2L	2nd channel Low gain input	㉓	Vctl4L	4th channel Low gain input
⑯	Vm1	Motor power supply-1	㉔	SS. GND	Small signal GND
⑰	Vbs1	Bootstrap power supply-1	㉕	Vrefm	Vm2 middle voltage monitor
⑱	Vcc	5V power supply	㉖	Vref	Reference voltage input

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Parameter	Conditions	Rating	Unit
Vbs	Bootstrap power supply	⑰ and ⑳ pins input voltage	15	V
Vm	Motor power supply	⑯ and ㉑ pins input voltage	15	V
Vcc	5V power supply	⑱ pin input voltage	7.0	V
Io	Output Current		700	mA
Vin	Maximum input voltage of terminals	②, ③, ④, ⑤, ⑭, ⑮, ⑱, ㉒, ㉓, ㉔, ㉕, ㉖, ㉗, ㉘, ㉙ pins	0 – Vcc	V
Pt	Power dissipation	Free Air	1.2	W
Kθ	Thermal derating	Free Air	9.6	mW/°C
Tj	Junction temperature		150	°C
Topr	Operating temperature		-20 – +70	°C
Tstg	Storage temperature		-40 – +150	°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Limits			Unit
		Min.	Typ.	Max.	
Vcc	5V power supply	4.5	5.0	5.5	V
Vm1, Vm2	Motor power supply		5.0		V
Vbs1, Vbs2	Bootstrap power supply		Vm+1.0		V

ELECTRICAL CHARACTERISTICS (Ta=25°C, Vcc=Vbs1=Vbs2=Vm1=Vm2=5V, no-load current unless otherwise noted.)

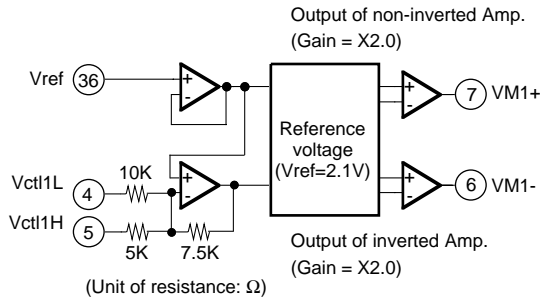
Symbol	Parameter	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Icc1	Sleep Mode Supply current-1	⑯, ⑰, ⑳, ㉑ pins input current (Vref=Vctl=2.1V)	—	20	30	mA
Icc2	Sleep Mode Supply current-2	⑲ pin input current (Vref=Vctl=2.1V)	—	3.0	6.0	mA
Vsat	Saturation voltage	Top and Bottom saturation voltage. Load current 500mA.	—	1.35	1.90	V
Vofs1	Output offset voltage-1	1st, 2nd channel. Vref=Vctl=2.1V, Vm1=5V	-26	—	+26	mV
Vofs2	Output offset voltage-2	3th, 4th channel. Vref=Vctl=2.1V, Vm2=Vbs2=12V	-100	—	+100	mV
VPor	Vcc check voltage (⑲ pin L to H)	Vcc voltage when ⑲ pin (-POR circuit) returns to High from Low condition.	4.10	4.25	4.40	V
ΔVPor	Vcc check circuit Hysteresis		80	130	180	mV
Vmute-on	Mute-on voltage	3th and 4th channels Mute-on.	—	—	0.8	V
Vmute-off	Mute-off voltage	3th and 4th channels Mute-off.	2.0	—	—	V
Imute	Mute terminals input current	② and ③ pin input current at 5V input voltage.	—	170	250	μA
VrefmL	Vref amp. Low output voltage	① pin output voltage at load current 1.0mA when Vrefm (⑳ pin) inputs 0V.	—	0.15	0.3	V
VrefmH	Vref amp. High output voltage	① pin output voltage at load current 0.5mA when Vrefm (⑳ pin) inputs 5V.	Vbs2- 2.25	Vbs2- 1.9	—	V
Vrefin	Vref amp. Input voltage range	⑳ pin input voltage range.	1.5	2.1	Vcc-1.2	V

Voltage gain of each channel

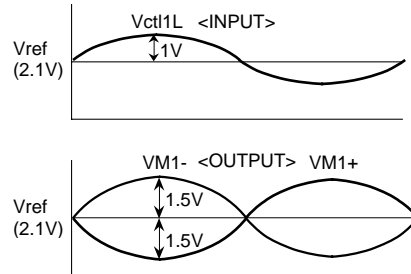
Symbol	Parameter	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Gain1L	1st channel voltage gain (L)	$\frac{\{VM1(+)-VM1(-)\}}{(Vctl1L-Vref)}$ (Vctl1L=④ pin)	8.86	9.77	10.6	db
Gain1H	1st channel voltage gain (H)	$\frac{\{VM1(+)-VM1(-)\}}{(Vctl1H-Vref)}$ (Vctl1H=⑤ pin)	14.6	15.6	16.4	db
Gain2L	2nd channel voltage gain (L)	$\frac{\{VM2(+)-VM2(-)\}}{(Vctl2L-Vref)}$ (Vctl2L=⑮ pin)	11.1	12.0	12.9	db
Gain2H	2nd channel voltage gain (H)	$\frac{\{VM2(+)-VM2(-)\}}{(Vctl2H-Vref)}$ (Vctl2H=⑭ pin)	14.5	15.4	16.2	db
Gain3	3th channel voltage gain	$\frac{\{VM3(+)-VM3(-)\}}{Vctl3(+)-Vctl3(-)}$ (Vctl3(+)=㉒ pin) (Vctl3(-)=㉓ pin)	-3.07	1.94	-1.33	db
Gain4L	4th channel voltage gain (L)	$\frac{\{VM4(+)-VM4(-)\}}{(Vctl4L-Vref)}$ (Vctl4L=⑳ pin)	11.1	12.0	12.9	db
Gain4H	4th channel voltage gain (H)	$\frac{\{VM4(+)-VM4(-)\}}{(Vctl4H-Vref)}$ (Vctl4H=㉑ pin is connected 10kΩ)	14.4	15.3	16.1	db

Input and output characteristics of each channels

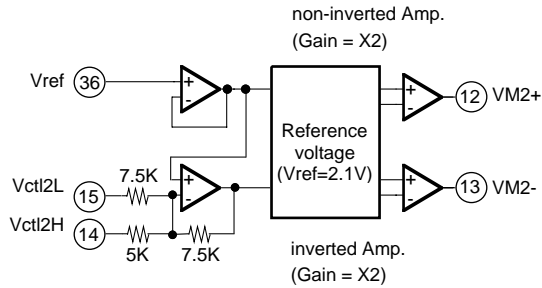
<Channel 1 Amp.>



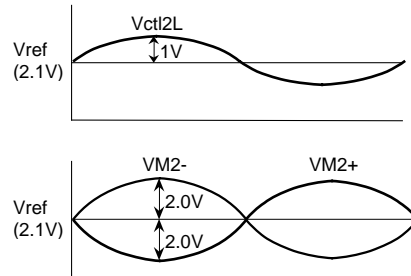
The voltage between the input and output when a voltage is inputted from Vct1(4 pin).



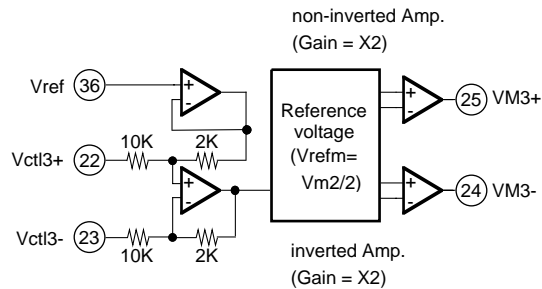
<Channel 2 Amp.>



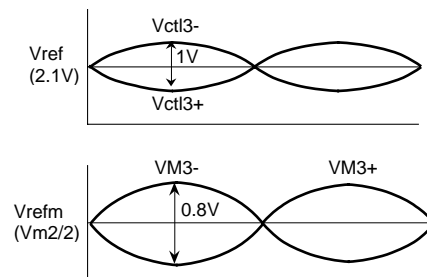
The voltage between the input and output when a voltage is inputted from Vct2(15 pin).



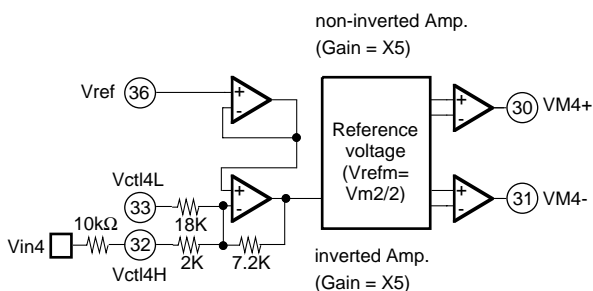
<Channel 3 Amp.>



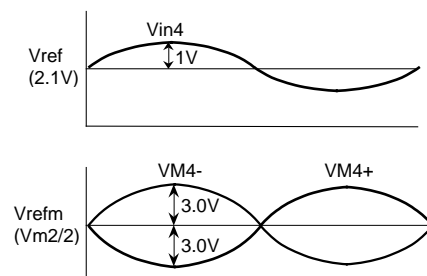
The voltage difference of 1V is inputted between Vct3- and Vct3+.



<Channel 4 Amp.>

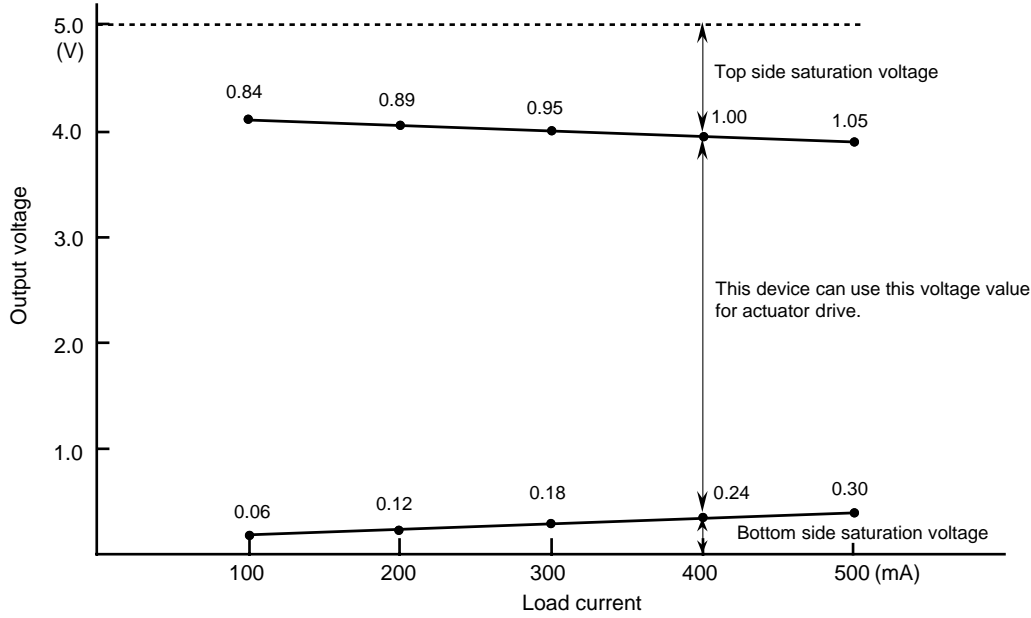


Vct4H (32 pin) is connected 10k Ω and the voltage between a input (Vin4) and out when a voltage is inputted from Vin4.

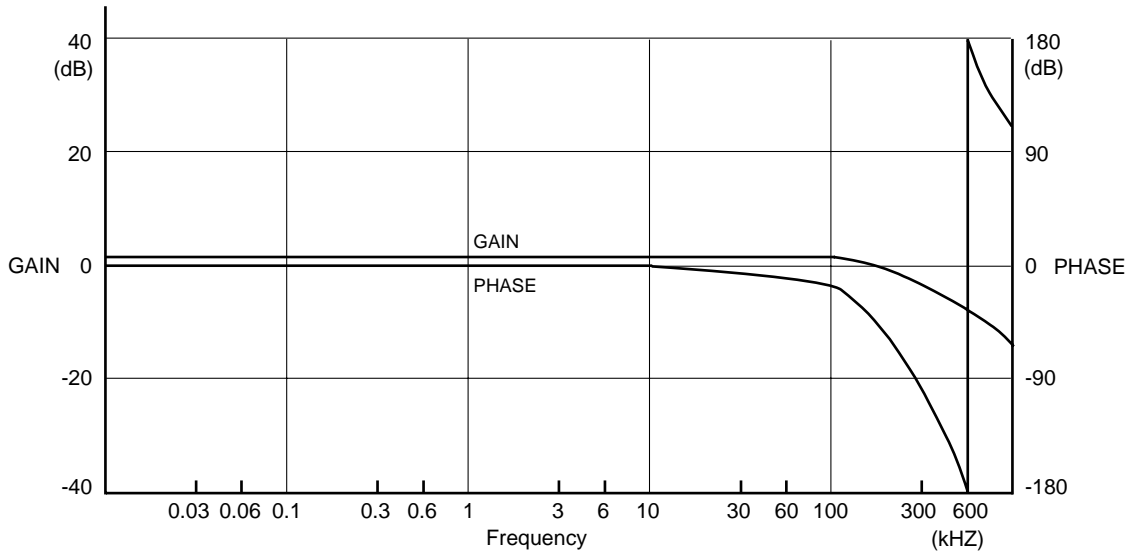


BASICALLY CHARACTERISTICS (Typical value)

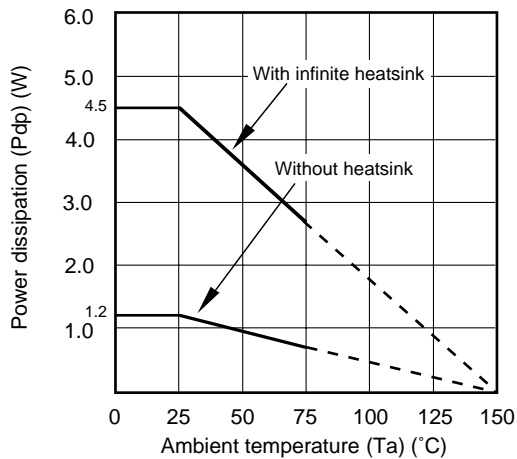
Output saturation voltage and Load current characteristic ($V_{bs}=V_m=V_{cc}=5V$)



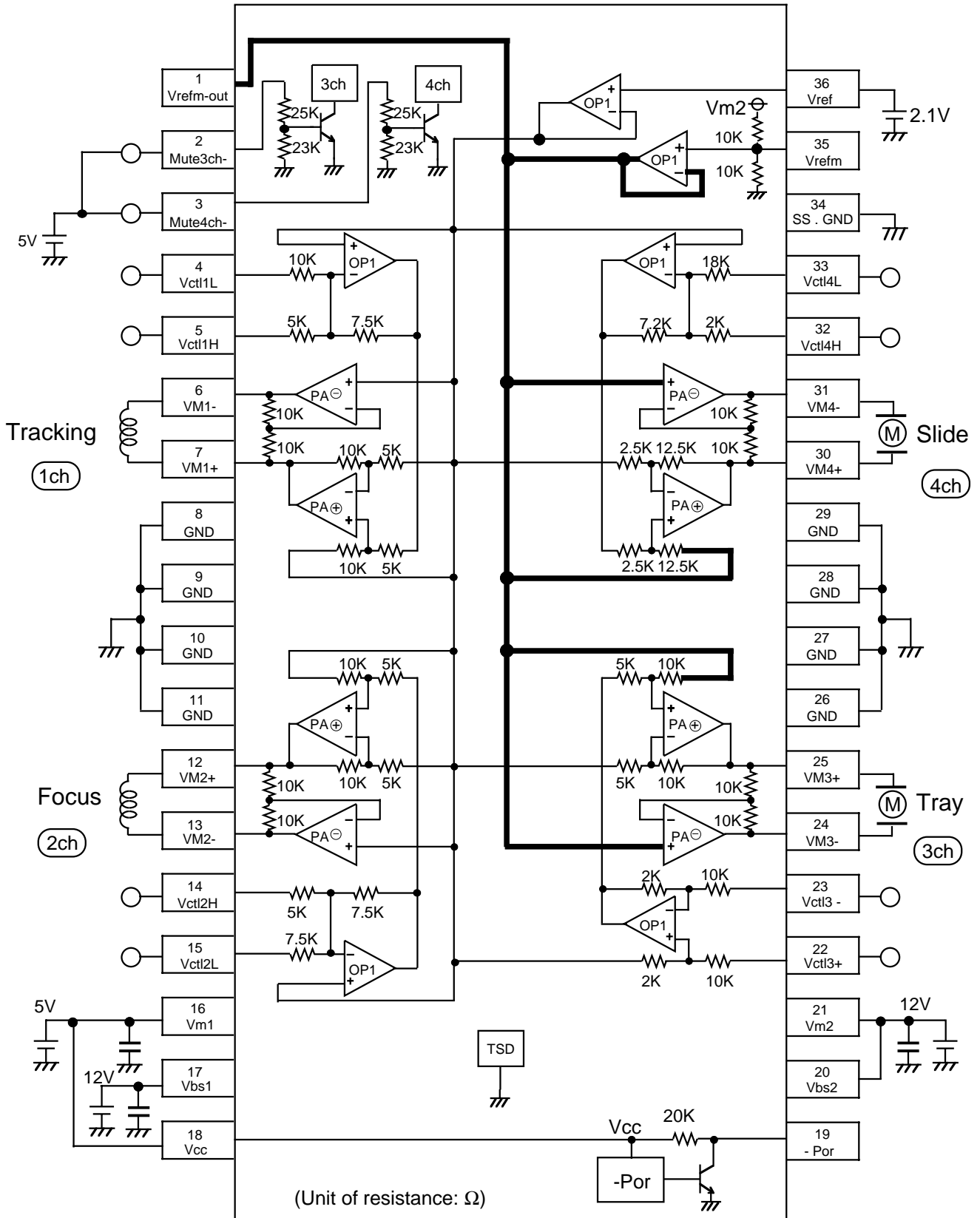
FREQUENCY CHARACTERISTIC



THERMAL DERATING



APPLICATION CIRCUIT



* When the Bootstrap function does not use, (17) and (20)pin must be connected with Motor power supply terminals ((16) and (21)pins).