

# M56753FP

## 2-CHANNEL ACTUATOR MOTOR DRIVER

### DESCRIPTION

The M56753FP is a semiconductor IC developed as the motor driver used DVD, DVD-ROM, CD-ROM and CD Player.

This device include 2 channel BTL drivers and can drive 2 actuators with one IC at the same time.

Also, the mute circuit, thermal protection circuit and VREF voltage monitor circuit functions are included.

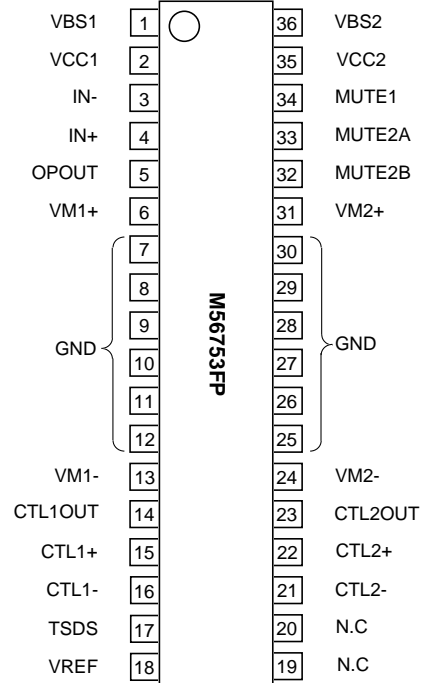
### FEATURES

- Low output saturation voltage (typ. 1.35V at 0.5A).
- Wide operating supply voltage range (4.5 to 15V).
- High current drive capability (maximum 0.9A).
- Low crossover distortion.
- High frequency capability.

### APPLICATION

DVD, DVD-ROM CD-ROM, CD PLAYER

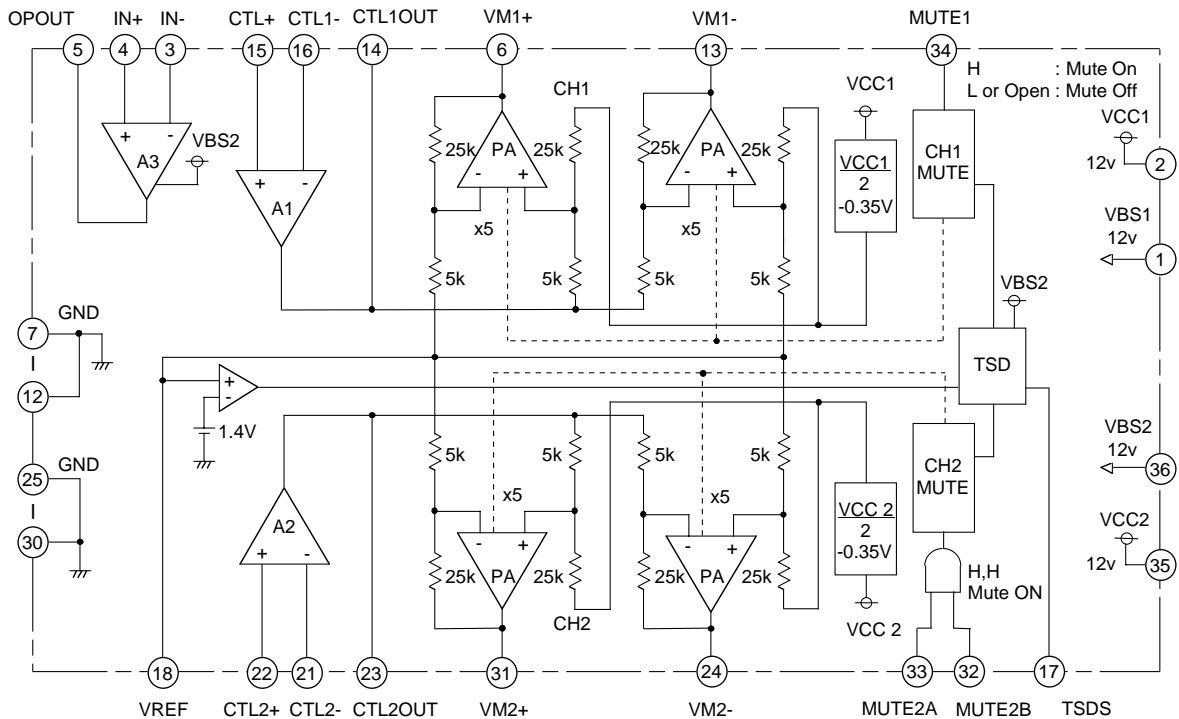
### PIN CONFIGURATION (TOP VIEW)



Outline 36P2R-D

N.C : no connection

### BLOCK DIAGRAM



**PIN DESCRIPTIONS**

Pin No.	Symbol	Function	Pin No.	Symbol	Function
①	VBS1	Bootstrap power supply 1	⑱	N.C	
②	VCC1	Power supply 1	⑳	N.C	
③	IN-	Op-Amp. inverted input	㉑	CTL2-	CH2 Amp. inverted input
④	IN+	Op-Amp. non-inverted input	㉒	CTL2+	CH2 Amp. non-inverted input
⑤	OPOUT	Op-Amp. output	㉓	CTL2OUT	CH2 input Amp. output
⑥	VM1+	CH1 Amp. non-inverted output	㉔	VM2-	CH2 Amp. inverted output
⑦ to ⑫	GND	GND	㉕ to ⑳	GND	GND
⑬	VM1-	CH1 Amp. inverted output	㉖	VM2+	CH2 Amp. non-inverted output
⑭	CTL1OUT	CH1 input Amp. output	㉗	MUTE2B	CH2 mute B
⑮	CTL1+	CH1 Amp. non-inverted input	㉘	MUTE2A	CH2 mute A
⑯	CTL1-	CH1 Amp. inverted input	㉙	MUTE1	CH1 mute
⑰	TSDS	Thermal monitor	㉚	VCC2	Power supply 2
⑱	VREF	Reference voltage input	㉛	VBS2	Bootstrap power supply 2

**ABSOLUTE MAXIMUM RATINGS (Ta=25°C)**

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>BS</sub>	Bootstrap Power Supply	①, ⑳ pins	15	V
V <sub>CC</sub>	Power Supply	②, ㉚ pins	15	V
I <sub>O</sub>	Output Current	V <sub>CC</sub> =V <sub>BS</sub> =12V	900	mA
V <sub>IN</sub>	Maximum Input Voltage of each Terminals	③, ④, ⑮, ⑯, ㉑, ㉒, ㉓, ㉔, ㉘ and ㉙ pins	0 – V <sub>CC</sub>	V
P <sub>d</sub>	Power Dissipation	With infinite heatsink	4.5	W
K <sub>θ</sub>	Thermal Derating	With infinite heatsink	27.8	°C/W
T <sub>j</sub>	Junction Temperature		150	°C
T <sub>opr</sub>	Operating Temperature		-20 – +75	°C
T <sub>stg</sub>	Storage Temperature		-40 – +150	°C

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Limits			Unit
		Min.	Typ.	Max.	
V <sub>CC1,2</sub>	Power Supply		12		V
V <sub>BS1,2</sub>	Bootstrap Power Supply		V <sub>CC</sub> +1		V

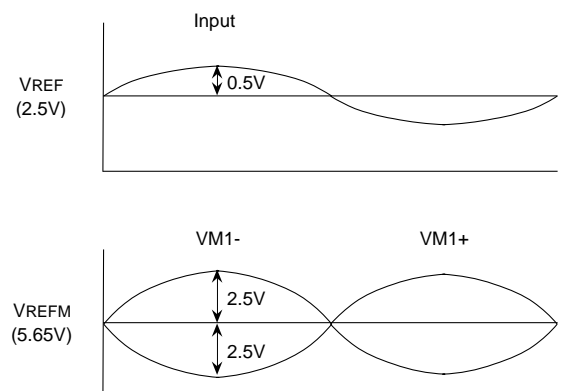
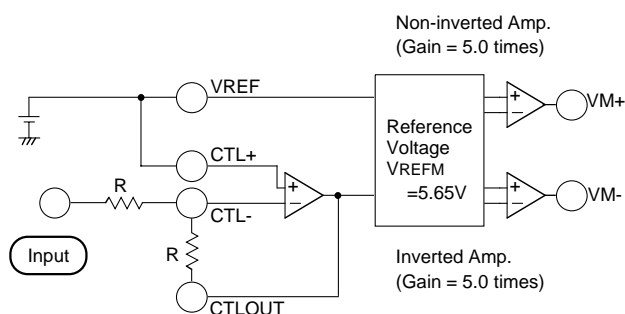
# M56753FP

## 2-CHANNEL ACTUATOR MOTOR DRIVER

### ELECTRICAL CHARACTERISTICS (Ta=25°C, Vcc1=Vcc2=VBS2=12V, Load=0, unless otherwise noted)

Symbol	Parameters	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
Icc1	Power Supply Current-1 (at Enable condition)	①, ②, ③⑤, ③⑥ pins current at VREF=0.	—	1.0	2.0	mA
Icc2	Power Supply Current-2 (at Mute condition)	①, ②, ③⑤, ③⑥ pins current at VREF=VCTL=2.5V, MUTE=5V.	—	4.5	7.0	mA
Icc3	Power Supply Current-3	①, ②, ③⑤, ③⑥ pins current at VREF=VCTL=2.5V, MUTE=0V.	—	23	37	mA
VSAT1	Output saturation voltage	Top and Bottom power Transistors saturation voltage (at Io=0.5A).	—	1.35	1.9	V
VSAT2	Output saturation voltage (at Bootstrap)		—	0.7	1.0	V
VOFS1	Output Amp. Offset voltage 1	VREF=VCTL=2.5V, VCC=VBS=5V (CTL Amp.=buffer.)	-27	—	+27	mV
VOFS2	Output Amp. Offset voltage 2	VREF=VCTL=2.5V, VCC=VBS=12V (CTL Amp.=buffer.)	-78	—	+78	mV
GAIN	Voltage Gain between input and output	$\frac{\{VM(+)-VM(-)\}}{(VCTL-VREF)}$ (CTL Amp.=buffer.)	19.1	20	20.8	dB
VMUTE ON	Mute ON voltage	CH2 is Mute-ON mode when MUTE2A=H and MUTE2B=H condition.	2.0	—	—	V
VMUTE OFF	Mute OFF current		—	—	0.8	V
IMUTE	Mute input current	MUTE1=MUTE2A=MUTE2B=5V	—	190	250	μA
VCTLIN	CTL Amp. Input voltage range	A1 and A2 Amps.	1.5	—	VBS-1.2	V
VCTLOUT	CTL Amp. Output voltage range	A1 and A2 Amps. Load=0	1.0	—	VBS-1.0	V
VA3IN	A3 Amp. Input voltage range		0	—	VBS-1.9	V
VA3OUT	A3 Amp. Output voltage range	Load=0	1.0	—	VBS-1.0	V
VA3OFS	A3 Amp. Offset voltage	Load=0	-5	—	+5	mV
VREFS	VREF Monitor Voltage	When VREF voltage is under this values, M56753FP makes the Bias shut off.	—	1.4	1.8	V
VREF1	VREF Input current	VREF=2.5V 1.25V ≤ VCTL ≤ 3.75V	-1	-0.37	0.1	mA

### CH1 and CH2 Input and Output Characteristics

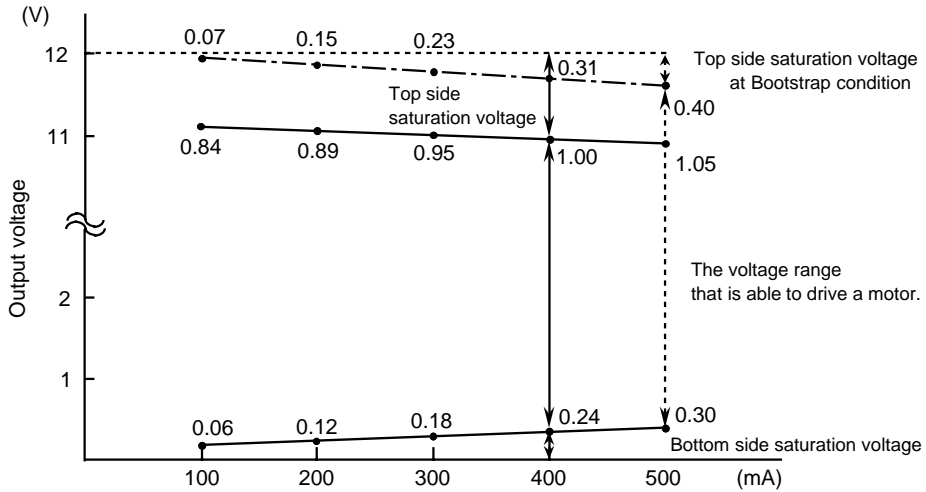


**TYPICAL CHARACTERISTICS**

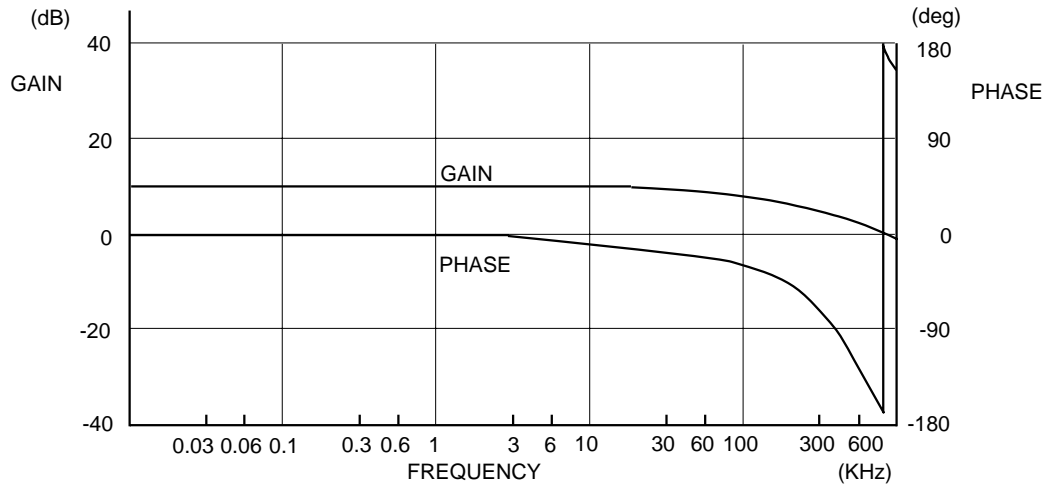
Output saturation voltage–Load Current Characteristics.

$V_{BS}=V_{CC}=12V$  No-Bootstrap condition : \_\_\_\_\_

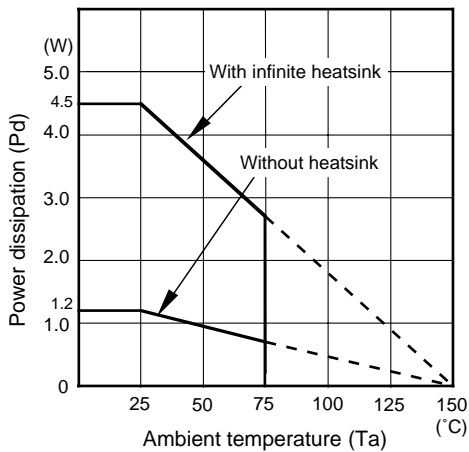
$V_{BS}=13V, V_{CC}=12V$  Bootstrap condition : - - - - -



**Frequency Characteristics**

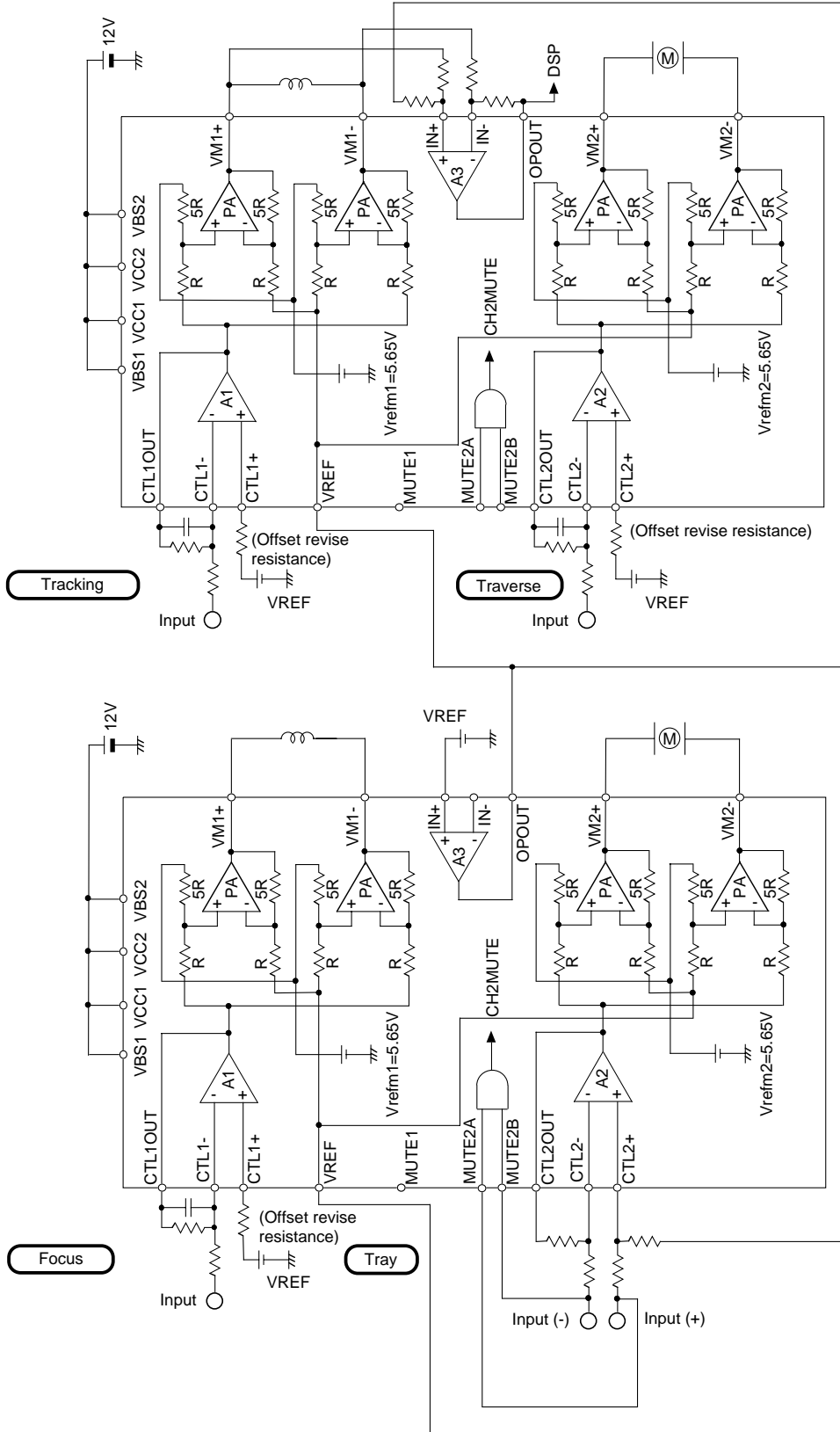


**Thermal Derating**



**APPLICATION CIRCUIT**

This show the 4 actuators drive circuit using two M56753FP.



Tray	Input(+)		
	L	H	
Input (-)	L	Stop(SB)	Forward
	H	Reverse	Shut off

If MUTE2A and MUTE2B are connected to Input(+) and Input(-), this device can be shut off the output when Input(-) and Input(+) are High condition.