

# M56781FP

## 2-CHANNEL ACTUATOR MOTOR DRIVER

### DESCRIPTION

The M56781FP 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.

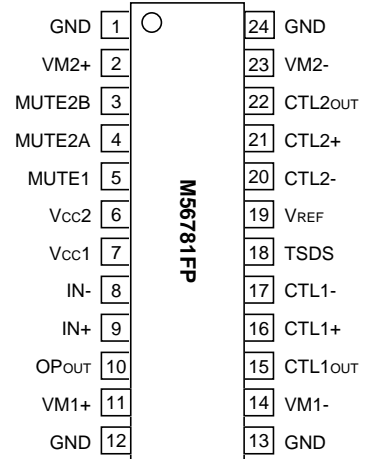
### FEATURES

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

### APPLICATION

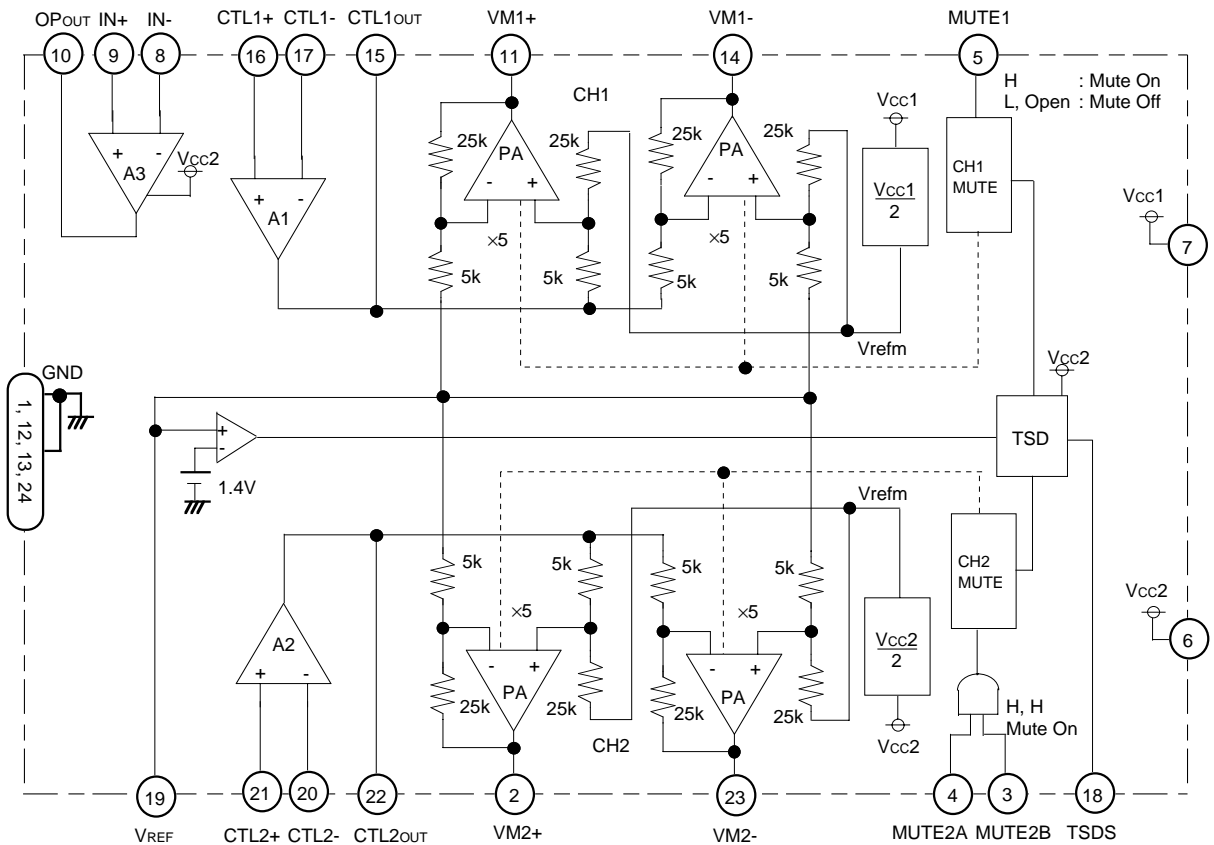
DVD, DVD-ROM, CD-ROM, CD-PLAYER

### PIN CONFIGURATION (TOP VIEW)



Outline 24P2Q-A

### BLOCK DIAGRAM



**PIN DESCRIPTIONS**

Pin No.	Symbol	Function	Pin No.	Symbol	Function
①	GND	GND	⑬	GND	GND
②	VM2+	CH2 Amp. non-inverted output	⑭	VM1-	CH1 Amp. inverted output
③	MUTE2B	CH2 mute B	⑮	CTL1OUT	CH1 input Amp. output
④	MUTE2A	CH2 mute A	⑯	CTL1+	CH1 Amp. non-inverted input
⑤	MUTE1	CH1 mute	⑰	CTL1-	CH1 Amp. inverted input
⑥	Vcc2	Power supply 2	⑱	TSDS	Thermal monitor
⑦	Vcc1	Power supply 1	⑲	VREF	Reference voltage input
⑧	IN-	Op-Amp. inverted input	⑳	CTL2-	CH2 Amp. inverted input
⑨	IN+	Op-Amp. non-inverted input	㉑	CTL2+	CH2 Amp. non-inverted input
⑩	OPOUT	Op-Amp. output	㉒	CTL2OUT	CH2 input Amp. output
⑪	VM1+	CH1 Amp. non-inverted output	㉓	VM2-	CH2 Amp. inverted output
⑫	GND	GND	㉔	GND	GND

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

Symbol	Parameter	Conditions	Rating	Units
Vcc	Power supply	⑥, ⑦ pins	15	V
Io	Output Current	Vcc = Vbs = 12V	900	mA
Vin	Maximum input voltage of each terminals	③, ④, ⑤, ⑧, ⑨, ⑯, ⑰, ⑱, ⑳, ㉑ pin	0 – Vcc	V
Pd	Power dissipation	With infinite heatsink	2.97	W
Kθ	Thermal derating	With infinite heatsink	42.1	°C/W
Tj	Junction temperature		150	°C
Topr	Operating temperature		-20 – +75	°C
Tstg	Storage temperature		-40 – +150	°C

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Limits			Units
		Min.	Typ.	Max.	
Vcc1, 2	Power supply		12		V

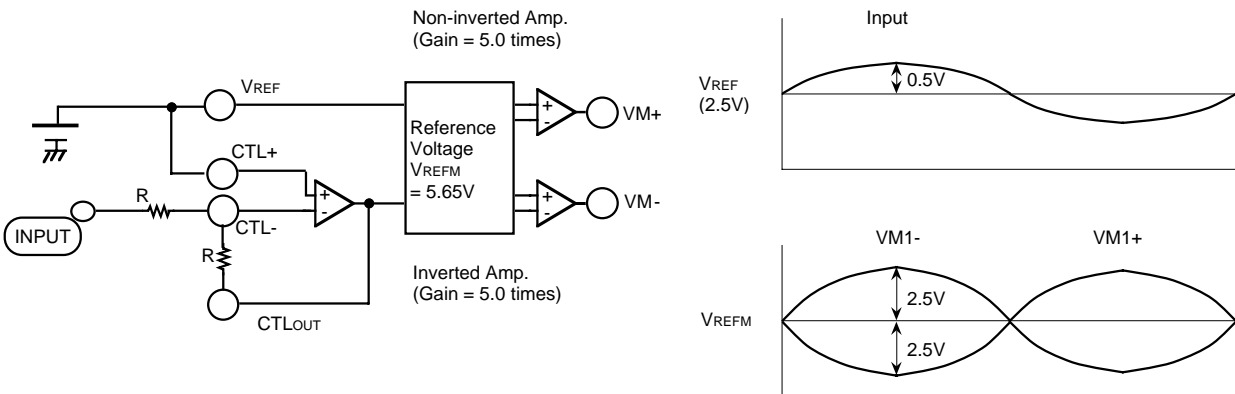
**ELECTRICAL CHARACTERISTICS** (Ta = 25°C, Vcc1 = Vcc2 = Vbs2 = 12V, Load = 0 unless otherwise noted.)

Symbol	Parameter	Measurement condition	Limits			Units
			Min.	Typ.	Max.	
Icc1	Power supply current - 1 (at Enable condition)	⑥, ⑦ pins current at VREF = 0.	—	1.0	2.0	mA
Icc2	Power supply current - 2 (at Mute condition)	⑥, ⑦ pins current at VREF = VCTL = 2.5V, MUTE = 5V.	—	4.5	7.0	mA
Icc3	Power supply current - 3	⑥, ⑦ pins current at VREF = VCTL = 2.5V, MUTE = 0V.	—	23	37	mA
VSAT	Output saturation voltage	Top and Bottom power Transistors saturation voltage (at Io = 0.5A).	—	1.35	1.9	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
VMUTEON	Mute ON voltage	CH2 is Mute-ON mode when MUTE2A = H and MUTE2B = H condition.	2.0	—	—	V
VMUTEOFF	Mute OFF voltage		—	—	0.8	V
IMUTE	Mute input current	MUTE1 = MUTE2A = MUTE2B = 5V	—	190	250	μA

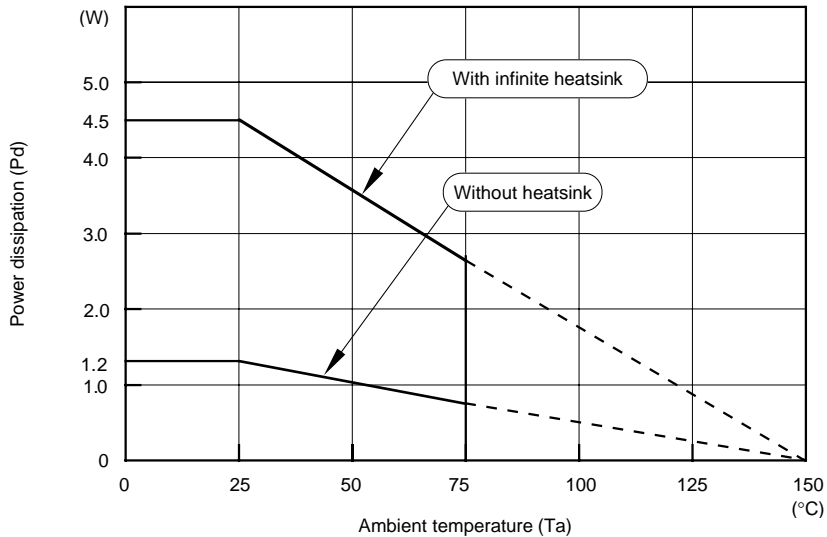
**ELECTRICAL CHARACTERISTICS** (Ta = 25°C, Vcc1 = Vcc2 = VBS1 = VBS2 = 12V, Load = 0)

Symbol	Parameter	Test conditions	Limits			Units
			Min.	Typ.	Max.	
VCTLIN	CTL Amp. Input voltage range	A1 and A2 Amps.	1.5	—	Vcc-1.2	V
VCTLIN	CTL Amp. Output voltage range	A1 and A2 Amps. Load = 0	1.0	—	Vcc-1.0	V
VA3IN	A3 Amp. Input voltage range		0	—	Vcc-1.9	V
VA3OUT	A3 Amp. Output voltage range	Load = 0	1.0	—	Vcc-1.0	V
VA3OFS	A3 Amp. Offset voltage	Load = 0	-5	—	+5	mV
VREFS	VREF monitor voltage	When VREF voltage is under this values, M56781FP 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**

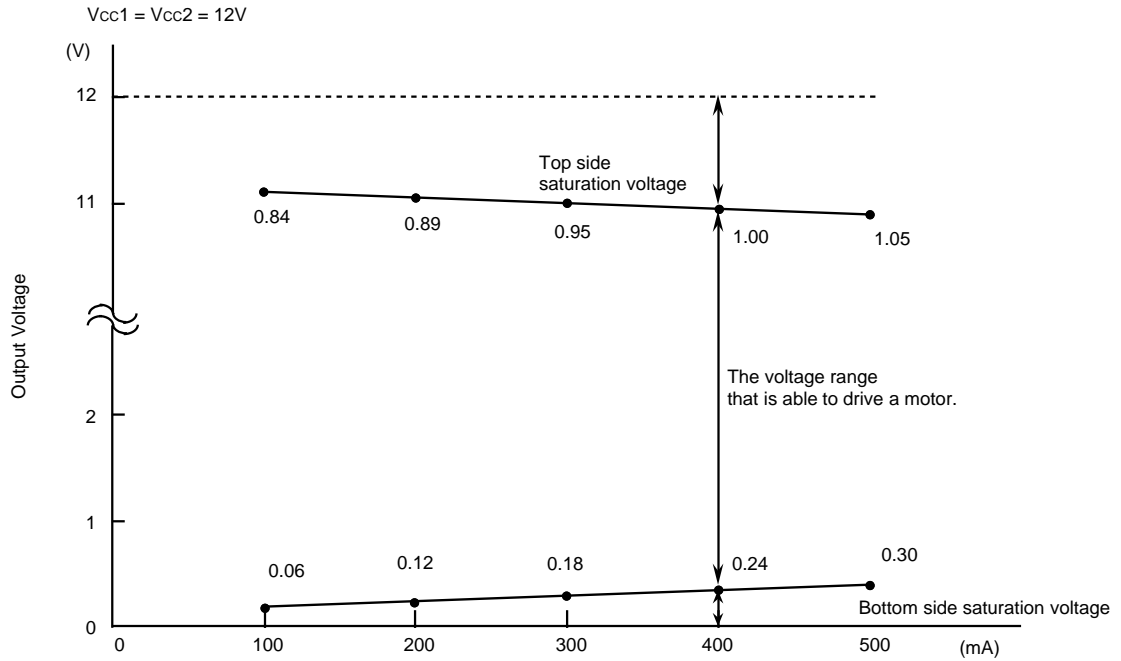


**THERMAL DRATING CURVE**

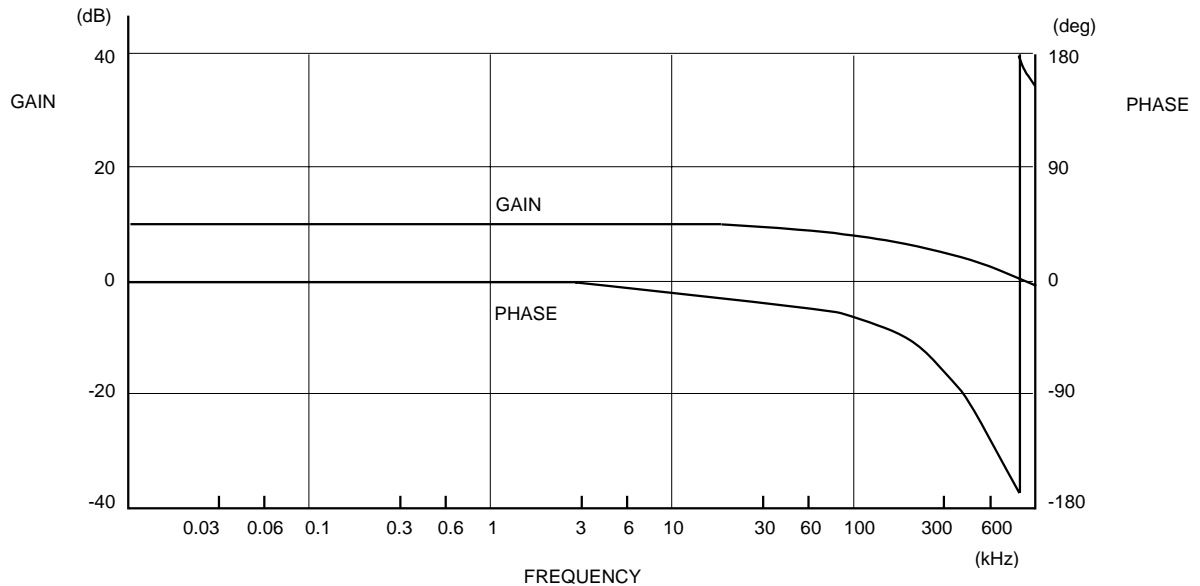


**TYPICAL CHARACTERISTICS**

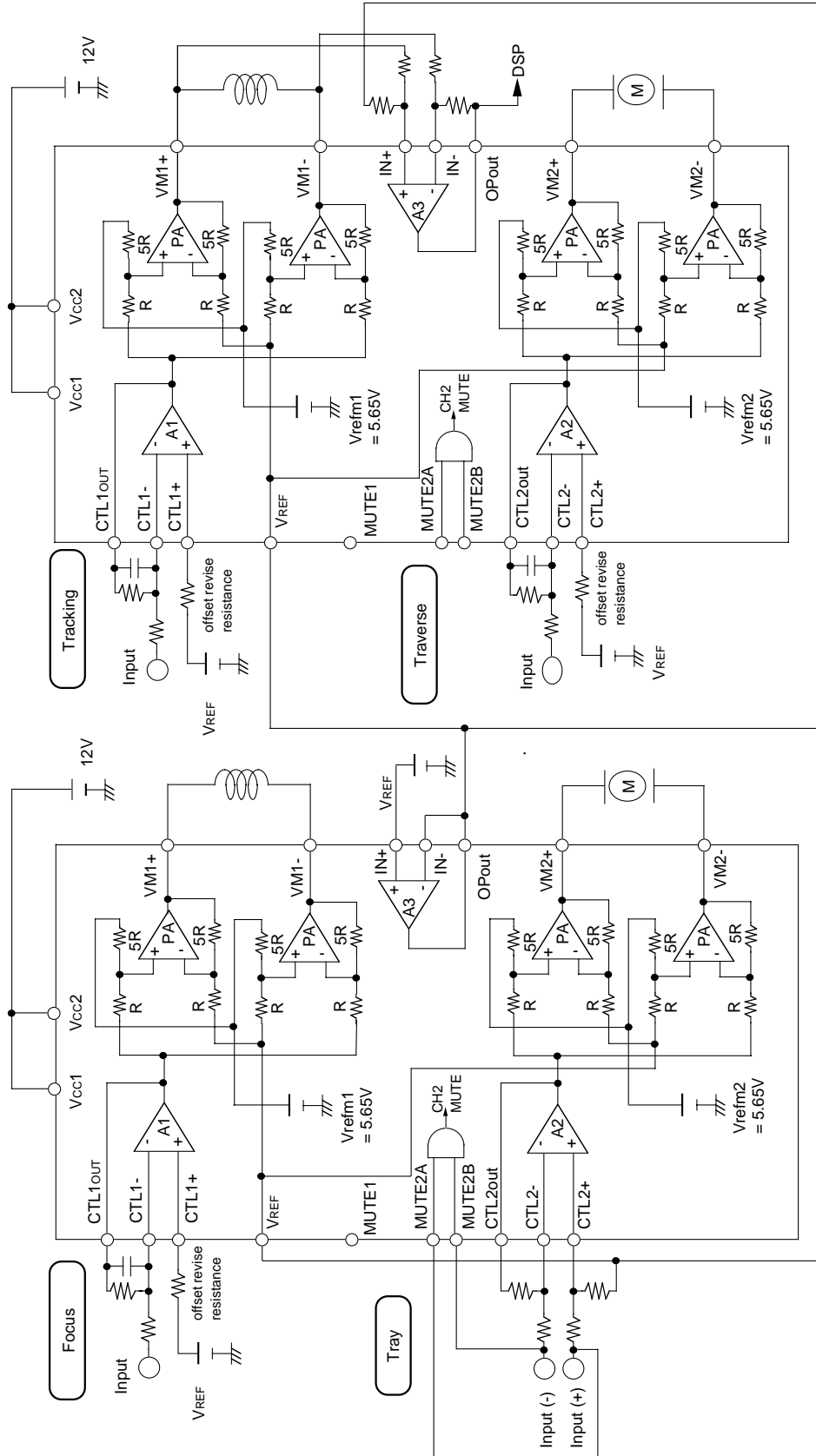
Output Saturation Voltage - Load Current Characteristics.



**FREQUENCY CHARACTERISTICS**



**APPLICATION CIRCUIT** This show the 4 actuators drive circuit using two M56781FP.



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.

Tray	Input (+)	
	L	H
Input (-)	L	Forward
	H	Shut off