M54548L

BI-DIRECTIONAL MOTOR DRIVER WITH MOTOR SPEED CONTROL

DESCRIPTION

The M54548L, BI-DIRECTIONAL MOTOR DRIVER, consists of a full bridge power driver designed for use in a D-C motor control circuit. The internal operational amplifier is capable for controlling the voltage across the bridge outputs.

FEATURES

- Wide operating voltage range
- NMOS and CMOS compatible input
- 1.2A output current
- Integral operational amplifier for output source voltage
- Output transient suppression
- Braking mode input

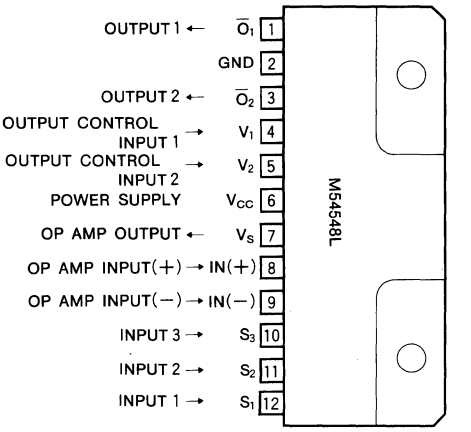
APPLICATION

Audio, video cassette recorder

FUNCTION

The M54548L, full bridge motor driver, has the logic circuitry and the quasi-darlington power driver for bidirectional control of D-C motors operating at current up to 1.2A. The inputs, S_1, S_2 and S_3, are capable to control the bridge output polarity and also to select the supply voltage of the predriver from the voltages drived by V_1, V_2 or the output of the operational amplifier.

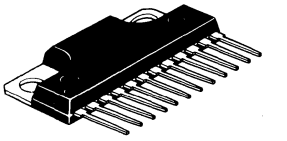
PIN CONFIGURATION (TOP VIEW)



Outline 12P9

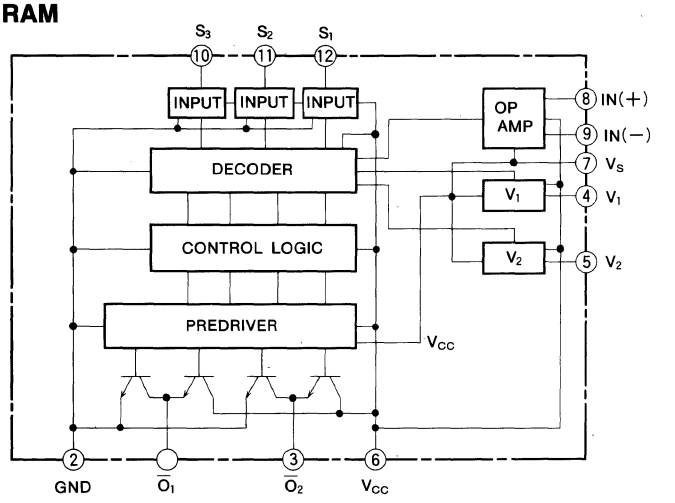
LOGIC TRUTH TABLE

Input			Output		Driver power supply	Note
S_1	S_2	S_3	$\overline{O_1}$	$\overline{O_2}$		
L	L	L	"OFF" state	"OFF" state	—	STOP
L	L	H	H	L	OP AMP OUTPUT	PLAY(+)
L	H	L	L	H	OP AMP OUTPUT	PLAY(−)
L	H	H	H	L	V_2	FF(2)
H	L	L	L	H	V_2	REW(2)
H	L	H	H	L	V_1	FF(1)
H	H	L	L	H	V_1	REW(1)
H	H	H	L	L	V_S	BRAKING



12-pin molded plastic SIL

BLOCK DIAGRAM



BI-DIRECTIONAL MOTOR DRIVER WITH MOTOR SPEED CONTROL

ABSOLUTE MAXIMUM RATINGS (T_a=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage	With an external heat sink (3000mm²×1.5mmᵗ)	−0.5～+18	V
V_I	Input voltage	4 Pin, 5 Pin	−0.5～+14or V_{CC}	V
			−0.5～V_{CC}	
V_O	Output voltage		−0.5～V_{CC}+2.5	V
$I_{O(max)}$	Peak output current	t_{op}=10ms; Repetitive cycle 0.2Hz max	±1.2	A
$I_{O(1)}$	Continuous output current (1)		±300	mA
$I_{O(2)}$	Continuous output current (2)	With an external heat sink (3000mm²×1.5mmᵗ)	±600	mA
P_d	Power dissipation	T_a=75℃	1.2	W
T_{OPr}	Operating ambient temperature range		−10～+75	℃
T_{stg}	Storage temperature range		−55～+125	℃

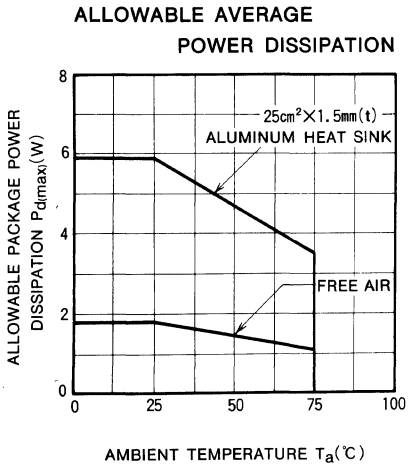
RECOMMENDED OPERATING CONDITIONS (T_a=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		4	12	16	V
I_O	Continuous output current				±200	mA
V_{IH}	"H" Input voltage		3			V
V_{IL}	"L" Input voltage				1	V
t_S	Motor braking interval		100			ms

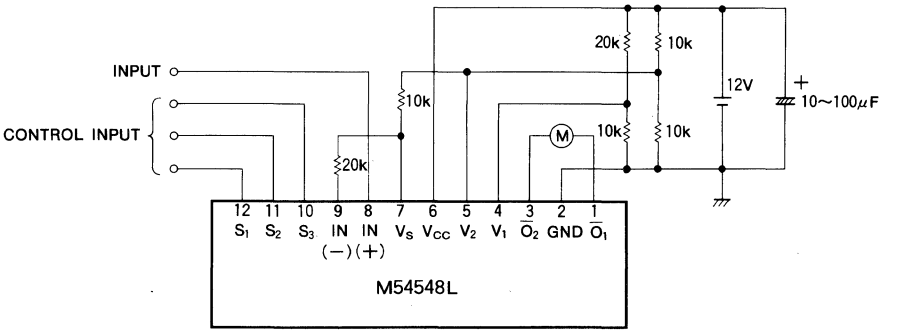
ELECTRICAL CHARACTERISTICS (T_a=25℃, unless otherwise noted)

Symbol	Parameter	Test conditions			Limits			Unit
					Min	Typ	Max	
$I_{O(leak)}$	Output leakage current	V_{S1}=0V, V_{S2}=0V, V_{S3}=0V		V_O=0V, V_{CC}=V_S=20V			−100	μA
				V_O=14V, V_{CC}=V_S=14V			+100	
$V_{OH(1)}$	"H" Output saturation voltage (1)	V_{CC}=16V, $V_{IN(-)}$=0V, $V_{IN(+)}$=3V	V_{S1}=V_{S2}=0V, V_{S3}=3V	I_{OH}=−200mA	13			V
				I_{OH}=−500mA	12.8			
$V_{OH(2)}$	"H" Output saturation voltage (2)	V_{CC}=16V, $V_{IN(-)}$=0V, $V_{IN(+)}$=3V	V_{S1}=V_{S3}=0V, V_{S2}=3V	I_{OH}=−200mA	13			V
				I_{OH}=−500mA	12.8			
$V_{OL(1)}$	"L" Output saturation voltage (1)	V_{CC}=16V, $V_{IN(-)}$=0V, $V_{IN(+)}$=3V	V_{S1}=V_{S3}=0V, V_{S2}=3V	I_{OL}=200mA			0.5	V
				I_{OL}=500mA			1.4	
$V_{OL(2)}$	"L" Output saturation voltage (2)	V_{CC}=16V, $V_{IN(-)}$=0V, $V_{IN(+)}$=3V	V_{S1}=V_{S2}=0V, V_{S3}=3V	I_{OL}=200mA			0.5	V
				I_{OL}=500mA			1.4	
I_{IH}	"H" Input current	V_{CC}=16V, V_{IS}=3V (S_1, S_2, S_3)					10	μA
I_{IL}	"L" Input current	V_{CC}=16V, V_{IS}=0V (S_1, S_2, S_3)					−20	μA
I_{CC}	Supply current	V_{CC}=16V, V_{S1}=V_{S2}=V_{S3}=3V					25	mA
A	Op amp open-loop-gain				50			dB

TYPICAL CHARACTERISTICS



TYPICAL APPLICATION



Unit : Ω