

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
- Integral diodes for transient suppression
- Braking mode input

APPLICATION

Audio, video cassette recorder

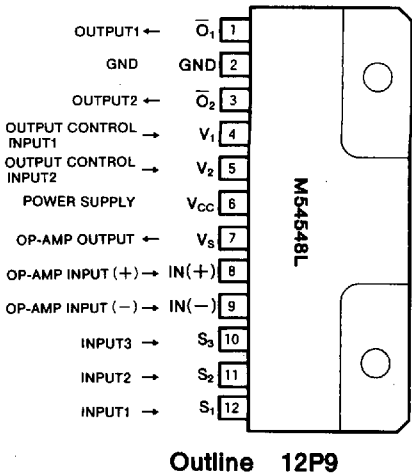
FUNCTION

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, S₁, S₂ and S₃, are capable to control the bridge output polarity and also to select the supply voltage of the predriver from the voltages driven by V₁, V₂ or the output of the operational amplifier.

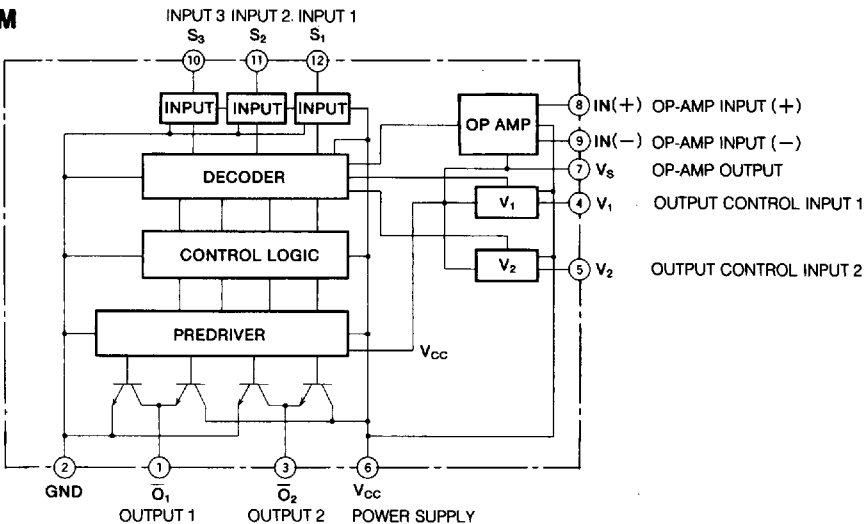
LOGIC TRUTH TABLE

Input			Output		Driver power supply	Note
S ₁	S ₂	S ₃	O ₁	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

PIN CONFIGURATION (TOP VIEW)



BLOCK DIAGRAM



BI-DIRECTIONAL MOTOR DRIVER WITH MOTOR SPEED CONTROL

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage	With an external heat sink (3000mm ² ×1.5mm ²)	-0.5~+18	V
V_i	Input voltage	4 Pin, 5 Pin	-0.5~+14 or V_{CC}	V
V_o	Output voltage		-0.5~ $V_{CC}+2.5$	V
$I_{O(max)}$	Peak output current	$t_{op}=10\text{ms}$; 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 (3000mm ² ×1.5mm ²)	± 600	mA
P_d	Power dissipation	$T_a = 75^\circ\text{C}$	1.6	W
T_{opr}	Operating temperature		-10~+75	$^\circ\text{C}$
T_{stg}	Storage temperature		-55~+125	$^\circ\text{C}$

RECOMMENDED OPERATING CONDITIONS ($T_a = 25^\circ\text{C}$, 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		10	100		ms

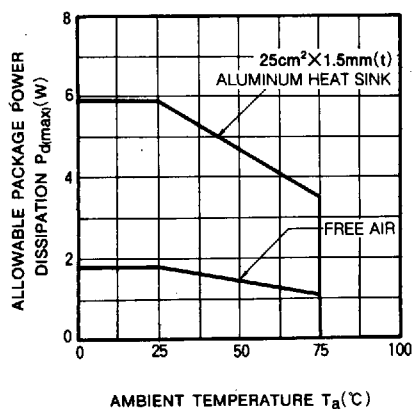
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test conditions		Limits			Unit
				Min	Typ	Max	
$I_{O(Leak)}$	Output leakage current	$V_{S1}=0\text{V}$ $V_{S2}=0\text{V}$ $V_{S3}=0\text{V}$	$V_O=0\text{V}$ $V_{CC}=V_S=20\text{V}$ $V_O=14\text{V}$ $V_{CC}=V_S=14\text{V}$			-100 +100	μA
$V_{OH(1)}$	"H" Output saturation voltage (1)	$V_{CC}=16\text{V}$ $V_{IN(-)}=0\text{V}$ $V_{IN(+)}=3\text{V}$	$V_{S1}=V_{S2}=0\text{V}$ $V_{S3}=3\text{V}$	$I_{OH}=-200\text{mA}$ $I_{OH}=-500\text{mA}$	13 12.8		V
$V_{OH(2)}$	"H" Output saturation voltage (2)	$V_{CC}=16\text{V}$ $V_{IN(-)}=0\text{V}$ $V_{IN(+)}=3\text{V}$	$V_{S1}=V_{S3}=0\text{V}$ $V_{S2}=3\text{V}$	$I_{OH}=-200\text{mA}$ $I_{OH}=-500\text{mA}$	13 12.8		V
$V_{OL(1)}$	"L" Output saturation voltage (1)	$V_{CC}=16\text{V}$ $V_{IN(-)}=0\text{V}$ $V_{IN(+)}=3\text{V}$	$V_{S1}=V_{S3}=0\text{V}$ $V_{S2}=3\text{V}$	$I_{OL}=200\text{mA}$ $I_{OL}=500\text{mA}$		0.5 1.4	V
$V_{OL(2)}$	"L" Output saturation voltage (2)	$V_{CC}=16\text{V}$ $V_{IN(-)}=0\text{V}$ $V_{IN(+)}=3\text{V}$	$V_{S1}=V_{S2}=0\text{V}$ $V_{S3}=3\text{V}$	$I_{OL}=200\text{mA}$ $I_{OL}=500\text{mA}$		0.5 1.4	V
I_{IH}	"H" Input current	$V_{CC}=16\text{V}$, $V_{IS}=3\text{V}$ (S_1 , S_2 , S_3)				10	μA
I_{IL}	"L" Input current	$V_{CC}=16\text{V}$, $V_{IS}=0\text{V}$ (S_1 , S_2 , S_3)				-20	μA
I_{CC}	Supply current	$V_{CC}=16\text{V}$, $V_{S1}=V_{S2}=V_{S3}=3\text{V}$				30	mA
A	Op amp open-loop-gain			50			dB

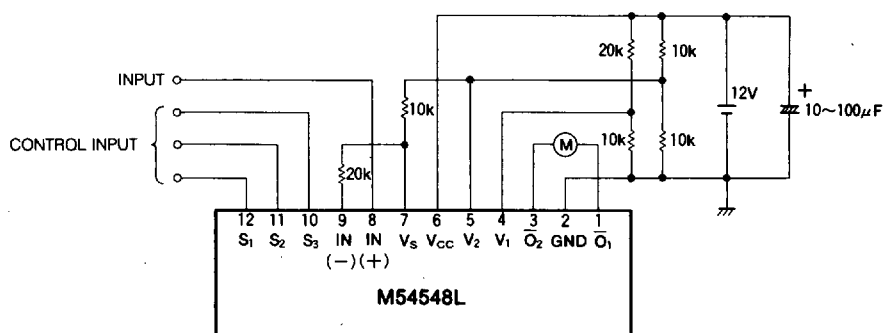
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TYPICAL CHARACTERISTICS

ALLOWABLE AVERAGE POWER DISSIPATION



APPLICATION EXAMPLE

Unit : Ω