DESCRIPTION

The M54648AL is a semiconductor integrated circuit, capable of directly driving bi-directional micro motor, with a built in speed control circuit.

FEATURES

- Wide operating voltage range (V_{CC}=4~18V)
- N MOS, C MOS IC output for direct drive
- Large output sink current ($I_{O(max)}$=±3.0A)
- Built-in operational amplifier for "H" output voltage control
- Built-in clamp diode
- Braking mode input
- Compact power package requiring small space

APPLICATION

Audio tape deck player, radio cassette player, VTR, Home-use equipment

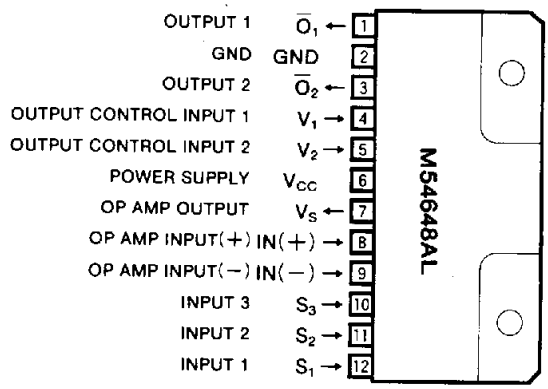
FUNCTION

The M54648AL, full bridge motor driver, has the logic circuitry and the quasi-darlington power driver for driver for bidirectional control of D-C motors operating at current up to 3. 0A.

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 operatinal amplifier.

The internal thermal shutdown protector protects the IC from thermal destruction due to blocking of motor, etc.

PIN CONFIGURATION (TOP VIEW)

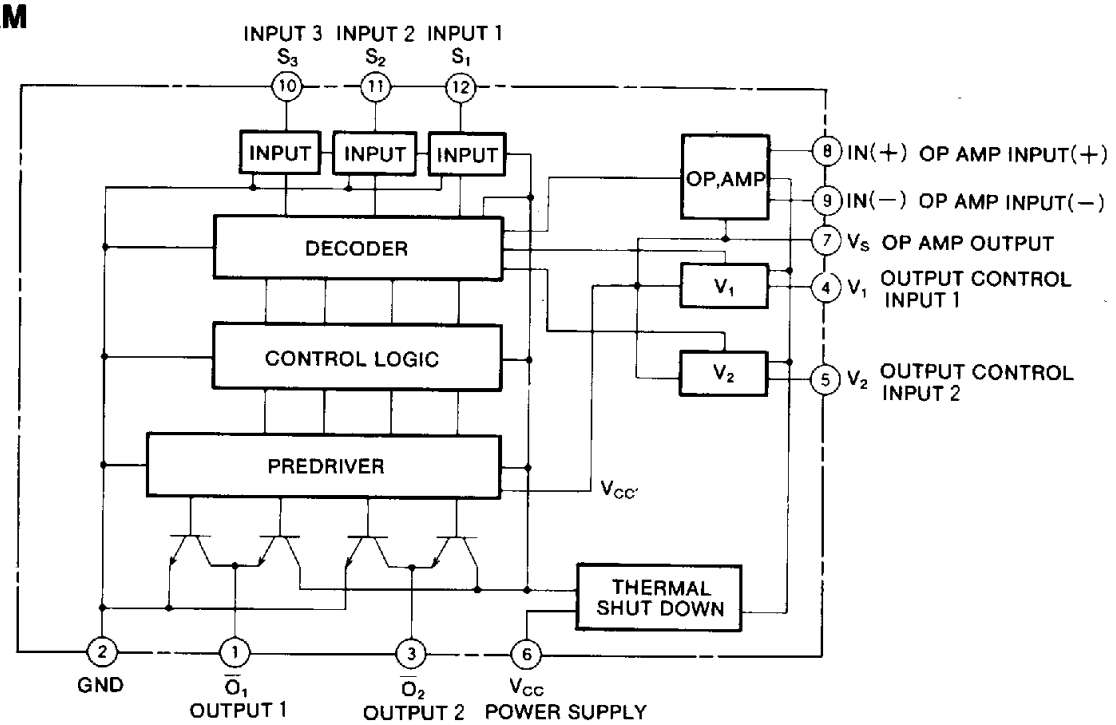


Outline 12P9B

LOGIC TRUTH TABLE

Input			Output		Driver power supply (V_{CC})	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	BRAKE

BLOCK DIAGRAM



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

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage	With an external heat sink (3000mm²×1.5mmt)	−0.5～+20	V
V_I	Input voltage	4Pin, 5Pin	−0.5～+14 or V_{CC}	V
		Inputs pin other than the above	−0.5～V_{CC}	
V_O	Output voltage		−2.0～V_{CC}+2.5	V
$I_{O(max)}$	Peak output current	top=10ms ; repetive cycle 0.2Hz max	±3.0	A
$I_{O(1)}$	Continuous output current (1)		±300	mA
$I_{O(2)}$	Continuous output current (2)	With an external hbat sink (3000mm²×1.5mmt)	±800	mA
P_d	Power dissipation	T_a=75℃	0.8	W
Topr	Operating temperature		−10～+75	℃
Tstg	Storage temperature		−55～+125	℃

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

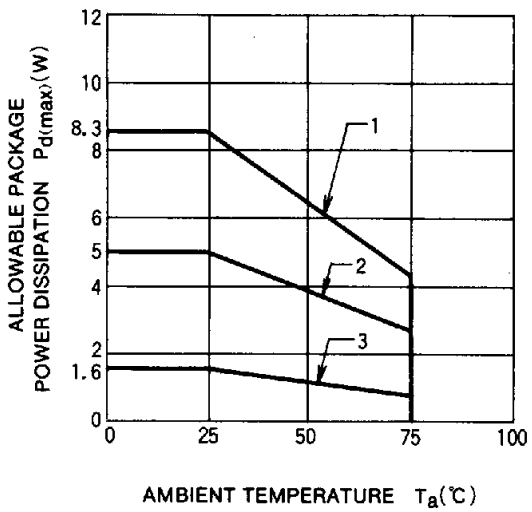
Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		4	12	18	V
I_O	Output current				±300	mA
V_{IH}	High-level input voltage		3		V_{CC}	V
V_{IL}	Low-level input voltage		0		1	V
t_B	Moter braking interval		100			ms
$t_{j(shut)}$	Thermal shutdown temperature		125	150		℃

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, S_{S2}=0V, V_{S3}=0V	V_O=0V, V_{CC}=V_S=20V				−100	μA
			V_O=14V, V_{CC}=V_S=14V				+100	
$V_{OH(1)}$	High-level output 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			
$V_{OH(2)}$	High-level output 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			
$V_{OL(1)}$	Low-level output voltage (1)	V_{CC}=16V, $V_{IN(-)}$=0V, $V_{IN(+)}$=3V	V_{S1}=V_{S3}=0V, V_{S2}=3V	I_{OL}=200mA			1.1	V
				I_{OL}=500mA			1.2	
$V_{OL(2)}$	Low-level output voltage (2)	V_{CC}=16V, $V_{IN(-)}$=0V, $V_{IN(+)}$=3V	V_{S1}=V_{S2}=0V, V_{S3}=3V	I_{OL}=200mA			1.1	V
				I_{OL}=500mA			1.2	
I_{IH}	High-level input current	V_{CC}=16V, V_{IS}=3V(S_1, S_2, S_3)					10	μA
I_{IL}	Low-level 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					30	mA
A	Op amp open-loop-gain				50			dB

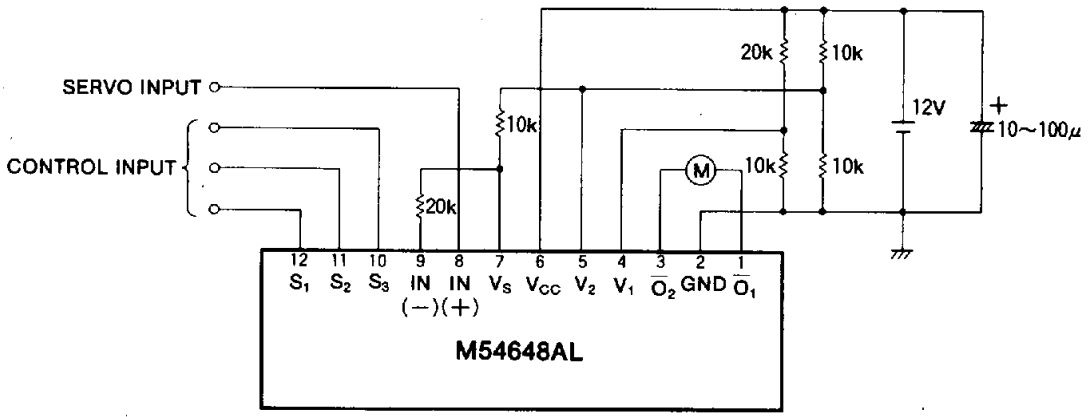
TYPICAL CHARACTERISTICS

ALLOWABLE AVERAGE POWER DISSIPATION



1) WITH HEAT SINK OF INFINITE SIZE
2) 25cm²×1.5mmt ALUMINUM HEAT SINK
3) FREE AIR

APPLICATION EXAMPLE



Unit : Ω