

M51712P

3-PHASE BRUSHLESS MOTOR DRIVER

DESCRIPTION

The M51712P is designed for use in 3-phase Brushless Motor in combination with the servo IC.

The M51712P is encapsulated in DIL with the fin 20-pin package, integrating Hall drivers, output drivers, Hall compensator and control amplifier and other functions.

The M51712P provides the linear amplified outputs (shown later) so that it can reduce the mechanical noise which occurs in pulse driving motors.

FEATURES

- Low torque ripple
- Reducing the mechanical noise
- High speed response
- Minimized external components

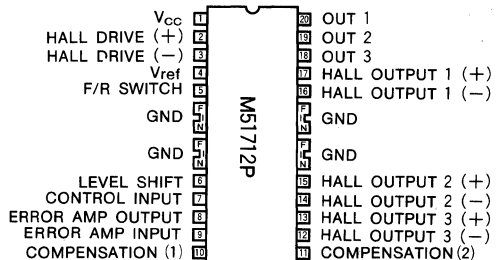
APPLICATION

VTR, floppy disk driver, etc

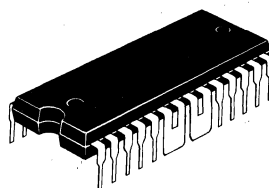
RECOMMENDED OPERATING CONDITIONS

Supply voltage range 6~12V
 Rated supply voltage 12V

PIN CONFIGURATION (TOP VIEW)

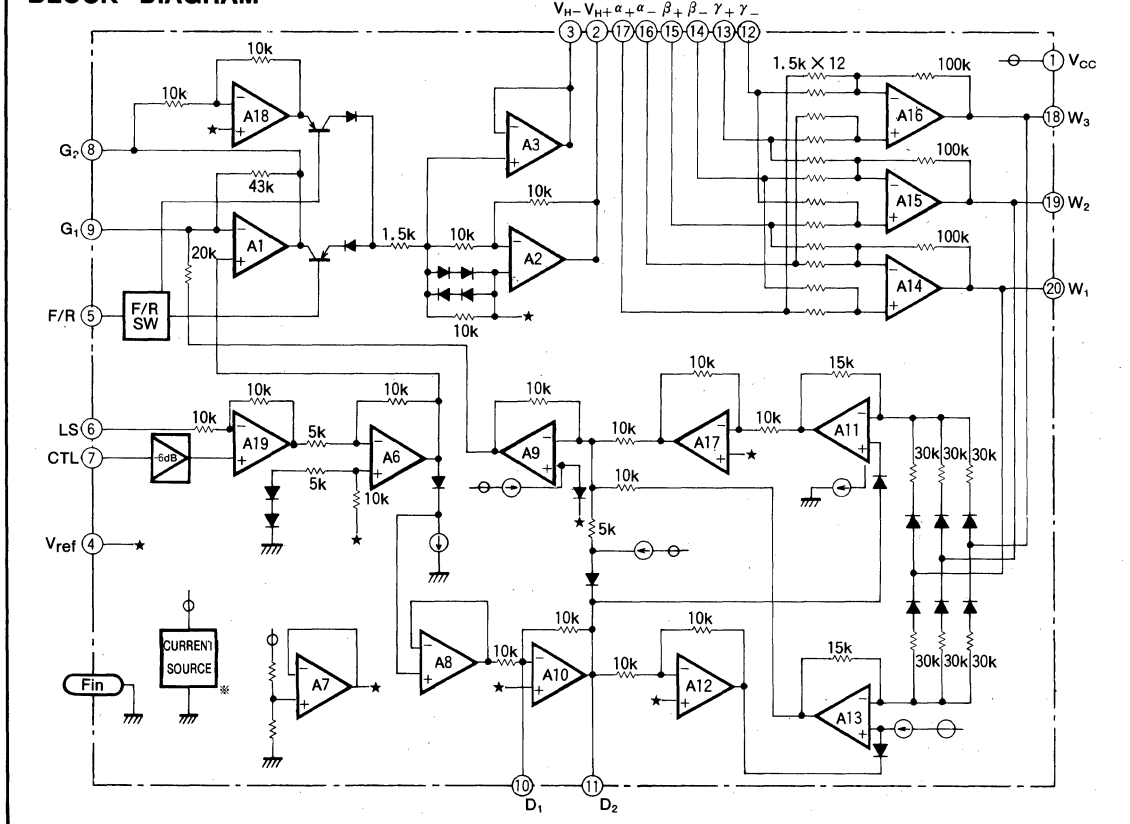


Outline 28P4-A



28-pin molded plastic DIL with fins

BLOCK DIAGRAM



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

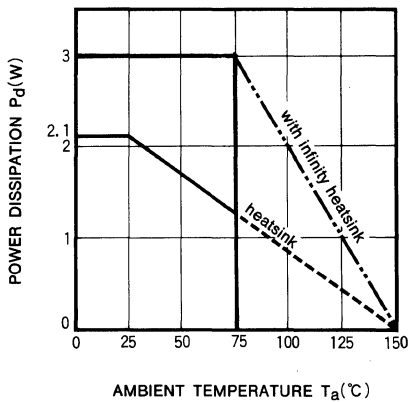
Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		26	V
$I_{O(MAX)}$	Maximum output current		1.2	A
P_d	Power dissipation		2.1	W
T_j	Junction temperature		150	°C
V_{CTL}	Control voltage		$0 \sim V_{CC}-1$	V
V_{LS}	Level shift voltage		$0 \sim 7$	V
I_h	Hall drive current		20	mA
T_{opr}	Operating temperature range		$-20 \sim +75$	°C
T_{stg}	Storage temperature range		$-40 \sim +125$	°C

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, $V_{CC}=12\text{V}$, unless otherwise noted)

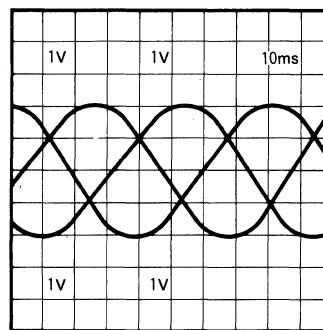
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Quiescent supply current		9	15	24	mA
V_{ref}	Reference voltage		5.6	6	6.4	V
G_{CTL}	Control amp voltage gain			2		V/V
G_{hd}	Hall drive amp voltage gain			1.4		V/V
G_{oa}	Output amp voltage gain			40		dB
$V_{sat}(U)$	Source saturation voltage	$I_o=0.8\text{A}$		1.2		V
$V_{sat}(D)$	Sink saturation voltage	$I_o=0.8\text{A}$		1.2		V

TYPICAL CHARACTERISTICS

THERMAL DERATING (MAXIMUM RATING)

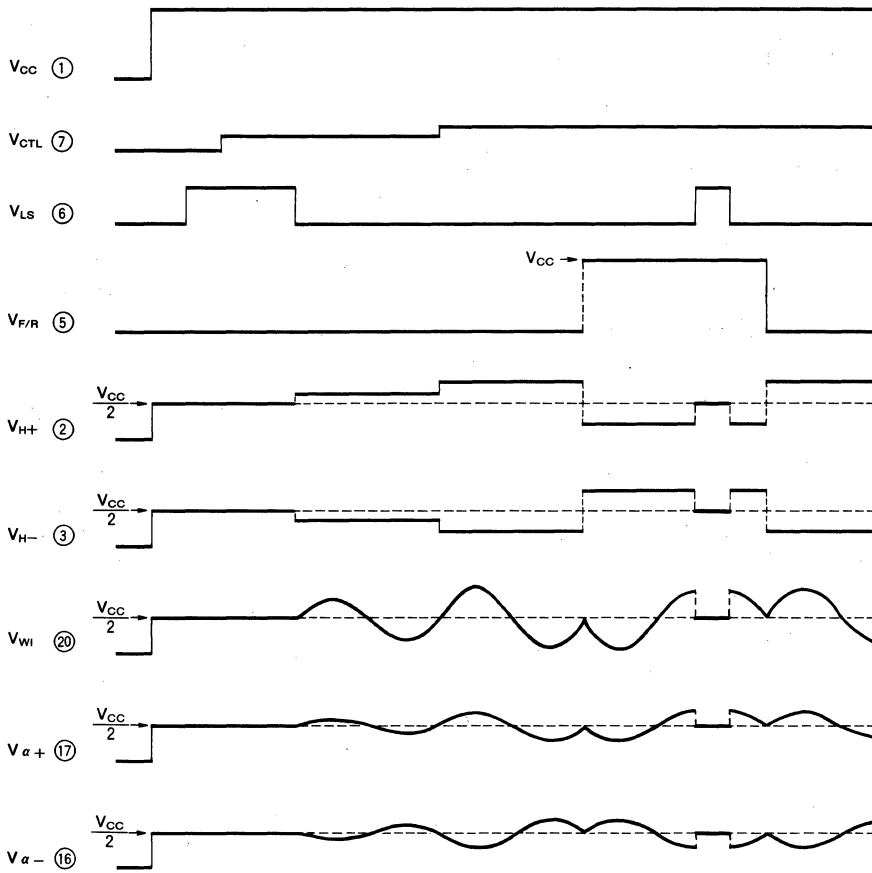


3-phase output waveforms



3-PHASE BRUSHLESS MOTOR DRIVER

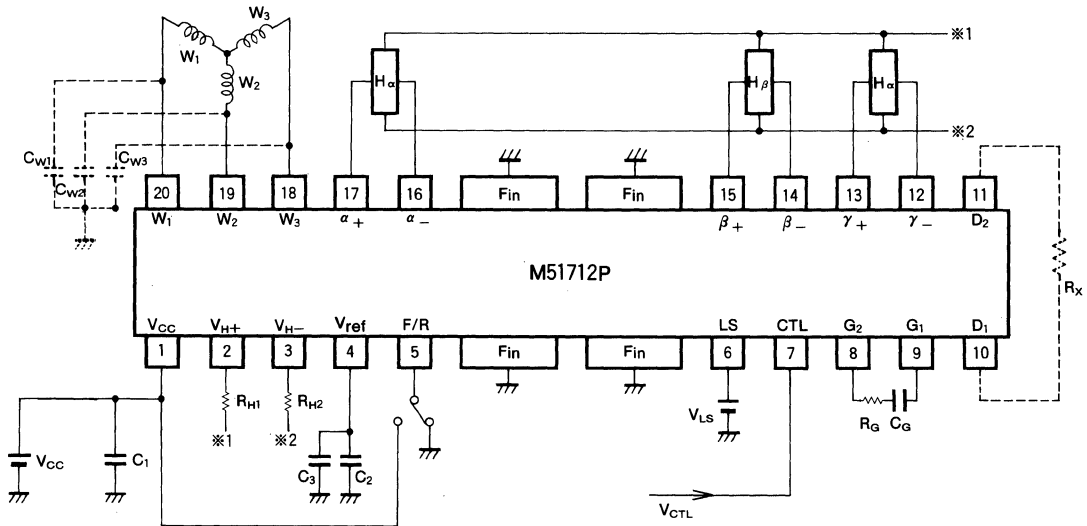
SIGNAL LEVEL & TIMING RELATIONSHIPS



- Note 1 . V_{w1}, V_{w2}, V_{w3}: Motor driver outputs
 2 . $O_{w2} = O_{w1} \pm 2/3\pi$, $O_{w3} = O_{w1} \pm 4/3\pi$
 3 . V_{a±}, V_{β±}, V_{γ±}: Hall elements outputs
 4 . V_{H+}, V_{H-}: Hall drive
 5 . N1 < N2

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APPLICATION EXAMPLE



- | | | |
|----------------------|--------------------------------------|------------------------------|
| V_{CC} | Supply voltage | 12V |
| V_{1s} | Level shift voltage | 0V(GND) |
| R_{H1}, R_{H2} | Short protection and gain tune | 0V(GND) |
| R_G, C_G | Phase compensation | 1.2k Ω , 0.01 μ F |
| $C_1 \sim C_3$ | Supply and reference voltage by-pass | 33, 10, 0.01 μ F |
| $C_{w1} \sim C_{w3}$ | For stability | 10 μ F (*3) |
| R_x | Compensating circuit gain adjust | normally open |
| V_{CTL} | Control voltage from servo system | |