

AN3891FBP

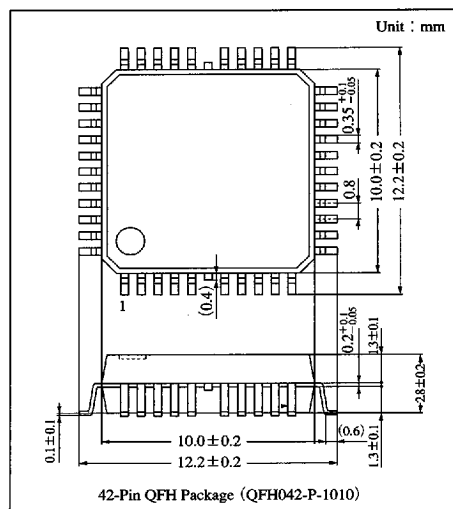
Spindle Motor Driver IC for Multi-Laser Player

Overview

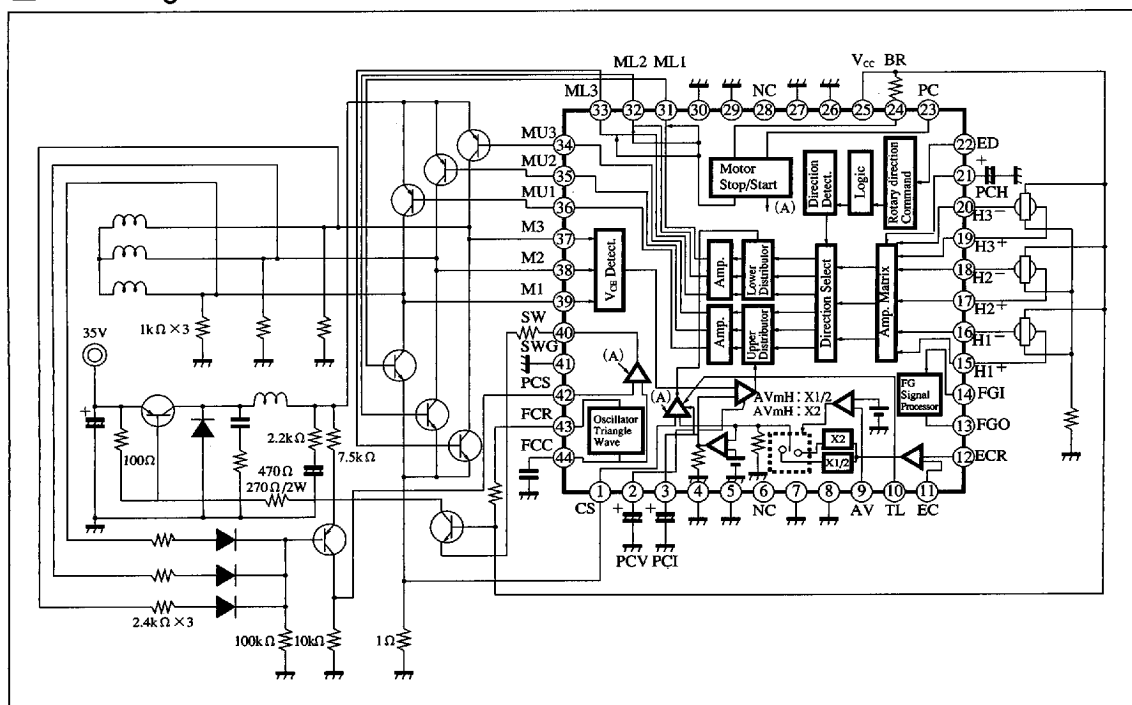
The AN3891FBP is a spindle motor driver IC for multi-laser player.

Features

- 3-phase full-wave overlapping drive
- Forward and reverse rotations
- Adjustable driver-gain
- Dynamic braking
- Built-in switching regulator control circuit



Block Diagram



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■ Pin Descriptions

Pin No.	Pin name and Symbol	Pin No.	Pin name and Symbol
1	Motor current detection CS	23	Power-cut control PC
2	Voltage feedback phase correction PCV	24	Dynamic brake current setting BR
3	Voltage feedback phase correction PCI	25	Power supply V _{CC}
4	Ground GND	26	Ground GND
5	Ground GND	27	Ground GND
6	No connection	28	No connection
7	Ground GND	29	Ground GND
8	Ground GND	30	Ground GND
9	A/V switching control AV	31	Lower predrive output (1) ML1
10	Torque limiter control TL	32	Lower predrive output (2) ML2
11	Torque reference EC	33	Lower predrive output (3) ML3
12	Torque command ECR	34	Upper predrive output (3) MU3
13	FG signal output FG _{OUT}	35	Upper predrive output (2) MU2
14	FG signal input FG _{IN}	36	Upper predrive output (1) MU1
15	Hall-element input H1 ⁺	37	Motor coil voltage detection (3) M3
16	Hall-element input H1 ⁻	38	Motor coil voltage detection (2) M2
17	Hall-element input H2 ⁺	39	Motor coil voltage detection (1) M1
18	Hall-element input H2 ⁻	40	Switching regulator drive signal SW
19	Hall-element input H3 ⁺	41	Ground for switching regulator SWG
20	Hall-element input H3 ⁻	42	Switching drive voltage feedback PCS
21	Hall-element AGC phase correction PCH	43	External resistor for triangle wave FC _R
22	Turn-over control ED	44	External capacitor for triangle wave FC _C

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■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	6.0	V
Supply current	I _{CC}	—	mA
Output terminal voltage (1) V _{O(1)} = 37, 38, 39, 40	V _{O(1)}	-0.7 to +20	V
Output terminal voltage (2) V _{O(2)} = 34, 35, 36	V _{O(2)}	0 to 20	V
Terminal voltage (1) V _n = 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 42, 44, 14, 9	V _n	-0.3 to V _{CC}	V
Power dissipation	P _D	780	mW
Operating ambient temperature ^{Note)}	T _{opr}	-20 to +70	°C
Storage temperature ^{Note)}	T _{stg}	-55 to +125	°C

Note) Ta = 25°C except operating ambient temperature and storage temperature.

■ Recommended Operating Range (Ta = 25°C)

Parameter	Symbol	Range
Operating supply voltage range	V _{CC}	4.5V to 5.5V

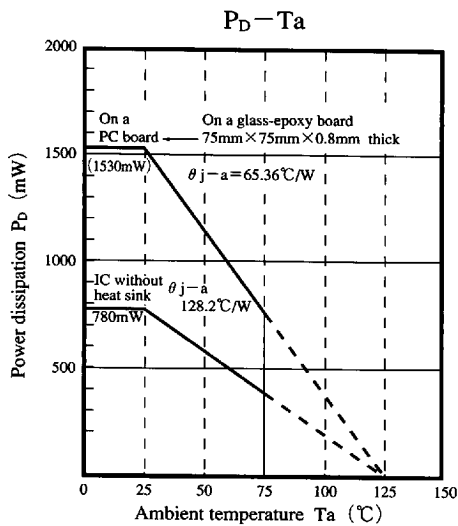
Electrical Characteristics ($V_{CC}=5V$, $T_a=25\pm2^\circ C$)

Parameter	Symbol	Condition	min	typ	max	Unit
Circuit current	I_{CC}		—	—	20	mA
Torque command input voltage	EC		0.5	—	4.0	V
Torque command input current	I_{EC}	$V_{EC}=V_{ECR}=2.5V$	-1	—	—	μA
Torque command offset voltage	EC_{OFS}	$AV=L$	-150	—	150	mV
Torque command dead zone (A)	$EC_{DZ(A)}$	$AV=H$	50	—	200	mV
Torque command dead zone (V)	$EC_{DZ(V)}$	$AV=L$	50	—	150	mV
Output idle voltage	ATC idle		0	—	4	mV
Input-output gain (A)	Gio (A)	$AV=H$	0.115	0.13	0.145	times
Input-output gain (V)	Gio (V)	$AV=L$	0.46	0.52	0.58	times
Max. output voltage (A)	$V_{ATC,max. (A)}$	$AV=H$	0.135	—	—	V
Max. output voltage (V)	$V_{ATC,max. (V)}$	$AV=L$	0.540	—	—	V
Hall input allowable voltage	H_{in}		1.0	—	3.5	V
Hall input offset	H_{OFS}		-8	—	8	mV
TL-CS offset	TL_{OFS}	$V_{TL}=0.1V$	0	7	15	mV
Upper drive max. current	I_{MP}		40	—	—	mA
Switching power supply drive current	I_{SW}		100	—	—	mA
Switching power supply rise time	SW_{ONt}		—	—	1.0	μs
Switching power supply fall time	SW_{OFFt}		—	—	1.0	μs
Switching power supply comparator offset	PCS_{OFS}		-10	—	10	mV
Switching power supply comparator input current	I_{PCS}		-5	—	—	μA
FG comparator hysteresis width	FGhw		150	—	250	mV
FG comparator output voltage (H)	$V_{FG(H)}$	$I_{FGOUT} = -100\mu A$	3.5	—	—	V
FG comparator output voltage (L)	$V_{FG(L)}$	$I_{FGin} = 1mA$	—	—	1.5	V
Power-cut ON voltage	PC_{ON}		3.5	—	—	V
Power-cut OFF voltage	PC_{OFF}		—	—	1.5	V
Forward command voltage	ED_F		3.5	—	—	V
Reverse command voltage	ED_R		—	—	1.5	V
Brake current	I_{BR}	$V_{BR}=3V$ $I_{ML1}-I_{ML3}$	-40	—	—	mA
Switching power supply oscillator oscillation frequency	f_{SW}	$R_{FCR}=2400\Omega$ $C_{FCC}=1000pF$	155	185	215	kHz
A/V change-over audio mode	A/V (A)		3.5	—	—	V
A/V change-over video mode	A/V (V)		—	—	1.5	V
Lower output voltage (1)	$V_{N(1)}$	$V_{ATC}=140mV$	0.36	0.52	0.68	V
Lower output voltage (2)	$V_{N(2)}$	$V_{ATC}=700mV$	0.955	1.36	1.775	V
Lower drive max. current	I_{ML}		-40	—	—	mA
Switching power supply oscillator oscillation level (H)	$FC_{C(H)}$	$R_{FCR}=2400\Omega$ $C_{FCC}=1000pF$	3.0	3.1	3.2	V
Switching power supply oscillator oscillation level (L)	$FC_{C(L)}$	$R_{FCR}=2400\Omega$ $C_{FCC}=1000pF$	1.9	2.0	2.1	V
Torque command reference voltage	EC_R		2.0	—	3.0	V

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