

AN3834K

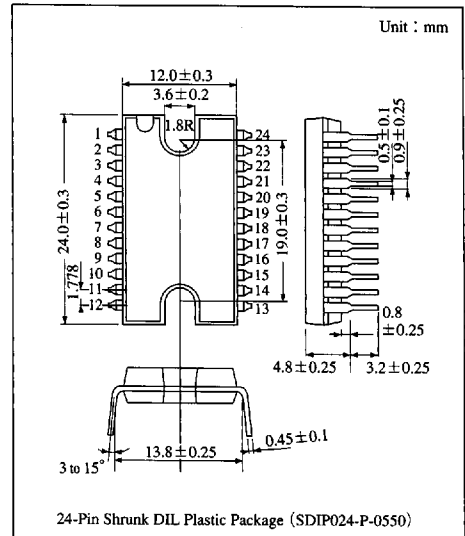
Reel Motor Driver IC for VCR

Overview

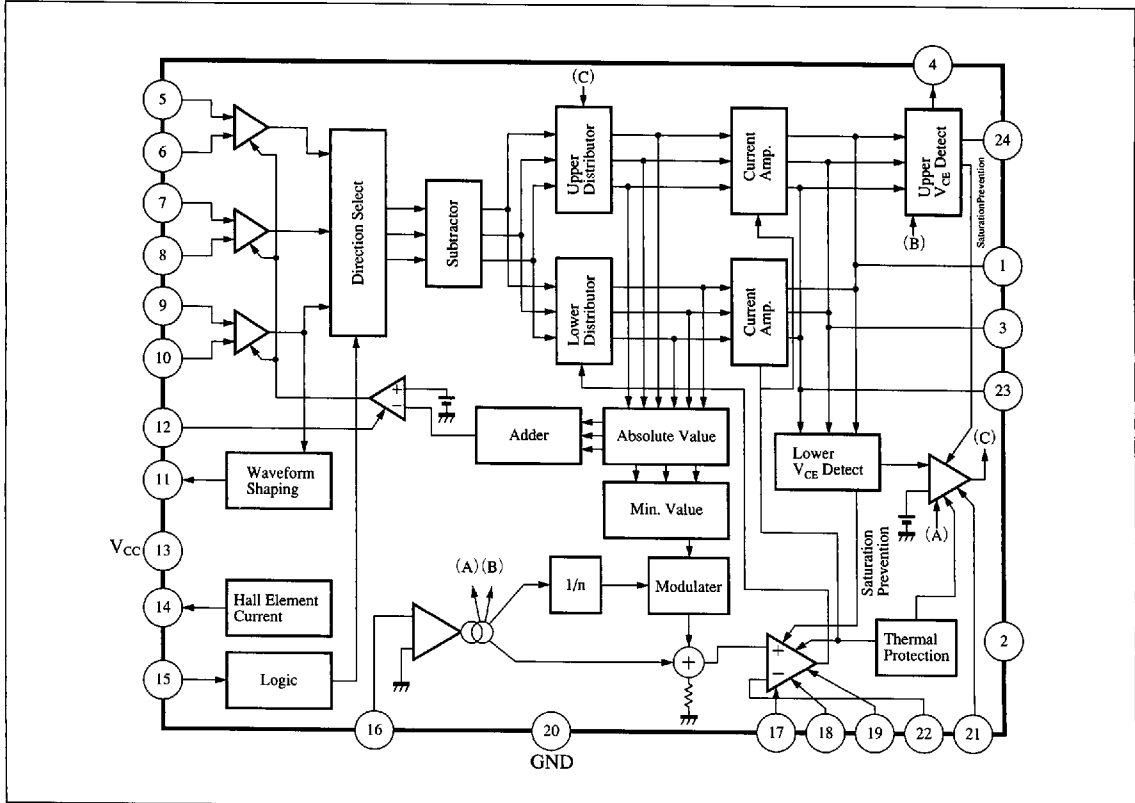
The AN3834K is an IC designed as a VCR reel motor drive.

Features

- Operating supply voltage range : $V_{CC}=4.5$ to $5.5V$.
- Operating motor supply voltage : $V_M=3$ to 18 .
- 3-phase full-wave forward/reverse overlap drive, built-in power transistor.
- Built-in high-accuracy torque ripple cancellation circuit.



Block Diagram



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■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	6	V
Power dissipation	P _D	1400	mW
Operating ambient temperature	T _{opr}	-20 to +70	°C
Storage temperature	T _{stg}	-55 to +150	°C
Motor supply voltage	V ₂₄	20	V
Motor drive current (n=1, 3, 23)	I _n	±1.5	A
Output pin voltage (n=1, 3, 23)	V _n	20	V
Pin voltage (m=5, 6, 7, 8, 9, 10, 15, 16, 17, 19)	V _m	V _{CC}	V
Pin 1, 4 current	I ₁₄	-100	mA

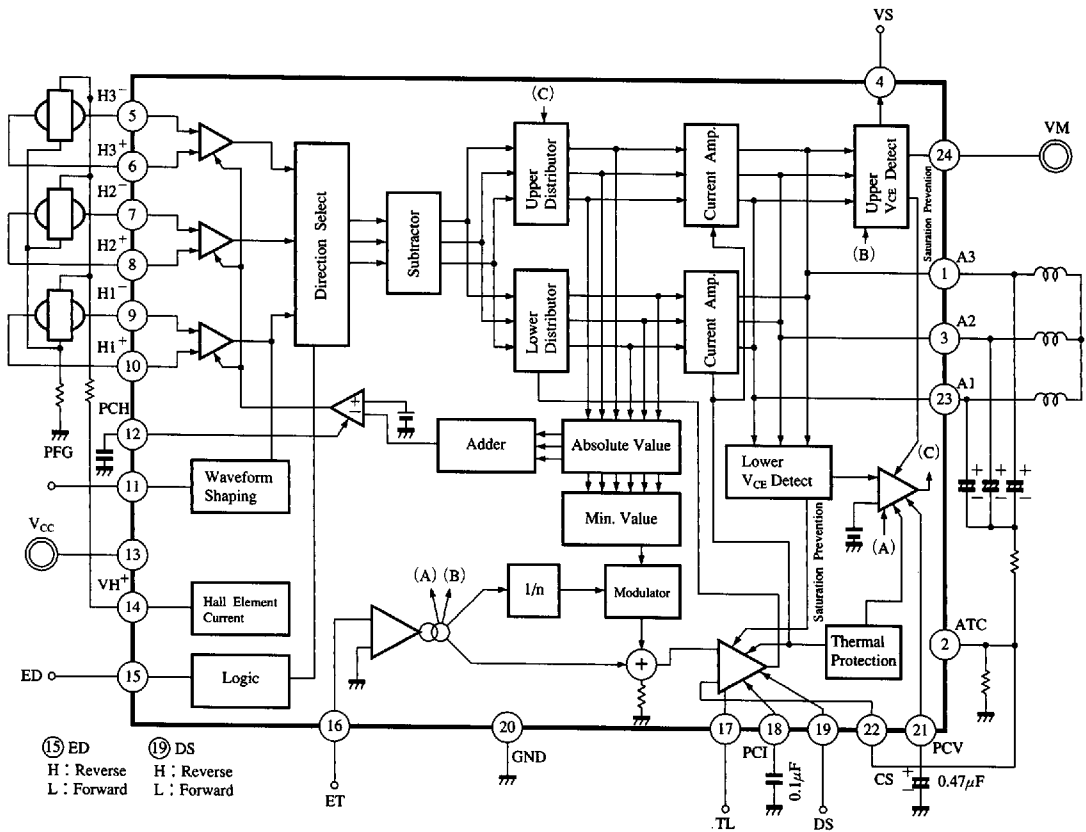
■ Recommended Operating Range (Ta=25°C)

Parameter	Symbol	Range
Operating supply voltage range	V _{CC}	4.5V to 5.5V
Motor supply voltage	V _M	3V to 18V

■ Electrical Characteristics (V_{CC}=5V, Ta=25°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Supply current	I _{CC}		5	—	15	mA
Torque command input current	I _{ET}		-4	—	0.5	μA
Torque command voltage	V _{ET}		0	—	1	V
Torque command offset voltage	V _{ofs}		-6	—	4	mV
Output idle voltage	V _{idle}		—	—	4	mV
I/O gain	G _{io}		0.85	—	1.05	times
TL-CS offset voltage	ΔTL	TL=0.1V, E _T =0.5V	4	—	25	mV
Forward command voltage	ED _F		—	—	2.3	V
Reverse command voltage	ED _R		2.7	—	—	V
DS ON voltage	DS _{on}		2.7	—	—	V
DS OFF voltage	DS _{off}		—	—	2.3	V
PFG output voltage (H)	PFG (H)	I _{PFG} = -100μA	2.8	—	—	V
PFG output voltage (L)	PFG (L)	I _{PFG} = 500μA	—	—	0.9	V
Hall element supply voltage	V _H ⁺	I _{VH} ⁺ = -20mA	2.6	—	3.2	V
Hall element input allowable voltage	H _{in}		1.2	—	4	V
Hall element input offset voltage	ΔH		-8	—	8	mV
Lower output voltage	V _N	E _T =0.6V	1.5	—	2.5	V
Upper saturation voltage	V _{P(sat)}	I _O =1A	—	—	2	V
Switching power control output	V _S	E _T =0.2V, V _M -A1=1.05V	2	—	3	V
Switching power control output gain	G _{VS}		2.2	—	3	times
Ripple cancellation rate	α	ATC=20mV	7	14	21	%

Application Circuit



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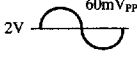
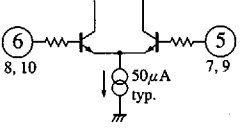

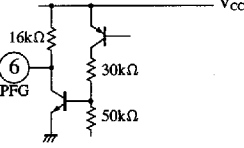

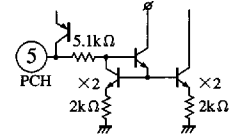
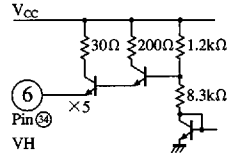
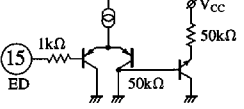
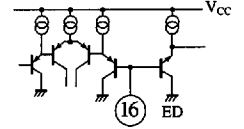
Pin Descriptions

Pin No.	Pin name	Typ. waveform	Description	I/O Impedance	Equivalent circuit
1 3 23	A3 drive output 3 A2 drive output 2 A1 drive output 1		Connect to the motor coil.	—	
2	ATC total current output		Outputs the total current of the output transistors.	—	
4	VS switching power control output		Outputs a voltage proportional to V _{CE} of the output transistor on the source side in order to control the switching power supply.	17kΩ	

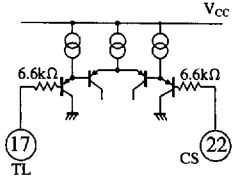

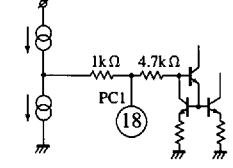
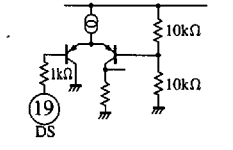
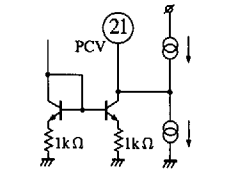
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Pin Descriptions (cont.)

Pin No.	Pin name	Typ. waveform	Description	I/O impedance	Equivalent circuit
5 6 7 8 9 10	H ₁ Hall element input H ₂ Hall element input H ₃ Hall element input H ₄ Hall element input H ₅ Hall element input H ₆ Hall element input		Inputs Hall element output of the motor.	—	
11	PFG Hall element input waveform shaping output		Shapes and outputs a Hall element input waveform	16kΩ	
12	PCH Hall amp. phase compensation		AGC loop phase compensation pin for the Hall amplifier.	—	
13	V _{CC} power pin	—	Inputs the supply voltage.	—	—
14	VH ⁺ Hall element power supply	—	Outputs the supply voltage for the Hall elements.	—	
15	ED direction command input pin	—	Gives a motor rotary direction with a 3-valued input.	—	
16	ET torque command input	—	Inputs a torque command voltage.	—	

■ Pin Descriptions (cont.)

Pin No.	Pin name	Typ. waveform	Description	I/O impedance	Equivalent circuit
17	TL torque limiter	—	Sets the max. voltage of the ATC pin.	—	
22	CS current detection pin	—	Inputs a current value detected by the resistor connected to the ATC pin.	—	
18	PCI current feedback system phase compensation	—	Phase compensation pin of the current control system for the output transistor on the sync. side.	—	
19	DS disable input	—	DS=L→Motor drive command. DS=H→Motor stop. Specifies motor start/stop.	—	
20	GND pin	—	Grounding pin	—	—
21	PCV voltage feedback system phase compensation	—	Phase compensation pin of the control system for the output transistor on the source side.	—	
24	V _M Motor power	—	Inputs the motor power.	—	—

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■ Supplementary Explanation

- Hall Input and Output Current Phases

