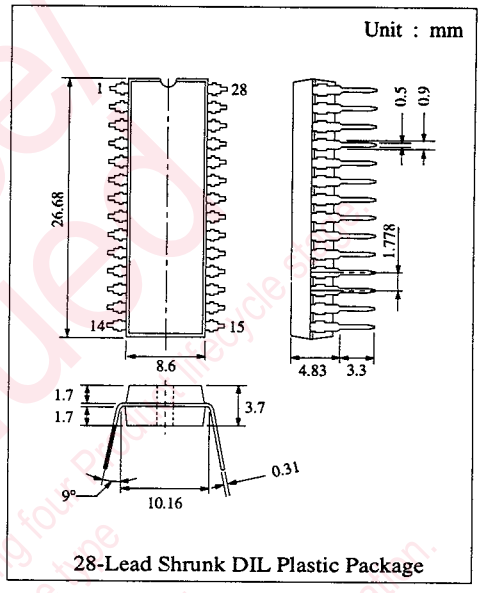
AN3826NK

VCR Capstan Motor Driver

■ Description

The AN3826NK is an integrated circuit designed as VCR capstan Hall motor drives.

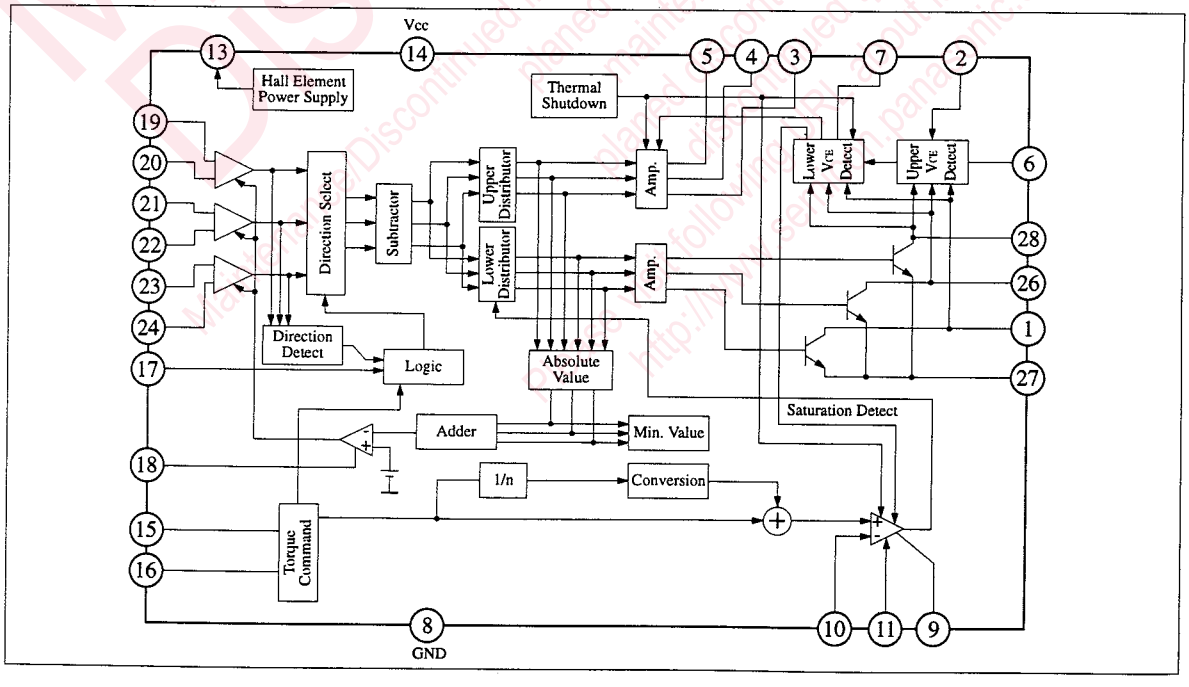


28-Lead Shrunk DIL Plastic Package

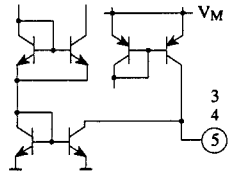
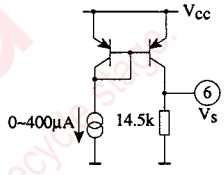
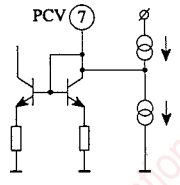
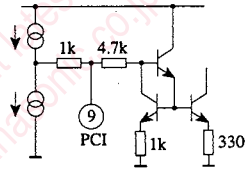
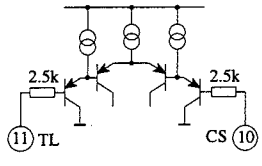
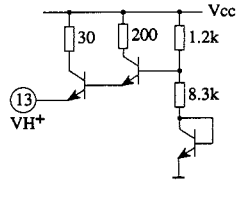
■ Features

- Operating supply voltage range : Vcc=4.5V to 5.5V
- 3-phase full-wave 180° power-on, overlap drive
- Max. motor voltage : V_M=20V
- Max. output current Iomax=1A
- Built-in torque ripple cancellation circuit
- Built-in Hall amplifier and AGC circuit

■ Block Diagram



■ Pin Descriptions

Pin No.	Pin Name	Typ. Waveform	Description	I/O Impedance	Equivalent Circuit
2	V_M motor power		Input the motor power		
3 4 5	MP3 upper predrive output 3 MP2 upper predrive output 2 MP1 upper predrive output 1		Predrive output of the output transistor on the source side (upper)		
6	VS switching power control output		Output a voltage proportional to V_{CE} of the output transistor on the source side in order to control the switching power	14.5kΩ	
7	PCV voltage feedback system phase compensation.		Phase compensation pin for the control system of the output transistor on the source side		
8	GND		Ground pin		
9	PCI current feedback system phase compensation		Phase compensation pin for the current control system of the output transistor on the sync. side		
10	CS current detection		Connect to the ATC pin. Input a current value detected by a resistor		
11	TL torque limit		Sets the max. voltage of the ATC pin		
13	VH^+ Hall element power supply		Output the supply voltage for Hall elements		

■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit	Note
Supply Voltage	Vcc	6	V	
Motor Supply Voltage	V_2	20	V	
Motor Drive Current	I_n	±1.5	A	n = 26, 28, 9
Output Pin Voltage	V_n	20	V	n = 26, 28, 9
Pin Voltage	V_m	Vcc	V	m = 6, 10, 11, 15, 16, 17, 19, 20, 21, 22, 23, 24
Pin 13 Current	I_{13}	-100	mA	
Power Dissipation (Ta=70°C)	P_D	1790	mW	
Operating Ambient Temperature	Topr	-20 ~ +70	°C	
Storage Temperature	Tstg	-55 ~ +150	°C	

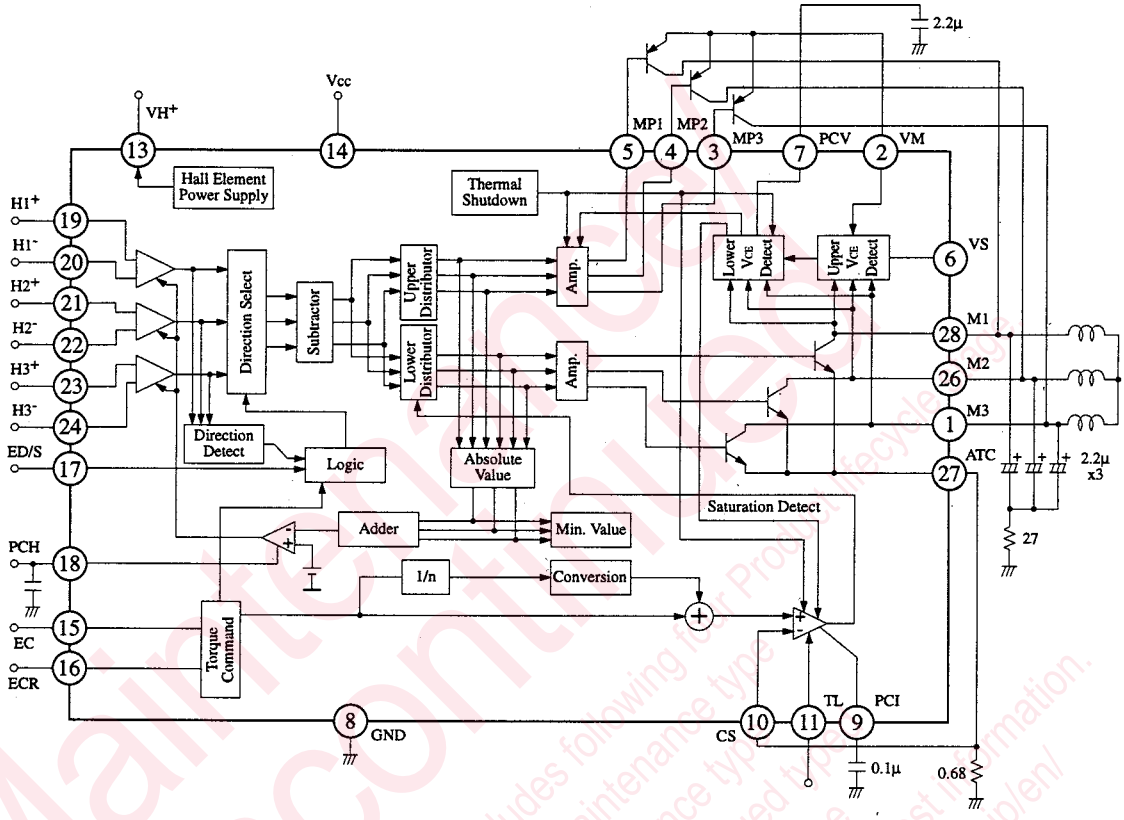
■ Recommended Operating Range (Ta=25°C)

Item	Symbol	Range
Operating Supply Voltage Range	Vcc	4.5V ~ 5.5V

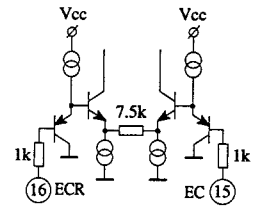
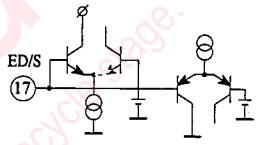
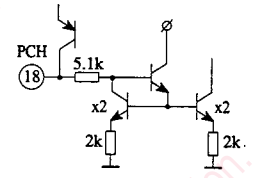
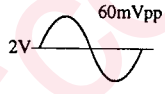
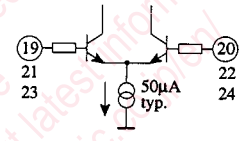
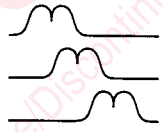
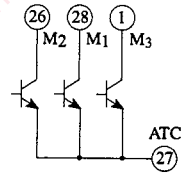
■ Electrical Characteristics (Vcc=5V, Ta=25°C)

Item	Symbol	Condition	min.	typ.	max.	Unit
Supply curent	Icc	Hall element supply current excluded			15	mA
Torque command ref. voltage	ECR		2		3.5	V
Torque command voltage	EC		0.5		4	V
Torque command input offset voltage	EC_{offset}		-150		150	mV
Torque command dead zone	EC_{DZ}		40		130	mV
Output idle voltage	ATC_{idle}				4	mV
I/O gain	G_{IO}		0.59	0.65	0.71	times
Maximum output voltage	ATC_{max}		0.75			V
Forward command voltage	ED_F				0.9	V
Stop command voltage	ED_S		1.3		3	V
Reverse command voltage	ED_R		3.5			V
Hall element input allowable voltage	H_{in}		1.2		4	V
Hall element input offset voltage	H_{offset}		-8		8	mV
Lower output voltage (1)	$V_{N(1)}$	ATC = 68mV	0.37		0.61	V
Lower output voltage (2)	$V_{N(2)}$	ECR = 2.5V, EC = 0.5V			3.2	V
TL-CS offset voltage	TL_{offset}	TL = 600mV,	10		45	mV
Ripple cancellation rate	a	ECR-EC = 0.2V	4		18	%
Upper drive max. current	I_{MP}		15			mA
Hall element supply voltage	V_{H^+}	I_{VH^+} = 20mA	2.6	2.85	3.2	V
Switching power control output	V_S	V_{M}-M_1 = 1V	1.5		3	V
Switching power control output gain	G_{VS}		1.5		2.5	times

■ Application Circuit



■ Pin Descriptions (Continue)

Pin No.	Pin Name	Typ. Waveform	Description	I/O Impedance	Equivalent Circuit
14	Vcc		Input the supply voltage		
15	EC torque command input		Input a torque command voltage		
16	ECR torque command ref. input		Input a torque command ref. voltage		
17	ED/S rotary direction command input		Specifies a motor rotary direction and stop with a 3-valued input		
18	PCH Hall amp. phase compensation		AGC loop phase compensation pin for the Hall amplifier		
19 20 21 22 23 24	H_1^+ Hall element input H_1^- Hall element input H_2^+ Hall element input H_2^- Hall element input H_3^+ Hall element input H_3^- Hall element input		Input Hall element output for the motor		
26 28 1	M2 motor coil pin 2 M1 motor coil pin 1 M3 motor coil pin 3		Connect to the motor coil		
27	ATC total current output		Output the total current of output transistors		

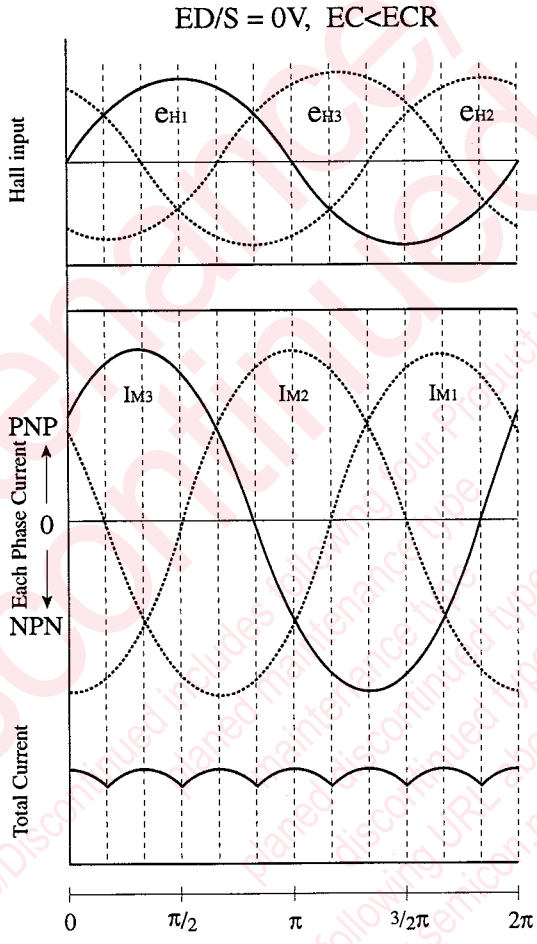
■ Supplementary Explanation

● Electrical Characteristic Design Reference Value (Ta=25°C)

Item	Symbol	Condition	min.	typ.	max.	Unit
Thermal protective circuit operation temperature	T_{ON}		150	175	200	°C

Note) The above characteristic is a design reference value, not a guarantee value.

● Hall Input and Output Current Phases



● Torque Direction Setting Logic

A direction of generated torque is determined by the following information.

- Information from the rotary direction detection : ER
  High : H1→H3→H2
- Brake information from the torque command circuit : EA
  High : ECR<EC
- Rotary direction command : ED
  High : H1→H3→H2
  H1→H3→H2 (forward rotation) at ED/S=0V
- Direction of generated torque : EP
  High : Generates a torque rotating in the direction of H1→H3→H2
  EP is determined as follows, depending on ER, EA, or ED.

	$\overline{EA}$	EA		$\overline{EA}$
ED	H	H	H	L
$\overline{ED}$	H	L	L	L
	$\overline{ER}$		ER	

Torque Direction Setting Karnaugh's Diagram

Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
 Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

20080805

littlediode
COMPONENTS FOR ALL

Littlediode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.