

STEPPER MOTOR DRIVER

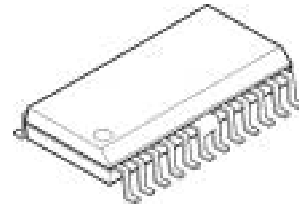
■ GENERAL DESCRIPTION

The NJM2673 is a stepper motor driver, which consists of a LS-TTL compatible logic input stage, off time control circuits and a pair of high power H-bridges and protection diodes.

The output current is up to 1000mA.

The NJM2673 with small number of external components conforms a complete control and drive unit for stepper motor systems.

■ PACKAGE OUTLINE

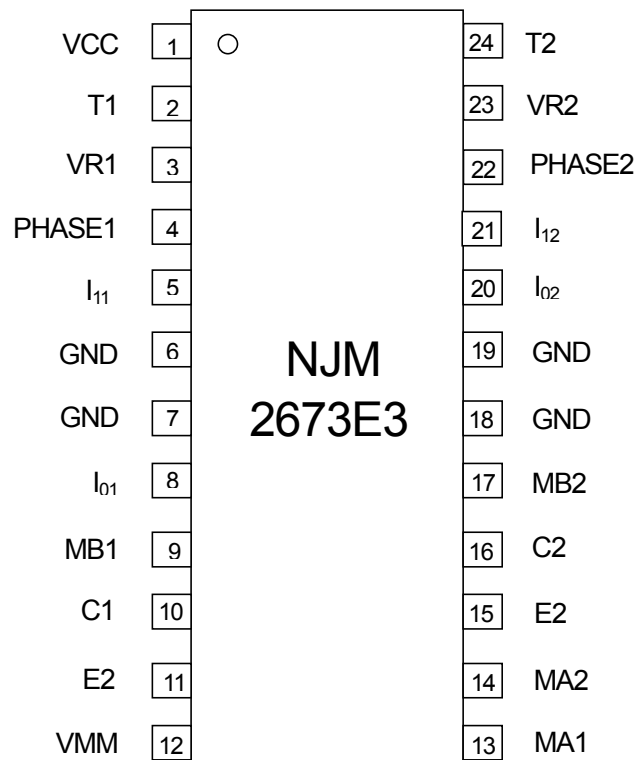


NJM2673E3

■ FEATURES

- Switched mode bipolar constant current drive
- Wide voltage range 4 to 45V
- Wide range of current control 5 to 1000mA
- Half- step and full-step operation
- Thermal overload protection
- Package EMP24

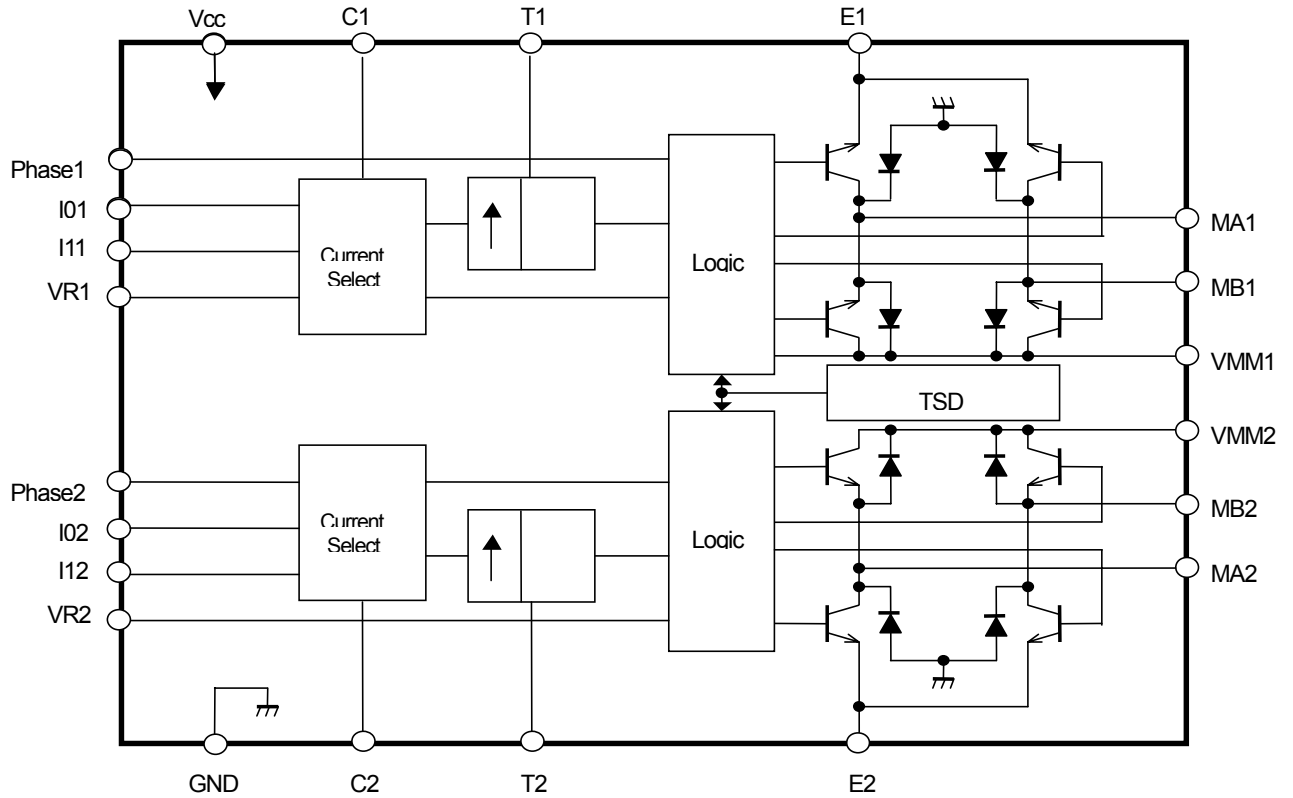
■ PIN CONNECTION



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■ BLOCK DIAGRAM



■ PIN DESCRIPTION

EMP	Symbol	Description
1	V _{CC}	Logic voltage supply normally +5V.
2	T ₁	Clock Oscillator, channel 1. Timing pin connect a 56kΩ resistance and a 820pF in parallel between T and ground.
3	V _{R1}	Reference voltage, channel 1. Controls the threshold voltage for the comparator and hence the output current.
4	Phase1	Controls the direction of the motor current of M _{A1} and M _{B1} outputs. Motor current flows from M _{A1} to M _{B1} when Phase1 is HIGH.
5	I ₁₁	Logic input, channel 1. It controls, together with the I ₀₁ input, the current level in the output stage.
6,7,18,19	GND	Ground and negative supply. These pins are used for heat sinking. Make sure that all ground pins are soldered onto a suitable large copper ground plane for efficient heat sinking.
8	I ₀₁	Logic input, channel 1. It controls, together with the I ₁₁ input, the current level in the output stage.
9	M _{B1}	Motor output B, channel 2. Motor current flows from M _{A1} to M _{B1} when Phase1 is high.
10	C ₁	Comparator input, channel 1. This input senses the instantaneous voltage across the sensing resistor, filtered through a RC network.
11	E ₁	Common emitter, channel 1. Connect the Sense resistor between this pin and ground.
12	V _{MM}	Motor supply voltage, 4 to 40V.
13	M _{A1}	Motor output A, channel 1. Motor current flows from M _{A1} to M _{B1} when Phase1 is high.
14	M _{A2}	Motor output A, channel 2. Motor current flows from M _{A2} to M _{B2} when Phase2 is high.
15	E ₂	Common emitter, channel 2. Connect the Sense resistor between this pin and ground.
16	C ₂	Comparator input, channel 2. This input senses the instantaneous voltage across the sensing resistor, filtered through a RC network.
17	M _{B2}	Motor output B, channel 2. Motor current flows from M _{A2} to M _{B2} when Phase2 is high.
20	I ₀₂	Logic input, channel 2. It controls, together with the I ₁₂ input, the current level in the output stage.
21	I ₁₂	Logic input, channel 2. It controls, together with the I ₀₂ input, the current level in the output stage.
22	Phase2	Controls the direction of the motor current of M _{A2} and M _{B2} outputs. Motor current flows from M _{A2} to M _{B2} when Phase2 is HIGH.
23	V _{R2}	Reference voltage, channel 2. Controls the threshold voltage for the comparator and hence the output current.
24	T ₂	Clock Oscillator, channel 2. Timing pin connect a 56kΩ resistance and a 820pF in parallel between T and ground.

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■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Voltage				
Logic Supply	V _{CC}	0	7	V
Motor Supply	V _{MM}	0	45	V
Logic Input Voltage	V _I	-0.3	V _{CC}	V
Comparator Input Voltage	V _C	-0.3	V _{CC}	V
Reference Input Voltage	V _C	-0.3	V _{CC}	V
Current				
Motor Output Current	I _M	-1000	+1000	mA
Logic Input Current	I _I	-10	-	mA
Analog Input Current	I _A	-10	-	mA
Temperature				
Operating Temperature	T _{opr}	-40	85	°C
Storage Temperature	T _{stg}	-55	150	°C

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Logic Supply	V _{CC}	4.75	5.00	5.25	V
Motor Supply	V _{MM}	4	-	40	V
Motor Output Current	I _M	-800	-	800	mA
Operating Junction Temperature	T _J	-20	-	+125	°C
Rise time Logic Inputs	t _r	-	-	2	μS
Fall Time Logic Inputs	t _f	-	-	2	μS

■ ELECTRICAL CHARACTERISTICS ($T_j=+25^{\circ}\text{C}$, $V_{CC}=5\text{V}$, $V_{MM}=40\text{V}$, $C_T=820\text{pF}$, $R_T=56\text{k}\Omega$)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
General						
Supply Current	I_{CC}		-	-	60	mA
Turn Off	t_d	$dV_c/dt \geq 50\text{mV}/\mu\text{s}$	-	0.9	-	μS
Thermal Shutdown Temperature	TSD		-	170	-	$^{\circ}\text{C}$
Logic Input						
H Level Input Voltage	V_{IH}		2.0	-	-	V
L Level Input Voltage	V_{IL}		-	-	0.8	V
H Level Input Current	I_{IH}	$V_i=2.4\text{V}$	-	-	20	μA
L Level Input Current	I_{IL}	$V_i=0.4\text{V}$	-250	-	-	μA
Input Resistance						
Input Resistance	R_R		-	8.8	-	$\text{k}\Omega$
Analog Input						
Threshold Voltage	V_{CH}	$V_R=5.0\text{V}, I_0=I_1=L$	405	450	495	mV
	V_{CM}	$V_R=5.0\text{V}, I_0=H, I_1=L$	284	315	347	mV
	V_{CL}	$V_R=5.0\text{V}, I_0=L, I_1=H$	134	150	163	mV
Input Current	I_C		-20	-	-	μA
Motor Output						
Lower Transistor Saturation Voltage	V_{OL}	$I_M=500\text{mA}$	-	1.1	1.4	V
		$I_M=800\text{mA}$	-	1.3	1.7	V
Upper Transistor Saturation Voltage	V_{OU}	$I_M=500\text{mA}$	-	1.1	1.4	V
		$I_M=800\text{mA}$	-	1.3	1.7	V
Lower Diode Forward Voltage Drop	V_{fL}	$I_M=500\text{mA}$	-	1.0	1.3	V
		$I_M=800\text{mA}$	-	1.2	1.6	V
Upper Diode Forward Voltage Drop	V_{fU}	$I_M=500\text{mA}$	-	1.1	1.4	V
		$I_M=800\text{mA}$	-	1.3	1.7	V
Output Leak Current	I_{lL}	$I_0=I_1=H$	-	-	100	μA
Monostable						
Cut Off Time	t_{off}		-	31	-	μS

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Thermal Resistance	$R_{th_{J-GND}}$		-	13	-	$^{\circ}\text{C}$
	$R_{th_{J-A}}$	Note2	-	42	-	$^{\circ}\text{C}$

Notes

1. All voltages are with respect to ground. Currents are positive into, negative out of specified terminal.
2. All ground pins soldered onto 20cm^2 PCB copper area with free air condition, $T_A=25^{\circ}\text{C}$.

[CAUTION]

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