TD62803P

TD62803P STEPPING MOTOR CONTROLLER/DRIVER

Features

- High-Voltage, High-Current Outputs
  $V_{CE}(SUS)\phi = 28V(MIN)$, $I_{OUT}\phi = 400mA$ (MAX)
- 1, 2, 1-2 Phase Excitation Mode Capable
- 3 Inputs Direction Control .. CK-1, CK-2 CW/CCW
- Output Enable Function ... E
- Initialized Status ..... $\overline{Mo}$ (Monitor out)
- Schmitt Trigger Inputs .... CK-1, CK-2, CW/CCW, $\overline{R}$
- Standard Supply Voltage

MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	$-0.3 \sim +7.0$	V
Output Sustaining Voltage		$V_{CE}(SUS)\phi$	$-0.3 \sim +28$	V
Output Current	ϕn	$I_{OUT}\phi$	400	mA
	$\overline{Mo}$, CK-OUT	$I_{OUT}\overline{Mo}$ CK-OUT	10	mA
Input Voltage		V_{IN}	$-0.3 \sim V_{CC}+0.3$	V
Input Current		I_{IN}	± 1	mA
Power Dissipation		P_D	2.7	W
Operating Temperature		T_{opr}	$-30 \sim +85$	°C
Storage Temperature		T_{stg}	$-55 \sim +150$	°C

BLOCK DIAGRAM

Unit in mm

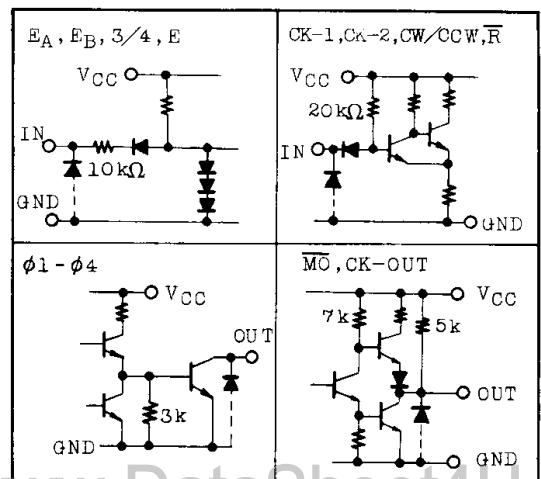| JEDEC	—
TOSHIBA	DIP16-P-600
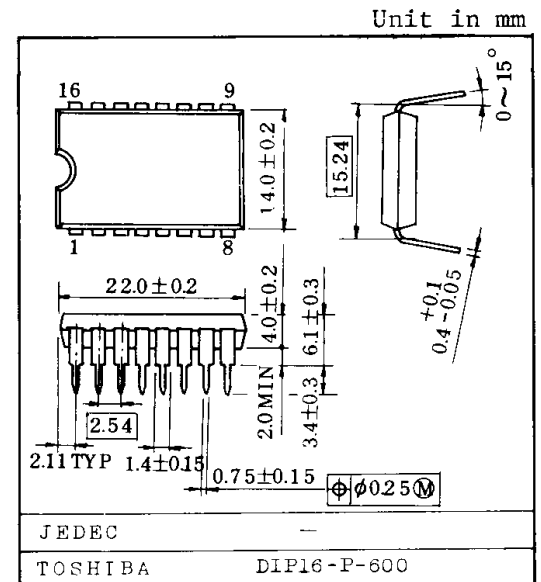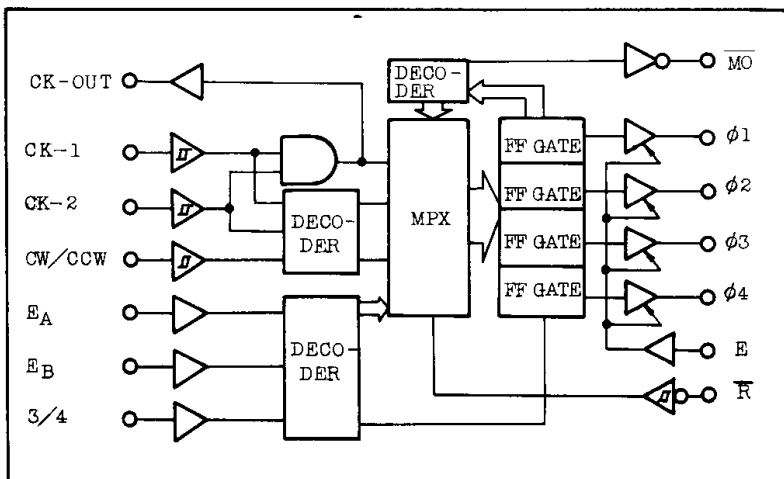
PIN CONNECTION (TOP VIEW)
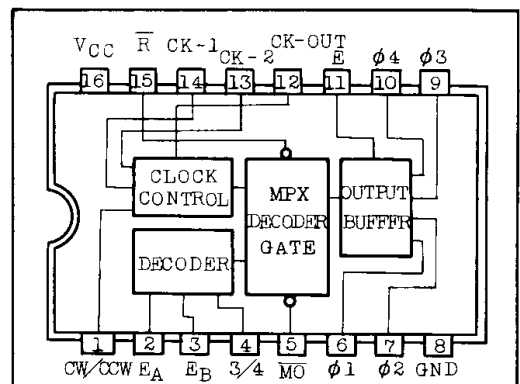
SCHEMATICS OF INPUTS AND OUTPUTS

TOSHIBA CORPORATION

TD62803P

RECOMMENDED OPERATING CONDITIONS (Ta=-30 ∿ +85°C)

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Voltage		V_{CC}		4.5	5.0	5.5	V
Output Sustaining Voltage		$V_{CE(SUS)}$		0		26	V
"L" Level Output Current ϕn		$I_{OUT}\phi$				400	mA
			Test Mode			250	
Output Current Mo,	"H" Level	I_{OH}				-0.4	mA
CK-OUT	"L" Level	I_{OL}				8	mA
Input Voltage		V_{IN}		0		V_{CC}	V
Clock Frequency		f_{CK}		0		100	kHz
Power Dissipation		P_D				1.0	W

ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
"H" Level Input Voltage		V_{IH}		2.0			V
"L" Level Input Voltage		V_{IL}				0.8	V
"H" Level Output Current ϕn		$I_{OH\phi}$	$V_{CC}=5.5V$, $V_{OUT}=26V$			100	μA
"H" Level Output Voltage $\overline{Mo}$,CK-OUT		V_{OH}	$V_{CC}=4.5V$, $I_{OH}=-0.4mA$	2.4			V
			$V_{CC}=5.0V$ $I_{OH}=-10\mu A$	4.0			
"L" Level Output Voltage	$\overline{Mo}$, CK-OUT	V_{OL}	$V_{CC}=4.5V$, $I_{OL}=8mA$			0.4	V
	ϕn	$V_{OUT\phi}$	$V_{CC}=4.5V$, $I_{OUT}=400mA$			1.1	
			$V_{CC}=4.5V$, $I_{OUT}=200mA$			0.6	
"H" Level Input Current		I_{IH}	$V_{CC}=5.5V$, $V_{IH}=5.5V$			10	μA
"L" Level Input Current		I_{IL}	$V_{CC}=5.5V$, $V_{IL}=0.4V$			-0.4	mA
Hysteresis		ΔV_T		200			mV
Supply Current		I_{CC}				100	mA

SWITCHING CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Propagation Delay Time, Low-to-High Level	CK-ϕn	t_{pLH}	$V_{CC}=5.0V$		2.0		μS
	CK-CK-OUT		R_L-CK-OUT, $\overline{Mo}=620\Omega$		1.0		
	CK-$\overline{Mo}$		R_L-$\phi_1\sim\phi_4=100\Omega$		2.8		
	E-ϕn		C_L-All Outputs=15pF		1.0		
	R-ϕn		$V_{OUT\phi}=24V$		2.0		

SWITCHING CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Propagation Delay Time High-to-Low Level	CK-ϕn	t_{pHL}	V_{CC}=5.0V R_L—CK-OUT, $\overline{Mo}$=620Ω R_L-$\phi_1 \sim \phi_4$=100Ω C_L-All Outputs = 15pF $V_{OUT}\phi$=24V		1.4		μS
	CK—CK-OUT				0.7		
	CK-$\overline{Mo}$				2.1		
	E-ϕn				1.2		
	$\overline{R}$-ϕn				1.0		
	$\overline{R}$-$\overline{Mo}$				2.0		
Maximum Clock Frequency		f_{max}			250		kHz
Set Up Time CK, CW/CCW		t_{set-up}			0.1		μS
Hold Time CK, CW/CCW		t_{hold}			0.1		
Minimum Clock Pulse Width		$t_{w(CK)}$			1.0		
Minimum Reset Pulse Width		$t_{w(\overline{R})}$			1.0		

Input

V_{IH} = 3.0V
V_{IL} = 0V

t_W
1.5V   1.5V

Output $\overline{Mo}$, CK-OUT

t_{pLH} t_{pLH}
V_{OH}
1.5V   1.5V
V_{OL}

t_{pHL} t_{pHL}
V_{OH}
50%   50%

Output ϕn

V_{OL}

V_{CC} = 5V
R_L = 620Ω
$\overline{MO}$
CK-OUT
C_L = 15pF

$V_{OUT}\phi$ = 24V
R_L = 100Ω
ϕ n
C_L = 15pF
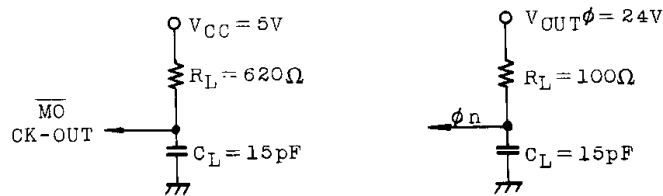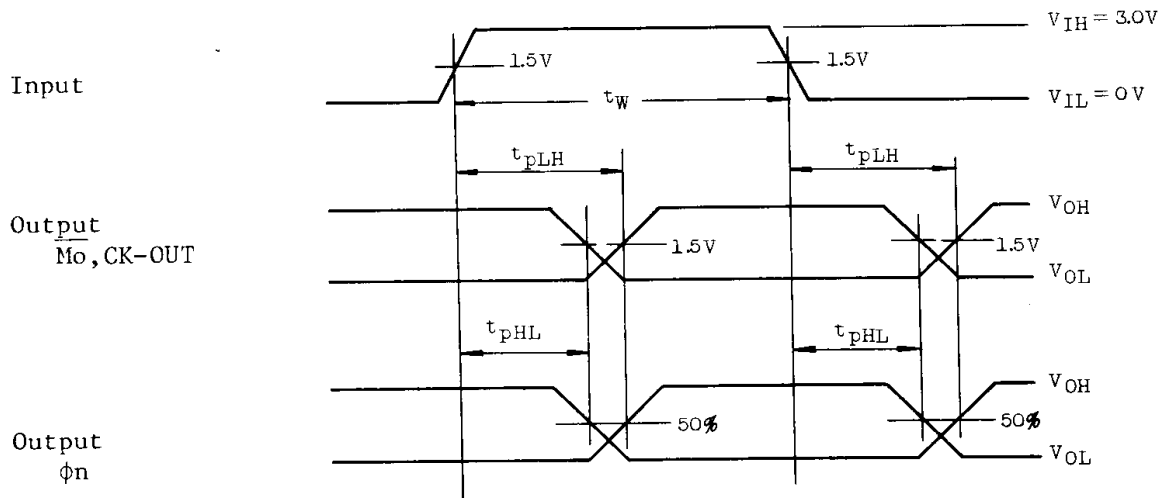
LOAD CIRCUIT

TD62803P

PIN NAMES AND FUNCTIONS

PIN NO.	SYMBOL	NAME	FUNCTION	
1	CW/CCW	Clock Wise/Counter Clock Wise	Direction Control Input	Function Table A
2	EA	Excitation A	Phase Excitation Mode Input	Function Table B
3	EB	Excitation B		
4	3/4	3 Phases/4 Phases	Phase Control Input	
5	$\overline{Mo}$	Monitor Out	Initial Status Output $\overline{Mo}$="L" at Initial State	
6	ϕ_1	ϕ_1 Out	ϕ_1 Output	
7	ϕ_2	ϕ_2 Out	ϕ_2 Output	
8	GND	GND	GND	
9	ϕ_3	ϕ_3 Out	ϕ_3 Output	
10	ϕ_4	ϕ_4 Out	ϕ_4 Output	
11	E	Output Enable	Outputs are Enable at E="H"	
12	CK-OUT	Clock-Out	Clock Output	
13	CK1	Clock In-1	Clock Input 1	Function Table A
14	CK2	Clock In-2	Clock Input 2	
15	$\overline{R}$	Reset	Reset Input	
16	V_{CC}	V_{CC}	V_{CC}	

FUNCTION TABLE A

CK1	CK2	CW/CCW	FUNCTION
⎍	H	L	CW
⊓⊓	L	L	Inhibit
H	⎍	L	CCW
L	⊓⊓	L	Inhibit
⎍	H	H	CCW
⊓⊓	L	H	Inhibit
H	⎍	H	CW
L	⊓⊓	H	Inhibit

FUNCTION TABLE B

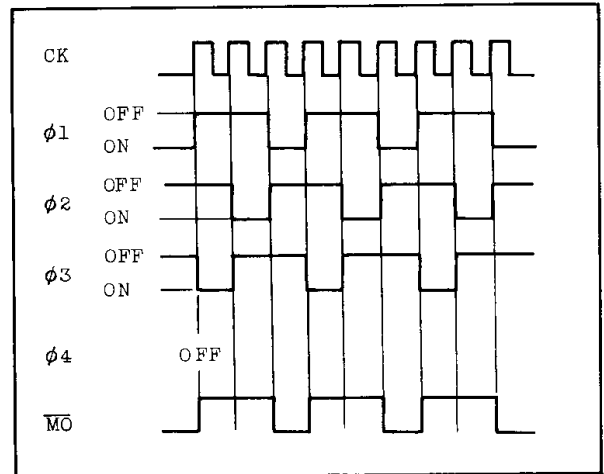| EA	EB	3/4	FUNCTION	
L	L	L	4 Phases	1 Phase Excitation
H	L	L		2 Phase Excitation
L	H	L		1-2 Phase Excitation
H	H	L	Test Mode	$\phi_1 \sim \phi_4$ ON
L	L	H	3 Phases	1 Phase Excitation
H	L	H		2 Phase Excitation
L	H	H		1-2 Phase Excitation
H	H	H	Test Mode	$\phi_1 \sim \phi_4$ ON

NOTE) Conversion of Phase Excitation Mode must be made after the Reset Mode is established.
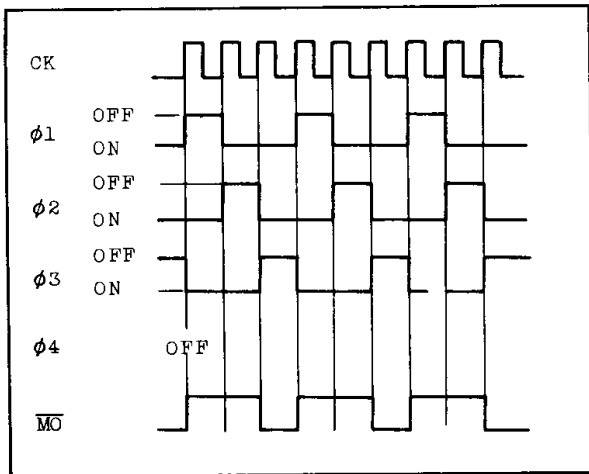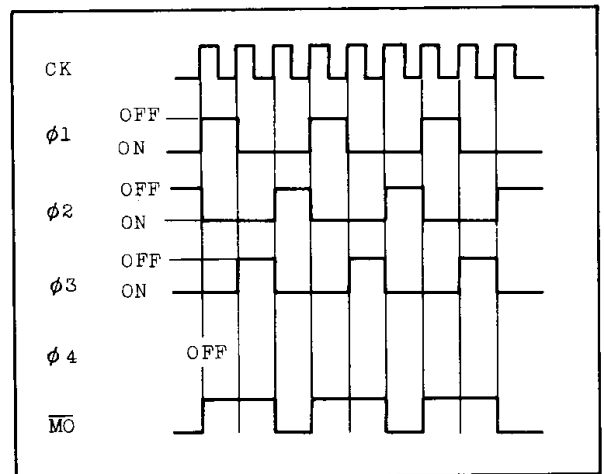
3 PHASES METHOD
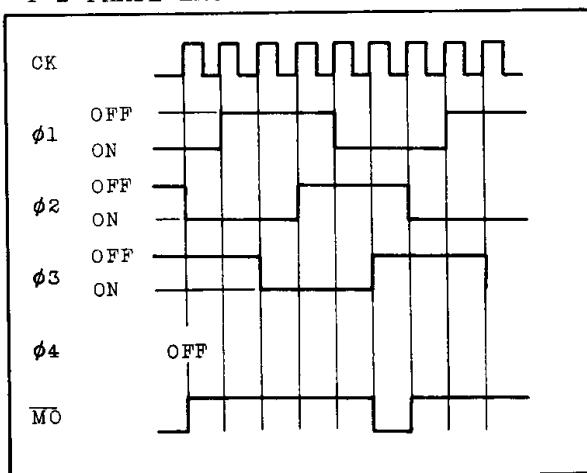
1 PHASE EXCITATION — CW
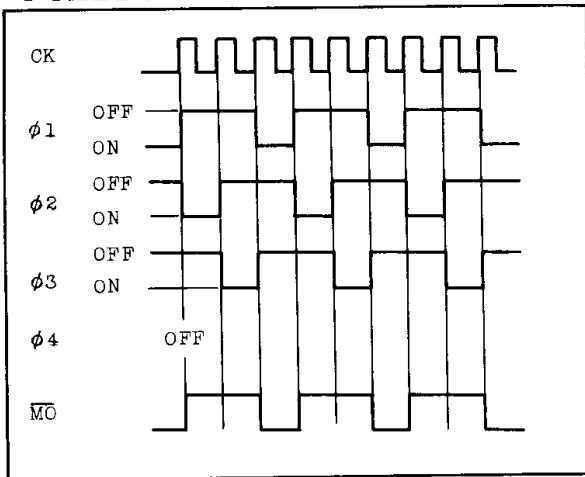
1 PHASE EXCITATION — CCW

2 PHASE EXCITATION — CW

2 PHASE EXCITATION — CCW

1-2 PHASE EXCITATION — CW

1-2 PHASE EXCITATION — CCW
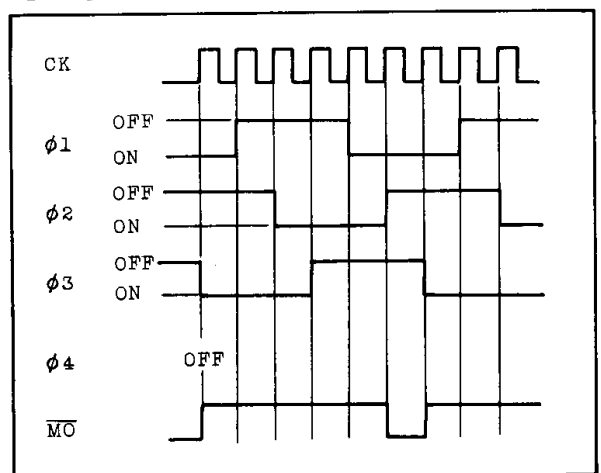
TD62803P

4 PHASES METHOD

1 PHASE EXCITATION — CW

1 PHASE EXCITATION — CCW

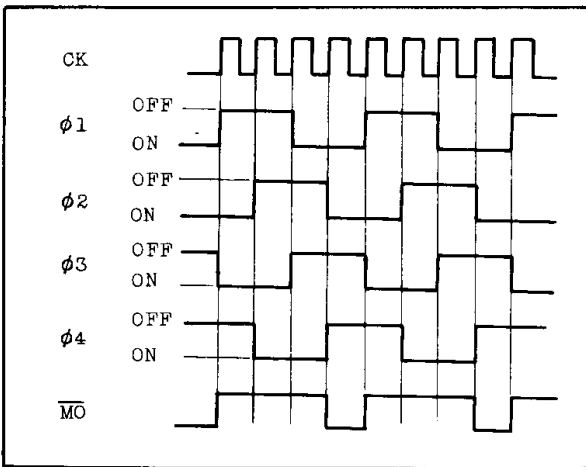### 2 PHASE EXCITATION — CW

2 PHASE EXCITATION — CCW

1-2 PHASE EXCITATION — CW

1-2 PHASE EXCITATION — CCW