

SLA7070MR, MPR, MPRT/7071MR, MPR, MPRT/7072MR, MPR, MPRT/7073MR, MPR, MPRT

2-Phase/1-2 Phase Excitation Support, Built-in Sequencer

■Features

- Lineup of built-in current sense resistor and built-in protection circuit-type
- Power supply voltages, V_{BB} : 46 V (max), 10 to 44 V normal operating range
- Logic supply voltages, V_{DD} : 3.0 to 5.5 V
- Maximum output currents: 1 A, 1.5 A, 2 A, and 3 A
- Built-in sequencer
- Self-excitation PWM current control with fixed off-time
- Synchronous PWM chopping function prevents motor noise in Hold mode
- Sleep mode for reducing the IC input current in stand-by state
- ZIP type 23-pin molded package (SLA package)

■Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Remarks
Motor Supply Voltage	V_M	46	V	
Driver Supply Voltage	V_{BB}	46	V	
Logic Supply Voltage	V_{DD}	6	V	
Output Current	I_O	*1	A	Mode F
Logic Input Voltage	V_{IN}	-0.3 to $V_{DD}+0.3$	V	
REF Input Voltage	V_{REF}	-0.3 to $V_{DD}+0.3$	V	
Sense Voltage	V_{RS}	± 2	V	Excluding $t_w < 1\mu s$
Power Dissipation	PD	4.7	W	When $T_a = 25^\circ C$
		17		When $T_c = 25^\circ C$
Junction Temperature	T_J	+150	$^\circ C$	
Operating Ambient Temperature	T_a	-20 to +85	$^\circ C$	
Storage Temperature	T_{stg}	-30 to +150	$^\circ C$	

*1: Output current value may be limited for the SLA7070MR, MPR, MPRT (1.0 A), SLA7071MR, MPR, MPRT (1.5 A), SLA7072MR, MPR, MPRT (2.0 A), and SA7073MR, MPR, MPRT (3.0 A), depending on the duty ratio, ambient temperature, and heating conditions.

Be sure that junction temperature of T_J is not exceeded under any circumstances.

■Recommended Operating Conditions

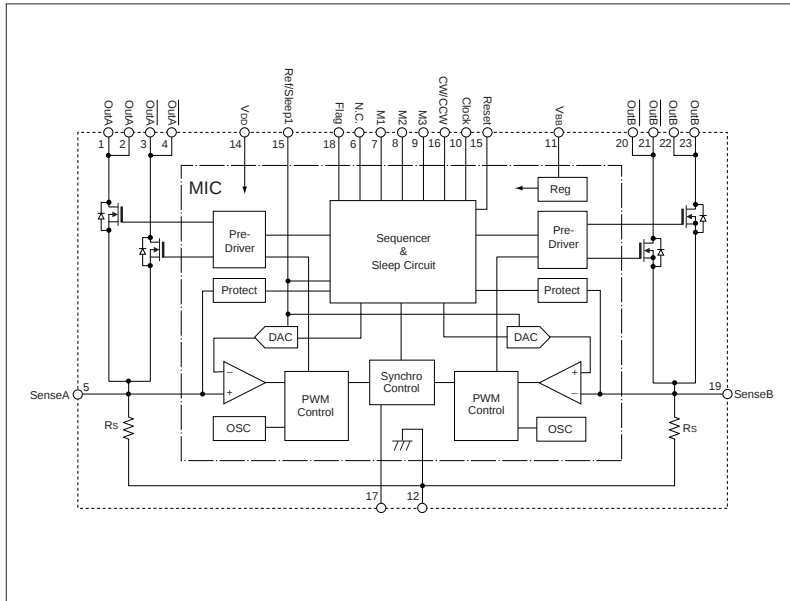
Parameter	Symbol	Rating		Unit	Remarks
		min.	max.		
Motor Supply Voltage	V_M		44	V	
Driver Supply Voltage	V_{BB}	10	44	V	
Logic Supply Voltage	V_{DD}	3.0	5.5	V	The V_{DD} surge voltage should be 0.5 V or lower
Case Temperature	T_c		90	$^\circ C$	Temperature at Pin-12 Lead (without heatsink)

■Electrical Characteristics

Parameter	Symbol	Ratings			Unit	Conditions
		min.	typ.	max.		
Main Supply Current	I_{BB}			15	mA	In operation
	I_{BBS}			100	μA	Sleep 1 and Sleep 2 modes
Logic Supply Current	I_{DD}			5	mA	
Output MOSFET Breakdown Voltage	$V_{(BR)DSS}$	100			V	$V_{BB}=44V, I_O=1mA$
Output MOSFET ON Resistance	$R_{DS(ON)}$		0.7	0.85	Ω	SLA7070M, $I_O=1.0A$
			0.45	0.6		SLA7071M, $I_O=1.5A$
			0.25	0.4		SLA7072M, $I_O=2.0A$
			0.18	0.24		SLA7073M, $I_O=3.0A$
Output MOSFET Diode Forward Voltage	V_F		0.85	1.1	V	SLA7070M, $I_O=1.0A$
			1.0	1.25		SLA7071M, $I_O=1.5A$
			0.95	1.2		SLA7072M, $I_O=2.0A$
			0.95	2.1		SLA7073M, $I_O=3.0A$
						When Clock Duty = 50%
Maximum Clock Frequency	F_{clock}	250			kHz	
Logic Input Voltage	V_{IL}			0.25VDD	V	
	V_{IH}	0.75VDD				
Logic Input Current	I_{IL}		± 1		μA	
	I_{IH}		± 1			
REF Input Voltage	V_{REF}	0.04		0.3	V	SLA7070M, within the current setting range
		0.04		0.45		SLA7071M, within the current setting range
		0.04		0.4		SLA7072M, within the current setting range
		0.04		0.45		SLA7073M, within the current setting range
	V_{REFS}	2		VDD		Output OFF (Sleep 1)
REF Input Current	I_{REF}		± 10		μA	
Sense Voltage	V_{SENSE}		V_{REF}		V	When step reference current ratio is 100%
Sleep-Enable Recovery Time	T_{SE}	100			μs	Sleep1&Sleep2
Switching Time	t_{con}		2.0		μs	Clock $\rightarrow$ Out ON
	t_{coff}		1.5		μs	Clock $\rightarrow$ Out OFF
Sense Resistance	R_s	0.296	0.305	0.314	Ω	SLA7070M, tolerance of $\pm 3\%$
		0.296	0.305	0.314		SLA7071M, tolerance of $\pm 3\%$
		0.199	0.205	0.211		SLA7072M, tolerance of $\pm 3\%$
		0.150	0.155	0.160		SLA7073M, tolerance of $\pm 3\%$
Overcurrent Sense Voltage	V_{ocp}	0.65	0.7	0.75	V	SLA7070xMPR, MPRT, when motor coil shorts out
Overcurrent Sense Current	I_{ocp}		2.3		A	SLA7070MPR, MPRT/7071MPR, MPRT
			3.5			SLA7072MPR, MPRT
			4.6			SLA7073MPR, MPRT
Thermal Protection Temperature	T_{tsd}		140		$^\circ C$	SLA707xMPRT, Rear of case (at the saturation temperature)
Flag Output Voltage	V_{FlagL}			1.25	V	SLA707xMPR, MPRT, $I_{FlagL}=1.25mA$
	V_{FlagH}	1.25-VDD				SLA707xMPR, MPRT, $I_{FlagH}=-1.25mA$
Flag Output Current	I_{FlagL}			1.25	mA	SLA707xMPR, MPRT
	I_{FlagH}	-1.25				
Step Reference Current Ratio	ModeF		100		%	
	Mode8		70.7		%	
PWM Minimum ON Time	$t_{on(min)}$		3.2		μs	
PWM OFF Time	t_{off}		12		μs	

* The direction in which current flows out of the device is regarded as negative.

Internal Block Diagram



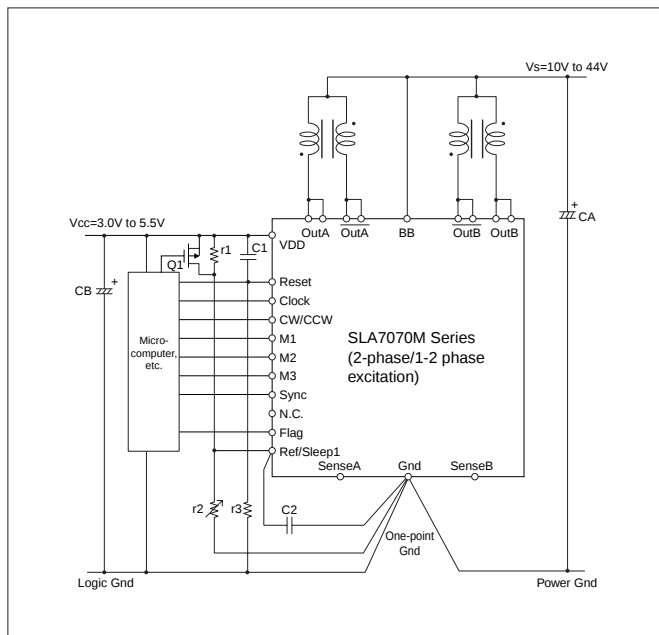
The protect circuit is deleted and the flag pin is N.C. for SLA7070MR, 7071MR, 7072MR, and 7073MR.

Pin Assignment

Pin No.	Symbol	Function
1	OutA	Phase A output
2		
3	OutA/	Phase A output
4		
5	SenseA	Phase A current sense
6	N.C.	N.C.
7	M1	Excitation mode/Sleep 2 setting input
8	M2	
9	M3	
10	Clock	Step Clock input
11	V _{SS}	Driver supply (motor supply)
12	Gnd	Device GND
13	Ref/Sleep1	Control current mode/Sleep 1 setting input
14	V _{DD}	Logic supply
15	Reset	Internal logic reset input
16	CW/CCW	Normal/reverse control input
17	Sync	PWM control signal input
18	Flag ^{*1}	Protection circuit monitor output ^{*1}
19	SenseB	Phase B current sense
20	OutB/	Phase B current output
21		
22	OutB	Phase B current output
23		

*1: N.C. pin for SLA7070MR, 7071MR, 7072MR, and 7073MR.

Typical Connection Diagram



* There is no Flag pin (Pin-18) for SLA7070MR, 7071MR, 7072MR, and 7073MR.

External Dimensions (ZIP23 with Fin[SLA23Pin])

