

**SLA7075MR, MPR, MPRT/7076MR, MPR, MPRT/7077MR, MPR, MPRT/7078MR, MPR, MPRT** 2-Phase to 4W 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
- Clock input method (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	$V_{ref}=0.4V$ , 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	$V_{RS}$	$\pm 2$	V	Excluding $tw < 1\mu s$
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 SLA7075MR, MPR, MPRT (1.0 A), SLA7076MR, MPR, MPRT (1.5 A), SLA7077MR, MPR, MPRT (2.0 A), and SA7078MR, MPR, MPRT (3.0 A), depending on the duty ratio, ambient temperature, and heating conditions.

Do not exceed junction temperature of  $T_j$  under any circumstances.

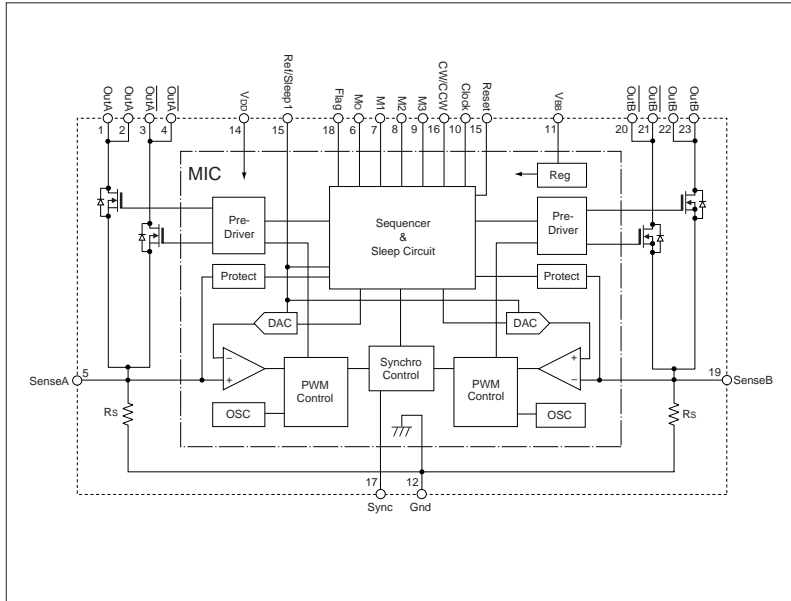
**Recommended Operating Conditions**

Parameter	Symbol	Rating		Unit	Remarks
		min.	max.		
Motor Supply Voltage	$V_M$		44	V	
Driver Supply Voltage	$V_S$	10	44	V	
Logic Supply Voltage	$V_{DD}$	3.0	5.5	V	The $V_{cc}$ 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 Sleep 1 and Sleep 2 modes
	$I_{BBS}$			100		
Logic Supply Current	$I_{DD}$			5	mA	
Output MOSFET Breakdown Voltage	$V_{(BR)DSS}$	100			V	$V_{BB}=44V, I_D=1mA$
Output MOSFET ON Resistance	$R_{DS(ON)}$		0.7	0.85	$\Omega$	SLA7075M, $I_D=1.0A$
			0.45	0.6		SLA7076M, $I_D=1.5A$
			0.25	0.4		SLA7077M, $I_D=2.0A$
			0.18	0.24		SLA7078M, $I_D=3.0A$
Output MOSFET Diode Forward Voltage	$V_F$		0.85	1.1	V	SLA7075M, $I_D=1.0A$
			1.0	1.25		SLA7076M, $I_D=1.5A$
			0.95	1.2		SLA7077M, $I_D=2.0A$
			0.95	2.1		SLA7078M, $I_D=3.0A$
Maximum Clock Frequency	$F_{clock}$	250			kHz	When Clock Duty = 50%
Logic Input Voltage	$V_{IL}$			$0.25V_{DD}$	V	
	$V_{IH}$	$0.75V_{DD}$				
Logic Input Current	$I_{IL}$		$\pm 1$		$\mu A$	
	$I_{IH}$		$\pm 1$			
REF Input Voltage	$V_{REF}$	0.04		0.3	V	SLA7075M, within the specified current limit
		0.04		0.45		SLA7076M, within the specified current limit
		0.04		0.4		SLA7077M, within the specified current limit
		0.04		0.45		SLA7078M, within the specified current limit
REF Input Current	$I_{REF}$		$\pm 10$	$V_{DD}$	$\mu A$	Output (OFF) Sleep 1
SENSE Sense Voltage	$V_{SENSE}$		$V_{REF}$		V	When step reference current ratio is 100%
Sleep-Enable Recovery Time	$T_{SE}$	100			$\mu s$	Sleep1&Sleep2
Switching Time	$t_{con}$		2.0		$\mu s$	Clock $\rightarrow$ Out ON
	$t_{coff}$		1.5			Clock $\rightarrow$ Out OFF
Sense Resistance	$R_S$	0.296	0.305	0.314	$\Omega$	SLA7075M, tolerance of $\pm 3\%$
		0.296	0.305	0.314		SLA7076M, tolerance of $\pm 3\%$
		0.199	0.205	0.211		SLA7077M, tolerance of $\pm 3\%$
		0.150	0.155	0.160		SLA7078M, tolerance of $\pm 3\%$
Overcurrent Sense Voltage	$V_{ocp}$	0.65	0.7	0.75	V	SLA707xMPR, MPRT, when motor coil shorts out
			2.3			SLA7075MPR, MPRT/7076MPR, MPRT
Overcurrent Sense Current	$I_{ocp}$		3.5		A	SLA7077MPR, MPRT
			4.6			SLA7078MPR, MPRT
			140			SLA707xMPRT, Rear of case (at the saturation temperature)
Logic Output Voltage	$V_{LOL}$			1.25	V	SLA707xMPR, MPRT, $I_{FlagL}=1.25mA$
	$V_{LOH}$	$V_{DD}-1.25$				SLA707xMPR, MPRT, $I_{FlagH}=-1.25mA$
Logic Output Current	$I_{LOL}$			1.25	mA	SLA707xMPR, MPRT
	$I_{LOH}$	-1.25				
Step Reference Current Ratio	ModeF		100		%	
	ModeE		98.1		%	
	ModeD		95.7		%	
	ModeC		92.4		%	
	ModeB		88.2		%	
	ModeA		83.1		%	
	Mode9		77.3		%	
	Mode8		70.7		%	
	Mode7		63.4		%	
	Mode6		55.5		%	
	Mode5		47.1		%	
	Mode4		38.2		%	
	Mode3		29.0		%	
PWM Minimum ON Time	$t_{on(min)}$		1.7		$\mu s$	
	$t_{off1}$		12			Mode 8 to F
	$t_{off2}$		9			Mode 4 to 7
PWM OFF Time	$t_{off3}$		7		$\mu s$	Mode 1 to 3

Internal Block Diagram



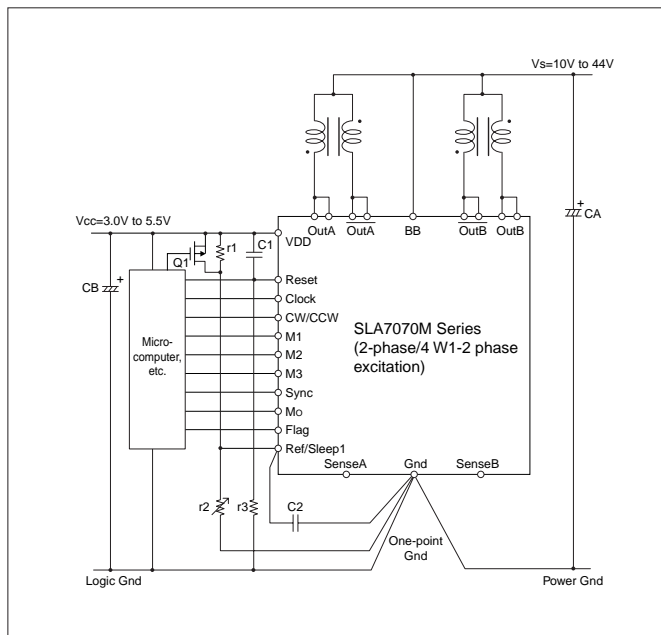
The protect circuit is deleted and the flag pin is N.C. for SLA7075MR, 7076MR, 7077MR, and 7078MR.

Pin Assignment

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

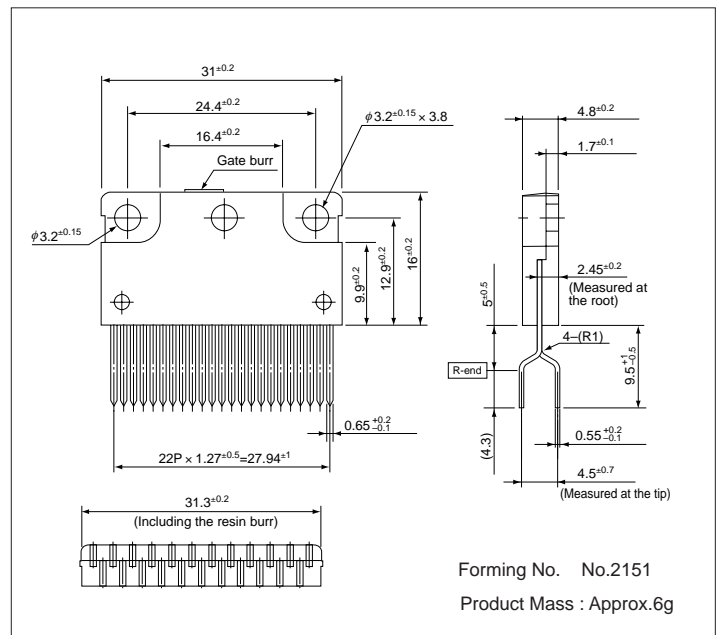
\*1: N.C. pin for SLA7075MR, 7076MR, 7077MR, and 7078MR.

Typical Connection Diagram



\* There is no Flag pin (pin 18) for SLA7075MR, 7076MR, 7077MR, and 7078MR.

External Dimensions (ZIP23 with Fin [SLA23Pin])



Forming No. No.2151  
Product Mass : Approx.6g