

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	°C	
Operating Ambient Temperature	T_a	-20 to +85	°C	
Storage Temperature	T_{stg}	-30 to +150	°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	°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	$V_{BB}=44V, I_D=1mA$	
Output MOSFET ON Resistance	$R_{DS(ON)}$		0.7	0.85	Ω	SLA7070M, $I_D=1.0A$	
			0.45	0.6		SLA7071M, $I_D=1.5A$	
			0.25	0.4		SLA7072M, $I_D=2.0A$	
			0.18	0.24		SLA7073M, $I_D=3.0A$	
Output MOSFET Diode Forward Voltage	V_F		0.85	1.1	V	SLA7070M, $I_D=1.0A$	
			1.0	1.25		SLA7071M, $I_D=1.5A$	
			0.95	1.2		SLA7072M, $I_D=2.0A$	
			0.95	2.1		SLA7073M, $I_D=3.0A$	
						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 → Out ON	
	t_{off}		1.5			Clock → Out OFF	
Sense Resistance	R_s		0.296	0.305	Ω	SLA7070M, tolerance of ±3%	
			0.296	0.305		0.314	SLA7071M, tolerance of ±3%
			0.199	0.205		0.211	SLA7072M, tolerance of ±3%
			0.150	0.155		0.160	SLA7073M, tolerance of ±3%
Overcurrent Sense Voltage	V_{ocp}		0.65	0.7	V	SLA7070xMPR, MPRT, when motor coil shorts out	
				2.3		SLA7070MPR, MPRT/7071MPR, MPRT	
Overcurrent Sense Current	I_{ocp}			3.5	A	SLA7072MPR, MPRT	
				4.6		SLA7073MPR, MPRT	
				140		°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.

