



# LA5779MP

## Monolithic Linear IC Separately-excited Step-down Switching Regulator (Variable Type)

### Overview

The LA5779MP is a Separately-excited step-down switching regulator (variable type).

### Functions

- High efficiency.
- Six external parts.
- Time-base generator (160kHz) incorporated.
- Current limiter incorporated.
- Thermal shutdown circuit incorporated.
- ON/OFF function.

### Specifications

#### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Input voltage	$V_{IN\ max}$		30	V
Maximum Output current	$I_O\ max$		3	A
SW pin application reverse voltage	$V_{SW}$		-1	V
Allowable power dissipation	$P_d\ max$	Mounted on a substrate.*	3.9	W
Operating temperature	$T_{opr}$		-30 to +125	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ\text{C}$

\* Specified substrate :  $76.1 \times 114.3 \times 1.6\text{mm}^3$  : Copper foil ratio 60% FR4

#### Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	$V_{IN}$		4.5 to 28	V

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Electrical Characteristics at  $T_a = 25^\circ\text{C}$ ,  $V_O = 3.3\text{V}$

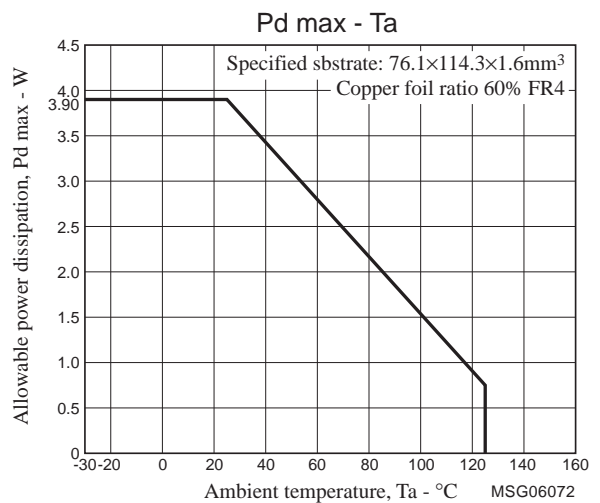
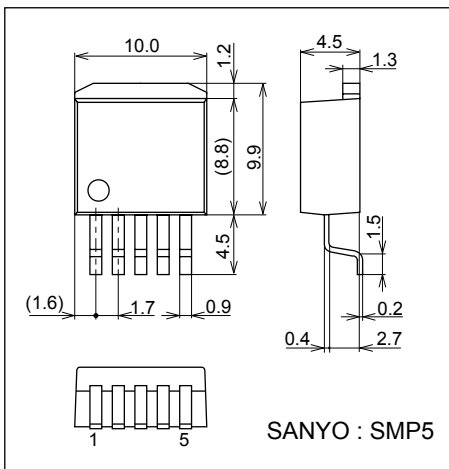
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage	$V_{OS}$	$V_{IN} = 15\text{V}$ , $I_O = 1.0\text{A}$	1.20	1.23	1.26	V
Efficiency	$\eta$	$V_{IN} = 15\text{V}$ , $I_O = 1.0\text{A}$ , Set $V_O = 5\text{V}$		84		%
Switching frequency	f	$V_{IN} = 15\text{V}$ , $I_O = 1.0\text{A}$	128	160	192	kHz
Switching frequency when short-circuit protection is active	fshort	$V_{IN} = 15\text{V}$ , $V_{OS} = 0\text{V}$	15	30	45	kHz
Line regulation	$\Delta V_{O\text{LINE}}$	$V_{IN} = 8$ to $20\text{V}$ , $I_O = 1.0\text{A}$		40	100	mV
Load regulation	$\Delta V_{O\text{LOAD}}$	$V_{IN} = 15\text{V}$ , $I_O = 0.5$ to $1.5\text{A}$		10	30	mV
Output voltage temperature coefficient	$\Delta V_O/\Delta T_a$	Designed target value. *		$\pm 0.5$		mV/°C
Ripple attenuation factor	RREJ	f = 100 to 120Hz		45		dB
Output leak current	$I_{O\text{leak}}$	$V_{IN} = 15\text{V}$ , $SW_{OUT} = -0.4\text{V}$			50	$\mu\text{A}$
Current limiter operating voltage	$I_S$	$V_{IN} = 15\text{V}$	3.1			A
Operating current	$I_{VIN}$	$V_{IN} = 15\text{V}$		5.6		mA
Standby current	$I_{STBY}$	$V_{IN} = 15\text{V}$ , $ENA = 5\text{V}$		50	100	$\mu\text{A}$
ENA pin LOW voltage range	$V_{ENAL}$				0.6	V
ENA pin HIGH voltage range	$V_{ENAH}$		2.4		$V_{IN}$	V
Thermal shutdown operating temperature	TSD	Designed target value. *		165		°C
Thermal shutdown Hysteresis width	$\Delta TSD$	Designed target value. *		15		°C

\* Design target value: No measurement made.

## Package Dimensions

unit : mm (typ)

3275

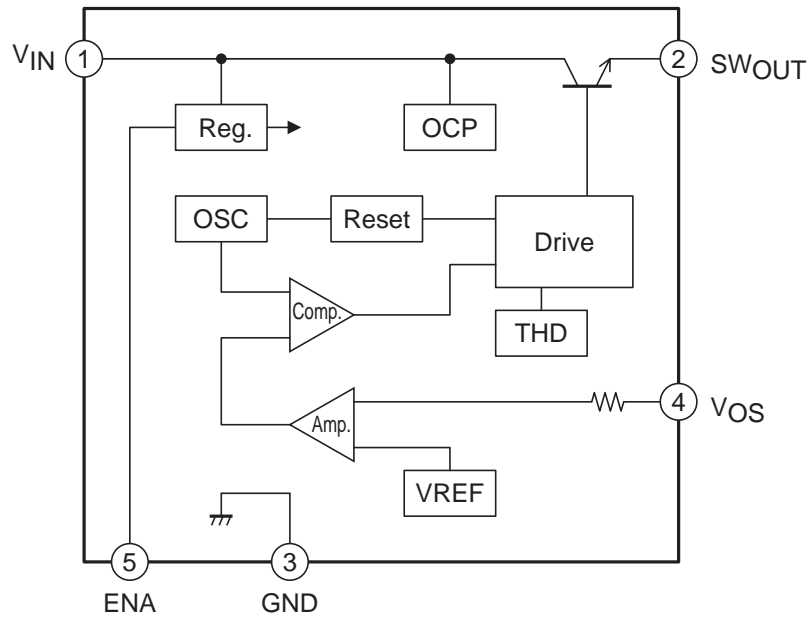


## Pin Assignment

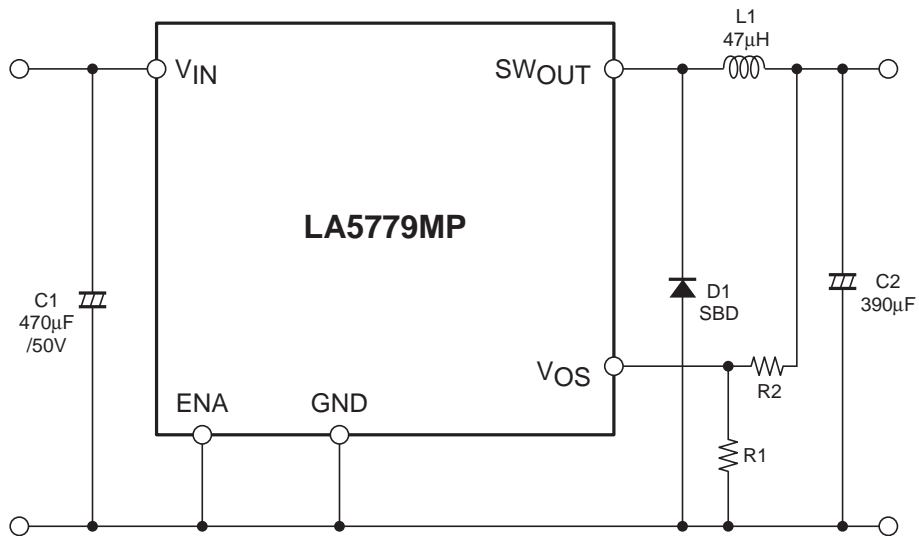
(1)  $V_{IN}$  (2)  $SW_{OUT}$  (3) GND (4)  $V_{OS}$  (5) ENA

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## Block Diagram



## Application Circuit Example



## Description of Functional Settings

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Calculation equation to set the output voltage

This IC controls the switching output so that the V<sub>OS</sub> pin voltage becomes 1.23V (typ).

The equation to set the output voltage is as follows:

$$V_O = \left(1 + \frac{R_2}{R_1}\right) \times 1.23V(\text{typ})$$

The V<sub>OS</sub> pin has the inrush current of 1μA (typ). Therefore, the error becomes larger when R1 and R2 resistance values are large.

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