LA5779MP

Monolithic Linear IC

Separately-excited Step-down Switching Regulator (Variable Type)



http://onsemi.com

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 Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Input voltage	V _{IN} max		30	V
Maximum Output current	I _O max		3	Α
SW pin application reverse voltage	V _{SW}		-1	V
Allowable power dissipation	Pd max	Mounted on a substrate.*	3.9	W
Operating temperature	Topr		-30 to +125	°C
Storage temperature	Tstg		-40 to +150	°C

^{*} Specified substrate : 76.1×114.3×1.6mm³ : Copper foil ratio 60% FR4

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Recommended Operating Conditions at $Ta = 25^{\circ}C$

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

Electrical Characteristics at Ta = 25°C, $V_O = 3.3V$

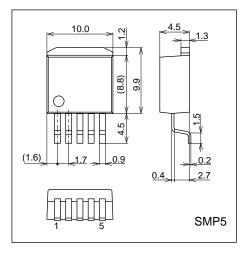
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	Unit
Reference voltage	Vos	V _{IN} = 15V, I _O = 1.0A	1.20	1.23	1.26	V
Efficiency	η	$V_{IN} = 15V$, $I_{O} = 1.0A$, Set $V_{O} = 5V$		84		%
Switching frequency	f	V _{IN} = 15V, I _O = 1.0A	128	160	192	kHz
Switching frequency when short-circuit protection is active	fshort	V _{IN} = 15V, V _{OS} = 0V	15	30	45	kHz
Line regulation	ΔV _O LINE	V _{IN} = 8 to 20V, I _O = 1.0A		40	100	mV
Load regulation	ΔV _O LOAD	V _{IN} = 15V, I _O = 0.5 to 1.5A		10	30	mV
Output voltage temperature coefficient	ΔV _O /ΔTa	Designed target value. *		±0.5		mV/°C
Ripple attenuation factor	RREJ	f = 100 to 120Hz		45		dB
Output leak current	lOleak	V _{IN} = 15V, SW _{OUT} = -0.4V			50	μΑ
Current limiter operating voltage	IS	V _{IN} = 15V	3.1			Α
Operating current	IV _{IN}	V _{IN} = 15V		5.6		mA
Standby current	ISTBY	V _{IN} = 15V, ENA = 5V		50	100	μΑ
ENA pin LOW voltage range	VENAL				0.6	V
ENA pin HIGH voltage range	V _{ENA} H		2.4		V_{IN}	V
Thermal shutdown operating temperature	TSD	Designed target value. *		165		°C
Thermal shutdown Hysteresis width	ΔTSD	Designed target value. *		15		°C

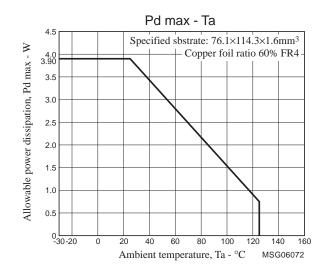
^{*} Design target value: No measurement made.

Package Dimensions

unit : mm (typ)

3275

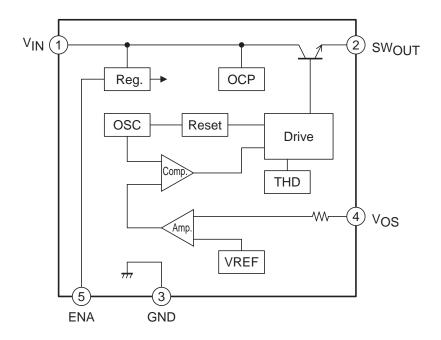




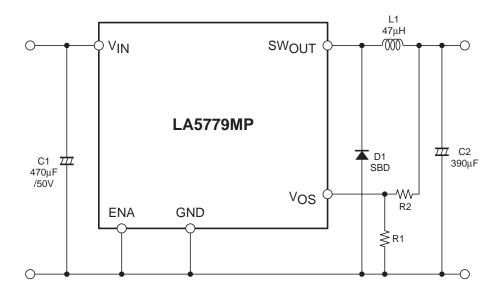
Pin Assignment

(1) $V_{\mbox{\footnotesize{IN}}}$ (2) $SW_{\mbox{\footnotesize{OUT}}}$ (3) $\mbox{\footnotesize{GND}}$ (4) $\mbox{\footnotesize{V}}_{\mbox{\footnotesize{OS}}}$ (5) $\mbox{\footnotesize{ENA}}$

Block Diagram



Application Circuit Example



LA5779MP

Description of Functional Settings

Calculation equation to set the output voltage

This IC controls the switching output so that the VOS pin voltage becomes 1.23V (typ).

The equation to set the output voltage is as follows:

$$V_O = \left(1 + \frac{R2}{R1}\right) \times 1.23 V(typ)$$

The V_{OS} pin has the inrush current of $1\mu A$ (typ). Therefore, the error becomes larger when R1 and R2 resistance values are large.

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