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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	$V_{IN\text{ max}}$		30	V
Maximum Output current	$I_O\text{ max}$		3	A
SW pin application reverse voltage	V_{SW}		-1	V
Allowable power dissipation	$P_d\text{ max}$	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

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 $T_a = 25^\circ\text{C}$

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

LA5779MP

Electrical Characteristics at Ta = 25°C, VO = 3.3V

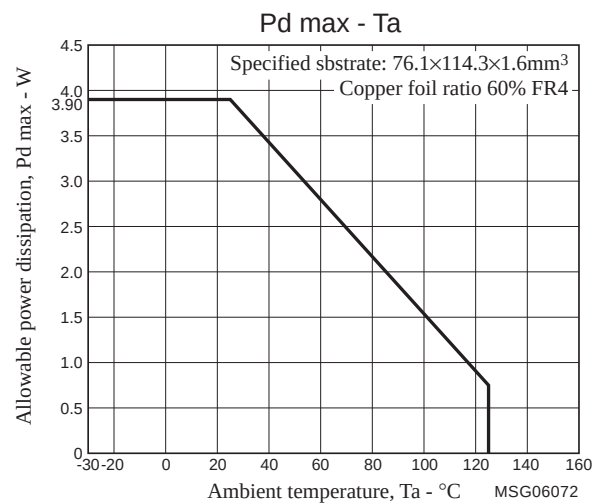
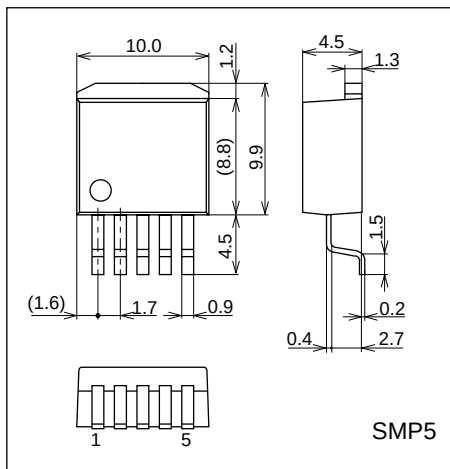
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage	V _{OS}	V _{IN} = 15V, I _O = 1.0A	1.20	1.23	1.26	V
Efficiency	η	V _{IN} = 15V, I _O = 1.0A, Set V _O = 5V		84		%
Switching frequency	f	V _{IN} = 15V, I _O = 1.0A	128	160	192	kHz
Switching frequency when short-circuit protection is active	f _{short}	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	I _O leak	V _{IN} = 15V, SW _{OUT} = -0.4V			50	μA
Current limiter operating voltage	I _S	V _{IN} = 15V	3.1			A
Operating current	I _{VIN}	V _{IN} = 15V		5.6		mA
Standby current	I _{STBY}	V _{IN} = 15V, ENA = 5V		50	100	μA
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	ΔTSD	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

Description of Functional Settings

Calculation equation to set the output voltage

This IC controls the switching output so that the V_{OS} 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_{OS} 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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