Ordering number : ENA0476A

SANYO Semiconductors
DATA SHEET

Monolithic Linear IC

# LA5779 — Separately-excited Step-down Switching Regulator (Variable Type)



## Overview

The LA5779 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 | A |
| SW pin application reverse voltage | $V_{SW}$ | | -1 | V |
| Allowable power dissipation | Pd max1 | Infinitely large heat sink. | 7.5 | W |
| | Pd max2 | Independent IC. | 1.75 | W |
| Operating temperature | Topr | | -30 to +125 | °C |
| Storage temperature | Tstg | | -40 to +150 | °C |
| Junction temperature | Tj max | | 150 | °C |

### Recommended Operating Conditions at Ta = 25°C

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



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**Electrical Characteristics** at Ta = 25°C, $V_O$ = 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 | fshort | $V_{IN}$ = 15V, $V_{OS}$ = 0V | 15 | 30 | 45 | kHz |
| Line regulation | $\Delta V_O$LINE | $V_{IN}$ = 8 to 20V, $I_O$ = 1.0A | | 40 | 100 | mV |
| Load regulation | $\Delta V_O$LOAD | $V_{IN}$ = 15V, $I_O$ = 0.5 to 1.5A | | 10 | 30 | mV |
| Output voltage temperature coefficient | $\Delta V_O/\Delta$Ta | 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 | $IV_{IN}$ | $V_{IN}$ = 15V | | 5.6 | | mA |
| Standby current | $I_{STBY}$ | $V_{IN}$ = 15V, ENA = 5V | | | 200 | μA |
| ENA pin LOW voltage range | $V_{ENA}$L | | | | 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 |

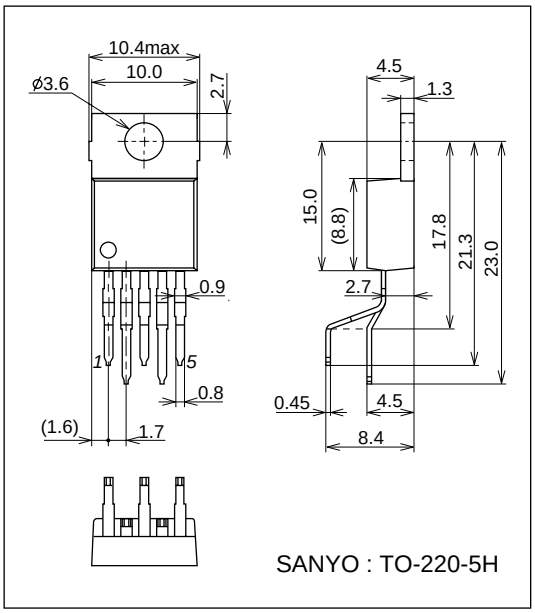
* Design target value: No measurement made.

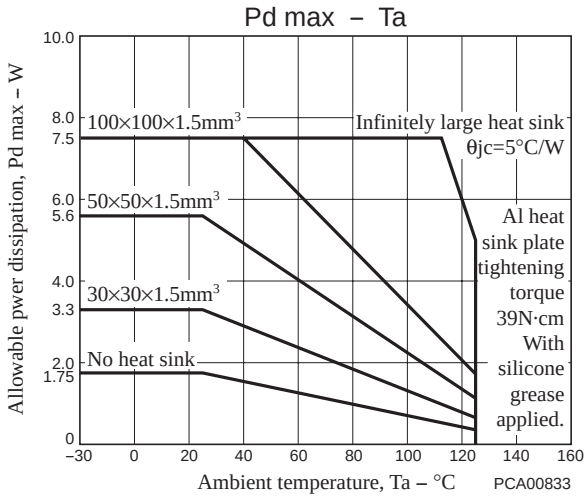


## Package Dimensions

unit : mm (typ)

3079A

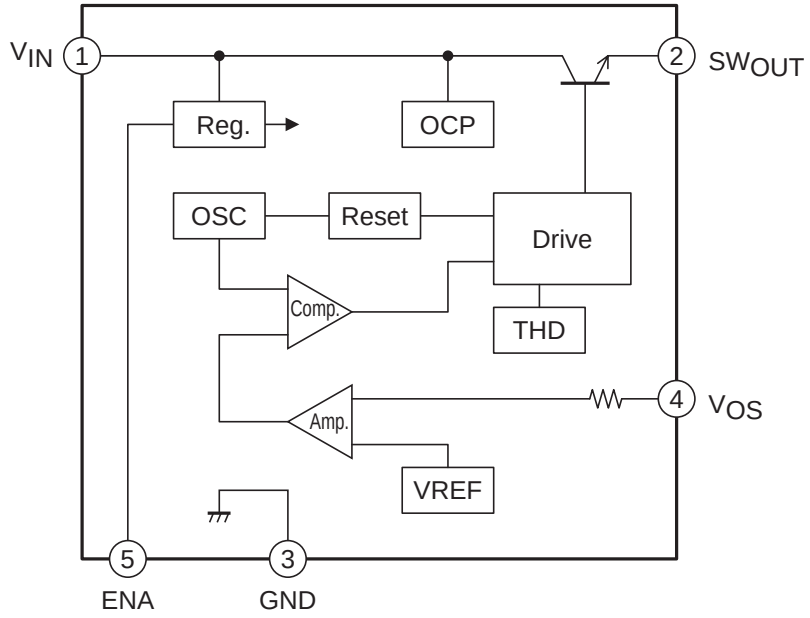



## Pin Assignment

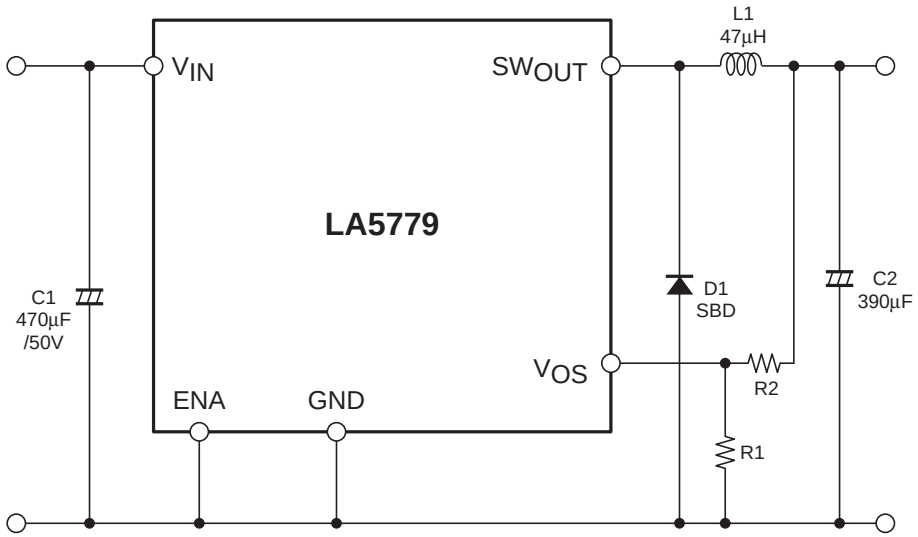
(1) $V_{IN}$ (2) $SW_{OUT}$ (3) GND (4) $V_{OS}$ (5) ENA

## Block Diagram






## Application Circuit Example



## 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:

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

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