# **LA5779**

**Monolithic Linear IC** 

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



http://onsemi.com

#### 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 <sub>IN</sub> max		30	٧
Maximum Output current	I <sub>O</sub> max		3	Α
SW pin application reverse voltage	V <sub>SW</sub>		-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

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°C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V <sub>IN</sub>		4.5 to 28	V

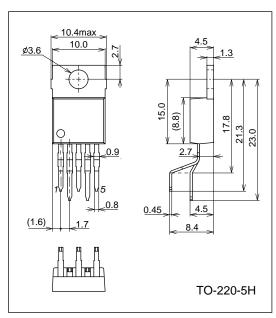
#### **Electrical Characteristics** at Ta = 25°C, $V_O = 3.3$ V

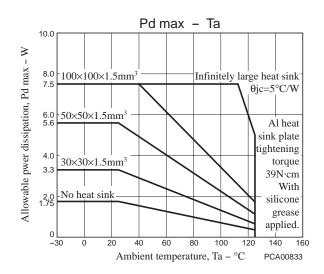
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	Unit
Reference voltage	Vos	V <sub>IN</sub> = 15V, I <sub>O</sub> = 1.0A	1.20	1.23	1.26	V
Efficiency	η	$V_{IN} = 15V$ , $I_{O} = 1.0A$ , Set $V_{O} = 5V$		84		%
Switching frequency	f	V <sub>IN</sub> = 15V, I <sub>O</sub> = 1.0A	128	160	192	kHz
Switching frequency when short-circuit protection is active	fshort	V <sub>IN</sub> = 15V, V <sub>OS</sub> = 0V	15	30	45	kHz
Line regulation	ΔV <sub>O</sub> LINE	V <sub>IN</sub> = 8 to 20V, I <sub>O</sub> = 1.0A		40	100	mV
Load regulation	ΔV <sub>O</sub> LOAD	V <sub>IN</sub> = 15V, I <sub>O</sub> = 0.5 to 1.5A		10	30	mV
Output voltage temperature coefficient	ΔV <sub>O</sub> /ΔTa	Designed target value. *		±0.5		mV/°C
Ripple attenuation factor	RREJ	f = 100 to 120Hz		45		dB
Output leak current	l <sub>O</sub> leak	V <sub>IN</sub> = 15V, SW <sub>OUT</sub> = -0.4V			50	μΑ
Current limiter operating voltage	IS	V <sub>IN</sub> = 15V	3.1			Α
Operating current	IVIN	V <sub>IN</sub> = 15V		5.6		mA
Standby current	ISTBY	V <sub>IN</sub> = 15V, ENA = 5V			200	μΑ
ENA pin LOW voltage range	VENAL				0.6	V
ENA pin HIGH voltage range	V <sub>ENA</sub> 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

<sup>\*</sup> Design target value: No measurement made.

## **Package Dimensions**

unit : mm (typ) 3079A

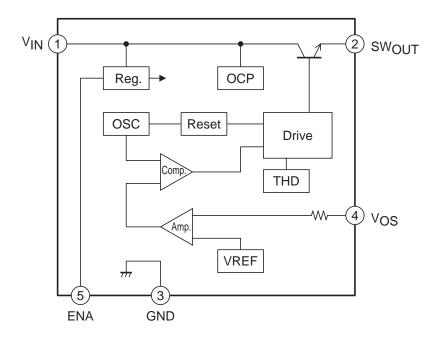




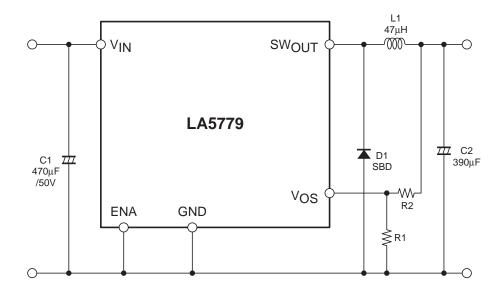
# **Pin Assignment**

(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**



#### **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.

ON Semiconductor and the ON logo are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equa