



SANYO Semiconductors

# DATA SHEET

## LA5160AM — Monolithic Linear IC 5V/0.1A Constant-voltage Power Supply IC with Output ON/OFF Feature

### Overview

The LA5160AM is a general-purpose constant-voltage power supply IC incorporating the output ON/OFF function, which offers advantages such as small current drain when output OFF and saves power dissipation of the equipment.

### Functions & Features

- Output voltage ON/OFF control with the strobe pin (active, low)
- Output current of 100mA obtainable
- Small current drain when output OFF and optimum for power saving
- MFP8 package, ensuring easy mounting design
- Full compliment of protection circuits incorporated (including overcurrent protection, thermal protection)

### Specifications

Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Input Voltage	V <sub>IN</sub> max		40	V
Strobe Pin Voltage	VST max		V <sub>IN</sub> max	V
Allowable Power Dissipation 1	Pd max1	Independent IC	0.3	W
Allowable Power Dissipation 2	Pd max2	* Mounted on a specified board	0.8	W
Operating Temperature	To <sub>pr</sub>		-40 to +125	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

\* Specified board: 114.3mm×76.1mm×1.6mm Board material: glass epoxy

Recommended Operating Conditions at Ta=-40°C • +25°C • +125°C

Parameter	Symbol	Conditions	Ratings	Unit
Input Voltage	V <sub>IN</sub>		7.5 to 20	V
Output Current	I <sub>OUT</sub>		0 to 100	mA
Output ON Control Voltage	VSTL		-0.3 to 0.7	V
Output OFF Control Voltage	VSTH		2.0 to V <sub>IN</sub>	V

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# LA5160AM

**Operation Characteristics** at  $T_a = -40^\circ\text{C} \cdot +25^\circ\text{C} \cdot +125^\circ\text{C}$ , unless otherwise specified,

$V_{IN} = 10\text{V}$  and  $I_{OUT} = 50\text{mA}$  in the specified test circuit

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Voltage 1	$V_{OUT1}$		4.8	5.0	5.2	V
Line Regulation 1	$\Delta\text{VOLN1}$	$7\text{V} \leq V_{IN} \leq 25\text{V}$ , $I_{OUT} = 20\text{mA}$		3	50	mV
Line Regulation 2	$\Delta\text{VOLN2}$	$8\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_{OUT} = 20\text{mA}$		1	25	mV
Load Regulation 1	$\Delta\text{VOLD1}$	$1\text{mA} \leq I_{OUT} \leq 50\text{mA}$			100	mV
Load Regulation 2	$\Delta\text{VOLD2}$	$1\text{mA} \leq I_{OUT} \leq 20\text{mA}$			50	mV
Output Voltage 2	$V_{OUT2}$	$7\text{V} \leq V_{IN} \leq 20\text{V}$ , $1\text{mA} \leq I_{OUT} \leq 50\text{mA}$	4.75		5.25	V
Current Dissipation	$I_Q$			1.9	5.0	mA
Output Noise Voltage	$V_{NO}$	$10\text{Hz} \leq f \leq 100\text{kHz}$		90		$\mu\text{V}_{\text{rms}}$
Ripple Rejection	Rrej1	$f = 120\text{Hz}$ $8\text{V} \leq V_{IN} \leq 19\text{V}$ $I_{OUT} = 10\text{mA}$	60	63		dB
	Rrej2	$f = 120\text{Hz}$ $8\text{V} \leq V_{IN} \leq 19\text{V}$ $I_{OUT} = 50\text{mA}$	50	54		dB
Minimum I/O Voltage Difference	$V_{\text{drop}}$	$I_{OUT} = 50\text{mA}$		2.0		V
Output ON Control Voltage	$V_{\text{STL}}$				0.7	V
Short-Circuit Current	$I_{\text{OSC}}$	$V_{IN} = 35\text{V}$ , relative to GND		300		mA
Peak Output Current	$I_{\text{OP}}$			700		mA

## [ VST="H" when the output is OFF ]

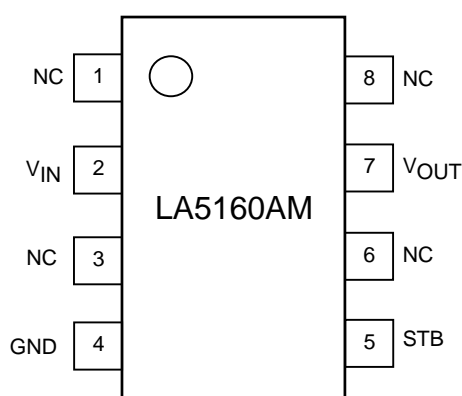
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
"L" Output Voltage	$V_{\text{OOFF}}$	$V_{\text{ST}} = 5\text{V}$		20	200	mV
Quiescent Current	$I_{\text{QOFF}}$	Excluding $V_{\text{ST}} = 5\text{V}$ and $I_{\text{STB}}$		35	40	$\mu\text{A}$
Output OFF Control Voltage	$V_{\text{STH}}$		2.0		$V_{IN}$	V

## Thermal protection

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Operating Temperature *	$T_{\text{TSD}}$		150	180		$^\circ\text{C}$

Note : The value with an asterisk mark for thermal protection is the design target value and no measurement is made.

## Pin Assignment



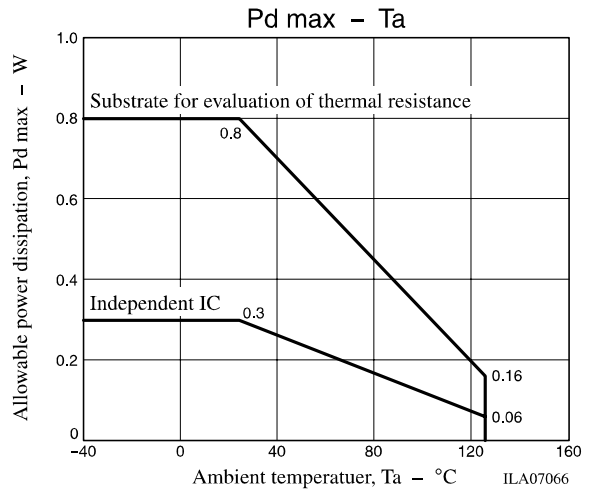
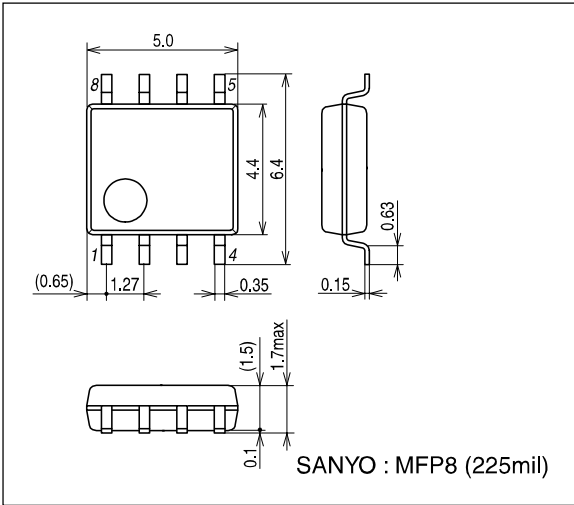
Top view

Note: Do not use NC pins (Pin Nos. 1, 3, 6, and 8)

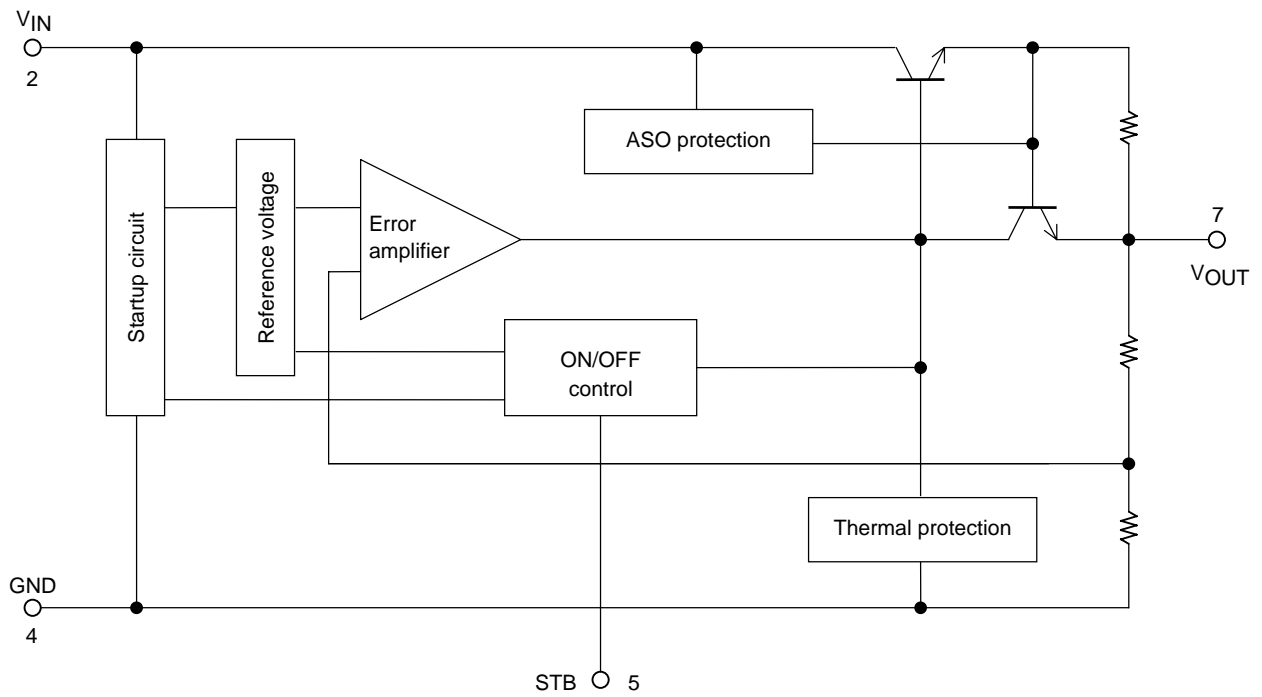
# LA5160AM

## Package Dimensions

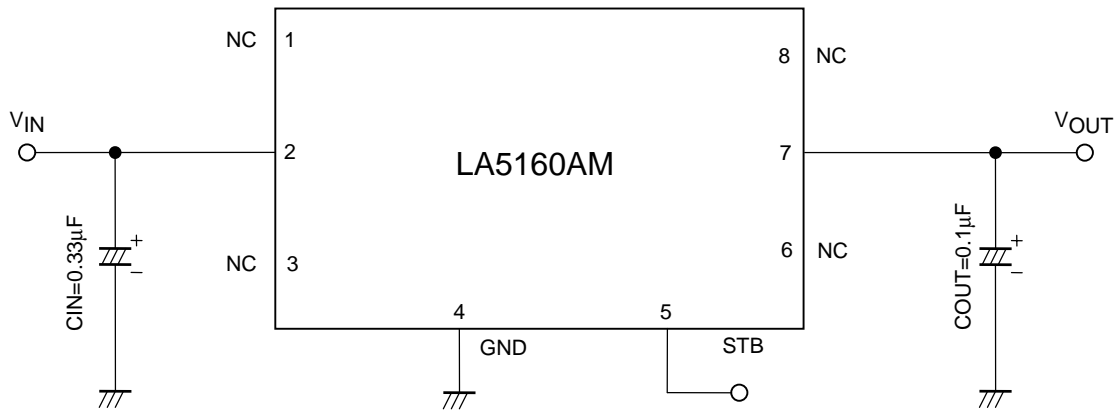
unit : mm  
3032D



## Equivalent Circuit Block Diagram



Specified Test Circuit Diagram



Cautions for application

Note : 1) To stabilize the operation, arrange CIN and COUT as near as possible to the IC.

2) COUT must have 0.1µF or more, with less capacitance fluctuation due to temperature, so as to prevent oscillation at low temperature (such as a tantalum capacitor, etc.).

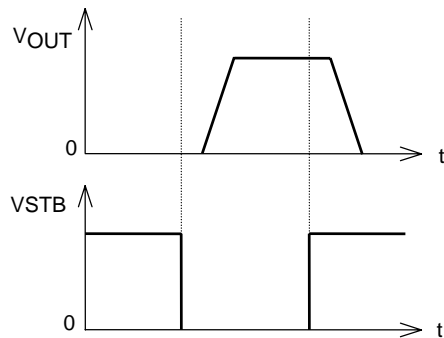
3) With the STB pin OPEN, the internal bias causes the output in the ON state.

When the STB function is not to be used, connect the STB pin to GND to ensure trouble-free operation of STB.

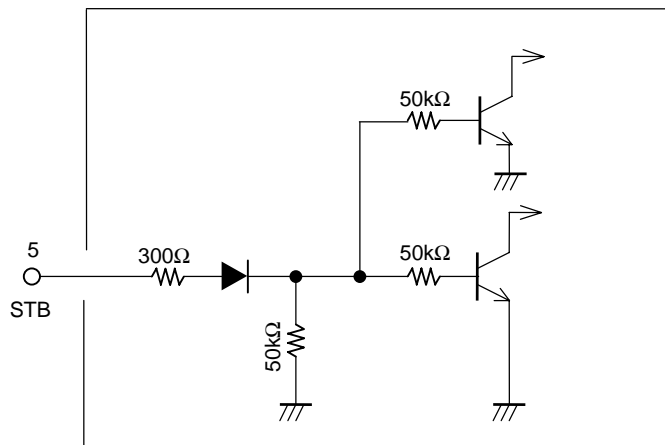
4) Note that wrong connection, such as connection of VIN to minus and GND to plus, may cause flow of the overcurrent.

Function Table

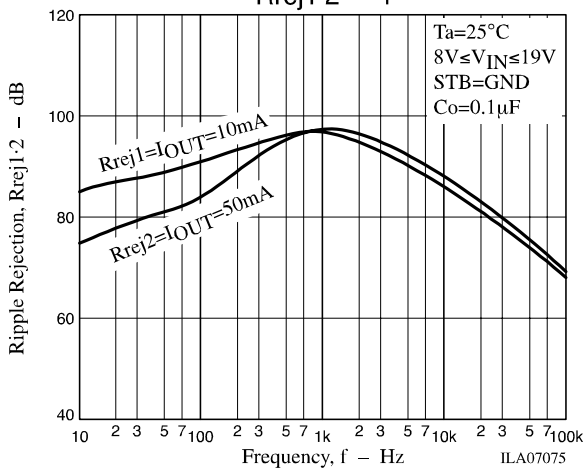
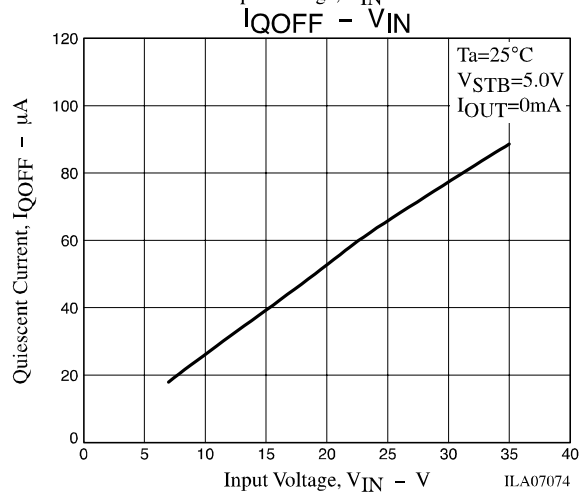
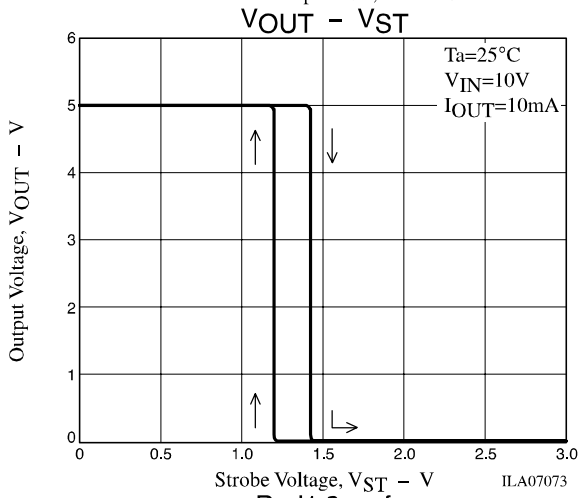
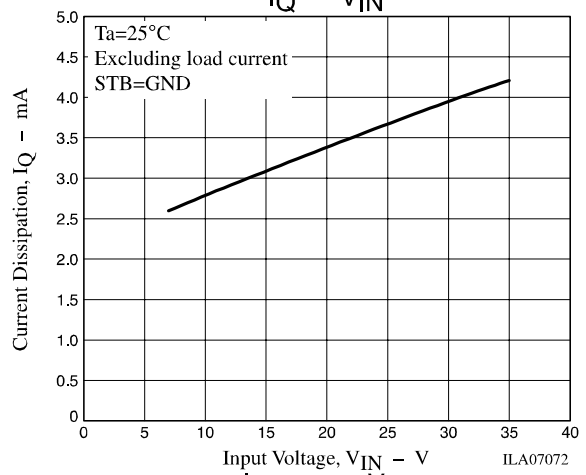
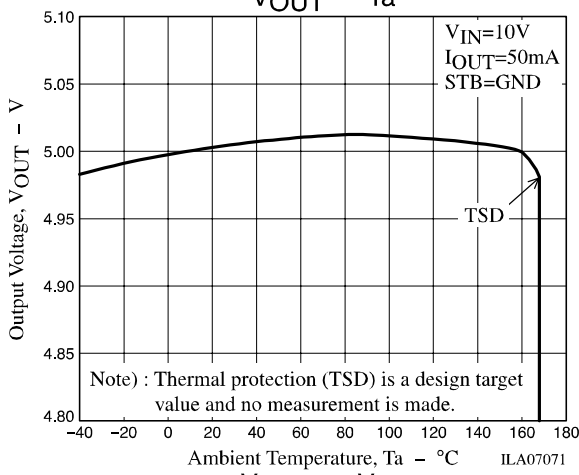
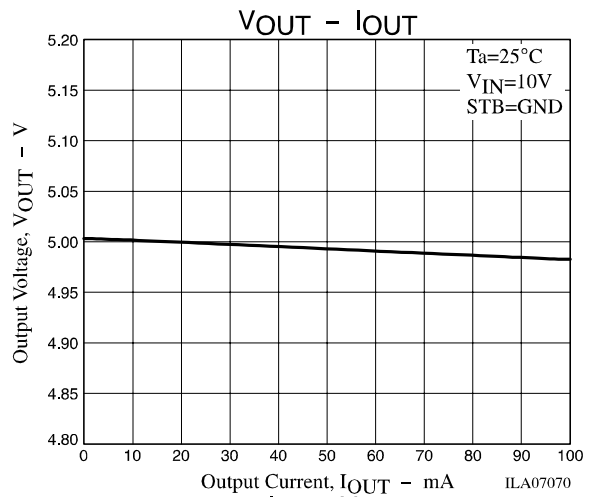
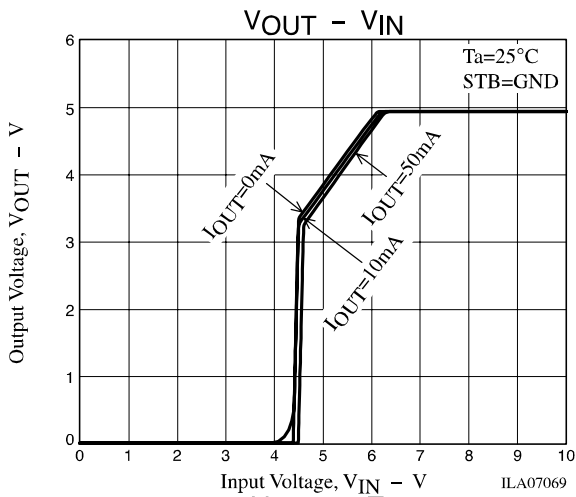
VSTB	VOUT
L	H
H	L



Equivalent Circuit for ON/OFF Control Input, etc.



# LA5160AM



The values shown in the characteristics diagrams are all typical values.

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