

General Description

The SY20731B is a low dropout LDO regulator with 3.3V fixed output voltage, capable of delivering up to 1A output current.

Only the input and output capacitors need to be selected for the targeted application specifications.

The SY20731B is available in an industry standard SOT-223 package, which offers low thermal resistance.

Features

- Input Voltage Range: 1.6-5.5V
- Output Voltage Accuracy: $\pm 3\%$
- Up to 1A Output Current
- Current Limiting Protection
- Quiescent Current: 80 μ A
- Overtemperature Protection
- Compact Package: SOT-223

Applications

- Portable Communication Equipment
- Hand-Held Instruments, Notebook PC
- Camcorders and Cameras

Typical Application

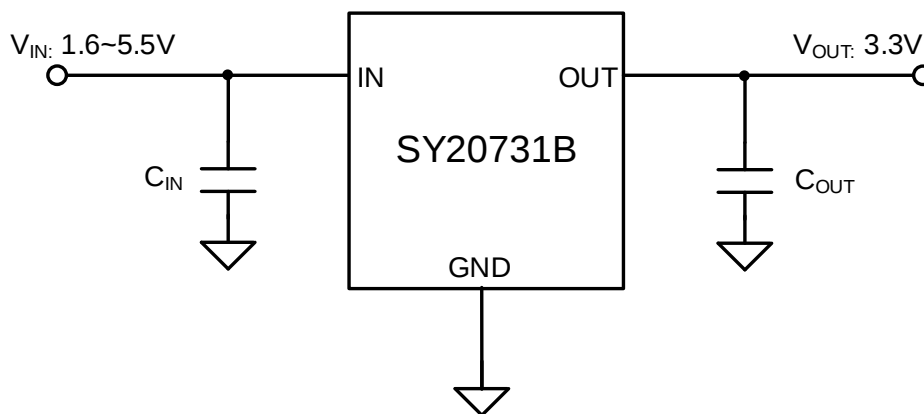


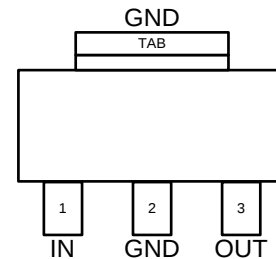
Figure 1. Schematic diagram

Ordering Information

Ordering Part Number	Package Type	Top Mark
SY20731BAJC	SOT-223 RoHS Compliant and Halogen Free	CSDxyz

x = year code, y = week code, z = lot number code

Pinout (top view)



Pin Description

Pin No	Pin Name	Pin Description
1	IN	Input pin. Decouple this pin to the GND pin with at least a 4.7 μ F ceramic capacitor.
2, TAB	GND	Ground pin.
3	OUT	Output pin. Decouple this pin to the GND pin with at least a 4.7 μ F ceramic capacitor.

Block Diagram

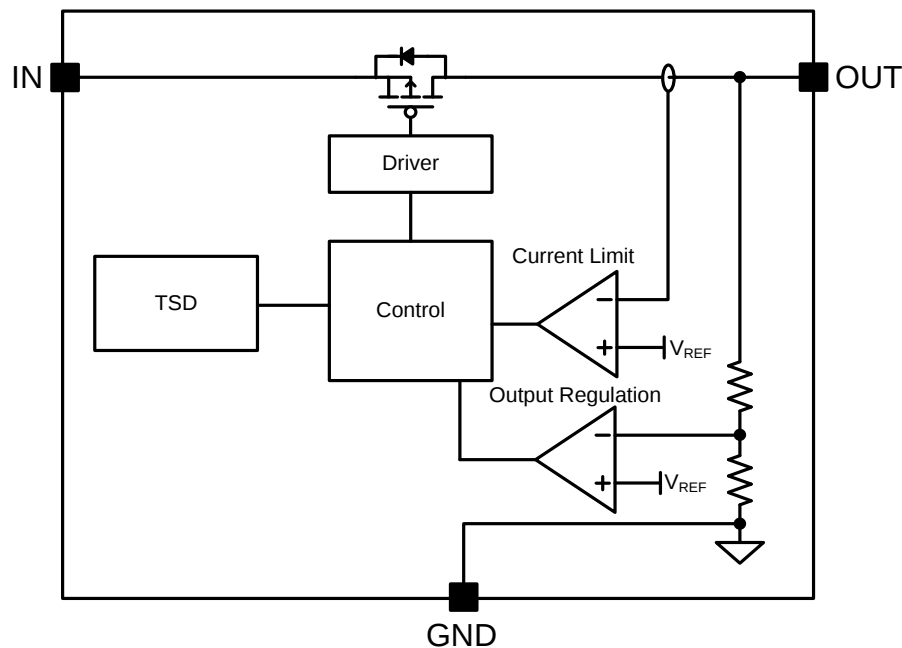


Figure 2. Block diagram

Absolute Maximum Ratings

Parameter (Note 1)	Min	Max	Unit
IN, OUT	-0.3	6	V
Lead Temperature (Soldering, 10s)		260	°C
Junction Temperature, Operating	-40	150	
Storage Temperature	-65	150	

Thermal Information

Parameter (Note 2)	Typ	Unit
θ_{JA} Junction-to-Ambient Thermal Resistance	36	°C/W
θ_{JC} Junction-to-Case Thermal Resistance	3.44	
PD Power Dissipation $T_A = 25^\circ\text{C}$	2.78	W

Recommended Operating Conditions

Parameter (Note 3)	Min	Max	Unit
IN	1.6	5.5	V
OUT	0	5.5	
Junction Temperature, Operating	-40	125	°C
Ambient Temperature	-40	85	

Note 1: Stresses beyond the “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^\circ\text{C}$ on Silergy test board.

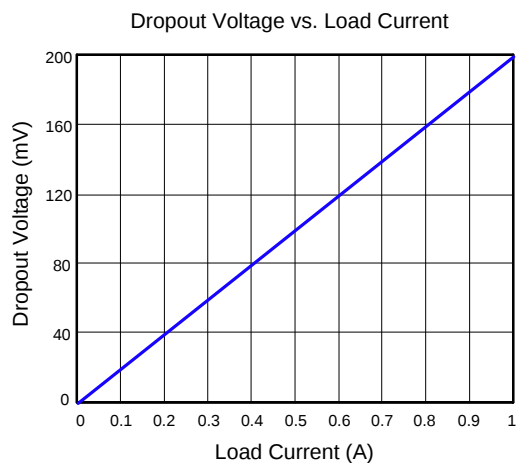
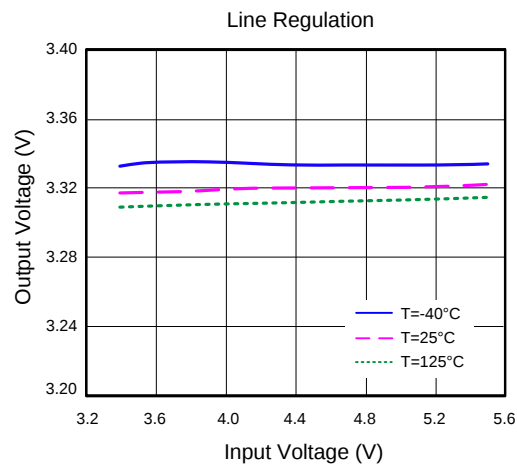
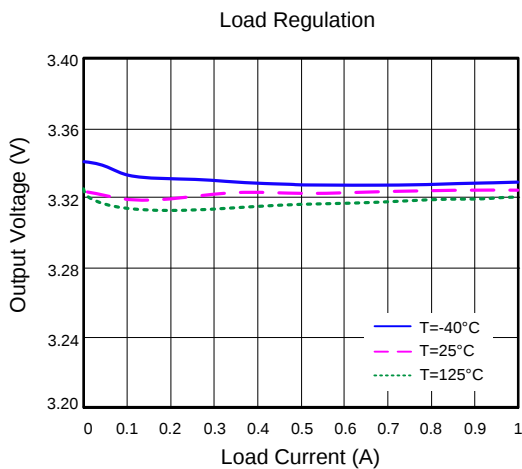
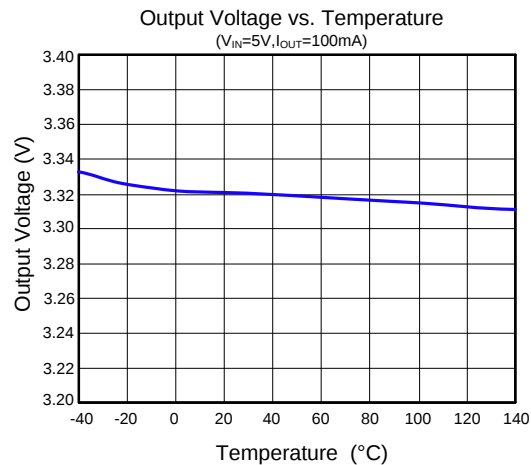
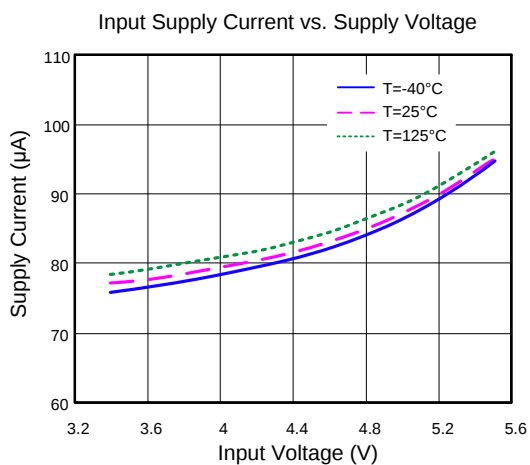
Note 3: The device is not guaranteed to function outside its operating conditions.

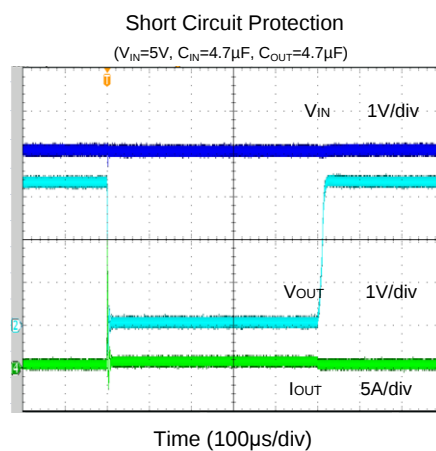
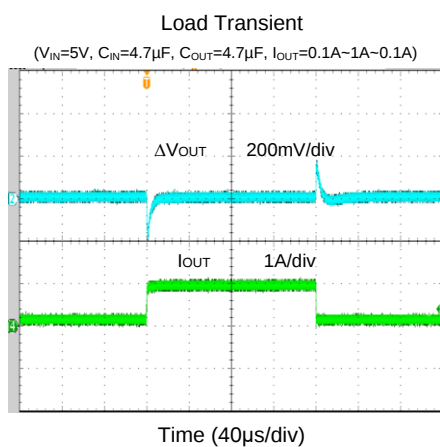
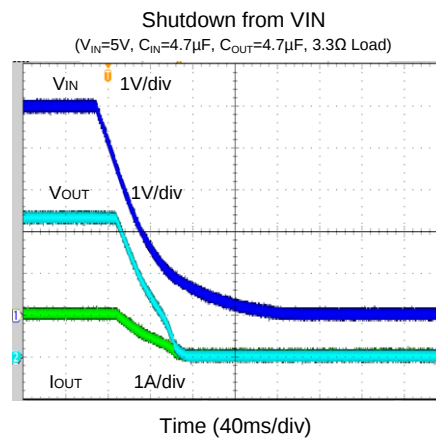
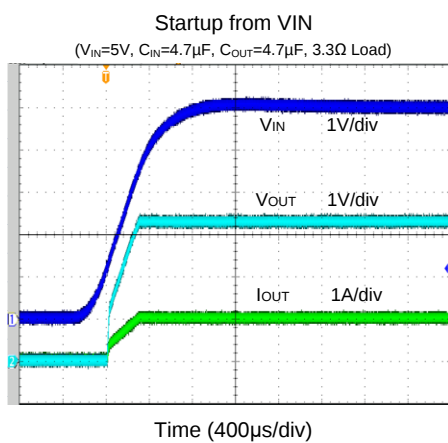
Electrical Characteristics

($V_{IN} = 5\text{V}$, $C_{IN} = 4.7\mu\text{F}$, $T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		1.6		5.5	V
Supply Current	I_{SS}	$V_{IN} = 5\text{V}$, $V_{OUT} = 3.3\text{V}$, $I_{OUT} = 0\text{A}$		80	110	μA
Output Voltage Accuracy	ΔV_{OUT}	$V_{IN} = 5\text{V}$, $I_{OUT} = 100\text{mA}$	3.201	3.3	3.399	V
Current Limit	I_{LMT}		1			A
Load Regulation	ΔV_{LD_REG}	$V_{IN} = 5\text{V}$, $1\text{mA} \leq I_{OUT} \leq 1\text{A}$		-10		mV/A
Line Regulation	ΔV_{LN_REG}	$2\text{V} \leq V_{IN} \leq 5.5\text{V}$, $I_{OUT} = 100\text{mA}$		0.22	0.55	%/V
Power Supply Ripple Rejection	PSRR	$V_{IN} = 5\text{V}$, $V_{OUT} = 3.3\text{V}$, $I_{OUT} = 100\text{mA}$, $f = 1\text{kHz}$		-60		dB
Output Voltage Temperature Co-efficient	ΔV_{TMP_SHT}	$I_{OUT} = 100\text{mA}$, $-40^\circ\text{C} \leq T_J \leq 85^\circ\text{C}$		± 100		ppm/°C
Short Current Limit	I_{SHORT}	$V_{OUT} = 0\text{V}$		350		mA
Dropout Voltage	ΔV_{DROP}	$I_{OUT} = 1\text{A}$		0.2		V
Thermal Shutdown Threshold	T_{SD}			150		°C
Thermal Shutdown Hysteresis	T_{HYS}			20		°C

Typical Operating Characteristics





Operation

The SY20731B is a super-low dropout LDO regulator with 3.3V fixed output voltage, capable of delivering up to 1A output current.

Applications Information

Overtemperature Protection (OTP)

The SY20731B includes overtemperature protection (OTP) circuitry to prevent overheating caused by excessive power dissipation. This will turn off the device when the junction temperature exceeds 150°C. Once the junction temperature cools down by approximately 20°C, the device will resume normal operation.

Overcurrent Protection

The minimum current limit is 1A. When an overcurrent condition is sensed, the gate of the pass switch is modulated to achieve constant output current. If the overcurrent condition persists for a long time, the junction temperature may exceed 150°C, and overtemperature protection will shut down the device. Once the chip temperature drops below 130°C, the part will restart.

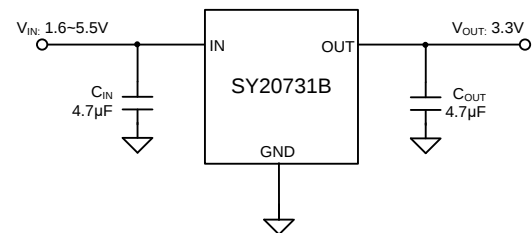
Input Capacitor C_{IN}

To minimize any potential noise problem and improve power-supply rejection (PSRR) and transient response, place a typical X5R or better grade ceramic capacitor as close as possible to the IN and GND pins. Care should be taken to minimize the loop area formed by C_{IN} and the IN/GND pins. In this case, a 4.7μF low-ESR ceramic capacitor is recommended.

Output Capacitor C_{OUT}

For stable operation over the full temperature range, a 4.7μF low-ESR ceramic capacitor is recommended. Use larger output-capacitor values, such as 10μF, to reduce noise and improve load-transient response and PSRR.

Application Schematic ($V_{OUT} = 3.3V$)



BOM List

Reference Designator	Description	Part Number	Manufacturer
C_{IN}	4.7μF/16V, 0603	GRM185R61C475KE11D+A01	Murata
C_{OUT}	4.7μF/16V, 0603	GRM185R61C475KE11D+A01	Murata

PCB Layout Guide

For optimal performance, adhere to the following guidelines:

- Keep all power traces as short and wide as possible.
- Place input/output capacitors close to the IC for better transient performance.

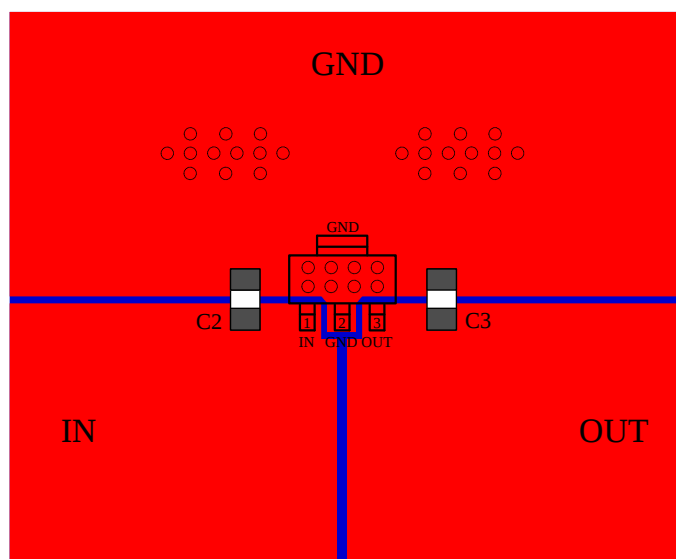
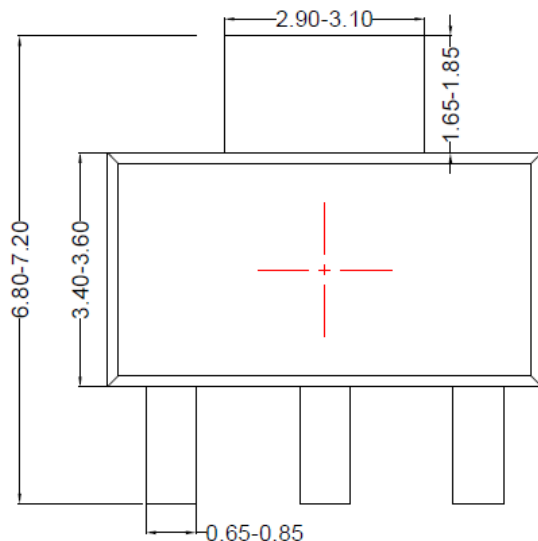
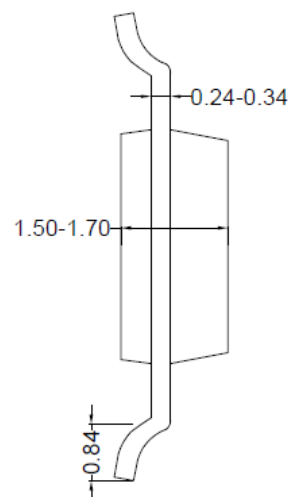


Figure 3. Recommended PCB layout

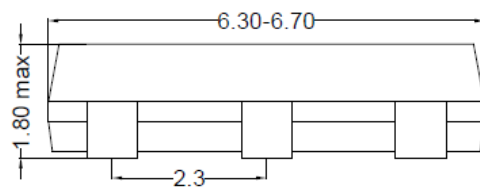
SOT223 Package Outline Drawing



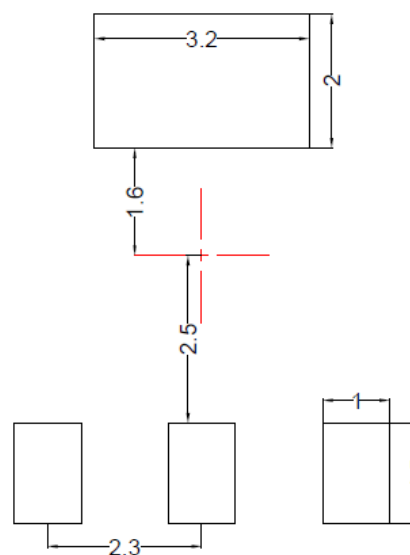
Top View



Bottom View



Front View



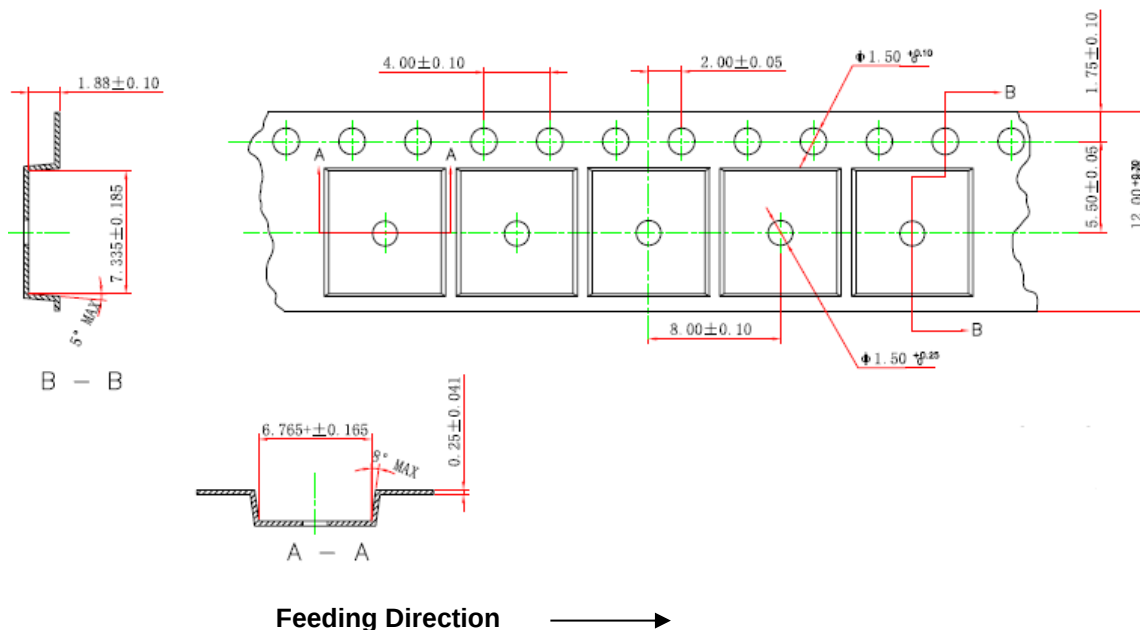
**Recommended PCB layout
(reference only)**

Notes:

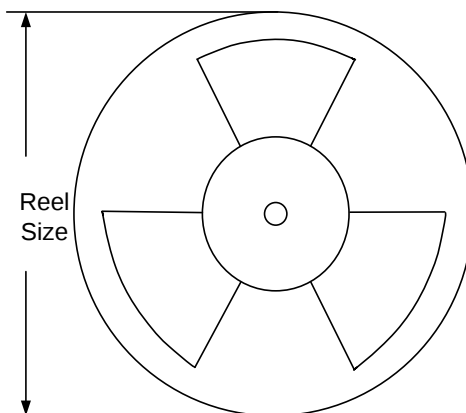
- All dimensions are in millimeters and exclude mold flash and metal burr.
- Center line on drawing refers to the chip body center

Taping and Reel Specification

1. Taping orientation



2. Carrier tape and reel specification for packages



Package type	Tape width (mm)	Pocket pitch (mm)	Reel size (Inches)	Trailer length (mm)	Leader length (mm)	Qty per reel
						(pcs)
SOT223	12	8	13	400	400	2500

3. Others: NA

Revision History

The revision history provided is for informational purposes only and is believed to be accurate, however, not warranted. Please make sure that you have the latest revision.

Date	Revision	Change
Mar.27, 2023	Revision 1.0	Upgrade the version code to Rev1.0 for Production Release.
Nov.25, 2019	Revision 0.9	Initial Release

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