ACE7503Y

Constant On-Time Synchronous Step-Down Converter

Description

The ACE7503Y is a high-efficiency synchronous step-down DC-DC regulator. The ACE7503Y can achieve up to 2.5 A continuous. The ACE7503Y operates over a wide input voltage ranging from 2.4 V to 5.5 V. The output voltage can be regulated to as low as 0.6 V. The ACE7503Y integrates the main switch and synchronous switch with very low RDS(ON) to minimize the conduction loss. Low output voltage ripple and small external inductor and capacitor sizes are achieved with 1 MHz switching frequency. Constant-on-time control provides a fast transient response and eases loop stabilization. The ACE7503Y is ideal for a wide range of applications, including LCD TVs, set top boxes and internet PCs.

Features

- 2.4 V to 5.5 V input voltage range
- 7 μA typical quiescent current
- 100% dropout operation
- Output discharge with a RDIS of 50 Ω
- Feedback reference voltage: 0.6 V
- Low RDS(ON) for internal switches (top/bottom) 80 mΩ / 50 mΩ, 3.0 A
- Operating temperature range: -40°C to 85°C
- High switching frequency 1 MHz minimizes the external components
- Internal soft start limits the inrush current
- Power-good output
- Reliable short-circuit protection: hiccup mode protection
- Fixed frequency COT architecture achieve ultra-fast transient response

Applications

- Access point routers
- LCD TVs
- Set top boxes
- Mini-notebook PCs
- Internet PCs

Thermal Considerations (Note)

Symbol	Parameter	Value	Units
RθJA	Junction-to-air thermal resistance	240	°C/W
RθJC	Junction-to-case thermal resistance	40	°C/W

Note:

The thermal resistance determines the heat insulation property of a material. The higher the thermal resistance is, the lower the heat loss. Accumulation of heat energy degrades the performance of semiconductor components.

Absolute Maximum Ratings (Note)

Symbol	Parameter	Ratings	Units
VCC	Supply Voltage (V+ – V-)	-0.3 to 6.0	V
VFB	Enable, FB Voltage	-0.3 to VIN + 0.6	V
PD	Power Dissipation, TA = 25°C	1	W
TSTG	Storage Temperature Range	-65 to 150	°C
TJ	Junction Temperature Range	150	°C
TL	Lead Temperature Range	260	°C
	Dynamic LX Voltage in 50 ns Duration	VIN + 3 to GND - 4	V

Note:

Exceeding the maximum ratings listed under Absolute Maximum Ratings when designing is likely to damage the device permanently. Do not design to the maximum limits because long-time exposure to them might impact the device's reliability. The ratings are obtained over an operating free-air temperature range unless otherwise specified.

Recommend Operating Conditions (Note)

Symbol	Parameter	Ratings	Units
VCC	Supply Voltage	2.4 to 5.5	V
TJ	Junction Temperature Range	-40 to 125	°C
TA	Ambient Temperature Range	-40 to 85	°C

Note:

Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. The ratings are obtained over an operating free-air temperature range unless otherwise specified.

ESD Ratings (Note)

Model	Condition	Value	Units
ESD	HBM, JEDEC:JS-001	±2000	V
	CDM, JEDEC:JS-002	±2000	V

Note:

When a statically-charged person or object touches an electrostatic discharge sensitive device, the electrostatic charge might be drained through sensitive circuitry in the device. If the electrostatic discharge possesses sufficient energy, damage might occur to the device due to localized overheating.

Ordering Information

ACE7503Y XX + H

- Halogen - free
- Pb - free
- BN: SOT-23-5
- GM: SOT-23-6

Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Technology Co., LTD. As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and shoes failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.