NTCKF-F6S-120 SATA Solid State Drive Datasheet

（Based on NAND Flash）

Version: 1.0

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I. Introduction

1 Overview

NTC SATA SSD (Solid State Drive) is a high performance and high reliability storage device based on NAND Flash technology that designed to solve the bottleneck of computing system by traditional hard disk drives. Our SATA SSD doesn't have a moving parts and it has a same host interface and same physical dimension with Hard Disk Drive, so it can be drop-in replaced with the hard disk drives without anything. With a high performance and low power consumption, Our SATA SSD can be a good storage device for NB and Tabletop PC.

NTC SATA SSD purely consists of semiconductor devices and NAND flash memories, which give rugged features against shock and vibration, used in extreme environment such as industrial PC to increase MTBF. Furthermore, Our SATA SSD has highly advanced flash memory management algorithm to guarantee higher performance and data integrity.

2 Part Type Introduction

This chapter is about the specifications of the 2.5" SATA Solid State Drive SSD with SATAⅡ interface.

Type	Capacity	Flash	Interface
NTCKF-F6S-120	120GB	TLC	SATAIII

Table 1 Capacity Specifications

Capacity	Available Capacity	R / W(MB/s)	Random R/W IOPS
120GB	111.6GB	560/471	27004/31545

Note: the maximum Read & Write performance test with ATTO Disk Benchmark;

IOPS test with IOmeter 2008.

Outline

Based spec	Interface	SATAIII
	Dimension	100*70*7 mm
	Weight①	62~72 g
	Capacity	120GB
	SDram	0MB
	Flash type	TLC NAND Flash
Read/Write Performance②	Sequential Read	Up to 560MB/s
	Sequential Write	Up to 471MB/s
	4KB Random Read IOPS	Up to 27004
	4KB Random Write IOPS	Up to 31545
	Response Time	0.2ms
Power Consumption	Power Supply	5V$\pm$5%
	Standby	0.3W
	Maximum Ripple	70 mV(peak to peak)
	4KB Random Write	2.5W
Reliability	Write endurance: 3years @ 100G write/day(120G)	
	Read endurance: unlimited	
	MTBF: >2,000,000 hours	
	Data retention: >20years @ 25℃	
	Data destroy do not support	
	Sudden power-off recovery support	
	S.M.A.R.T,NCQ,Trim and dynamic power management support	
	Static and dynamic wear-leveling	
	Bad block management algorithm	
	ECC: LDPC ECC	
Environment	Storage temperature: -55~95 ℃	
	Operation temperature: -0~75℃	
	Humidity: 5%~95%	
	Vibration	15G (10 to 2000Hz)
	Shock	350G at 0.5ms
Warranty	2 years	

Table 2 outline of the driver

①, ②: The Read/Write performance and weight vary with different capacity of products.

The testing environment is below:

OS: Windows 7 Ultimate

CPU: Intel (R) Core(TM) i3-2100T CPU @2.50GHz

Memory: 4GB

Motherboard: Asrock H67M

Test program: ATTOBenchMark V2.47 (sequential R/W speed)

IOmeter2008 (IOPS)

HD tune V4.6.1 (sustainably R/W speed, access time)
Test Drive: NTCKF-F6S-120 (TLC)

II. Block Diagram
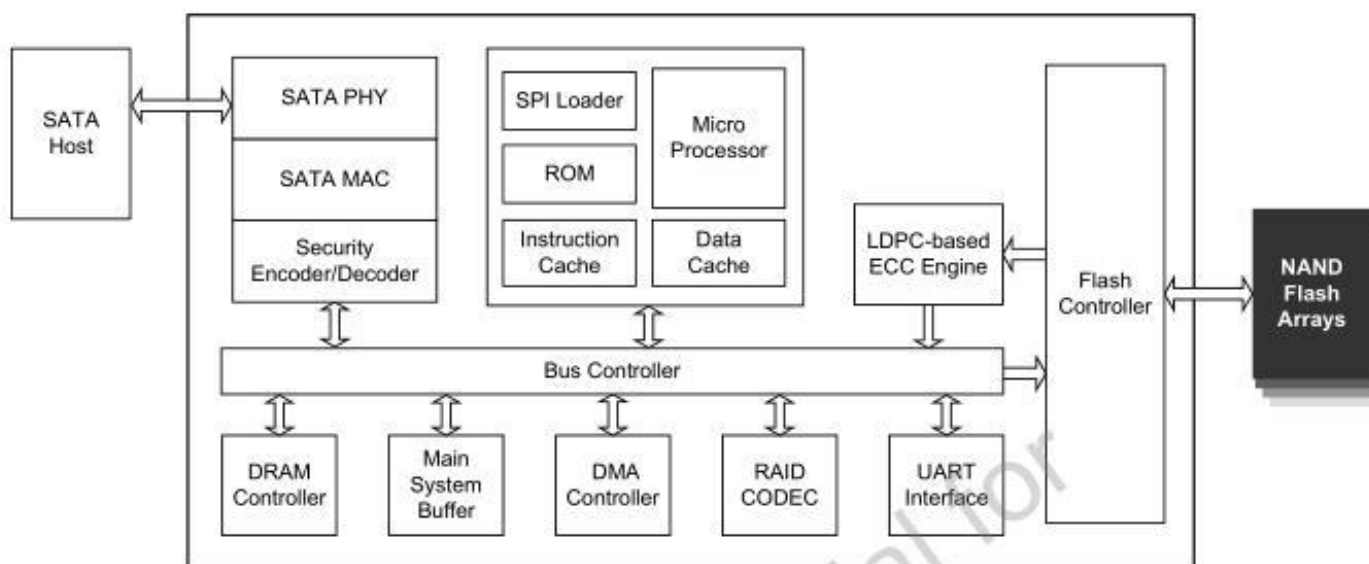
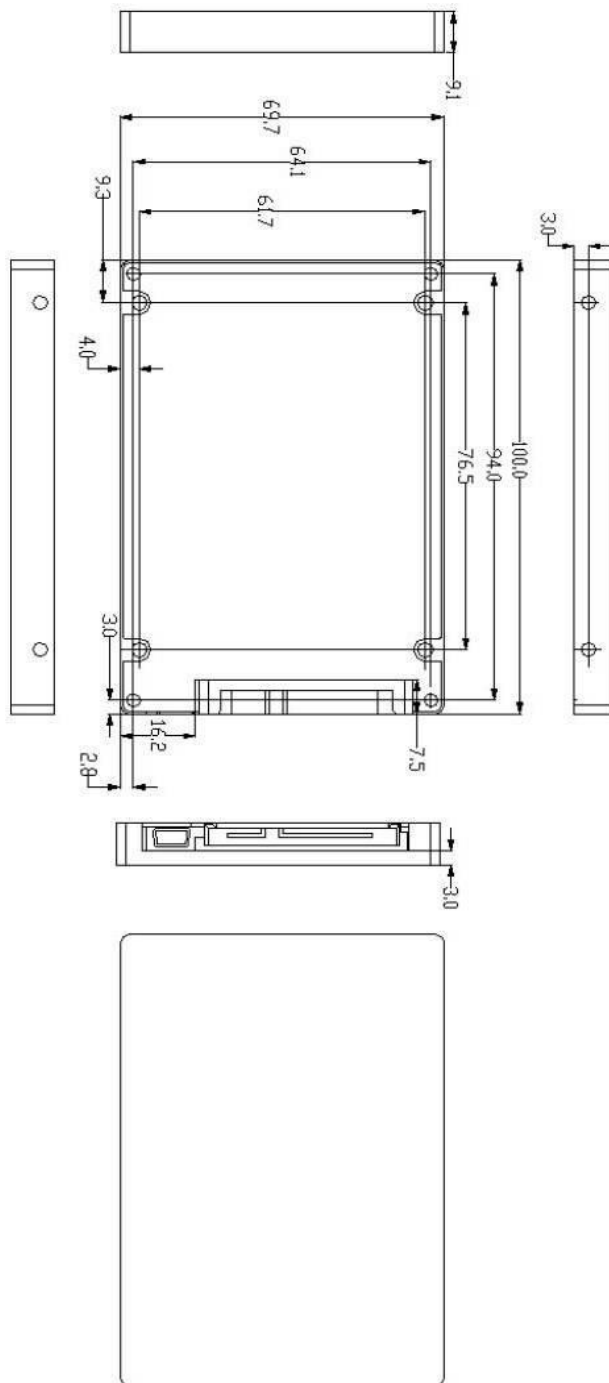Figure 1: SM2256 Block Diagram

Figure 2   Block Diagram

IV. Product Specifications

4.1 Physical Dimensions

Parameter	Value
Length	100±0.1 mm
width	70±0.1 mm
height	7±0.1 mm

Table 3 Physical dimensions of the driver

4.2 Interface Specification
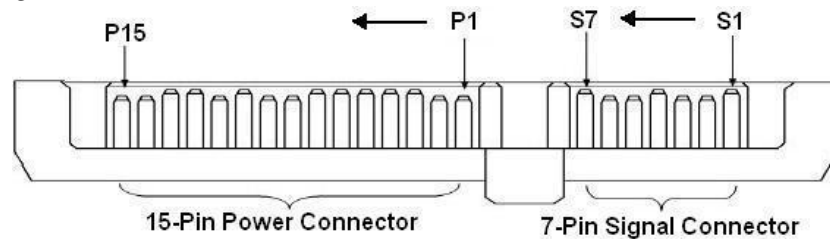
4.2.1 Pin Assignment

Figure 4 Pin connector

Pin number	Signal name	Description
S1	GND	2nd mate
S2	A+	Differential signal pair A
S3	A-	From physical layer electronics
S4	GND	2nd mate
S5	B-	Differential signal pair B
S6	B+	From physical layer electronics
S7	GND	2nd mate
P1	V33	3.3V power (unused)
P2	V33	3.3V power (unused)
P3	V33	3.3V power,pre-charge,2nd mate(unused)
P4	GND	1st mate
P5	GND	2nd mate
P6	GND	2nd mate
P7	V5	5V power,pre-charge,2nd mate
P8	V5	5V power
P9	V5	5V power
P10	GND	2nd mate
P11	DAS/DSS	Device activity signal/Disable staggered spinal(unused)
P12	GND	1st mate
P13	V12	12V power,pre-charge,2nd mate(unused)
P14	V12	12V power(unused)
P15	V12	12V power(unused)

Table 4   SATAⅡ interface pin assignment

4.2.2 Interface Mode

The interface of the 2.5" SATA SSD complies with the standard Serial ATA version 3.1:

① Host Transfer Rate is 600MB/s(6.0Gb/s)

② PIO mode 0,1,2,3,4

③ DMA mode 0,1,2

④ UDMA mode 0,1,2,3,4,5,6

V. Reliability

5.1 ECC Descriptions

LDPC ECC

The LDPC ECC engine executes parity generation and error detection/correction features, and enhances decoding throughput and data reliability. With LDPC of correction capability 1e-2 RBER, the hard and soft decoding mechanism provides powerful error correction. Hence the SM2256 can enhance the endurance and retention of TLC NAND and extends the SSD lifespan.

5.2 Advance Wear-Leveling Algorithm

The NAND flash devices are limited by a certain number of write cycles. When using a file system, frequent file table updates is mandatory. If some area on the flash wears out faster than others, it would significantly reduce the lifetime of the whole device, even if the erase counts of others are far from the write cycle limit. Thus, if the write cycles can be distributed evenly across the media, the lifetime of the media can be prolonged significantly. The scheme is achieved both via buffer management and specific advanced wear leveling to ensure that the lifetime of the flash media can be increased, and the disk access performance is optimized as well.

5.3 S.M.A.R.T Function

S.M.A.R.T. is an acronym for Self-Monitoring, Analysis and Reporting Technology, an open standard allowing disk drives to automatically monitor their own health and report potential problems. It protects the user from unscheduled downtime by monitoring and storing critical drive performance and calibration parameters. Ideally, this should allow taking proactive actions to prevent impending drive failure. SMART feature adopts the standard SMART command B0h to read data from the drive. When the SMART Utility running on the host, it analyzes and reports the disk status to the host before the device is in critical condition.

VI. Ordering Information

Model	Capacity	PN
NTCKF-F6S	120GB	NTCKF-F6S-120

VII. Related documentation

For more information, visit www.ntccomputadores.com.br

Attachment

Test platform：

System : Windows 7

        CPU: Intel (R) Core(TM) i3-2100T CPU @2.50GHz

        Memory : 4GB

        Mother Board: Asrock H67M