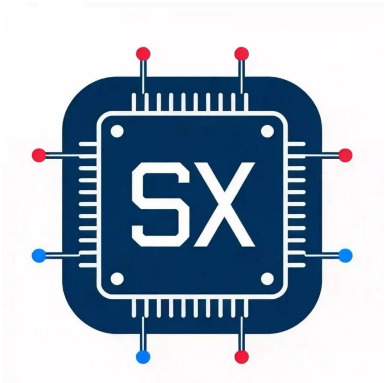



# SXD042

## 16-Bit, 50 MSPS D/A Converter

## 16 位 50MSPS D/A 转换器

16-bit | 1 channel | 50 MSPS | SSOP-28 | Parallel CMOS/TTL

16 位 | 单通道 | 50MSPS | SSOP-28 | 并行 CMOS/TTL

**对标 / Cross Reference: LTC1668 — pin-to-pin compatible alternative**

Product Datasheet / 产品数据手册

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# SXD042 16-Bit 50MSPS D/A Converter — Product Manual (Bilingual)

# SXD042 型 16 位 50MSPS D/A 转换器产品说明书、使用手册（中英对照）

**Shenzhen Shenxin Technology Co., Ltd. / 深信科技** **V1.20260723**

**对标 / Cross Reference: LTC1668 — pin-to-pin compatible alternative**

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19. 附加说明 / Additional Notes

## 版本修订记录 / Revision History

| 版本号 / Version | 发布日期 / Release Date | 更改章节 / Changed Section | 更改说明 / Change Description | 备注 / Remarks |
|---|---|---|---|---|
| V1.20260723 | 2026.7.23 | / | / | 首次发布 / Initial release |

## 产品用途及应用范围 / Applications and Scope

**English:** Mobile base stations; multi-carrier base stations; wireless communications; DDS; xDSL modems; arbitrary waveform generation; automatic test equipment; instruments and instrumentation.

**中文：** 移动基站；多载波基站；无线通信；DDS；xDSL 调制解调器；任意波形发生；自动测试设备；仪表、仪器。

## 标准 / Standards

**English:** Detailed specification and approval number: Q/GC 0229-2026 — Detailed Specification for Semiconductor Integrated Circuit SXD042 16-Bit 50MSPS D/A Converter. Quality grade / quality assurance requirement: enterprise standard.

**中文：** 详细规范及确认号：Q/GC 0229-2026 《半导体集成电路 SXD042 型 16 位 50MSPS D/A 转换器详细规范》；质量等级/质量保证要求：企标。

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## 产品特点 / Features

**English:** - Analog supply voltage: ±5V - Clock frequency: 50MHz - Resolution: 16Bits - Spurious-free dynamic range (SFDR): ≥70 dB @ fCLK=50MHz, fout=1MHz - Power consumption: ≤225W - Analog output range: 1mA~10mA - ESD rating: Class 1B, HBM model: 500V - Weight: 0.25g±0.05g - Moisture sensitivity level and package: MSL3, SOP28

**中文：** - 模拟电源电压：±5V - 时钟频率 50MHz - 分辨率：16Bits - 无杂散动态范围：≥70 dB@fCLK=50MHz，fout=1MHz - 功耗：≤225W - 模拟输出范围：1mA~10mA - ESD 等级：1B 级，HBM 模型：500V - 重量：0.25g±0.05g - 湿敏等级和封装形式：MSL3，SOP28

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## 产品描述 / Product Description

**English:** The SXD042 16-bit 50MSPS D/A converter is a 16-bit D/A converter circuit fabricated in a CMOS process. The circuit consists mainly of an input latch, a current-source array, current-source switches, an attenuation ladder, a reference voltage, and a current-source control amplifier. The circuit uses a segmented-decoding current-steering architecture: the 16-bit data passes through the input driver and level-conversion circuits into the circuit, where DB12~DB15 pass through a thermometer-decoding circuit, and master-slave D flip-flops synchronize the data signals under the action of the clock signal; the current-source switches control the direction of current flow, and differential current is output via IOUTA and IOUTB. A 2.5V reference provides a precise reference voltage and bias voltages for the entire circuit.

This product is packaged in a 28-lead plastic small-outline package, code SOP28, with a product weight of 0.25g±0.05g.

The functional block diagram of this product is shown in Figure 1.

The operating timing of this product is as follows:

**中文：** SXD042 型 16 位 50MSPS D/A 转换器是采用 CMOS 工艺制造的 16 位 D/A 转换器路，电路主要由输入锁存、电流源阵列、电流源开关、衰减阶梯、基准电压、电流源控制放大器等模块构成，电路采用分段译码电流舵结构，16-Bit 数据经输入驱动及电平转换电路进入电路内部，其中 DB12~DB15 经温度计译码电路，主从 D 触发器在时钟信号的作用下同步数据信号，电流源开关控制电流的流向，通过 IOUTA 和 IOUTB 输出差分电流。2.5V 基准为整个电路提供精密参考电压和偏置电压。

该产品采用 28 线塑料小外形外壳封装，代号 SOP28 封装，产品重量为 0.25g±0.05g。

该产品功能框图如图 1 所示。

该产品工作时序如下：

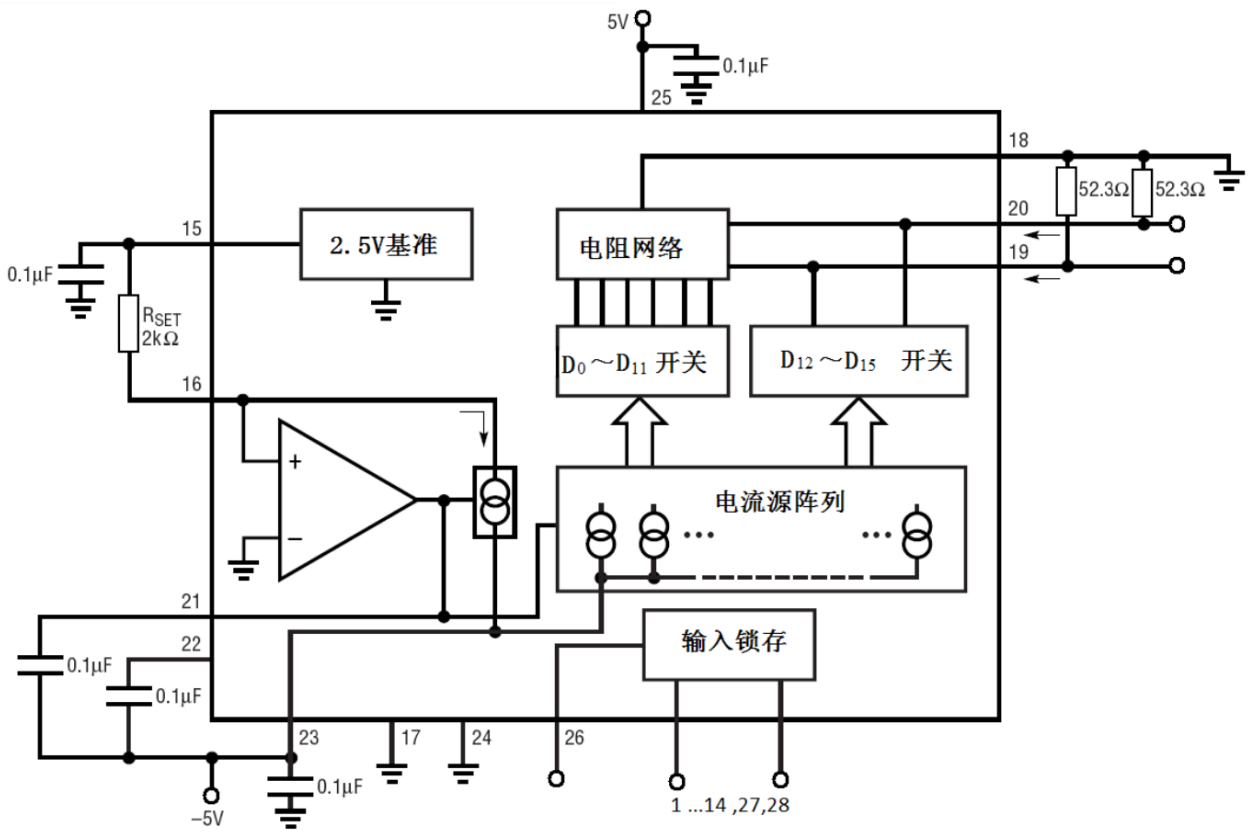



Figure 1: Functional block diagram

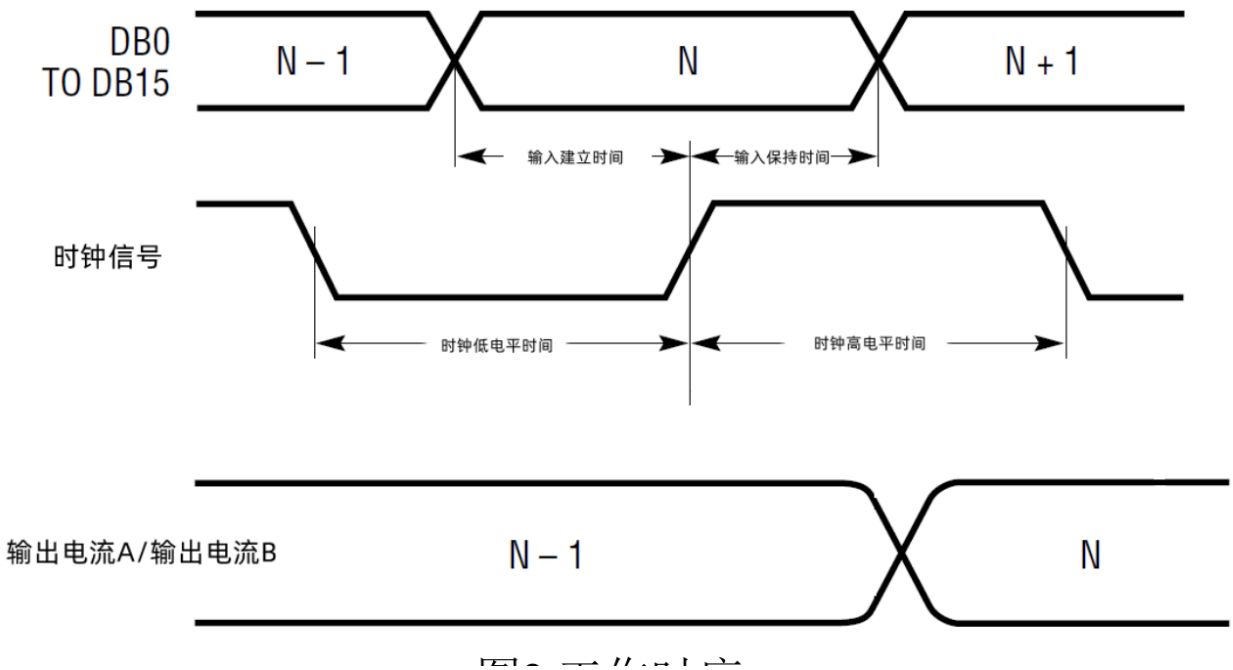



Figure 2: Operating timing diagram

## 产品外形图和实物图片 / Package Outline and Product Photos

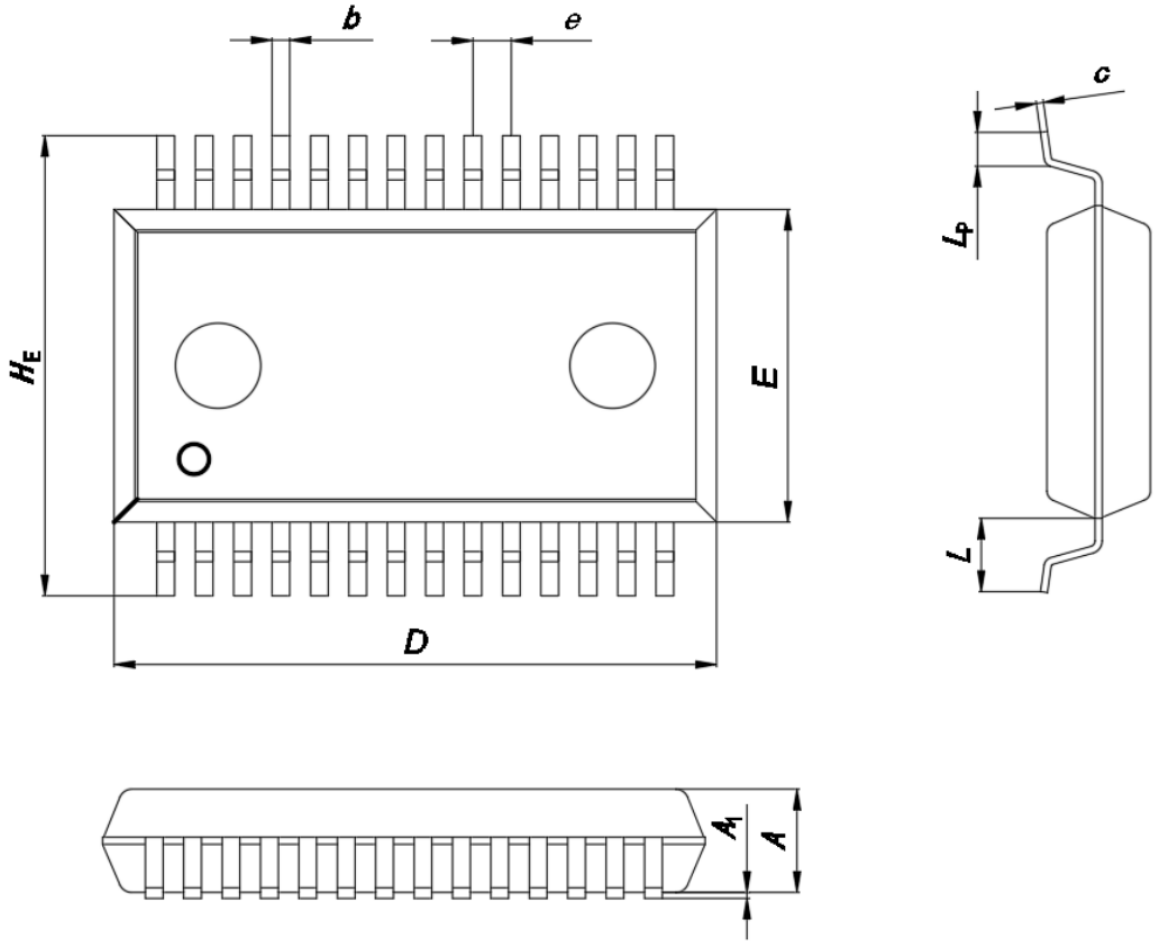



Figure 3: Package outline dimensions

单位为毫米 / Units in mm

| 尺寸符号 / Dimension | 数值 / Value — 最小 / Min | 数值 / Value — 公称 / Nom | 数值 / Value — 最大 / Max | 尺寸符号 / Dimension | 数值 / Value — 最小 / Min | 数值 / Value — 公称 / Nom | 数值 / Value — 最大 / Max |
|---|---|---|---|---|---|---|---|
| A | — | — | 2.00 | b | 0.22 | 0.30[a] | 0.38 |
| A1 | 0.05 | — | — | c | 0.09 | 0.17[a] | 0.30 |
| D | 9.80 | 10.20[a] | 10.60 | Lp | 0.55 | 0.75[a] | 0.95 |
| E | 4.90 | 5.30[a] | 5.70 | L | 1.10 | 1.25[a] | 1.60 |
| HE | 7.30 | 7.80[a] | 8.30 | e | — | 0.65 | — |

[a] 外壳实际公称值，推荐用户参考该尺寸设计使用；/ Actual nominal package values; users are advised to design with reference to these dimensions.

注：推荐焊盘设计详见电装说明。/ Note: see the assembly instructions for recommended pad layout.

## 引出端排列（俯视图）/ Pin Arrangement (Top View)

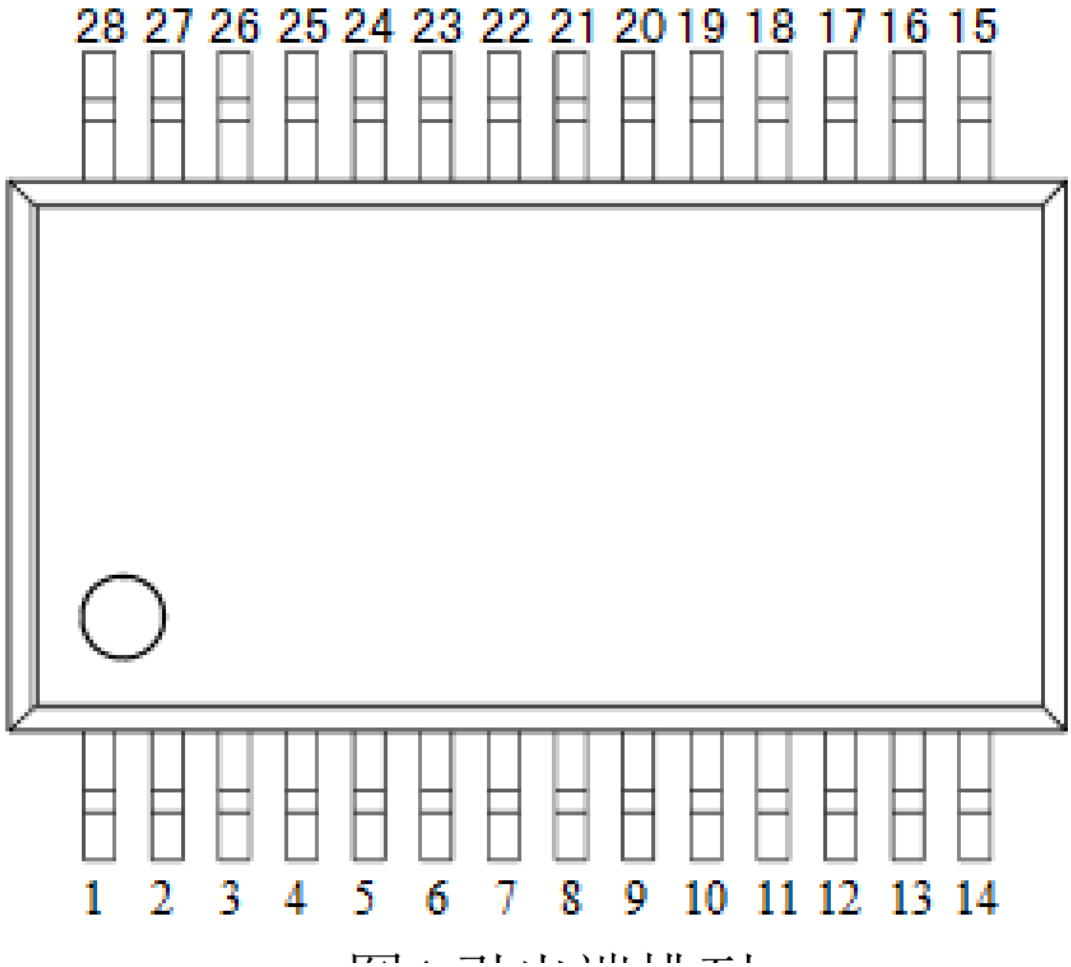



Figure 4: Pin arrangement

## 引出端功能符号表 / Pin Function Table

| 引出端号 / Pin No. | 符号 / Symbol | 名称 / Name | I/O | 引出端号 / Pin No. | 符号 / Symbol | 名称 / Name | I/O |
|---|---|---|---|---|---|---|---|
| 1 | D13 | 数字输入数据位 13 / Digital input data bit 13 | I | 15 | OUTREF | 内部基准电压输出 / Internal reference voltage output | O |
| 2 | D12 | 数字输入数据位 12 / Digital input data bit 12 | I | 16 | IREFIN | 参考输入电流 / Reference input current | I |
| 3 | D11 | 数字输入数据位 11 / Digital input data bit 11 | I | 17 | GNDA | 模拟地 / Analog ground | / |
| 4 | D10 | 数字输入数据位 10 / Digital input data bit 10 | I | 18 | LADCOM | 衰减阶梯公共点 / Attenuation ladder common node | / |
| 5 | D9 | 数字输入数据位 9 / Digital input data bit 9 | I | 19 | IOUTB | 互补 DAC 输出电流 / Complementary DAC output current | O |
| 6 | D8 | 数字输入数据位 8 / Digital input data bit 8 | I | 20 | IOUTA | DAC 输出电流 / DAC output current | O |

| 引出端号 / Pin No. | 符号 / Symbol | 名称 / Name | I/O | 引出端号 / Pin No. | 符号 / Symbol | 名称 / Name | I/O |
|---|---|---|---|---|---|---|---|
| 7 | D7 | 数字输入数据位 7 / Digital input data bit 7 | I | 21 | COMP1 | 电流源控制放大器补偿 / Current-source control amplifier compensation | / |
| 8 | D6 | 数字输入数据位 6 / Digital input data bit 6 | I | 22 | COMP2 | 内部旁路节点 / Internal bypass node | / |
| 9 | D5 | 数字输入数据位 5 / Digital input data bit 5 | I | 23 | VSS | 负电源电压 / Negative supply voltage | / |
| 10 | D4 | 数字输入数据位 4 / Digital input data bit 4 | I | 24 | GNDD | 数字地 / Digital ground | / |
| 11 | D3 | 数字输入数据位 3 / Digital input data bit 3 | I | 25 | VDD | 正电源电压 / Positive supply voltage | / |
| 12 | D2 | 数字输入数据位 2 / Digital input data bit 2 | I | 26 | CLK | 时钟输入 / Clock input | I |
| 13 | D1 | 数字输入数据位 1 / Digital input data bit 1 | I | 27 | D15 | 数字输入数据位 15 / Digital input data bit 15 | I |
| 14 | D0 | 数字输入数据位 0 / Digital input data bit 0 | I | 28 | D14 | 数字输入数据位 14 / Digital input data bit 14 | I |

## 绝对最大额定值 / Absolute Maximum Ratings

**English:** - Positive supply voltage (VCC): 6V - Negative supply voltage (VSS): -6V - Storage temperature (Tstg): -65°C~150°C - Lead soldering temperature (Th) (10s): 260°C

**中文：** - 正电源电压(VCC)：6V - 负电源电压(VSS)：-6V - 贮存温度(Tstg)：-65°C~150°C - 引线耐焊接温度(Th)(10s)：260°C

## 推荐工作条件 / Recommended Operating Conditions

**English:** - Supply voltage (VDD) to AGND: 5V - Supply voltage (VSS) to AGND: -5V - Operating temperature range (TA): -40°C~85°C

Note: please see the cross-reference notes vs. the foreign product in the Additional Notes.

**中文：** - 电源电压（VDD）to AGND：5V - 电源电压（VSS）to AGND：-5V - 工作温度范围（TA）：-40°C~85°C

注：请查看附件说明中替代国外产品情况说明。

## 性能指标 / Performance Specifications

Conditions / 条件（除另有规定外 / unless otherwise specified）: VDD=5V, VSS=-5V, VLADCOM=GNDA=GNDD=0V, -40°C≤TA≤85°C. Typical values / 典型值：TA=25°C.

| 参数名称 / Parameter | 符号 / Symbol | 条件 / Conditions | 最小值 / Min | 典型值 / Typ | 最大值 / Max | 单位 / Unit |
|---|---|---|---|---|---|---|
| 分辨率 / Resolution | RES | | | 16 | | Bit |
| 微分非线性 / Differential nonlinearity | EDL | | -10 | -3.88~1.43 | 10 | LSB |
| 积分非线性 / Integral nonlinearity | EL | TA=25°C | -10 | -4.7~5.17 | 10 | LSB |
| 积分非线性 / Integral nonlinearity | EL | TA=-40、85°C | -15 | - | 15 | LSB |
| 失调误差 / Offset error | EO | | -0.2 | -0.11 | 0.2 | %FSR |
| 增益误差 / Gain error | EG | 内基准 RSET=2kΩ / Internal reference, RSET=2kΩ | -2 | 0.21 | 2 | %FSR |
| 满度输出电流 / Full-scale output current | IOUTFS | | - | 9.59 | 10 | mA |
| 基准电压 / Reference voltage | VREF | | 2.475 | 2.499 | 2.525 | V |
| 正电源电流 / Positive supply current | IDD | | - | 3.43 | 5 | mA |
| 负电源电流 / Negative supply current | ISS | | - | -33.03 | 40 | mA |
| 功耗 / Power consumption | PD | | - | 182.33 | 225 | mW |
| 时钟频率 / Clock frequency | fclk | | 50 | - | - | MHz |
| 无杂散动态范围 / Spurious-free dynamic range | SFDR | fclk=25MHz，fout=1MHz | 70 | 80 | - | dB |
| 无杂散动态范围 / Spurious-free dynamic range | SFDR | fclk=25MHz，fout=1MHz | 68 | 78 | - | dB |
| 数字输入高电平 / Digital input high level | VIH | | 2.4 | - | - | V |
| 数字输入低电平 / Digital input low level | VIL | | - | - | 0.8 | V |
| 输入建立时间 / Input setup time | tDS | | 8 | - | - | ns |
| 输入保持时间 / Input hold time | tDH | | 4 | - | - | ns |
| 时钟高电平时间 / Clock high time | tCLKH | | 5 | - | - | ns |
| 时钟低电平时间 / Clock low time | tCLKL | | 8 | - | - | ns |

注：典型值为常温测试数据。/ Note: typical values are room-temperature test data.

## 主要特性曲线图（电特性测试图）/ Typical Characteristic Curves (Electrical Test Plots)

**English:** 1. Differential nonlinearity error vs. temperature. 2. Integral nonlinearity error vs. temperature. 3. Offset error vs. temperature. 4. Gain error vs. temperature. 5. Full-scale output current vs. temperature. 6.

Internal reference voltage vs. temperature. 7. Positive supply current vs. temperature. 8. Negative supply current vs. temperature. 9. SFDR vs. temperature. 10. Power consumption vs. clock frequency. 11. SFDR vs. clock frequency. 12. SFDR vs. output frequency. 12. SFDR vs. supply voltage.

**中文：** 1、微分非线性误差随温度变化曲线图。2、积分非线性误差随温度变化曲线图。3、失调误差随温度变化曲线图。4、增益误差随温度变化曲线图。5、满度输出电流随温度变化曲线图。6、内部基准电压随温度变化曲线图。7、正电源电流随温度变化曲线图。8、负电源电流随温度变化曲线图。9、SFDR 随温度变化曲线图。10、功耗随时钟频率变化曲线图。11、SFDR 随时钟频率变化曲线图。12、SFDR 随输出频率变化曲线图。12、SFDR 随电源电压变化曲线图。

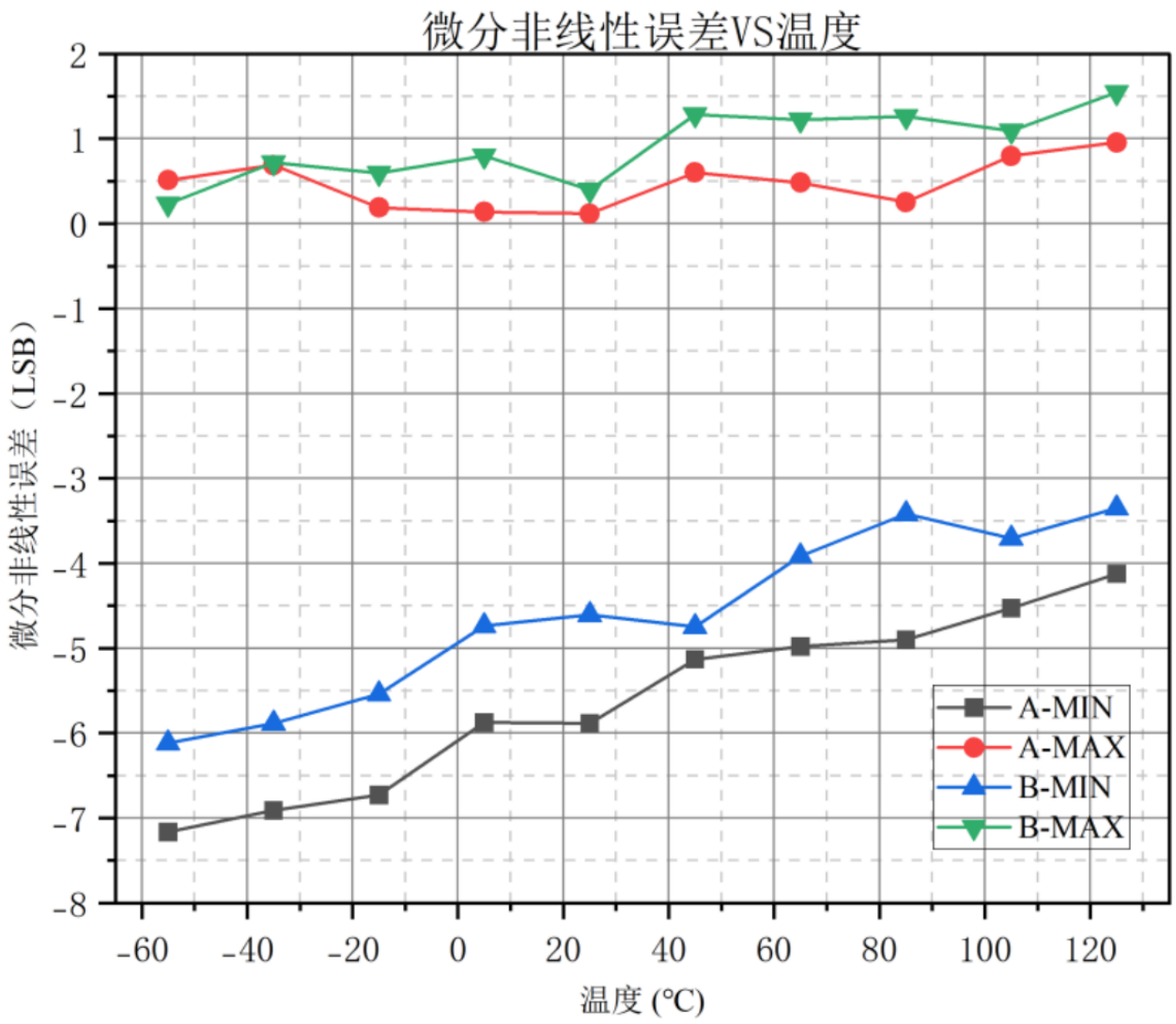



Figure 5: Differential nonlinearity error vs. temperature

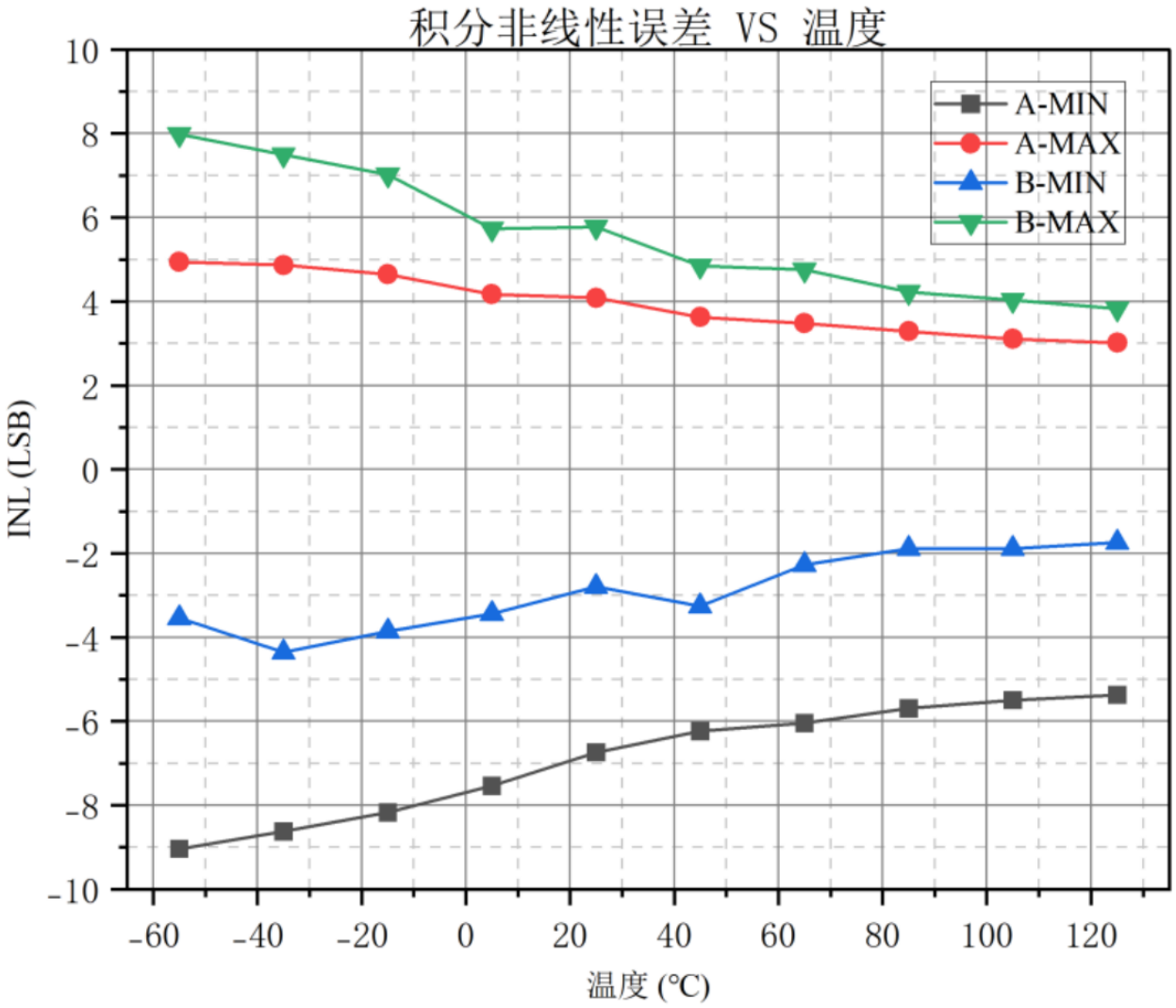



Figure 6: Integral nonlinearity error vs. temperature

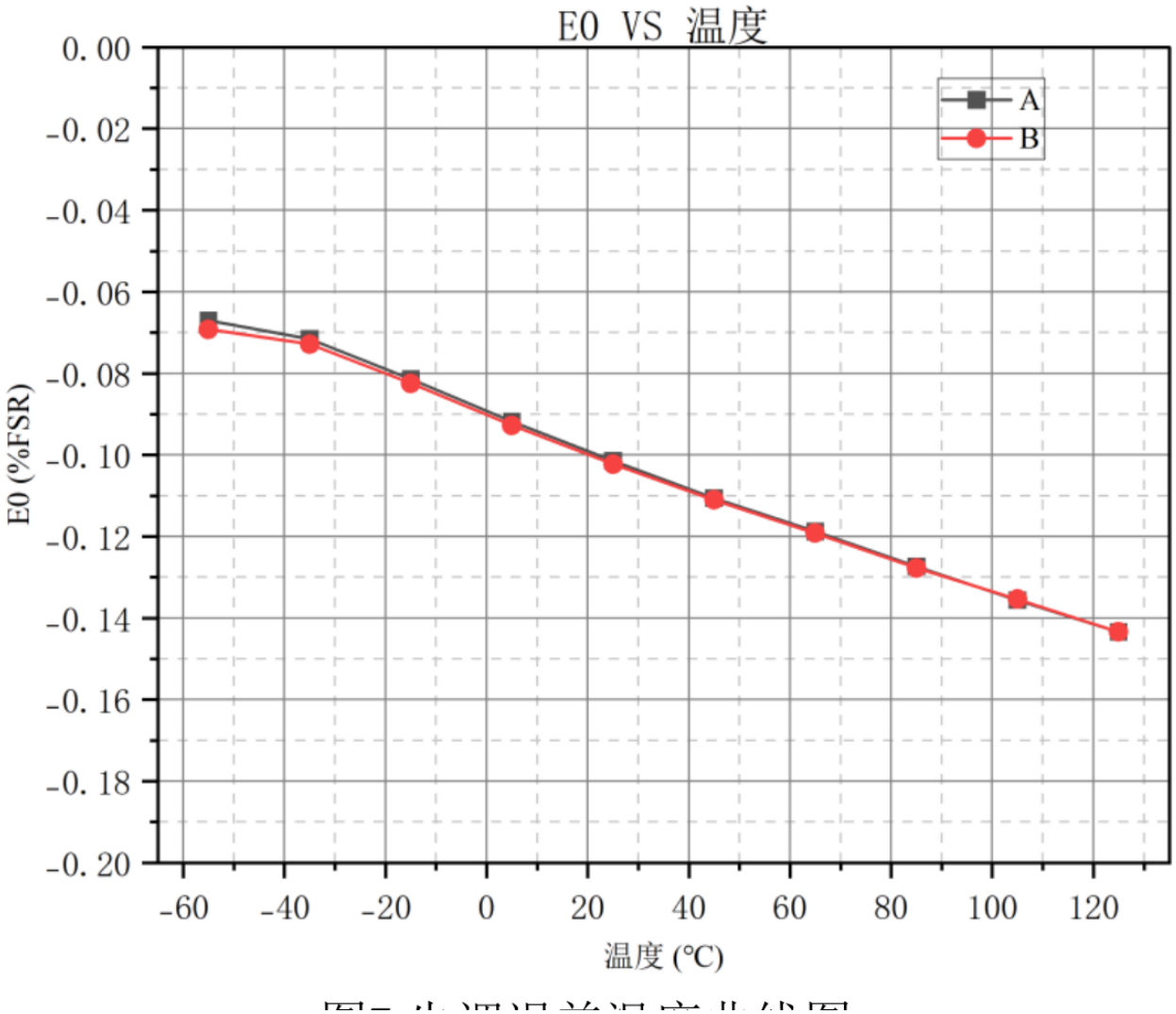



Figure 7: Offset error vs. temperature

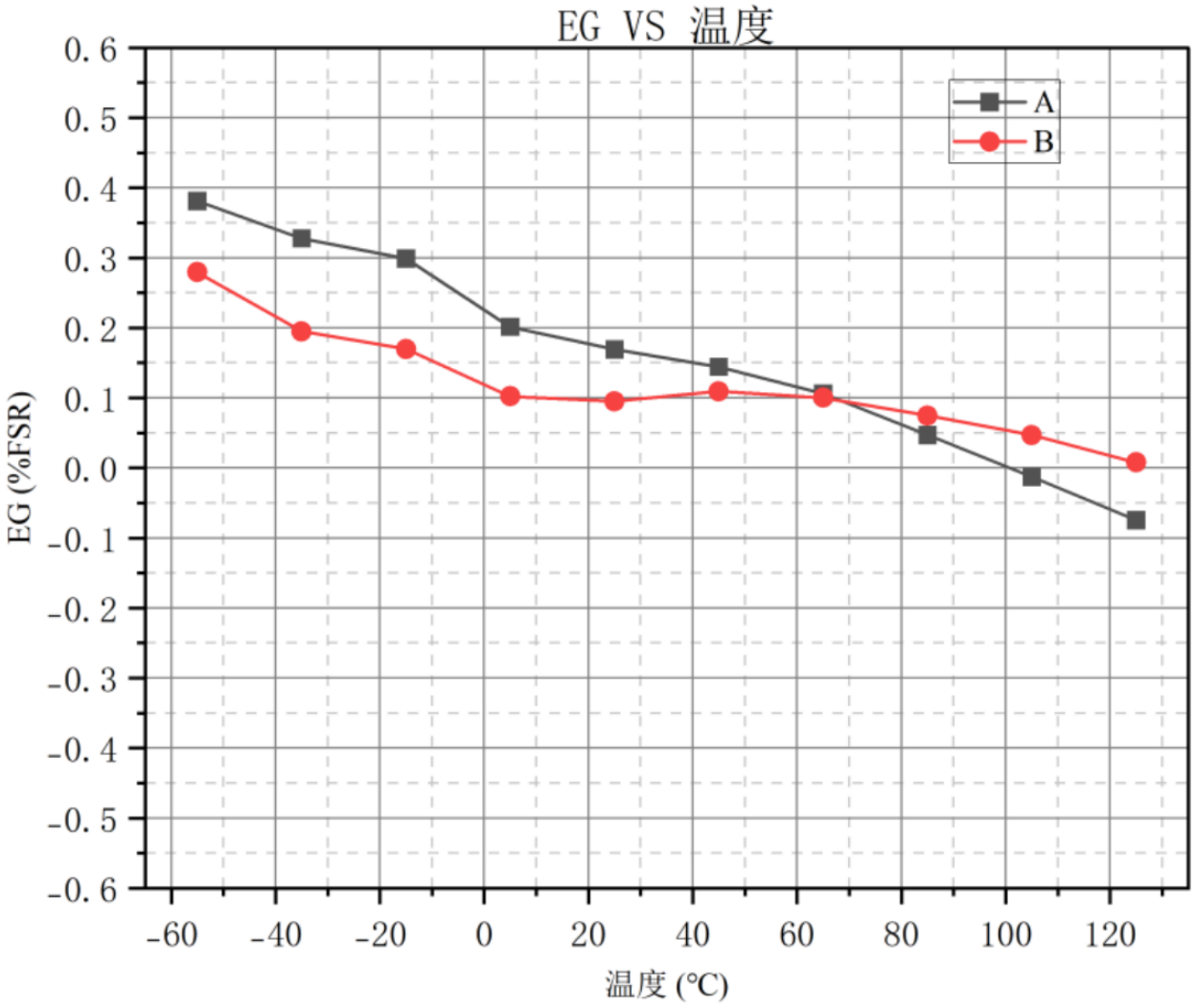



Figure 8: Gain error vs. temperature

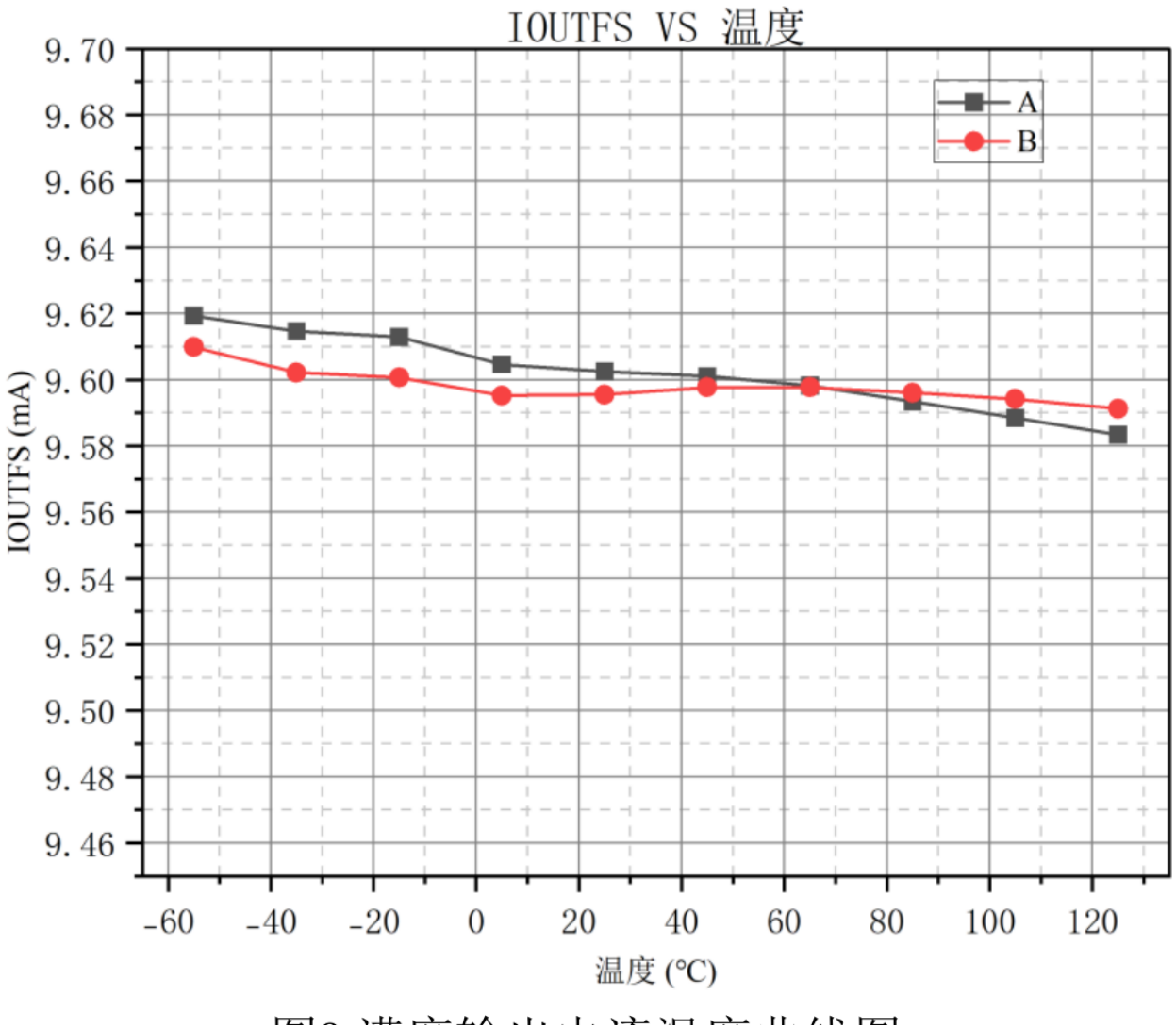



Figure 9: Full-scale output current vs. temperature

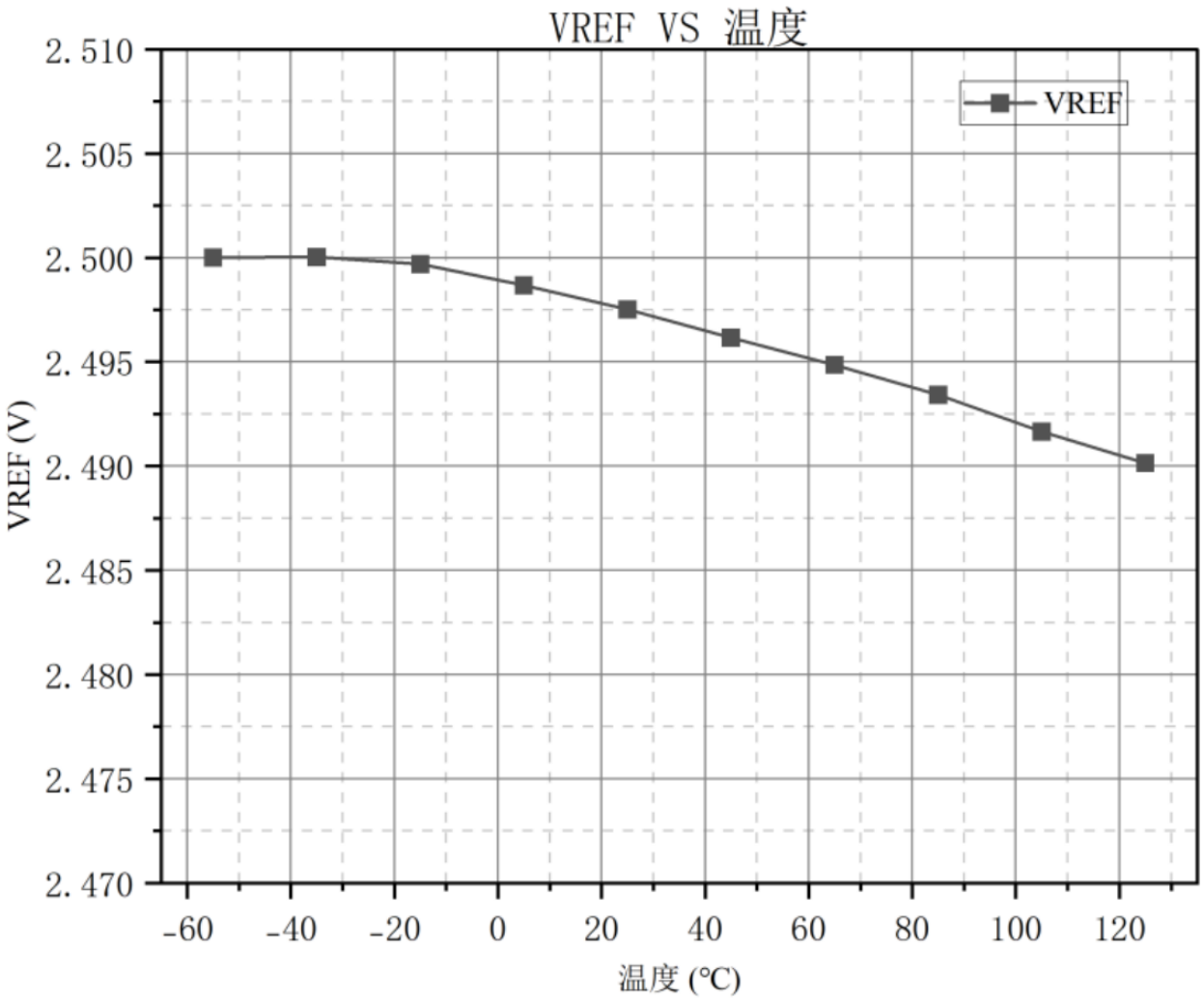



Figure 10: Internal reference voltage vs. temperature

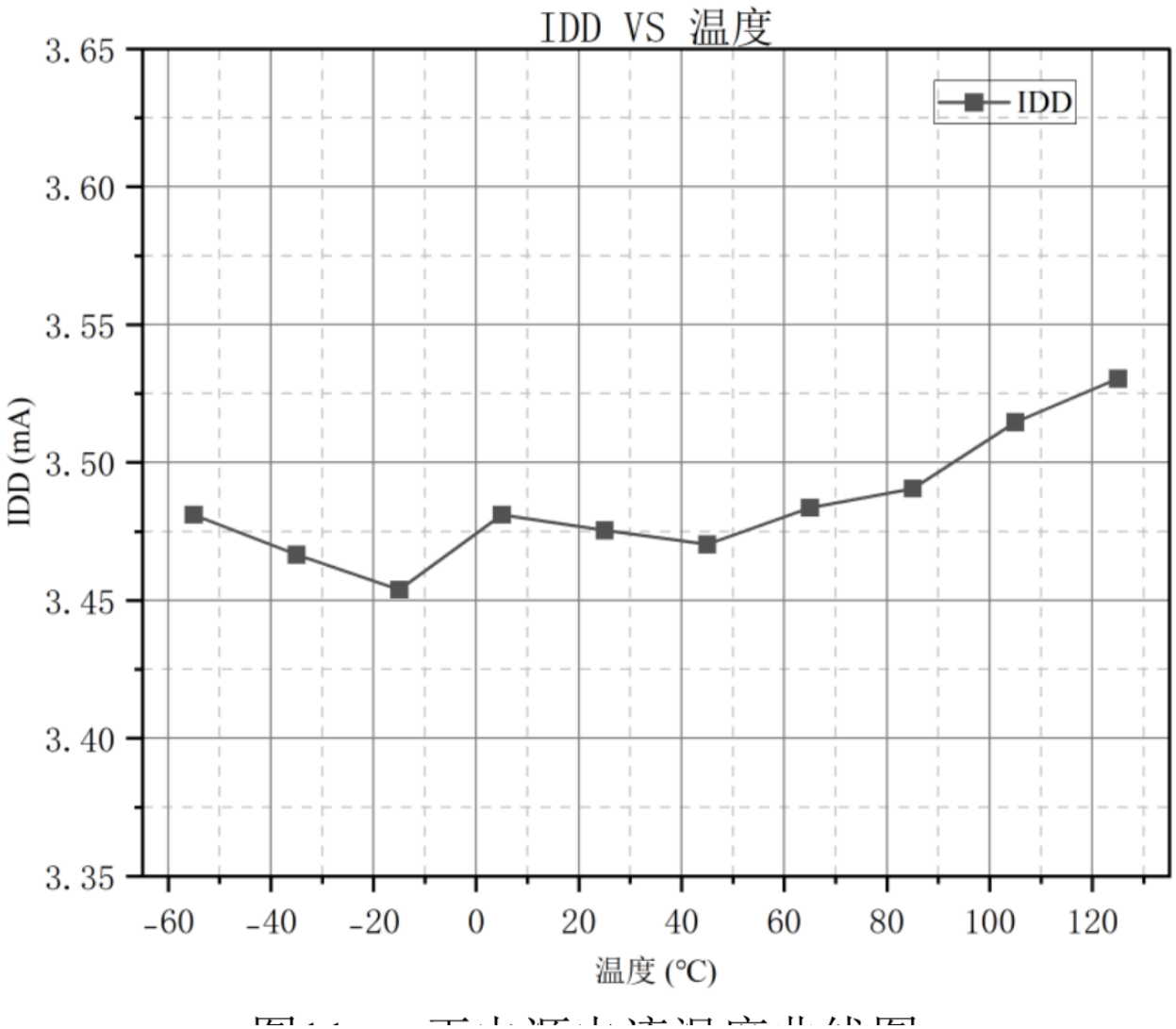



Figure 11: Positive supply current vs. temperature

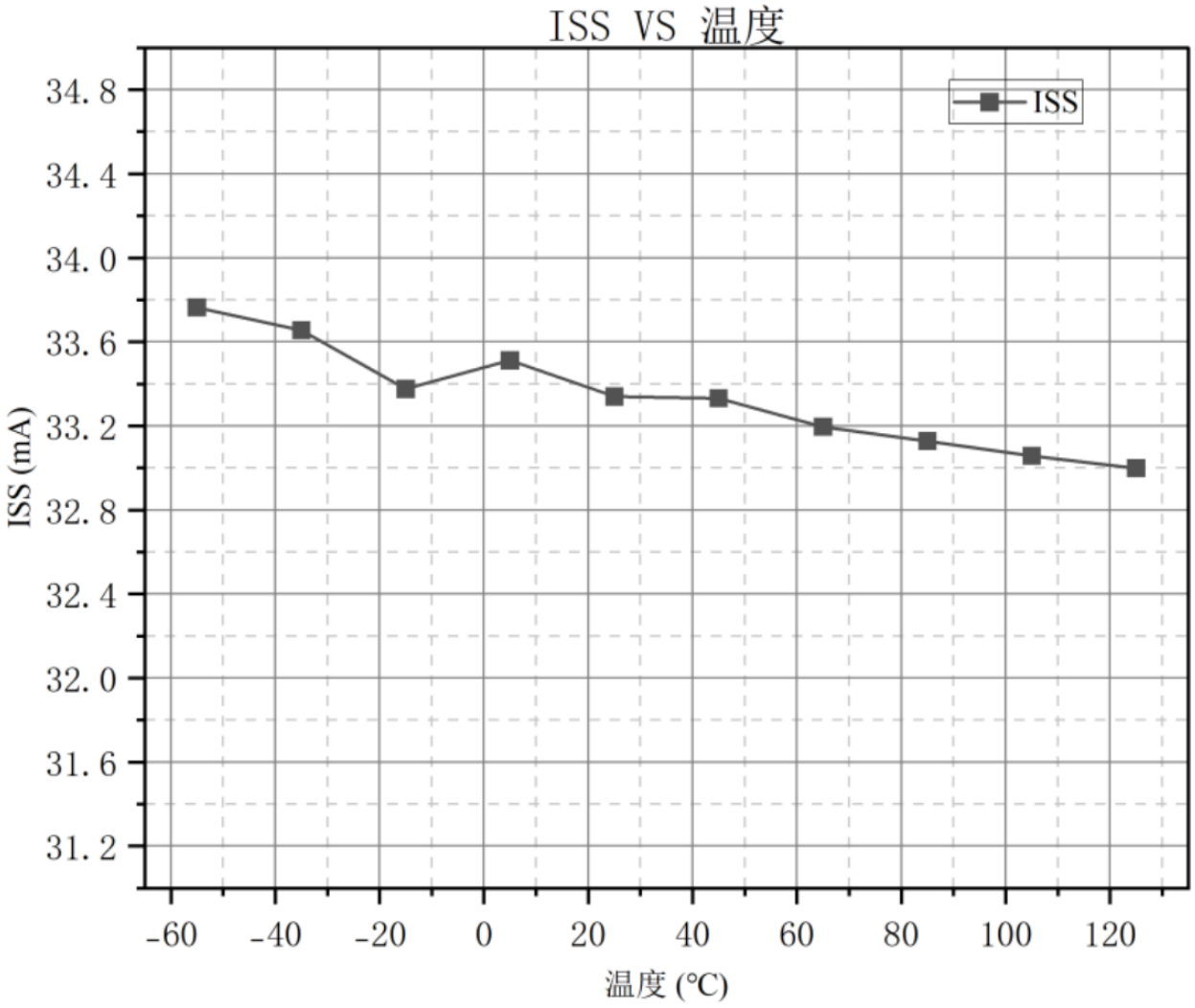



Figure 12: Negative supply current vs. temperature

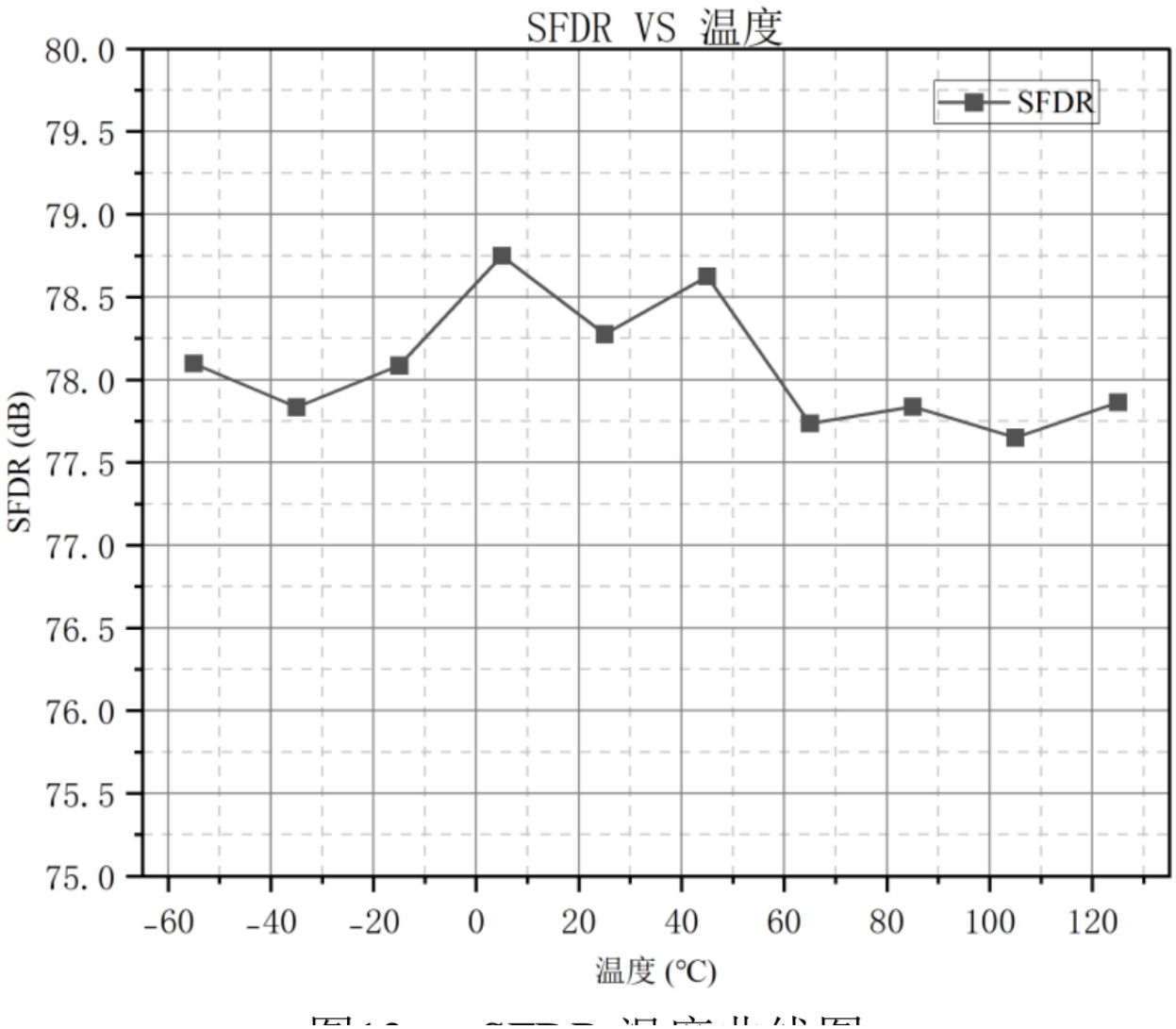



Figure 13: SFDR vs. temperature

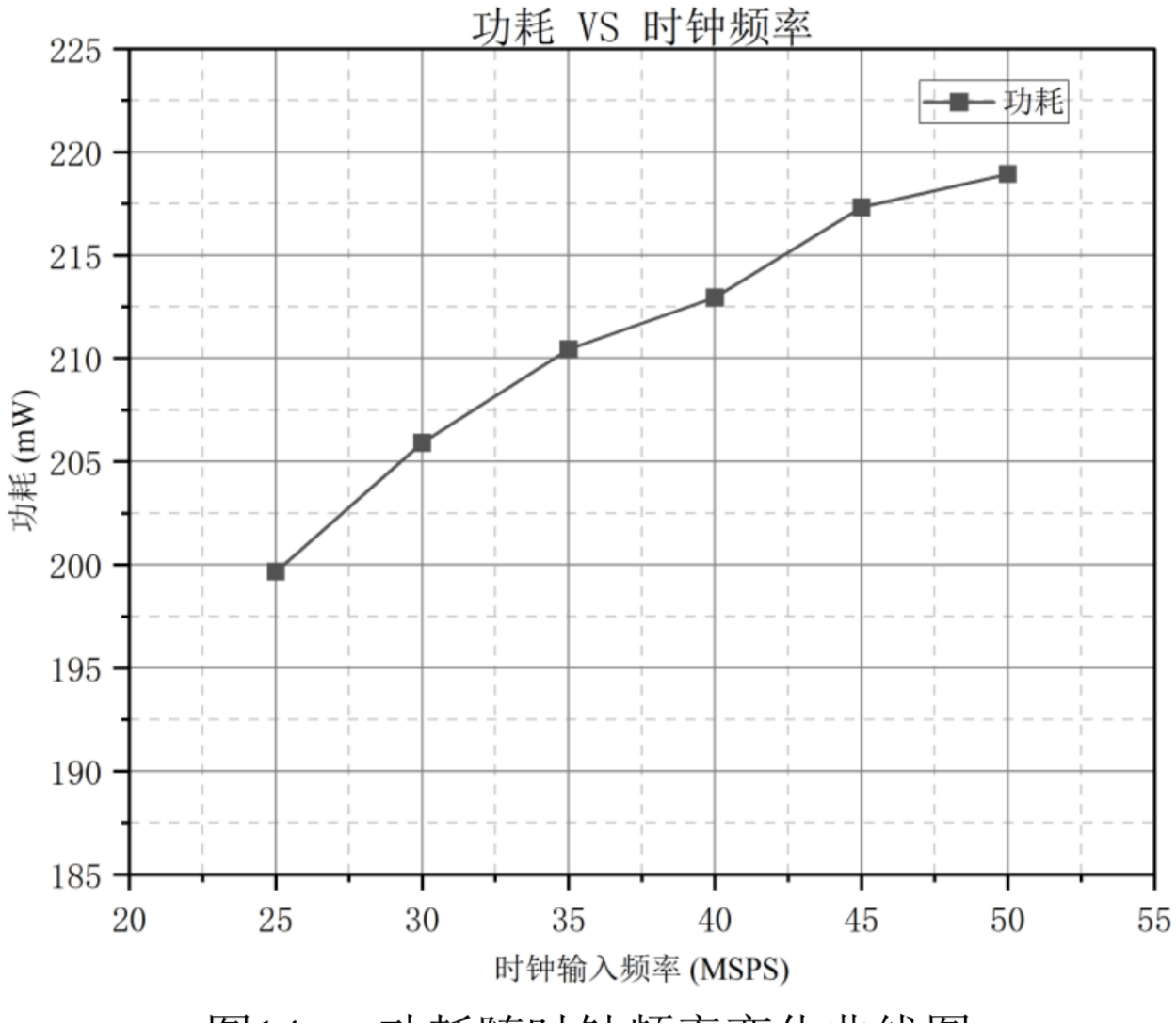



Figure 14: Power consumption vs. clock frequency

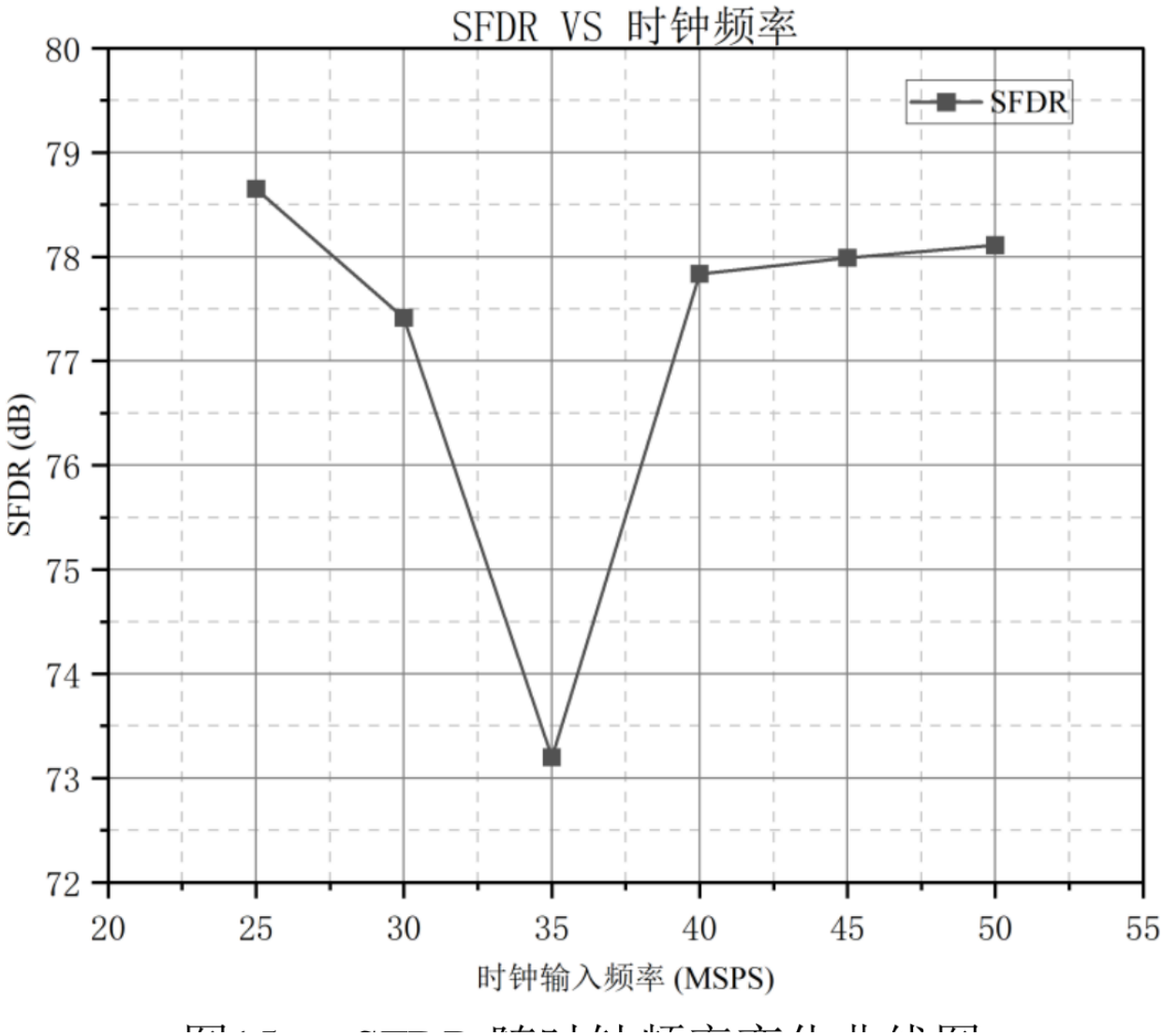



Figure 15: SFDR vs. clock frequency

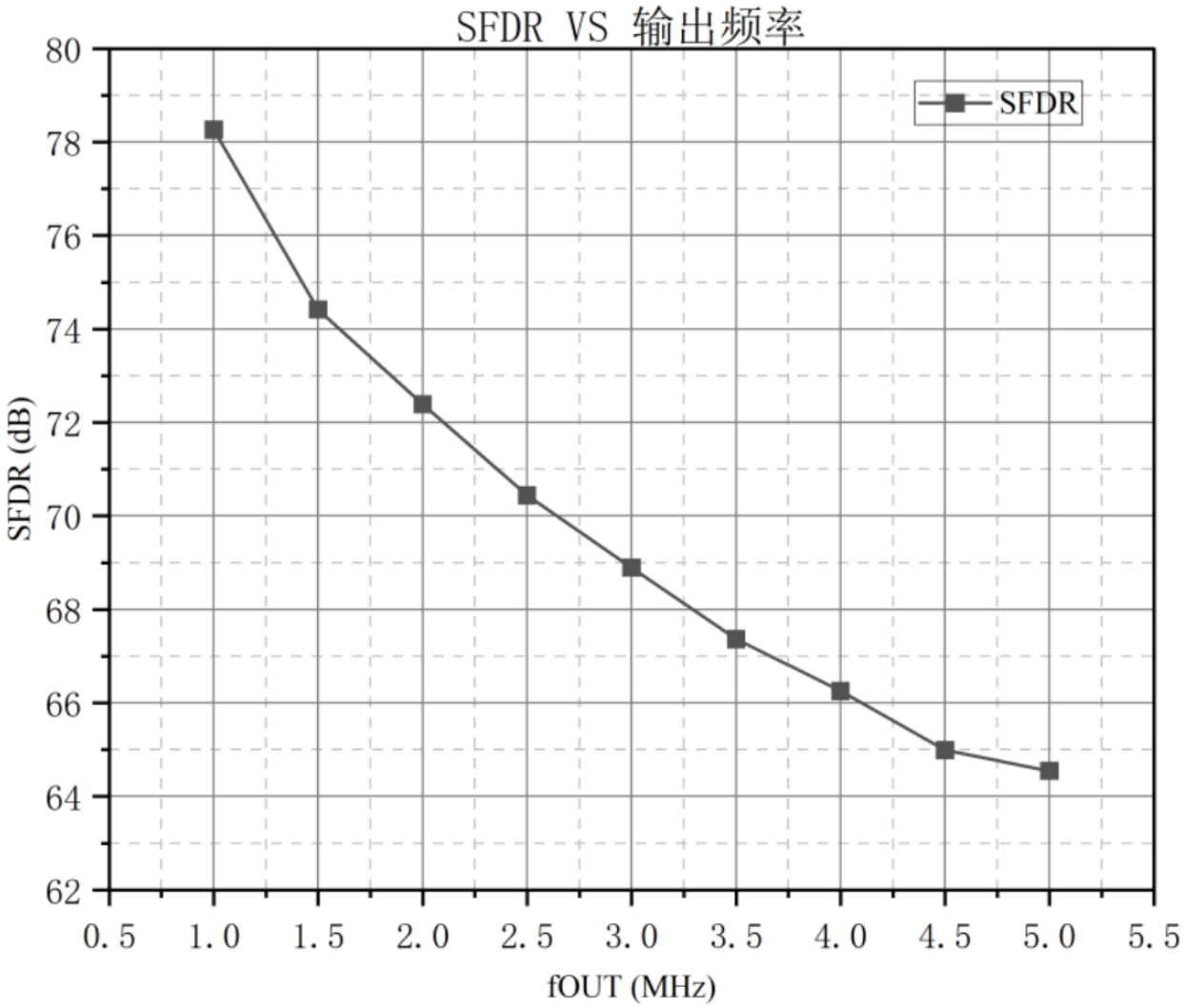



Figure 16: SFDR vs. output frequency

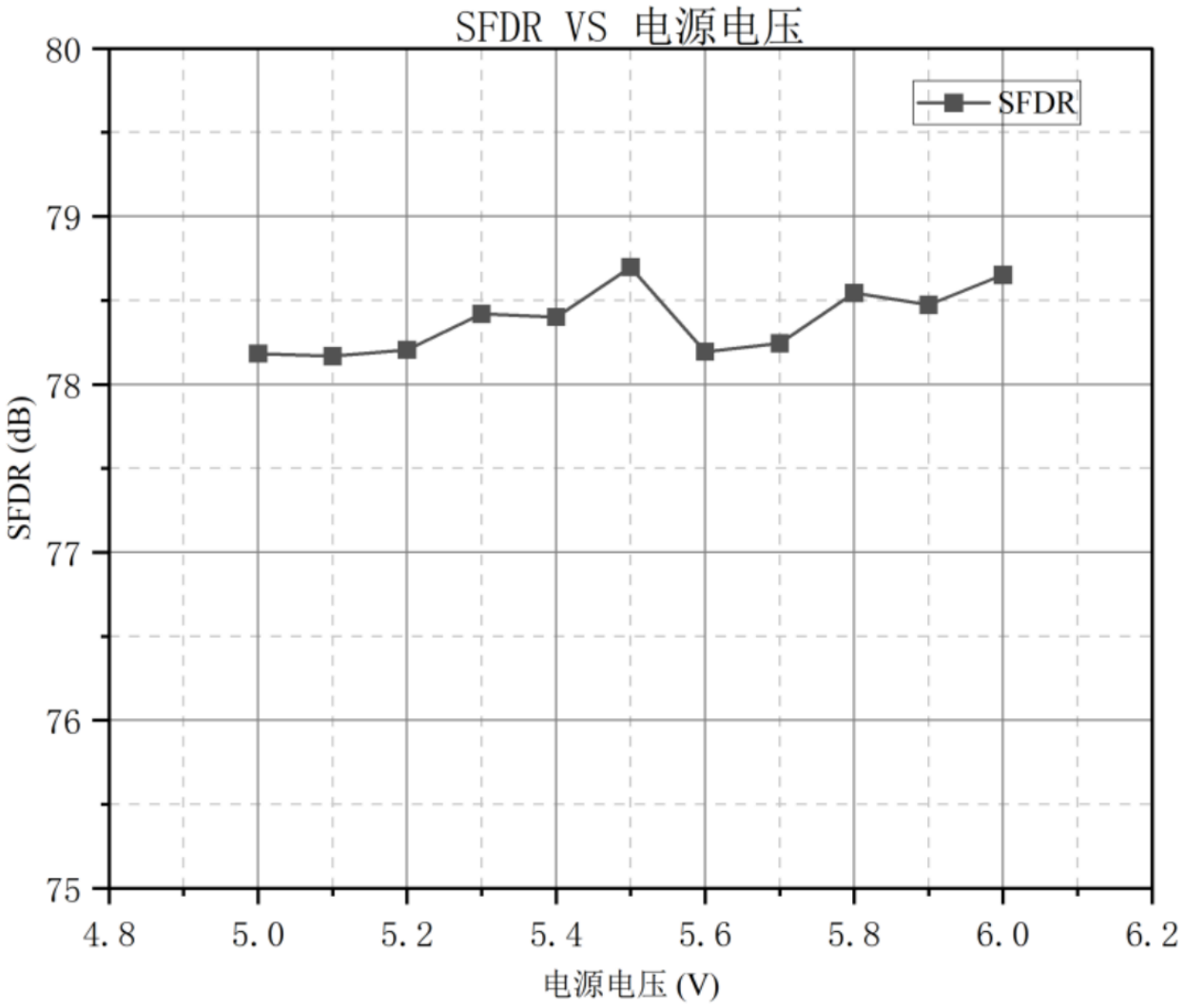



Figure 17: SFDR vs. supply voltage

## 典型应用线路图 / Typical Application Circuit

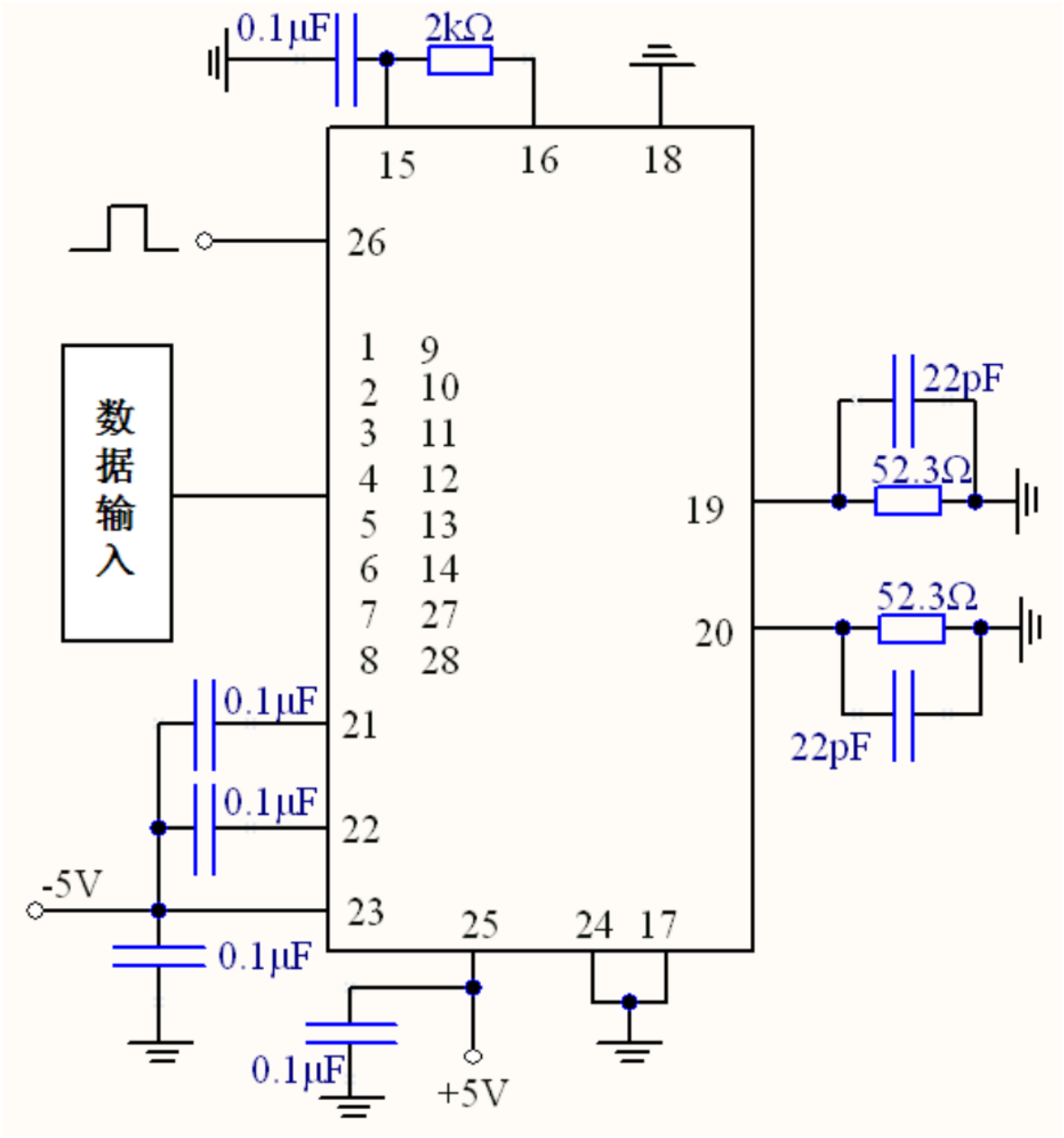



Figure 18: SXD042 typical peripheral circuit

## 单元模块及工作原理 / Functional Blocks and Operating Principles

### 1、满量程电流 IOUTFS / 1. Full-Scale Current IOUTFS

**English:** The DAC full-scale output current IOUTFS is set by placing a resistor RSET between the REFOUT pin and the IREFIN pin, and can be expressed as:

IOUTFS = 8 × IREFIN = 8 × (VREF / RSET)

For example, with RSET = 2KΩ and the connected VREF = REFOUT = 2.5V, IREFIN = 1.25mA and the full-scale current IOUTFS = 10mA.

**中文：** 通过在 REFOUT 引脚和 IREFIN 引脚之间放置一个电阻 RSET 来设置 DAC 满量程输出电流 IOUTFS，可以表示为：

IOUTFS =8IREFIN =8(VREF/RSET)

RSET=2KΩ 且连接的 VREF=REFOUT=2.5V，则 IREFIN=1.25mA，满量程电流 IOUTFS = 10mA。例如，

## 2、模拟输出 / 2. Analog Output

**English:** The SXD042 uses binary digital coding. The complementary current outputs swing from 0mA to IOUTFS; the specific outputs can be expressed as:

IOUTA = IOUTFS × (CODE / 65536)

IOUTB = IOUTFS × (1 − CODE / 65536)

In a typical application, differential output current is usually used to drive a resistive load, or to drive an equivalent resistive load through a transformer. The voltage outputs generated by the IOUTA and IOUTB output currents are:

VOUTA = IOUTA × RLOAD

VOUTB = IOUTB × RLOAD

VDIFF = VOUTA − VOUTB = [(2 × CODE / 65536) − 1] × 8 × VREF × (RLOAD / RSET)

**中文：** SXD042 采用二进制数字编码模式。互补电流输出从 0mA 到 IOUTFS 摆动，具体输出可以用下式表示：

IOUTA=IOUTFS*（CODE/65536）

IOUTB=IOUTFS*（1-CODE/65536）

在典型应用中，通常采用差分输出电流来驱动电阻负载或者通过变压器来驱动等效电阻负载。由 IOUTA 和 IOUTB 输出电流生成的电压输出为：

VOUTA=IOUTA*RLOAD

VOUTB=IOUTB* RLOAD

VDIFF=VOUTA-VOUTB=[(2CODE/65536)-1]8* VREF*(RLOAD /RSET)

## 3、数字接口 / 3. Digital Interface

**English:** The SXD042 supports parallel data input; the input data is latched on the rising edge of the clock. CMOS levels of 5V or 3.3V logic can be used, and the clock frequency can reach up to 50MHz. The digital-logic minimum high level VIH is 2.4V and the maximum low level VIL is 0.8V. The setup time tDS is a minimum of 8ns and the hold time tDH is a minimum of 4ns. The minimum guaranteed clock high and low times are 5ns and 8ns, respectively; 5V or 3.3V logic CMOS levels are likewise used, with a logic minimum high level VIH of 2.4V and a maximum low level VIL of 0.8V.

**中文：** SXD042 支持数据并行输入，这些输入数据在时钟上升沿被锁存。可以使用 5V 或 3.3V 逻辑的 CMOS 电平，并且时钟频率最高可以达到 50MHz。数字逻辑最小高电平 VIH 为 2.4V，最大低电平 VIL 为 0.8V。建立时间 tDS 最小为 8ns，保持时间 tDH 最小为 4ns。时钟高电平和低电平的最小保证时间分别为 5ns 和 8ns，同样采用 5V 或 3.3V 逻辑的 CMOS 电平，逻辑最小高电平 VIH 为 2.4V，最大低电平 VIL 为 0.8V。

## 寄存器 / Registers

**English:** None.

**中文：** 无。

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## 电源地间保护 / Power-to-Ground Protection

**English:** To improve the anti-static capability of the device, the following ESD protection loops exist between the various supply pins inside the device. The forward conduction voltage drop of each ESD protection device is approximately 0.35V; during power-up and normal use, prolonged forward conduction of these ESD protection devices should be avoided.

**中文：** 为了提高器件的抗静电能力，器件内部的各电源引脚之间存在如下的静电保护回路，每个 ESD 保护管的正向导通压降约 0.35V，上电及正常使用中应避免这些 ESD 保护管长时间正向导通。

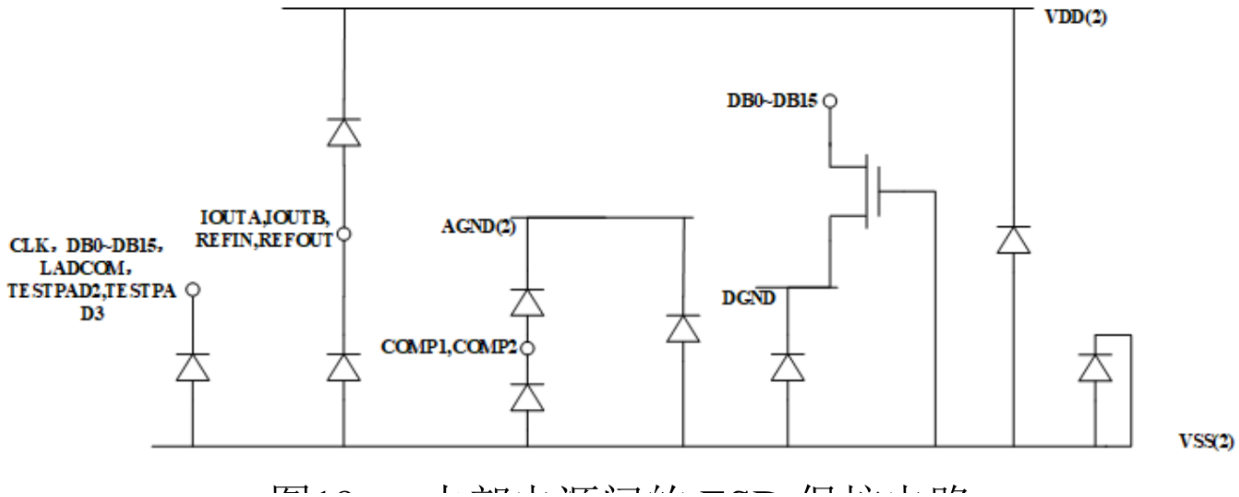



Figure 19: ESD protection circuits between internal supplies

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## 注意事项 / Precautions

### 1、产品安装注意事项 / 1. Product Installation Precautions

**English:** 1) Pay attention to the pin sequence during installation to avoid pin misalignment. 2) During installation, the temperature must not exceed 260°C and the time must not exceed 3s.

**中文：** 1) 安装时注意引脚顺序，以免引脚错位。 2) 安装时温度不超过 260°C，时间不超过 3s。

## 2、产品使用注意事项 / 2. Product Usage Precautions

**English:** 1) A decoupling capacitor must be placed close to each supply pin group, to its corresponding ground plane. 2) Provide good grounding to reduce interference and ensure product accuracy and performance. 3) The application circuit board is required to have a complete, clean ground. 4) The application board is required to be a multilayer board containing an independent ground layer. 5) The digital ground and analog ground of the application circuit board should be separated as much as possible; do not route digital traces next to analog traces or underneath the ADC. 6) Input traces should be as short as possible to minimize parasitic capacitance and noise pickup.

**中文：** 1) 对每一组电源端都需要就近接去耦电容到各自对应的地平面。 2) 要接地良好，以减少干扰保证产品精度性能。 3) 要求应用对象电路板有一个完整干净的地。 4) 要求应用对象为多层布线板且内含独立的地层。 5) 要求应用对象电路板的数字地和模拟地尽量分离，不要将数字线布于模拟线旁边或于 ADC 底下。 6) 输入连线应尽量短以最小化寄生电容和噪声引入。

## 3、产品防护注意事项 / 3. Product Protection Precautions

**English:** 1) Electrostatic charge accumulates easily on the human body and test equipment and can discharge without being noticed. Although this product has dedicated ESD protection circuits, permanent device damage may occur when subjected to high-energy electrostatic discharge. Appropriate ESD precautions are therefore recommended to avoid device performance degradation or loss of function. The ESD protection rating of this product is Class 1B (500V). 2) Exceeding the absolute maximum ratings may cause permanent damage to the device. These are maximum ratings only and do not imply that the device can operate normally under these conditions or under any other conditions beyond those shown in this product manual. Prolonged operation at the absolute maximum ratings will affect device reliability. 3) Unused products should be stored in an environment of 10°C~25°C temperature and 25%~70% relative humidity, with no acid, alkali, or other corrosive gases in the surroundings. 4) During use, this product should be protected from dropping, to avoid mechanical stress damage.

**中文：** 1) 静电电荷很容易在人体和测试设备上累积，并可能在没有察觉的情况下放电。尽管本产品具有专用 ESD 保护电路，但在遇到高能量静电放电时，可能会发生永久性器件损坏。因此，建议采取适当的 ESD 防范措施，以避免器件性能下降或功能丧失。本产品的静电防护等级为 1B 级（500V）。 2) 超出绝对最大额定值可能会导致器件永久性损坏。这只是额定最值，不表示在这些条件下或者在任何其它超出本产品手册中所示的条件下，器件能够正常工作。长期在绝对最大额定值条件下工作会影响器件的可靠性 3) 未使用的产品应贮存在温度 10°C～25°C，相对湿度 25%～70%的环境中，周围没有酸、碱或者其它腐蚀性气体。 4) 本产品在使用过程中应避免跌落以免造成机械应力损伤。

## 4、电装说明 / 4. Assembly Instructions

**English:** 1) The moisture sensitivity level of this product is MSL3. The allowable exposure time to the external environment after removal from the moisture-barrier bag, dry storage, or baking, and before reflow soldering is: ≤30°C/60RH%, 168h; 2) If the device storage conditions cannot be controlled or traced, strictly perform baking at 125°C for 8h before assembly; 3) If the assembly environment temperature and humidity cannot be guaranteed at ≤30°C/60RH%, complete soldering within 12h after baking; 4) After baking, the product generates static electricity very easily; ESD protection must be observed during all operations; 5) For board-level assembly with leaded reflow soldering (Sn63Pb37), the recommended peak temperature range is 210°C~235°C, the maximum peak temperature is recommended

not to exceed 235°C, the dwell time within ±5°C of the peak temperature is ≤20s, the time above the liquidus line is 60~90s, the ramp-up rate is 2~4°C/s, and the ramp-down rate is 2~6°C/s; 6) For board-level assembly with lead-free reflow soldering (SAC305), the recommended peak temperature range is 230°C~245°C, the maximum peak temperature is recommended not to exceed 260°C, the dwell time within ±5°C of the peak temperature is ≤20s, the time above the liquidus line is 60~90s, the ramp-up rate is 2~4°C/s, and the ramp-down rate is 2~6°C ; 7) If a mixed assembly process requires a higher temperature, ensure that the maximum device body temperature does not exceed 260°C (the device body temperature measurement point is on the top surface of the device during reflow soldering); 8) The solder termination surface finish of this product is electroplated pure tin.

**中文：** 1) 本产品潮湿敏感等级为 MSL3，将产品从防潮袋中取出、进行干燥储存或烘干后到回流焊前所暴露在外部环境的允许时间为：≤30°C/60RH%，168h； 2) 若器件储存条件无法控制或追溯，请在电装前严格执行 125°C，8h 烘烤； 3) 若电装环境温湿度无法保证≤30°C/60RH%，请在烘烤后 12h 内完成焊接； 4) 产品烘烤后，极易产生静电，所有操作过程需要注意 ESD 防护； 5) 板级组装采用有铅回流焊（Sn63Pb37）时，推荐峰值温度范围 210°C~235°C，最大峰值温度不建议超过 235°C，峰值温度±5°C以内停留时间≤20s，液相线以上停留时间 60~90s，升温速率 2~4°C/s，降温速率 2~6°C/s； 6) 板级组装采用无铅回流焊（SAC305）时，推荐峰值温度范围 230°C~245°C，最大峰值温度不建议超过 260°C，峰值温度±5°C以内停留时间≤20s，液相线以上停留时间 60~90s，升温速率 2~4°C/s，降温速率 2~6°C； 7) 若混合电装工艺需要温度升高，应保证器件本体温度最高不超过 260°C（器件本体温度测量点位于回流焊时器件上表面）； 8) 本产品焊接端表面处理方式为电镀纯锡

### 5、热阻 / 5. Thermal Resistance

**English:**

**中文：**

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## 常见故障及处理办法 / Common Faults and Troubleshooting

**English:** 1. Abnormal device supply current: check whether the supply and ground signal connections are normal, and ensure the supply voltage is stable. 2. Device has no conversion function: check whether the reference VREF voltage is normal; the high/low levels of the digital inputs and clock input must meet the recommended operating conditions; check whether the supply and ground signal connections are normal. 3. Output voltage jitter: check that the external capacitor connections are correct, to ensure stable circuit operation. 4. Device operates unstably: check the power supply and ensure the supply voltage is stable.

**中文：** 1、 器件电源电流异常：检查电源、地信号连接是否正常，确保电源电压稳定。 2、 器件无转换功能：检查基准 VREF 电压是否正常；数字输入与时钟输入高低电平要满足推荐工作条件要求，检查电源、地信号连接是否正常。 3、 输出电压抖动：检查外部电容连接准确，保证电路工作稳定。 4、 器件工作不稳定：检查电源，保证电源电压稳定。

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## 附加说明 / Additional Notes

**English:** 1. First release date of this manual: July 2026. 2. Product status: ☑ Production (this model is currently in production; formal products are available). ☐ Pre-release (this model has not yet entered formal production; samples are available). 3. Model suffix difference explanation (for series products, model suffixes are to be explained as in the example below; add this section when needed): The SXD042 differs from the foreign model in package form and can functionally replace the foreign circuit. The SXD042 uses a plastic 28-lead small-outline SSOP28 package with outline dimensions of 10.2mm × 7.8mm × 2mm. The foreign product uses a plastic 28-lead small-outline SSOP28 package with outline dimensions of 10.2mm × 7.78mm × 1.86mm. 4. Cross-reference notes vs. the foreign product: The absolute maximum ratings and nominal supply values of the SXD042 are the same as those of the foreign model, and the recommended supply range is the same as in the foreign model's device manual. The SXD042 is pin-compatible with the foreign model and can provide a functional replacement for the foreign model. Detailed descriptions of the SXD042's main functions may refer to the foreign model's datasheet; where inconsistent with the foreign model's datasheet, this product manual shall prevail. If you have any questions, please contact technical support personnel to obtain technical support.

**中文：** 1. 本说明书首次发布日期：2026 年 7 月。 2. 本产品状态：☑生产 （该产品型号目前已在生产，可以提供正式产品）☐预发布（该产品型号尚未投入正式生产，可以提供样品） 3. 型号后缀差异性说明（系列化产品需对型号后缀说明如下示例，需要时增加此部分）：SXD042 与国外型号封装形式存在差异，可功能替代国外电路。SXD042 采用塑封 28 引线小外形封装 SSOP28 封装，外形尺寸为 10.2mm7.8mm2mm。国外产品采用塑封 28 引线小外形封装 SSOP28 封装，外形尺寸为 10.2mm7.78mm1.86mm。 4. 替代国外产品情况说明：SXD042 电源绝对最大额定值和标称值与国外型号一致，电源推荐范围与国外型号器件手册一致，SXD042 与国外型号管脚兼容，可实现对国外型号的功能替换。SXD042 主要功能的详细描述可以参考国外型号数据手册，当与国外型号数据手册不一致时，以本产品说明书为准，如有疑问请联系技术支持人员，以获得技术支持。

### 1）绝对最大额定值对比 / 1) Absolute Maximum Ratings Comparison

附表1 绝对最大额定值对比 / Appendix Table 1. Absolute Maximum Ratings Comparison

| 参数 / Parameter | SXD042 规范要求 / SXD042 Specification | 国外型号 / Foreign Model | 比对结果 / Comparison Result |
|---|---|---|---|
| 正电源电压(VCC) / Positive supply voltage (VCC) | 6V | 6V | 一致 / Consistent |
| 负电源电压(VSS) / Negative supply voltage (VSS) | -6V | -6V | 一致 / Consistent |
| 贮存温度(Tstg) / Storage temperature (Tstg) | -65°C~150°C | -65°C~150°C | 一致 / Consistent |
| 结温(TJ) / Junction temperature (TJ) | 150°C | 170°C | 有差异 / Different |
| 引线耐焊接温度（10s）/ Lead soldering temperature (10s) | 260°C | | |

### 2）推荐工作条件对比 / 2) Recommended Operating Conditions Comparison

附表2 推荐工作条件对比 / Appendix Table 2. Recommended Operating Conditions Comparison

| 参数 / Parameter | SXD042 规范要求 / SXD042 Specification | 国外型号 / Foreign Model | 比对结果 / Comparison Result |
|---|---|---|---|
| 正电源电压(VCC) / Positive supply voltage (VCC) | 5V | 5V | 一致 / Consistent |
| 负电源电压(VSS) / Negative supply voltage (VSS) | -5V | -5V | 一致 / Consistent |
| 工作环境温度(TA) / Operating ambient temperature (TA) | -40°C~85°C | -40°C~85°C | 一致 / Consistent |

## 3）性能指标对比 / 3) Performance Specifications Comparison

附表3 主要性能指标对比 / Appendix Table 3. Main Performance Specifications Comparison

Conditions / 条件（除另有规定外 / unless otherwise specified）: VDD=5V, VSS=-5V, VLADCOM=GNDA=GNDD=0.

| 特性 / Parameter | 符号 / Symbol | 条件 / Conditions | 国外型号 / Foreign Model — 最小 / Min | 国外型号 / Foreign Model — 最大 / Max | SXD042 — 最小 / Min | SXD042 — 最大 / Max | 单位 / Unit | 对比结果 / Comparison Result |
|---|---|---|---|---|---|---|---|---|
| 分辨率 / Resolution | RES | | 16 | | 16 | | Bit | 一致 / Consistent |
| 微分误差 / Differential error | EDL | | - | ±4 | -10 | 10 | LSB | 有差异 / Different |
| 积分误差 / Integral error | EL | TA=25°C | - | ±8 | -10 | 10 | LSB | 有差异 / Different |
| 积分误差 / Integral error | EL | TA=-40、85°C | - | - | -15 | 15 | LSB | 一致 / Consistent |
| 失调误差 / Offset error | EO | | - | ±0.2 | -0.2 | 0.2 | %FSR | 一致 / Consistent |
| 增益误差 / Gain error | EG | 内基准 RSET=2kΩ / Internal reference, RSET=2kΩ | - | 2 | -2 | 2 | %FSR | 一致 / Consistent |
| 满度输出电流 / Full-scale output current | IOUTFS | | 1 | 10 | - | 10 | mA | 一致 / Consistent |
| 基准电压 / Reference voltage | VREF | | 2.475 | 2.525 | 2.475 | 2.525 | V | 一致 / Consistent |
| 正电源电流 / Positive supply current | IDD | | - | 5 | - | 5 | mA | 一致 / Consistent |
| 数字输入高电平 / Digital input high level | VIH | | 2.4 | - | 2.4 | - | V | 一致 / Consistent |
| 数字输入低电平 / Digital input low level | VIL | | - | 0.8 | - | 0.8 | V | 一致 / Consistent |
| 负电源电流 / Negative supply current | ISS | | - | 40 | - | 40 | mA | 一致 / Consistent |
| 时钟频率 / Clock frequency | fclk | | 50 Msps | - | 50MHZ | - | - | 一致 / Consistent |
| 无杂散动态范围 / Spurious-free dynamic range | SFDR | fclk=25MHz，fout=1MHz | 78 | - | 70 | - | dB | 一致 / Consistent |
| 无杂散动态范围 / Spurious-free dynamic range | SFDR | fclk=50MHz，fout=1MHz | - | - | 68 | - | dB | 一致 / Consistent |
| 输入建立时间 / Input setup time | tDS | | 8 | - | 8 | - | ns | 一致 / Consistent |
| 输入保持时间 / Input hold time | tDH | | 4 | - | 4 | - | ns | 一致 / Consistent |
| 时钟高电平时间 / Clock high time | tCLKH | | 5 | - | 5 | - | ns | 一致 / Consistent |
| 时钟低电平时间 / Clock low time | tCLKL | | 8 | - | 8 | - | ns | 一致 / Consistent |
| 工作温度范围 / Operating temperature range | TA | | -40 | 85 | -40 | 85 | °C | 一致 / Consistent |

## 4）其他指标对比 / 4) Other Parameter Comparison

附表4 其它指标对比 / Appendix Table 4. Other Parameter Comparison

| 参数 / Parameter | SXD042 | 国外型号 / Foreign Model | 比对结果 / Comparison Result |
|---|---|---|---|
| 封装形式 / Package | SSOP28 | SSOP28 | 一致 / Consistent |
| 质量等级 / Quality grade | 企标 / Enterprise standard | 工业级 / Industrial grade | 有差异 / Different |
| 尺寸 / Dimensions | 10.2mm7.8mm2mm | 10.2mm7.78mm1.86mm | 有差异 / Different |

| 参数 / Parameter | SXD042 | 国外型号 / Foreign Model | 比对结果 / Comparison Result |
| --- | --- | --- | --- |
| 替代建议 / Cross-reference recommendation | ☐直接替代 / ☐Direct replacement ☐有效替代 / ☐Effective alternative ☑功能替代 / ☑Functional alternative | | |

End of document / 文档结束