FAIRCHILD SEMICONDUCTOR®

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# FAN7021

## CMOS Power Amplifier

### Features

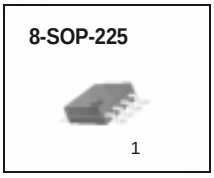
- Continuous Average Power is 1.0W (8Ω)
- Low THD: Under 0.2% (5V)
- Do not Need Output Coupling Capacitor or Bootstrap Capacitor
- Low Shutdown Current: 0.01μA
- Shutdown: High Active
- Built in Reduction Circuit for Popping noise
- Built in TSD Circuit

### Typical Applications

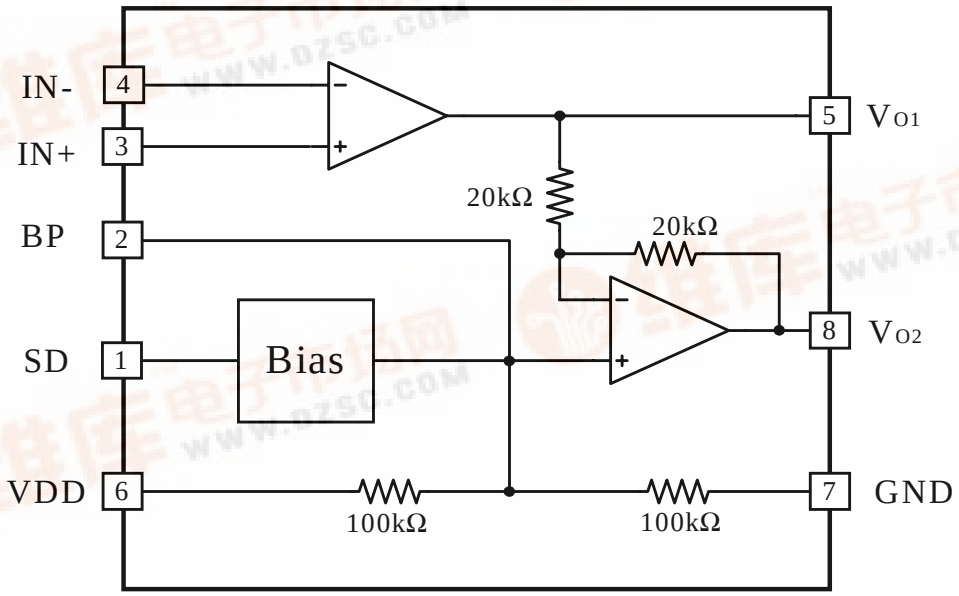
- Cellular Phone
- Portable Computer
- Audio Systems

### Description

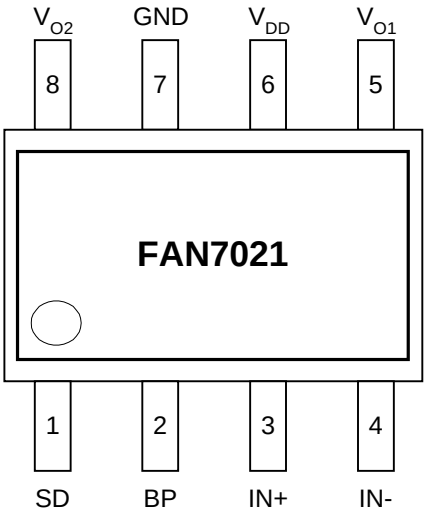
The FAN7021 is a bridge connected audio power amplifier capable of delivering 1W of continuous average power to an 8Ω load with less than 0.2%(THD) from a 5V power supply. The FAN7021 require few external components and operate on low supply voltage from 2.0V to 5.5V. Since the FAN7021 does not require output coupling capacitor, bootstrap capacitors, or snubber networks, it is ideally suited for low power portable systems that require minimum volume and weight. The FAN7021 feqtures an externally controlled, low power consumption shutdown mode (0.01 uA,typ). Additional FAN7021 features include thermal shutdown protection, unity gain stability, and external gain set.




### Internal Block Diagram



## Pin Assignments




## Pin Definitions

| Pin Number | Pin Name | Pin Function Description |
|---|---|---|
| 1 | SD | Shutdown |
| 2 | BP | Bypass |
| 3 | IN+ | Input + |
| 4 | IN– | Input – |
| 5 | $V_{O1}$ | Power AMP Output 1 |
| 6 | $V_{DD}$ | Supply Voltage |
| 7 | GND | Ground |
| 8 | $V_{O2}$ | Power AMP Output 2 |

## Absolute Maximum Ratings (Ta = 25°C)

| Parameter | Symbol | Value | Unit | Remark |
|---|---|---|---|---|
| Maximum Supply Voltage | $V_{DD}$ | 6.0 | V | Maximum Supply Voltage |
| Power Dissipation | $P_D$ | - | W | - |
| Operating Temperature | $T_{OPR}$ | –40 ~ +85 | °C | Operating Temperature |
| Storage Temperature | $T_{STG}$ | –65 ~ +150 | °C | Storage Temperature |
| Thermal Resistance | $\theta_{JA}$ | 180 | °C/W | Thermal Resistance |

## Recommended Operating Conditions (Ta = 25°C)

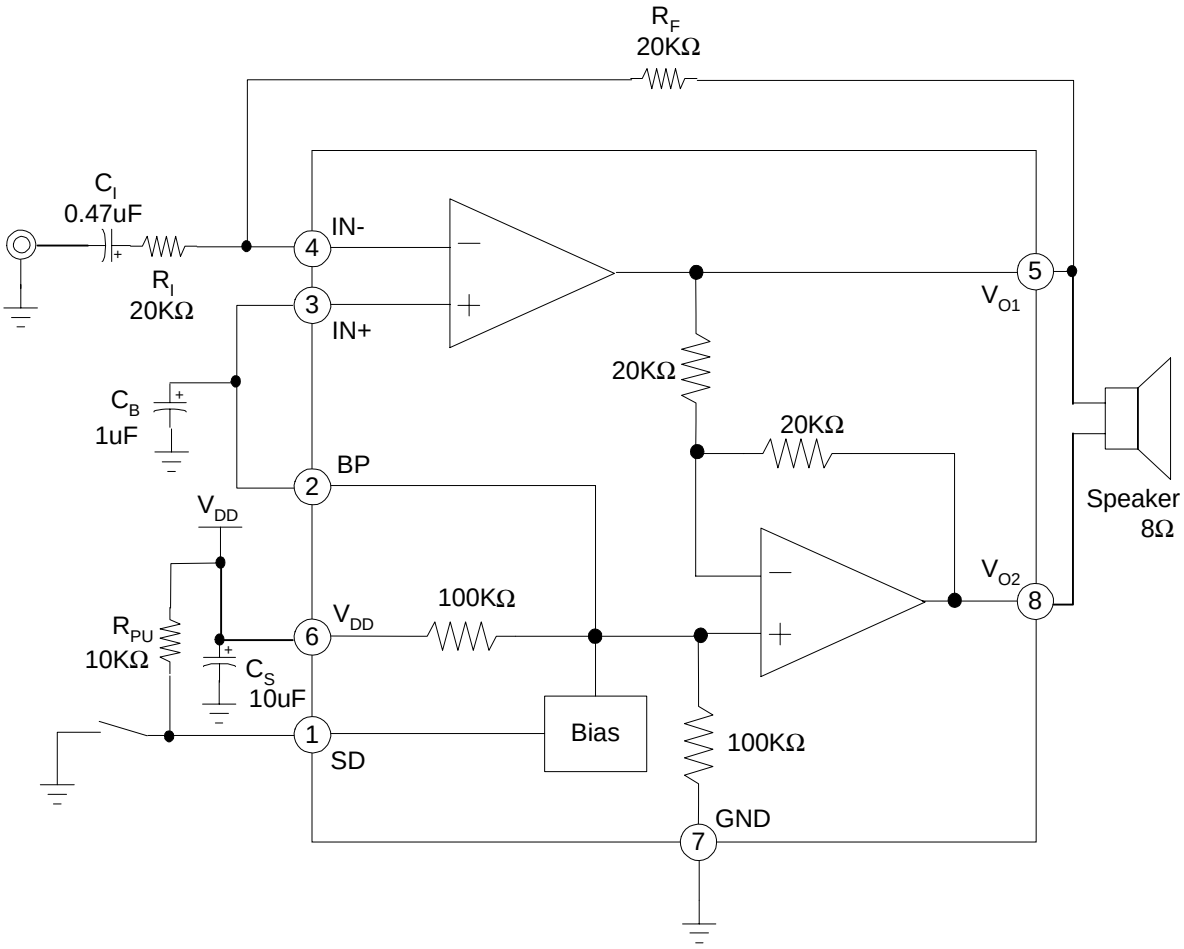
| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Operating Supply Voltage | $V_{DD}$ | 2.0 | - | 5.5 | V |

## Electrical Characteristics

($R_L$ = 8Ω, Ta = 25°C, Unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **$V_{DD}$ = 5.0V, UNLESS OTHERWISE SPECIFIED** | | | | | | |
| Quiescent Power Supply Current | $I_{DD}$ | $V_{IN}$=0V,$I_O$=0A | - | 4.0 | 7.0 | mA |
| Shutdown Current | $I_{SD}$ | $V_{SD}$=$V_{DD}$ | - | 0.01 | 2.0 | μA |
| Output Offset Voltage | $V_{OS}$ | $V_{IN}$=0V | - | 5 | 50 | mV |
| Output Power | $P_O$ | THD=0.2% (Max.);f=1KHz | - | 1 | - | W |
| Total Harmonic Distortion+noise | THD+N | $P_O$=0.25Wrms,$A_{VD}$=2 | | | | |
| | | f=1KHz | - | 0.1 | - | % |
| | | f=20KHz | - | 0.4 | - | % |
| Power Supply Rejection Ratio | PSRR | $V_{DD}$=4.9V to 5.1V | - | 65 | - | dB |
| **$V_{DD}$ = 3.3V, UNLESS OTHERWISE SPECIFIED** | | | | | | |
| Quiescent Power Supply Current | $I_{DD}$ | $V_{IN}$=0V,$I_O$=0A | - | 3.0 | - | mA |
| Shutdown Current | $I_{SD}$ | $V_{SD}$=$V_{DD}$ | - | 0.01 | - | μA |
| Output Offset Voltage | $V_{OS}$ | $V_{IN}$=0V | - | 5 | - | mV |
| Output Power | $P_O$ | THD=1% (Max.);f=1KHz | - | 0.5 | - | W |
| Total Harmonic Distortion+noise | THD+N | $P_O$=0.25Wrms,$A_{VD}$=2 | | | | |
| | | f=1KHz | - | 0.15 | - | % |
| | | f=20KHz | - | 0.45 | - | % |
| Power Supply Rejection Ratio | PSRR | $V_{DD}$=3.2V to 3.4V | - | 65 | - | dB |
| **$V_{DD}$ = 2.6V, UNLESS OTHERWISE SPECIFIED** | | | | | | |
| Quiescent Power Supply Current | $I_{DD}$ | $V_{IN}$=0V,$I_O$=0A | - | 2.5 | - | mA |
| Shutdown Current | $I_{SD}$ | $V_{SD}$=$V_{DD}$ | - | 0.01 | - | μA |
| Output Offset Voltage | $V_{OS}$ | $V_{IN}$=0V | - | 5 | - | mV |
| Output Power | $P_O$ | THD=0.3% (Max.);f=1KHz | - | 0.25 | - | W |
| Total Harmonic Distortion+Noise | THD+N | $P_O$=0.25Wrms,$A_{VD}$=2 | | | | |
| | | f=1KHz | - | 0.25 | - | % |
| | | f=20KHz | - | 0.5 | - | % |
| Power Supply Rejection Ratio | PSRR | $V_{DD}$=2.5V to 2.7V | - | 65 | - | dB |

## Typical Application Circuits



# Performance Characteristics

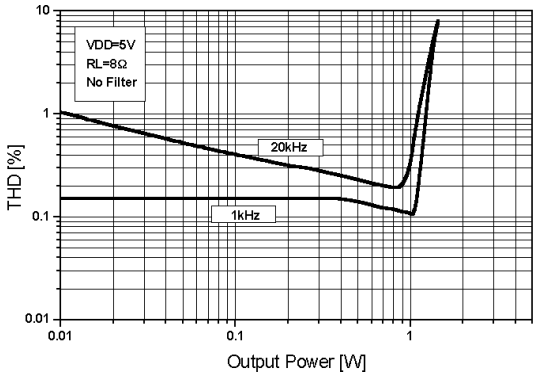



**Figure 1. THD+N versus output power**

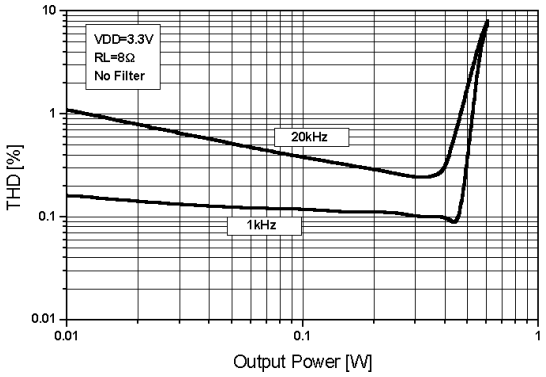



**Figure 2. THD+N versus output power**

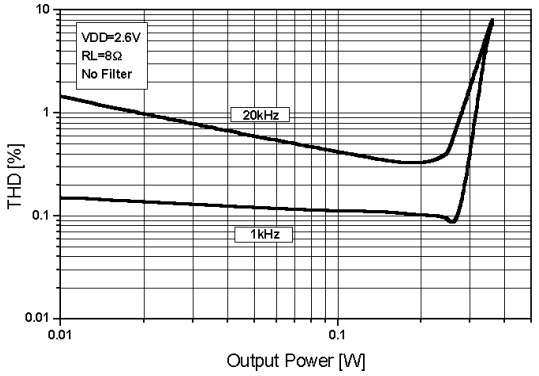



**Figure 3. THD+N versus output power**

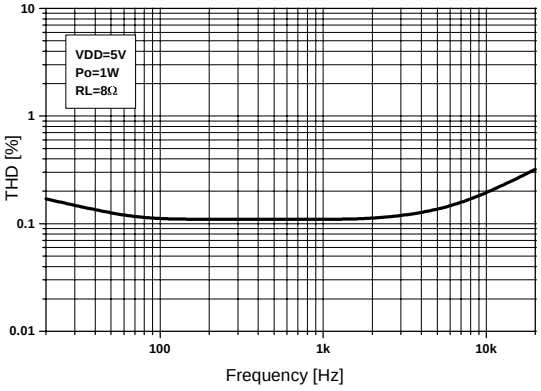



**Figure 4. THD+N versus Frequency**

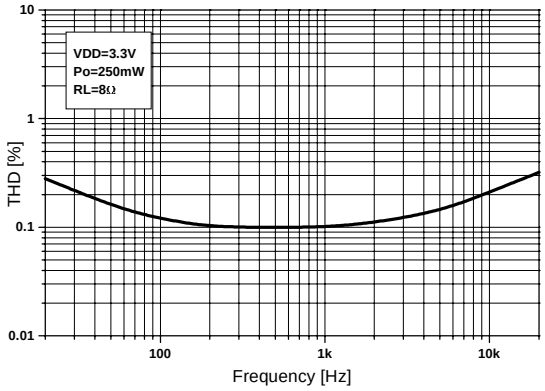



**Figure 5. THD+N versus Frequency**

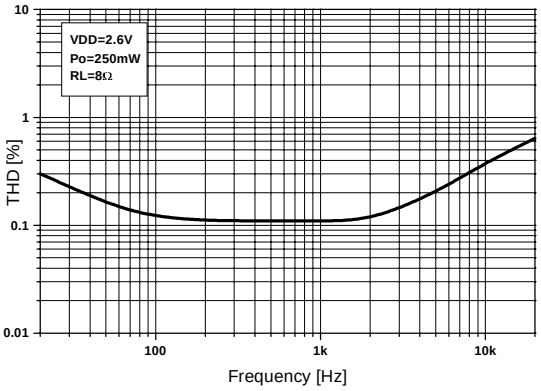



**Figure 6. THD+N versus Frequency**

## Performance Characteristics (Continued)

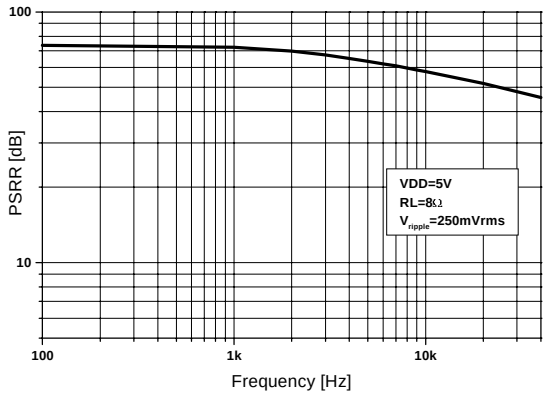



**Figure 7. Power supply rejection ration**

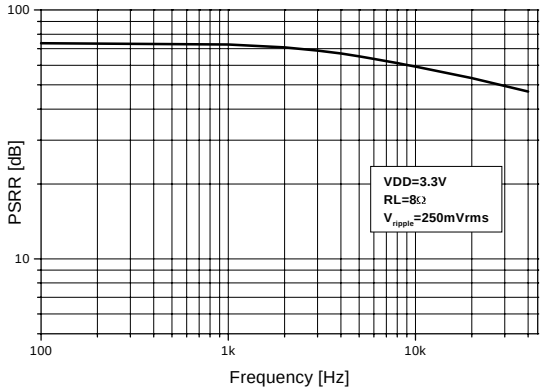



**Figure 8. Power supply rejection ration**

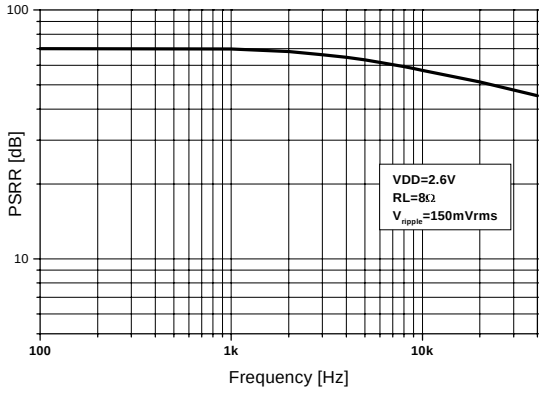



**Figure 9. Power supply rejection ration**

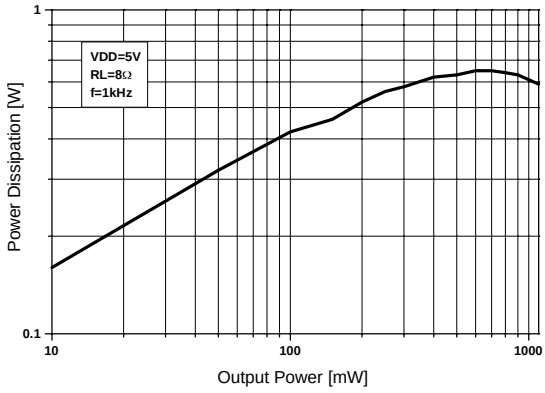



**Figure 10. Power Dissipation versus output power**

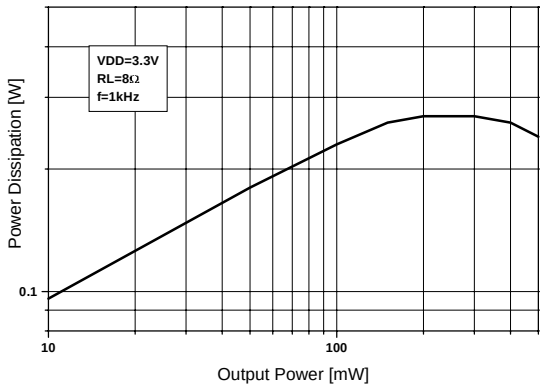



**Figure 11. Power Dissipation versus output power**

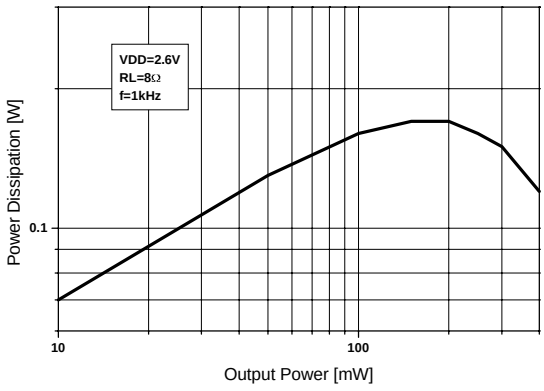



**Figure 12. Power Dissipation versus output power**

## Performance Characteristics (Continued)

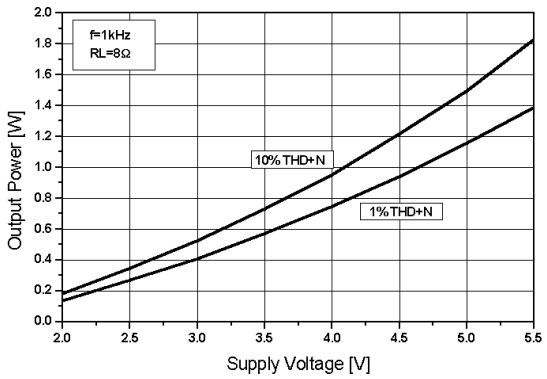



**Figure 13. Output power versus supply voltage**

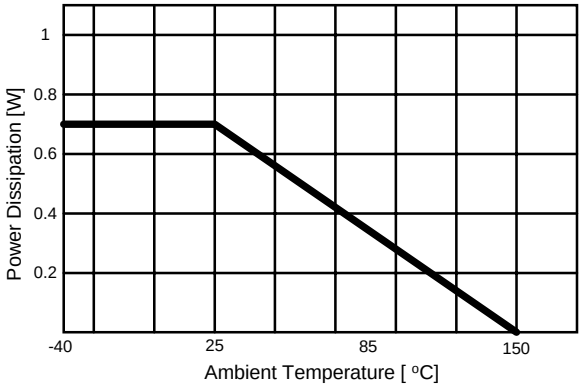
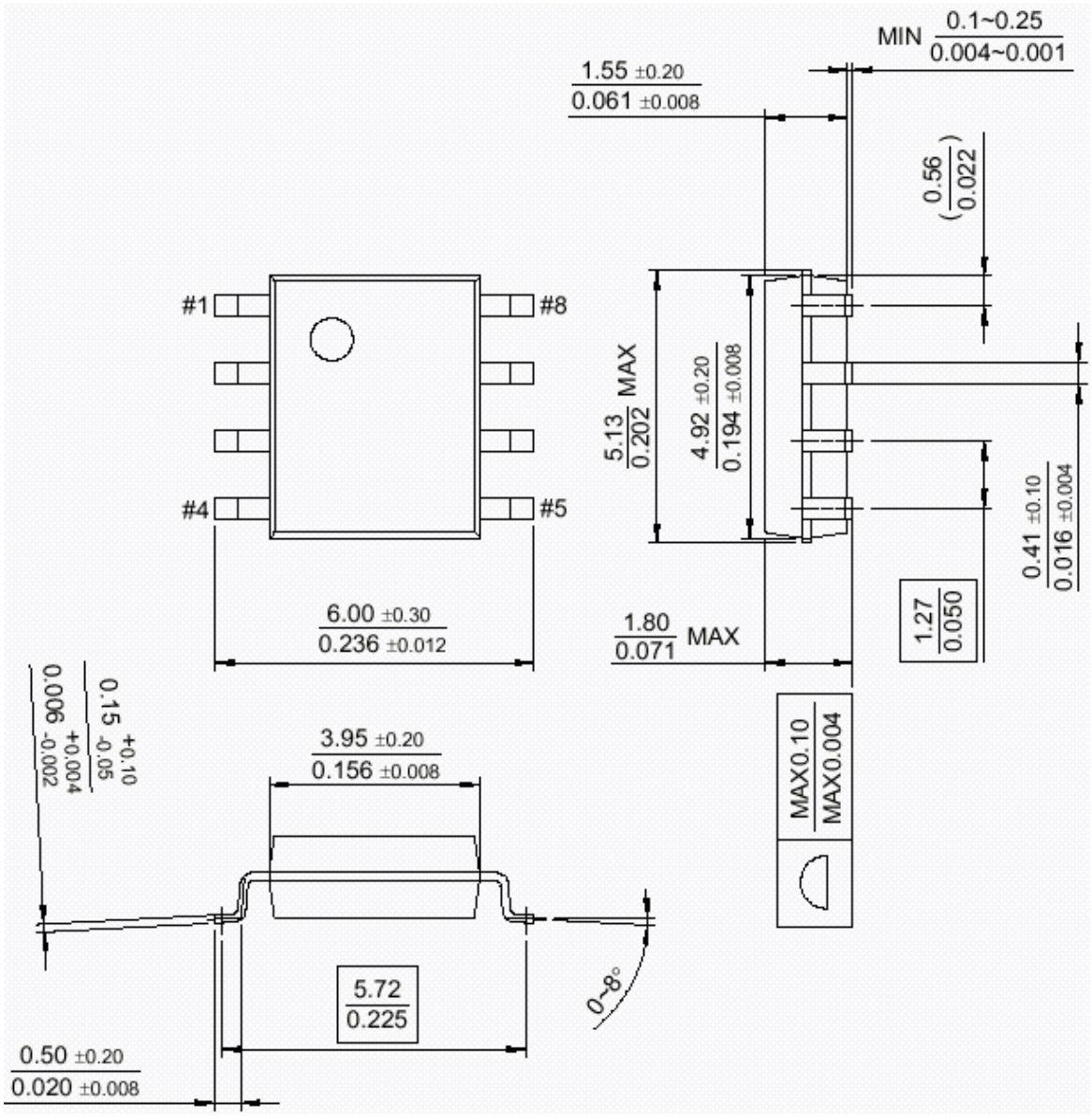



**Figure 14. Power darting curve**

## Mechanical Dimensions (Unit: mm)

### Package

# 8-SOP-225



## Ordering Information

| Device | Package | Operating Temp. |
|---|---|---|
| FAN7021M | 8-SOP-225 | –40°C ~ +85°C |

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