

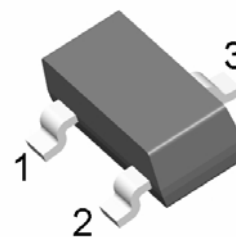
開關三極管 Switching Transistors

Switching Transistors 開關三極管

FHS4401

DESCRIPTION & FEATURES 概述及特點
Complementary to 4403.

SOT-23



PIN ASSIGNMENT 引腳說明

| PIN NAME 管腳符號 | PIN NUMBER 引腳序號 | FUNCTION 功能 |
|------------------|-----------------|----------------|
| | SOT-23 | |
| B | 1 | BASE |
| E | 2 | EMITTER |
| C | 3 | COLLECTOR |

MAXIMUM RATINGS(T_a=25°C) 最大額定值

| CHARACTERISTIC 特性參數 | Symbol 符號 | Rating 額定值 | Unit 單位 |
|--|------------------|------------|---------|
| Collector-Emitter Voltage 集電極-發射極電壓 | V _{CEO} | 40 | Vdc |
| Collector-Base Voltage 集電極-基極電壓 | V _{CBO} | 60 | Vdc |
| Emitter-Base Voltage 發射極-基極電壓 | V _{EBO} | 6 | Vdc |
| Collector Current—Continuous 集電極電流-連續 | I _C | 600 | mAdc |

THERMAL CHARACTERISTICS 熱特性

| CHARACTERISTIC 特性參數 | Symbol 符號 | Max 最大值 | Unit 單位 |
|---|--------------------------------------|----------------------|---------|
| Total Device Dissipation 總耗散功率 FR-5 Board(1) (T _A =25°C 環境溫度=25°C) | P _D | 225 | mW |
| Derate above 25°C 超過 25°C 遞減 | | 1.8 | mW/°C |
| Thermal Resistance Junction to Ambient 熱阻 | R _{JA} | 556 | °C/W |
| Total Device Dissipation Alumina Substrate, (2) T _A =25°C 總耗散功率 氧化鋁襯底 | P _D | 300 | mW |
| Derate above 25°C 超過 25°C 遞減 | | 2.4 | mW/°C |
| Thermal Resistance Junction to Ambient 熱阻 | R _{JA} | 417 | °C/W |
| Junction and Storage Temperature 結溫和儲存溫度 | T _j , T _{stg} | 150 , -55 to +150 | °C |

DEVICE MARKING 打標

FHS4401=2X

ELECTRICAL CHARACTERISTICS 電特性

(T_A=25°C unless otherwise noted 如無特殊說明，溫度為 25°C)

| Characteristic 特性參數 | Symbol 符號 | Test Condition 測試條件 | Min 最小值 | Type 典型值 | Max 最大值 | Unit 單位 |
|--|----------------------|--|---------|----------|---------|---------|
| Collector Cutoff Current 集電極截止電流 | I _{CEX} | V _{CE} =35Vdc, V _{EB} =0.4Vdc | — | — | 100 | nAdc |
| Base Cutoff Current 基極截止電流 | I _{BEX} | V _{CE} =35Vdc, V _{EB} =0.4Vdc | — | — | 100 | nAdc |
| Collector-Emitter Breakdown Voltage (3) 集電極-發射極擊穿電壓 | V _{(BR)CEO} | I _C =1.0 mAdc, I _B =0 | 40 | — | — | Vdc |
| Collector-Base Breakdown Voltage 集電極-基極擊穿電壓 | V _{(BR)CBO} | I _C =100 μAdc, I _E =0 | 60 | — | — | Vdc |
| Emitter-Base Breakdown Voltage 發射極-基極擊穿電壓 | V _{(BR)EBO} | I _E =100 μAdc, I _C =0 | 6 | — | — | Vdc |

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| | | | | | | |
|--|---------------|---|------|---|------|------------------|
| DC Current Gain 直流電流增益 | h_{FE} | $I_C=0.1mA_{dc}$, $V_{CE}=1.0V_{dc}$ | 20 | — | — | — |
| | | $I_C=1.0mA_{dc}$, $V_{CE}=1.0V_{dc}$ | 40 | — | — | |
| | | $I_C=10mA_{dc}$, $V_{CE}=1.0V_{dc}$ | 80 | — | — | |
| | | $I_C=150mA_{dc}$, $V_{CE}=2.0V_{dc}$ | 100 | — | 300 | |
| | | $I_C=500mA_{dc}$, $V_{CE}=2.0V_{dc}$ | 40 | — | — | |
| Collector-Emitter Saturation Voltage(3)集電極-發射極飽和壓降 | $V_{CE(sat)}$ | $I_C=150mA_{dc}$, $I_B=15mA_{dc}$ | — | — | 0.4 | Vdc |
| | | $I_C=500mA_{dc}$, $I_B=50mA_{dc}$ | — | — | 0.75 | |
| Base-Emitter Saturation Voltage 基極-發射極飽和壓降 | $V_{BE(sat)}$ | $I_C=150mA_{dc}$, $I_B=15mA_{dc}$ | 0.75 | — | 0.95 | Vdc |
| | | $I_C=500mA_{dc}$, $I_B=50mA_{dc}$ | — | — | 1.2 | |
| Current-Gain-Bandwidth Product 電流增益-帶寬乘積 | f_T | $I_C=20mA_{dc}$, $V_{CE}=10V_{dc}$, $f=100MHz$ | 250 | — | — | MHz |
| Output Capacitance 輸出電容 | C_{obo} | $V_{CB}=5.0V_{dc}$, $I_E=0$, $f=1.0MHz$ | — | — | 6.5 | pF |
| Input Capacitance 輸入電容 | C_{ibo} | $V_{EB}=0.5V_{dc}$, $I_C=0$, $f=1.0MHz$ | — | — | 30 | pF |
| Input Impedance 輸入阻抗 | h_{ie} | $V_{CE}=10V_{dc}$, $I_C=1.0mA_{dc}$, $f=1.0KHz$ | 1.0 | — | 15 | k Ω |
| Voltage Feedback Ratio 電壓回饋係數 | h_{re} | $V_{CE}=10V_{dc}$, $I_C=1.0mA_{dc}$, $f=1.0KHz$ | 0.5 | — | 8.0 | $\times 10^{-4}$ |
| Small-Signal Current Gain 小信號電流增益 | h_{fe} | $V_{CE}=10V_{dc}$, $I_C=1.0mA_{dc}$, $f=1.0KHz$ | 100 | — | 500 | — |
| Output Admittance 輸出導納 | h_{oe} | $V_{CE}=10V_{dc}$, $I_C=1.0mA_{dc}$, $f=1.0KHz$ | 1.0 | — | 100 | μ mhos |

SWITCHING CHARACTERISTICS 開關特性

| | | | | | | |
|-------------------|-------|---|---|---|-----|----|
| Delay Time 延遲時間 | t_d | $V_{CC}=30V_{dc}$, $V_{BE}=2.0V_{dc}$, $I_C=150mA_{dc}$, $I_{B1}=15mA_{dc}$ | — | — | 15 | nS |
| Rise Time 上升時間 | t_r | | — | — | 20 | |
| Storage Time 儲存時間 | t_s | $V_{CC}=30V_{dc}$, $I_C=150mA_{dc}$, $I_{B1}=I_{B2}=15mA_{dc}$ | — | — | 225 | nS |
| Fall Time 下降時間 | t_f | | — | — | 30 | |

- FR-5=1.0x0.75x0.062in.
- Alumina=0.4x0.3x0.024in, 99.5%alumina.
- Pulse Width \leq 300 μ S; Duty Cycle \leq 2.0%.