

Features

- Internal current sense resistor
- High accuracy current monitor output (sample & hold function)
- Built-in overcurrent and thermal protection circuits

Absolute Maximum Ratings

(Ta=25°C)

| Parameter | Symbol | Ratings | Unit | Conditions |
|-------------------------|---------------------------------|---|------|--|
| Power supply voltage 1 | V _B | 0 to 32 | V | |
| Power supply voltage 2 | V _{CC} | -0.5 to 7.0 | V | |
| Power supply voltage 3 | V _B | 0 to 40 | V | V _B terminal, t = 1 min |
| Current sensing voltage | V _{sense} ⁺ | -0.8 to 6 | V | |
| | V _{sense} ⁻ | V _{sense} ⁺ ± I _o • R _{sense} | | |
| Output terminal voltage | V _{OUT} | -2 to 32 | V | |
| Input terminal voltage | V _{PWM} | -0.5 to 7.0 | V | |
| | V _{Hold} | | | |
| Output current | I _{OUT} | 2.0 | A | |
| Power dissipation | P _D | 2.4 to 5.0 | W | Depends on surface-mount board pattern |
| Storage temperature | T _{stg} | -40 to +150 | °C | |
| Channel temperature | T _{ch} | 150 | °C | |

Electrical Characteristics

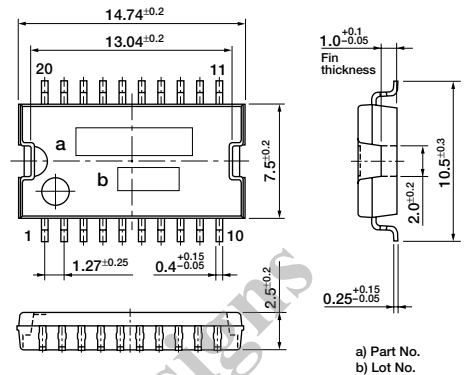
(V_B=14V, Ta=25°C unless otherwise specified) – One circuit equivalent

| Parameter | Symbol | Ratings | | | Unit | Conditions |
|--|--------------------|---------|-------|-------|------|--|
| | | min | typ | max | | |
| Min. operating power supply voltage | V _B min | 6 | | | V | Minimum operation of OUT terminal. |
| Operating power supply voltage 1 | V _B | 10 | 14 | 16 | V | *1 |
| Operating power supply voltage 2 | V _{CC} | | 5.0 | | V | *2 |
| Quiescent circuit current 1 | I _{qvb} | | | 7.2 | mA | V _{CC} =5V, V _{PWM} =0V, One circuit equivalent |
| Quiescent circuit current 2 | I _{qvcc} | | | 0.2 | mA | V _{CC} =5V, V _{PWM} =0V |
| PWM terminal input voltage | V _{PWMH} | 3.5 | | | V | V _{CC} =5V |
| | V _{PWML} | | | 1.5 | | |
| PWM terminal input current | I _{PWMH} | | 70 | 110 | μA | V _{CC} =5V, V _{PWM} =5V, Active H *3 |
| Hold terminal input voltage | V _{HoldH} | 3.5 | | | V | V _{CC} =5V |
| | V _{HoldL} | | | 1.5 | | |
| Hold terminal input current | I _{HoldH} | | 70 | 110 | μA | V _{CC} =5V, V _{PWM} =5V, Active H *3 |
| Output ON resistance | R _{Dson} | | | 0.14 | Ω | I _{OUT} =1A |
| | | | | 0.21 | | I _{OUT} =1A, Ta=125°C |
| | | | | 0.21 | | I _{OUT} =1A |
| Current sensing resistance | R _{sense} | | | 0.25 | Ω | I _{OUT} =1A, Ta=125°C |
| Overcurrent protection starting current | I _s | 3.0 | | | A | *4 |
| Thermal shutdown operating temperature | T _{tstg} | 150 | | | °C | |
| Operation circuit for current monitor output | I _o | 0.2 | | 1.2 | A | *1 |
| Current monitor output voltage | V _{SH} | | | 0.2 | V | I _o =0A, V _{CC} =5V |
| | | 0.488 | 0.500 | 0.512 | | I _o =0.2A, V _{CC} =5V |
| | | 1.219 | 1.250 | 1.281 | | I _o =0.5A, V _{CC} =5V, Ta=-40 to 140°C |
| | | 2.925 | 3.000 | 3.075 | | I _o =1.2A, V _{CC} =5V, Ta=-40 to 140°C |
| | | | | 5 | | I _o =1A, V _{CC} =5V, V _{SH} =0V |
| Current monitor output current | I _{SH} | | | | mA | I _o =1A, V _{CC} =5V, V _{SH} =5V |
| | | -6 | | | | |
| Output transfer time | t _{on} | | | 15 | μs | I _o =0.5A, V _{CC} =5V |
| | t _{off} | | | 15 | | |
| Output rise time | t _r | | | 100 | μs | |
| Output fall time | t _f | | | 50 | μs | |
| Current monitor output hold time | t _{sh} | 500 | | 650 | μs | |
| Current monitor output delay time | t _{shd} | | | 1 | μs | I _o =0.5A, V _{CC} =5V, C1=0.033μF |
| Hold time after inputting hold | t _{shh} | | | 2 | μs | |
| S/H settling time | t _{stt} | | | 70 | μs | V _B =11V, V _{CC} =5V, I _o =1.2A, C1=0.033μF |
| | | | | 80 | | V _B =11V, V _{CC} =5V, I _o =1.2A, C1=0.033μF, Ta=125°C |

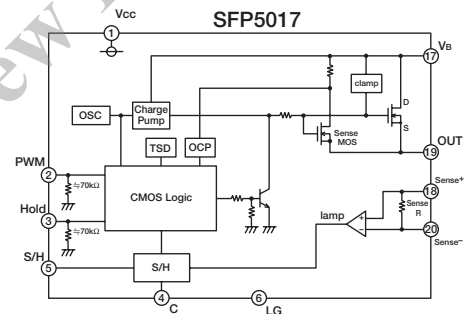
Note:

- *1: Accuracy warranty range for current monitor output
- *2: Equivalent errors are not included in current monitor output accuracy.
- *3: With built-in pull-down resistance (70kΩ typ)
- *4: Self-excitation and oscillation type
- *5: Accuracy of current monitor output is affected by the materials of the hold capacitor (C1). The capacitor C1 must be of low dielectric absorption and have good bias and leak current characteristics.

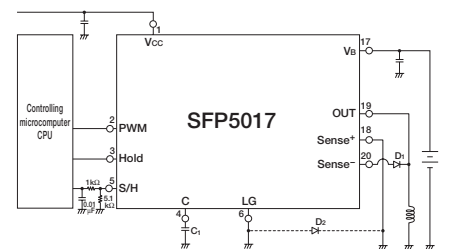
External Dimensions (unit: mm)



Block Diagram (for one channel)

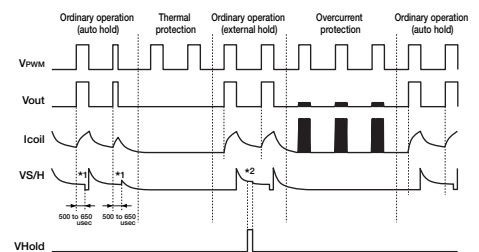


Standard Connection Diagram



* Use a Schottky Di for D2 when the Sense* terminal is lower than the abs. max. rated voltage (-0.8V)

Timing Chart



Truth table

| V _{PWM} | L | H |
|------------------|---|---|
| V _{OUT} | L | H |