ShinDengen
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# MH2513SC

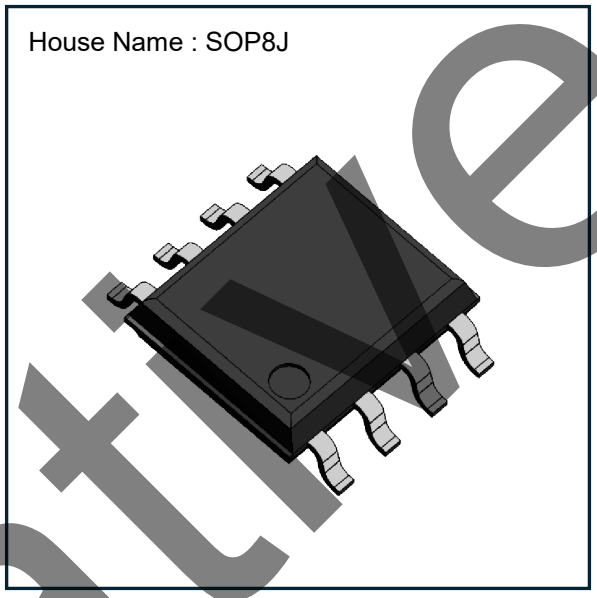
## PFC ICs

## Feature

- Follower IC
- Critical Current Mode
- Enabled multiphase interleaving of 3 or more phases with follower IC
- VCC withstand voltage 26 V
- Overcurrent protection
- Pb free terminals
- RoHS:Yes

## Outline

House Name : SOP8J



## 1 Absolute Maximum Ratings (at Tc=25℃)
## 1 絶対最大定格 (at Tc=25℃)

### 1-1 Thermal Ratings
### 1-1 熱規格

| Item<br>項目 | Symbol<br>記 号 | Ratings<br>規 格 値 | Unit<br>単位 |
|---|---|---|---|
| Storage temperature<br>保存温度 | Tstg | −55 ～ 150 | ℃ |
| Junction temperature<br>接合部温度 | Tj | −40 ～ 150 | ℃ |
| Total power dissipation<br>許容損失 | Pt | 1.5 | W |
| Thermal resistance<br>熱抵抗 (※1) | Rth(j-c) | 13 | ℃/W |
| | Rth(j-a) | 83.3 | ℃/W |

(※1) ガラエポ基板 :114.3mm×76.2mm, 厚さ:1.6mm　内面銅箔サイズ :74.2mm×74.2mm, 厚さ:35μm
Glass-Epoxy Board :114.3mm×76.2mm, Thickness:1.6mm　Inside copper foil :74.2mm×74.2mm, Thickness:35μm

### 1-2 Electrical Ratings
### 1-2 電気的規格

| Item<br>項目 | Symbol<br>記 号 | Ratings<br>規 格 値 | Unit<br>単位 |
|---|---|---|---|
| VCC maximum applied voltage<br>VCC端子 最大印加電圧 | VCC | −0.3 ～ 26 | V |
| VIS into maximum current<br>VIS端子最大流入電流 | IVIS | −5 ～ 5 | mA |
| IL_IN into maximum current<br>IL_IN端子最大流入電流 | IIL_IN | −5 ～ 5 | mA |
| IL_OUT into maximum current<br>IL_OUT端子最大流入電流 | IIL_OUT | −5 ～ 5 | mA |
| VDZC into maximum current<br>VDZC端子最大流入電流 | IVDZC | −5 ～ 5 | mA |
| OCL into maximum current<br>OCL端子最大流入電流 | IOCL | −5 ～ 5 | mA |

Notes : Using with parameters, condition of use and logic controls that are not specified in the specifications are not assured.
When used with the conditions that are not specified, please consult us in advance.
The contents described herein are subject to change without notice.

注意 : 本仕様書に記載されていない項目、使用条件、論理の組み合わせでの使用は保証していません。
記載されている以外の条件で使用する場合は必ず事前に当社担当営業部門までご相談下さい。

## 2 Recommended Operation Conditions
## 2 推奨動作条件

| Item<br>項目 | Symbol<br>記 号 | Recommended value<br>推 奨 値 | | | Unit<br>単位 |
|---|---|---|---|---|---|
| | | min | typ | max | |
| Operating temperature<br>動作温度 | Top | −40 | − | 125 | ℃ |
| VCC applied voltage<br>VCC端子印加電圧 | VCC | 12 | − | 23 | V |
| VIS into current<br>VIS端子入力電流 | IVIS | −4.5 | − | 4.5 | mA |
| VDZC into current<br>VDZC端子入力電流 | IVDZC | −4.5 | − | 4.5 | mA |

Notes : The product life depends on the condition of use even within the above operating conditions.
Using at Tj = 100℃ or less is recommended for the equipment where a long life is expected.

注意 : 上記の規格範囲内においても、製品寿命に関しましてはお客様の使用環境により異なりますので、長寿命を期待される製品に、
ご使用される場合には Tj=100℃以下でご使用頂く事を推奨致します。

**3-1 Electrical/Thermal Characteristics (at Ta=25℃)**
**3-1 電気的・熱的特性 (at Ta=25℃)**

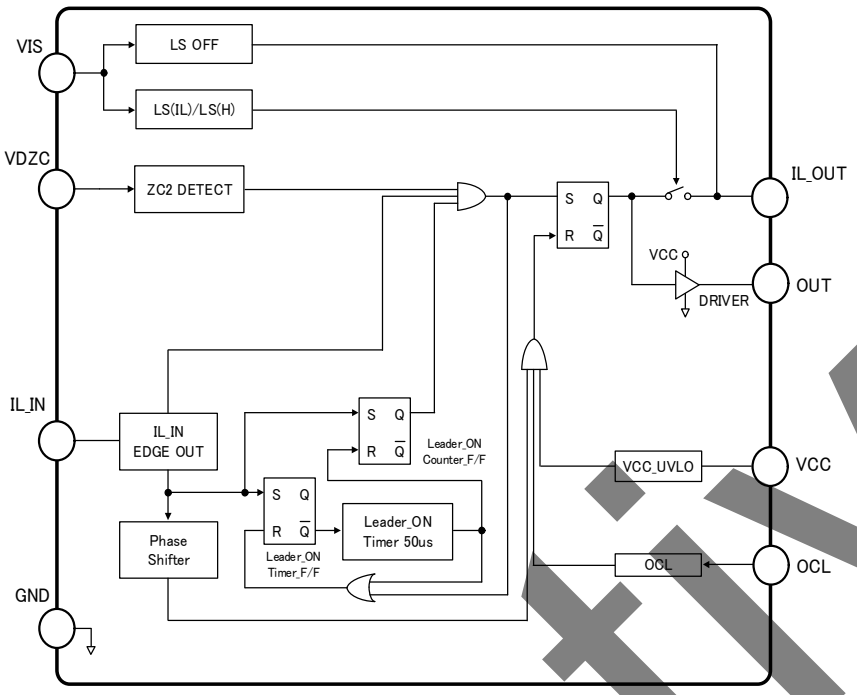
| Item<br>項 目 | Symbol<br>記 号 | Condition<br>条 件 | Ratings<br>規 格 値 | | | Unit<br>単位 |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| VCC端子 (VCC Terminal) | | | | | | |
| On-state voltage<br>発振開始電圧 | VCC(start) | OCL=0V | 9.5 | 10.0 | 10.5 | V |
| Under-voltage lockout (UVLO)<br>発振停止電圧 | VCC(stop) | OCL=0V | 6.5 | 7.0 | 7.5 | V |
| VCC start/stop hysteresis voltage<br>発振開始-停止ﾋｽﾃﾘｼｽ | VCC(hys) | OCL=0V | 3.5 | 4.0 | 4.5 | V |
| VCC current (Active mode)<br>VCC電流(動作時) | ICC(act) | | 1.0 | 2.0 | 3.0 | mA |
| VCC current (UVLO mode)<br>VCC電流(発振停止時) | ICC(UVLO) | VCC=6V | - | - | 100 | μA |
| VCC current (standby mode)<br>VCC電流(ｽﾀﾝﾊﾞｲﾓｰﾄﾞ時) | ICC(stby) | | - | - | 100 | μA |
| OUT端子 (OUT Terminal) | | | | | | |
| Source current<br>ソース電流 | Iout(source) | VCC=12V OUT=6.5V | -0.8 | -0.5 | -0.2 | A |
| Sink current<br>シンク電流 | Iout(sink) | VCC=12V OUT=4.0V | 0.8 | 1.2 | 1.5 | A |
| IL_OUT端子 (IL_OUT Terminal) | | | | | | |
| Source current(S1)<br>ソース電流(S1) | IL(source)S1 | VIS≧4.5V IL_OUT=0V | -6.5 | -4.5 | -2.0 | mA |
| Source current(S2)<br>ソース電流(S2) | IL(source)S2 | VIS<0.85V/0.65V IL_OUT=0V | -1.5 | -1.0 | -0.5 | mA |
| Source current(S3)<br>ソース電流(S3) | IL(source)S3 | 0.85V/0.65V≦VIS<4.5V IL_OUT=0V | - | 0 | - | mA |
| Sink current<br>シンク電流 | IL(Sink) | VIS≧4.5V IL_OUT=5V | 12 | 22 | 32 | mA |
| VDZC端子 (VDZC Terminal) | | | | | | |
| 臨界制御検出しきい値 | VDZCCR | | -0.8 | -1.0 | -1.2 | V |
| ZC2 detection voltage<br>ZC2検出しきい値 | VZC2 | | 1.8 | 2.0 | 2.2 | V |
| IL_IN端子 (IL_IN Terminal) | | | | | | |
| IL_IN detection voltage(L)<br>IL_IN検出電圧(L) | VIL_IN(L) | OCL=0V | 0.7 | 1.0 | 1.3 | V |
| IL_IN detection voltage(H)<br>IL_IN検出電圧(H) | VIL_IN(H) | OCL=0V | 1.7 | 2.0 | 2.3 | V |
| IL_IN detection voltage hysteresis<br>IL_IN検出ヒステリシス | VIL_IN(hys) | OCL=0V | 0.7 | 1.0 | 1.3 | V |
| On dead time<br>ｵﾝﾃﾞｯﾄﾞﾀｲﾑ | Tondead | OCL=0V | 340 | 400 | 460 | ns |
| Maximum IL_IN(H) detection on time<br>IL_IN検出(H)最大ON時間 | TIL_IN MAX | OCL=0V | 40 | 45 | 50 | μs |

**3-2 Electrical/Thermal Characteristics (at Ta=25℃)**
**3-2 電気的・熱的特性 (at Ta=25℃)**

| Item<br>項 目 | Symbol<br>記 号 | Condition<br>条 件 | Ratings<br>規 格 値 | | | Unit<br>単位 |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| OCL端子 (OCL Terminal) | | | | | | |
| Overcurrent protection voltage<br>過電流保護電圧 | VTH_OCL | | 0.45 | 0.50 | 0.55 | V |
| Leading edge blanking time<br>ﾘｰﾃﾞｨﾝｸﾞｴｯｼﾞﾌﾞﾗﾝｸﾀｲﾑ (※2) | TLEB | | − | 500 | − | ns |
| VIS端子 (VIS Terminal) | | | | | | |
| 低AC入力電圧しきい値(H) | VIS(H) | | 0.77 | 0.85 | 0.93 | V |
| 低AC入力電圧しきい値(L) | VIS(L) | | 0.59 | 0.65 | 0.71 | V |
| 低ACしきい値ﾋｽﾃﾘｼｽ | ΔVIS(hys) | | 0.15 | 0.20 | 0.25 | V |
| ｲﾝﾀｰﾘｰﾌﾞ出力ﾓｰﾄﾞ電圧 | VIS(IL) | | 4.2 | 4.5 | 4.8 | V |
| VIS discharge current<br>VIS端子放電電流 | IVIS(discharge) | | 0.2 | 0.5 | 0.8 | μA |

(※2) 設計保証
(※2) Design assurance

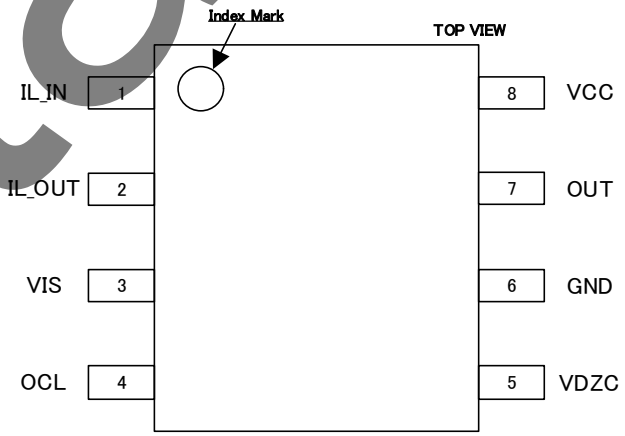
**4 Block Diagram**
**4 ブロック図**




**5 Pin Function**
**5 端子機能**

| Terminal No.<br>端子番号 | Symbol<br>記号 | Terminal Name<br>端子名称 |
|---|---|---|
| 1 | IL_IN | The signal input terminal for interleave operation<br>インターリーブ動作用信号入力端子 |
| 2 | IL_OUT | The signal output terminal for interleave operation<br>インターリーブ動作用信号出力端子 |
| 3 | VIS | The input terminal for AC voltage detection<br>AC入力電圧監視用端子 |
| 4 | OCL | The input terminal for over current detection<br>過電流検出用入力端子 |
| 5 | VDZC | The input terminal for zero current detection<br>ゼロ電流検出端子 |
| 6 | GND | Ground Terminal<br>グランド端子 |
| 7 | OUT | The output terminal for a MOSFET drive<br>MOSFET駆動用出力端子 |
| 8 | VCC | The input terminal for Power supply voltage<br>電源電圧入力端子 |

**6 Pin Assignment**
**6 端子配置**

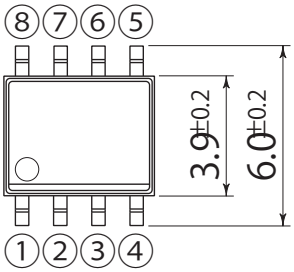


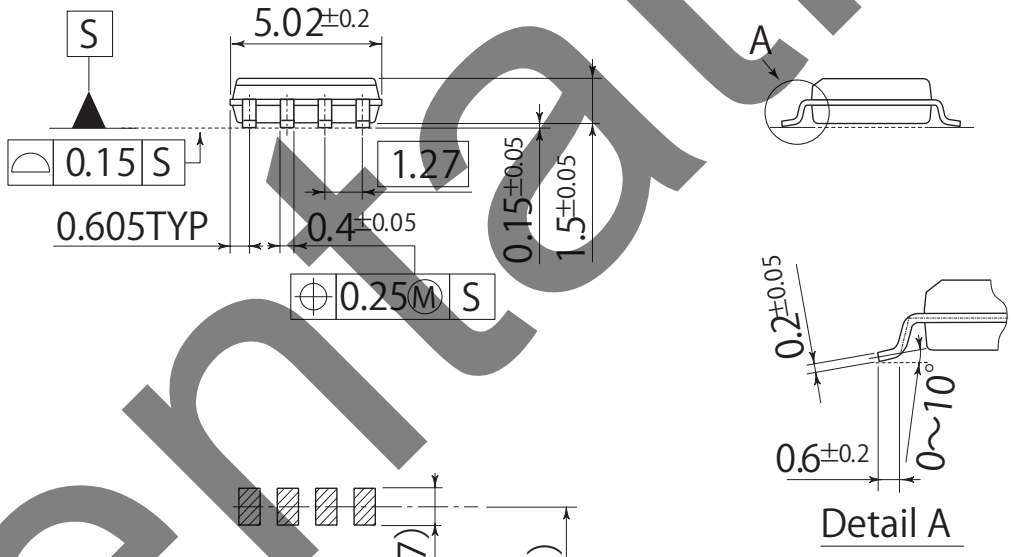
# Package Outline-Dimensions

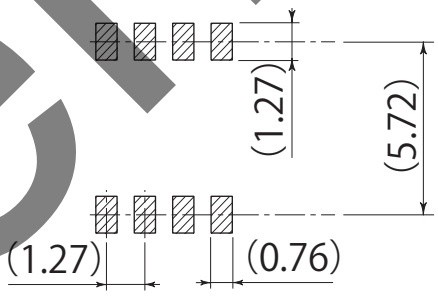
unit : mm
scale: 4/1

L2

| | |
|---|---|
| JEDEC Code | – |
| JEITA Code | – |
| House Name | SOP8J |




Referential Soldering Pad

・量産時には、適正化を図って下さい
・Optimize soldering pad to the board design and soldering condition.



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