ShinDengen

MF2003SV

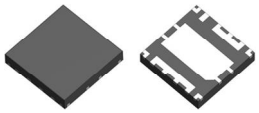
Ideal Diode IC V-Diode™

Feature

- Built-in reverse current protection
- Built-in reverse connection protection
- Built-in Pch MOSFET protection active clamp function
- Operating voltage 2.5V～40V
- Quiescent current ≦3μA
- Small leadless package WSON8（wettable flank）
- Based on AEC-Q100
- Pb free
- RoHS:Yes

Outline

House Name: WSON8



1.絶対最大定格
Absolute Maximum Ratings

1-1.入出力定格
Input Output Ratings

特に指定なき場合はTj=25℃
Tj=25℃ unless otherwise specified

項目 Item	記号 Symbol	規格値 Value	単位 Unit
電源電圧 Supply voltage	V_{VIN}	−42 ～ 42	V
出力電圧 Output Voltage	V_{OUT}	−1.0 ～ 42	V
ピーク繰返し逆電圧 Repective peak reverse voltage	V_{RRM}	40	V
平均順電流 Average forward current	I_{OUT}	5	A
サージ順電流 (*1) Surge forward current	I_{FSM}	70	A

*1 50Hz, 正弦波, 非繰り返し, 1サイクル, せん頭値, Tj=25℃
50Hz, Sine wave, Non-repetitive, 1cycle, Peak value, Tj=25℃

注意
Notes
静電気耐量としては、AEC-Q100試験基準で実施し、下記の条件をパスしています。
Electrostatic discharge is performed in accordance with the AEC-Q100 Qualification test and is as following level are passed.
AEC-Q100 HBM:2kV Class 2 , CDM:500V(Corner Pins:750V) Class C4B.

1-2.熱定格
Thermal Ratings

項目 Item		記号 Symbol	規格値 Value	単位 Unit
許容損失 Total power dissipation	裏面タブ接続 (*2) Back tab connection	Pd	2.79	W
接合部温度 Junction temperature		Tj	150	℃
保存温度 Storage temperature		Tstg	−55 ～ 150	℃

1-3.熱抵抗
Thermal Resistance

項目 Item		記号 Symbol	規格値 Value	単位 Unit
熱抵抗 Thermal Resistance	裏面タブ接続 (*2) Back tab connection	Rth(j-a)	43	℃/W
		Rth(j-c)	8.6	℃/W

*2 4-layer Board with via
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

注意
Notes
裏面タブのはんだ付けの状態が不十分な場合、(*2)の熱特性を満たせない場合があります。
If soldering condition on back tab is insufficient, it may not be possible to satisfy (*2)thermal characteristics.

2.推奨動作条件
Recommended operating conditions

項目 Item	記号 Symbol	推奨値 Value	単位 Unit
接合部温度 Junction temperature	Tj	−40 ～ 125 *3	℃

*3 AEC-Q100 Device Temperature Grade1

注意
Notes

推奨動作条件の範囲を超えて使用すると、信頼性に影響を及ぼす場合があります。
It might influence reliability when using it beyond the range of recommended operating conditions.

定常的に105℃を超えてご使用される場合は、必ず事前に当社担当営業部門までご相談下さい。
When using over 105℃ regularly, make sure to get advice from a salesman of our company beforehand.

本ICを御使用の際は絶対最大定格を越えないようにしてください。絶対最大定格を超えた場合、ICが破壊する可能性があります。破壊した場合、その破壊モード(オープンモード、ショートモード)は特定できませんので、ヒューズなど物理的な安全対策を施すようお願いします。
Do not use this IC beyond its absolute maximum ratings to prevent the IC from possible damage. Since the type of destructive mode cannot be identified (open mode, short mode), take safety measures such as fusing.

3.電気的特性
Electrical characteristics

3-1.電気的特性
Electrical characteristics

特に指定なき場合はVIN=12V,Tj=25℃
VIN=12V,Tj=25℃ unless otherwise specified

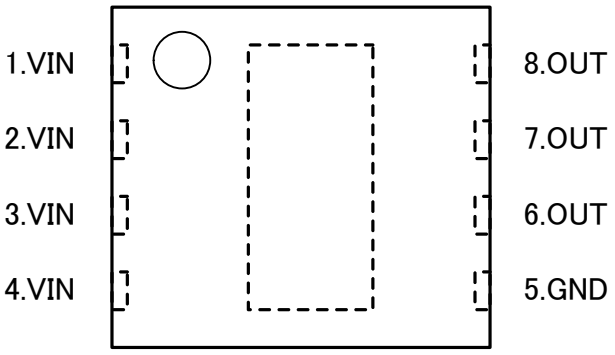
項目 Item	記号 Symbol	条件 Condition	規格値 Ratings MIN	TYP	MAX	単位 Unit
主要特性 Main Characteristics						
無負荷時消費電流 Quiescent current	Iq	Iout=0A		1.8	3.0	μA
出力リーク電流 Output Leak current	Ioleak	OUT=32V ※4			10	μA
動作時消費電流 Operating current consumption	Ignd	I_{OUT}=1A			300	μA
動作開始電圧 Operating Start Voltage	Vst	IIN≧0.7μA			2.5	V
VIN-OUT レギュレーション電圧 Regulation Voltage	Vds	IIN=10mA	8	25	50	mV
ターンオン遅延時間 Delay time of Turn ON	Ton	I_{OUT}＝0A ⇒-0.5A VIN-OUT＜200mV		5	50	μs
ターンオフ遅延時間 Delay time of Turn OFF	Toff	VIN＝12V⇒0V VIN-OUT<0V		0.5	1.5	μs
ボディダイオード 順方向電圧 Forward voltage	Vbody	IIN=2A, VIN=0V		0.8	1.0	V
内蔵MOSFET ON 抵抗 MOS RON reststance	Rdson	IIN=2A		53	70	mΩ
アクティブクランプ動作時Vds電圧 Vds voltage during active clamp operation	Vcl	OUT=0V,I_{OUT}=2A	35	40	46	V

※4 アクティブクランプ非動作設定
Active clamp non-operating setting.

4.端子機能説明
Pin Function

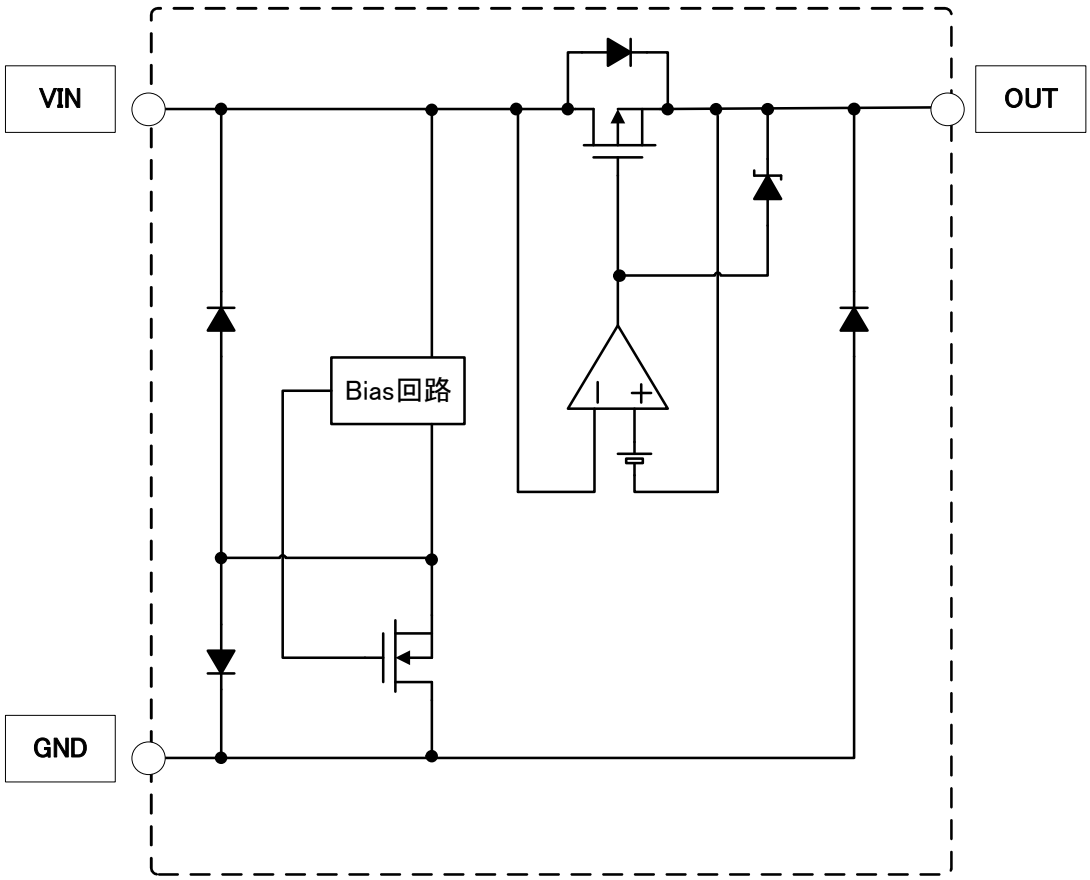
端子番号 PIN No.	記号 symbol	機能 function
1	VIN	電源供給端子 Terminal for a power supply
2	VIN	電源供給端子 Terminal for a power supply
3	VIN	電源供給端子 Terminal for a power supply
4	VIN	電源供給端子 Terminal for a power supply
5	GND	グランド端子 Ground Terminal
6	OUT	出力端子 Output Terminal
7	OUT	出力端子 Output Terminal
8	OUT	出力端子 Output Terminal

5.端子配置
Pin configuration

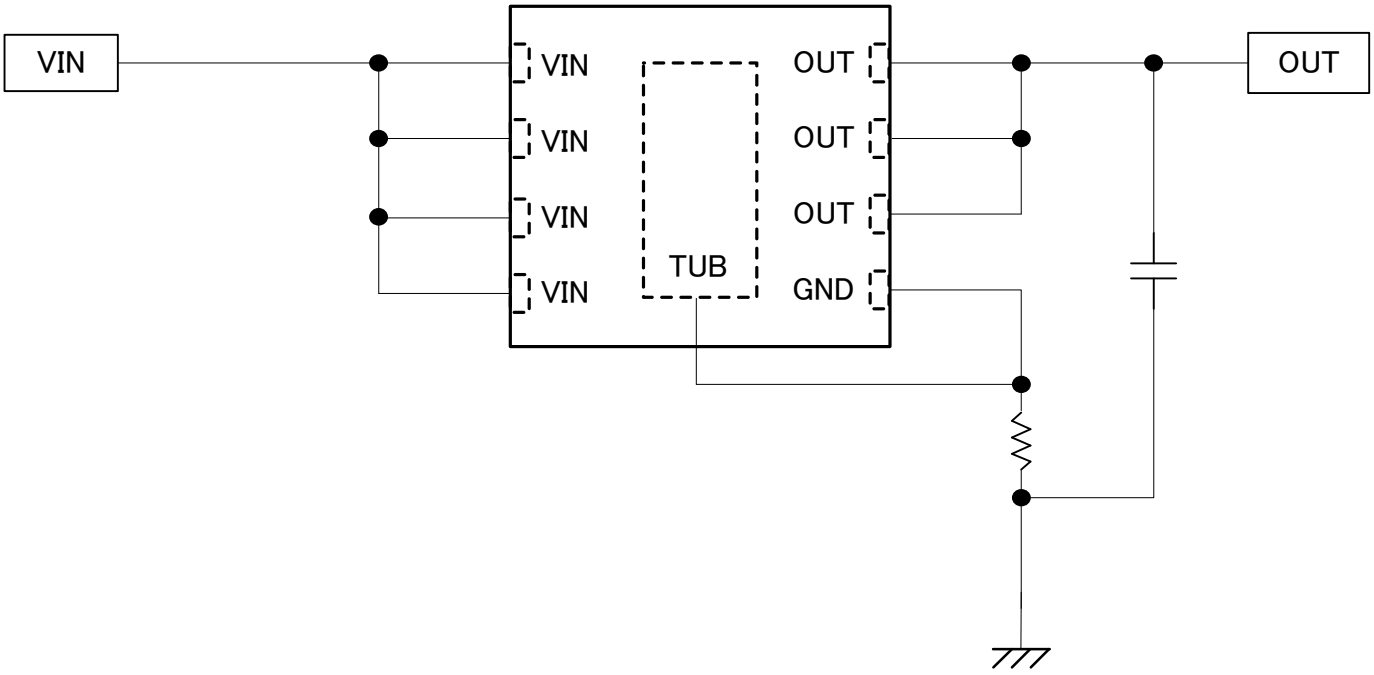


裏面TUB FLOATING
Back side TUB FLOATING

6.ブロック図
Block Diagram



7.代表回路図
Example Circuit Diagram

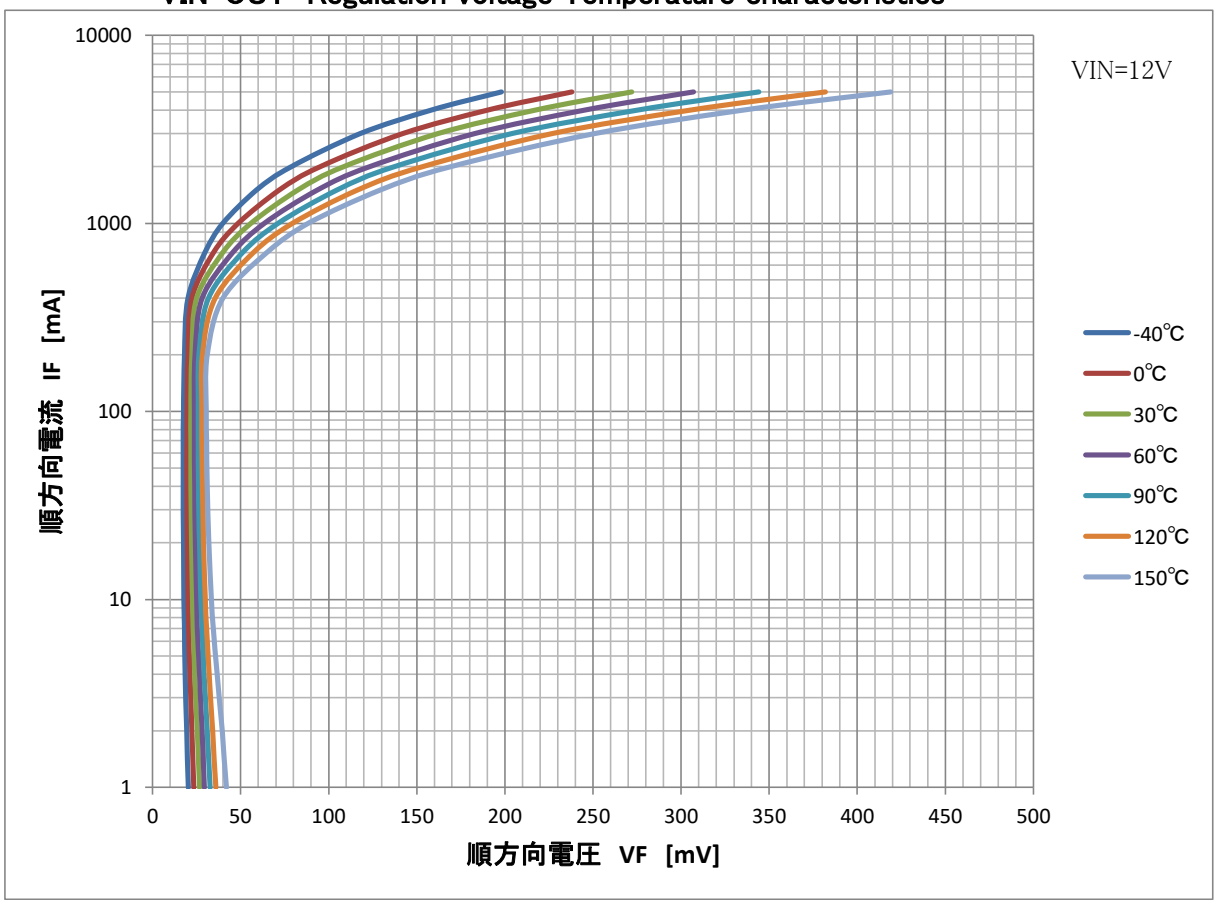


同一機能ピンは端子近傍で短絡して使用してください。
半田不良の場合、期待する性能とならない場合がありますので注意してください。
The same function pins should be shorted near the terminals.
Note that normal operation may not occur if solder is defective.

8. 各種電気的特性(参考値)
Various electrical characteristics

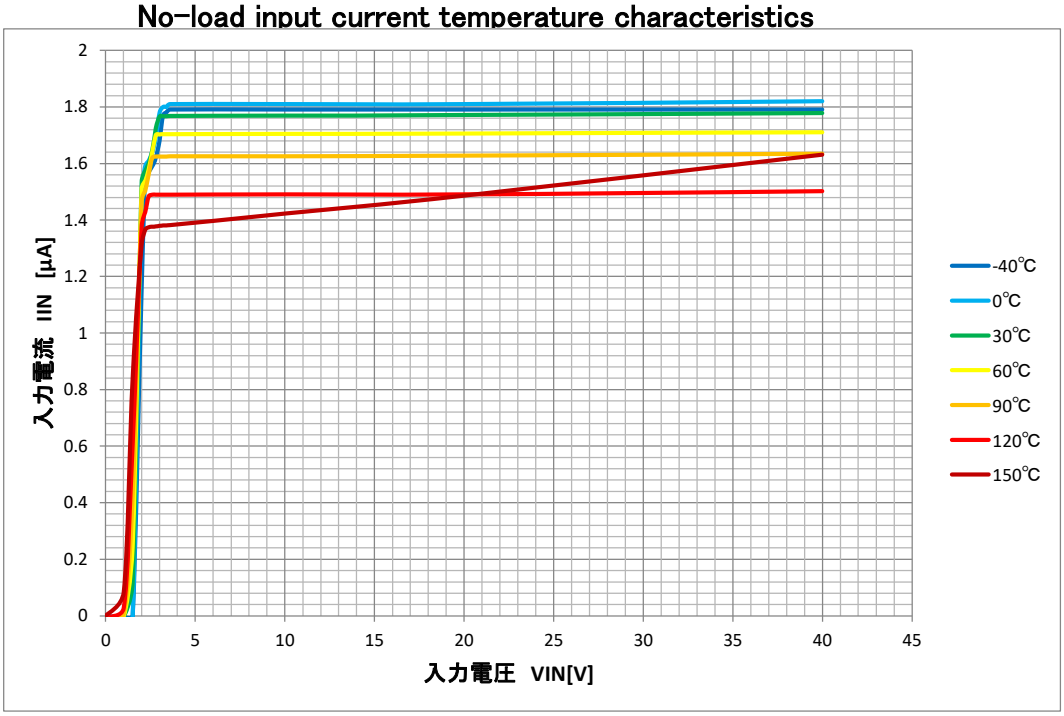
VIN-OUTレギュレーション電圧　温度特性

VIN-OUT　Regulation voltage Temperature characteristics

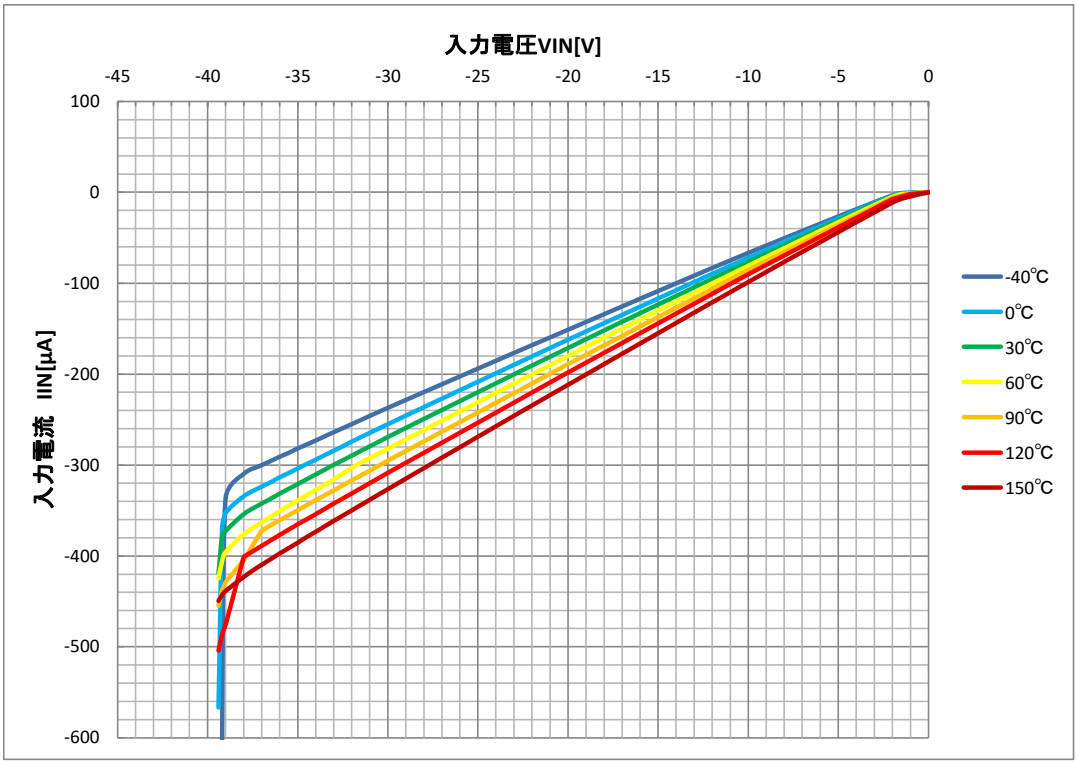


8. 各種電気的特性（参考値）
Various electrical characteristics

無負荷時入力電流温度特性
No-load input current temperature characteristics



入力逆電圧電流温度特性
Input reverse voltage input current temperature characteristics

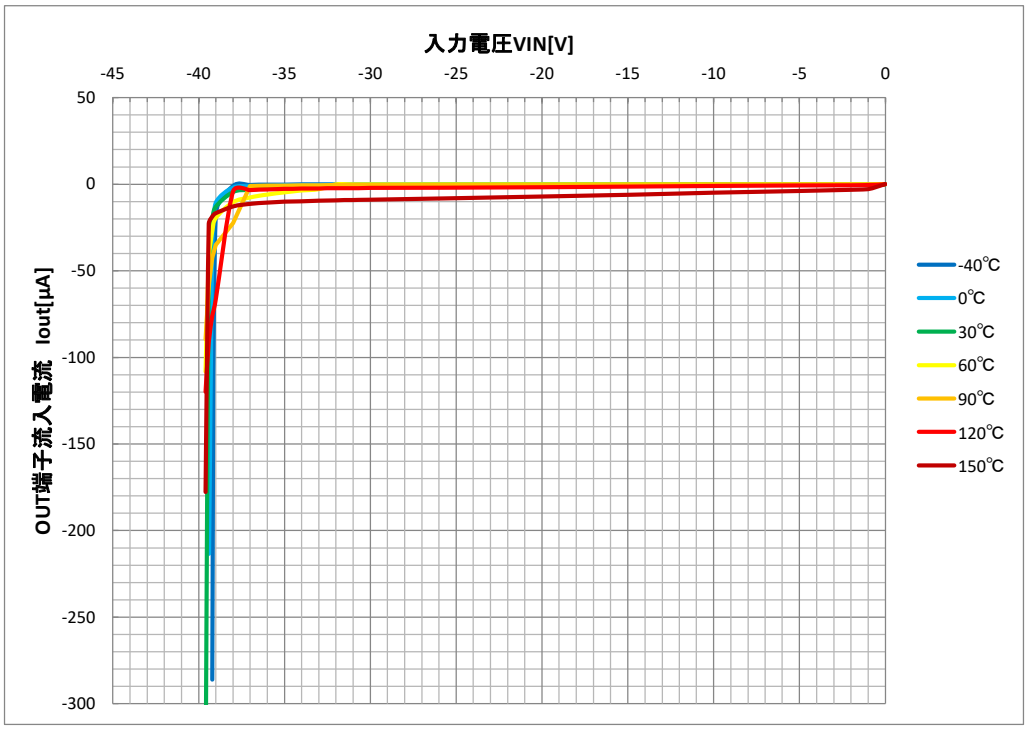


8. 各種電気的特性（参考値）

Various electrical characteristics

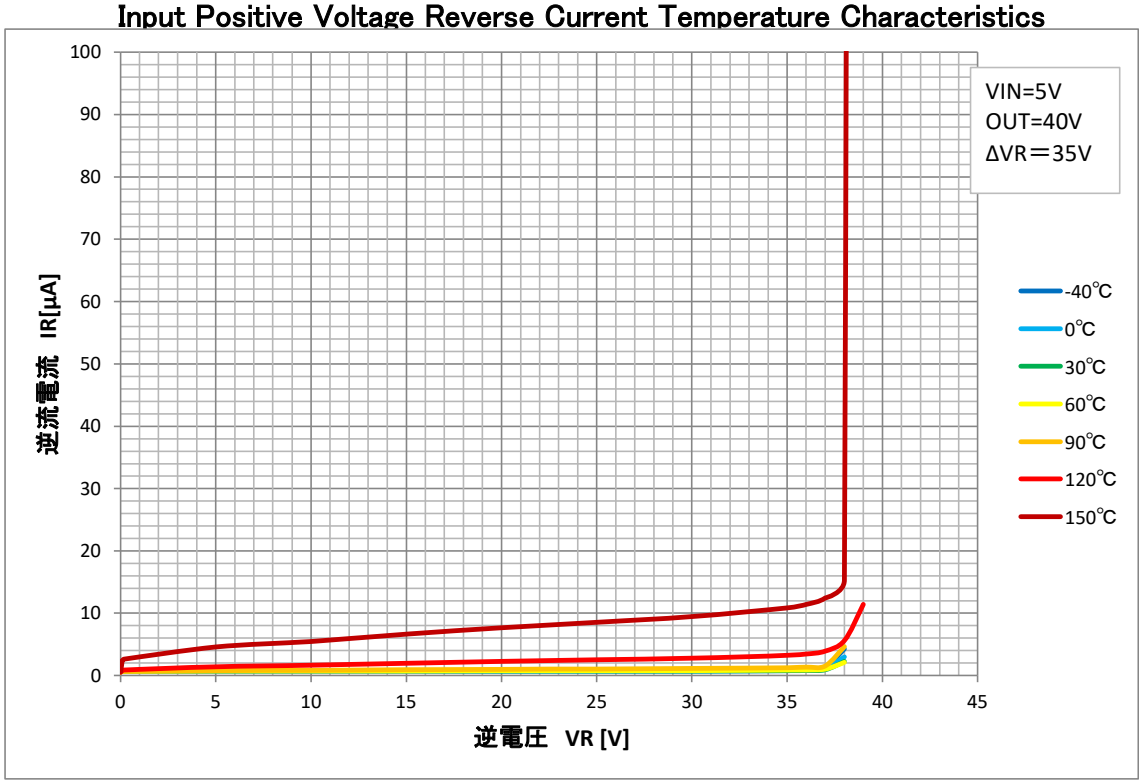
入力逆電圧OUT端子流入電流温度特性

Input reverse voltage OUT terminal current temperature characteristics

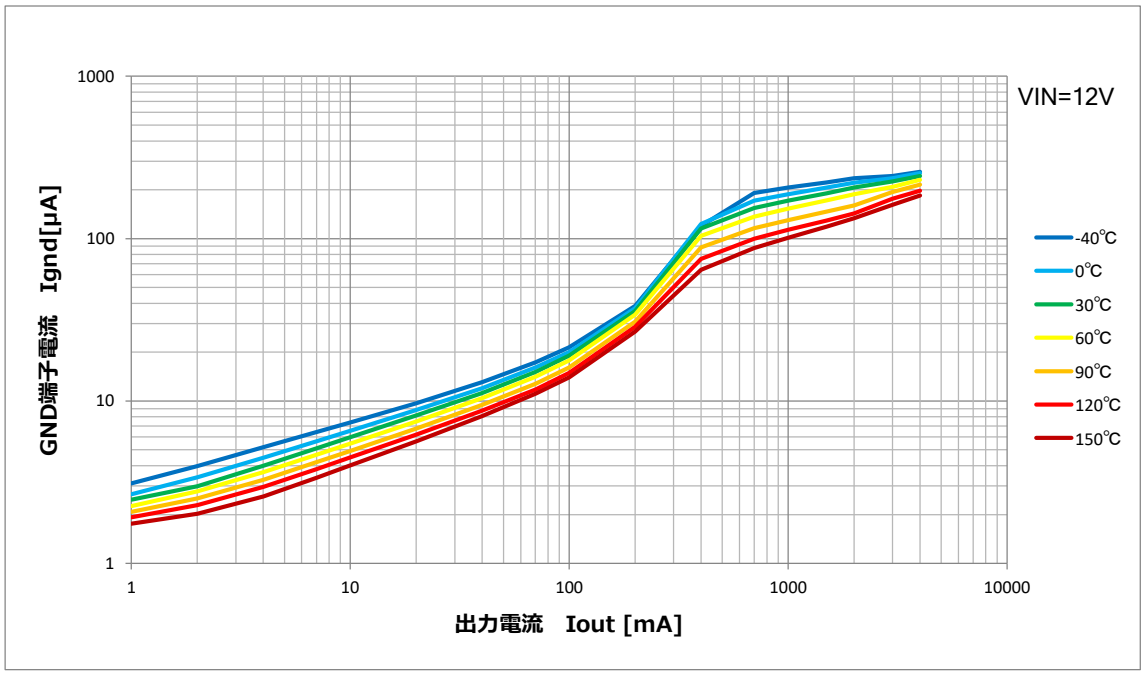


8. 各種電気的特性（参考値）
Various electrical characteristics

入力電圧正電圧の逆電流温度特性
Input Positive Voltage Reverse Current Temperature Characteristics

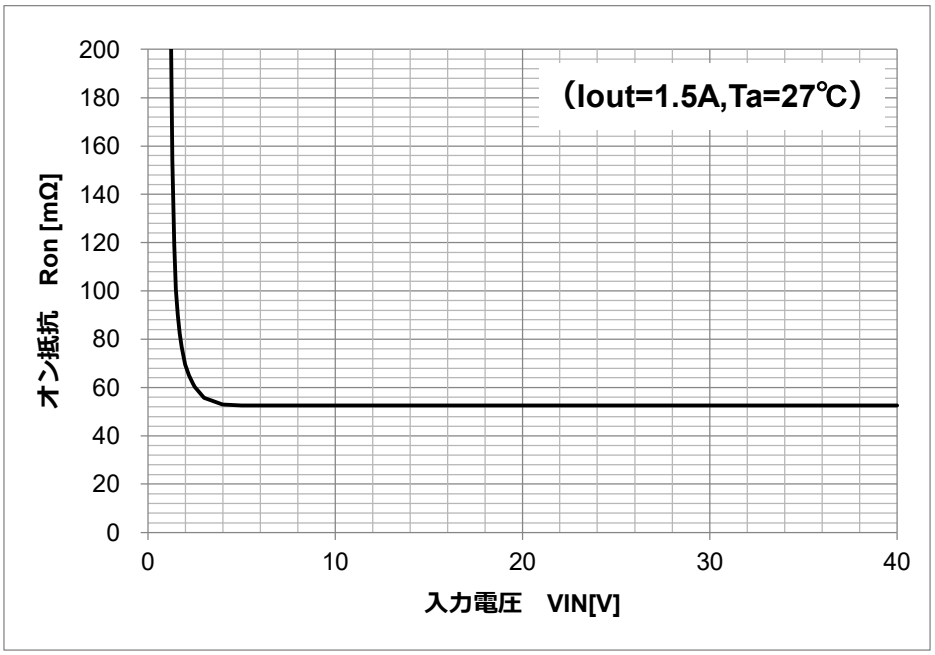


動作時消費電流（VIN=12VのGND端子電流）温度特性
GND terminal current temperature characteristics during operation

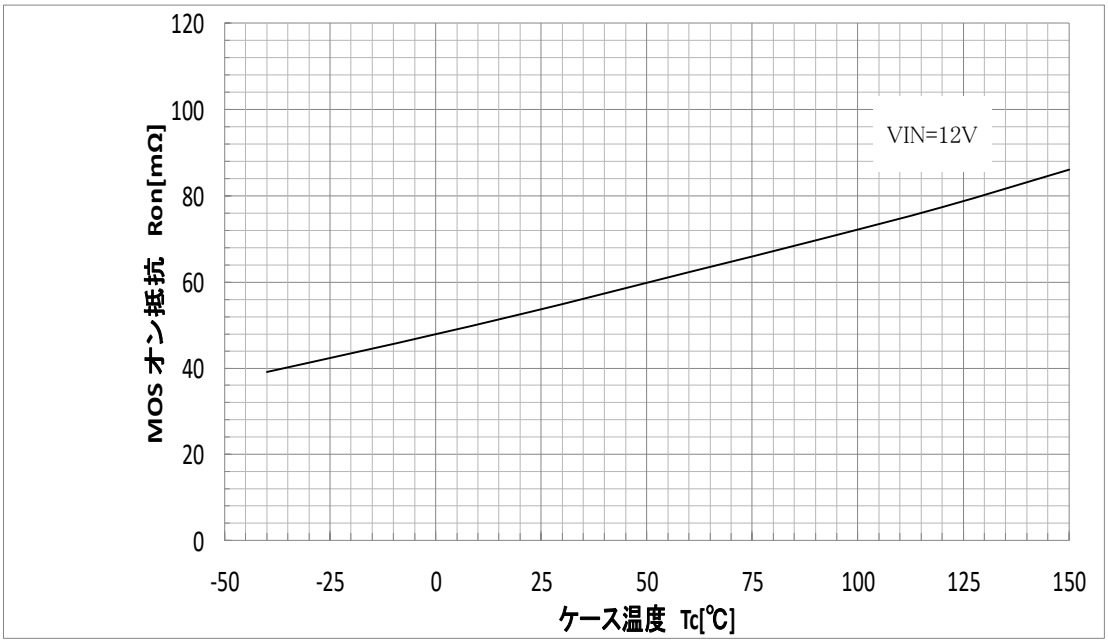


8. 各種電気的特性（参考値）
Various electrical characteristics

オン抵抗の入力電圧特性
Input voltage vs. Ron resistance characteristics

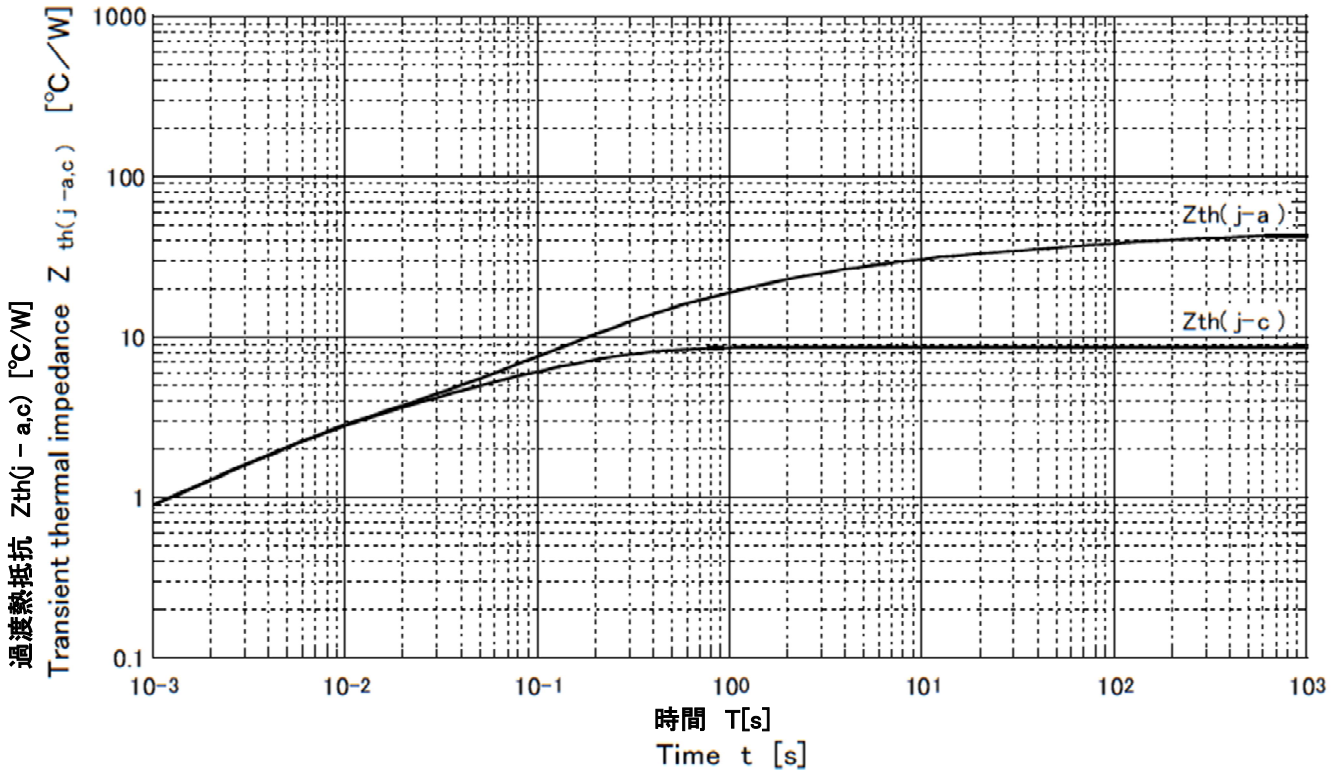


MOS　オン抵抗の温度特性
Temperature characteristics of　MOS　Ron resistance



9. 過渡熱抵抗特性
Transient Thermal Impedance Characteristic

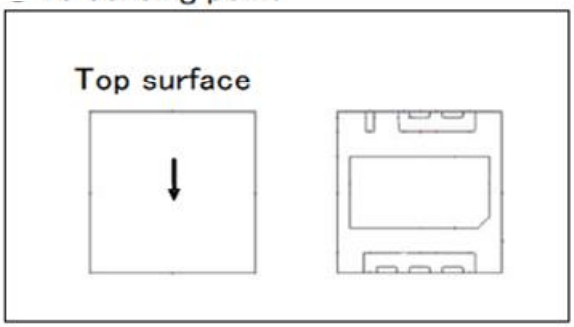
過渡熱抵抗
Transient thermal impedance



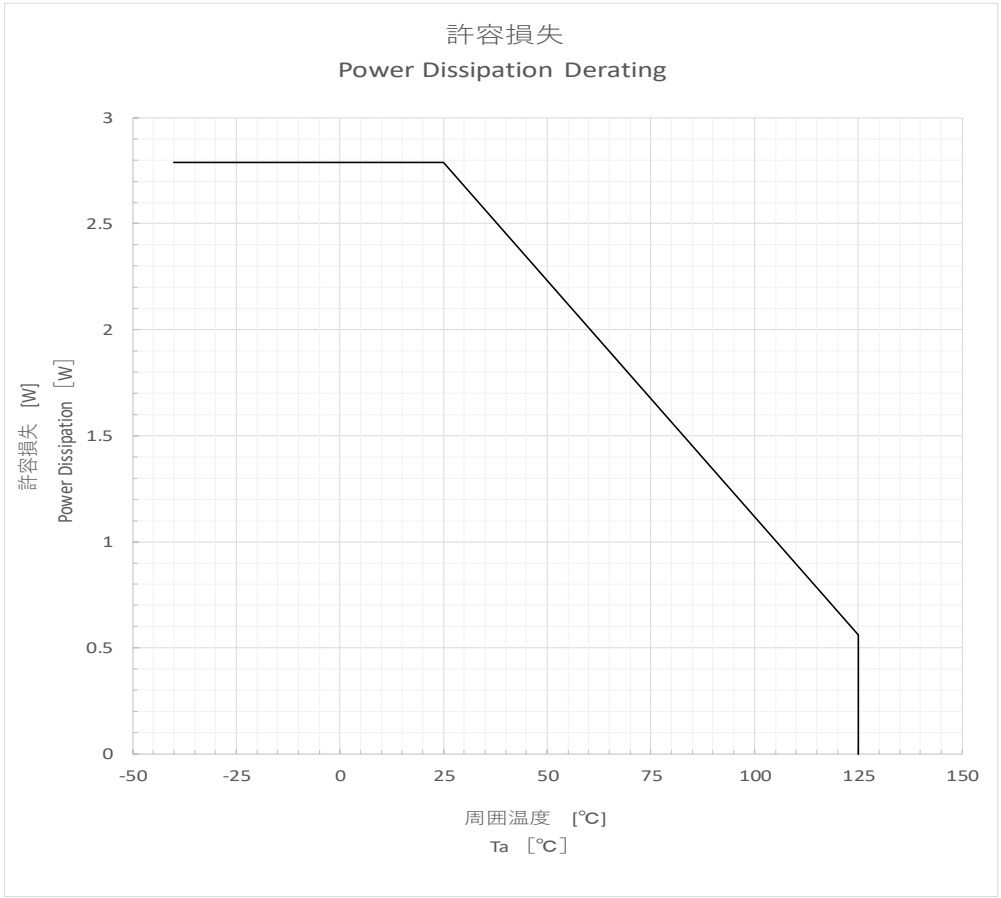
基板詳細(ガラエポ基板 4層)ビアあり
Substrate Detail (Glass-Epoxy Board, 4layers) With VIA

Type	Glass-epoxy substrate
Size	114.3mm×76.2mm
Thickness	1.6mm
Conductor thickness	1st layer 70μm 2nd layer 35μm 3rd layer 35μm 4th layer 70μm
Pattern area	1st layer 65.7mm^2 2nd layer 5502mm^2 3rd layer 5502mm^2 4th layer 2.15mm^2

温度検出点
Tc sensing point



10. ディレーティング特性
Power Dissipation Derating Characteristic



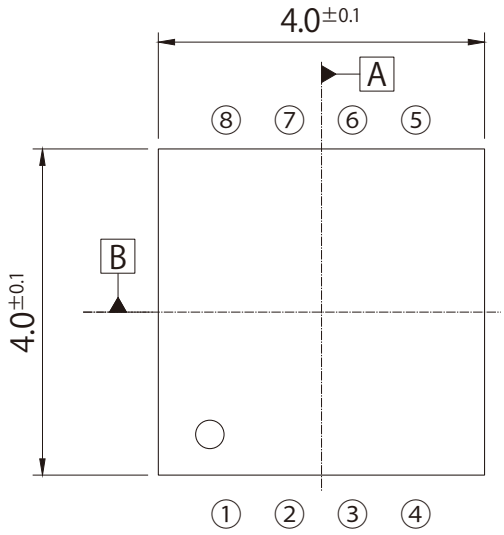
*2 4-layer Board with via
ガラエポ基板：114.3mm×76.2mm, 厚さ：1.6mm、内面銅箔サイズ：74.2mm×74.2mm, 厚さ：35μm
Glass-Epoxy Board ：114.3mm×76.2mm , Thickness：1.6mm, Inside copper foil：74.2mm×74.2mm, Thickness：35μm

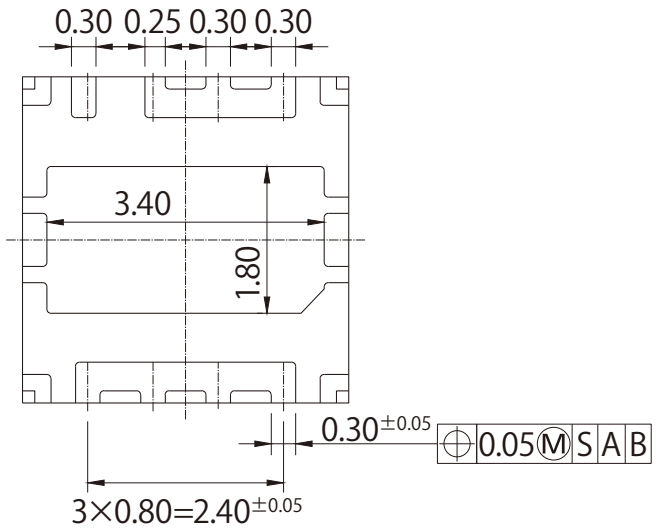
Package Outline-Dimensions

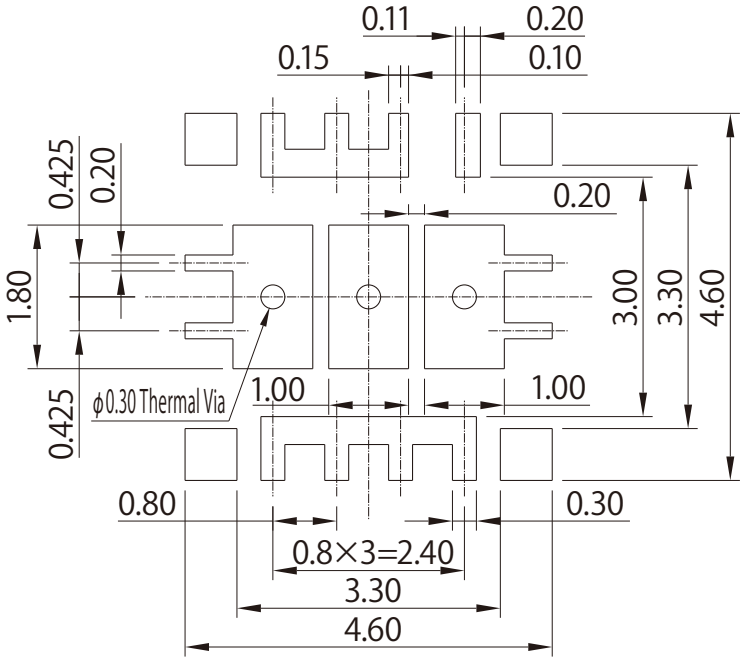
unit : mm

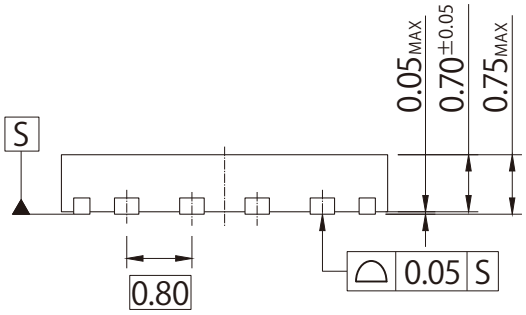
L9

JEDEC Code	–
JEITA Code	–
House Name	WSON8









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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Notes

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   Transportation equipment (vehicles, ships, etc.), trunk-line communication equipment, traffic signal control systems, anti-disaster/crime systems, safety equipment, medical equipment, etc.
   【Specific applications】
   Nuclear reactor control systems, aircraft, aerospace equipment, submarine repeaters, life support equipment and systems, etc.
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