MF2007SW

Ideal Diode IC V-Diode™

Feature

- Built-in reverse current protection（Can also be disabled）
- Built-in reverse connection protection
- Back to Back connection of Nch MOSFET is possible
- Operating voltage：3.5V～65V
- Shutdown function
- Operating current(@shutdown)：5μA
- VDS sensing function of Nch MOSFET
- Small package：TSSOP10
- Halogen free
- Pb free
- RoHS:Yes

Outline

House Name: TSSOP10

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
VIN/SOURCE-GND	VIN/SOURCE	-40	～	70	V
EN/REV-GND	EN/REV	-0.3	～	70	V
VIN-OUT	VIN_OUT	-70	～	70	V
VIN-SOURCE	VIN_SOURCE	-0.3	～	70	V
OUT/GND(※1)	OUT	-2	～	70	V
GATE-SOURCE	GATE_SOURCE	-0.3	～	15	V
IDET-GND (※1)	IDET	-0.3	～	5.5	V

※1 VINに負電圧印加時を除く
※1 Except when a negative voltage is applied to the VIN.

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	Pd	1.08			W
接合部温度 Junction temperature	Tj	-40	～	150	℃
保存温度 Storage temperature	Tstg	-55	～	150	℃

1-3.熱定格(熱抵抗)
Thermal Ratings (Thermal Resistance)

項目 Item	記号 Symbol	規格値 Value	単位 Unit
熱抵抗 ※2 Thermal Resistance	Rth (j-a)	115	℃/W
	Rth (j-c)	30	℃/W

※2 4-layer Board
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

2.推奨動作条件
Recommended operating conditions

項目 Item	記号 Symbol	推奨値 Value	単位 Unit
VIN/SOURCE-GND	VIN/SOURCE	4.5 ※3 ～ 65	V
OUT-GND	OUT	−0.3 ※3 ～ 65	V
接合部温度 Junction temperature	Tj	−40 ～ 125	℃

※3 VINに負電圧印加時を除く
※3 Except when a negative voltage is applied to the VIN.

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

記号 Symbol	項目 Item	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
VIN端子						
Vop	動作可能電圧 Operating Supply Voltage		4.5	–	65	V
Vcp_stt	チャージポンプ供給開始電圧 Supply start voltage of Charge pump		–	3.0	4.5	V
Vcp_stp	チャージポンプ供給停止電圧 Supply stop voltage of Charge pump		–	2.5	4	V
Iq	シャットダウン時動作電流 Shutdown Supply current	EN=0V	1	5	10	uA
Iop	動作時消費電流 Operating quientscent current		100	200	280	uA
EN端子						
Venst	昇圧回路動作開始閾値 Charge pump start threshold voltage		0.9	1.5	2.1	V
Vensp	昇圧回路動作停止閾値 Charge pump start threshold voltage		0.6	1.0	1.4	V
IEN	EN端子放電電流 EN pin sink current	EN=0V	0.1	0.4	1.0	uA
GATE端子						
Vgate	昇圧電圧 Charge pump voltage		10	12.5	15	V
Igso1	ソース電流1 Charge pump source current 1	Δvgate=0V	45	75	105	uA
Igso2	ソース電流2 Charge pump source current 2	Δvgate=5V	30	50	70	uA
Igsi1	逆電流保護時シンク電流 Gate sink current (reverse current protection)	VIN-OUT=0.5⇒-0.1V	0.4	0.7	1.0	A
Trevoff	逆電流保護時OFF時間 Turn-off Delay (reverse current protection)	VIN=12V, VIN-OUT=0.5⇒-1V Δvgate<2V,Cgate=0pF	–	200	300	ns
Igsi2	EN停止時シンク電流 Gate sink current (EN stop)	EN=5⇒0V	0.06	0.12	0.18	A
Tenoff	EN停止時OFF時間 Turn-off Delay (EN stop)	VIN=12V,EN=3⇒0V, Δvgate<2V,Cgate=0pF	–	50	100	ns
Tenon	EN起動時ON時間 Turn-on Delay(EN start)	VIN=12V, OUT=0V, EN=0V⇒3VΔvgate>0.5V, Cgate=0pF	–	12	25	us

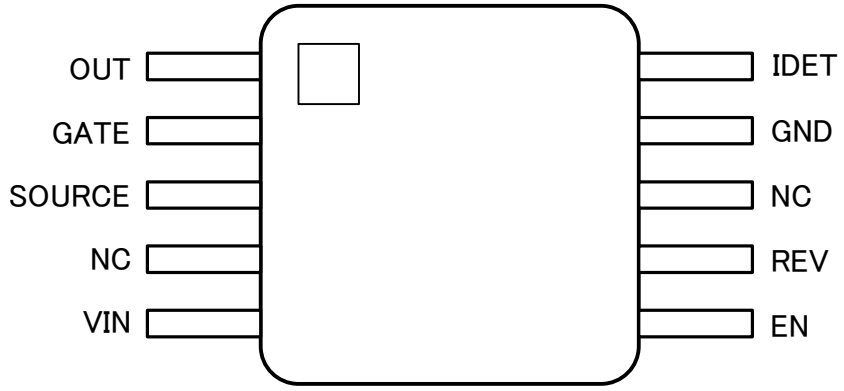
特に指定なき場合はVIN=12V,Tj=25℃
VIN=12V,Tj=25℃ unless otherwise specified

記号 Symbol	項目 Item	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
SOURCE端子						
Isq	シャットダウン電流 Shutdown current	VIN=SOURCE=12V EN=0V	–	0	1	uA
OUT端子						
Ioq	シャットダウン電流 Shutdown current	VIN=OUT=12V EN=0V	–	0	1	uA
Ir	逆接続時電流 Reverse connection current	VIN=−12V OUT=12V	–	0	1	uA
Vrev	逆電流保護閾値 Reverse current protection threshold voltage	VIN−OUT	−25	−13	−2	mV
IDET端子						
Idet_Si1	順電圧時シンク電流1 Sink current of regular voltage 1	VIN=12V OUT=11.5V, IDET=4V	80	110	140	uA
Idet_Si2	順電圧時シンク電流2 Sink current of regular voltage 2	VIN=12V OUT=11.9V, IDET=4V	5	25	45	uA
Idet_So1	逆電圧時ソース電流1 Source current of reverse voltage 1	VIN=12V OUT=12.1V, IDET=0V	5	25	45	uA
Idet_So2	逆電圧時ソース電流2 Source current of reverse voltage 1	VIN=12V OUT=12.5V, IDET=0V	70	100	130	uA
gm	電流増幅率 Current transconductance	VIN−OUT=−0.1～0.1V	180	220	260	uA/V
REV端子						
Vrevst	逆電流保護動作開始電圧 Reverse current protection start voltage		0.9	1.5	2.1	V
Vrevsp	逆電流保護動作停止電圧 Reverse current protection stop voltage		0.6	1.0	1.4	V
Irev	REV端子放電電流 REV pin sink current	EN=0V	0.1	0.4	1.0	uA

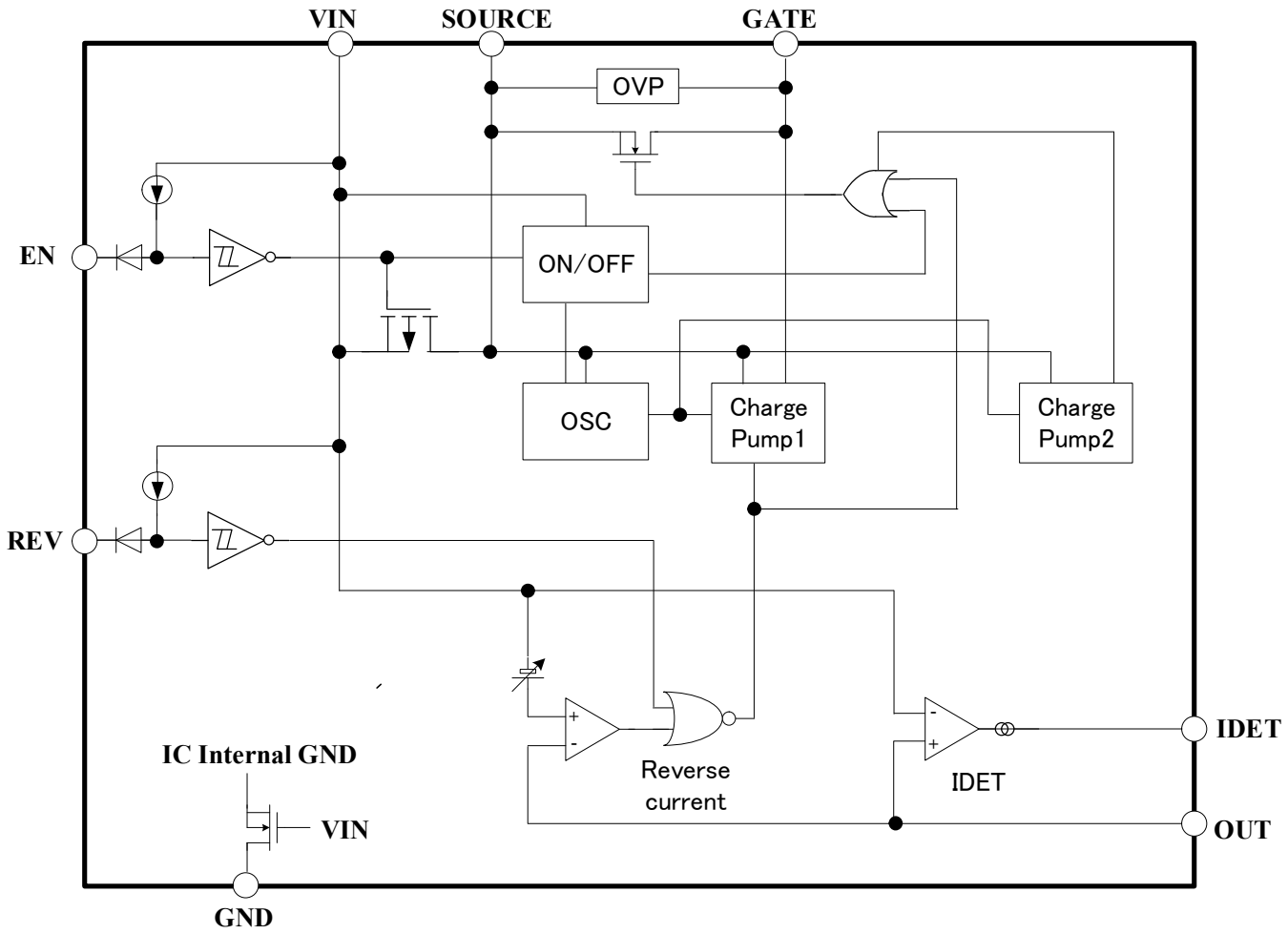
4.端子機能説明
Pin Function

端子番号 PIN No.	記号 symbol	機能 function
1	OUT	出力端子 Output Terminal
2	GATE	外部MOSFETゲート接続端子 External MOSFET GateTerminal
3	SOURCE	外部MOSFETソース接続端子 External MOSFET SourceTerminal
4	NC	Non connection
5	VIN	電源供給端子 Power supply Terminal
6	EN	スタンバイ信号入力端子 Stand-by signal input Terminal
7	REV	逆電流保護切替端子 Reverse current protection changing Terminal
8	NC	Non connection
9	GND	GND端子 GND Terminal
10	IDET	外部MOSFET電位差出力端子 External MOSFET VDS outputTerminal

5.端子配置
Pin configuration



6.ブロック図
Block Diagram

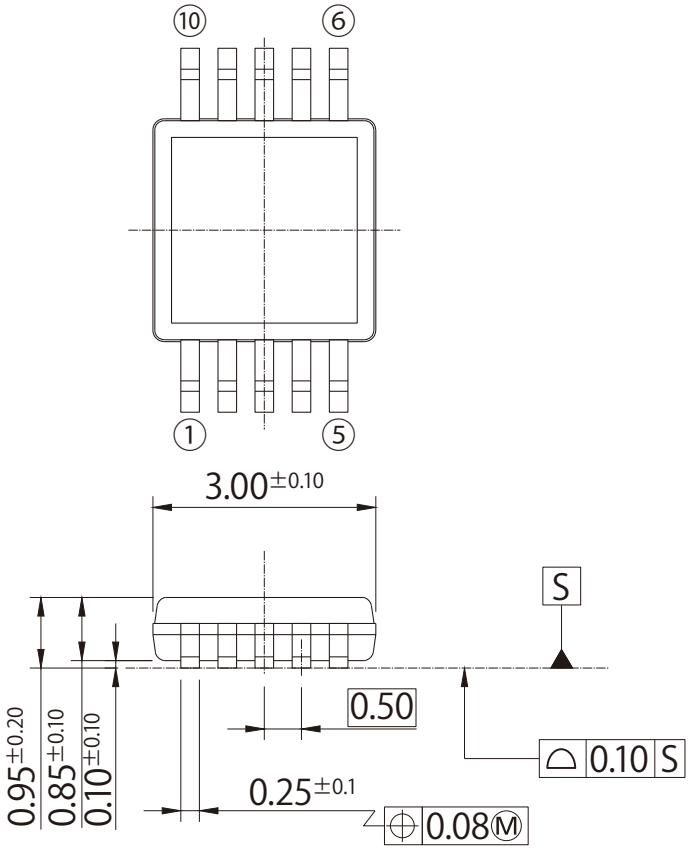


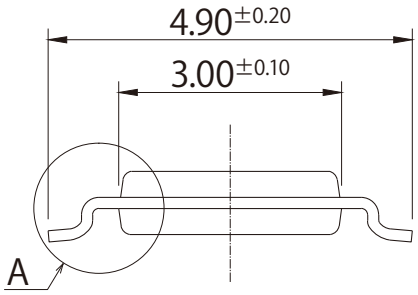
Package Outline-Dimensions

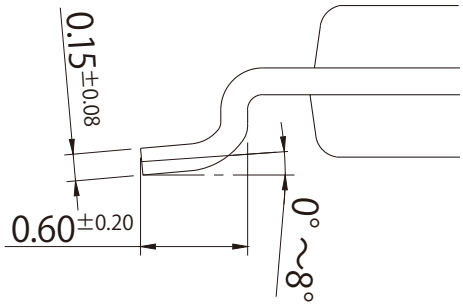
unit : mm

L10

JEDEC Code	–
JEITA Code	–
House Name	TSSOP10







Detail A

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ShinDengen

Notes

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