

RAJ2800034H12HPF

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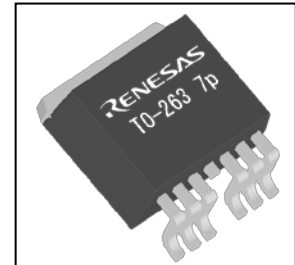
Intelligent Power Device for automotive application

1. Overview

1.1 Description

Family:

RAJ280003 is 2.5mohm single channel Intelligent Power Devices (IPD) embedded in TO263-7 package. It is N-channel high-side switches with charge pump, diagnostic feedback with proportional load current sense and embedded protection function. Family includes up to 4 devices depending on on-state resistance, input interface combination between current driven and voltage driven.



Scalability:

Variety of on-state resistance combined with standardized package on pin-out give user high flexibility for unit design depending on target load.

Robustness:

Because of advanced protection method, RAJ280003 achieves high robustness against long term and repetitive short circuit condition.

1.2 Features

- Built-in charge pump
- 3.3V compatible logic interface
- Low standby current
- Short circuit protection
 - Shutdown by over current detection
 - Power limitation protection by over load detection (Power limitation: current limitation with delta Tch control)
 - Shutdown by absolute channel over temperature detection
- Built-in diagnostic function
 - Proportional load current sensing
 - Defined fault signal in case of abnormal load condition
- Reverse battery protection by self-turn ON
- Loss of ground protection
- Under voltage lock out
- Active clamp operation at inductive load switch off
- AEC Qualified
- RoHS compliant

1.3 Product summary

| Parameter | Symbol | Values |
|---|--------------|--------------------------|
| Operating Voltage | V_{CC} | 4.5V ~ 28V |
| Under voltage shutdown | $V_{CC}(Uv)$ | Max. 4.5V |
| On-state resistance at 25°C | R_{on} | Max. 3mohm, Typ. 2.5mohm |
| Inductive load switch-off energy dissipation single pulse | EAS | 700mJ |
| Inductive load switch-off energy dissipation repetitive pulse | EAR | 360mJ |
| Minimum Over current detection current | IL(SC) | 120A |

1.4 Application

- All types of resistive, inductive and capacitive loads, especially for high current loads.
- Power management application such as Power distribution switches, Heaters, glow plugs, etc

NOTE: The information contained in this document is the one that was obtained when the document was issued, and may be subject to change.

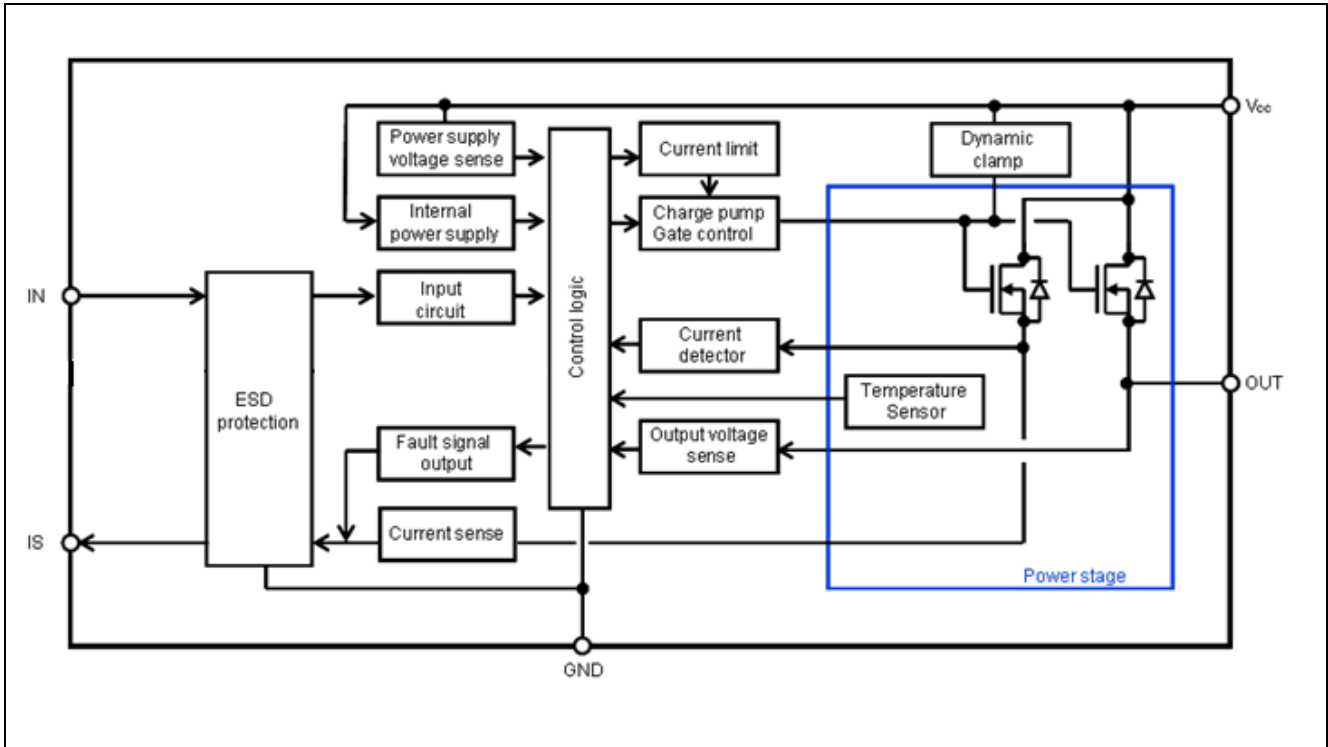
2. Ordering Information

| Part No. | Lead plating | Packing | Package |
|------------------|---------------|-------------------|---------|
| RAJ2800034H12HPF | Pure Matte Sn | Tape 800 pcs/reel | TO263-7 |

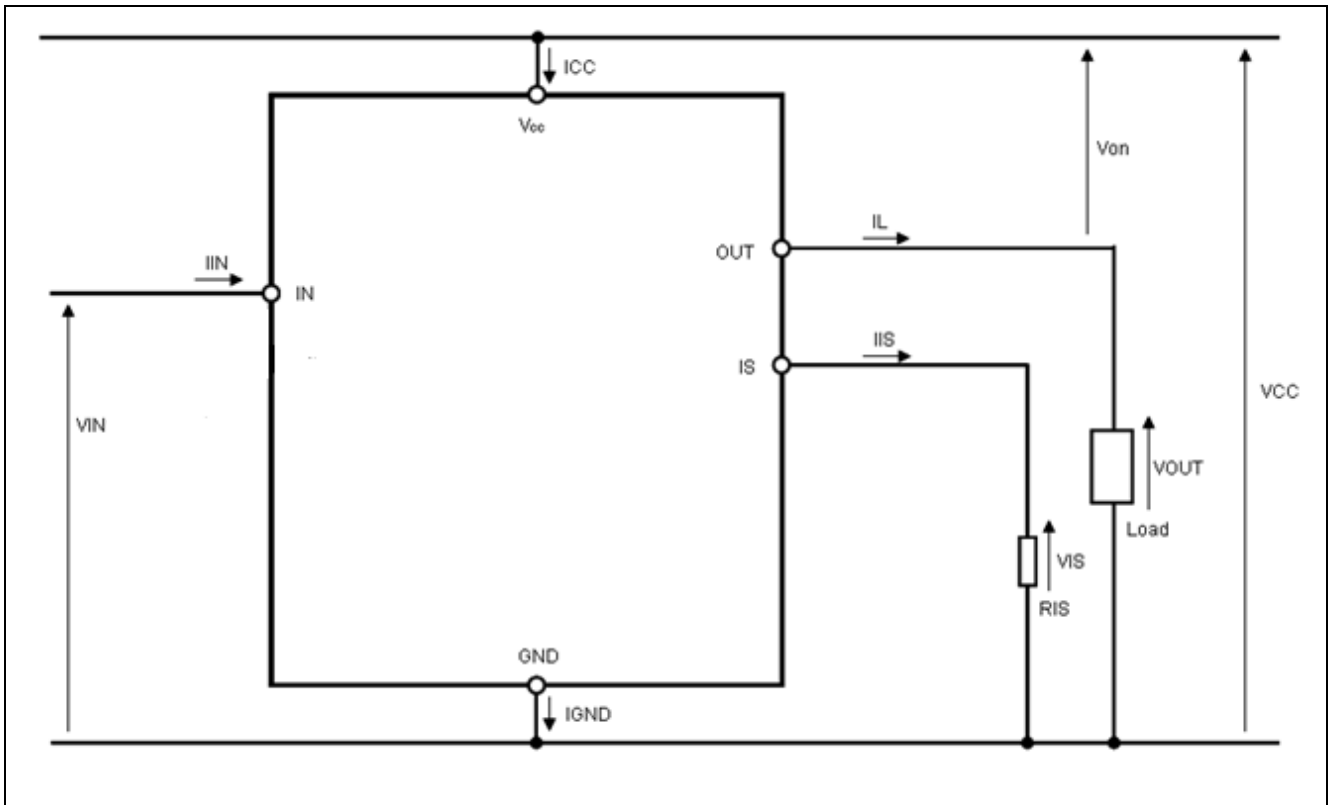
3. Specification

3.1 Block Diagram

3.1.1 Nch High-side Single Channel Device Block Diagram



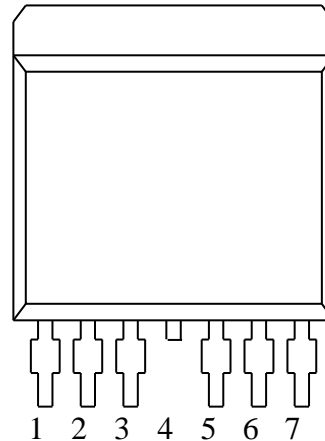
Voltage and Current Definition



3.2 Pin Configuration

3.2.1 TO263-7 Pin Configuration

| Pin No. | Terminal Name |
|---------|---------------|
| 1 | GND |
| 2 | IN |
| 3 | IS |
| 4, Tab | VCC |
| 5 | OUT |
| 6 | OUT |
| 7 | OUT |



Pin function

| Terminal Name | Pin function | Recommended connection |
|---------------|---|---|
| GND | Ground connection | Connected to GND through a 100 Ohm resistor |
| IN | Input signal for channel activation Active high | Connected to MCU port through a 2k-50K serial resistor |
| IS | Current sense and Diagnosis output signal | Connected to GND through a 1K-6K resistor ¹⁾ |
| OUT | Protected high-side power output | Connected to load with 50-100nf capacitor in parallel |
| VCC | Positive power supply for logic supply as well as output power supply | Connected to battery voltage with 100nf capacitor in parallel |

1) A resistor is necessary to satisfy standby current characteristics

3.3 Absolute Maximum Ratings

Stress values that exceed those listed here may cause permanent damage to the device. Exposure to absolute maximum rating condition for extended periods may affect device reliability.

Integrated protection functions are designed to prevent IC destruction under fault condition described in the data sheet. Fault conditions are considered as out of normal operation. Protection function shall not be intended to be used for continuous repetitive operation.

Ta=25degreeC, unless other specified

| Parameter | Symbol | Rating | Unit | Test Condition | | |
|---|------------------------|----------------------|---------|--|---|----------|
| Vcc Voltage | V _{CC} | 28 | V | | | |
| Vcc Voltage at reverse battery condition | -V _{CC} | -16 | V | At nominal load current, t<2min, R _{IN} =2kohm, R _{IS} =1kohm, R _{GND} =100ohm | | |
| Vcc voltage under Load Dump condition | V _{load dump} | 42 | V | R _I =1ohm, R _L =Nominal load, R _{IS} =1kohm, R _{IN} =2kohm, R _{GND} =100ohm, t _d =400ms, | | |
| Load Current | I _L | Self limited | A | | | |
| Total power dissipation for whole device (DC) | P _D | 3.10 | W | Ta=85degreeC, Device on 50mmx50mmx1.5mm epoxy PCB FR4 with 6 cm ² of 70 um copper area | | |
| Voltage at IN pin | V _{IN} | -2 ~ 16 | V | DC R _{IN} =2kohm | | |
| | | -16 | | At reverse battery condition, t<2min, R _{IN} =2kohm | | |
| IN pin current | I _{IN} | 10 | mA | DC | | |
| Voltage at IS pin | V _{IS} | -2 ~ V _{CC} | V | DC R _{IS} =1kohm | | |
| | | -16 | V | At reverse battery condition, t<2min, R _L = Nominal load, R _{IS} =1kohm | | |
| IS Reverse current at reverse battery condition | I _{IS(Rev)} | -30 | mA | At reverse battery condition, t<2min, R _L = Nominal load | | |
| Channel Temperature | T _{ch} | -40 to +150 | degreeC | | | |
| Storage Temperature | T _{stg} | -55 to +150 | degreeC | | | |
| ESD susceptibility | V _{ESD} | 2000 | V | HBM | AEC-Q100-002 std. R=1.5kohm, C=100pF | All pin |
| | | 4000 | | | IEC61000-4-2 std. R=330ohm, C=150pF, 100nF at VCC and OUT | VCC, OUT |
| | | 200 | V | MM | AEC-Q100-003 std. R=0ohm, C=200pF | |
| Inductive load switch-off energy dissipation single pulse | EAS | 700 | mJ | VCC=13.5V, T _{ch,start} <150degreeC, R _L =Nominal load, Refer to 3.6.7 | | |
| Inductive load switch-off energy dissipation repetitive pulse | EAR | 360 | mJ | VCC=13.5V, T _{ch,start} =85degreeC, R _L =Nominal load, Refer to 3.6.7 | | |

Remark) All voltages refer to ground pin of the device

3.4 Thermal Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------|-----------|-----|------|-----|---------------|--|
| Thermal characteristics | Rth(ch-a) | | 21 | | degree C/W | According to JEDEC JESD51-2, -5, -7 on FR4 2s2p board |
| | Rth(ch-c) | | 0.32 | | degree C/W | |

3.5 Electrical Characteristics

Operation function

Tch=-40 to 150degreeC, Vcc=7 to 18V, unless other wise specified

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition | |
|---------------------------------------|------------------------|-----|------|------|------|---|---|
| Operating Voltage | V _{CC} | 4.5 | | 28 | V | V _{IN} =4.5V, RL=Nominal load, Refer to 3.6.7 | |
| Operating current | I _{GND} | | 2.5 | 5 | mA | V _{IN} =4.5V | |
| Output Leakage current | I _{L(off)} | | | 0.5 | μA | Tch=25°C | VCC=13.5V, VIN=0V, VIS=0V, VOUT=0V, VGND=0V |
| | | | | 13 | | Tch=-40~125°C | |
| Standby current | I _{CC(off)} | | | 0.5 | μA | Tch=25°C | VCC=13.5V, VIN=0V, VIS=0V, VOUT=0V, VGND=0V |
| | | | | 1.5 | | Tch=-40~85°C | |
| On-state resistance | R _{on} | | 2.5 | 3 | mohm | Tch=25°C | IL= Nominal current, Refer to 3.6.7, VIN>2.5V |
| | | | | 5.6 | | Tch=150°C | |
| Low level IN pin voltage | V _{IL} | | | 0.8 | V | | |
| High level IN pin voltage | V _{IH} | 2.5 | | | V | | |
| Low level IN pin current | I _{IL} | 2 | | 30 | μA | V _{IN} =0.8V | |
| High level IN pin current | I _{IH} | 2 | | 30 | μA | V _{IN} =2.5V | |
| Clamping IN pin voltage ¹⁾ | V _{ZIN} | 5 | 6 | | V | | |
| Operating current at cranking | I _{GND(cr)} | | 0.4 | | mA | VCC=3.2V, RGND=100ohm, Pulse duration=24ms, IL= Nominal current, Refer to 3.6.7 | |
| Cranking mode voltage | V _{CC(cr)} | | | 4.5 | V | | |
| On-state resistance at cranking | R _{on(cr)} | | | 12 | mohm | VCC=3.2V, RGND=100ohm, Tch=25°C, Pulse duration=24ms, IL= Nominal current, Refer to 3.6.7 | |
| Operating Voltage range for cranking | V _{CC(Uv,cr)} | 3.2 | | | | RGND=100ohm, Tch=25°C, Pulse duration=24ms, IL=Nominal current Refer to 3.6.7 | |
| Under voltage shutdown | V _{CC(Uv)} | | | 4.5 | V | | |
| Under voltage restart | V _{CC(Cpr)} | | | 4.5 | V | | |
| Turn on time | ton | | 500 | 1000 | μs | VCC=13.5V, RL=Nominal load, Refer to 3.6.7 | |
| Turn on delay time | td(on) | | 150 | 300 | μs | | |
| Turn off time | toff | | 350 | 900 | μs | | |
| Turn off delay time | td(off) | | 200 | 500 | μs | | |
| Slew rate on | dV/dton | | 0.05 | 0.1 | V/μs | | |
| Slew rate off | -dV/dtoff | | 0.1 | 0.2 | V/μs | | |
| Turn on energy loss ¹⁾ | E _{on} | | 18 | | mJ | VCC=13.5V, Tch=25°C, RL=Nominal load, Refer to 3.6.7 | |
| Turn off energy loss ¹⁾ | E _{off} | | 10 | | mJ | | |
| Driving capability ¹⁾ | Dr(cap) | 92 | | | mohm | Tch=25°C, VCC=8~16V | |
| | | 118 | | | | Tch=105°C, VCC=8~16V | |

Remark) All voltages refer to ground pin of the device

1) not subjected production test, guaranteed by design

Protection function

Tch=-40 to 150degreeC, Vcc=7 to 18V, unless other wise specified

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---------------|-----|-----|-----|------|------------------------------|
| Over current detection current | IL(SC) | 120 | 180 | | A | VCC=13.5V, Von=5V, Tch=25°C |
| Current limitation under power limitation toggling | IL(CL) | | 60 | | A | VCC=13.5V |
| Sense current output trigger threshold | Von(CL1) | | 1.0 | | V | VCC=13.5V |
| Current limitation trigger threshold during on-state | Von(CL2) | | 0.3 | | V | VCC=13.5V |
| Turn-on check delay after input signal positive slope | td(CL) | | 1.6 | | ms | VCC=13.5V |
| Absolute thermal shutdown temperature | aTth | 150 | | | °C | |
| Power limitation thermal shutdown temperature | dTth | | 40 | | °C | |
| Power limitation restart temperature | dTth, restart | | 19 | | °C | |
| Output clamp at inductive load switch off | Von,clamp | 30 | | 40 | V | VCC=13.5V, IL=40mA, Tch=25°C |
| Output current while GND disconnection | IL(GND) | | | 1 | mA | IIN=0A, IGND=0A, IIS=0A |
| On-state resistance at reverse battery condition | Ron(rev) | | | 3.8 | mohm | Tch=25°C |
| | | | | 7.0 | | Tch=150°C |
| Gnd current at reverse battery condition | IGND(rev) | | -2 | | mA | VCC=-16V, Tch=25 °C |

Remark) All voltages refer to ground pin of the device

Diagnosis function

Tch=-40 to 150degreeC, Vcc=7 to 18V, VIN=4.5V, unless otherwise specified

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|-------|-------|-------|------|--|
| Current sense ratio | KILIS | 21000 | 40000 | 64000 | | IL= 13.5 A |
| | | 24000 | 40000 | 60000 | | IL= 27 A |
| Current sense drift depend on temperature | dKILIS | -20 | | 20 | % | VCC=13.5V, Tch,start=25°C, IL =27A, Refer to 3.6.7 |
| Sense current offset current | lis,offset | | | 50 | µA | IL=0A, Tch =25deg |
| Sense voltage under fault condition | Vis,fault | 4.5 | 5.6 | 7.0 | V | RIS=1kohm |
| Load current to output sense current | IL,min | 2.5 | | | A | VCC=13.5V, Tch=25degreeC, IIS>1uA |
| Sense current settling time after input signal positive slope | tsis(on) | | 500 | 1100 | µs | VCC=13.5V, VIN=0V to 4.5V, IL/IIS=KILIS, RL=Nominal load, Refer to 3.6.7 |
| Sense current settling time after input signal negative slope ¹⁾ | tsis(off) | | | 10 | µs | VIN=4.5V to 0V |
| Sense current settling time during on-state ¹⁾ | tsis(LC) | | | 50 | µs | RL= 2 * Nominal load to Nominal load, Refer to 3.6.7 |
| Fault signal delay after over current detection ¹⁾ | tdsc(fault) | | | 10 | µs | VIN=0V to 4.5V, IL=IL(SC) |
| Fault signal delay after power limitation valid ¹⁾ | tdpl(fault) | | | 10 | µs | Von>Von(CL1) |
| Fault signal delay after power limitation invalid ¹⁾ | tdpl(off) | | | 30 | µs | Von<Von(CL1) |
| Fault signal delay after absolute thermal shutdown ¹⁾ | tdot(fault) | | | 10 | µs | VIS→VIS,fault |
| Fault signal delay after input negative slope ¹⁾ | tdoff(fault) | | | 10 | µs | VIN=4.5V to 0V |

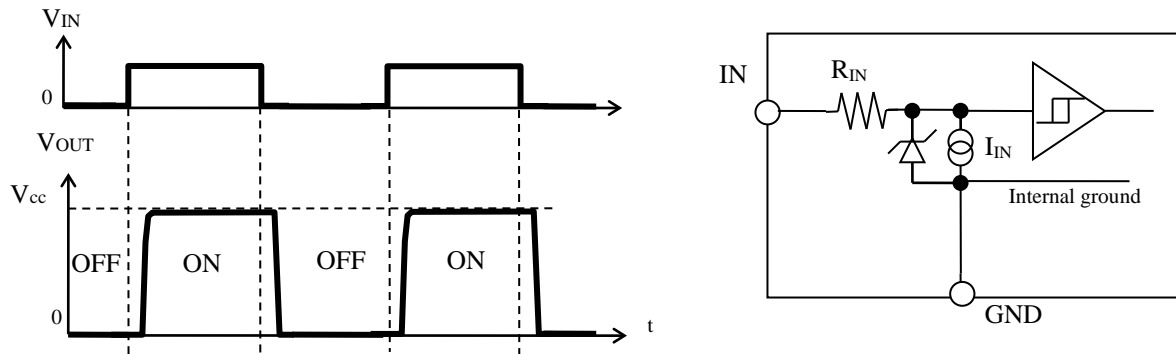
Remark) All voltages refer to ground pin of the device

1) not subjected production test, guaranteed by design

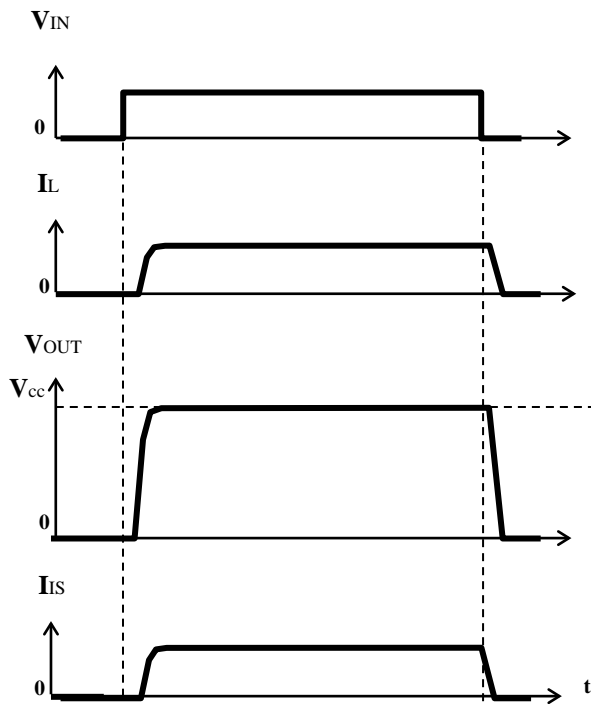
3.6 Feature Description

3.6.1 Driving Circuit

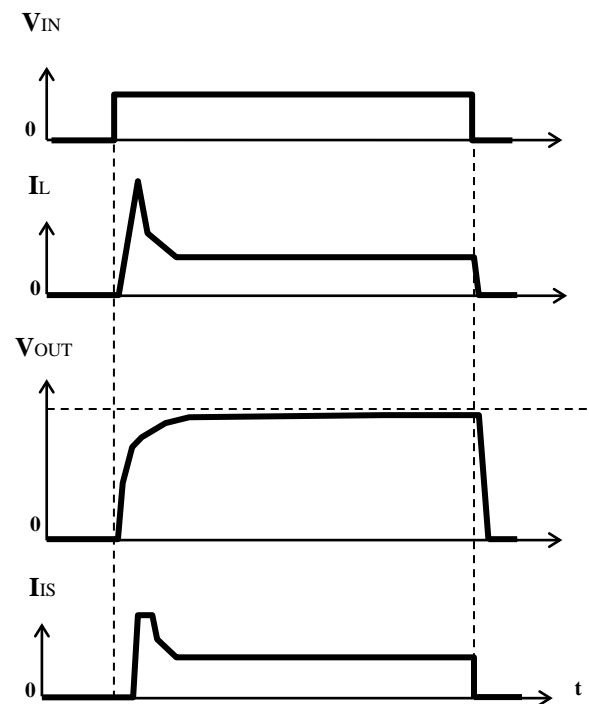
The high-side output is turned on, if the input pin is over V_{IH} . The high-side output is turned off, if the input pin is open or the input pin is below V_{IL} . Threshold is designed between V_{IH} min and V_{IL} max with hysteresis. IN terminal is pulled down with constant current source.



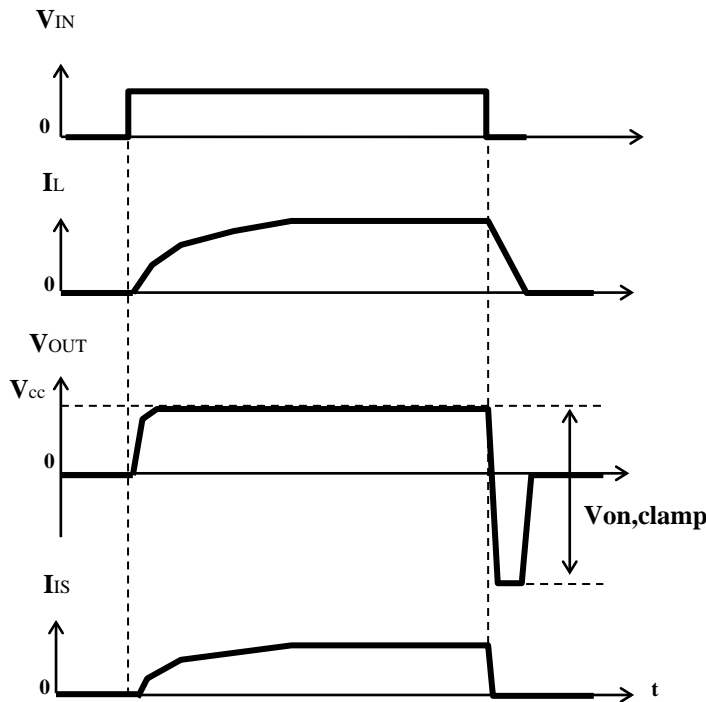
Switching a resistive load



switching lamps



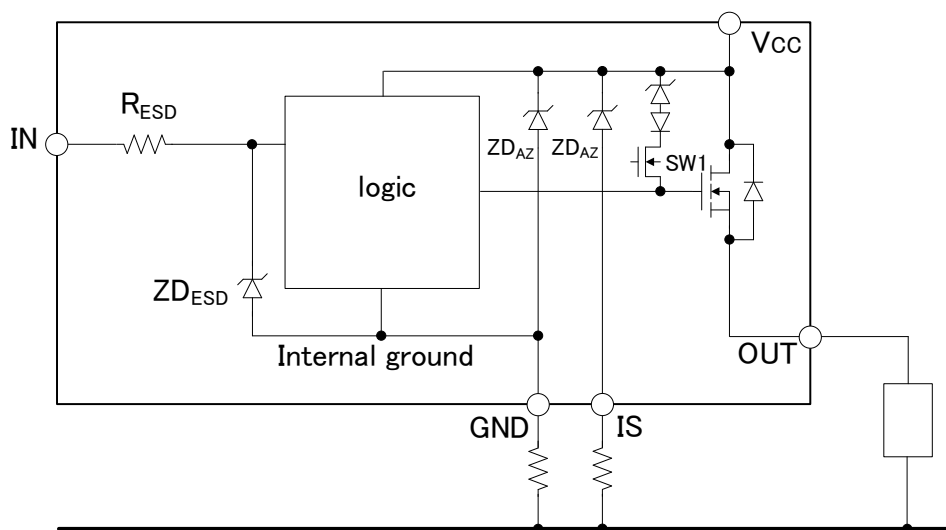
Switching an inductive load



The dynamic clamp circuit works only when the inductive load is switched off. When the inductive load is switched off, the voltage of OUT falls below 0V. The gate voltage of SW1 is then nearly equal to GND. Next, the voltage at the source of SW1 (= gate of output MOS) falls below the GND voltage.

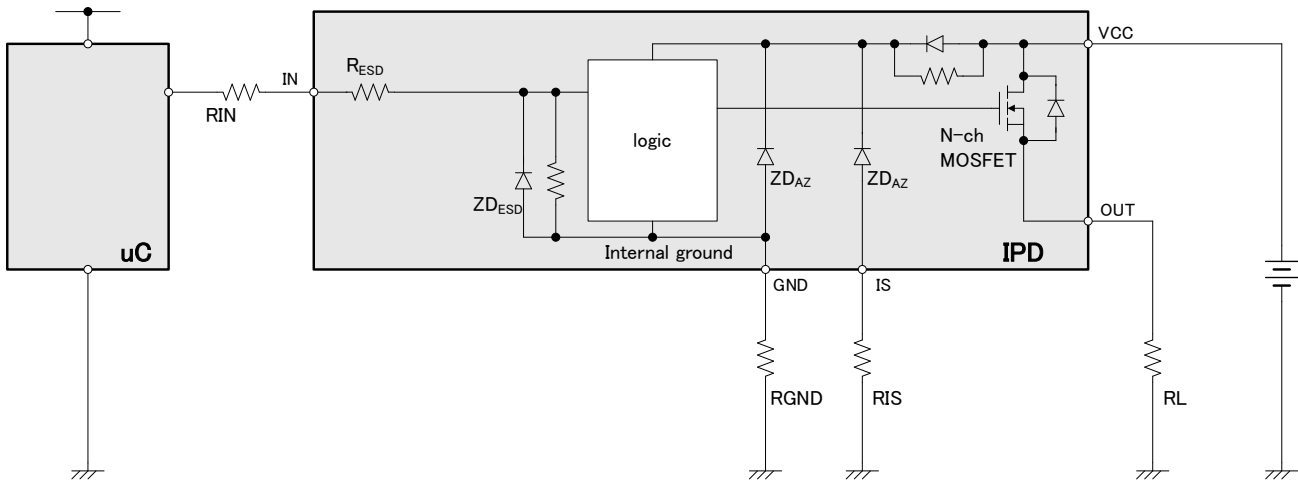
SW1 is turned on, and the clamp diode is connected to the gate of the output MOS, activating the dynamic clamp circuit.

When the over-voltage is applied to VCC, the gate voltage and source voltage of SW1 are both nearly equal to GND. SW1 is not turned on, the clamp diode is not connected to the gate of the output MOS, and the dynamic clamp circuit is not activated.



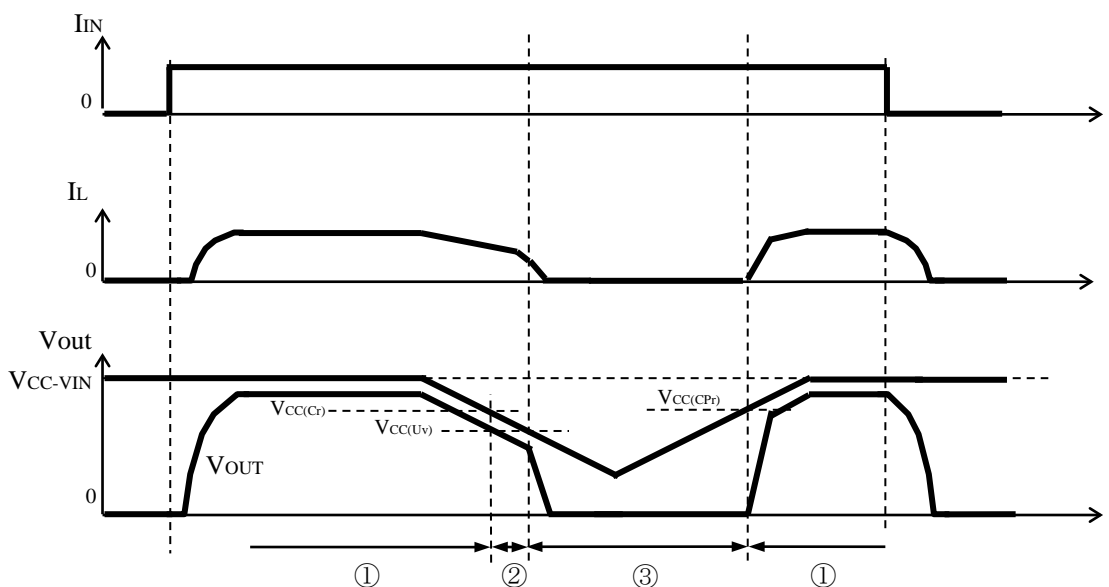
3.6.2 Device behavior at over voltage condition

In case of supply voltage greater than V_{load} dump, logic part is clamped by ZD_{AZ} (35V min). And current through of logic part is limited by external ground resistor. In addition, the power transistor switches off in order to protect the load from over voltage. Permanent supply voltage than V_{load} dump must not be applied to VCC.



3.6.3 Device behavior at low voltage condition

If the voltage supply ($V_{CC} - V_{IN}$) goes down under $V_{CC}(Uv)$, the device outputs shuts down. If voltage supply ($V_{CC} - V_{IN}$) increase over $V_{CC}(Cpr)$, the device outputs turns back on automatically. The device keeps off state after under voltage shutdown. The IS output is cleared during off-state.



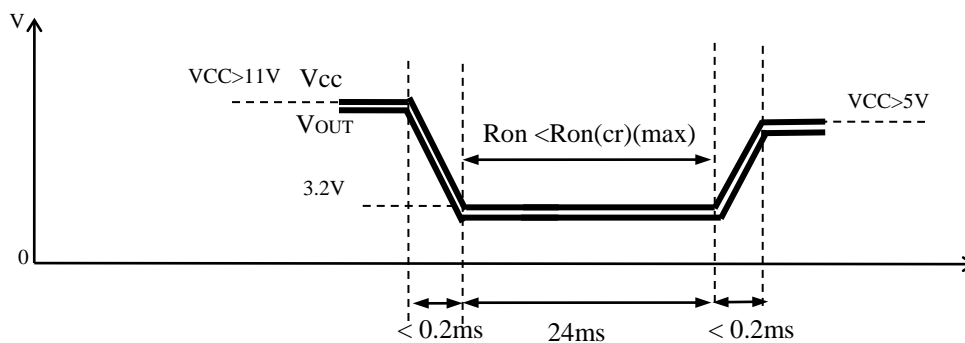
- ① : Normal operating mode
- ② : Cranking mode
- ③ : Under voltage mode

Availability of each function in each mode

○: Enable, ×: Disable

| | Function | ① | ② | ③ | Note |
|------------------|------------------|---|------------------|---|---|
| Normal operation | Turn on | ○ | × | × | |
| Normal operation | Turn off | ○ | ○ | | |
| Normal operation | Keep on-state | ○ | ○ ^(*) | × | ^(*) Ron is defined as Ron(Cr). |
| Normal operation | KILIS function | ○ | × | × | In case of Von < Von(CL1) |
| Diagnosis | Von(CL1), td(CL) | ○ | × | × | Refer to 3.6.5 |
| Protection | IL(SC) | ○ | × | × | Refer to 3.6.5 |
| Protection | Von(CL2) | ○ | × | × | Refer to 3.6.5 |
| Protection | aTch | ○ | ○ | | Refer to 3.6.5 |
| Protection | dTch | ○ | × | × | Refer to 3.6.5 |
| Protection | Von(CL1) | × | ○ | ○ | Refer to 3.6.5 |

Definition of on-state resistance at cranking



3.6.4 Loss of Ground protection

In case of complete loss of the device ground connection, but connected load ground, the device securely changes to off if VIN was initially greater than VIH state or keeps off state if VIN was initially lower than VIL state.

In case of device loss of ground, IN terminal will/ could/ might be at VCC voltage?

3.6.5 Short circuit protection

Turn-on in an over load condition including short circuit condition

The device shuts down automatically when condition (a) or (c) is detected. The sense pin output Vis,fault. Shutdown is latched until the next reset via input pin. The device shuts down automatically when condition (b) is detected. The device restarts automatically in power limitation mode. The sense pin output Vis,fault when (d) is detected.

- (a) $IL > IL(SC)$
- (b) $\Delta T_{ch} > dT_{th}$
- (c) $T_{ch} > aT_{th}$
- (d) $V_{on} > V_{on}(CL1)$ after $t_d(CL)$

Over load condition including short circuit condition during on-state

The device runs automatically into power limitation mode when condition (e) is detected once after $V_{on} < V_{on}(CL2)$. The device shuts down automatically when condition (f) is detected. The device restarts automatically in power limitation mode. The sense pin output Vis,fault during power limitation mode. The device shuts down automatically when condition (g) or (h) is detected. The sense pin output Vis,fault. Shutdown is latched until the next reset via input pin.

- (e) $V_{on} > V_{on}(CL2)$
- (f) $\Delta T_{ch} > dT_{th}$
- (g) $T_{ch} > aT_{th}$
- (h) $IL > IL(SC)$

Power limitation control

Current limitation control with $IL(CL)$ when auto restart from ΔT_{ch} protection.

During toggling mode due to ΔT_{ch} protection, if $V_{on} > V_{on}(CL1)$ or if the current is limited to $IL(CL)$, the sense pin output Vis, fault. If $V_{on} < V_{on}(CL2)$ and if the short current is not high enough to reach $IL(CL)$ during toggling mode with ΔT_{ch} protection, then the sense pin outputs sense current at on-state and Vis,fault at off state.

delta Tch

Junction temperature differences between thermal sensors of power area.

3.6.6 Diagnostic signal

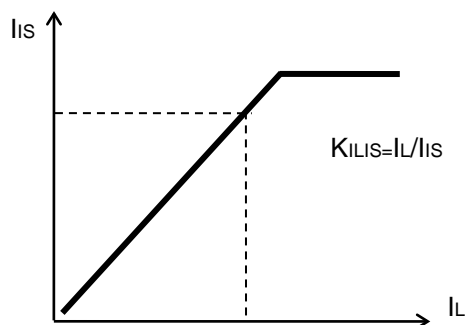
Truth table

| | Input | Output | Diagnostic output |
|---|-------|--------------------|---|
| Normal Operation | H | VCC | IIS = IL/KILIS |
| | L | L ¹⁾ | L ²⁾ |
| Shutdown by over current detection | H | L ¹⁾ | Vis,fault ³⁾ |
| | L | L ¹⁾ | L ²⁾ |
| Power limitation | H | VOUT ⁶⁾ | IIS = IL/KILIS in case of Von<Von(CL1) Vis,fault ⁴⁾ in case of Von>Von(CL1) |
| | | L ¹⁾ | Vis,fault ⁴⁾ |
| | L | L ¹⁾ | L ²⁾ |
| Shutdown by over absolute channel temperature detection | H | L ¹⁾ | Vis,fault ⁵⁾ |
| | L | L ¹⁾ | L ²⁾ |
| Short circuit to VCC | H | VCC | <IIS |
| | L | VOUT ⁷⁾ | L ²⁾ |

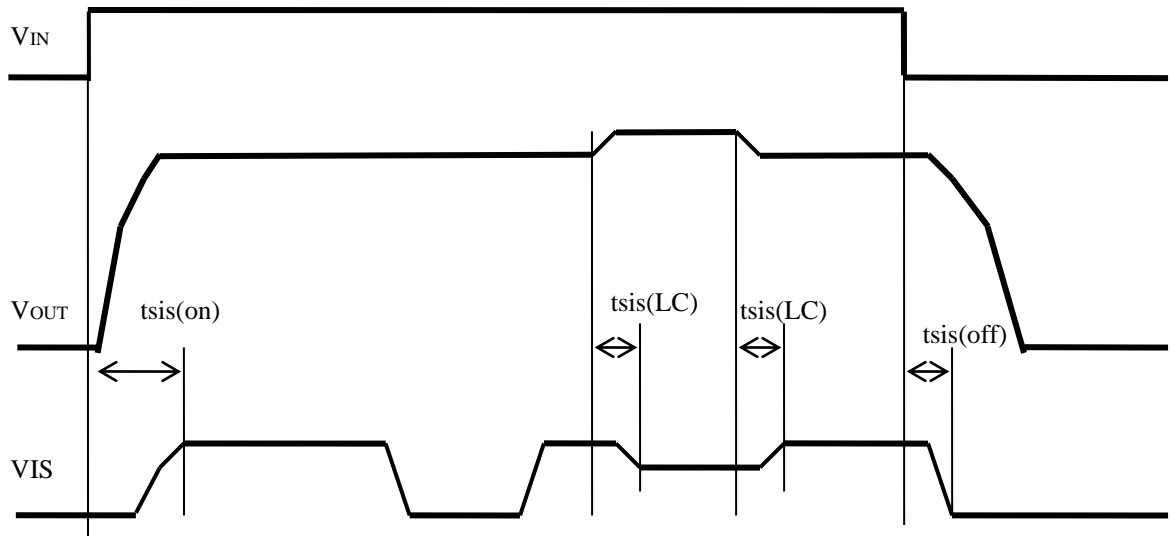
- 1) In case of OUT terminal is connected to GND via load.
- 2) In case of IS terminal is connected to GND via resistor.
- 3) IS terminal keeps Vis,fault as long as input signal activate after the over current detection.
- 4) IS terminal keeps Vis,fault during power limitation if Von>Von(CL1).
- 5) IS terminal keeps Vis,fault as long as input signal activate after over absolute channel temperature detection.
- 6) VOUT depends on the short circuit condition
- 7) VOUT depends on the ratio of VCC-OUT-GND resistive component.

Current sense output

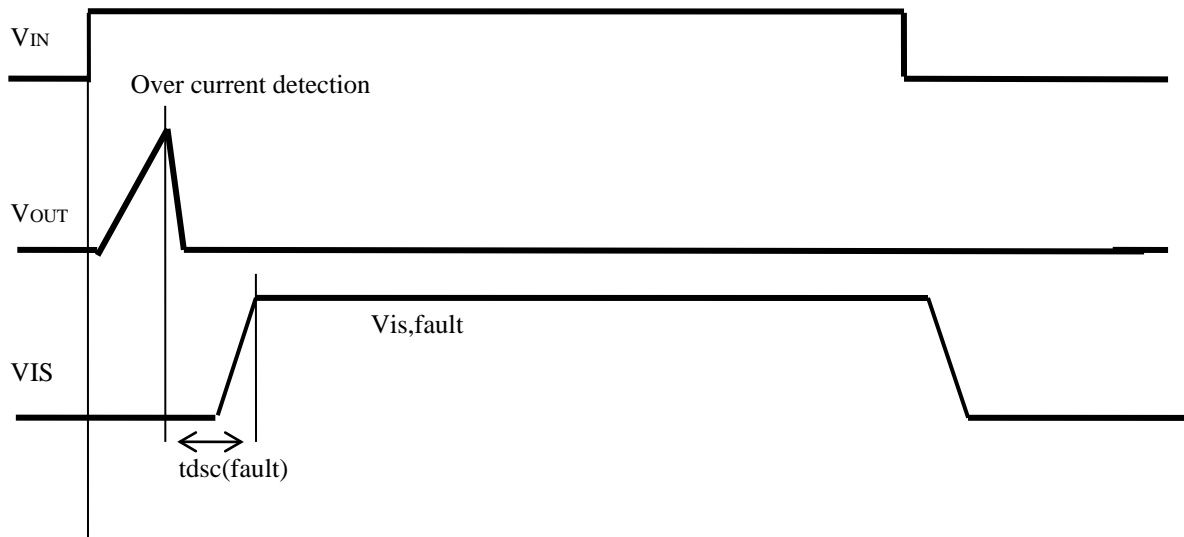
The device output analog feedback current proportional to output current from IS pin. In the case of much higher current than nominal load current, current sense output is saturated.



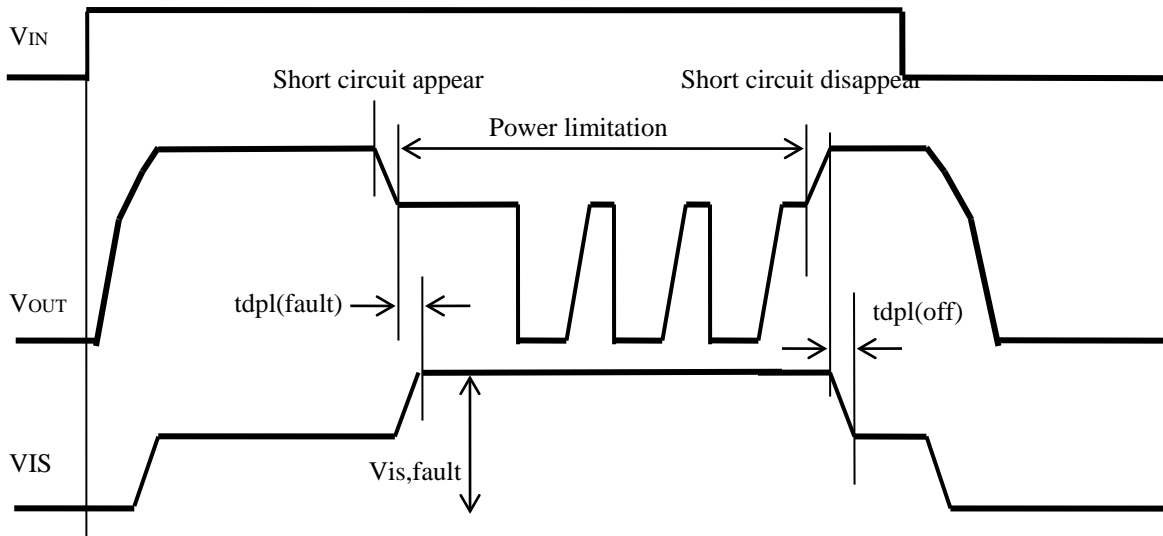
Sense voltage setting time



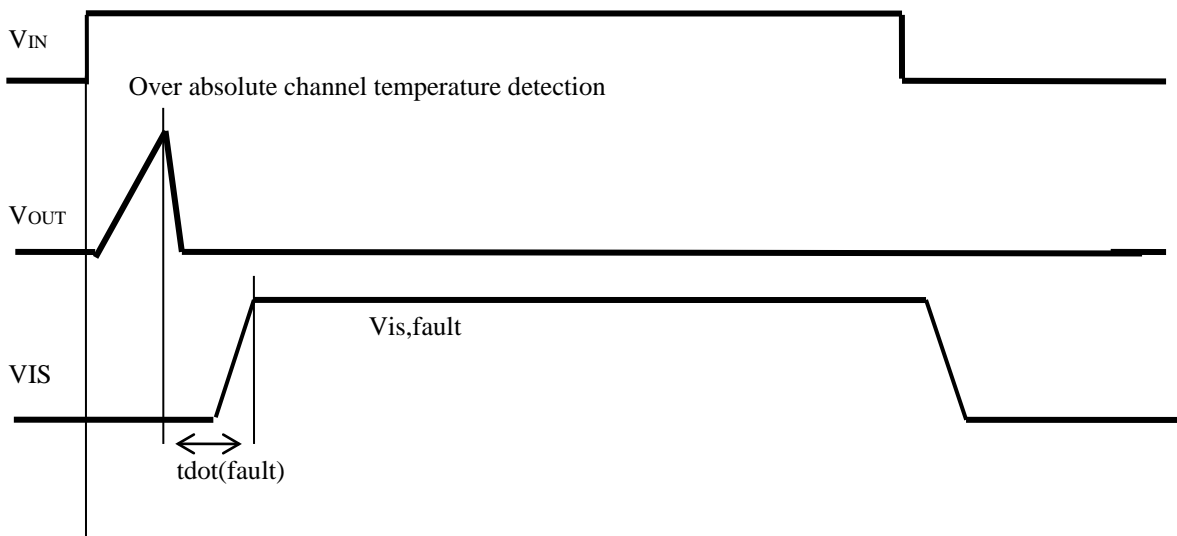
Fault signal delay time at over current detection



Fault signal delay time at power limitation



Fault signal delay time at over absolute channel temperature detection

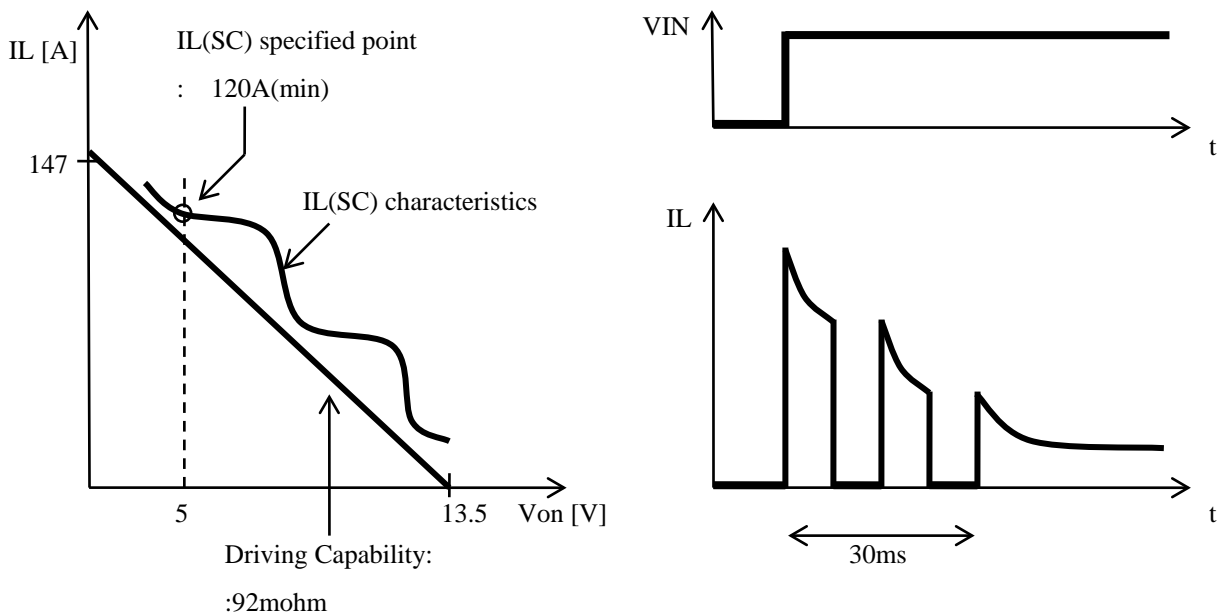


3.6.7 Nominal load and nominal current

| Parameter | Values | Condition |
|-----------------|--------|------------------------------|
| Nominal load | 0.6ohm | $T_j \leq 150^\circ\text{C}$ |
| Nominal current | 27A | $T_j \leq 150^\circ\text{C}$ |

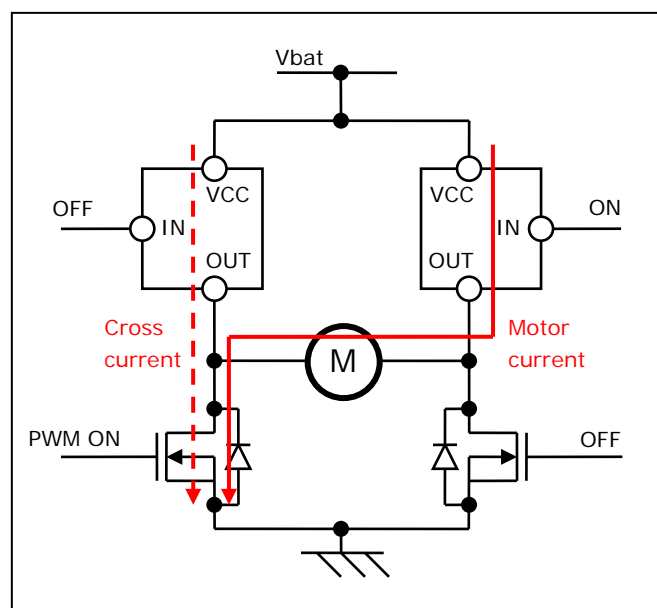
3.6.8 Driving Capability

Driving Capability is specified as load impedance. Over current detection characteristics is designed above Driving Capability characteristics. If estimated load impedance which comes from peak inrush current is lower than Driving Capability characteristics, this means, the device does not detect inrush current as over current and does not shutdown the output. Depend on the conditions, Power Limitation function may work during inrush current. If estimated load impedance which comes from peak inrush current is lower than Driving Capability characteristics, Power limitation disappear within 30ms. This parameter does not mean that the device can drive the resistive load up to Driving Capability characteristics.



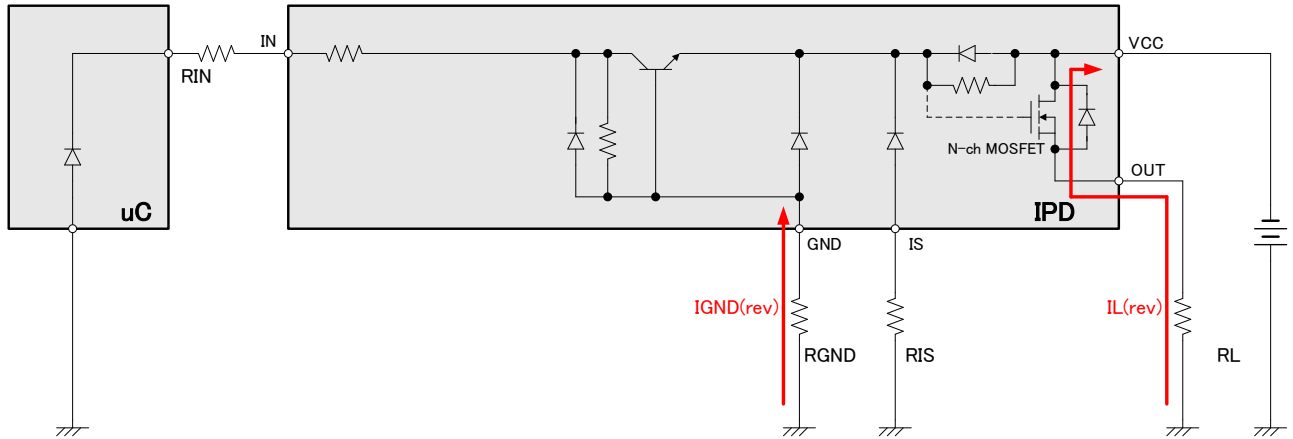
3.6.9 Cross current protection in case of H-bridge high side usage

In case of using High side driver in H-bridge circuit, High side driver protects High side driver itself and also low side driver from high power dissipation by cross current when low side driver switching on.



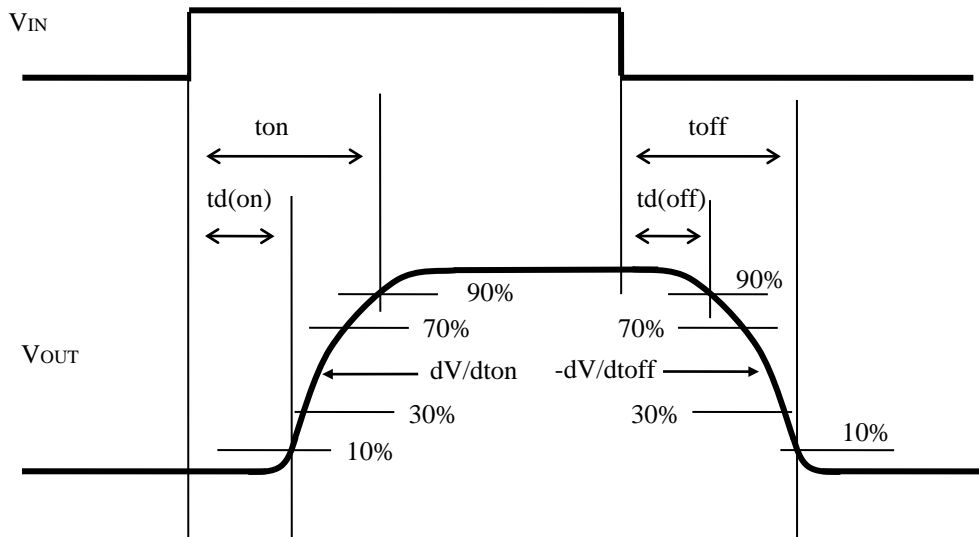
3.6.10 Reverse Battery Protection by turn on the output

In case of a reverse battery is applied to the device, the N-ch MOSFET will turn on only if reverse current flow from GND pin. The reverse current through the N-ch MOSFET has to be limited by the connected load. IGND(rev) is limited internally approx. 2mA even without external RGND. Reverse current flow from IN, IS should be limited by external component such as recommendation value in Pin function, refer 3.2 Pin configuration.



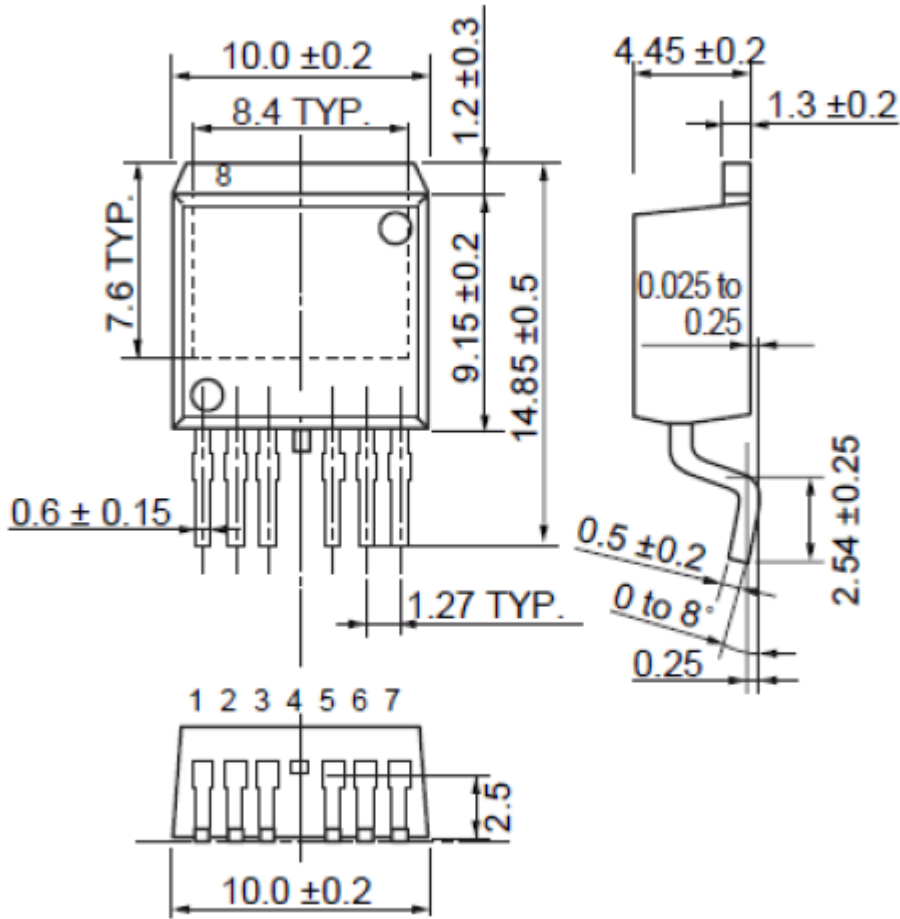
3.6.11 Measurement condition

Switching waveform of OUT terminal

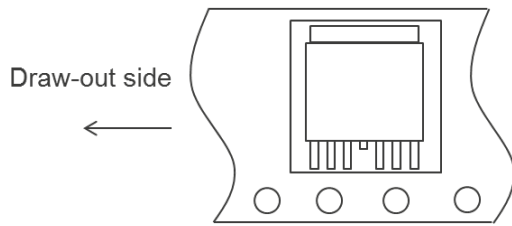


3.7 Package drawing

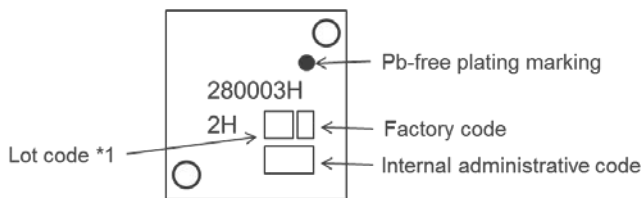
UNIT:mm



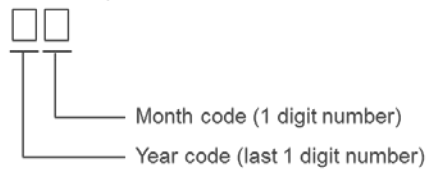
3.8 Taping information



3.9 Marking information

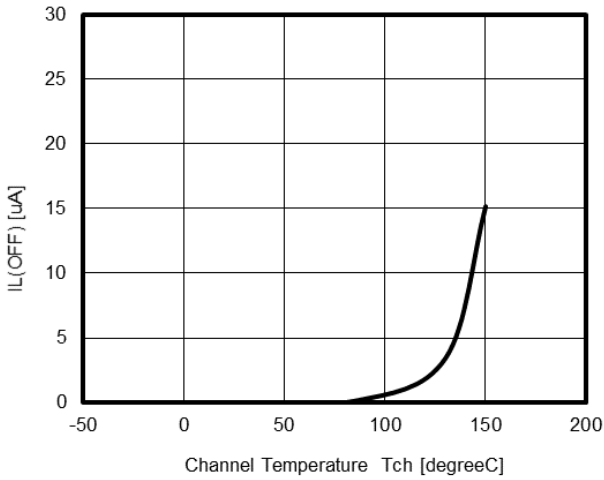


Note: *1. Composition of the lot code

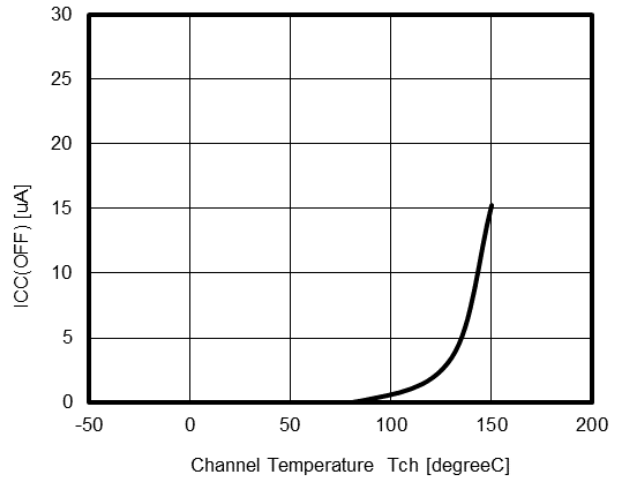


4 Typical characteristics

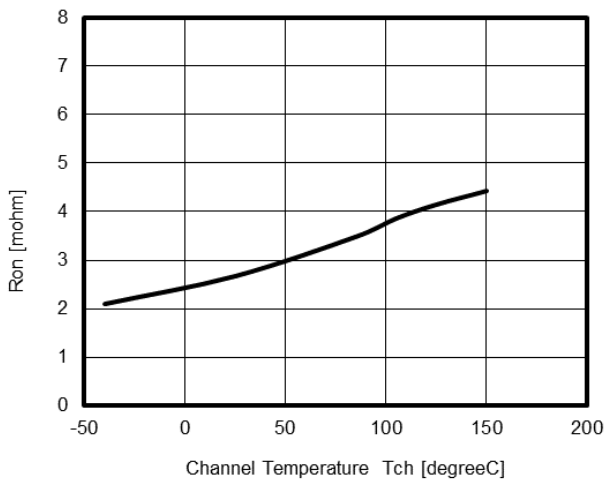
Output Leakage current per channel
VS. Channel TEMPERATURE



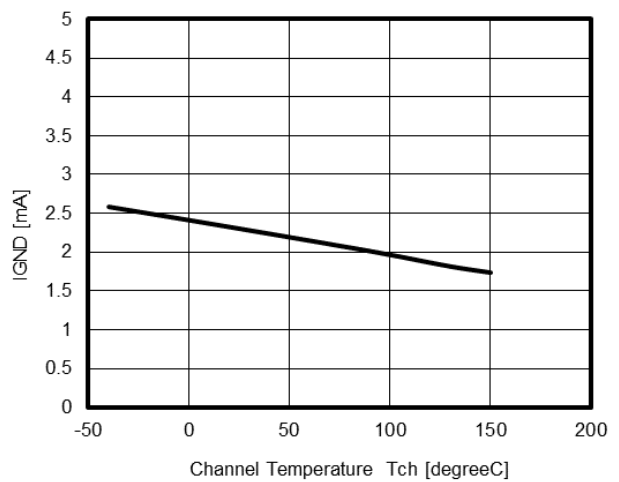
Standby current
VS. Channel TEMPERATURE



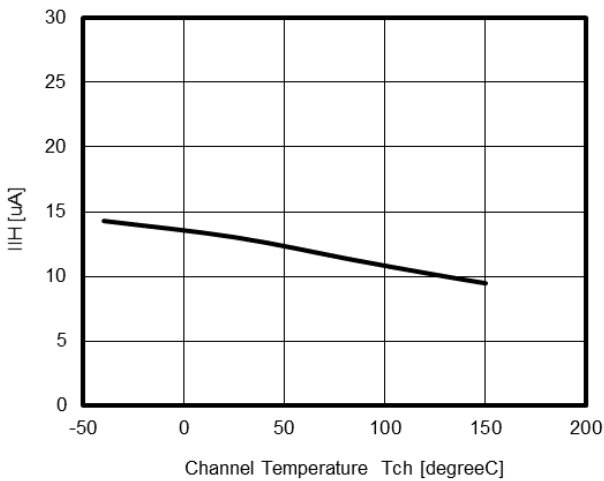
On-state resistance per channel
VS. Channel TEMPERATURE



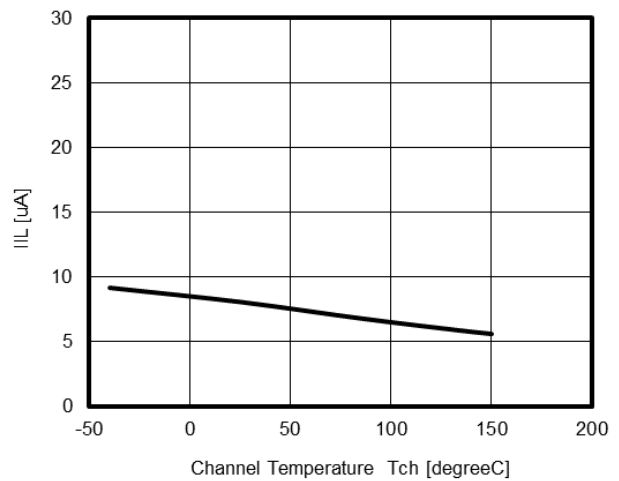
Operating current
VS. Channel TEMPERATURE

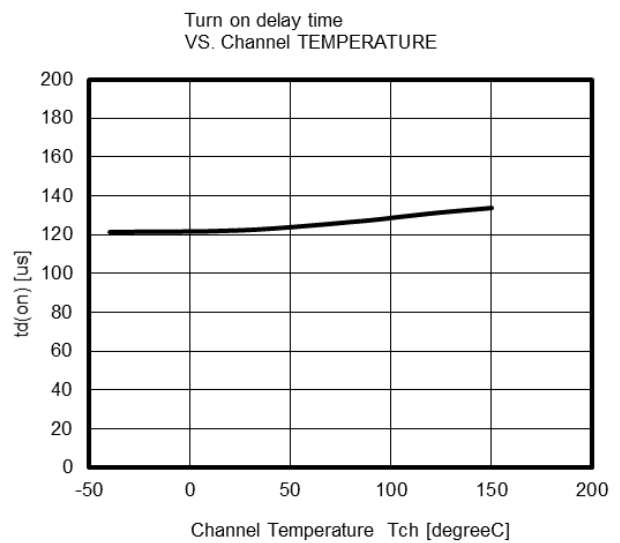
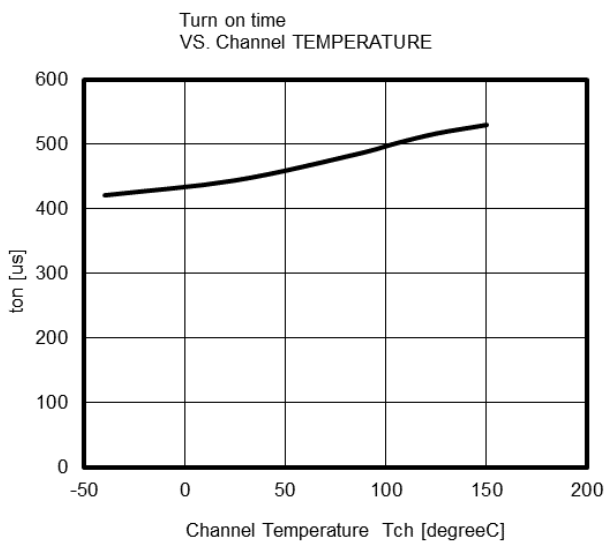
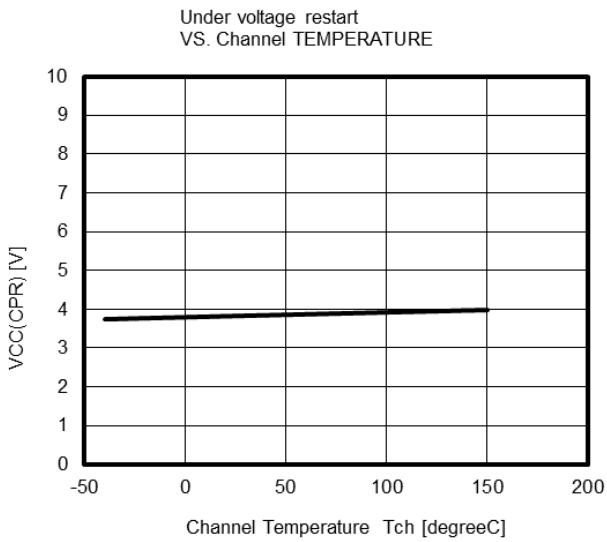
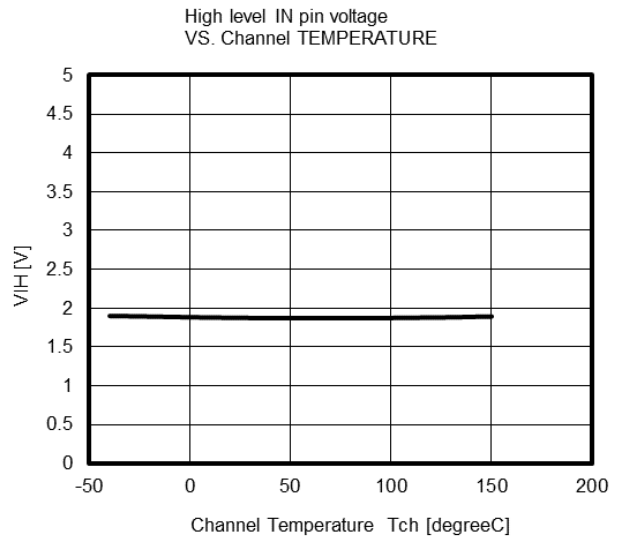
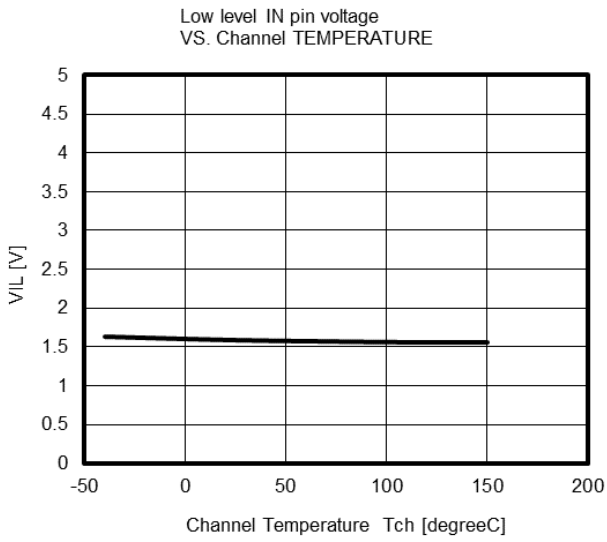


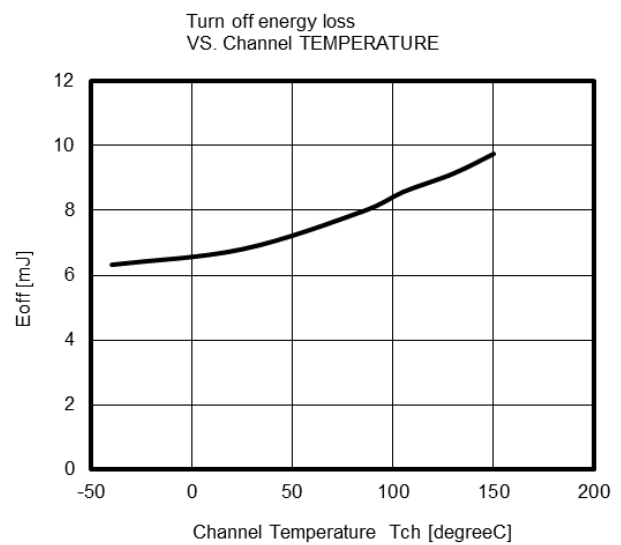
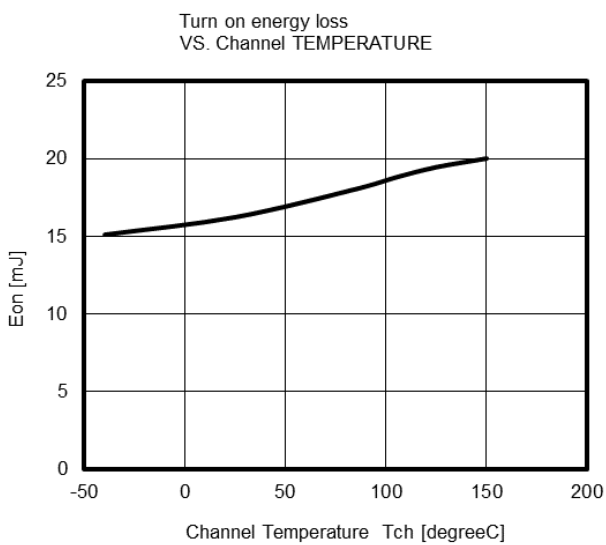
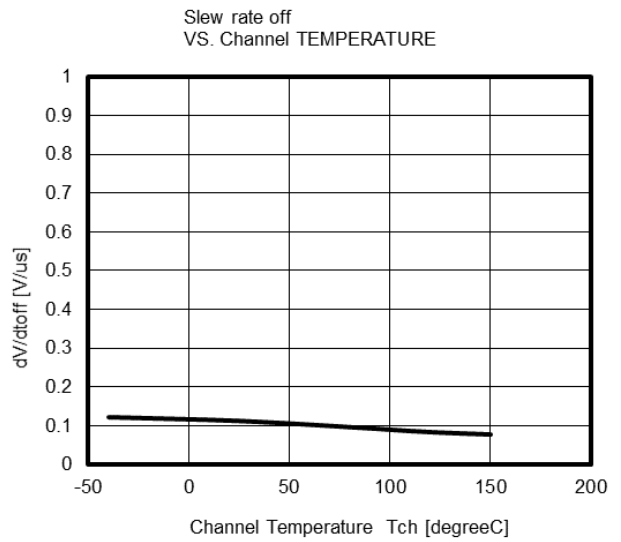
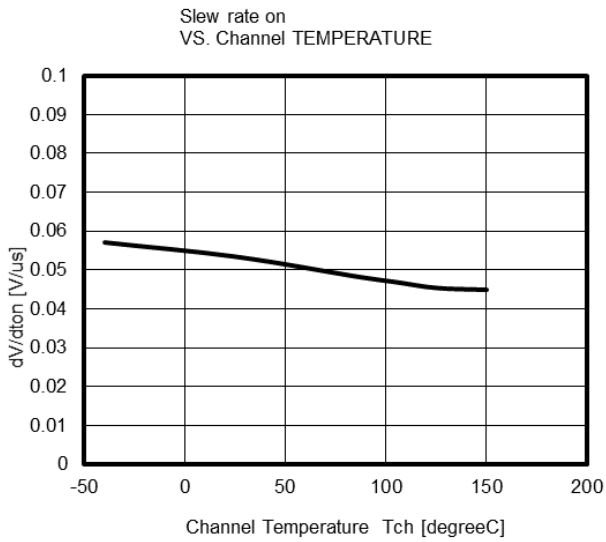
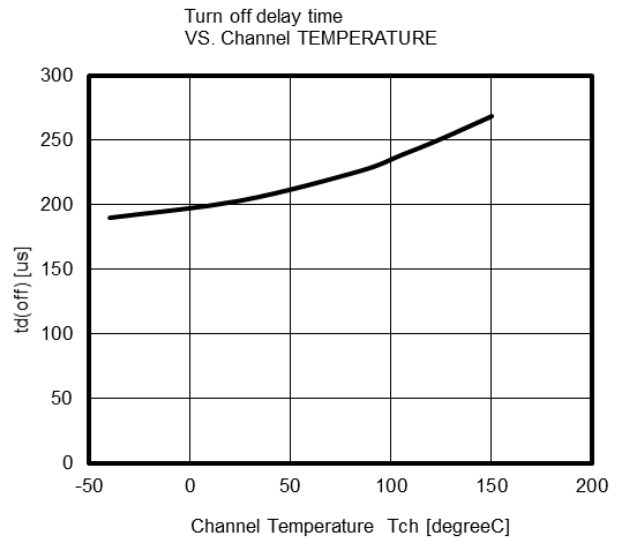
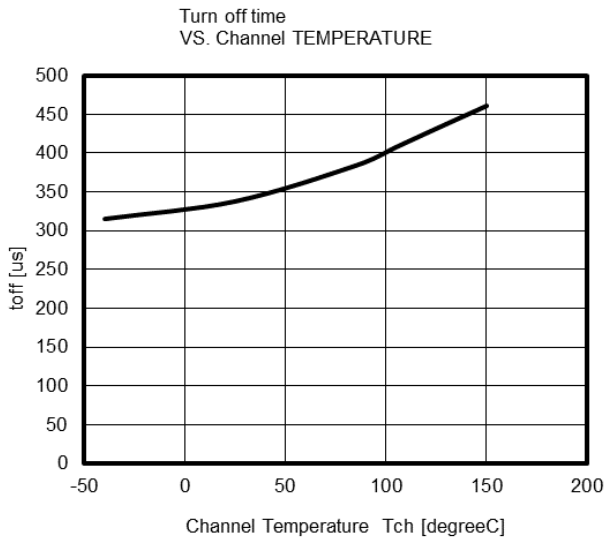
High level IN pin current
VS. Channel TEMPERATURE

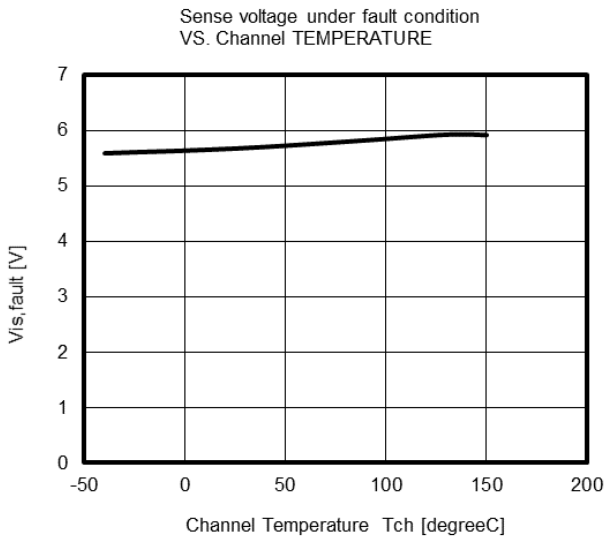
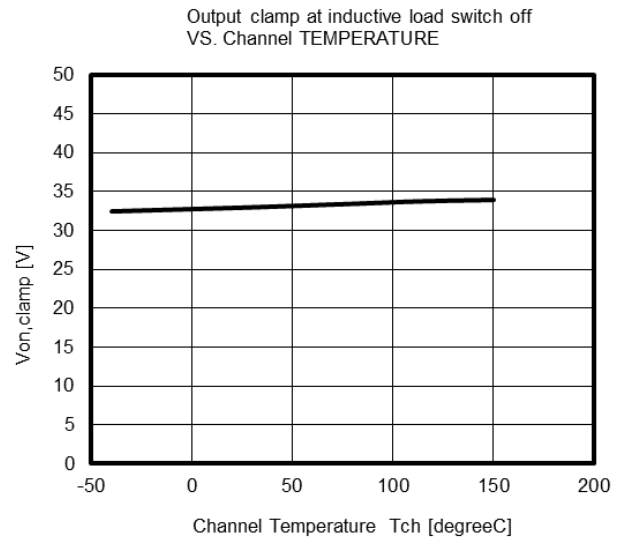
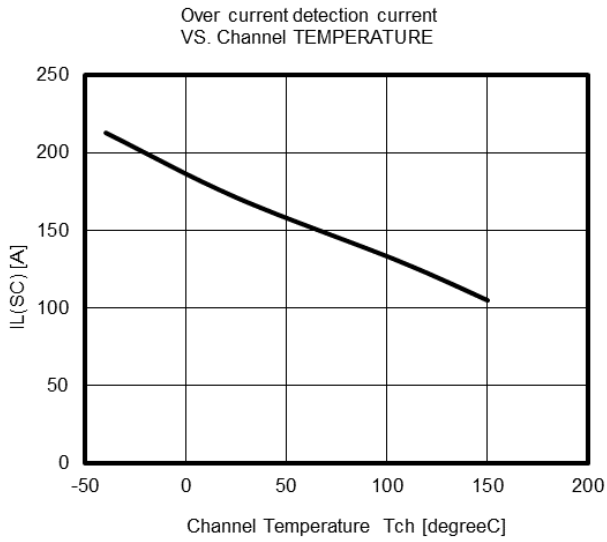


Low level IN pin current
VS. Channel TEMPERATURE

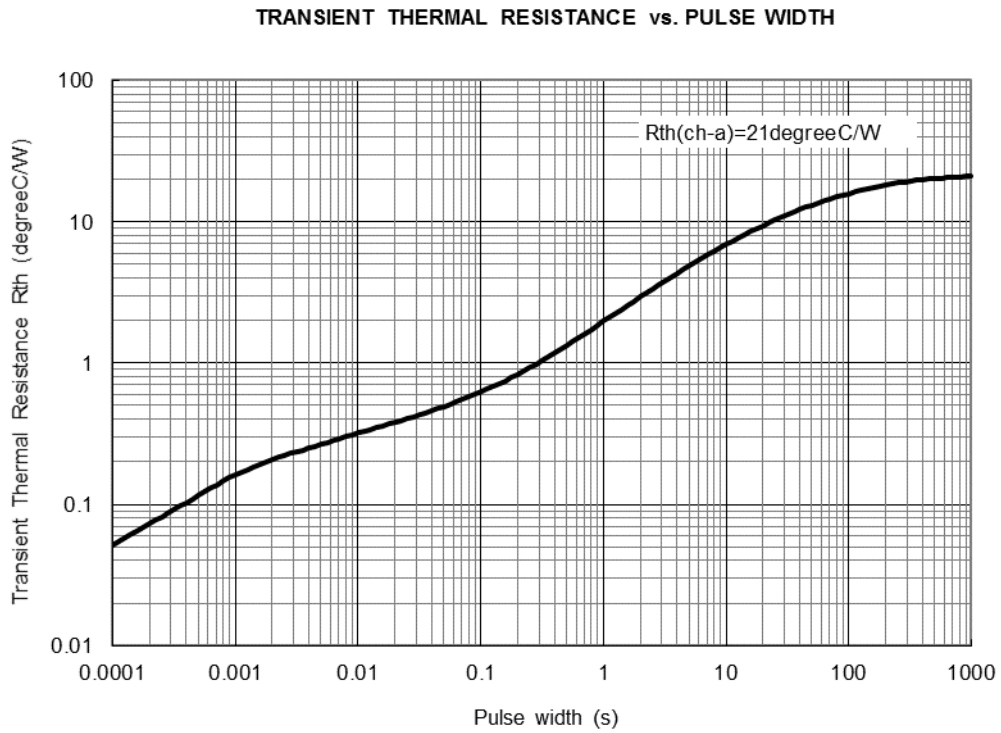




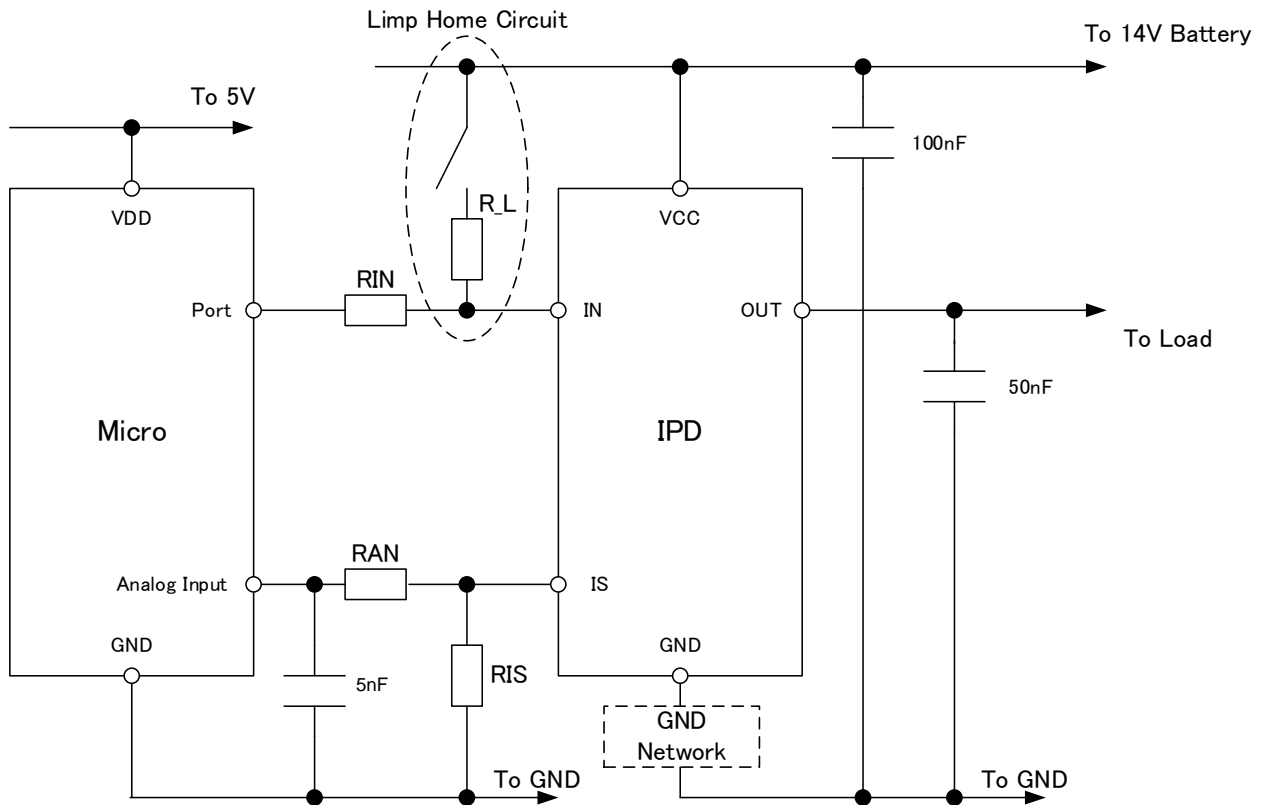




5 Thermal characteristics



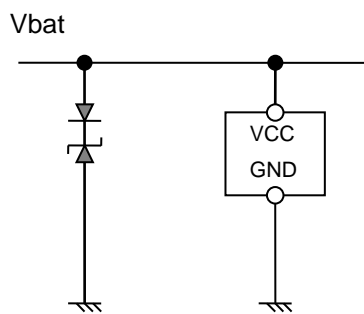
6 Application example in principle



RIN, RAN values are in range of 2k to 50kohm depending microcontroller while R_L value is typically 4kohm. If necessary to raise HBM tolerated dose, adding resistor between OUT terminal and Ground is effective. Resistor's value is typically 100kohm

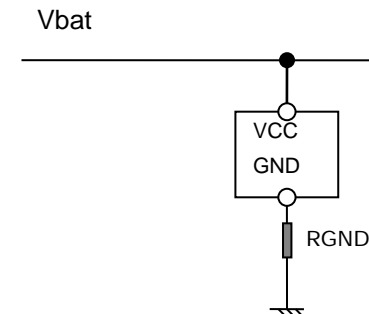
GND Network recommendation

In case of $V_{load\ dump} < 35V$



No external component is required.

In case of $35V < V_{load\ dump} < 42V$



External resistor is recommended in order to limit the current through ZD_{AZ} at load dump condition. 100ohm is recommended as RGND.

| | |
|-------------------------|-----------------------------------|
| Revision History | RAJ2800034H12HPF Datasheet |
|-------------------------|-----------------------------------|

| Rev. | Date | Description | |
|------|--------------|-------------|-----------|
| | | Page | Summary |
| 1.00 | Aug. 1, 2017 | 1-27 | 1st issue |
| | | | |
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