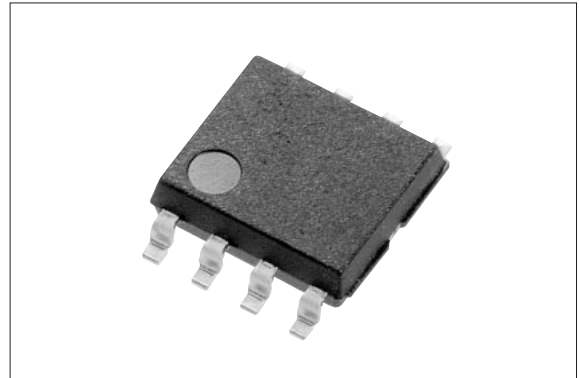


SI-3000LSA Series

Surface-Mount, Low Current Consumption, Low Dropout Voltage Dropper Type

■Features

- Compact surface-mount package (SOP-8)
- Output current: 1 A
- Low current consumption: $I_{q(OFF)}$ (1 μ A ($V_c = 0$ V)
- Low dropout voltage: $V_{DIF} \leq 0.8$ V (at $I_o = 1$ A)
 $V_{DIF} \leq 1.2$ V ($I_o = 1$ A) for SI-3018LSA
- 4 types of output voltages (1.8 V, 2.5 V, 3.3 V, 5.0 V) available
- Output ON/OFF control compatible with LS-TTL
- Built-in foldback overcurrent, thermal protection circuits



■Applications

- Auxiliary power supply for PC
- Battery-driven electronic equipment

■Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Ratings | Unit |
|---|---------------------|-------------|--------------------|
| DC Input Voltage | V_{IN} | 16 | V |
| DC Output Current | I_o | 1 | A |
| Power Dissipation | P_{D1}^{*1} | 1.16 | W |
| | P_{D2}^{*2} | 1.1 | W |
| Junction Temperature | T_j^{*3} | -30 to +150 | $^\circ\text{C}$ |
| Ambient Operating Temperature | T_{op} | -30 to +150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -30 to +150 | $^\circ\text{C}$ |
| Thermal Resistance (Junction to Lead (pin 8)) | θ_{j-l} | 36 | $^\circ\text{C/W}$ |
| Thermal Resistance (Junction to Ambient Air) | θ_{j-a}^{*2} | 100 | $^\circ\text{C/W}$ |

*1: When mounted on glass-epoxy board 56.5×56.5 mm (copper laminate area 100%)

*2: When mounted on glass-epoxy board 40×40 mm (copper laminate area 100%).

*3: Thermal protection circuits may operate if the junction temperature exceeds 135°C

■Recommended Operating Conditions

| Parameter | Symbol | Ratings | | | | Unit |
|--------------------------------|-----------|--------------------------|------------------------------------|------------------------------------|----------------------|------------------|
| | | SI-3018LSA | SI-3025LSA | SI-3033LSA | SI-3050LSA | |
| DC Input Voltage Range | V_{IN} | 3.1 to 3.5 ^{*1} | ^{*2} to 3.5 ^{*1} | ^{*2} to 5.2 ^{*1} | ^{*2} to 8.0 | V |
| DC Output Current Range | I_o | 0 to 1 | | | | A |
| Operating Junction Temperature | T_{jop} | -20 to +125 | | | | $^\circ\text{C}$ |
| Ambient Operating Temperature | T_{aop} | -30 to +85 | | | | $^\circ\text{C}$ |

*1: V_{IN} (max) and I_o (max) are restricted by the relationship $P_D = (V_{IN} - V_o) \times I_o$.

Calculate these values referring to the reference data.

*2: Refer to the dropout voltage section.

■Electrical Characteristics

(Ta=25°C, Vc=2V unless otherwise specified)

| Parameter | Symbol | Ratings | | | | | | | | | | | | Unit | |
|---|--------------------------------|---------------------------------|-------|-------|---------------------------------|-------|-------|-------------------------------|-------|-------|---------------------------------|------|------|-------|----|
| | | SI-3018LSA | | | SI-3025LSA | | | SI-3033LSA | | | SI-3050LSA | | | | |
| | | min. | typ. | max. | min. | typ. | max. | min. | typ. | max. | min. | typ. | max. | | |
| Output Voltage | Vo | 1.764 | 1.800 | 1.836 | 2.450 | 2.500 | 2.550 | 3.234 | 3.300 | 3.366 | 4.90 | 5.00 | 5.10 | V | |
| | Conditions | VIN=3.3V, Io=0.5A | | | VIN=3.3V, Io=0.5A | | | VIN=5V, Io=0.5A | | | VIN=6.5V, Io=0.5A | | | | |
| Dropout Voltage | V _{DIF} | | - | | | | 0.4 | | | 0.4 | | | 0.4 | V | |
| | Conditions | - | | | Io≤0.5A | | | Io≤0.5A | | | Io≤0.5A | | | | |
| | Conditions | 0.6 | 1.2 | | | 0.8 | | | 0.8 | | | 0.8 | | | |
| Line Regulation | ΔV _{LINE} | | 2 | 10 | | 2 | 10 | | 3 | 10 | | | 15 | mV | |
| | Conditions | VIN=3.1 to 3.5V, Io=0.3A | | | VIN=3.1 to 3.5V, Io=0.3A | | | VIN=4.5 to 5.5V, Io=0.3A | | | VIN=6 to 7V, Io=0.3A | | | | |
| Load Regulation | ΔV _{LOAD} | | 10 | 20 | | 10 | 20 | | 10 | 20 | | | 30 | mV | |
| | Conditions | VIN=3.3V, Io=0 to 1A | | | VIN=3.3V, Io=0 to 1A | | | VIN=5V, Io=0 to 1A | | | VIN=6.5V, Io=0 to 1A | | | | |
| Temperature Coefficient of Output Voltage | ΔVo/ΔTa | | ±0.3 | | | ±0.3 | | | ±0.3 | | | ±0.5 | | mV/°C | |
| | Conditions | VIN=3.3V, Io=5mA, Tj=0 to 100°C | | | VIN=3.3V, Io=5mA, Tj=0 to 100°C | | | VIN=5V, Io=5mA, Tj=0 to 100°C | | | VIN=6.5V, Io=5mA, Tj=0 to 100°C | | | | |
| Ripple Rejection | R _{REJ} | | 60 | | | 57 | | | 55 | | | 55 | | dB | |
| | Conditions | VIN=3.3V, f=100 to 120Hz | | | VIN=3.3V, f=100 to 120Hz | | | VIN=5V, f=100 to 120Hz | | | VIN=6.5V, f=100 to 120Hz | | | | |
| Quiescent Circuit Current | I _q | | 1.7 | 2.5 | | 1.7 | 2.5 | | 1.7 | 2.5 | | 1.7 | 2.5 | mA | |
| | Conditions | VIN=3.3V, Io=0A | | | VIN=3.3V, Io=0A | | | VIN=5V, Io=0A | | | VIN=6.5V, Io=0A | | | | |
| OFF Circuit Current | I _q (OFF) | | | 1 | | | 1 | | | 1 | | | 1 | μA | |
| | Conditions | VIN=3.3V, Io=0A, Vc=0V | | | VIN=3.3V, Io=0A, Vc=0V | | | VIN=5V, Io=0A, Vc=0V | | | VIN=6.5V, Io=0A, Vc=0V | | | | |
| Overcurrent Protection Starting Current*1,3 | I _{s1} | 1.2 | | | 1.2 | | | 1.2 | | | 1.2 | | | A | |
| | Conditions | VIN=3.3V | | | VIN=3.3V | | | VIN=5V | | | VIN=6V | | | | |
| Vc Pin | Control Voltage (Output ON)*2 | Vc, IH | 2.0 | | | 2.0 | | | 2.0 | | | 2.0 | | V | |
| | Control Voltage (Output OFF)*2 | Vc, IL | | | 0.8 | | | 0.8 | | | 0.8 | | 0.8 | | |
| | Control Current (Output ON) | Ic, IH | | 40 | 80 | | 40 | 80 | | 40 | 80 | | 40 | 80 | μA |
| | | Conditions | Vc=2V | | | | | | | | | | | | |
| | Control Current (Output OFF) | Ic, IL | | 0 | -5 | | 0 | -5 | | 0 | -5 | | 0 | -5 | μA |
| Conditions | | Vc=0V | | | | | | | | | | | | | |
| Output OFF Voltage | Vo | | | 0.5 | | | 0.5 | | | 0.5 | | | 0.5 | V | |
| | Conditions | VIN=3.3V, Io=0A | | | VIN=3.3V, Io=0A | | | VIN=5V, Io=0A | | | VIN=6.5V, Io=0A | | | | |

*1: Is1 is specified as the 5% drop point of output voltage Vo on the condition that VIN = 3.3 V (5 V for SI-3033LSA), and Io = 0.5 A.

*2: Output is OFF when the output control terminal Vc is open. Each input level is equivalent to that for LS-TTL. Therefore, it is possible to be driven directly by an LS-TTL circuit.

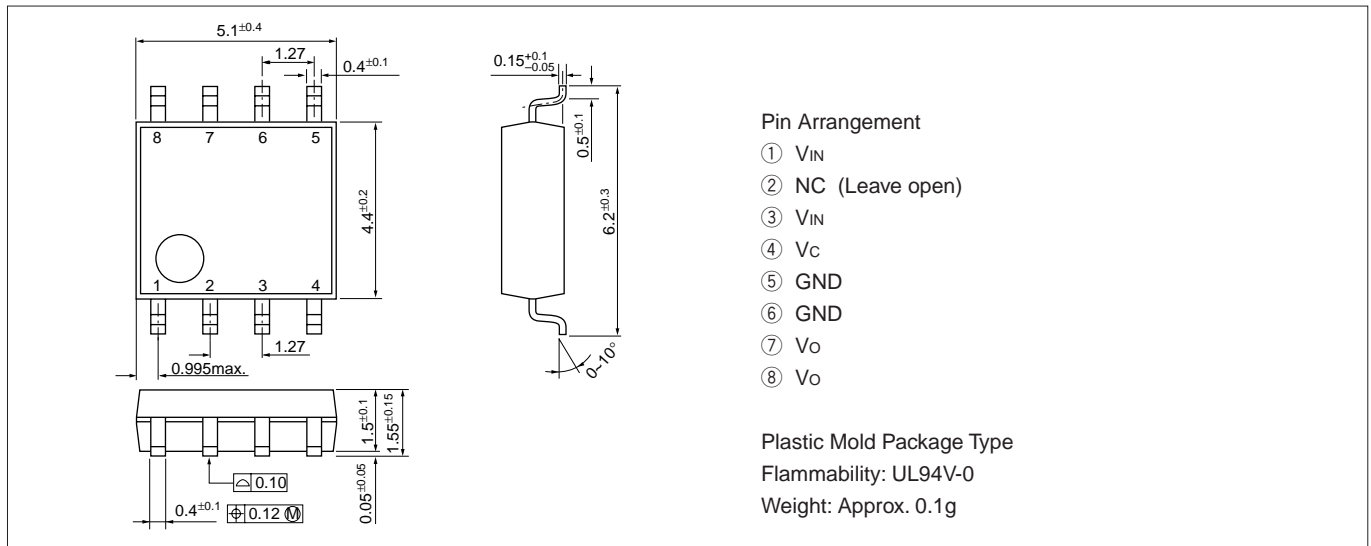
The SI-3000LSA series employs a foldback-type overcurrent protection circuit.

*3: In applications in which a certain current is required for start-up, this circuit may cause a start-up error, and therefore the SI-3000LSA series is not recommended for use in such applications.

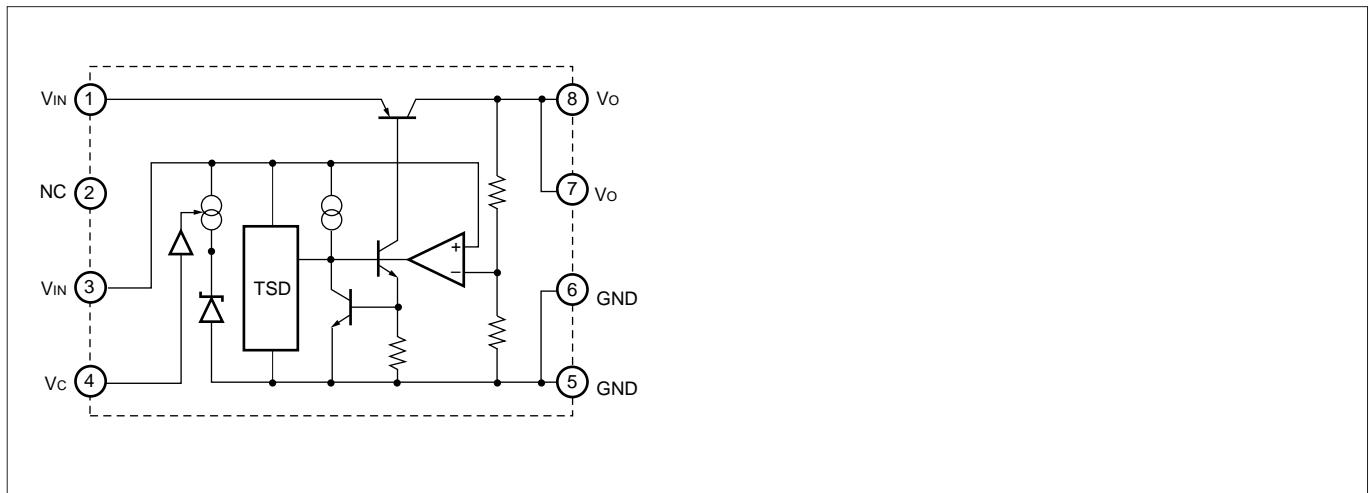
- (1) Constant current load (2) Dual polarity power supply (3) Series power supply (4) Vo adjustment by raising ground voltage

■External Dimensions

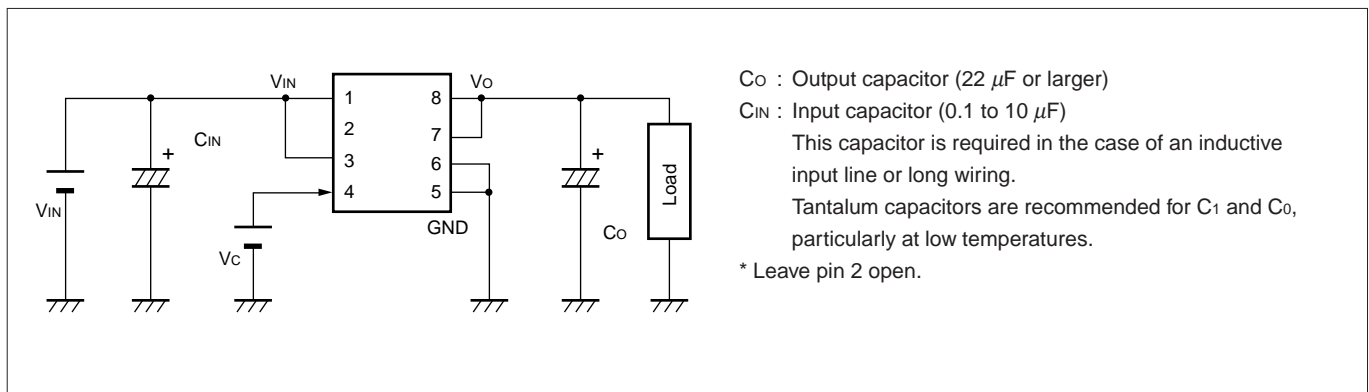
(Unit : mm)



■Block Diagram

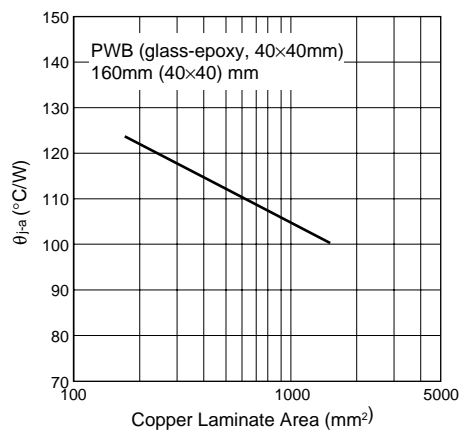


■Standard External Circuit

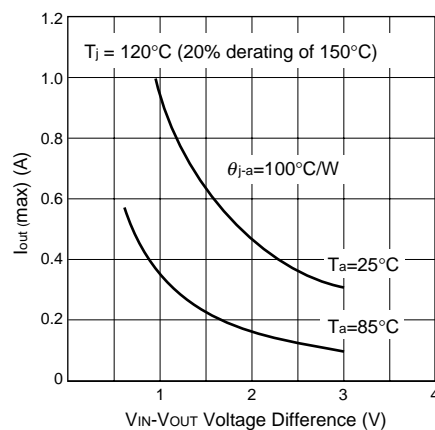


■Reference Data

PWB Copper Laminate Area vs. Junction to Ambient Air Thermal Resistance



Allowable Output Current (vs. $V_{IN}-V_{OUT}$ Voltage Difference)
 $V_{IN}-I_o$ max

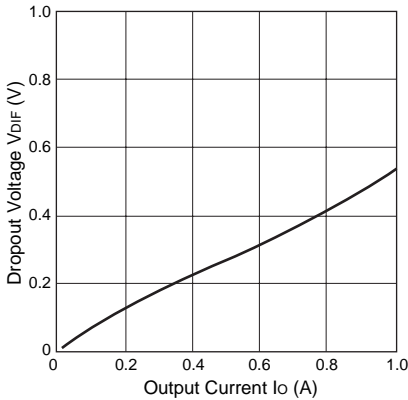


The inner frame stage, on which the PTr is mounted, is directly connected to the V_{OUT} pin. Therefore, enlarging the copper laminate area achieves a heat radiation effect of the V_{OUT} pin.

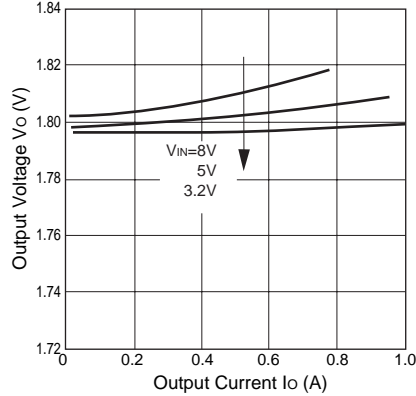
■Typical Characteristics of SI-3018LSA

($T_a=25^\circ\text{C}$)

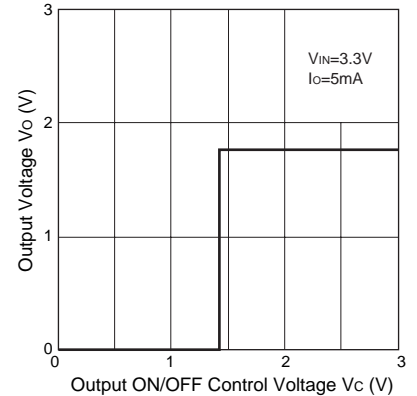
I_o vs. V_{DIF} Characteristics



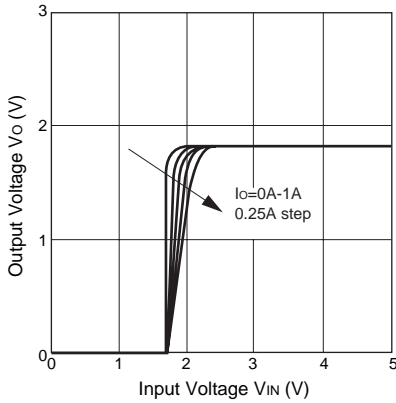
Load Regulation



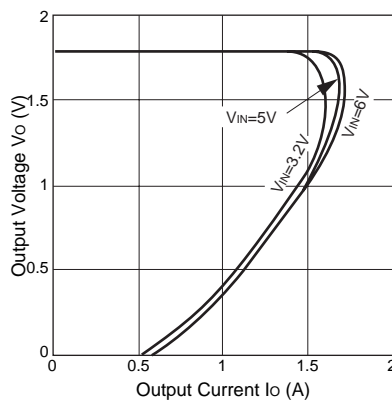
Output ON/OFF Control



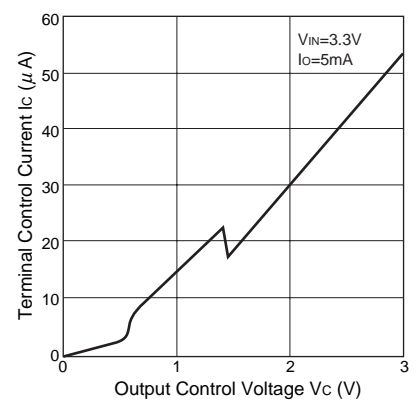
Output Voltage Characteristics



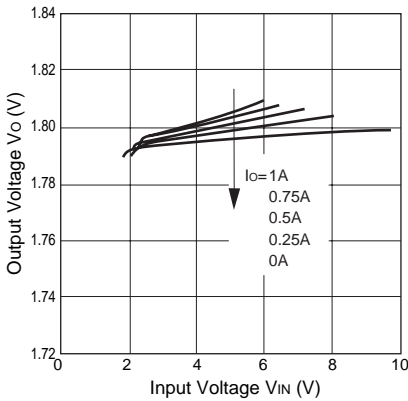
Overcurrent Protection Characteristics



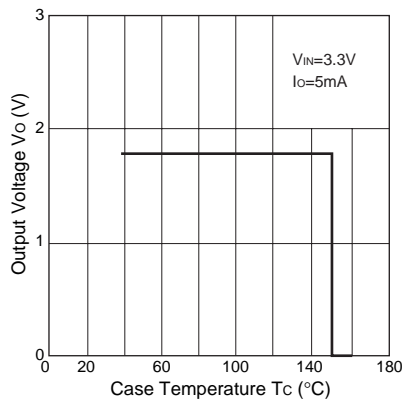
Output ON/OFF Control Current



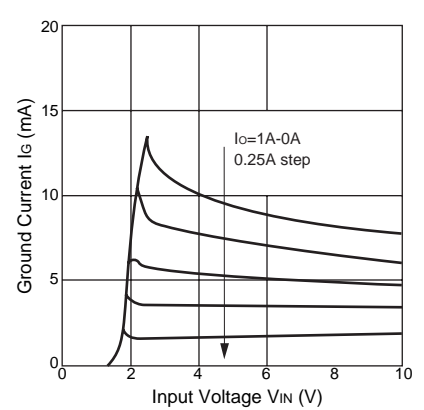
Line Regulation



Thermal Protection Characteristics



Circuit Current



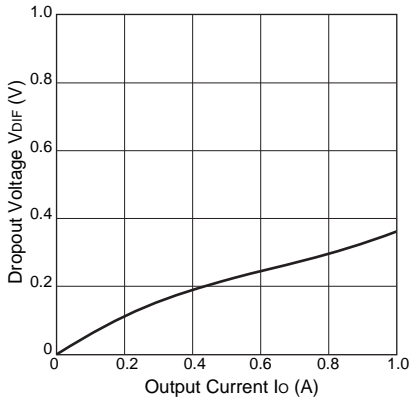
[Note on Thermal Protection]

The thermal protection circuit is intended for protection against heat during instantaneous short-circuiting. Its operation is not guaranteed for continuous heating conditions such as short-circuiting over extended periods of time.

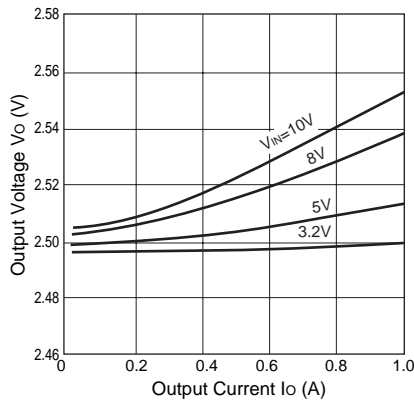
■Typical Characteristics of SI-3025LSA

($T_a=25^\circ\text{C}$)

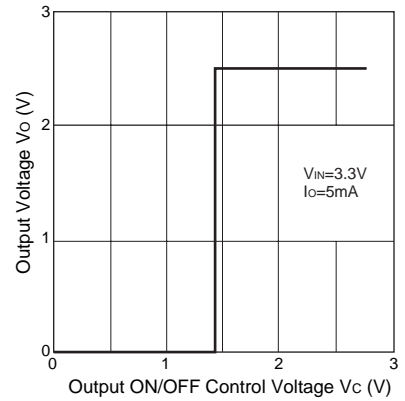
I_o vs. V_{DIF} Characteristics



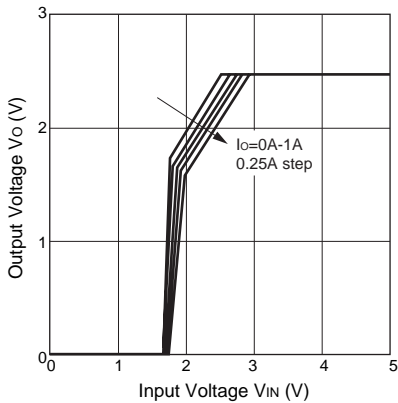
Load Regulation



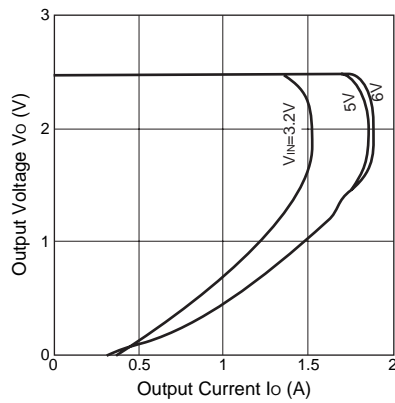
Output ON/OFF Control



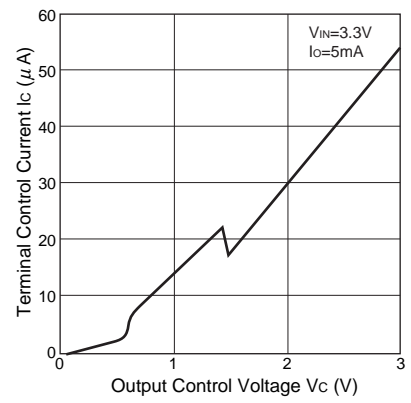
Output Voltage Characteristics



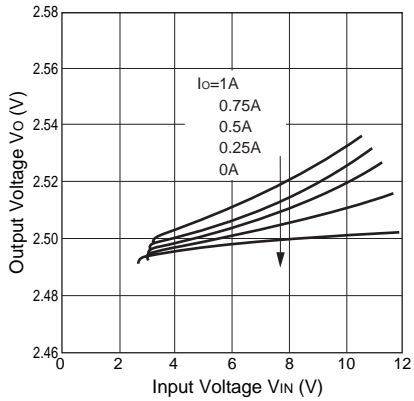
Overcurrent Protection Characteristics



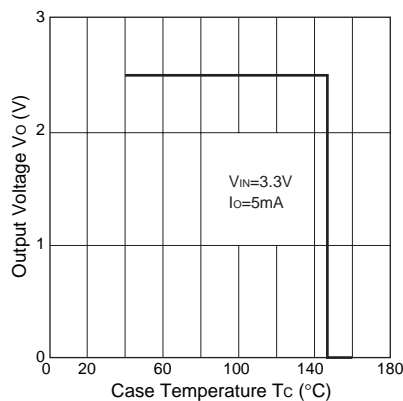
Output ON/OFF Control Current



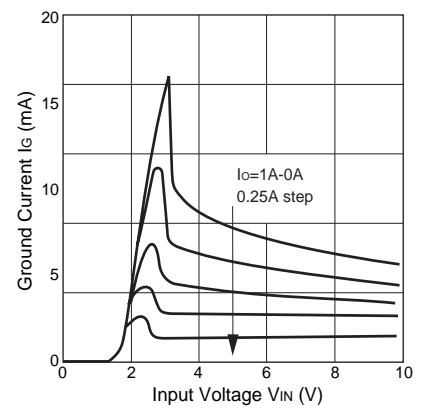
Line Regulation



Thermal Protection Characteristics



Circuit Current



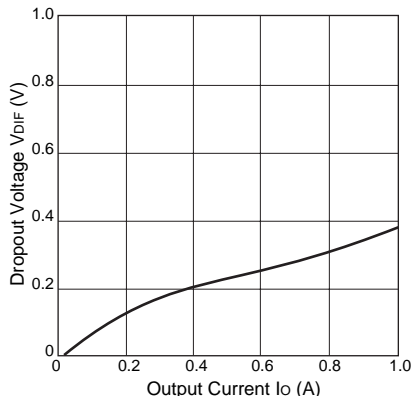
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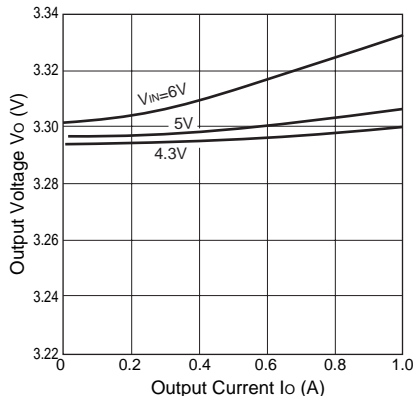
■Typical Characteristics of SI-3033LSA

($T_a=25^\circ\text{C}$)

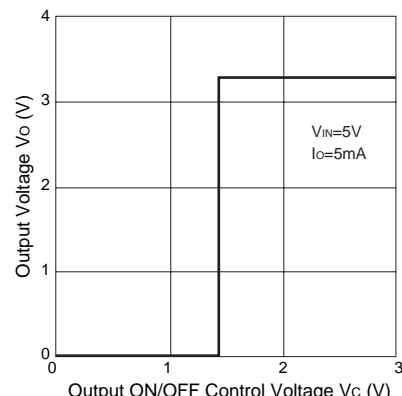
I_o vs. V_{DIF} Characteristics



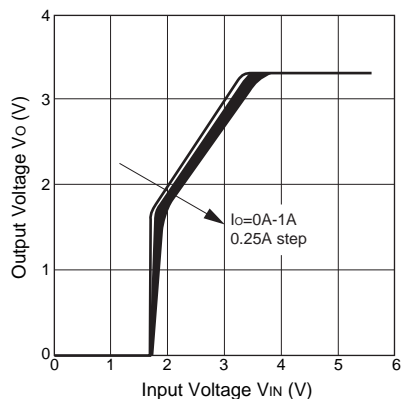
Load Regulation



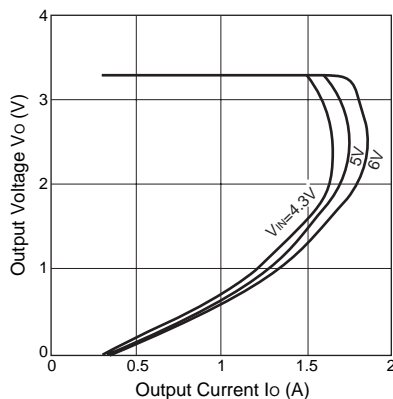
Output ON/OFF Control



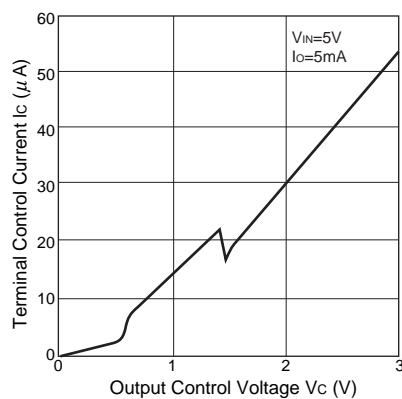
Output Voltage Characteristics



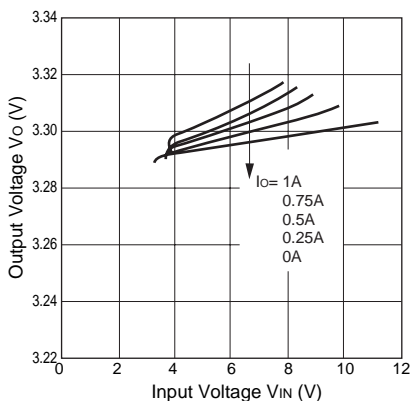
Overcurrent Protection Characteristics



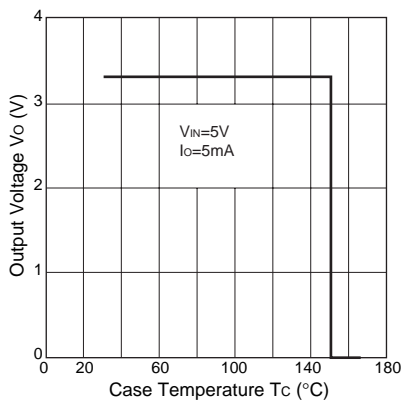
Output ON/OFF Control Current



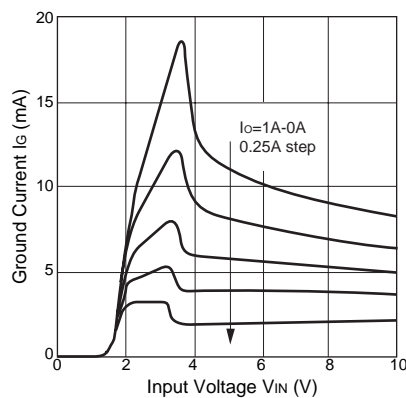
Line Regulation



Thermal Protection Characteristics



Circuit Current



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