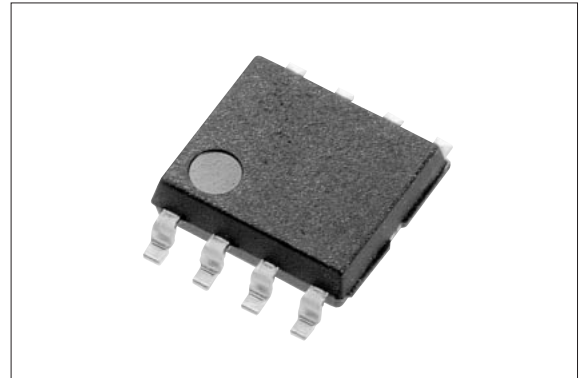


SI-3000LSA Series

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	$^\circ\text{C}/\text{W}$
Thermal Resistance (Junction to Ambient Air)	θ_{j-a}^{*2}	100	$^\circ\text{C}/\text{W}$

*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

($T_a=25^{\circ}\text{C}$, $V_c=2\text{V}$ 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	V_o	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	$V_{IN}=3.3\text{V}$, $I_o=0.5\text{A}$			$V_{IN}=3.3\text{V}$, $I_o=0.5\text{A}$			$V_{IN}=5\text{V}$, $I_o=0.5\text{A}$			$V_{IN}=6.5\text{V}$, $I_o=0.5\text{A}$				
Dropout Voltage	V_{DIF}		-				0.4			0.4			0.4	V	
	Conditions	-			$I_o \leq 0.5\text{A}$			$I_o \leq 0.5\text{A}$			$I_o \leq 0.5\text{A}$				
	Conditions	0.6			1.2			0.8			0.8				
Line Regulation	ΔV_{LINE}		2	10		2	10		3	10			15	mV	
	Conditions	$V_{IN}=3.1$ to 3.5V , $I_o=0.3\text{A}$			$V_{IN}=3.1$ to 3.5V , $I_o=0.3\text{A}$			$V_{IN}=4.5$ to 5.5V , $I_o=0.3\text{A}$			$V_{IN}=6$ to 7V , $I_o=0.3\text{A}$				
Load Regulation	ΔV_{LOAD}		10	20		10	20		10	20			30	mV	
	Conditions	$V_{IN}=3.3\text{V}$, $I_o=0$ to 1A			$V_{IN}=3.3\text{V}$, $I_o=0$ to 1A			$V_{IN}=5\text{V}$, $I_o=0$ to 1A			$V_{IN}=6.5\text{V}$, $I_o=0$ to 1A				
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T_a$		± 0.3			± 0.3			± 0.3			± 0.5		mV/ $^{\circ}\text{C}$	
	Conditions	$V_{IN}=3.3\text{V}$, $I_o=5\text{mA}$, $T_j=0$ to 100°C			$V_{IN}=3.3\text{V}$, $I_o=5\text{mA}$, $T_j=0$ to 100°C			$V_{IN}=5\text{V}$, $I_o=5\text{mA}$, $T_j=0$ to 100°C			$V_{IN}=6.5\text{V}$, $I_o=5\text{mA}$, $T_j=0$ to 100°C				
Ripple Rejection	R_{REJ}		60			57			55			55		dB	
	Conditions	$V_{IN}=3.3\text{V}$, $f=100$ to 120Hz			$V_{IN}=3.3\text{V}$, $f=100$ to 120Hz			$V_{IN}=5\text{V}$, $f=100$ to 120Hz			$V_{IN}=6.5\text{V}$, $f=100$ 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	$V_{IN}=3.3\text{V}$, $I_o=0\text{A}$			$V_{IN}=3.3\text{V}$, $I_o=0\text{A}$			$V_{IN}=5\text{V}$, $I_o=0\text{A}$			$V_{IN}=6.5\text{V}$, $I_o=0\text{A}$				
OFF Circuit Current	$I_q(\text{OFF})$			1			1			1			1	μA	
	Conditions	$V_{IN}=3.3\text{V}$, $I_o=0\text{A}$, $V_c=0\text{V}$			$V_{IN}=3.3\text{V}$, $I_o=0\text{A}$, $V_c=0\text{V}$			$V_{IN}=5\text{V}$, $I_o=0\text{A}$, $V_c=0\text{V}$			$V_{IN}=6.5\text{V}$, $I_o=0\text{A}$, $V_c=0\text{V}$				
Overcurrent Protection Starting Current*1,3	I_{s1}	1.2			1.2			1.2			1.2			A	
	Conditions	$V_{IN}=3.3\text{V}$			$V_{IN}=3.3\text{V}$			$V_{IN}=5\text{V}$			$V_{IN}=6\text{V}$				
Vc Pin	Control Voltage (Output ON)*2	V_c, I_H	2.0			2.0			2.0			2.0		V	
	Control Voltage (Output OFF)*2	V_c, I_L			0.8			0.8			0.8		0.8		
	Control Current (Output ON)	I_c, I_H		40	80		40	80		40	80		40	80	μA
		Conditions	$V_c=2\text{V}$												
	Control Current (Output OFF)	I_c, I_L		0	-5		0	-5		0	-5		0	-5	μA
Conditions		$V_c=0\text{V}$													
Output OFF Voltage	V_o			0.5			0.5			0.5			0.5	V	
	Conditions	$V_{IN}=3.3\text{V}$, $I_o=0\text{A}$			$V_{IN}=3.3\text{V}$, $I_o=0\text{A}$			$V_{IN}=5\text{V}$, $I_o=0\text{A}$			$V_{IN}=6.5\text{V}$, $I_o=0\text{A}$				

*1: I_{s1} is specified as the 5% drop point of output voltage V_o on the condition that $V_{IN} = 3.3\text{V}$ (5V for SI-3033LSA), and $I_o = 0.5\text{A}$.

*2: Output is OFF when the output control terminal V_c 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.

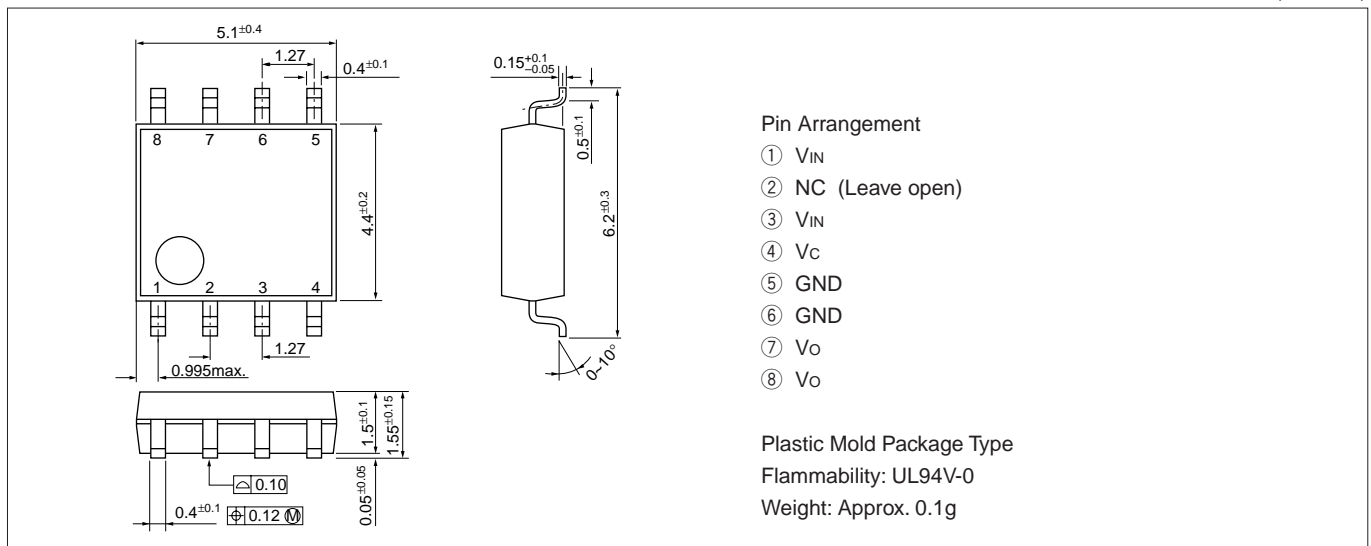
The SI-3000LSA series employs a foldback-type overcurrent protection circuit.

*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.

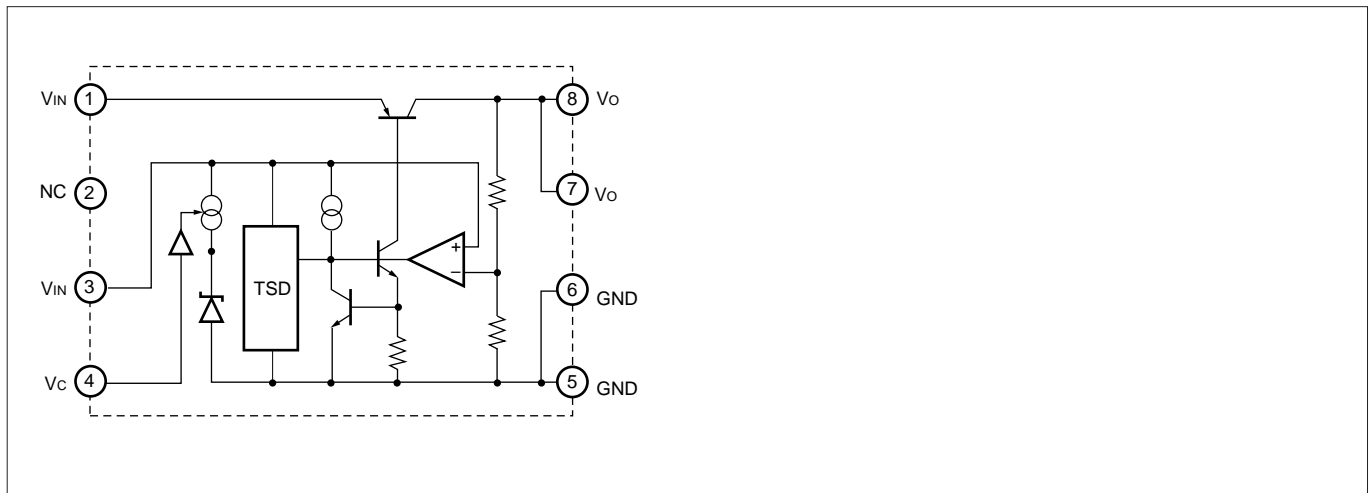
- (1) Constant current load (2) Dual polarity power supply (3) Series power supply (4) V_o adjustment by raising ground voltage

■External Dimensions

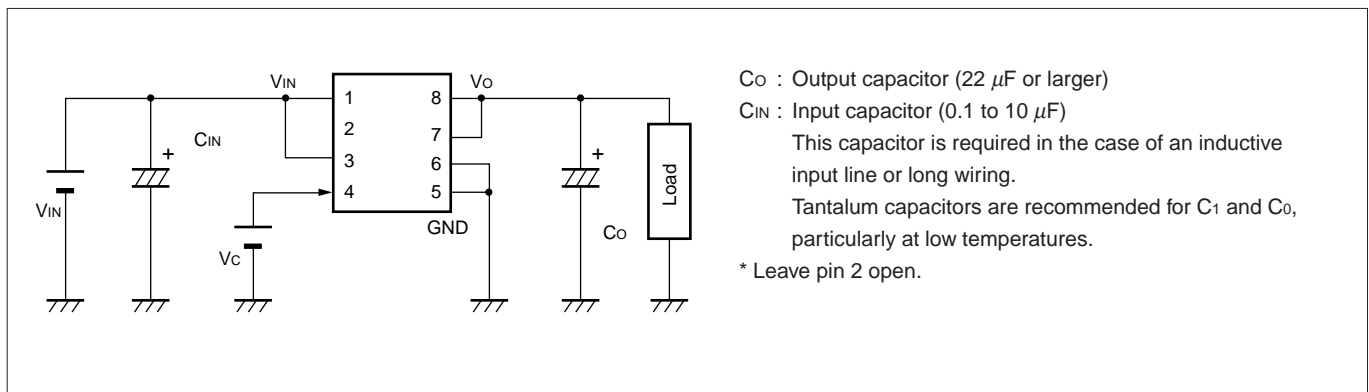
(Unit : mm)



■Block Diagram

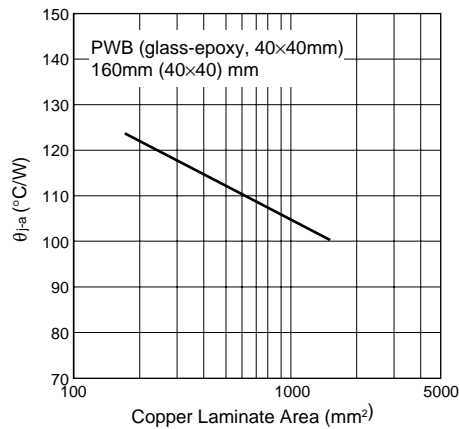


■Standard External Circuit

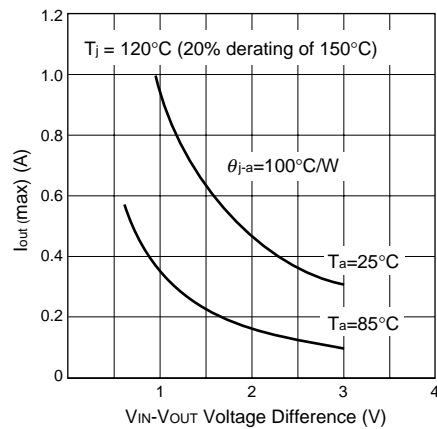


■Reference Data

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

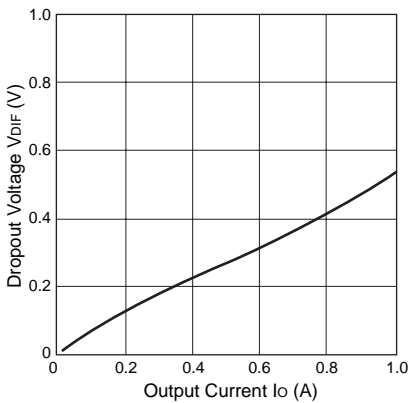


The inner frame stage, on which the PT_r is mounted, is directly connected to the V_{OUT} pin. Therefore, enlarging the copper laminate area achieves a heat radiation effect of the V_{OUT} pin.

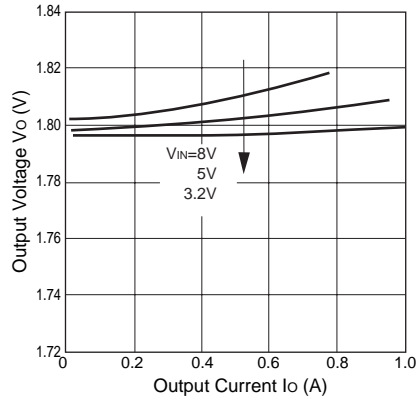
■Typical Characteristics of SI-3018LSA

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

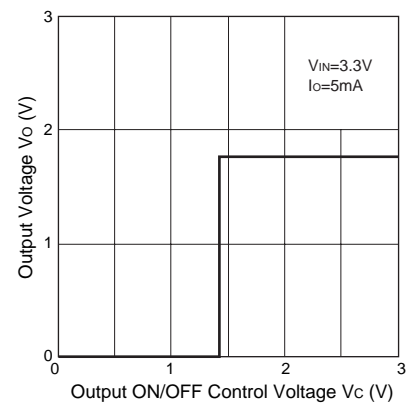
I_o vs. V_{DIF} Characteristics



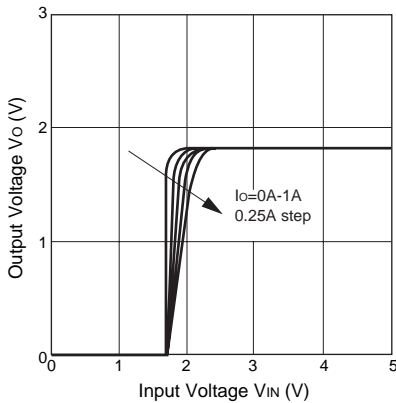
Load Regulation



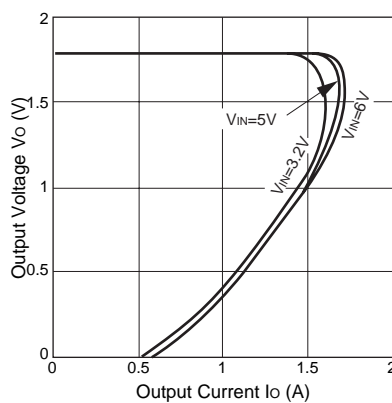
Output ON/OFF Control



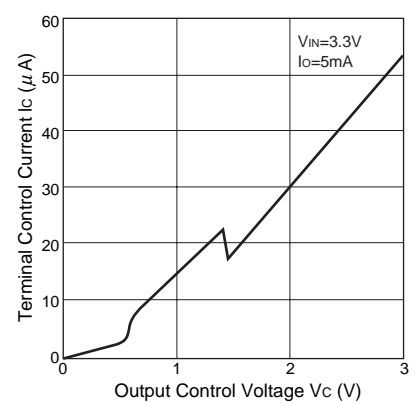
Output Voltage Characteristics



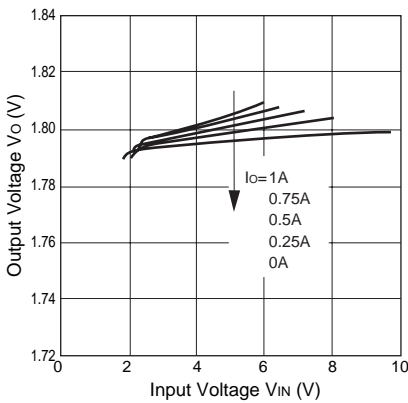
Overcurrent Protection Characteristics



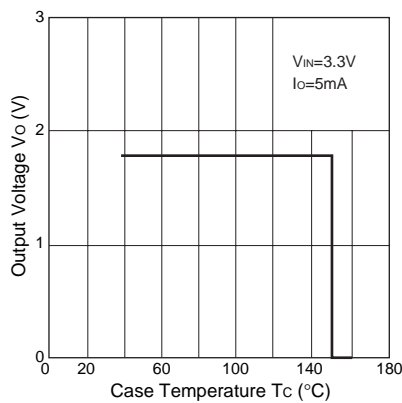
Output ON/OFF Control Current



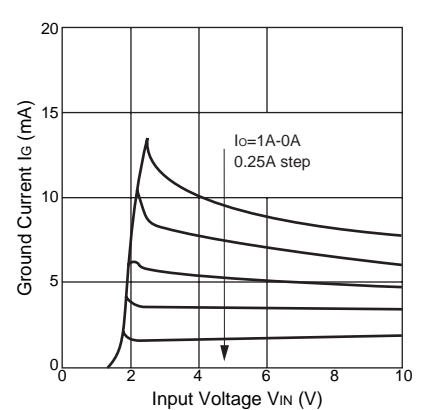
Line Regulation



Thermal Protection Characteristics



Circuit Current



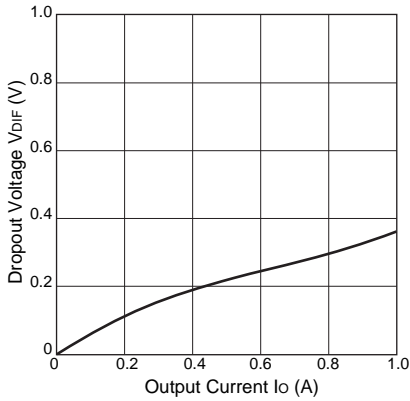
[Note on Thermal Protection]

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.

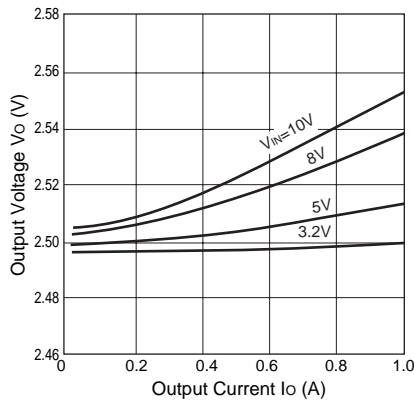
■Typical Characteristics of SI-3025LSA

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

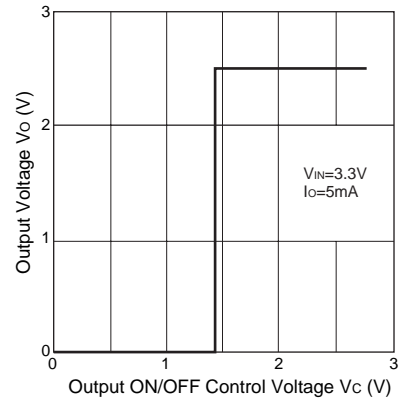
I_o vs. V_{DIF} Characteristics



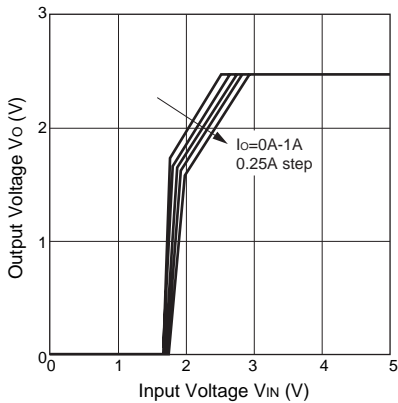
Load Regulation



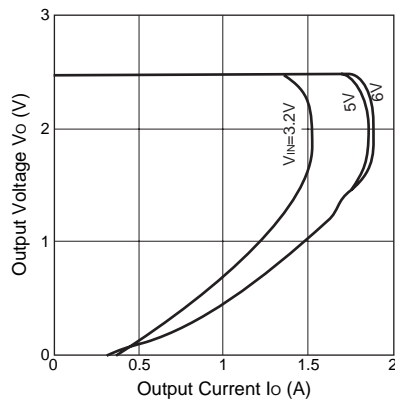
Output ON/OFF Control



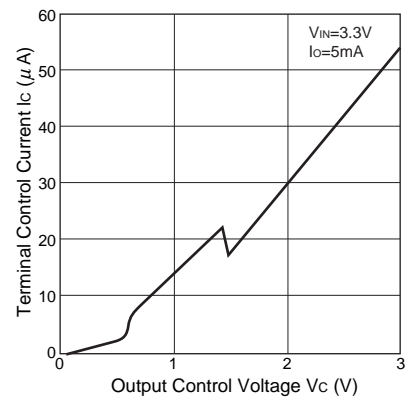
Output Voltage Characteristics



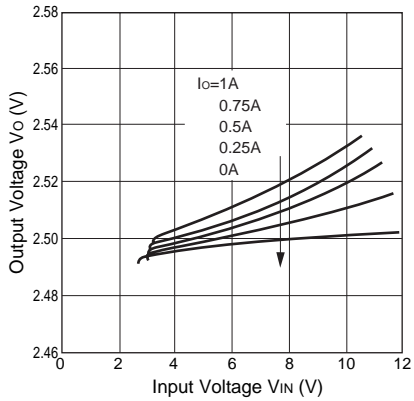
Overcurrent Protection Characteristics



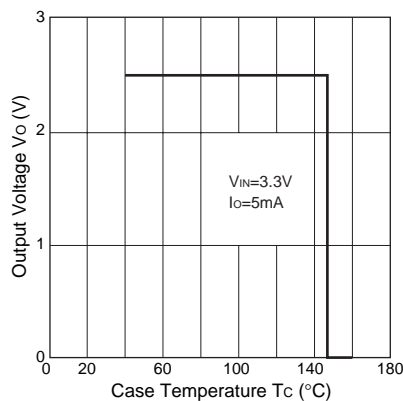
Output ON/OFF Control Current



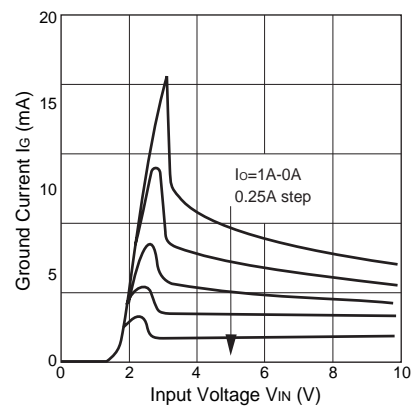
Line Regulation



Thermal Protection Characteristics



Circuit Current



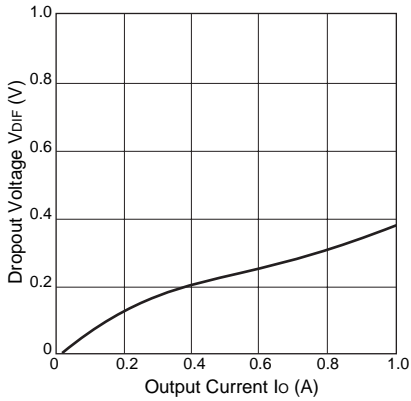
[Note on Thermal Protection]

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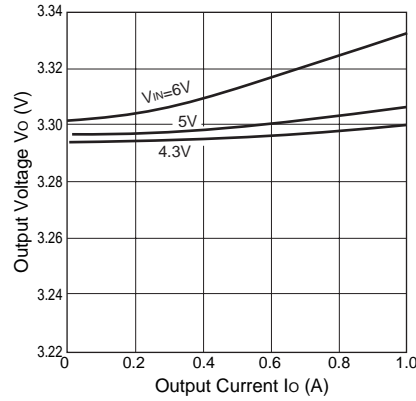
■Typical Characteristics of SI-3033LSA

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

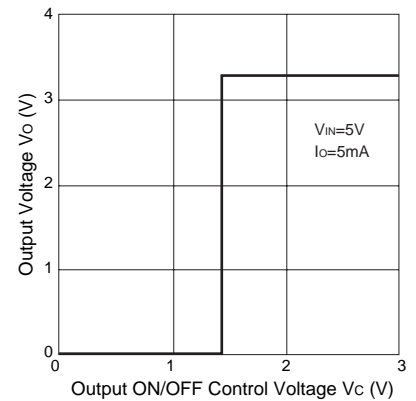
I_o vs. V_{DIF} Characteristics



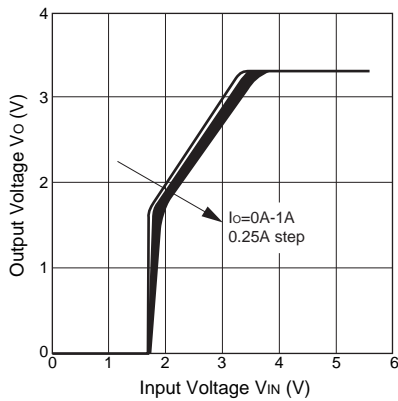
Load Regulation



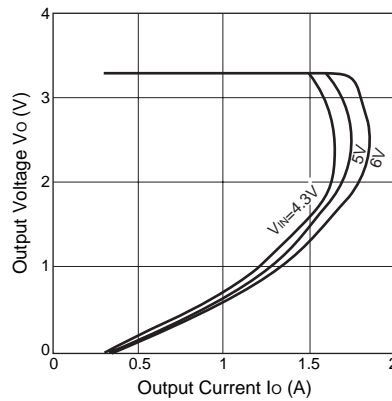
Output ON/OFF Control



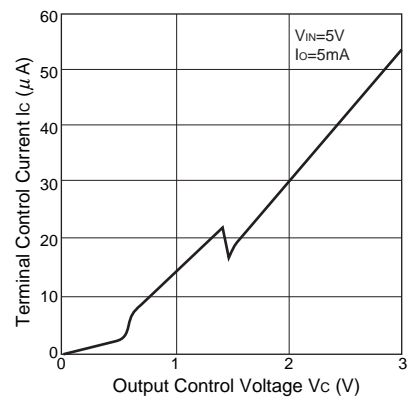
Output Voltage Characteristics



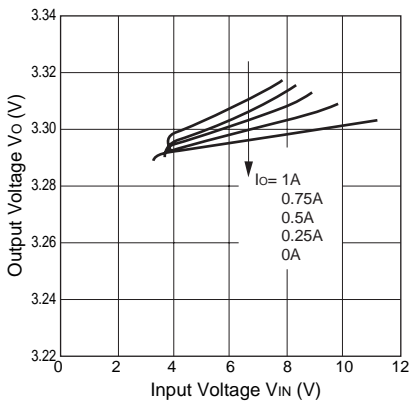
Overcurrent Protection Characteristics



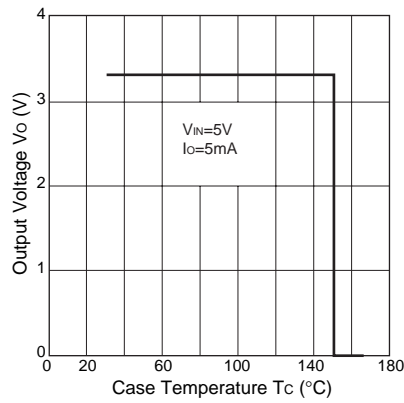
Output ON/OFF Control Current



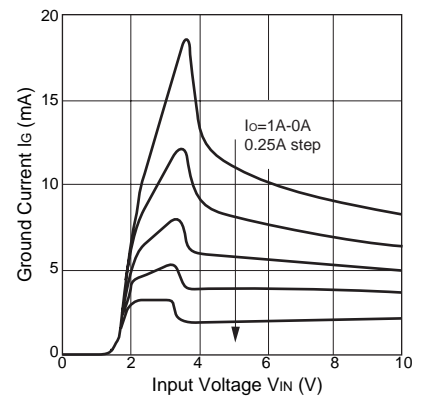
Line Regulation



Thermal Protection Characteristics



Circuit Current



[Note on Thermal Protection]

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