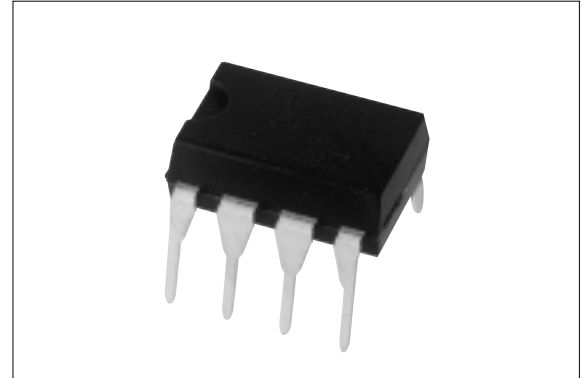


SI-8000GL Series

Compact, Separate Excitation Switching Type

■Features

- DIP 8 pin package
- Output current: 1.5 A
- High efficiency: 91% (at $V_{IN} = 10\text{ V}$, $I_o = 1\text{ A}$, $V_o = 5\text{ V}$)
- High operating efficiency of 250 kHz allows reduction of choke coil.
- A 1 V reference voltage (V_{ref}) of variable output voltage type can support output voltage from 1 V to 24 V.
- Wide Input Voltage Range (8 to 50 V)
- Output ON/OFF capable
- Built-in overcurrent protection and thermal protection circuit



■Applications

- Onboard local power supplies
- OA equipment
- For stabilization of the secondary stage output voltage of switching power supplies

■Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Ratings	Unit
DC Input Voltage	V_{IN}	53	V
Power Dissipation	P_D^{*1}	1	W
Junction Temperature	T_j	+125	°C
Storage Temperature	T_{stg}	-40 to +125	°C
Thermal Resistance (junction to case)	$R_{th(j-c)}$	28	°C/W
Thermal Resistance (junction to ambient air)	$R_{th(j-a)}$	100	°C/W

*1: Limited due to thermal protection.

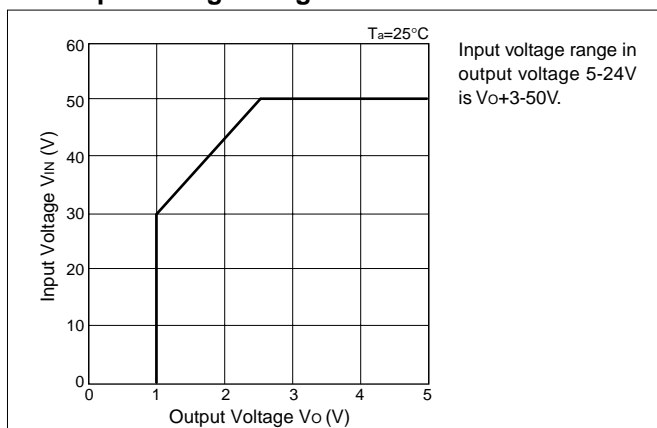
■Recommended Operating Conditions

Parameter	Symbol	Ratings	
		SI-8010GL	SI-8050GL
DC Input Voltage Range	V_{IN}	(8 or V_o+3) ^{*1} to 50 ^{*2}	8 to 50
Output Voltage Range	V_o	1 to 24	—
Output Current Range	I_o	0.02 to 1.5	
Operating Junction Temperature Range	T_{jop}	-30 to +125	
Operating Temperature Range	T_{op}	-30 to +125	

*1: The minimum value of an input voltage range is the higher of either 8V or $V_o+3\text{ V}$.

*2: See the following table for the maximum value of the input voltage range.

■DC Input Voltage Range



■Electrical Characteristics

(Ta=25°C)

Parameter	Symbol	Rating						Unit
		SI-8010GL (Variable type)			SI-8050GL (On developing)			
		min.	typ.	max.	min.	typ.	max.	
Output Voltage*1	Vo(VREF)*2	0.97	1.00	1.03	4.85	5.00	5.15	V
	Conditions	VIN=12V, IO=1A			VIN=20V, IO=1A			
Efficiency	Eff		86			86		%
	Conditions	VIN=20V, IO=1A, VO=5V			VIN=20V, IO=1A			
Switching Frequency	Fosc		250			250		kHz
	Conditions	VIN=12V, IO=1A			VIN=12V, IO=1A			
Line Regulation	ΔVOLINE		20	40		20	80	mV
	Conditions	VIN=10 to 30V, IO=1A			VIN=10 to 30V, IO=1A			
Load Regulation	ΔVOLOAD		10	30		10	40	mV
	Conditions	VIN=12V, IO=0.1 to 1.5A			VIN=20V, IO=0.1 to 1.5A			
Temperature Coefficient of Output Voltage*3	ΔVo/ΔTa		±0.5			±0.5		mV/°C
	ΔVREF/ΔTa*4							
Overcurrent Protection Starting Current	Is	1.6			1.6			A
	Conditions	VIN=12V			VIN=20V			
Quiescent Circuit Current	Iq		7			7		mA
	Conditions	VIN=12V, IO=0A			VIN=20V, IO=0A			
Off Circuit Current	Iq(off)			400			400	μA
	Conditions	VIN=12V, VON/OFF=0.3V			VIN=20V, VON/OFF=0.3V			
CE/SS*5 Terminal	Low Level Voltage	VSSL		0.5			0.5	V
	Leak Current at Low Voltage	ISSL		50			50	
	Conditions	VSSL=0V			VSSL=0V			

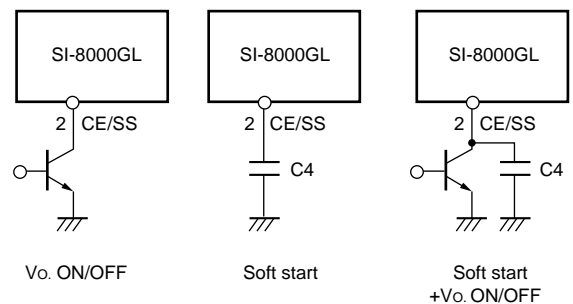
*1: Reference voltage for SI-8010GL

*3: Reference voltage temperature coefficient for SI-8010GL

*2: VREF for SI-8010GL

*4: ΔVREF/ΔTa for SI-8010GL

*5: No. 2 terminal is a CE/SS terminal to enable soft start by connecting a capacitor. The output can be turned on and off by using a CE/SS terminal. The output is stopped by decreasing the CE/SS terminal voltage below VSSL and in order to perform ON/OFF operation of VOUT, it is required to be connected NPN transistor or the output of open collector type TTL between No. 5 terminal and GND.



In case that both soft start and VOUT ON/OFF are used, a protection measure such as limitation of current is required, as the discharge current of C4 flows across a transistor for ON/OFF operation, if the capacitance of C4 large. As a pull-up type resistor is provided inside the IC, no external voltage can be applied.

■Application Notes

Parallel Operation:

The parallel operation to increase the current is not available.

Thermal Protection Characteristics:

The SI-8000GL series has a thermal protection circuit. This circuit keeps the IC from the fever by the over load. But this circuit cannot guarantee the long-term reliability against the continuously over load status.

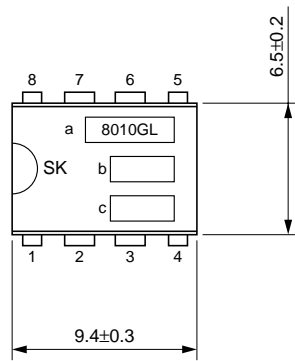
■Handling Remarks to Prevent Damage by Static Electricity

Considerations to protect the Products from Electrostatic Discharge

- When handling the devices, operator must be grounded. Grounded wrist straps be worn and should have at least 1 MΩ of resistance near operators to ground to prevent shock hazard.
- Workbenches where the devices are handled should be grounded and be provided with conductive table and floor mats.
- When using measuring equipment such as a curve tracer, the equipment should also be grounded.
- When soldering the devices, the head of a soldering iron or a solder bath must be grounded in other to prevent leak voltage generated by them being applied to the devices.
- The devices should always be stored and transported in our shipping containers or conductive containers, or be wrapped up in aluminum foil.

■External Dimensions

(Unit: mm)



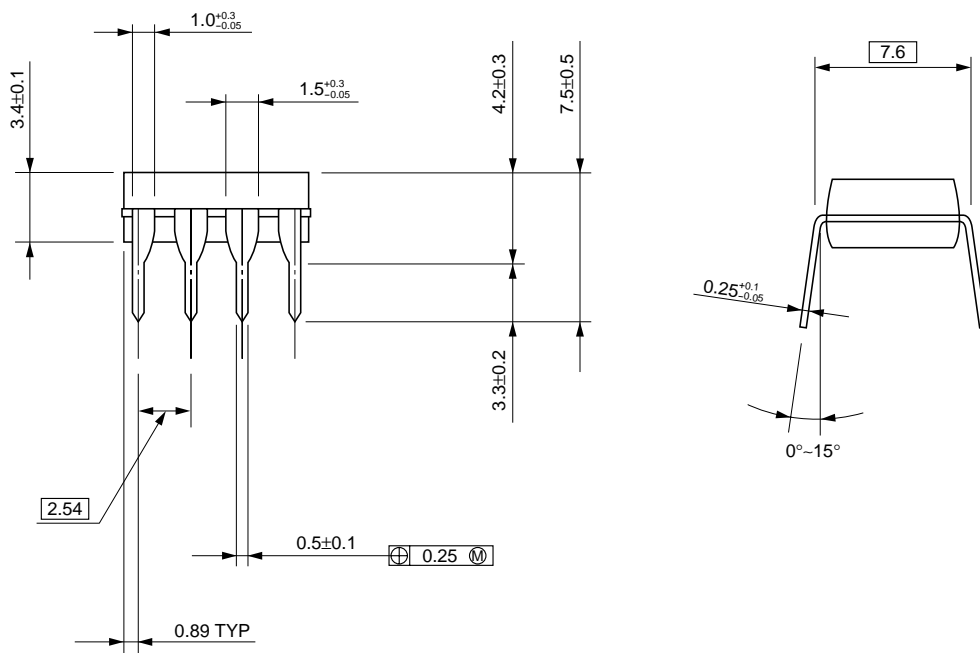
Pin Arrangement

1. GND
2. CE/SS
3. Reg
4. SW_{OUT}
5. V_{IN}
6. B.S
7. Comp
8. V_{REF} (SI-8010GL)
V_S (SI-8050GL)

a. Part Number Display

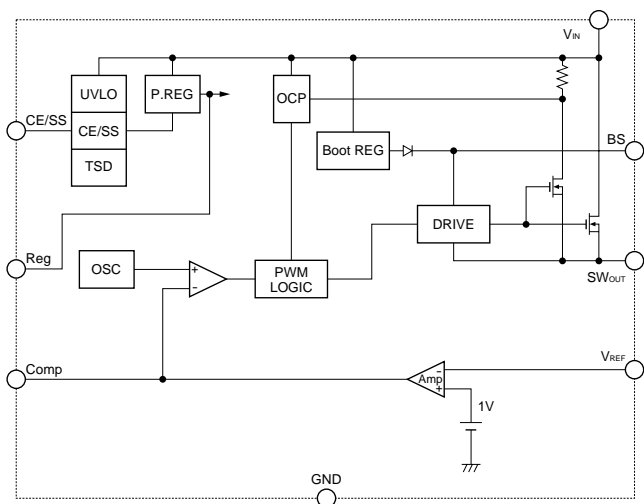
- b. Lot Number (3 digits)
- 1st character Year (last digit)
 - 2nd character Month
 - Jan-Sep: Arabic numerals
 - Oct: O
 - Nov: N
 - Dec: D
 - 3rd character Week
 - 01-05: Arabic numerals

c. Administration Number (4 digits)

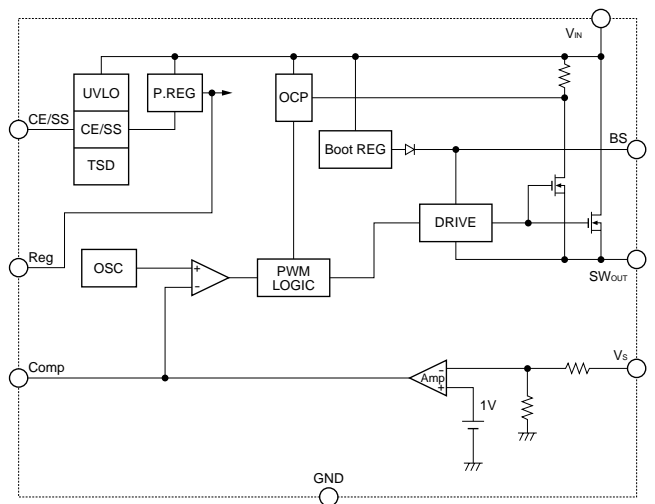


■Block Diagram

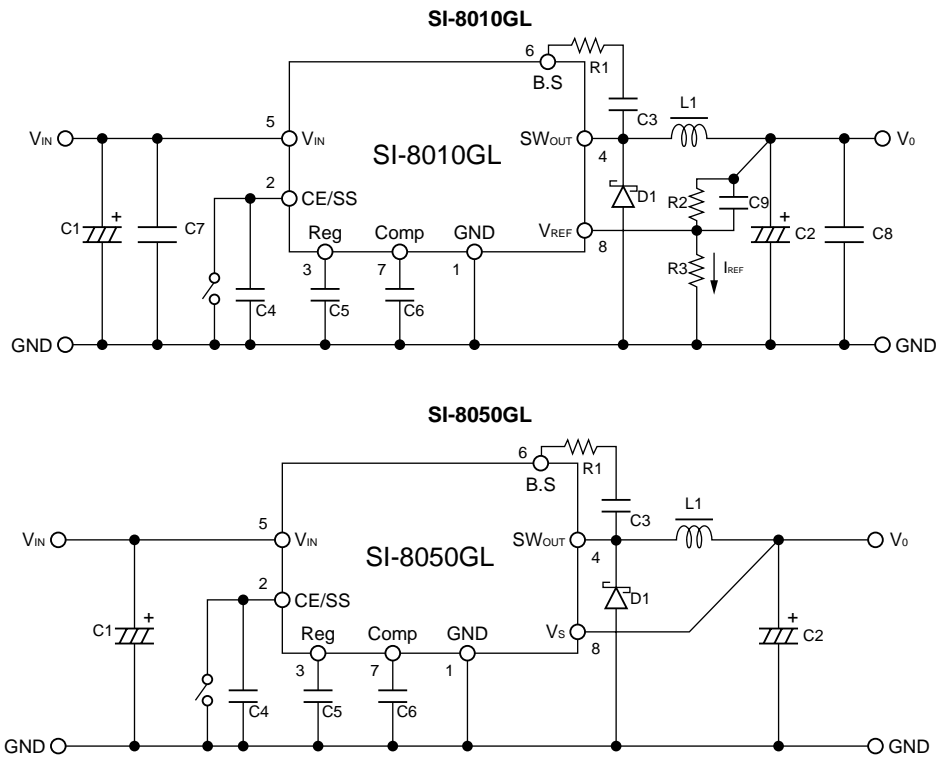
SI-8010GL



SI-8050GL



■Standard External Circuit



- C1: 220 μ F/63V
- C2: 470 μ F/25V
- C3: 0.1 μ F
- C4: 1000pF
- C5: 0.1 μ F
- C6: 0.047 μ F
- C7: 0.1 μ F
- C8: 0.1 μ F
- C9: 6800pF
- R1: 47 Ω
- L1: 47 μ H
- D1: RK16 (Sanken)

Diode D1

- The schottky-barrier diode must be used for D1. If other diodes like fast recovery diodes are used, IC may be destroyed because of the reverse voltage applied by the recovery voltage or ON voltage.

Choke coil L1

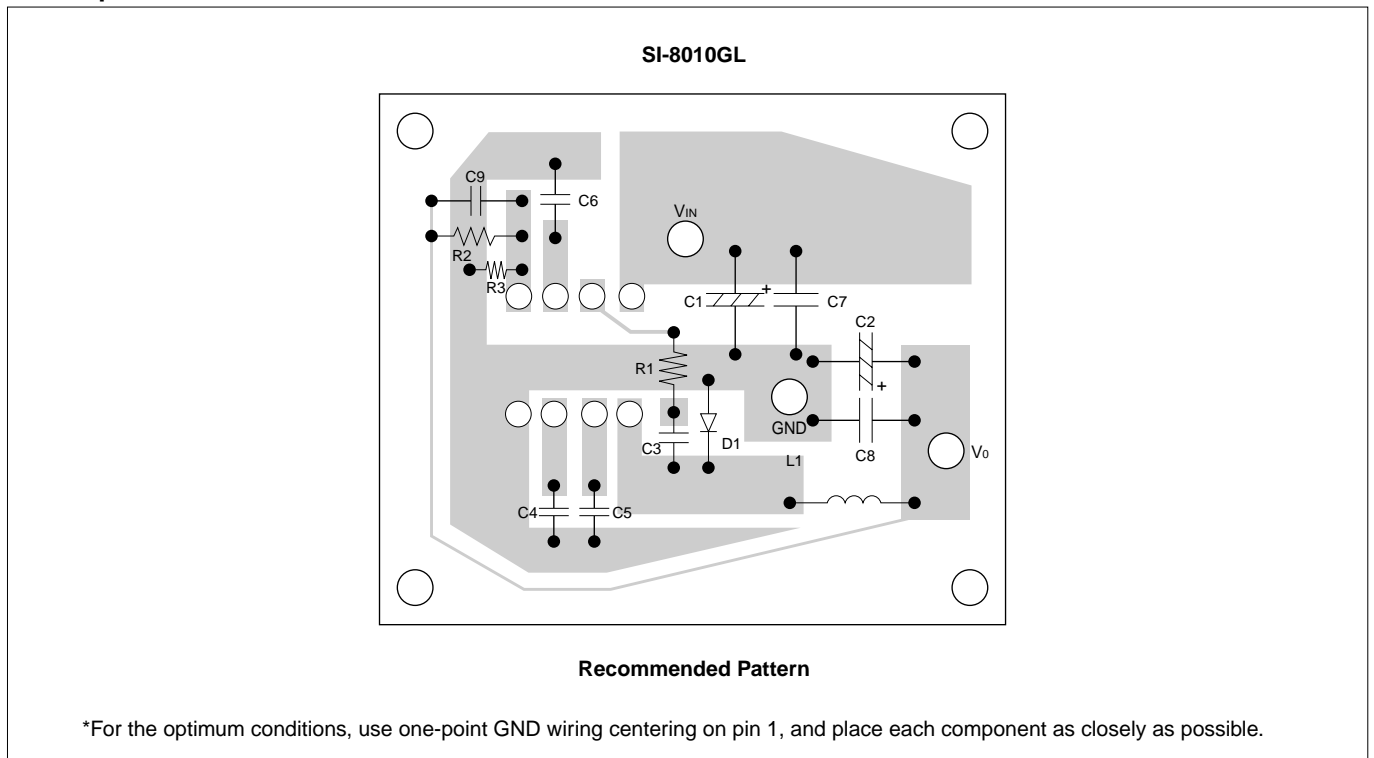
- If the winding resistance of the choke coil is too high, the efficiency may go down to the extent that it is out of the rating.
- As the overcurrent protection start current is approx. 2.5 A, attention must be paid to the heating of the choke coil by the magnetic saturation due to overload or short-circulated load.

Capacitor C1, C2

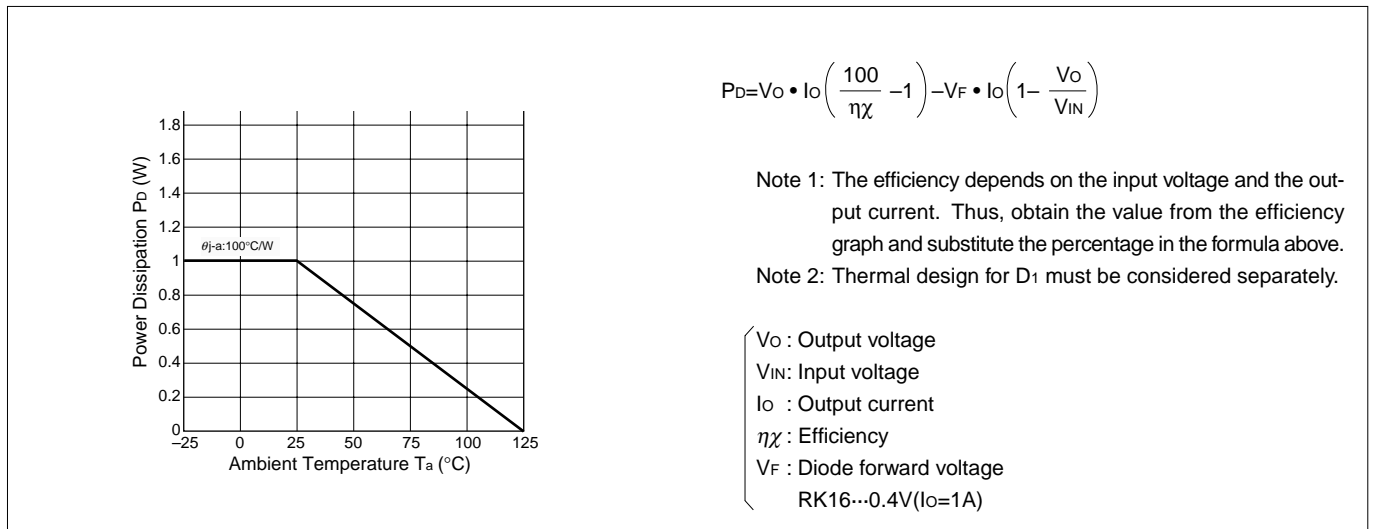
- As large ripple currents flow across C1 and C2, capacitors with high frequency and low impedance for SMPS must be used. Especially when the impedance of C2 is high, the switching waveform may not be normal at low temperature. Please use neither OS capacitor nor tantalum capacitor which causes an abnormal oscillation for the C2.

©In order to have optimum operating condition, each component must be laid out with the minimum distance.

■Example of Pattern on PC Board

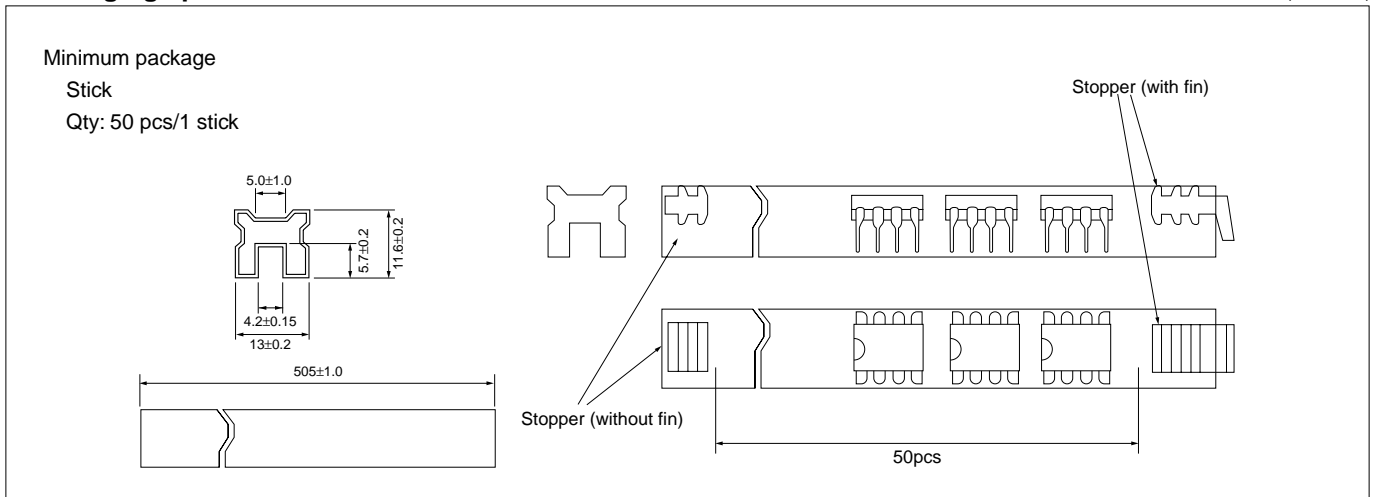


■T_a-P_D Characteristics



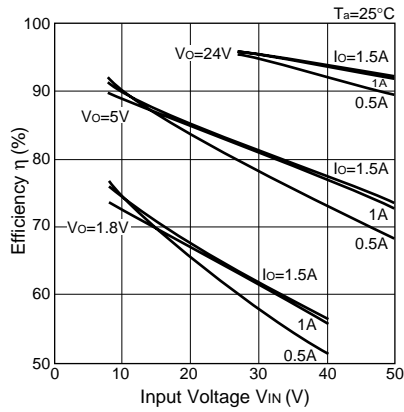
■Packaging specifications

(Unit: mm)

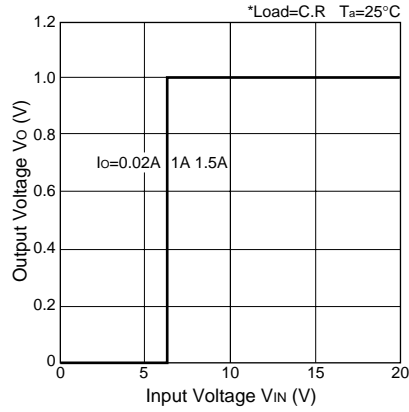


■Typical characteristics (SI-8010GL)

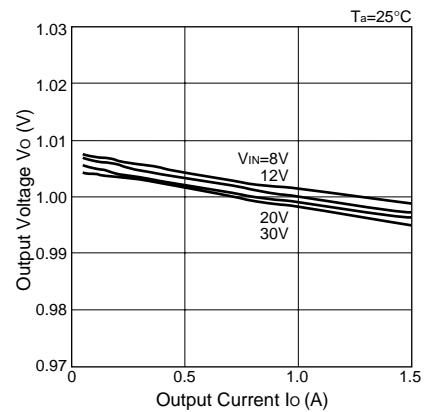
Efficiency Characteristics



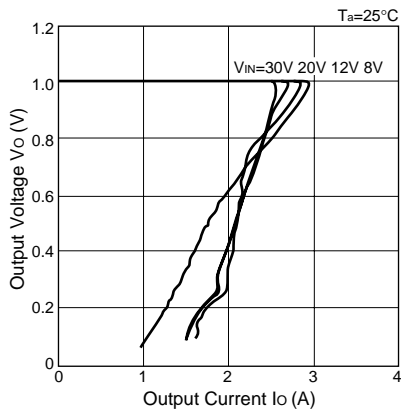
Output Voltage



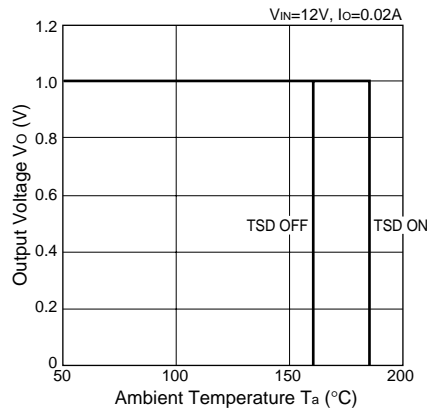
Load Regulation



Overcurrent Protection Characteristics



Thermal Protection Characteristics



Temperature Characteristics

