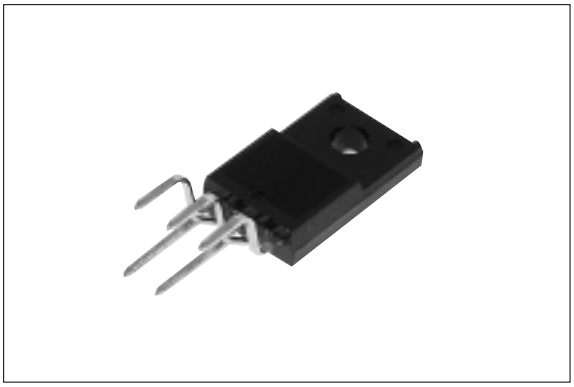
SI-8000JF Series

Full-Mold, Separate Excitation Switching Type

■Features

- Compact full-mold package (equivalent to TO220)
- Output current: 1.5 A
- High efficiency: 79 to 91%
- Requires only 4 external components
- Phase correction and output voltage adjustment performed internally
- Choke coil size can be reduced through the employment of high frequency (125 kHz) design
- Built-in foldback overcurrent protection, thermal protection circuits
- Output ON/OFF capable (OFF state current consumption: 200 μA max.)
- Soft start possible via ON/OFF pin



■Applications

- Power supplies for telecommunication equipment
- Onboard local power supplies

■Lineup

Part Number	SI-8015JF	SI-8025JF	SI-8033JF	SI-8050JF	SI-8090JF	SI-8120JF
V_O (V)	1.59	2.5	3.3	5.0	9.0	12.0
I_O (A)	1.5					

■Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
DC Input Voltage	V_{IN}	43	V
Power Dissipation	P_{D1}	16.6 (with infinite heatsink)	W
	P_{D2}	1.5 (without heatsink, standalone operation)	W
Junction Temperature	T_j	+125	°C
Storage Temperature	T_{stg}	–40 to +125	°C
Thermal Resistance (Junction to Case)	$R_{th\ (j-c)}$	6.0	°C/W

■Recommended Operating Conditions

Parameter	Symbol	Ratings						Unit	Conditions
		SI-8015JF*	SI-8025JF	SI-8033JF	SI-8050JF	SI-8090JF	SI-8120JF		
DC Input Voltage Range	$V_{IN}1$	V_O+2 to V_O+3	4.5 to 5.5	5.3 to 6.3	7 to 8	11 to 12	14 to 15	V	I_O=0 to 1A
	$V_{IN}2$	V_O+3 to 40	5.5 to 40	6.3 to 40	8 to 40	12 to 40	15 to 40	V	I_O=0 to 1.5A
Output Current Range	I_O	0 to 1.5						A	$V_{IN} \geq V_O$+3V
Operating Junction Temperature Range	T_{jop}	–30 to +125						°C	

*SI-8015JF is a variable output voltage type. The variable output voltage range is from 2.5 V to 24 V.

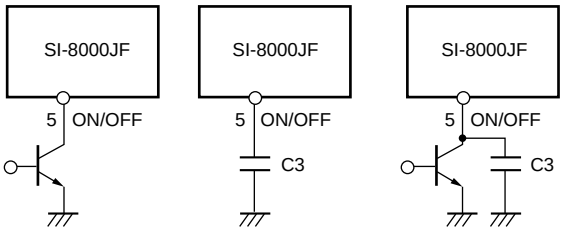
■Electrical Characteristics

(T_a=25°C)

Parameter		Symbol	Rating																			Unit
			SI-8015JF			SI-8025JF			SI-8033JF			SI-8050JF			SI-8090JF			SI-8120JF			
			min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	
Output Voltage*1		V_O*2	1.558	1.59	1.622	2.45	2.50	2.55	3.234	3.30	3.366	4.90	5.00	5.10	8.82	9.00	9.18	11.76	12.00	12.24	V
		Conditions	V_{IN}=12V, I_O=0.5A			V_{IN}=12V, I_O=0.5A			V_{IN}=15V, I_O=0.5A			V_{IN}=20V, I_O=0.5A			V_{IN}=21V, I_O=0.5A			V_{IN}=24V, I_O=0.5A			
Efficiency		η		67			74			77			82			86			88		%
		Conditions	V_{IN}=12V, I_O=0.5A			V_{IN}=12V, I_O=0.5A			V_{IN}=15V, I_O=0.5A			V_{IN}=20V, I_O=0.5A			V_{IN}=21V, I_O=0.5A			V_{IN}=24V, I_O=0.5A			
Switching Frequency		f		125			125			125			125			125			125		kHz
		Conditions	V_{IN}=12V, I_O=0.5A			V_{IN}=12V, I_O=0.5A			V_{IN}=15V, I_O=0.5A			V_{IN}=20V, I_O=0.5A			V_{IN}=21V, I_O=0.5A			V_{IN}=24V, I_O=0.5A			
Line Regulation		ΔV_{OLINE}		25	80		25	80		25	80		40	100		50	120		60	130	mV
		Conditions	V_{IN}=8 to 30V, I_O=0.5A			V_{IN}=7 to 30V, I_O=0.5A			V_{IN}=8 to 30V, I_O=1.0A			V_{IN}=10 to 30V, I_O=1.0A			V_{IN}=15 to 30V, I_O=1.0A			V_{IN}=18 to 30V, I_O=1.0A			
Load Regulation		ΔV_{OLOAD}		10	30		10	30		10	30		10	40		10	40		10	40	mV
		Conditions	V_{IN}=12V, I_O=0.2 to 0.8A			V_{IN}=12V, I_O=0.2 to 0.8A			V_{IN}=15V, I_O=0.5 to 1.5A			V_{IN}=20V, I_O=0.5 to 1.5A			V_{IN}=21V, I_O=0.5 to 1.5A			V_{IN}=24V, I_O=0.5 to 1.5A			
Temperature Coefficient of Output Voltage*3		$\Delta V_O/\Delta T_a$*4		±0.5			±0.5			±1.0			±1.0								mV/°C
Overcurrent Protection Starting Current		I_{S1}	1.6			1.6			1.6			1.6			1.6			1.6			A
		Conditions	V_{IN}=12V			V_{IN}=12V			V_{IN}=15V			V_{IN}=20V			V_{IN}=21V			V_{IN}=24V			
ON/OFF*5 Terminal	Low Level Voltage	V_{SSL}			0.5			0.5			0.5			0.5			0.5			0.5	V
	Leak Current at Low Voltage	I_{SSL}			100			100			100			100			100			100	μA
		Conditions	V_{SSL}=0V			V_{SSL}=0V			V_{SSL}=0V			V_{SSL}=0V			V_{SSL}=0V			V_{SSL}=0V			
Quiescent Circuit Current		I_q		7			7			7			7			7			7		mA
		Conditions	V_{IN}=12V, I_O=0A			V_{IN}=12V, I_O=0A			V_{IN}=15V, I_O=0A			V_{IN}=20V, I_O=0A			V_{IN}=21V, I_O=0A			V_{IN}=24V, I_O=0A			
		$I_{q(off)}$			200			200			200			200			200			200	μA
		Conditions	V_{IN}=12V, $V_{ON/OFF}$=0.3V			V_{IN}=12V, $V_{ON/OFF}$=0.3V			V_{IN}=15V, $V_{ON/OFF}$=0.3V			V_{IN}=20V, $V_{ON/OFF}$=0.3V			V_{IN}=21V, $V_{ON/OFF}$=0.3V			V_{IN}=24V, $V_{ON/OFF}$=0.3V			

*1: Reference voltage for SI-8015JF
*2: V_{REF} for SI-8015JF
*3: Reference voltage temperature coefficient for SI-8015JF
*4: $\Delta V_{REF}/\Delta T_a$ for SI-8015JF

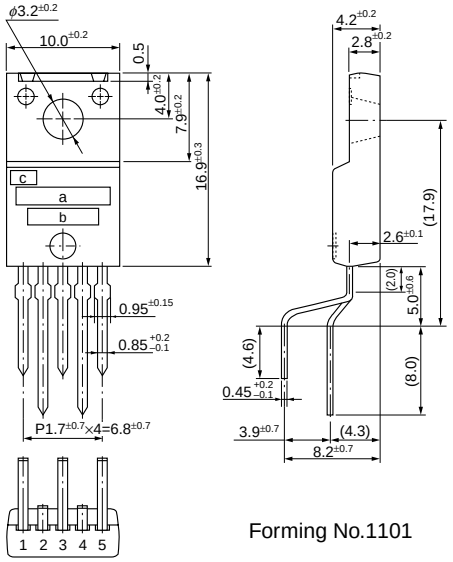
*5: Pin 5 is the ON/OFF pin. Connecting a capacitor to this pin enables the soft start function. By using this pin, the output can also be turned on or off.
To stop output, set the ON/OFF pin voltage to VSSL or less. To switch the potential of the ON/OFF pin, drive the open collector of the trainsistor, etc. When SI-8000JF is started using the ON/OFF pin, take appropriate action such as limiting the current for a large-capacity C3 because a discharge current flows to the ON/OFF control transmistor from C3. The ON/OFF pin is pulled up to the power supply in the IC, so no external voltage can be applied. If this pin is not used, leave it open.



$V_{OUT.}$ ON/OFF　　Soft start　　Soft start +$V_{OUT.}$ ON/OFF

■External Dimensions

(Unit : mm)



Forming No.1101

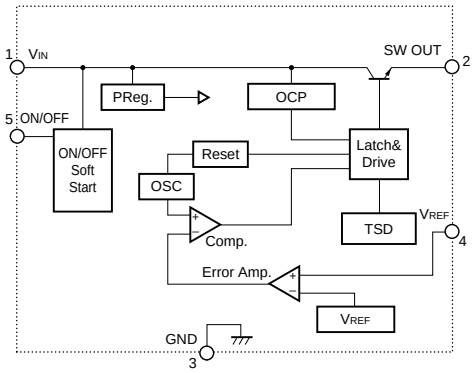
a. Part Number
b. Lot Number
c. Logo Mark

Pin Arrangement
① V_{IN}
② SW_{OUT}
③ GND
④ V_{OS}
⑤ ON/OFF

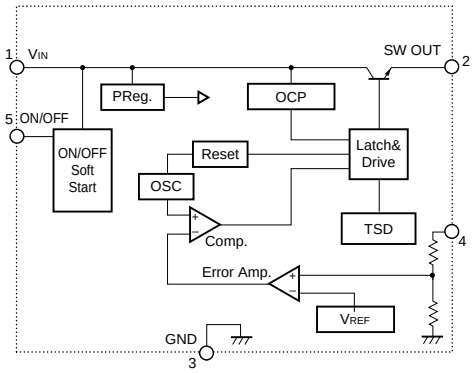
Plastic Mold Package Type
Flammability: UL94V-0
Weight: Approx. 2.3g

■Block Diagram

SI-8015JF

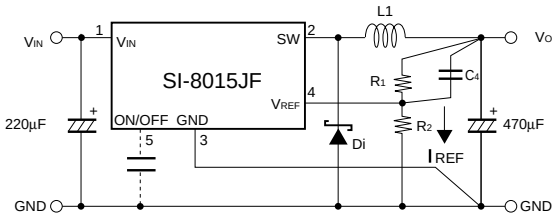


SI-8025JF, 8033JF, 8050JF, 8090JF, 8120JF

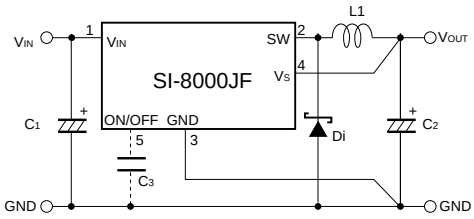


■Standard External Circuit

SI-8015JF



SI-8025JF, 8033JF, 8050JF, 8090JF, 8120JF

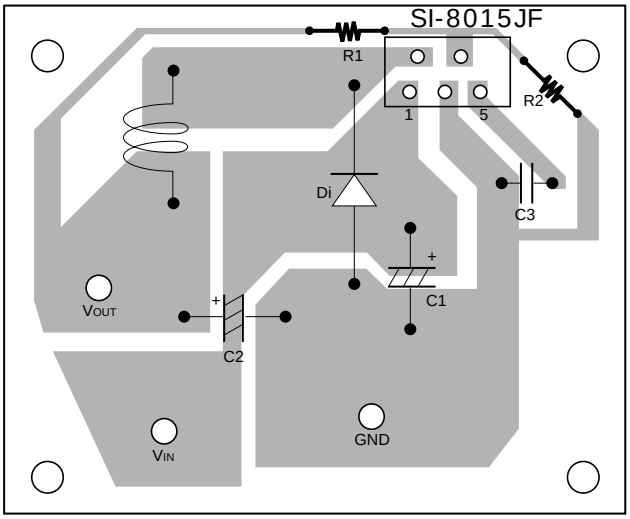


C1 : 50V/220µF
C2 : 25V/470µF
C3 : 10V/0.47µF (when using soft-start function)
C4 : 6800pF
L1 : 100µH
Di : RK16 (Sanken)

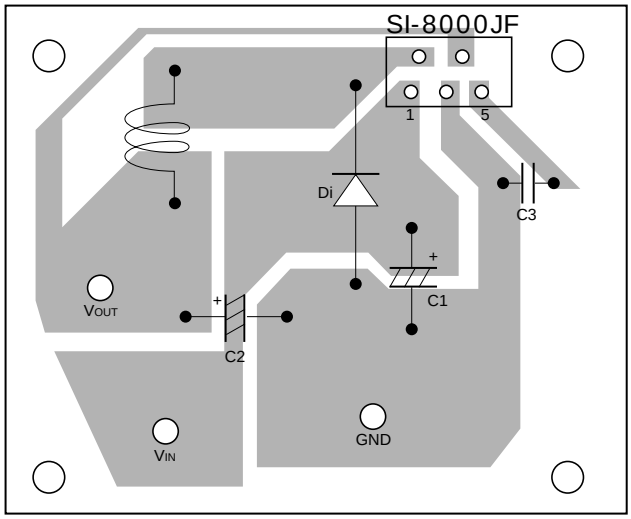
C1 : 50V/220µF
C2 : 25V/470µF
C3 : 10V/0.47µF (when using soft-start function)
L1 : 100µH
Di : RK16 (Sanken)

■Example of Pattern on PC Board

SI-8015JF
Recommended Pattern



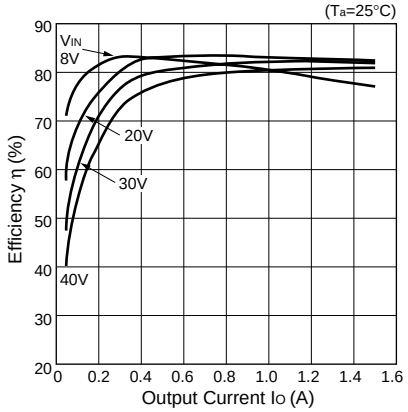
SI-8025JF, 8033JF, 8050JF, 8090JF, 8120JF
Recommended Pattern



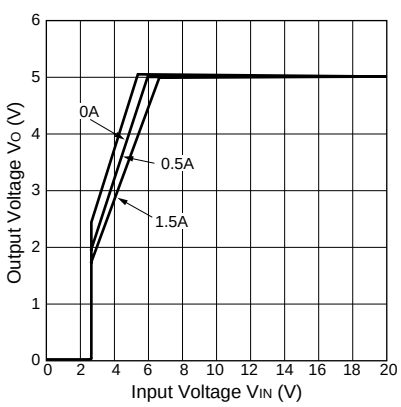
* For the optimum operating conditions, use one-point GND wiring centering on pin 3, and place each component as closely as possible.

■Typical characteristics (SI-8015JF) (VO=5V)

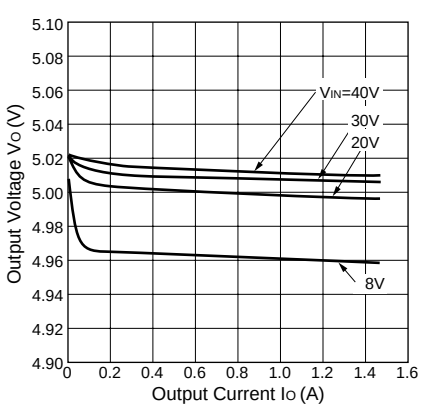
Efficiency Characteristics



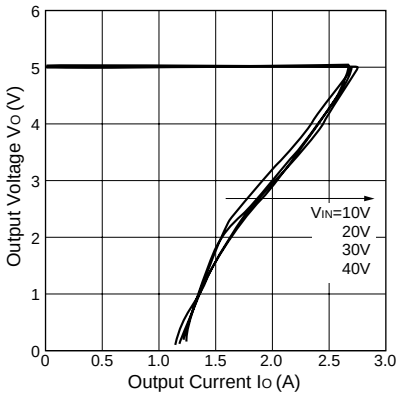
Output Voltage



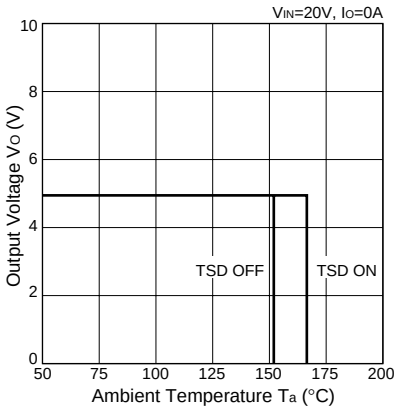
Load Regulation



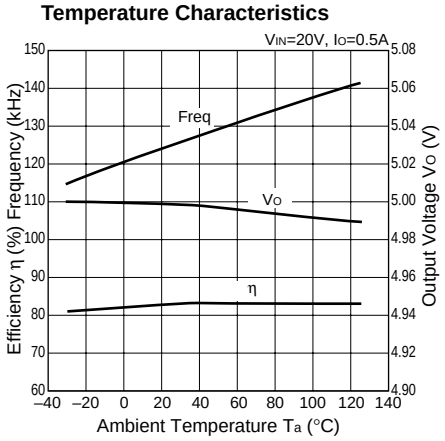
Overcurrent Protection Characteristics



Thermal Protection Characteristics

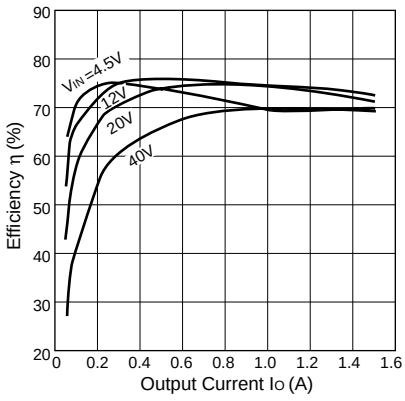


Temperature Characteristics

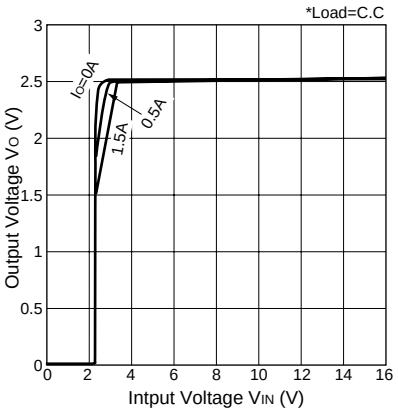


■Typical characteristics (SI-8025JF)

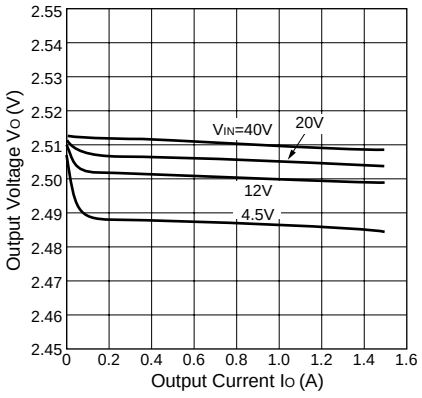
Efficiency Characteristics



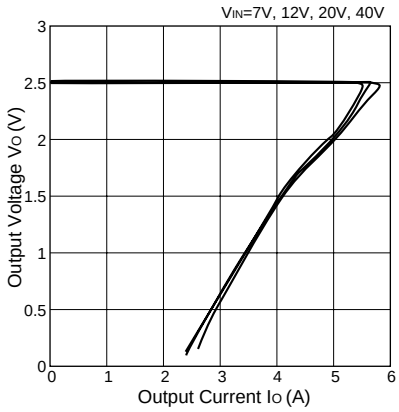
Output Voltage



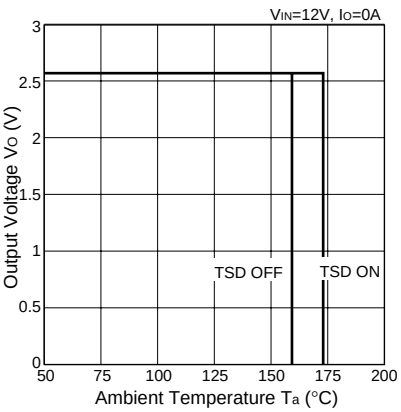
Load Regulation



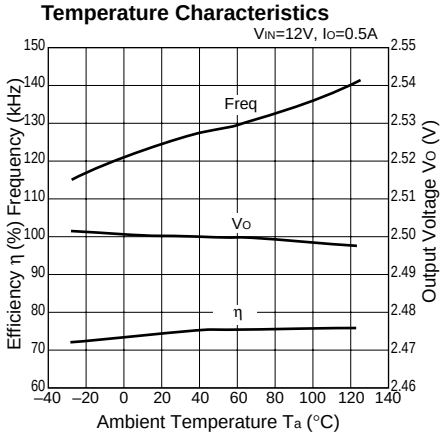
Overcurrent Protection Characteristics



Thermal Protection Characteristics

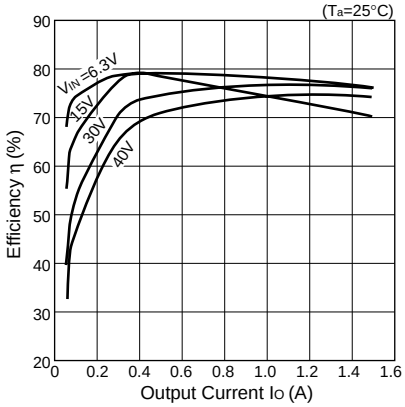


Temperature Characteristics

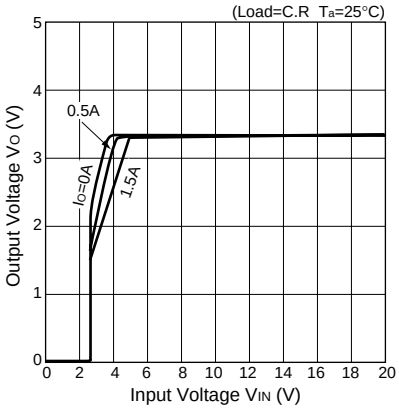


■Typical characteristics (SI-8033JF)

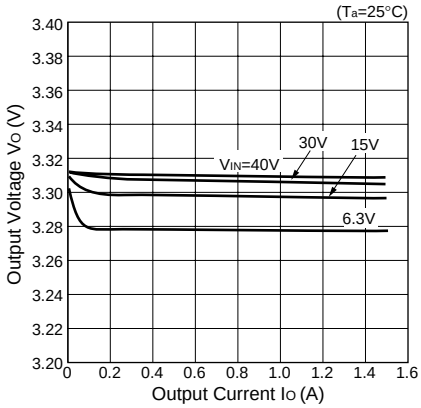
Efficiency Characteristics



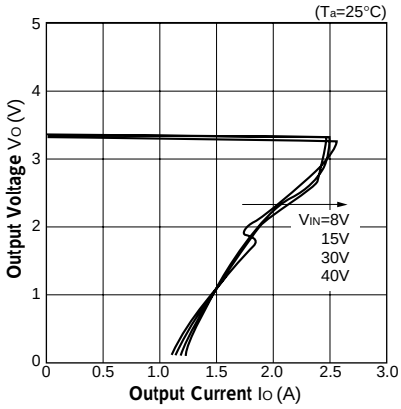
Output Voltage



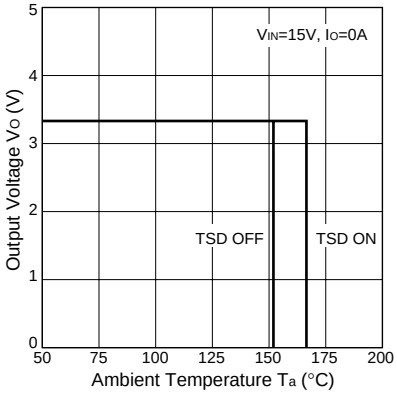
Load Regulation



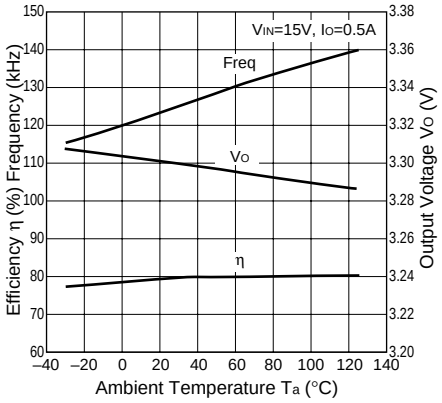
Overcurrent Protection Characteristics



Thermal Protection Characteristics

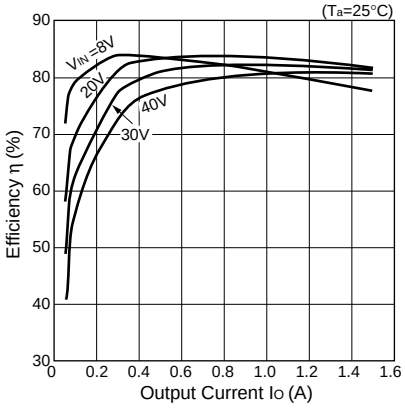


Temperature Characteristics

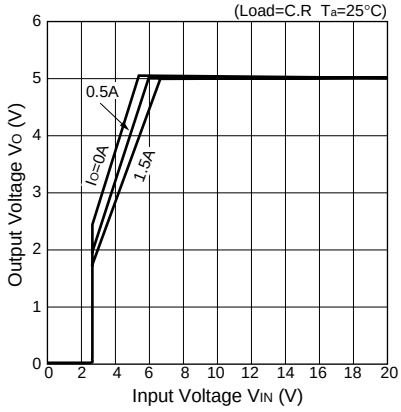


■Typical characteristics (SI-8050JF)

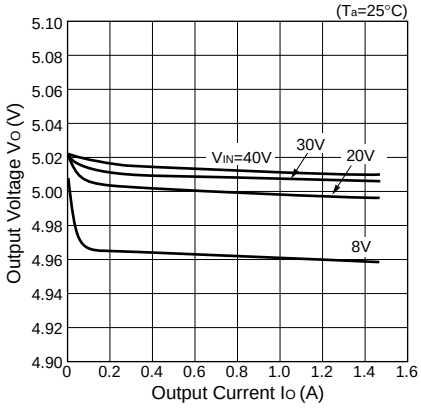
Efficiency Characteristics



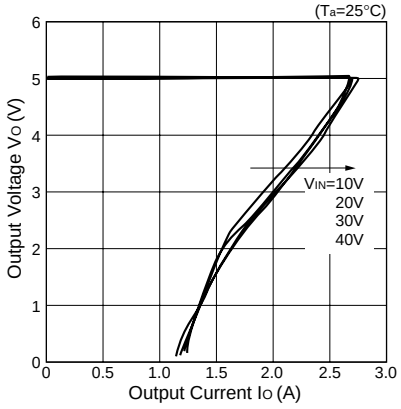
Output Voltage



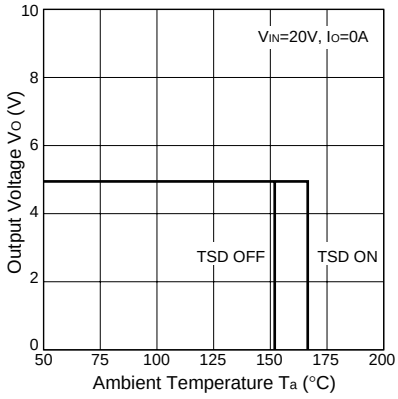
Load Regulation



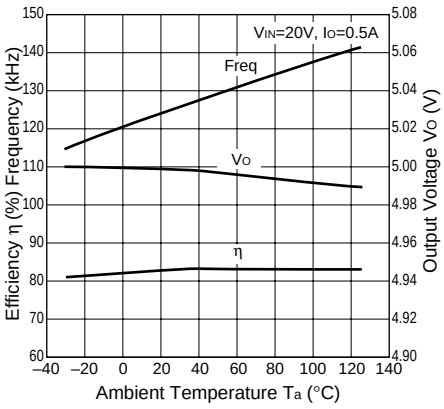
Overcurrent Protection Characteristics



Thermal Protection Characteristics

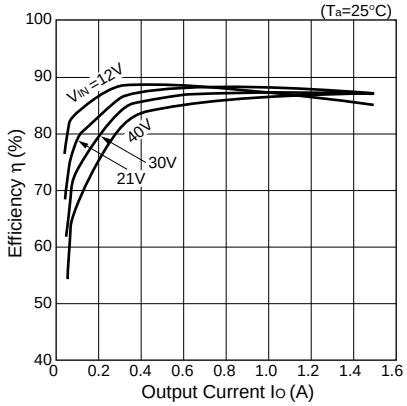


Temperature Characteristics

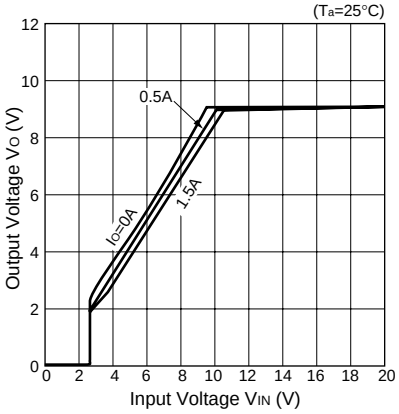


■Typical characteristics (SI-8090JF)

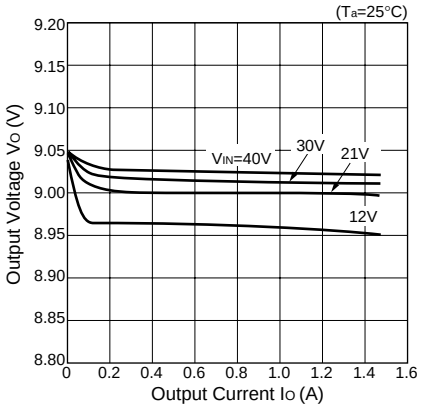
Efficiency Characteristics



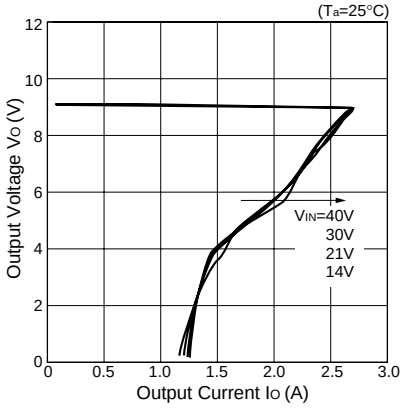
Output Voltage



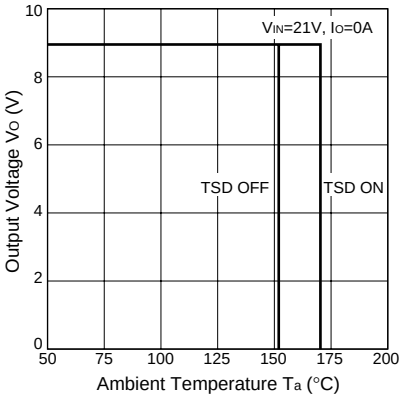
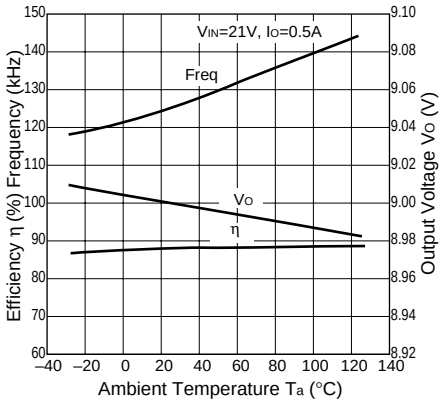
Load Regulation



Overcurrent Protection Characteristics



Thermal Protection Characteristics



Temperature Characteristics