Features

- Dual input and dual output (ch1: 5V/0.4A, ch2: 5V/0.2A)
- Power on reset function
- Watchdog timer
- Built-in drooping type overcurrent and thermal protection circuits (ch1)

Absolute Maximum Ratings

(Ta=25°C)

Parameter		Symbol	Ratings	Unit	Remarks
DC input voltage		$V_{IN}1$	–13 to 35	V	Reverse connection 1 min max.
		$V_{IN}2$			
Vo1, Vo2 output control terminal voltage		EN	–0.3 to 35	V	
Vo2 output control terminal voltage		VC	–0.3 to 35	V	
Output current	CH1	Io1	0.4	A	
	CH2	Io2	0.2		
TC terminal input voltage		TC	–0.3 to 7	V	
CK terminal input voltage		CK			
W/D/C terminal input voltage		W/D/C			
Reset terminal output voltage		RESET			
Power dissipation		P_D1	18.6	W	With an infinite heatsink mounted.
		P_D2	2.97		*1
Junction temperature		Tj	–40 to 150	°C	
Operating temperature		Top	–40 to 105	°C	
Storage temperature		Tstg	–40 to 150	°C	
Thermal resistance (junction to case)		θj-c	6.7	°C/W	With an infinite heatsink mounted.
Thermal resistance (junction to ambient air)		θj-a	42	°C/W	*1

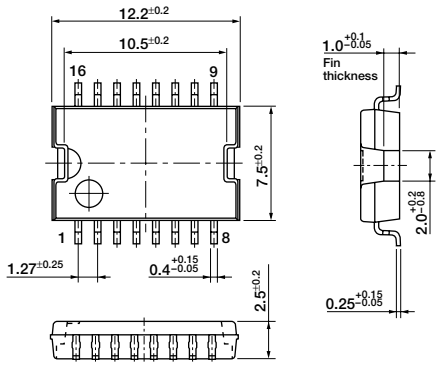
Notes: *1: With glass epoxy + copper foil board (size 5.0•7.4cm; t: glass epoxy=1.6mm / copper foil=18μm)

Electrical Characteristics

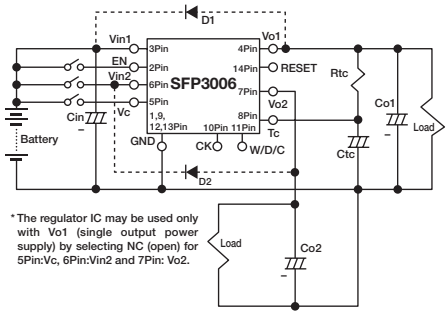
Parameter		Symbol	Ratings min	Ratings typ	Ratings max	Unit	Conditions
Input voltage		$V_{IN}1, 2$	$V_{O}1+V_{DIF}1$		35	V	*2, 3
Output voltage	CH1	Vo1	4.85	5.00	5.15	V	$V_{IN}1$=6 to 18V, Io=0 to 0.3A
	CH2	Vo2	4.85	5.00	5.15		$V_{IN}2$=6 to 18V, Io=0 to 0.3A
Dropout voltage	CH1	$V_{DIF}1$			0.5	V	
	CH2	$V_{DIF}2$			0.5		
Ripple rejection	CH1	$R_{REJ}1$		54		db	f=100 to 120Hz
	CH2	$R_{REJ}2$		54			
Quiescent circuit current		Iq		10	50	μA	$V_{IN}1$=16V, V_{EN}=0V
				50	250		$V_{IN}1$=35V, V_{EN}=0V
				5	10	mA	
GND current		I_{GND}		70	100	mA	Io1=Io2=0.2A
Overcurrent protection starting current	CH1	Is11	0.402		1.8	A	Vo1=4.5V
	CH2	Is21	0.201		0.8		Vo2=4.5V
Residual current at a short	CH1	Is21	0.402		1.8	A	Vo1=0V
	CH2	Is22	0.201		0.8		Vo2=0V
EN output control voltage		V_{EN}th	0.9		3.5	V	
EN output control current	ON	I_{EN}H			50	μA	EN=5V
	OFF	I_{EN}L	–1.0		1.0		EN=0V
Reset terminal LOW voltage		V_{RS}L			0.5	V	Isink=250μA (Pull-up resistance 20kΩ typ)
Reset terminal HI voltage		V_{RS}H	Vo1-0.8V			V	Isource=15μA *4
Reset detect voltage	CH	Vo1thH			Vo1•0.97	V	Vrs＞4.5V
		Vo1thL	4.05			V	Vrs＜0.8V
Power on reset delay time		t_{dly}	1.18•Rtc•Ctc	1.26•Rtc•Ctc	1.35•Rtc•Ctc	S	Min. set time: 6mS
W/D time		t_{wd}	0.93•Rtc•Ctc	1.03•Rtc•Ctc	1.13•Rtc•Ctc	S	Min. set time: 4mS
W/D pulse time		t_{wdp}	0.07•Rtc•Ctc	0.13•Rtc•Ctc	0.19•Rtc•Ctc	S	Min. set time: 400μS
CK terminal control voltage		Vckth	1.0		3.0	V	Min. clock pulse time: 5μs (Duty 50%)
CK terminal control current	ON	IckH			200	μA	V_{CK}=5V
	OFF	IckL	–1.0		1.0		V_{CK}=0V
Vc output control voltage		Vcth	1.0		3.5	V	
Vc output control current		IcH			300	μA	Vc=5V
		IcL	–1.0		1.0		Vc=0V
W/D/C terminal control voltage		Vw/d/cth	1.0		3.0	V	
W/D/C terminal control current	ON	Iw/d/cH			200	μA	$V_{W/D/C}$=5V
	OFF	Iw/d/cL	–1.0		1.0		$V_{W/D/C}$=0V

Notes:
*2: Refer to Dropout Voltage.
*3: Since $P_D(max) = (V_{IN}–V_O1) • I_O1 + (V_{IN}2–V_O2) • I_O2 + (V_{IN} • Iq) = 22W$, $V_{IN}(max)$, $I_O1(max)$ and $I_O2(max)$ may be limited depending on operating conditions.
*4: The RESET terminal is pulled up in the IC; may be directly connected to logic circuits.
*6: The thermal protection function is built in V_{O1} (CH1 side) only. The design thermal protection starting temperature is 151 °C (min.) and 165°C (typ). These values represent the design warranty.

External Dimensions (unit: mm)



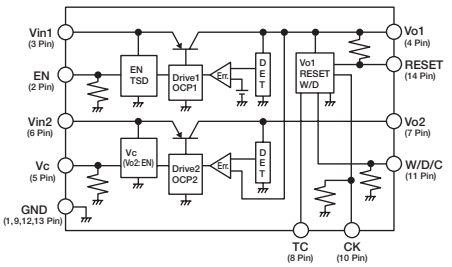
Standard Connection Diagram



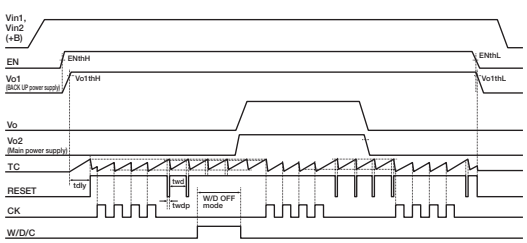
*The regulator IC may be used only with Vo1 (single output power supply) by selecting NC (open) for 5Pin:Vc, 6Pin:Vin2 and 7Pin: Vo2.

Cin: Capacitor (39μF) for oscillation prevention
C_O1: Output capacitor (39μF)
C_O2: Output capacitor (39μF)
Tantalum capacitors are recommended particularly for low temperatures (tantalum capacitors of about 0.47μ F in parallel).
D1, D2: Protection diodes.
Required for protection against reverse biasing between input and output (Recommended diode: SANKEN EU2Z).

Circuit Block Diagram

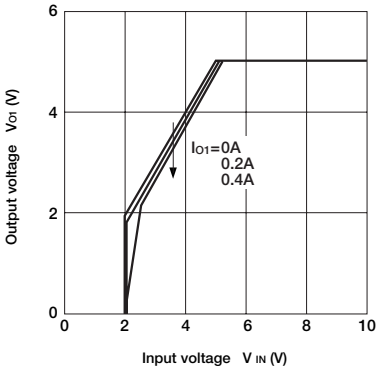


Timing Chart

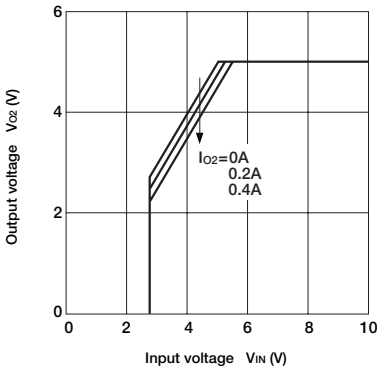


Electrical Characteristics

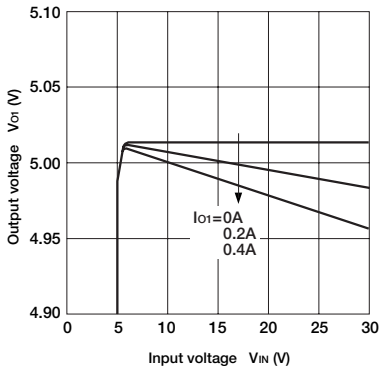
■ Rise Characteristics of Output Voltage (V_{O1})



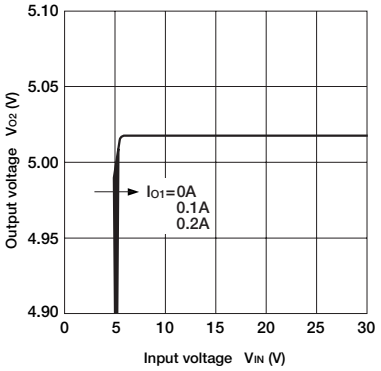
■ Rise Characteristics of Output Voltage (V_{O2})



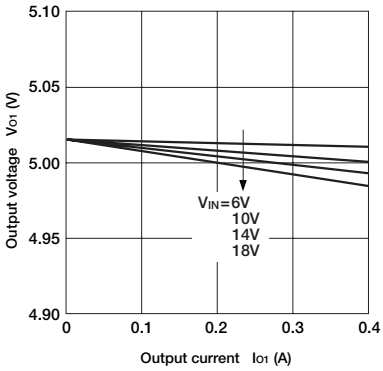
■ Line Regulation (V_{O1})



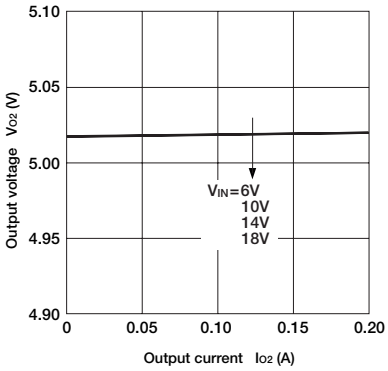
■ Line Regulation (V_{O2})



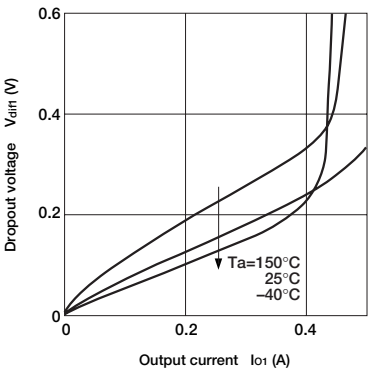
■ Load Regulation (V_{O1})



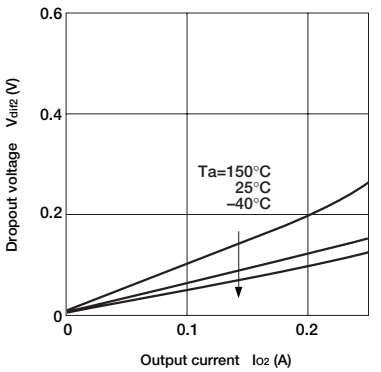
■ Load Regulation (V_{O2})



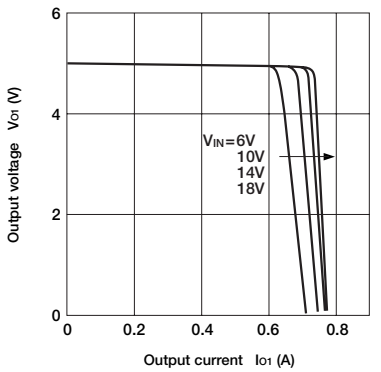
■ Dropout Voltage (V_{O1})



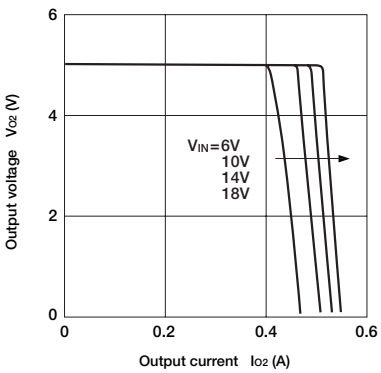
■ Dropout Voltage (V_{O2})



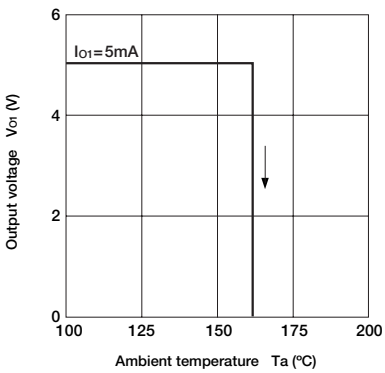
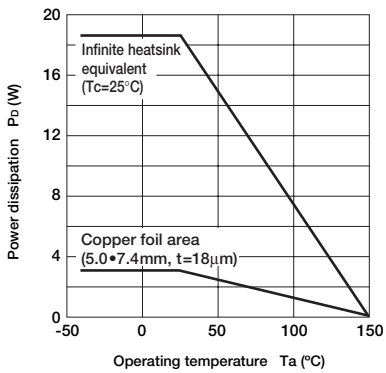
■ Overcurrent Protection Characteristics (V_{O1})



■ Overcurrent Protection Characteristics (V_{O2})



■ Thermal Protection Characteristics



■ Ta—P_D Characteristics