

SI-8000TFE Series Full-Mold, Separate Excitation Step-down Switching Mode

Features

- Compact full-mold package (equivalent to TO220)
- Output current: 1.5 A
- High efficiency: 81% typ. (at $V_o = 5\text{ V}$)
- Requires only 4 discrete components
- Built-in reference oscillator (300 kHz)
- Built-in dropping-type-overcurrent and thermal protection circuits
- Output ON/OFF available (circuit current at output OFF: $200\mu\text{A}$ typ.)
- Soft start available by ON/OFF pin

Applications

- Onboard local power supplies
- AV equipment
- OA equipment

Lineup

Part Number	SI-8008TFE	SI-8050TFE
V_o (V)	Variable (0.8 to 24)	5
I_o (A)		1.5

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Conditions
DC Input Voltage	V_{IN}	43	V	
Power Dissipation	P_{D1-1}	17.8 (with infinite heatsink)	W	Limited by thermal protection, $T_{jmax}=150^\circ\text{C}$
	P_{D1-2}	14.2 (with infinite heatsink)		$T_{jmax}=125^\circ\text{C}$
	P_{D2-1}	2.15 (without heat sink, standalone operation)		Limited by thermal protection, $T_{jmax}=150^\circ\text{C}$
	P_{D2-2}	1.72 (without heatsink, standalone operation)		$T_{jmax}=125^\circ\text{C}$
Junction Temperature*	T_j	-30 to $+150$	$^\circ\text{C}$	
Storage Temperature	T_{stg}	-40 to $+150$	$^\circ\text{C}$	
Thermal Resistance (Junction to Case)	θ_{j-c}	7	$^\circ\text{C/W}$	
Thermal Resistance (Junction to Ambient Air)	θ_{j-a}	58	$^\circ\text{C/W}$	

*: This product has built-in thermal protection circuits that may operate when the junction temperature rises above 130°C . The recommended design for the junction temperature during operation is below 125°C .

Recommended Operating Conditions

Parameter	Symbol	Ratings		Unit
		SI-8008TFE	SI-8050TFE	
Input Voltage Range	V_{IN}	V_o+3^1 to 40	8 to 40	V
Output Voltage Range	V_o	0.8 to 24	5.0	V
Output Current Range	I_o	0 to 1.5		A
Operating Junction Temperature Range	T_{jop}	-20 to $+125$		$^\circ\text{C}$
Operating Temperature Range	T_{op}	-20 to $+85$		$^\circ\text{C}$

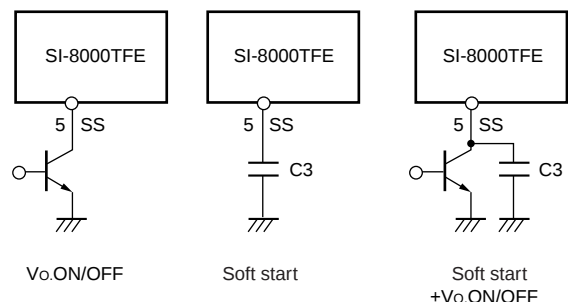
*1: The minimum value of an input voltage range is the higher of 4.5 V or $V_o + 3\text{ V}$.

Electrical Characteristics

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

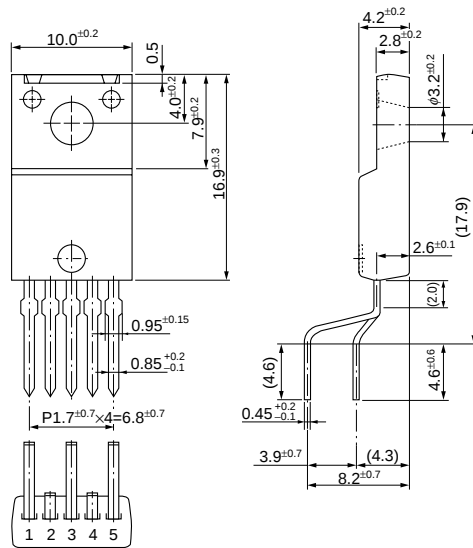
Parameter		Symbol	Ratings			Ratings			Unit
			SI-8008TFE			SI-8050TFE			
			min.	typ.	max.	min.	typ.	max.	
Output Voltage (Reference Voltage)		Vo (VADJ)	0.784	0.800	0.816	4.90	5.00	5.10	V
		Conditions	VIN=15V, Io=0.1A			VIN=15V, Io=0.1A			
Temperature Coefficient of Output Voltage (Temperature Coefficient of Reference Voltage)		ΔVo/ΔT (ΔVREF/ΔT)					±0.5		mV/°C
		Conditions	VIN=15V, Io=0.1A, Tc=0 to 100°C			VIN=15V, Io=0.1A, Tc=0 to 100°C			
Efficiency		η	81				81		%
		Conditions	VIN=15V, Io=0.5A			VIN=15V, Io=0.5A			
Oscillation Frequency		fo		300			300		kHz
		Conditions	VIN=15V, Io=0.5A			VIN=15V, Io=0.5A			
Line Regulation		ΔVoline		60	80		60	80	mV
		Conditions	VIN=10 to 30V, Io=0.5A			VIN=10 to 30V, Io=0.5A			
Load Regulation		ΔVoload		10	40		10	40	mV
		Conditions	VIN=15V, Io=0.2 to 1.5A			VIN=15V, Io=0.2 to 1.5A			
Overcurrent Protection Starting Current		Is	1.6			1.6			A
		Conditions	VIN=15V			VIN=15V			
ON/OFF Pin*	Low Level Voltage	VSSL			0.5			0.5	V
	Outflow Current at Low Voltage	Issl		10	40		10	40	μA
		Conditions	VSSL=0V			VSSL=0V			
Quiescent Circuit Current		Iq		6			6		mA
		Conditions	VIN=15V, Io=0A			VIN=15V, Io=0A			
		Iq(OFF)		200	400		200	400	
		Conditions	VIN=15V, VSS=0V			VIN=15V, VSS=0V			

*: Pin 5 is the SS pin. Soft start at power on can be performed with a capacitor connected to this pin. The output can also be turned ON/OFF with this pin. The output is stopped by setting the voltage of this pin to V_{SSL} or lower. SS-pin voltage can be changed with an open-collector drive circuit of a transistor. When using both the soft-start and ON/OFF functions together, the discharge current from C3 flows into the ON/OFF control transistor. Therefore, limit the current securely to protect the transistor if C3 capacitance is large. The SS pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited. If the pin is not used, leave it open.



■External Dimensions (TO220F-5)

(Unit : mm)

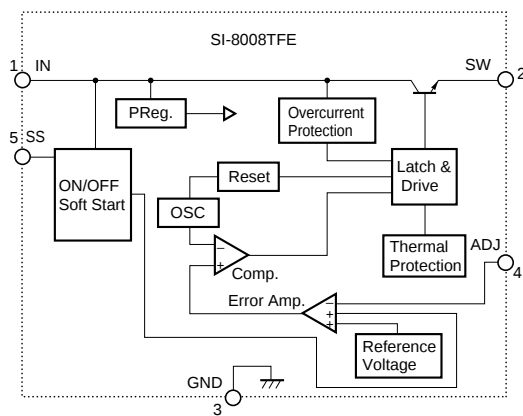


Pin Assignment

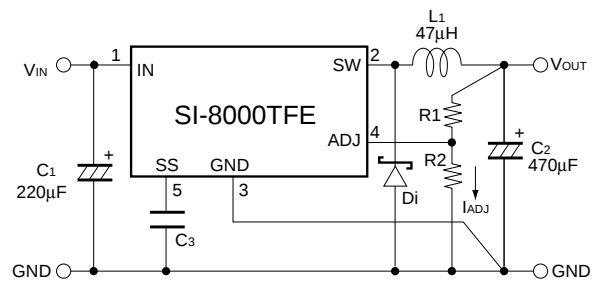
- ① IN
- ② SW
- ③ GND
- ④ ADJ
- ⑤ SS

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

■Block Diagram



■Typical Connection Diagram



C₁ : 220μF
 C₂ : 470μF
 C₃ : 1μF (Only when using soft-start function)
 L₁ : 47μH
 Di : RK16 (Sanken)