

STA820M Series

Separate Excitation Switching Mode Regulator ICs with Flywheel Diode

Features

- Output current: 3A
- High efficiency: TYP 83% (STA821M)
- Built-in flywheel diode (Schottky-barrier diode)
- Requires only 3 discrete components: output coil, input and output capacitors
- Phase correction and output voltage adjustment performed internally
- Built-in reference oscillator (110kHz)
- Built-in foldback-overcurrent and thermal protection circuits
- Built-in ON/OFF circuit (soft start available)

Applications

- Power supplies for telecommunication equipment
- On-board local power supplies
- OA equipment
- For stabilization of the secondary-side output voltage of switching power supplies

Lineup

Part Number	Output Voltage (V)
STA821M	5

Output voltage: 3.3V, 9V, 12V; adjustable types currently being planned

Absolute Maximum Ratings*1

Parameter	Symbol	Ratings	Unit
DC Input Voltage	V _{IN}	31	V
Output Current	I _o	3	A
Power Dissipation*2	P _{D1}	18.2 (With infinite heatsink)	W
	P _{D2}	2.7 (Without heatsink, stand-alone operation)	W
Junction Temperature	T _j	+125	°C
Storage Temperature	T _{stg}	−40 to +125	°C
Thermal Resistance (Junction to Case)	θ _{j-c}	5.5	°C/W
Thermal Resistance (Junction to Ambient Air)	θ _{j-a}	37	°C/W

*1: The absolute maximum ratings show the destructive limit. No parameter should exceed the ratings in transient or normal operations.
*2: Limited by thermal protection.

Recommended Operating Conditions*1

Parameter	Symbol	Ratings		Unit
		STA821M		
		min.	max.	
DC Input Voltage Range	V _{IN}	7	30	V
Output Current Range ^{*2}	I _o	0	3	A
Operating Junction Temperature Range	T _{jop}	−30	+125	°C
Ambient Temperature Range ^{*2}	T _{op}	−30	+80	°C

*1: The recommended operating conditions show the operating conditions required for the normal circuit function described in the electrical characteristics. These conditions must be followed in actual use.
*2: Limited by T_a-P_D characteristics.

Electrical Characteristics

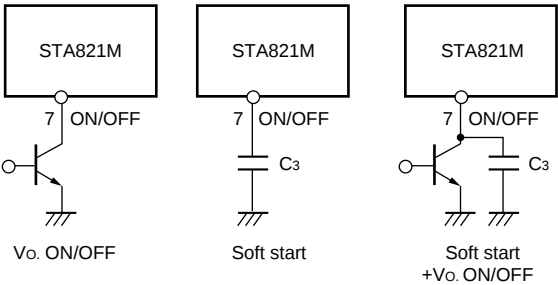
(T_a=25°C)

Parameter		Symbol	Ratings			Unit
			STA821M			
			min.	typ.	max.	
Output Voltage		V _O	4.8	5.0	5.2	V
		Conditions	V _{IN} =20V, I _O =1A			
Efficiency* ¹		η		83		%
		Conditions	V _{IN} =20V, I _O =1A			
Oscillation Frequency		f _o		110		kHz
		Conditions	V _{IN} =20V, I _O =1A			
Line Regulation		V _{Line}		40	100	mV
		Conditions	V _{IN} =10 to 30V, I _O =1A			
Load Regulation		V _{Load}		10	40	mV
		Conditions	V _{IN} =20V, I _O =0.5 to 1.5A			
Temperature Coefficient of Output Voltage		ΔV _O /ΔT		±0.5		mV/°C
Overcurrent Protection Starting Current		I _S	3.1			A
		Conditions	V _{IN} =20V			
ON/OFF Terminal* ²	Low Level Voltage	V _{SSL}		0.2		V
	Outflow Current at Low Voltage	I _{SSL}	15	25	35	μA
		Conditions	V _{SSL} =0.2V			
Quiescent Circuit Current		I _q		4		mA
		Conditions	V _{IN} =20V, I _O =0A			

*1: Efficiency is calculated from the following formula.

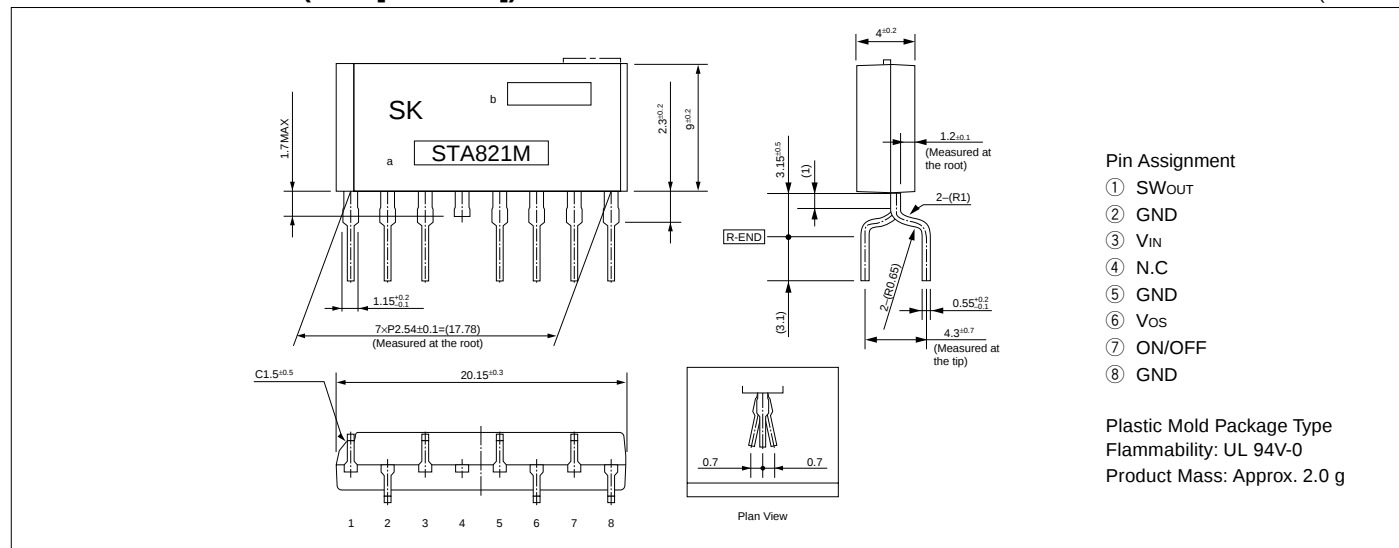
$$\eta(\%) = \frac{V_o \cdot I_o}{V_{IN} \cdot I_{IN}} \times 100$$

*2: Pin 7 is the ON/OFF pin. Soft start at power on can be performed by connecting a capacitor 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. ON/OFF-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 ON/OFF pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited. If this pin is not used, leave it open.

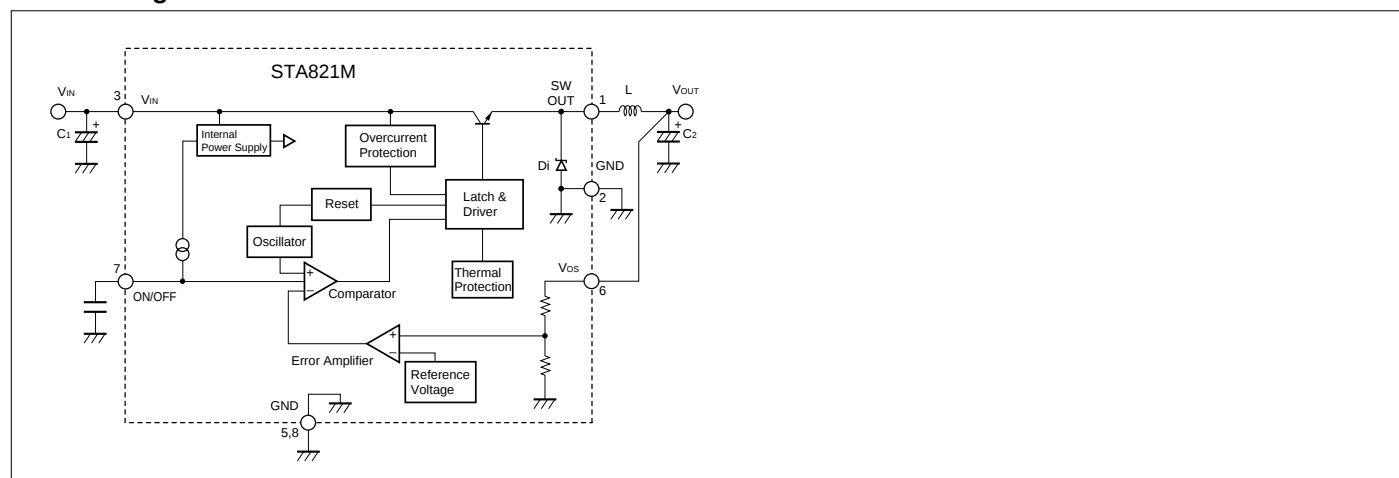


External Dimensions (SIP8 [STA 8Pin])

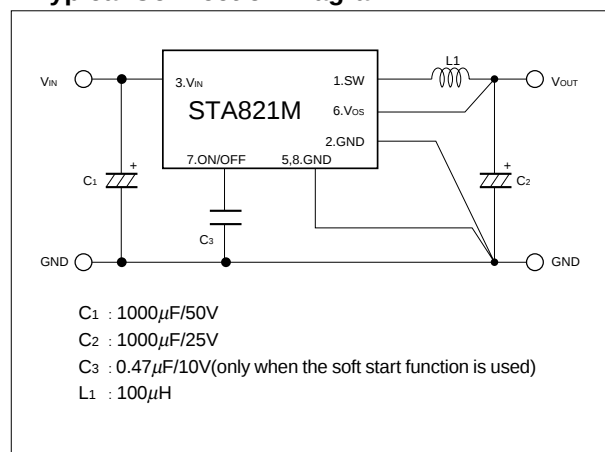
(Unit : mm)



Block Diagram



Typical Connection Diagram



Ta-Pd Characteristics

