

Step Down DC - DC Converter Power IC

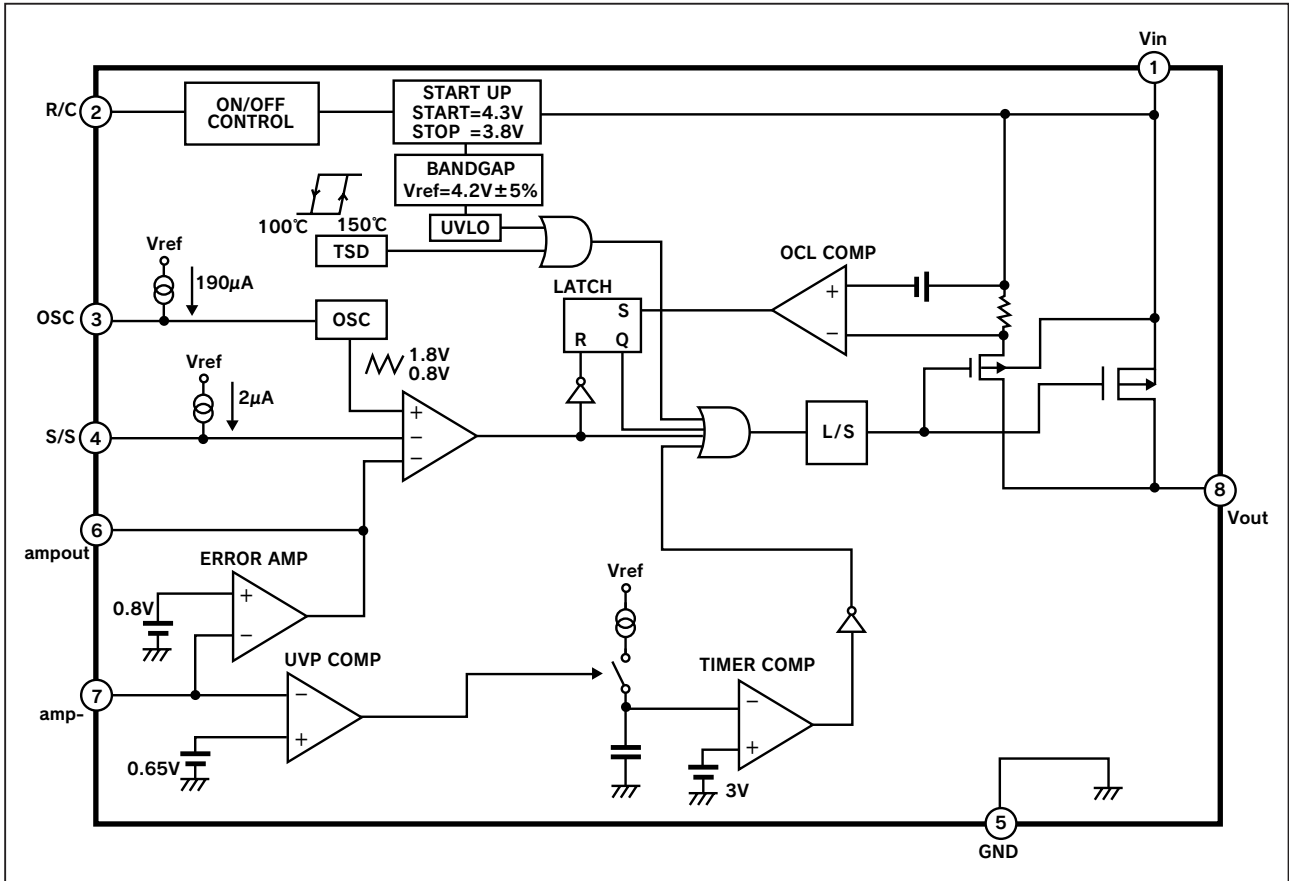
MD5001T

- Compact
- Frequency adjustable
- Output adjustable
- Remote On/Off
- 5V Input

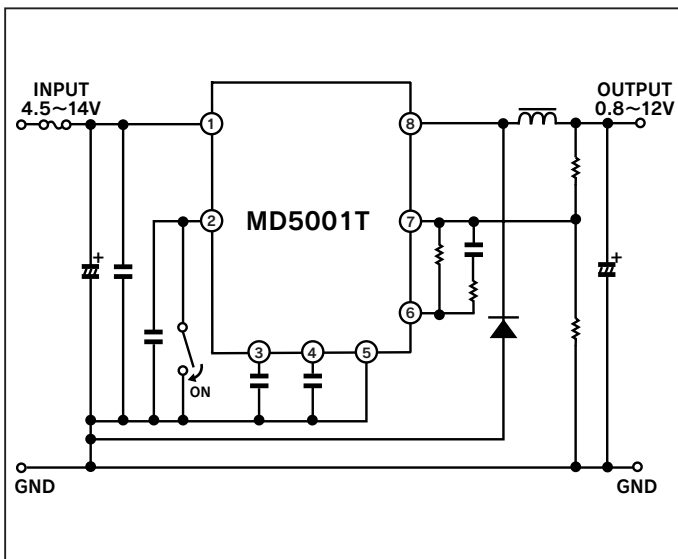
Feature

- Input Voltage range 4.5V to 14V
- Maximum Output Current 1A
- Adjustable output voltage from 0.8V to 12V with external resistors
- Adjustable oscillation frequency from 100kHz to 500kHz with external capacitors
- Over Current Protection
- Thermal Shut Down
- Remote On / Off

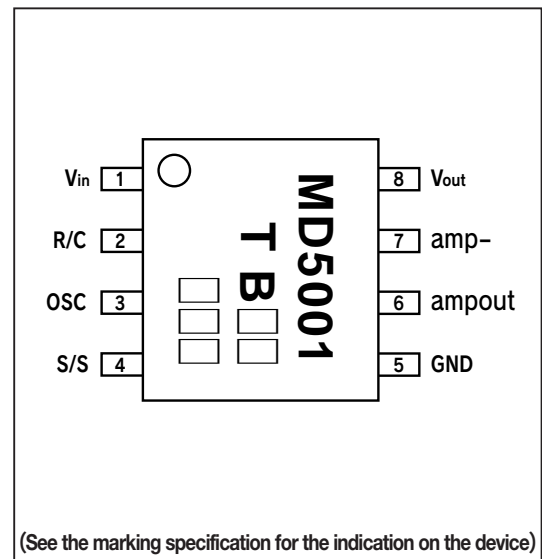
Block Diagram



Standard Connection Diagram



Pin Assignment (SOP8)



Absolute Maximum Ratings

Unless otherwise specified : Ta=25°C

Item	Symbol	Ratings	Units
Input/Output Ratings			
Input voltage	V _{in}	16	V
R/C input voltage	V _{R/C}	5.5	V
Thermal Ratings			
Power dissipation max ^{※1}	PD	0.85	W
Operating temperature	T _{a-ope}	-40 to 85	°C
Storage temperature	T _{stg}	-40 to 150	°C
Junction temperature	T _j	150	°C
Thermal resistance ^{※1}	θ _{ja}	148	°C/W
	θ _{jc} ^{※2}	12	°C/W

※1 Glass-Epoxy Board : 50.8×50.8mm², Thickness : 1mm, Copper Pattern Rate : 4% (Top Side), 0% (Bottom Side), There is no through-hole.

※2 The measurement result in the center of case.

Recommended Operating Conditions

Item	Symbol	Recommendation	Units
Junction temperature	T _j	-40 to 125	°C
Input voltage range	V _i ^{※3}	4.5 to 14	V
Output voltage setting range	V _o ^{※4}	0.8 to 12	V
Output current (ave)	I _{OUTAVE}	1	A
Output current (peak)	I _{OUTPEAK}	1.3	A
Oscillation frequency	frq	100 to 500	kHz

※3 Input voltage at the time of power supply operation.

※4 Output voltage at the time of power supply operation.

Electrical Characteristics

Unless otherwise specified : Ta=25°C

Item	Symbol	Condition	MIN	TYP	MAX	Units
High Side MOSFET						
Drain-source breakdown voltage	V _{DSS}	I _D =5 μA, V _{GS} =0V	16	—	—	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =16V, V _{GS} =0V	—	—	10	μA
Static drain-source on-state resistance	R _{ON}	I _D =1A, V _{GS} =8V	—	600	700	mΩ
Source-drain diode forward voltage	V _{SD}	I _S =1A, V _{GS} =0V	—	—	1.5	V
Control IC						
Supply current (f=100kHz)	I _{CC_100}	V _{in} =4.5 to 14V	—	3	5	mA
Supply current (f=500kHz)	I _{CC_500}	V _{in} =4.5 to 14V	—	4	6	mA
Supply current at remote OFF	I _{CC_off}	V _{in} =4.5 to 14V	—	30	100	μA
Undervoltage lockout threshold (start)	V _{CC_start}	—	4.1	4.3	4.5	V
Undervoltage lockout hysteresis	V _{CC_hys}	—	0.4	0.5	0.6	V
Frequency1 accuracy	f _{osc1}	V _{in} =5V, C _{osc} =900pF	90	100	110	kHz
Frequency2 accuracy	f _{osc2}	V _{in} =5V, C _{osc} =120pF	450	500	550	kHz
Charge current of oscillator	I _{osc_O}	V _{in} =5V	-210	-190	-170	μA
Discharge current of oscillator	I _{osc_I}	V _{in} =5V	170	190	210	μA
Lower voltage of triangle wave	V _{osc_L}	V _{in} =5V	0.76	0.8	0.84	V
Hysteresis of triangle wave	V _{osc_hys}	V _{in} =5V	0.9	1	1.1	V
Remote control ON input voltage	V _{R/C_ON}	V _{in} =5V	-0.2	—	0.5	V
Remote control OFF input voltage	V _{R/C_OFF}	V _{in} =5V	2	—	5.5	V
Remote control source current	I _{R/C}	V _{in} =4.5V to 14V	—	5	30	μA
Soft-start source current	I _{s/s}	V _{in} =5V	-3	-2	-1	μA
Error amplifier reference voltage	V _{vamp}	V _{in} =4.5V to 14V	0.784	0.8	0.816	V
Threshold of over current limit	I _{th_OCL}	V _{in} =5V	1.31	—	—	A
Threshold of UVP	V _{th_UVP}	V _{in} =5V	V _{vamp} ×74%	V _{vamp} ×81.2%	V _{vamp} ×90%	V
Time of timer-latch	T _{timer}	V _{in} =5V	10	50	100	μs
Thermal shutdown temperature	T _{TSD}	—	—	150	—	°C