

Step Down DC - DC Converter Power IC

MD3222N

Selectable
Output
2.5V/3.3V

Output
adjustable

Remote
On/Off

Synchronous
Rectification

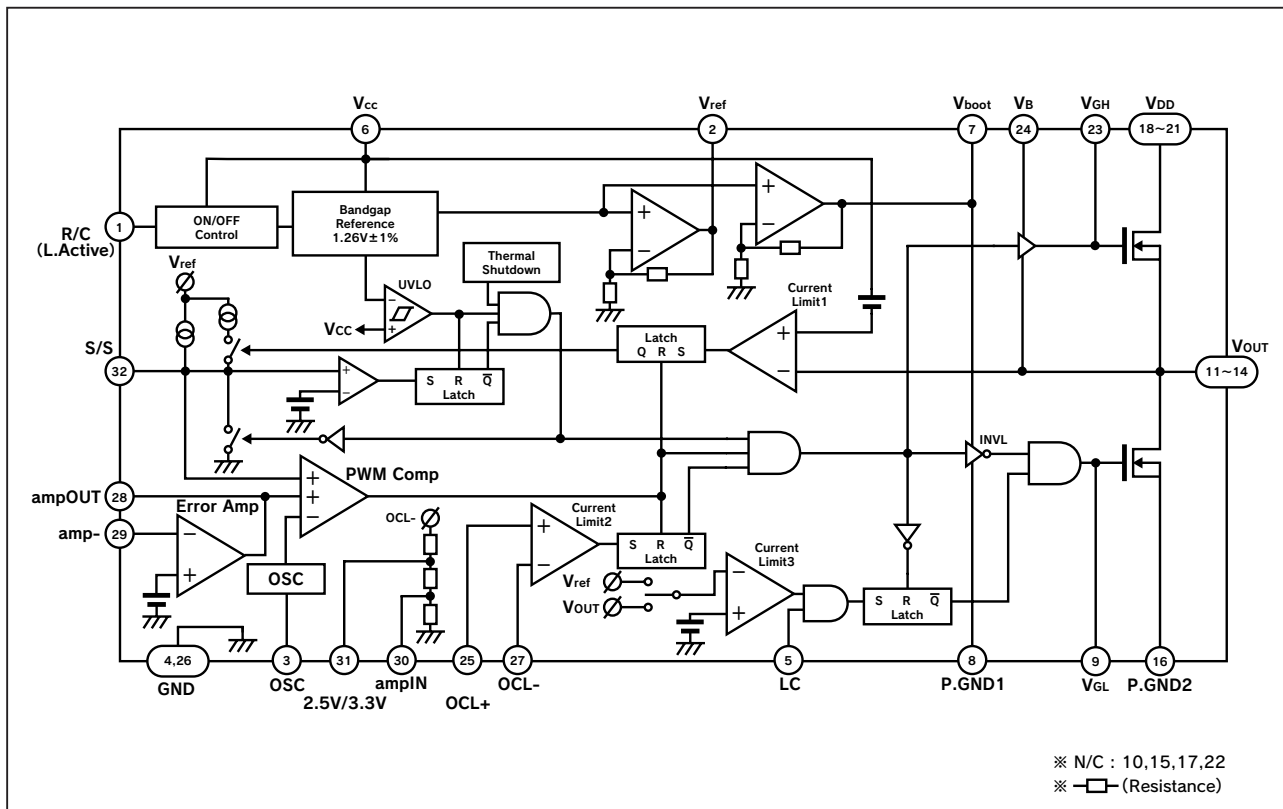
5V
Input

Output
Current 6A

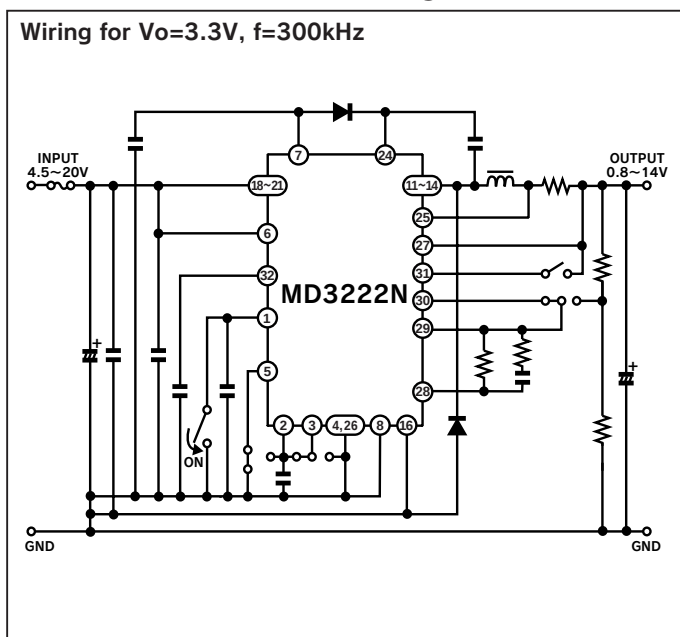
Feature

- Input Voltage range 4.5V to 20V
- Maximum Output Current 6A
- Built_in MOSFETs for main switch and synchronous rectification
- Pin selectable output voltage 2.5V / 3.3V
- High Efficiency typ. 96% (at: $V_{in}=5V$, $V_{out}=3.3V$, $I_{out}=1A$)
- Switching frequency of 100kHz or 300kHz (external C.R not required)
- Over Current Protection
- The L Cut (Cut off detect)
- Under Voltage Lockout
- Thermal Shut Down
- Remote On / Off

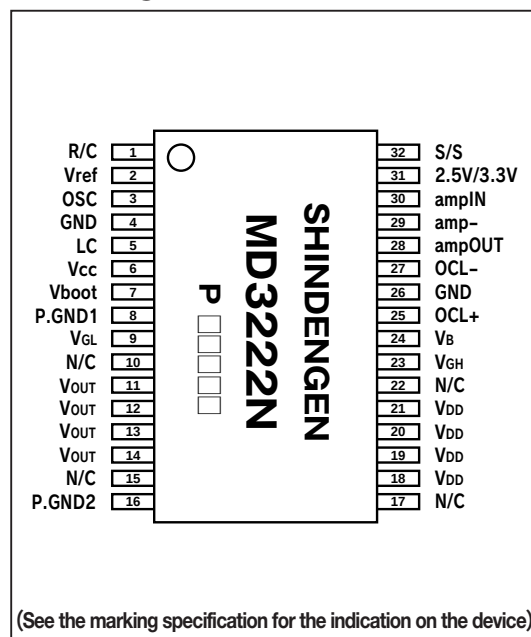
Block Diagram



Standard Connection Diagram



Pin Assignment (SSOP32)



Absolute Maximum Ratings

Unless otherwise specified : Ta=25°C

Item	Symbol	Ratings	Units
Input/Output Ratings			
Input voltage	V _{CC}	22	V
Main MOSFET input voltage	V _{DD}	22	V
Output current (ave)	I _{OUTave}	6	A
Output current (peak)	I _{OUTpeak}	8	A
Input voltage between V _B and V _{OUT}	V _B	5.5	V
Vboot sink current	I _{boot}	−30	mA
Remote control voltage	V _{RC}	V _{CC}	V
OSC input voltage	V _{OSC}	V _{ref}	V
LC input voltage	V _{LC}	V _{ref}	V
Amp− input voltage	V _{amp−}	V _{ref}	V
OCL−,OCL+ input Voltage	V _{OCL}	a) V _{CC} − 1.4 b) 14 (V _{CC} > 15.4V)	V
Vref sink current	I _{ref}	−3	mA
Thermal Ratings			
Power dissipation max ※1	PD	2.5	W
Operating temperature	Ta − ope	−30 to 85	°C
Storage temperature	T _{stg}	−40 to 150	°C
Junction temperature	T _j	150	°C
Thermal resistance ※1	θ_{ja}	50	°C/W
	θ_{jc} ※2	20	°C/W

※1 Glass-Epoxy Board : 56×39mm², Thickness : 1mm, Copper Pattern Rate : 87.1% (Top Side), 82.1% (Bottom Side), Those with through-hole.

※2 The measurement result in the center of case.

Recommended Operating Conditions

Item	Symbol	Recommendation	Units
Junction temperature	T _j	−30 to 125	°C
Input voltage	V _i ※3	4.5 to 20	V
Output voltage setting range	V _O ※4	0.8 to 14	V

※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_H}	I _D = 1mA, V _{GS} = 0V	22	—	—	V
Zero gate voltage drain current	I _{DSS_H}	V _{DS} = 22V, V _{GS} = 0V	—	—	10	μA
Static drain-source on-state resistance	R _{ON_H}	I _D = 1.2A, V _{GS} = 4.5V	—	22	55	mΩ
Source-drain diode forward voltage	V _{SD_H}	I _S = 1.2A, V _{GS} = 0V	—	—	1.5	V
Low Side MOSFET						
Drain-source breakdown voltage	V _{DSS_L}	I _D = 1mA, V _{GS} = 0V	22	—	—	V
Zero gate voltage drain current	I _{DSS_L}	V _{DS} = 22V, V _{GS} = 0V	—	—	10	μA
Static drain-source on-state resistance	R _{ON_L}	I _D = 1.2A, V _{GS} = 4.5V	—	22	55	mΩ
Source-drain diode forward voltage	V _{SD_L}	I _S = 1.2A, V _{GS} = 0V	—	—	1.5	V
Control IC						
Undervoltage lockout threshold (start)	V _{CC_start}	—	4.0	4.3	4.5	V
Undervoltage lockout hysteresis	V _{CC_hys}	—	0.4	0.5	0.6	V
Supply current (f=100kHz)	I _{CC_L}	V _{CC} = 4.5 to 20V	—	4.0	4.6	mA
Supply current (f=300kHz)	I _{CC_H}	V _{CC} = 4.5 to 20V	—	5.7	6.6	mA
Supply current at remote OFF	I _{CC_off}	V _{CC} = 4.5 to 20V	—	45	70	μA
Remote control ON input voltage	V _{RC_ON}	V _{CC} = 5V	−0.2	—	0.7	V
Remote control OFF input voltage	V _{RC_OFF}	V _{CC} = 5V	2	—	V _{CC}	V
Remote control source current	I _{RC}	V _{CC} = 5V	—	4	12	μA
Bootstrap voltage	V _{boot}	V _{CC} = 5V	3.84	4	4.16	V
Reference voltage	V _{ref}	V _{CC} = 5V	3.84	4	4.16	V
Initial frequency1 accuracy	f _{osc1}	V _{CC} = 5V	85	100	115	kHz
Initial frequency2 accuracy	f _{osc2}	V _{CC} = 5V	255	300	345	kHz
Soft-start source current	I _{s/s}	V _{CC} = 5V	−3	−2.5	−2	μA
Error amplifier reference voltage	V _{amp}	V _{CC} = 5V	0.784	0.8	0.816	V
Output voltage accuracy (Vo=0.8V)	V _{F/B_1}	V _{CC} = 4.5 to 20V	0.784	0.800	0.816	V
Output voltage accuracy (Vo=2.5V)	V _{F/B_2}	V _{CC} = 4.5 to 20V	2.425	2.500	2.575	V
Output voltage accuracy (Vo=3.3V)	V _{F/B_3}	V _{CC} = 4.5 to 20V	3.200	3.300	3.400	V
Threshold of over current limit at Ron detection	I _{th_OCL1}	V _{CC} = 5V	6	—	—	A
Threshold of over current limit at external resistance detection	V _{th_OCL2}	V _{CC} = 5V	85	100	115	mV
Threshold of latch	V _{th_lat}	V _{CC} = 5V	3.3	3.45	3.6	V
Thermal shutdown temperature	T _{TSD}	—	—	140	—	°C