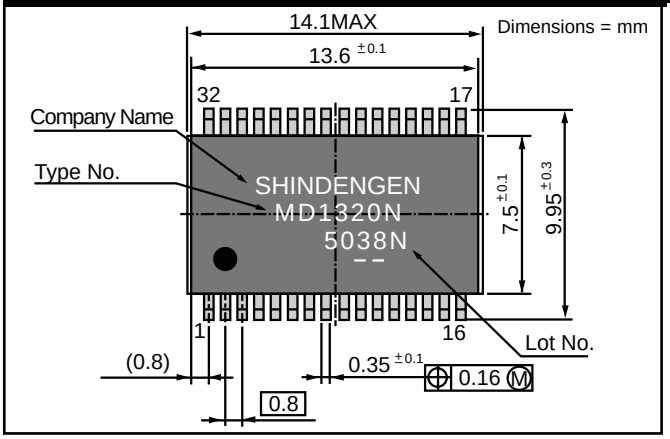
3.3V/5V Output MD1320N

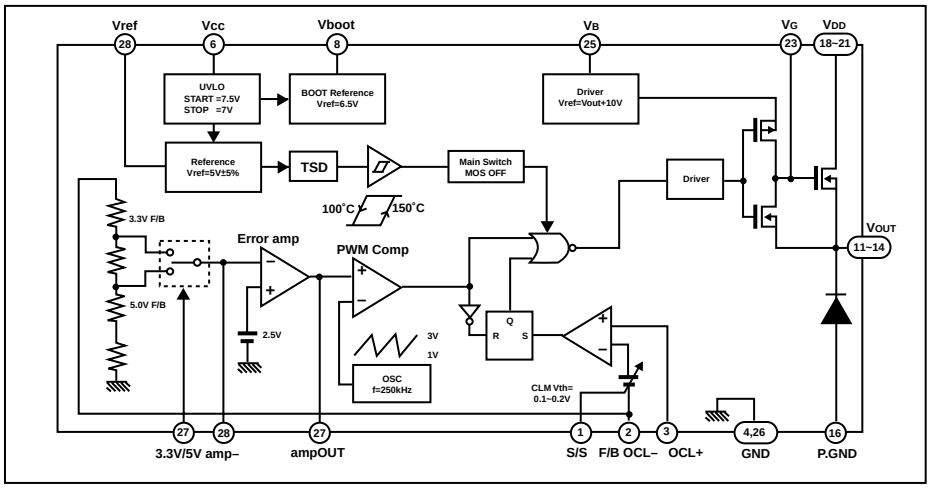
Shindengen America, Inc.



DESCRIPTION

The MD1320N is a high-efficiency step down DC-DC converter power integrated circuit with main MOSFET switch and Schottky Barrier Diode. The MD1320N can deliver 7.5 watts maximum (5V, 1.5A) with high efficiency over a wide input voltage range. This device has output voltage digitally selectable for 3.3V or 5V. With the MD1320N you can construct a complete DC-DC converter using only a few external components. Featuring an SSOP 32-pin surface mount package, the MD1320N allows you to incorporate a very small and thin power supply on your circuit board.

BLOCK DIAGRAM

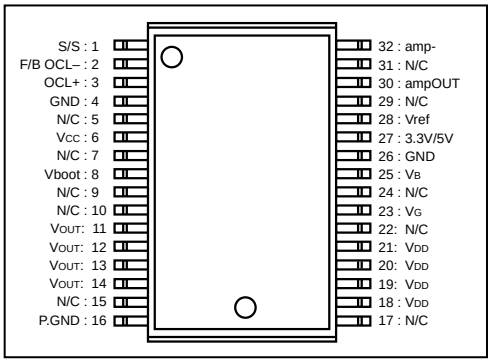


FEATURES

- High efficiency typ. 91%
- Wide input voltage load range
  8VDC to 30VDC
  Up to 1.5ADC
- Output voltage selectable function
  3.3V or 5V digitally
- Internal Switching power device
  Main MOSFET for switch
  SBD for rectification
- Fixed 250kHz PWM frequency
  Without external resistor and capacitor
- Overcurrent protection
- Thermal shutdown function

PIN ASSIGNMENT

Pin#	Symbol	Function description
1	S/S	Capacitor for softstart
2	F/B OCL-	Overcurrent protection (OCL) (-) and output voltage feedback
3	OCL+	Overcurrent protection (OCL) (+)
4	GND	Signal GND
5	N/C	Non-connection
6	Vcc	Input voltage
7	N/C	Non-connection
8	Vboot	High side drive supply for main MOS
9,10	N/C	Non-connection
11 ~ 14	VOUT	Power stage output
15	N/C	Non-connection
16	P.GND	Power GND
17	N/C	Non-connection
18 ~ 21	VDD	Drain of main MOS Switch
22	N/C	Non-connection
23	VG	Gate terminal of main MOS
24	N/C	Non-connection
25	VB	Bootstrap capacitor between VB and VOUT
26	GND	Signal GND
27	3.3V/5V Vref AmpOUT	Output voltage selectable terminal "L" means 5V output voltage "H" means 3.3V output voltage
28	Vref	Internal voltage reference
29	N/C	Non-connection
30	AmpOUT	Error Amp out
31	N/C	Non-connection
32	amp-	Error Amp (-) input



- **Vref** - Temperature compensated internal voltage. You can pull 1mA maximum for external circuit.
- **OSC** - MCD1320N uses internal oscillator without external component. Frequency (Saw tooth wave form) is trimmed to 250kHz on chip.
- **Error Amp** - Error Amp detects output voltage of DC-DC converter and controls PWM signal. You can adjust the loop gain when you connect feedback resistor and capacitor between AmpOUT and Amp (-). It will provide stable phase compensation.
- **Overcurrent protection** - MD1320N uses pulse-by-pulse current protection. Current will be sensed voltage drop of external current sensing resistor. Threshold of OCL is 0.19V.

ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

Parameter	Symbol	Rating	Units
Line voltage	V_{IN}	32	V
Output MOS input voltage	V_{DD}	32	V
Output current (AVE)	$I_{OUT}ave$	1.5	A
Output Current (PEAK)	$I_{OUT}peak$	2	A
Storage temperature	Tstg	-40 ~ 150	°C
Junction temperature	Tj	150	°C

RECOMMENDED OPERATION CONDITIONS

Parameter	Recommendation	Units
Input voltage	8 ~ 30	V
Operation temperature	-10 ~ 80	°C

ELECTRICAL CHARACTERISTICS

(Ta=25°C)

Parameter	Symbol	Conditions	MIN	TYP	MAX	Units
High side MOS D - S voltage	Vdss	I_D=1mA, V_{GS}=0V	32	-	-	V
High side MOS Drain interruption current	Idss	V_{DS}=30V, V_{GS}=0V	-	-	10	uA
High side MOS Drain-source ON resistance	Ron	I_D=1.2A, V_{GS}=4V	-	140	250	mΩ
High side MOS Source-drain Di forward voltage	V_{SD}	I_S=1.2A, V_{DS}=0V	-	-	1.5	V
Low side SBD Peak reverse voltage	V_{RM}	-	40	-	-	V
Low side SBD Forward voltage	V_F	I_F=1.2A	-	-	0.55	V
Low side SBD reverse current	I_R	V_R=V_{RM}	-	-	2	mA
Start voltage	Vcc_start	-	7	7.5	8	V
Stop voltage	Vcc_stop	-	6.5	7	7.5	V
Stop-start voltage hysteresis	Vcc_hys	-	-	0.5	-	V
Current consumption	Icc	Vcc=8V ~ 30V	-	8	10	mA
BOOT terminal voltage	Vboot	Vcc=8V ~ 30V	6	6.5	7	V
Internal reference voltage	Vref	Vcc=8V ~ 30V	4.75	5	5.25	V
Initial oscillation frequency	fosc	Vcc=24V	212.5	250	287.5	kHz
Overcurrent threshold voltage	Vth_OCL	Vcc=24V	0.162	0.19	0.218	V
Softstart terminal current	$I_{S/S}$	Vcc=24V	-20	-12.5	-5	uA
“H“ CHG terminal input voltage	V_{CHGH}	-	4.5	-	Vref	V
“L“ CHG” terminal input voltage	V_{CHGL}	-	GND	-	0.5	V
Overcurrent protection operating temperature	T_TSD	-	-	150	-	°C