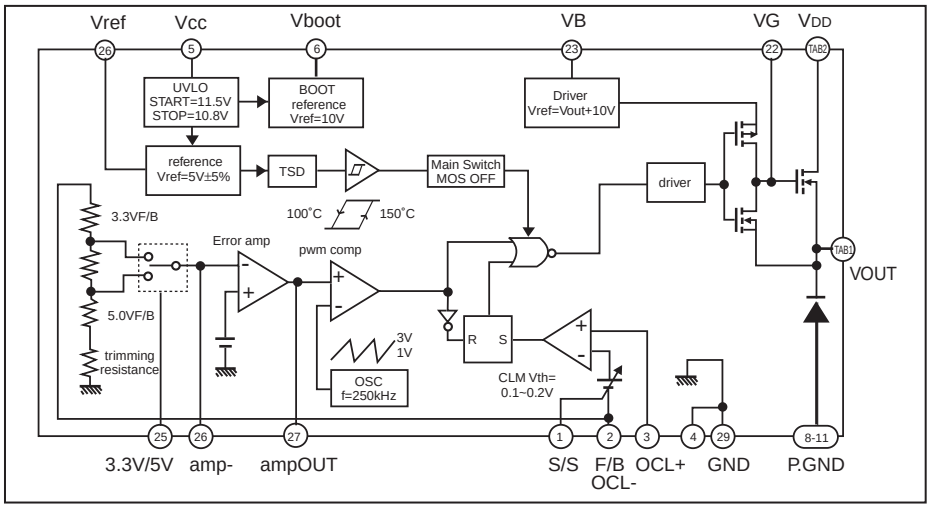
3.3V/5V Output MD1320F

Shindengen America, Inc.

DESCRIPTION

The MD1320F is a high-efficiency step down DC-DC converter power integrated circuit with main MOSFET switch and Schottky Barrier Diode. The MD1320F can deliver15watts maximum (5V, 3.0A) with high efficiency over a wide input voltage range. This device has output voltage digitally selectable for 3.3V or 5V. With the MD1320F you can construct a complete DC-DC converter using only a few external components. Featuring an HSOP 28 pin surface mount package, the MD1320F allows you to incorporate a very small and thin power supply on your circuit board.

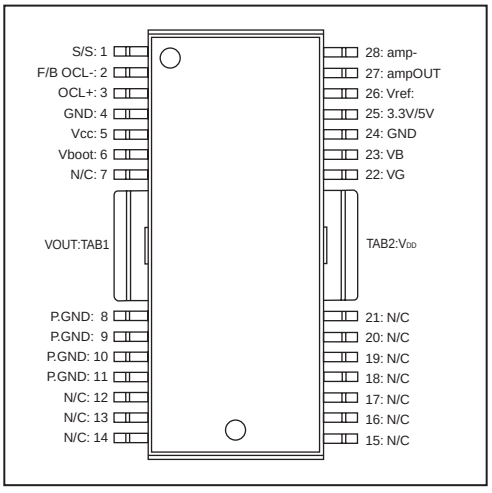
BLOCK DIAGRAM



FEATURES

- n Wide input voltage load range
  - 12VDC to 30VDC
  - Up to 3ADC
- n Output voltage selectable function
  - 3.3V or 5V digitally
- n Internal Switching power device
  - Main MOSFET for switch
  - SBD for rectification
- n Fixed 250kHz PWM frequency
  - Without external resistor and capacitor
- n Overcurrent protection
- n Thermal shutdown function

PIN ASSIGNMENT



- n **Vref** - Temperature compensated internal voltage. You can pull 1mA maximum for external circuit.
- n **OSC** - MCD1320F uses internal oscillator without external component. Frequency (Saw tooth wave form) is trimmed to 250kHz on chip.
- n **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.
- n **Overcurrent protection** - MD1320F uses pulse-by-pulse current protection. Current will be sensed voltage drop of external current sensing resistor. Threshold of OCL is 0.19V.

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	Vcc	Input voltage
6	Vboot	High side drive supply for main MOS
7	N/C	Non-connection
8 ~ 11	P.GND	Power GND
12 ~ 21	N/C	Non-connection
22	VG	Gate terminal of main MOS
23	VB	Bootstrap capacitor between VB and VOUT
24	GND	Signal GND
25	3.3V/5V	Output voltage selectable terminal “L” means 5V output voltage “H” means 3.3V output voltage
26	Vref	Internal voltage reference
27	AmpOUT	Error Amp out
28	amp-	Error Amp (-) input
TAB1	VOUT	Power stage output
TAB2	VDD	Drain of main MOS Switch

ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

Parameter	Symbol	Rating	Units
Input voltage	VIN	32	V
Main MOS voltage	VDD	32	V
Output current (ave)	IOUTave	3	A
Output Current (peak)	IOUTpeak	4	A
Storage temperature	Tstg	-40 ~ 150	°C
Junction temperature	Tj	150	°C

RECOMMENDED OPERATION CONDITIONS

Parameter	Recommendation	Units
Input voltage	12 ~ 30	V
Operation temperature	-10 ~ 80	°C

ELECTRIC CHARACTERISTICS

(Ta=25°C)

Parameter	Symbol	Conditions	MIN	TYP	MAX	Units
High side MOS D - S Voltage	Vdss	ID=1mA, VGS=0V	32	-	-	V
High side MOS Drain Leakage Current	Idss	VSD=30V, VGS=0V	-	-	10	uA
High side MOS On State Resistance	Ron	ID=1.2A, VGS=4V	-	140	250	mΩ
High side MOS Bodydiode forward drop	VSD	IS=1.2A, VDS=0V	-	-	1.5	V
Low side SBD Output voltage	VRM	-	40	-	-	V
Low side SBD Forward drop	VF	IF=1.2A	-	-	0.55	V
Low side SBD Leakage Current	IR	VR=VRM	-	-	2	mA
Under-Voltage Lockout Threshold(start)	Vcc_start	-	10.5	11.25	11.9	V
Under-Voltage Lockout Threshold(stop)	Vcc_stop	-	10	10.75	11.5	V
Under-Voltage Lockout Hysteresis	Vcc_hys	-	-	0.5	-	V
VCC Current - run mode	Icc	Vcc=12V ~ 30V	-	8	10	mA
Vboot Regulation	Vboot	Vcc=12V ~ 30V	10	11	12	V
Reference Voltage	Vref	Vcc=12V ~ 30V	4.75	5	5.25	V
Initial Frequency Accuracy	fosc	Vcc=24V	212.5	250	287.5	kHz
Threshold of OCL	Vth_OCL	Vcc=24V	0.162	0.19	0.218	V
Input current of Softstart terminal	IS/S	Vcc=24V	-20	-12.5	-5	uA
“CHG” High input voltage	VCHGH	-	4.5	-	Vref	V
“CHG” Low input voltage	VCHGL	-	GND	-	0.5	V
Thermal shutdown temperature	T_TSD	-	-	150	-	°C