

NCP1209

Product Preview

PWM Voltage Mode Controller

The NCP1209P series is an enhanced version of the MC44608P series. It is a high performance voltage mode controller designed for fly-back SMPS.

These 2 series are pin to pin compatible. The device is a Power MOSFET driver offering a discrete approach (controller + discrete MOSFET) for building an offline SMPS.

It features a very high efficiency stand-by management consisting in a fully controlled and adaptable Pulsed Mode operation working in conjunction with a secondary reconfiguration.

Features

- 45 kHz, 65 kHz, 77 kHz
- 7% Frequency Accuracy Over the Whole Temp Range
- Extended V_{CC} Working Range 8.6 V to 16 V
- Programmable Stand-by Burst Duty Cycle
- Stand-by Mode Selection from the Secondary Side of the SMPS
- 5 mA VHV Start-up Current Source
- Device Inhibition Through Start-up Current Source Reduction

Typical Applications

- Energy Management in Set Top Box
- Opto Feed-back Offline SMPS
- SMPS Using a Secondary Reconfiguration for the Stand-by Mode
- Ability to Adapt the MOSFET Gate Drive
- All General Purpose Fly-back SMPS

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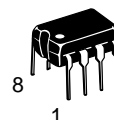
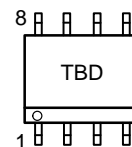
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SMPS CONTROLLER WITH ENHANCED STAND-BY MANAGEMENT

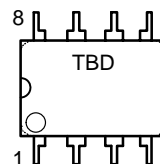
MARKING DIAGRAMS



SO-8
CASE 751
PLASTIC

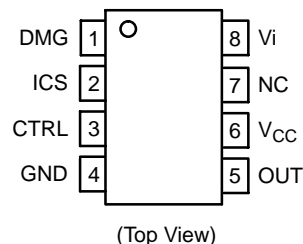


DIP-8
CASE 626
PLASTIC



xx = Specific Device Code
A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week

PIN CONNECTIONS



ORDERING INFORMATION

Device	Package	Shipping
NCP1209P45	TBD	TBD
NCP1209P65	TBD	TBD
NCP1209P77	TBD	TBD

NCP1209

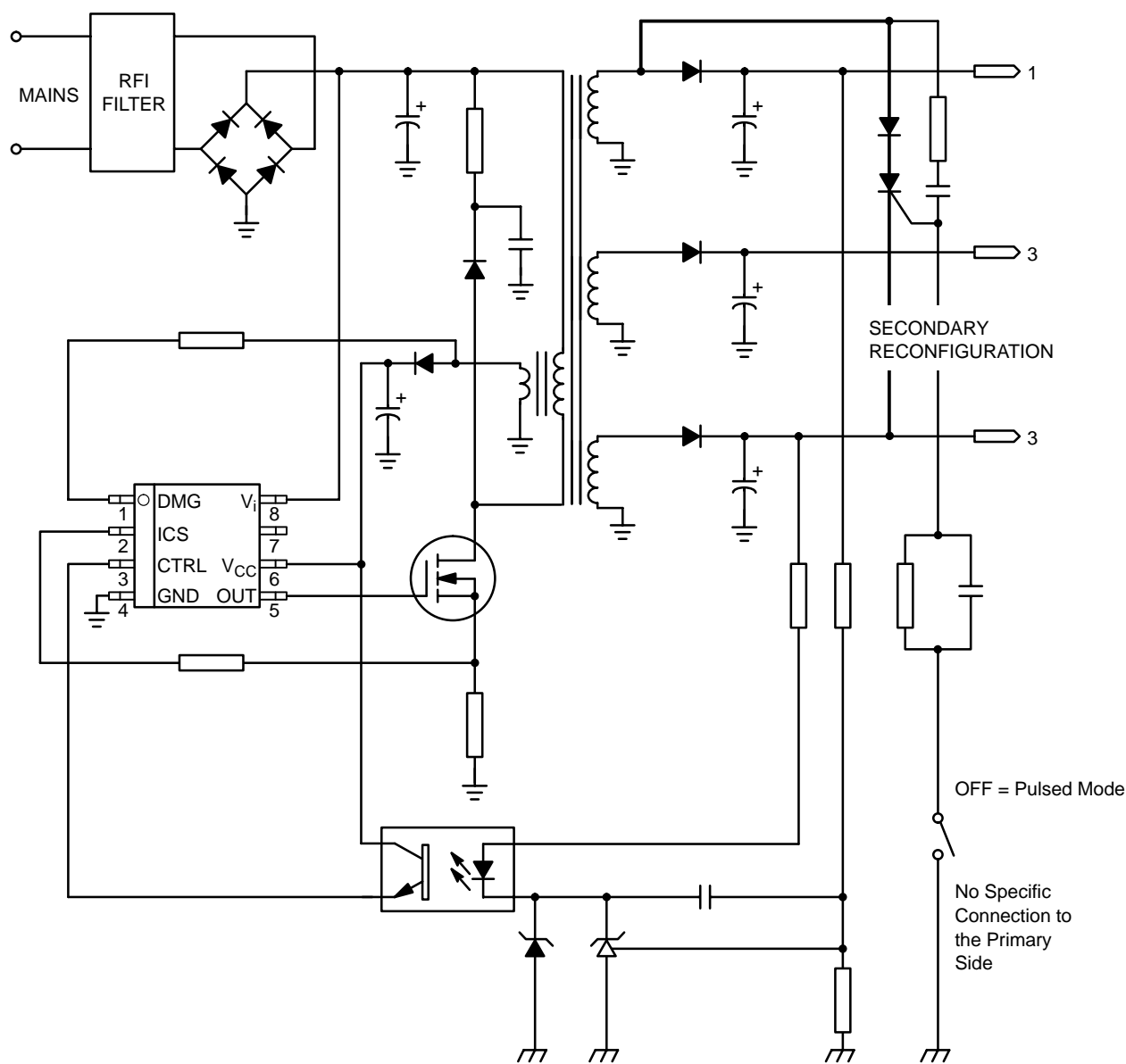


Figure 1. Typical Application Example

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
V _{CC} voltage	V _{CC}	18	V
Pin 3 sink and source current	I _{pin3}	±3	mA
VHV pin8 voltage	V _{pin8}	500	V
Total power supply current	I _{CC}	20	mA
All inputs except Vi	V _{inputs}	−1.0 to +16	V
Power dissipation and Thermal characteristics			
Thermal Resistance, Junction to Air PDIP	R _{θJA}	100	°C/W
Thermal Resistance, Junction to Air SOIC	R _{θJA}	178	°C/W
Maximum power dissipation at T _A = 85°C PDIP	P _D	600	mW
Maximum power dissipation at T _A = 85°C SOIC	P _D	365	mW
Operating Junction Temperature	T _J	150	°C
Operating Ambient Temperature	T _A	−25 to +85	°C

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ELECTRICAL CHARACTERISTICS ($V_{CC} = 10\text{ V}$, $T_J = 0^\circ\text{C}$ up 105°C , Output Loaded with 1 nF)

Characteristic	Symbol	Min	Typ	Max	Unit
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Output Section

Output Resistor Sink Source	R_{OL} R_{OH}	5 —	8.5 15	15 —	W
Output Voltage Rise Time (from 3 V up to 8 V)	t_r	—	50	—	ns
Output Voltage Falling Edge Slew-Rate (from 8 V down to 3 V)	t_f	—	50	—	ns

Control Input Section

Duty Cycle @ $I_{pin3} = 450\text{ }\mu\text{A}$	$D_{450\text{ }\mu\text{A}}$	—	—	0	%
Duty Cycle @ $I_{pin3} = 225\text{ }\mu\text{A}$	$D_{225\text{ }\mu\text{A}}$	TBD	43	TBD	%
Control Input Clamp Voltage (Switching phase) @ $I_{pin3} = -225\text{ }\mu\text{A}$	V_{shunt}	4.65	4.9	5.15	V
Latched-off Phase Control Input (stand-by) @ $I_{pin3} = 75\text{ }\mu\text{A}$	$V_{LP-STBY}$	—	TBD	—	V
Latched-off Phase Control Input (stand-by) @ $I_{pin3} = 37\text{ }\mu\text{A}$	$V_{LP-STBY}$	—	TBD	—	V
Internal Pin3 Resistance	R_{int3}	TBD	2	TBD	$k\Omega$
$(I_{supply} - I_{CC}) / I_{pin3}$ (75 μA)	$K3(75)$	—	20	—	—
$(I_{supply} - I_{CC}) / I_{pin3}$ (75 μA)	$K3(37)$	—	20	—	—

Current Sense Section

Maximum Sense Input Threshold	V_{CS-th}	0.9	1.0	1.05	V
Input Bias Current	I_{B-CS}	-1.8	—	+1.8	mA
Current Sense Source Current during Start-up Phase	$I_{CS-stup}$	180	200	220	mA
Stand-by Current Sense Input Current	$I_{CS-stby}$	97	100	103	mA
LEB + Propagation Delay (P45)	T_{DLY}	TBD	TBD	TBD	ns
LEB + Propagation Delay (P65)	T_{DLY}	TBD	TBD	TBD	ns
LEB + Propagation Delay (P77)	T_{DLY}	TBD	350	TBD	ns
Current Sense Propagation Delay (Pin2 to OUT) (P45)	T_{prg}	TBD	TBD	TBD	ns
Current Sense Propagation Delay (Pin2 to OUT) (P65)	T_{prg}	TBD	TBD	TBD	ns
Current Sense Propagation Delay (Pin2 to OUT) (P77)	T_{prg}	TBD	175	TBD	ns
Leading Edge Blanking $T_{DLY} - T_{prg}$ (P45)	T_{LEB}	—	TBD	—	ns
Leading Edge Blanking $T_{DLY} - T_{prg}$ (P65)	T_{LEB}	—	TBD	—	ns
Leading Edge Blanking $T_{DLY} - T_{prg}$ (P77)	T_{LEB}	—	TBD	—	ns

Oscillator Section

Normal Operation Frequency (P45)	f_{osc}	41.8	45	48.1	kHz
Normal Operation Frequency (P65)	f_{osc}	60.45	65	69.55	kHz
Normal Operation Frequency (P77)	f_{osc}	71.6	77	82.4	kHz
Maximum Duty Cycle @ $f = f_{osc}$	d_{max}	76	80	84	%

Overvoltage Section

OVP threshold level on V_{CC}	V_{CC-ovp}	15.9	16.4	16.9	V
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ELECTRICAL CHARACTERISTICS ($V_{CC} = 10\text{ V}$, $T_J = 0^\circ\text{C}$ up 105°C , Output Loaded with 1 nF)

Characteristic	Symbol	Min	Typ	Max	Unit
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Demagnetisation Detection Section

Demag Comparator Threshold (V_{pin1} decreasing)	V_{dmg-th}	45	50	55	mV
Demag Comparator Hysteresis	H_{dmg}	–	30	–	mV
Propagation Delay (Input to Output, Low to High)	$T_{PHL(In/Out)}$	–	300	–	ns
Input Bias Current ($V_{demag} = 50\text{mV}$)	I_{dem-lb}	–0.6	–	–	mA
Negative Clamp Level @ $I_{demag} = 50\text{ }\mu\text{A}$	$V_{cl-neg-dem}$	–0.9	–0.7	–0.4	V
Positive Clamp Level @ $I_{demag} = 50\text{ }\mu\text{A}$	$V_{cl-pos dem}$	9	10	11	V

Overtemperature Section

Overtemp		–	150	–	$^\circ\text{C}$
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Normal Mode Recovery Section

Demagnetisation Voltage for Normal Mode Recovery	$V_{dem NM}$	2.38	2.4	2.52	V
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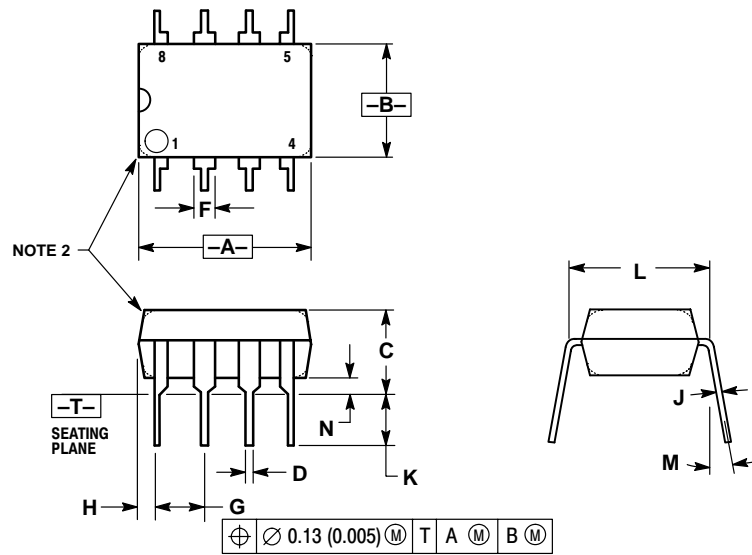
Supply Section

Start-up Voltage	V_{stup}	11.8	12.4	13	V
Output Disabling V_{CC}	V_{uvlo1}	8.2	8.6	9	V
V_{CC} Voltage for $I_{start-up}$ activation	V_{uvlo2}	5.03	5.3	5.5	V
1 st level start-up HV Current Source @ $V_{CC} < 1.5\text{ V}$	I_{CC1}	100	200	300	mA
2 nd level start-up HV Current Source @ $V_{CC} > 3\text{ V}$	I_{CC2L}	3.2	4.2	4.8	mA
2 nd level start-up HV Current Source @ $V_{CC} = 10\text{ V}$	I_{CC2H}	2.2	3.2	3.8	mA
Start-up Current Source Leakage	$I_{stup lk}$	–	70	–	mA
I_{CC} when Switching (P45)	I_{CCS}	TBD	–	TBD	mA
I_{CC} when Switching (P65)	I_{CCS}	TBD	–	TBD	mA
I_{CC} when Switching (P77)	I_{CCS}	2.2	2.6	3	mA
I_{CC} in the Latched Off Phase	I_{CCOFF}	350	500	650	mA
Hiccup Mode Duty Cycle	D_{hiccup}	–	12.5	–	%

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PACKAGE DIMENSIONS

DIP-8
CASE 626-05
ISSUE L



NOTES:

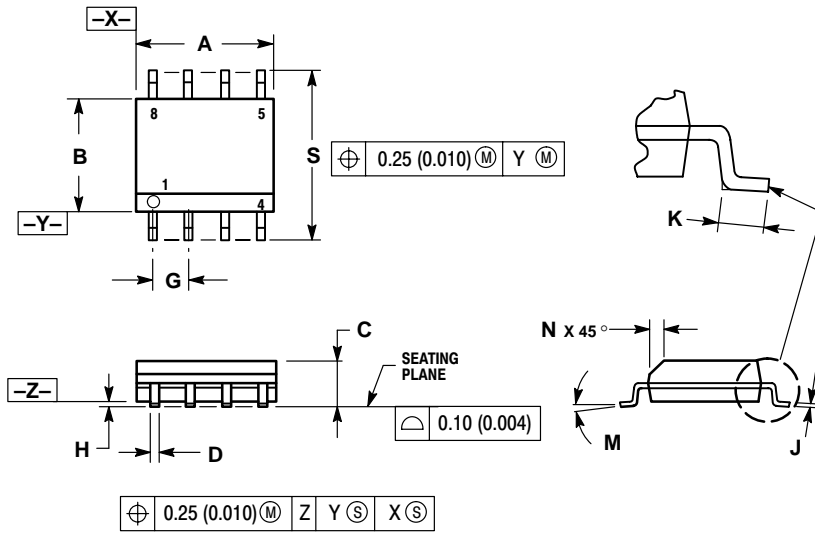
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2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	---	10°	---	10°
N	0.76	1.01	0.030	0.040

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PACKAGE DIMENSIONS

SO-8
CASE 751-07
ISSUE W



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

Notes

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