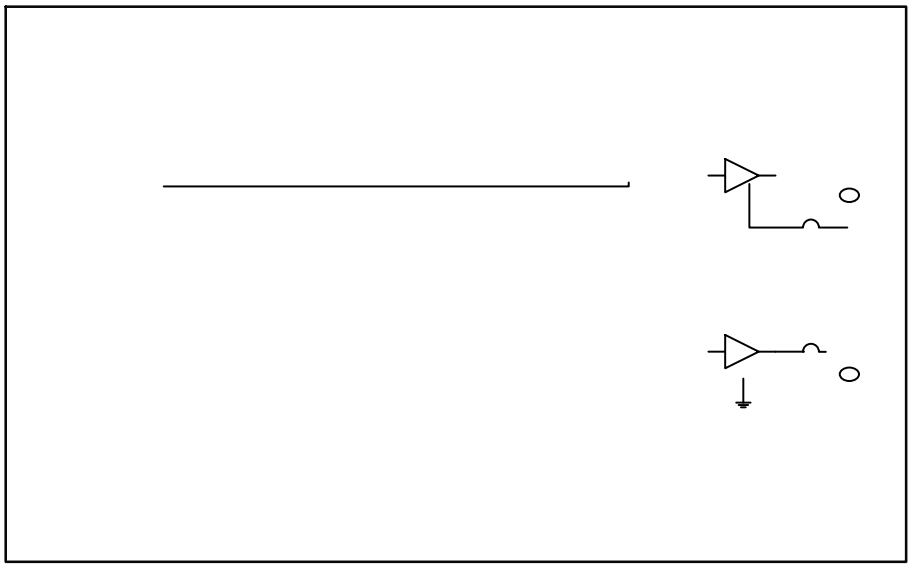


Figure 1. Block Diagram

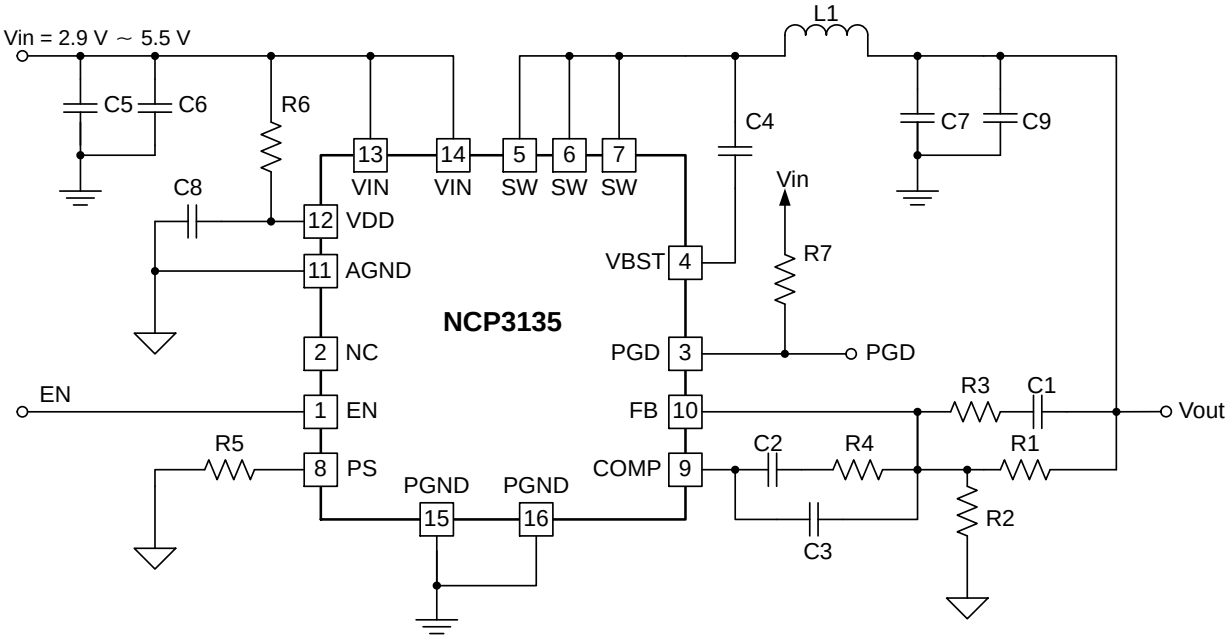


Figure 2. NCP3135 Single Voltage Rail for V_{IN} and V_{DD}

Table 2. ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value		Units
		Min	Max	
Input Voltage Range	VIN, VDD, PS, EN	−0.3	6.5	V
	VBST	−0.3	17	
	VBST (with respect to SW)			

Table 5. ELECTRICAL CHARACTERISTICS (V_{DD} = V_{IN} = 3.3 V and V_{DD} = V_{IN} = 5.0 V, T_A = T_J = −40°C to 125°C. Typical values are at T_A = 25°C, PGND = GND unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units

Table 5. ELECTRICAL CHARACTERISTICS (V_{DD} = V_{IN} = 3.3 V and V_{DD} = V_{IN} = 5.0 V, T_A = T_J = −40°C to 125°C. Typical values are at T_A = 25°C, PGND = GND unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
LOGIC PINS: I/O VOLTAGE AND CURRENT						
EN high threshold voltage			1.1	1.18	1.30	V
EN hysteresis				0.18	0.24	V
EN input pull up resistor				1.35		MΩ
PS mode threshold voltage		Level 1 to Level 2		2.2		V
PS source		10 μA pull−up current when enabled	8	10	12	μA
INTERNAL BST DIODE						
Reverse−bias leakage current		V_{BST} = 6.6 V, V_{in} = 3.3 V, T_A = 25°C			1	μA
SOFT STOP						
Output discharge on−resistance		EN = 0, V_{IN} = 3.3 V, V_{out} = 0.5 V		20		Ω
TIMERS: SOFT START						
Soft start ramp−up time	tSS	Rising from Vss = 0 V to Vss = 0.6 V		1.0		ms
Delay after EN asserting		EN = 'HI'		0.2		ms
Switching frequency control		Forced CCM mode	0.99	1.1	1.21	MHz
PWM						
Minimum OFF time		FCCM mode or Automatic CCM/DCM mode		100	140	ns
PWM ramp amplitude (Note1)		2.9 V < V_{IN} < 5.5 V		VIN/4		V
Maximum duty cycle, FCCM mode or Automatic CCM/DCM mode		Fs_W = 1.1 MHz, 0°C < T_A < 85°C	84%	89%		
THERMAL SHUTDOWN						
Thermal shutdown threshold (Note 1)			130	140	150	°C
Thermal shutdown hysteresis (Note 1)				40		°C

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Guaranteed by design, no production test

TYPICAL CHARACTERISTICS

TYPICAL CHARACTERISTICS

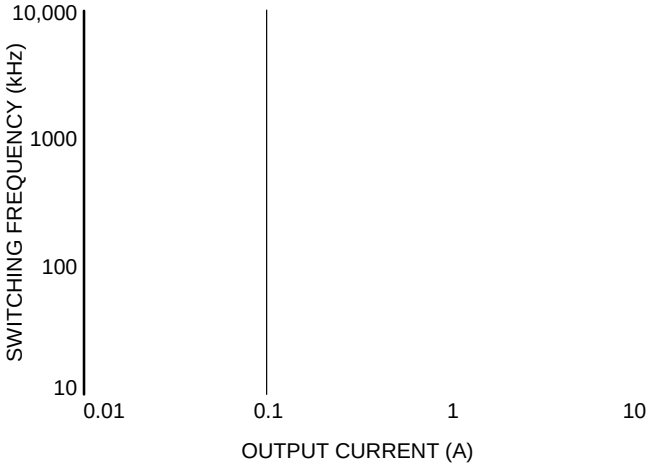


Figure 10. Switching Frequency vs. Output Current at Vin = 3.3 V

Figure 11. Switching Frequency vs. Output Current at Vin = 5.0 V

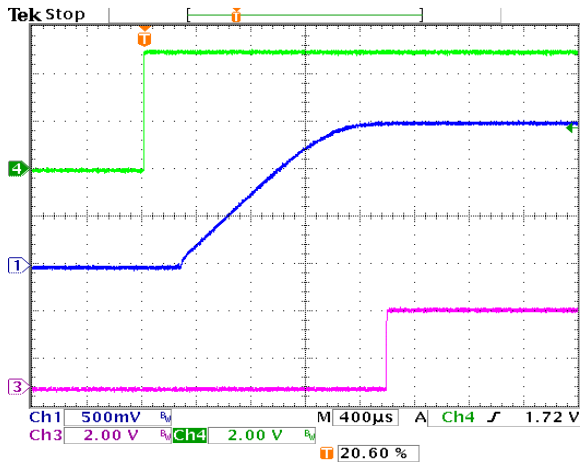


Figure 12. Soft Start−up at Auto CCM/DCM Mode Vin = 3.3 V, No Load

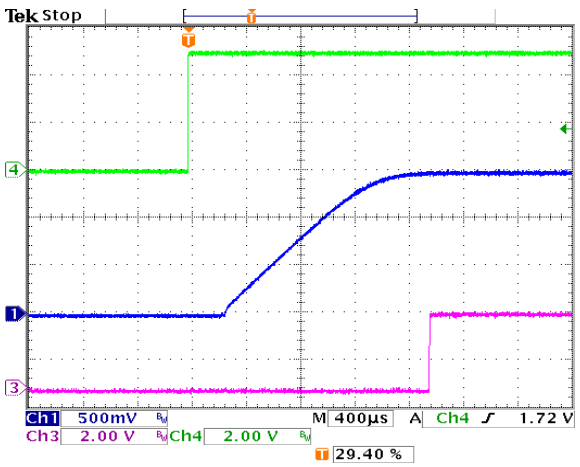


Figure 13. Soft Start−up at Auto CCM/DCM Mode Vin = 3.3 V, 5 A Load

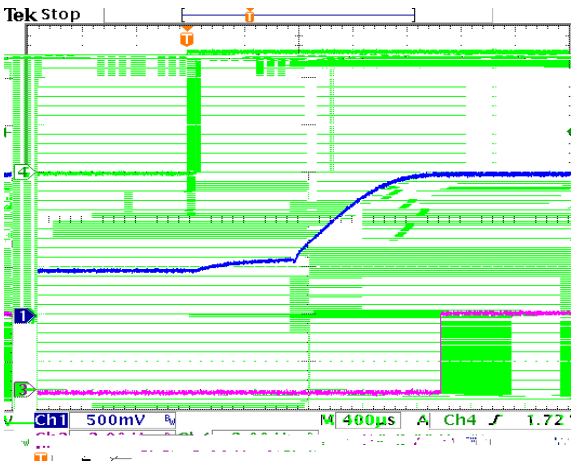


Figure 14. Pre−bias Start−up at Auto CCM/DCM Mode Vin = 3.3 V, No Load

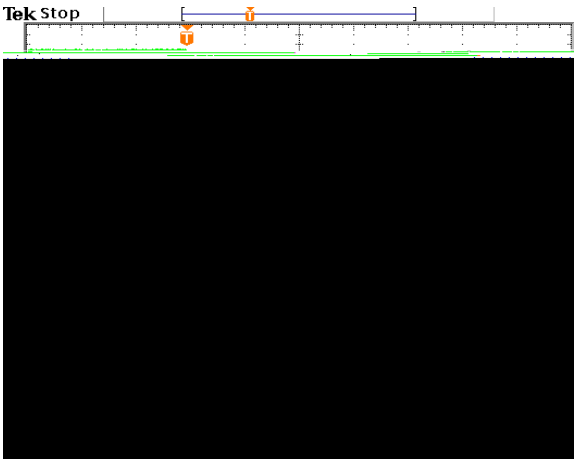


Figure 15. Soft Stop at Auto CCM/DCM Mode Vin = 3.3 V, No Load

TYPICAL CHARACTERISTICS

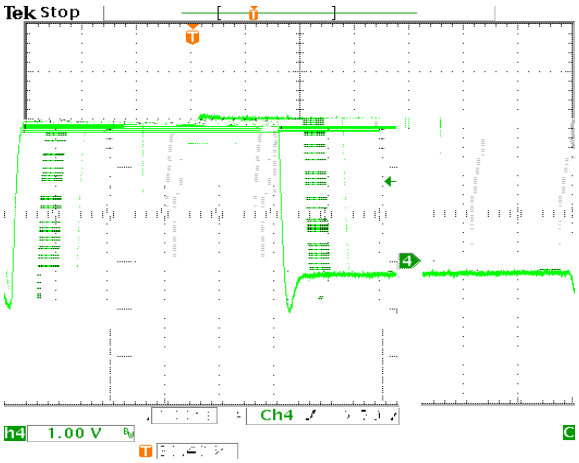


Figure 16. Switching Node Waveform at Auto CCM/DCM Mode Vin = 3.3 V, 5 A Load

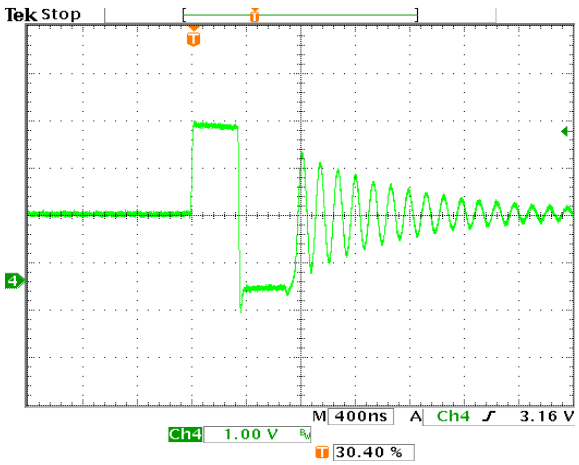


Figure 17. Switching Node Waveform at Auto CCM/DCM Mode Vin = 3.3 V, No Load

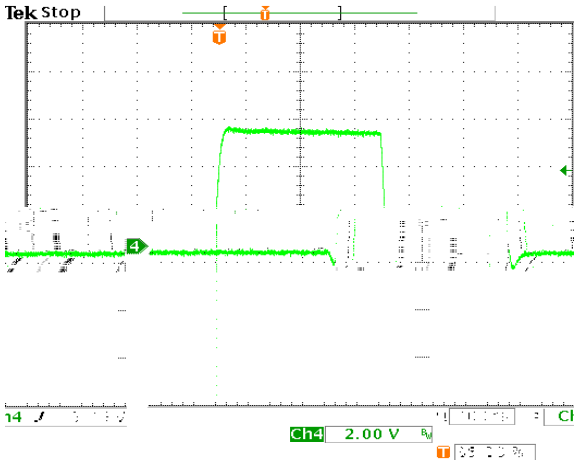


Figure 18. Switching Node Waveform at Auto CCM/DCM Mode Vin = 5.0 V, 5 A Load

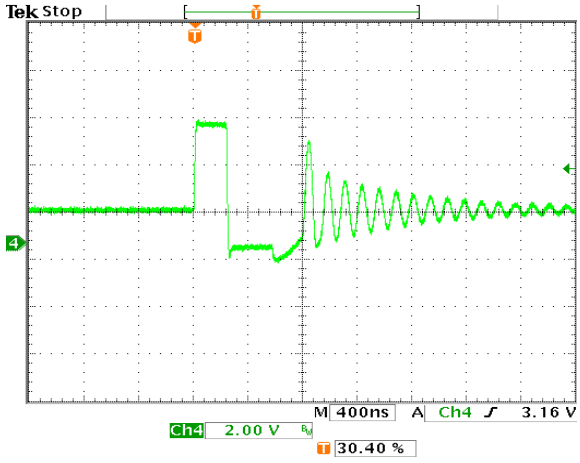


Figure 19. Switching Node Waveform at Auto CCM/DCM Mode Vin = 5.0 V, No Load

DETAILED DESCRIPTION

Overview

C 1 5 5 A . CC /DC

– FE . C 1 5 0.6 0.8 .9 5.5 . C 1 5 – – , – – . – , , , .

Operation Mode

C 1 5 , .

Table 6.

PS pin Connection	Operation Mode	Auto Skip at Light Load
(≤)174 kΩ to GND	Automatic CCM/DCM	Yes
Floating or pulled to VDD	FCCM	

(FCC), – FE – – FE – . . A CC /DC , – FE – – FE – . A – . , – FE . , – . (CC) – . CC , .

Soft Stop

– . , (E) 0 Ω . – .

Automatic Power Saving Mode

A CC /DC , . D , –

Reference Voltage

C 1 5 600 1.0 % .

Internal Soft−Start

– , 0 . 1.0 .

PROTECTIONS

Under Voltage Lockout (UVLO)

- ( )
DD C 1 5,
.8 75 DD
1 0 . ,

.
D E .

Over Voltage Protection (OVP)

17% ( )
1.7 µ , .
, – D
– .

.
FB .
– . .

Under Voltage Protection (UVP)

–
–

Layout Guidelines

CB C 1 5 , , D .
.
. C.
; FB, C ,
. B .
CB , DD
C .
.

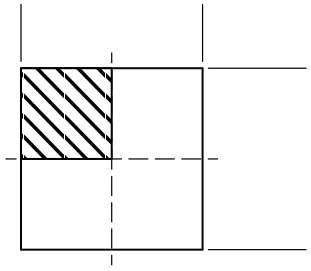
ORDERING INFORMATION

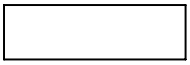
Device	Marking	Package	Shipping†
NCP3135MNTXG	3135	QFN16, 3 x 3, 0.5P (Pb−Free)	3000 / Tape & Reel

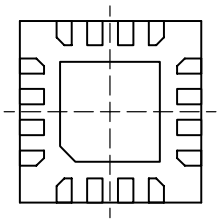
QFN16 3x3, 0.5P
CASE 485DA
ISSUE A

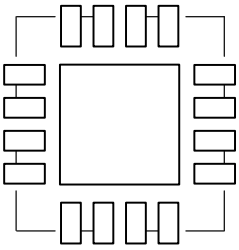
SCALE 2:1

DATE 22 SEP 2015









NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

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