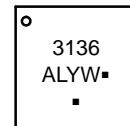


NCP3136

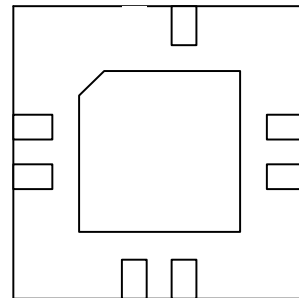
I B. C 6 A

NCP3136 is a fully integrated synchronous buck converter for 3.3 V and 5 V step-down applications. It can provide up to 6.5 A instantaneous current. NCP3136 supports high efficiency, fast transient response and provides power good indicator. The control scheme includes two operation modes: FCCM and automatic CCM/DCM. In automatic CCM/DCM mode, the controller can smoothly switch between CCM and DCM, where converter runs at reduced switching frequency with much higher efficiency. NCP3136 is available in 3 mm x 3 mm QFN16 pin package.

- High Efficiency in Both CCM and DCM
 - Operation Frequency: 1.1 MHz
 - Support MLCC Output Capacitor
 - Small Footprint, 3 mm x 3 mm, 16-pin QFN Package
 - 2.9 V to 5.5 V Wide Conversion Voltage Range
 - Output Voltage Range from 0.6 V to 0.84 X V_{IN}
 - Automatic Power-Saving Mode
 - Voltage Mode Control
 - Support Pre-bias Start-up Functionality
 - Output Discharge Operation
 - Over-Temperature Protection
 - Built-in Over-Voltage, Under-Voltage and Over-Current Protection
 - Power Good Indicator
 - This Device is Pb-Free and is RoHS Compliant
-
- 5 V Step Down Rail
 - 3.3 V Step Down Rail

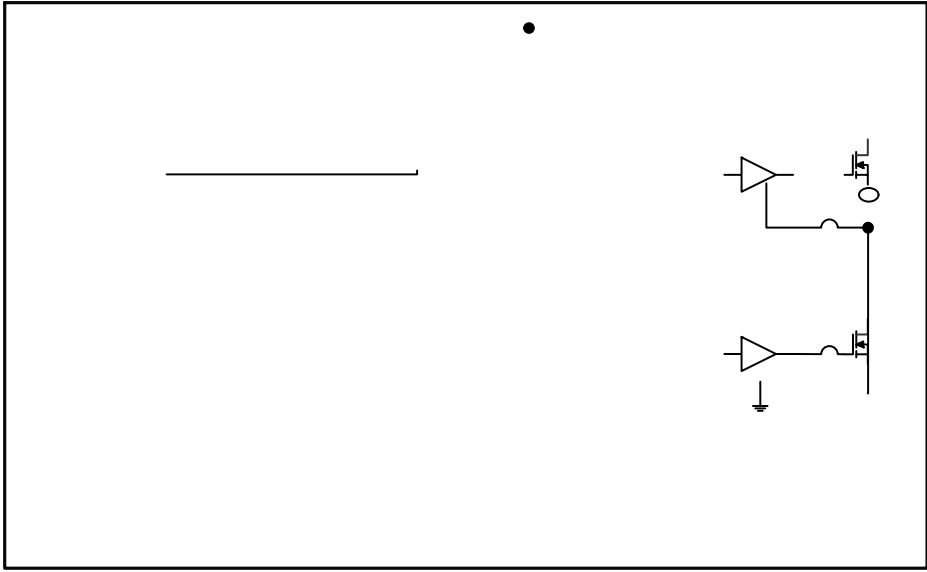


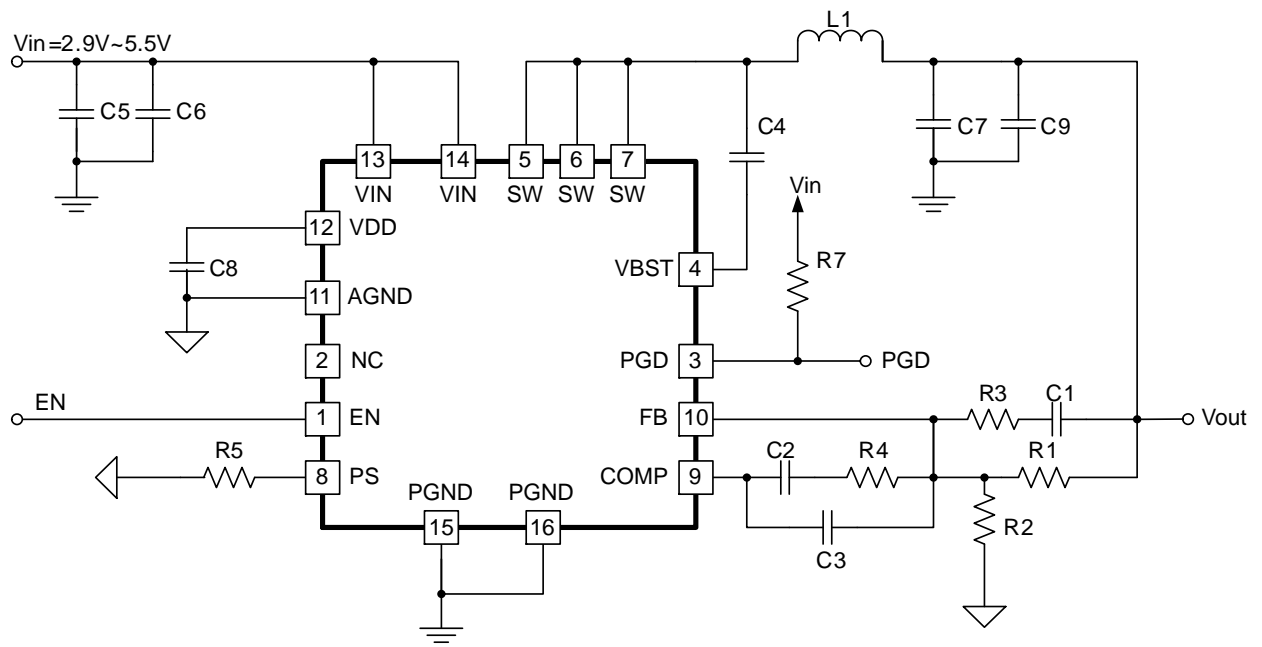
(Note: Microdot may be in either location)



		†
NCP3136MNTXG	QFN16 (Pb-Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.





Input Voltage Range	VIN, PS		-0.3	6.5	V
	VBST		-0.3	17	
	VBST (with respect to SW)		-0.3	6.5	
	EN, FB		-0.3	VDD + 0.3	
Output Voltage Range	SW	DC	-1	6.5	V
		Pulse < 20 ns, E = 5 μJ	-3	10	
	PGD		-0.3	6.5	
	COMP		-0.3	VDD + 0.3	
	PGND		-0.3	0.3	
Operation ambient temperature	T _A		-40	125	°C
Storage temperature	T _S		-55	150	
Junction temperature	T _J		-40	150	
Thermal Characteristics	R _θ				

($V_{DD} = V_{IN} = 3.3\text{ V}$, $T_A = T_J = -40^\circ\text{C}$ to $+125^\circ\text{C}$. Typical values are at $T_A = 25^\circ\text{C}$, PGND = GND unless otherwise noted)

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PS mode threshold voltage	PS _{THS}	Level 1 to Level 2		0.05		V
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2 3 4 5
LOAD CURRENT (A)

LOAD CURRENT (A)



NCP3136 is a low input voltage high performance synchronous buck converter with two integrated N-MOSFETs. NCP3136's output voltage range is from 0.6 V to $0.84 \times V_{in}$ and it has wide input voltage range from 2.9 V to 5.5 V. The features of NCP3136 include supporting pre-bias start-up to protect sensitive loads, cycle-by-cycle over-current limiting and short circuit protection, power good monitor, over voltage and under voltage protection, built in output discharge and thermal shutdown.

NCP3136 provides two operation modes to fit various application requirements. The automatic CCM/DCM mode operation provides reduced power loss and increases the efficiency at light load. The adaptive power control architecture enables smooth transition between light load and heavy load while maintaining fast response to load transients.

In forced continuous conduction mode (FCCM), the high-side FET is ON during the on-time and the low-side FET is ON during the off-time. The switching is synchronized to an internal clock thus the switching frequency is fixed.

In Automatic CCM/DCM mode, the high-side FET is ON during the on-time and low-side FET is ON during the off-time until the inductor current reaches zero. An internal zero-crossing comparator detects the zero crossing of the inductor current from positive to negative. When the inductor current reaches zero, the comparator sends a signal to the logic circuitry and turns off the low-side FET.

When the load is increased, the inductor current is always positive and the zero-crossing comparator does not send any zero-crossing signal. The converter enters into continuous conduction mode (CCM) when no zero-crossing is detected for two consecutive PWM pulses. In CCM mode, the switching synchronizes to the internal clock and the switching frequency is fixed.

The VDD voltage is supplied from VIN via an internal resistor. Meanwhile, it is also ok to short the VDD pin and VIN pins externally.

The NCP3136 incorporates 600 mV reference voltage with 1.0% tolerance.

To limit the start-up inrush current, an internal soft start circuit is used to ramp up the reference voltage from 0 V to its final value linearly. The internal soft start time is 2.0 ms typically.

Soft-Stop or discharge mode is always on during faults or disable. In this mode, disable (EN) causes the output to be discharged through an internal 40Ω transistor inside of SW terminal. The time constant of soft-stop is a function of output capacitance and the resistance of the discharge transistor.

In Automatic CCM/DCM mode when the load current decreases, the converter will enter power saving mode operation. During power saving mode, the low-side MOSFET will turn off when the inductor current reaches zero. So the converter skips switching and operates with reduced frequency, which minimizes the quiescent current and maintains high efficiency.

When PS pin is floating or pulled high, NCP3136 is operating in forced continuous conduction mode in both light load and heavy load conditions. In this mode, the switching frequency remains constant over the entire load range, making it suitable for applications that need tight regulation of switching frequency at a cost of lower efficiency at light load.

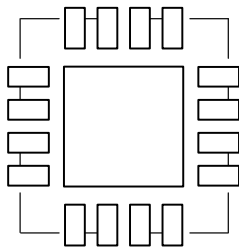
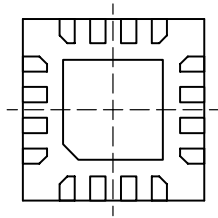
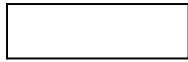
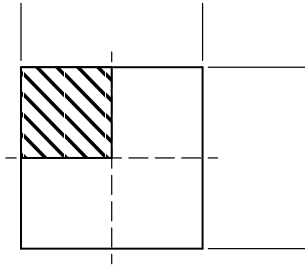
QFN16 3x3, 0.5P
CASE 485DA
ISSUE A

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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