Linear Voltage Regulator - Fast Transient Response, Enable

500 mA

NCP177

The NCP177 is CMOS LDO regulator featuring 500 mA output current. The input voltage is as low as 1.6 V and the output voltage can be set from 0.7 V.

Features

- Operating Input Voltage Range: 1.6 V to 5.5 V
- Output Voltage Range: 0.7 V to 3.6 V
- Quiescent Current typ. 60 μA
- Low Dropout: 200 mV Typ. at 500 mA, $V_{OUT-NOM}$ = 1.8 V
- High Output Voltage Accuracy 0.8%
- Stable with Small 1 μF Ceramic Capacitors
- Over−current Protection
- Thermal Shutdown Protection: 175° C
- With (NCP177A) and Without (NCP177B) Output Discharge Function
- Available in XDFN4 1 mm x 1 mm x 0.4 mm Package
- This is a Pb−Free Device

Typical Applications

- Battery Powered Equipment
- Portable Communication Equipment
- Cameras, Image Sensors and Camcorders

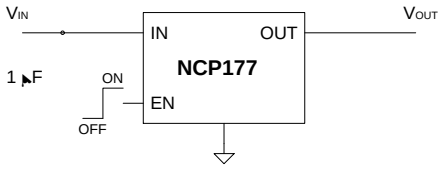
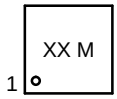


Figure 1. Typical Application Schematic

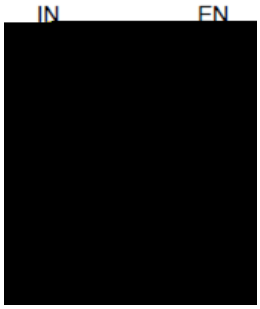
XDFN4
CASE 711AJ

MARKING DIAGRAM



XX = Specific Device Code
M = Date Code

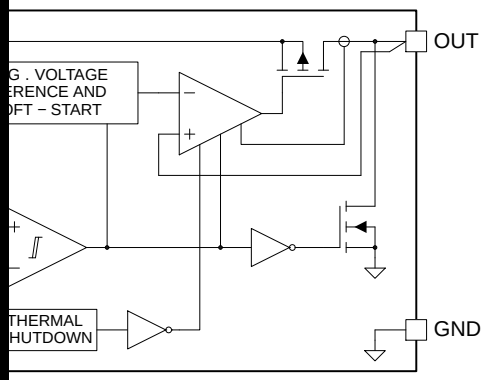
PINOUT DIAGRAM



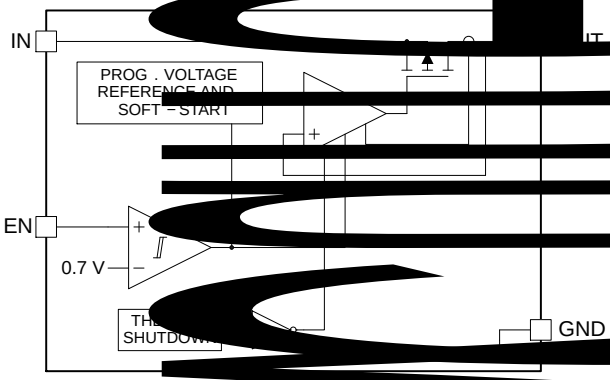
(Top View)

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 10 of this data sheet.



P177A (with output active discharge)



NCP177B (without output active discharge)

Figure 2. Internal Block Diagram

TION DESCRIPTION

o.	Pin Name	D
	OUT	Regulated output voltage pin
	GND	Power supply ground pin
	EN	Enable pin (active “H”)
	IN	Power supply input voltage pin
	EPAD	Exposed pad should be tied to ground for better power dissipation

E MAXIMUM RATINGS

Rating	Sy	Value	Unit
e (Note 1)		−0.3 to 6.0	V

NCP177

NCP177

TYPICAL CHARACTERISTICS

V_{IN} = $V_{OUT−NOM}$ + 0.5 V OR V_{IN} = 1.6 V (WHICHEVER IS HIGHER), V_{EN} = 1.2 V, I_{OUT} = 1 MA, C_{IN} = C_{OUT} = 1.0 ΜF, T_J = 25° C

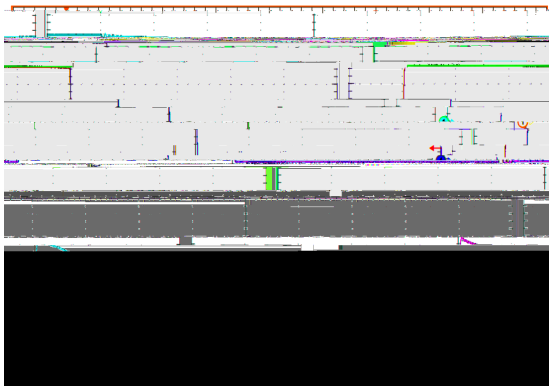


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Figure 27. Load Transient Response

Figure 28. θ_{JA} and $P_{D(MAX)}$ vs. Copper Area

The EN pin has internal pull−down current source with value of 300 nA typ. which assures the device is turned off when the EN pin is unconnected. In case when the EN function isn't required the EN pin should be tied directly to IN pin.

Output Current Limit

Output current is internally limited to a 750 mA typ. The LDO will source this current when the output voltage drops down from the nominal output voltage (test condition is $V_{OUT−NOM}$ − 100 mV). If the output voltage is shorted to ground, the short circuit protection will limit the output current to 700 mA typ. The current limit and short circuit protection will work properly over the whole temperature and input voltage ranges. There is no limitation for the short circuit duration.

Thermal Shutdown

When the LDO's die temperature exceeds the thermal shutdown threshold value the device is internally disabled. The IC will remain in this state until the die temperature decreases by value called thermal shutdown hysteresis. Once the IC temperature falls this way the LDO is back enabled. The thermal shutdown feature provides the protection against overheating due to some application failure and it is not intended to be used as a normal working function.

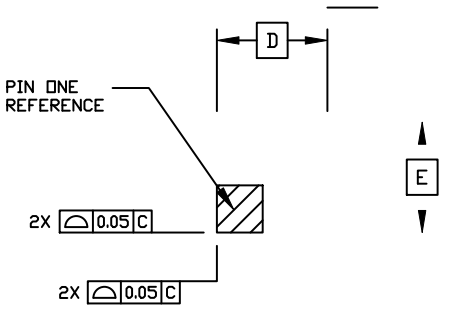
Power Dissipation

Power dissipation caused by voltage drop across the LDO and by the output current flowing through the device needs to be dissipated out from the chip. The maximum power dissipation is dependent on the PCB layout, number of used Cu layers, Cu layers thickness and the ambient temperature. The maximum power dissipation can be computed by following equation:

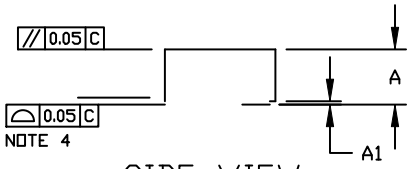
$$P_{D(MAX)} = {}^{T}$$

XDFN4 1.0x1.0, 0.65P
CASE 711AJ
ISSUE C

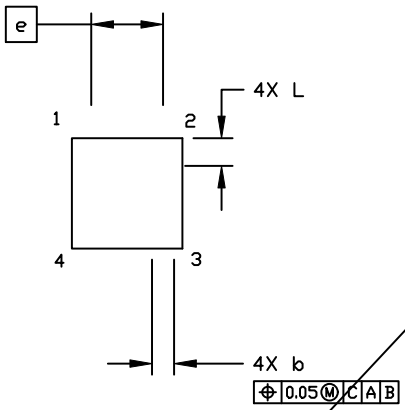
DATE 08 MAR 2022



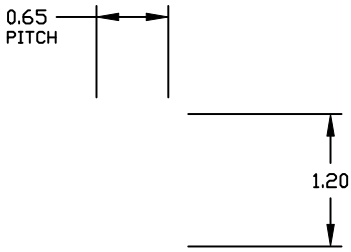
TOP VIEW



SIDE VIEW



BOTTOM VIEW



RECOMMENDED
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