

NCP383

A . **ab** **C** - **L**
P - **D** **b**
S ,

The NCP383 is a single input dual outputs power-distribution switch designed for applications where heavy capacitive loads and short-circuits are likely to be encountered, incorporating two very low $R_{DS(on)}$, N-channel MOSFETs in a single package. Each channel of the device limits the output current to a desired level by switching into a constant-current mode when the output load exceeds the current-limit threshold or a short circuit is present. The current-limit threshold is externally fixed by a pull down resistor placed between I_{lim} and GND. The power-switches rise and fall times are controlled to minimize current ringing during turn on/off.

An internal reverse-voltage detection comparator disables the power-switch if the output voltage is higher than the input voltage to protect devices on the input side of the switches.

The /FLAGx logic output asserts low during over-current, reverse-voltage or over temperature conditions. The switch is controlled by a logic enable input active low.

Features

- 2.7 V – 5.5 V Operating Range
- Current limit: Adjustable up to 2.8 A
- $\pm 7.5\%$ Current Limit Accuracy at 2.8 A
- Very fast Over-Current Detection Response: 2 μ s (typ)
- 1 μ A Maximum Standby Supply Current
- Under Voltage Lock-out (UVLO)
- Soft-Start Prevents Inrush Current
- Thermal Protection
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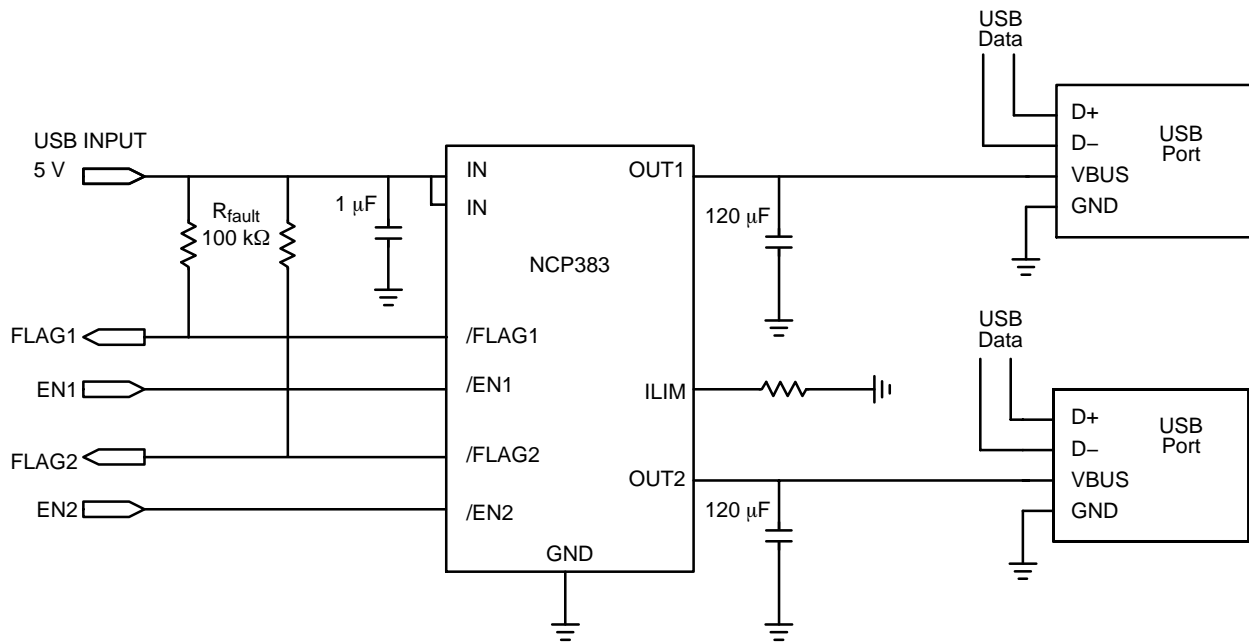


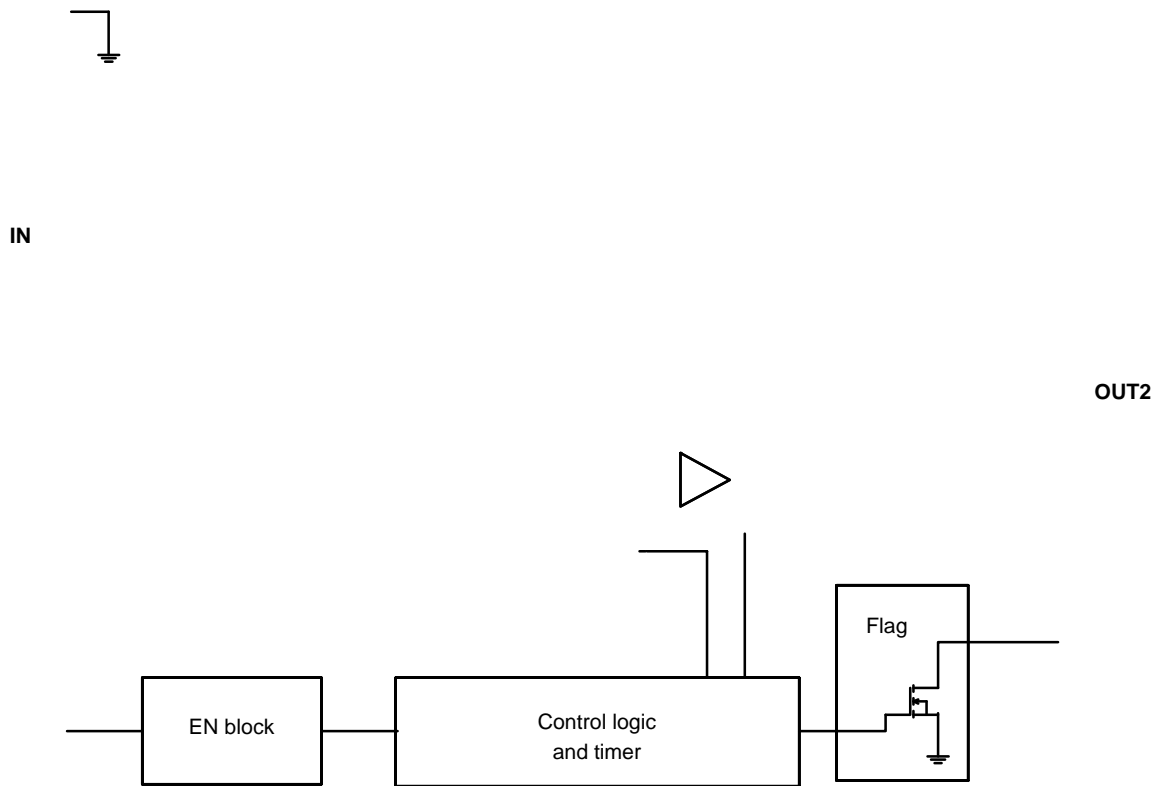
Figure 1. Typical Application Circuit: NCP383xMUAJxx

Adjustable Current limit on Channel 1 and Channel 2

PIN FUNCTION DESCRIPTION

Pin Name	Number	Function
IN	1	Input
/FLAG1	2	Flag 1
/EN1	3	Enable 1
/FLAG2	4	Flag 2
/EN2	5	Enable 2
GND	6	Ground
OUT1	7	Output 1
ILIM	8	Current Limit
OUT2	9	Output 2

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MAXIMUM RATINGS

Rating	Symbol	Value	Unit
From IN to OUT1, From IN to OUT2 Supply Voltage (Note 1)	$V_{IN}, V_{OUT1}, V_{OUT2}$	-7.0 to +7.0	V
IN, OUT1, OUT2, /EN1, /EN2, /FLAG1, /FLAG2, ILIM Pins: In/Output (Note 1)	$V_{IN}, V_{OUT1}, V_{OUT2}, V_{EN1}, V_{EN2}, V_{FLAG1}, V_{FLAG2}, V_{ILIM}$	-0.3 to +7.0	V
/FLAG1, /FLAG2 Sink Current	I_{SINK}	2	mA
ESD Withstand Voltage (IEC 61000-4-2) (output only, when bypassed with 1.0 μ F capacitor minimum)	ESD IEC	15 Air, 8 contact	kV
Human Body Model (HBM) ESD Rating are (Note 2)	ESD HBM	2000	V
Machine Model (MM) ESD Rating are (Note 2)	ESD MM	200	V>Note 2)

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ELECTRICAL CHARACTERISTICS Min & Max Limits apply for T_A between -40°C to $+85^{\circ}\text{C}$ and T_J up to $+125^{\circ}\text{C}$ for V_{IN} between 2.5 V to 5.5 V (Unless otherwise noted). Typical values are referenced to $T_A = +25^{\circ}\text{C}$ and $V_{IN} = 5\text{ V}$.

Symbol	Parameter	Conditions	Conditions	Min	Typ	Max	Unit
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POWER SWITCH

$R_{DS(on)}$	Static drain–source on–state resistance, per channel	$T_J = 25^{\circ}\text{C}$			45	70	$\text{m}\Omega$
		$-40^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$				95	
T_R	Output rise time	$V_{IN} = 5\text{ V}$	$C_{LOAD} = 1\mu\text{F}$, $R_{LOAD} = 100\ \Omega$ (Note 9)	1.5	2.5	4	ms
T_F	Output fall time	$V_{IN} = 5\text{ V}$		0.1		0.5	

Logic Pins

V_{IHEN}	High–level input voltage			1.2			V
V_{ILEN}	Low–level input voltage					0.4	V
I_{ENx}	Input current	$V_{ENx} = 0\text{ V}$, $V_{/ENx} = 5\text{ V}$		-0.5		0.5	μA
T_{ON}	Turn on time	$C_{LOAD} = 1\mu\text{F}$, $R_{LOAD} = 100\ \Omega$ (Note 9)		1	-	9	ms
T_{OFF}	Turn off time			1		3	ms

CURRENT LIMIT

I_{OCP}	Current–limit threshold (Max-)
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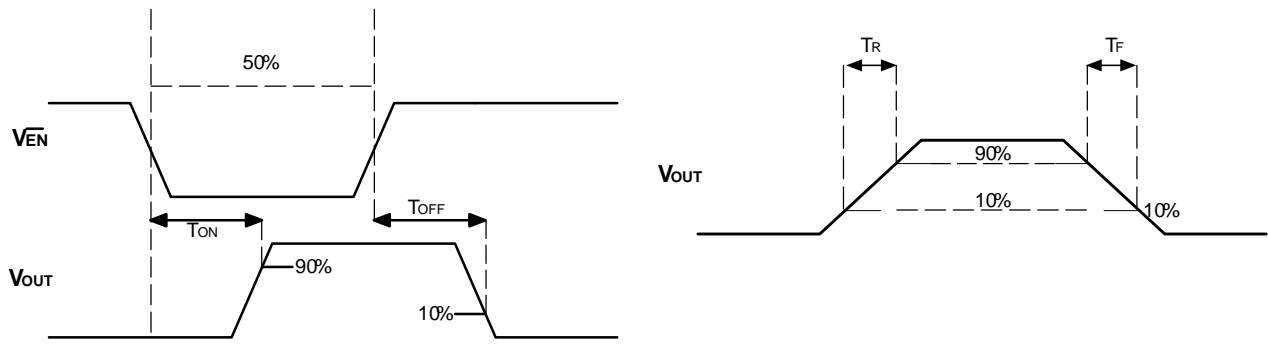


Figure 3. Ton, Toff, Trise, and Tfall

FUNCTIONAL DESCRIPTION

Overview

The NCP383 is a dual high side N channel MOSFET power distribution switches designed to protect the input supply voltage in case of heavy capacitive loads, short circuit or over current. In addition, the high side MOSFETs are turned off during under voltage, thermal shutdown or reverse voltage condition. Thanks to

NCP383

- Off-phase: Power MOSFET is off during T_{OCP} to allow the die temperature to drop.
- On-phase: regulation current mode during T_{REG} . The current is regulated to the I_{OCP}

APPLICATION INFORMATION

Power Dissipation

The device's junction temperature depends on different contributor factor such as board layout, ambient temperature, device environment, etc... Yet, the main contributor in term of junction temperature is the power dissipation of the power MOSFET. Assuming this, the power dissipation and the junction temperature in normal mode can be calculated with the following equations:

$$P_D = R_{DS(on)} \times \left(I_{OUT1} \right)^2$$

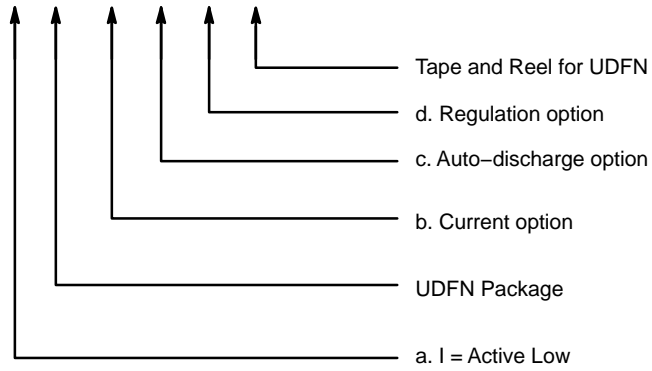
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ORDERING INFORMATION

Device	Package	Shipping†
NCP383LMUAJAATXG	UDFN10 (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 Specifications Brochure, BRD8011/D.

NCP383xMUAJxxTXG



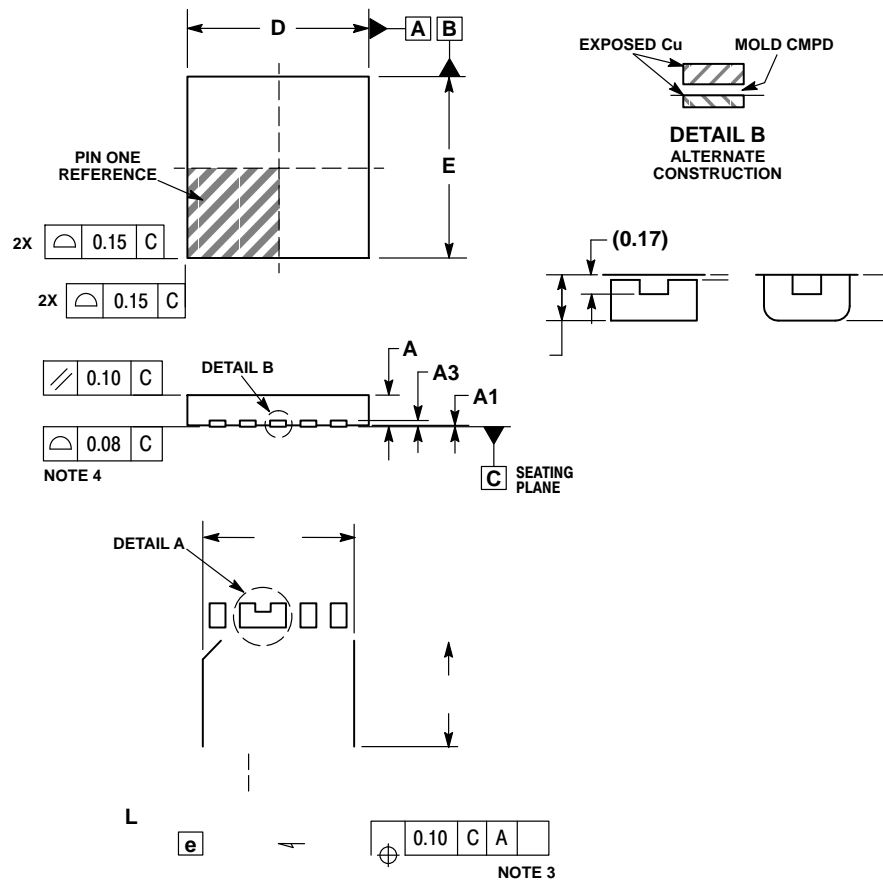
Code	Contents
a	L: active low
b	AJ: adjustable current limit
c	A: No autodischarge output path
d	A: standard regulation (CC + TSD warning + timer)



SCALE 2:1

UDFN10 3x3, 0.5P (Leads 2 & 3 Tied)
CASE 517CC
ISSUE O

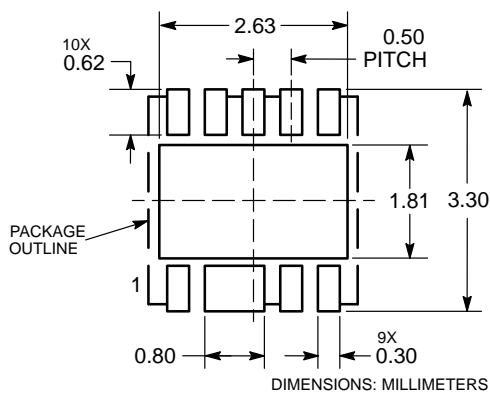
DATE 10 OCT 2011



- 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 0.30mm FROM THE TERMINAL TIP.
 4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13 REF	
b	0.15	0.25
D	3.00 BSC	
D2	2.39	2.59
E	3.00 BSC	
E2	1.59	1.79
e	0.50 BSC	
L1	---	0.15

RECOMMENDED
SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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