

Power Management IC designed for “NXP® i.MX 8M Nano”

## BD71850MWV 1x22μF Buck Output Capacitor

### 1. Introduction

This document summarizes the BD71850MWV electrical performance while reducing the BUCK output capacitors from 2pcs x 22μF to 1pcs.

### 2. Conclusion

If the BUCK regulators of BD71850MWV operate in forced PWM mode, the capacitance can be reduced to 1x 22μF each buck in order to optimize the BOM cost and furthermore reduce the PCB area. The following characteristics have been confirmed to ensure that the SoC specifications are met.

- Transient Response
- AC-Ripple Voltage

However, if high light load system efficiency is requested, it is recommended to use 2x 22μF and run the BUCKs in Auto mode.

Power Rail Name for i.MX 8M Nano Platform	BD71850MWV VR	Recommended external parts With Forced PWM mode	Recommended external parts With Auto Mode
VDD_ARM	BUCK2 0.9V / 3.0A with DVS	L=0.47uH, Cout=22μF x 1	L=0.47uH, Cout=22μF x 2
VDD_SOC/VPU/GPU/DRAM	BUCK1 0.8V / 3.0A with DVS	L=0.47uH, Cout=22μF x 1	L=0.47uH, Cout=22μF x 2
NVCC_3V3	BUCK6 3.3V / 3.0A	L=1uH, Cout=22μF x 1	L=1uH, Cout=22μF x 2
NVCC_DRAM	BUCK8 1.1V / 3.0A	L=0.47uH, Cout=22μF x 1	L=0.47uH, Cout=22μF x 2

### 3. Validation Results (1 x 22 $\mu$ F output capacitor)

#### 3.1 Transient Response summary (1 x 22 $\mu$ F output capacitor)

Ta = -40°C, 25°C, 105°C

VSYS = 3.8V

VR	Typ. Voltage [V]	Load Current [mA]	Transient Response Results Worst Case Results			
			Droop Limit [mV]	Droop [mV]	Overshoot Limit [mV]	Overshoot [mV]
BUCK1	0.8	0 to 3000	45	32	1.15	31
BUCK2	0.9	0 to 3000	45	32	1.15	33
BUCK5	0.9	0 to 3000	45	34	1.15	31
BUCK6*	3.3	0 to 3000	300	130	3.8	118
BUCK7	1.8	0 to 1500	150	42	2.15	39
BUCK8	1.1	0 to 3000	40	34	1.14	30

#### 3.2 AC-Ripple summary (1 x 22 $\mu$ F buck output capacitor)

Ta = -40°C, 25°C, 105°C

VSYS = 3.8V

VR	Typ.	Load Current [mA]	Maximum Ripple Voltage Worst Case Result			
			Limit [mV]	AC-Ripple [mV]	DC-set-point [mV]	WC [mV]
BUCK1	0.8	0 / 3000	45	12.8 / 13.2	+/-9	15.6
BUCK2	0.9	0 / 3000	45	11.6 / 12.4	+/-10	16.2
BUCK5	0.9	0 / 3000	45	10.4 / 11.6	+/-10	15.8
BUCK6*	3.3	0 / 3000	300	12.0 / 12.0	+/-33	39
BUCK7	1.8	0 / 1500	150	12.0 / 12.0	+/-18	24
BUCK8	1.1	0 / 3000	40	14.0 / 13.6	+/-11	18

## 4 Revision History

Date	Revision Number	Description
13 <sup>th</sup> .Dec.2019	001	First Release

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