DC6M4/5/6 series 6 MHz DC/DC step-down converter

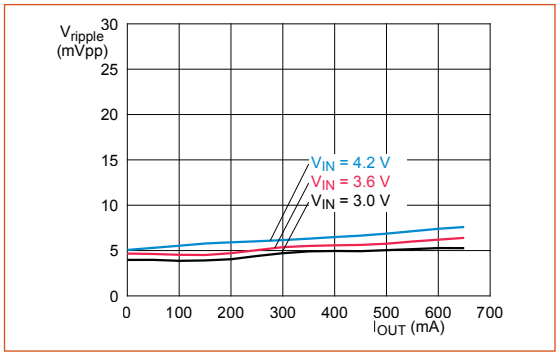
Small, highly efficient switching converters with ultra-low output voltage ripple

Ideal for mobile and battery driven devices, the DC6M4/5/6 series combine the advantages of a high frequency DC/DC buck converter with high performance and small package (1.0 mm * 1.4 mm). The 6 MHz switching frequency allows use of inductors as small as 470 nH to save board space. Another key advantage is the ultra-low output voltage ripple performance of only 7 mV (typ).

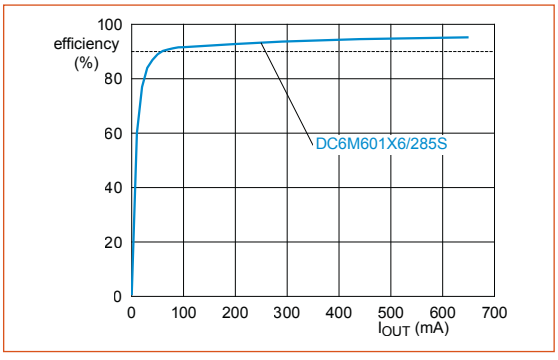
Key features

- Ultra-low output voltage ripple of 7 mV (typ)
- Very small WLCSP6 package for board space reduction
- Optimized for load range of 40 mA to 650 mA with an efficiency of up to 95%
- Input voltage range 2.3 V - 5.5 V
- Available with output currents of 425, 500, 650 mA
- Low quiescent current of 0.2 µA (typ) in shutdown
- Inrush, short circuit & temperature protection
- Available with Auto/PWM mode select, output voltage select or power good/XSHUTDOWN option

Ultra-low output voltage ripple performance



Conversion efficiency



Key applications

- Mobile phones
- PC tablets
- DSCs (Digital Still Cameras)
- Video cameras
- Game pads
- Notebooks, Netbooks, and Ultrabooks

NXPs new DC6M4/5/6 product series are an ideal solution for mobile applications and battery driven devices.

Selection guide

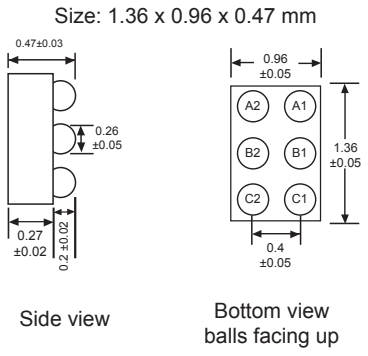
V_{IN} (V)	Operation frequency (MHz)	Shutdown current typ (µA)	Output voltage ripple typ (mV)	Efficiency up to (%)	I_{OUT} (mA)	Output voltage V*	DC6Mx01/xxxS Modulation select (Auto or forced PWM)	DC6Mx02/xxxxxA Voltage select PWM/PFM Auto Modulation	DC6Mx02/xxxxxF Voltage select Forced PWM	DC6Mx03/xxxA XSHUTDOWN PWM/PFM Auto Modulation
2.3 - 5.5	6	0.2	7	95	425	1.8	DC6M401X6/18S	-	-	-
						2.85	DC6M401X6/285S	-	-	-
						1.8 / 2.85	-	DC6M402X6/18285A	-	-
					500	1.2	DC6M501X6/12S	-	-	DC6M503X6/12A
						1.5	DC6M501X6/15S	-	-	DC6M503X6/15A
						1.8	DC6M501X6/18S	-	-	DC6M503X6/18A
						1.2 / 1.5	-	DC6M502X6/1215A	DC6M502X6/1215F	-
						1.2 / 1.8	-	DC6M502X6/1218A	DC6M502X6/1218F	-
						1.5 / 1.8	-	DC6M502X6/1518A	DC6M502X6/1518F	-
					650	1.2	DC6M601X6/12S	-	-	DC6M603X6/12A
						1.5	DC6M601X6/15S	-	-	DC6M603X6/15A
						1.8	DC6M601X6/18S	-	-	DC6M603X6/18A
						2.85	DC6M601X6/285S	-	-	-
						1.2 / 1.5	-	DC6M602X6/1215A	DC6M602X6/1215F	-
						1.2 / 1.8	-	DC6M602X6/1218A	DC6M602X6/1218F	-
						1.5 / 1.8	-	DC6M602X6/1518A	DC6M602X6/1518F	-

* Other output voltages are available on request

Three different operation mode versions can be ordered:

- DC6Mx01 - Modulation select: automatic pulse frequency modulation (PFM) / pulse width modulation (PWM) or forced PWM mode operation. Selection via the A1 MODE pin.
- DC6Mx02 - Output voltage select: switch between 2 different output voltages V_{OUT}, e.g. /1218 means 1.2 V or 1.8 V to be selected via the A1 MODE pin.
- DC6Mx03 – Power good/XSHUTDOWN output: e.g. enabling a camera device through the A1 pin.

WLCSP6 package

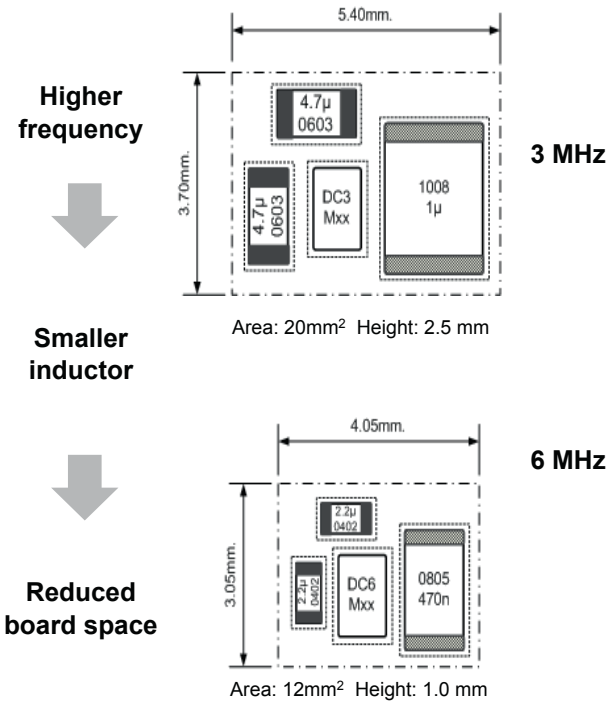


Package outline

A1	MODE select or voltage select or power good	Auto moulation or forwed PWM output voltage 1 or voltage 2 high if power good
A2	V_{IN}	Supply input voltage
B1	SW	Output voltage switch regulator
B2	EN	Enable
C1	FB	Control feedback
C2	GND	Ground

Pinning

6 MHz frequency supports small inductors



Comparison - typical inductor size vs. DC/DC frequency

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