



## 3MHz 2A Buck Converter in DFN Package

### Features

- Input Voltage Range: 2.5V~5.5V
- Output Voltage:  
1.20V,1.86V,3.30V,1.05V,1.35V,1.50V,1.80V,  
1.10V,3.10V,1.08V
- Maximum Output Current: 2A
- 3MHz PWM with Seamless PWM/PFM  
Switching for Light-load Efficiency
- Excellent Load and Line Transient
- Quiescent Current in PFM Tristate: 60uA
- Comprehensive Protection
  - Input Under-Voltage Lockout (UVLO)
  - Input Over-Voltage Lockout (OVLO)
  - Over Current and Short-Circuit Protection
  - Thermal Shut-down
- Active Discharge When Disabled
- Automatic PFM
- Enable Input
- Power Good Output

- Soft Start
- 2mm x 2mm DFN-6 Package

### Applications

- Memory, Hard Disk Drive and SSD
- Data Cards
- Smart Phones
- Tablets
- Handheld Devices

### Order Information

Part Number	V <sub>OUT</sub>	Max Load Current	Pin 2 Function	Soft-Start (t <sub>SS</sub> )	Package	Packing Method
HL7504FN01	1.20V	2A	Power Good	1ms	DFN-6	Tape & Reel
HL7504FN02	1.86V	2A	Power Good	1ms		
HL7504FN03	3.30V	2A	Power Good	1ms		
HL7504FN04	1.05V	2A	Power Good	1ms		
HL7504FN05	1.35V	2A	Power Good	1ms		
HL7504FN06	1.50V	2A	Power Good	1ms		
HL7504FN07	1.80V	2A	Power Good	300μs		
HL7504FN08	1.10V	2A	Power Good	300μs		
HL7504FN09	3.10V	2A	Power Good	300μs		
HL7504FN10	1.08V	2A	Power Good	300μs		
HL7504FN13	3.30V	2A	Power Good	1ms		

**For other default output voltage and maximum load current options, contact a Halo Micro sales representative.**



## Typical Application Diagram

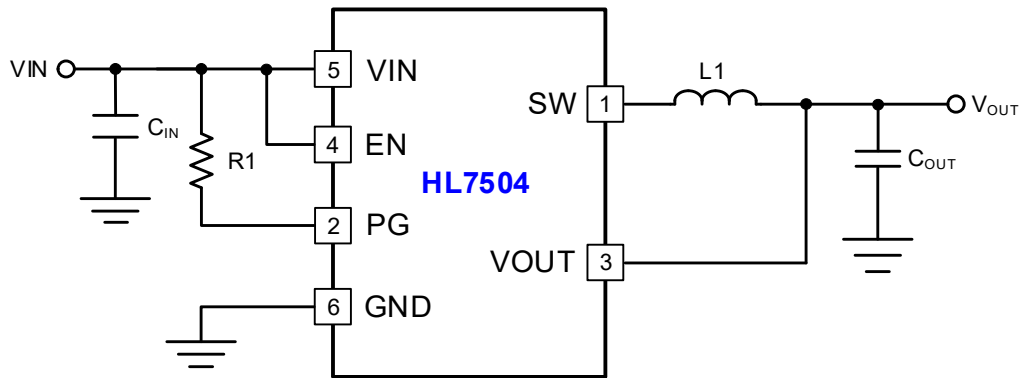


Figure 1 HL7504 Typical Application Diagram

Component	Part Number	Value	Size	Vendor
L1	See Table2	1.0 or 2.2 $\mu$ H	1616	See Table2
R1		1M $\Omega$		TDK
Cin, Cout	C1608X5R0J106M	10 $\mu$ F	0603	TDK

Table 1 Recommended External Components

Manufacturer	Part Number	L ( $\mu$ H)	$I_{MAXDC}^{(1)}$ (mA)	Component Dimensions (mm)		
				L	W	H
MURATA	LQH44PN1R0NP0	1.0	2950	4	4	1.8
MURATA	NR4018T2R2M	2.2	2700	4	4	1.8

Table 2 Recommended Inductors

### Notes:

- $I_{MAXDC}$  is the smaller current to produce 40°C temperature rise or 30% effective inductance reduction.



## Description

HL7504 is a synchronous buck converter optimized to supply different sub systems of portable applications. Its input voltage range is 2.5V to 5.5V. Its output voltage is a factory pre-set value between 1.05V and 3.3V.

HL7504 can deliver up to 2.0A with 80% efficiency, while maintaining over 80% efficiency at load currents as low as 10mA. It operates at a high frequency of 3MHz, which greatly reduces the value of the external components. A wide range of output capacitors can be used to optimize  $V_{OUT}$  stability during load transients. Inductors from 1.0uH to 2.2uH may be used without affecting loop stability.

At moderate to light loads, Pulse Frequency Modulation (PFM) is used to maintain conversion efficiency with a typical non-switching quiescent current of 39 $\mu$ A. Even

with such a low quiescent current, HL7504 maintains excellent load and line transient responses. At higher loads, the system automatically switches to fixed-frequency Pulse Width Modulation (PWM) operation at 3MHz for minimum  $V_{OUT}$  ripple and optimal load transient response. In Shutdown Mode, the supply current drops below 1 $\mu$ A, reducing power consumption.

The HL7504 is available in 2 x 2mm DFN-6 Package.