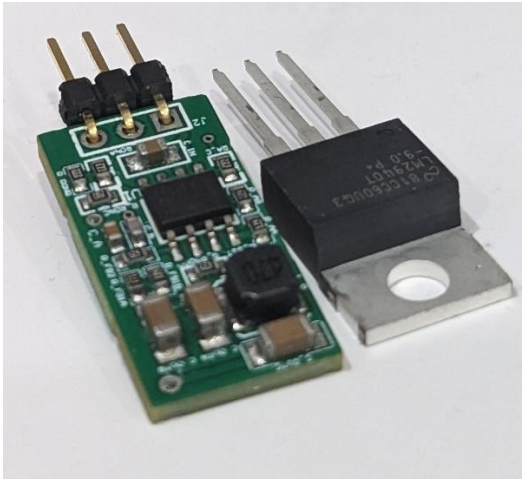
GDCVRR5164-xxx-vv 6-48V 1A Low Ripple Switching Voltage Regulator LDO Replacement

1. Features

- Replaces typical TO-220 Linear Voltage regulators pin-for-pin (pins 1 – 3 only)
- Input voltage range 6V to 50V
- Output Current 0.7A to 1A
- Ultra Low Ripple (10mv peak-to-peak)
- Drops down voltage from much higher starting voltage than LDOs
- Thermal management is not required
- External capacitors not required but can be added for high load applications
- >90% efficiency



2. Applications

- Microcontroller power supply
- IC Logic power
- Relay and Cooling fan power
- Drone and RC

3. Description

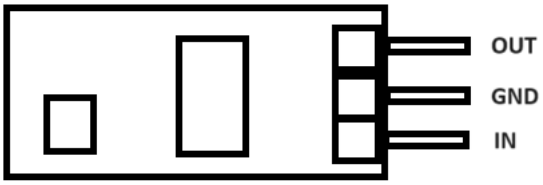
The GDCVRR5164 range of buck converters are designed to be a pin-for-pin replacement for positive linear voltage regulators (LDOs). These regulators are based on the Texas Instruments LM5164 configured as Low Ripple (COT Type III) and provide step down voltage from between 6V to 50V down to between 3.3V and 48V. This provides efficient regulated output over a wide range of input voltages making it possible to step down from much higher voltages than is typical for LDOs without the need for thermal management.

There is no need for additional filter capacitors to support the component. The device will out up to 700mA without support components and up 1A of current with additional output capacitors.

Device Information

Dimensions mm (+/- 0.1)		
Width	Height (excluding pins)	Depth (max)
12.3	27.0	4.4

4. Pin Configurations



PIN Outs		
Name	#	Function
IN	1	Unregulated voltage (50V max) (must be 2V+ higher than OUT)
GND	2	Ground
OUT	3	Filtered/regulated output voltage

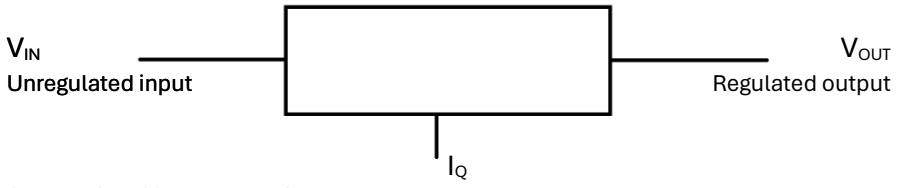


Figure 1 Simplified Schematic

5. Specifications

Absolute Maximum Ratings

Specification	MIN	MAX	UNIT
Input Voltage	5.3	50*	V
Output Voltage	3.3	48	V
Continuous Output Current	-	1	A
Operating junction temperature (T_J)	-40	150	°C
Storage Temperature(T_{stg})	-65	150	°C

** NOTE: Maximum input is limited by the input and timing capacitors. Higher input voltages up to 100V are possible by replacing the input and output capacitors.*

Recommended Ratings

Specification	MIN	MAX	UNIT
Input Voltage	6	48	V
Output Voltage	3.3	36	V
Continuous Output Current	-	700	mA
Operating junction temperature (T_J)	0	150	°C
Storage Temperature(T_{stg})	-65	150	°C

6. Detailed Schematic

The GDCVRR5165 detailed schematic in Figure 2 follows the recommendations of Texas Instruments for the COT III (low ripple) implementation. Components with fixed values are common for all versions. Components without a specified value vary depending on the required output voltage.

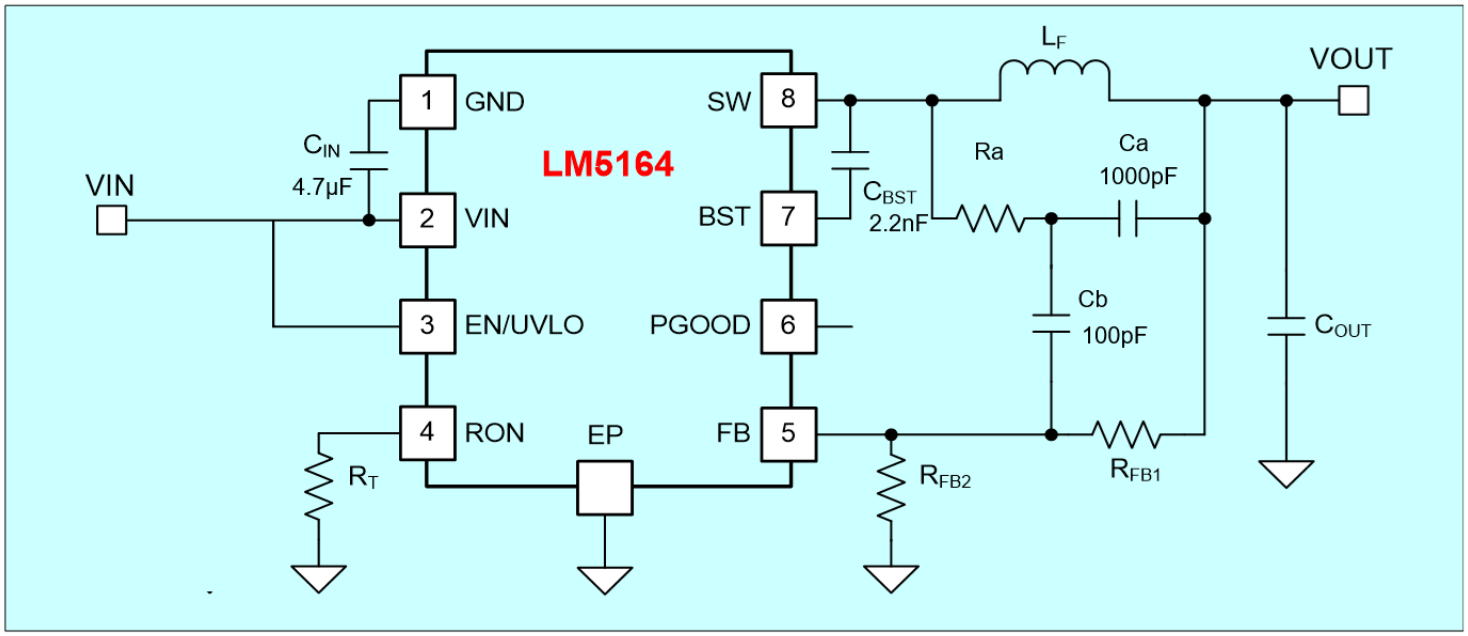


Figure 2 - Detailed Schematic

7. Fixed Components

The following components are common to all version of the GDCVRR5164.

Designator	Component	Fixed value
C_{IN}	Filter capacitor (fixed)	4.7uF
C_{BST}	Boost Feedback	2.2nF
Ca	Low ripple capacitor A	1000pF
Cb	Low ripple capacitor B	100pF

8. Typical Efficiency

The choice of specific components for different versions of the GDCVRR5164 are optimised for efficiency. Each version of the device is configured to produce a similar Current-to-Efficiency curve as displayed in Figure 3. GDCVRR5164-100-01 10V @ 24V input.

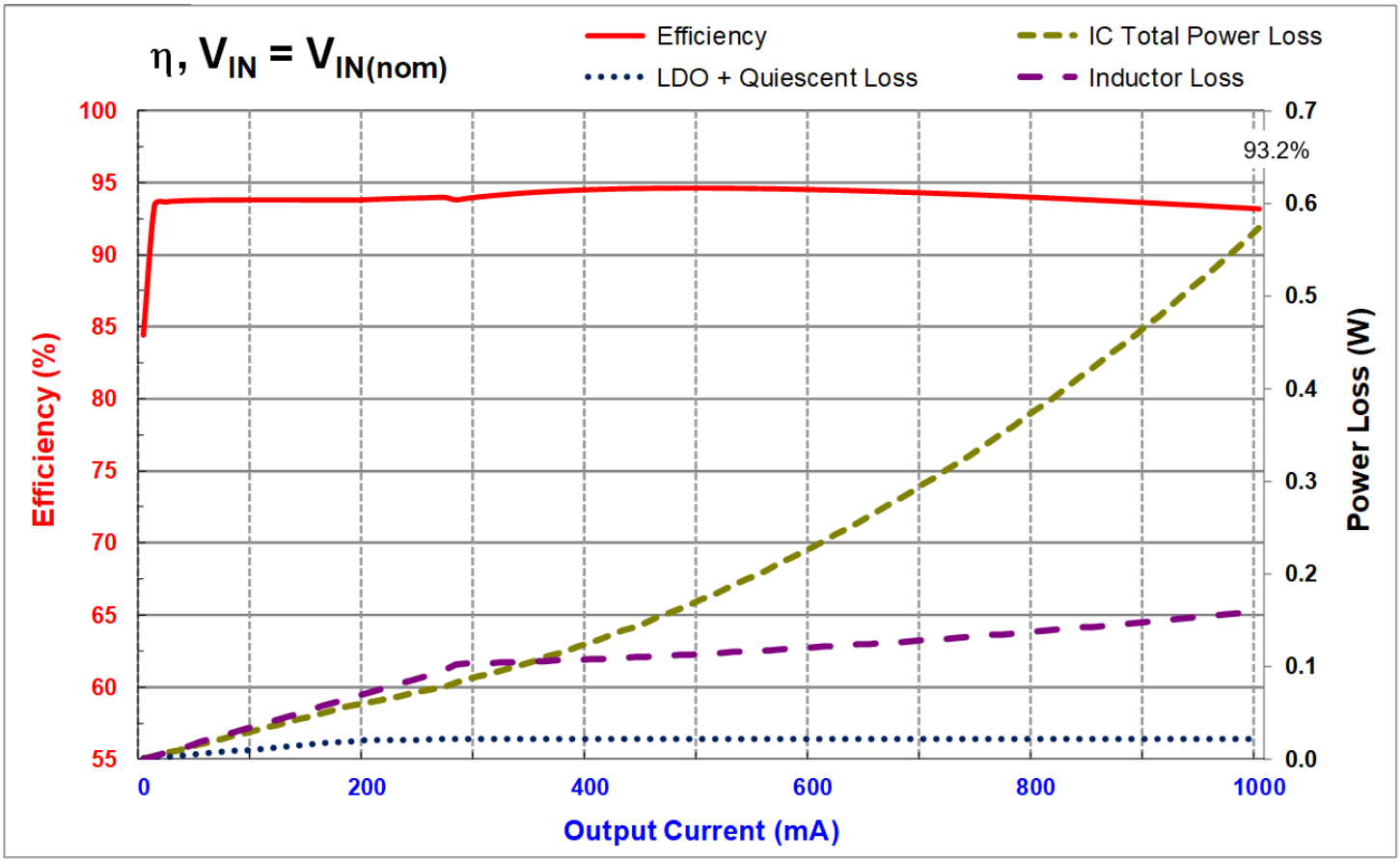


Figure 3. GDCVRR5164-100-01 10V @ 24V input

9. References

Please refer to the Texas Instruments LM5164 100-V Input, 1-A Synchronous Buck DC/DC Converter datasheet at ***ti.com*** for detailed information about the LM5164 Buck converter and the COT III implementation.

10. Ordering Information

GDCVRR5164-**xxx**		
xxx	Example	Output
The output voltage in dV	GDCVRR5164-**33**	3.3V
	GDCVRR5164-240	24.0V

Note: Any fixed voltage between 3.3V and 48V is available (non-standard output voltages must be pre-ordered). Use the GDCVRR5164-DEV for custom designs.