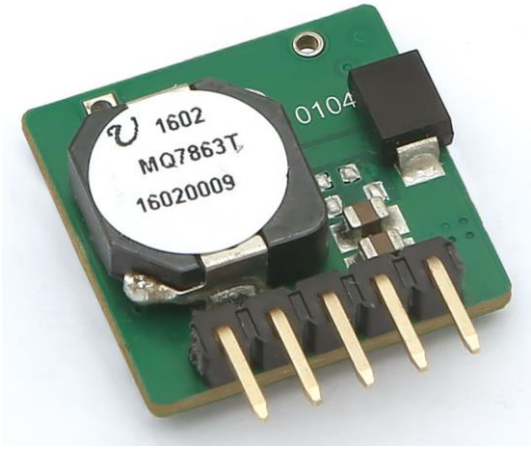
PowerBean™ MQ7863
Compact, Wide input, Positive to Negative output, DC-DC Converter



Features

- Wide operating voltage: 5V ~ 18V
- Output Voltage: -5V ~ -18V
- Low output voltage ripple
- Overcurrent /shortcircuit protection
- Over-temperature protection ;
- Remote Control: Positive Logic (EN Floating -- OFF)
- Minimal space on PCB:
  - SIP PIN out
    - 17.8 mm x 17.8 mm x 6.7 mm or
    - 0.70 in x 0.70 in x 0.26 in
  - SMT PIN out
    - 17.78 mm x 17.78 mm x 8.8 mm or
    - 0.70 in x 0.70 in x 0.35 in
- No derating to +55℃, natural convection
- UL/IEC/EN60950 compliant
- RoHS Compliant

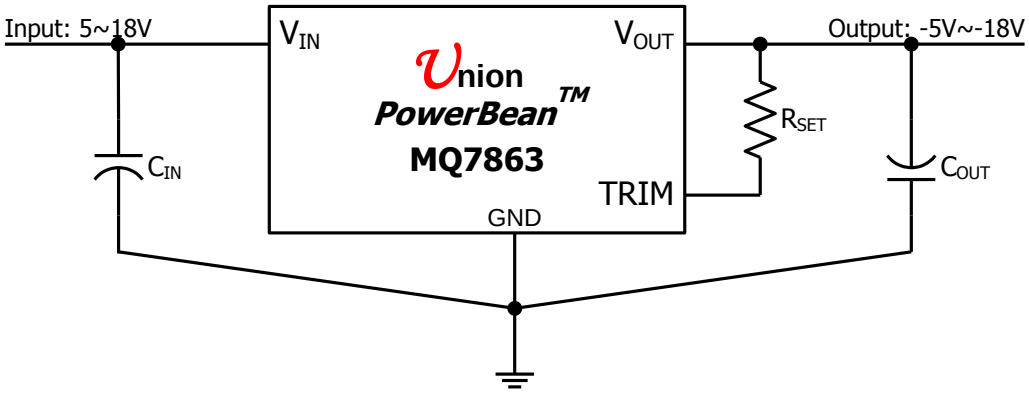
Applications

- Industry Control
- Audio Video Devices
- Data Acquisition Equipmen

Description

The ***PowerBean™*** MQ7863 Series Power Modules are non-isolated dc-dc converters that operate over a wide input voltage range of 5Vdc to 18Vdc and provide a precisely (3%) regulated negative dc output with industry. Such a module is suitable to applications like industrial automatic control, audio and video devices, and data acquisition systems. The modules have a maximum output current rating of 2A at a typical full-load efficiency TBD.

********** *Typical Application Circuit* **********



Performance Specifications (at TA=+25℃)

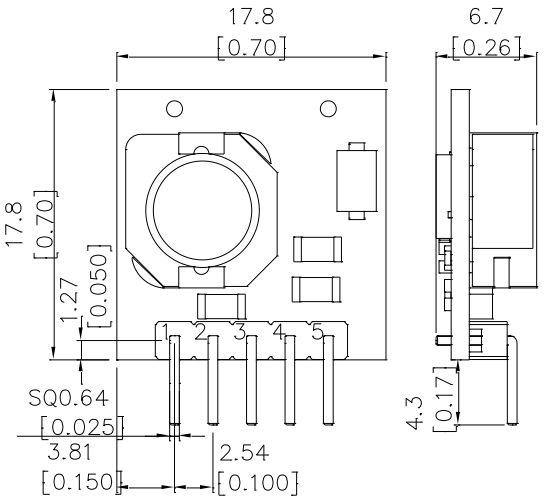
Model	Input V_{IN} Range (V)	Output				Efficiency (%)
		I_{OUT} (A)	Trim Range (V)	Regulation		
				Line (%)	Load (%)	
MQ7863T	5~18	See Table 1, page 3	-5~-18V	1	2	See Table 1, page 3
MQ7863S						

Note: The maximum difference between Vin and Vout must not be over 23V.

Mechanical Specifications

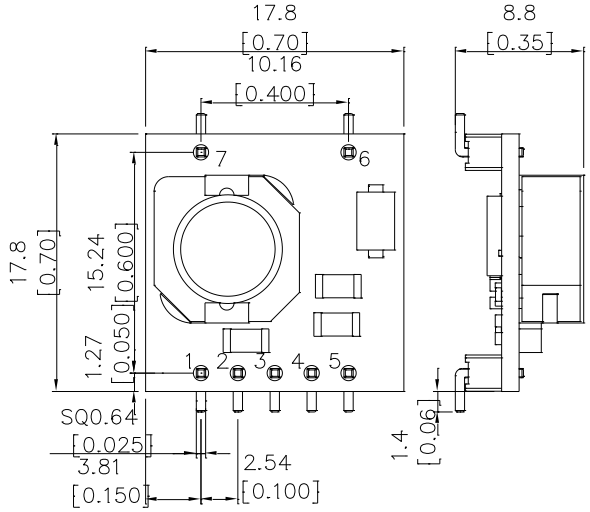
Dimensions are in mm (inches)

MQ7863T- Dimensions are in mm (inches)



PIN	DESCRIPTION
1	Enable
2	V_{in}
3	GND
4	V_{out}
5	T_{rim}

MQ7863S- Dimensions are in mm (inches)



PIN	DESCRIPTION
1	Enable
2	V_{in}
3	GND
4	V_{out}
5	T_{rim}
6	No Connect
7	No Connect

Ordering Information

MQ7863T

Union Microsystems Power module P/N

T: Through hole
S: Surface Mount

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Absolute Maximum Ratings

Note: These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. Proper operation under conditions other than those listed in the Performance Specifications Table is not implied.

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}	-0.3	23	V
Storage Temperature	T_{STG}	-40	125	℃

MQ7863 Electrical Specifications: *(T_A=+25℃, input voltage 12V, unless otherwise noted)*

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Input Voltage Range		V_{IN}	5		18	V
Output Current		Io	See table 1, below			A
Output Voltage Set point	100% load	Δ Vo	-2		+2	%
Temperature Regulation	T_A= $T_{A.MIN}$ To $T_{A.MAX}$	-		0.4		%$V_{O.SET}$
Output Trim Range	***TBD***					
Line Regulation						
Load Regulation						
Output Ripple and Noise Voltage	See table 1, below					
Transient Response						

Table 1, Maximum Output Current vs. Input Voltage vs. Output Voltage

(T_A=+25℃, Cin / Co =68uF /47uF Tan Capacitor)

Input (V)	Output V)	Maximum Output Current （A）	Noise & Ripple @ Imax (mVPP)	Efficiency (%)
5	-5	1.200	70	80
	-9	0.300	40	83
	-12	0.300	50	81
	-15	0.200	50	76
	-18	0.200	60	68
12	-5	2.000	100	82
	-9	1.200	100	85
15	-5	2.000	90	82
	-7.5	1.500	100	82

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Test Configurations

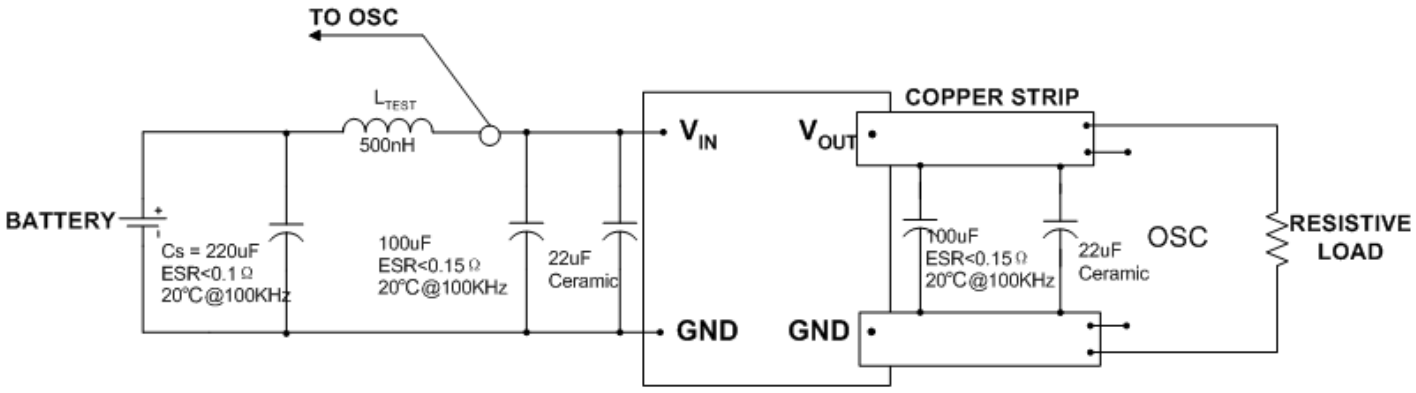

Fig 1 Test setup for input noise, output noise and ripple

Note:

Output noise is measured with 0.1μ F ceramic capacitor connected at the output. OSC measurement should be made using a BNC socket. Position the load between 50mm and 75mm（2in. and 3in）from the tested module.

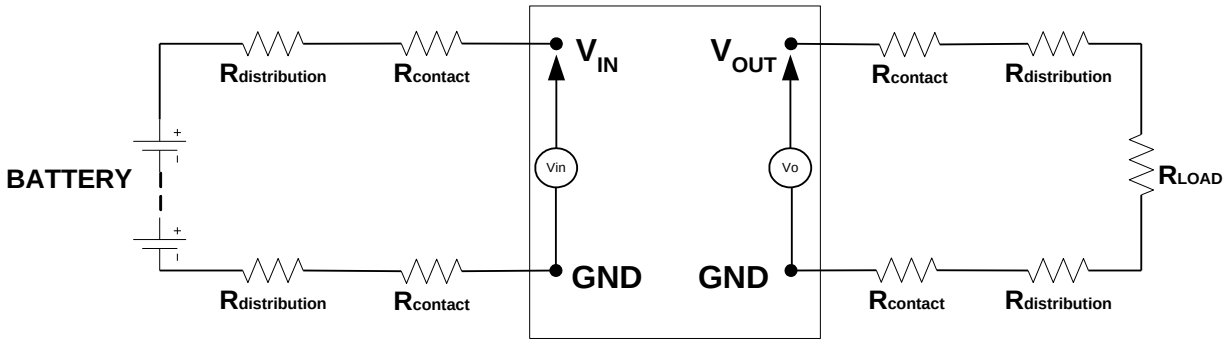

Fig 2 Test setup for efficiency

Note:

All voltage measurements must be taken at the module's terminals, as shown above. If sockets are needed, Kelvin connections are required at the module terminals to avoid measurement errors due to socket contact resistance.

Output Voltage Trimming

MQ7863's output voltage can be trimmed in certain ranges. See Performance Specifications for allowable trim ranges in detail. Also customized products are offered.

Trim with external resistor (Fig 3), the equation as below：

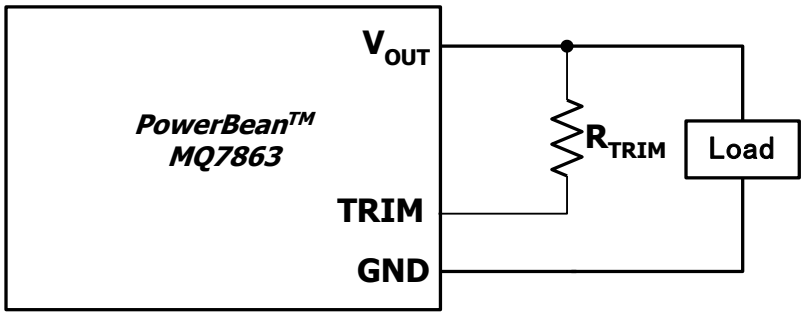

Fig 3. Circuit configuration for programming output voltage using external resistor

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$$R_{TRIM} = \frac{14762}{|V_O| - 4.5} - 1000$$

Resistor values are in Ω; V_O is desired output voltage.
For examples, to trim output to -12V, then

$$R_{TRIM} = \frac{14762}{|-12| - 4.5} - 1000 = 968$$

So, R_{TRIM} = 968Ω

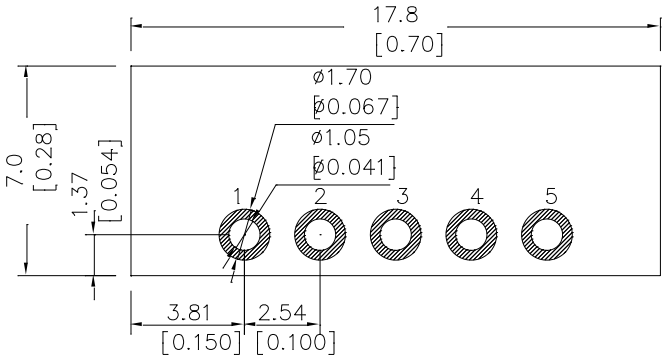
Required Trim resistors for most common voltages, as Table 1.

Table 1, the required trim resistors R_{TRIM} for most common voltages

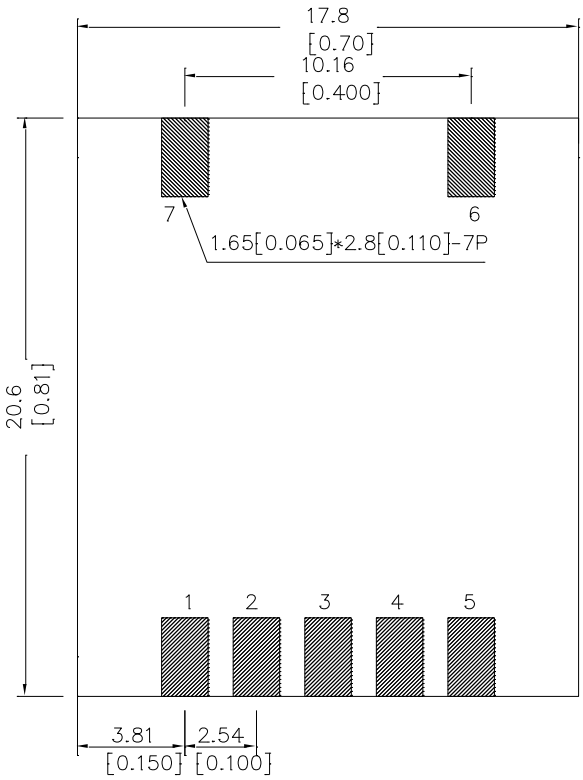
Desired Voltages (V)	RTRIM (kΩ)
-4.5	Open
-5	28.524
-6	8.841
-8	3.218
-9	2.280
-12	0.968
-15	0.405
-18	0.093

Recommended Hole Pattern

Dimensions are in millimeters (inches)



Component-side footprint for Through-Hole Pin Out



Component-side footprint for SMT Pin OUT

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