

300W, 9 to 53V Input Non-Isolated Ruggedized DC-DC Buck-Boost Converters

<http://product.tdk.com/en/power/rgc>
www.emea.lambda.tdk.com/rgc



Industrial



COTS



Test



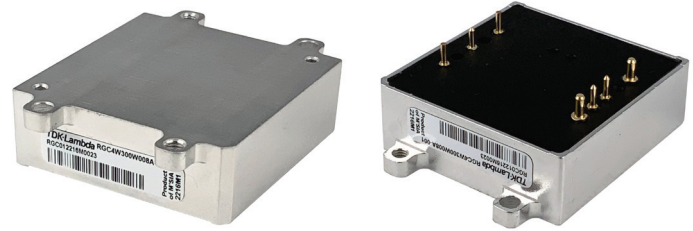
COMM



Broadcast



Robotics



The rugged RGC non-isolated DC-DC step-up and step-down converters are encapsulated in a five-sided aluminum case and rated for up to 115°C operation. The modules have the industry standard 1/16th brick pin-out, are qualified to MIL-STD-810G (shock and vibration) and designed for fan-less, conduction cooled applications. The series accepts a wide input range to support multiple DC bus and battery voltages. Standard features include remote on/off, remote sense and output trim while a full feature adds power good, frequency synchronization and output current monitoring, making the modules a truly versatile board mount power solution. The wide output adjustment range allows one model to be used in multiple positions, assisting inventory and part number reduction.

Features	Benefits
• Up to 300W in a 1/16th Brick-Pin-Out	• High Power Density, Less Board Area Needed
• Encapsulated in a 5-sided Aluminum case	• Improves EMI
• 115°C maximum case temperature	• Rugged deployment in harsh environment with high shock & vibration exposure
• Efficiency - Up to 97%	• Longer Battery Life / Low Power Consumed
• Wide Output Adjustment from 5 up to 48V	• One Part Supports Multiple System Voltages
• Wide Input Range from 9 to 53V	• Can Operate from Different DC Input Source Voltages
• Buck-Boost - maintains output regulation even when input varies	• Extends run times on battery-powered equipment

Model Selector						
Model	Input Voltage (V)	Output Voltage (V)	Max Current (A)	Max Power (W)	Negative Logic On/Off	Feature Set
RGC4W300W008A-001	9 - 53	9.6 - 48	8	300	Yes	Standard
RGC4W300W008A-003	9 - 53	9.6 - 48	8	300	Yes	Full
RGC4W300W012A-001	9 - 53	5.0 - 28	12.5	300	Yes	Standard
RGC4W300W012A-003	9 - 53	5.0 - 28	12.5	300	Yes	Full

Contact factory for other upcoming part number suffix options.

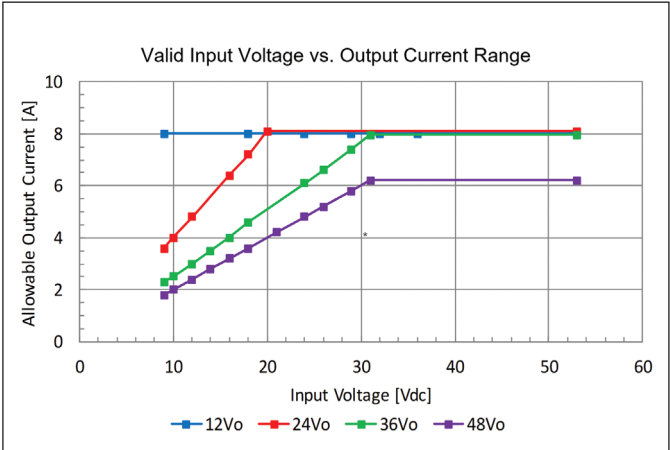
Related Products		
Type	Part Number(s)	Size (mm) / Description
Ruggedized DC-DC Buck Converter	RGA	250W, Input 9-40V and Output 3.3-24V or, 9-53V Input and 3.3V up to 40V Output
DC-DC Buck-Boost Converter	i7C	300W, Input 9-53V or 9-36V, Output 9.6-48V 8A, 5-28V 12.5A or 8-24V 20A
DC-DC Buck Converter	i7A	500-750W, Input 18-60V or 18-32V, Output 3.3-24V 33A or 3.3-18V 45A
DC-DC Buck Converter	i6A4W	250W, Input 9 -53V, Output 3.3-40V 10A or 3.3-15V 20A
Isolated DC-DC Converter	GQA	120W Industrial, Input 9-36V, Isolated Quarter Brick
Non-Isolated DC-DC Converter	iBH	80W/20A, 3.5-14Vin, 0.7 - 5.5Vout, DOSA Compatible
Non-Isolated DC-DC Converter	iCH	85W/12A, 4.5-14Vin, 0.7 - 8.5Vout, DOSA Compatible
Input Filter	iDQ	75V / 10A Filter
Evaluation Board	i7X-C01-EVK-S0	Evaluation board with no module. Order required RGC part number separately.

Specifications			
Model		RGC4W300W008A	RGC4W300W012A
Input			
Input Voltage Range	Vdc	9 - 53	
Input Current (max)	A	25	
Standby Input Current	mA	0.25	
No Load Input Current	mA	5	
Turn-ON Input Voltage	Vdc	9.5	
Turn-OFF Input Voltage	Vdc	8.5	
Efficiency (typ)	%	93 - 97%	91 - 96%
Safety Certifications and Markings	-	CE, UKCA Mark	
Output			
Output Voltage Initial Setpoint	%	±2.5	±2.5
Output Voltage Tolerance	%	±4.0	±4.0
Line Regulation	%	0.8	0.8
Load Regulation	%	0.5	0.8
Ripple & Noise ⁽²⁾ (step-down) (step-up)	mVpp	60	100
		300	350
External Load Capacitance	uF	330 - 3000	
Switching Frequency	kHz	250	
Overcurrent Protection Threshold (typ)	A	15	17
Overtemperature Protection	°C	130 case, shutdown - autorecovery	
Output Voltage Adjustment Range		See full specification for output trim equation.	
Remote Sense		(+) Sense, compensating up to 5% of output voltage	
Remove On/Off		Negative Logic	
Frequency Synchronization		See full specifications	
Current Monitoring (Imon)		See full specifications	
Environmental			
Operating Temperature (Tcase)	°C	-40 to 115	
Storage Temperature	°C	-55 to 125	
Humidity (non condensing)	%RH	10 - 95	
Altitude ⁽³⁾	m	2000	
Cooling	-	Conduction Cooling	
Shock	-	MIL-STD-810G 516.6 Procedure I & IV	
Vibration		MIL-STD-810G 514.6 Procedure I, Cat 10	
Thermal Cycling Test (TCT)		Qualified to 700 cycles / -40 to 125°C, 60°C/minute ramp, 30minute dwell time	
Other			
Weight (max)	g	68.1	
Size (LxWxH)	mm	38.1 x 49.5 x 13.0	
		38.1 x 39.4 x 13.0 (Mounting tab excluded)	
Size (LxWxH)	Inches	1.50 x 1.95 x 0.51	
		1.50 x 1.55 x 0.51 (Mounting tab excluded)	
MTBF - Telcordia SR-332 (100% Load, 40°C)	MHrs	> 10	
Warranty	yrs	3	

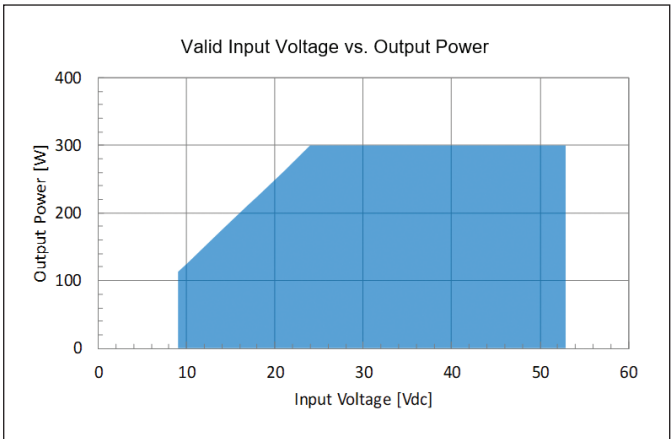
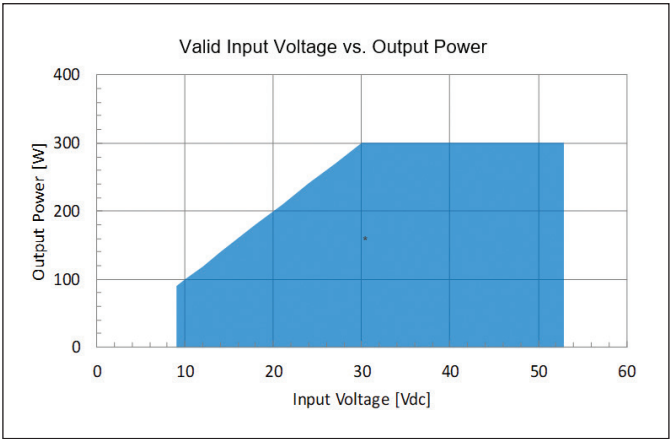
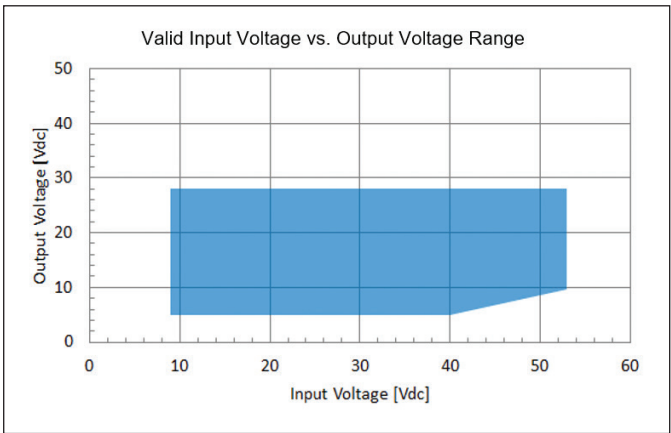
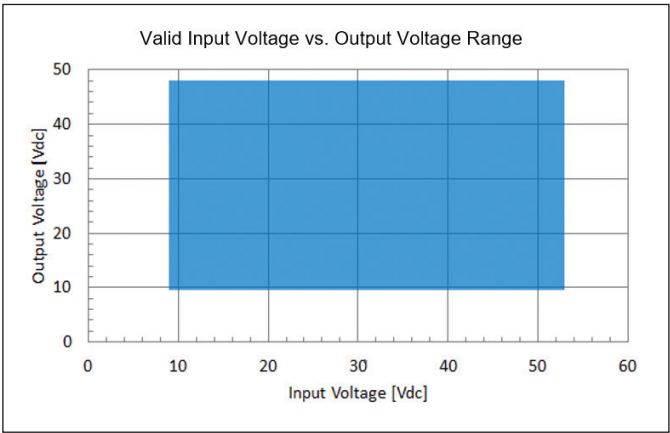
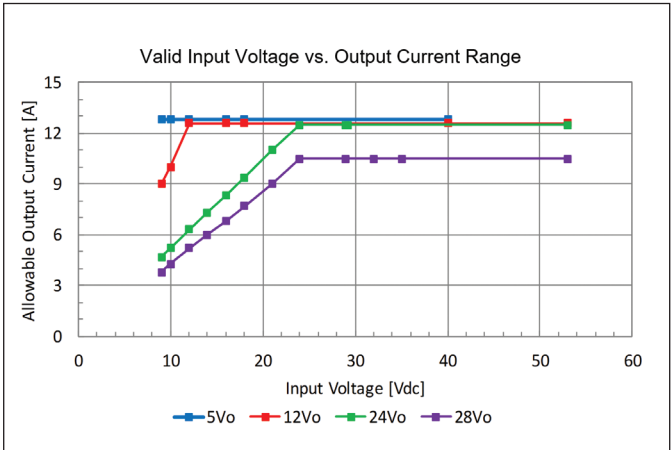
Notes

- (1) See website for detailed product [specifications](#).
- (2) Measured with one 330 µF electrolytic and one 22 µF ceramic capacitors, BW = 20MHz.
- (3) Contact Technical Support for operation at higher altitudes.

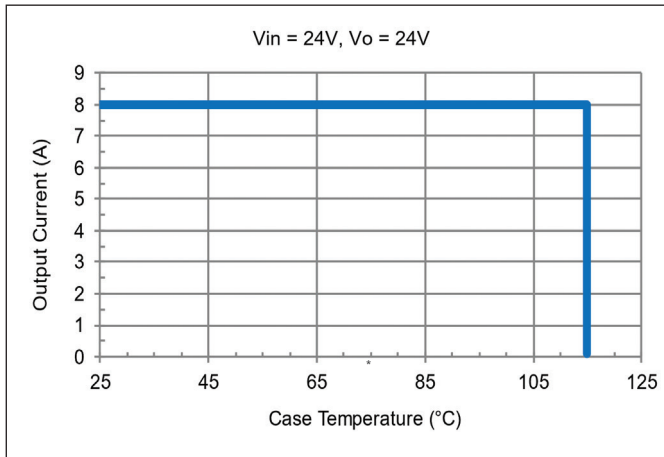
Operating Range (RGC4W300W008A-001)



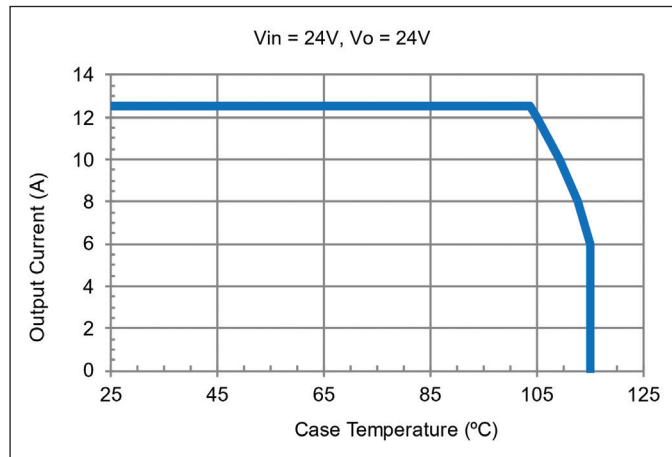
Operating Range (RGC4W300W012A-001)



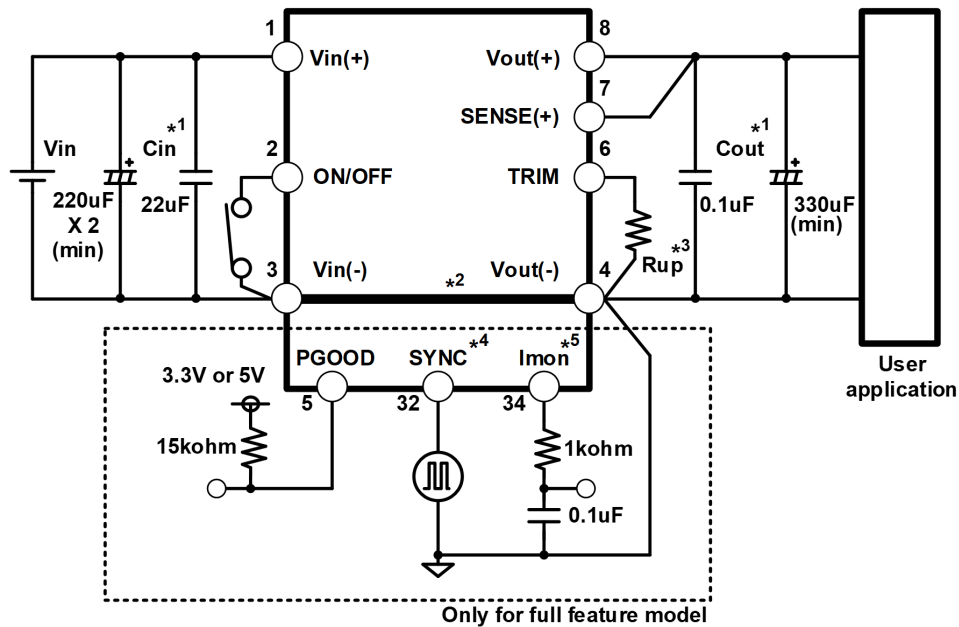
Typical Thermal Derating (RGC4W300W008A-001)



Typical Thermal Derating (RGC4W300W012A-001)



Typical Application Circuit



Recommendation

1. C_{in}/C_{out} MLCC should be connected to the RGC module as close as possible in order to reject high frequency noise.
2. Connect $V_{in}(-)$ and $V_{out}(-)$ to copper ground plane underneath the RGC module.
3. TRIM resistor " R_{up} " should be connected to the RGC module as close as possible.
4. SYNC must be connected to GND when not in use.
5. External R-C filter should be present when using Current Monitor.

Technical drawing of a PCB layout showing top and bottom views with dimensions and callouts.

Top View Dimensions:

- Overall width: 38.1 ± 0.5 [1.50 ± 0.02]
- Overall height: 49.5 ± 0.5 [1.95 ± 0.02]
- Distance from top edge to top mounting holes: 29.85 [1.175]
- Distance from bottom edge to bottom mounting holes: 14.61 [0.575]
- Distance between mounting holes: 25.40 [1.000]
- Distance from left edge to mounting holes: 39.4 [1.55]
- Distance from right edge to mounting holes: 2.54 [0.100]
- Distance from left edge to center of mounting holes: 5.1 [0.20]
- Distance from right edge to center of mounting holes: 5.1 [0.20]

Top View Callouts:

- $\phi 3.20$ [$\phi 0.126$] 2 Places diagonally
- Pin 1 Chamfer
- M3X0.5 Holes 2 Places diagonally

Bottom View Dimensions:

- Overall width: 13.0 ± 0.5 [0.51 ± 0.02]
- Distance from top edge to mounting holes: 3.18 [0.125]
- Distance from bottom edge to mounting holes: 3.68 [0.145] Default

Bottom View Callouts:

- 1.57 [0.062] DIA Pins
- 2.59 [0.102] DIA Stand-offs 2 Places
- 1.02 [0.040] DIA Pins
- 1.78 [0.070] DIA Stand-offs 5 or 6 or 7 or 8 Places

Note: Case is not connected to ground (floating).

Figure 1 is a schematic diagram of the layout of the test facility. It shows a rectangular layout with various dimensions and numbered points (1-8, 32, 34). Dimensions are given in meters [feet]. Key dimensions include: overall width 38.1 [1.50], overall height 49.5 [1.95], and various internal offsets and distances between points.

Pinout			
PIN		Function	
PIN		Function	
1	VIN(+)	6	TRIM
2	ON / OFF	7	SENSE (+)
3	VIN (-) / GND	8	VOUT (+)
4	VOUT (-) / GND	32	Sync (Option)
5	PWR GOOD (Option)	34	Current Monitor / Imon (Option)

RGC Series