

400W-750W, 9 to 18V, 18 to 32V or 18 to 60V Input Non-Isolated Ruggedized Step-Down DC-DC Buck Converter

<https://product.tdk.com/en/power/rgb>
www.emea.lambda.tdk.com/rgb



The rugged RGB non-isolated DC-DC step-down converters are encapsulated in a five-sided aluminum case that's rated for up to 115°C operation. These modules have the industry standard 1/16th brick pin-out, are qualified to MIL-STD-810G for shock and vibration, and are designed for fan-less, conduction-cooled applications. The series accepts a wide input range to accommodate various DC bus and battery voltages. The RGB modules come with standard features like remote On/Off, remote sense, output trim, and optional adjustable output current limit, making the modules a truly versatile power solution. The wide output adjustment range allows one model to be used in multiple DC output voltage positions, assisting inventory and part number reduction.

Features	Benefits
• Up to 750W in a 1/16th Brick-Pin-Out	• High Power Density, Less Board Area Needed
• Encapsulated in a 5-sided metal case	• Improves EMI
• 115°C Maximum Case Temperature	• Rugged deployment in harsh environment with high shock & vibration exposure
• Efficiency - Up to 98.5%	• Longer Battery Life / Low Power Consumed
• Wide Output Adjustment from 0.8 up to 24V	• One Part Supports Multiple System Voltages
• Wide Input Range	• Can Operate from Different DC Input Source Voltages
• Adjustable Current Limit	• Reduces stress on the input source, converter and load due to overloading

Model Selector						
Model	Input Voltage (V)	Output Voltage (V)	Max Current (A)	Max Power (W)	Negative Logic On/Off	Full Feature
RGB4W500W033A-001	18 - 60	3.3 - 24	33	500	Yes	-
RGB4W500W033A-003	18 - 60	3.3 - 24	33	500	Yes	Yes
RGB24750W045A-001	18 - 32	3.3 - 18	45	750	Yes	-
RGB24750W045A-003	18 - 32	3.3 - 18	45	750	Yes	Yes
RGB12400W060A-001	9 - 18	0.8 - 8	60	400	Yes	-
RGB12400W060A-003	9 - 18	0.8 - 8	60	400	Yes	Yes

Related Products		
Type	Part Number	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
Ruggedized DC-DC Buck-Boost Converter	RGC	300W, Input 9-53V, Output 9.6-48V 8A or 5-28V 12.5A
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
Non-Isolated DC-DC Converter	iCH	85W/12A, 4.5-14Vin, 0.7 - 8.5Vout, DOSA Compatible
Isolated DC-DC Converter	GQA	120W Industrial, Input 9-36V, Isolated Quarter Brick
Evaluation Board	i7X-C01-EVK-S0	Evaluation board with no module. Order required RGB part number separately.

Specification				
Model		RGB4W500W033A	RGB24750W045A	RGB12400W060A
Input				
Input Voltage Range	Vdc	18 - 60	18 - 32	9 - 18
Input Transient (t<100 ms)	Vdc	65 max	36 max	22 max
Input Current (max)	A	50	50	50
Turn-ON Input Voltage	Vdc	16.5 typical		8.1 typical
Turn-OFF Input Voltage	Vdc	15 typical		7.6 typical
Efficiency	%	91 - 98	93 - 98.5	86 - 97
Safety Certifications and Markings	-	CE, UKCA Mark		
Output				
Output Voltage Initial Setpoint	%	±2		
Output Voltage Tolerance	%	±3.5		
Output Voltage Adjustment Range	Vdc	3.3 - 24	3.3 - 18	0.8 - 8
Line Regulation	%	0.2		
Load Regulation	%	0.4		
Ripple & Noise ⁽²⁾	mVpp	25		40
Output Current	A	0 - 33	0 - 45	0 - 60
Over Current Protection Threshold (typ)	A	45	63	70
Over Current Protection Limit Adjustment	-	See full specification for details.		
Short Circuit Current (Vo = 0.25V)	A	33	50	45
External Load Capacitance	µF	220 - 10000 ⁽³⁾	330 - 10000 ⁽³⁾	330 - 10000 ⁽³⁾⁽⁴⁾
Switching Frequency	kHz	330 (fixed)		
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 (Default)		
Environmental				
Operating Temperature (Tcase)	°C	-40 to 115		
Storage Temperature	°C	-55 to 125		
Humidity (non condensing)	%RH	10 - 95		
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)	-	700 cycles / -40 to 125°C, 60°C / minute ramp, 30 minute 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	> 5		
Warranty	yrs	3		

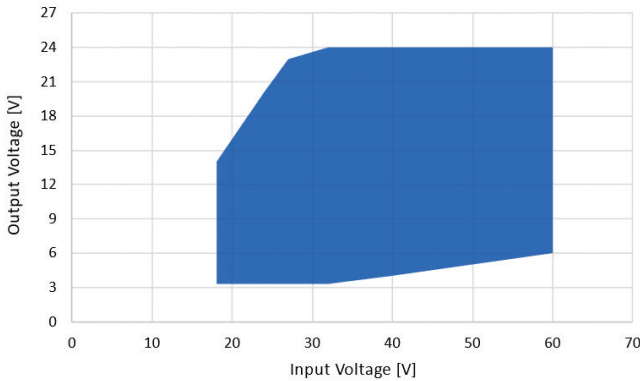
Notes

(1) See website for detailed product [specifications](#).(2) Measured with one 22 μF ceramic capacitor, BW = 20MHz.

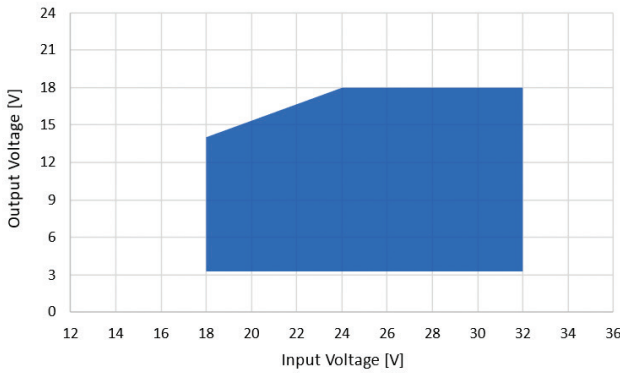
(3) Contact technical support for very low ESR capacitor banks or higher capacitance is required.

(4) For $V_o \leq 1.2V$, 470 μF min output capacitance is recommended.

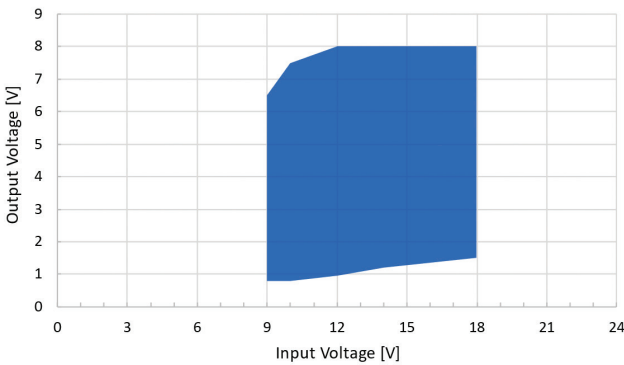
Input vs. Output Operating Range



RGB4W500W033A

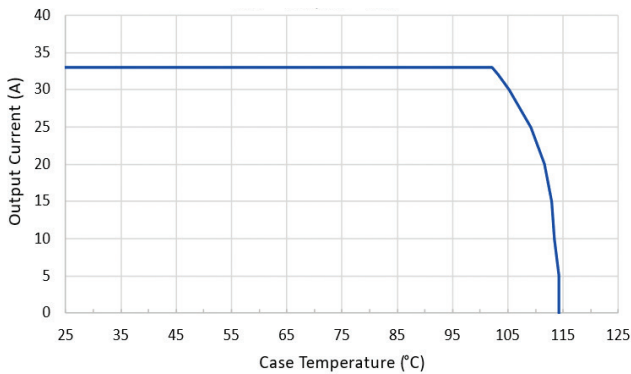


RGB24750W045A

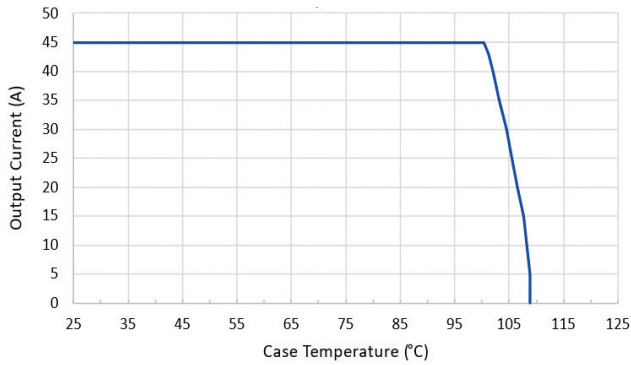


RGB12400W060A

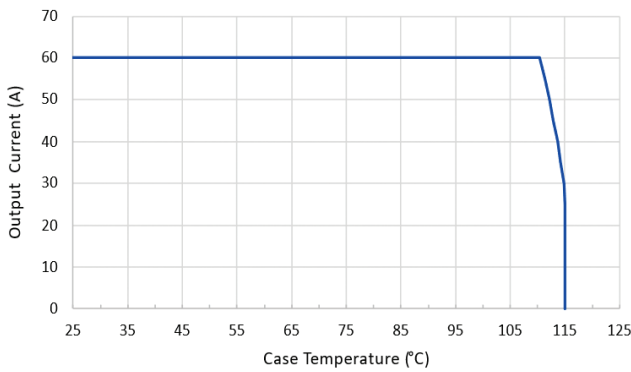
Typical Thermal Derating



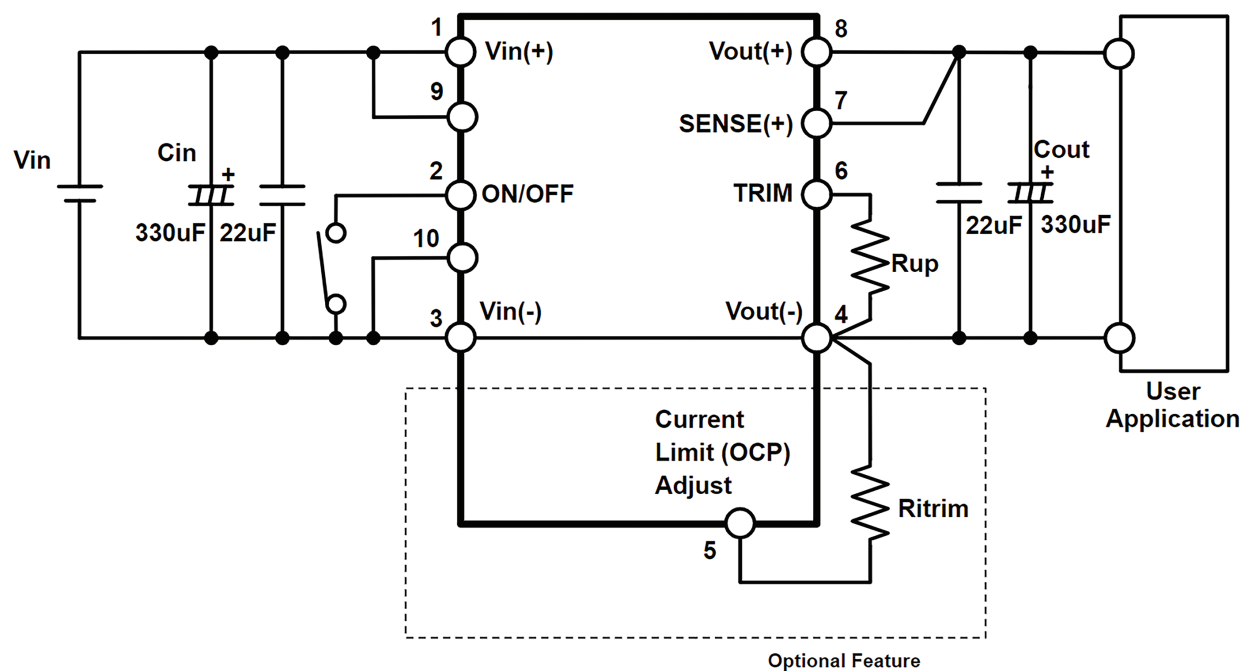
RGB4W500W033A: $V_{in} = 48V$, $V_o = 12V$



RGB24750W045A: $V_{in} = 24V$, $V_o = 12V$



RGB12400W060A: $V_{in} = 12V$, $V_o = 5V$

Typical Application Circuit

Notes:

1. The input and output capacitor values can vary based on the application requirements.
2. TRIM resistor " R_{up} " should be connected to the RGB module as close as possible.



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