



### FEATURES

- 1500VDC Isolation
- Six-Sided Shielding
- Efficiency up to 86%
- MTBF > 700,000 Hours
- Internal SMT Construction
- 4:1 Ultra Wide Input Range
- UL 94V-0 Package Material
- UL60950-1 Safety Approval
- Complies with EN55022 Class A
- Positive Remote On/Off Control (Optional)

### DESCRIPTION

The DMW series of DC/DC converters provide up to 15 watts in a 2 x 1 x 0.4 inch package. These converters operate over 4:1 wide input voltage ranges of 9-36VDC and 18-75VDC. This series also has single and dual output models available. These converters feature efficiency up to 86%, positive remote ON/OFF (optional), six-sided shielding, 1500VDC isolation, and short circuit protection. This series is ideal for data communication equipment, mobile battery driven equipment, process/machine control equipment, telecommunication equipment, computer peripheral systems, distributed power systems, mixed analog/digital subsystems, and industrial robot systems. The EN55022 Class A conducted noise compliance minimizes design time, cost, and eliminates the need for external filter components.

SPECIFICATIONS: DMW Ultra Wide Series					
All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted. We reserve the right to change specifications based on technological advances.					
SPECIFICATION	TEST CONDITIONS	Min	Nom	Max	Unit
<b>INPUT (V<sub>in</sub>)</b>					
Operating Voltage Range	24V nominal input models 48V nominal input models	9 18	24 48	36 75	VDC VDC
Start Voltage	24V nominal input models 48V nominal input models	8 15	8.5 17	9 18	VDC VDC
Under Voltage Shutdown	24V nominal input models 48V nominal input models	7 13	8 15	8.5 17	VDC VDC
Reverse Polarity Input Current				1	A
Short Circuit Input Power				3500	mW
Input Surge Voltage (1000ms)	24V nominal input models 48V nominal input models	-0.7 -0.7		50 100	VDC VDC
Input Filter				Pi Filter	
<b>OUTPUT (V<sub>o</sub>)</b>					
Output Voltage Range			See Table		
Output Voltage Accuracy			±1.0	±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads		±0.5	±2.0	%
Load Regulation	I <sub>o</sub> = 10% to 100%		±0.5	±1.0	%
Line Regulation	V <sub>in</sub> = min. to max.		±0.1	±0.5	%
Output Power				15	W
Output Current Range			See Table		
Ripple & Noise (peak to peak)	20MHz bandwidth		55	80	mV <sub>pk-pk</sub>
Ripple & Noise (peak to peak)	Over Line, Load, and Temperature			100	mV <sub>pk-pk</sub>
Ripple & Noise				15	mV <sub>rms</sub>
Transient Recovery Time (See Note 1)	25% load step change		300	500	µs
Transient Response Deviation	25% load step change		±2	±4	%
<b>POSITIVE REMOTE ON/OFF (See Note 5)</b>					
Supply On			2.5 to 5.5VDC or Open Circuit		
Supply Off		-0.7		0.8	VDC
Standby Input Current				10	mA
Control Input Current (On)	V <sub>in</sub> – RC = 5.0V			50	mA
Control Input Current (Off)	V <sub>in</sub> – RC = 0V			-1	mA
Control Common				Referenced to negative input	
<b>PROTECTION</b>					
Over Power Protection		120			%
Short Circuit Protection			Continuous		
Input Fuse Recommendation	24V nominal input models 48V nominal input models		2500mA Slow-Blow Type 1250mA Slow-Blow Type		
<b>GENERAL</b>					
Efficiency			See Table		
Switching Frequency		290	330	400	KHz
Isolation Voltage Rated	60 seconds	1500			VDC
Isolation Voltage Test	Flash Test for 1 second	1650			VDC
Isolation Resistance	500VDC	1000			MΩ
Isolation Capacitance	100KHz, 1V		1200	1500	pF
Internal Power Dissipation				5,000	mW
<b>ENVIRONMENTAL</b>					
Operating Temperature (Ambient)		-40		+60	°C
Operating Temperature (Case)		-40		+100	°C
Storage Temperature		-50		+125	°C
Lead Temperature	1.5mm from case for 10 seconds			260	°C
Humidity				95	%
Cooling			Free air convection		
RFI			Six-sided shielding, metal case		
Temperature Coefficient			±0.01	±0.02	%/°C
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign			700,000 hours	
Conducted EMI				EN55022 Class A	
<b>PHYSICAL</b>					
Weight				1.13oz (32g)	
Dimensions			2.0 x 1.0 x 0.4 inches (50.8 x 25.4 x 10.2 mm)		
Case Material			Metal with non-conductive baseplate		
Flammability				UL94V-0	

### MODEL SELECTION TABLE

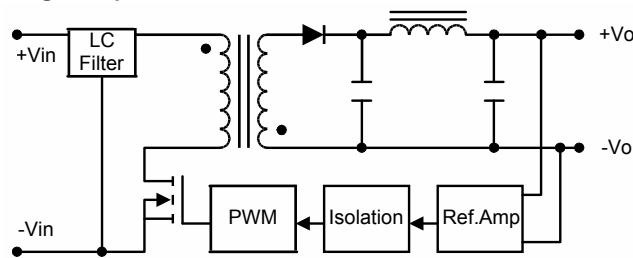
Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Output Power	Efficiency (Typ)	Max Capacitive Load
			Min	Max	No Load	Max Load				
DMW24S3.3-3000	24 VDC (9 ~ 36 VDC)	3.3 VDC	300mA	3000mA	25mA (typ)	528mA	40mA (typ)	9.9W	78%	470µF
DMW24S5-3000		5 VDC	300mA	3000mA		762mA		15W	82%	470µF
DMW24S5.1-3000		5.1 VDC	300mA	3000mA		735mA		15.3W	81%	470µF
DMW24S12-1250		12 VDC	125mA	1250mA		726mA		15W	85%	470µF
DMW24S15-1000		15 VDC	100mA	1000mA		771mA		15W	86%	470µF
DMW24D5-1500		±5 VDC	±150mA	±1500mA		735mA		15W	81%	220µF
DMW24D12-625		±12 VDC	±62.5mA	±625mA		726mA		15W	85%	220µF
DMW24D15-500		±15 VDC	±50mA	±500mA		787mA		15W	86%	220µF
DMW48S3.3-3000		48 VDC (18 ~ 75 VDC)	3.3 VDC	300mA		3000mA		15mA (typ)	26mA	30mA (typ)
DMW48S5-3000	5 VDC		300mA	3000mA	381mA	15W	82%		470µF	
DMW48S5.1-3000	5.1 VDC		300mA	3000mA	368mA	15.3W	81%		470µF	
DMW48S12-1250	12 VDC		125mA	1250mA	363mA	15W	85%		470µF	
DMW48S15-1000	15 VDC		100mA	1000mA	386mA	15W	86%		470µF	
DMW48D5-1500	±5 VDC		±150mA	±1500mA	368mA	15W	81%		220µF	
DMW48D12-625	±12 VDC		±62.5mA	±625mA	363mA	15W	85%		220µF	
DMW48D15-500	±15 VDC		±50mA	±500mA	393mA	15W	86%		220µF	

### NOTES

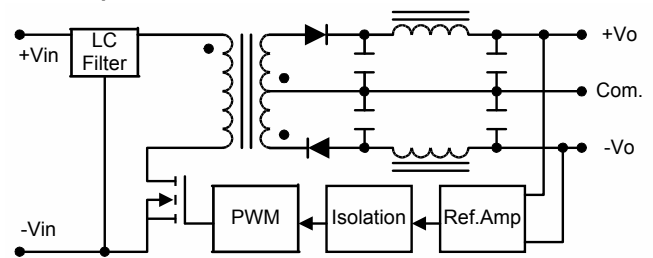
- Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
- The DMW series requires a minimum output load to maintain specified regulations. Operation under no-load condition will not damage these devices; however they may not meet all listed specifications.
- All DC/DC converters should be externally fused at the front end for protection.
- Other input and output voltages may be available, please contact factory.
- Only positive control logic remote On/Off is available. To order the converter with positive remote on/off add the suffix "RC" to the part number.
- To order the converter with EN55022 Class A function, please add the suffix "A" to the part number.
- To order the converter with a heatsink please add the suffix "HS" to the part number.

### BLOCK DIAGRAMS

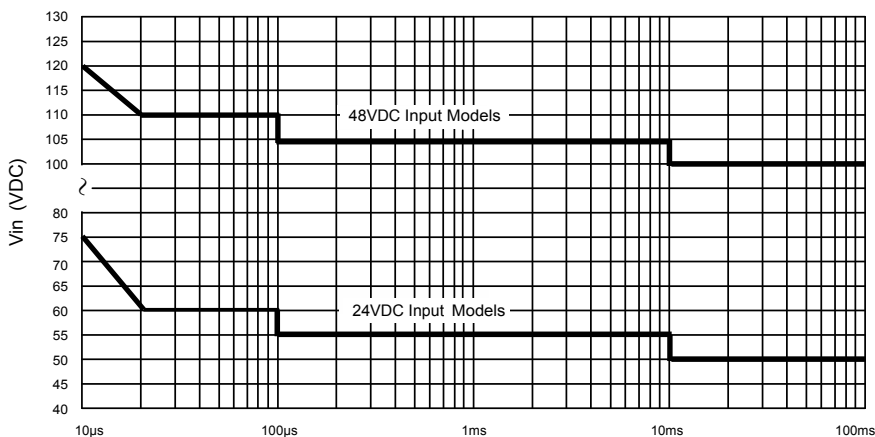
#### Single Output



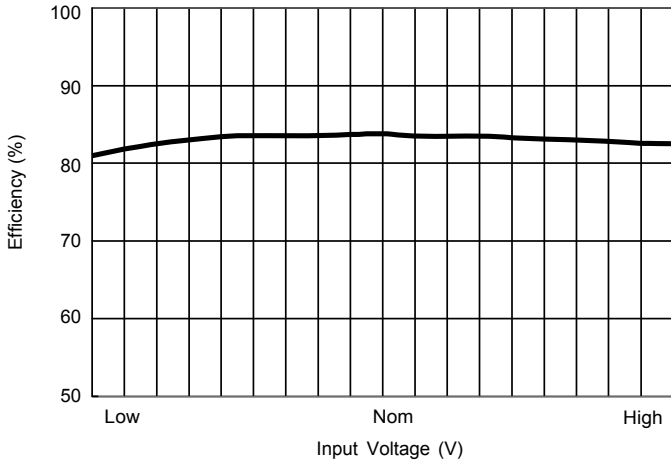
#### Dual Output



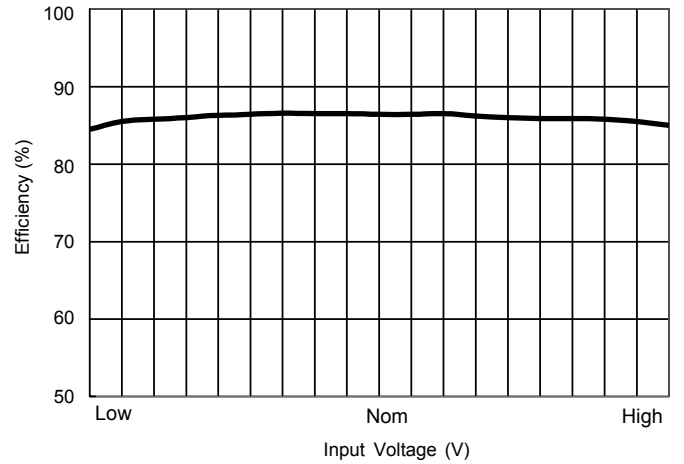
### INPUT VOLTAGE TRANSIENT RATING



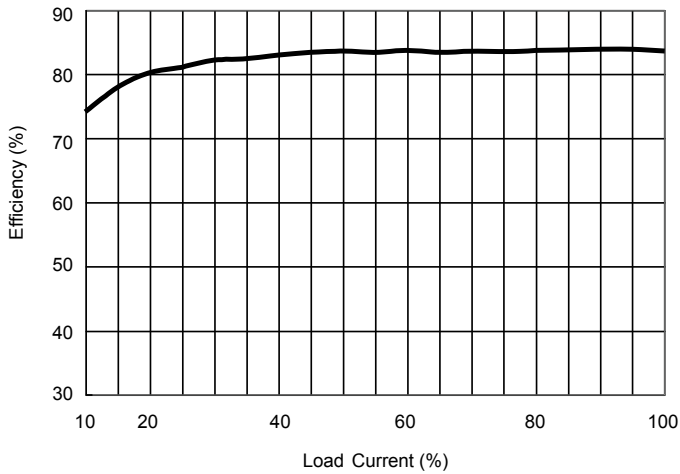
**Efficiency vs Input Voltage (Single Output)**



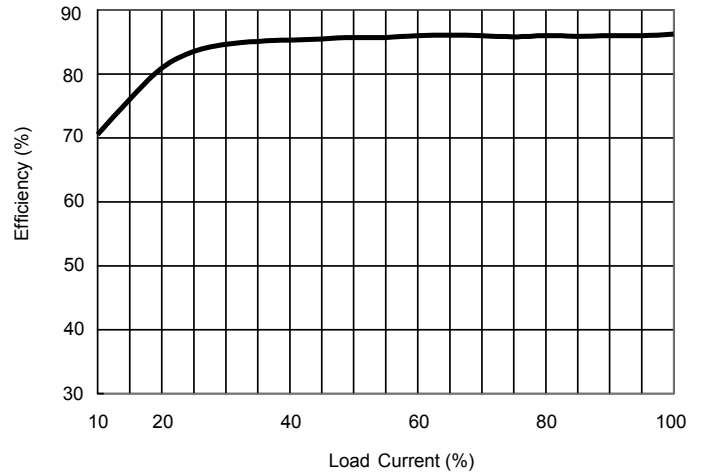
**Efficiency vs Input Voltage (Dual Output)**



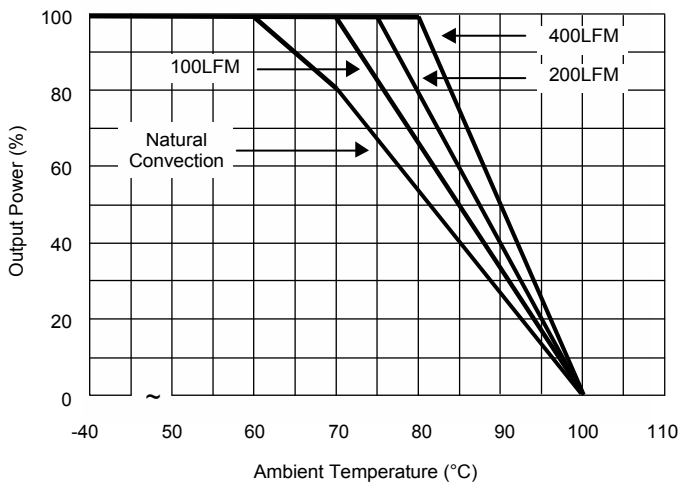
**Efficiency vs Output Load (Single Output)**



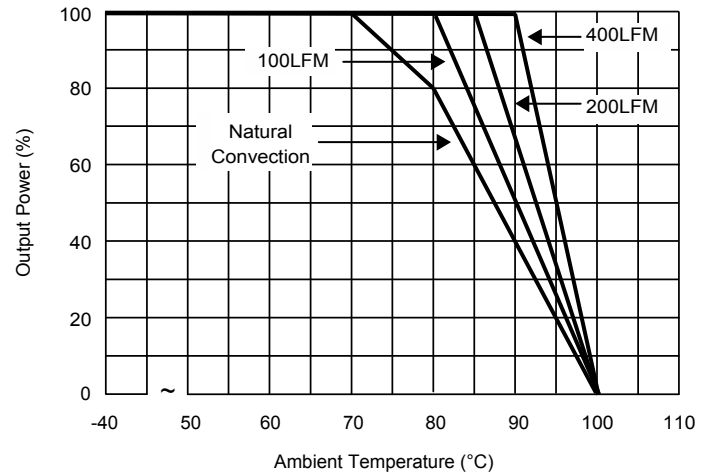
**Efficiency vs Output Load (Dual Output)**



**Derating Curve without Heatsink**



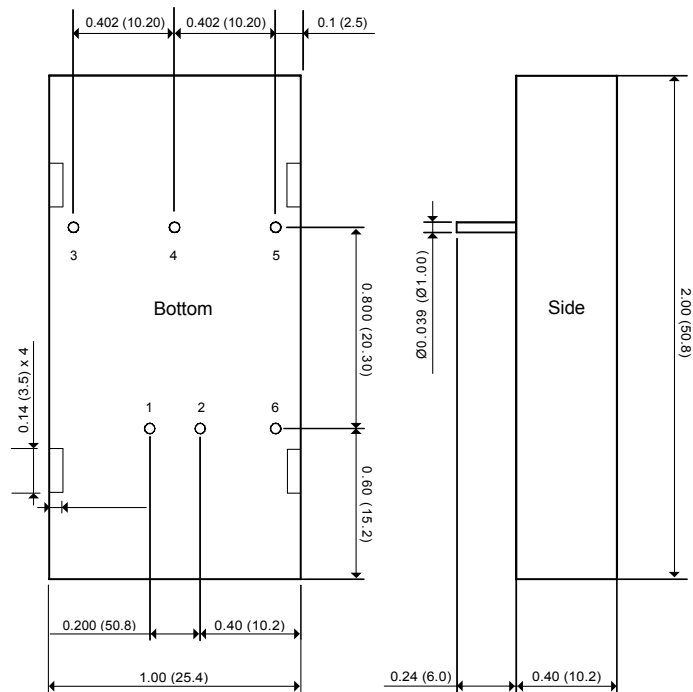
**Derating Curve with Heatsink**



**MECHANICAL DRAWING**

**STANDARD**

Unit: inches (mm)



1. Tolerance: X.XX±0.01 (X.X±0.25)  
X.XXX±0.005 (X.XX±0.13)
2. Pin: ±0.002 (±0.05)

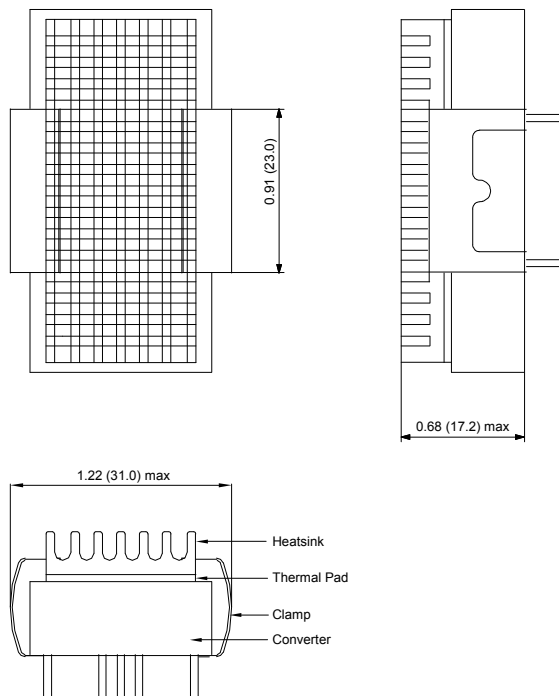
PIN CONNECTIONS		
Pin	Single Output	Dual Output
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Pin	Common
5	-Vout	-Vout
6	*Positive Remote ON/OFF (Optional)	

\*Add the suffix "RC" to the part number for Remote On/Off option

The DMW Series converter is encapsulated in a low thermal resistance molding compound that has excellent resistance/electrical characteristics over a wide temperature range or in high humidity environments. The encapsulant and unit case are both rated to UL 94V-0 flammability specifications. Leads are tin plated for improved solderability.

**WITH HEATSINK**

Unit: inches (mm)



**Heatsink Specifications**

Heatsink Material: Aluminum  
 Finish: Anodic treatment (black)  
 Weight: 0.07oz (2g)

1. Tolerance: X.XX±0.01 (X.X±0.25)  
X.XXX±0.005 (X.XX±0.13)
2. Pin: ±0.002 (±0.05)

**The Advantages of adding a Heatsink:**

1. To help heat dissipation and increase the stability and reliability of DC/DC converters at high operating temperature atmosphere.
2. To upgrade the operating temperature of DC/DC converters, please refer to the Derating Curve.

**DESIGN & FEATURE CONSIDERATIONS**

**Remote On/Off**

Positive logic remote on/off turns the module on during a logic high voltage on the remote on/off pin, and off during a logic low. To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. The switch can be an open collector or equivalent.

A logic low is -0.7V to 0.8V.

A logic high is 2.5V to 5.5V.

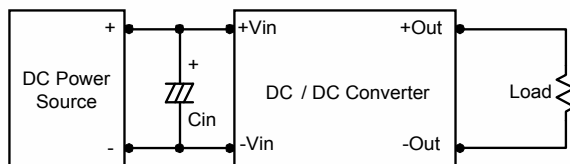
The maximum sink current at on/off terminal during a logic low is -1mA. The maximum allowable leakage current of the switch at on/off terminal (2.5 to 5.5V) is 50µA.

**Over Current Protection**

To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

**Input Source Impedance**

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. A capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100KHz) capacitor of a 6.8µF for the 24V and 48V input devices.



**Maximum Capacitive Load**

The DMW series has a limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. For optimum performance we recommend 220µF maximum capacitive load for dual outputs and 470µF capacitive load for single outputs. The maximum capacitance can be found in the Model Selection Guide.

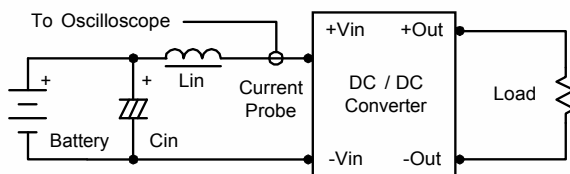
**TEST CONFIGURATIONS**

**Input Reflected-Ripple Current Test Setup**

Input reflected-ripple current is measured with an inductor Lin (4.7µH) and Cin (220µF, ESR < 1.0Ω at 100KHz) to simulate source impedance.

Capacitor Cin offsets possible battery impedance.

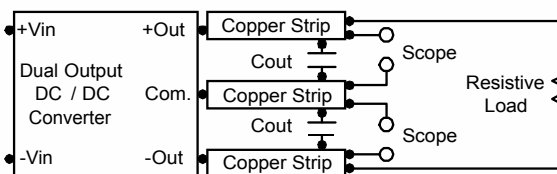
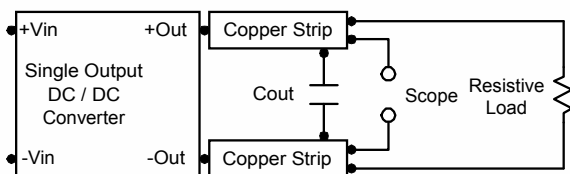
Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0-500 KHz.



**Peak-to-Peak Output Noise Measurement Test**

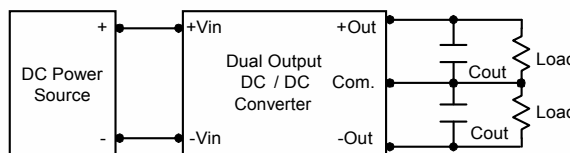
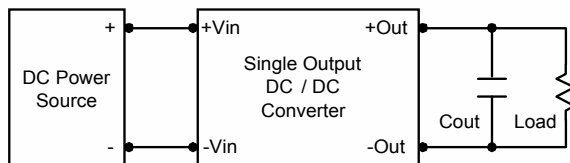
Use a Cout 0.47µF ceramic capacitor.

Scope measurement should be made by using a BNC socket; measurement bandwidth is 0-20 MHz. Position the load between 50 mm and 75 mm from the DC/DC converter.

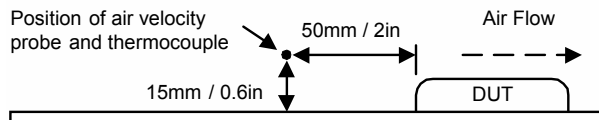


**Output Ripple Reduction**

A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 4.7 $\mu$ F capacitors at the output.

**Thermal Considerations**

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 100°C. The derating curves are determined from measurements obtained in an experimental apparatus.

**COMPANY INFORMATION:**

Wall Industries, Inc. has created custom and modified units for over 40 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on time and on budget. Our ISO9001-2008 certification is just one example of our commitment to producing a high quality, well documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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