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ATQ150 SERIES 9-75VDC INPUT / 150W OUTPUT 8:1 ISOLATED DC-DC CONVERTER



"Achieve Total Assurance and Quality in Power."

EFFICIENT - INNOVATIVE - VERSATILE

The ATQ150 Series provides a high-performance solution for demanding power conversion applications. With its 150-Watt output power, 9 - 75VDC input voltage and 8:1 input voltage range, this isolated DC-DC converter ensures reliable operation and high efficiency. It is engineered for robustness supports a wide operating temperature range and complies with industrial standards.

- I. Compliant with MIL-STD-1275^(*) with external components
- II. Compliant with MIL-STD-704^(*) with external components

NOTE:

* Suitable for COTS use. If the product is intended to be used with a military system, it must be tested in the internal structure of a system subject to military tests. ATAQ does not guarantee the use of this product in military and medical products.

FEATURES TABLE

Feature	Specification	Details
Ultra-Wide Input Voltage: Efficiency: Switching Frequency: Output Regulation: Remote On/Off: Protection: Isolation Voltage: Operating Case Temperature: Package Size: Safety Approval:	9 – 75 VDC Up to 90% Fixed, 200kHz Regulated Outputs Yes Fully (OTP/OCP/OVP/UVLO) 1500Vdc I/O Isolation -40°C to +100°C Half Brick Size UL60950-1 2nd Edition	- Over-Temperature, Over-Current, Short-Circuit, Over-Voltage, Under-Voltage Lockout protection. - Turned off by the ON/OFF input. - Output voltage trim range of $\pm 10\%$. - Remote sense for the output voltage. - 2.40" L x 2.28" W x 0.50" H (61.0mm L x 57.9mm W x 12.7mm H) - Complies with safety standards for reliable operation.

Discover your needs, let us help you! Contact us at info@ataq.com.tr or visit our official website www.ataq.com.tr

- w w w . a t a q . c o m . t r -

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULLLOAD	Nominal Input Voltage 36VDC	
ATQ150-WH36S12	9-75 VDC	15 VDC	0 mA	10 A	60 mA	4.66 A	89.5 ⁽¹⁾	5000μF ⁽²⁾

NOTE:

1. The output terminal of 24Vout models required a minimum capacitor 100uF to maintain specified regulation
2. The input external capacitor recommends to parallel with 330uF ESR<0.5Ω to reduce the input ripple voltage

PART NUMBER

Series	Input Voltage Range	Dimension	Nominal Input Voltage	Number of Outputs		Nominal Output Voltage	Remote On/Off Logic	
ATQ150-	X	X	XX	X		XX	X	
	W Wide Input Voltage Range (9-75 VDC)	H (Half Brick)	36 (36 VDC)	Single Double	S D	15 (15 VDC)	High Low	- L

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

ABSOLUTE MAXIMUM RATINGS:

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	15Vo	-0.3		75	Vdc
Input Surge Voltage	100ms max.	15Vo			100	Vdc
Input Surge Voltage	100ms max.	15Vo			80	Vdc
Operating Case Temperature	At the Center Part of Base Plate	15Vo	-40		100	°C
Storage Temperature		15Vo	-55		105	°C

INPUT CHARACTERISTICS:

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		15Vo	9	36	75	Vdc
Input Under Voltage Lockout						
Turn-On Voltage Threshold		15Vo	8.5	9.0	9.5	Vdc
Turn-Off Voltage Threshold		15Vo	7.5	8.0	8.5	Vdc
ON/OFF control, positive remote ON/OFF logic	Logic low (Module OFF) Logic high (Module ON)	15Vo	0 3.5V or open circuit		1.2 75	Vdc
Lockout Hysteresis Voltage		15Vo	1			Vdc
Maximum Input Current	Vin=9V, Full Load.	15Vo	20			A
No-Load Input Current	Vin=36V, Io=0A		20			mA
Input Filter	LC filter	15Vo				
Recommended Input Fuse	Fast acting type	15Vo	30			A
Input Capacitance (External)	< 0.5Ω ESR	15Vo	330			uF
Switching frequency		15Vo	200			kHz

OUTPUT CHARACTERISTICS:

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	$V_{in}=36V$, Full Load, $T_c=25^{\circ}C$	15Vo	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full Load to No Load	15Vo			± 0.2	%
Line Regulation	V_{in} =High Line to Low Line, Full Load	15Vo			± 0.2	%
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 10uF tantalum and 1.0uF ceramic capacitors	15Vo			120	mV
RMS		15Vo			60	mV
Output Current Range	$V_{in}=9$ to 75V		0 – 6.25			A
Over Current Protection	$<90\% V_o$	15Vo	105	160	200	%
Short Circuit Protection	Hiccup Mode / Auto Recovery	15Vo	Continuous, Auto Recovery			
External Load Capacitance	Full load (Constant resistive load)		5000			μF
Output Voltage Trim Range	$P_o \leq \text{max rated power}$, $I_o \leq I_{o_max}$	15Vo	-10		+10	%
Start-up time		15Vo		110		ms

EFFICIENCY:

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	$V_{in}=24V$		up to 90%			%

GENERAL SPECIFICATIONS:

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I _o =100% of I _{o_max} ; MIL-HDBK-217F_Notice 1, GB, 25°C	15Vo		800		K hours
Weight		15Vo		109		Grams
Isolation resistance	10 ⁷ ohms, min.					
Isolation capacitance (Typical)	Input to Output	3500				pF
	Input to Case (Base Plate)	1000				
	Output to Case (Base Plate)	1000				
Isolation voltage	Input / Output : 1500VDC min. (1 minute) Input / Case : 1500VDC min. Output / Case : 1500VDC min.					
Case Material	Plastic, DAP, UL 94V-0					
Dimensions	57.9 x 61.0 x 12.7 mm					
Base plate Material	Aluminum					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Nickel with Matte Tin					
Shock/Vibration	MIL-STD-810F Compliant					
Humidity	95% RH max. non-condensing					
Altitude	2000m Operating Altitude, 12000m Transport Altitude					
Thermal Shock	MIL-STD-810F					
EMI	Meets EN55032 (with external filter)					Class A

ELECTRICAL BLOCK DIAGRAM:

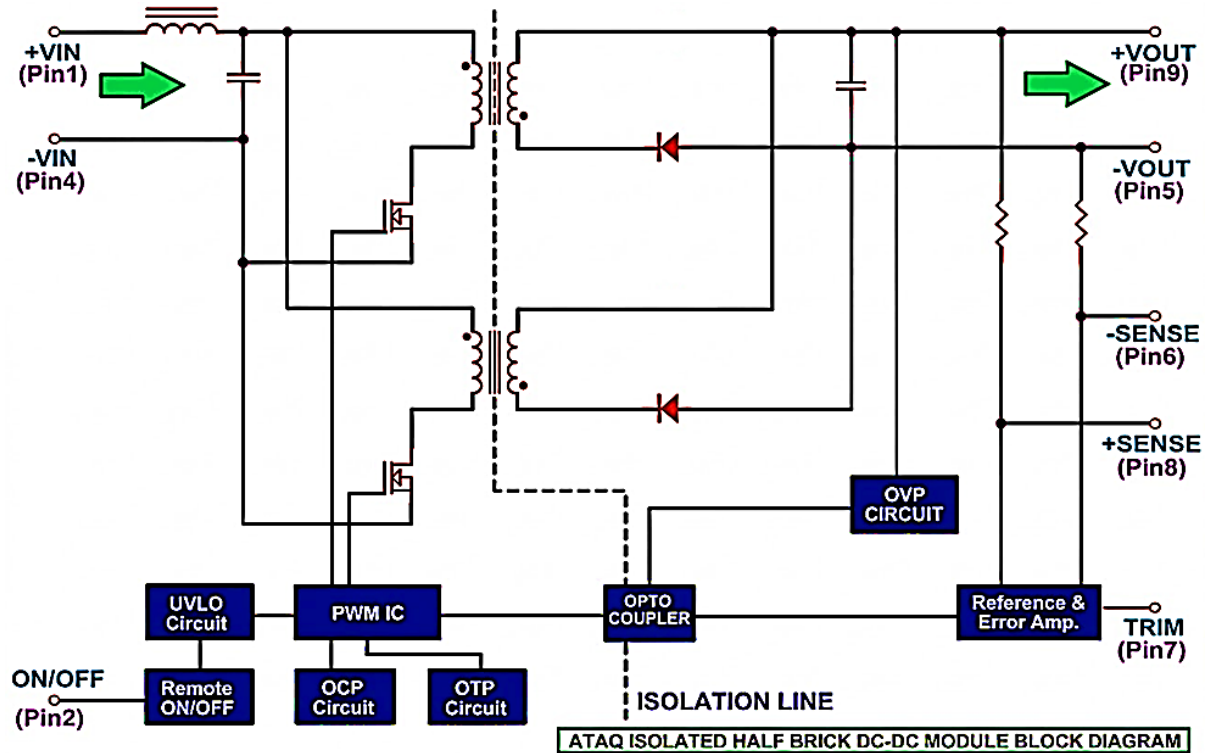


Figure-1

STANDARDS COMPLIANCE						
MIL-STD-1275D						
No	Parameters	Min	Typ	Max	Unit	Status
1	5.1.3.1 Steady-State Voltage	25	-	30	VDC	Passed
2	5.1.3.2 Ripple	-	-	2	VDC	Passed
3	5.1.3.3 Surges	28	-	40	VDC	Passed
4	5.1.4.1 Steady-State Voltage	23	-	33	VDC	Passed
5	5.1.4.2 Ripple	-	-	7	VDC	Passed
MIL-HDBK-704-8						
No	Parameters	Min	Typ	Max	Unit	Status
1	LDC101	-	-	-	-	Passed
2	LDC102	16	28	40	VDC	Passed
3	LDC105	28	-	100	VDC	Passed
4	LDC201	-	-	-	-	Passed
5	LDC301-704E	20	-	31,5	VDC	Passed
6	LDC302-704E	22	-	50	VDC	Passed
7	LDC401-704E	18	-	29	VDC	Passed
8	LDC501	12	-	29	VDC	Passed
9	LDC601	0	-	28	VDC	Passed

Table-1: MIL-STD-1275 and MIL-STD-704 baseline test results applied with external components (TVS+EMC filters).

CHARACTERISTIC CURVE & GRAPHS

POWER DERATING CURVE:

Note: Figure 1 shows the results of thermal tests for different heatsinks.

Heatsink – 1 / VHS-95 (517-95AB) / , Heatsink – 2 / VHS-45 (528-45AB), Heatsink – 3 / M-C308

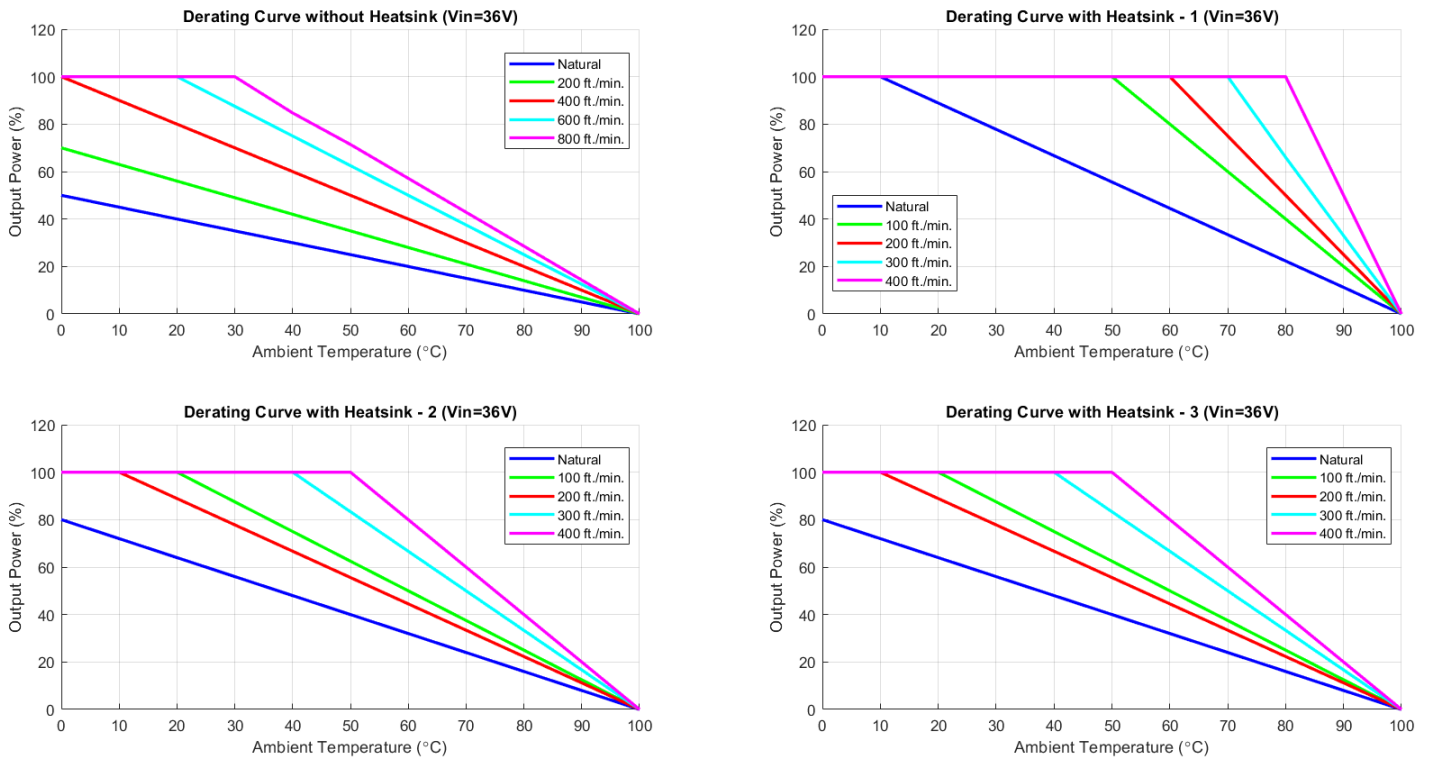


Figure-2

PERFORMANS INFO & DATA

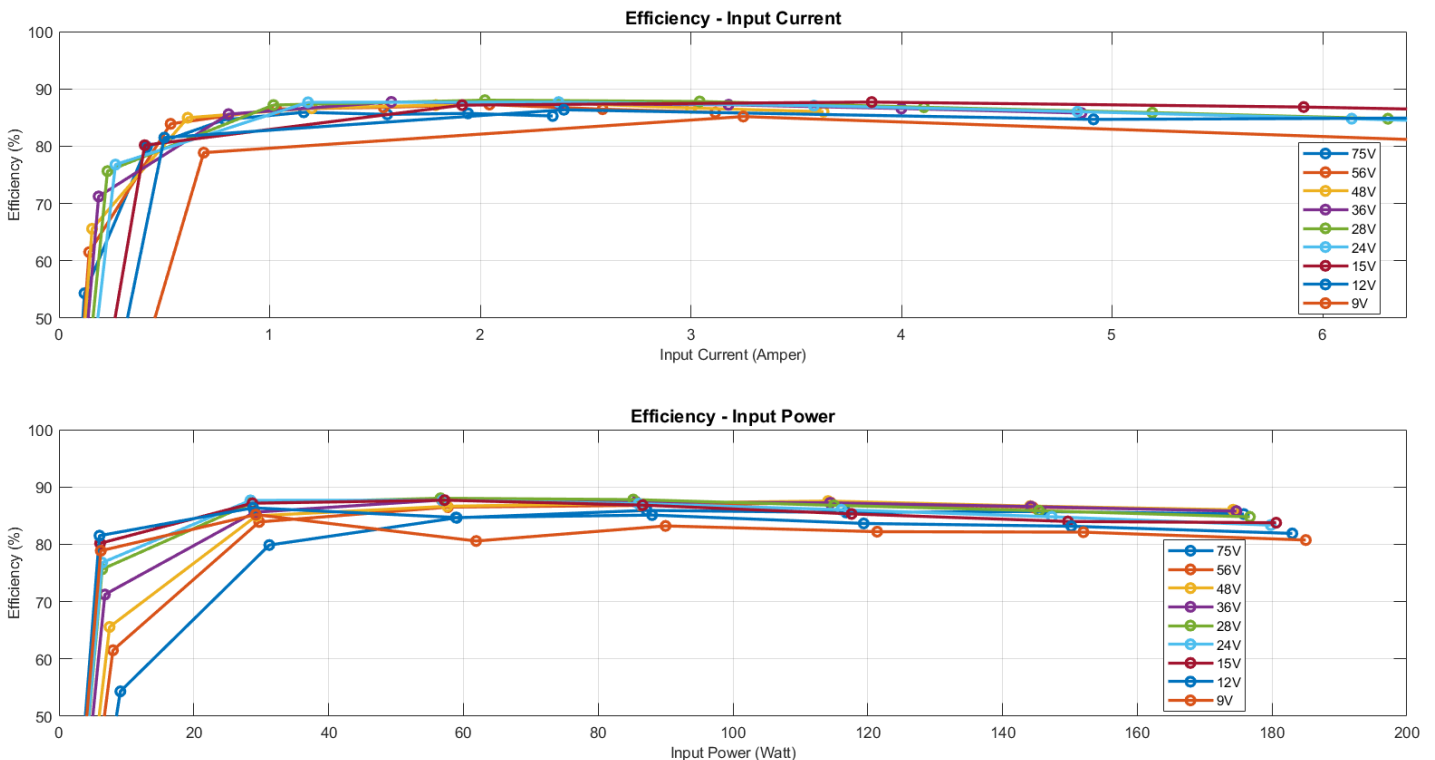


Figure-3

Note: The Efficiency-Output Power graph provides a clearer view of the relationship between output power and efficiency for each load value.
(Figure-3 / Efficiency – Output Power Graph)

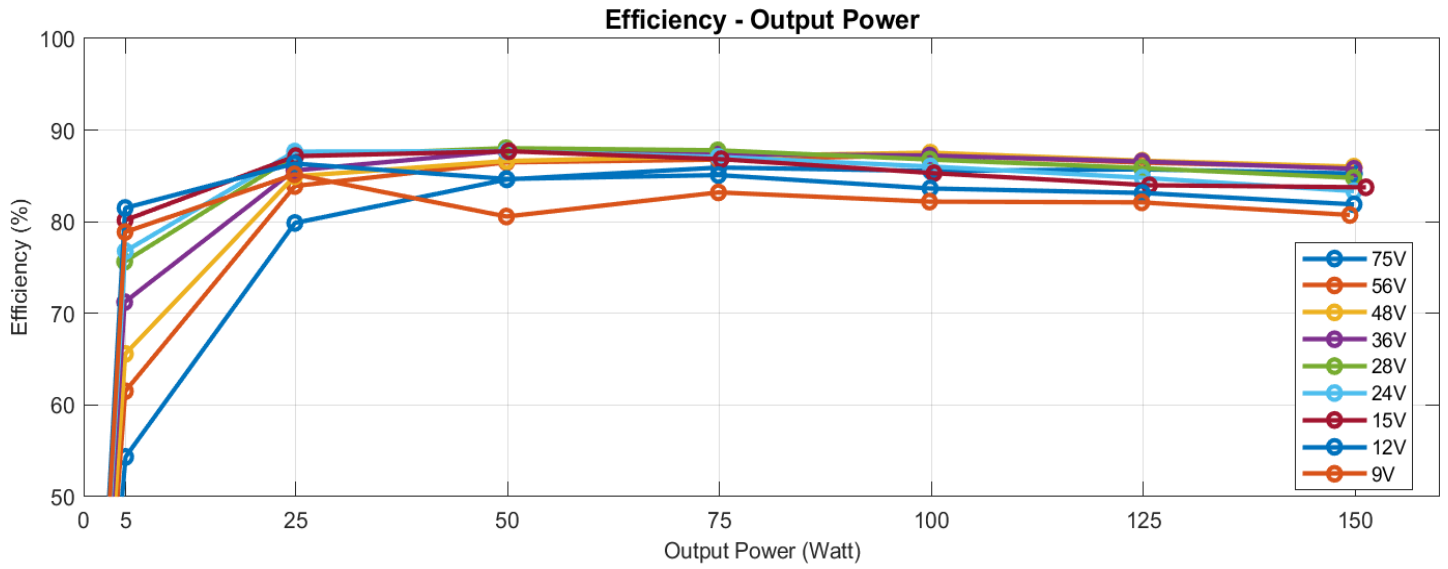


Figure-4

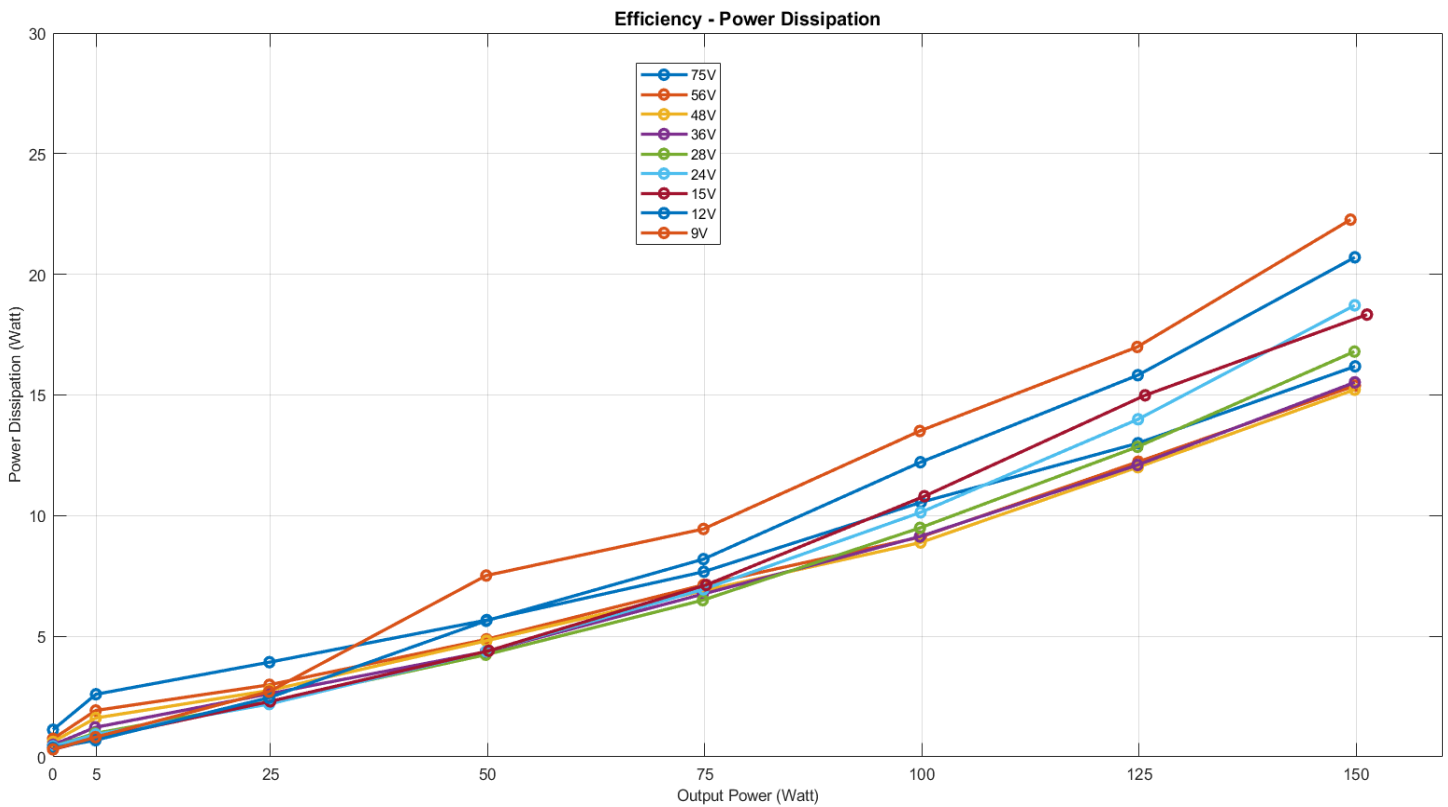


Figure-5

OUTPUT VOLTAGE ADJUSTMENT:

The Trim input permits the user to adjust the output voltage up or down 10%. This is accomplished by connecting an external resistor between the Trim pin and either the Vo (+) pin or the Vo (-) pin (TRIM pin). Please see Figure.

Only one of the trim-up or trim-down resistors should be used to increase or decrease the output voltage.

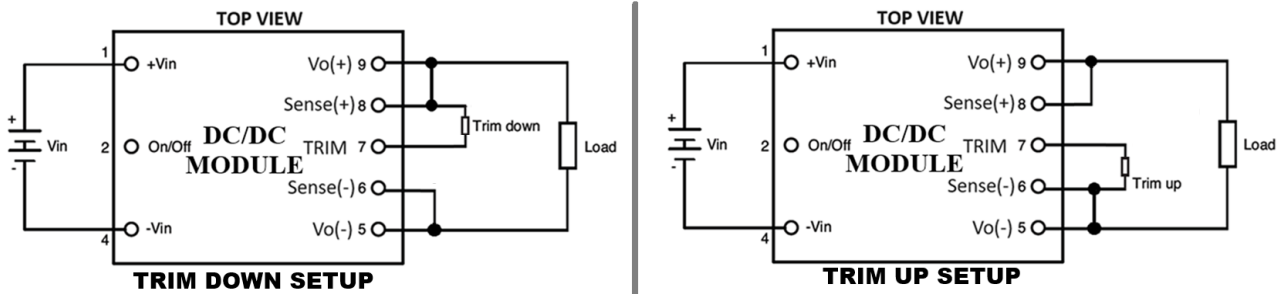


Figure-6

The Trim pin should be left open if trimming is not being used. Connecting an external resistor ($R_{trim-down}$) between the Trim pin and the Vout(+) (or Sense(+)) pin decreases the output voltage.

The following equation determines the required external resistor value to obtain a down percentage output voltage change of $\Delta\%$.

$V_{out}=15V$:

$$R_{trim_down} = 20 * \frac{(V_{o,set} - \Delta\% * V_{o,set} - 1.24)}{\Delta\% * V_{o,set}} - 100K\Omega$$

Where

For example, to trim-down the output voltage of 15V module (ATQ150-WH36S15) by 5% to 14.25V, $R_{trim-down}$ is calculated as follow:

$$\Delta\% = 5\%$$

$$R_{trim_down} = 20 * \frac{(15 - 5\% * 15 - 1.24)}{5\% * 15} - 100K\Omega$$

$$R_{trim_down} = 246.93 \text{ k}\Omega$$

Connecting an external resistor ($R_{trim-up}$) between the Trim pin and the Vout (-) (or Sense (-)) pin increases the output voltage. The following equations determine the required external resistor value to obtain an up percentage output voltage change of $\Delta\%$.

$V_{out}=15V$:

$$R_{trim_up} = 20 * \frac{(1.24 - \frac{0.46 * 100}{100 + 4.3})}{\Delta\% * V_{o,set}} - \frac{4.3 * 100}{100 + 4.3} K\Omega$$

Where

$$V_{out} = V_{o,set}, \Delta\% = \left(\frac{V_{desired} - V_{o,set}}{V_{o,set}} \right) \times 100$$

For example, to trim-up the output voltage of 15V module (ATQ150-WH36S15) by 5% to 15.75V, Rtrim-up is calculated as follow:

$$\Delta \% = 5\%$$

$$R_{trim_up} = 20 * \frac{(1.24 - \frac{0.46 * 100}{100 + 4.3})}{5\% * 15} - \frac{4.3 * 100}{100 + 4.3} K\Omega$$

$$R_{trim_up} = 17.184 k\Omega$$

The output voltage on 15V models is adjustable within the range of +10% to -10%.

MECHANICAL SPECIFICATION:

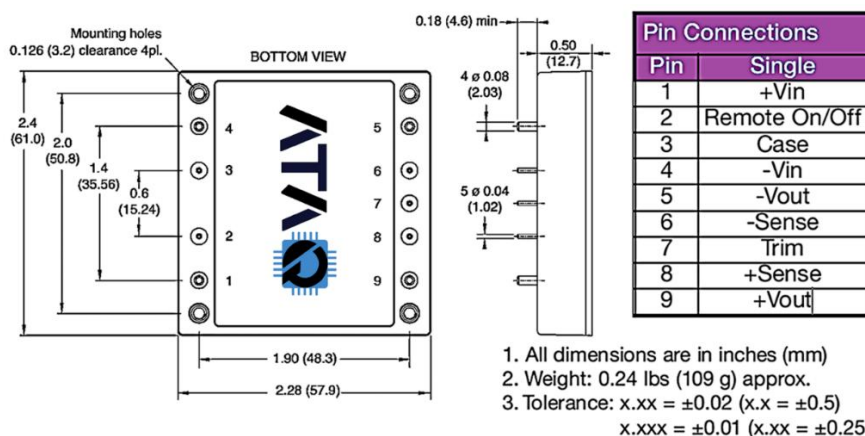


Figure-7



Figure-8

PACKAGING:

Due to ATAQ's value-added services, the packaging type may change when purchasing quantities below the standard package.



Figure-9

For all other features and applications, please refer to the ATQ150-WH series application notes document.

Contact ATAQ for further information and to order.