



MADE IN USA



# SynQor®

Advancing the Power Curve®



## MilQor®

## Mil-COTS

Products for the Military and Aerospace Industry

# Mil-COTS DC-DC Converters for Military and Aerospace Applications

The MilQor® series of Mil-COTS DC-DC converters brings SynQor's field proven high-efficiency synchronous rectifier technology to the Military/Aerospace industry. These "off-the-shelf" converters are compatible with the industry standard format, operate at a fixed frequency, and follow conservative component derating guidelines. Designed and manufactured to comply with a wide range of military standards. Full power operation at  $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ .

Product Family	Brick Size	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	40V	48V
<b>MCOTS-28</b> 16-40Vin Cont. 50Vin 1s Trans.* Absolute Max Vin = 60V	<b>1/2 Zeta</b>	—	—	—	—	—	—	—	—	—	18A 432W	18A 504W	10A 400W	10A 480W
	<b>1/2 Peta</b>	60A 72W	60A 90W	60A 108W	60A 150W	50A 165W	40A 200W	28A 196W	16A 192W	13A 195W	8A 192W	7A 196W	5A 200W	4A 192W
	<b>1/4</b>	40A 48W	40A 60W	40A 72W	40A 100W	30A 99W	24A 120W	17A 119W	10A 120W	8A 120W	5A 120W	4A 112W	3A 120W	2.5A 120W
	<b>1/8</b>	25A 30W	25A 38W	25A 45W	20A 50W	20A 66W	15A 75W	10A 70W	6A 72W	5A 72W	3A 72W	—	—	—
	<b>1/16</b>	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W	4A 48W	3A 45W	—	—	—	—

Product Family	Brick Size	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	40V	48V
<b>MCOTS-48</b> 34-75Vin Cont. 90Vin 0.1s Trans.* Absolute Max Vin = 100V	<b>1/2 Zeta</b>	—	—	—	—	—	—	—	50A 600W	—	—	—	—	—
	<b>1/2 Peta</b>	60A 72W	60A 90W	60A 108W	60A 150W	60A 198W	46A 230W	35A 245W	21A 252W	17A 255W	10.5A 252W	9A 252W	6.3A 252W	5.2A 250W
	<b>1/4</b>	40A 48W	40A 60W	40A 72W	40A 100W	30A 99W	25A 125W	20A 140W	12A 144W	10A 150W	6A 144W	4A 112W	3A 120W	3A 144W
	<b>1/8</b>	25A 30W	25A 38W	25A 45W	20A 50W	20A 66W	15A 75W	10A 70W	6A 72W	5A 75W	3A 72A	—	—	—
	<b>1/16</b>	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W	4A 48W	3A 45W	—	—	—	—

Product Family	Brick Size	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	40V	48V
<b>MCOTS-270</b> 155-425Vin Cont. 475Vin 0.1s Trans.* Absolute Max Vin = 550V	<b>Full</b>	—	—	—	—	—	—	—	50A 600W	40A 600W	25A 600W	21A 588W	—	—
	<b>1/2</b>	50A 60W	50A 75W	50A 90W	50A 125W	50A 165W	45A 225W	35A 245W	20.8A 250W	16.6A 249W	10.4A 250W	10.7A 300W	—	—
	<b>1/4</b>	30A 36W	30A 45W	30A 54W	30A 75W	30A 99W	25A 125W	21A 147W	12.5A 150W	10A 150W	25A 150W	5.3A 148W	—	—

\* Converters may be operated continuously at the highest transient input voltage, but some component electrical and thermal stresses would be beyond MIL-HDBK-1547A guidelines.

# PRODUCT FEATURES

## Operational

- High efficiency synchronous rectifier designs
- High power density
- Smaller, lower power modules require less board area and provide greater design flexibility
- Three wide-range continuous (transient) input voltages — 16-40(50)V, 34-75(90)V and 155-425(475)V ranges
- Fixed switching frequency, yields predictable EMI filtering
- Wide variety of output voltages
- Thirteen output voltages from 1.2V to 48V for numerous application requirements
- Fully encased solution
- Rugged design for harsh environments
- 2250V, 30M $\Omega$  input-to-output isolation
- Offers reinforced insulation
- Baseplate operating temperature range of -55 to +100°C
- No minimum load requirement

## Mechanical

- Industry standard pin-out configurations
- Industry standard footprints:
  - Flanged baseplate versions available
  - Sixteenth Brick: 1.04" x 1.44" x 0.50"
  - Eighth Brick: 0.99" x 2.39" x 0.50"
  - Quarter Brick: 1.54" x 2.39" x 0.50"
  - Half Brick: 2.39" x 2.49" x 0.50"
  - Full Brick: 2.40" x 4.60" x 0.50"

## Military Standards

- Stringent qualification and characterization
- Meets MIL-STD-704D input voltage
- Available in standard and MIL grade screening options
- Full component traceability; unique part serialization
- Complies with a wide range of military standards
- Designed for cost sensitive military/aerospace applications

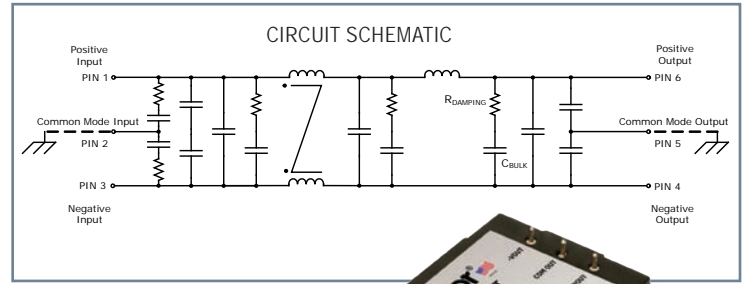
## Protection/Control

- Input under-voltage lockout
- Output current limit and short circuit protection
- Active back bias limit prevents damage to converter from external load induced pre-bias
- Output over-voltage protection
- Thermal shutdown



# Mil-COTS EMI Filters

The EMI filters are available in 28V, 48V and 270V versions, with very low dc resistance these “off-the-shelf” products will meet your Mil-COTS needs. These filters provide >80dB of differential attenuation (MCOTS-F-270-P >60dB), and >36dB of common-mode attenuation (MCOTS-F-270-P >50dB) at 250kHz, and include stabilizing bulk capacitors and damping resistors.



Model Number	Current	Vin Continuous	Vin Transient	Vin Absolute Maximum	Isolation Voltage	Maximum DC Resistance @ 100°C	Differential Mode Attenuation (250kHz)	Common Mode Attenuation (250kHz)
<b>MCOTS-F-28-P</b>	30A	16-40V	50V 1s	60V	2250V	20mΩ	>80dB	>36dB
<b>MCOTS-F-48-P</b>	20A	34-75V	100V 0.1s	100V	2250V	32mΩ	>80dB	>36dB
<b>MCOTS-F-270-P</b>	3A	155-400V	475V 0.1s	550V	2250V	1.4Ω	>60dB	>50dB

# Mil-COTS Screening

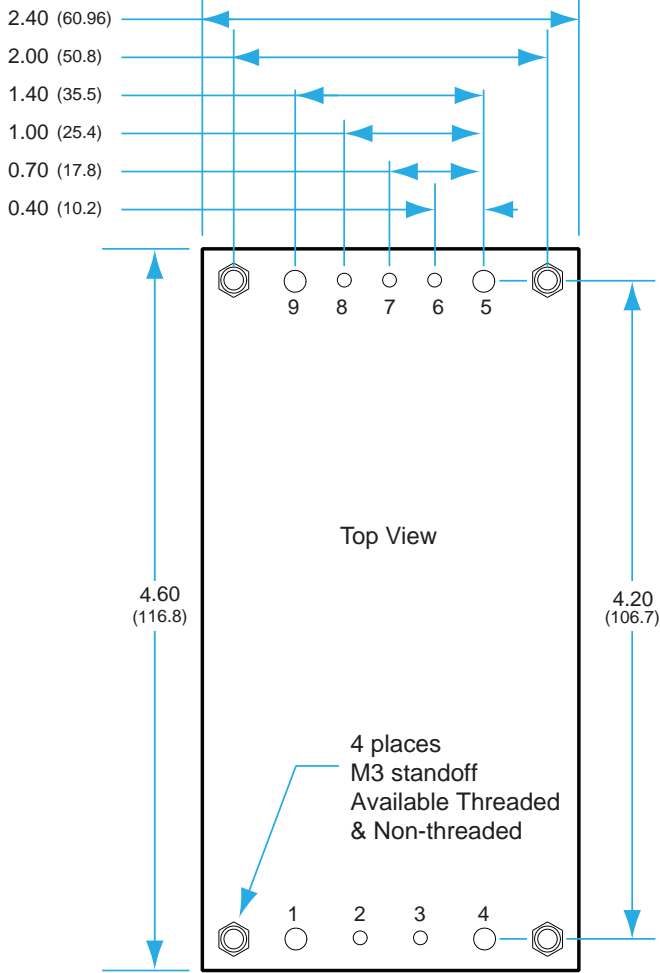
Screening	Process Description	S-Grade	M-Grade
<b>Baseplate Operating Temperature</b>		-55°C to +100°C	-55°C to +100°C
<b>Storage Temperature</b>		-65°C to +135°C	-65°C to +135°C
<b>Pre-Cap Inspection</b>	IPC-610 Class III	•	•
<b>Temperature Cycling</b>	Method 1010, Condition B, 10 Cycles	N/A	•
<b>Burn-In</b>	100°C Baseplate	12 hours	96 hours
<b>Final Electrical Test</b>	100%	@25°C	-55°C, +25°C, +100°C
<b>Final Visual Inspection</b>	MIL-STD-2008	•	•

# Mil-COTS Qualification

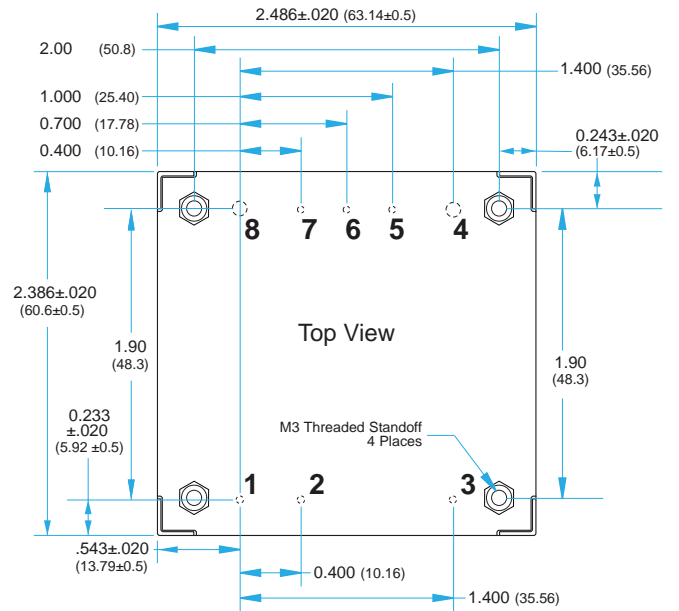
Test Name	Details	# Tested (# Failed)	Consistent with MIL-STD-883F Method	Consistent with MIL-STD-883F Method 5005
<b>Life Testing</b>	Visual, mechanical and electrical test before, during and after 1000 hour burn-in @ full load	15 (0)	Method 1005.8	—
<b>Shock-Vibration</b>	Visual, mechanical and electrical test before, during and after shock and vibration tests	5 (0)	—	MIL-STD 202, Method 1
<b>Humidity</b>	+85°C, 85%RH, 1000 hours, 2 minutes on 6 hours off	8 (0)	Method 1004.7	—
<b>Temperature Cycling</b>	500 cycles of -40°C to +100°C (30 minute dwell at each temperature)	10 (0)	Method 1010.8	Condition A
<b>Solderability</b>	15 pins	15 (0)	Method 2003	—
<b>DMT</b>	-65°C to +110°C across full line, and load specifications in 5°C steps	7 (0)	—	—



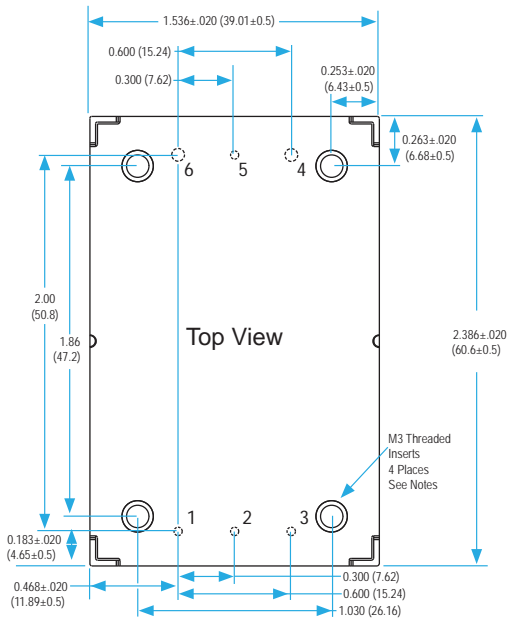
### Full Brick



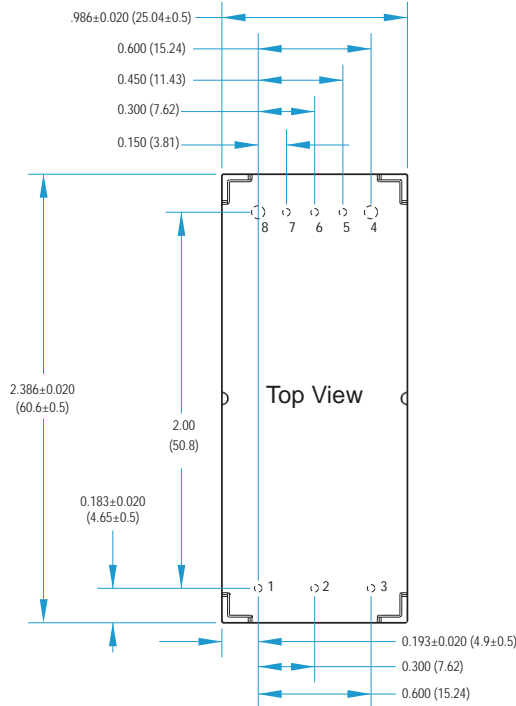
### Half Brick Peta



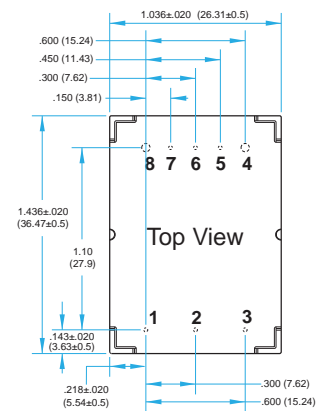
### Quarter Brick



### Eighth Brick



### Sixteenth Brick



All bricks are 0.5" in height

## **Advancing The Power Curve®**

*Founded in 1997, SynQor® has become the technology, quality and service leader for high efficiency dc-dc converters for the telecom/datacom marketplace. The PowerQor®, BusQor®, DualQor®, iQor™, and NiQor® product lines, combined with SynQor's unmatched lead-times, flexibility, design support and lowest total cost of ownership have become the benchmark sought by SynQor's worldwide customer base.*

*In 2004, SynQor began its successful entry into the military, medical and industrial market segments with the MilQor®, InQor® and ACuQor® product lines. These new technology leading dc-dc and ac-dc product lines have enabled customers to realize vast savings in space, weight and overall system costs while dramatically increasing power densities and end-system performance. Equally important is the service and support advantage SynQor has brought to customers in these market segments.*

*SynQor is a privately owned U.S. company headquartered in Boxborough, Massachusetts, which is also the location of all of its manufacturing operations. SynQor has a design center in Dallas Texas, and sales/marketing offices in North America, Europe and Asia. More information is available on the company's website at [www.synqor.com](http://www.synqor.com).*



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