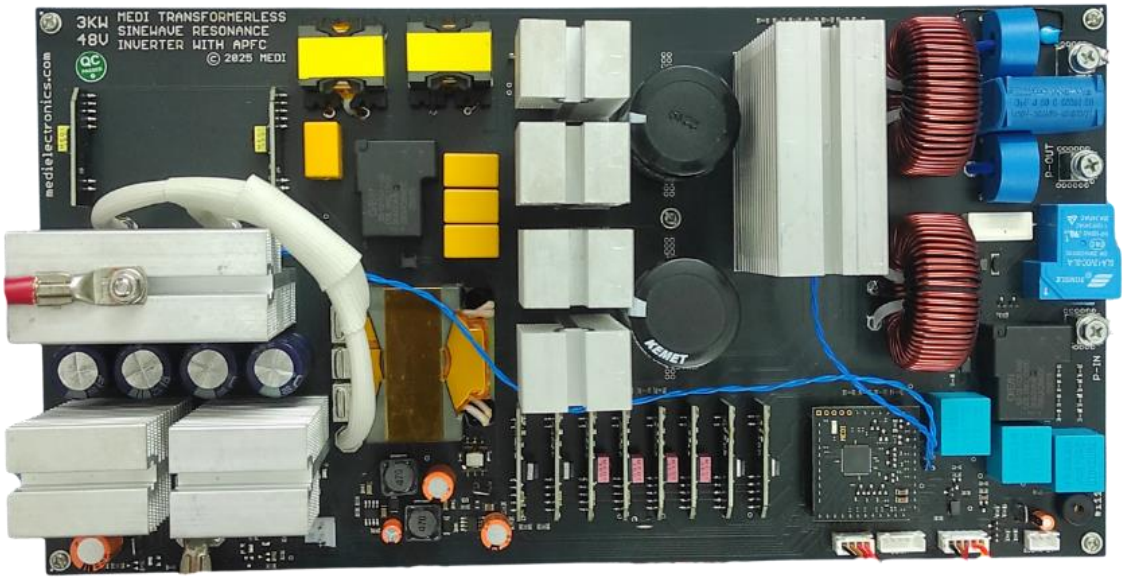
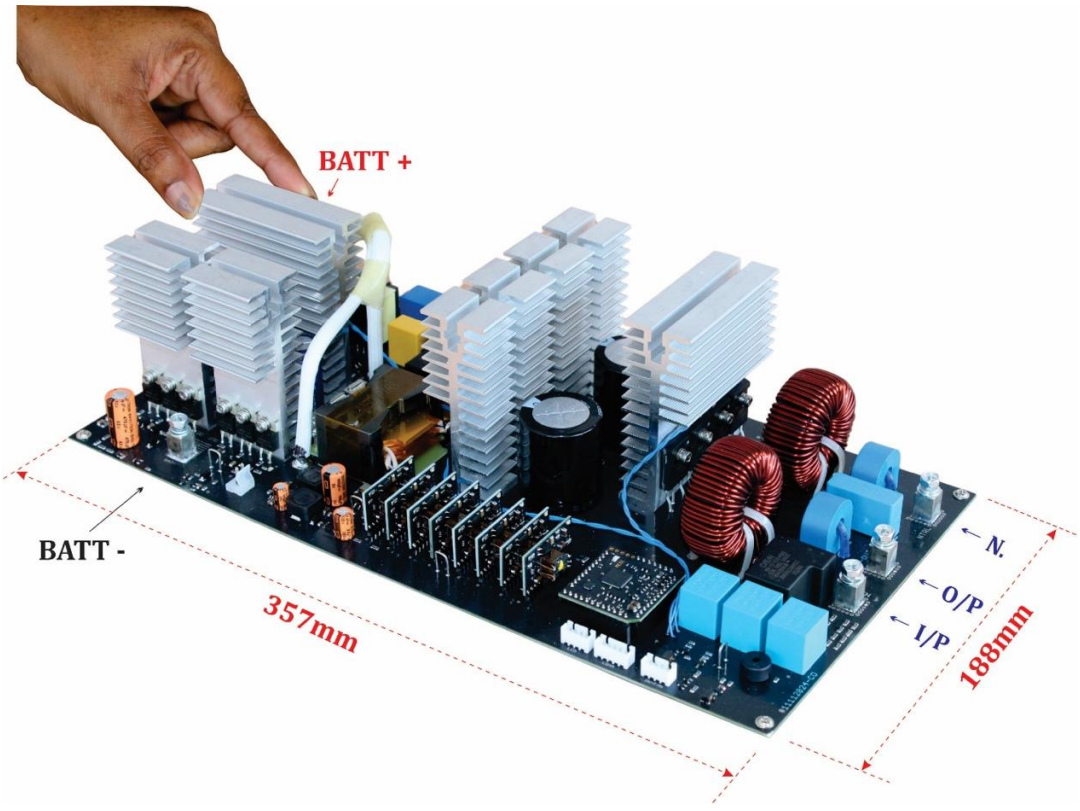
PLANAR INVERTER

MEDI's 3KW TRANSFORMER-LESS RESONANCE SWITCHING SINEWAVE INVERTER WITH APFC

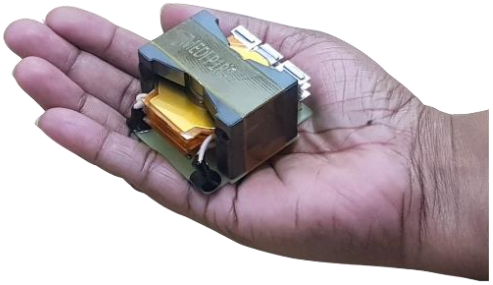
MEDI is pleased to announce the launch of its new product PLANAR INVERTER – transformer-less sinewave inverter with resonance switching topology with Active Power Factor Correction.



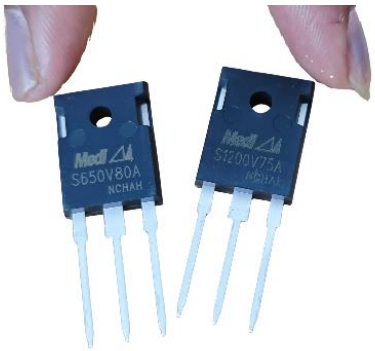
Light weight single PCB design – battery input, AC input, AC output all connectors are brought to a single PCB.



Fully resonance topology will achieve zero current zero voltage switching during both turn on and turn off of the switching device. This zero current zero voltage switching happens in both inverter mode and charging mode. This will result in very high efficiency.
Because there is no switching loss, the switching frequency can be hundreds of KHz. Which means, we can use a very light weight planar transformer and the size of the inductors will be very small. This makes it compact and light weight even compared to traditional transformer-less ferrite core based designs.



MEDI PLANAR TRANSFORMER



We have customized SiC mosfet suitable for this LC inverter application. This SiC mosfet increases the efficiency compared to discrete IGBT, however the cost is slightly higher. The option for both SiC (where efficiency is key) and IGBT (low cost) are available.

MEDI SIC MOSFETS

Features –

1. Transformer-less sinewave inverter 3KW 48V
2. High efficiency > 96% with SiC and > 92% with IGBT
3. Charging power factor 0.99, current harmonic < 7%
4. Lithium battery charging algorithm
5. Charging current settable up to 40A with Active Power Factor Correction (APFC) and Active Harmonic Filter (AHF)
6. Totem-pole APFC with synchronous rectifier + output synchronous rectifier
7. 100% galvanic isolation from battery to inverter output and battery to grid
8. Battery to AC output galvanic isolation
9. AC input to battery galvanic isolation
10. Mains to inverter and inverter to mains is fast changeover <3ms so computer will not reboot
11. 160KHz resonance switching results in no switching loss and very low EMI
12. Compatible with MPPT and zero drop solar charger

13. When solar charging current above 3A, mains charger standby option
14. High voltage protection – input 440V protection
15. Other protections – overload, surge load, short circuit, high temperature, optional battery reverse protection available
16. LCD will show solar charging ampere, mains charging ampere, AC output / input voltage, battery voltage, battery full / low, overload, short circuit etc

TOTEM-POLE PFC WITH SYNCHRONOUS RECTIFIER – The PFC section is a full bridge consisting of only mosfets. There is no diode so there is no diode drop, the mosfets are used for synchronous rectification instead of diodes. The PWM is applied to the full bridge, this PWM width is modulated in order to maintain the grid input current waveform in phase and shape with the grid voltage. This will result in high power factor and low current harmonics.

Operating phase	Single phase
AC input voltage range	140V to 260V
AC input frequency range	45Hz to 55Hz
Battery input voltage	48V
Battery type	Lithium and lead acid
Factory set battery charging current	40A
THD	<5%
Solar charging	Compatible (separate PWM / MPPT to be used)
AC low-cut in inverter mode	140V
AC high-cut in inverter mode	260V
AC low-cut in UPS mode	180V
AC high-cut in UPS mode	260V
Output voltage in mains mode	Same as mains input
Output voltage in UPS / inverter mode	220V +/- 1%
Output frequency in UPS / inverter mode	50Hz +/- 1%
Charging method	CCCV
Battery deep discharge recovery	Yes (at minimum 3V per battery)
Double phase input protection in mains mode	Yes
Neutral failure protection in mains mode	Yes

EFFICIENCY

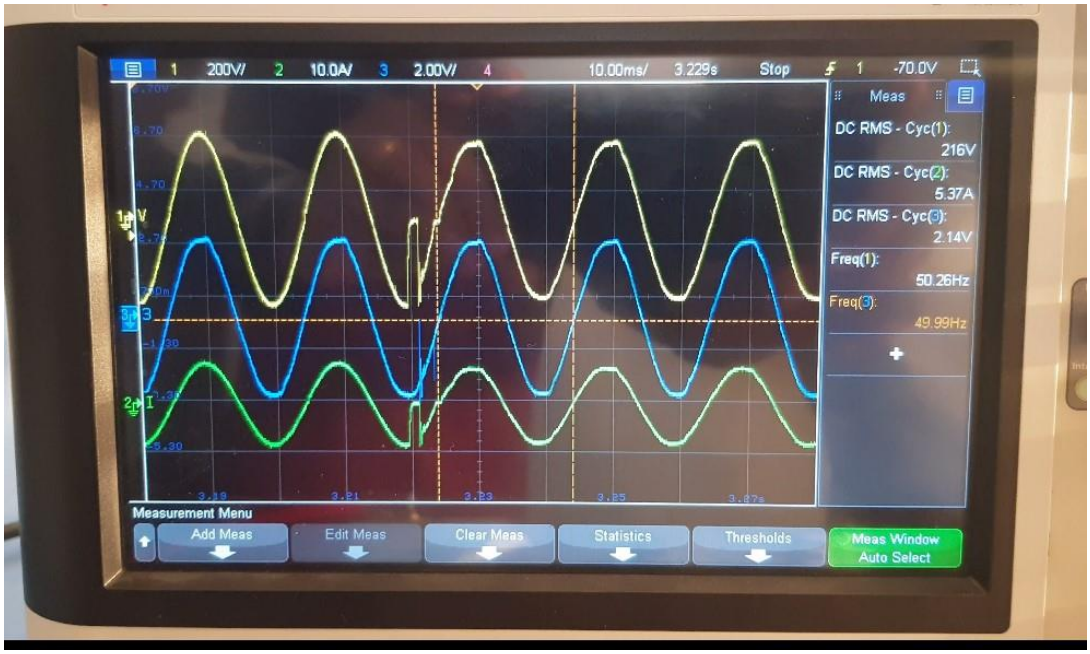
Inverter efficiency
Battery to AC output 220V

Device	Battery voltage	100% load	50% load
MEDI SiC	48V	94%	96%
IGBT	48V	91%	92%

Charger efficiency
Battery charging efficiency from AC mains

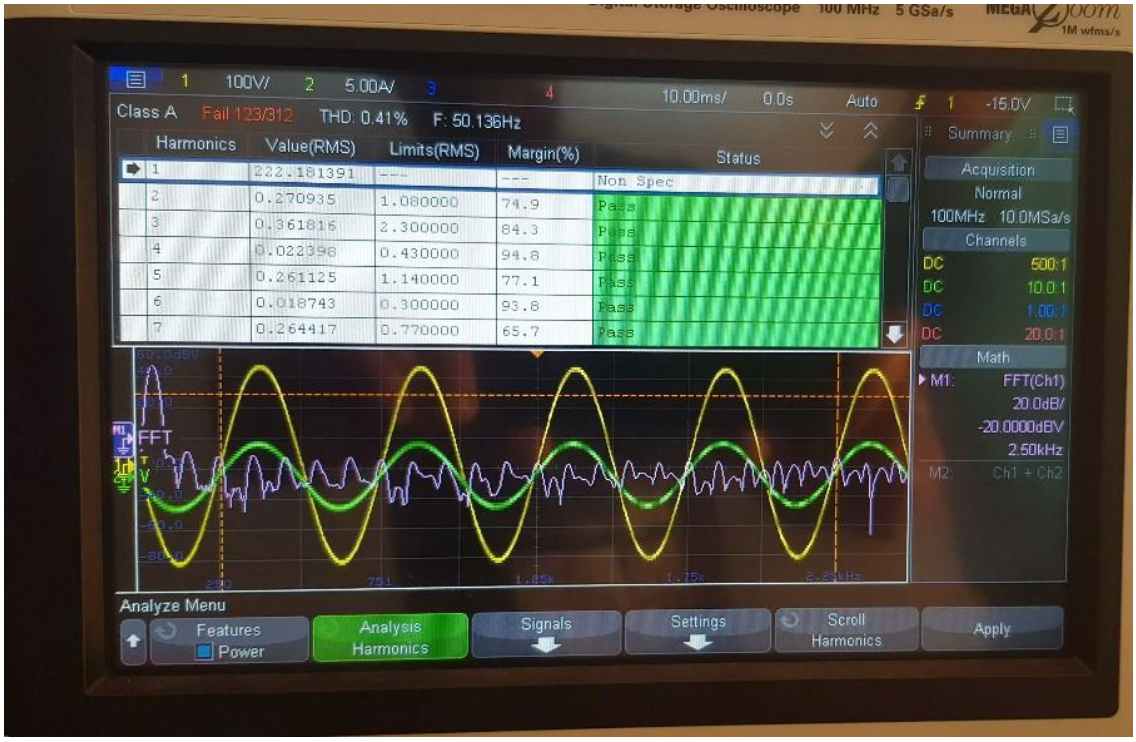
Battery voltage	MEDI SIC	IGBT
48V	96%	94%

Mains to Inverter changeover
Yellow Inverter output waveform, Blue Mains input waveform, Green inverter output current

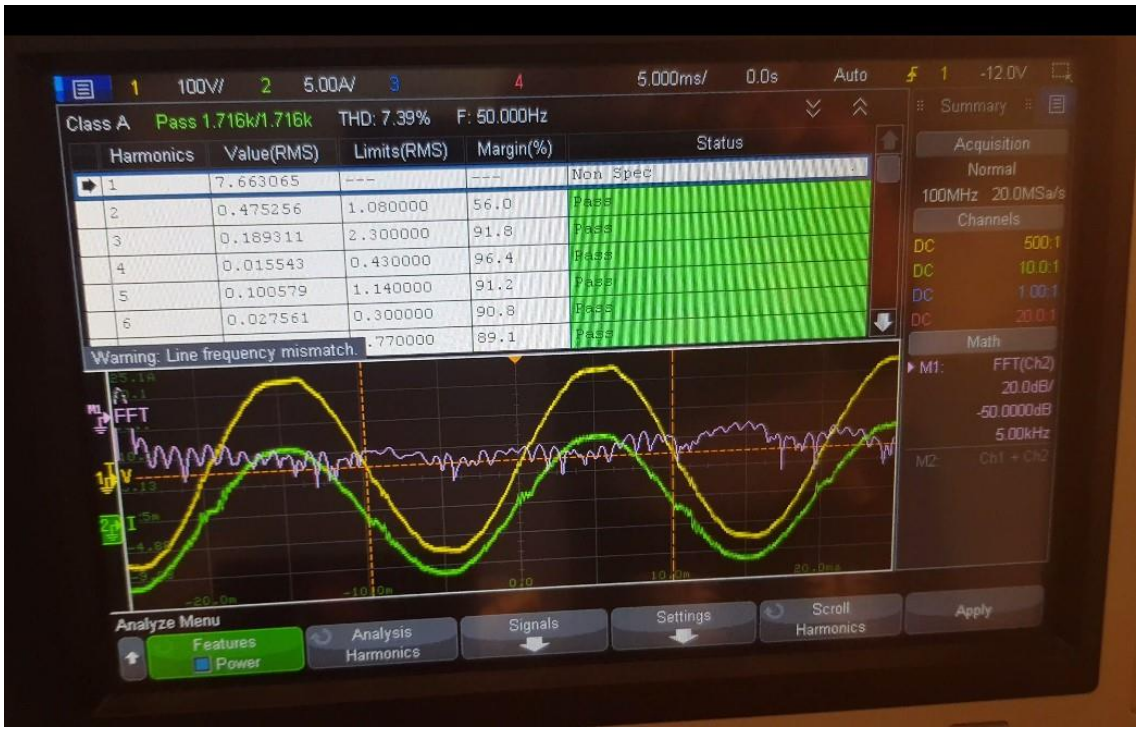


Inverter to Mains changeover
Yellow Inverter output voltage waveform, Blue AC input voltage waveform,
Green inverter output current waveform

Inverter to Mains changeover time 1.2ms
Yellow Inverter output voltage waveform, Blue AC input voltage waveform
Green inverter output current waveform



Inverter output harmonics
Yellow Inverter output voltage waveform THD 0.40%
Green Inverter output current



Charging harmonics
Yellow Ac input voltage waveform THD 3.5%
Green AC input current waveform THD 7.39%

Charging power factor 0.994
Yellow AC input voltage waveform, Green AC input current waveform

PRICES

IGBT based 3KVA 48V Planar inverter with APFC – Rs.14750
MEDI SiC based 3KVA 48V Planar inverter with APFC – Rs.17,500

Minimum quantity purchase – 3 numbers.

Factory set charging current is 40A. Please mention the charging current you want when you place the order.

Optional extras

Battery reverse cut-off protection – The battery when reversed the inverter will cut-off and when the battery is connected back in the right polarity the inverter will restart. This feature is optional.
Battery reverse cut-off and auto reconnect PCB – Rs.1250

Graphic LCD with WiFi – Rs.2500