

PowerElectronicsTeachingSystem

- Enables practical experimentation & makes your study of power electronics safer by preventing dangerous & expensive failures.
- Increases your demonstration time & reduces build uptime. IGBT based demonstration converter for colleges & universities.
- V P Electronics' encapsulated assembly makes it easier for students working in power electronics laboratory and to study modern converters without shock hazards.

Hence "TOTAL SAFETY."

- Various waveforms can be observed just by connecting CRO probes.
- V P Electronics' power electronics teaching kit is mainly designed for College students studying power electronics course and to help them have practical knowledge about IGBT based Inverter.

VP Electronics

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Website:-www.vpelectronics.net

Specifications

| | |
|---------------------|------------------------------|
| Input AC Voltage | =415Volt |
| Output AC Voltage | =415V |
| Output AC Current | =9.5A |
| DC Link Voltage | = 900V |
| Output Frequency | $F_{ac}=50\text{Hz}$ |
| Switching Frequency | $F_{sw}=100\text{ KHz}$ |
| Ambient Temperature | $T_{amb}=40^{\circ}\text{C}$ |
| Cooling Method | Forced Air Cooled. |
| Duty Class | Class I 100% continuous |

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Teaching system consists of

| | |
|--------------|--------------------------------|
| Sic Module | ACM020P120Q (4 Nos.) |
| Sic drivers | Dual SiC RS485 Driver (2 Nos.) |
| Heat sink | 154x80x235mm (1 No.) |
| Fan | Rexnord Make (2 Nos.) |
| Thermal trip | 80degC (1no) |

All the above components are encapsulated in Polycarbonate case for protection from electrical Shock.

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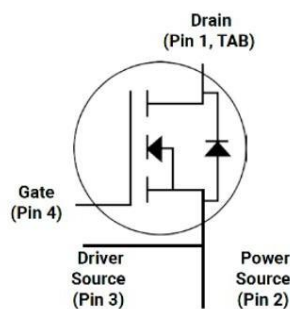
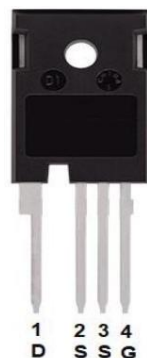
TheSiCModule:ACM020P120Q

Features

- High Blocking Voltage
- High Frequency Operation
- Low on-resistance
- Fast intrinsic diode with low reverse recovery

Benefits

- Higher System Efficiency
- Parallel Device Convenience without thermal run away
- High Temperature Application
- Hard Switching & Higher Reliability
- Easy to drive



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DC-Link Capacitor Bank and Snubber Capacitors

- Rectified DC input is given to electrolytic filtering capacitors. Each capacitor is 75 μ F /600 V.
- Capacitors are connected in series to have equivalent capacitance of 37 μ F/1200Veach.
- Resistors of value 470k Ω /1Ware connected across each capacitor for voltage balancing.
- Snubber Capacitors of 220k/305VDC are connected across the DC link for voltage over shoot protection.
- The snubber limits the over-voltages during commutations and as a consequence reduces the losses.
- They are kept very close to the device to reduce the inductance between the switches and the capacitors.

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Heat sink and Fan

- Stack assembly is provided with forced air cooling. IGBT modules are mounted on 235 mm heat sink (extruded type).
- Rexnord fans are connected to the heat sink to dissipate the heat generated by the IGBTs.
- Flow of air is 3m/s.
- Input to the fan is 12VDC Supply.

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Temperature Protection

- Normally Closed Thermal contact switch is used for protection against thermal runaway.
- Terminals of the switch are electrically short, when its temperature is below the threshold temperature (80degC) & get Electrically Open above 80 deg C.
- After cooling down, it again retains it normally closed position. Thermal switch is placed at the warmest point on the heat sink.
- It is recommended to take the feedback of the thermal trip output to the controller.

NOTE :- IF WE USE / NEED THERMAL PROTECTION

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Important Instructions

- Ensure that the Fan is switched on before starting the converter.
- Power Supply of the driver cards should be turned ON before applying pulses to the driver.
- Use Error Feedback signal from the driver to Shut OFF the System.
- Connect a circuit breaker in the mains supply.
- Do not exceed the current/voltage limit as specified.

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