



**New 17.5" and 14.1" Color TFT-LCD Modules with LED Backlight by Mitsubishi Electric**

Mitsubishi Electric is introducing its new 17.5" and 14.1" wide-XGA color TFT-LCD modules for industrial use. The products AA175TD01 and AA141TC01 will be equipped with white Light Emitting Diode (LED) backlights, providing a longer lifetime and enhanced efficiency, and will be available through Mitsubishi Electric sales sites.

In addition to providing a longer lifetime, TFT-LCD modules using LED backlights can be operated



without an inverter, unlike previous models which used Cold Cathode Fluorescent Lamp (CCFL) backlights. At 25 degrees Celsius, LED backlights have an operating lifetime of at least 80,000 hours. The TFT-LCD modules offer a brightness of 800cd/m<sup>2</sup>, making them suitable for outdoor use and in very bright illuminated environments.

The AA175TD01 and the AA141TC01 both achieve a top level wide operating temperature range from -20 degrees to 70 degrees Celsius, making them useful in severe climatic environments. In addition, the package size, mounting position, signal interface connectors and pin alignments are compatible with Mitsubishi Electric's previous models for an easier replacement.

Mitsubishi Electric was one of the first companies to incorporate LED backlights in its TFT-LCD modules. With the addition of the two new LED backlight models, Mitsubishi Electric's TFT-LCD module lineup now includes more than 80 different modules covering 18 combinations of screen size and resolution types. Out of these 16 combinations are available with LED backlights. Mitsubishi Electric aims to further expand its lineup of industrial-use TFT-LCD modules in future. The LED TFT-LCD modules are mercury-free.

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### World's first C-band GaN HEMT Amplifiers exclusive for Satellite Applications

Mitsubishi Electric Corporation is introducing the world's first GaN HEMT\* power amplifiers, which are exclusively designed for use in satellite applications in the 3.7-4.2GHz band. Depending on the individual device the output power of these transistors ranges from 2 to 100 Watt.

Three of the four new devices are internally impedance-matched and specified for the frequency range from 3.7 to 4.2GHz in order to operate in one of the three separated sub-bands with more than 60% efficiency. While the MGFC50G3742S provides an output power of 50dBm (100W) with a linear power



gain of 13dB the output power ratings of MGFC46G3742S and MGFC43G3742S are 46dBm (40W) and, respectively, 43dBm (20W) with linear power gains of 14dB for both components.

In order to gain 100W output with conventional GaAs amplifiers it is necessary to combine an additional amplifier with an output of approximately 25W in the final stage. By using the new GaN HEMT amplifier MGFC50G3742S from Mitsubishi Electric the designers can achieve an output power of 100W already from a single device at the form factor of a conventional 25W GaAs amplifier. Furthermore, the new device operates with a very high power-added efficiency of 60%. The package size of these three new components is 17.4 x 24.0 x 4.3mm.

The fourth new device dubbed MGF2633GS is not internally impedance-matched, designed specifically for operation at 4.0GHz with an efficiency of 50% while providing an output power of 33dBm (2W) with a linear power gain of 12dB. The MGF2633GS is integrated in a package measuring just 2.5 x 8.5 x 2.0mm.

All four new GaN HEMT amplifiers fulfil the demands of satellite applications requiring an operating time of one million hours at a maximum chip temperature of 175°C and the capability to operate under the severe conditions found in space. The new transistors offer the possibility to replace expensive travelling wave tube amplifiers (TWTA's\*\*) by GaN based solid state power amplifiers (SSPA's\*\*\*).

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### Intelligent Power Modules for Solar Inverters

Mitsubishi Electric Corporation is introducing its new "PV Series" of intelligent power modules (IPMs), which is mainly intended for use in residential photovoltaic (PV) inverters. The six different modules which are also well-suited for inverters in fuel cell systems, are integrated in packages with a footprint of just 90mm x 50mm.

Compared to Mitsubishi Electric's current PV series IPMs, which were launched already in 2005 these new modules require 30% less board space. Therefore, the new PV IPMs from Mitsubishi Electric provide a significant contribution to making PV inverters smaller.

#### Six New PV IPMs

In order to suit the various types of IPMs needed in PV inverters Mitsubishi Electric has developed six different modules within its new PV IPM series. This means that the new devices are well-suited for single-output inverters without chopper or with one or two choppers.



All the devices are rated for a collector-emitter voltage of 600V with a collector-emitter saturation voltage of  $V_{CE(sat)} = 1.9V$  (typ.) @  $T_j = 25^\circ C$  and a  $FWD_i$  forward voltage of  $V_f = 1.7V$  @  $T_j = 25^\circ C$ . While the models PM50B4L1C060 (inverter part only), PM50B5L1C060 (+ 1 chopper) and PM50B6L1C060 (+ 2 choppers) are specified for collector currents of 50A, the models PM75B4L1C060 (inverter part only), PM75B5L1C060 (+ 1 chopper) and PM75B6L1C060 (+ 2 choppers) are specified for collector currents of 75A. All IPMs are protected against short circuit, undervoltage and overtemperature.

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### Intelligent Power Modules with High Output Power (V1-Series)

Mitsubishi Electric has launched the new V1-Series as part of the IPM (Intelligent Power Module) line-up. V1-Series is a new intelligent power module which is mainly developed to increase the efficiency of motor drives and power supplies like DC/DC converters. The V1-Series IPM is focussing on applications in the two digit kW- class offering a respective lineup of 200A/300A/450A in 1200V and 400A/600A in 600V.



For this purpose several new technologies have been implemented such as a new full gate CSTBTM chip and a newly developed dedicated control IC. The short circuit detection is realised by a Mirror Emitter technology. With this technology the stress during short circuit could be efficiently reduced, compared to a conventional desaturation detection method.

Chip technology and structure improvements reduce the effective junction temperature and increase the power and thermal cycling capability of this family of IPMs while keeping the mechanical compatibility with the previous 2 in1 V-Series IPMs. Compared to its predecessors of the V-Series the new V1-Series IPMs reduce power losses by approximately 20% as the collector-emitter saturation voltage of the new V1-Series is specified with just 1.85V @125°C.

Protection functions against short circuit (SC), control supply under voltage (UV) and over temperature (OT) are implemented. The OT sensor is part of the surface of the IGBT chip.

The new V1-Series IPM is available for design-in activities.

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