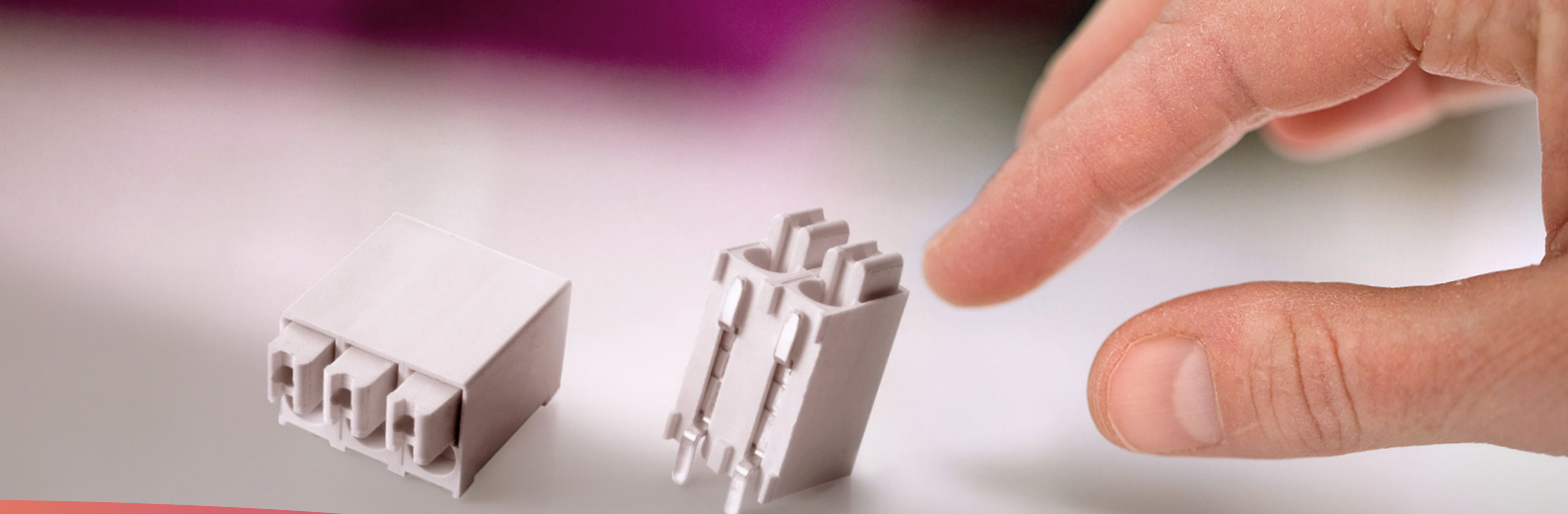


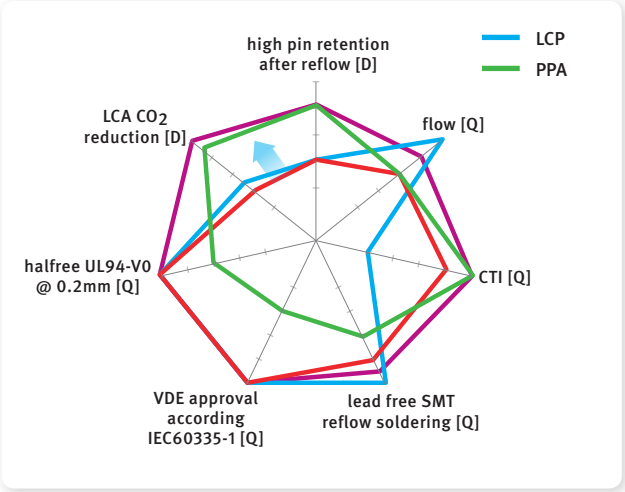
Increased sustainability and performance with ForTii® in terminal blocks

The electronics industry has recently focused significant interest in green design. In addition to reducing the energy consumed, Original Equipment Manufacturers (OEMs) are placing greater restrictions on the use of certain halogens as flame retardant substances in plastics.

For some low- to mid-temperature thermoplastics, halogen-free solutions are commercially available that have comparable performance to their halogenated counterparts. For high-temperature plastics, which are typically used in terminal blocks, there may be no drop-in solution that meets the engineering and cost targets. These new materials often require component re-qualification, which typically requires new capital expenditure for mold and extrusion tooling to account for changes in processing and shrinkage.

DSM offers ForTii ®, an entirely halogen-free material that meets the most stringent requirements for surface mount technology (SMT) terminal blocks to produce plastic housings that are robust and reliable, while enabling power connections that easily go up to 600V and 16A.

Terminal blocks are electrical connectors located on printed circuit boards (PCBs) that connect the PCB with the outside world. One of the primary advantages of terminal blocks is that they can be connected directly by cable or mating connector. They also allow complex wiring to be centralized for easier maintenance. Terminal blocks are commonly used in industrial machinery, automation, transportation, and building infrastructure.



Properties outside red marked minimal requirement fulfill the spec.
[D] Differentiator [Q] Qualifier

The latest trend is to move conventional wave soldering to SMT or surface-mount technology through hole reflow (SMT THR).

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THR configurations combine robust connections with the ability to carry substantial power, while also eliminating the costly and environmentally unfavourable wave soldering process. SMT THR components have a much lower rejection rate of four parts per million versus 50 parts per million for wave/hand soldering.

The main issue with rejected components is a weak or defective soldering joint or a blistered terminal block, both of which are discovered after assembly. Using a robust material that is stable for soldering and better suited to SMT THR can therefore reduce processing costs significantly.

ForTii, our innovative high-temperature thermoplastic, delivers UL94-V0 flame retardency together with outstanding thermal and mechanical performance. It helps electronics manufacturers comply with global environmental regulations, including RoHS and WEEE, omitting the use of any halogens or re-phosphorous while reducing the material carbon footprint by 50% versus LCP and 10% versus PPAs.

The greatest advantage of ForTii in terminal blocks is its improved soldering performance during SMT soldering.
ForTii was developed to comply with MSL1 level according to IPC/JEDEC J-STD 020D. This means that the material has an infinite floor life under factory conditions with no need for dedicated component packaging. Combined with its outstanding mechanical properties, it leads to fewer defects during assembly.

ForTii T11 has been approved or is currently under test at leading terminal block producers. WECO Contact GmbH in Hanau, Germany, a leading global supplier of surface mount devices, decided last year to use the advantages of ForTii T11 for all terminal blocks as well as pin strips in its SMartConn product range. Its latest product, the 830-A-111-SMD terminal block, with a pin pitch of 3.5 mm and a total space requirement on the PCB of just 97 mm², offers high performance in a very small space. It is ideally suited for reflow soldering, and with its white ForTii T11 housing, it is ideally suited for use in the lighting industry.

Comparison Datasheet

	ForTii T11	LCP	PPA
Properties	**Typical Data**	**Typical Data**	**Typical Data**
Mechanical properties	dry / cond	Value	dry / cond
Tensile modulus (MPa)	12000 / 12000	15000	10000 / 10000
Stress at break (MPa)	155 / 155	150	150 / 130
Strain at break (%)	2/2	1,6	2.2 / 2
Thermal properties	dry / cond	Value	dry / cond
Melting temperature (10°C/min) (°C)	325 / *	335	310 / *
Temp. of deflection under load (1.80 MPa) (°C)	300	276	283
Thickness tested (mm)	0,2mm	0,2mm	0,4mm
Burning Behav. at thickness h (class)	V-0	V-0	V-0
Electrical properties	dry / cond	Value	dry / cond
Comparative tracking index	600	175	600
Comparative tracking index (PLC) (class)	0 / *	4	0/ *
Other properties	dry / cond	Value	dry / cond
Density (kg/m³)	1460 / -	1610	1440 / -

DSM Engineering Plastics

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