



TECHNICON – 7TH GENERATION IGBT MODULES

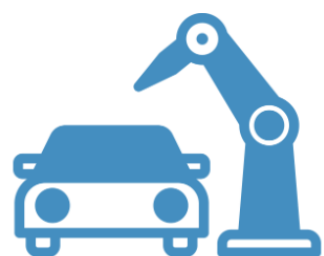
Key Features of Technicon Modules

POWERING THE FUTURE WITH TECHNICON

High-performance power modules
for industrial and automotive applications



Technicon is a global power module brand for those who value reliability, quality, and expert support.



Quality standards & test standards for automotive products are used for the production of our modules (especially for ED3)



QUALITY AND TRANSPARENCY GUARANTEES

WE GUARANTEE:

- A timely PCN submission about upcoming product changes
- That all the parameters mentioned in a datasheet correspond with the characteristics of our products



All parameters are checked twice – in the laboratory and in the field



100% label compliance = declared data correspond with content of product

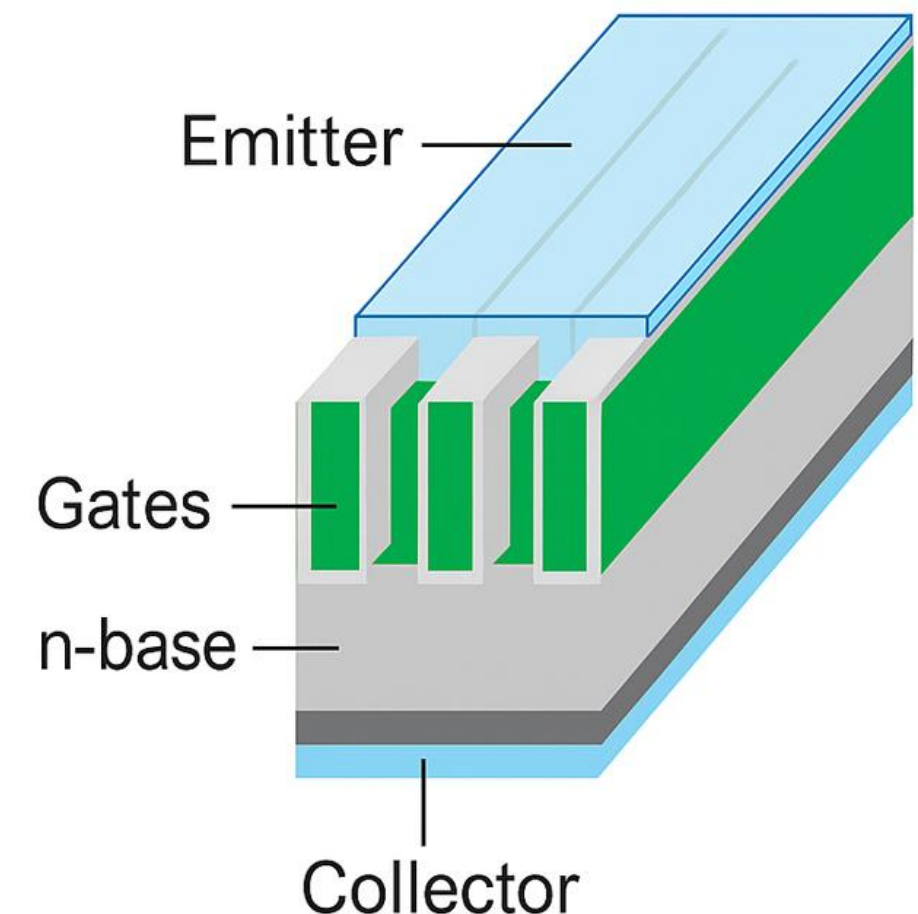
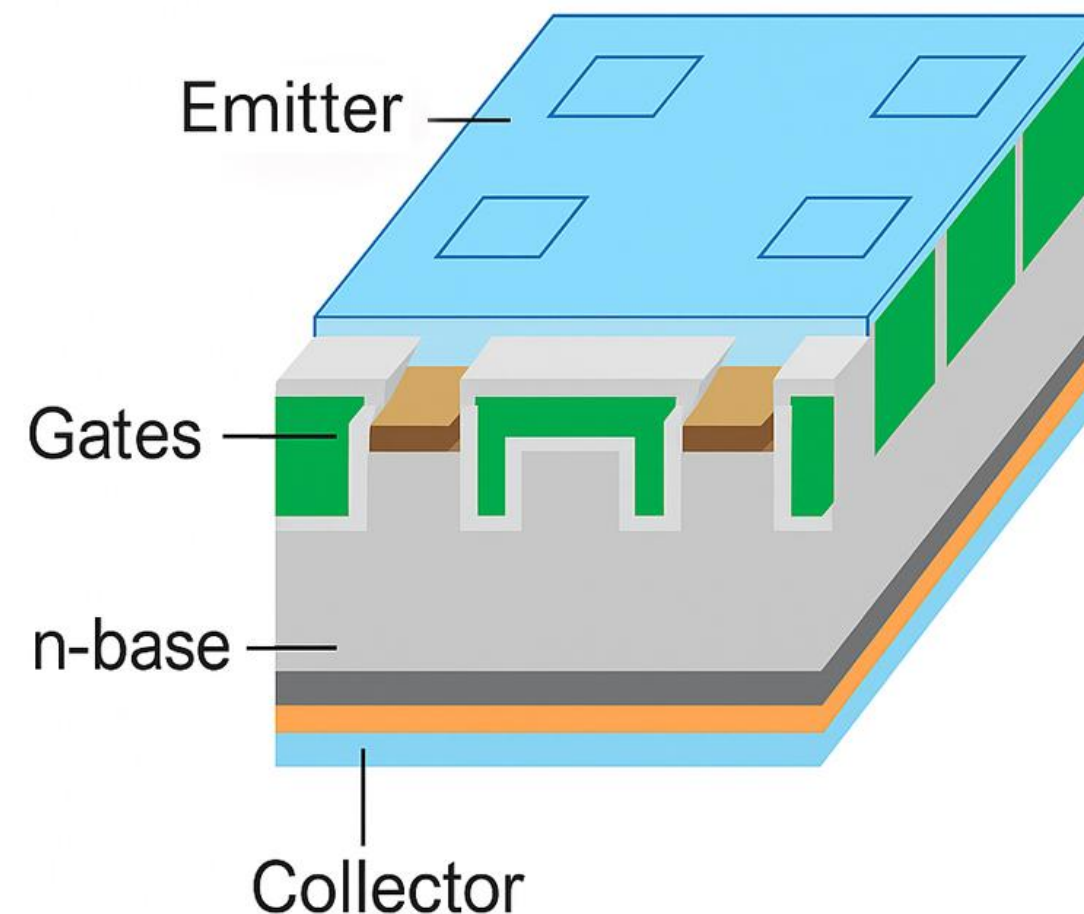


KEY FEATURES OF GEN. 7 TECHNOLOGY

The launch of 7th generation chips marked a significant advancement in IGBT technology.

Gen. 7 IGBT chips use a striped gate with high cell density, consisting of alternating active and passive trenches.

This increases carrier concentration near the emitter and greatly enhances conductivity in the drift region.



Cell structure of Trench IGBT of the 4th and 7th generations

KEY FEATURES OF GEN. 7 TECHNOLOGY

- Higher power density → >30% improvement over Trench 4
- Lower static losses (V_{CE_sat}) → >20% lower vs. Trench 4
- Comparable dynamic losses to Trench 4
- Enhanced climate resistance (H3TRB test, 2018 standard)
- $T_{jmax} = 175^{\circ}C$ – overload mode allowed without loss of reliability
- Short-circuit rating = 8 μs at $T_j = 150^{\circ}C$

Main Applications:

- Medium & high power industrial drives (100 kW to MW range)
- Submersible pump drives (1200V/450A/600A)
- Marine propulsion systems
- General purpose drives

OUTPUT CHARACTERISTICS

Static Losses Vce(sat)

FF450R12ME4P_B11 (Trench 4)

Charakteristische Werte / Characteristic Values				min.	typ.	max.	
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage	$I_C = 450\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$ $T_{vj} = 125^\circ\text{C}$ $T_{vj} = 150^\circ\text{C}$	$V_{CE\text{ sat}}$		1,75	2,10	V
					2,00		V
					2,05		V

FF450R12ME7_B11 (Trench 7)

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	$V_{CE\text{ sat}}$	$I_C = 450\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$		1.50	1.75	V
			$T_{vj} = 125^\circ\text{C}$		1.65		
			$T_{vj} = 175^\circ\text{C}$		1.75		

TE450GB12C5R7-CA (MPT – Trench 7)

Characteristic Values				min.	typ.	max.	
Collector-emitter Saturation Voltage ¹⁾	$I_C = 450\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$ $T_{vj} = 150^\circ\text{C}$ $T_{vj} = 175^\circ\text{C}$	$V_{CE\text{ sat}}$	1.40	1.51	1.70	V
					1.71		
					1.79		

Chip level	IFX IGBT4 (1200V/450A)	IFX IGBT7 (1200V/450A)	Technicon (1200V/450A)
VCE (25°C)	1.8 V	1.50 V	1.51 V
VCE (150°C)	2.05 V	1.7 2V	1.71 V

TECHNICON GEN. 7: Test Results

Modules were tested in a 630A submersible pump drive (2 × IGBT 1200V/600A per phase)

Test Conditions:

- Output voltage: 380V AC
- Output current: 630A (~315A per IGBT)
- PWM frequency: 5 kHz

Test N°1 – Full Load Test (Measurement of heatsink temperature Ts)

Type IGBT	Package	Manufacturer	Maximum heatsink temperature Ts_max (°C), referred to ambient temperature Ta = 50°C	T_in - T_out (VFD), (°C)
FF600R12KE7	62 mm	INFINEON	92.1	16.2
TE600GB12C2R7-CA	62 mm	TECHNICON	94.5	18.6
FF600R12KE4	62 mm	INFINEON	97.4	30.5
DFI600HF12I4ME1	EconoDUAL	LEAPERS	97.9	19.6
GD600HFX120C2S	62 mm	STARPOWER	99.2	20.8
GT600HF120T9H	EconoDUAL	SILVERMICRO	100.1	33.2
GD600HFX120C6S	EconoDUAL	STARPOWER	101.5	34.8
SPS600B12D3L4	EconoDUAL	SPS	103.8	32.4

TECHNICON GEN. 7: Test Results

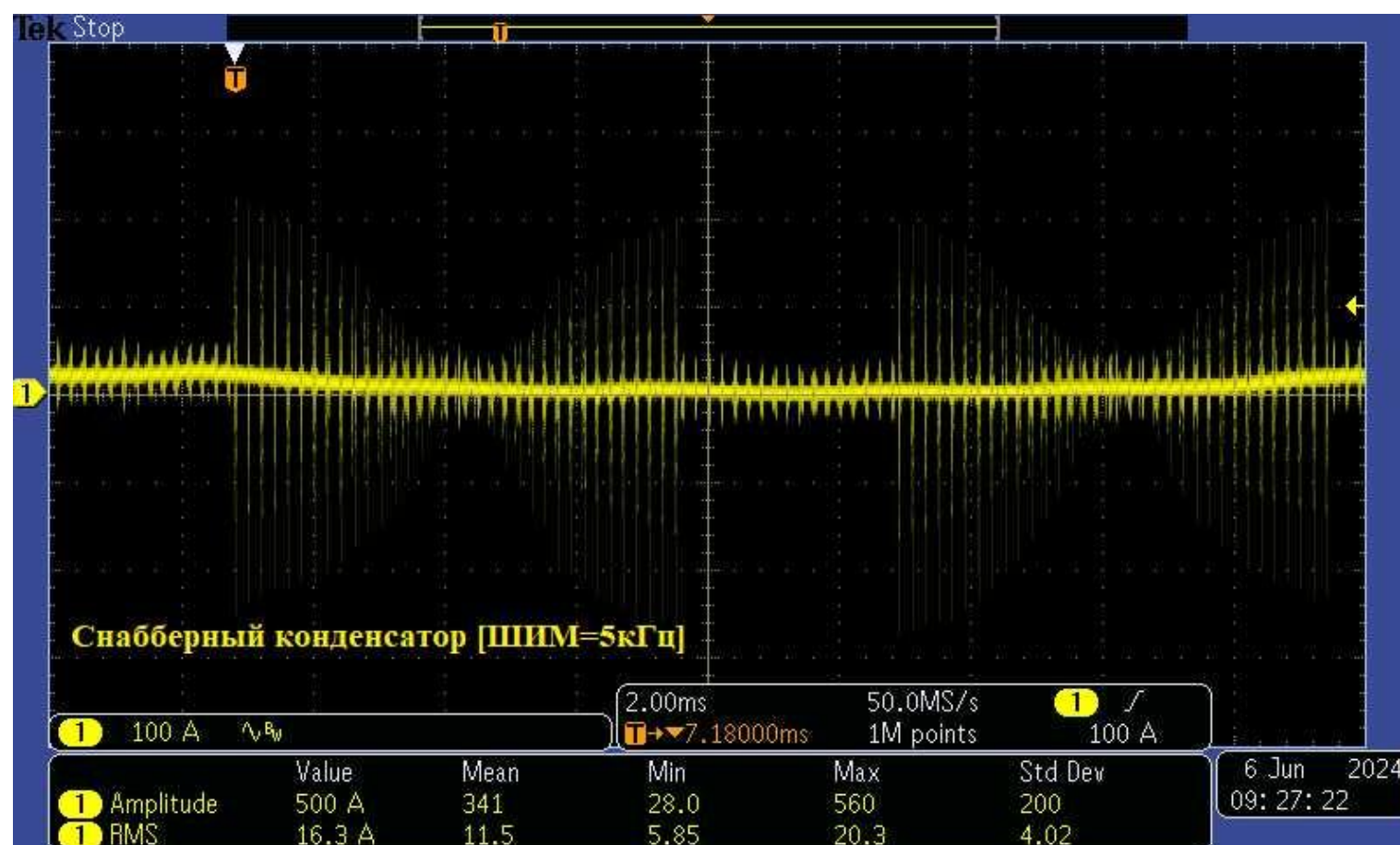
Test N°2 – Snubber Capacitor Current

($I_{out} = 630A$, $F_{sw} = 5\text{ kHz}$, compared to reference module FF600R12KE4)

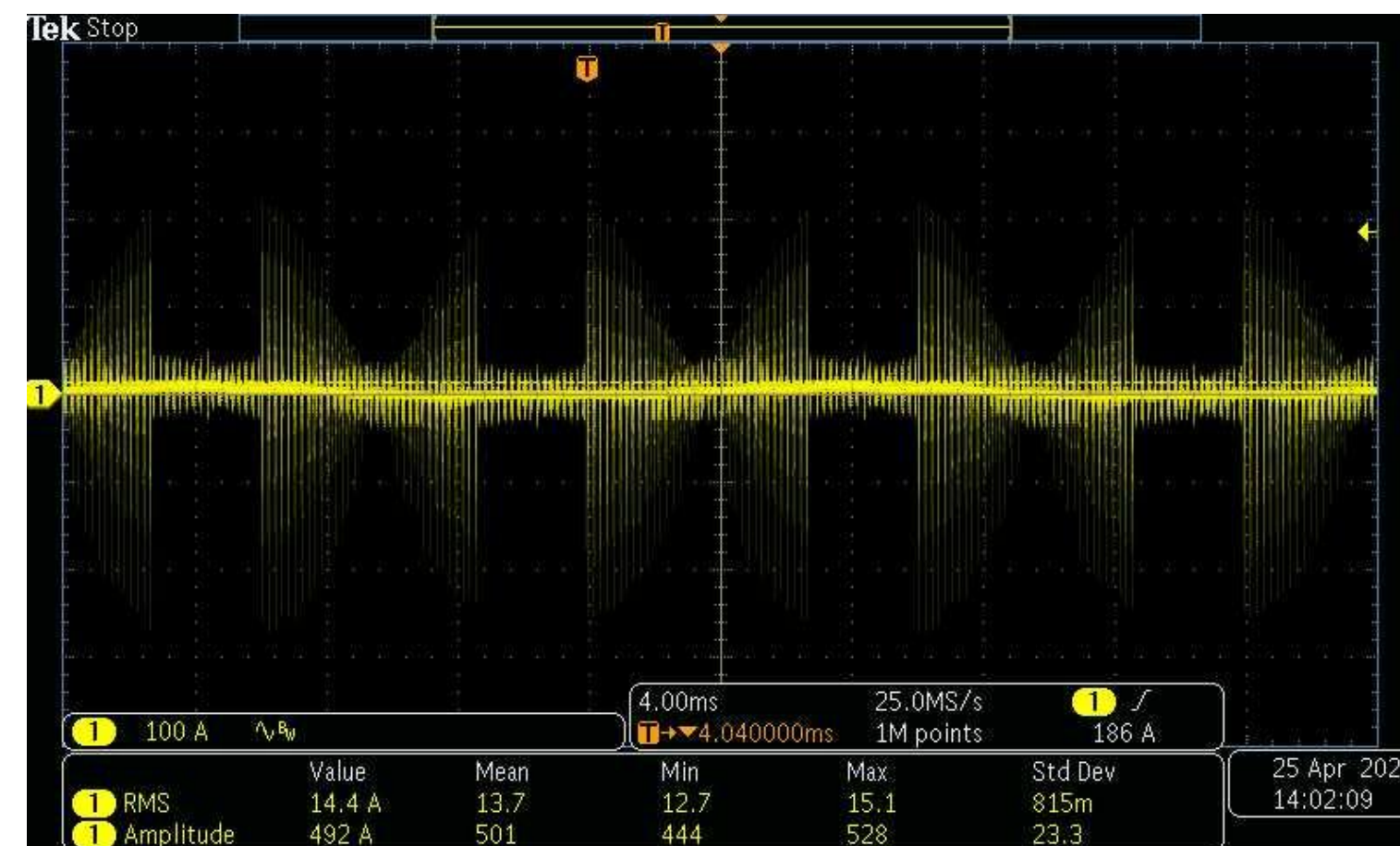
This test indirectly indicates the match of dynamic parameters between IGBT and FWD.

Benefits of lower snubber current:

- Better dynamic parameter matching
- Lower snubber temperature
- Lower switching voltage spikes
- Reduced EMI



FF600R12KE4: $I_{s_rms} = 16,3A$



TE600GB12C2R7: $I_{s_rms} = 14,4A$

TECHNICON GEN. 7: Test Results

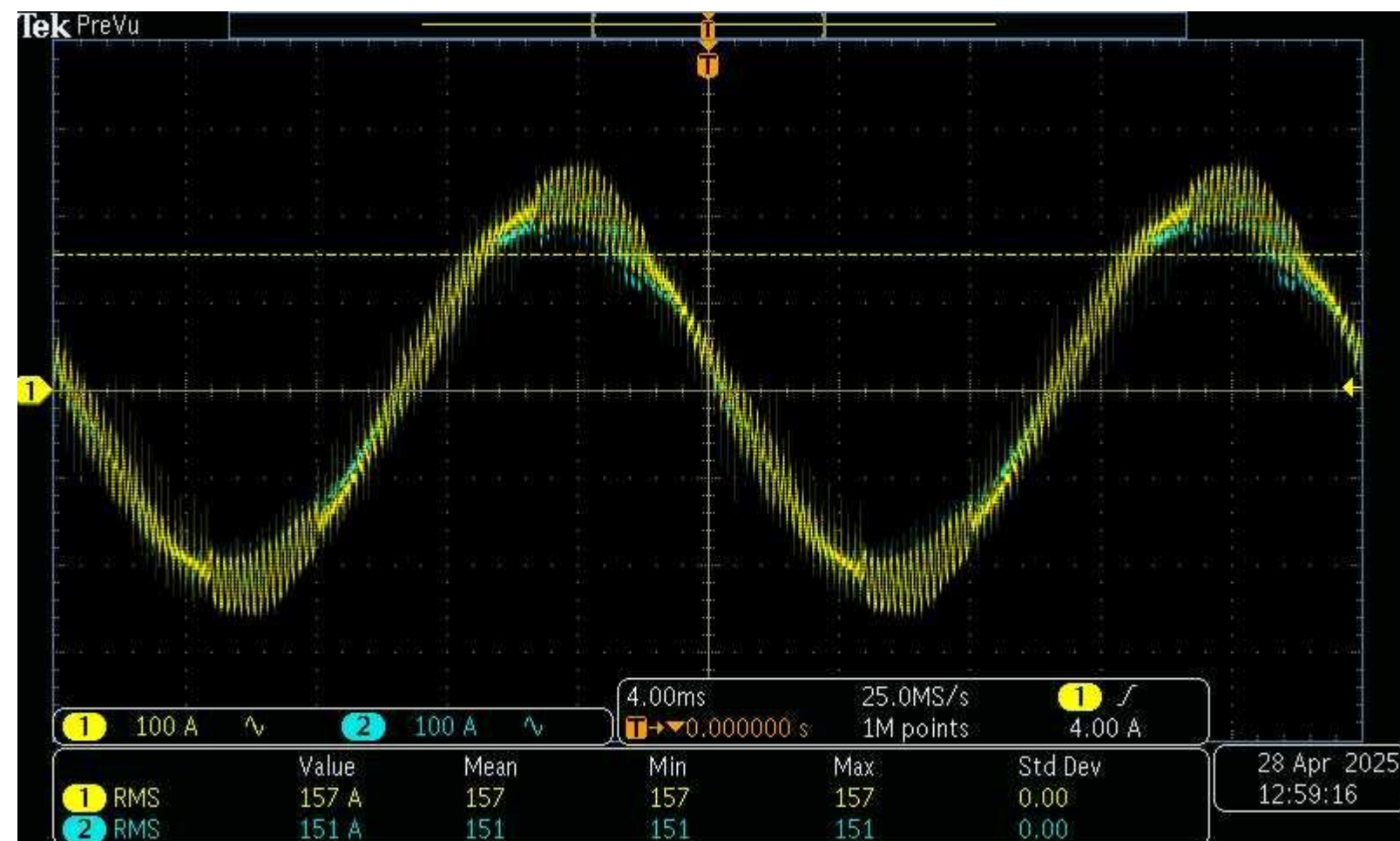
Test N°3 – Current Sharing in Parallel Modules **TE600GB12C2R7**

(I_{out} = 315A (50%), 630A (100%), F_{sw} = 5 kHz)

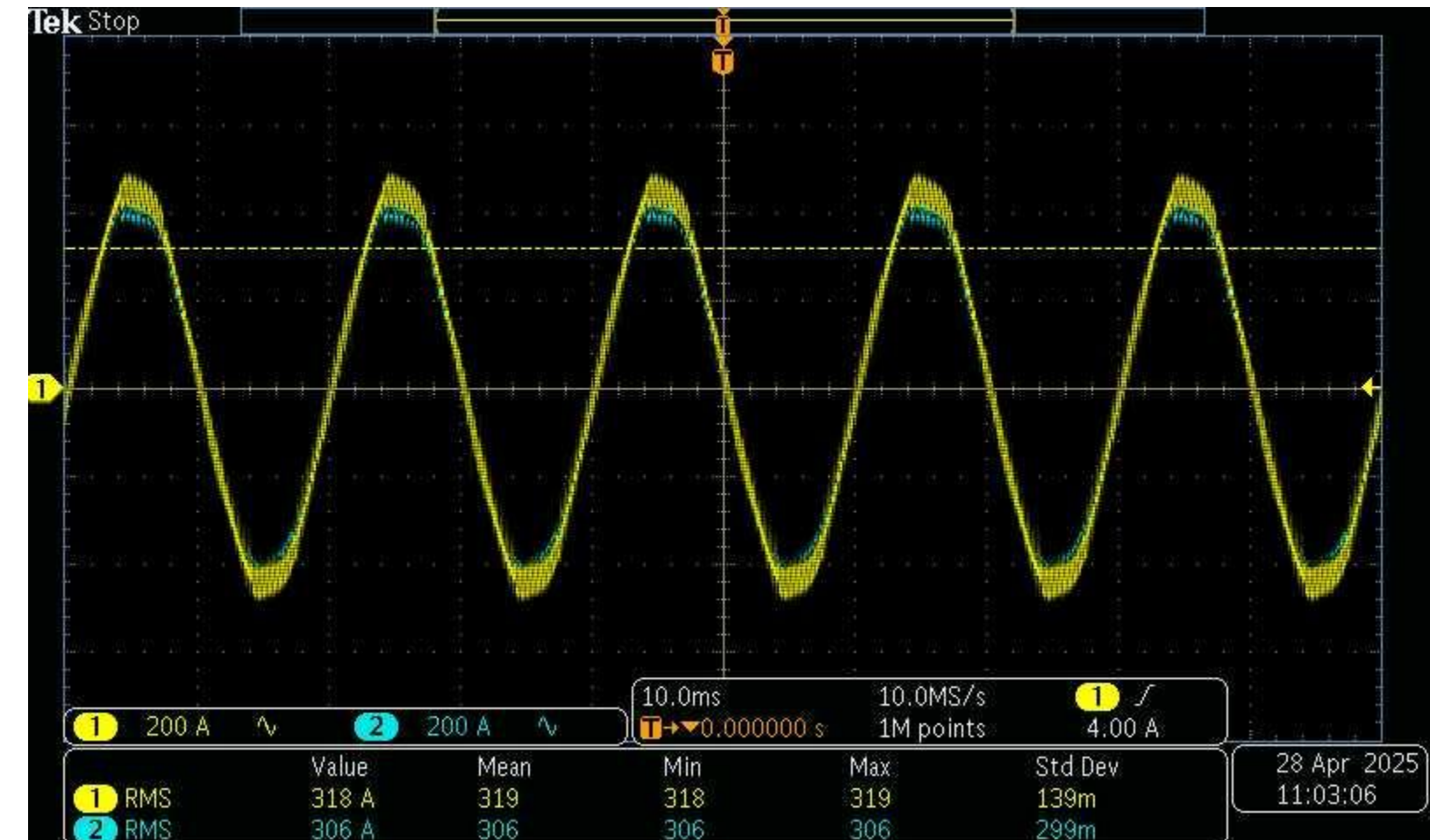
Feature: Adoption for parallel connection (V_f selection)

This test evaluates consistency of static and dynamic parameters within the same BIN group and batch.

At different load levels (50% and 100%), module selection guarantees minimum current imbalance and reliable operation of parallel IGBTs



I_{out} = 50%



I_{out} = 100%

A WEIGHTY CHOICE IN FAVOR OF TECHNICON



You get Technicon modules — with documentation, testing, and support like a global brand



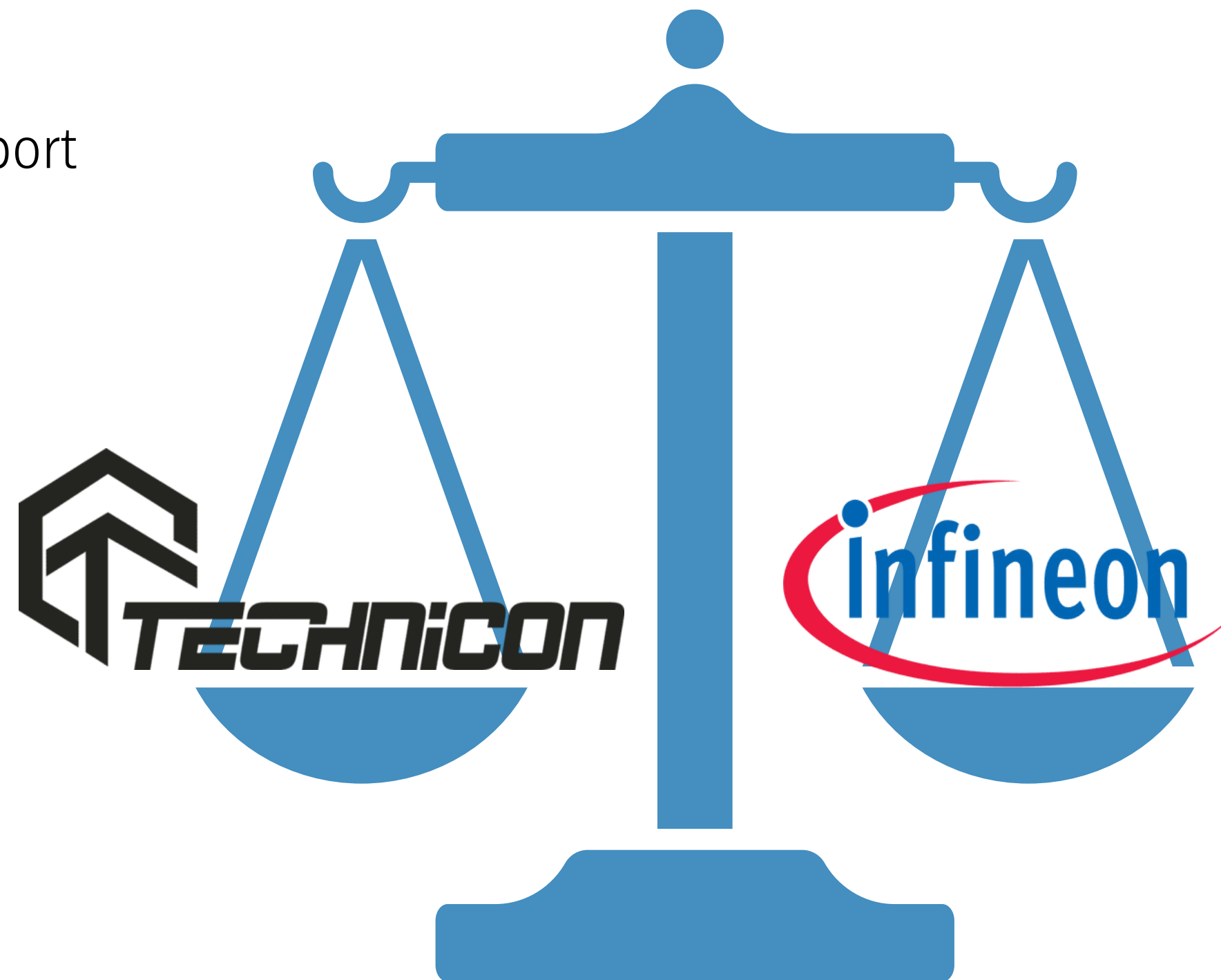
We don't look for someone to blame—we look for solutions! We work as if we were doing it for ourselves—with attention to detail and true respect for the craft, **answering all technical questions within 48 hours**



Technicon — more than just an alternative
It's protection for your project and your deadlines



Trusted by top oil and gas companies — tested in submersible pump drive applications



TECHNICON IGBT GEN.7: Product Line

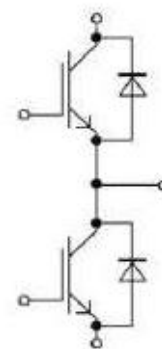


TE600GB12C2R7-CA

C2 series package: 1200V 600A IGBT module



Datasheet



Equivalent
Circuit Schematic

Features:

- Trenchgate Gen.7 IGBT technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High RBSOA capability
- Low static losses: $V_{CE(sat)} = 1,5V@25^{\circ}C$
- Low dynamic losses

Options:

- Options: pre-applied TIM
- adoption for parallel connection (Vf selection)

Typical Applications:

- High Power Converters
- Motor Drives
- Uninterrupted Power Supply
- Photovoltaic

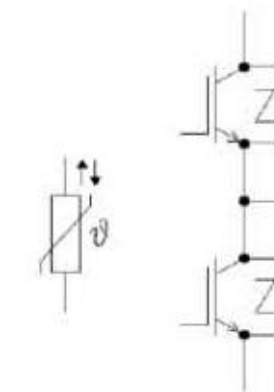


TE600GB12C5R7-CA

C5 series package: 1200V 600A IGBT module



Datasheet



Equivalent
Circuit Schematic

Features:

- Trenchgate Gen.7 IGBT technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High RBSOA capability
- Low static losses: $V_{CE(sat)} = 1,5V@25^{\circ}C$
- Low dynamic losses

Options:

- Pre-applied TIM
- Adoption for parallel connection (Vf selection)

Typical Applications:

- Motor Drives
- Solar Applications
- UPS Systems
- Energy Storage

Technicon Gen.7:

- Technicon Gen.7 Modules in 62mm and ED3 packages
- Voltage: 1200V / 1700V
- Current: 300A/450A/600A/800A
- Options:
- Pre-applied thermal interface material
- Parameter selection for parallel operation

62mm/1200V/450A	TE450GB12C2R7-CA
62mm/1200V/600A	TE600GB12C2R7-CA
ED3/1200V/450A	TE450GB12C5R7-CA
ED3/1200V/600A	TE600GB12C5R7-CA
62mm/1700V/450A	TE450GB17C2R7-CA
62mm/1700V/600A	TE600GB17C2R7-CA
ED3/1200V/450A	TE450GB17C5R7-CA
ED3/1200V/600A	TE600GB17C5R7-CA

TECHNICON IGBT FAST FS: Product Line

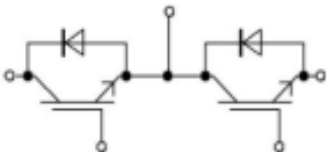


TE200GB12C2R5-C

C2 series package: 1200V 200A IGBT module

Datasheet





Equivalent
Circuit Schematic

Features:

- IGBT 1200V/200A
- Planar Field Stop Fast IGBT technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High RBSOA capability
- Ultra Low dynamic losses

Options:

- pre-applied TIM

Typical Applications:

- Inductive Heating
- Welding
- High Frequency Switching Application

Technicon Fast FS IGBT:

- Packages 34mm/62mm
- Voltage - 1200V
- Current: 75A/100A/200A/300A

Options:

- Pre-applied thermal interface material

34 mm/1200V/100A	TE100GB12C1R5-C (on request)
62 mm/1200V/200A	TE200GB12C2R5-C
62 mm/1200V/450A	TE300GB12C2R5-C
62 mm/1200V/600A	TE150GB12C2R5-C

TECHNICON IGBT GEN.7: **Pre-applied TIM option**

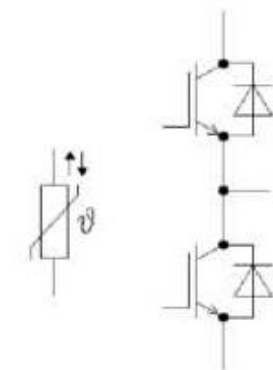


TE600GB12C5R7-CA

C5 series package: 1200V 600A IGBT module



Datasheet



Equivalent
Circuit Schematic

Features:

- Trenchgate Gen.7 IGBT technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High RBSOA capability
- Low static losses: $V_{CE(sat)} = 1,5V@25^{\circ}C$
- Low dynamic losses

Options:

- Pre-applied TIM
- Adoption for parallel connection (V_f selection)

Typical Applications:

- Motor Drives
- Solar Applications
- UPS Systems
- Energy Storage

Modules supplied with factory-applied thermal paste

- Simplifies and lowers cost of installation
- Eliminates the thermal paste application step
- Ensures consistent and stable thermal performance
- High-quality Wacker P12 paste (recommended by world leaders)
- Proven long-term thermal stability
- Special blister prevents paste damage during shipping and facilitates module handling



TECHNICON IGBT GEN.7: Technical Documentation

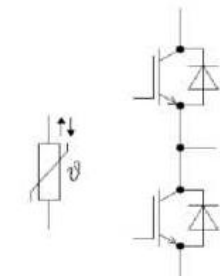


TE600GB12C5R7-CA

C5 series package: 1200V 600A IGBT module



Datasheet



Equivalent
Circuit Schematic

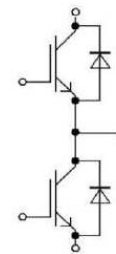


TE600GB12C2R7-CA

C2 series package: 1200V 600A IGBT module



Datasheet



Equivalent
Circuit Schematic

Available documentation:

- Technical specifications (Datasheet)
- Mounting instructions
- Parallel connection of IGBT



IGBT Modules Technicon: ED3, 34mm, 62mm

Mounting Instructions
Version 1.0 / December 2024

1. Preparation, Surface Specifications

To obtain maximum thermal conductivity the underside of the module must be
To ensure long-term reliable electrical contacts with adapter board signal conta
all times and should never be touched by hand.

The heat sink must fulfil the following specifications:

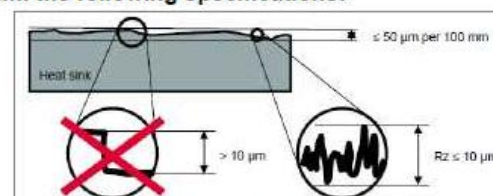


Fig. 1-1. Heat sink surface specifications



Technicon AN 02-2025: Parallel connection of IGBT

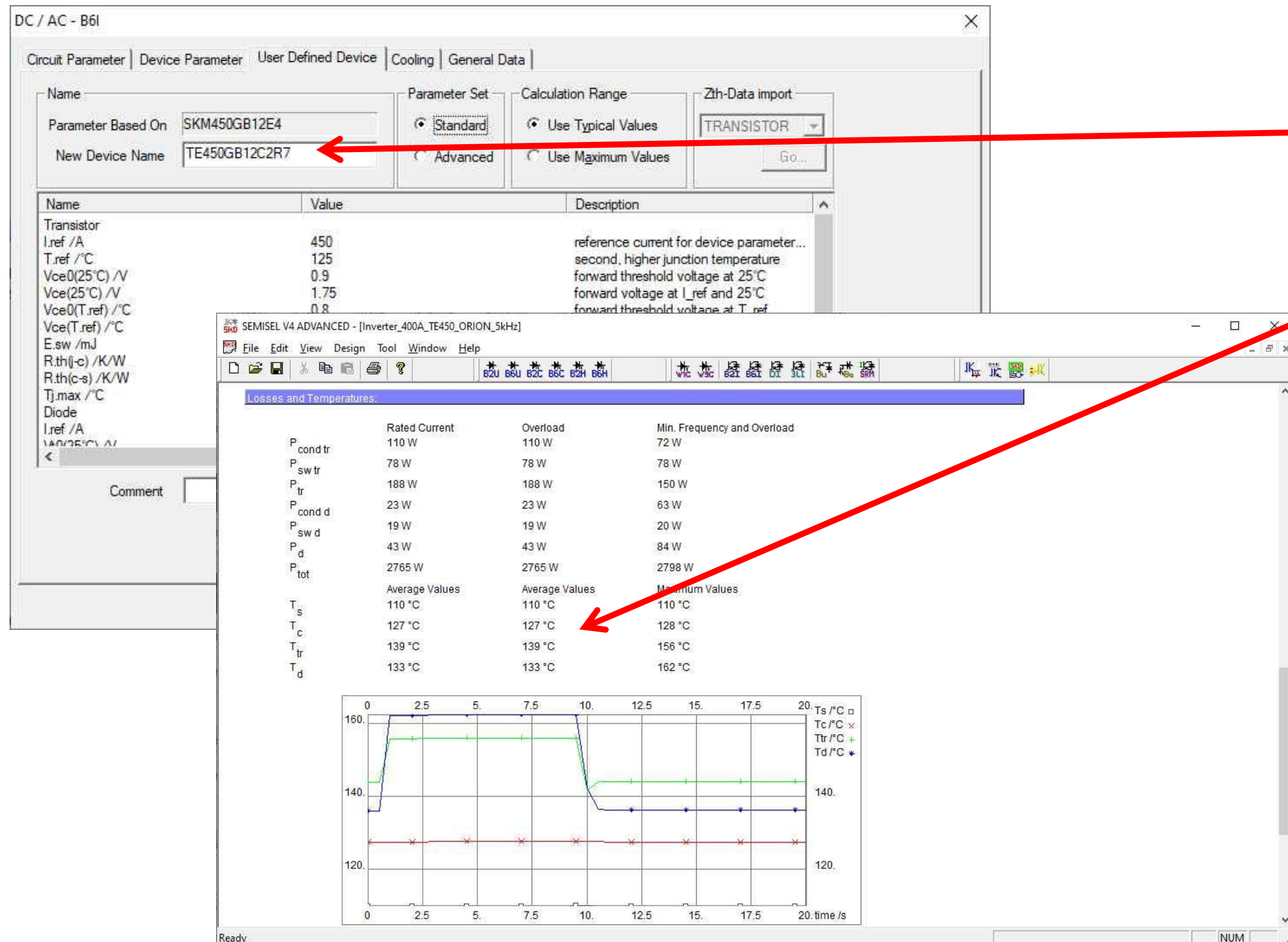
REV.02, December 2024

General considerations

Parallel connection of IGBTs is used to increase total power of converter if the performance of single element is insufficient. This starts at the microscopic level with several 100.000 individual IGBT cells, then further in module by parallel connection of the chips and continues at circuit level by parallel connection of modules and entire inverter units.

Parallel connection of single switches allows covering wide power range with minimum nomenclature of power modules. Optimal utilization of parallel power switch units is achieved only with ideal static (i.e. during conduction period) and dynamic (i.e. during switching cycle) symmetry of currents in parallel nets. Main factors affecting the parallel use of IGBT is shown in Table 1.

TECHNICON IGBT GEN.7: Thermal Calculation



- Thermal models have been developed for all Technicon IGBT modules.
- Simulation results closely match measured data.

WHY INDUSTRY LEADERS CHOOSE TECHNICON

The choice of those responsible for results and deadlines:

- Reliable performance at high temperatures
- Minimal static losses and stable thermal characteristics
- Current balancing in modules during parallel operation
- The full range: 1200V / 1700V, 100A / 150A / 200A / 300A / 450A / 600A, in 34mm, 62mm, and ED3 packages — is available for order



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