

# REPLACEMENT TABLE FOR THE POWER SEMICONDUCTORS OF SAMI STAR FREQUENCY CONVERTERS

The replacement table gives a list of those semiconductors, which can be used in SAMI STAR frequency converters. The types given for each semiconductor are interchangeable. Detail information about the mounting of the power semiconductor is given in the semiconductor assembly instructions (code 57192593).

**Table**

1. GTO-thyristors ( press-pack type)
2. Transistor modules
3. Thyristors (press-pack and module type)
4. Rectifier diodes (press-pack and module type)
5. Free-wheeling diodes ( stud and press-pack type)
6. Snubber diodes ( stud type)
7. Chopper diodes ( stud and press-pack type)

## 1. REPLACEMENT TABLE FOR GTO-THYRISTORS

On the following table are listed the GTO's, which are approved for SAMI STAR. Mechanically these GTO's are of press-pack type. Because of different dimensions of the GTO's there are available installation set for each specification, if it is necessary. The installation set including instructions are delivered with spare GTO's.

LEGEND:

$I_{TGQ}$	Controllable turn-off current
$V_{DRM}$	Peak off-state voltage
F	Clamping force in kN
d * h	GTO diameter * height in mm

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<b>1.1</b>	<b><math>I_{TGQ} = 370 A</math></b>	<b>Standard spec. 5152 8891</b>
	<b><math>V_{DRM} = 1300 V</math></b>	<b>Code: 3AFE 61197711 (ABB P/N 61197711)</b>

Installation set:

Chopper GTO in	SAFUI	160F415 250F415 200F500 290F460 315F500	Clamp SLZF 70A (5...12 kN) Code: 3AFE 5716 8480
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Main GTO in	SAFUK	80F500
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Old code	Manufacturer	Type marking	F (kN)	d * h(mm)
3AFE 0991 6431	Toshiba	S6475R	5	45 * 20

3AFE 1000 2141	Mitsubishi	FG450BL-261E	5	54 * 18
3AFE 1000 2150	GEC Plessey	DGT304SE13X1	5	40 * 15
3AFE 0991 7632	Westcode	WG6013/ZA	7	50 * 16
	Westcode	WG4013D2S	7	50 * 16

**1.2 I<sub>TGQ</sub> = 560 A Standard spec. 5152 8905**

**V<sub>DRM</sub> = 1300 V Code: 3AFE61179828 (ABB P/N 61179828)**

Installation set code: 3AFE 5812 8171

Main GTO in SAFUI 160F415 Clamp SLZF 89C (5...12 kN)  
 " 200F500 Code: 3AFE 5786 1444

Chopper GTO in SAFUI 400F415 Clamp SLZF 70A (5...12 kN)  
 " 460F460 Code: 3AFE 5716 8480  
 " 500F500

Main GTO in SAFUK 125F500

<b>Old code</b>	<b>Manufacturer</b>	<b>Type marking</b>	<b>F (kN)</b>	<b>d * h (mm)</b>
3AFE 0991 7641	Toshiba	S6476R	7	51 * 20
3AFE 0991 7560	Mitsubishi	FG600AL-26-5620	10	56 * 18
3AFE 0991 7632	Westcode	WG6013/ZA	7	50 * 16
3AFE 1000 2222	GEC Plessey	DGT304SE13X2	5	40 * 15
3AFE 1000 1463	ABB Väst	YSG700 *	7	60 * 26

\* Only main GTO in SAFUI

**Note:** In the inverters delivered before 86-05-22, the clamp of the main GTOs has been SLZF 89A (7...20 kN), code 3AFE 5716 8463.

**1.3 I<sub>TGQ</sub> = 880 A Standard spec. 5152 8913**

**V<sub>DRM</sub> = 1300 V Code: 3AFE 61179801 (ABB P/N 61179801)**

Installation set code: 3AFE 5812 8180

Main GTO in SAFUI 250F415 Clamp SLZF 89C (5...12 kN)  
 290F460 Code 3AFE 5786 1444  
 315F500

Chopper GTO in SAFUI 630F415 Clamp SLZF 70A (5...12 kN)  
 730F460 Code 3AFE 5716 8480  
 800F500  
 1000F500

Main GTO in SAFUK 200F500 Clamp SLZF 89A (7...20 kN)  
 Code 3AFE 5716 8463

<b>Old code</b>	<b>Manufacturer</b>	<b>Type marking</b>	<b>F (kN)</b>	<b>d * h (mm)</b>
3AFE 0991 7756	Toshiba	S6425R	12	60 * 26
3AFE 0991 7756	Toshiba	S6723R	7	51 * 20
3AFE 0991 7586	Mitsubishi	FG1000AL-26-8830	12	56 * 18
3AFE 0991 7748	Westcode	WG9013A3A	7	50 * 16
3AFE 1000 1471	ABB Väst	YSG1000 *	12	78 * 26
	ABB Semic.	CSG809-14A04	11	58 * 17

\* Only main GTO in SAFUI

**Note:** In the inverters delivered before 86-05-22, the clamp of the main GTOs has been SLZF 89A (7...20 kN), code 3AFE 5716 8463.

**1.4 I<sub>TGQ</sub> = 1400 A Standard spec. 5152 8921**

**V<sub>DRM</sub> = 1300 V Code: 3AFE61179780 (ABB P/N 61179780)**

Installation set code : 3AFE 5812 8198

Main GTO in	SAFUI	400F415	Clamp SLZF 117 (11...25 kN)
		460F460	Code 3AFE 5741 9709
		500F500	

<b>Code</b>	<b>Manufacturer</b>	<b>Type marking</b>	<b>F (kN)</b>	<b>d * h (mm)</b>
3AFE 0991 7888	Toshiba	S6426R	20	93 * 26
3AFE 0991 7888	Toshiba	S6594R	14	75 * 26
3AFE 0991 7811	Mitsubishi	FG1000AL-26-1430	14	56 * 18
3AFE 1000 1145	Westcode	WG14013	17	74 * 26

**Note:** In the inverters, delivered before 90-09-01, 1400 A's GTOs were used.

**1.5 I<sub>TGQ</sub> = 1500 A Standard spec. 5812 4729**

**V<sub>DRM</sub> = 1300 V Code: 3AFE 61179780 (ABB P/N 61179780)**

Installation set code: 3AFE 5812 8198

Main GTO in	SAFUI	400F415	Clamp SLZF 117 (11...25 kN)
		460F460	Code 3AFE 5741 9709
		500F500	

<b>Old code</b>	<b>Manufacturer</b>	<b>Type marking</b>	<b>F (kN)</b>	<b>d * h (mm)</b>
3AFE 0991 7811	Mitsubishi	FG1000AL-26-1540	14	56 * 18
3AFE 0991 7888	Toshiba	S6426R	20	93 * 26
3AFE 0991 7888	Toshiba	S6594R	14	75 * 26
3AFE 1000 1145	Westcode	WG14513C2H	17	74 * 26
	Westcode	WG15013B8C	17	74 * 26
	ABB Semic.	5SGA1514F0001	15	75 * 26

**Note:** In the inverters, delivered after 90-09-01, 1500 A's GTOs were used.

**1.6** **I<sub>TGQ</sub> = 2220 A**

**Standard spec. 5152 8930**

**V<sub>DRM</sub> = 1300 V**

**Code: 3AFE 61179771 (ABB P/N 61179771)**

Installation set -

Main GTO in SAFUI 630F415 Clamp SLZF 142 (16...50 kN)  
730F460 Code 3AFE 5719 8664  
800F500

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0991 8001	Toshiba	S6427R	33	120 * 26
3AFE 0991 8001	Toshiba	S6724R	20	93 * 26
	ABB Semic.	CSG2001-14A04	20	100 * 26

**1.7** **I<sub>TGQ</sub> = 340 A**

**Standard spec. 5152 8964**

**V<sub>DRM</sub> = 1700 V**

**Code: 3AFE 61197745 (ABB P/N 61197745)**

Installation set -

Main GTO in SAFUI 40F660 Clamp SLZF 89C (5...12 kN)  
160F660 Code 3AFE 5786 1444

Chopper GTO in SAFUI 40F660 Clamp SLZF 70A (5...12 kN)  
160F660 Code 3AFE 5716 8480  
250F660  
340F575  
400F660

Main GTO in SAFUK 100F660

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0991 6415	Toshiba	S6475W	5	45 * 20
3AFE 1000 2184	Mitsubishi	FG450BL-34	5	56 * 18
3AFE 0991 8167	Westcode	WG6017/ZB	7	50 * 16

**Note:** In the inverters delivered before 86-05-22. the clamp of the main GTOs has been SLZF 89A (7...20 kN), code 3AFE 5716 8463.

**1.8** **I<sub>TGQ</sub> = 530 A**

**Standard spec. 5152 8972**

**V<sub>DRM</sub> = 1700 V**

**Code: 3AFE 61179755 (ABB P/N 61179755)**

Installation set code: 3AFE 5812 8171

Main GTO in SAFUI 250F660 Clamp SLZF 89C (5...12 kN)  
Code 3AFE 5786 1444

Chopper GTO in SAFUI 540F575 Clamp SLZF 70A (5...12 kN)  
630F660 Code 3AFE 5716 8480

Main GTO in SAFUK 160F660

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0991 8159	Toshiba	S6476W	7	51 * 20
3AFE 0991 8141	Mitsubishi	FG600AL-34-5320	10	56 * 18
3AFE 1000 2192	Westcode	WG6017 D2F	7	50 * 16
3AFE 1000 1463	ABB Väst.	YSG700 *	7	60 * 26

\* Only main GTO in SAFUI

**Note:** In the inverters delivered before 86-05-22 the clamp of the main GTOs has been SLZF 89A (7...20 kN), code VE 5716 8463.

**1.9** **I<sub>TGQ</sub> = 600 A** **Standard spec. 6103 2649**

**V<sub>DRM</sub> = 1700 V** **Code: 3AFE 1002 8558 (ABB P/N 10028558)**

Main GTO in SAFUK 63F380 Clamp SLZF 89C (5...12 kN)  
100F380 Code: 3AFE 5786 1444  
160F380  
80F500  
125F500  
200F500  
100F660  
160F660  
250F660  
250F690

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
	Toshiba	SG800W24 (STROM)	7	51 * 20

**Note:** This GTO is only used in the braking chopper units (SAFUK)

**1.10** **I<sub>TGQ</sub> = 840 A** **Standard spec. 5152 8981**

**V<sub>DRM</sub> = 1700 V** **Code: 3AFE 61179747 (ABB P/N 61179747)**

Installation set code: 3AFE 5812 8180

Main GTO in SAFUI 340F575 Clamp SLZF 89C (5...12 kN)  
400F660 Code 3AFE 5786 1444

Chopper GTO in SAFUI 870F575 Clamp SLZF 70A (5...12 kN)  
1000F660 Code 3AFE 5716 8480  
1370F690

Main GTO in SAFUK 250F660 Clamp SLZF 89A (7...20 kN)  
250F690 Code 3AFE 5716 8463

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
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**1.13**  $I_{TQ} = 2100 \text{ A}$

**Standard spec. 5152 9006**

$V_{DRM} = 1700 \text{ V}$

**Code: 3AFE 61179721 (ABB P/N 61179721)**

Installation set -

Main GTO in SAFUI 870F575 Clamp SLZF 142 (16...50 kN)  
1000F660 Code 3AFE 5719 8664

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0991 8558	Toshiba	S6427W	33	120 * 26
3AFE 0991 8558	Toshiba	S6724W	20	93 * 26
3AFE 1000 0327	Siemens	BGTS2000A18	22	100 * 26
	ABB Väst.	YSG2000P18	20	120 * 26
	ABB Semic.	CSG2001-18A04	20	100 * 26

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**1.14**  $I_{TQ} = 3000 \text{ A}$

**Standard spec. 6101 2443**

$V_{DRM} = 1700 \text{ V}$

**Code: 3AFE 61179712 (ABB P/N 61179712)**

Installation set: -

Main GTO in SAFUI 1000F500 Clamp SLZF 142 (16...50 kN)  
1370F690 Code 3AFE 57198664

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
	ABB Semic.	CSG3001-18A04	40	120 * 26

## 2. REPLACEMENT TABLE FOR TRANSISTOR MODULES

On the following table are listed the transistor (GTR) modules, which are approved for SAMI STAR frequency converters.

### LEGEND:

- $I_C$  - Continuous collector current
  - $V_{CE}$  - Peak off-state voltage
  - T - Mounting torque in Nm for module type devices(case to heatsink)
  - $l * w * h$  - Module length \* width \* height in mm
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**2.1**  $I_C = 75 \text{ A}$

**Dual transistor**

$V_{CE} = 1000 \text{ V}$

**Standard spec. 5351 3492**

Used in SAFUI 25F415

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 0013	Fuji	2DI75Z-100(-E)	3.0	108*34*37
	Toshiba	MG75M2YK1	3.0	108*35*38
	Mitsubishi	QM75DY-2H	3.0	108*34*37
	Powerex	KD221K75	Same component as QM75DY-2H	
3AFE 0981 0056	Fuji	2DI75Z-120(-E) *	3.0	108*34*37
	Toshiba	MG75Q2YK1 *	3.0	108*35*38
	Mitsubishi	QM75DY-24 *	3.0	108*34*37
	Powerex	KD221275	Same component as QM75DY-24	

**Note:** In earlier inverter versions (code 5743 8690) also the Toshiba transistor MG75M2CK1 (code 0981 0005) was used. **This transistor should not be used.**

\* **Note:** - This GTR has Vce = 1200 V (Standard spec. 5351 6904)

## 2.2 $I_C = 150 A$ Dual transistor

$V_{CE} = 1000 V$  Standard spec. 5351 3514

Used in SAFUI 40F415

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 0111	Fuji	2DI150Z-100(-E)	3.0	108*62*37
	Toshiba	MG150M2YK1	3.0	108*62*38
	Mitsubishi	QM150DY-2H	3.0	108*62*37
	Powerex	KD421K15	Same component as QM150DY-2H	
3AFE 0981 0137	Fuji	2DI150Z-120(-E) *	3.0	108*62*37
	Toshiba	MG150Q2YK1 *	3.0	108*62*38
	Mitsubishi	QM150DY-24 *	3.0	108*62*37
	Powerex	KD421215	Same component as QM150DY-24	

**Note:** In earlier inverter versions (code 5743 8711) also the Toshiba transistor MG150M2CK1 (code 09810102) was used. **This transistor should not be used.**

\* **Note:** - This GTR has Vce = 1200 V (Standard spec. 5351 6921)

## 2.3 $I_C = 200 A$ Single transistor

$V_{CE} = 1000 V$  Standard spec. 5351 3522

Used in SAFUI 63F415

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 0251	Fuji	1DI200Z-100-04(-E)	3.0	108*62*42
	Toshiba	MG200M1UK1	3.0	108*62*44
	Mitsubishi	QM200HA-2H	3.0	108*62*42
	Powerex	KS621K20	Same component as QM200HA-2H	
3AFE 0981 0269	Fuji	1DI200Z-120-05(-E)*	3.0	108*62*42
	Toshiba	MG200Q1UK1 *	3.0	108*62*44



Mitsubishi	QM200HA-24 *	3.0	108*62*42
Powerex	KS621220	Same component as QM200HA-24	

**Note:** In earlier inverter versions (code 5743 8738) also the Toshiba transistor MG200M1FK1 (code 09810242) was used. **This transistor should not be used.**

\* **Note:** - This GTR has  $V_{ce} = 1200$  V (Standard spec. 5351 6939)

**2.4**             **$I_C = 300$  A**                            **Single transistor**

**$V_{CE} = 1000$  V**                            **Standard spec. 5351 3531**

Used in            SAFUI            100F415

<b>Code</b>	<b>Manufacturer</b>	<b>Type marking</b>	<b>T (Nm)</b>	<b>l * w * h(mm)</b>
3AFE 0981 0315	Fuji	1DI300Z-100-04(-E)	3.0	108*62*42
	Toshiba	MG300M1UK1	3.0	108*62*44
	Toshiba	MG300M1UK2	3.0	108*62*44
	Mitsubishi	QM300HA-2H	3.0	108*62*42
	Powerex	KS621K30	Same component as QM300HA-2H	
3AFE 0981 0340	Fuji	1DI300Z-120-05(-E)*	3.0	108*62*42
	Toshiba	MG300Q1UK1 *	3.0	108*62*44
	Toshiba	MG300Q1UK2 *	3.0	108*62*44
	Mitsubishi	QM300HA-24 *	3.0	108*62*42
	Powerex	KS621230	Same component as QM300HA-24	

**Note:** In earlier inverter versions (code 5743 8754) also the Toshiba transistor MG300M1FK1 (code 0981 0307) was used. **This transistor should not be used.**

\* **Note:** - This GTR has  $V_{CE} = 1200$  V (Standard spec. 5351 6947)

**2.5**             **$I_C = 75$  A**                            **Dual transistor**

**1200 V**                            **Standard spec. 5351 6904**

**$V_{CE} =$**

Used in            SAFUI            32F500

<b>Code</b>	<b>Manufacturer</b>	<b>Type marking</b>	<b>T (Nm)</b>	<b>l * w * h(mm)</b>
3AFE 0981 0056	Fuji	2DI75Z-120(-E)	3.0	108*34*37
	Toshiba	MG75Q2YK1	3.0	108*35*38
	Mitsubishi	QM75DY-24	3.0	108*34*37
	Powerex	KD221275	Same component as QM75DY-24	

**Note:** In earlier inverter versions (code 5742 9011) also the Fuji transistor 2DI75A-120 (code 0981 0048) was used. **This transistor should not be used.**

2.6  $I_C = 150 \text{ A}$

Dual transistor

$V_{CE} = 1200 \text{ V}$

Standard spec. 5351 6921

Used in SAFUI 50F500

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 0137	Fuji	2DI150Z-120(-E)	3.0	108*62*37
	Toshiba	MG150Q2YK1	3.0	108*62*38
	Mitsubishi	QM150DY-24	3.0	108*62*37
	Powerex	KD421215	Same component as QM150DY-24	

**Note:** In earlier inverter versions (code 57429020) also the Fuji transistor 2DI150A-120 (code 09810129) was used.  
**This transistor should not be used..**

2.7  $I_C = 200 \text{ A}$

Single transistor

$V_{CE} = 1200 \text{ V}$

Standard spec. 5351 6939

Used in SAFUI 80F500

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 0269	Fuji	1DI200Z-120-05(-E)	3.0	108*62*42
	Toshiba	MG200Q1UK1	3.0	108*62*44
	Mitsubishi	QM200HA-24	3.0	108*62*42
	Powerex	KS621220	Same component as QM200HA-24	

**Note:** In earlier inverter versions (code 5742 9038) also the Fuji transistor 1DI200A-120 (code 0981 0323) was used.  
**This transistor should not be used.**

2.8  $I_C = 300 \text{ A}$

Single transistor

$V_{CE} = 1200 \text{ V}$

Standard spec. 5351 6947

Used in SAFUI 125F500

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 0340	Fuji	1DI300Z-120-05(-E)	3.0	108*62*42
	Toshiba	MG300Q1UK1	3.0	108*62*34
	Toshiba	MG300Q1UK2	3.0	108*62*34
	Mitsubishi	QM300HA-24	3.0	108*62*42
	Powerex	KS621230	Same component as QM300HA-24	

**Note:** In earlier inverter versions (code 57429046) also the Fuji transistor 1DI300A-120 (code 09810331) was used.  
**This transistor should not be used.**

### 3. REPLACEMENT TABLE FOR THYRISTORS

On the following table are listed the thyristors, which are approved for SAMI STAR thyristor braking unit (SAFUX / SAFUT). Mechanically these thyristors are of press-pack (capsule) or module type.

#### LEGEND:

$I_{TSM}$	- Maximum surge on-state current
$V_{DRM}$	- Repetitive peak off-state voltage
F	- Clamping force in kN for press-pack
T	- Mounting torque in Nm for module type devices(case to heatsink)
d * h	- Press-pack diameter * height in mm
l * w * h	- Module length * width * height in mm

#### 3.1 $I_{TSM} = 7000 \text{ A}$ Module type

$V_{DRM} = 1550 \text{ V}$  Standard spec. 3450 9662

Used in SAFUX 315 F 500

Code	Manufacturer	Type marking	T (Nm)	l * w * h(mm)
3AFE 1000 2044	IR	IRKT250-16S90	6.0	115*50*60

#### 3.2 $I_{TSM} = 16400 \text{ A}$ Press-pack type

$V_{DRM} = 2050 \text{ V}$  Standard spec. 5351 8541

Used in SAFUX 315 F 500 Clamp SLZF 89B (16...30 kN)  
 500 F 500 Code 3AFE 5716 8455  
 800 F 500  
 400 F 660  
 630 F 660  
 1000 F 660

Code	Manufacturer	Type marking	F (kN)	d * h(mm)
3AFE 0980 2011	Westcode	N490CH22B8K	20	74*28
	Powerex	T9GO211003XX58	20	74*27

#### 3.3 $I_{TSM} = 34000 \text{ A}$ Press-pack type

$V_{DRM} = 2100 \text{ V}$  Standard spec. 5812 3871

Used in SAFUX 2000F/A500 Clamp SLZF 142 (16...50 kN)  
 2500F/A660 Code 3AFE 57198664

<u>Old code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h(mm)</u>
3AFE 1000 0564	Westcode	N 980 CH 21 B4S	37	110*37
	ABB Semic.	5STP 2422M001	50	110*36

**3.4**  $I_{TSM} = 8000 \text{ A}$  **Module type**

$V_{DRM} = 2200 \text{ V}$  **Standard spec.**

Used in SAFUX 400 F 660

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 1000 0556	ABB Västerås /	YSTT6-22 P22C *	8	145*54*59

\* **Note:** - Manufacturing of this thyristor has been finished. In the thyristor braking units, delivered before 91-08-09, these thyristors were used.

#### 4. REPLACEMENT TABLE FOR RECTIFIER DIODES

On the following table are listed the diodes, which are approved as rectifier diodes for SAMI STAR frequency converters. Mechanically they are of press-pack (capsule) or module type.

LEGEND:

$I_{FRM}$	- Maximum repetitive peak forward current
$I_{FSM}$	- Maximum surge forward current
$V_{RRM}$	- Maximum repetitive reverse voltage
T	- Mounting torque in Nm for module type devices(case to heatsink)
F	- Clamping force in kN for press-pack
d * h	- Press-pack diameter * height in mm
l * w * h	- Module type device dimensions in mm

**4.1**  $I_{FSM} = 1650 \text{ A}$  **Module type**

$V_{RRM} = 1200 \text{ V}$  **Standard spec. 5351 3620**

Used in SAFUS  
40F415  
63F415

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 3136	IR	IRKD 91-12	5.0	92*20*35
	Semikron	SKKD 81-12	5.0	93*20*35
	Eupec(AEG)	DD85N 1200	4.0	92*20*35

**4.2**  $I_{FSM} = 4500 \text{ A}$

**Module type**

$V_{RRM} = 1200 \text{ V}$

**Standard spec. 5351 3646**

Used in SAFUS 100F415  
160F415

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 3128	Eupec(AEG)	DD151N 1200	6.0	94*30*45
	Semikron	SKKD 201-12	5.0	115*50*52
	Siemens	DIL 78A80-V	5.0	94*34*35
	IR	IRKD 161-12S833	5.0	94*30*47

**4.3**  $I_{FSM} = 7500 \text{ A}$

**Module type**

$V_{RRM} = 1200 \text{ V}$

**Standard spec. 5351 3654**

Used in SAFUD 250F415

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 3144	IR	IRKD 260-12	5.0	115*50*60
	Eupec(AEG)	DD260N 1400K	6.0	115*50*52
3AFE 0981 3152	IR	IRKD 260-16 *	5.0	115*50*60
	Eupec(AEG)	DD260N 1600K *	6.0	115*50*52

\* **Note:** This diode has  $I_{FSM} = 7500 \text{ A}$ ,  $V_{RRM} = 1600 \text{ V}$  (Standard spec. 5351 3671).

**4.4**  $I_{FSM} = 1650 \text{ A}$

**Module type**

$V_{RRM} = 1500 \text{ V}$

**Standard spec. 5352 0103**

Used in SAFUS 50F460  
75F460  
50F500  
80F500

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 3101	IR	IRKD 71-16	5.0	92*20*37
	IR	IRKD 81-16	5.0	92*20*37
	Eupec(AEG)	DD86N 1600	4.0	92*25*37

**4.5**  $I_{FSM} = 4500 \text{ A}$

**Module type**

$V_{RRM} = 1500 \text{ V}$

**Standard spec. 5351 3662**

Used in SAFUS 115F460

180F460  
125F500  
200F500

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 3110	Eupec(AEG)	DD151N 1600	6.0	94*30*45
	IR	IRKD 161-16S834	5.0	94*30*47
	Siemens	DIL78A110-V	5.0	94*34*35
	Semikron	SKKD 201-16	5.0	115*50*52

**4.6**  $I_{FSM} = 7500 \text{ A}$  **Module type**

$V_{RRM} = 1500 \text{ V}$  **Standard spec. 5351 3671**

Used in SAFUD 315F500  
SAFUC 315F500

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>l * w * h(mm)</u>
3AFE 0981 3152	IR	IRKD 260-16	5.0	115*50*60
	Eupec(AEG)	DD260N 1600K	6.0	115*50*52

**Note:** - Manufacturing of SAFUC 315F500 has been finished.

**4.7**  $I_{FSM} = 11500 \text{ A}$  **Press-pack type**

$V_{RRM} = 2100 \text{ V}$  **Standard spec. 5152 1579**

Used in SAFUS 140F575 Clamp SLZF 70A (5...12 kN)  
Code 3AFE 5716 8480  
SAFUD 400F415  
SAFUC 500F500 Clamp SLZF 89A (7...20 kN)  
800F500 Code 3AFE 5716 8463

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h(mm)</u>
3AFE 0980 5613	IR	G1552PDE-S444 *	9.8	42*16
	Westcode	SW21CXC805	12	59*27
	GE	A 540 LA	9.8	42*15
	GE	A 433 LA	9.8	42*15

\* **Note:** This diode needs the extra plate for the installation (code G1552PDE)  
- Type marking -S444 is equivalent to -R30E22A

**4.8**  $I_{FSM} = 11500 \text{ A}$  **Press-pack type**

$V_{RRM} = 2300 \text{ V}$  **Standard spec. 6105 0094**



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5.1  $I_{FSM} = 600 \text{ A}$  Stud type, anode to stud

$V_{RRM} = 1200 \text{ V}$  Standard spec. 5351 3565

Free-wheeling diode in SAFUK 80F500  
125F500  
200F500

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 0991 6555	Westcode	SM12PCR074A2P	4.5	DO-203 AB	M6
	Semikron	SKN 60 F 12	2.5	DO-203 AB	M6
3AFE 1000 0505	Westcode	SM15MCR074B7W *2.5	*2.5	DO-203 AB	M6
	Semikron	SKN 60 F 15 *	2.5	DO-203 AB	M6

\* **Note:** This diode has  $I_{FRM} = 840 \text{ A}$ ,  $V_{RRM} = 1500 \text{ V}$  (Standard spec. 5812 0332)

**Note:** In the braking choppers, delivered before 89-10-04, the diode BBC / DSD 35-16A was used. **This diode should not be used.**

In the braking choppers, delivered after 93-04-16, this diode (0991 6555) is used no more.

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5.2  $I_{FSM} = 4000 \text{ A}$  Press-pack type

$V_{RRM} = 1300 \text{ V}$  Standard spec. 5351 7927

Free-wheeling diode in SAFUI 160F415 Clamp SLZF 61S (2...6 kN)  
200F500 Code 3AFE 5719 6815

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0980 5761	Westcode	SM13CXC174	4.5	42*15

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5.3  $I_{FRM} = 840 \text{ A}$  Stud type, anode to stud

$V_{RRM} = 1500 \text{ V}$  Standard spec. 5812 0332

Free-wheeling diode in SAFUK 80F500  
125F500  
200F500  
100F660  
160F660  
250F660  
250F690

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 1000 0505	Semikron	SKN 60 F 15	2.5	DO-203 AB	M6
	Westcode	SM15MCR074B7W	2.5	DO-203 AB	M6



**Note:** In the braking choppers, delivered before 89-10-04, the diode BBC / DSD 35-16A was used. **This diode should not be used.**

In the braking choppers, delivered before 93-04-16, the diode 0991 6555 (1200V/600A) was used. **This diode should not be used.**

5.4  $I_{FSM} = 4000 \text{ A}$

**Press-pack type**

$V_{RRM} = 1700 \text{ V}$

**Standard spec. 5351 7935**

Free-wheeling diode in SAFUI 40F660 Clamp SLZF 61 (2...6 kN)  
160F660 Code 3AFE 5717 2321  
250F660

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0980 5559	Westcode	SM18CXC176	5.0	42*15

5.5  $I_{FSM} = 6000 \text{ A}$

**Press-pack type**

$V_{RRM} = 1700 \text{ V}$

**Standard spec. 5350 8341**

Free-wheeling diode in SAFUI 250F415 Clamp SLZF 61S (2...6 kN)  
290F460 Code 3AFE 5719 6815  
315F500  
340F575  
400F660

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0991 6512	Westcode	SM16CXC190VR	6.0	42*15
	IR	851PDE 160L25	6.0	42*16
	GEC Plessey	DSF45217-6411/1	6.0	42*15

5.6  $I_{FSM} = 16000 \text{ A}$

**Press-pack type**

$V_{RRM} = 1700 \text{ V}$

**Standard spec. 5351 6823**

Free-wheeling diode in SAFUI 630F415 Clamp SLZF 89B (16...30 kN)  
730F460 Code 3AFE 5716 8455  
800F500  
870F575  
1000F660

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0980 5796	Westcode	SM18CXC924/YP	23.0	74*27
	GEC Plessey	DSF2013SD18	23.0	74*30

5.7  $I_{FSM} = 16700 \text{ A}$

Press-pack type

$V_{RRM} = 1800 \text{ V}$

Standard spec. 5151 9515

Free-wheeling diode in SAFUI 400F415 Clamp SLZF 70B (10...24 kN)  
460F460 Code 3AFE 5716 8471  
500F500  
540F575  
630F660

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 0980 5800	Westcode	SM18CXC805TU	17.0	59*27

5.8  $I_{FSM} = 20000 \text{ A}$

Press-pack type

$V_{RRM} = 1700 \text{ V}$

Standard spec. 6105 9202

Free-wheeling diode in SAFUI 1000F500 Clamp SLZF 142 (16...50 kN)  
1370F690 Code 3AFE 5719 8664

<u>Code</u>	<u>Manufacturer</u>	<u>Type marking</u>	<u>F (kN)</u>	<u>d * h (mm)</u>
3AFE 1001 1892	Westcode	SM18FXC968	30.0	102*26

## 6. REPLACEMENT TABLE FOR SNUBBER DIODES

On the following table are listed the threaded stud diodes, which are approved as snubber diodes for SAMI STAR frequency converter.

LEGEND:

$I_{FRM}$  - Maximum repetitive peak forward current  
 $I_{FSM}$  - Maximum surge forward current  
 $V_{RRM}$  - Maximum repetitive reverse voltage  
T - Mounting torque in Nm  
Case/Th - JEDEC outline / Thread

6.1  $I_{FSM} = 600 \text{ A}$

Stud type, anode to stud

$V_{RRM} = 1200 \text{ V}$

Standard spec. 5351 3565

Snubber diode in SAFUI 25F415  
40F415  
63F415  
100F415  
32F500  
50F500  
80F500  
125F500

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
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3AFE 0991 6555	Westcode	SM12PCR074A2P	4.5	DO-203 AB	M6
	Semikron	SKN 60 F 12	2.5	DO-203 AB	M6
3AFE 1000 0505	Westcode	SM15MCR074B7W*	2.5	DO-203 AB	M6
	Semikron	SKN 60 F 15 *	2.5	DO-203 AB	M6

\* **Note:** This diode has  $I_{FRM} = 840$  A,  $V_{RRM} = 1500$  V (Standard spec. 58120332)

**Note:** In the inverters, delivered before 89-10-04, the diode BBC / DSD 35-16A was used. **This diode should not be used.**

**6.2**  $I_{FSM} = 600$  A **Stud type, cathode to stud**

$V_{RRM} = 1200$  V **Standard spec. 5351 3573**

Snubber diode in	SAFUI	25F415
		40F415
		63F415
		100F415
		32F500
		50F500
		80F500
		125F500

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 0980 5702	Westcode	SM12PCN074A2P	4.5	DO-203 AB	M6
	Semikron	SKR 60 F 12	2.5	DO-203 AB	M6
3AFE 1000 0513	Westcode	SM15MCN074B7R *	2.5	DO-203 AB	M6
	Semikron	SKR 60 F 15 *	2.5	DO-203 AB	M6

\* **Note:** This diode has  $I_{FRM} = 840$  A,  $V_{RRM} = 1500$  V (Standard spec. 58120341)

**Note:** In the inverters, delivered before 89-10-03, the diode BBC / DSDI 35-16A was used. **This diode should not be used.**

**6.3**  $I_{FRM} = 840$  A **Stud type, anode to stud**

$V_{RRM} = 1500$  V **Standard spec. 5812 0332**

Snubber diode in	SAFUI	160F415
		250F415
		290F460
		200F500
		315F500

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 1000 0505	Semikron	SKN 60 F 15	2.5	DO-203 AB	M6
	Westcode	SM15MCR074B7W	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-04, the diode BBC / DSD 35-16A was used. **This diode should not be used.**

- If the diodes of this type have been connected parallel, see paragraph A in page 26.

**6.4**  $I_{FRM} = 840 \text{ A}$  Stud type, cathode to stud

$V_{RRM} = 1500 \text{ V}$  Standard spec. 5812 0341

Snubber diode in SAFUI 160F415  
250F415  
290F460  
200F500  
315F500

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 1000 0513	Semikron	SKR 60 F 15	2.5	DO-203 AB	M6
	Westcode	SM15MCN074B7R	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-03, the diode BBC / DSDI 35-16A was used. **This diode should not be used.**

- If the diodes of this type have been connected parallel, see paragraph A in page 26

**6.5**  $I_{FRM} = 2500 \text{ A}$  Stud type, anode to stud

$V_{RRM} = 1500 \text{ V}$  Standard spec. 5811 7790

Snubber diode in SAFUI 400F415  
630F415  
460F460  
730F460  
500F500  
800F500

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 1000 0343	Semikron	SKN 141 F 15	10	-----	M12

**6.6**  $I_{FRM} = 2500 \text{ A}$  Stud type, cathode to stud

$V_{RRM} = 1500 \text{ V}$  Standard spec. 5811 7781

Snubber diode in SAFUI 400F415  
630F415  
460F460  
730F460  
500F500  
800F500  
1000F500 Two diodes parallel

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 1000 0335	Semikron	SKR 141 F 15	10	-----	M12

6.7  $I_{FRM} = 840 \text{ A}$  Stud type, anode to stud

$V_{RRM} = 1700 \text{ V}$  Standard spec. 5812 0324

Snubber diode in SAFUI 340F575  
40F660  
160F660  
250F660  
400F660

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 1000 0521	Semikron	SKN 60 F 17	2.5	DO-203 AB	M6
	Westcode	SM17MCR054B7T	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-04, the diode BBC / DSD 35-18A was used. **This diode should not be used.**

- If the diodes of this type have been connected parallel, see paragraph B in page 26

6.8  $I_{FRM} = 840 \text{ A}$  Stud type, cathode to stud

$V_{RRM} = 1700 \text{ V}$  Standard spec. 5812 0316

Snubber diode in SAFUI 340F575  
40F660  
160F660  
250F660  
400F660

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
3AFE 1000 0530	Semikron	SKR 60 F 17	2.5	DO-203 AB	M6
	Westcode	SM17MCN054B7S	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-04, the diode BBC / DSDI 35-18A was used. **This diode should not be used.**

- If the diodes of this type have been connected parallel, see paragraph B in page 26

6.9  $I_{FRM} = 2500 \text{ A}$  Stud type, anode to stud

$V_{RRM} = 1700 \text{ V}$  Standard spec. 5352 9186

Snubber diode in SAFUI 540F575  
870F575  
630F660  
1000F660

<u>Code</u>	<u>Manuf.</u>	<u>Type marking</u>	<u>T (Nm)</u>	<u>Case</u>	<u>Th</u>
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**6.10**       **$I_{FRM} = 2500 \text{ A}$**       **Stud type, cathode to stud**

**$V_{RRM} = 1700 \text{ V}$**       **Standard spec. 5352 9178**

Snubber diode in	SAFUI	540F575	
		870F575	
		630F660	
		1000F660	
		1370F690	Two diodes parallel

Code	Manuf.	Type marking	T (Nm)	Case	Th
3AFE 1000 0157	Semikron	SKR 141 F 17	10	-----	M12

## 7. REPLACEMENT TABLE FOR CHOPPER DIODES

On the following table are listed the diodes, which are approved as chopper diodes for SAMI STAR frequency converters. Mechanically these diodes are of press-pack (capsule) or stud type.

### LEGEND:

$I_{FRM}$	- Maximum repetitive peak forward current
$I_{FSM}$	- Maximum surge forward current
$V_{RRM}$	- Maximum repetitive reverse voltage
F	- Clamping force in kN for press-pack type devices
T	- Mounting torque in Nm for stud type devices
d * h	- Press-pack diameter * height in mm
Case/Th	- JEDEC outline / Thread of stud type device

**7.1**       **$I_{FSM} = 4000 \text{ A}$**       **Press-pack type**

**$V_{RRM} = 1300 \text{ V}$**       **Standard spec. 5351 7927**

Chopper diode (V27) in	SAFUI	160F415	Clamp SLZF 61S (2...6 kN)
		250F415	Code 3AFE 5719 6815
		400F415	
		630F415	
		290F460	
		460F460	
		730F460	
		200F500	
		315F500	
		500F500	
		800F500	
		1000F500	
		340F575	
		540F575	
		40F660	

160F660  
 250F660  
 400F660  
 630F660

Code	Manufacturer	Type marking	F (kN)	d * h (mm)
3AFE 0980 5761	Westcode	SM13CXC174	4.5	42*15

**7.2**             **$I_{FRM} = 840 \text{ A}$**                             **Stud type, anode to stud**

**$V_{RRM} = 1500 \text{ V}$**     **Standard spec. 5812 0332**

Chopper diode (V30) in	SAFUI	160F415
		250F415
		400F415
		630F415
		290F460
		460F460
		730F460
		200F500
		315F500
		500F500
		800F500
		1000F500

Code	Manuf.	Type marking	T (Nm)	Case	Th
3AFE 1000 0505	Semikron	SKN 60 F 15	2.5	DO-203 AB	M6
	Westcode	SM15MCR074B7W	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-04, the diode BBC / DSD 35-16A was used. **This diode should not be used.**

**7.3**             **$I_{FRM} = 840 \text{ A}$**                             **Stud type, cathode to stud**

**$V_{RRM} = 1500 \text{ V}$**     **Standard spec. 5812 0341**

Chopper diode (V28, V29) in	SAFUI	160F415
(V28, V29)		250F415
(V29)		400F415
(V29)		630F415
(V28, V29)		290F460
(V29)		460F460
(V29)		730F460
(V28, V29)		200F500
(V28, V29)		315F500
(V29)		500F500
(V29)		800F500
(V29)		1000F500

Code	Manuf.	Type marking	T (Nm)	Case	Th
3AFE 1000 0513	Semikron	SKR 60 F 15	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-03, the diode BBC / DSDI 35-16A was used. **This diode should not be used.**

- If the diodes of this type have been connected parallel, see paragraph C in page 26

**7.4**  $I_{FRM} = 2500 \text{ A}$  **Stud type, cathode to stud**

$V_{RRM} = 1500 \text{ V}$  **Standard spec. 5811 7781**

Chopper diode (V28) in SAFUI  
 400F415  
 630F415  
 460F460  
 730F460  
 500F500  
 800F500  
 1000F500

Code	Manuf.	Type marking	T (Nm)	Case	Th
3AFE 1000 0335	Semikron	SKR 141 F 15	10	-----	M12

**7.5**  $I_{FSM} = 6000 \text{ A}$  **Press-pack type**

$V_{RRM} = 1700 \text{ V}$  **Standard spec. 5350 8341**

Chopper diode (V27) in SAFUI  
 1000F500 Clamp SLZF 61S (2...6 kN)  
 870F575 Code 3AFE 5719 6815  
 1000F660  
 1370F690

Code	Manufacturer	Type marking	F (kN)	d * h (mm)
3AFE 0991 6512	Westcode	SM16CXC190VR	6.0	42*15

**7.6**  $I_{FRM} = 840 \text{ A}$  **Stud type, anode to stud**

$V_{RRM} = 1700 \text{ V}$  **Standard spec. 5812 0324**

Chopper diode (V30) in SAFUI  
 340F575  
 540F575  
 870F575  
 40F660  
 160F660  
 250F660  
 400F660  
 630F660  
 1000F660  
 1370F690



<b>Code</b>	<b>Manuf.</b>	<b>Type marking</b>	<b>T (Nm)</b>	<b>Case</b>	<b>Th</b>
3AFE 1000 0521	Semikron	SKN 60 F 17	2.5	DO-203 AB	M6
	Westcode	SM17MCR054B7T	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-04, the diode BBC / DSD 35-18A was used. **This diode should not be used.**

**7.7**  **$I_{FRM} = 840 \text{ A}$**  **Stud type, cathode to stud**

**$V_{RRM} = 1700 \text{ V}$**  **Standard spec. 5812 0316**

Chopper diode (V28, V29) in	SAFUI	340F575
(V29)		540F575
(V29)		870F575
(V28, V29)		40F660
(V28, V29)		160F660
(V28, V29)		250F660
(V28, V29)		400F660
(V29)		630F660
(V29)		1000F660
(V29)		1370F690

<b>Code</b>	<b>Manuf.</b>	<b>Type marking</b>	<b>T (Nm)</b>	<b>Case</b>	<b>Th</b>
3AFE 1000 0530	Semikron	SKR 60 F 17	2.5	DO-203 AB	M6
	Westcode	SM17MCN054B7S	2.5	DO-203 AB	M6

**Note:** In the inverters, delivered before 89-10-04, the diode BBC / DSDI 35-18A was used. **This diode should not be used.**

- If the diodes of this type have been connected parallel, see paragraph D in page 26

**7.8**  **$I_{FRM} = 2500 \text{ A}$**  **Stud type, cathode to stud**

**$V_{RRM} = 1700 \text{ V}$**  **Standard spec. 5352 9178**

Chopper diode (V28) in	SAFUI	540F575
		870F575
		630F660
		1000F660
		1370F690

<b>Code</b>	<b>Manuf.</b>	<b>Type marking</b>	<b>T (Nm)</b>	<b>Case</b>	<b>Th</b>
3AFE 1000 0157	Semikron	SKR 141 F 17	10	-----	M12

## 8. PARALLEL CONNECTED DIODES

In the inverters, delivered before 89-01-01, were used parallel connected diodes as snubber and chopper diodes. On the following table are listed the diodes, which have been used parallel connected. These diodes are selected according to the special requirements (on-state voltage window). Contact ABB Service.

### SNUBBER DIODES

#### A. Diodes 6.3 , 6.4 (1500 V / 840 A)

Two diodes parallel in	SAFUI	400F415 460F460 500F500
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Three diodes parallel in	SAFUI	630F415 730F460 800F500
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#### B. Diodes 6.7 , 6.8 (1700 V / 840 A)

Two diodes parallel in	SAFUI	570F575 630F660
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Three diodes parallel in	SAFUI	870F575 1000F660
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### CHOPPER DIODE (V 28)

#### C. Diode 7.3 (1500 V / 840 A)

Two diodes parallel in	SAFUI	630F415 730F460 800F500
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#### D. Diode 7.7 (1700 V / 840 A)

Two diodes parallel in	SAFUI	870F575 1000F660
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