flow NPC 12w — NPC Application — 2400 V / 1200 A

General conditions

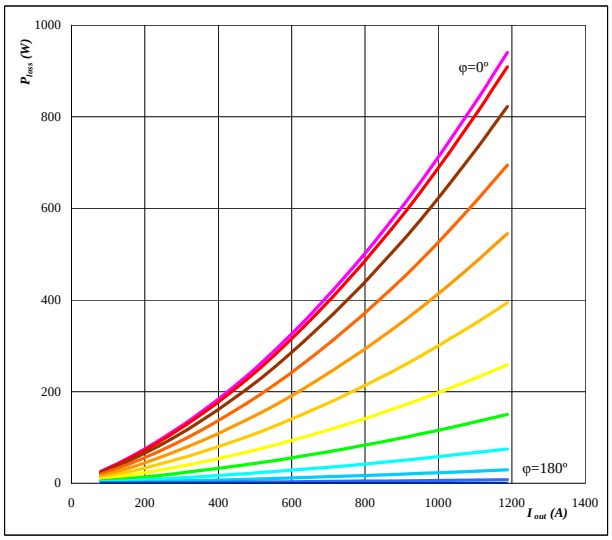
BUCK		
V_{GEon}	=	15 V
V_{GEoff}	=	-10 V
R_{gon}	=	0,3 Ω
R_{goff}	=	0,3 Ω

V_{out}= 400 VAC

BOOST		
V_{GEon}	=	15 V
V_{GEoff}	=	-10 V
R_{gon}	=	0,9 Ω
R_{goff}	=	0,9 Ω

Figure 1. **Buck T1, T4 / D5, D6 IGBT**

Typical average static loss as a function of output current I_{oRMS}

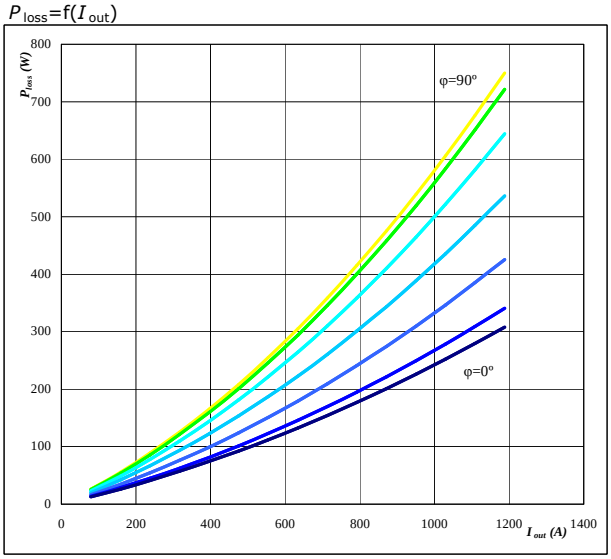


Conditions T_j= 125 °C
parameter φ from 0° to 180°
in 12 steps

Figure 2. **Buck T1, T4 / D5, D6 FWD**

Typical average static loss as a function of output current I_{oRMS}

$P_{loss}=f(I_{out})$

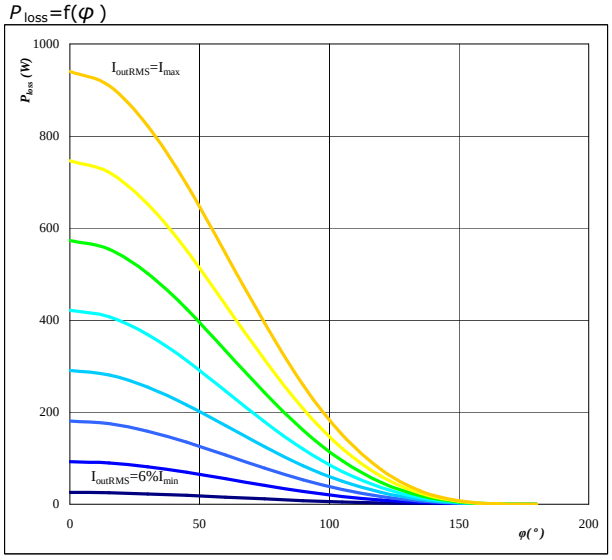


Conditions T_j= 125 °C
parameter φ from 0° to 180°
in 12 steps

Figure 3. **Buck T1, T4 / D5, D6 IGBT**

Typical average static loss as a function of phase displacement φ

$P_{loss}=f(\varphi)$

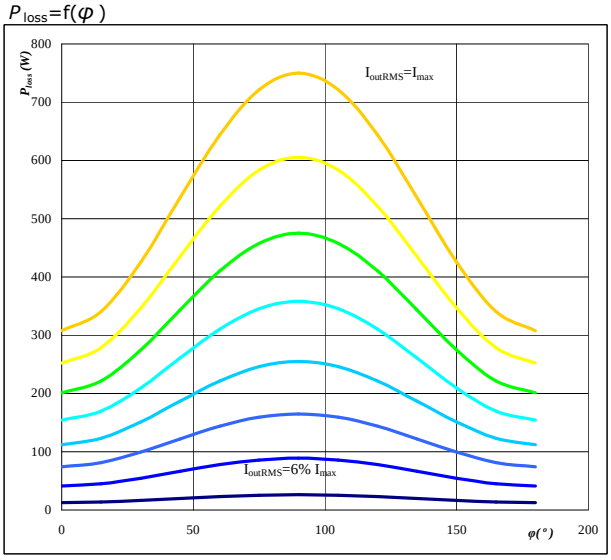


Conditions T_j= 125 °C
parameter I_{oRMS} from 79,2 A to 1187 A
in steps of 158 A

Figure 4. **Buck T1, T4 / D5, D6 FWD**

Typical average static loss as a function of phase displacement φ

$P_{loss}=f(\varphi)$

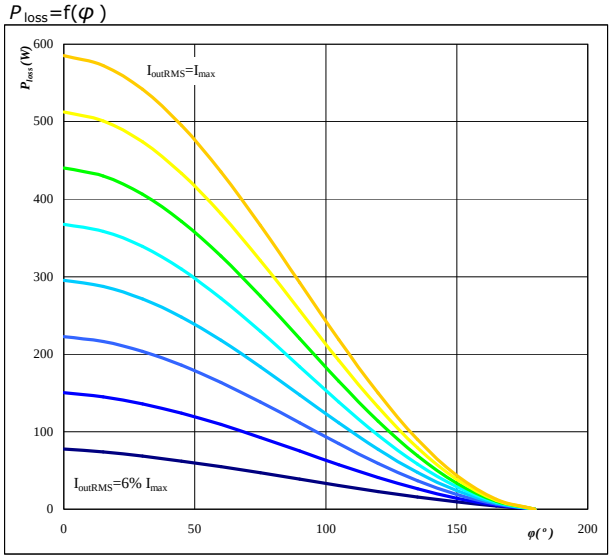


Conditions T_j= 125 °C
parameter I_{oRMS} from 79,2 A to 1187 A
in steps of 158 A

Figure 5. **Buck T1, T4 / D5, D6 IGBT**

Typical average switching loss as a function of phase displacement φ

$P_{loss}=f(\varphi)$

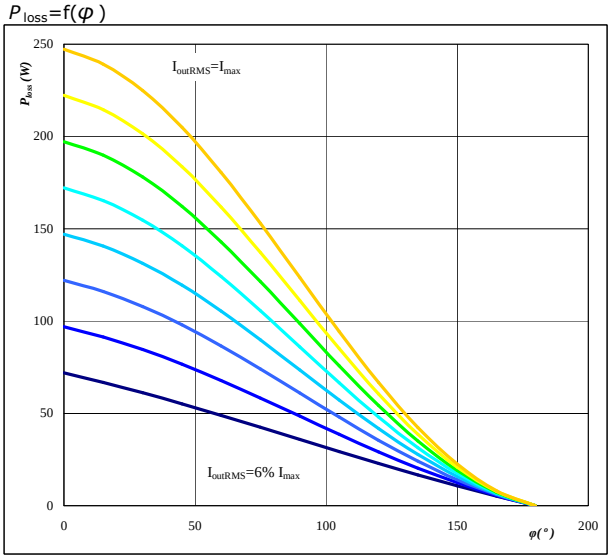


Conditions	T_j=	125	°C	
	f_{sw}=	8	kHz	
	DC-link=	1200	V	
parameter	I_{oRMS}	from 79,2 A	to	1187 A
		in steps of 158	A	

Figure 6. **Buck T1, T4 / D5, D6 FWD**

Typical average switching loss as a function of phase displacement φ

$P_{loss}=f(\varphi)$

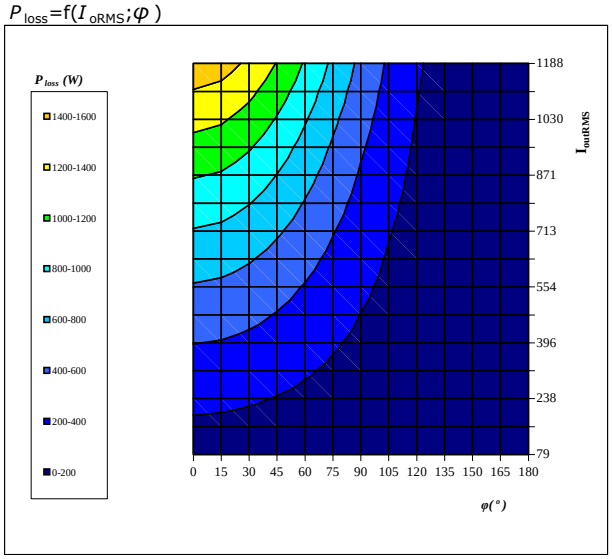


Conditions	T_j=	125	°C	
	f_{sw}=	8	kHz	
	DC-link=	1200	V	
parameter	I_{oRMS}	from 79,2 A	to	1187 A
		in steps of 158	A	

Figure 7. **Buck T1, T4 / D5, D6 IGBT**

Typical total loss as a function of phase displacement φ and output current I_{oRMS}

$P_{loss}=f(I_{oRMS};\varphi)$

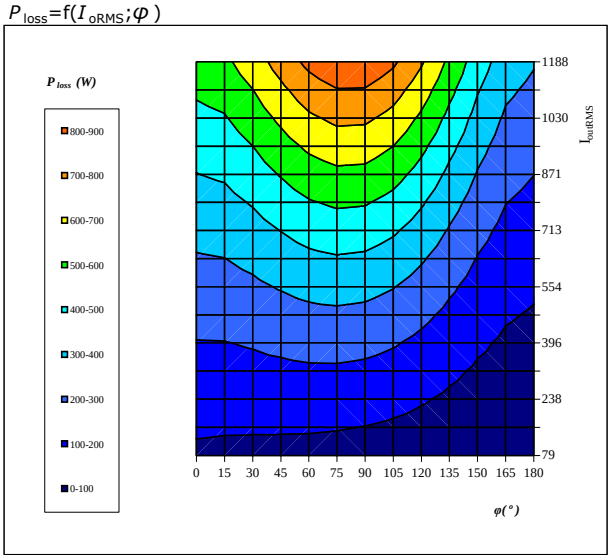


Conditions	T_j=	125	°C
	DC-link=	1200	V
	f_{sw}=	8	kHz

Figure 8. **Buck T1, T4 / D5, D6 FWD**

Typical total loss as a function of phase displacement φ and output current I_{oRMS}

$P_{loss}=f(I_{oRMS};\varphi)$

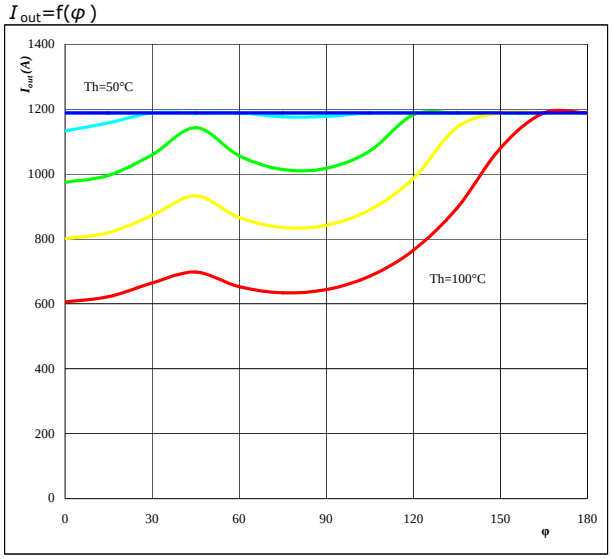


Conditions	T_j=	125	°C
	DC-link=	1200	V
	f_{sw}=	8	kHz

Figure 9. **for Buck T1, T4 / D5, D6 IGBT+FWD**

Typical available output current as a function of phase displacement φ

$I_{out}=f(\varphi)$

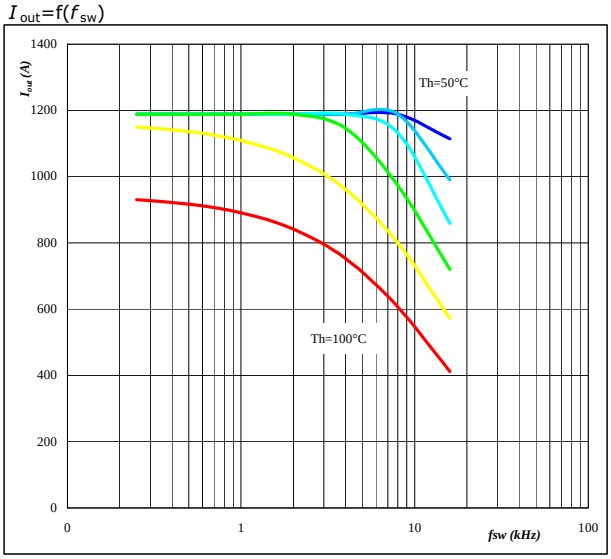


Conditions T_j= T_{jmax}-25 °C f_{sw}= 8 kHz
DC-link= 1200 V
parameter: Heatsink temp.
T_h from 50 °C to 100 °C
in 10 °C steps

Figure 10. **for Buck T1, T4 / D5, D6 IGBT+FWD**

Typical available output current as a function of switching frequency f_{sw}

$I_{out}=f(f_{sw})$

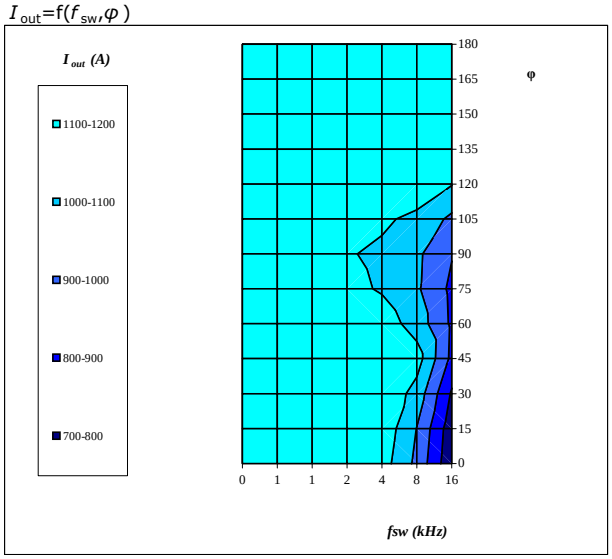


Conditions T_j= T_{jmax}-25 °C φ = 0 °
DC-link= 1200 V
parameter Heatsink temp.
T_h from 50 °C to 100 °C
in 10 °C steps

Figure 11. **for Buck T1, T4 / D5, D6 IGBT+FRED**

Typical available 50Hz output current as a function of fsw and phase displacement φ

$I_{out}=f(f_{sw},\varphi)$

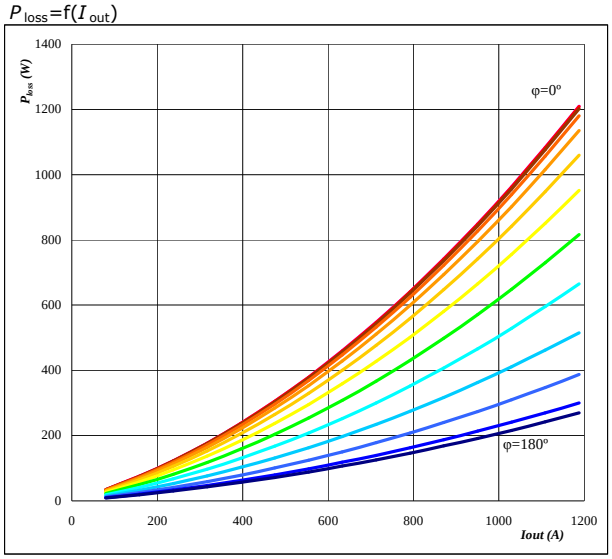


Conditions T_j= T_{jmax}-25 °C
DC-link= 1200 V
T_h= 80 °C

Figure 12. **Boost T2, T3 / D2, D3 IGBT**

Typical average static loss as a function of output current

$P_{loss}=f(I_{out})$

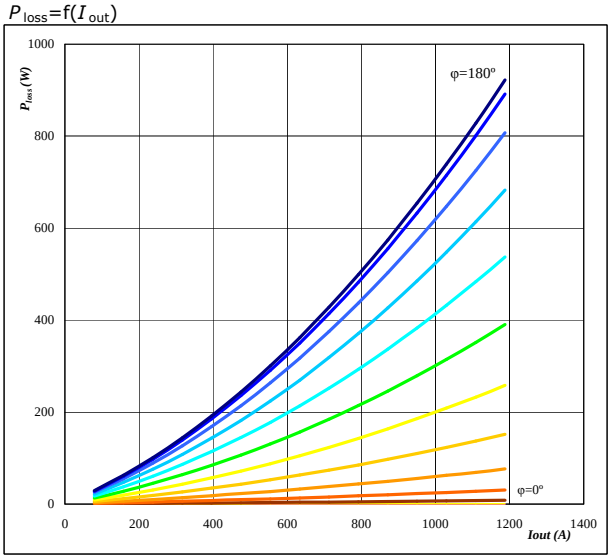


Conditions					
parameter	T_j=	125	°C		
	φ	from	0°	to	180°
		in	12	steps	

Figure 13. **Boost T2, T3 / D2, D3 FRED**

Typical average static loss as a function of output current

$P_{loss}=f(I_{out})$

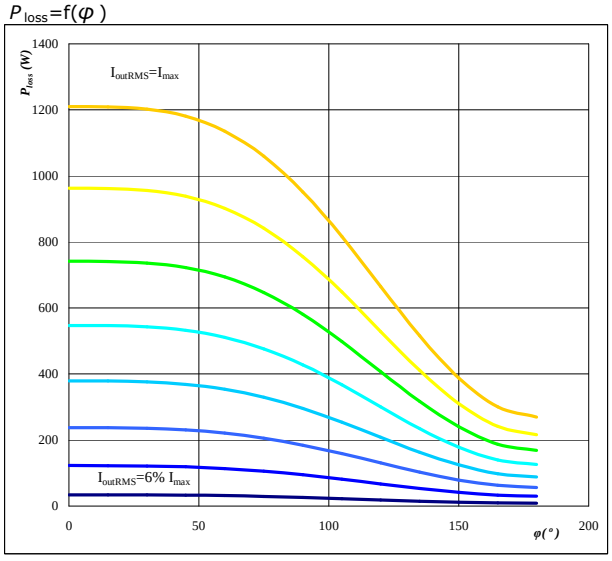


Conditions					
parameter	T_j=	125	°C		
	φ	from	0°	to	180°
		in	12	steps	

Figure 14. **Boost T2, T3 / D2, D3 IGBT**

Typical average static loss as a function of phase displacement

$P_{loss}=f(\varphi)$

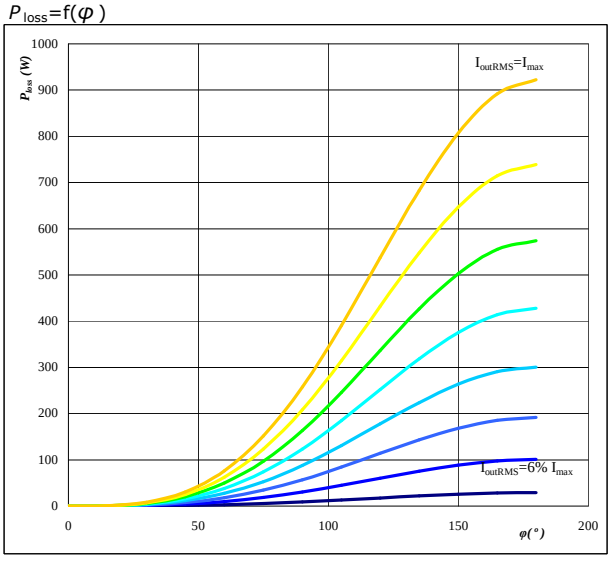


Conditions						
parameter	T_j=	125	°C			
	I_{oRMS}	from	79	A	to	1187 A
		in steps of	158	A		

Figure 15. **Boost T2, T3 / D2, D3 FRED**

Typical average static loss as a function of phase displacement

$P_{loss}=f(\varphi)$

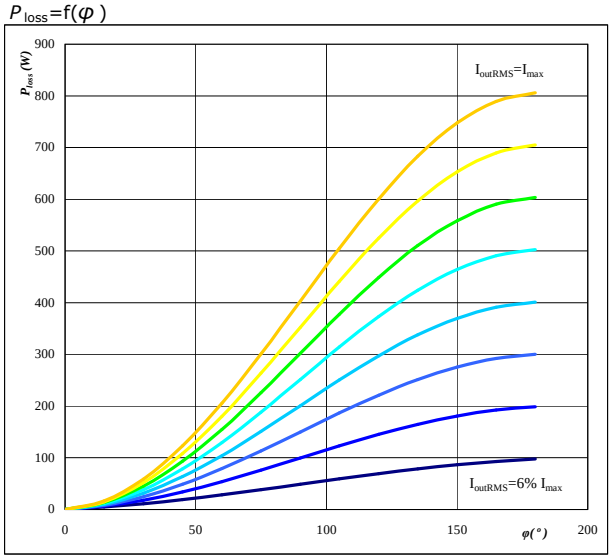


Conditions						
parameter	T_j=	125	°C			
	I_{oRMS}	from	79	A	to	1187 A
		in steps of	158	A		

Figure 16. **Boost T2, T3 / D2, D3 IGBT**

Typical average switching loss as a function of phase displacement

$P_{loss}=f(\varphi)$

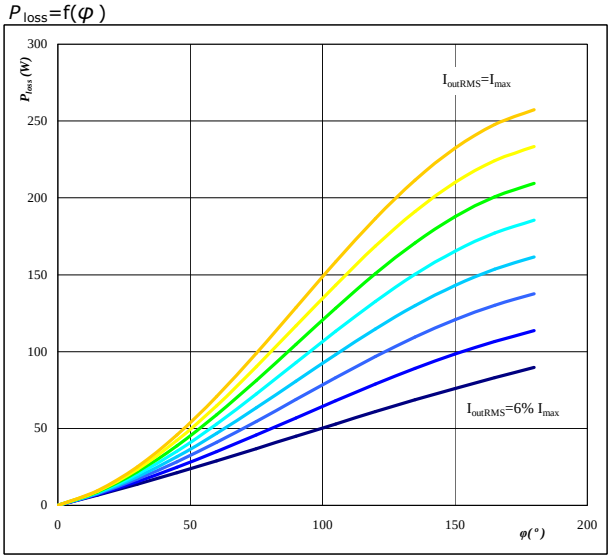


Conditions	T_j=	125	°C	f_{sw}=	8	kHz
	DC-link=	1200	V			
parameter	I_{oRMS}	from	79 A	to	1187 A	
		in steps of	158 A	A		

Figure 17. **Boost T2, T3 / D2, D3 FRED**

Typical average switching loss as a function of phase displacement

$P_{loss}=f(\varphi)$

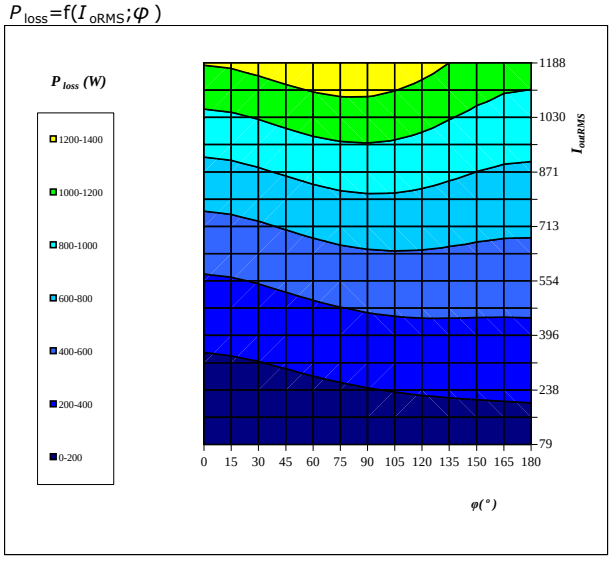


Conditions	T_j=	125	°C	f_{sw}=	8	kHz
	DC-link=	1200	V			
parameter	I_{oRMS}	from	79 A	to	1187 A	
		in steps of	158 A	A		

Figure 18. **Boost T2, T3 / D2, D3 IGBT**

Typical total loss as a function of phase displacement and Iout$_{RMS}$

$P_{loss}=f(I_{oRMS};\varphi)$

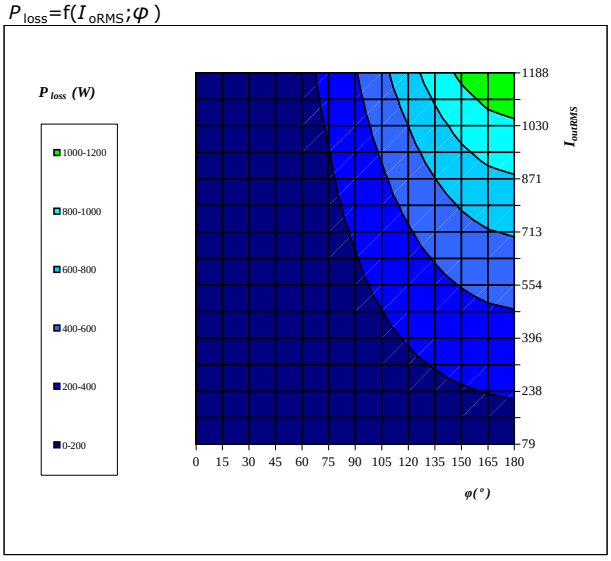


Conditions	T_j=	125	°C
	DC-link=	1200	V
	f_{sw}=	8	kHz

Figure 19. **Boost T2, T3 / D2, D3 FRED**

Typical total loss as a function of phase displacement and Iout$_{RMS}$

$P_{loss}=f(I_{oRMS};\varphi)$

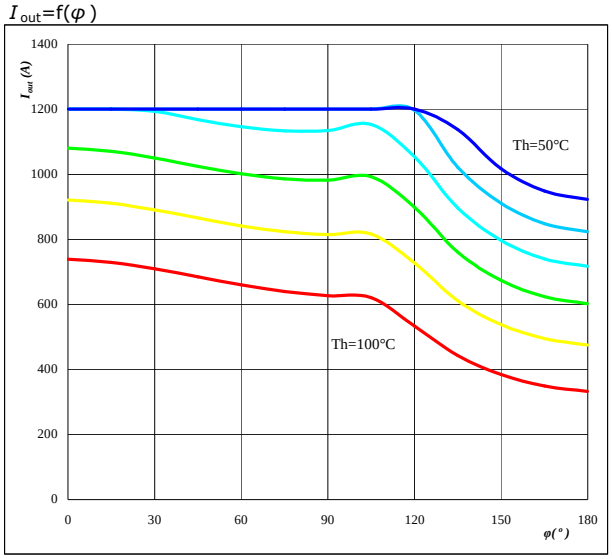


Conditions	T_j=	125	°C
	DC-link=	1200	V
	f_{sw}=	8	kHz

Figure 20. **Boost T2, T3 / D2, D3 IGBT+FWD**

Typical available output current as a function of of phase displacement

$I_{out}=f(\varphi)$

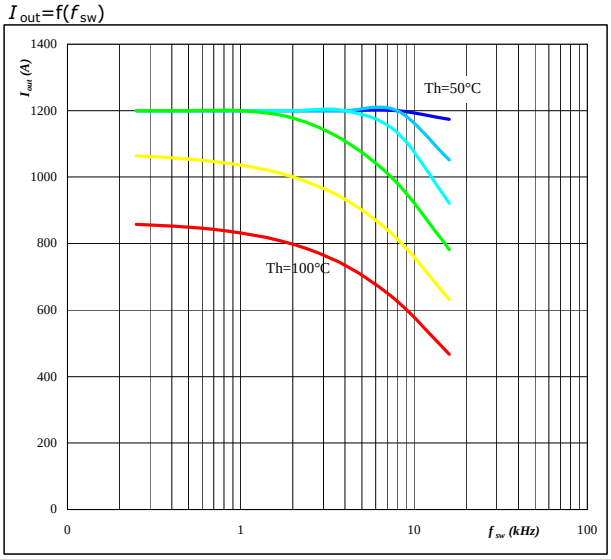


Conditions	T_j=	T_{jmax}-25	°C		f_{sw}=	8 kHz
	DC-link=	1200	V			
parameter:		Heatsink temp.				
	T_h from	50	°C to		100	°C
	in	10	°C		steps	

Figure 21. **Boost T2, T3 / D2, D3 IGBT+FWD**

Typical available output current as a function of switching frequency

$I_{out}=f(f_{sw})$

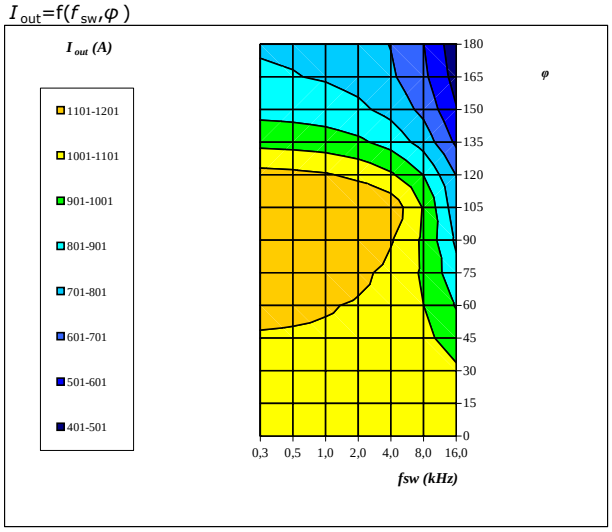


Conditions	T_j=	T_{jmax}-25	°C		φ =	90°
	DC-link=	1200	V			
parameter:		Heatsink temp.				
	T_h from	50	°C to		100	°C
	in	10	°C		steps	

Figure 22. **Boost T2, T3 / D2, D3 IGBT+FRED**

Typical available 50Hz output current as a function of f_{sw} and phase displacement

$I_{out}=f(f_{sw},\varphi)$

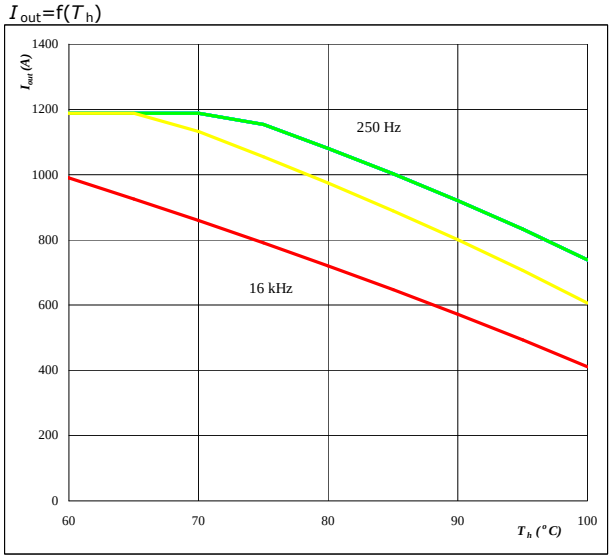


Conditions	T_j=	T_{jmax}-25	°C			
	DC-link=	1200	V			
	T_h=	80	°C			

Figure 23. **per MODULE**

Typical available output current as a function of heat sink temperature

$I_{out}=f(T_h)$

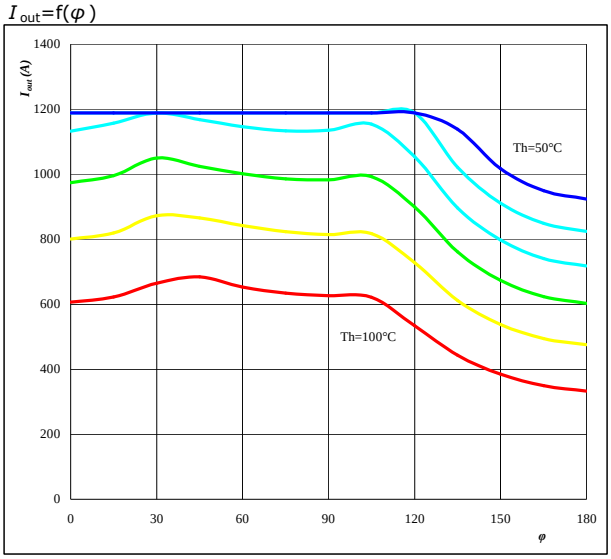


Conditions	T_j=	T_{jmax}-25	°C	
	DC-link=	1200	V	
	φ =	0	°	
parameter:	Switching freq.			
	f_{sw} from	0,25	kHz to	16 kHz
	in steps of factor 2			

Figure 24. **per MODULE**

Typical available output current as a function of phase displacement

$I_{out}=f(\varphi)$

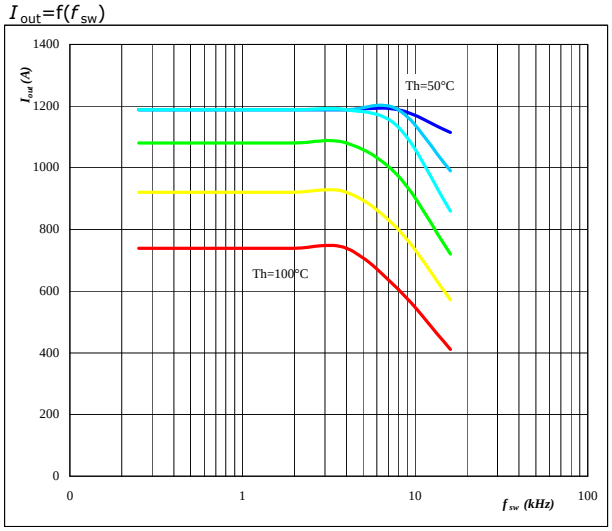


Conditions	T_j=	T_{jmax}-25	°C	
	DC-link=	1200	V	
	f_{sw}=	8	kHz	
parameter:	Heatsink temp.			
	T_h from	50	°C to	100
	in	10	°C	steps

Figure 25. **per MODULE**

Typical available output current as a function of switching frequency

$I_{out}=f(f_{sw})$

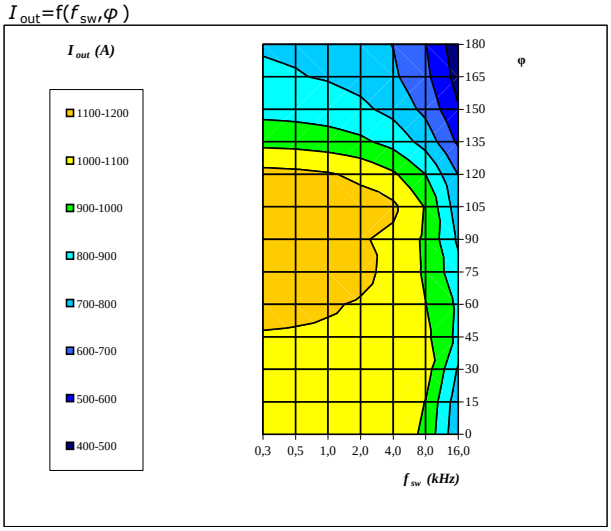


Conditions	T_j=	T_{jmax}-25	°C	φ =	0	°
	DC-link=	1200	V			
parameter:	Heatsink temp.					
	T_h from	50	°C to	100		
	in	10	°C	steps		

Figure 26. **per MODULE**

Typical available 50Hz output current as a function of f_{sw} and phase displacement

$I_{out}=f(f_{sw},\varphi)$

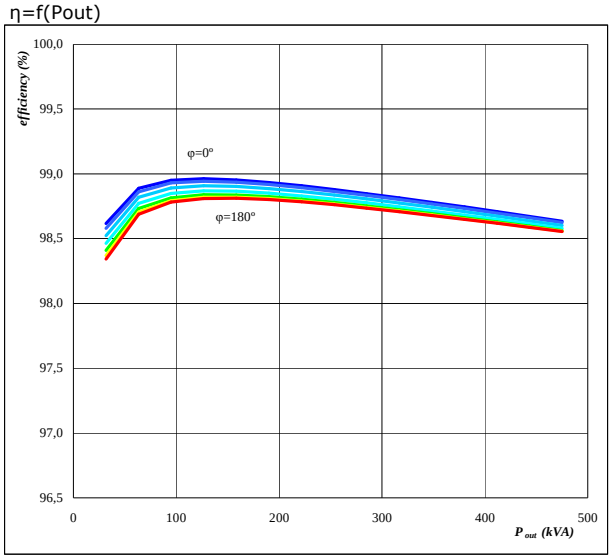


Conditions	T_j=	T_{jmax}-25	°C	
	DC-link=	1200	V	
	T_h=	80	°C	

Figure 27. **per MODULE**

Typical efficiency as a function of output power

η=f(Pout)

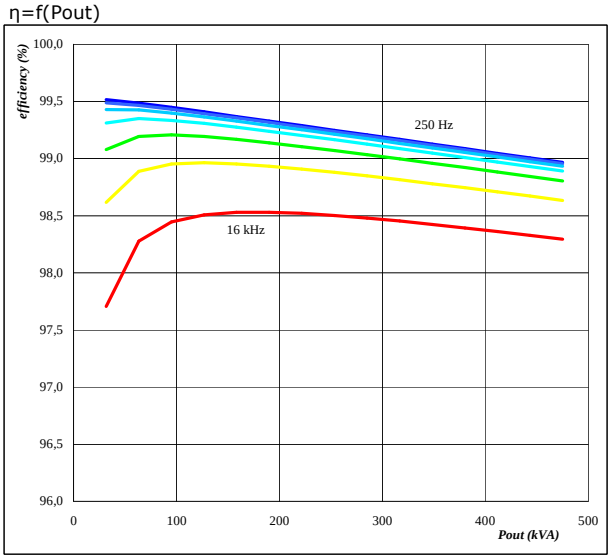


Conditions T_j= 125 °C
f_{sw}= 8 kHz
DC-link= 1200 V
parameter: phase displacement
φ from 0 ° to 180 °
in steps of 30 °

Figure 28. **per MODULE**

Typical efficiency as a function of output power

η=f(Pout)

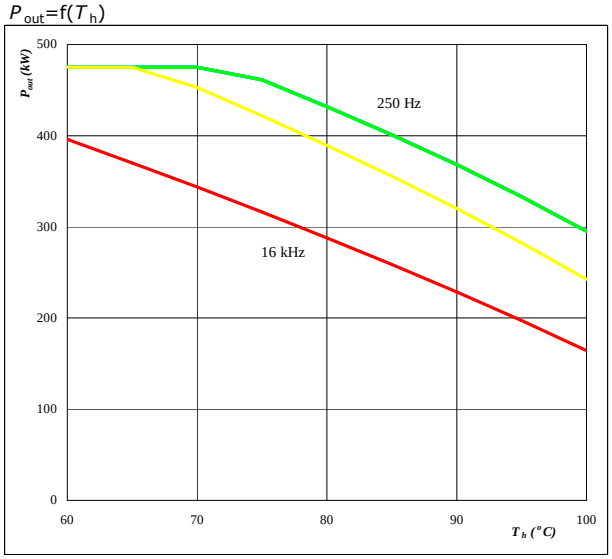


Conditions T_j= 125 °C φ = 0 °
DC-link= 1200 V
parameter: Switching freq.
f_{sw} from 0,25 kHz to 16 kHz
in steps of factor 2

Figure 29. **per MODULE**

Typical available output power as a function of heat sink temperature

$P_{out}=f(T_h)$

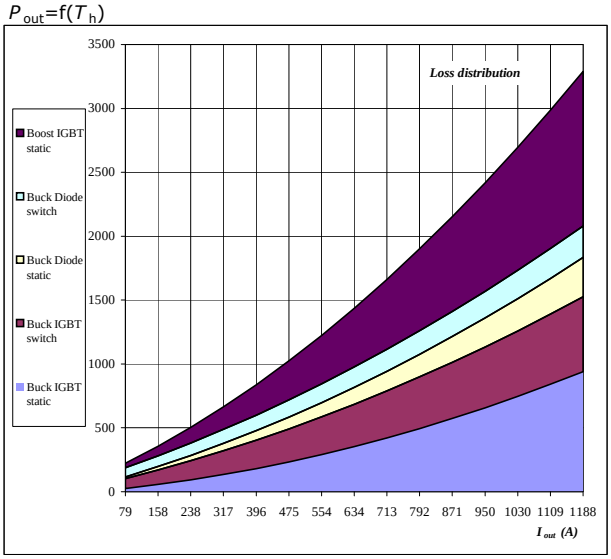


Conditions T_j= T_{jmax}-25 °C
DC-link= 1200 V
φ = 0 °
parameter: Switching freq.
f_{sw} from 0 kHz to 16 kHz
in steps of factor 2

Figure 30. **per MODULE**

Typical loss distribution as a function of output current

$P_{out}=f(T_h)$

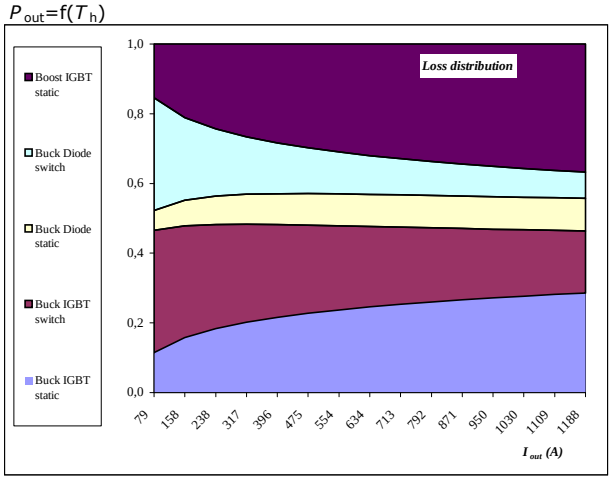


Conditions T_j= 125 °C
f_{sw}= 8 kHz
DC-link= 1200 V
φ = 0 °

Figure 31. **per MODULE**

Typical relativ loss distribution as a function of output current

$P_{out}=f(T_h)$



Conditions			
	T_j=	125	°C
	f_{sw}=	8	kHz
	DC-link=	1200	V
	φ =	0 °	