flowNPC 0 | **NPC Application** | **600 V/50 A & 45 A PS***

General conditions

BUCK		
V_{GEon}	=	+ 15 V
V_{GEoff}	=	- 15 V
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

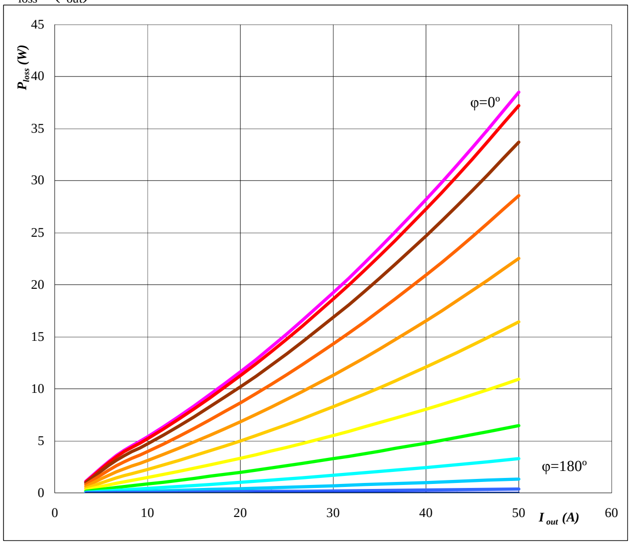
V_{out}= 230 V_{AC}

BOOST		
V_{GEon}	=	15 V
V_{GEoff}	=	0 V
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

Figure 1. **Buck MOSFET**

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

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

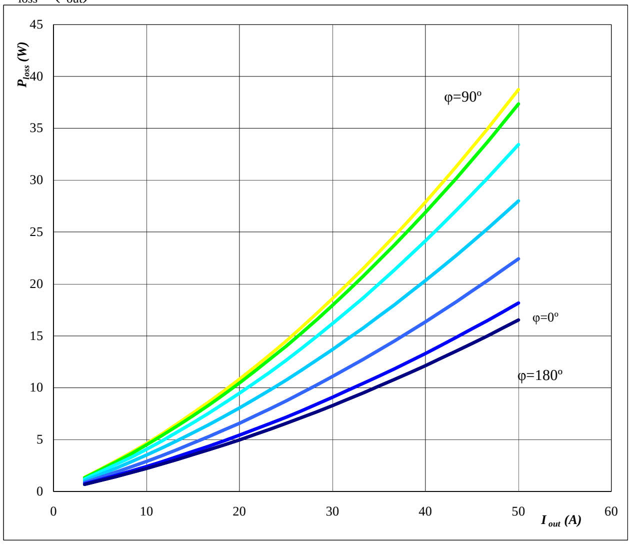


Conditions:	T_j=	125	°C		
parameter:	φ	from	0°	to	180°
		in	12	steps	

Figure 2. **Buck FRED**

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

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

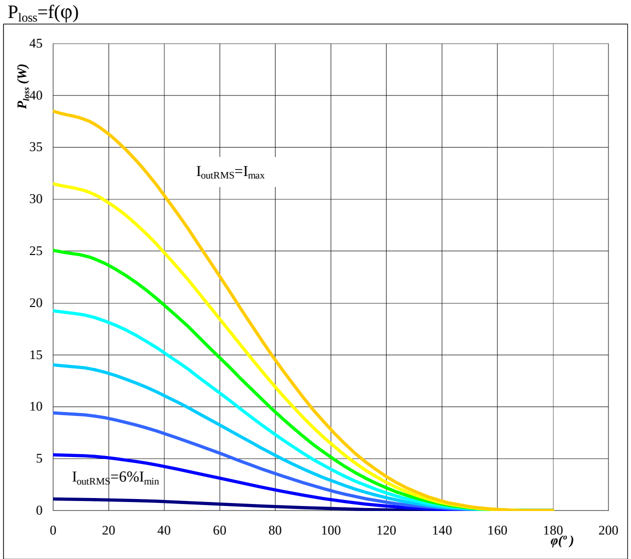


Conditions:	T_j=	125	°C		
parameter:	φ	from	0°	to	180°
		in	12	steps	

Figure 3. **Buck MOSFET**

Typical average static loss as a function of phase displacement φ

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

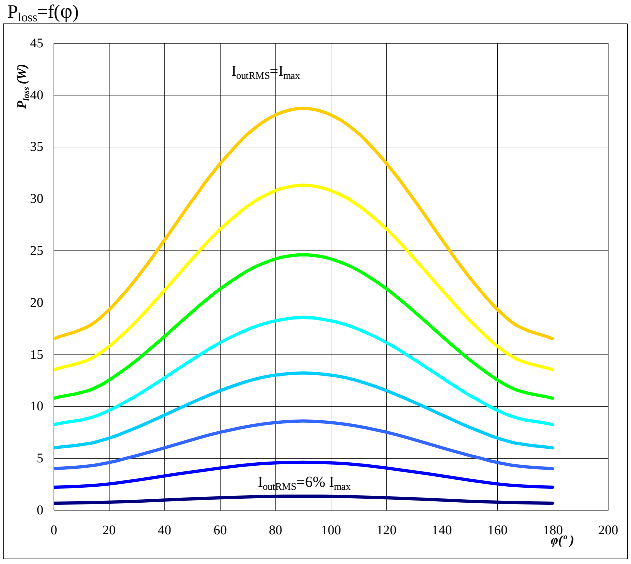


Conditions:	T_j=	125	°C		
parameter:	I_{oRMS}	from	3,33 A	to	50 A
		in steps of	7	A	

Figure 4. **Buck FRED**

Typical average static loss as a function of phase displacement φ

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

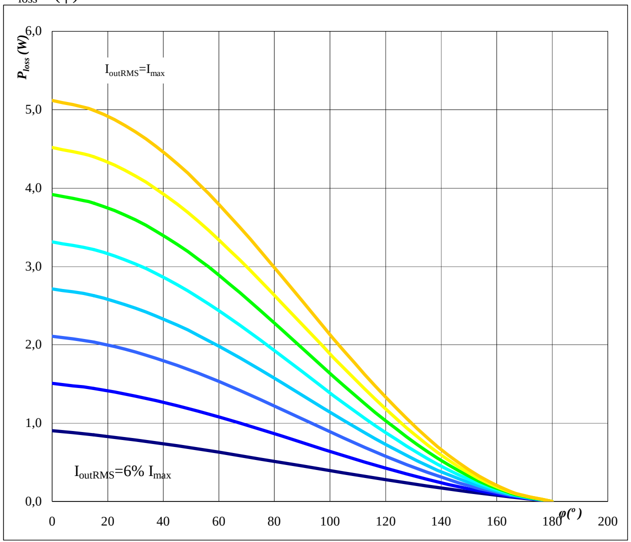


Conditions:	T_j=	125	°C		
parameter:	I_{oRMS}	from	3,33 A	to	50 A
		in steps of	7	A	

Figure 5. **Buck MOSFET**

Typical average switching loss as a function of phase displacement φ

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

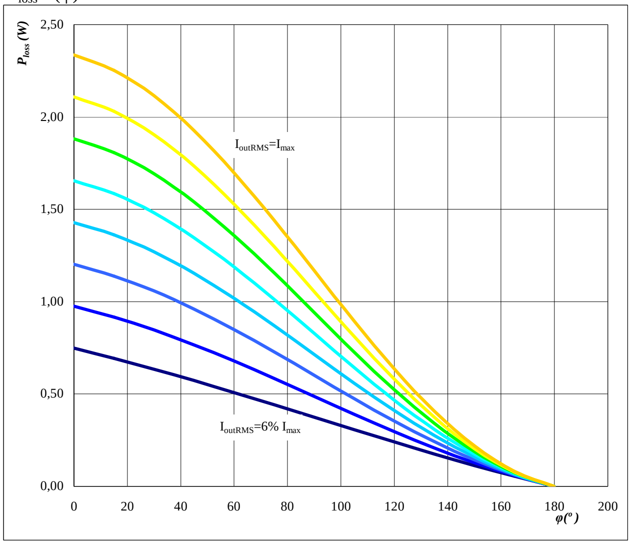


Conditions: T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
parameter: I_{oRMS} from 3,33 A to 50 A
in steps of 7 A

Figure 6. **Buck FRED**

Typical average switching loss as a function of phase displacement φ

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

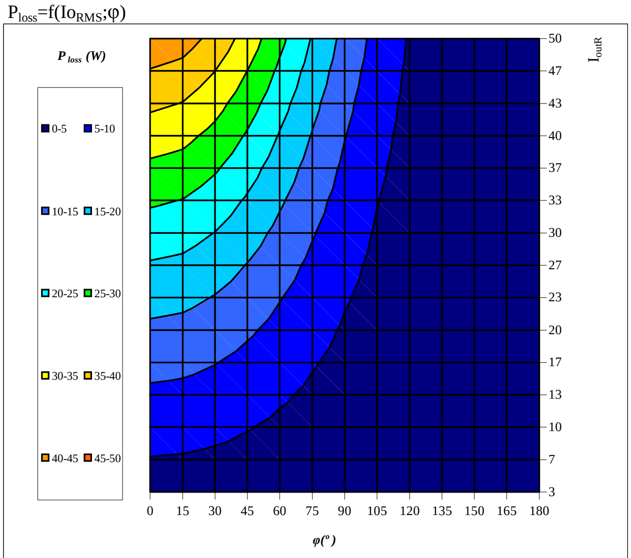


Conditions: T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
parameter: I_{oRMS} from 3,33 A to 50 A
in steps of 7 A

Figure 7. **Buck MOSFET**

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

$P_{loss}=f(Io_{RMS};\varphi)$

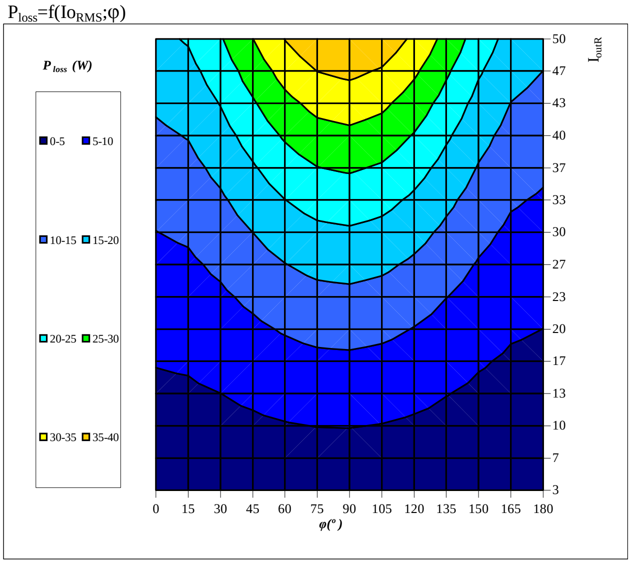


Conditions: T_j= 125 °C
DC link= 700 V
f_{sw}= 20 kHz

Figure 8. **Buck FRED**

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

$P_{loss}=f(Io_{RMS};\varphi)$



Conditions: T_j= 125 °C
DC link= 700 V
f_{sw}= 20 kHz

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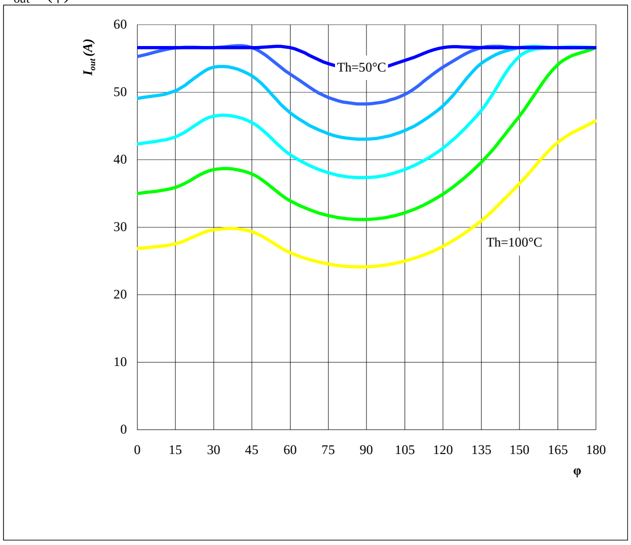
Figure 9. for Buck MOSFET+FRED

Typical available output current as a function of phase displacement φ

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

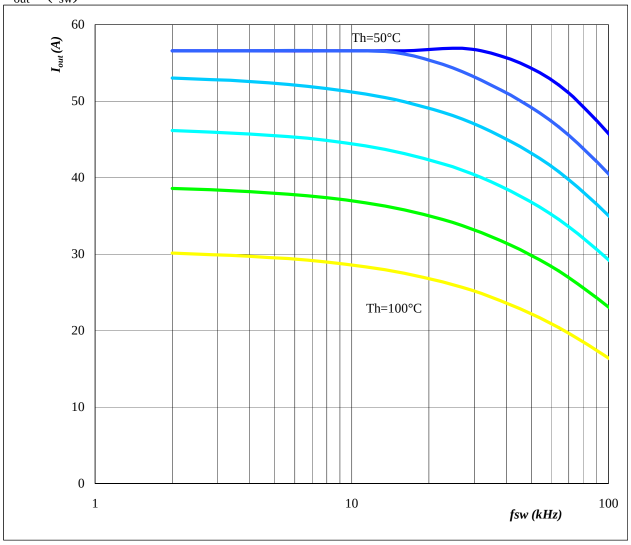


Conditions:	T_j=	Tjmax-25	°C	f_{sw}=	20 kHz	
	DC link=	700	V			
parameter:		Heatsink temp.				
	T_h from	50	°C to	100	°C	
	in	10	°C	steps		

Figure 10. for Buck MOSFET+FRED

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

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

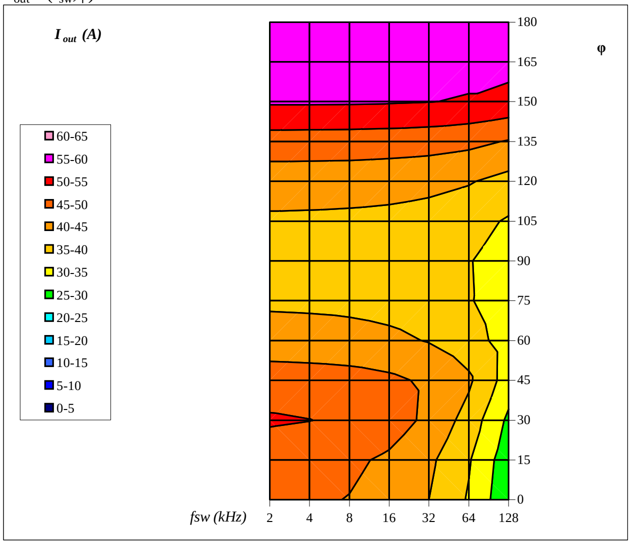


Conditions:	T_j=	Tjmax-25	°C	φ= 0 °		
	DC link=	700	V			
parameter:		Heatsink temp.				
	T_h from	50	°C to	100	°C	
	in	10	°C	steps		

Figure 11. for Buck IGBT+FRED

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

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

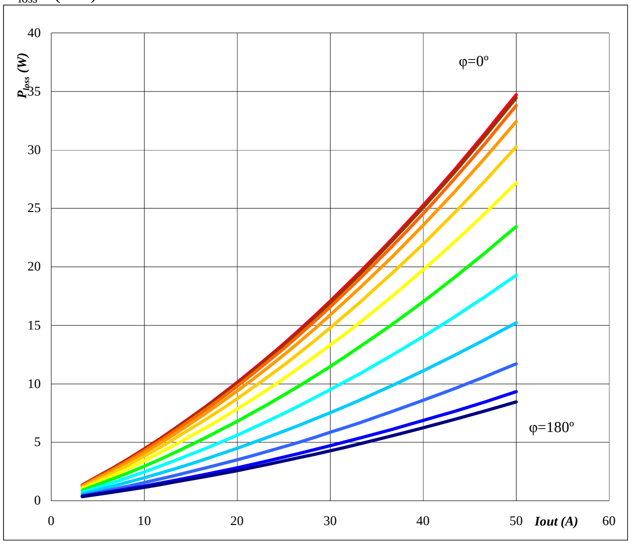


Conditions:	T_j=	Tjmax-25	°C
	DC link=	700	V
	T_h=	80	°C

Figure 12. Boost IGBT

Typical average static loss as a function of output current

P_{loss}=f(Iout)

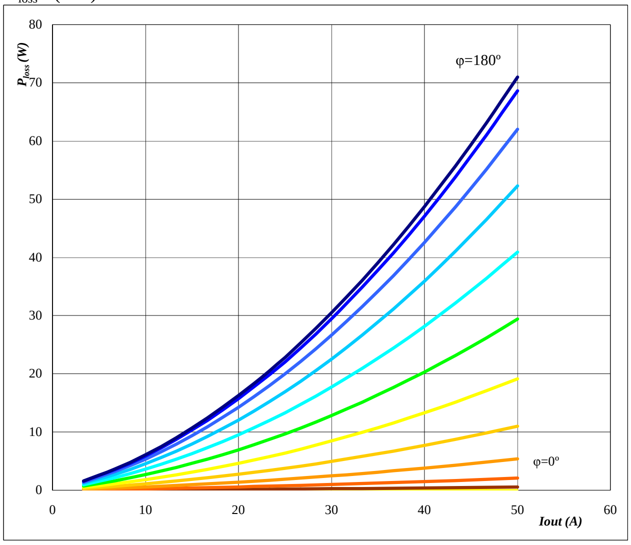


Conditions:	T_j=	125	°C		
parameter:	φ	from	0°	to	180º
		in	12	steps	

Figure 13. Boost FRED

Typical average static loss as a function of output current

P_{loss}=f(Iout)

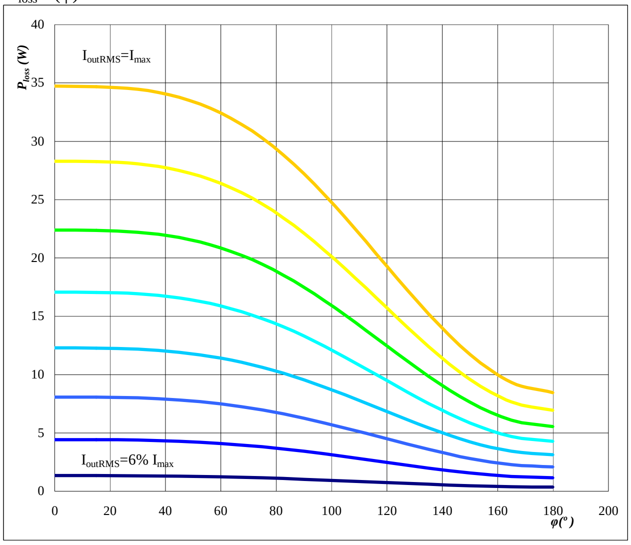


Conditions:	T_j=	125	°C		
parameter:	φ	from	0°	to	180º
		in	12	steps	

Figure 14. Boost IGBT

Typical average static loss as a function of phase displacement

P_{loss}=f(φ)

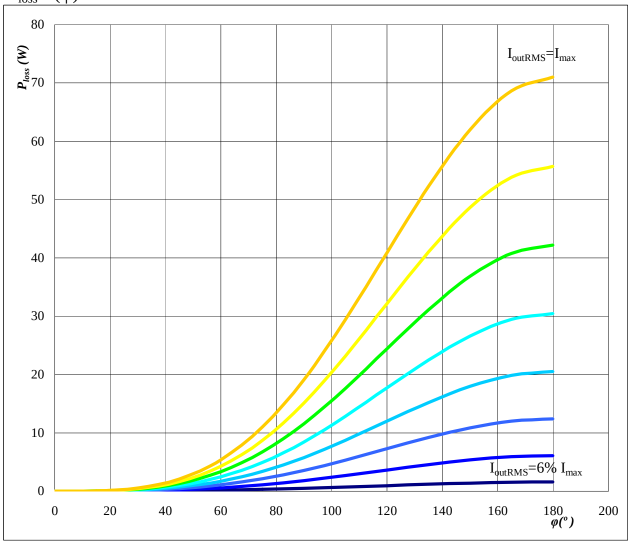


Conditions:	T_j=	125	°C		
parameter:	I_{oRMS}	from	3 A	to	50 A
		in steps of	7 A		

Figure 15. Boost FRED

Typical average static loss as a function of phase displacement

P_{loss}=f(φ)

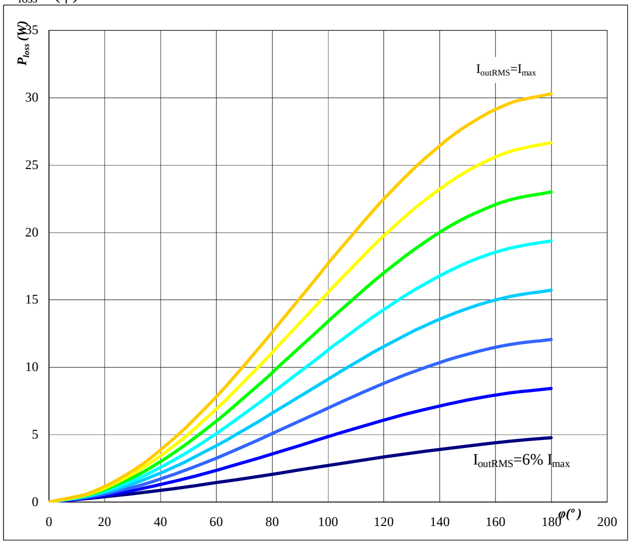


Conditions:	T_j=	125	°C		
parameter:	I_{oRMS}	from	3 A	to	50 A
		in steps of	7 A		

Figure 16. Boost IGBT

Typical average switching loss as a function of phase displacement

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

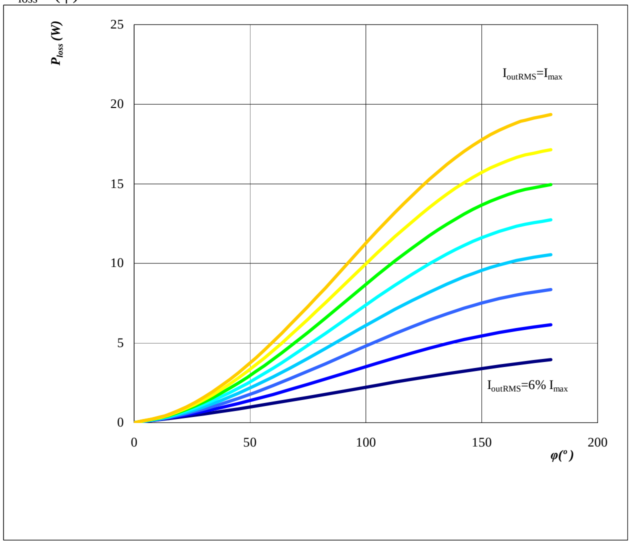


Conditions:	T_j=	125	°C		f_{sw}=	20 kHz
	DC link=	700	V			
parameter:	I_{oRMS}	from	3 A		to	50 A
		in steps of	7 A		A	

Figure 17. Boost FRED

Typical average switching loss as a function of phase displacement

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

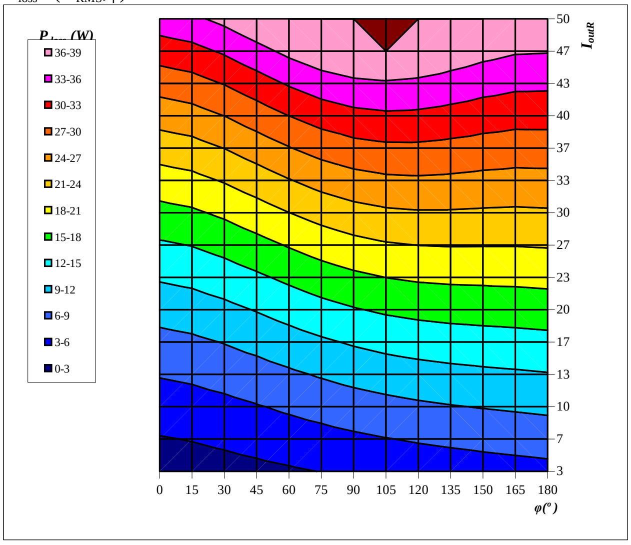


Conditions:	T_j=	125	°C		f_{sw}=	20 kHz
	DC link=	700	V			
parameter:	I_{oRMS}	from	3 A		to	50 A
		in steps of	7 A		A	

Figure 18. Boost IGBT

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

$P_{loss}=f(Io_{RMS};\varphi)$

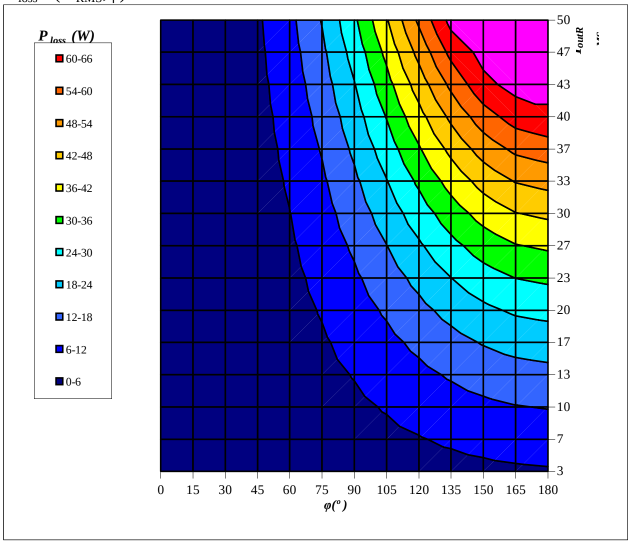


Conditions:	T_j=	125	°C
	DC link=	700	V
	f_{sw}=	20	kHz

Figure 19. Boost FRED

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

$P_{loss}=f(Io_{RMS};\varphi)$



Conditions:	T_j=	125	°C
	DC link=	700	V
	f_{sw}=	20	kHz

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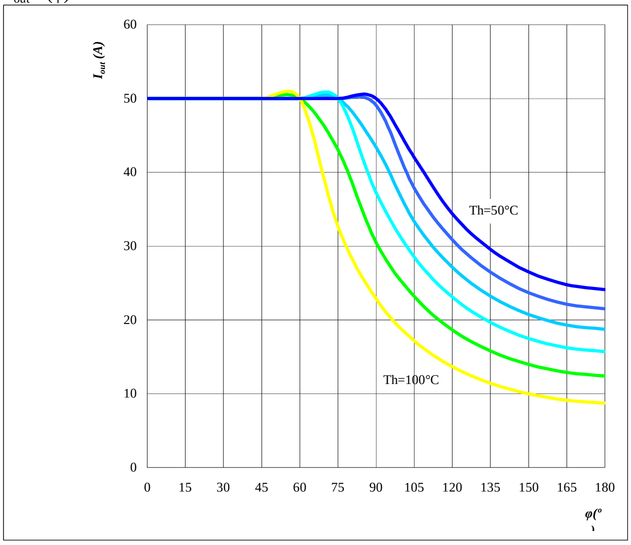
Figure 20. **Boost IGBT+FRED**

Typical available output current as a function of of phase displacement

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

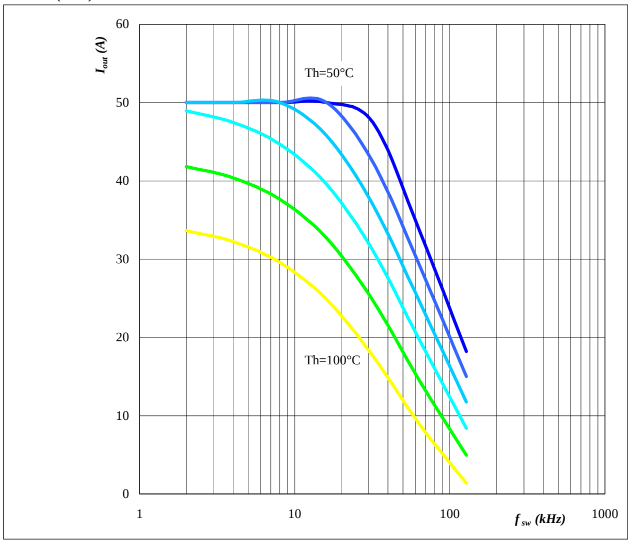


Conditions:	T_j=	Tjmax-25	°C		f_{sw}=	20 kHz
	DC link=	700	V			
parameter:		Heatsink temp.				
	Th from	50	°C to	100	°C	
	in	10	°C	steps		

Figure 21. **Boost IGBT+FRED**

Typical available output current as a function of switching frequency

Iout=f(fsw)

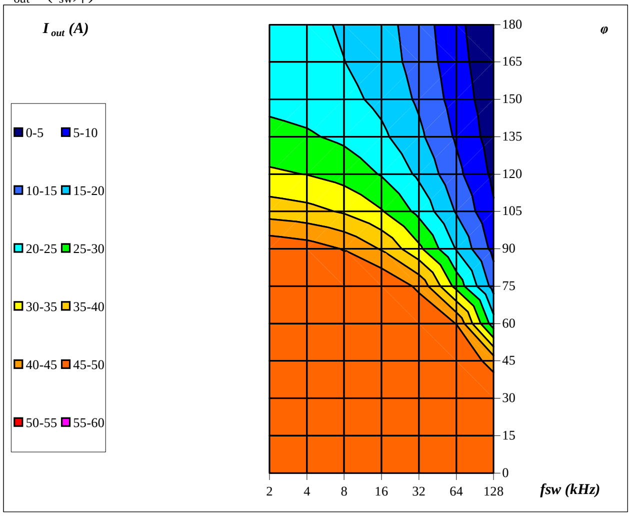


Conditions:	T_j=	Tjmax-25	°C		φ= 90°	
	DC link=	700	V			
parameter:		Heatsink temp.				
	Th from	50	°C to	100	°C	
	in	10	°C	steps		

Figure 22. **Boost IGBT+FRED**

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

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

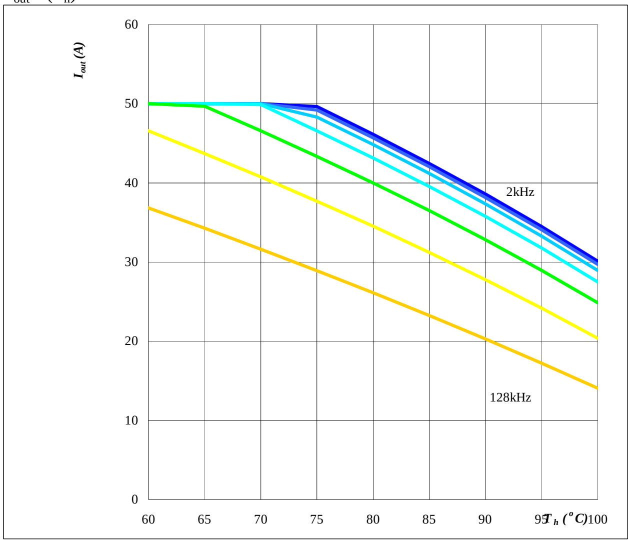


Conditions:	T_j=	Tjmax-25	°C
	DC link=	700	V
	T_h=	80	°C

Figure 23. per MODULE

Typical available output current as a function of heat sink temperature

$I_{out}=f(T_h)$

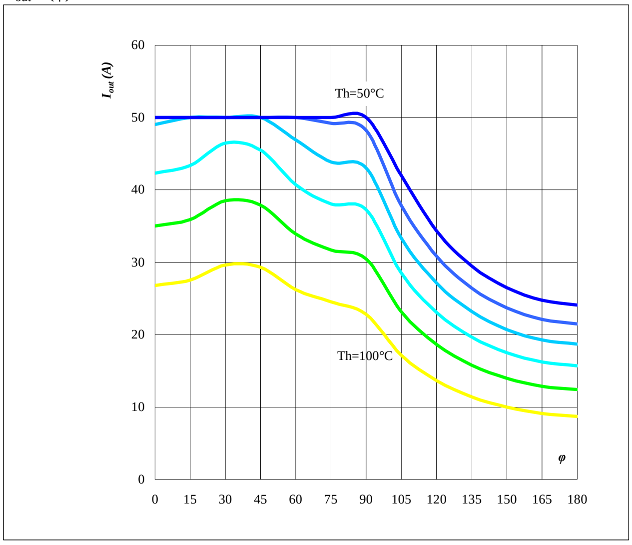


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
φ= 0 °
parameter: Switching freq.
fsw from 2 kHz to 128 kHz
in steps of factor 2

Figure 24. per MODULE

Typical available output current as a function of phase displacement

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

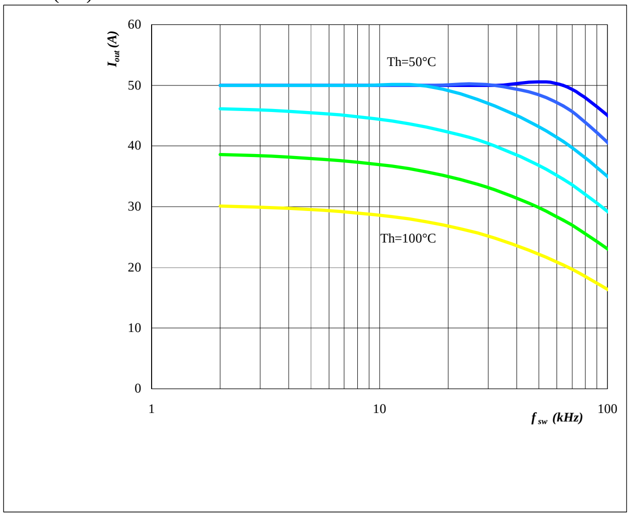


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
f_{sw}= 20 kHz
parameter: Heatsink temp.
Th from 50 °C to 100
in 10 °C steps

Figure 25. per MODULE

Typical available output current as a function of switching frequency

Iout=f(fsw)

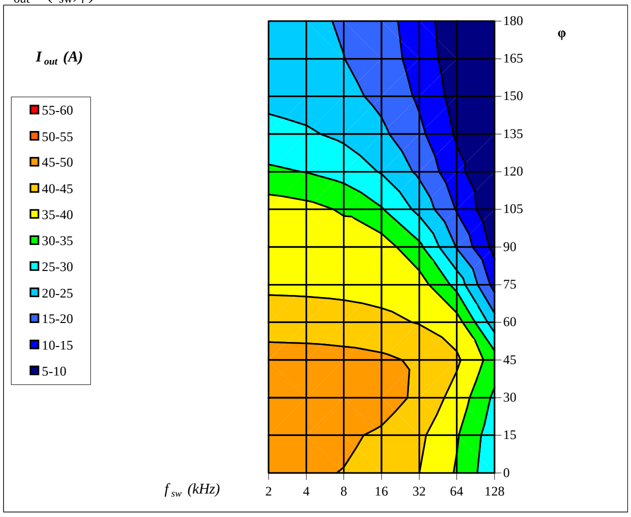


Conditions: T_j= Tjmax-25 °C φ= 0 °
DC link= 700 V
parameter: Heatsink temp.
Th from 50 °C to 100
in 10 °C steps

Figure 26. per MODULE

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

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

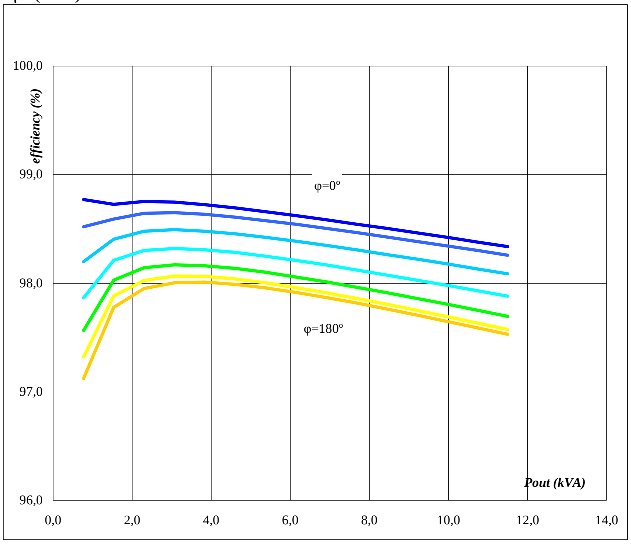


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
T_h= 80 °C

Figure 27. per MODULE

Typical efficiency as a function of output power

η=f(Pout)

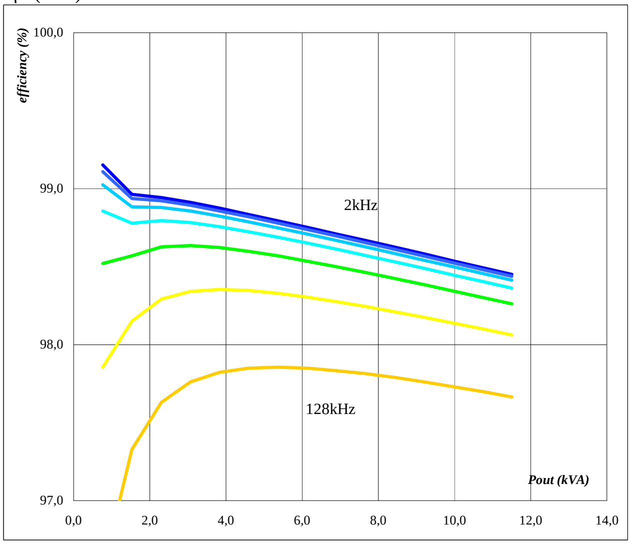


Conditions: T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
parameter: phase displacement
φ from 0 ° to 180 °
in steps of 30 °

Figure 28. per MODULE

Typical efficiency as a function of output power

η=f(Pout)

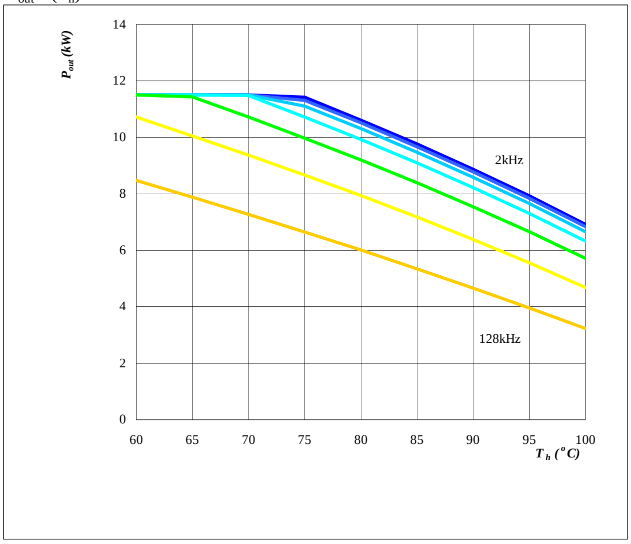


Conditions: T_j= 125 °C φ= 0 °
DC link= 700 V
parameter: Switching freq.
fsw from 2 kHz to 128 kHz
in steps of factor 2

Figure 29. per MODULE

Typical available output power as a function of heat sink temperature

P_{out}=f(T_h)

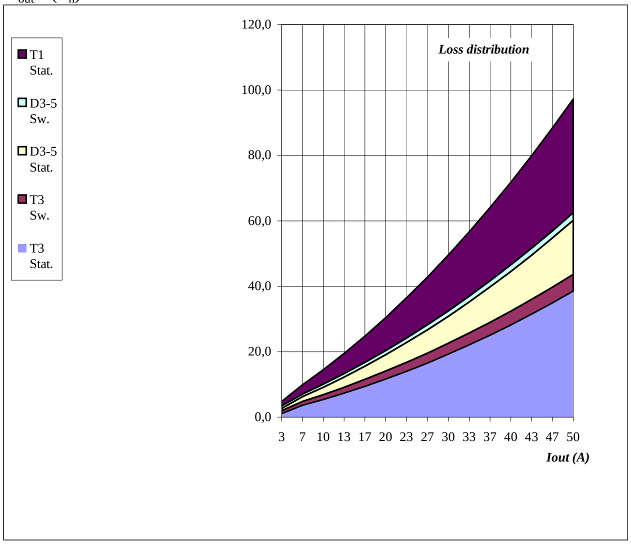


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
φ= 0 °
parameter: Switching freq.
fsw from 2 kHz to 128 kHz
in steps of factor 2

Figure 30. per MODULE

Typical loss distribution as a function of output current

P_{out}=f(T_h)

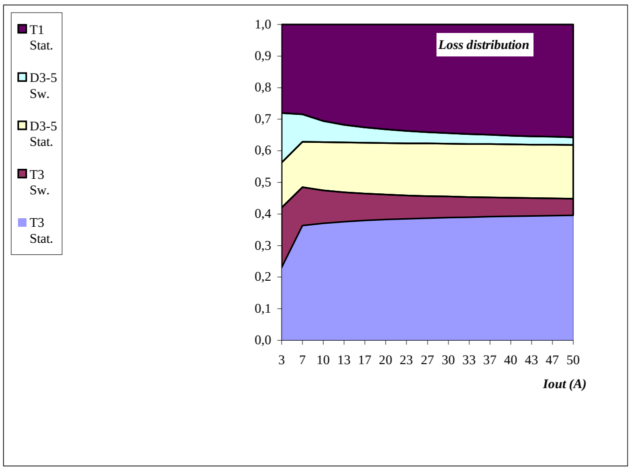


Conditions: T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
φ= 0 °

Figure 31. per MODULE

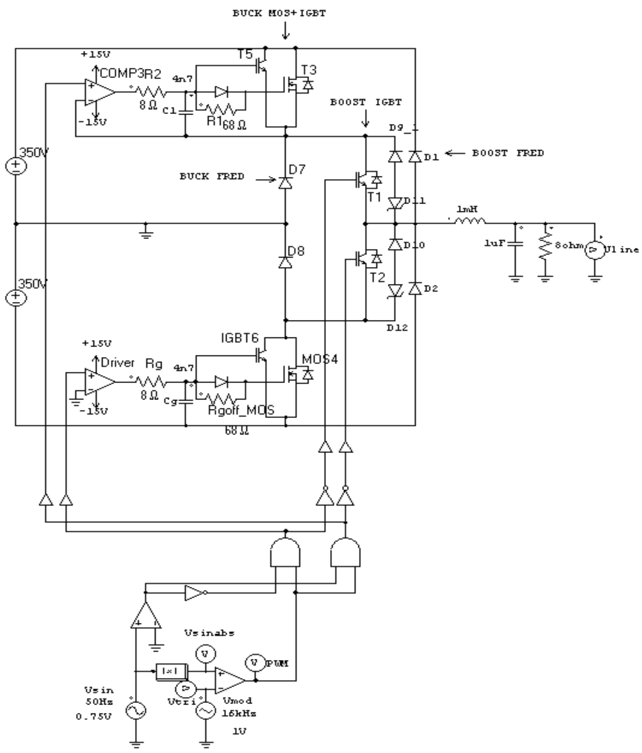
Typical relativ loss distribution as a function of output current

$P_{out}=f(T_h)$



Conditions:	T_j=	125	°C
	f_{sw}=	20	kHz
	DC link=	700	V
	φ=	0 °	

Figure 32. per MODULE



Cg is included in the module

PRODUCT STATUS DEFINITIONS

Datasheet Status	Product Status	Definition
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