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

General conditions

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

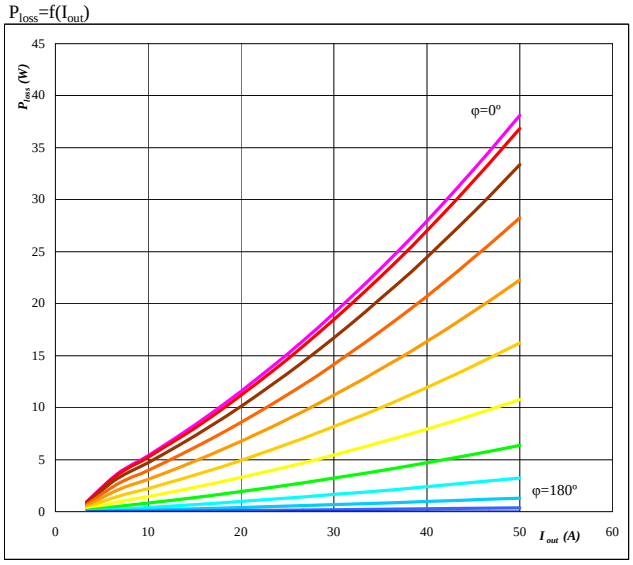
V_{out}= 230 V_{AC}

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}

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

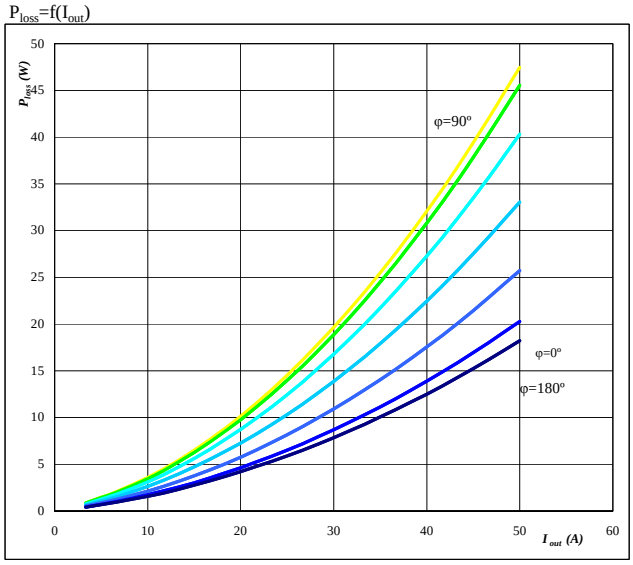


Conditions: T_j= 125 °C
parameter: **φ** from 0° to 180°
in 12 steps

Figure 2. **Buck FRED**

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

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

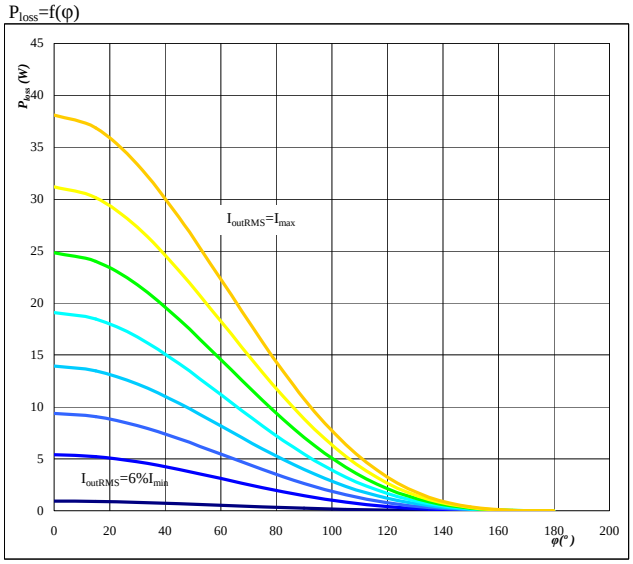


Conditions: T_j= 125 °C
parameter: **φ** from 0° to 180°
in 12 steps

Figure 3. **Buck MOSFET**

Typical average static loss as a function of phase displacement φ

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

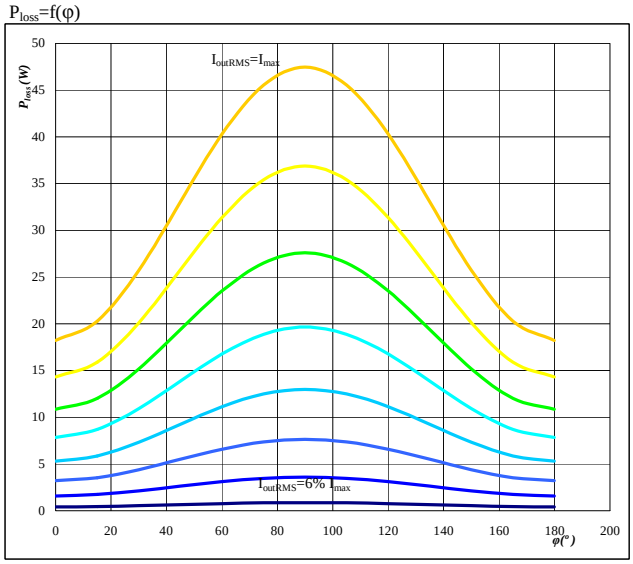


Conditions: T_j= 125 °C
parameter: I_{oRMS} from 3,33 A to 50 A
in steps of 7 A

Figure 4. **Buck FRED**

Typical average static loss as a function of phase displacement φ

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



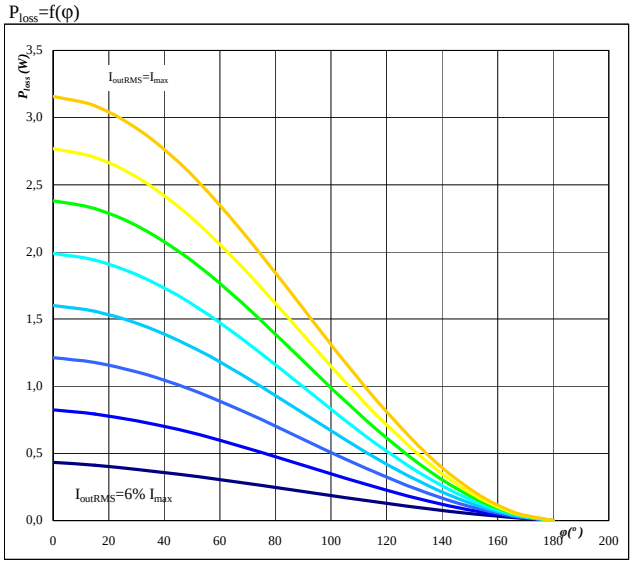
Conditions: T_j= 125 °C
parameter: I_{oRMS} from 3,33 A to 50 A
in steps of 7 A

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

Figure 5. Buck MOSFET

Typical average switching loss as a function of phase displacement φ

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

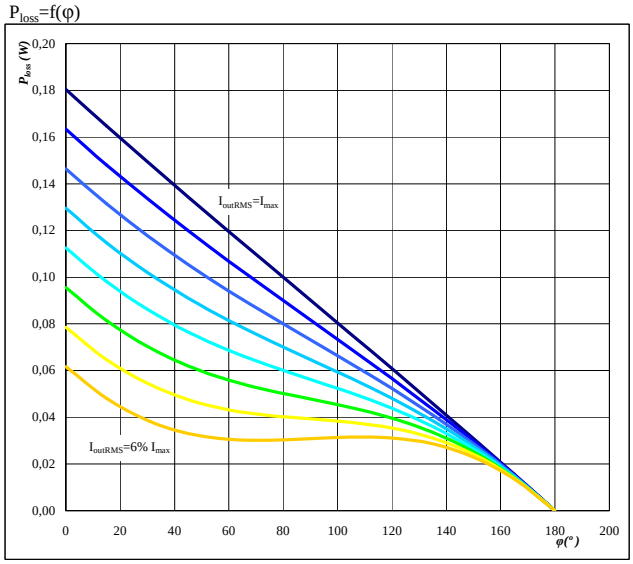


Conditions:
T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
parameter: I_{oRMS} from 3,33 A to 50 A
in steps of 7 A

Figure 6. Buck FRED

Typical average switching loss as a function of phase displacement φ

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

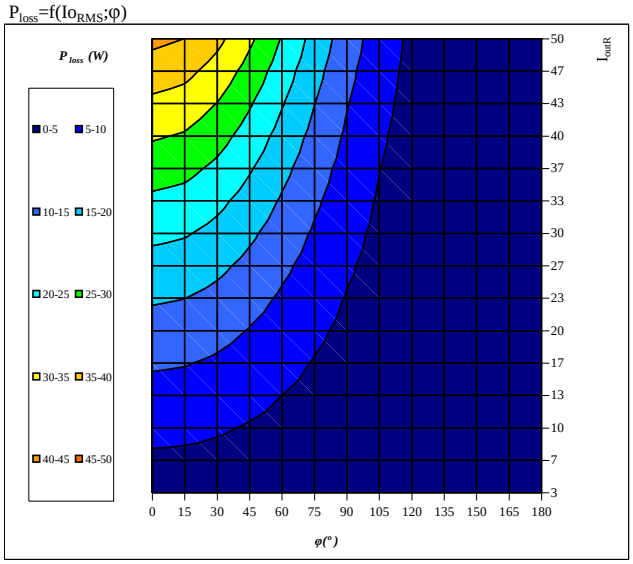


Conditions:
T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
parameter: I_{oRMS} from 3,33 A to 50 A
in steps of 7 A

Figure 7. Buck MOSFET

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

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

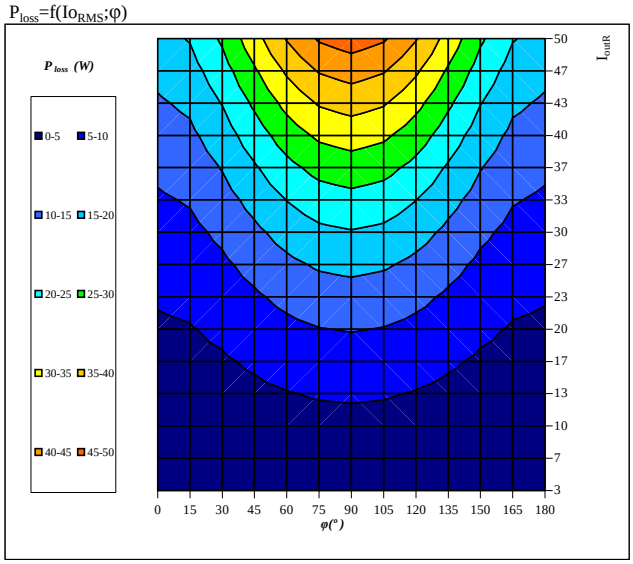


Conditions:
T_j= 125 °C
DC link= 700 V
f_{sw}= 20 kHz

Figure 8. Buck FRED

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

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

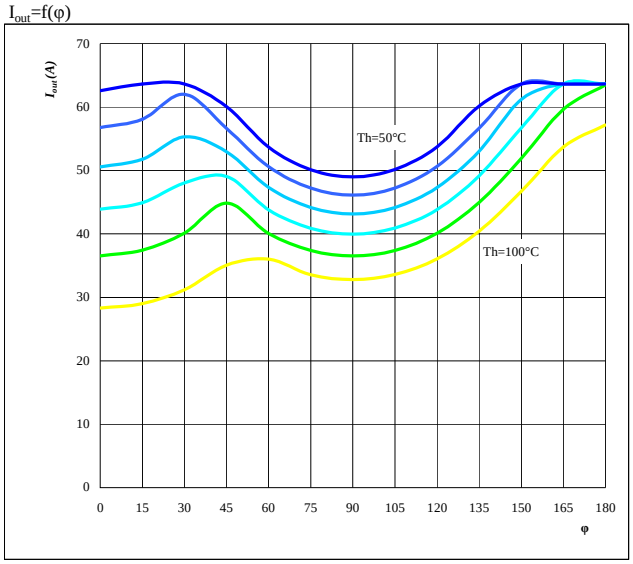


Conditions:
T_j= 125 °C
DC link= 700 V
f_{sw}= 20 kHz

Figure 9. for Buck MOSFET+FRED

Typical available output current as a function of phase displacement φ

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

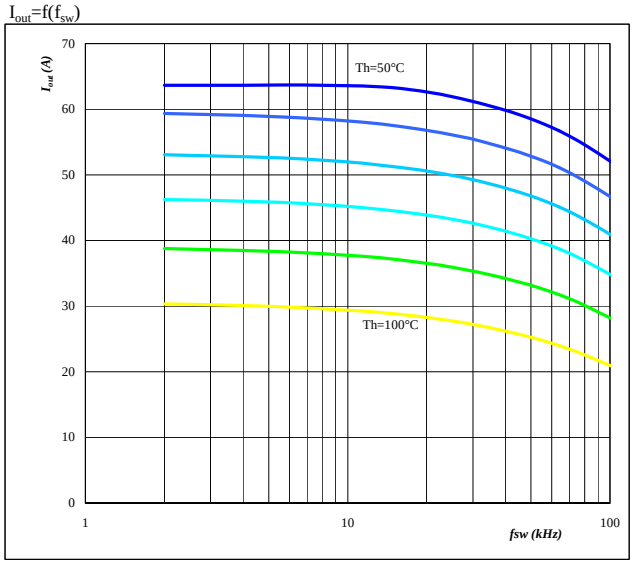


Conditions: T_j= Tjmax-25 °C f_{sw}= 20 kHz
DC link= 700 V
parameter: Heatsink temp.
T_h from 50 °C to 100 °C
in 10 °C steps

Figure 10. for Buck MOSFET+FRED

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

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

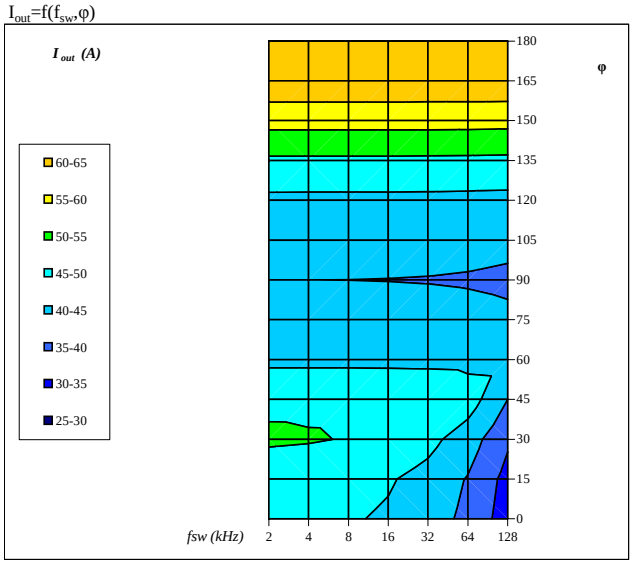


Conditions: T_j= Tjmax-25 °C φ= 0 °
DC link= 700 V
parameter: Heatsink temp.
T_h from 50 °C to 100 °C
in 10 °C steps

Figure 11. for Buck IGBT+FRED

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

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



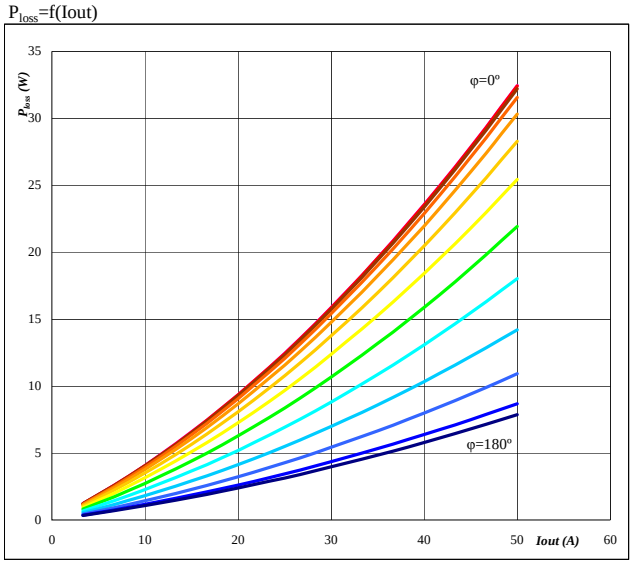
Conditions: T_j= Tjmax-25 °C
DC link= 700 V
T_h= 80 °C

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

Figure 12. **Boost IGBT**

Typical average static loss as a function of output current

$P_{loss}=f(Iout)$

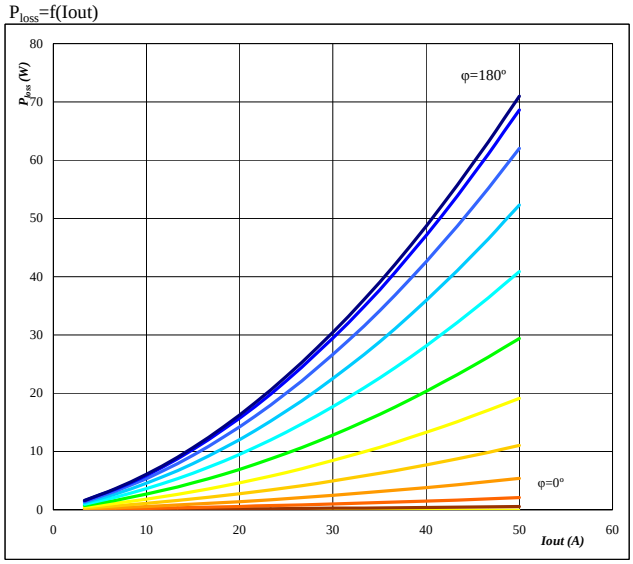


Conditions: T_j= 125 °C
parameter: **φ** from 0° to 180°
in 12 steps

Figure 13. **Boost FRED**

Typical average static loss as a function of output current

$P_{loss}=f(Iout)$

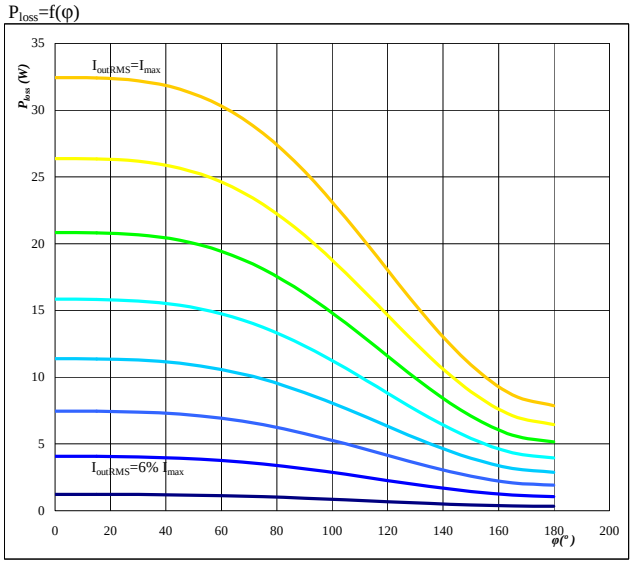


Conditions: T_j= 125 °C
parameter: **φ** from 0° to 180°
in 12 steps

Figure 14. **Boost IGBT**

Typical average static loss as a function of phase displacement

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

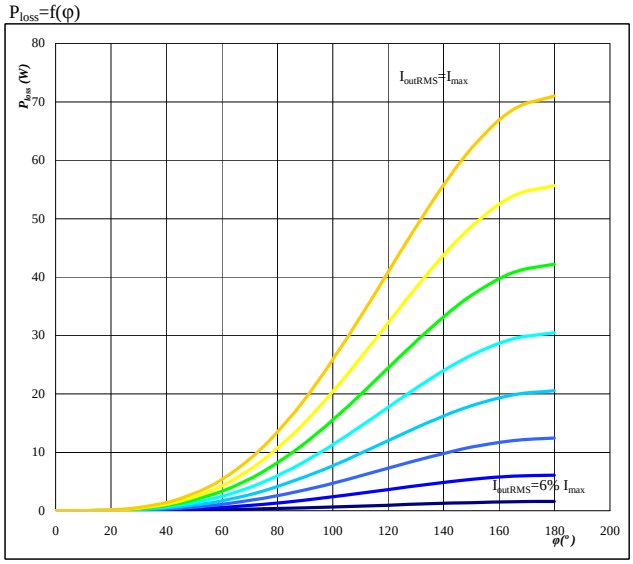


Conditions: T_j= 125 °C
parameter: I_{oRMS} from 3 A to 50 A
in steps of 7 A

Figure 15. **Boost FRED**

Typical average static loss as a function of phase displacement

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

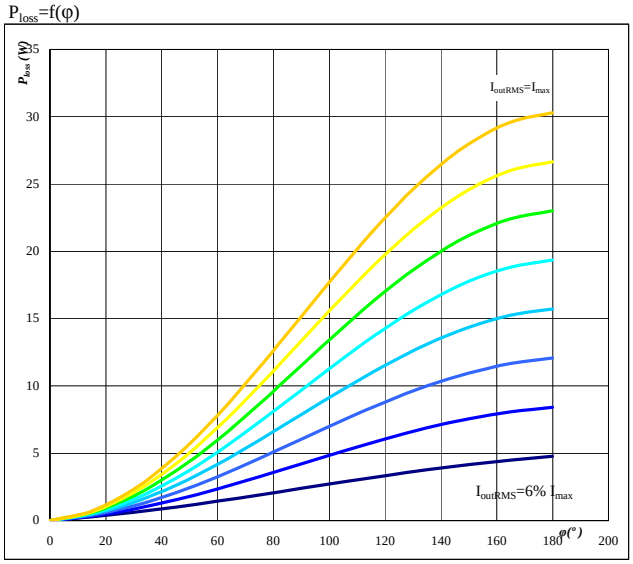


Conditions: T_j= 125 °C
parameter: I_{oRMS} from 3 A to 50 A
in steps of 7 A

Figure 16. Boost IGBT

Typical average switching loss as a function of phase displacement

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

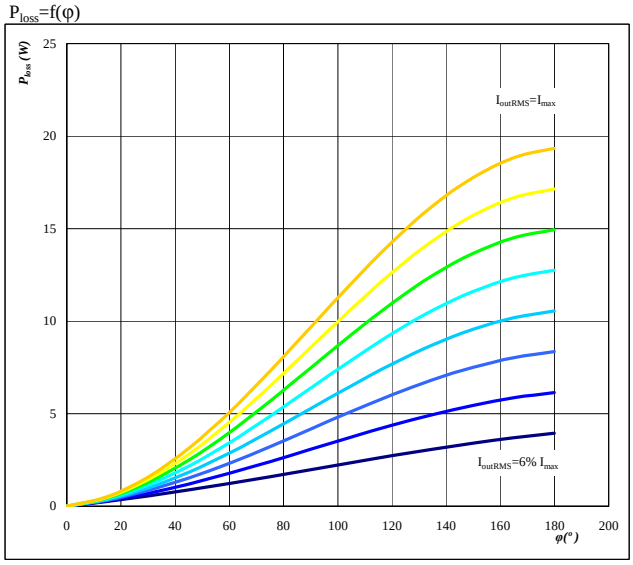


Conditions:	T_j=	125	°C		f_{sw}=	20 kHz
	DC link=	700	V			
parameter:	I_{oRMS}	from	3 A	to	50 A	
		in steps of	7 A	A		

Figure 17. Boost FRED

Typical average switching loss as a function of phase displacement

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

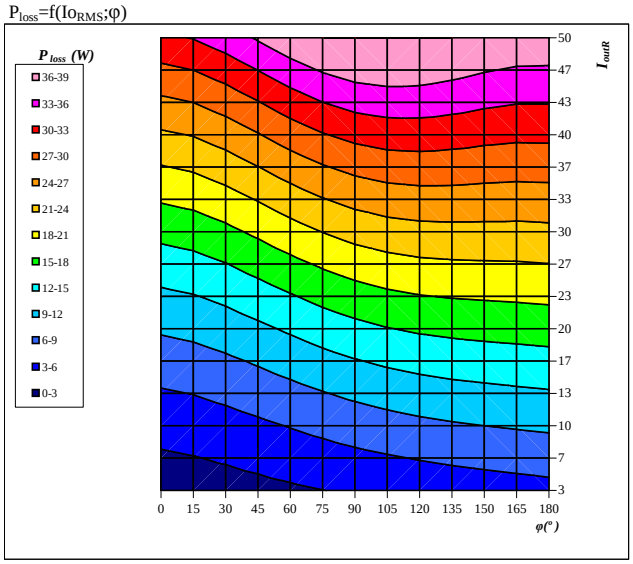


Conditions:	T_j=	125	°C		f_{sw}=	20 kHz
	DC link=	700	V			
parameter:	I_{oRMS}	from	3 A	to	50 A	
		in steps of	7 A	A		

Figure 18. Boost IGBT

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

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

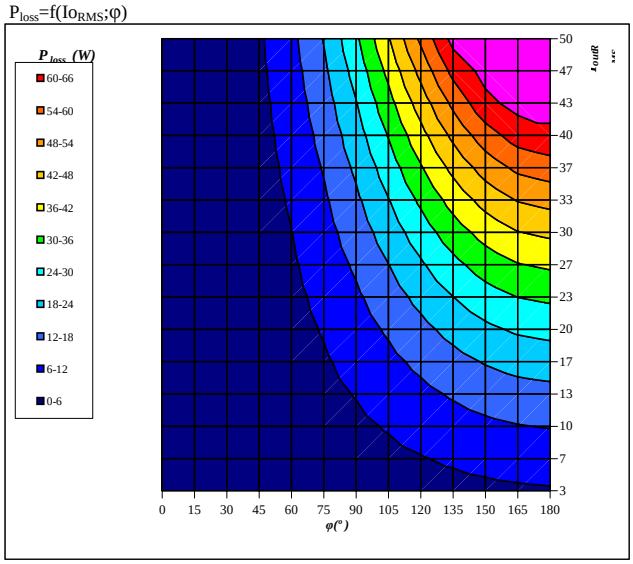


Conditions:	T_j=	125	°C
	DC link=	700	V
	f_{sw}=	20	kHz

Figure 19. Boost FRED

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

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

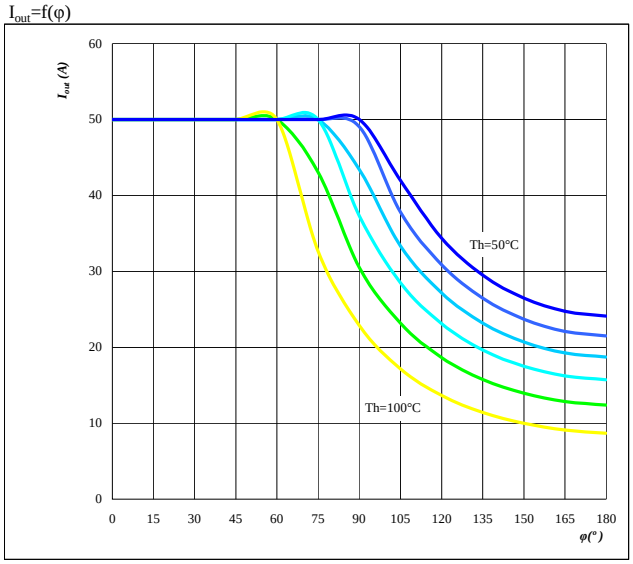


Conditions:	T_j=	125	°C
	DC link=	700	V
	f_{sw}=	20	kHz

Figure 20. Boost IGBT+FRED

Typical available output current as a function of of phase displacement

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

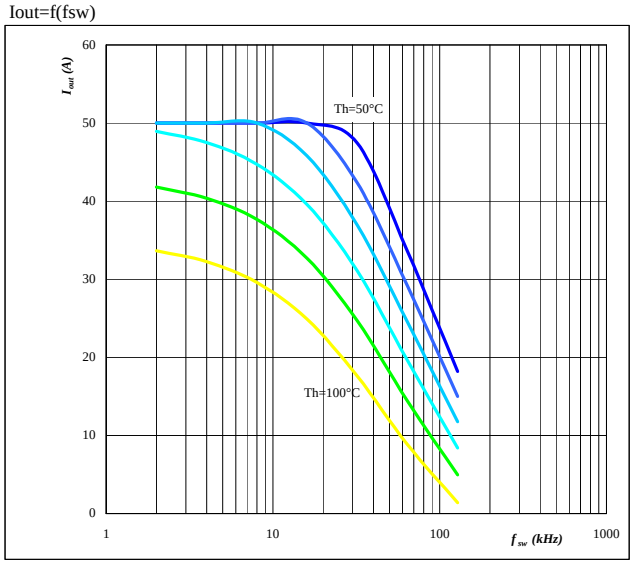


Conditions:	T_j=	Tjmax-25	°C		f_{sw}=	20 kHz
	DC link=	700	V			
parameter:	Heatsink temp.					
	Th from	50	°C to	100		°C
	in	10	°C	steps		

Figure 21. Boost IGBT+FRED

Typical available output current as a function of switching frequency

Iout=f(fsw)

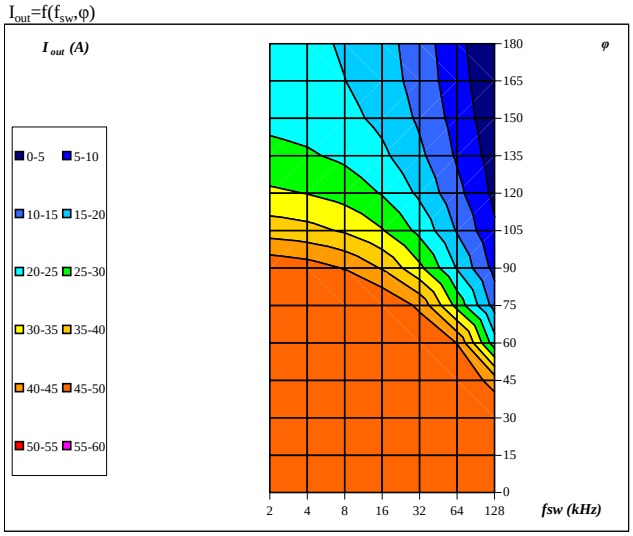


Conditions:	T_j=	Tjmax-25	°C		φ=	90°
	DC link=	700	V			
parameter:	Heatsink temp.					
	Th from	50	°C to	100		°C
	in	10	°C	steps		

Figure 22. Boost IGBT+FRED

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

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

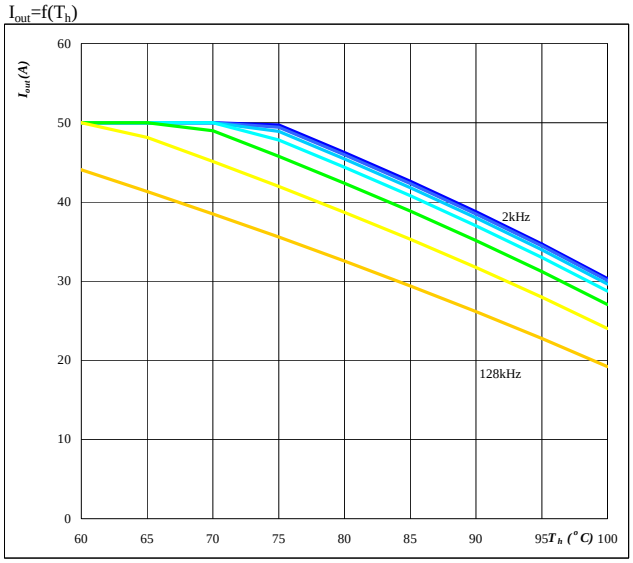


Conditions:	T_j=	Tjmax-25	°C
	DC link=	700	V
	T_h=	80	°C

Figure 23. per MODULE

Typical available output current as a function of heat sink temperature

$I_{out}=f(T_h)$

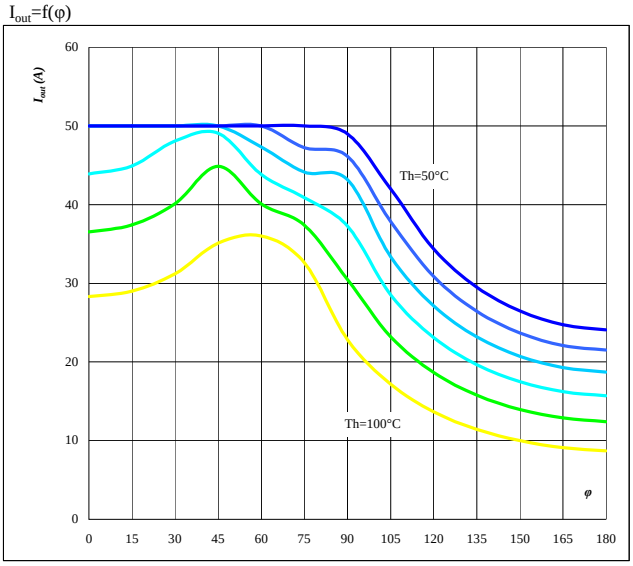


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
φ= 0 °
parameter: Switching freq.
fsw from 2 kHz to 128 kHz
in steps of factor 2

Figure 24. per MODULE

Typical available output current as a function of phase displacement

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

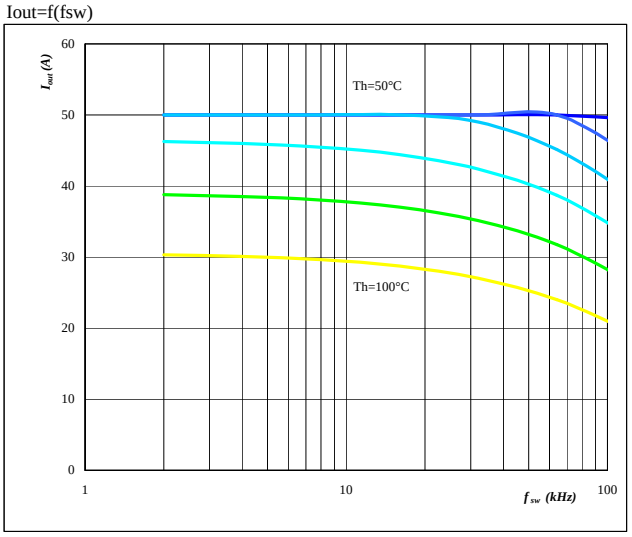


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
f_{sw}= 20 kHz
parameter: Heatsink temp.
Th from 50 °C to 100
in 10 °C steps

Figure 25. per MODULE

Typical available output current as a function of switching frequency

Iout=f(fsw)

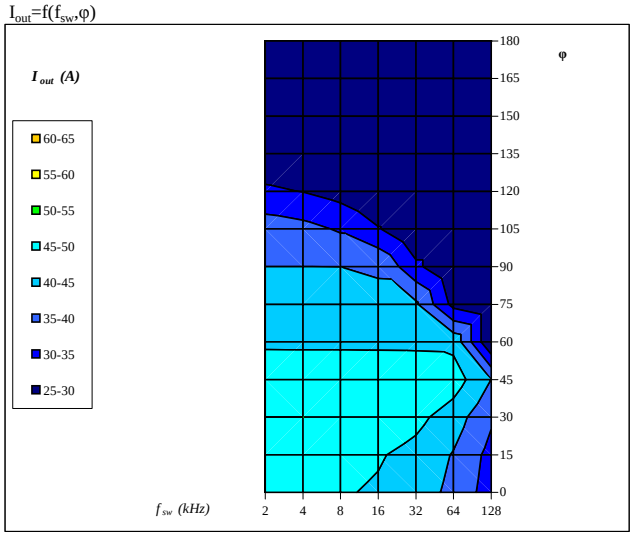


Conditions: T_j= Tjmax-25 °C φ= 0 °
DC link= 700 V
parameter: Heatsink temp.
Th from 50 °C to 100
in 10 °C steps

Figure 26. per MODULE

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

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

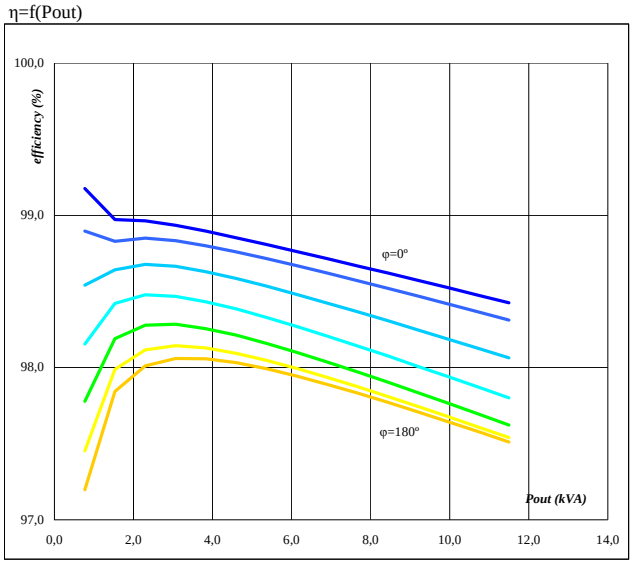


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
T_h= 80 °C

Figure 27. per MODULE

Typical efficiency as a function of output power

η=f(Pout)

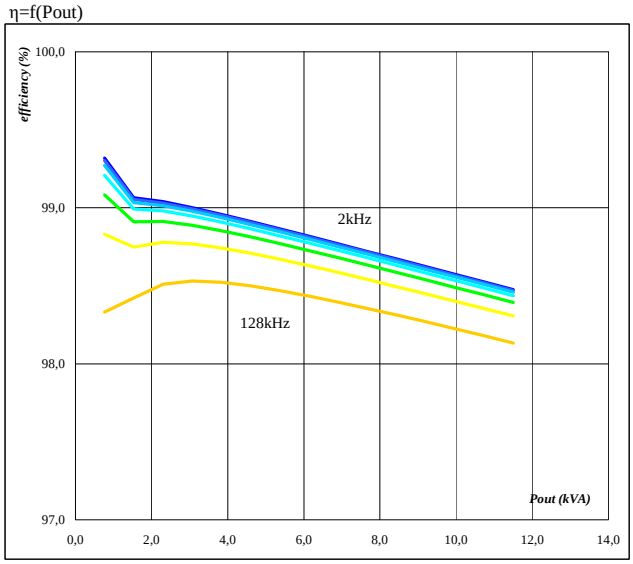


Conditions: T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
parameter: phase displacement
φ from 0 ° to 180 °
in steps of 30 °

Figure 28. per MODULE

Typical efficiency as a function of output power

η=f(Pout)

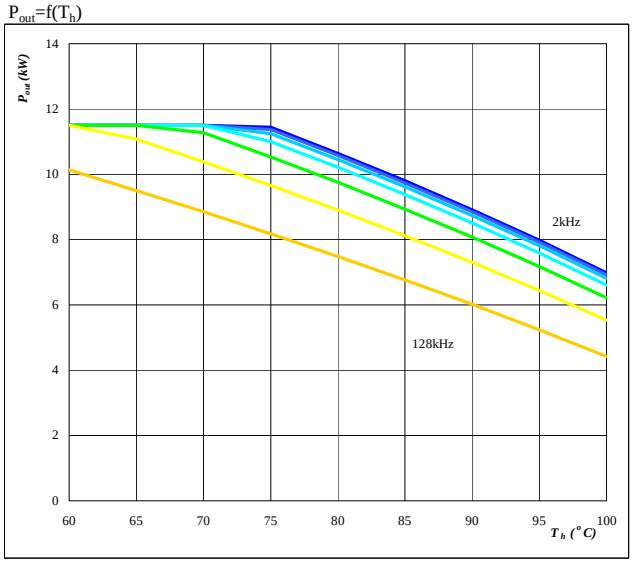


Conditions: T_j= 125 °C φ= 0 °
DC link= 700 V
parameter: Switching freq.
fsw from 2 kHz to 128 kHz
in steps of factor 2

Figure 29. per MODULE

Typical available output power as a function of heat sink temperature

$P_{out}=f(T_h)$

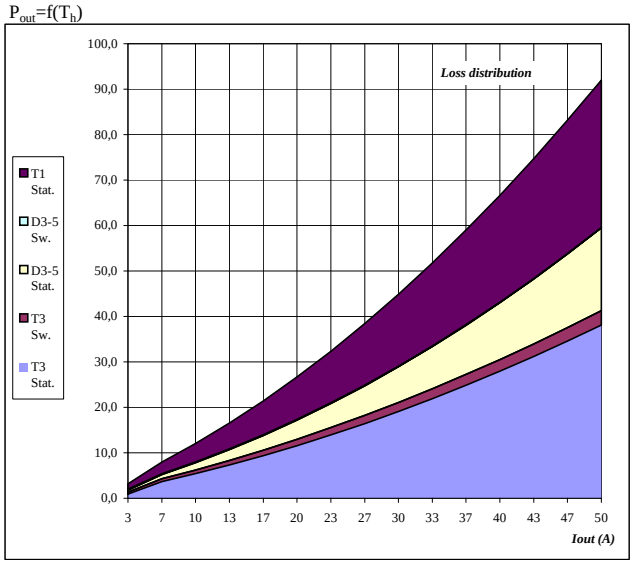


Conditions: T_j= Tjmax-25 °C
DC link= 700 V
φ= 0 °
parameter: Switching freq.
fsw from 2 kHz to 128 kHz
in steps of factor 2

Figure 30. per MODULE

Typical loss distribution as a function of output current

$P_{out}=f(T_h)$

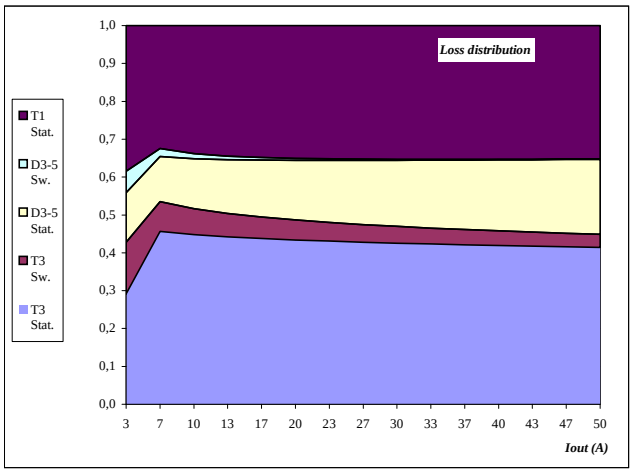


Conditions: T_j= 125 °C
f_{sw}= 20 kHz
DC link= 700 V
φ= 0 °

Figure 31. per MODULE

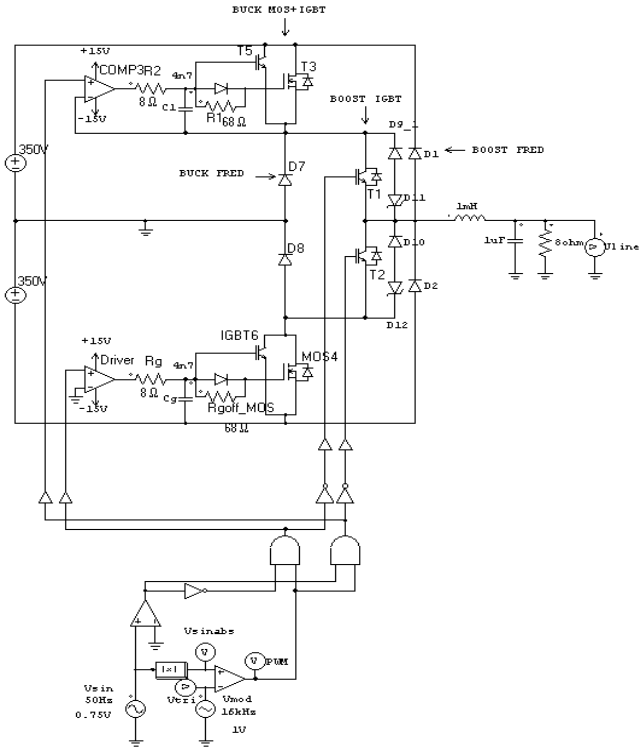
Typical relativ loss distribution as a function of output current

$P_{out}=f(T_h)$



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
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data may be published at a later date. Vincotech reserves the right to make changes at any time without notice in order to improve design. The data contained is exclusively intended for technically trained staff.
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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.