

General conditions

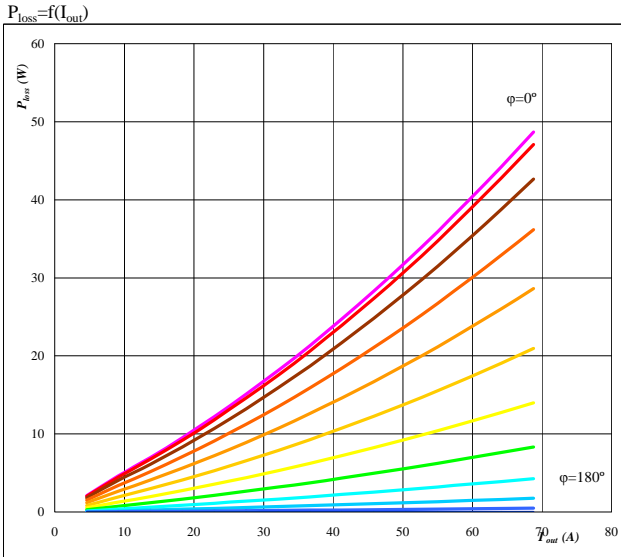
V_{out}= 230 VAC

BUCK	
V _{GEon}	= 15 V
V _{GEoff}	= -15 V
R _{gon}	= 8 Ω
R _{goff}	= 8 Ω

BOOST	
V _{GEon}	= 15 V
V _{GEoff}	= 0 V
R _{gon}	= 8 Ω
R _{goff}	= 8 Ω

Figure 1. Buck MOSFET

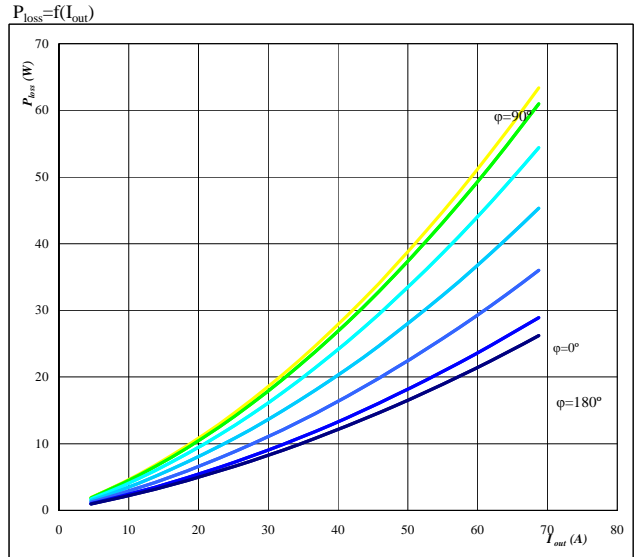
Typical average static loss as a function of output current I_{oRMS}



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

Figure 2. Buck FRED

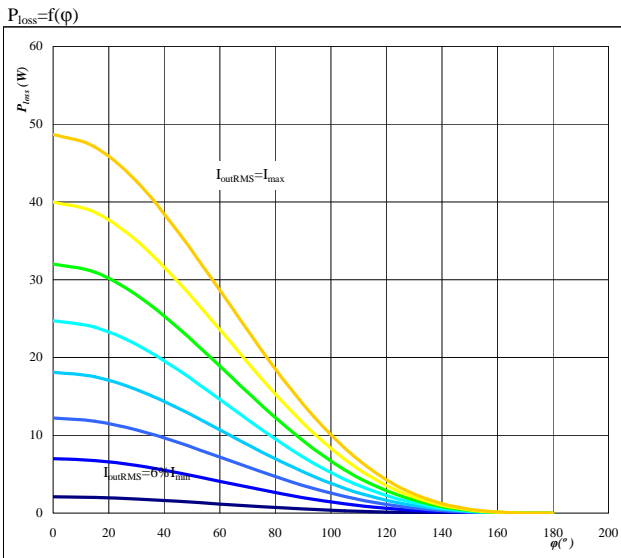
Typical average static loss as a function of output current I_{oRMS}



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

Figure 3. Buck MOSFET

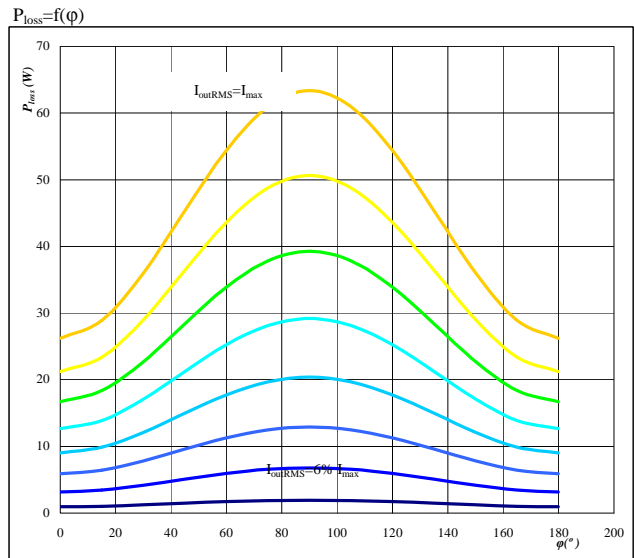
Typical average static loss as a function of phase displacement φ



Conditions: T_j= 125 °C
parameter: I_{oRMS} from 4,58 A to 68 A
in steps of 9 A

Figure 4. Buck FRED

Typical average static loss as a function of phase displacement φ

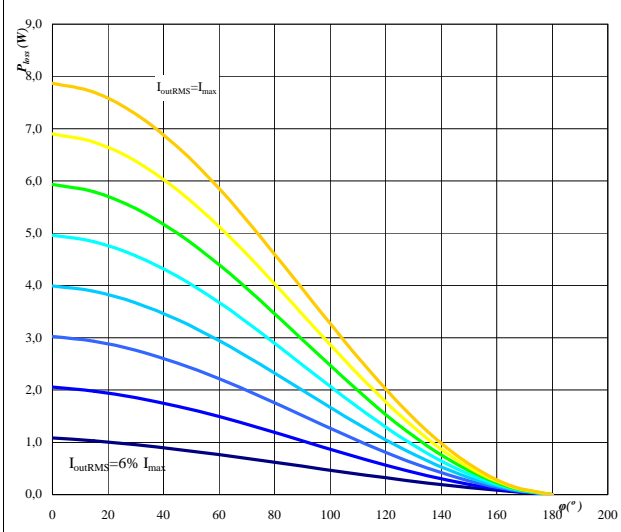


Conditions: T_j= 125 °C
parameter: I_{oRMS} from 4,58 A to 68 A
in steps of 9 A

Figure 5. Buck MOSFET

Typical average switching loss as a function of phase displacement ϕ

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

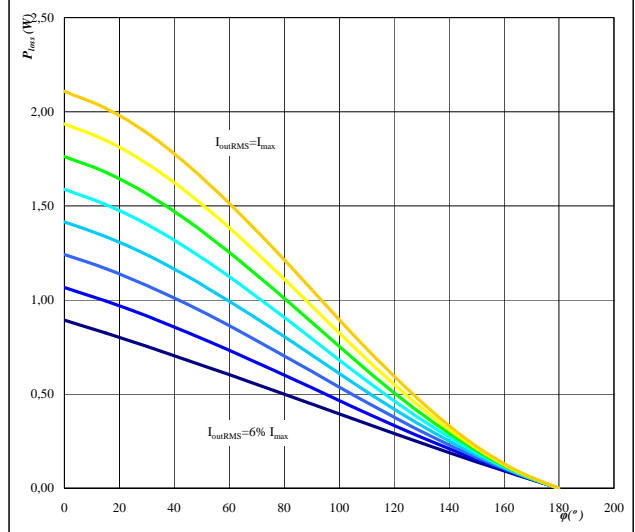


Conditions: $T_j = 125$ °C
 $f_{sw} = 20$ kHz
 DC link = 700 V
 parameter: I_{oRMS} from 4,58 A to 68 A
 in steps of 9 A

Figure 6. Buck FRED

Typical average switching loss as a function of phase displacement ϕ

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

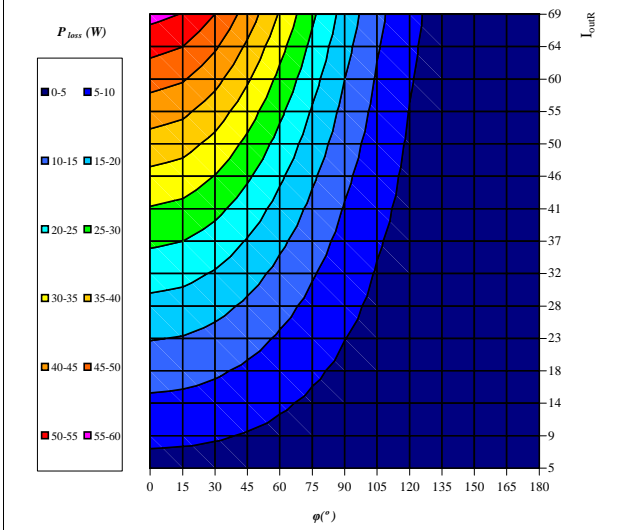


Conditions: $T_j = 125$ °C
 $f_{sw} = 20$ kHz
 DC link = 700 V
 parameter: I_{oRMS} from 4,58 A to 68 A
 in steps of 9 A

Figure 7. Buck MOSFET

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

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

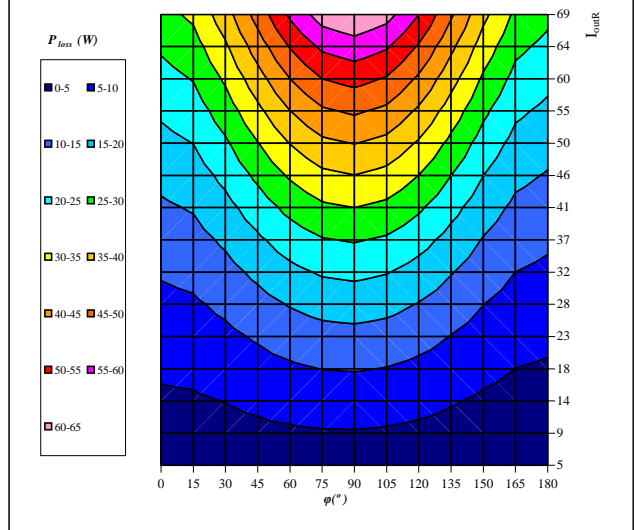


Conditions: $T_j = 125$ °C
 DC link = 700 V
 $f_{sw} = 20$ kHz

Figure 8. Buck FRED

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

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



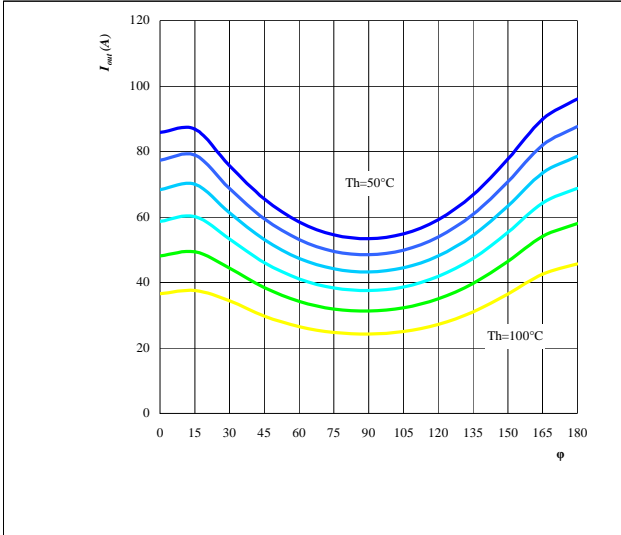
Conditions: $T_j = 125$ °C
 DC link = 700 V
 $f_{sw} = 20$ kHz

flowNPC 0 **NPC Application** 600V/75A & 70A PS*

Figure 9. for Buck MOSFET+FRED

Typical available output current as a function of phase displacement ϕ

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

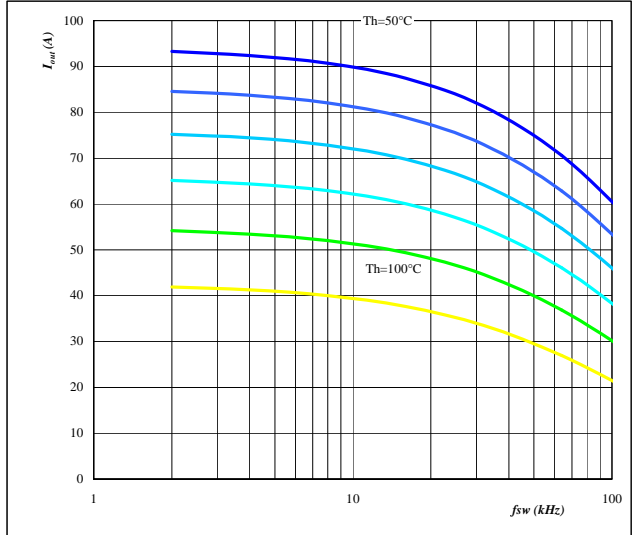


Conditions: $T_j = T_{jmax}-25 \text{ }^\circ\text{C}$ $f_{sw} = 20 \text{ kHz}$
 DC link= 700 V
 parameter: Heatsink temp.
 T_h from 50 $^\circ\text{C}$ to 100 $^\circ\text{C}$
 in 10 $^\circ\text{C}$ steps

Figure 10. for Buck MOSFET+FRED

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

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

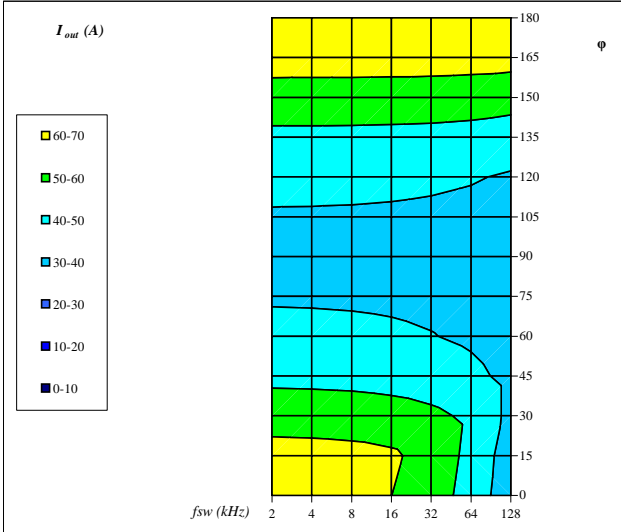


Conditions: $T_j = T_{jmax}-25 \text{ }^\circ\text{C}$ $\phi = 0^\circ$
 DC link= 700 V
 parameter: Heatsink temp.
 T_h from 50 $^\circ\text{C}$ to 100 $^\circ\text{C}$
 in 10 $^\circ\text{C}$ steps

Figure 11. for Buck IGBT+FRED

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

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



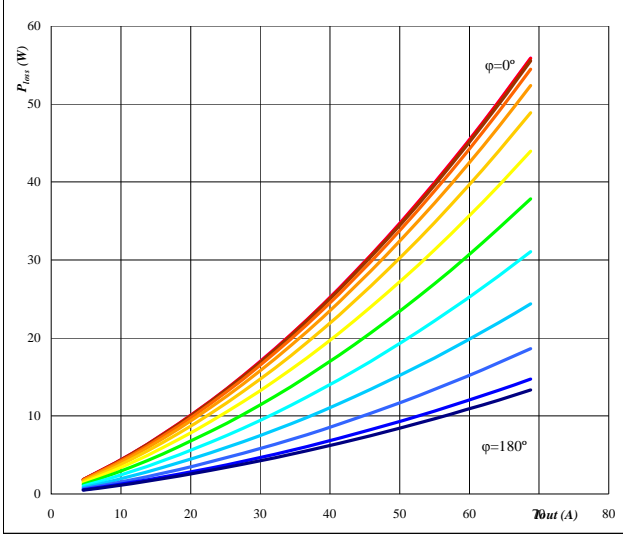
Conditions: $T_j = T_{jmax}-25 \text{ }^\circ\text{C}$
 DC link= 700 V
 $T_h = 80 \text{ }^\circ\text{C}$

flowNPC 0 **NPC Application** 600V/75A & 70A PS*

Figure 12. Boost IGBT

Typical average static loss as a function of output current

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

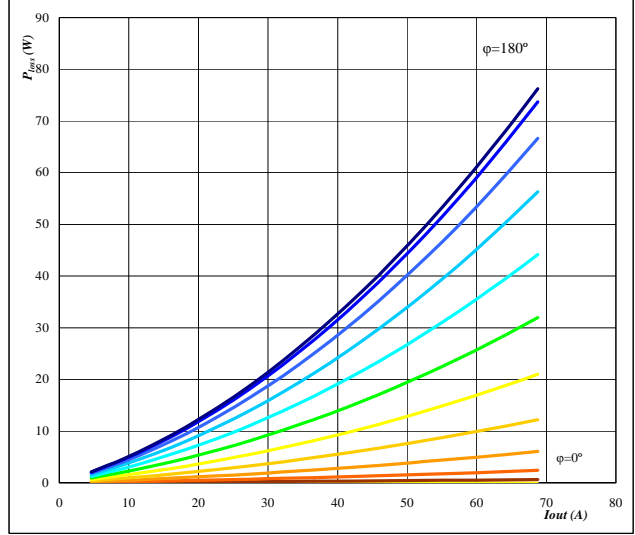


Conditions: $T_j = 125$ °C
parameter: ϕ from 0° to 180°
in 12 steps

Figure 13. Boost FRED

Typical average static loss as a function of output current

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

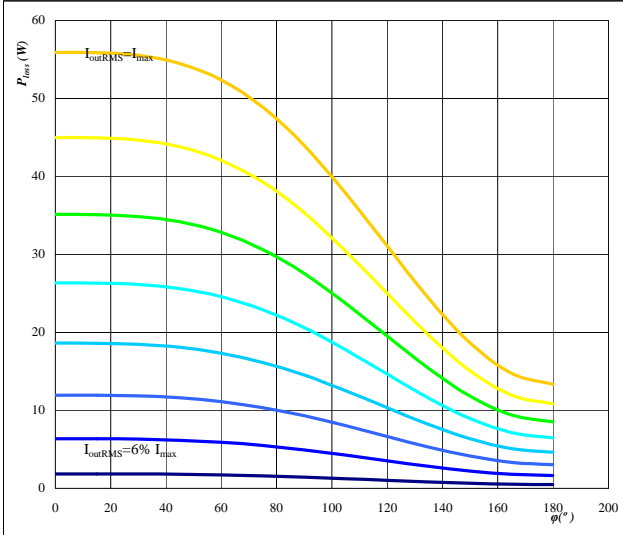


Conditions: $T_j = 125$ °C
parameter: ϕ from 0° to 180°
in 12 steps

Figure 14. Boost IGBT

Typical average static loss as a function of phase displacement

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

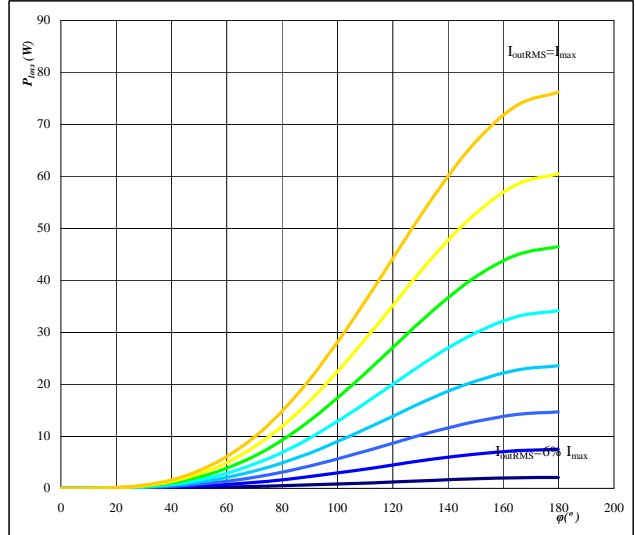


Conditions: $T_j = 125$ °C
parameter: I_{oRMS} from 5 A to 68 A
in steps of 9 A

Figure 15. Boost FRED

Typical average static loss as a function of phase displacement

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



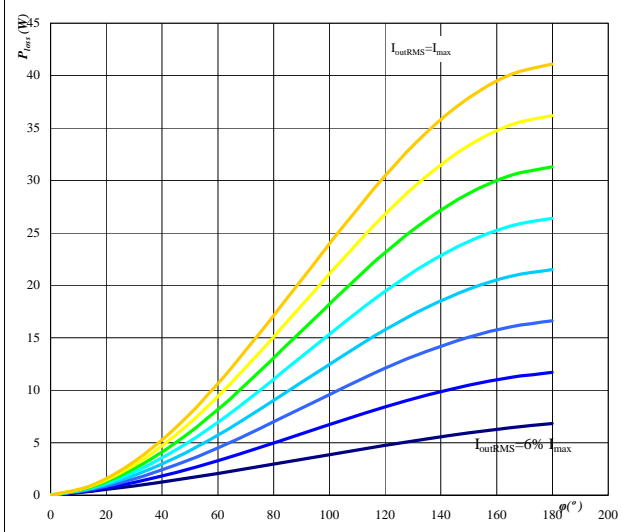
Conditions: $T_j = 125$ °C
parameter: I_{oRMS} from 5 A to 68 A
in steps of 9 A

flowNPC 0 **NPC Application** 600V/75A & 70A PS*

Figure 16. Boost IGBT

Typical average switching loss as a function of phase displacement

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

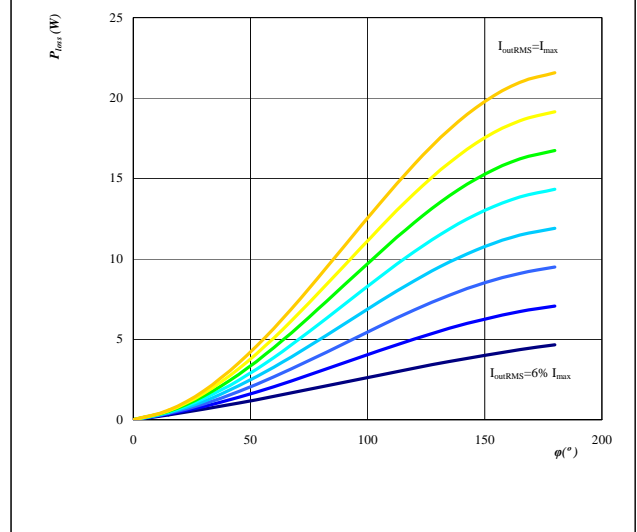


Conditions: $T_j = 125$ °C $f_{sw} = 20$ kHz
 DC link = 700 V
 parameter: I_{oRMS} from 5 A to 68 A
 in steps of 9 A A

Figure 17. Boost FRED

Typical average switching loss as a function of phase displacement

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

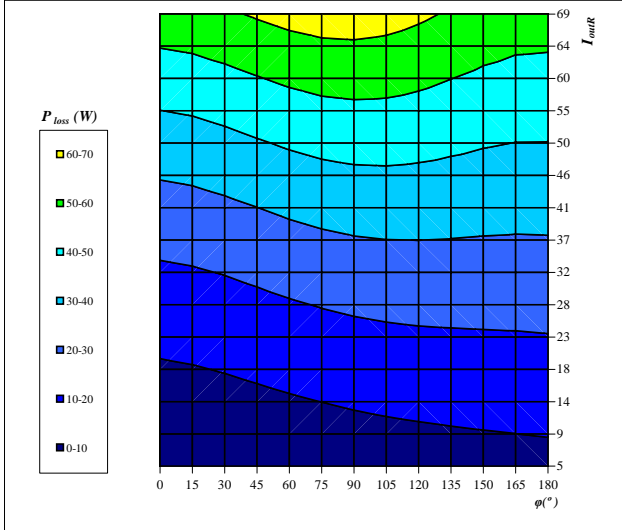


Conditions: $T_j = 125$ °C $f_{sw} = 20$ kHz
 DC link = 700 V
 parameter: I_{oRMS} from 5 A to 68 A
 in steps of 9 A A

Figure 18. Boost IGBT

Typical total loss as a function of phase displacement and I_{outRMS}

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

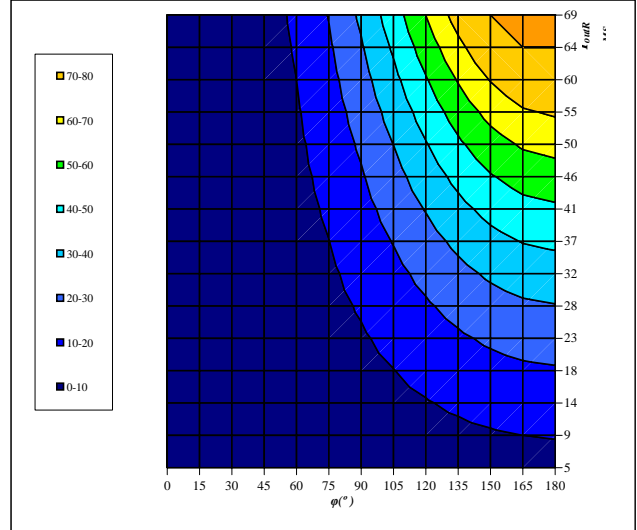


Conditions: $T_j = 125$ °C
 DC link = 700 V
 $f_{sw} = 20$ kHz

Figure 19. Boost FRED

Typical total loss as a function of phase displacement and I_{outRMS}

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

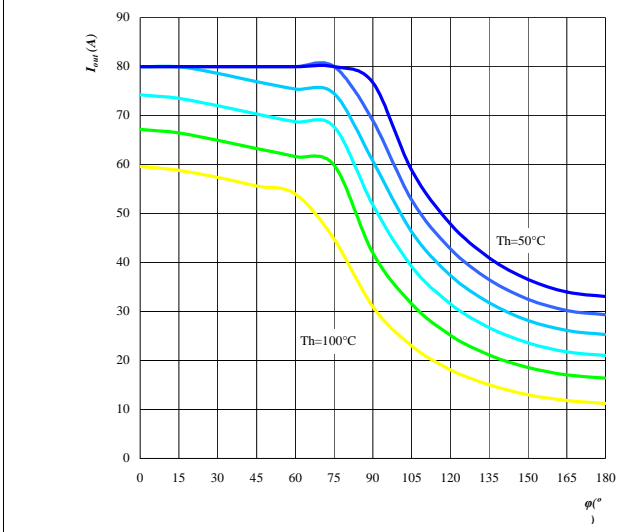


Conditions: $T_j = 125$ °C
 DC link = 700 V
 $f_{sw} = 20$ kHz

Figure 20. Boost IGBT+FRED

Typical available output current as a function of phase displacement

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

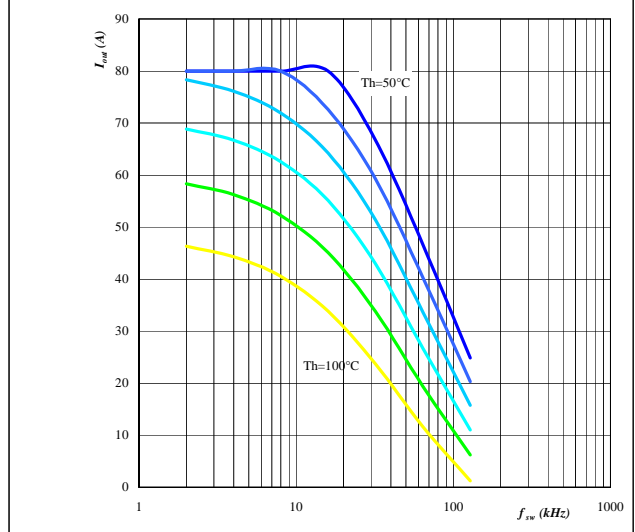


Conditions: $T_j = T_{jmax}-25 \text{ } ^\circ\text{C}$ $f_{sw} = 20 \text{ kHz}$
 DC link= 700 V
 parameter: Heatsink temp.
 Th from 50 $^\circ\text{C}$ to 100 $^\circ\text{C}$
 in 10 $^\circ\text{C}$ steps

Figure 21. Boost IGBT+FRED

Typical available output current as a function of switching frequency

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

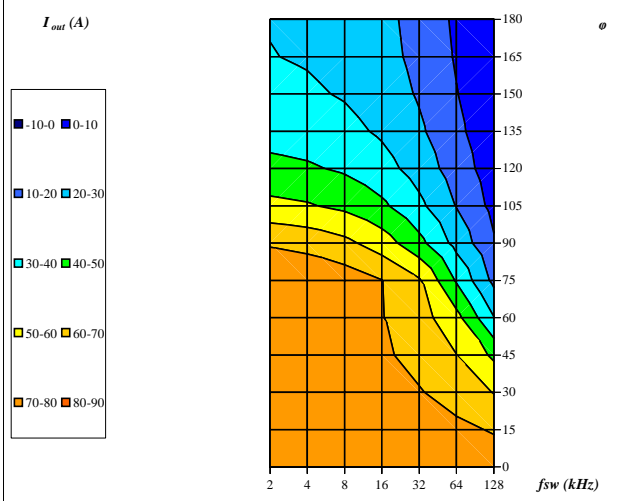


Conditions: $T_j = T_{jmax}-25 \text{ } ^\circ\text{C}$ $\varphi = 90^\circ$
 DC link= 700 V
 parameter: Heatsink temp.
 Th from 50 $^\circ\text{C}$ to 100 $^\circ\text{C}$
 in 10 $^\circ\text{C}$ steps

Figure 22. Boost IGBT+FRED

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

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

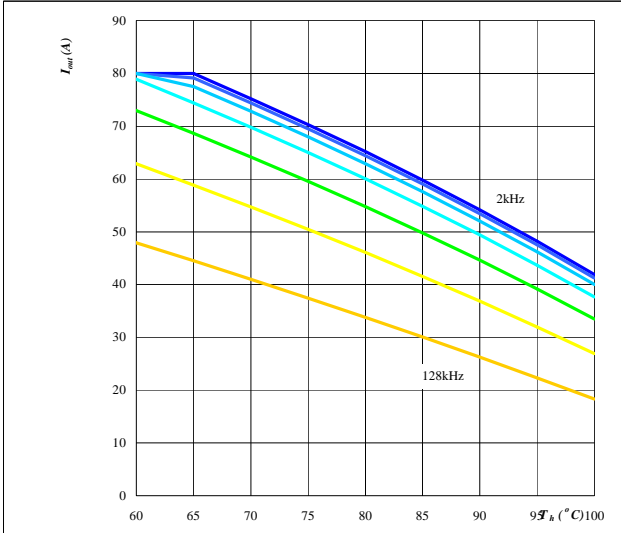


Conditions: $T_j = T_{jmax}-25 \text{ } ^\circ\text{C}$
 DC link= 700 V
 $T_h = 80 \text{ } ^\circ\text{C}$

Figure 23. per MODULE

Typical available output current as a function of heat sink temperature

$I_{out}=f(T_h)$

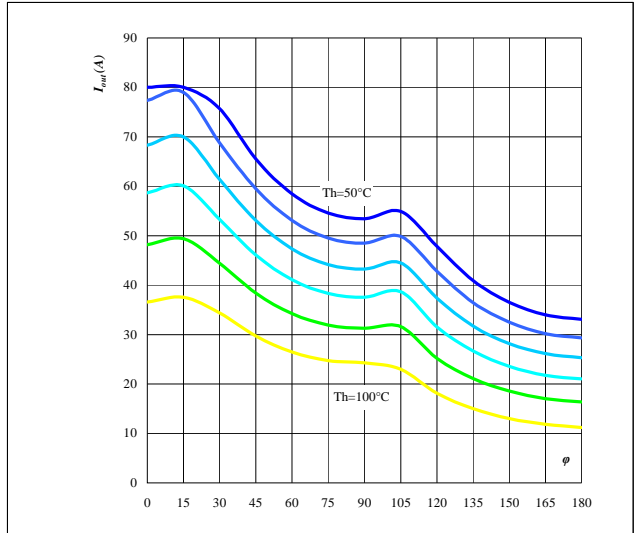


Conditions: $T_j = T_{jmax} - 25 \text{ }^\circ\text{C}$
 DC link= 700 V
 $\varphi = 0^\circ$
 parameter: Switching freq.
 fsw from 2 kHz to 128 kHz
 in steps of factor 2

Figure 24. per MODULE

Typical available output current as a function of phase displacement

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

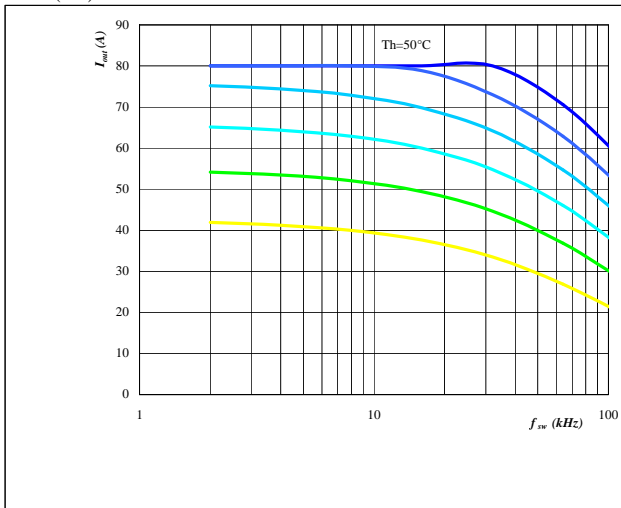


Conditions: $T_j = T_{jmax} - 25 \text{ }^\circ\text{C}$
 DC link= 700 V
 $f_{sw} = 20 \text{ kHz}$
 parameter: Heatsink temp.
 Th from 50 °C to 100 °C
 in 10 °C steps

Figure 25. per MODULE

Typical available output current as a function of switching frequency

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

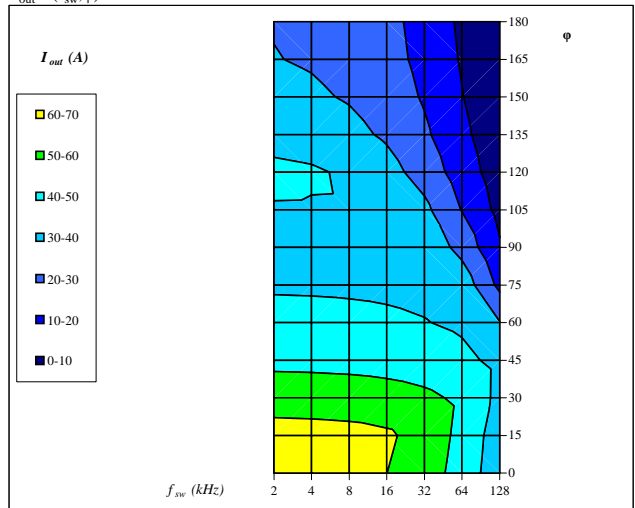


Conditions: $T_j = T_{jmax} - 25 \text{ }^\circ\text{C}$ $\varphi = 0^\circ$
 DC link= 700 V
 parameter: Heatsink temp.
 Th from 50 °C to 100 °C
 in 10 °C steps

Figure 26. per MODULE

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

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

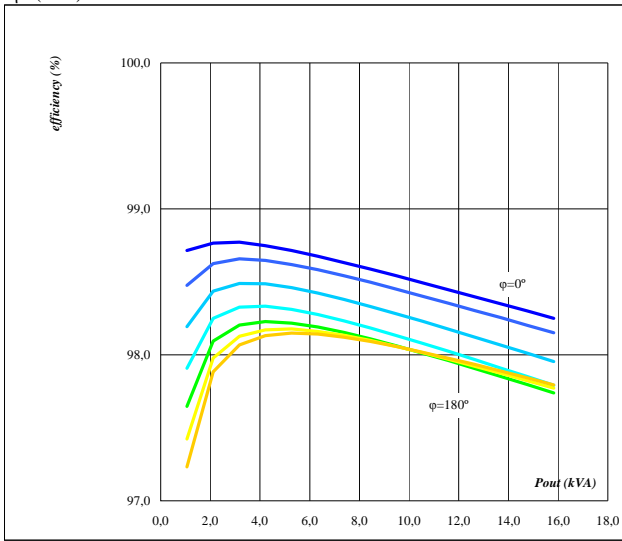


Conditions: $T_j = T_{jmax} - 25 \text{ }^\circ\text{C}$
 DC link= 700 V
 $T_h = 80 \text{ }^\circ\text{C}$

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Figure 27. per MODULE

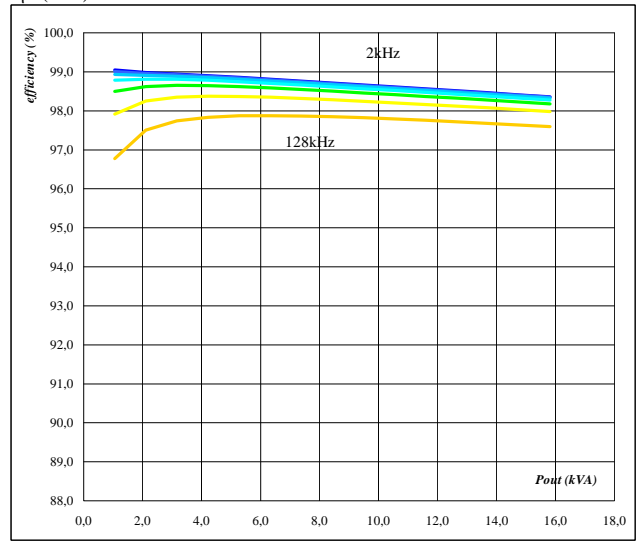
Typical efficiency as a function of output power
 $\eta=f(P_{out})$



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

Figure 28. per MODULE

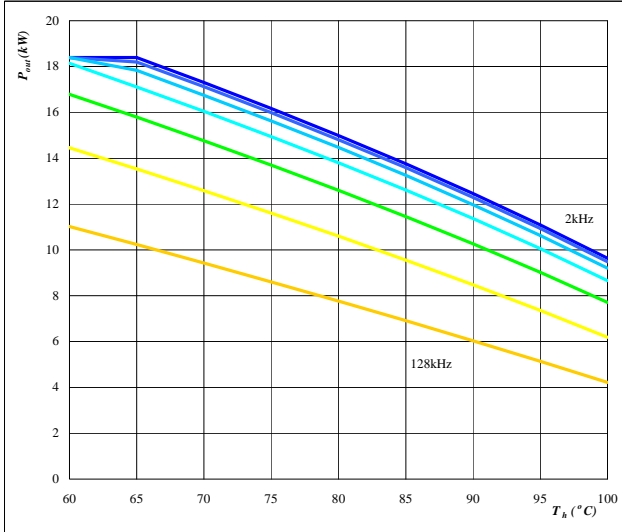
Typical efficiency as a function of output power
 $\eta=f(P_{out})$



Conditions: $T_j = 125 \text{ }^\circ\text{C}$ $\phi = 0^\circ$
 DC link = 700 V
 parameter: Switching freq. f_{sw} from 2 kHz to 128 kHz
 in steps of factor 2

Figure 29. per MODULE

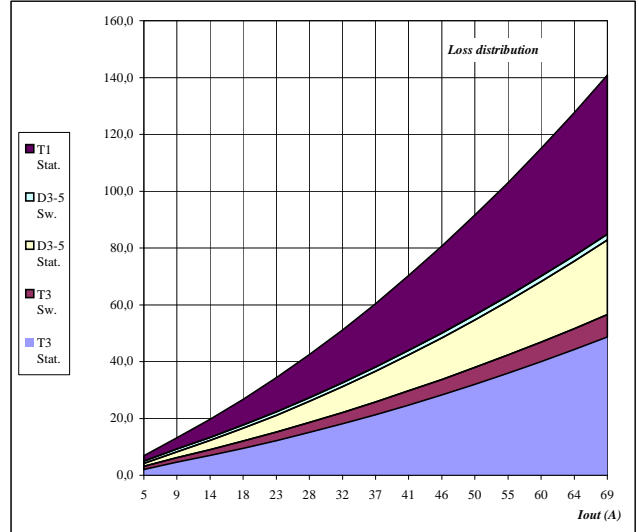
Typical available output power as a function of heat sink temperature
 $P_{out}=f(T_h)$



Conditions: $T_j = T_{jmax} - 25 \text{ }^\circ\text{C}$
 DC link = 700 V
 $\phi = 0^\circ$
 parameter: Switching freq. f_{sw} from 2 kHz to 128 kHz
 in steps of factor 2

Figure 30. per MODULE

Typical loss distribution as a function of output current
 $P_{out}=f(T_h)$

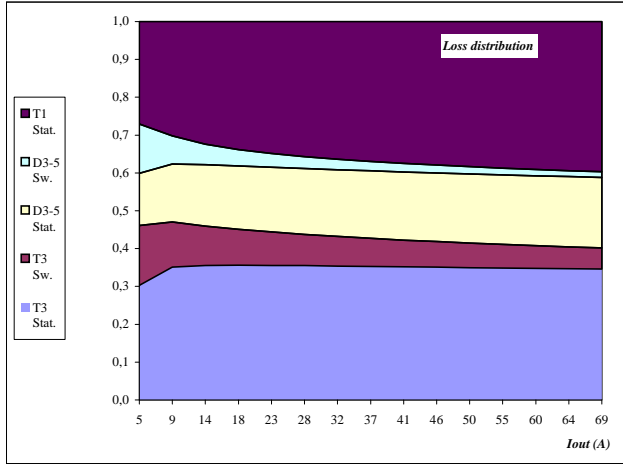


Conditions: $T_j = 125 \text{ }^\circ\text{C}$
 $f_{sw} = 20 \text{ kHz}$
 DC link = 700 V
 $\phi = 0^\circ$

Figure 31. per MODULE

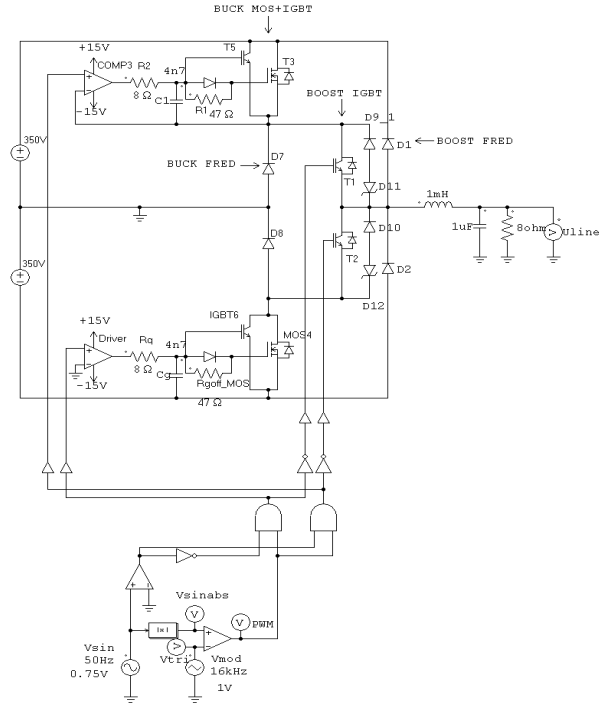
Typical relativ loss distribution as a function of output current

$$P_{out}=f(T_h)$$



Conditions:

$T_j =$	125	°C
$f_{sw} =$	20	kHz
DC link =	700	V
$\phi =$	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.
Final	Full Production	This datasheet contains final specifications. 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.