Switching Definitions INPUT BOOST MOSFET+IGBT

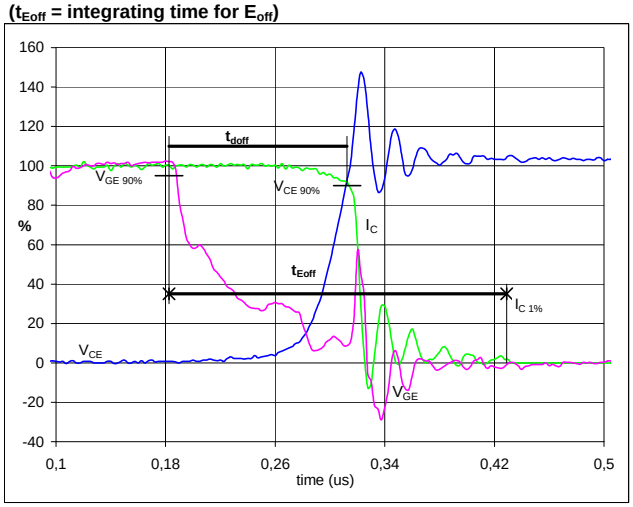
General conditions

T_j	=	125 °C
$R_{gon\ IGBT}$	=	4 Ω
$R_{goff\ IGBT}$	=	4 Ω

MOSFET turn off delayed by 100ns

Figure 1 INPUT BOOST MOSFET+IGBT

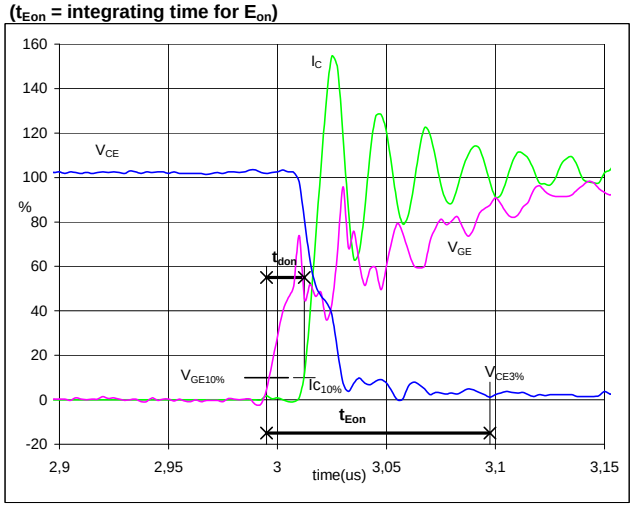
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff}
(t_{Eoff} = integrating time for E_{off})



V_{GE} (0%) =	0	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	77	A
t_{doff} =	0,12	µs
t_{Eoff} =	0,25	µs

Figure 2 INPUT BOOST MOSFET+IGBT

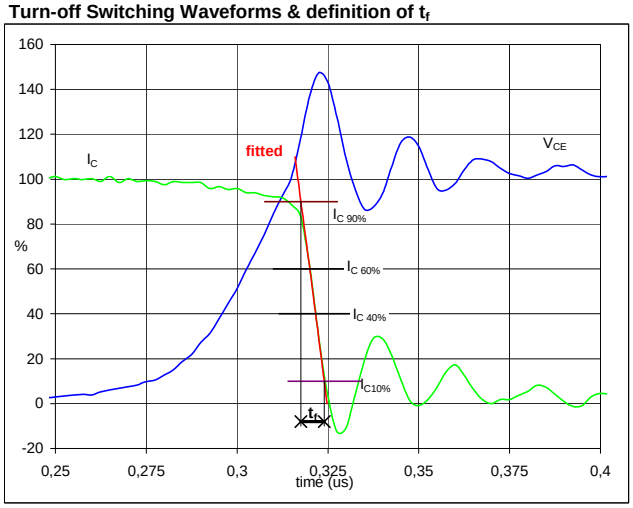
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon}
(t_{Eon} = integrating time for E_{on})



V_{GE} (0%) =	0	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	77	A
t_{don} =	0,02	µs
t_{Eon} =	0,10	µs

Figure 3 INPUT BOOST MOSFET+IGBT

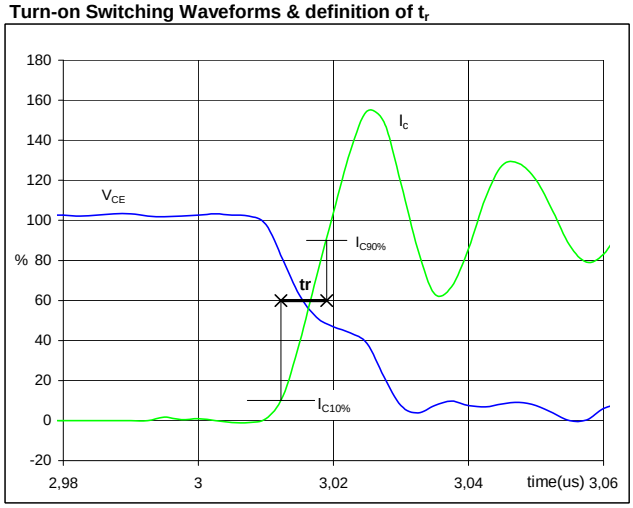
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	350	V
I_C (100%) =	77	A
t_f =	0,007	µs

Figure 4 INPUT BOOST MOSFET+IGBT

Turn-on Switching Waveforms & definition of t_r

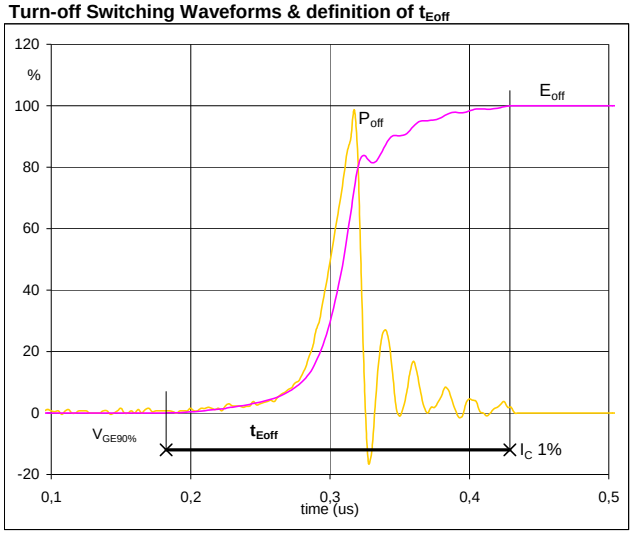


V_C (100%) =	350	V
I_C (100%) =	77	A
t_r =	0,007	µs

Switching Definitions INPUT BOOST MOSFET+IGBT

Figure 5 INPUT BOOST MOSFET+IGBT

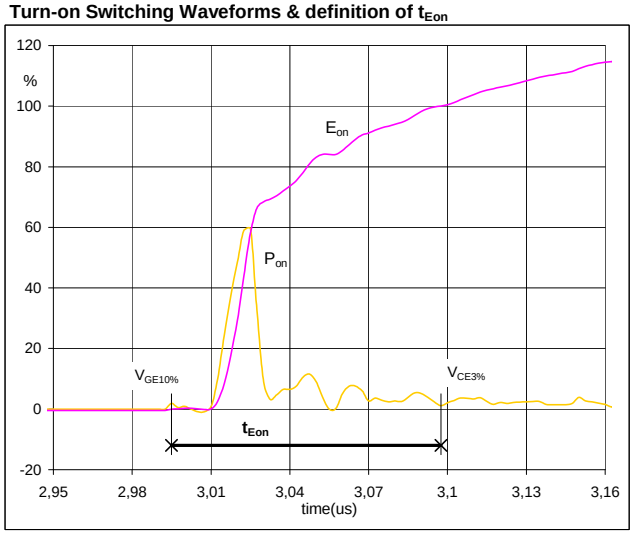
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	27,11	kW
E_{off} (100%) =	0,84	mJ
t_{Eoff} =	0,25	µs

Figure 6 INPUT BOOST MOSFET+IGBT

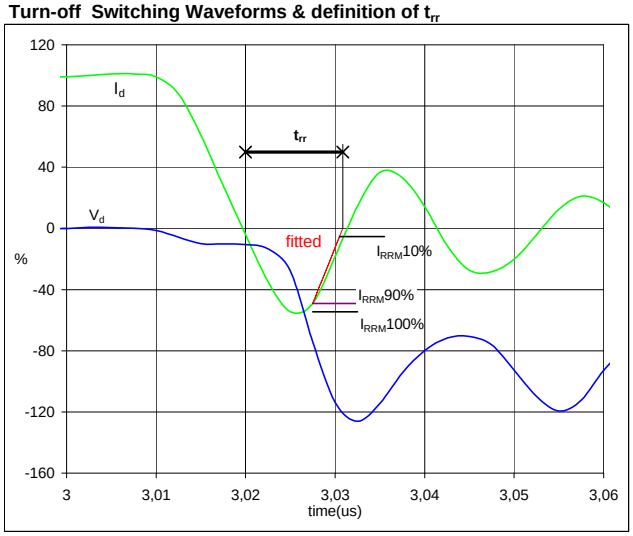
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	27,11	kW
E_{on} (100%) =	0,29	mJ
t_{Eon} =	0,10	µs

Figure 7 INPUT BOOST MOSFET+IGBT

Turn-off Switching Waveforms & definition of t_{rr}

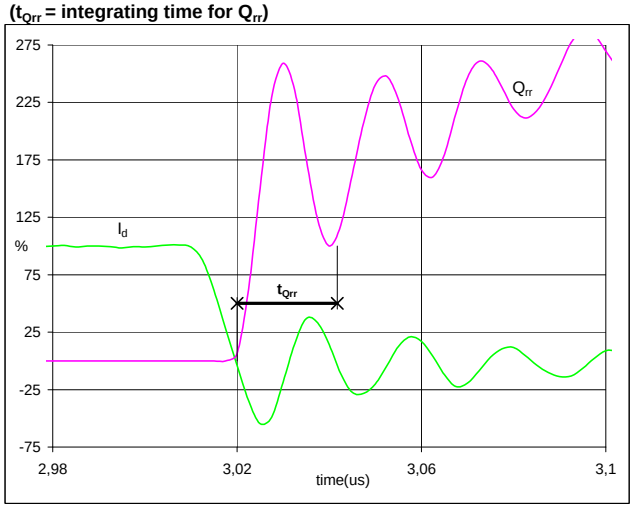


V_d (100%) =	350	V
I_d (100%) =	77	A
I_{RRM} (100%) =	-43	A
t_{rr} =	0,012	µs

Figure 8 INPUT BOOST MOSFET+IGBT

Turn-on Switching Waveforms & definition of t_{Qrr}

(t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	77	A
Q_{rr} (100%) =	0,60	µC
t_{Qrr} =	0,02	µs

flowBoost0	DC Boost Application	600V/84A PS*

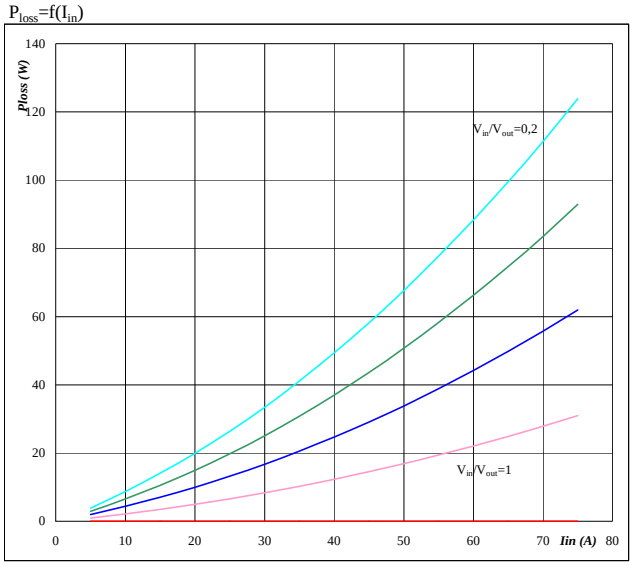
General conditions

BOOST		
V_{GEon}	=	15 V
V_{GEoff}	=	0 V
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

Figure 1. IGBT+MOSFET

Typical average static loss as a function of input current Ii$_{RMS}$

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

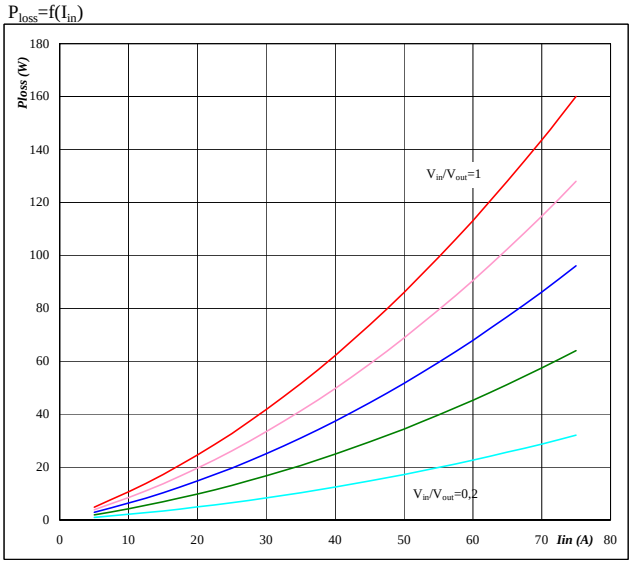


Conditions: T_j= 125 °C
Ratio of input DC voltage to output DC voltage
parameter: V_{in}/V_{out} from 0,2 to 1,0
in 0,2 steps

Figure 2. FWD

Typical average static loss as a function of input current Ii$_{RMS}$

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

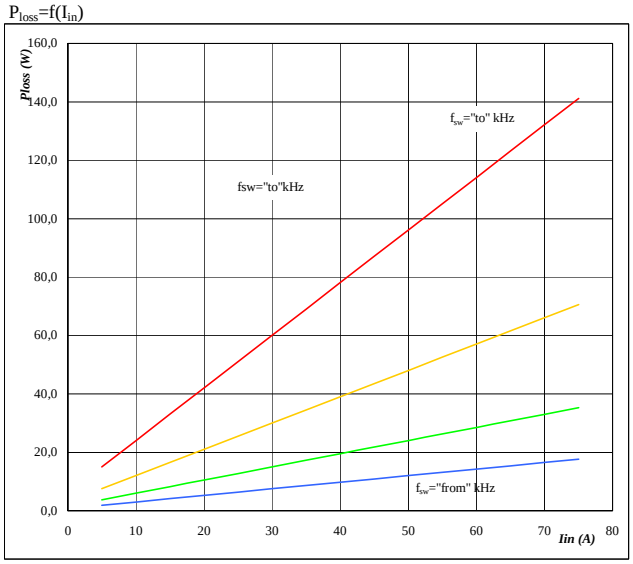


Conditions: T_j= 125 °C
Ratio of input DC voltage to output DC voltage
parameter: V_{in}/V_{out} from 0,2 to 1,0
in 0,2 steps

Figure 3. IGBT+MOSFET

Typical average switching loss as a function of input current

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

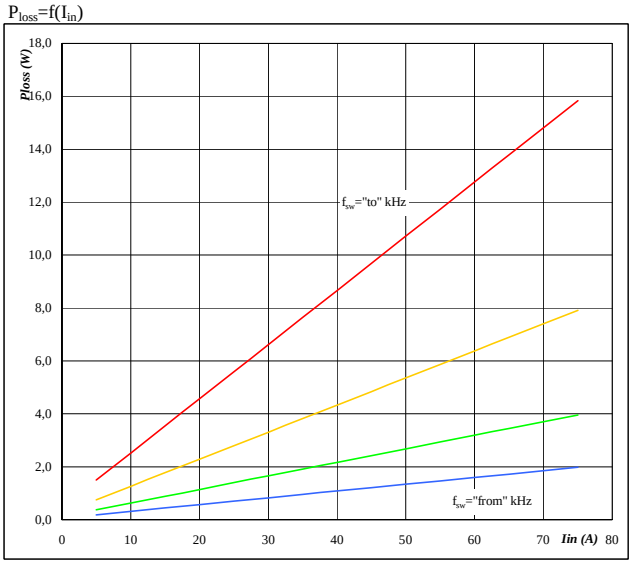


Conditions: Tj= 125 °C
V_{out} = 350 V
Sw. freq. fsw from 16 kHz to 128 kHz
in steps of factor 2

Figure 4. FWD

Typical average switching loss as a function of input current

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



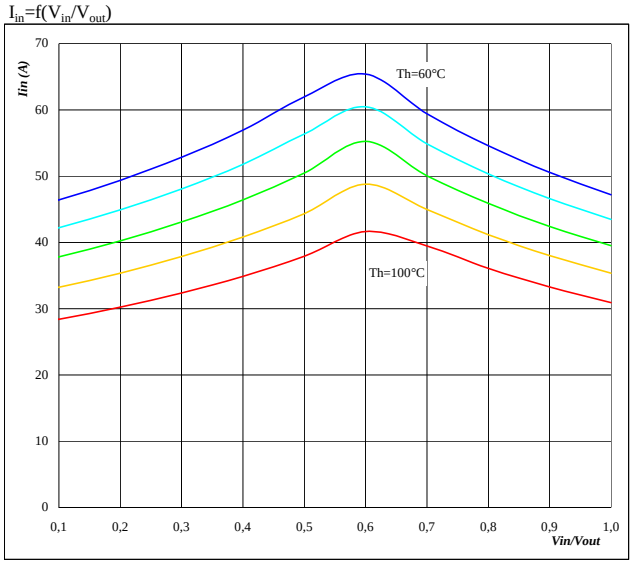
Conditions: Tj= 125 °C
V_{out} = 350 V
Sw. freq. fsw from 16 kHz to 128 kHz
in steps of factor 2

flowBoost0 | **DC Boost Application** | **600V/84A PS***

Figure 5. **per PHASE**

Typical available input current as a function of V_{in}/V_{out}

$I_{in}=f(V_{in}/V_{out})$

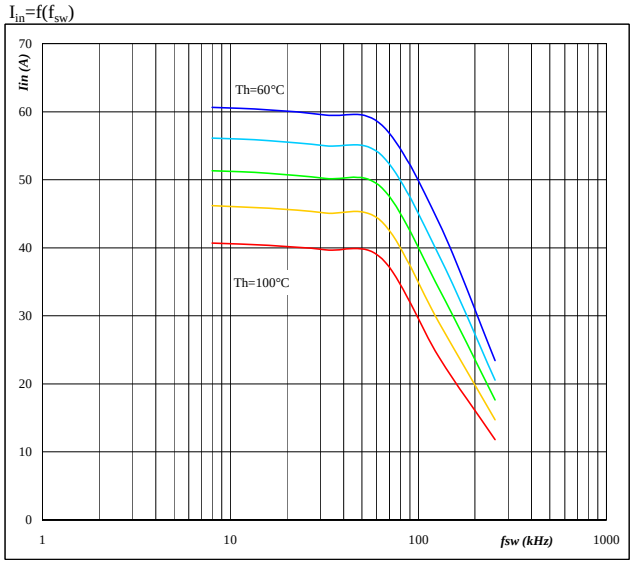


Conditions: T_j= T_{jmax}-25°C
DC link= 350 V f_{sw}= 50 kHz
parameter: Heatsink temp.
Th from 60 °C to 100 °C
in 10 °C steps

Figure 6. **per PHASE**

Typical available input current as a function of switching frequency

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

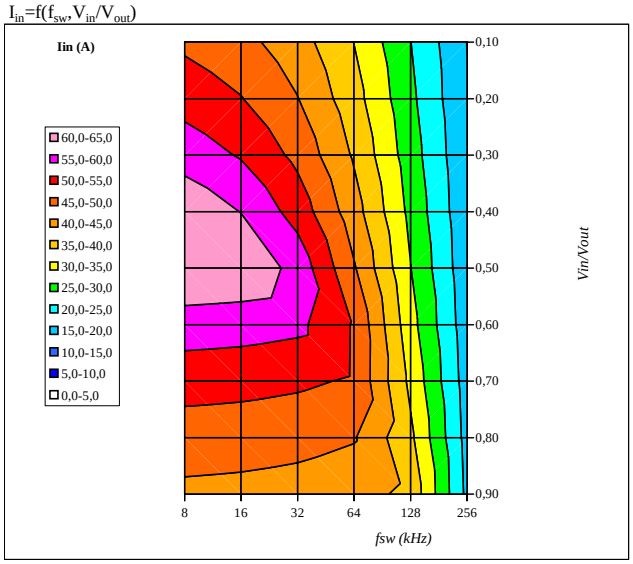


Conditions: T_j= T_{jmax}-25°C
DC link= 350 V Vin 250 V
parameter: Heatsink temp.
Th from 60 °C to 100 °C
in 10 °C steps

Figure 7. **per PHASE**

Typical available input current as a function of f_{sw} and V_{in}/V_{out}

$I_{in}=f(f_{sw},V_{in}/V_{out})$

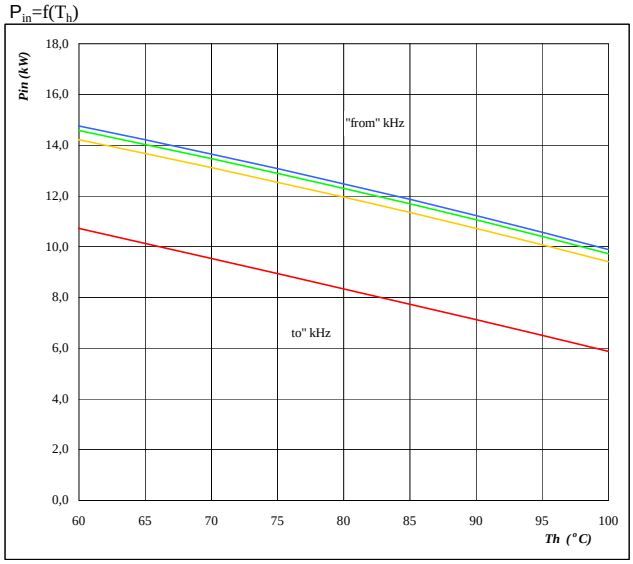


Conditions: Tj= T_{jmax}-25°C
DC link= 350 V
Th= 80 °C

Figure 8. **per PHASE**

Typical available electric input power as a function of heatsink temperature

$P_{in}=f(T_h)$

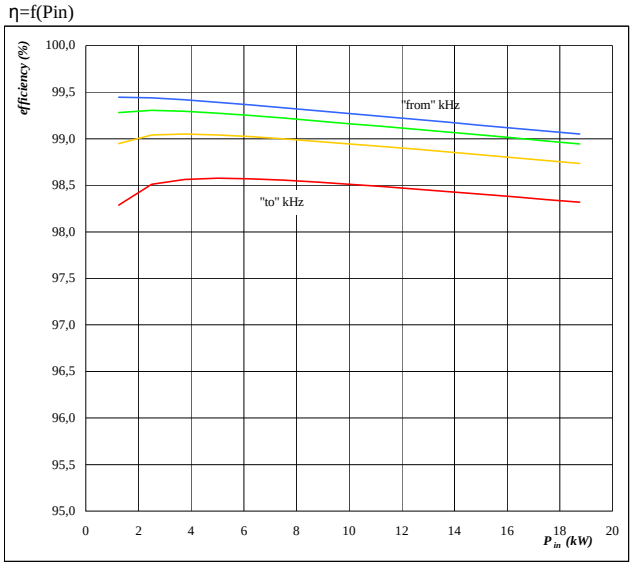


Conditions: Tj= T_{jmax}-25°C
Vin 250 V DC link= 350 V
Sw. freq. fsw from 16 kHz to 128 kHz

Figure 9. **per PHASE**

Typical efficiency as a function of input power

η=f(Pin)



Conditions: Tj= T_{jmax}-25°C

Vin 250 V DC link= 350 V

parameter:

Sw. freq. fsw from 16 kHz to 128 kHz