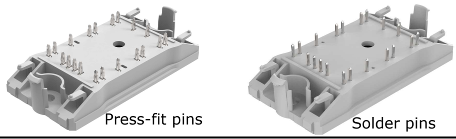
flow **MNPC 0** — **650 V / 100 A**

Features

- Mixed voltage NPC topology
- Reactive power capability
- Low inductance layout
- Common collector neutral connection

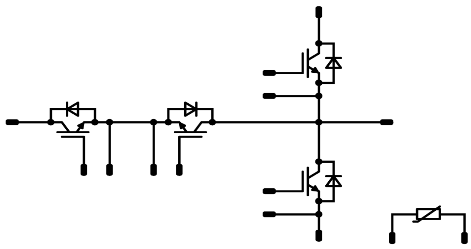
flow 0 12mm housing



Target Applications

- Solar Inverter
- UPS

Schematic



Types

- 10-FZ07NMA100SM-M265F58
- 10-PZ07NMA100SM-M265F58Y

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Buck Switch					
Collector-emitter breakdown voltage	V_{CES}			650	V
DC collector current	I_C	$T_j = T_{jmax}$	T_s = 80 °C	79	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		300	A
Turn off safe operating area		T_j ≤ 150 °C $V_{CE} <= V_{CES}$		300	A
Power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	136	W
Gate-emitter peak voltage	V_{GE}			±20	V
Maximum Junction Temperature	T_{jmax}			175	°C
Buck Diode					
Peak Repetitive Reverse Voltage	V_{RRM}			600	V
Mean forward current	I_{FAV}	$T_j = T_{jmax}$	T_s = 80 °C	50	A
Power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	69	W
Maximum Junction Temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Boost Switch					
Collector-emitter breakdown voltage	V_{CES}			600	V
DC collector current	I_C	$T_j = T_{jmax}$	T_s = 80 °C	57	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		225	A
Turn off safe operating area		T_j ≤ 150 °C $V_{CE} <= V_{CES}$		225	A
Power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	82	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	T_j ≤ 150 °C V_{GE} = 15 V		6 360	μs V
Maximum Junction Temperature	T_{jmax}			175	°C
Boost Diode					
Peak Repetitive Reverse Voltage	V_{RRM}			650	V
Mean forward current	I_{FAV}	$T_j = T_{jmax}$	T_s = 80 °C	47	A
Surge (non-repetitive) forward current	I_{FSM}	t_p = 10 ms		100	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		100	A
Power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	70	W
Maximum Junction Temperature	T_{jmax}			175	°C
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{op}			-40…+(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage		t = 2 s	DC Test Voltage*	4000	V
Creepage distance		Press-fit pins / Solder pins		min >12,7	mm
Clearance		Press-fit pins / Solder pins		9 / 9,15	mm
Comparative Tracking Index	CTI			>200	

*100% tested in production

Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] V_{GS} [V]	V_r [V] V_{CE} [V] V_{DS} [V]	I_C [A] I_F [A] I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Buck Switch										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		100	25 125	1	1,63 1,78	2,4	V
Collector-emitter cut-off current incl. Diode	I_{CES}		0	650		25			0,07	mA
Gate-emitter leakage current	I_{GES}		20	0		25			400	nA
Integrated Gate resistor	R_{gint}							none		Ω
Turn-on delay time	$t_{d(on)}$					25 125		70 71		
Rise time	t_r					25 125		18 21		ns
Turn-off delay time	$t_{d(off)}$	R_{goff} = 4 Ω R_{gon} = 4 Ω	±15	150	50	25 125		78 94		
Fall time	t_f					25 125		13 22		
Turn-on energy loss	E_{on}					25 125		0,14 0,27		mWs
Turn-off energy loss	E_{off}					25 125		0,18 0,32		
Input capacitance	C_{ies}							6000		
Output capacitance	C_{oss}	f = 1 MHz	0	25		25		100		pF
Reverse transfer capacitance	C_{rss}							22		
Gate charge	Q_G		±15	520	100	25		240		nC
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,7		K/W
Buck Diode										
Diode forward voltage	V_F				60	25 125		1,80 1,58	3	V
Reverse leakage current	I_r			600		25			10	μA
Peak reverse recovery current	I_{RRM}					25 125		41 59		A
Reverse recovery time	t_{rr}					25 125		33 113		ns
Reverse recovered charge	Q_{rr}	R_{gon} = 4 Ω	±15	150	50	25 125		1,00 3,10		μC
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125		4239 2404		A/μs
Reverse recovered energy	E_{rec}					25 125		0,084 0,306		mWs
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,38		K/W

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_r [V] V_{CE} [V] V_{DS} [V]	I_C [A] I_F [A] I_D [A]	T_j [°C]	Min	Typ	Max	
Boost Switch										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0012	25	5	5,8	6,5	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125	1,05	1,44 1,58	1,85	V
Collector-emitter cut-off incl diode	I_{CES}		0	600		25			0,03	mA
Gate-emitter leakage current	I_{GES}		20	0		25			700	nA
Integrated Gate resistor	R_{gint}							none		Ω
Turn-on delay time	$t_{d(on)}$	R_{goff} = 4 Ω R_{gon} = 4 Ω	±15	150	50	25 125		93 94		ns
Rise time	t_r					25 125		14 17		
Turn-off delay time	$t_{d(off)}$					25 125		138 156		
Fall time	t_f					25 125		74 97		
Turn-on energy loss	E_{on}					25 125		0,13 0,25		mWs
Turn-off energy loss	E_{off}					25 125		0,70 0,95		
Input capacitance	C_{ies}	f = 1 MHz	0	25		25		4620		pF
Output capacitance	C_{oss}							288		
Reverse transfer capacitance	C_{rss}							137		
Gate charge	Q_G		15	480	75	25		470		nC
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,16		K/W
Boost Diode										
Diode forward voltage	V_F				50	25 125	1	1,62 1,53	2	V
Reverse leakage current	I_r			650		25			27	µA
Peak reverse recovery current	I_{RRM}	R_{gon} = 4 Ω	±15	150	60	25 125		37 43		A
Reverse recovery time	t_{rr}					25 125		144 290		ns
Reverse recovered charge	Q_{rr}					25 125		1,98 4,21		µC
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125		2751 1443		A/µs
Reverse recovery energy	E_{rec}					25 125		0,24 0,52		mWs
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,36		K/W
Thermistor										
Rated resistance	R					25		22000		Ω
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1486 Ω				100	-12		+14	%
Power dissipation	P					25		200		mW
Power dissipation constant						25		2		mW/K
B-value	B(25/50)	Tol. ±3%				25		3950		K
B-value	B(25/100)	Tol. ±3%				25		3998		K
Vincotech NTC Reference									B	

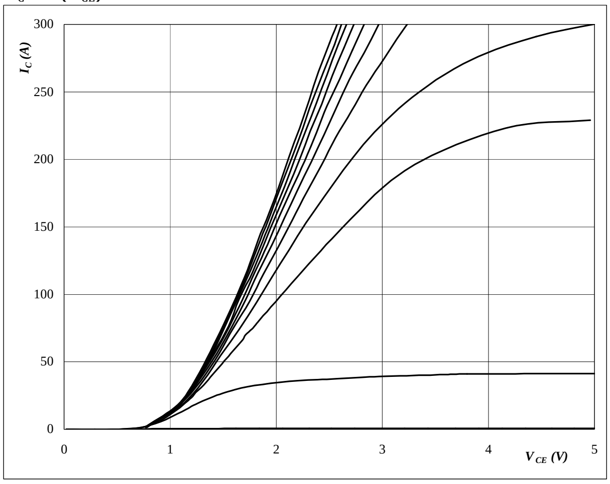
Buck

Buck Switch IGBT and Buck Diode FWD

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



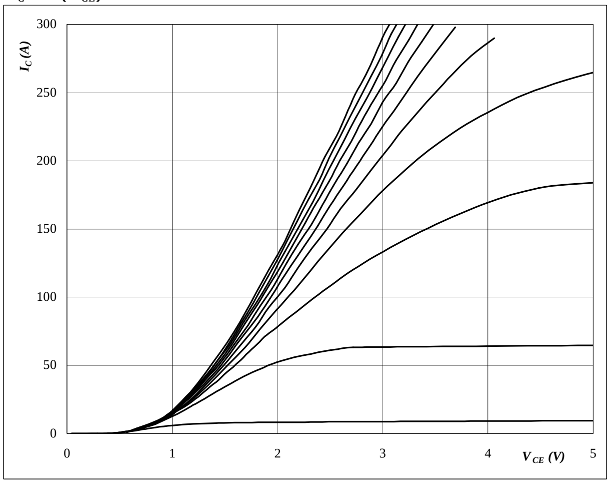
At

t_p =	250	μs
T_j =	25	°C
V_{GE} from	5 V to 15 V in steps of 1 V	

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



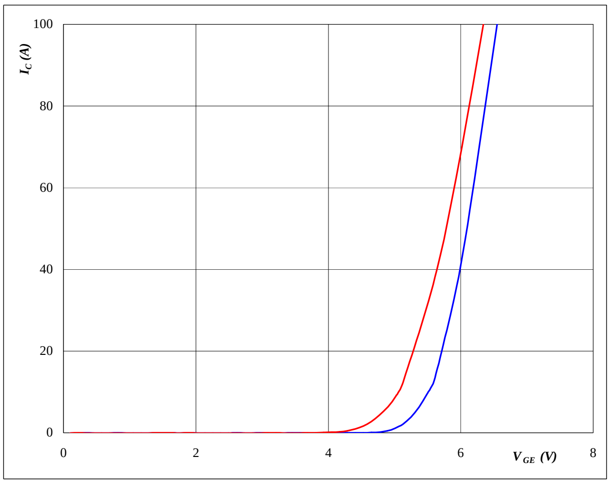
At

t_p =	250	μs
T_j =	125	°C
V_{GE} from	5 V to 15 V in steps of 1 V	

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$



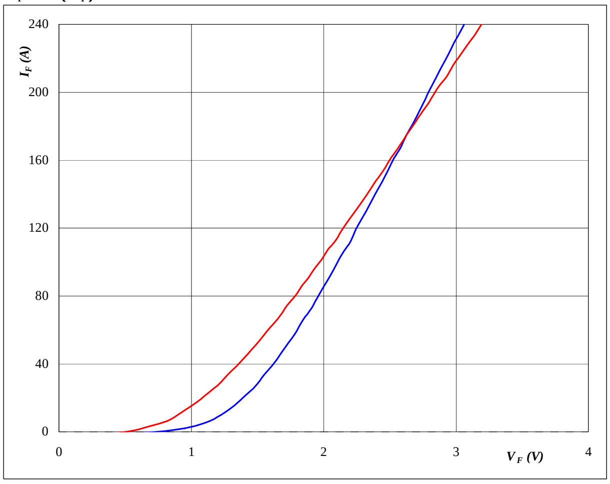
At

T_j =	25/125	°C
t_p =	250	μs
V_{CE} =	10	V

figure 4. **FWD**

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



At

T_j =	25/125	°C
t_p =	250	μs

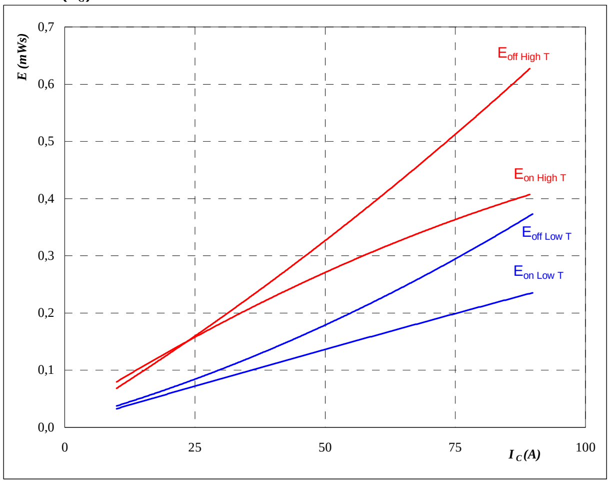
Buck

Buck Switch IGBT and Buck Diode FWD

figure 5.	IGBT

Typical switching energy losses
as a function of collector current

$E = f(I_C)$



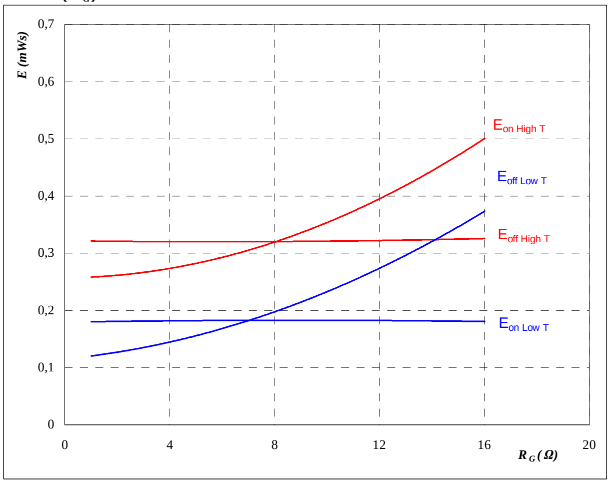
With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 6.	IGBT

Typical switching energy losses
as a function of gate resistor

$E = f(R_G)$



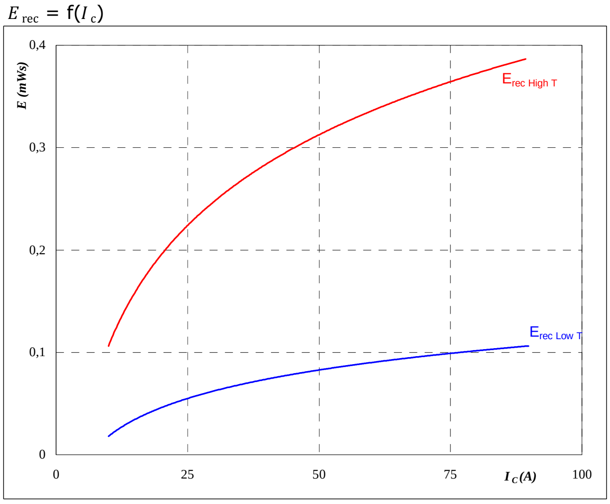
With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
I_C =	50	A

figure 7.	FWD

Typical reverse recovery energy loss
as a function of collector current

$E_{rec} = f(I_c)$



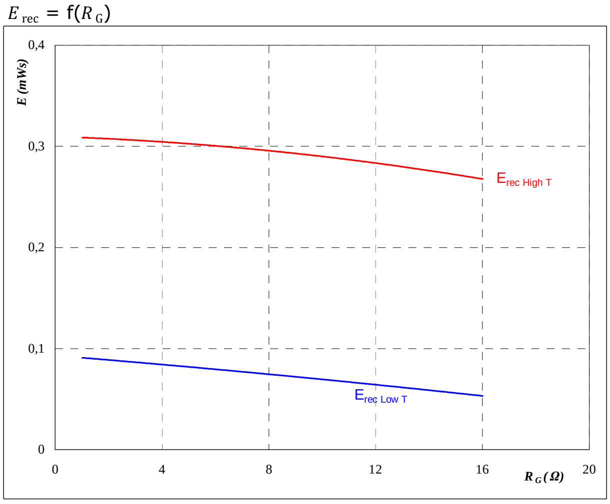
With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 8.	FWD

Typical reverse recovery energy loss
as a function of gate resistor

$E_{rec} = f(R_G)$



With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
I_C =	50	A

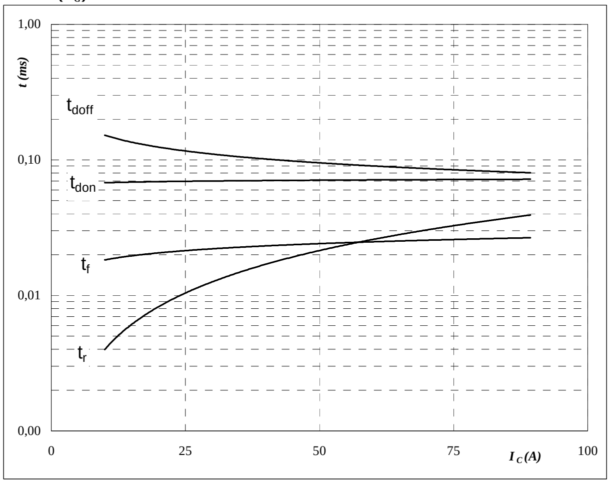
Buck

Buck Switch IGBT and Buck Diode FWD

figure 9. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



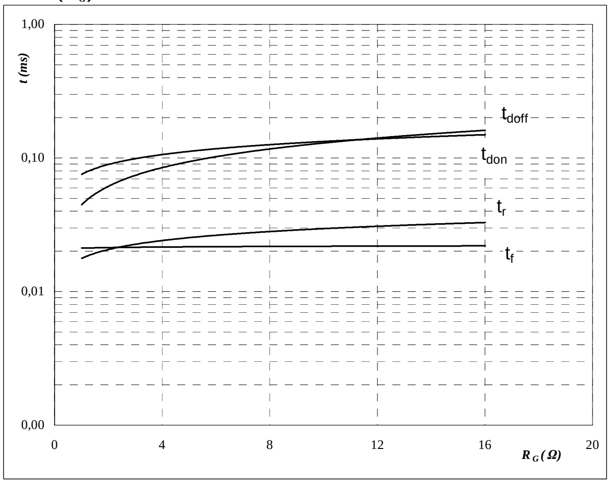
With an inductive load at

T_j =	125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 10. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_G)$



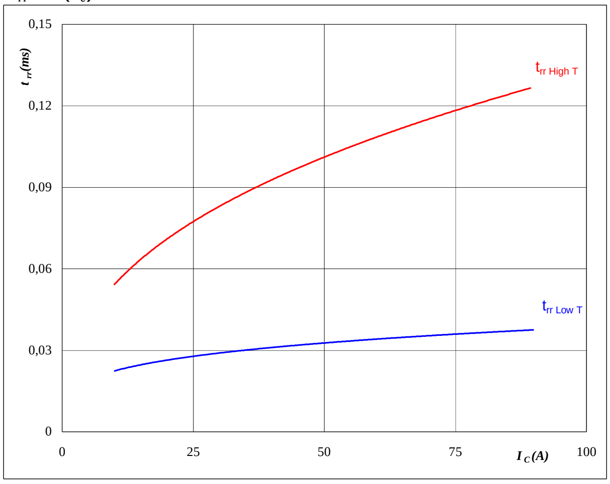
With an inductive load at

T_j =	125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
I_C =	50	A

figure 11. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



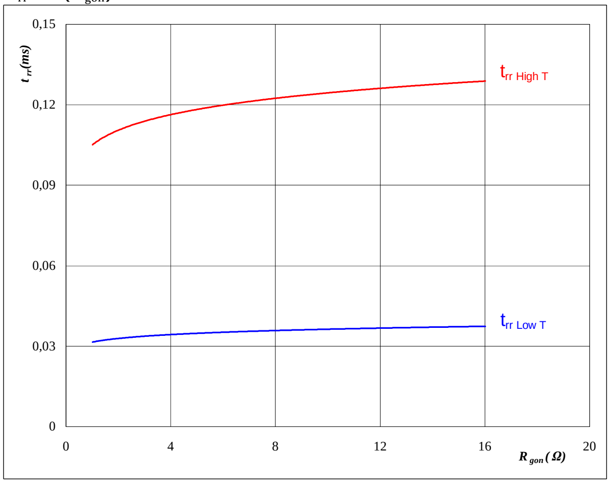
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 12. **FWD**

Typical reverse recovery time as a function of IGBT turn on gate resistor

$t_{rr} = f(R_{gon})$



At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

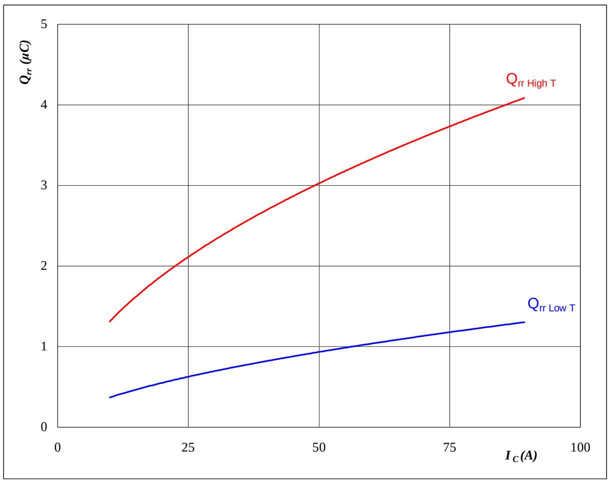
Buck

Buck Switch IGBT and Buck Diode FWD

figure 13. **FWD**

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



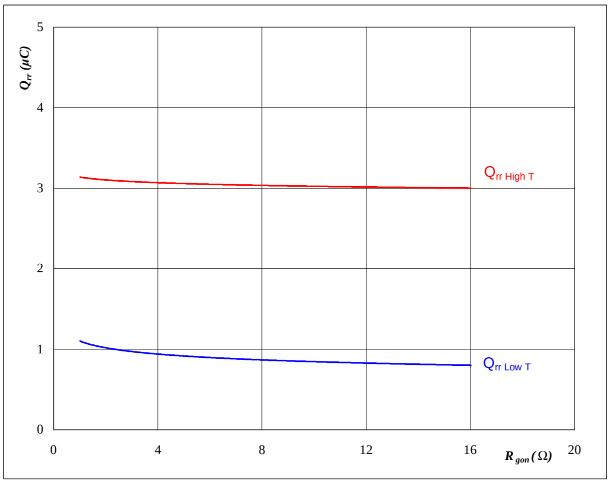
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 14. **FWD**

Typical reverse recovery charge as a function of IGBT turn on gate resistor

$Q_{rr} = f(R_{gon})$



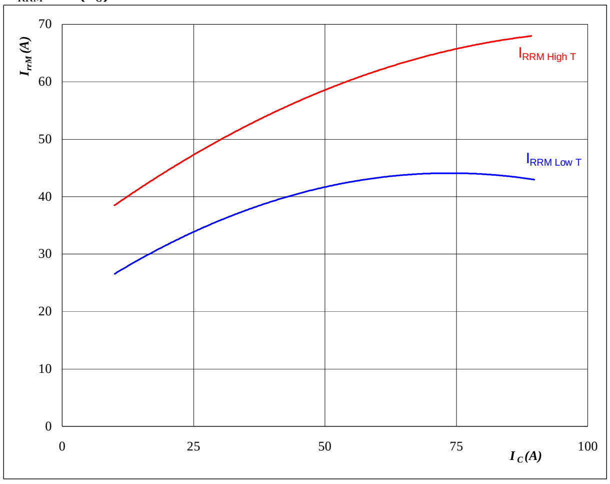
At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

figure 15. **FWD**

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



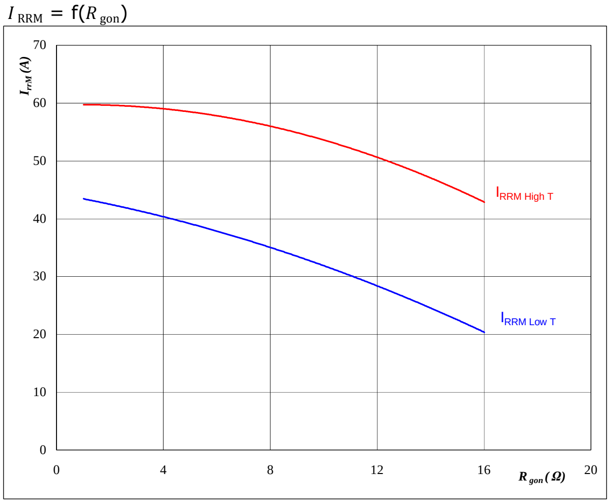
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 16. **FWD**

Typical reverse recovery current as a function of IGBT turn on gate resistor

$I_{RRM} = f(R_{gon})$



At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

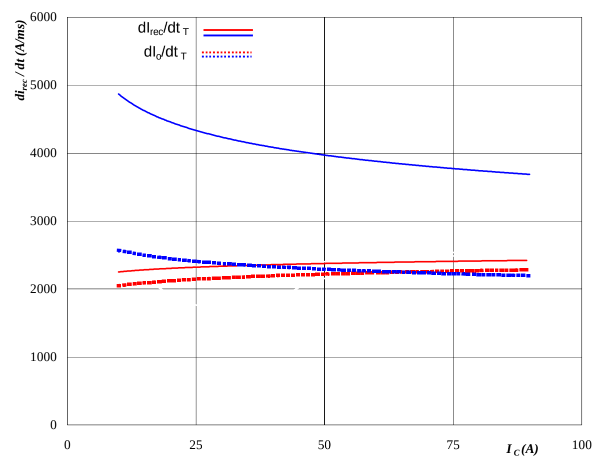
Buck

Buck Switch IGBT and Buck Diode FWD

figure 17.	FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current

$dI_0/dt, dI_{rec}/dt = f(I_c)$



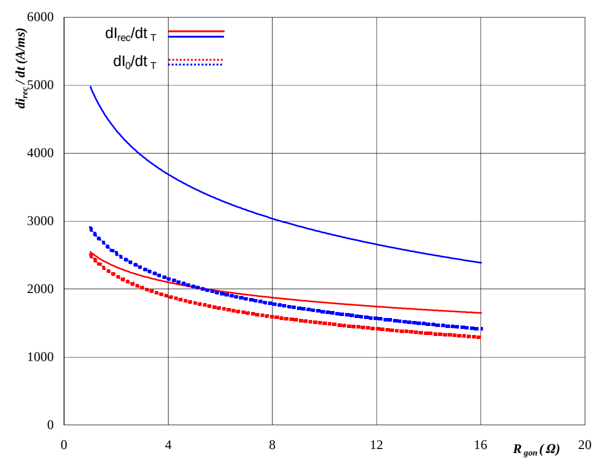
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 18.	FWD

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$dI_0/dt, dI_{rec}/dt = f(R_{gon})$



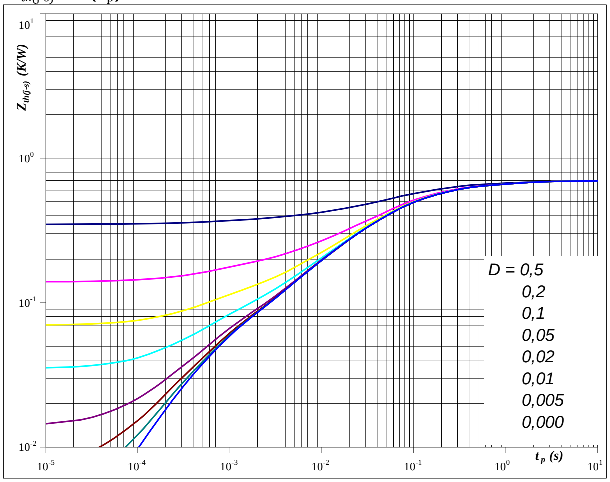
At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

figure 19.	IGBT

IGBT transient thermal impedance as a function of pulse width

$Z_{th(j-s)} = f(t_p)$



At

D =	t_p / T	
$R_{th(j-s)}$ =	0,70	K/W

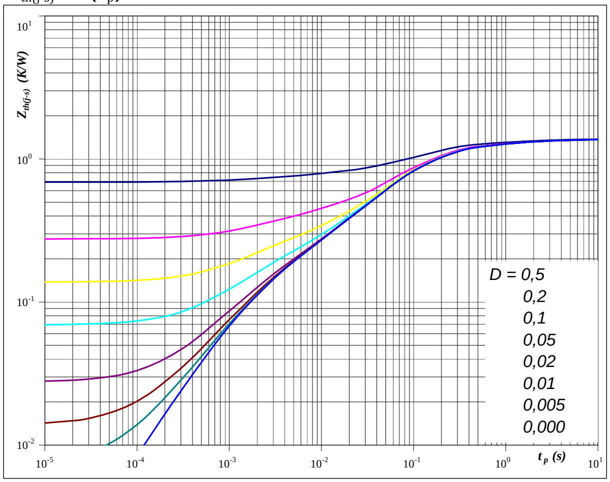
IGBT thermal model values

R (K/W)	Tau (s)
6,67E-02	1,43E+00
1,15E-01	2,44E-01
2,87E-01	6,53E-02
1,30E-01	1,67E-02
5,73E-02	4,56E-03

figure 20.	FWD

FWD transient thermal impedance as a function of pulse width

$Z_{th(j-s)} = f(t_p)$



At

D =	t_p / T	
$R_{th(j-s)}$ =	1,38	K/W

FWD thermal model values

R (K/W)	Tau (s)
8,16E-02	3,99E+00
2,02E-01	6,32E-01
7,09E-01	1,11E-01
2,16E-01	3,68E-02
9,74E-02	5,31E-03

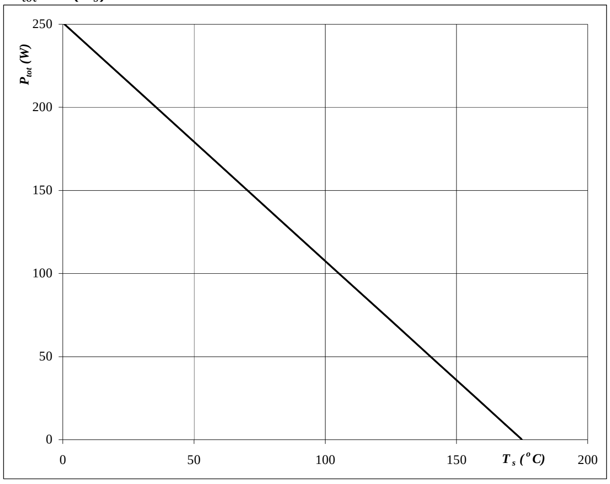
Buck

Buck Switch IGBT and Buck Diode FWD

figure 21. **IGBT**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



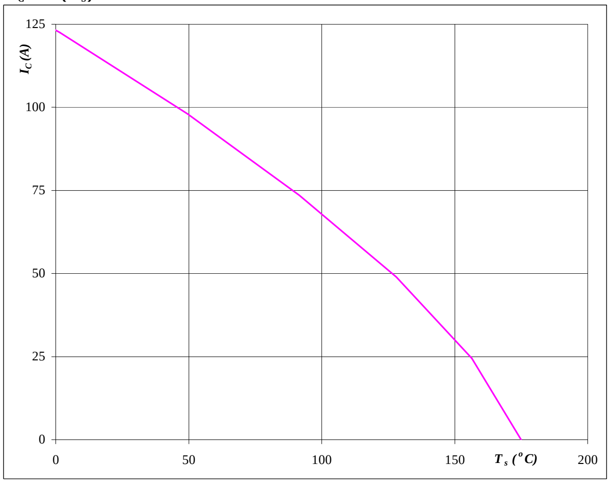
At

T_j = 175 °C

figure 22. **IGBT**

Collector current as a function of heatsink temperature

$I_C = f(T_s)$



At

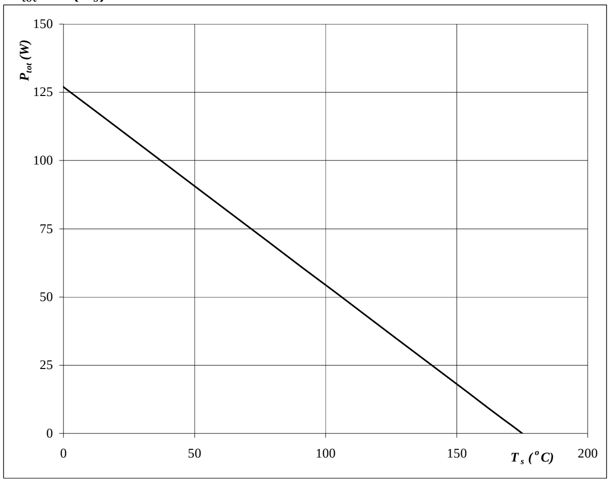
T_j = 175 °C

V_{GE} = 15 V

figure 23. **FWD**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



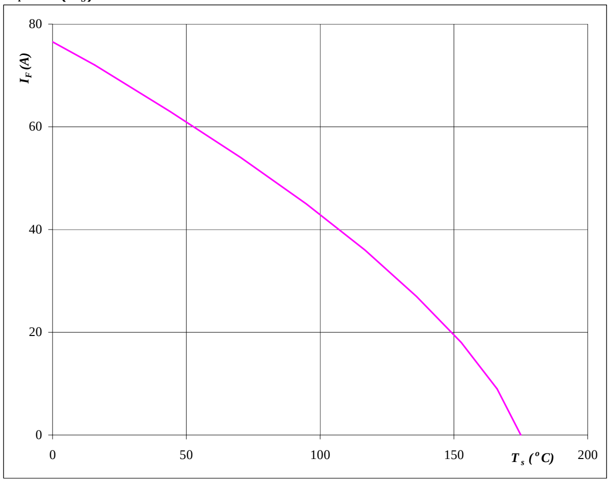
At

T_j = 175 °C

figure 24. **FWD**

Forward current as a function of heatsink temperature

$I_F = f(T_s)$



At

T_j = 175 °C

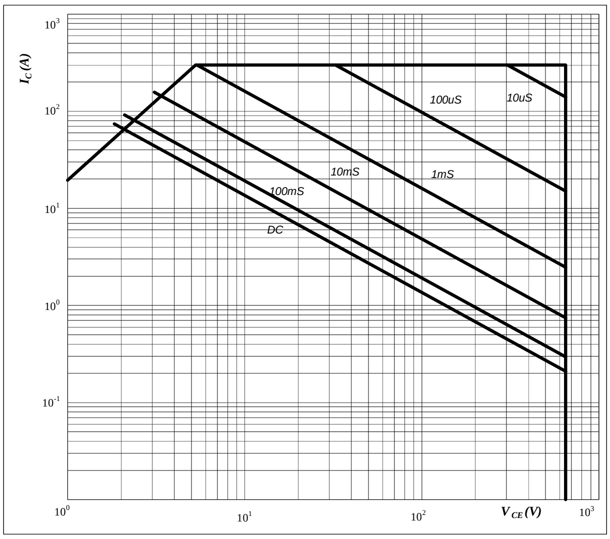
Buck

Buck Switch IGBT and Buck Diode FWD

figure 25. **IGBT**

Safe operating area as a function of collector-emitter voltage

$I_C = f(V_{CE})$



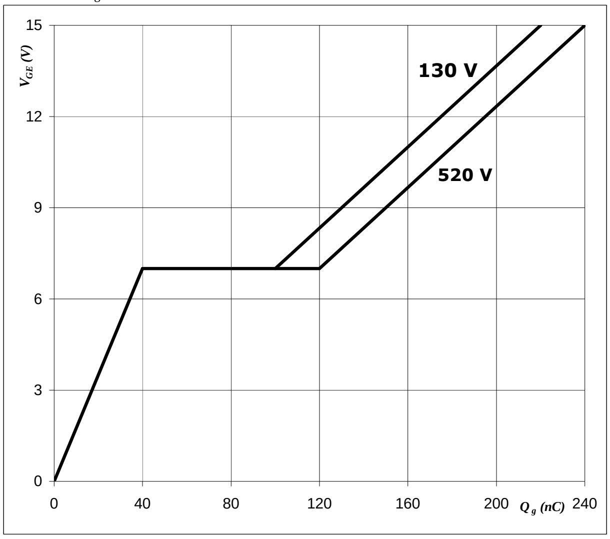
At

D =	single pulse	
T_s =	80	ºC
V_{GE} =	±15	V
T_j =	T_{jmax}	

figure 26. **IGBT**

Gate voltage vs Gate charge

$V_{GE} = f(Q_g)$



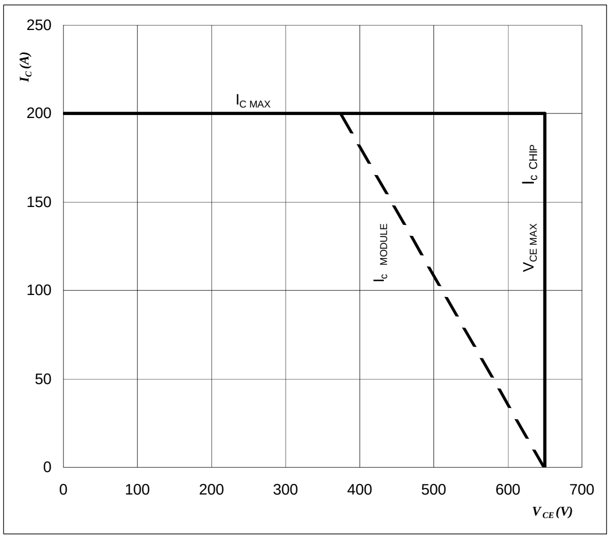
At

I_C =	100	A

figure 27. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

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

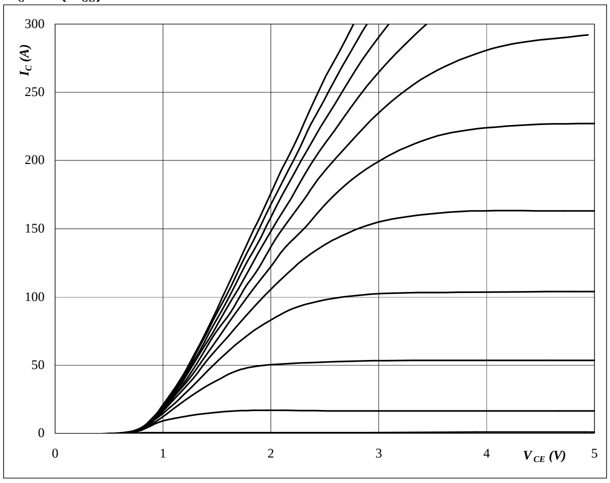
Boost

Boost Switch IGBT and Boost Diode FWD

figure 1.	IGBT

Typical output characteristics

$I_C = f(V_{CE})$



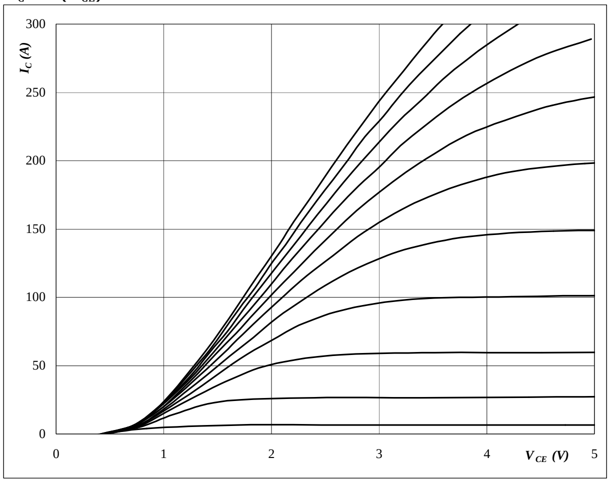
At

t_p =	250	µs
T_j =	25	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

figure 2.	IGBT

Typical output characteristics

$I_C = f(V_{CE})$



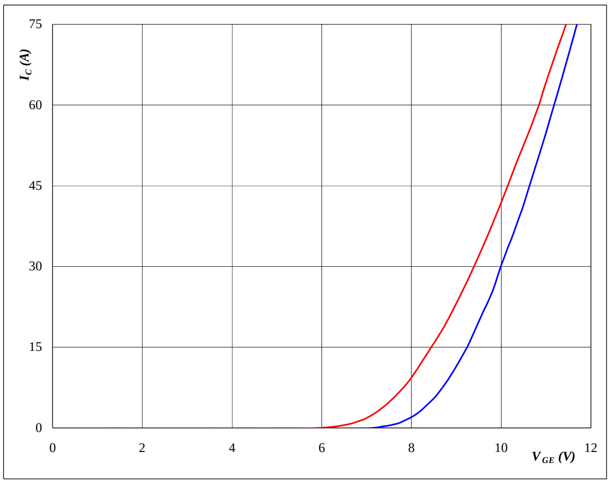
At

t_p =	250	µs
T_j =	125	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

figure 3.	IGBT

Typical transfer characteristics

$I_C = f(V_{GE})$



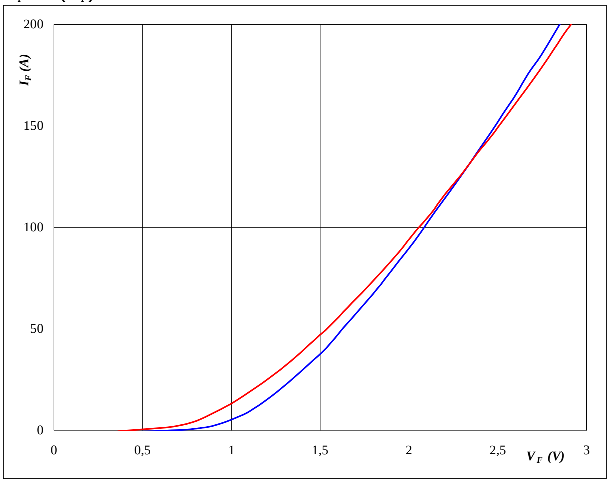
At

T_j =	25/125	°C
t_p =	250	µs
V_{CE} =	10	V

figure 4.	FWD

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



At

T_j =	25/125	°C
t_p =	250	µs

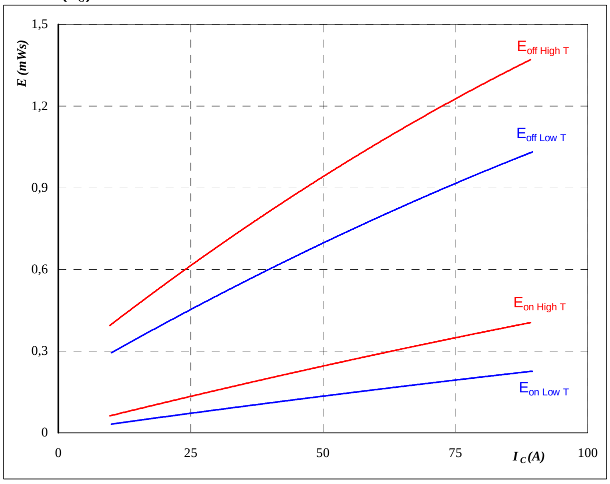
Boost

Boost Switch IGBT and Boost Diode FWD

figure 5. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



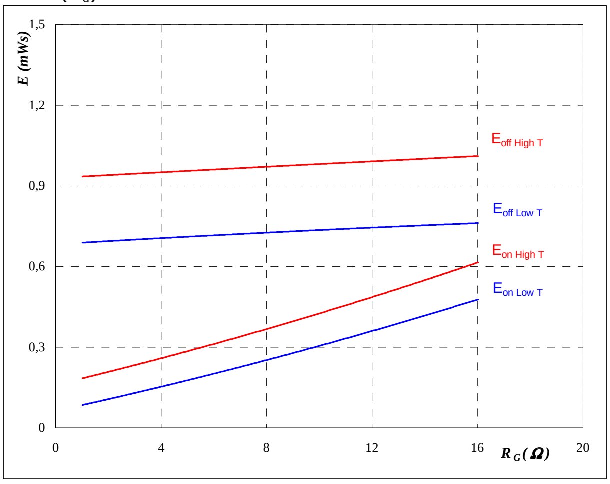
With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 6. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_G)$



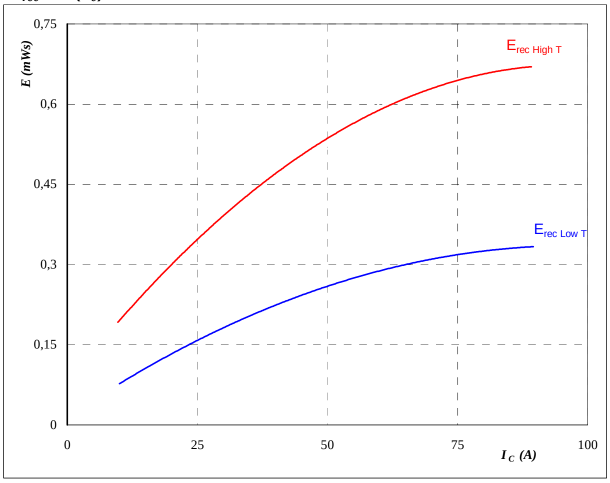
With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
I_C =	50	A

figure 7. **FWD**

Typical reverse recovery energy loss as a function of collector current

$E_{rec} = f(I_c)$



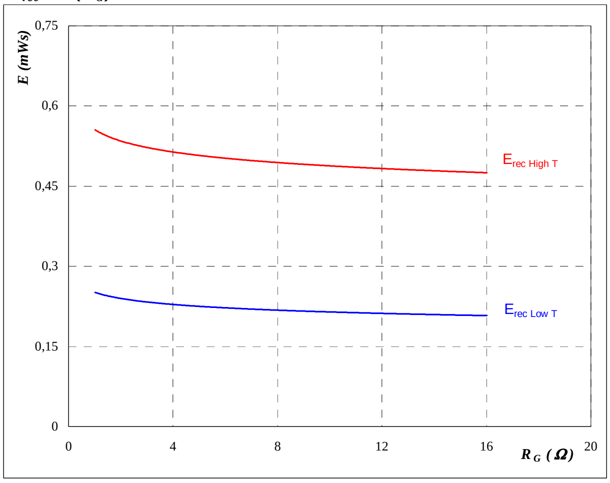
With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 8. **FWD**

Typical reverse recovery energy loss as a function of gate resistor

$E_{rec} = f(R_G)$



With an inductive load at

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
I_C =	50	A

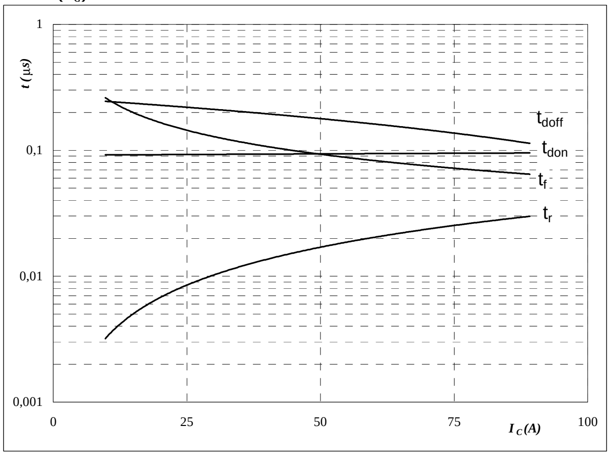
Boost

Boost Switch IGBT and Boost Diode FWD

figure 9. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



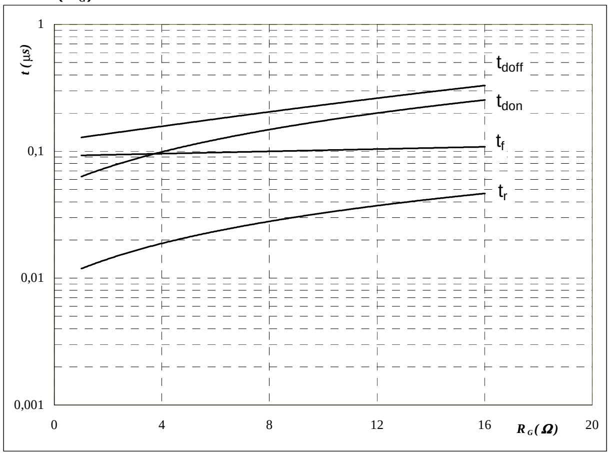
With an inductive load at

T_j =	125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 10. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_G)$



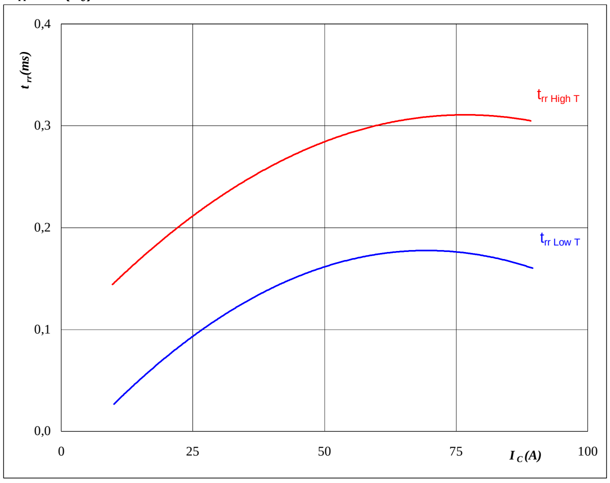
With an inductive load at

T_j =	125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
I_C =	50	A

figure 11. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_c)$



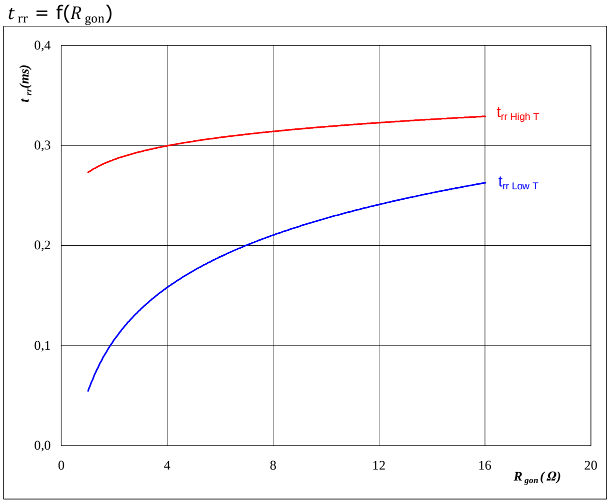
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 12. **FWD**

Typical reverse recovery time as a function of IGBT turn on gate resistor

$t_{rr} = f(R_{gon})$



At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

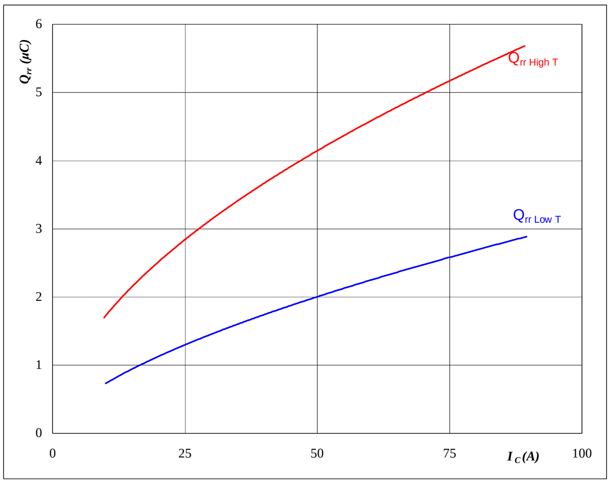
Boost

Boost Switch IGBT and Boost Diode FWD

figure 13. **FWD**

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



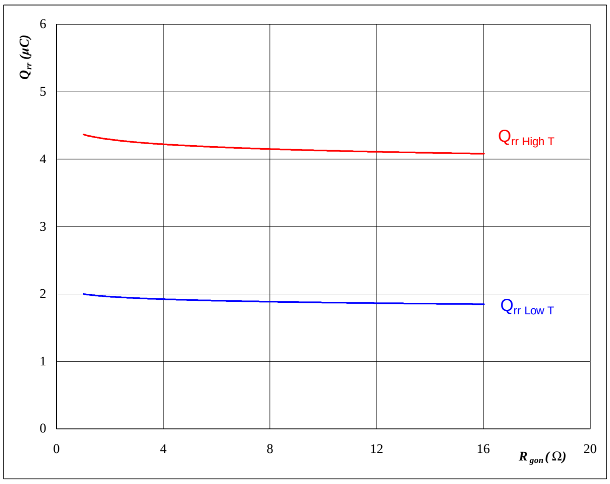
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 14. **FWD**

Typical reverse recovery charge as a function of IGBT turn on gate resistor

$Q_{rr} = f(R_{gon})$



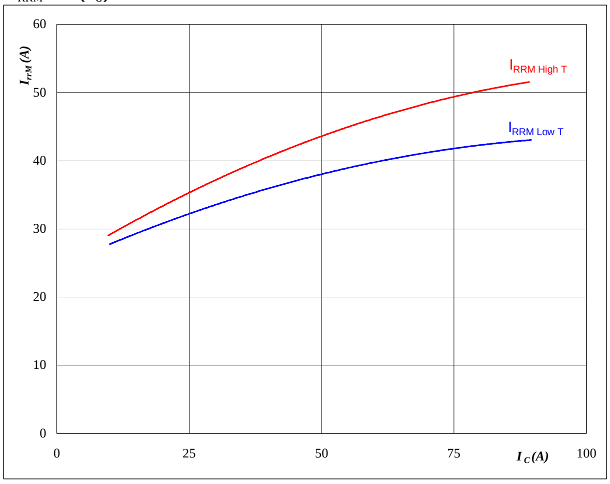
At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

figure 15. **FWD**

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



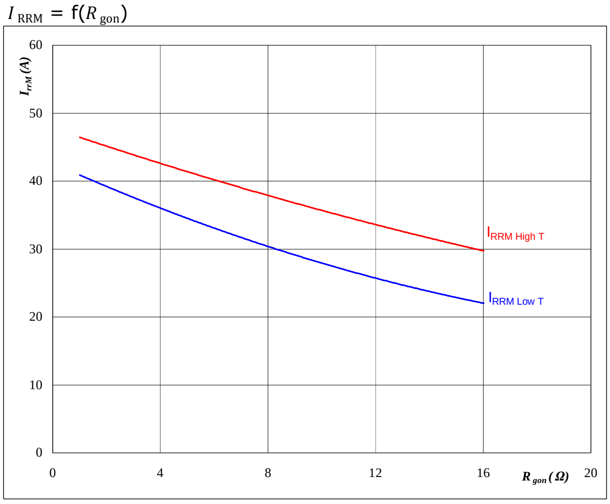
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 16. **FWD**

Typical reverse recovery current as a function of IGBT turn on gate resistor

$I_{RRM} = f(R_{gon})$



At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

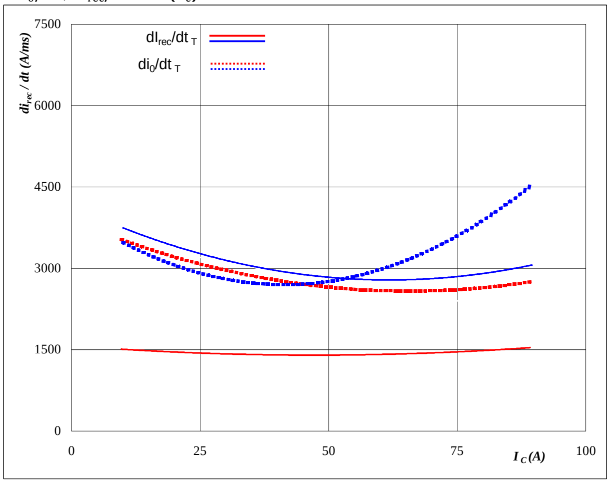
Boost

Boost Switch IGBT and Boost Diode FWD

figure 17.	FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current

$dI_0/dt, dI_{rec}/dt = f(I_c)$



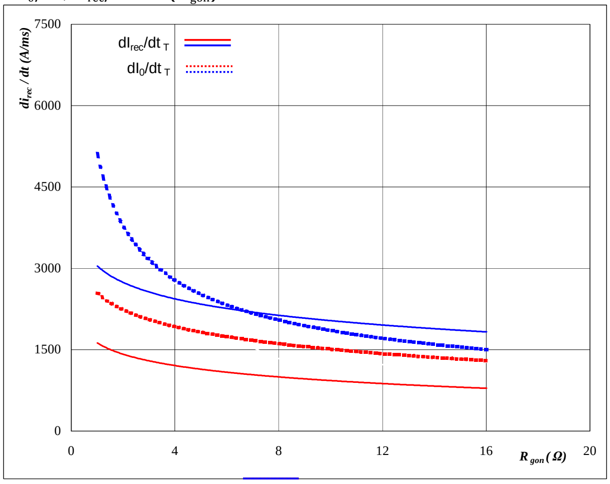
At

T_j =	25/125	°C
V_{CE} =	150	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 18.	FWD

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$dI_0/dt, dI_{rec}/dt = f(R_{gon})$



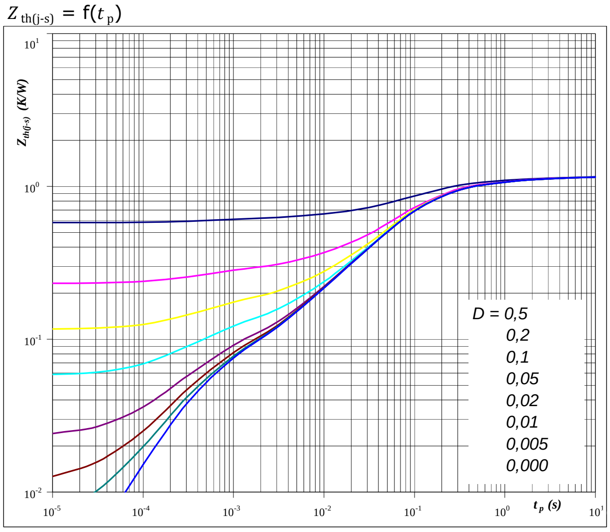
At

T_j =	25/125	°C
V_R =	150	V
I_F =	50	A
V_{GE} =	±15	V

figure 19.	IGBT

IGBT transient thermal impedance as a function of pulse width

$Z_{th(j-s)} = f(t_p)$



At

D =	t_p / T	
$R_{th(j-s)}$ =	1,16	K/W

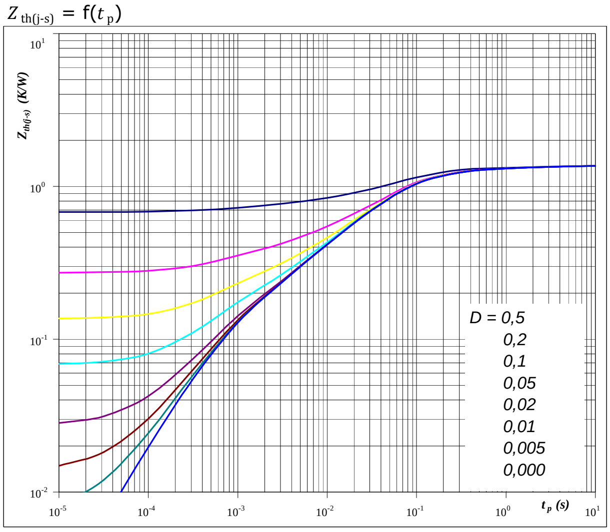
IGBT thermal model values

R (K/W)	Tau (s)
5,64E-02	4,97E+00
1,45E-01	9,35E-01
4,55E-01	1,51E-01
3,75E-01	4,97E-02
7,15E-02	5,37E-03
5,72E-02	3,97E-04

figure 20.	FWD

FWD transient thermal impedance as a function of pulse width

$Z_{th(j-s)} = f(t_p)$



At

D =	t_p / T	
$R_{th(j-s)}$ =	1,36	K/W

FWD thermal model values

R (K/W)	Tau (s)
6,09E-02	2,36E+00
1,41E-01	3,82E-01
6,52E-01	6,81E-02
2,75E-01	2,04E-02
1,29E-01	4,50E-03
1,02E-01	6,56E-04

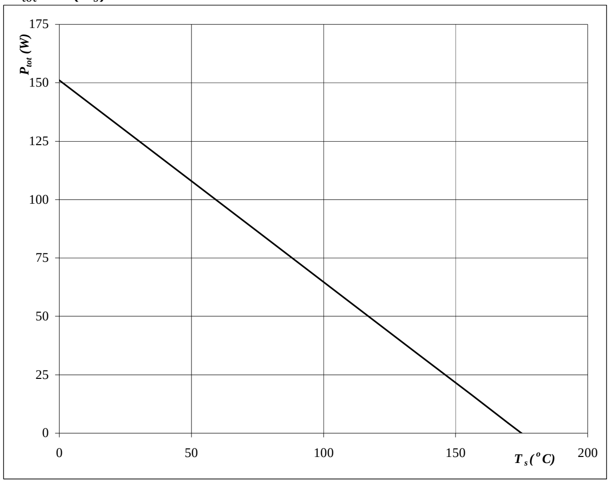
Boost

Boost Switch IGBT and Boost Diode FWD

figure 21. **IGBT**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



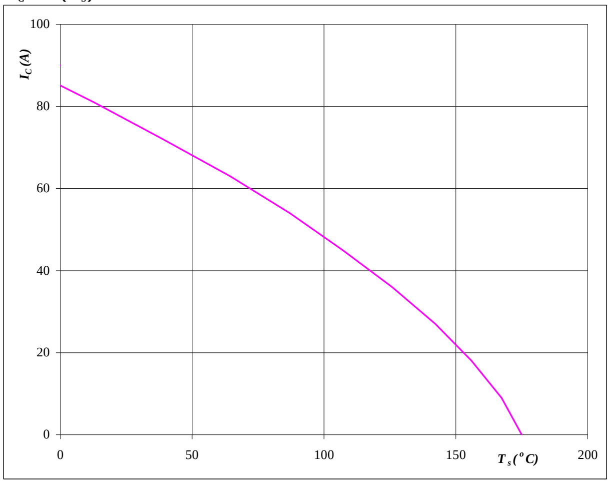
At

T_j = 175 ºC

figure 22. **IGBT**

Collector current as a function of heatsink temperature

$I_C = f(T_s)$



At

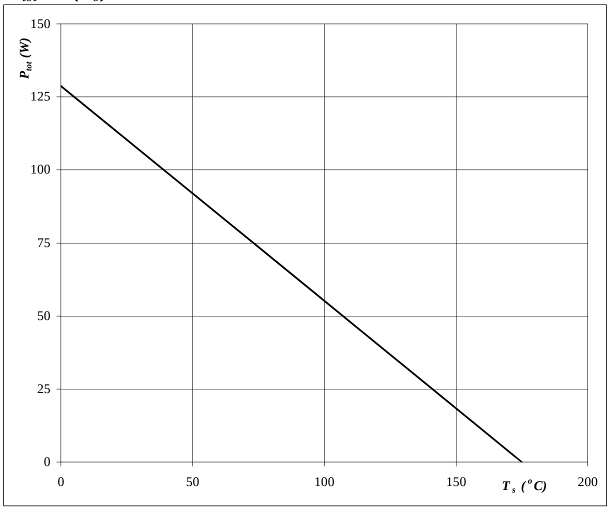
T_j = 175 ºC

V_{GE} = 15 V

figure 23. **FWD**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



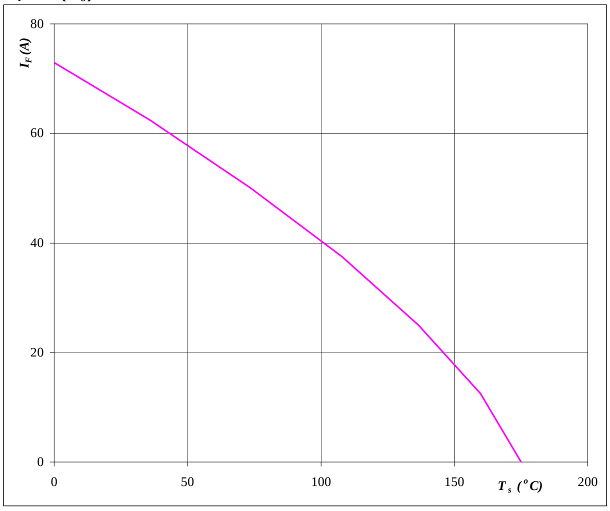
At

T_j = 175 ºC

figure 24. **FWD**

Forward current as a function of heatsink temperature

$I_F = f(T_s)$



At

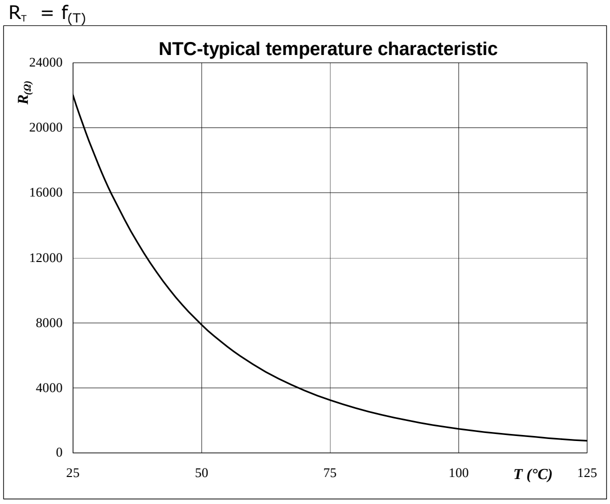
T_j = 175 ºC

Thermistor

figure 1.	Thermistor

Typical NTC characteristic
as a function of temperature

$R_T = f_{(T)}$



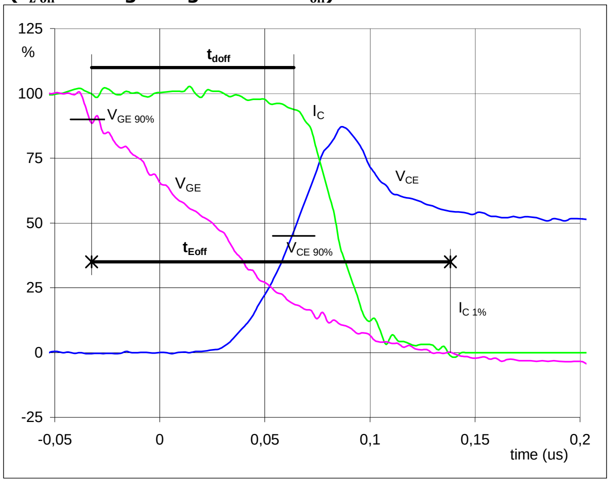
Buck Switching Definitions

General conditions

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

figure 1. **IGBT**

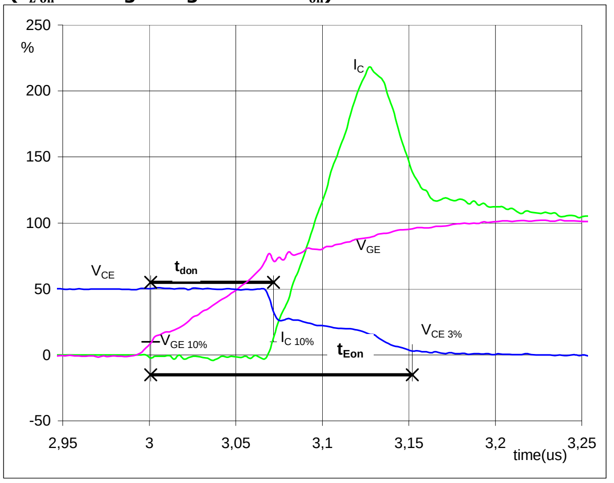
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff}
($t_{E\,off}$ = integrating time for E_{off})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	150	V
I_C (100%) =	50	A
t_{doff} =	0,094	μs
$t_{E\,off}$ =	0,171	μs

figure 2. **IGBT**

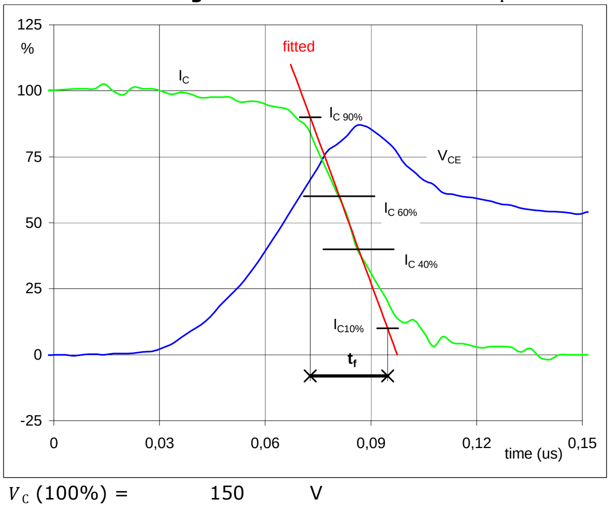
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon}
($t_{E\,on}$ = integrating time for E_{on})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	150	V
I_C (100%) =	50	A
t_{don} =	0,071	μs
$t_{E\,on}$ =	0,151	μs

figure 3. **IGBT**

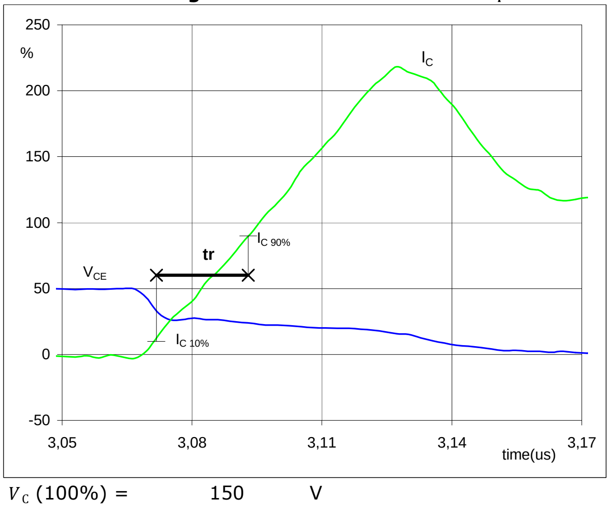
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	150	V
I_C (100%) =	50	A
t_f =	0,022	μs

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

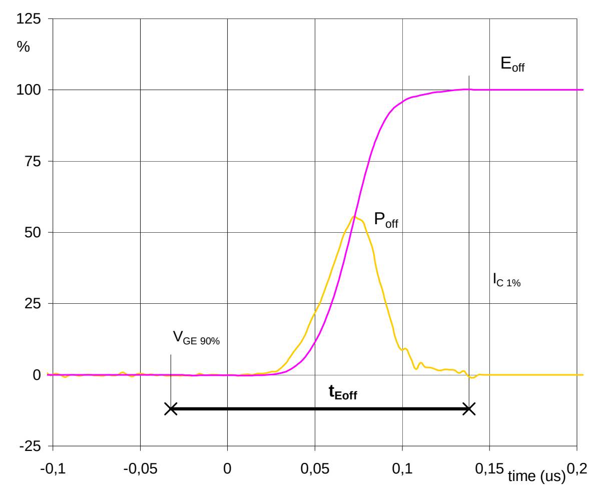


V_C (100%) =	150	V
I_C (100%) =	50	A
t_r =	0,021	μs

Buck Switching Definitions

figure 5. **IGBT**

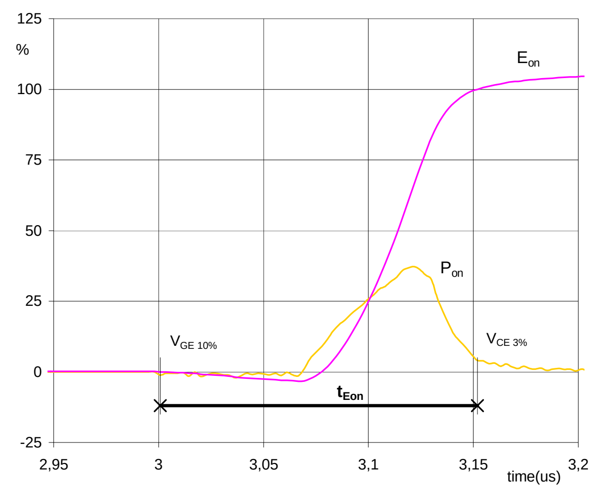
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	7,49	kW
E_{off} (100%) =	0,32	mJ
$t_{E\,off}$ =	0,171	µs

figure 6. **IGBT**

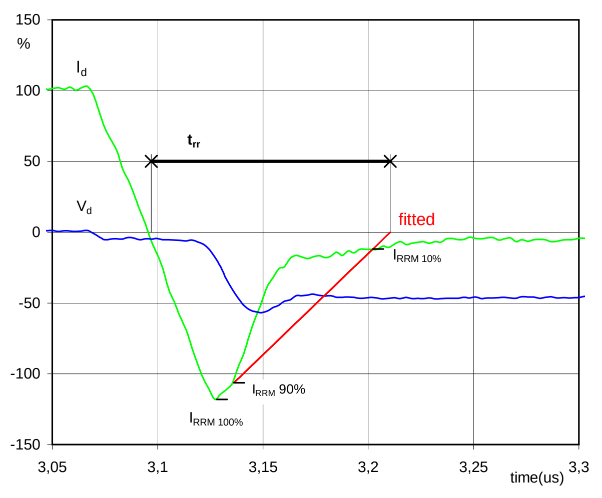
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	7,49	kW
E_{on} (100%) =	0,27	mJ
$t_{E\,on}$ =	0,151	µs

figure 7. **IGBT**

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

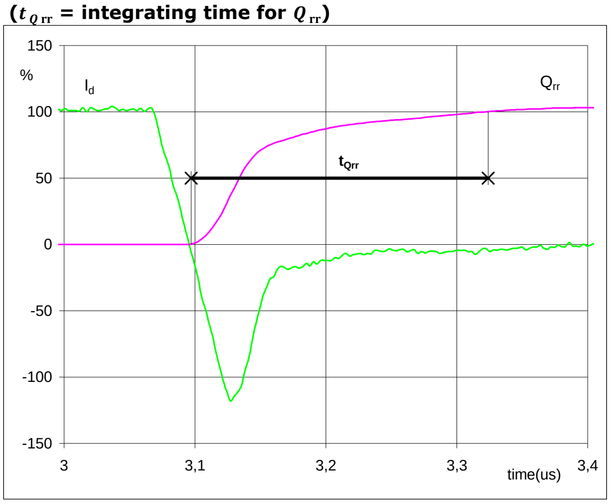


V_d (100%) =	150	V
I_d (100%) =	50	A
I_{RRM} (100%) =	-59	A
t_{rr} =	0,113	µs

Buck Switching Definitions

figure 8. **FWD**

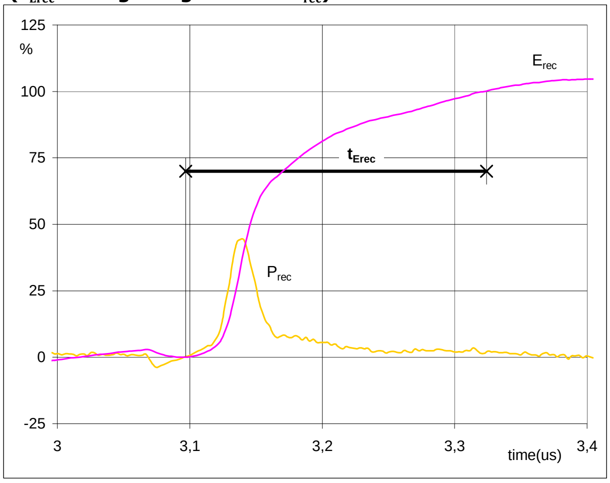
Turn-on Switching Waveforms & definition of t_{Qrr}
($t_{Q rr}$ = integrating time for Q_{rr})



I_d (100%) =	50	A
Q_{rr} (100%) =	3,10	μC
$t_{Q rr}$ =	0,227	μs

figure 9. **FWD**

Turn-on Switching Waveforms & definition of t_{Erec}
(t_{Erec}= integrating time for E_{rec})

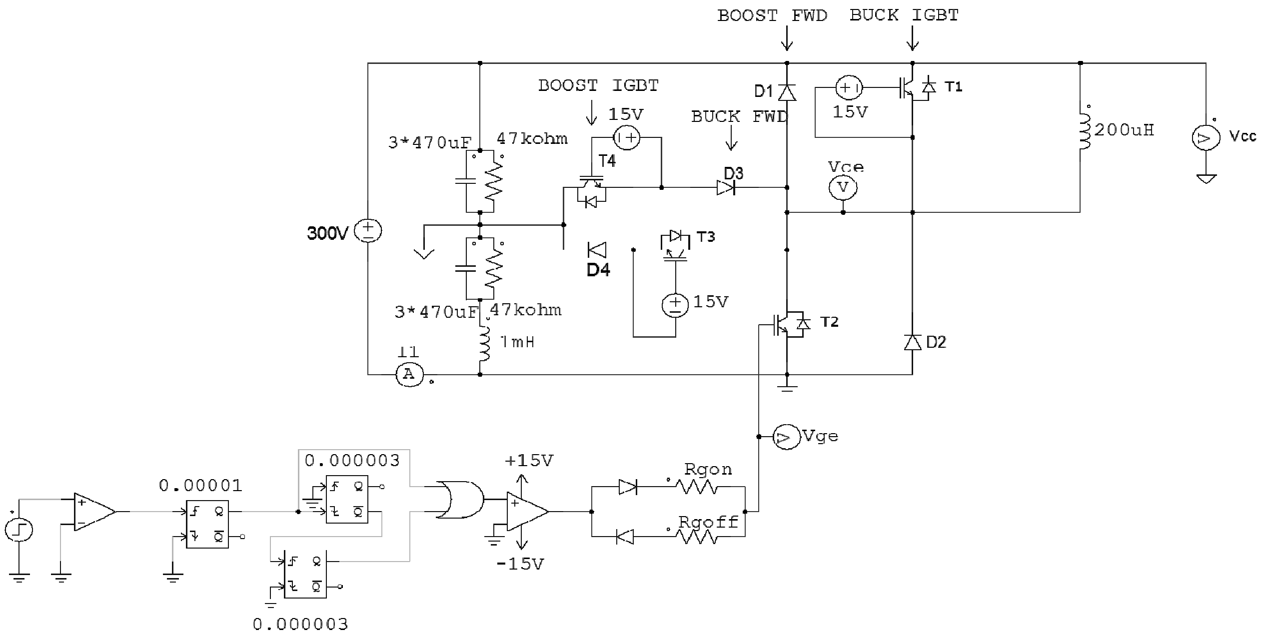


P_{rec} (100%) =	7,49	kW
E_{rec} (100%) =	0,31	mJ
$t_{E rec}$ =	0,227	μs

Measurement circuits

figure 10.

Buck stage switching measurement circuit



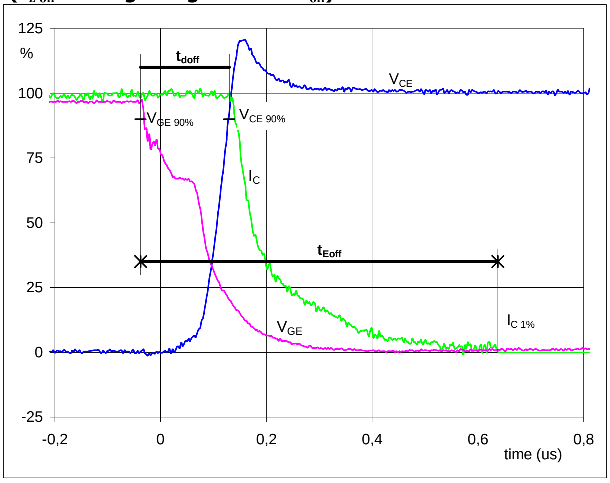
Boost Switching Definitions

General conditions

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

figure 1. **IGBT**

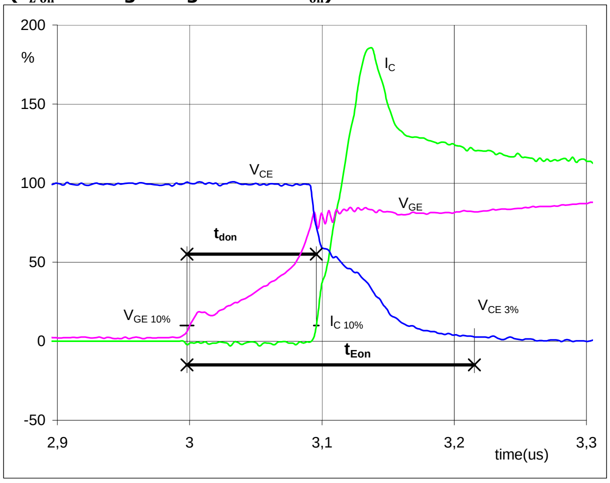
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff}
($t_{E\,off}$ = integrating time for E_{off})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	150	V
I_C (100%) =	50	A
t_{doff} =	0,156	μs
$t_{E\,off}$ =	0,676	μs

figure 2. **IGBT**

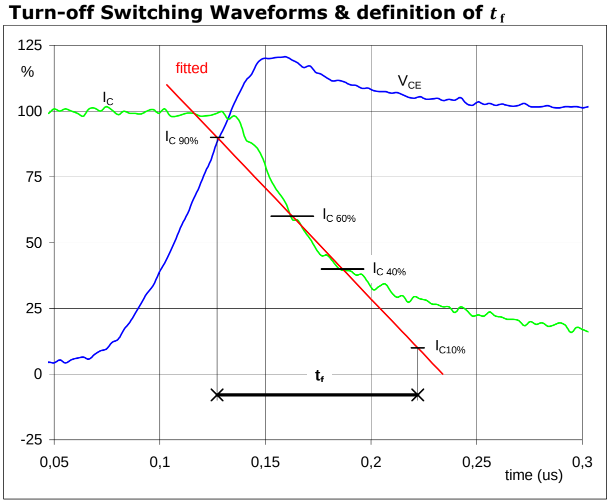
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon}
($t_{E\,on}$ = integrating time for E_{on})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	150	V
I_C (100%) =	50	A
t_{don} =	0,094	μs
$t_{E\,on}$ =	0,217	μs

figure 3. **IGBT**

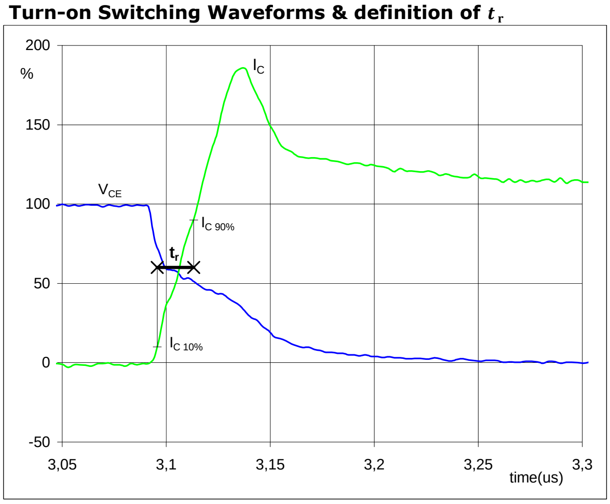
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	150	V
I_C (100%) =	50	A
t_f =	0,097	μs

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

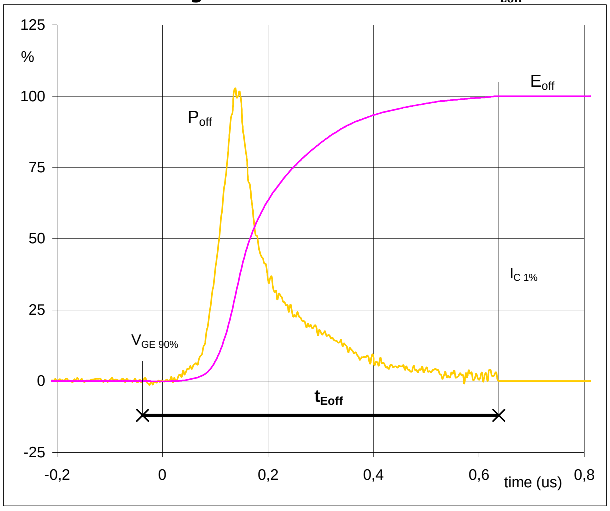


V_C (100%) =	150	V
I_C (100%) =	50	A
t_r =	0,017	μs

Boost Switching Definitions

figure 5.	IGBT

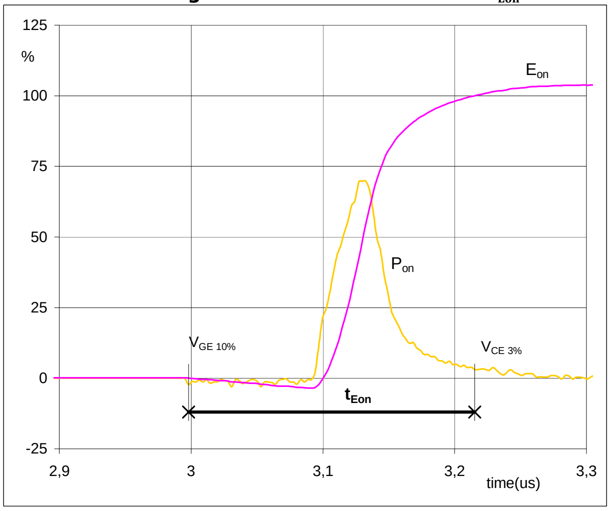
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	7,56	kW
E_{off} (100%) =	0,95	mJ
$t_{E\,off}$ =	0,676	µs

figure 6.	IGBT

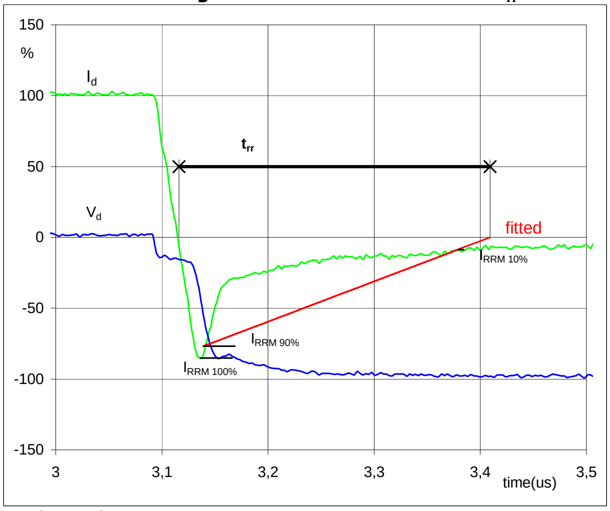
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	7,56	kW
E_{on} (100%) =	0,25	mJ
$t_{E\,on}$ =	0,217	µs

figure 7.	IGBT

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

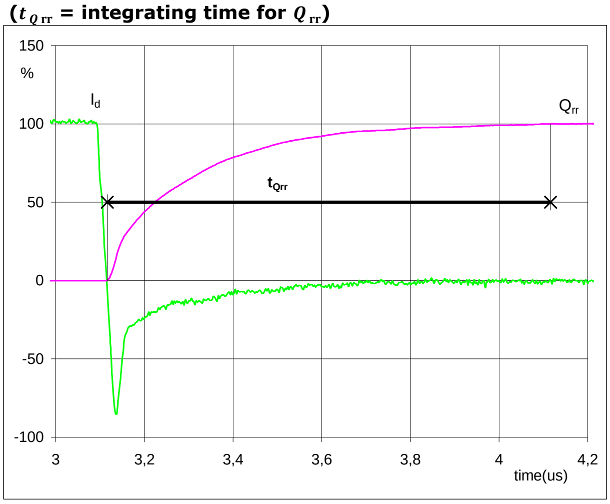


V_d (100%) =	150	V
I_d (100%) =	50	A
I_{RRM} (100%) =	-43	A
t_{rr} =	0,290	µs

Boost Switching Definitions

figure 8.	FWD

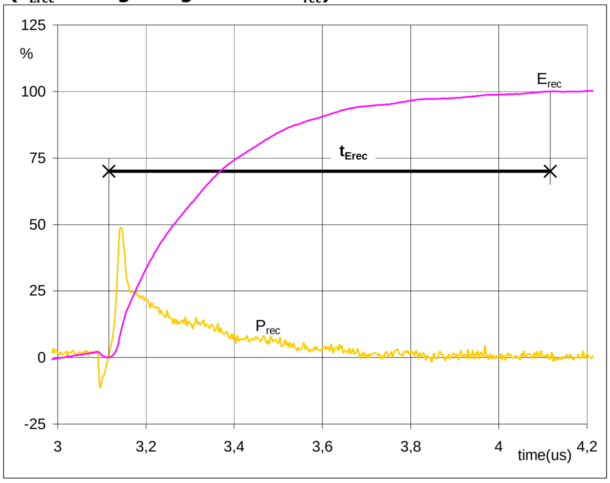
Turn-on Switching Waveforms & definition of t_{Qrr}
($t_{Q\,rr}$ = integrating time for Q_{rr})



I_d (100%) =	50	A
Q_{rr} (100%) =	4,21	µC
$t_{Q\,rr}$ =	1,00	µs

figure 9.	FWD

Turn-on Switching Waveforms & definition of t_{Erec}
(t_{Erec}= integrating time for E_{rec})

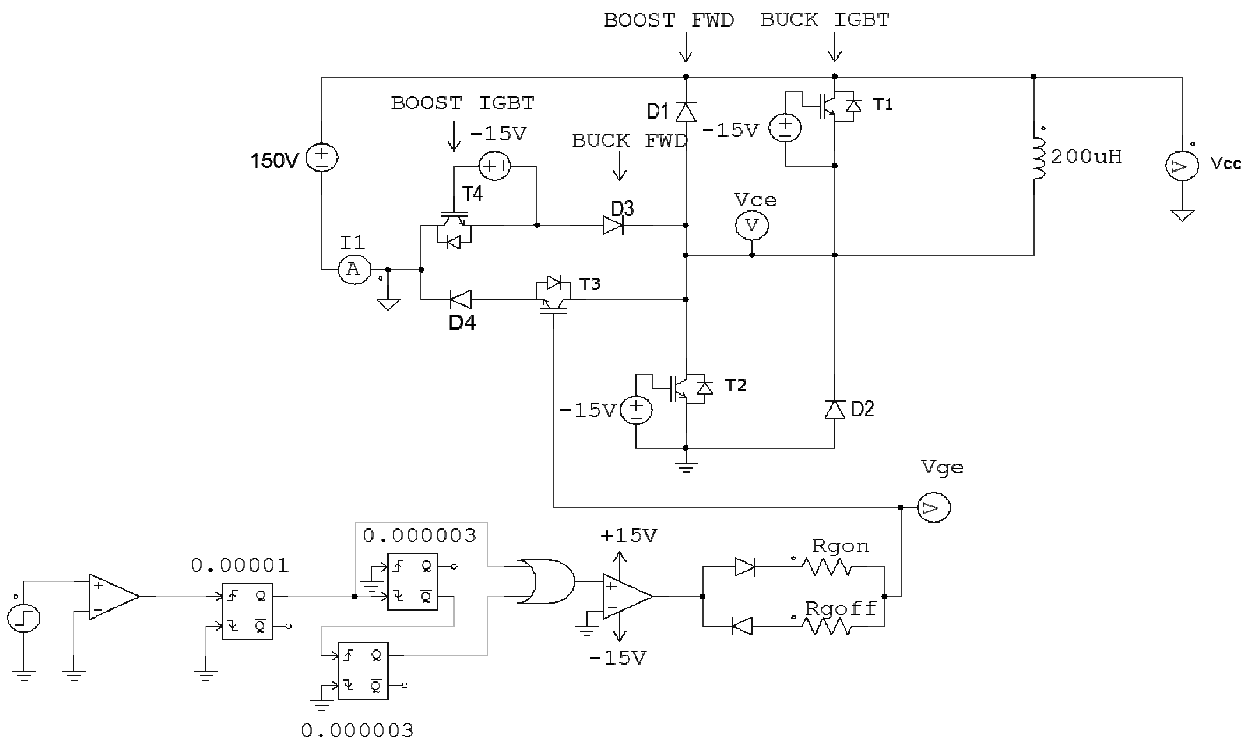


P_{rec} (100%) =	7,56	kW
E_{rec} (100%) =	0,52	mJ
$t_{E\,rec}$ =	1,00	µs

Measurement circuits

figure 10.

Boost stage switching measurement circuit



Ordering Code & Marking

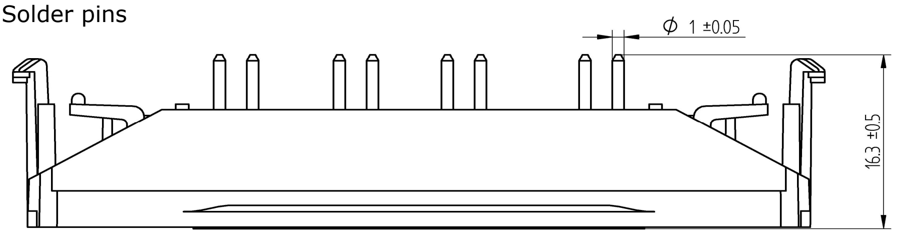
Version	Ordering Code
without thermal paste 12 mm housing with solder pins	10-FZ07NMA100SM-M265F58
with thermal paste 12 mm housing with solder pins	10-FZ07NMA100SM-M265F58-/3/
without thermal paste 12 mm housing with press-fit pins	10-PZ07NMA100SM-M265F58Y
with thermal paste 12 mm housing with press-fit pins	10-PZ07NMA100SM-M265F58Y-/3/

	Name	Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV	WWYY	UL VIN	LLLLL	SSSS
	Type&Ver	**Lot number**	**Serial**	**Date code**	
Datamatrix	TTTTTTTVV	LLLLL	SSSS	WWYY	

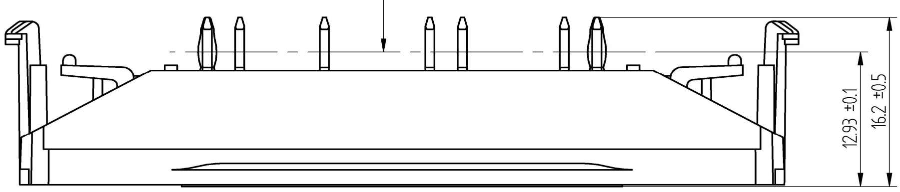
Outline

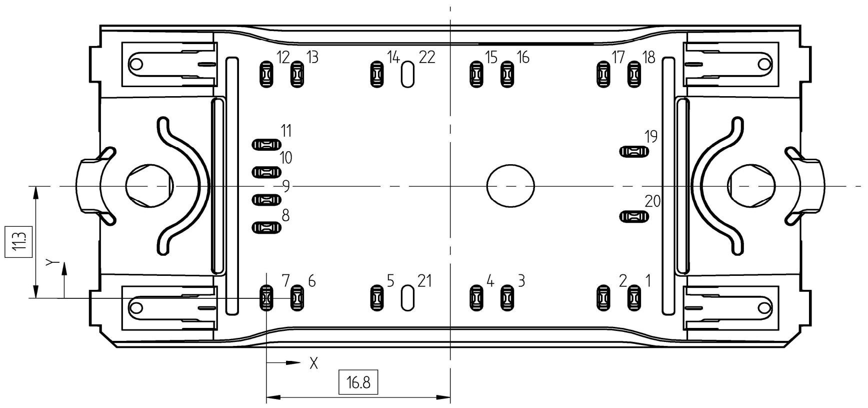
Pin table [mm]			
Pin	X	Y	Function
1	33,6	0	S2
2	30,8	0	G2
3	22	0	-DC
4	19,2	0	-DC
5	10,1	0	GND
6	2,8	0	S4
7	0	0	G4
8	0	7,1	Line
9	0	9,9	Line
10	0	12,7	Line
11	0	15,5	Line
12	0	22,6	G3
13	2,8	22,6	S3
14	10,1	22,6	GND
15	19,2	22,6	+DC
16	22	22,6	+DC
17	30,8	22,6	G1
18	33,6	22,6	S1
19	33,6	14,8	NTC1
20	33,6	8,2	NTC2
21	Not assembled		
22			

Solder pins



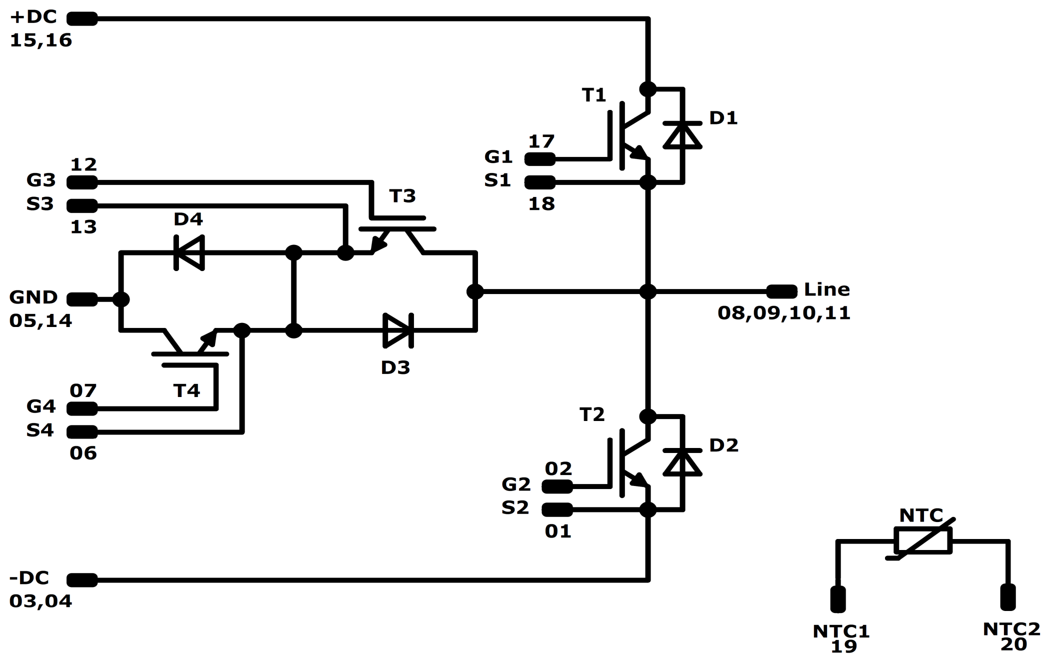
Press-fit pins





Tolerance of pinpositions: ±0.5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1, T2	IGBT	650 V	100 A	Buck Switch	
D4, D3	FWD	600 V	60 A	Buck Diode	
T4, T3	IGBT	600 V	75 A	Boost Switch	
D1, D2	FWD	650 V	50 A	Boost Diode	
NTC	NTC			Thermistor	

Packaging instruction					
Standard packaging quantity (SPQ)	**135**	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 0 packages see vincotech.com website.

Package data
Package data for *flow* 0 packages see vincotech.com website.

UL recognition and file number
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-xZ07NMA100SM-M265F58x-D4-14	17 Jan. 2019	Correct NTC coordinates	27