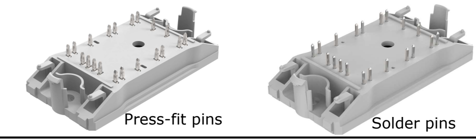
Vincotech

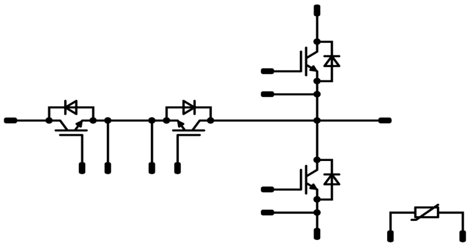
10-FZ07NMA100SM-M265F58
10-PZ07NMA100SM-M265F58Y
Datasheet

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					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	
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	$t_{d(on)}$	$R_{goff} = 4\ \Omega$ $R_{gon} = 4\ \Omega$	±15	150	50	25 125		70 71		ns
Rise time	t_r					25 125		18 21		
Turn-off delay time	$t_{d(off)}$					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}	$f = 1$ MHz	0	25		25		6000		pF
Output capacitance	C_{oss}							100		
Reverse transfer capacitance	C_{rss}							22		
Gate charge	Q_G		±15	520	100	25		240		nC
Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3{,}4$ 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}	$R_{gon} = 4\ \Omega$	±15	150	50	25 125		41 59		A
Reverse recovery time	t_{rr}					25 125		33 113		ns
Reverse recovered charge	Q_{rr}					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	$R_{th(j-s)}$	$\lambda_{paste} = 3{,}4$ 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	$t_{d(on)}$					25 125		93 94		
Rise time	t_r					25 125		14 17		
Turn-off delay time	$t_{d(off)}$	R_{goff} = 4 Ω R_{gon} = 4 Ω	±15	150	50	25 125		138 156		ns
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}							4620		
Output capacitance	C_{oss}	f = 1 MHz	0	25		25		288		pF
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}					25 125		37 43		A
Reverse recovery time	t_{rr}					25 125		144 290		ns
Reverse recovered charge	Q_{rr}	R_{gon} = 4 Ω	±15	150	60	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	

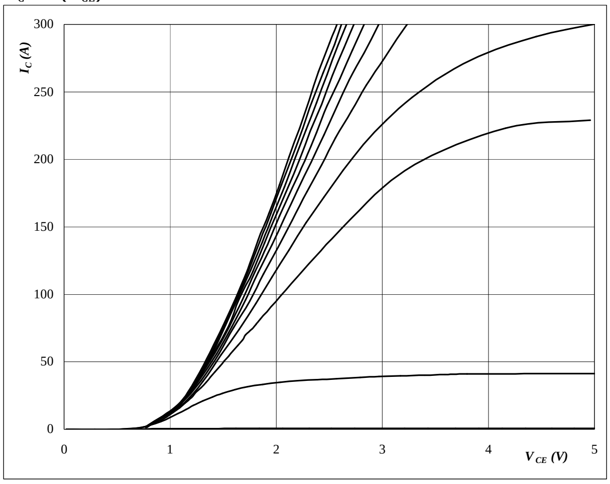
Buck

Buck Switch IGBT and Buck Diode FWD

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



At

t_p = 250 µs

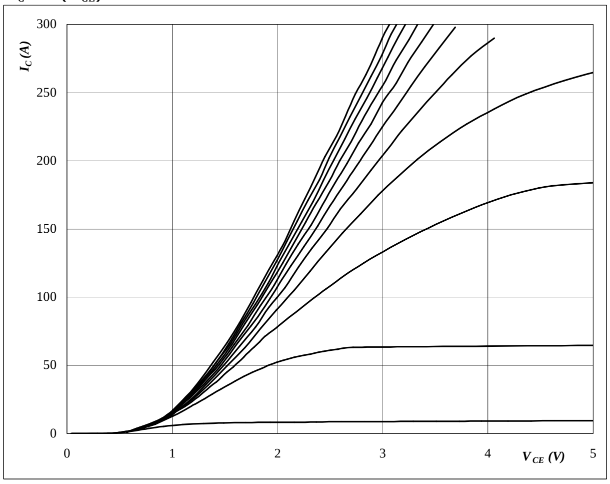
T_j = 25 °C

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

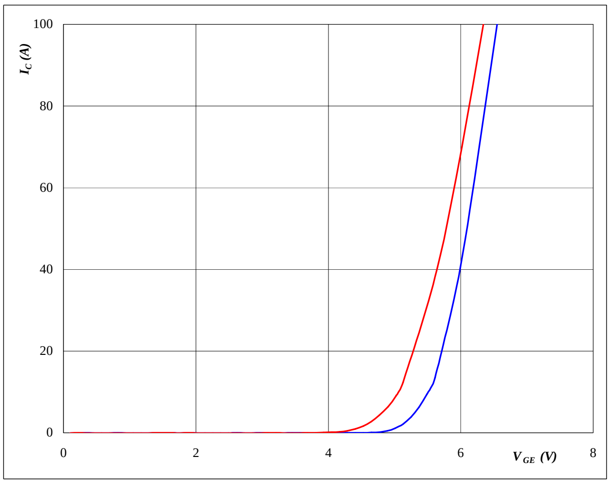
T_j = 125 °C

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

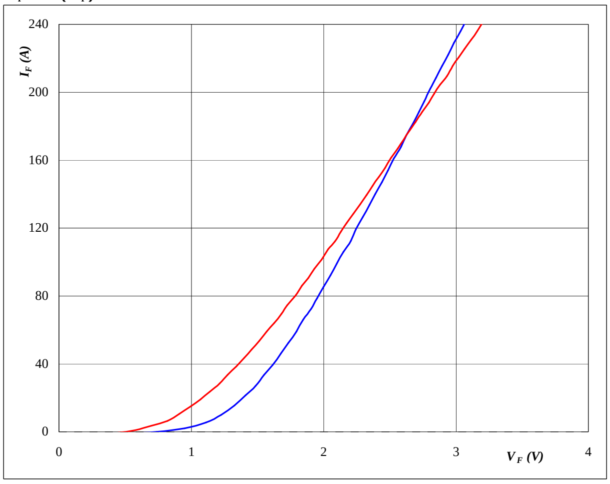
t_p = 250 µs

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

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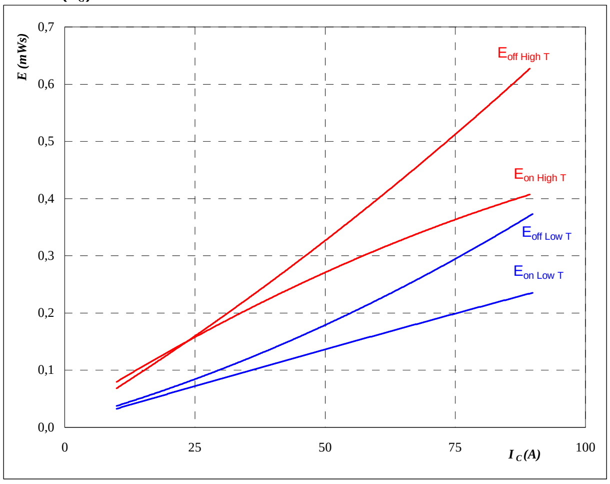
Buck Switch IGBT and Buck Diode FWD

figure 5. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



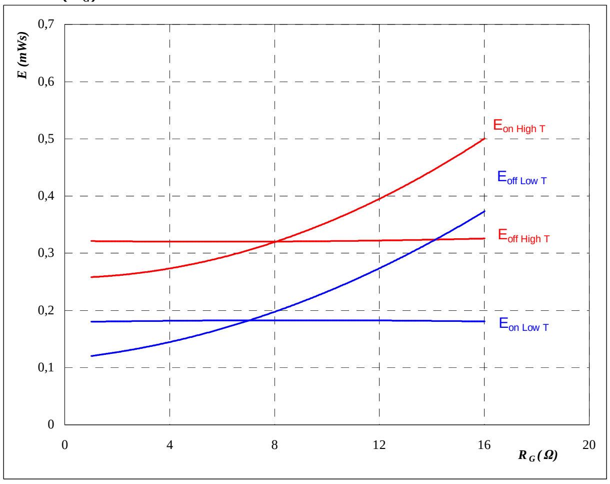
With an inductive load at

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

$E = f(R_G)$



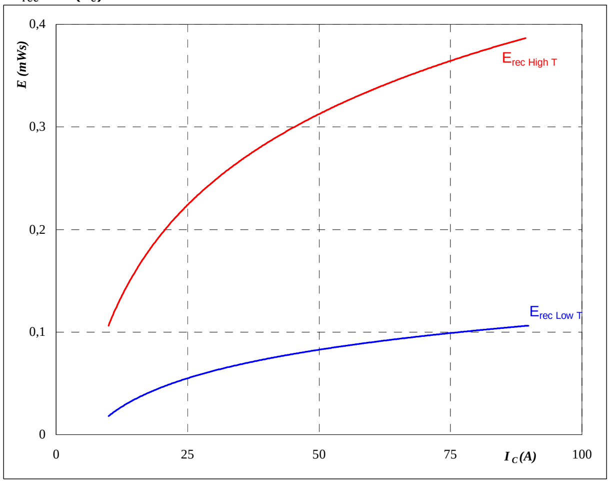
With an inductive load at

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

$E_{rec} = f(I_c)$



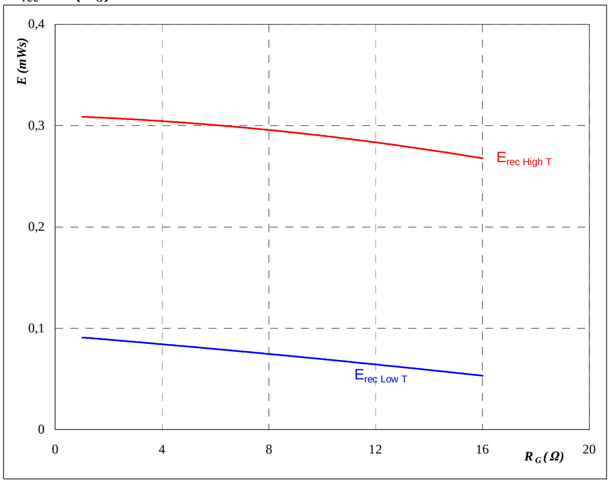
With an inductive load at

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

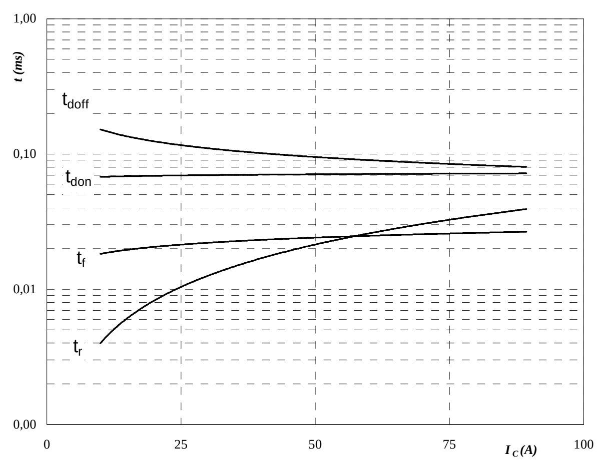
Buck

Buck Switch IGBT and Buck Diode FWD

figure 9. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



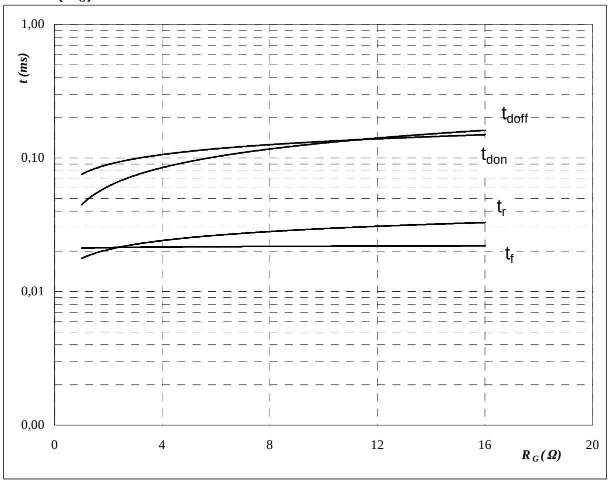
With an inductive load at

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

$t = f(R_G)$



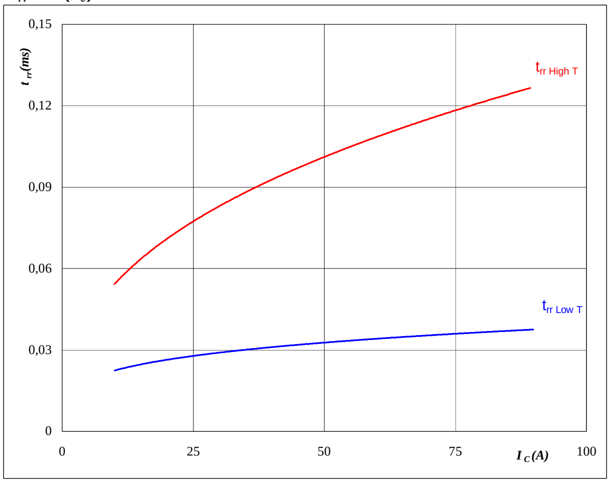
With an inductive load at

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

$t_{rr} = f(I_c)$



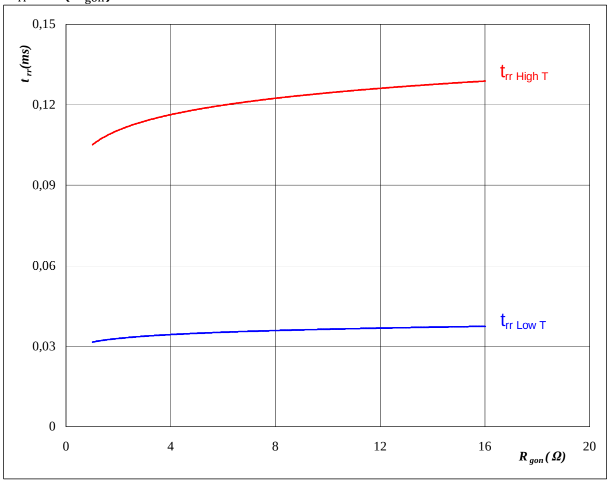
At

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

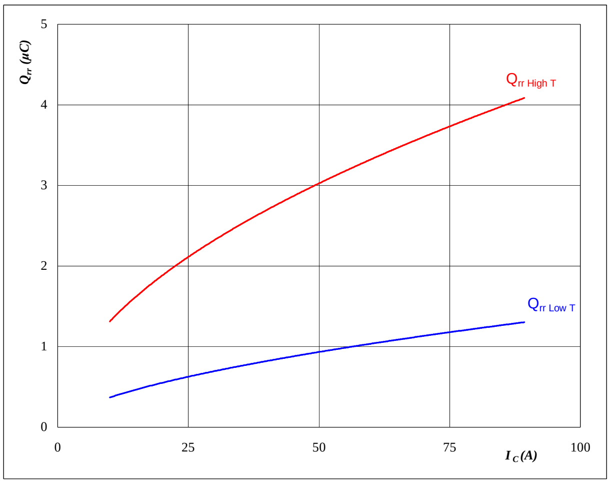
Buck

Buck Switch IGBT and Buck Diode FWD

figure 13. **FWD**

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



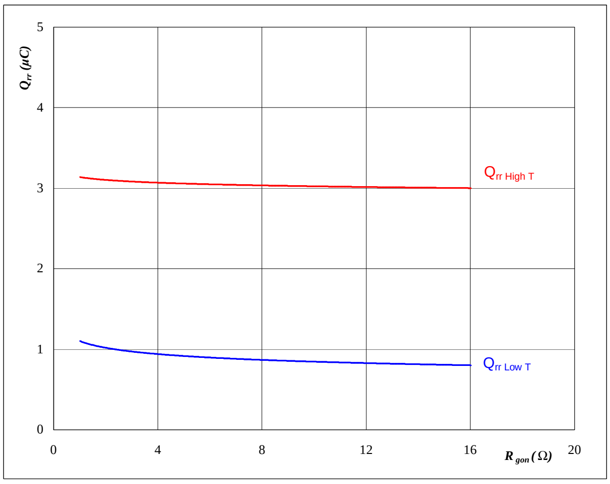
At

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

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



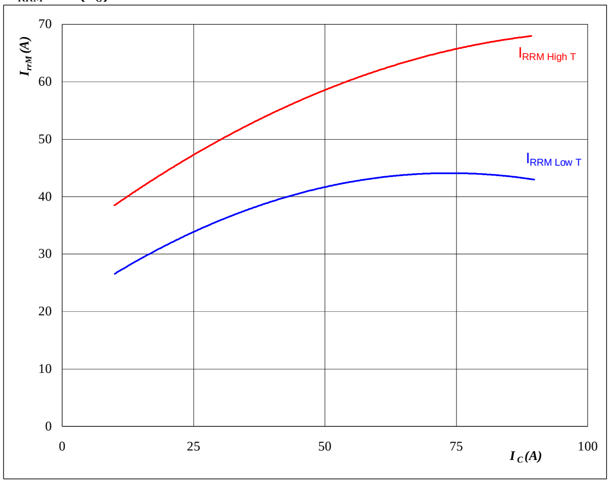
At

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

$I_{RRM} = f(I_C)$



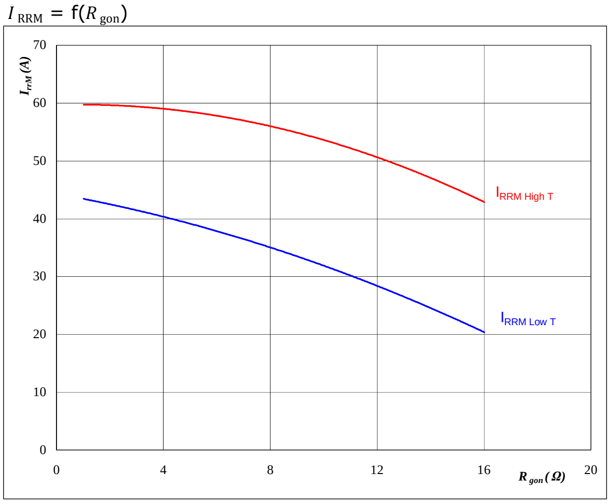
At

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

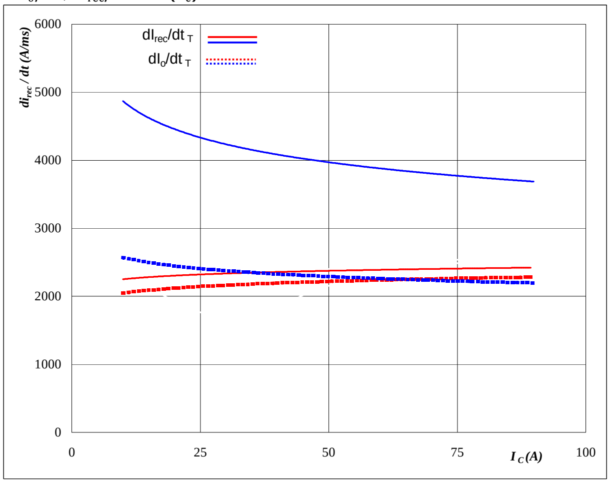
Buck

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

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



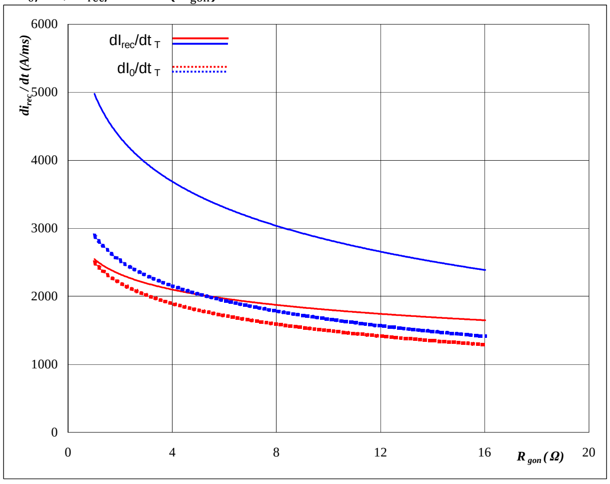
At

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

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



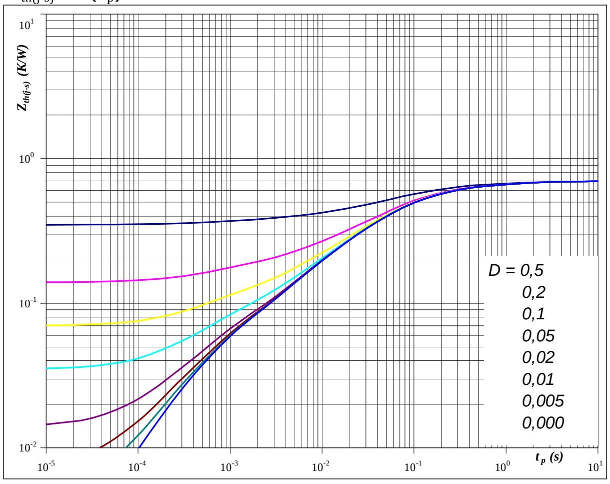
At

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

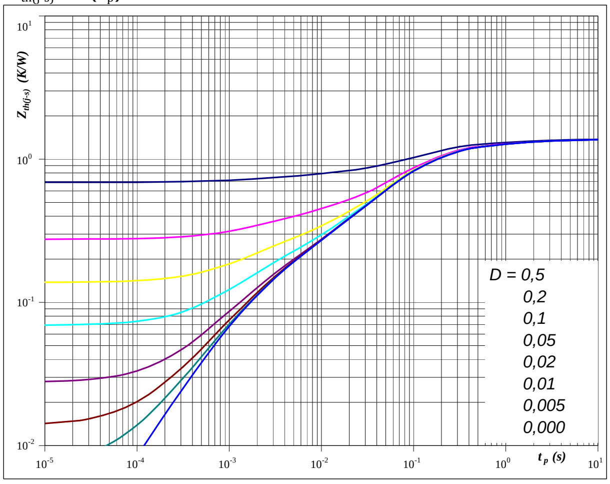
IGBT thermal model values

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

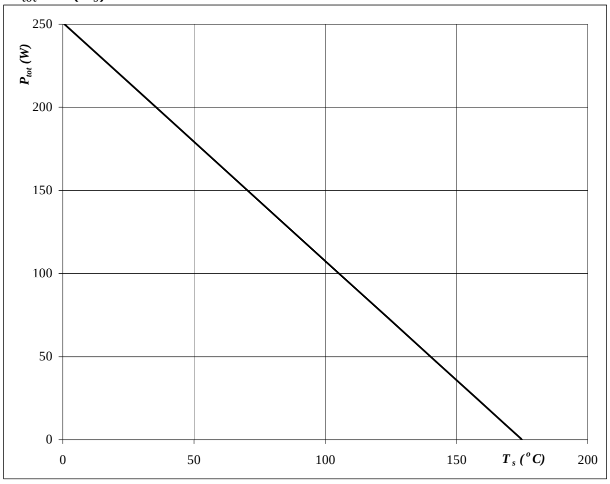
Buck

Buck Switch IGBT and Buck Diode FWD

figure 21. **IGBT**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



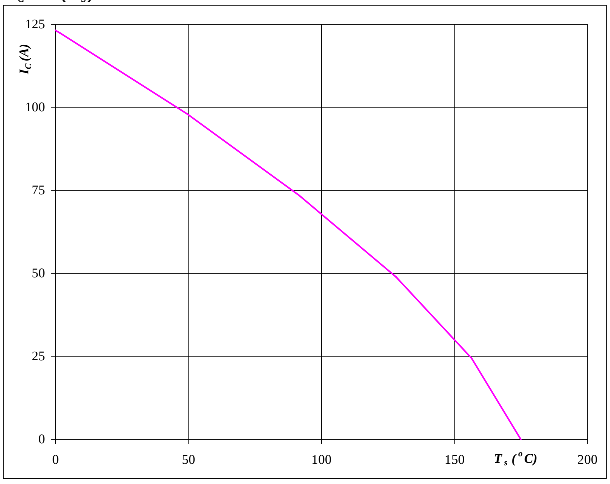
At

T_j = 175 °C

figure 22. **IGBT**

Collector current as a function of heatsink temperature

$I_C = f(T_s)$



At

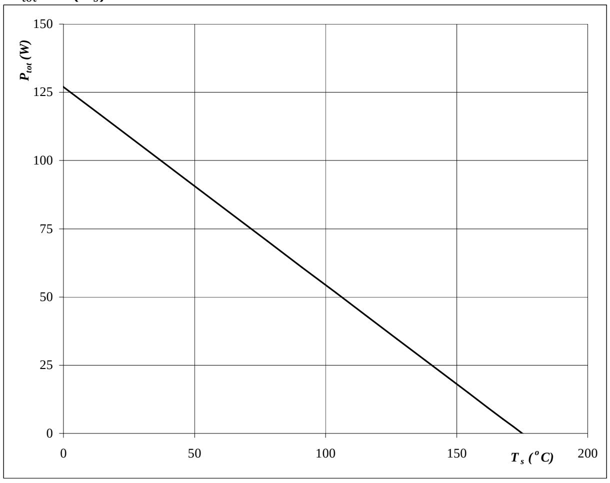
T_j = 175 °C

V_{GE} = 15 V

figure 23. **FWD**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



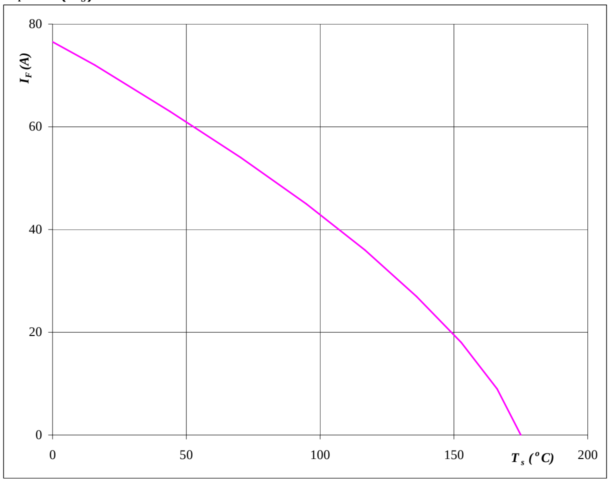
At

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

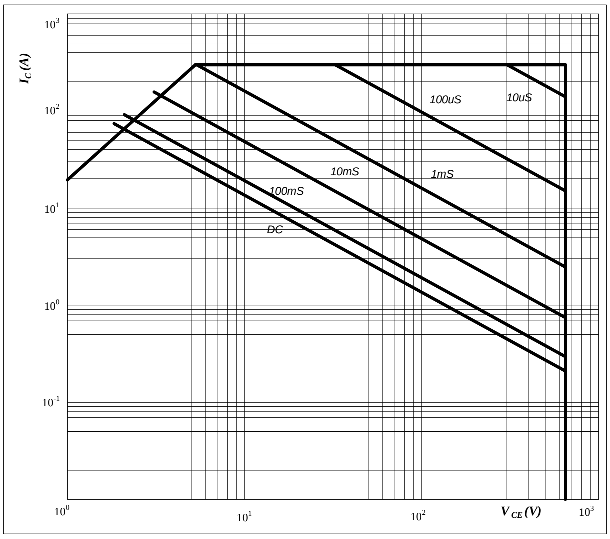
Buck

Buck Switch IGBT and Buck Diode FWD

figure 25. **IGBT**

Safe operating area as a function of collector-emitter voltage

$I_C = f(V_{CE})$



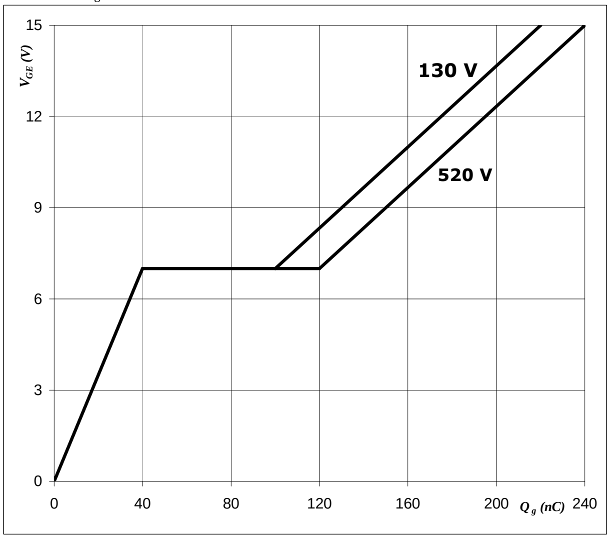
At

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

figure 26. **IGBT**

Gate voltage vs Gate charge

$V_{GE} = f(Q_g)$



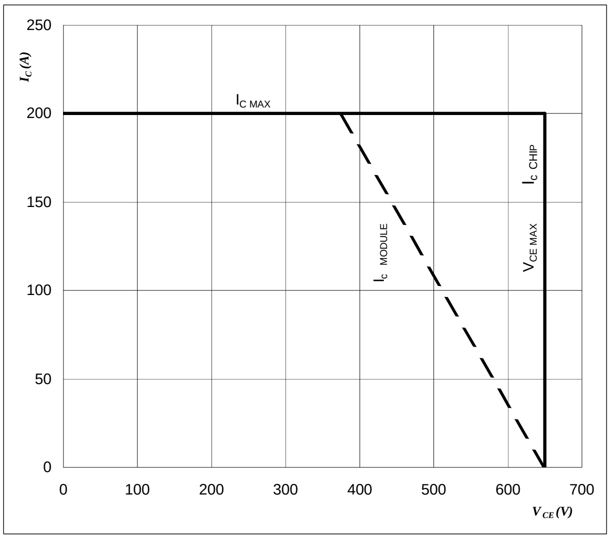
At

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

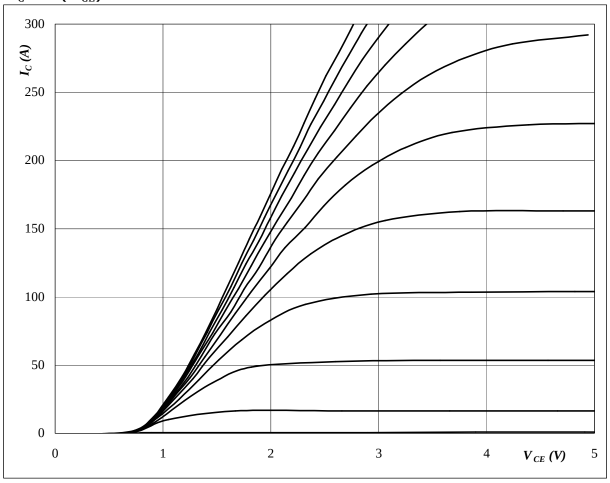
Boost

Boost Switch IGBT and Boost Diode FWD

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



At

t_p = 250 µs

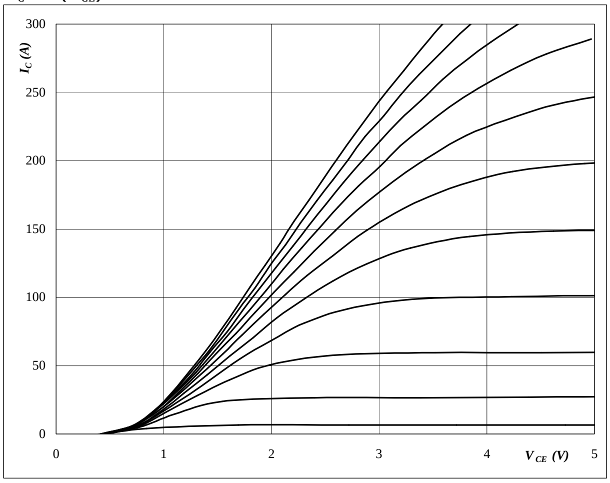
T_j = 25 °C

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

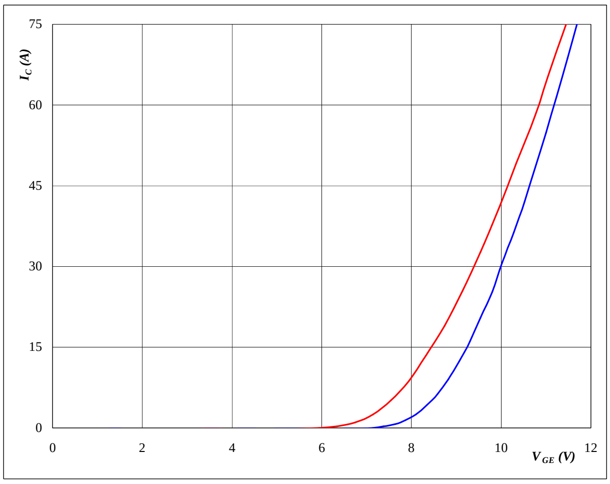
T_j = 125 °C

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

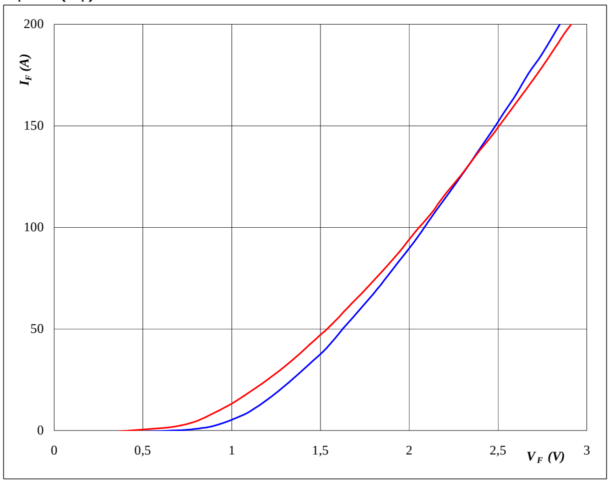
t_p = 250 µs

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

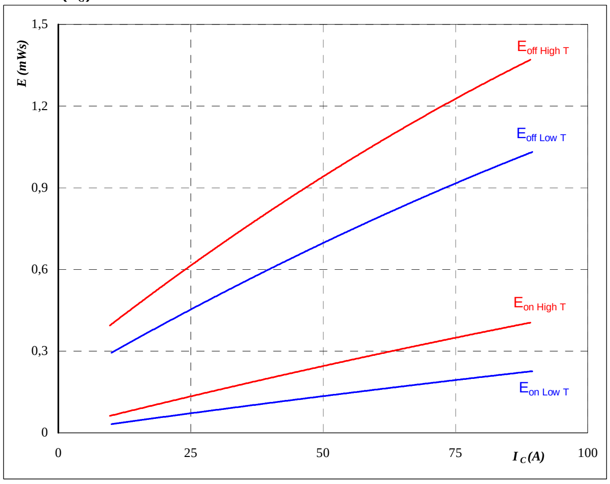
Boost

Boost Switch IGBT and Boost Diode FWD

figure 5.	**IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



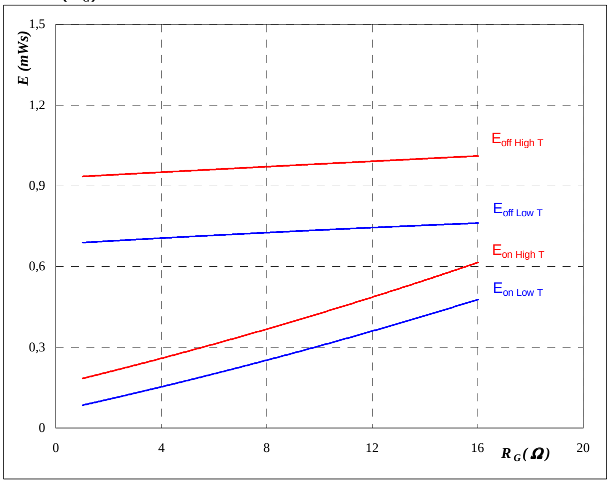
With an inductive load at

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

$E = f(R_G)$



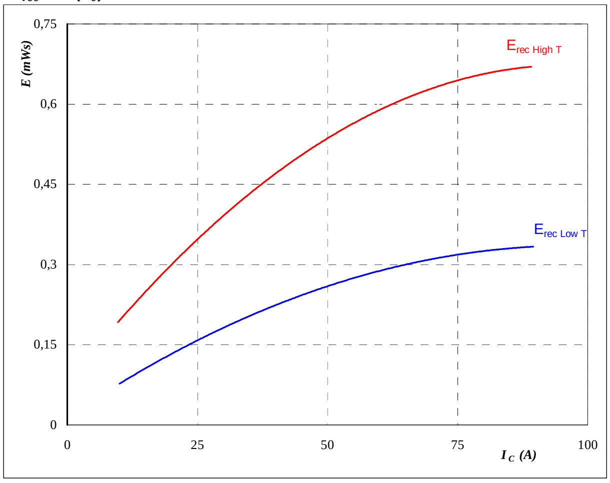
With an inductive load at

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

$E_{rec} = f(I_c)$



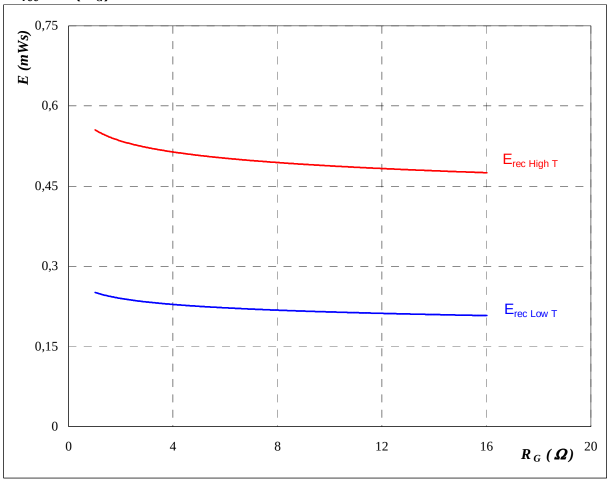
With an inductive load at

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

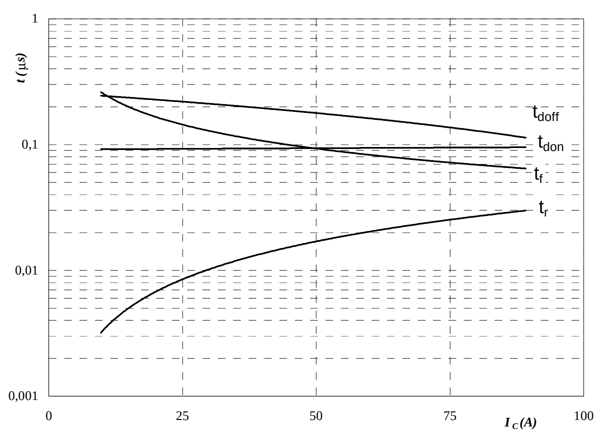
Boost

Boost Switch IGBT and Boost Diode FWD

figure 9. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



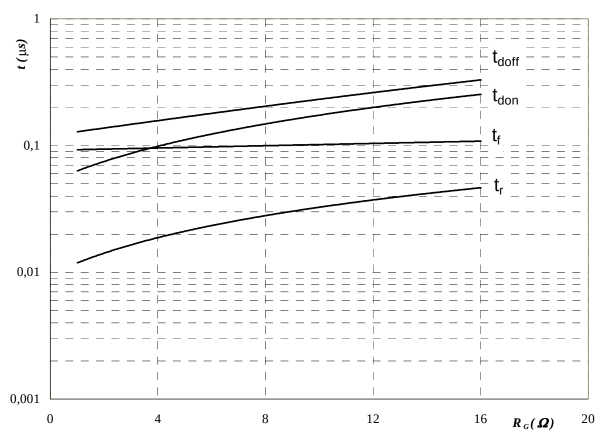
With an inductive load at

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

$t = f(R_G)$



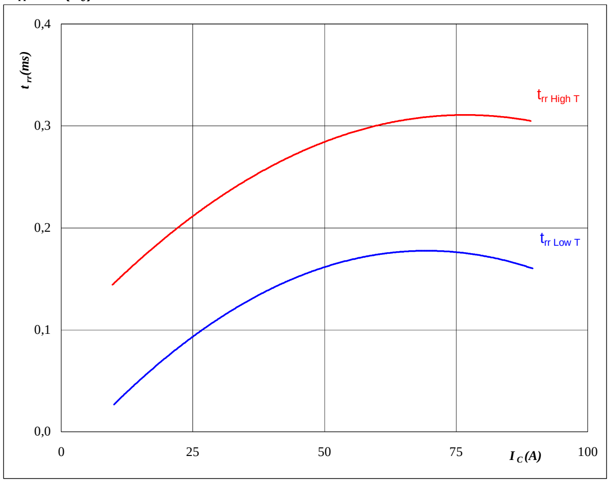
With an inductive load at

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

$t_{rr} = f(I_c)$



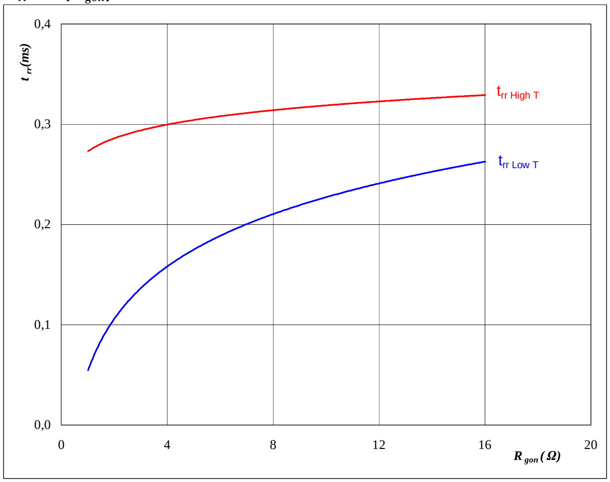
At

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

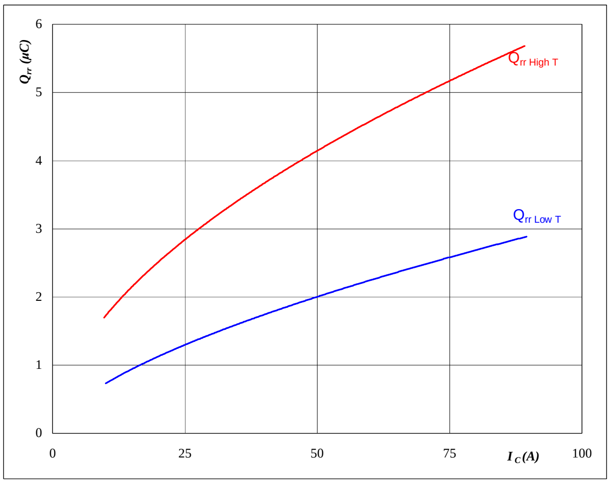
Boost

Boost Switch IGBT and Boost Diode FWD

figure 13. **FWD**

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



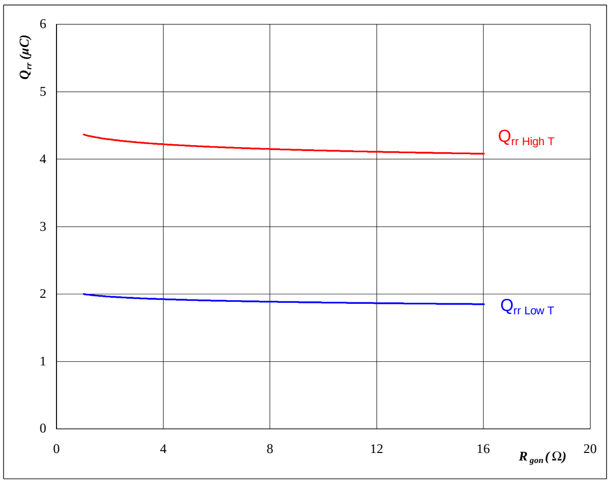
At

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

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



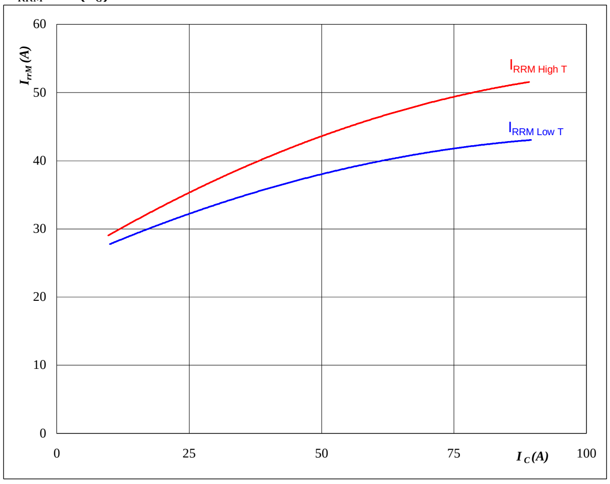
At

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

$I_{RRM} = f(I_C)$



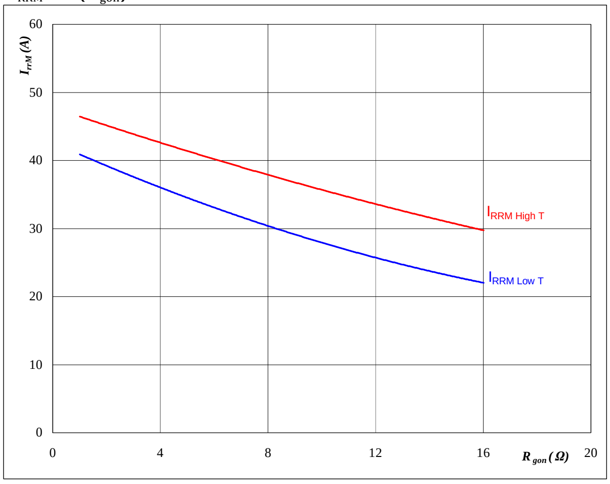
At

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

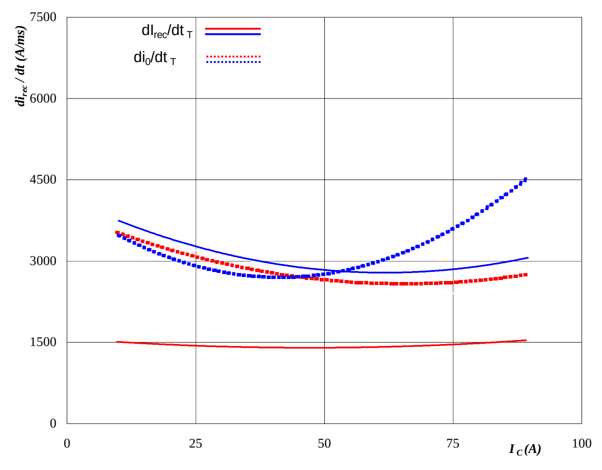
Boost

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

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



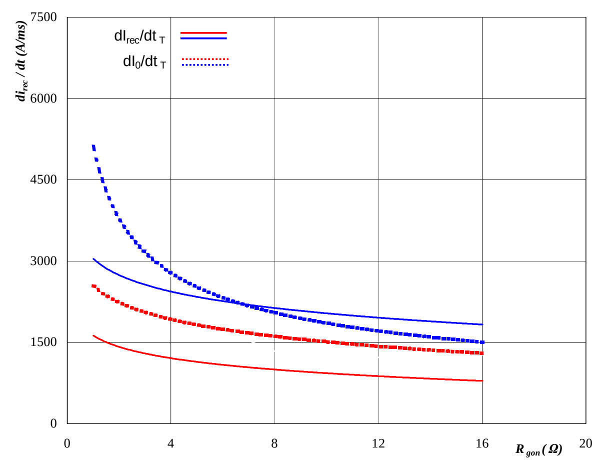
At

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

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



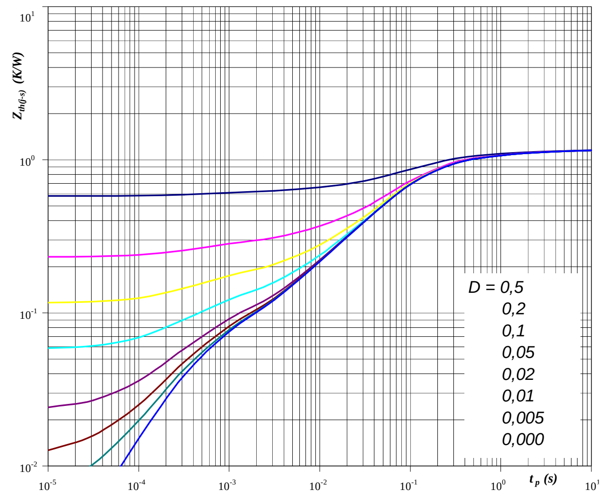
At

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

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



At

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

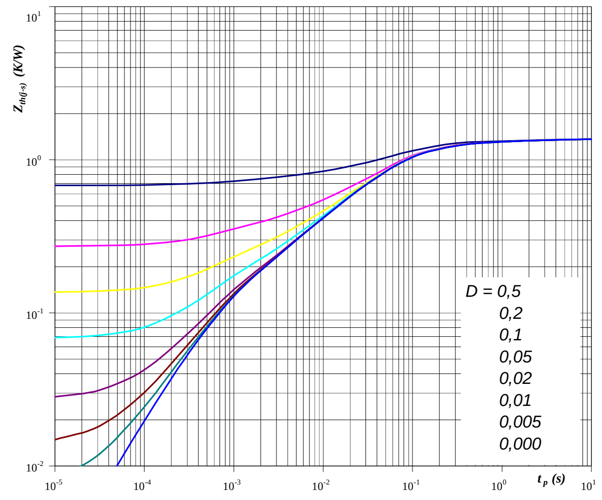
IGBT thermal model values

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

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



At

D =	t_p / T	
$R_{th(j\text{-}s)}$ =	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

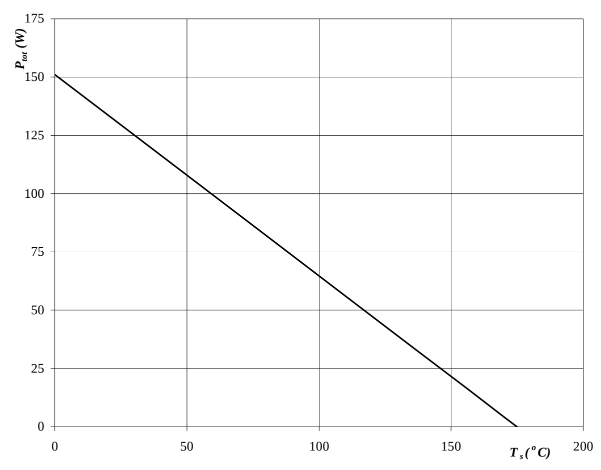
Boost

Boost Switch IGBT and Boost Diode FWD

figure 21. **IGBT**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



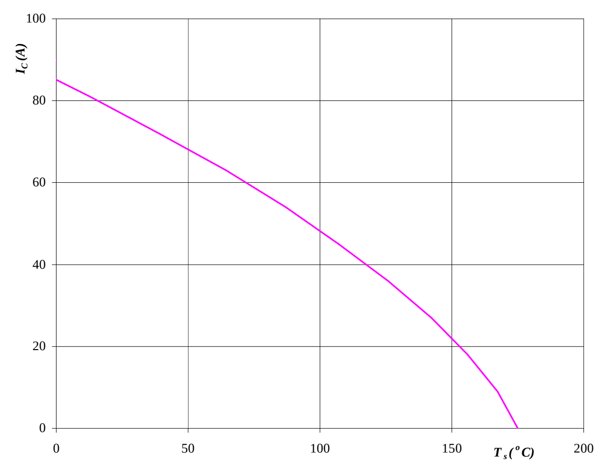
At

T_j = 175 ºC

figure 22. **IGBT**

Collector current as a function of heatsink temperature

$I_C = f(T_s)$



At

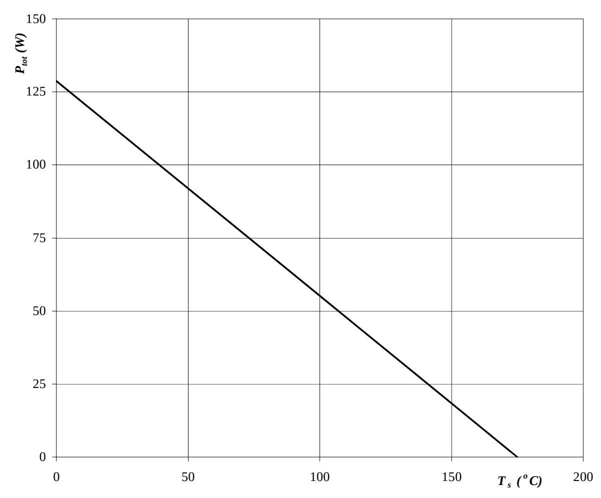
T_j = 175 ºC

V_{GE} = 15 V

figure 23. **FWD**

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_s)$



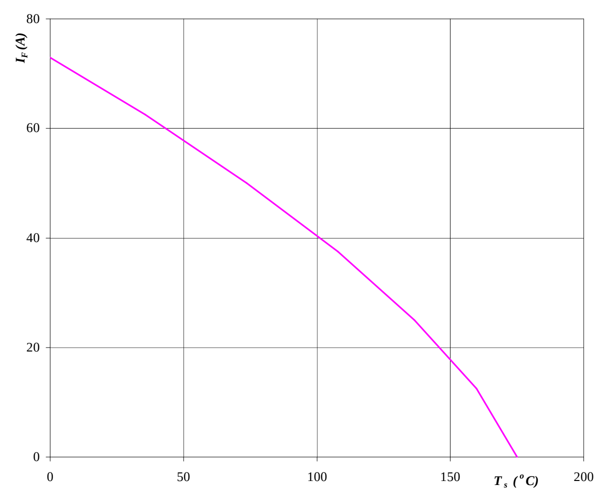
At

T_j = 175 ºC

figure 24. **FWD**

Forward current as a function of heatsink temperature

$I_F = f(T_s)$



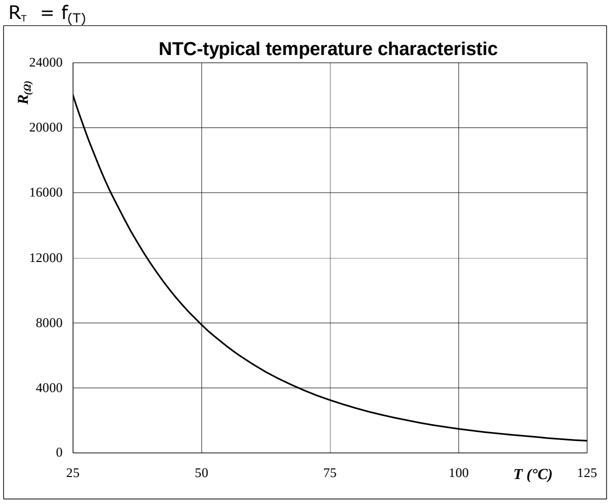
At

T_j = 175 ºC

Thermistor

figure 1.	**Thermistor**

Typical NTC characteristic
as a function of temperature
$R_T = f_{(T)}$



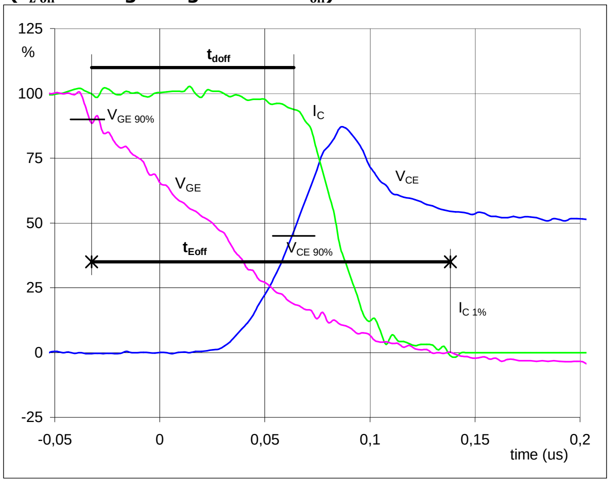
Buck Switching Definitions

General conditions

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

figure 1. **IGBT**

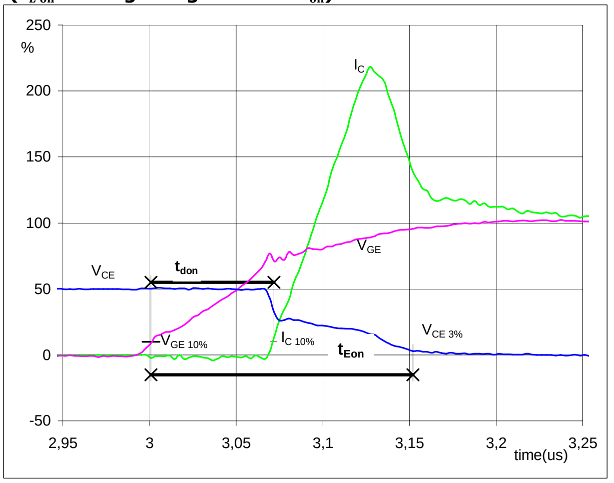
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff}
($t_{E\,off}$ = integrating time for E_{off})



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**

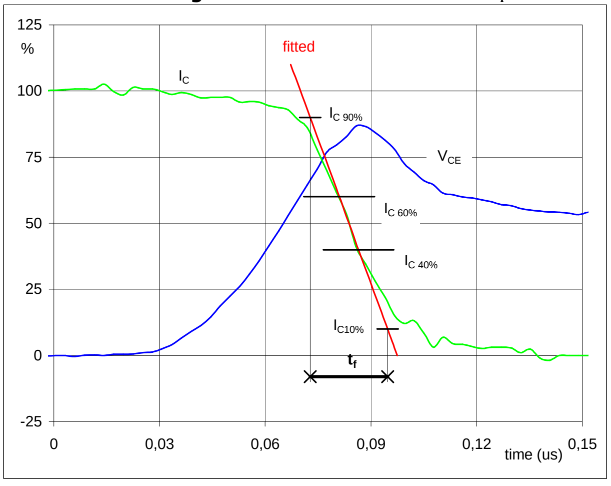
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon}
($t_{E\,on}$ = integrating time for E_{on})



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**

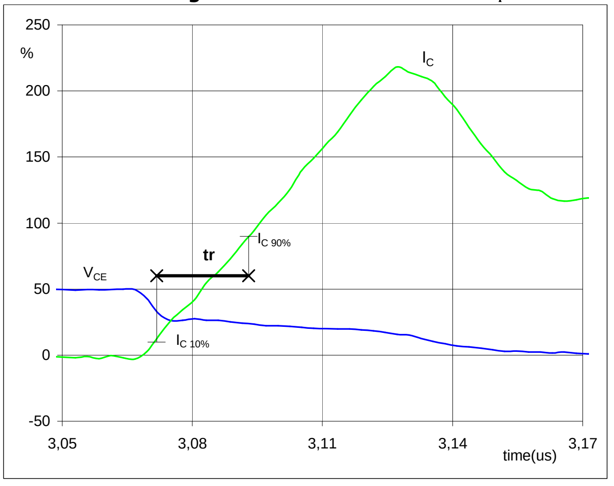
Turn-off Switching Waveforms & definition of t_f



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

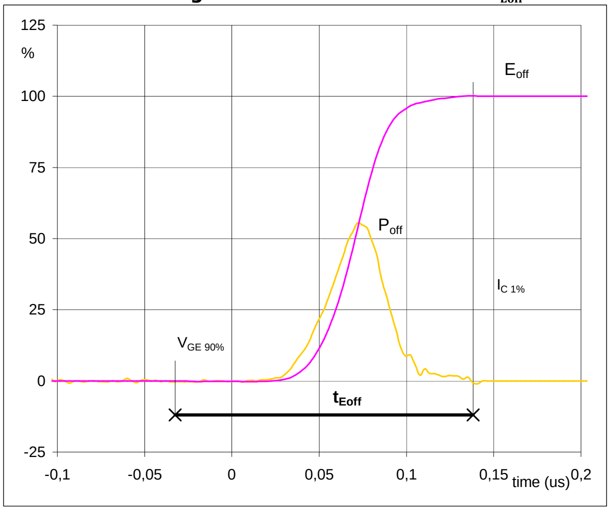


V_C (100%) =	150	V
I_C (100%) =	50	A
t_r =	0,021	μs

Buck Switching Definitions

figure 5. **IGBT**

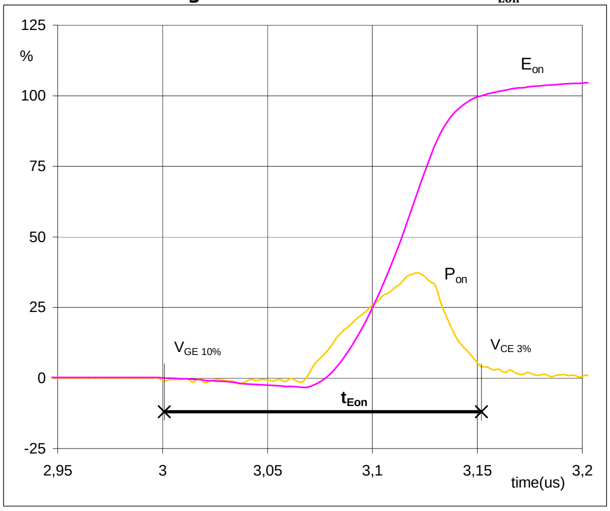
Turn-off Switching Waveforms & definition of t_{Eoff}



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

figure 6. **IGBT**

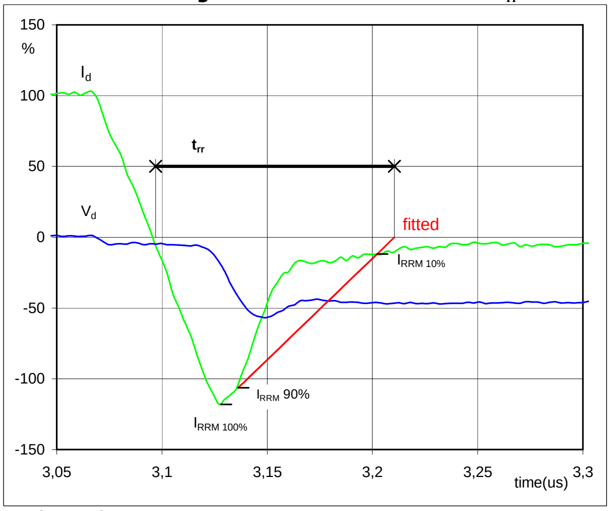
Turn-on Switching Waveforms & definition of t_{Eon}



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}

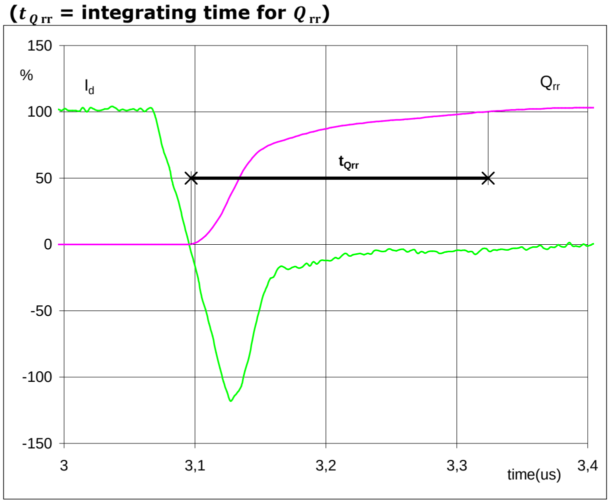


V_d (100%) =	150	V
I_d (100%) =	50	A
I_{RRM} (100%) =	-59	A
t_{rr} =	0,113	μs

Buck Switching Definitions

figure 8.	FWD

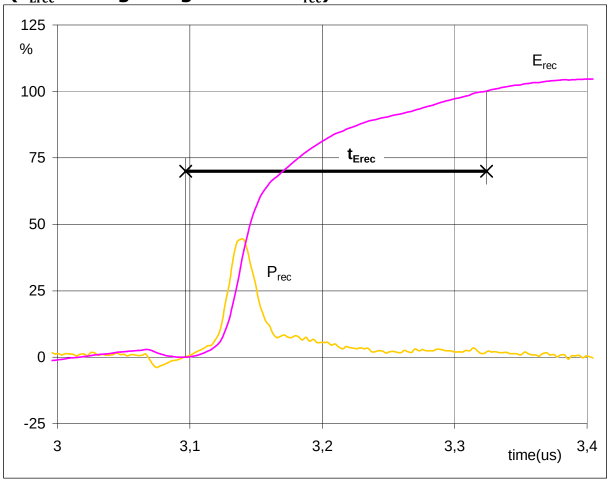
Turn-on Switching Waveforms & definition of t_{Qrr}
($t_{Q\,rr}$ = integrating time for Q_{rr})



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})

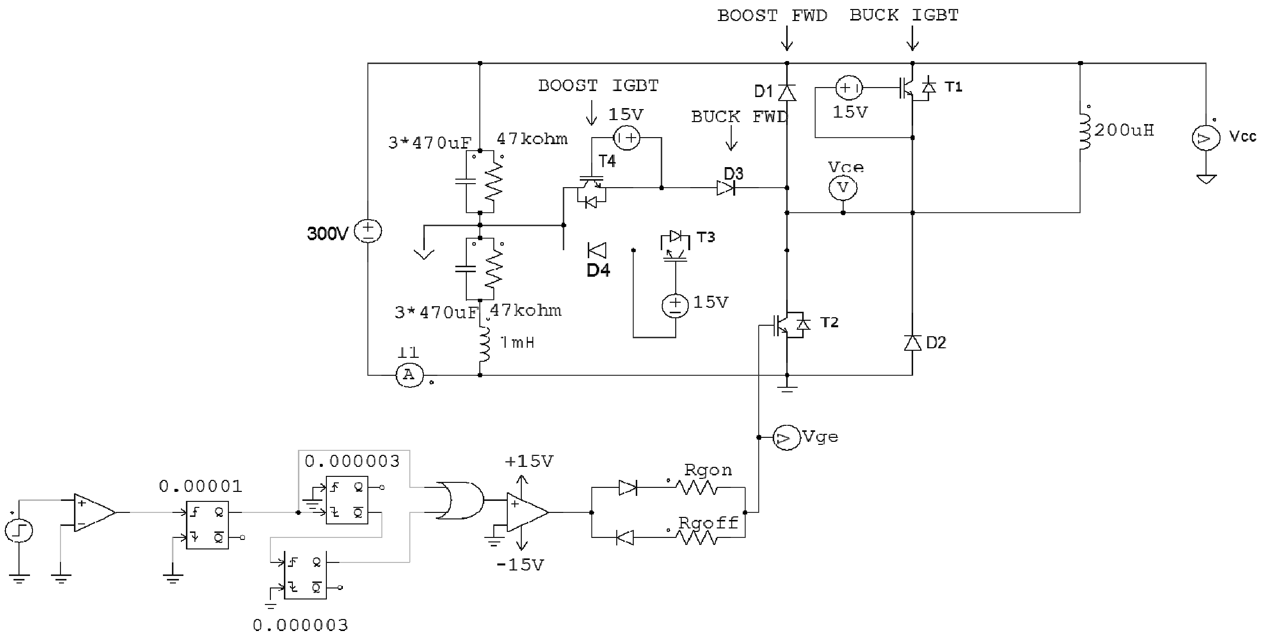


P_{rec} (100%) =	7,49	kW
E_{rec} (100%) =	0,31	mJ
$t_{E\,rec}$ =	0,227	μs

Measurement circuits

figure 10.

Buck stage switching measurement circuit

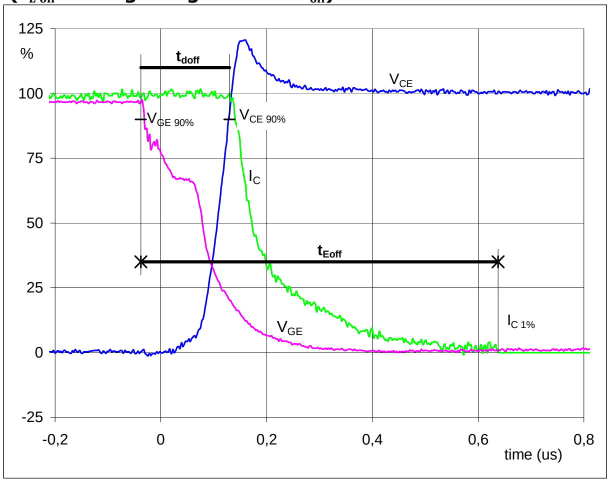


Boost Switching Definitions

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

figure 1. **IGBT**

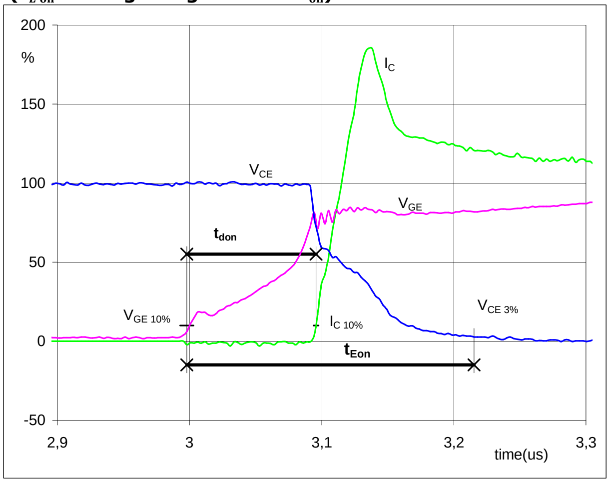
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff}
($t_{E\,off}$ = integrating time for E_{off})



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**

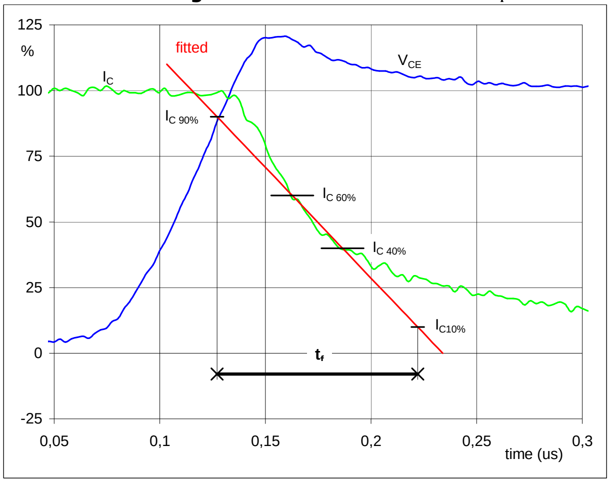
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon}
($t_{E\,on}$ = integrating time for E_{on})



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**

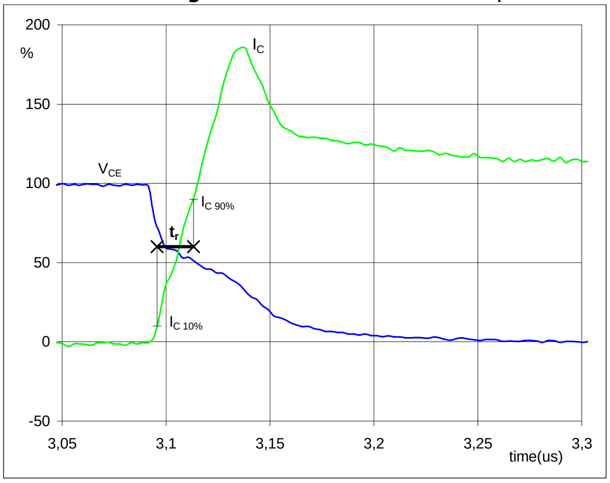
Turn-off Switching Waveforms & definition of t_f



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

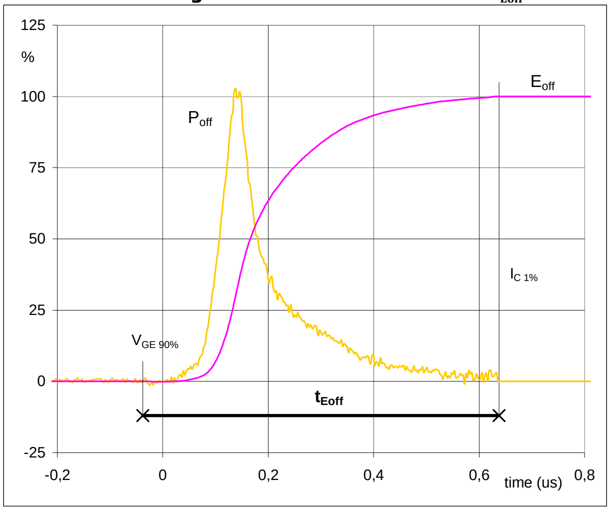


V_C (100%) =	150	V
I_C (100%) =	50	A
t_r =	0,017	μs

Boost Switching Definitions

figure 5. **IGBT**

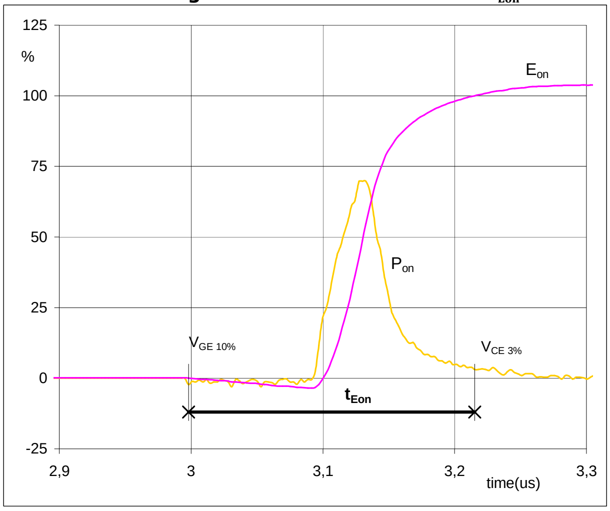
Turn-off Switching Waveforms & definition of t_{Eoff}



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

figure 6. **IGBT**

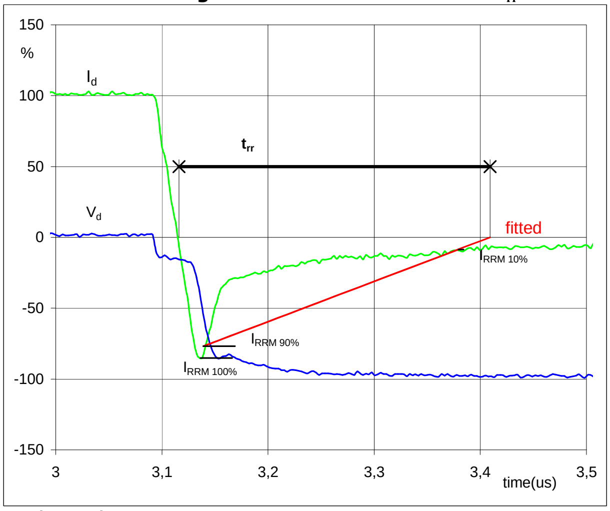
Turn-on Switching Waveforms & definition of t_{Eon}



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}

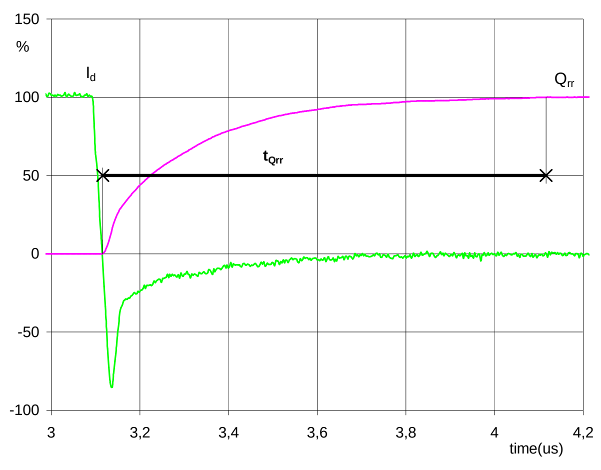


V_d (100%) =	150	V
I_d (100%) =	50	A
I_{RRM} (100%) =	-43	A
t_{rr} =	0,290	µs

Boost Switching Definitions

figure 8. **FWD**

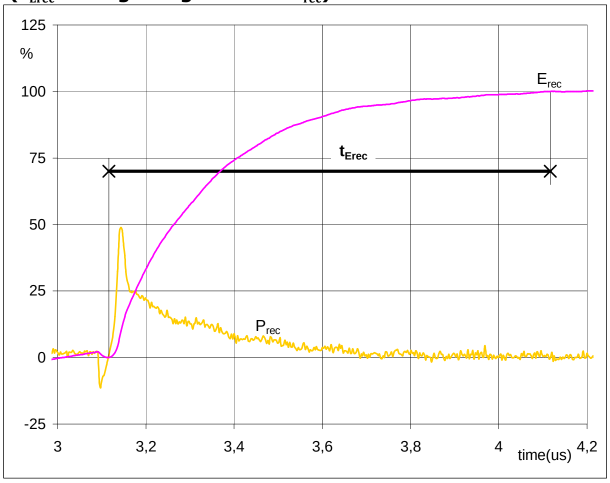
Turn-on Switching Waveforms & definition of t_{Qrr}
($t_{Q\,rr}$ = integrating time for Q_{rr})



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})

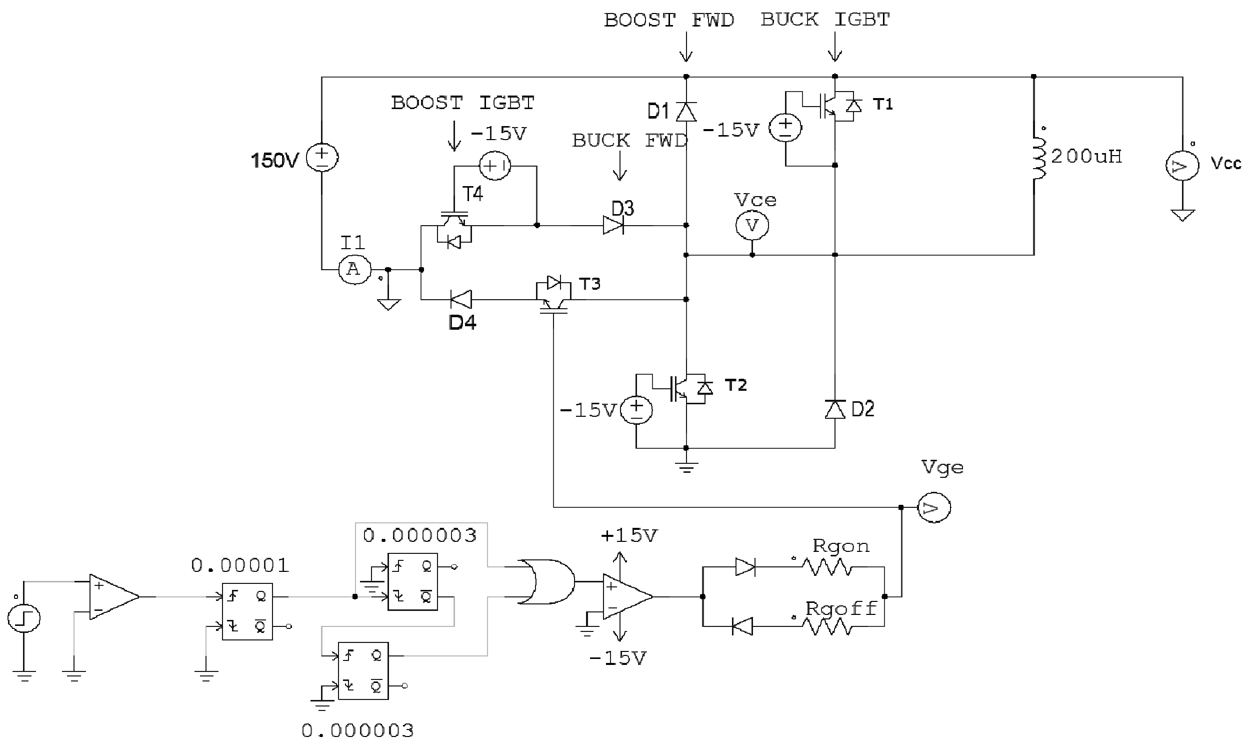


P_{rec} (100%) =	7,56	kW
E_{rec} (100%) =	0,52	mJ
$t_{E\,rec}$ =	1,00	μs

Measurement circuits

figure 10.

Boost stage switching measurement circuit



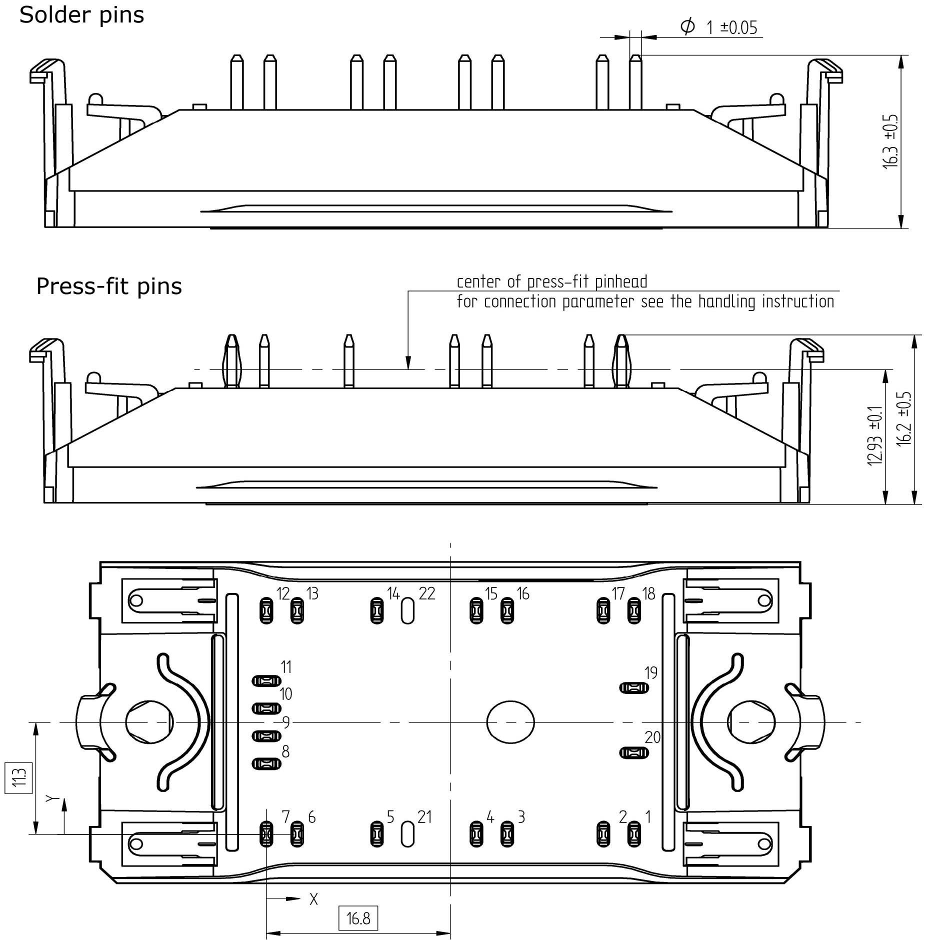
Ordering Code & Marking

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	

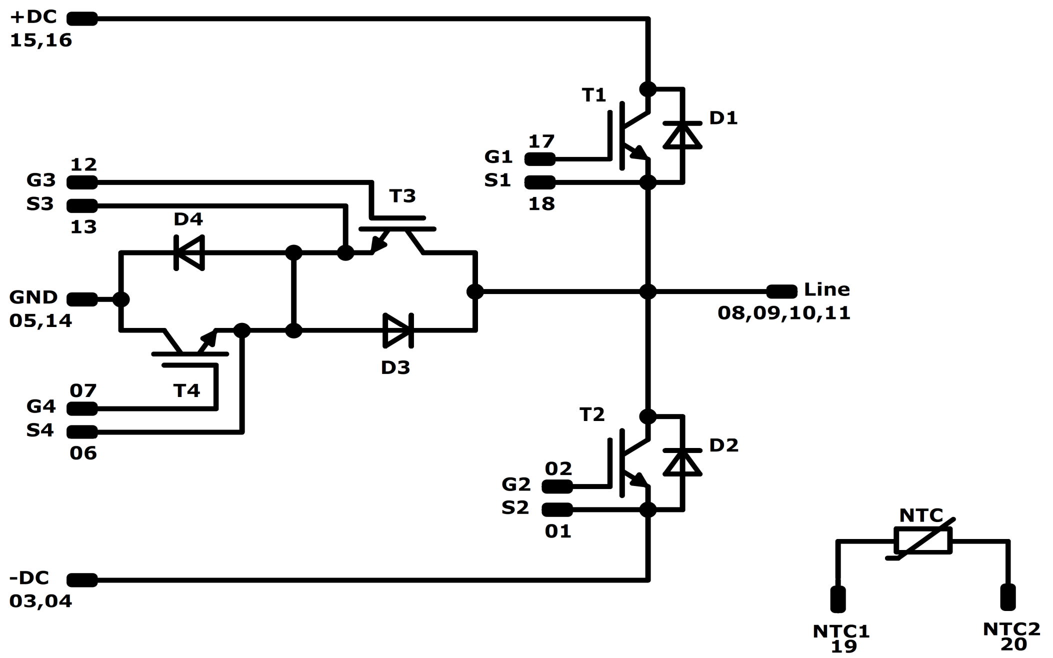
Outline

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	22,6	NTC1
20	33,6	22,6	NTC2
21	Not assembled		
22			



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-D3-14	04 Jan. 2018	New colors, logo, added press-fit version	All

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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.