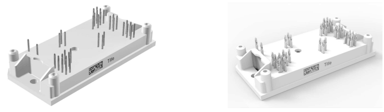
flow 1 NPC	650 V / 150 A

Features

- switching with high speed components
- low voltage ride through (LVRT)
- reactive power capable
- improved Rth (AlN) substrat

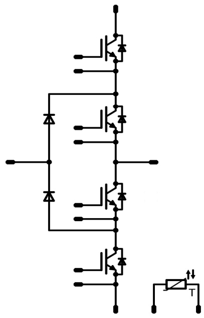
flow 1 17mm housing



Target Applications

- UPS
- Motor Drive
- Solar inverters

Schematic



Types

- 10-F107NIB150SG06-M136F39
- 10-P107NIB150SG06-M136F39Y

Maximum Ratings

T_j=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Buck IGBT					
Collector-emitter break down voltage	V_{CE}			650	V
DC collector current	I_C	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	128 168	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		450	A
Power dissipation	P_{tot}	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	279 422	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	T_j≤150°C V_{GE}=15V		5 400	μs V
Maximum Junction Temperature	T_{jmax}			175	°C
Buck Diode					
Peak Repetitive Reverse Voltage	V_{RRM}			650	V
DC forward current	I_F	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	125 170	A
Diode surge non repetitive forward current	I_{FSM}	t_p=10ms, sine halfewave	T_c=100°C	1280	A
Power dissipation	P_{tot}	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	241 365	W
Maximum Junction Temperature	T_{jmax}			175	°C

Maximum Ratings

T_j=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Boost IGBT					
Collector-emitter break down voltage	V_{CE}			600	V
DC collector current	I_C	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	173 228	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		450	A
Power dissipation	P_{tot}	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	324 490	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	T_j≤150°C V_{GE}=15V		6 360	μs V
Maximum Junction Temperature	T_{jmax}			175	°C
Boost Inverse Diode					
Peak Repetitive Reverse Voltage	V_{RRM}			600	V
DC forward current	I_F	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	124 164	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		200	A
Power dissipation	P_{tot}	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	204 310	W
Maximum Junction Temperature	T_{jmax}			175	°C
Boost Diode					
Peak Repetitive Reverse Voltage	V_{RRM}	T_j=25°C		650	V
DC forward current	I_F	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	120 161	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		200	A
Power dissipation	P_{tot}	$T_j=T_{jmax}$	T_s=80°C T_c=80°C	203 307	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
Insulation Properties					
Insulation voltage	V_{is}	DC voltage	t=2s	4000	V
Creepage distance				min 12,7	mm
Clearance				min 12,7	mm
Comparative Tracking Index	CTI			>200	

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_C [A] or I_F [A] or I_D [A]	T_j [°C]	Min	Typ	Max	
Buck IGBT										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$			0,0024	25 150	4,2	5,1	5,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		150	25 150	1,38	1,94 2,26	2,22	V
Collector-emitter cut-off current incl. Diode	I_{CES}		0	650		25 150			0,0076	mA
Gate-emitter leakage current	I_{GES}		20	0		25 150			300	nA
Integrated Gate resistor	R_{gint}							none		Ω
Turn-on delay time	$t_{d(on)}$					25 150		147 149		
Rise time	t_r					25 150		30 34		
Turn-off delay time	$t_{d(off)}$	R_{goff}=4 Ω R_{gon}=4 Ω	±15	350	150	25 150		197 219		ns
Fall time	t_f					25 150		18 27		
Turn-on energy loss per pulse	E_{on}					25 150		1,53 2,45		mWs
Turn-off energy loss per pulse	E_{off}					25 150		1,69 2,68		
Input capacitance	C_{ies}							9240		
Output capacitance	C_{oss}	f=1MHz	0	25		25		480		pF
Reverse transfer capacitance	C_{rss}							274		
Gate charge	Q_G		15	480	150	25		940		nC
Thermal resistance chip to heatsink	$R_{th(j-s)}$	phase-change material λ=3,4W/mK						0,34		K/W
Buck Diode										
Diode forward voltage	V_F				160	25 150		1,67 2,01	1,7	V
Reverse leakage current	I_r			650		25 150			160	µA
Peak reverse recovery current	I_{RRM}					25 150		104 157		A
Reverse recovery time	t_{rr}					25 150		59 97		ns
Reverse recovered charge	Q_{rr}	R_{gon}=4 Ω	±15	350	150	25 150		5 10		µC
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 150		6885 3093		A/µs
Reverse recovered energy	E_{rec}					25 150		0,92 2,07		mWs
Thermal resistance chip to heatsink	$R_{th(j-s)}$	phase-change material λ=3,4W/mK						0,39		K/W

Characteristic Values

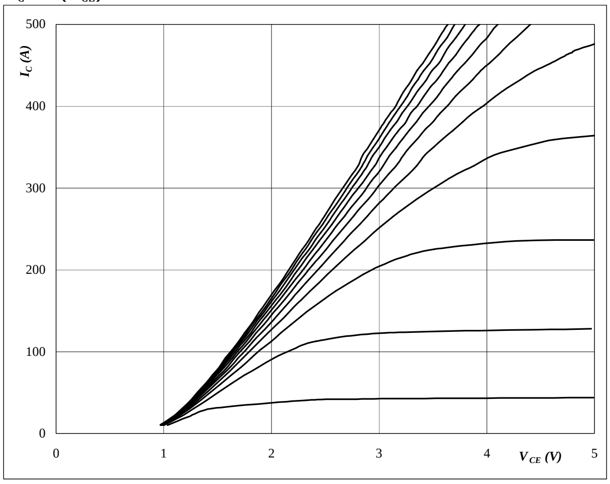
Parameter	Symbol	Conditions	V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_C [A] or I_F [A] or I_D [A]	T_j [°C]	Value Min	Value Typ	Value Max	Unit
Boost IGBT										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$			0,0024	25 150	5	5,8	6,5	V
Collector-emitter saturation voltage	V_{CEsat}		15		150	25 150	1,05	1,46 1,65	1,85	V
Collector-emitter cut-off incl diode	I_{CES}		0	600		25 150			0,0076	mA
Gate-emitter leakage current	I_{GES}		20	0					1200	nA
Integrated Gate resistor	R_{gint}					25 150		none		Ω
Turn-on delay time	$t_{d(on)}$					25 150		149 151		
Rise time	t_r					25 150		31 36		ns
Turn-off delay time	$t_{d(off)}$	R_{goff}=4 Ω R_{gon}=4 Ω	±15	350	150	25 150		220 245		
Fall time	t_f					25 150		58 78		
Turn-on energy loss per pulse	E_{on}					25 150		1,77 2,38		mWs
Turn-off energy loss per pulse	E_{off}					25 150		4,26 5,95		
Input capacitance	C_{ies}							9240		
Output capacitance	C_{oss}	f=1MHz	0	25		25		576		pF
Reverse transfer capacitance	C_{rss}							274		
Gate charge	Q_G		15	480	150			940		nC
Thermal resistance chip to heatsink	$R_{th(j-s)}$	phase-change material λ=3,4W/mK						0,29		K/W
Boost Inverse Diode										
Diode forward voltage	V_F				100	25 150	1,20	1,77 1,54	1,90	V
Thermal resistance chip to heatsink	$R_{th(j-s)}$	phase-change material λ=3,4W/mK						0,46		K/W
Boost Diode										
Diode forward voltage	V_F				100	25 150	1,2	1,77 1,57	1,9	V
Reverse leakage current	I_r			650		25 150			48	μA
Peak reverse recovery current	I_{RRM}					25 150		82 114		A
Reverse recovery time	t_{rr}					25 150		133 290		ns
Reverse recovered charge	Q_{rr}	R_{gon}=4 Ω	±15	350	150	25 150		6 13		μC
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 150		559 676		A/μs
Reverse recovery energy	E_{rec}					25 150		1,65 3,68		mWs
Thermal resistance chip to heatsink	$R_{th(j-s)}$	phase-change material λ=3,4W/mK						0,47		K/W
Thermistor										
Rated resistance	R					25		21511		Ω
Deviation of R100	$\Delta_{R/R}$	R_{100}=1486Ω				100	-4,5		+4,5	%
Power dissipation	P					25		210		mW
Power dissipation constant						25		3,5		mW/K
B-value	$B_{(25/50)}$					25		3884		K
B-value	$B_{(25/100)}$	Tol. ±1%				25		3964		K
Vincotech NTC Reference									F	

Buck

Figure 1	IGBT

Typical output characteristics

$I_C = f(V_{CE})$



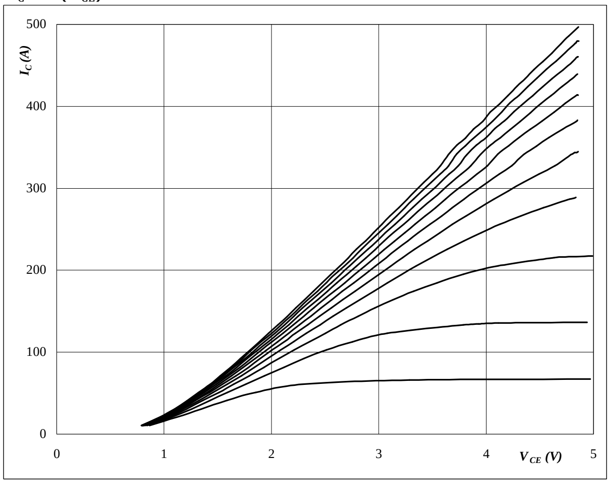
At

t_p =	350	μs
T_j =	25	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

Figure 2	IGBT

Typical output characteristics

$I_C = f(V_{CE})$



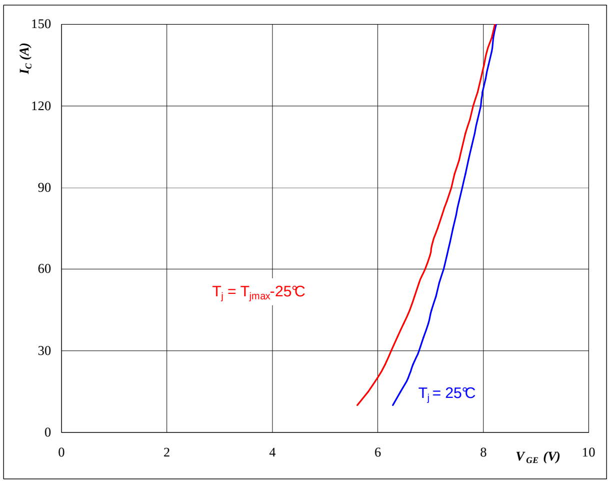
At

t_p =	350	μs
T_j =	150	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

Figure 3	IGBT

Typical transfer characteristics

$I_C = f(V_{GE})$



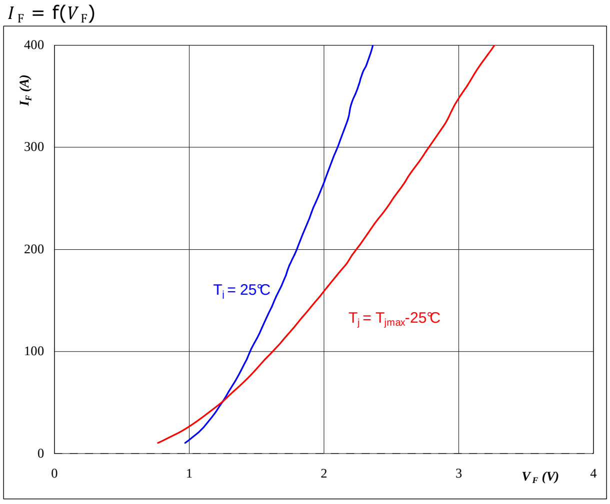
At

t_p =	350	μs
V_{CE} =	10	V

Figure 4	FWD

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



At

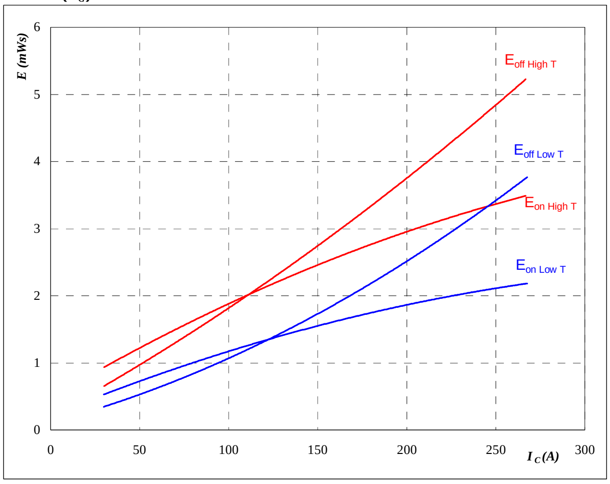
t_p =	350	μs

Buck

Figure 5 IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$



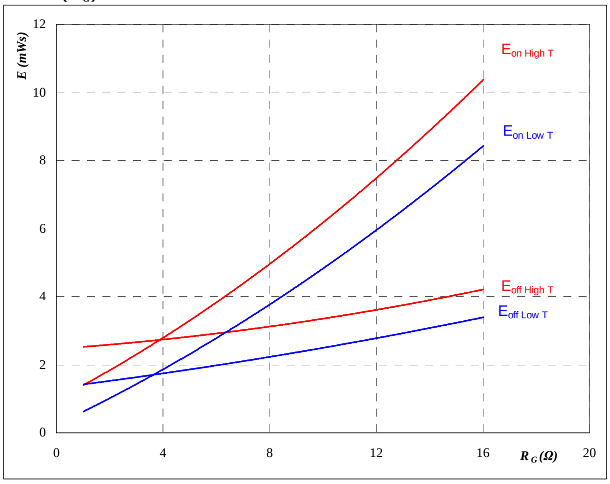
With an inductive load at

T_j =	25/150	°C
V_{CE} =	350	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

$E = f(R_G)$



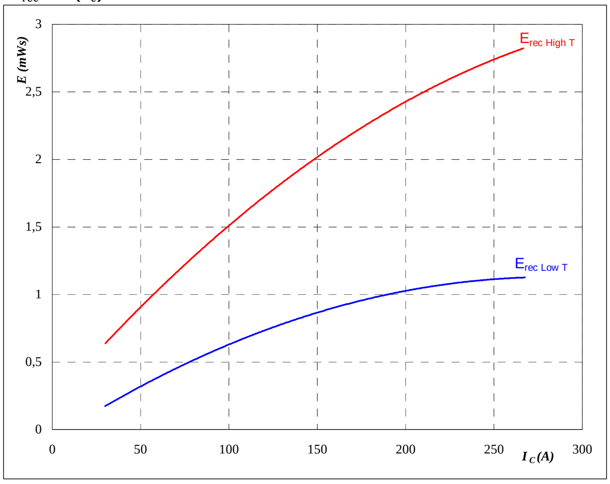
With an inductive load at

T_j =	25/150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	150	A

Figure 7 FWD

Typical reverse recovery energy loss as a function of collector current

$E_{rec} = f(I_c)$



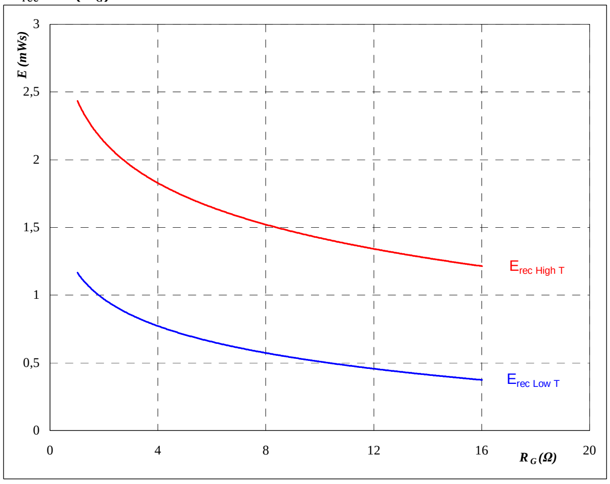
With an inductive load at

T_j =	25/150	°C
V_{CE} =	350	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

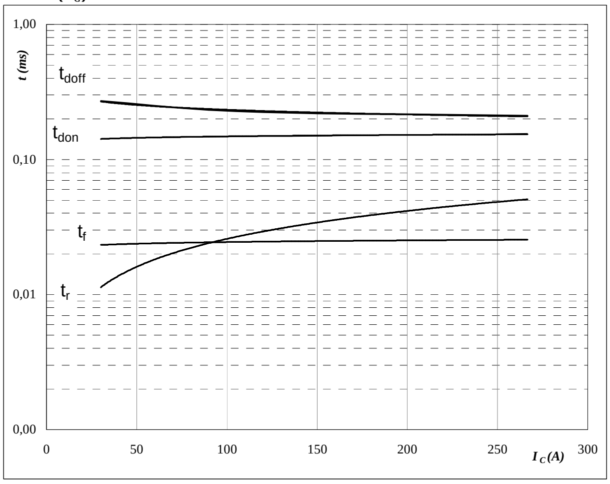
T_j =	25/150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	150	A

Buck

Figure 9 IGBT

Typical switching times as a function of collector current

$t = f(I_C)$



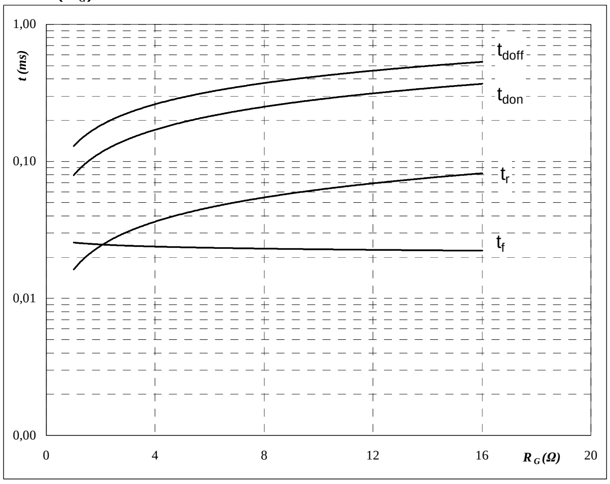
With an inductive load at

T_j =	150	°C
V_{CE} =	350	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

$t = f(R_G)$



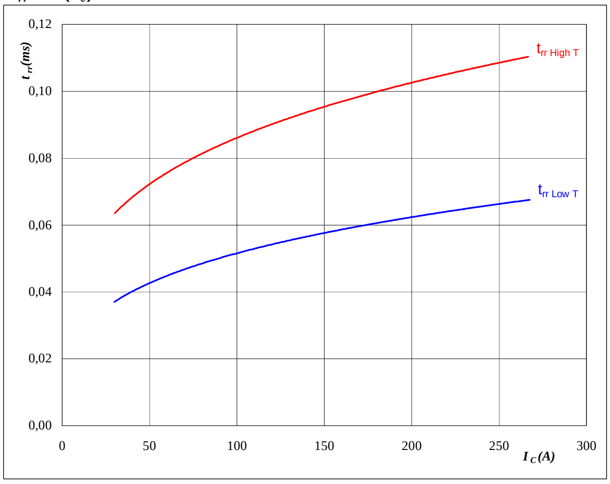
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	150	A

Figure 11 FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



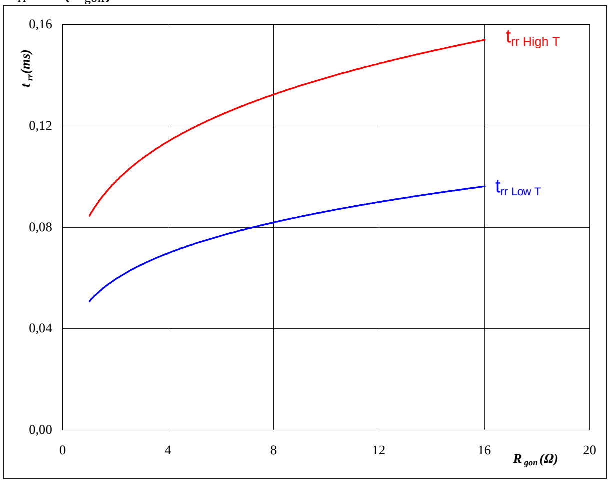
At

T_j =	25/150	°C
V_{CE} =	350	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

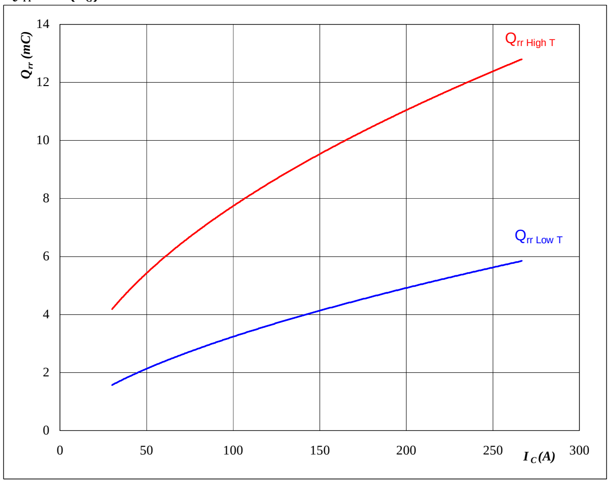
T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Buck

Figure 13 FWD

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



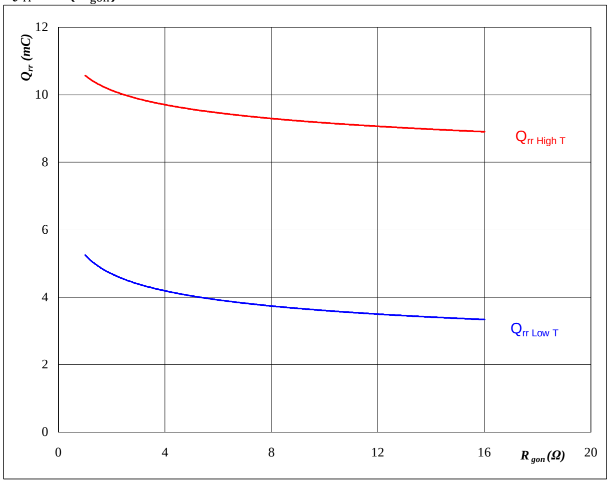
At

T_j =	25/150	°C
V_{CE} =	350	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

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



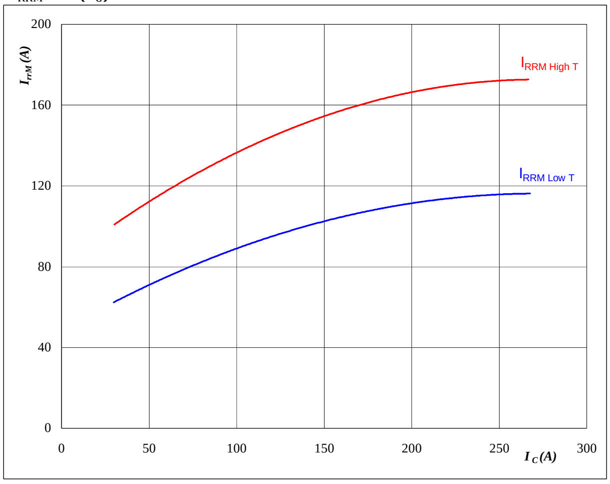
At

T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Figure 15 FWD

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



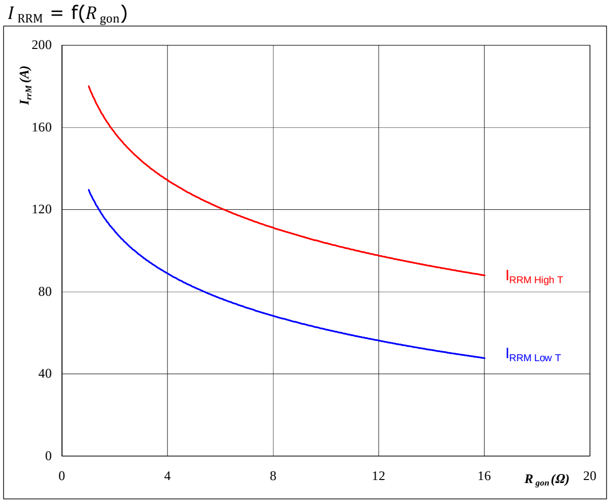
At

T_j =	25/150	°C
V_{CE} =	350	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

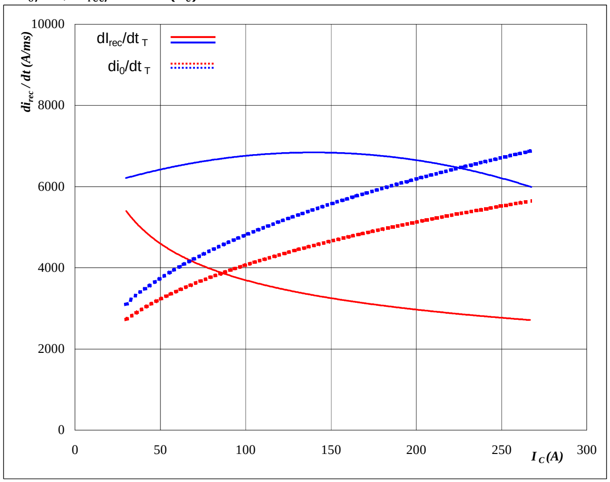
T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Buck

Figure 17 FWD

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

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



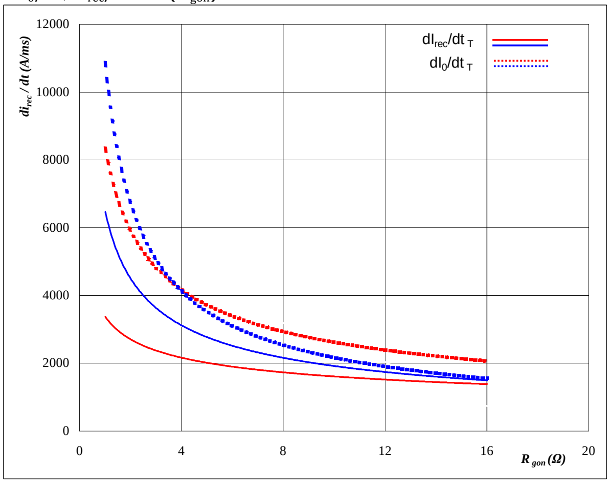
At

T_j =	25/150	°C
V_{CE} =	350	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

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



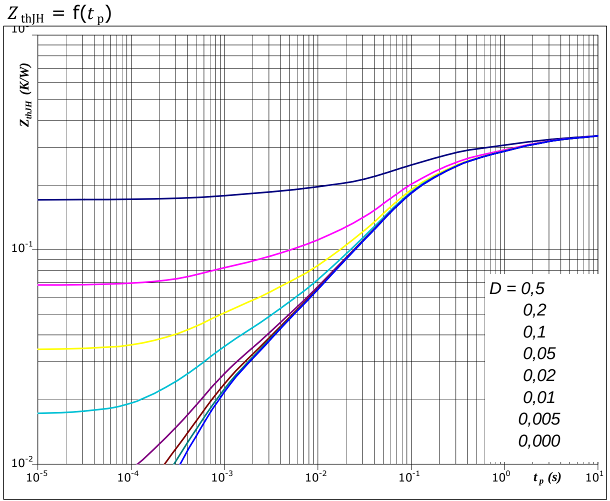
At

T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Figure 19 IGBT

IGBT transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

D =	t_p / T	
R_{thJH} =	0,34	K/W

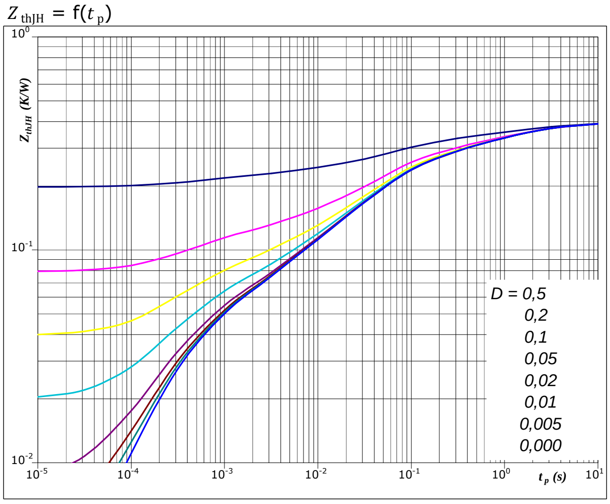
IGBT thermal model values

R (K/W)	Tau (s)
0,04	3,5E+00
0,06	8,6E-01
0,10	1,4E-01
0,09	4,3E-02
0,02	4,4E-03
0,02	6,2E-04

Figure 20 FWD

FWD transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

D =	t_p / T	
R_{thJH} =	0,39	K/W

FWD thermal model values

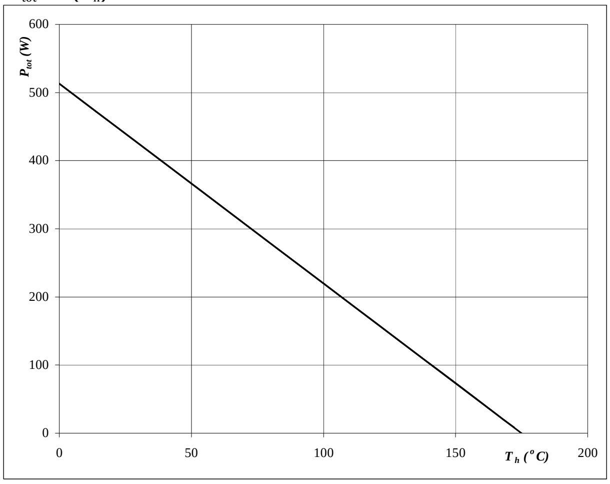
R (K/W)	Tau (s)
0,05	3,8E+00
0,07	9,2E-01
0,05	2,2E-01
0,13	5,1E-02
0,03	1,2E-02
0,03	2,4E-03

Buck

Figure 21 IGBT

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



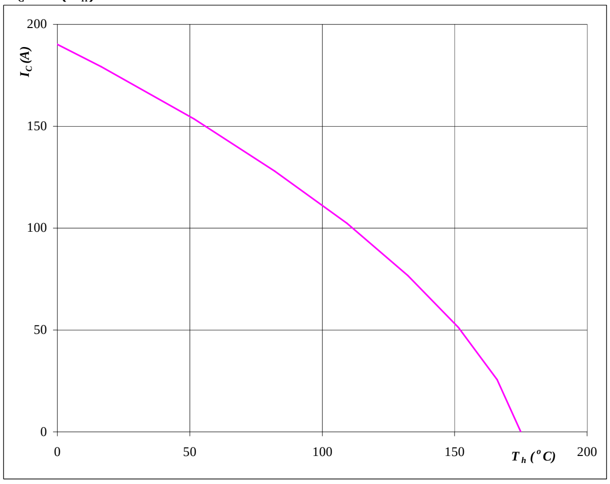
At

T_j = 175 °C

Figure 22 IGBT

Collector current as a function of heatsink temperature

$I_C = f(T_h)$



At

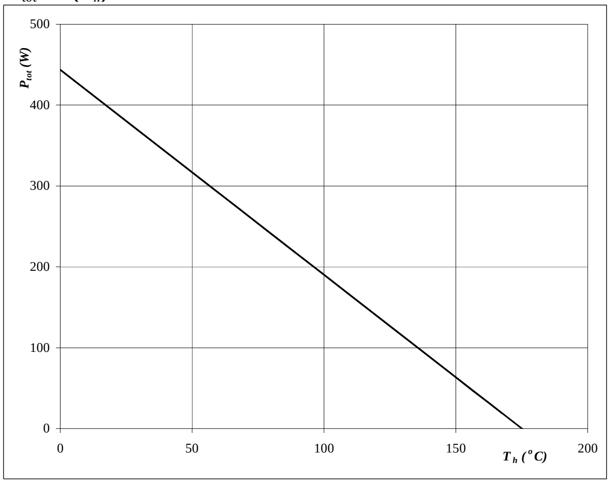
T_j = 175 °C

V_{GE} = 15 V

Figure 23 FWD

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



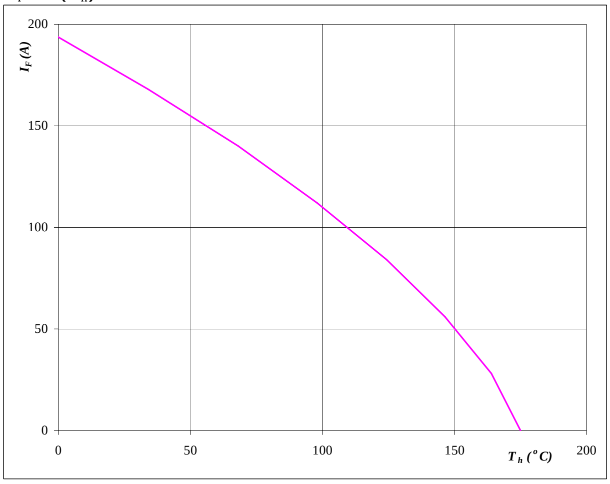
At

T_j = 175 °C

Figure 24 FWD

Forward current as a function of heatsink temperature

$I_F = f(T_h)$



At

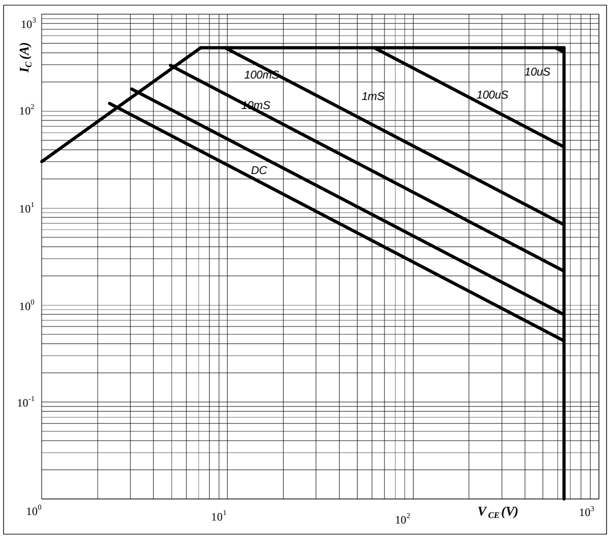
T_j = 175 °C

Buck

Figure 25 IGBT

Safe operating area as a function of collector-emitter voltage

$I_C = f(V_{CE})$



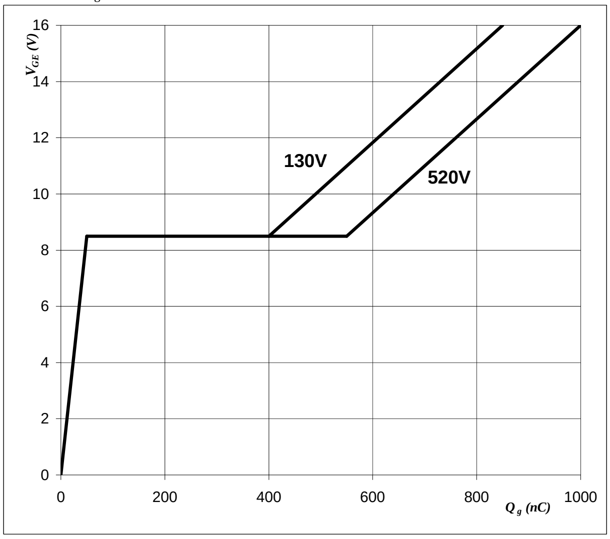
At

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

Figure 26 IGBT

Gate voltage vs Gate charge

$V_{GE} = f(Q_g)$



At

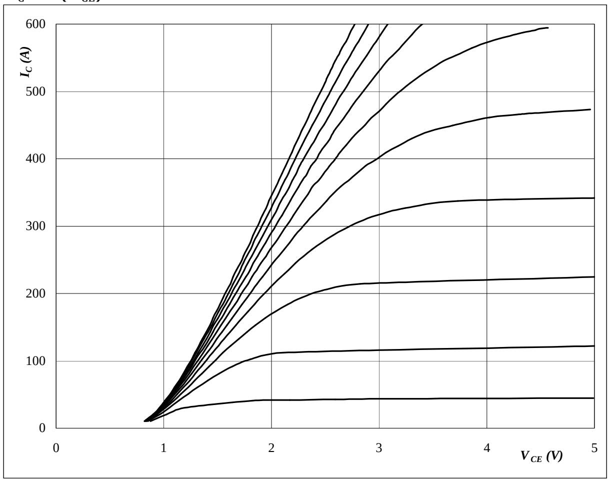
I_C =	150	A

Boost

Figure 1 IGBT

Typical output characteristics

$I_C = f(V_{CE})$



At

t_p = 350 µs

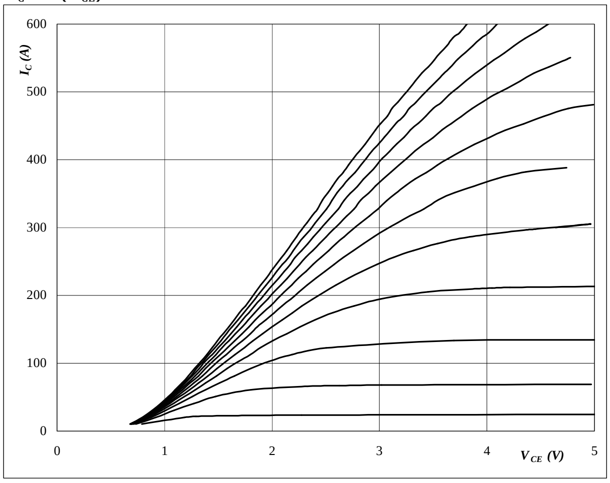
T_j = 25 °C

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 = 350 µs

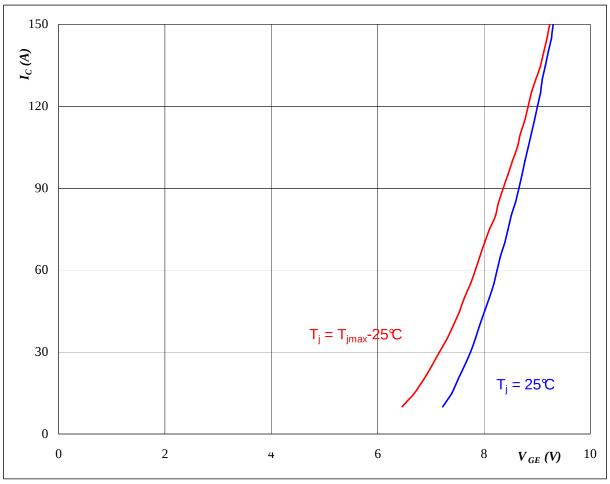
T_j = 150 °C

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

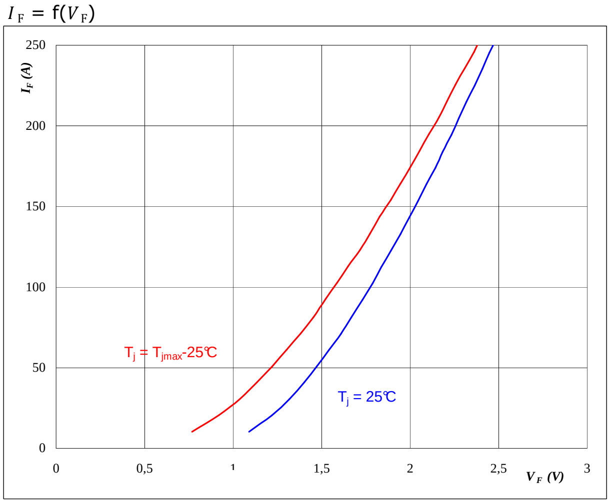
t_p = 350 µs

V_{CE} = 10 V

Figure 4 FWD

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



At

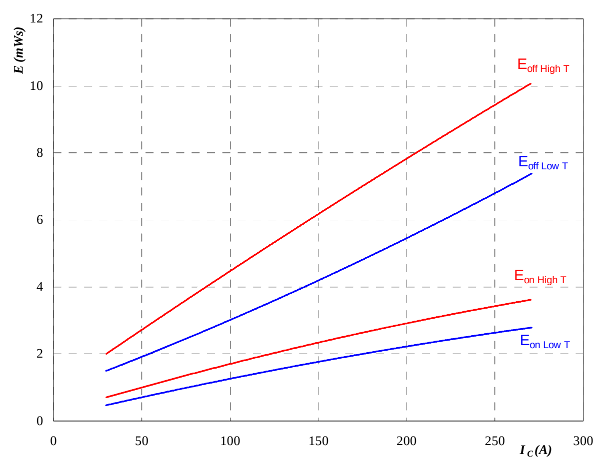
t_p = 350 µs

Boost

Figure 5 IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$



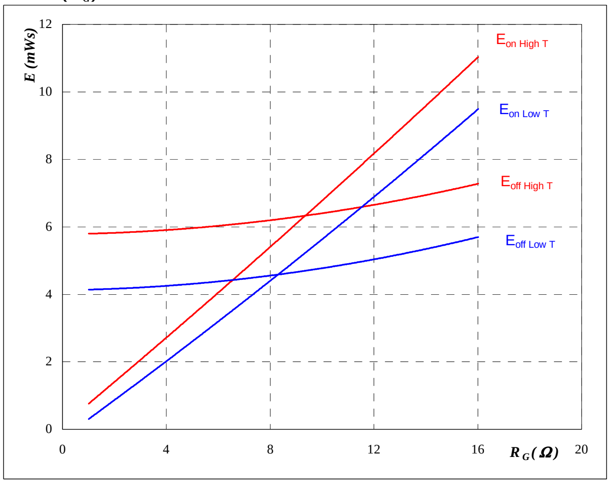
With an inductive load at

T_j =	25/150	°C
V_{CE} =	350	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

$E = f(R_G)$



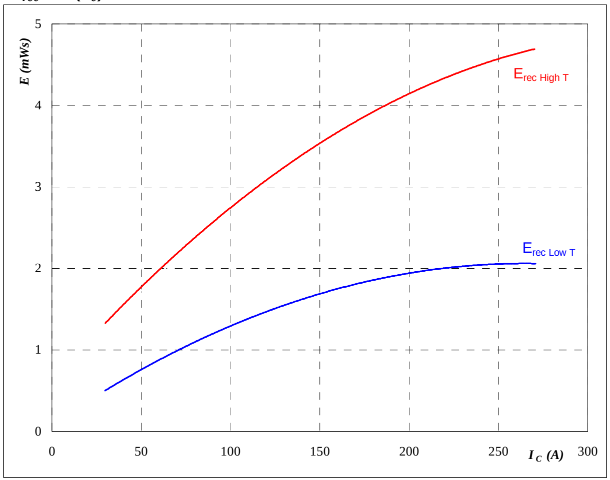
With an inductive load at

T_j =	25/150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	150	A

Figure 7 FWD

Typical reverse recovery energy loss as a function of collector current

$E_{rec} = f(I_c)$



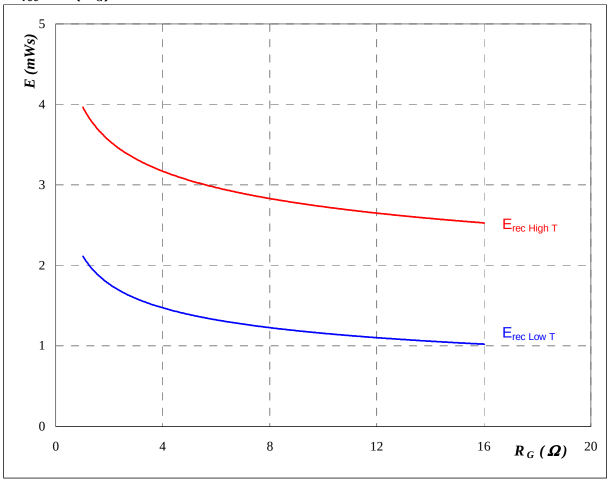
With an inductive load at

T_j =	25/150	°C
V_{CE} =	350	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

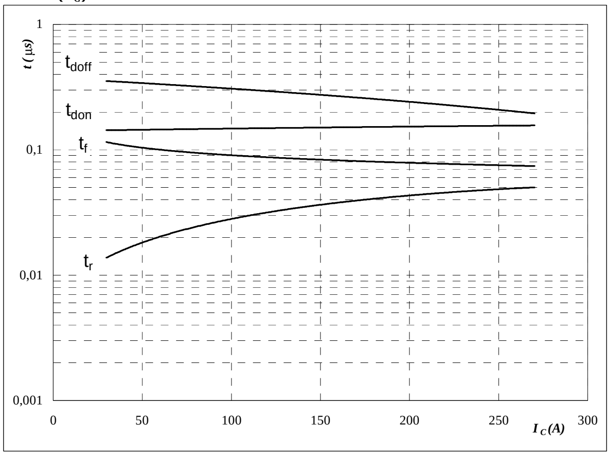
T_j =	25/150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	150	A

Boost

Figure 9 IGBT

Typical switching times as a function of collector current

$t = f(I_C)$



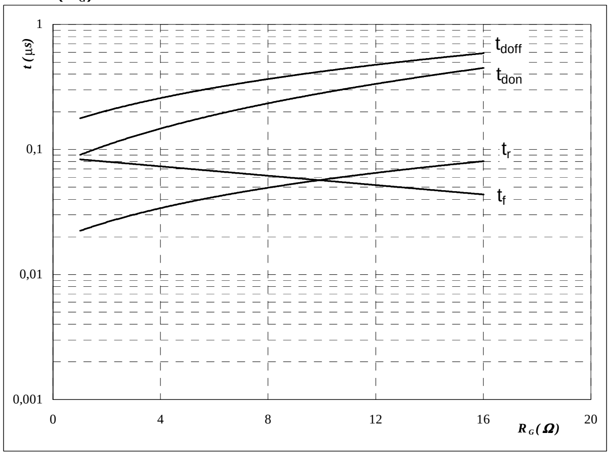
With an inductive load at

T_j =	150	°C
V_{CE} =	350	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

$t = f(R_G)$



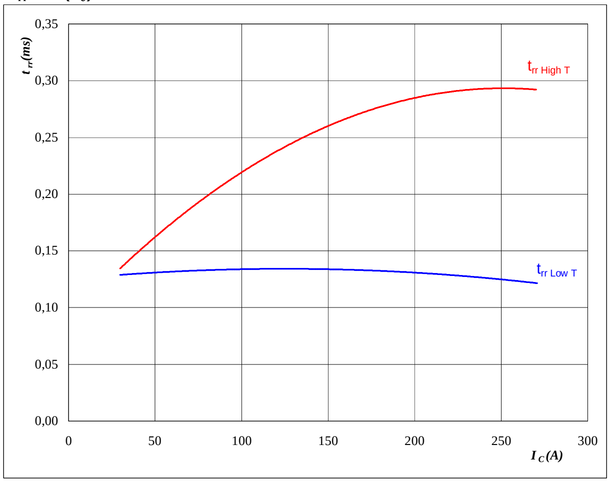
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	150	A

Figure 11 FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_c)$



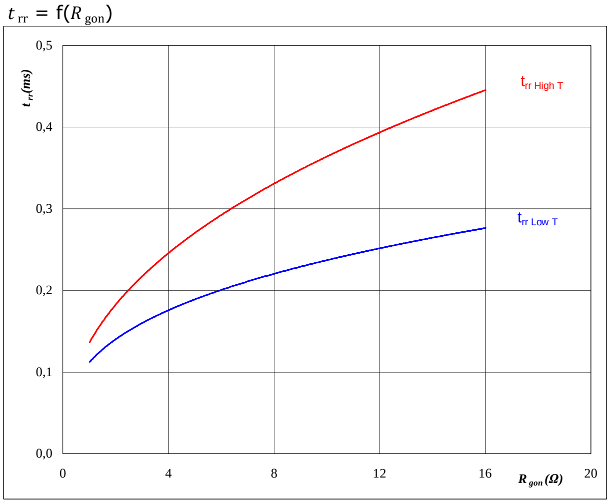
At

T_j =	25/150	°C
V_{CE} =	350	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

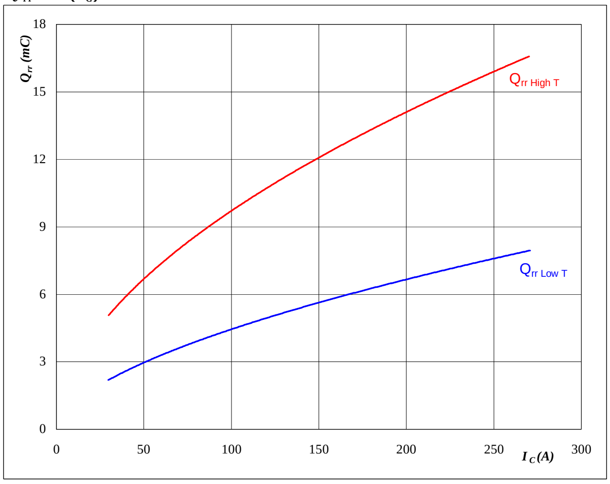
T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Boost

Figure 13 FWD

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



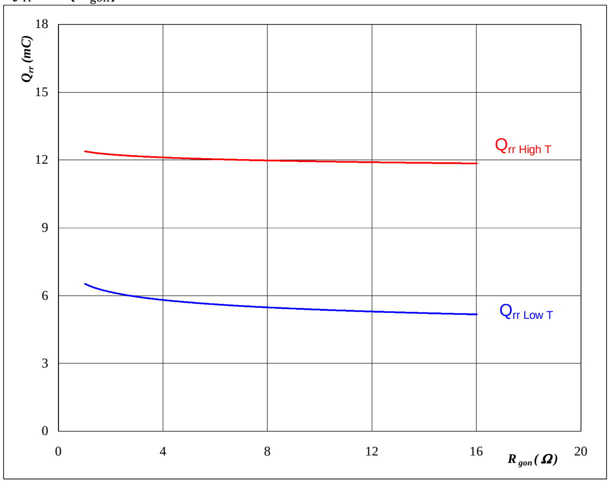
At

T_j =	25/150	°C
V_{CE} =	350	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

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



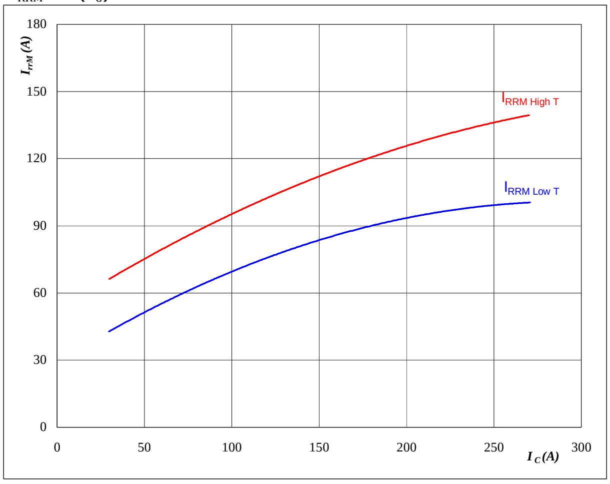
At

T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Figure 15 FWD

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



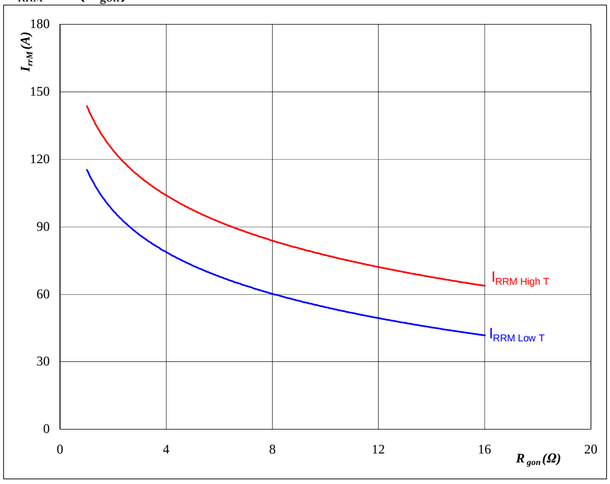
At

T_j =	25/150	°C
V_{CE} =	350	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

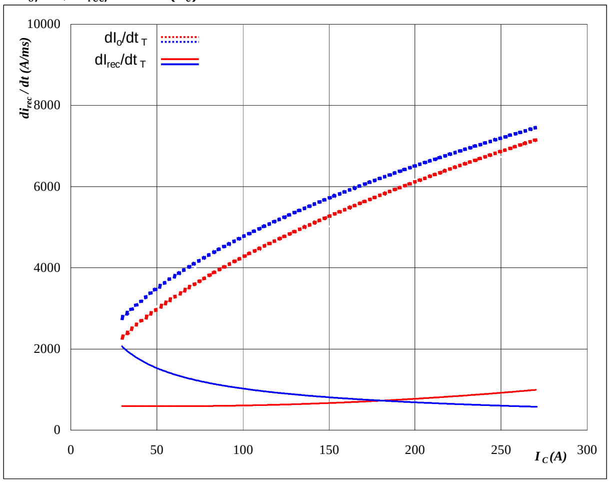
T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Boost

Figure 17	FWD

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

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



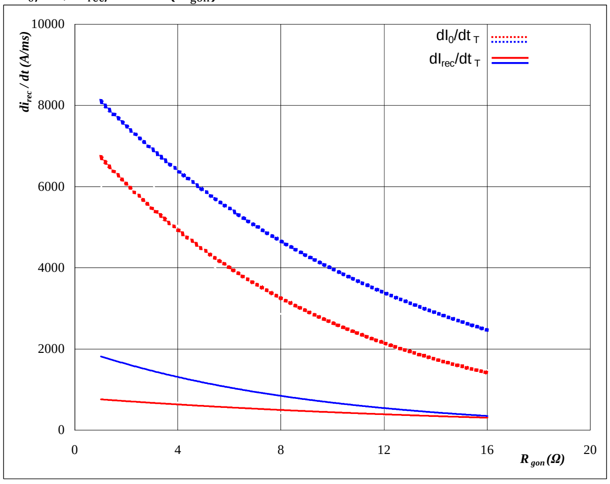
At

T_j =	25/150	°C
V_{CE} =	350	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

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



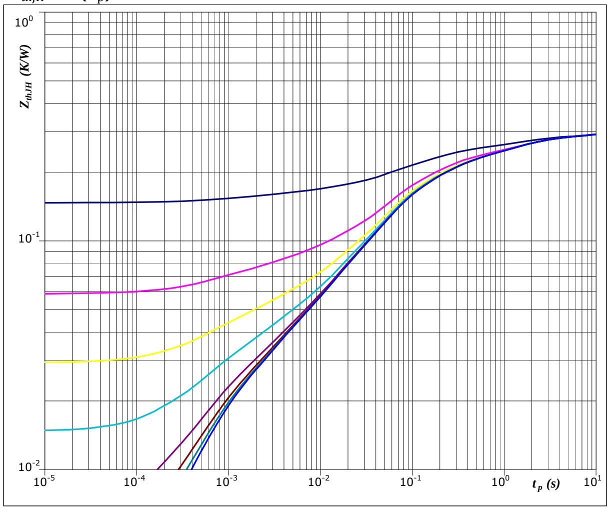
At

T_j =	25/150	°C
V_R =	350	V
I_F =	150	A
V_{GE} =	±15	V

Figure 19	IGBT

IGBT transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

D =	t_p / T	
R_{thJH} =	0,29	K/W

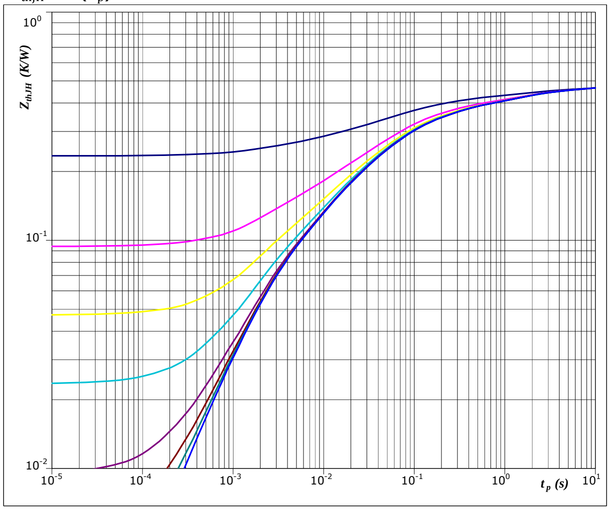
IGBT thermal model values

R (K/W)	Tau (s)
0,04	3,0E+00
0,05	7,9E-01
0,08	1,4E-01
0,09	4,3E-02
0,02	3,8E-03
0,01	6,0E-04

Figure 20	FWD

FWD transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

D =	t_p / T	
R_{thJH} =	0,47	K/W

FWD thermal model values

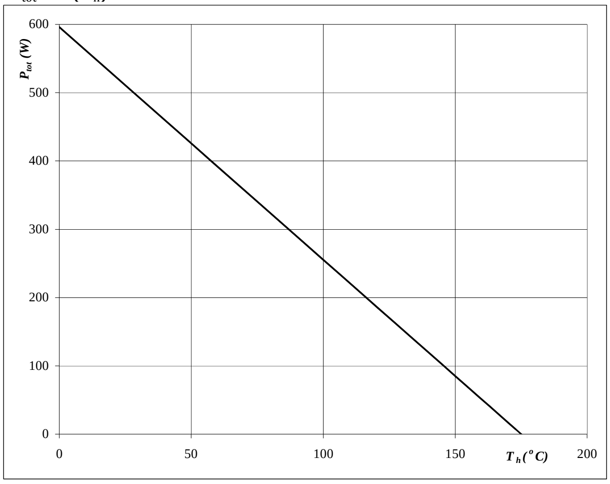
R (K/W)	Tau (s)
0,05	4,1E+00
0,07	9,2E-01
0,10	1,4E-01
0,14	3,8E-02
0,06	9,0E-03
0,05	2,0E-03

Boost

Figure 21 IGBT

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



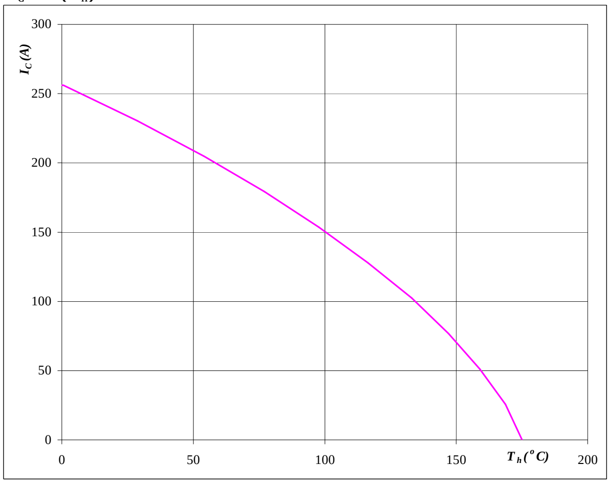
At

T_j = 175 ºC

Figure 22 IGBT

Collector current as a function of heatsink temperature

$I_C = f(T_h)$



At

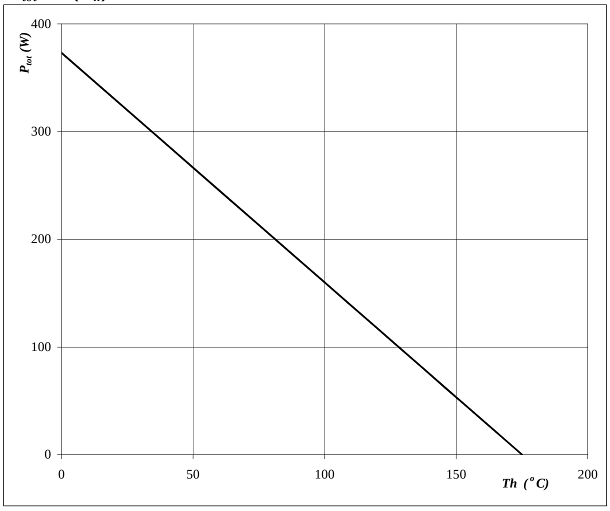
T_j = 175 ºC

V_{GE} = 15 V

Figure 23 FWD

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



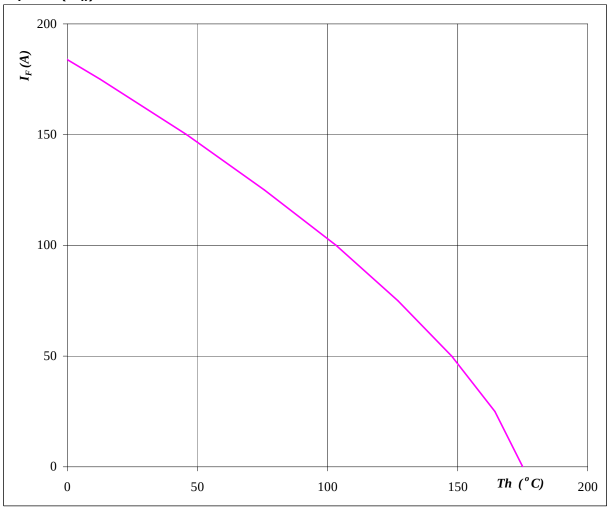
At

T_j = 175 ºC

Figure 24 FWD

Forward current as a function of heatsink temperature

$I_F = f(T_h)$



At

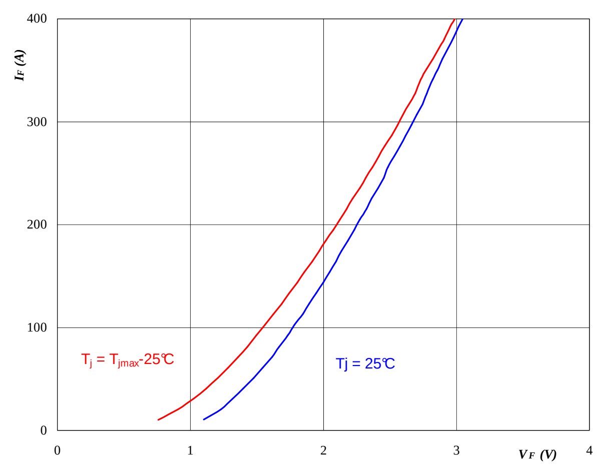
T_j = 175 ºC

Boost inv. Diode

Figure 25 Boost Inverse Diode

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



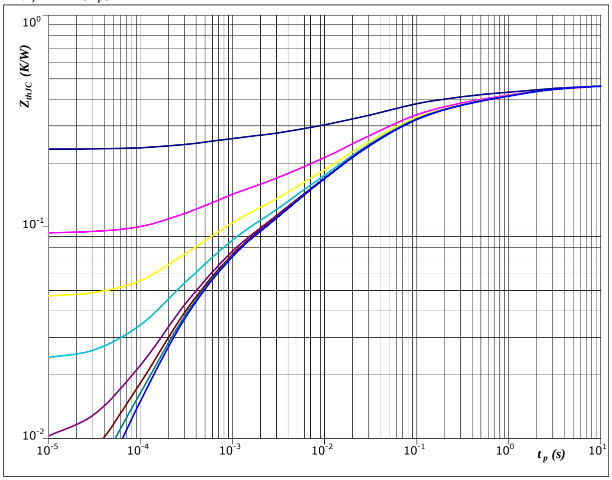
At

t_p = 250 µs

Figure 26 Boost Inverse Diode

Diode transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

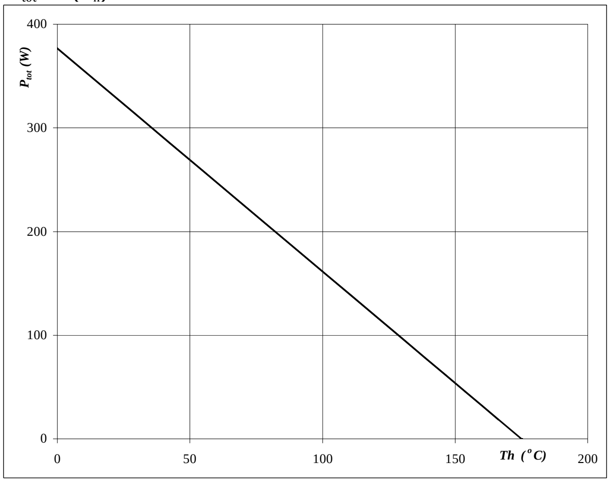
$D = t_p / T$

R_{thJH} = 0,46 K/W

Figure 27 Boost Inverse Diode

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



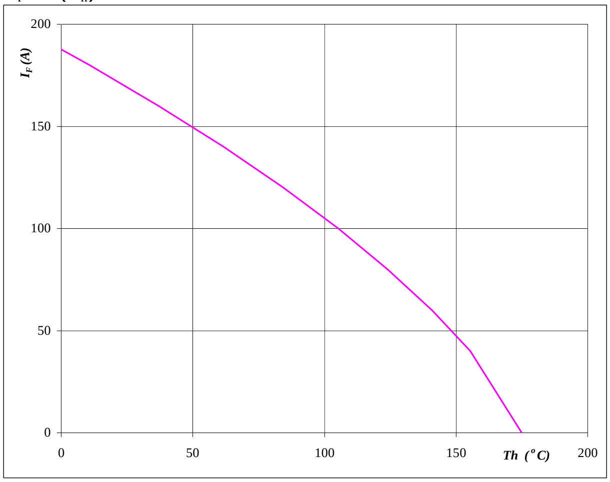
At

T_j = 175 ºC

Figure 28 Boost Inverse Diode

Forward current as a function of heatsink temperature

$I_F = f(T_h)$



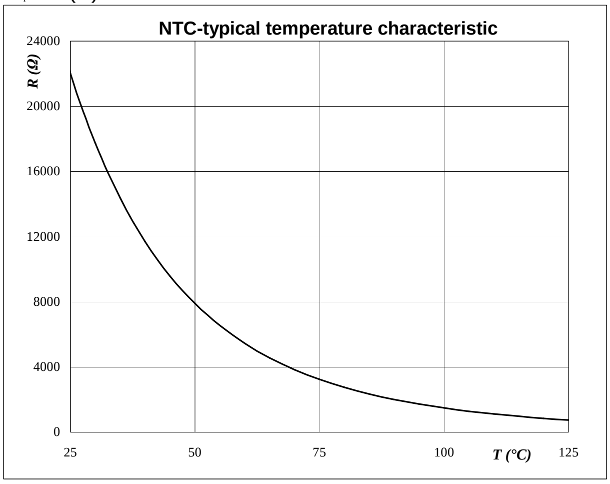
At

T_j = 175 ºC

Thermistor

Figure 1	Thermistor

Typical NTC characteristic
as a function of temperature
$R_T = f(T)$



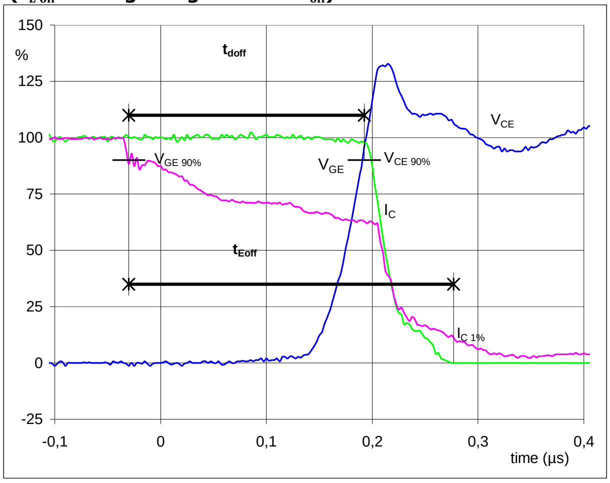
Switching Definitions BUCK

General conditions

T_j	=	150 °C
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

Figure 1 Buck IGBT

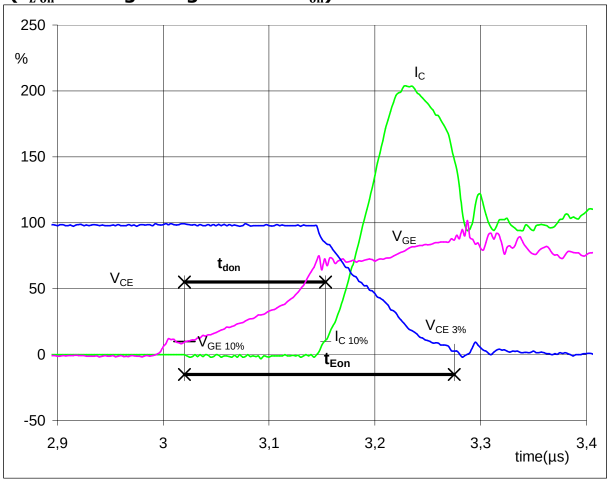
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff}
($t_{E\,off}$ = integrating time for E_{off})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	150	A
t_{doff} =	0,22	µs
$t_{E\,off}$ =	0,31	µs

Figure 2 Buck IGBT

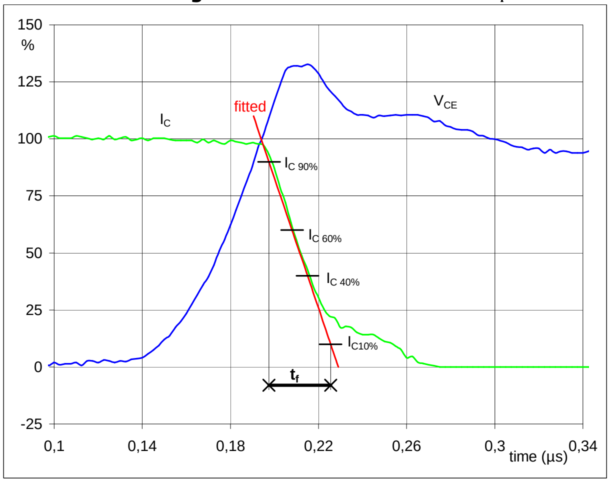
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon}
($t_{E\,on}$ = integrating time for E_{on})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	150	A
t_{don} =	0,15	µs
$t_{E\,on}$ =	0,25	µs

Figure 3 Buck IGBT

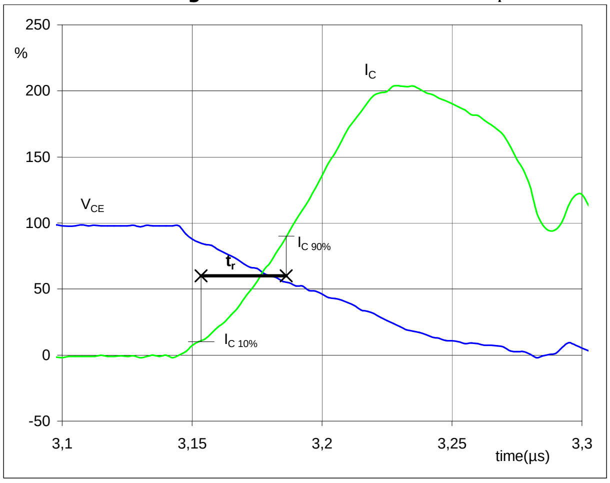
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	350	V
I_C (100%) =	150	A
t_f =	0,03	µs

Figure 4 Buck IGBT

Turn-on Switching Waveforms & definition of t_r

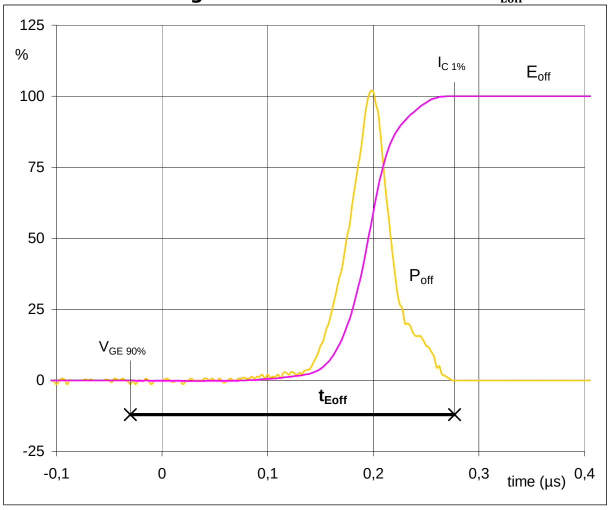


V_C (100%) =	350	V
I_C (100%) =	150	A
t_r =	0,03	µs

Switching Definitions BUCK

Figure 5 Buck IGBT

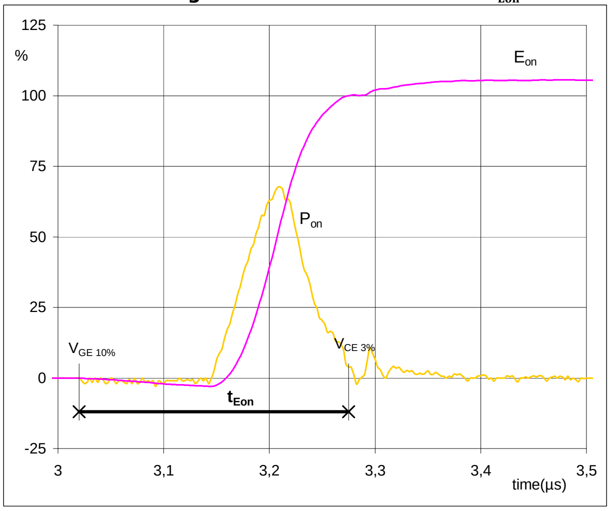
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	52,50	kW
E_{off} (100%) =	2,68	mJ
$t_{E\ off}$ =	0,31	µs

Figure 6 Buck IGBT

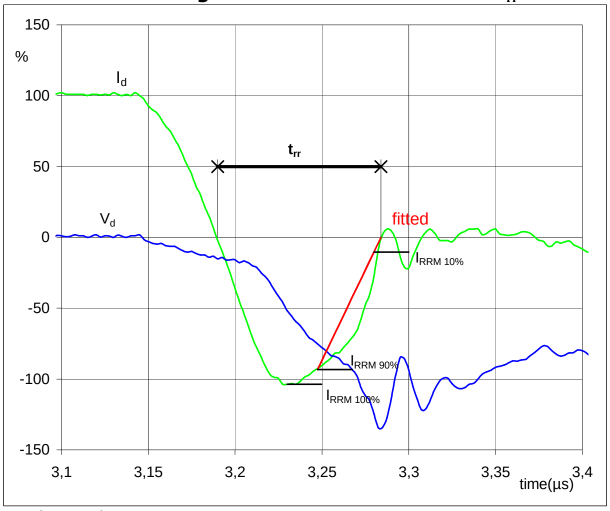
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	52,50	kW
E_{on} (100%) =	2,45	mJ
$t_{E\ on}$ =	0,25	µs

Figure 8 Buck FWD

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

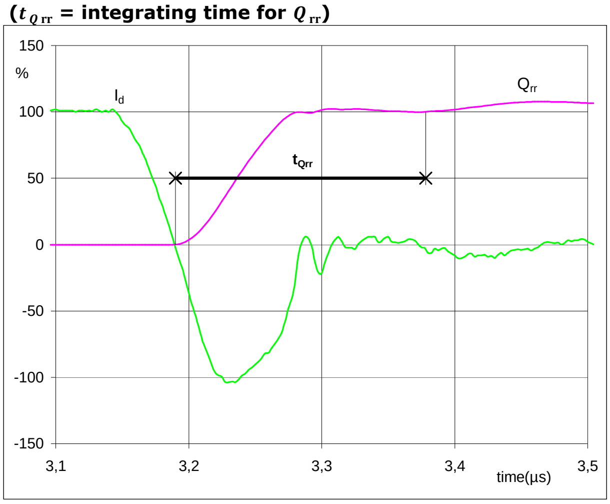


V_d (100%) =	350	V
I_d (100%) =	150	A
I_{RRM} (100%) =	-157	A
t_{rr} =	0,10	µs

Switching Definitions BUCK

Figure 9 Buck FWD

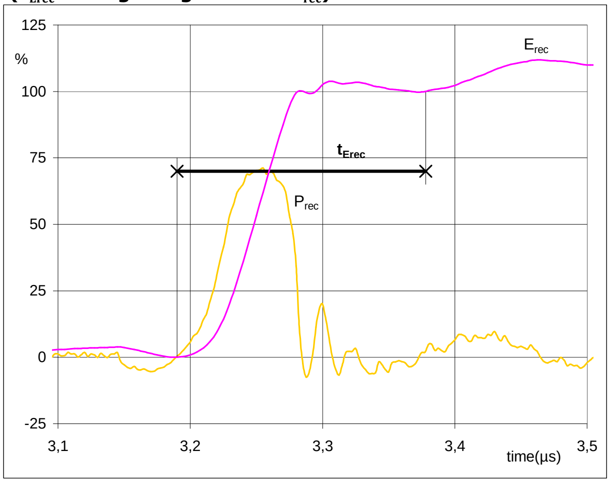
Turn-on Switching Waveforms & definition of t_{Qrr}
($t_{Q\,rr}$ = integrating time for Q_{rr})



I_d (100%) =	150	A
Q_{rr} (100%) =	9,91	µC
$t_{Q\,rr}$ =	0,19	µs

Figure 10 Buck FWD

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



P_{rec} (100%) =	52,50	kW
E_{rec} (100%) =	2,07	mJ
$t_{E\,rec}$ =	0,19	µs

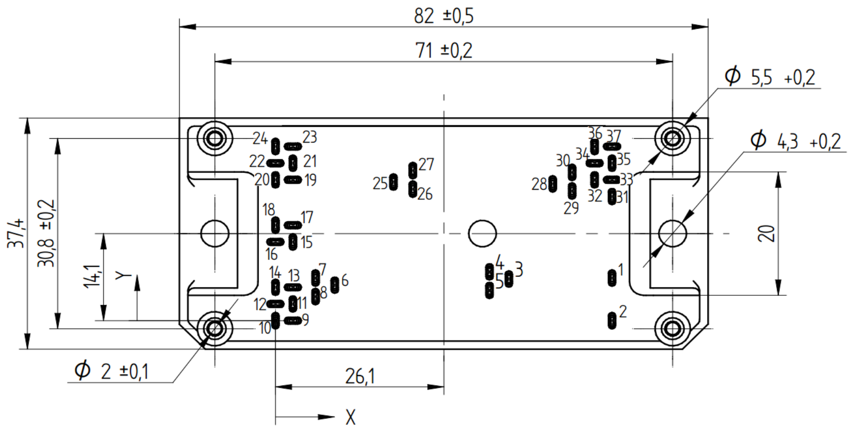
Ordering Code and Marking - Outline - Pinout

Ordering Code & Marking

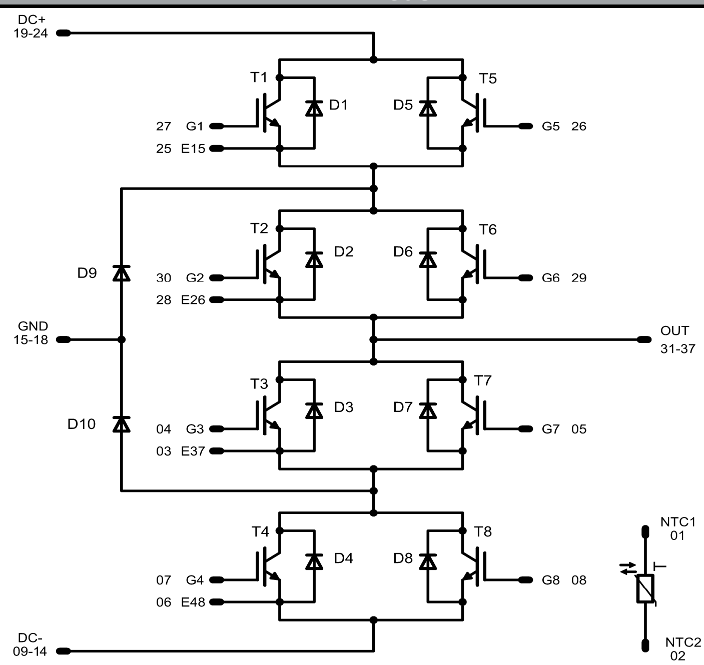
Version	Ordering Code	in DataMatrix as	in packaging barcode as
without thermal paste 17mm housing	10-F107NIB150SG06-M136F39	M136F39	M136F39
with thermal paste 17mm housing	10-P107NIB150SG06-M136F39-/3/	M136F39-/3/	M136F39-/3/
without thermal paste 17mm housing with press-fit pins	10-P107NIB150SG06-M136F39Y	M136F39Y	M136F39Y

Outline

Pin table			Pin table		
Pin	X	Y	Pin	X	Y
1	52,2	6,9	23	2,7	28,2
2	52,2	0	24	0	28,2
3	36,2	6,75	25	18,3	22,45
4	33,2	7,9	26	21,3	21,3
5	33,2	4,9	27	21,3	24,3
6	9,2	5,75	28	43	22,15
7	6,2	6,9	29	46	21
8	6,2	3,9	30	46	24
9	2,7	0	31	52,2	20,1
10	0	0	32	49,5	22,8
11	2,7	2,7	33	52,2	22,8
12	0	2,7	34	49,5	25,5
13	2,7	5,4	35	52,2	25,5
14	0	5,4	36	49,5	28,2
15	2,7	12,75	37	52,2	28,2
16	0	12,75			
17	2,7	15,45			
18	0	15,45			
19	2,7	22,8			
20	0	22,8			
21	2,7	25,5			
22	0	25,5			



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1,T4,T5,T8	IGBT	650V	75A	Buck Switch	
T2,T3,T6,T7	IGBT	600V	75A	Boost Switch	
D1,D4,D5,D8	FWD	650V	50A	Boost Diode	
D2,D3,D6,D7	FWD	600V	50A	Boost Sw. Protection Diode	
D9,D10	FWD	650V	160A	Buck Diode	
T	NTC	-	-	Thermistor	

Packaging instruction					
Standard packaging quantity (SPQ)	**100**	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 1 packages see vincotech.com website.

General datasheet
General datasheet for *flow* 1 packages see vincotech.com website.