flowNPC0	600V/50A

Features

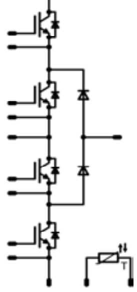
- Neutral-point-Clamped inverter
- Clip-In PCB mounting
- Low Inductance Layout

flow0 housing

Target Applications

- UPS and Solar

Schematic



Types

- 10-FZ06NIA050SA-P925L33

Maximum Ratings

Tj=25℃, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Buck IGBT					
Collector-emitter break down voltage	V_{CES}			600	V
DC collector current	I_C	$T_j=T_jmax$	$T_h=80℃$ $T_c=80℃$	49 50	A
Pulsed collector current	I_{Cpulse}	t_p limited by T_jmax		150	A
Power dissipation per IGBT	P_{tot}	$T_j=T_jmax$	$T_h=80℃$ $T_c=80℃$	77 117	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j≤150℃$ $V_{GE}=15V$		6 360	μs V
Maximum Junction Temperature	T_jmax			175	℃
Turn off safe operating area		$T_j≤150℃$ $V_{CE}<=V_{CES}$		100	A
Buck FWD					
Peak Repetitive Reverse Voltage	V_{RRM}	$T_j=25℃$		600	V
DC forward current	I_F	$T_j=T_jmax$	$T_h=80℃$ $T_c=80℃$	41 50	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_jmax	$T_c=100℃$	100	A
Power dissipation per Diode	P_{tot}	$T_j=T_jmax$	$T_h=80℃$ $T_c=80℃$	54 82	W
Maximum Junction Temperature	T_jmax			175	℃

Maximum Ratings

T_j=25℃, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Boost IGBT					
Collector-emitter break down voltage	V_{CES}			600	V
DC collector current	I_C	$T_j=T_j$max	T_h=80℃ T_c=80℃	49 50	A
Pulsed collector current	I_{Cpuls}	t_p limited by $T_j$max		150	A
Power dissipation per IGBT	P_{tot}	$T_j=T_j$max	T_h=80℃ T_c=80℃	77 117	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	T_j≤150℃ V_{GE}=15V		6 360	μs V
Maximum Junction Temperature	$T_j$max			175	℃
Turn off safe operating area		T_j≤150℃ $V_{CE}<=V_{CES}$		100	A
Buck and Boost Inverse FWD					
Peak Repetitive Reverse Voltage	V_{RRM}	T_c=25℃		600	V
DC forward current	I_F	$T_j=T_j$max	T_h=80℃ T_c=80℃	40 55	A
Repetitive peak forward current	I_{FRM}	t_p limited by $T_j$max		100	A
Power dissipation per Diode	P_{tot}	$T_j=T_j$max	T_h=80℃ T_c=80℃	54 82	W
Maximum Junction Temperature	$T_j$max			175	℃
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	℃
Operation temperature under switching condition	T_{op}			-40…+(Tjmax - 25)	℃
Insulation Properties					
Insulation voltage	V_{is}	t=2s	DC voltage	4000	V
Creepage distance				min 12,7	mm
Clearance				min 12,7	mm

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	Min	Typ	Max	
Buck IGBT										
Gate emitter threshold voltage	$V_{GE(th)}$	VCE=VGE			0,0008	Tj=25°C Tj=125°C	5	5,8	6,5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		50	Tj=25°C Tj=125°C		1,63 1,62		V
Collector-emitter cut-off current incl. Diode	I_{CES}		0	600		Tj=25°C Tj=125°C			30	µA
Gate-emitter leakage current	I_{GES}		20	0		Tj=25°C Tj=125°C			650	nA
Integrated Gate resistor	R_{gint}							none		Ω
Turn-on delay time	$t_{d(on)}$	Rgoff=8 Ω Rgon=8 Ω	±15	350	50	Tj=25°C Tj=125°C		101 102		ns
Rise time	t_r					Tj=25°C Tj=125°C		12 15		
Turn-off delay time	$t_{d(off)}$					Tj=25°C Tj=125°C		184 206		
Fall time	t_f					Tj=25°C Tj=125°C		100 129		
Turn-on energy loss per pulse	E_{on}					Tj=25°C Tj=125°C		0,66 1,00		mWs
Turn-off energy loss per pulse	E_{off}					Tj=25°C Tj=125°C		1,54 1,95		
Input capacitance	C_{ies}	f=1MHz	0	25		Tj=25°C		3140		pF
Output capacitance	C_{oss}							200		
Reverse transfer capacitance	C_{rss}							93		
Gate charge	Q_{Gate}		±15	480	50	Tj=25°C		310		nC
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						1,23		K/W
Buck FWD										
Diode forward voltage	V_F				50	Tj=25°C Tj=125°C	1	1,55 1,48	2,05	V
Peak reverse recovery current	I_{RRM}	Rgon=8 Ω	±15	350	50	Tj=25°C Tj=125°C		66 72		A
Reverse recovery time	t_{rr}					Tj=25°C Tj=125°C		116 208		ns
Reverse recovered charge	Q_{rr}					Tj=25°C Tj=125°C		2,47 4,40		µC
Peak rate of fall of recovery current	di(rec)max /dt					Tj=25°C Tj=125°C		5789 3653		A/µs
Reverse recovered energy	Erec					Tj=25°C Tj=125°C		0,57 1,07		mWs
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						1,75		K/W

Characteristic Values

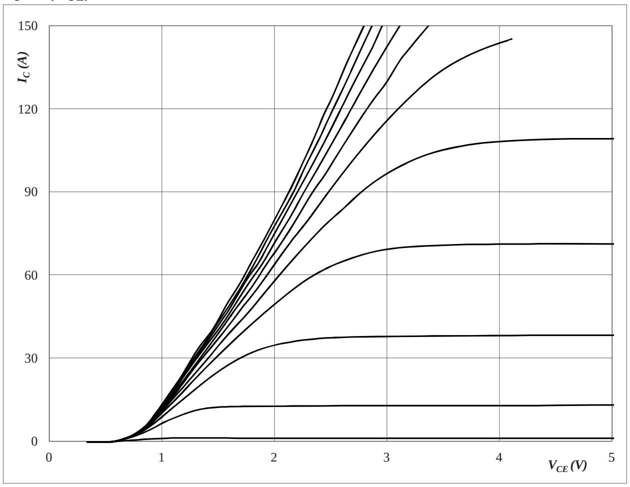
Parameter	Symbol	Conditions	V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_C [A] or I_F [A] or I_D [A]	T_j	Min	Typ	Max	Unit
Boost IGBT										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$			0,0008	Tj=25℃ Tj=125℃	5	5,8	6,5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		50	Tj=25℃ Tj=125℃	1	1,63 1,62	1,8	V
Collector-emitter cut-off incl diode	I_{CES}		0	600		Tj=25℃ Tj=125℃			30	µA
Gate-emitter leakage current	I_{GES}		20	0		Tj=25℃ Tj=125℃			650	nA
Integrated Gate resistor	R_{gint}							none		Ω
Turn-on delay time	$t_{d(on)}$	Rgoff=8 Ω Rgon=8 Ω	±15	350	50	Tj=25℃ Tj=125℃		100 100		ns
Rise time	t_r					Tj=25℃ Tj=125℃		16 17		
Turn-off delay time	$t_{d(off)}$					Tj=25℃ Tj=125℃		173 192		
Fall time	t_f					Tj=25℃ Tj=125℃		83 99		
Turn-on energy loss per pulse	E_{on}					Tj=25℃ Tj=125℃		0,62 0,83		mWs
Turn-off energy loss per pulse	E_{off}					Tj=25℃ Tj=125℃		1,34 1,70		
Input capacitance	C_{ies}	f=1MHz	0	25		Tj=25℃		3140		pF
Output capacitance	C_{oss}							200		
Reverse transfer capacitance	C_{rss}							93		
Gate charge	Q_{Gate}		±15	480	50	Tj=25℃		310		nC
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						1,23		K/W
Buck and Boost Inverse FWD										
Diode forward voltage	V_F				50	Tj=25℃ Tj=125℃		1,55 1,48		V
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						1,75		K/W
Thermistor										
Rated resistance	R					T=25℃		22000		Ω
Deviation of R100	ΔR/R	R100=1486 Ω				T=100℃	-5		5	%
Power dissipation	P					T=25℃		200		mW
Power dissipation constant						T=25℃		2		mW/K
B-value	$B_{(25/50)}$	Tol. ±3%				T=25℃		3950		K
B-value	$B_{(25/100)}$	Tol. ±3%				T=25℃		3996		K
Vincotech NTC Reference						T=25℃			E	

Buck

Figure 1 IGBT

Typical output characteristics

$I_C = f(V_{CE})$



At

t_p = 250 µs

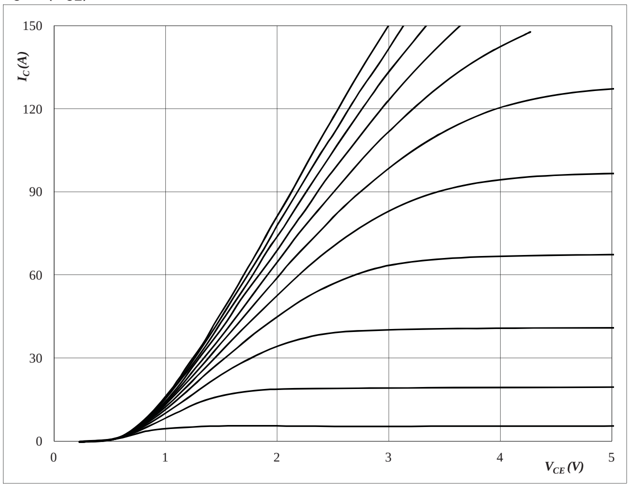
T_j = 25 °C

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

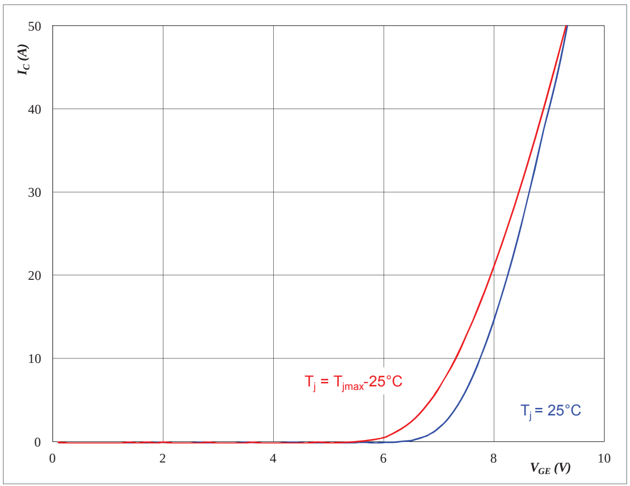
T_j = 125 °C

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

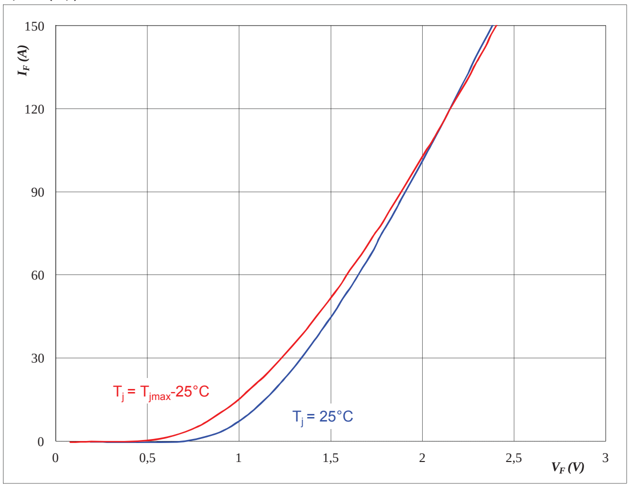
t_p = 250 µs

V_{CE} = 10 V

Figure 4 FWD

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



At

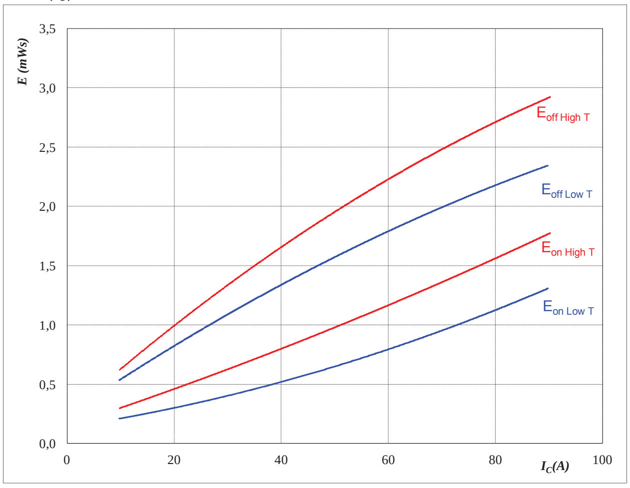
t_p = 250 µs

Buck

Figure 5 IGBT

Typical switching energy losses as a function of collector current

E = f(I_C)



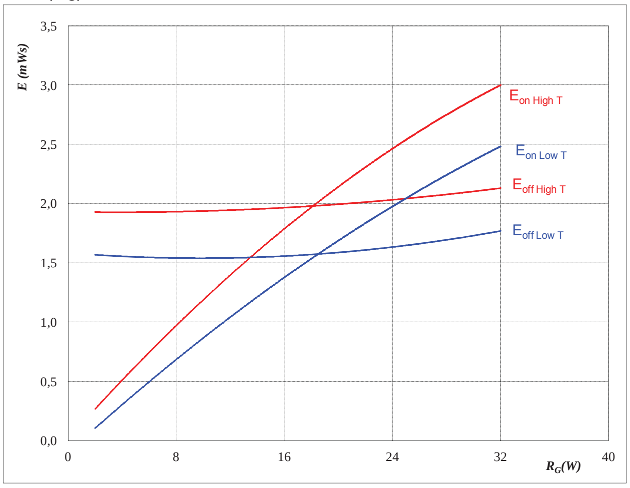
With an inductive load at

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Figure 6 IGBT

Typical switching energy losses as a function of gate resistor

E = f(R_G)



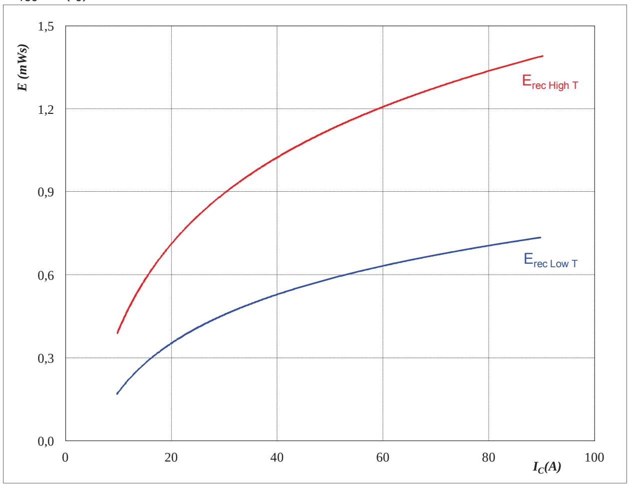
With an inductive load at

T_j =	25/125	℃
V_{CE} =	350	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)



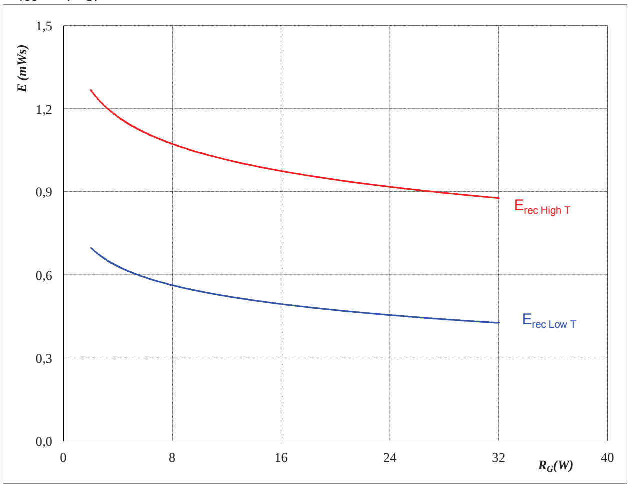
With an inductive load at

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	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

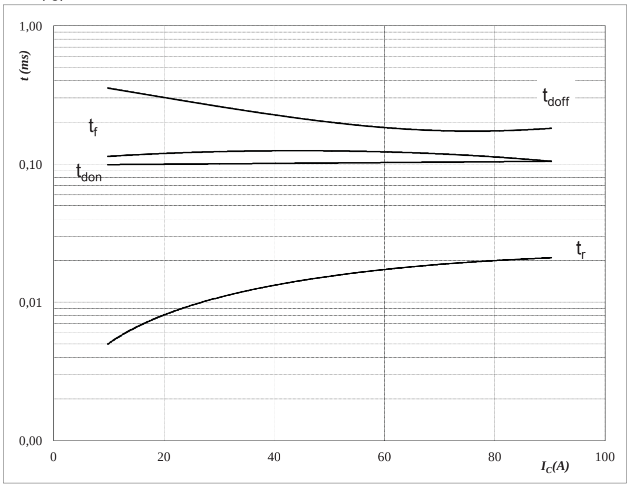
T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	50	A

Buck

Figure 9 IGBT

Typical switching times as a function of collector current

$t = f(I_C)$



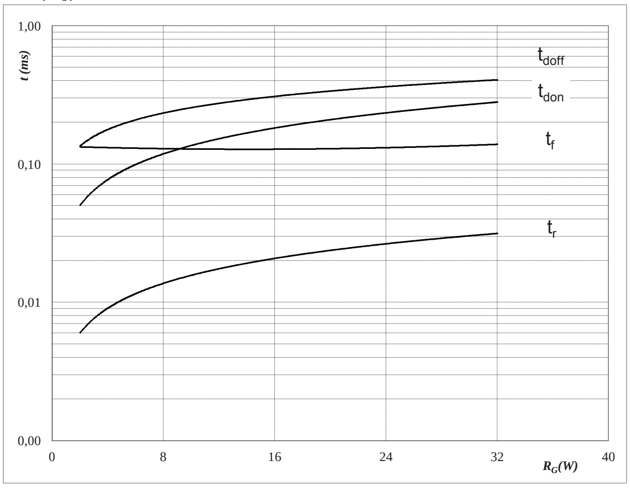
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Figure 10 IGBT

Typical switching times as a function of gate resistor

$t = f(R_G)$



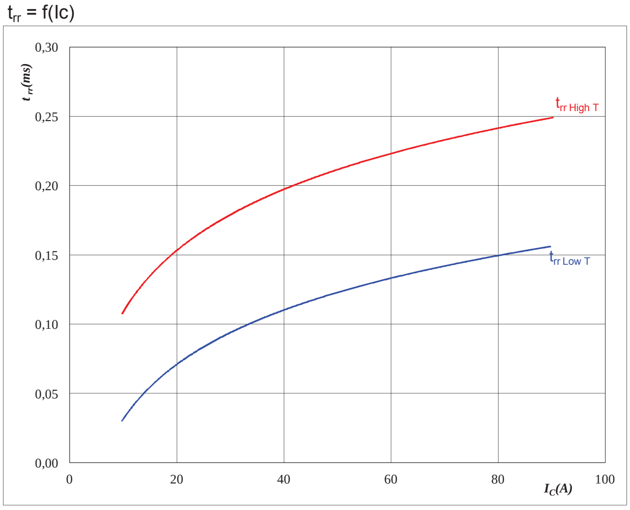
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	50	A

Figure 11 FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(Ic)$



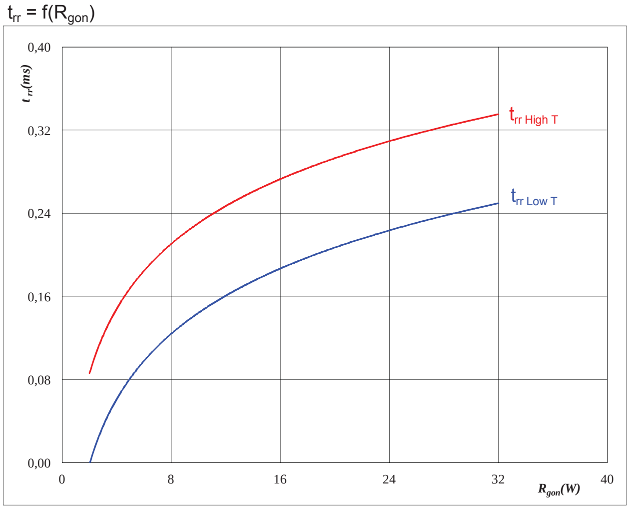
At

T_j =	25/125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 12 FWD

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

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



At

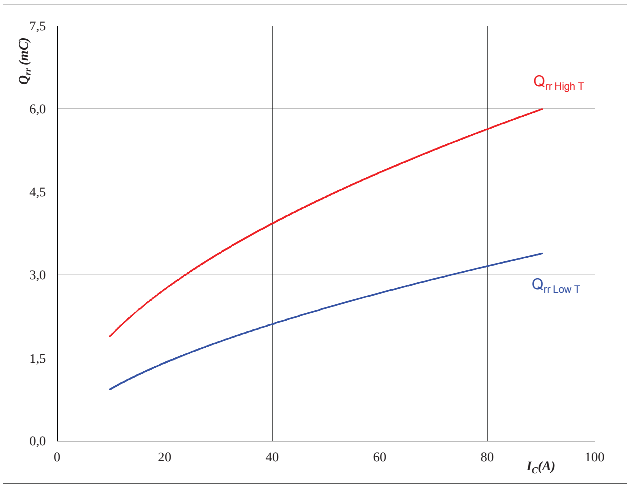
T_j =	25/125	°C
V_R =	350	V
I_F =	50	A
V_{GE} =	±15	V

Buck

Figure 13 FWD

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



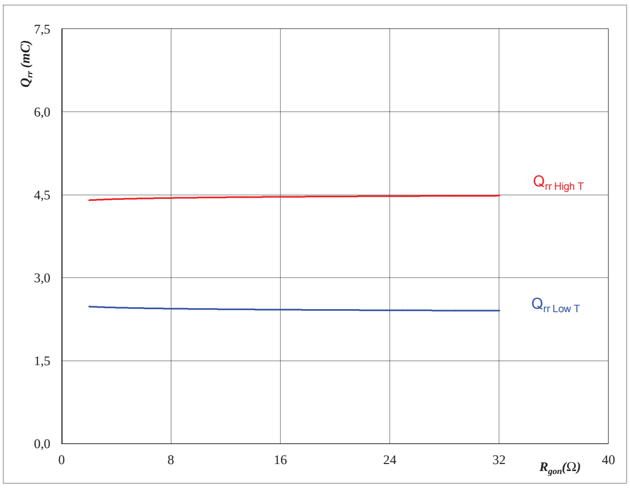
At

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 14 FWD

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

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



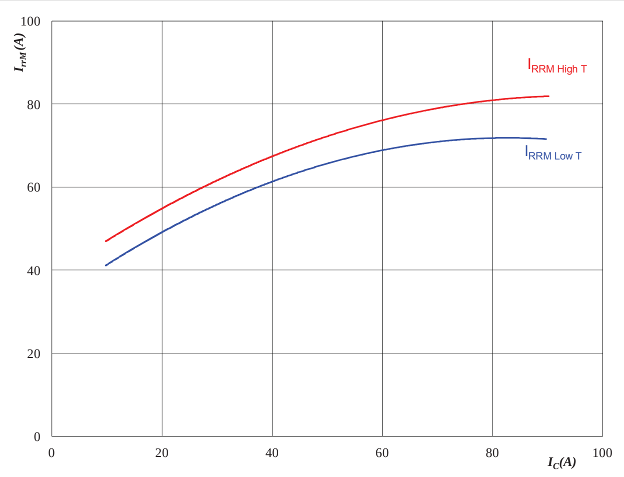
At

T_j =	25/125	℃
V_R =	350	V
I_F =	50	A
V_{GE} =	±15	V

Figure 15 FWD

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



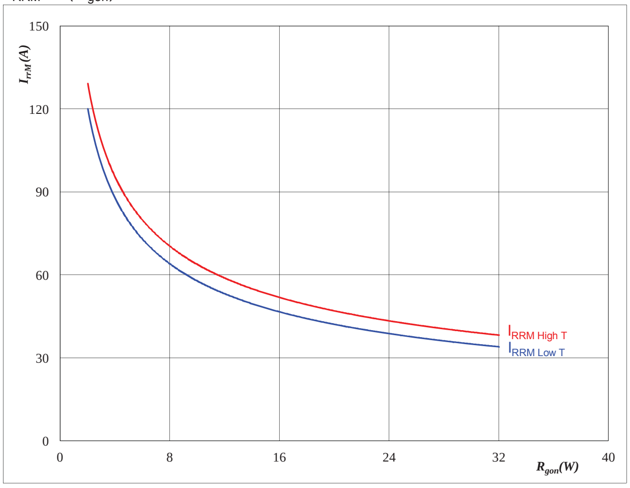
At

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 16 FWD

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

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



At

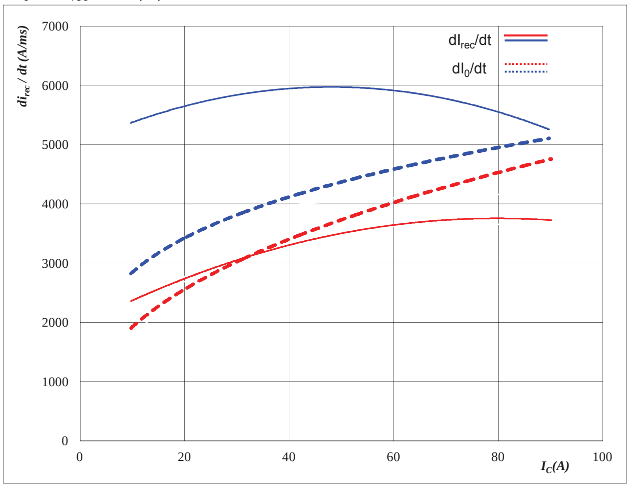
T_j =	25/125	℃
V_R =	350	V
I_F =	50	A
V_{GE} =	±15	V

Buck

Figure 17 FWD

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

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



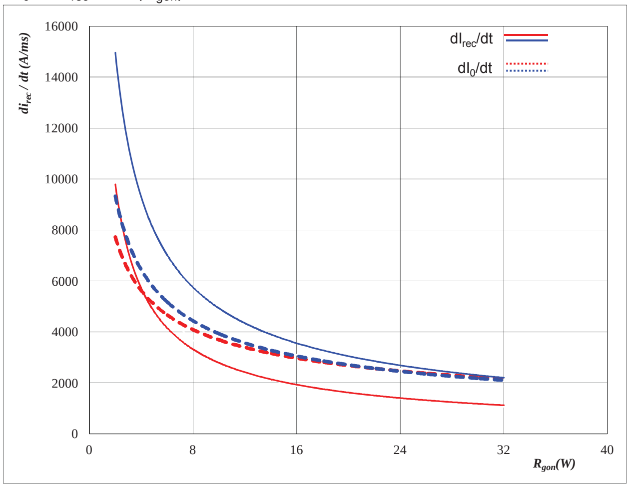
At

T_j =	25/125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 18 FWD

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

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



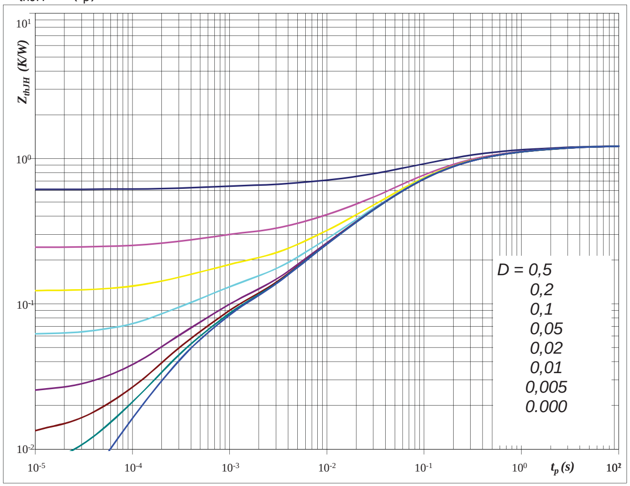
At

T_j =	25/125	°C
V_R =	350	V
I_F =	50	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} =	1,23	K/W

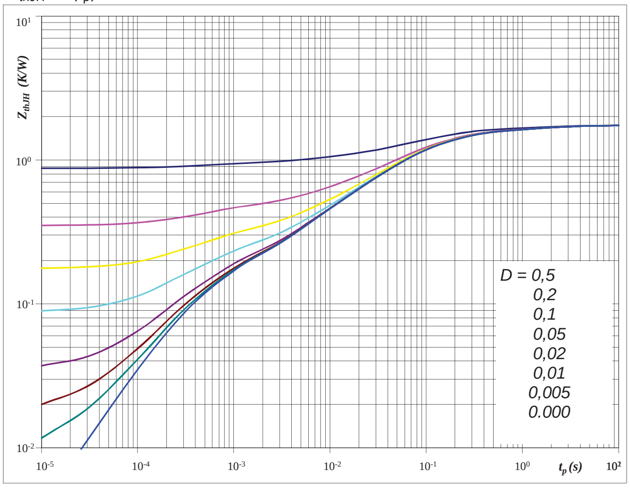
IGBT thermal model values

R (C/W)	Tau (s)
0,04	7,4E+00
0,19	1,2E+00
0,46	1,7E-01
0,35	4,2E-02
0,12	7,1E-03
0,06	4,1E-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} =	1,75	K/W

FWD thermal model values

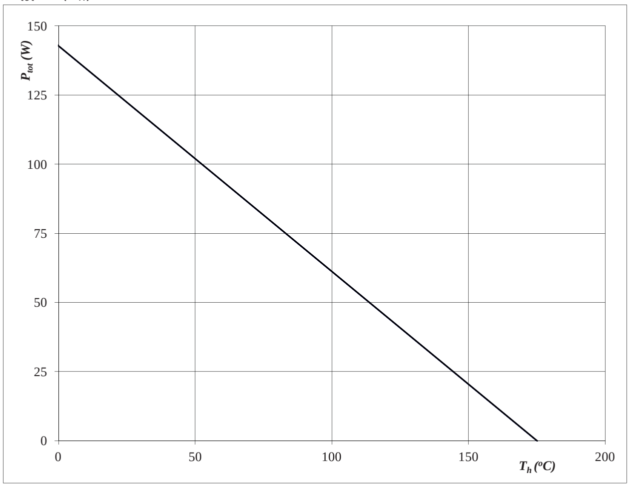
R (C/W)	Tau (s)
0,06	5,5E+00
0,21	9,4E-01
0,68	1,2E-01
0,51	3,3E-02
0,16	5,2E-03
0,13	3,9E-04

Buck

Figure 21 IGBT

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



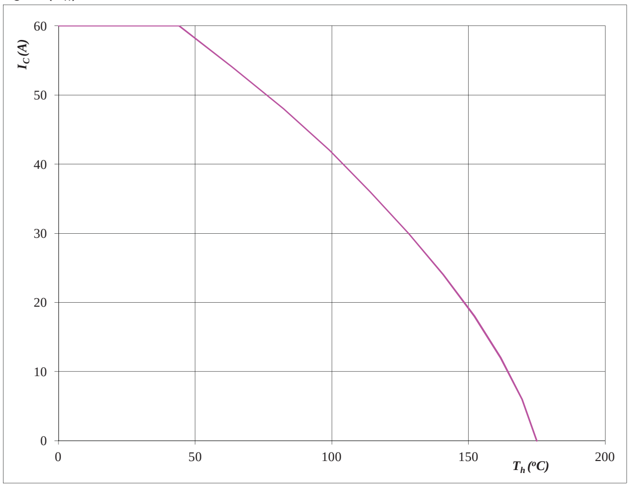
At

T_j = 175 ℃

Figure 22 IGBT

Collector current as a function of heatsink temperature

$I_C = f(T_h)$



At

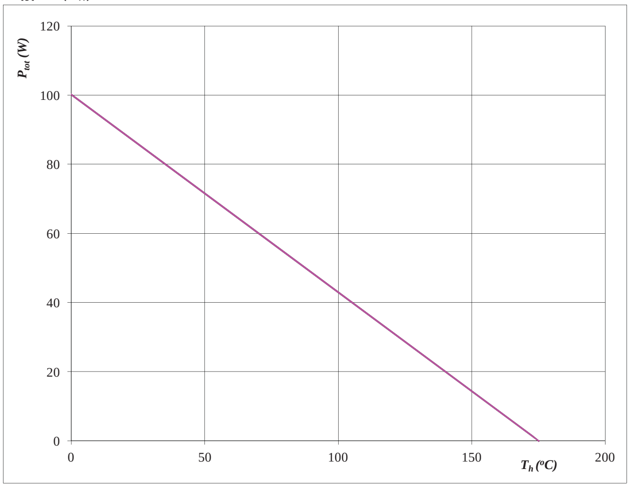
T_j = 175 ℃

V_{GE} = 15 V

Figure 23 FWD

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



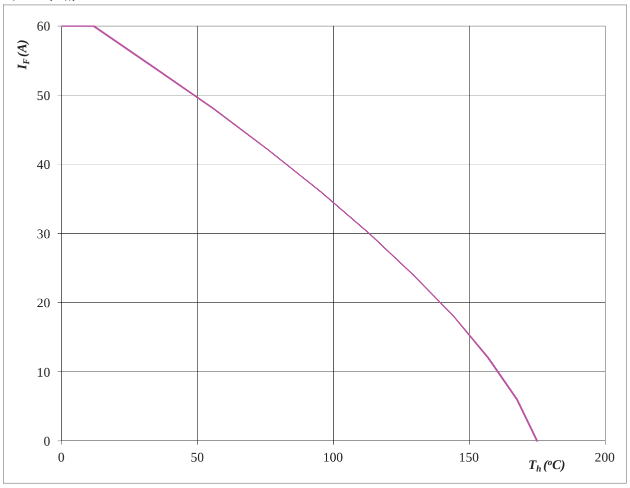
At

T_j = 175 ℃

Figure 24 FWD

Forward current as a function of heatsink temperature

$I_F = f(T_h)$



At

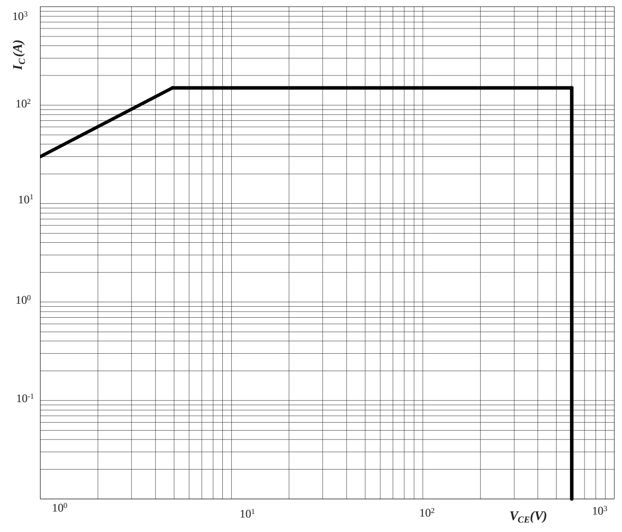
T_j = 175 ℃

Buck & Boost

Figure 25 IGBT

Turn on safe operating area as a function of collector-emitter voltage

$I_C = f(V_{CE})$



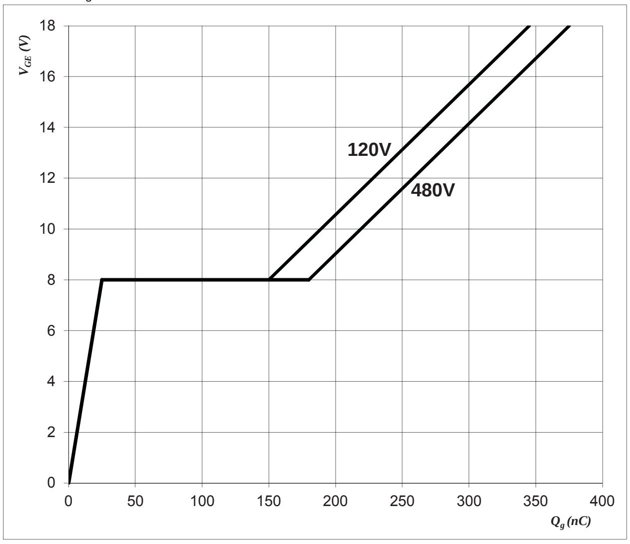
At

T_j <= T_{jmax}

Figure 26 IGBT

Gate voltage vs Gate charge

$V_{GE} = f(Q_g)$



At

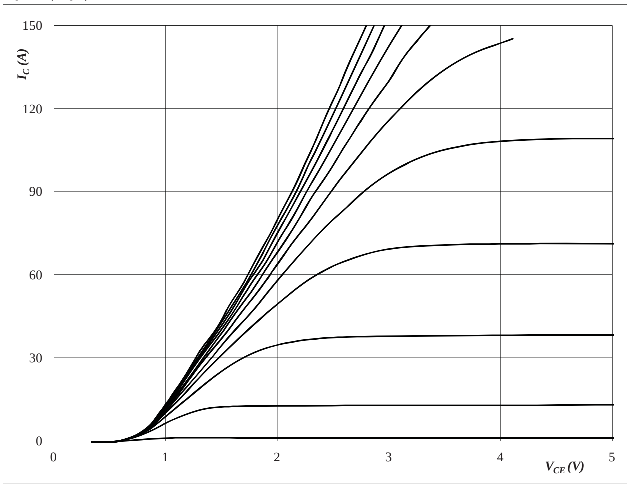
I_C = 50 A

Boost

Figure 1 IGBT

Typical output characteristics

$I_C = f(V_{CE})$



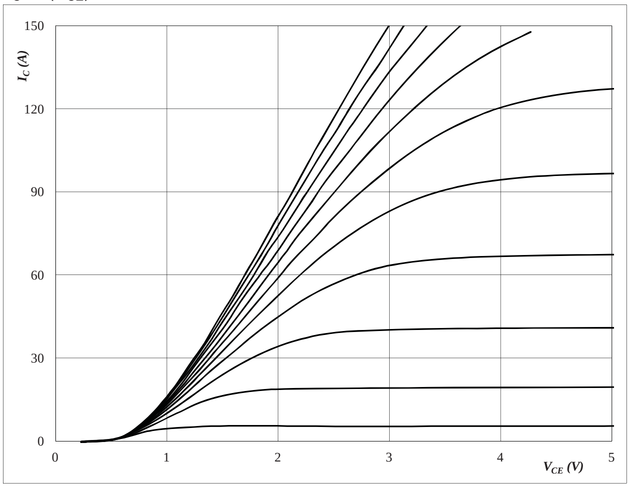
At

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

Figure 2 IGBT

Typical output characteristics

$I_C = f(V_{CE})$



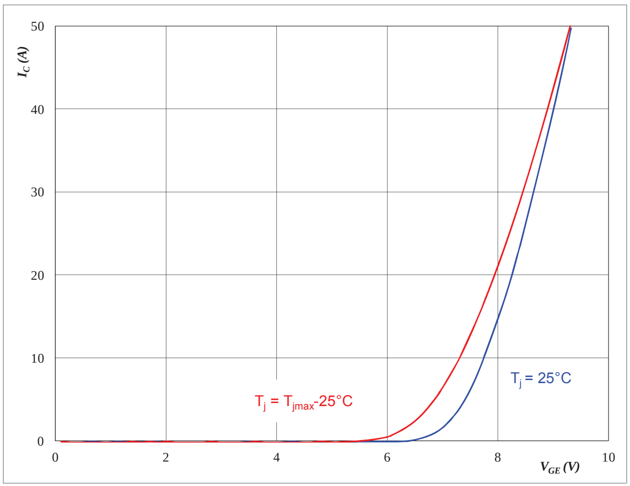
At

t_p =	250	μs
T_j =	125	℃
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

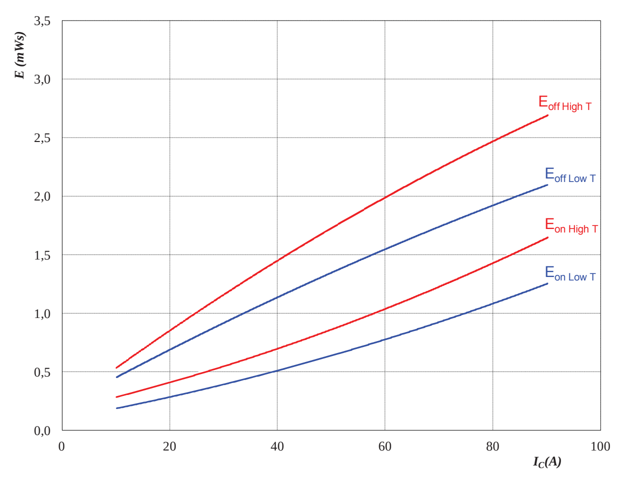
t_p =	250	μs
V_{CE} =	10	V

Boost

Figure 4	IGBT

Typical switching energy losses as a function of collector current

E = f(I_C)



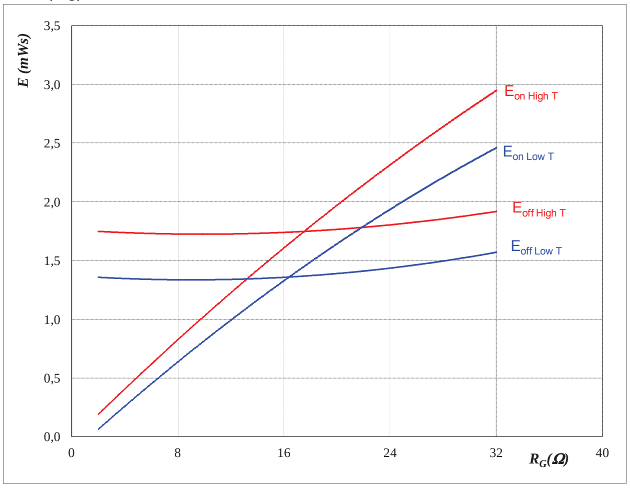
With an inductive load at

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Figure 5	IGBT

Typical switching energy losses as a function of gate resistor

E = f(R_G)



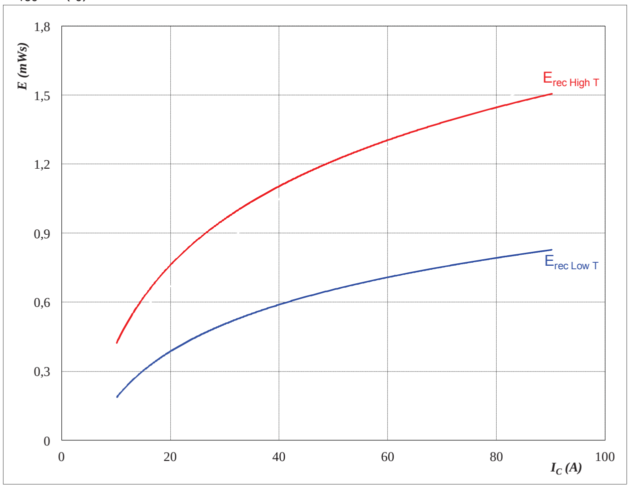
With an inductive load at

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	50	A

Figure 6	IGBT

Typical reverse recovery energy loss as a function of collector current

E_{rec} = f(I_c)



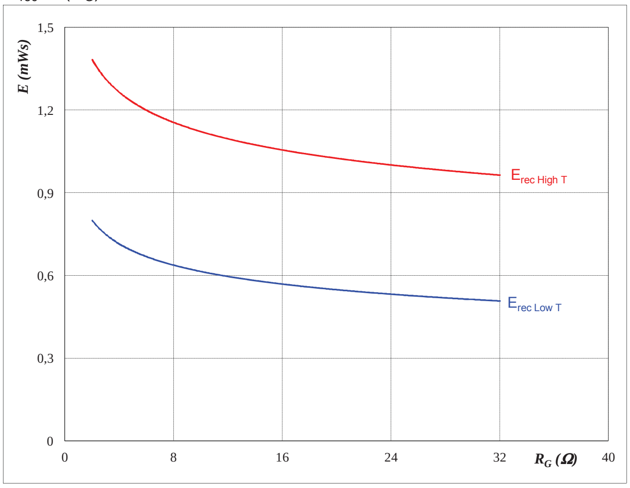
With an inductive load at

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 7	IGBT

Typical reverse recovery energy loss as a function of gate resistor

E_{rec} = f(R_G)



With an inductive load at

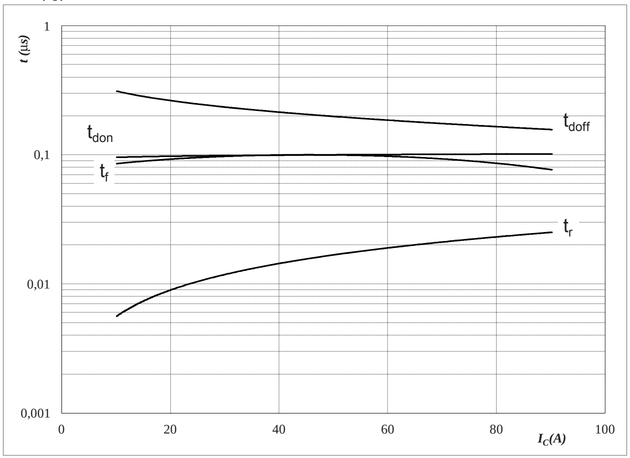
T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	50	A

Boost

Figure 8 IGBT

Typical switching times as a function of collector current

t = f(I_C)



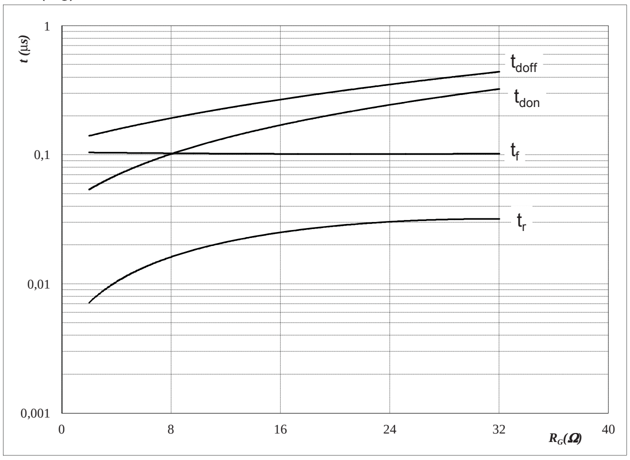
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Figure 9 IGBT

Typical switching times as a function of gate resistor

t = f(R_G)



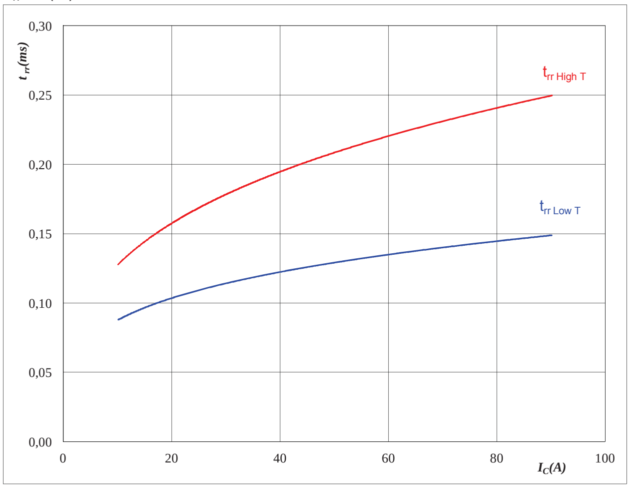
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	50	A

Figure 10 FWD

Typical reverse recovery time as a function of collector current

t_{rr} = f(Ic)



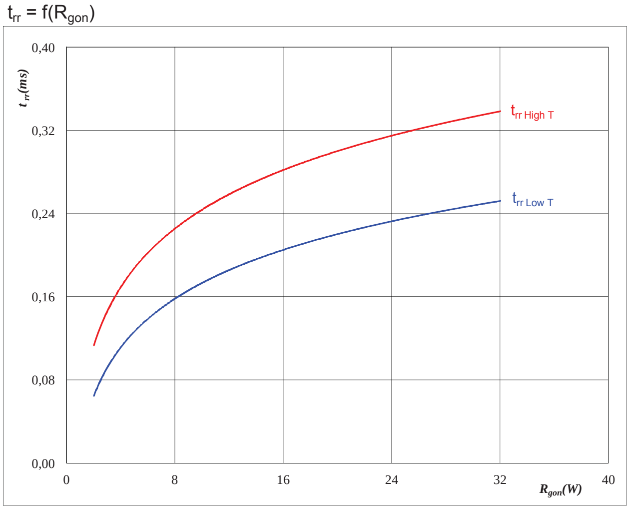
At

T_j =	25/125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 11 FWD

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

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



At

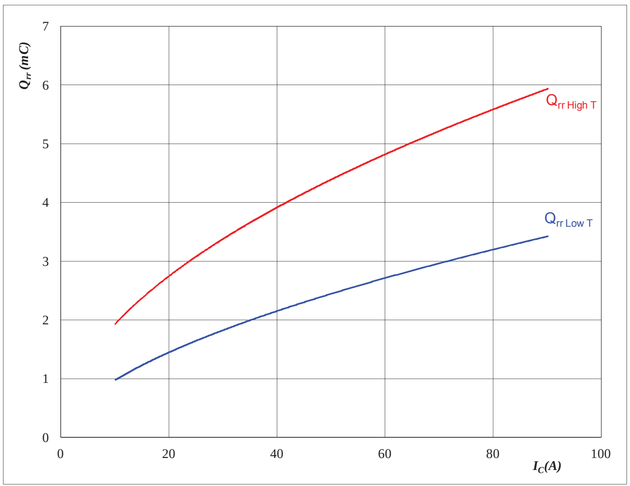
T_j =	25/125	°C
V_R =	350	V
I_F =	50	A
V_{GE} =	±15	V

Boost

Figure 12 FWD

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



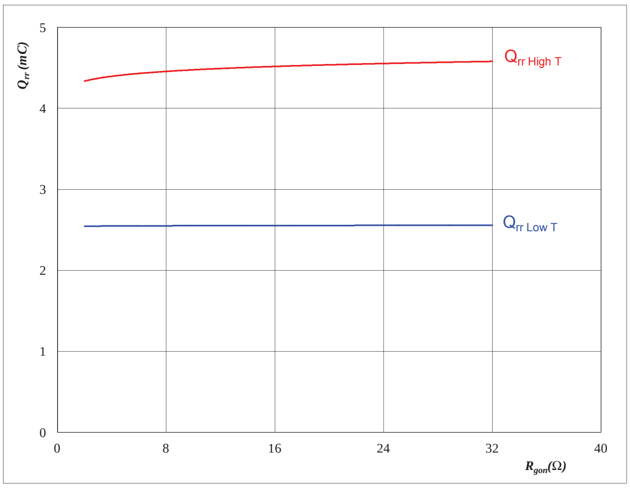
At

T_j =	25/125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 13 FWD

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

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



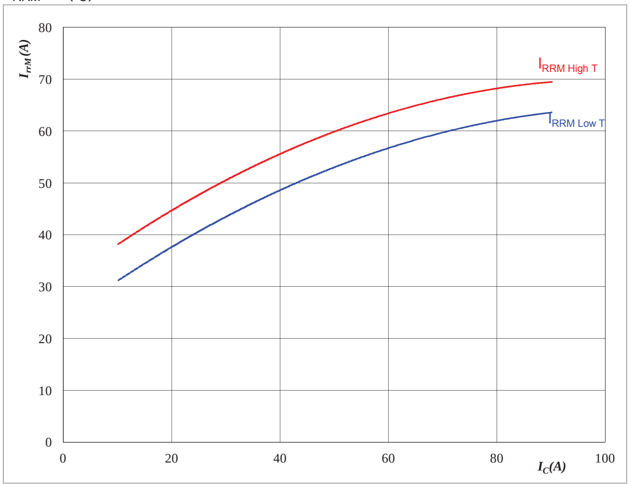
At

T_j =	25/125	°C
V_R =	350	V
I_F =	50	A
V_{GE} =	±15	V

Figure 14 FWD

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



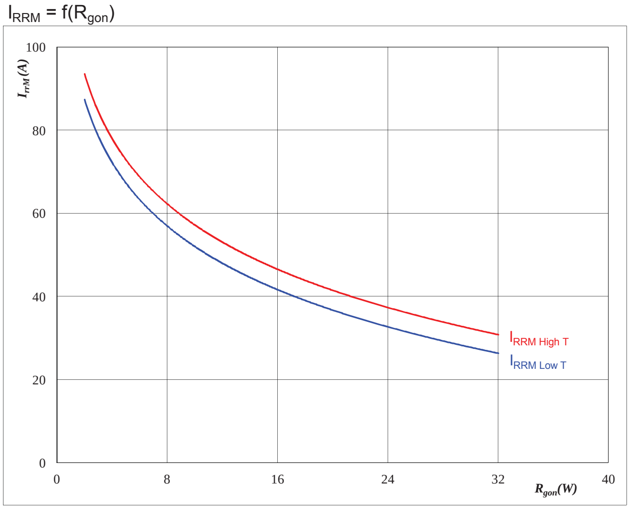
At

T_j =	25/125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 15 FWD

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

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



At

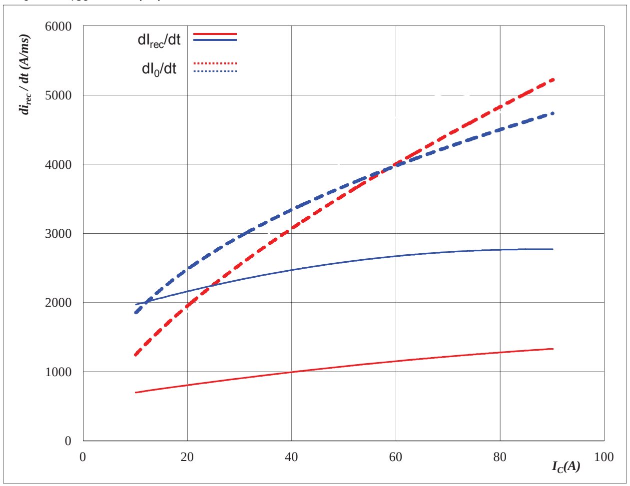
T_j =	25/125	°C
V_R =	350	V
I_F =	50	A
V_{GE} =	±15	V

Boost

Figure 16 FWD

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

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



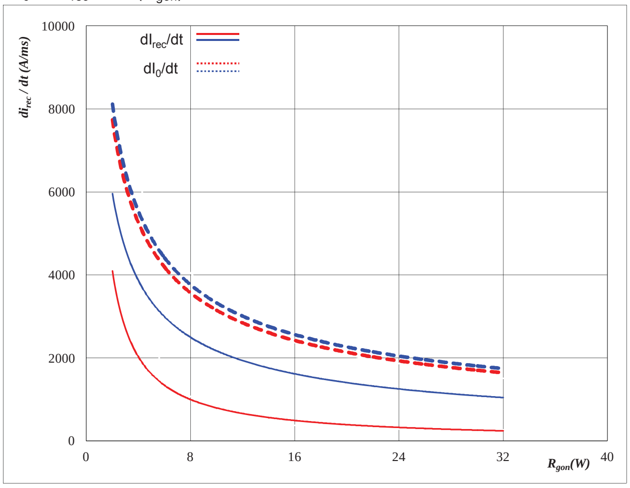
At

T_j =	25/125	℃
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

Figure 17 FWD

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

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



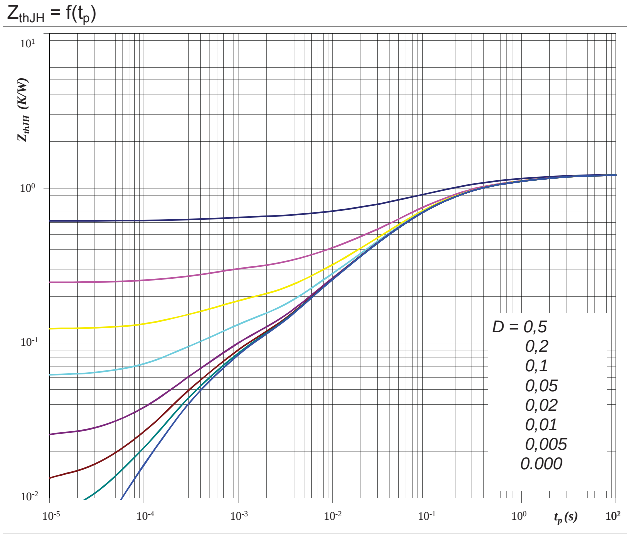
At

T_j =	25/125	℃
V_R =	350	V
I_F =	50	A
V_{GE} =	±15	V

Figure 18 IGBT

IGBT transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

D =	tp / T	
R_{thJH} =	1,23	K/W

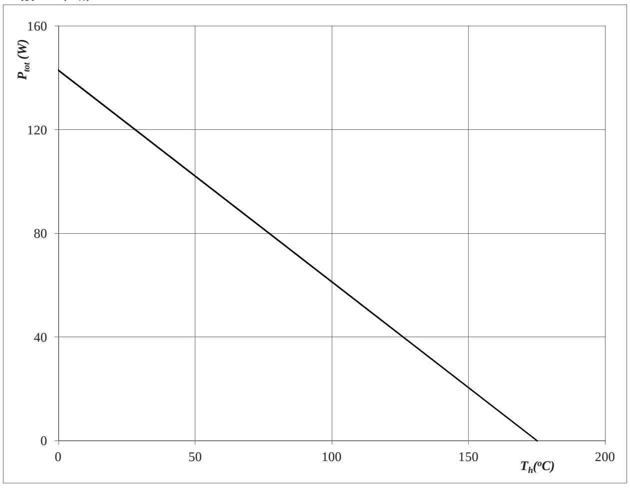
R (C/W)	Tau (s)
0,04	7,4E+00
0,19	1,2E+00
0,46	1,7E-01
0,35	4,2E-02
0,12	7,1E-03
0,06	4,1E-04

Boost

Figure 19	IGBT

Power dissipation as a
function of heatsink temperature

$P_{tot} = f(T_h)$



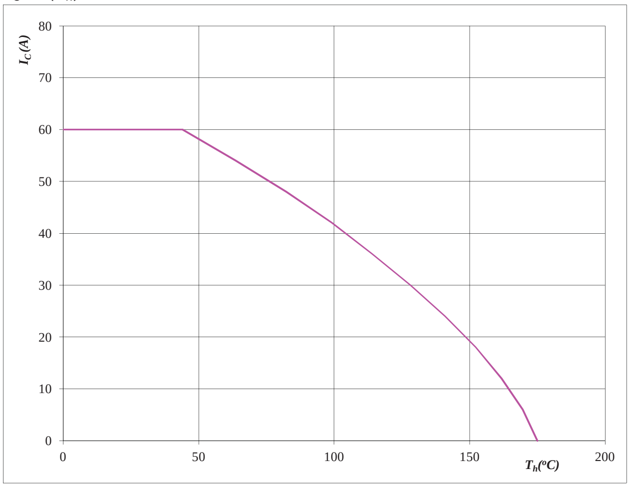
At

T_j = 175 ºC

Figure 20	IGBT

Collector current as a
function of heatsink temperature

$I_C = f(T_h)$



At

T_j = 175 ºC

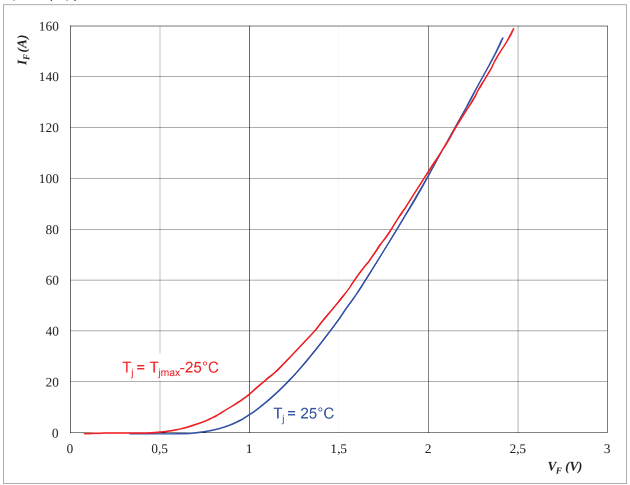
V_{GE} = 15 V

Buck and Boost Inverse Diode

Figure 1 Buck and Boost Inverse Diode

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



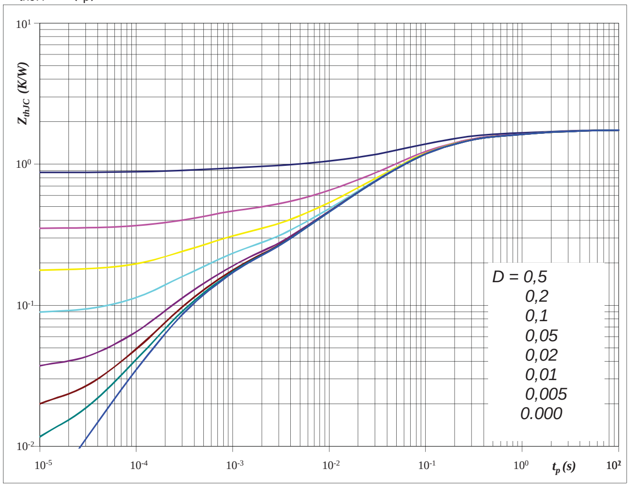
At

t_p = 250 µs

Figure 2 Buck and Boost Inverse Diode

Diode transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

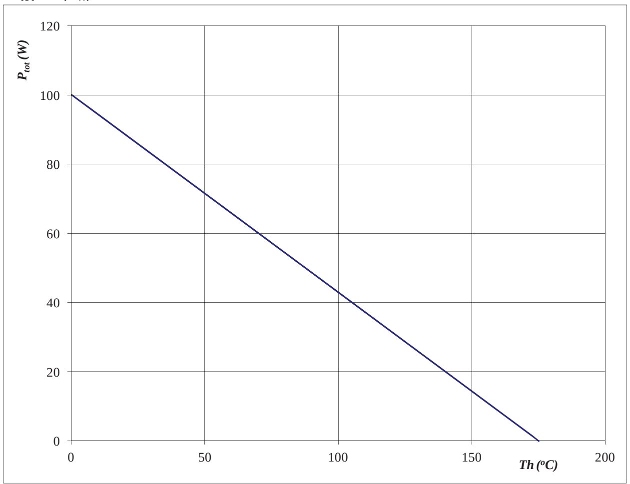
D = tp / T

R_{thJH} = 1,75 K/W

Figure 3 Buck and Boost Inverse Diode

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



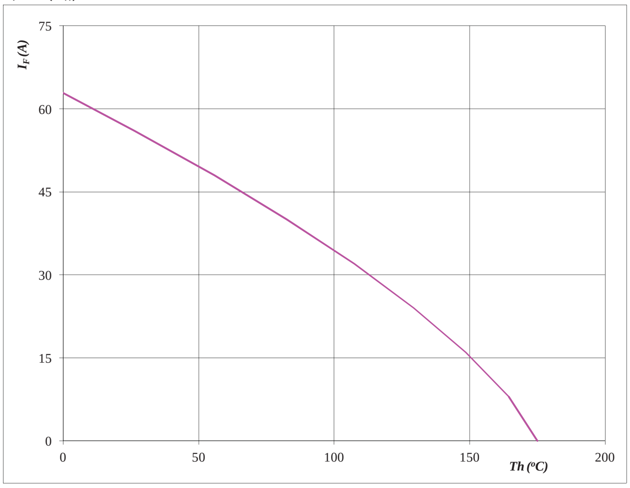
At

T_j = 175 °C

Figure 4 Buck and Boost Inverse Diode

Forward current as a function of heatsink temperature

$I_F = f(T_h)$



At

T_j = 175 °C

Thermistor

Figure 1 Thermistor

Typical NTC characteristic as a function of temperature

$R_T = f(T)$

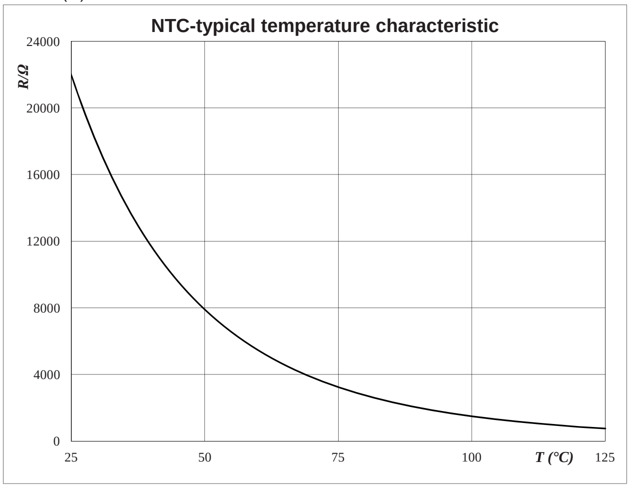


Figure 2 Thermistor

Typical NTC resistance values

$$R(T) = R_{25} \cdot e^{\left(B_{25/100} \cdot \left(\frac{1}{T} - \frac{1}{T_{25}}\right)\right)} \quad [\Omega]$$

T [°C]	R [Ω]	T [°C]	R [Ω]
-55	3006477	30	17635
-50	1993973	40	11574
-45	1346473	50	7796
-40	924676	55	6457
-35	645112	60	5378
-30	456784	65	4503
-25	327965	70	3791
-20	238577	75	3207
-15	175705	80	2726
-10	130914	85	2327
-5	98618	90	1996
0	75063	95	1718
5	57698	100	1486
10	44764	105	1289
15	35037	110	1123
20	27654	115	982
25	22000	120	861
30	17635	125	758

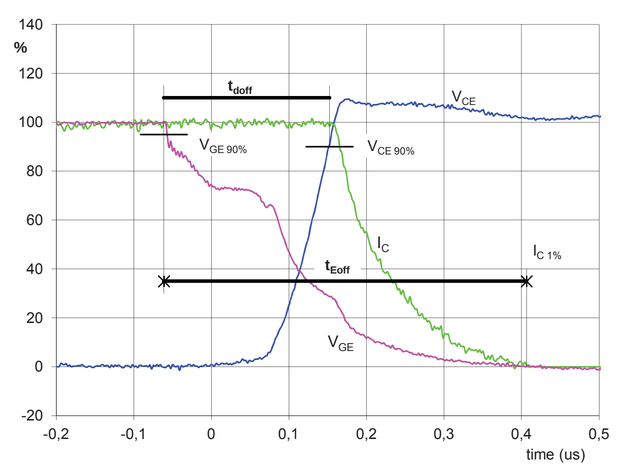
Switching Definitions BUCK IGBT

General conditions

T_j	=	125 °C
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

Figure 1 Output inverter IGBT

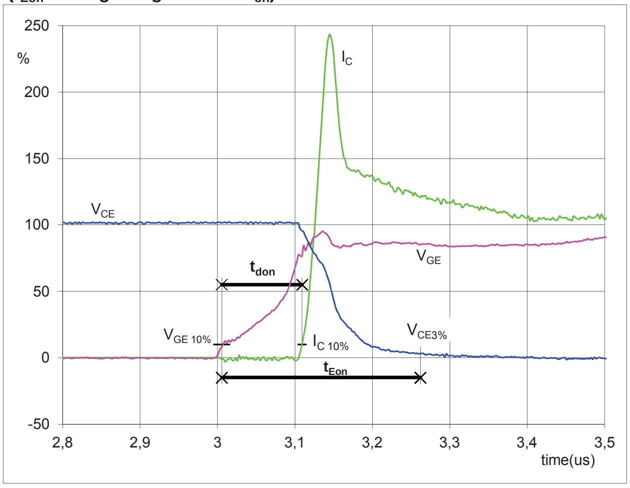
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff}
(t_{Eoff} = integrating time for E_{off})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	50	A
t_{doff} =	0,21	μs
t_{Eoff} =	0,47	μs

Figure 2 Output inverter IGBT

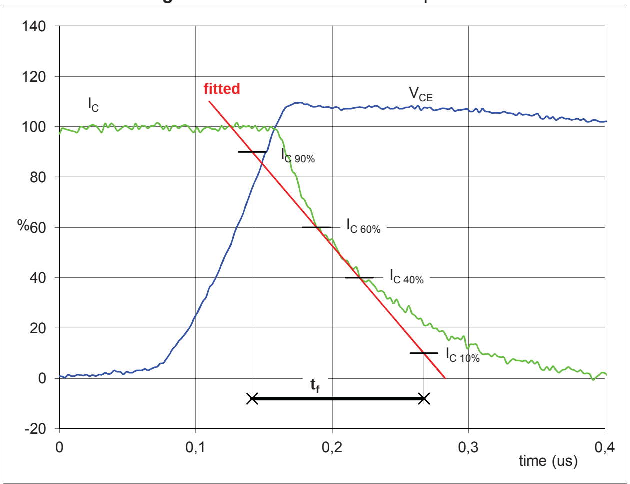
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon}
(t_{Eon} = integrating time for E_{on})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	50	A
t_{don} =	0,10	μs
t_{Eon} =	0,26	μs

Figure 3 Output inverter IGBT

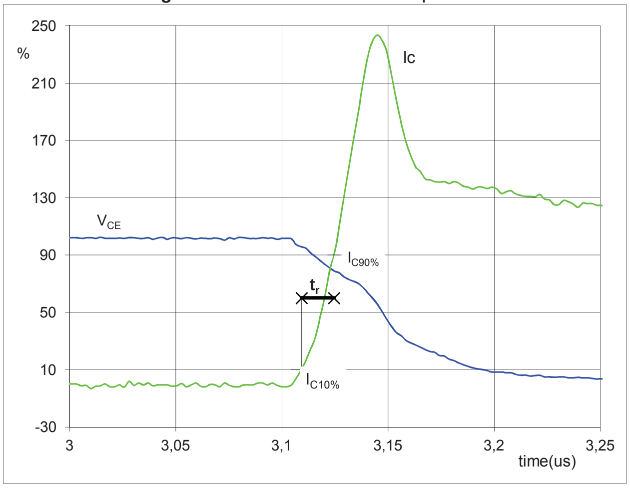
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	350	V
I_C (100%) =	50	A
t_f =	0,13	μs

Figure 4 Output inverter IGBT

Turn-on Switching Waveforms & definition of t_r

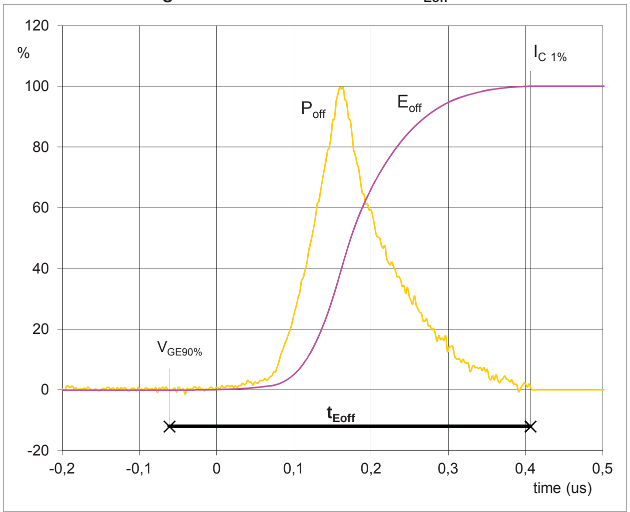


V_C (100%) =	350	V
I_C (100%) =	50	A
t_r =	0,02	μs

Switching Definitions BUCK IGBT

Figure 5	Output inverter IGBT

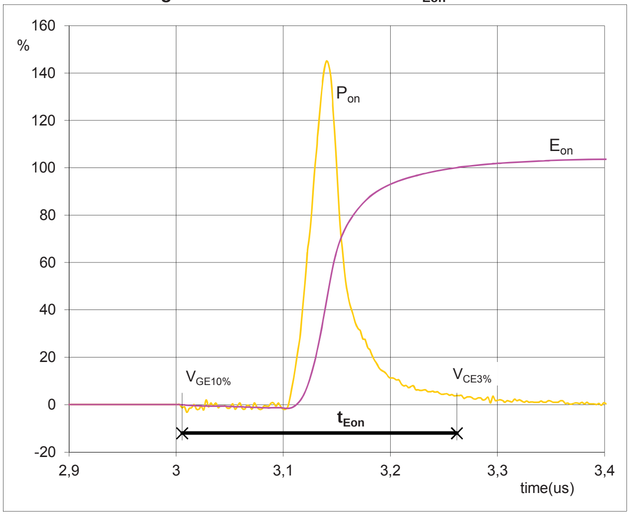
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	17,53	kW
E_{off} (100%) =	1,95	mJ
t_{Eoff} =	0,47	µs

Figure 6	Output inverter IGBT

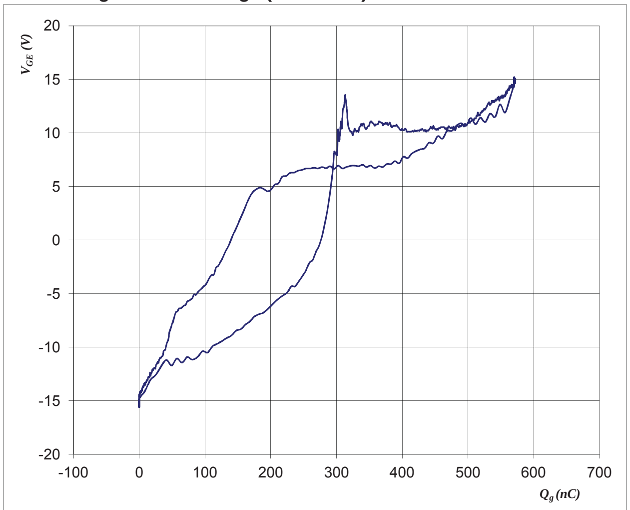
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	17,53	kW
E_{on} (100%) =	1,00	mJ
t_{Eon} =	0,26	µs

Figure 7	Output inverter FWD

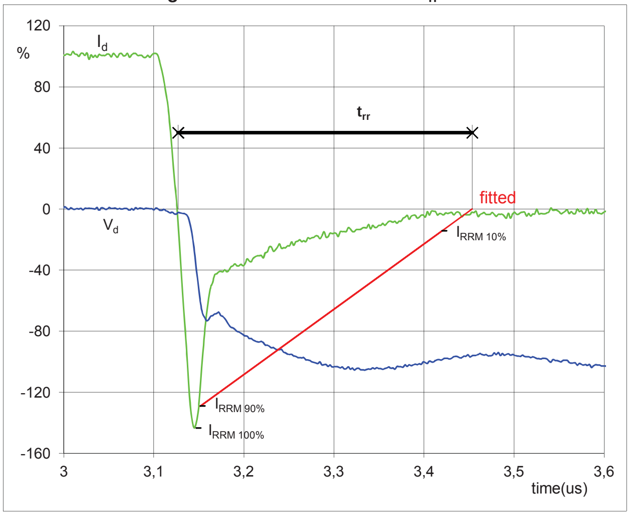
Gate voltage vs Gate charge (measured)



V_{GEoff} =	-15	V
V_{GEon} =	15	V
V_C (100%) =	350	V
I_C (100%) =	50	A
Q_g =	572,22	nC

Figure 8	Output inverter IGBT

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

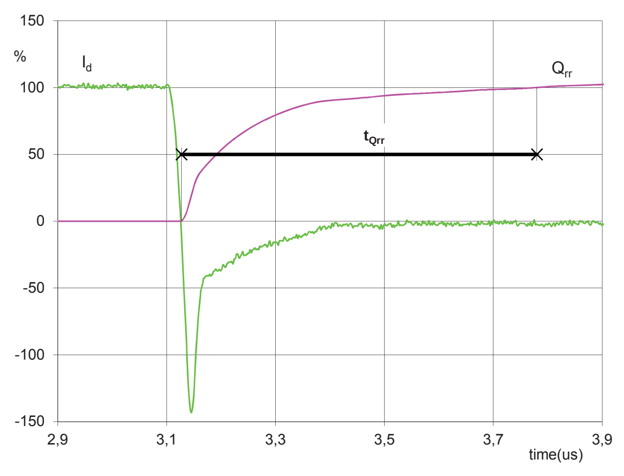


V_d (100%) =	350	V
I_d (100%) =	50	A
I_{RRM} (100%) =	-72	A
t_{rr} =	0,21	µs

Switching Definitions BUCK IGBT

Figure 9 Output inverter FWD

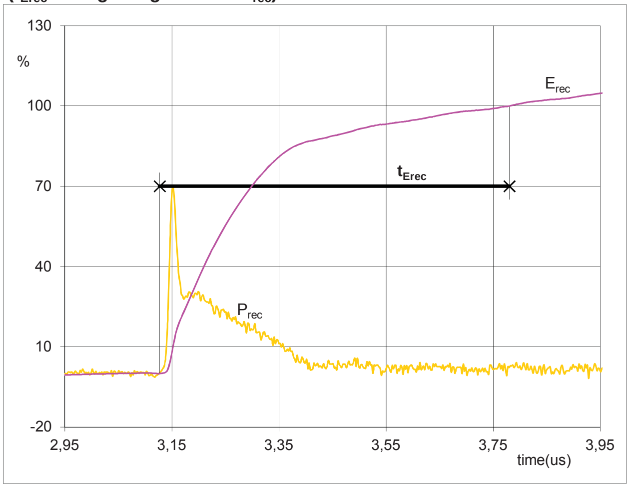
Turn-on Switching Waveforms & definition of t_{Qrr}
(t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	50	A
Q_{rr} (100%) =	4,40	µC
t_{Qrr} =	0,65	µs

Figure 10 Output inverter FWD

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



P_{rec} (100%) =	17,53	kW
E_{rec} (100%) =	1,07	mJ
t_{Erec} =	0,65	µs

Measurement circuits

Figure 11

BUCK stage switching measurement circuit

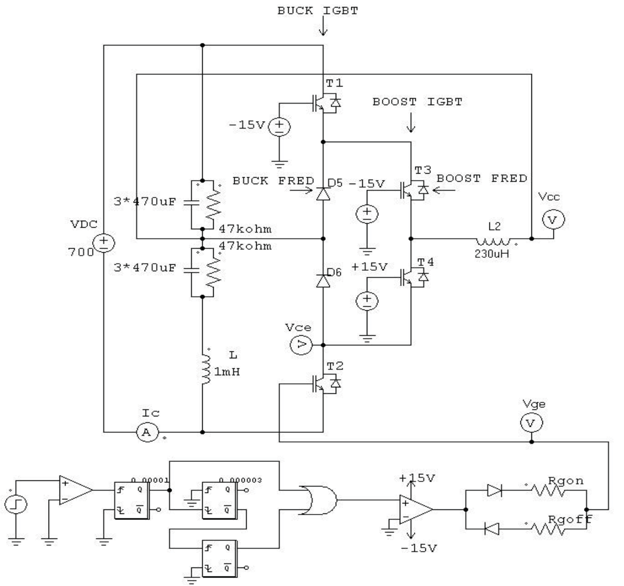
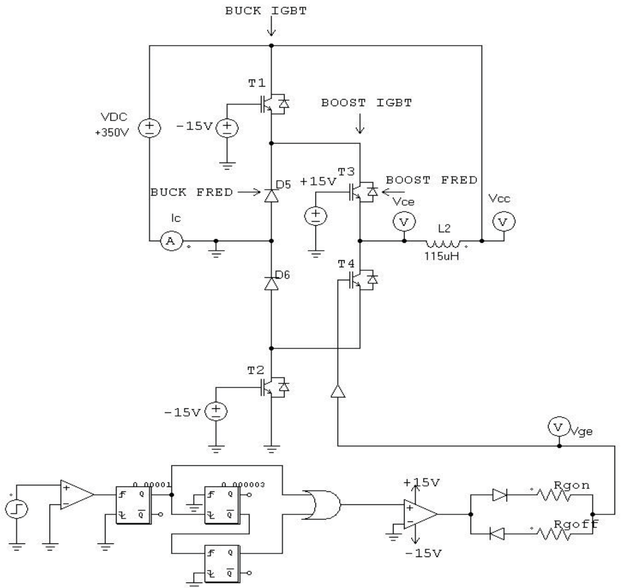


Figure 12

BOOST stage switching measurement circuit



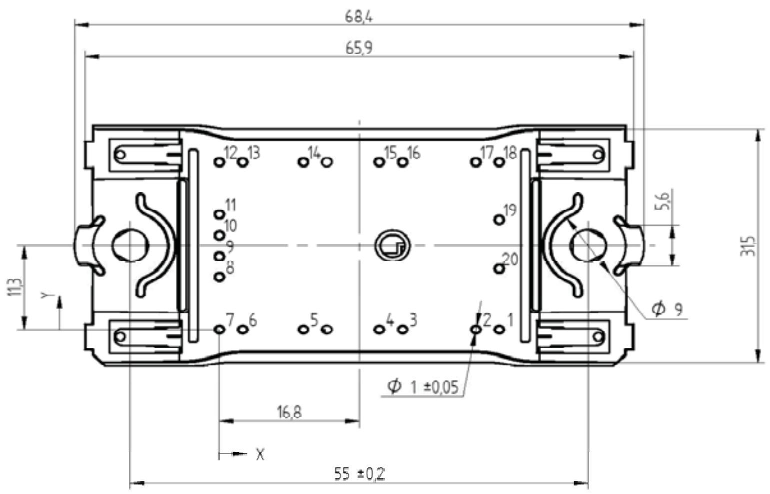
Ordering Code and Marking - Outline - Pinout

Ordering Code & Marking

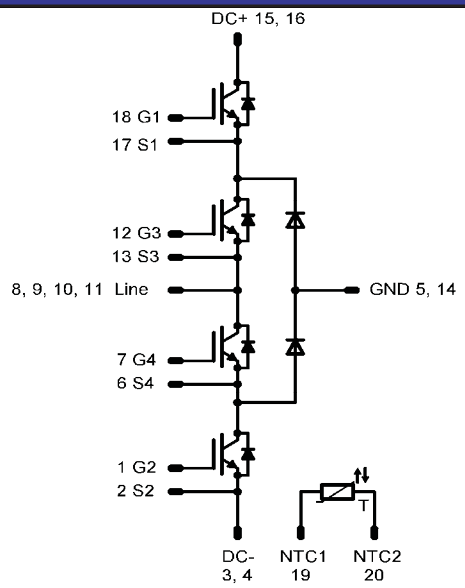
Version	Ordering Code	in DataMatrix as	in packaging barcode as
Standard in flow0 12mm housing	10-FZ06NIA050SA-P925F33	P925F33	P925F33

Outline

Pin table		
Pin	X	Y
1	33,6	0
2	30,8	0
3	22	0
4	19,2	0
5	10,1	0
6	2,8	0
7	0	0
8	0	7,1
9	0	9,9
10	0	12,7
11	0	15,5
12	0	22,6
13	2,8	22,6
14	10,1	22,6
15	19,2	22,6
16	22	22,6
17	30,8	22,6
18	33,6	22,6
19	33,6	14,8
20	33,6	8,2



Pinout



PRODUCT STATUS DEFINITIONS

Datasheet Status	Product Status	Definition
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data may be published at a later date. Vincotech reserves the right to make changes at any time without notice in order to improve design. The data contained is exclusively intended for technically trained staff.
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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.