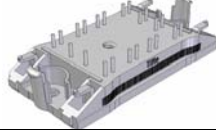
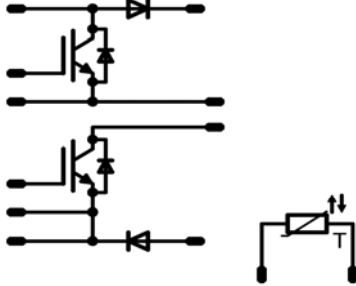


flowBOOST0	600V/30A
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Features</p> <ul style="list-style-type: none"> Symmetric boost Clip-In PCB mounting Low Inductance Layout </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Target Applications</p> <ul style="list-style-type: none"> UPS </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Types</p> <ul style="list-style-type: none"> 10-FZ06NBA030SA-P914L33 </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">flow0 housing</p>  </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Schematic</p>  </div>

Maximum Ratings

$T_j=25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Input Boost IGBT				
Collector-emitter break down voltage	V_{CE}		600	V
DC collector current	I_C	$T_j=T_{jmax}$ $T_h=80^\circ\text{C}$ $T_c=80^\circ\text{C}$	31 41	A
Repetitive peak collector current	I_{Cpulse}	t_p limited by T_{jmax}	90	A
Power dissipation per IGBT	P_{tot}	$T_j=T_{jmax}$ $T_h=80^\circ\text{C}$ $T_c=80^\circ\text{C}$	60 91	W
Gate-emitter peak voltage	V_{GE}		± 20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j \leq 150^\circ\text{C}$ $V_{GE}=15\text{V}$	6 360	μs V
Maximum Junction Temperature	T_{jmax}		175	$^\circ\text{C}$
Input Boost Inverse Diode				
Peak Repetitive Reverse Voltage	V_{RRM}	$T_j=25^\circ\text{C}$	600	V
DC forward current	I_F	$T_j=T_{jmax}$ $T_h=80^\circ\text{C}$ $T_c=80^\circ\text{C}$	19 25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	30	A
Power dissipation per Diode	P_{tot}	$T_j=T_{jmax}$ $T_h=80^\circ\text{C}$ $T_c=80^\circ\text{C}$	35 53	W
Maximum Junction Temperature	T_{jmax}		175	$^\circ\text{C}$

Maximum Ratings

 $T_j=25^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit	
Input Boost FWD					
Peak Repetitive Reverse Voltage	V_{RRM}	$T_j=25^{\circ}\text{C}$	600	V	
DC forward current	I_F	$T_j=T_{jmax}$	$T_h=80^{\circ}\text{C}$	30	A
			$T_c=80^{\circ}\text{C}$	39	
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	$T_c=100^{\circ}\text{C}$	60	A
Power dissipation	P_{tot}	$T_j=T_{jmax}$	$T_h=80^{\circ}\text{C}$	48	W
			$T_c=80^{\circ}\text{C}$	73	
Maximum Junction Temperature	T_{jmax}		175	$^{\circ}\text{C}$	

Thermal Properties

Storage temperature	T_{stg}		-40...+125	$^{\circ}\text{C}$
Operation temperature under switching condition	T_{op}		-40...+($T_{jmax} - 25$)	$^{\circ}\text{C}$

Insulation Properties

Insulation voltage	V_{is}	$t=2\text{s}$ 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			
Input Boost IGBT											
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$			0,00043	$T_j=25^\circ C$ $T_j=150^\circ C$	5	5,8	6,5	V	
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		30	$T_j=25^\circ C$ $T_j=150^\circ C$	1	1,58 1,81	2,05	V	
Collector-emitter cut-off	I_{CES}		0	600		$T_j=25^\circ C$ $T_j=150^\circ C$			0,03	mA	
Gate-emitter leakage current	I_{GES}		± 20	0		$T_j=25^\circ C$ $T_j=150^\circ C$			350	nA	
Integrated Gate resistor	R_{gint}							none		Ω	
Turn-on delay time	$t_{d(on)}$	$R_{gon}=16 \Omega$ $R_{goff}=16 \Omega$	± 15	300	30	$T_j=25^\circ C$		103		ns	
Rise time	t_r					$T_j=150^\circ C$		103			
Turn-off delay time	$t_{d(off)}$					$T_j=25^\circ C$		14			
						$T_j=150^\circ C$		19			
Fall time	t_f					$T_j=25^\circ C$		152			
						$T_j=150^\circ C$		173			
Turn-on energy loss per pulse	E_{on}					$T_j=25^\circ C$		85			
		$T_j=150^\circ C$		103							
Turn-off energy loss per pulse	E_{off}	$T_j=25^\circ C$		0,40							
		$T_j=150^\circ C$		0,54							
Input capacitance	C_{ies}	$f=1MHz$	0	25		$T_j=25^\circ C$		1630		pF	
								Output capacitance	C_{oss}		
Reverse transfer capacitance	C_{rss}							50			
Gate charge	Q_{Gate}	$f=1MHz$	0	25		$T_j=25^\circ C$		167		nC	
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness $\leq 50\mu m$ $\lambda = 1 W/mK$							1,58		K/W
Input Boost Inverse Diode											
Diode forward voltage	V_F				10	$T_j=25^\circ C$ $T_j=125^\circ C$	1	1,79 1,67	2,05	V	
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness $\leq 50\mu m$ $\lambda = 1 W/mK$							2,69		K/W
Input Boost FWD											
Forward voltage	V_F				30	$T_j=25^\circ C$ $T_j=125^\circ C$	1	1,71 1,64	2,05	V	
Reverse leakage current	I_{rm}		± 15	600		$T_j=25^\circ C$ $T_j=125^\circ C$			30	μA	
Peak recovery current	I_{RRM}	$R_{gon}=16 \Omega$	± 15	300	30	$T_j=25^\circ C$		33		A	
Reverse recovery time	t_{rr}					$T_j=125^\circ C$		39			
						$T_j=25^\circ C$		111			
Reverse recovery charge	Q_{rr}					$T_j=125^\circ C$		178			
						$T_j=25^\circ C$		1,30			
Reverse recovered energy	E_{rec}					$T_j=125^\circ C$		2,57			
						$T_j=25^\circ C$		0,27			
Peak rate of fall of recovery current	$di(rec)max/dt$	$T_j=125^\circ C$		0,58							
		$T_j=25^\circ C$		3664							
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness $\leq 50\mu m$ $\lambda = 1 W/mK$							1,97		K/W
Thermistor											
Rated resistance	R					$T_j=25^\circ C$		22000		Ω	
Deviation of R100	$\Delta_{R/R}$	$R_{100}=1486 \Omega$				$T_j=100^\circ C$	-5		+5	%	
Power dissipation	P					$T_j=25^\circ C$		200		mW	
Power dissipation constant						$T_j=25^\circ C$		2		mW/K	
B-value	$B_{(25/50)}$	Tol. $\pm 3\%$				$T_j=25^\circ C$		3950		K	
B-value	$B_{(25/100)}$	Tol. $\pm 3\%$				$T_j=25^\circ C$		3996		K	
Vincotech NTC Reference						$T_j=25^\circ C$			B		

INPUT BOOST

Figure 1 BOOST IGBT

Typical output characteristics

$I_D = f(V_{DS})$

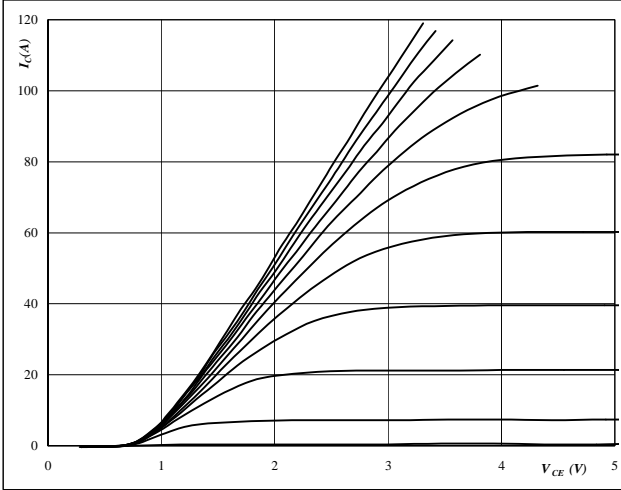

At
 $t_p = 250 \mu s$
 $T_j = 25 \text{ } ^\circ C$
 V_{DS} from 7 V to 17 V in steps of 1 V

Figure 2 BOOST IGBT

Typical output characteristics

$I_D = f(V_{DS})$

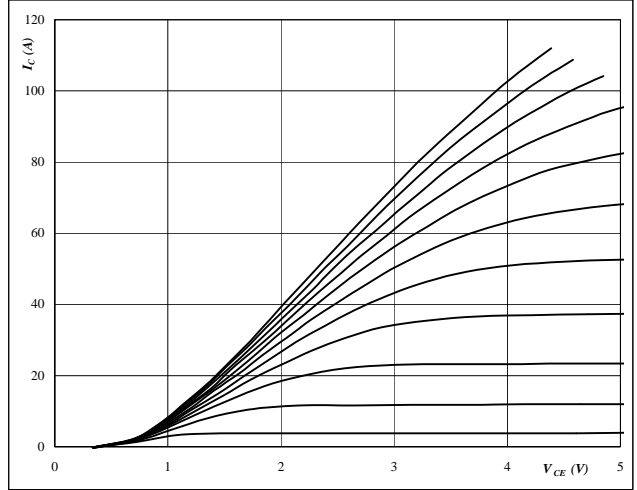
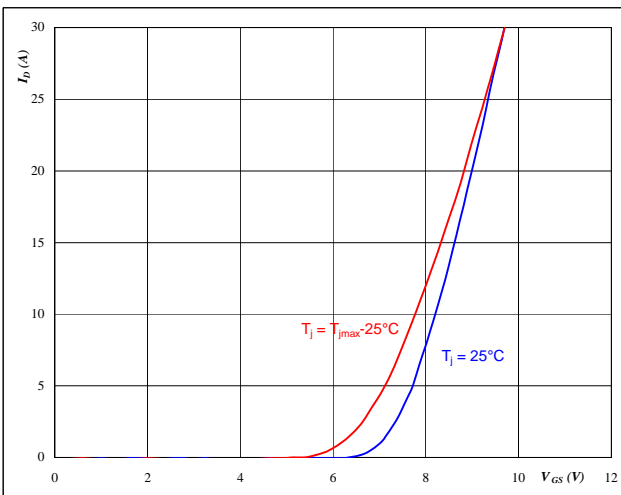

At
 $t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ C$
 V_{DS} from 7 V to 17 V in steps of 1 V

Figure 3 BOOST IGBT

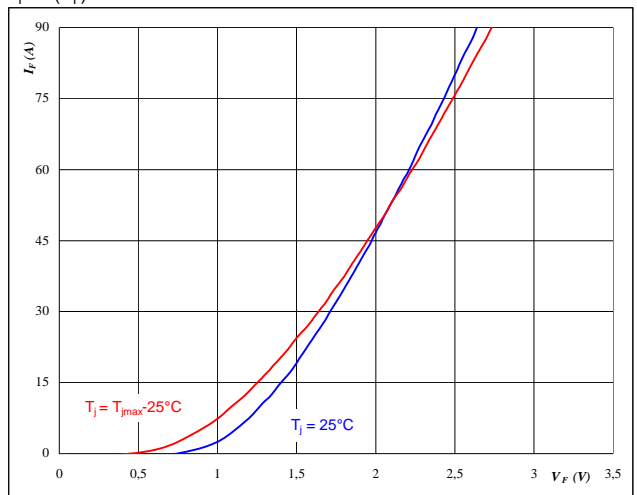
Typical transfer characteristics

$I_D = f(V_{DS})$


At
 $t_p = 250 \mu s$
 $V_{DS} = 10 \text{ V}$
Figure 4 BOOST FWD

Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$

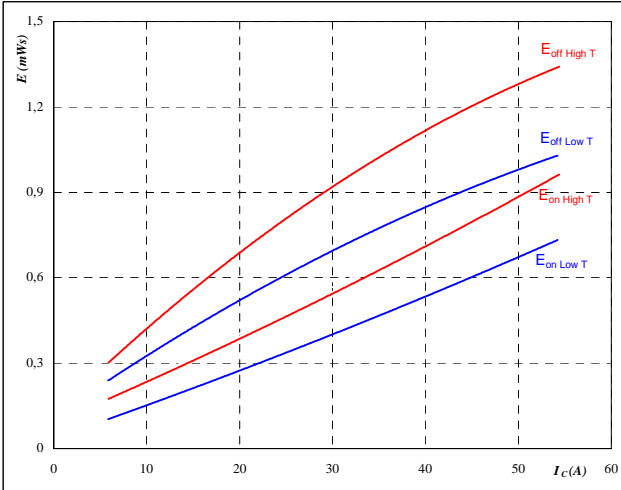

At
 $t_p = 250 \mu s$

INPUT BOOST

Figure 5 BOOST IGBT

**Typical switching energy losses
as a function of collector current**

$$E = f(I_D)$$



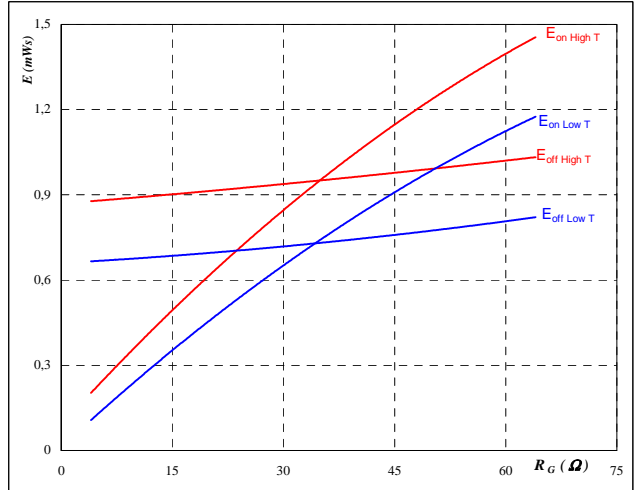
With an inductive load at

$T_j =$	25/150	°C
$V_{DS} =$	300	V
$V_{GS} =$	±15	V
$R_{gon} =$	16	Ω
$R_{goff} =$	16	Ω

Figure 6 BOOST IGBT

**Typical switching energy losses
as a function of gate resistor**

$$E = f(R_G)$$



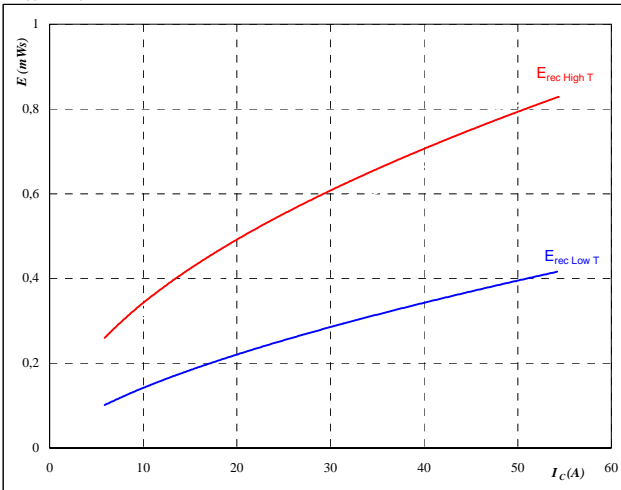
With an inductive load at

$T_j =$	25/150	°C
$V_{DS} =$	300	V
$V_{GS} =$	±15	V
$I_D =$	30	A

Figure 7 BOOST IGBT

**Typical reverse recovery energy loss
as a function of collector (drain) current**

$$E_{rec} = f(I_c)$$



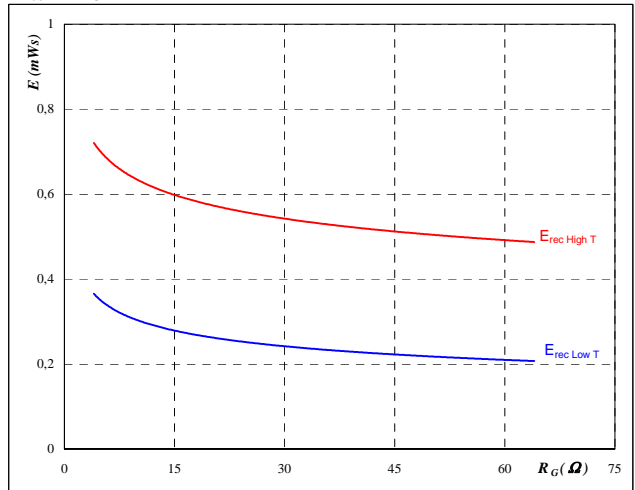
With an inductive load at

$T_j =$	25/150	°C
$V_{DS} =$	300	V
$V_{GS} =$	±15	V
$R_{gon} =$	16	Ω
$R_{goff} =$	16	Ω

Figure 8 BOOST IGBT

**Typical reverse recovery energy loss
as a function of gate resistor**

$$E_{rec} = f(R_G)$$



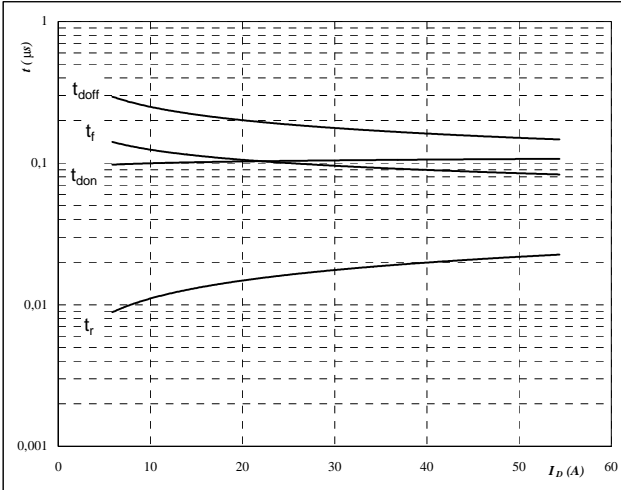
With an inductive load at

$T_j =$	25/150	°C
$V_{DS} =$	300	V
$V_{GS} =$	±15	V
$I_D =$	30	A

INPUT BOOST

Figure 9 BOOST IGBT

Typical switching times as a function of collector current
 $t = f(I_C)$

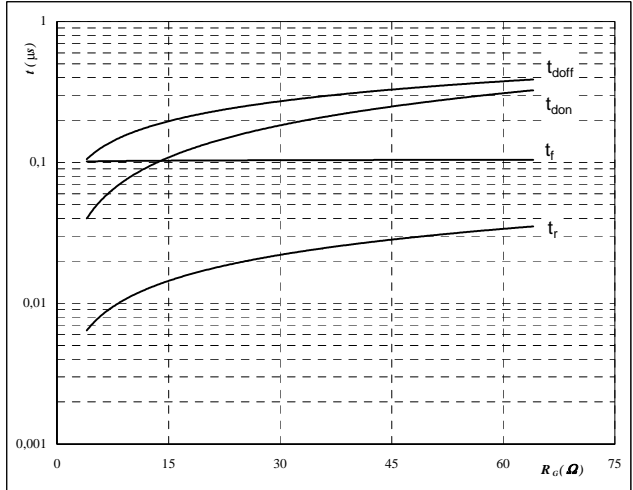


With an inductive load at

$T_j = 150 \text{ } ^\circ\text{C}$
 $V_{DS} = 300 \text{ V}$
 $V_{GS} = \pm 15 \text{ V}$
 $R_{gon} = 16 \text{ } \Omega$
 $R_{goff} = 16 \text{ } \Omega$

Figure 10 BOOST IGBT

Typical switching times as a function of gate resistor
 $t = f(R_G)$

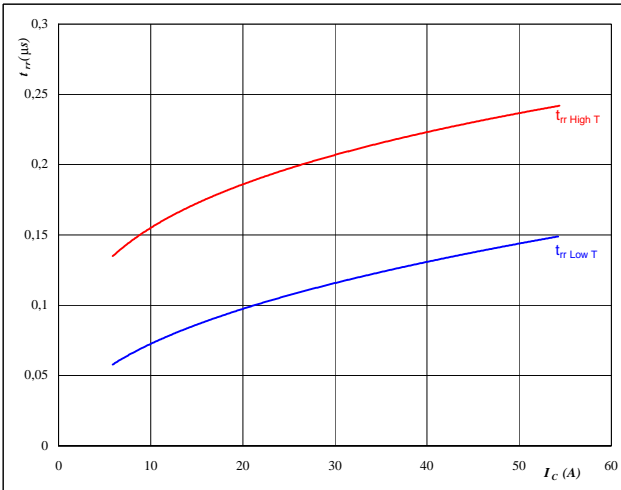


With an inductive load at

$T_j = 150 \text{ } ^\circ\text{C}$
 $V_{DS} = 300 \text{ V}$
 $V_{GS} = \pm 15 \text{ V}$
 $I_C = 30 \text{ A}$

Figure 11 BOOST FWD

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_C)$

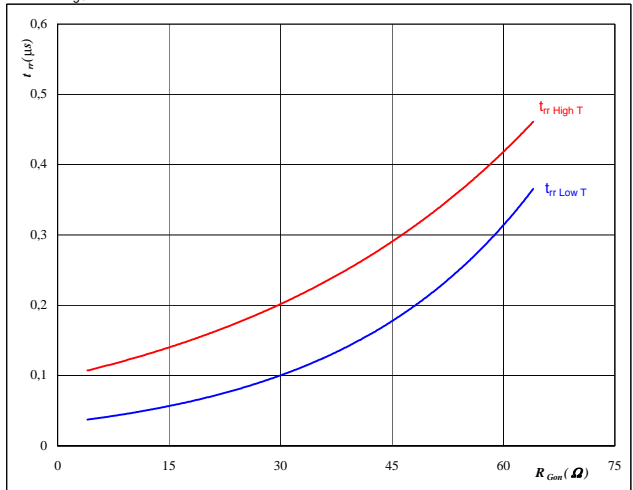


At

$T_j = 25/150 \text{ } ^\circ\text{C}$
 $V_{DS} = 300 \text{ V}$
 $V_{GS} = \pm 15 \text{ V}$
 $R_{gon} = 16 \text{ } \Omega$

Figure 12 BOOST FWD

Typical reverse recovery time as a function of MOSFET turn on gate resistor
 $t_{rr} = f(R_{gon})$



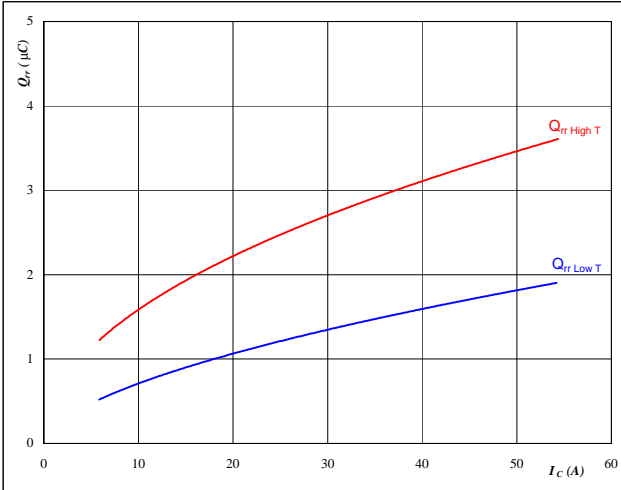
At

$T_j = 25/150 \text{ } ^\circ\text{C}$
 $V_R = 300 \text{ V}$
 $I_F = 30 \text{ A}$
 $V_{GS} = \pm 15 \text{ V}$

INPUT BOOST

Figure 13 BOOST FWD
Typical reverse recovery charge as a function of collector current

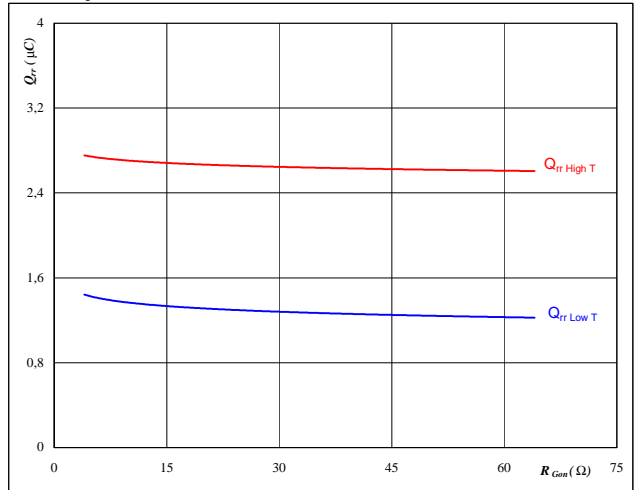
$$Q_{rr} = f(I_C)$$


At

$T_j =$	25/150	°C
$V_{DS} =$	300	V
$V_{GS} =$	±15	V
$R_{gon} =$	16	Ω

Figure 14 BOOST FWD
Typical reverse recovery charge as a function of MOSFET turn on gate resistor

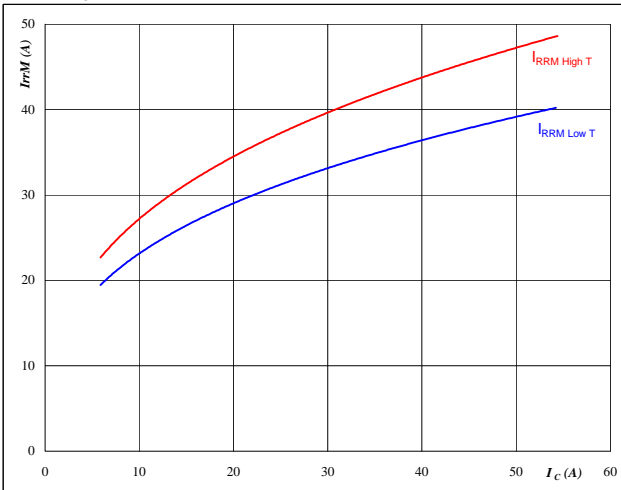
$$Q_{rr} = f(R_{gon})$$


At

$T_j =$	25/150	°C
$V_R =$	300	V
$I_F =$	30	A
$V_{GS} =$	±15	V

Figure 15 BOOST FWD
Typical reverse recovery current as a function of collector current

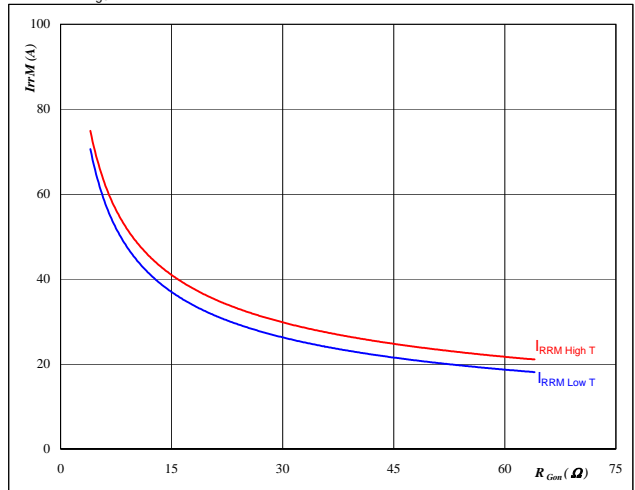
$$I_{RRM} = f(I_C)$$


At

$T_j =$	25/150	°C
$V_{DS} =$	300	V
$V_{GS} =$	±15	V
$R_{gon} =$	16	Ω

Figure 16 BOOST FWD
Typical reverse recovery current as a function of IGBT turn on gate resistor

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


At

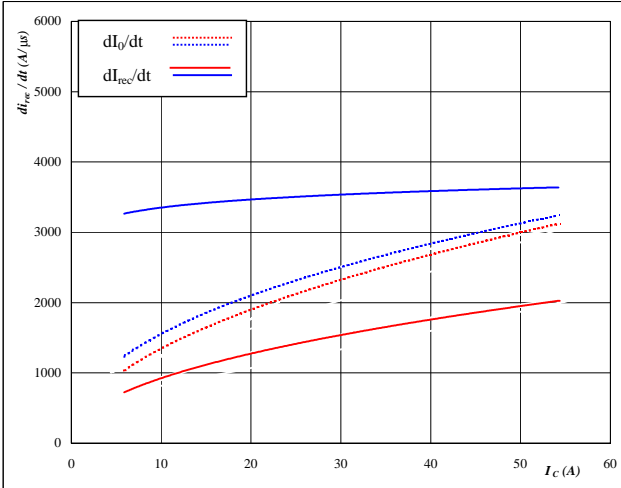
$T_j =$	25/150	°C
$V_R =$	300	V
$I_F =$	30	A
$V_{GS} =$	±15	V

INPUT BOOST

Figure 17 BOOST FWD

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

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

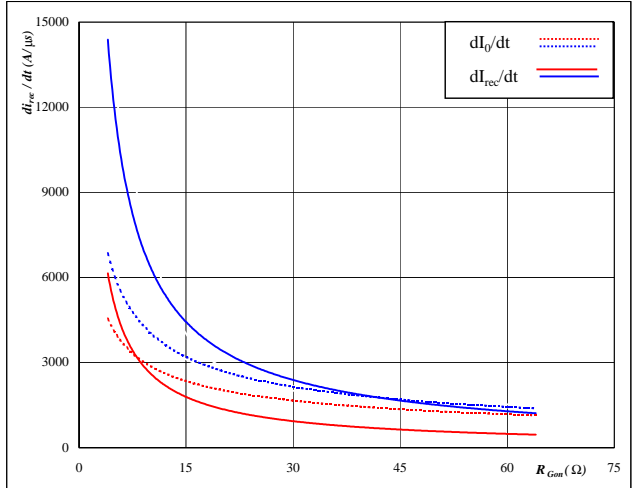


At
 $T_j = 25/150$ °C
 $V_{CE} = 300$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 16$ Ω

Figure 18 BOOST FWD

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

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

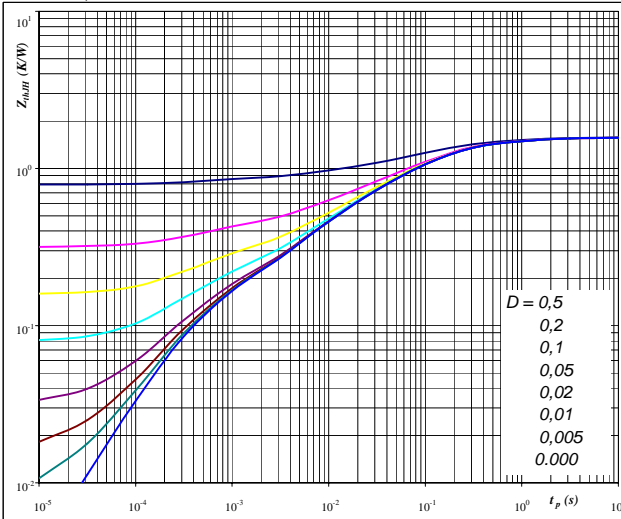


At
 $T_j = 25/150$ °C
 $V_{CE} = 300$ V
 $I_f = 30$ A
 $V_{GS} = \pm 15$ V

Figure 19 BOOST IGBT

MOSFET transient thermal impedance as a function of pulse width

$$Z_{thJH} = f(t_p)$$



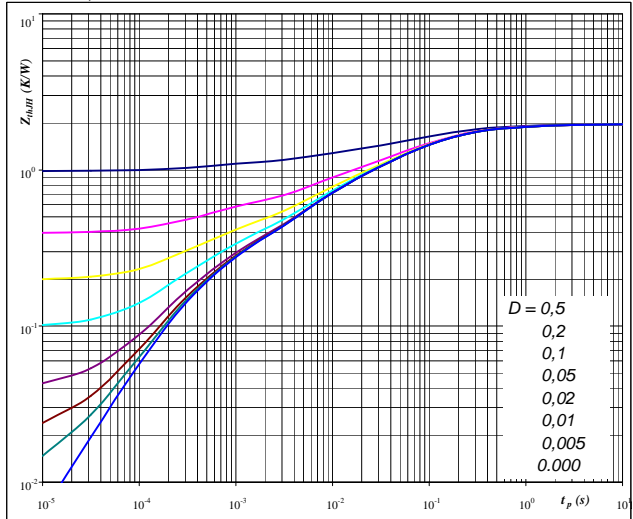
At
 $D = t_p / T$
 $R_{thJH} = 1,58$ K/W IGBT thermal model values

R (C/W)	Tau (s)
0,034	7,75E+00
0,168	9,36E-01
0,630	1,45E-01
0,427	2,94E-02
0,199	5,22E-03
0,122	3,91E-04

Figure 20 BOOST FWD

FWD transient thermal impedance as a function of pulse width

$$Z_{thJH} = f(t_p)$$



At
 $D = t_p / T$
 $R_{thJH} = 1,97$ K/W FWD thermal model values

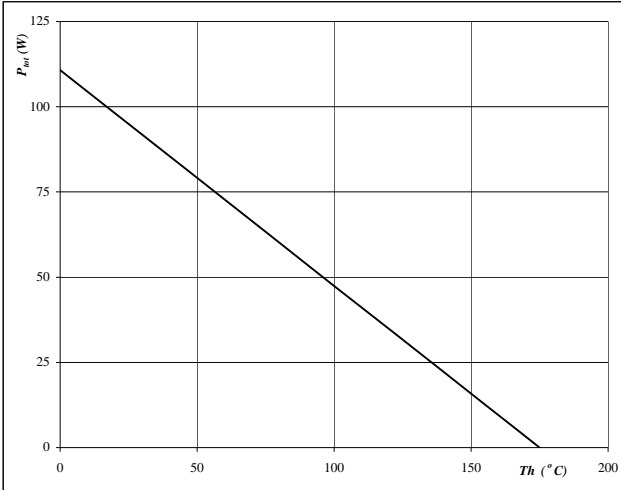
R (C/W)	Tau (s)
0,03	9,53E+00
0,17	8,69E-01
0,70	1,31E-01
0,54	2,74E-02
0,33	4,55E-03
0,20	3,66E-04

INPUT BOOST

Figure 21 BOOST IGBT

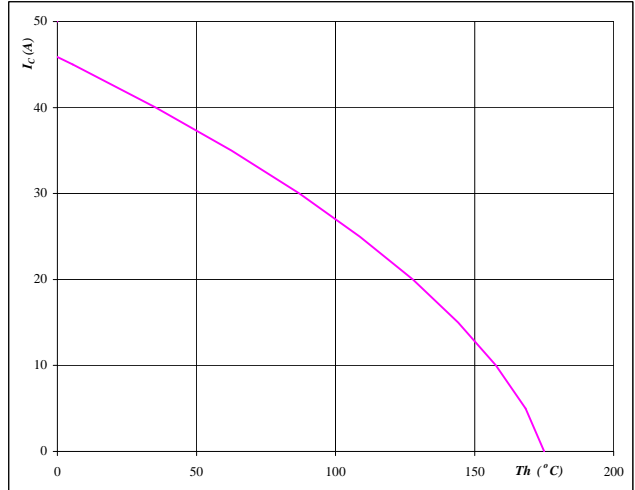
Power dissipation as a function of heatsink temperature

$$P_{tot} = f(T_h)$$


At
 $T_j = 175 \text{ } ^\circ\text{C}$
Figure 22 BOOST IGBT

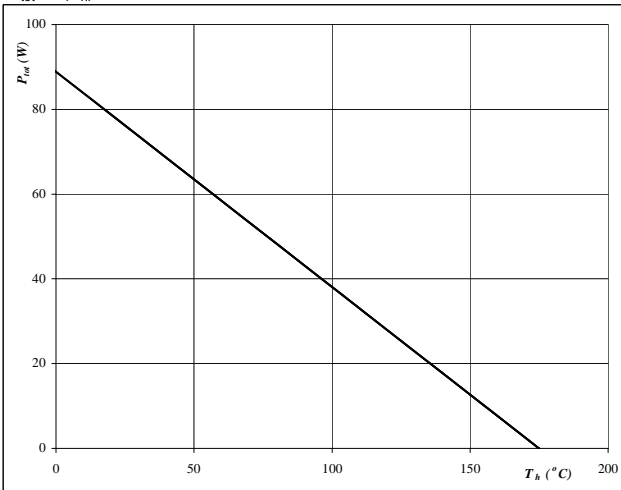
Collector/Drain current as a function of heatsink temperature

$$I_C = f(T_h)$$


At
 $T_j = 175 \text{ } ^\circ\text{C}$
 $V_{GS} = 15 \text{ V}$
Figure 23 BOOST FWD

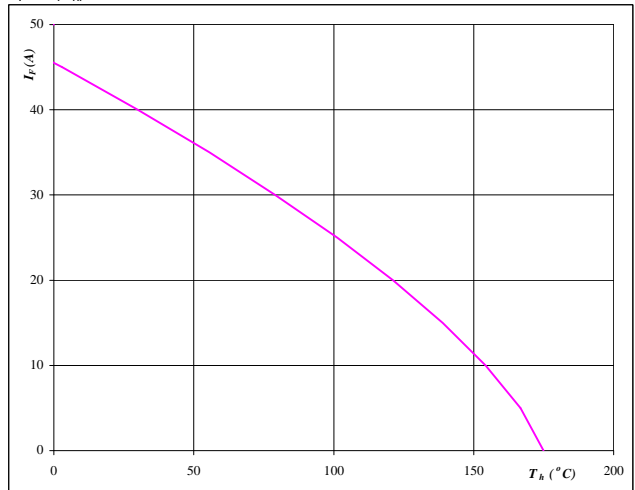
Power dissipation as a function of heatsink temperature

$$P_{tot} = f(T_h)$$


At
 $T_j = 175 \text{ } ^\circ\text{C}$
Figure 24 BOOST FWD

Forward current as a function of heatsink temperature

$$I_F = f(T_h)$$

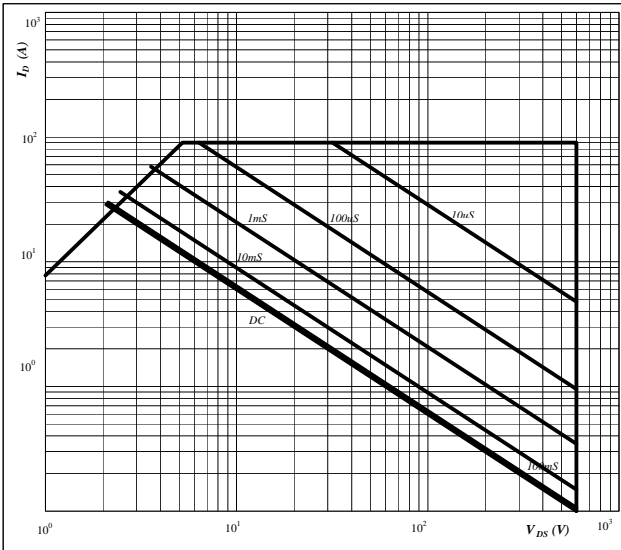

At
 $T_j = 175 \text{ } ^\circ\text{C}$

INPUT BOOST

Figure 25 BOOST IGBT

Safe operating area as a function of drain-source voltage

$$I_D = f(V_{DS})$$

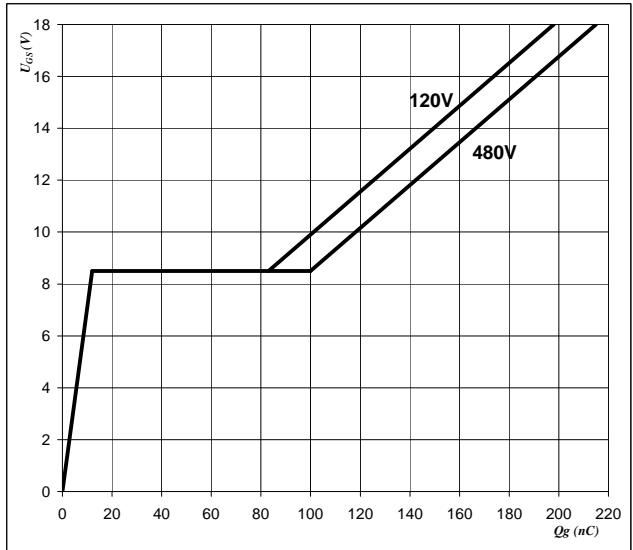


At
 D = single pulse
 $T_h = 80 \text{ } ^\circ\text{C}$
 $V_{GS} = \pm 15 \text{ V}$
 $T_j = T_{jmax} \text{ } ^\circ\text{C}$

Figure 26 BOOST IGBT

Gate voltage vs Gate charge

$$V_{GS} = f(Q_g)$$

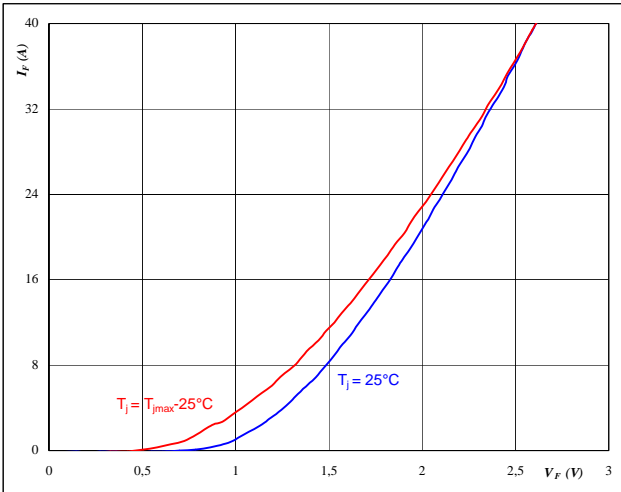


At
 $I_D = 30 \text{ A}$

BOOST INV. DIODE
Figure 1 BOOST INV. DIODE

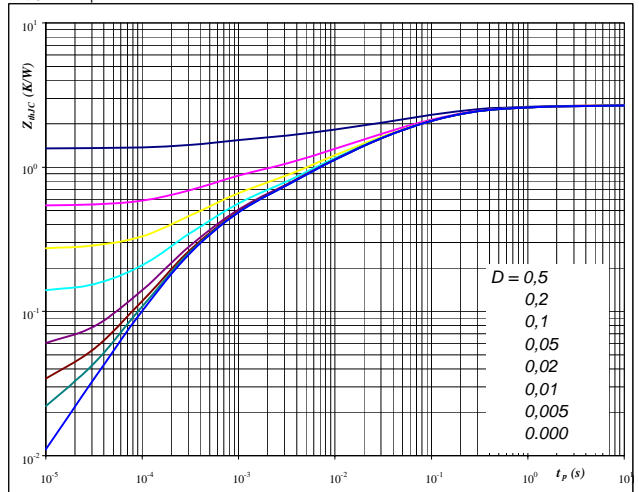
Typical diode forward current as a function of forward voltage

$$I_F = f(V_F)$$


At
 $t_p = 250 \mu\text{s}$
Figure 2 BOOST INV. DIODE

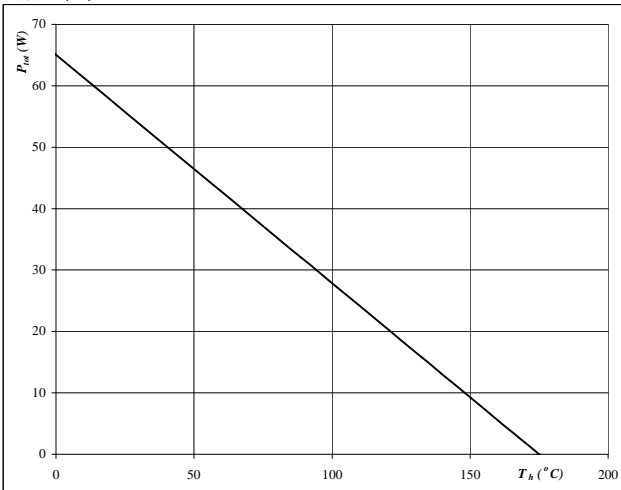
Diode transient thermal impedance as a function of pulse width

$$Z_{thJH} = f(t_p)$$


At
 $D = t_p / T$
 $R_{thJH} = 2,69 \text{ K/W}$
Figure 3 BOOST INV. DIODE

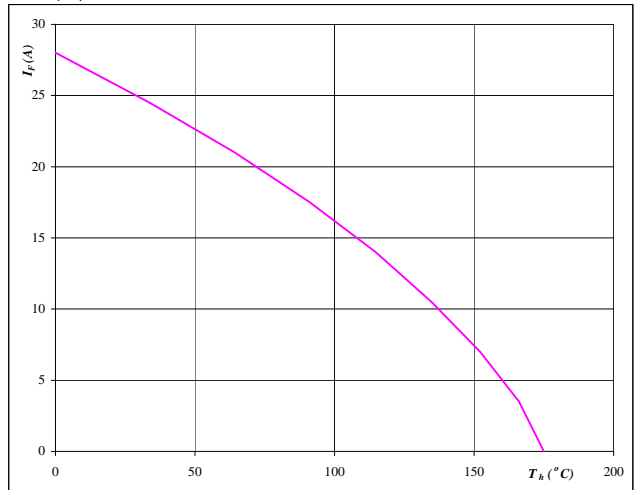
Power dissipation as a function of heatsink temperature

$$P_{tot} = f(T_h)$$


At
 $T_j = 175 \text{ }^\circ\text{C}$
Figure 4 BOOST INV. DIODE

Forward current as a function of heatsink temperature

$$I_F = f(T_h)$$

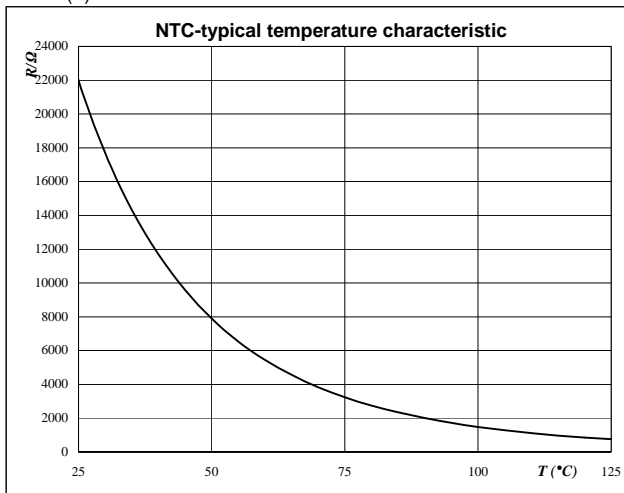

At
 $T_j = 175 \text{ }^\circ\text{C}$

Thermistor

Figure 1 Thermistor

Typical NTC characteristic
 as a function of temperature

$$R_T = f(T)$$


Figure 2 Thermistor

Typical NTC resistance values

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

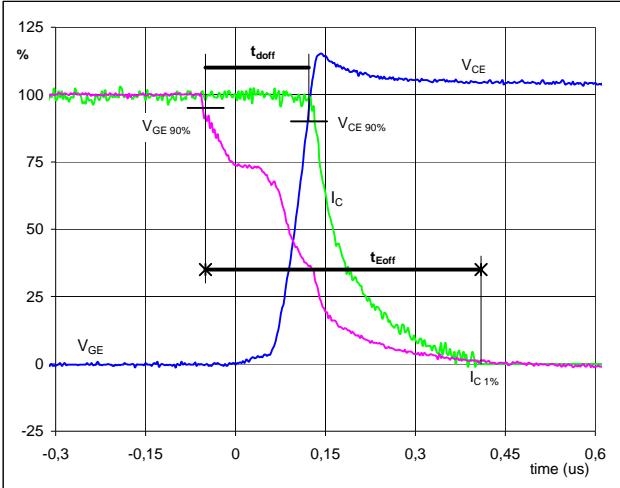
T [°C]	R [Ω]	T [°C]	R [Ω]
-55	3006477	30	17635
-50	1993973	40	11574
-45	1346473	50	7796
-40	924676	55	6457
-35	645112	60	5378
-30	456784	65	4503
-25	327965	70	3791
-20	238577	75	3207
-15	175705	80	2726
-10	130914	85	2327
-5	98618	90	1996
0	75063	95	1718
5	57698	100	1486
10	44764	105	1289
15	35037	110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

Switching Definitions Boost IGBT

General conditions

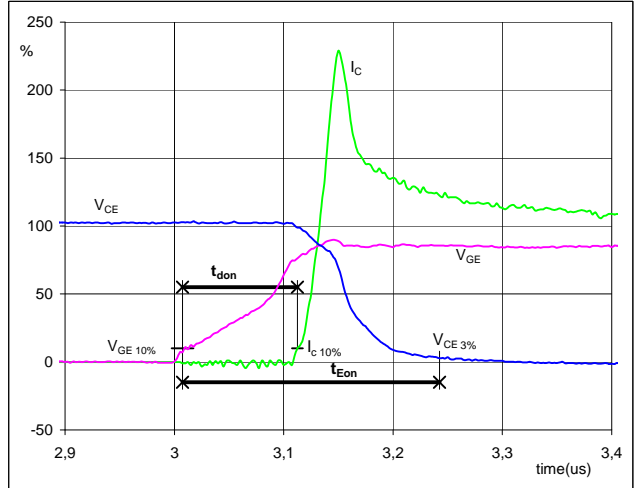
T_j	=	175 °C
R_{gon}	=	16 Ω
R_{goff}	=	16 Ω

Figure 1 BOOST IGBT

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


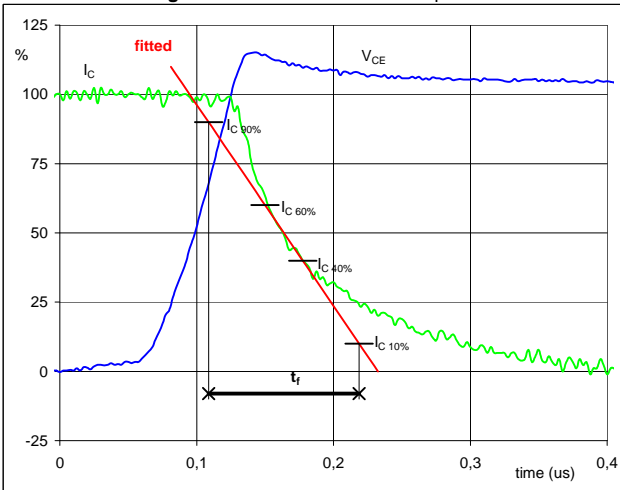
V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	300	V
I_C (100%) =	30	A
t_{doff} =	0,17	μ S
t_{Eoff} =	0,46	μ S

Figure 2 BOOST IGBT

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


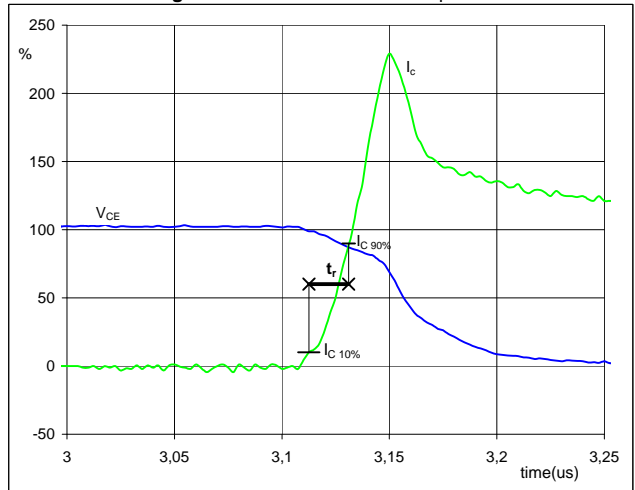
V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	300	V
I_C (100%) =	30	A
t_{don} =	0,10	μ S
t_{Eon} =	0,23	μ S

Figure 3 BOOST IGBT

Turn-off Switching Waveforms & definition of t_f


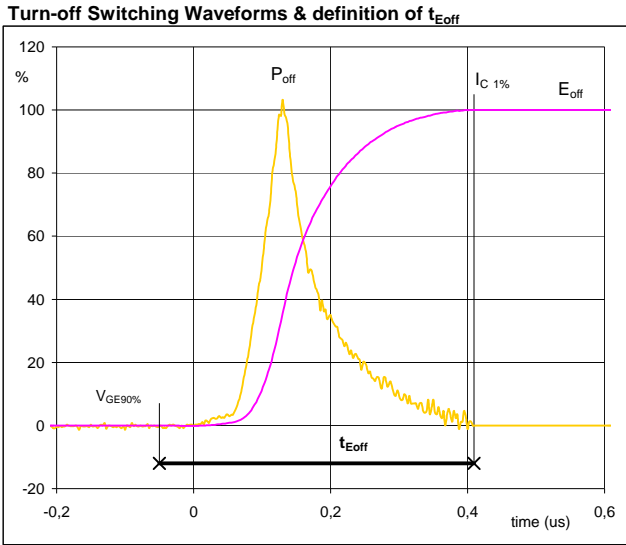
V_C (100%) =	300	V
I_C (100%) =	30	A
t_f =	0,10	μ S

Figure 4 BOOST IGBT

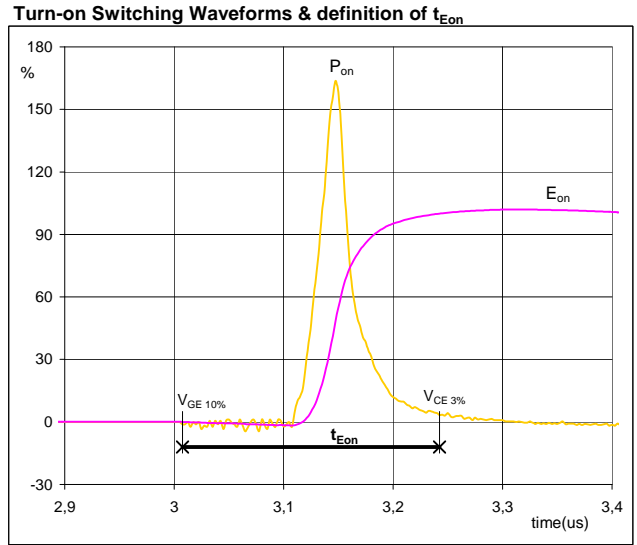
Turn-on Switching Waveforms & definition of t_r


V_C (100%) =	300	V
I_C (100%) =	30	A
t_r =	0,02	μ S

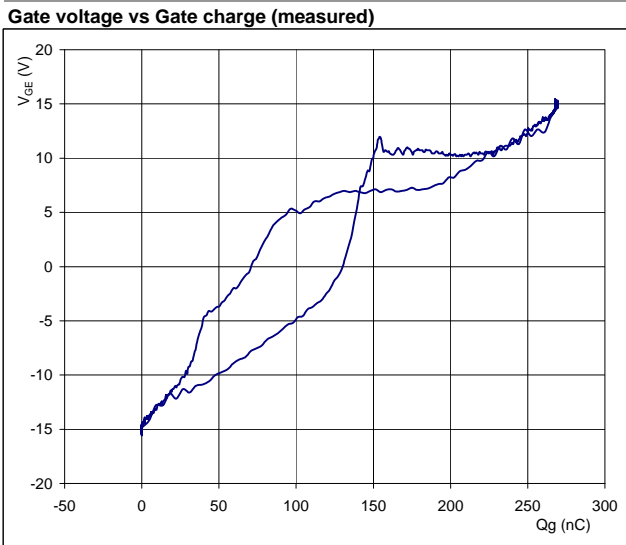
Switching Definitions Boost IGBT

Figure 5 BOOST IGBT


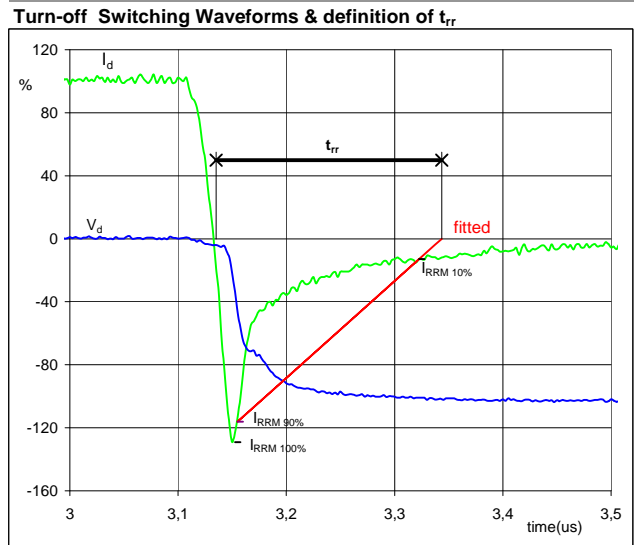
$P_{off} (100\%) =$	9,06	kW
$E_{off} (100\%) =$	0,92	mJ
$t_{Eoff} =$	0,46	μ s

Figure 6 BOOST IGBT


$P_{on} (100\%) =$	9,06	kW
$E_{on} (100\%) =$	0,54	mJ
$t_{Eon} =$	0,23	μ s

Figure 7 BOOST IGBT


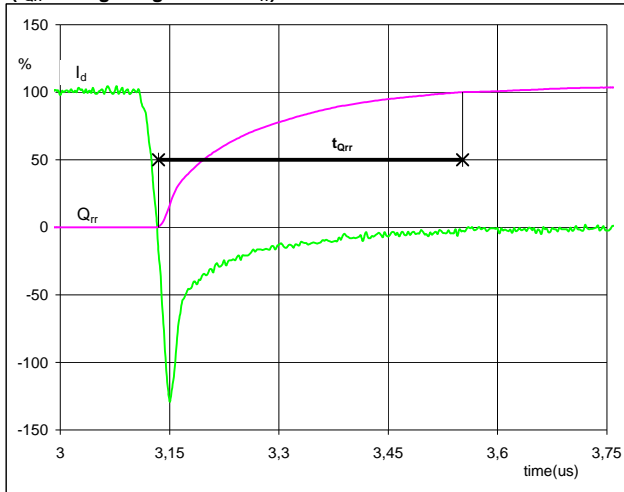
$V_{GEoff} =$	-15	V
$V_{GEon} =$	15	V
$V_C (100\%) =$	300	V
$I_C (100\%) =$	30	A
$Q_g =$	270,23	nC

Figure 8 BOOST FWD


$V_d (100\%) =$	300	V
$I_d (100\%) =$	30	A
$I_{RRM} (100\%) =$	-39	A
$t_{rr} =$	0,18	μ s

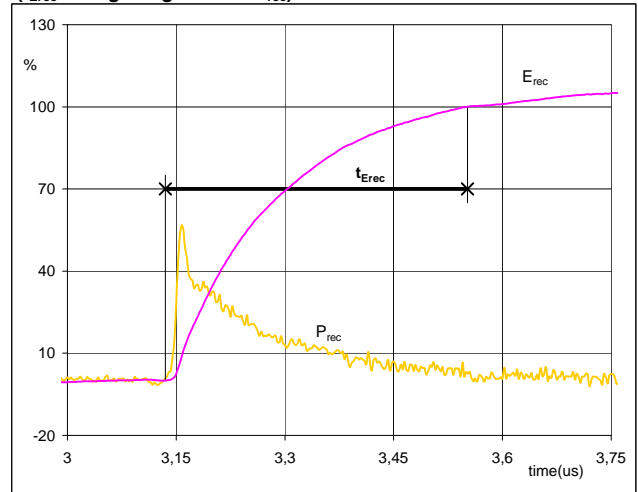
Switching Definitions Boost IGBT

Figure 9 BOOST FWD

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


I_d (100%) =	30	A
Q_{rr} (100%) =	2,57	μC
t_{Qrr} =	0,42	μs

Figure 10 BOOST FWD

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


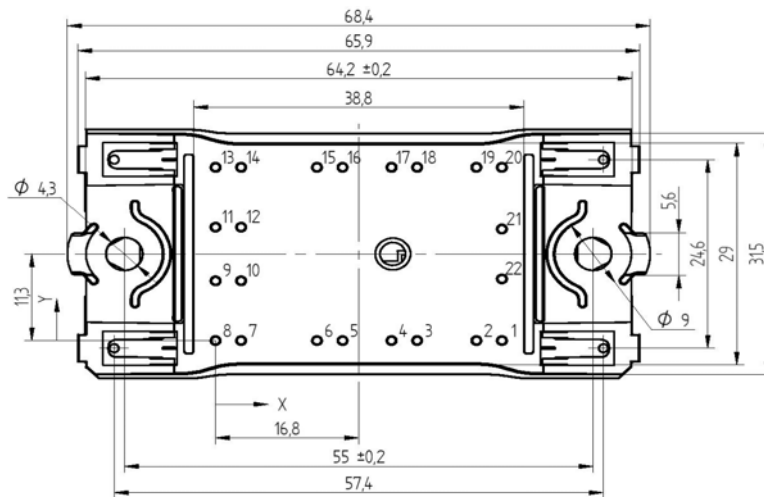
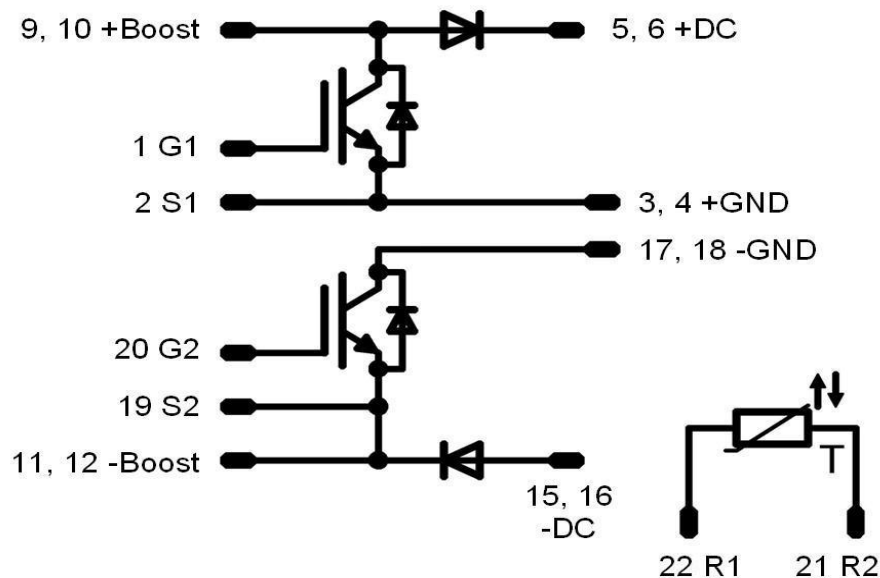
P_{rec} (100%) =	9,06	kW
E_{rec} (100%) =	0,58	mJ
t_{Erec} =	0,42	μs

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-FZ06NBA030SA-P914L33	P914L33	P914L33

Outline

Pin table		
Pin	X	Y
1	33,6	0
2	30,6	0
3	23,65	0
4	20,65	0
5	14,9	0
6	11,9	0
7	3	0
8	0	0
9	0	7,8
10	3	7,8
11	0	14,8
12	3	14,8
13	0	22,6
14	3	22,6
15	11,9	22,6
16	14,9	22,6
17	20,65	22,6
18	23,65	22,6
19	30,6	22,6
20	33,6	22,6
21	33,6	14,55
22	33,6	8,05


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.
Final	Full Production	This datasheet contains final specifications. 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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