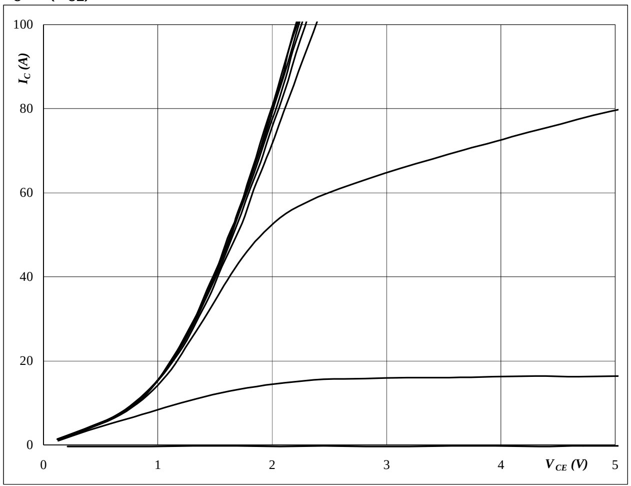
Input Boost

Figure 1	IGBT+MOSFET

Typical output characteristics

$I_C = f(V_{CE})$



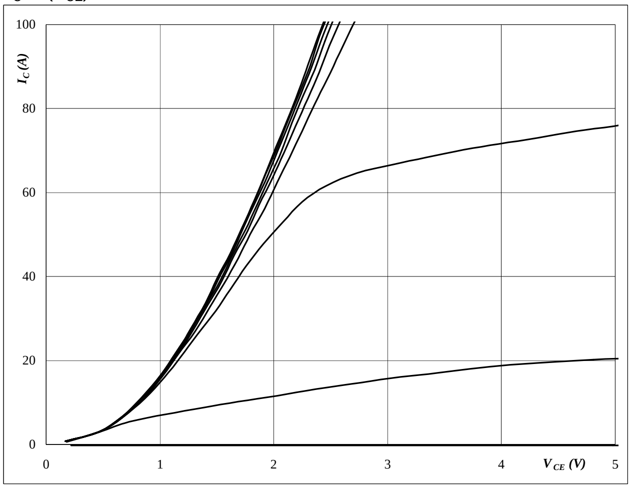
At

t_p =	250	μs
T_j =	25	°C
V_{GE} from	3 V to 19 V in steps of 2 V	

Figure 2	IGBT+MOSFET

Typical output characteristics

$I_C = f(V_{CE})$



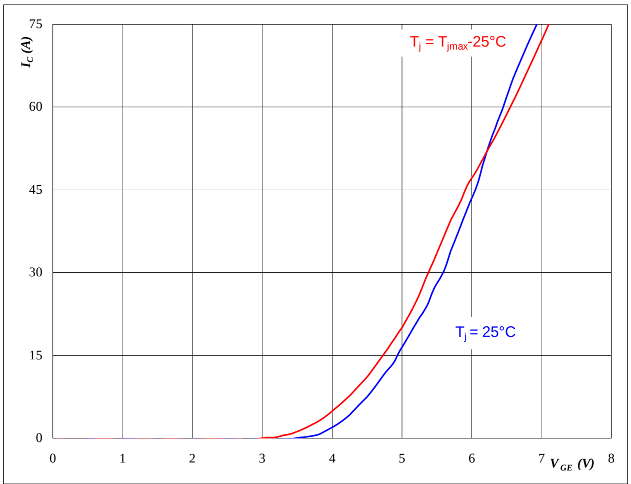
At

t_p =	250	μs
T_j =	126	°C
V_{GE} from	3 V to 19 V in steps of 2 V	

Figure 3	IGBT+MOSFET

Typical transfer characteristics

$I_C = f(V_{GE})$



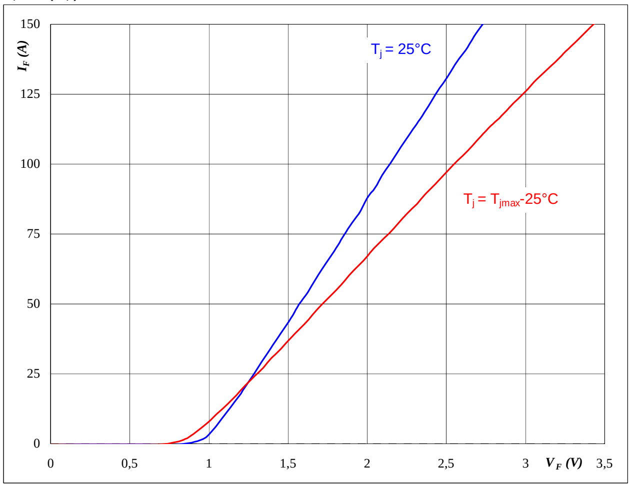
At

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

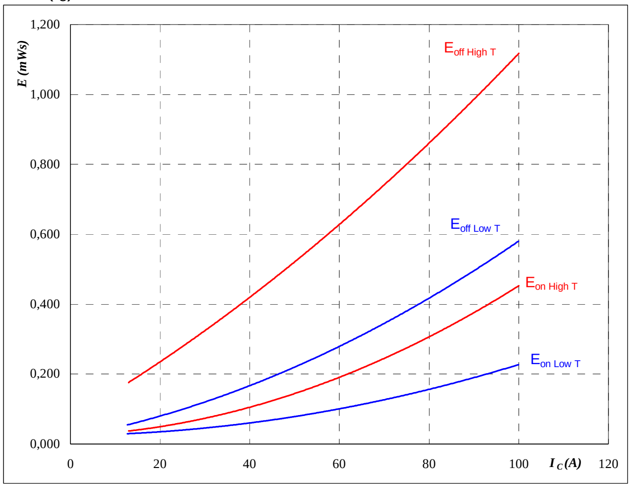
t_p =	250	μs

Input Boost

Figure 5 IGBT+MOSFET

Typical switching energy losses
as a function of collector current

E = f(I_C)



With an inductive load at

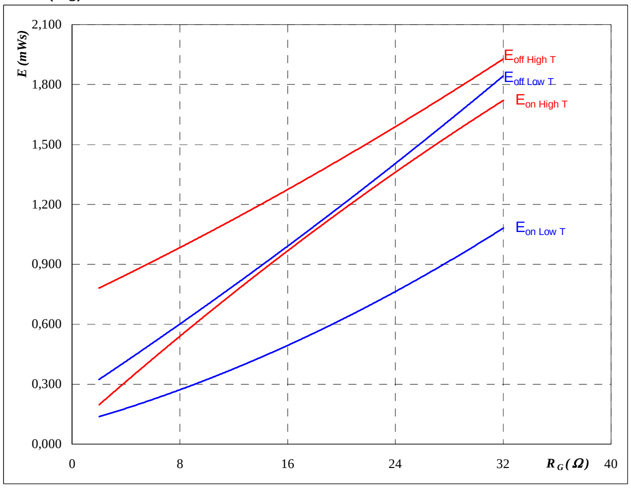
T_j =	25/126	°C
V_{CE} =	350	V
V_{GE} =	15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

MOSFET turn off delayed by 100ns

Figure 6 IGBT+MOSFET

Typical switching energy losses
as a function of gate resistor

E = f(R_G)



With an inductive load at

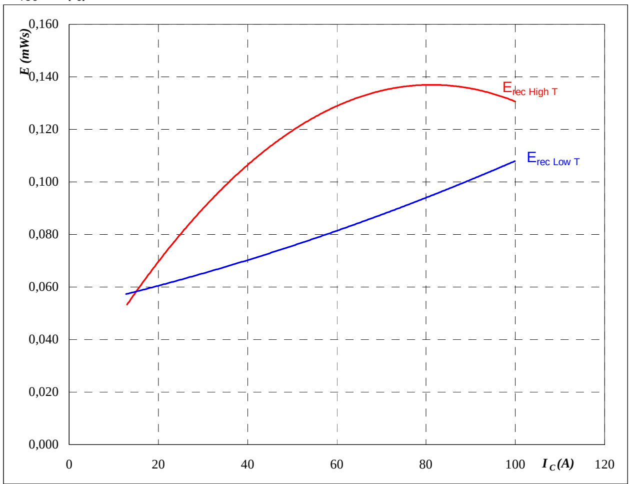
T_j =	25/126	°C
V_{CE} =	350	V
V_{GE} =	15	V
I_C =	78	A

MOSFET turn off delayed by 100ns

Figure 7 FWD

Typical reverse recovery energy loss
as a function of collector current

E_{rec} = f(I_c)



With an inductive load at

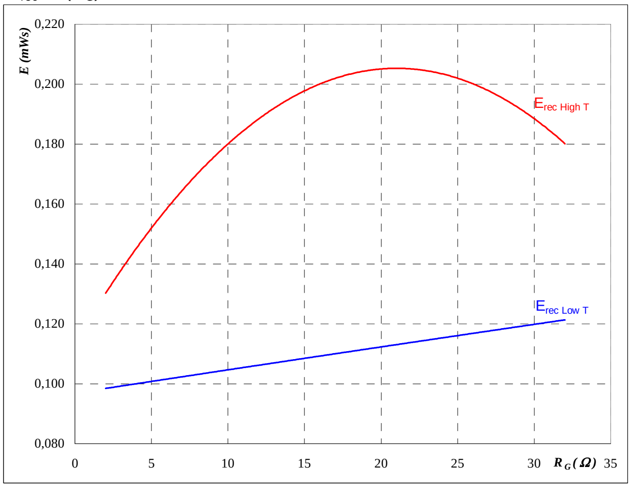
T_j =	25/126	°C
V_{CE} =	350	V
V_{GE} =	15	V
R_{gon} =	4	Ω

MOSFET turn off delayed by 100ns

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 =	25/126	°C
V_{CE} =	350	V
V_{GE} =	15	V
I_C =	78	A

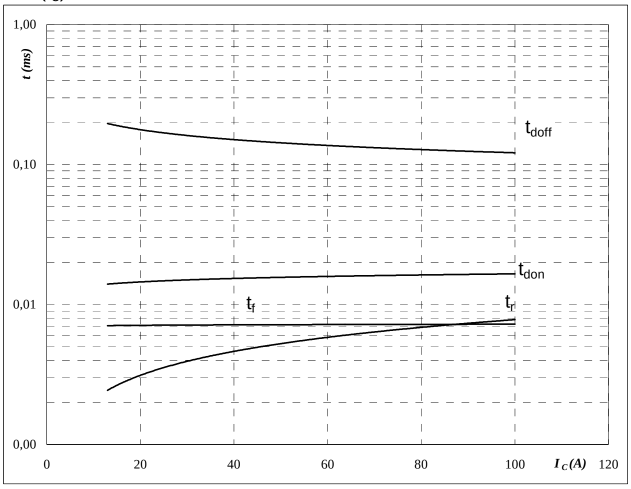
MOSFET turn off delayed by 100ns

Input Boost

Figure 9 IGBT+MOSFET

Typical switching times as a function of collector current

$t = f(I_C)$



With an inductive load at

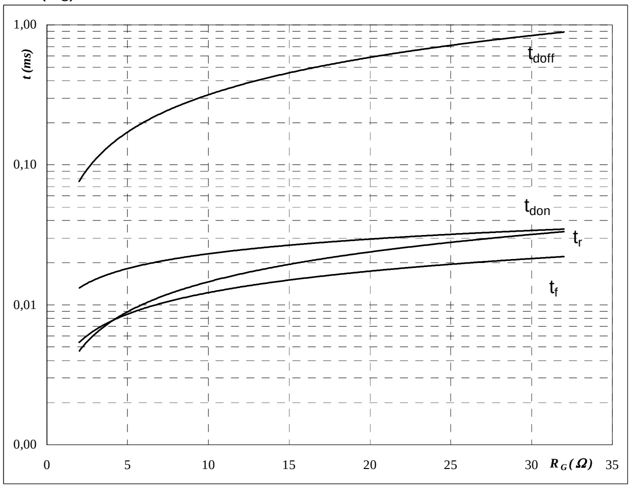
T_j =	126	°C
V_{CE} =	350	V
V_{GE} =	15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

MOSFET turn off delayed by 100ns

Figure 10 IGBT+MOSFET

Typical switching times as a function of gate resistor

$t = f(R_G)$



With an inductive load at

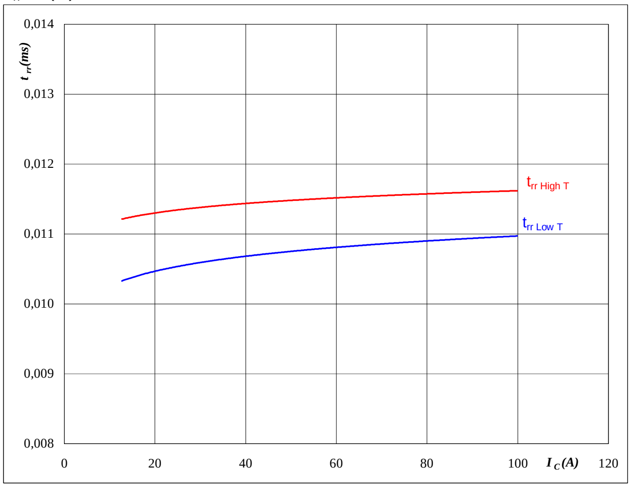
T_j =	126	°C
V_{CE} =	350	V
V_{GE} =	15	V
I_C =	78	A

MOSFET turn off delayed by 100ns

Figure 11 FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(Ic)$



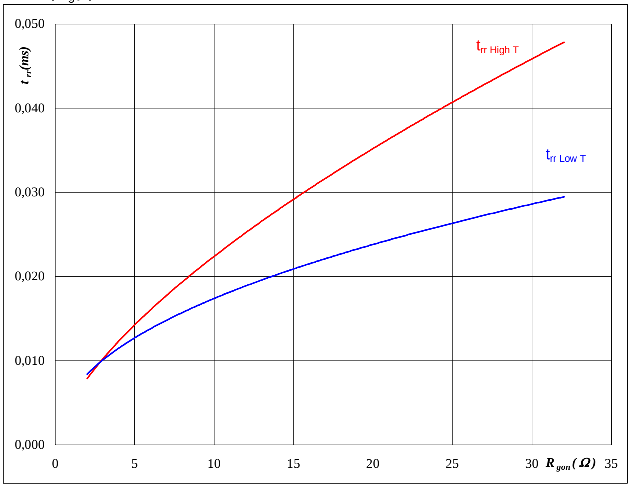
At

T_j =	25/126	°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

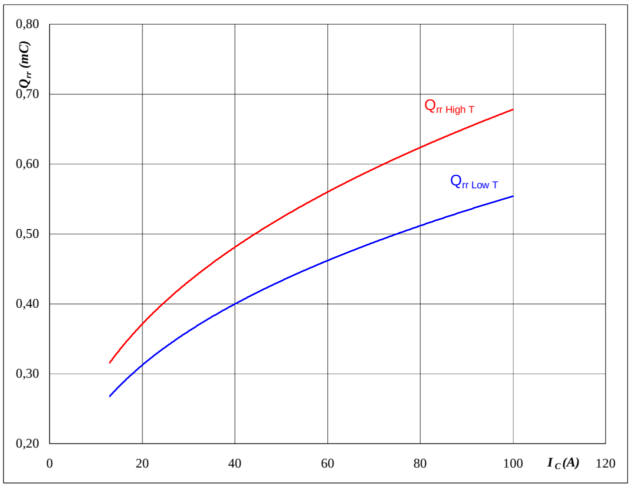
T_j =	25/126	°C
V_R =	350	V
I_F =	78	A
V_{GE} =	15	V

Input Boost

Figure 13 FWD

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



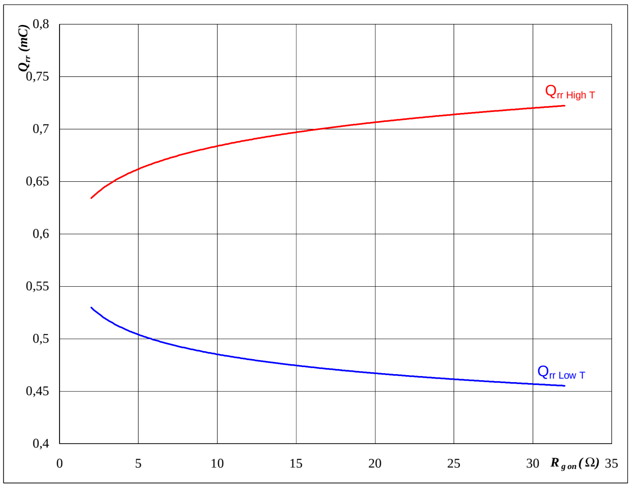
At

T_j =	25/126	°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

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



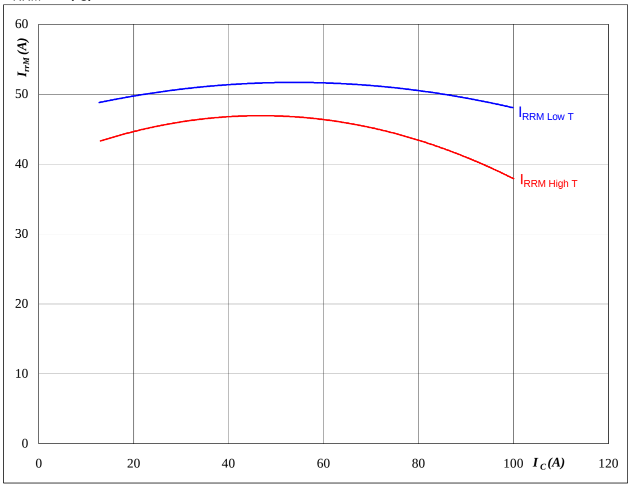
At

T_j =	25/126	°C
V_R =	350	V
I_F =	78	A
V_{GE} =	15	V

Figure 15 FWD

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



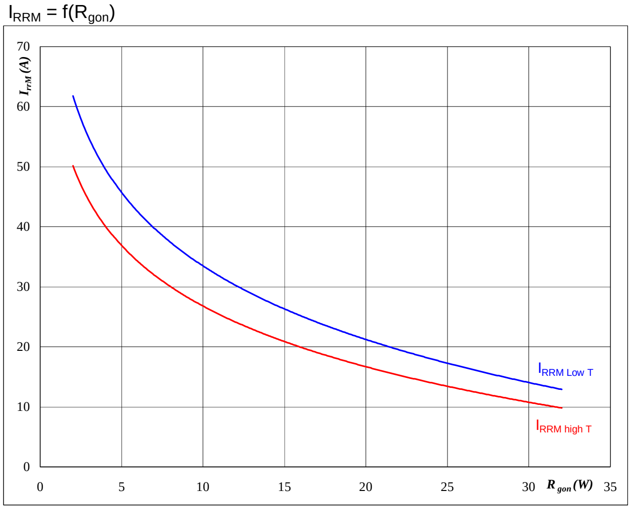
At

T_j =	25/126	°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

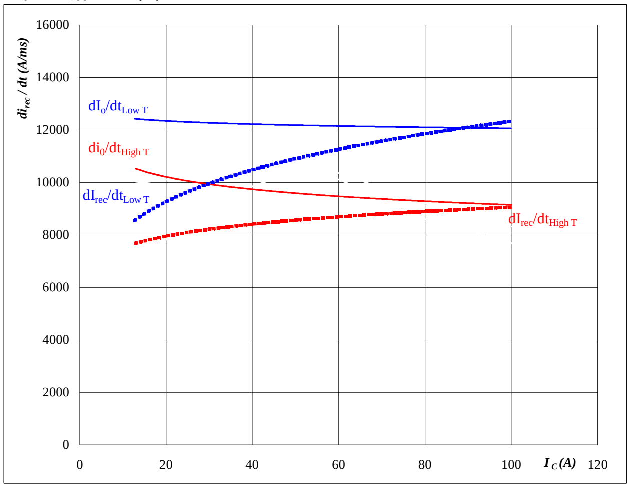
T_j =	25/126	°C
V_R =	350	V
I_F =	78	A
V_{GE} =	15	V

Input Boost

Figure 17 FWD

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

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



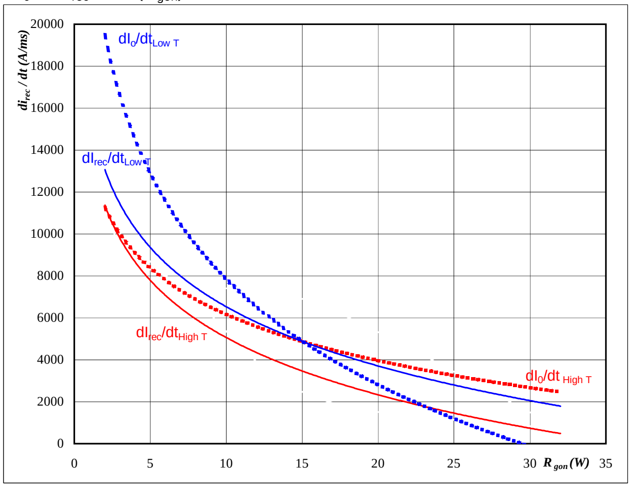
At

T_j =	25/126	°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

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



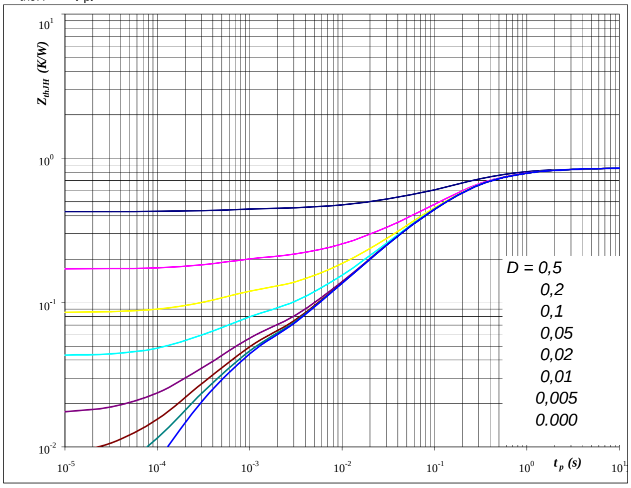
At

T_j =	25/126	°C
V_R =	350	V
I_F =	78	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} =	0,85	K/W

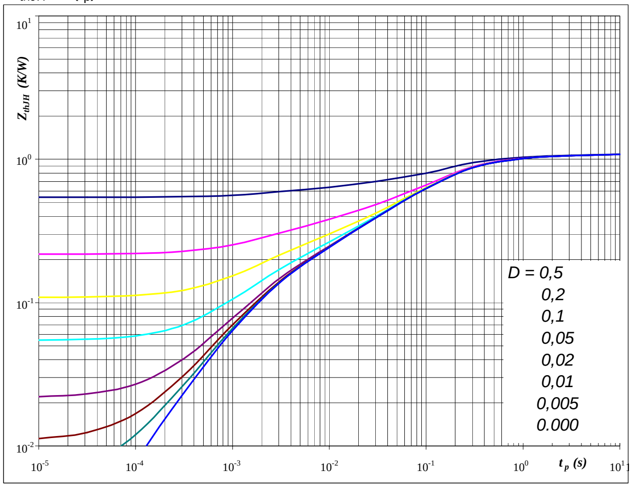
IGBT thermal model values

R (C/W)	Tau (s)
0,10	1,8E+00
0,32	2,8E-01
0,30	8,4E-02
0,09	1,2E-02
0,04	5,0E-04

Figure 20 FWD

FRED transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

D =	t_p / T	
R_{thJH} =	1,09	K/W

FRED thermal model values

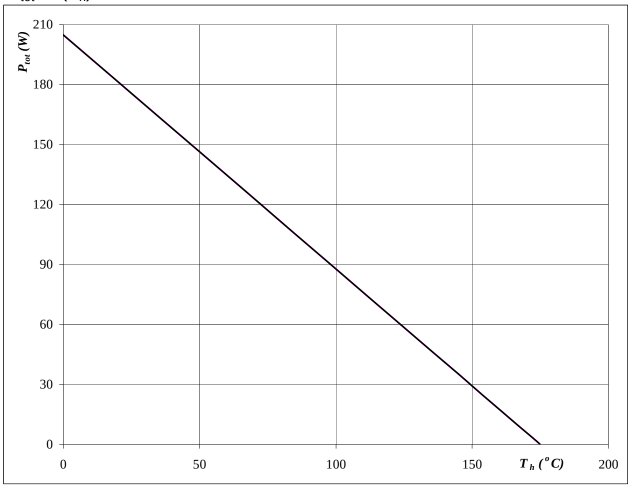
R (C/W)	Tau (s)
0,06	4,1E+00
0,22	5,0E-01
0,55	1,1E-01
0,16	1,1E-02
0,10	1,6E-03

Input Boost

Figure 21 IGBT

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



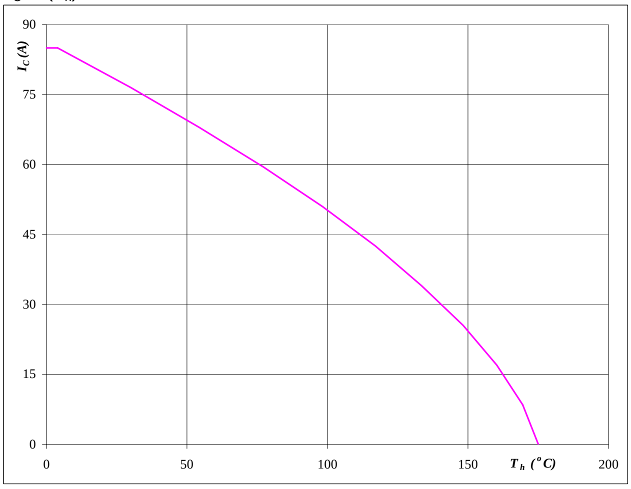
At

T_j = 175 °C

Figure 22 IGBT

Collector current as a function of heatsink temperature

$I_C = f(T_h)$



At

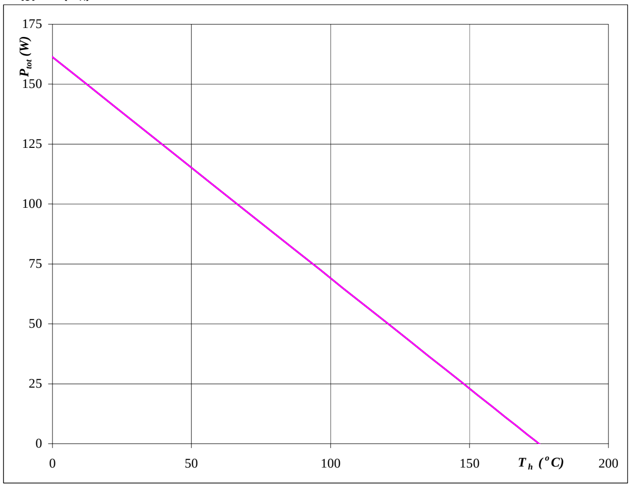
T_j = 175 °C

V_{GE} = 15 V

Figure 23 FWD

Power dissipation as a function of heatsink temperature

$P_{tot} = f(T_h)$



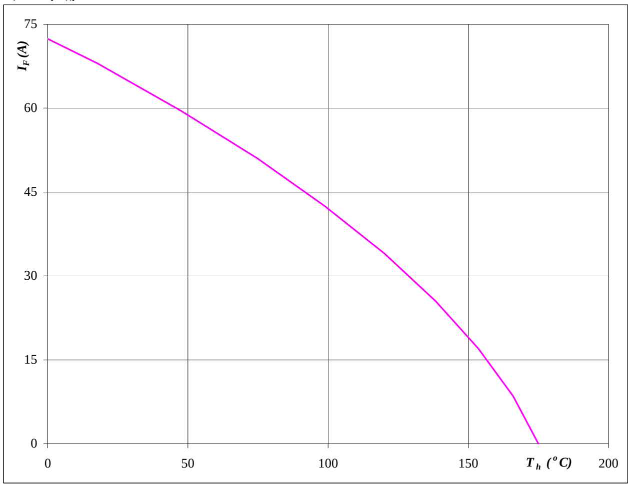
At

T_j = 175 °C

Figure 24 FWD

Forward current as a function of heatsink temperature

$I_F = f(T_h)$



At

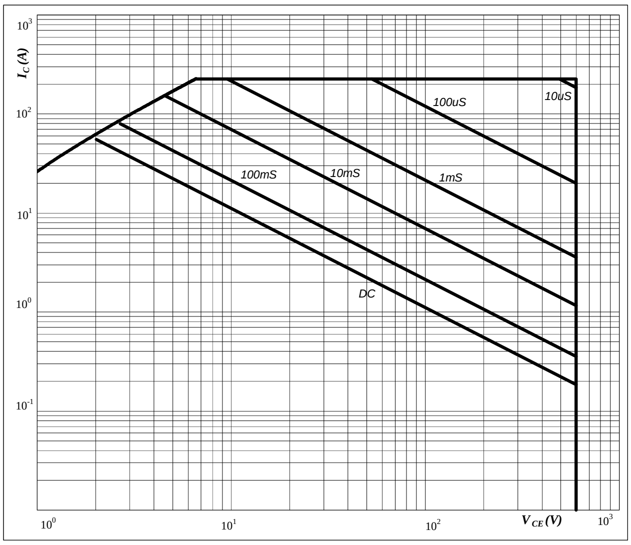
T_j = 175 °C

Input Boost

Figure 25	IGBT

Safe operating area as a function of collector-emitter voltage

$I_C = f(V_{CE})$



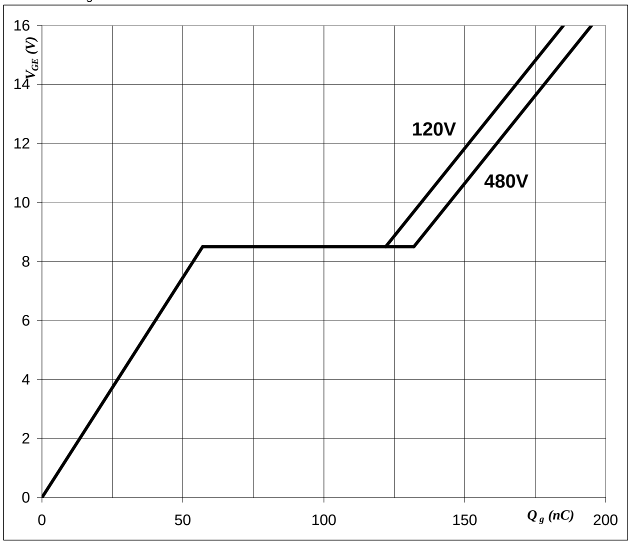
At

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

Figure 26	IGBT

Gate voltage vs Gate charge

$V_{GE} = f(Q_g)$



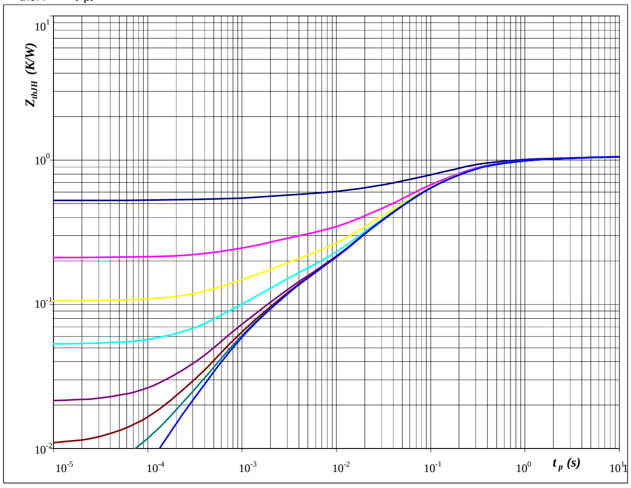
At

$I_{G(REF)}$=1mA, R_L=15Ω

Figure 27	MOSFET

MOSFET transient thermal impedance as a function of pulse width

$Z_{thJH} = f(t_p)$



At

D =	t_p / T	
R_{thJH} =	1,05	K/W

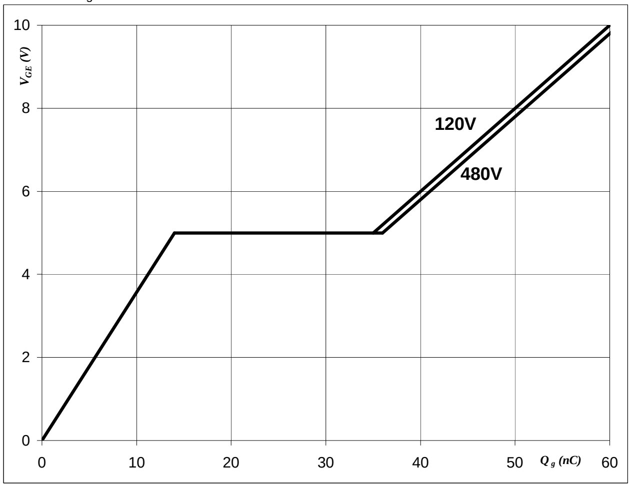
MOSFET thermal model values

R (C/W)	Tau (s)
0,06	3,4E+00
0,23	4,0E-01
0,53	8,8E-02
0,15	1,5E-02
0,08	1,3E-03
0,05	4,7E-04

Figure 28	MOSFET

Gate voltage vs Gate charge

$V_{GE} = f(Q_g)$



At

I_C =	18	A

Thermistor

Figure 1	Thermistor

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

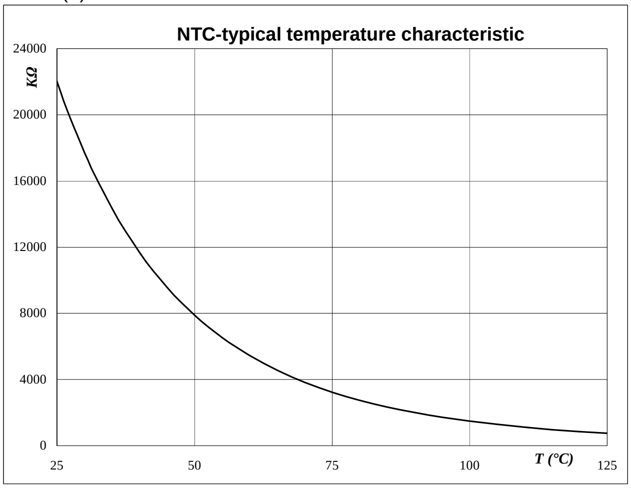


Figure 2	Thermistor

Typical NTC resistance values

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

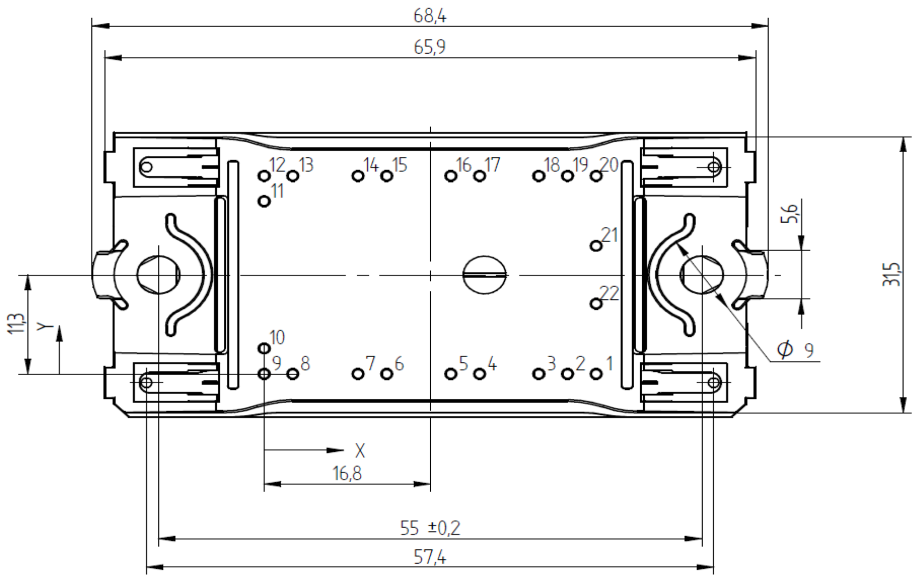
Ordering Code and Marking - Outline - Pinout

Ordering Code & Marking

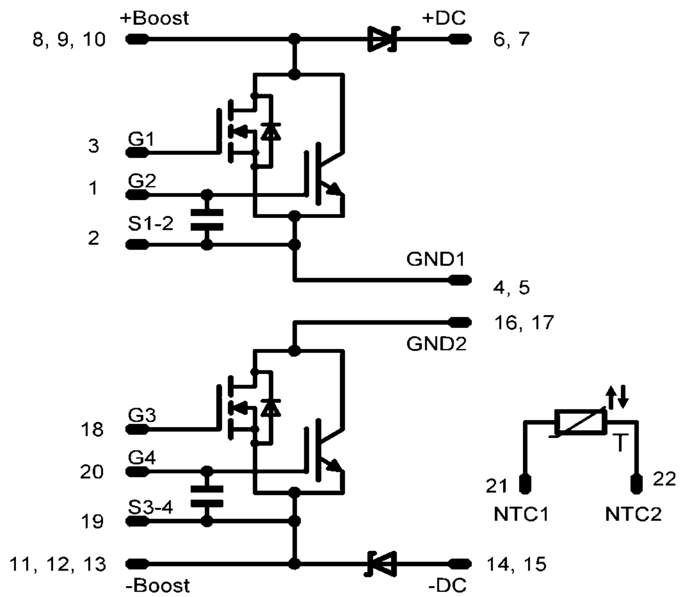
Version	Ordering Code	in DataMatrix as	in packaging barcode as
without thermal paste 12mm housing	10-FZ06NBA084FP-M306L48	M306L48	M306L48

Outline

Pin table		
Pin	X	Y
1	33,6	0
2	30,7	0
3	27,8	0
4	21,8	0
5	18,9	0
6	12,4	0
7	9,5	0
8	2,9	0
9	0	0
10	0	2,9
11	0	19,7
12	0	22,6
13	2,9	22,6
14	9,5	22,6
15	12,4	22,6
16	18,9	22,6
17	21,8	22,6
18	27,8	22,6
19	30,7	22,6
20	33,6	22,6
21	33,6	14,6
22	33,6	8



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.