Vincotech

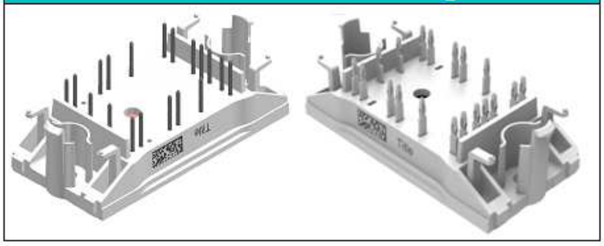
10-P012NME080SH-M910F09Y
10-F012NME080SH-M910F09
datasheet

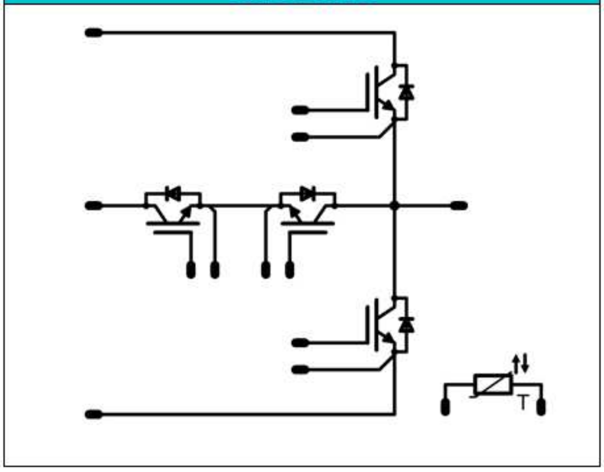
flow MNPC 0 — 1200 V / 80 A

Features
- Mixed voltage component topology
- Neutral point clamped inverter
- Pin compatibility to P96x NPC family
- LVRT and reactive power capability

Target applications
- Solar inverter
- UPS

Types
- 10-F012NME080SH-M910F09
- 10-P012NME080SH-M910F09Y

flow 0 17mm housing


Schematic


Buck switch maximum ratings

T_j=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Collector-emitter break down voltage	V_{CES}			1200	V
DC collector current	I_C	T_j=$T_j$max	T_h=80°C	71	A
Pulsed collector current	I_{Cpulse}	t_p limited by $T_j$max		240	A
Turn off safe operating area		Tj≤ 150°C, VCE≤ 1200V		160	A
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C	168	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	Tj≤ 150°C VGE= 15V		10 800	µs V
Maximum Junction Temperature	$T_j$max			175	°C

Tj=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Boost switch					
Collector-emitter break down voltage	V_{CES}			600	V
DC collector current	I_C	T_j=$T_j$max	T_h=80°C	59	A
Pulsed collector current	I_{Cpulse}	t_p limited by $T_j$max		225	A
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C	87	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	Tj≤ 150°C VGE= 15V		6 360	μs V
Maximum Junction Temperature	$T_j$max			175	°C

Tj=25°C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Boost diode					
Peak Repetitive Reverse Voltage	V_{RRM}			1200	V
DC forward current	I_F	T_j=$T_j$max	T_h=80°C	32	A
Non-repetitive peak surge current	I_{FSM}	60Hz Single Half Sine Wave		170	A
I^2t value	I^2t	tp=10ms 50Hz sine	Tj=150°C	145	A^2s
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C	73	W
Maximum Junction Temperature	$T_j$max			175	°C

Tj=25°C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Buck diode					
Peak Repetitive Reverse Voltage	V_{RRM}			600	V
DC forward current	I_F	T_j=$T_j$max	T_h=80°C	51	A
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C	67	W
Maximum Junction Temperature	$T_j$max			175	°C

Module Properties

Parameter	Symbol	Conditions		Value	Unit
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{op}			-40…+(Tjmax - 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	

Buck switch Characteristic values

Tj=25°C, unless otherwise specified

Parameter	Symbol	Conditions	V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	Unit
Static										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$			0,003	25 125	5,2	5,8	6,4	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		80	25 125 150	1,7	1,99 2,33 2,41	2,4	V
Collector-emitter cut-off	I_{CES}		0	1200		25 125			10	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			240	nA
Integrated Gate resistor	R_{gint}							none		Ω
Input capacitance	C_{ies}	f=1MHz	0	25		25		4600		pF
Output capacitance	C_{oss}							260		
Reverse transfer capacitance	C_{rss}							220		
Gate charge	Q_{Gate}		15	960	80	25		406		nC
Thermal										
Thermal resistance chip to heatsink per chip	R_{thJH}	Phase-Change Material						0,56		K/W

Buck switch Dynamic 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	
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	Rgoff=4Ω Rgon=4Ω	30	700	56	25 125		78 79		ns
Rise time	t_r					25 125		13 15		
Turn-off delay time	$t_{d(off)}$					25 125		170 221		
Fall time	t_f					25 125		43 68		
Turn-on energy loss per pulse	E_{on}	QrrFWD=1uC QrrFWD=2,7uC				25 125		0,473 0,972		mWs
Turn-off energy loss per pulse	E_{off}					25 125		1,285 2,172		
FWD Switching										
Peak recovery current	I_{RRM}	4710 4651	±15	700	56	25 125		64 83		A
Reverse recovery time	t_{rr}	4710 4651				25 125		29 73		ns
Reverse recovery charge	Q_{rr}	4710 4651				25 125		1,008 2,742		μC
Reverse recovered energy	E_{rec}	4710 4651				25 125		0,172 0,521		mWs
Peak rate of fall of recovery current	di(rec)max /dt	4710 4651				25 125		9597 3522		A/μs

Boost switch Characteristic values

Tj=25°C, unless otherwise specified

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j[°C]	Min	Typ	Max	
Static										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$			0,0012	25 125	5	5,8	6,5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		75	25 125 150	1,05	1,45 1,59 1,64	1,85	V
Collector-emitter cut-off	I_{CES}		0	600		25 125			3,8	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			600	nA
Integrated Gate resistor	R_{gint}							none		Ω
Input capacitance	C_{ies}	f=1 MHz	0	25		25		4620		pF
Output capacitance	C_{oss}	f=1 MHz	0	25		25		288		pF
Reverse transfer capacitance	C_{rss}	f=1 MHz	0	25		25		137		pF
Gate charge	Q_{Gate}		15	480	75	25		470		nC
Thermal										
Thermal resistance chip to heatsink per chip	R_{thJH}	Phase-Change Material						1,09		K/W

Boost switch Dynamic 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	
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	Rgoff=4Ω Rgon=4Ω	30	350	56	25 125 150		85 85 87		ns
Rise time	t_r					25 125 150		6 6 13		
Turn-off delay time	$t_{d(off)}$					25 125 150		227 269 206		
Fall time	t_f					25 125 150		84 89 96		
Turn-on energy loss per pulse	E_{on}	QrrFWD=1,7uC QrrFWD=4,1uC				25 125 150		0,252 0,358 0,750		mWs
Turn-off energy loss per pulse	E_{off}					25 125 150		0,965 1,248 2,464		
FWD Switching										
Peak recovery current	I_{RRM}	1933 2310	±15	350	56	25 125 150		62 72 105		A
Reverse recovery time	t_{rr}	1933 2310				25 125 150		30 90 99		ns
Reverse recovery charge	Q_{rr}	1933 2310				25 125 150		1,702 4,146 6,869		µC
Reverse recovered energy	E_{rec}	1933 2310				25 125 150		0,428 1,197 1,964		mWs
Peak rate of fall of recovery current	di(rec)max /dt	1933 2310				25 125 150		4940 4322 5963		A/µs

Boost diode Characteristic values

Parameter	Symbol	Conditions					Value			Unit
		dI_F/dt [A/us]		V_r [V]	I_F [A]	T_j	Min	Typ	Max	
Static										
Forward voltage	V_F				35	25°C 125°C 150°C		2,27 2,39 2,29	2,62	V
Reverse leakage current	I_{rm}			1200		25°C 150°C			60 -	µA
Thermal										
Thermal resistance chip to heatsink per chip	R_{thJH}	Phase-Change Material						1,30		K/W

Buck diode Characteristic values

Parameter	Symbol	Conditions					Value			Unit
		dI_F/dt [A/us]		V_r [V]	I_F [A]	T_j	Min	Typ	Max	
Static										
Forward voltage	V_F				60	25°C 125°C 150°C		2,27 1,68 1,58	2,8	V
Reverse leakage current	I_{rm}			600		25°C 150°C			10 -	µA
Thermal										
Thermal resistance chip to heatsink per chip	R_{thJH}	Phase-Change Material						1,42		K/W

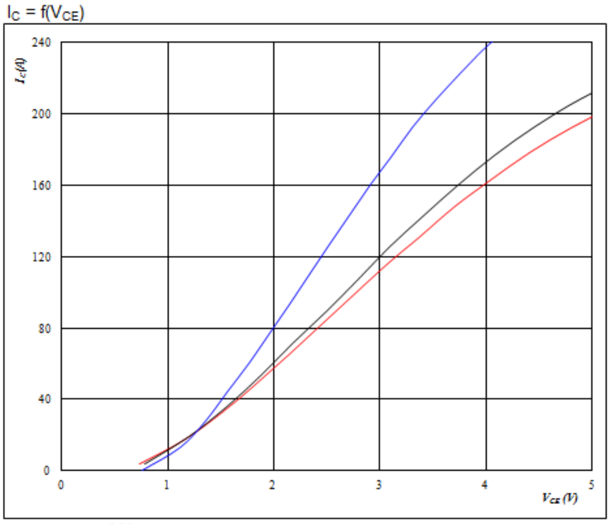
Thermistor

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j[°C]	Min	Typ	Max	
Rated resistance	R					25		21,5		kΩ
Deviation of R100	$\Delta_{R/R}$	R100=1486 Ω				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	$B_{(25/100)}$					25		3964		K
Vincotech NTC Reference									F	

Buck switch Characteristics

Typical output characteristics IGBT

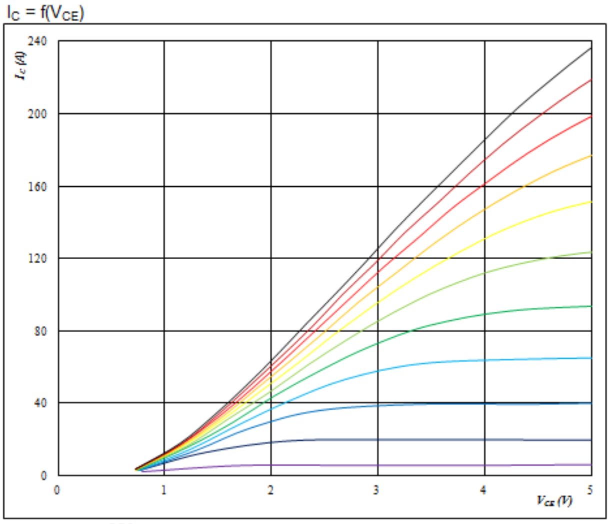
$I_C = f(V_{CE})$



t_p = 250 µs
T_j = 25/125/150 °C
V_{GE}= 15 V

Typical output characteristics IGBT

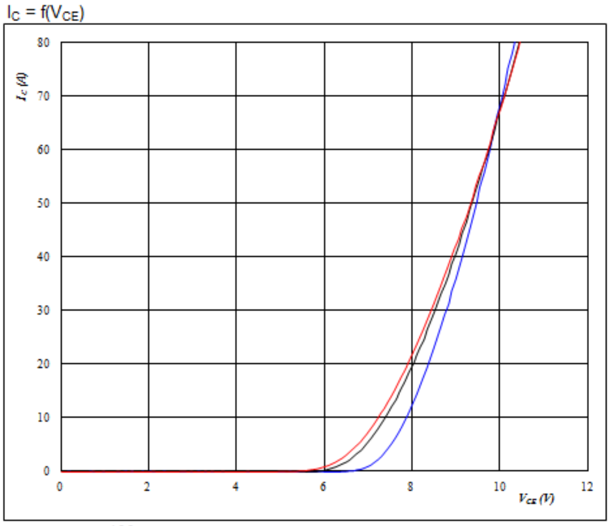
$I_C = f(V_{CE})$



t_p = 250 µs
T_j = 150oC °C
V_{GE} from 7 V to 17 V in steps of 1 V

Typical transfer characteristics IGBT

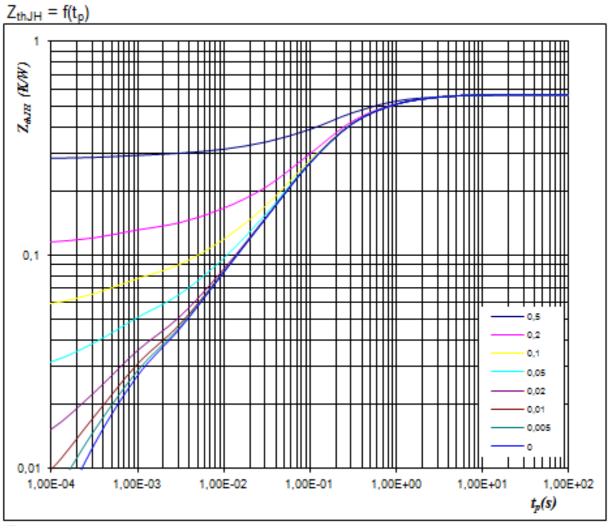
$I_C = f(V_{CE})$



t_p = 100 µs
V_{CE} = 10 V
T_j = 25/125/150 °C

Transient thermal impedance as a function of pulse width IGBT

$Z_{thJH} = f(t_p)$



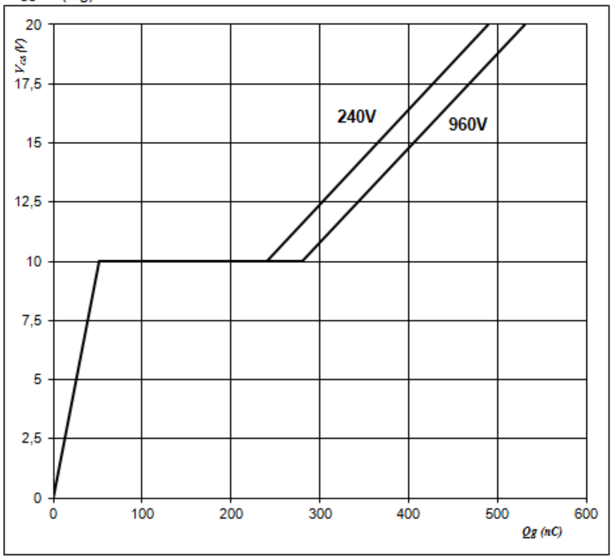
D = t_p / T
R_{thJH} = 0,56 K/W

R (K/W)	Tau (s)
9,27E-02	1,60E+00
2,57E-01	2,45E-01
1,50E-01	7,05E-02
4,28E-02	8,23E-03
2,21E-02	4,97E-04

Buck switch Characteristics

Gate voltage vs Gate charge IGBT

$V_{GS} = f(Qg)$

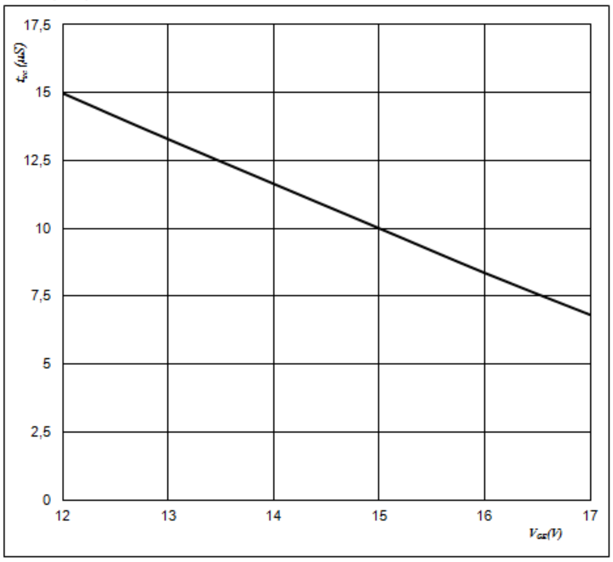


At

I_C=	80	A

Short circuit withstand time as a function of Vge IGBT

$t_{sc} = f(V_{GE})$

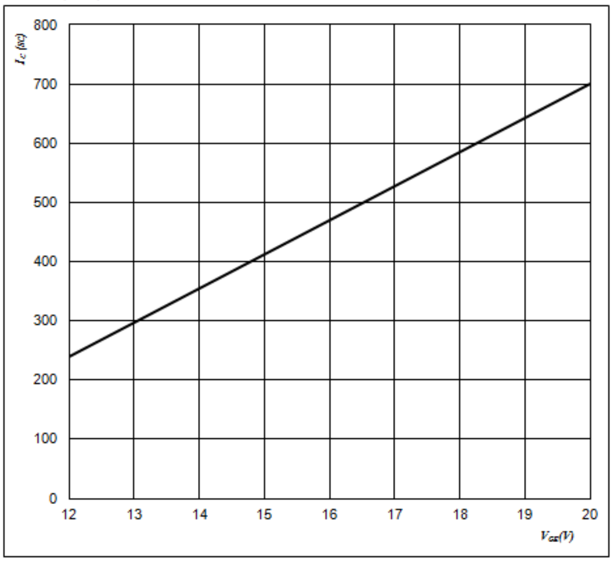


At

V_{CE} =	1200	V
T_j ≤	175	ºC

Typical short circuit collector current as a function of Vge IGBT

$V_{GE} = f(Q_{GE})$



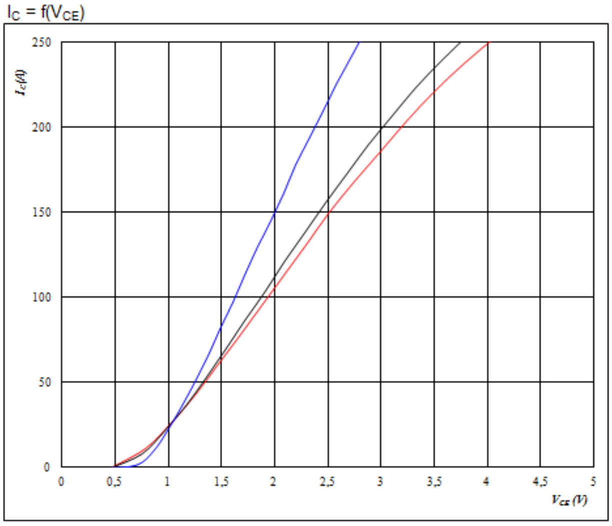
At

V_{CE} ≤	1200	V
T_j =	175	ºC

Boost switch Characteristics

Typical output characteristics IGBT

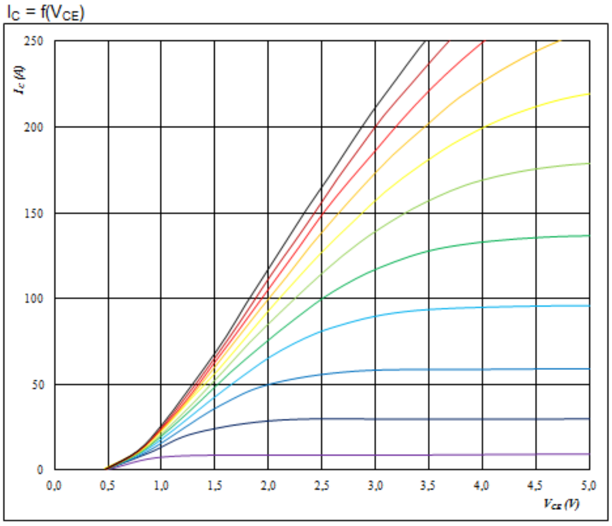
$I_C = f(V_{CE})$



t_p =	250	μs
T_j =	25/125/150	°C
V_{GE}=	15	V

Typical output characteristics IGBT

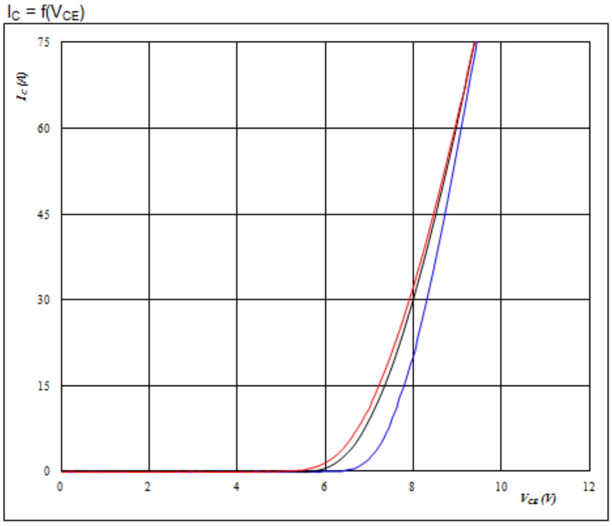
$I_C = f(V_{CE})$



t_p =	250	μs
T_j =	150oC	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

Typical transfer characteristics IGBT

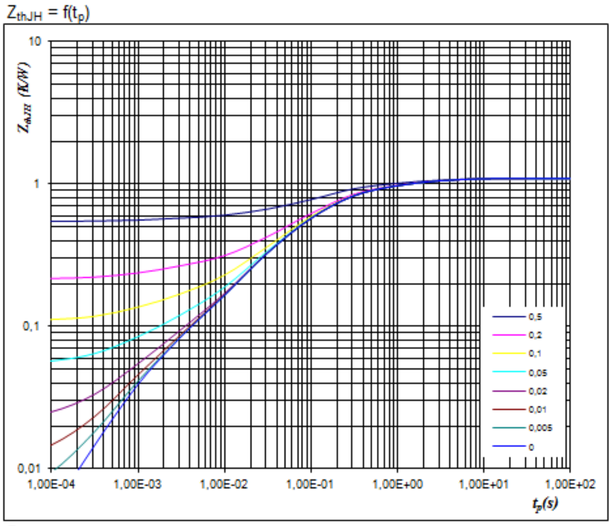
$I_C = f(V_{CE})$



t_p =	100	μs
V_{CE} =	10	V
T_j =	25/125/150	°C

Transient thermal impedance as a function of pulse width IGBT

$Z_{thJH} = f(t_p)$



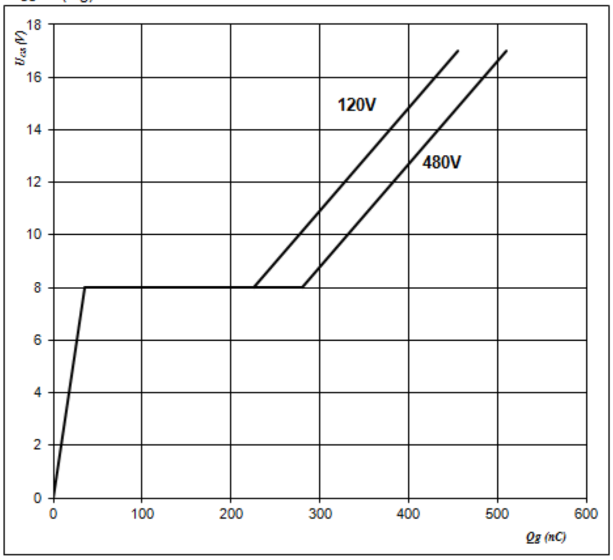
D =	t_p / T	
R_{thJH} =	1,09	K/W

R (K/W)	Tau(s)
9,42E-02	3,68E+00
2,52E-01	6,16E-01
5,35E-01	1,09E-01
1,62E-01	1,90E-02
4,63E-02	1,27E-03

Boost switch Characteristics

Gate voltage vs Gate charge IGBT

$V_{GS} = f(Qg)$

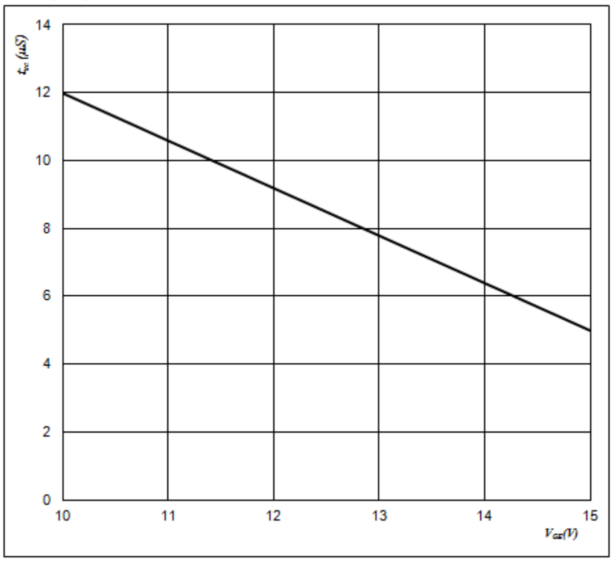


At

I_C=	75	A

Short circuit withstand time as a function of Vge IGBT

$t_{sc} = f(V_{GE})$

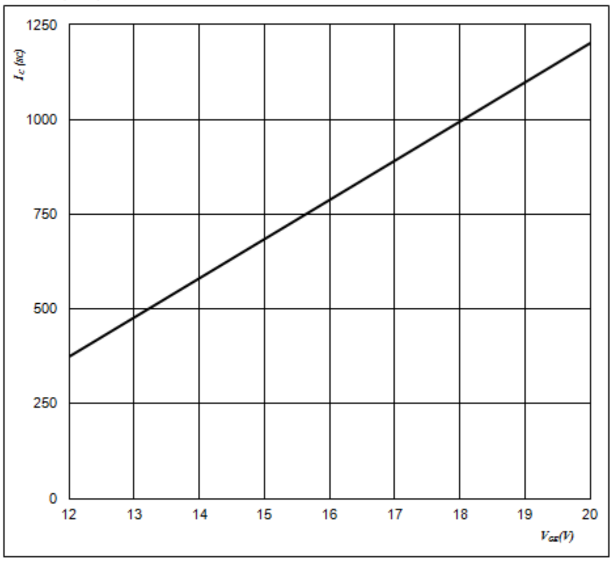


At

V_{CE} =	600	V
T_j ≤	175	ºC

Typical short circuit collector current as a function of Vge IGBT

$V_{GE} = f(Q_{GE})$



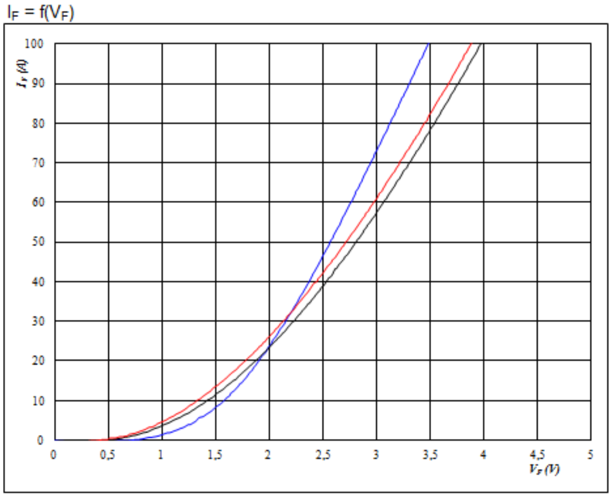
At

V_{CE} ≤	600	V
T_j =	175	ºC

Boost diode Characteristics

Typical forward characteristics FWD

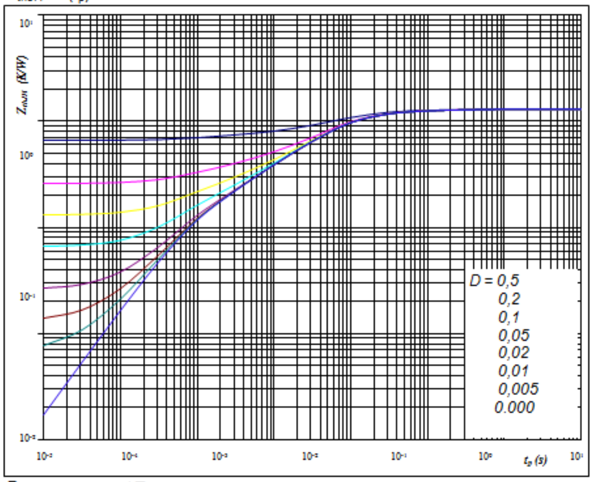
$I_F = f(V_F)$



t_p = 250 μs
Tj= 25, 125, 150 °C

Transient thermal impedance as a function of pulse width FWD

$Z_{thJH} = f(t_p)$



D = t_p / T
R_{thJH} = 1,30 K/W

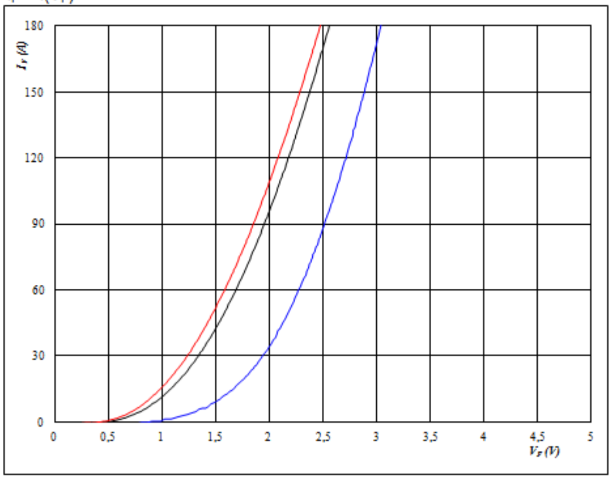
FWD thermal model values

R (K/W)	Tau (s)
6,45E-02	2,71E+00
2,18E-01	2,75E-01
6,86E-01	5,73E-02
2,18E-01	8,34E-03
1,17E-01	8,86E-04
4,74E-02	1,65E-03

Buck diode Characteristics

Typical forward characteristics FWD

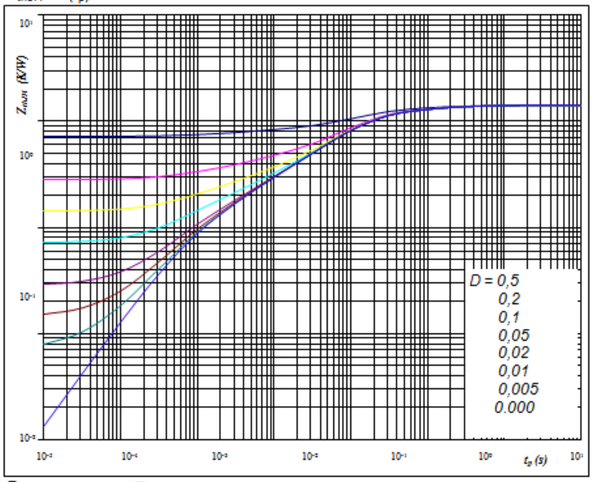
$I_F = f(V_F)$



t_p = 250 μs
Tj= 25, 125, 150 °C

Transient thermal impedance as a function of pulse width FWD

$Z_{thJH} = f(t_p)$



D = t_p / T
R_{thJH} = 1,42 K/W

FWD thermal model values

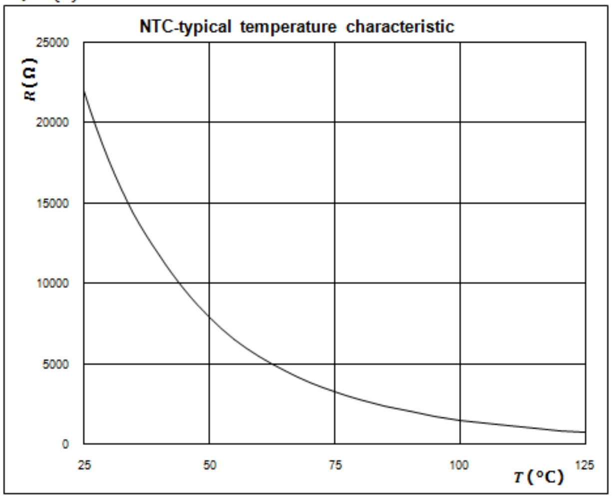
R (K/W)	Tau (s)
6,64E-02	5,93E+00
1,99E-01	9,52E-01
6,62E-01	1,48E-01
3,00E-01	3,82E-02
1,32E-01	4,28E-03
6,21E-02	6,82E-04

Thermistor

Thermistor typical temperature characteristic

Typical NTC characteristic
as a function of temperature

$R_T = f(T)$

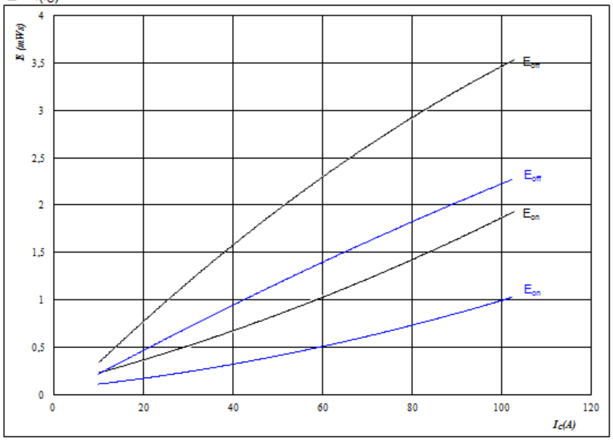


Buck Switching Definitions

Figure 1. IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$



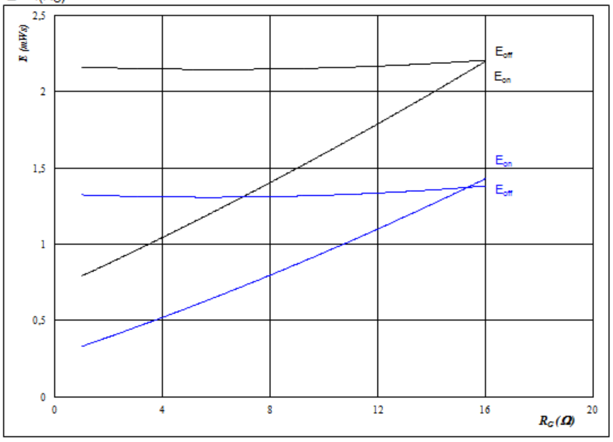
With an inductive load at

T_j =	25/125/150	°C	R_{gon} =	4	Ω
V_{CE} =	700	V	R_{goff} =	4	Ω
V_{GE} =	±15	V			

Figure 2. IGBT

Typical switching energy losses as a function of gate resistor

$E = f(R_G)$



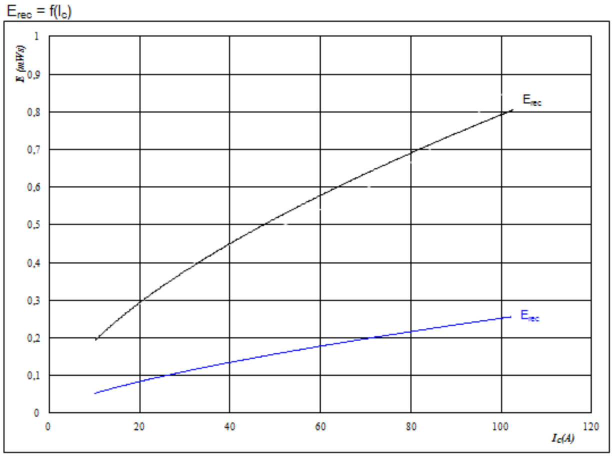
With an inductive load at

T_j =	25/125/150	°C	V_{GE} =	±15	V
V_{CE} =	700	V	I_C =	56	A

Figure 3. FWD

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

$E_{rec} = f(I_c)$



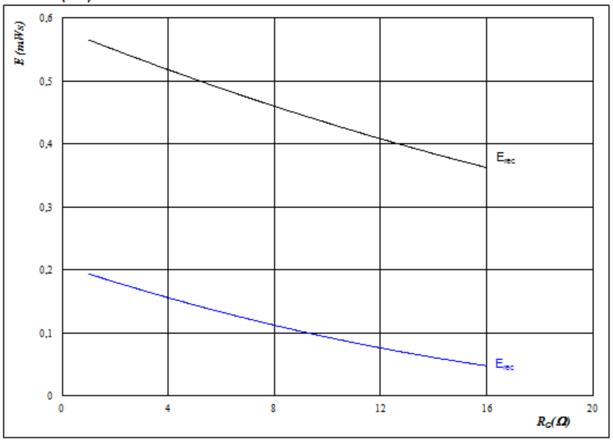
With an inductive load at

T_j =	25/125/150	°C	R_{gon} =	4	Ω
V_{CE} =	700	V	R_{goff} =	4	Ω
V_{GE} =	±15	V			

Figure 4. FWD

Typical reverse recovery energy loss as a function of gate resistor

Erec = f(RG)



With an inductive load at

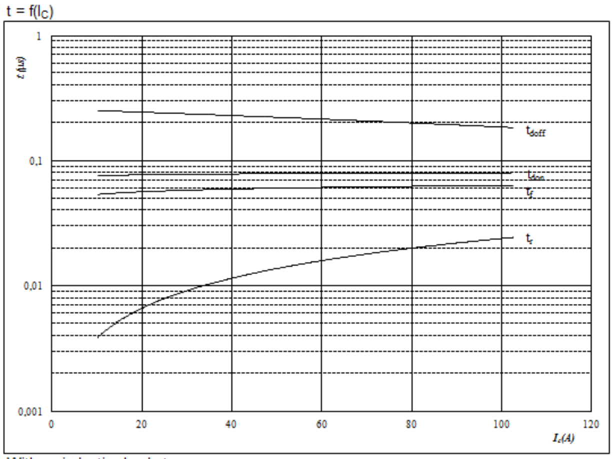
T_j =	25/125/150	°C	V_{GE} =	±15	V
V_{CE} =	700	V	I_C =	56	A

Buck Switching Definitions

Figure 5. IGBT

Typical switching times as a function of collector current

$t = f(I_C)$



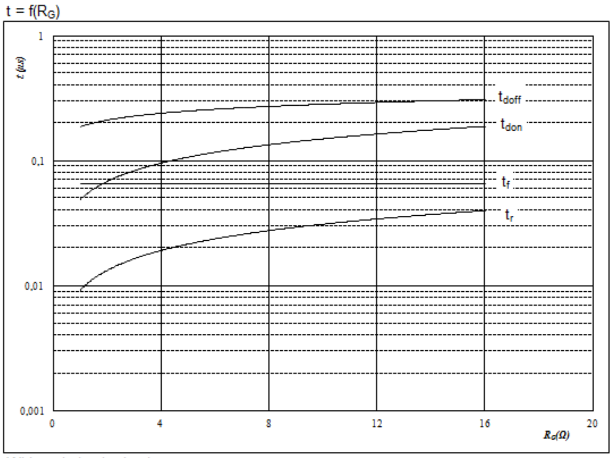
With an inductive load at

T_j =	125	°C
V_{CE} =	700	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

Figure 6. IGBT

Typical switching times as a function of gate resistor

$t = f(R_G)$



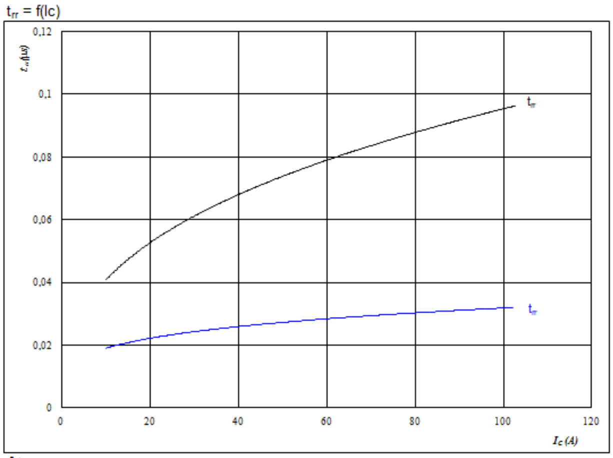
With an inductive load at

T_j =	125	°C
V_{CE} =	700	V
V_{GE} =	±15	V
I_C =	56	A

Figure 7. FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



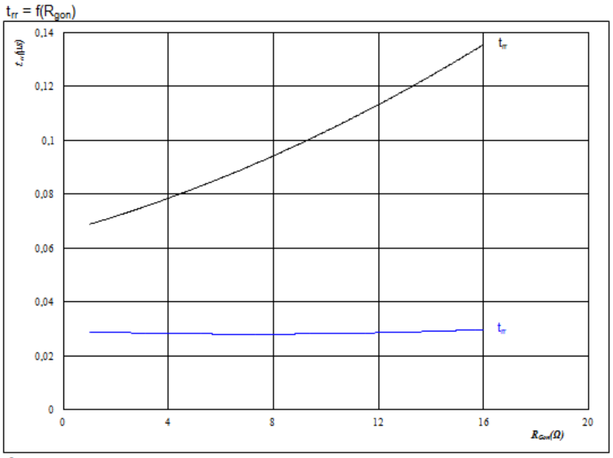
At

T_j =	25/125/150	°C
V_{CE} =	700	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

Figure 8. FWD

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

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



At

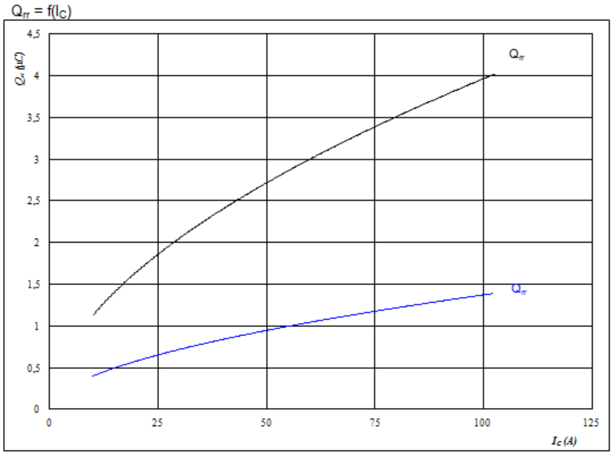
T_j =	25/125/150	°C
V_R =	700	V
I_F =	56	A
V_{GE} =	±15	V

Buck Switching Definitions

Figure 9. FWD

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



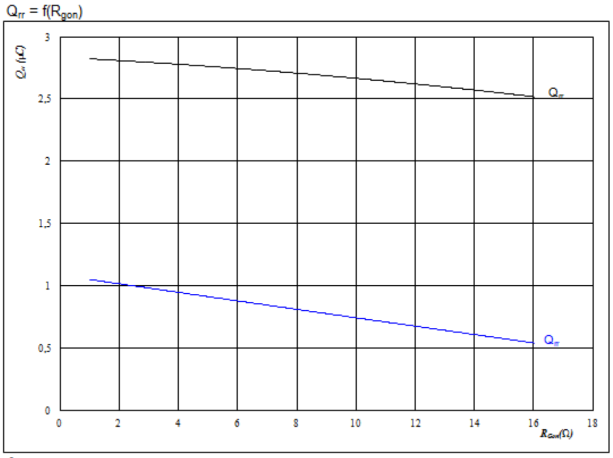
At

T_j =	25/125/150	°C
V_{CE} =	700	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

Figure 10. FWD

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

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



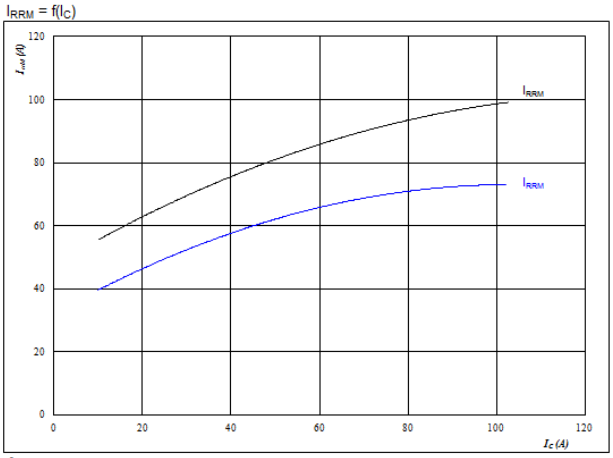
At

T_j =	25/125/150	°C
V_R =	700	V
I_F =	56	A
V_{GE} =	±15	V

Figure 11. FWD

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



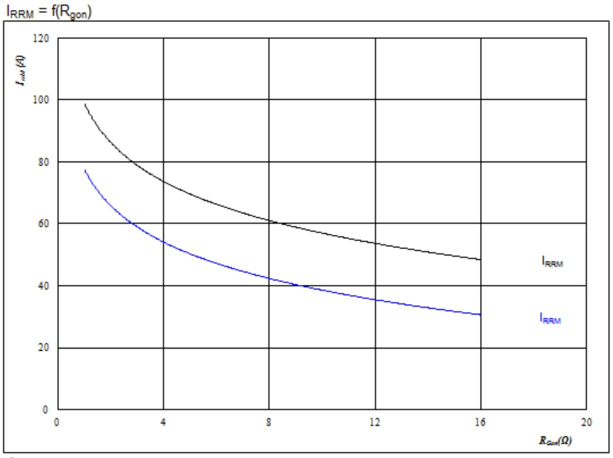
At

T_j =	25/125/150	°C	R_{gon} =	4	Ω
V_{CE} =	700	V			
V_{GE} =	±15	V			

Figure 12. FWD

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

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



At

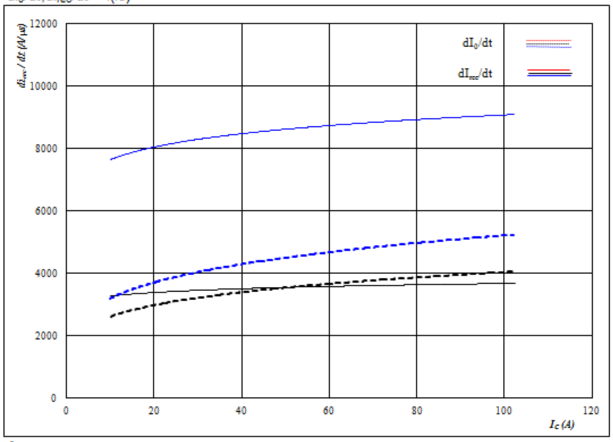
T_j =	25/125/150	°C	V_{GE} =	±15	V
V_R =	700	V			
I_F =	56	A			

Buck Switching Definitions

Figure 13. FWD

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

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

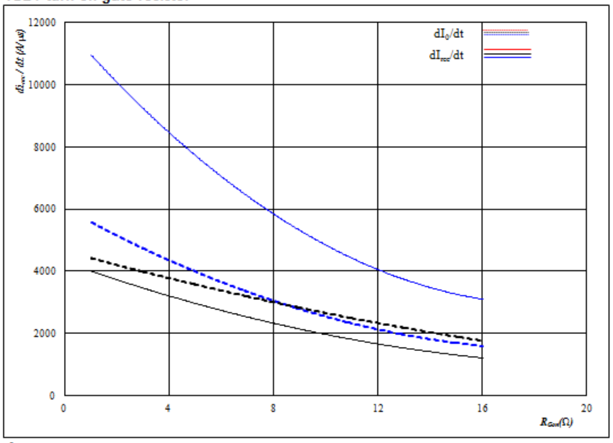


At

T_j =	25/125/150	°C
V_{CE} =	700	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

Figure 14. FWD

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



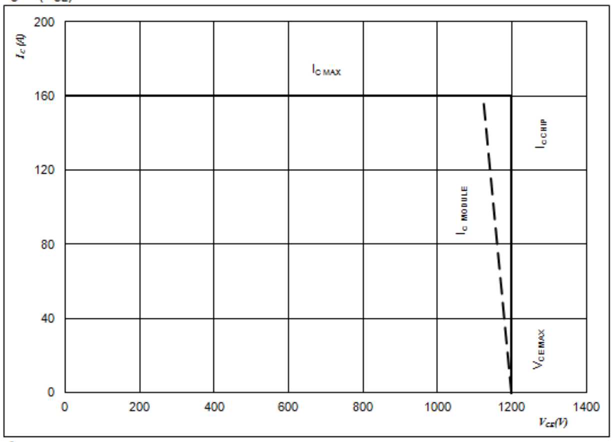
At

T_j =	25/125/150	°C
V_R =	700	V
I_F =	56	A
V_{GE} =	±15	V

Figure 15. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

T_j =	175	°C
Rgon =	4	Ω
Rgoff =	4	Ω

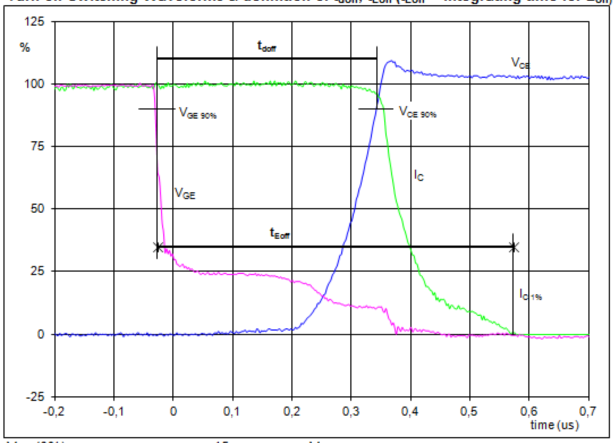
Buck Switching Definitions

General conditions

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

Figure 1. IGBT

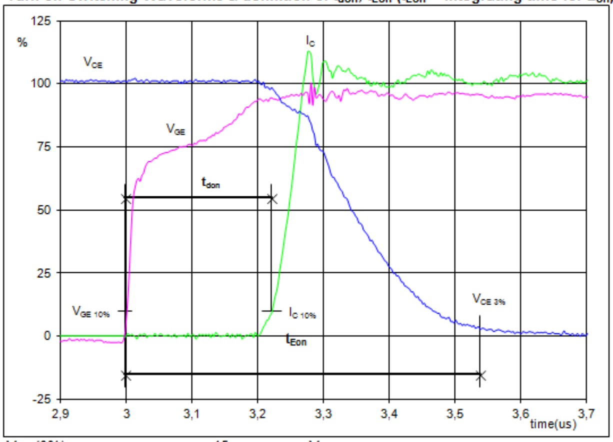
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	600	V
I_C (100%) =	100	A
t_{doff} =	0,372	µs
t_{Eoff} =	0,601	µs

Figure 2. IGBT

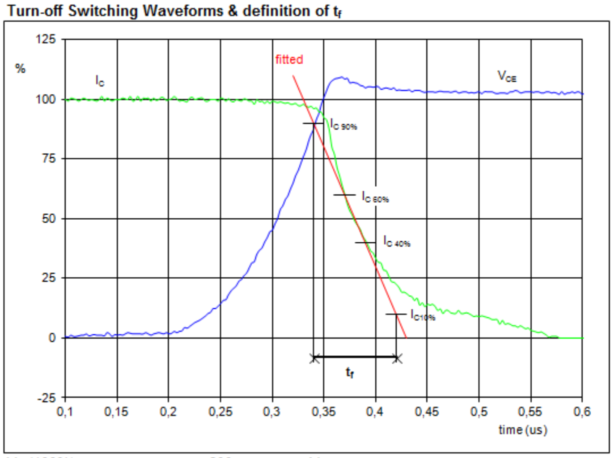
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	600	V
I_C (100%) =	100	A
t_{don} =	0,221	µs
t_{Eon} =	0,540	µs

Figure 3. IGBT

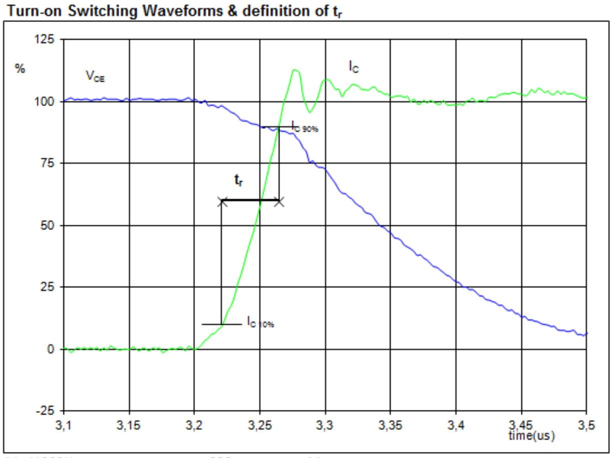
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	600	V
I_C (100%) =	100	A
t_f =	0,087	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r

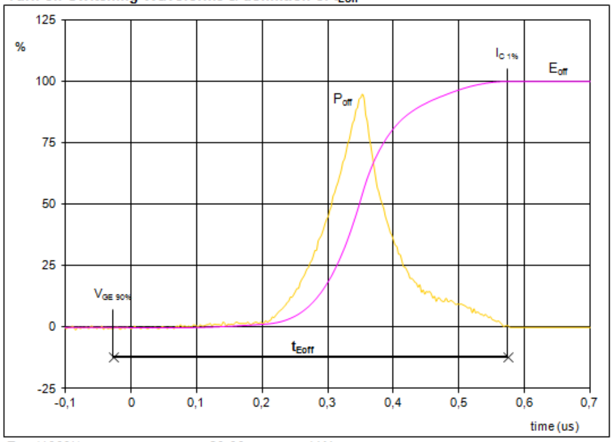


V_C (100%) =	600	V
I_C (100%) =	100	A
t_r =	0,044	µs

Buck Switching Definitions

Figure 5. IGBT

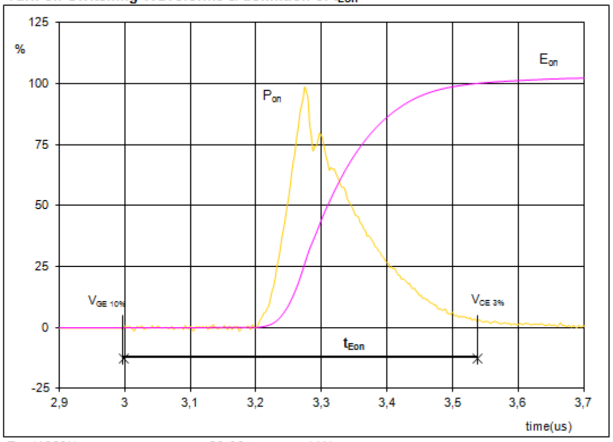
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	60,00	kW
E_{off} (100%) =	6,45	mJ
t_{Eoff} =	0,60	μs

Figure 6. IGBT

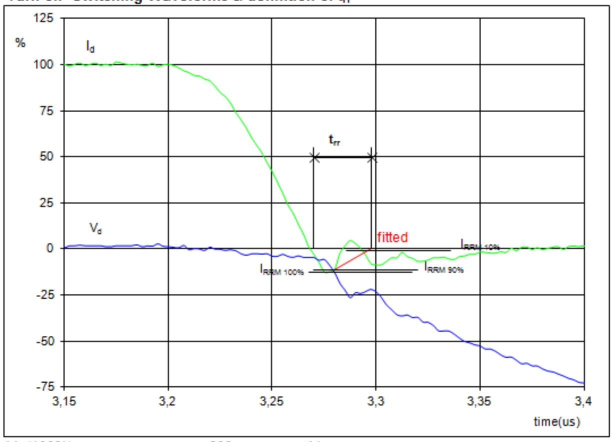
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	60,00	kW
E_{on} (100%) =	7,09	mJ
t_{Eon} =	0,54	μs

Figure 7. FWD

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

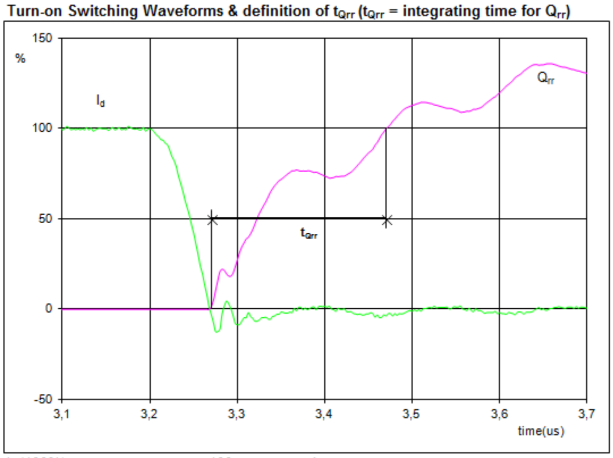


V_d (100%) =	600	V
I_d (100%) =	100	A
I_{RRM} (100%) =	-15	A
t_{rr} =	0,016	μs

Buck Switching Definitions

Figure 8. FWD

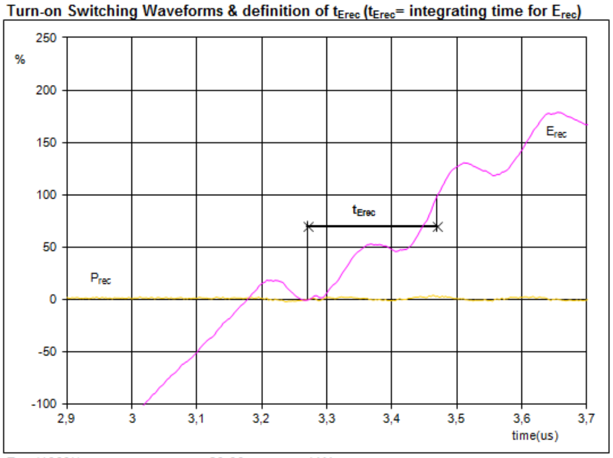
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	100	A
Q_{rr} (100%) =	0,55	µC
t_{Qrr} =	0,20	µs

Figure 9. FWD

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



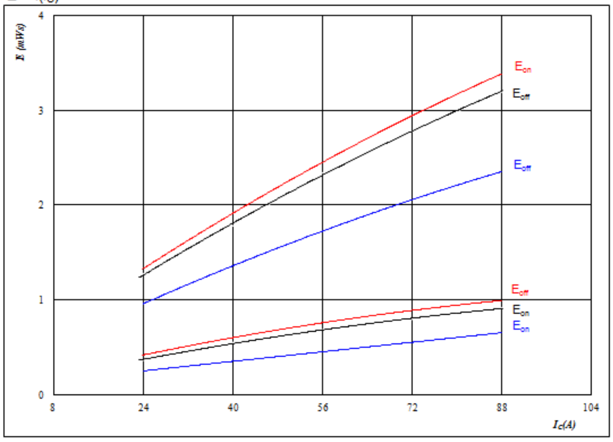
P_{rec} (100%) =	60,00	kW
E_{rec} (100%) =	0,15	mJ
t_{Erec} =	0,20	µs

Boost Switching Definitions

Figure 1. IGBT

Typical switching energy losses as a function of collector current

E = f(I_C)



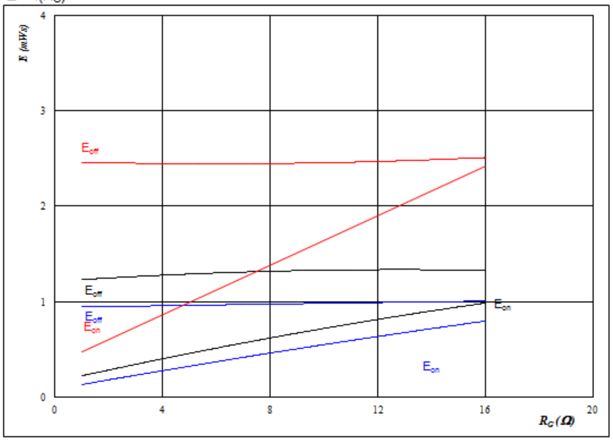
With an inductive load at

T_j =	25/125/150	°C	R_{gon} =	4	Ω
V_{CE} =	350	V	R_{goff} =	4	Ω
V_{GE} =	±15	V			

Figure 2. IGBT

Typical switching energy losses as a function of gate resistor

E = f(R_G)



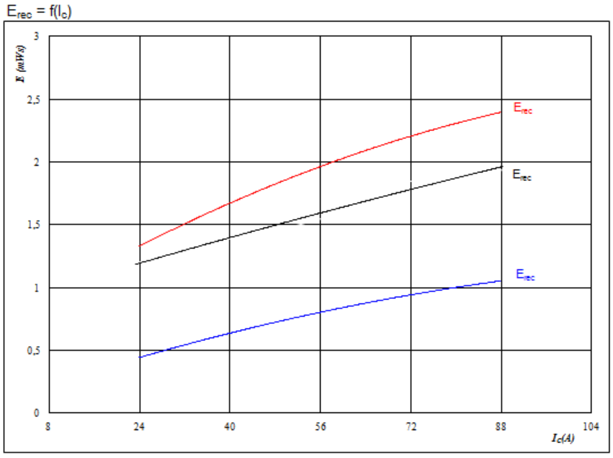
With an inductive load at

T_j =	25/125/150	°C	V_{GE} =	±15	V
V_{CE} =	350	V	I_C =	23	A

Figure 3. FWD

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

E_{rec} = f(I_c)



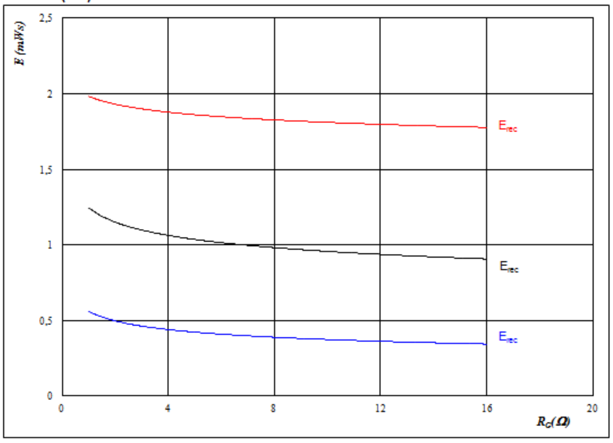
With an inductive load at

T_j =	25/125/150	°C	R_{gon} =	4	Ω
V_{CE} =	350	V	R_{goff} =	4	Ω
V_{GE} =	±15	V			

Figure 4. FWD

Typical reverse recovery energy loss as a function of gate resistor

Erec = f(RG)



With an inductive load at

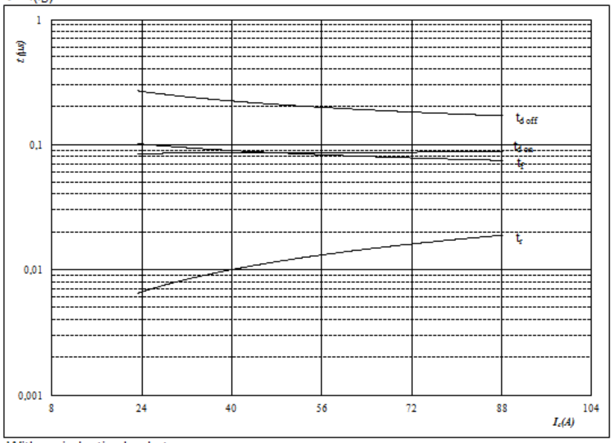
T_j =	25/125/150	°C	V_{GE} =	±15	V
V_{CE} =	350	V	I_C =	23	A

Boost Switching Definitions

Figure 5. IGBT

Typical switching times as a function of collector current

$t = f(I_D)$



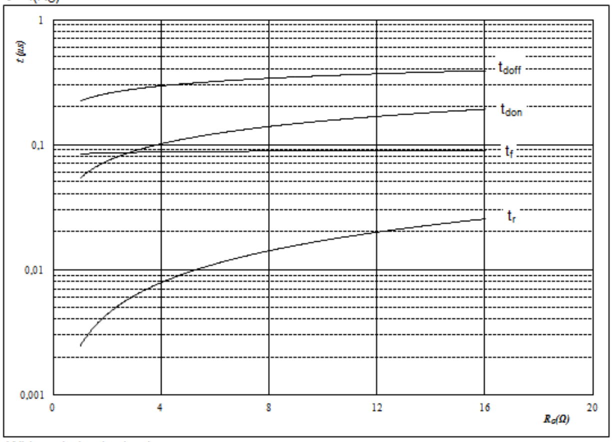
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

Figure 6. IGBT

Typical switching times as a function of gate resistor

$t = f(R_G)$



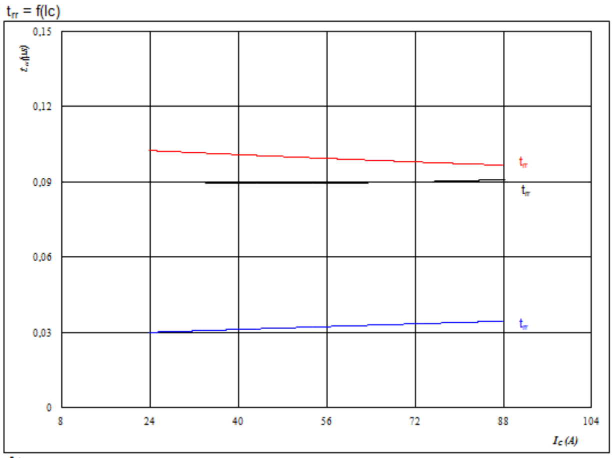
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	23	A

Figure 7. FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



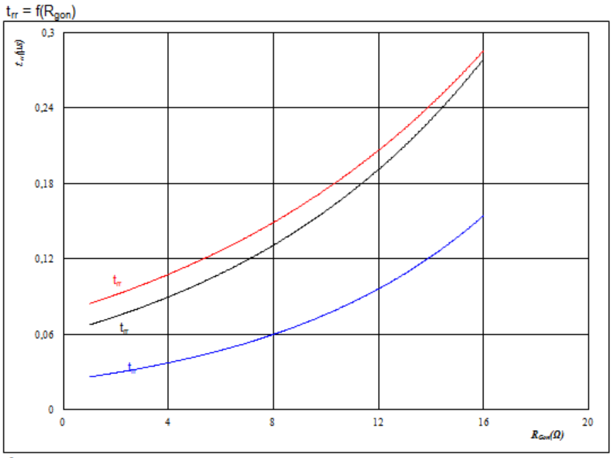
At

T_j =	25/125/150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

Figure 8. FWD

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

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



At

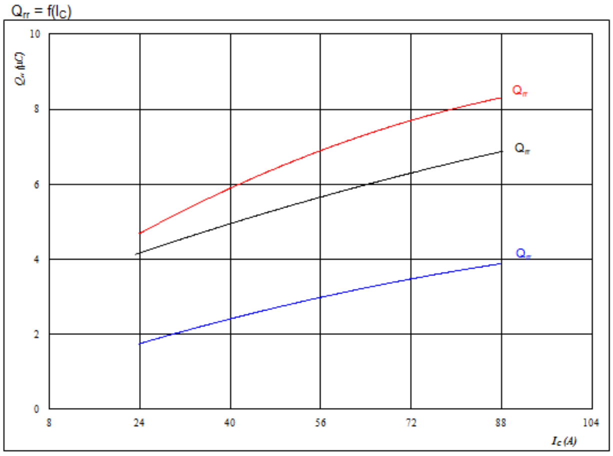
T_j =	25/125/150	°C
V_R =	350	V
I_F =	23	A
V_{GE} =	±15	V

Boost Switching Definitions

Figure 9. FWD

Typical reverse recovery charge as a function of collector current

$Q_{rr} = f(I_C)$



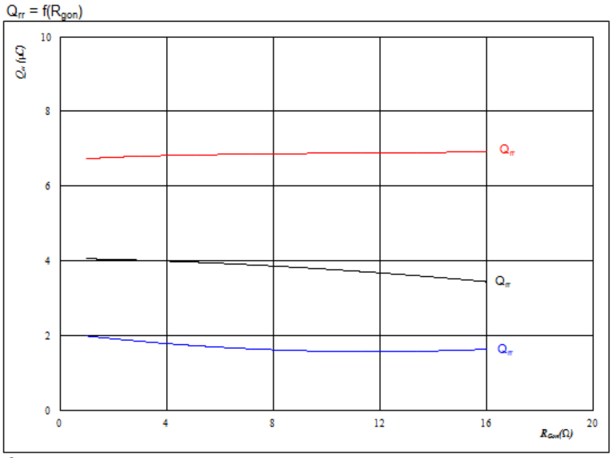
At

T_j =	25/125/150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

Figure 10. FWD

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

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



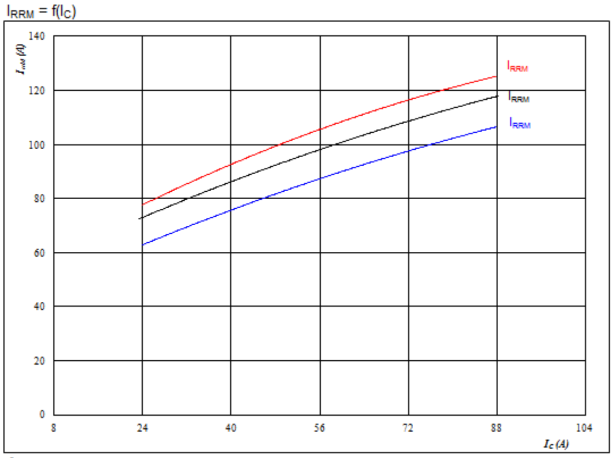
At

T_j =	25/125/150	°C
V_R =	350	V
I_F =	23	A
V_{GE} =	±15	V

Figure 11. FWD

Typical reverse recovery current as a function of collector current

$I_{RRM} = f(I_C)$



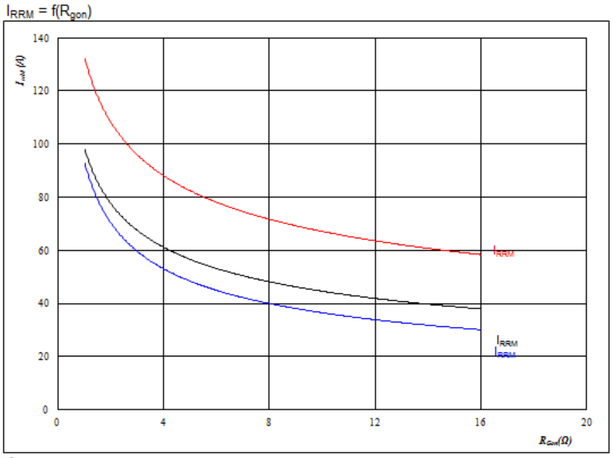
At

T_j =	25/125/150	°C	R_{gon} =	4	Ω
V_{CE} =	350	V			
V_{GE} =	±15	V			

Figure 12. FWD

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

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



At

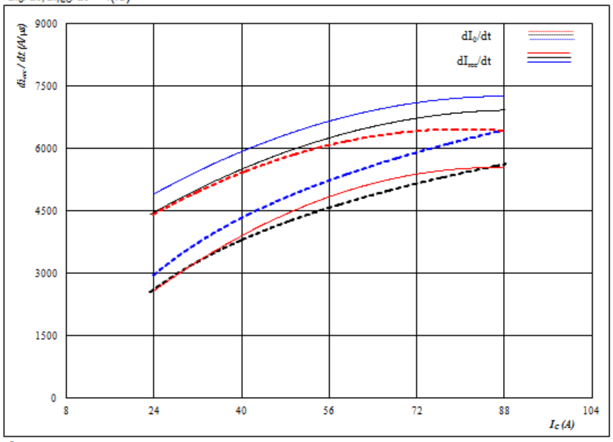
T_j =	25/125/150	°C	V_{GE} =	±15	V
V_R =	350	V			
I_F =	23	A			

Boost Switching Definitions

Figure 13. FWD

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

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

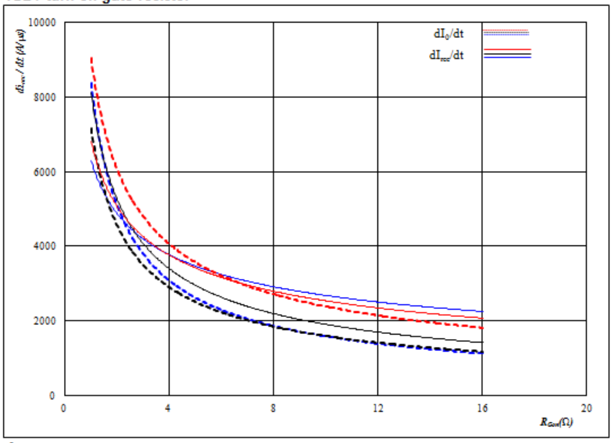


At

T_j =	25/125/150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

Figure 14. FWD

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



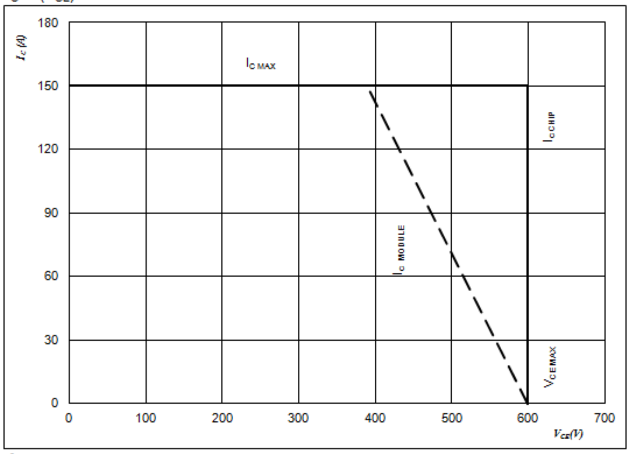
At

T_j =	25/125/150	°C
V_R =	350	V
I_F =	23	A
V_{GE} =	±15	V

Figure 15. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

T_j =	175	°C
Rgon =	4	Ω
Rgoff =	4	Ω

Vincotech

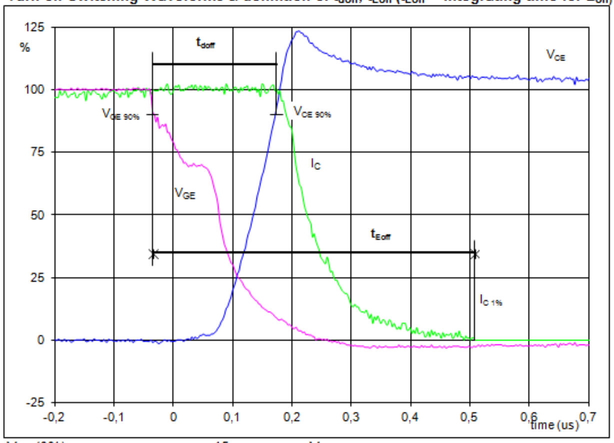
10-P012NME080SH-M910F09Y
10-F012NME080SH-M910F09
datasheet

Boost Switching Definitions

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

Figure 1. IGBT

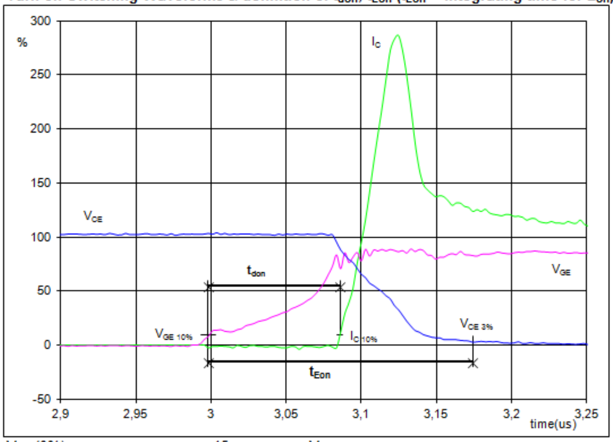
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	55	A
t_{doff} =	0,206	μs
t_{Eoff} =	0,543	μs

Figure 2. IGBT

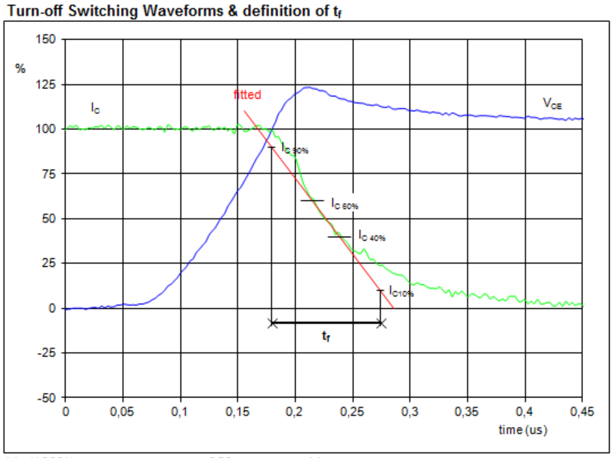
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	350	V
I_C (100%) =	55	A
t_{don} =	0,087	μs
t_{Eon} =	0,176	μs

Figure 3. IGBT

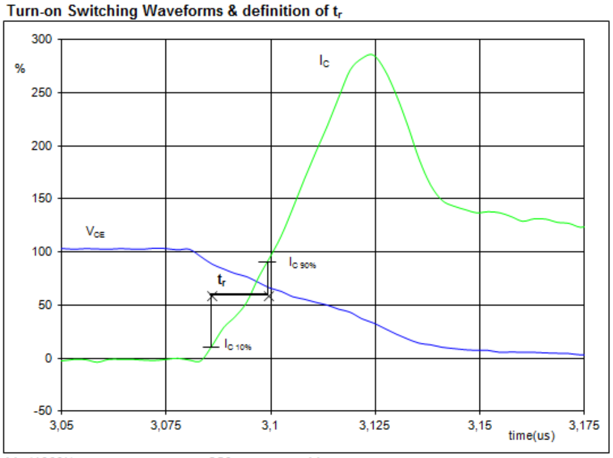
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	350	V
I_C (100%) =	55	A
t_f =	0,096	μs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r

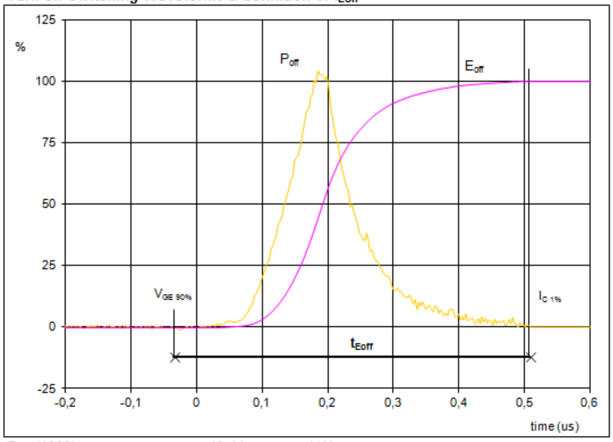


V_C (100%) =	350	V
I_C (100%) =	55	A
t_r =	0,013	μs

Boost Switching Definitions

Figure 5. IGBT

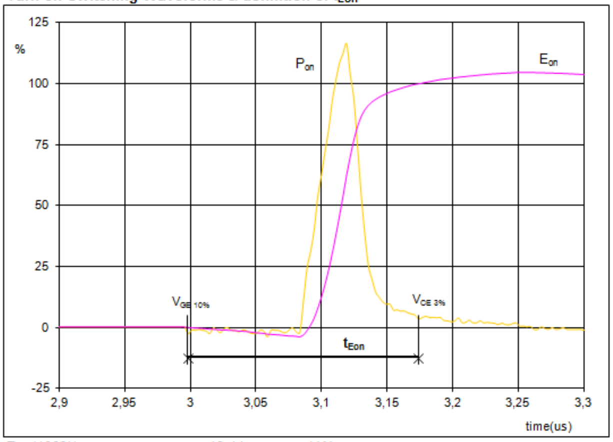
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	19,41	kW
E_{off} (100%) =	2,46	mJ
t_{Eoff} =	0,54	μs

Figure 6. IGBT

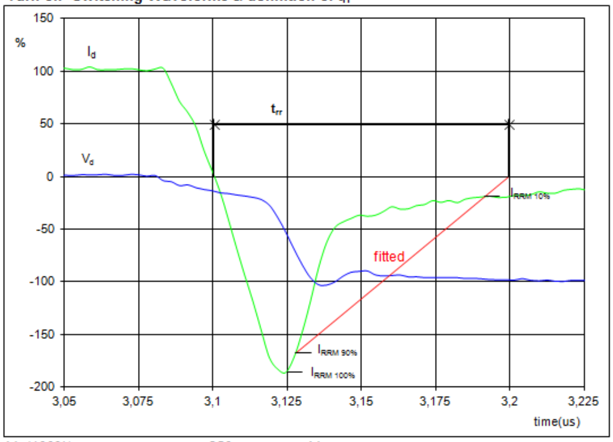
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	19,41	kW
E_{on} (100%) =	0,75	mJ
t_{Eon} =	0,18	μs

Figure 7. FWD

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

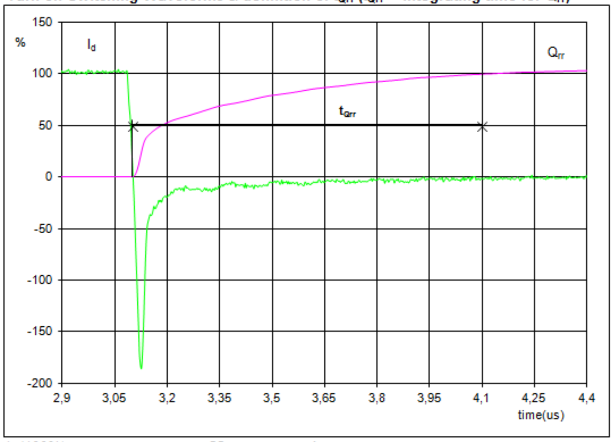


V_d (100%) =	350	V
I_d (100%) =	55	A
I_{RRM} (100%) =	-105	A
t_{rr} =	0,099	μs

Boost Switching Definitions

Figure 8. FWD

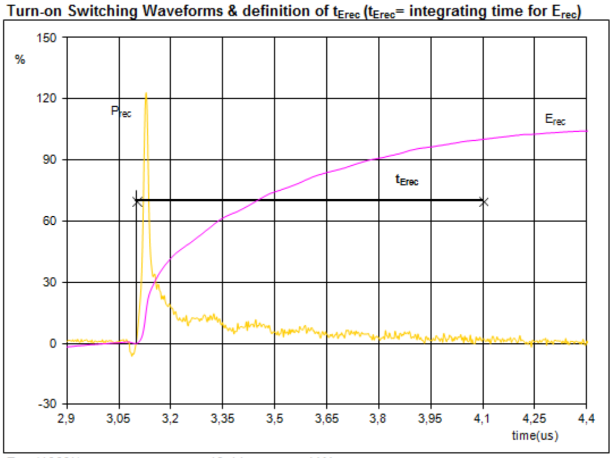
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	55	A
Q_{rr} (100%) =	6,87	µC
t_{Qrr} =	1,00	µs

Figure 9. FWD

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



P_{rec} (100%) =	19,41	kW
E_{rec} (100%) =	1,96	mJ
t_{Erec} =	1,00	µs

Vincotech

10-P012NME080SH-M910F09Y
10-F012NME080SH-M910F09
datasheet

Ordering Code & Marking

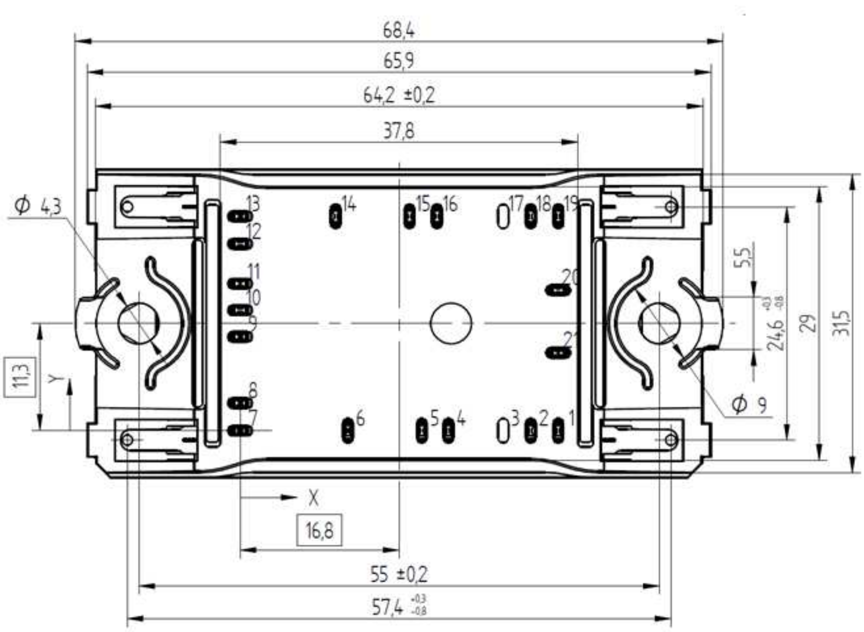
Version	Ordering Code	in DataMatrix as	in packaging barcode as
w/o thermal paste 17mm housing	10-F012NME080SH-M910F09	M910F09	M910F09
w/o thermal paste 17mm housing Press-fit pins	10-P012NME080SH-M910F09Y	M910F09Y	M910F09Y

Text	Name		Date code	UL & Vinco	Lot	Serial
	NN-NNNNNNNNNNNNNN-NNNNNNNN		WWYY	UL Vinco	LLLLL	SSSS
Datamatrix	Type	Lot number	Serial	Date code		
	TTTT-TTT	LLLLL	SSSS	WWYY		

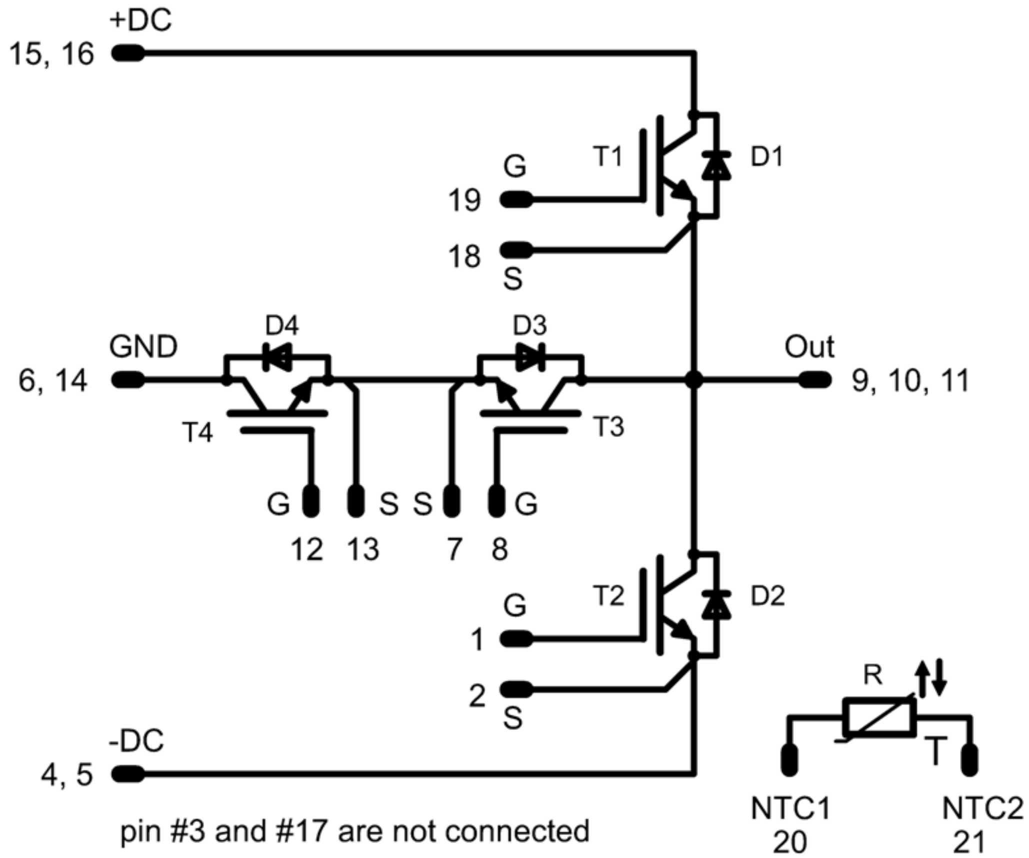
Outline

Pin table [mm]

Pin	X	Y	Pos
1	33,6	0	G
2	30,7	0	S
3	not used		
4	22	0	DC-
5	19,2	0	DC-
6	11,4	0	GND
7	0	0	S
8	0	2,9	G
9	0	9,9	Line
10	0	12,7	Line
11	0	15,5	Line
12	0	19,7	G
13	0	22,6	S
14	10,1	22,6	GND
15	17,9	22,6	DC+
16	20,8	22,6	DC+
17	not used		
18	30,7	22,6	S
19	33,6	22,6	G
20	33,6	14,8	NTC1
21	33,6	8,2	NTC2



Pinout



Identification

ID	Component	Voltage	Technology	Current	Function	Comment
T1,T2	IGBT	1200V		2*40A	Buck switch	
T3,T4	IGBT	600V		75A	Boost switch	
D1,D2	Diode	1200V		35A	Boost diode	
D3,D4	Diode	600V		60A	Buck diode	
R	NTC	-		-	Thermistor	

Packaging instruction					
Standard packaging quantity (SPQ)	135	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 0 packages see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-F012NME080SH-M910F09Y-D2-14	05 Feb. 2015		