Vincotech

10-F107NIB150SG06-M136F39
10-P107NIB150SG06-M136F39Y
datasheet

***flow*NPC 1**	**1200 V / 150 A**

Features

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

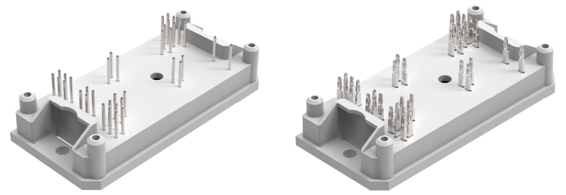
Target applications

- UPS
- Motor drive
- Solar inverters

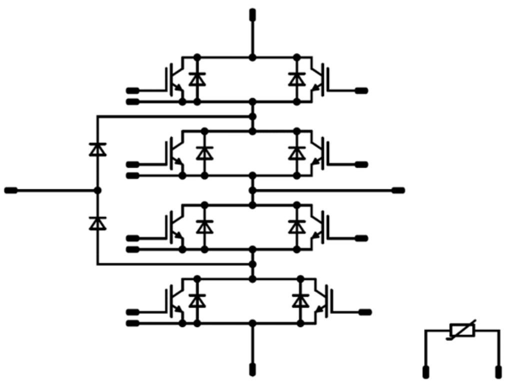
Types

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

flow 1 17 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Buck Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ T_s = 80 °C	128	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	450	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	279	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V V_{cc} = 400 V T_j ≤ 150 °C	5	µs
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition			Value	Unit
Buck Diode						
Peak repetitive reverse voltage	V_{RRM}				650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$		T_s = 80 °C	125	A
Surge (non-repetitive) forward current	I_{FSM}	t_p = 10 ms sine Wave		T_j = 100 °C	1280	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	241	W
Maximum junction temperature	T_{jmax}				175	°C
Boost Switch						
Collector-emitter voltage	V_{CES}				600	V
Collector current	I_C	$T_j = T_{jmax}$		T_s = 80 °C	173	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}			450	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	324	W
Gate-emitter voltage	V_{GES}				±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V	V_{cc} = 360 V	T_j = 150 °C	6	μs
Maximum junction temperature	T_{jmax}				175	°C
Boost Diode						
Peak repetitive reverse voltage	V_{RRM}				650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$		T_s = 80 °C	120	A
Repetitive peak forward current	I_{FRM}				200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	203	W
Maximum junction temperature	T_{jmax}				175	°C
Boost Sw.Inv.Diode						
Peak repetitive reverse voltage	V_{RRM}				600	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$		T_s = 80 °C	124	A
Repetitive peak forward current	I_{FRM}				200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	204	W
Maximum junction temperature	T_{jmax}				175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Module Properties					
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{jop}			-40…(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	6000	V
		AC Voltage	t_p = 1 min	2500	V
Creepage distance				min. 12,7	mm
Clearance				min. 12,7	mm
Comparative Tracking Index	CTI			> 200	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	Unit
Buck Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,0024	25	4,2	5,1	5,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		150	25 150	1,38	1,89 2,25	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			7,6	µA
Gate-emitter leakage current	I_{GES}		20	0		25			300	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}							9240		
Output capacitance	C_{oes}	f= 1 Mhz	0	25		25		480		pF
Reverse transfer capacitance	C_{res}							274		
Gate charge	Q_g		15	480	150	25		940		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,34		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 125 150		149 150 151		
Rise time	t_r	R_{gon} = 4 Ω R_{goff} = 4 Ω				25 125 150		30 32 33		
Turn-off delay time	$t_{d(off)}$					25 125 150		192 188 212		ns
Fall time	t_f		±15	350	150	25 125 150		12 15 17		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 4,8 µC Q_{rFWD} = 9,1 µC Q_{rFWD} = 10,3 µC				25 125 150		1,815 2,442 2,616		
Turn-off energy (per pulse)	E_{off}					25 125 150		2,084 2,747 2,964		mWs

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Buck Diode										
Static										
Forward voltage	V_F				160	25 125 150		1,52 1,47 1,45	1,92	V
Reverse leakage current	I_R			650		25			8,4	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,39		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 5294 A/µs di/dt = 5307 A/µs di/dt = 4893 A/µs	±15	350	150	25 125 150		100 143 152		A
Reverse recovery time	t_{rr}					25 125 150		66 95 105		ns
Recovered charge	Q_r					25 125 150		4,759 9,056 10,295		µC
Reverse recovered energy	E_{rec}					25 125 150		1,035 2,055 2,344		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2725 2076 1787		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,0024	25	5	5,8	6,5	V
Collector-emitter saturation voltage	V_{CEsat}		15		150	25 150	1,05	1,46 1,64	1,85	V
Collector-emitter cut-off current	I_{CES}		0	600		25			7,6	µA
Gate-emitter leakage current	I_{GES}		20	0		25			1200	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}							9240		
Output capacitance	C_{oes}	f = 1 Mhz	0	25		25		576		pF
Reverse transfer capacitance	C_{res}							274		
Gate charge	Q_g		15	480	150	25		940		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,29		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 150		149 151		
Rise time	t_r	R_{gon} = 4 Ω R_{goff} = 4 Ω				25 150		31 36		
Turn-off delay time	$t_{d(off)}$					25 150		220 245		ns
Fall time	t_f		±15	350	150	25 150		58 78		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 5,9 µC Q_{rFWD} = 12,9 µC				25 150		1,77 2,38		
Turn-off energy (per pulse)	E_{off}					25 150		4,26 5,95		mWs

Characteristic Values

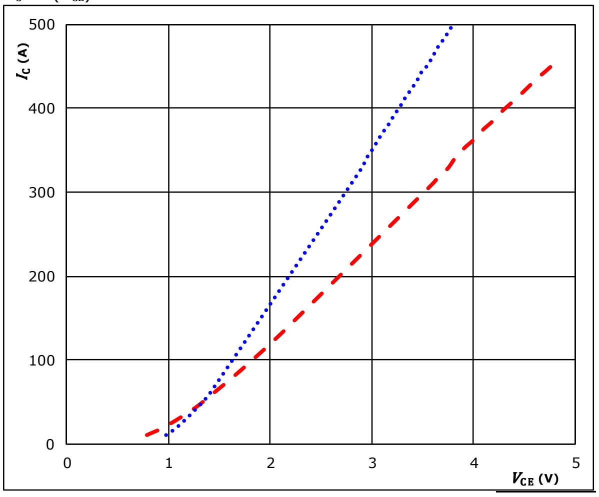
Parameter	Symbol	Conditions	V_{GE} [V] / V_{GS} [V]	V_{CE} [V] / V_{DS} [V] / V_F [V]	I_C [A] / I_D [A] / I_F [A]	T_j [°C]	Min	Typ	Max	Unit
Boost Diode										
Static										
Forward voltage	V_F				100	25 150	1,20	1,77 1,57	1,9	V
Reverse leakage current	I_R			650		25			48	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,47		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 7150 A/µs di/dt = 5023 A/µs	±15	350	150	25 150		82 114		A
Reverse recovery time	t_{rr}					25 150		133 290		ns
Recovered charge	Q_r					25 150		5,92 12,85		µC
Reverse recovered energy	E_{rec}					25 150		1,65 3,68		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 150		559 676		A/µs
Boost Sw.Inv.Diode										
Static										
Forward voltage	V_F				100	25 150	1,2	1,77 1,54	1,9	V
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,46		K/W
Thermistor										
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		5		mW
Power dissipation constant						25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %				25		3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %				25		4000		K
Vincotech NTC Reference									I	

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

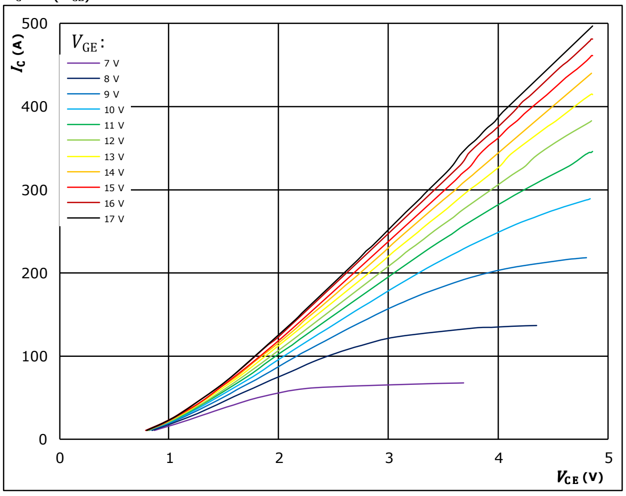


t_p =	250	µs	T_j:	25 °C	dotted
V_{GE} =	15	V		150 °C	dashed

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



t_p = 250 µs

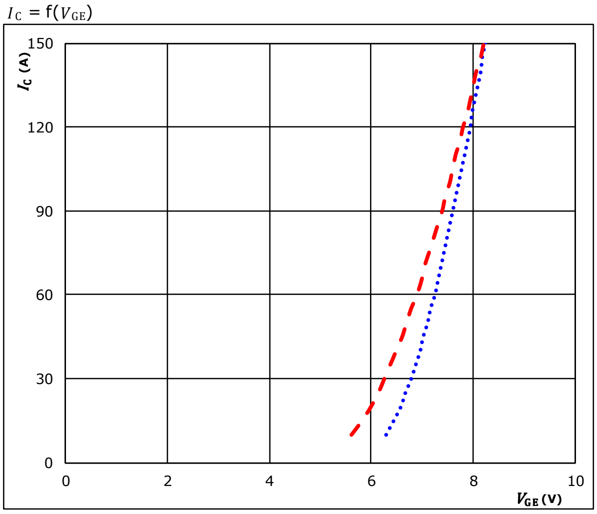
T_j = 125 °C

V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

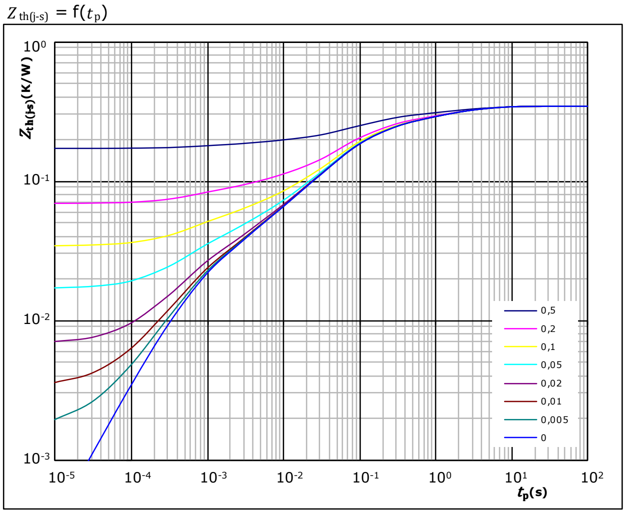


t_p =	100	µs	T_j:	25 °C	dotted
V_{CE} =	0	V		150 °C	dashed

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

$Z_{th(j-s)} = f(t_p)$



D = t_p / T

$R_{th(j-s)}$ = 0,34 K/W

IGBT thermal model values

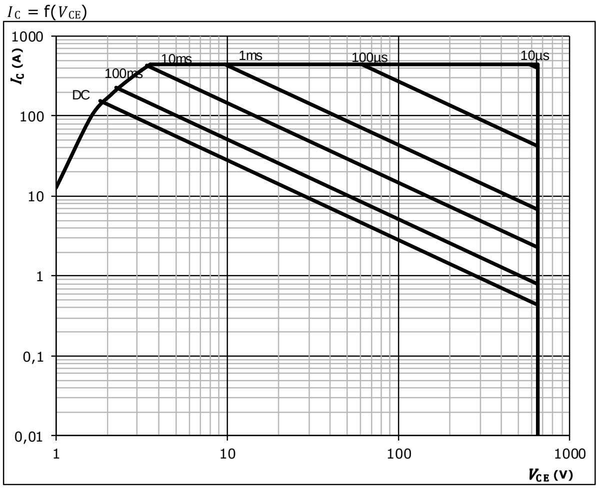
R (K/W)	τ (s)
4,43E-02	3,55E+00
6,46E-02	8,58E-01
1,01E-01	1,36E-01
9,03E-02	4,30E-02
2,31E-02	4,39E-03
1,76E-02	6,24E-04

Buck Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



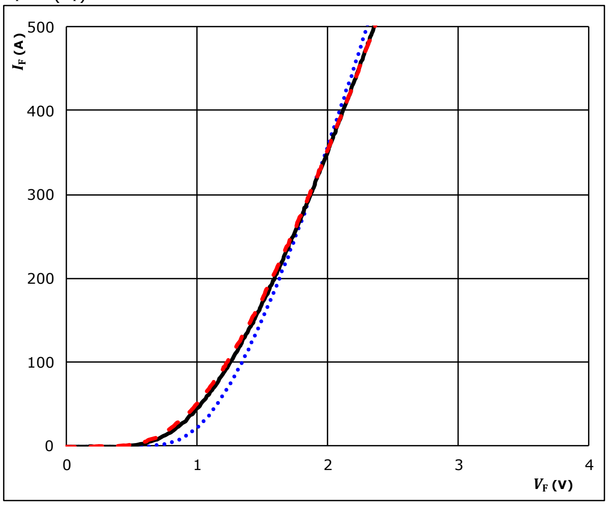
D =	single pulse	
T_s =	80	ºC
V_{GE} =	±15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$

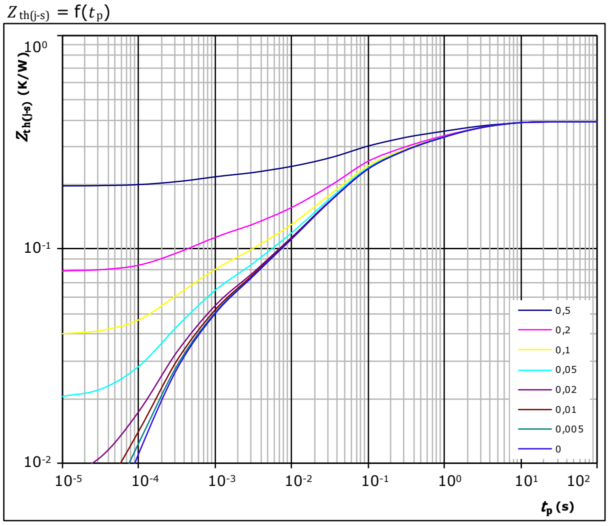


t_p =	250	µs	T_j:	25 °C
				125 °C
				150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

$Z_{th(j\text{-}s)} = f(t_p)$



D = t_p / T

$R_{th(j\text{-}s)}$ = 0,39 K/W

FWD thermal model values

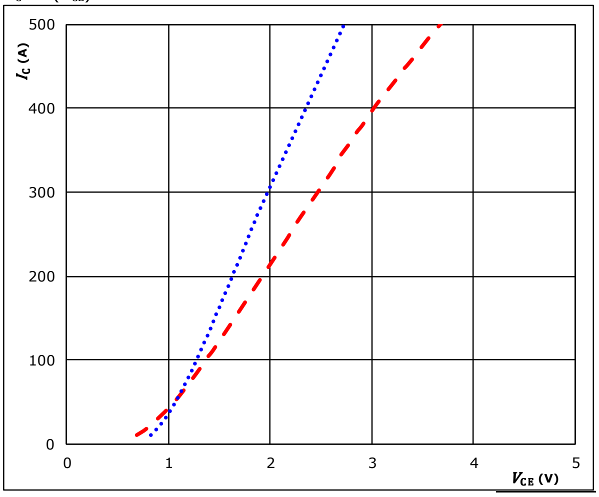
R (K/W)	τ (s)
4,62E-02	3,80E+00
6,71E-02	9,22E-01
5,38E-02	2,23E-01
1,26E-01	5,05E-02
3,49E-02	1,17E-02
3,03E-02	2,42E-03
3,61E-02	3,36E-04

Boost Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

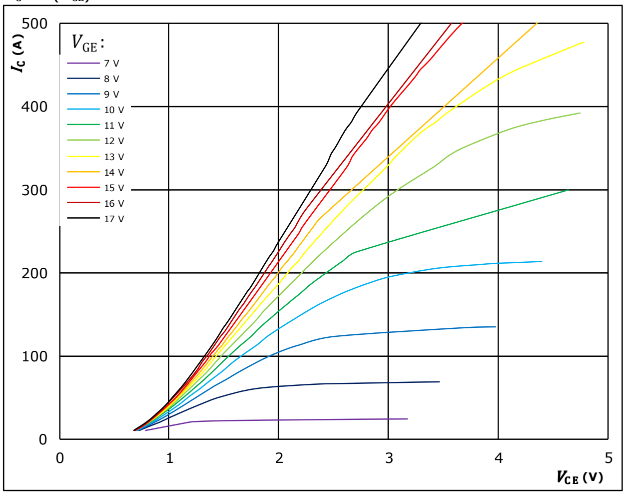


t_p =	250	µs	T_j:	25 °C	dotted
V_{GE} =	15	V		150 °C	dashed

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

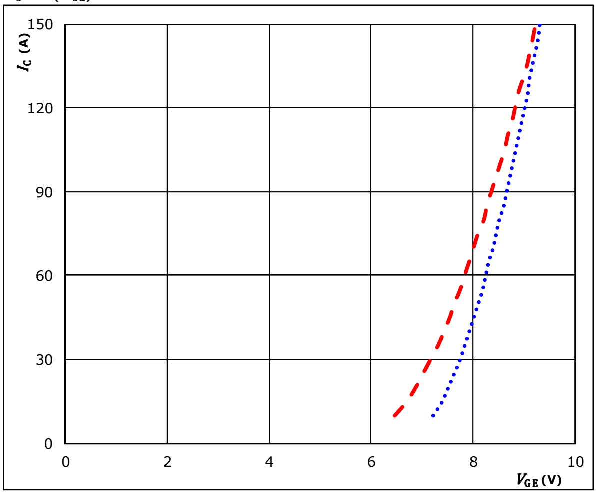


t_p = 250 µs
T_j = 125 °C
V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

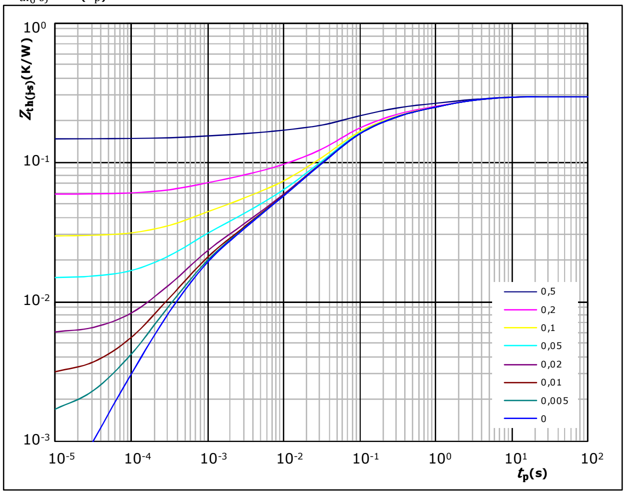


t_p =	100	µs	T_j:	25 °C	dotted
V_{CE} =	0	V		150 °C	dashed

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

$Z_{th(j\text{-}s)} = f(t_p)$



D = t_p / T
$R_{th(j\text{-}s)}$ = 0,29 K/W

IGBT thermal model values

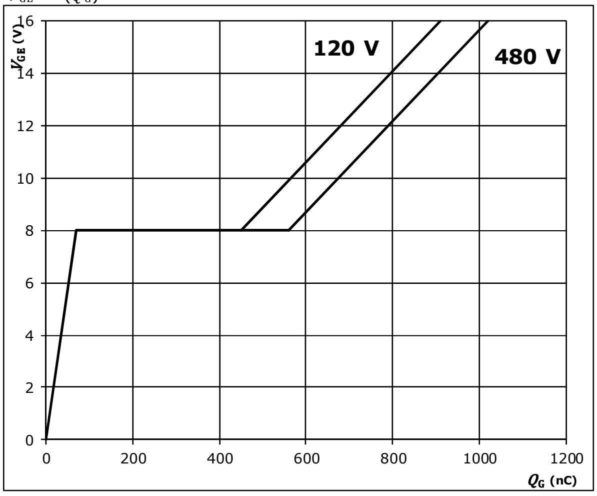
R (K/W)	τ (s)
4,40E-02	2,95E+00
5,08E-02	7,93E-01
7,83E-02	1,41E-01
8,59E-02	4,33E-02
2,00E-02	3,83E-03
1,46E-02	5,99E-04

Boost Switch Characteristics

figure 5. IGBT

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

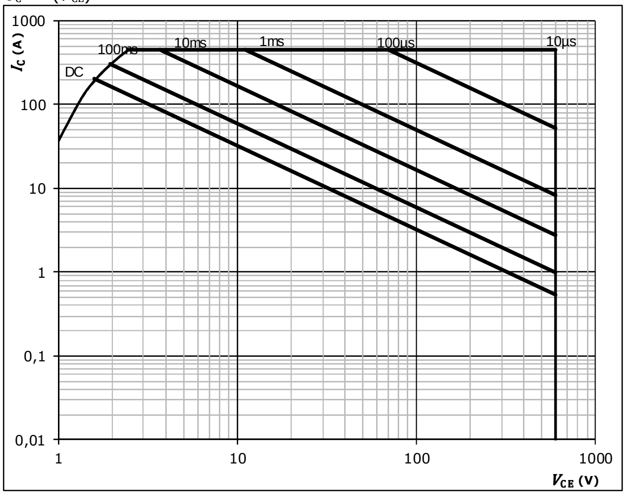


I_C = 150 A

figure 6. IGBT

Safe operating area

$I_C = f(V_{CE})$

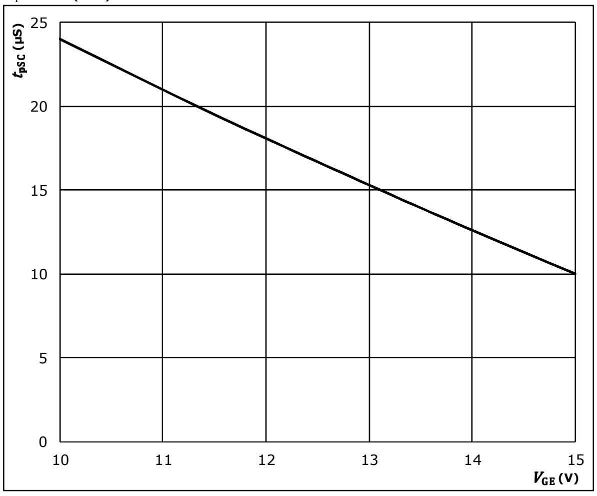


D = single pulse
T_s = 80 ºC
V_{GE} = ±15 V
T_j = T_{jmax}

figure 7. IGBT

Short circuit duration as a function of V_{GE}

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

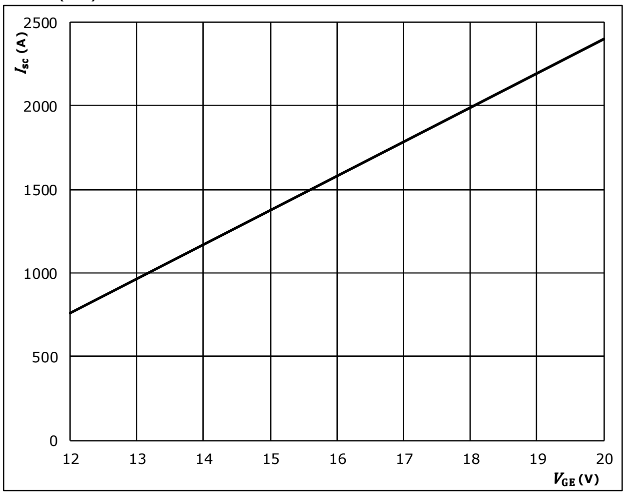


V_{CE} = 400 V
T_j ≤ 150 ºC

figure 8. IGBT

Typical short circuit current as a function of V_{GE}

$I_{SC} = f(V_{GE})$



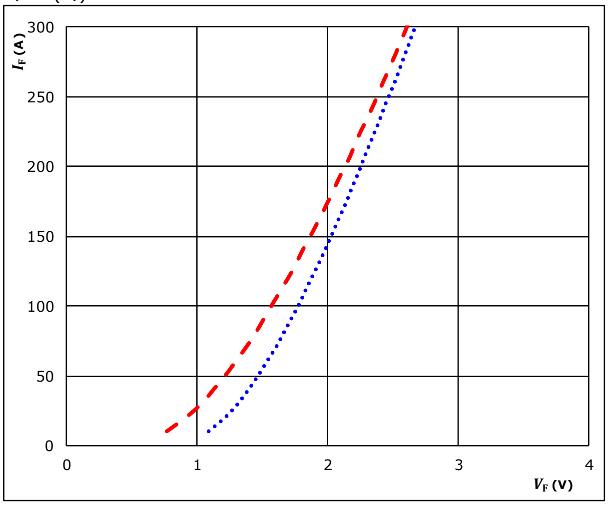
V_{CE} ≤ 400 V
T_j ≤ 150 ºC

Boost Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



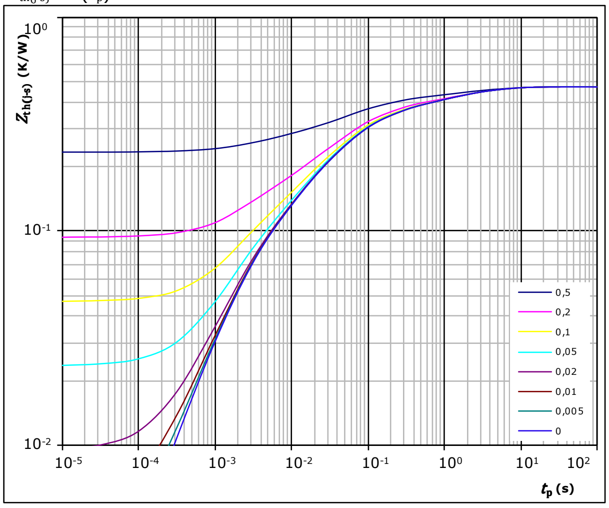
t_p = 250 µs

T_j: 25 °C
150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

$Z_{th(j-s)} = f(t_p)$



$D = t_p / T$

$R_{th(j-s)}$ = 0,47 K/W

FWD thermal model values

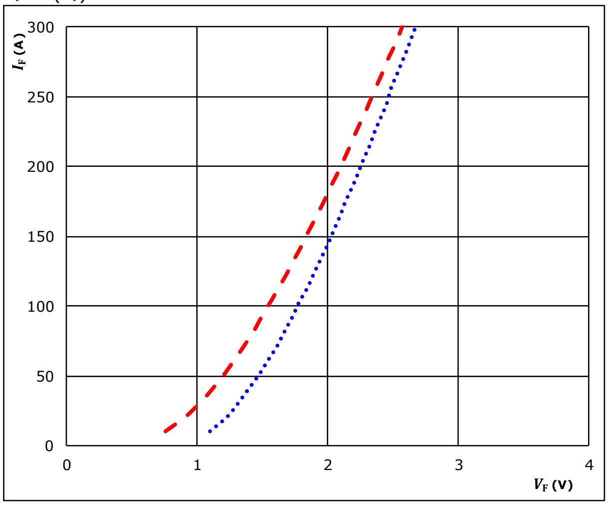
R (K/W)	τ (s)
4,73E-02	4,12E+00
6,76E-02	9,18E-01
1,01E-01	1,37E-01
1,41E-01	3,83E-02
6,28E-02	8,98E-03
4,92E-02	1,99E-03

Boost Sw.Inv.Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



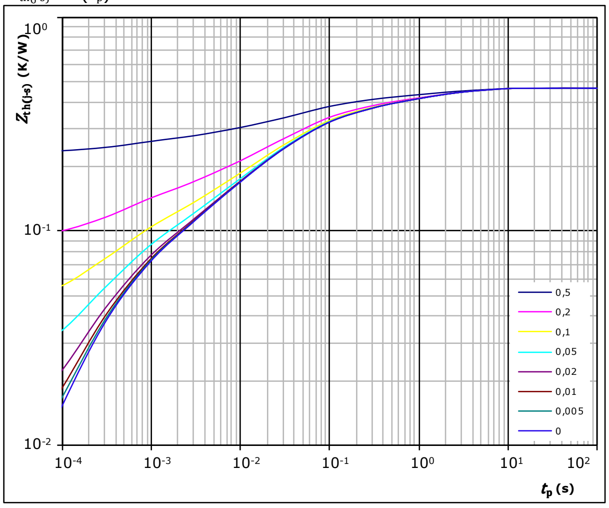
t_p = 250 µs

T_j: 25 °C; 125 °C; 150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

$Z_{th(j\text{-}s)} = f(t_p)$



$D = t_p / T$

$R_{th(j\text{-}s)}$ = 0,46 K/W

FWD thermal model values

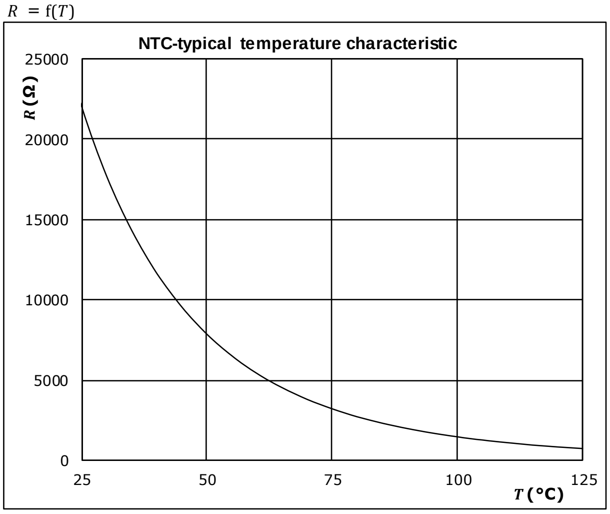
R (K/W)	τ (s)
4,32E-02	3,42E+00
5,82E-02	8,07E-01
7,54E-02	1,51E-01
1,32E-01	3,88E-02
6,30E-02	9,31E-03
4,34E-02	2,22E-03
4,90E-02	3,53E-04

Thermistor Characteristics

figure 1. **Thermistor**

Typical NTC characteristic as a function of temperature

$R = f(T)$

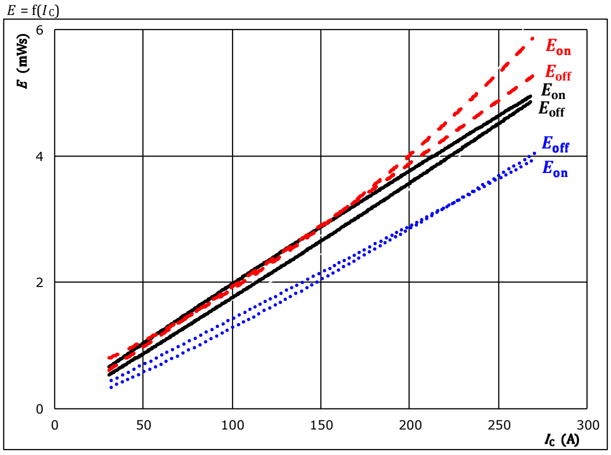


Buck Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



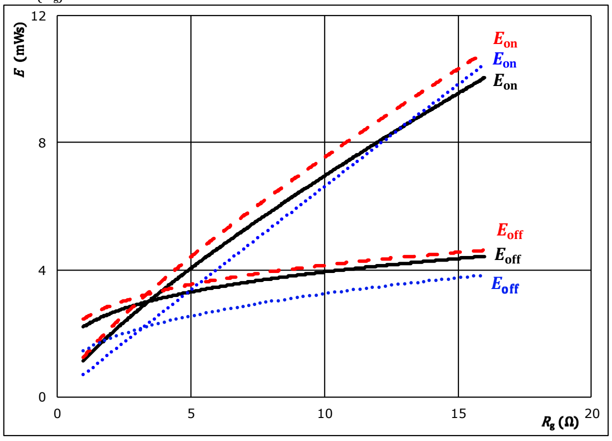
With an inductive load at

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

figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



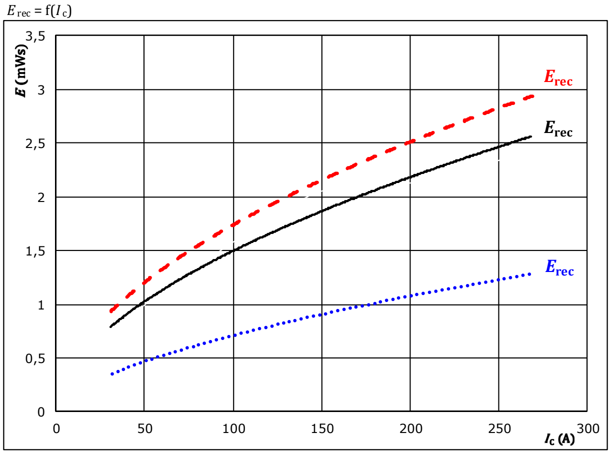
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	············
V_{GE} =	±15	V		125 °C	——
I_C =	150	A		150 °C	– – –

figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_c)$



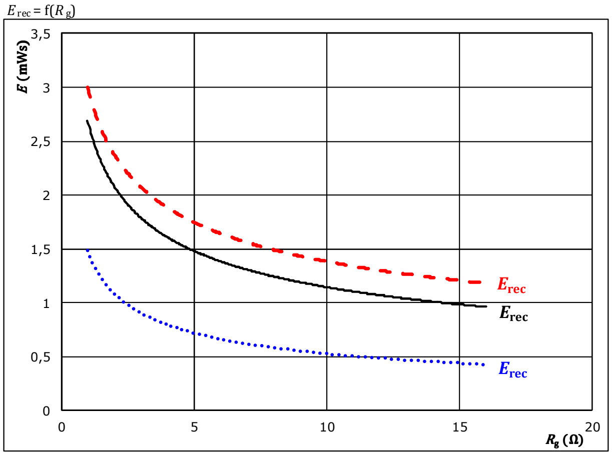
With an inductive load at

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

figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

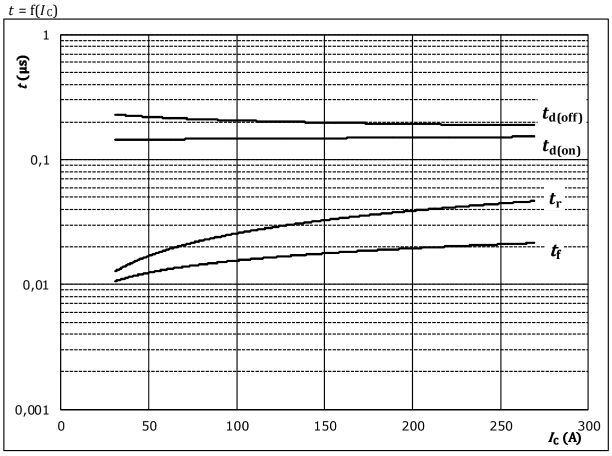
V_{CE} =	350	V	T_j:	25 °C	············
V_{GE} =	±15	V		125 °C	——
I_C =	150	A		150 °C	– – –

Buck Switching Characteristics

figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



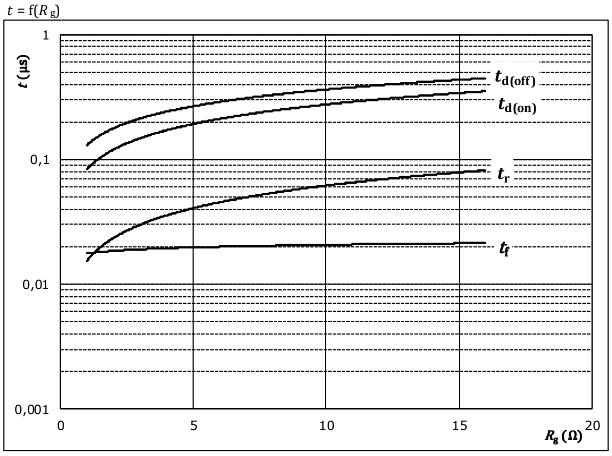
With an inductive load at

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

figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



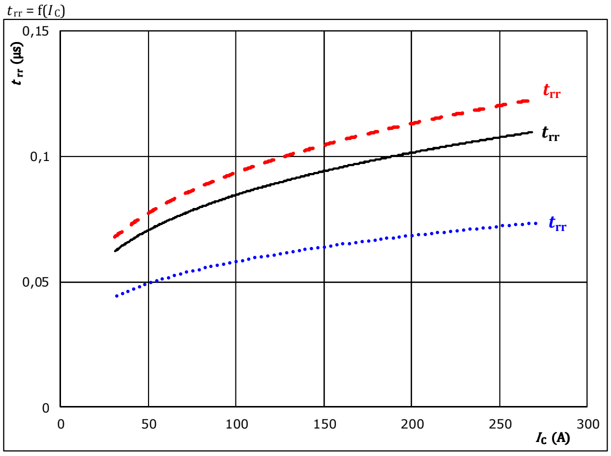
With an inductive load at

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

figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



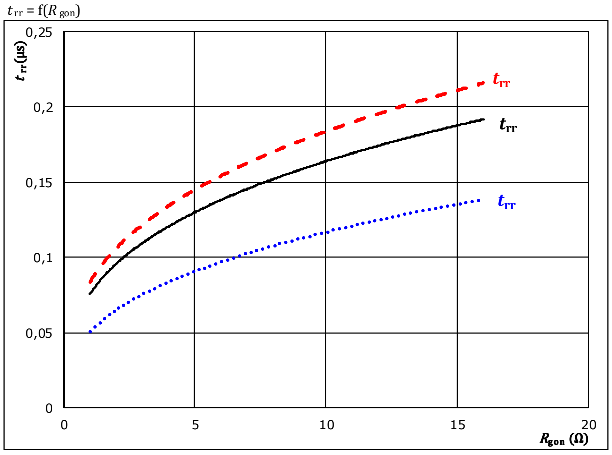
With an inductive load at

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

figure 8. **FWD**

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

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



With an inductive load at

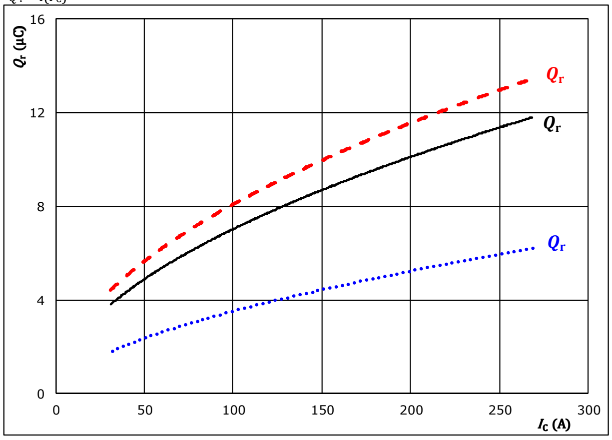
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	150	A		150 °C

Buck Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



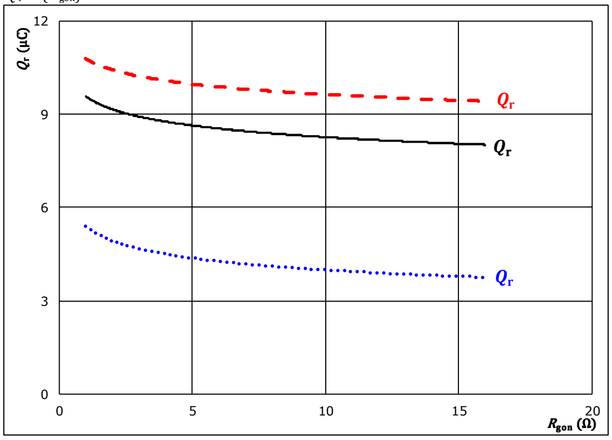
With an inductive load at

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

figure 10. FWD

Typical recovered charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$



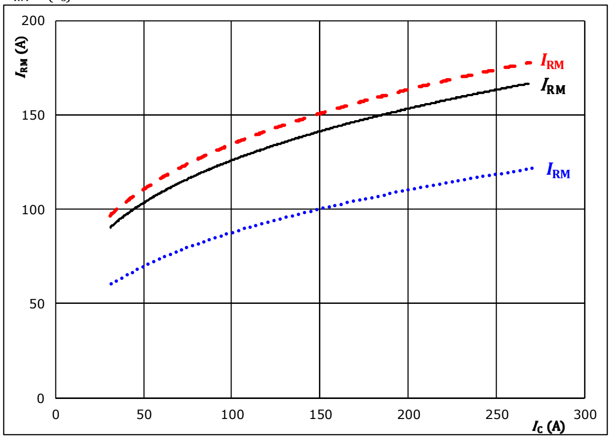
With an inductive load at

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

figure 11. FWD

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$



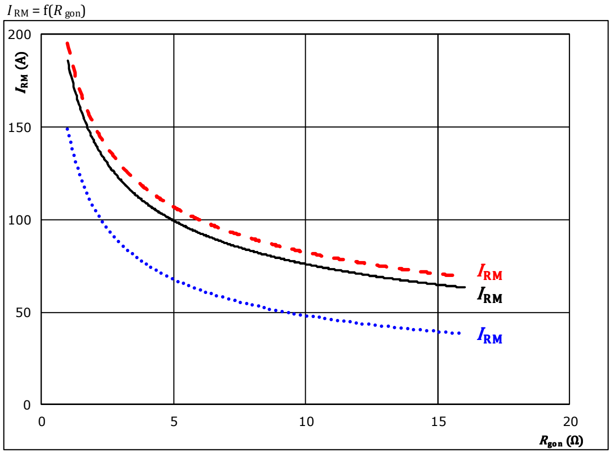
With an inductive load at

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

figure 12. FWD

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

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



With an inductive load at

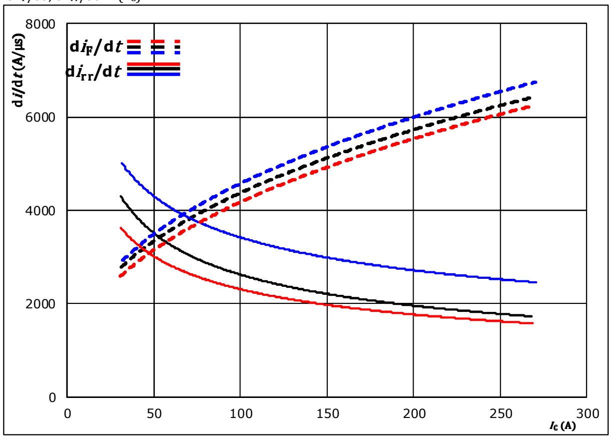
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C=	150	A		150 °C

Buck Switching Characteristics

figure 13. **FWD**

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

di_F/dt, di_{rr}/dt = f(I_C)



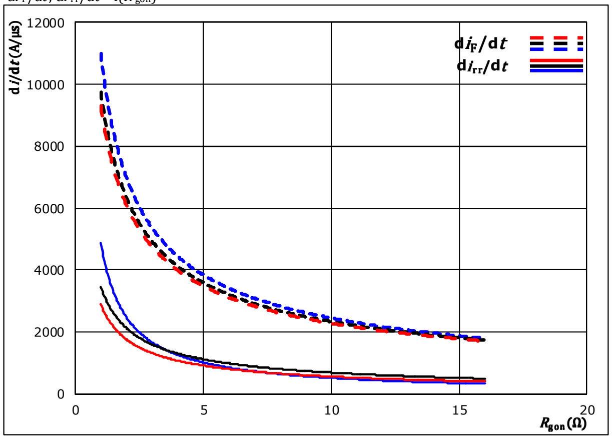
With an inductive load at

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

figure 14. **FWD**

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

di_F/dt, di_{rr}/dt = f(R_{gon})



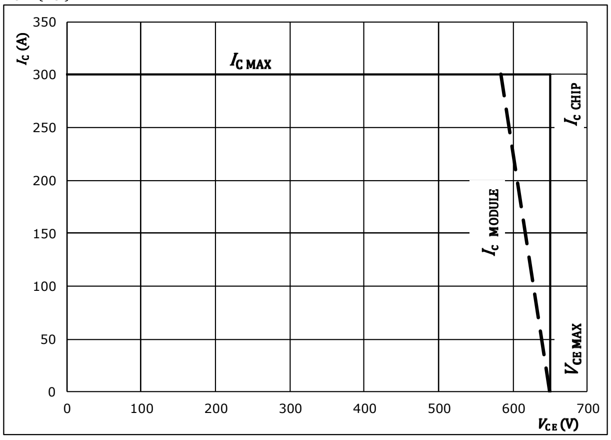
With an inductive load at

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

figure 15. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

T_j =	125	°C
R_{gon} =	4	Ω
R_{goff} =	4	Ω

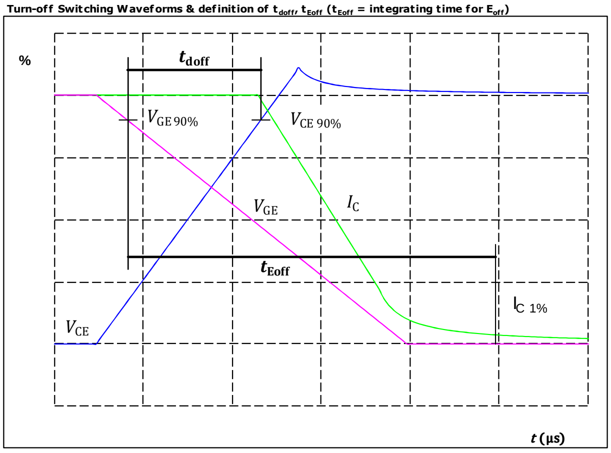
Buck Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

figure 1. **IGBT**

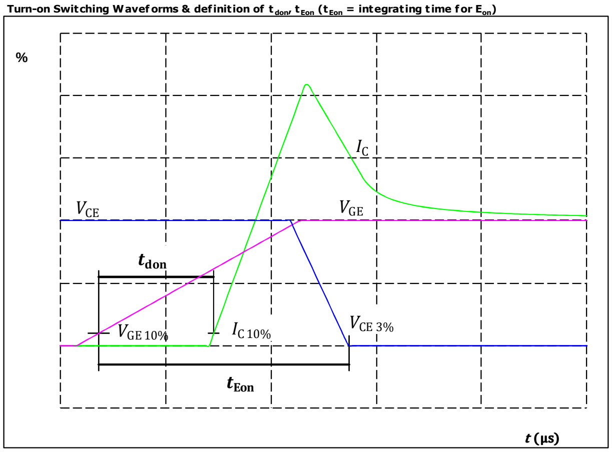
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



$V_{GE}(0\%)$ = -15 V
$V_{GE}(100\%)$ = 15 V
$V_C(100\%)$ = 350 V
$I_C(100\%)$ = 150 A
t_{doff} = 188 ns

figure 2. **IGBT**

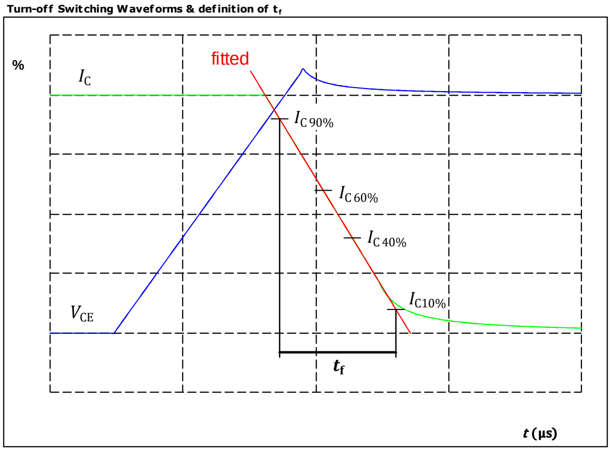
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



$V_{GE}(0\%)$ = -15 V
$V_{GE}(100\%)$ = 15 V
$V_C(100\%)$ = 350 V
$I_C(100\%)$ = 150 A
t_{don} = 150 ns

figure 3. **IGBT**

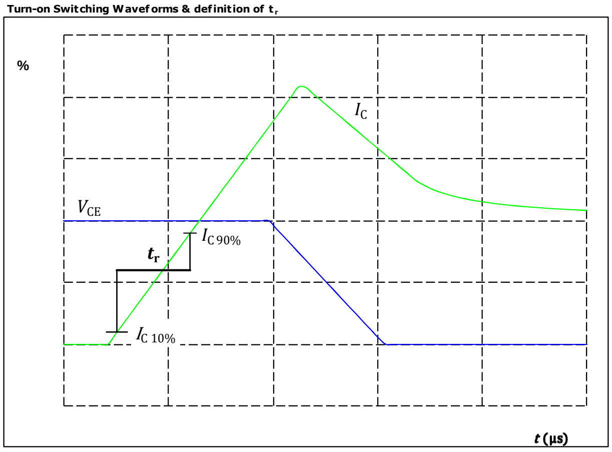
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%)$ = 350 V
$I_C(100\%)$ = 150 A
t_f = 15 ns

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

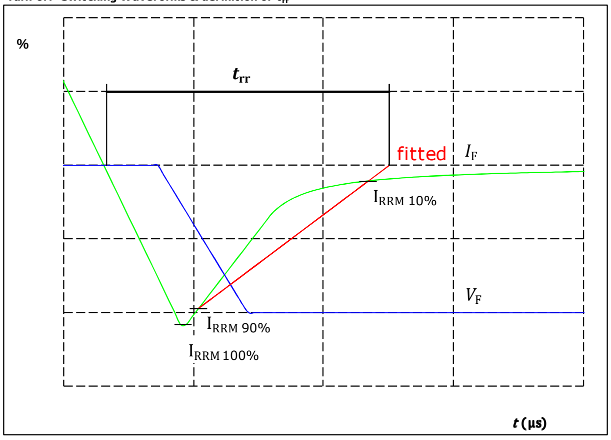


$V_C(100\%)$ = 350 V
$I_C(100\%)$ = 150 A
t_r = 32 ns

Buck Switching Characteristics

figure 5. **FWD**

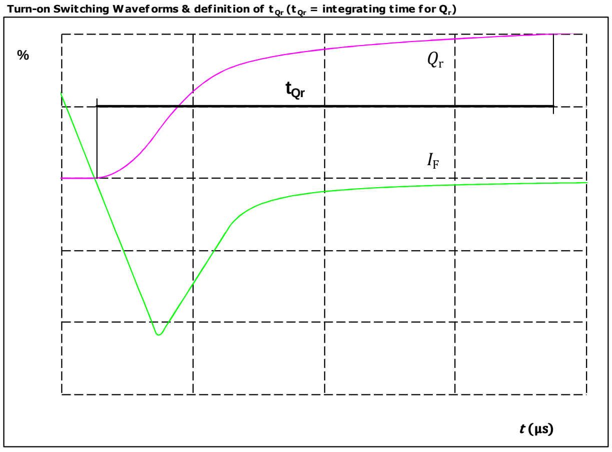
Turn-off Switching Waveforms & definition of t_{rr}



V_F (100%) =	350	V
I_F (100%) =	150	A
I_{RRM} (100%) =	143	A
t_{rr} =	95	ns

figure 6. **FWD**

Turn-on Switching Waveforms & definition of t_{Qr} (t_{Qr} = integrating time for Q_r)



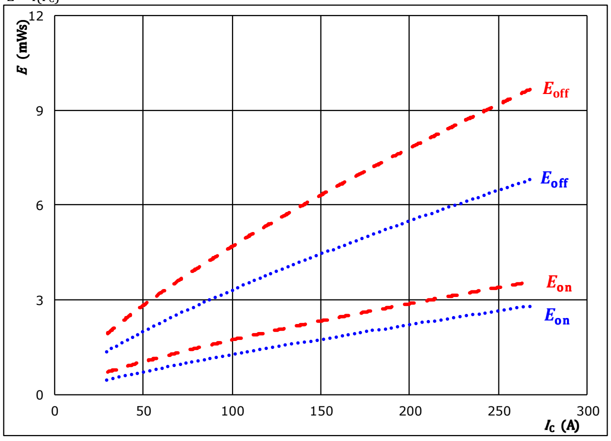
I_F (100%) =	150	A
Q_r (100%) =	0	µC

Boost Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



With an inductive load at

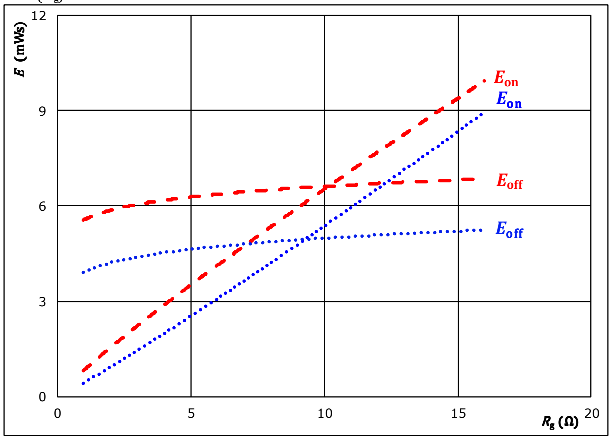
T_j: 25 °C .... / 150 °C – – – –

V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



With an inductive load at

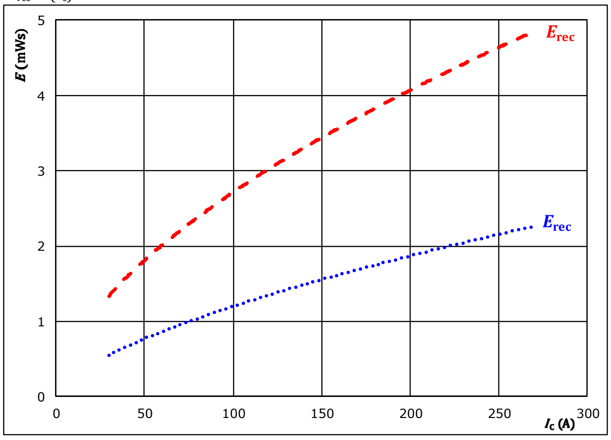
T_j: 25 °C .... / 150 °C – – – –

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

figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



With an inductive load at

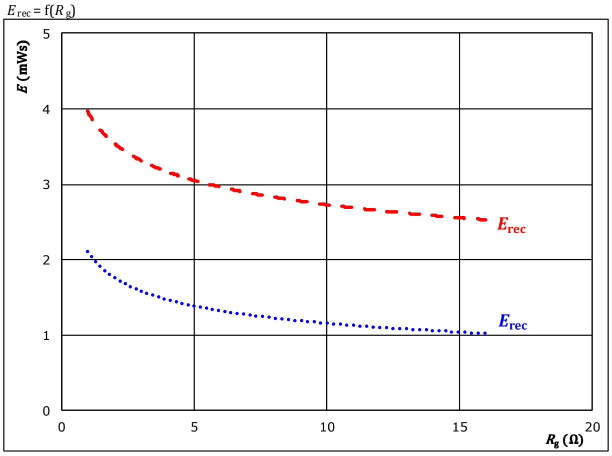
T_j: 25 °C .... / 150 °C – – – –

V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

T_j: 25 °C .... / 150 °C – – – –

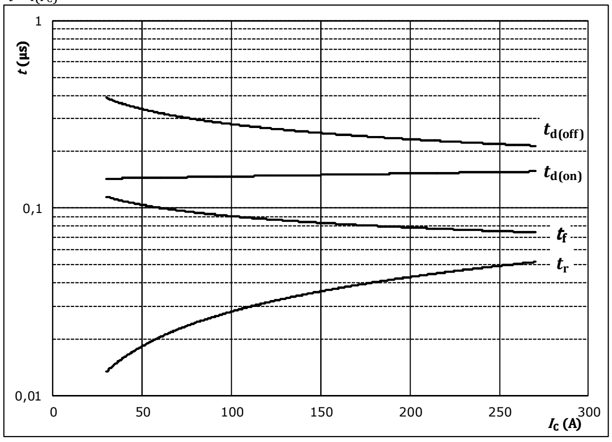
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	150	A

Boost Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$t = f(I_C)$



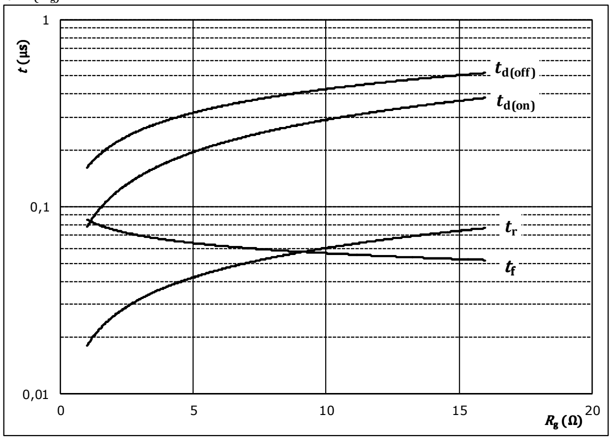
With an inductive load at

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

figure 6. IGBT

Typical switching times as a function of gate resistor

$t = f(R_g)$



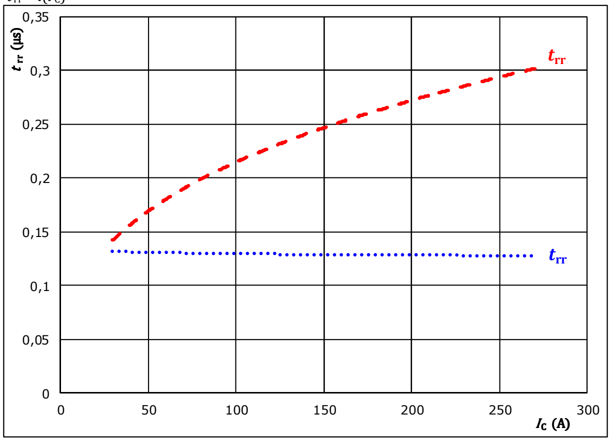
With an inductive load at

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

figure 7. FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

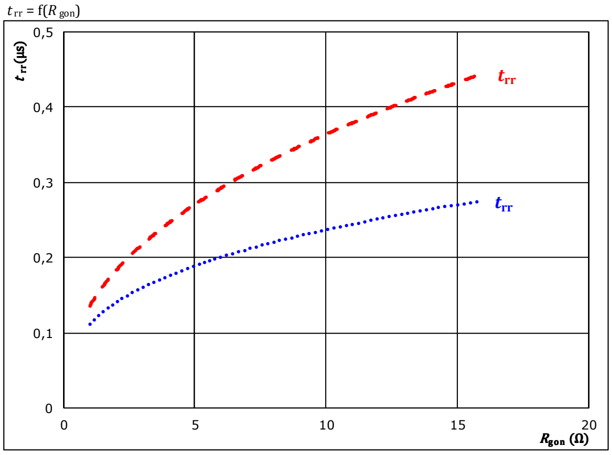
V_{CE}=	350	V
V_{GE}=	±15	V
R_{gon} =	4	Ω

T_j: 25 °C (dotted), 150 °C (dashed)

figure 8. FWD

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

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



With an inductive load at

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

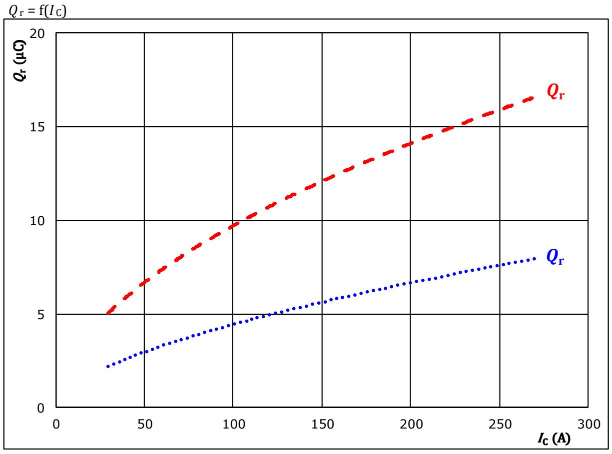
T_j: 25 °C (dotted), 150 °C (dashed)

Boost Switching Characteristics

figure 9. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



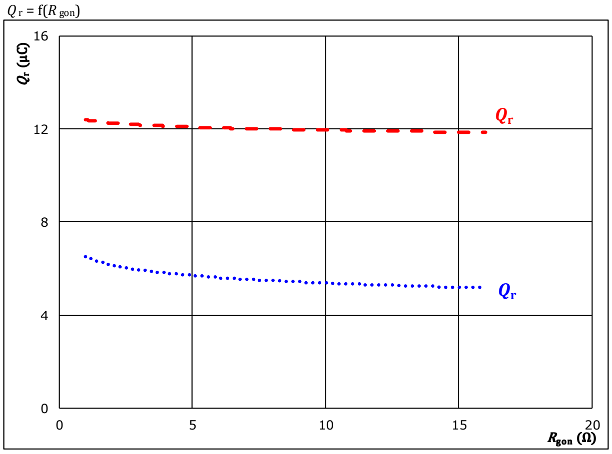
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	···········
V_{GE} =	±15	V		150 °C	– – – –
R_{gon} =	4	Ω			

figure 10. **FWD**

Typical recovered charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$



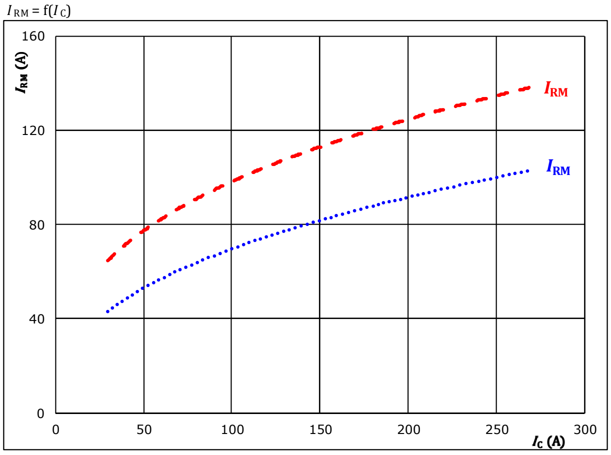
With an inductive load at

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

figure 11. **FWD**

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$



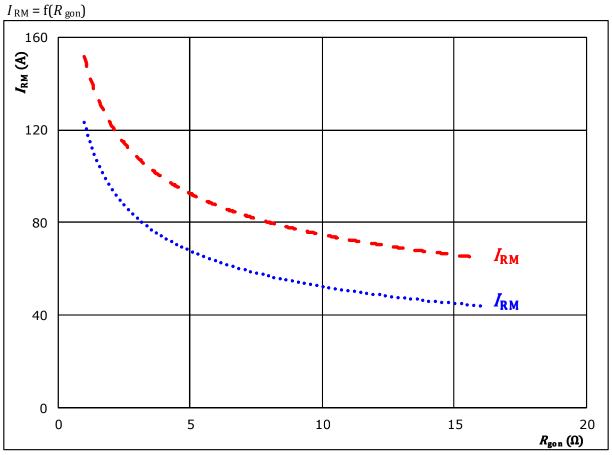
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	···········
V_{GE} =	±15	V		150 °C	– – – –
R_{gon} =	4	Ω			

figure 12. **FWD**

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

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



With an inductive load at

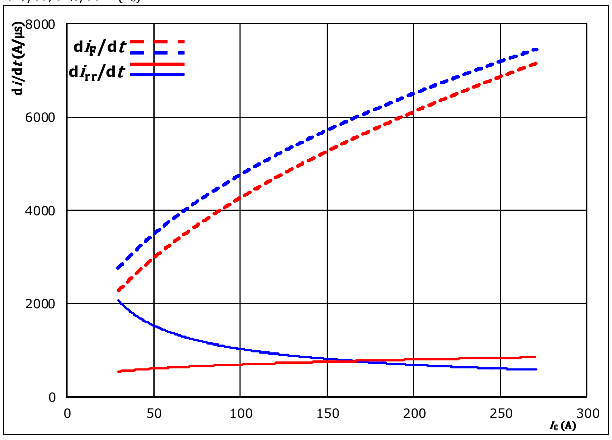
V_{CE}=	350	V	T_j:	25 °C	···········
V_{GE} =	±15	V		150 °C	– – – –
I_C=	150	A			

Boost Switching Characteristics

figure 13. **FWD**

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

di_F/dt, $di_{rr}/dt = f(I_C)$



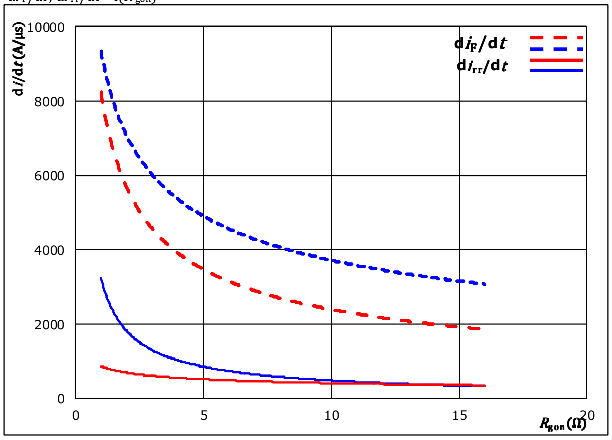
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		150 °C
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

di_F/dt, $di_{rr}/dt = f(R_{gon})$



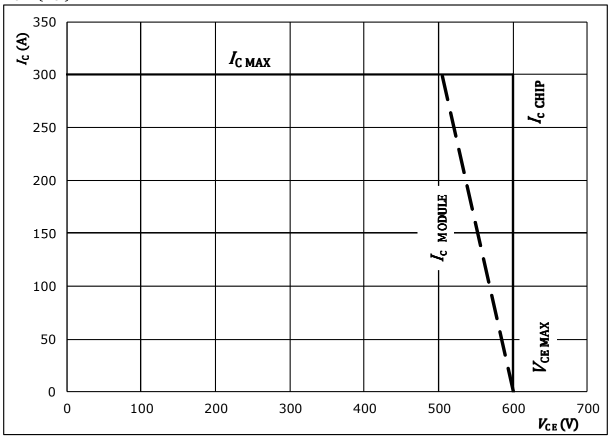
With an inductive load at

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

figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

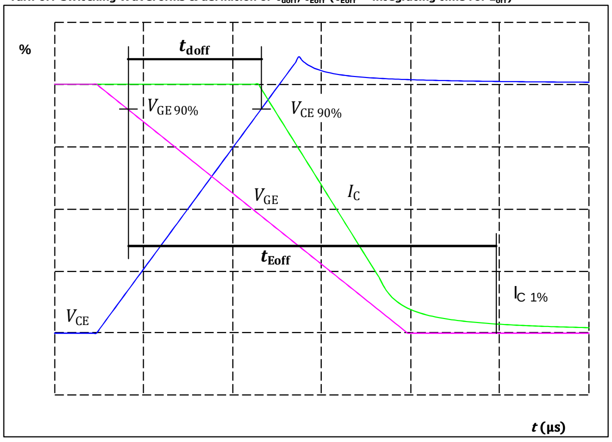
T_j =	150	°C
R_{gon} =	4	Ω
R_{goff} =	4	Ω

Boost Switching Definitions

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

figure 1. **IGBT**

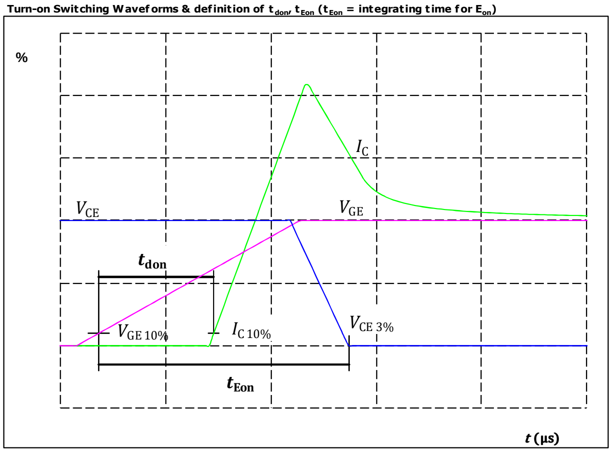
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



V_{GE}(0%) =	-15	V
V_{GE}(100%) =	15	V
V_C(100%) =	350	V
I_C(100%) =	150	A
t_{doff} =	245	ns

figure 2. **IGBT**

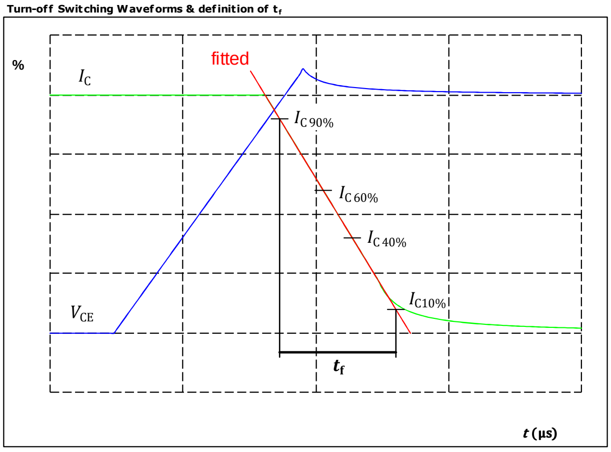
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



V_{GE}(0%) =	-15	V
V_{GE}(100%) =	15	V
V_C(100%) =	350	V
I_C(100%) =	150	A
t_{don} =	151	ns

figure 3. **IGBT**

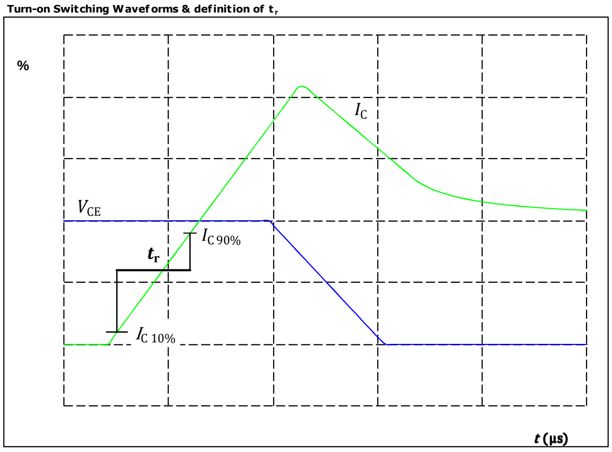
Turn-off Switching Waveforms & definition of t_f



V_C(100%) =	350	V
I_C(100%) =	150	A
t_f =	78	ns

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

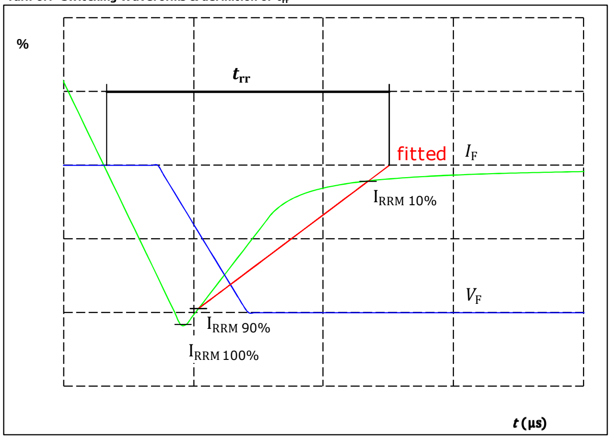


V_C(100%) =	350	V
I_C(100%) =	150	A
t_r =	36	ns

Boost Switching Characteristics

figure 5. **FWD**

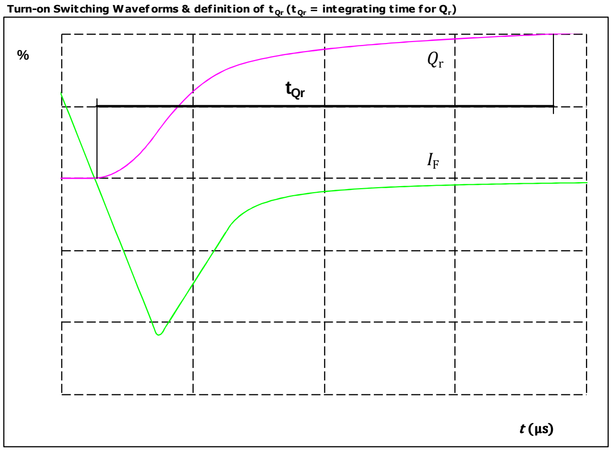
Turn-off Switching Waveforms & definition of t_{rr}



V_F (100%) =	350	V
I_F (100%) =	150	A
I_{RRM} (100%) =	114	A
t_{rr} =	290	ns

figure 6. **FWD**

Turn-on Switching Waveforms & definition of t_{Qr} (t_{Qr} = integrating time for Q_r)

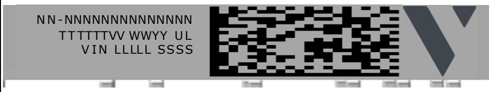


I_F (100%) =	150	A
Q_r (100%) =	0	μC

10-F107NIB150SG06-M136F39
10-P107NIB150SG06-M136F39Y
datasheet

Ordering Code & Marking

Version	Ordering Code
without thermal paste 17mm housing	10-F107NIB150SG06-M136F39
without thermal paste 17mm housing with press-fit pins	10-P107NIB150SG06-M136F39Y

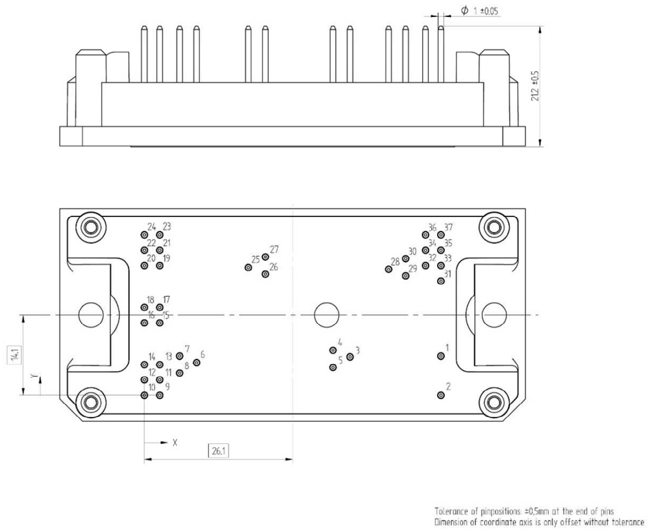


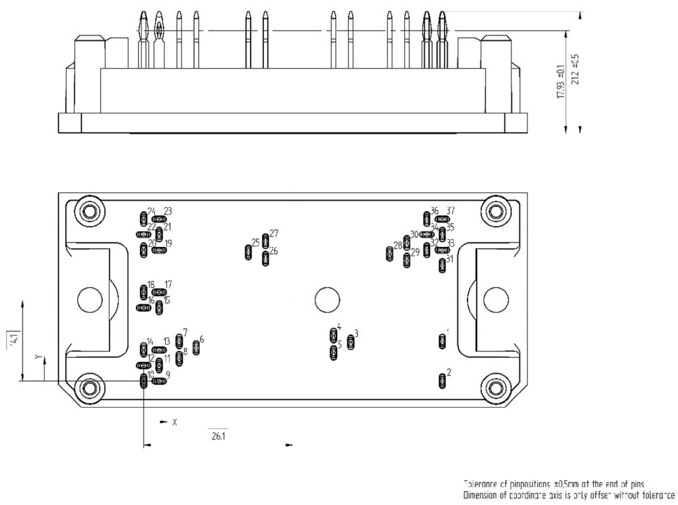
Text	**Name**		**Date code**	**UL & VIN**	**Lot**	**Serial**
	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]

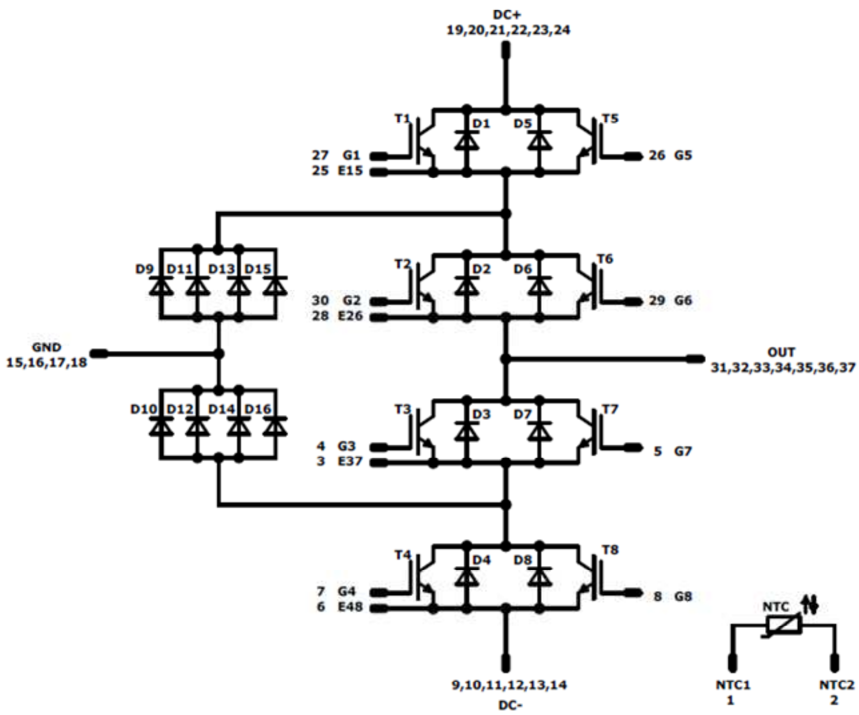
Pin	X	Y	Function
1	52,2	6,9	NTC1
2	52,2	0	NTC2
3	36,2	6,75	E37
4	33,2	7,9	G3
5	33,2	4,9	G7
6	9,2	5,75	E48
7	6,2	6,9	G4
8	6,2	3,9	G8
9	2,7	0	DC-
10	0	0	DC-
11	2,7	2,7	DC-
12	0	2,7	DC-
13	2,7	5,4	DC-
14	0	5,4	DC-
15	2,7	12,75	GND
16	0	12,75	GND
17	2,7	15,45	GND
18	0	15,45	GND
19	2,7	22,8	DC+
20	0	22,8	DC+
21	2,7	25,5	DC+
22	0	25,5	DC+
23	2,7	28,2	DC+
24	0	28,2	DC+
25	18,3	22,45	E15
26	21,3	21,3	G5
27	21,3	24,3	G1
28	43	22,15	E26
29	46	21	G6
30	46	24	G2
31	52,2	20,1	OUT
32	49,5	22,8	OUT
33	52,2	22,8	OUT
34	49,5	25,5	OUT
35	52,2	25,5	OUT
36	49,5	28,2	OUT
37	52,2	28,2	OUT





Vincotech

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1, T4, T5, T8	IGBT	650 V	75 A	Buck Switch	
D9, D11, D13, D15, D10, D12, D14, D16	FWD	650 V	40 A	Buck Diode	
T2, T3, T6, T7	IGBT	600 V	75 A	Boost Switch	
D1, D4, D5, D8	FWD	650 V	50 A	Boost Diode	
D2, D3, D6, D7	Diode	600 V	50 A	Boost Sw.Inv.Diode	
NTC	Thermistor			Thermistor	

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

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

Package data
Package data for *flow* 1 packages see vincotech.com website.

UL recognition and file number
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-F107NIB150SG06-M136F39-D6-14	24 Jan. 2019	Upgrade of D9-16 diodes; DS update	All