10-FZ07NIA075SM-P926F58
datasheet

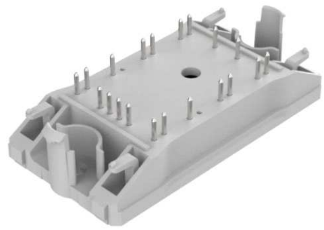
Vincotech

flow NPC 0 — 650 V / 75 A

Features

- High Efficiency three-level half-bridge
- High efficiency IGBT
- Neutral point-Clamped inverter
- Clip-In PCB mounting
- Low Inductance Layout

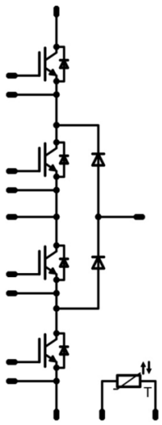
flow 0 12mm housing



Target applications

- Solar inverters
- UPS
- Power supplies

Schematic



Types

- 10-FZ07NIA075SM-P926F58

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Buck Switch\Out. Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ T_s = 80 °C	57	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	225	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	97	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum Junction Temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Buck Diode\Out. Boost Diode					
Peak Repetitive Reverse Voltage	V_{RRM}			650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80°C	59	A
Repetitive peak forward current	I_{FRM}			150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80°C	78	W
Maximum Junction Temperature	T_{jmax}			175	°C
Out. Boost Inverse Diode					
Peak Repetitive Reverse Voltage	V_{RRM}			650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80°C	65	A
Repetitive peak forward current	I_{FRM}			150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80°C	85	W
Maximum Junction Temperature	T_{jmax}			175	°C

Module Properties

Thermal Properties

Parameter	Symbol	Condition	Value	Unit
Storage temperature	T_{stg}		-40…+125	°C
Operation temperature under switching condition	T_{jop}		-40…+(T_{jmax} - 25)	°C

Isolation Properties

Parameter	Symbol	Condition		Value	Unit
Isolation voltage	V_{isol}	DC Voltage	t_p = 2 s	4000	V
Creepage distance				min. 12,7	mm
Clearance				9,75	mm
Comparative Tracking Index	CTI			> 200	

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Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{GS} [V] V_{r} [V]	I_{C} [A] I_{D} [A] I_{F} [A]	T_{j}[°C]	Min	Typ	Max	Unit
Buck Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,00075	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125 150		1,67 1,84 1,89	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_{g}							none		Ω
Input capacitance	C_{ies}	f = 1 MHz	0	25		25		4300		pF
Output capacitance	C_{oes}							75		
Reverse transfer capacitance	C_{res}							16		
Gate charge	Q_{g}		15	520	75	25		166		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material ʎ = 3,4 W/mK						0,98		K/W
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 4 Ω R_{gon} = 4 Ω	±15	350	75	25 125 150		39 39 39		ns
Rise time	t_{r}					25 125 150		12 14 15		
Turn-off delay time	$t_{d(off)}$					25 125 150		102 115 119		
Fall time	t_{f}					25 125 150		5 8 8		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 2,4 µC Q_{rFWD} = 4,8 µC Q_{rFWD} = 5,4 µC				25 125 150		0,799 1,170 1,223		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,314 0,534 0,592		

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Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{GS} [V] V_{r} [V]	I_{C} [A] I_{D} [A] I_{F} [A]	T_{j}[°C]	Min	Typ	Max	Unit
Buck Diode										
Static										
Forward voltage	V_{F}				75	25 125 150		1,53 1,49 1,47	1,77	V
Reverse leakage current	I_{r}			650		25			3,8	μA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						1,23		K/W
FWD Switching										
Peak recovery current	I_{RRM}	di/dt = 4857 A/μs di/dt = 5610 A/μs di/dt = 5462 A/μs	±15	350	75	25 125 150		60 79 84		A
Reverse recovery time	t_{rr}					25 125 150		72 121 134		ns
Recovered charge	Q_{r}					25 125 150		2,434 4,832 5,418		μC
Reverse recovered energy	E_{rec}					25 125 150		0,484 1,031 1,126		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		708 814 959		A/μs

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{GS} [V] V_r [V]	I_C [A] I_D [A] I_F [A]	T_j[°C]	Min	Typ	Max	
Out. Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,00075	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125 150		1,67 1,84 1,89	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	f = 1 MHz	0	25		25		4300		pF
Output capacitance	C_{oes}							75		
Reverse transfer capacitance	C_{res}							16		
Gate charge	Q_g		15	520	75	25		166		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,98		K/W
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 4 Ω R_{gon} = 4 Ω	±15	350	75	25 125 150		40 40 40		ns
Rise time	t_r					25 125 150		13 15 15		
Turn-off delay time	$t_{d(off)}$					25 125 150		105 120 124		
Fall time	t_f					25 125 150		5 10 13		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 2,5 µC Q_{rFWD} = 4,7 µC Q_{rFWD} = 5,3 µC				25 125 150		0,710 0,987 1,047		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,332 0,597 0,647		

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{GS} [V] V_r [V]	I_C [A] I_D [A] I_F [A]	T_j[°C]	Min	Typ	Max	
Out. Boost Diode										
Static										
Forward voltage	V_F				75	25 125 150		1,53 1,49 1,47	1,77	V
Reverse leakage current	I_r			650		25			3,8	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j\text{-}s)}$	phase-change material λ = 3,4 W/mK						1,23		K/W
FWD Switching										
Peak recovery current	I_{RRM}	di/dt = 5868 A/µs di/dt = 5310 A/µs di/dt = 4117 A/µs	±15	350	75	25 125 150		56 73 77		A
Reverse recovery time	t_{rr}					25 125 150		74 114 124		ns
Recovered charge	Q_r					25 125 150		2,450 4,736 5,336		µC
Reverse recovered energy	E_{rec}					25 125 150		0,607 1,222 1,380		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		498 431 444		A/µs
Out. Boost Inverse Diode										
Static										
Forward voltage	V_F				75	25 125 150		1,46 1,42 1,40	1,82	V
Reverse leakage current	I_r			650		25			0,9	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j\text{-}s)}$	phase-change material λ = 3,4 W/mK						1,12		K/W

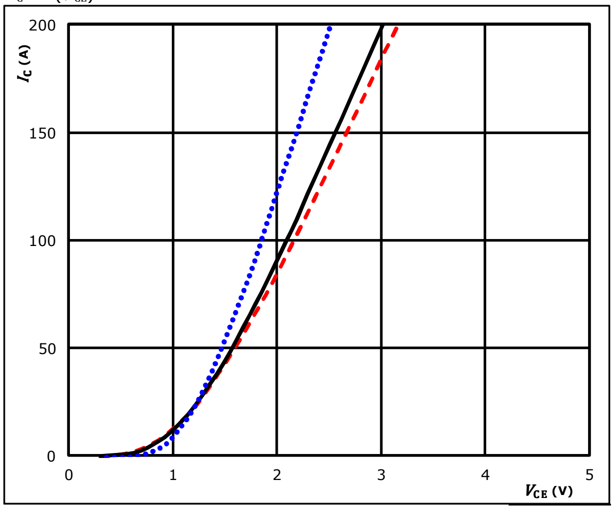
Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{GS} [V] V_r [V]	I_C [A] I_D [A] I_F [A]	T_j[°C]	Min	Typ	Max	
Thermistor										
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R100=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\Out. Boost Switch Characteristics

Typical output characteristics IGBT

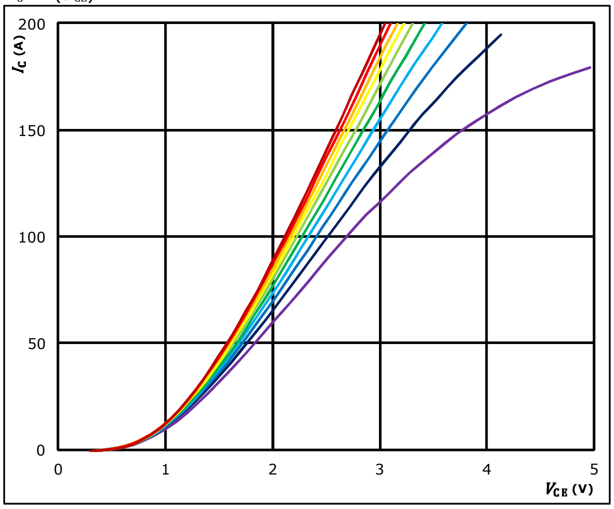
$I_C = f(V_{CE})$



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

Typical output characteristics IGBT

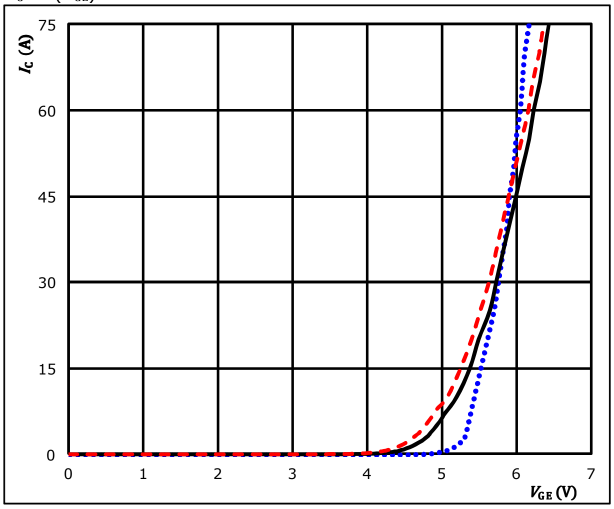
$I_C = f(V_{CE})$



t_p = 250 μs
T_j = 150 °C
V_{GE} from 8 V to 17 V in steps of 1 V

Typical transfer characteristics IGBT

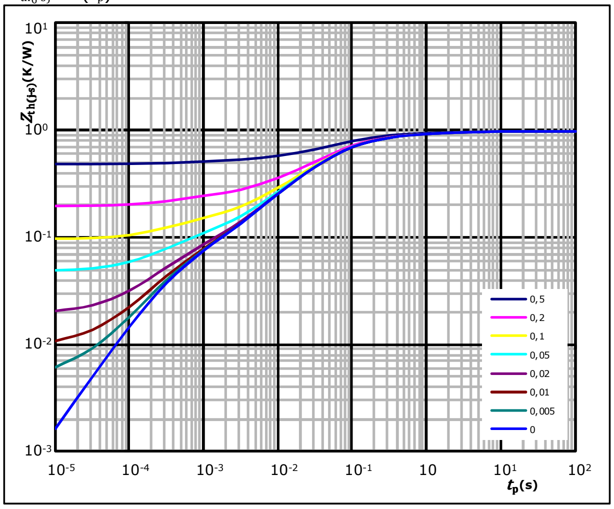
$I_C = f(V_{GE})$



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

Transient Thermal Impedance as function of Pulse duration IGBT

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



D = t_p / T
$R_{th(j-s)}$ = 0,98 K/W

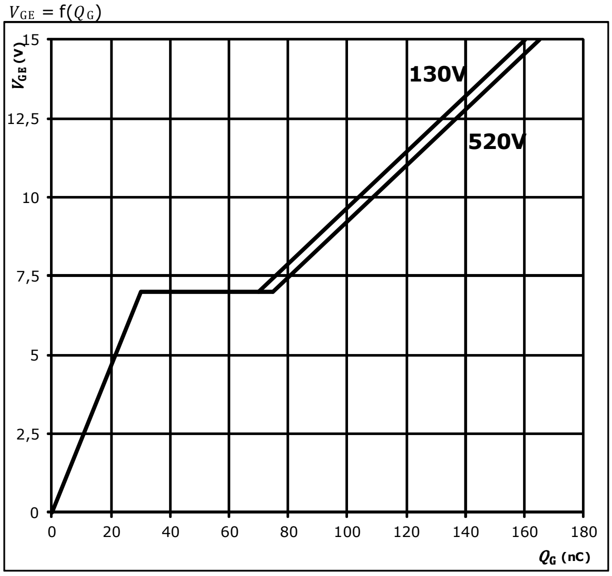
IGBT thermal model values

R (K/W)	τ (s)
7,21E-02	2,25E+00
1,46E-01	3,32E-01
4,74E-01	6,42E-02
1,76E-01	1,63E-02
6,17E-02	3,99E-03
4,63E-02	3,57E-04

Buck Switch\Out. Boost Switch Characteristics

Gate voltage vs Gate charge **IGBT**

$V_{GE} = f(Q_G)$

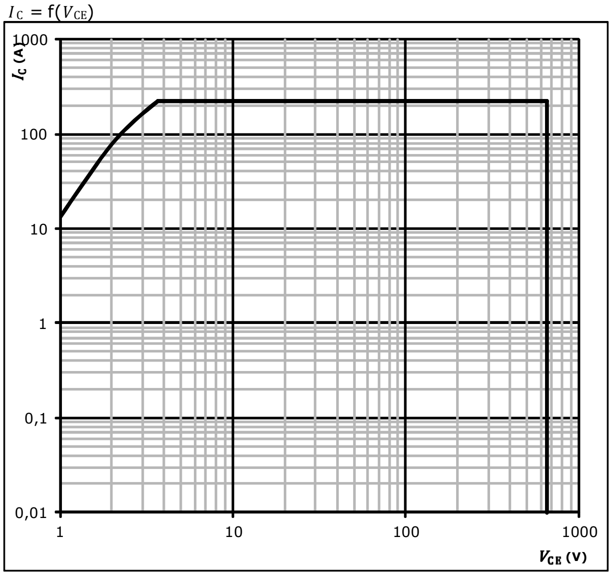


At

I_C=	75	A

Safe operating area **IGBT**

$I_C = f(V_{CE})$



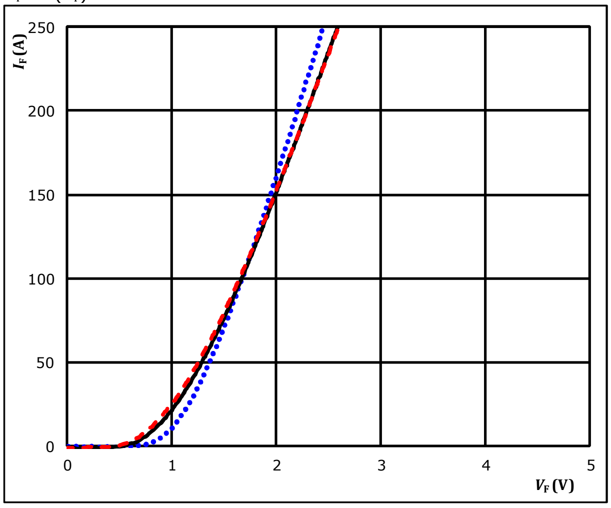
At

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

Buck Diode\Out. Boost Diode Characteristics

Typical forward characteristics **FWD**

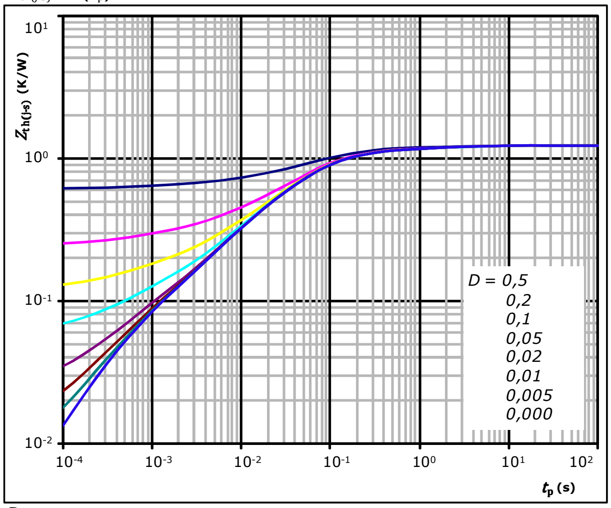
$I_F = f(V_F)$



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

Transient thermal impedance as a function of pulse width **FWD**

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



D = t_p / T

$R_{th(j\text{-}s)}$ = 1,23 K/W

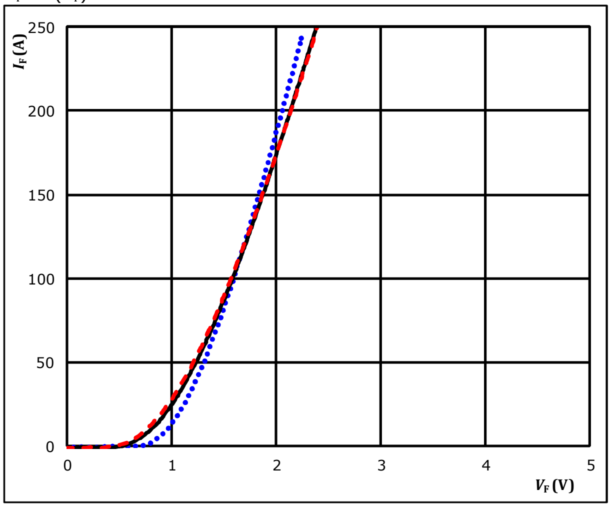
FWD thermal model values

R (K/W)	τ (s)
8,04E-02	2,68E+00
1,74E-01	2,85E-01
6,28E-01	6,23E-02
2,05E-01	1,65E-02
8,90E-02	4,15E-03
4,76E-02	4,96E-04

Out. Boost Inverse Diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$

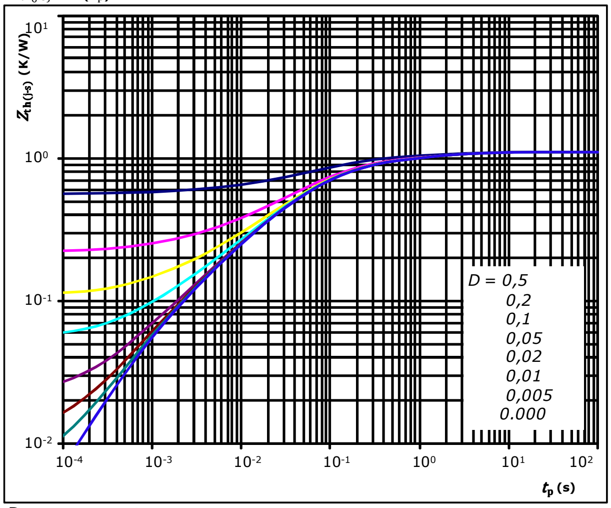


t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

Transient thermal impedance as a function of pulse width **FWD**

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



D = t_p / T

$R_{th(j-s)}$ = 1,12 K/W

FWD thermal model values

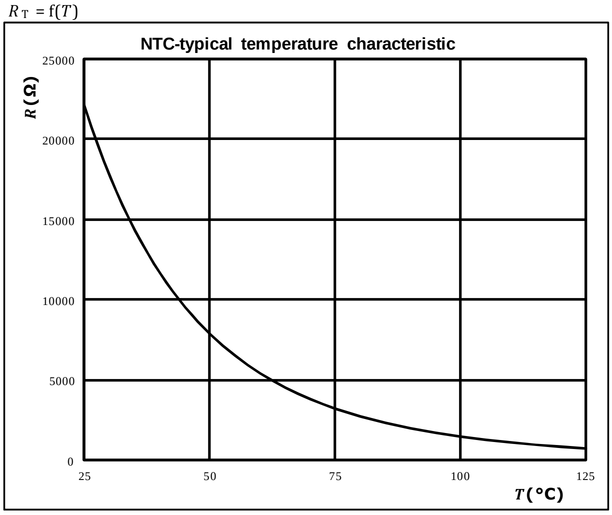
R (K/W)	τ (s)
6,8840E-02	4,0940E+00
1,6010E-01	8,4260E-01
3,6790E-01	1,3000E-01
3,1440E-01	4,0920E-02
1,5680E-01	8,7800E-03
4,7270E-02	1,1130E-03

Thermistor Characteristics

Thermistor typical temperature characteristic

Typical NTC characteristic as a function of temperature

$R_T = f(T)$

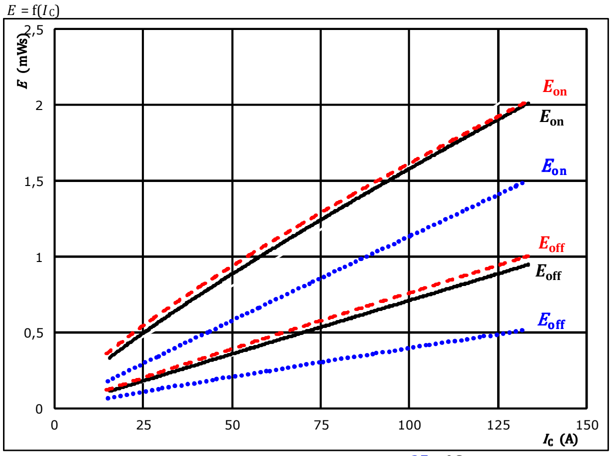


Buck Switching Characteristics

Figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



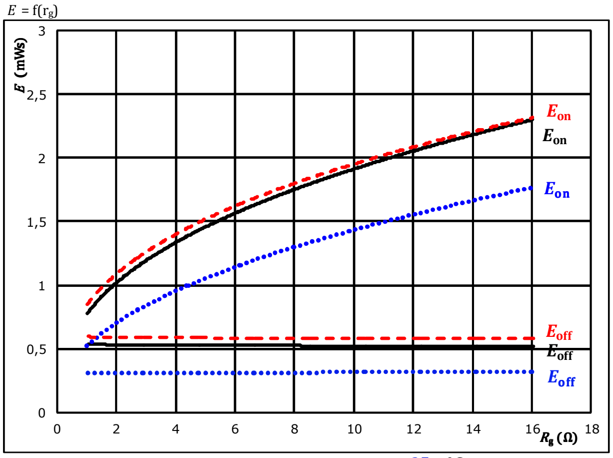
With an inductive load at

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

$E = f(r_g)$



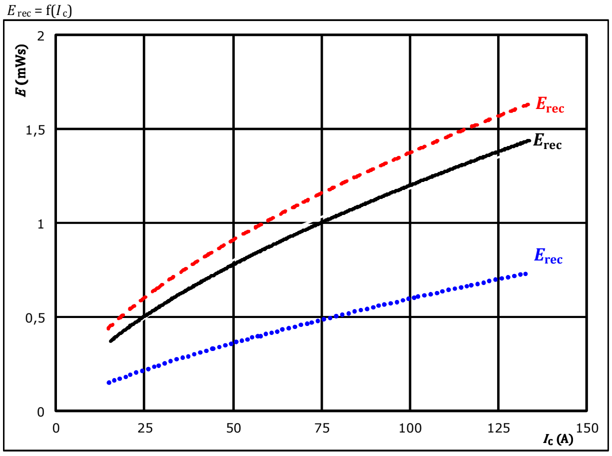
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	75	A		150 °C

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



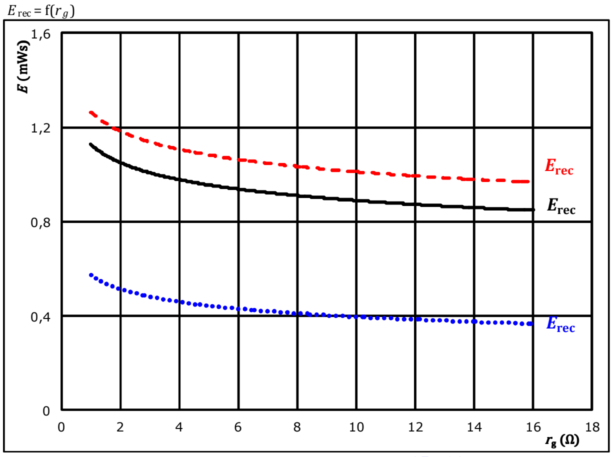
With an inductive load at

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

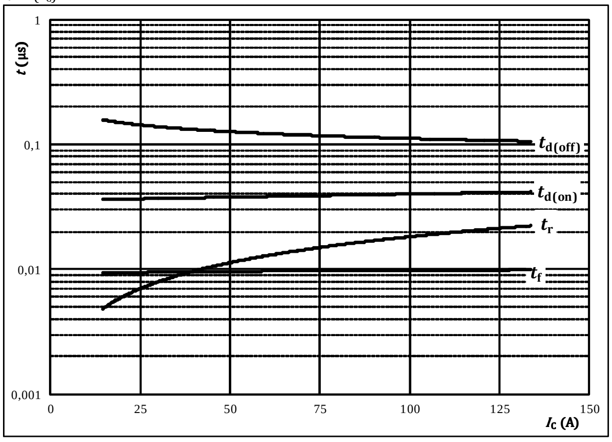
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	75	A		150 °C

Buck Switching Characteristics

Figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



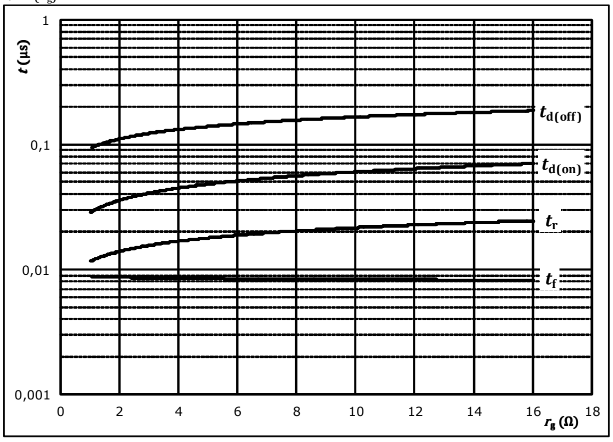
With an inductive load at

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

$t = f(r_g)$



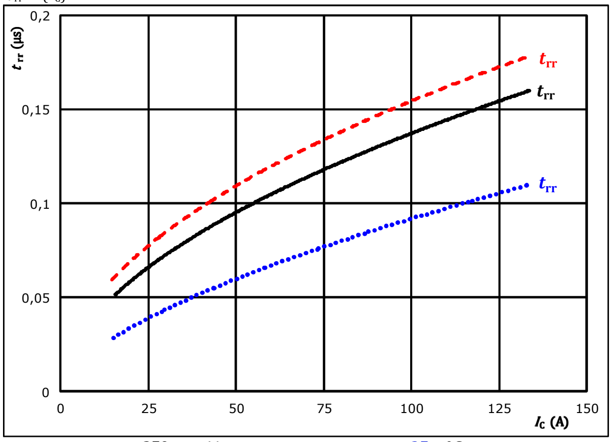
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	75	A

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$

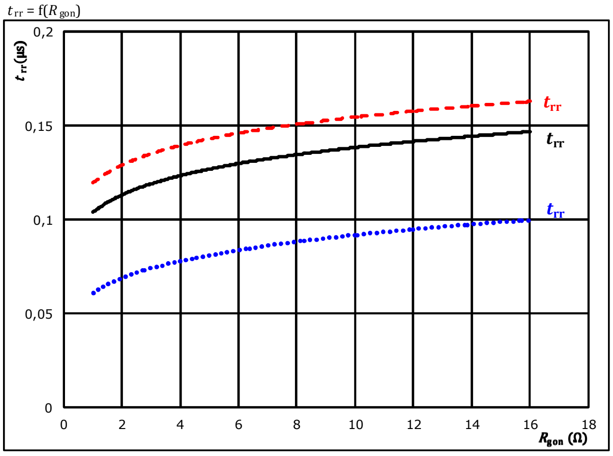


At					
V_{CE}=	350	V		25 °C	dotted
V_{GE} =	±15	V	T_j:	125 °C	solid
R_{gon} =	4	Ω		150 °C	dashed

Figure 8. **FWD**

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

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



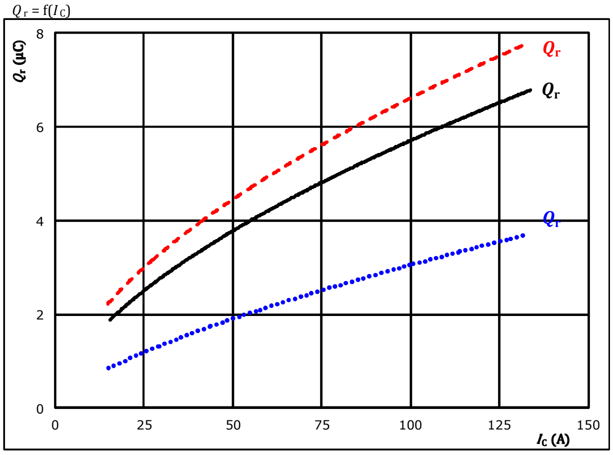
At					
V_{CE} =	350	V		25 °C	dotted
V_{GE} =	±15	V	T_j:	125 °C	solid
I_C =	75	A		150 °C	dashed

Buck Switching Characteristics

Figure 9. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

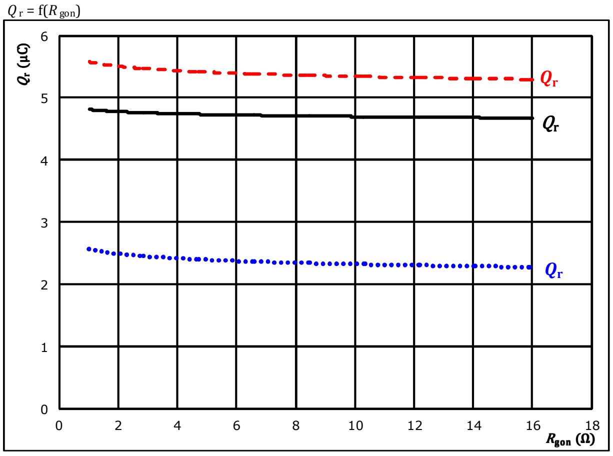


At					
V_{CE} =	350	V		25 °C	········
V_{GE} =	±15	V	T_j:	125 °C	——
R_{gon} =	4	Ω		150 °C	– – –

Figure 10. **FWD**

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

$Q_r = f(R_{gon})$

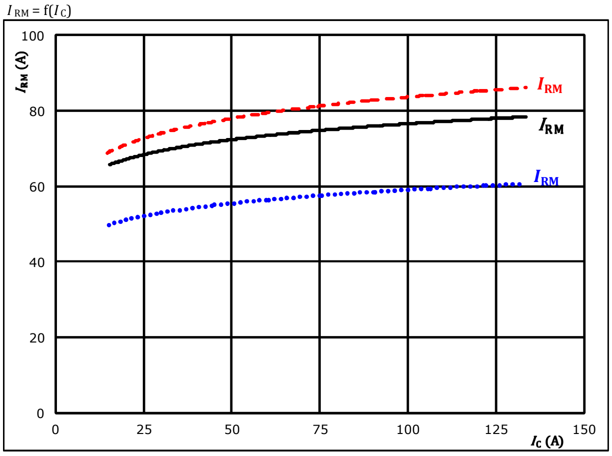


At					
V_{CE}=	350	V		25 °C	········
V_{GE} =	±15	V	T_j:	125 °C	——
I_C=	75	A		150 °C	– – –

Figure 11. **FWD**

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

$I_{RM} = f(I_C)$

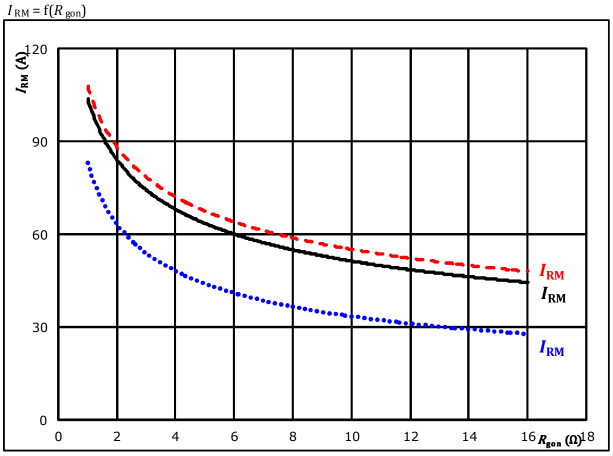


At					
V_{CE}:	350	V		25 °C	········
V_{GE} =	±15	V	T_j:	125 °C	——
R_{gon} =	4	Ω		150 °C	– – –

Figure 12. **FWD**

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

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



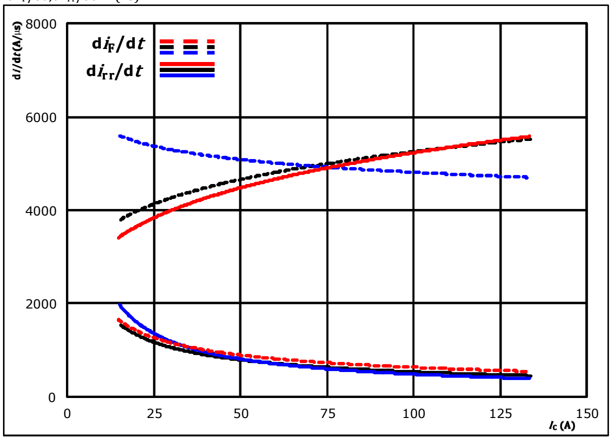
At					
V_{CE} =	350	V		25 °C	········
V_{GE} =	±15	V	T_j:	125 °C	——
I_C =	75	A		150 °C	– – –

Buck Switching Characteristics

Figure 13. **FWD**

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

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



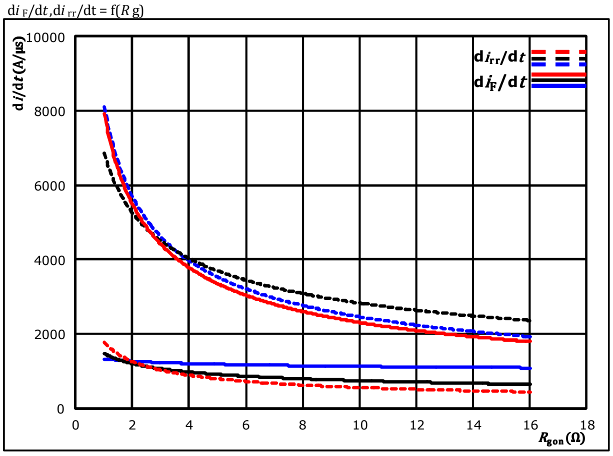
At

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

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



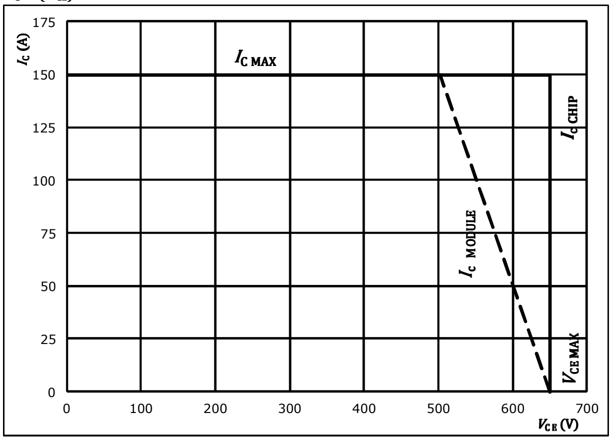
At

V_{CE} =	350	V		25	°C	···········
V_{GE} =	±15	V	T_j:	125	°C	———
I_C =	75	A		150	°C	– – –

Figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

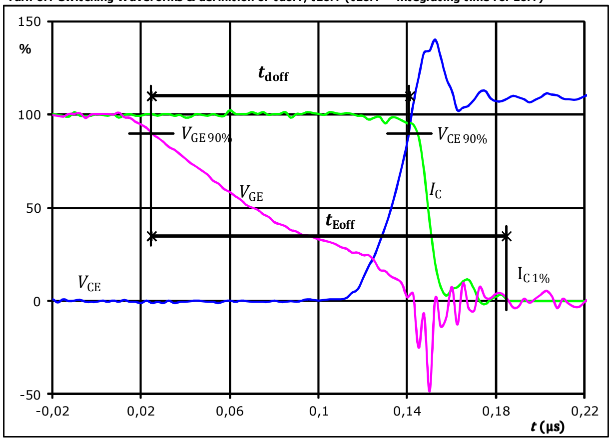
T_j =	175	°C
R_{gon} =	4	Ω
R_{goff} =	4	Ω

Buck Switching Definitions

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

Figure 1. IGBT

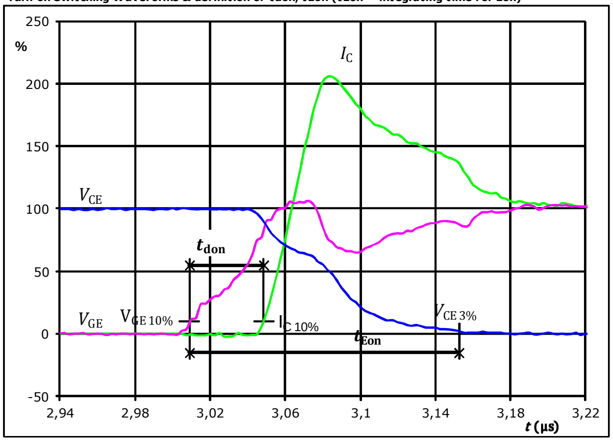
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GE}(0\%)$ =	0	V
$V_{GE}(100\%)$ =	20	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	74	A
t_{doff} =	0,115	µs
t_{Eoff} =	0,160	µs

Figure 2. IGBT

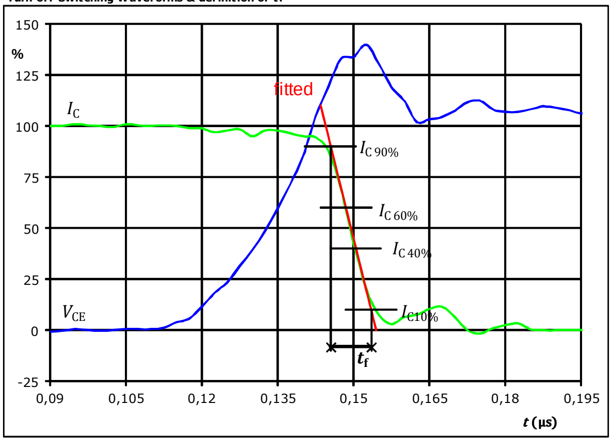
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GE}(0\%)$ =	0	V
$V_{GE}(100\%)$ =	20	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	74	A
t_{don} =	0,039	µs
t_{Eon} =	0,143	µs

Figure 3. IGBT

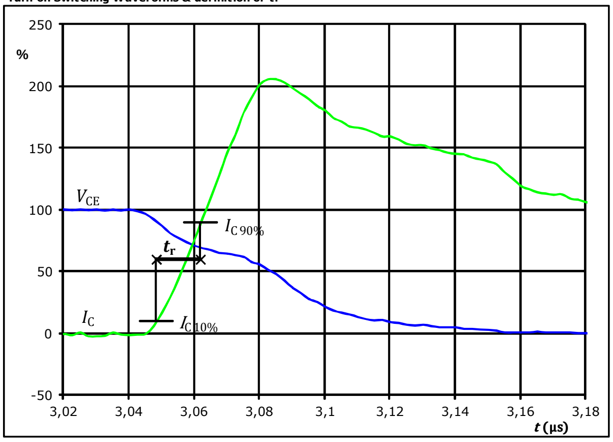
Turn-off Switching Waveforms & definition of tf



$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	74	A
t_f =	0,008	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of tr

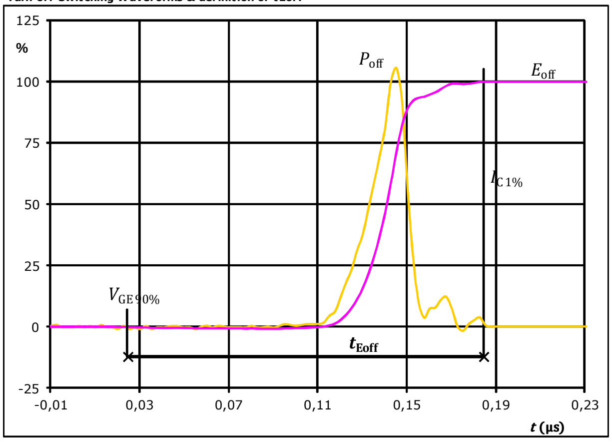


$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	74	A
t_r =	0,014	µs

Buck Switching Definitions

Figure 5. **IGBT**

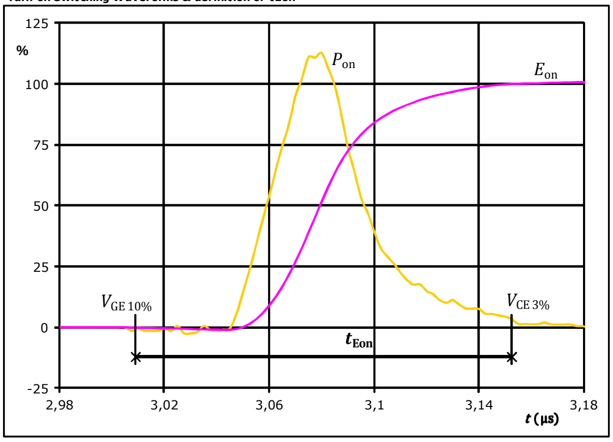
Turn-off Switching Waveforms & definition of tEoff



P_{off} (100%) =	26,01	kW
E_{off} (100%) =	0,53	mJ
t_{Eoff} =	0,16	µs

Figure 6. **IGBT**

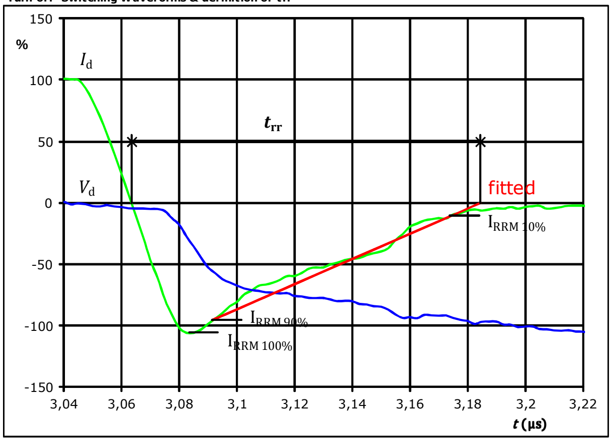
Turn-on Switching Waveforms & definition of tEon



P_{on} (100%) =	26,01	kW
E_{on} (100%) =	1,17	mJ
t_{Eon} =	0,14	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

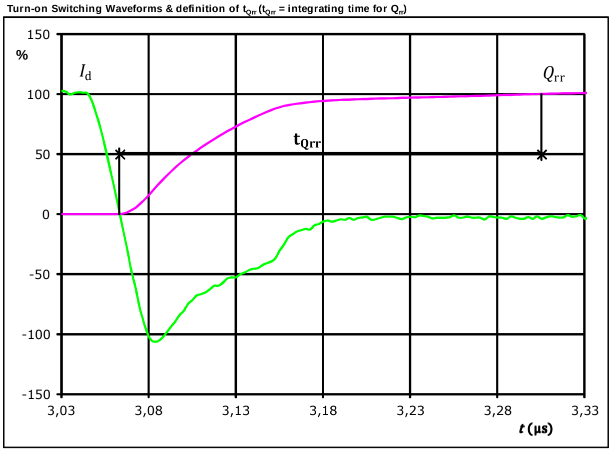


V_d (100%) =	350	V
I_d (100%) =	74	A
I_{RRM} (100%) =	-79	A
t_{rr} =	0,121	µs

Buck Switching Definitions

Figure 8. **FWD**

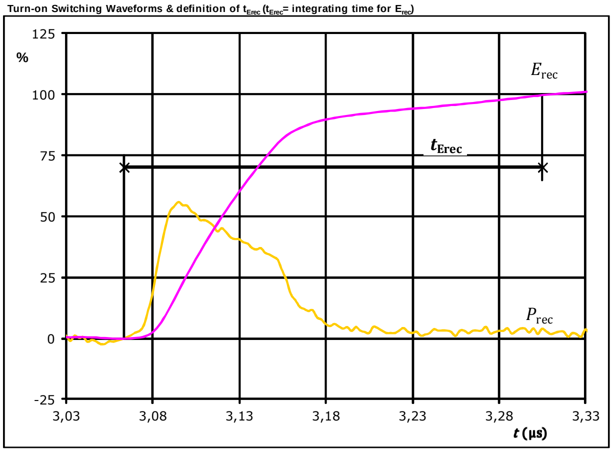
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	74	A
Q_{rr} (100%) =	4,83	µC
t_{Qrr} =	0,24	µs

Figure 9. **FWD**

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



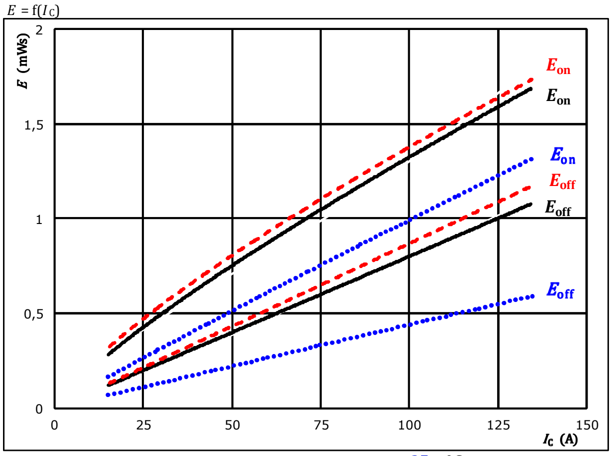
P_{rec} (100%) =	26,01	kW
E_{rec} (100%) =	1,03	mJ
t_{Erec} =	0,24	µs

Out. Boost Switching Characteristics

Figure 1. IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$



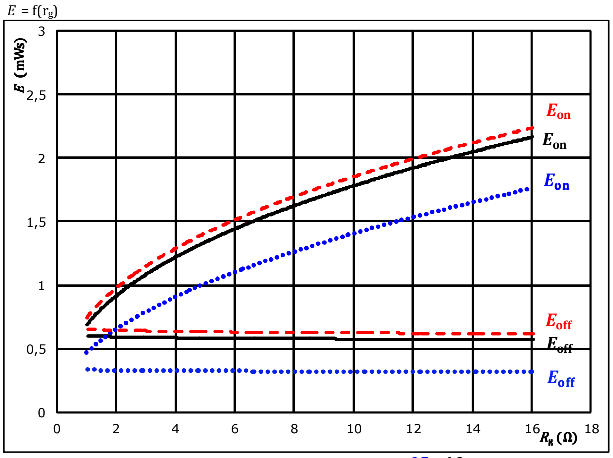
With an inductive load at

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

$E = f(r_g)$



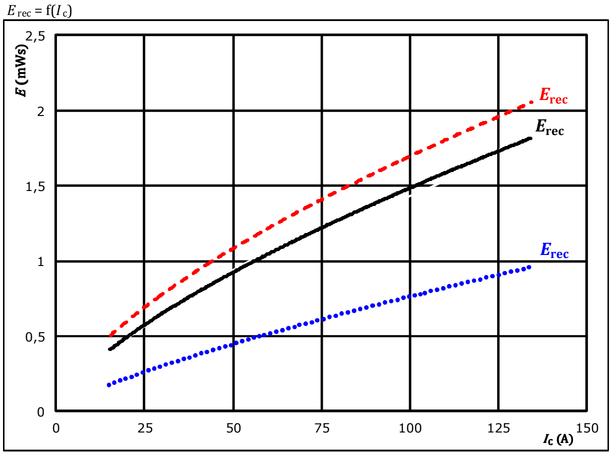
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	············
V_{GE} =	±15	V		125 °C	——
I_C =	75	A		150 °C	– – – –

Figure 3. FWD

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



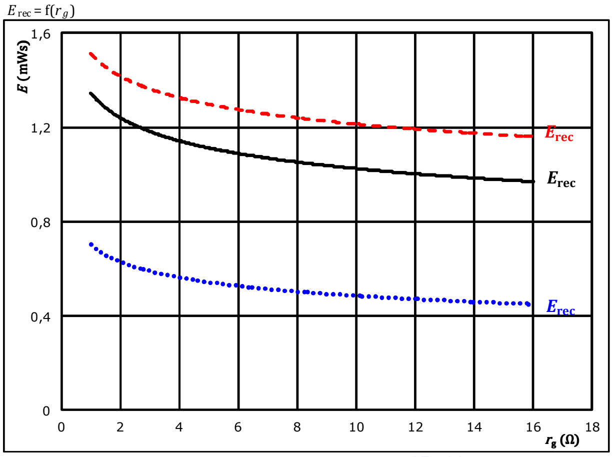
With an inductive load at

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

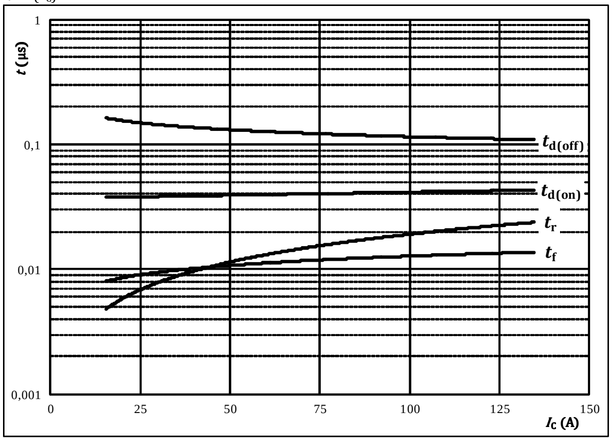
V_{CE} =	350	V	T_j:	25 °C	············
V_{GE} =	±15	V		125 °C	——
I_C =	75	A		150 °C	– – – –

Out. Boost Switching Characteristics

Figure 5. IGBT

Typical switching times as a function of collector current

$t = f(I_C)$



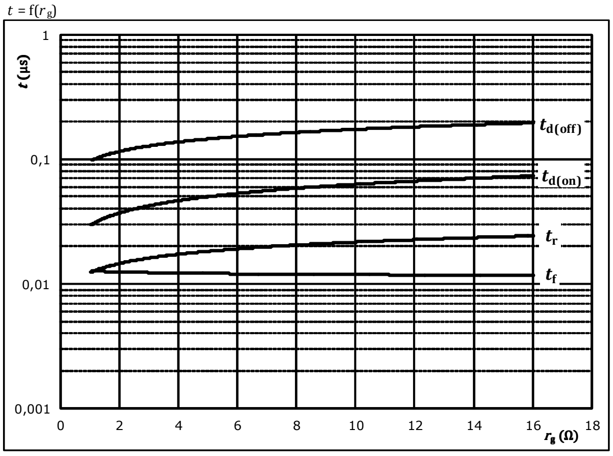
With an inductive load at

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

$t = f(r_g)$



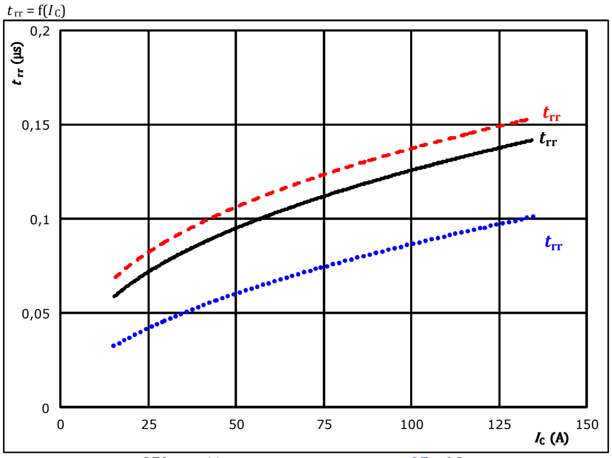
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	75	A

Figure 7. FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$

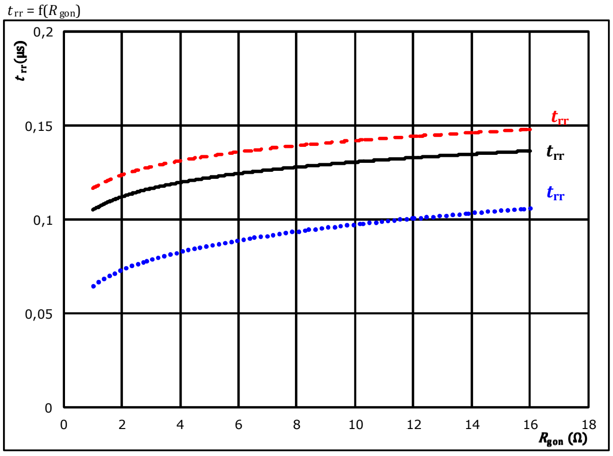


At					
V_{CE} =	350	V		25 °C	···········
V_{GE} =	±15	V	T_j:	125 °C	———
R_{gon} =	4	Ω		150 °C	– – –

Figure 8. FWD

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

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



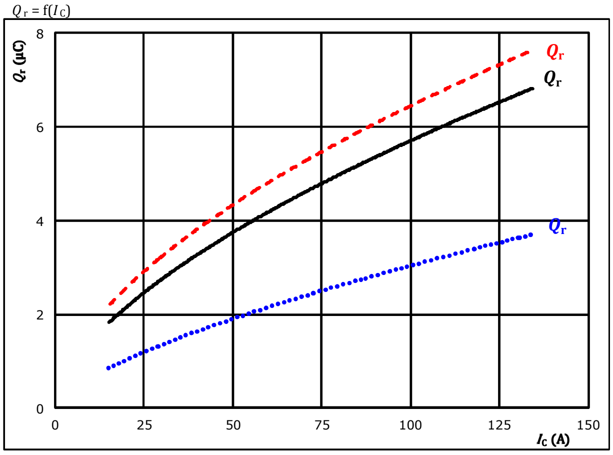
At					
V_{CE} =	350	V		25 °C	···········
V_{GE} =	±15	V	T_j:	125 °C	———
I_C =	75	A		150 °C	– – –

Out. Boost Switching Characteristics

Figure 9. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

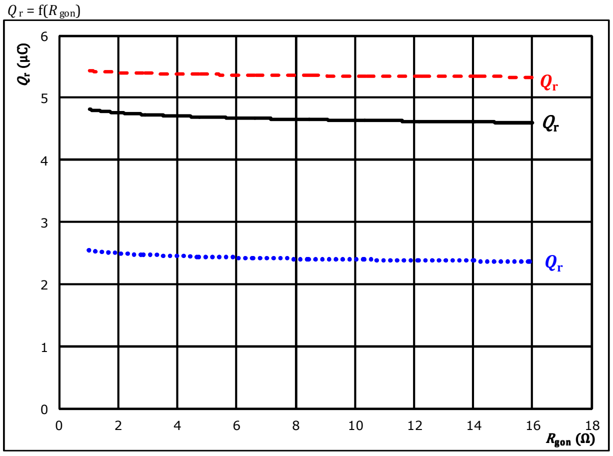


At	V_{CE} =	350	V	T_j:	25 °C	dotted
	V_{GE} =	±15	V		125 °C	solid
	R_{gon} =	4	Ω		150 °C	dashed

Figure 10. **FWD**

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

$Q_r = f(R_{gon})$

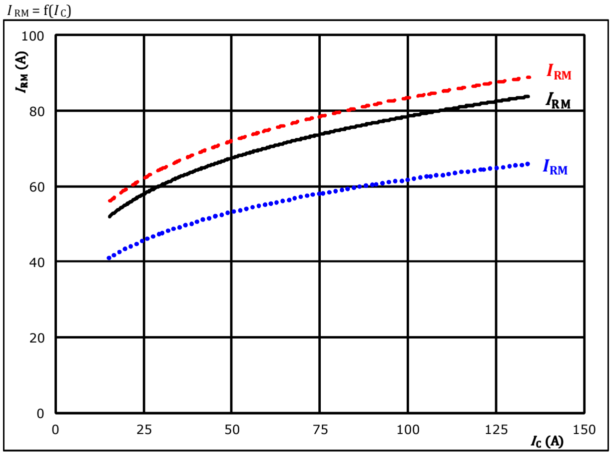


At	V_{CE}=	350	V	T_j:	25 °C	dotted
	V_{GE} =	±15	V		125 °C	solid
	I_C=	75	A		150 °C	dashed

Figure 11. **FWD**

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

$I_{RM} = f(I_C)$

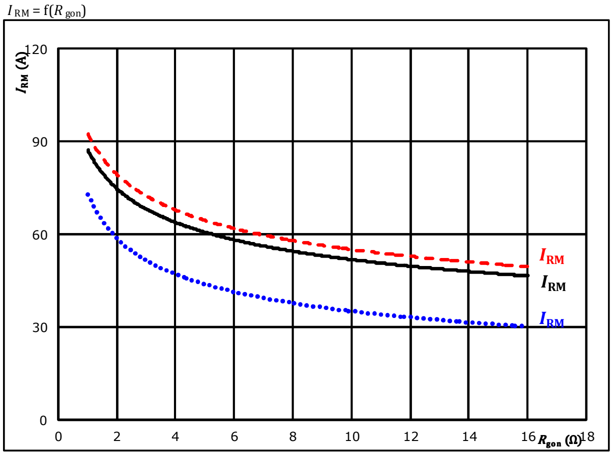


At	V_{CE} =	350	V	T_j:	25 °C	dotted
	V_{GE} =	±15	V		125 °C	solid
	R_{gon} =	4	Ω		150 °C	dashed

Figure 12. **FWD**

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

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



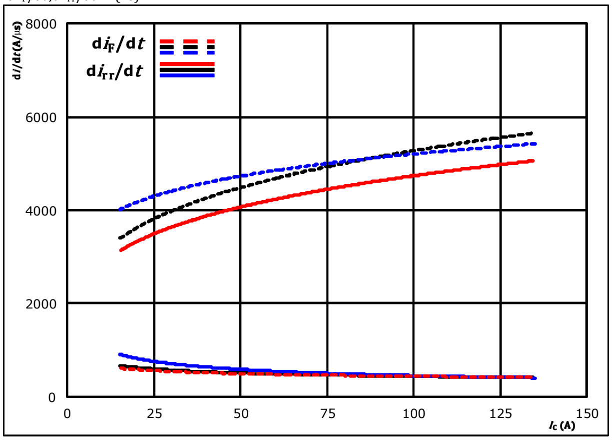
At	V_{CE} =	350	V	T_j:	25 °C	dotted
	V_{GE} =	±15	V		125 °C	solid
	I_C =	75	A		150 °C	dashed

Out. Boost Switching Characteristics

Figure 13. **FWD**

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

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

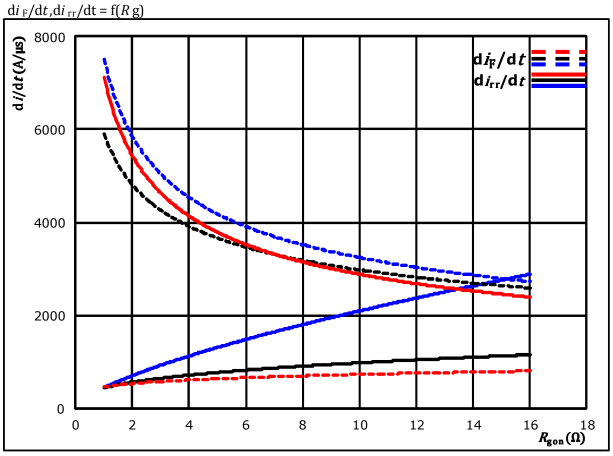


At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	4	Ω		150 °C	dashed

Figure 14. **FWD**

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

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

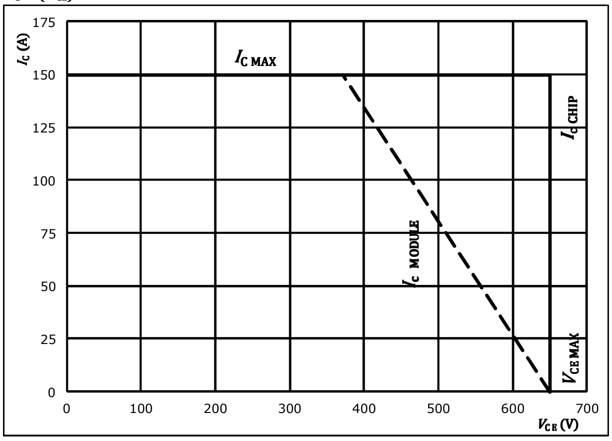


At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	75	A		150 °C	dashed

Figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At		
T_j =	175	°C
R_{gon} =	4	Ω
R_{goff} =	4	Ω

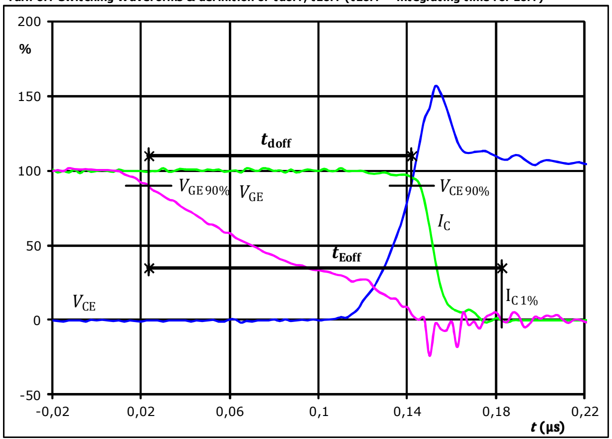
Out. Boost Switching Definitions

General conditions

T_j	=	25 °C
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

Figure 1. **IGBT**

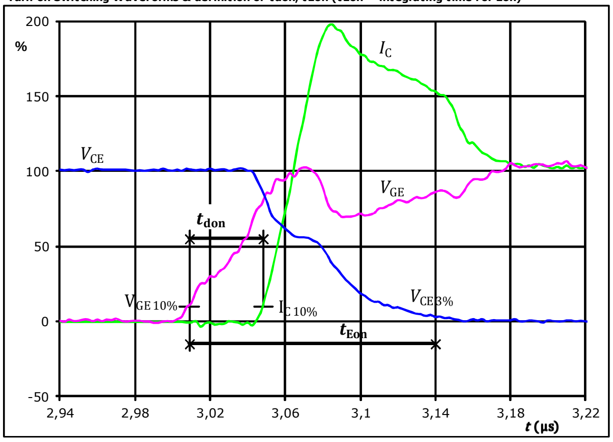
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GE}(0\%)$ =	0	V
$V_{GE}(100\%)$ =	20	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_{doff} =	0,120	µs
t_{Eoff} =	0,159	µs

Figure 2. **IGBT**

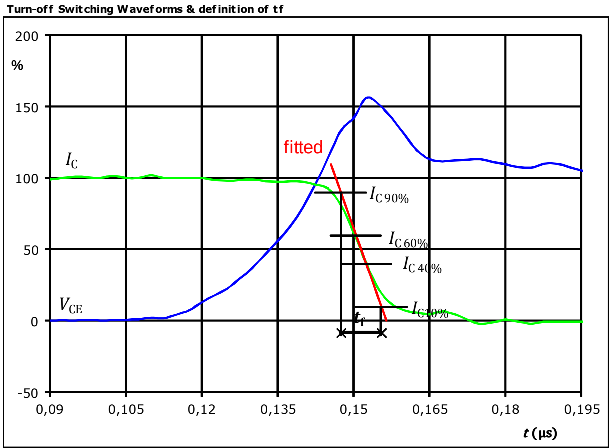
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GE}(0\%)$ =	0	V
$V_{GE}(100\%)$ =	20	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_{don} =	0,040	µs
t_{Eon} =	0,131	µs

Figure 3. **IGBT**

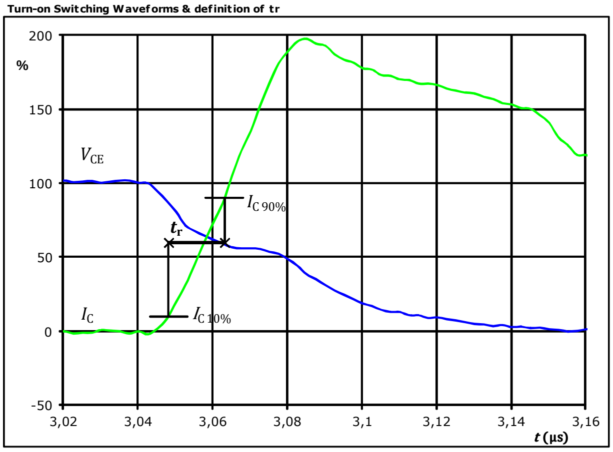
Turn-off Switching Waveforms & definition of tf



$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_f =	0,009	µs

Figure 4. **IGBT**

Turn-on Switching Waveforms & definition of tr

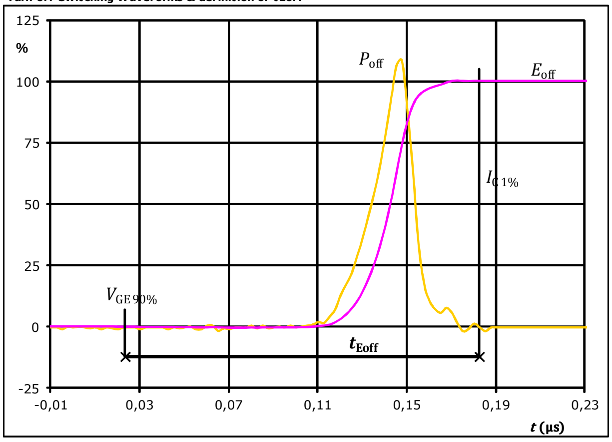


$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_r =	0,015	µs

Out. Boost Switching Definitions

Figure 5.	IGBT

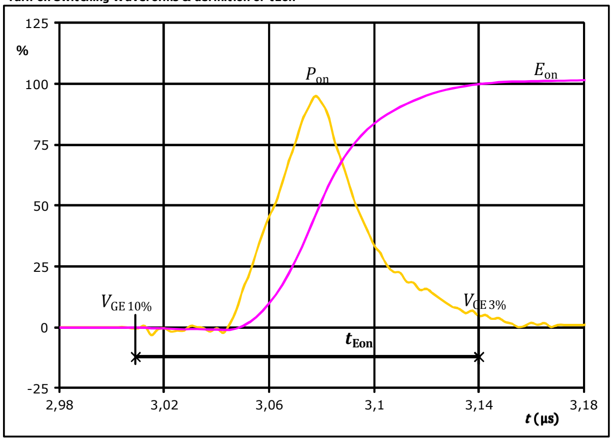
Turn-off Switching Waveforms & definition of tEoff



P_{off} (100%) =	26,12	kW
E_{off} (100%) =	0,60	mJ
t_{Eoff} =	0,16	µs

Figure 6.	IGBT

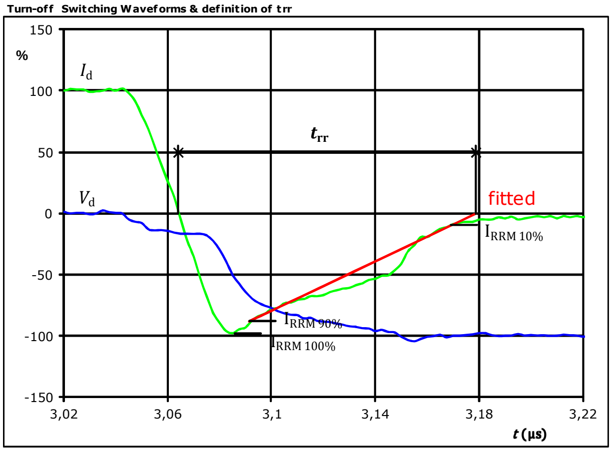
Turn-on Switching Waveforms & definition of tEon



P_{on} (100%) =	26,12	kW
E_{on} (100%) =	0,99	mJ
t_{Eon} =	0,13	µs

Figure 7.	FWD

Turn-off Switching Waveforms & definition of trr

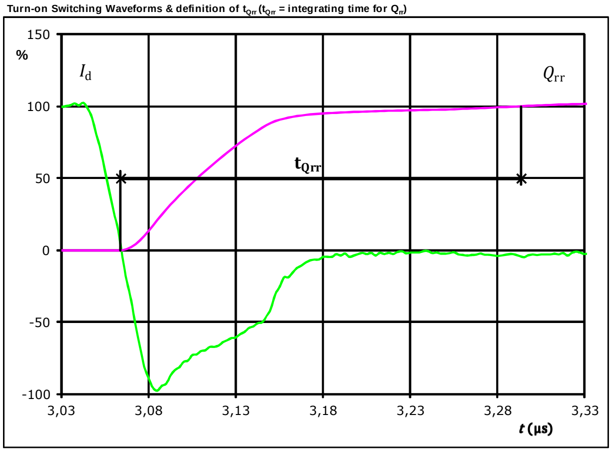


V_d (100%) =	350	V
I_d (100%) =	75	A
I_{RRM} (100%) =	-73	A
t_{rr} =	0,114	µs

Out. Boost Switching Definitions

Figure 8. **FWD**

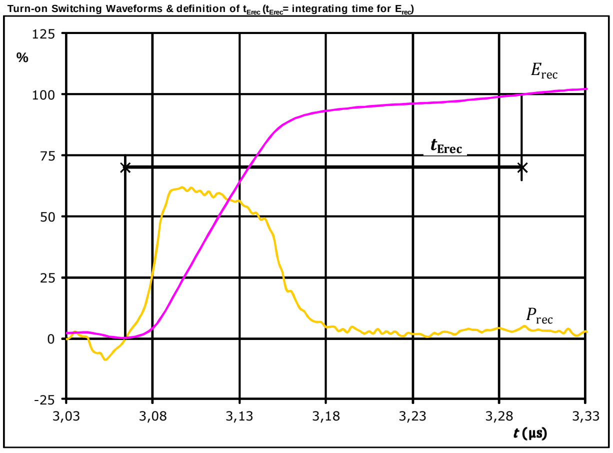
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	75	A
Q_{rr} (100%) =	4,74	µC
t_{Qrr} =	0,23	µs

Figure 9. **FWD**

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



P_{rec} (100%) =	26,12	kW
E_{rec} (100%) =	1,22	mJ
t_{Erec} =	0,23	µs

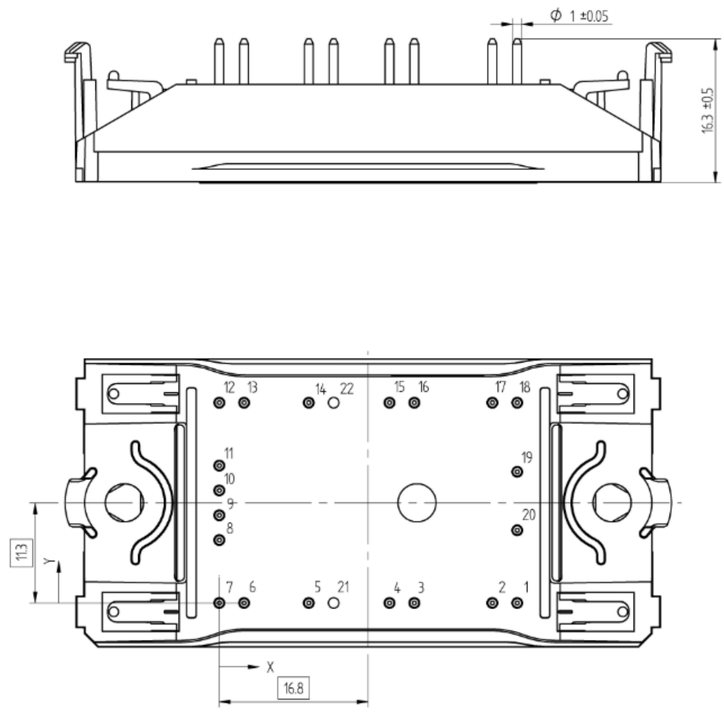
Ordering Code & Marking

Version	Ordering Code
without thermal paste 12mm housing with solder pins	10-FZ07NIA075SM-P926F58
with thermal paste 12mm housing with solder pins	10-FZ07NIA075SM-P926F58-/3/

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

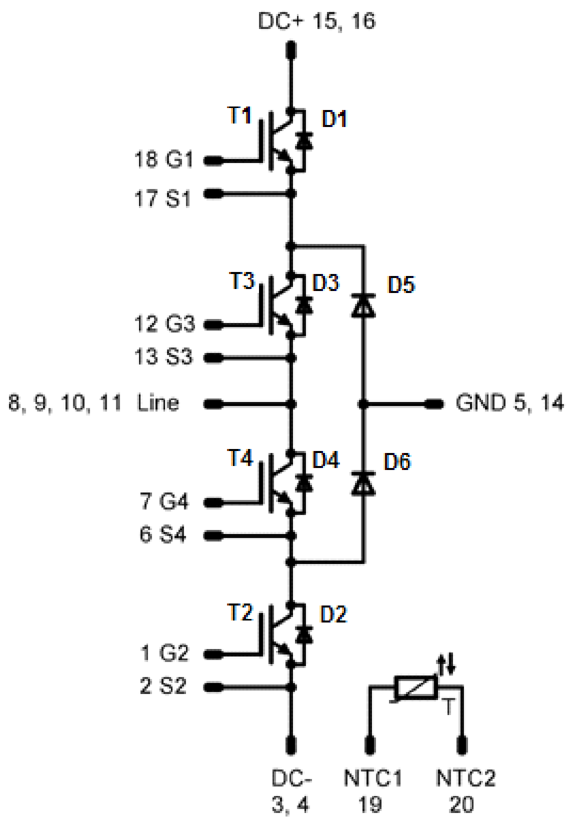
Outline

Pin table			
Pin	X	Y	Function
1	33,6	0	G2
2	30,8	0	S2
3	22	0	-DC
4	19,2	0	-DC
5	10,1	0	GND
6	2,8	0	S4
7	0	0	G4
8	0	7,1	Line
9	0	9,9	Line
10	0	12,7	Line
11	0	15,5	Line
12	0	22,6	G3
13	2,8	22,6	S3
14	10,1	22,6	GND
15	19,2	22,6	+DC
16	22	22,6	+DC
17	30,8	22,6	S1
18	33,6	22,6	G1
19	33,6	14,8	NTC1
20	33,6	8,2	NTC2
21	Not assembled		
22	Not assembled		



Tolerance of pinpositions: ±0,5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1,T2	IGBT	650 V	75 A	Buck Switch	
D5,D6	FWD	650 V	75 A	Buck Diode	
T3,T4	IGBT	650 V	75 A	Out. Boost Switch	
D1,D2	FWD	650 V	75 A	Out. Boost Diode	
D3,D4	FWD	650 V	75 A	Out. Boost Inverse Diode	
T	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.

Package data
Package data for *flow* 0 packages see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-FZ07NIA075SM-P926F58-D2-14	23 Mar. 2020	Correction of ordering code	All
		Ordering option with thermal interface material added	26