10-FZ07BBA075S5-L684L58
datasheet

flow BUCK-BOOST 0 — 650 V / 75 A

Features

- Battery Buck Boost
- NPC-like topology
- IGBT S5 + Rapid1S Diode
- Thermistor

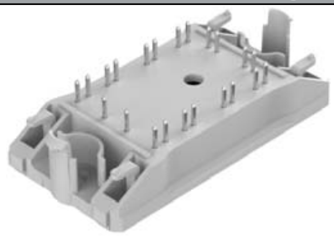
Target applications

- UPS

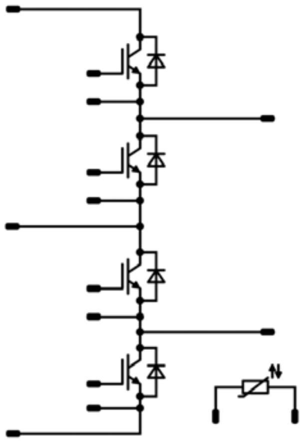
Types

- 10-FZ07BBA075S5-L684L58

flow 0 12 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	42	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		120	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	65	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C

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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	33	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	50	W
Maximum Junction Temperature	T_{jmax}			175	°C
Boost Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current	I_C	$T_j = T_{jmax}$	T_s = 80 °C	58	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	86	W
Gate-emitter voltage	V_{GES}			±20	V
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	55	A
Repetitive peak forward current	I_{FRM}	T_j limited by T_{jmax}		150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	71	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				9,55	mm
Comparative Tracking Index	CTI			> 200	

*100 % tested in production

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 Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,0004	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		40	25 125 150		1,34 1,41 1,46	1,75	V
Collector-emitter cut-off current	I_{CES}		0	650		25			50	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		2500		pF
Output capacitance	C_{oes}							71		
Reverse transfer capacitance	C_{res}							9		
Gate charge	Q_g		15	520	40	25		95		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						1,46		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 8 Ω R_{gon} = 8 Ω	±15	350	40	25 125 150		37 38 39		ns
Rise time	t_r					25 125 150		7 8 8		
Turn-off delay time	$t_{d(off)}$					25 125 150		63 77 81		
Fall time	t_f					25 125 150		12 20 21		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 1,5 µC Q_{rFWD} = 2,4 µC Q_{rFWD} = 2,6 µC				25 125 150		0,385 0,539 0,580		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,272 0,403 0,532		

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 Diode										
Static										
Forward voltage	V_F				30	25 125 150		1,52 1,46 1,44	1,92	V
Reverse leakage current	I_r			650		25			1,6	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						1,92		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 9311 A/µs di/dt = 6512 A/µs di/dt = 6556 A/µs	±15	350	40	25 125 150		72 86 92		A
Reverse recovery time	t_{rr}					25 125 150		29 35 37		ns
Recovered charge	Q_r					25 125 150		1,540 2,359 2,630		µC
Reverse recovered energy	E_{rec}					25 125 150		0,228 0,427 0,486		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		6119 5624 5662		A/µs

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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]	Value Min	Value Typ	Value Max	Unit
Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,00075	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125 150		1,56 1,56 1,59	1,75	V
Collector-emitter cut-off current	I_{CES}		0	650		25			50	μA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}							4500		
Output capacitance	C_{oes}	f = 1 Mhz	0	25		25		130		pF
Reverse transfer capacitance	C_{res}							17		
Gate charge	Q_g		15	520	75	25		164		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						1,10		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 125 150		24 24 24		
Rise time	t_r	R_{goff} = 4 Ω R_{gon} = 4 Ω				25 125 150		11 12 12		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		127 145 150		
Fall time	t_f		15/0	350	75	25 125 150		22 30 36		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 2,5 μC Q_{rFWD} = 4,7 μC Q_{rFWD} = 5,4 μC				25 125 150		0,379 0,605 0,681		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,854 1,240 1,360		

Characteristic Values

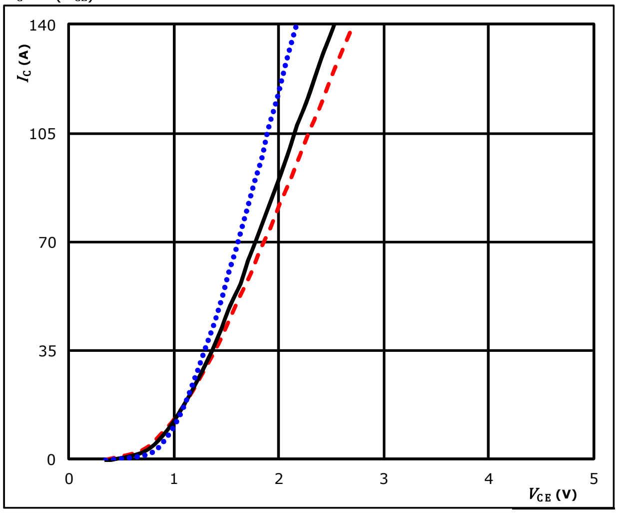
Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Boost Diode										
Static										
Forward voltage	V_F				75	25 125 150		1,53 1,49 1,47	1,92	V
Reverse leakage current	I_r			650		25			3,8	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						1,34		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 8536 A/µs di/dt = 6881 A/µs di/dt = 6458 A/µs	15/0	350	75	25 125 150		92 116 123		A
Reverse recovery time	t_{rr}					25 125 150		53 84 94		ns
Recovered charge	Q_r					25 125 150		2,488 4,663 5,377		µC
Reverse recovered energy	E_{rec}					25 125 150		0,672 1,267 1,457		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2911 2634 2713		A/µs
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

$I_C = f(V_{CE})$

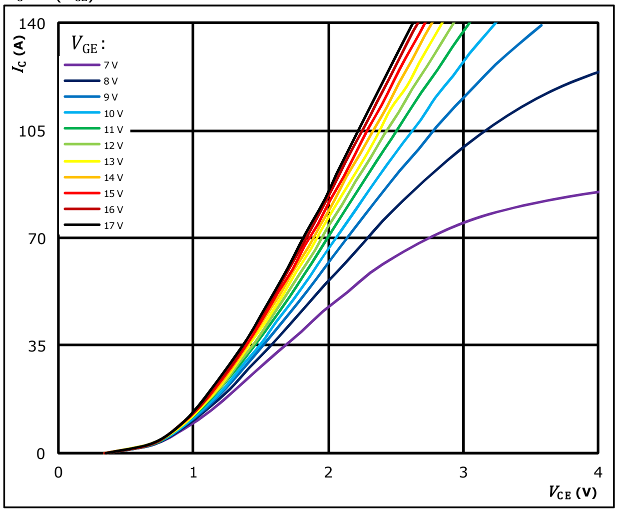


t_p =	250	μs		25 °C	···········
V_{GE} =	15	V	T_j:	125 °C	———
				150 °C	– – –

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

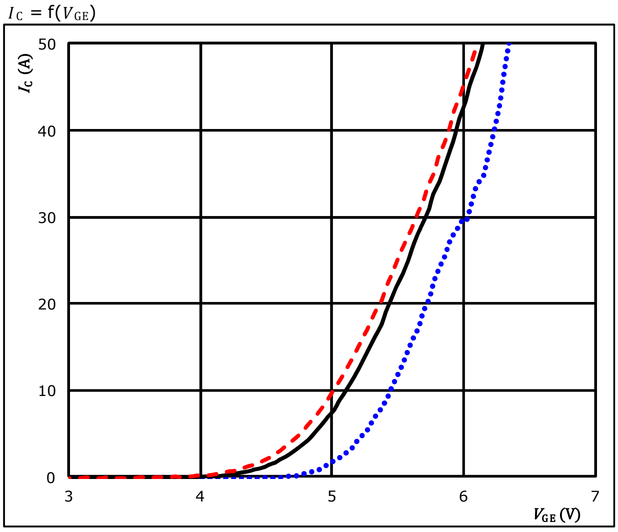


t_p =	250	μs
T_j =	150	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

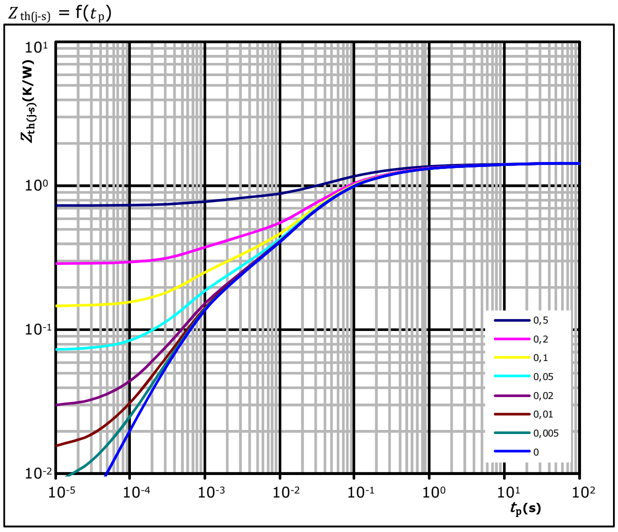


t_p =	100	μs		25 °C	···········
V_{CE} =	10	V	T_j:	125 °C	———
				150 °C	– – –

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

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



D = t_p / T

$R_{th(j\text{-}s)}$ = 1,46 K/W

IGBT thermal model values

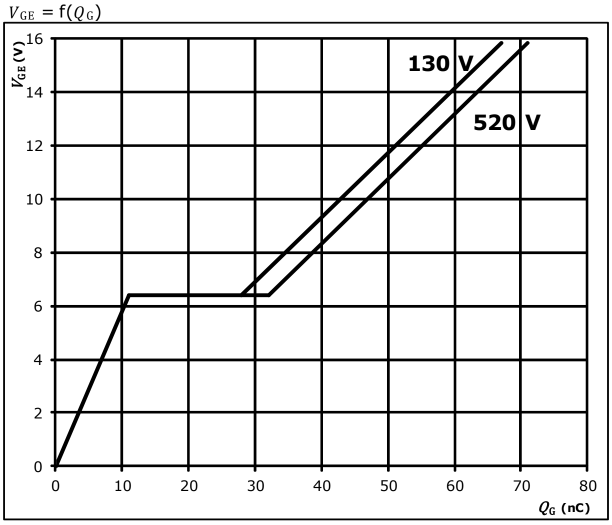
R (K/W)	τ (s)
8,80E-02	8,62E+00
2,70E-01	5,13E-01
6,06E-01	6,64E-02
2,71E-01	1,75E-02
6,68E-02	8,58E-03
1,56E-01	8,90E-04

Buck Switch Characteristics

figure 5. **IGBT**

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

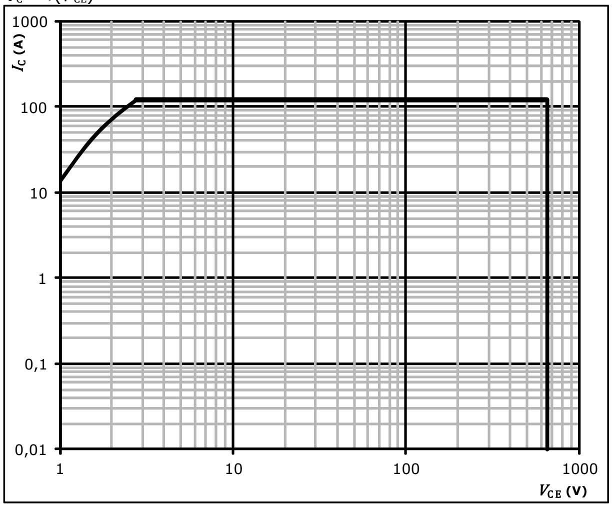


$I_C =$ 40 A

figure 6. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



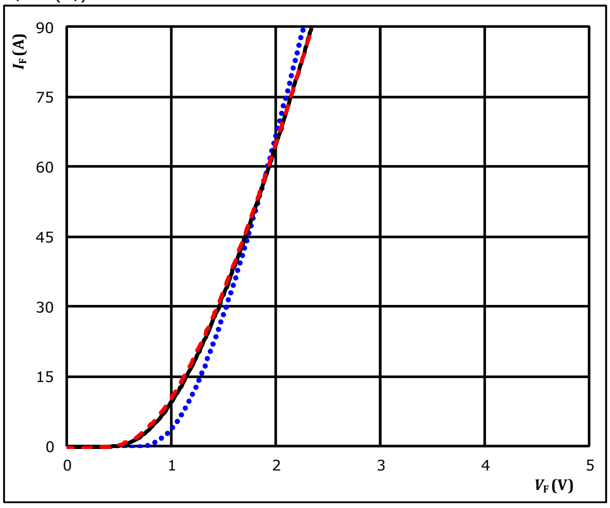
D =	single pulse	
T_s =	80	ºC
V_{GE} =	±15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



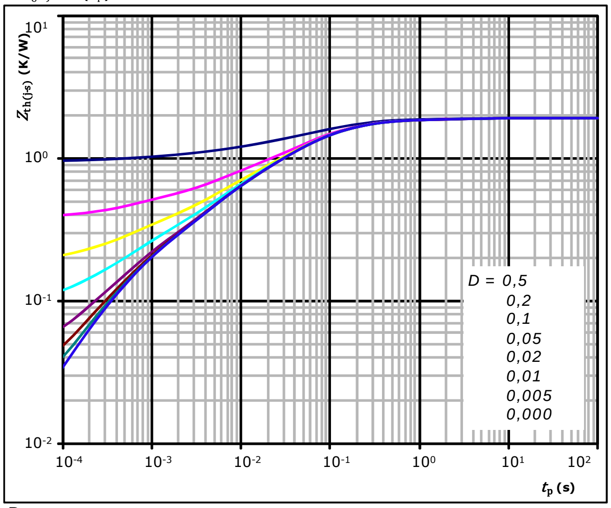
t_p = 250 μs

T_j: 25 °C, 125 °C, 150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,92 K/W

FWD thermal model values

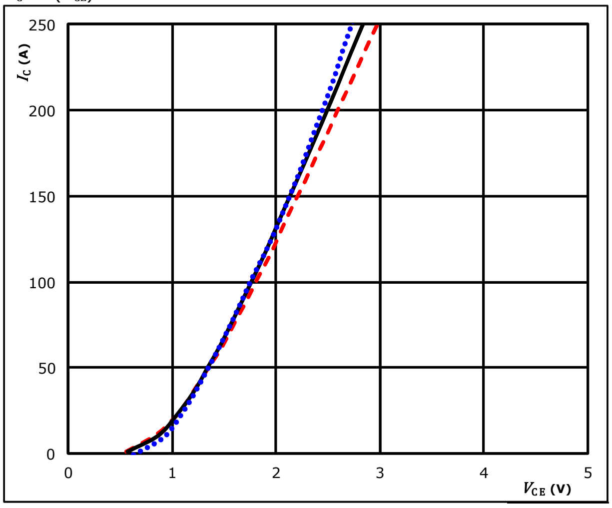
R (K/W)	τ (s)
9,41E-02	2,25E+00
3,44E-01	2,12E-01
8,56E-01	5,84E-02
3,61E-01	9,83E-03
1,37E-01	2,89E-03
1,27E-01	4,79E-04

Boost Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

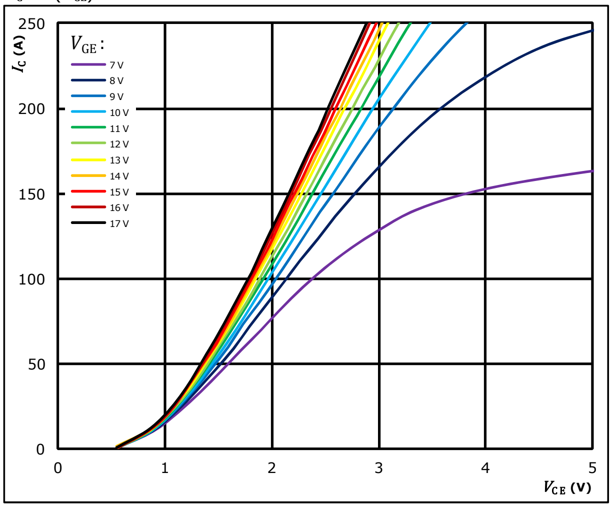


t_p =	250	µs	T_j:	25 °C	dotted
V_{GE} =	15	V		125 °C	solid
				150 °C	dashed

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



t_p = 250 µs

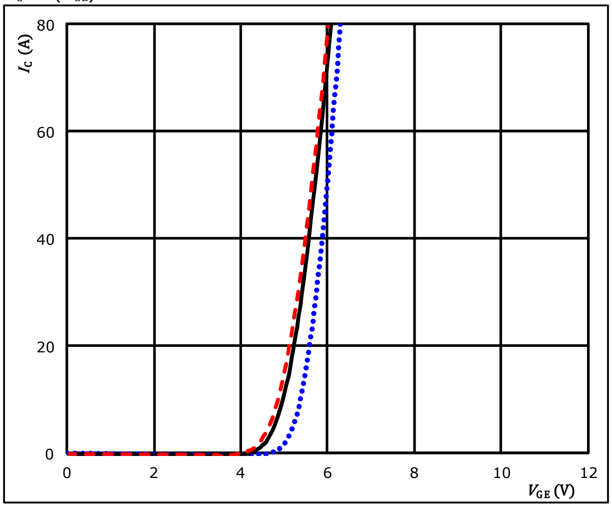
T_j = 150 °C

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

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

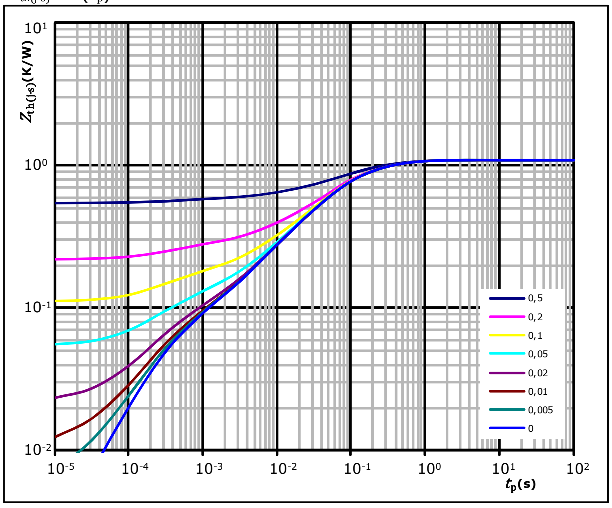


t_p =	100	µs	T_j:	25 °C	dotted
V_{CE} =	10	V		125 °C	solid
				150 °C	dashed

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

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



D = t_p / T

$R_{th(j-s)}$ = 1,10 K/W

IGBT thermal model values

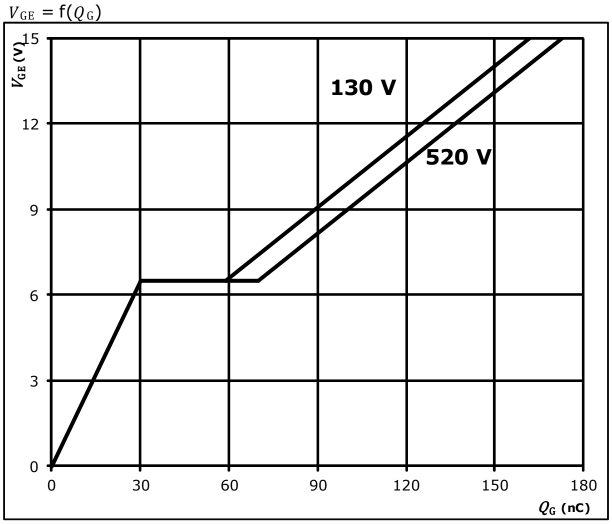
R (K/W)	τ (s)
2,16E-01	4,05E-01
6,30E-01	6,87E-02
1,62E-01	1,13E-02
3,68E-02	2,51E-03
6,02E-02	3,09E-04

Boost Switch Characteristics

figure 5. **IGBT**

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

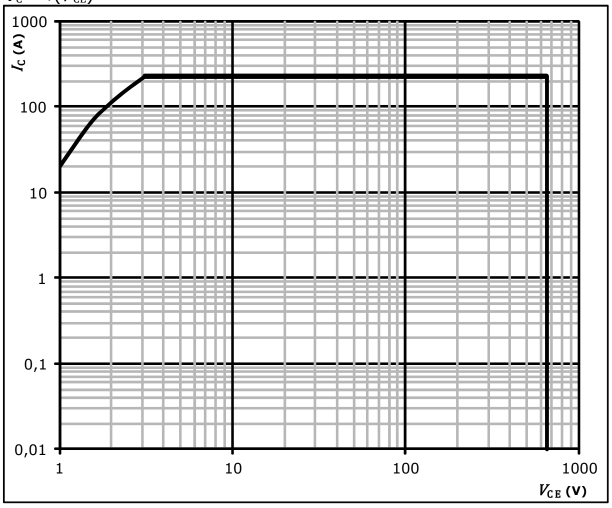


I_C= 75 A

figure 6. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



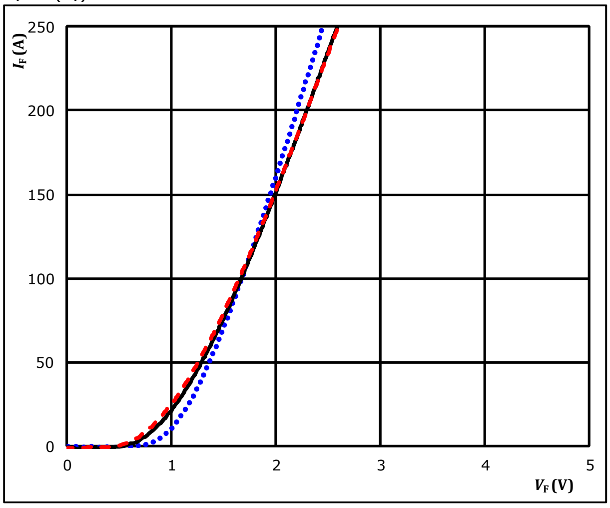
D =	single pulse	
T_s =	80	ºC
V_{GE} =	±15	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



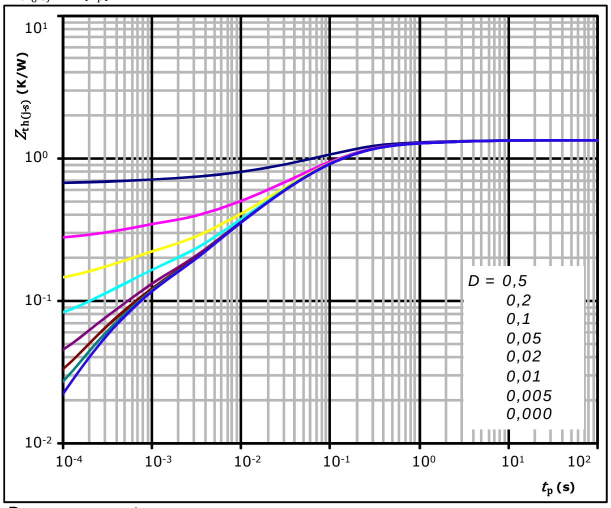
t_p = 250 μs

T_j: 25 °C, 125 °C, 150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,34 K/W

FWD thermal model values

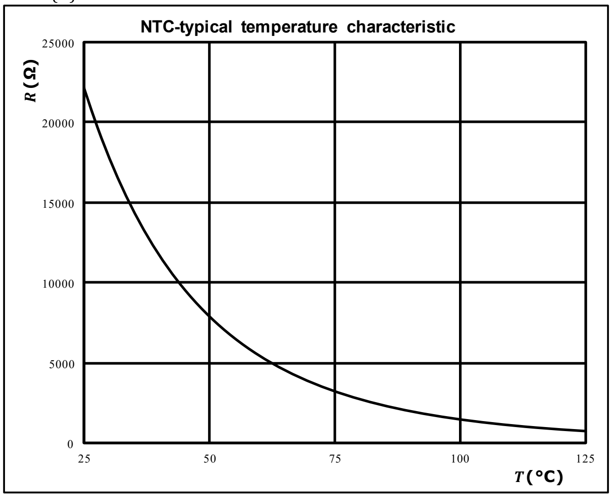
R (K/W)	τ (s)
5,84E-02	3,64E+00
1,57E-01	5,25E-01
5,86E-01	1,06E-01
3,27E-01	2,57E-02
1,27E-01	4,84E-03
8,12E-02	4,11E-04

NTC Characteristics

figure 1.	Thermistor

Typical NTC characteristic
as a function of temperature

$R = f(T)$

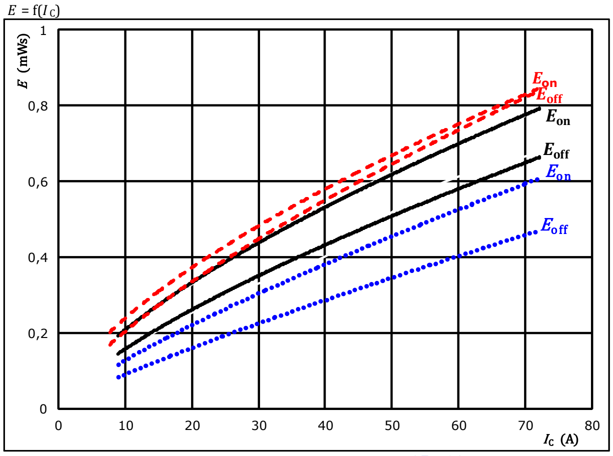


Buck Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



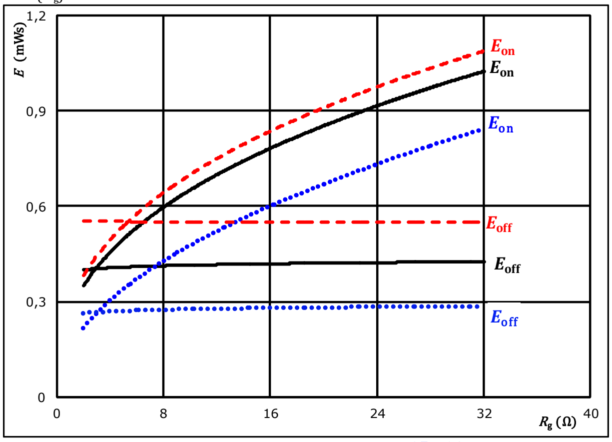
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed
R_{goff} =	8	Ω			

figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



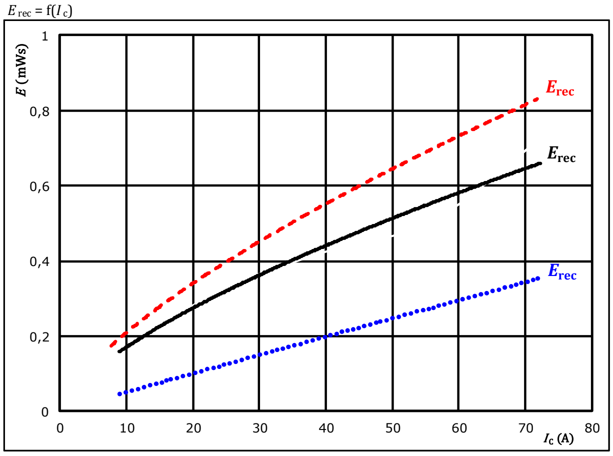
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	40	A		150 °C	dashed

figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



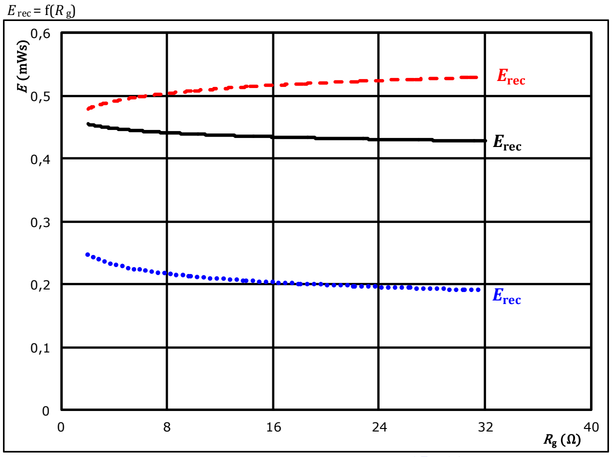
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

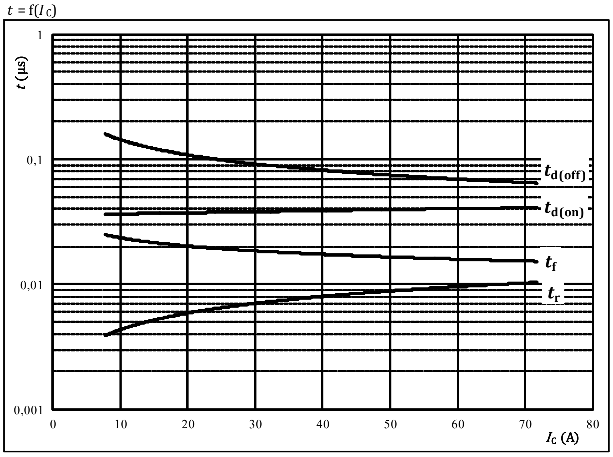
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	40	A		150 °C	dashed

Buck Switching Characteristics

figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



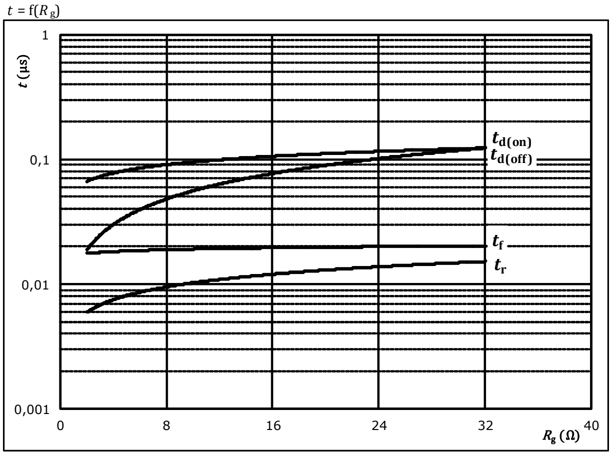
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



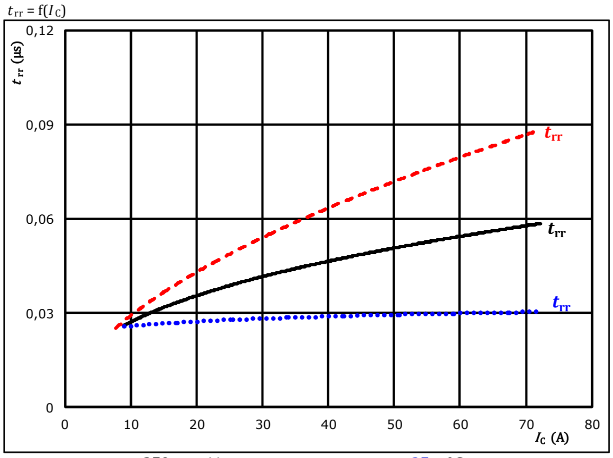
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	40	A

figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$

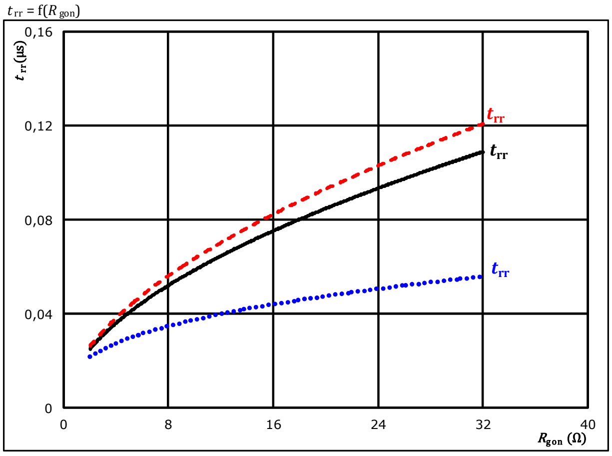


At						
V_{CE} =	350	V		25	°C	(dotted blue)
V_{GE} =	±15	V	T_j:	125	°C	(solid black)
R_{gon} =	8	Ω		150	°C	(dashed red)

figure 8. **FWD**

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

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



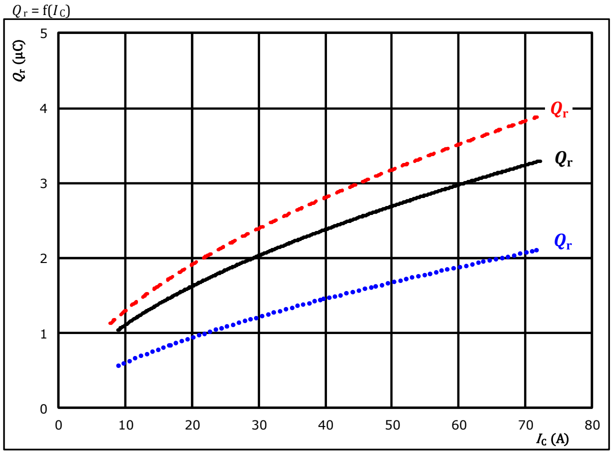
At						
V_{CE} =	350	V		25	°C	(dotted blue)
V_{GE} =	±15	V	T_j:	125	°C	(solid black)
I_C =	40	A		150	°C	(dashed red)

Buck Switching Characteristics

figure 9. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

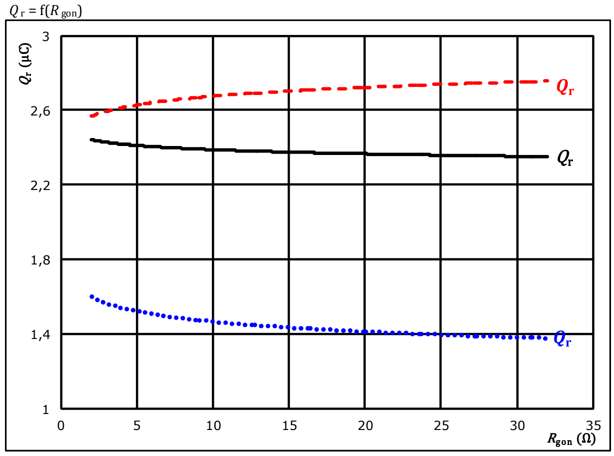


At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

figure 10. **FWD**

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

$Q_r = f(R_{gon})$

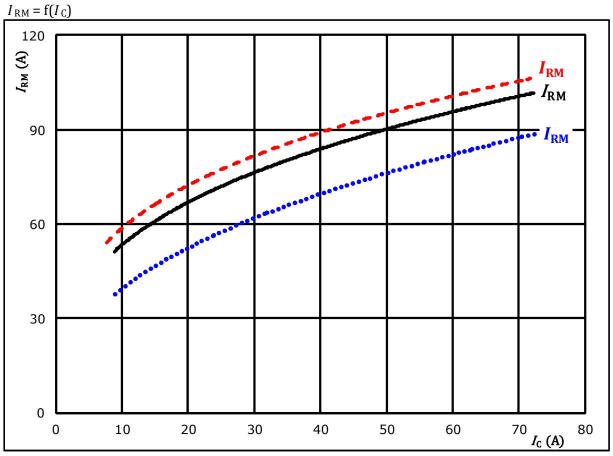


At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	40	A		150 °C	dashed

figure 11. **FWD**

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

$I_{RM} = f(I_C)$

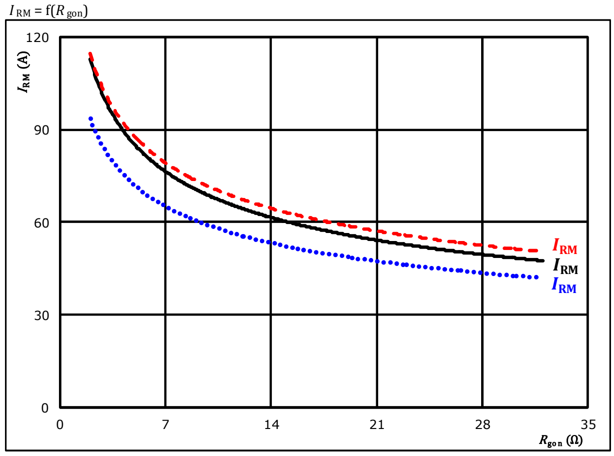


At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

figure 12. **FWD**

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

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



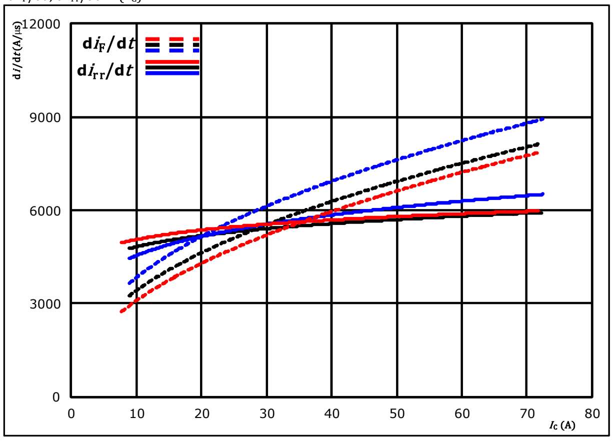
At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	40	A		150 °C	dashed

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

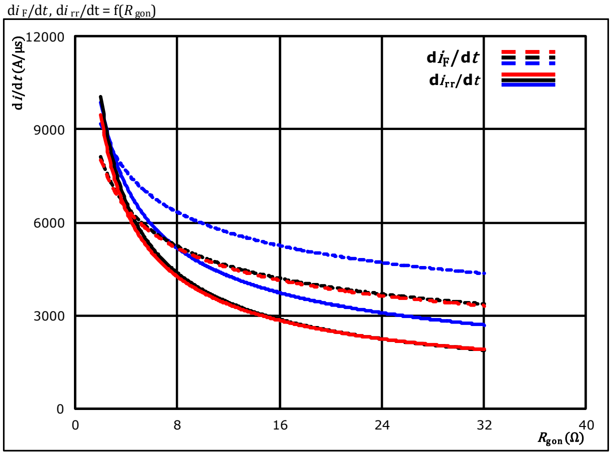


At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

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

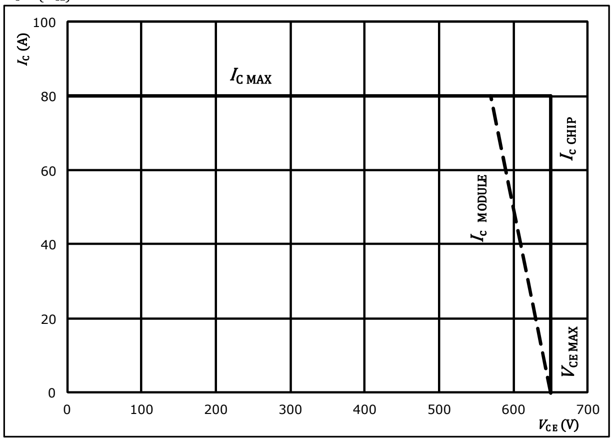


At					
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	40	A		150 °C	dashed

figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At		
T_j =	175	°C
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Vincotech

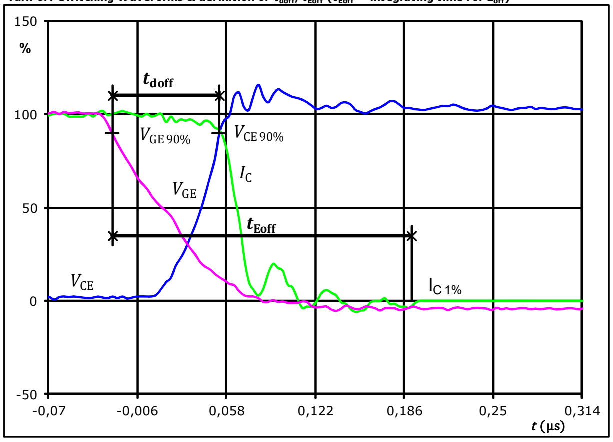
Buck Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

figure 1. **IGBT**

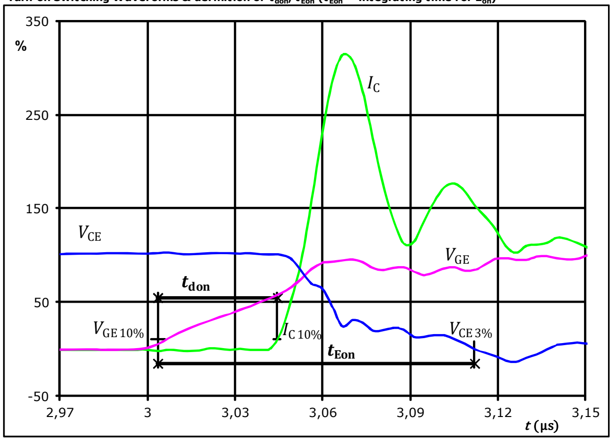
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



V_{GE}(0%) =	-15	V
V_{GE}(100%) =	15	V
V_C(100%) =	350	V
I_C(100%) =	40	A
t_{doff} =	0,077	µs
t_{Eoff} =	0,215	µs

figure 2. **IGBT**

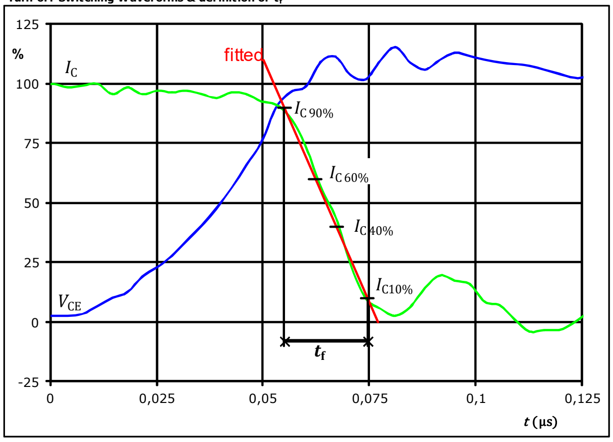
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



V_{GE}(0%) =	-15	V
V_{GE}(100%) =	15	V
V_C(100%) =	350	V
I_C(100%) =	40	A
t_{don} =	0,038	µs
t_{Eon} =	0,108	µs

figure 3. **IGBT**

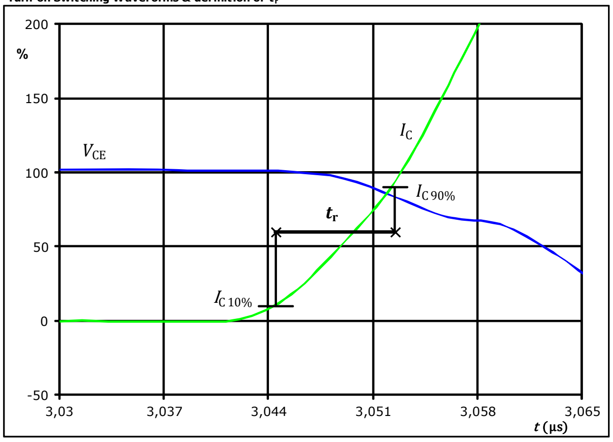
Turn-off Switching Waveforms & definition of t_f



V_C(100%) =	350	V
I_C(100%) =	40	A
t_f =	0,020	µs

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

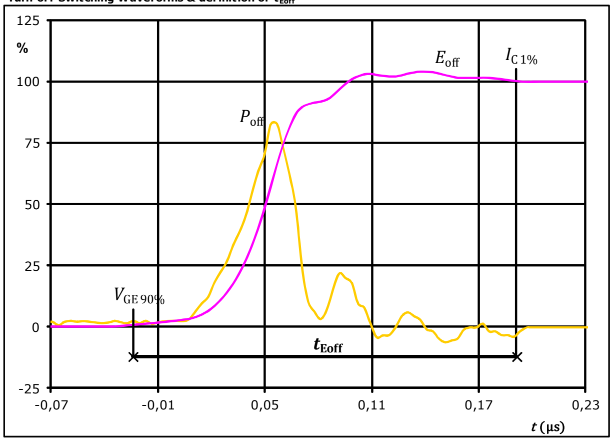


V_C(100%) =	350	V
I_C(100%) =	40	A
t_r =	0,008	µs

Buck Switching Characteristics

figure 5. IGBT

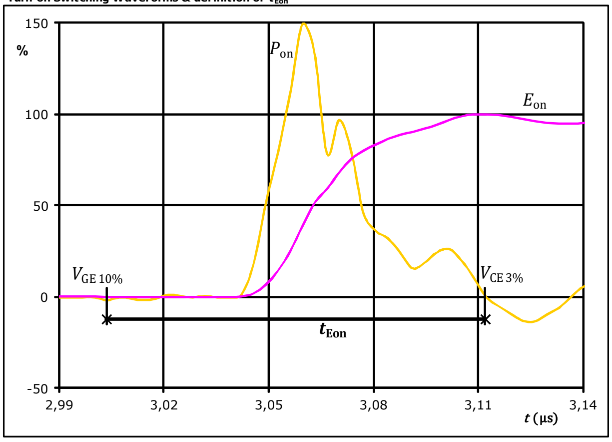
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) = 14,07 kW
E_{off} (100%) = 0,40 mJ
t_{Eoff} = 0,22 µs

figure 6. IGBT

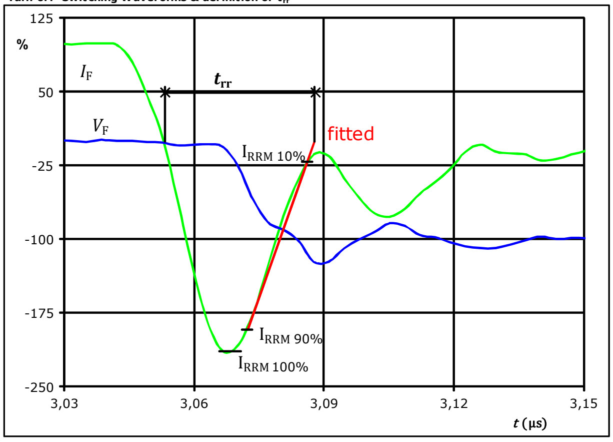
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) = 14,07 kW
E_{on} (100%) = 0,54 mJ
t_{Eon} = 0,11 µs

figure 7. FWD

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

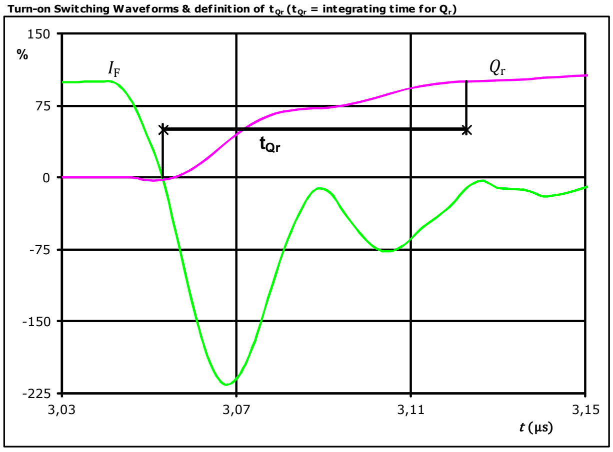


V_F (100%) = 350 V
I_F (100%) = 40 A
I_{RRM} (100%) = -86 A
t_{rr} = 0,034 µs

Buck Switching Characteristics

figure 8.	FWD

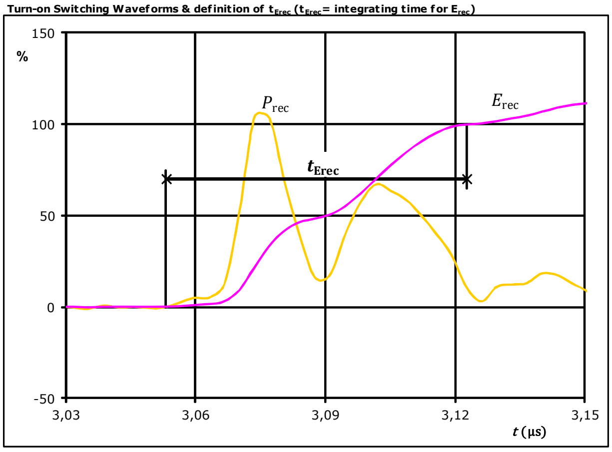
Turn-on Switching Waveforms & definition of t_{Qr} (t_{Qr} = integrating time for Q_r)



I_F (100%) =	40	A
Q_r (100%) =	2,36	µC
t_{Qr} =	0,07	µs

figure 9.	FWD

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



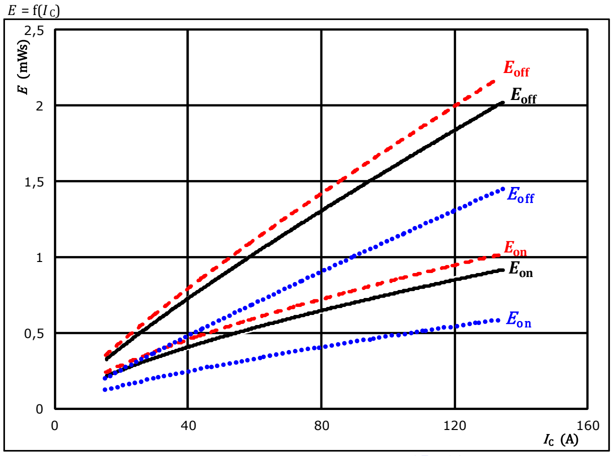
P_{rec} (100%) =	14,07	kW
E_{rec} (100%) =	0,43	mJ
t_{Erec} =	0,07	µs

Boost Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



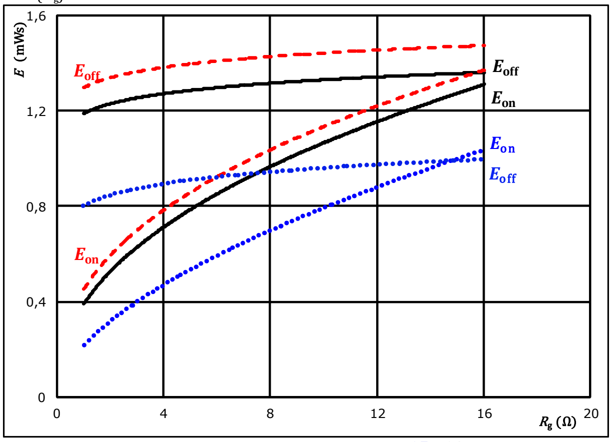
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted (blue)
V_{GE} =	15/0	V		125 °C	solid (black)
R_{gon} =	4	Ω		150 °C	dashed (red)
R_{goff} =	4	Ω			

figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



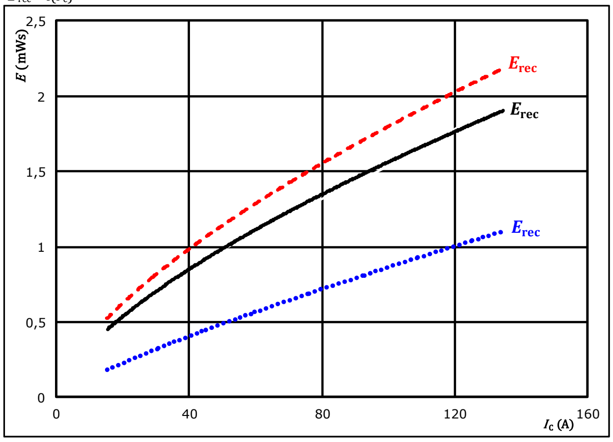
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted (blue)
V_{GE} =	15/0	V		125 °C	solid (black)
I_C =	75	A		150 °C	dashed (red)

figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



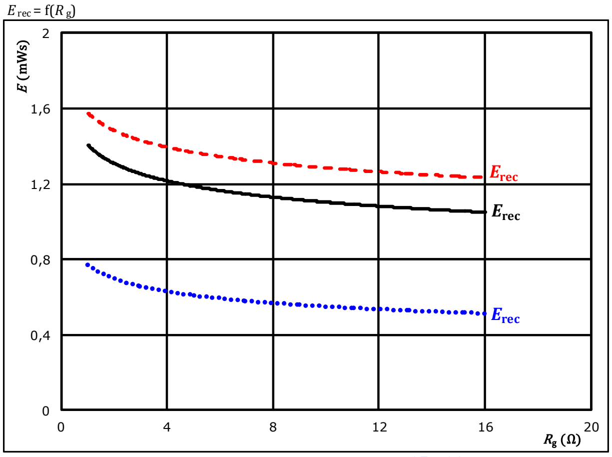
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted (blue)
V_{GE} =	15/0	V		125 °C	solid (black)
R_{gon} =	4	Ω		150 °C	dashed (red)

figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

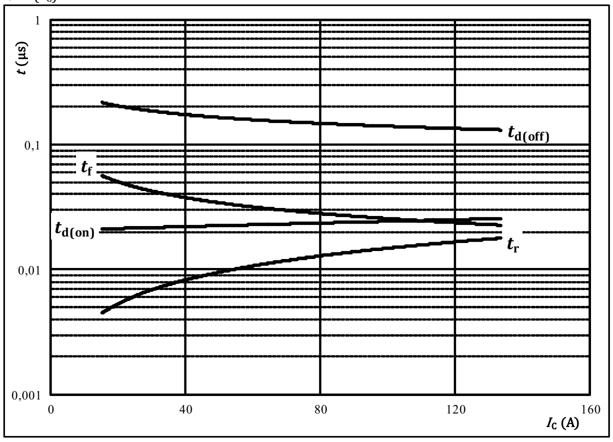
V_{CE} =	350	V	T_j:	25 °C	dotted (blue)
V_{GE} =	15/0	V		125 °C	solid (black)
I_C =	75	A		150 °C	dashed (red)

Boost Switching Characteristics

figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



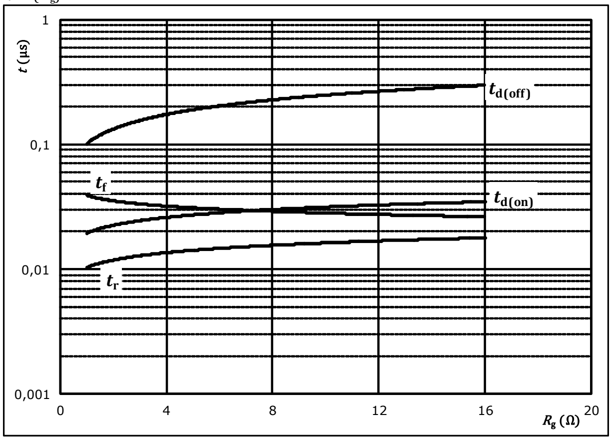
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	15/0	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



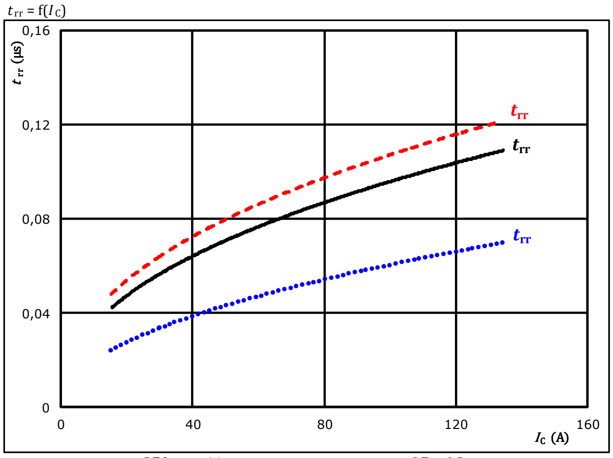
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	15/0	V
I_C =	75	A

figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$

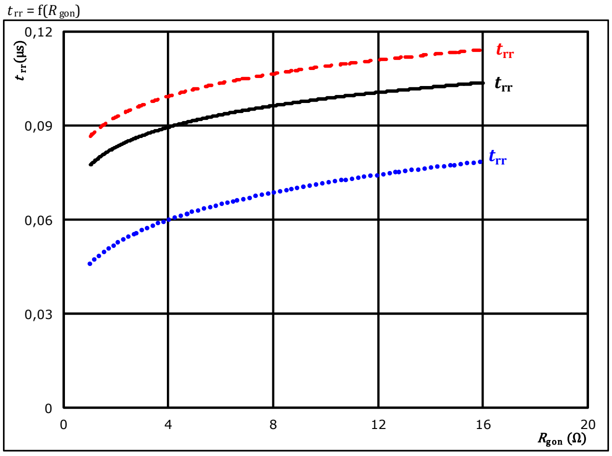


At V_{CE} =	350	V		25 °C	············
V_{GE} =	15/0	V	T_j:	125 °C	———
R_{gon} =	4	Ω		150 °C	– – –

figure 8. **FWD**

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

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



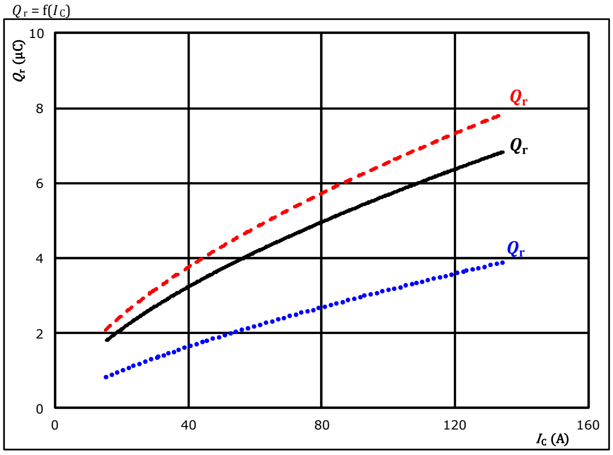
At V_{CE} =	350	V		25 °C	············
V_{GE} =	15/0	V	T_j:	125 °C	———
I_C =	75	A		150 °C	– – –

Boost Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

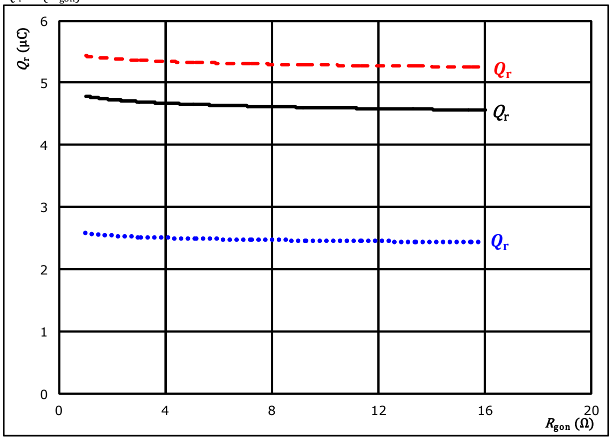


At						
V_{CE} =	350	V		25	°C	···········
V_{GE} =	15/0	V	T_j:	125	°C	———
R_{gon} =	4	Ω		150	°C	– – –

figure 10. FWD

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

$Q_r = f(R_{gon})$

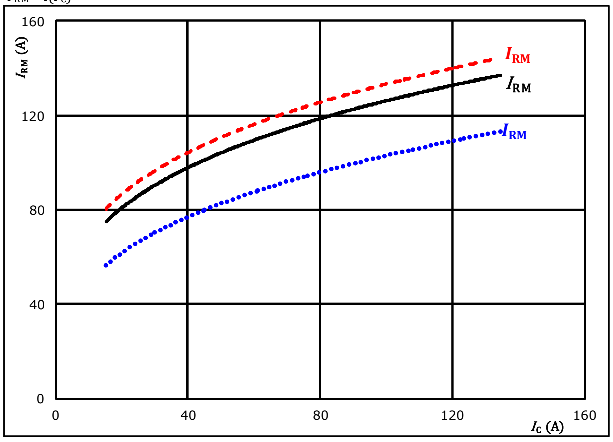


At						
V_{CE}=	350	V		25	°C	···········
V_{GE} =	15/0	V	T_j:	125	°C	———
I_C=	75	A		150	°C	– – –

figure 11. FWD

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

$I_{RM} = f(I_C)$

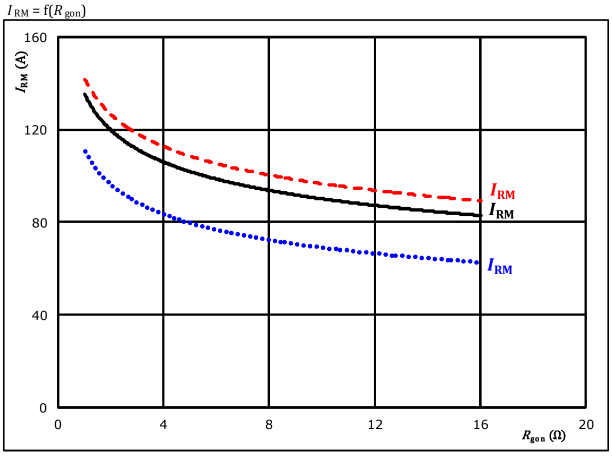


At						
V_{CE} =	350	V		25	°C	···········
V_{GE} =	15/0	V	T_j:	125	°C	———
R_{gon} =	4	Ω		150	°C	– – –

figure 12. FWD

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

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



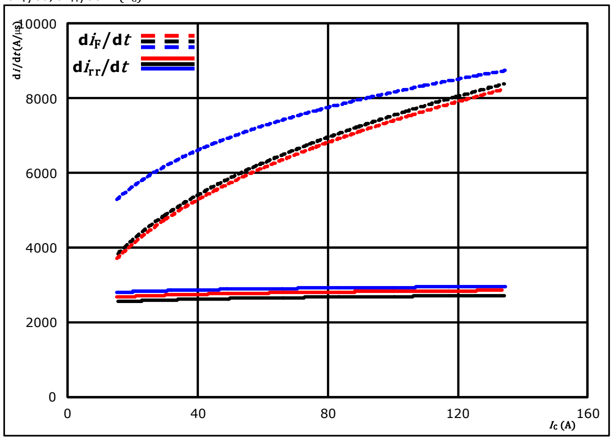
At						
V_{CE} =	350	V		25	°C	···········
V_{GE} =	15/0	V	T_j:	125	°C	———
I_C =	75	A		150	°C	– – –

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

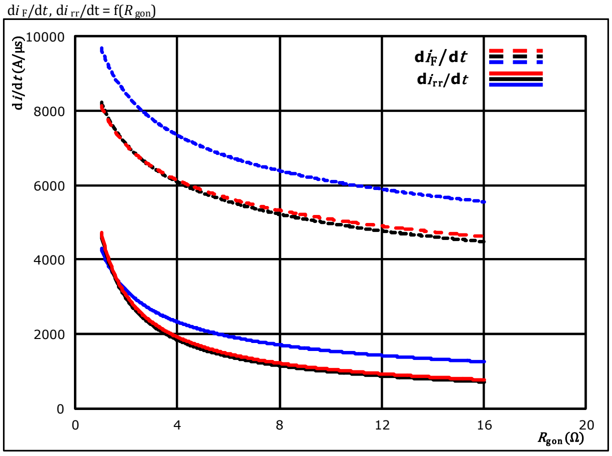


At						
	V_{CE} =	350	V		25	°C
	V_{GE} =	15/0	V	T_j:	125	°C
	R_{gon} =	4	Ω		150	°C

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

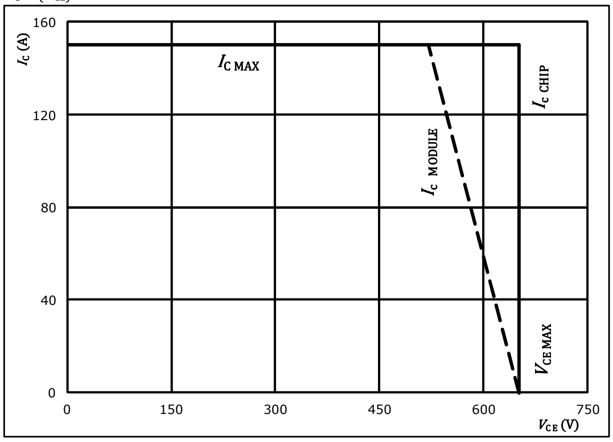


At						
	V_{CE} =	350	V		25	°C
	V_{GE} =	15/0	V	T_j:	125	°C
	I_C =	75	A		150	°C

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

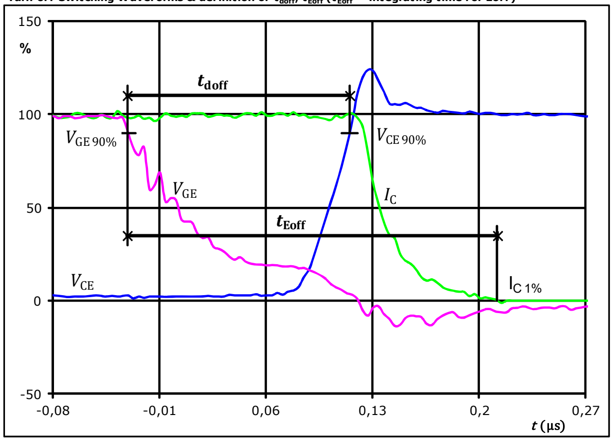
Boost Switching Definitions

General conditions

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

figure 1. IGBT

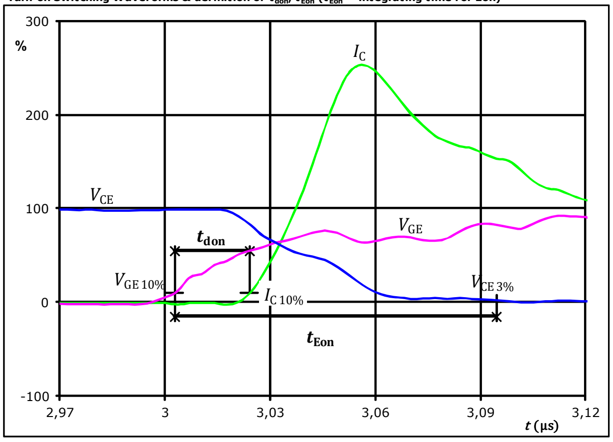
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for Eoff)



$V_{GE}(0\%)$ =	0	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_{doff} =	0,145	µs
t_{Eoff} =	0,243	µs

figure 2. IGBT

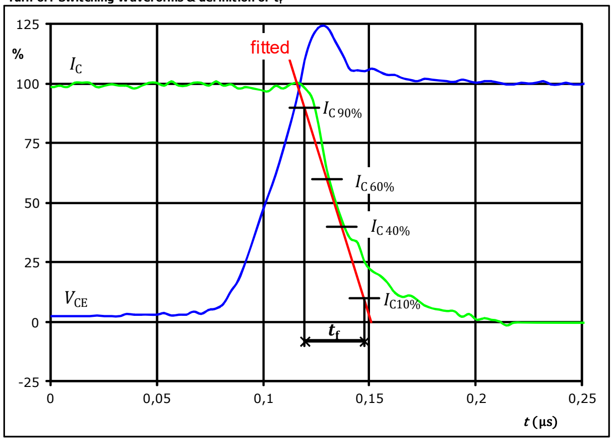
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for Eon)



$V_{GE}(0\%)$ =	0	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_{don} =	0,024	µs
t_{Eon} =	0,092	µs

figure 3. IGBT

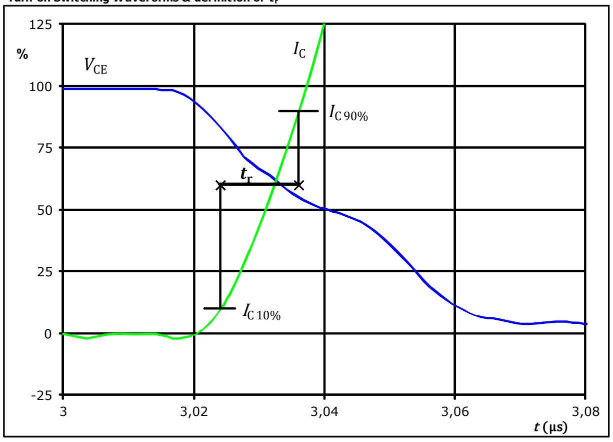
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_f =	0,030	µs

figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r

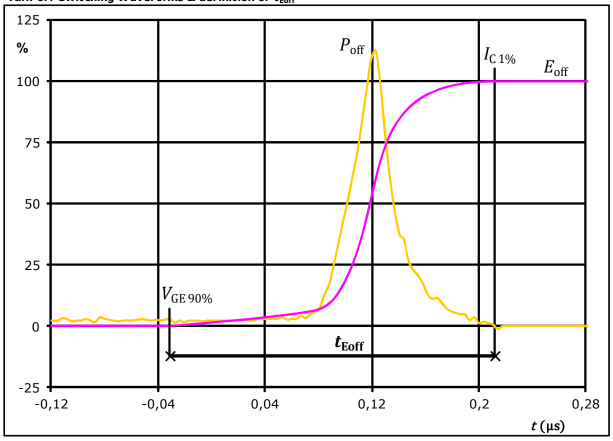


$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	75	A
t_r =	0,012	µs

Boost Switching Characteristics

figure 5. **IGBT**

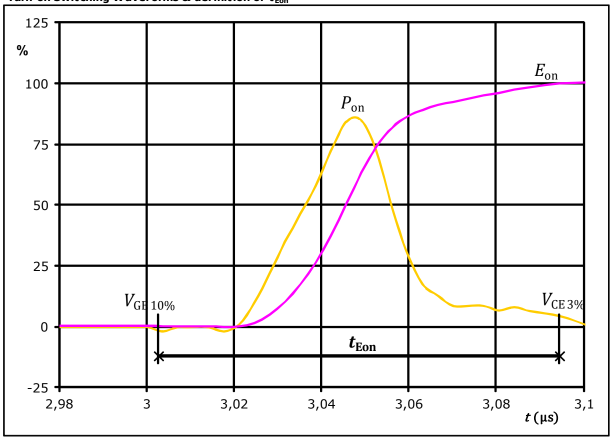
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	26,41	kW
E_{off} (100%) =	1,24	mJ
t_{Eoff} =	0,24	µs

figure 6. **IGBT**

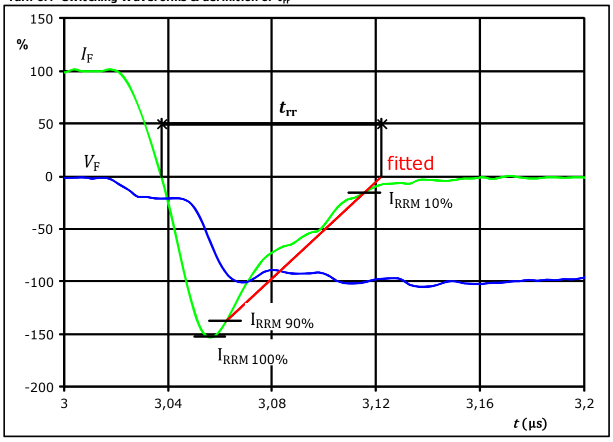
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	26,41	kW
E_{on} (100%) =	0,61	mJ
t_{Eon} =	0,09	µs

figure 7. **FWD**

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

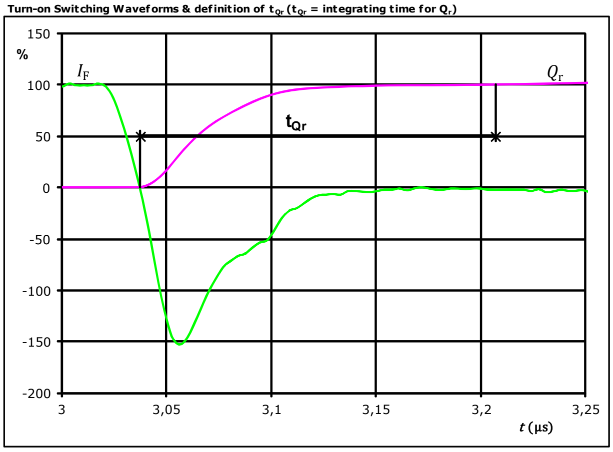


V_F (100%) =	350	V
I_F (100%) =	75	A
I_{RRM} (100%) =	-116	A
t_{rr} =	0,084	µs

Boost Switching Characteristics

figure 8. **FWD**

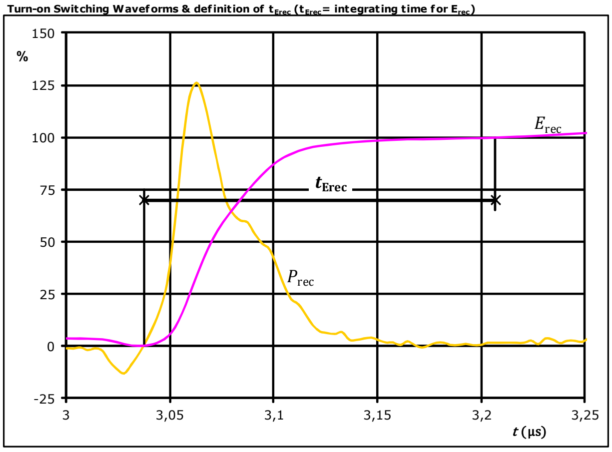
Turn-on Switching Waveforms & definition of t_{Qr} (t_{Qr} = integrating time for Q_r)



I_F (100%) =	75	A
Q_r (100%) =	4,66	µC
t_{Qr} =	0,17	µs

figure 9. **FWD**

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



P_{rec} (100%) =	26,41	kW
E_{rec} (100%) =	1,27	mJ
t_{Erec} =	0,17	µs

Ordering Code & Marking

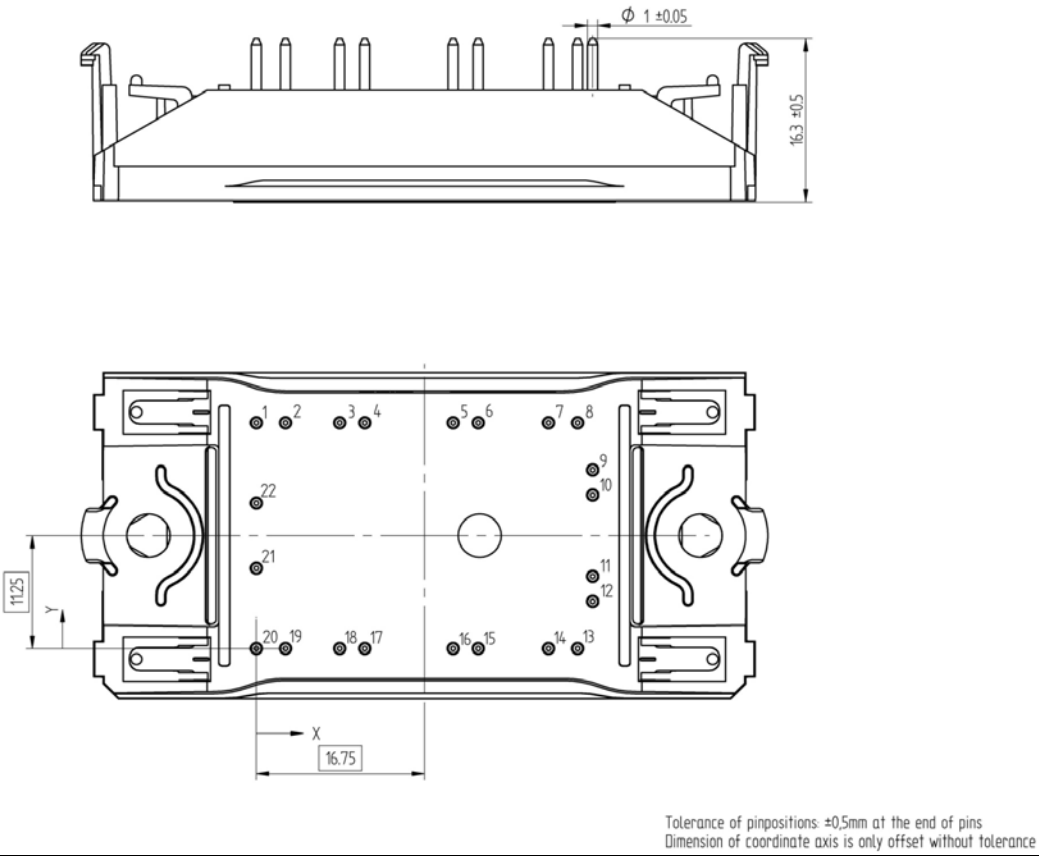
Version	Ordering Code
without thermal paste 12 mm housing with solder pins	10-FZ07BBA075S5-L684L58
with thermal paste 12 mm housing with solder pins	10-FZ07BBA075S5-L684L58-/3/

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		

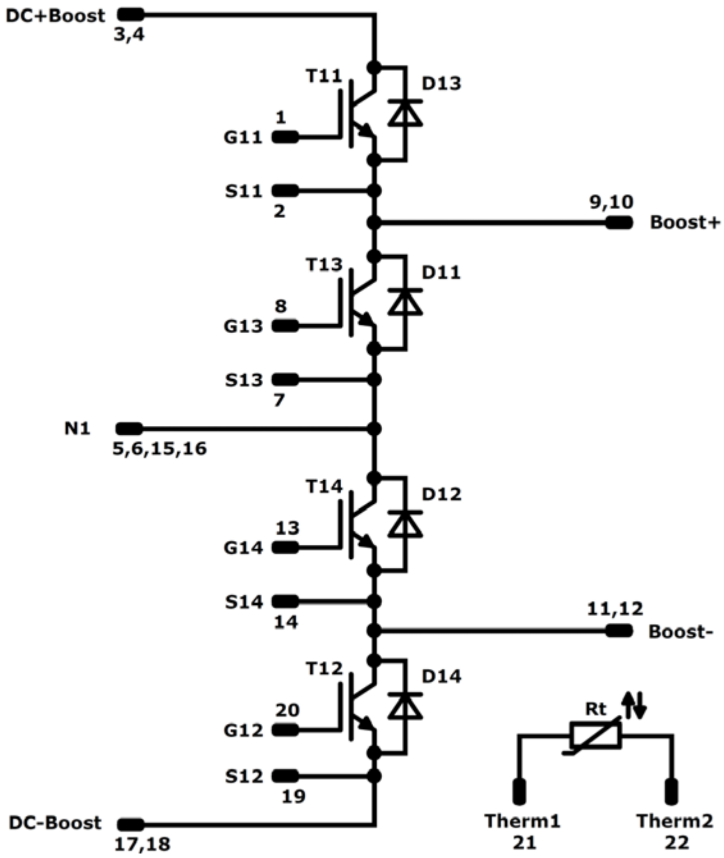
Outline

Pin table

Pin	X	Y	Function
1	0	22,5	G11
2	2,9	22,5	S11
3	8,3	22,5	DC+Boost
4	10,8	22,5	DC+Boost
5	19,6	22,5	N1
6	22,1	22,5	N1
7	29,1	22,5	S13
8	32	22,5	G13
9	33,5	17,8	Boost+
10	33,5	15,3	Boost+
11	33,5	7,2	Boost-
12	33,5	4,7	Boost-
13	32	0	G14
14	29,1	0	S14
15	22,1	0	N1
16	19,6	0	N1
17	10,8	0	DC-Boost
18	8,3	0	DC-Boost
19	2,9	0	S12
20	0	0	G12
21	0	8	Therm1
22	0	14,5	Therm2



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	650 V	40 A	Buck Switch	
D11, D12	FWD	650 V	30 A	Buck Diode	
T13, T14	IGBT	650 V	75 A	Boost Switch	
D13, D14	FWD	650 V	75 A	Boost Diode	
Rt	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.

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-FZ07BBA075S5-L684L58-D1-14	22 Aug. 2017		

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.