30-FT07NIB200S502-LE04F58

datasheet

***flow*NPC 2** **650 V / 200 A**

Topology features

- Kelvin Emitter for improved switching performance
- Temperature sensor
- Neutral Point Clamped Topology (I-Type)

Component features

- High speed and smooth switching
- Low gate charge
- Very low collector emitter saturation voltage

Housing features

- Base isolation: Al_2O_3
- Convex shaped baseplate for superior thermal contact
- Cu baseplate
- Thermo-mechanical push-and-pull force relief
- Solder pin

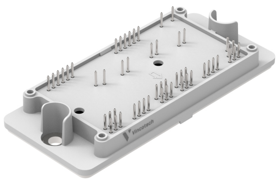
Target applications

- UPS

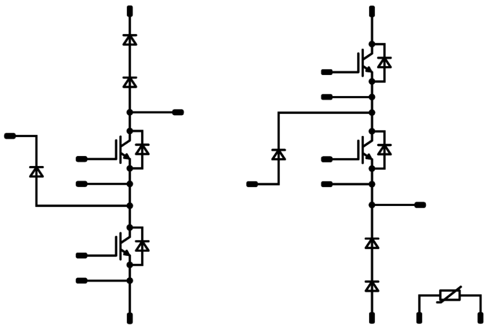
Types

- 30-FT07NIB200S502-LE04F58

flow 2 13 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Buck Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	164	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	236	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C
Buck Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	148	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	186	W
Maximum junction temperature	T_{jmax}			175	°C
Buck Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	36	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	59	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Boost Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	164	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	236	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C
Boost Diode					
Peak repetitive reverse voltage	V_{RRM}			1300	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	142	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	374	W
Maximum junction temperature	T_{jmax}			175	°C
Boost Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	36	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	59	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		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
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance				>12,7	mm
Clearance				>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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,002	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		200	25 125 150		1,39 1,48 1,51	1,75(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			200	µA
Gate-emitter leakage current	I_{GES}		20	0		25			400	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		12400		pF
Output capacitance	C_{oes}							352		pF
Reverse transfer capacitance	C_{res}							48		pF
Gate charge	Q_g	V_{CC} = 520 V	15		200	25		480		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,4		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	-5/15	350	120	25 125 150		50 50,5 51		ns
Rise time	t_r					25 125 150		8 8,5 8,5		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		155 182 189		ns
Fall time	t_f					25 125 150		8,9 13,54 17,2		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=4,45 µC Q_{rFWD}=8,82 µC Q_{rFWD}=10,08 µC				25 125 150		1,42 2,13 2,22		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,14 1,95 2,16		mWs

Characteristic Values

Parameter	Symbol	Conditions					Values			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				200	25 125 150		1,5 1,44 1,42	1,92(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			10,6	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,51		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=13388 A/µs d*i*/d*t*=12775 A/µs d*i*/d*t*=14167 A/µs	-5/15	350	120	25 125 150		175,24 234,95 251,15		A
Reverse recovery time	t_{rr}					25 125 150		44,56 65,22 71,8		ns
Recovered charge	Q_r					25 125 150		4,45 8,82 10,08		µC
Reverse recovered energy	E_{rec}					25 125 150		0,726 1,76 2,11		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		6361 4385 4770		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			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 Sw. Protection Diode										
Static										
Forward voltage	V_F				30	25 125	1,23	1,7 1,59	1,87(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,36	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,61		K/W

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 Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,002	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		200	25 125 150		1,39 1,48 1,51	1,75(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			200	µA
Gate-emitter leakage current	I_{GES}		20	0		25			400	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		12400		pF
Output capacitance	C_{oes}							352		pF
Reverse transfer capacitance	C_{res}							48		pF
Gate charge	Q_g	V_{CC} = 520 V	15		200	25		480		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,4		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	-5/15	350	120	25 125 150		58,5 50,5 57,5		ns
Rise time	t_r					25 125 150		7 8 8,5		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		154,5 182,5 188,5		ns
Fall time	t_f					25 125 150		9,48 15,41 18,94		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=4,85 µC Q_{rFWD}=9,35 µC Q_{rFWD}=10,9 µC				25 125 150		1,28 2,19 2,24		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,15 1,99 2,24		mWs

Characteristic Values

Parameter	Symbol	Conditions					Values			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				200	25 125 150		3,37 3,14 3,04	3,84[(1)]	V
Reverse leakage current	I_R	V_r = 1300 V				25			10,6	µA
Thermal										
Thermal resistance junction to sink[(2)]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,25		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=14933 A/µs d*i*/d*t*=12780 A/µs d*i*/d*t*=13600 A/µs	-5/15	350	120	25 125 150		144,9 195,79 209,45		A
Reverse recovery time	t_{rr}					25 125 150		86,68 114,65 130,2		ns
Recovered charge	Q_r					25 125 150		4,85 9,35 10,9		µC
Reverse recovered energy	E_{rec}					25 125 150		1,04 2,21 2,6		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		12289 7167 6631		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			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 Sw. Protection Diode										
Static										
Forward voltage	V_F				30	25 125	1,23	1,7 1,59	1,87(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,36	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,61		K/W
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

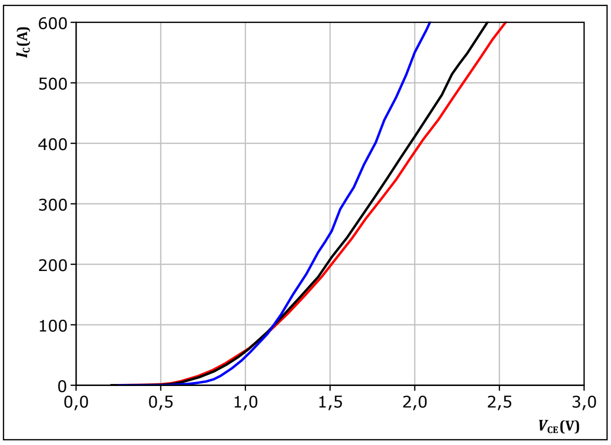
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

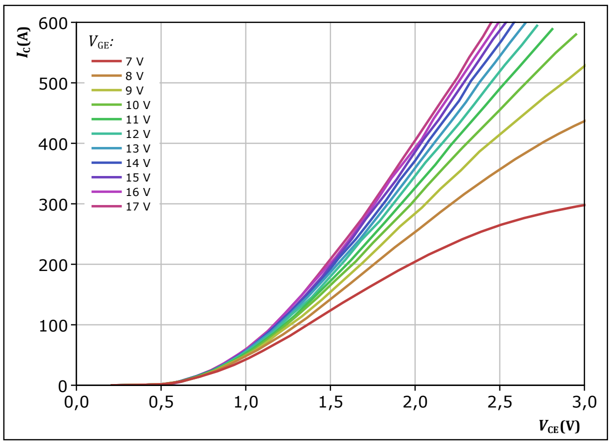


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



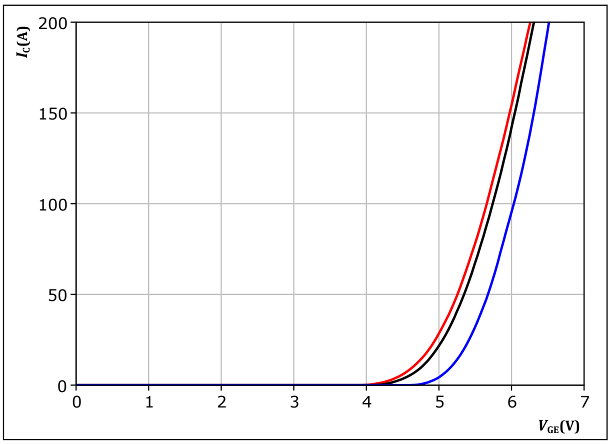
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

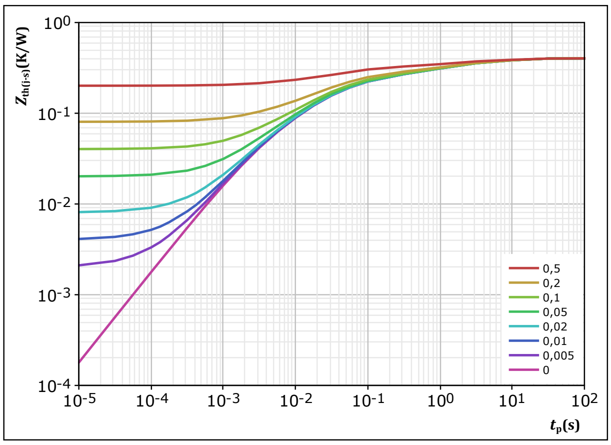


t_p =	250	µs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,402	K/W

IGBT thermal model values

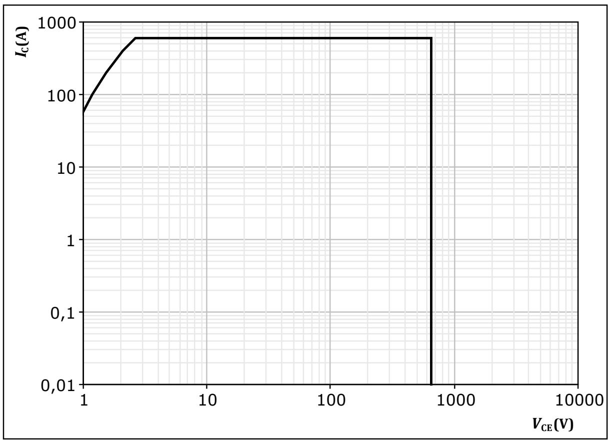
R (K/W)	τ (s)
5,60E-02	8,91E+00
9,21E-02	1,22E+00
7,03E-02	1,44E-01
1,40E-01	2,68E-02
3,76E-02	4,52E-03
6,37E-03	1,66E-03

Buck Switch Characteristics

figure 5.	IGBT

Safe operating area

I_C = f(V_{CE})



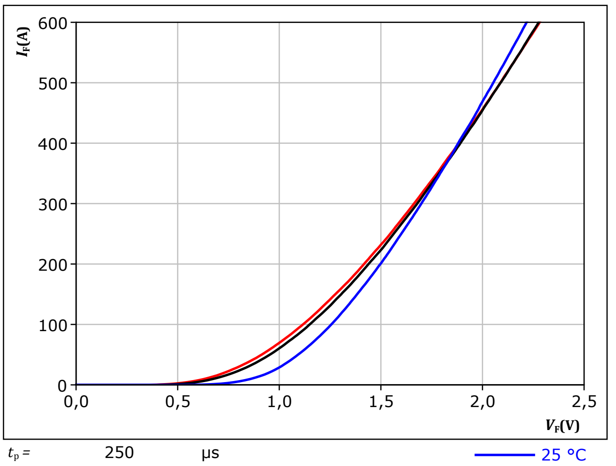
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

I_F = f(V_F)



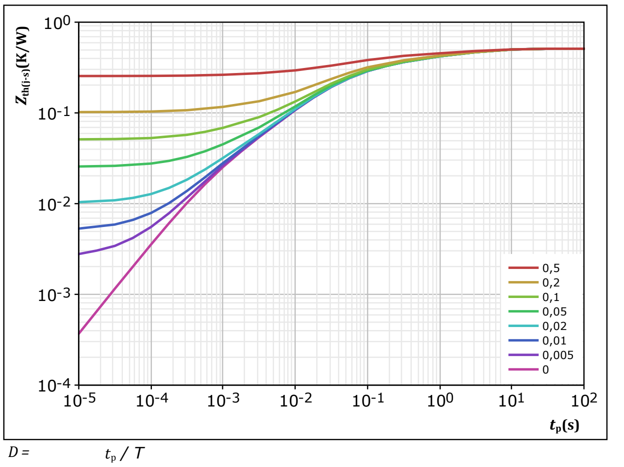
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,51 K/W

FWD thermal model values

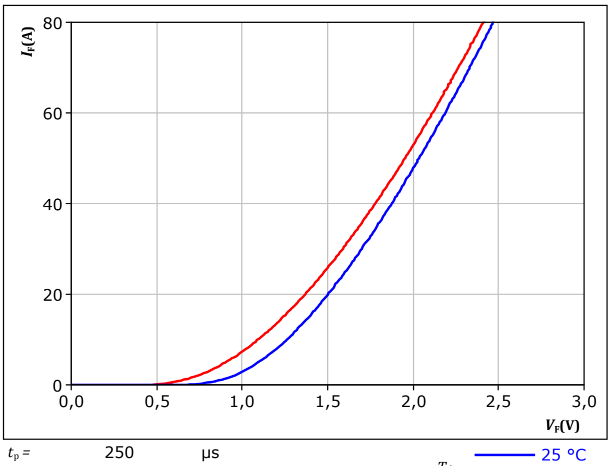
R (K/W)	τ (s)
8,05E-02	4,81E+00
1,12E-01	6,43E-01
1,62E-01	7,87E-02
1,15E-01	1,87E-02
2,73E-02	3,44E-03
1,29E-02	6,21E-04

Buck Sw. Protection Diode Characteristics

figure 8. FWD

Typical forward characteristics

I_F = f(V_F)



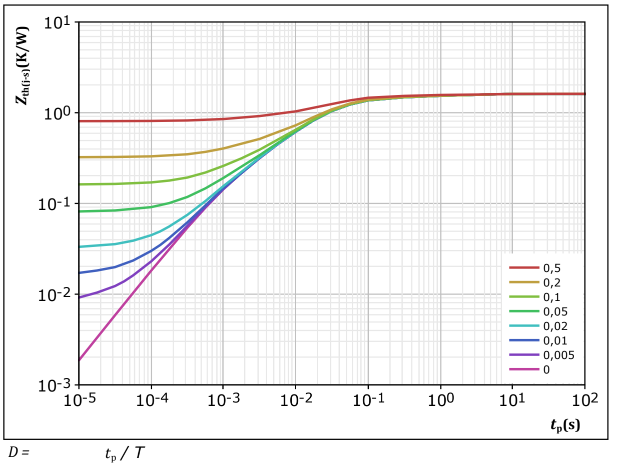
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 9. FWD

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,614 K/W

FWD thermal model values

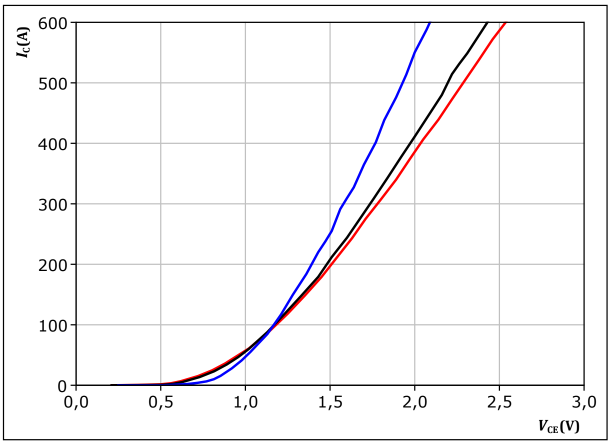
R (K/W)	τ (s)
1,05E-01	3,05E+00
1,86E-01	2,04E-01
8,60E-01	3,00E-02
3,40E-01	8,15E-03
1,24E-01	1,07E-03

Boost Switch Characteristics

figure 10. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

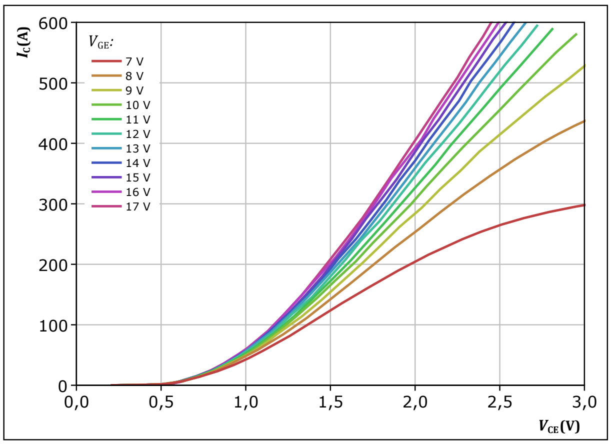


t_p =	250	μs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 11. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



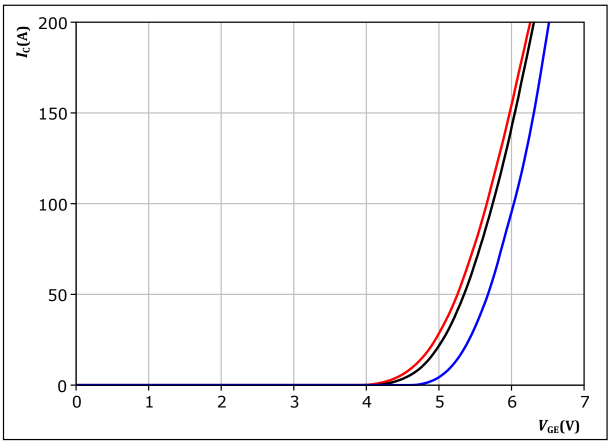
t_p =	250	μs
T_j =	150	°C

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

figure 12. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

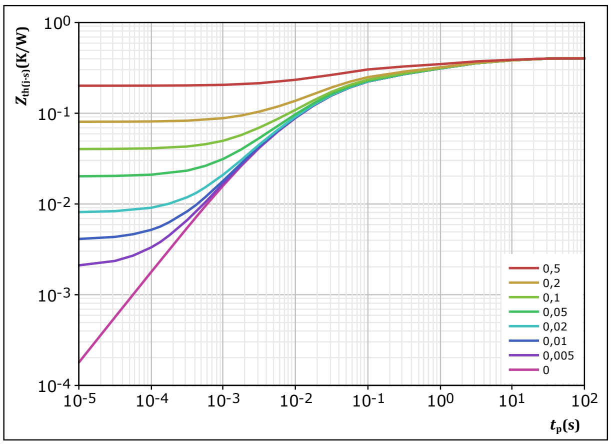


t_p =	250	μs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 13. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,402	K/W

IGBT thermal model values

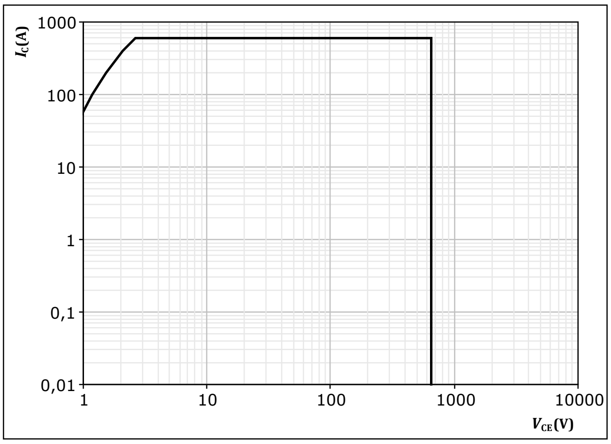
R (K/W)	τ (s)
5,60E-02	8,91E+00
9,21E-02	1,22E+00
7,03E-02	1,44E-01
1,40E-01	2,68E-02
3,76E-02	4,52E-03
6,37E-03	1,66E-03

Boost Switch Characteristics

figure 14.	IGBT

Safe operating area

I_C = f(V_{CE})



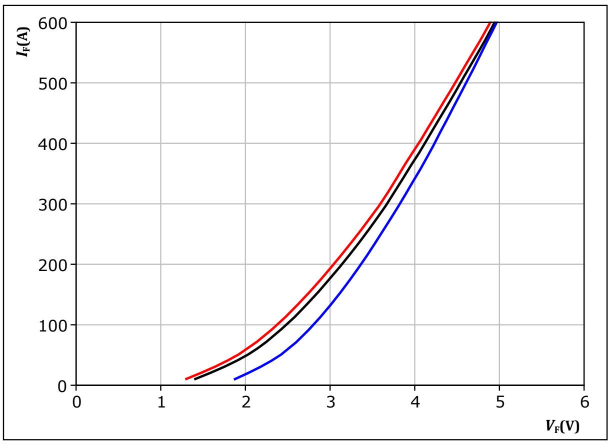
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



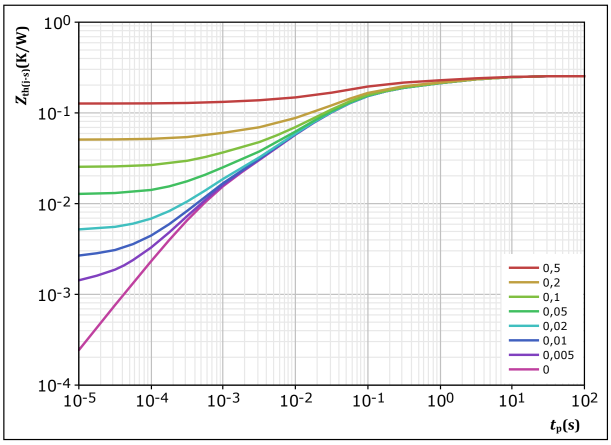
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 16. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,254 K/W

FWD thermal model values

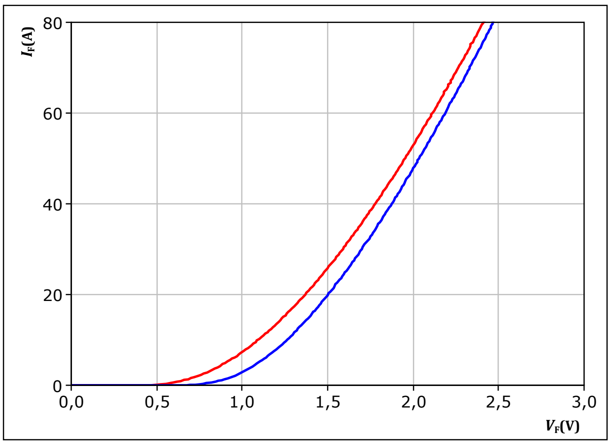
R (K/W)	τ (s)
2,72E-02	5,98E+00
3,88E-02	1,28E+00
5,65E-02	1,68E-01
9,22E-02	3,81E-02
2,73E-02	6,72E-03
1,17E-02	6,64E-04

Boost Sw. Protection Diode Characteristics

figure 17. **FWD**

Typical forward characteristics

I_F = f(V_F)



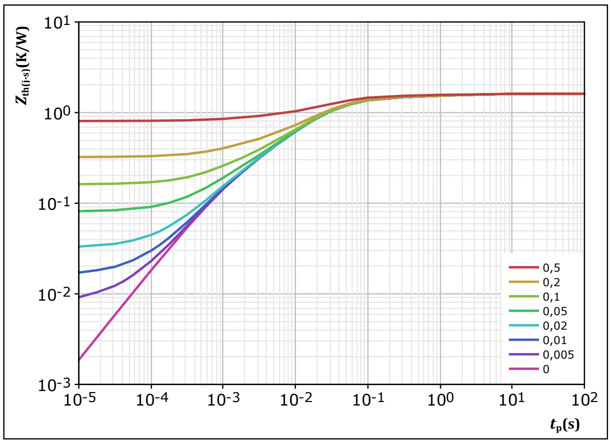
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 18. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,614 K/W

FWD thermal model values

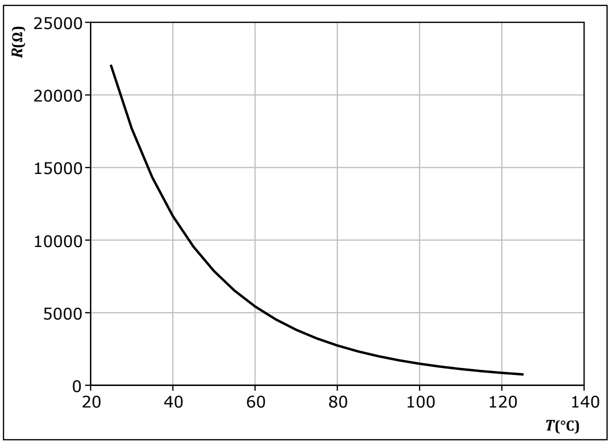
R (K/W)	τ (s)
1,05E-01	3,05E+00
1,86E-01	2,04E-01
8,60E-01	3,00E-02
3,40E-01	8,15E-03
1,24E-01	1,07E-03

Thermistor Characteristics

figure 19. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

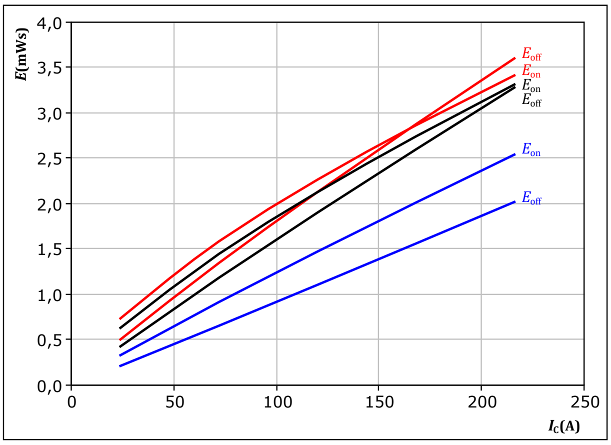


Buck Switching Characteristics

figure 20. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



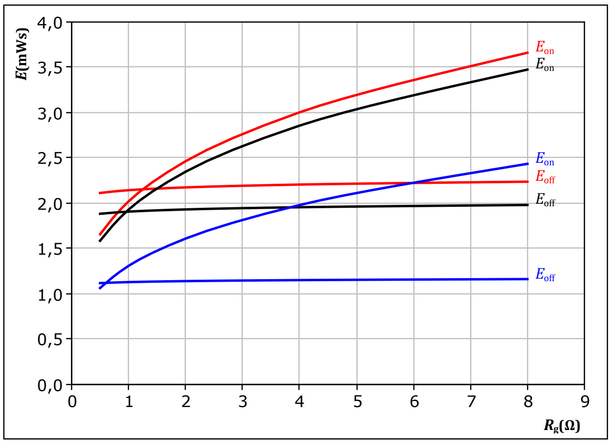
With an inductive load at

V_{CE} =	350	V	T_j:		25 °C
V_{GE} =	-5/15	V			125 °C
R_{gon} =	2	Ω			150 °C
R_{goff} =	2	Ω			

figure 21. **IGBT**

Typical switching energy losses as a function of IGBT turn on gate resistor

$E = f(R_g)$



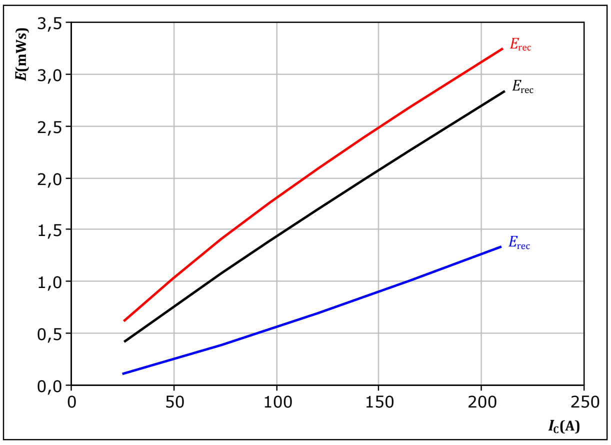
With an inductive load at

V_{CE} =	350	V	T_j:		25 °C
V_{GE} =	-5/15	V			125 °C
I_C =	120	A			150 °C

figure 22. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



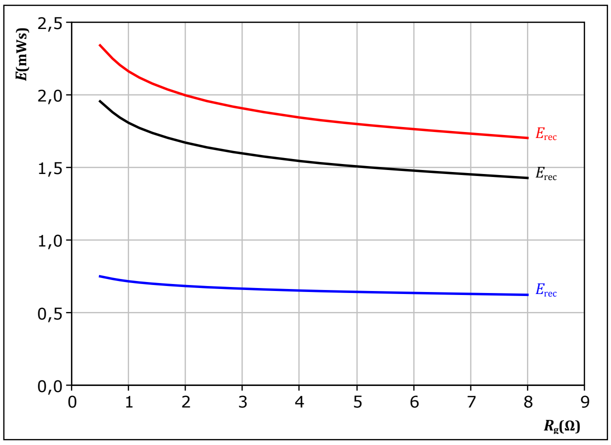
With an inductive load at

V_{CE} =	350	V	T_j:		25 °C
V_{GE} =	-5/15	V			125 °C
R_{gon} =	2	Ω			150 °C

figure 23. **FWD**

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

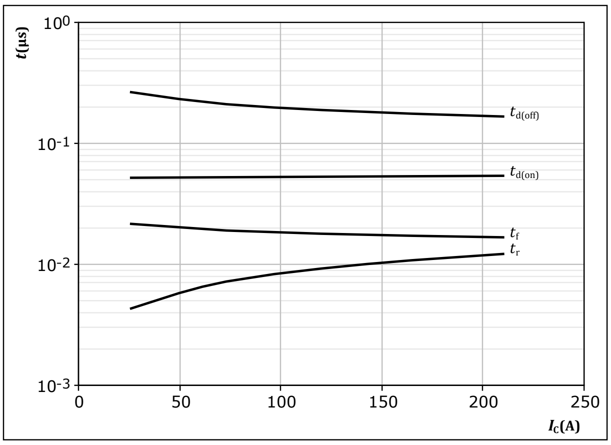
V_{CE} =	350	V	T_j:		25 °C
V_{GE} =	-5/15	V			125 °C
I_C =	120	A			150 °C

Buck Switching Characteristics

figure 24. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



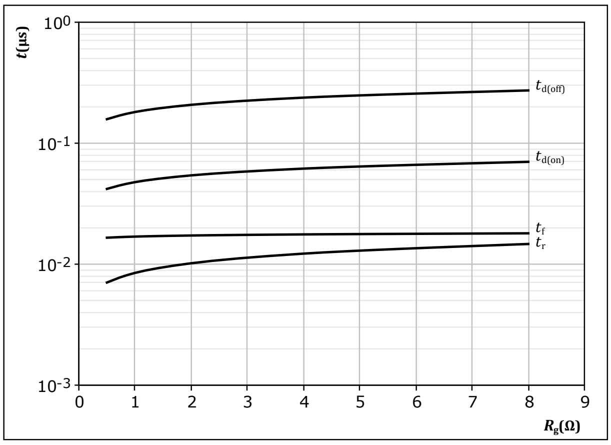
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 25. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

$t = f(R_g)$



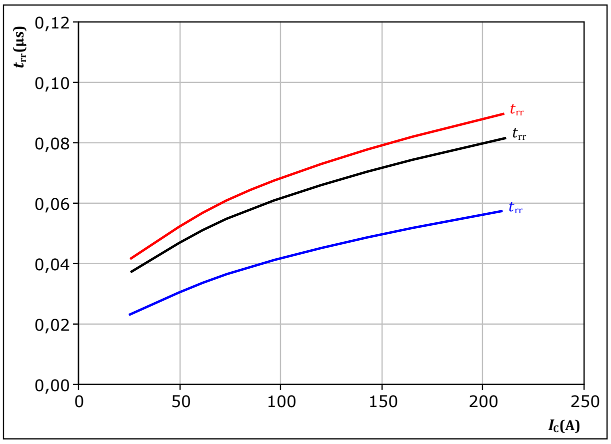
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	120	A

figure 26. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

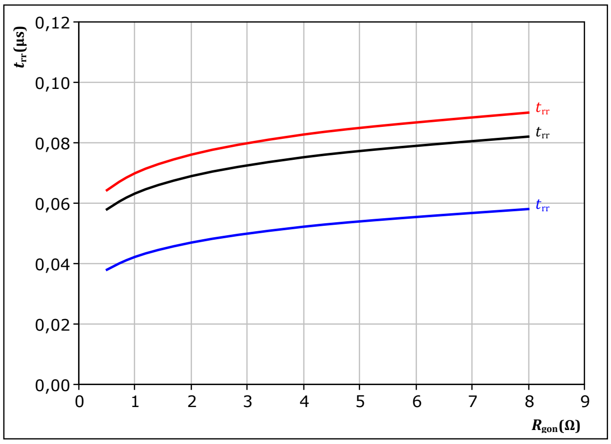
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 27. **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} =	-5/15	V
I_C =	120	A

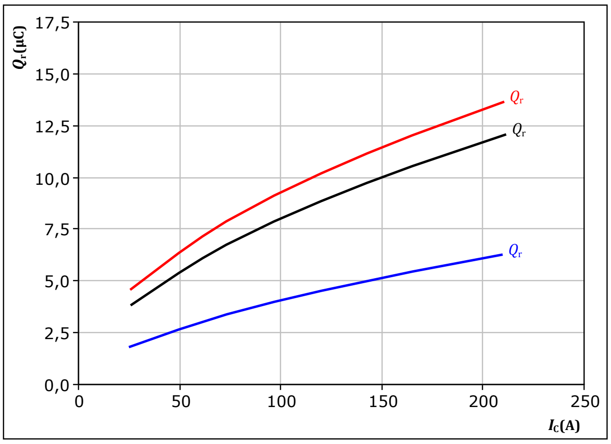
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 28. FWD

Typical recovered charge as a function of collector current

Q_r = f(I_C)



With an inductive load at

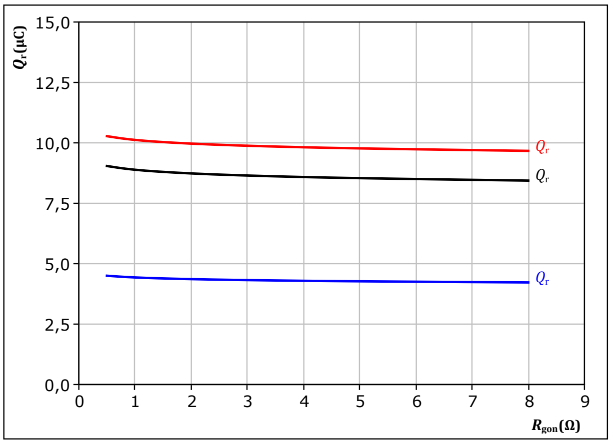
V_{CE} = 350 V
V_{GE} = -5/15 V
R_{gon} = 2 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 29. FWD

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

Q_r = f(R_{gon})



With an inductive load at

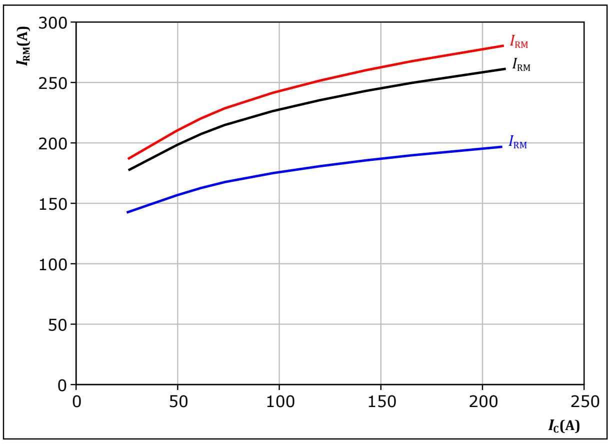
V_{CE} = 350 V
V_{GE} = -5/15 V
I_C = 120 A

T_j: 25 °C, 125 °C, 150 °C

figure 30. FWD

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



With an inductive load at

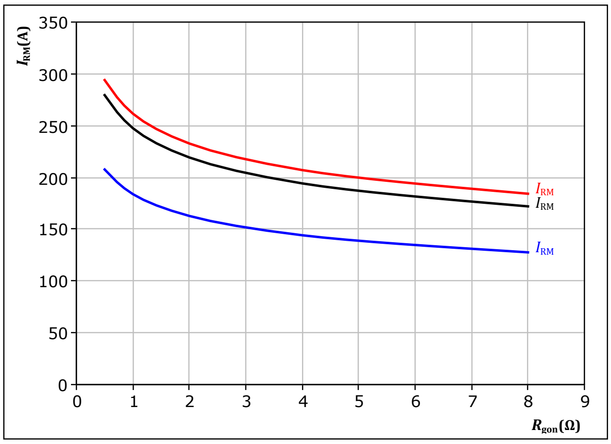
V_{CE} = 350 V
V_{GE} = -5/15 V
R_{gon} = 2 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 31. 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
V_{GE} = -5/15 V
I_C = 120 A

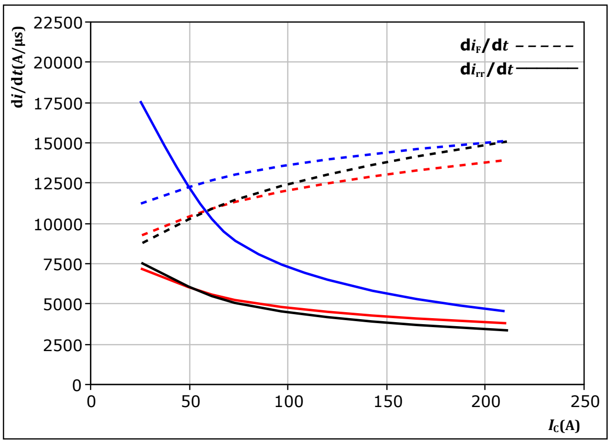
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 32.	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)



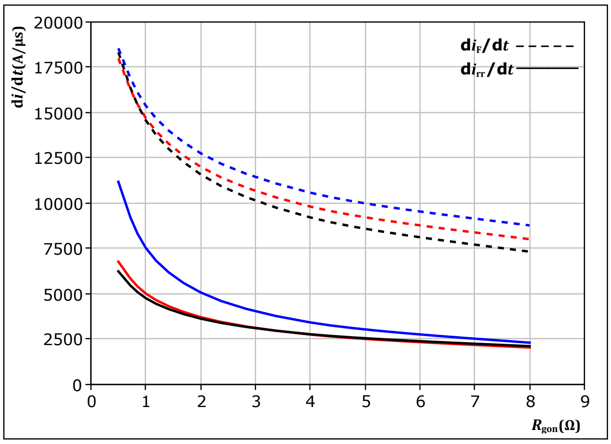
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 33.	FWD

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

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



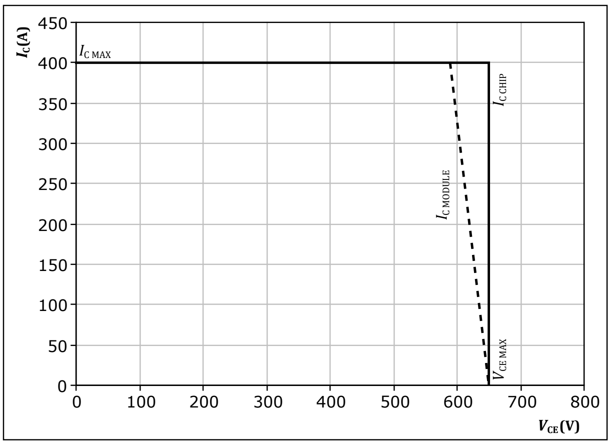
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	120	A		150 °C

figure 34.	IGBT

Reverse bias safe operating area

I_C = f(V_{CE})



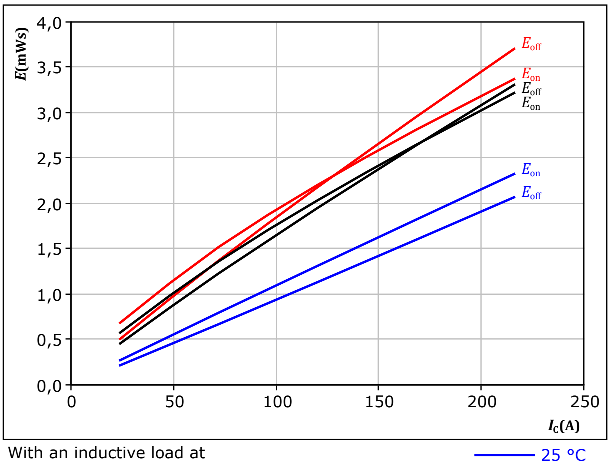
At			
	T_j =	150	°C
	R_{gon} =	2	Ω
	R_{goff} =	2	Ω

Boost Switching Characteristics

figure 35. IGBT

Typical switching energy losses as a function of collector current

E = f(I_C)



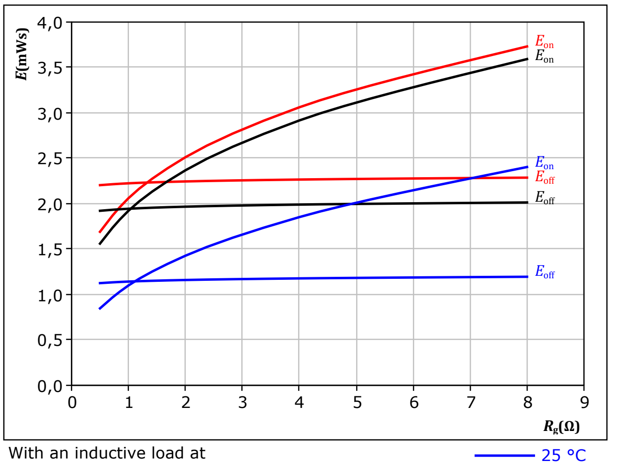
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	2	Ω		150 °C
R_{goff} =	2	Ω		

figure 36. IGBT

Typical switching energy losses as a function of IGBT turn on gate resistor

E = f(R_g)



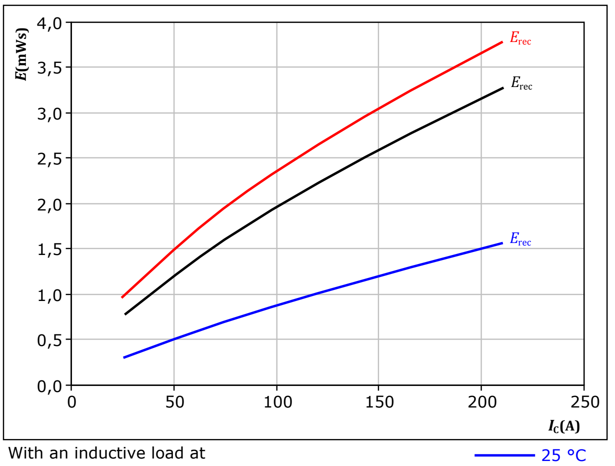
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	120	A		150 °C

figure 37. FWD

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



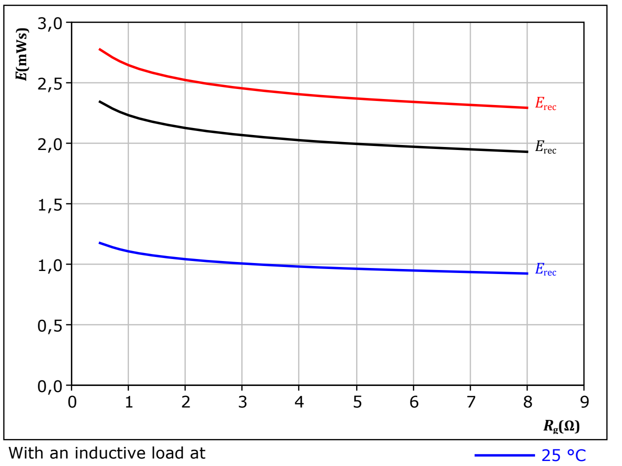
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 38. FWD

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

E_{rec} = f(R_g)



With an inductive load at

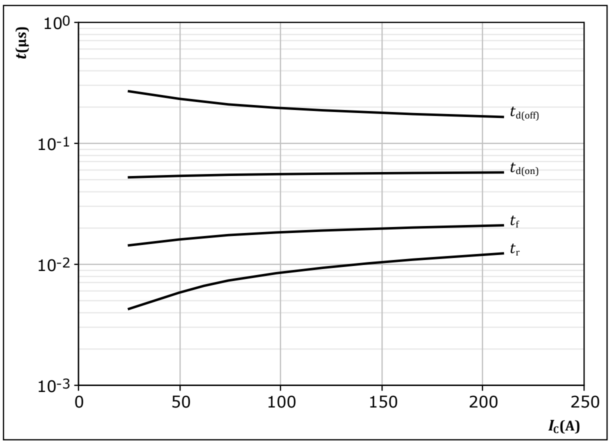
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	120	A		150 °C

Boost Switching Characteristics

figure 39. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



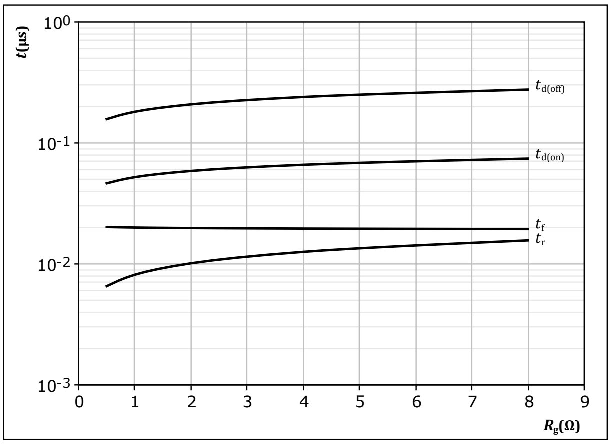
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 40. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

t = f(R_g)



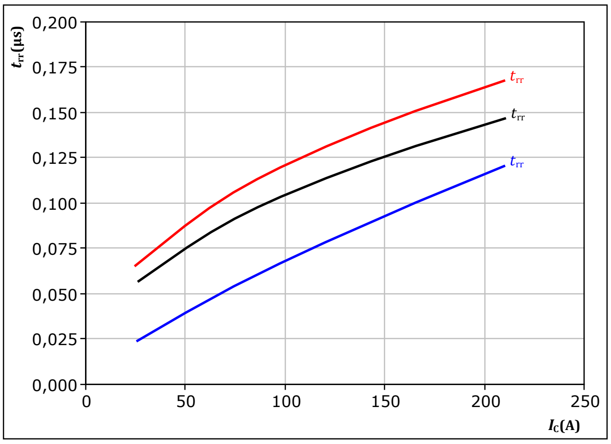
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	120	A

figure 41. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

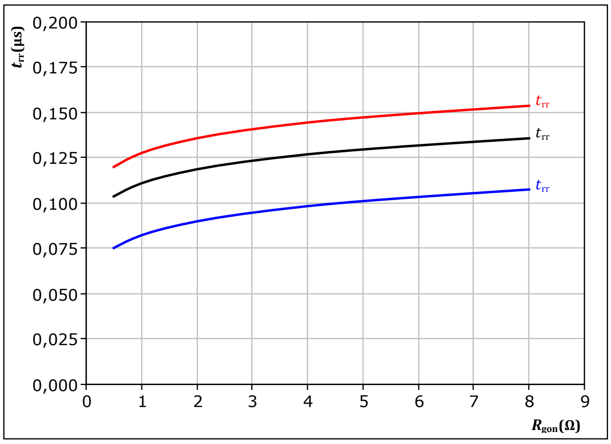
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 42. **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} =	-5/15	V
I_C =	120	A

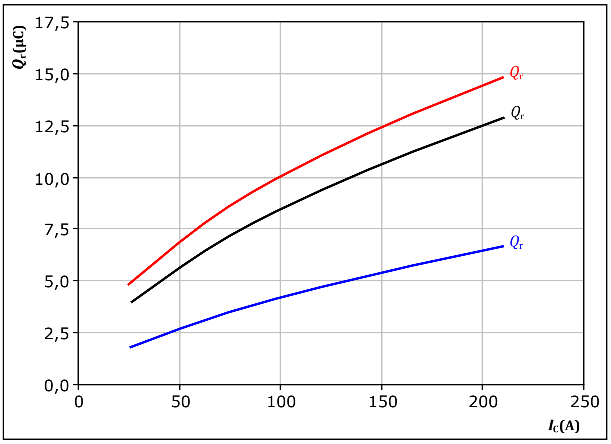
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 43. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



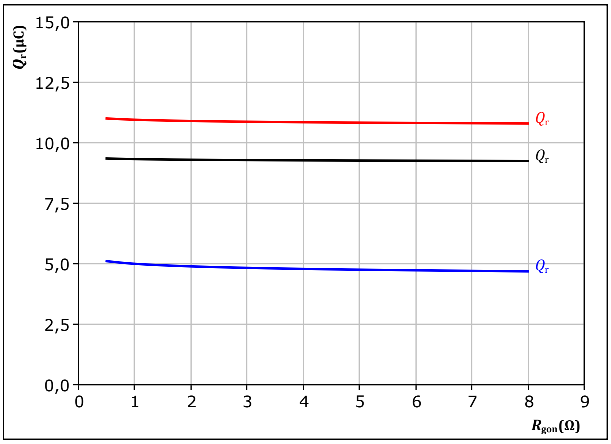
With an inductive load at

			T_j:	
V_{CE} =	350	V		25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 44. **FWD**

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

Q_r = f(R_{gon})



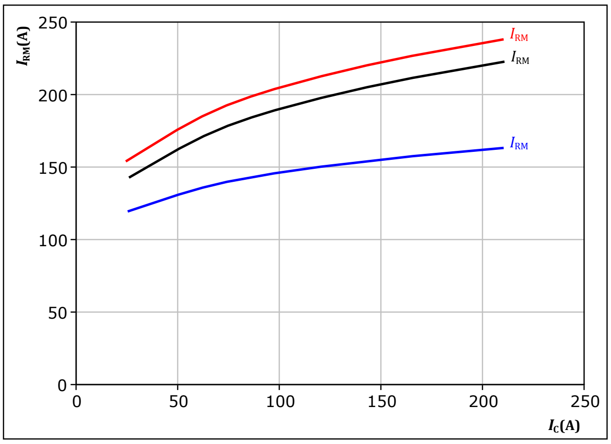
With an inductive load at

			T_j:	
V_{CE} =	350	V		25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	120	A		150 °C

figure 45. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



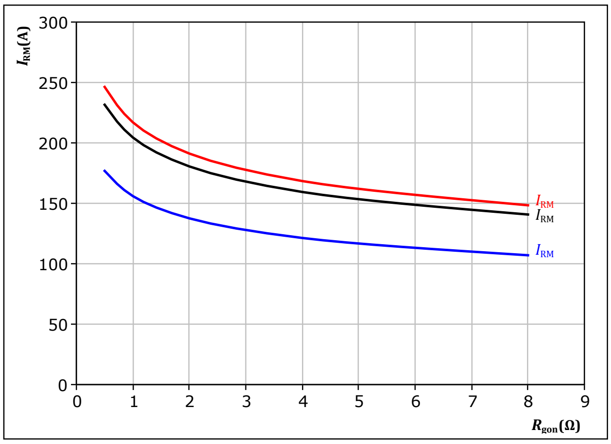
With an inductive load at

			T_j:	
V_{CE} =	350	V		25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 46. **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

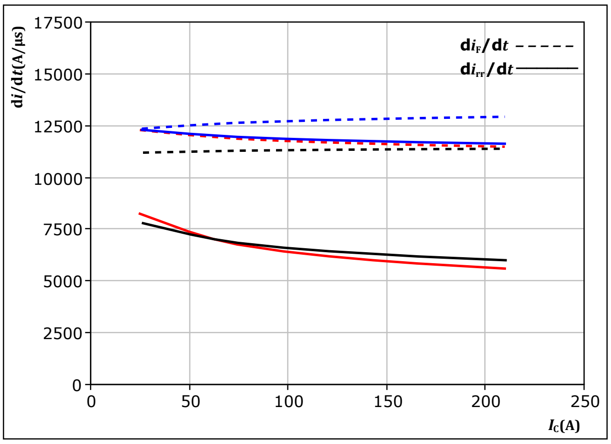
			T_j:	
V_{CE} =	350	V		25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	120	A		150 °C

Boost Switching Characteristics

figure 47. **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)



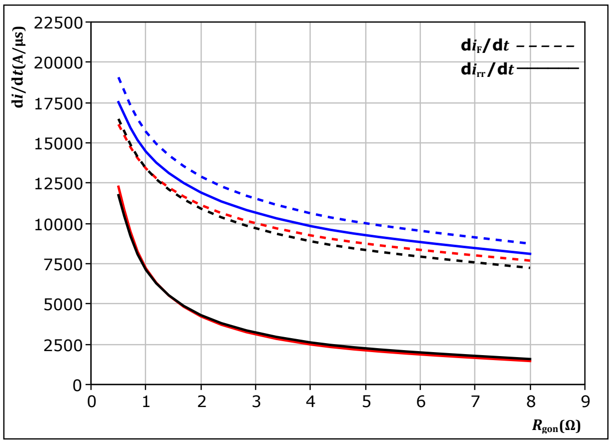
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 48. **FWD**

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

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



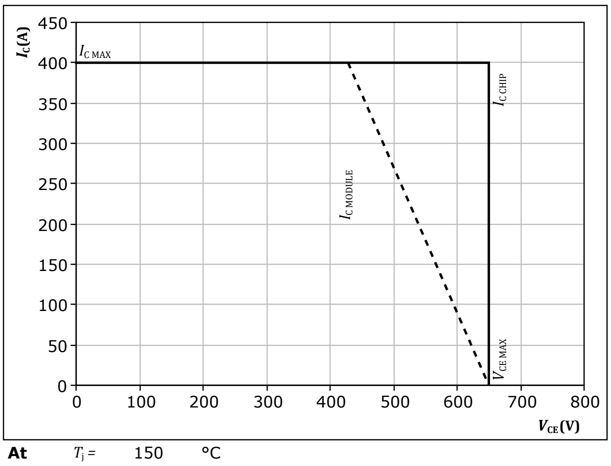
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	120	A		150 °C

figure 49. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At	T_j =	150	°C
	R_{gon} =	2	Ω
	R_{goff} =	2	Ω

Switching Definitions

figure 50. **IGBT**

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

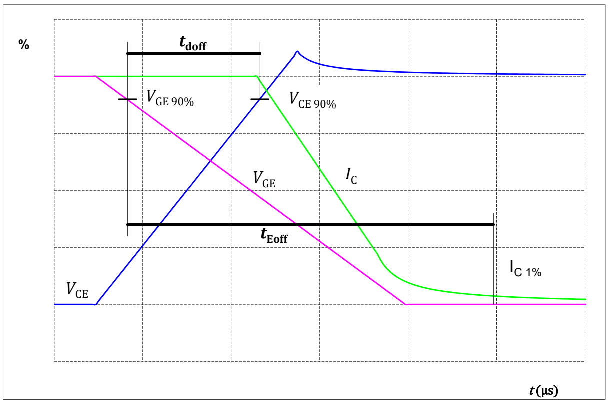


figure 51. **IGBT**

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

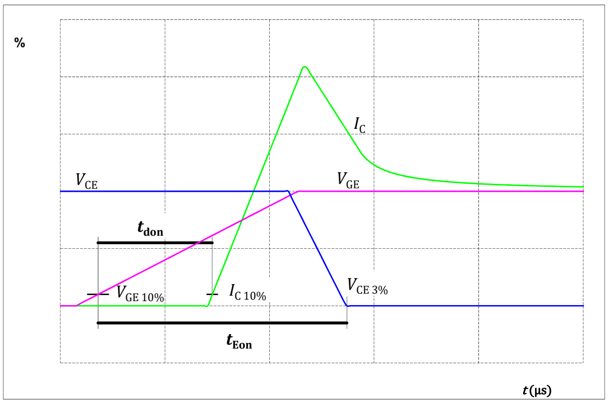


figure 52. **IGBT**

Turn-off Switching Waveforms & definition of t_f

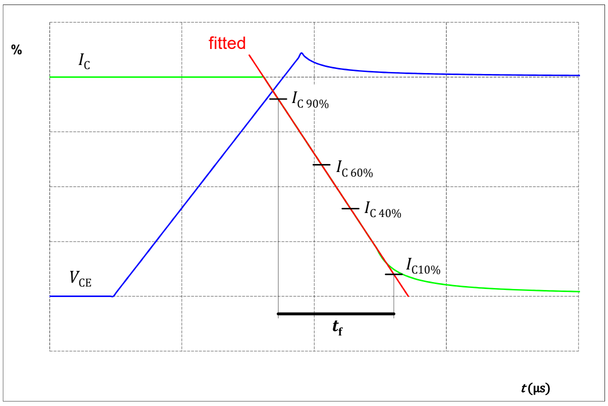
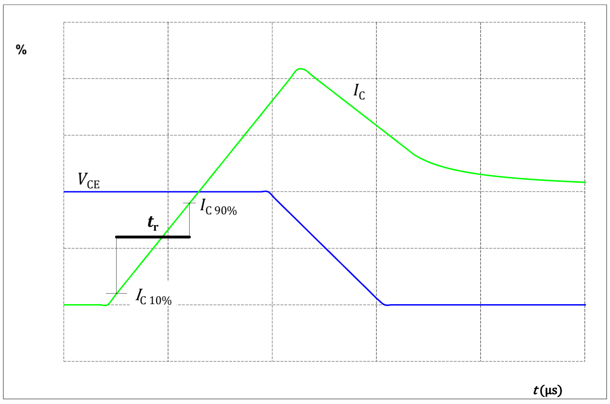


figure 53. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 54.	FWD

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

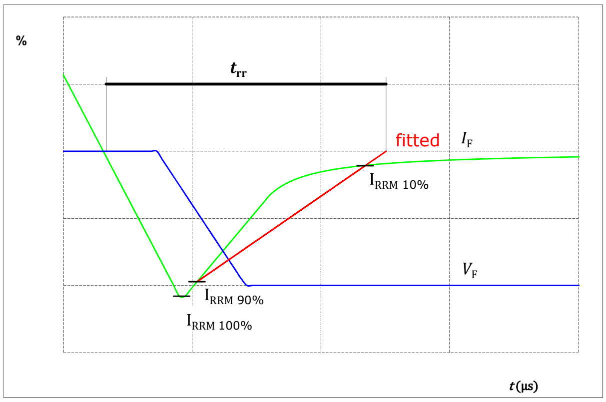
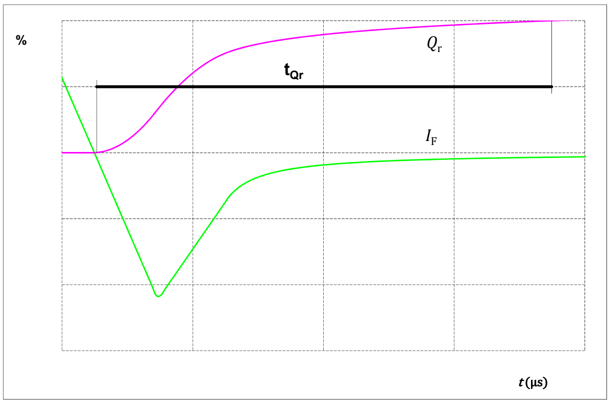


figure 55.	FWD

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



Ordering Code

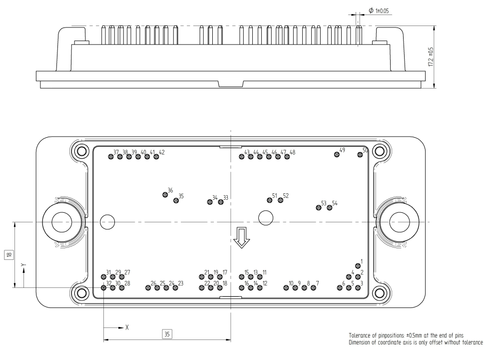
Version	Ordering Code
Without thermal paste	30-FT07NIB200S502-LE04F58
With thermal paste (3,4 W/mK, PSX-P7)	30-FT07NIB200S502-LE04F58-/3/

Marking

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	28	5	0	DC+1
1	70	6	DC+2	29	2,5	3	DC+1
2	70	3	DC+2	30	2,5	0	DC+1
3	70	0	DC+2	31	0	3	DC+1
4	67,5	3	DC+2	32	0	0	DC+1
5	67,5	0	DC+2	33	32,25	23,55	S12
6	65	0	DC+2	34	29,25	23,55	G12
7	57,75	0	GND2	35	19,95	23,95	S14
8	55,25	0	GND2	36	16,95	25,55	G14
9	52,75	0	GND2	37	2	36	Ph1
10	50,25	0	GND2	38	4,5	36	Ph1
11	43	3	DC-2	39	7	36	Ph1
12	43	0	DC-2	40	9,5	36	Ph1
13	40,5	3	DC-2	41	12	36	Ph1
14	40,5	0	DC-2	42	14,5	36	Ph1
15	38	3	DC-2	43	38	36	Ph2
16	38	0	DC-2	44	40,5	36	Ph2
17	32	3	DC-1	45	43	36	Ph2
18	32	0	DC-1	46	45,5	36	Ph2
19	29,5	3	DC-1	47	48	36	Ph2
20	29,5	0	DC-1	48	50,5	36	Ph2
21	27	3	DC-1	49	64,2	36,6	Therm1
22	27	0	DC-1	50	70,6	36,55	Therm2
23	19,75	0	GND1	51	45,7	24,05	S13
24	17,25	0	GND1	52	48,7	24,05	G13
25	14,75	0	GND1	53	59,2	22	S11
26	12,25	0	GND1	54	62,2	22	G11
27	5	3	DC+1				

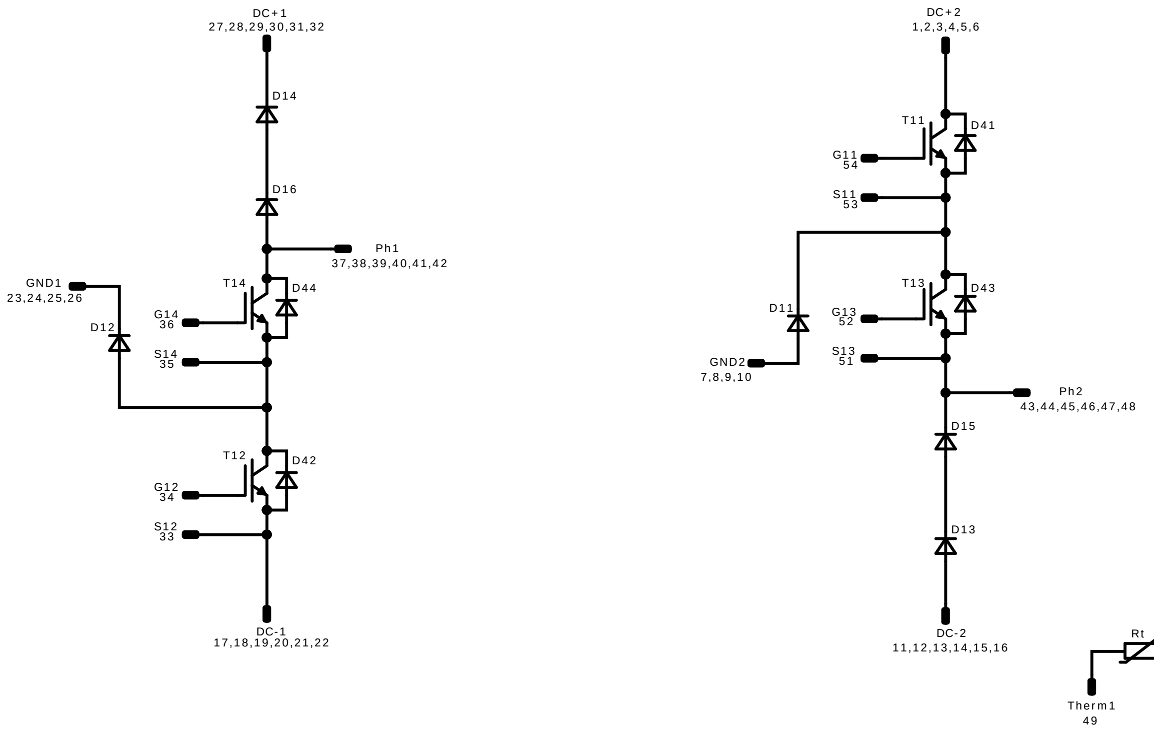


Vincotech

30-FT07NIB200S502-LE04F58

datasheet

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	650 V	200 A	Buck Switch	
D11, D12	FWD	650 V	200 A	Buck Diode	
D41, D42	FWD	650 V	30 A	Buck Sw. Protection Diode	
T13, T14	IGBT	650 V	200 A	Boost Switch	
D13, D15, D14, D16	FWD	1300 V	200 A	Boost Diode	Serial devices. Values apply to complete device.
D43, D44	FWD	650 V	30 A	Boost Sw. Protection Diode	
Rt	Thermistor			Thermistor	

30-FT07NIB200S502-LE04F58
datasheet

Packaging instruction				
Standard packaging quantity (SPQ) 36	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 2 packages see vincotech.com website.

Package data
Package data for *flow* 2 packages see vincotech.com website.

Vincotech thermistor reference
See Vincotech thermistor reference table at 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
30-FT07NIB200S502-LE04F58-D2-14	9 Feb. 2023	Buck and Boost Sw. Protection Diode static characteristics are updated DC isolation test voltage is updated Separated datasheet New datasheet format, module is unchanged	