B0-SP103BB100S764-PB80L98T
datasheet

***flow*BOOST S3 symmetric triple** **950 V / 100 A**

Topology features

- Kelvin Emitter for improved switching performance
- Temperature sensor
- Triple Flying Cap Booster
- Auxiliary diodes for FC pre-charge (patent pending)

Component features

- Low collector emitter saturation voltage
- High speed and smooth switching

Housing features

- Base isolation: Al_2O_3
- CTI600 housing material
- Compact, baseplate-less housing
- VINcoPress Technology
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

Target applications

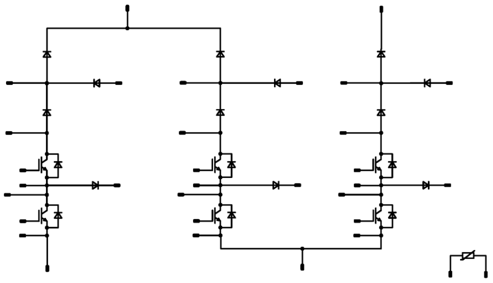
- Energy Storage Systems
- Solar Inverters

Types

- B0-SP103BB100S764-PB80L98T

flow S3 12 mm housing

Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Inner Boost Switch					
Collector-emitter voltage	V_{CES}			950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	77	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	145	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C
Inner Boost Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	74	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	429	A
Surge current capability	I^2t			918	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	158	W
Maximum junction temperature	T_{jmax}			175	°C
Inner Boost Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	49	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	90	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Outer Boost Switch					
Collector-emitter voltage	V_{CES}			950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	77	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	145	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C
Outer Boost Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	74	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	429	A
Surge current capability	I^2t			918	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	158	W
Maximum junction temperature	T_{jmax}			175	°C
Outer Boost Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	49	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	90	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Aux Diode H					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	32	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	170	A
Surge current capability	I^2t			145	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	73	W
Maximum junction temperature	T_{jmax}			175	°C
Aux Diode L					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	32	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	170	A
Surge current capability	I^2t			145	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	73	W
Maximum junction temperature	T_{jmax}			175	°C
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
Creepage distance				10,12	mm
Clearance				8,26	mm
Comparative Tracking Index	CTI			≥ 600	

*100 % tested in production

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	
Inner Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00167	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	V_{CEsat}		15		100	25 125 150		1,67 1,94 2,01	2,35(1)	V
Collector-emitter cut-off current	I_{CES}		0	950		25			2	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							1,5		Ω
Input capacitance	C_{ies}	f = 100 kHz	0	25		25		6500		pF
Output capacitance	C_{oes}							139		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g		±15		0	25		230		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,66		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	±15	600	100	25 125 150		93,17 95,19 95,8		ns
Rise time	t_r					25 125 150		16,58 17,99 18,48		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		94,61 118,3 123,99		ns
Fall time	t_f					25 125 150		25,2 53,77 62,81		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,252 µC Q_{rFWD}=0,285 µC Q_{rFWD}=0,294 µC				25 125 150		2,28 2,3 2,3		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		2,46 3,93 4,34		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	
Inner Boost Diode										
Static										
Forward voltage	V_F				60	25 125 150		1,44 1,71 1,81	1,6(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25 150		0,6 42	240	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,6		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=3421 A/µs d*i*/d*t*=3846 A/µs d*i*/d*t*=4494 A/µs	±15	600	100	25 125 150		23,03 26,31 27,3		A
Reverse recovery time	t_{rr}					25 125 150		18,02 17,77 17,74		ns
Recovered charge	Q_r					25 125 150		0,252 0,285 0,294		µC
Reverse recovered energy	E_{rec}					25 125 150		0,06 0,075 0,079		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		3097,66 3970,72 4415,47		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	
Inner Boost Sw. Protection Diode										
Static										
Forward voltage	V_F				50	25 125 150		1,66 1,78 1,79	2,1(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25			40	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,06		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]	Values Min	Typ	Max	Unit
Outer Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00167	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	V_{CEsat}		15		100	25 125 150		1,67 1,94 2,01	2,35(1)	V
Collector-emitter cut-off current	I_{CES}		0	950		25			2	μA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							1,5		Ω
Input capacitance	C_{ies}	f = 100 kHz	0	25		25		6500		pF
Output capacitance	C_{oes}							139		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g		±15		0	25		230		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,66		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	±15	600	100	25 125 150		93,7 95,36 96,03		ns
Rise time	t_r					25 125 150		15 16,85 17,07		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		95,5 117,76 123,5		ns
Fall time	t_f					25 125 150		31,33 50,22 58,66		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,339 μC Q_{rFWD}=0,353 μC Q_{rFWD}=0,36 μC				25 125 150		1,59 1,75 1,75		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		2,52 3,89 4,28		mWs

Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	Unit
Outer Boost Diode										
Static										
Forward voltage	V_F				60	25 125 150		1,44 1,71 1,81	1,6(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25 150		0,6 42	240	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,6		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=3849 A/µs d*i*/d*t*=4417 A/µs d*i*/d*t*=4684 A/µs	±15	600	100	25 125 150		33,56 34,26 34,56		A
Reverse recovery time	t_{rr}					25 125 150		16,39 16,77 16,99		ns
Recovered charge	Q_r					25 125 150		0,339 0,353 0,36		µC
Reverse recovered energy	E_{rec}					25 125 150		0,123 0,134 0,138		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		5162,72 5159,65 5231,68		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	
Outer Boost Sw. Protection Diode										
Static										
Forward voltage	V_F				50	25 125 150		1,66 1,78 1,79	2,1(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25			40	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,06		K/W
Aux Diode H										
Static										
Forward voltage	V_F				35	25 150		2,37 2,35	2,62(1) 2,62(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25 150		 2700	60 5500	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,31		K/W
Aux Diode L										
Static										
Forward voltage	V_F				35	25 150		2,37 2,35	2,62(1) 2,62(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25 150		 2700	60 5500	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,31		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
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	

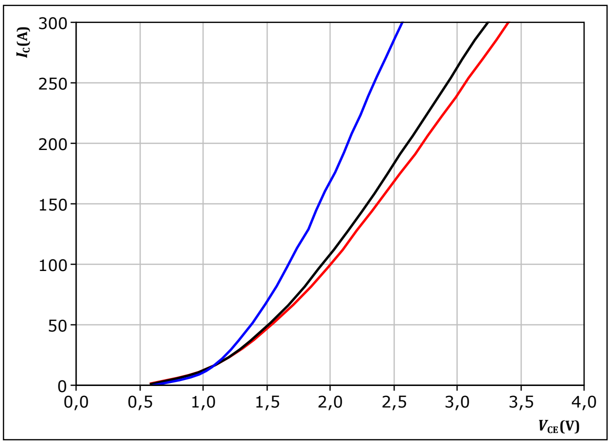
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Inner Boost Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



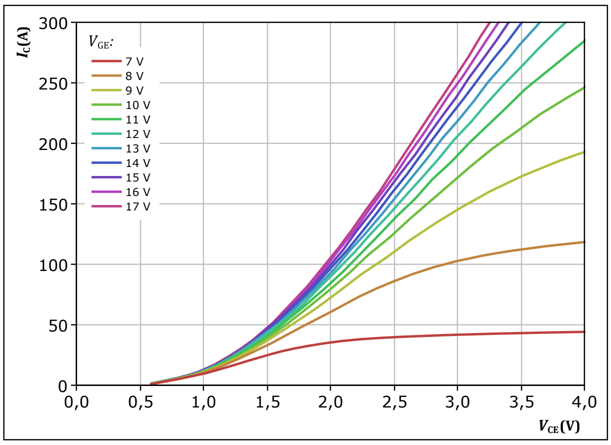
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



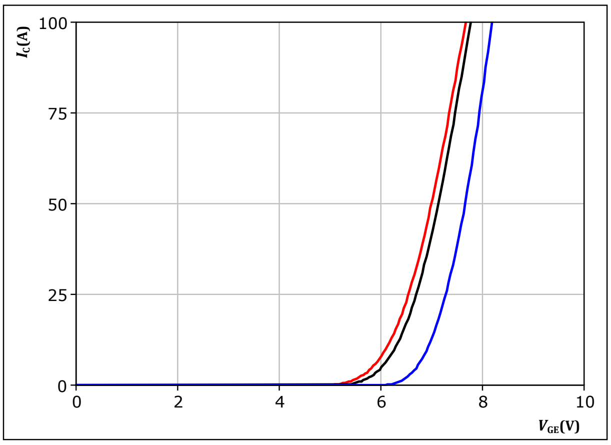
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})



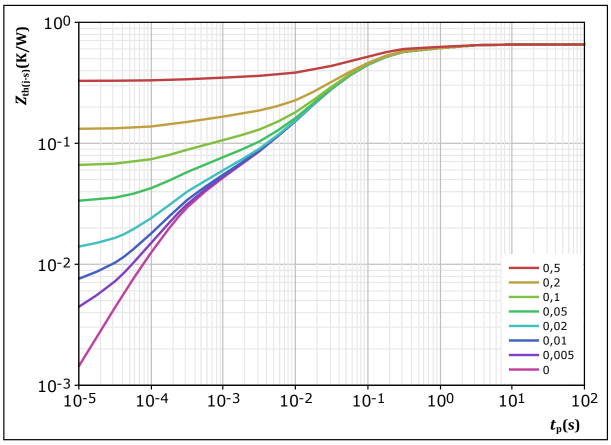
t_p =	250	µs
V_{CE} =	10	V

T_j: 25 °C, 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	
$R_{th(j-s)}$ =	0,656	K/W

IGBT thermal model values

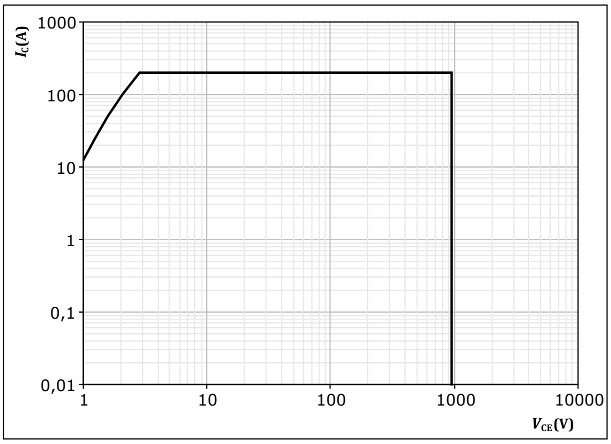
R (K/W)	τ (s)
8,75E-02	1,42E+00
3,39E-01	1,02E-01
1,74E-01	2,16E-02
2,53E-02	1,80E-03
3,08E-02	2,55E-04

Inner Boost Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})



D = single pulse

T_s = 80 °C

V_{GE} = 15 V

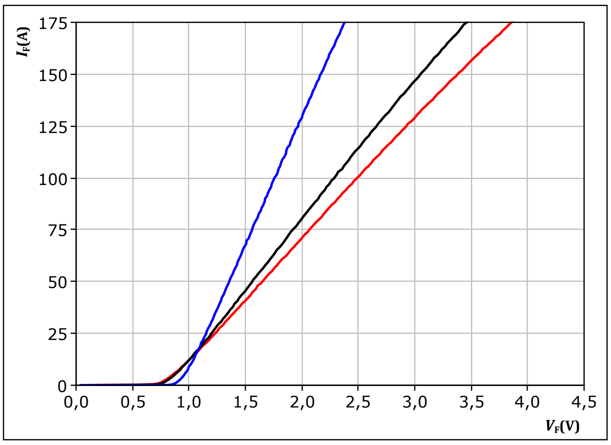
T_j = T_{jmax}

Inner Boost Diode Characteristics

figure 6. FWD

Typical forward characteristics

$I_F = f(V_F)$



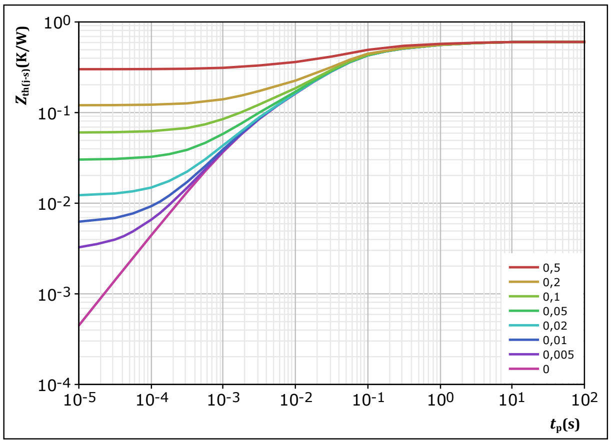
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,602 K/W

FWD thermal model values

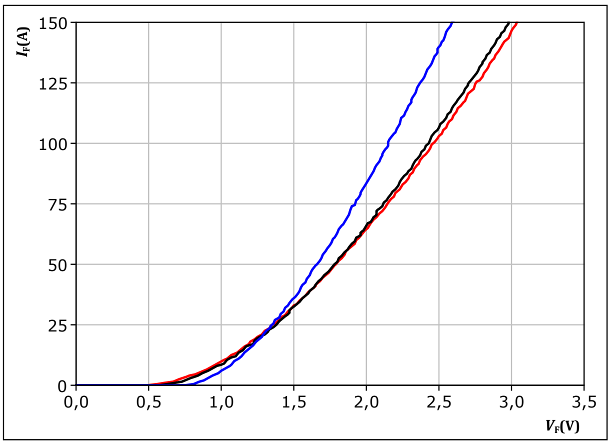
R (K/W)	τ (s)
4,24E-02	3,27E+00
1,01E-01	4,81E-01
3,09E-01	5,52E-02
9,91E-02	1,09E-02
5,00E-02	1,66E-03

Inner Boost Sw. Protection Diode Characteristics

figure 8. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



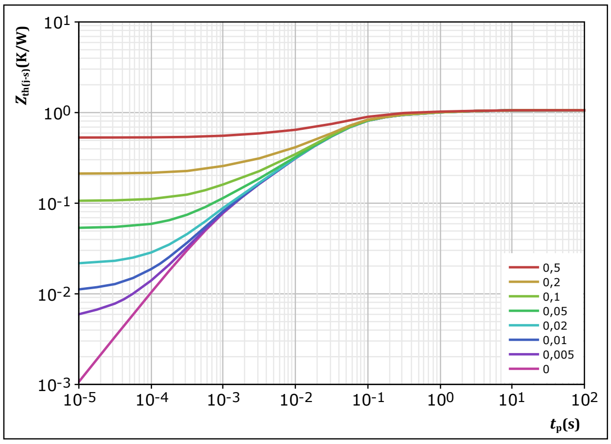
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 9. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 1,061 K/W

FWD thermal model values

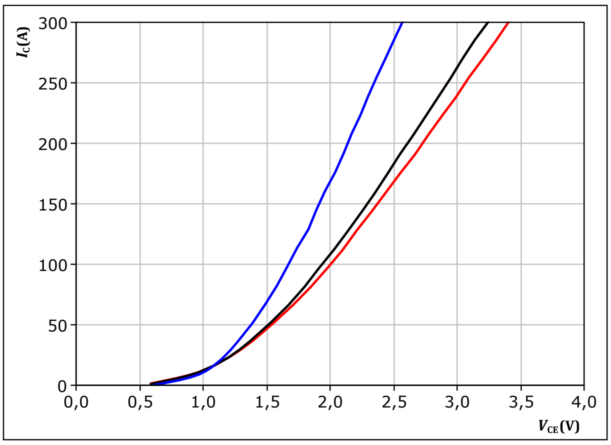
R (K/W)	τ (s)
6,96E-02	2,39E+00
1,22E-01	3,75E-01
6,12E-01	5,08E-02
1,89E-01	8,26E-03
6,78E-02	9,42E-04

Outer Boost Switch Characteristics

figure 10. IGBT

Typical output characteristics

I_C = f(V_{CE})

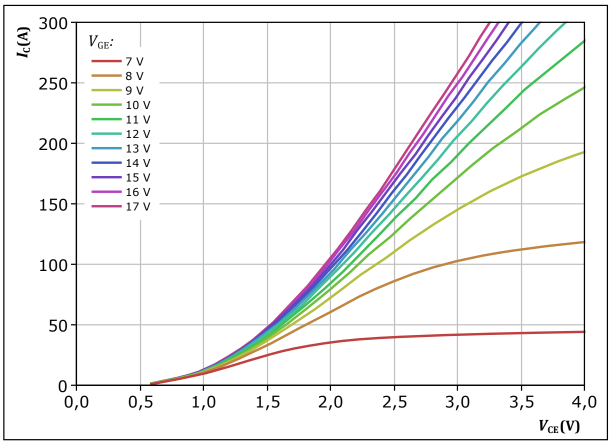


t_p = 250 µs
V_{GE} = 15 V
T_j: 25 °C, 125 °C, 150 °C

figure 11. IGBT

Typical output characteristics

I_C = f(V_{CE})

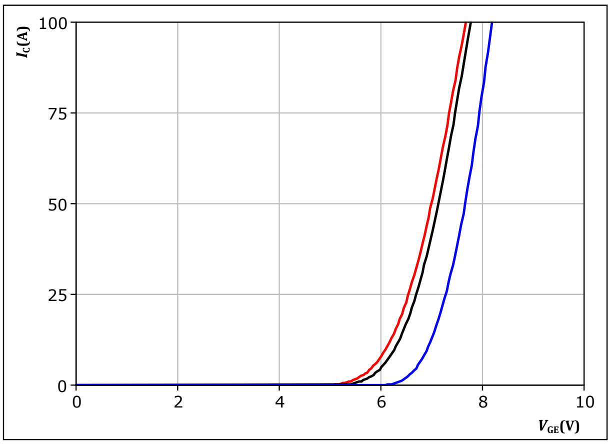


t_p = 250 µs
T_j = 150 °C
V_{GE} from 7 V to 17 V in steps of 1 V

figure 12. IGBT

Typical transfer characteristics

I_C = f(V_{GE})

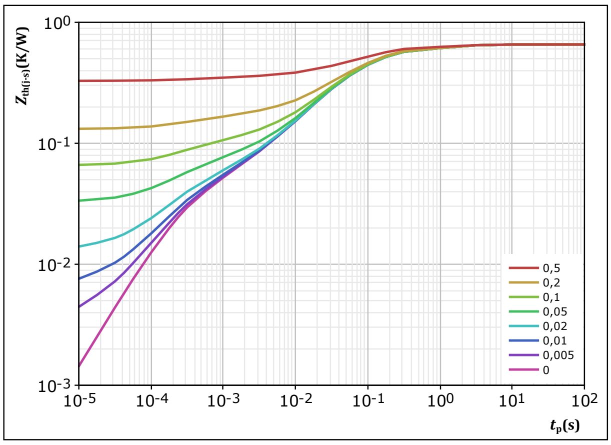


t_p = 250 µs
V_{CE} = 10 V
T_j: 25 °C, 125 °C, 150 °C

figure 13. IGBT

Transient thermal impedance as a function of pulse width

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



D = t_p / T
$R_{th(j-s)}$ = 0,656 K/W

IGBT thermal model values

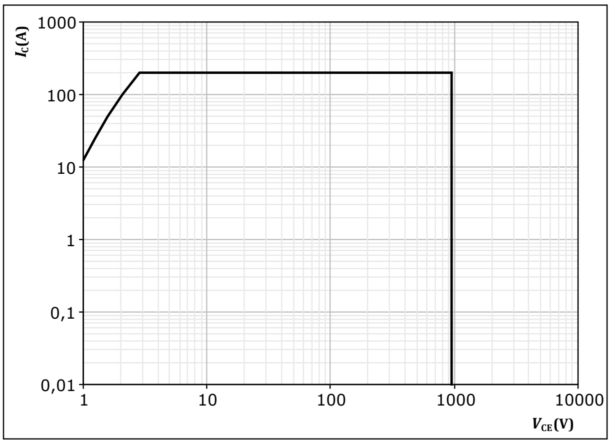
R (K/W)	τ (s)
8,75E-02	1,42E+00
3,39E-01	1,02E-01
1,74E-01	2,16E-02
2,53E-02	1,80E-03
3,08E-02	2,55E-04

Outer Boost Switch Characteristics

figure 14. **IGBT**

Safe operating area

I_C = f(V_{CE})



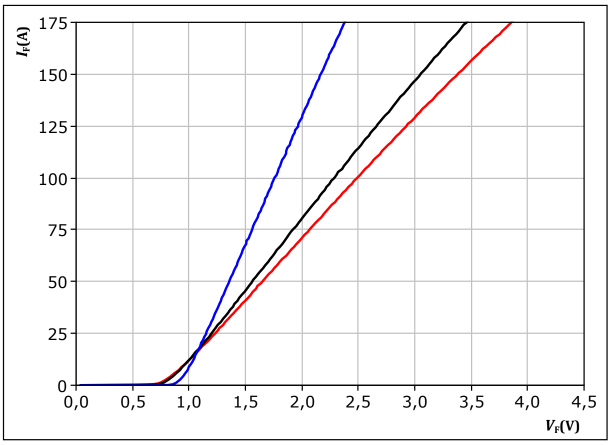
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Outer Boost Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



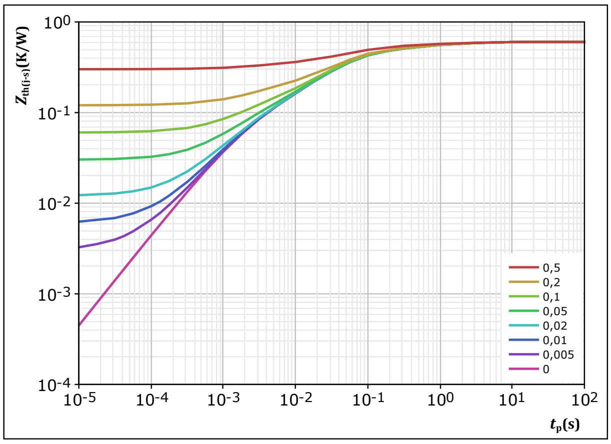
t_p = 250 μs

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

$R_{th(j-s)}$ = 0,602 K/W

FWD thermal model values

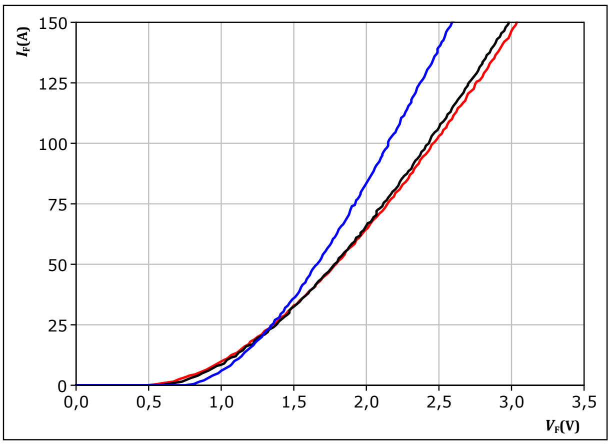
R (K/W)	τ (s)
4,24E-02	3,27E+00
1,01E-01	4,81E-01
3,09E-01	5,52E-02
9,91E-02	1,09E-02
5,00E-02	1,66E-03

Outer Boost Sw. Protection Diode Characteristics

figure 17. FWD

Typical forward characteristics

$I_F = f(V_F)$



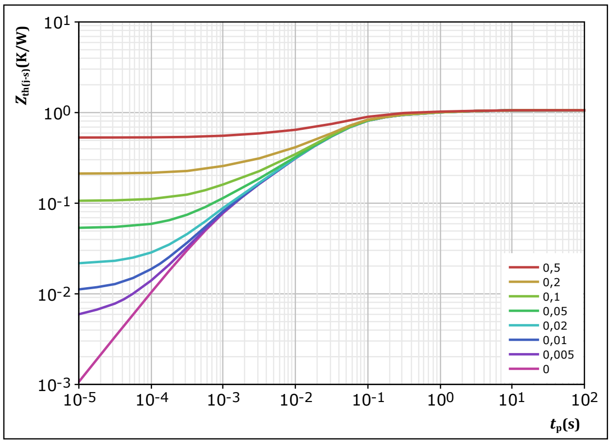
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 18. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 1,061 K/W

FWD thermal model values

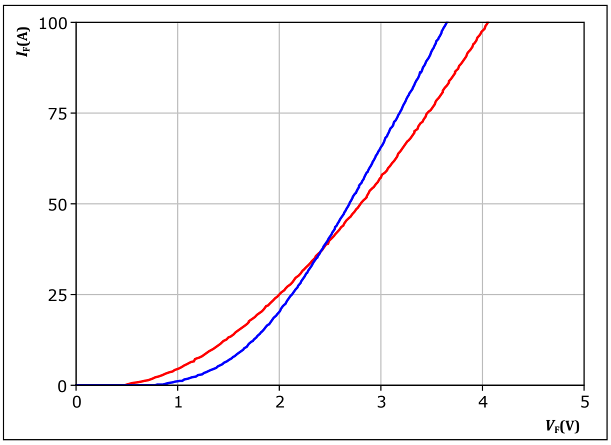
R (K/W)	τ (s)
6,96E-02	2,39E+00
1,22E-01	3,75E-01
6,12E-01	5,08E-02
1,89E-01	8,26E-03
6,78E-02	9,42E-04

Aux Diode H Characteristics

figure 19. **FWD**

Typical forward characteristics

I_F = f(V_F)



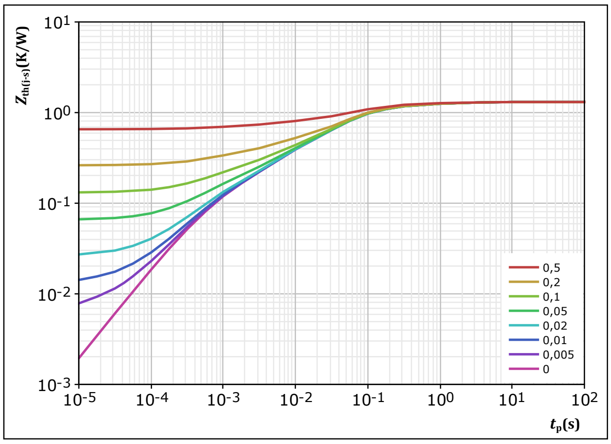
t_p = 250 µs

T_j: 25 °C, 150 °C

figure 20. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,308 K/W

FWD thermal model values

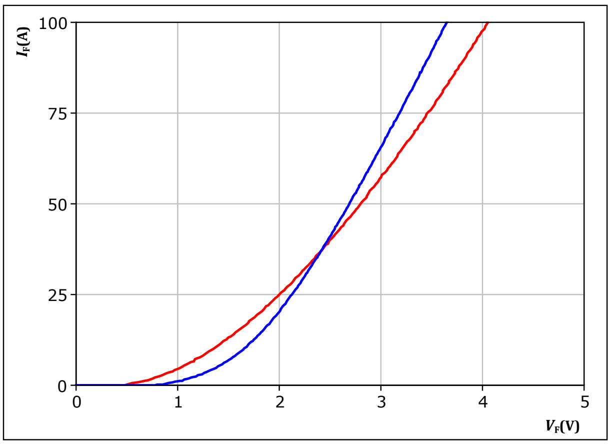
R (K/W)	τ (s)
9,18E-02	1,91E+00
2,59E-01	2,04E-01
6,72E-01	4,91E-02
1,98E-01	5,31E-03
8,79E-02	6,11E-04

Aux Diode L Characteristics

figure 21. **FWD**

Typical forward characteristics

I_F = f(V_F)



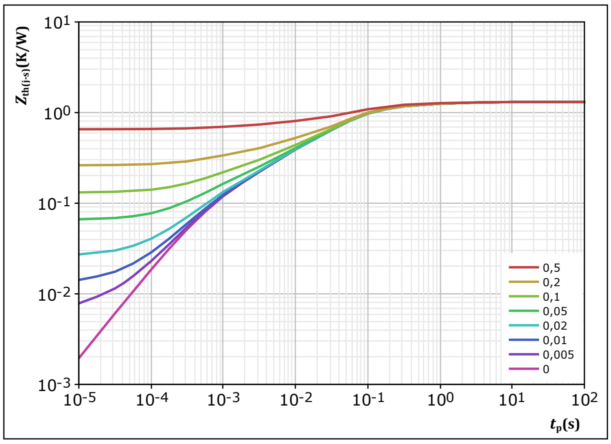
t_p = 250 µs

T_j: 25 °C, 150 °C

figure 22. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,308 K/W

FWD thermal model values

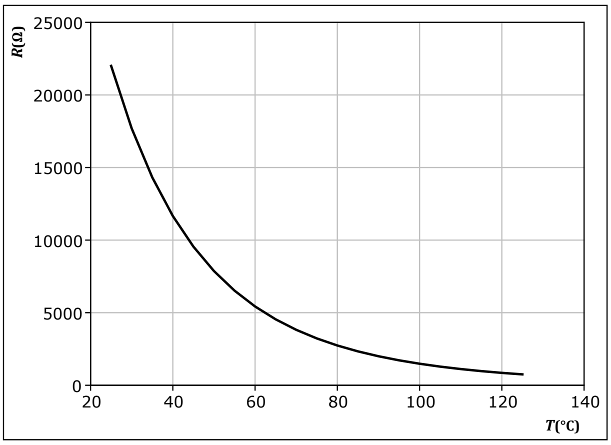
R (K/W)	τ (s)
9,18E-02	1,91E+00
2,59E-01	2,04E-01
6,72E-01	4,91E-02
1,98E-01	5,31E-03
8,79E-02	6,11E-04

Thermistor Characteristics

figure 23.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

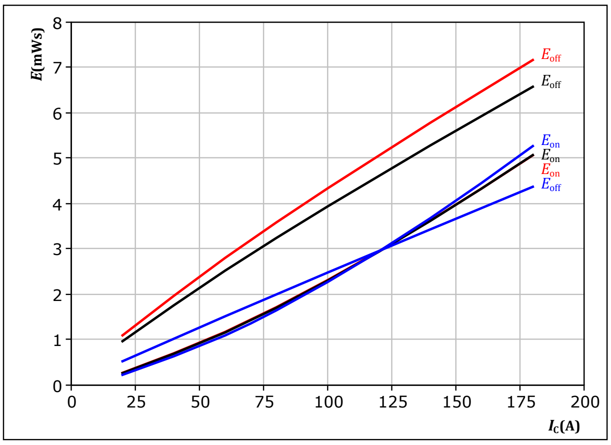


Inner Boost Switching Characteristics

figure 24. **IGBT**

Typical switching energy losses as a function of collector current

E = f(I_C)



With an inductive load at

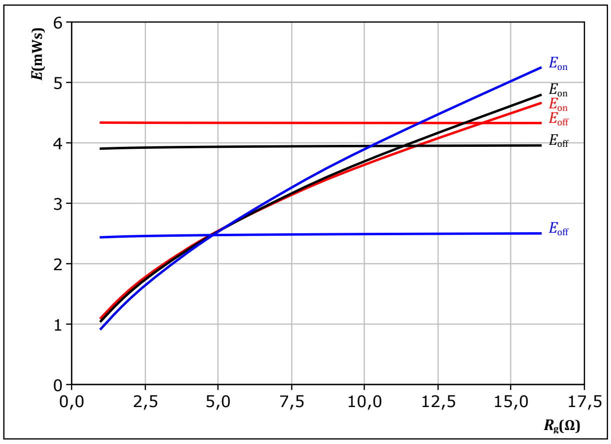
V_{CE} =	600	V	
V_{GE} =	±15	V	
R_{gon} =	4	Ω	
R_{goff} =	4	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 25. **IGBT**

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

E = f(R_g)



With an inductive load at

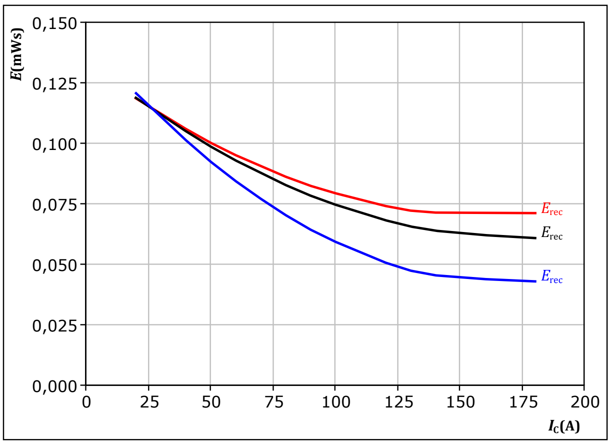
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	100	A

T_j: 25 °C, 125 °C, 150 °C

figure 26. **FWD**

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



With an inductive load at

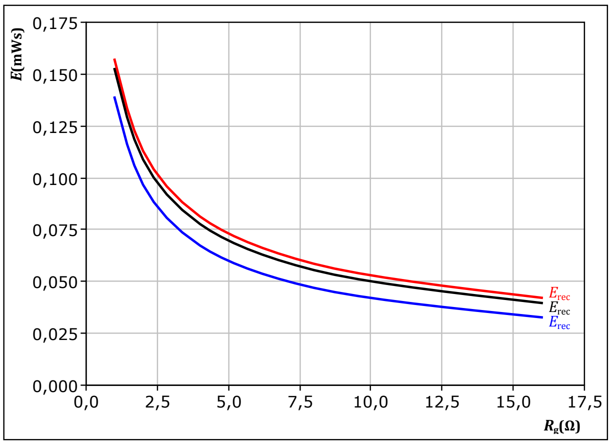
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 27. **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} =	600	V
V_{GE} =	±15	V
I_C =	100	A

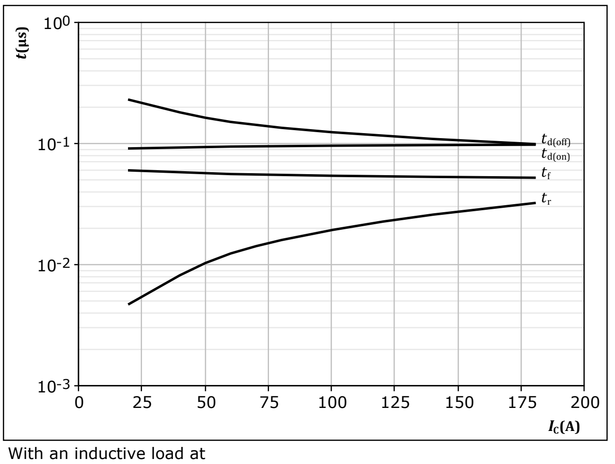
T_j: 25 °C, 125 °C, 150 °C

Inner Boost Switching Characteristics

figure 28. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



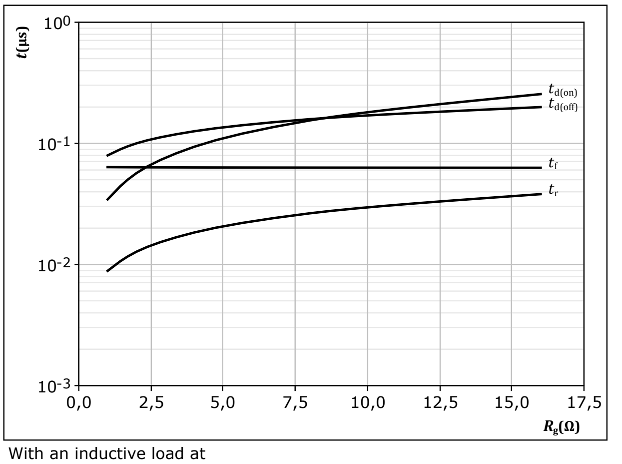
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 29. **IGBT**

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

t = f(R_g)



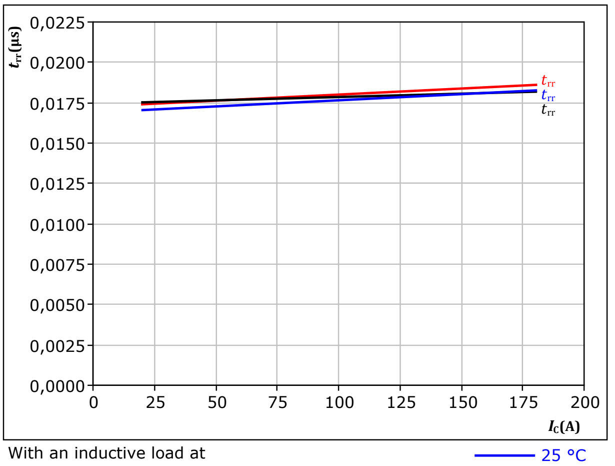
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	100	A

figure 30. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

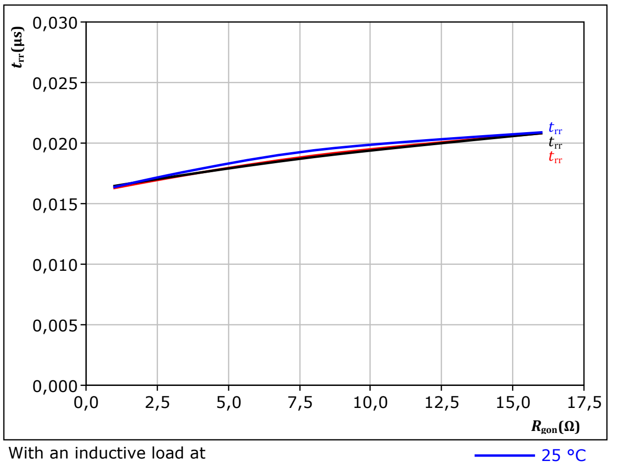
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 31. **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} =	600	V
V_{GE} =	±15	V
I_C =	100	A

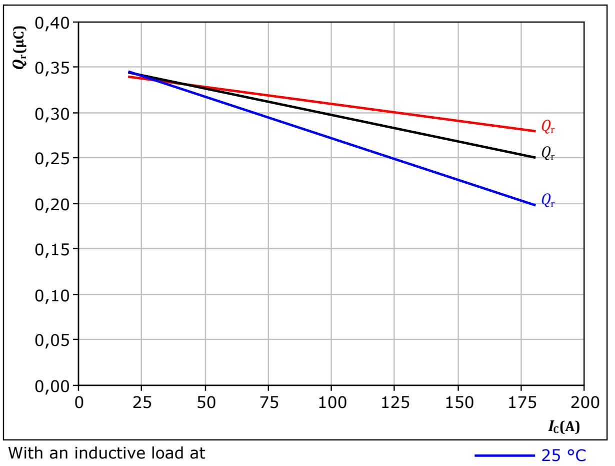
T_j: 25 °C, 125 °C, 150 °C

Inner Boost Switching Characteristics

figure 32. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



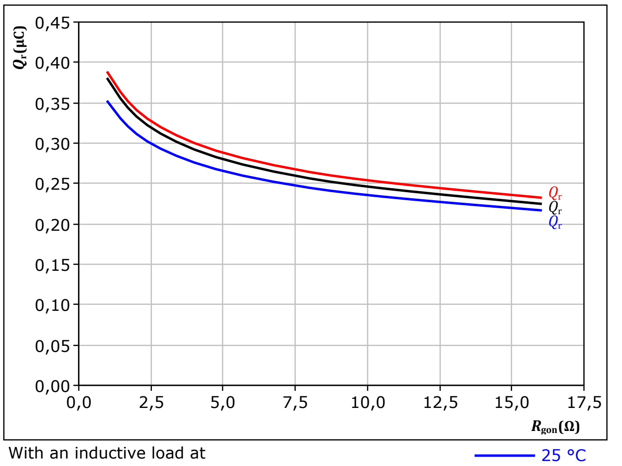
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 33. **FWD**

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

Q_r = f(R_{gon})



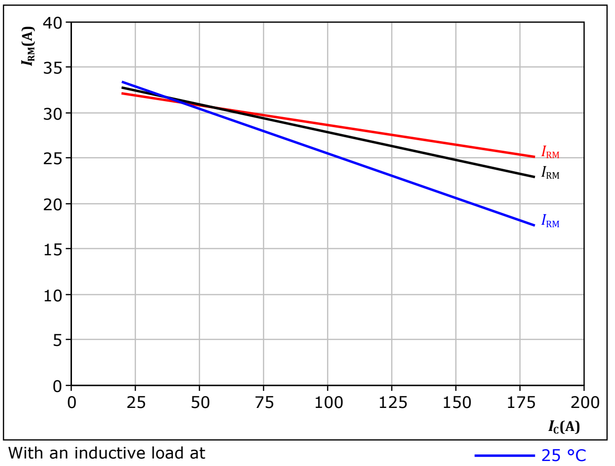
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

figure 34. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



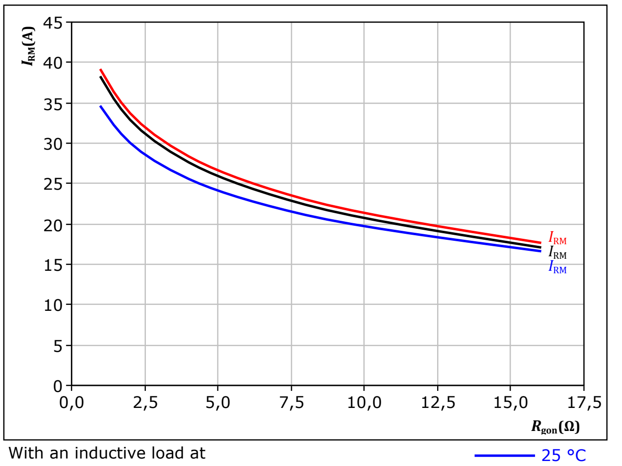
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 35. **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

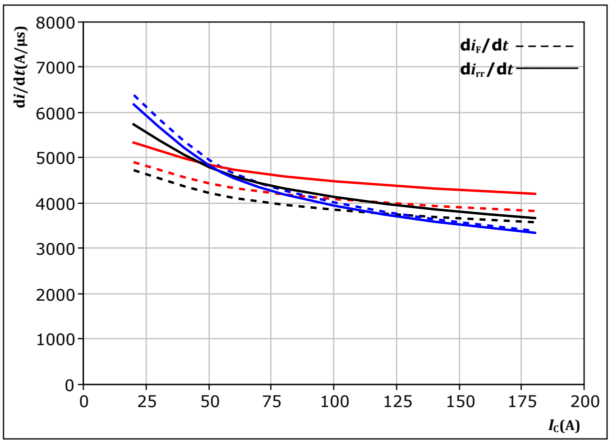
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

Inner Boost Switching Characteristics

figure 36. **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} = 600 V

V_{GE} = ±15 V

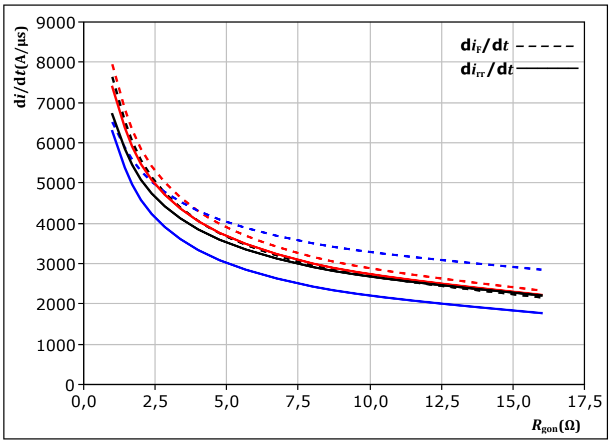
R_{gon} = 4 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 37. **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} = 600 V

V_{GE} = ±15 V

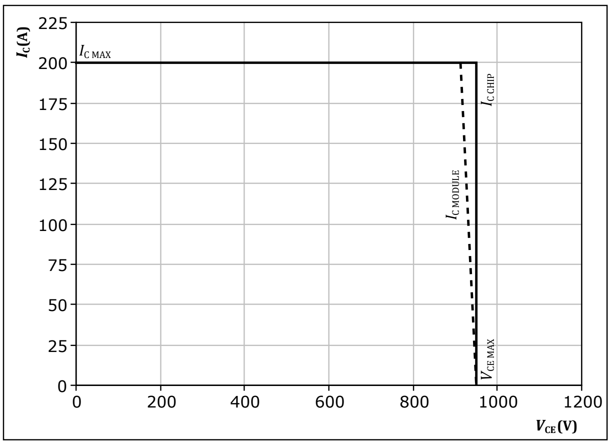
I_C = 100 A

T_j: 25 °C, 125 °C, 150 °C

figure 38. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At T_j = 150 °C

R_{gon} = 4 Ω

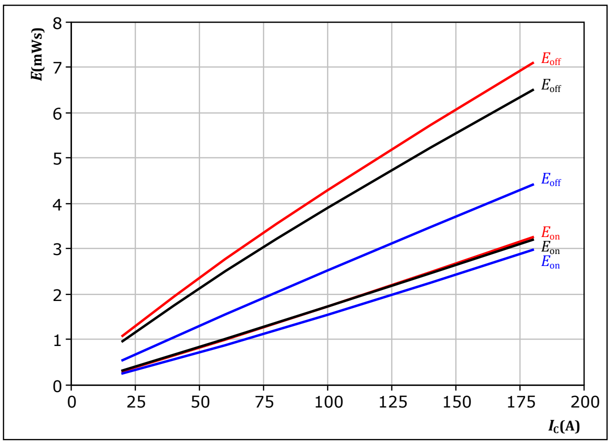
R_{goff} = 4 Ω

Outer Boost Switching Characteristics

figure 39. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



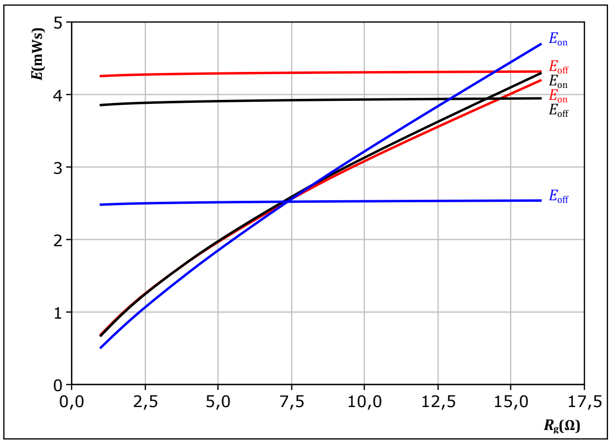
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C
R_{goff} =	4	Ω		

figure 40. **IGBT**

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

$E = f(R_g)$



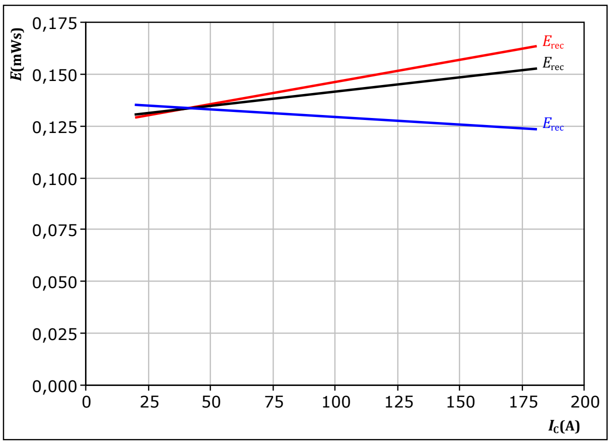
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

figure 41. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



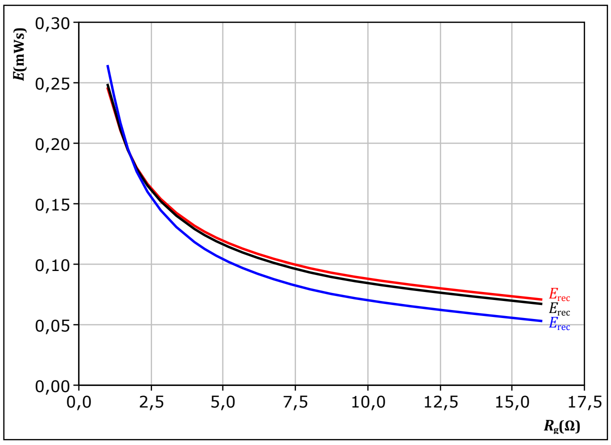
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 42. **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

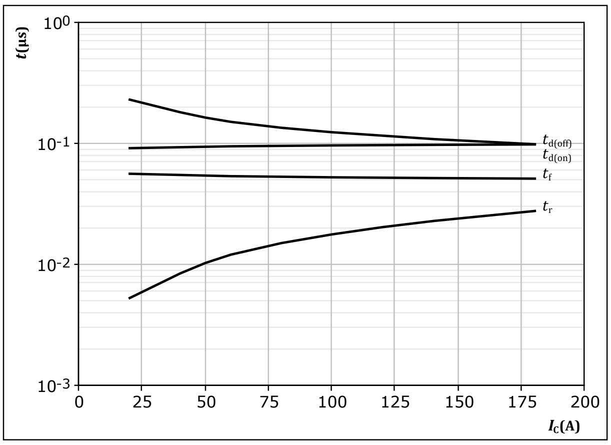
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

Outer Boost Switching Characteristics

figure 43. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



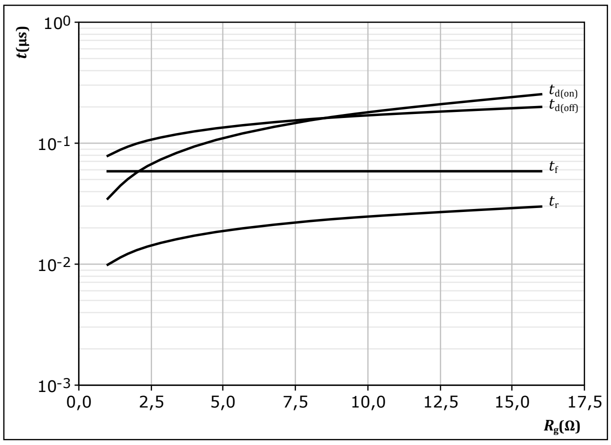
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 44. **IGBT**

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

t = f(R_g)



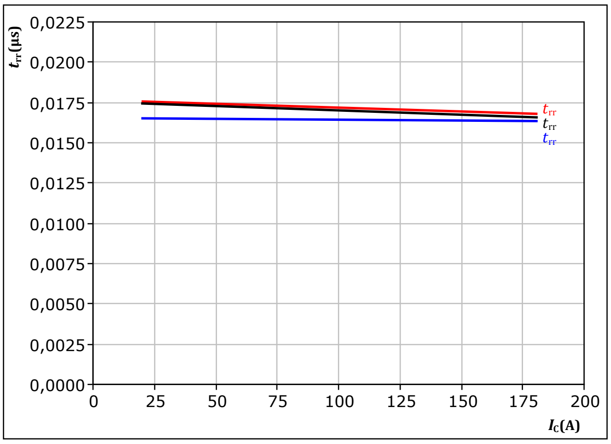
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	100	A

figure 45. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

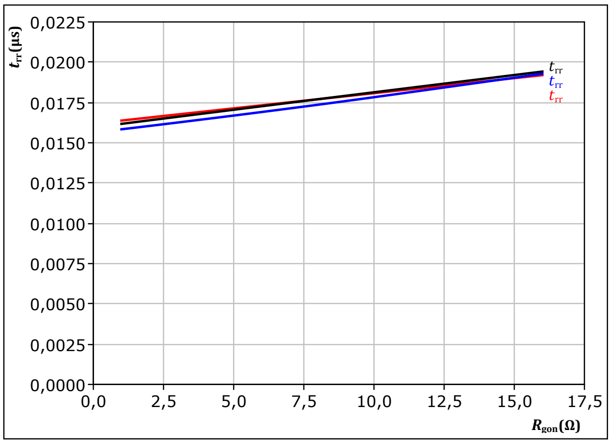
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 46. **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} =	600	V
V_{GE} =	±15	V
I_C =	100	A

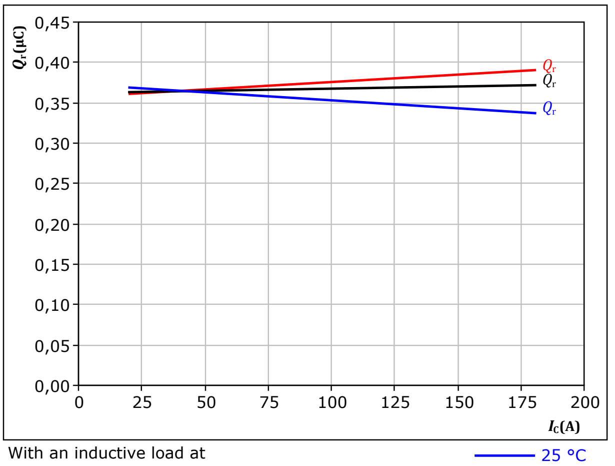
T_j: 25 °C, 125 °C, 150 °C

Outer Boost Switching Characteristics

figure 47. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



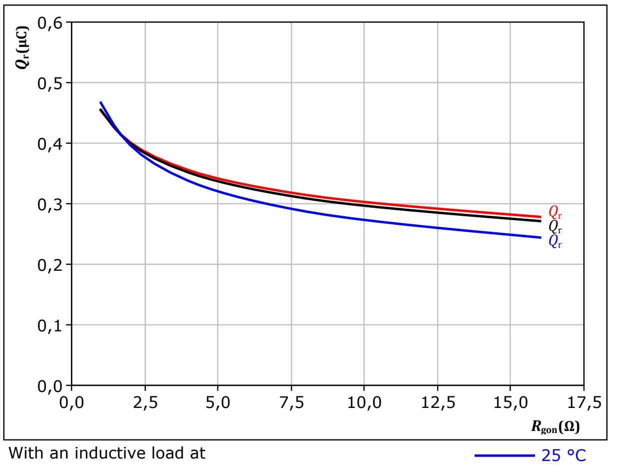
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 48. **FWD**

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

Q_r = f(R_{gon})



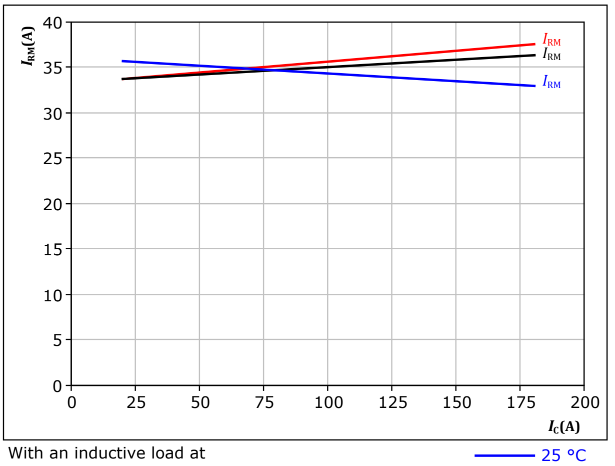
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

figure 49. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



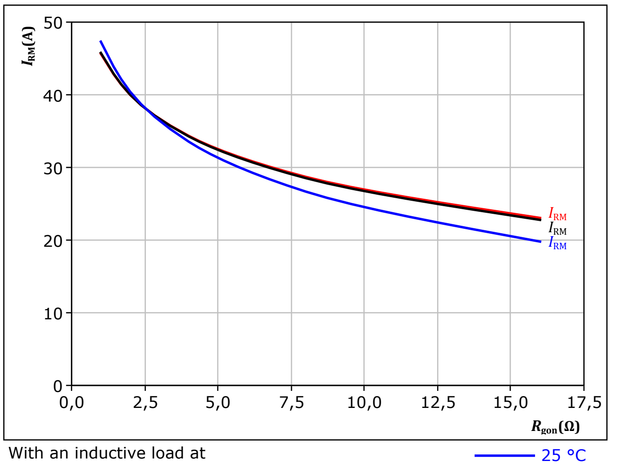
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 50. **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

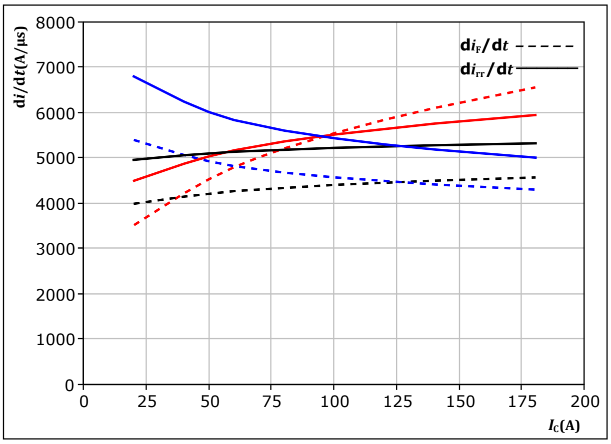
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

Outer Boost Switching Characteristics

figure 51. **FWD**

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

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



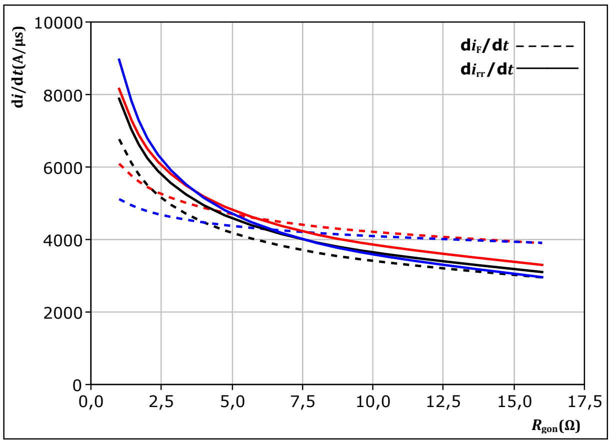
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 52. **FWD**

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

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



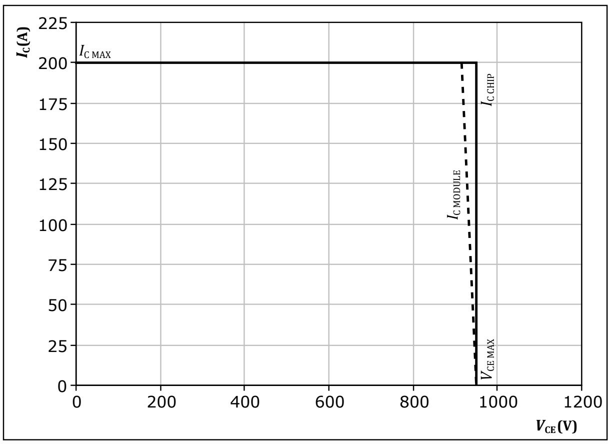
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

figure 53. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



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

Switching Definitions

figure 54. **IGBT**

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

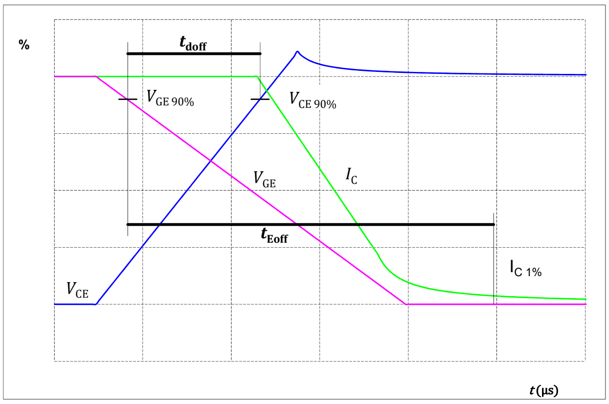


figure 55. **IGBT**

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

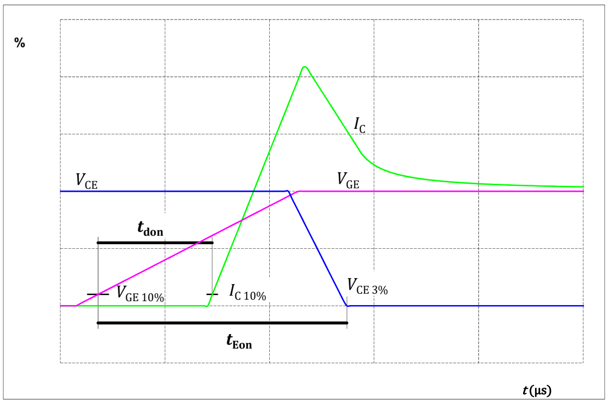


figure 56. **IGBT**

Turn-off Switching Waveforms & definition of t_f

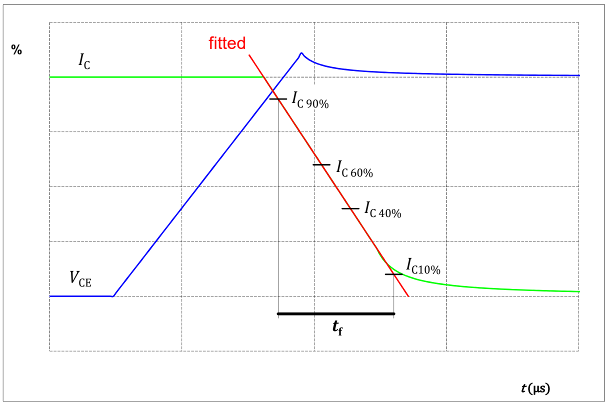
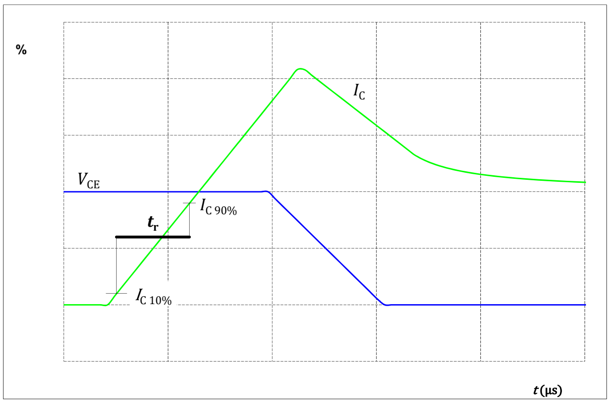


figure 57. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 58. **FWD**

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

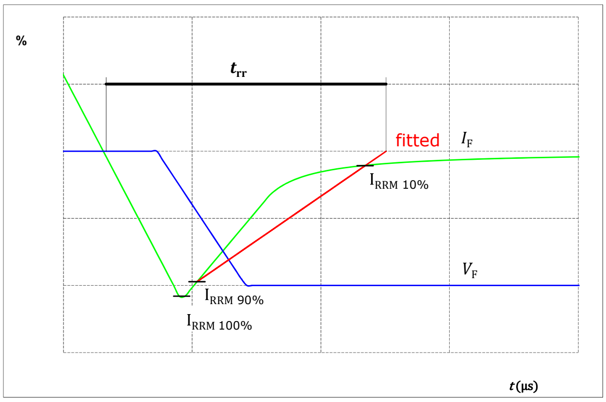
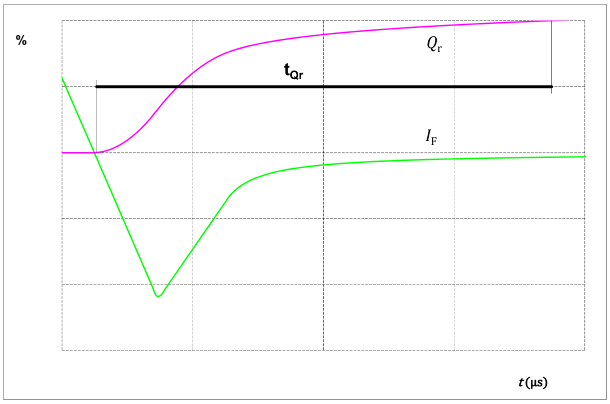


figure 59. **FWD**

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



Vincotech

B0-SP103BB100S764-PB80L98T
datasheet

Ordering Code

Version	Ordering Code
Without thermal paste	B0-SP103BB100S764-PB80L98T
With thermal paste (5,2 W/mK, PTM6000HV)	B0-SP103BB100S764-PB80L98T-/7/

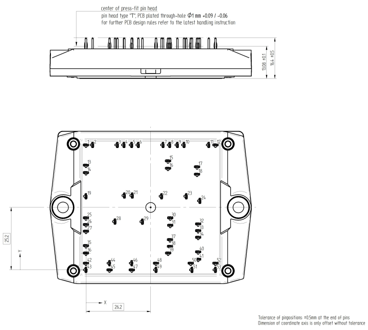
Marking

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

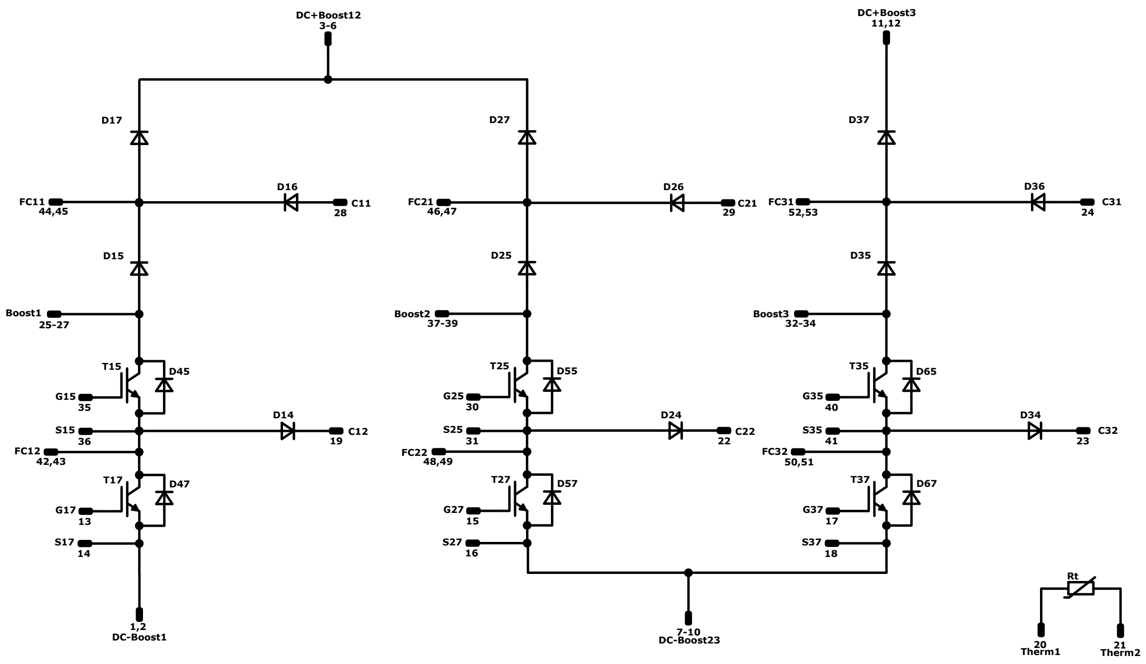
Outline

Pin table [mm]

Pin	X	Y	Function	28	11,75	19,5	C11
1	0	50,4	DC-Boost1	29	22,85	19,45	C21
2	2,7	50,4	DC-Boost1	30	34,1	21	G25
3	12,7	50,4	DC+Boost12	31	34,1	18	S25
4	15,4	50,4	DC+Boost12	32	45,4	18,55	Boost3
5	18,5	50,4	DC+Boost12	33	45,4	15,85	Boost3
6	21,2	50,4	DC+Boost12	34	45,4	13,15	Boost3
7	31,2	50,4	DC-Boost23	35	0	9,8	G15
8	33,9	50,4	DC-Boost23	36	0	6,8	S15
9	37	50,4	DC-Boost23	37	34	12,2	Boost2
10	39,7	50,4	DC-Boost23	38	34	9,5	Boost2
11	49,7	50,4	DC+Boost3	39	33,25	6,8	Boost2
12	52,4	50,4	DC+Boost3	40	45,4	7,3	G35
13	0	42,25	G17	41	45,4	4,3	S35
14	0	39,25	S17	42	0	2,7	FC12
15	33,2	44	G27	43	0	0	FC12
16	33,2	41	S27	44	9,55	2,7	FC11
17	44,95	41,6	G37	45	9,55	0	FC11
18	44,95	38,6	S37	46	18,55	2,7	FC21
19	0	29,7	C12	47	18,55	0	FC21
20	15,55	30	Therm1	48	28,35	2,7	FC22
21	18,75	30	Therm2	49	28,35	0	FC22
22	30,6	29,7	C22	50	42,4	2,7	FC32
23	40,6	29,7	C32	51	42,9	0	FC32
24	46,1	27,85	C31	52	52,4	2,7	FC31
25	0	21	Boost1	53	52,4	0	FC31
26	0	18,3	Boost1				
27	0	15,6	Boost1				



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T15, T25, T35	IGBT	950 V	100 A	Inner Boost Switch	
D15, D25, D35	FWD	1200 V	60 A	Inner Boost Diode	
D45, D55 , D65	FWD	1200 V	50 A	Inner Boost Sw. Protection Diode	
T17, T27, T37	IGBT	950 V	100 A	Outer Boost Switch	
D17, D27, D37	FWD	1200 V	60 A	Outer Boost Diode	
D47, D57, D67	FWD	1200 V	50 A	Outer Boost Sw. Protection Diode	
D16, D26, D36	FWD	1200 V	35 A	Aux Diode H	
D14, D24, D34	FWD	1200 V	35 A	Aux Diode L	
Rt	Thermistor			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 45	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* S3 packages see vincotech.com website.

Package data
Package data for *flow* S3 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
B0-SP103BB100S764-PB80L98T-D2-14	29 Mar. 2023	Change Inner/Outer Boost Diode	