



flowBOOST S3 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: Al₂O₃
- CTI600 housing material
- Compact, baseplate-less housing
- VINcoPress Technology
- Thermo-mechanical push-and-pull force relief
- Solder pin

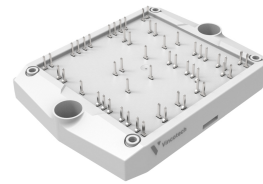
Target applications

- Energy Storage Systems
- Solar Inverters

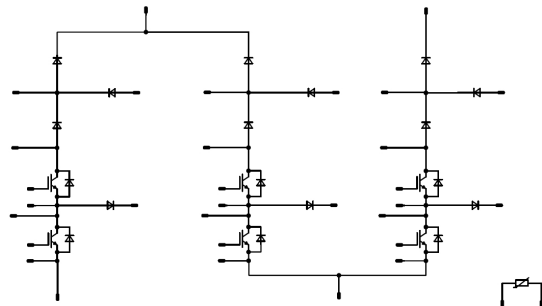
Types

- B0-SL103BB100S764-PB80L98Z

flow S3 12 mm housing



Schematic





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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

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



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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
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Outer Boost Switch

Collector-emitter voltage	V_{CES}		950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	77	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	74	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	429	A
Surge current capability	I^2t		918	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	49	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	90	W
Maximum junction temperature	T_{jmax}		175	°C



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Maximum Ratings

$T_j = 25\text{ °C}$, 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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	32	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	170	A
Surge current capability	I^2t		145	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	32	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	170	A
Surge current capability	I^2t		145	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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* $t_p = 2\text{ s}$	6000	V
Creepage distance			11,51	mm
Clearance			8,26	mm
Comparative Tracking Index	CTI		≥ 600	

*100 % tested in production



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [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	$V_{CE(sat)}$		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}							6500		pF
Output capacitance	C_{oes}	$f = 100$ kHz	0	25		25		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⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$					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}	$Q_{tFWD} = 0,252$ μC $Q_{tFWD} = 0,285$ μC $Q_{tFWD} = 0,294$ 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



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datasheet

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	$V_T = 1200$ V			25 150		0,6 42	240		μA
Thermal										
Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)					0,6			K/W
Dynamic										
Peak recovery current	I_{RM}				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	$di/dt=3421$ A/μs $di/dt=3846$ A/μs $di/dt=4494$ A/μs	±15	600	100	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	$(di_r/dt)_{max}$				25 125 150		3097,66 3970,72 4415,47			A/μs



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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	μ A

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)					1,06		K/W
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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 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	$V_{CE(sat)}$		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}							6500		pF
Output capacitance	C_{oes}	$f = 100$ kHz	0	25		25		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⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$					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}	$Q_{tFWD} = 0,339$ μC $Q_{tFWD} = 0,353$ μC $Q_{tFWD} = 0,36$ 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



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datasheet

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 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⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,6		K/W
Dynamic										
Peak recovery current	I_{RM}					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	$di/dt=3849$ A/μs $di/dt=4417$ A/μs $di/dt=4684$ A/μs	±15	600	100	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	$(di_r/dt)_{max}$					25 125 150		5162,72 5159,65 5231,68		A/μs



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [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	$V_i = 1200$ V				25			40	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,06		K/W
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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	$V_i = 1200$ V				25 150		2700	60 5500	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,31		K/W
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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	$V_i = 1200$ V				25 150		2700	60 5500	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,31		K/W
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Vincotech

Characteristic Values

Parameter	Symbol	Conditions					Values			Unit	
		V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	V_{CE} [V]	V_F [V]	I_D [A]	I_C [A]	I_F [A]		T_j [°C]

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R100	$A_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1 \%$						3962		K
B-value	$B_{(25/100)}$	Tol. $\pm 1 \%$						4000		K
Vincotech Thermistor Reference									I	

⁽¹⁾ Value at chip level

⁽²⁾ Only valid with pre-applied Vincotech thermal interface material.

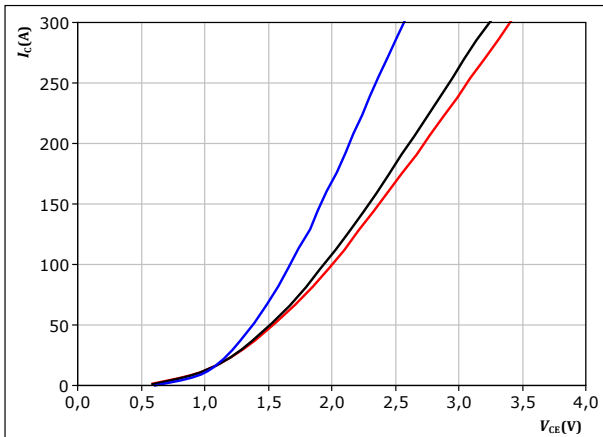


Inner Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$



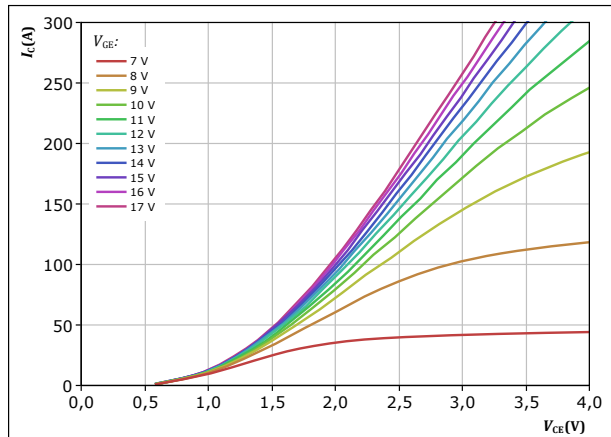
$t_p = 250 \mu s$
 $V_{GE} = 15 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 2. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

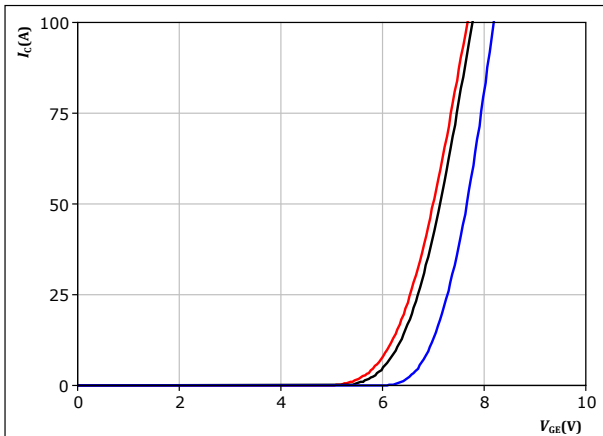


$t_p = 250 \mu s$
 $T_j = 150 \text{ }^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

$$I_C = f(V_{GE})$$



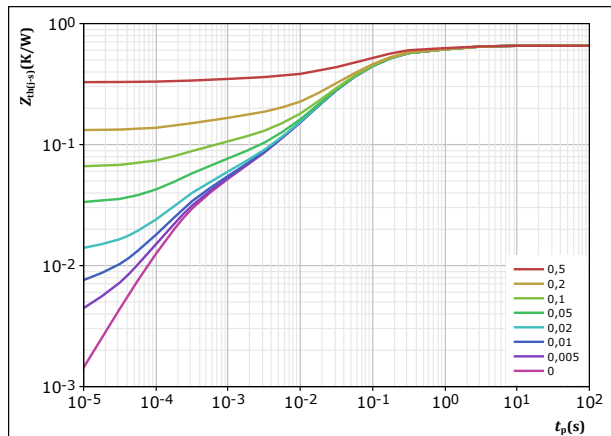
$t_p = 250 \mu s$
 $V_{CE} = 10 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



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

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

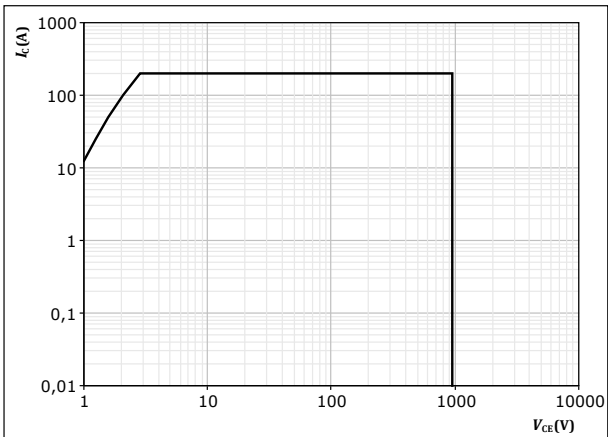


Inner Boost Switch Characteristics

figure 5. IGBT

Safe operating area

$I_C = f(V_{CE})$



$D =$ single pulse

$T_s = 80$ °C

$V_{CE} = 15$ V

$T_j = T_{jmax}$



Inner Boost Diode Characteristics

figure 6. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

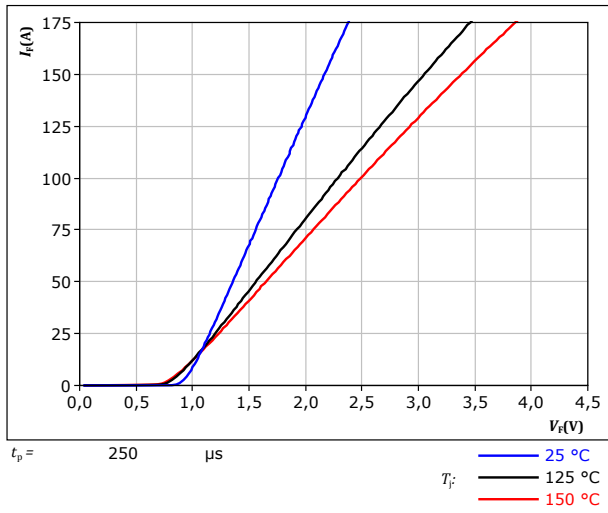
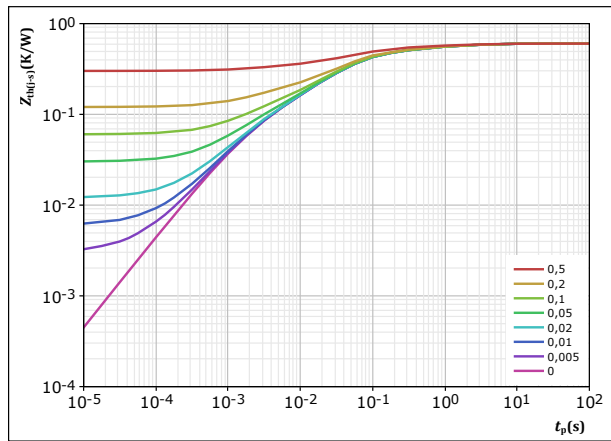


figure 7. FWD

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

$$I_F = f(V_F)$$

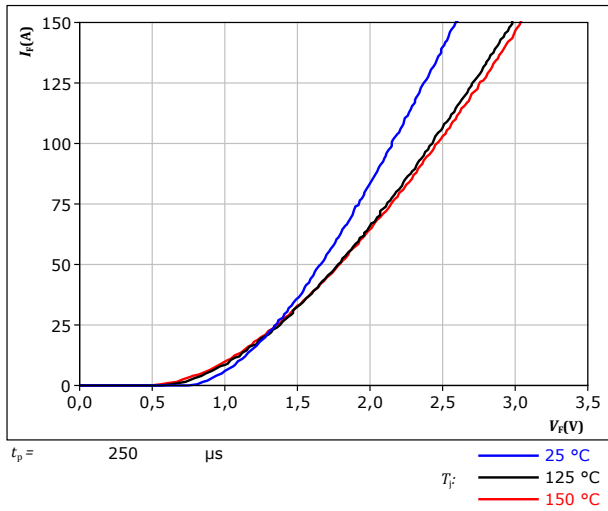
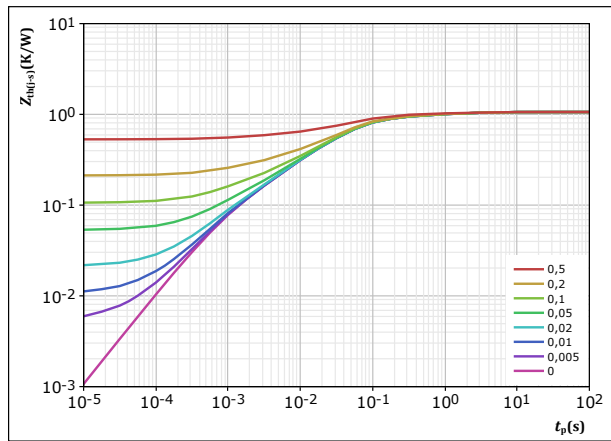


figure 9. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,061 \text{ K/W}$
 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

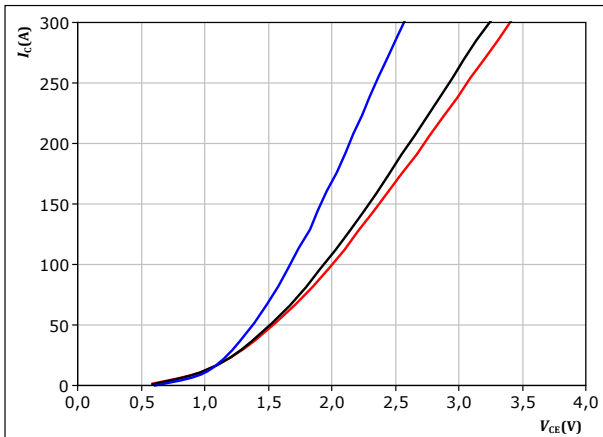


Outer Boost Switch Characteristics

figure 10. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$



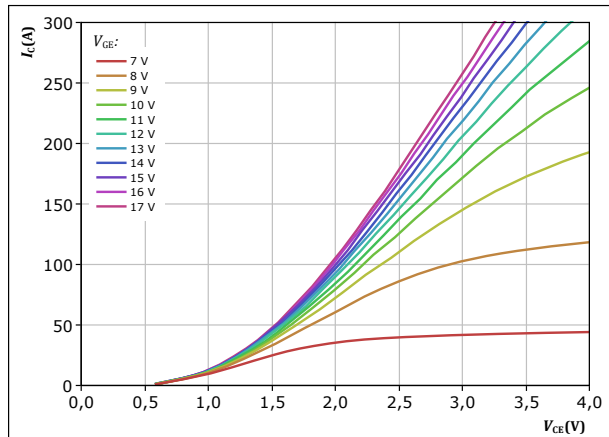
$t_p = 250 \mu s$
 $V_{GE} = 15 V$

T_j : — 25 °C
— 125 °C
— 150 °C

figure 11. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

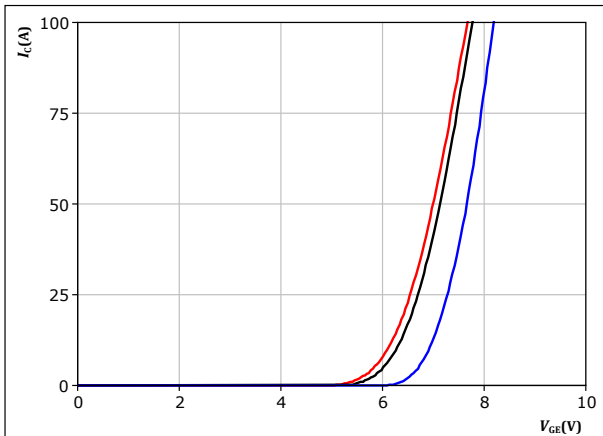


$t_p = 250 \mu s$
 $T_j = 150 \text{ °C}$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 12. IGBT

Typical transfer characteristics

$$I_C = f(V_{GE})$$



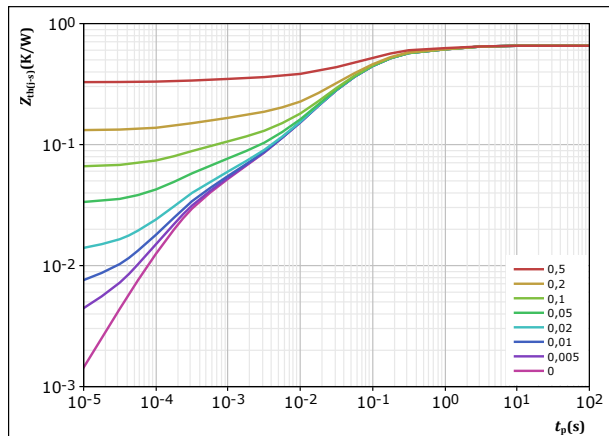
$t_p = 250 \mu s$
 $V_{CE} = 10 V$

T_j : — 25 °C
— 125 °C
— 150 °C

figure 13. IGBT

Transient thermal impedance as a function of pulse width

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



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

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

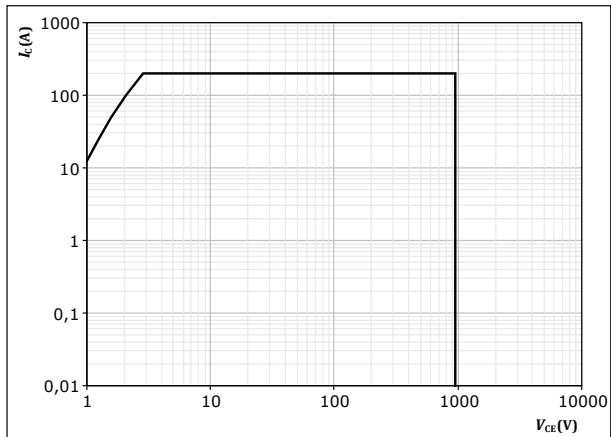


Outer Boost Switch Characteristics

figure 14. IGBT

Safe operating area

$I_C = f(V_{CE})$



$D =$ single pulse
 $T_s = 80 \text{ } ^\circ\text{C}$
 $V_{CE} = 15 \text{ V}$
 $T_j = T_{jmax}$



Outer Boost Diode Characteristics

figure 15. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

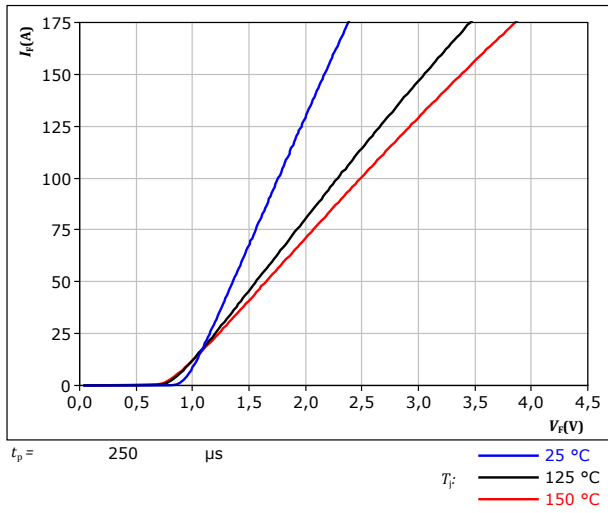
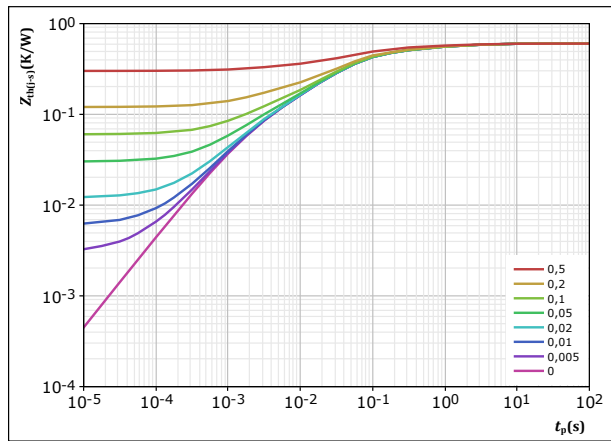


figure 16. FWD

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

$$I_F = f(V_F)$$

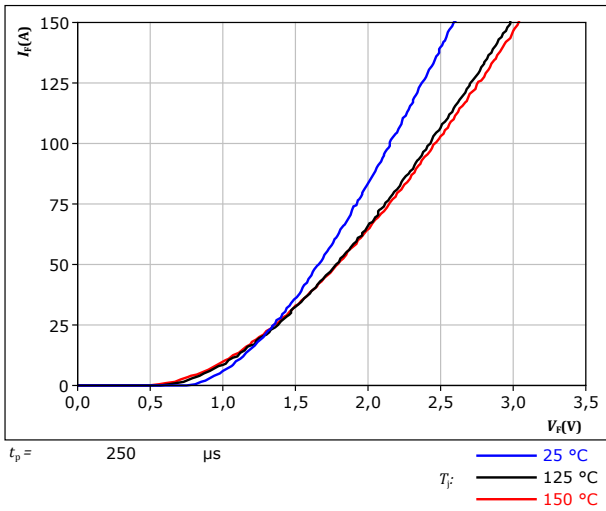
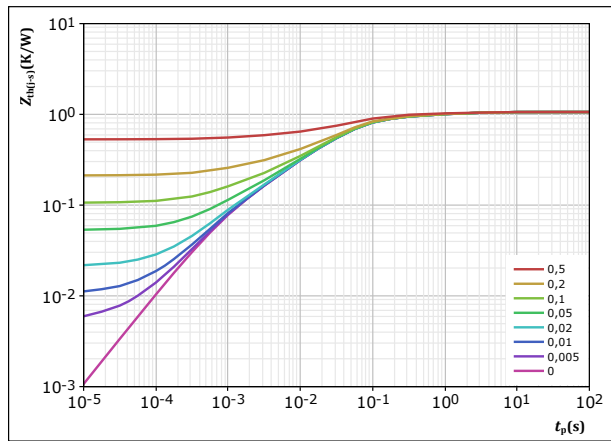


figure 18. FWD

Transient thermal impedance as a function of pulse width

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



$D = \frac{t_p}{T}$
 $R_{th(j-s)} = 1,061 \text{ K/W}$
 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

$$I_F = f(V_F)$$

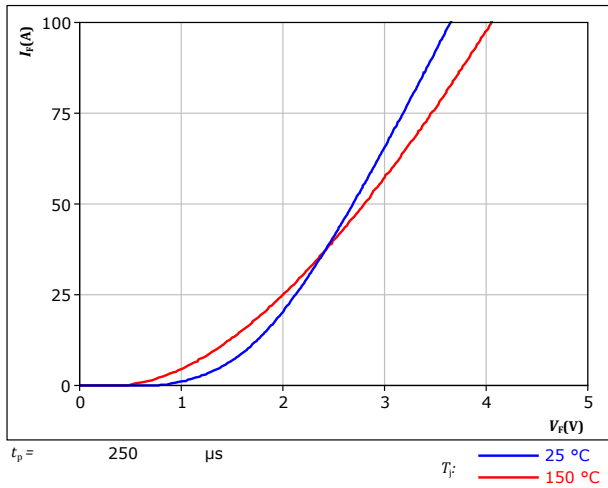
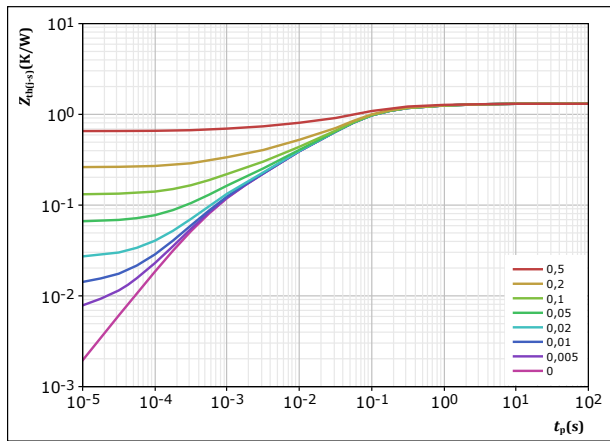


figure 20. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

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

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
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

$$I_F = f(V_F)$$

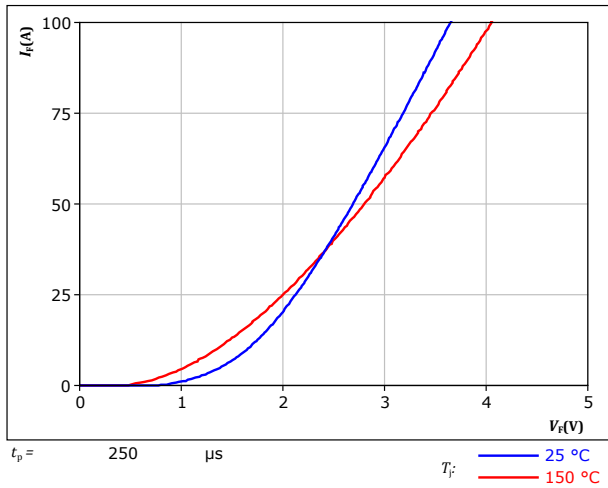
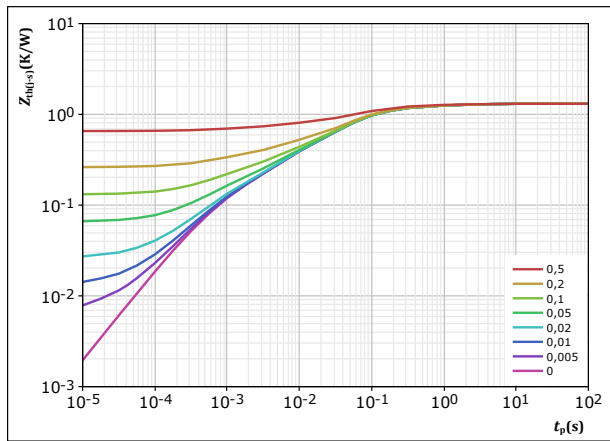


figure 22. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

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

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
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

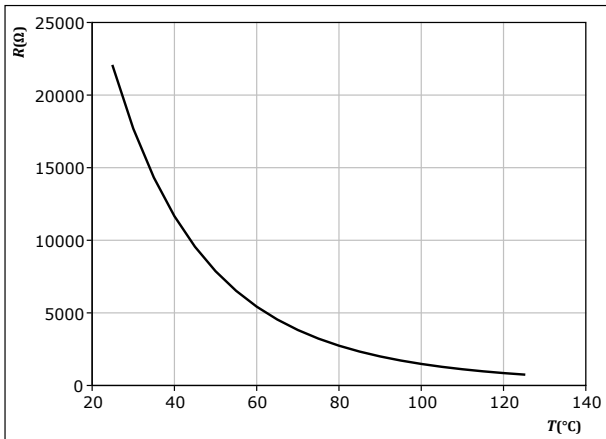


Thermistor Characteristics

figure 23. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$

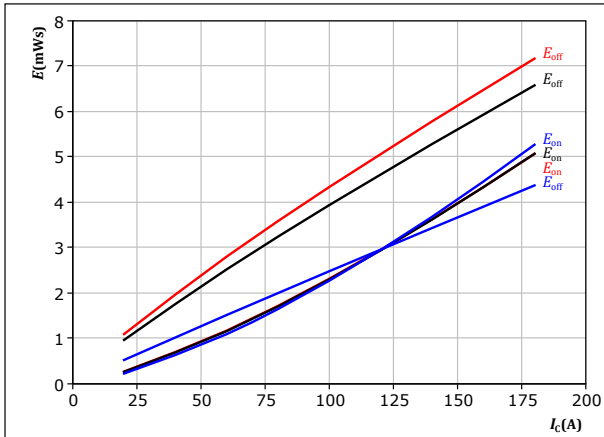




Inner Boost Switching Characteristics

figure 24. IGBT

Typical switching energy losses as a function of collector current
 $E = f(I_c)$



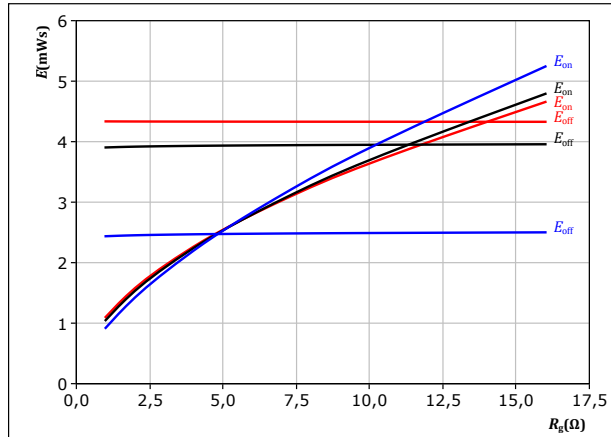
With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ 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
 $E = f(R_g)$



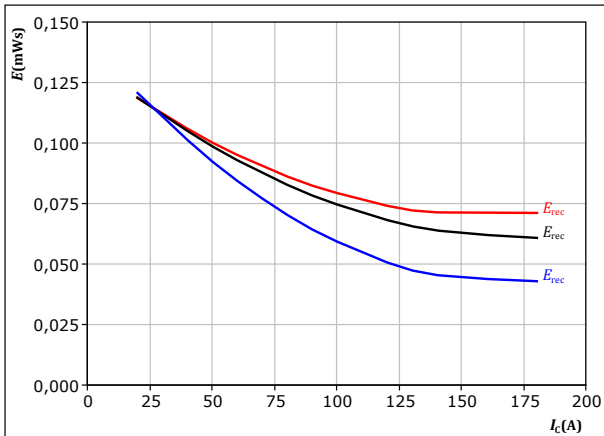
With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ 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
 $E_{rec} = f(I_c)$



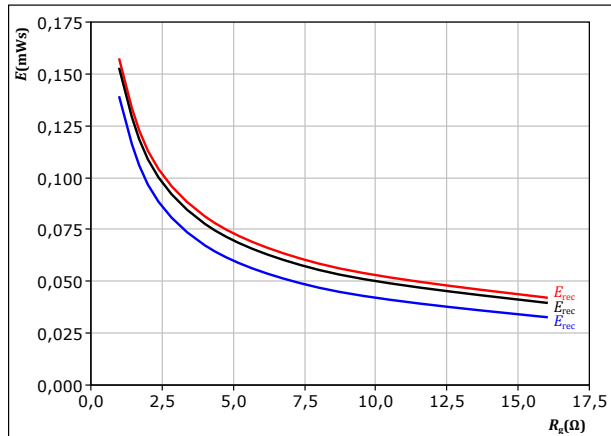
With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ 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
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

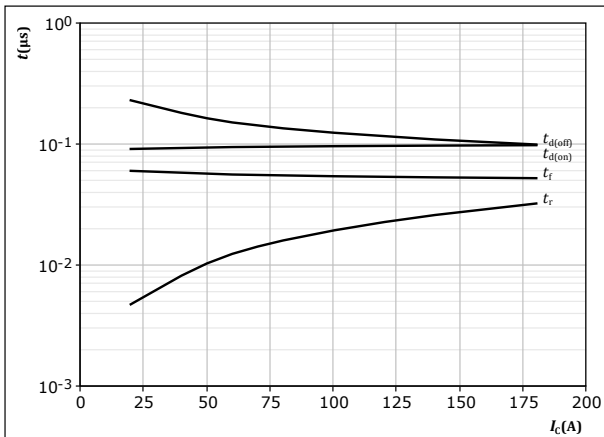
T_j : — 25 °C
 — 125 °C
 — 150 °C



Inner Boost Switching Characteristics

figure 28. IGBT

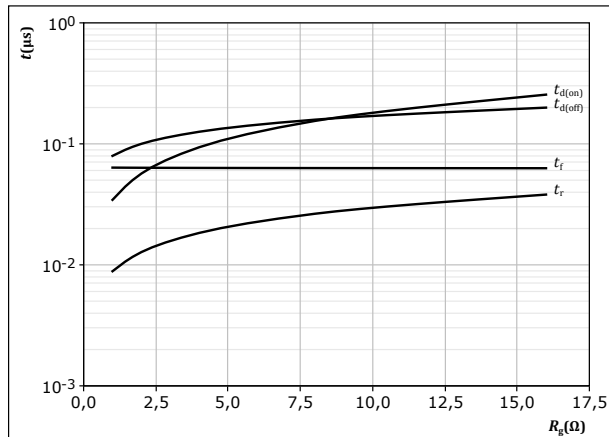
Typical switching times as a function of collector current
 $t = f(I_c)$



With an inductive load at
 $T_j = 150$ °C
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

figure 29. IGBT

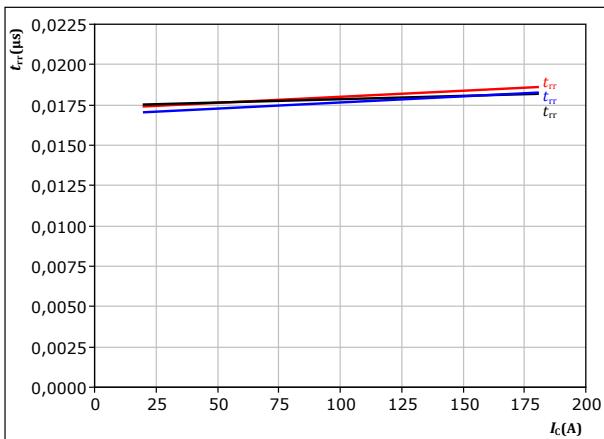
Typical switching times as a function of IGBT turn on gate resistor
 $t = f(R_g)$



With an inductive load at
 $T_j = 150$ °C
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

figure 30. FWD

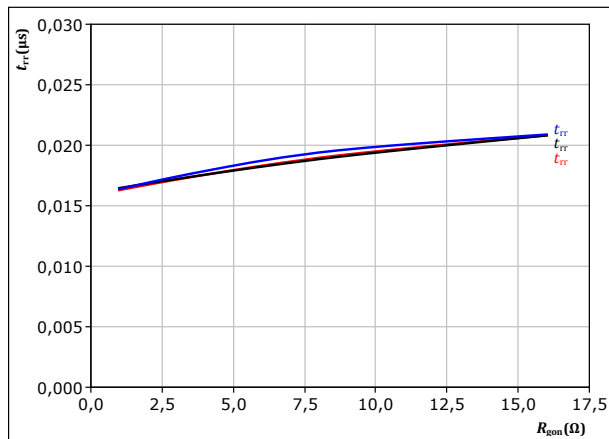
Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_c)$



With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ 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
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A
 T_j : — 25 °C
— 125 °C
— 150 °C

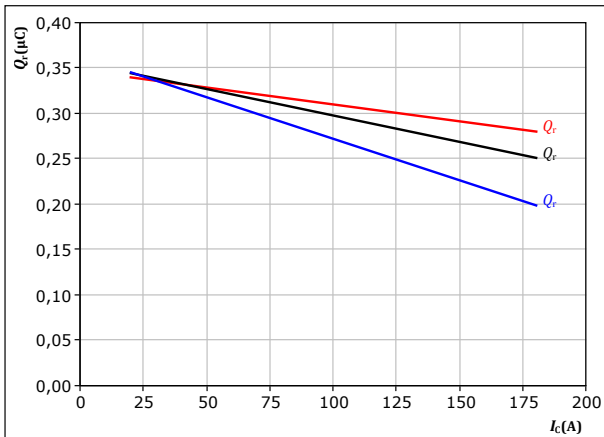


Inner Boost Switching Characteristics

figure 32. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

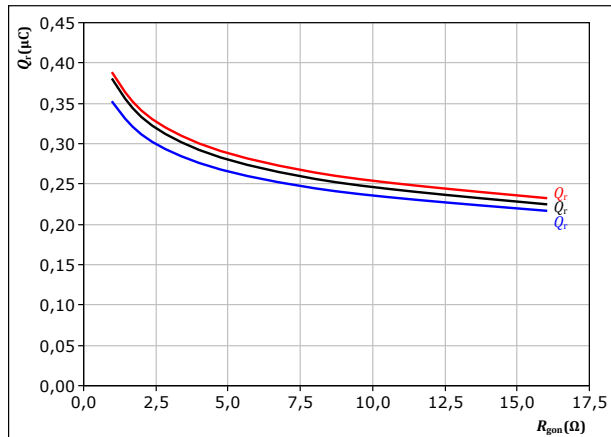
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω

T_j : — 25 °C
— 125 °C
— 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

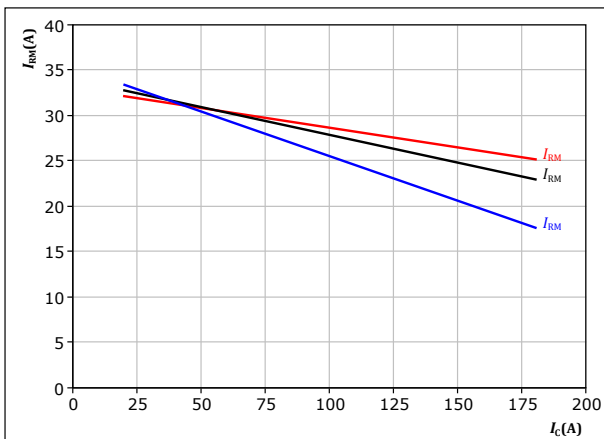
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

T_j : — 25 °C
— 125 °C
— 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

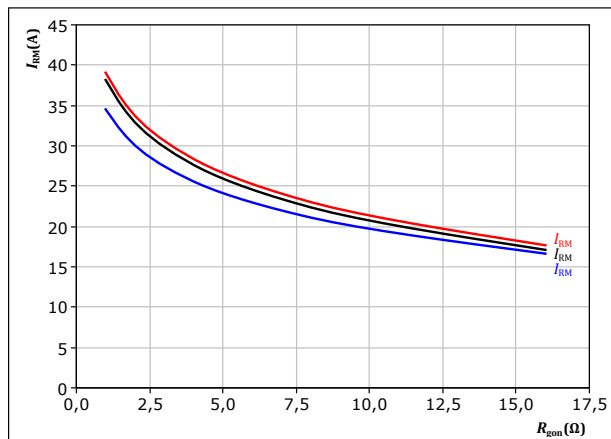
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω

T_j : — 25 °C
— 125 °C
— 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
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

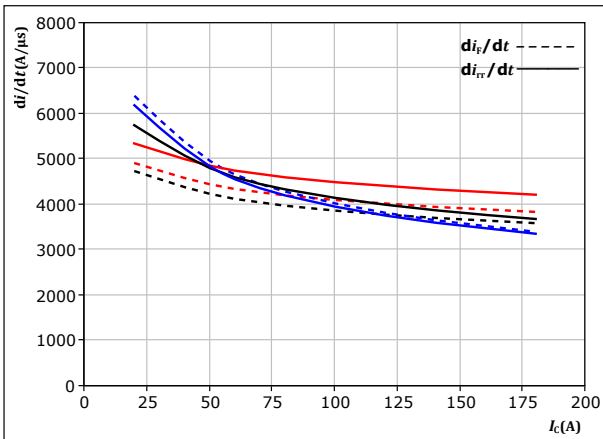
T_j : — 25 °C
— 125 °C
— 150 °C



Inner Boost Switching Characteristics

figure 36. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$



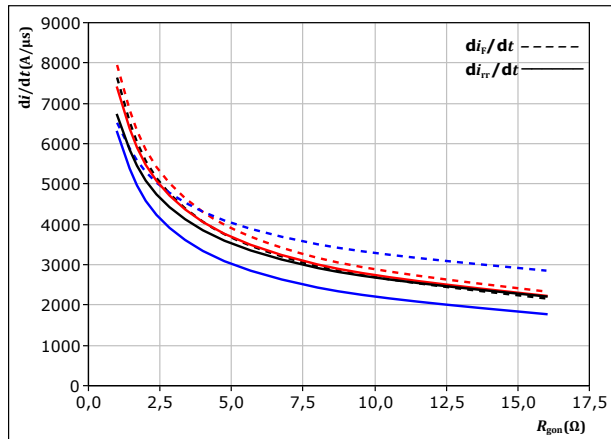
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \ \Omega$

$T_j:$
— 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
 $di_f/dt, di_r/dt = f(R_{gon})$



With an inductive load at

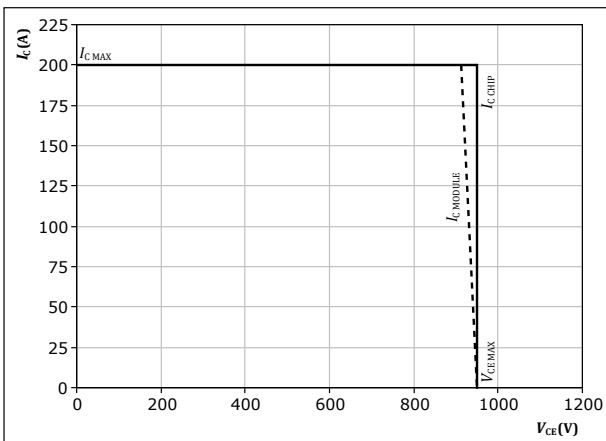
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 100 \text{ A}$

$T_j:$
— 25 °C
— 125 °C
— 150 °C

figure 38. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



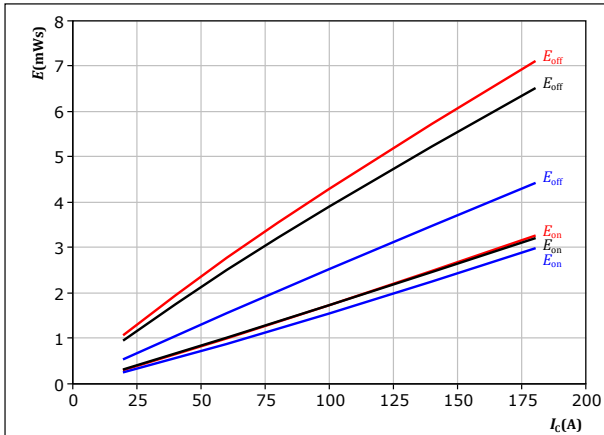
At $T_j = 150 \text{ °C}$
 $R_{gon} = 4 \ \Omega$
 $R_{goff} = 4 \ \Omega$



Outer Boost Switching Characteristics

figure 39. IGBT

Typical switching energy losses as a function of collector current
 $E = f(I_c)$

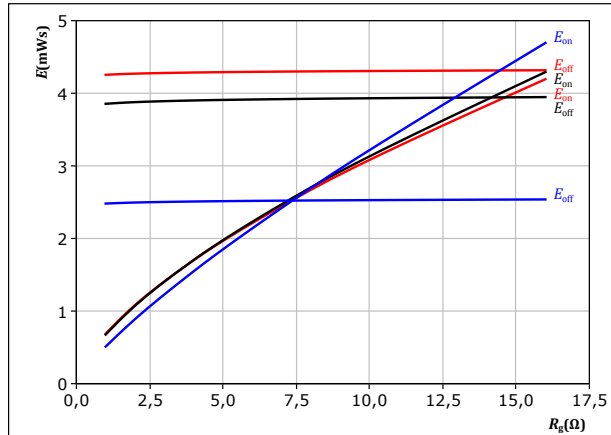


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

T_j : — 25 °C
 — 125 °C
 — 150 °C

figure 40. IGBT

Typical switching energy losses as a function of IGBT turn on gate resistor
 $E = f(R_g)$

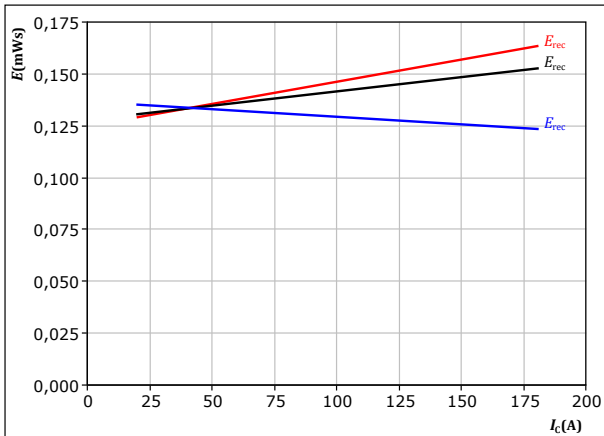


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

T_j : — 25 °C
 — 125 °C
 — 150 °C

figure 41. FWD

Typical reverse recovered energy loss as a function of collector current
 $E_{rec} = f(I_c)$

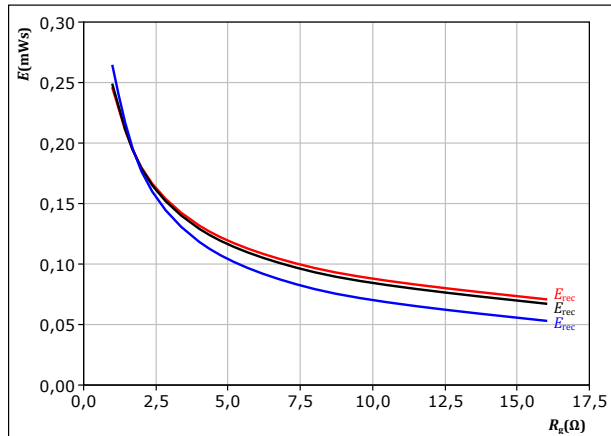


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω

T_j : — 25 °C
 — 125 °C
 — 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
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

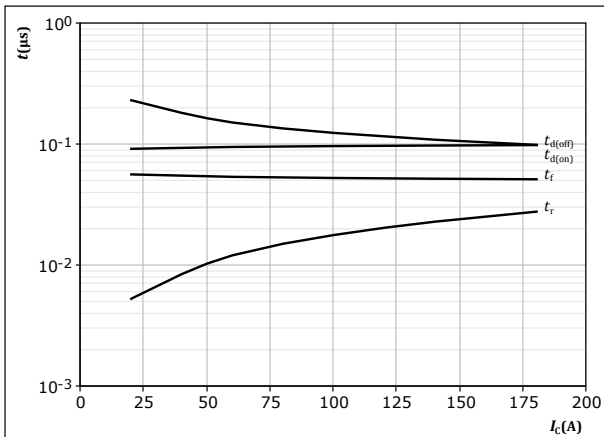
T_j : — 25 °C
 — 125 °C
 — 150 °C



Outer Boost Switching Characteristics

figure 43. IGBT

Typical switching times as a function of collector current
 $t = f(I_c)$

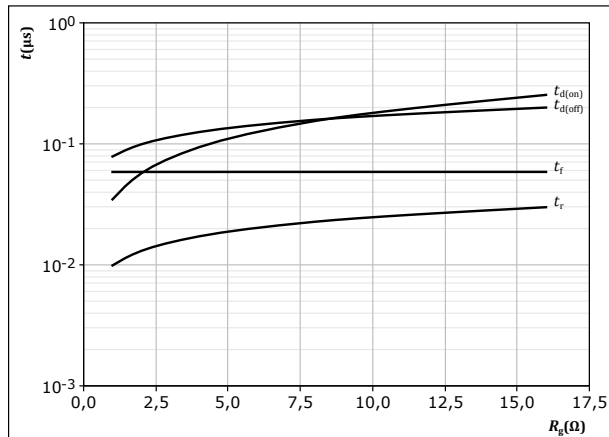


With an inductive load at

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

figure 44. IGBT

Typical switching times as a function of IGBT turn on gate resistor
 $t = f(R_g)$

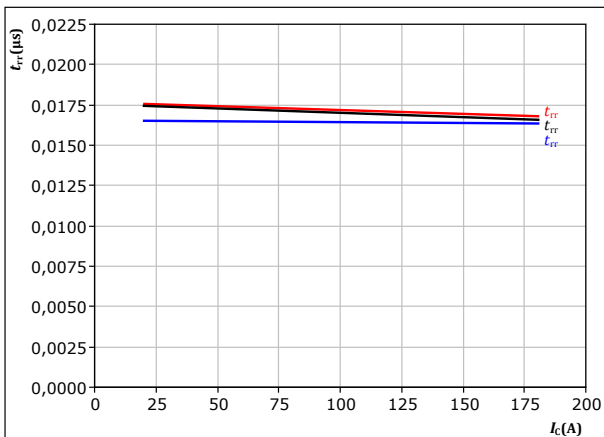


With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

figure 45. FWD

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_c)$

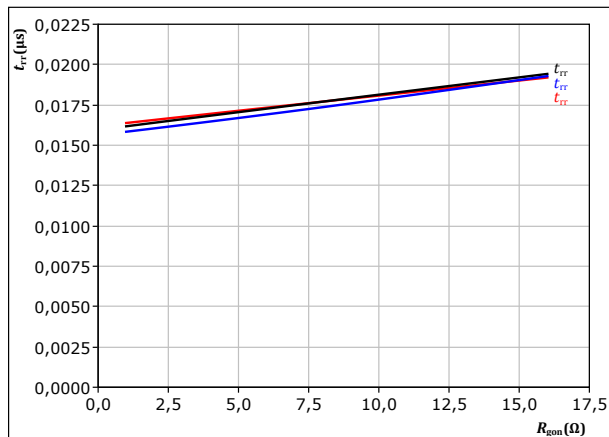


With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 $T_j: 25$ °C (blue), 125 °C (black), 150 °C (red)

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
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A
 $T_j: 25$ °C (blue), 125 °C (black), 150 °C (red)

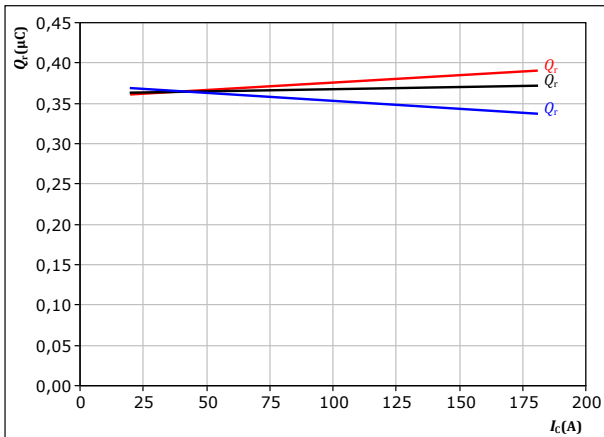


Outer Boost Switching Characteristics

figure 47. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



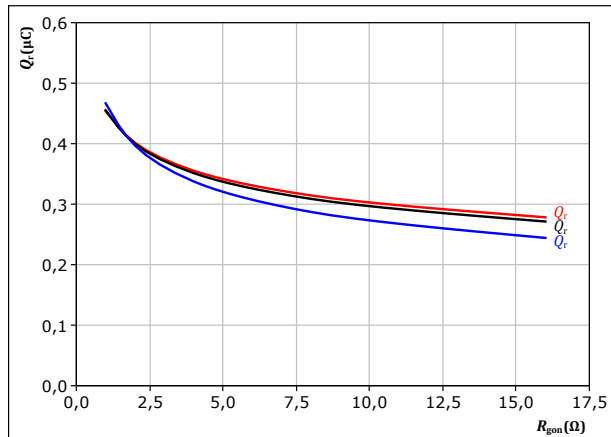
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$
 $T_j: 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$

figure 48. FWD

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

$$Q_r = f(R_{gon})$$



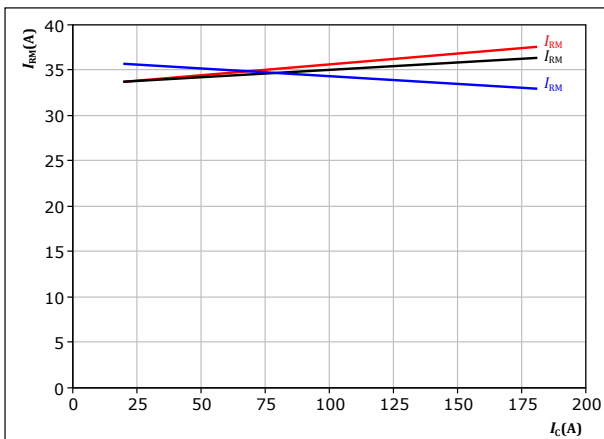
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 100 \text{ A}$
 $T_j: 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$

figure 49. FWD

Typical peak reverse recovery current as a function of collector current

$$I_{RM} = f(I_c)$$



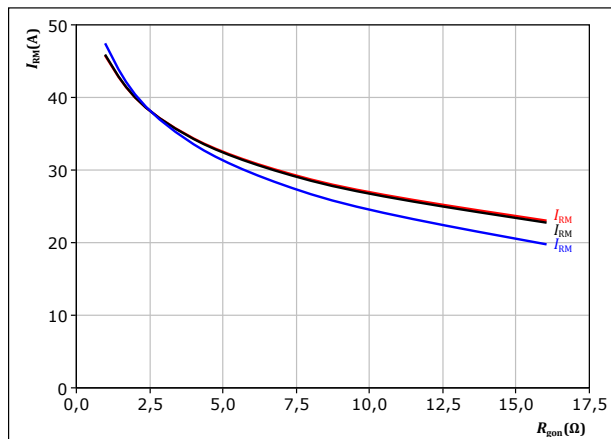
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$
 $T_j: 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$

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

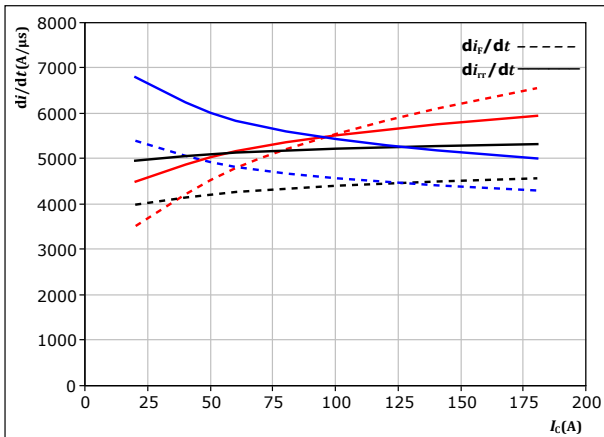
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 100 \text{ A}$
 $T_j: 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$



Outer Boost Switching Characteristics

figure 51. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_i/dt, di_r/dt = f(I_C)$



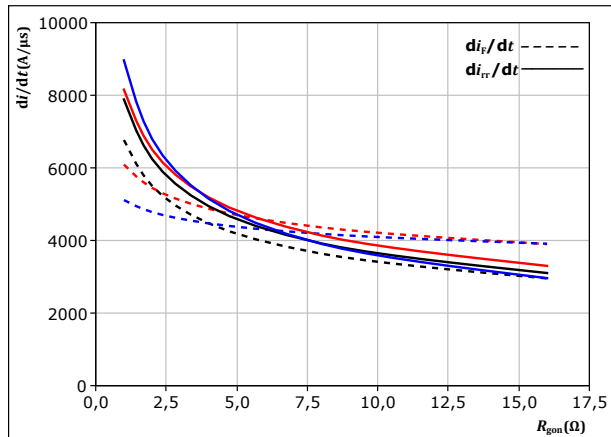
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \ \Omega$

T_j : — 25 °C
 — 125 °C
 — 150 °C

figure 52. FWD

Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor
 $di_i/dt, di_r/dt = f(R_{gon})$



With an inductive load at

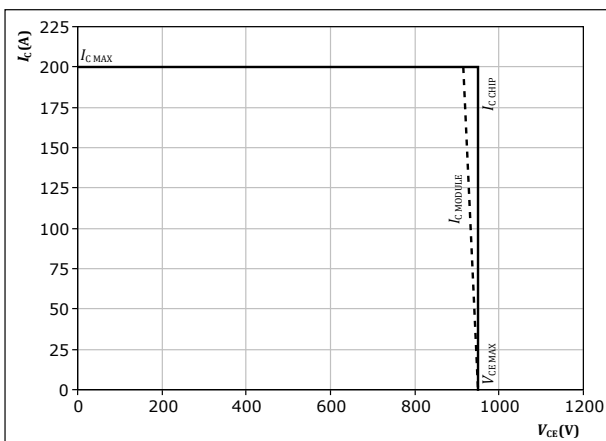
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 100 \text{ A}$

T_j : — 25 °C
 — 125 °C
 — 150 °C

figure 53. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150 \text{ °C}$
 $R_{gon} = 4 \ \Omega$
 $R_{goff} = 4 \ \Omega$



Switching Definitions

figure 54. IGBT

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

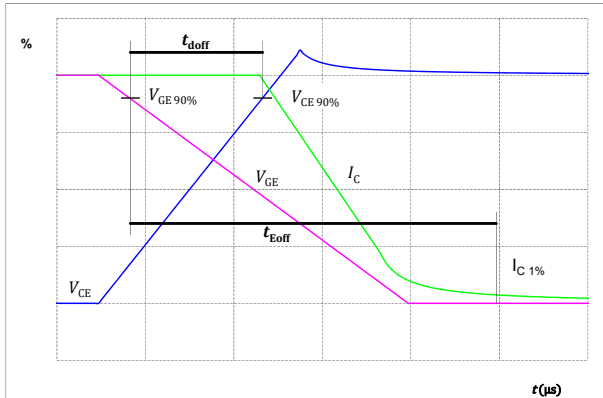


figure 55. IGBT

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

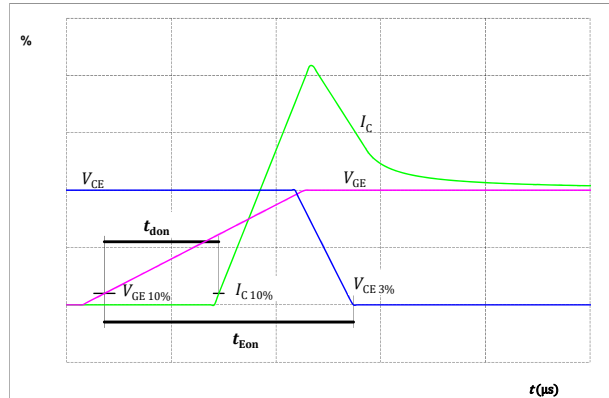


figure 56. IGBT

Turn-off Switching Waveforms & definition of t_f

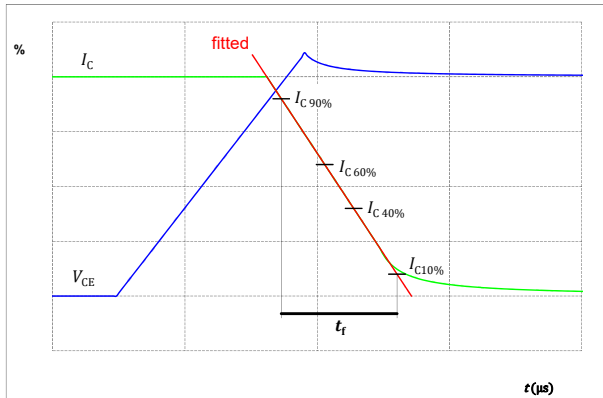
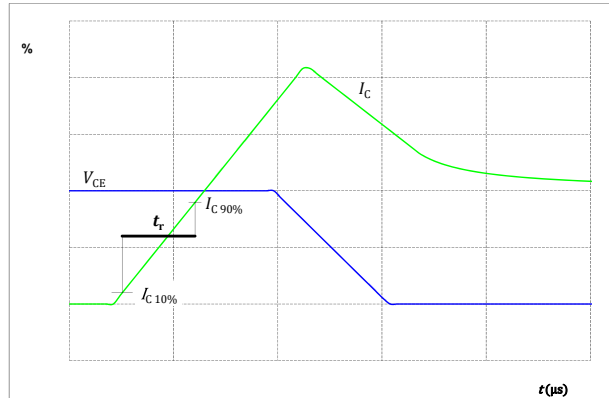


figure 57. IGBT

Turn-on Switching Waveforms & definition of t_r





Switching Definitions

figure 58. FWD

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

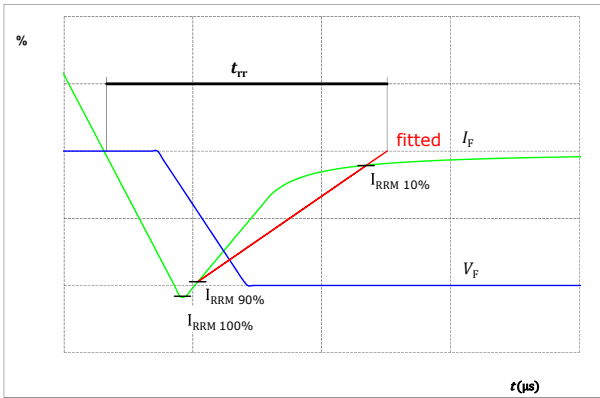
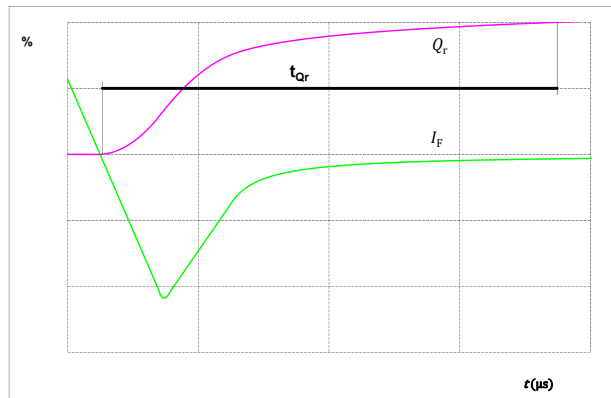


figure 59. FWD

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





Vincotech

Ordering Code	
Version	Ordering Code
Without thermal paste	B0-SL103BB100S764-PB80L98Z
With thermal paste (5,2 W/mK, PTM6000HV)	B0-SL103BB100S764-PB80L98Z-7/

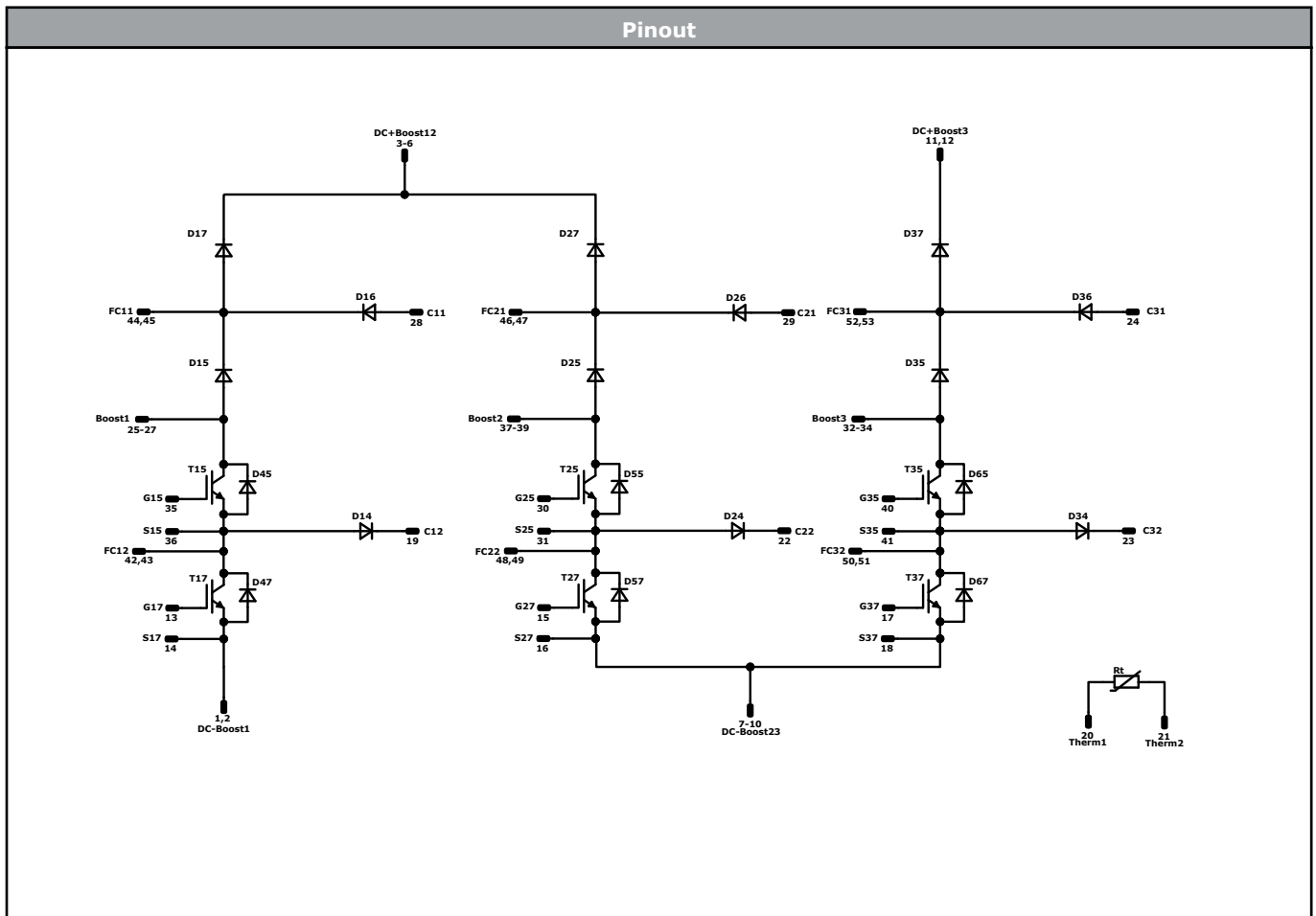
Marking						
	Text	Name NN-NNNNNNNNNNNNNNN- TTTTTWWYY LL TTTTTVV	Date code WWYY	UL & VIN UL VIN	Lot LLLLL	Serial SSSS
	Datamatrix	Type&Ver TTTTTTTVV	Lot number LLLLL	Serial SSSS	Date code WWYY	

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+Boost1	31	34,1	18	S25
4	15,4	50,4	DC+Boost1	32	45,4	18,55	Boost3
5	18,5	50,4	DC+Boost1	33	45,4	15,85	Boost3
6	21,2	50,4	DC+Boost1	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				

Dimensions of component are given at the end of pins.
Dimension of component are only given without tape.



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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	



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

Handling instruction
Handling instructions for <i>flow</i> S3 packages see vincotech.com website.

Package data
Package data for <i>flow</i> S3 packages see vincotech.com website.

Vincotech thermistor reference
See Vincotech thermistor reference table at vincotech.com website.

Application Note
For use of pre-charging auxiliary diodes see application note: "The Advantages and Opearation of Flying-Capacitor Boosters" at vincotech.com

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-SL103BB100S764-PB80L98Z-D4-14	29 Mar. 2023	Change Inner/Outer Boost Diode	

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