



Vincotech

B0-SP103BB100S764-PB80L98T

datasheet

flowBOOST 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

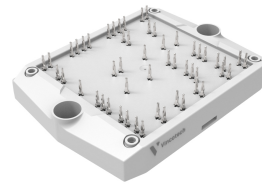
Target applications

- Energy Storage Systems
- Solar Inverters

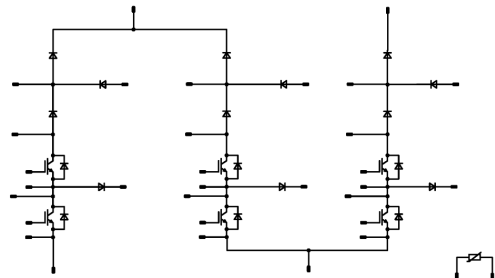
Types

- B0-SP103BB100S764-PB80L98T

flow S3 12 mm housing



Schematic





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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
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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			10,12	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_{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	$V_{CE(sat)}$		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}	$f = 100 \text{ kHz}$	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⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \Omega$ $R_{goff} = 4 \Omega$	±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}					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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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	$V_i = 1200$ 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
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Dynamic

Peak recovery current	I_{RM}	$di/dt=3421$ A/μs $di/dt=3846$ A/μs $di/dt=4494$ 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	$(di_{rr}/dt)_{max}$					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	$V_i = 1200$ 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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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}	$f = 100 \text{ kHz}$	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⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \text{ Ω}$ $R_{goff} = 4 \text{ Ω}$	±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}	$Q_{tFWD}=0,339 \text{ µC}$ $Q_{tFWD}=0,353 \text{ µC}$ $Q_{tFWD}=0,36 \text{ µC}$				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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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	$V_i = 1200$ 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
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Dynamic

Peak recovery current	I_{RM}	$di/dt=3849$ A/μs $di/dt=4417$ A/μs $di/dt=4684$ 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	$(di_{rr}/dt)_{max}$					25 125 150		5162,72 5159,65 5231,68		A/μs



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		V_{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	$V_i = 1200$ 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				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				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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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	

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				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.



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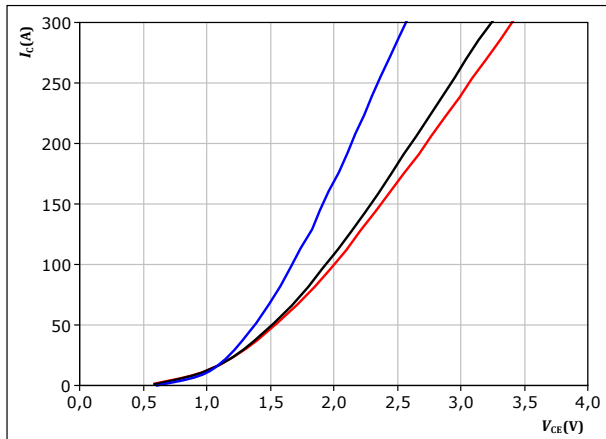
datasheet

Inner Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

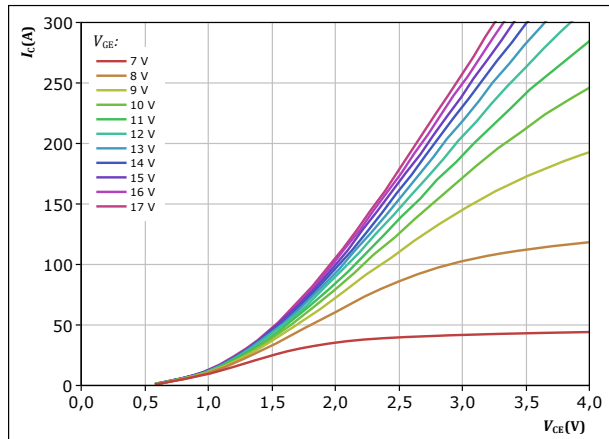


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 2. IGBT

Typical output characteristics

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

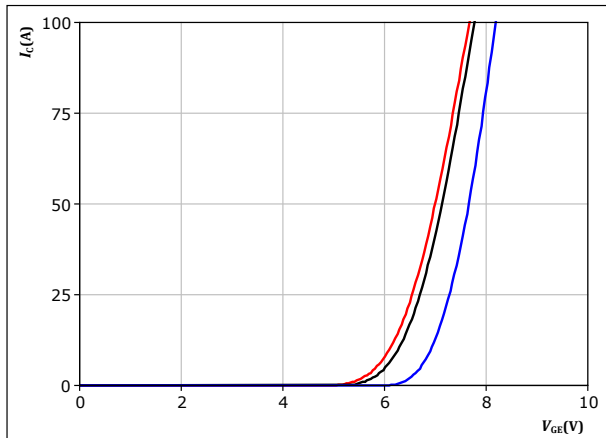


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

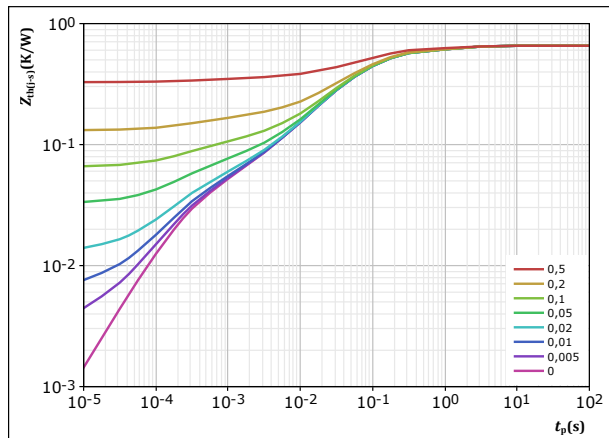


$t_p = 250 \mu s$
 $V_{CE} = 10 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



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

$R (K/W)$	$\tau (s)$
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



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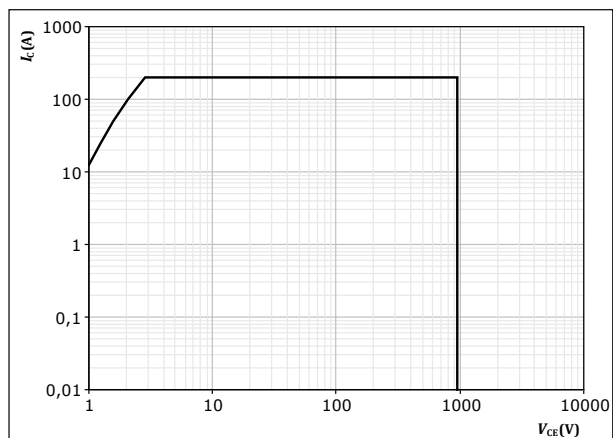
Inner Boost Switch Characteristics

figure 5.

IGBT

Safe operating area

$I_C = f(V_{CE})$



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$
 $V_{GE} = 15 \text{ V}$
 $T_j = T_{jmax}$



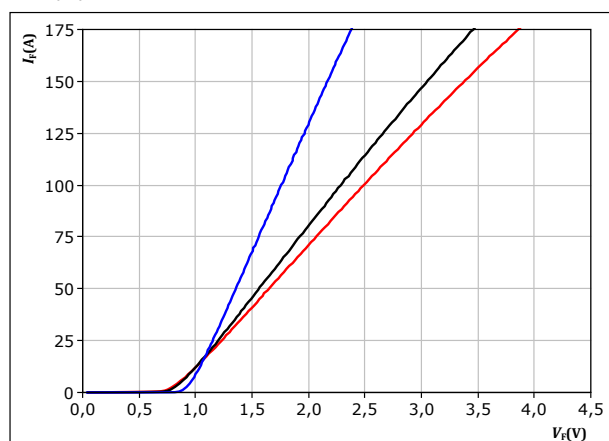
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Inner Boost Diode Characteristics

figure 6. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

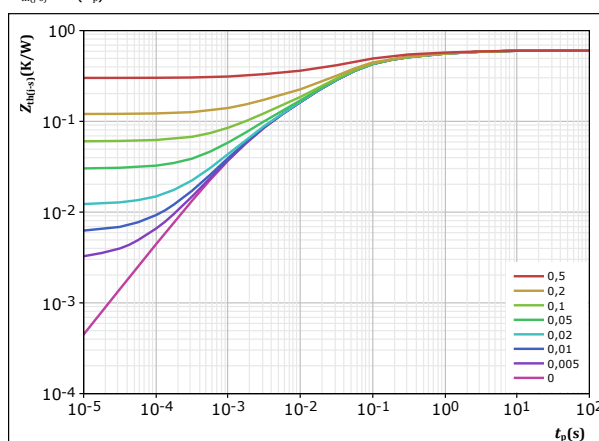
T_j :

- 25 °C
- 125 °C
- 150 °C

figure 7. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

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

FWD thermal model values

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



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Inner Boost Sw. Protection Diode Characteristics

figure 8. FWD

Typical forward characteristics
 $I_F = f(V_F)$

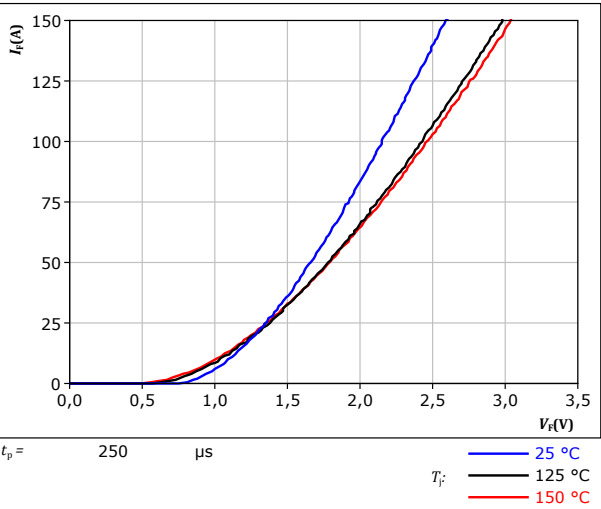
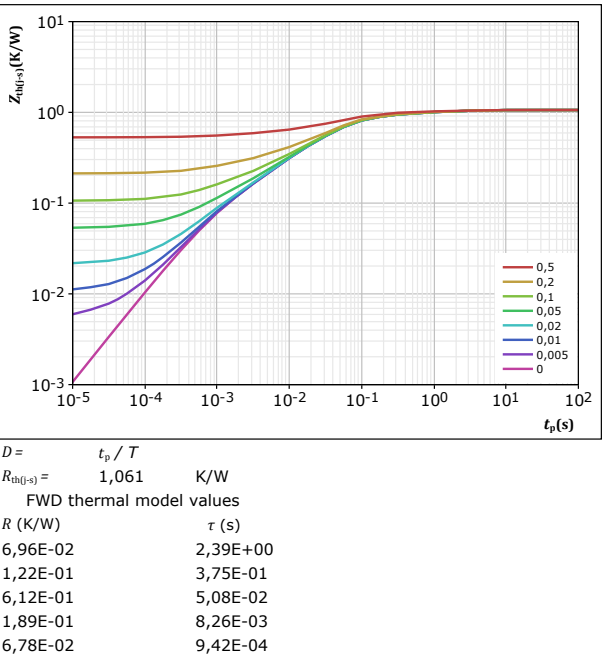


figure 9. FWD

Transient thermal impedance as a function of pulse width
 $Z_{th(j-s)} = f(t_p)$





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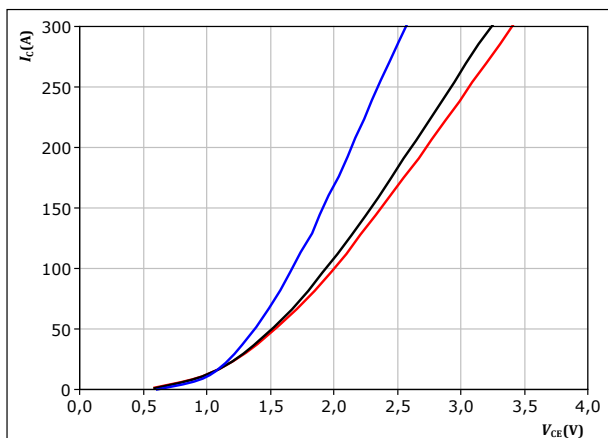
Outer Boost Switch Characteristics

figure 10.

IGBT

Typical output characteristics

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



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

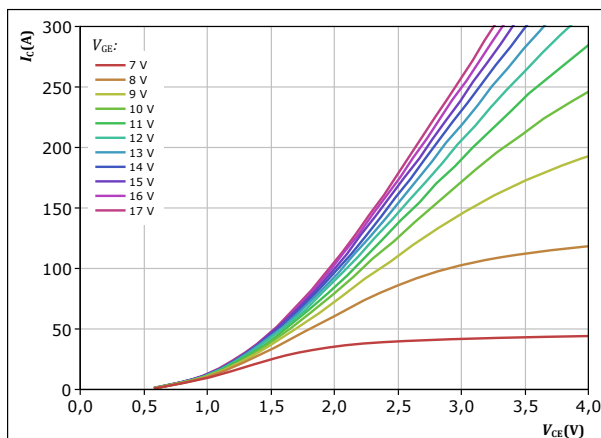
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 11.

IGBT

Typical output characteristics

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



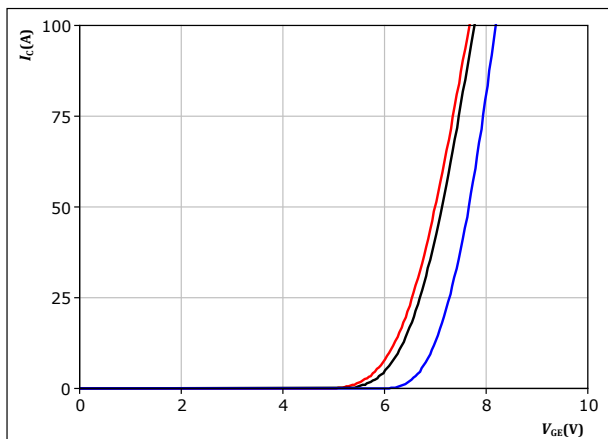
$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 12.

IGBT

Typical transfer characteristics

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



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

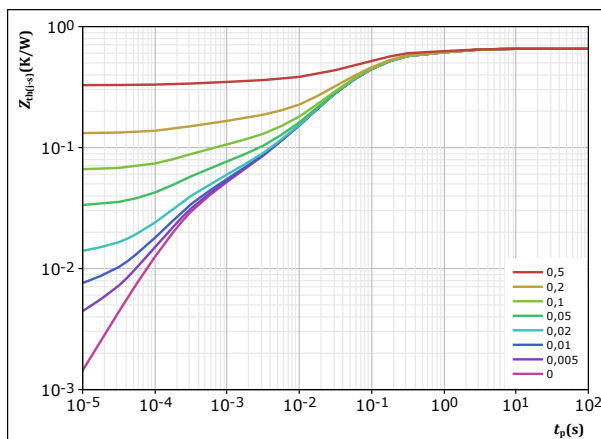
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 13.

IGBT

Transient thermal impedance as a function of pulse width

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



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

$R (K/W)$	$\tau (s)$
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



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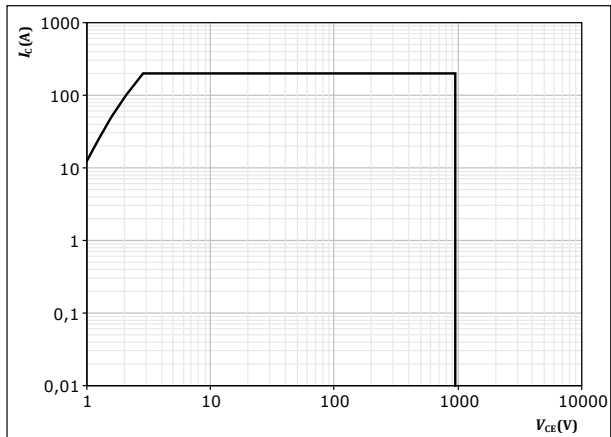
Outer Boost Switch Characteristics

figure 14.

IGBT

Safe operating area

$I_C = f(V_{CE})$



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$
 $V_{GE} = 15 \text{ V}$
 $T_j = T_{jmax}$



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datasheet

Outer Boost Diode Characteristics

figure 15.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

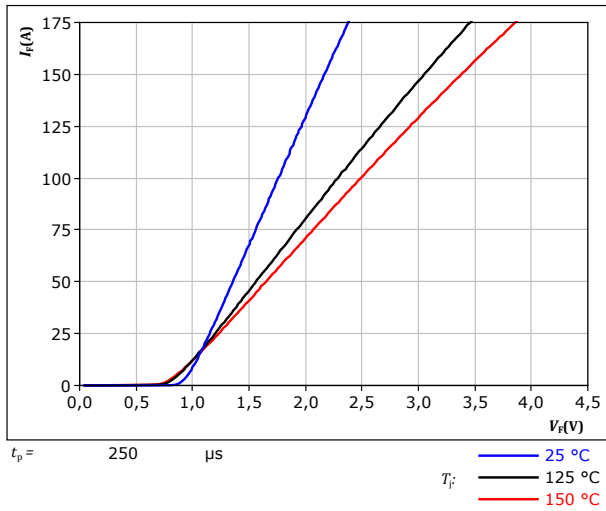
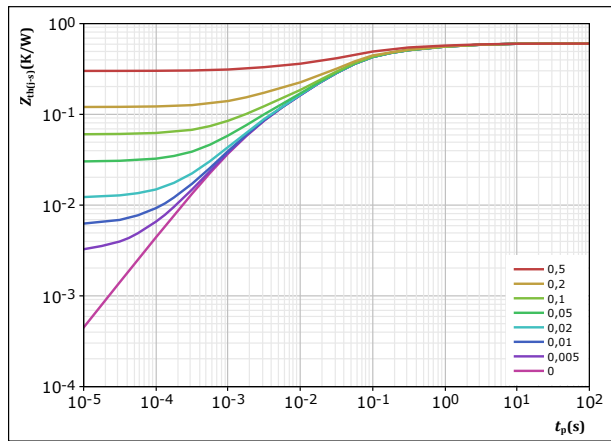


figure 16.

FWD

Transient thermal impedance as a function of pulse width

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





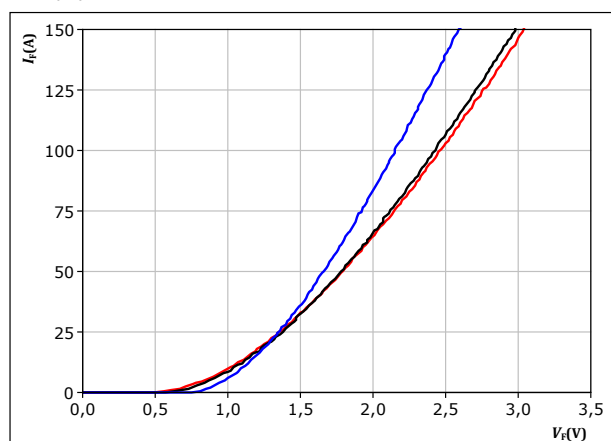
Vincotech

Outer Boost Sw. Protection Diode Characteristics

figure 17. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

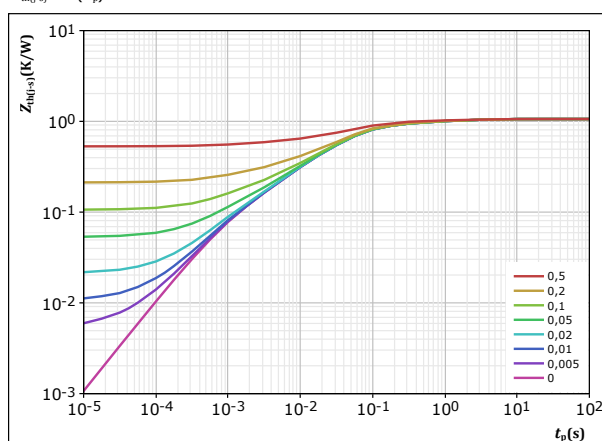
T_j :

- 25 °C
- 125 °C
- 150 °C

figure 18. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

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

FWD thermal model values

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



Vincotech

Aux Diode H Characteristics

figure 19.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

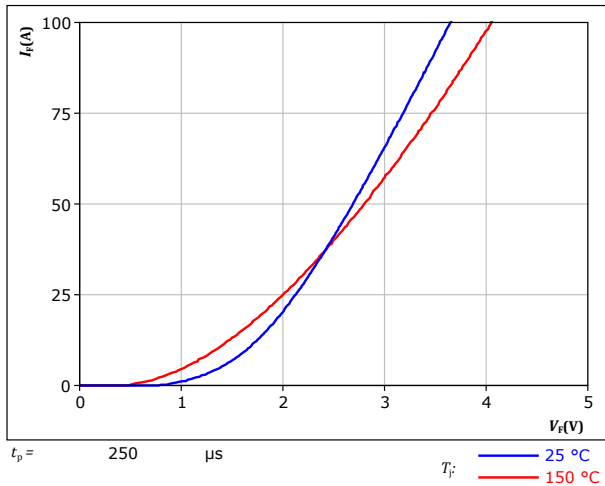
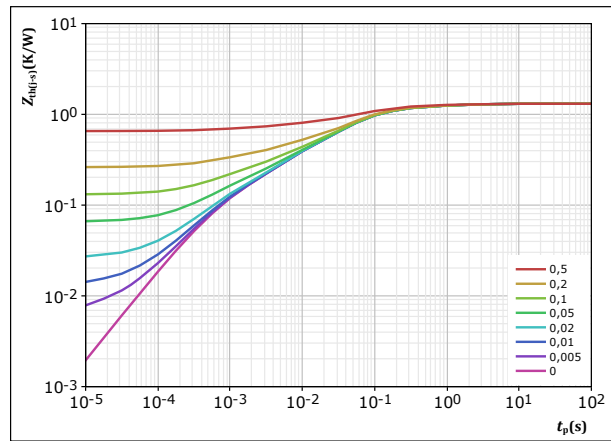


figure 20.

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 (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



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Aux Diode L Characteristics

figure 21.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

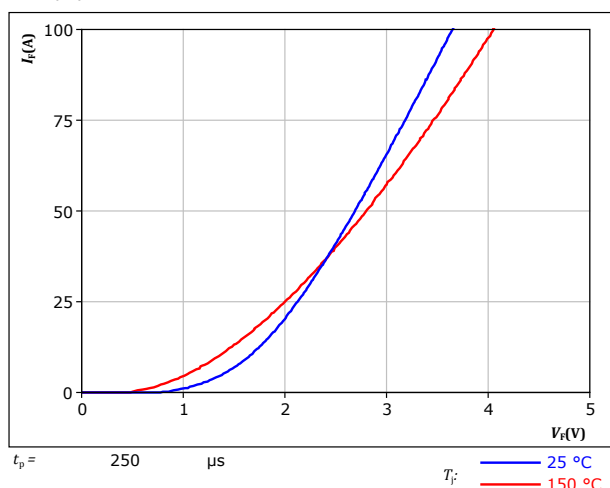
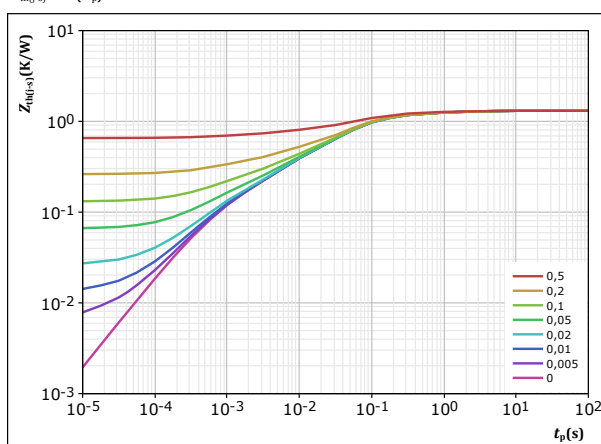


figure 22.

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	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	



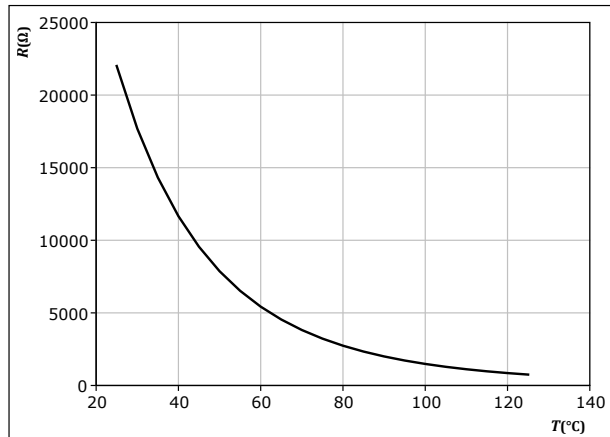
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Thermistor Characteristics

figure 23. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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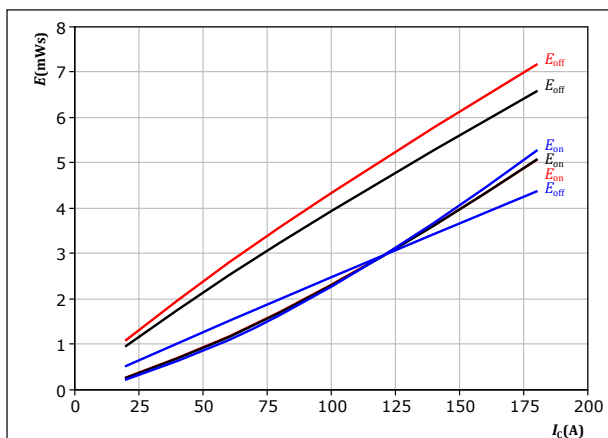
Inner Boost Switching Characteristics

figure 24.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

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

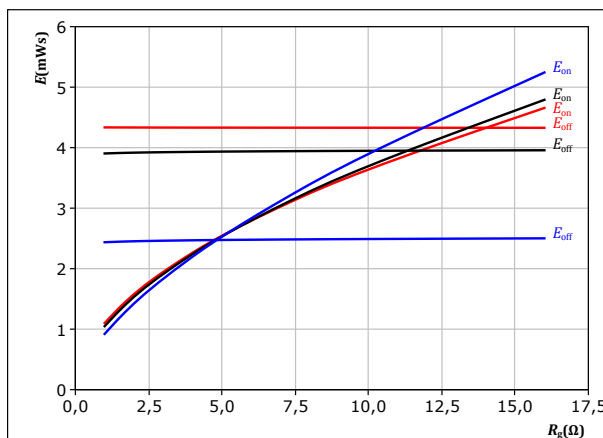
T_j : $25 \text{ } ^\circ\text{C}$ (blue)
 $125 \text{ } ^\circ\text{C}$ (black)
 $150 \text{ } ^\circ\text{C}$ (red)

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

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

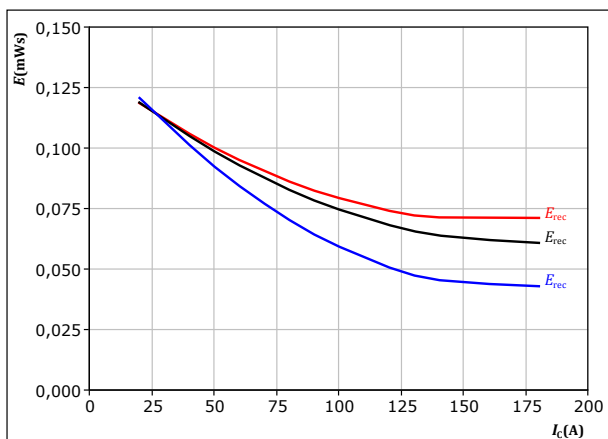
T_j : $25 \text{ } ^\circ\text{C}$ (blue)
 $125 \text{ } ^\circ\text{C}$ (black)
 $150 \text{ } ^\circ\text{C}$ (red)

figure 26.

FWD

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_C)$$



With an inductive load at

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

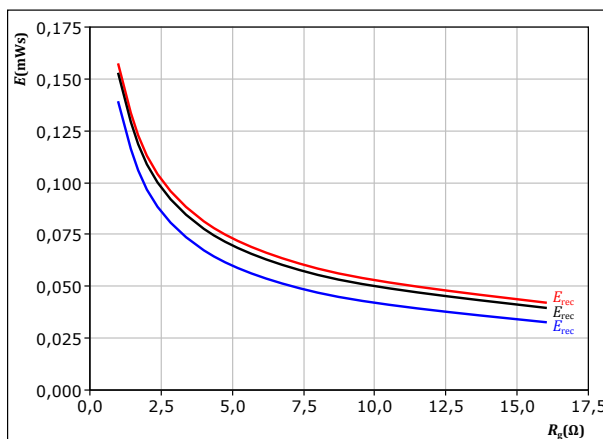
T_j : $25 \text{ } ^\circ\text{C}$ (blue)
 $125 \text{ } ^\circ\text{C}$ (black)
 $150 \text{ } ^\circ\text{C}$ (red)

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

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

T_j : $25 \text{ } ^\circ\text{C}$ (blue)
 $125 \text{ } ^\circ\text{C}$ (black)
 $150 \text{ } ^\circ\text{C}$ (red)



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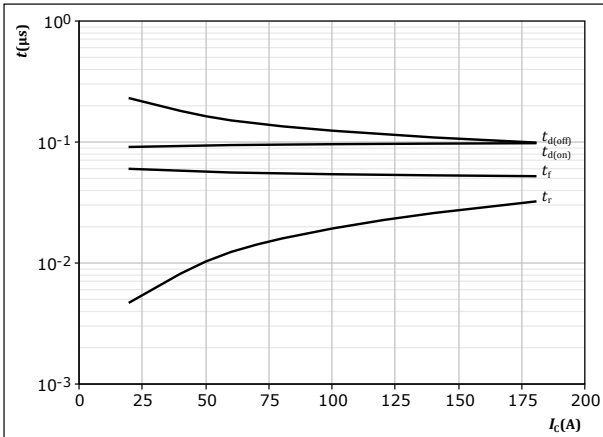
datasheet

Inner Boost Switching Characteristics

figure 28.

IGBT

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



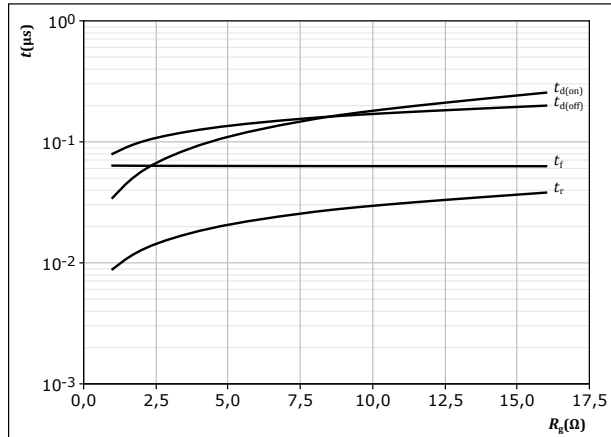
With an inductive load at

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

figure 29.

IGBT

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



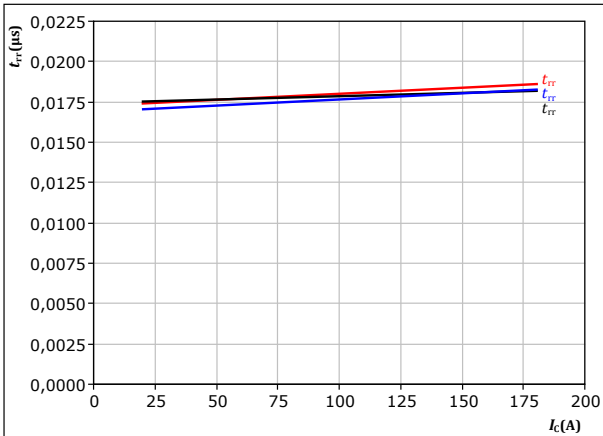
With an inductive load at

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

figure 30.

FWD

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



With an inductive load at

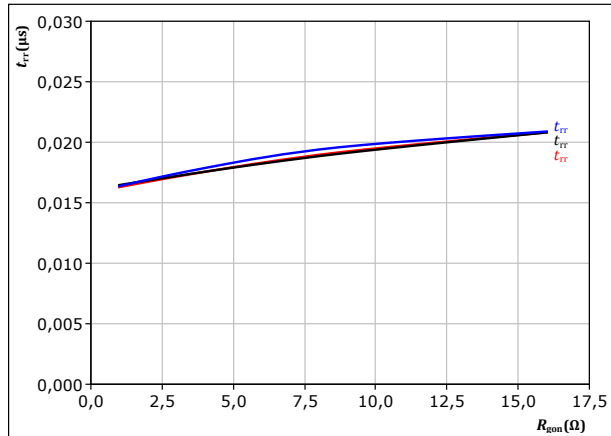
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$

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

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

T_j : — 25 °C
— 125 °C
— 150 °C



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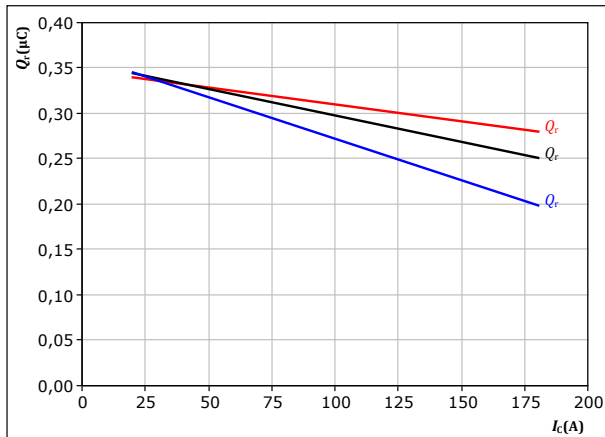
Inner Boost Switching Characteristics

figure 32.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

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

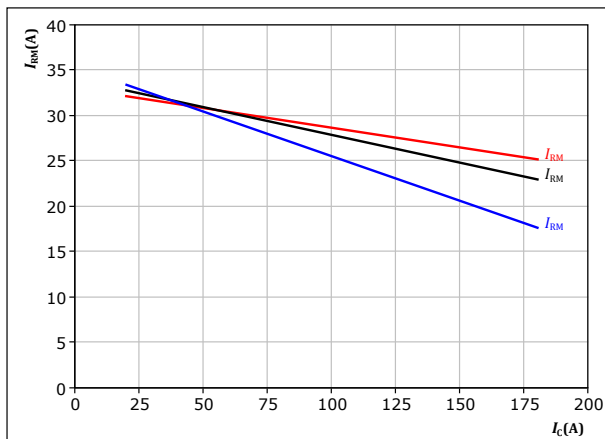
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 34.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

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

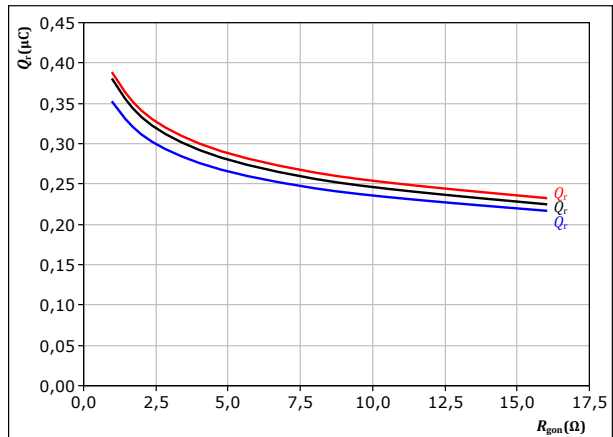
T_j :
— 25 °C
— 125 °C
— 150 °C

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

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

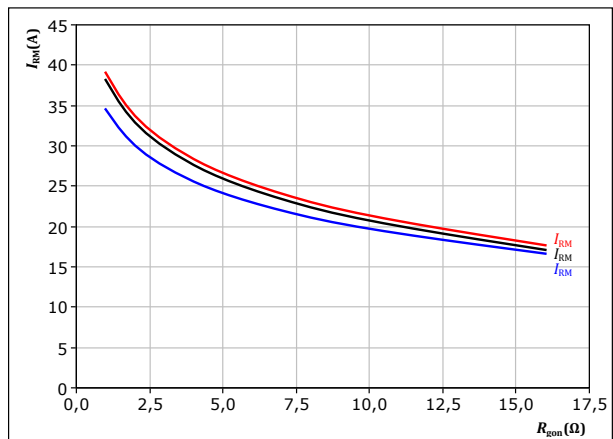
T_j :
— 25 °C
— 125 °C
— 150 °C

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

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

T_j :
— 25 °C
— 125 °C
— 150 °C



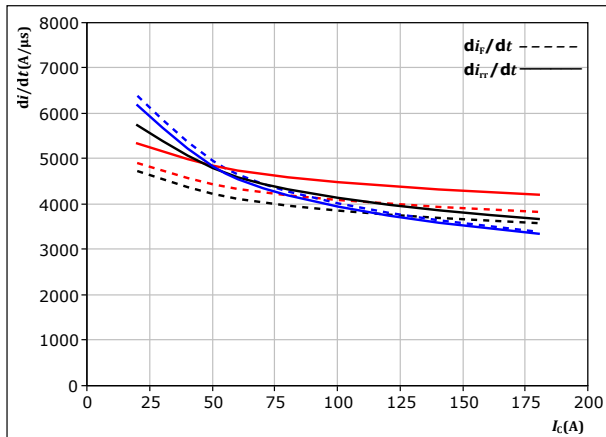
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datasheet

Inner Boost Switching Characteristics

figure 36. FWD

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



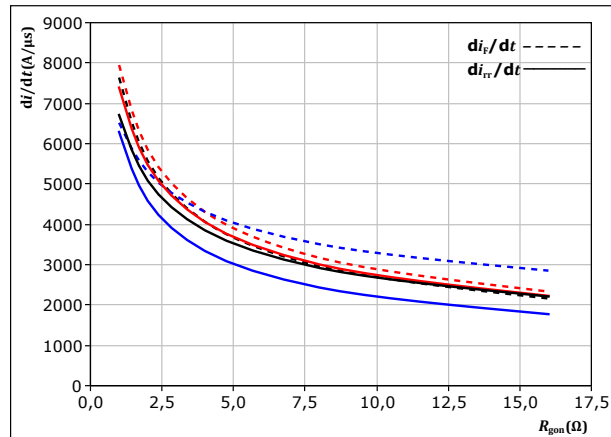
With an inductive load at

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

$T_j:$ — 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

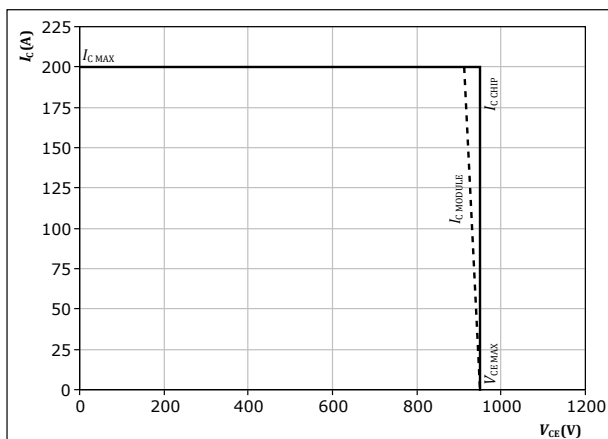
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 100 \text{ A}$

$T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 38. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



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



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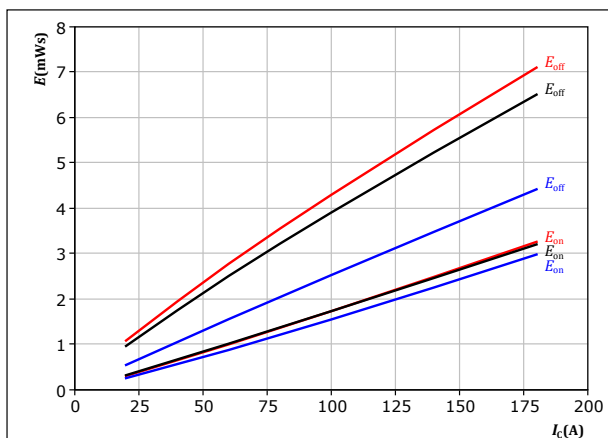
Outer Boost Switching Characteristics

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

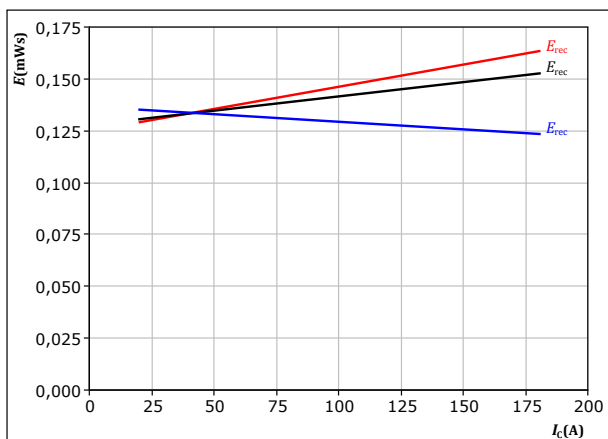
T_j : 25 °C
125 °C
150 °C

figure 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

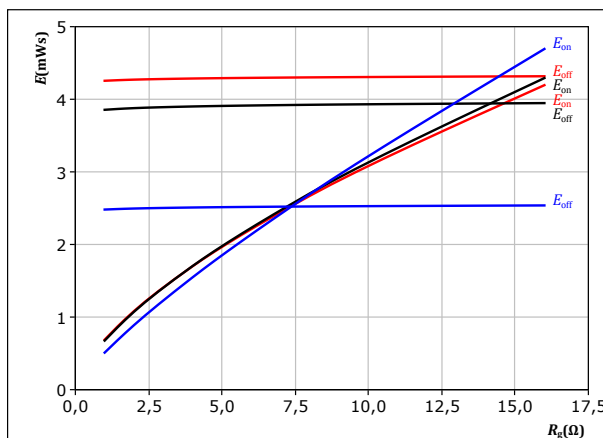
T_j : 25 °C
125 °C
150 °C

figure 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

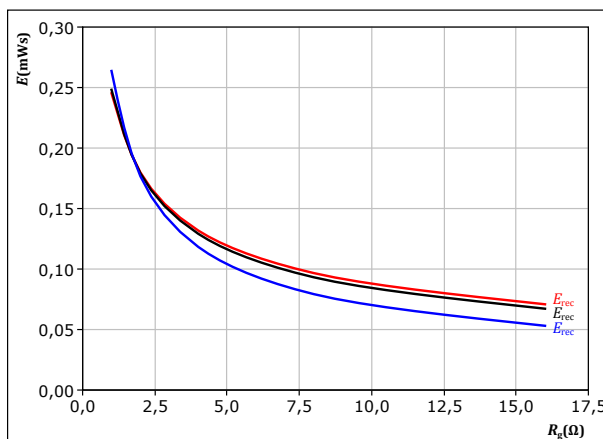
T_j : 25 °C
125 °C
150 °C

figure 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



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datasheet

Outer Boost Switching Characteristics

figure 43.

IGBT

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

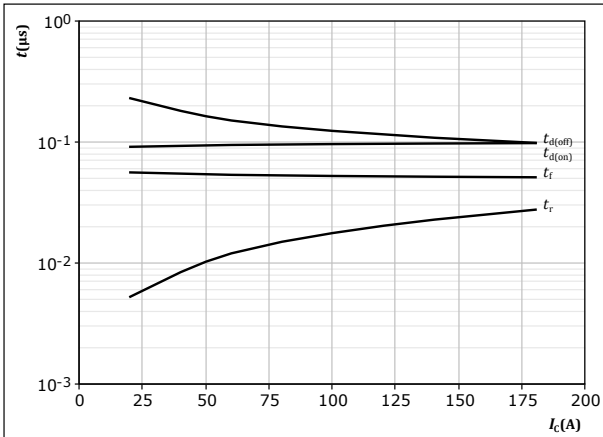


figure 44.

IGBT

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

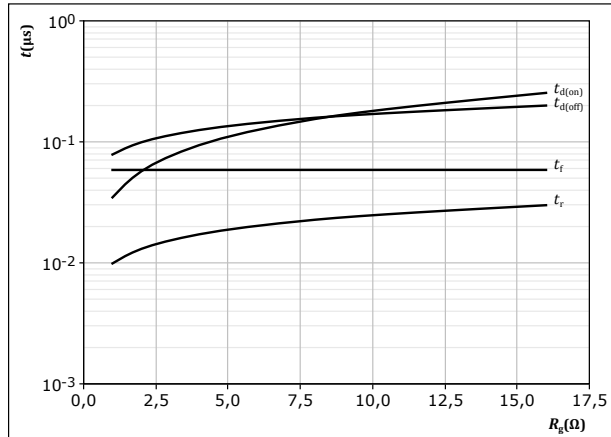


figure 45.

FWD

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

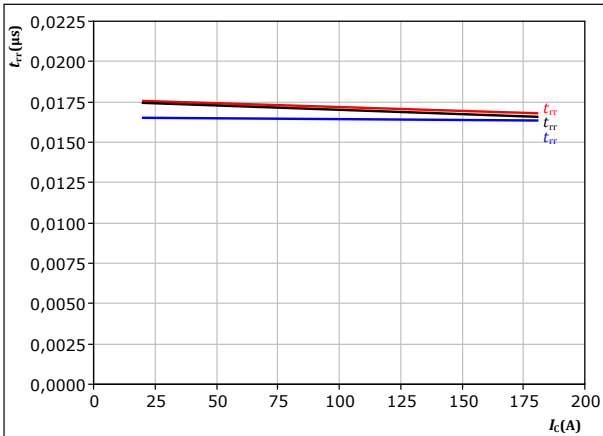
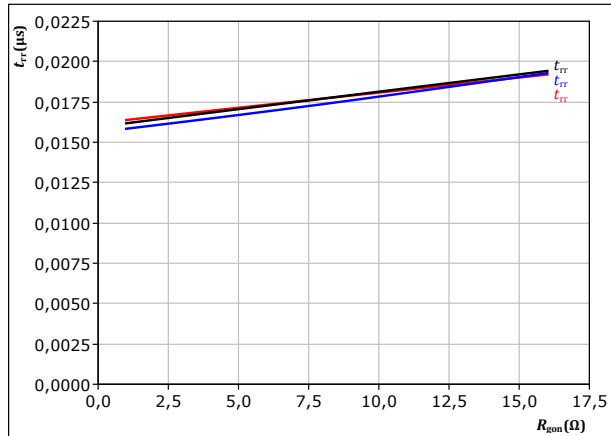


figure 46.

FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor
 $t_{rr} = f(R_{gon})$





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datasheet

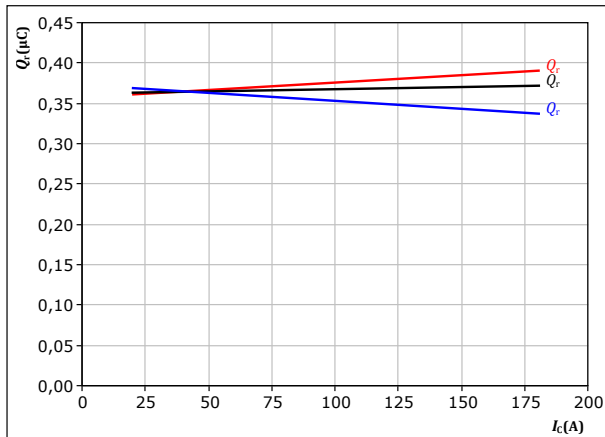
Outer Boost Switching Characteristics

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

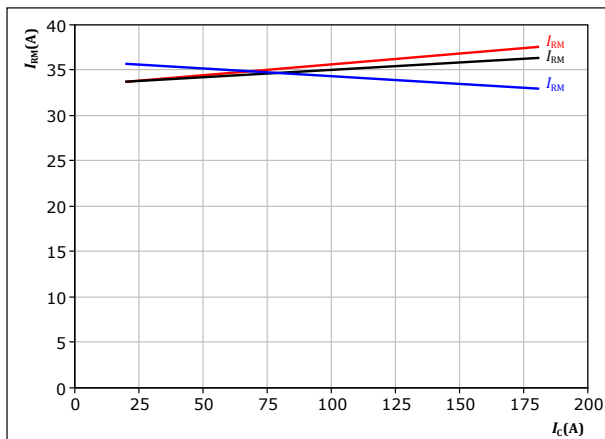
T_j :
— 25 °C
— 125 °C
— 150 °C

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

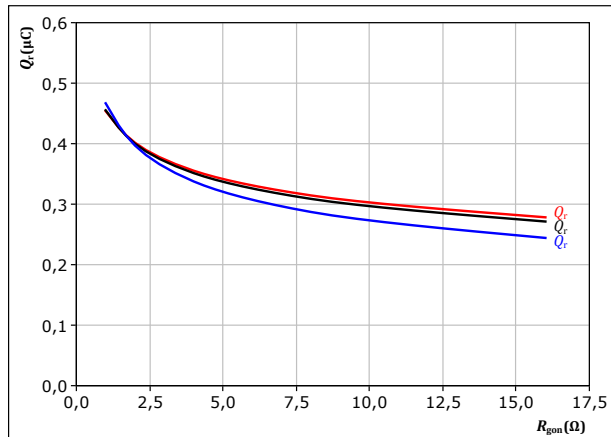
T_j :
— 25 °C
— 125 °C
— 150 °C

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

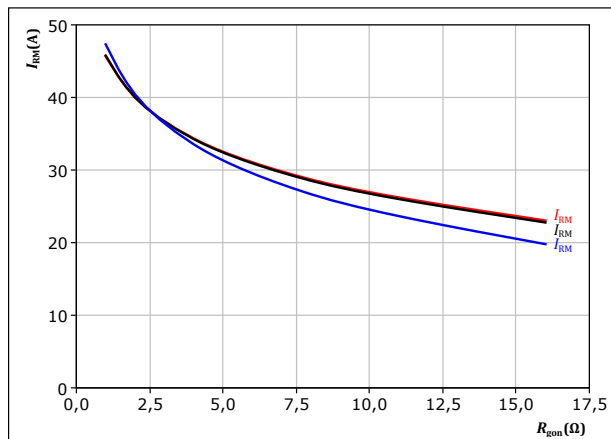
T_j :
— 25 °C
— 125 °C
— 150 °C

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

T_j :
— 25 °C
— 125 °C
— 150 °C



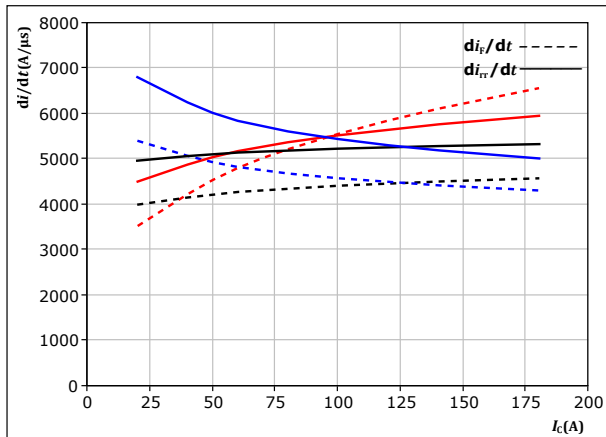
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datasheet

Outer Boost Switching Characteristics

figure 51. FWD

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



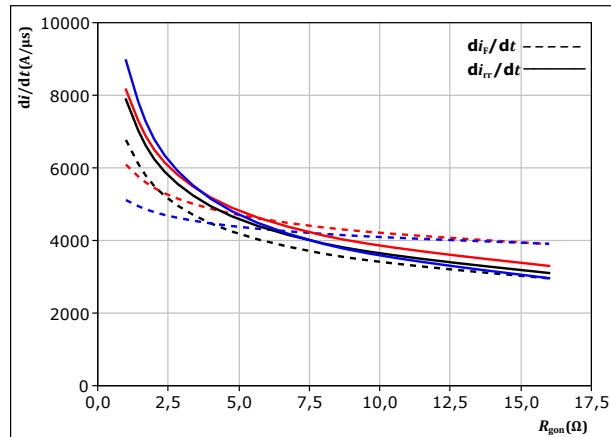
With an inductive load at

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

T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 52. FWD

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



With an inductive load at

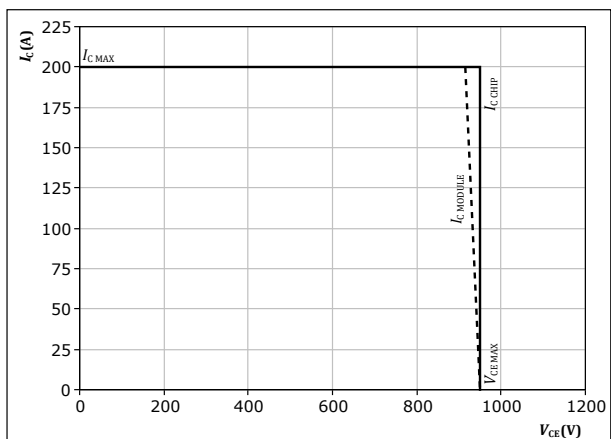
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 100 \text{ A}$

T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 53. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



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



Vincotech

B0-SP103BB100S764-PB80L98T

datasheet

Switching Definitions

figure 54. IGBT

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

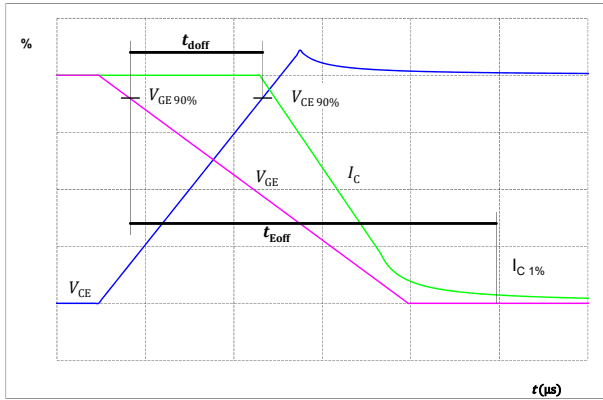


figure 55. IGBT

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

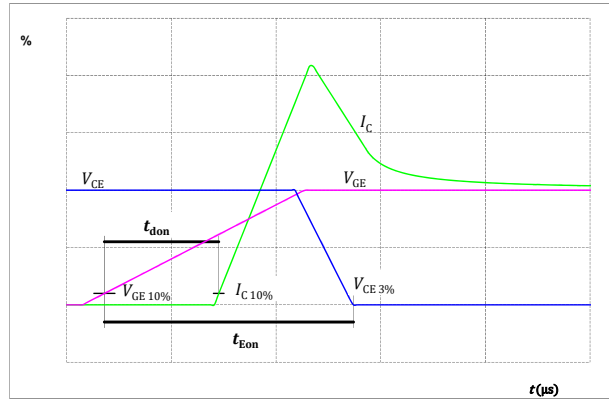


figure 56. IGBT

Turn-off Switching Waveforms & definition of t_f

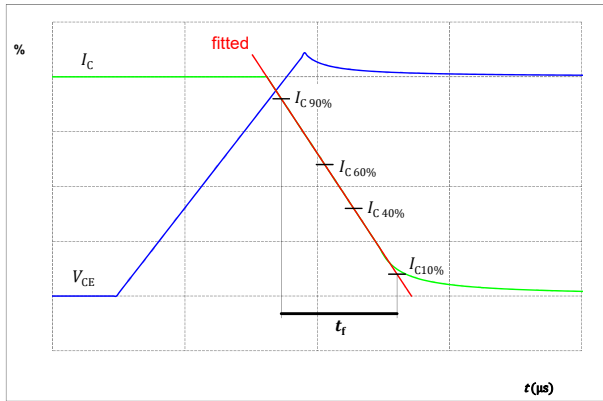
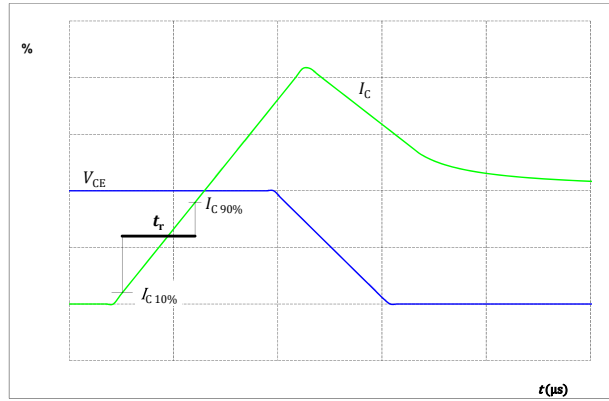


figure 57. IGBT

Turn-on Switching Waveforms & definition of t_r





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Switching Definitions

figure 58.

FWD

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

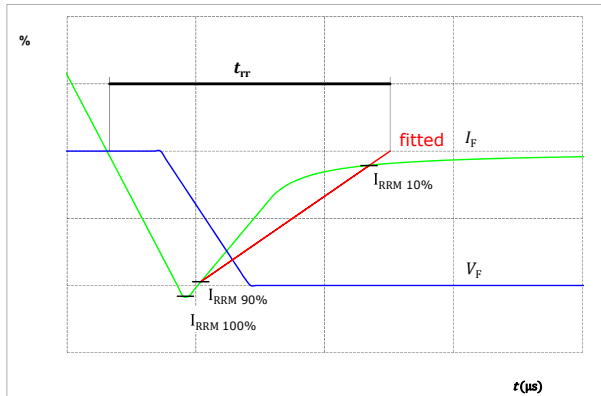
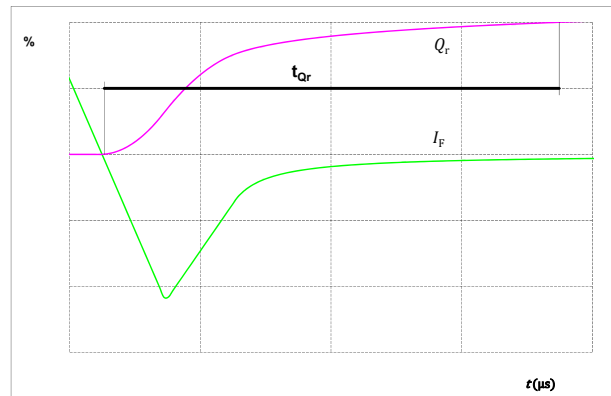


figure 59.

FWD


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





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							
 <p>NLN00000000000000 TTTTTIVVWYY UL VIN LLLLL SSSS</p>	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNN- TTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTIVV	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				

Top view of the PCB showing dimensions and pin locations. Dimensions include 100mm width, 50mm height, and various pin spacing dimensions like 25.4mm, 12.7mm, etc.

Side view of the PCB showing dimensions and pin locations. Dimensions include 100mm width, 50mm height, and various pin spacing dimensions like 25.4mm, 12.7mm, etc.



datasheet

Pinout

The schematic diagram illustrates the power management system for the TMS320C6748, featuring three DC-DC converters and a thermistor interface.

DC-Boost1 (Left): This converter is powered by the **DC-Boost1** input (pins 1, 2) and provides output to **DC-Boost12** (pins 3, 6). It includes MOSFETs T15, T17, T25, and T27, diodes D15, D17, D25, and D27, and capacitors C11 and C12.

DC-Boost2 (Middle): This converter is powered by the **DC-Boost2** input (pins 7, 10) and provides output to **DC-Boost3** (pins 11, 12). It includes MOSFETs T25, T27, T35, and T37, diodes D25, D27, D35, and D37, and capacitors C21 and C22.

DC-Boost3 (Right): This converter is powered by the **DC-Boost3** input (pins 32, 34) and provides output to **DC-Boost12** (pins 3, 6). It includes MOSFETs T35, T37, T45, and T47, diodes D35, D37, D45, and D47, and capacitors C31 and C32.


Thermistor Interface: The thermistor interface is connected to pins 20 (Therm1) and 21 (Therm2) through a resistor **Rt**.

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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B0-SP103BB100S764-PB80L98T
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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.				
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	

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