



Vincotech

flowBOOST S3 symmetric triple		950 V / 100 A
Topology features		
<ul style="list-style-type: none">• Kelvin Emitter for improved switching performance• Temperature sensor• Triple Flying Cap Booster• Auxiliary diodes for FC pre-charge (patent pending)		
Component features		
<ul style="list-style-type: none">• Low collector emitter saturation voltage• High speed and smooth switching		
Housing features		
<ul style="list-style-type: none">• Base isolation: Al₂O₃• 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		
<ul style="list-style-type: none">• Solar Inverters		
Types		
<ul style="list-style-type: none">• B0-SP103BA100S704-LS69L98T		
flow S3 12 mm housing		
Schematic		



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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Inner Boost Switch				
Collector-emitter voltage	V_{CES}		950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	77	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	145	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Inner Boost Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	41	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	141	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10 \text{ ms}$ $T_j = 25^\circ\text{C}$	213	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	116	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Inner Boost Sw. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	40	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	70	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	76	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$



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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Outer Boost Switch				
Collector-emitter voltage	V_{CES}		950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	77	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	145	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Outer Boost Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	41	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	141	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10 \text{ ms}$ $T_j = 25^\circ\text{C}$	213	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	116	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Outer Boost Sw. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	40	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	70	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	76	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$



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Maximum Ratings

$T_j = 25^\circ\text{C}$, 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	$T_j = T_{jmax}$	32	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10 \text{ ms}$	170	A
Surge current capability	I^t	$T_j = 150^\circ\text{C}$	145	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	73	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Aux Diode L

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	32	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10 \text{ ms}$	170	A
Surge current capability	I^t	$T_j = 150^\circ\text{C}$	145	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	73	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Module Properties

Thermal Properties

Storage temperature	T_{stg}		-40...+125	$^\circ\text{C}$
Operation temperature under switching condition	T_{jop}		-40...+($T_{jmax} - 25$)	$^\circ\text{C}$

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage*	$t_p = 2 \text{ s}$	6000	V
Creepage distance				9,63	mm
Clearance				8,33	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	$V_{GE(\text{th})}$	$V_{CE} = V_{GE}$			0,00167	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(\text{sat})}$		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_{res}	$f = 100 \text{ kHz}$	0	25	25	25	6500	139	20	pF
Output capacitance	C_{oes}									
Reverse transfer capacitance	C_{res}									
Gate charge	Q_g		±15		0	25		230		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{\text{paste}} = 5,2 \text{ W/mK}$ (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	±15	600	65	25		149,92		
Rise time	t_r					125		150,4		ns
						150		150,56		
Turn-off delay time	$t_{d(off)}$					25		13,76		
						125		15,68		
Fall time	t_f					150		16		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD}=0,147 \mu\text{C}$ $Q_{tfwd}=0,157 \mu\text{C}$ $Q_{tfwd}=0,152 \mu\text{C}$				25		142,4		
						125		172		
						150		181,12		
Turn-off energy (per pulse)	E_{off}					25		32,64		
						125		58,3		
						150		71,3		ns
						25		1,42		
						125		1,54		
						150		1,49		mWs
						25		1,68		
						125		2,66		
						150		2,95		mWs



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Characteristic Values

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

Inner Boost Diode

Static

Forward voltage	V_F				30	25 125 150		1,51 2,03 2,13	1,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V			25		90	750	μ A	

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,82		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=4142$ A/ μ s $di/dt=3944$ A/ μ s $di/dt=3969$ A/ μ s	± 15	600	65	25 125 150		20,2 20,82 20,44		A
Reverse recovery time	t_{rr}					25 125 150		11,61 12,48 12,61		ns
Recovered charge	Q_r					25 125 150		0,147 0,157 0,152		μ C
Reverse recovered energy	E_{rec}					25 125 150		0,038 0,042 0,04		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		4618 3995 3943		A/μ s



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Characteristic Values

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

Inner Boost Sw. Protection Diode

Static

Forward voltage	V_F				35	25 125 150		1,66 1,76 1,75	2,1 ⁽¹⁾	V
Reverse leakage current	I_R	$V_T = 1200$ V				25			40	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,26		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	$V_{GE(\text{th})}$	$V_{CE} = V_{GE}$			0,00167	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(\text{sat})}$		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_{res}	$f = 100 \text{ kHz}$	0	25	25	25	6500	139	20	pF
Output capacitance	C_{oes}									
Reverse transfer capacitance	C_{res}									
Gate charge	Q_g		±15		0	25		230		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{\text{paste}} = 5,2 \text{ W/mK}$ (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	±15	600	65	25		149,12		
Rise time	t_r					125		150,24		ns
						150		150,4		
Turn-off delay time	$t_{d(off)}$					25		12,16		
						125		13,6		
Fall time	t_f					150		14,24		
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD}=0,168 \mu\text{C}$ $Q_{tfwd}=0,175 \mu\text{C}$ $Q_{tfwd}=0,168 \mu\text{C}$				25		143,52		
						125		179,04		
						150		187,52		
Turn-off energy (per pulse)	E_{off}					25		32,58		
						125		59,3		
						150		72,44		
						25		1,22		
						125		1,24		
						150		1,28		mWs
						25		1,67		
						125		2,8		
						150		3,16		mWs



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Characteristic Values

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

Outer Boost Diode

Static

Forward voltage	V_F				30	25 125 150		1,51 2,03 2,13	1,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V			25		90	750	μ A	

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,82		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=5570$ A/ μ s $di/dt=5323$ A/ μ s $di/dt=5215$ A/ μ s	± 15	600	65	25 125 150		26,44 26,06 25,67		A
Reverse recovery time	t_{rr}					25 125 150		11,35 11,92 12,03		ns
Recovered charge	Q_r					25 125 150		0,168 0,175 0,168		μ C
Reverse recovered energy	E_{rec}					25 125 150		0,054 0,058 0,054		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6819 5794 5769		A/μ s



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Characteristic Values

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

Outer Boost Sw. Protection Diode

Static

Forward voltage	V_F				35	25 125 150		1,66 1,76 1,75	2,1 ⁽¹⁾		V
Reverse leakage current	I_R	$V_r = 1200$ V				25			40		µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,26			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	$V_r = 1200$ 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	$V_r = 1200$ 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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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		V_{GE} [V]	V_{GS} [V]	V_{CE} [V]	V_{DS} [V]	I_C [A]	T_j [°C]	Min	Typ	Max

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. ±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.



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Inner Boost Switch Characteristics

figure 1. IGBT

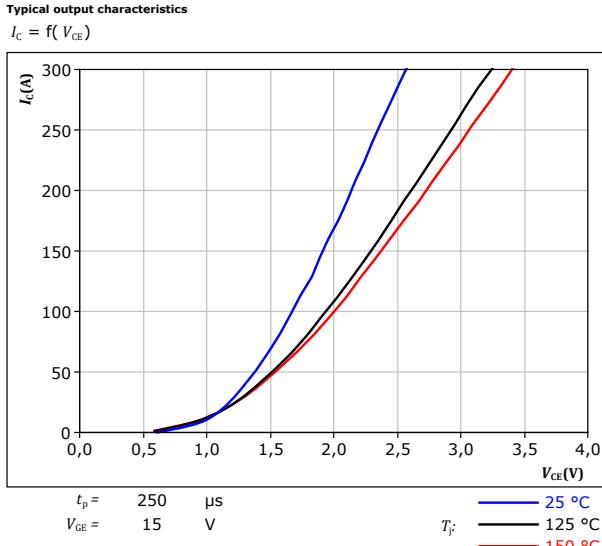


figure 2. IGBT

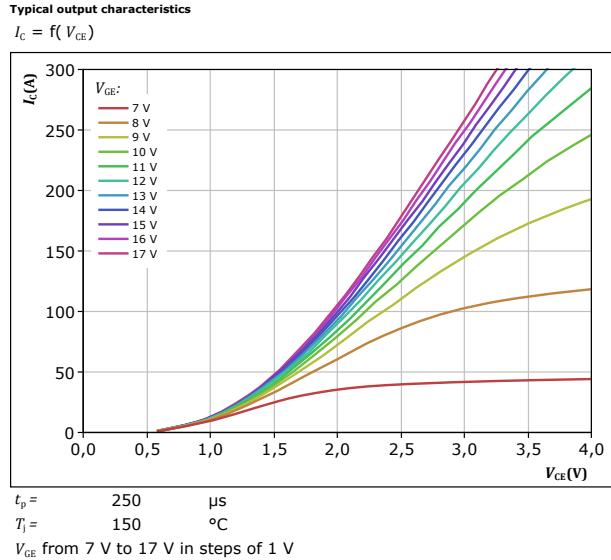


figure 3. IGBT

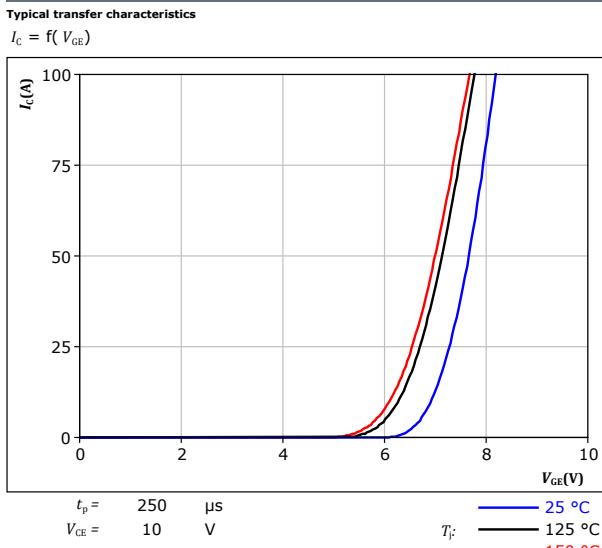
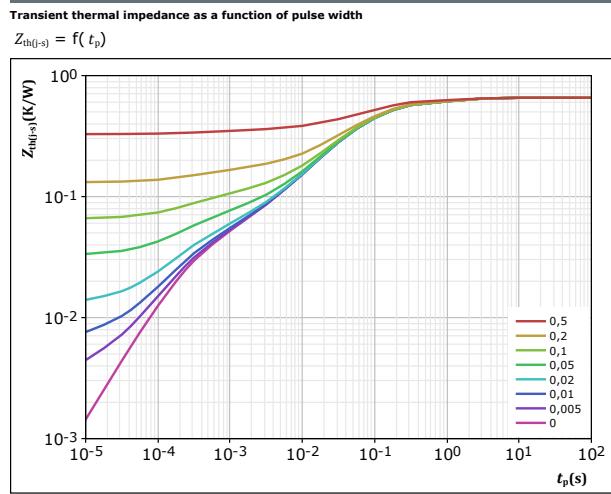
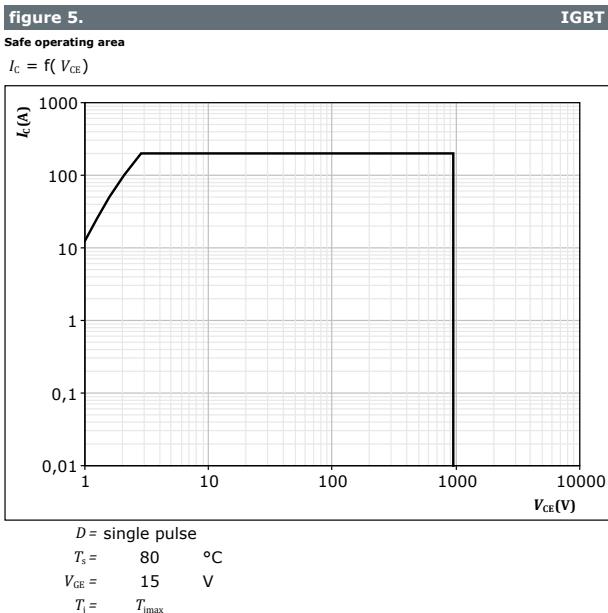


figure 4. IGBT





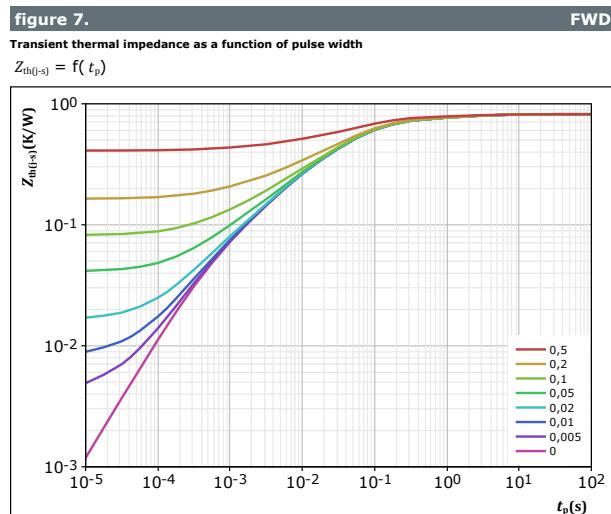
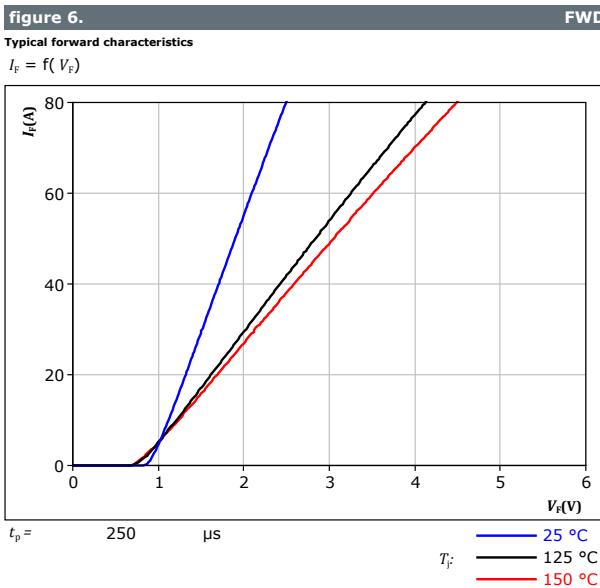
Inner Boost Switch Characteristics



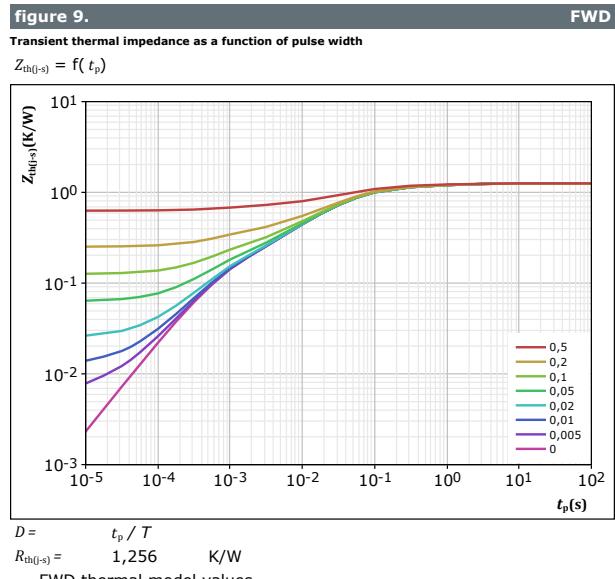
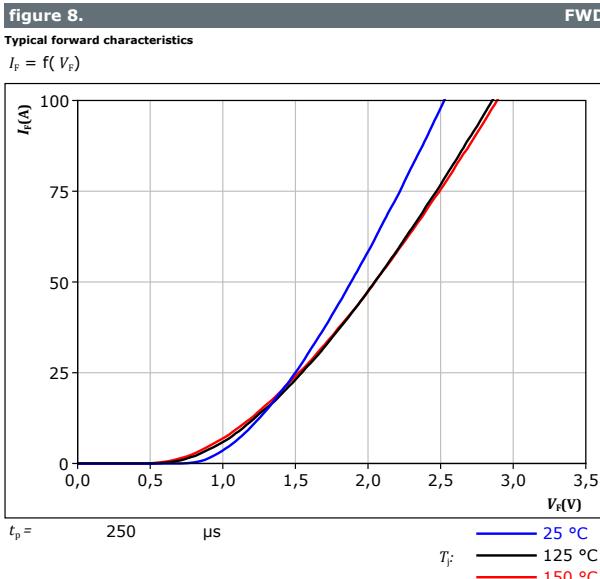


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Inner Boost Diode Characteristics



Inner Boost Sw. Protection Diode Characteristics





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Outer Boost Switch Characteristics

figure 10. IGBT

Typical output characteristics
 $I_C = f(V_{CE})$

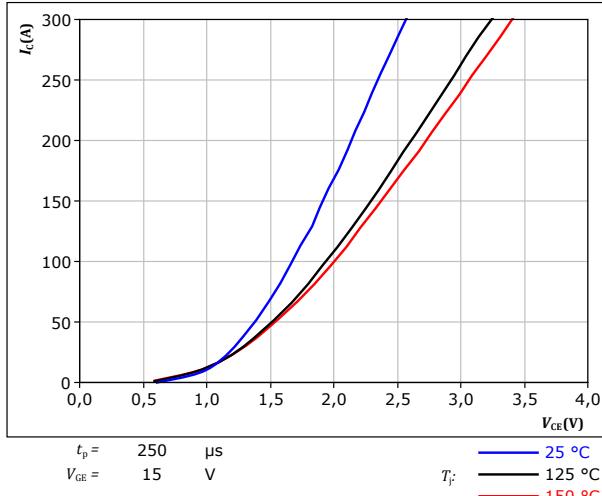


figure 11. IGBT

Typical output characteristics
 $I_C = f(V_{CE})$

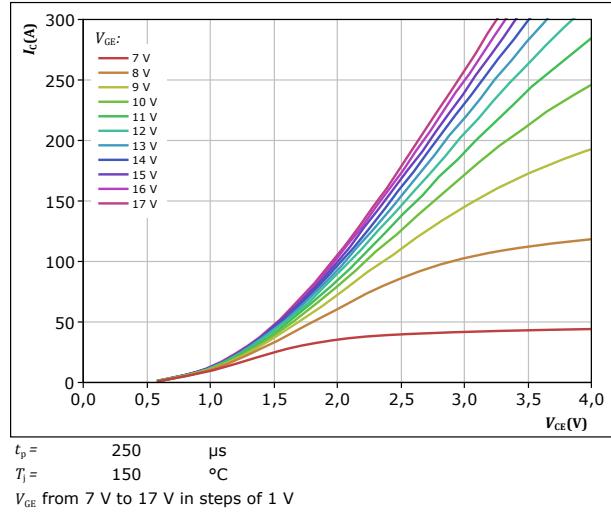


figure 12. IGBT

Typical transfer characteristics
 $I_C = f(V_{GE})$

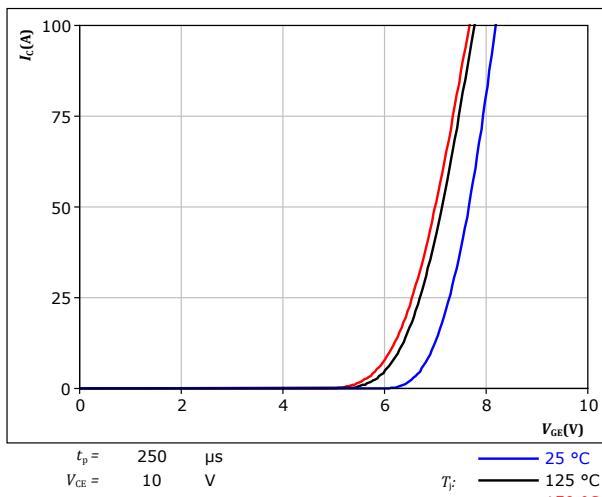
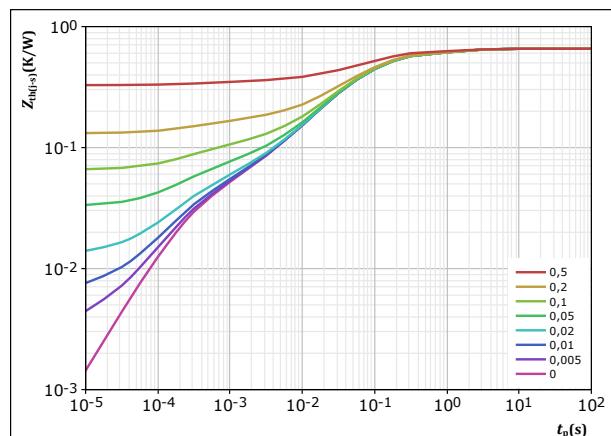


figure 13. IGBT

Transient thermal impedance as a function of pulse width

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



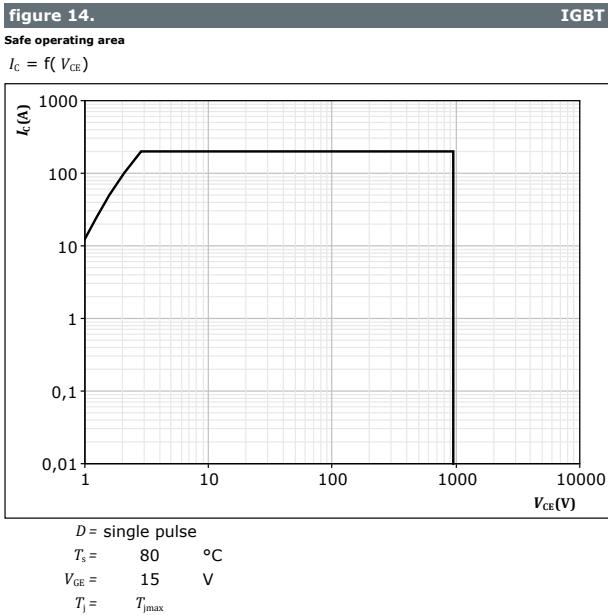
$$D = \frac{t_p / \tau}{0,656} \quad \text{K/W}$$

IGBT thermal model values

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





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Outer Boost Diode Characteristics

figure 15.

Typical forward characteristics

$$I_F = f(V_F)$$

FWD

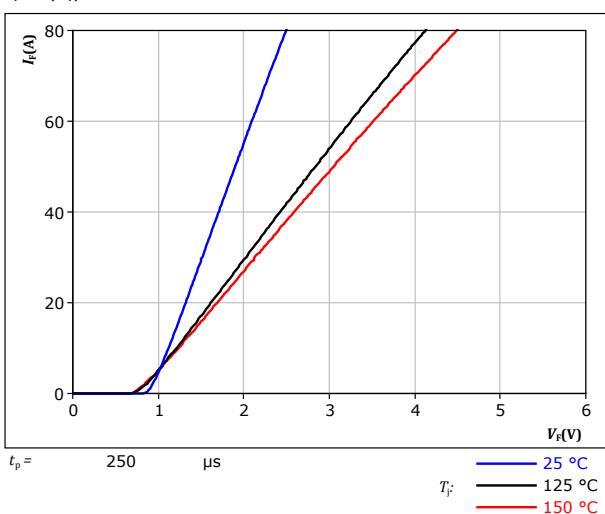
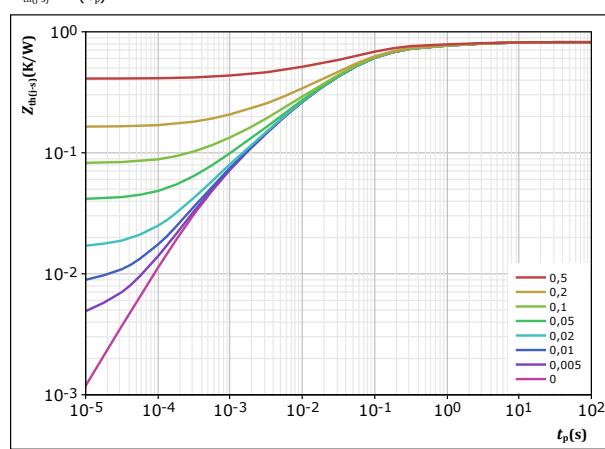


figure 16.

Transient thermal impedance as a function of pulse width

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

FWD



$$D = \frac{t_p / T}{R_{th(j-s)}} = 0,821 \text{ K/W}$$

FWD thermal model values

$R(K/W)$	$\tau(s)$
4,26E-02	4,27E+00
7,38E-02	7,05E-01
3,02E-01	9,22E-02
2,45E-01	2,42E-02
1,22E-01	3,86E-03
3,59E-02	4,82E-04



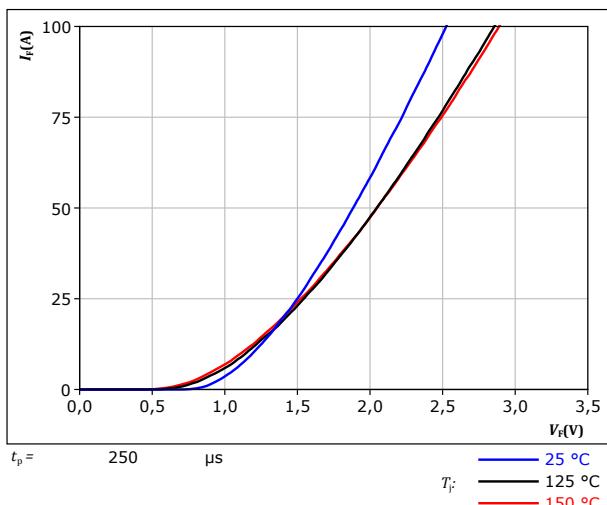
Outer Boost Sw. Protection Diode Characteristics

figure 17.

Typical forward characteristics

$$I_F = f(V_F)$$

FWD



$$t_p = 250 \mu\text{s}$$

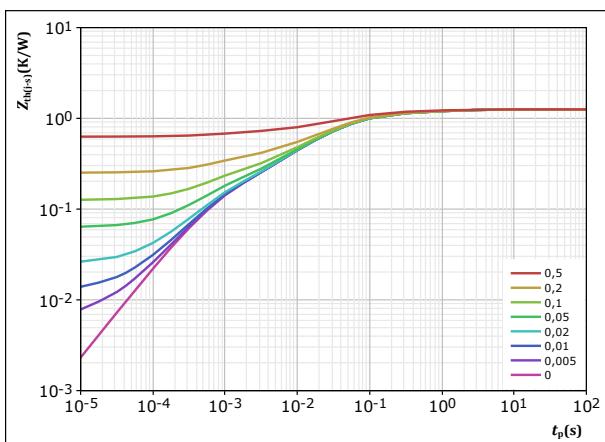
T_F :
— 25 °C
— 125 °C
— 150 °C

figure 18.

Transient thermal impedance as a function of pulse width

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

FWD



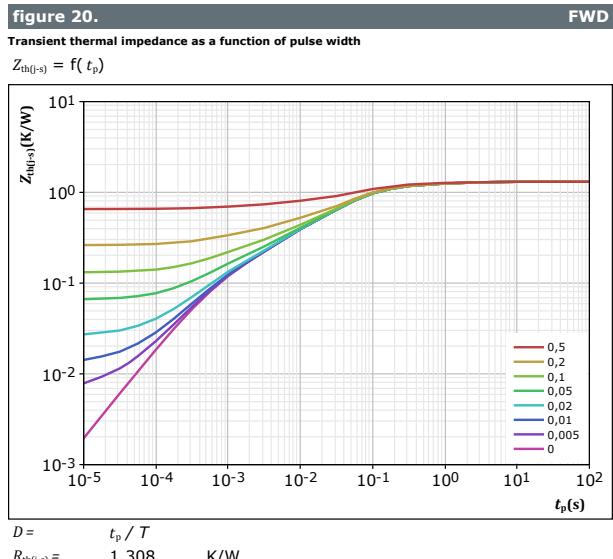
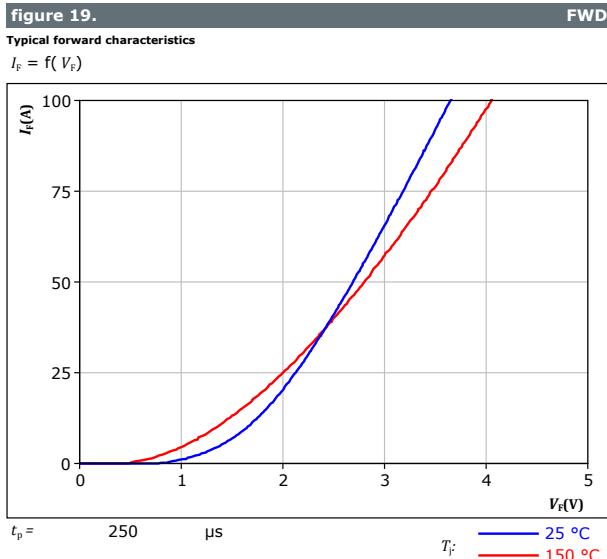
$$D = \frac{t_p}{T} \quad R_{th(j-s)} = \frac{t_p}{1,256} \quad K/W$$

FWD thermal model values

$R(K/W)$	$\tau(s)$
8,30E-02	2,06E+00
1,53E-01	2,53E-01
5,96E-01	4,75E-02
2,95E-01	9,13E-03
1,30E-01	6,93E-04



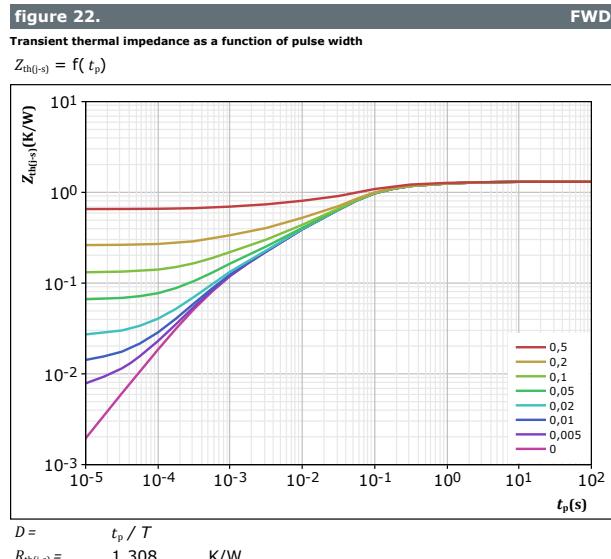
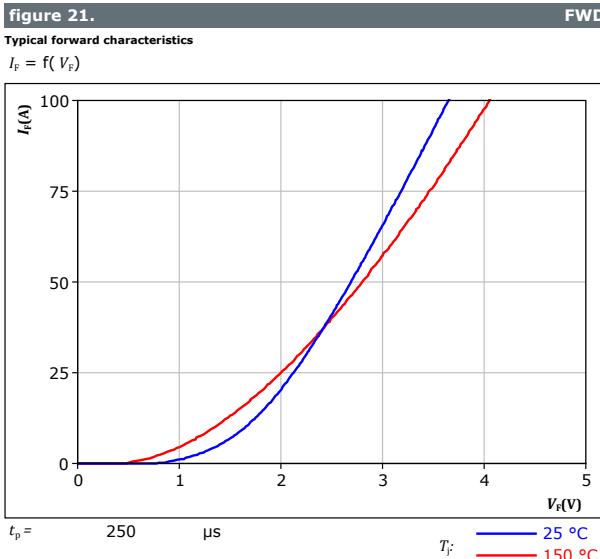
Aux Diode H Characteristics





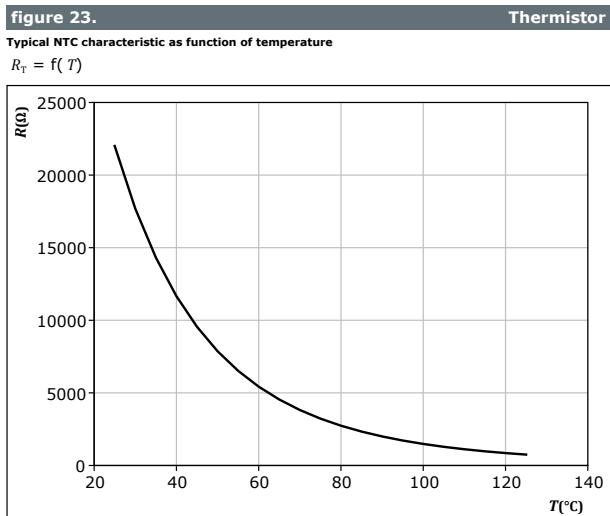
Vincotech

Aux Diode L Characteristics





Thermistor Characteristics





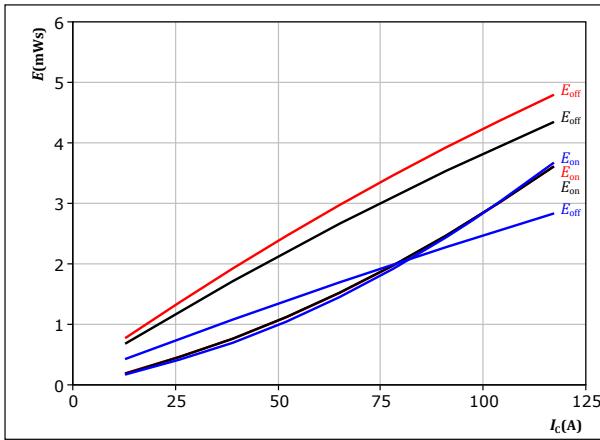
Vincotech

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

$$V_{CE} = 600 \text{ V}$$

$$V_{GE} = \pm 15 \text{ V}$$

$$R_{gon} = 8 \Omega$$

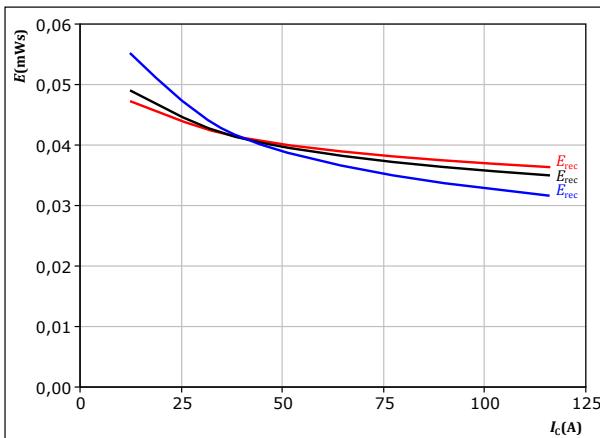
$$R_{goff} = 8 \Omega$$

$$T_f: \quad \begin{array}{l} 25^\circ\text{C} \\ \hline 125^\circ\text{C} \\ 150^\circ\text{C} \end{array}$$

figure 26. FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

$$V_{CE} = 600 \text{ V}$$

$$V_{GE} = \pm 15 \text{ V}$$

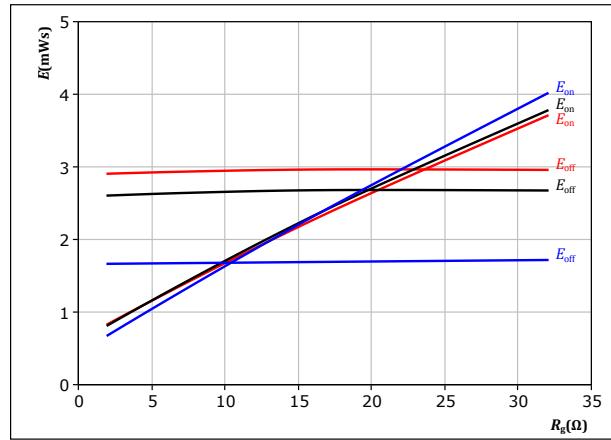
$$R_{gon} = 8 \Omega$$

$$T_f: \quad \begin{array}{l} 25^\circ\text{C} \\ \hline 125^\circ\text{C} \\ 150^\circ\text{C} \end{array}$$

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

$$V_{CE} = 600 \text{ V}$$

$$V_{GE} = \pm 15 \text{ V}$$

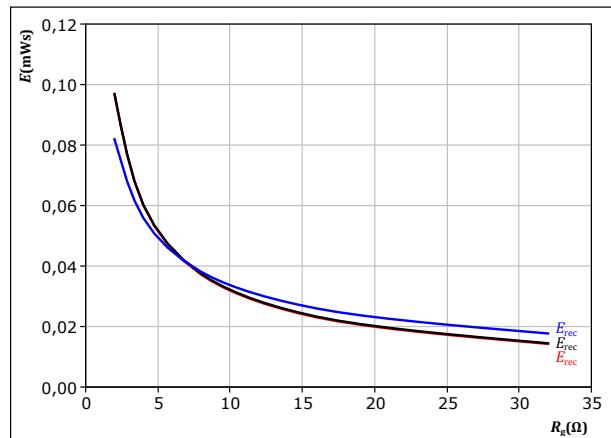
$$I_c = 65 \text{ A}$$

$$T_f: \quad \begin{array}{l} 25^\circ\text{C} \\ \hline 125^\circ\text{C} \\ 150^\circ\text{C} \end{array}$$

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

$$V_{CE} = 600 \text{ V}$$

$$V_{GE} = \pm 15 \text{ V}$$

$$I_c = 65 \text{ A}$$

$$T_f: \quad \begin{array}{l} 25^\circ\text{C} \\ \hline 125^\circ\text{C} \\ 150^\circ\text{C} \end{array}$$

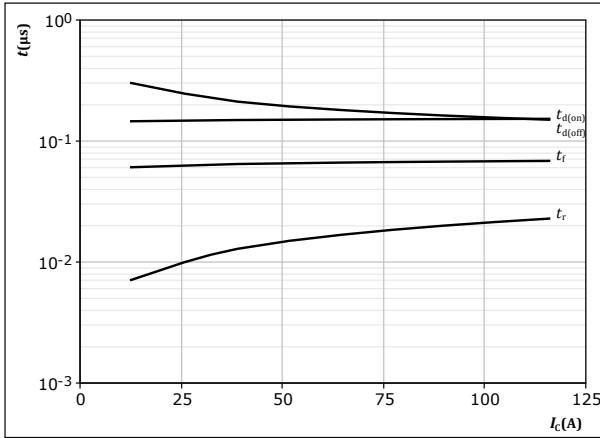


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Inner Boost Switching Characteristics

figure 28. IGBT

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

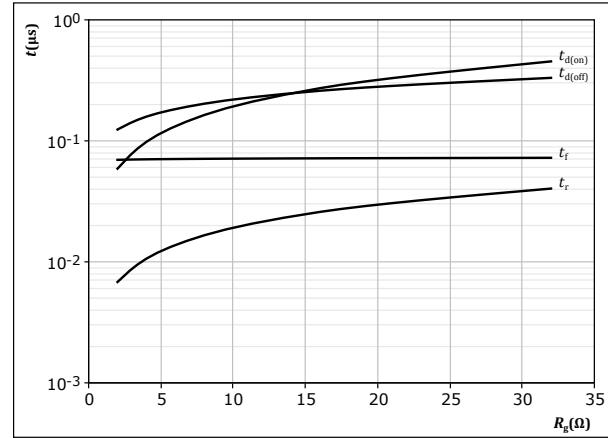


With an inductive load at

$T_j = 150^\circ\text{C}$
 $V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \Omega$
 $R_{goff} = 8 \Omega$

figure 29. IGBT

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

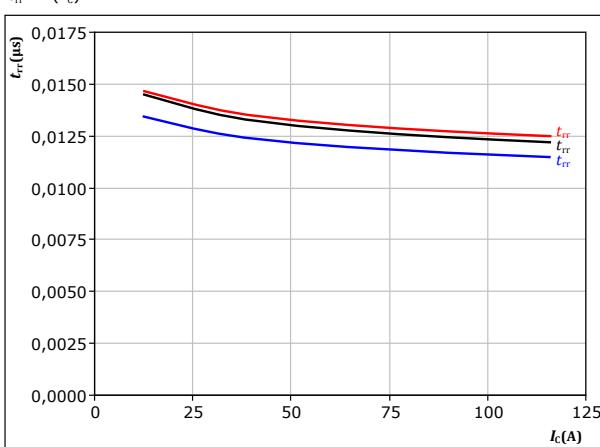


With an inductive load at

$T_j = 150^\circ\text{C}$
 $V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 65 \text{ A}$

figure 30. FWD

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

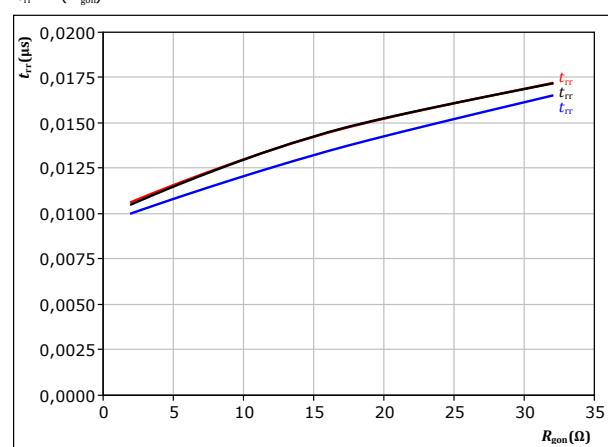


With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \Omega$

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

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 65 \text{ A}$



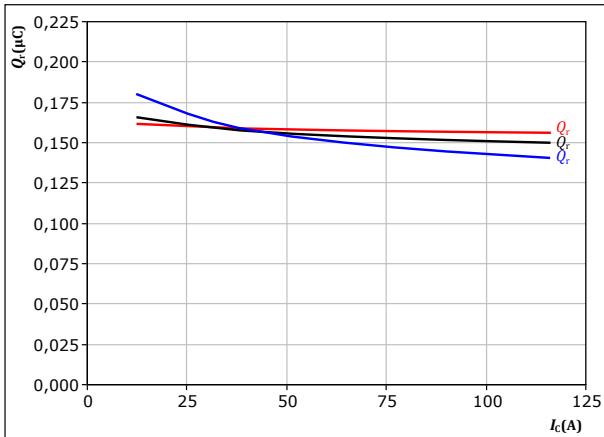
Vincotech

Inner Boost Switching Characteristics

figure 32.

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

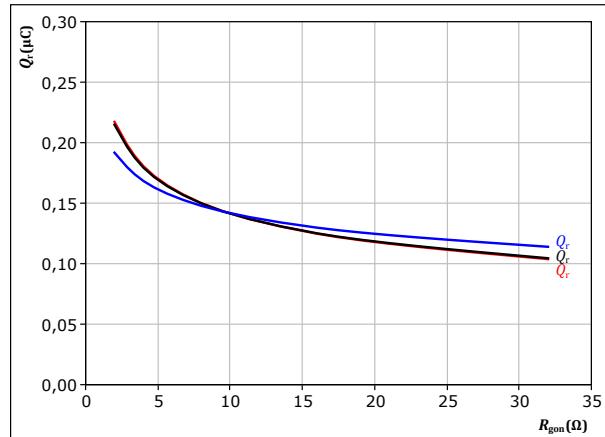
$$\begin{aligned} V_{CE} &= 600 \text{ V} & T_f &= 25 \text{ °C} \\ V_{GE} &= \pm 15 \text{ V} & & \\ R_{gon} &= 8 \Omega & I_c &= 65 \text{ A} \end{aligned}$$

FWD

figure 33.

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

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



With an inductive load at

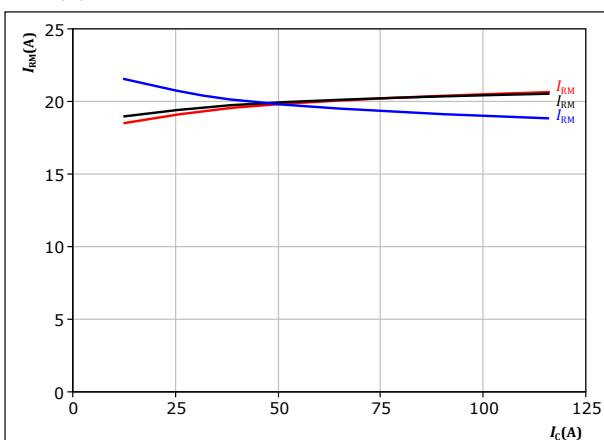
$$\begin{aligned} V_{CE} &= 600 \text{ V} & T_f &= 25 \text{ °C} \\ V_{GE} &= \pm 15 \text{ V} & & \\ I_c &= 65 \text{ A} & R_{gon} &= 8 \Omega \end{aligned}$$

FWD

figure 34.

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

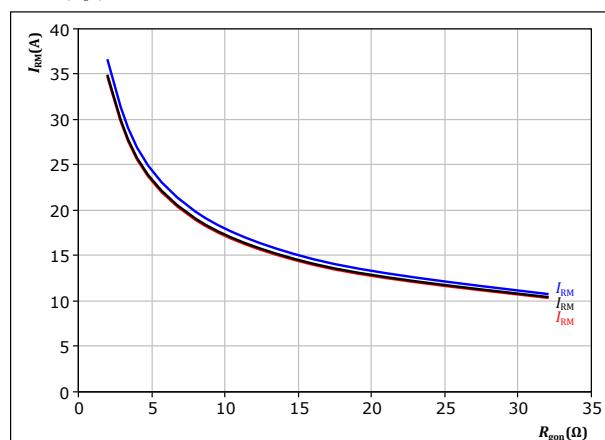
$$\begin{aligned} V_{CE} &= 600 \text{ V} & T_f &= 25 \text{ °C} \\ V_{GE} &= \pm 15 \text{ V} & & \\ R_{gon} &= 8 \Omega & I_c &= 65 \text{ A} \end{aligned}$$

FWD

figure 35.

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

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



With an inductive load at

$$\begin{aligned} V_{CE} &= 600 \text{ V} & T_f &= 25 \text{ °C} \\ V_{GE} &= \pm 15 \text{ V} & & \\ I_c &= 65 \text{ A} & R_{gon} &= 8 \Omega \end{aligned}$$

FWD

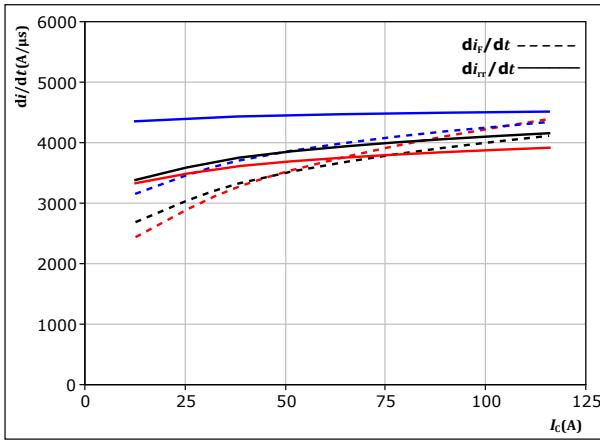


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Inner Boost Switching Characteristics

figure 36. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_{rr}/dt = f(I_c)$



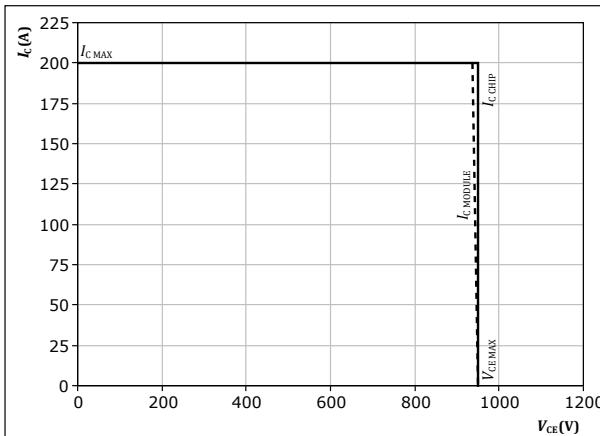
With an inductive load at

$V_{CE} = 600 \text{ V}$ $T_j = 25^\circ\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $T_j = 125^\circ\text{C}$
 $R_{gon} = 8 \Omega$ $T_j = 150^\circ\text{C}$

figure 38. IGBT

Reverse bias safe operating area

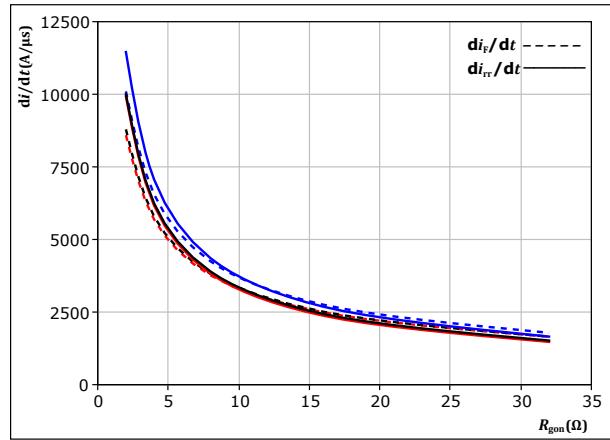
$I_c = f(V_{CE})$



At $T_j = 150^\circ\text{C}$
 $R_{gon} = 8 \Omega$
 $R_{goff} = 8 \Omega$

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

$V_{CE} = 600 \text{ V}$ $T_j = 25^\circ\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $T_j = 125^\circ\text{C}$
 $I_c = 65 \text{ A}$ $T_j = 150^\circ\text{C}$

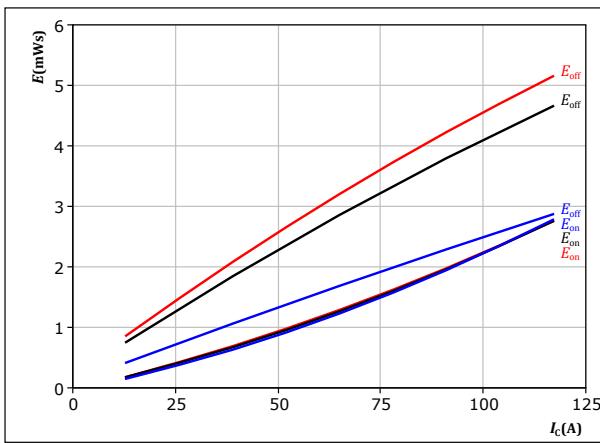


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Outer Boost Switching Characteristics

figure 39. IGBT

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

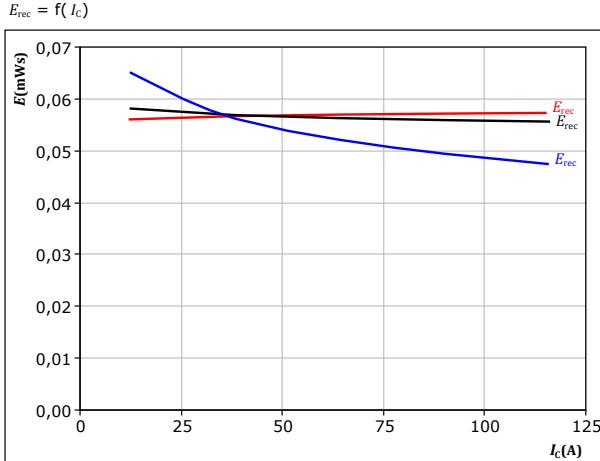


With an inductive load at

$V_{CE} = 600$ V $T_f:$ 25 °C
 $V_{GE} = \pm 15$ V 125 °C
 $R_{gon} = 8$ Ω 150 °C
 $R_{goff} = 8$ Ω

figure 41. FWD

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

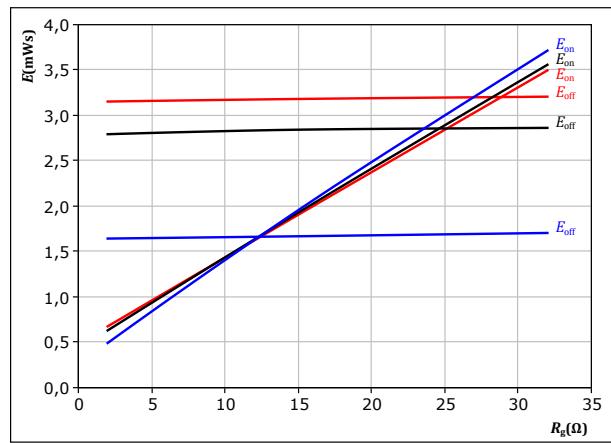


With an inductive load at

$V_{CE} = 600$ V $T_f:$ 25 °C
 $V_{GE} = \pm 15$ V 125 °C
 $R_{gon} = 8$ Ω 150 °C

figure 40. IGBT

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

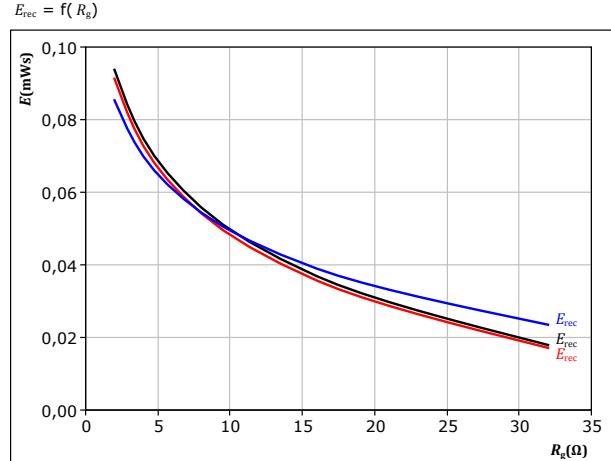


With an inductive load at

$V_{CE} = 600$ V $T_f:$ 25 °C
 $V_{GE} = \pm 15$ V 125 °C
 $I_c = 65$ A 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 $T_f:$ 25 °C
 $V_{GE} = \pm 15$ V 125 °C
 $I_c = 65$ A 150 °C

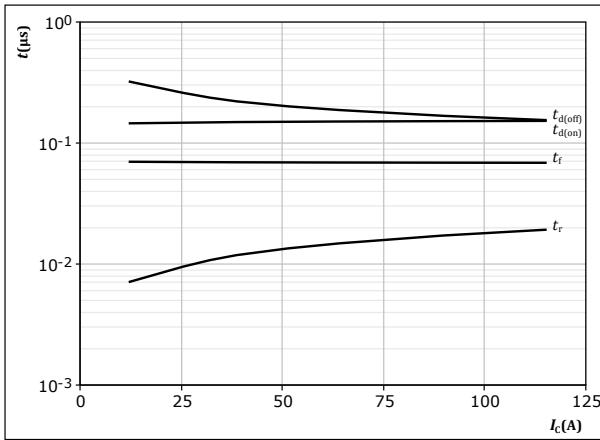


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Outer Boost Switching Characteristics

figure 43. IGBT

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

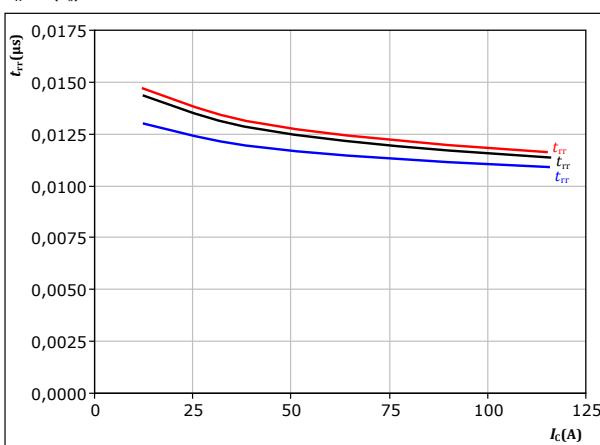


With an inductive load at

$T_j = 150^\circ\text{C}$
 $V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \Omega$
 $R_{goff} = 8 \Omega$

figure 45. FWD

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

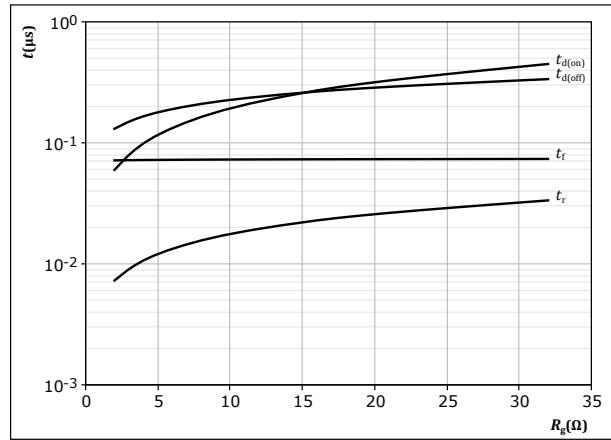


With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \Omega$

figure 44. IGBT

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

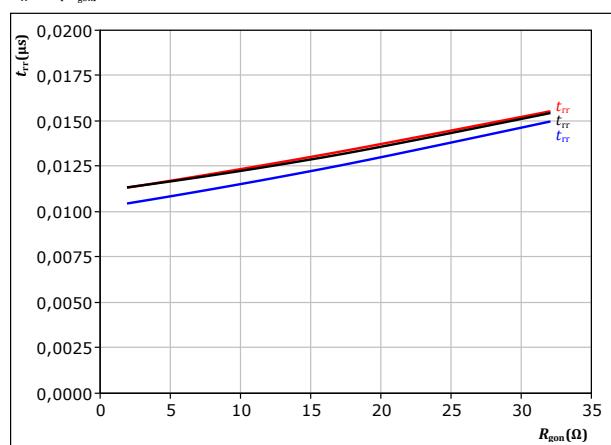


With an inductive load at

$T_j = 150^\circ\text{C}$
 $V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 65 \text{ A}$

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

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 65 \text{ A}$



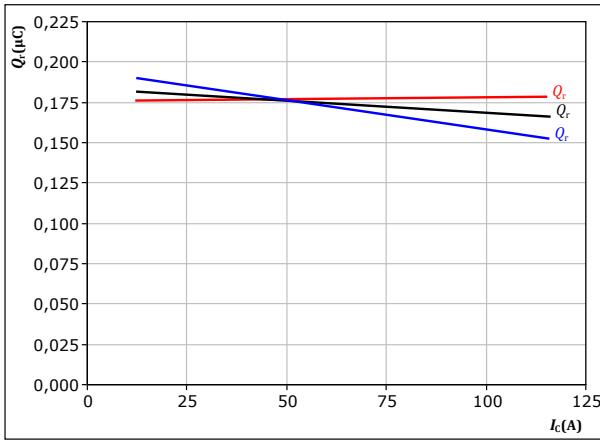
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Outer Boost Switching Characteristics

figure 47.

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

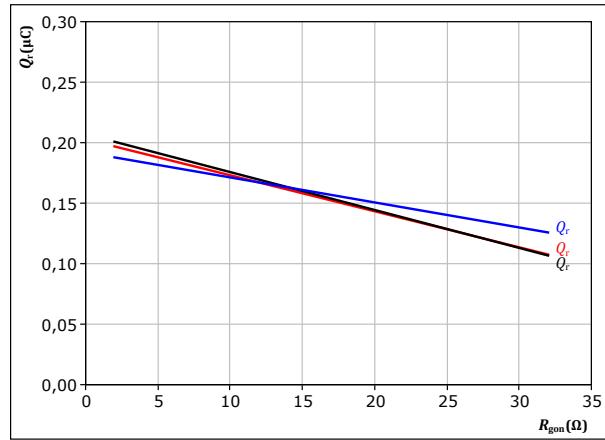
$$\begin{aligned} V_{CE} &= 600 \text{ V} \\ V_{GE} &= \pm 15 \text{ V} \\ R_{gon} &= 8 \Omega \end{aligned}$$

FWD

figure 48.

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

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



With an inductive load at

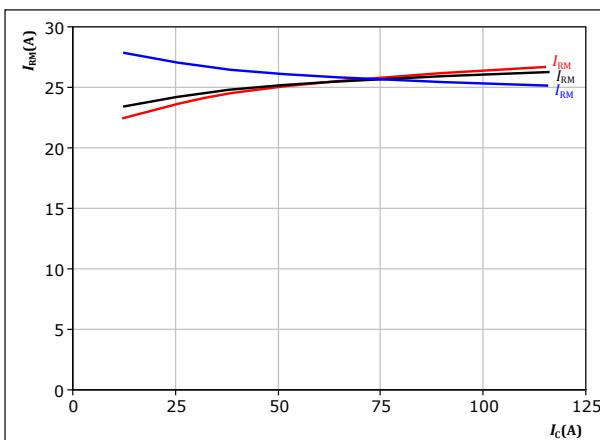
$$\begin{aligned} V_{CE} &= 600 \text{ V} \\ V_{GE} &= \pm 15 \text{ V} \\ I_c &= 65 \text{ A} \end{aligned}$$

FWD

figure 49.

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

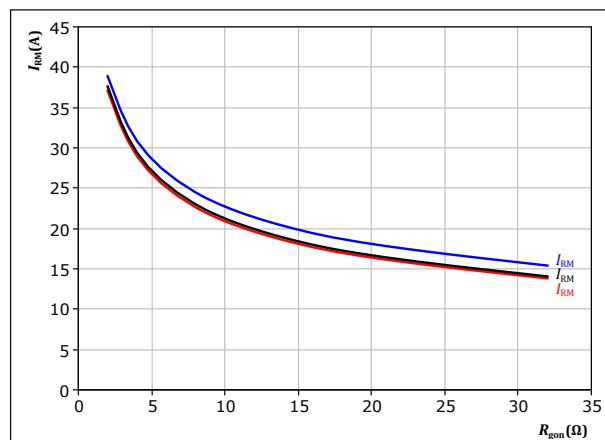
$$\begin{aligned} V_{CE} &= 600 \text{ V} \\ V_{GE} &= \pm 15 \text{ V} \\ R_{gon} &= 8 \Omega \end{aligned}$$

FWD

figure 50.

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

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



With an inductive load at

$$\begin{aligned} V_{CE} &= 600 \text{ V} \\ V_{GE} &= \pm 15 \text{ V} \\ I_c &= 65 \text{ A} \end{aligned}$$

FWD

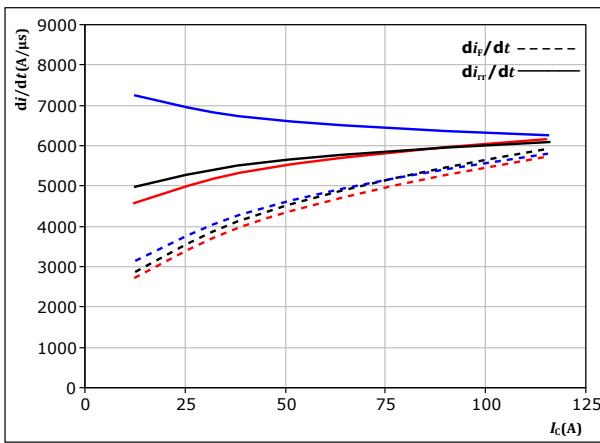


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Outer Boost Switching Characteristics

figure 51. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_{rr}/dt = f(I_c)$

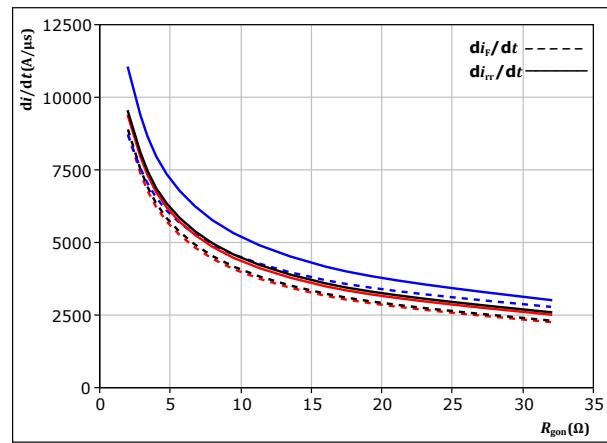


With an inductive load at

$V_{CE} = 600 \text{ V}$ $T_j = 25^\circ\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $T_j = 125^\circ\text{C}$
 $R_{gon} = 8 \Omega$ $T_j = 150^\circ\text{C}$

figure 52. FWD

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



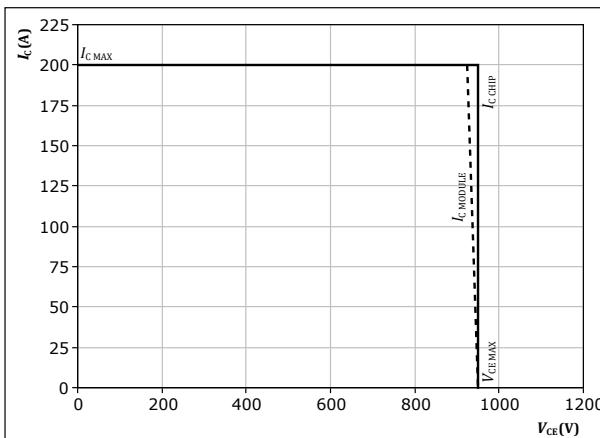
With an inductive load at

$V_{CE} = 600 \text{ V}$ $T_j = 25^\circ\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $T_j = 125^\circ\text{C}$
 $I_c = 65 \text{ A}$ $T_j = 150^\circ\text{C}$

figure 53. IGBT

Reverse bias safe operating area

$I_c = f(V_{CE})$



At $T_j = 150^\circ\text{C}$
 $R_{gon} = 8 \Omega$
 $R_{goff} = 8 \Omega$



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Switching Definitions

figure 54. IGBT

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

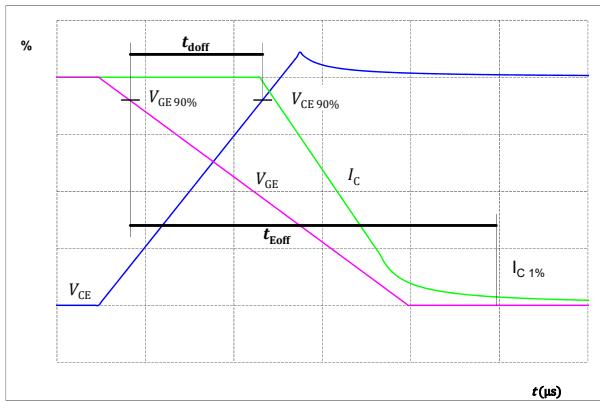


figure 55. IGBT

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

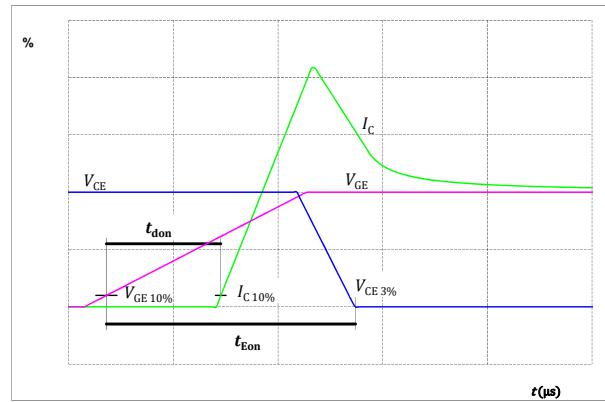


figure 56. IGBT

Turn-off Switching Waveforms & definition of t_f

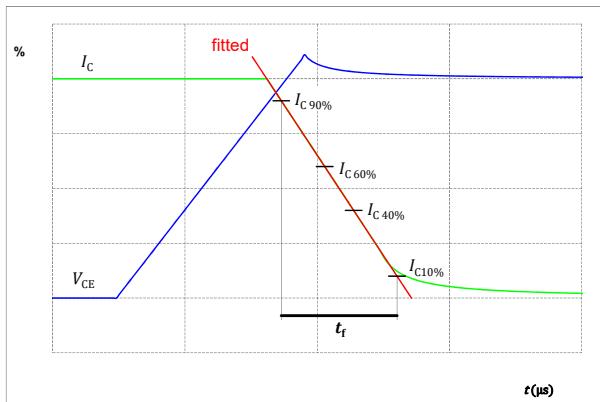
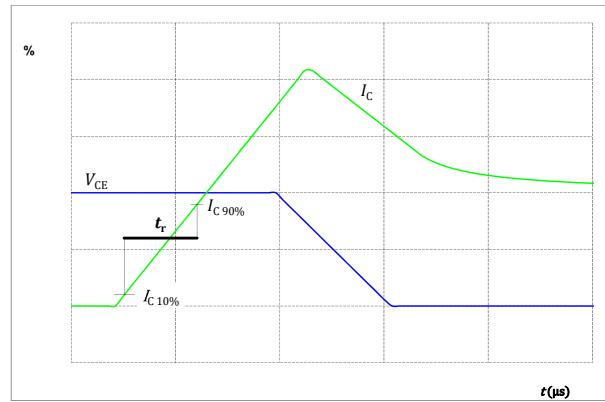


figure 57. IGBT

Turn-on Switching Waveforms & definition of t_r





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Switching Definitions

figure 58.

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

FWD

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

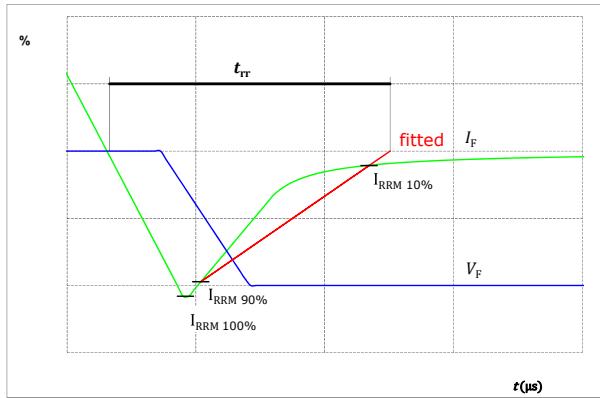
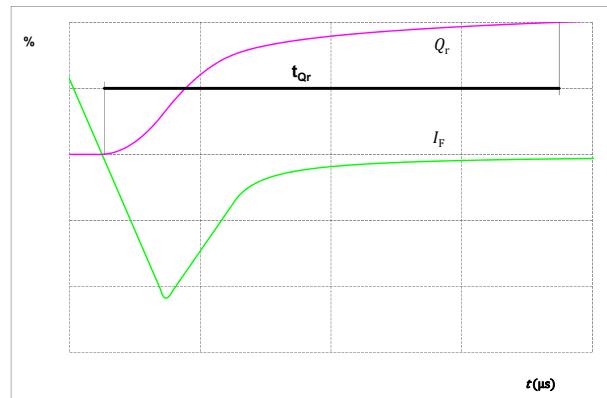


figure 59.

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

FWD

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



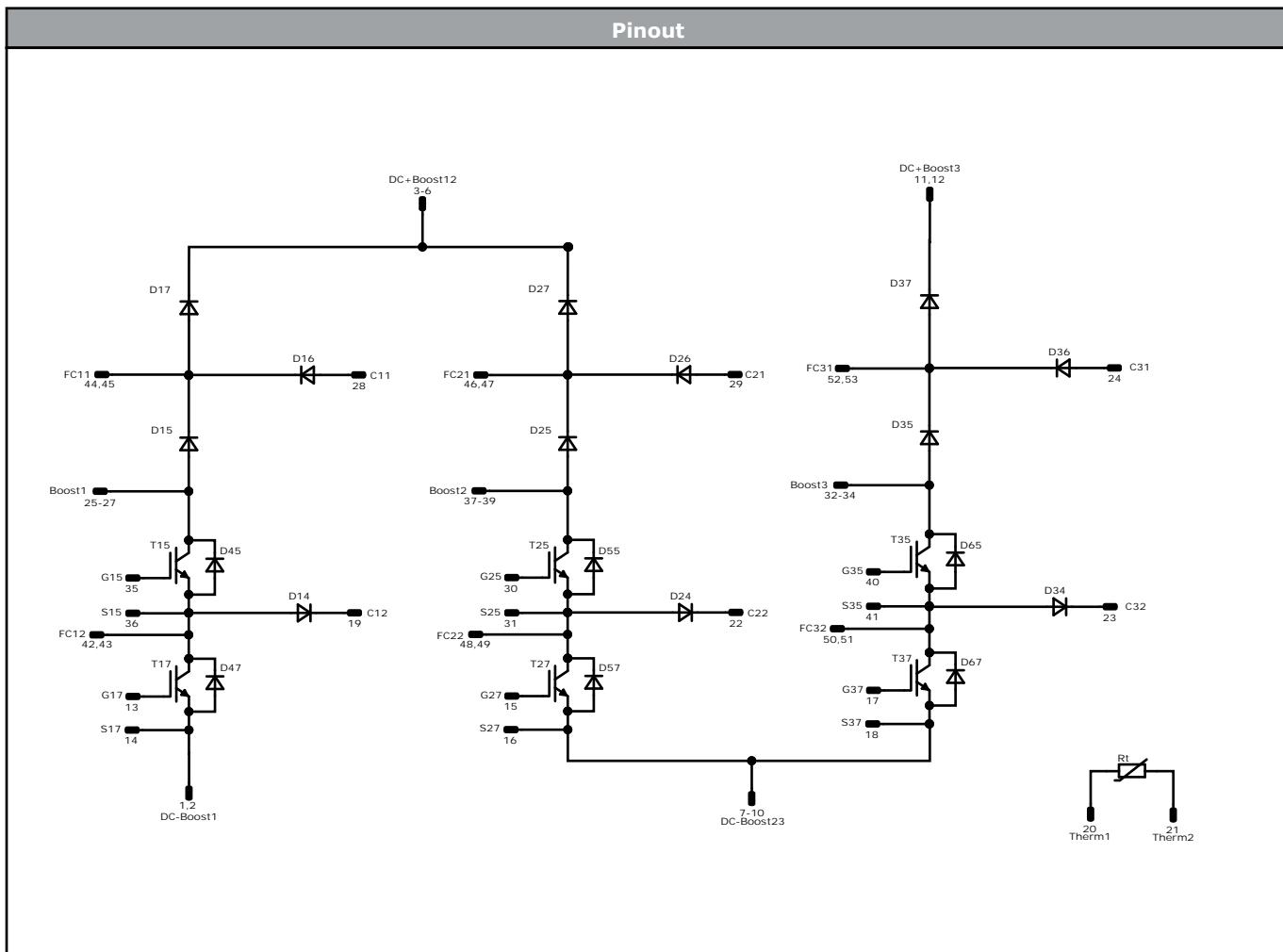


Vincotech

Ordering Code							
Version				Ordering Code			
Without thermal paste				B0-SP103BA100S704-LS69L98T			
With thermal paste (5,2 W/mK, PTM6000HV)				B0-SP103BA100S704-LS69L98T-/7/			
Marking							
		Text	Name	Date code	UL & VIN	Lot	Serial
			NN-NNNNNNNNNNNNN- YYYYYYVV	WWYY	UL VIN	LLLL	SSSS
		Datamatrix	Type&Ver	Lot number	Serial	Date code	
			YYYYYYVV	LLLL	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	0	FC22
21	18,75	30	Therm2	49	31,05	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				



Vincotech



Identification

ID	Component	Voltage	Current	Function	Comment
T15, T25, T35	IGBT	950 V	100 A	Inner Boost Switch	
D15, D25, D35	FWD	1200 V	30 A	Inner Boost Diode	
D45, D55 , D65	FWD	1200 V	35 A	Inner Boost Sw. Protection Diode	
T17, T27, T37	IGBT	950 V	100 A	Outer Boost Switch	
D17, D27, D37	FWD	1200 V	30 A	Outer Boost Diode	
D47, D57, D67	FWD	1200 V	35 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 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-SP103BA100S704-LS69L98T-D3-14	16 Feb. 2023	Correct Isolation voltage	

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As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.