



Vincotech

flowBOOST S3 triple	950 V / 100 A
Features	flow S3 12 mm housing
<ul style="list-style-type: none">• Triple Booster• High Performance Flying Capacitor Topology• Optimized for 1500 V applications• Latest IGBT & SiC Technology• Integrated auxiliary diodes for flying capacitor precharge.• Integrated NTC• Low Inductance Design	
Target applications	Schematic
<ul style="list-style-type: none">• Solar Inverters	
Types	
<ul style="list-style-type: none">• B0-SP103BA100S714-LS60L98T	



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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	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	52	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	188	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10 \text{ ms}$ $T_j = 25^\circ\text{C}$	284	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	141	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	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	52	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	188	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10 \text{ ms}$ $T_j = 25^\circ\text{C}$	284	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	141	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	$C_{o\text{es}}$									
Reverse transfer capacitance	$C_{r\text{es}}$									
Gate charge	Q_g		±15		0	25		230		nC

Thermal

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

Turn-on delay time	$t_{d(\text{on})}$	$R_{\text{gon}} = 8 \Omega$ $R_{\text{goff}} = 8 \Omega$	± 15	600	65	25 125		147,2 147,52		ns
Rise time	t_r					25 125		14,08 16,32		ns
Turn-off delay time	$t_{d(\text{off})}$					25 125		139,84 172,8		ns
Fall time	t_f					25 125		25,43 64,44		ns
Turn-on energy (per pulse)	E_{on}					25 125		1,71 1,78		mWs
Turn-off energy (per pulse)	E_{off}					25 125		1,65 2,78		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				40	25 125 150		1,51 2,03 2,13	1,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_F = 1200$ V			25		120	1000	μ A	

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,67		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=4622$ A/ μ s $di/dt=4037$ A/ μ s	± 15	600	65	25 125		23,55 23,6		A
Reverse recovery time	t_{rr}					25 125		14,26 14,7		ns
Recovered charge	Q_r					25 125		0,171 0,171		μ C
Reverse recovered energy	E_{rec}					25 125		0,029 0,031		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125		4241 3833		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

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	$C_{o\text{es}}$									
Reverse transfer capacitance	$C_{r\text{es}}$									
Gate charge	Q_g		±15		0	25		230		nC

Thermal

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

Turn-on delay time	$t_{d(\text{on})}$	$R_{\text{gon}} = 8 \Omega$ $R_{\text{goff}} = 8 \Omega$	± 15	600	65	25 125		147,84 148,8		ns
Rise time	t_r					25 125		12,8 14,08		ns
Turn-off delay time	$t_{d(\text{off})}$					25 125		144,64 177,92		ns
Fall time	t_f					25 125		31,79 55,25		ns
Turn-on energy (per pulse)	E_{on}					25 125		1,4 1,47		mWs
Turn-off energy (per pulse)	E_{off}					25 125		1,74 2,83		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				40	25 125 150		1,51 2,03 2,13	1,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_F = 1200$ V			25		120	1000	μ A	

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,67		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=5513$ A/ μ s $di/dt=4820$ A/ μ s	± 15	600	65	25 125		28,7 28,5		A
Reverse recovery time	t_{rr}					25 125		13,14 13,78		ns
Recovered charge	Q_r					25 125		0,162 0,158		μ C
Reverse recovered energy	E_{rec}					25 125		0,032 0,032		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125		6350 5602		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]	T_j [°C]	Min	Typ	

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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Vincotech

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 R_{100}	$A_{R/R}$	$R_{100} = 1484 \Omega$				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

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

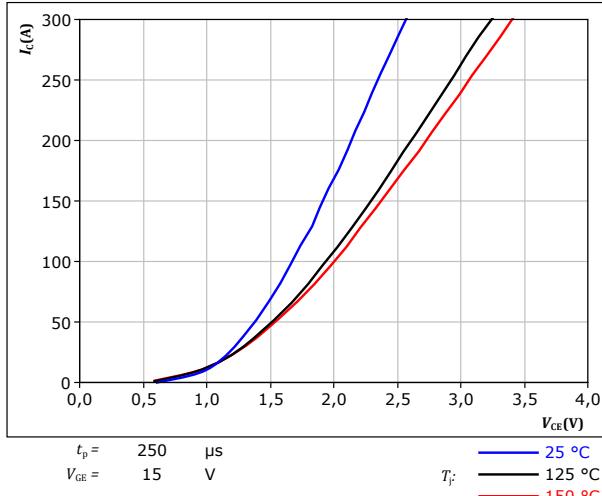


figure 2. IGBT

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

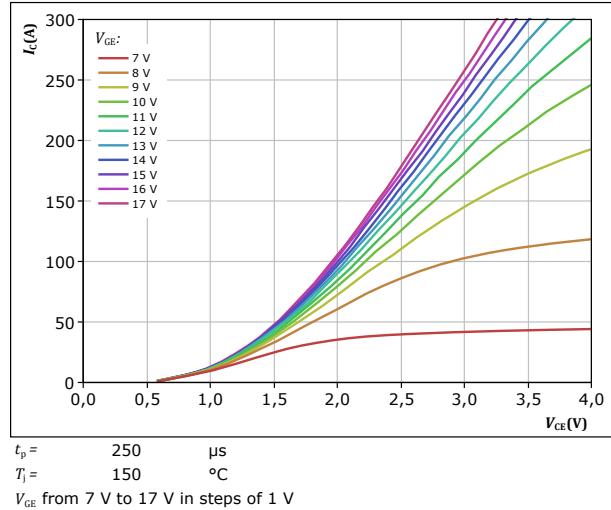


figure 3. IGBT

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

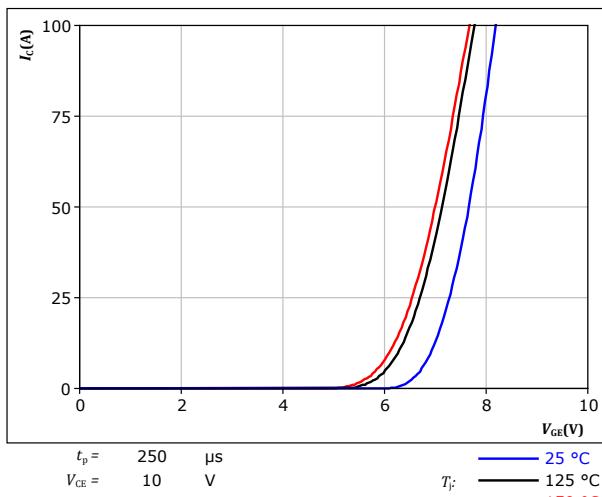
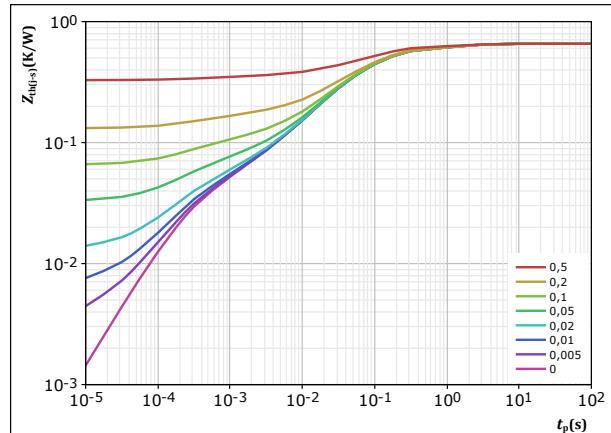


figure 4. IGBT

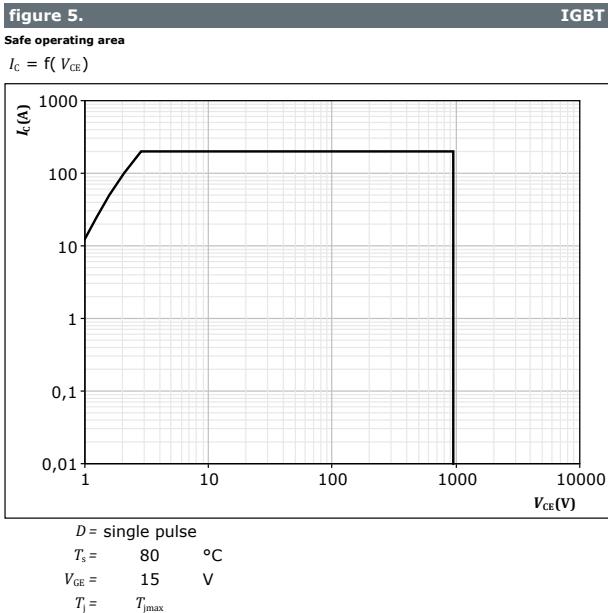
Transient thermal impedance as a function of pulse width

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



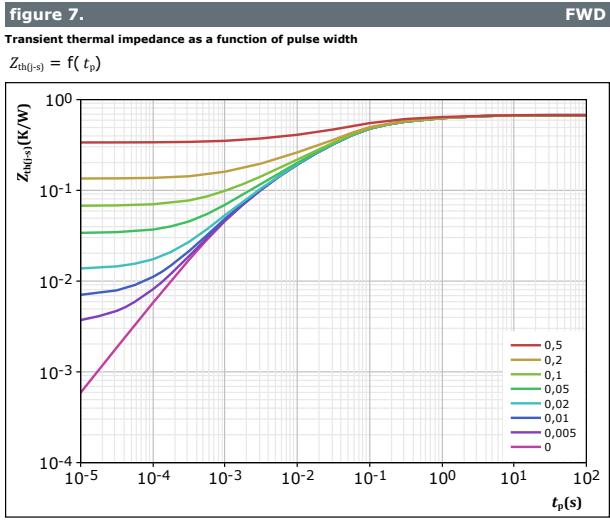
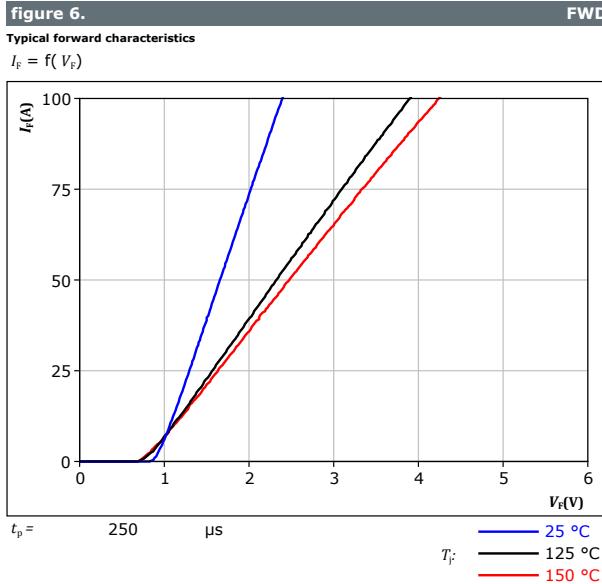


Inner Boost Switch Characteristics

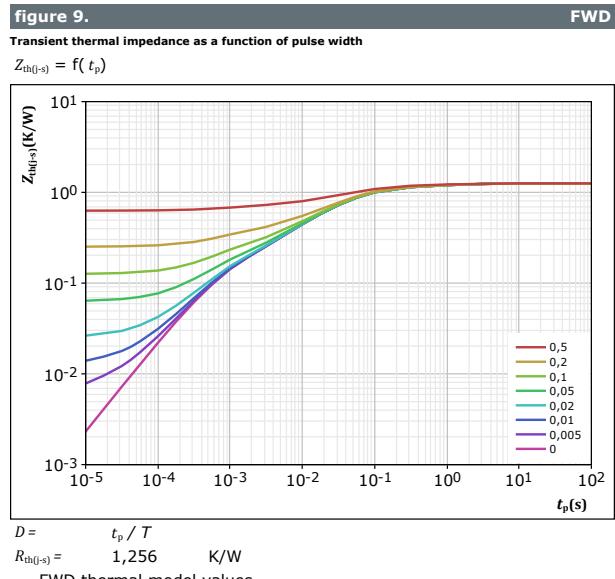
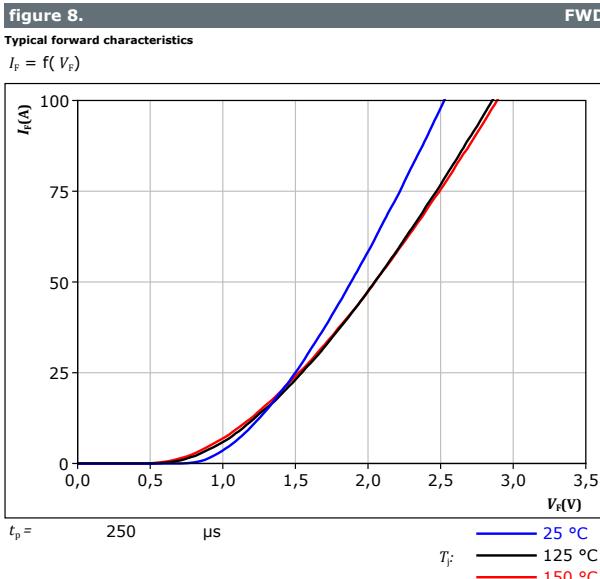




Inner Boost Diode Characteristics



Inner Boost Sw. Protection Diode Characteristics





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Outer Boost Switch Characteristics

figure 10. IGBT

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

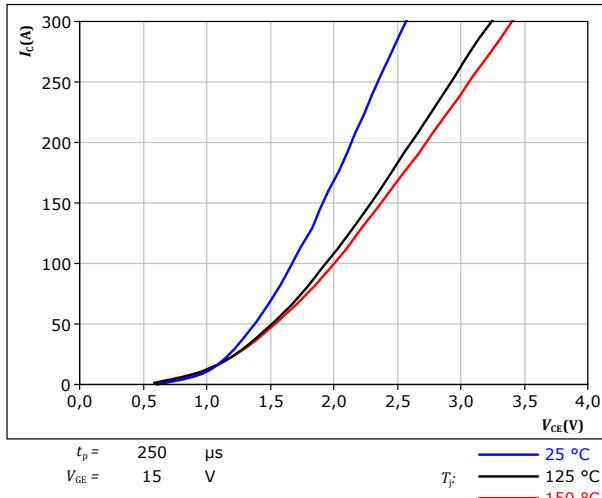


figure 11. IGBT

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

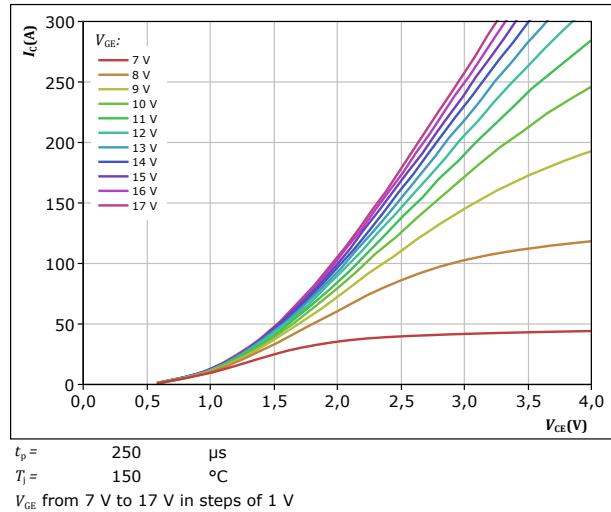


figure 12. IGBT

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

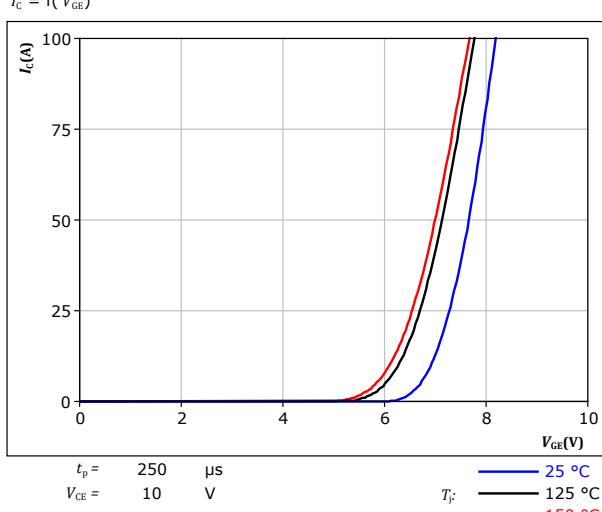
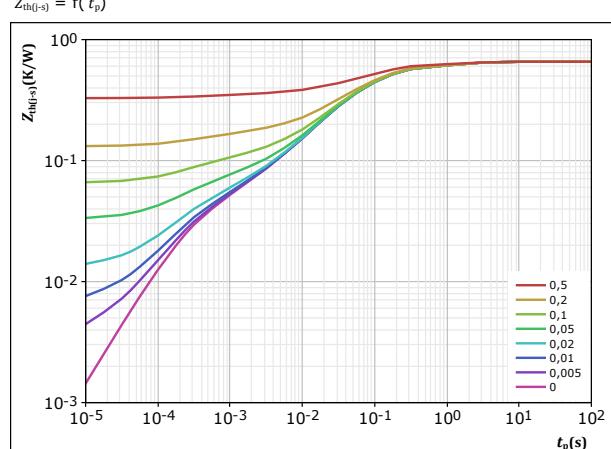


figure 13. IGBT

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



$$D = \frac{t_p}{T}$$

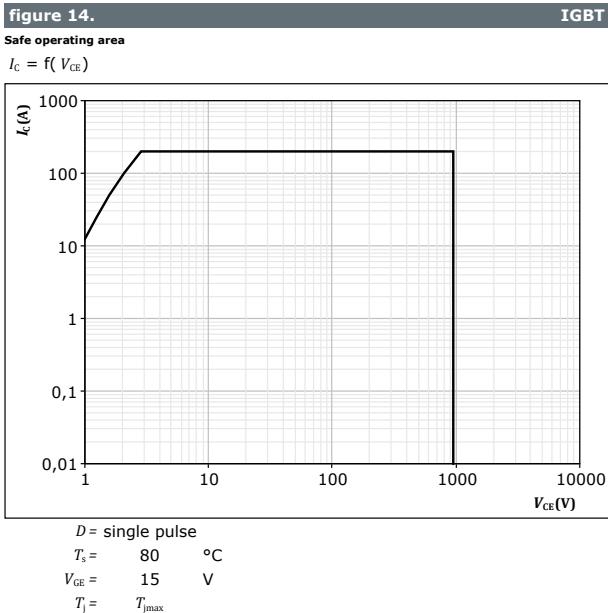
$$R_{th(j-s)} = 0,656 \text{ K/W}$$

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





Outer Boost Diode Characteristics

figure 15.

Typical forward characteristics

$$I_F = f(V_F)$$

FWD

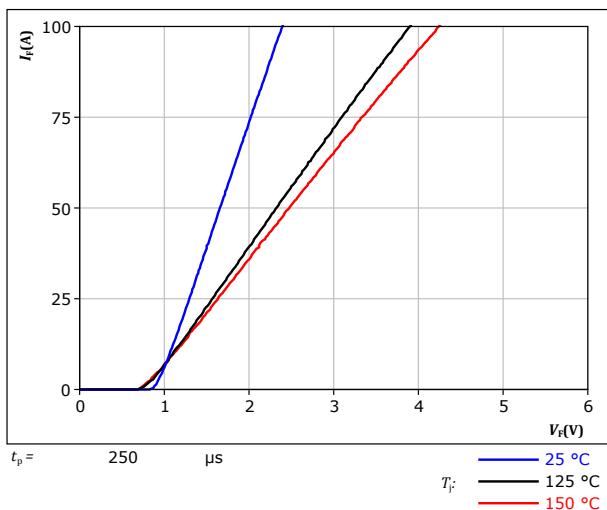
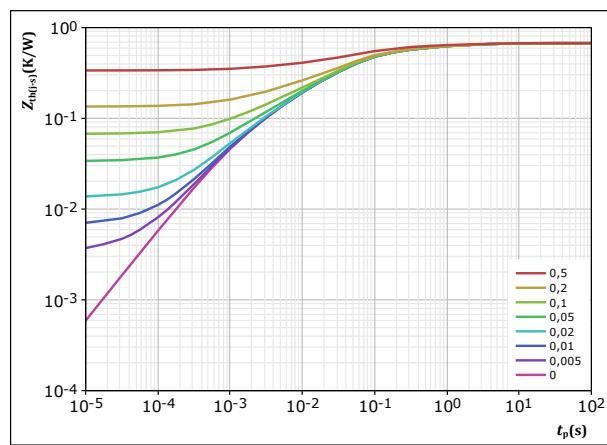


figure 16.

Transient thermal impedance as a function of pulse width

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

FWD



$$D = \frac{t_p / T}{R_{th(j-s)}} = 0,674 \text{ K/W}$$

FWD thermal model values

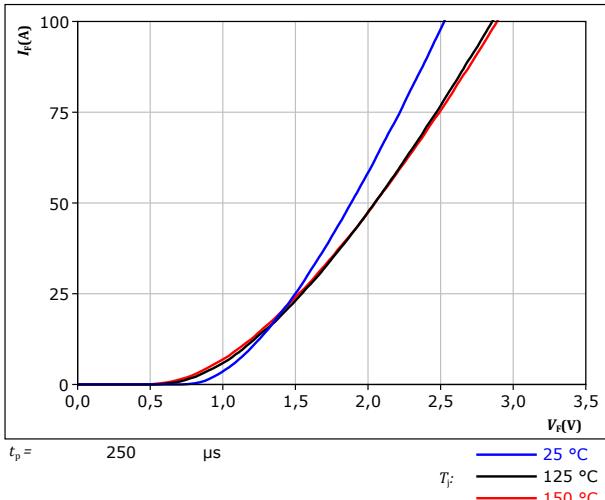
R (K/W)	τ (s)
6,19E-02	2,66E+00
1,12E-01	3,55E-01
3,32E-01	5,39E-02
1,25E-01	7,89E-03
4,31E-02	1,17E-03

Outer Boost Sw. Protection Diode Characteristics

figure 17.

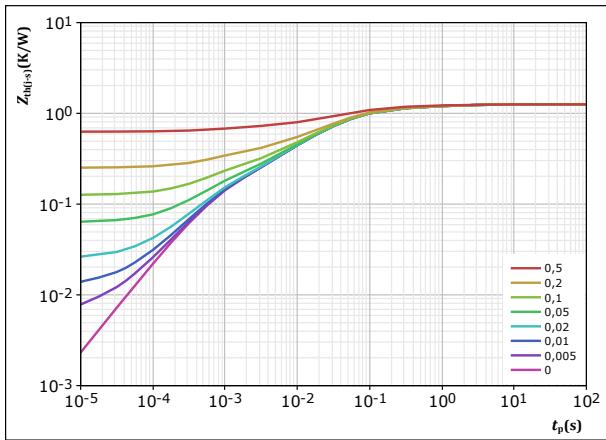
Typical forward characteristics

$$I_F = f(V_F)$$

**FWD****figure 18.**

Transient thermal impedance as a function of pulse width

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

**FWD**

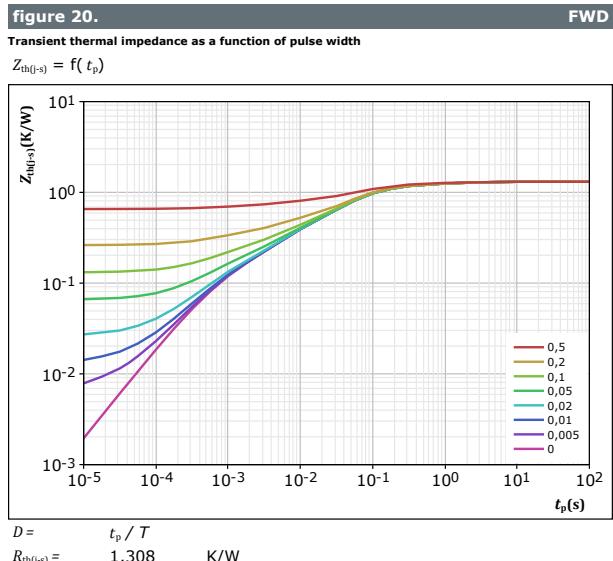
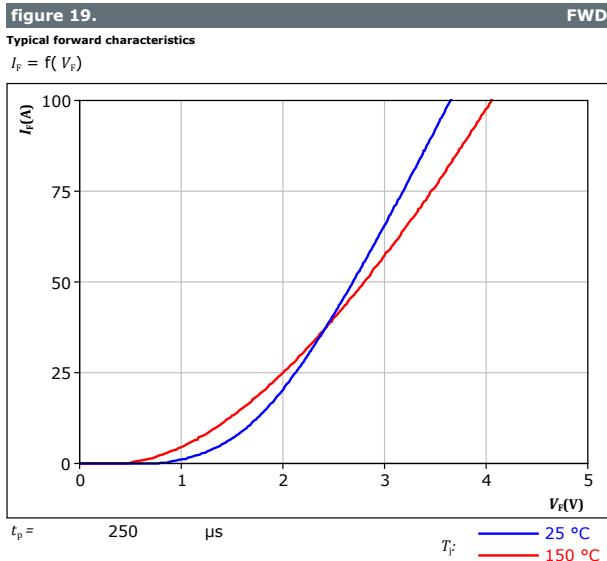
$$D = \frac{t_p / T}{1,256} \quad K/W$$

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

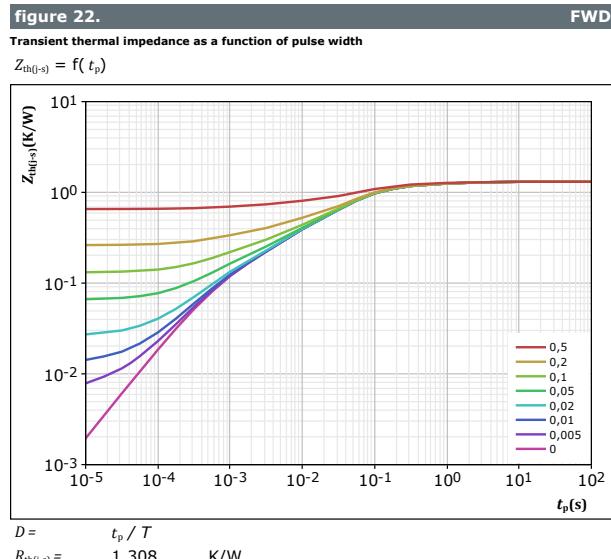
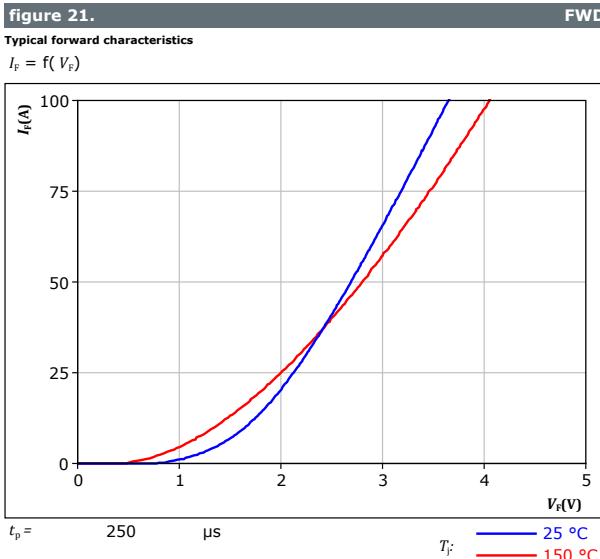


Aux Diode H Characteristics



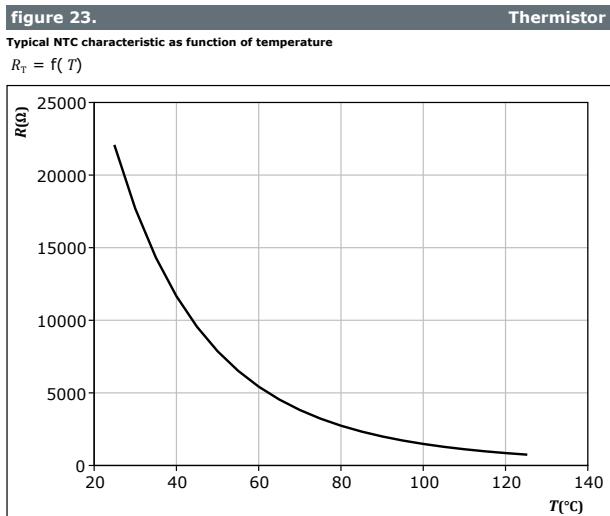


Aux Diode L Characteristics





Thermistor Characteristics





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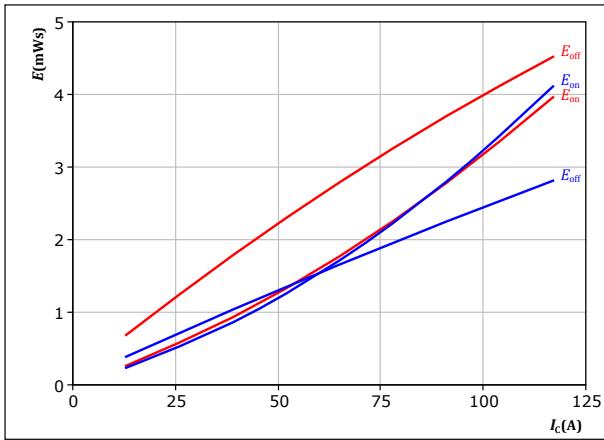
Inner Boost Switching Characteristics

figure 24.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



With an inductive load at

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

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

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

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

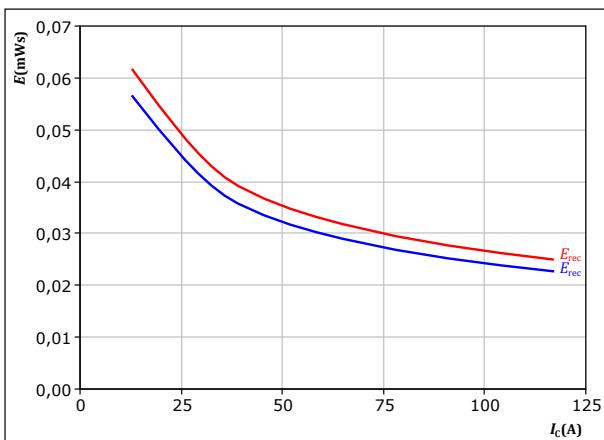
$$T_f: \quad \text{---} \quad 25^\circ\text{C} \quad \text{---} \quad 125^\circ\text{C}$$

figure 26.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

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

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

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

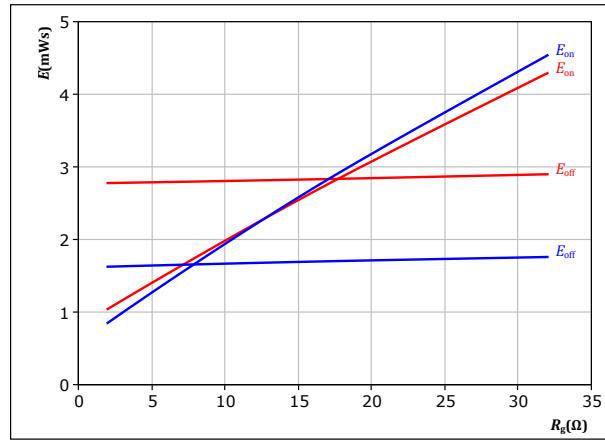
$$T_f: \quad \text{---} \quad 25^\circ\text{C} \quad \text{---} \quad 125^\circ\text{C}$$

figure 25.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

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

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

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

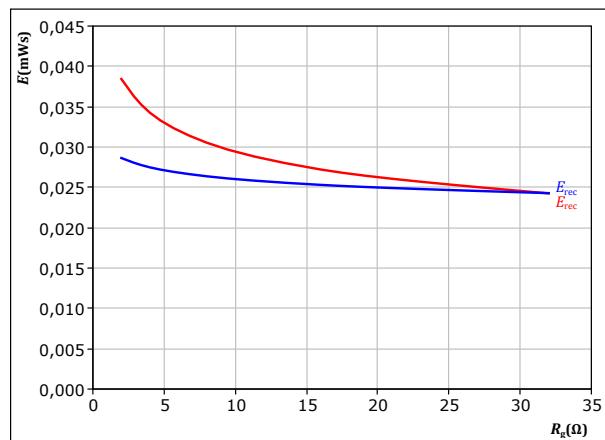
$$T_f: \quad \text{---} \quad 25^\circ\text{C} \quad \text{---} \quad 125^\circ\text{C}$$

figure 27.

FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

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

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

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

$$T_f: \quad \text{---} \quad 25^\circ\text{C} \quad \text{---} \quad 125^\circ\text{C}$$

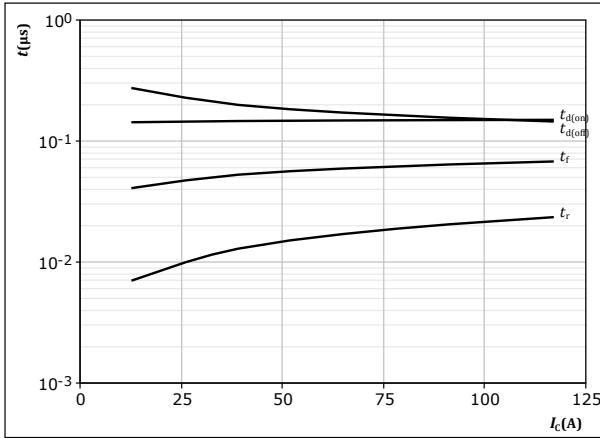


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Inner Boost Switching Characteristics

figure 28. IGBT

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

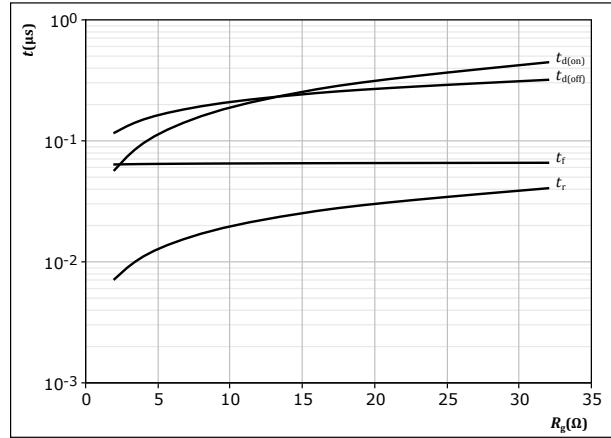


With an inductive load at

$T_j =$	125	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

figure 29. IGBT

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

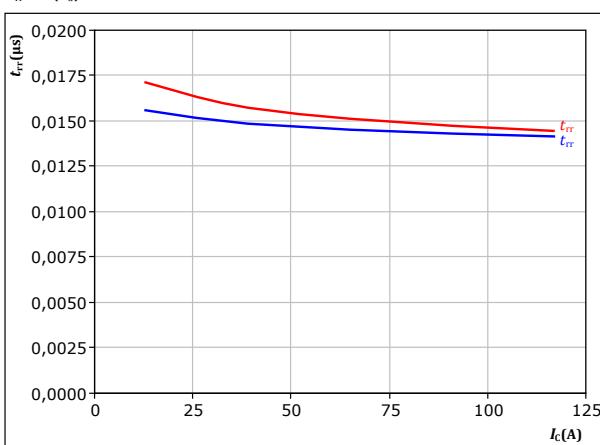


With an inductive load at

$T_j =$	125	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$I_C =$	65	A

figure 30. FWD

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

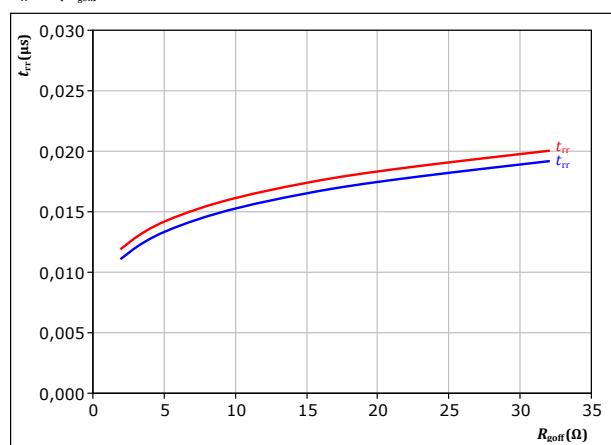


With an inductive load at

$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{gon} =$	8	Ω

figure 31. FWD

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



With an inductive load at
 $T_j =$ 25 °C (blue)
125 °C (red)



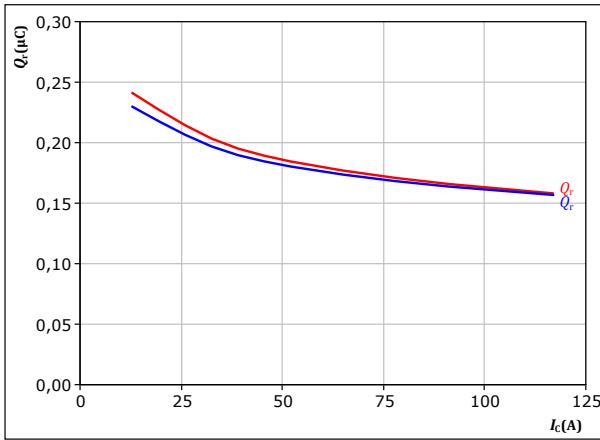
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Inner Boost Switching Characteristics

figure 32. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

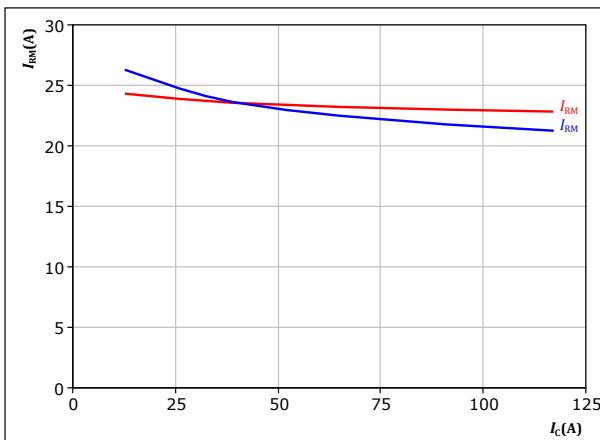
$$\begin{aligned} V_{CE} &= 600 \quad V \\ V_{GE} &= \pm 15 \quad V \\ R_{gon} &= 8 \quad \Omega \end{aligned}$$

$$T_f: \quad \text{---} \quad 25 \text{ }^{\circ}\text{C} \quad \text{---} \quad 125 \text{ }^{\circ}\text{C}$$

figure 34. FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

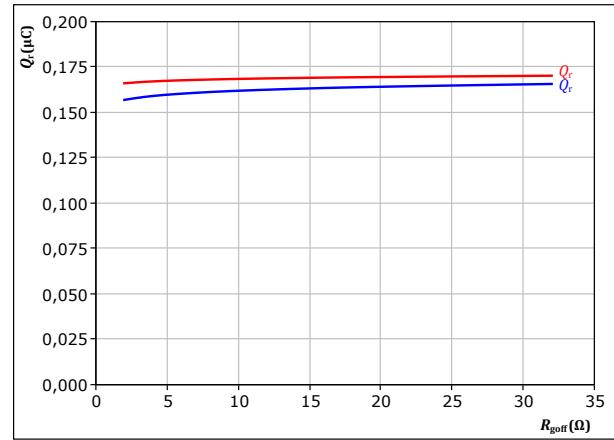
$$\begin{aligned} V_{CE} &= 600 \quad V \\ V_{GE} &= \pm 15 \quad V \\ R_{gon} &= 8 \quad \Omega \end{aligned}$$

$$T_f: \quad \text{---} \quad 25 \text{ }^{\circ}\text{C} \quad \text{---} \quad 125 \text{ }^{\circ}\text{C}$$

figure 33. FWD

Typical recovered charge as a function of turn off gate resistor

$$Q_r = f(R_{go\bar{f}})$$



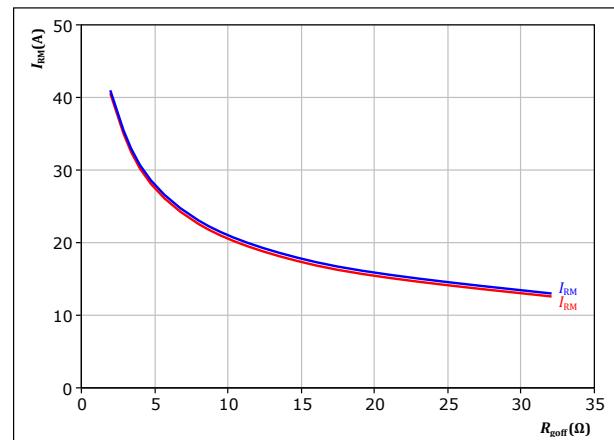
With an inductive load at

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

figure 35. FWD

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

$$I_{RM} = f(R_{go\bar{f}})$$



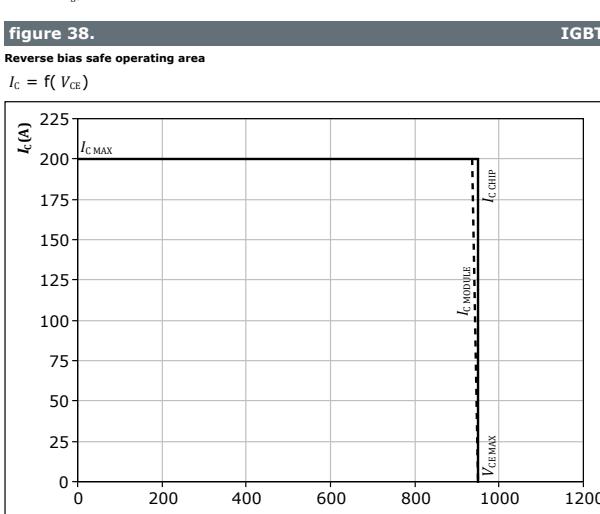
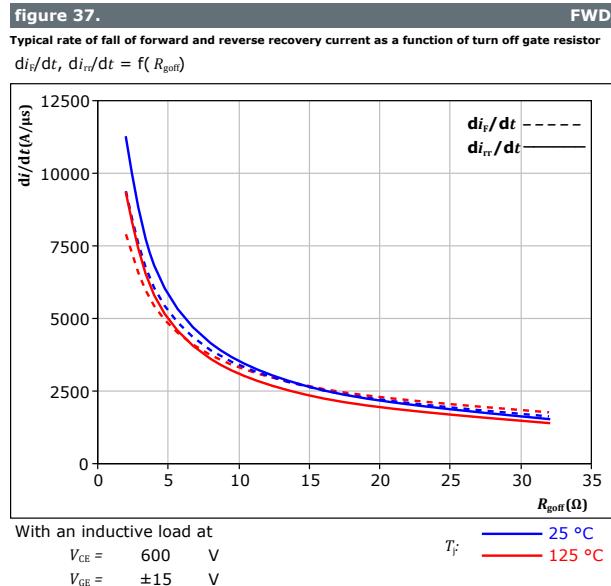
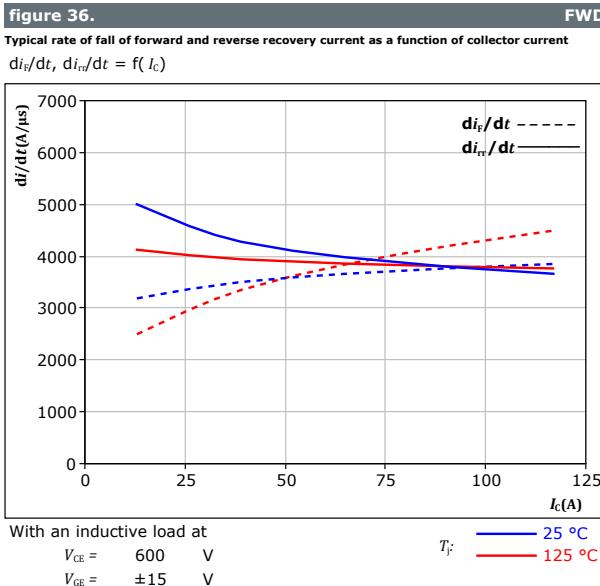
With an inductive load at

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



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Inner Boost Switching Characteristics



At $T_j = 125^\circ\text{C}$

$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

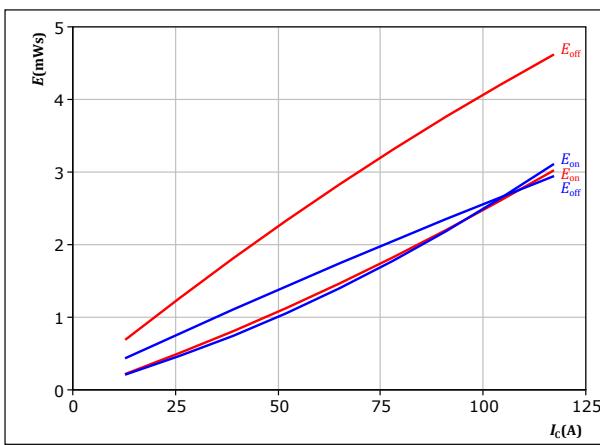


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Outer Boost Switching Characteristics

figure 39.

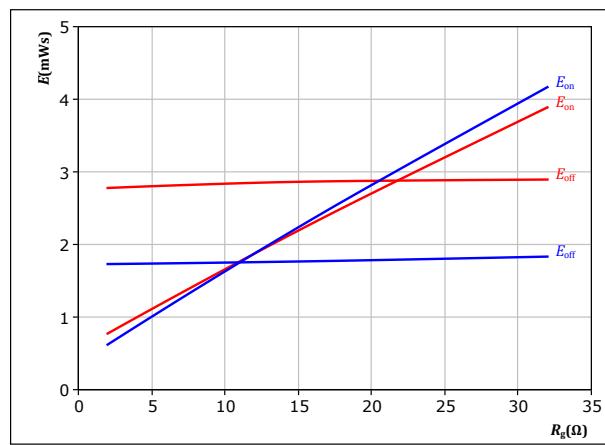
Typical switching energy losses as a function of collector current
 $E = f(I_c)$



IGBT

figure 40.

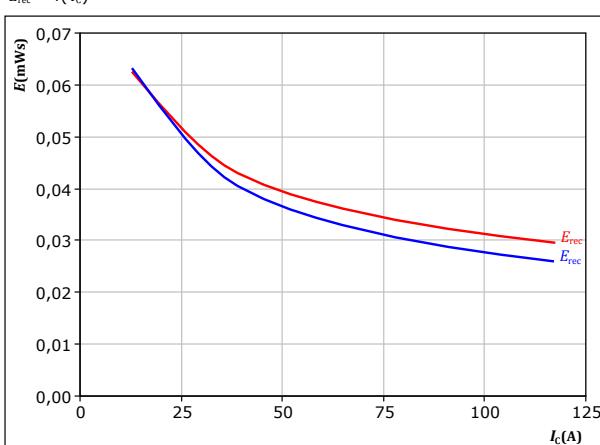
Typical switching energy losses as a function of gate resistor
 $E = f(R_g)$



IGBT

figure 41.

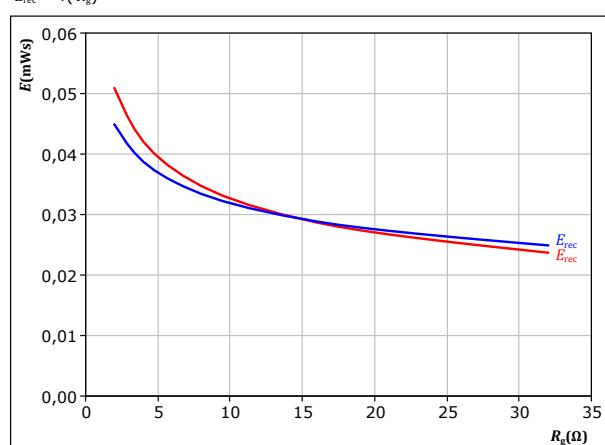
Typical reverse recovered energy loss as a function of collector current
 $E_{rec} = f(I_c)$



FWD

figure 42.

Typical reverse recovered energy loss as a function of gate resistor
 $E_{rec} = f(R_g)$



FWD

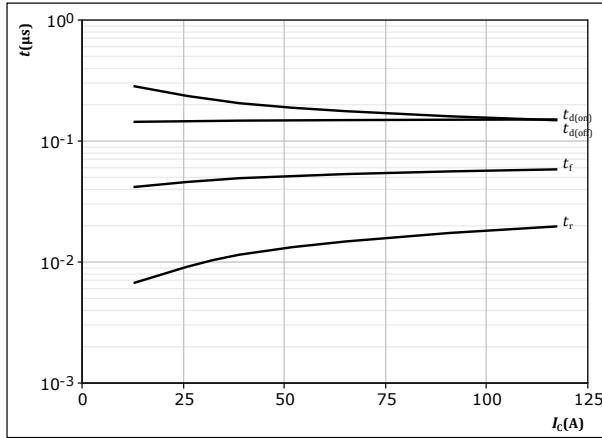


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Outer Boost Switching Characteristics

figure 43. IGBT

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

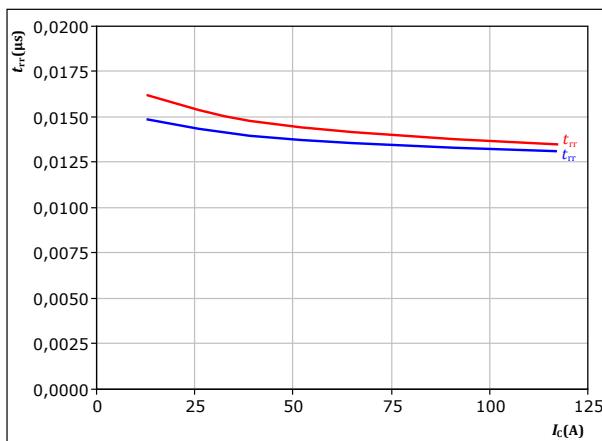


With an inductive load at

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

figure 45. FWD

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

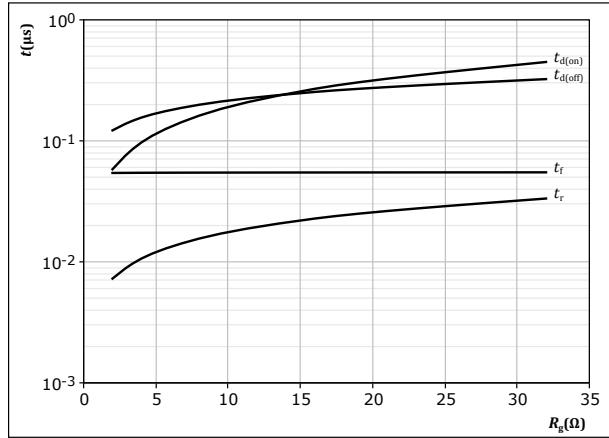


With an inductive load at

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

figure 44. IGBT

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

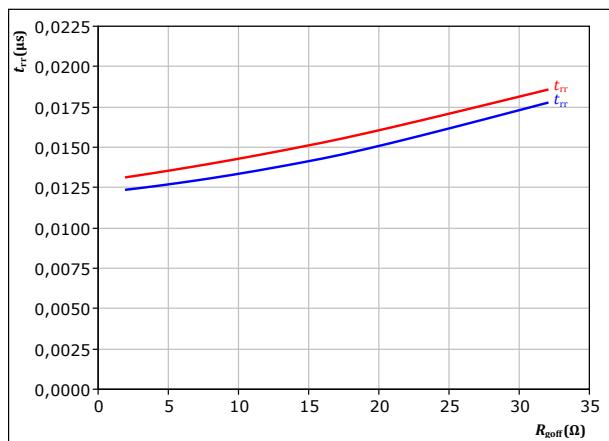


With an inductive load at

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

figure 46. FWD

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



With an inductive load at

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



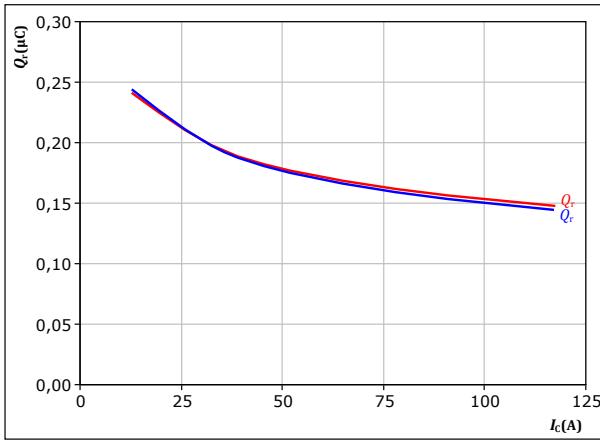
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Outer Boost Switching Characteristics

figure 47.

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

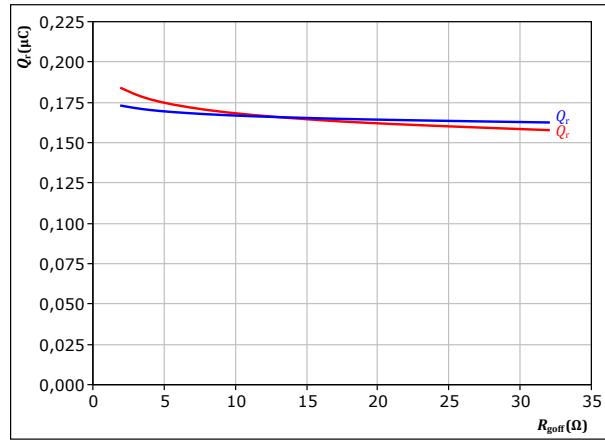
$$\begin{aligned} V_{CE} &= 600 \text{ V} \\ V_{GE} &= \pm 15 \text{ V} \\ R_{gon} &= 8 \Omega \end{aligned}$$

FWD

figure 48.

Typical recovered charge as a function of turn off gate resistor

$$Q_r = f(R_{go\bar{n}})$$



With an inductive load at

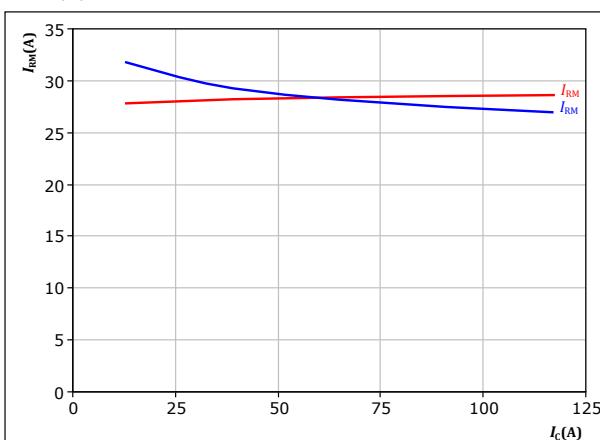
$$\begin{aligned} V_{CE} &= 600 \text{ V} \\ V_{GE} &= \pm 15 \text{ V} \\ I_c &= 65 \text{ A} \end{aligned}$$

FWD

figure 49.

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

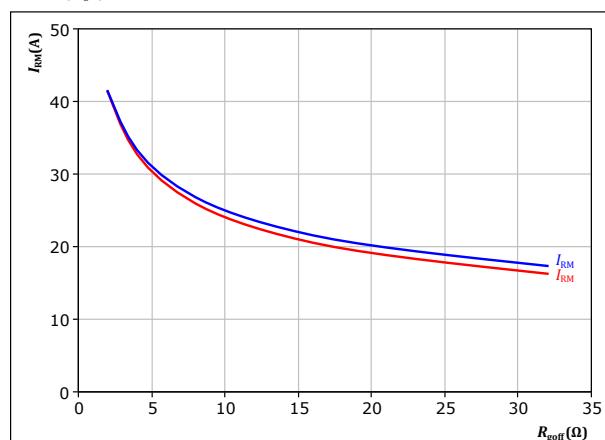
$$\begin{aligned} V_{CE} &= 600 \text{ V} \\ V_{GE} &= \pm 15 \text{ V} \\ R_{gon} &= 8 \Omega \end{aligned}$$

FWD

figure 50.

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

$$I_{RM} = f(R_{go\bar{n}})$$



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

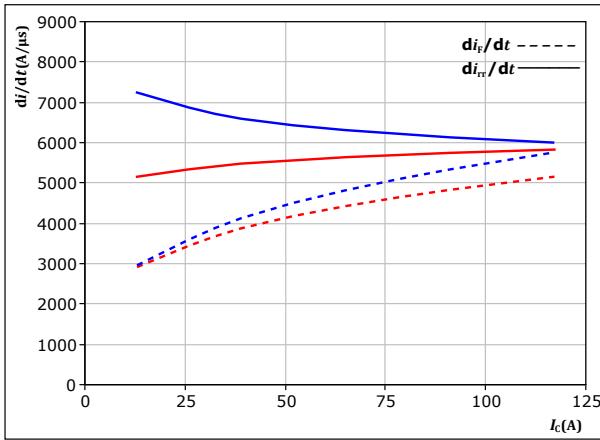


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Outer Boost Switching Characteristics

figure 51. FWD

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



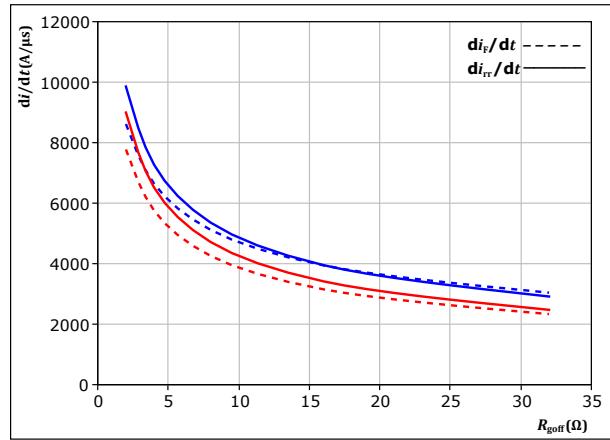
With an inductive load at

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

$T_j = 25^\circ\text{C}$ (blue line)
 $T_j = 125^\circ\text{C}$ (red line)

figure 52. FWD

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



With an inductive load at

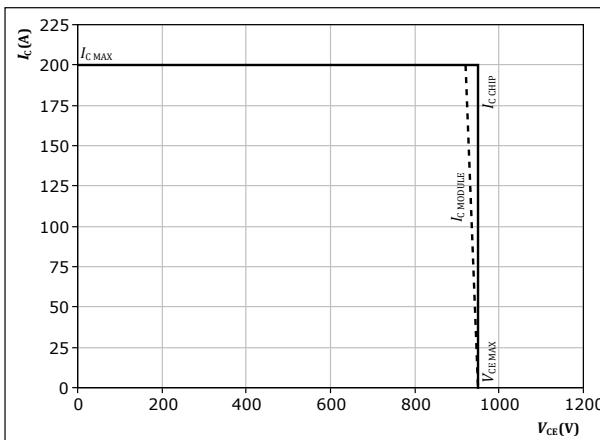
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 65 \text{ A}$

$T_j = 25^\circ\text{C}$ (blue line)
 $T_j = 125^\circ\text{C}$ (red line)

figure 53. IGBT

Reverse bias safe operating area

$I_c = f(V_{CE})$



At $T_j = 125^\circ\text{C}$
 $R_{gon} = 8 \Omega$
 $R_{goff} = 8 \Omega$



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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})

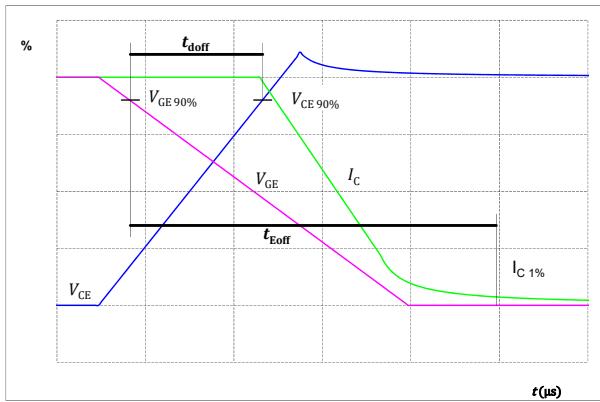


figure 56. IGBT

Turn-off Switching Waveforms & definition of t_f

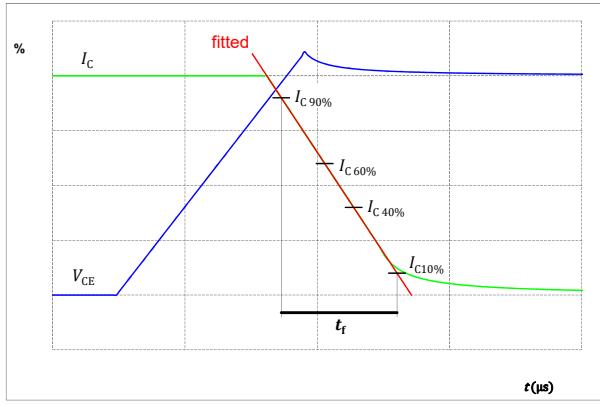


figure 55. IGBT

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

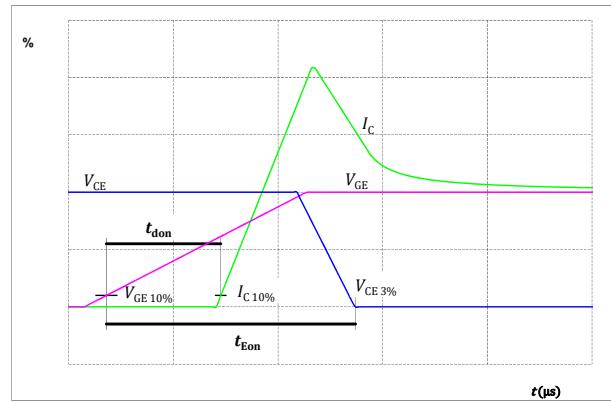
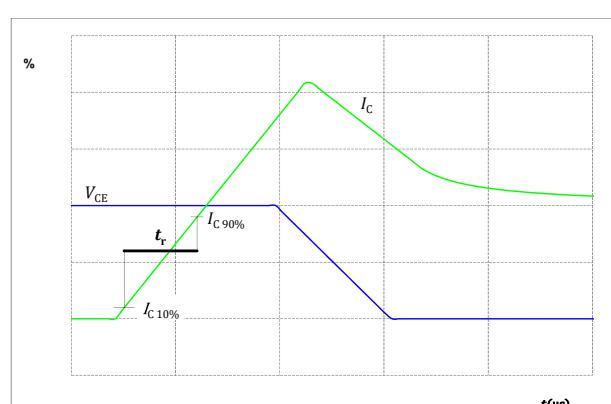


figure 57. IGBT

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}

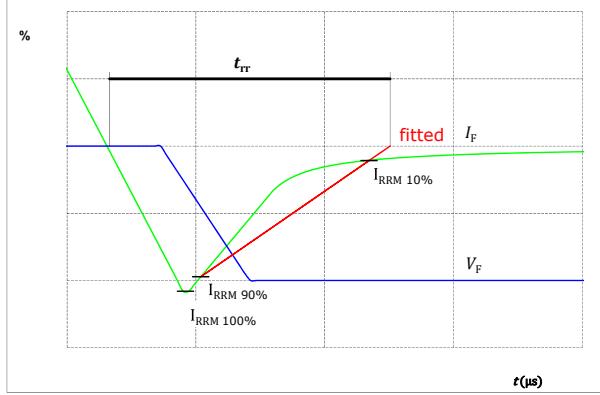
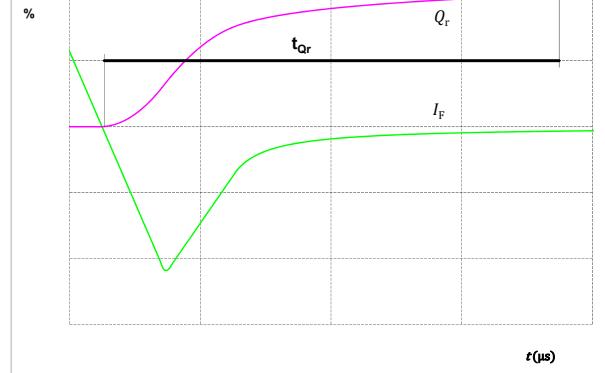


figure 59.

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)



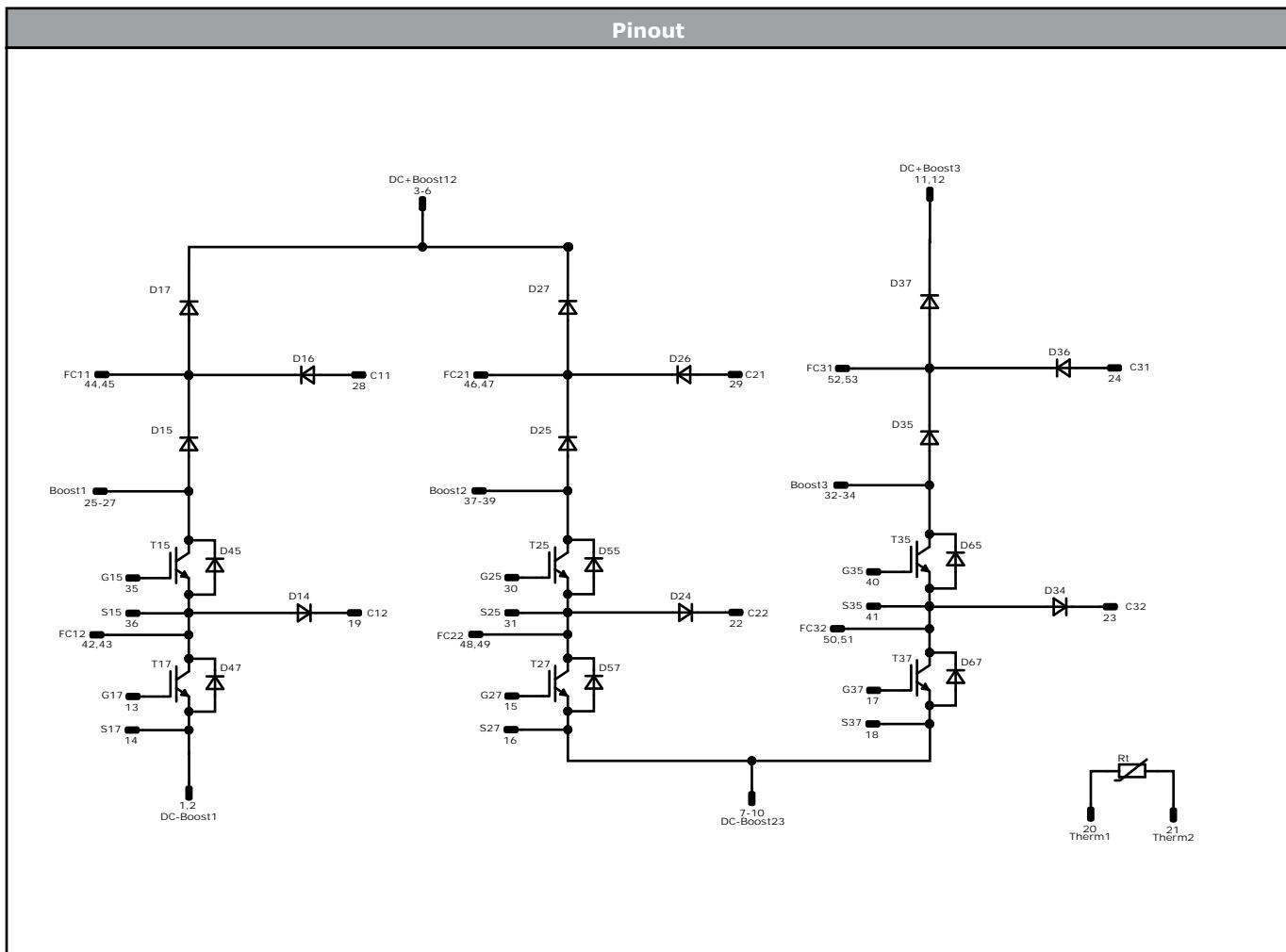


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Ordering Code							
Version				Ordering Code			
With thermal paste (5,2 W/mK, PTM6000HV)				BO-SP103BA100S714-LS60L98T-/7/			
Marking							
 	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNNN- TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code		
		TTTTTTVV	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	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				



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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	40 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	40 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	



Vincotech

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-SP103BA100S714-LS60L98T-D2-14	16 Jan. 2022	Remove Capacitors	

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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.