



Vincotech

# B0-SL10B2A200S705-PA58L96Z

datasheet

flowBOOST S3 dual

950 V / 200 A

## Topology features

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

## Component features

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

## Housing features

- Base isolation:  $\text{Al}_2\text{O}_3$
- CTI600 housing material
- Compact, baseplate-less housing
- VINcoPress Technology
- Thermo-mechanical push-and-pull force relief
- Solder pin

## Target applications

- Energy Storage Systems
- Solar Inverters

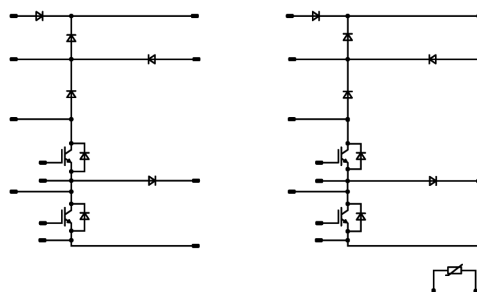
## Types

- B0-SL10B2A200S705-PA58L96Z

## 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)	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	145	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	400	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	276	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Maximum junction temperature	$T_{jmax}$		175	°C

### Inner Boost Diode

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	82	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	267	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 110\text{ °C}$	387	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	173	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)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	67	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	150	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	120	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)	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	145	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	400	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	276	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Maximum junction temperature	$T_{jmax}$		175	°C

### Outer Boost Diode

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	82	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	267	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 110\text{ °C}$	387	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	173	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)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	67	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	150	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	120	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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### Aux Diode H

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	43	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	270	A
Surge current capability	$I^2t$		365	A <sup>2</sup> s
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	91	W
Maximum junction temperature	$T_{jmax}$		175	°C

### Aux Diode L

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	43	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	270	A
Surge current capability	$I^2t$		365	A <sup>2</sup> s
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	91	W
Maximum junction temperature	$T_{jmax}$		175	°C

### ByPass Diode

Peak repetitive reverse voltage	$V_{RRM}$		1800	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	85	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	600	A
Surge current capability	$I^2t$		1800	A <sup>2</sup> s
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	108	W
Maximum junction temperature	$T_{jmax}$		150	°C





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## Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
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## Module Properties

### Thermal Properties

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

### Isolation Properties

Isolation voltage	$V_{\text{isol}}$	DC Test Voltage* $t_p = 2\text{ s}$	6800	V
Creepage distance			10,39	mm
Clearance			10,39	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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00334	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		200	25 125 150		1,83 2,06 2,11	2,35 <sup>(1)</sup>	V
Collector-emitter cut-off current	$I_{CES}$		0	950		25			4	µA
Gate-emitter leakage current	$I_{GES}$		20	0		25			200	nA
Internal gate resistance	$r_g$							0,75		Ω
Input capacitance	$C_{ies}$	$f = 100 \text{ kHz}$	0	25		25		13000		pF
Output capacitance	$C_{oes}$							278		pF
Reverse transfer capacitance	$C_{res}$							40		pF
Gate charge	$Q_g$		±15		0	25		460		nC

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (PTM)						0,34		K/W
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#### Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	±15	600	135	25 125 150		260,62 258,45 257,59		ns
Rise time	$t_r$					25 125 150		26,24 29,77 30,71		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		199,42 234,7 241,48		ns
Fall time	$t_f$					25 125 150		26,27 52,16 61,01		ns
Turn-on energy (per pulse)	$E_{on}$	$Q_{tFWD} = 0,377 \mu\text{C}$ $Q_{tFWD} = 0,381 \mu\text{C}$ $Q_{tFWD} = 0,384 \mu\text{C}$				25 125 150		6 5,83 6		mWs
Turn-off energy (per pulse)	$E_{off}$					25 125 150		3,6 6 6,76		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		1,39 1,58 1,74	2 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_i = 1200$ V				25		15	1500	µA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,55		K/W
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#### Dynamic

Peak recovery current	$I_{RM}$	$di/dt=3542$ A/µs $di/dt=4666$ A/µs $di/dt=5143$ A/µs	$\pm 15$	600	135	25 125 150		37,79 37,76 37,3		A
Reverse recovery time	$t_{rr}$					25 125 150		16,83 16,94 17,03		ns
Recovered charge	$Q_r$					25 125 150		0,377 0,381 0,384		µC
Reverse recovered energy	$E_{rec}$					25 125 150		0,051 0,052 0,052		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6496,31 7837,72 7324,28		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	$V_F$				75	25 125 150		1,74 1,83 1,84	2,15 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_i = 1200$ V				25			55	μA

**Thermal**

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,79		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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00334	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		200	25 125 150		1,83 2,06 2,11	2,35 <sup>(1)</sup>	V
Collector-emitter cut-off current	$I_{CES}$		0	950		25			4	μA
Gate-emitter leakage current	$I_{GES}$		20	0		25			200	nA
Internal gate resistance	$r_g$							0,75		Ω
Input capacitance	$C_{ies}$	$f = 100 \text{ kHz}$	0	25		25		13000		pF
Output capacitance	$C_{oes}$							278		pF
Reverse transfer capacitance	$C_{res}$							40		pF
Gate charge	$Q_g$		±15		0	25		460		nC

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (PTM)						0,34		K/W
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#### Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	±15	600	135	25 125 150		260,62 258,45 257,59		ns
Rise time	$t_r$					25 125 150		26,24 29,77 30,71		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		199,42 234,7 241,48		ns
Fall time	$t_f$					25 125 150		26,27 52,16 61,01		ns
Turn-on energy (per pulse)	$E_{on}$					25 125 150		6 5,83 6		mWs
Turn-off energy (per pulse)	$E_{off}$					25 125 150		3,6 6 6,76		mWs



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datasheet

## Characteristic Values

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

### Outer Boost Diode

#### Static

Forward voltage	$V_F$				60	25 125 150		1,39 1,58 1,74	2 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_i = 1200$ V				25		15	1500	µA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,55		K/W
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#### Dynamic

Peak recovery current	$I_{RM}$	$di/dt=3542$ A/µs $di/dt=4666$ A/µs $di/dt=5143$ A/µs	$\pm 15$	600	135	25 125 150		37,79 37,76 37,3		A
Reverse recovery time	$t_{rr}$					25 125 150		16,83 16,94 17,03		ns
Recovered charge	$Q_r$					25 125 150		0,377 0,381 0,384		µC
Reverse recovered energy	$E_{rec}$					25 125 150		0,051 0,052 0,052		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6496,31 7837,72 7324,28		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	$V_F$				75	25 125 150		1,74 1,83 1,84	2,15 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_r = 1200$ V				25			55	μA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,79		K/W
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### Aux Diode H

#### Static

Forward voltage	$V_F$				50	25 125 150		2,22 2,31 2,21	2,54 <sup>(1)</sup> 2,5 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_r = 1200$ V				25 150			60 8800	μA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,04		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	

### Aux Diode L

#### Static

Forward voltage	$V_F$				50	25 125 150		2,22 2,31 2,21	2,54 <sup>(1)</sup> 2,5 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_r = 1200$ V				25 150		4400	60 8800	μA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,04		K/W
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### ByPass Diode

#### Static

Forward voltage	$V_F$				50	25 125 150		1,12 1,1 1,08	1,2 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_r = 1800$ V				25 150			10 1500	μA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,65		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	

<sup>(1)</sup> Value at chip level

<sup>(2)</sup> Only valid with pre-applied Vincotech thermal interface material.



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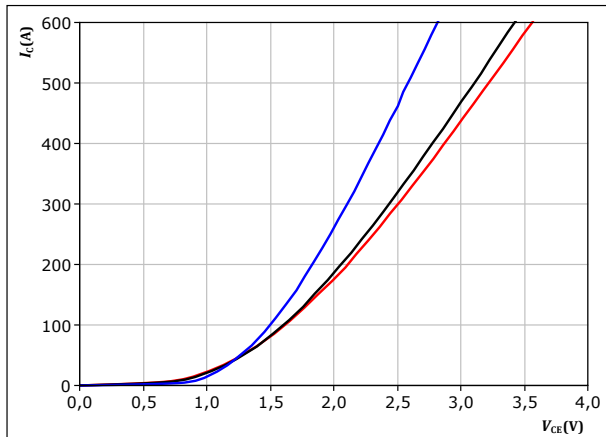
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## Inner Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

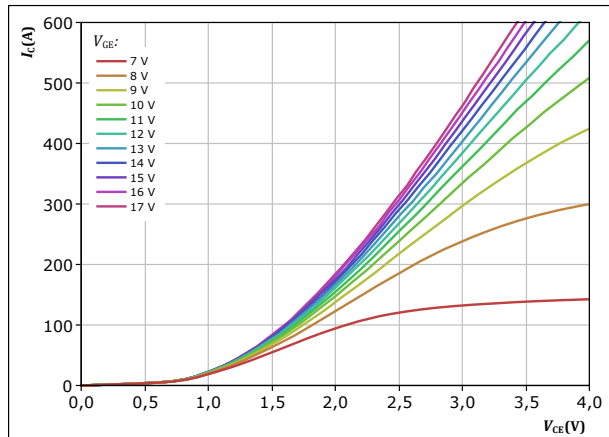


$t_p = 250 \mu s$   
 $V_{GE} = 15 V$   
 $T_j:$  25 °C, 125 °C, 150 °C

figure 2. IGBT

Typical output characteristics

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

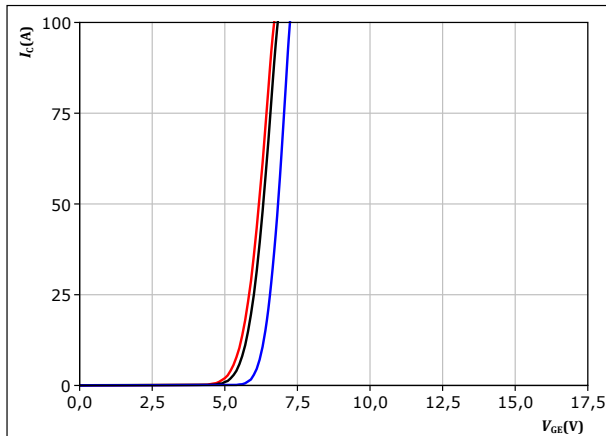


$t_p = 250 \mu s$   
 $T_j = 150 \text{ } ^\circ C$   
 $V_{GE}$  from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

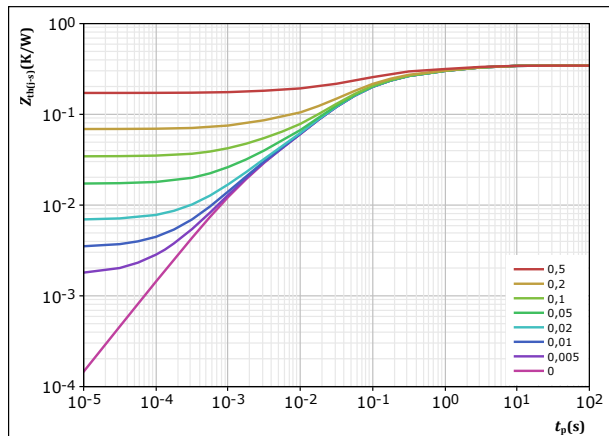


$t_p = 250 \mu s$   
 $V_{CE} = 8 V$   
 $T_j:$  25 °C, 125 °C, 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$   
 $R_{th(j-s)} = 0.344 \text{ K/W}$   
IGBT thermal model values  

$R \text{ (K/W)}$	$\tau \text{ (s)}$
3.51E-02	3.52E+00
6.84E-02	7.05E-01
1.60E-01	8.54E-02
6.50E-02	1.97E-02
1.61E-02	1.73E-03



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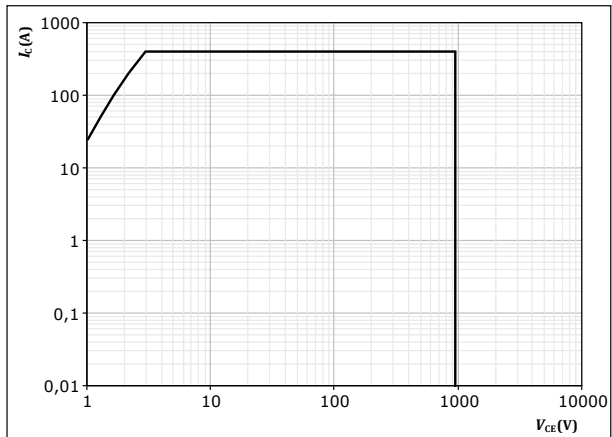
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## Inner Boost Switch Characteristics

**figure 5.** IGBT

Safe operating area

$I_C = f(V_{CE})$



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$

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

$T_j = T_{jmax}$



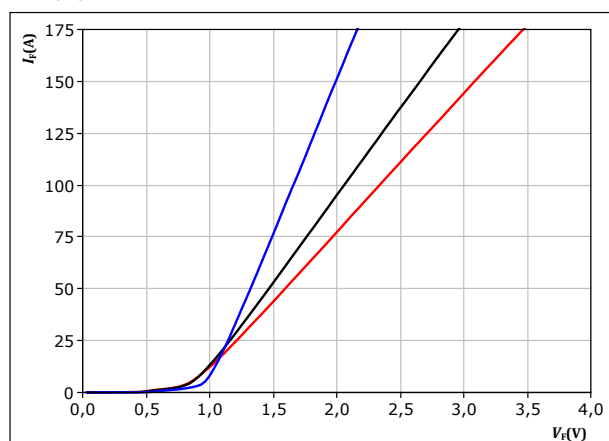
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## Inner Boost Diode Characteristics

figure 6. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

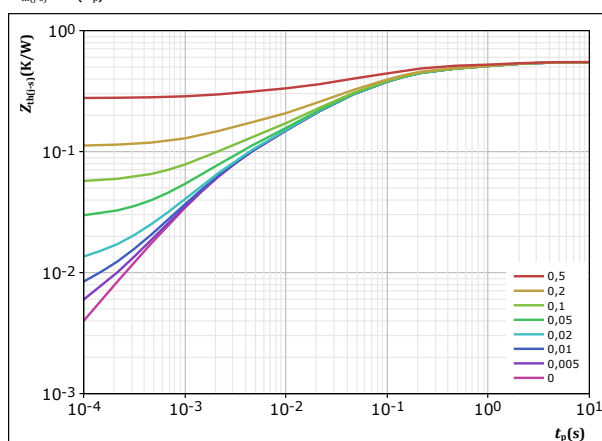
$T_j$ :

- 25 °C
- 125 °C
- 150 °C

figure 7. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,55 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
8,50E-03	1,82E+01
9,03E-02	1,06E+00
2,46E-01	9,28E-02
1,46E-01	1,82E-02
6,17E-02	2,07E-03



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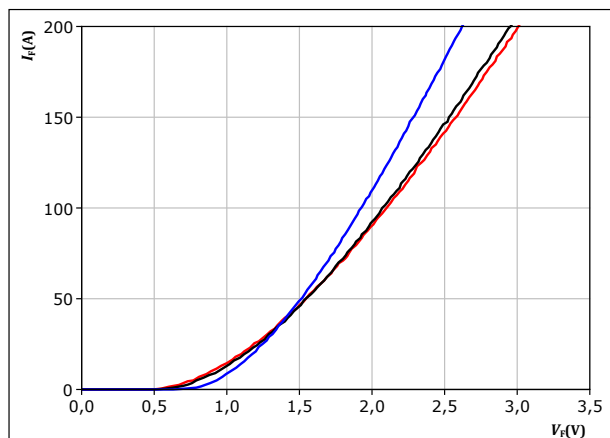
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## Inner Boost Sw. Protection Diode Characteristics

**figure 8.** FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

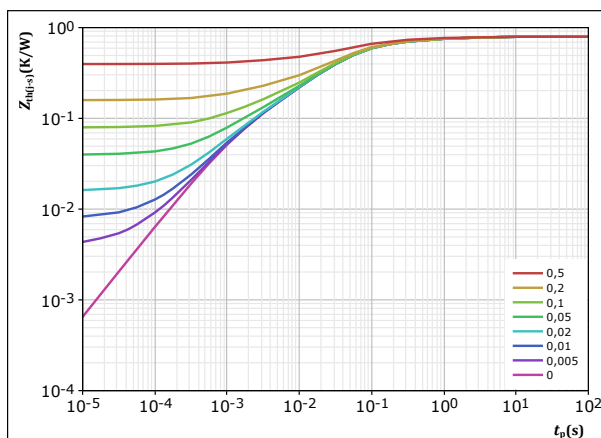
$T_j$ :

- 25 °C
- 125 °C
- 150 °C

**figure 9.** FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,793 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
5,39E-02	2,49E+00
1,33E-01	2,82E-01
4,13E-01	4,97E-02
1,37E-01	1,07E-02
5,71E-02	1,31E-03



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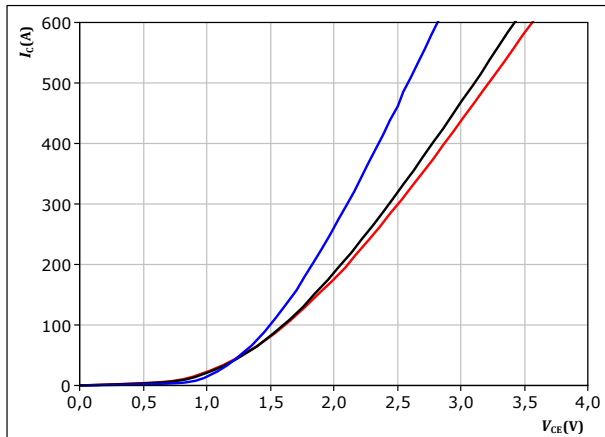
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## Outer Boost Switch Characteristics

figure 10. IGBT

Typical output characteristics

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

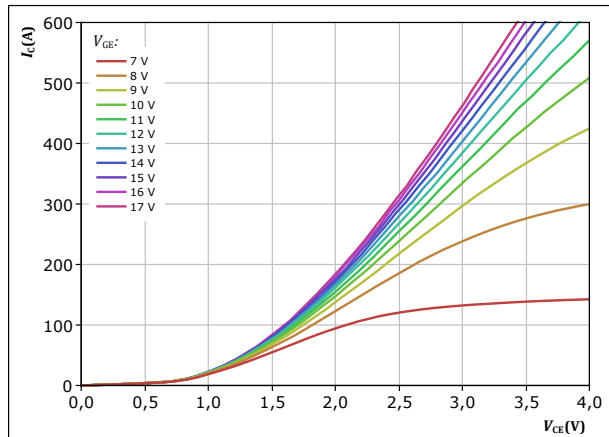


$t_p = 250 \mu s$   
 $V_{GE} = 15 V$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

figure 11. IGBT

Typical output characteristics

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

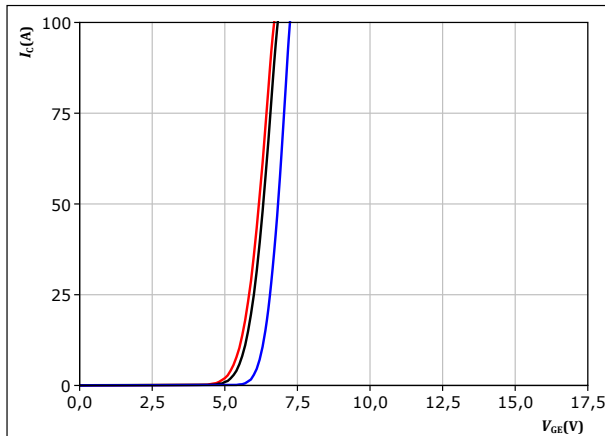


$t_p = 250 \mu s$   
 $T_j = 150 \text{ } ^\circ C$   
 $V_{GE}$  from 7 V to 17 V in steps of 1 V

figure 12. IGBT

Typical transfer characteristics

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

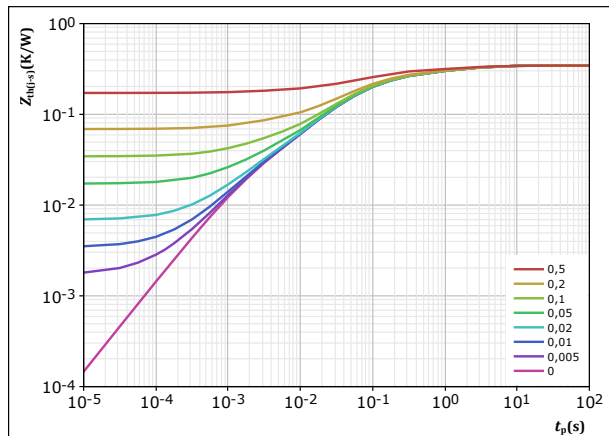


$t_p = 250 \mu s$   
 $V_{CE} = 8 V$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

figure 13. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$   
 $R_{th(j-s)} = 0.344 \text{ K/W}$   
IGBT thermal model values  

$R \text{ (K/W)}$	$\tau \text{ (s)}$
3,51E-02	3,52E+00
6,84E-02	7,05E-01
1,60E-01	8,54E-02
6,50E-02	1,97E-02
1,61E-02	1,73E-03



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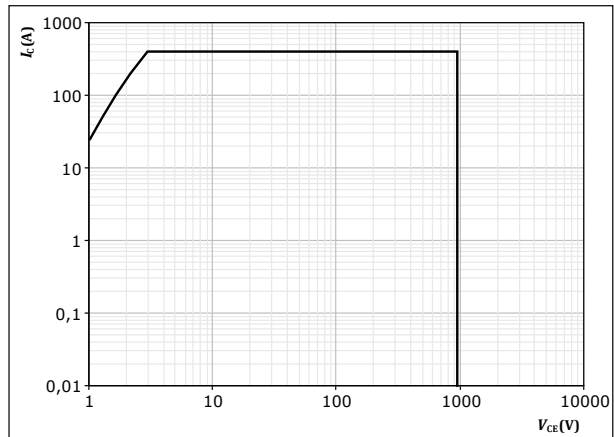
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## Outer Boost Switch Characteristics

figure 14. IGBT

Safe operating area

$I_C = f(V_{CE})$



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$

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

$T_j = T_{jmax}$



Outer Boost Diode Characteristics

figure 15. FWD

Typical forward characteristics

$I_F = f(V_F)$

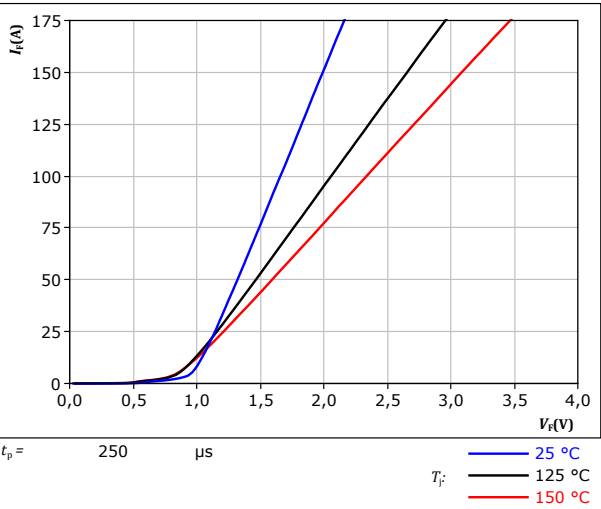
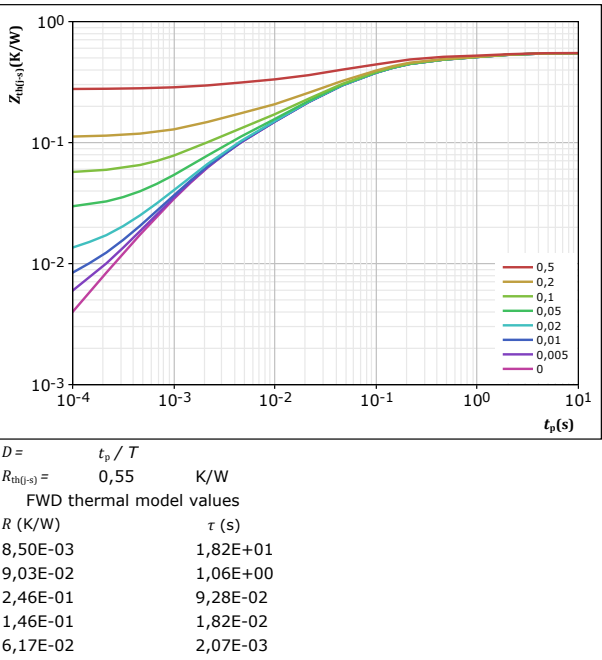


figure 16. FWD

Transient thermal impedance as a function of pulse width

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







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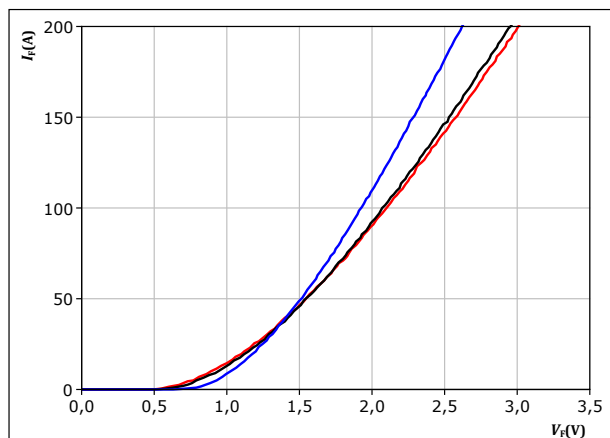
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## Outer Boost Sw. Protection Diode Characteristics

**figure 17.** FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

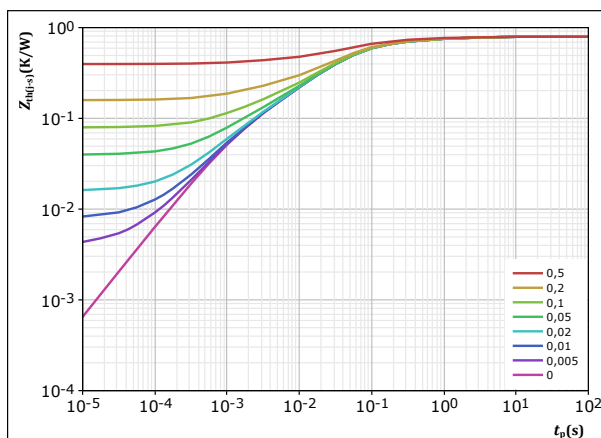
$T_j$ :

- 25 °C
- 125 °C
- 150 °C

**figure 18.** FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,793 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
5,39E-02	2,49E+00
1,33E-01	2,82E-01
4,13E-01	4,97E-02
1,37E-01	1,07E-02
5,71E-02	1,31E-03



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## Aux Diode H Characteristics

figure 19.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

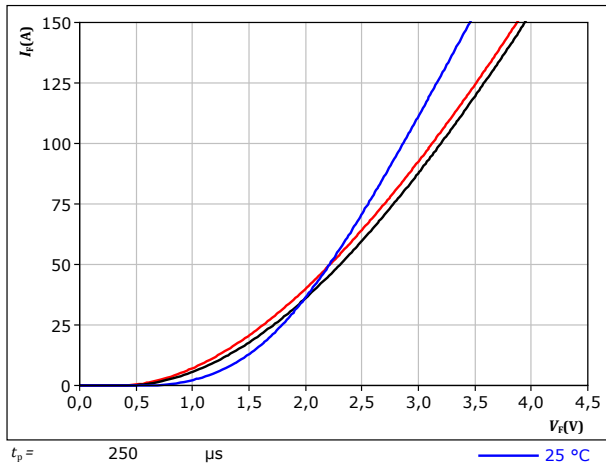
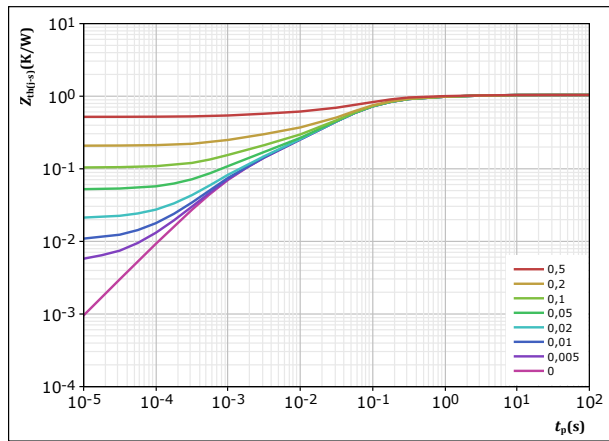


figure 20.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	$t_p / T$
$R_{th(j-s)} =$	1,04 K/W
FWD thermal model values	
$R$ (K/W)	$\tau$ (s)
6,44E-02	2,63E+00
1,36E-01	3,97E-01
6,27E-01	6,88E-02
1,30E-01	9,91E-03
8,29E-02	1,13E-03



Aux Diode L Characteristics

figure 21. FWD

Typical forward characteristics

$I_F = f(V_F)$

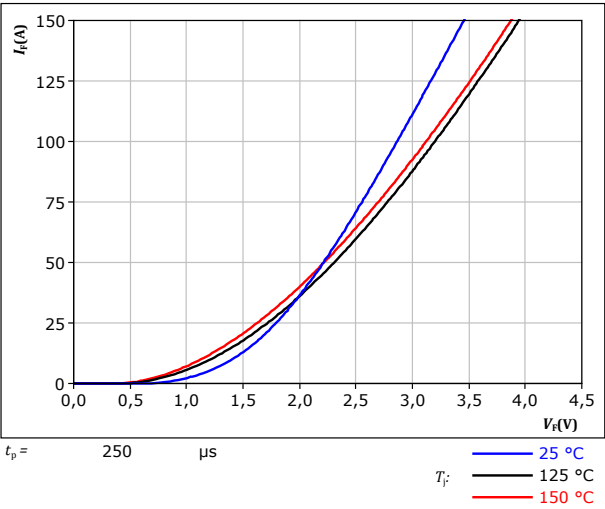
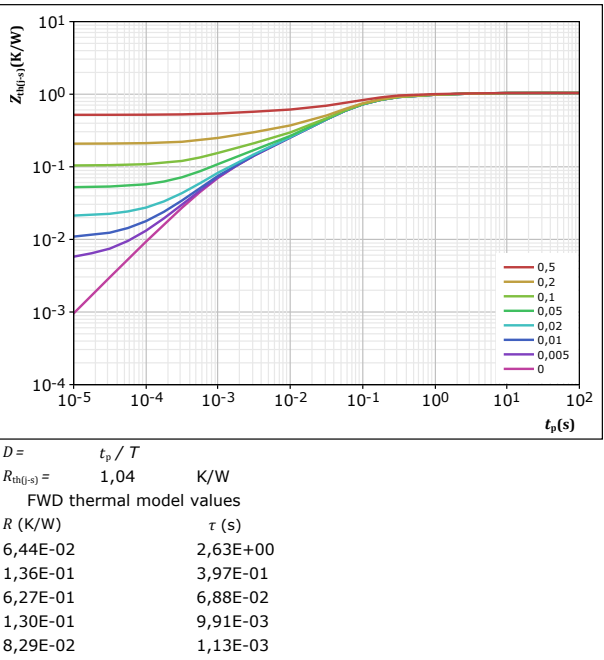


figure 22. FWD

Transient thermal impedance as a function of pulse width

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





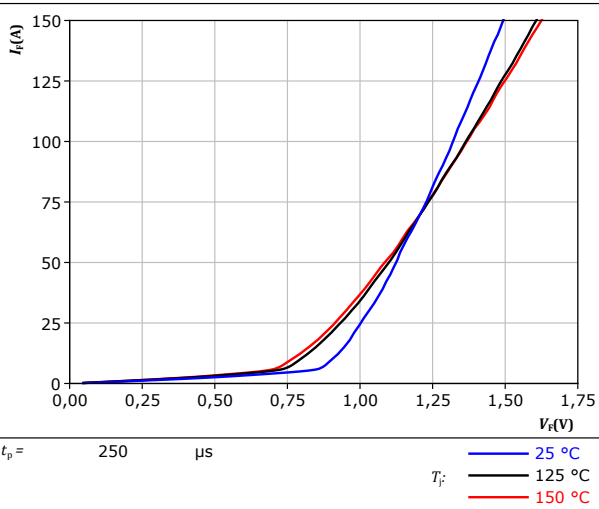
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**ByPass Diode Characteristics**

**figure 23.** Rectifier

Typical forward characteristics

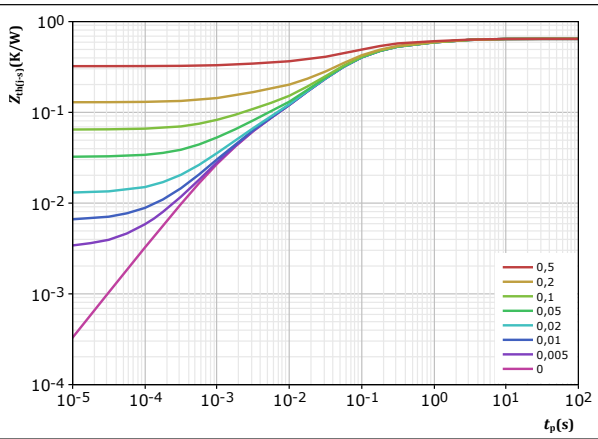
$I_F = f(V_F)$



**figure 24.** Rectifier

Transient thermal impedance as a function of pulse width

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



$D =$	$t_p / T$
$R_{th(j-s)} =$	0,646 K/W
Rectifier thermal model values	
$R$ (K/W)	$\tau$ (s)
4,48E-02	3,10E+00
1,16E-01	6,03E-01
3,64E-01	7,75E-02
8,07E-02	1,76E-02
3,95E-02	1,68E-03



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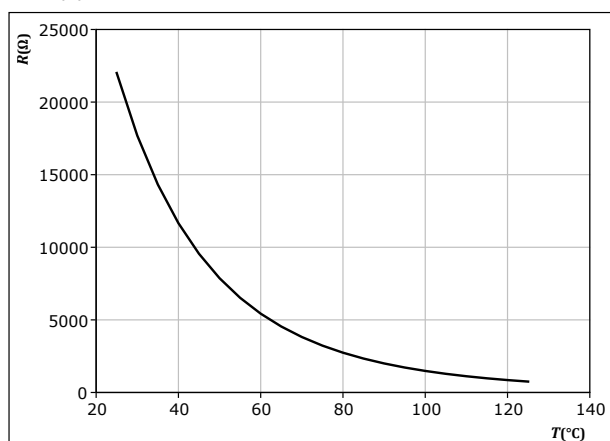
## Thermistor Characteristics

figure 25.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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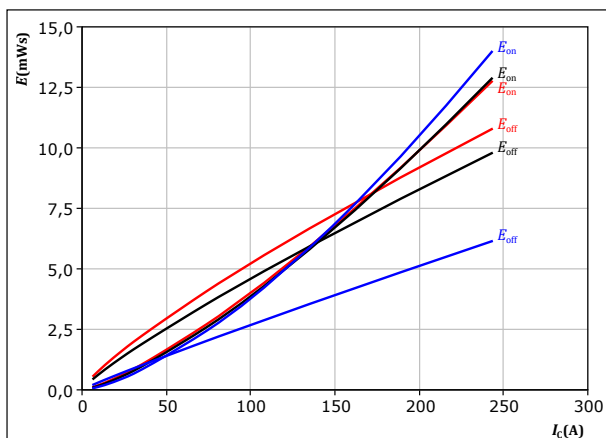
## Inner Boost Switching Characteristics

figure 26.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



With an inductive load at

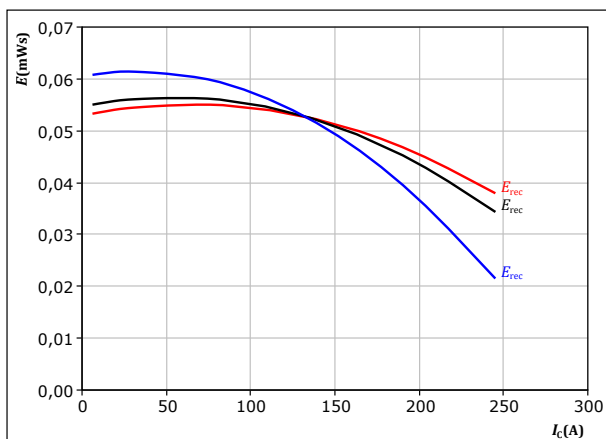
$V_{CE} =$	600	V	$T_j:$	25 °C
$V_{GE} =$	±15	V		125 °C
$R_{gon} =$	8	Ω		150 °C
$R_{goff} =$	8	Ω		

figure 28.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

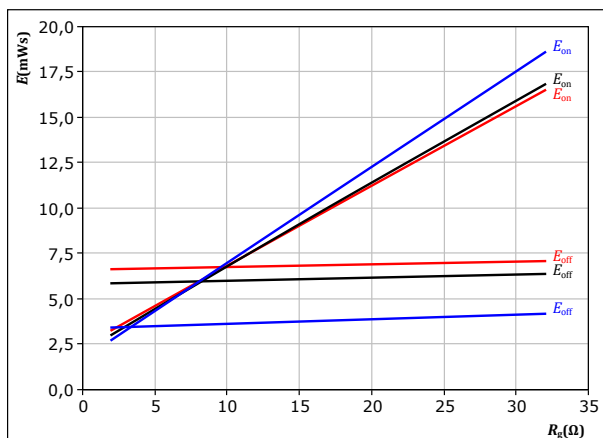
$V_{CE} =$	600	V	$T_j:$	25 °C
$V_{GE} =$	±15	V		125 °C
$R_{gon} =$	8	Ω		150 °C

figure 27.

IGBT

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

$$E = f(R_g)$$



With an inductive load at

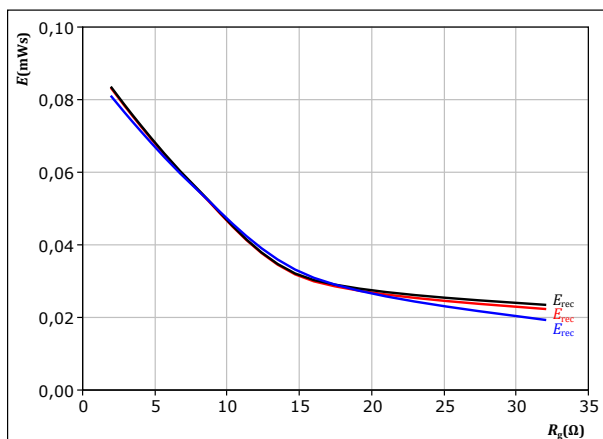
$V_{CE} =$	600	V	$T_j:$	25 °C
$V_{GE} =$	±15	V		125 °C
$I_c =$	135	A		150 °C

figure 29.

FWD

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

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



With an inductive load at

$V_{CE} =$	600	V	$T_j:$	25 °C
$V_{GE} =$	±15	V		125 °C
$I_c =$	135	A		150 °C



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## Inner Boost Switching Characteristics

figure 30.

IGBT

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

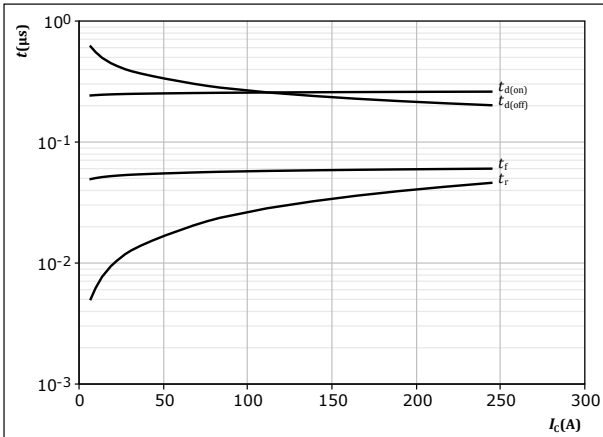


figure 31.

IGBT

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

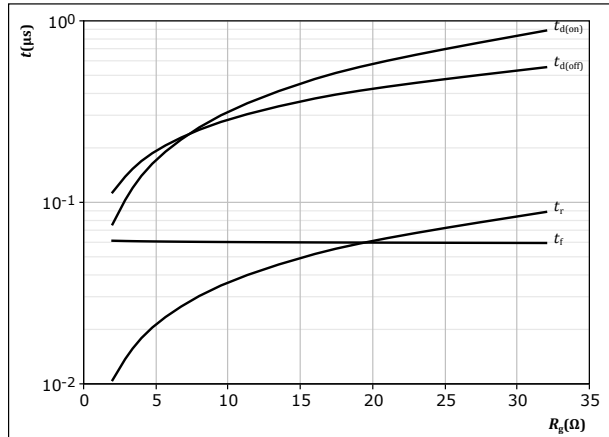


figure 32.

FWD

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

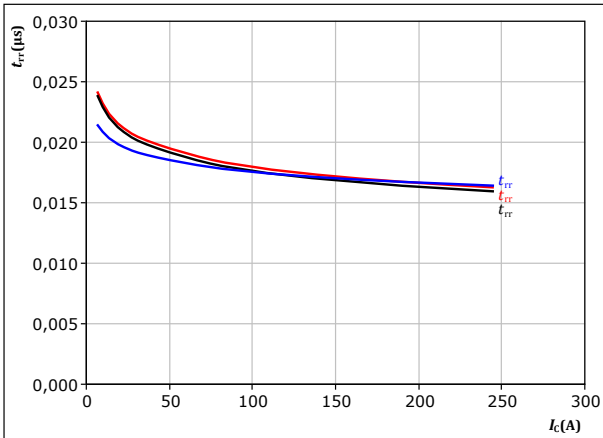
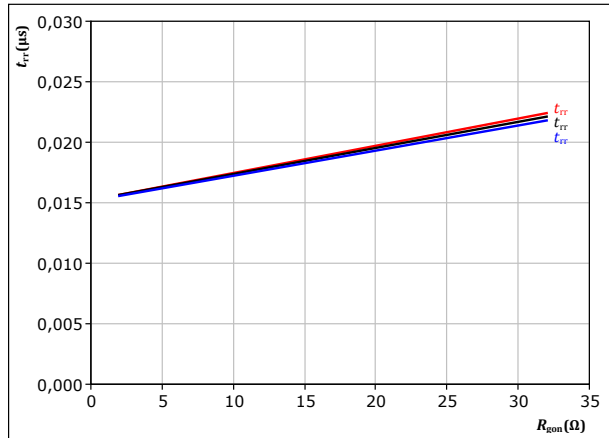


figure 33.

FWD

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





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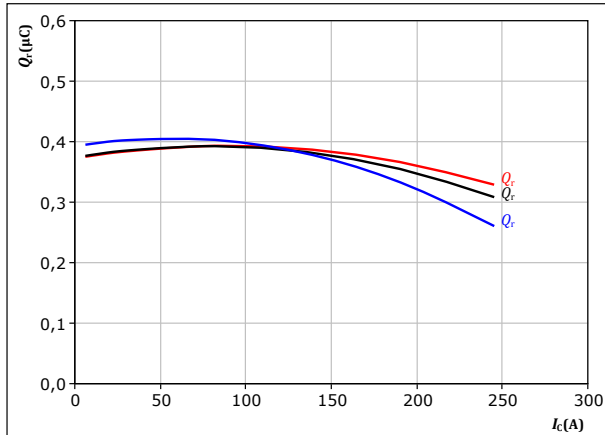
## Inner Boost Switching Characteristics

figure 34.

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  
 $R_{gon} = 8$  Ω

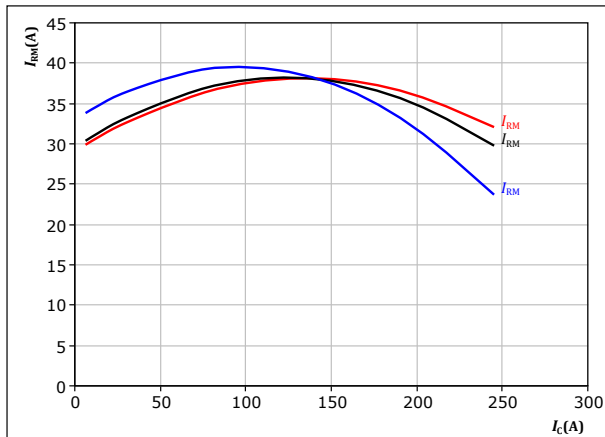
$T_j$ : 25 °C  
125 °C  
150 °C

figure 36.

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  
 $R_{gon} = 8$  Ω

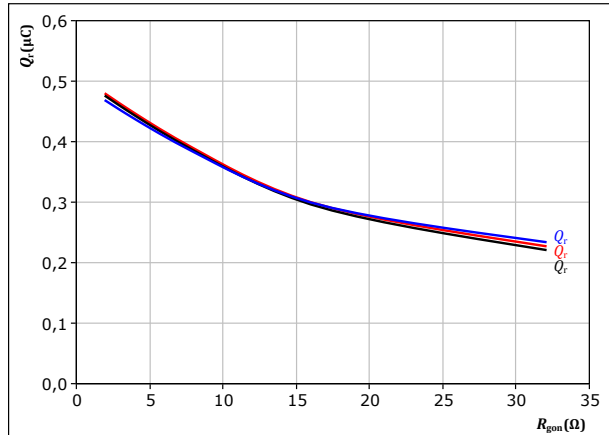
$T_j$ : 25 °C  
125 °C  
150 °C

figure 35.

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  
 $I_c = 135$  A

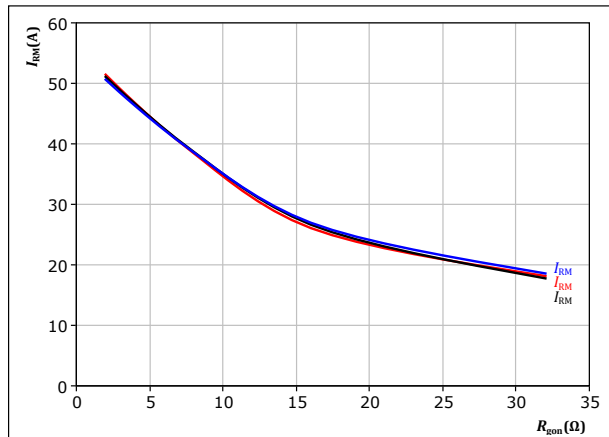
$T_j$ : 25 °C  
125 °C  
150 °C

figure 37.

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  
 $I_c = 135$  A

$T_j$ : 25 °C  
125 °C  
150 °C





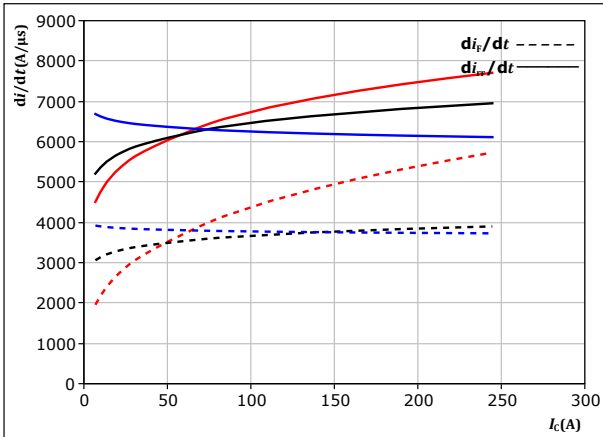
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## Inner Boost Switching Characteristics

**figure 38.** FWD

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



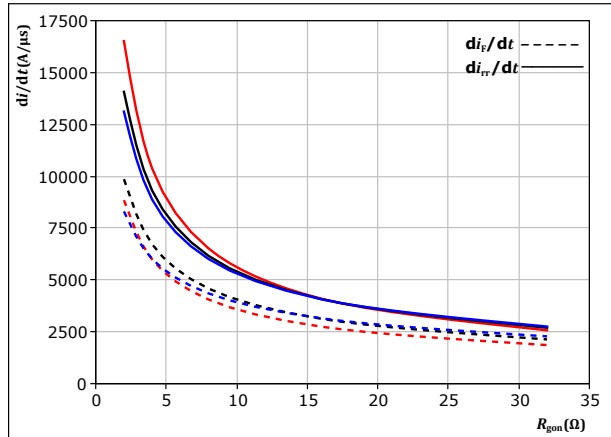
With an inductive load at

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

$T_j:$  — 25 °C  
— 125 °C  
— 150 °C

**figure 39.** 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

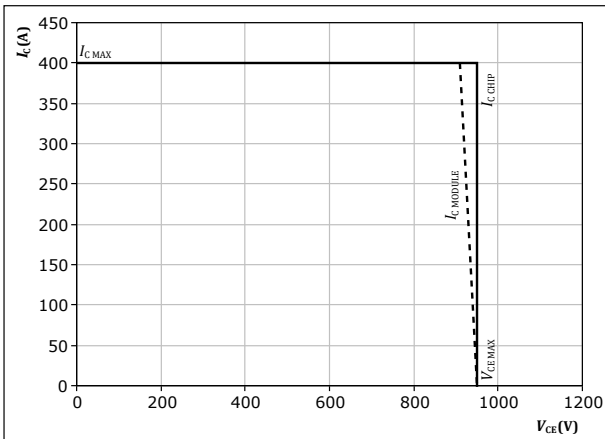
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_C = 135 \text{ A}$

$T_j:$  — 25 °C  
— 125 °C  
— 150 °C

**figure 40.** IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



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



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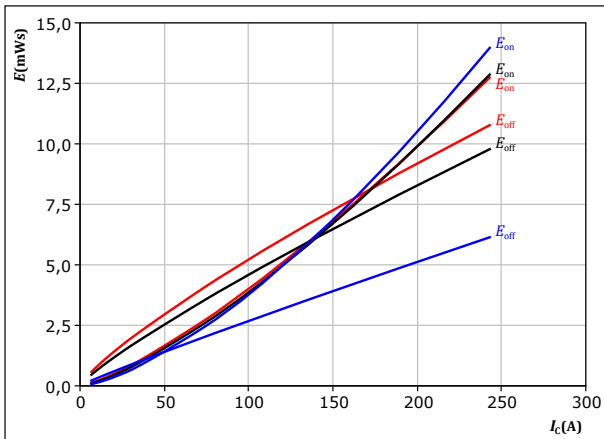
## Outer Boost Switching Characteristics

figure 41.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



With an inductive load at

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

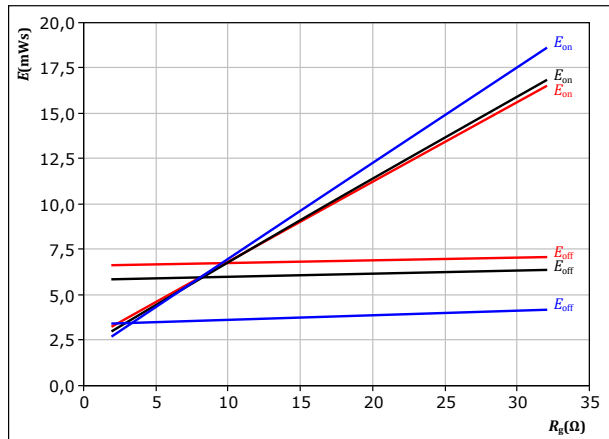
$T_j$ : 25 °C  
125 °C  
150 °C

figure 42.

IGBT

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

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 135 \text{ A}$

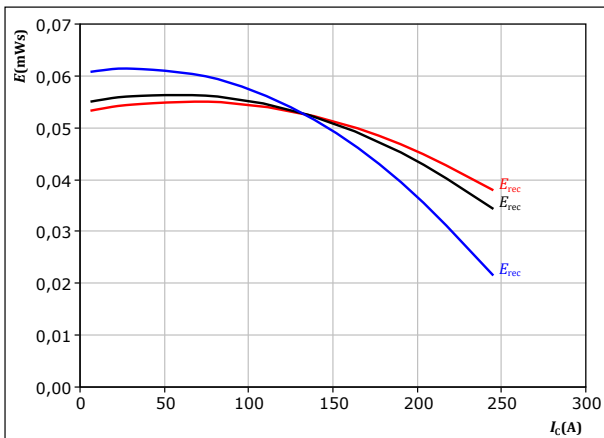
$T_j$ : 25 °C  
125 °C  
150 °C

figure 43.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

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

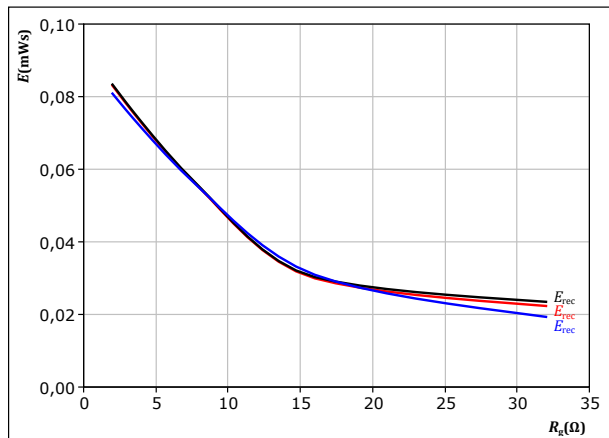
$T_j$ : 25 °C  
125 °C  
150 °C

figure 44.

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

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 135 \text{ A}$

$T_j$ : 25 °C  
125 °C  
150 °C



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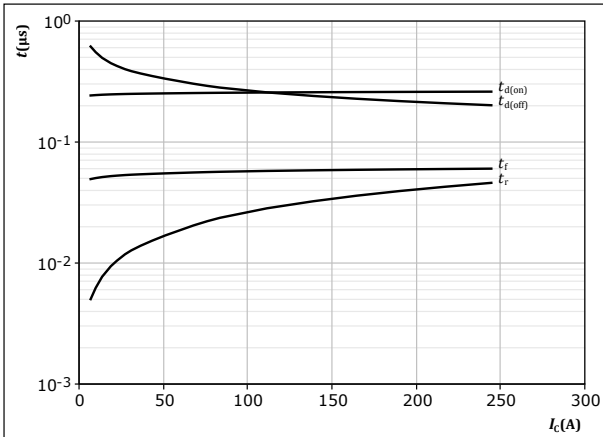
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## Outer Boost Switching Characteristics

figure 45.

IGBT

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



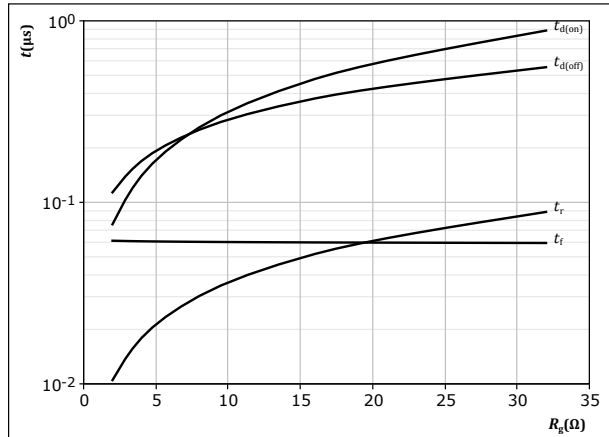
With an inductive load at

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

figure 46.

IGBT

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



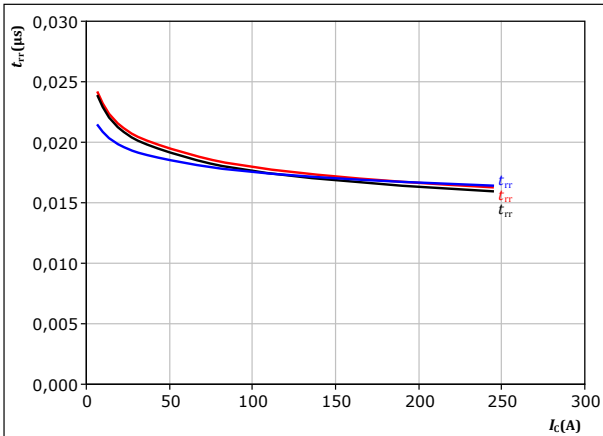
With an inductive load at

$T_j = 150$  °C  
 $V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_c = 135$  A

figure 47.

FWD

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



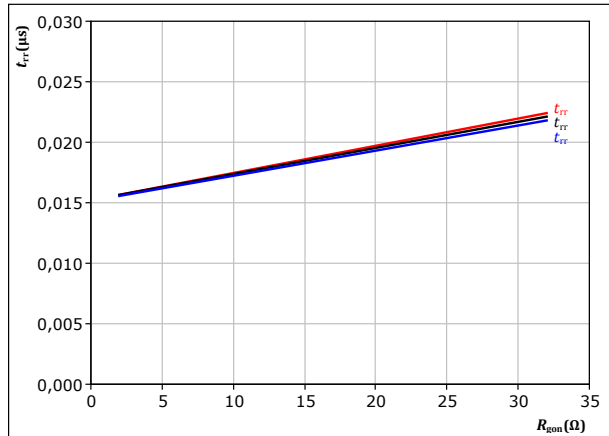
With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 8$  Ω  
 $T_j: 25$  °C (blue), 125 °C (black), 150 °C (red)

figure 48.

FWD

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



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_c = 135$  A  
 $T_j: 25$  °C (blue), 125 °C (black), 150 °C (red)



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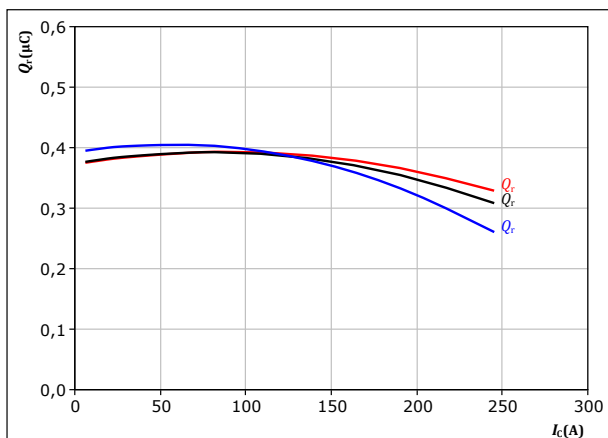
## Outer Boost Switching Characteristics

figure 49.

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

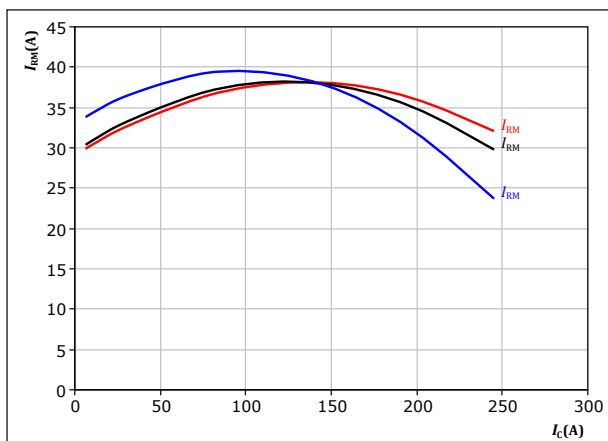
$T_j$ : 25 °C  
125 °C  
150 °C

figure 51.

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

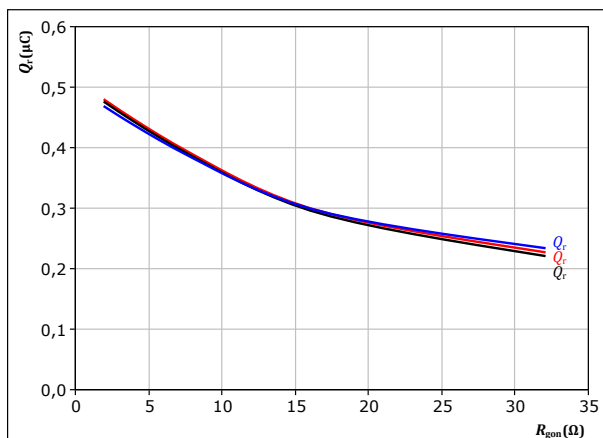
$T_j$ : 25 °C  
125 °C  
150 °C

figure 50.

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  
 $I_c = 135$  A

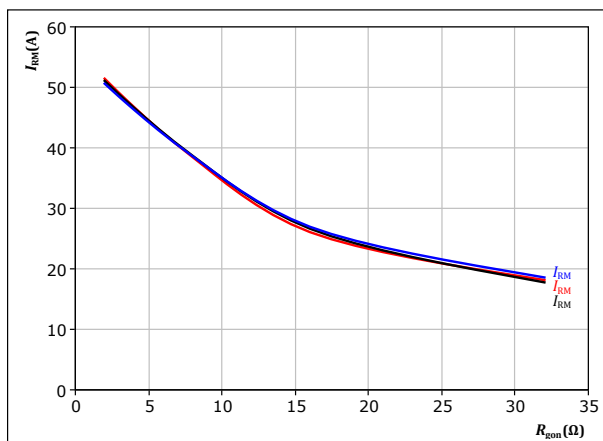
$T_j$ : 25 °C  
125 °C  
150 °C

figure 52.

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  
 $I_c = 135$  A

$T_j$ : 25 °C  
125 °C  
150 °C

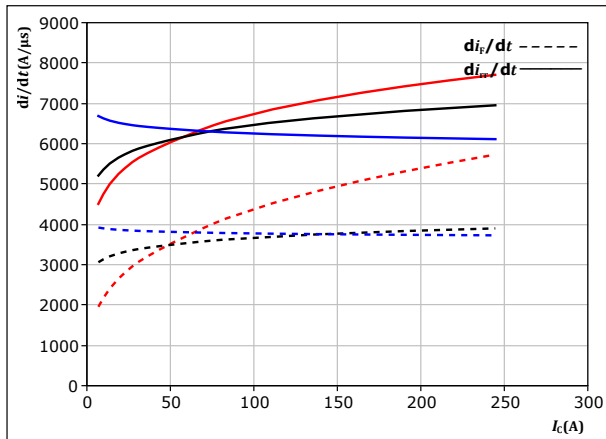


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## Outer Boost Switching Characteristics

**figure 53.** FWD

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



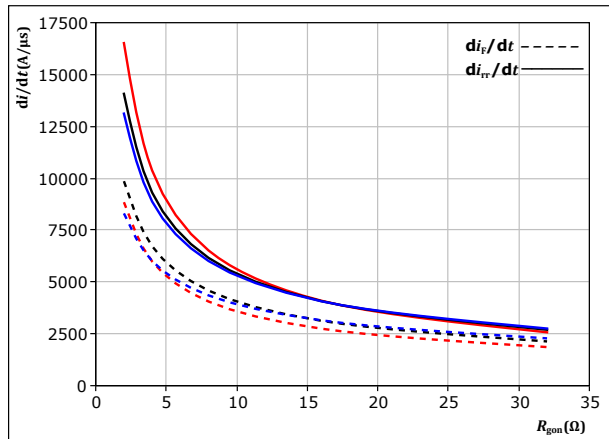
With an inductive load at

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

$T_j:$  — 25 °C  
— 125 °C  
— 150 °C

**figure 54.** 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

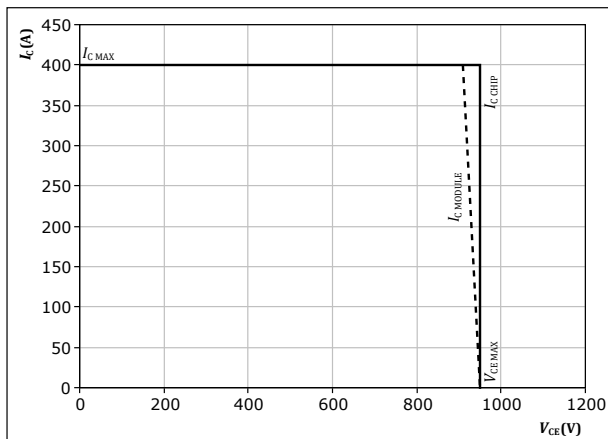
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_C = 135 \text{ A}$

$T_j:$  — 25 °C  
— 125 °C  
— 150 °C

**figure 55.** IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



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

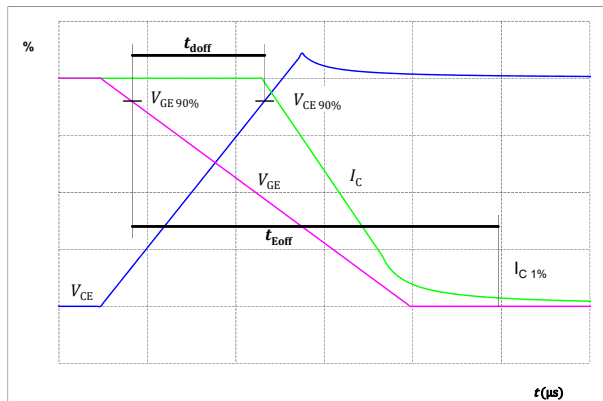


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## Switching Definitions

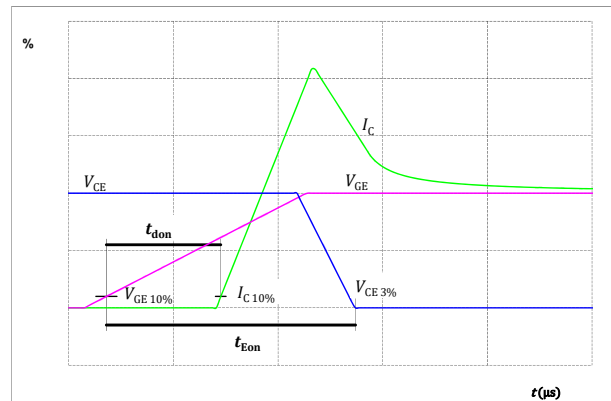
**figure 56.** IGBT

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



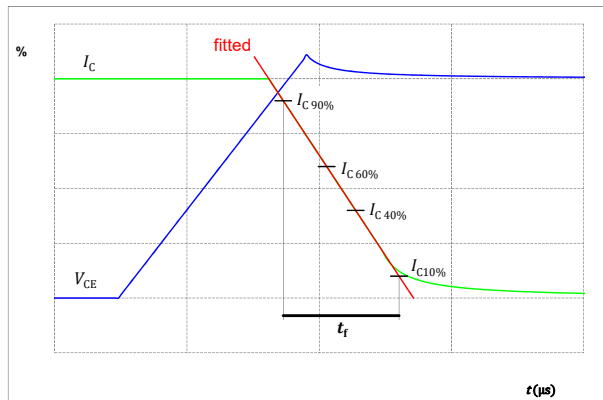
**figure 57.** IGBT

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



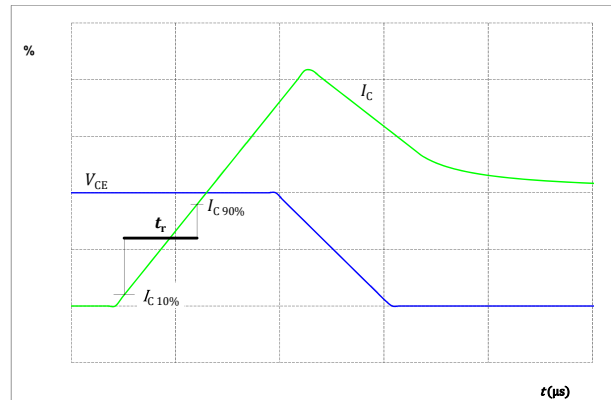
**figure 58.** IGBT

Turn-off Switching Waveforms & definition of  $t_f$



**figure 59.** IGBT

Turn-on Switching Waveforms & definition of  $t_r$





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## Switching Definitions

figure 60.

FWD

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

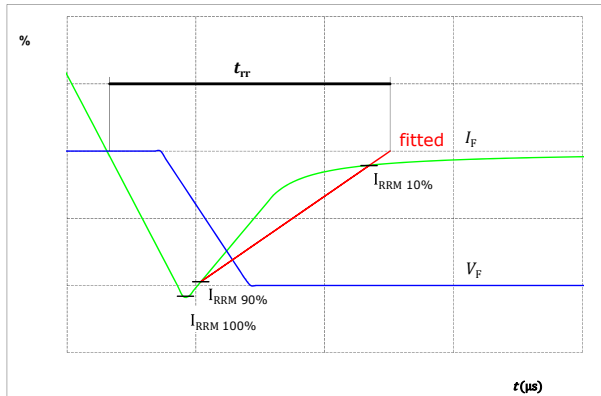
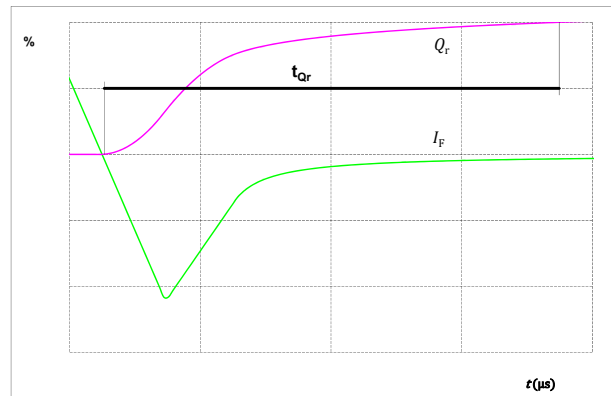


figure 61.

FWD


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





**B0-SL10B2A200S705-PA58L96Z**  
datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	B0-SL10B2A200S705-PA58L96Z
With thermal paste (5,2 W/mK, PTM6000HV)	B0-SL10B2A200S705-PA58L96Z-/7/
With thermal paste (5,2 W/mK, PTM6000HV) and Protection Foil	B0-SL10B2A200S705-PA58L96Z-/7F/

Marking							
	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNN- TTTTTV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code		
		TTTTTTTV	LLLLL	SSSS	WWYY		

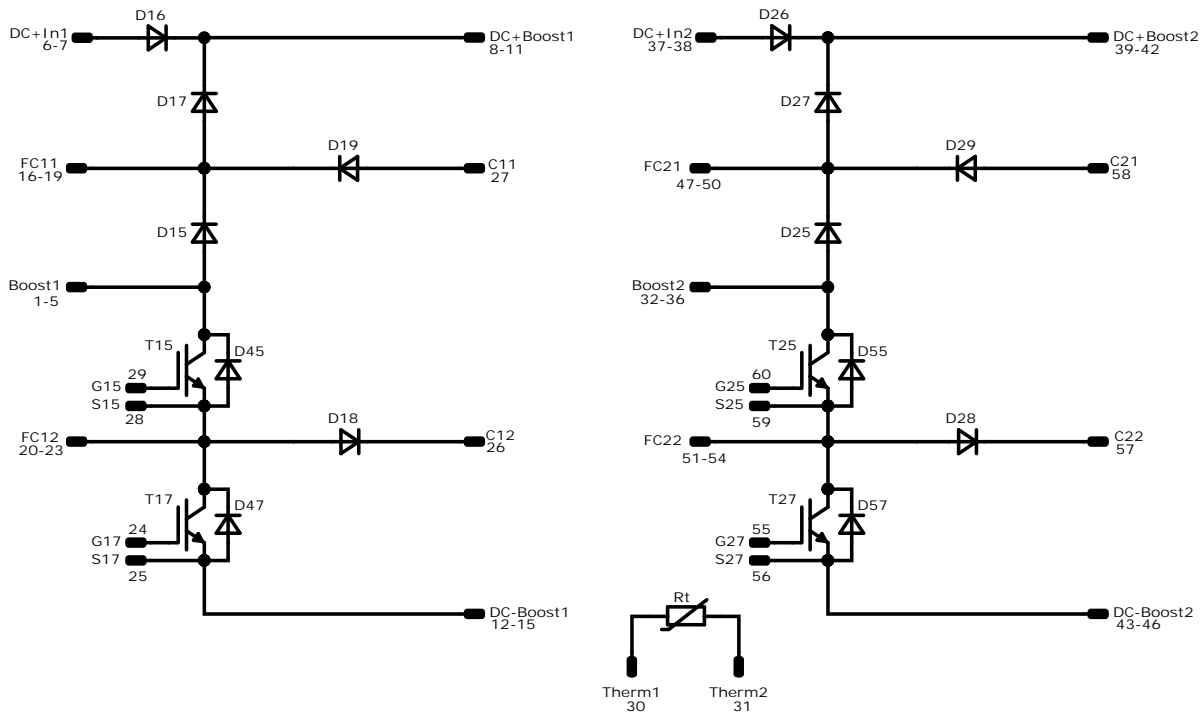
Outline									
Pin table [mm]									
Pin	X	Y	Function	31	27,7	0,05	Therm2		
1	10,8	0	Boost1	32	41,6	0	Boost1		
2	8,1	0	Boost1	33	44,3	0	Boost1		
3	5,4	0	Boost1	34	47	0	Boost1		
4	2,7	0	Boost1	35	49,7	0	Boost1		
5	0	0	Boost1	36	52,4	0	Boost1		
6	0	47,7	DC+In1	37	52,4	47,7	DC+In2		
7	0	50,4	DC+In1	38	52,4	50,4	DC+In2		
8	10,65	45	DC+Boost1	39	41,75	45	DC+Boost2		
9	12,5	47,7	DC+Boost1	40	39,9	47,7	DC+Boost2		
10	9,8	50,4	DC+Boost1	41	42,6	50,4	DC+Boost2		
11	12,5	50,4	DC+Boost1	42	39,9	50,4	DC+Boost2		
12	22	47,7	DC-Boost1	43	30,4	47,7	DC-Boost2		
13	22	50,4	DC-Boost1	44	30,4	50,4	DC-Boost2		
14	24,7	47,7	DC-Boost1	45	27,7	47,7	DC-Boost2		
15	24,7	50,4	DC-Boost1	46	27,7	50,4	DC-Boost2		
16	10,65	39,15	FC11	47	41,75	39,15	FC21		
17	7,95	39,15	FC11	48	44,45	39,15	FC21		
18	7,65	36,45	FC11	49	44,75	36,45	FC21		
19	7,65	33,75	FC11	50	44,75	33,75	FC21		
20	11,9	29,2	FC12	51	40,5	29,2	FC22		
21	9,2	27,9	FC12	52	43,2	27,9	FC22		
22	11,9	26,5	FC12	53	40,5	26,5	FC22		
23	9,2	25,2	FC12	54	43,2	25,2	FC22		
24	21,65	36,5	G17	55	30,75	36,5	G27		
25	24,7	36,5	S17	56	27,7	36,5	S27		
26	17,8	25,2	C12	57	34,6	25,2	C22		
27	12,65	18,4	C11	58	39,75	18,4	C21		
28	17,15	14,4	S15	59	35,25	14,4	S25		
29	16,45	11,4	G15	60	35,95	11,4	G25		
30	24,7	0,05	Therm1						





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Pinout




Identification

ID	Component	Voltage	Current	Function	Comment
T15, T25	IGBT	950 V	200 A	Inner Boost Switch	
D15, D25	FWD	1200 V	60 A	Inner Boost Diode	
D45, D55	FWD	1200 V	75 A	Inner Boost Sw. Protection Diode	
T17, T27	IGBT	950 V	200 A	Outer Boost Switch	
D17, D27	FWD	1200 V	60 A	Outer Boost Diode	
D47, D57	FWD	1200 V	75 A	Outer Boost Sw. Protection Diode	
D19, D29	FWD	1200 V	50 A	Aux Diode H	
D18, D28	FWD	1200 V	50 A	Aux Diode L	
D16, D26	Rectifier	1800 V	50 A	ByPass Diode	
Rt	Thermistor			Thermistor	



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**B0-SL10B2A200S705-PA58L96Z**  
datasheet

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 UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,sp}=150^{\circ}\text{C}$ and up to 4000VAC/1min isolation voltage. For more information see vincotech.com website.				

Document No.:	Date:	Modification:	Pages
B0-SL10B2A200S705-PA58L96Z-D4-14	4 Jun. 2026	Change Boost Diodes according to PCN-2025-001	

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