



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: Al_2O_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

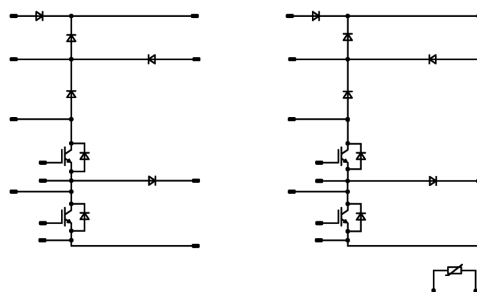
Types

- 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}		± 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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	72	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	273	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	390	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	168	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}		± 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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	72	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	273	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	390	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	168	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 ² 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 ² 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 ² 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_{stg}		-40...+125	°C
Operation temperature under switching condition	T_{jop}		-40...+(T_{jmax} - 25)	°C

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage* $t_p = 2\text{ s}$	6000	V
Creepage distance			10,39	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 ⁽¹⁾	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 ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (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		259,9 258,86 258,6		ns
Rise time	t_r					25 125 150		25,92 28,8 30,29		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		193,14 224,38 233,5		ns
Fall time	t_f					25 125 150		22,27 45,76 54,07		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		5,49 5,4 5,42		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,2 5,36 6		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			1,5 1,86 2,01	1,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 1200$ V			25			105	600	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,57		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=4162$ A/µs $di/dt=4717$ A/µs $di/dt=4994$ A/µs	± 15	600	135	25 125 150		29,31 28,88 28,56		A
Reverse recovery time	t_{rr}					25 125 150		15,13 15,51 15,64		ns
Recovered charge	Q_r					25 125 150		0,271 0,273 0,272		µC
Reverse recovered energy	E_{rec}					25 125 150		0,033 0,033 0,033		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		10460,35 8703,36 7469,31		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 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 1200$ V				25			55	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ 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 ⁽¹⁾	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 ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (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		259,9 258,86 258,6		ns
Rise time	t_r					25 125 150		25,92 28,8 30,29		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		193,14 224,38 233,5		ns
Fall time	t_f					25 125 150		22,27 45,76 54,07		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		5,49 5,4 5,42		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,2 5,36 6		mWs



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]		Min	Typ	Max	
Outer Boost Diode										
Static										
Forward voltage	V_F			60	25 125 150			1,5 1,86 2,01	1,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 1200$ V			25			105	600	µA
Thermal										
Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,57		K/W
Dynamic										
Peak recovery current	I_{RM}	$di/dt=4162$ A/µs $di/dt=4717$ A/µs $di/dt=4994$ A/µs	± 15	600	135	25 125 150		29,31 28,88 28,56		A
Reverse recovery time	t_{rr}					25 125 150		15,13 15,51 15,64		ns
Recovered charge	Q_r					25 125 150		0,271 0,273 0,272		µC
Reverse recovered energy	E_{rec}					25 125 150		0,033 0,033 0,033		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		10460,35 8703,36 7469,31		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 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V				25			55	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ 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 ⁽¹⁾ 2,5 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V				25 150			60 8800	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ 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 ⁽¹⁾ 2,5 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V				25 150		4400	60 8800	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ 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 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1800$ V				25 150			10 1500	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ 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	

⁽¹⁾ Value at chip level

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



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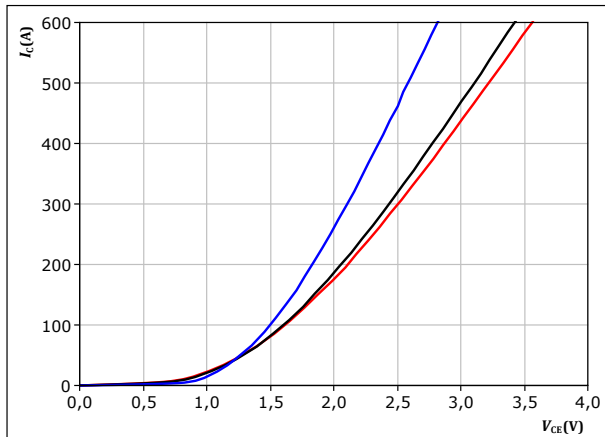
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Inner Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

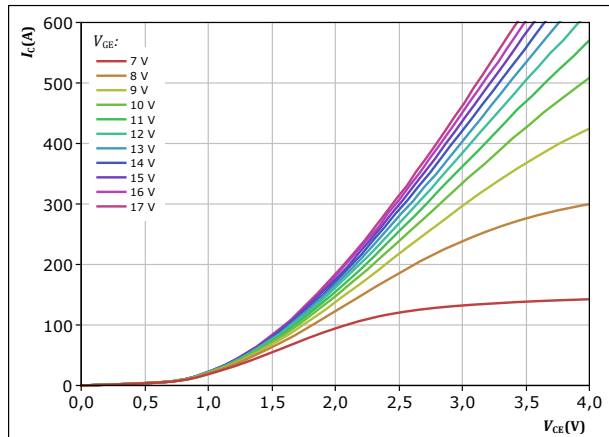


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 2. IGBT

Typical output characteristics

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

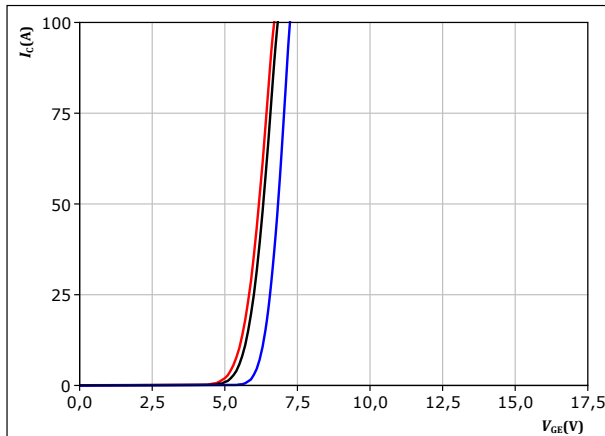


$t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

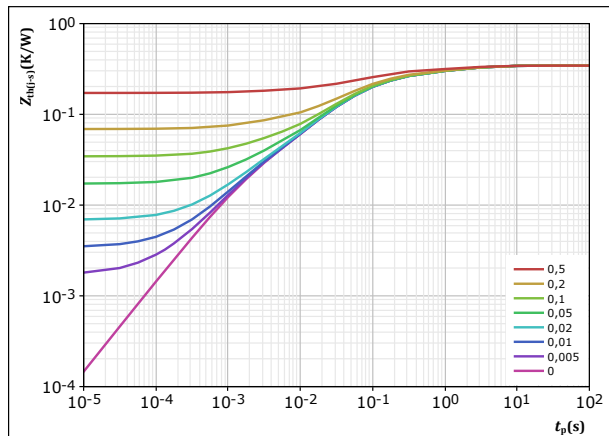


$t_p = 250 \mu s$
 $V_{CE} = 8 V$
 $T_j:$ — 25 °C
— 125 °C
— 150 °C

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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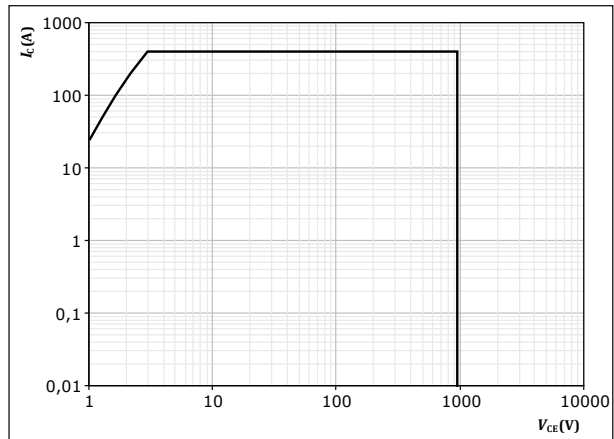
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Inner Boost Switch Characteristics

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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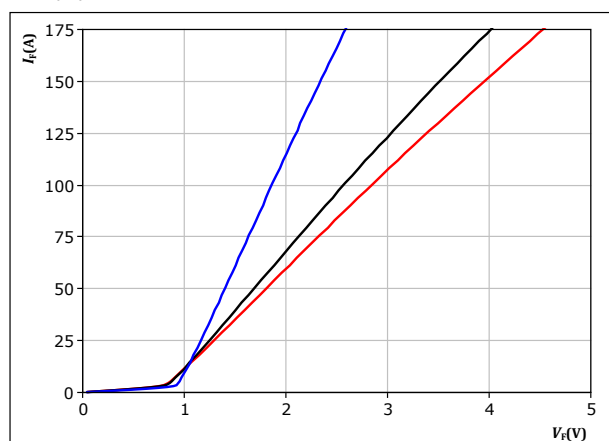
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Inner Boost Diode Characteristics

figure 6. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

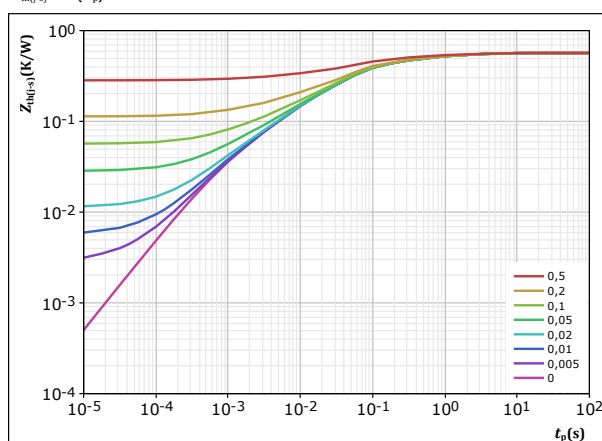
T_j :

- 25 °C
- 125 °C
- 150 °C

figure 7. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,566 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
6,09E-02	2,27E+00
1,15E-01	3,23E-01
2,90E-01	4,74E-02
7,95E-02	5,40E-03
2,18E-02	7,49E-04



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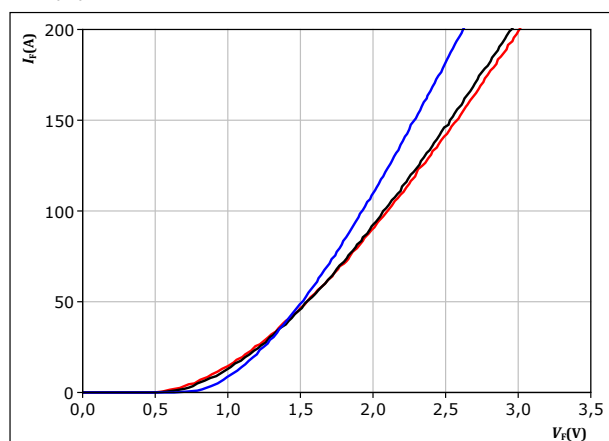
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datasheet

Inner Boost Sw. Protection Diode Characteristics

figure 8. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

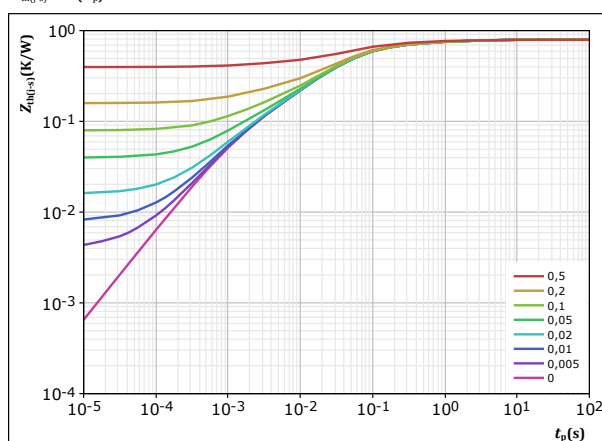
T_j :

- 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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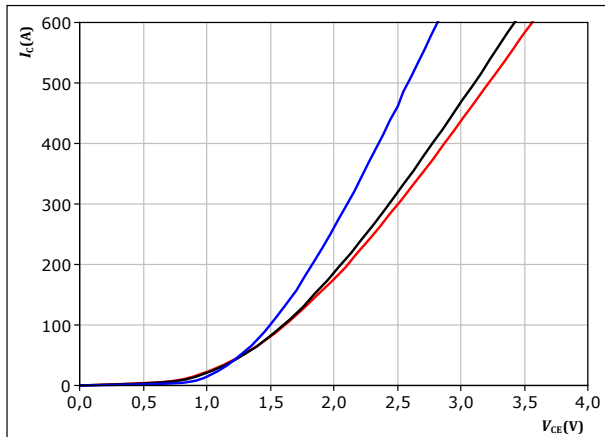
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Outer Boost Switch Characteristics

figure 10. IGBT

Typical output characteristics

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

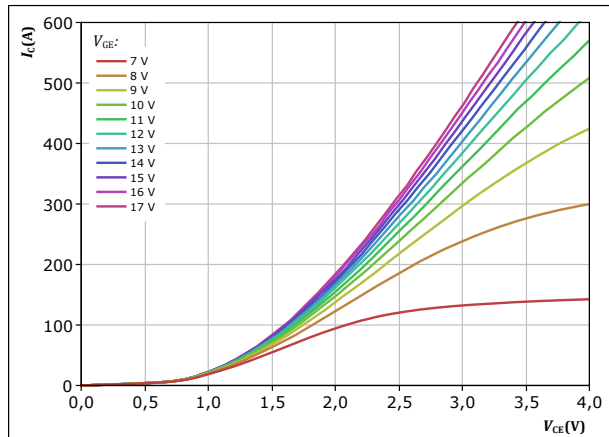


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 11. IGBT

Typical output characteristics

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

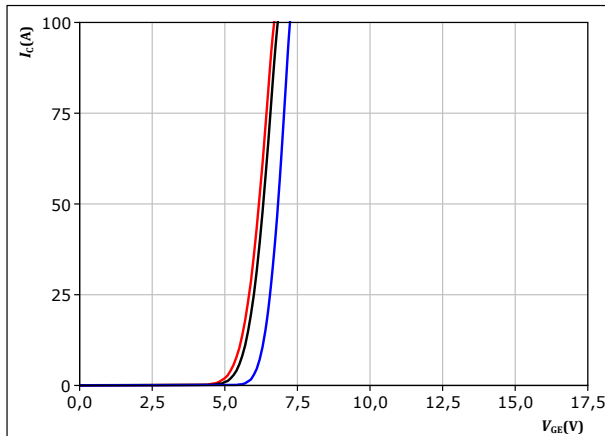


$t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 12. IGBT

Typical transfer characteristics

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

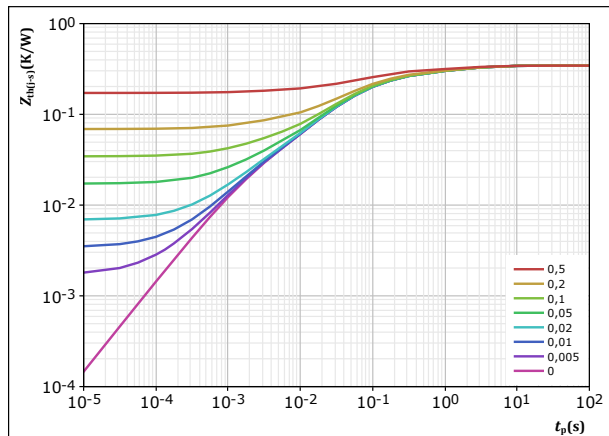


$t_p = 250 \mu s$
 $V_{CE} = 8 V$
 $T_j:$ — 25 °C
— 125 °C
— 150 °C

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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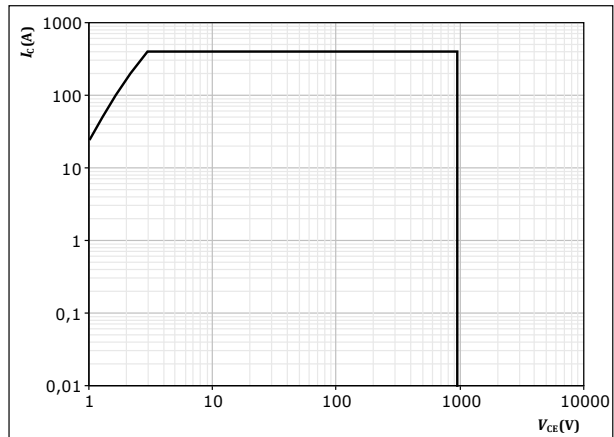
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datasheet

Outer Boost Switch Characteristics

figure 14. IGBT

Safe operating area

$I_C = f(V_{CE})$



$D = \text{single pulse}$

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

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

$T_j = T_{jmax}$



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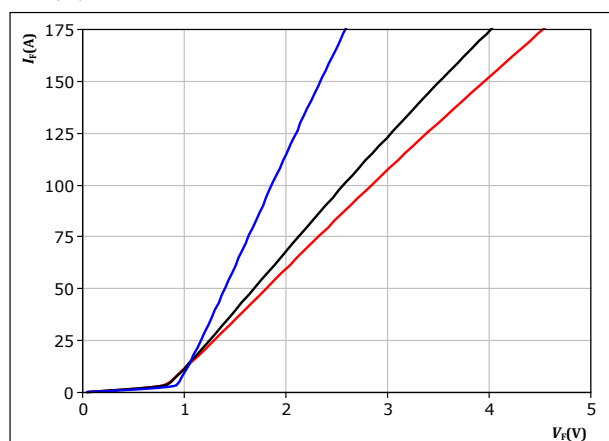
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datasheet

Outer Boost Diode Characteristics

figure 15. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

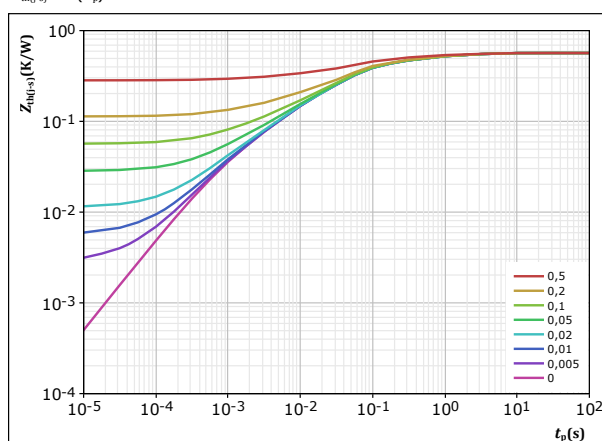
T_j :

- 25 °C
- 125 °C
- 150 °C

figure 16. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,566 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
6,09E-02	2,27E+00
1,15E-01	3,23E-01
2,90E-01	4,74E-02
7,95E-02	5,40E-03
2,18E-02	7,49E-04



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Outer Boost Sw. Protection Diode Characteristics

figure 17. FWD

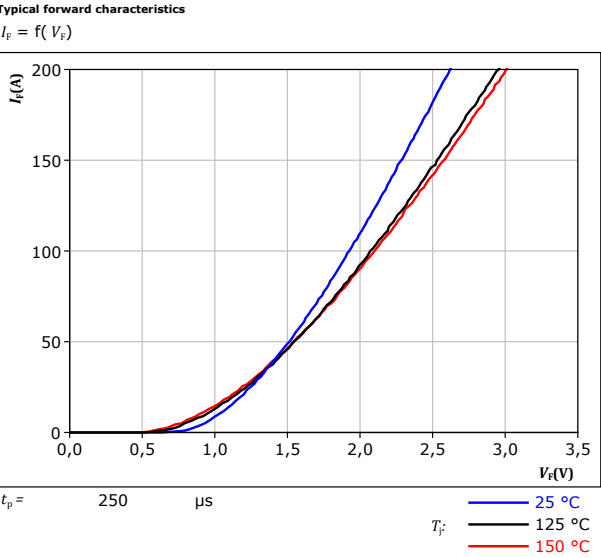
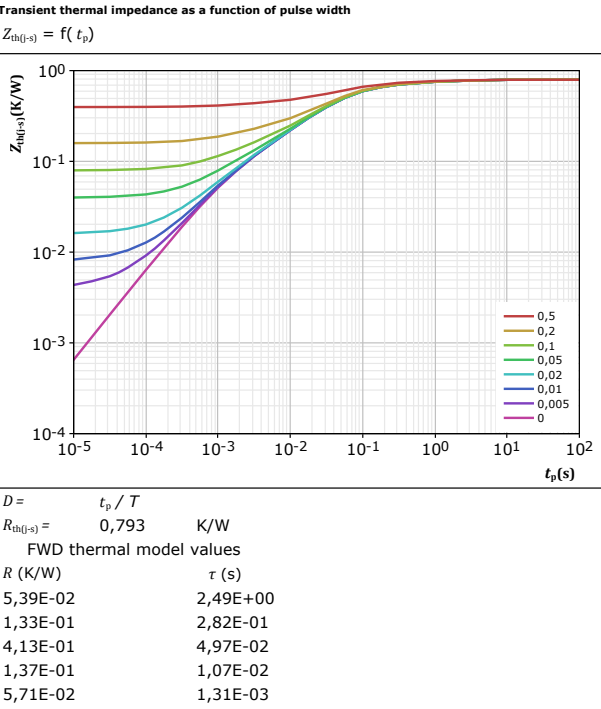


figure 18. FWD





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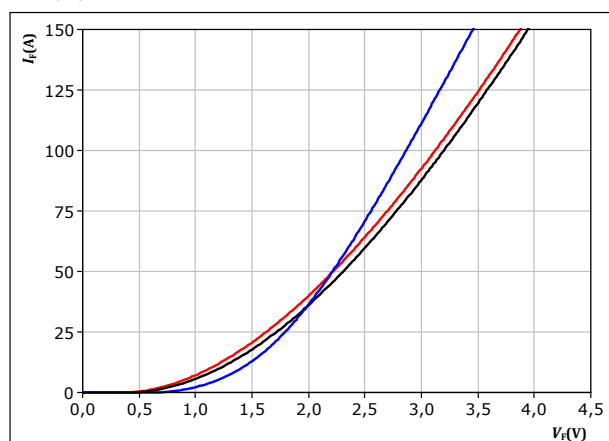
Aux Diode H Characteristics

figure 19.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

T_j :

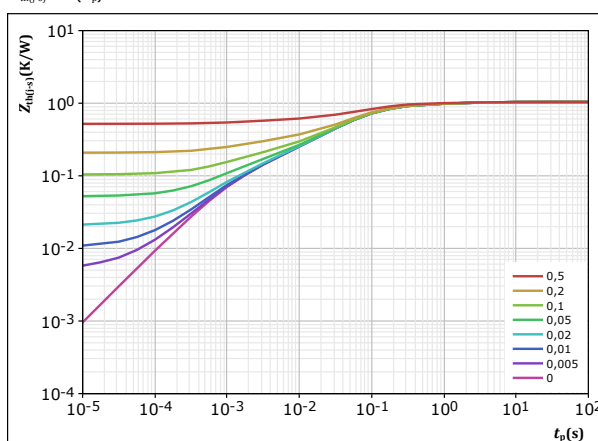
- 25 °C
- 125 °C
- 150 °C

figure 20.

FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 1,04 \text{ K/W}$

FWD thermal model values

R (K/W)	τ (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



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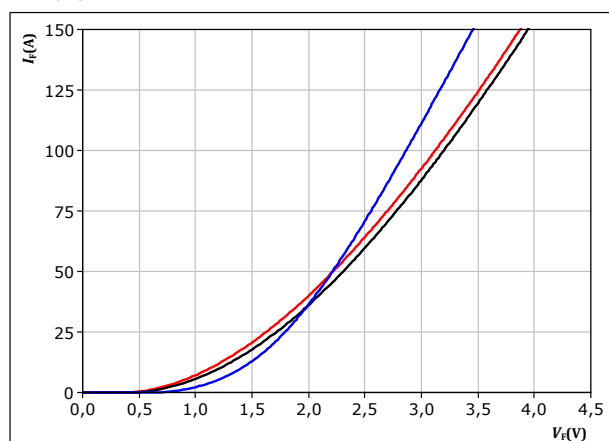
Aux Diode L Characteristics

figure 21.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

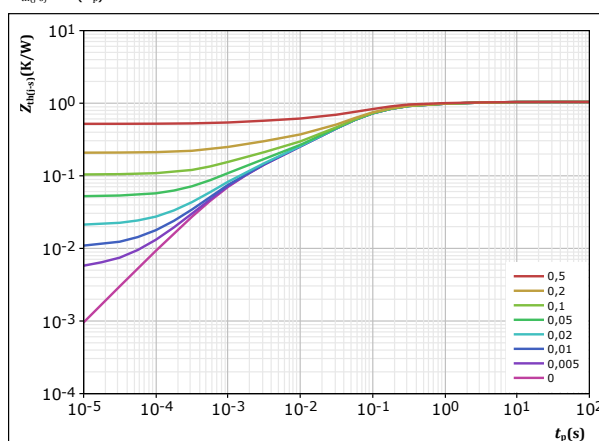
$T_j:$
— 25 °C
— 125 °C
— 150 °C

figure 22.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	1,04	K/W
FWD thermal model values		
R (K/W)	τ (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	



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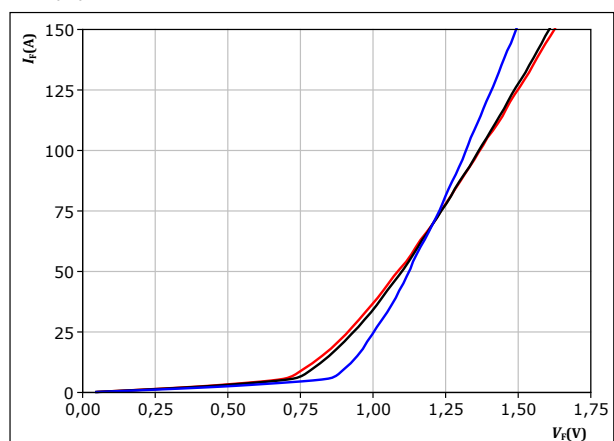
ByPass Diode Characteristics

figure 23.

Rectifier

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p =$ 250 μ s

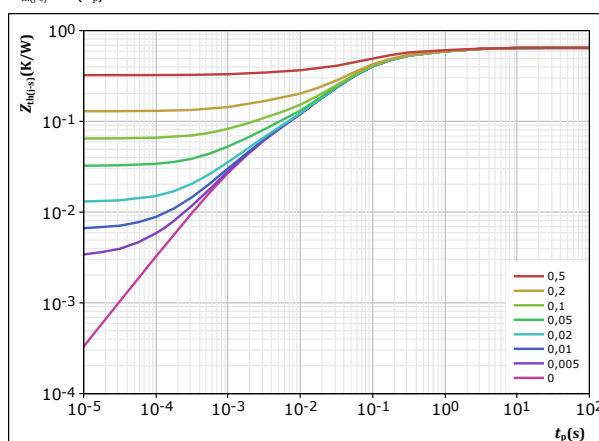
T_j :
— 25 °C
— 125 °C
— 150 °C

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)	τ (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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datasheet

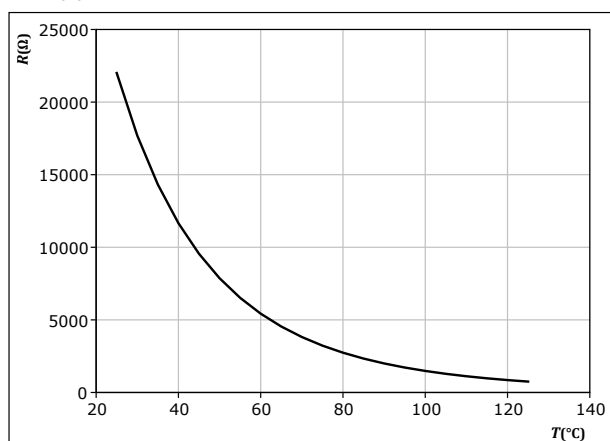
Thermistor Characteristics

figure 25.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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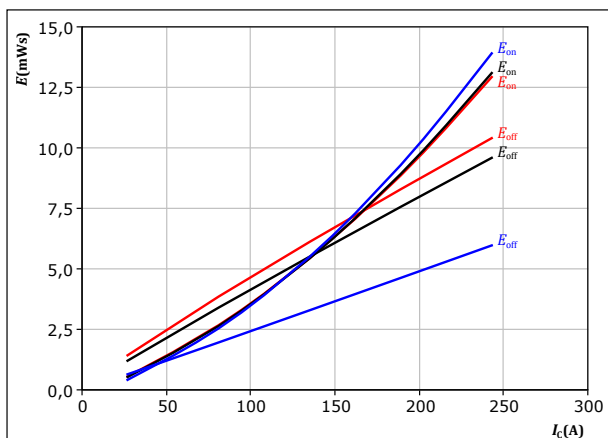
Inner Boost Switching Characteristics

figure 26.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



With an inductive load at

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

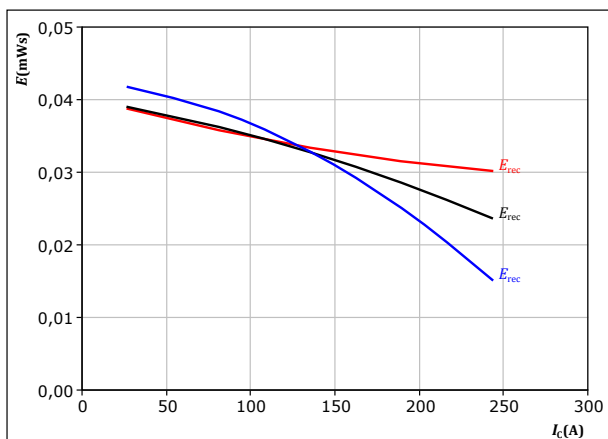
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 28.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

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

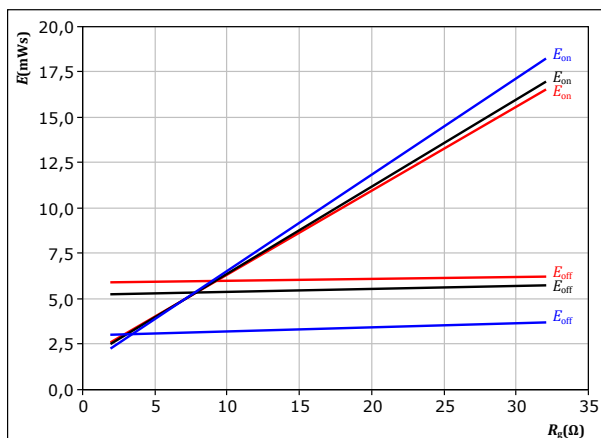
T_j :
— 25 °C
— 125 °C
— 150 °C

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

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

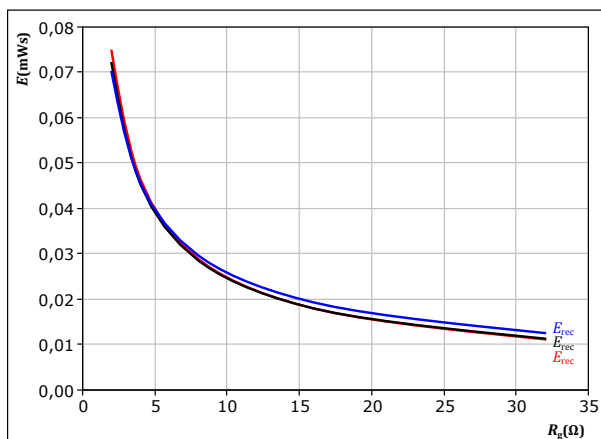
T_j :
— 25 °C
— 125 °C
— 150 °C

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

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

T_j :
— 25 °C
— 125 °C
— 150 °C



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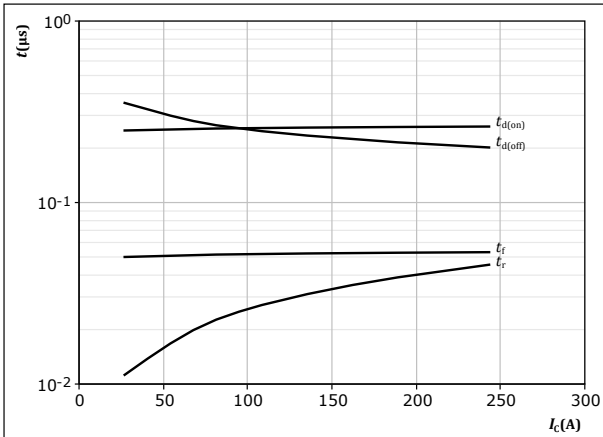
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datasheet

Inner Boost Switching Characteristics

figure 30.

IGBT

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



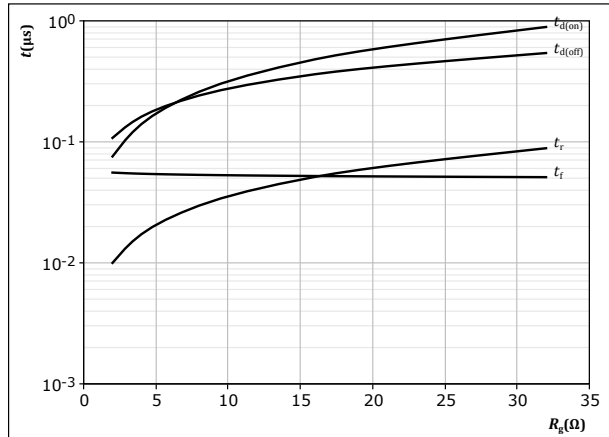
With an inductive load at

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

figure 31.

IGBT

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



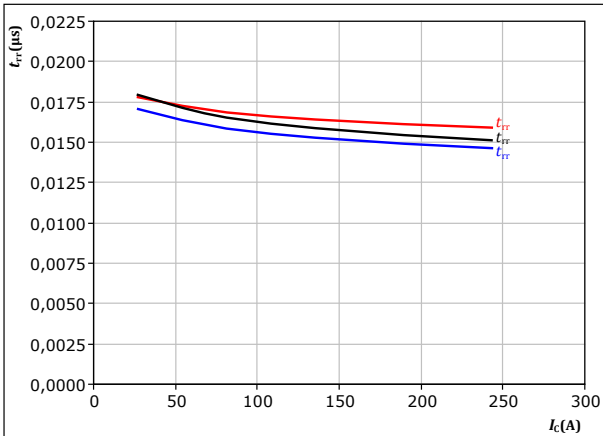
With an inductive load at

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

figure 32.

FWD

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



With an inductive load at

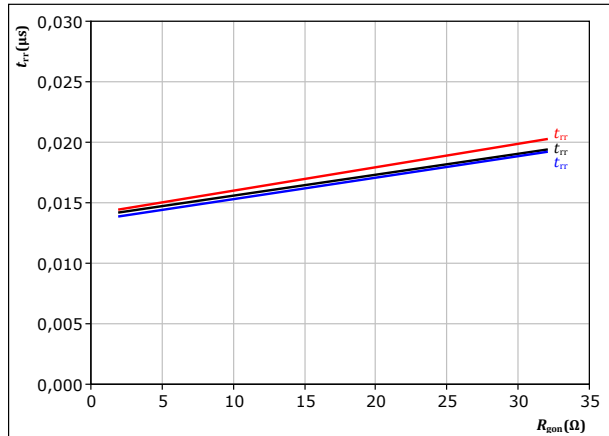
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

T_j : 25 °C
125 °C
150 °C

figure 33.

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
125 °C
150 °C



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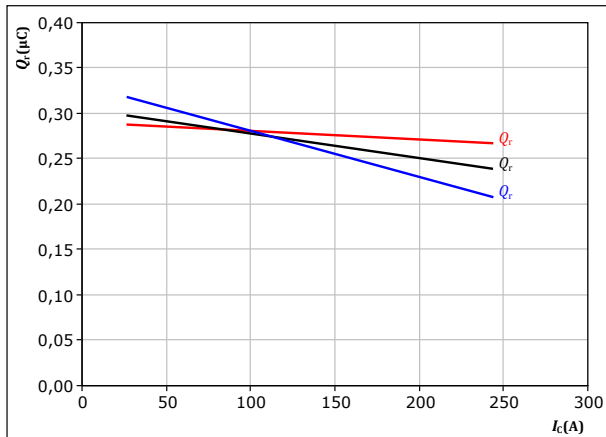
datasheet

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

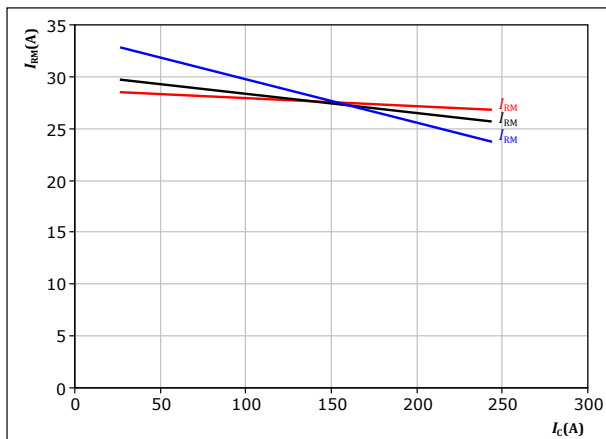
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

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

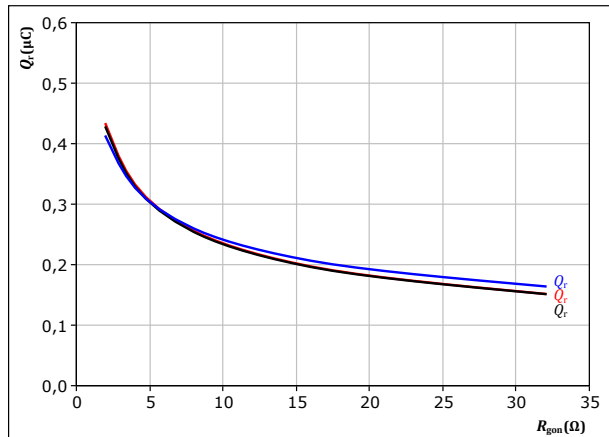
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

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

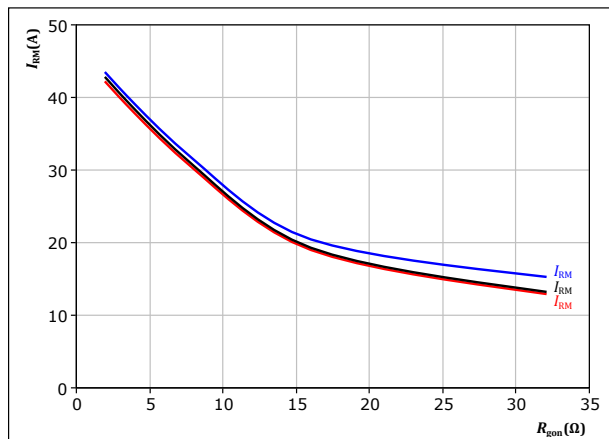
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 135$ A

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
 $di_f/dt, di_r/dt = f(I_C)$

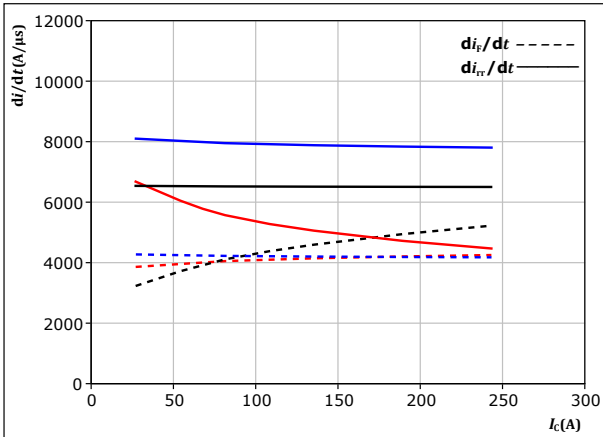


figure 40. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$

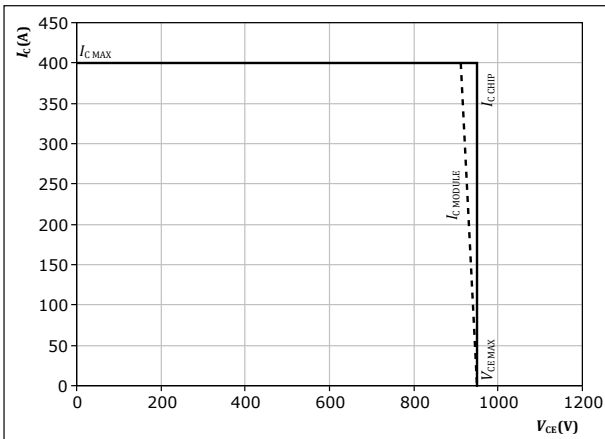
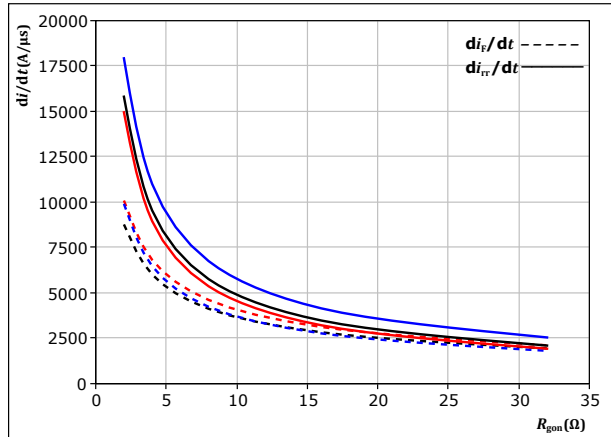


figure 39. FWD

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





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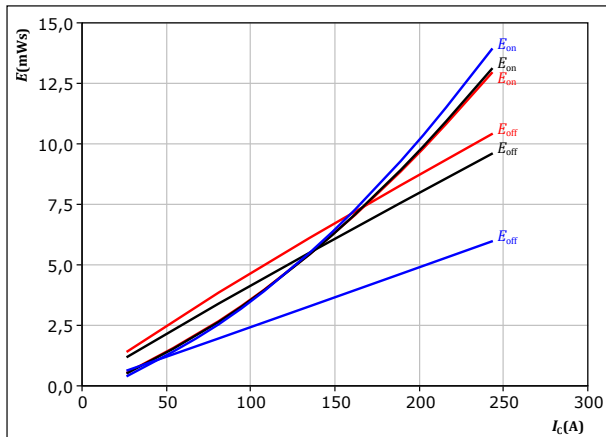
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Outer Boost Switching Characteristics

figure 41. IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



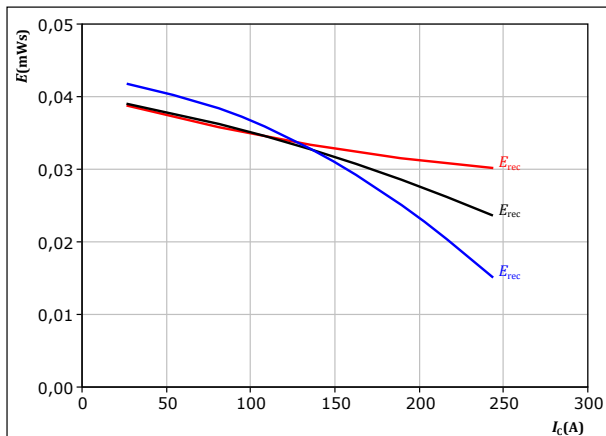
With an inductive load at

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

figure 43. FWD

Typical reverse recovered energy loss as a function of collector current

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



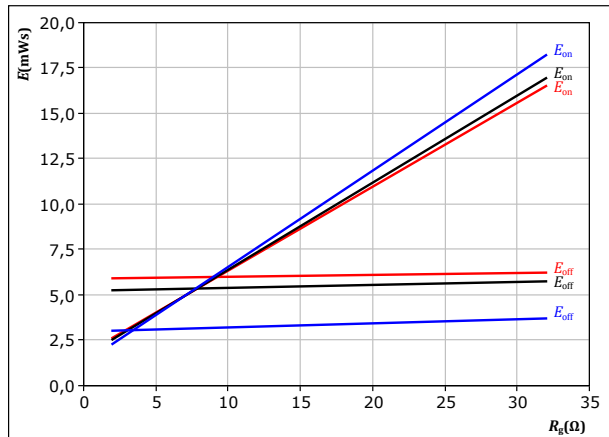
With an inductive load at

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

figure 42. IGBT

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

$$E = f(R_g)$$



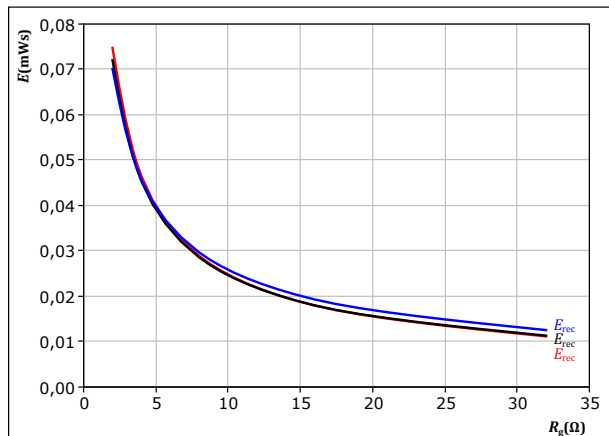
With an inductive load at

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



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datasheet

Outer Boost Switching Characteristics

figure 45.

IGBT

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

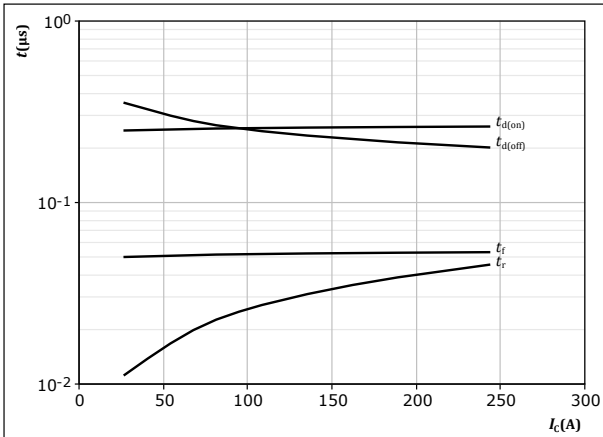


figure 46.

IGBT

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

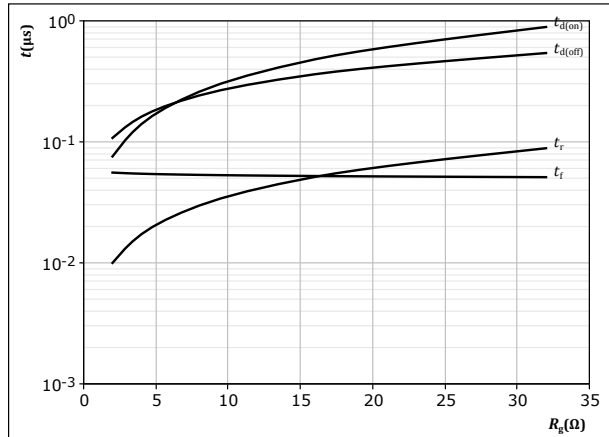


figure 47.

FWD

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

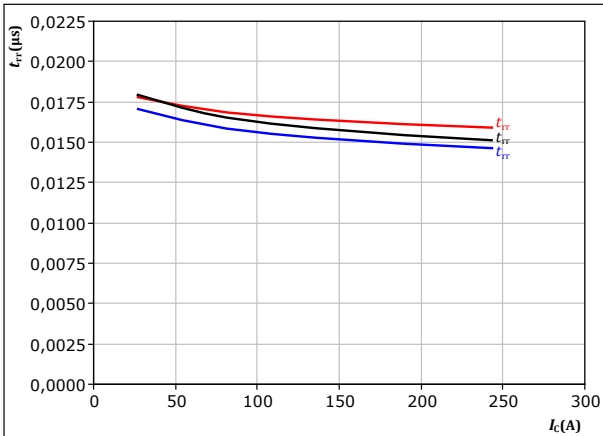
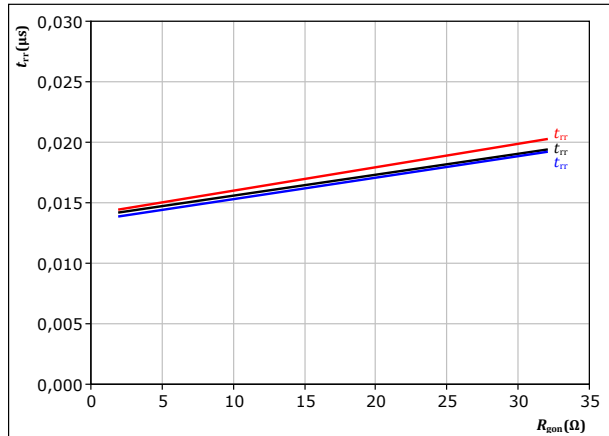


figure 48.

FWD

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





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datasheet

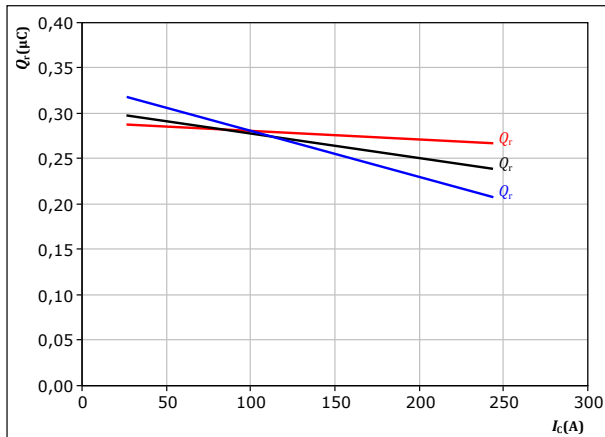
Outer Boost Switching Characteristics

figure 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
 $R_{gon} = 8$ Ω

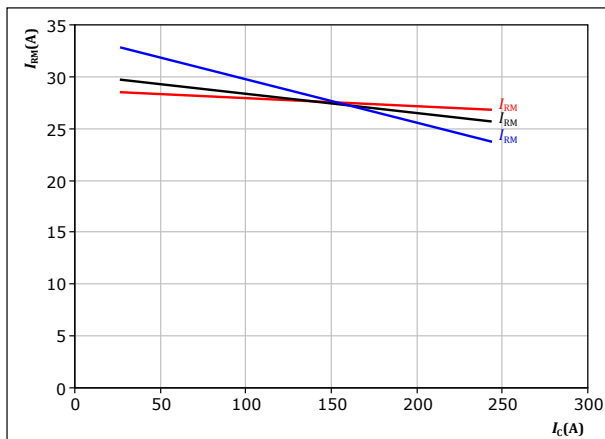
T_j : 25 °C
125 °C
150 °C

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
 $R_{gon} = 8$ Ω

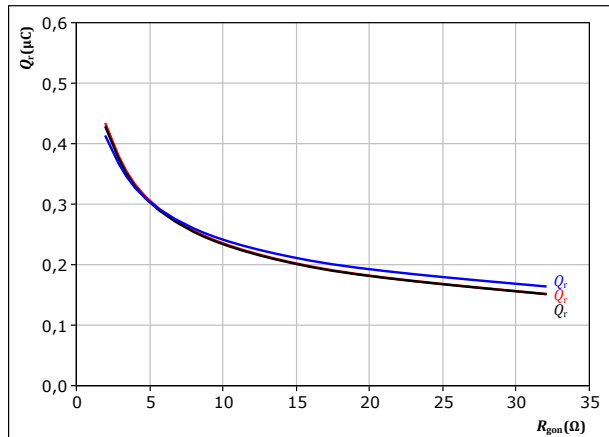
T_j : 25 °C
125 °C
150 °C

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

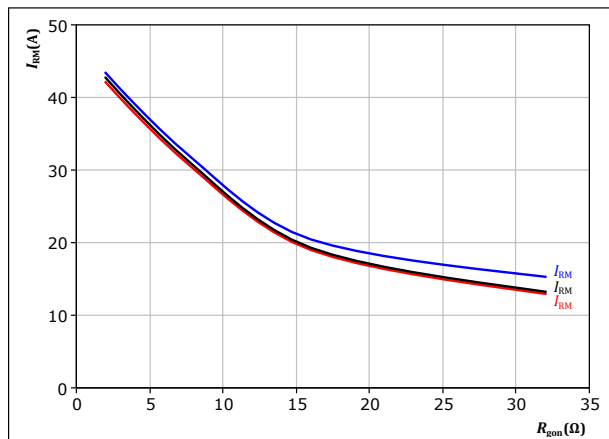
T_j : 25 °C
125 °C
150 °C

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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datasheet

Outer Boost Switching Characteristics

figure 53. FWD

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

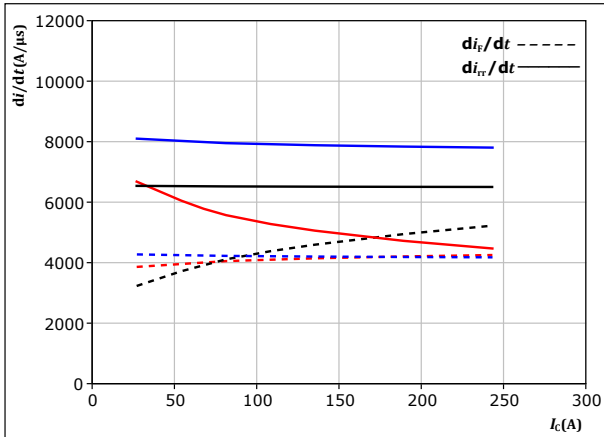


figure 54. FWD

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

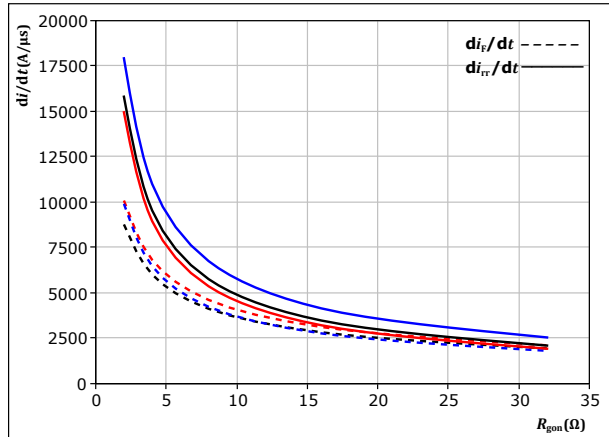
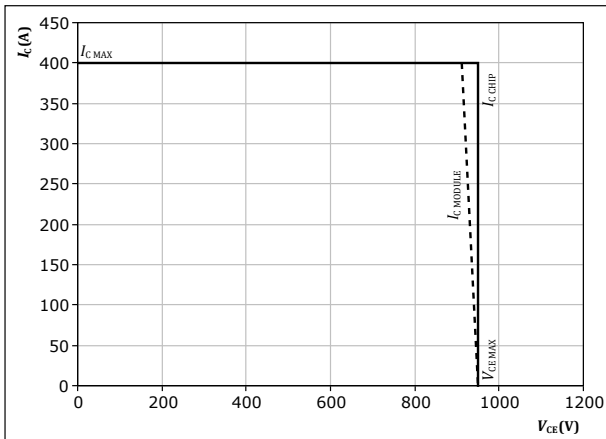


figure 55. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$





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datasheet

Switching Definitions

figure 56. IGBT

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

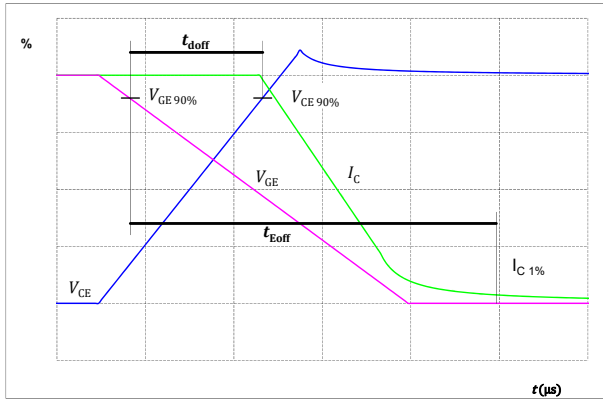


figure 57. IGBT

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

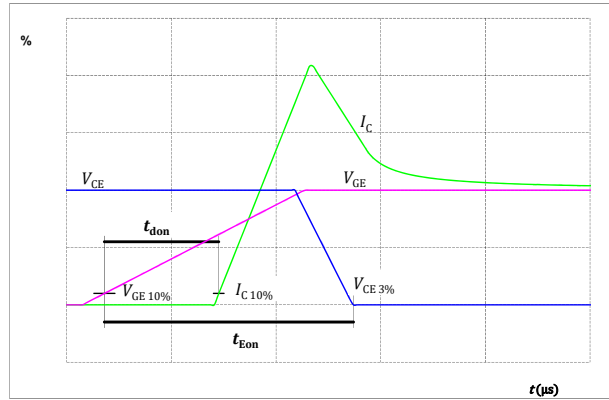


figure 58. IGBT

Turn-off Switching Waveforms & definition of t_f

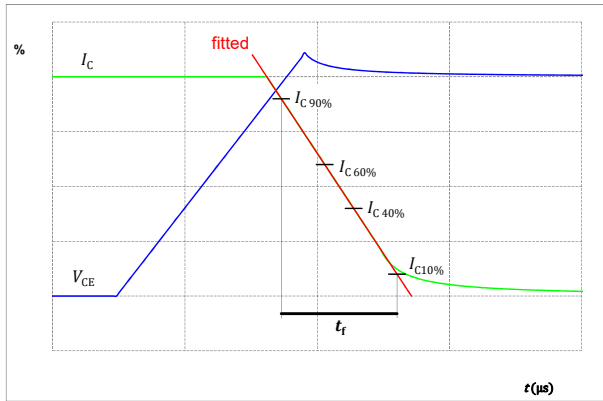
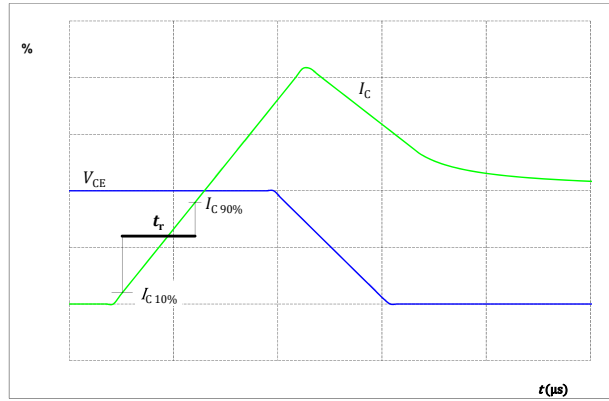


figure 59. IGBT

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}

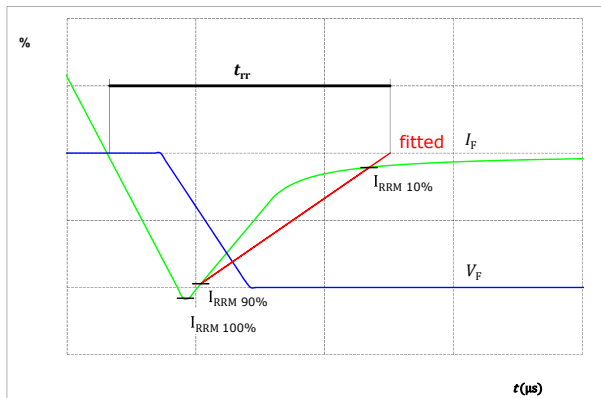
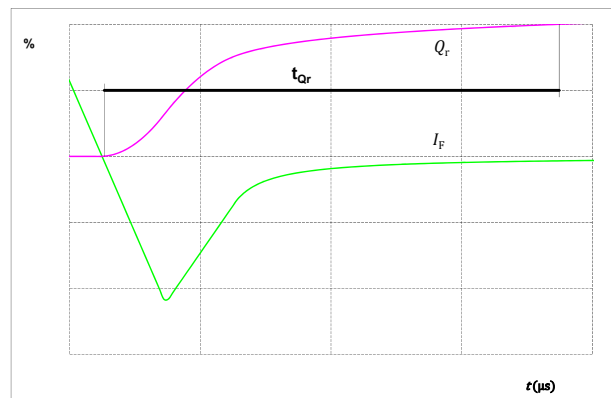


figure 61.

FWD

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





datasheet

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				

Dimensions: 30,4 mm (width), 47,7 mm (height), 10,65 mm (pin offset), 12,5 mm (pin offset), 9,8 mm (pin offset), 22 mm (pin offset), 24,7 mm (pin offset), 10,65 mm (pin offset), 7,95 mm (pin offset), 7,65 mm (pin offset), 11,9 mm (pin offset), 9,2 mm (pin offset), 21,65 mm (pin offset), 17,8 mm (pin offset), 12,65 mm (pin offset), 17,15 mm (pin offset), 16,45 mm (pin offset), 24,7 mm (pin offset).

[illegible]

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.				
Application Note				
For use of pre-charging auxiliary diodes see application note: "The Advantages and Operation of Flying-Capacitor Boosters" at vincotech.com				
UL recognition and file number				
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.				

Document No.:	Date:	Modification:	Pages
B0-SL10B2A200S705-PA58L96Z-D3-14	20 Jan. 2023	Without Capacitors	

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