



Vincotech

B0-SL10NIA300S704-LS78F98Z

datasheet

flowNPC S3

950 V / 300 A

Features

- Low inductive mid-power package
- Optimized components for 1500 V applications
- Improved LVRT performance

Target applications

- Solar Inverters

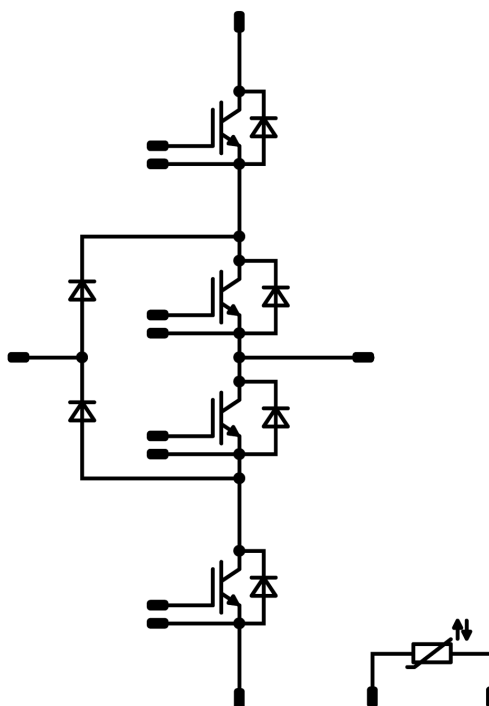
Types

- B0-SL10NIA300S704-LS78F98Z

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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Buck Switch

Collector-emitter voltage	V_{CES}		950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	196	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	393	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	°C

Buck Diode

Peak repetitive reverse voltage	V_{RRM}		950	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	101	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	177	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Switch

Collector-emitter voltage	V_{CES}		950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	148	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	283	W
Gate-emitter voltage	V_{GES}		± 20	V
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
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		950	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	101	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	177	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Sw. Inv. Diode

Peak repetitive reverse voltage	V_{RRM}		950	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	101	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	177	W
Maximum junction temperature	T_{jmax}		175	°C

Module Properties

Thermal Properties

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

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage* $t_p = 2\text{ s}$	6000	V
Creepage distance			11,65	mm
Clearance			10,18	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	

Buck Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00501	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		300	25 125 150		1,9 2,23 2,31	2,35 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	950		25			6	µA
Gate-emitter leakage current	I_{GES}		20	0		25			300	nA
Internal gate resistance	r_g							0,5		Ω
Input capacitance	C_{ies}	$f = 100 \text{ kHz}$	0	25		25		19500		pF
Output capacitance	C_{oes}							417		pF
Reverse transfer capacitance	C_{res}							60		pF
Gate charge	Q_g		±15		0	25		690		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (PTM)						0,24		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \text{ } \Omega$ $R_{goff} = 4 \text{ } \Omega$	±15	600	200	25 125 150		214,4 214,4 214,72		ns
Rise time	t_r					25 125 150		24,64 26,88 27,52		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		170,88 203,84 212,8		ns
Fall time	t_f					25 125 150		26,29 50,25 61,85		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		7,73 8,96 9,14		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		6,02 10,13 11,42		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	

Buck Diode

Static

Forward voltage	V_F				200	25 125 150	2,1	2,64 2,44 2,36	2,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 950$ V				25			8	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,54		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=6992$ A/μs $di/dt=6819$ A/μs $di/dt=6814$ A/μs	± 15	600	200	25 125 150		131,6 188,79 203,87		A
Reverse recovery time	t_{rr}					25 125 150		130,35 171,25 185,89		ns
Recovered charge	Q_r					25 125 150		5,72 12 14		μC
Reverse recovered energy	E_{rec}					25 125 150		1,95 4,34 5,18		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6440 5535 5499		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		

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	$t_{d(on)}$	$R_{gon} = 4 \Omega$ $R_{goff} = 4 \Omega$	±15	600	200	25 125 150		154,24 155,2 156,16		ns
Rise time	t_r					25 125 150		23,04 26,24 26,24		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		125,12 147,84 153,92		ns
Fall time	t_f					25 125 150		29,93 54,38 65,41		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		7,44 8,33 8,57		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		5,56 9,29 10,33		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	

Boost Diode

Static

Forward voltage	V_F				200	25 125 150	2,1	2,64 2,44 2,36	2,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 950$ V				25			8	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,54		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=6438$ A/μs $di/dt=6133$ A/μs $di/dt=6024$ A/μs	± 15	600	200	25 125 150		107,62 158,66 175,89		A
Reverse recovery time	t_{rr}					25 125 150		141,68 186,21 204,13		ns
Recovered charge	Q_r					25 125 150		5,52 11,68 14,09		μC
Reverse recovered energy	E_{rec}					25 125 150		1,76 3,88 4,78		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		4525 3268 3188		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	

Boost Sw. Inv. Diode

Static

Forward voltage	V_F			200	25 125 150	2,1	2,64 2,44 2,36	2,8 ⁽¹⁾		V
Reverse leakage current	I_R	$V_i = 950$ V			25			8		µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)					0,54			K/W
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Thermistor

Static

Rated resistance	R				25		22			kΩ
Deviation of R_{100}	$\Delta_{R/R}$	$R_{100} = 1484$ Ω			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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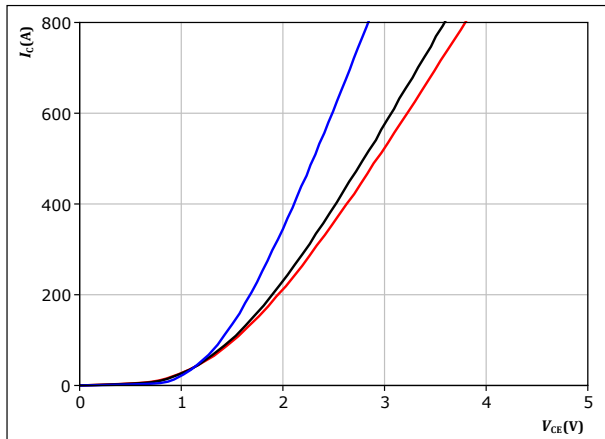
datasheet

Buck Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

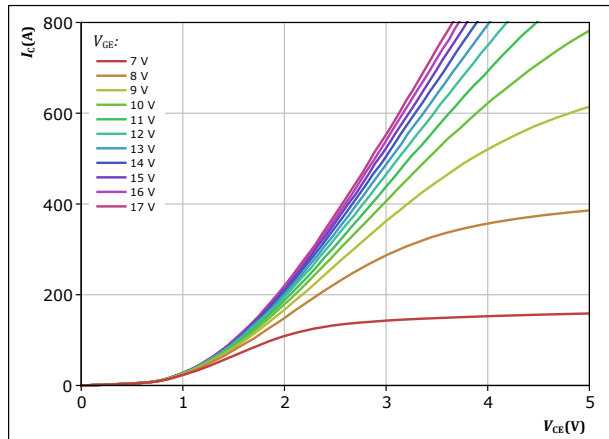


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 T_j : 25 °C, 125 °C, 150 °C

figure 2. IGBT

Typical output characteristics

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

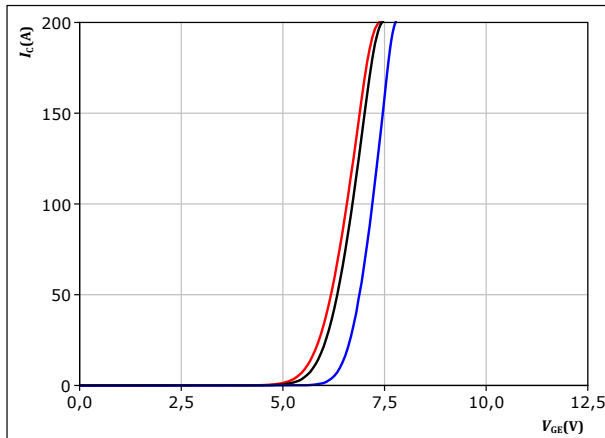


$t_p = 250 \mu s$
 $T_j = 150 \text{ °C}$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

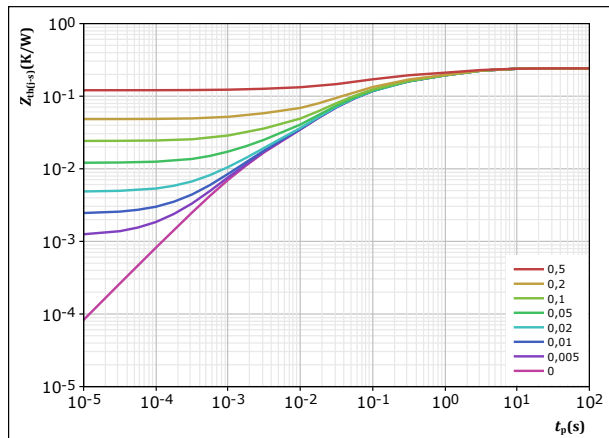


$t_p = 250 \mu s$
 $V_{CE} = 18 V$
 T_j : 25 °C, 125 °C, 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,242 \text{ K/W}$
IGBT thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
2,73E-02	4,22E+00
6,54E-02	1,10E+00
7,62E-02	1,31E-01
6,25E-02	2,86E-02
1,02E-02	1,84E-03



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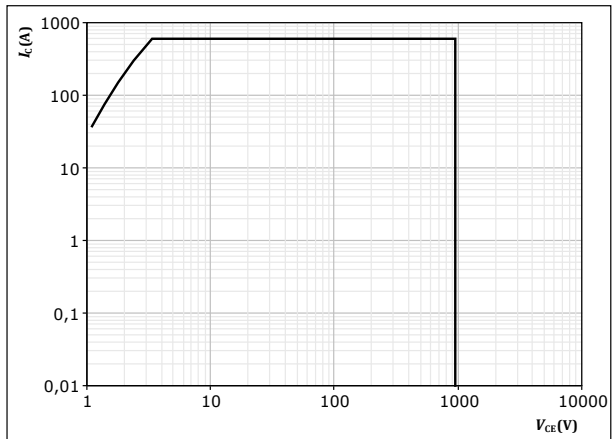
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datasheet

Buck Switch Characteristics

figure 5. IGBT

Safe operating area

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



$D =$ single pulse

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



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Buck Diode Characteristics

figure 6.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

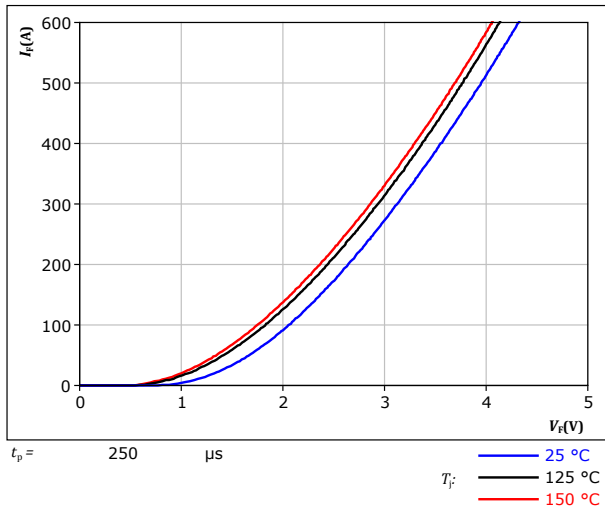
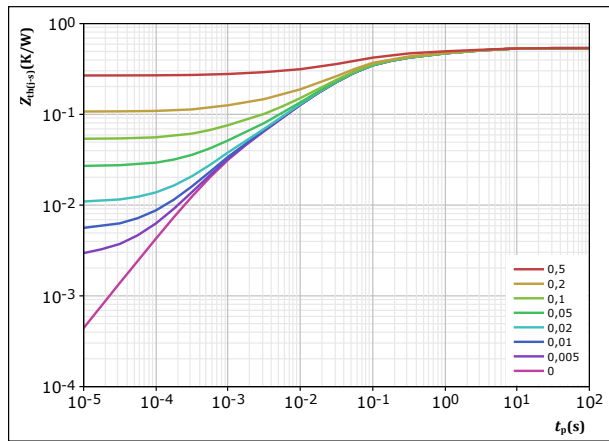


figure 7.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	0,536	K/W
FWD thermal model values		
R (K/W)	τ (s)	
7,69E-02	3,35E+00	
9,02E-02	4,45E-01	
2,58E-01	5,60E-02	
8,45E-02	9,21E-03	
2,68E-02	8,82E-04	



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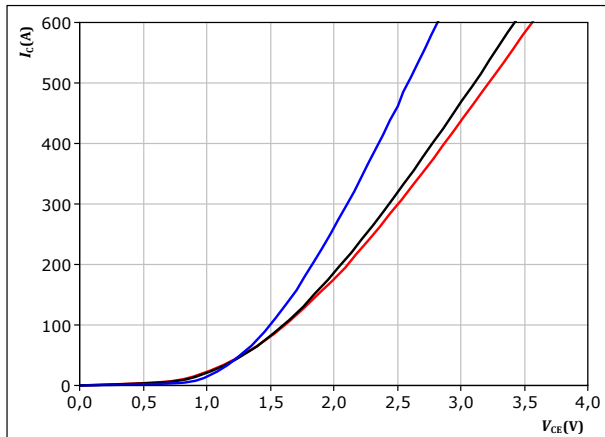
datasheet

Boost Switch Characteristics

figure 8. IGBT

Typical output characteristics

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

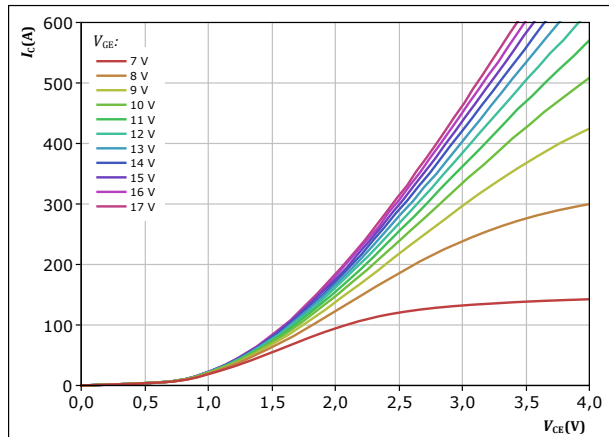


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 9. IGBT

Typical output characteristics

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

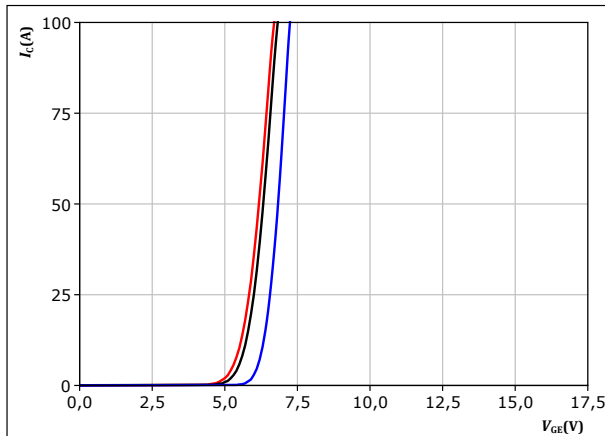


$t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 10. IGBT

Typical transfer characteristics

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

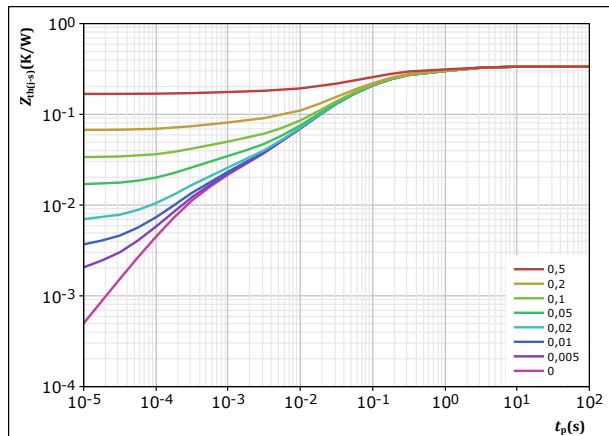


$t_p = 250 \mu s$
 $V_{CE} = 8 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 11. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0.336 \text{ K/W}$
IGBT thermal model values

R (K/W)	τ (s)
6,56E-02	1,61E+00
1,54E-01	1,15E-01
9,21E-02	2,31E-02
1,13E-02	2,30E-03
1,31E-02	3,26E-04



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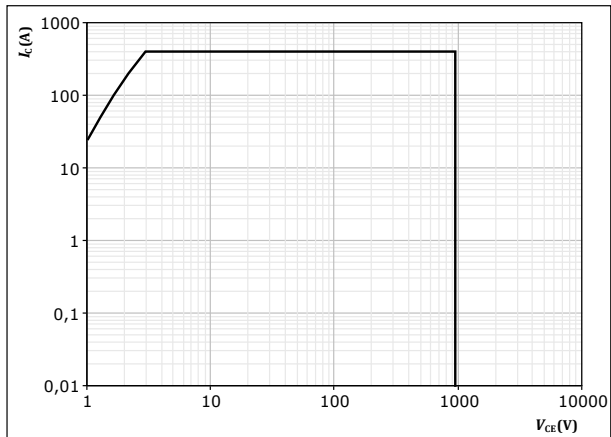
Boost Switch Characteristics

figure 12.

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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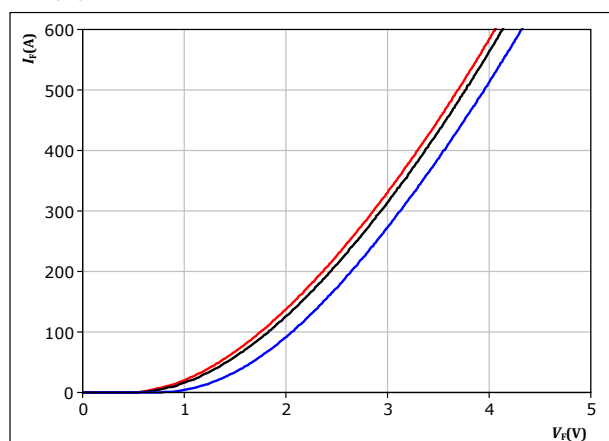
Boost Diode Characteristics

figure 13.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

$T_j:$

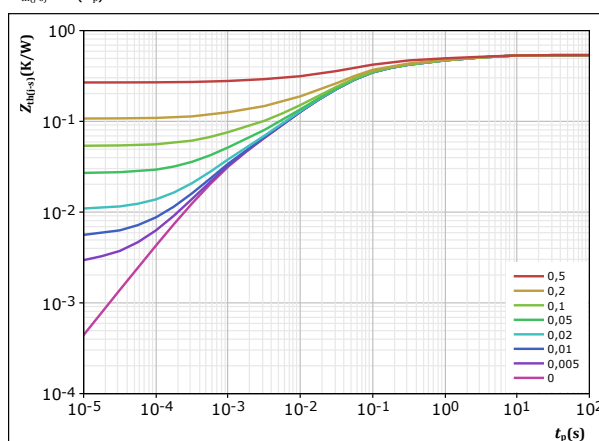
- 25 °C
- 125 °C
- 150 °C

figure 14.

FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,536 \text{ K/W}$

FWD thermal model values

R (K/W)	τ (s)
7,69E-02	3,35E+00
9,02E-02	4,45E-01
2,58E-01	5,60E-02
8,45E-02	9,21E-03
2,68E-02	8,82E-04



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Boost Sw. Inv. Diode Characteristics

figure 15.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

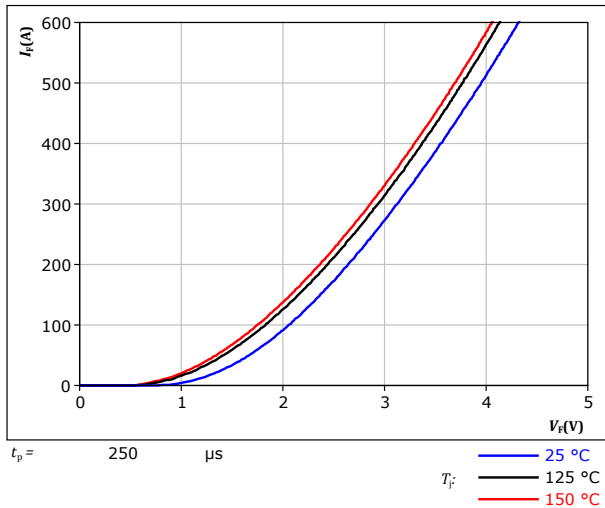
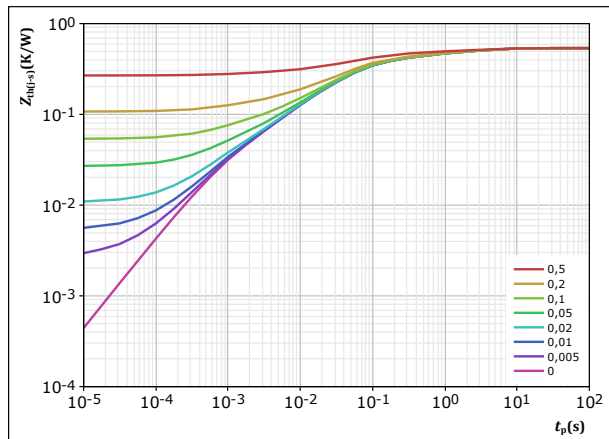


figure 16.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	0,536	K/W
FWD thermal model values		
R (K/W)	τ (s)	
7,69E-02	3,35E+00	
9,02E-02	4,45E-01	
2,58E-01	5,60E-02	
8,45E-02	9,21E-03	
2,68E-02	8,82E-04	



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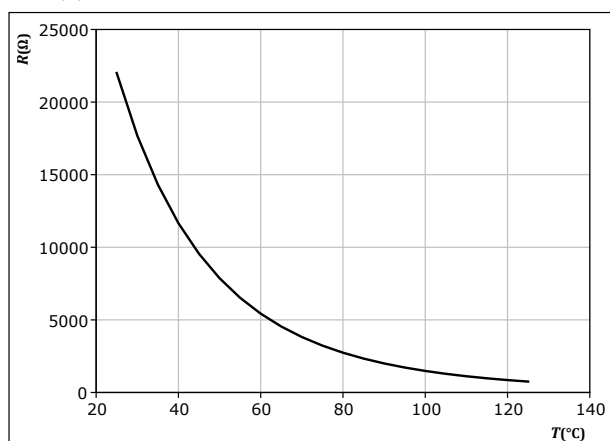
Thermistor Characteristics

figure 17.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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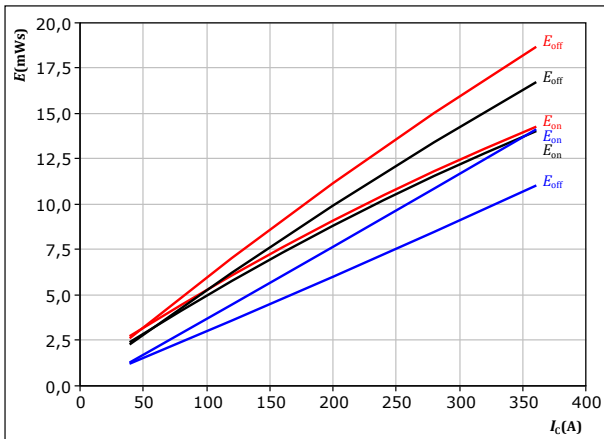
Buck Switching Characteristics

figure 18.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

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

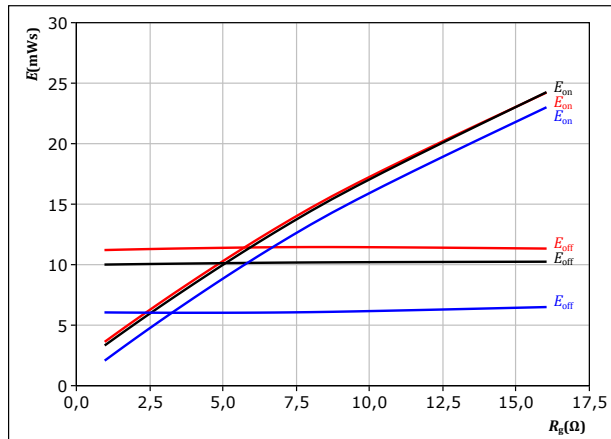
T_j : 25 °C
125 °C
150 °C

figure 19.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 200 \text{ A}$

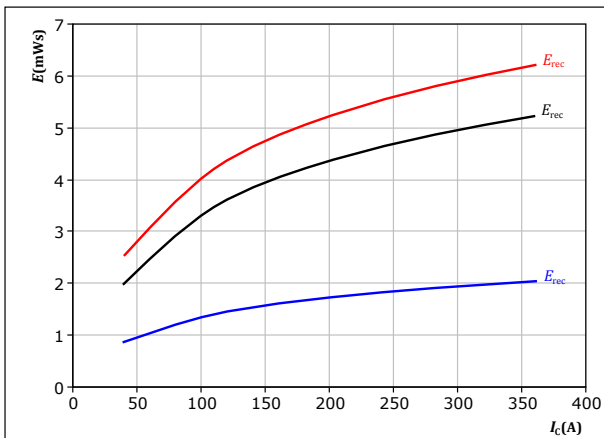
T_j : 25 °C
125 °C
150 °C

figure 20.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

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

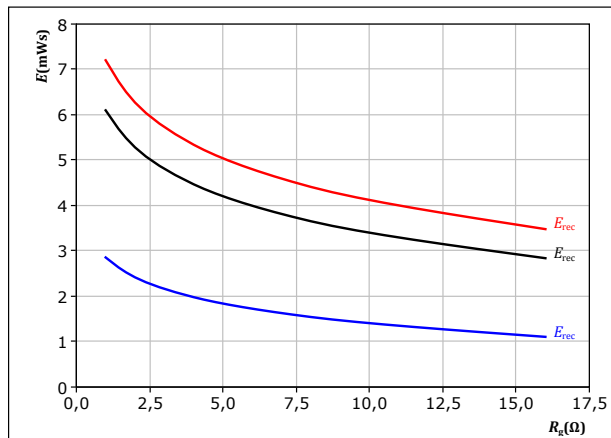
T_j : 25 °C
125 °C
150 °C

figure 21.

FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 200 \text{ A}$

T_j : 25 °C
125 °C
150 °C



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Buck Switching Characteristics

figure 22.

IGBT

Typical switching times as a function of collector current

$$t = f(I_c)$$

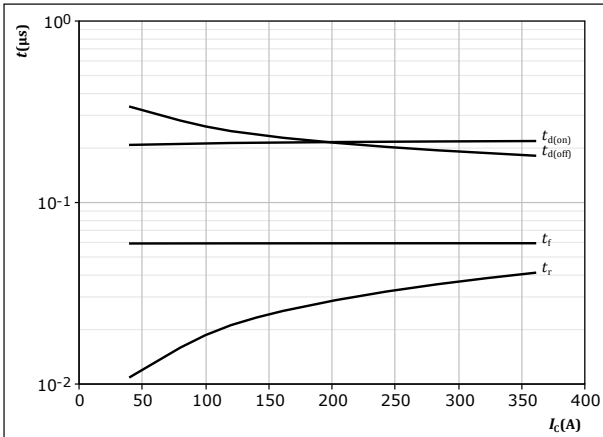


figure 23.

IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$

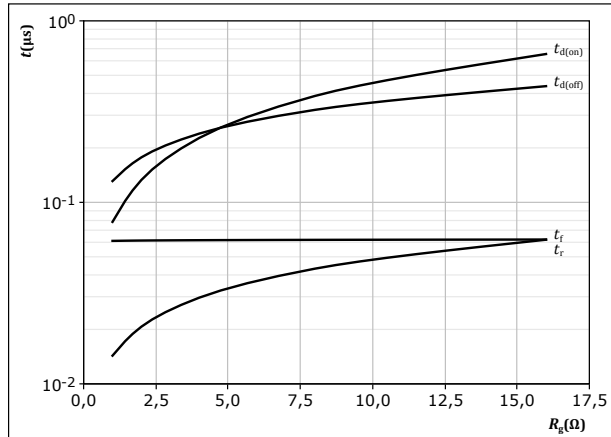


figure 24.

FWD

Typical reverse recovery time as a function of collector current

$$t_{rr} = f(I_c)$$

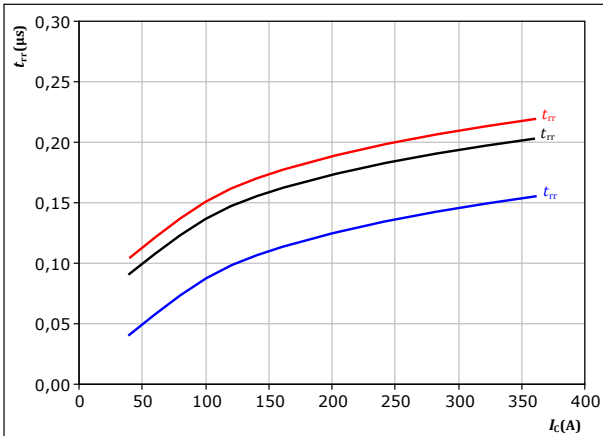
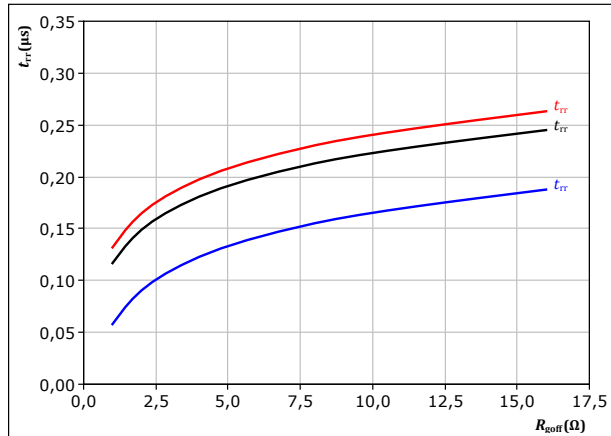


figure 25.

FWD

Typical reverse recovery time as a function of IGBT turn off gate resistor

$$t_{rr} = f(R_{goff})$$





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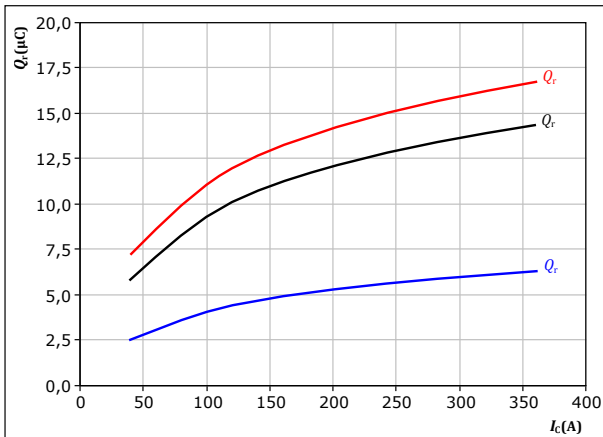
Buck Switching Characteristics

figure 26.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

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

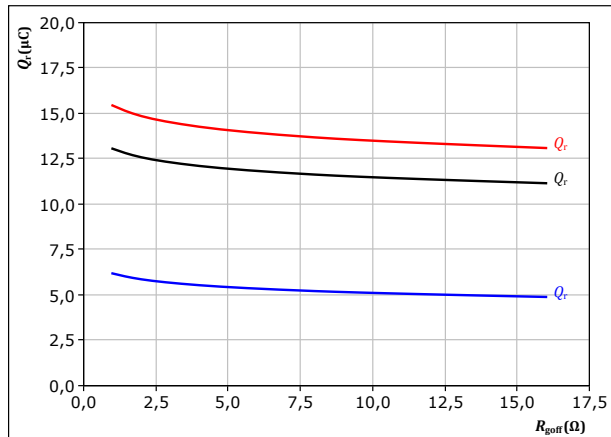
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 27.

FWD

Typical recovered charge as a function of turn off gate resistor

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 200$ A

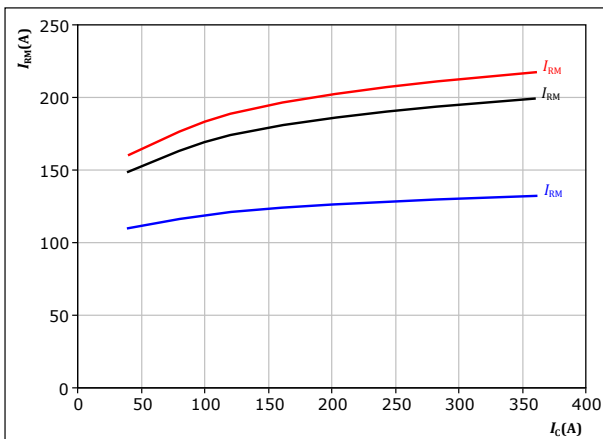
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 28.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

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

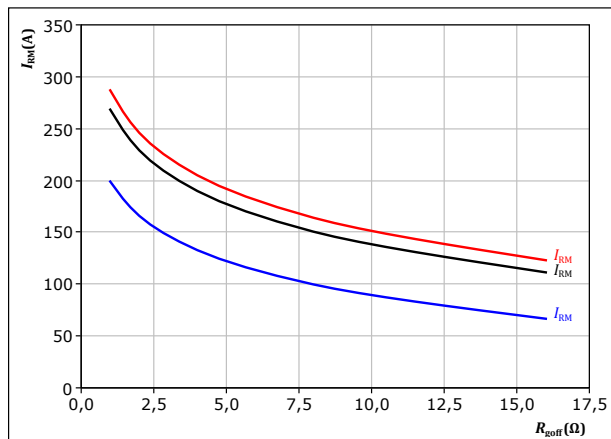
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 29.

FWD

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

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 200$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



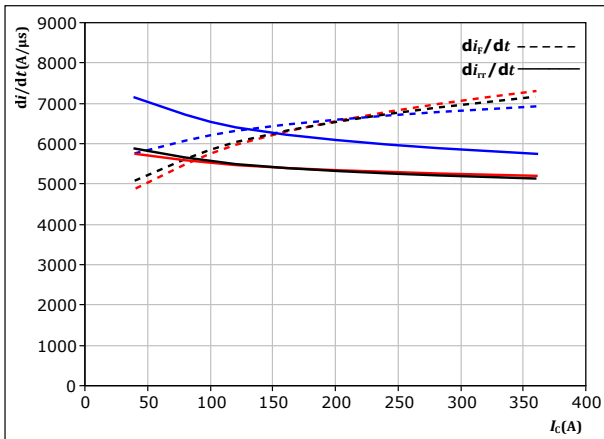
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datasheet

Buck Switching Characteristics

figure 30. FWD

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



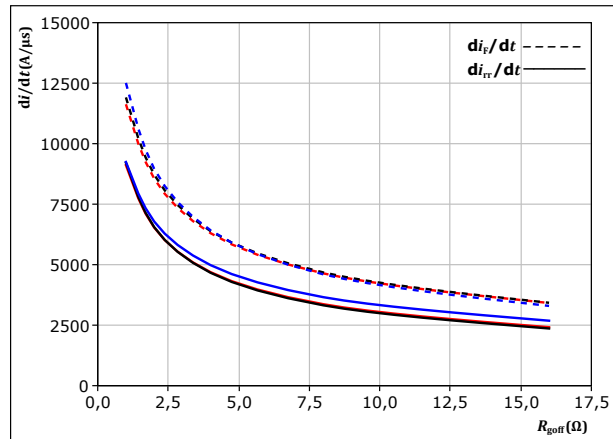
With an inductive load at

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

$T_j = 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$

figure 31. FWD

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



With an inductive load at

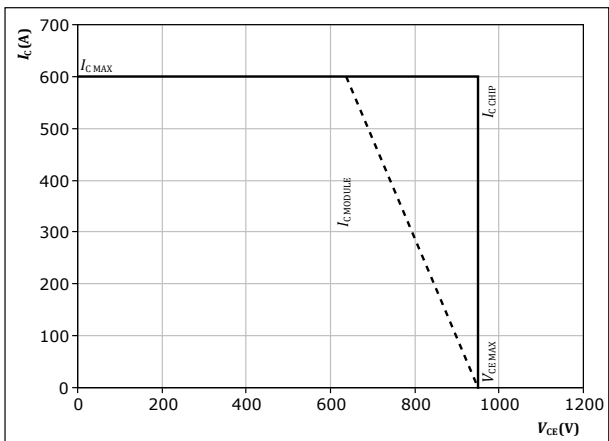
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 200 \text{ A}$

$T_j = 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$

figure 32. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



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



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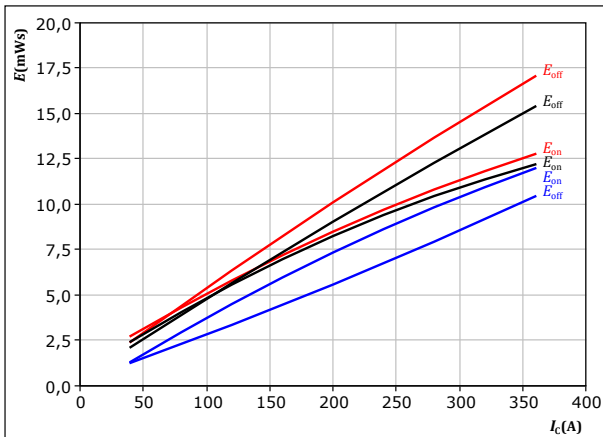
Boost Switching Characteristics

figure 33.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

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

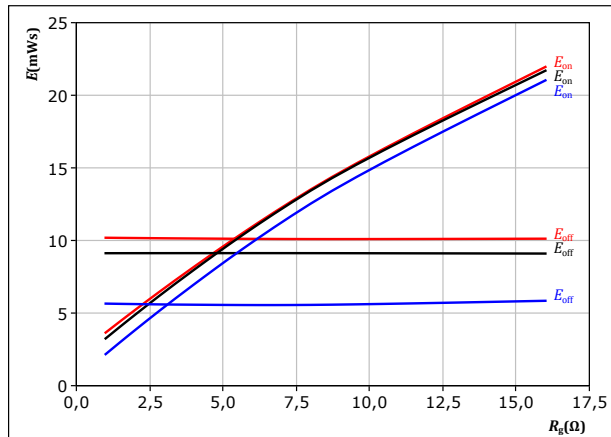
T_j : $25 \text{ } ^\circ\text{C}$ (blue)
 $125 \text{ } ^\circ\text{C}$ (black)
 $150 \text{ } ^\circ\text{C}$ (red)

figure 34.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 200 \text{ A}$

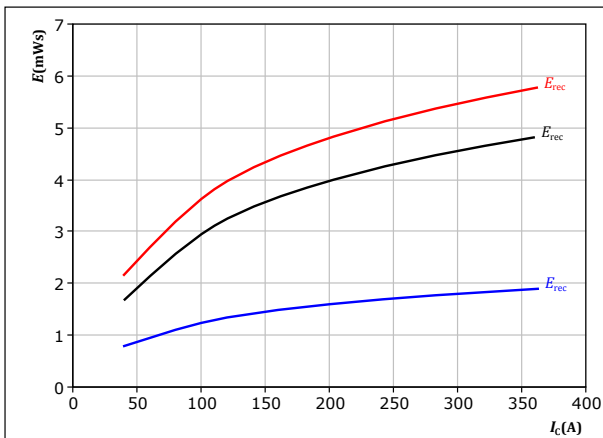
T_j : $25 \text{ } ^\circ\text{C}$ (blue)
 $125 \text{ } ^\circ\text{C}$ (black)
 $150 \text{ } ^\circ\text{C}$ (red)

figure 35.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

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

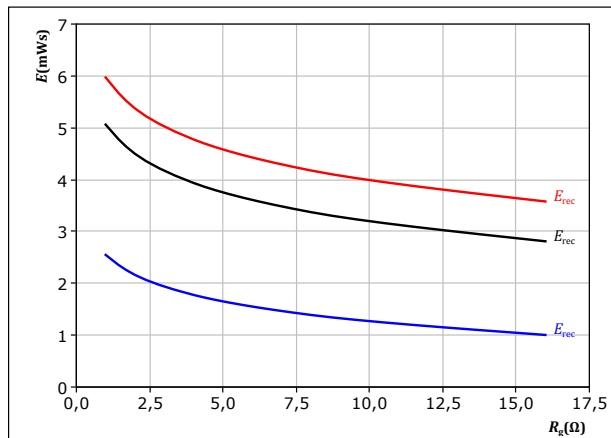
T_j : $25 \text{ } ^\circ\text{C}$ (blue)
 $125 \text{ } ^\circ\text{C}$ (black)
 $150 \text{ } ^\circ\text{C}$ (red)

figure 36.

FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 200 \text{ A}$

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



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Boost Switching Characteristics

figure 37.

IGBT

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

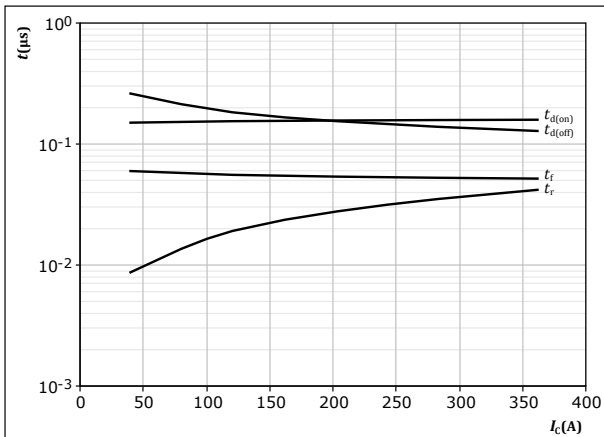


figure 38.

IGBT

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

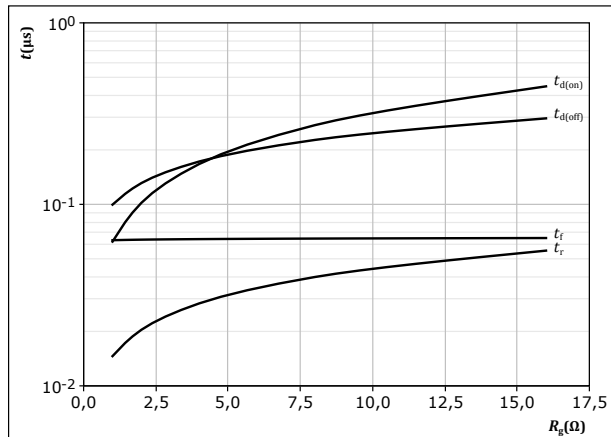


figure 39.

FWD

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

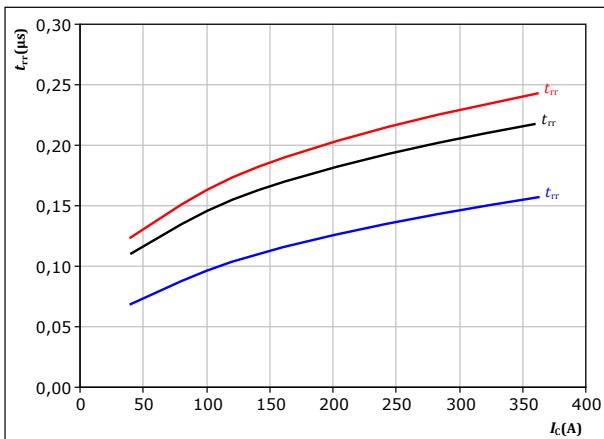
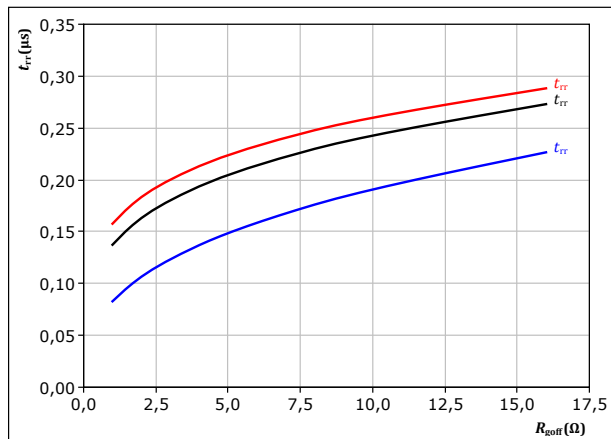


figure 40.

FWD

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





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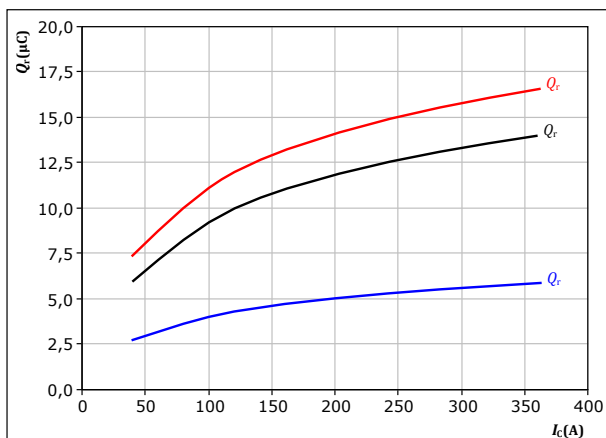
Boost Switching Characteristics

figure 41.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

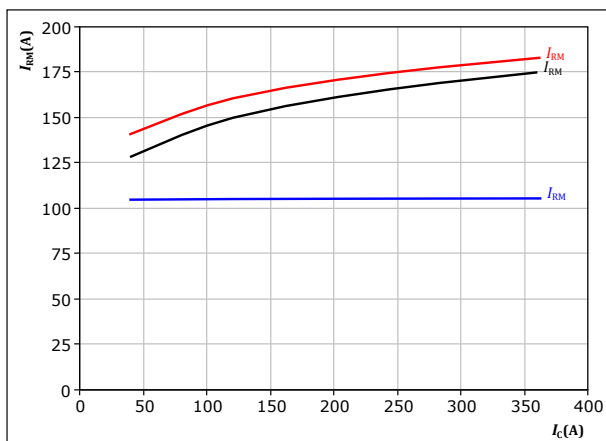
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 43.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

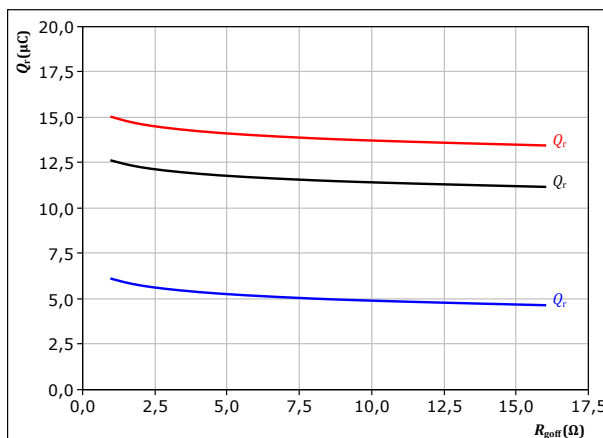
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 42.

FWD

Typical recovered charge as a function of turn off gate resistor

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



With an inductive load at

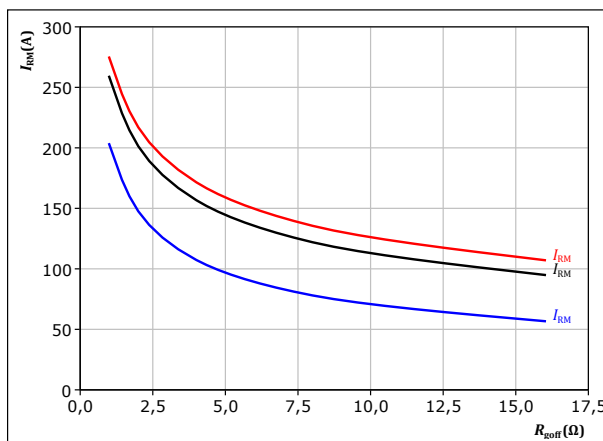
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 200$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 44.

FWD

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

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 200$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)



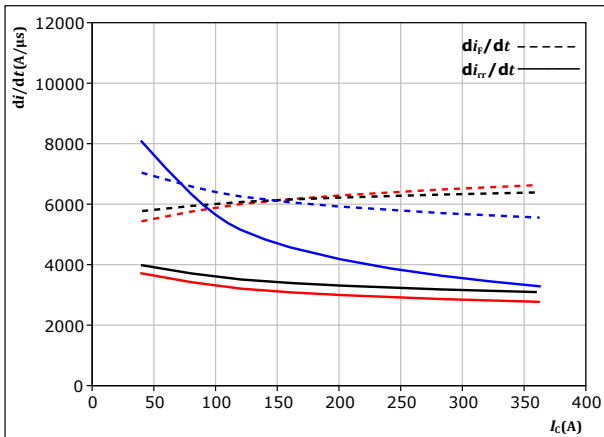
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datasheet

Boost Switching Characteristics

figure 45. 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

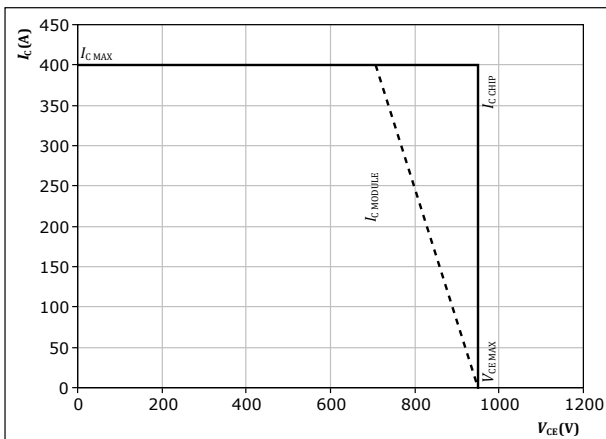
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{goff} = 4 \text{ } \Omega$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 47. IGBT

Reverse bias safe operating area

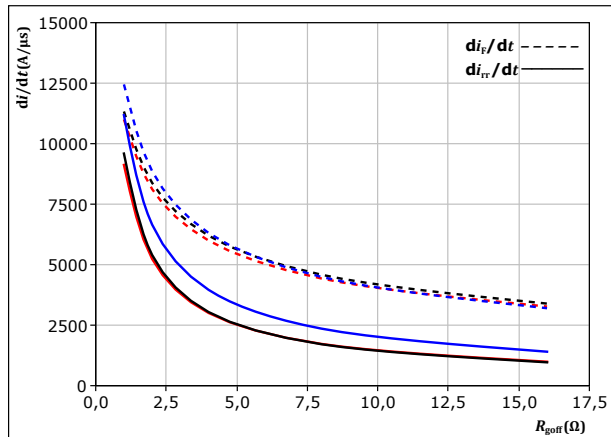
$I_C = f(V_{CE})$



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

figure 46. FWD

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



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 200 \text{ A}$

T_j :
— 25 °C
— 125 °C
— 150 °C



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Switching Definitions

figure 48. IGBT

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

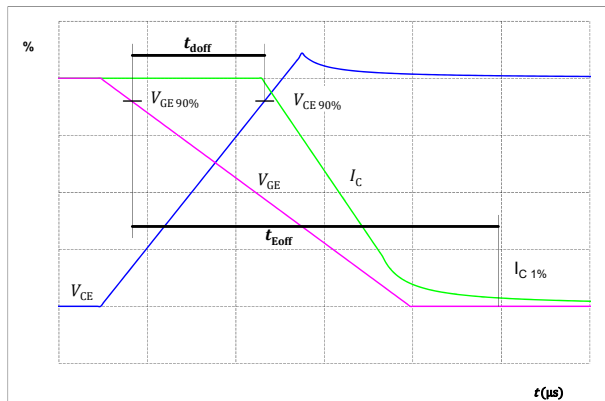


figure 49. IGBT

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

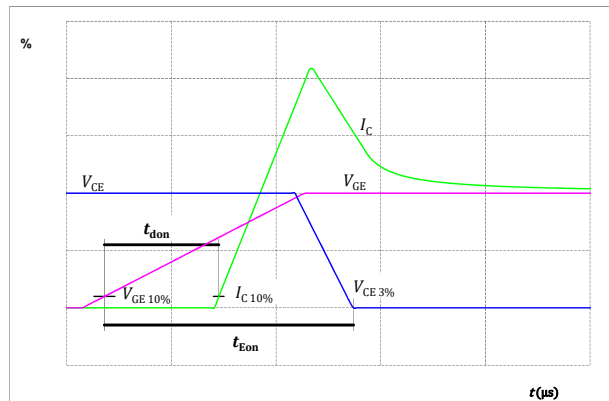


figure 50. IGBT

Turn-off Switching Waveforms & definition of t_f

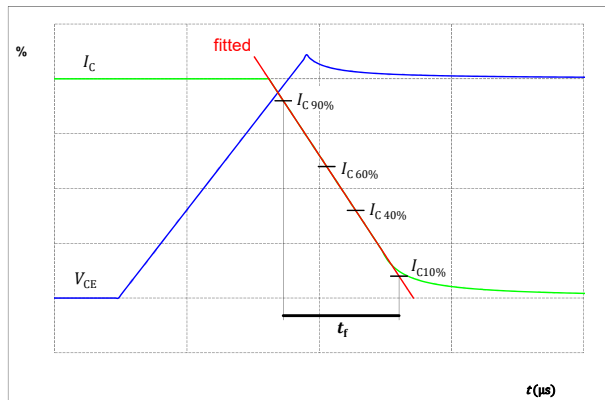
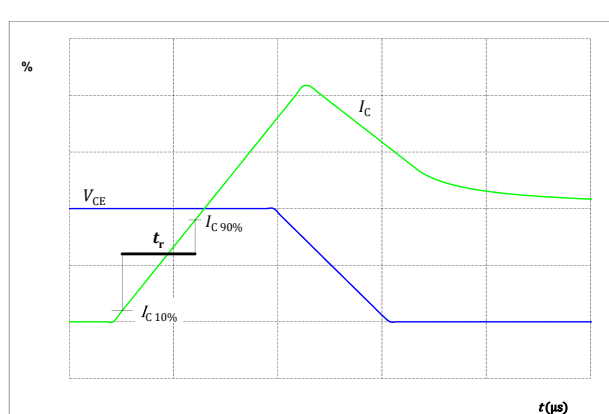


figure 51. IGBT

Turn-on Switching Waveforms & definition of t_r





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Switching Definitions

figure 52.

FWD

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

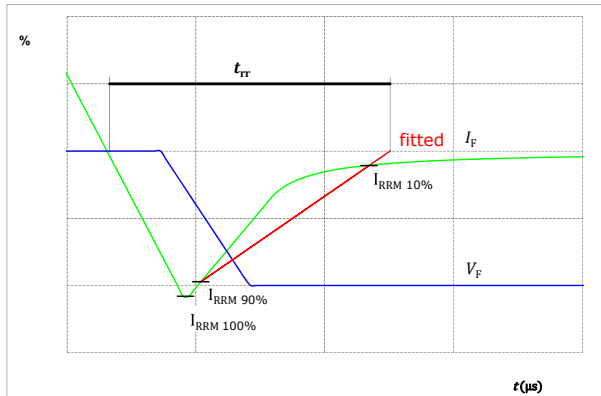
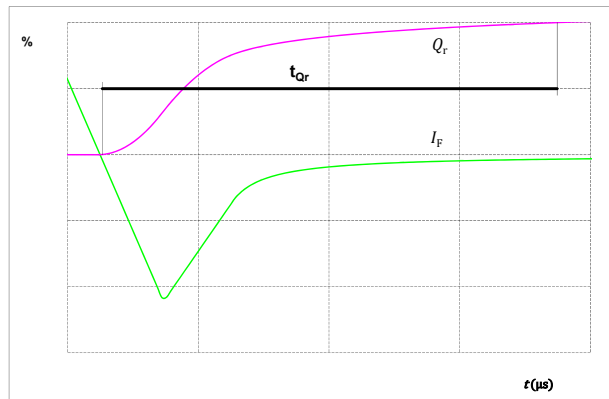


figure 53.

FWD

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





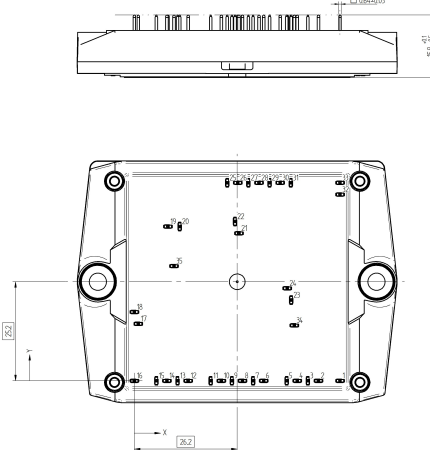
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Ordering Code	
Version	Ordering Code
With thermal paste (5,2 W/mK, PTM6000HV)	B0-SL10NIA300S704-LS78F98Z-/7/

Marking							
 NN-NNNNNNNNNNNNNN TTTTTTWWYY UL VIN LLLL SSSS	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNN- TTTTTTVV		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	
1	52,4	0	DC-	
2	46,9	0	DC-	
3	44,2	0	DC-	
4	41,5	0	DC-	
5	38,8	0	DC-	
6	32,95	0	GND	
7	30,25	0	GND	
8	27,55	0	GND	
9	24,85	0	GND	
10	22,15	0	GND	
11	19,45	0	GND	
12	13,7	0	DC+	
13	11	0	DC+	
14	8,3	0	DC+	
15	5,6	0	DC+	
16	0	0	DC+	
17	1	14,5	G11	
18	0	17,5	S11	
19	8,55	39,25	S12	
20	11,55	39,25	G12	
21	26,65	37,55	G13	
22	25,65	40,55	S13	
23	39,95	20,55	G14	
24	38,95	23,55	S14	
25	23,65	50,4	Ph	
26	26,35	50,4	Ph	
27	29,05	50,4	Ph	
28	31,75	50,4	Ph	
29	34,45	50,4	Ph	
30	37,15	50,4	Ph	
31	39,85	50,4	Ph	
32	52,4	47,4	Therm1	
33	52,4	50,4	Therm2	
34	40,75	14,1	N	
35	10,1	29,2	P	

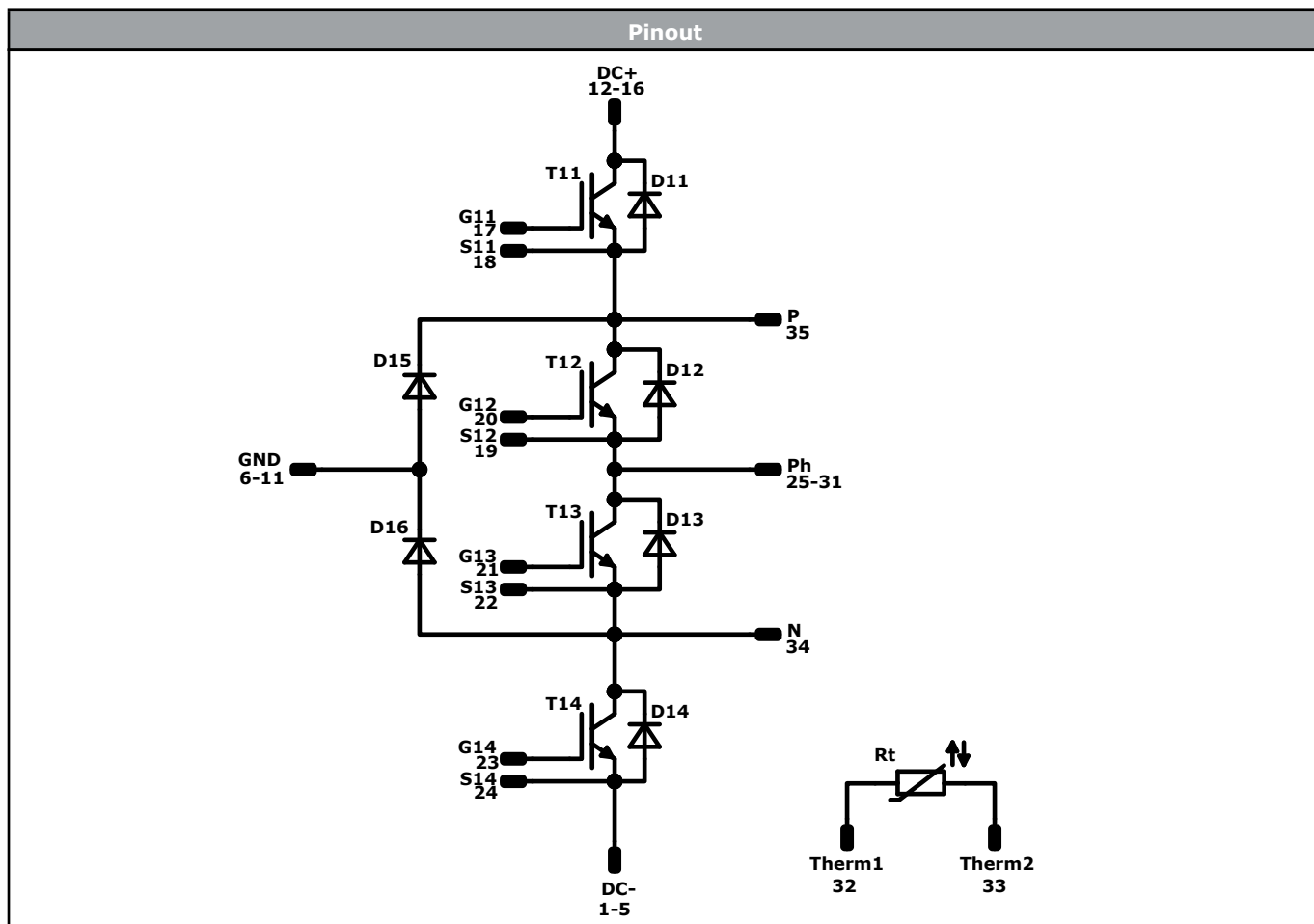


Tolerance of positions: $\pm 0,05$ mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



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Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T14	IGBT	950 V	300 A	Buck Switch	
D15, D16	FWD	950 V	200 A	Buck Diode	
T12, T13	IGBT	950 V	200 A	Boost Switch	
D14, D11	FWD	950 V	200 A	Boost Diode	
D13, D12	FWD	950 V	200 A	Boost Sw. Inv. Diode	
Rt	Thermistor			Thermistor	



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Packaging instruction				
Standard packaging quantity (SPQ) 45	>SPQ	Standard	<SPQ	Sample
Handling instruction				
Handling instructions for <i>flow</i> S3 packages see vincotech.com website.				
Package data				
Package data for <i>flow</i> S3 packages see vincotech.com website.				
Vincotech thermistor reference				
See Vincotech thermistor reference table at vincotech.com website.				
UL recognition and file number				
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.				

Document No.:	Date:	Modification:	Pages
B0-SL10NIA300S704-LS78F98Z-D1-14	7 Jan. 2021		
B0-SL10NIA300S704-LS78F98Z-D2-14	7 Jul. 2021	Module marking is updated with UL logo, product is unchanged	
B0-SL10NIA300S704-LS78F98Z-D3-14	27 Jan. 2022	Correct function names in Pin table	

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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.