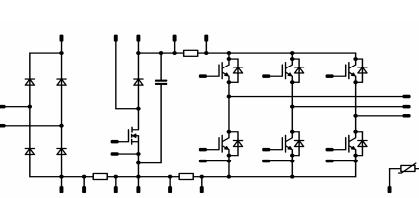


**flow PIM 1 + PFC****600 V / 10 A****Features**

- Single-Phase Input Rectifier
- PFC Transistor + Diode
- Three-phase Inverter IGBT + FWD
- HF-Capacitor in DC Link
- Shunt for short to Ground protection in the B+
- Current sense shunt in the B -
- Current sense shunt for PFC controlling in the DC -
- NTC

**flow 1 17 mm housing****Target Applications**

- Embedded Drives
- Industrial Drives

**Schematic****Types**

- V23990-P303-B24-PM

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

Parameter	Symbol	Condition	Value	Unit
-----------	--------	-----------	-------	------

**Input Rectifier Diode**

Repetitive peak reverse voltage	$V_{RRM}$		1200	V
DC forward current	$I_{FAV}$	$T_j = T_{jmax}$	25	A
Surge forward current	$I_{FSM}$	$t_p = 10 \text{ ms}$	200	A
I <sup>2</sup> t-value	$I^2t$		200	$\text{A}^2\text{s}$
Power dissipation per Diode	$P_{tot}$	$T_j = T_{jmax}$	44	W
Maximum Junction Temperature	$T_{jmax}$		150	$^\circ\text{C}$

**PFC MOSFET**

Drain to source breakdown voltage	$V_{DS}$		500	V
DC drain current	$I_D$	$T_j = T_{jmax}$	19	A
Pulsed drain current	$I_{Dpulse}$	$t_p$ limited by $T_{jmax}$	30	A
Power dissipation	$P_{tot}$	$T_j = T_{jmax}$	156	W
Gate-source peak voltage	$V_{GSS}$		$\pm 20$	V
Maximum Junction Temperature	$T_{jmax}$		150	$^\circ\text{C}$

**PFC FWD**

Peak Repetitive Reverse Voltage	$V_{RRM}$		600	V
DC forward current	$I_F$	$T_j = T_{jmax}$	10	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	20	A
Power dissipation	$P_{tot}$	$T_j = T_{jmax}$	13	W
Maximum Junction Temperature	$T_{jmax}$		150	$^\circ\text{C}$



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## Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
<b>PFC Shunt</b>				
DC forward current	$I_F$	$T_c=25^\circ\text{C}$	14	A
Power dissipation per Shunt	$P_{\text{tot}}$	$T_c=25^\circ\text{C}$	10	W

## Inverter IGBT

Collector-emitter break down voltage	$V_{\text{CE}}$		600	V
DC collector current	$I_C$	$T_j = T_{j\text{max}}$	10	A
Pulsed collector current	$I_{\text{CRM}}$	$t_p$ limited by $T_{j\text{max}}$	20	A
Power dissipation per IGBT	$P_{\text{tot}}$	$T_j = T_{j\text{max}}$	20	W
Gate-emitter peak voltage	$V_{\text{GE}}$		$\pm 20$	V
Short circuit ratings	$t_{\text{SC}}$	$T_j \leq 150^\circ\text{C}$ $V_{\text{GE}} = 15\text{ V}$	10	$\mu\text{s}$
Maximum Junction Temperature	$T_{j\text{max}}$		175	$^\circ\text{C}$

## Inverter FWD

Peak Repetitive Reverse Voltage	$V_{\text{RRM}}$		600	V
DC forward current	$I_F$	$T_j = T_{j\text{max}}$	10	A
Repetitive peak forward current	$I_{\text{FRM}}$	$t_p$ limited by $T_{j\text{max}}$	20	A
Power dissipation per Diode	$P_{\text{tot}}$	$T_j = T_{j\text{max}}$	17	W
Maximum Junction Temperature	$T_{j\text{max}}$		175	$^\circ\text{C}$

## DC - Shunt

DC forward current	$I_F$	$T_c=25^\circ\text{C}$	10	A
Power dissipation per Shunt	$P_{\text{tot}}$	$T_c=25^\circ\text{C}$	5	W

## DC + Shunt

DC forward current	$I_F$	$T_c=25^\circ\text{C}$	7	A
Power dissipation per Shunt	$P_{\text{tot}}$	$T_c=25^\circ\text{C}$	5	W

## DC link Capacitor

Max.DC voltage	$V_{\text{MAX}}$	$T_c=25^\circ\text{C}$	630	V
----------------	------------------	------------------------	-----	---

## Thermal Properties

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

## Insulation Properties

Insulation voltage	$V_{\text{isol}}$	DC Test Voltage*	$t_p = 2\text{ s}$	6000	V
		AC Voltage	$t_p = 1\text{ min}$	2500	V
Creepage distance				min 12,7	mm
Clearance				min 12,7	mm
Comparative Tracking Index	CTI			>200	

\*100% tested in production



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datasheet

## Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		$V_{GE}$ [V]	$V_{GS}$ [V]	$V_r$ [V]	$I_C$ [A]	$T_j$ [ $^{\circ}$ C]	Min	Typ	Max	

### Input Rectifier Diode

Forward voltage	$V_F$			10	25		1,05		V
Threshold voltage (for power loss calc. only)	$V_{to}$			10	25		0,89		V
Slope resistance (for power loss calc. only)	$r_t$			10	25		16		m $\Omega$
Reverse current	$I_r$		1600		25			0,01	mA
Thermal resistance chip to heatsink per chip	$R_{th(j-s)}$	$\lambda_{paste} = 0,8 \text{ W/mK}$ (P12)					1,50		K/W

### PFC MOSFET\*

Static drain to source ON resistance	$r_{DS(on)}$	$V_{CE} = V_{GE}$	10		13	25			260	m $\Omega$
Gate threshold voltage	$V_{I(GS)th}$	$V_{DS} = V_{GS}$			250	25	2		4	V
Gate to Source Leakage Current	$I_{GSS}$		30			25			100	nA
Turn On Delay Time	$t_{d(on)}$					25		26		
Rise Time	$t_r$					25		94		
Turn off delay time	$t_{d(off)}$	$R_{goff} = 18 \Omega$ $R_{gon} = 18 \Omega$				25		47		ns
Fall time	$t_f$					25		47		
Total gate charge	$Q_{GE}$								120	nC
Gate to source charge	$Q_{GS}$		10	400	22	25			32	
Input capacitance	$C_{iss}$	$f = 1 \text{ MHz}$	0	25		25		3450		pF
Output capacitance	$C_{oss}$							137		
Thermal resistance chip to heatsink per chip	$R_{th(j-s)}$	$\lambda_{paste} = 0,8 \text{ W/mK}$ (P12)						0,80		K/W

\* Dynamic values refer to discrete Data Sheet

### PFC FWD\*

Forward voltage	$V_F$			8	25 125		1,4 1,3	1,7 1,6	V
Reverse leakage current	$I_{rm}$		600	12	25			10	$\mu$ A
Peak recovery current	$I_{RRM}$				25 125		3,5 5,6	6 10	A
Reverse recovery time	$t_{rr}$	$di/dt = 200 \text{ A}/\mu\text{s}$	200	12	25 125		42 80	60 120	ns
Reverse recovery charge	$Q_{rr}$				25 125		80 220	180 600	$\mu$ C
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$				25 125		180 120		$\text{A}/\mu\text{s}$
Thermal resistance chip to heatsink per chip	$R_{th(j-s)}$	$\lambda_{paste} = 0,8 \text{ W/mK}$ (P12)					2,20		K/W

\* Dynamic values refer to discrete Data Sheet

### PFC Shunt

Resistance value	$R$						50		m $\Omega$
------------------	-----	--	--	--	--	--	----	--	------------



Vincotech

V23990-P303-B24-PM

datasheet

## Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
		$V_{GE}$ [V]	$V_r$ [V]	$I_C$ [A]	$T_j$ [ $^{\circ}$ C]	$V_{GS}$ [V]	$I_F$ [A]	$I_D$ [A]	Min	Typ	

### Inverter IGBT

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00035	25	4,5	5,5	6,5	V
Collector-emitter saturation voltage	$V_{CESat}$		15		10	25	1,6	2	2,5	V
Collector-emitter cut-off current incl. Diode	$I_{CES}$		0	600		25			0,05	mA
Gate-emitter leakage current	$I_{GES}$		30	0		25			120	nA
Integrated Gate resistor	$R_{gint}$						none			$\Omega$
Turn-on delay time	$t_{d(on)}$	$R_{goff} = 24 \Omega$ $R_{gon} = 24 \Omega$	$\pm 15$	400	10	25	14	36		
Rise time	$t_r$					125	15	36		
Turn-off delay time	$t_{d(off)}$					25	10	26		
Fall time	$t_f$					125	10	26		
Turn-on energy loss per pulse	$E_{on}$					25	134	280		
Turn-off energy loss per pulse	$E_{off}$					125	152	312		
Input capacitance	$C_{ies}$					125	25	54		
Thermal resistance chip to heatsink per chip	$R_{th(j-s)}$	$\lambda_{paste} = 0,8 \text{ W/mK}$ (P12)				125	28	72		
									2,10	K/W

### Inverter FWD

Diode forward voltage	$V_F$				10	25		2,2		V
Peak reverse recovery current	$I_{RRM}$	$di/dt = 200 \text{ A}/\mu\text{s}$	$\pm 15$	400	10	25		8		A
Reverse recovery time	$t_{rr}$					25		78		ns
Reverse recovered charge	$Q_{rr}$					25		280		$\mu\text{C}$
Peak rate of fall of recovery current	$(di_r/dt)_{max}$					25		200		$\text{A}/\mu\text{s}$
Thermal resistance chip to heatsink per chip	$R_{th(j-s)}$	$\lambda_{paste} = 0,8 \text{ W/mK}$ (P12)						3,20		K/W

### DC - Shunt

Resistance	$R$				25		50		$m\Omega$
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### DC + Shunt

Resistance	$R$				25		100		$m\Omega$
------------	-----	--	--	--	----	--	-----	--	-----------

### DC link Capacitor

C value	$C$					100		$n\text{F}$
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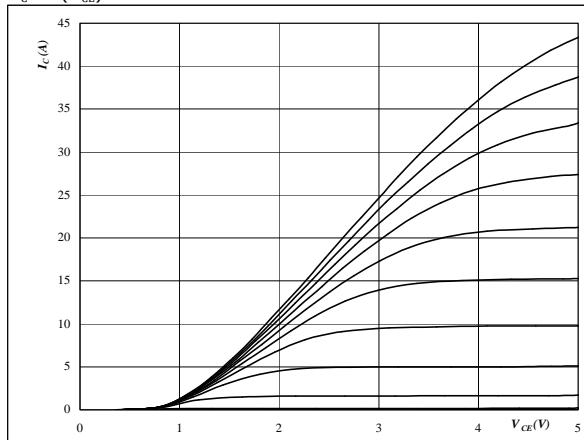
### Thermistor

Rated resistance	$R$				25		22		$\Omega$
Deviation of $R_{100}$	$\Delta R/R$	$R_{100} = 1486 \Omega$			25	-5	5		%
Power dissipation	$P$				25			5	$\text{mW}$
B-value	$B_{(25/100)}$				25		4000		K
Vincotech NTC Reference								I	

## Output Inverter

**figure 1.****Output inverter IGBT****Typical output characteristics**

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

**At**

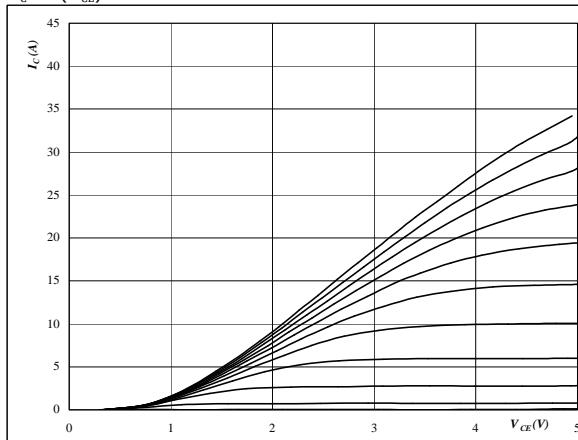
$$t_p = 250 \mu\text{s}$$

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

$V_{GE}$  from 6 V to 16 V in steps of 1 V

**figure 2.****Output inverter IGBT****Typical output characteristics**

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

**At**

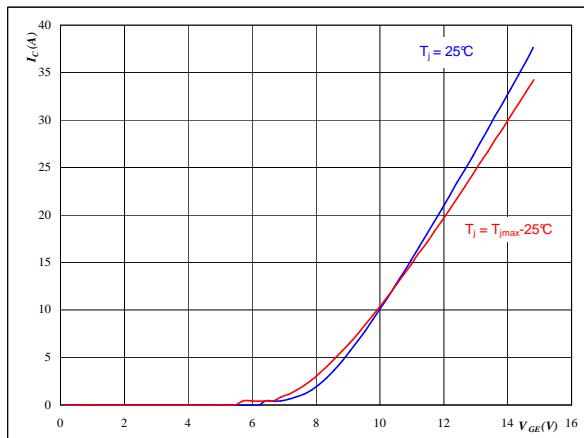
$$t_p = 250 \mu\text{s}$$

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

$V_{GE}$  from 6 V to 16 V in steps of 1 V

**figure 3.****Output inverter IGBT****Typical transfer characteristics**

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

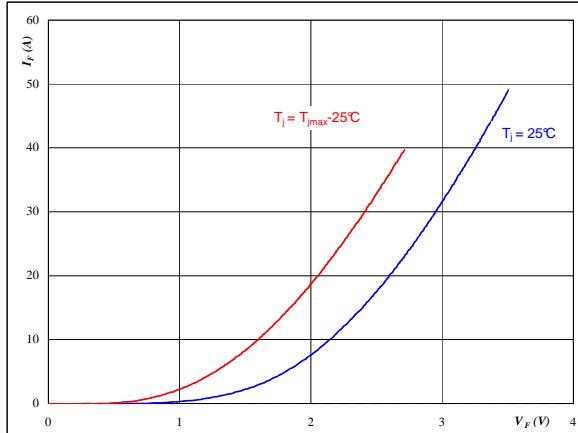
**At**

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

$$V_{CE} = 20 \text{ V}$$

**figure 4.****Output inverter FWD****Typical diode forward current as a function of forward voltage**

$$I_F = f(V_F)$$

**At**

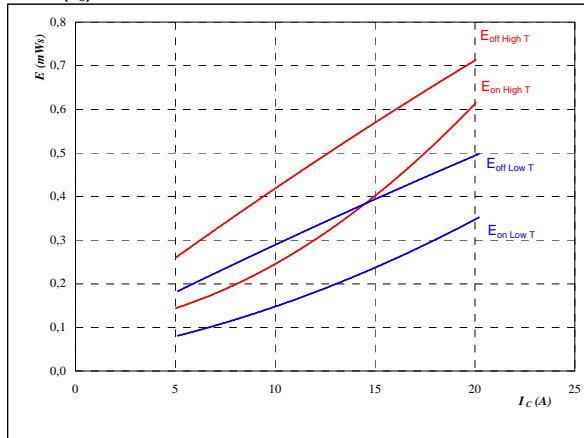
$$t_p = 250 \mu\text{s}$$

## Output Inverter

**figure 5.****Output inverter IGBT**

**Typical switching energy losses  
as a function of collector current**

$$E = f(I_C)$$



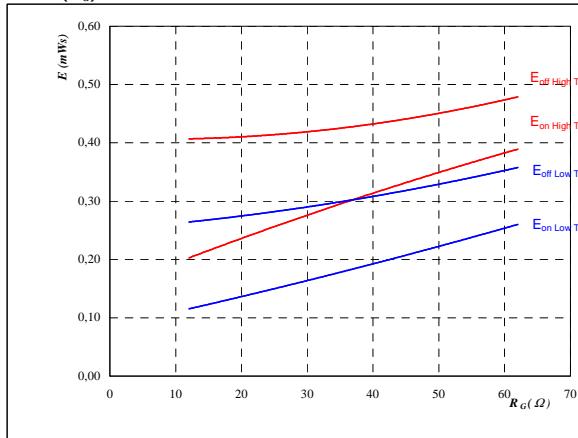
With an inductive load at

$$\begin{aligned}T_j &= 25/125 \quad ^\circ\text{C} \\V_{CE} &= 400 \quad \text{V} \\V_{GE} &= 15 \quad \text{V} \\R_{gon} &= 24 \quad \Omega \\R_{goff} &= 24 \quad \Omega\end{aligned}$$

**figure 6.****Output inverter IGBT**

**Typical switching energy losses  
as a function of gate resistor**

$$E = f(R_G)$$



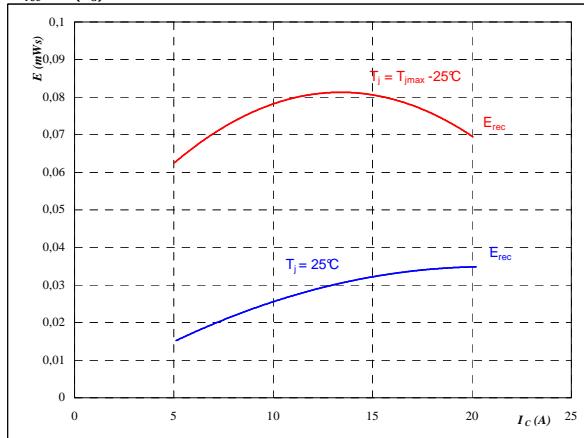
With an inductive load at

$$\begin{aligned}T_j &= 25/125 \quad ^\circ\text{C} \\V_{CE} &= 400 \quad \text{V} \\V_{GE} &= 15 \quad \text{V} \\I_C &= 10 \quad \text{A}\end{aligned}$$

**figure 7.****Output inverter FWD**

**Typical reverse recovery energy loss  
as a function of collector current**

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



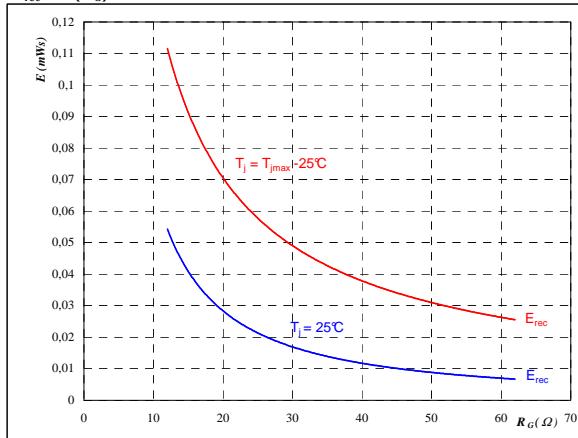
With an inductive load at

$$\begin{aligned}T_j &= 25/125 \quad ^\circ\text{C} \\V_{CE} &= 400 \quad \text{V} \\V_{GE} &= 15 \quad \text{V} \\R_{gon} &= 24 \quad \Omega\end{aligned}$$

**figure 8.****Output inverter FWD**

**Typical reverse recovery energy loss  
as a function of gate resistor**

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



With an inductive load at

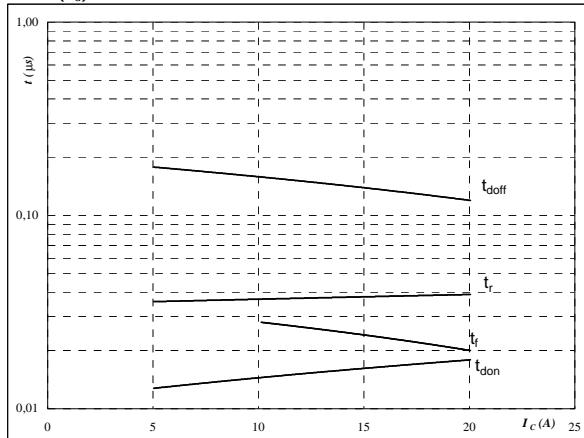
$$\begin{aligned}T_j &= 25/125 \quad ^\circ\text{C} \\V_{CE} &= 400 \quad \text{V} \\V_{GE} &= 15 \quad \text{V} \\I_C &= 10 \quad \text{A}\end{aligned}$$

## Output Inverter

**figure 9.****Output inverter IGBT**

**Typical switching times as a function of collector current**

$$t = f(I_C)$$



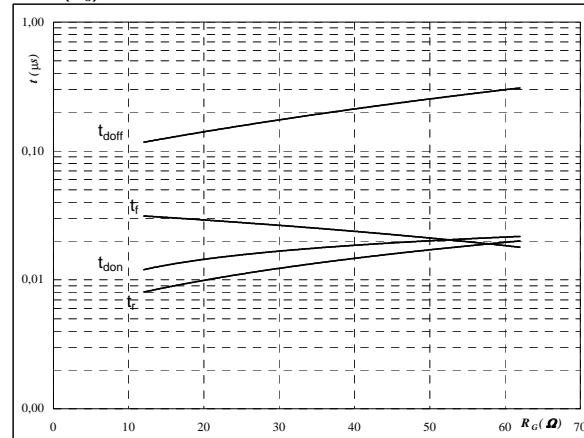
With an inductive load at

$T_j = 125 \text{ } ^\circ\text{C}$   
 $V_{CE} = 400 \text{ V}$   
 $V_{GE} = 15 \text{ V}$   
 $R_{gon} = 24 \Omega$   
 $R_{goff} = 24 \Omega$

**figure 10.****Output inverter IGBT**

**Typical switching times as a function of gate resistor**

$$t = f(R_G)$$



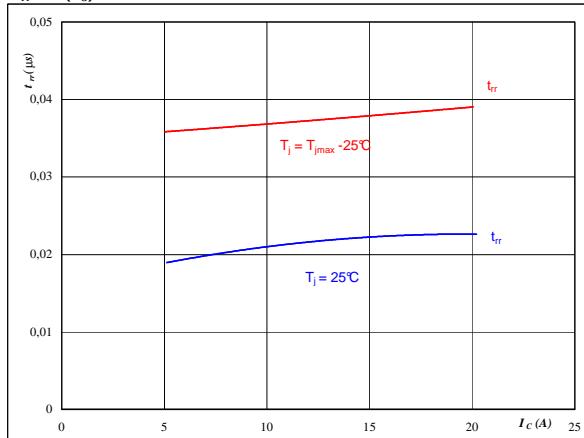
With an inductive load at

$T_j = 125 \text{ } ^\circ\text{C}$   
 $V_{CE} = 400 \text{ V}$   
 $V_{GE} = 15 \text{ V}$   
 $I_C = 10 \text{ A}$

**figure 11.****Output inverter FWD**

**Typical reverse recovery time as a function of collector current**

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



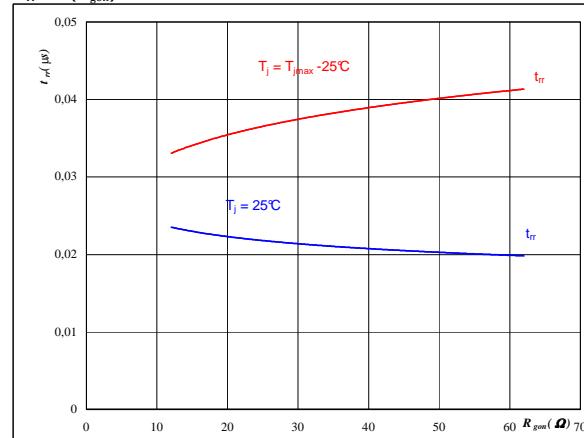
**At**

$T_j = 25/125 \text{ } ^\circ\text{C}$   
 $V_{CE} = 400 \text{ V}$   
 $V_{GE} = 15 \text{ V}$   
 $R_{gon} = 24 \Omega$

**figure 12.****Output inverter FWD**

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

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



**At**

$T_j = 25/125 \text{ } ^\circ\text{C}$   
 $V_R = 400 \text{ V}$   
 $I_F = 10 \text{ A}$   
 $V_{GE} = 15 \text{ V}$

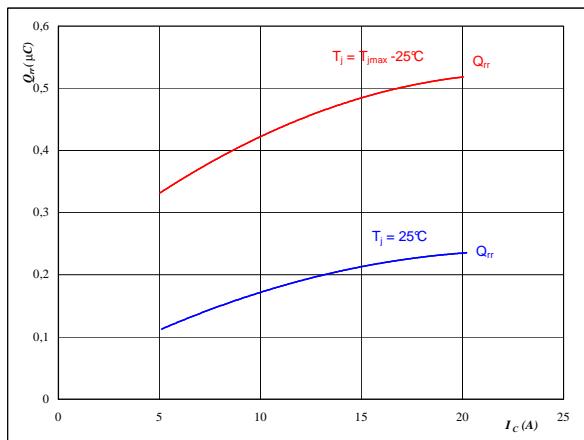
## Output Inverter

figure 13.

Output inverter FWD

**Typical reverse recovery charge as a function of collector current**

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

**At**

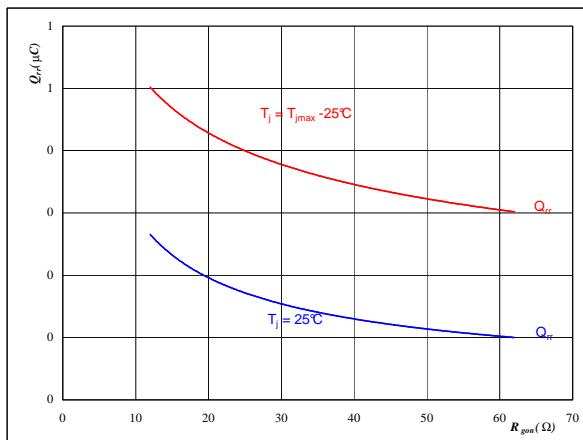
$$\begin{aligned} T_j &= 25/125 \quad {}^\circ\text{C} \\ V_{CE} &= 400 \quad \text{V} \\ V_{GE} &= 15 \quad \text{V} \\ R_{gon} &= 24 \quad \Omega \end{aligned}$$

figure 14.

Output inverter FWD

**Typical reverse recovery charge as a function of IGBT turn on gate resistor**

$$Q_{rr} = f(R_{gon})$$

**At**

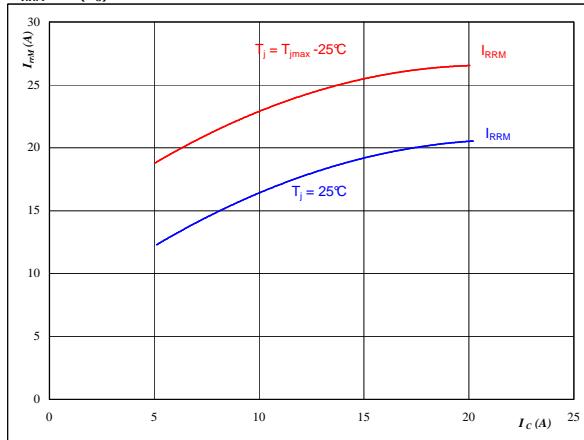
$$\begin{aligned} T_j &= 25/125 \quad {}^\circ\text{C} \\ V_R &= 400 \quad \text{V} \\ I_F &= 10 \quad \text{A} \\ V_{GE} &= 15 \quad \text{V} \end{aligned}$$

figure 15.

Output inverter FWD

**Typical reverse recovery current as a function of collector current**

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

**At**

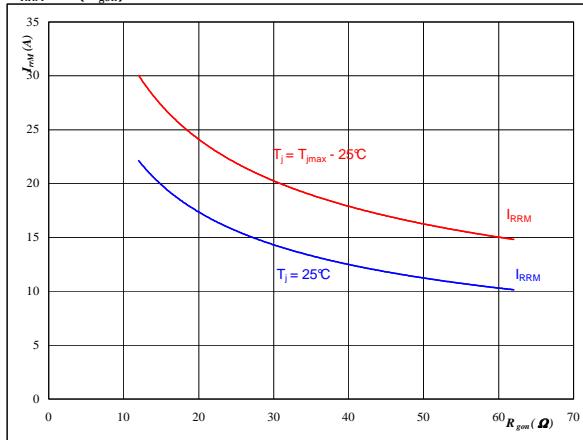
$$\begin{aligned} T_j &= 25/125 \quad {}^\circ\text{C} \\ V_{CE} &= 400 \quad \text{V} \\ V_{GE} &= 15 \quad \text{V} \\ R_{gon} &= 24 \quad \Omega \end{aligned}$$

figure 16.

Output inverter FWD

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

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

**At**

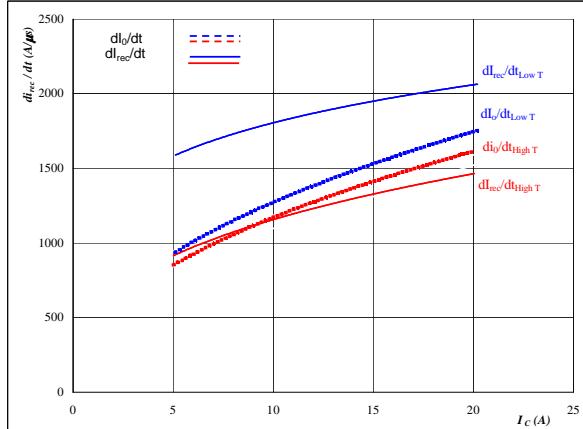
$$\begin{aligned} T_j &= 25/125 \quad {}^\circ\text{C} \\ V_R &= 400 \quad \text{V} \\ I_F &= 10 \quad \text{A} \\ V_{GE} &= 15 \quad \text{V} \end{aligned}$$

## Output Inverter

**figure 17.****Output inverter FWD**

**Typical rate of fall of forward  
and reverse recovery current as a  
function of collector current**

$$dI_0/dt, dI_{rec}/dt = f(I_C)$$

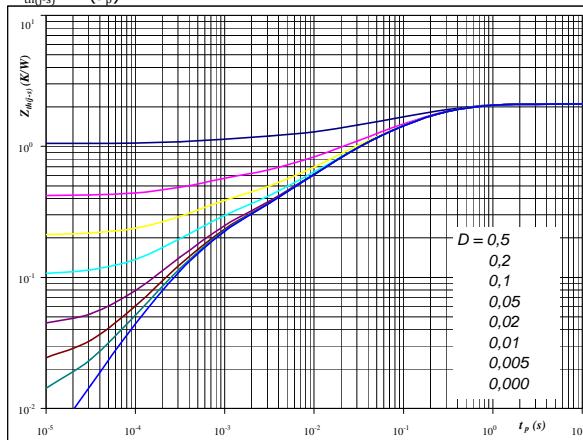
**At**

$$\begin{aligned} T_j &= 25/125 \quad ^\circ\text{C} \\ V_{CE} &= 400 \quad \text{V} \\ V_{GE} &= 15 \quad \text{V} \\ R_{gon} &= 24 \quad \Omega \end{aligned}$$

**figure 19.****Output inverter IGBT**

**IGBT transient thermal impedance  
as a function of pulse width**

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

**At**

$$\begin{aligned} D &= t_p / T \\ R_{th(j-s)} &= 2,10 \quad \text{K/W} \end{aligned}$$

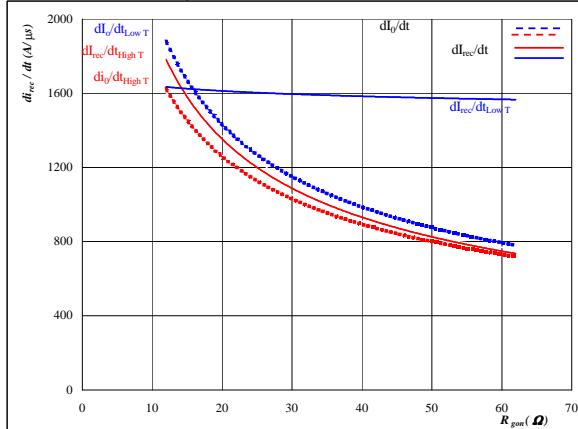
IGBT thermal model values

R (K/W)	Tau (s)
1,01E-01	1,31E+00
8,34E-01	2,47E-01
6,33E-01	5,08E-02
3,24E-01	1,01E-02
1,61E-01	8,58E-04
4,82E-02	2,76E-04

**figure 18.****Output inverter FWD**

**Typical rate of fall of forward  
and reverse recovery current as a  
function of IGBT turn on gate resistor**

$$dI_0/dt, dI_{rec}/dt = f(R_{gon})$$

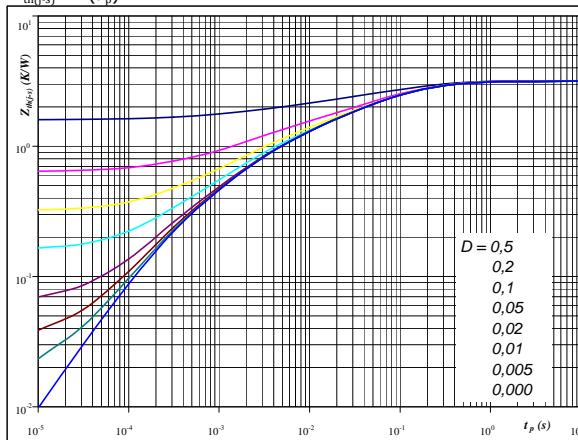
**At**

$$\begin{aligned} T_j &= 25/125 \quad ^\circ\text{C} \\ V_R &= 400 \quad \text{V} \\ I_F &= 10 \quad \text{A} \\ V_{GE} &= 15 \quad \text{V} \end{aligned}$$

**figure 20.****Output inverter FWD**

**FWD transient thermal impedance  
as a function of pulse width**

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

**At**

$$\begin{aligned} D &= t_p / T \\ R_{th(j-s)} &= 3,20 \quad \text{K/W} \end{aligned}$$

FWD thermal model values

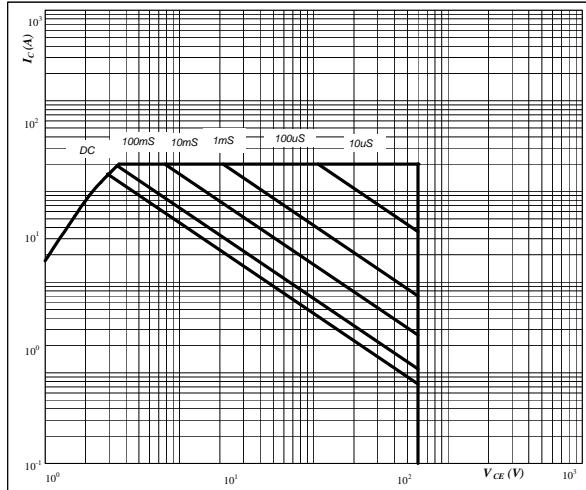
R (K/W)	Tau (s)
7,03E-02	1,66E+01
5,98E-01	2,92E-01
1,17E+00	6,69E-02
6,63E-01	1,08E-02
5,23E-01	2,08E-03
1,74E-01	2,88E-04

## Output Inverter

**figure 25.**  
Safe operating area as a function  
of collector-emitter voltage

Output inverter IGBT

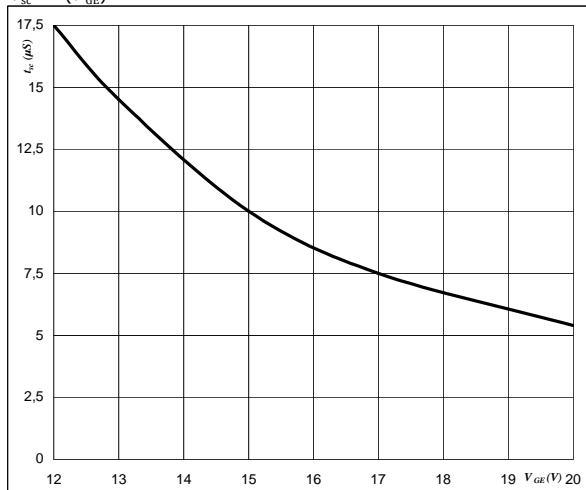
$$I_C = f(V_{CE})$$

**At** $I_C = \text{single pulse}$  $T_s = 80 \text{ } ^\circ\text{C}$  $V_{GE} = 15 \text{ V}$  $T_j = T_{jmax}$ **figure 27.**

Output inverter IGBT

Short circuit withstand time as a function of  
gate-emitter voltage

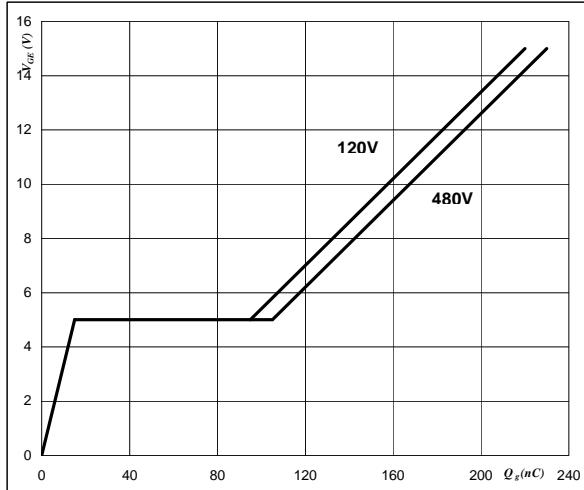
$$t_{sc} = f(V_{GE})$$

**At** $V_{CE} = 600 \text{ V}$  $T_j \leq 175 \text{ } ^\circ\text{C}$ 

**figure 26.**  
Gate voltage vs Gate charge

Output inverter IGBT

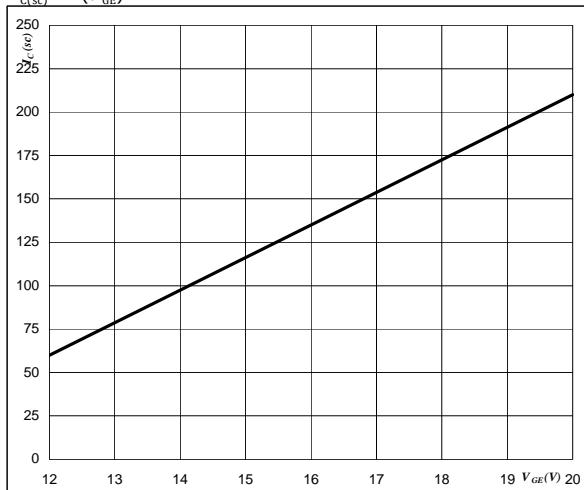
$$V_{GE} = f(Q_g)$$

**At** $I_C = 10 \text{ A}$ **figure 28.**

Output inverter IGBT

Typical short circuit collector current as a function of  
gate-emitter voltage

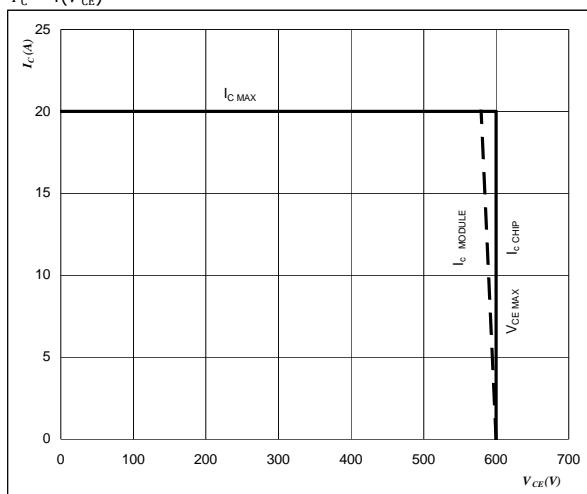
$$I_{C(sc)} = f(V_{GE})$$

**At** $V_{CE} \leq 600 \text{ V}$  $T_j = 175 \text{ } ^\circ\text{C}$

## Output Inverter

**figure 29.**
**IGBT**
**Reverse bias safe operating area**

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


**At**

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

$$R_{gon} = 4 \text{ } \Omega$$

$$R_{goff} = 4 \text{ } \Omega$$

## PFC

**figure 1.**  
**Typical output characteristics**

$$I_D = f(V_{DS})$$



**At**

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

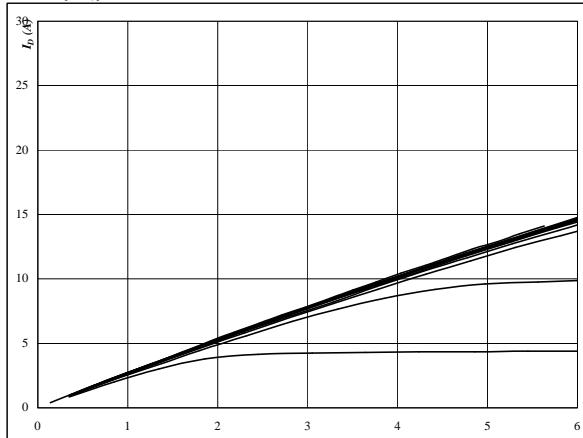
$$T_j = 25^\circ\text{C}$$

$V_{GS}$  from 5 V to 10 V in steps of 0,5 V

**PFC MOSFET**

**figure 2.**  
**Typical output characteristics**

$$I_D = f(V_{DS})$$



**At**

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

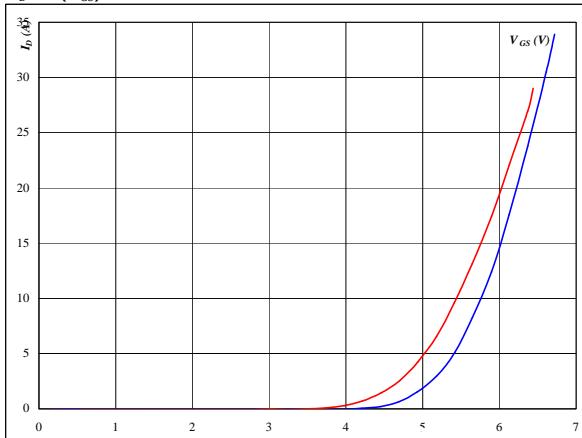
$$T_j = 125^\circ\text{C}$$

$V_{GS}$  from 5 V to 10 V in steps of 0,5 V

**figure 3.**  
**Typical transfer characteristics**

**PFC MOSFET**

$$I_D = f(V_{GS})$$



**At**

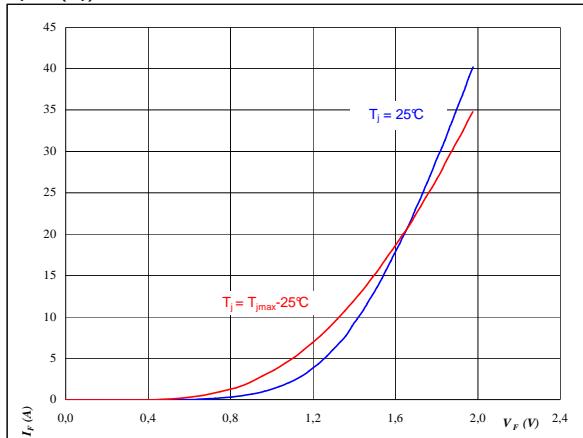
$$t_p = 250 \mu\text{s}$$

$$V_{DS} = 20 \text{ V}$$

**figure 4.**  
**Typical diode forward current as a function of forward voltage**

**PFC FWD**

$$I_F = f(V_F)$$



**At**

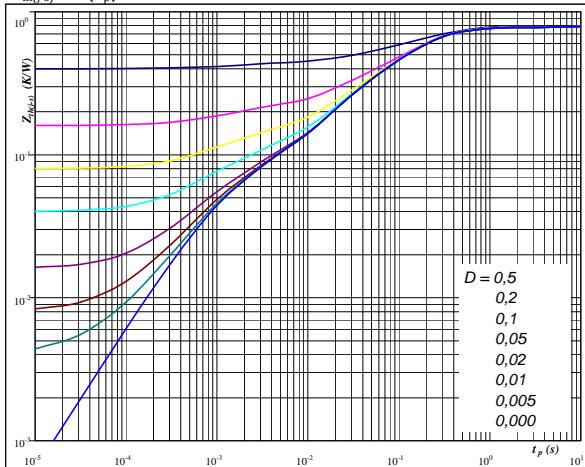
$$t_p = 250 \mu\text{s}$$

## PFC

**figure 19.****PFC MOSFET**

**IGBT/MOSFET transient thermal impedance  
as a function of pulse width**

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

**At**

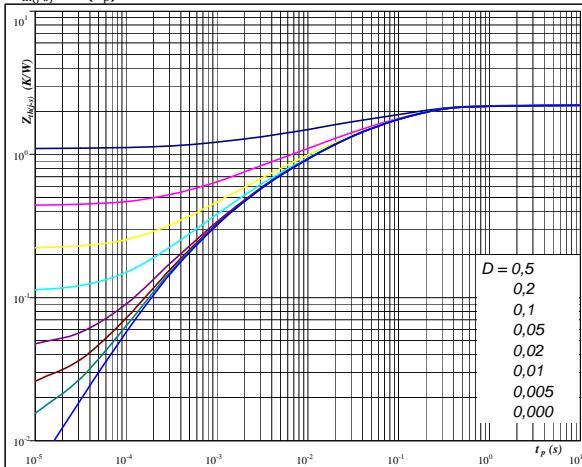
$$D = t_p / T$$

$$R_{\text{th(j-s)}} = 0,80 \quad \text{K/W}$$

**figure 20.****PFC FWD**

**FWD transient thermal impedance  
as a function of pulse width**

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

**At**

$$D = t_p / T$$

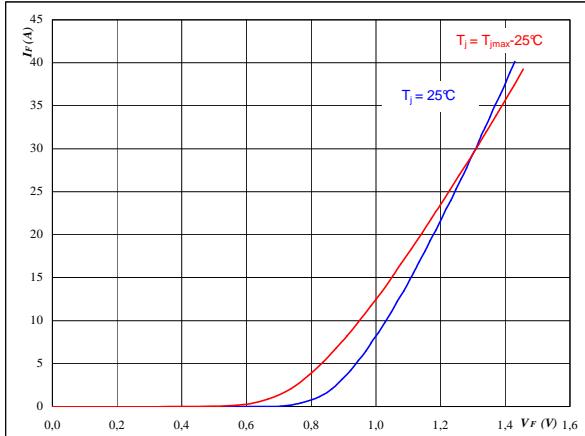
$$R_{\text{th(j-s)}} = 2,20 \quad \text{K/W}$$

## Input Rectifier Bridge

**figure 1.****Rectifier diode**

**Typical diode forward current as  
a function of forward voltage**

$$I_F = f(V_F)$$

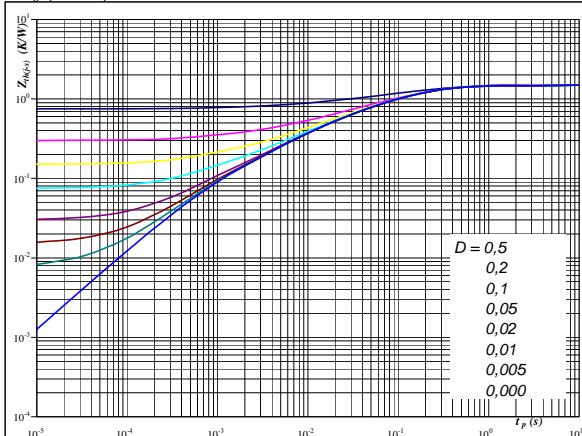
**At**

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

**figure 2.****Rectifier diode**

**Diode transient thermal impedance  
as a function of pulse width**

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

**At**

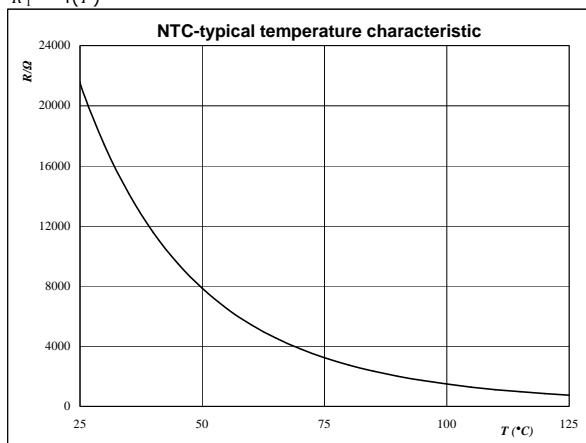
$$D = t_p / T$$

$$R_{\text{th(j-s)}} = 1,50 \quad \text{K/W}$$

## Thermistor

**figure 1.**  
**Typical NTC characteristic  
as a function of temperature**  
 $R_T = f(T)$

**Thermistor**

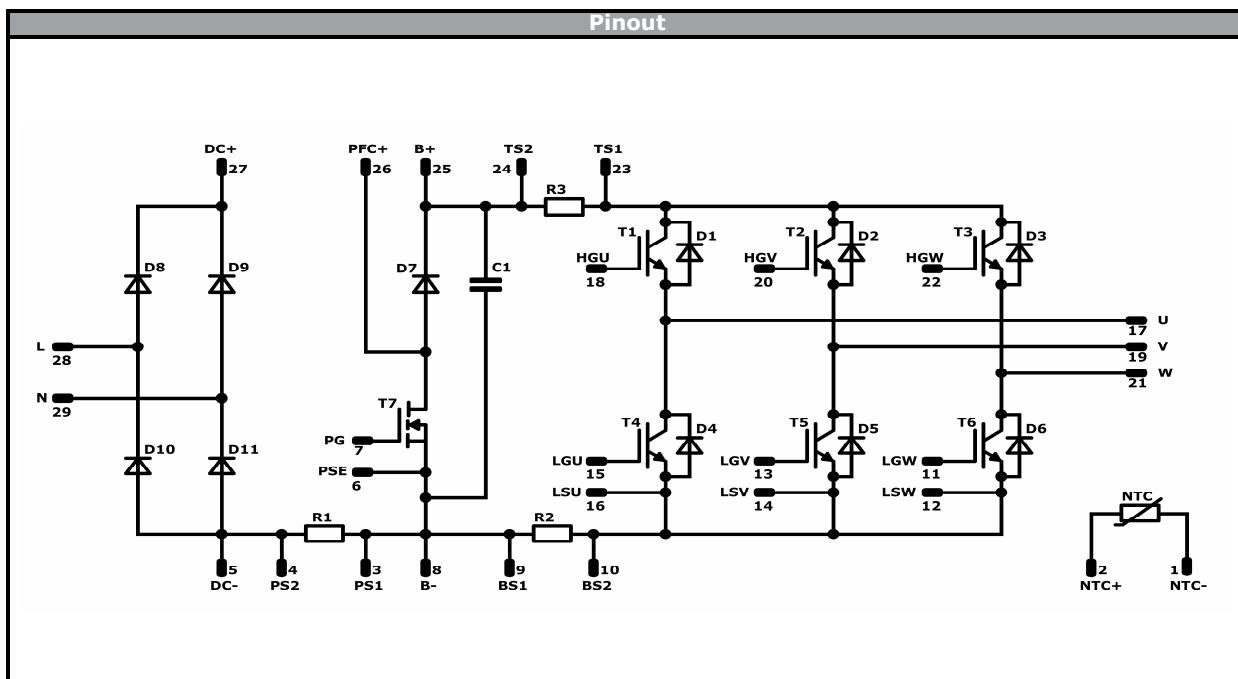


Ordering Code & Marking			
Version		Ordering Code	
without thermal paste 17 mm housing with solder pins		V23990-P303-B24-PM	
VIN:WWYY NNNNNNNVVUL LLLL SSSS		Text	VIN
			WWYY NNNNNNVUL UL SSSS
		Type&Ver	Lot number
		Datamatrix	Serial Date code
			TTTTTTVV LLLL SSSS WWYY

Outline																																																																																																																											
Pin table [mm]		Outline Drawing																																																																																																																									
<table border="1"> <thead> <tr> <th>Pin</th><th>X</th><th>Y</th><th>Function</th></tr> </thead> <tbody> <tr><td>1</td><td>53,3</td><td>0</td><td>NTC-</td></tr> <tr><td>2</td><td>49,7</td><td>0</td><td>NTC+</td></tr> <tr><td>3</td><td>46,8</td><td>0</td><td>PS1</td></tr> <tr><td>4</td><td>43,9</td><td>0</td><td>PS2</td></tr> <tr><td>5</td><td>41,1</td><td>0</td><td>DC-</td></tr> <tr><td>6</td><td>37,2</td><td>0</td><td>PSE</td></tr> <tr><td>7</td><td>33,2</td><td>0</td><td>PG</td></tr> <tr><td>8</td><td>30,4</td><td>0</td><td>B-</td></tr> <tr><td>9</td><td>27,5</td><td>0</td><td>BS1</td></tr> <tr><td>10</td><td>23,4</td><td>0</td><td>BS2</td></tr> <tr><td>11</td><td>20,5</td><td>0</td><td>LGW</td></tr> <tr><td>12</td><td>16,4</td><td>0</td><td>LSW</td></tr> <tr><td>13</td><td>12,3</td><td>0</td><td>LGV</td></tr> <tr><td>14</td><td>8,2</td><td>0</td><td>LSV</td></tr> <tr><td>15</td><td>4,1</td><td>0</td><td>LGU</td></tr> <tr><td>16</td><td>0</td><td>0</td><td>LSU</td></tr> <tr><td>17</td><td>2,5</td><td>28,3</td><td>U</td></tr> <tr><td>18</td><td>2,5</td><td>25,4</td><td>HGU</td></tr> <tr><td>19</td><td>10,2</td><td>28,3</td><td>V</td></tr> <tr><td>20</td><td>10,2</td><td>25,4</td><td>HGV</td></tr> <tr><td>21</td><td>17,9</td><td>28,3</td><td>W</td></tr> <tr><td>22</td><td>17,9</td><td>25,4</td><td>HGW</td></tr> <tr><td>23</td><td>23,2</td><td>28,3</td><td>TS1</td></tr> <tr><td>24</td><td>26,2</td><td>28,3</td><td>TS2</td></tr> <tr><td>25</td><td>30,4</td><td>28,3</td><td>B+</td></tr> <tr><td>26</td><td>37,4</td><td>28,3</td><td>PFC+</td></tr> <tr><td>27</td><td>45,5</td><td>28,3</td><td>DC+</td></tr> <tr><td>28</td><td>53,3</td><td>20,1</td><td>L</td></tr> <tr><td>29</td><td>53,3</td><td>10,3</td><td>N</td></tr> </tbody> </table>				Pin	X	Y	Function	1	53,3	0	NTC-	2	49,7	0	NTC+	3	46,8	0	PS1	4	43,9	0	PS2	5	41,1	0	DC-	6	37,2	0	PSE	7	33,2	0	PG	8	30,4	0	B-	9	27,5	0	BS1	10	23,4	0	BS2	11	20,5	0	LGW	12	16,4	0	LSW	13	12,3	0	LGV	14	8,2	0	LSV	15	4,1	0	LGU	16	0	0	LSU	17	2,5	28,3	U	18	2,5	25,4	HGU	19	10,2	28,3	V	20	10,2	25,4	HGV	21	17,9	28,3	W	22	17,9	25,4	HGW	23	23,2	28,3	TS1	24	26,2	28,3	TS2	25	30,4	28,3	B+	26	37,4	28,3	PFC+	27	45,5	28,3	DC+	28	53,3	20,1	L	29	53,3	10,3	N
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Tolerance of pinpositions +0.5mm at the end of pins.  
 Dimension of coordinate axis is only offset without tolerance.



<b>Identification</b>					
ID	Component	Voltage	Current	Function	Comment
T1 - T6	IGBT	600 V	10 A	Inverter Switch	
D1 - D6	FWD	600 V	10 A	Inverter Diode	
T7	MOSFET	500 V	260 mΩ	PFC Switch	
D7	FWD	600 V	10 A	PFC Diode	
D8 - D11	Rectifier	1200 V	25 A	Rectifier Diode	
R1	Resistor		14 A	PFC Shunt	
R2	Resistor		10 A	DC - Shunt	
R3	Resistor		7 A	DC + Shunt	
C1	Capacitor	630 V		DC link Capacitor	
NTC	NTC			Thermistor	

<b>Packaging instruction</b>			
Standard packaging quantity (SPQ)	<b>100</b>	>SPQ	Standard

<b>Handling instruction</b>	
Handling instructions for <i>flow</i> 1 packages see vincotech.com website.	

<b>Package data</b>	
Package data for <i>flow</i> 1 packages see vincotech.com website.	

<b>UL recognition and file number</b>	
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.	

<b>Document No.:</b>	<b>Date:</b>	<b>Modification:</b>	<b>Pages</b>
V23990-P303-B24-D1-14	06 Mar. 2018		

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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.