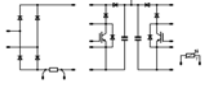
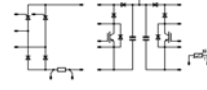
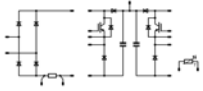
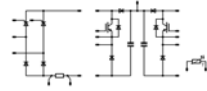


flowPFC 0		600 V/ 2 x 20 A / 35 kHz	
Features - Vincotech clip-in housing - Compact and low inductance design - Suitable for Interleaved topology - Suitable for current sensing in collector or in emitter - Ultrafast boost IGBT and FRED		flow 0 housing 	
Target Applications - PFC for welding - PFC for SMPS - PFC for motor drives - PFC for UPS - PFC for battery charger		Schematic FZ062TA040FB  FZ062TA040FB01  FZ062TA040FB02  FZ062TA040FB03 	
Types - FZ062TA040FB; without SCR, current sense in collector - FZ062TA040FB01; with SCR, current sense in collector - FZ062TA040FB02; without SCR, current sense in emitter - FZ062TA040FB03; with SCR, current sense in emitter			

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}		1600	V
DC forward current	I_F	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	35	A
Surge forward current	I_{FSM}	$t_p=10\text{ms}$ $T_j=25^{\circ}\text{C}$	250	A
I2t-value	I^2t		310	A^2s
Power dissipation per Diode	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	40	W
Maximum Junction Temperature	T_{jmax}		150	$^{\circ}\text{C}$
Input Rectifier Thyristor				
Repetitive peak reverse voltage	V_{RRM}		800	V
DC forward current	I_F	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	34	A
Surge forward current	I_{FSM}	$t_p=10\text{ms}$ $T_j=25^{\circ}\text{C}$	250	A
I2t-value	I^2t		310	A^2s
Power dissipation per Thyristor	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	44	W
Maximum Junction Temperature	T_{jmax}		150	$^{\circ}\text{C}$

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
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PFC IGBT

Collector-emitter break down voltage	V_{CE}		600	V
DC collector current	I_C	$T_J=T_{Jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	27	A
Repetitive peak collector current	I_{Cpulse}	t_p limited by T_{Jmax}	150	A
Power dissipation per IGBT	P_{tot}	$T_J=T_{Jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	71	W
Gate-emitter peak voltage	V_{GE}		+/- 20	V
Short circuit ratings	I_{SC} V_{CC}	$T_J \leq 150^{\circ}\text{C}$ $V_{GE}=15\text{V}$	10 600	μs V
Maximum Junction Temperature	T_{Jmax}		150	$^{\circ}\text{C}$

C.T. Inverse diode

Peak Repetitive Reverse Voltage	V_{RRM}	$T_J=25^{\circ}\text{C}$	600	V
DC forward current	I_F	$T_J=T_{Jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	8	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{Jmax}	16	A
Power dissipation per Diode	P_{tot}	$T_J=T_{Jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	14	W
Maximum Junction Temperature	T_{Jmax}		175	$^{\circ}\text{C}$

PFC Diode

Peak Repetitive Reverse Voltage	V_{RRM}	$T_J=25^{\circ}\text{C}$	600	V
DC forward current	I_F	$T_J=T_{Jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{Jmax}	50	A
Power dissipation	P_{tot}	$T_J=T_{Jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	37	W
Maximum Junction Temperature	T_{Jmax}		600	$^{\circ}\text{C}$

PFC Shunt

DC forward current	I_F	$T_c=25^{\circ}\text{C}$	44.7	A
Power dissipation per Shunt	P_{tot}	$T_c=25^{\circ}\text{C}$	10	W

DC link Capacitor

Max.DC voltage	V_{MAX}	$T_c=25^{\circ}\text{C}$	500	V
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Thermal Properties

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

Insulation Properties

Insulation voltage	V_{is}	$t=2\text{s}$ DC voltage	4000	V
Creepage distance			min 12,7	mm
Clearance			min 12,7	mm

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_c [A] or I_F [A] or I_b [A]	T_j	Min	Typ	Max	
Input Rectifier Diode										
Forward voltage	V_F				30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		1.16 1.11	1.4	V
Threshold voltage (for power loss calc. only)	V_{to}				30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		0.9 0.77		V
Slope resistance (for power loss calc. only)	r_t				30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		9 12		mΩ
Reverse current	I_r			1500		$T_j=25^{\circ}\text{C}$ $T_j=150^{\circ}\text{C}$			0.02 2	mA
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness50um $\lambda = 1$ W/mK						1.72		K/W
Input Rectifier Thyristor										
Forward voltage	V_F				30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		1.25 1.22	1.6	V
Threshold voltage (for power loss calc. only)	V_{to}				30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		0.93 0.82		V
Slope resistance (for power loss calc. only)	r_t				30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		0.011 0.014		mΩ
Reverse current	I_r			800		$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$			0.05 2	mA
Gate controlled delay time	t_{GD}	$I_g=0,5A$ dig/dt=0,5A/us		$VD=1/2V_{drm}$		$T_j=25^{\circ}\text{C}$			2	μs
Gate controlled rise time	t_{GR}	$I_g=0,2A$ dig/dt=0,2A/us				$T_j=25^{\circ}\text{C}$		<1		μs
Critical rate of rise of off-state voltage	(dv/dt)cr			$VD=2/3V_{drm}$		$T_j=125^{\circ}\text{C}$			500	V/μs
Critical rate of rise of on-state current	(di/dt)cr	$I_g=0,2A$ f=50Hz		$VD=2/3V_{drm}$	40	$T_j=125^{\circ}\text{C}$			150	A/μs
Circuit commutated turn-off time	t_q	$VD=2/3V_{drm}$ tp=200us		100	26	$T_j=125^{\circ}\text{C}$		150		μs
Holding current	I_H	$VD=6V$				$T_j=25^{\circ}\text{C}$			50	mA
Latching current	I_L	tp=10us I _g =0,2A				$T_j=25^{\circ}\text{C}$			90	mA
Gate trigger voltage	V_{GT}	$VD=6V$				$T_j=25^{\circ}\text{C}$ $T_j=-40^{\circ}\text{C}$			1.3 1.6	V
Gate trigger current	I_{GT}	$VD=6V$				$T_j=25^{\circ}\text{C}$ $T_j=-40^{\circ}\text{C}$	11		28 50	mA
Gate non-trigger voltage	V_{GD}			$VD=1/2V_{drm}$		$T_j=125^{\circ}\text{C}$			0.2	V
Gate non-trigger current	I_{GD}			$VD=1/2V_{drm}$		$T_j=125^{\circ}\text{C}$			1	mA
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness50um $\lambda = 1$ W/mK						1.57		K/W
PFC IGBT										
Gate emitter threshold voltage	$V_{GE(th)}$		Vce		0.002	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$	3	4	5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$				50	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		2.74 3.25	3.3	V
Collector-emitter cut-off	I_{CES}		0	600		$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		3.25	40	uA
Gate-emitter leakage current	I_{GES}		20	0		$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$			0.2	uA
Integrated Gate resistor	R_{gint}							n.a.		Ω
Turn-on delay time	$t_{d(on)}$	Rgoff=8Ω Rgon=8Ω	15	400	30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		22 22.6		ns
Rise time	t_r					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		14 14.6		
Turn-off delay time	$t_{d(off)}$					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		327.6 354.2		
Fall time	t_f					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		9.4 11.1		
Turn-on energy loss per pulse	E_{on}					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		0.5052 0.7837	mWs	
Turn-off energy loss per pulse	E_{off}	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		0.7981 0.968						
Input capacitance	C_{ies}	f=1MHz	0	25		$T_j=25^{\circ}\text{C}$		2572		pF
Output capacitance	C_{oss}							245		
Reverse transfer capacitance	C_{rss}							158		
Gate charge	Q_{Gate}		15	480	50	$T_j=25^{\circ}\text{C}$		158		nC
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness50um $\lambda = 1$ W/mK						0.99		K/W

Characteristic Values

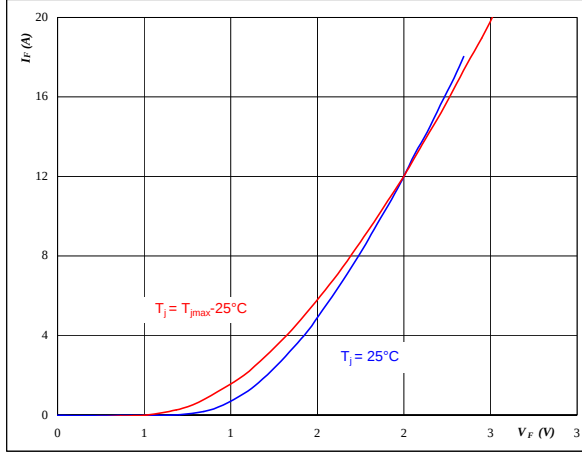
Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] or V_{GS} [V]	V_i [V] or V_{CE} [V] or V_{DS} [V]	I_c [A] or I_F [A] or I_D [A]	T_j	Min	Typ	Max	
C.T. Inverse diode										
Diode forward voltage	V_F					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		1.66 1.61		V
Thermal resistance chip to heatsink per chip	$R_{\theta JH}$	Thermal grease thickness50um $\lambda = 1 \text{ W/mK}$						5.12		K/W
PFC Diode										
Forward voltage	V_F				30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		2.52 1.81	2.8	V
Reverse leakage current	I_{rm}			600		$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$			100	μA
Peak recovery current	I_{RRM}	$R_{goff}=8\Omega$	15	400	30	$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		37.632 59.961		A
Reverse recovery time	t_{rr}					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		12.6 23		ns
Reverse recovery charge	Q_{rr}					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		0.2238 0.7628		μC
Reverse recovered energy	E_{rec}					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		0.0115 0.1151		mWs
Peak rate of fall of recovery current	$di(\text{rec})_{\text{max}}/dt$					$T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$		16814 11387		A/ μs
Thermal resistance chip to heatsink per chip	$R_{\theta JH}$	Thermal grease thickness50um $\lambda = 1 \text{ W/mK}$						1.88		K/W
PFC Shunt										
R1 value	R						4.7	5	5.3	m Ω
Temperature coefficient	t_c	20 $^{\circ}\text{C}$ to 60 $^{\circ}\text{C}$						< 50		ppm/K
Internal heat resistance	$R_{\theta hi}$							< 6.5		K/W
Inductance	L							< 3		nH
DC link Capacitor										
C value	C						480	540	600	nF
Thermistor										
Rated resistance	R					$T_j=25^{\circ}\text{C}$		22		k Ω
Deviation of R100	$\Delta R/R$	R25=22 K Ω				$T_j=100^{\circ}\text{C}$	-5		5	%
Power dissipation	P					$T_j=25^{\circ}\text{C}$			210	mW
Power dissipation constant						$T_j=25^{\circ}\text{C}$		3.5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 3\%$				$T_j=25^{\circ}\text{C}$		3940		K
B-value	$B_{(25/100)}$	Tol. $\pm 3\%$				$T_j=25^{\circ}\text{C}$		4000		K

PFC Switch & C.T. Inverse Diode

Figure 1 Inverse diode

Typical diode forward current as a function of forward voltage

$$I_F = f(V_F)$$

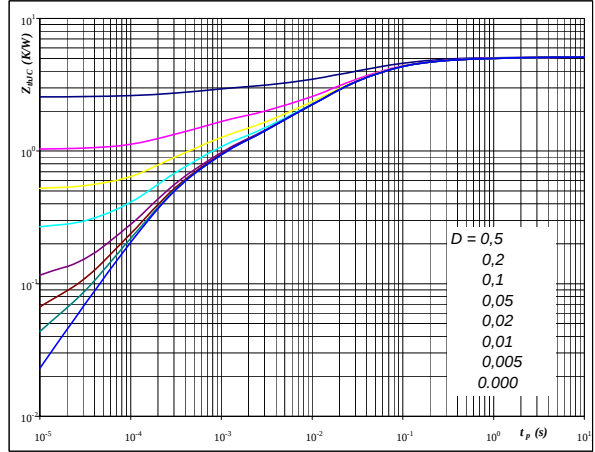


$$t_p = 250 \mu s$$

Figure 2 Inverse diode

Diode transient thermal impedance as a function of pulse width

$$Z_{thJH} = f(t_p)$$



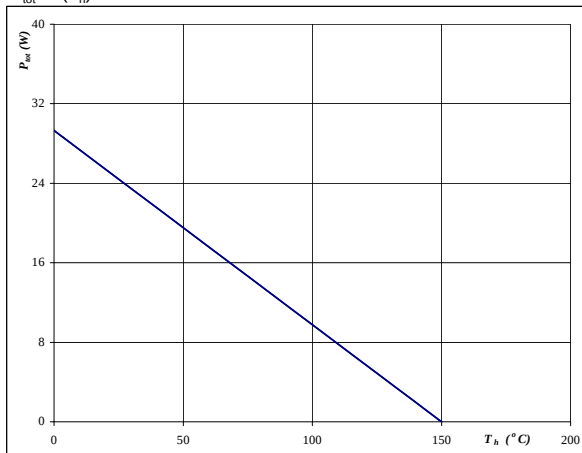
$$D = t_p / T$$

$$R_{thJH} = 5.12 \text{ K/W}$$

Figure 3 Inverse diode

Power dissipation as a function of heatsink temperature

$$P_{tot} = f(T_h)$$

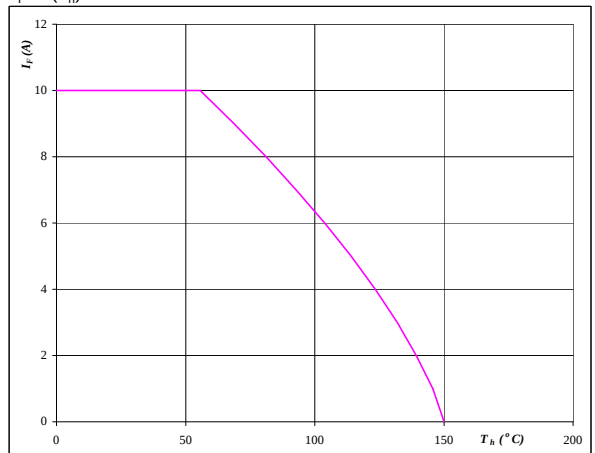


$$T_j = 150 \text{ °C}$$

Figure 4 Inverse diode

Forward current as a function of heatsink temperature

$$I_F = f(T_h)$$



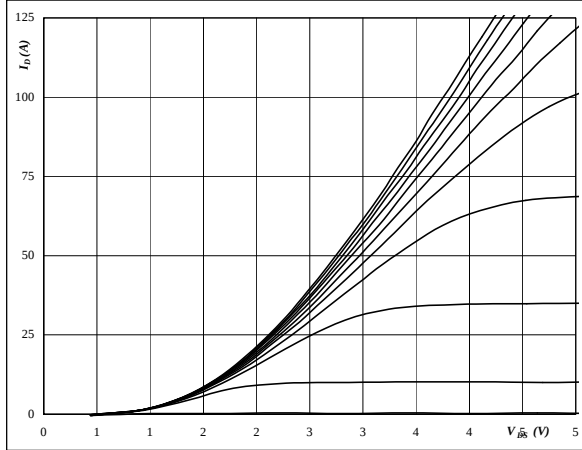
$$T_j = 150 \text{ °C}$$

PFC

Figure 1 PFC SWITCH

Typical output characteristics

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

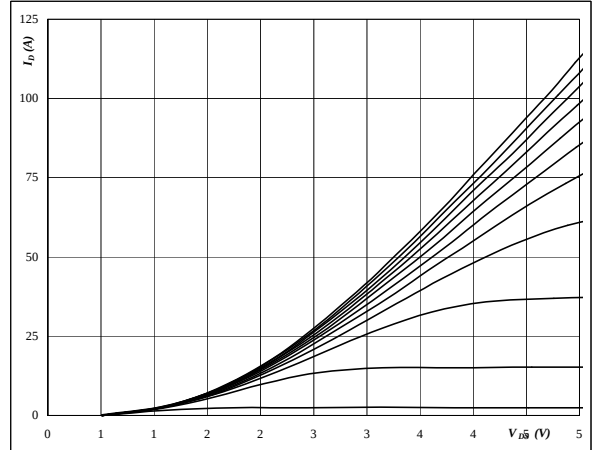


$t_p = 250 \mu s$
 $T_j = 25 ^\circ C$
 V_{GS} from 5 V to 15 V in steps of 1 V

Figure 2 PFC SWITCH

Typical output characteristics

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

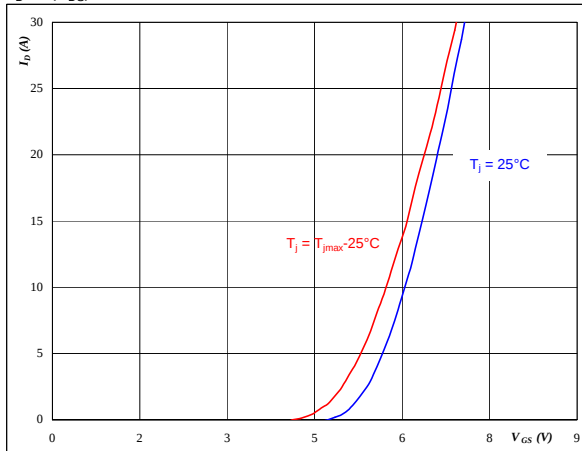


$t_p = 250 \mu s$
 $T_j = 125 ^\circ C$
 V_{GS} from 5 V to 15 V in steps of 1 V

Figure 3 PFC SWITCH

Typical transfer characteristics

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

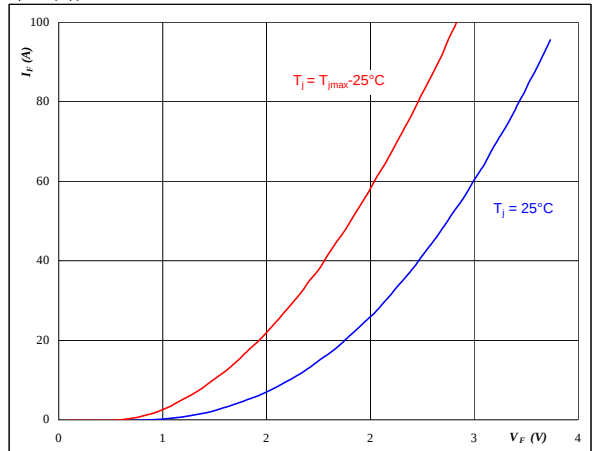


$t_p = 250 \mu s$
 $V_{DS} = 10 V$

Figure 4 PFC FRED

Typical diode forward current as a function of forward voltage

$$I_F = f(V_F)$$

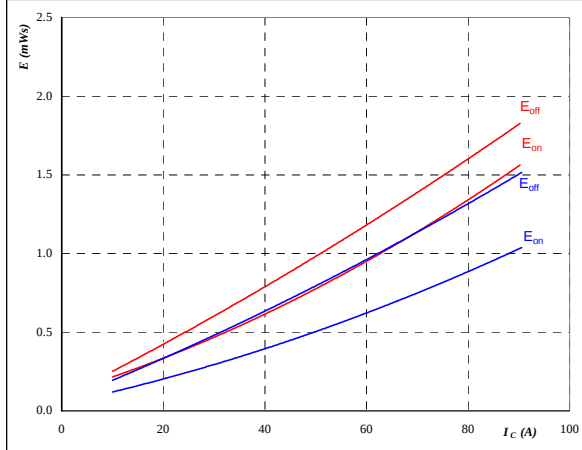


$t_p = 250 \mu s$

PFC

Figure 5 PFC SWITCH

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

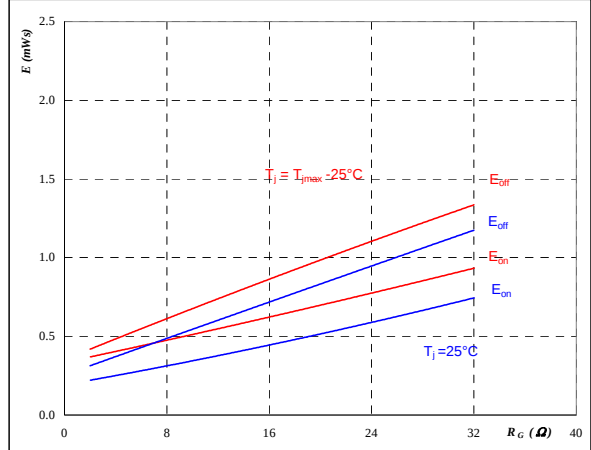


inductive load

$T_J =$	25/125	°C
$V_{DS} =$	400	V
$V_{GS} =$	15	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

Figure 6 PFC SWITCH

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

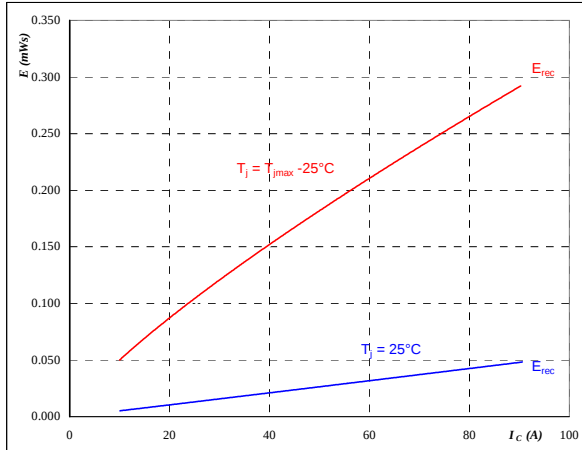


inductive load

$T_J =$	25/125	°C
$V_{DS} =$	400	V
$V_{GS} =$	15	V
$I_D =$	30	A

Figure 7 PFC SWITCH

Typical reverse recovery energy loss
as a function of collector (drain) current
 $E_{rec} = f(I_C)$

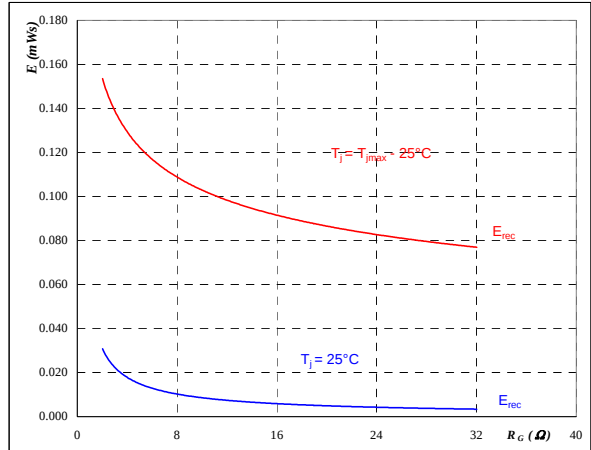


inductive load

$T_J =$	25/125	°C
$V_{DS} =$	400	V
$V_{GS} =$	15	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

Figure 8 PFC SWITCH

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



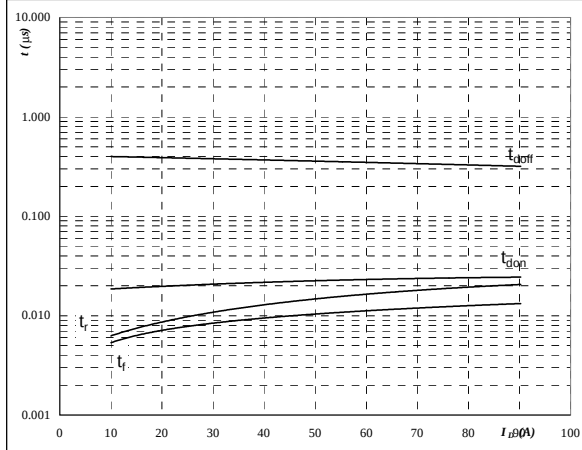
inductive load

$T_J =$	25/125	°C
$V_{DS} =$	400	V
$V_{GS} =$	15	V
$I_D =$	30	A

PFC

Figure 9 PFC SWITCH

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

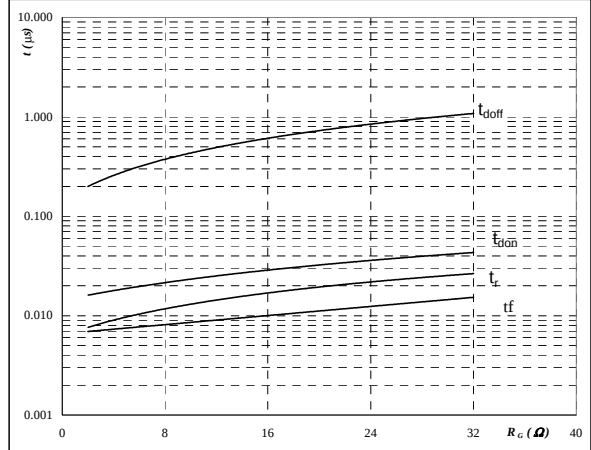


inductive load

$T_j =$	125	°C
$V_{DS} =$	400	V
$V_{GS} =$	15	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

Figure 10 PFC SWITCH

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

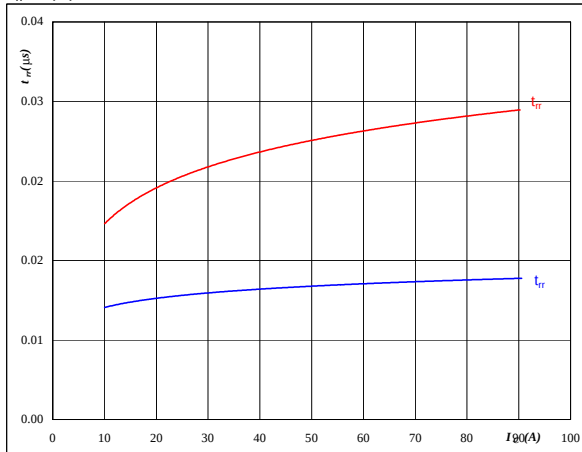


inductive load

$T_j =$	125	°C
$V_{DS} =$	400	V
$V_{GS} =$	15	V
$I_C =$	30	A

Figure 11 PFC FRED

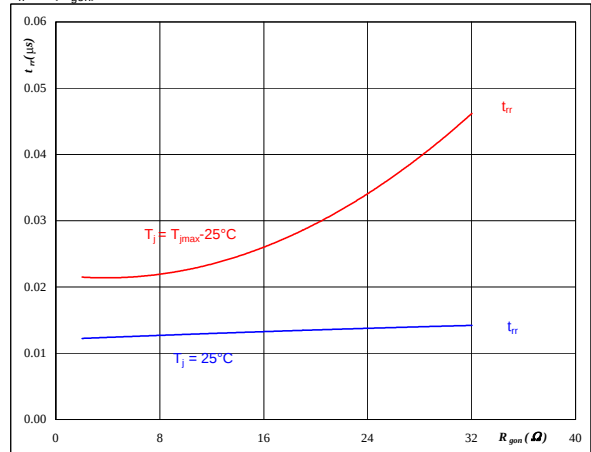
Typical reverse recovery time as a
function of collector current
 $t_{rr} = f(I_C)$



$T_j =$	25/125	°C
$V_{CE} =$	400	V
$V_{GE} =$	15	V
$R_{gon} =$	8	Ω

Figure 12 PFC FRED

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



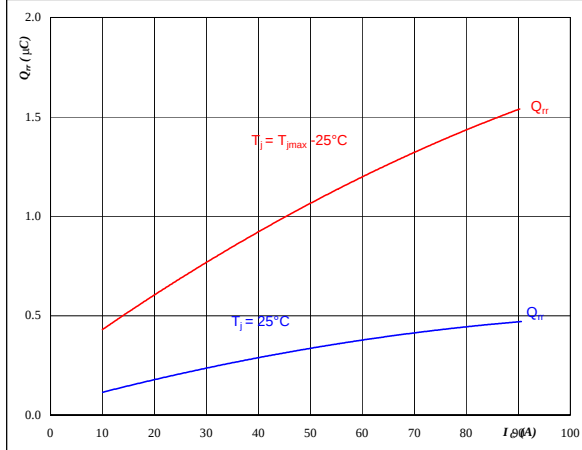
$T_j =$	25/125	°C
$V_R =$	400	V
$I_F =$	30	A
$V_{GS} =$	15	V

PFC

Figure 13 PFC FRED

Typical reverse recovery charge as a function of collector current

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

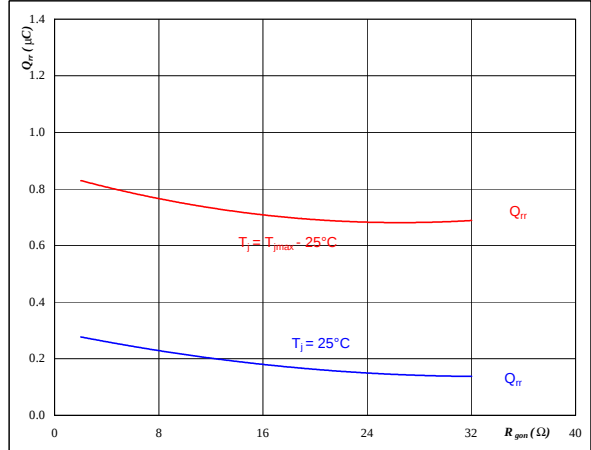


$T_j = 25/125^\circ\text{C}$
 $V_{CE} = 400\text{ V}$
 $V_{GE} = 15\text{ V}$
 $R_{gon} = 8\ \Omega$

Figure 14 PFC FRED

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

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

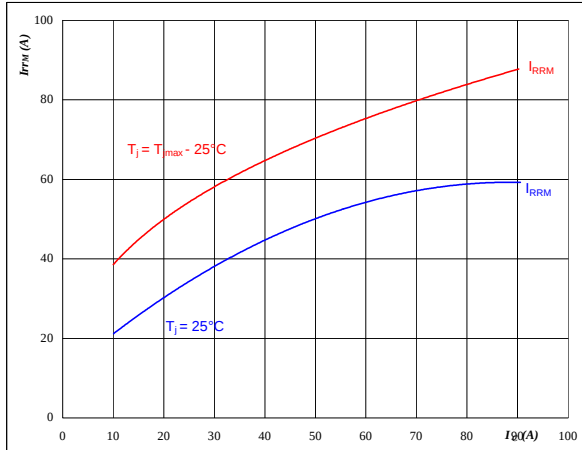


$T_j = 25/125^\circ\text{C}$
 $V_R = 400\text{ V}$
 $I_F = 30\text{ A}$
 $V_{GS} = 15\text{ V}$

Figure 15 PFC FRED

Typical reverse recovery current as a function of collector current

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

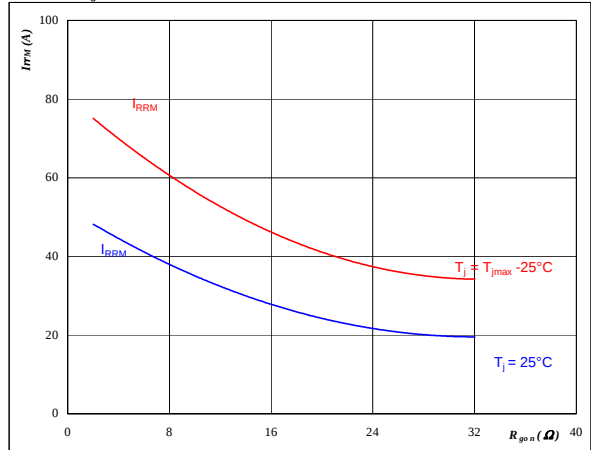


$T_j = 25/125^\circ\text{C}$
 $V_{CE} = 400\text{ V}$
 $V_{GE} = 15\text{ V}$
 $R_{gon} = 8\ \Omega$

Figure 16 PFC FRED

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

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



$T_j = 25/125^\circ\text{C}$
 $V_R = 400\text{ V}$
 $I_F = 30\text{ A}$
 $V_{GS} = 15\text{ V}$

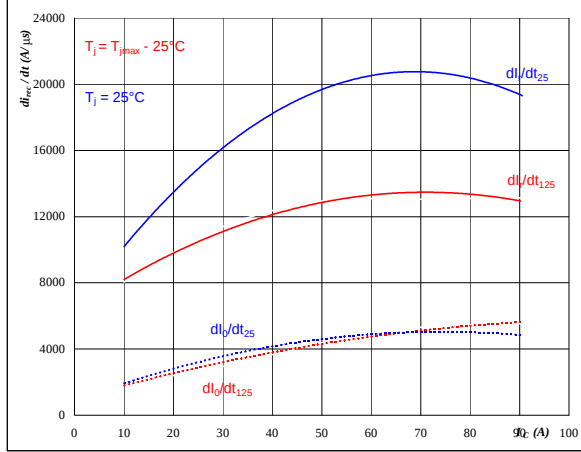
PFC

Figure 17

PFC FRED

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

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



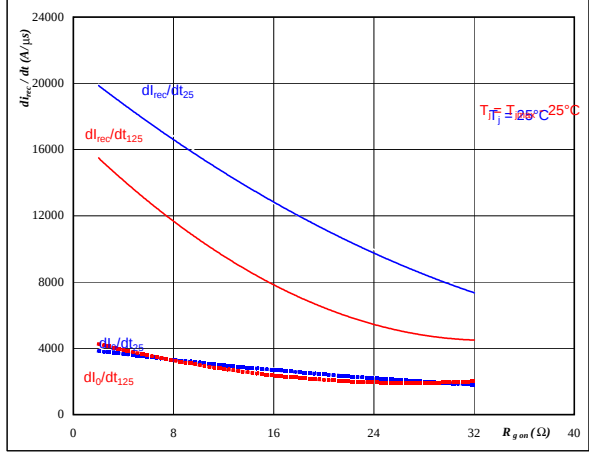
$T_J = 25/125 \text{ } ^\circ\text{C}$
 $V_{CE} = 400 \text{ V}$
 $V_{GE} = 15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$

Figure 18

PFC FRED

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

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



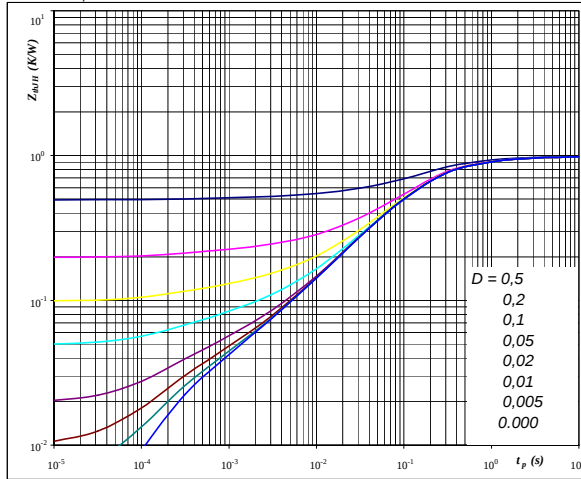
$T_J = 25/125 \text{ } ^\circ\text{C}$
 $V_R = 400 \text{ V}$
 $I_F = 30 \text{ A}$
 $V_{GS} = 15 \text{ V}$

Figure 19

PFC SWITCH

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

$$Z_{thJH} = f(t_p)$$



$D = t_p / T$
 $R_{thJH} = 0.99 \text{ K/W}$

IGBT thermal model values

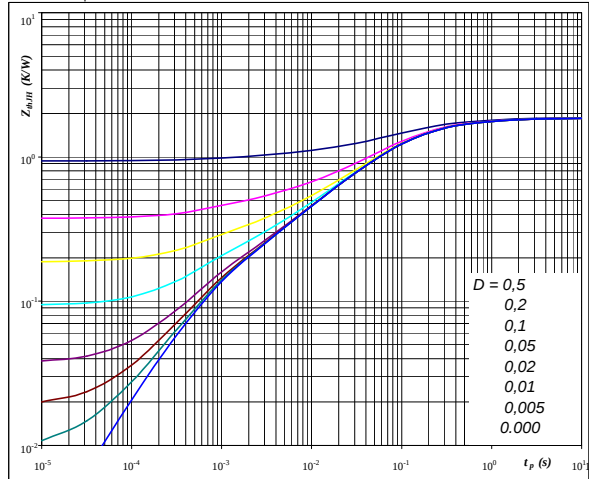
R (C/W)	Tau (s)
0.049	4.52E+00
0.198	6.47E-01
0.559	1.37E-01
0.129	2.16E-02
0.030	2.42E-03
0.022	2.71E-04

Figure 20

PFC FRED

FRED transient thermal impedance
as a function of pulse width

$$Z_{thJH} = f(t_p)$$



$D = t_p / T$
 $R_{thJH} = 1.87 \text{ K/W}$

FRED thermal model values

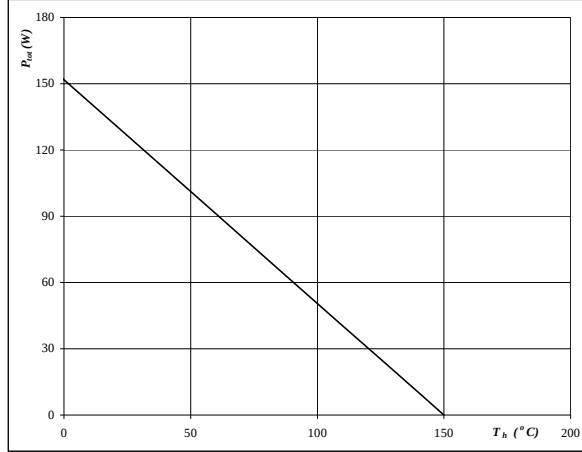
R (C/W)	Tau (s)
0.04	1.03E+01
0.21	9.26E-01
0.76	1.43E-01
0.57	3.47E-02
0.18	4.85E-03
0.11	6.60E-04

PFC

Figure 21 PFC SWITCH

Power dissipation as a
function of heatsink temperature

$$P_{tot} = f(T_h)$$

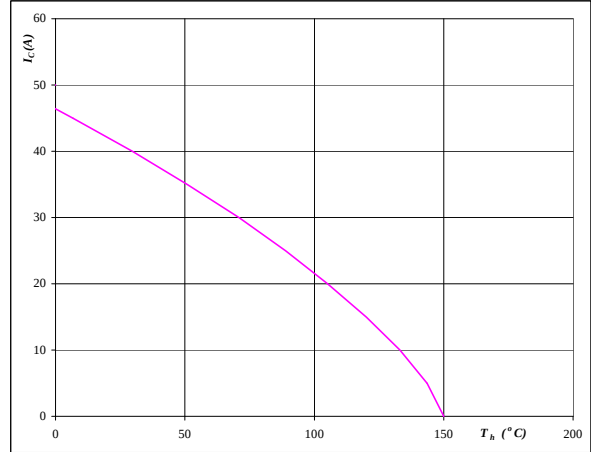


$T_j = 150$ °C

Figure 22 PFC SWITCH

Collector/Drain current as a
function of heatsink temperature

$$I_C = f(T_h)$$

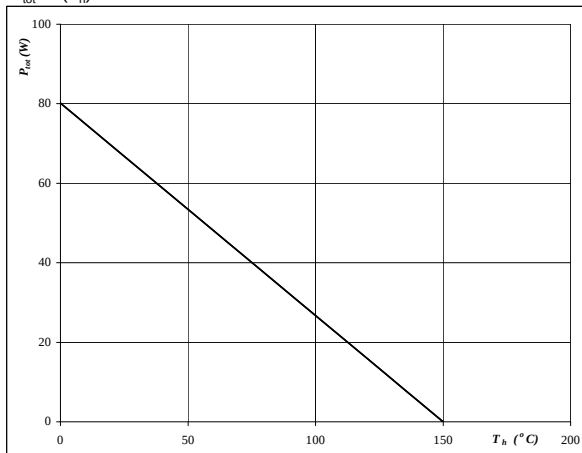


$T_j = 150$ °C
 $V_{GS} = 15$ V

Figure 23 PFC FRED

Power dissipation as a
function of heatsink temperature

$$P_{tot} = f(T_h)$$

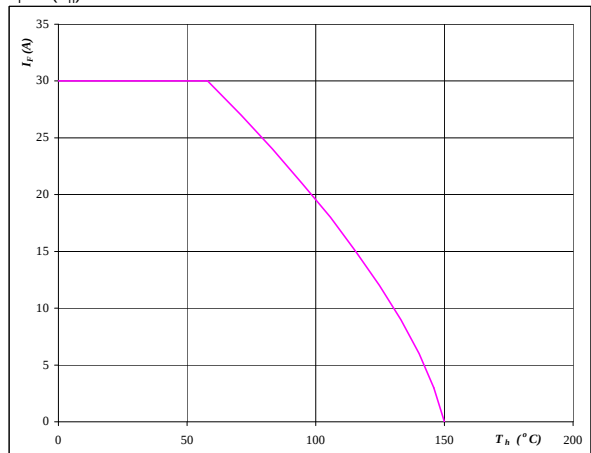


$T_j = 150$ °C

Figure 24 PFC FRED

Forward current as a
function of heatsink temperature

$$I_F = f(T_h)$$



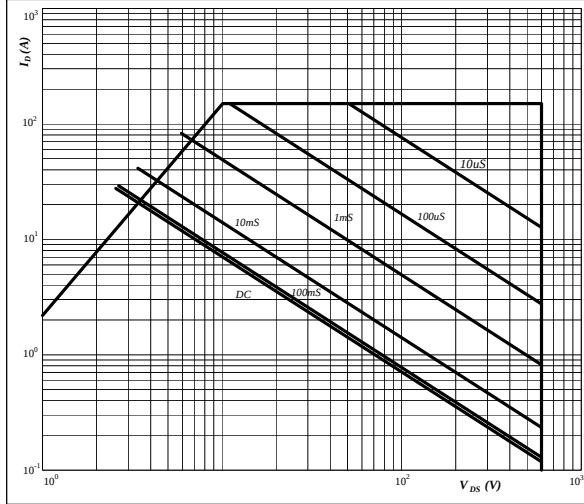
$T_j = 150$ °C

PFC

Figure 25

PFC SWITCH

Safe operating area as a function
of drain-source voltage
 $I_D = f(V_{DS})$



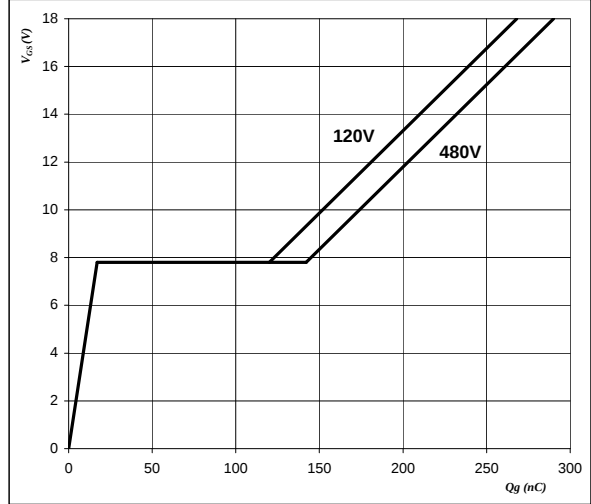
D = single pulse
 $T_h = 80$ °C
 $V_{GS} = 15$ V
 $T_j = T_{jmax}$ °C

Figure 26

PFC SWITCH

Gate voltage vs Gate charge

$V_{GS} = f(Q_g)$



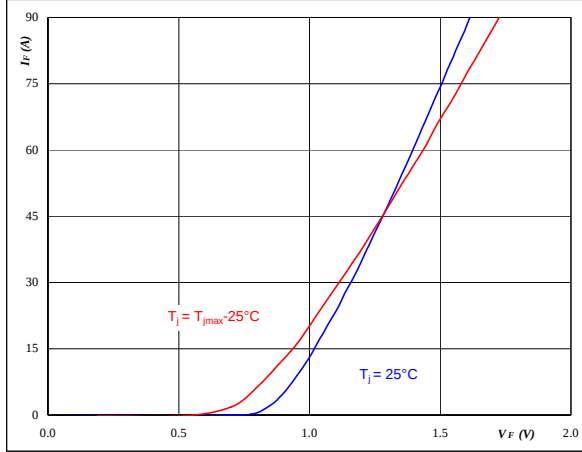
$I_D = 50$ A

Input Rectifier Bridge

Figure 1 Rectifier diode

Typical diode forward current as
a function of forward voltage

$$I_F = f(V_F)$$

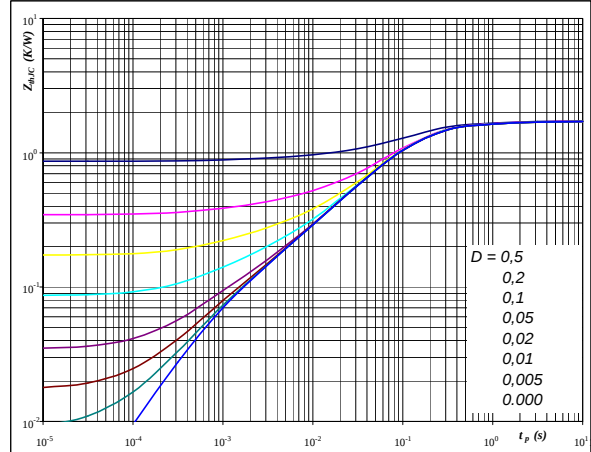


$$t_p = 250 \mu s$$

Figure 2 Rectifier diode

Diode transient thermal impedance
as a function of pulse width

$$Z_{thJH} = f(t_p)$$



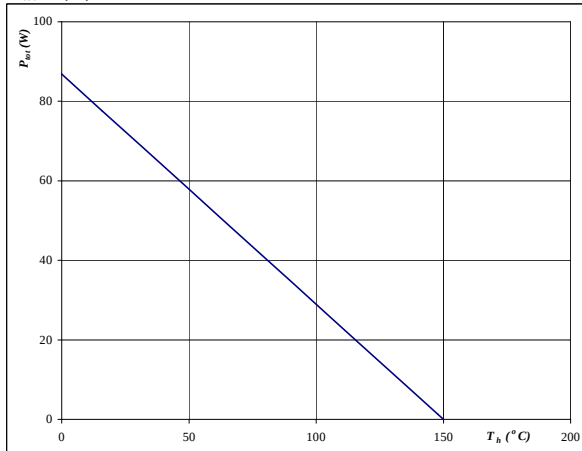
$$D = t_p / T$$

$$R_{thJH} = 1.728 \text{ K/W}$$

Figure 3 Rectifier diode

Power dissipation as a
function of heatsink temperature

$$P_{tot} = f(T_h)$$

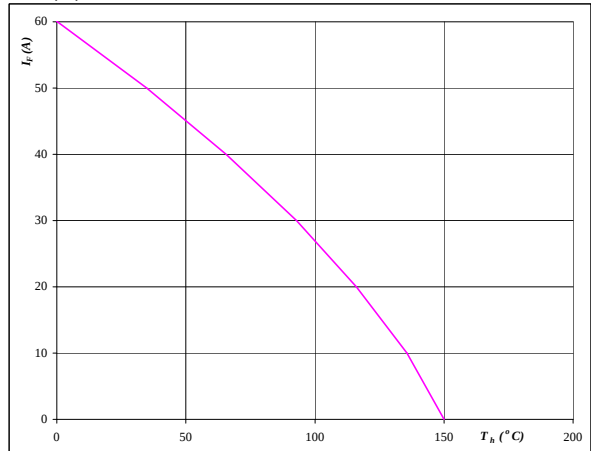


$$T_j = 150 \text{ } ^\circ\text{C}$$

Figure 4 Rectifier diode

Forward current as a
function of heatsink temperature

$$I_F = f(T_h)$$



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

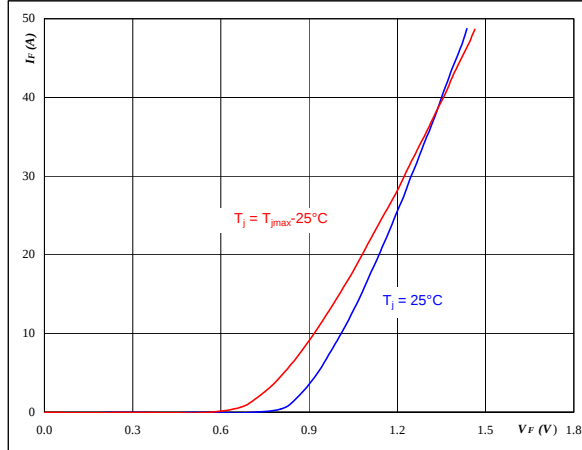
Thyristor

Figure 1

Thyristor

Typical thyristor forward current as
a function of forward voltage

$$I_F = f(V_F)$$



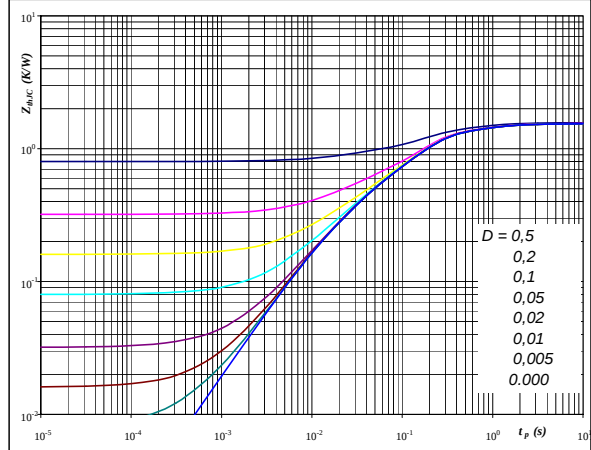
$$t_p = 250 \mu s$$

Figure 2

Thyristor

Thyristor transient thermal impedance
as a function of pulse width

$$Z_{thJH} = f(t_p)$$



$$D = t_p / T$$

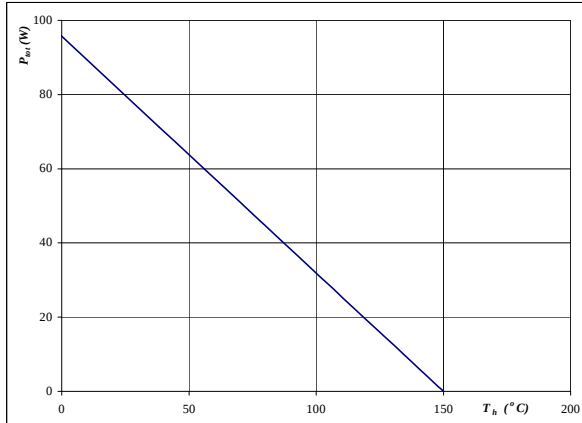
$$R_{thJH} = 1.57 \text{ K/W}$$

Figure 3

Thyristor

Power dissipation as a
function of heatsink temperature

$$P_{tot} = f(T_h)$$



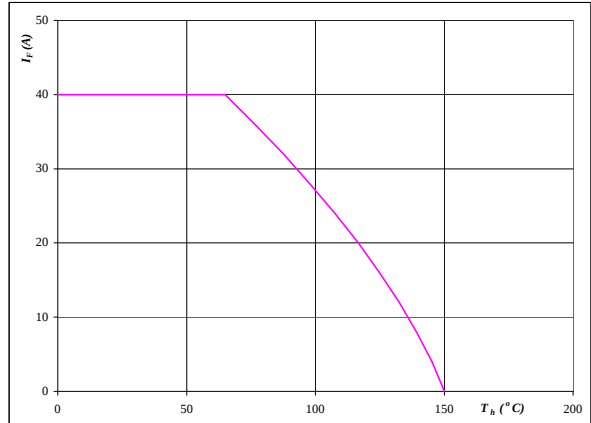
$$T_j = 150 \text{ } ^\circ\text{C}$$

Figure 4

Thyristor

Forward current as a
function of heatsink temperature

$$I_F = f(T_h)$$



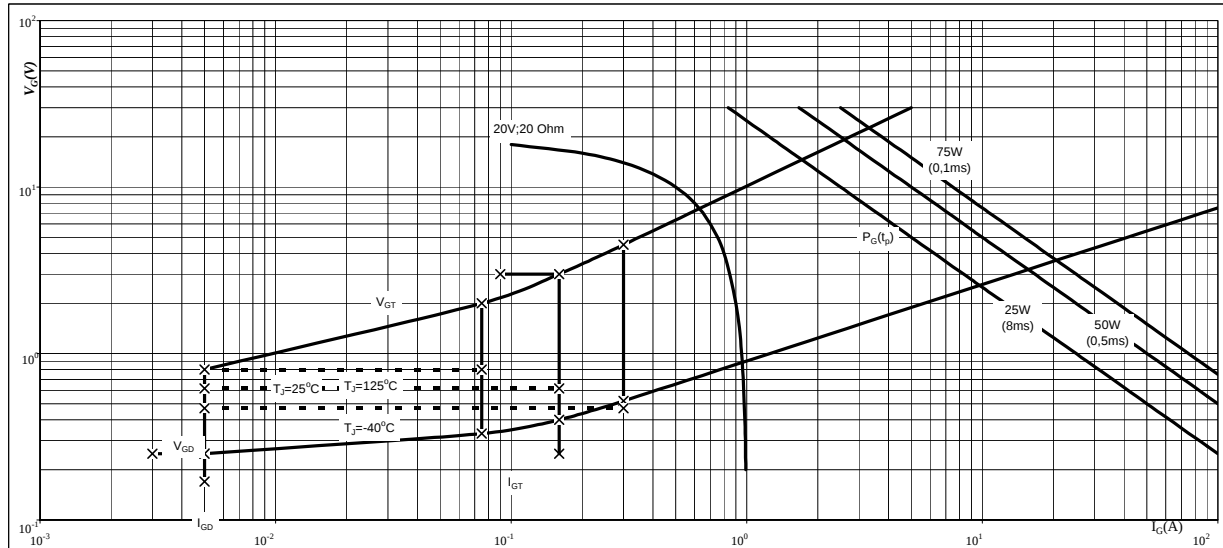
$$T_j = 150 \text{ } ^\circ\text{C}$$

Thyristor

Figure 5

Thyristor

Gate trigger characteristics



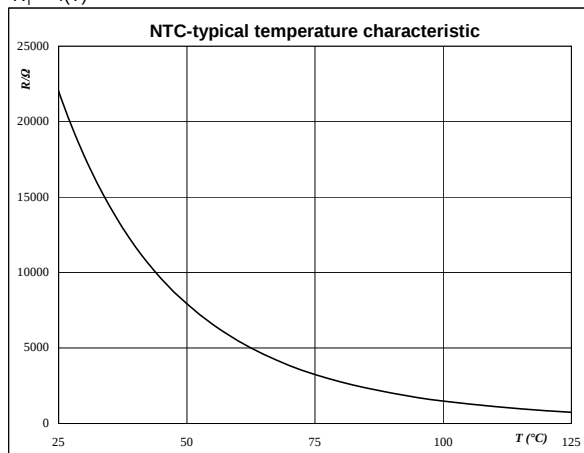
Thermistor

Figure 1

Thermistor

Typical NTC characteristic
as a function of temperature

$$R_T = f(T)$$



Switching Definitions PFC

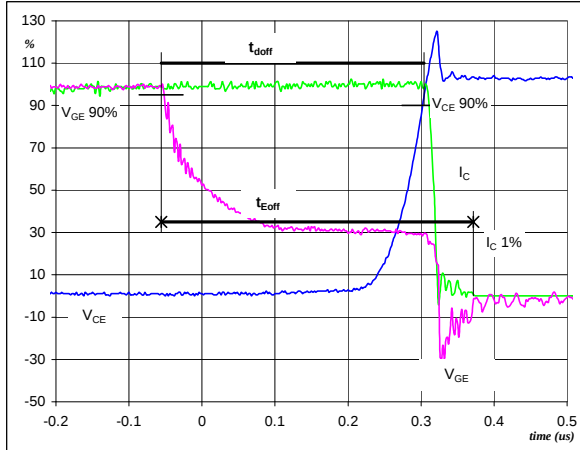
General conditions

T_j	=	125 °C
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

Figure 1 PFC SWITCH

Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff}

(t_{Eoff} = integrating time for E_{off})

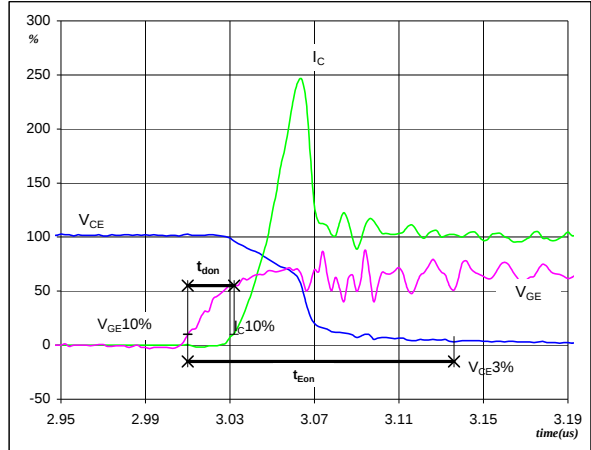


$V_{GE}(0\%) =$	0	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	400	V
$I_C(100\%) =$	50	A
$t_{doff} =$	0.35	μs
$t_{Eoff} =$	0.43	μs

Figure 2 PFC SWITCH

Turn-on Switching Waveforms & definition of t_{don} , t_{Eon}

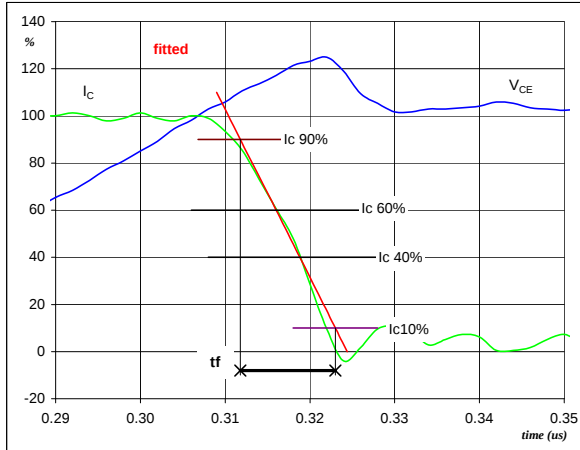
(t_{Eon} = integrating time for E_{on})



$V_{GE}(0\%) =$	0	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	400	V
$I_C(100\%) =$	50	A
$t_{don} =$	0.02	μs
$t_{Eon} =$	0.13	μs

Figure 3 PFC SWITCH

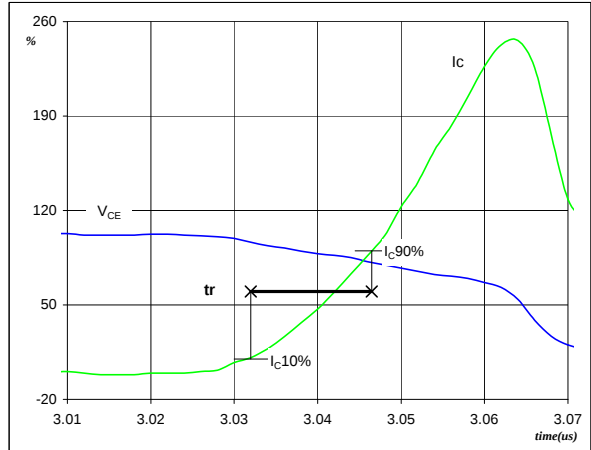
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%) =$	400	V
$I_C(100\%) =$	50	A
$t_f =$	0.011	μs

Figure 4 PFC SWITCH

Turn-on Switching Waveforms & definition of t_r

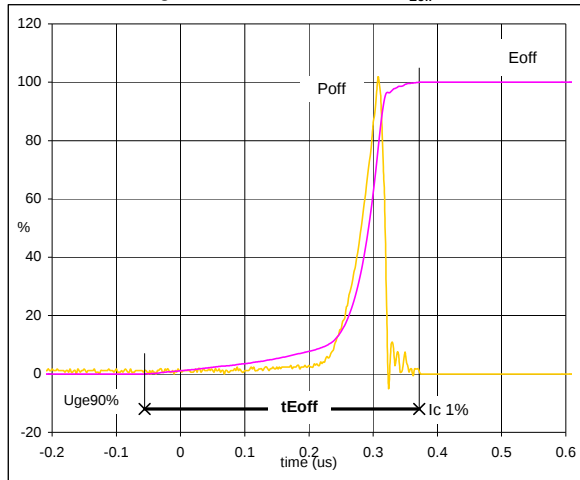


$V_C(100\%) =$	400	V
$I_C(100\%) =$	50	A
$t_r =$	0.015	μs

Switching Definitions PFC

Figure 5 PFC SWITCH

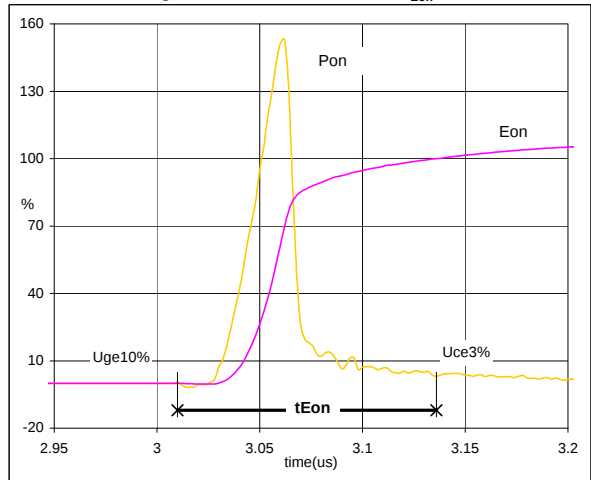
Turn-off Switching Waveforms & definition of t_{Eoff}



$P_{off}(100\%) = 20.08$ kW
 $E_{off}(100\%) = 0.97$ mJ
 $t_{Eoff} = 0.43$ μ s

Figure 6 PFC SWITCH

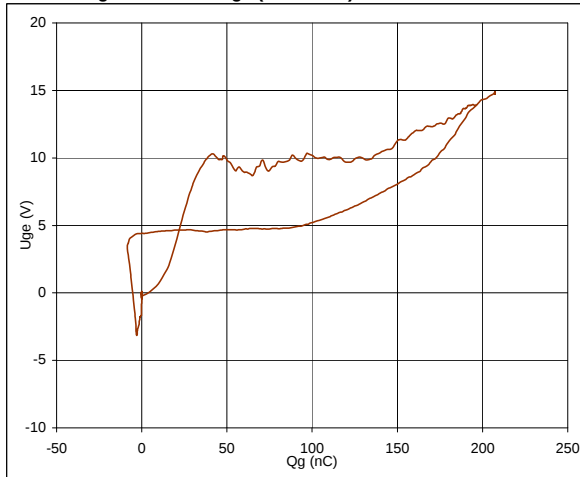
Turn-on Switching Waveforms & definition of t_{Eon}



$P_{on}(100\%) = 20.08$ kW
 $E_{on}(100\%) = 0.78$ mJ
 $t_{Eon} = 0.126$ μ s

Figure 7 PFC SWITCH

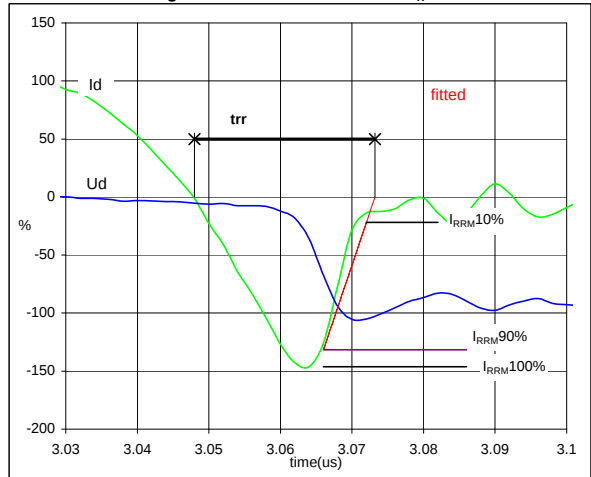
Gate voltage vs Gate charge (measured)



$V_{GEoff} = 0$ V
 $V_{GEon} = 15$ V
 $V_C(100\%) = 400$ V
 $I_C(100\%) = 50$ A
 $Q_g = 207.14$ nC

Figure 8 PFC FRED

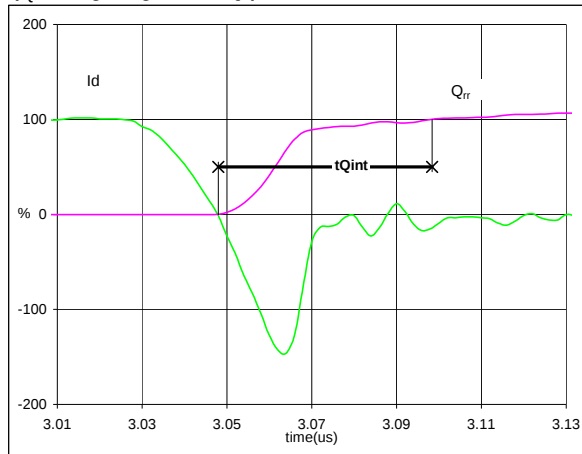
Turn-off Switching Waveforms & definition of t_{tr}



$V_d(100\%) = 400$ V
 $I_d(100\%) = 50$ A
 $I_{RRM}(100\%) = -73$ A
 $t_{tr} = 0.03$ μ s

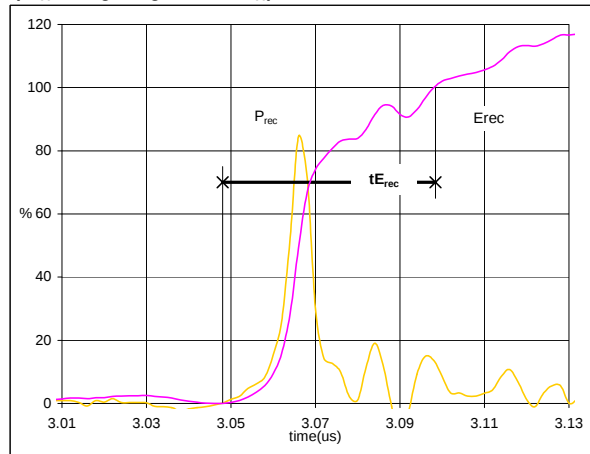
Switching Definitions PFC

Figure 9 PFC FRED
Turn-on Switching Waveforms & definition of t_{Qrr}
(t_{Qrr} = integrating time for Q_{rr})



I_d (100%) = 50 A
 Q_{rr} (100%) = 1.08 μC
 t_{Qint} = 0.05 μs

Figure 10 PFC FRED
Turn-on Switching Waveforms & definition of t_{Erec}
(t_{Erec} = integrating time for E_{rec})



P_{rec} (100%) = 20.08 kW
 E_{rec} (100%) = 0.19 mJ
 t_{Erec} = 0.05 μs

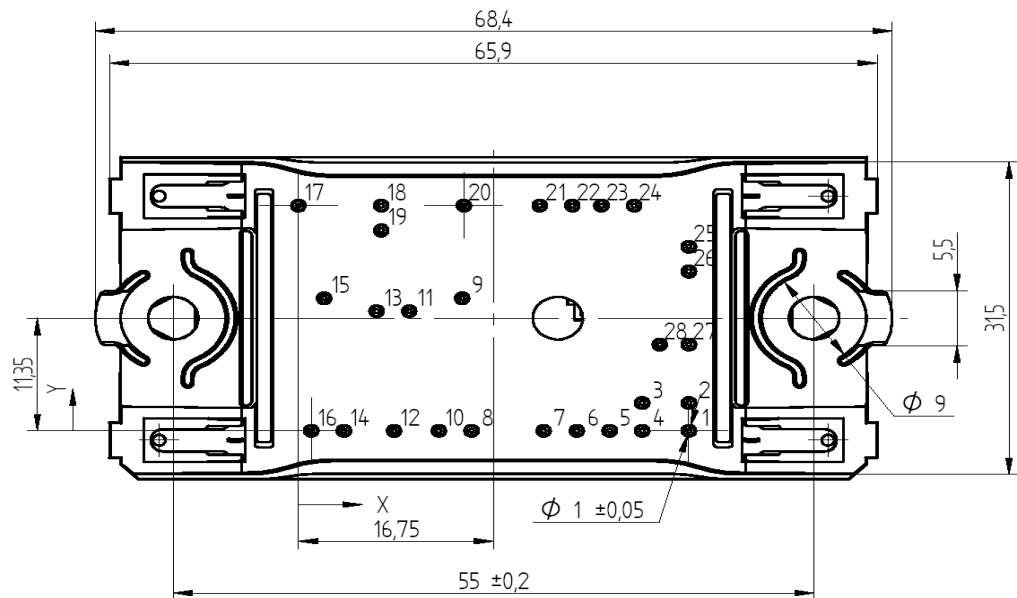
Ordering Code and Marking - Outline - Pinout

Ordering Code & Marking

Version	Ordering Code	in DataMatrix as	in packaging barcode as
without SCR, current sense in collector	10-FZ062TA040FB-P984D18	P984D18	P984D18
with SCR, current sense in collector	10-FZ062TA040FB01-P984D28	P984D28	P984D28
without SCR, current sense in emitter	10-FZ062TA040FB02-P984D38	P984D38	P984D38
with SCR, current sense in emitter	10-FZ062TA040FB03-P984D48	P984D48	P984D48

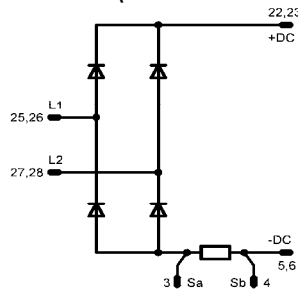
Outline

Pin	X	Y
1	335	0
2	335	2,8
3	295	2,8
4	295	0
5	26,7	0
6	23,9	0
7	2105	0
8	16,85	0
9	16,05	13,95
10	12,05	0
11	9,5	12,05
12	8,2	0
13	6,7	12,05
14	3,9	0
15	2,2	13,95
16	1,1	0
17	0	22,7
18	7,1	22,7
19	7,1	20,2
20	14,2	22,7
21	20,7	22,7
22	23,5	22,7
23	26	22,7
24	28,8	22,7
25	335	16,95
26	335	16,05
27	335	8,7
28	31	8,7



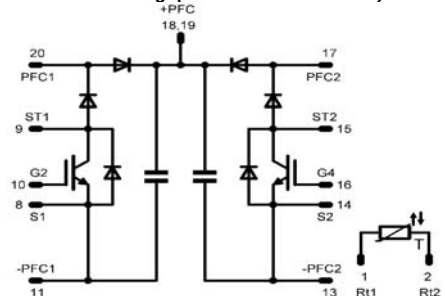
Pinout

Rectifier(FZ062TA040FB & FB02)



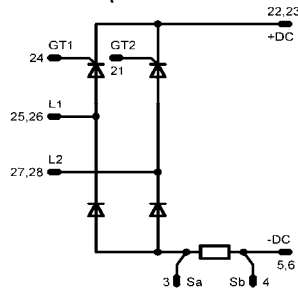
Pin nr. 21 & 24 without electrical connection

Boost stage(FZ062TA040FB & FB01)



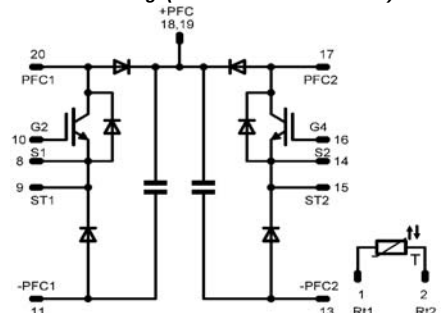
Pin nr. 7 & 12 without electrical connection

Rectifier(FZ062TA040FB01 & FB03)



Pin nr. 7 & 12 without electrical connection

Boost stage(FZ062TA040FB02 & FB03)



PRODUCT STATUS DEFINITIONS

Datasheet Status	Product Status	Definition
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data may be published at a later date. Vincotech reserves the right to make changes at any time without notice in order to improve design. The data contained is exclusively intended for technically trained staff.
Final	Full Production	This datasheet contains final specifications. Vincotech reserves the right to make changes at any time without notice in order to improve design. The data contained is exclusively intended for technically trained staff.

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