10-PG06PPA030SJ-LJ02B08T
datasheet

***flow*PIM 1 + PFC** **600 V / 30 A**

Features

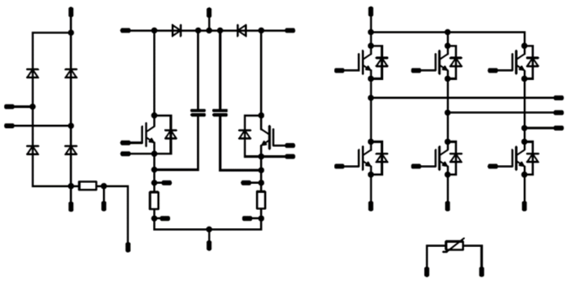
- One-phase rectifier
- Interleaved PFC circuit
- High speed IGBT in the inverter
- Integrated shunts and capacitors

flow 1 12mm housing

Target applications

- Embedded Drives
- Industrial Drives

Schematic



Types

- 10-PG06PPA030SJ-LJ02B08T

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Rectifier Diode					
Peak repetitive reverse voltage	V_{RRM}			1600	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80 °C	44	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave t_p = 10 ms	T_j = 150 °C	270	A
Surge current capability	I^2t			365	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	64	W
Maximum junction temperature	T_{jmax}			150	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition			Value	Unit
Inverter Switch						
Collector-emitter voltage	V_{CES}				600	V
Collector current	I_C	$T_j = T_{jmax}$		T_s = 80 °C	30	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}			90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	63	W
Gate-emitter voltage	V_{GES}				±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V	V_{cc} = 400 V	T_j = 150 °C	5	µs
Maximum junction temperature	T_{jmax}				175	°C
Inverter Diode						
Peak repetitive reverse voltage	V_{RRM}				600	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$		T_s = 80 °C	28	A
Repetitive peak forward current	I_{FRM}				40	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	50	W
Maximum junction temperature	T_{jmax}				175	°C
PFC Switch						
Collector-emitter voltage	V_{CES}				650	V
Collector current	I_C	$T_j = T_{jmax}$		T_s = 80 °C	29	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}			90	A
Turn off safe operating area		T_j ≤ 175°C, V_{CE} ≤ 650 V			90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	68	W
Gate-emitter voltage	V_{GES}				±20	V
Maximum junction temperature	T_{jmax}				175	°C
PFC Diode						
Peak repetitive reverse voltage	V_{RRM}				650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$		T_s = 80 °C	32	A
Repetitive peak forward current	I_{FRM}				180	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$		T_s = 80 °C	59	W
Maximum junction temperature	T_{jmax}				175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
PFC Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80 °C	8	A
Repetitive peak forward current	I_{FRM}			12	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	38	W
Maximum junction temperature	T_{jmax}			175	°C
Capacitor (PFC)					
Maximum DC voltage	V_{MAX}			630	V
Operation Temperature	T_{op}			-55...+125	°C
PFC Shunt					
Max DC current	I_{MAX}		T_c = 25 °C	32	A
Power dissipation	P_{tot}		T_c = 70 °C	2	W
Shunt					
Max DC current	I_{MAX}		T_c = 25 °C	32	A
Power dissipation	P_{tot}		T_c = 70 °C	2	W

Module Properties

Parameter	Symbol	Condition		Value	Unit
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 s	6000	V
		AC Voltage	t_p = 1 min	2500	V
Creepage distance				min. 12,7	mm
Clearance				7,82	mm
Comparative Tracking Index	CTI			> 200	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions					Value			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	
Rectifier Diode										
Static										
Forward voltage	V_F				31	25 125		1,14 1,10	1,8	V
Reverse leakage current	I_R			1600		25 150			100	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,10		K/W

Characteristic Values

Parameter	Symbol	Conditions	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	Unit
Inverter Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,00048	25	4,1	5,1	5,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		30	25 125 150		1,73 1,97 2,01	2	V
Collector-emitter cut-off current	I_{CES}		0	600		25			29	µA
Gate-emitter leakage current	I_{GES}		20	0		25			200	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	f= 1 Mhz	0	25		25		1050		pF
Output capacitance	C_{oes}							45		
Reverse transfer capacitance	C_{res}							36		
Gate charge	Q_g		15	480	30	25		130		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,52		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	30	25 125 150		37 38 38		ns
Rise time	t_r					25 125 150		12 13 15		
Turn-off delay time	$t_{d(off)}$					25 125 150		90 109 113		
Fall time	t_f					25 125 150		12 19 23		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 0,8 µC Q_{rFWD} = 1,8 µC Q_{rFWD} = 2 µC				25 125 150		0,758 0,981 1,040		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,233 0,422 0,469		

Characteristic Values

Parameter	Symbol	Conditions					Value			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	
Inverter Diode										
Static										
Forward voltage	V_F				20	25 125		1,70 1,58	2,05	V
Reverse leakage current	I_R			600		25			27	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,91		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 500 A/µs di/dt = 1295 A/µs di/dt = 1294 A/µs	±15	350	30	25 125 150		8 12 13		A
Reverse recovery time	t_{rr}					25 125 150		201 276 328		ns
Recovered charge	Q_r					25 125 150		0,812 1,814 2,025		µC
Reverse recovered energy	E_{rec}					25 125 150		0,161 0,388 0,431		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		54 61 82		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Value			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	
PFC Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,0003	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		30	25 125		1,97 2,24	2,35	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			200	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	f= 1 Mhz	0	25		25		2100		pF
Output capacitance	C_{oes}							45		
Reverse transfer capacitance	C_{res}							7,7		
Gate charge	Q_g		15	520	30	25		65		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,39		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	0 / 15	400	30	25 125 150		12 12 13		ns
Rise time	t_r					25 125 150		8 8 8		
Turn-off delay time	$t_{d(off)}$					25 125 150		80 94 98		
Fall time	t_f					25 125 150		8 10 10		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 0,4 µC Q_{rFWD} = 1 µC Q_{rFWD} = 1,2 µC				25 125 150		0,391 0,524 0,451		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,086 0,207 0,332		

Characteristic Values

Parameter	Symbol	Conditions					Value			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	
PFC Diode										
Static										
Forward voltage	V_F				30	25 125		2,46 2,03	2,8	V
Reverse leakage current	I_R			650		25			10	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,61		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 4524 A/µs di/dt = 4528 A/µs di/dt = 4350 A/µs	0 / 15	400	30	25 125 150		24 40 45		A
Reverse recovery time	t_{rr}					25 125 150		19 47 50		ns
Recovered charge	Q_r					25 125 150		0,394 0,956 1,172		µC
Reverse recovered energy	E_{rec}					25 125 150		0,088 0,221 0,275		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2361 2958 3147		A/µs
PFC Sw. Protection Diode										
Static										
Forward voltage	V_F				6	25 125 150		1,73 1,59 1,54	2	V
Reverse leakage current	I_R			650		25			0,1	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,53		K/W
Capacitor (PFC)										
Capacitance	C							33		nF
Tolerance							-5		+5	%

Characteristic Values

Parameter	Symbol	Conditions					Value			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	

PFC Shunt

Resistance	R							2		mΩ
Tolerance*								1		%
Temperature coefficient	tc					20 - 60			75	ppm/K

* Nominal tolerance of the component as shown in manufacturer's datasheet. **Not tested in production**

Shunt

Resistance	R							2		mΩ
Tolerance*								1		%
Temperature coefficient	tc					20 - 60			75	ppm/K

* Nominal tolerance of the component as shown in manufacturer's datasheet. **Not tested in production**

Thermistor

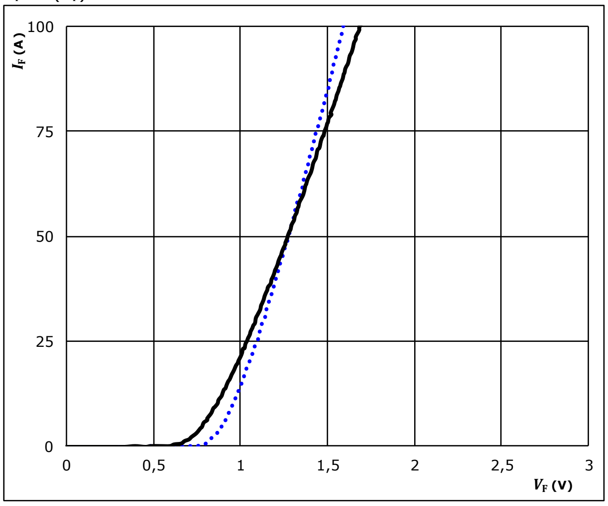
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		5		mW
Power dissipation constant						25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %				25		3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %				25		4000		K
Vincotech NTC Reference									I	

Rectifier Diode Characteristics

figure 1. **Rectifier Diode**

Typical forward characteristics

$I_F = f(V_F)$



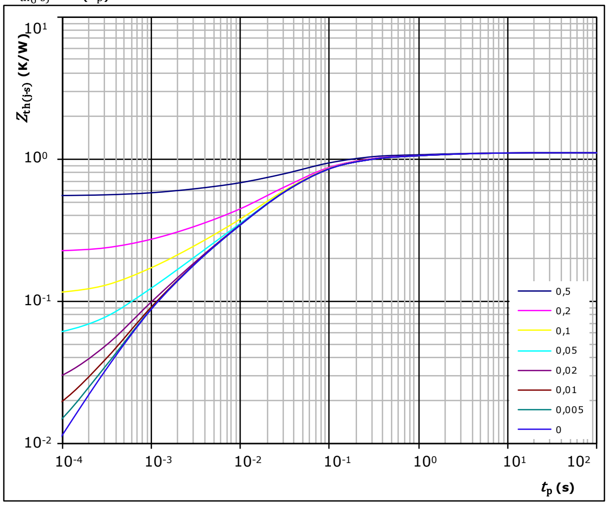
t_p = 250 µs

T_j: 25 °C (dotted), 125 °C (solid)

figure 2. **Rectifier Diode**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j\text{-}s)}$ = 1,10 K/W

Diode thermal model values

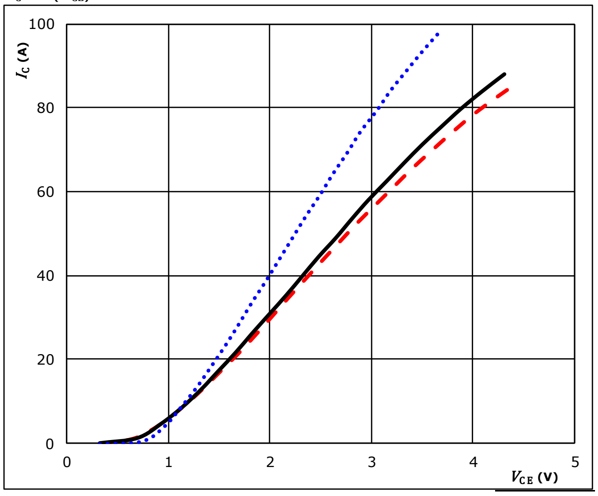
R (K/W)	τ (s)
4,35E-02	3,78E+00
9,34E-02	6,17E-01
3,79E-01	8,75E-02
3,82E-01	2,72E-02
1,24E-01	5,56E-03
7,66E-02	1,02E-03

Inverter Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

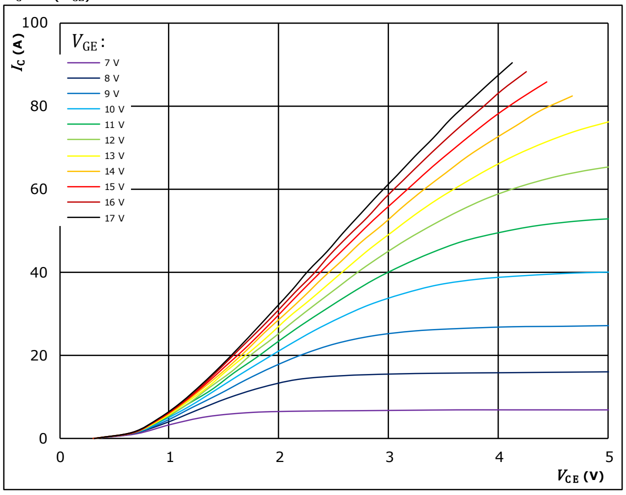


t_p =	250	µs		25 °C	dotted blue
V_{GE} =	15	V	T_j:	125 °C	solid black
				150 °C	dashed red

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

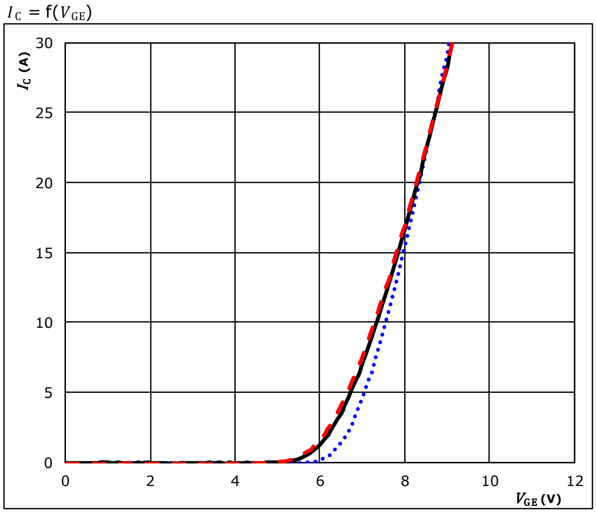


t_p =	250	µs
T_j =	150	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

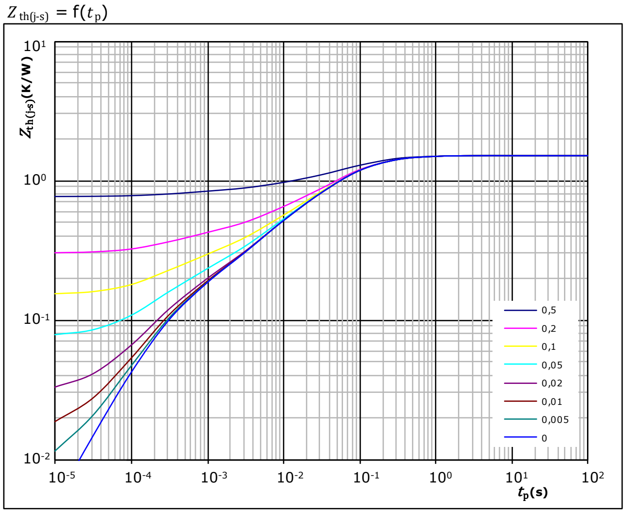


t_p =	100	µs		25 °C	dotted blue
V_{CE} =	10	V	T_j:	125 °C	solid black
				150 °C	dashed red

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

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



D = t_p / T

$R_{th(j-s)}$ = 1,52 K/W

IGBT thermal model values

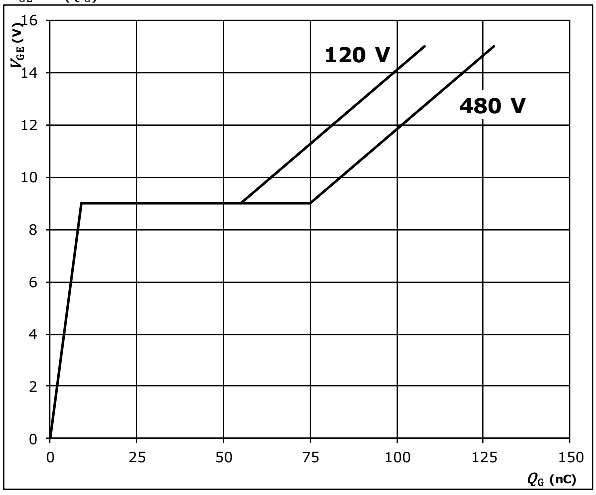
R (K/W)	τ (s)
1,77E-01	4,07E-01
6,88E-01	7,37E-02
3,07E-01	2,16E-02
2,02E-01	4,82E-03
6,94E-02	7,03E-04
7,56E-02	2,19E-04

Inverter Switch Characteristics

figure 5. **IGBT**

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

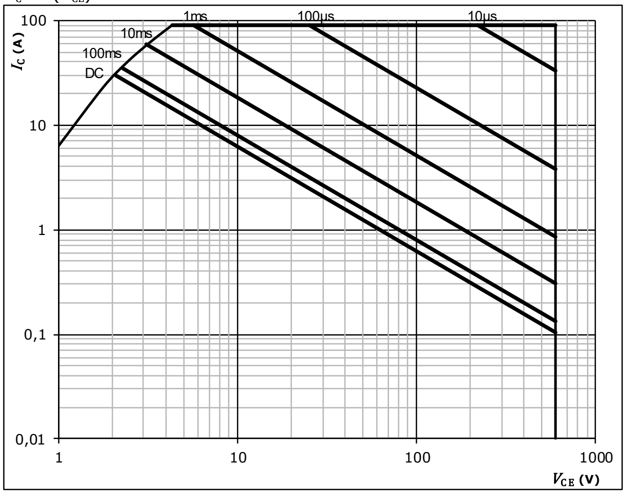


$I_C =$ 30 A

figure 6. **IGBT**

Safe operating area

$I_C = f(V_{CE})$

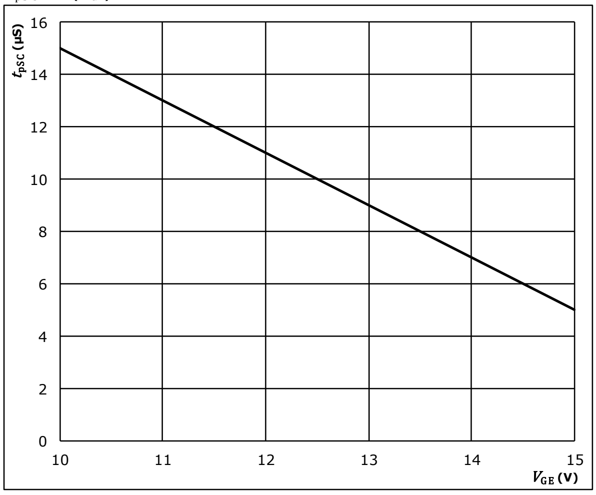


$D =$ single pulse
$T_s =$ 80 ºC
$V_{GE} =$ ±15 V
$T_j =$ T_{jmax}

figure 7. **IGBT**

Short circuit duration as a function of V_{GE}

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

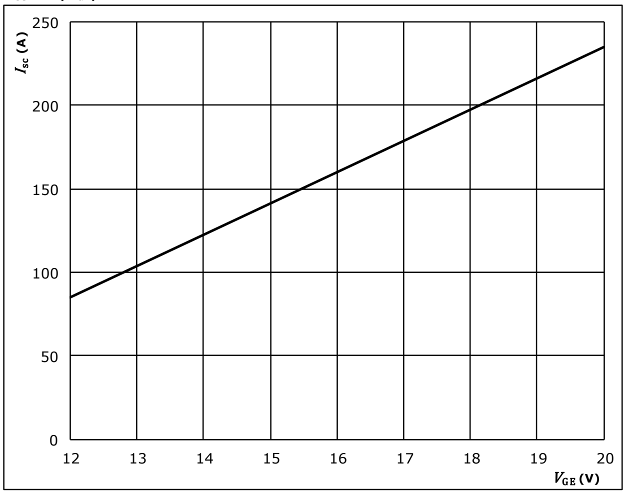


$V_{CE} =$ 400 V
$T_j \leq$ 150 ºC

figure 8. **IGBT**

Typical short circuit current as a function of V_{GE}

$I_{SC} = f(V_{GE})$



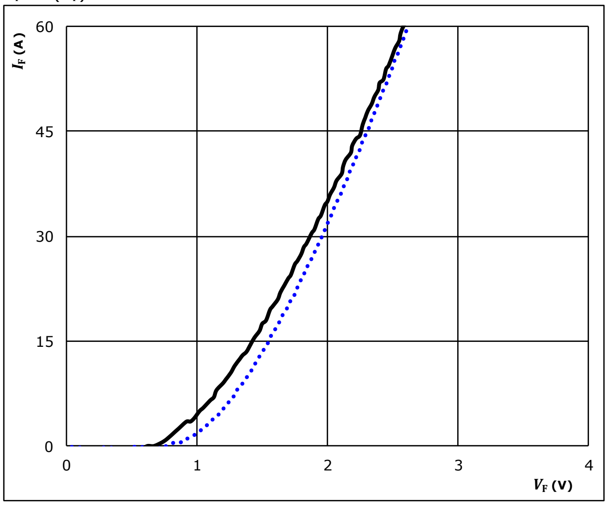
$V_{CE} \leq$ 400 V
$T_j \leq$ 25 ºC

Inverter Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



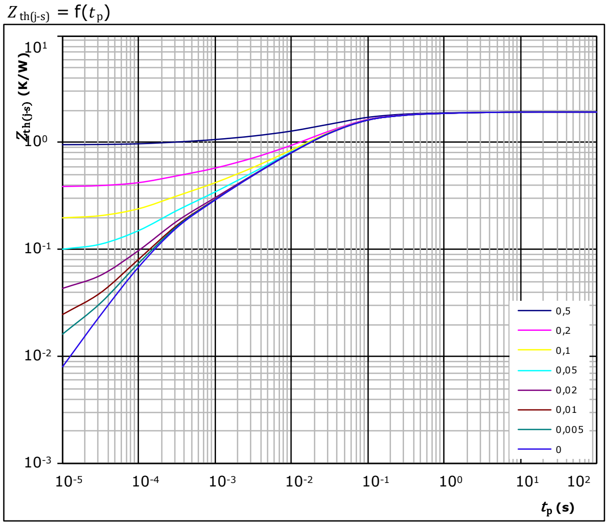
t_p = 250 μs

T_j: 25 °C ········
125 °C ——

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 1,91 K/W

FWD thermal model values

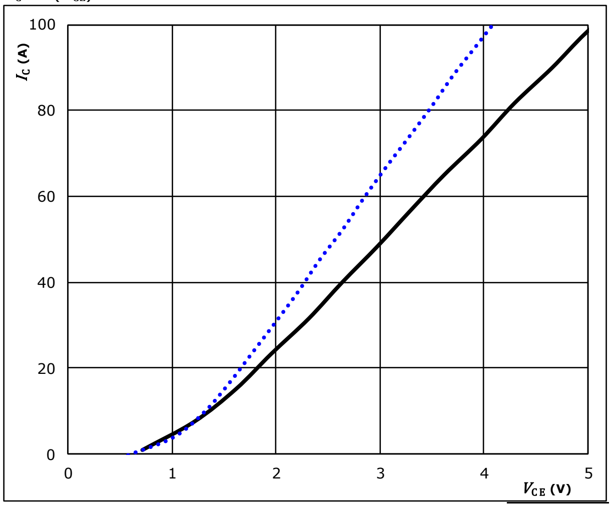
R (K/W)	τ (s)
8,07E-02	2,12E+00
2,18E-01	2,13E-01
8,50E-01	4,23E-02
4,32E-01	8,96E-03
2,00E-01	1,53E-03
1,34E-01	2,03E-04

PFC Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

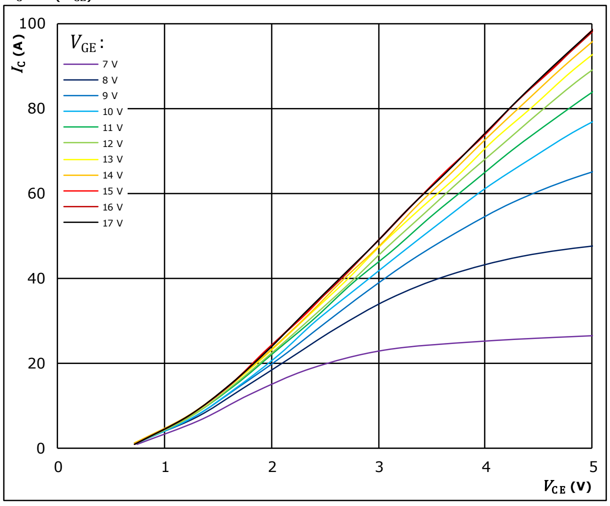


t_p =	250	µs	T_j:	25 °C	··········
V_{GE} =	15	V		125 °C	——

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



t_p = 250 µs

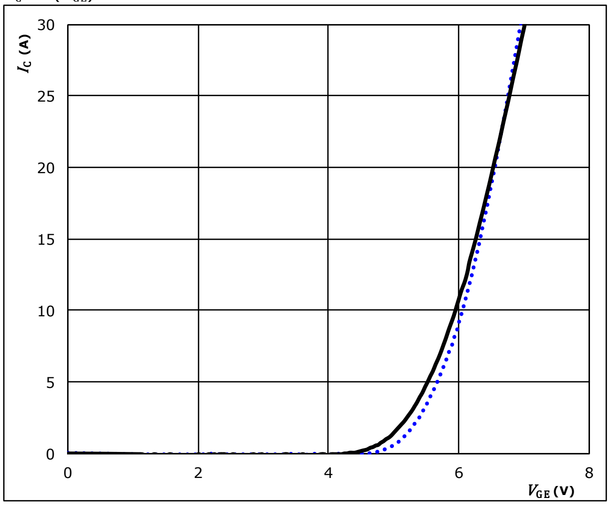
T_j = 125 °C

V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

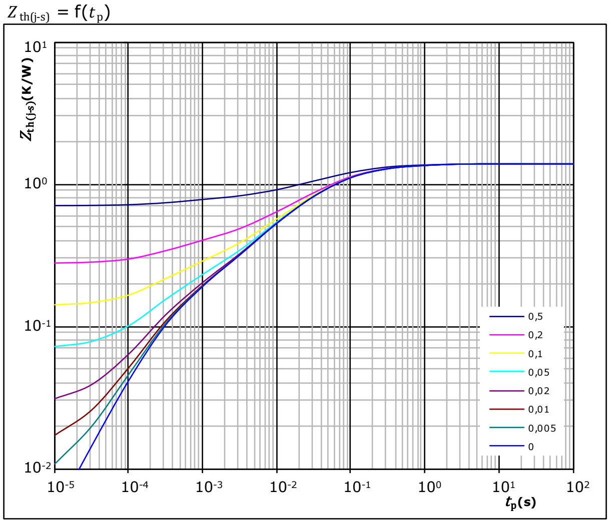


t_p =	100	µs	T_j:	25 °C	··········
V_{CE} =	10	V		125 °C	——

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

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



D = t_p / T

$R_{th(j\text{-}s)}$ = 1,39 K/W

IGBT thermal model values

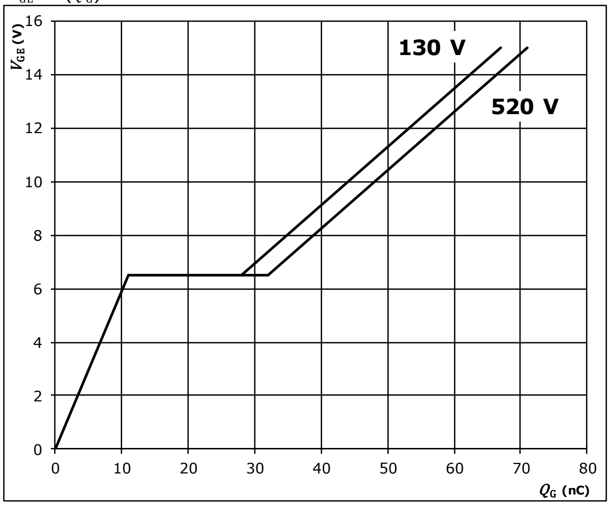
R (K/W)	τ (s)
8,66E-02	9,60E-01
1,95E-01	1,81E-01
5,59E-01	4,84E-02
3,47E-01	9,35E-03
9,37E-02	1,74E-03
1,12E-01	2,76E-04

PFC Switch Characteristics

figure 5.	IGBT

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

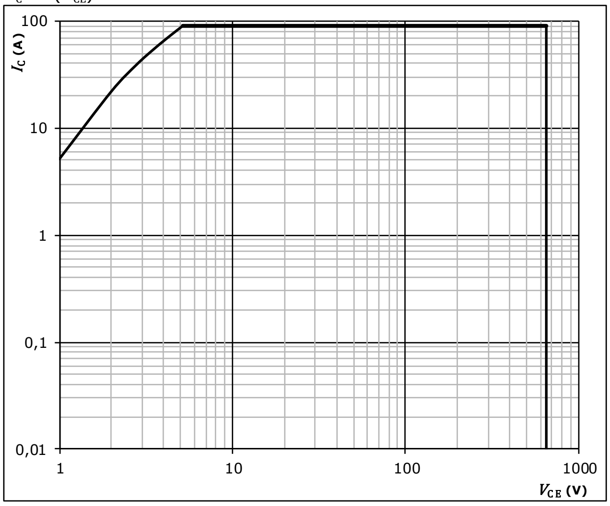


$I_C =$ 30 A

figure 6.	IGBT

Safe operating area

$I_C = f(V_{CE})$



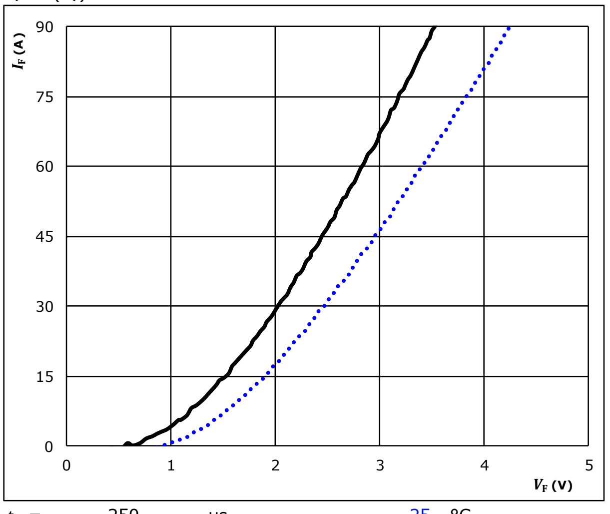
D =	single pulse	
T_s =	80	ºC
V_{GE} =	±15	V
T_j =	T_{jmax}	

PFC Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



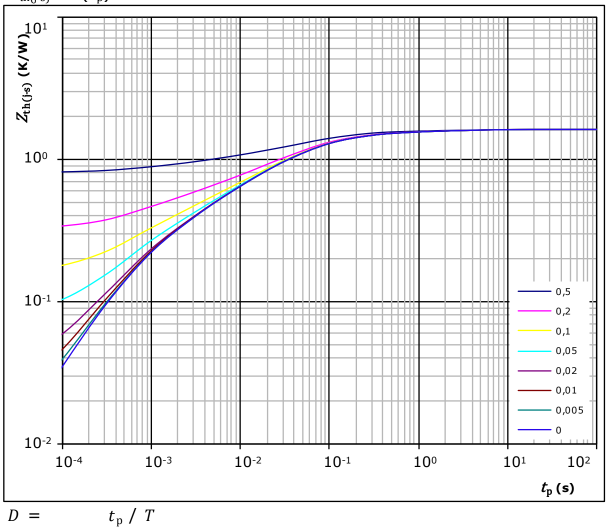
t_p = 250 μs

T_j: 25 °C
125 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j\text{-}s)}$ = 1,61 K/W

FWD thermal model values

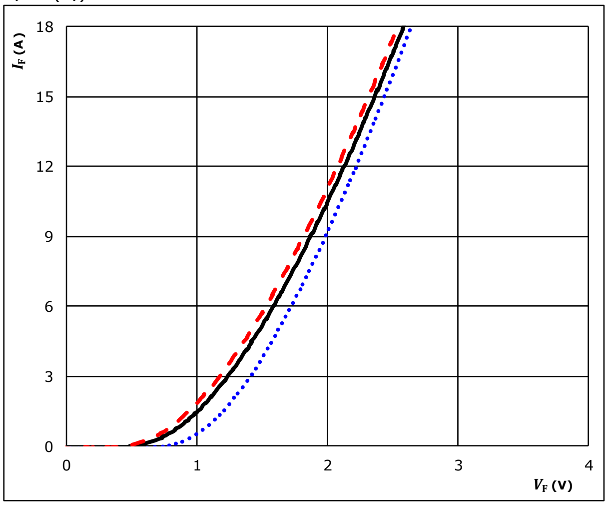
R (K/W)	τ (s)
6,26E-02	3,66E+00
1,57E-01	4,37E-01
5,80E-01	6,90E-02
4,30E-01	1,72E-02
2,34E-01	3,04E-03
1,51E-01	5,73E-04

PFC Sw. Protection Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



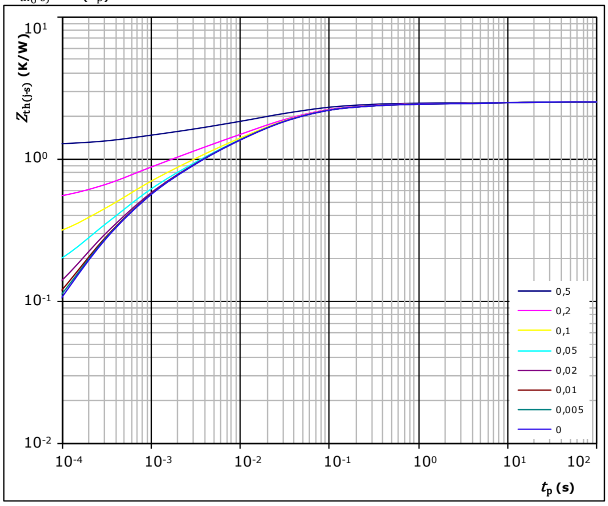
t_p = 250 µs

T_j: 25 °C; 125 °C; 150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 2,53 K/W

FWD thermal model values

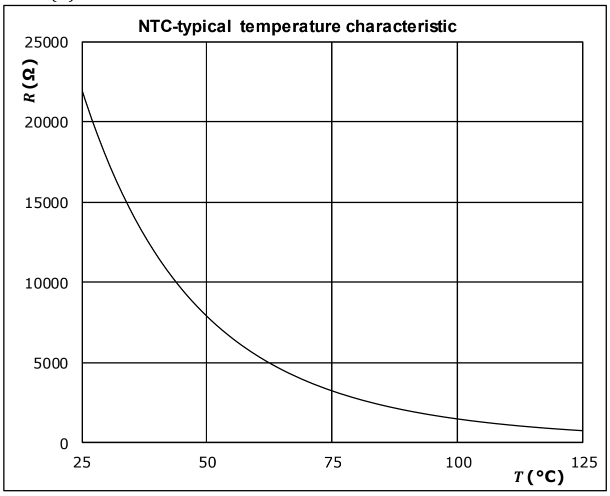
R (K/W)	τ (s)
9,24E-02	7,87E+00
1,75E-01	2,72E-01
7,31E-01	4,21E-02
7,14E-01	9,84E-03
4,89E-01	1,79E-03
3,27E-01	3,20E-04

Thermistor Characteristics

figure 1. **Thermistor**

Typical NTC characteristic as a function of temperature

$R = f(T)$

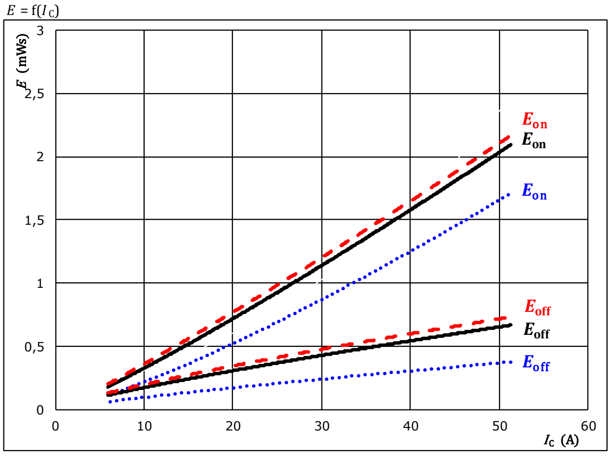


Inverter Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



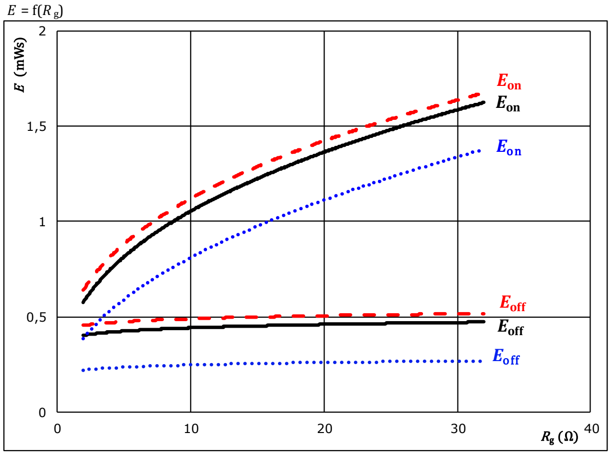
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed
R_{goff} =	8	Ω			

figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



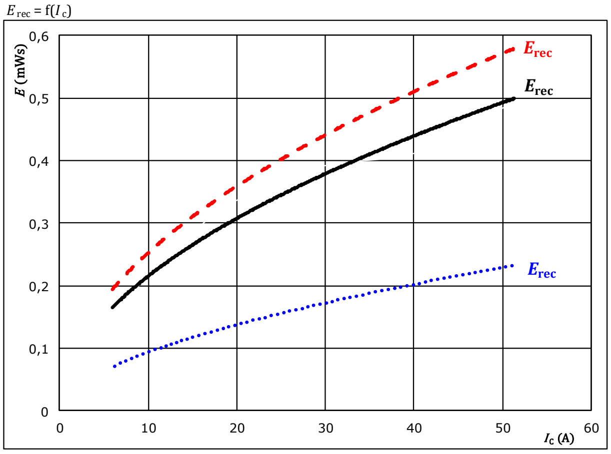
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	30	A		150 °C	dashed

figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_c)$



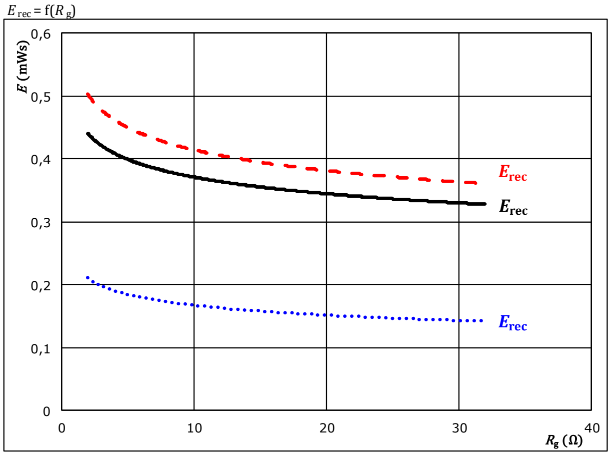
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

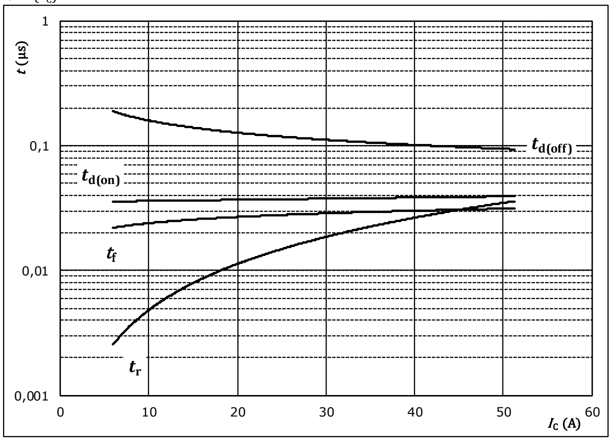
V_{CE} =	350	V	T_j:	25 °C	dotted
V_{GE} =	±15	V		125 °C	solid
I_C =	30	A		150 °C	dashed

Inverter Switching Characteristics

figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



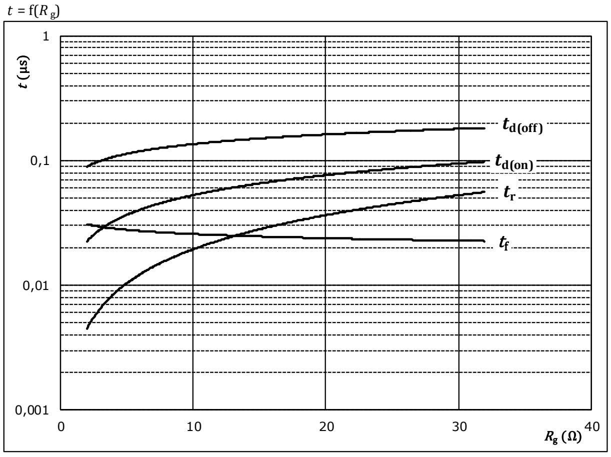
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



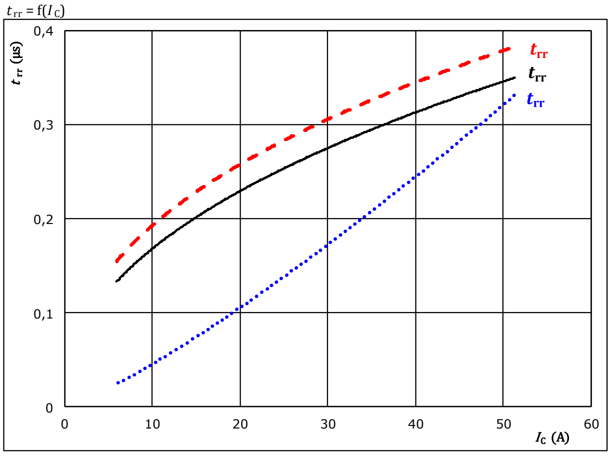
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	30	A

figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



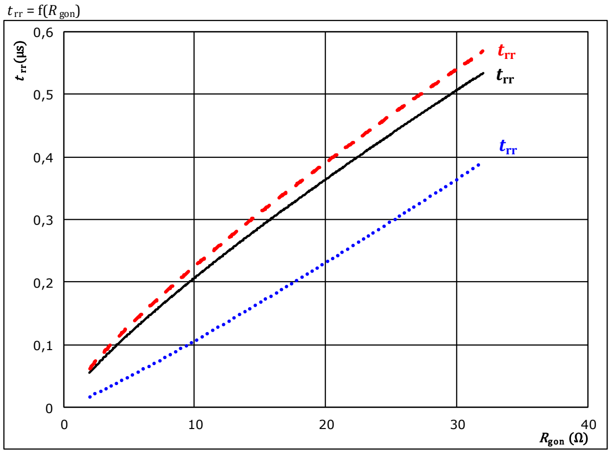
With an inductive load at

V_{CE}=	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 8. **FWD**

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

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



With an inductive load at

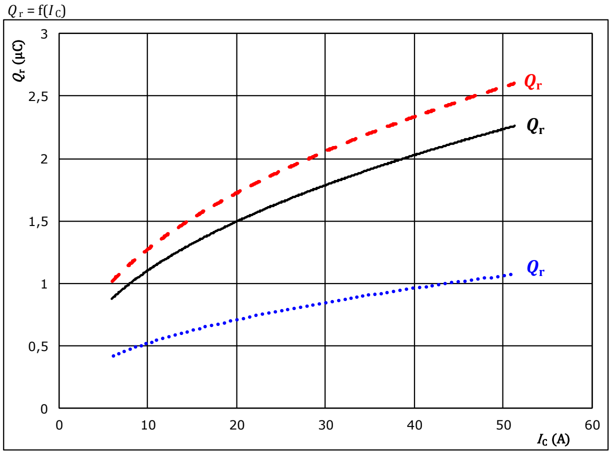
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	30	A		150 °C

Inverter Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

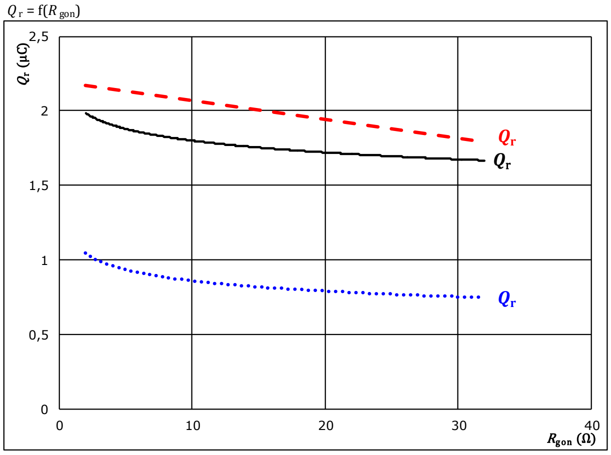


With an inductive load at			T_j:	
V_{CE} =	350	V	25 °C	············
V_{GE} =	±15	V	125 °C	———
R_{gon} =	8	Ω	150 °C	– – –

figure 10. FWD

Typical recovered charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$

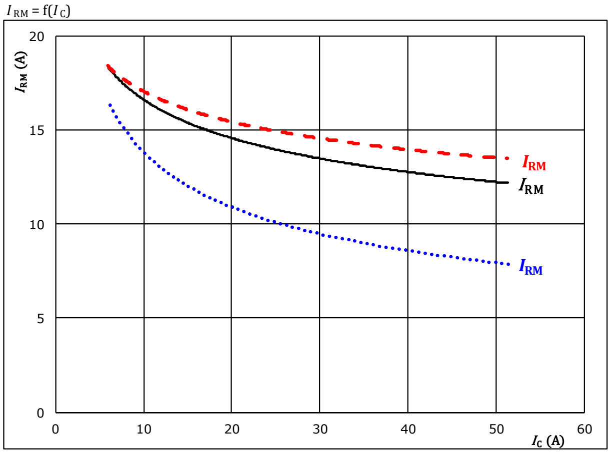


With an inductive load at			T_j:	
V_{CE} =	350	V	25 °C	············
V_{GE} =	±15	V	125 °C	———
I_C =	30	A	150 °C	– – –

figure 11. FWD

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

$I_{RM} = f(I_C)$

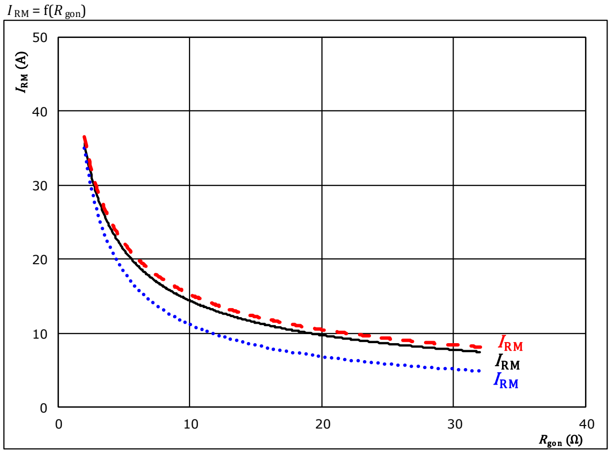


With an inductive load at			T_j:	
V_{CE} =	350	V	25 °C	············
V_{GE} =	±15	V	125 °C	———
R_{gon} =	8	Ω	150 °C	– – –

figure 12. FWD

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

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



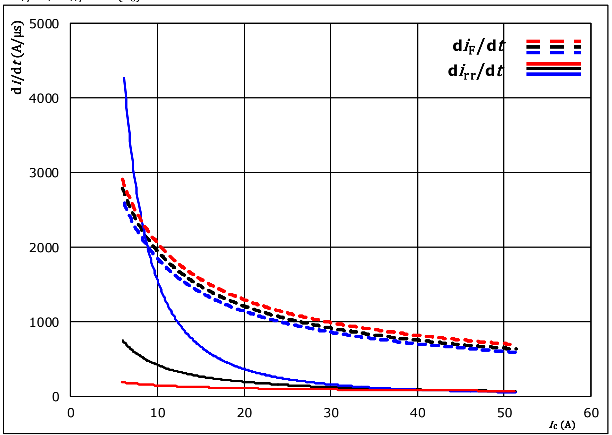
With an inductive load at			T_j:	
V_{CE} =	350	V	25 °C	············
V_{GE} =	±15	V	125 °C	———
I_C =	30	A	150 °C	– – –

Inverter Switching Characteristics

figure 13. **FWD**

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

di_F/dt, di_{rr}/dt = f(I_C)



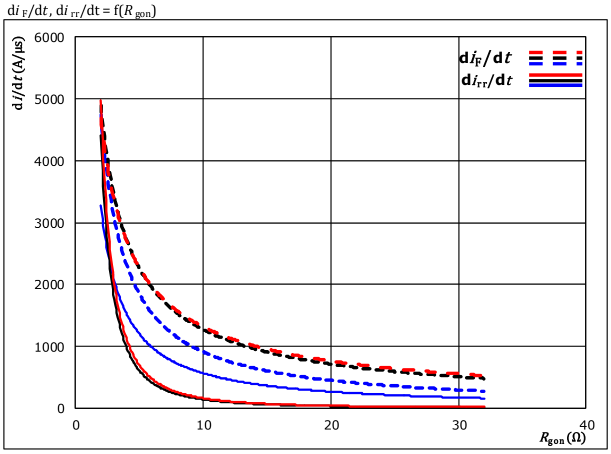
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 14. **FWD**

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

di_F/dt, di_{rr}/dt = f(R_{gon})



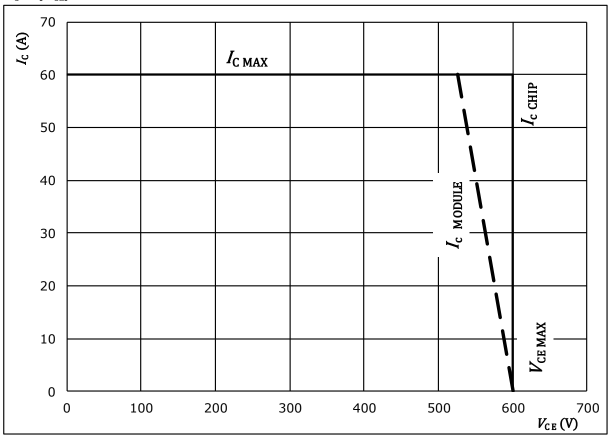
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C=	30	A		150 °C

figure 15. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

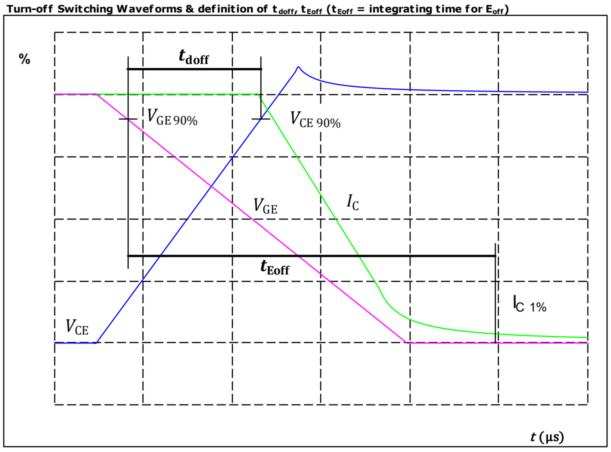
T_j =	125	°C
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Inverter Switching Definitions

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

figure 1. IGBT

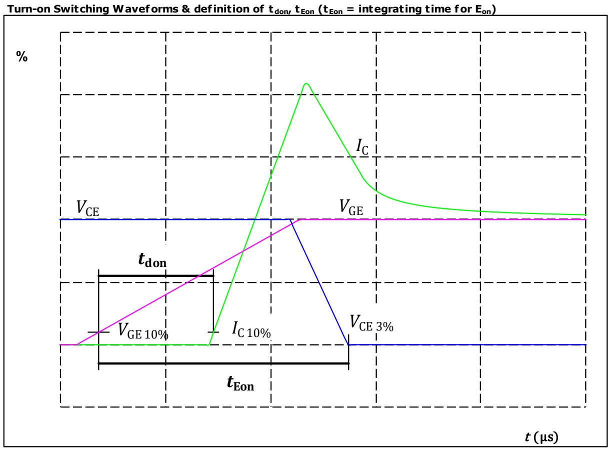
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



V_{GE}(0%) =	-15	V
V_{GE}(100%) =	15	V
V_C(100%) =	350	V
I_C(100%) =	30	A
t_{doff} =	109	ns

figure 2. IGBT

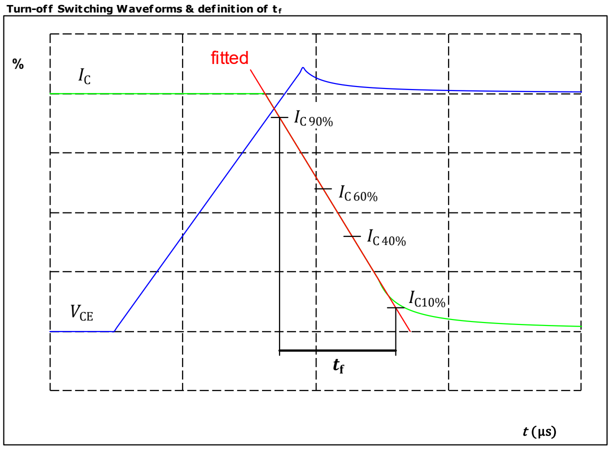
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



V_{GE}(0%) =	-15	V
V_{GE}(100%) =	15	V
V_C(100%) =	350	V
I_C(100%) =	30	A
t_{don} =	38	ns

figure 3. IGBT

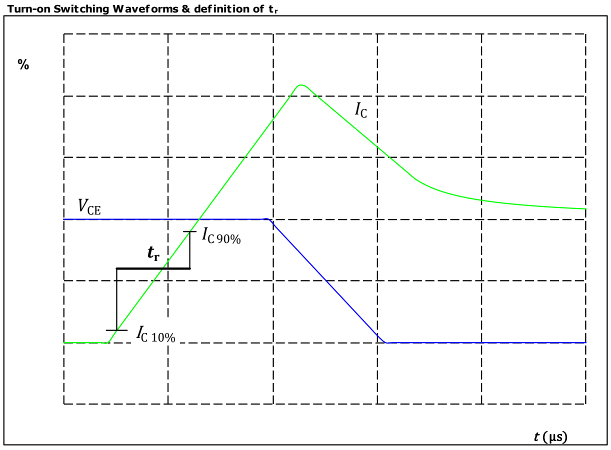
Turn-off Switching Waveforms & definition of t_f



V_C(100%) =	350	V
I_C(100%) =	30	A
t_f =	19	ns

figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r

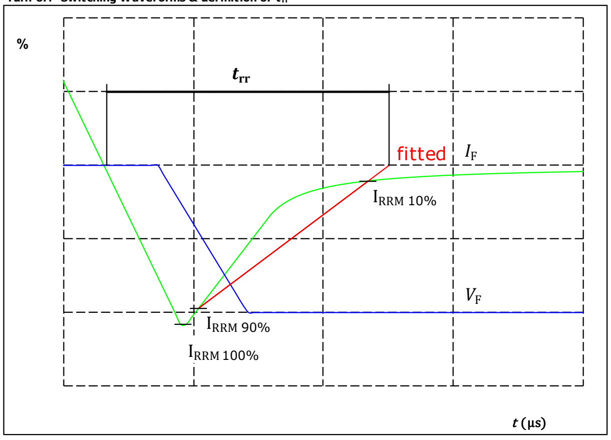


V_C(100%) =	350	V
I_C(100%) =	30	A
t_r =	13	ns

Inverter Switching Characteristics

figure 5. **FWD**

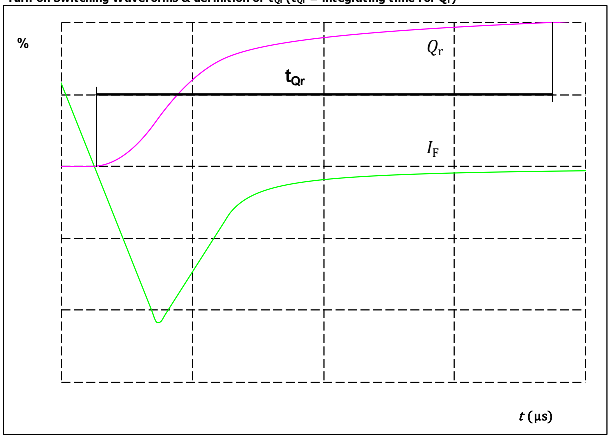
Turn-off Switching Waveforms & definition of t_{rr}



V_F (100%) =	350	V
I_F (100%) =	30	A
I_{RRM} (100%) =	12	A
t_{rr} =	276	ns

figure 6. **FWD**

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



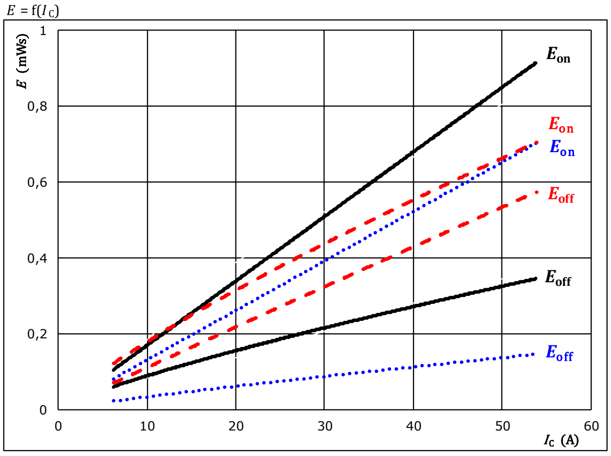
I_F (100%) =	30	A
Q_r (100%) =	1,81	µC

PFC Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



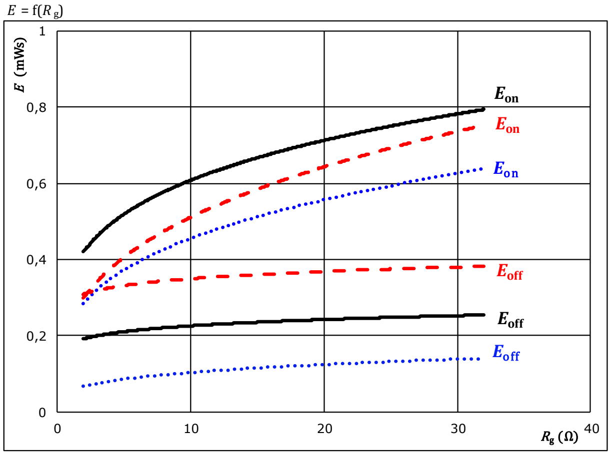
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed
R_{goff} =	8	Ω			

figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



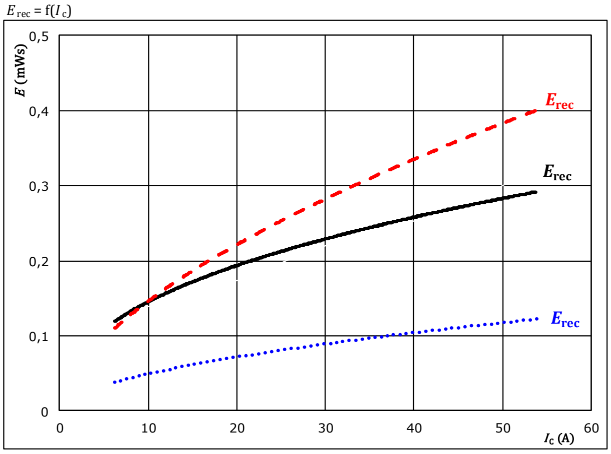
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
I_C =	30	A		150 °C	dashed

figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



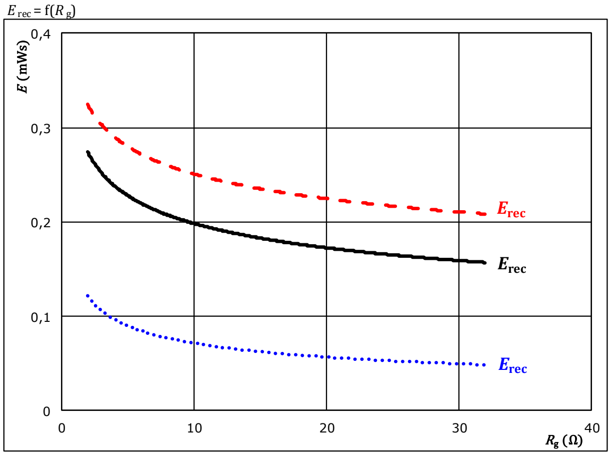
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

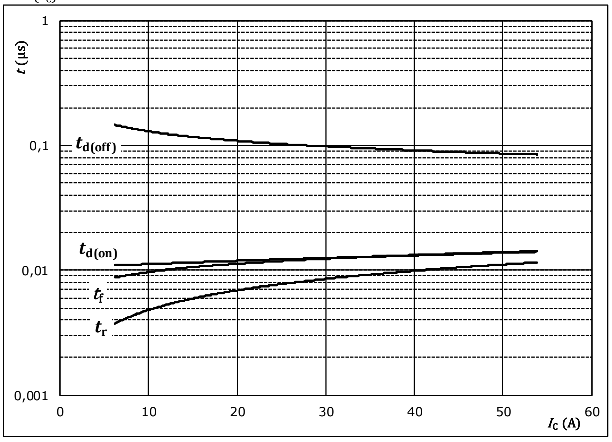
V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
I_C =	30	A		150 °C	dashed

PFC Switching Characteristics

figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



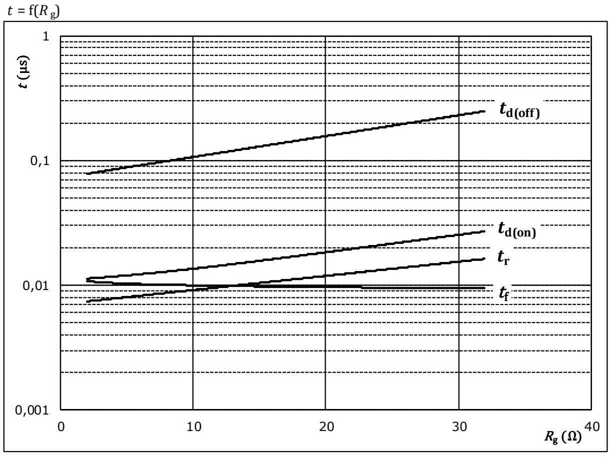
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	0 / 15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



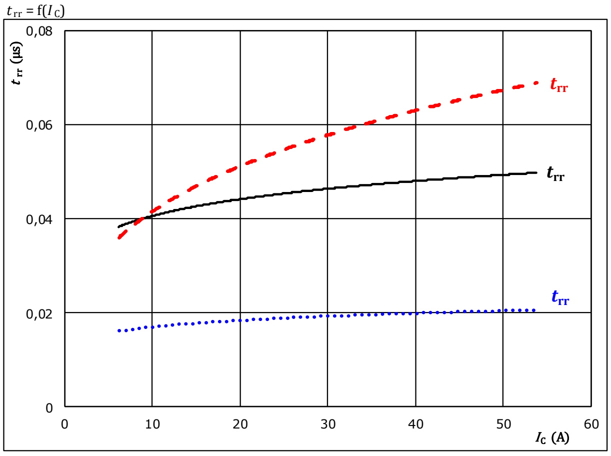
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	0 / 15	V
I_C =	30	A

figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



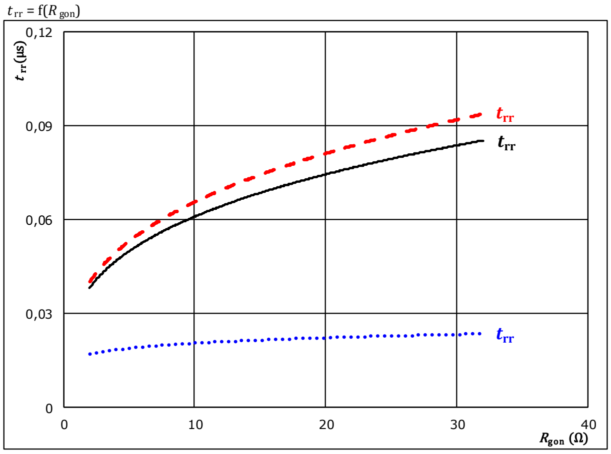
With an inductive load at

V_{CE}=	400	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	0 / 15	V		
R_{gon} =	8	Ω		

figure 8. **FWD**

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

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



With an inductive load at

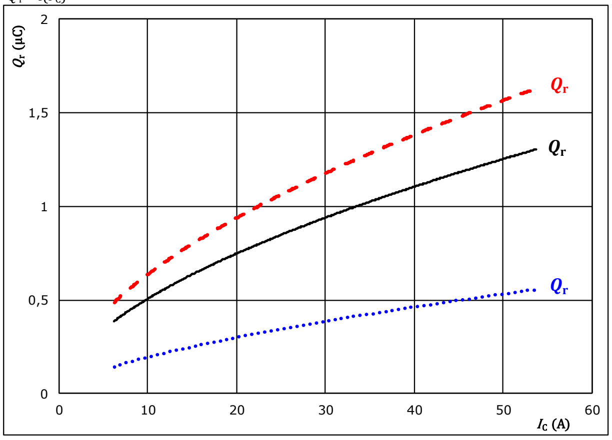
V_{CE} =	400	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	0 / 15	V		
I_C =	30	A		

PFC Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



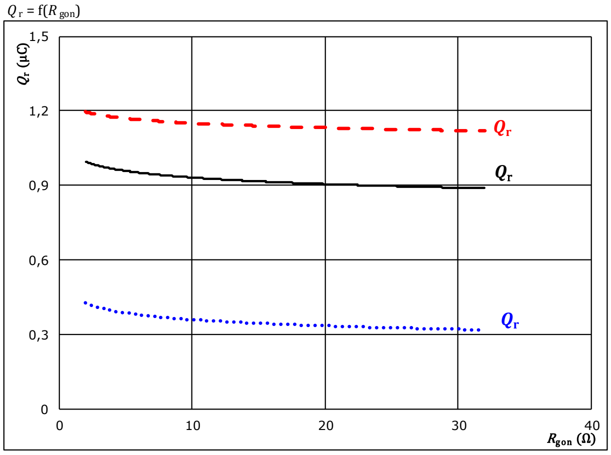
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

figure 10. FWD

Typical recovered charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$



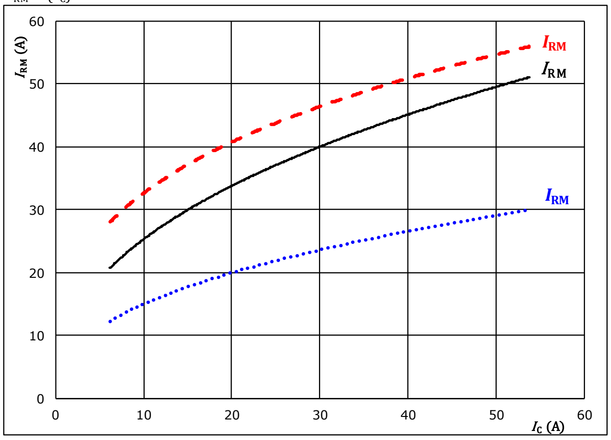
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
I_C =	30	A		150 °C	dashed

figure 11. FWD

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

$I_{RM} = f(I_C)$



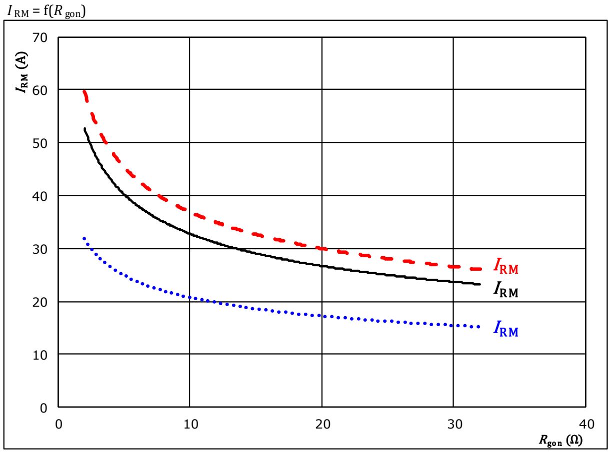
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
R_{gon} =	8	Ω		150 °C	dashed

figure 12. FWD

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

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



With an inductive load at

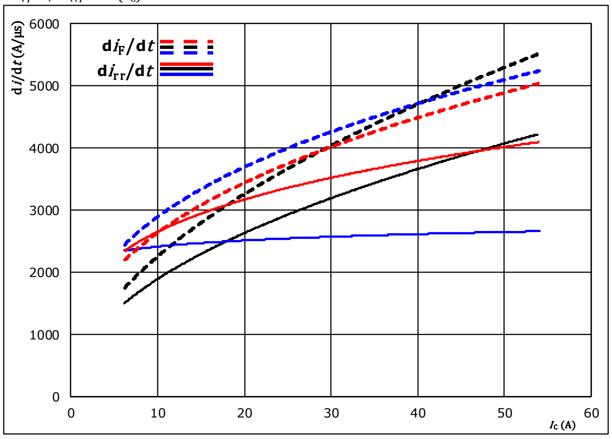
V_{CE} =	400	V	T_j:	25 °C	dotted
V_{GE} =	0 / 15	V		125 °C	solid
I_C =	30	A		150 °C	dashed

PFC Switching Characteristics

figure 13. **FWD**

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

di_F/dt, $di_{rr}/dt = f(I_C)$



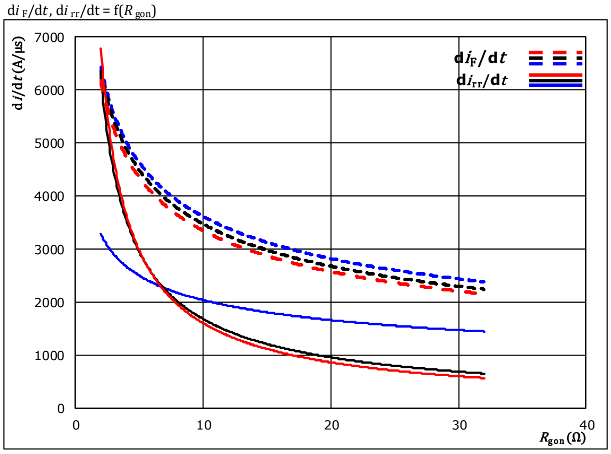
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0 / 15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 14. **FWD**

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

di_F/dt, $di_{rr}/dt = f(R_{gon})$



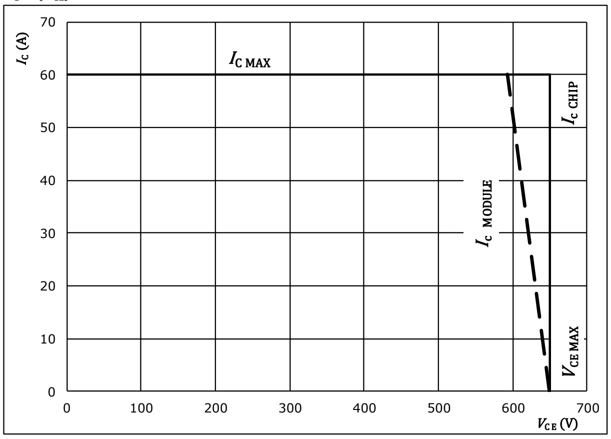
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0 / 15	V		125 °C
I_C =	30	A		150 °C

figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

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

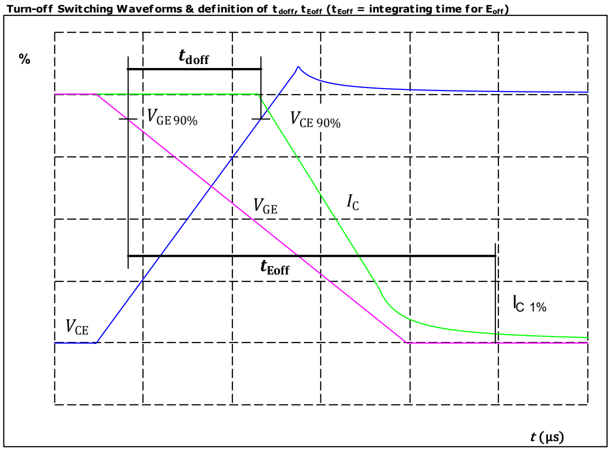
PFC Switching Definitions

General conditions

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

figure 1. **IGBT**

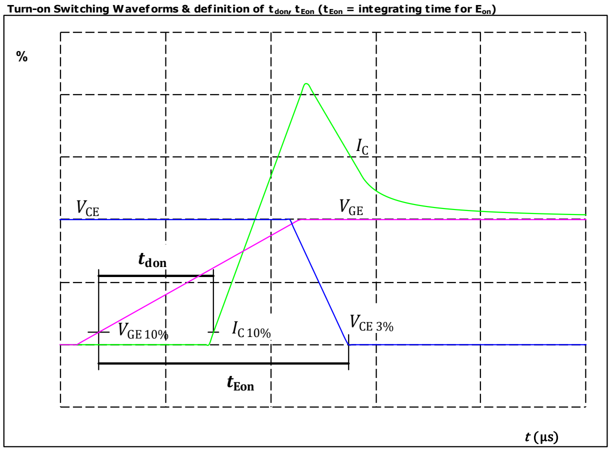
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



V_{GE} (0%) =	0	V
V_{GE} (100%) =	15	V
V_C (100%) =	400	V
I_C (100%) =	30	A
t_{doff} =	94	ns

figure 2. **IGBT**

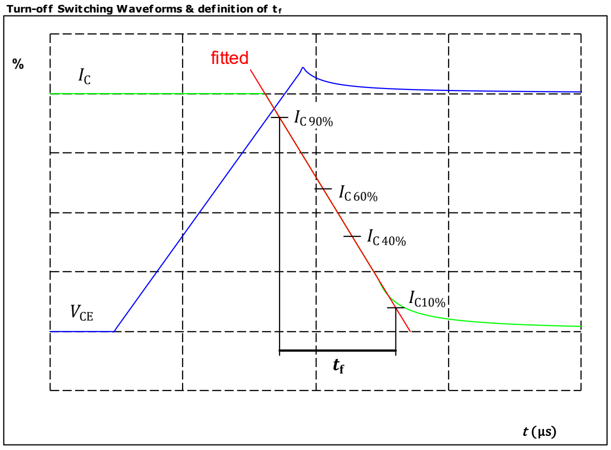
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



V_{GE} (0%) =	0	V
V_{GE} (100%) =	15	V
V_C (100%) =	400	V
I_C (100%) =	30	A
t_{don} =	12	ns

figure 3. **IGBT**

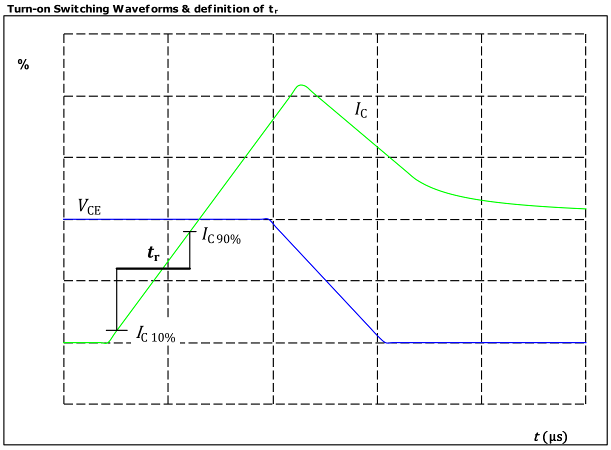
Turn-off Switching Waveforms & definition of t_f



V_C (100%) =	400	V
I_C (100%) =	30	A
t_f =	10	ns

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

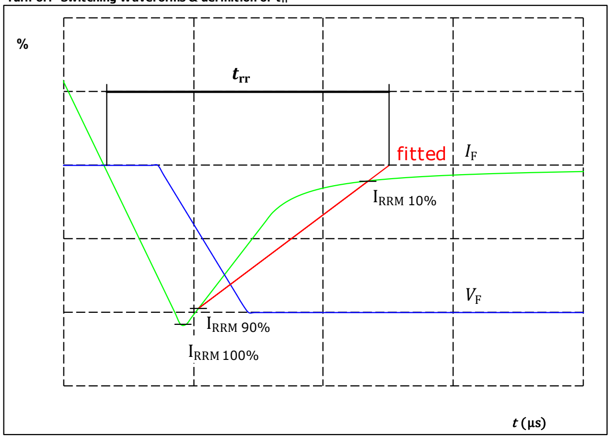


V_C (100%) =	400	V
I_C (100%) =	30	A
t_r =	8	ns

PFC Switching Characteristics

figure 5. **FWD**

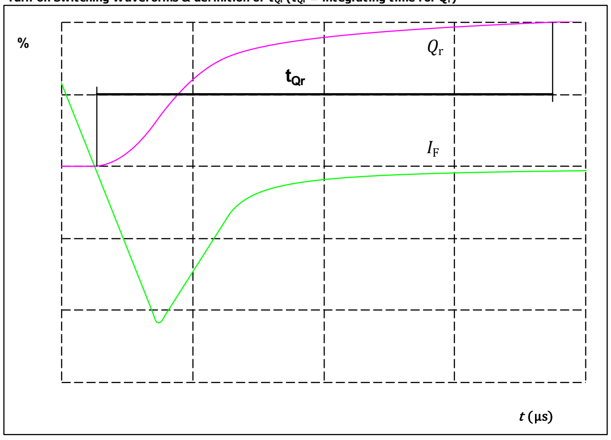
Turn-off Switching Waveforms & definition of t_{rr}



V_F (100%) =	400	V
I_F (100%) =	30	A
I_{RRM} (100%) =	40	A
t_{rr} =	47	ns

figure 6. **FWD**

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



I_F (100%) =	30	A
Q_r (100%) =	0,96	µC

10-PG06PPA030SJ-LJ02B08T
datasheet

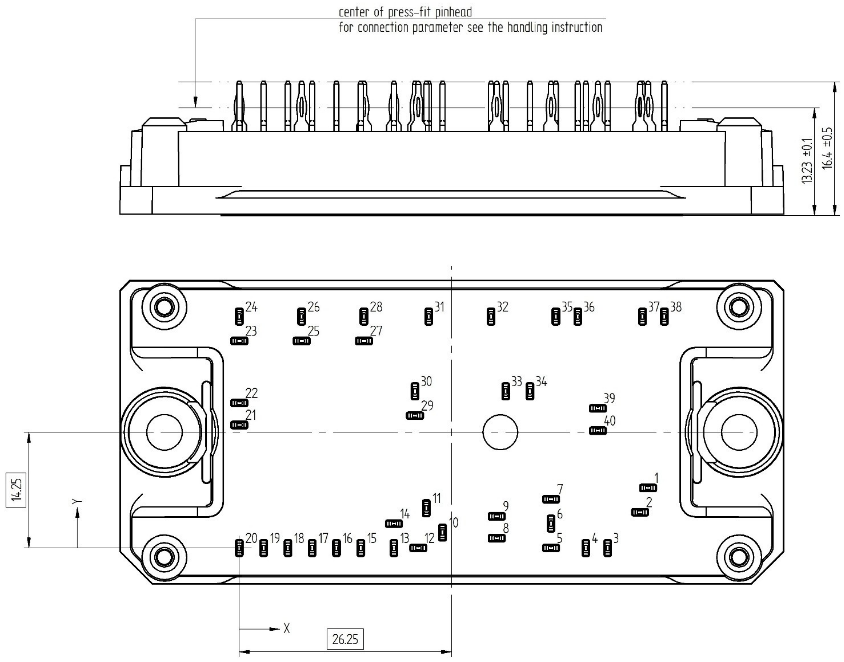
Ordering Code & Marking

Version	Ordering Code
without thermal paste 12mm housing with Press-fit pins	10-PG06PPA030SJ-LJ02B08T
with thermal paste 12mm housing with Press-fit pins	10-PG06PPA030SJ-LJ02B08T-/3/

Text	Name		Date code	UL & VIN	Lot	Serial
	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

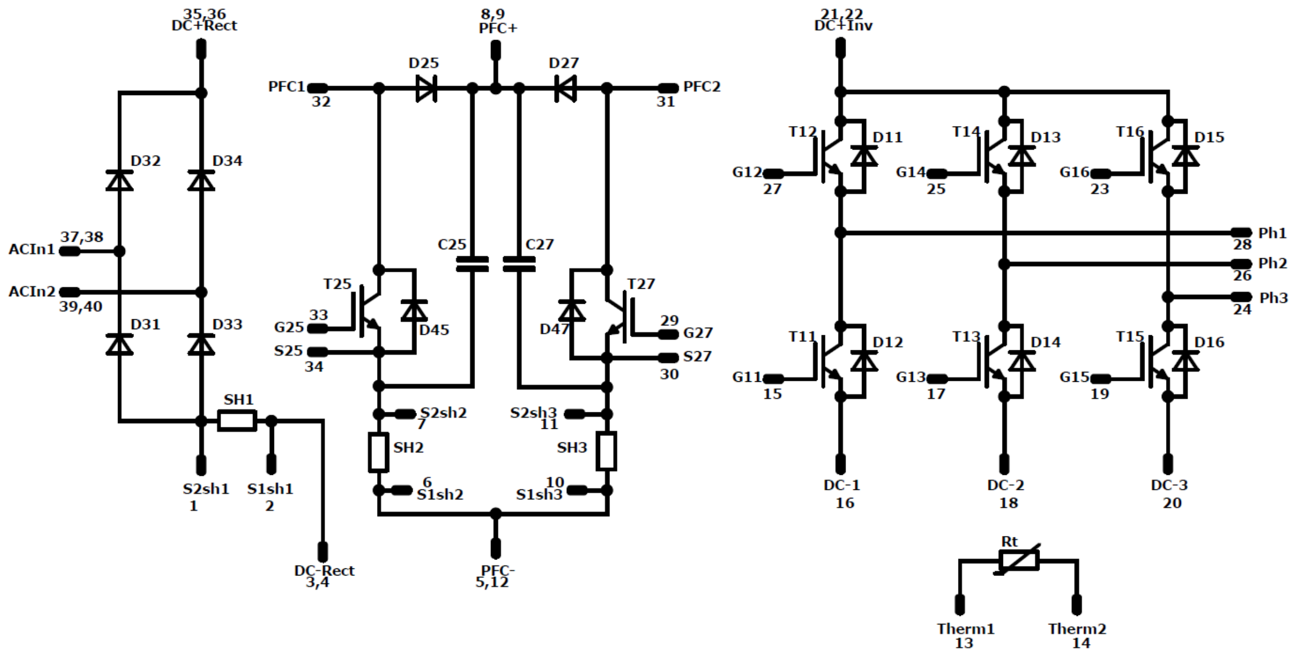
Pin	X	Y	Function
1	50,5	7,4	S2sh1
2	49,5	4,4	S1sh1
3	45,5	0	DC-Rect
4	42,8	0	DC-Rect
5	38,5	0	PFC-
6	38,5	3	S1sh2
7	38,5	6	S2sh2
8	31,8	1,2	PFC+
9	31,8	3,9	PFC+
10	25,1	1,9	S1sh3
11	23,1	4,9	S2sh3
12	22,1	0	PFC-
13	19,1	0	Therm1
14	19,1	3	Therm2
15	15	0	G11
16	12	0	DC-1
17	9	0	G13
18	6	0	DC-2
19	3	0	G15
20	0	0	DC-3
21	0	15,15	DC+Inv
22	0	17,85	DC+Inv
23	0	25,5	G16
24	0	28,5	Ph3
25	7,7	25,5	G14
26	7,7	28,5	Ph2
27	15,4	25,5	G12
28	15,4	28,5	Ph1
29	21,7	16,3	G27
30	21,7	19,3	S27
31	23,4	28,5	PFC2
32	31,1	28,5	PFC1
33	32,9	19,3	G25
34	35,9	19,3	S25
35	39,1	28,5	DC+Rect
36	41,8	28,5	DC+Rect
37	49,8	28,5	ACIn1
38	52,5	28,5	ACIn1
39	44,3	17,2	ACIn2
40	44,3	14,45	ACIn2



Tolerance of pinpositions: ±0.4mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

Vincotech

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
D31, D32, D33, D34	FWD	1600 V	31 A	Rectifier Diode	
T11, T12, T13, T14, T15, T16	IGBT	600 V	30 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	600 V	20 A	Inverter Diode	
T25, T27	IGBT	650 V	30 A	PFC Switch	
D25, D27	FWD	650 V	30 A	PFC Diode	
D45, D47	FWD	650 V	6 A	PFC Sw. Protection Diode	
C25, C27	Capacitor	630 V		Capacitor (PFC)	
SH1	Shunt		32 A	PFC Shunt	
SH2, SH3	Shunt		32 A	Shunt	
Rt	NTC			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for flow 1 Packaging instructions packages see vincotech.com website.

Package data
Package data for flow 1 Packaging instructions packages see 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
10-PG06PPA030SJ-LJ02B08T-D2-14	17 May. 2019	Correction of I_c/I_f values	1,2,3