10-PY07PPA030I703-PQ72E68T

datasheet

Vincotech

***flow*PIM 1 + PFC** **650 V / 30 A**

Topology features

- 2-leg interleaved PFC + Inverter
- On-board Capacitors
- Open Emitter configuration
- Shunt in the PFC only
- Temperature sensor

Component features

- Easy paralleling
- Low collector emitter saturation voltage
- Low turn-off losses
- Positive temperature coefficient

Housing features

- Base isolation: Al_2O_3
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

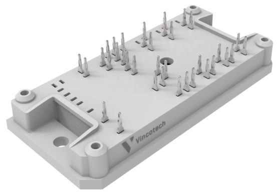
Target applications

- Embedded Drives
- Heat Pumps
- HVAC
- Industrial Drives

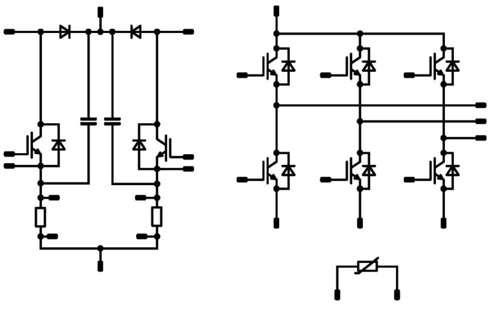
Types

- 10-PY07PPA030I703-PQ72E68T

flow 1 12 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Inverter Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	39	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	3	μs
Maximum junction temperature	T_{jmax}			175	°C
Inverter Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	24	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	40	W
Maximum junction temperature	T_{jmax}			175	°C
PFC Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	27	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	59	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
PFC Diode					
Peak repetitive reverse voltage	V_{RRM}			600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	48	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		60	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 25 °C	310	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	64	W
Maximum junction temperature	T_{jmax}			175	°C
PFC Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s <= 80 °C	10 [1]	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		10	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	27	W
Maximum junction temperature	T_{jmax}			175	°C

(1) limited by I_{FRM}

Parameter	Symbol	Conditions		Value	Unit
Shunt					
DC current	I			31,6	A
Power dissipation	P_{tot}		T_c = 70 °C	2	W
Operation Temperature	T_{op}			-65 ... 170	°C
Capacitor (PFC)					
Maximum DC voltage	V_{MAX}			630	V
Operation Temperature	T_{op}			-55 ... 150	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Module Properties					
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{jop}			-40…+(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	6000	V
Creepage distance				>12,7	mm
Clearance				9,88	mm
Comparative Tracking Index	CTI			≥ 600	

*100 % tested in production

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_{CE} = V_{GE}			0,0003	25	4,35	5	5,65	V
Collector-emitter saturation voltage	V_{CEsat}		15		30	25 125 150		1,3 1,37 1,39	1,65(2)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			20	μA
Gate-emitter leakage current	I_{GES}		0	650		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		1900		pF
Output capacitance	C_{oes}							62		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g	V_{CC} = 520 V	15		30	25		180		nC
Thermal										
Thermal resistance junction to sink(3)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,51		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 16 Ω R_{goff} = 16 Ω	±15	350	30	25 125 150		118,69 121,55 122,06		ns
Rise time	t_r					25 125 150		29,88 30,89 31,13		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		164,63 195,34 201,73		ns
Fall time	t_f					25 125 150		20,86 43,56 49,42		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,526 μC Q_{rFWD}=1,1 μC Q_{rFWD}=1,26 μC				25 125 150		0,698 0,865 0,904		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,532 0,78 0,815		mWs

Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_{F} [V]	I_{C} [A] I_{D} [A] I_{F} [A]	T_j [°C]	Min	Typ	Max	
Inverter Diode										
Static										
Forward voltage	V_F				20	25 125 150		1,71 1,6 1,55	2(2)	V
Reverse leakage current	I_R	V_r = 650 V				25			20	µA
Thermal										
Thermal resistance junction to sink(3)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						2,38		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=879 A/µs di/dt=1007 A/µs di/dt=947 A/µs	±15	350	30	25 125 150		11,16 15,26 16,6		A
Reverse recovery time	t_{rr}					25 125 150		89,11 132,12 144,4		ns
Recovered charge	Q_r					25 125 150		0,526 1,1 1,26		µC
Reverse recovered energy	E_{rec}					25 125 150		0,094 0,218 0,256		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		81,64 101,73 99,09		A/µs

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
PFC Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0003	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		30	25 125		1,97 2,25	2,22(2)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		1800		pF
Output capacitance	C_{oes}							45		pF
Reverse transfer capacitance	C_{res}							9		pF
Gate charge	Q_g	V_{CC} = 520 V	15		30	25		65		nC
Thermal										
Thermal resistance junction to sink(3)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,6		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		15,34 15,05 14,92		ns
Rise time	t_r					25 125 150		5,17 6,33 6,63		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		85,92 101,31 105,05		ns
Fall time	t_f					25 125 150		2,81 9,84 11,19		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,485 µC Q_{rFWD}=1,27 µC Q_{rFWD}=1,56 µC				25 125 150		0,324 0,502 0,569		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,179 0,255 0,284		mWs

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
PFC Diode										
Static										
Forward voltage	V_F				30	25 125 150		1,67 1,33 1,24	2,5(2)	V
Reverse leakage current	I_R	V_r = 600 V				25			20	µA
Thermal										
Thermal resistance junction to sink(3)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,49		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=4701 A/µs d*i*/d*t*=3916 A/µs d*i*/d*t*=3651 A/µs	0/15	400	30	25 125 150		51,45 72,06 80,39		A
Reverse recovery time	t_{rr}					25 125 150		18,4 39,47 42,63		ns
Recovered charge	Q_r					25 125 150		0,485 1,27 1,56		µC
Reverse recovered energy	E_{rec}					25 125 150		0,073 0,239 0,304		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		9845,3 7490,35 6957,28		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
PFC Sw. Protection Diode										
Static										
Forward voltage	V_F				5	25 125 150		1,57 1,66 1,65	2,1(2)	V
Reverse leakage current	I_R	V_r = 1200 V				25			20	µA
Thermal										
Thermal resistance junction to sink(3)	$R_{th(j\text{-}s)}$	λ_{paste} = 5,2 W/mK (PTM)						3,57		K/W
Shunt										
Static										
Resistance	R							2		mΩ
Temperature coeficient	tc								275	ppm/K
Capacitor (PFC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		33		nF
Tolerance							-5		5	%

Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

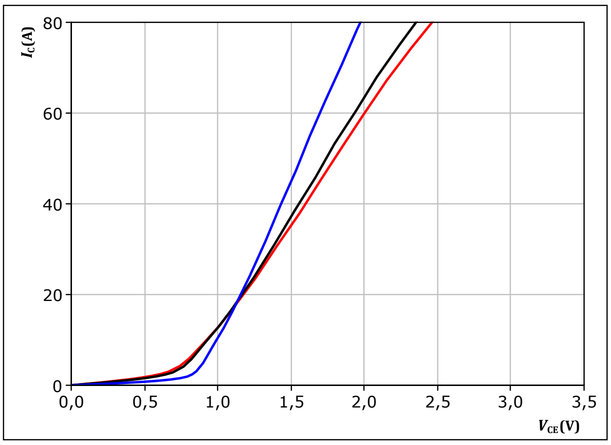
(2) Value at chip level
(3) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



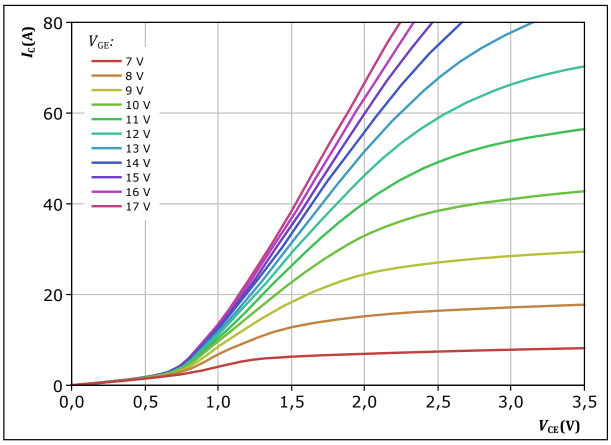
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



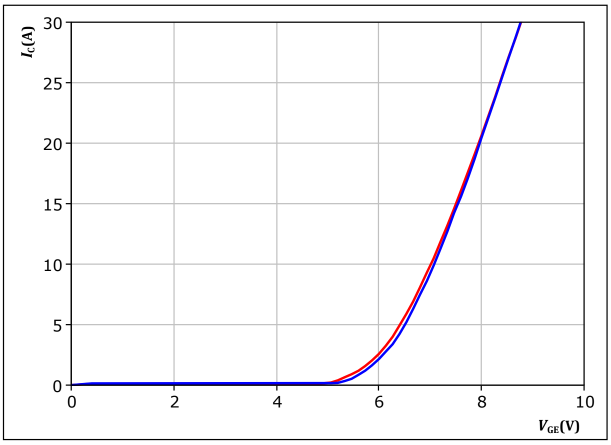
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})



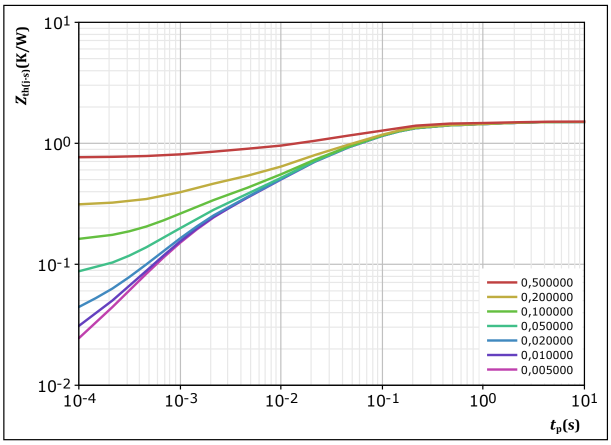
t_p =	250	µs
V_{CE} =	9	V

T_j: 125 °C, 150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,512	K/W

IGBT thermal model values

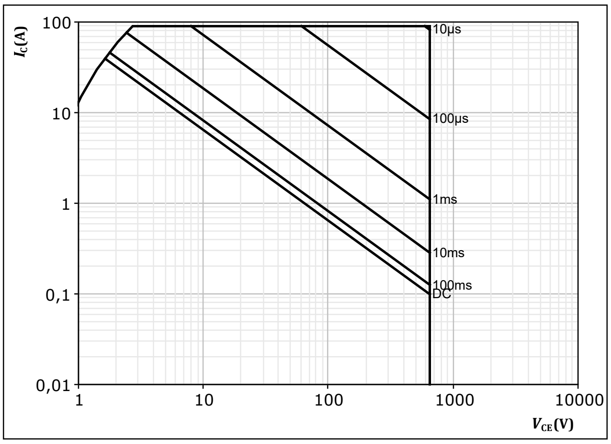
R (K/W)	τ (s)
2,66E-02	4,31E+01
1,31E-01	1,18E+00
7,68E-01	8,17E-02
4,06E-01	1,27E-02
1,91E-01	1,20E-03

Inverter Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})

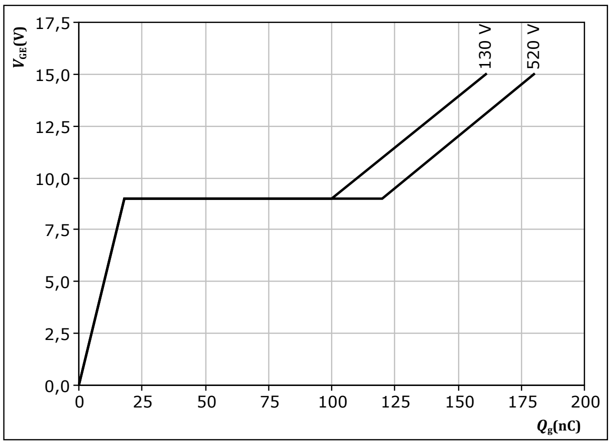


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 6. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



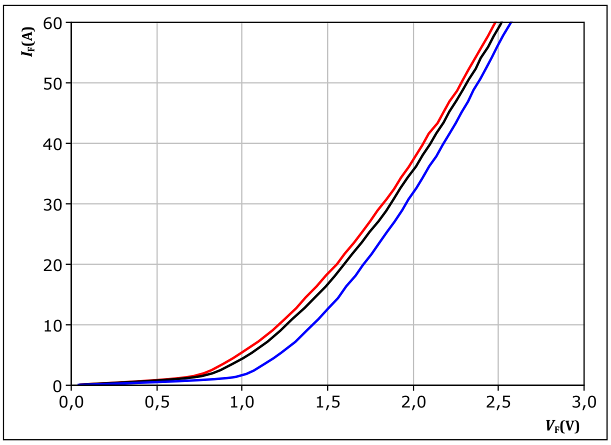
I_C =	30	A
T_j =	25	°C

Inverter Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



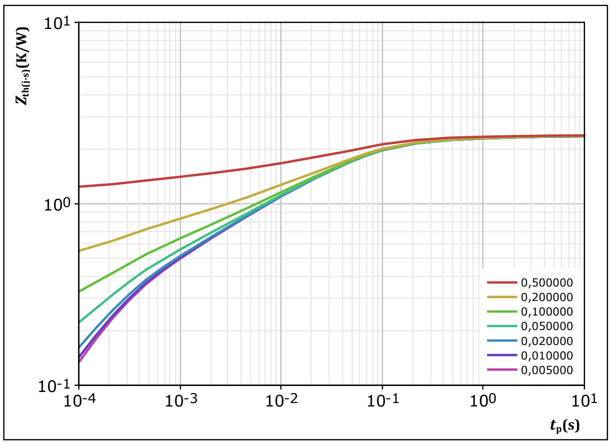
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 8. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 2,381 K/W

FWD thermal model values

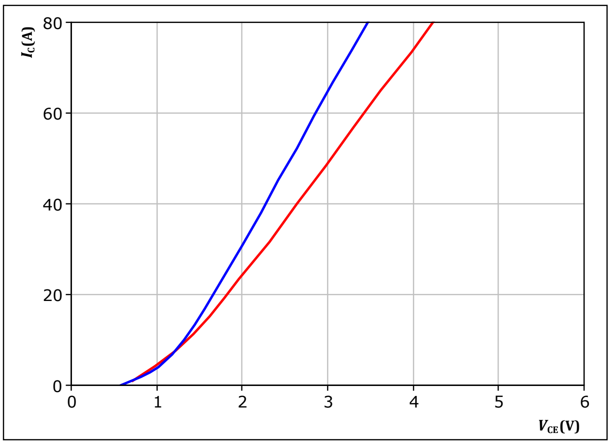
R (K/W)	τ (s)
6,09E-02	1,10E+02
1,14E-01	1,40E+00
3,76E-01	1,57E-01
8,89E-01	3,94E-02
4,69E-01	6,22E-03
2,44E-01	1,08E-03
2,57E-01	2,13E-04

PFC Switch Characteristics

figure 9. IGBT

Typical output characteristics

I_C = f(V_{CE})



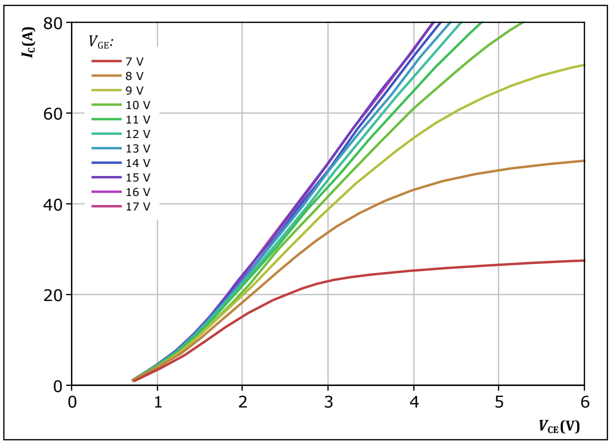
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C

figure 10. IGBT

Typical output characteristics

I_C = f(V_{CE})



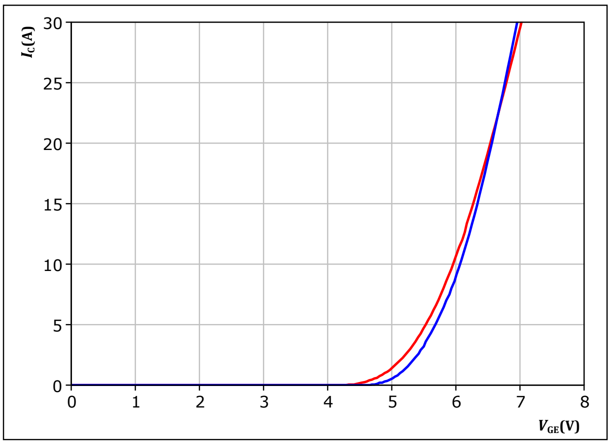
t_p =	250	µs
T_j =	125	°C

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

figure 11. IGBT

Typical transfer characteristics

I_C = f(V_{GE})



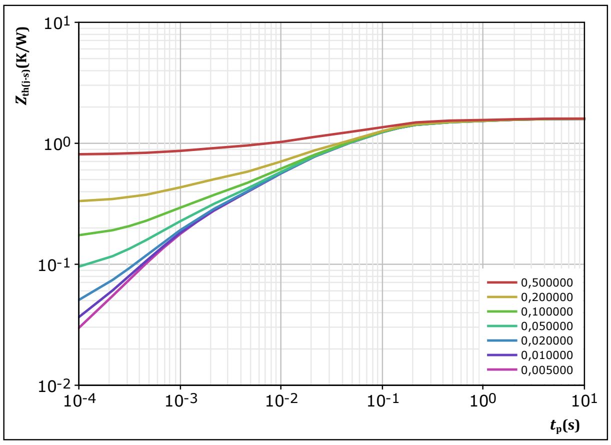
t_p =	250	µs
V_{CE} =	10	V

T_j: 25 °C, 125 °C

figure 12. IGBT

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,601 K/W

IGBT thermal model values

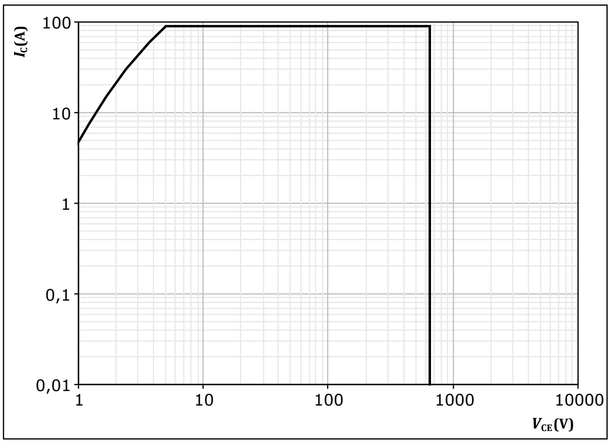
R (K/W)	τ (s)
2,46E-02	4,11E+01
1,44E-01	1,07E+00
8,18E-01	7,63E-02
4,41E-01	1,00E-02
1,85E-01	9,09E-04

PFC Switch Characteristics

figure 13. **IGBT**

Safe operating area

I_C = f(V_{CE})

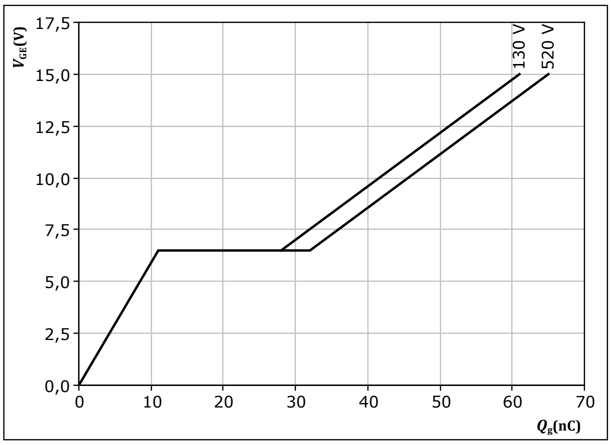


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 14. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



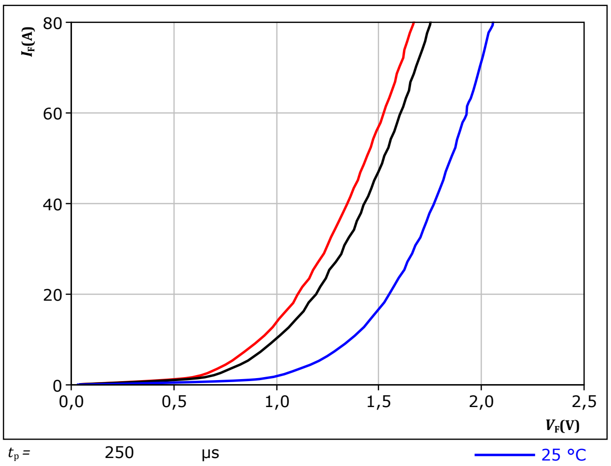
I_C =	30	A
T_j =	25	°C

PFC Diode Characteristics

figure 15. FWD

Typical forward characteristics

I_F = f(V_F)



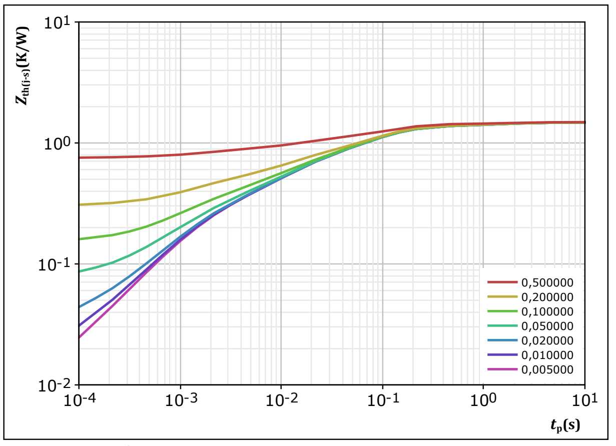
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 16. FWD

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,487 K/W

FWD thermal model values

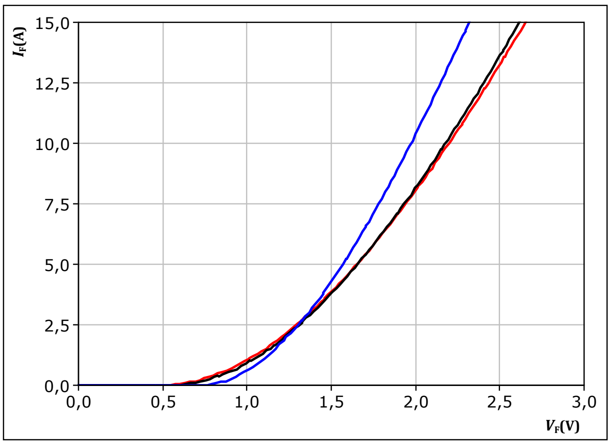
R (K/W)	τ (s)
3,22E-02	5,29E+01
1,26E-01	1,26E+00
7,71E-01	8,39E-02
3,69E-01	1,11E-02
2,04E-01	1,26E-03

PFC Sw. Protection Diode Characteristics

figure 17. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



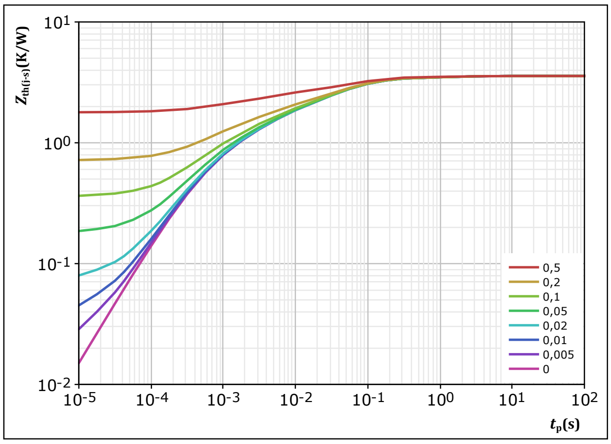
t_p = 250 μs

T_j: 25 °C, 125 °C, 150 °C

figure 18. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 3,572 K/W

FWD thermal model values

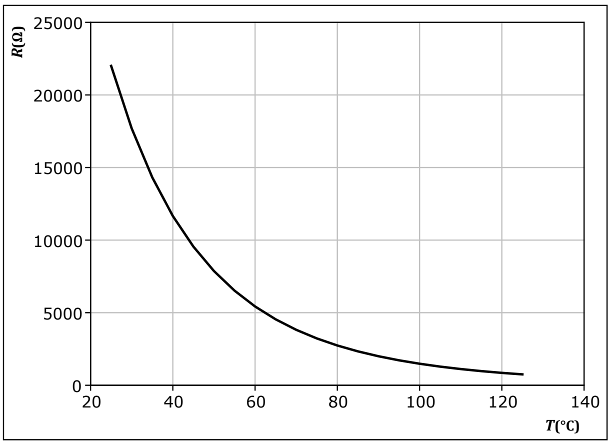
R (K/W)	τ (s)
1,62E-01	1,61E+00
8,99E-01	9,70E-02
1,06E+00	2,46E-02
8,96E-01	2,98E-03
5,56E-01	4,78E-04

Thermistor Characteristics

figure 19.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

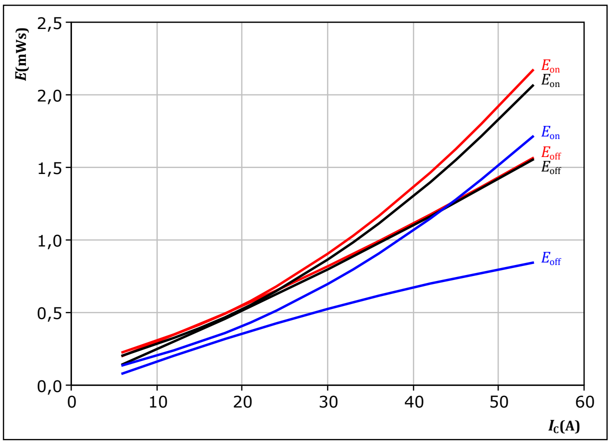


Inverter Switching Characteristics

figure 20. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



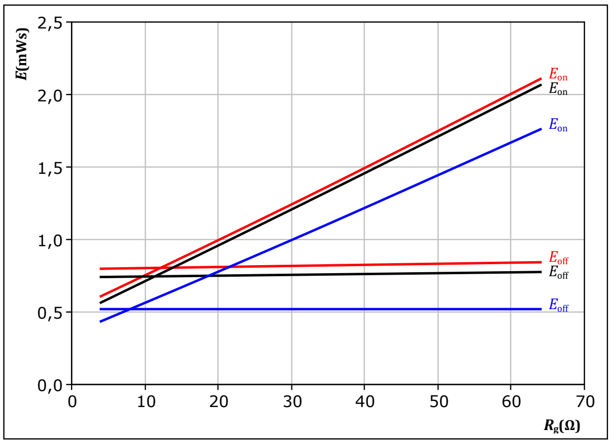
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	±15	V		
R_{gon} =	16	Ω		
R_{goff} =	16	Ω		

figure 21. **IGBT**

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

$E = f(R_g)$



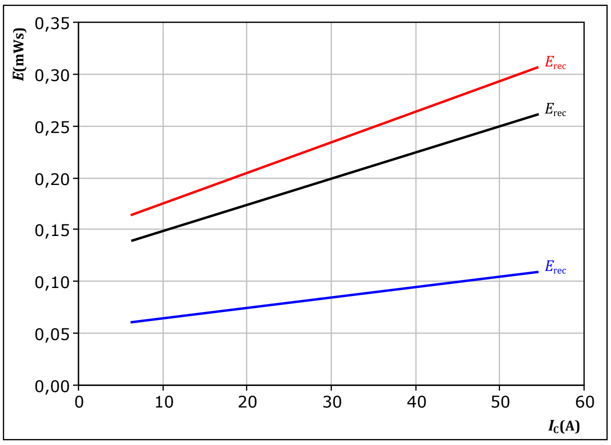
With an inductive load at

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

figure 22. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



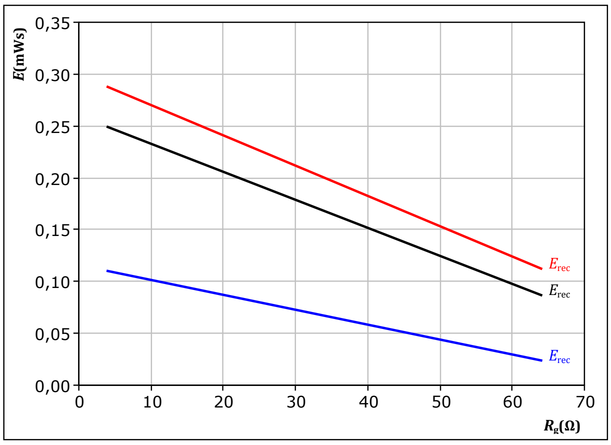
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	±15	V		
R_{gon} =	16	Ω		

figure 23. **FWD**

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

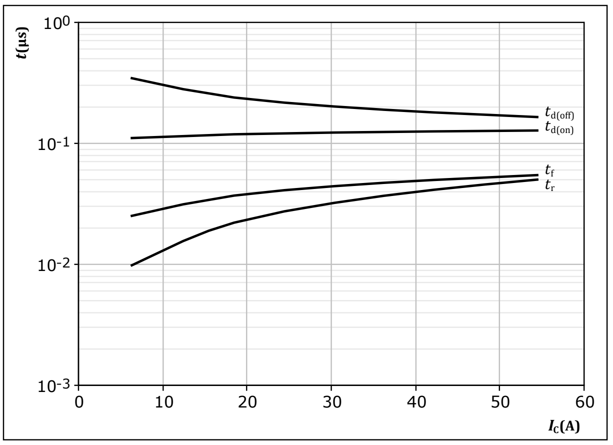
V_{CE} =	350	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	±15	V		
I_C =	30	A		

Inverter Switching Characteristics

figure 24. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



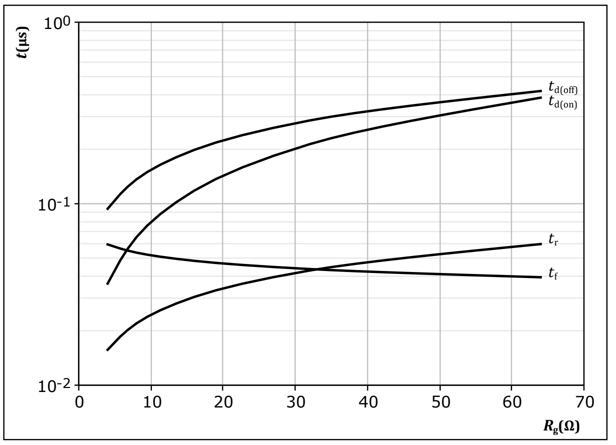
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	16	Ω
R_{goff} =	16	Ω

figure 25. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

t = f(R_g)



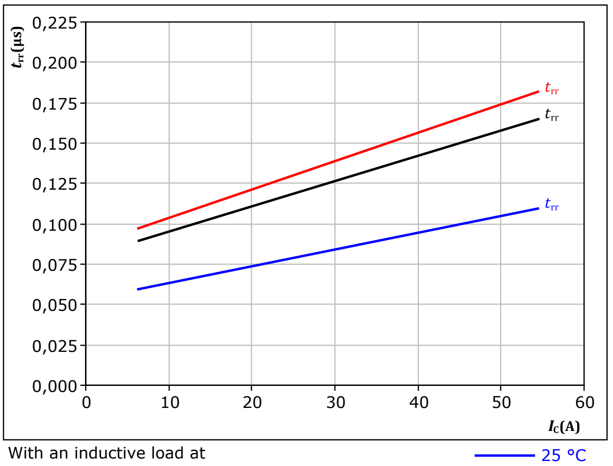
With an inductive load at

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

figure 26. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

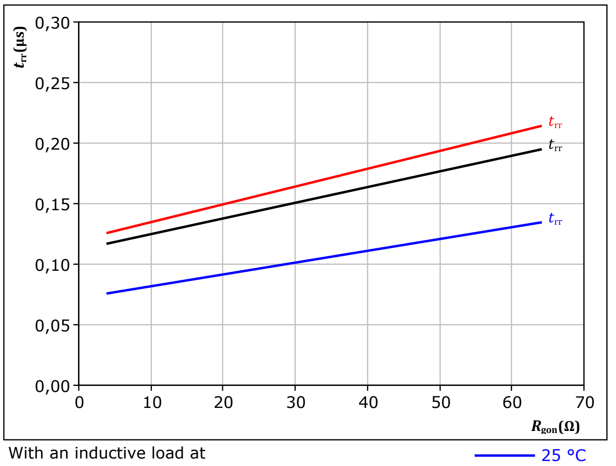
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	16	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 27. **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
V_{GE} =	±15	V
I_C =	30	A

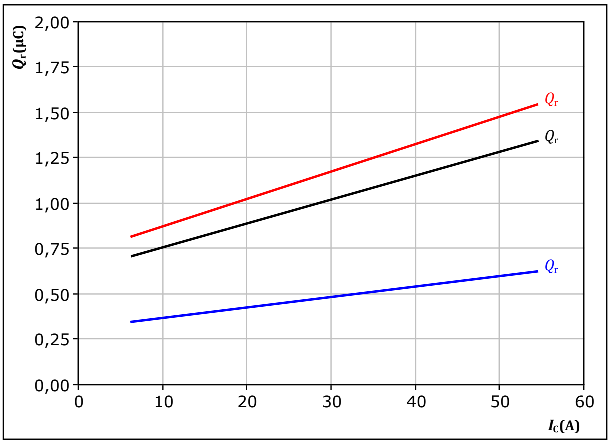
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 28. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



With an inductive load at

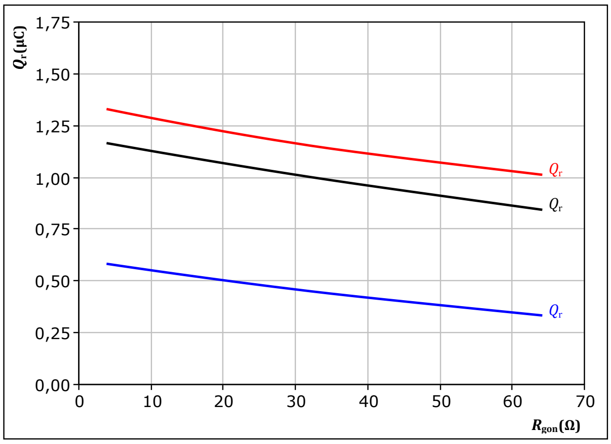
V_{CE} = 350 V
V_{GE} = ±15 V
R_{gon} = 16 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 29. **FWD**

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

$Q_r = f(R_{gon})$



With an inductive load at

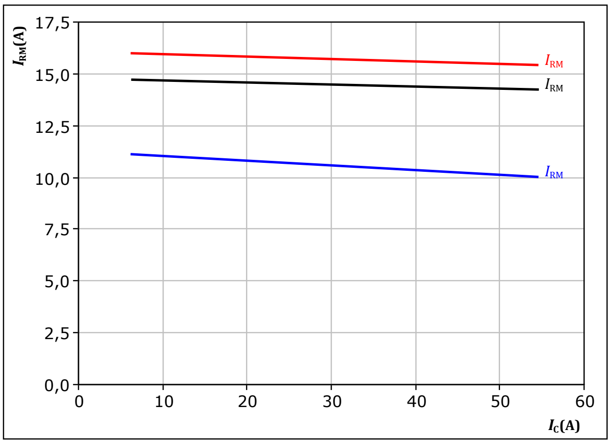
V_{CE} = 350 V
V_{GE} = ±15 V
I_C = 30 A

T_j: 25 °C, 125 °C, 150 °C

figure 30. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



With an inductive load at

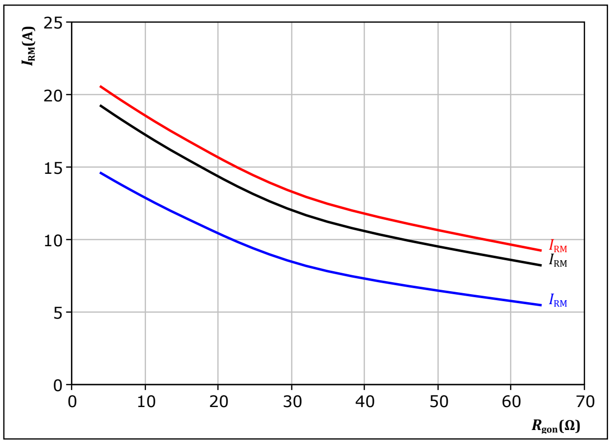
V_{CE} = 350 V
V_{GE} = ±15 V
R_{gon} = 16 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 31. **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} = 350 V
V_{GE} = ±15 V
I_C = 30 A

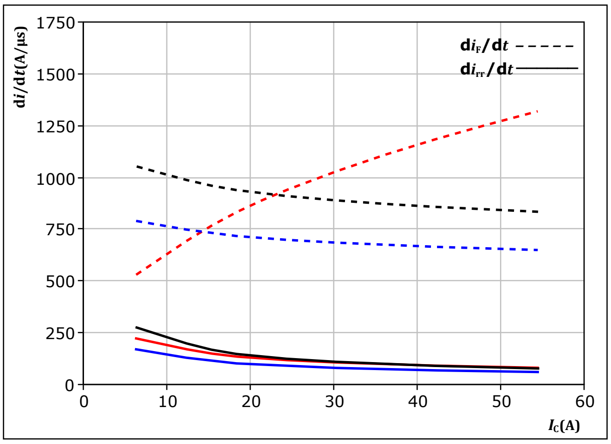
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 32. **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)



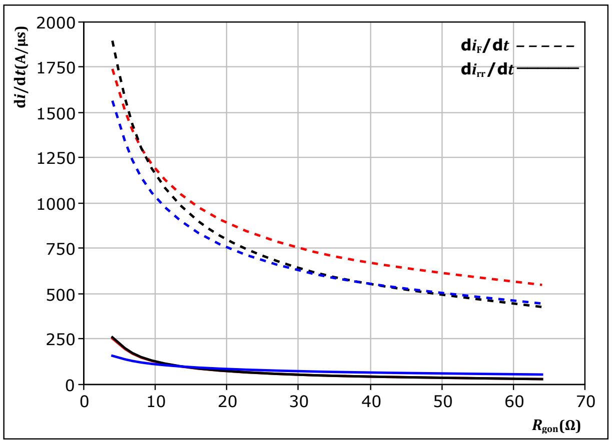
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C

figure 33. **FWD**

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

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



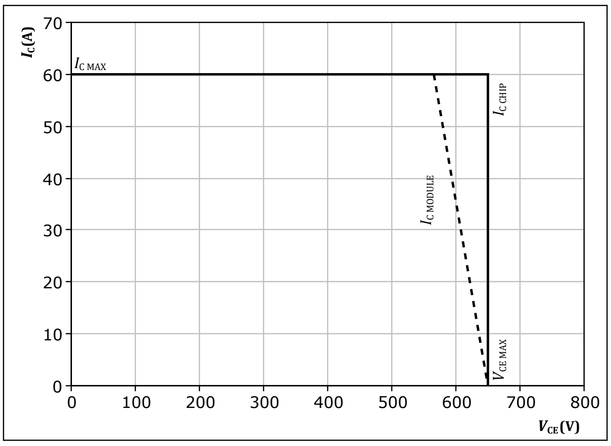
With an inductive load at

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

figure 34. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



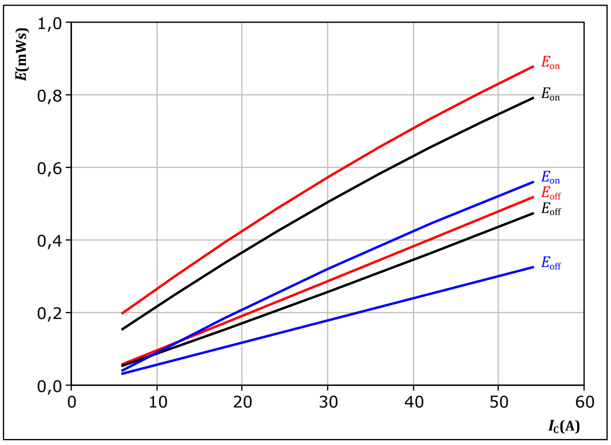
At	T_j =	150	°C
	R_{gon} =	16	Ω
	R_{goff} =	16	Ω

PFC Switching Characteristics

figure 35. **IGBT**

Typical switching energy losses as a function of collector current

E = f(I_C)



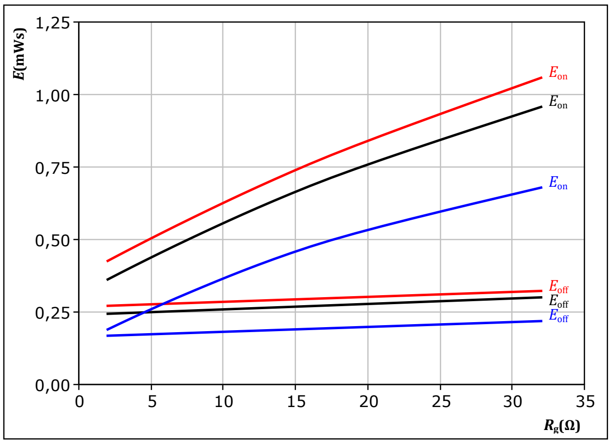
With an inductive load at

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

figure 36. **IGBT**

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

E = f(R_g)



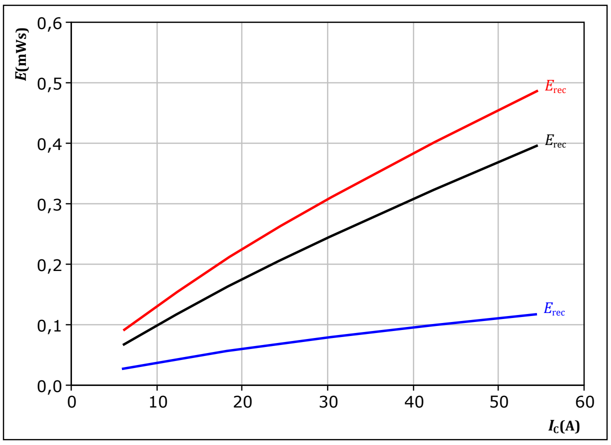
With an inductive load at

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

figure 37. **FWD**

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



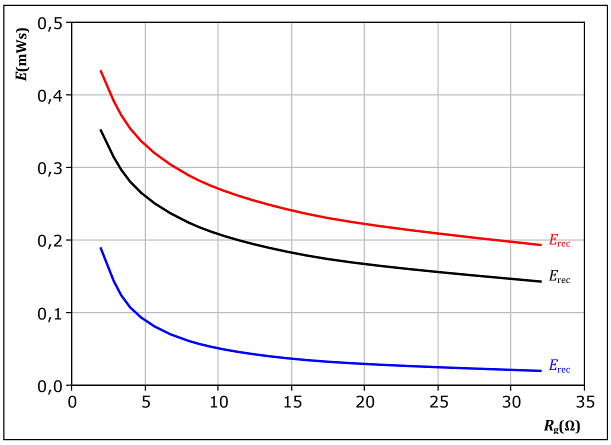
With an inductive load at

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

figure 38. **FWD**

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

E_{rec} = f(R_g)



With an inductive load at

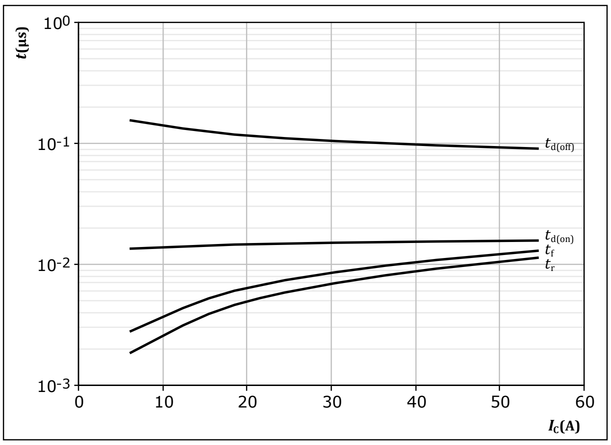
V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	30	A		150 °C

PFC Switching Characteristics

figure 39. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



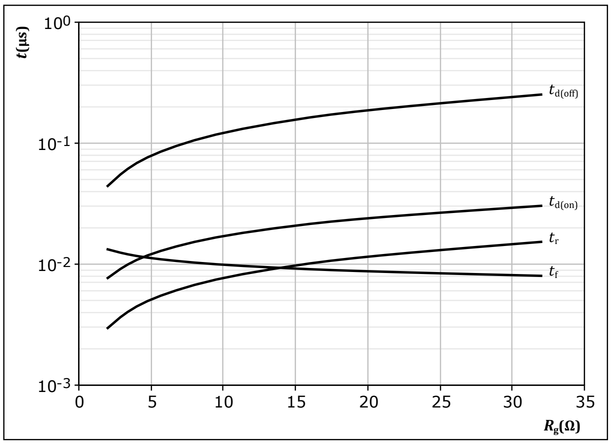
With an inductive load at

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

figure 40. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

t = f(R_g)



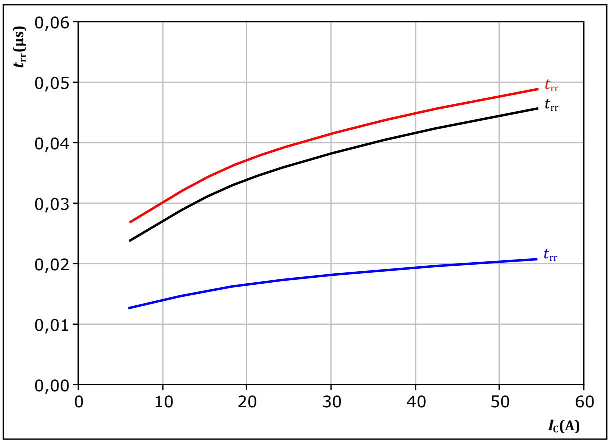
With an inductive load at

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

figure 41. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

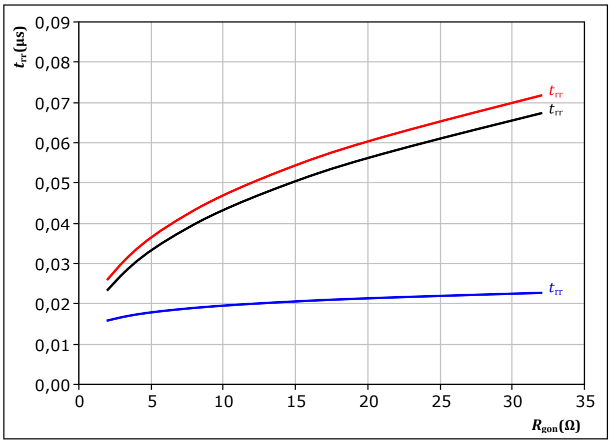
V_{CE} =	400	V
V_{GE} =	0/15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 42. **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
V_{GE} =	0/15	V
I_C =	30	A

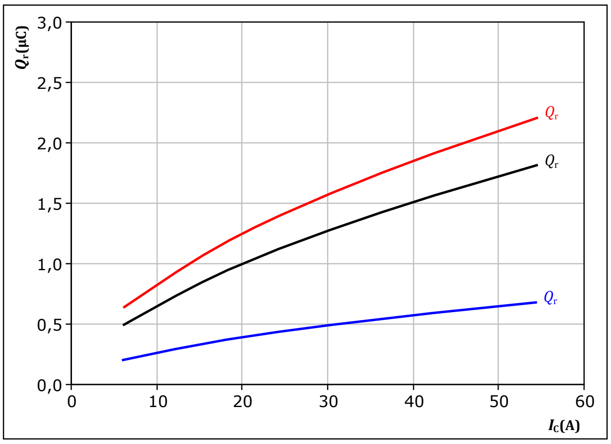
T_j: 25 °C, 125 °C, 150 °C

PFC Switching Characteristics

figure 43. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



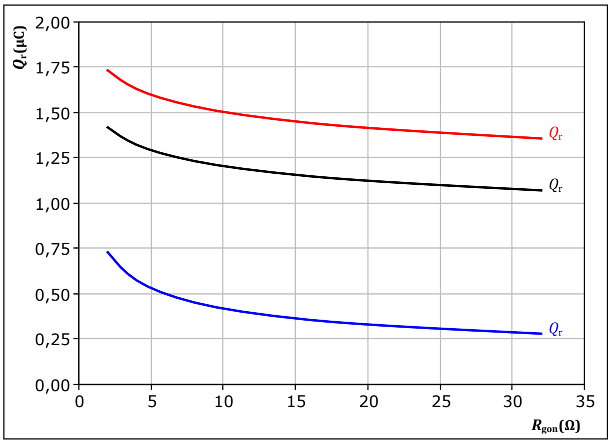
With an inductive load at

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

figure 44. **FWD**

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

Q_r = f(R_{gon})



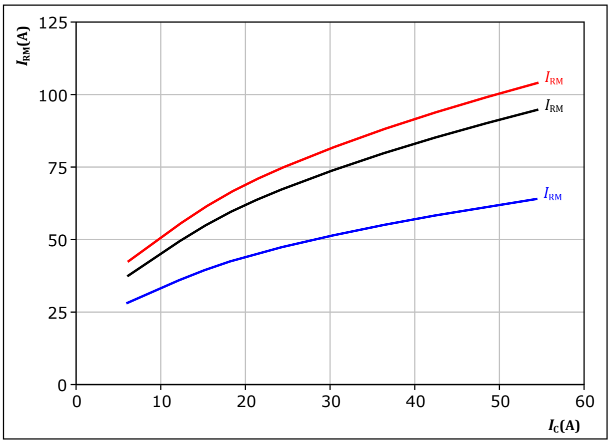
With an inductive load at

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

figure 45. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



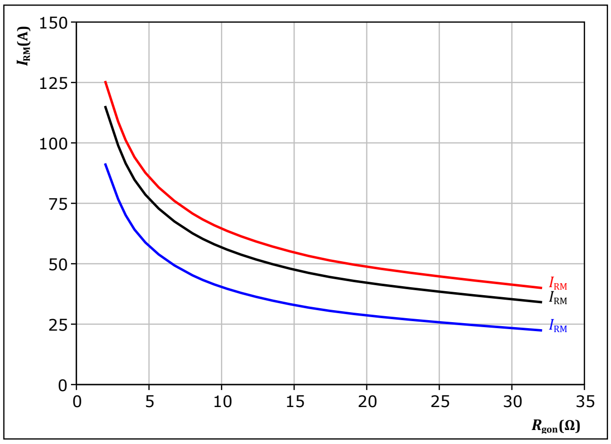
With an inductive load at

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

figure 46. **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

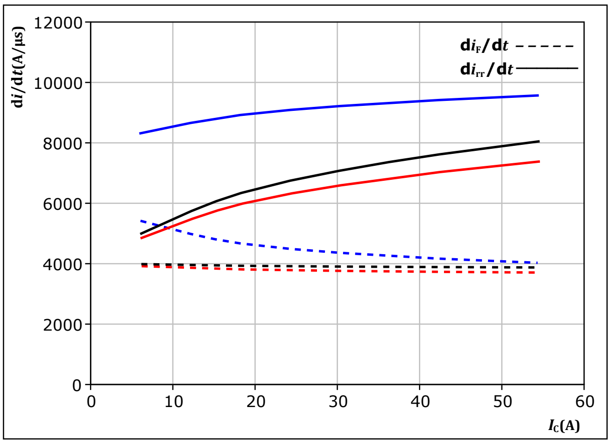
V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	30	A		150 °C

PFC Switching Characteristics

figure 47. **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

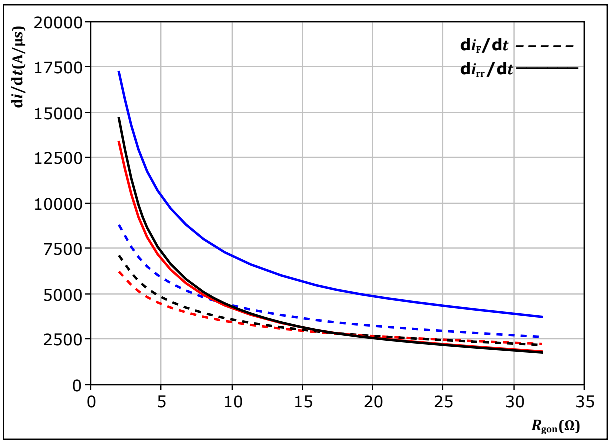
V_{CE} =	400	V
V_{GE} =	0/15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 48. **FWD**

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

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



With an inductive load at

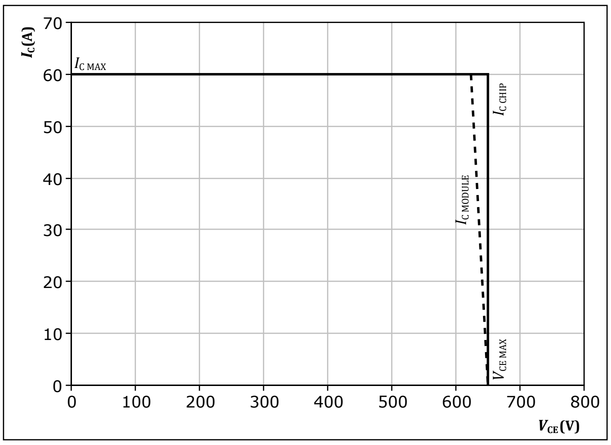
V_{CE} =	400	V
V_{GE} =	0/15	V
I_C =	30	A

T_j: 25 °C, 125 °C, 150 °C

figure 49. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At	T_j =	150	°C
	R_{gon} =	8	Ω
	R_{goff} =	8	Ω

Switching Definitions

figure 50. **IGBT**

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

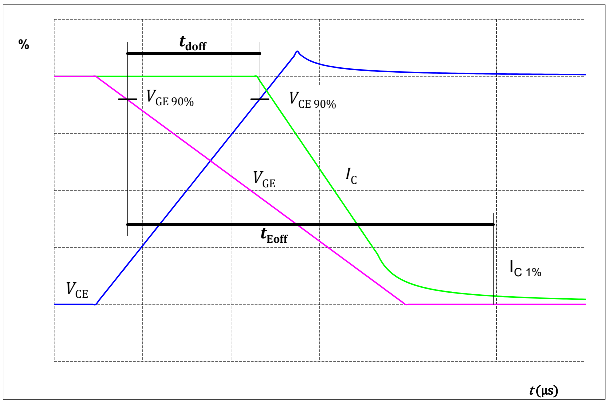


figure 51. **IGBT**

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

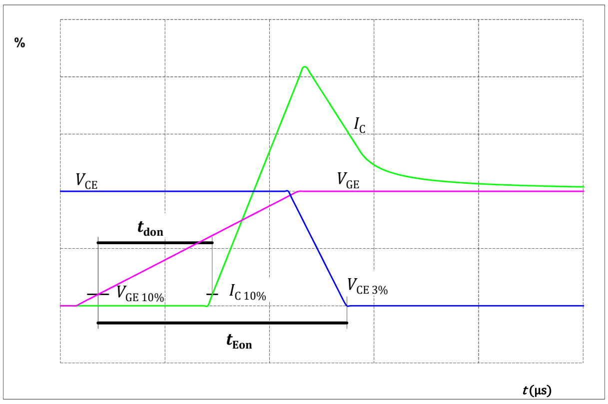


figure 52. **IGBT**

Turn-off Switching Waveforms & definition of t_f

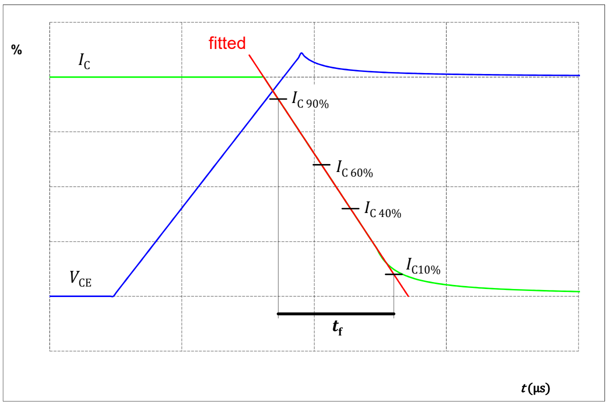
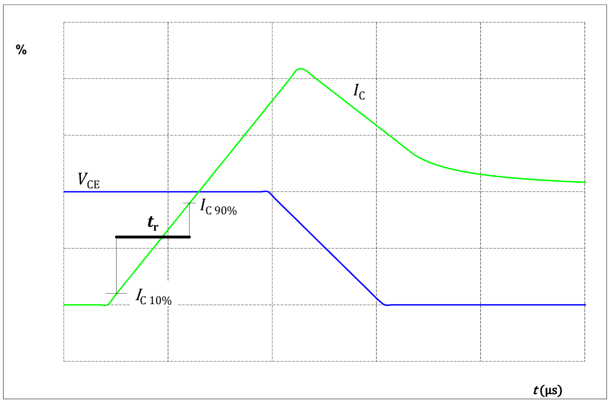


figure 53. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 54.	FWD

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

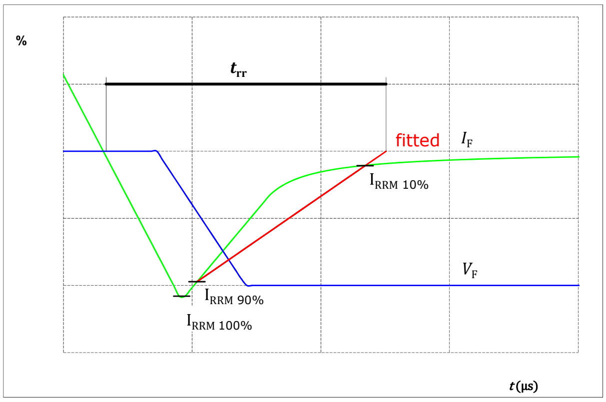
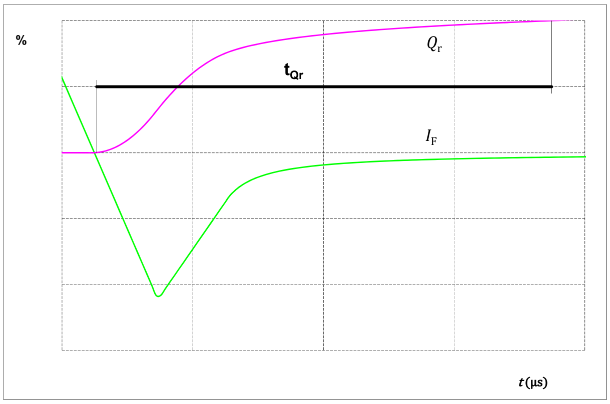


figure 55.	FWD

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



10-PY07PPA030I703-PQ72E68T
datasheet

Ordering Code

Version	Ordering Code
Without thermal paste	10-PY07PPA030I703-PQ72E68T
With thermal paste (5,2 W/mK, PTM6000HV)	10-PY07PPA030I703-PQ72E68T-/7/

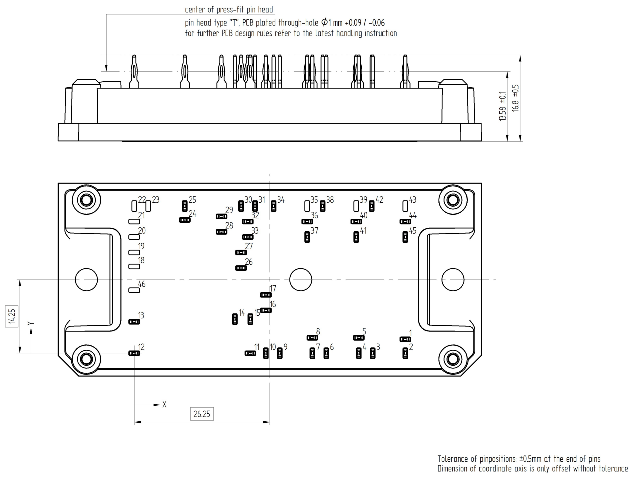
Marking

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

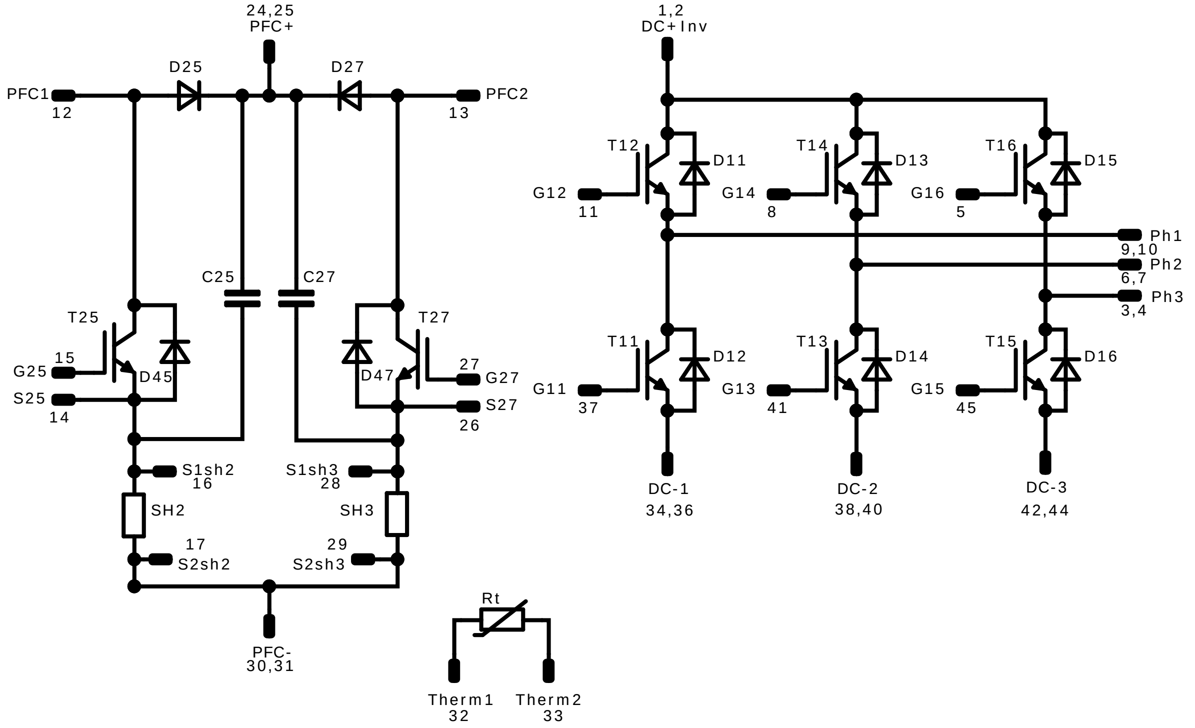
Outline

Pin	X	Y	Function
1	52,5	2,7	DC+Inv
2	52,5	0	DC+Inv
3	46,2	0	Ph3
4	43,5	0	Ph3
5	43,5	3	G16
6	37,2	0	Ph2
7	34,5	0	Ph2
8	34,5	3	G14
9	28,2	0	Ph1
10	25,5	0	Ph1
11	22,5	0	G12
12	0	0	PFC1
13	0	6,1	PFC2
14	19,5	6,6	S25
15	22,5	6,6	G25
16	25,5	8,3	S1sh2
17	25,5	11,3	S2sh2
18	not assembled		
19	not assembled		
20	not assembled		
21	not assembled		
22	not assembled		
23	not assembled		
24	9,8	25,8	PFC+
25	9,8	28,5	PFC+
26	20,7	16,5	S27
27	20,7	19,5	G27
28	16,9	23,5	S1sh3
29	16,9	26,5	S2sh3
30	20,7	28,5	PFC-
31	23,4	28,5	PFC-
32	22	25,5	Therm1
33	22	22,5	Therm2
34	27	28,5	DC-1
35	not assembled		
36	33,5	25,5	DC-1
37	33,5	22,5	G11
38	36,5	28,5	DC-2
39	not assembled		
40	43	25,5	DC-2
41	43	22,5	G13
42	46	28,5	DC-3
43	not assembled		
44	52,5	25,5	DC-3
45	52,5	22,5	G15
46	not assembled		

Pin table [mm]



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	650 V	30 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	650 V	20 A	Inverter Diode	
T25, T27	IGBT	650 V	30 A	PFC Switch	
D25, D27	FWD	600 V	30 A	PFC Diode	
D45, D47	FWD	1200 V	5 A	PFC Sw. Protection Diode	
SH2, SH3	Shunt			Shunt	
C25, C27	Capacitor	630 V		Capacitor (PFC)	
Rt	Thermistor			Thermistor	

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

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

Package data
Package data for *flow* 1 packages see vincotech.com website.

Vincotech thermistor reference
See Vincotech thermistor reference table at vincotech.com website.

UL recognition and file number
This device is UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,op}$=175°C and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.

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