10-FY07PPA050I702-LK25B28Z

datasheet

***flow*PIM 1 + PFC** — **650 V / 50 A**

Topology features

- 1-leg rectifier
- 2-leg interleaved PFC + Inverter
- Open Emitter configuration
- 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
- Solder pin
- Thermo-mechanical push-and-pull force relief

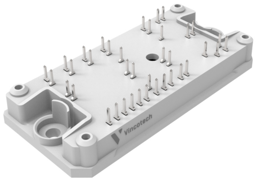
Target applications

- Embedded Drives
- Heat Pumps
- HVAC

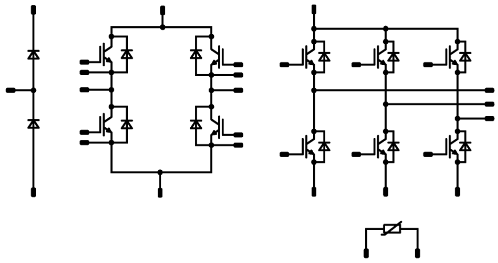
Types

- 10-FY07PPA050I702-LK25B28Z

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	61	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		150	A
Turn off safe operating area		T_j = 150°C, V_{CE} = 1200 V		150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	94	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	38	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	60	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	50	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	88	W
Gate-emitter voltage	V_{GES}			±30	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	66	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		120	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 25 °C	480	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	96	W
Maximum junction temperature	T_{jmax}			175	°C
Rectifier Diode					
Peak repetitive reverse voltage	V_{RRM}			1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	94	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	600	A
Surge current capability	I^2t	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	1800	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	108	W
Maximum junction temperature	T_{jmax}			150	°C
Module Properties					
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{jop}			-40…+(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	6000	V
Creepage distance				>12,7	mm
Clearance				8,17	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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	4,35	5	5,65	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125 150		1,3 1,36 1,38	1,65(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			20	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		3050		pF
Output capacitance	C_{oes}							92		pF
Reverse transfer capacitance	C_{res}							31		pF
Gate charge	Q_g	V_{CC} = 520 V	15		50	25		290		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,01		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	60	25 125 150		105,69 110,28 111,92		ns
Rise time	t_r					25 125 150		45,32 46,13 45,86		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		142,13 170,96 176,67		ns
Fall time	t_f					25 125 150		27,65 46,28 51,4		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,574 µC Q_{rFWD}=1,49 µC Q_{rFWD}=1,63 µC				25 125 150		1,59 2,02 2,12		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,94 1,45 1,54		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				30	25 125 150		1,63 1,53 1,5	2(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			20	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,57		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=790 A/µs d*i*/d*t*=1227 A/µs d*i*/d*t*=909 A/µs	±15	350	60	25 125 150		10,51 16,58 17,23		A
Reverse recovery time	t_{rr}					25 125 150		83,9 138,44 153,01		ns
Recovered charge	Q_r					25 125 150		0,574 1,49 1,63		µC
Reverse recovered energy	E_{rec}					25 125 150		0,096 0,295 0,328		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		60,16 180,96 185,87		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	$V_{GE(th)}$			5	0,033	25	5	6	7	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125 150		1,5 1,66 1,7	1,9(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			0,01	mA
Gate-emitter leakage current	I_{GES}		30	0		25			0,2	µA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	30		25		4200		pF
Output capacitance	C_{oes}							104		pF
Reverse transfer capacitance	C_{res}							79		pF
Gate charge	Q_g		15	400	50	25		141		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,08		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	-5/15	350	50	25 125 150		41,78 40,57 40,12		ns
Rise time	t_r					25 125 150		11,99 13 13,43		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		98,59 110,86 114,11		ns
Fall time	t_f					25 125 150		24,45 34,44 42,36		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,771 µC Q_{rFWD}=1,99 µC Q_{rFWD}=2,49 µC				25 125 150		0,395 0,654 0,748		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,849 0,999 1,12		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	
PFC Diode										
Static										
Forward voltage	V_F				60	25 125 150		1,89 1,57 1,5	2,5(1)	V
Reverse leakage current	I_R	V_r = 600 V				25			25	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,99		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=4881 A/µs di/dt=5092 A/µs di/dt=4818 A/µs	-5/15	350	50	25 125 150		65,94 99,33 111,03		A
Reverse recovery time	t_{rr}					25 125 150		22,15 36,13 40,33		ns
Recovered charge	Q_r					25 125 150		0,771 1,99 2,49		µC
Reverse recovered energy	E_{rec}					25 125 150		0,124 0,358 0,457		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		10392,93 7905,75 7844,04		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	
Rectifier Diode										
Static										
Forward voltage	V_F				50	25 125 150		1,06 0,984 0,964	1,5(1)	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			100 2	µA mA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,65		K/W
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	

(1) Value at chip level

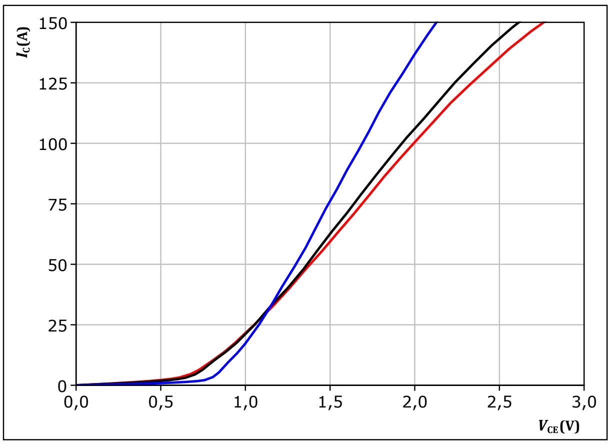
(2) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

$I_C = f(V_{CE})$



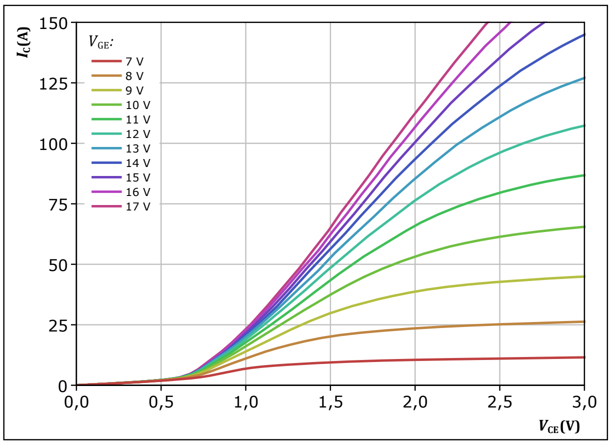
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 2. IGBT

Typical output characteristics

$I_C = f(V_{CE})$



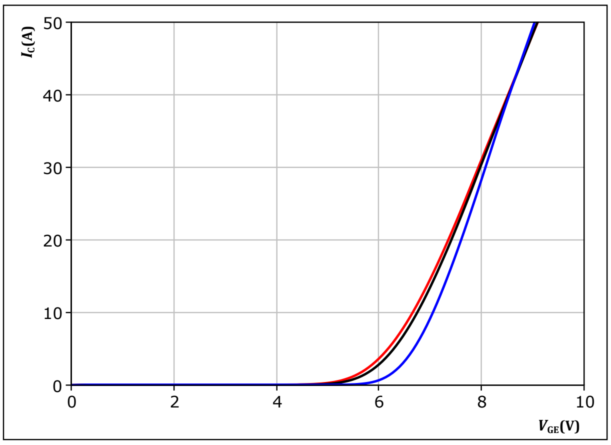
t_p =	250	µs
T_j =	150	°C

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

figure 3. IGBT

Typical transfer characteristics

$I_C = f(V_{GE})$



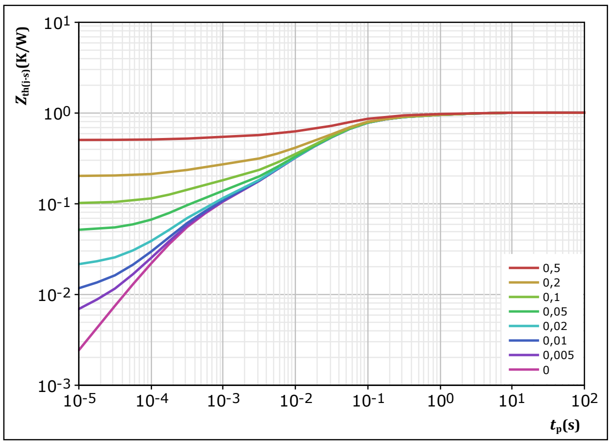
t_p =	250	µs
V_{CE} =	9	V

T_j: 25 °C, 125 °C, 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,01	K/W

IGBT thermal model values

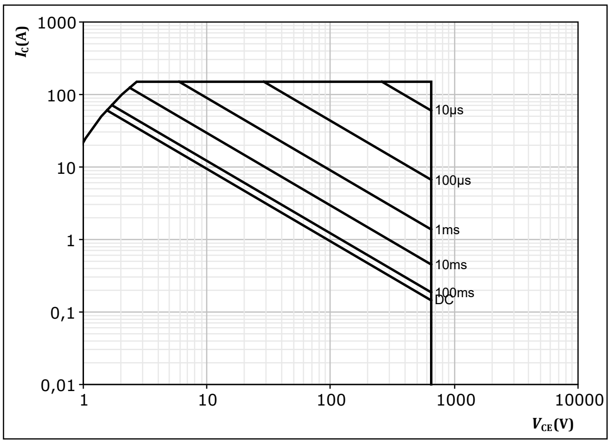
R (K/W)	τ (s)
8,68E-02	2,07E+00
1,87E-01	1,78E-01
5,18E-01	3,82E-02
1,46E-01	5,69E-03
7,24E-02	3,51E-04

Inverter Switch Characteristics

figure 5.	**IGBT**

Safe operating area

I_C = f(V_{CE})

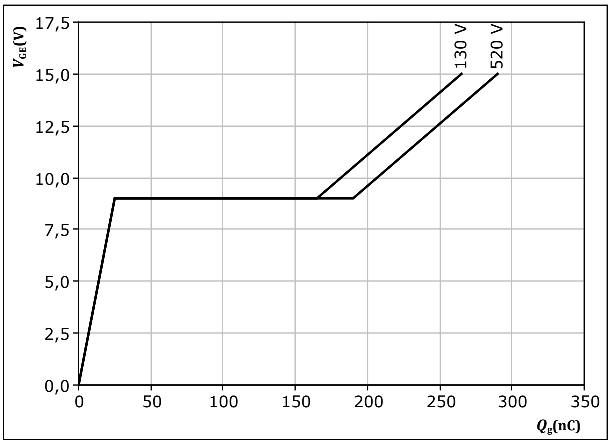


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 6.	**IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



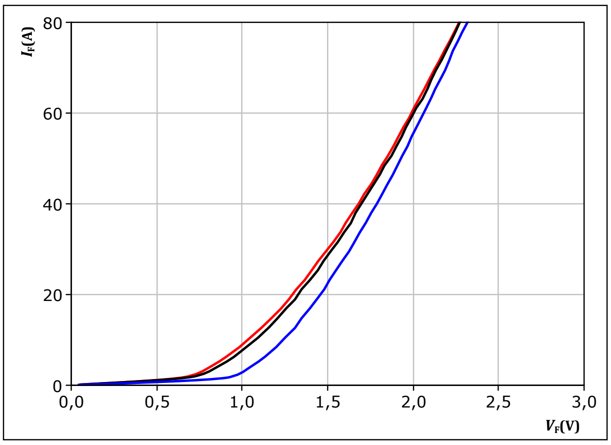
I_C =	50	A
T_j =	25	°C

Inverter Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

I_F = f(V_F)



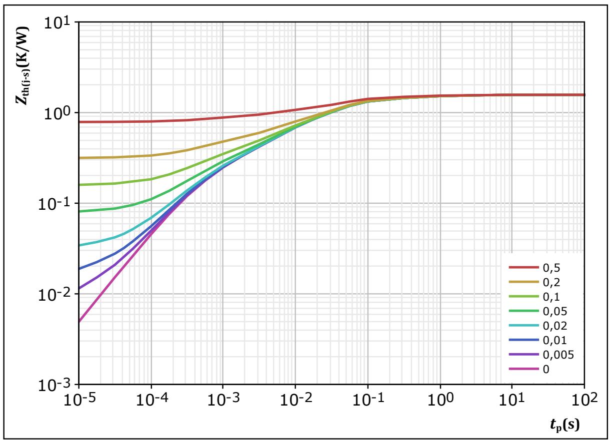
t_p = 250 µs

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

$R_{th(j-s)}$ = 1,572 K/W

FWD thermal model values

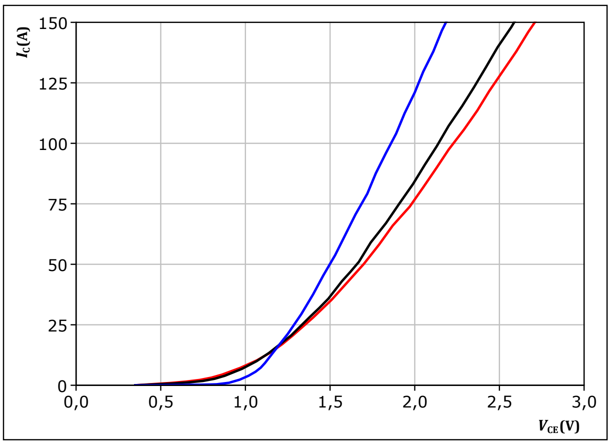
R (K/W)	τ (s)
7,23E-02	2,57E+00
1,93E-01	2,66E-01
7,93E-01	3,45E-02
3,42E-01	4,25E-03
1,71E-01	4,36E-04

PFC Switch Characteristics

figure 9. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

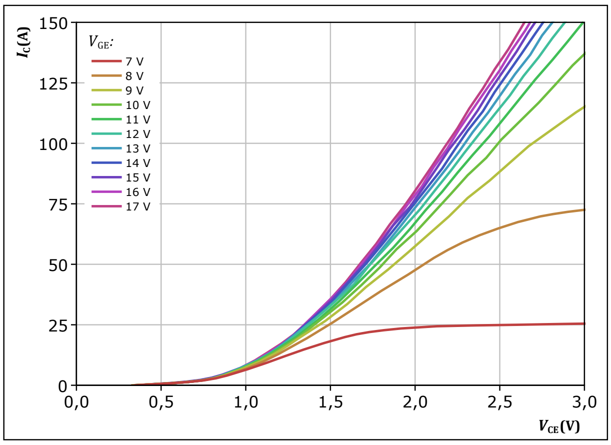


t_p =	250	μs	
V_{GE} =	15	V	
		T_j:	25 °C
			125 °C
			150 °C

figure 10. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



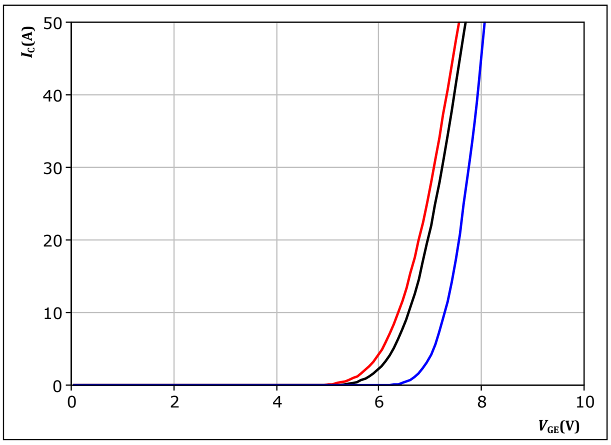
t_p =	250	μs
T_j =	150	°C

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

figure 11. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

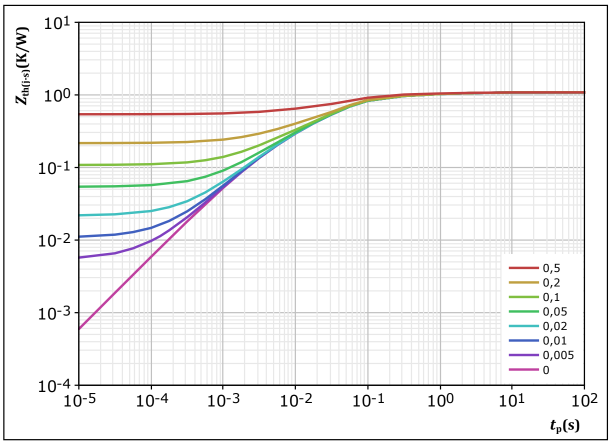


t_p =	250	μs	
V_{CE} =	10	V	
		T_j:	25 °C
			125 °C
			150 °C

figure 12. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,083	K/W

IGBT thermal model values

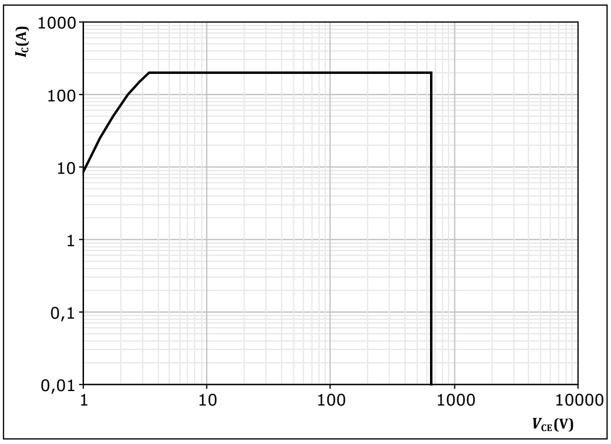
R (K/W)	τ (s)
7,01E-02	2,16E+00
1,22E-01	3,87E-01
6,85E-01	4,96E-02
1,72E-01	6,84E-03
3,38E-02	1,67E-03

PFC Switch Characteristics

figure 13.	IGBT

Safe operating area

I_C = f(V_{CE})



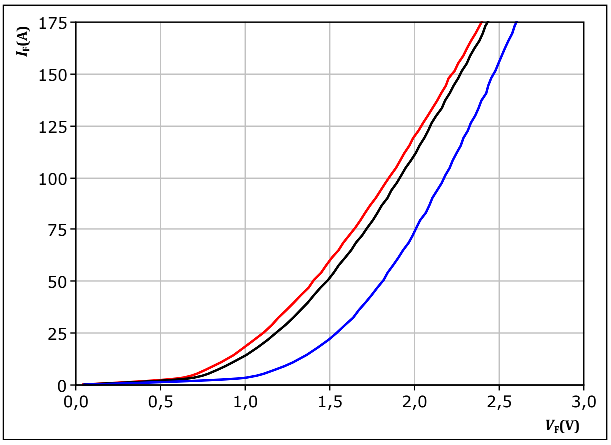
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

PFC Diode Characteristics

figure 14. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



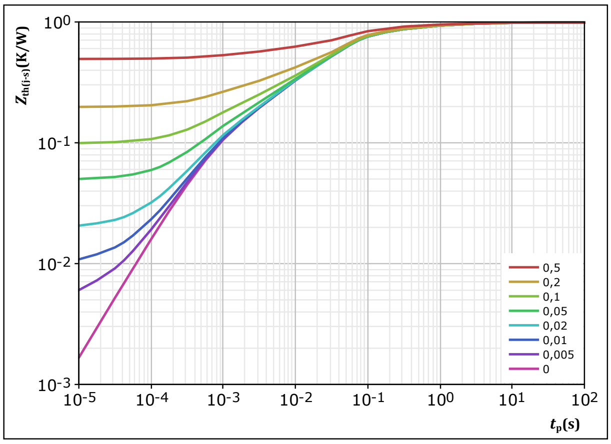
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 15. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,988 K/W

FWD thermal model values

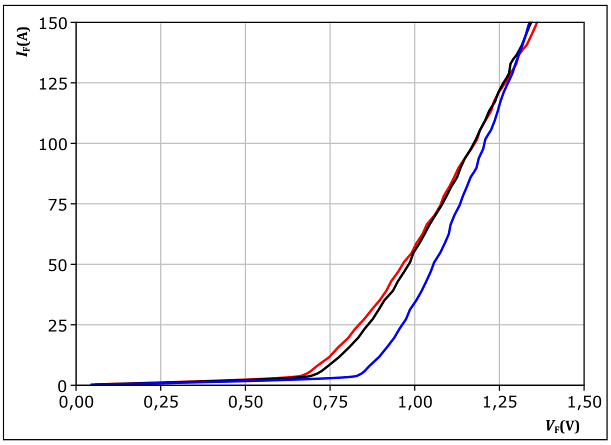
R (K/W)	τ (s)
6,01E-02	2,89E+00
1,33E-01	4,07E-01
5,50E-01	4,79E-02
1,55E-01	5,25E-03
8,99E-02	7,12E-04

Rectifier Diode Characteristics

figure 16. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



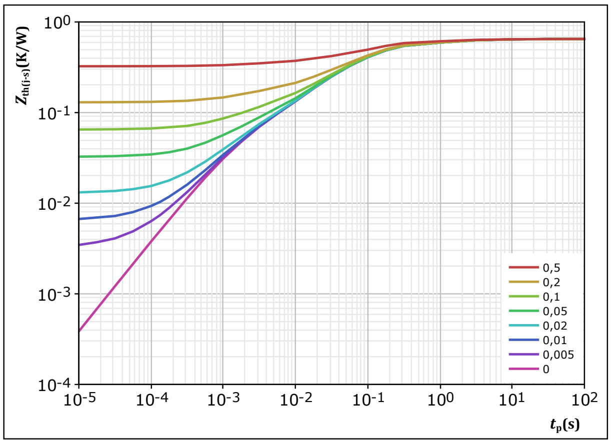
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 17. **Rectifier**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,649 K/W

Rectifier thermal model values

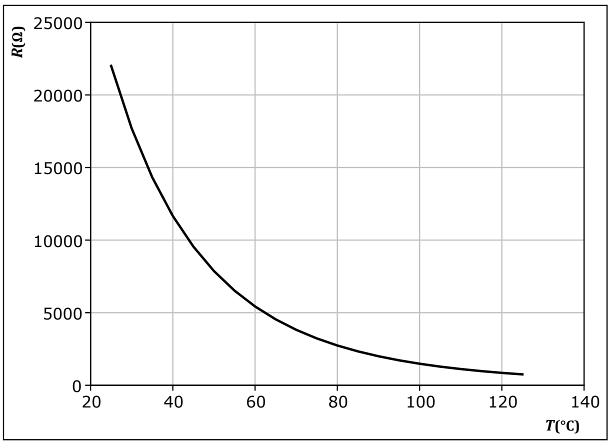
R (K/W)	τ (s)
1,66E-02	1,08E+01
9,13E-02	1,26E+00
3,70E-01	1,02E-01
1,28E-01	1,77E-02
4,30E-02	1,55E-03

Thermistor Characteristics

figure 18.	Thermistor

Typical NTC characteristic as function of temperature

$R_T = f(T)$

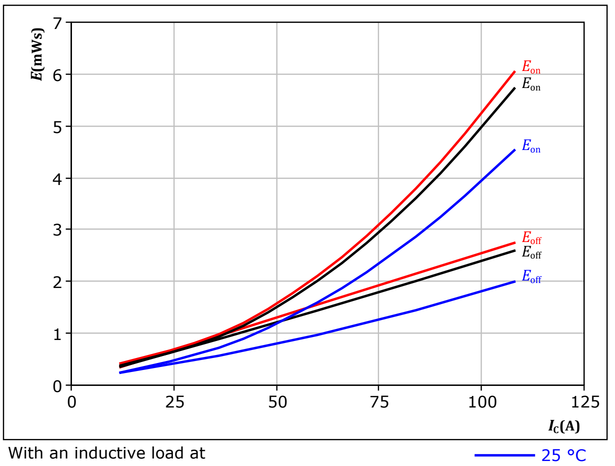


Inverter Switching Characteristics

figure 19. **IGBT**

Typical switching energy losses as a function of collector current

E = f(I_C)



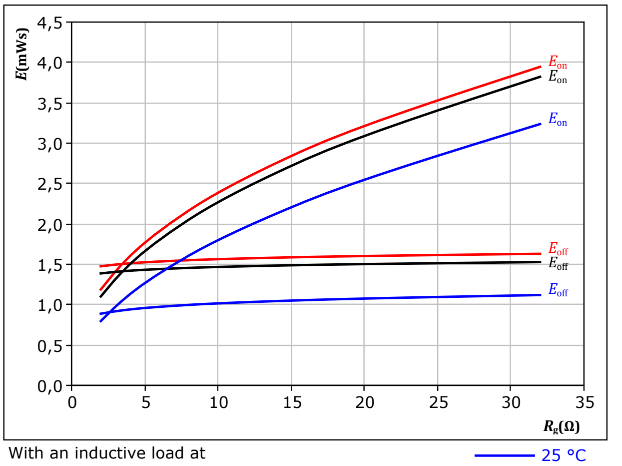
With an inductive load at

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

figure 20. **IGBT**

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

E = f(R_g)



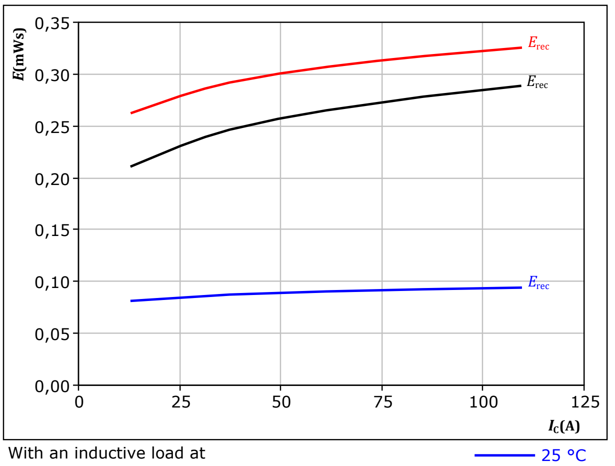
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	60	A		150 °C

figure 21. **FWD**

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



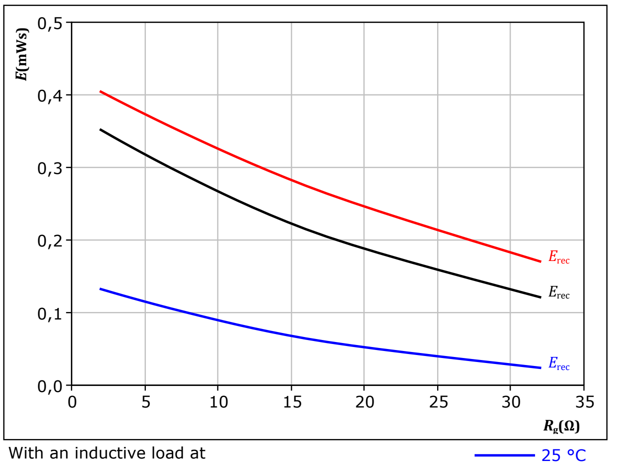
With an inductive load at

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

figure 22. **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

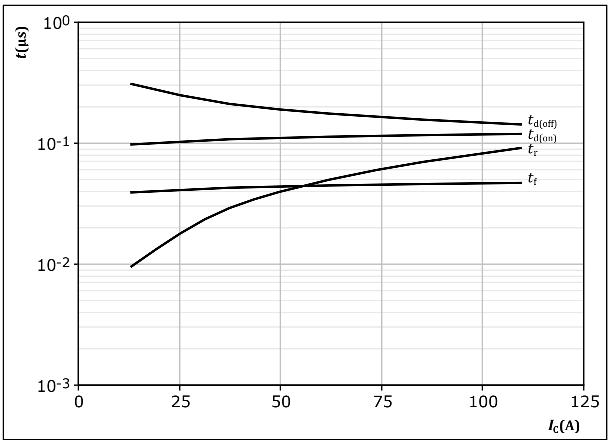
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	60	A		150 °C

Inverter Switching Characteristics

figure 23. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



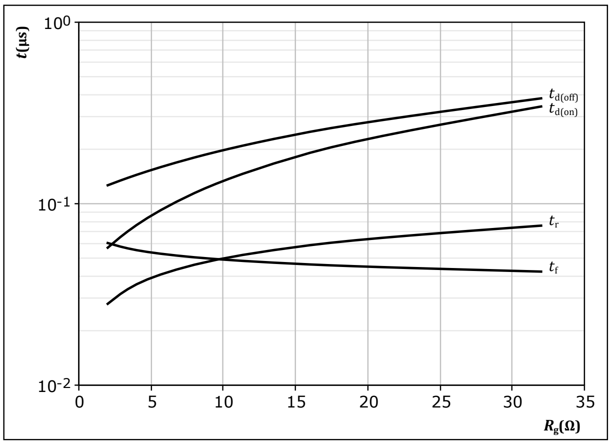
With an inductive load at

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

figure 24. **IGBT**

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

$t = f(R_g)$



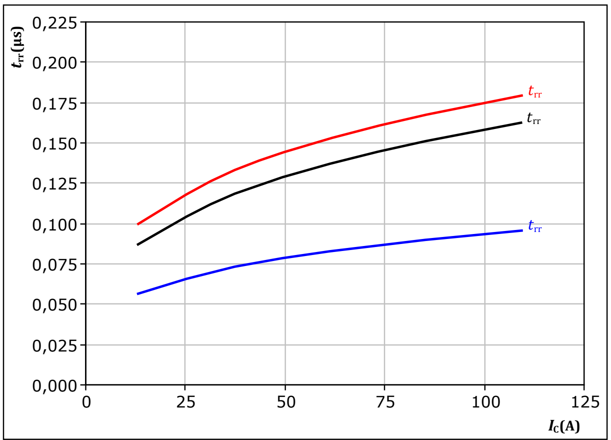
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	60	A

figure 25. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

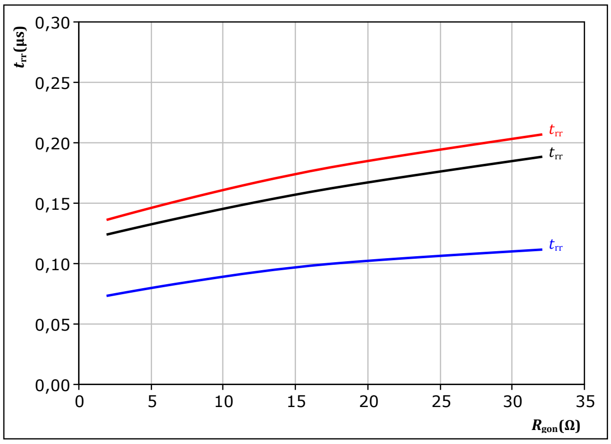
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 26. **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 =	60	A

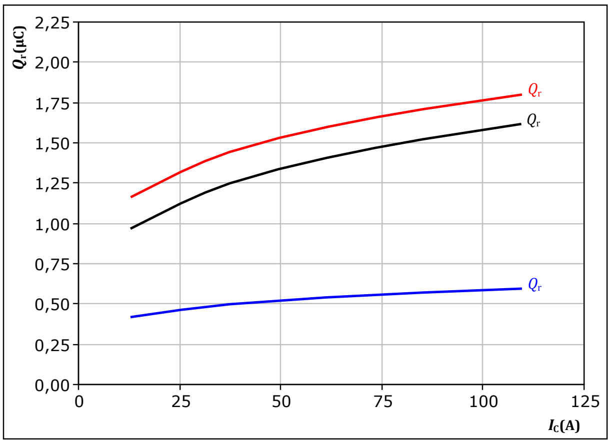
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 27. FWD

Typical recovered charge as a function of collector current

Q_r = f(I_C)



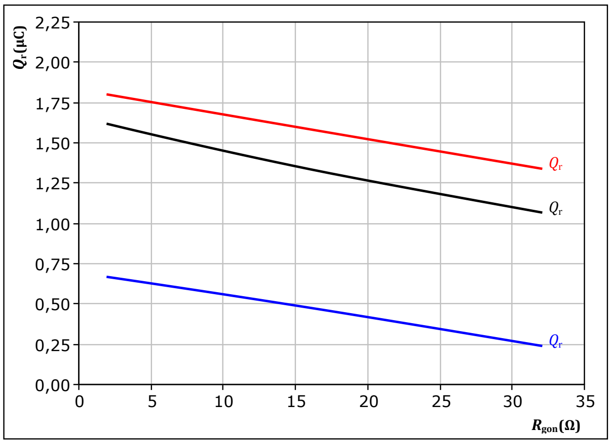
With an inductive load at

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

figure 28. FWD

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

Q_r = f(R_{gon})



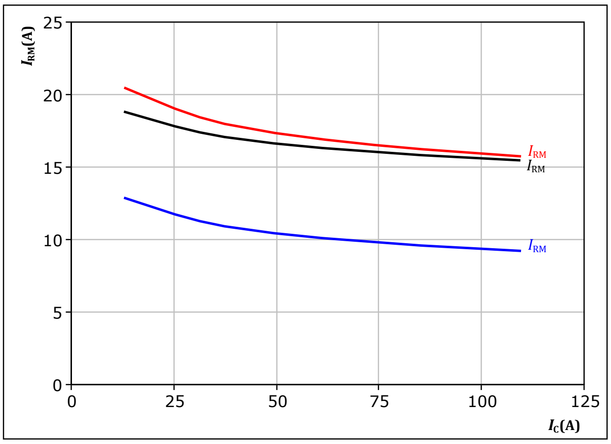
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	60	A		150 °C

figure 29. FWD

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



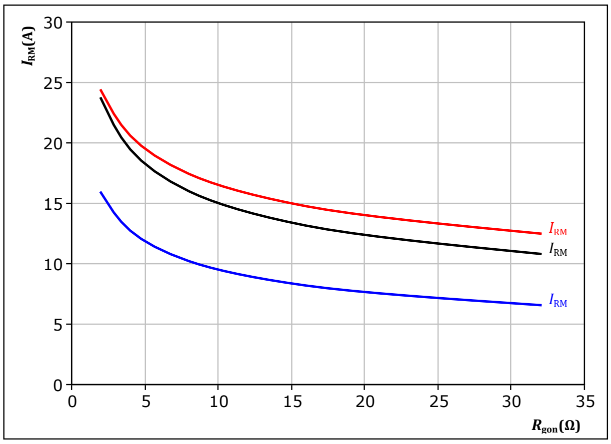
With an inductive load at

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

figure 30. 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

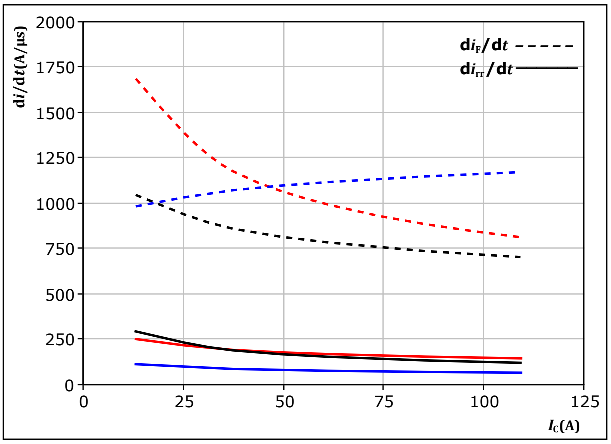
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	60	A		150 °C

Inverter Switching Characteristics

figure 31. **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

V_{GE} = ±15 V

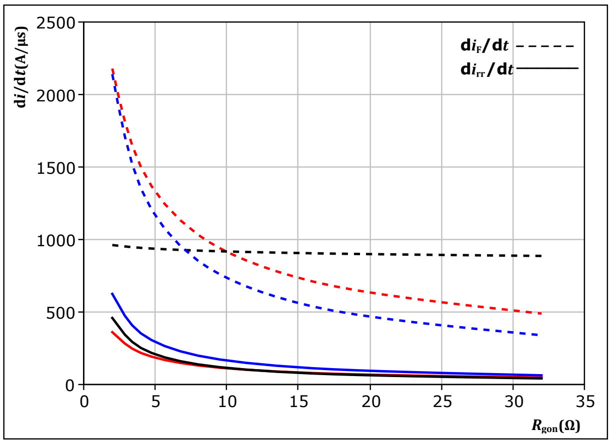
R_{gon} = 8 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 32. **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

V_{GE} = ±15 V

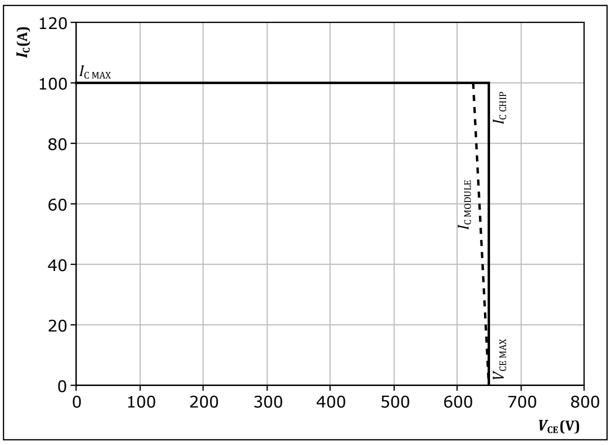
I_C = 60 A

T_j: 25 °C, 125 °C, 150 °C

figure 33. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At T_j = 150 °C

R_{gon} = 8 Ω

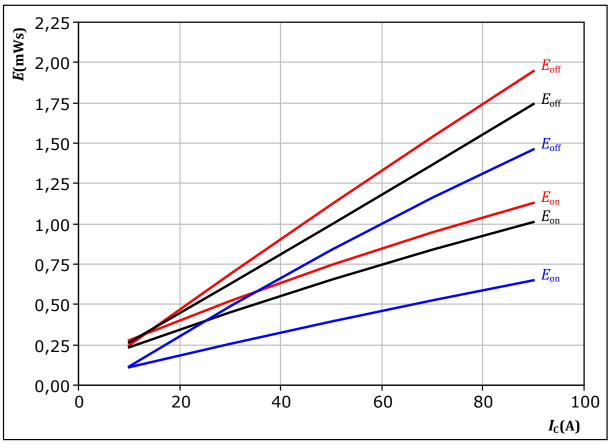
R_{goff} = 8 Ω

PFC Switching Characteristics

figure 34. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



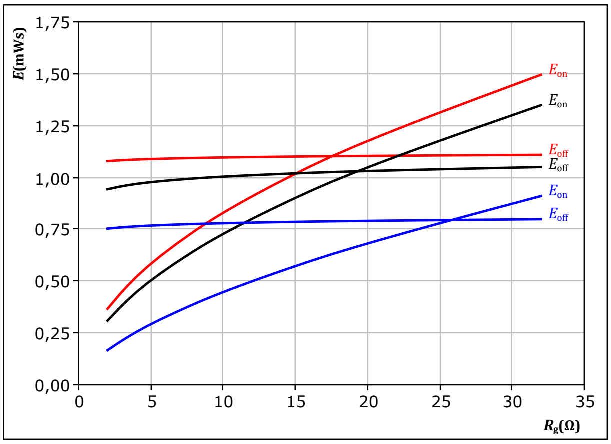
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	8	Ω		

figure 35. **IGBT**

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

$E = f(R_g)$



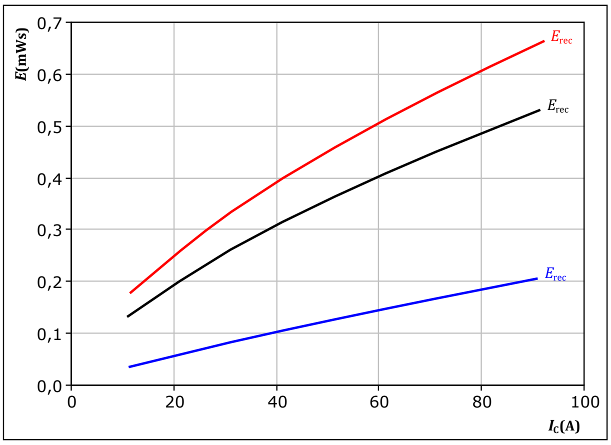
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	50	A		150 °C

figure 36. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



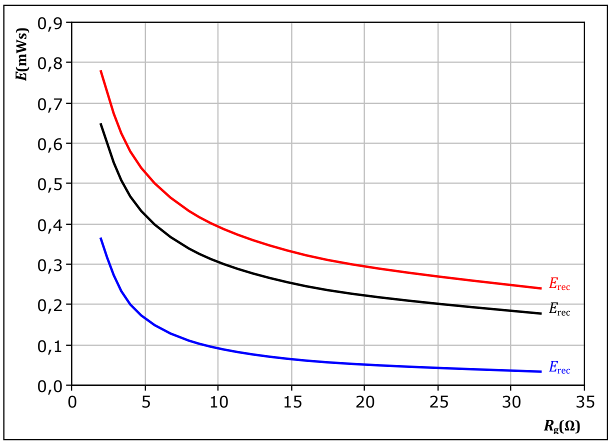
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 37. **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

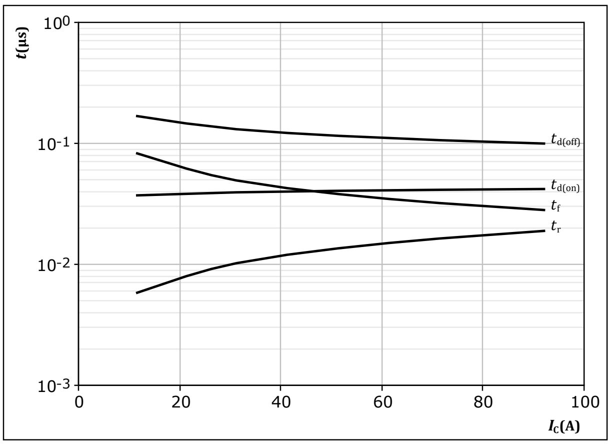
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	50	A		150 °C

PFC Switching Characteristics

figure 38. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



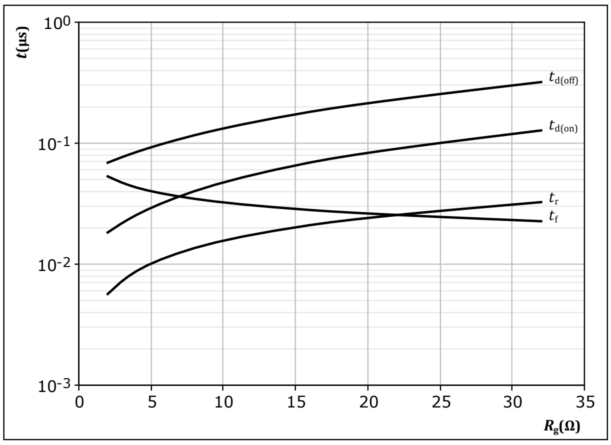
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 39. **IGBT**

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

$t = f(R_g)$



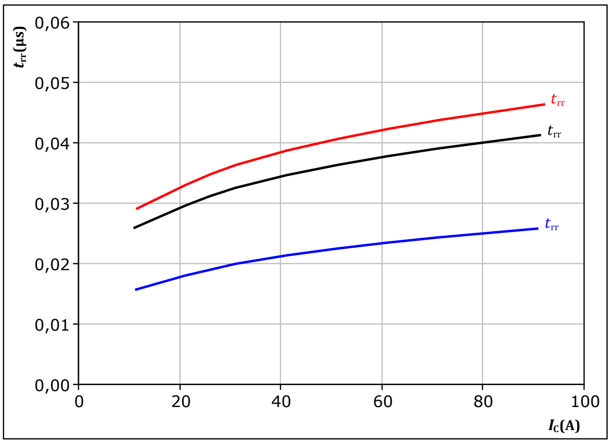
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	50	A

figure 40. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

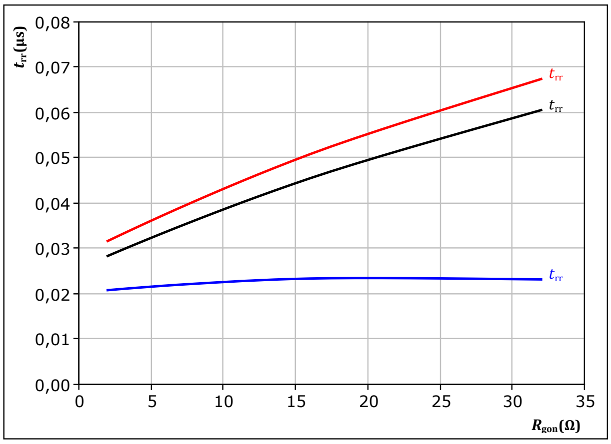
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 41. **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} =	-5/15	V
I_C =	50	A

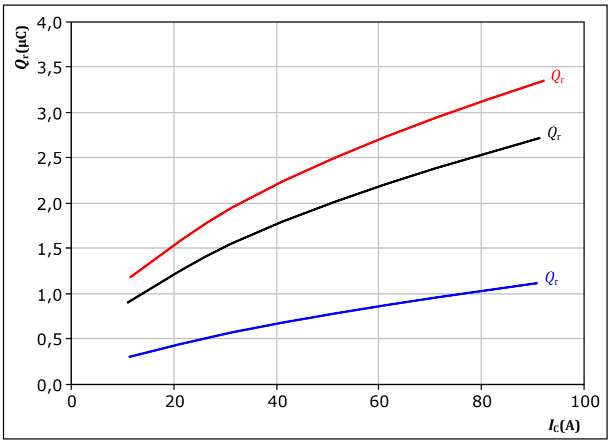
T_j: 25 °C, 125 °C, 150 °C

PFC Switching Characteristics

figure 42. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



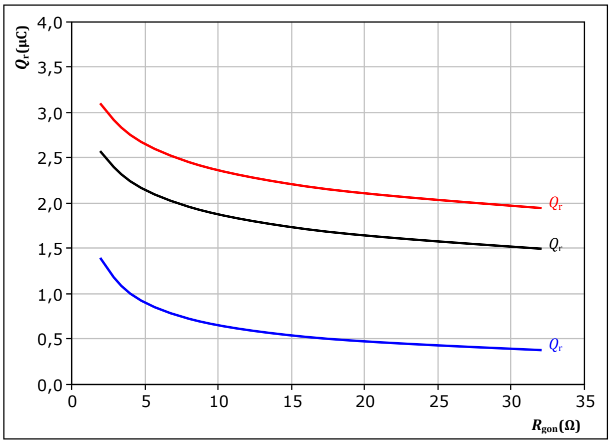
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 43. **FWD**

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

Q_r = f(R_{gon})



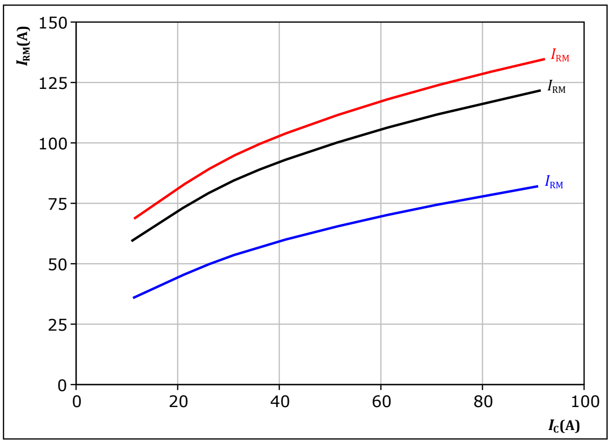
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	50	A		150 °C

figure 44. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



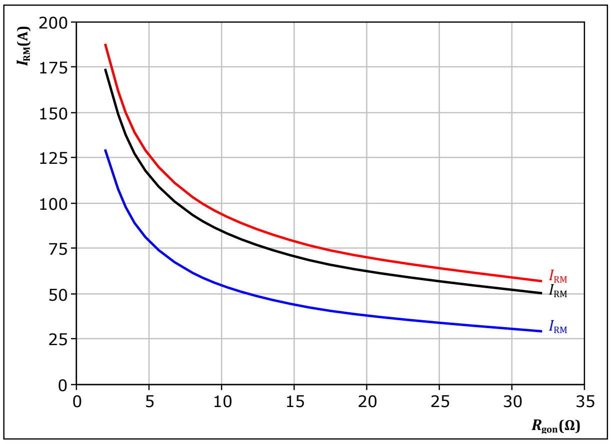
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 45. **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

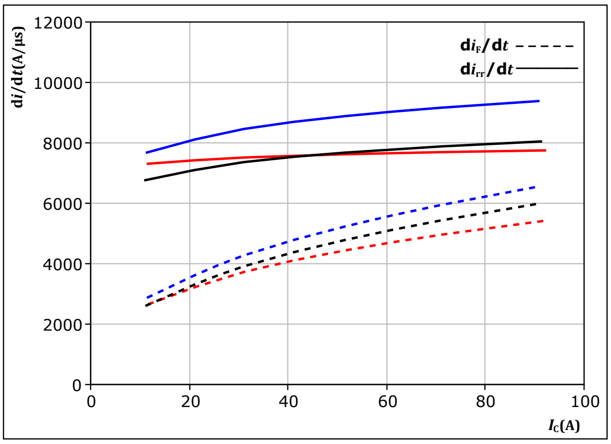
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	50	A		150 °C

PFC Switching Characteristics

figure 46. **FWD**

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

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



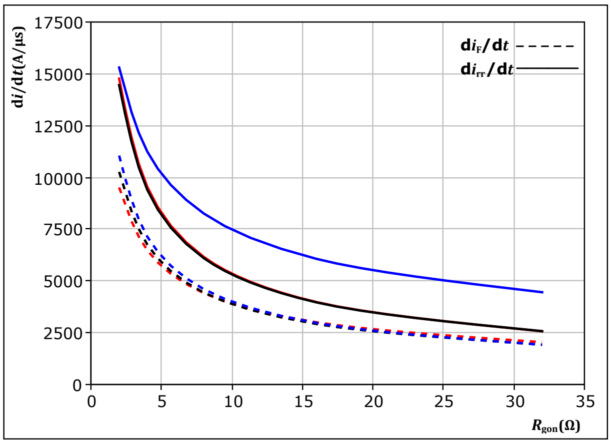
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 47. **FWD**

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

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



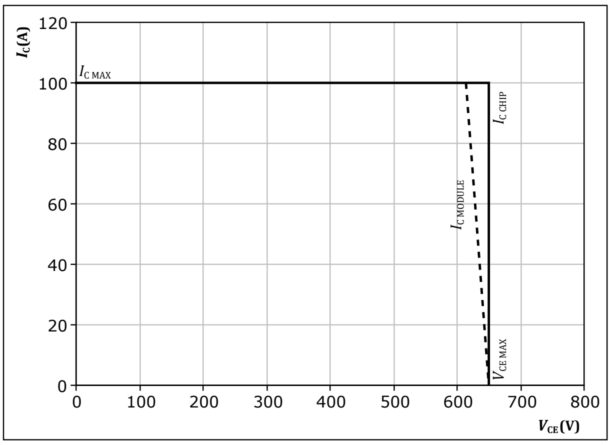
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	50	A		150 °C

figure 48. **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 49. **IGBT**

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

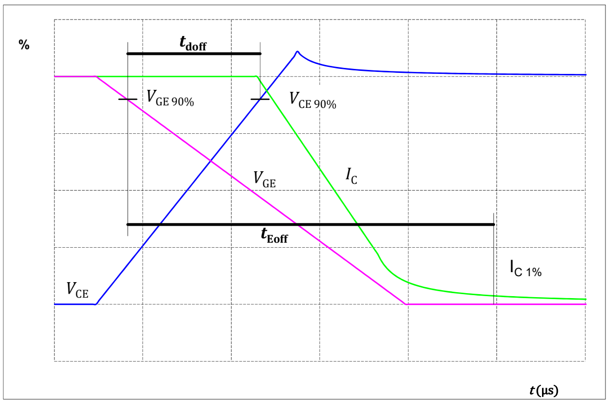


figure 50. **IGBT**

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

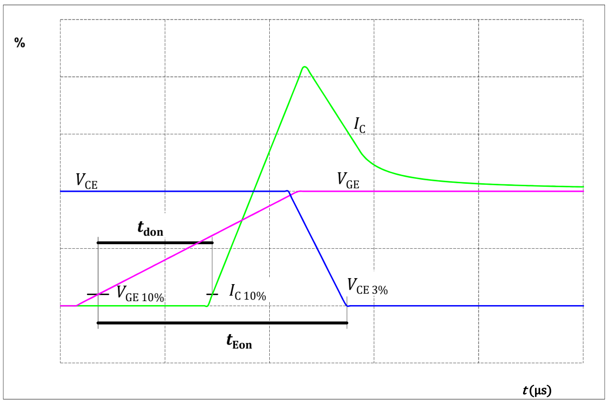


figure 51. **IGBT**

Turn-off Switching Waveforms & definition of t_f

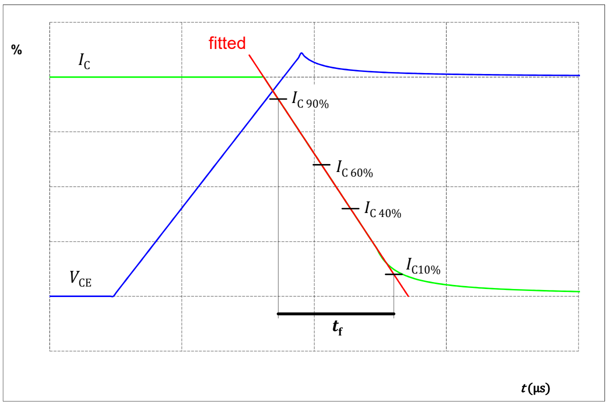
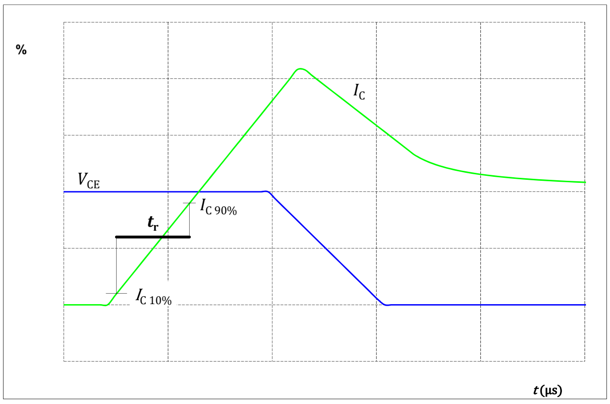


figure 52. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 53. **FWD**

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

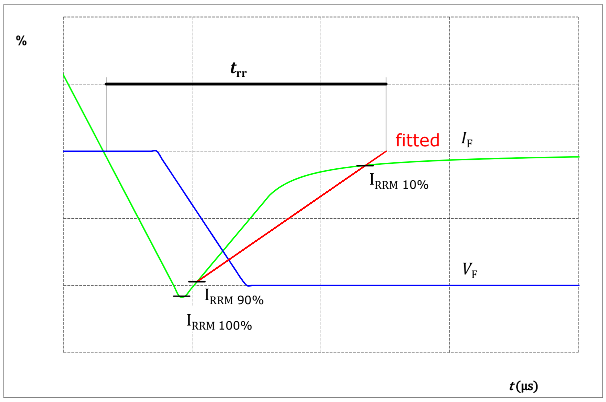
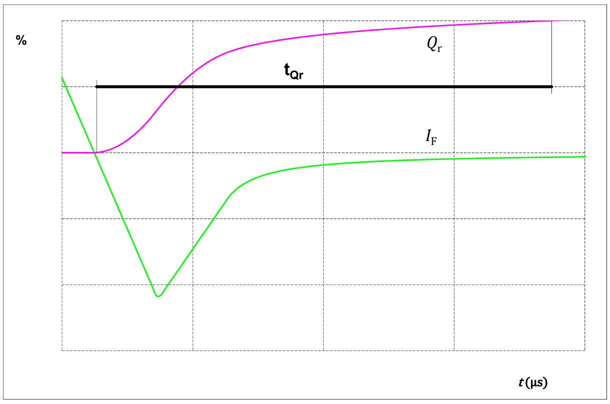


figure 54. **FWD**

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



10-FY07PPA050I702-LK25B28Z
datasheet

Ordering Code

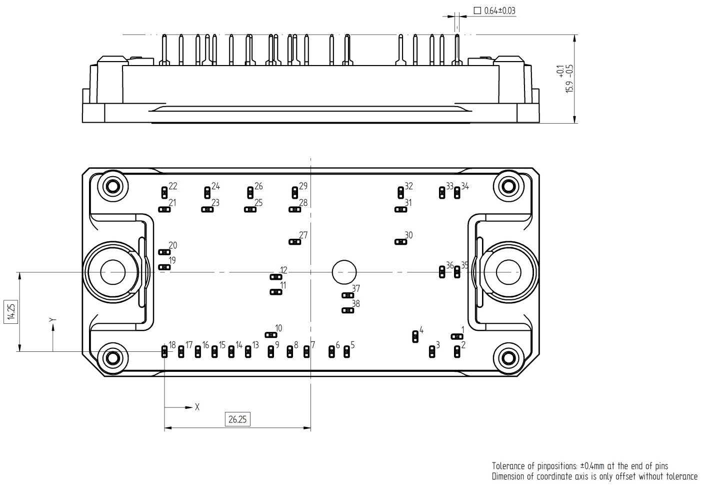
Version	Ordering Code
Without thermal paste	10-FY07PPA050I702-LK25B28Z
With thermal paste (5,2 W/mK, PTM6000HV)	10-FY07PPA050I702-LK25B28Z-/7/

Marking

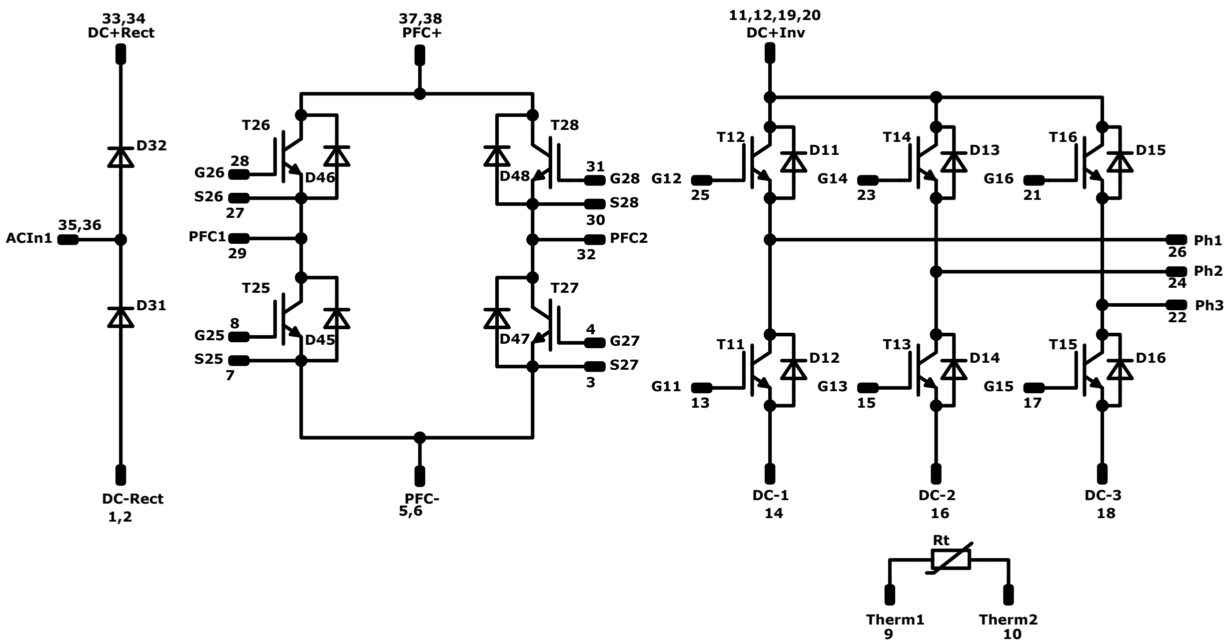
	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Type&Ver	**Lot number**	**Serial**	**Date code**		
Datamatrix	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	52,5	2,7	DC-Rect
2	52,5	0	DC-Rect
3	48	0	S27
4	45	2,7	G27
5	32,7	0	PFC-
6	30	0	PFC-
7	25,5	0	S25
8	22,5	0	G25
9	19,1	0	Therm1
10	19,1	3	Therm2
11	20	10,7	DC+Inv
12	20	13,4	DC+Inv
13	15	0	G11
14	12	0	DC-1
15	9	0	G13
16	6	0	DC-2
17	3	0	G15
18	0	0	DC-3
19	0	15,15	DC+Inv
20	0	17,85	DC+Inv
21	0	25,5	G16
22	0	28,5	Ph3
23	7,7	25,5	G14
24	7,7	28,5	Ph2
25	15,4	25,5	G12
26	15,4	28,5	Ph1
27	23,4	19,7	S26
28	23,4	25,5	G26
29	23,4	28,5	PFC1
30	42,4	19,7	S28
31	42,4	25,5	G28
32	42,4	28,5	PFC2
33	49,8	28,5	DC+Rect
34	52,5	28,5	DC+Rect
35	52,5	14,3	ACIn1
36	49,8	14,3	ACIn1
37	32,9	10,1	PFC+
38	32,9	7,4	PFC+



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	650 V	50 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	650 V	30 A	Inverter Diode	
T25, T26, T27, T28	IGBT	650 V	50 A	PFC Switch	
D46, D45, D48, D47	FWD	600 V	60 A	PFC Diode	
D31, D32	Rectifier	1600 V	50 A	Rectifier Diode	
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.

Document No.:	Date:	Modification:	Pages
10-FY07PPA050I702-LK25B28Z-D1-14	20 Oct. 2024	Initial Release	