Vincotech

10-PG06PPA050SJ02-LH94E08T

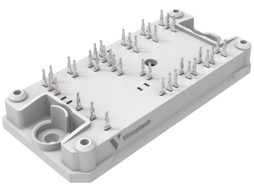
datasheet

***flow*PIM 1 + PFC** | **600 V / 50 A**

Features

- Highly integrated PIM with interleaved PFC circuit
- High switching frequency PFC circuit
- On-board capacitors
- New generation high speed IGBTs in the inverter

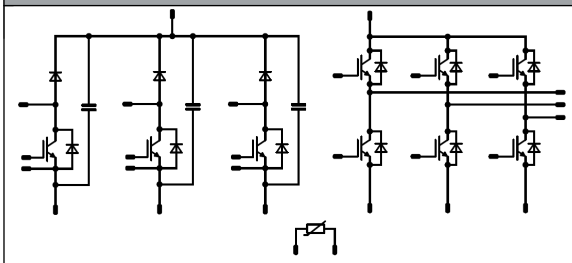
flow 1 12 mm housing



Target applications

- Embedded Drives
- Industrial Drives

Schematic



Types

- 10-PG06PPA050SJ02-LH94E08T

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Inverter Switch					
Collector-emitter voltage	V_{CES}			600	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	49	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	81	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
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	36	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	58	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	29	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	68	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}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	32	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		180	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	59	W
Maximum junction temperature	T_{jmax}			175	°C
PFC Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	18	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		20	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	33	W
Maximum junction temperature	T_{jmax}			175	°C
Capacitor (PFC)					
Maximum DC voltage	V_{MAX}			630	V
Operation Temperature	T_{op}			-55 ... 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
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance				>12,7	mm
Clearance				8,05	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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0008	25	4,1	5,1	5,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125 150		1,49 1,61 1,64	1,8(1)	V
Collector-emitter cut-off current	I_{CES}		0	600		25			2,8	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		1950		pF
Output capacitance	C_{oes}	f = 1 Mhz	0	25		25		83		pF
Reverse transfer capacitance	C_{res}	f = 1 Mhz	0	25		25		67		pF
Gate charge	Q_g	V_{CC} = 480 V	15		50	25		249		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,18		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	50	25 125 150		70 70 71,2		ns
Rise time	t_r	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	50	25 125 150		45,2 43,2 42,8		ns
Turn-off delay time	$t_{d(off)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	50	25 125 150		114,8 133,6 138,6		ns
Fall time	t_f	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	50	25 125 150		22,47 34,2 41,12		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=1,62 µC Q_{rFWD}=3,09 µC Q_{rFWD}=3,57 µC	±15	350	50	25 125 150		1,84 2,2 2,28		mWs
Turn-off energy (per pulse)	E_{off}		±15	350	50	25 125 150		0,536 0,839 0,941		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
Inverter Diode										
Static										
Forward voltage	V_F				30	25 150	1,25	1,64 1,55	1,95[(1)]	V
Reverse leakage current	I_R	V_r = 600 V				25			27	µA
Thermal										
Thermal resistance junction to sink [(2)]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,63		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt=245 A/µs di/dt=545 A/µs di/dt=378 A/µs	±15	350	50	25 125 150		10,63 16,09 16,77		A
Reverse recovery time	t_{rr}					25 125 150		251,47 331,66 392,82		ns
Recovered charge	Q_r					25 125 150		1,62 3,09 3,57		µC
Reverse recovered energy	E_{rec}					25 125 150		0,406 0,762 0,892		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		76,03 88,46 100,72		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[1]	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		2100		pF
Output capacitance	C_{oes}	f = 1 Mhz	0	25		25		45		pF
Reverse transfer capacitance	C_{res}	f = 1 Mhz	0	25		25		7,7		pF
Gate charge	Q_g	V_{CC} = 520 V	15		30	25		65		nC
Thermal										
Thermal resistance junction to sink [2]	$R_{th(j-s)}$	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	R_{gon} = 8 Ω R_{goff} = 8 Ω	0/15	400	30	25 125 150		8 8 8		ns
Turn-off delay time	$t_{d(off)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	0/15	400	30	25 125 150		80 94 98		ns
Fall time	t_f	R_{gon} = 8 Ω R_{goff} = 8 Ω	0/15	400	30	25 125 150		7,96 9,61 10,37		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,394 µC Q_{rFWD}=0,956 µC Q_{rFWD}=1,17 µC	0/15	400	30	25 125 150		0,391 0,524 0,451		mWs
Turn-off energy (per pulse)	E_{off}		0/15	400	30	25 125 150		0,086 0,207 0,332		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				30	25 125		2,47 2,03	2,6[(1)]	V
Reverse leakage current	I_R	V_r = 650 V				25			10	µA
Thermal										
Thermal resistance junction to sink [(2)]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,61		K/W
Dynamic										
Peak recovery current	I_{RRM}	d*i*/d*t*=4524 A/µs d*i*/d*t*=4528 A/µs d*i*/d*t*=4350 A/µs	0/15	400	30	25 125 150		24,18 39,85 45,05		A
Reverse recovery time	t_{rr}					25 125 150		18,85 47,2 50,43		ns
Recovered charge	Q_r					25 125 150		0,394 0,956 1,17		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

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 Sw. Protection Diode										
Static										
Forward voltage	V_F				10	25 125	1,23	1,67 1,54	1,87[1]	V
Reverse leakage current	I_R	V_r = 650 V				25			0,14	µA
Thermal										
Thermal resistance junction to sink [2]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,87		K/W
Capacitor (PFC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		33		nF
Tolerance							-5		5	%
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P							5		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	

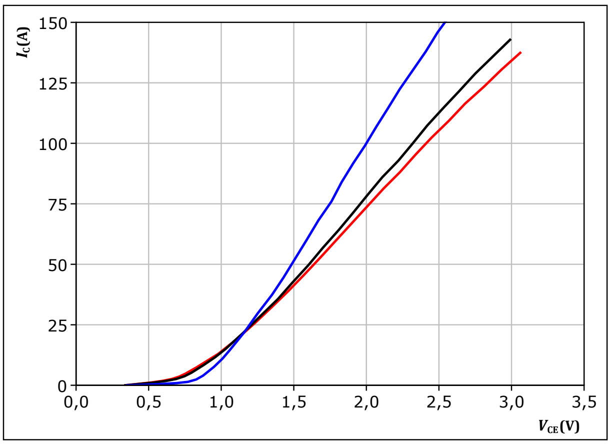
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



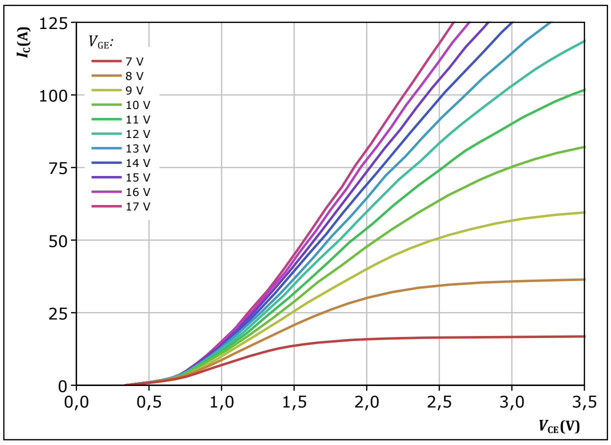
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



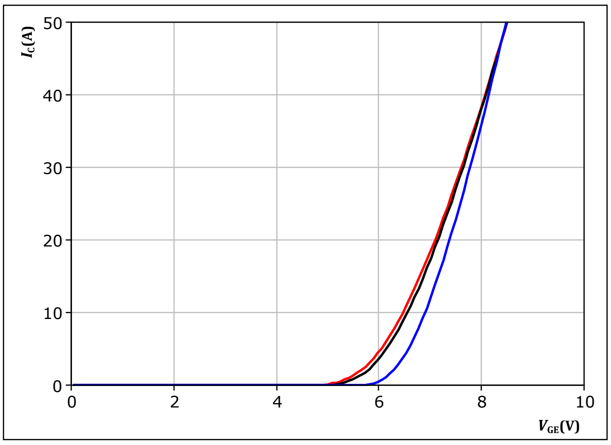
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})



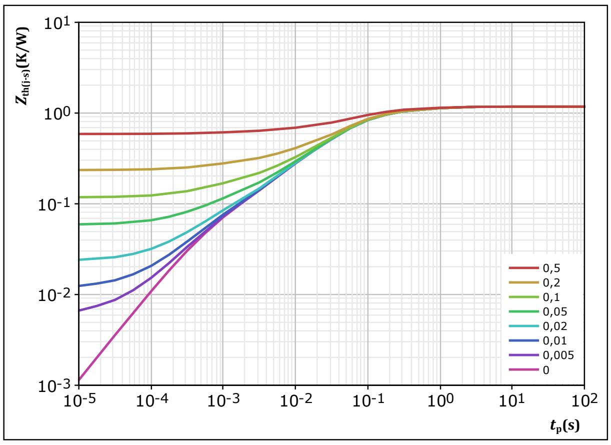
t_p =	250	µs
V_{CE} =	10	V

T_j: 25 °C, 125 °C, 150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j\text{-}s)}$ =	1,176	K/W

IGBT thermal model values

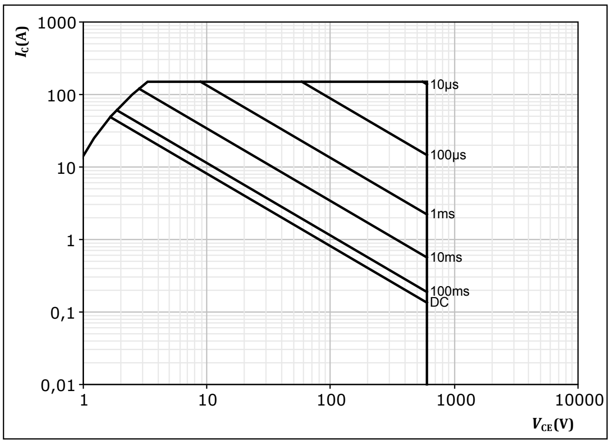
R (K/W)	τ (s)
1,28E-01	9,19E-01
3,00E-01	1,49E-01
5,67E-01	4,76E-02
1,34E-01	6,63E-03
4,70E-02	5,83E-04

Inverter Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})



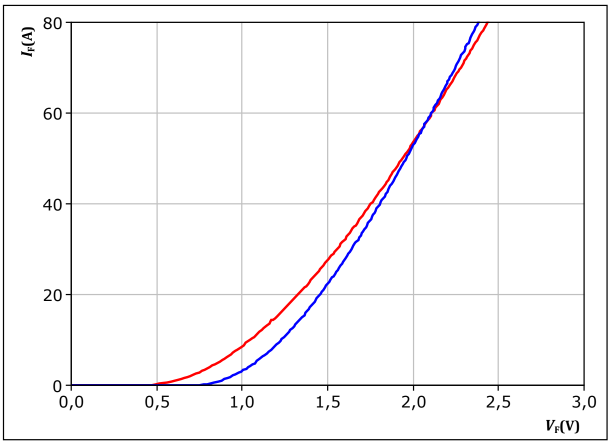
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Inverter Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

I_F = f(V_F)



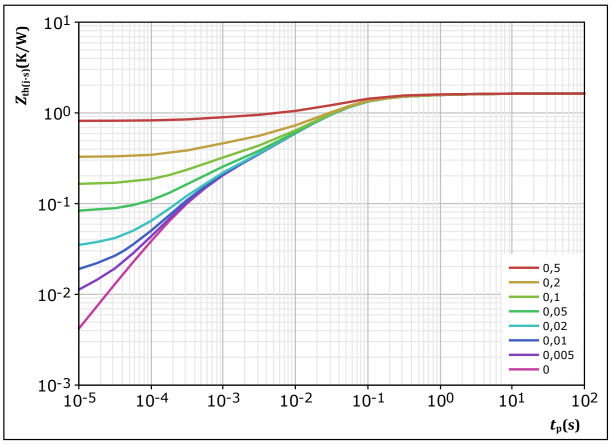
t_p = 250 µs

T_j: 25 °C, 150 °C

figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,633 K/W

FWD thermal model values

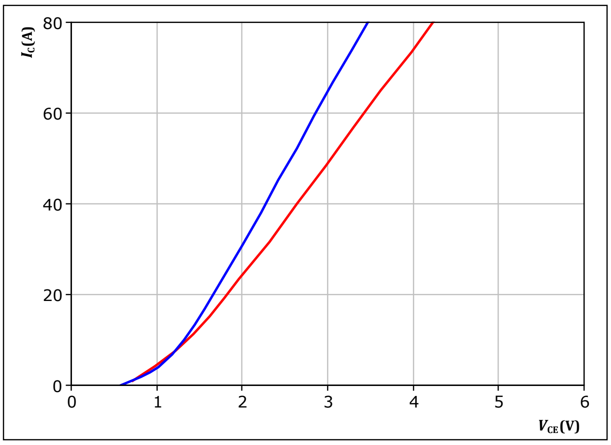
R (K/W)	τ (s)
7,13E-02	2,70E+00
1,55E-01	3,01E-01
7,25E-01	5,48E-02
3,93E-01	1,54E-02
1,57E-01	2,76E-03
1,32E-01	4,03E-04

PFC Switch Characteristics

figure 8. IGBT

Typical output characteristics

I_C = f(V_{CE})



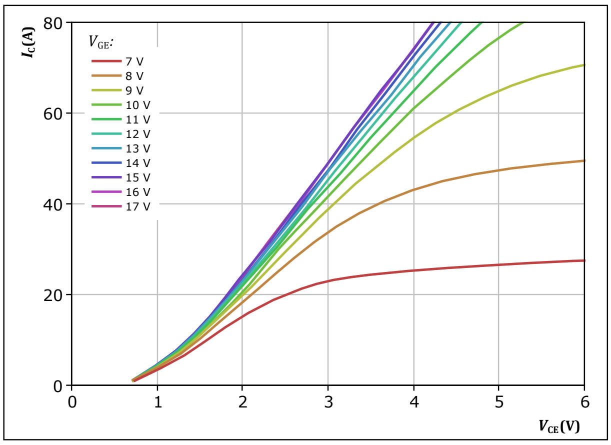
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C

figure 9. IGBT

Typical output characteristics

I_C = f(V_{CE})



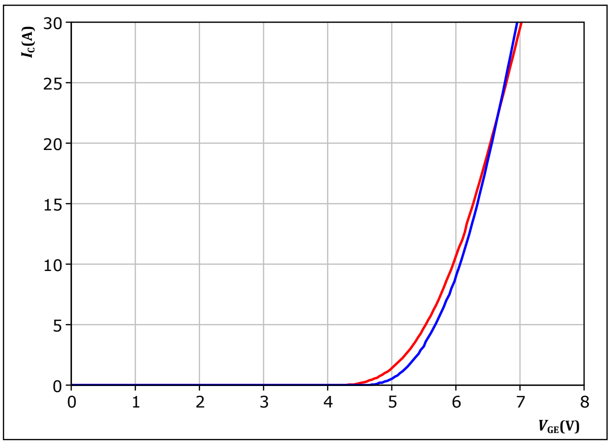
t_p =	250	µs
T_j =	125	°C

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

figure 10. IGBT

Typical transfer characteristics

I_C = f(V_{GE})



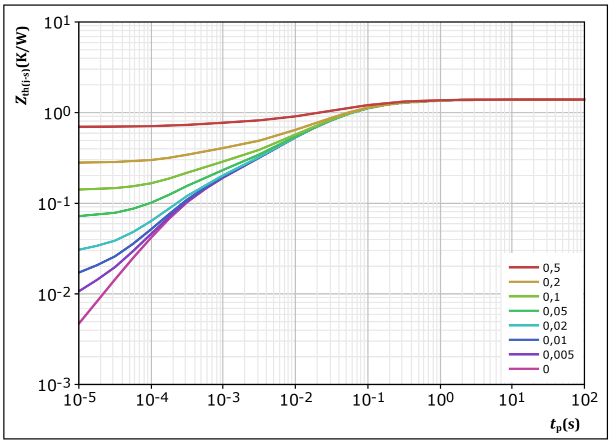
t_p =	250	µs
V_{CE} =	10	V

T_j: 25 °C, 125 °C

figure 11. IGBT

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,394 K/W

IGBT thermal model values

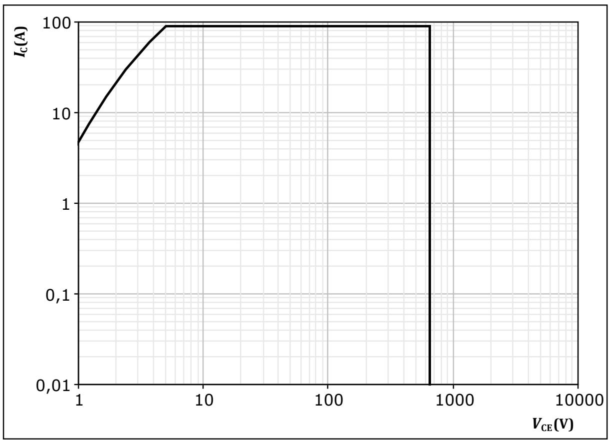
R (K/W)	τ (s)
8,66E-02	1,03E+00
1,95E-01	1,93E-01
5,59E-01	5,17E-02
3,47E-01	9,99E-03
9,37E-02	1,86E-03
1,12E-01	2,95E-04

PFC Switch Characteristics

figure 12. **IGBT**

Safe operating area

I_C = f(V_{CE})

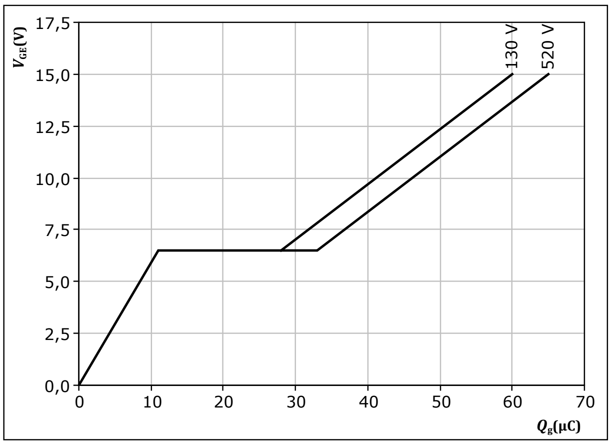


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 13. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



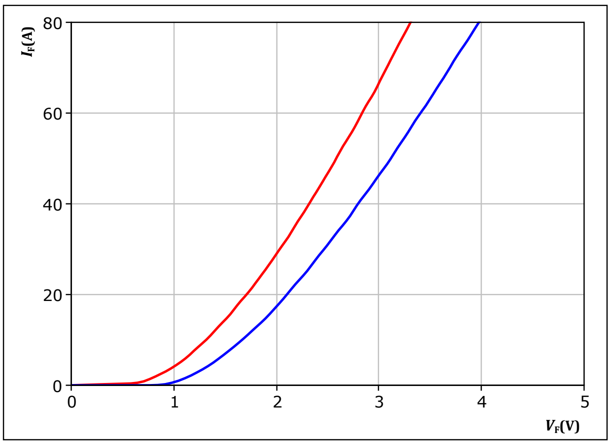
I_C =	30	A
T_j =	25	°C

PFC Diode Characteristics

figure 14. FWD

Typical forward characteristics

I_F = f(V_F)



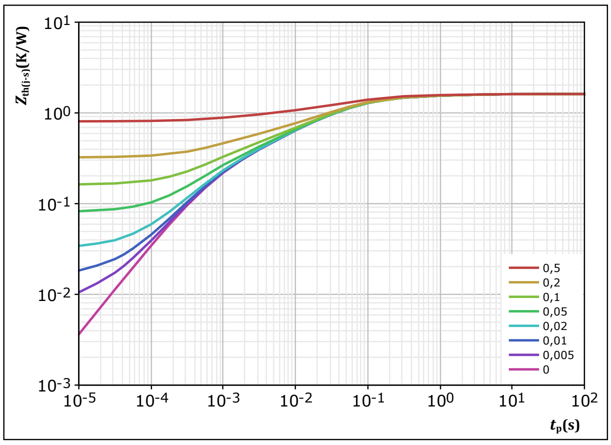
t_p = 250 μs

T_j: 25 °C, 125 °C

figure 15. FWD

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,615 K/W

FWD thermal model values

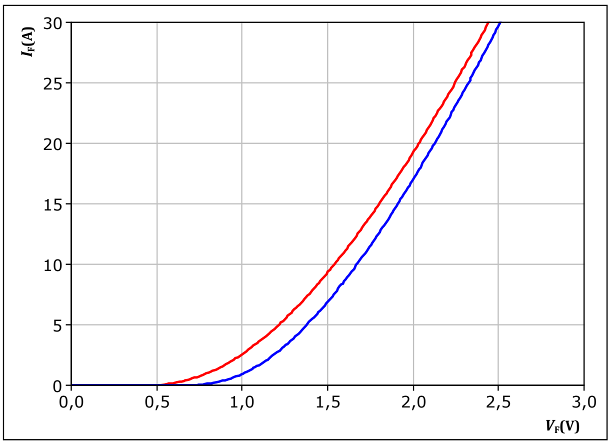
R (K/W)	τ (s)
6,26E-02	3,75E+00
1,57E-01	4,48E-01
5,80E-01	7,07E-02
4,30E-01	1,76E-02
2,34E-01	3,12E-03
1,51E-01	5,87E-04

PFC Sw. Protection Diode Characteristics

figure 16. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



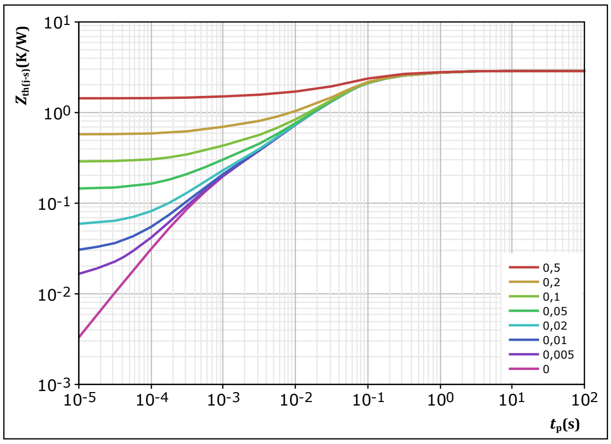
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 17. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 2,874 K/W

FWD thermal model values

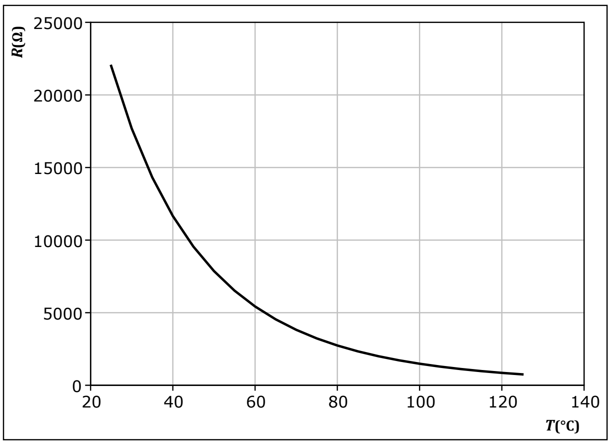
R (K/W)	τ (s)
2,86E-01	1,08E+00
5,75E-01	1,73E-01
1,57E+00	4,54E-02
3,05E-01	5,64E-03
1,34E-01	5,58E-04

Thermistor Characteristics

figure 18. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

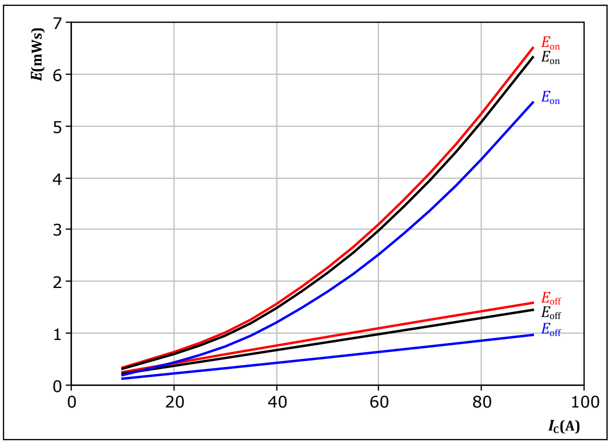


Inverter Switching Characteristics

figure 19. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



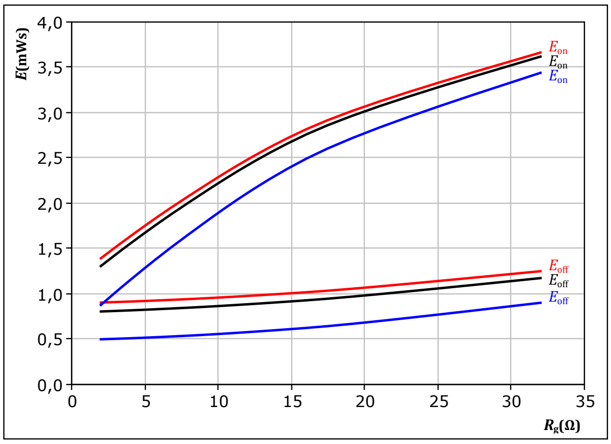
With an inductive load at

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

figure 20. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



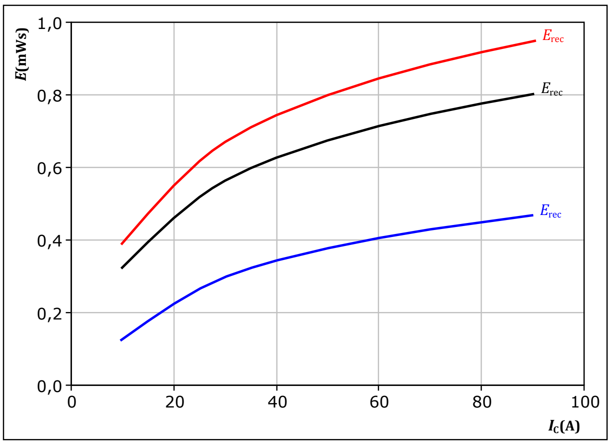
With an inductive load at

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

figure 21. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



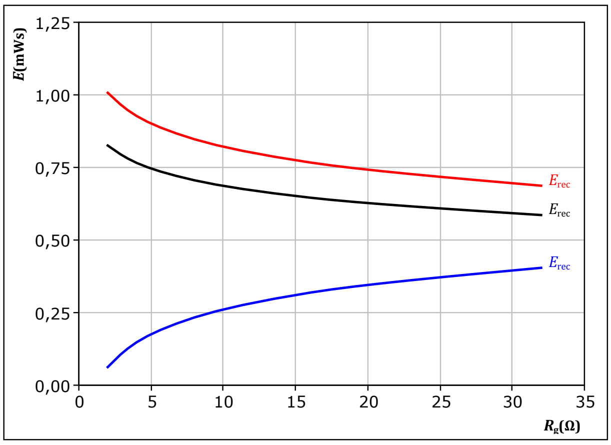
With an inductive load at

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

figure 22. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

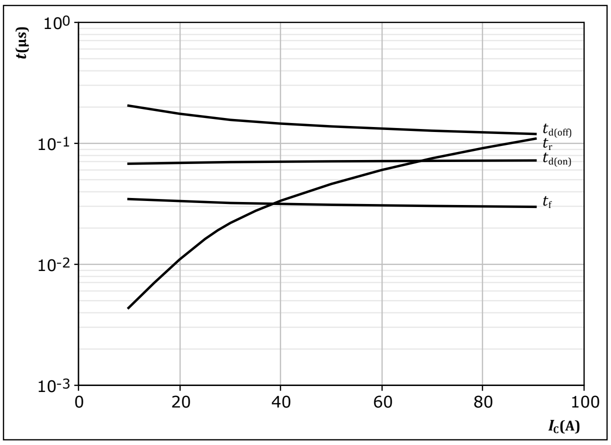
V_{CE} =	350	V		25 °C
V_{GE} =	±15	V	T_j:	125 °C
I_C =	50	A		150 °C

Inverter Switching Characteristics

figure 23. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



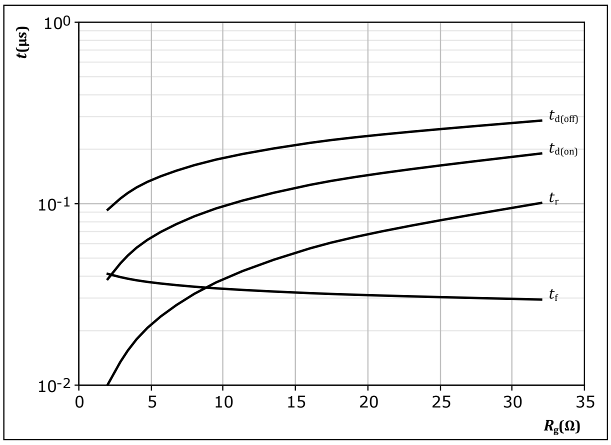
With an inductive load at

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 gate resistor

t = f(R_g)



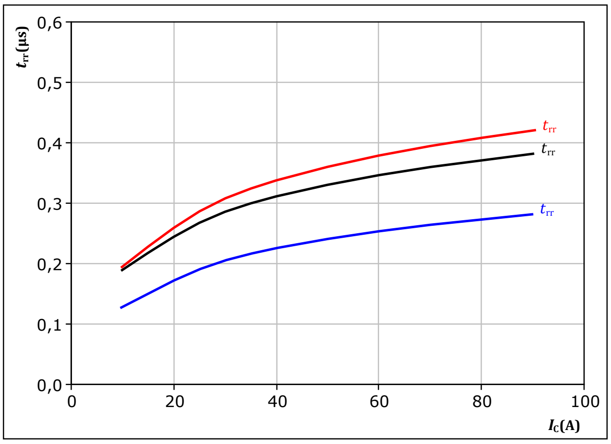
With an inductive load at

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

figure 25. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

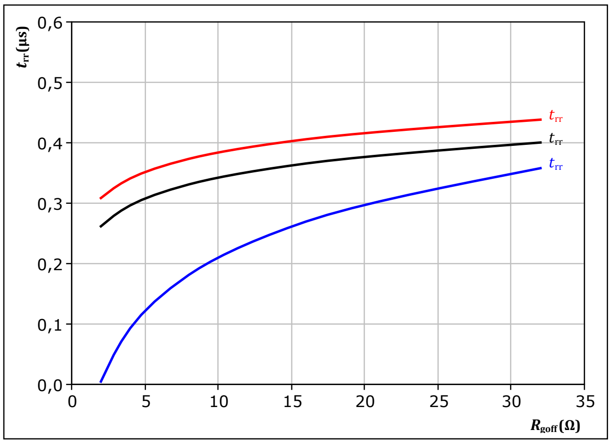
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 26. **FWD**

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

t_{rr} = f(R_{goff})



With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	50	A

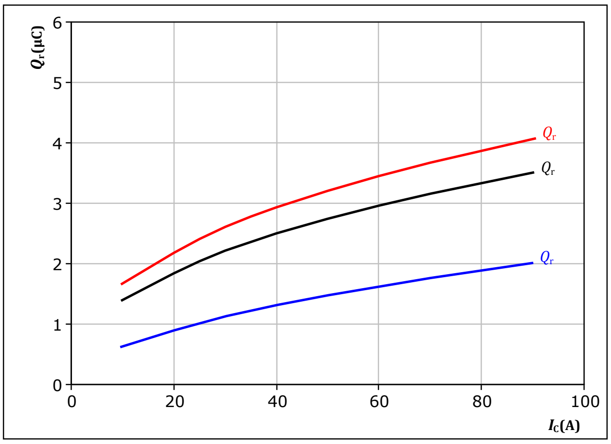
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 27. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



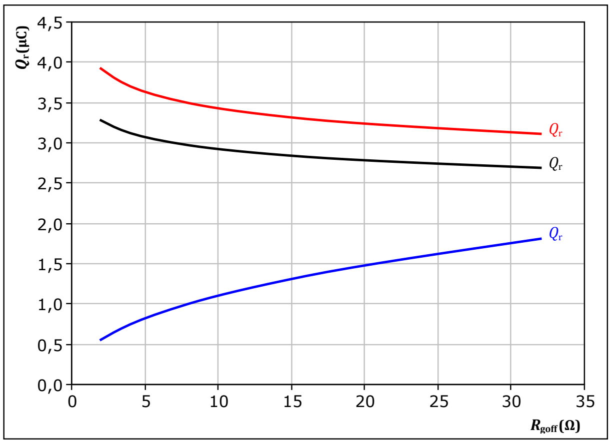
With an inductive load at

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 turn off gate resistor

Q_r = f(R_{goff})



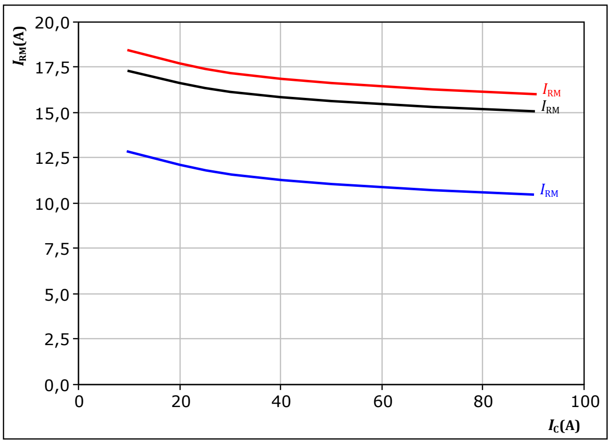
With an inductive load at

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

figure 29. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



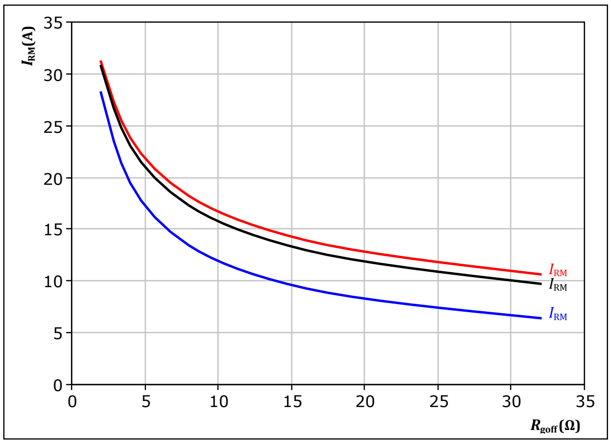
With an inductive load at

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 turn off gate resistor

I_{RM} = f(R_{goff})



With an inductive load at

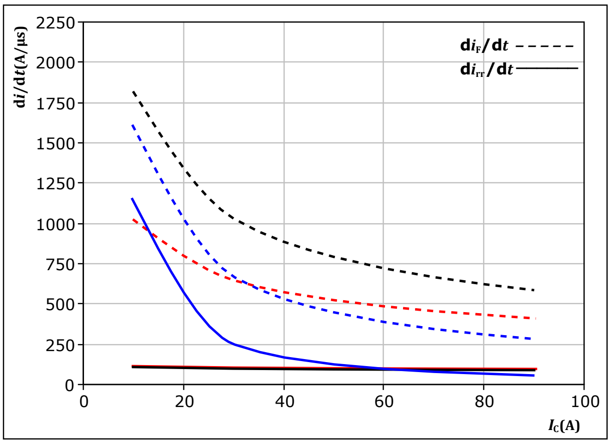
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	50	A		150 °C

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)



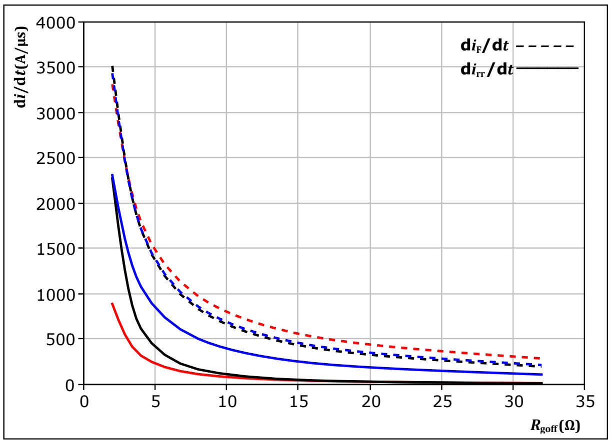
With an inductive load at

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

figure 32. **FWD**

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

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



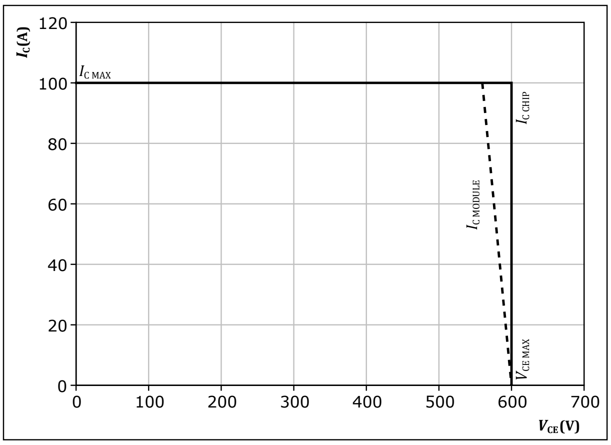
With an inductive load at

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

figure 33. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



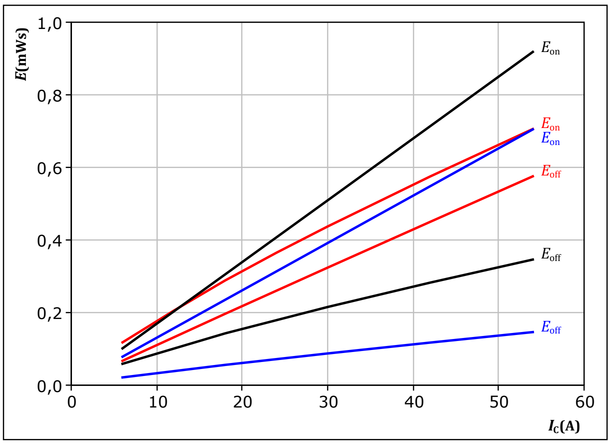
At	T_j =	150	°C
	R_{gon} =	8	Ω
	R_{goff} =	8	Ω

PFC Switching Characteristics

figure 34. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



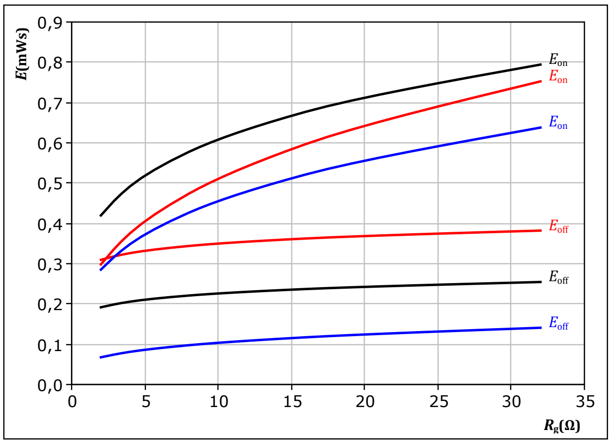
With an inductive load at

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

figure 35. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



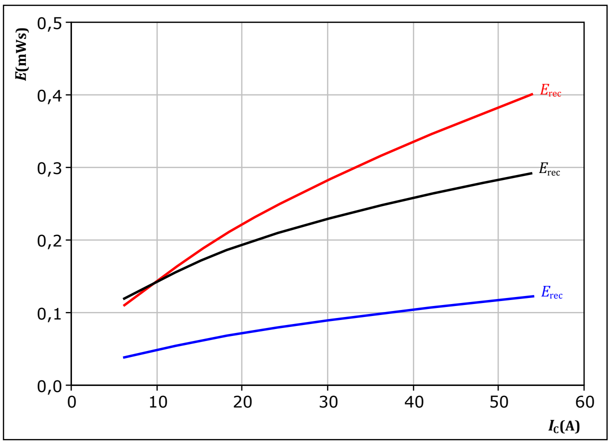
With an inductive load at

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

figure 36. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



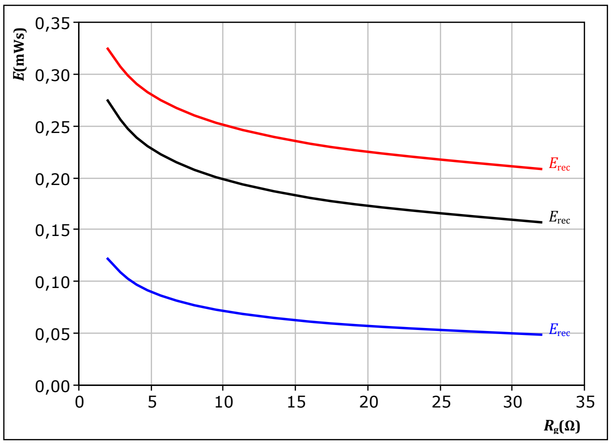
With an inductive load at

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

figure 37. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

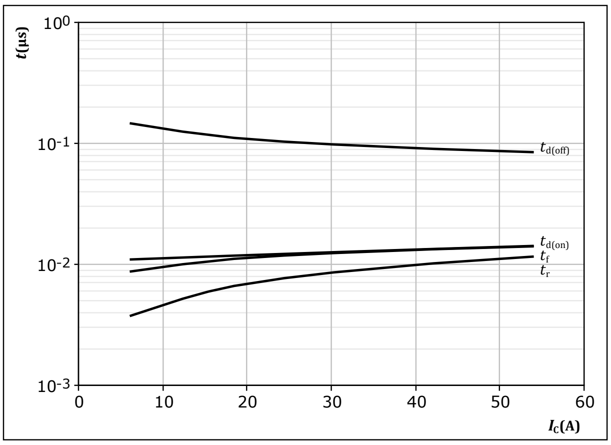
V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	30	A		150 °C

PFC Switching Characteristics

figure 38. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



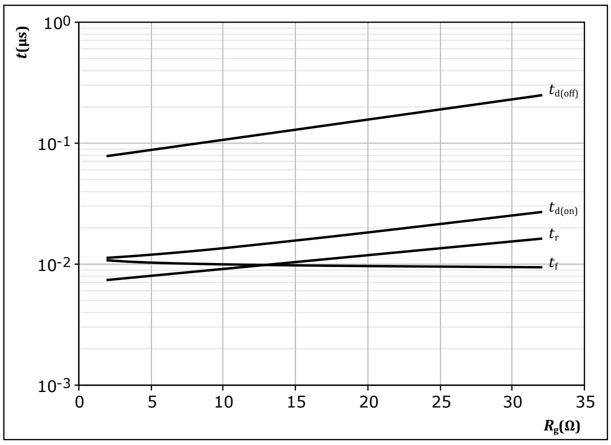
With an inductive load at

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

figure 39. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



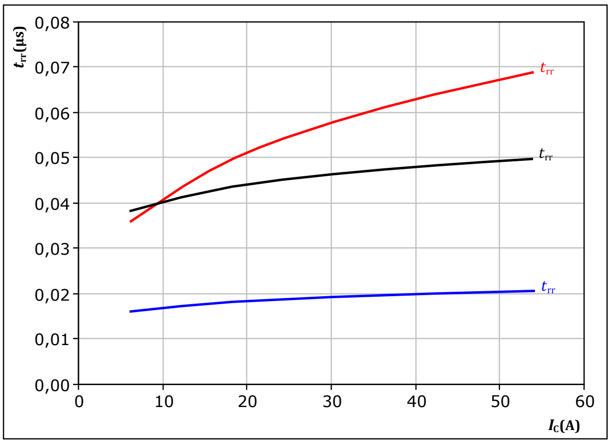
With an inductive load at

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

figure 40. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

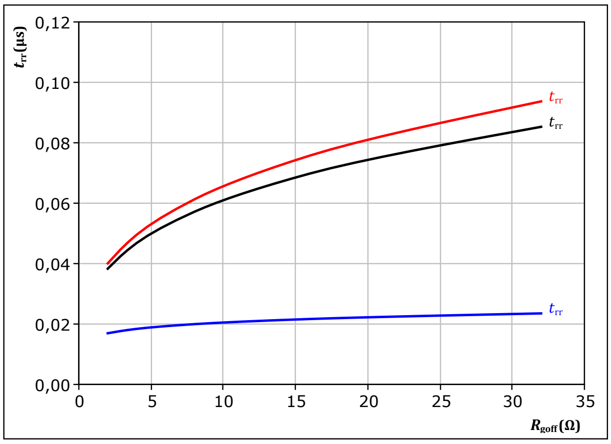
V_{CE} =	400	V
V_{GE} =	0/15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 41. **FWD**

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

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



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

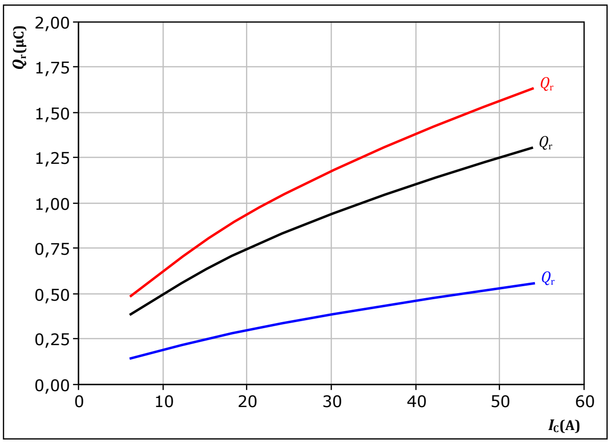
Vincotech

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

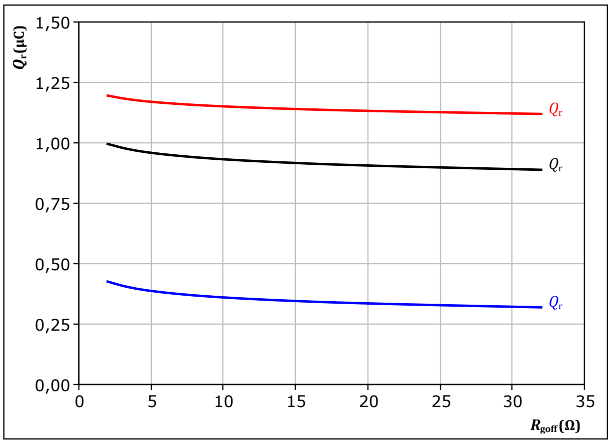
V_{CE} =	400	V	
V_{GE} =	0/15	V	
R_{gon} =	8	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 43. **FWD**

Typical recovered charge as a function of turn off gate resistor

Q_r = f(R_{goff})



With an inductive load at

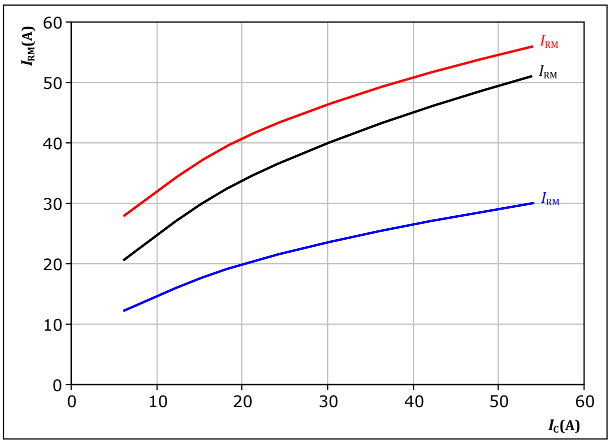
V_{CE} =	400	V	
V_{GE} =	0/15	V	
I_C =	30	A	

T_j: 25 °C, 125 °C, 150 °C

figure 44. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



With an inductive load at

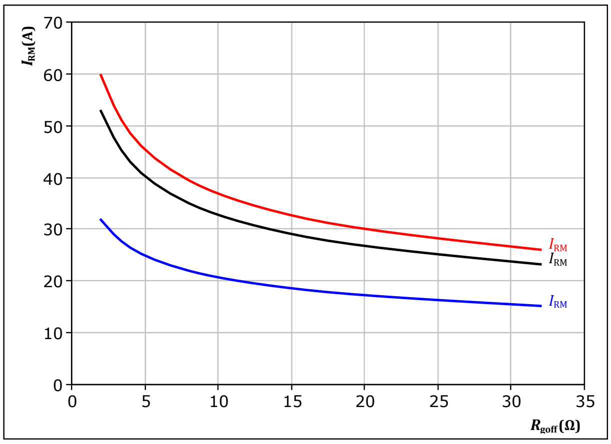
V_{CE} =	400	V	
V_{GE} =	0/15	V	
R_{gon} =	8	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 45. **FWD**

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

I_{RM} = f(R_{goff})



With an inductive load at

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

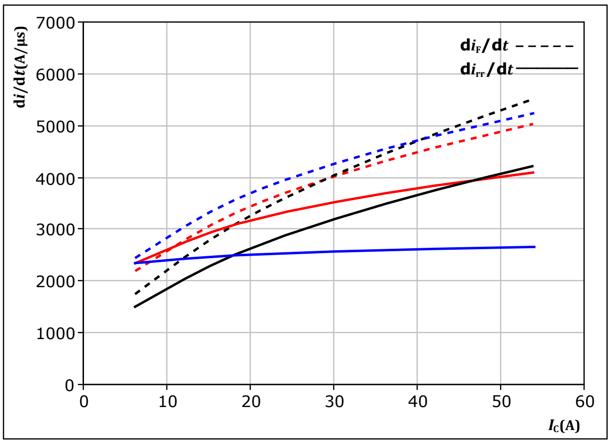
T_j: 25 °C, 125 °C, 150 °C

PFC Switching Characteristics

figure 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)



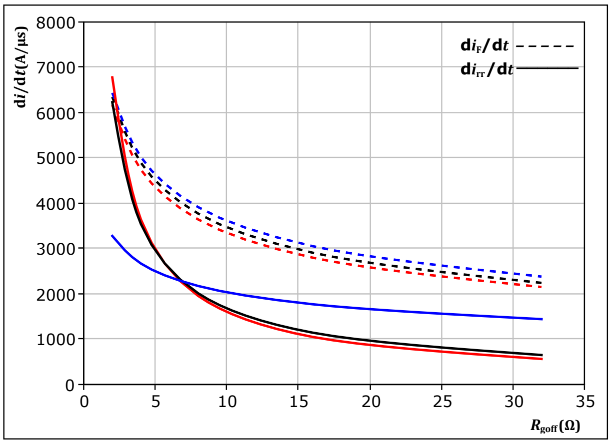
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	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 off gate resistor

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



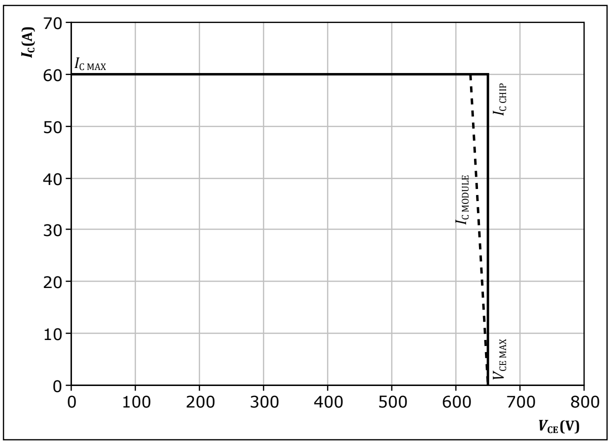
With an inductive load at

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

figure 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})

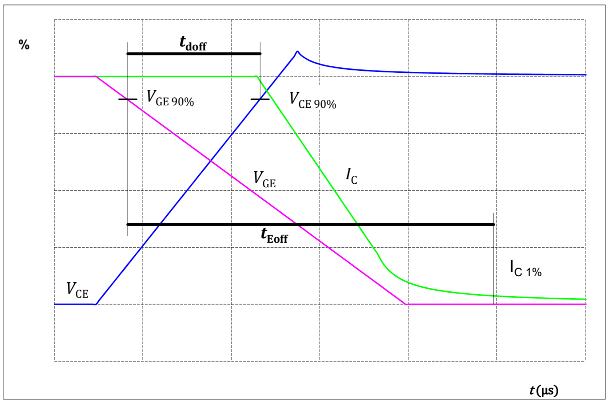


figure 50.	IGBT

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

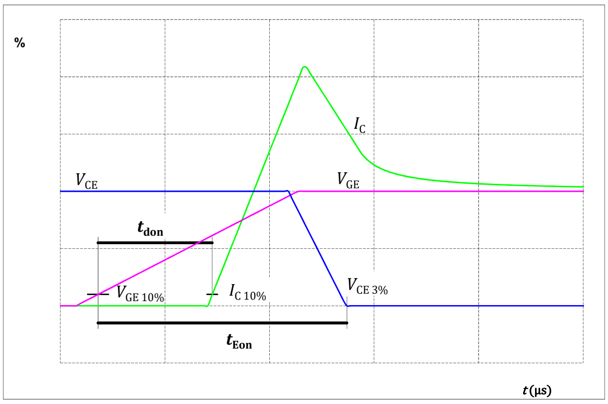


figure 51.	IGBT

Turn-off Switching Waveforms & definition of t_f

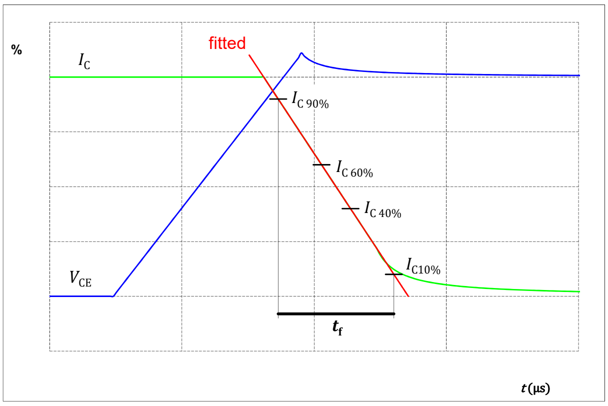
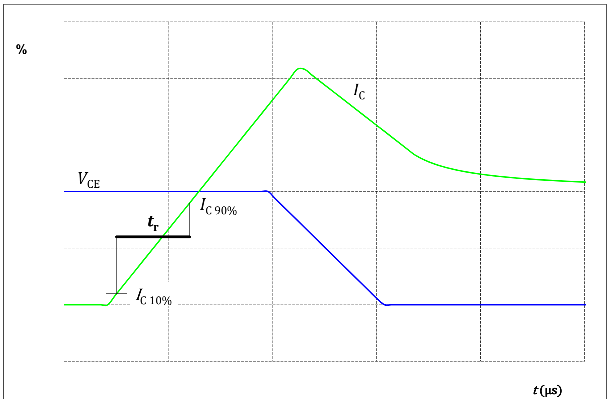


figure 52.	IGBT

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 53.	FWD

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

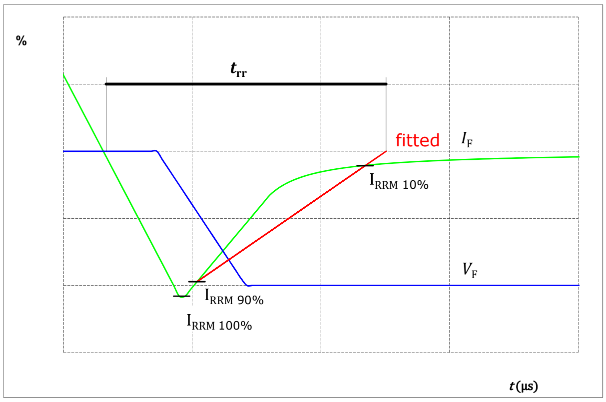
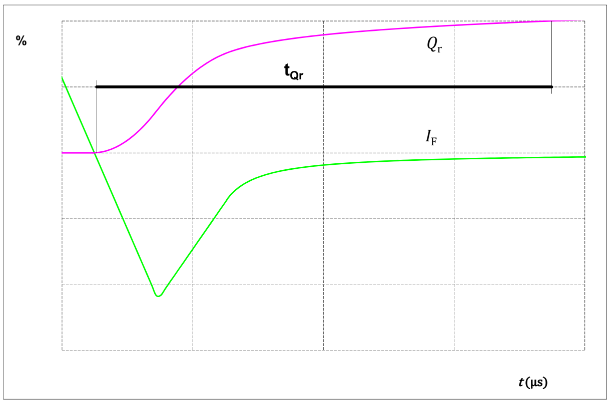


figure 54.	FWD

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



10-PG06PPA050SJ02-LH94E08T

datasheet

Vincotech

Ordering Code

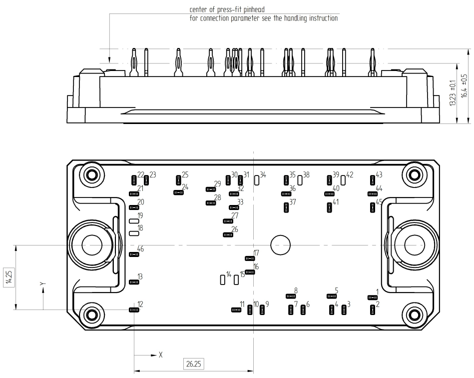
Version	Ordering Code
Without thermal paste	10-PG06PPA050SJ02-LH94E08T
With thermal paste (5,2 W/mK, PTM6000HV)	10-PG06PPA050SJ02-LH94E08T-/7/
With thermal paste (3,4 W/mK, PSX-P7)	10-PG06PPA050SJ02-LH94E08T-/3/

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	

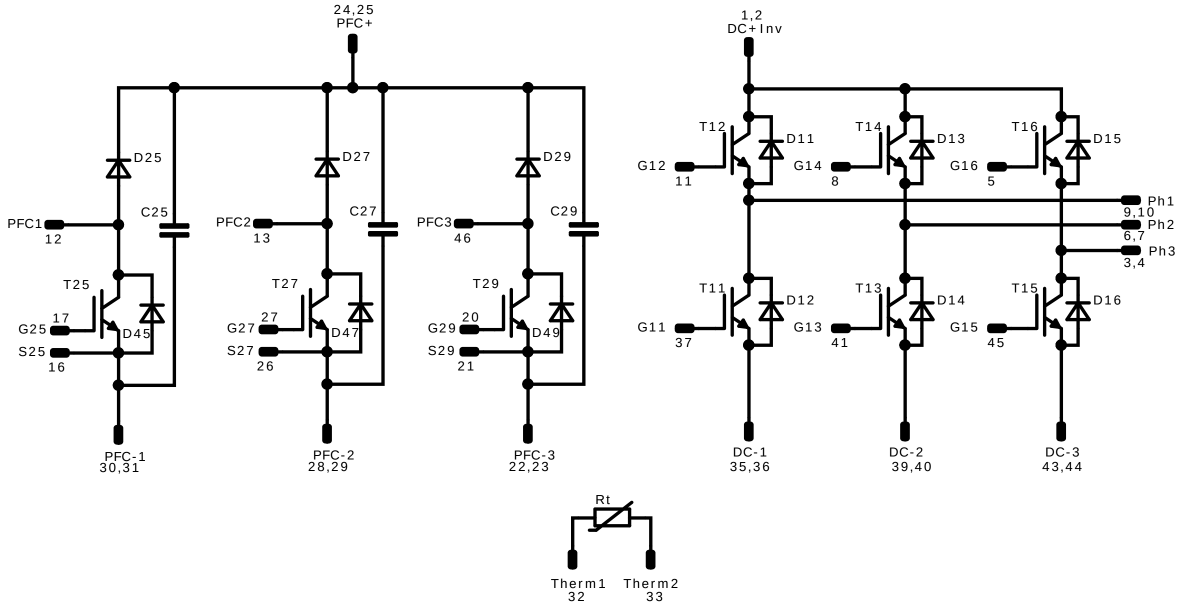
Outline

Pin table [mm]			
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	not assembled		
15	not assembled		
16	25,5	8,3	S25
17	25,5	11,3	G25
18	not assembled		
19	not assembled		
20	0	22,5	G29
21	0	25,5	S29
22	0	28,5	PFC-3
23	2,7	28,5	PFC-3
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	PFC-2
29	16,9	26,5	PFC-2
30	20,7	28,5	PFC-1
31	23,4	28,5	PFC-1
32	22	25,5	Therm1
33	22	22,5	Therm2
34	not assembled		
35	33,5	28,5	DC-1
36	33,5	25,5	DC-1
37	33,5	22,5	G11
38	not assembled		
39	43	28,5	DC-2
40	43	25,5	DC-2
41	43	22,5	G13
42	not assembled		
43	52,5	28,5	DC-3
44	52,5	25,5	DC-3
45	52,5	22,5	G15
46	0	12,2	PFC3



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

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	600 V	50 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	600 V	30 A	Inverter Diode	
T25, T27, T29	IGBT	650 V	30 A	PFC Switch	
D25, D27, D29	FWD	650 V	30 A	PFC Diode	
D45, D47, D49	FWD	650 V	10 A	PFC Sw. Protection Diode	
C25, C27, C29	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 certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-PG06PPA050SJ02-LH94E08T-D3-14	26 Sep. 2021	New Datasheet format, module is unchanged Update Rth of Inverter Switch	

单击下面可查看定价，库存，交付和生命周期等信息

>>Vincotech(威科)