10-FY07ZAB075SM-L515B08
datasheet

***flow*RPI 1** **650 V / 75 A**

Topology features

- Rectifier + Dual Booster + H-Bridge
- Kelvin Emitter for improved switching performance
- Open Emitter configuration
- Temperature sensor

Component features

- High efficiency in hard switching and resonant topologies
- High speed switching
- Low gate charge

Housing features

- Base isolation: Al_2O_3
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Solder pin

Extra features

- Wide input voltage range rated PFC

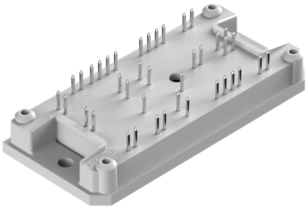
Target applications

- UPS
- Welding & Cutting

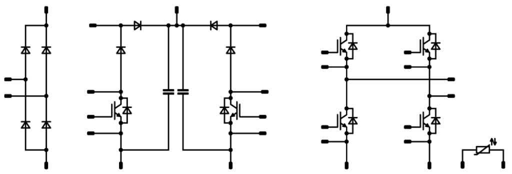
Types

- 10-FY07ZAB075SM-L515B08

flow 1 12 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
H-Bridge Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	53	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		225	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	90	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C
H-Bridge Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	65	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	86	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	60	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	100	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	55	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	76	W
Maximum junction temperature	T_{jmax}			175	°C

PFC Sw. Protection Diode

Parameter	Symbol	Conditions		Value	Unit
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s <= 80 °C	20 (1)	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

(1) limited by I_{FRM}

Current Transformer Protection Diode

Parameter	Symbol	Conditions		Value	Unit
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s <= 80 °C	20 (2)	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

(2) limited by I_{FRM}

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Rectifier Diode					
Peak repetitive reverse voltage	V_{RRM}			1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	67	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	490	A
Surge current capability	I^2t			1200	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	78	W
Maximum junction temperature	T_{jmax}			150	°C
Capacitor (DC)					
Maximum DC voltage	V_{MAX}			630	V
Operation Temperature	T_{op}			-55 ... 125	°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				7,58	mm
Comparative Tracking Index	CTI			≥ 200	

*100 % tested in production

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	
H-Bridge Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00075	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125 150		1,67 1,84 1,89	2,22(3)	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		4300		pF
Output capacitance	C_{oes}							75		pF
Reverse transfer capacitance	C_{res}							16		pF
Gate charge	Q_g	V_{CC} = 520 V	15		75	25		166		nC
Thermal										
Thermal resistance junction to sink(4)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,06		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	-5/15	350	75	25 125 150		29,53 29,78 29,84		ns
Rise time	t_r					25 125 150		12,27 13,97 14,66		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		82,92 94,96 98		ns
Fall time	t_f					25 125 150		6,67 10,7 12,58		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=1,23 µC Q_{rFWD}=3,43 µC Q_{rFWD}=4,17 µC				25 125 150		0,671 1,04 1,16		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,451 0,646 0,69		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	
H-Bridge Diode										
Static										
Forward voltage	V_F				70	25 125 150		1,73 1,45 1,41	2,5(3)	V
Reverse leakage current	I_R	V_r = 650 V				25			15	µA
Thermal										
Thermal resistance junction to sink(4)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,11		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=5569 A/µs di/dt=5192 A/µs di/dt=5414 A/µs	-5/15	350	75	25 125 150		78,79 114,86 124,79		A
Reverse recovery time	t_{rr}					25 125 150		29,94 71 78,94		ns
Recovered charge	Q_r					25 125 150		1,23 3,43 4,17		µC
Reverse recovered energy	E_{rec}					25 125 150		0,235 0,751 0,914		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		7514,9 5605,79 5472,23		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 Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,001	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		100	25 125 150		1,73 1,94 2	2,22(3)	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}							6560		pF
Output capacitance	C_{oes}	f = 1 Mhz	0	25		25		97		pF
Reverse transfer capacitance	C_{res}							21		pF
Gate charge	Q_g	V_{CC} = 520 V	15		100	25		210		nC
Thermal										
Thermal resistance junction to sink(4)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,95		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 12,8 Ω R_{goff} = 12,8 Ω	0/15	400	95	25 125 150		40,96 38,94 38,52		ns
Rise time	t_r					25 125 150		23,31 26,07 26,62		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		293,82 317,1 322,72		ns
Fall time	t_f					25 125 150		26,35 12,42 14,51		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,717 μC Q_{rFWD}=2,36 μC Q_{rFWD}=2,98 μC				25 125 150		2,01 2,78 2,99		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,23 1,35 1,39		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(3)	V
Reverse leakage current	I_R	V_r = 600 V				25			25	µA
Thermal										
Thermal resistance junction to sink(4)	$R_{th(j\text{-}s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,25		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=2930 A/µs di/dt=3027 A/µs di/dt=2914 A/µs	0/15	400	95	25 125 150		40,58 60,44 67,86		A
Reverse recovery time	t_{rr}					25 125 150		32,94 67,95 74,07		ns
Recovered charge	Q_r					25 125 150		0,717 2,36 2,98		µC
Reverse recovered energy	E_{rec}					25 125 150		0,088 0,345 0,453		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4096,72 1499,32 1679,58		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				10	25 125	1,23	1,67 1,56	1,87(3)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,14	µA
Thermal										
Thermal resistance junction to sink(4)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,87		K/W
Current Transformer Protection Diode										
Static										
Forward voltage	V_F				10	25 125	1,23	1,67 1,56	1,87(3)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,14	µA
Thermal										
Thermal resistance junction to sink(4)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,87		K/W
Rectifier Diode										
Static										
Forward voltage	V_F				25	25 125		1 0,915	1,21(3) 1,1(3)	V
Reverse leakage current	I_R	V_r = 1600 V				25			50	µA
Thermal										
Thermal resistance junction to sink(4)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,9		K/W

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	
Capacitor (DC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		100		nF
Tolerance							-10		10	%
Dissipation factor		f = 1 kHz				25		2,5		%
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	

(3) Value at chip level

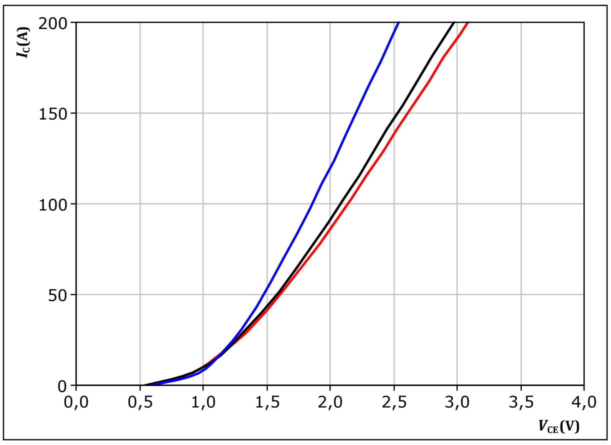
(4) Only valid with pre-applied Vincotech thermal interface material.

H-Bridge Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

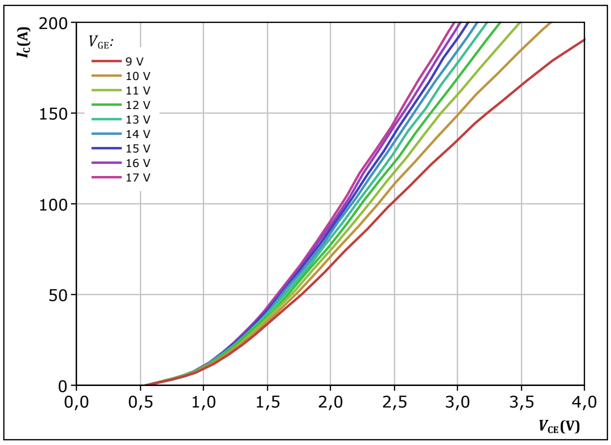


t_p =	250	μs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



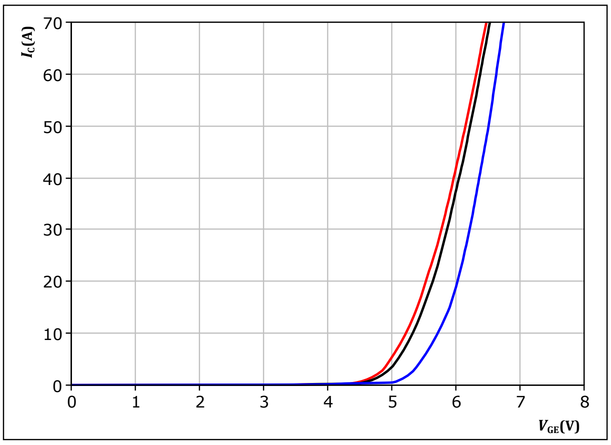
t_p =	250	μs
T_j =	150	°C

V_{GE} from 9 V to 17 V in steps of 1 V

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

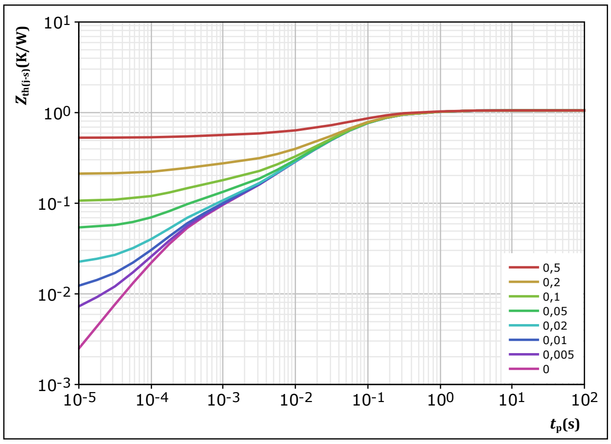


t_p =	250	μs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,057 K/W

IGBT thermal model values

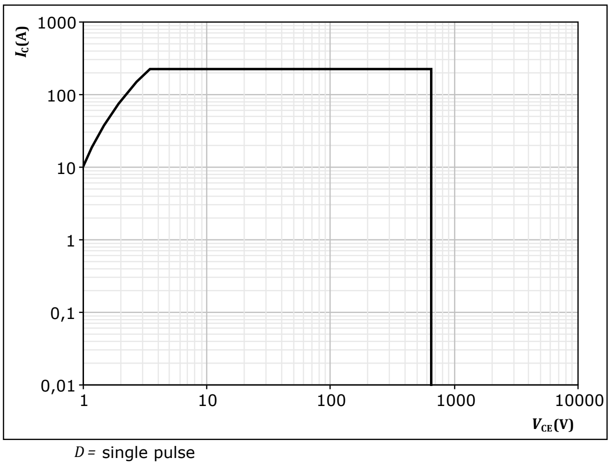
R (K/W)	τ (s)
1,05E-01	8,62E-01
2,95E-01	1,39E-01
4,07E-01	4,84E-02
1,50E-01	1,04E-02
3,75E-02	2,37E-03
6,12E-02	2,88E-04

H-Bridge Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})

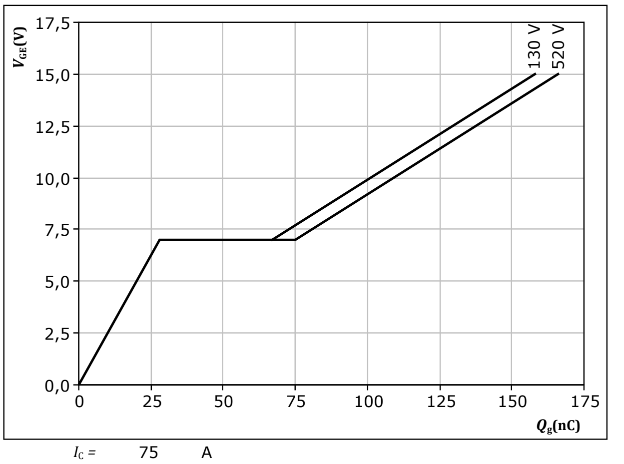


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 6. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



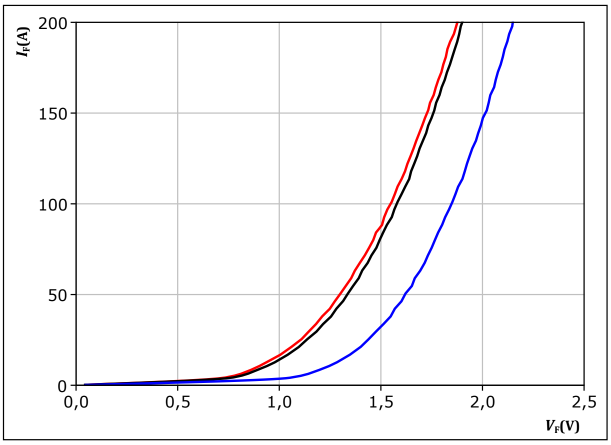
I_C =	75	A
T_j =	25	°C

H-Bridge Diode Characteristics

figure 7. FWD

Typical forward characteristics

$I_F = f(V_F)$



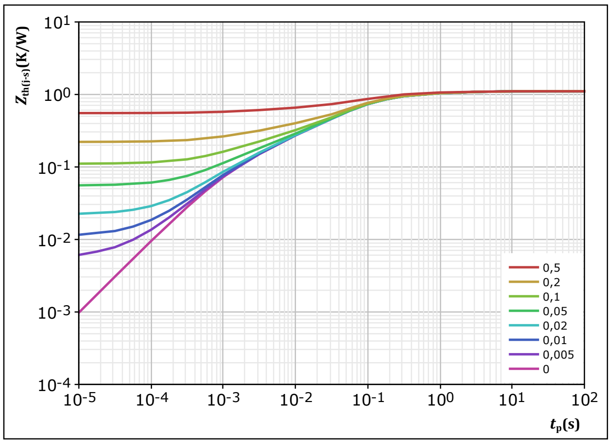
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 8. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 1,107 K/W

FWD thermal model values

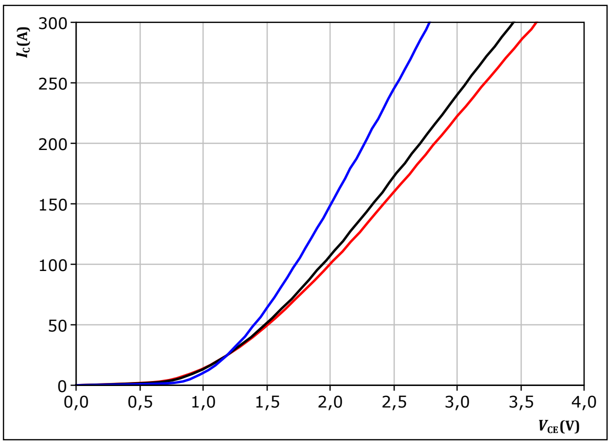
R (K/W)	τ (s)
8,97E-02	2,23E+00
2,36E-01	2,84E-01
5,62E-01	6,41E-02
1,48E-01	6,95E-03
6,99E-02	1,04E-03

PFC Switch Characteristics

figure 9. IGBT

Typical output characteristics

$I_C = f(V_{CE})$



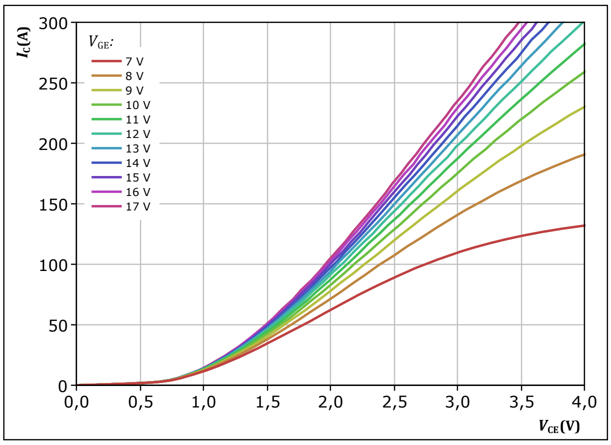
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 10. IGBT

Typical output characteristics

$I_C = f(V_{CE})$



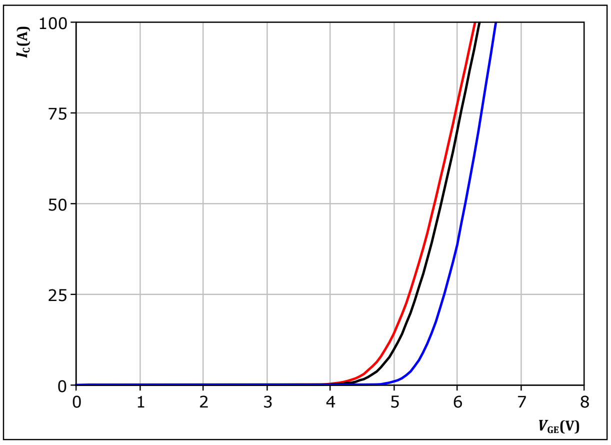
t_p =	250	µs
T_j =	150	°C

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

figure 11. IGBT

Typical transfer characteristics

$I_C = f(V_{GE})$



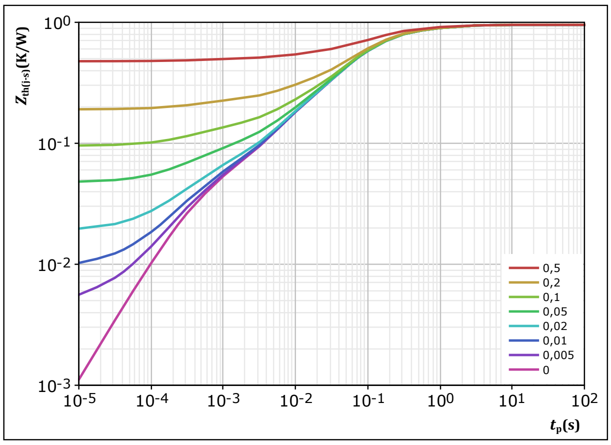
t_p =	250	µs
V_{CE} =	25	V

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	
$R_{th(j-s)}$ =	0,953	K/W

IGBT thermal model values

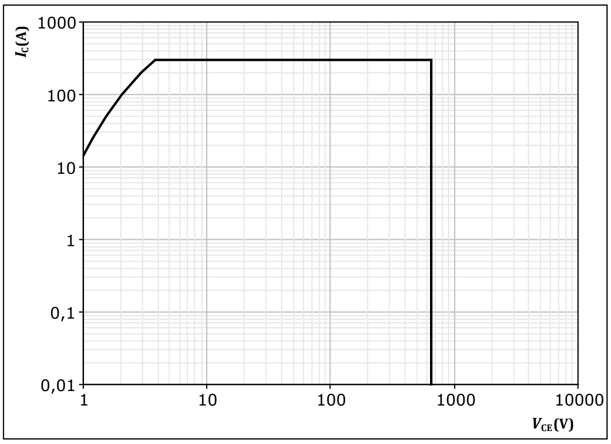
R (K/W)	τ (s)
1,15E-01	1,33E+00
2,84E-01	2,05E-01
4,21E-01	6,63E-02
9,73E-02	7,41E-03
3,65E-02	3,98E-04

PFC Switch Characteristics

figure 13.	IGBT

Safe operating area

I_C = f(V_{CE})

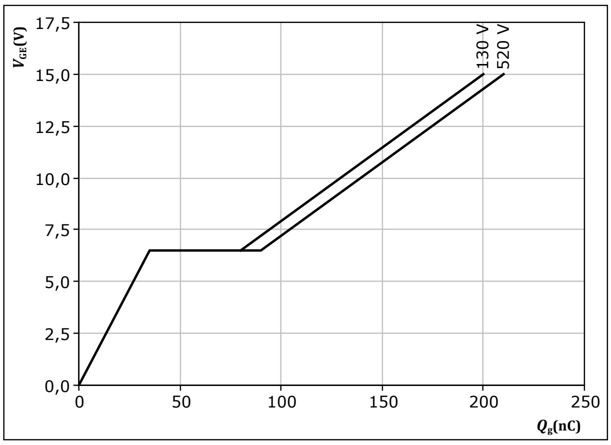


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 14.	IGBT

Gate voltage vs gate charge

V_{GE} = f(Q_g)



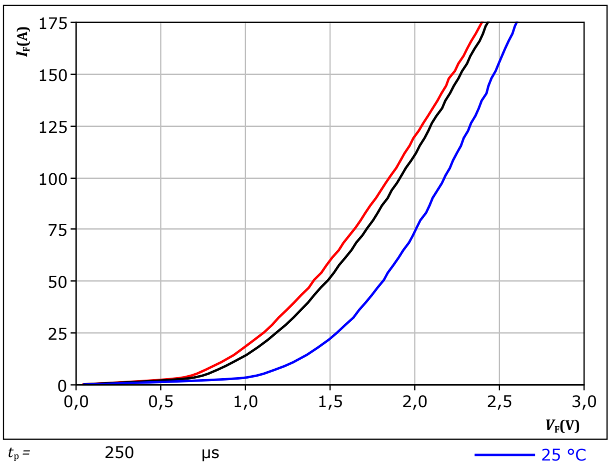
I_C =	100	A
T_j =	25	°C

PFC Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

I_F = f(V_F)



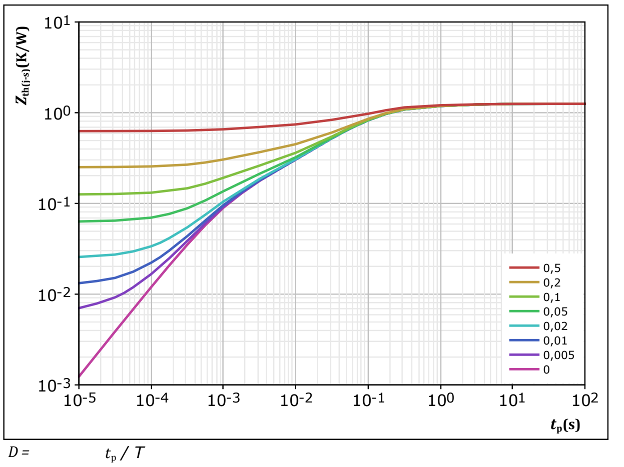
t_p = 250 µs

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

$R_{th(j-s)}$ = 1,254 K/W

FWD thermal model values

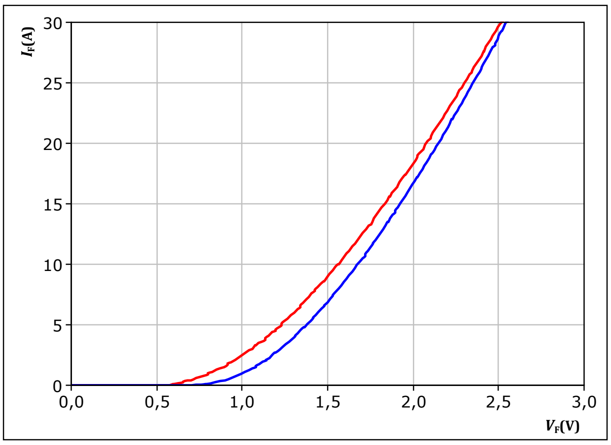
R (K/W)	τ (s)
6,51E-02	3,13E+00
1,82E-01	4,53E-01
6,95E-01	8,72E-02
2,01E-01	1,20E-02
1,12E-01	1,13E-03

PFC Sw. Protection Diode Characteristics

figure 17. FWD

Typical forward characteristics

$I_F = f(V_F)$



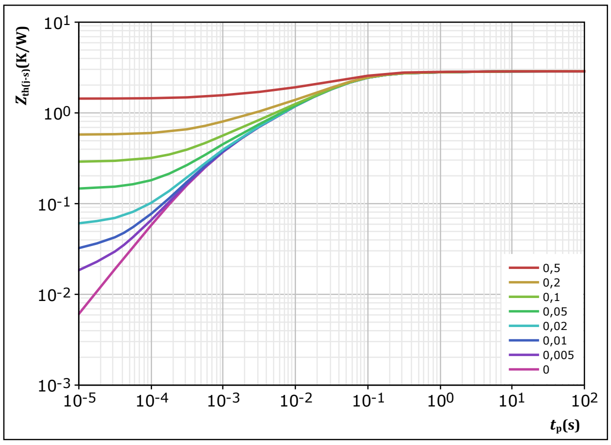
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 18. FWD

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 2,873 K/W

FWD thermal model values

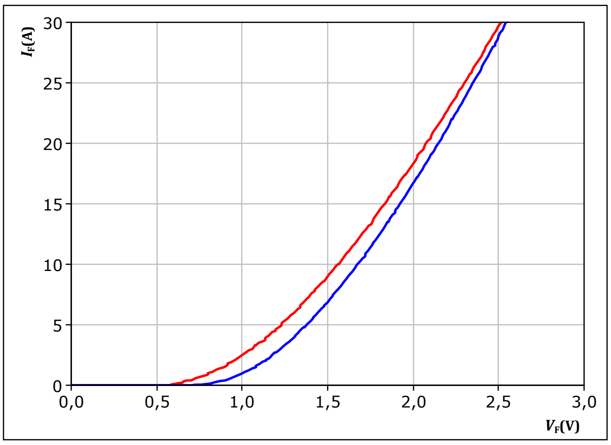
R (K/W)	τ (s)
6,53E-02	3,94E+00
1,48E-01	4,48E-01
1,31E+00	5,96E-02
7,32E-01	1,36E-02
4,04E-01	2,79E-03
2,11E-01	5,37E-04

Current Transformer Protection Diode Characteristics

figure 19. FWD

Typical forward characteristics

$I_F = f(V_F)$



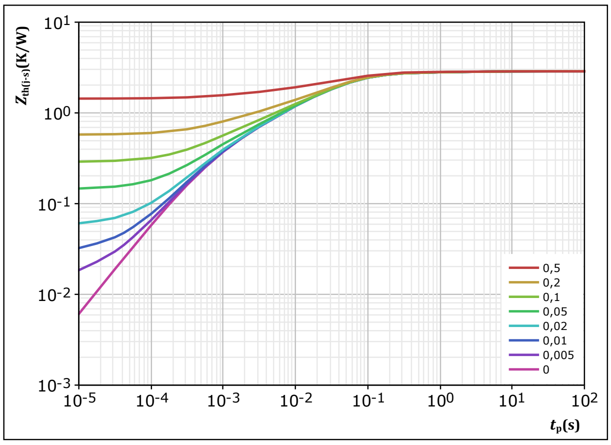
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 20. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 2,873 K/W

FWD thermal model values

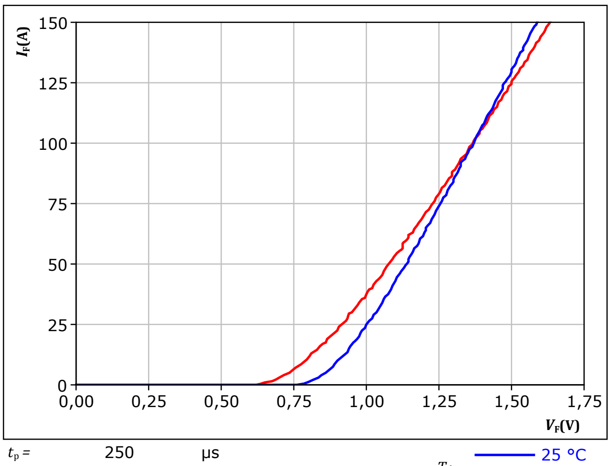
R (K/W)	τ (s)
6,53E-02	3,94E+00
1,48E-01	4,48E-01
1,31E+00	5,96E-02
7,32E-01	1,36E-02
4,04E-01	2,79E-03
2,11E-01	5,37E-04

Rectifier Diode Characteristics

figure 21. **Rectifier**

Typical forward characteristics

I_F = f(V_F)



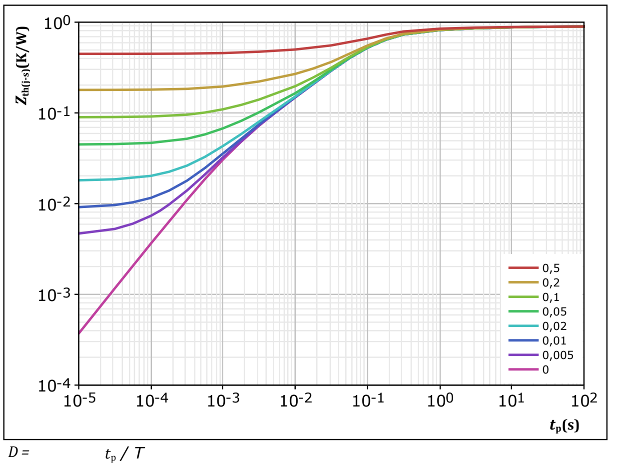
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 22. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,895 K/W

Rectifier thermal model values

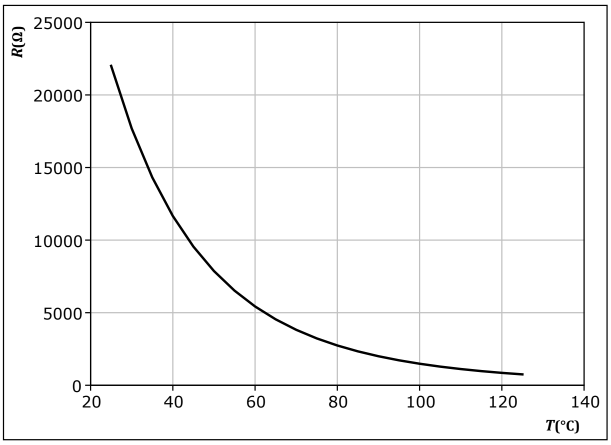
R (K/W)	τ (s)
3,53E-02	1,46E+01
8,25E-02	1,44E+00
2,22E-01	2,31E-01
4,39E-01	7,58E-02
8,14E-02	1,11E-02
3,58E-02	1,56E-03

Thermistor Characteristics

figure 23.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

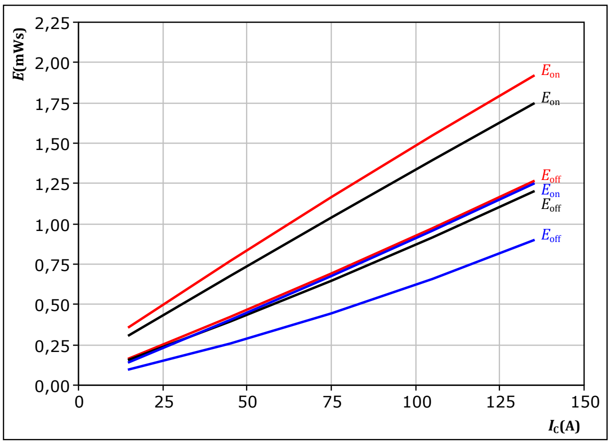


H-Bridge Switching Characteristics

figure 24. **IGBT**

Typical switching energy losses as a function of collector current

E = f(I_C)



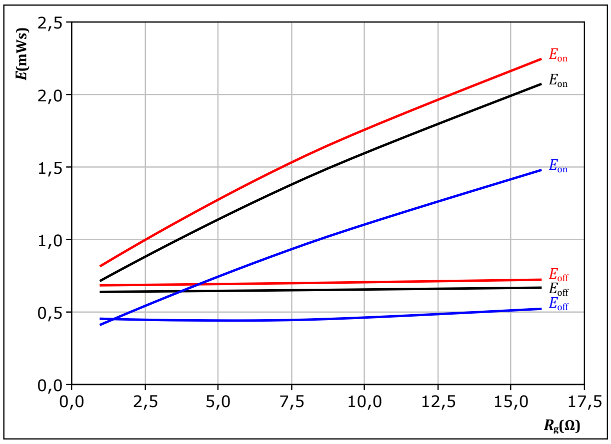
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	
V_{GE} =	-5/15	V		125 °C	
R_{gon} =	4	Ω		150 °C	
R_{goff} =	4	Ω			

figure 25. **IGBT**

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

E = f(R_g)



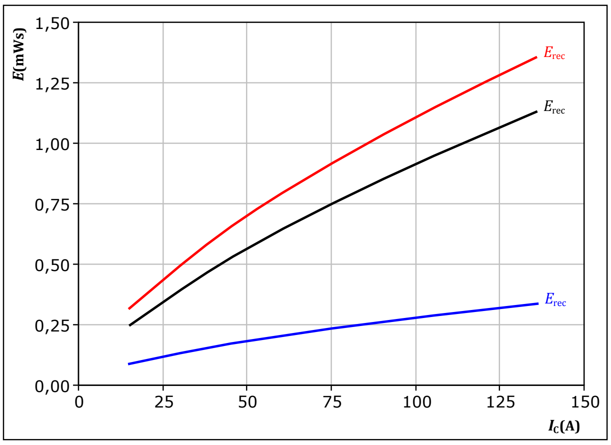
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	75	A		150 °C

figure 26. **FWD**

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



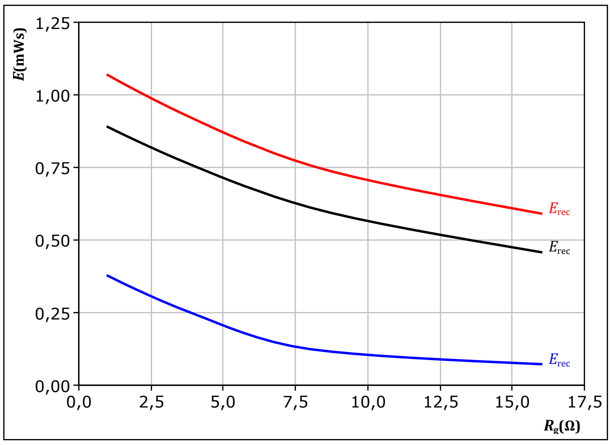
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 27. **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

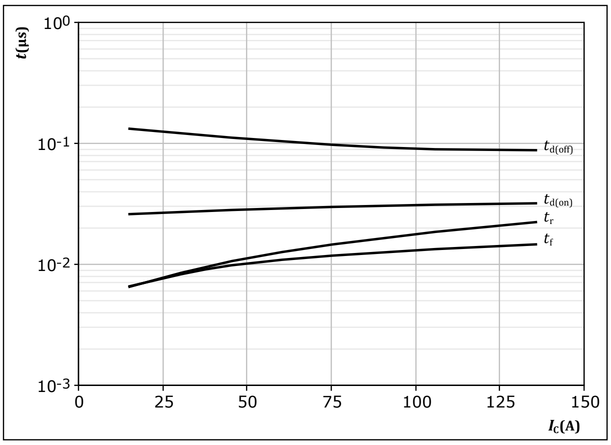
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	75	A		150 °C

H-Bridge Switching Characteristics

figure 28. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



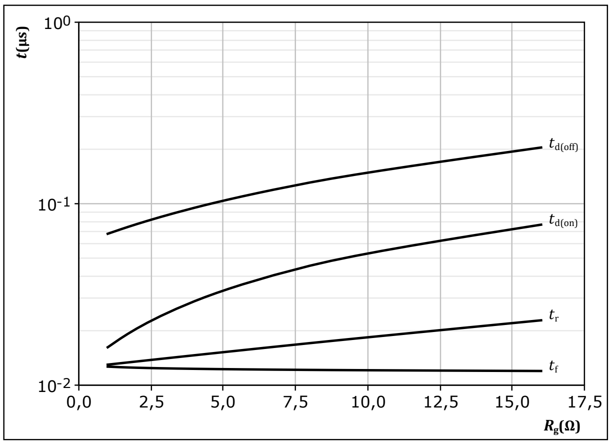
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 29. **IGBT**

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

t = f(R_g)



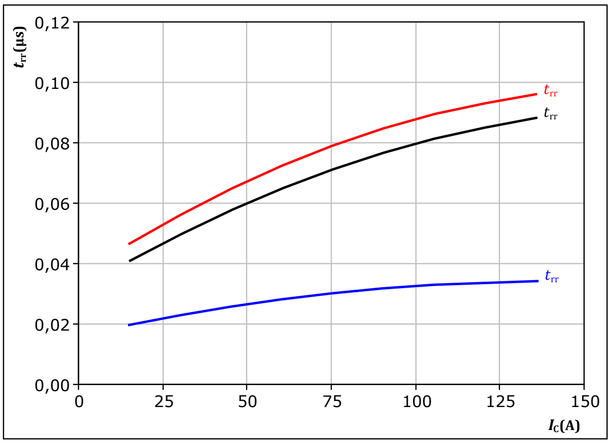
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	75	A

figure 30. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

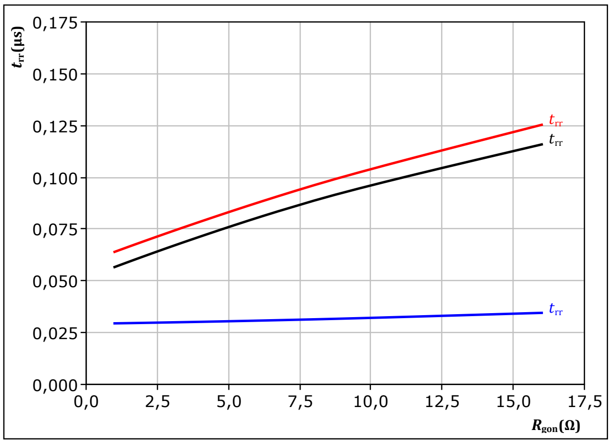
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 31. **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 =	75	A

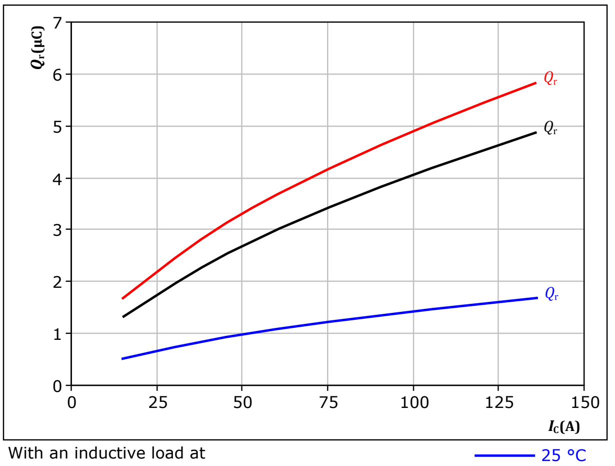
T_j: 25 °C, 125 °C, 150 °C

H-Bridge Switching Characteristics

figure 32. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



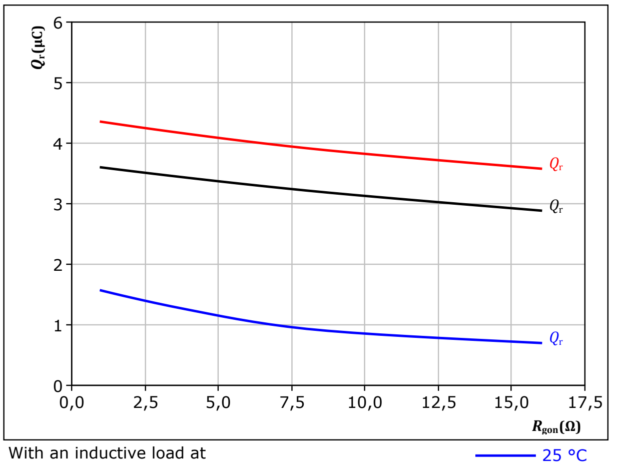
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 33. **FWD**

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

Q_r = f(R_{gon})



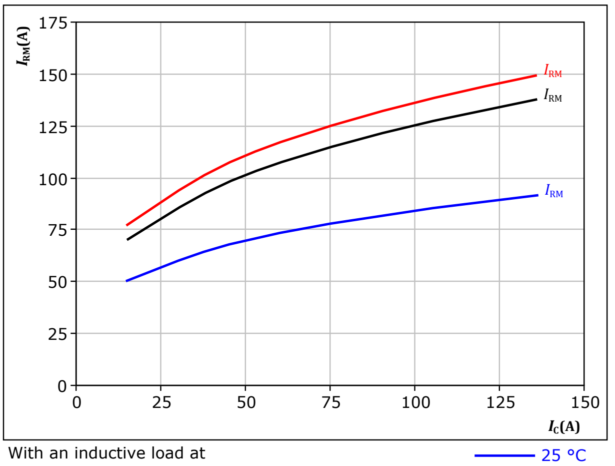
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	75	A		150 °C

figure 34. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



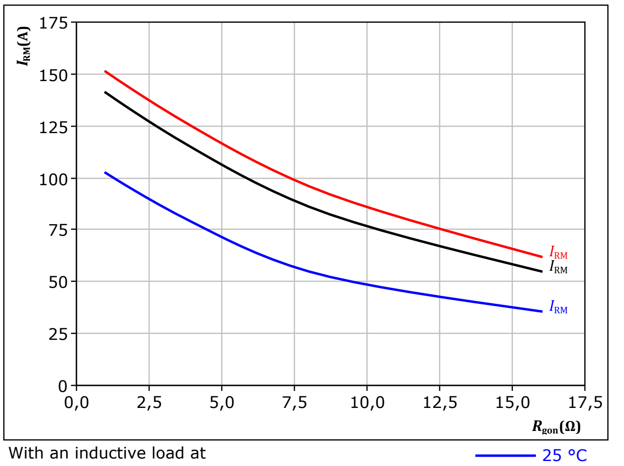
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 35. **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

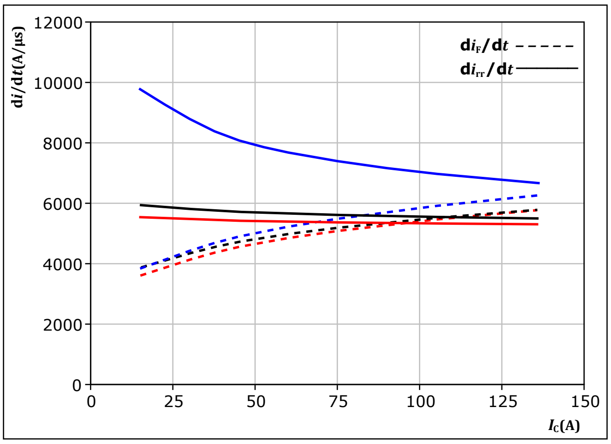
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	75	A		150 °C

H-Bridge Switching Characteristics

figure 36. **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)



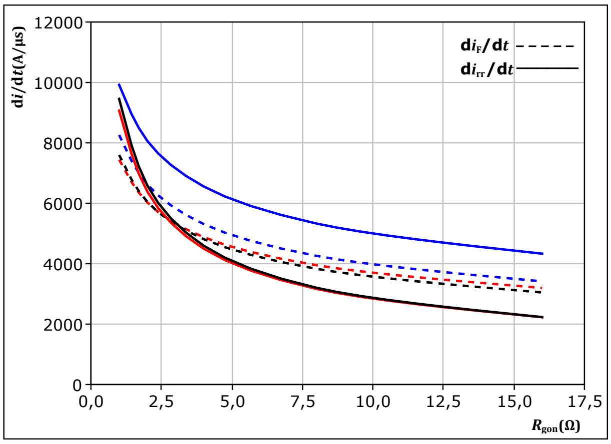
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C / 125 °C / 150 °C
V_{GE} =	-5/15	V	
R_{gon} =	4	Ω	

figure 37. **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})



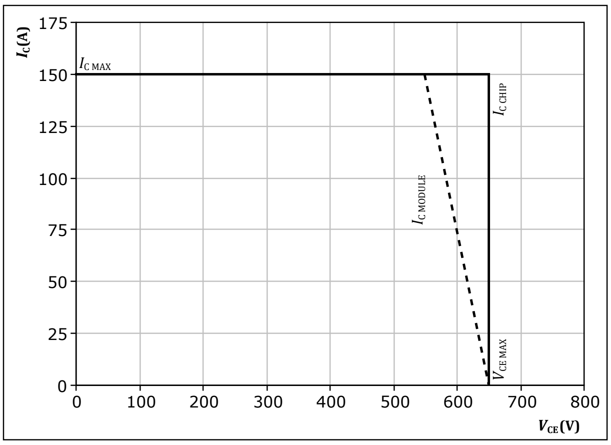
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C / 125 °C / 150 °C
V_{GE} =	-5/15	V	
I_C =	75	A	

figure 38. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



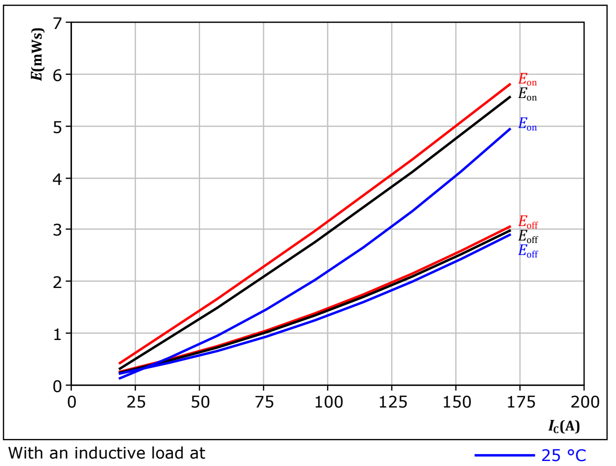
At	T_j =	150	°C
	R_{gon} =	4	Ω
	R_{goff} =	4	Ω

PFC Switching Characteristics

figure 39. IGBT

Typical switching energy losses as a function of collector current

E = f(I_C)



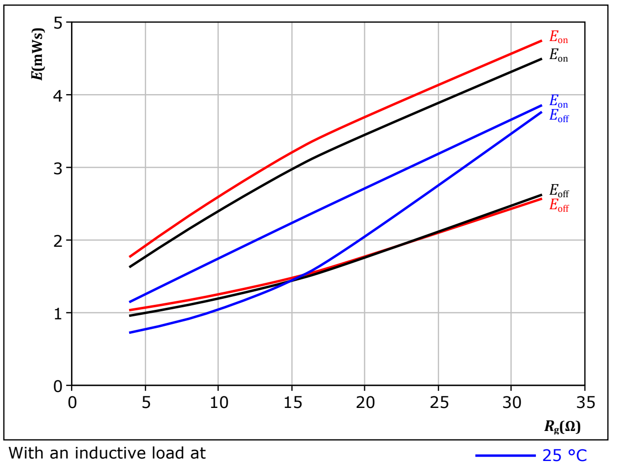
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	12,8	Ω		150 °C
R_{goff} =	12,8	Ω		

figure 40. IGBT

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

E = f(R_g)



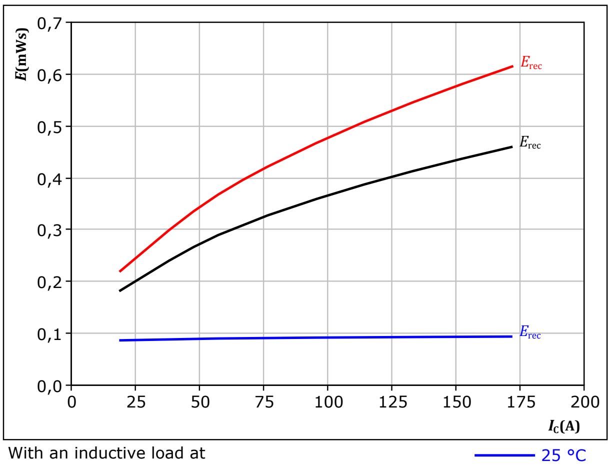
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	95	A		150 °C

figure 41. FWD

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



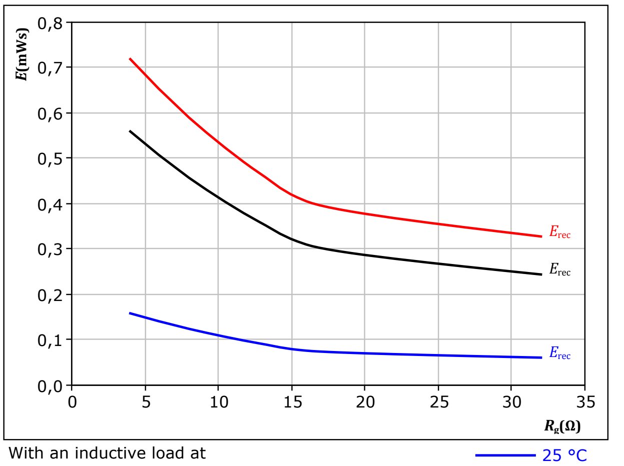
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	12,8	Ω		150 °C

figure 42. 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

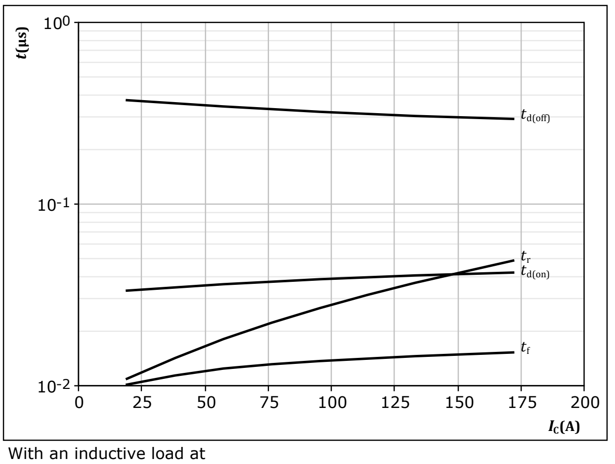
V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	95	A		150 °C

PFC Switching Characteristics

figure 43. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



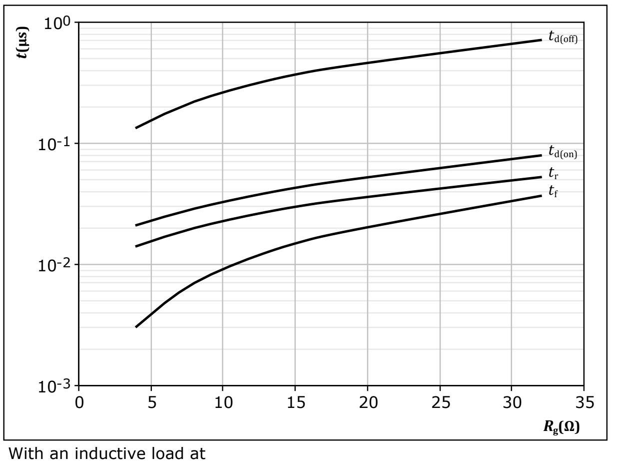
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	0/15	V
R_{gon} =	12,8	Ω
R_{goff} =	12,8	Ω

figure 44. **IGBT**

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

t = f(R_g)



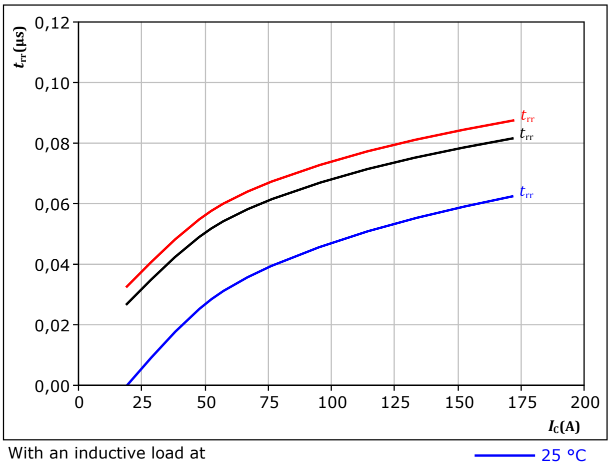
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	0/15	V
I_C =	95	A

figure 45. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

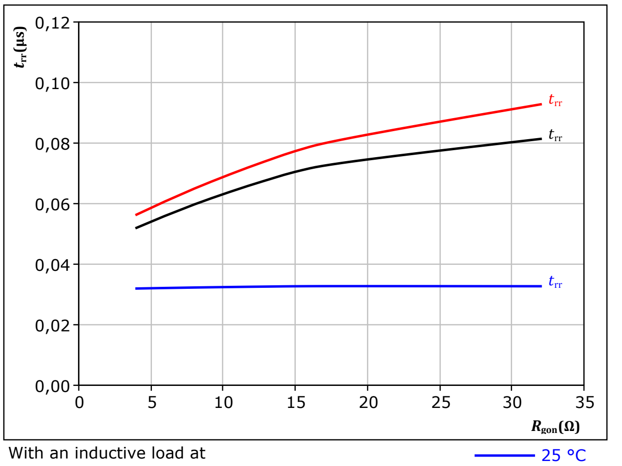
V_{CE} =	400	V
V_{GE} =	0/15	V
R_{gon} =	12,8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 46. **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 =	95	A

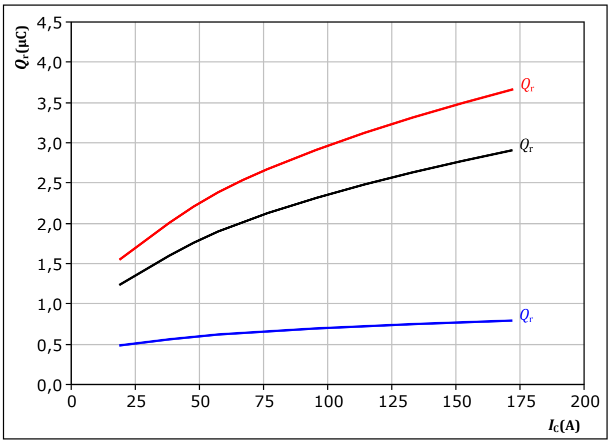
T_j: 25 °C, 125 °C, 150 °C

PFC Switching Characteristics

figure 47. FWD

Typical recovered charge as a function of collector current

Q_r = f(I_C)



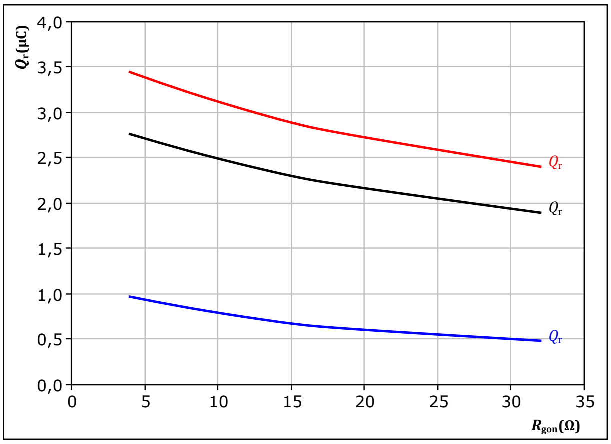
With an inductive load at

			T_j:
V_{CE} =	400	V	25 °C
V_{GE} =	0/15	V	125 °C
R_{gon} =	12,8	Ω	150 °C

figure 48. FWD

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

Q_r = f(R_{gon})



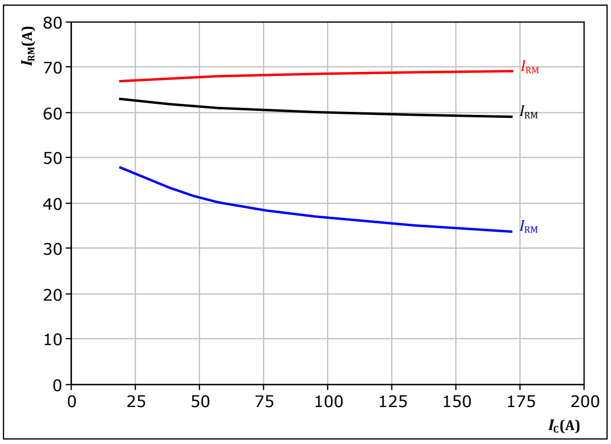
With an inductive load at

			T_j:
V_{CE} =	400	V	25 °C
V_{GE} =	0/15	V	125 °C
I_C =	95	A	150 °C

figure 49. FWD

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



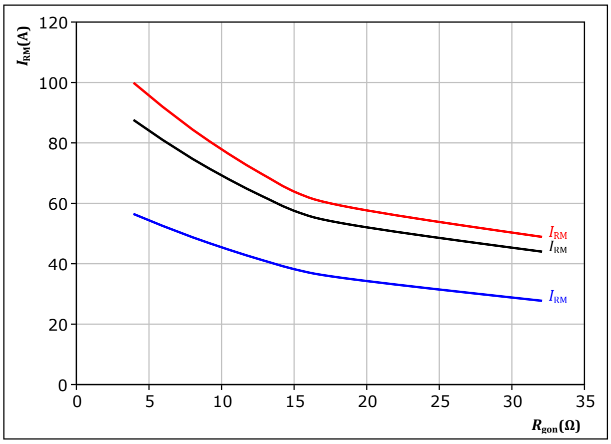
With an inductive load at

			T_j:
V_{CE} =	400	V	25 °C
V_{GE} =	0/15	V	125 °C
R_{gon} =	12,8	Ω	150 °C

figure 50. FWD

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

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



With an inductive load at

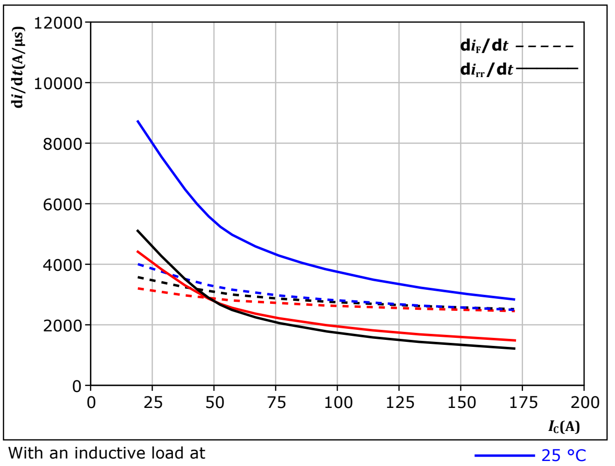
			T_j:
V_{CE} =	400	V	25 °C
V_{GE} =	0/15	V	125 °C
I_C =	95	A	150 °C

PFC Switching Characteristics

figure 51. **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)



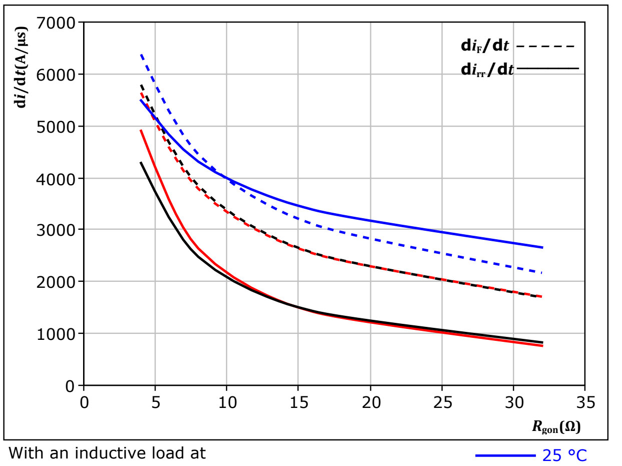
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	12,8	Ω		150 °C

figure 52. **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})



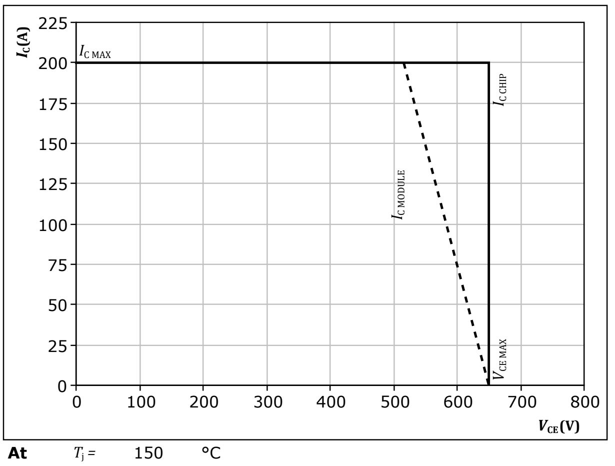
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	95	A		150 °C

figure 53. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At	T_j =	150	°C
	R_{gon} =	12,8	Ω
	R_{goff} =	12,8	Ω

Switching Definitions

figure 54. **IGBT**

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

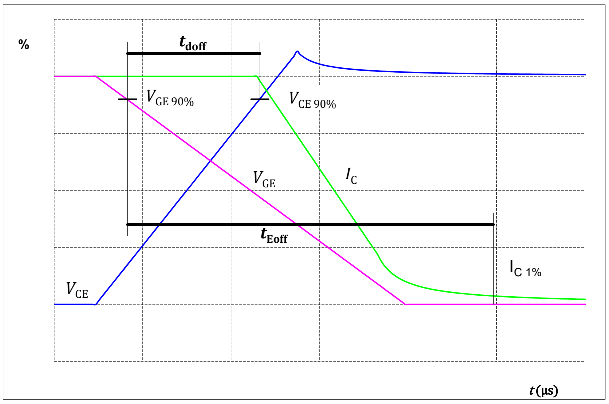


figure 55. **IGBT**

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

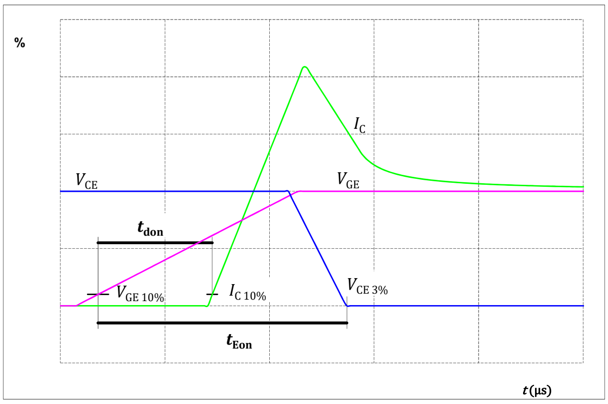


figure 56. **IGBT**

Turn-off Switching Waveforms & definition of t_f

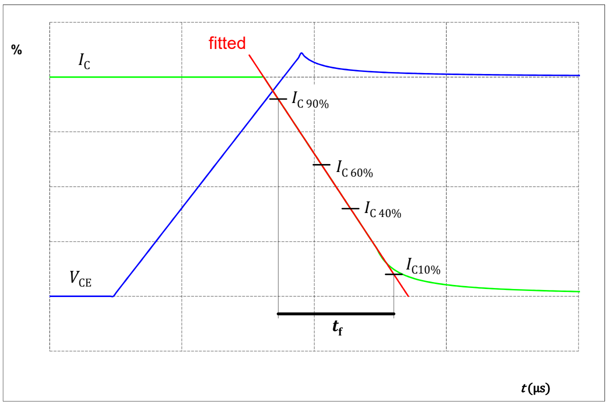
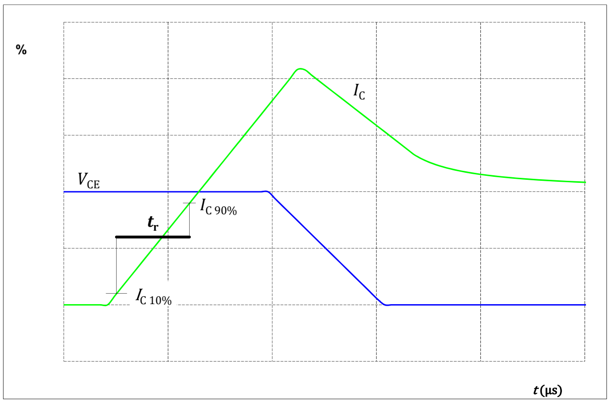


figure 57. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 58. **FWD**

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

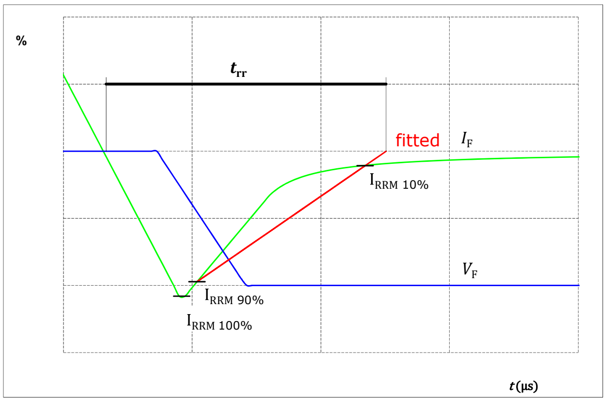
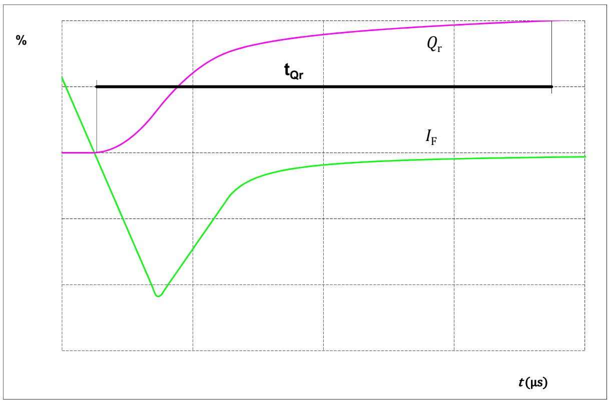


figure 59. **FWD**

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



Ordering Code

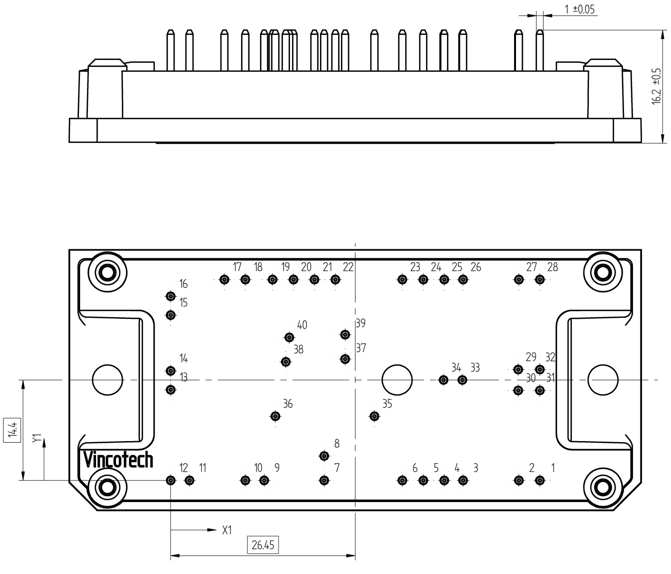
Version	Ordering Code
Without thermal paste	10-FY07ZAB075SM-L515B08
With thermal paste (5,2 W/mK, PTM6000HV)	10-FY07ZAB075SM-L515B08-/7/
With thermal paste (3,4 W/mK, PSX-P7)	10-FY07ZAB075SM-L515B08-/3/

Marking

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

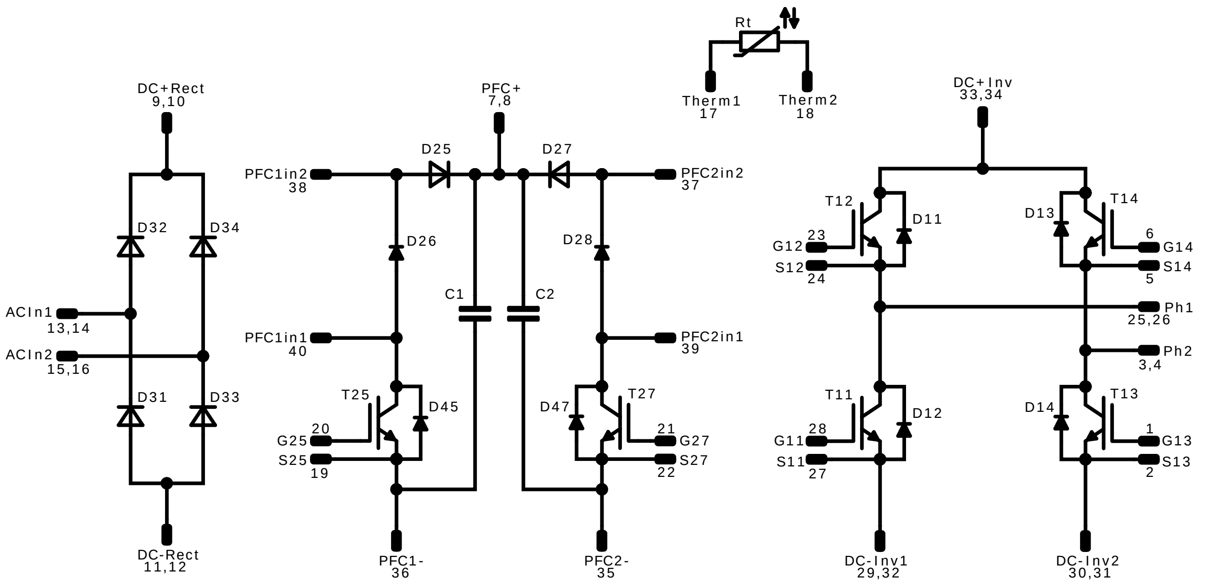
Outline

Pin table [mm]			
Pin	X	Y	Function
1	52,9	0	G13
2	49,9	0	S13
3	41,9	0	Ph2
4	39,2	0	Ph2
5	36,2	0	S14
6	33,2	0	G14
7	22	0	PFC+
8	22	3,5	PFC+
9	13,4	0	DC+Rect
10	10,7	0	DC+Rect
11	2,7	0	DC-Rect
12	0	0	DC-Rect
13	0	13	ACIn1
14	0	15,7	ACIn1
15	0	23,7	ACIn2
16	0	26,4	ACIn2
17	7,7	28,8	Therm1
18	10,7	28,8	Therm2
19	14,6	28,8	S25
20	17,6	28,8	G25
21	20,6	28,8	G27
22	23,6	28,8	S27
23	33,2	28,8	G12
24	36,2	28,8	S12
25	39,2	28,8	Ph1
26	41,9	28,8	Ph1
27	49,9	28,8	S11
28	52,9	28,8	G11
29	49,8	15,9	DC-Inv1
30	49,8	12,9	DC-Inv2
31	52,9	12,9	DC-Inv2
32	52,9	15,9	DC-Inv1
33	41,8	14,4	DC+Inv
34	39,1	14,4	DC+Inv
35	29,2	9,2	PFC2-
36	15	9,2	PFC1-
37	25	17,4	PFC2in2
38	16,5	17	PFC1in2
39	25	20,9	PFC2in1
40	17	20,5	PFC1in1



Tolerance of pinpositions: ±0,5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T13, T12, T14	IGBT	650 V	75 A	H-Bridge Switch	
D11, D13, D12, D14	FWD	650 V	70 A	H-Bridge Diode	
T25, T27	IGBT	650 V	100 A	PFC Switch	
D25, D27	FWD	600 V	60 A	PFC Diode	
D45, D47	FWD	650 V	10 A	PFC Sw. Protection Diode	
D26, D28	FWD	650 V	10 A	Current Transformer Protection Diode	
D31, D32, D33, D34	Rectifier	1600 V	50 A	Rectifier Diode	
C1, C2	Capacitor	630 V		Capacitor (DC)	
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-FY07ZAB075SM-L515B08-D2-14	15 Jun. 2023	H-Bridge Diode and PFC Diode change	