Vincotech

10-F112VPA080MS-LK88A09
datasheet

***flow*PIM 1 + 3xPFC** **1200 V / 80 mΩ**

Topology features

- 3ph Vienna rectifier
- Inverter
- Open Emitter configuration
- Temperature sensor

Component features

- High Blocking Voltage with low drain source on state resistance
- High speed SiC-MOSFET technology
- Resistant to Latch-up

Housing features

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

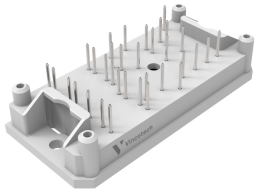
Target applications

- Embedded Drives
- HVAC
- Heat Pumps
- Industrial Drives

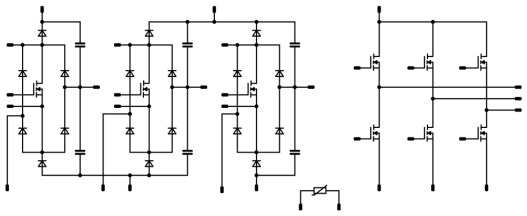
Types

- 10-F112VPA080MS-LK88A09

flow 1 17 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Inverter Switch					
Drain-source voltage	V_{DSS}			1200	V
Drain current (DC current)	I_D	T_j = T_{jmax}	T_s = 80 °C	25	A
Peak drain current	I_{DM}	t_P limited by T_{jmax}		68	A
Total power dissipation	P_{tot}	T_j = T_{jmax}	T_s = 80 °C	57	W
Gate-source voltage	V_{GSS}	static		0 / 18	V
		dynamic		-5 / 22	V
Maximum Junction Temperature	T_{jmax}			175	°C
Boost Switch					
Drain-source voltage	V_{DSS}			600	V
Drain current (DC current)	I_D	T_j = T_{jmax}	T_s = 80 °C	15	A
Peak drain current	I_{DM}	t_P limited by T_{jmax}		100	A
Avalanche energy, single pulse	E_{AS}	V_{DD} = 50 V	I_D = 5,1 A	105	mJ
Avalanche energy, repetitive	E_{AR}	V_{DD} = 50 V	I_D = 5,1 A	0,53	mJ
MOSFET dv/dt ruggedness	dv/dt	V_{DS}= 0..400 V	T_s = 25 °C	80	V/ns
Total power dissipation	P_{tot}	T_j = T_{jmax}	T_s = 80 °C	45	W
Gate-source voltage	V_{GSS}	static		±20	V
Reverse diode dv/dt	dv/dt			50	V/ns
Maximum Junction Temperature	T_{jmax}			150	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Boost Diode					
Peak repetitive reverse voltage	V_{RRM}			600	V
Forward current (DC current)	I_F	T_j = T_{jmax}	T_s = 80 °C	30	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 25 °C	185	A
Total power dissipation	P_{tot}	T_j = T_{jmax}	T_s = 80 °C	41	W
Maximum junction temperature	T_{jmax}			175	°C
Neutral Point Diode					
Peak repetitive reverse voltage	V_{RRM}			1600	V
Forward current (DC current)	I_F	T_j = T_{jmax}	T_s = 80 °C	21	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 8,3 ms	T_j = 25 °C	150	A
Surge current capability	I^2t			112	A^2s
Total power dissipation	P_{tot}	T_j = T_{jmax}	T_s = 80 °C	26	W
Maximum junction temperature	T_{jmax}			150	°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	21	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 8,3 ms	T_j = 25 °C	150	A
Surge current capability	I^2t			112	A^2s
Total power dissipation	P_{tot}	T_j = T_{jmax}	T_s = 80 °C	26	W
Maximum junction temperature	T_{jmax}			150	°C
Capacitor (DC)					
Maximum DC voltage	V_{MAX}			630	V
Operation Temperature	T_{op}			-55 ... 150	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Module Properties				
Thermal Properties				
Storage temperature	T_{stg}		-40…+125	°C
Operation temperature under switching condition	T_{jop}		-40…+(T_{jmax} - 25)	°C
Isolation Properties				
Isolation voltage	V_{isol}	DC Test Voltage* t_p = 2 s	6800	V
Creepage distance			>12,7	mm
Clearance			12,67	mm
Comparative Tracking Index	CTI		≥ 600	

*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	
Inverter Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		18		15	25 125 150		72,9 82 89,5	110(1)	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,0015	25	3,6	4,6	5,6	V
Gate to Source Leakage Current	I_{GSS}		22	0		25			200	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25			50	µA
Internal gate resistance	r_g							3		Ω
Short-circuit input capacitance	C_{iss}		0	10	0	25		2000		pF
Reverse transfer capacitance	C_{rss}							46		
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,66		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	
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 0,5 Ω R_{goff} = 0,5 Ω	0/18	600	16	25 125 150		12,2 10,71 10,67		ns
Rise time	t_r					25 125 150		10,38 9,37 9,6		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		28,92 31,07 31,96		ns
Fall time	t_f					25 125 150		5,43 3,97 3,6		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,14 µC Q_{rFWD}=0,249 µC Q_{rFWD}=0,293 µC				25 125 150		0,275 0,308 0,33		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,025 0,026 0,025		mWs
Peak recovery current	I_{RRM}	di/dt=758 A/µs di/dt=744 A/µs di/dt=918 A/µs				25 125 150		9,22 15,68 17,98		A
Reverse recovery time	t_{rr}					25 125 150		24,71 26,35 27,33		ns
Recovered charge	Q_r					25 125 150		0,14 0,249 0,293		µC
Reverse recovered energy	E_{rec}					25 125 150		0,034 0,066 0,078		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2362,3 3870,72 3806,54		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	
Boost Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		10		10,5	25 125		94,4 168	99(1)	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,00053	25	3	3,5	4	V
Gate to Source Leakage Current	I_{GSS}		20	0		25			100	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	600		25			1	µA
Internal gate resistance	r_g							5,9		Ω
Gate charge	Q_g		0/10	400	10,5	25		45		nC
Short-circuit input capacitance	C_{iss}	f = 250 kHz	0	400	0	25		1952		pF
Short-circuit output capacitance	C_{oss}							33		
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,57		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	0/10	400	15	25 125		20,73 20,34		ns
Rise time	t_r					25 125		3,84 3,94		ns
Turn-off delay time	$t_{d(off)}$					25 125		57,91 65,36		ns
Fall time	t_f					25 125		5,51 8,52		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,39 µC Q_{rFWD}=0,741 µC				25 125		0,069 0,193		mWs
Turn-off energy (per pulse)	E_{off}					25 125		0,016 0,022		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	
Boost Diode										
Static										
Forward voltage	V_F				15	25 125 150		1,59 1,28 1,19	2,5[1]	V
Reverse leakage current	I_R	V_r = 600 V				25			10	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						2,33		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=4640 A/µs di/dt=3753 A/µs	0/10	400	15	25 125		42,07 44,32		A
Reverse recovery time	t_{rr}					25 125		17,72 32,89		ns
Recovered charge	Q_r					25 125		0,39 0,741		µC
Reverse recovered energy	E_{rec}					25 125		0,098 0,148		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125		5644,61 2680,1		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	
Neutral Point Diode										
Static										
Forward voltage	V_F				7	25 125 150		1,02 0,936	1,11(1) 1,01(1)	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			5 700	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						2,66		K/W
Rectifier Diode										
Static										
Forward voltage	V_F				7	25 125 150		1,02 0,936	1,11(1) 1,01(1)	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			5 700	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						2,66		K/W
Capacitor (DC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		33		nF
Tolerance							-5		5	%

Characteristic Values

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

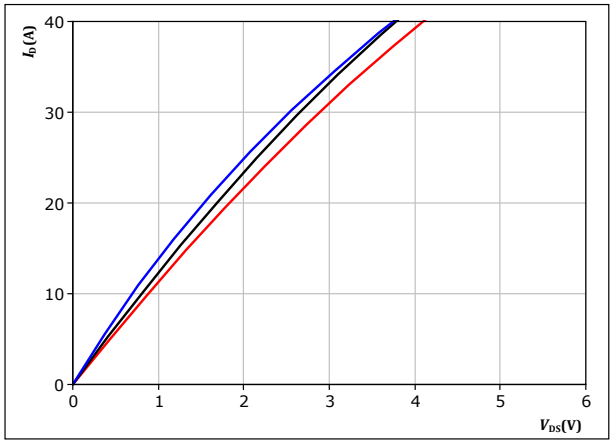
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

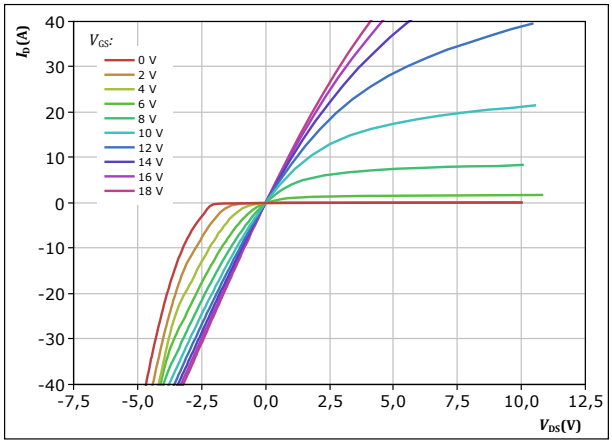


t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



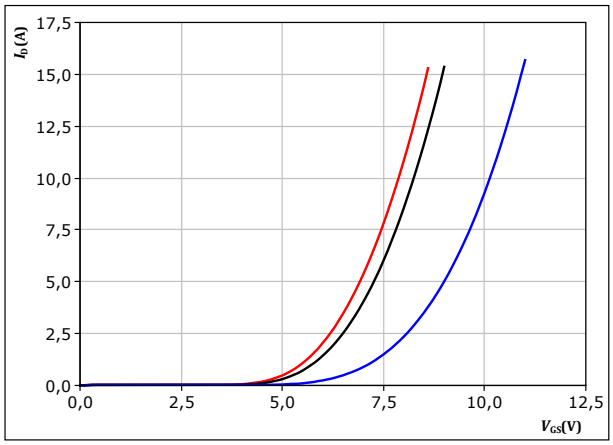
t_p =	250	µs
T_j =	150	°C

V_{GS} from 0 V to 18 V in steps of 2 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

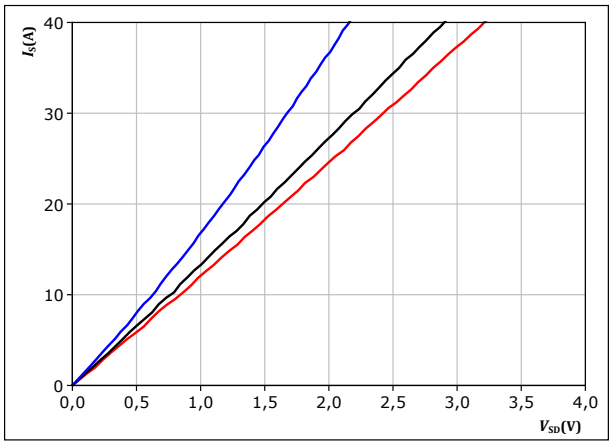


t_p =	250	µs		
V_{DS} =	23	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

Typical reverse drain current characteristics

$I_{SD} = f(V_{SD})$



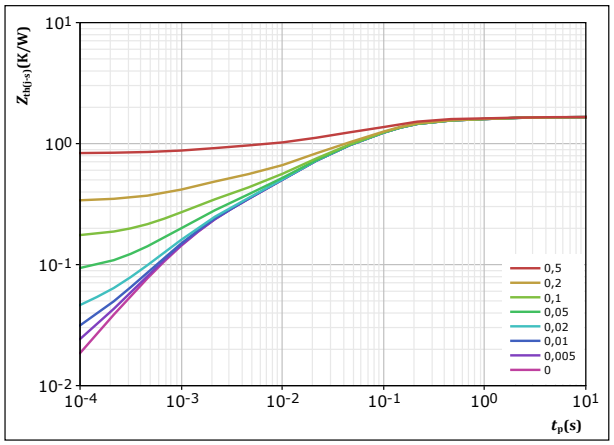
t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

Inverter Switch Characteristics

figure 5. **MOSFET**

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	1,657	K/W

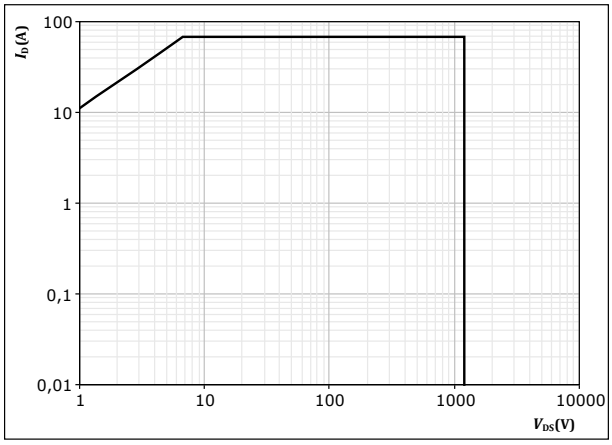
MOSFET thermal model values

R (K/W)	τ (s)
1,74E-02	8,30E+00
1,39E-01	9,74E-01
8,83E-01	8,90E-02
4,36E-01	1,42E-02
1,87E-01	1,24E-03

figure 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



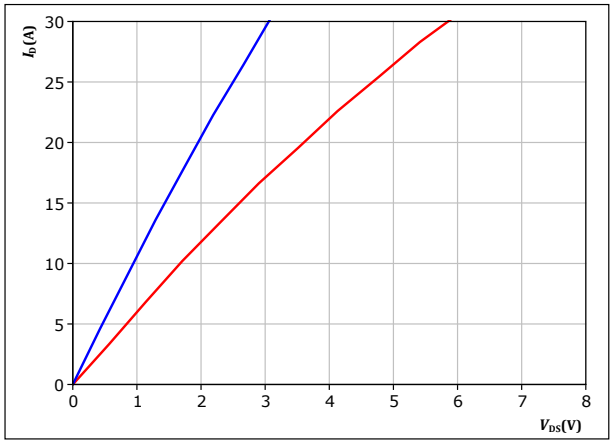
$D =$	single pulse	
$T_s =$	80	°C
$V_{GS} =$	18	V
$T_j =$	T_{jmax}	

Boost Switch Characteristics

figure 7. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

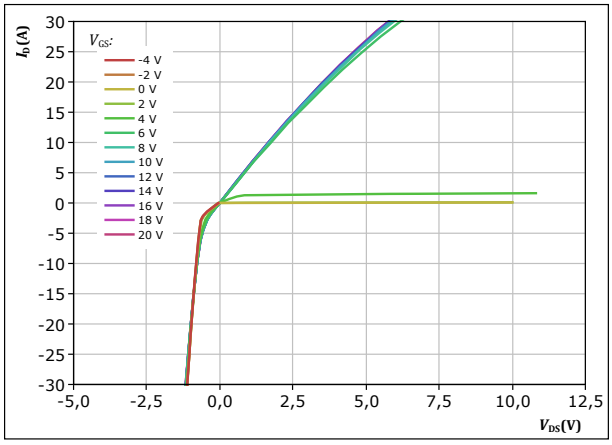


t_p =	250	µs	T_j:	25 °C
V_{GS} =	10	V		125 °C

figure 8. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



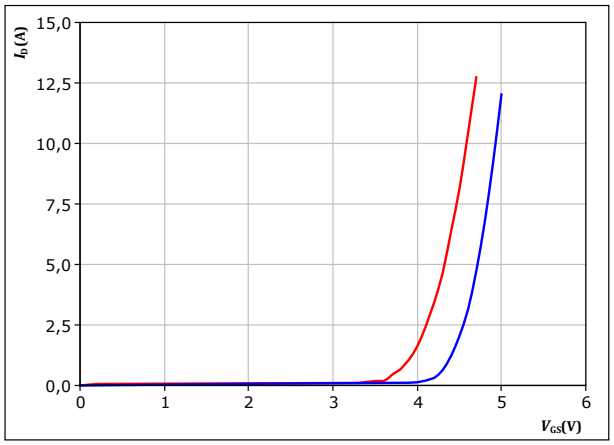
t_p =	250	µs
T_j =	125	°C

V_{GS} from -4 V to 20 V in steps of 2 V

figure 9. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

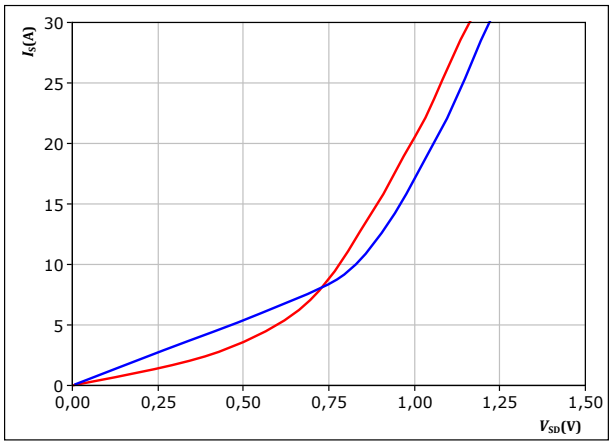


t_p =	250	µs	T_j:	25 °C
V_{DS} =	10	V		125 °C

figure 10. **MOSFET**

Typical reverse drain current characteristics

$I_{SD} = f(V_{SD})$



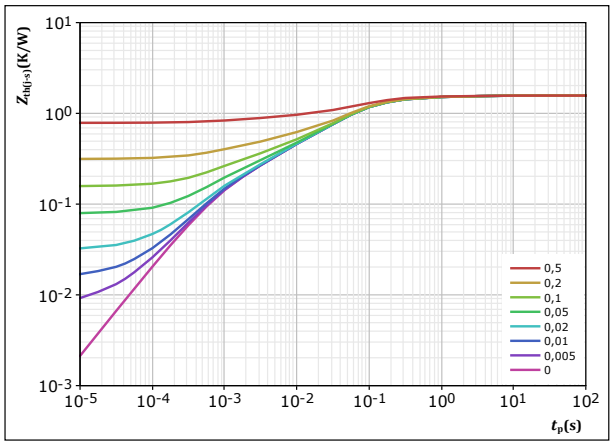
t_p =	250	µs	T_j:	25 °C
V_{GS} =	10	V		125 °C

Boost Switch Characteristics

figure 11. **MOSFET**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,57	K/W

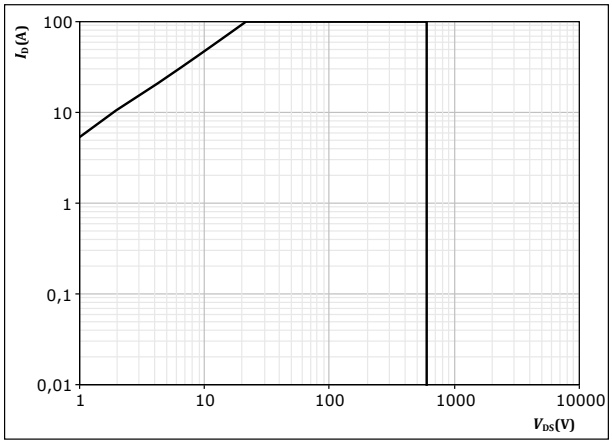
MOSFET thermal model values

R (K/W)	τ (s)
6,39E-02	3,03E+00
2,01E-01	3,38E-01
9,37E-01	6,22E-02
2,33E-01	6,81E-03
1,35E-01	8,27E-04

figure 12. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



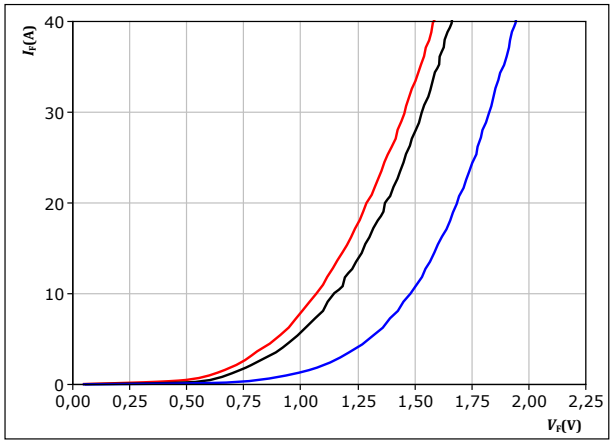
D =	single pulse	
T_s =	80	°C
V_{GS} =	10	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 13. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



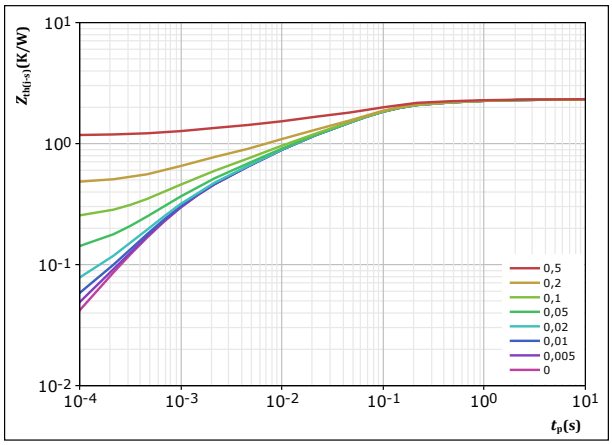
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 14. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 2,328 K/W

FWD thermal model values

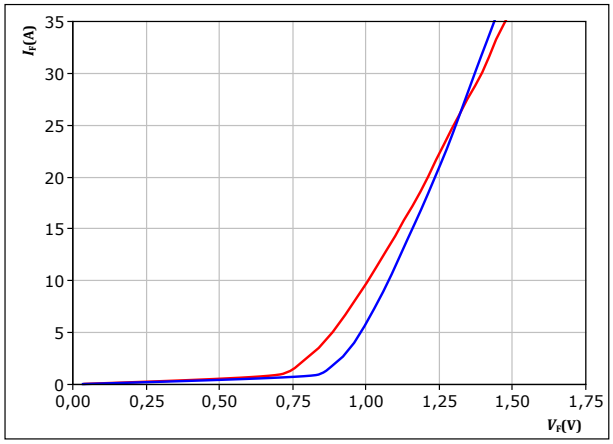
R (K/W)	τ (s)
7,17E-02	4,19E+00
2,46E-01	4,04E-01
1,17E+00	6,27E-02
5,36E-01	7,39E-03
3,14E-01	9,07E-04

Neutral Point Diode Characteristics

figure 15. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



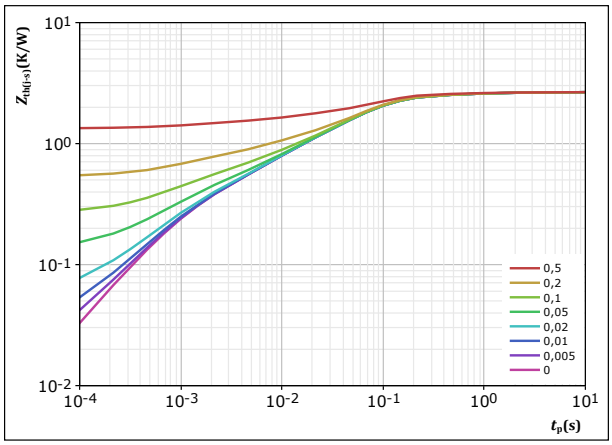
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 16. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 2,663 K/W

Rectifier thermal model values

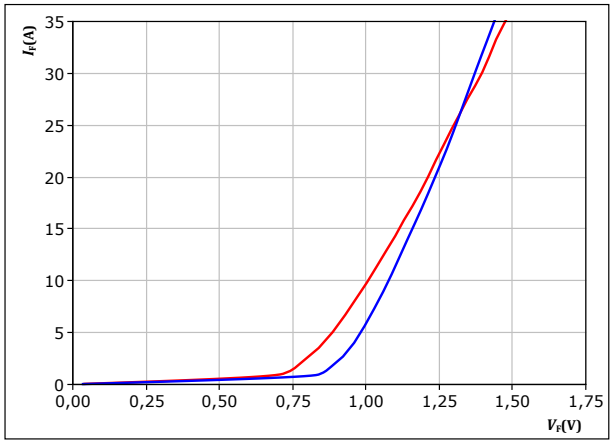
R (K/W)	τ (s)
5,42E-02	4,38E+00
2,48E-01	4,58E-01
1,73E+00	6,32E-02
3,84E-01	7,21E-03
2,50E-01	9,57E-04

Rectifier Diode Characteristics

figure 17. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



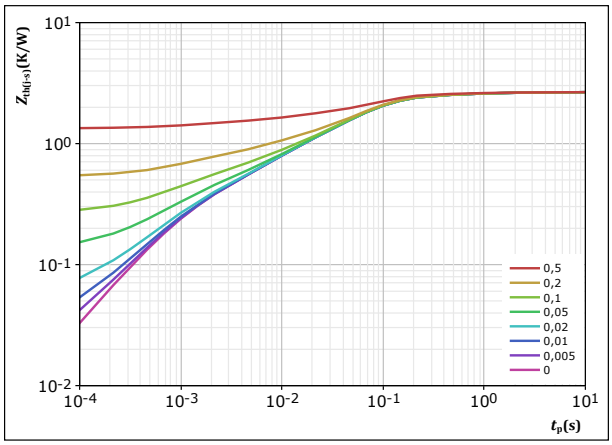
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 18. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 2,663 K/W

Rectifier thermal model values

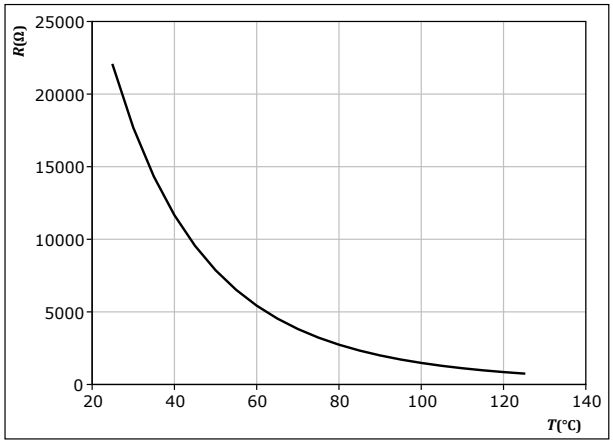
R (K/W)	τ (s)
5,42E-02	4,38E+00
2,48E-01	4,58E-01
1,73E+00	6,32E-02
3,84E-01	7,21E-03
2,50E-01	9,57E-04

Thermistor Characteristics

figure 19. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

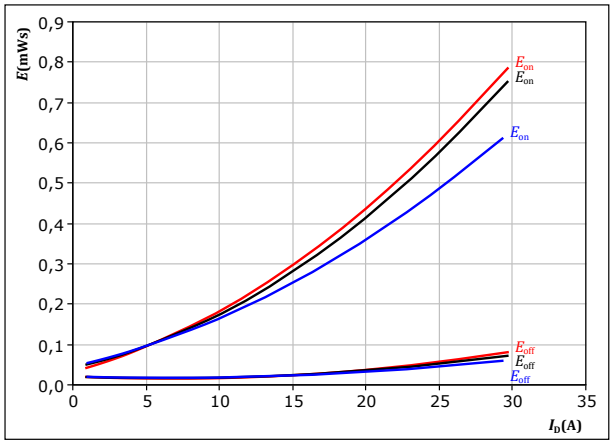


Inverter Switching Characteristics

figure 20. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



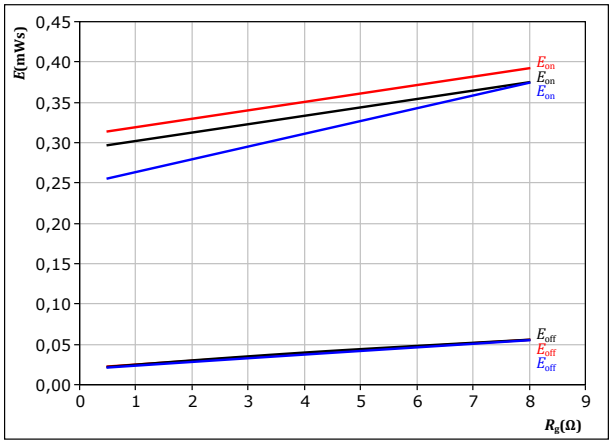
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
R_{gon} =	0,5	Ω		150 °C
R_{goff} =	0,5	Ω		

figure 21. **MOSFET**

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

$E = f(R_g)$



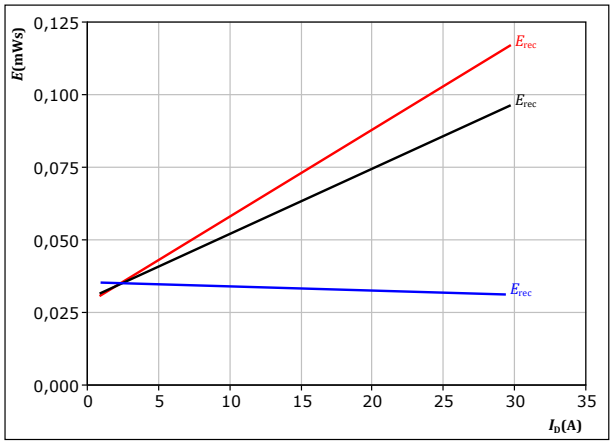
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
I_D =	16	A		150 °C

figure 22. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



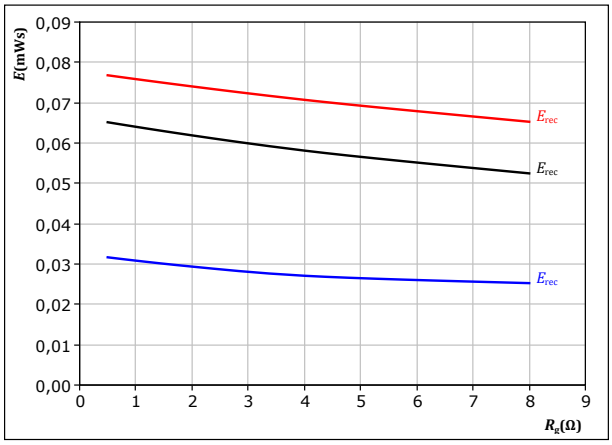
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 23. **MOSFET**

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

$E_{rec} = f(R_g)$



With an inductive load at

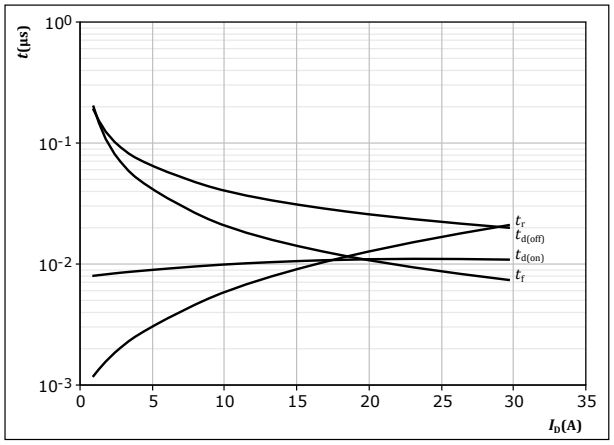
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
I_D =	16	A		150 °C

Inverter Switching Characteristics

figure 24. **MOSFET**

Typical switching times as a function of drain current

t = f(I_D)



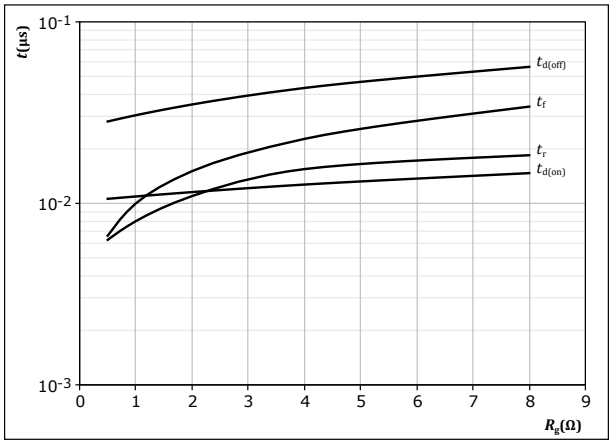
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/18	V
R_{gon} =	0,5	Ω
R_{goff} =	0,5	Ω

figure 25. **MOSFET**

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

t = f(R_g)



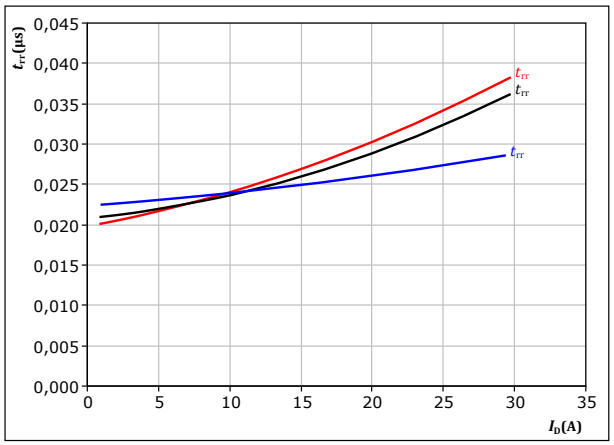
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/18	V
I_D =	16	A

figure 26. **MOSFET**

Typical reverse recovery time as a function of drain current

t_{rr} = f(I_D)



At

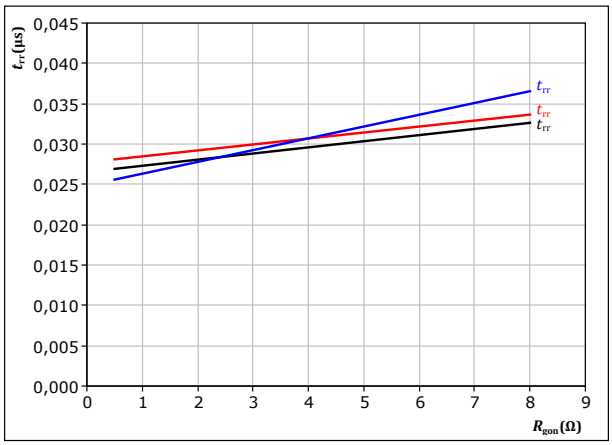
V_{DS} =	600	V
V_{GS} =	0/18	V
R_{gon} =	0,5	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 27. **MOSFET**

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

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



At

V_{DS} =	600	V
V_{GS} =	0/18	V
I_D =	16	A

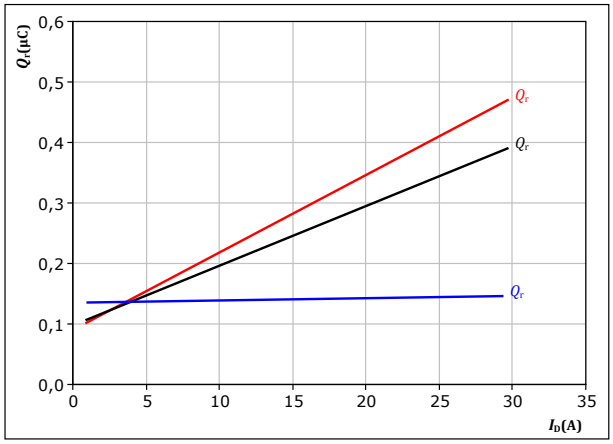
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 28. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

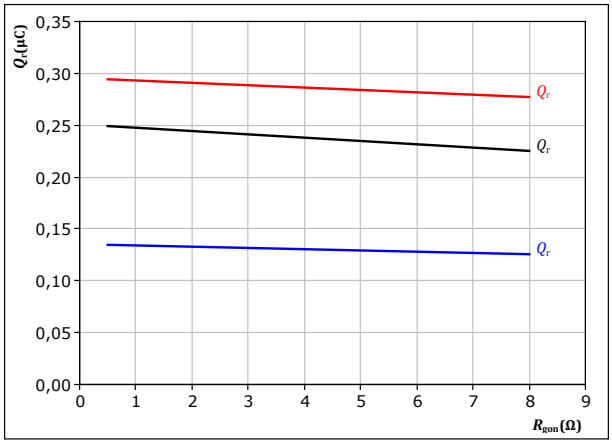


At					
	V_{DS} =	600	V		
	V_{GS} =	0/18	V	T_j:	25 °C
	R_{gon} =	0,5	Ω		125 °C
					150 °C

figure 29. **MOSFET**

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

$Q_r = f(R_{gon})$

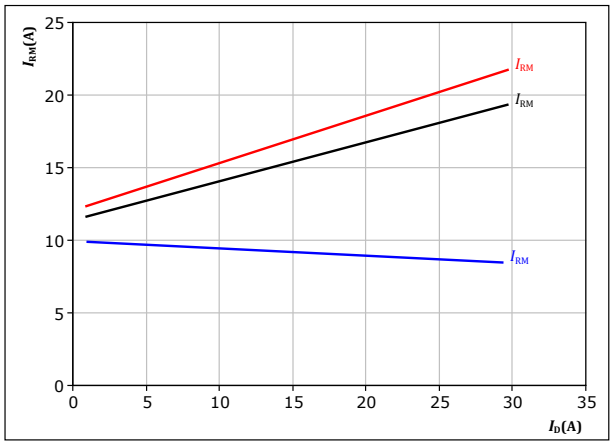


At					
	V_{DS} =	600	V		
	V_{GS} =	0/18	V	T_j:	25 °C
	I_D =	16	A		125 °C
					150 °C

figure 30. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

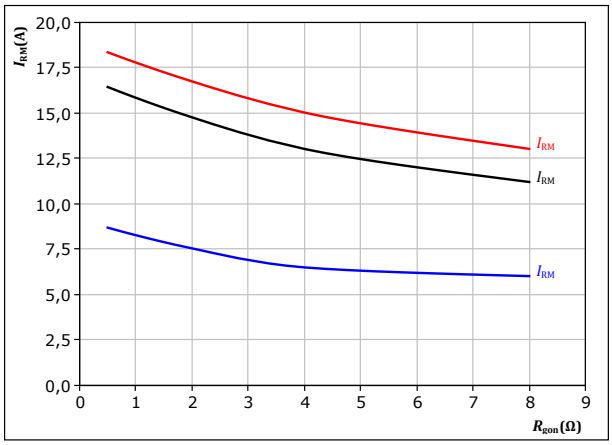


At					
	V_{DS} =	600	V		
	V_{GS} =	0/18	V	T_j:	25 °C
	R_{gon} =	0,5	Ω		125 °C
					150 °C

figure 31. **MOSFET**

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

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



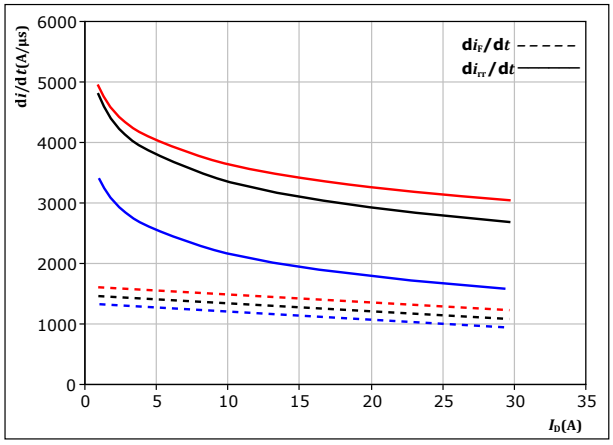
At					
	V_{DS} =	600	V		
	V_{GS} =	0/18	V	T_j:	25 °C
	I_D =	16	A		125 °C
					150 °C

Inverter Switching Characteristics

figure 32. **MOSFET**

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

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

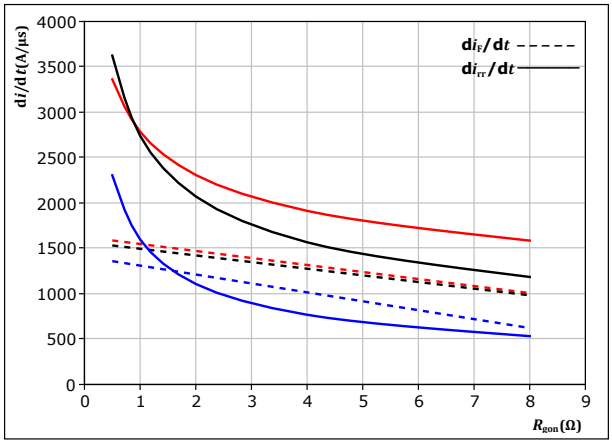


At	V_{DS} =	600	V		
	V_{GS} =	0/18	V	T_j:	25 °C
	R_{gon} =	0,5	Ω		125 °C
					150 °C

figure 33. **MOSFET**

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})

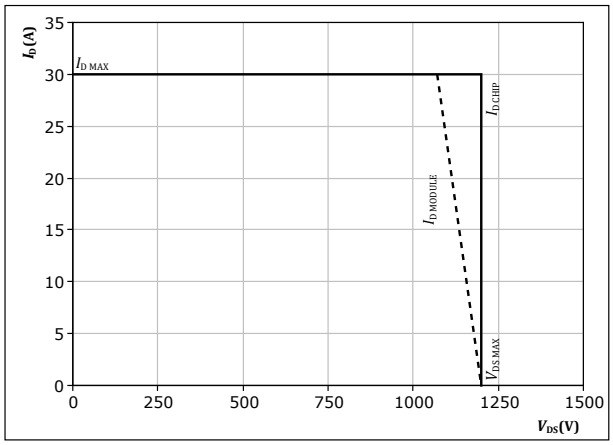


At	V_{DS} =	600	V		
	V_{GS} =	0/18	V	T_j:	25 °C
	I_D =	16	A		125 °C
					150 °C

figure 34. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



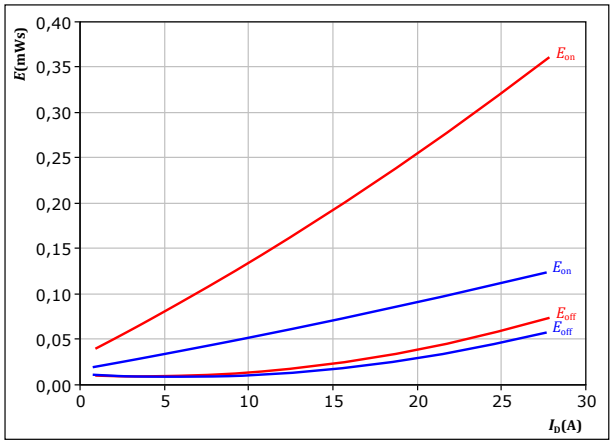
At	T_j =	150	°C
	R_{gon} =	0,5	Ω
	R_{goff} =	0,5	Ω

Boost Switching Characteristics

figure 35. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



With an inductive load at

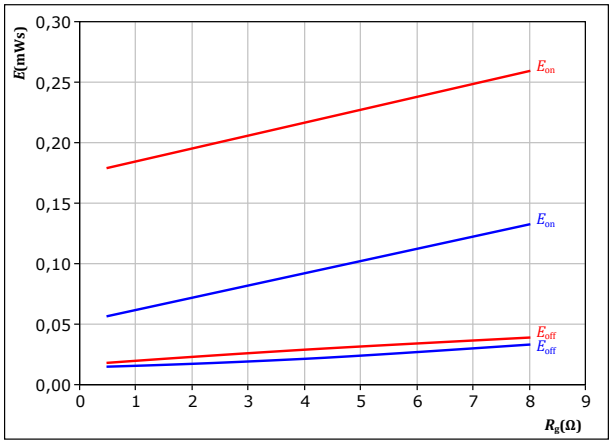
V_{DS} =	400	V
V_{GS} =	0/10	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

T_j: 25 °C, 125 °C

figure 36. **MOSFET**

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

$E = f(R_g)$



With an inductive load at

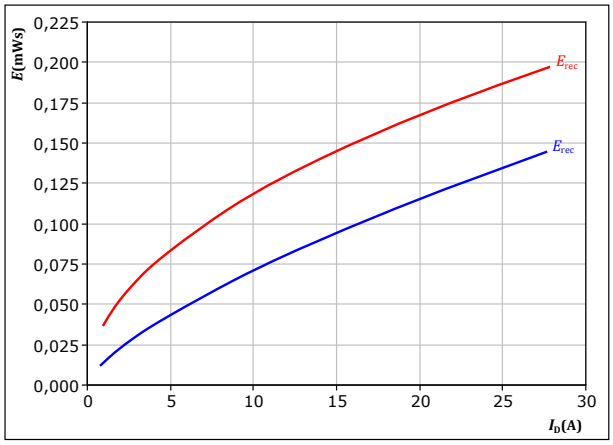
V_{DS} =	400	V
V_{GS} =	0/10	V
I_D =	15	A

T_j: 25 °C, 125 °C

figure 37. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



With an inductive load at

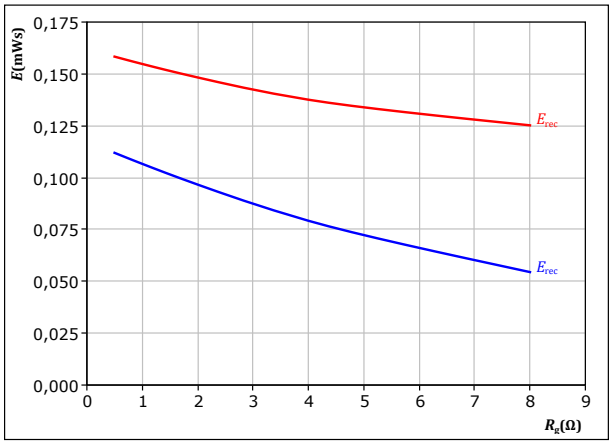
V_{DS} =	400	V
V_{GS} =	0/10	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C

figure 38. **MOSFET**

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

$E_{rec} = f(R_g)$



With an inductive load at

V_{DS} =	400	V
V_{GS} =	0/10	V
I_D =	15	A

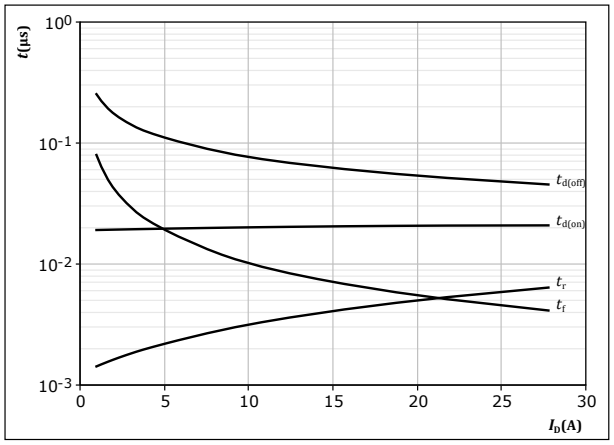
T_j: 25 °C, 125 °C

Boost Switching Characteristics

figure 39. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



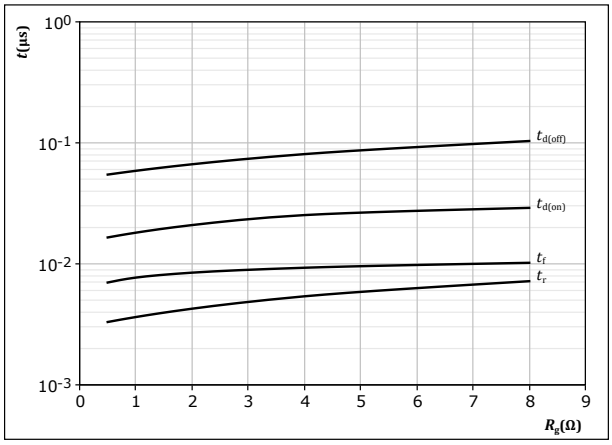
With an inductive load at

T_j =	125	°C
V_{DS} =	400	V
V_{GS} =	0/10	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 40. **MOSFET**

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

$t = f(R_g)$



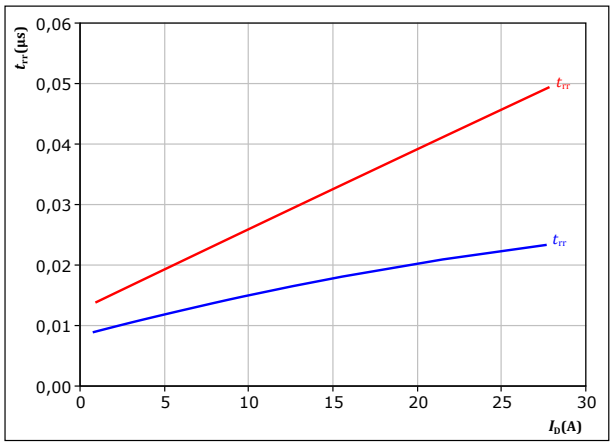
With an inductive load at

T_j =	125	°C
V_{DS} =	400	V
V_{GS} =	0/10	V
I_D =	15	A

figure 41. **MOSFET**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



At

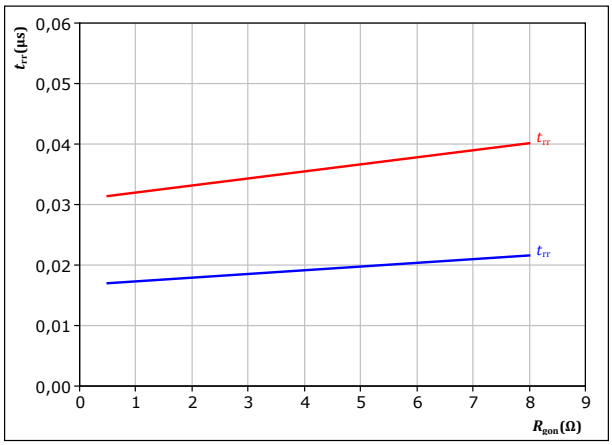
V_{DS} =	400	V
V_{GS} =	0/10	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C

figure 42. **MOSFET**

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

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



At

V_{DS} =	400	V
V_{GS} =	0/10	V
I_D =	15	A

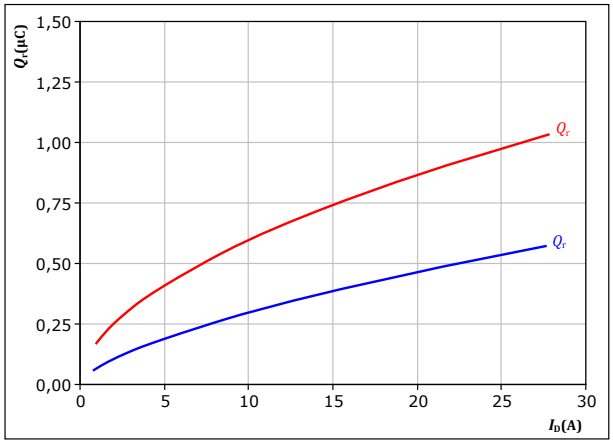
T_j: 25 °C, 125 °C

Boost Switching Characteristics

figure 43. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$



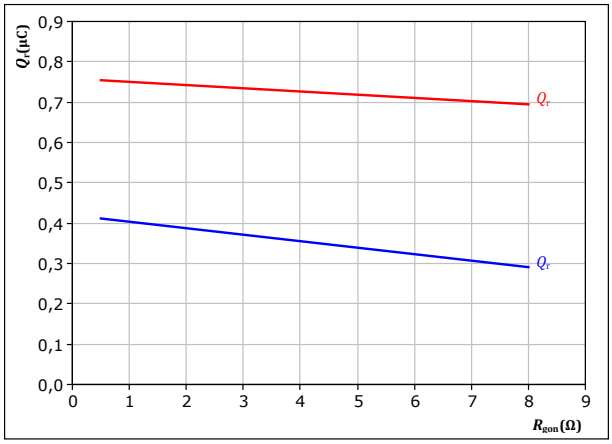
At			
V_{DS} =	400	V	
V_{GS} =	0/10	V	
R_{gon} =	2	Ω	

T_j: 25 °C, 125 °C

figure 44. **MOSFET**

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

$Q_r = f(R_{gon})$



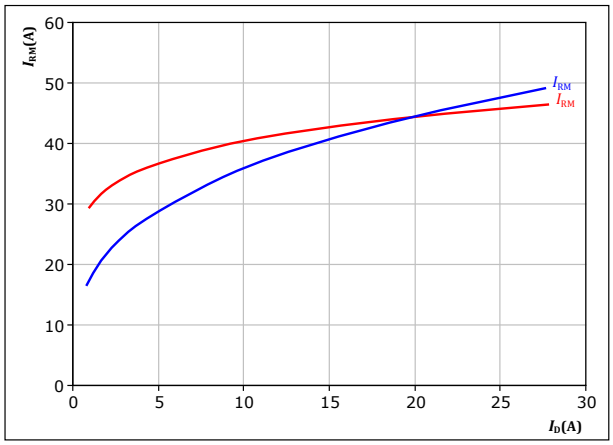
At			
V_{DS} =	400	V	
V_{GS} =	0/10	V	
I_D =	15	A	

T_j: 25 °C, 125 °C

figure 45. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$



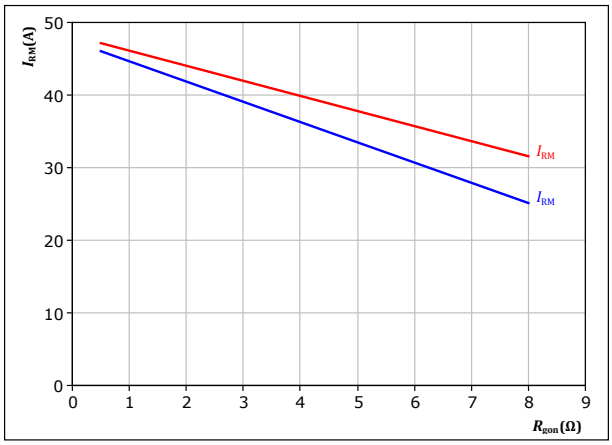
At			
V_{DS} =	400	V	
V_{GS} =	0/10	V	
R_{gon} =	2	Ω	

T_j: 25 °C, 125 °C

figure 46. **MOSFET**

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

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



At			
V_{DS} =	400	V	
V_{GS} =	0/10	V	
I_D =	15	A	

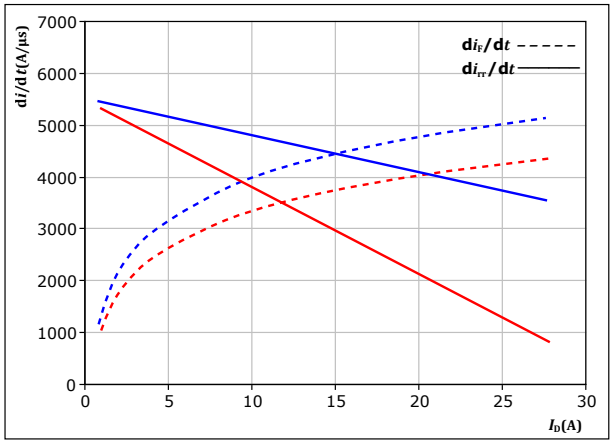
T_j: 25 °C, 125 °C

Boost Switching Characteristics

figure 47. **MOSFET**

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

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



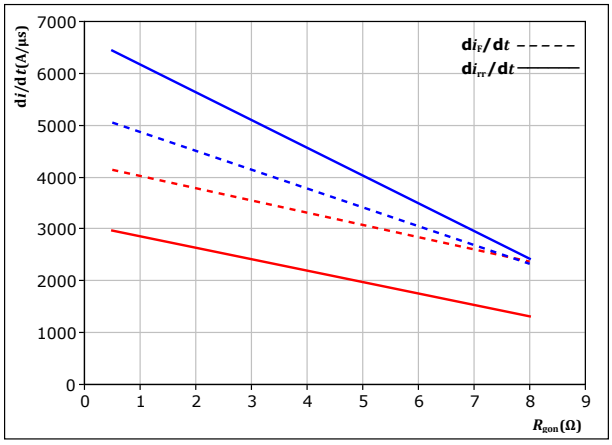
At	V_{DS} =	400	V
	V_{GS} =	0/10	V
	R_{gon} =	2	Ω

T_j: 25 °C, 125 °C

figure 48. **MOSFET**

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})



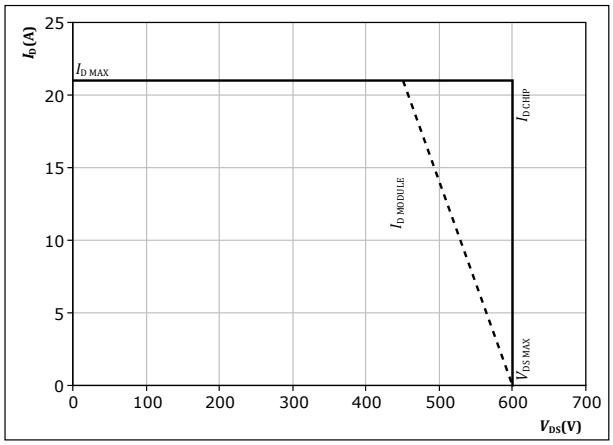
At	V_{DS} =	400	V
	V_{GS} =	0/10	V
	I_D =	15	A

T_j: 25 °C, 125 °C

figure 49. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



At	T_j =	125	°C
	R_{gon} =	2	Ω
	R_{goff} =	2	Ω

Switching Definitions

figure 50. MOSFET

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

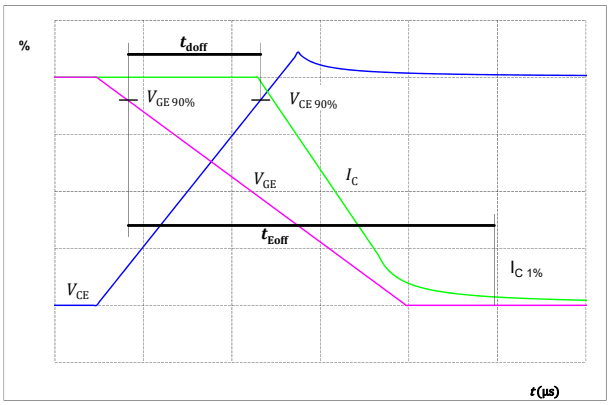


figure 51. MOSFET

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

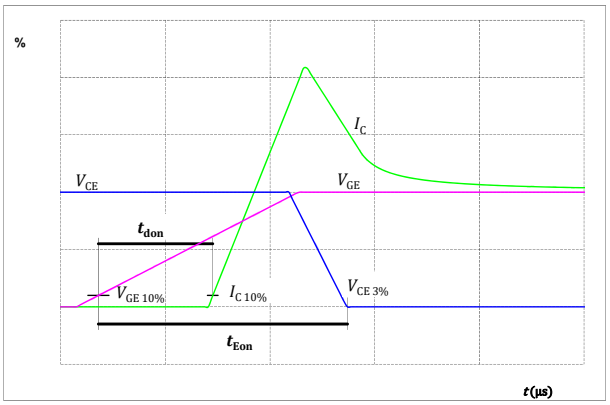


figure 52. MOSFET

Turn-off Switching Waveforms & definition of t_f

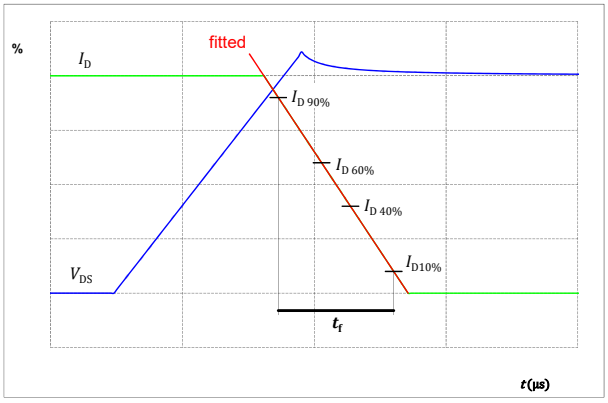
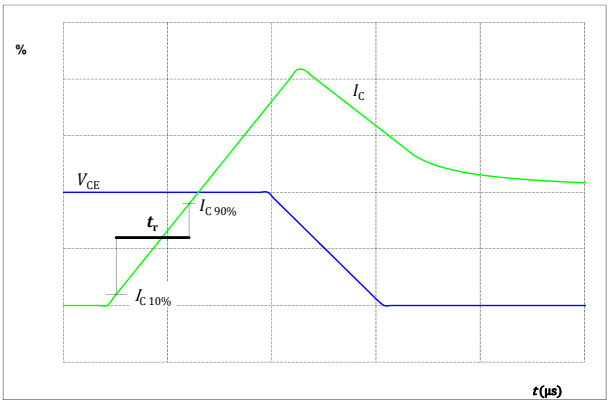


figure 53. MOSFET

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 54. **FWD**

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

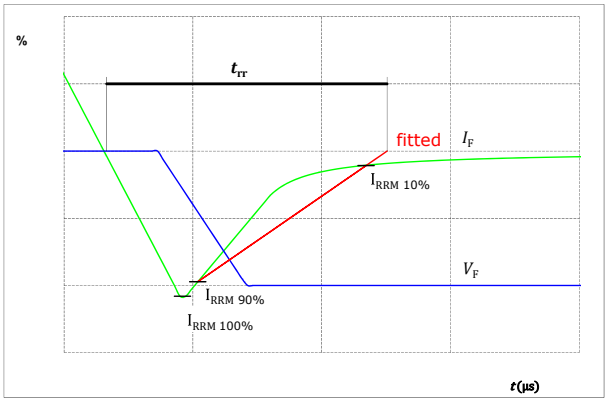


figure 55. **FWD**

Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})

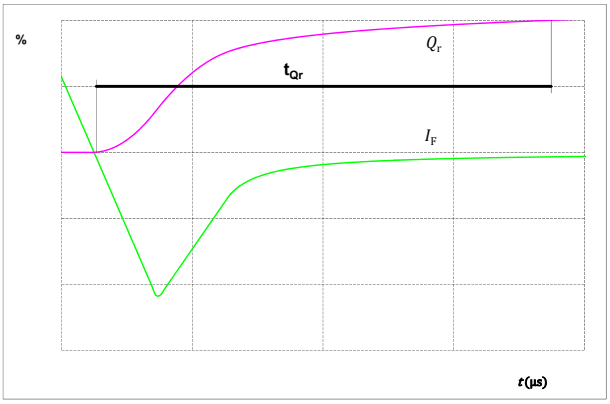
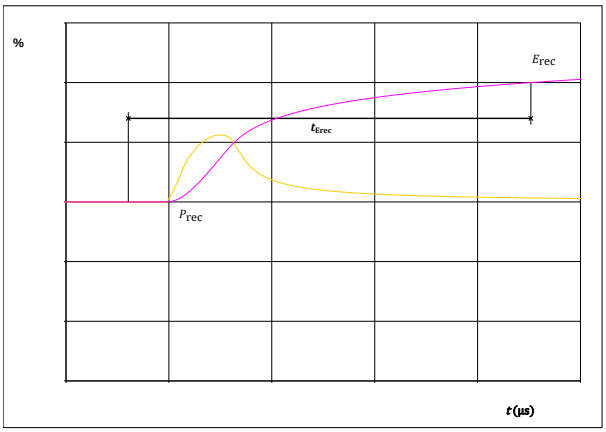


figure 56. **FWD**

Turn-on Switching Waveforms & definition of t_{Erec} (t_{Erec} = integrating time for E_{rec})



Ordering Code

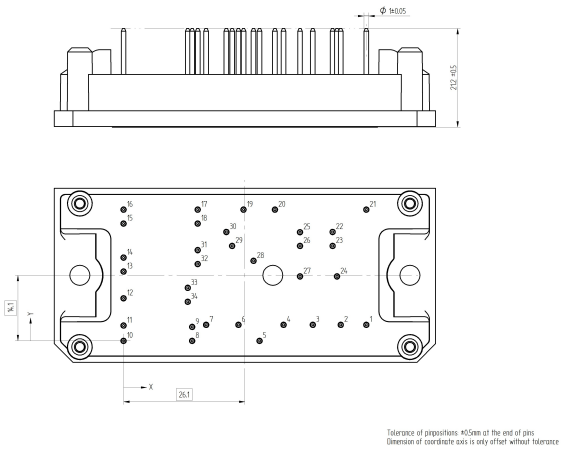
Version	Ordering Code
Without thermal paste	10-F112VPA080MS-LK88A09
With thermal paste (5,2 W/mK, PTM6000HV)	10-F112VPA080MS-LK88A09-/7/

Marking

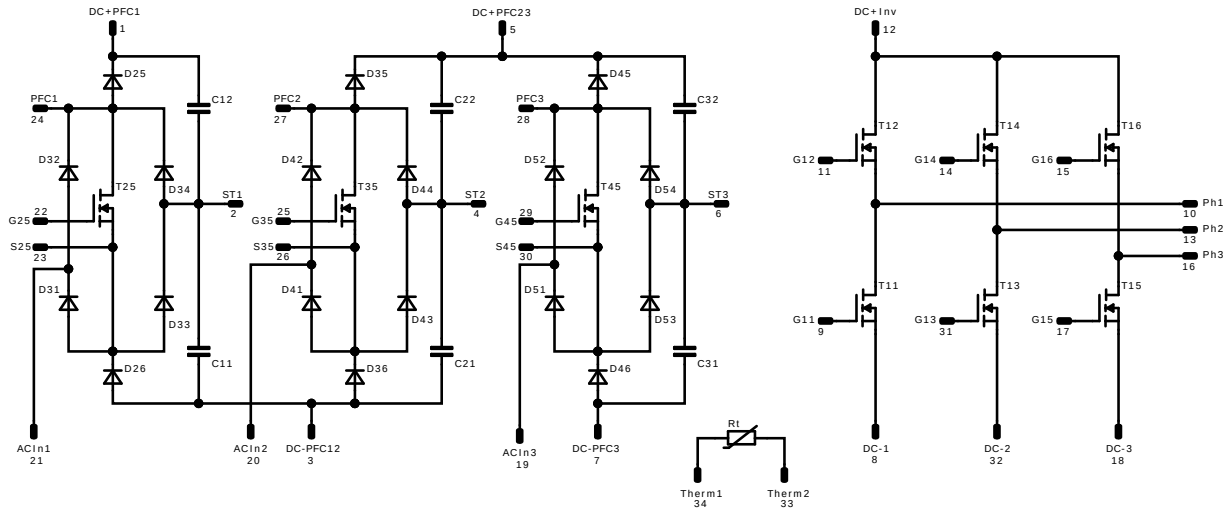
	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	52,2	3,45	DC+PFC1
2	46,7	3,45	ST1
3	40,7	3,45	DC-PFC12
4	34,4	3,45	ST2
5	29,25	0	DC+PFC23
6	24,7	3,45	ST3
7	17,75	3,45	DC-PFC3
8	14,75	0	DC-1
9	14,75	3	G11
10	0	0	Ph1
11	0	3,3	G12
12	0	9,15	DC+Inv
13	0	14,9	Ph2
14	0	17,9	G14
15	0	25,2	G16
16	0	28,2	Ph3
17	15,95	28,2	G15
18	15,95	25,2	DC-3
19	25,8	28,2	ACIn3
20	32,55	28,2	ACIn2
21	52,2	28,2	ACIn1
22	44,95	23,4	G25
23	44,95	20,4	S25
24	45,9	13,85	PFC1
25	37,95	23,35	G35
26	37,95	20,4	S35
27	37,95	13,85	PFC2
28	27,95	17,2	PFC3
29	23,35	20,4	G45
30	22,1	23,4	S45
31	15,95	19,5	G13
32	15,95	16,5	DC-2
33	13,8	11,4	Therm2
34	13,8	8,4	Therm1



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	MOSFET	1200 V	80 mΩ	Inverter Switch	
T25, T35, T45	MOSFET	600 V	77 mΩ	Boost Switch	
D25, D35, D45, D26, D36, D46	FWD	600 V	15 A	Boost Diode	
D33, D34, D43, D44, D53, D54	Rectifier	1600 V	12 A	Neutral Point Diode	
D31, D32, D41, D42, D51, D52	Rectifier	1600 V	12 A	Rectifier Diode	
C11, C12, C21, C22, C31, C32	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 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-F112VPA080MS-LK88A09-D1-14	7 Aug. 2026	Initial Release	