Vincotech

30-EQ14B2A007WS01-PS29F28T
datasheet

flowBOOST E3BP dual **1400 V / 6,67 mΩ**

Topology features

- Kelvin Emitter for improved switching performance
- Temperature sensor
- Gate Resistor
- MOSFET
- Dual Flying Cap Booster
- Auxiliary diodes for FC pre-charge (patent pending)

Component features

- Easy paralleling
- Fast switching speed
- Low on-resistance

Housing features

- Base isolation: Al_2O_3
- Cu baseplate
- Convex shaped baseplate for superior thermal contact
- CTI600 housing material
- Baseplate with rough surface
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

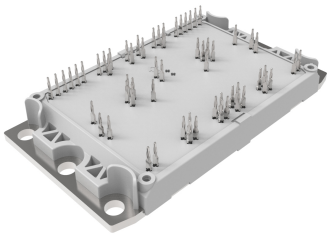
Target applications

- Solar Inverters

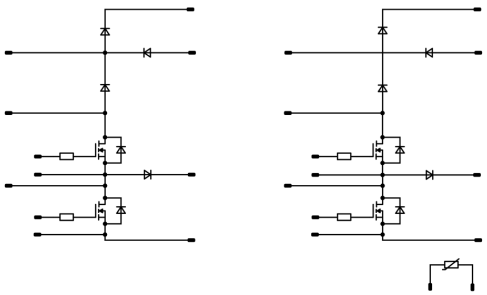
Types

- 30-EQ14B2A007WS01-PS29F28T

flow E3BP 15 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Inner Boost Switch				
Drain-source voltage	V_{DSS}		1400	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$ T_s = 80 °C	161	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	477	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	288	W
Gate-source voltage	V_{GSS}	static	-4 / 18	V
		dynamic	-12 / 24	V
Maximum Junction Temperature	T_{jmax}		175	°C
Inner Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		1400	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	149	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	320	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms T_j = 25 °C	1280	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	328	W
Maximum junction temperature	T_{jmax}		175	°C
Inner Boost Sw. Protection Diode				
Peak repetitive reverse voltage	V_{RRM}		1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	116	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms T_j = 150 °C	600	A
Surge current capability	I^2t		1800	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	146	W
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Outer Boost Switch				
Drain-source voltage	V_{DSS}		1400	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$ T_s = 80 °C	161	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	477	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	288	W
Gate-source voltage	V_{GSS}	static	-4 / 18	V
		dynamic	-12 / 24	V
Maximum Junction Temperature	T_{jmax}		175	°C
Outer Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		1400	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	149	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	320	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms T_j = 25 °C	1280	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	328	W
Maximum junction temperature	T_{jmax}		175	°C
Outer Boost Sw. Protection Diode				
Peak repetitive reverse voltage	V_{RRM}		1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	116	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms T_j = 150 °C	600	A
Surge current capability	I^2t		1800	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	146	W
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Aux Diode H				
Peak repetitive reverse voltage	V_{RRM}		1400	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	73	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	280	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	150	W
Maximum junction temperature	T_{jmax}		175	°C
Aux Diode L				
Peak repetitive reverse voltage	V_{RRM}		1400	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	58	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	126	W
Maximum junction temperature	T_{jmax}		175	°C
Resistor (Gate)				
DC current	I	terminal temperature Tk = 90 C°	1060	mA
Power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	0,75	W
Operation Temperature	T_{op}		-55 ... 155	°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	6800	V
Creepage distance			>12,7	mm
Clearance			11,81	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	
Inner Boost Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		18		150	25 125 150		6,92 9,39 10,5	9,67[1]	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,06	25	1,9	2,6	3,5	V
Gate to Source Leakage Current	I_{GSS}		24	0		25		30	300	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1400		25		0,6	300	µA
Internal gate resistance	r_g							0,2		Ω
Gate charge	Q_g		-4/18	800	150	25		645		nC
Short-circuit input capacitance	C_{iss}	f = 1 Mhz	0	1000	0	25		14103		pF
Short-circuit output capacitance	C_{oss}							597		
Reverse transfer capacitance	C_{rss}							60		
Diode forward voltage	V_{SD}		0		75	25		2,9		V
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,33		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	-4/18	800	150	25 125 150		38,91 35,56 35,23		ns
Rise time	t_r					25 125 150		20,3 17,71 16,43		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		95,59 104,74 107,19		ns
Fall time	t_f					25 125 150		14,31 15,9 16,51		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,613 µC Q_{rFWD}=0,713 µC Q_{rFWD}=0,724 µC				25 125 150		3,14 2,44 2,32		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,94 1,9 1,95		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	
Inner Boost Diode										
Static										
Forward voltage	V_F				160	25 125 150		1,62 2,03 2,19	1,7(1) 2,2(1)	V
Reverse leakage current	I_R	V_r = 1400 V				25		8	800	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,29		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=11288 A/µs di/dt=9739 A/µs di/dt=14354 A/µs	-4/18	800	150	25 125 150		58,48 69,54 70,78		A
Reverse recovery time	t_{rr}					25 125 150		17,22 16,65 16,68		ns
Recovered charge	Q_r					25 125 150		0,613 0,713 0,724		µC
Reverse recovered energy	E_{rec}					25 125 150		0,229 0,324 0,338		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		9204,68 11179,29 11888,26		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	
Inner Boost Sw. Protection Diode										
Static										
Forward voltage	V_F				50	25 125 150		1,06 0,991 0,977	1,5(1)	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			50 1500	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,65		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	
Outer Boost Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		18		150	25 125 150		6,92 9,39 10,5	9,67[1]	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,06	25	1,9	2,6	3,5	V
Gate to Source Leakage Current	I_{GSS}		24	0		25		30	300	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1400		25		0,6	300	µA
Internal gate resistance	r_g							0,2		Ω
Gate charge	Q_g		-4/18	800	150	25		645		nC
Short-circuit input capacitance	C_{iss}	f = 1 Mhz	0	1000	0	25		14103		pF
Short-circuit output capacitance	C_{oss}							597		
Reverse transfer capacitance	C_{rss}							60		
Diode forward voltage	V_{SD}		0		75	25		2,9		V
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,33		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	-4/18	800	150	25 125 150		60,84 53,95 53,13		ns
Rise time	t_r					25 125 150		31,51 25,44 25,09		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		163,14 180,79 186,14		ns
Fall time	t_f					25 125 150		15,2 17,05 16,66		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,618 µC Q_{rFWD}=0,703 µC Q_{rFWD}=0,71 µC				25 125 150		3,96 3,02 2,89		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,03 3,14 3,18		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	
Outer Boost Diode										
Static										
Forward voltage	V_F				160	25 125 150		1,62 2,03 2,19	1,7(1) 2,2(1)	V
Reverse leakage current	I_R	V_r = 1400 V				25		8	800	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,29		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=5021 A/µs di/dt=6522 A/µs di/dt=8685 A/µs	-4/18	800	150	25 125 150		55,82 64,79 65,41		A
Reverse recovery time	t_{rr}					25 125 150		19,93 19,81 19,78		ns
Recovered charge	Q_r					25 125 150		0,618 0,703 0,71		µC
Reverse recovered energy	E_{rec}					25 125 150		0,206 0,273 0,281		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		9597,95 11642,73 10226,49		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	
Outer Boost Sw. Protection Diode										
Static										
Forward voltage	V_F				50	25 125 150		1,06 0,991 0,977	1,5[1]	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			50 1500	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,65		K/W
Aux Diode H										
Static										
Forward voltage	V_F				140	25 125 150		3 2,85 2,78	4,5[1]	V
Reverse leakage current	I_R	V_r = 1400 V				25			5	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,64		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	
Aux Diode L										
Static										
Forward voltage	V_F				60	25 125 150		1,54 1,96 2,11	1,7(1) 2,2(1)	V
Reverse leakage current	I_R	V_r = 1400 V				25		3	300	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,75		K/W
Resistor (Gate)										
Static										
Resistance	R							0,667		Ω
Tolerance							-1		1	%
Temperature coeficient	tc							100		ppm/K
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

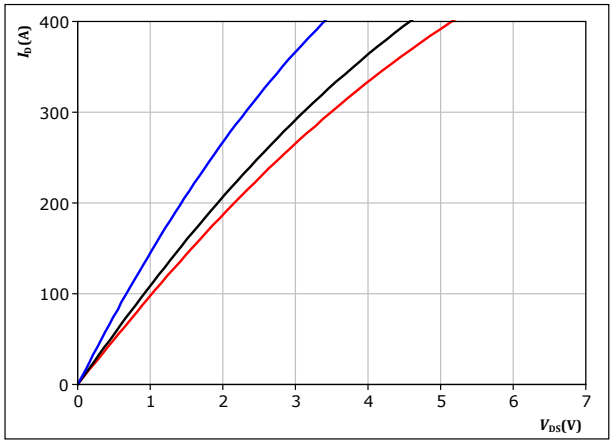
(2) Only valid with pre-applied Vincotech thermal interface material.

Inner Boost Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

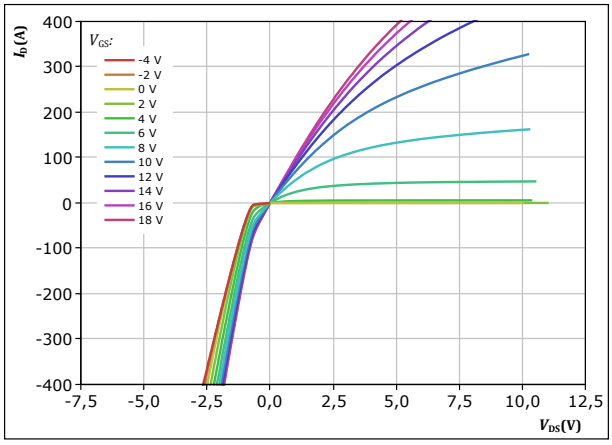


t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



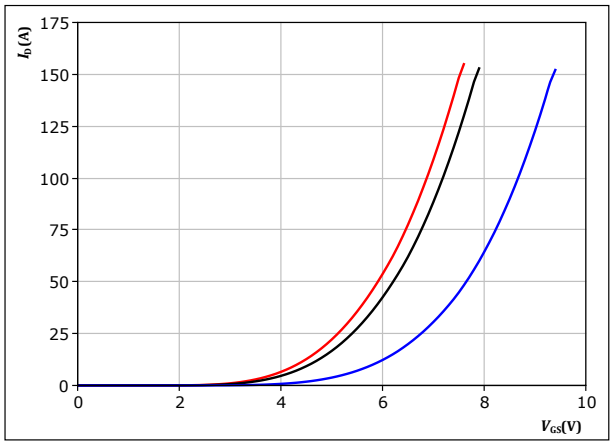
t_p =	250	µs
T_j =	150	°C

V_{GS} from -4 V to 18 V in steps of 2 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

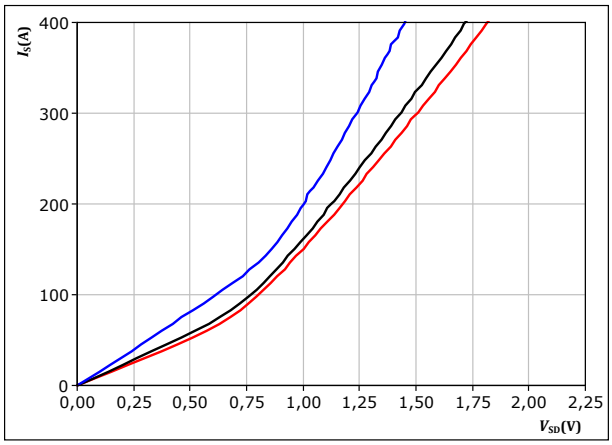


t_p =	250	µs		
V_{DS} =	30	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

Typical reverse drain current characteristics

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



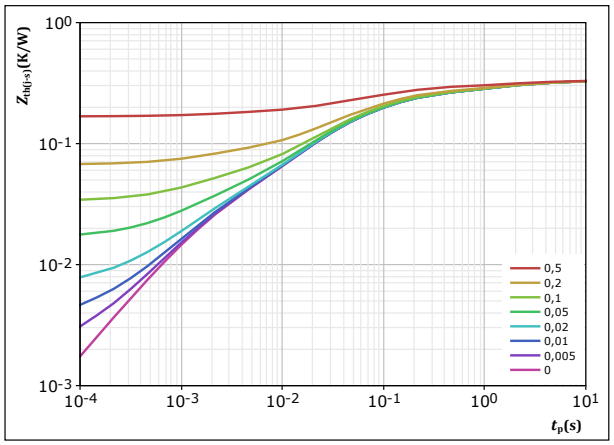
t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

Inner Boost 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	
$R_{th(j-s)}$ =	0,329	K/W

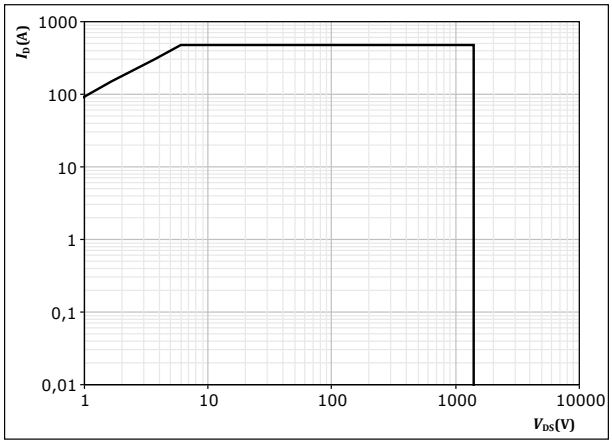
MOSFET thermal model values

R (K/W)	τ (s)
3,02E-02	7,11E+00
6,31E-02	1,07E+00
1,32E-01	1,01E-01
9,02E-02	2,26E-02
2,00E-02	1,60E-03

figure 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



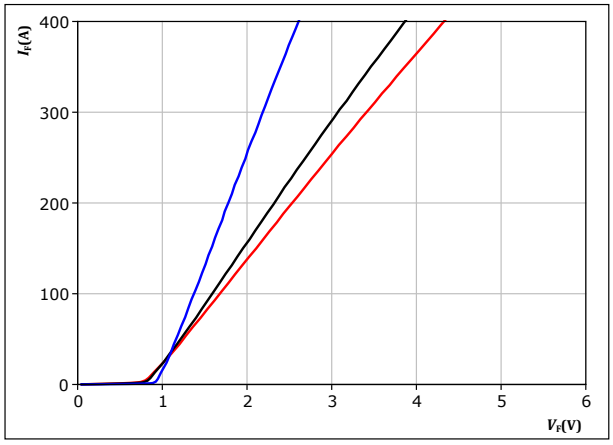
D =	single pulse	
T_s =	80	°C
V_{GS} =	18	V
T_j =	T_{jmax}	

Inner Boost Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



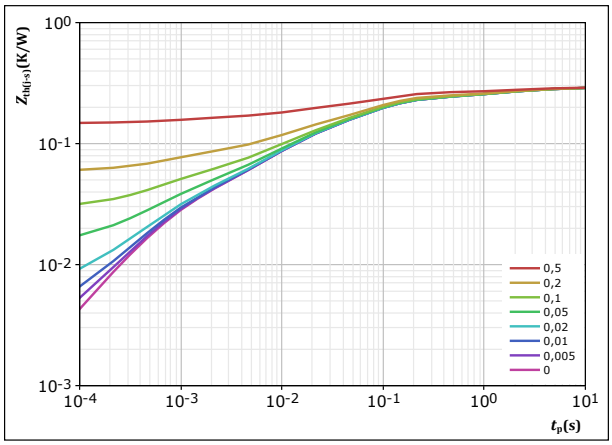
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,29 K/W

FWD thermal model values

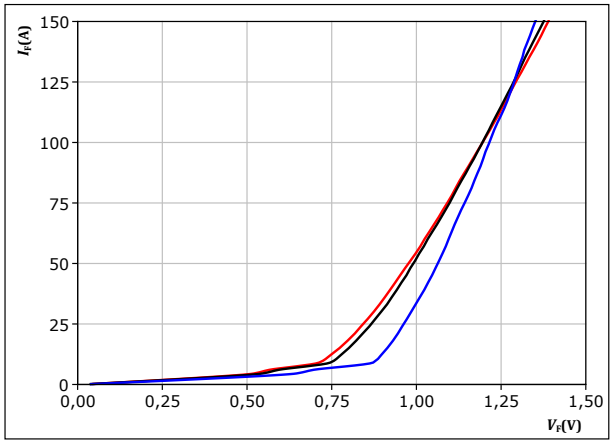
R (K/W)	τ (s)
1,97E-02	7,97E+00
4,43E-02	1,29E+00
1,37E-01	7,55E-02
6,65E-02	9,68E-03
2,67E-02	7,30E-04

Inner Boost Sw. Protection Diode Characteristics

figure 9. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



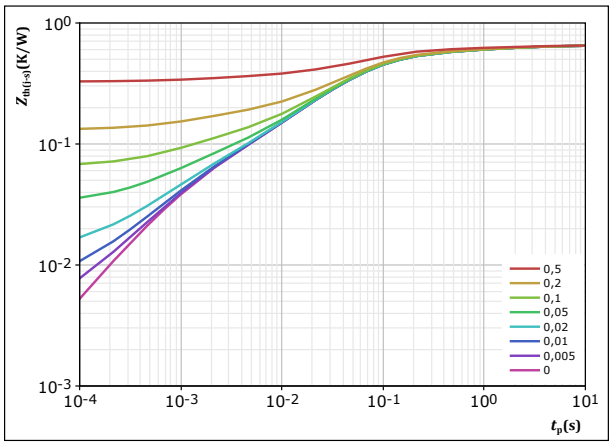
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 10. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,65 K/W

Rectifier thermal model values

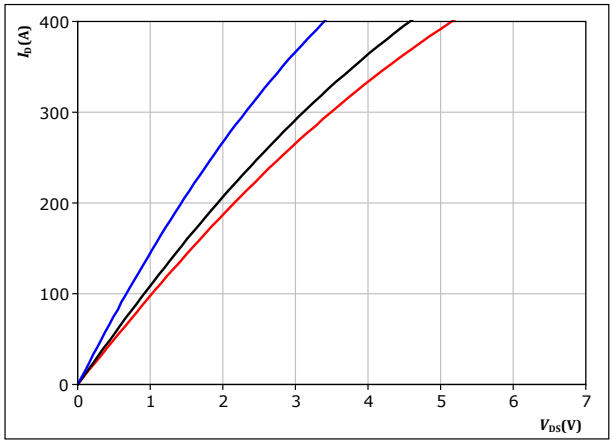
R (K/W)	τ (s)
1,73E-02	1,08E+01
6,50E-02	1,55E+00
1,07E-01	2,30E-01
3,45E-01	5,48E-02
7,56E-02	1,22E-02
4,07E-02	1,35E-03
4,61E-03	3,90E-04

Outer Boost Switch Characteristics

figure 11. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

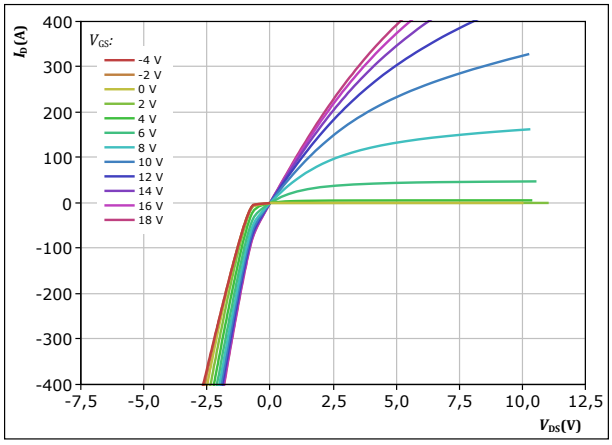


t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

figure 12. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



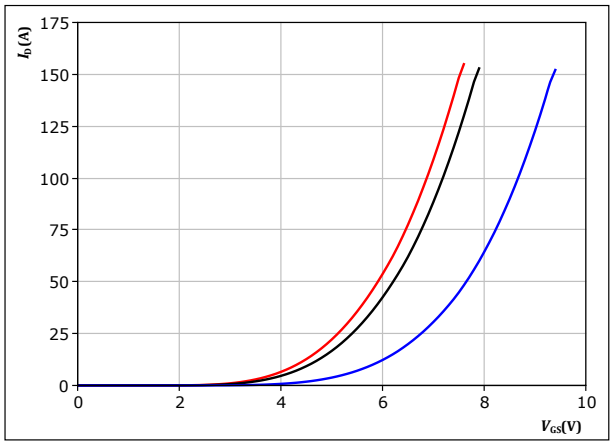
t_p =	250	µs
T_j =	150	°C

V_{GS} from -4 V to 18 V in steps of 2 V

figure 13. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

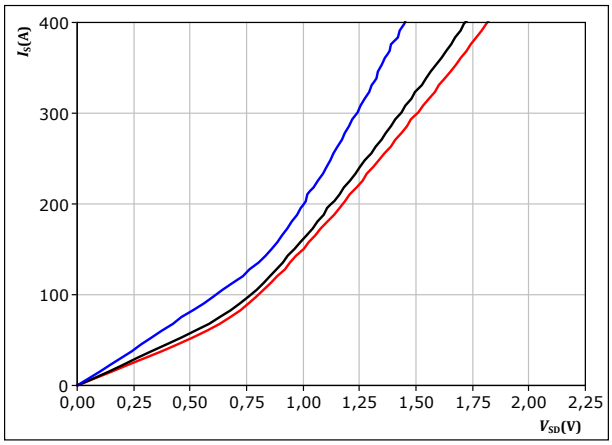


t_p =	250	µs		
V_{DS} =	30	V	T_j:	25 °C
				125 °C
				150 °C

figure 14. **MOSFET**

Typical reverse drain current characteristics

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



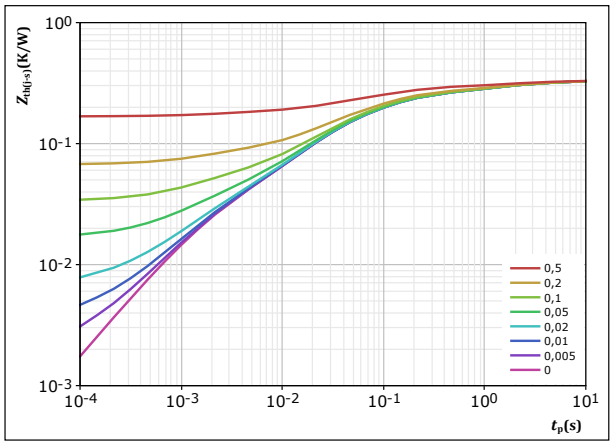
t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

Outer Boost Switch Characteristics

figure 15. **MOSFET**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,329	K/W

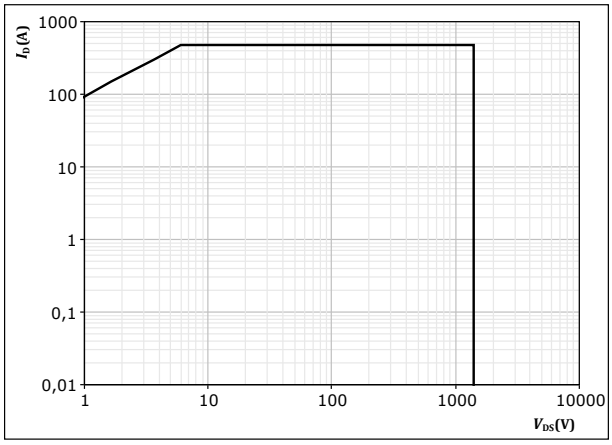
MOSFET thermal model values

R (K/W)	τ (s)
3,02E-02	7,11E+00
6,31E-02	1,07E+00
1,32E-01	1,01E-01
9,02E-02	2,26E-02
2,00E-02	1,60E-03

figure 16. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



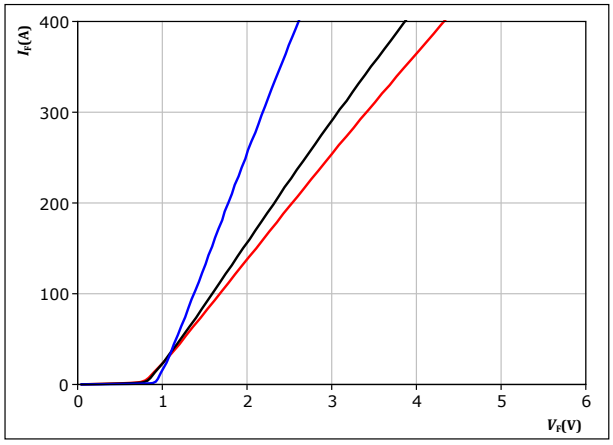
D =	single pulse	
T_s =	80	°C
V_{GS} =	18	V
T_j =	T_{jmax}	

Outer Boost Diode Characteristics

figure 17. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



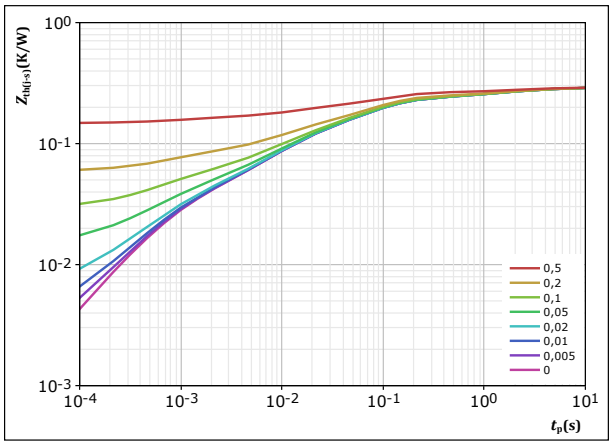
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 18. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,29 K/W

FWD thermal model values

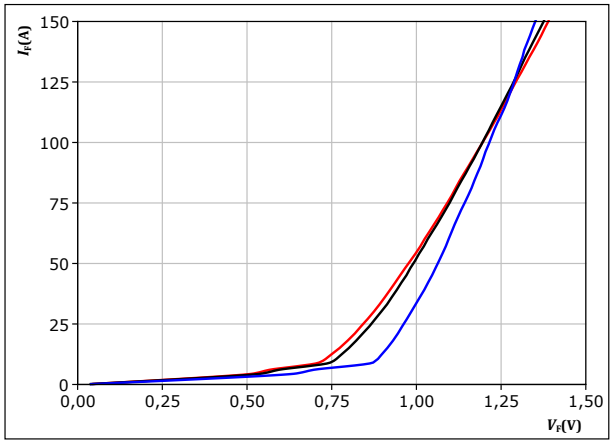
R (K/W)	τ (s)
1,97E-02	7,97E+00
4,43E-02	1,29E+00
1,37E-01	7,55E-02
6,65E-02	9,68E-03
2,67E-02	7,30E-04

Outer Boost Sw. Protection Diode Characteristics

figure 19. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



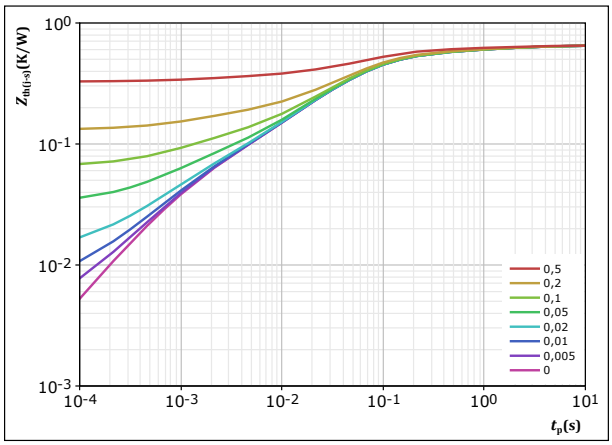
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 20. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,65 K/W

Rectifier thermal model values

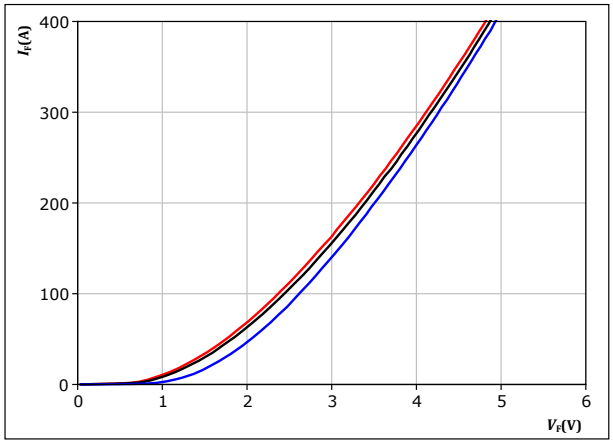
R (K/W)	τ (s)
1,73E-02	1,08E+01
6,50E-02	1,55E+00
1,07E-01	2,30E-01
3,45E-01	5,48E-02
7,56E-02	1,22E-02
4,07E-02	1,35E-03
4,61E-03	3,90E-04

Aux Diode H Characteristics

figure 21. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



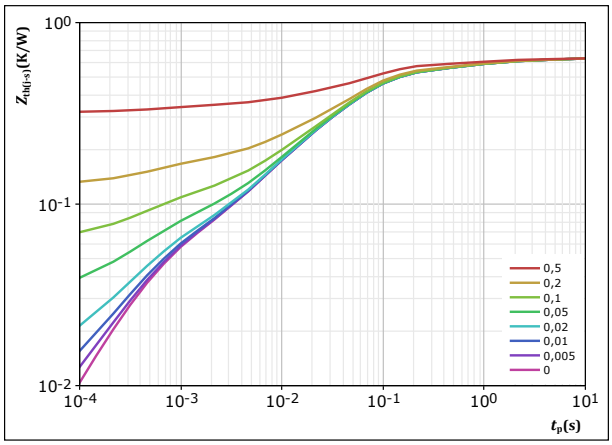
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 22. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,635 K/W

FWD thermal model values

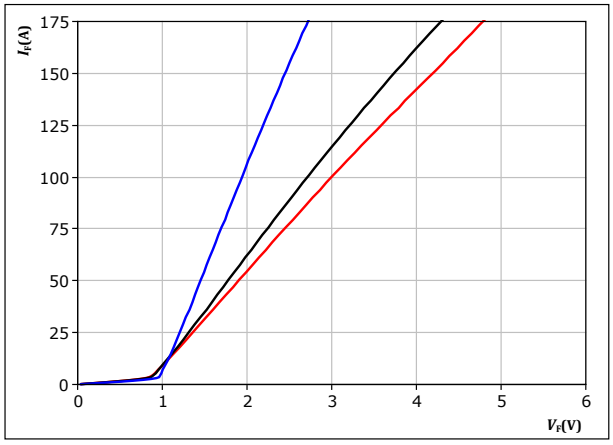
R (K/W)	τ (s)
3,53E-02	5,28E+00
9,25E-02	6,12E-01
3,69E-01	5,76E-02
9,59E-02	8,29E-03
4,70E-02	4,97E-04

Aux Diode L Characteristics

figure 23. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



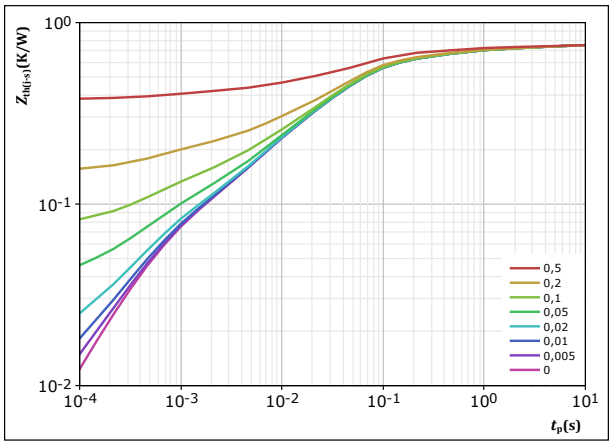
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 24. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,752 K/W

FWD thermal model values

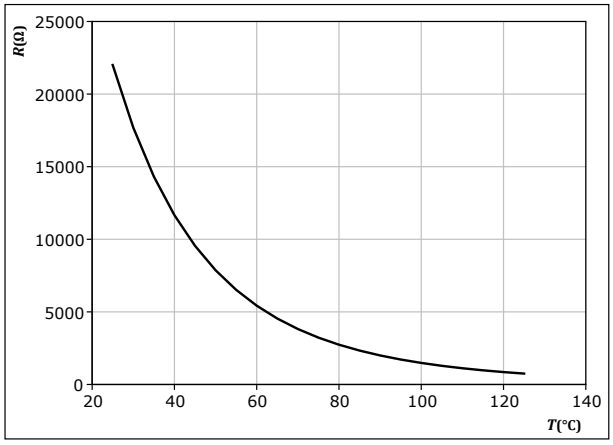
R (K/W)	τ (s)
5,66E-02	3,74E+00
1,20E-01	3,49E-01
4,06E-01	4,61E-02
1,12E-01	6,42E-03
6,04E-02	5,73E-04

Thermistor Characteristics

figure 25. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

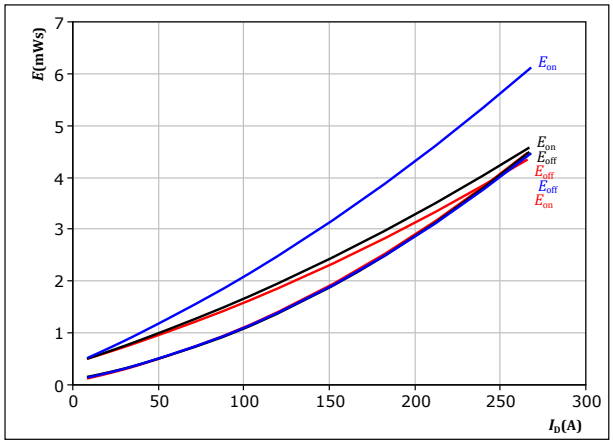


Inner Boost Switching Characteristics

figure 26. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



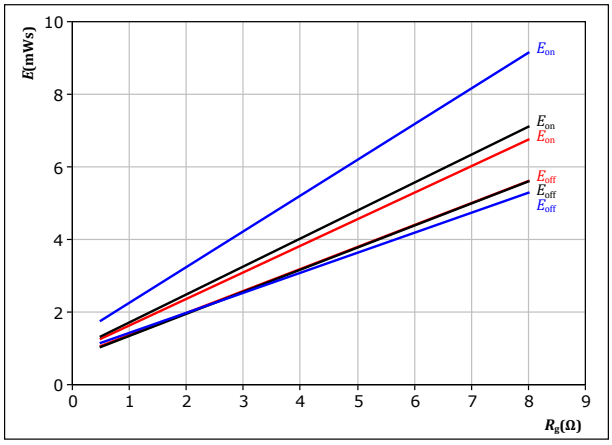
With an inductive load at

V_{DS} =	800	V	T_j: 25 °C
V_{GS} =	-4/18	V	125 °C
R_{gon} =	2	Ω	150 °C
R_{goff} =	2	Ω	

figure 27. **MOSFET**

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

$E = f(R_g)$



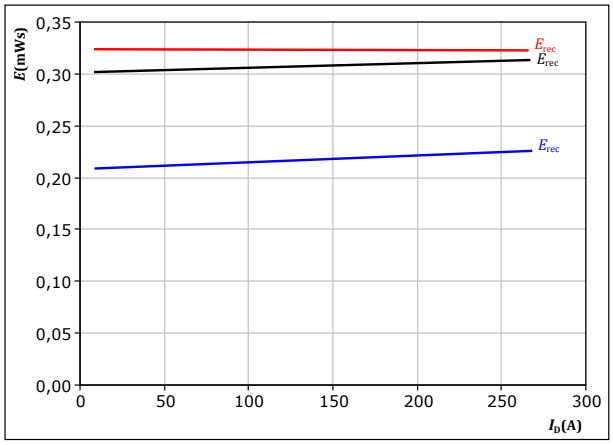
With an inductive load at

V_{DS} =	800	V	T_j: 25 °C
V_{GS} =	-4/18	V	125 °C
I_D =	150	A	150 °C

figure 28. **FWD**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



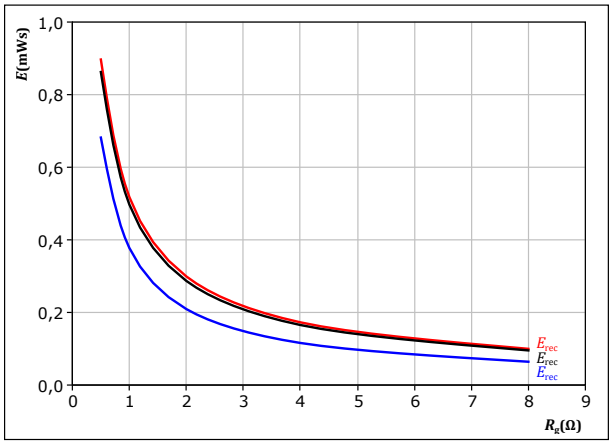
With an inductive load at

V_{DS} =	800	V	T_j: 25 °C
V_{GS} =	-4/18	V	125 °C
R_{gon} =	2	Ω	150 °C

figure 29. **FWD**

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

$E_{rec} = f(R_g)$



With an inductive load at

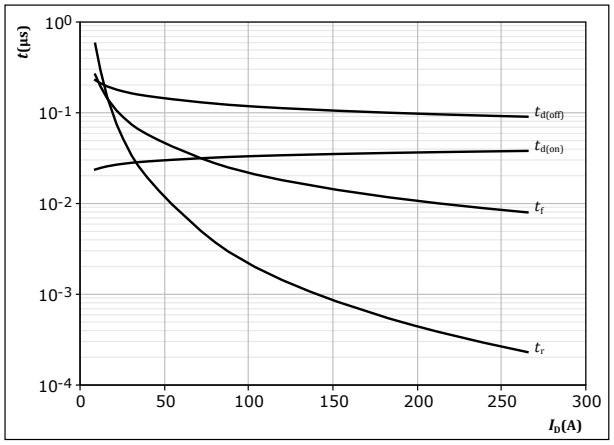
V_{DS} =	800	V	T_j: 25 °C
V_{GS} =	-4/18	V	125 °C
I_D =	150	A	150 °C

Inner Boost Switching Characteristics

figure 30. **MOSFET**

Typical switching times as a function of drain current

t = f(I_D)



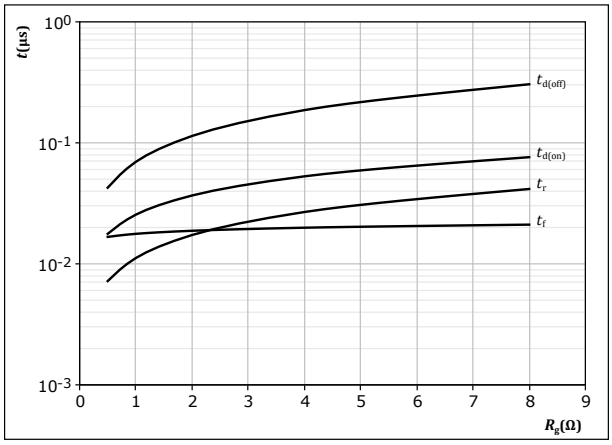
With an inductive load at

T_j =	150	°C
V_{DS} =	800	V
V_{GS} =	-4/18	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 31. **MOSFET**

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

t = f(R_g)



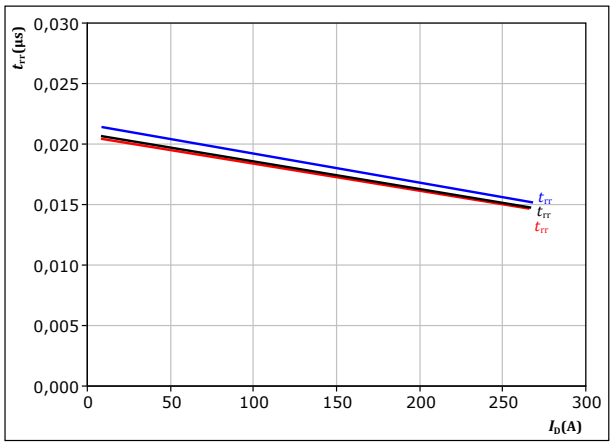
With an inductive load at

T_j =	150	°C
V_{DS} =	800	V
V_{GS} =	-4/18	V
I_D =	150	A

figure 32. **FWD**

Typical reverse recovery time as a function of drain current

t_{rr} = f(I_D)



At

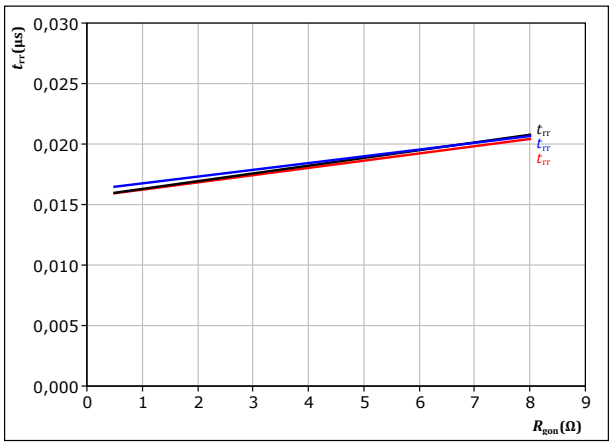
V_{DS} =	800	V
V_{GS} =	-4/18	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 33. **FWD**

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

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



At

V_{DS} =	800	V
V_{GS} =	-4/18	V
I_D =	150	A

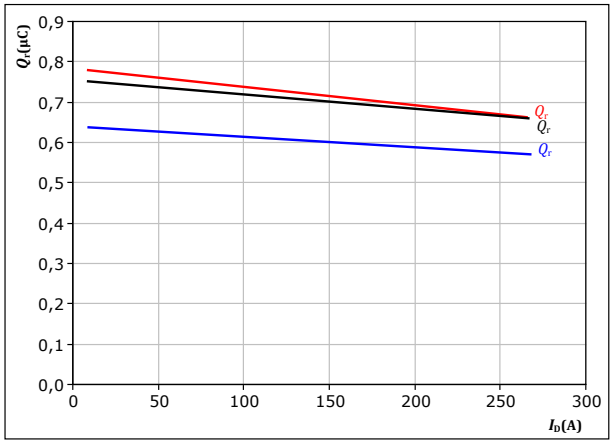
T_j: 25 °C, 125 °C, 150 °C

Inner Boost Switching Characteristics

figure 34. **FWD**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

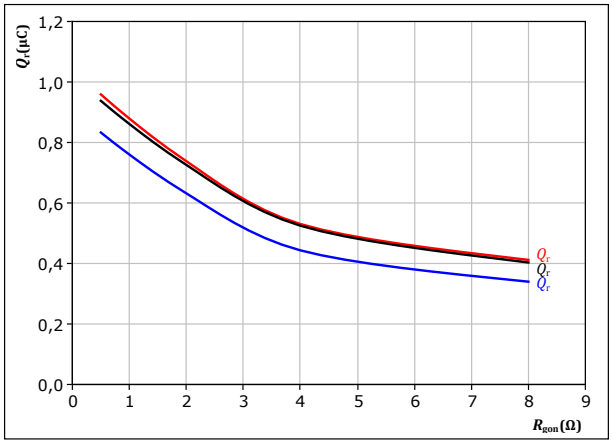


At				T_j:	
	V_{DS} =	800	V		25 °C
	V_{GS} =	-4/18	V		125 °C
	R_{gon} =	2	Ω		150 °C

figure 35. **FWD**

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

$Q_r = f(R_{gon})$

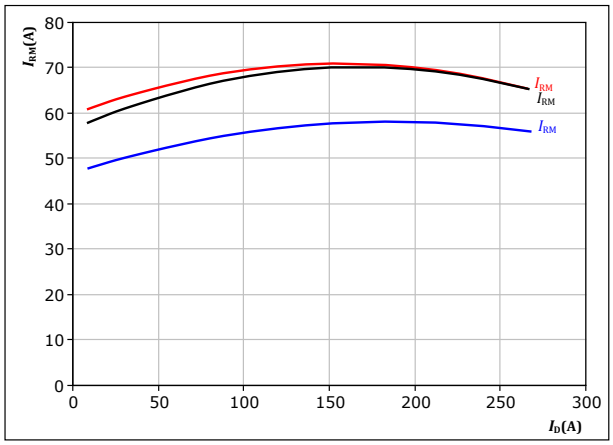


At				T_j:	
	V_{DS} =	800	V		25 °C
	V_{GS} =	-4/18	V		125 °C
	I_D =	150	A		150 °C

figure 36. **FWD**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

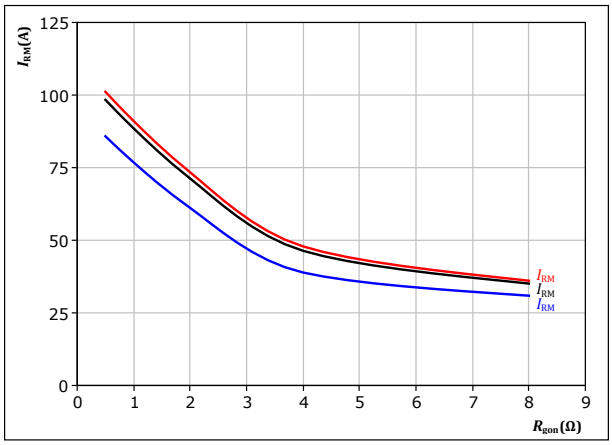


At				T_j:	
	V_{DS} =	800	V		25 °C
	V_{GS} =	-4/18	V		125 °C
	R_{gon} =	2	Ω		150 °C

figure 37. **FWD**

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

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



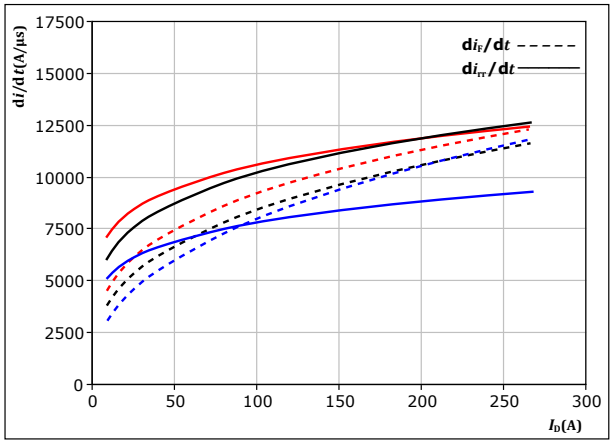
At				T_j:	
	V_{DS} =	800	V		25 °C
	V_{GS} =	-4/18	V		125 °C
	I_D =	150	A		150 °C

Inner Boost Switching Characteristics

figure 38. **FWD**

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)

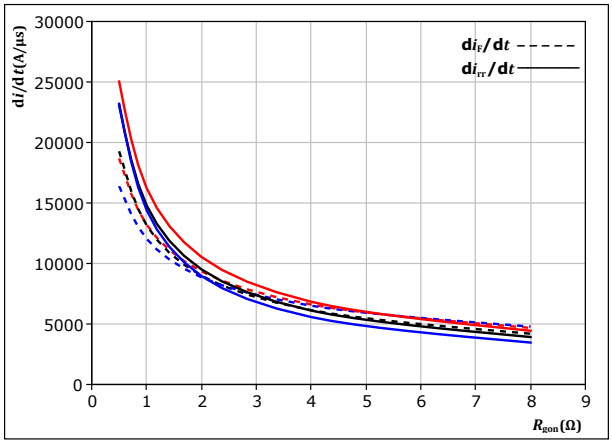


At					
	V_{DS} =	800	V		
	V_{GS} =	-4/18	V	T_j:	25 °C
	R_{gon} =	2	Ω		125 °C
					150 °C

figure 39. **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})

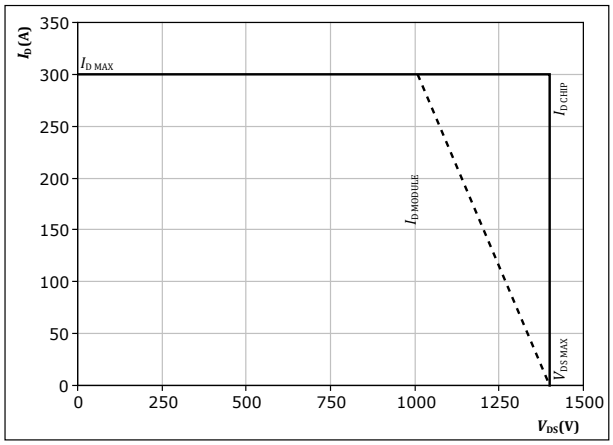


At					
	V_{DS} =	800	V		
	V_{GS} =	-4/18	V	T_j:	25 °C
	I_D =	150	A		125 °C
					150 °C

figure 40. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



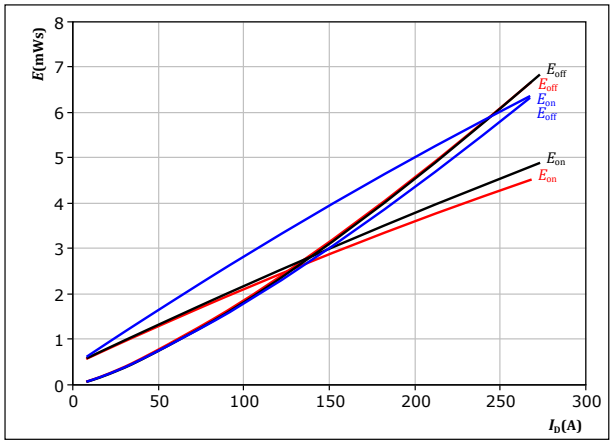
At			
	T_j =	150	°C
	R_{gon} =	2	Ω
	R_{goff} =	2	Ω

Outer Boost Switching Characteristics

figure 41. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



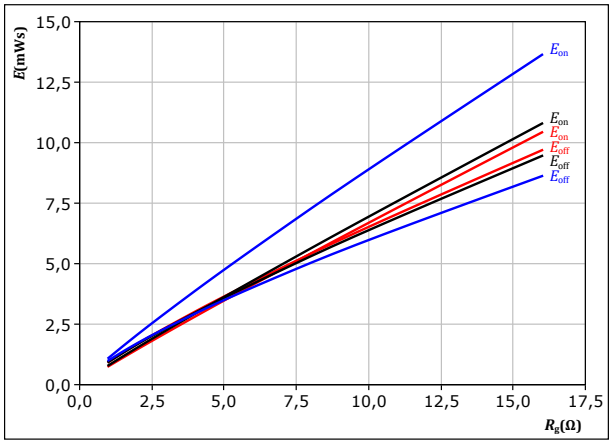
With an inductive load at

			T_j:	
V_{DS} =	800	V		25 °C
V_{GS} =	-4/18	V		125 °C
R_{gon} =	4	Ω		150 °C
R_{goff} =	4	Ω		

figure 42. **MOSFET**

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

$E = f(R_g)$



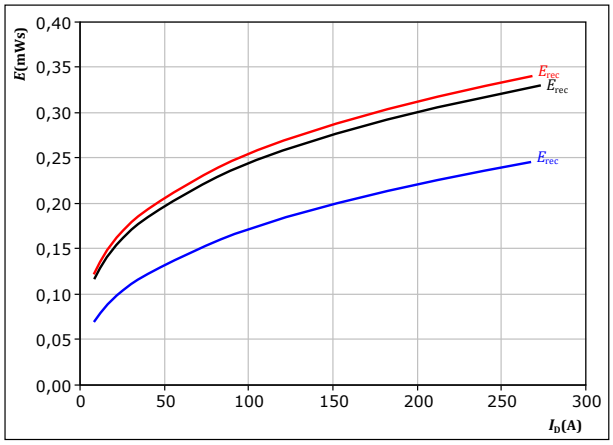
With an inductive load at

			T_j:	
V_{DS} =	800	V		25 °C
V_{GS} =	-4/18	V		125 °C
I_D =	150	A		150 °C

figure 43. **FWD**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



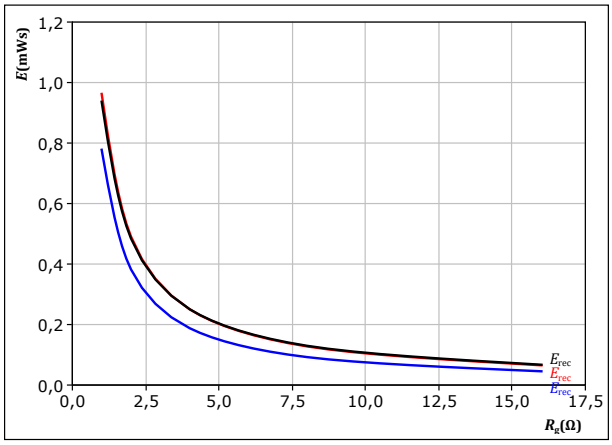
With an inductive load at

			T_j:	
V_{DS} =	800	V		25 °C
V_{GS} =	-4/18	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 44. **FWD**

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

$E_{rec} = f(R_g)$



With an inductive load at

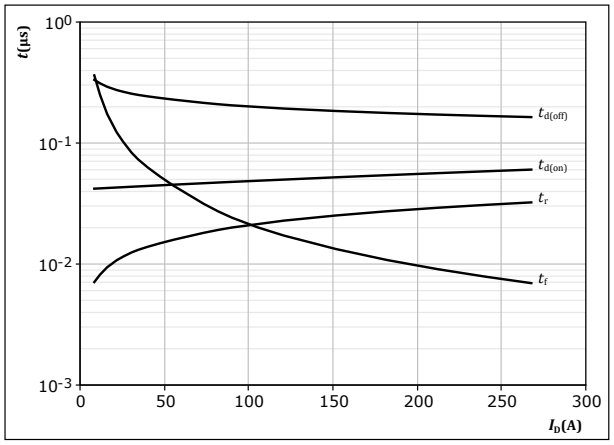
			T_j:	
V_{DS} =	800	V		25 °C
V_{GS} =	-4/18	V		125 °C
I_D =	150	A		150 °C

Outer Boost Switching Characteristics

figure 45. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



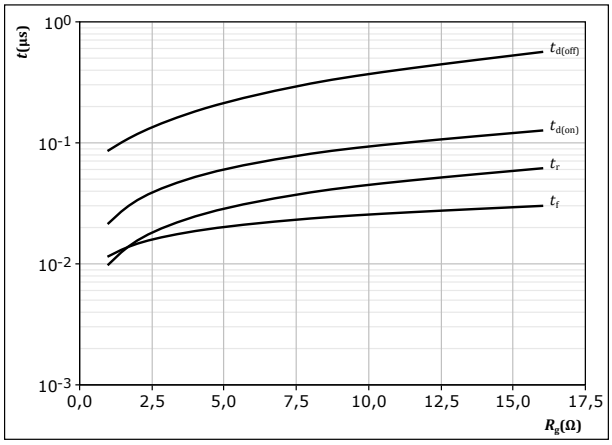
With an inductive load at

T_j =	150	°C
V_{DS} =	800	V
V_{GS} =	-4/18	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 46. **MOSFET**

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

$t = f(R_g)$



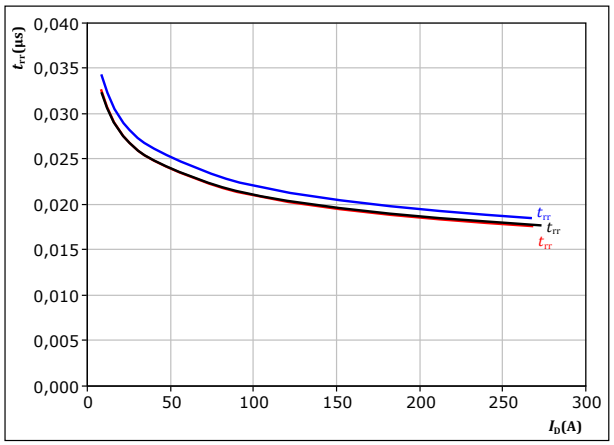
With an inductive load at

T_j =	150	°C
V_{DS} =	800	V
V_{GS} =	-4/18	V
I_D =	150	A

figure 47. **FWD**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



At

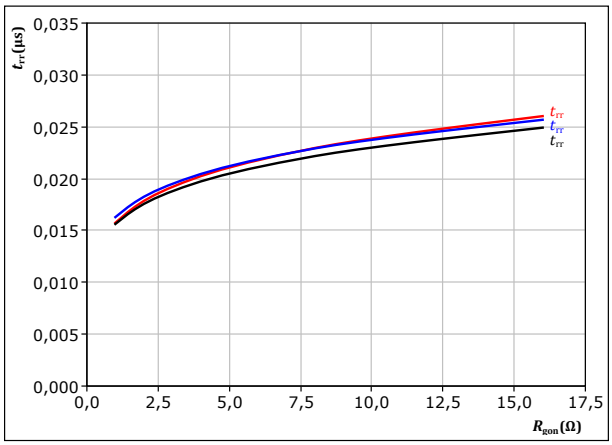
V_{DS} =	800	V
V_{GS} =	-4/18	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 48. **FWD**

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

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



At

V_{DS} =	800	V
V_{GS} =	-4/18	V
I_D =	150	A

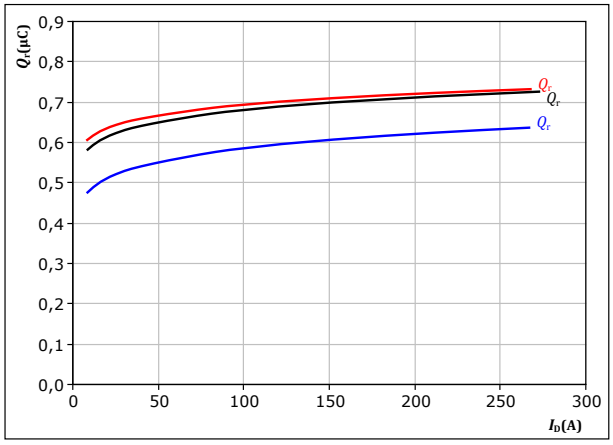
T_j: 25 °C, 125 °C, 150 °C

Outer Boost Switching Characteristics

figure 49. **FWD**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

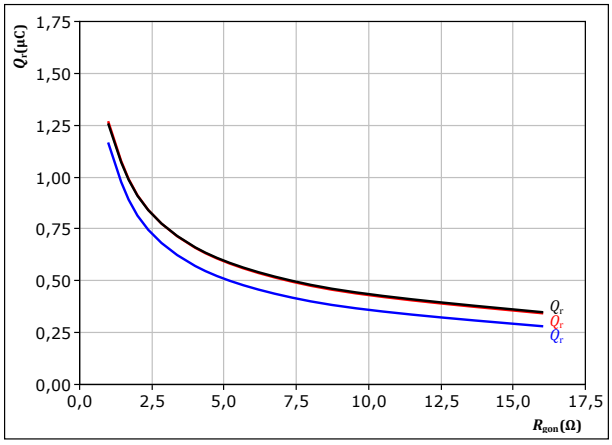


At					
	V_{DS} =	800	V		
	V_{GS} =	-4/18	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 50. **FWD**

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

$Q_r = f(R_{gon})$

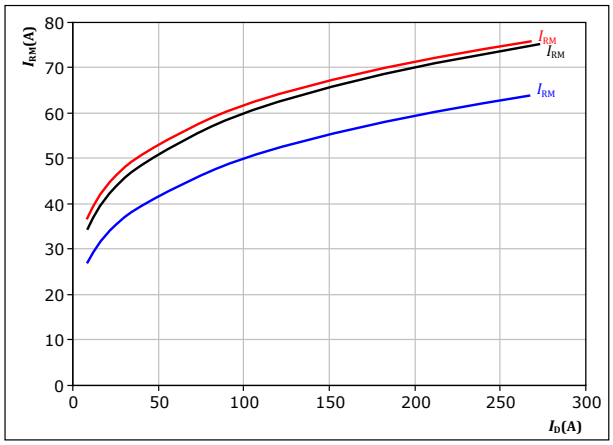


At					
	V_{DS} =	800	V		
	V_{GS} =	-4/18	V	T_j:	25 °C
	I_D =	150	A		125 °C
					150 °C

figure 51. **FWD**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

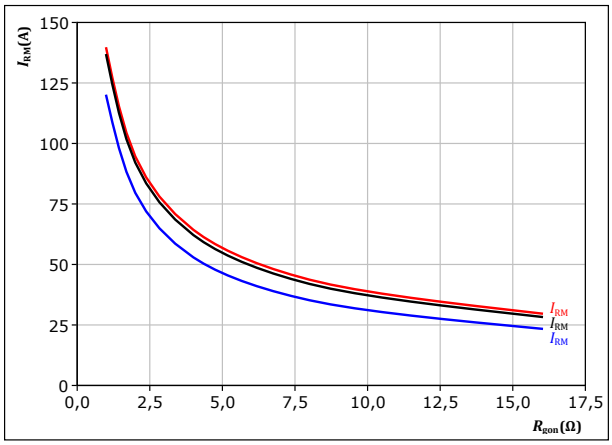


At					
	V_{DS} =	800	V		
	V_{GS} =	-4/18	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 52. **FWD**

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

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



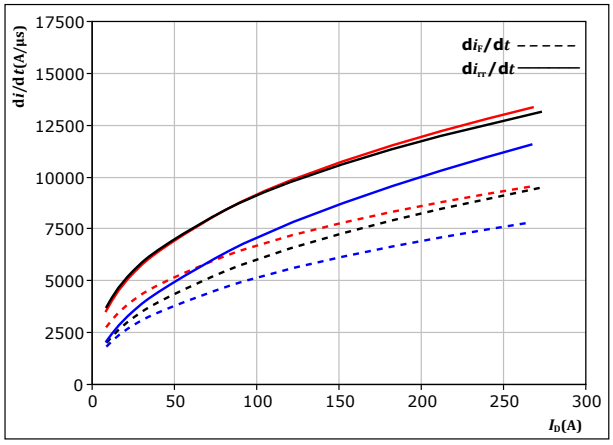
At					
	V_{DS} =	800	V		
	V_{GS} =	-4/18	V	T_j:	25 °C
	I_D =	150	A		125 °C
					150 °C

Outer Boost Switching Characteristics

figure 53. **FWD**

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)

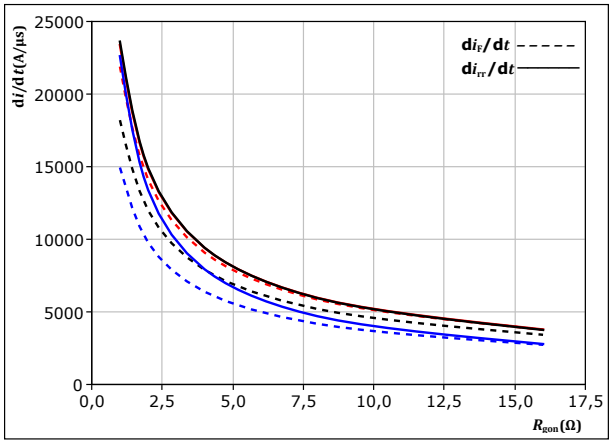


At				
	V_{DS} =	800	V	
	V_{GS} =	-4/18	V	
	R_{gon} =	4	Ω	
	T_j:			25 °C
				125 °C
				150 °C

figure 54. **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})

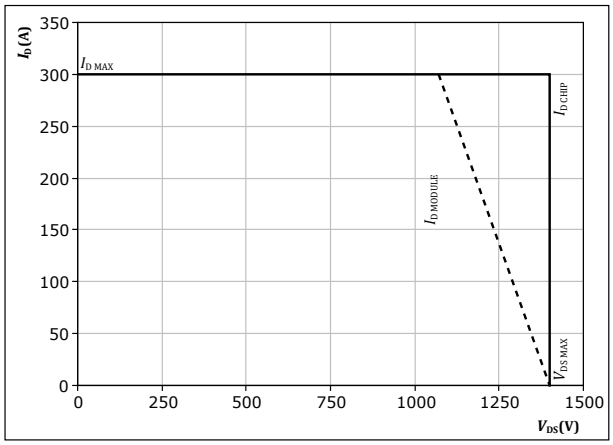


At				
	V_{DS} =	800	V	
	V_{GS} =	-4/18	V	
	I_D =	150	A	
	T_j:			25 °C
				125 °C
				150 °C

figure 55. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



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

Switching Definitions

figure 56. MOSFET

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

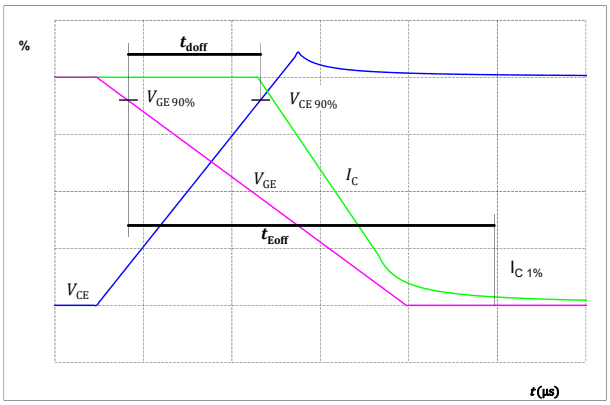


figure 57. MOSFET

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

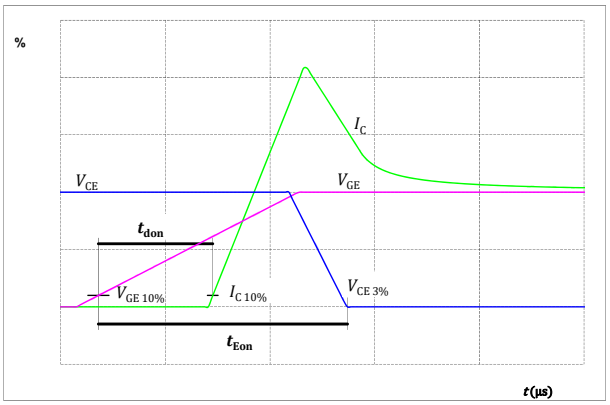


figure 58. MOSFET

Turn-off Switching Waveforms & definition of t_f

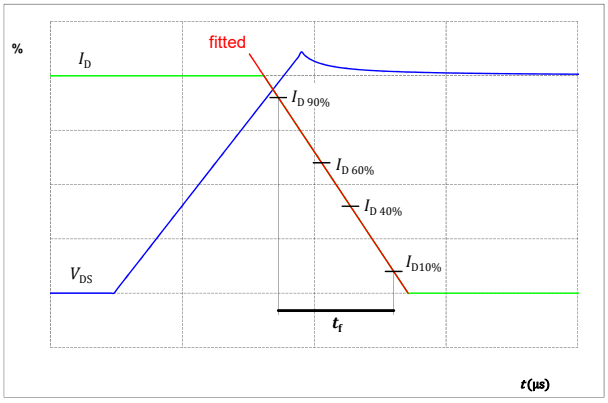
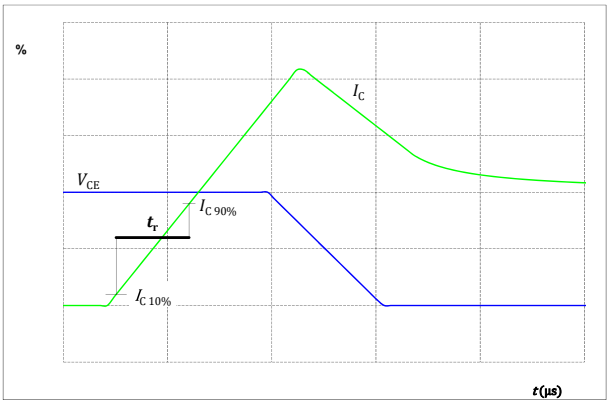


figure 59. MOSFET

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 60. **FWD**

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

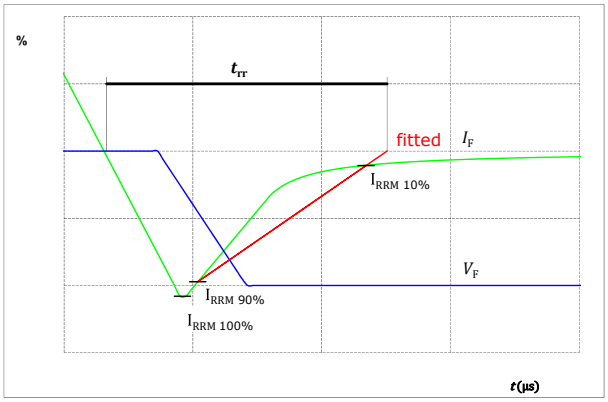


figure 61. **FWD**

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

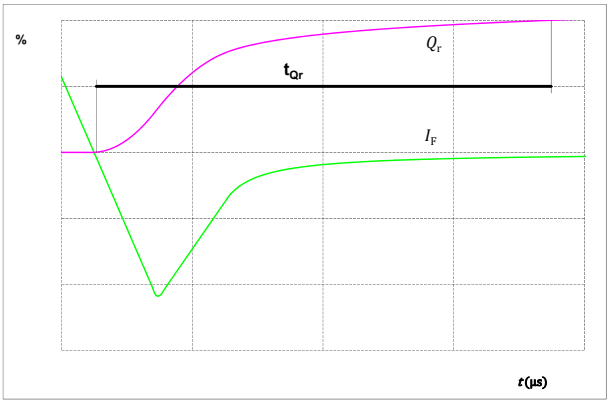
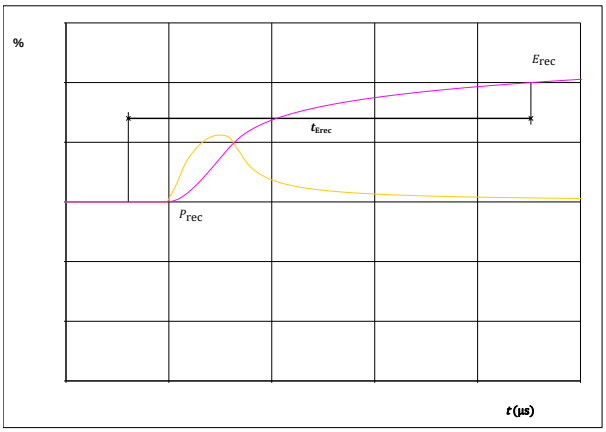


figure 62. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	30-EQ14B2A007WS01-PS29F28T
With thermal paste (5,2 W/mK, PTM6000HV)	30-EQ14B2A007WS01-PS29F28T-/7/

Marking

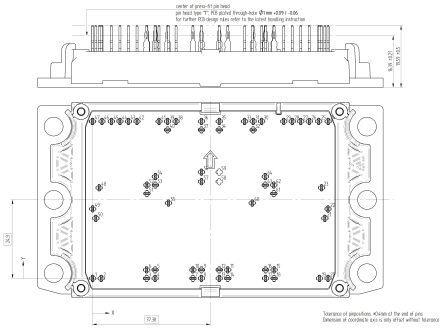
	Name	Date code	Logo	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV	WWYY	VIN	LLLLL	SSSS

	Type&Ver	Lot number	Serial	Date code		
Datamatrix	TTTTTTVV	LLLLL	SSSS	WWYY		

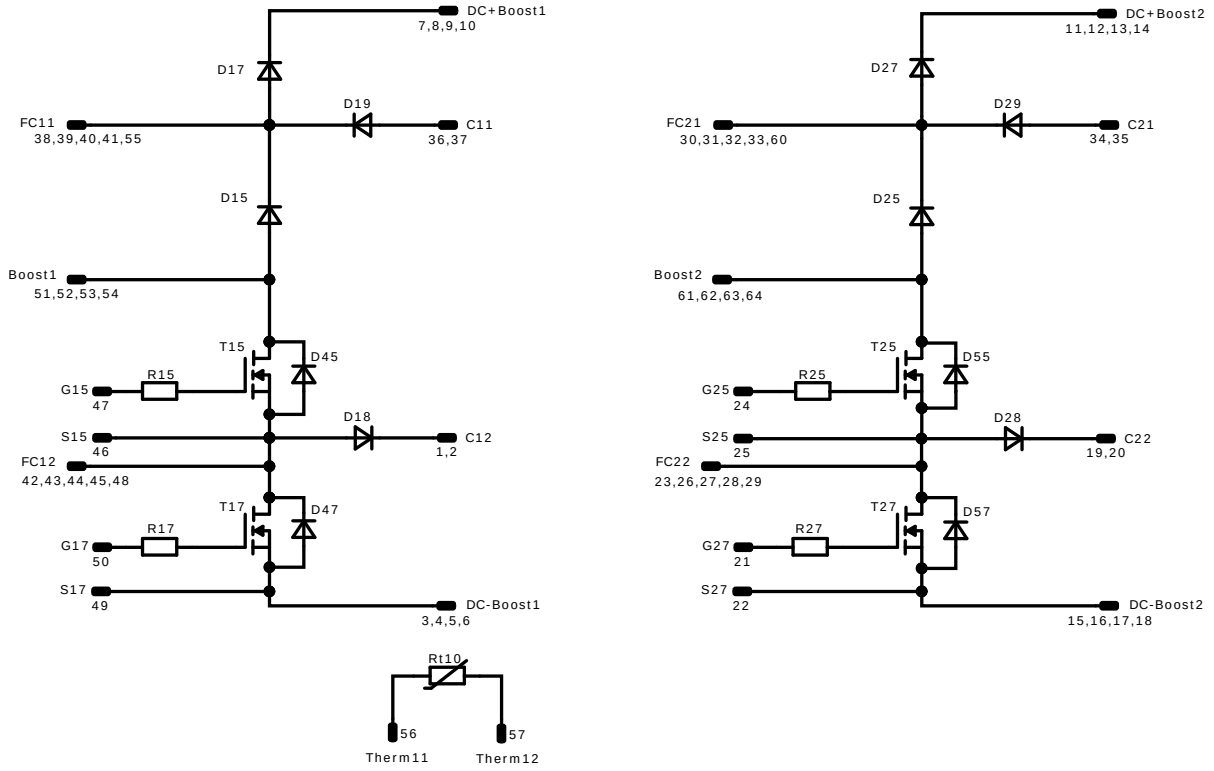
Outline

Pin table [mm]

Pin	X	Y	Function	Pin	X	Y	Function
1	0,05	0	C12	33	48,26	49,8	FC21
2	2,75	0	C12	34	40,21	47,1	C21
3	17,15	0	DC-Boost1	35	40,21	49,8	C21
4	19,85	0	DC-Boost1	36	34,55	49,8	C11
5	19,85	2,7	DC-Boost1	37	34,55	47,1	C11
6	17,15	2,7	DC-Boost1	38	26,5	49,8	FC11
7	31,85	0	DC+Boost1	39	23,8	49,8	FC11
8	34,55	0	DC+Boost1	40	23,8	47,1	FC11
9	34,55	2,7	DC+Boost1	41	21,1	49,8	FC11
10	31,85	2,7	DC+Boost1	42	14,1	49,8	FC12
11	42,91	2,7	DC+Boost2	43	11,4	49,8	FC12
12	40,21	2,7	DC+Boost2	44	8,7	49,8	FC12
13	40,21	0	DC+Boost2	45	6	49,8	FC12
14	42,91	0	DC+Boost2	46	3	49,8	S15
15	57,61	2,7	DC-Boost2	47	0	49,8	G15
16	54,91	2,7	DC-Boost2	48	2,1	28,75	FC12
17	54,91	0	DC-Boost2	49	0,05	22,05	S17
18	57,61	0	DC-Boost2	50	1,05	19,05	G17
19	72,01	0	C22	51	17,25	26,9	Boost1
20	74,71	0	C22	52	17,25	29,6	Boost1
21	73,71	19,05	G27	53	19,95	29,6	Boost1
22	74,71	22,05	S27	54	19,95	32,3	Boost1
23	72,66	28,75	FC22	55	24,1	23,9	FC11
24	74,76	49,8	G25	56	34,55	33,7	Therm11
25	71,76	49,8	S25	57	34,55	30,7	Therm12
26	68,76	49,8	FC22	58	not assembled		
27	66,06	49,8	FC22	59	not assembled		
28	63,36	49,8	FC22	60	50,66	23,9	FC21
29	60,66	49,8	FC22	61	57,51	26,9	Boost2
30	53,66	49,8	FC21	62	57,51	29,6	Boost2
31	50,96	49,8	FC21	63	54,81	29,6	Boost2
32	50,96	47,1	FC21	64	54,81	32,3	Boost2



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T15, T25	MOSFET	1400 V	5,43 mΩ	Inner Boost Switch	
D15, D25	FWD	1400 V	160 A	Inner Boost Diode	
D45, D55	Rectifier	1600 V	50 A	Inner Boost Sw. Protection Diode	
T17, T27	MOSFET	1400 V	5,43 mΩ	Outer Boost Switch	
D17, D27	FWD	1400 V	160 A	Outer Boost Diode	
D47, D57	Rectifier	1600 V	50 A	Outer Boost Sw. Protection Diode	
D19, D29	FWD	1400 V	140 A	Aux Diode H	
D18, D28	FWD	1400 V	60 A	Aux Diode L	
R15, R17, R25, R27	Resistor			Resistor (Gate)	
Rt	Thermistor			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 24	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* E3BP packages see vincotech.com website.

Package data
Package data for *flow* E3BP packages see vincotech.com website.

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

Application Note
For use of pre-charging auxiliary diodes see application note: "The Advantages and Operation of Flying-Capacitor Boosters" at vincotech.com

UL recognition and file number
Certification pending. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
30-EQ14B2A007WS01-PS29F28T-D1-14	11 Dec. 2025	Initial Release	