



Vincotech

30-EX14B2A007WS01-PS29F28Z

datasheet

flowBOOST E3BP dual

1400 V / 7 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: Al₂O₃
- Cu baseplate
- Convex shaped baseplate for superior thermal contact
- CTI600 housing material
- Baseplate with rough surface
- Solder pin
- Thermo-mechanical push-and-pull force relief

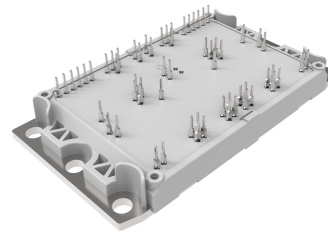
Target applications

- Solar Inverters

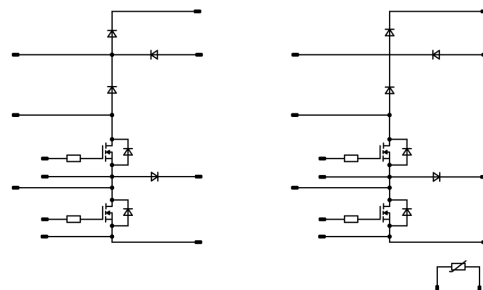
Types

- 30-EX14B2A007WS01-PS29F28Z

flow E3BP 15 mm housing



Schematic





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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
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Inner Boost Switch

Drain-source voltage	V_{DS}		1400	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	135	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	609	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	240	W
Gate-source voltage	V_{GS}	static	-10 / 22	V
		dynamic	-11 / 25	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	163	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	948	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	1800	A
Surge current capability	I^2t		16192	A²s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	313	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	116	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	600	A
Surge current capability	I^2t		1800	A²s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	146	W
Maximum junction temperature	T_{jmax}		175	°C



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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Outer Boost Switch				
Drain-source voltage	V_{DS}		1400	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	135	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	609	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	240	W
Gate-source voltage	V_{GS}	static	-10 / 22	V
		dynamic	-11 / 25	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	163	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	948	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	1800	A
Surge current capability	I^2t		16192	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	313	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	116	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	600	A
Surge current capability	I^2t		1800	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	146	W
Maximum junction temperature	T_{jmax}		175	°C



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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
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Aux Diode H

Peak repetitive reverse voltage	V_{RRM}		1400	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	73	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	420	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	77	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	501	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	657	A
Surge current capability	I^2t		2151	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	167	W
Maximum junction temperature	T_{jmax}		175	°C

Resistor (Gate)

DC current	I	terminal temperature $T_k = 90\text{ °C}$	1060	mA
Power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	0,75	W
Operation Temperature	T_{op}		-55 ... 155	°C



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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
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Module Properties

Thermal Properties

Storage temperature	T_{stg}		-40...+125	°C
Operation temperature under switching condition	T_{jop}		-40...+175 *	°C

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage** $t_p = 2\text{ s}$	6800	V
Creepage distance			12,56	mm
Clearance			11,81	mm
Comparative Tracking Index	CTI		≥ 600	

* The chip temperature under switching has an impact on the total lifetime. Please request a lifetime calculation for your mission profile.

** 100 % tested in production



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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		180	25 125 150		6,65 10,8 12,4	9,33 ⁽¹⁾	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,06	25	1,8	2,6	4,2	V
Gate to Source Leakage Current	I_{GSS}		18	0		25		3	750	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1400		25		3	300	μA
Internal gate resistance	r_g							0,567		Ω
Gate charge	Q_g	$V_{DD} = 1000$ V	-5/18		180	25		492		nC
Short-circuit input capacitance	C_{iss}	$f = 100$ kHz	0	1200	0	25		10011		pF
Short-circuit output capacitance	C_{oss}							381		
Reverse transfer capacitance	C_{rss}							27		
Diode forward voltage	V_{SD}		0		180	25		4,4		V

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,4		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 1$ Ω $R_{goff} = 1$ Ω	-5/18	800	150	25 125 150		24,94 23,67 23,62		ns
Rise time	t_r					25 125 150		8,24 7,72 7,41		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		66,87 74,82 77,12		ns
Fall time	t_f					25 125 150		8,83 10,76 10,86		ns
Turn-on energy (per pulse)	E_{on}	$Q_{rFWD} = 1,52$ μC $Q_{rFWD} = 1,54$ μC $Q_{rFWD} = 1,54$ μC				25 125 150		0,769 0,704 0,697		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,441 0,545 0,569		mWs



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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		1,41 1,73 1,86	1,6 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 1400$ V				25		20	640	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,3		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=22267$ A/μs $di/dt=19392$ A/μs $di/dt=22841$ A/μs	-5/18	800	150	25 125 150		160,47 161,4 163,34		A
Reverse recovery time	t_{rr}					25 125 150		16,32 16,21 16,23		ns
Recovered charge	Q_r					25 125 150		1,52 1,54 1,54		μC
Reverse recovered energy	E_{rec}					25 125 150		0,622 0,627 0,626		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		30681,18 36240,73 31813,62		A/μs



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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	$V_i = 1600$ V				25 150			50 1500	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,65		K/W
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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		180	25 125 150		6,65 10,8 12,4	9,33 ⁽¹⁾	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,06	25	1,8	2,6	4,2	V
Gate to Source Leakage Current	I_{GSS}		18	0		25		3	750	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1400		25		3	300	μA
Internal gate resistance	r_g							0,567		Ω
Gate charge	Q_g	$V_{DD} = 1000$ V	-5/18		180	25		492		nC
Short-circuit input capacitance	C_{iss}	$f = 100$ kHz	0	1200	0	25		10011		pF
Short-circuit output capacitance	C_{oss}							381		
Reverse transfer capacitance	C_{rss}							27		
Diode forward voltage	V_{SD}		0		180	25		4,4		V

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,4		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 1$ Ω $R_{goff} = 1$ Ω	-5/18	800	150	25 125 150		25,11 23,53 23,15		ns
Rise time	t_r					25 125 150		8,31 7,87 7,95		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		67,33 75,49 77,47		ns
Fall time	t_f					25 125 150		9,07 9,93 10,42		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		0,417 0,392 0,436		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,435 0,531 0,56		mWs



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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		1,41 1,73 1,86	1,6 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1400$ V				25		20	640	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,3		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=16016$ A/µs $di/dt=18794$ A/µs $di/dt=20900$ A/µs	-5/18	800	150	25 125 150		147,61 146,57 145,81		A
Reverse recovery time	t_{rr}					25 125 150		17,66 17,82 17,75		ns
Recovered charge	Q_r					25 125 150		1,54 1,54 1,53		µC
Reverse recovered energy	E_{rec}					25 125 150		0,644 0,625 0,619		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		26868,98 29839,62 25662,82		A/µs



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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⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,65			K/W
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Aux Diode H

Static

Forward voltage	V_F				140	25 125 150		3 2,85 2,78	3,3 ⁽¹⁾		V
Reverse leakage current	I_R	$V_r = 1400$ V				25			0,6		μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,64			K/W
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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		1,4 1,7 1,82	1,5 ⁽¹⁾		V
Reverse leakage current	I_R	$V_i = 1400$ V				25		9	240		μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,57			K/W
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Resistor (Gate)

Static

Resistance	R							0,667			Ω
Tolerance							-1		1		%
Temperature coefficient	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.



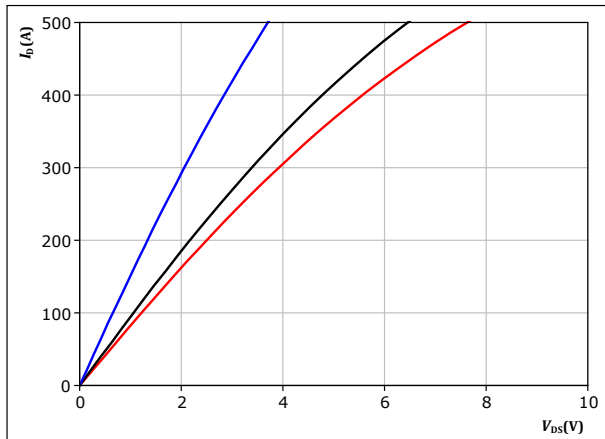
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Inner Boost Switch Characteristics

figure 1. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$

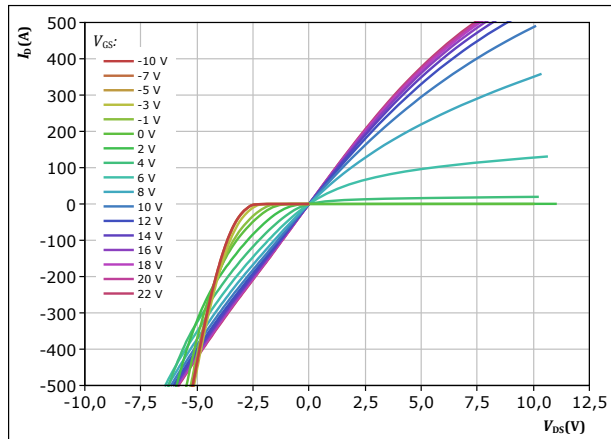


$t_p = 250 \mu s$
 $V_{GS} = 18 V$
 $T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 2. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$

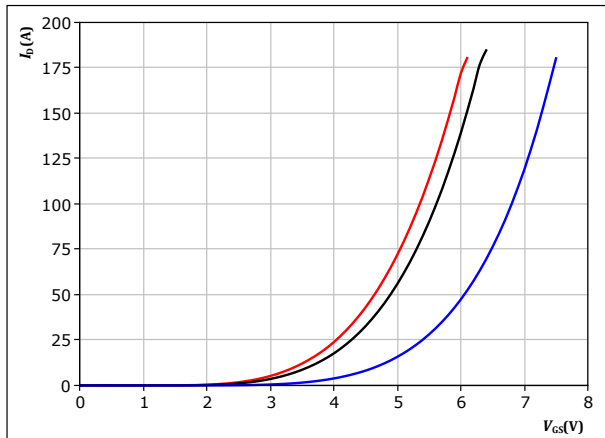


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GS} from -10 V to 22 V in steps of 3 V

figure 3. MOSFET

Typical transfer characteristics

$$I_D = f(V_{GS})$$

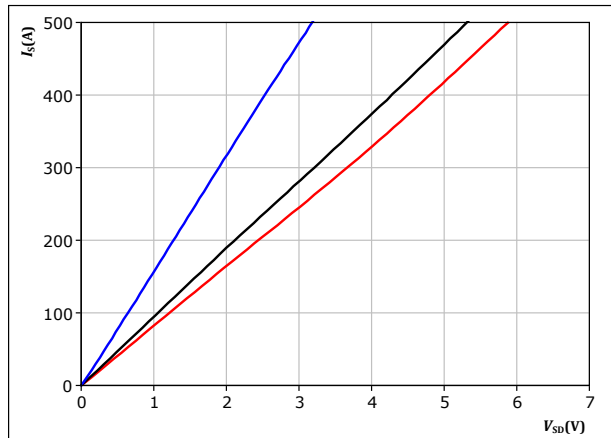


$t_p = 250 \mu s$
 $V_{DS} = 24 V$
 $T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 4. MOSFET

Typical reverse drain current characteristics

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



$t_p = 250 \mu s$
 $V_{GS} = 18 V$
 $T_j:$ — 25 °C
— 125 °C
— 150 °C



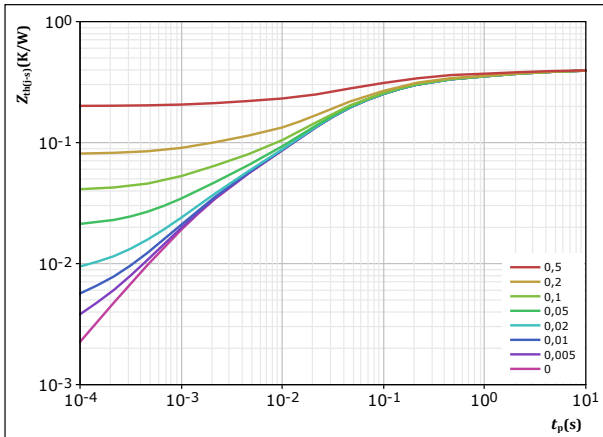
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Inner Boost Switch Characteristics

figure 5. MOSFET

Transient thermal impedance as a function of pulse width

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



$$D = t_p / T$$

$$R_{th(j-a)} = 0,395 \text{ K/W}$$

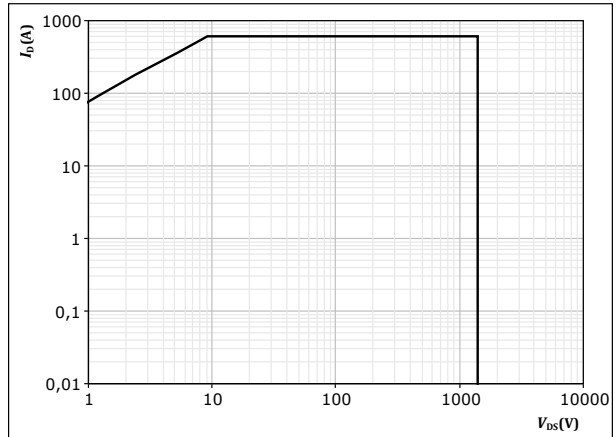
MOSFET thermal model values

R (K/W)	τ (s)
2,87E-02	7,60E+00
5,76E-02	1,10E+00
1,57E-01	1,16E-01
1,30E-01	2,33E-02
2,75E-02	1,72E-03

figure 6. MOSFET

Safe operating area

$$I_D = f(V_{DS})$$



D = single pulse

$$T_a = 80 \text{ } ^\circ\text{C}$$

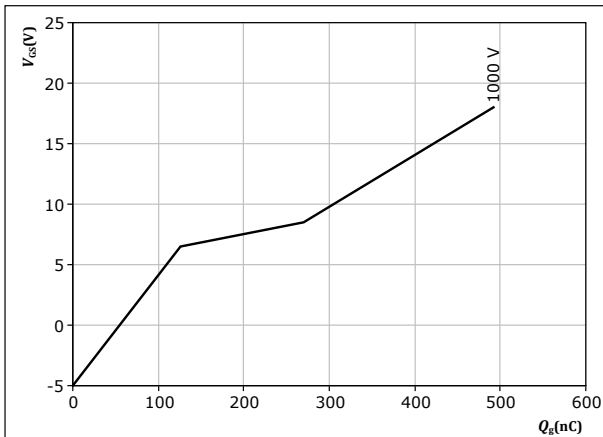
$$V_{GS} = 18 \text{ V}$$

$$T_j = T_{jmax}$$

figure 7. MOSFET

Gate voltage vs gate charge

$$V_{GS} = f(Q_g)$$



$$I_D = 180 \text{ A}$$

$$T_j = 25 \text{ } ^\circ\text{C}$$



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Inner Boost Diode Characteristics

figure 8.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

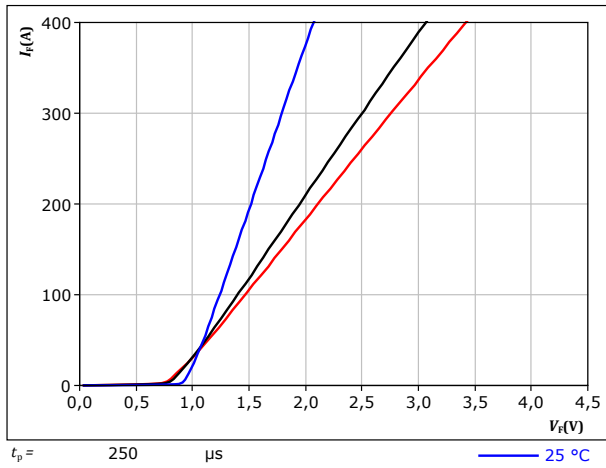
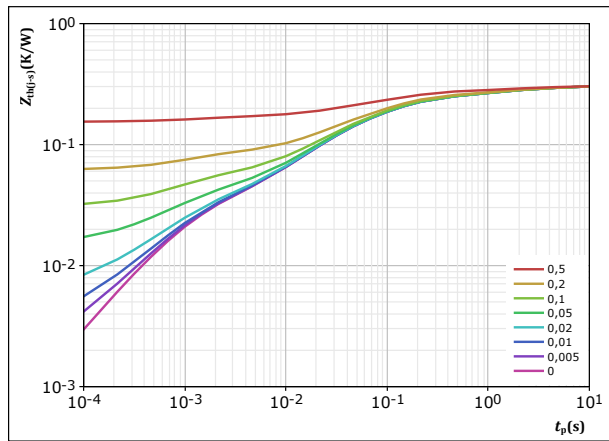


figure 9.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T
$R_{th(j-s)} =$	0,303 K/W
FWD thermal model values	
R (K/W)	τ (s)
2,78E-02	6,25E+00
4,81E-02	9,88E-01
1,29E-01	1,05E-01
7,78E-02	2,27E-02
2,52E-02	9,62E-04



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Inner Boost Sw. Protection Diode Characteristics

figure 10. Rectifier

Typical forward characteristics

$$I_F = f(V_F)$$

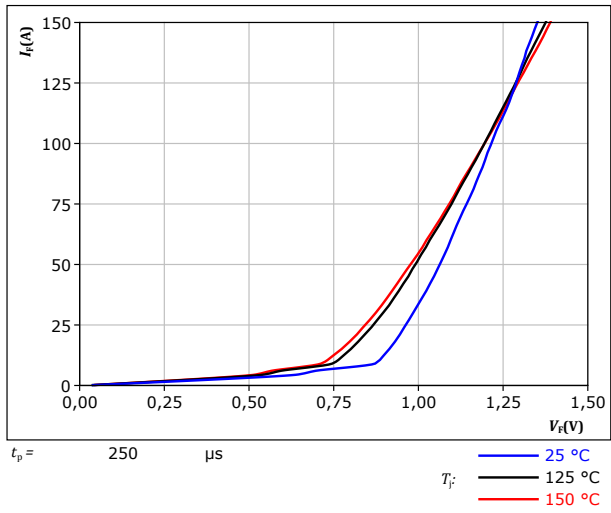
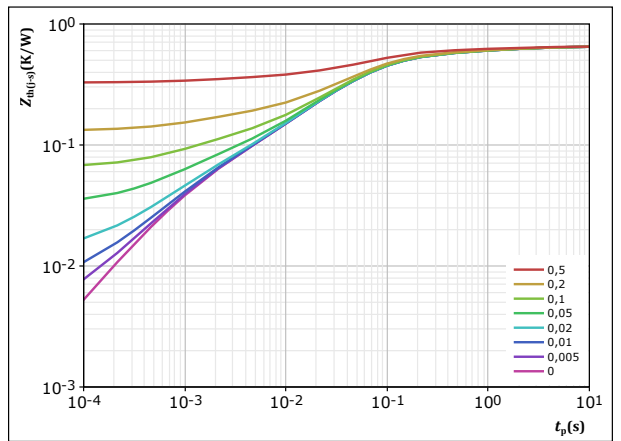


figure 11. Rectifier

Transient thermal impedance as a function of pulse width

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



Rectifier thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
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



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Outer Boost Switch Characteristics

figure 12. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$

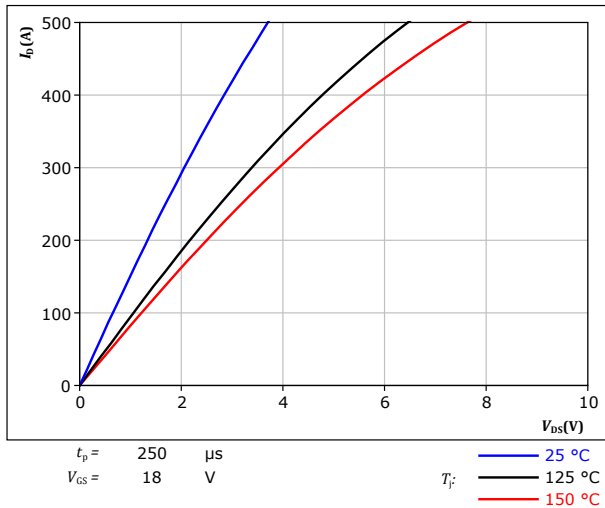


figure 13. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$

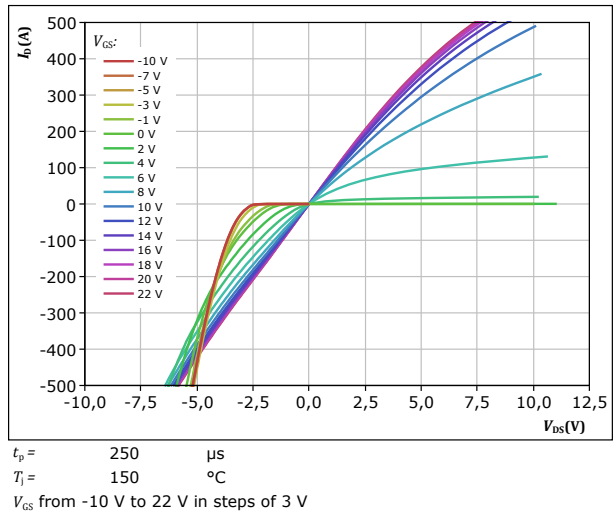


figure 14. MOSFET

Typical transfer characteristics

$$I_D = f(V_{GS})$$

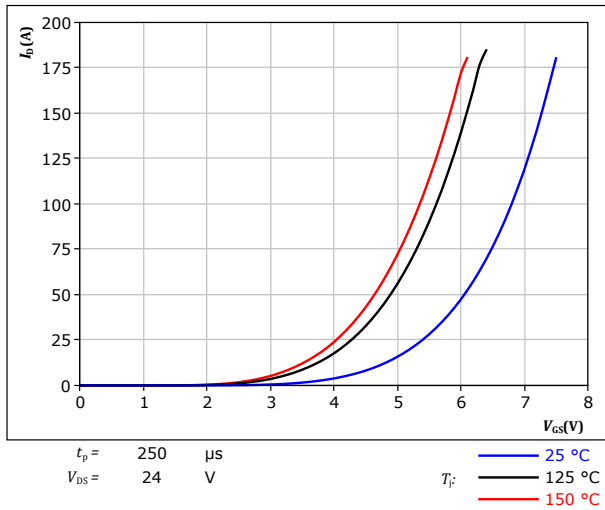
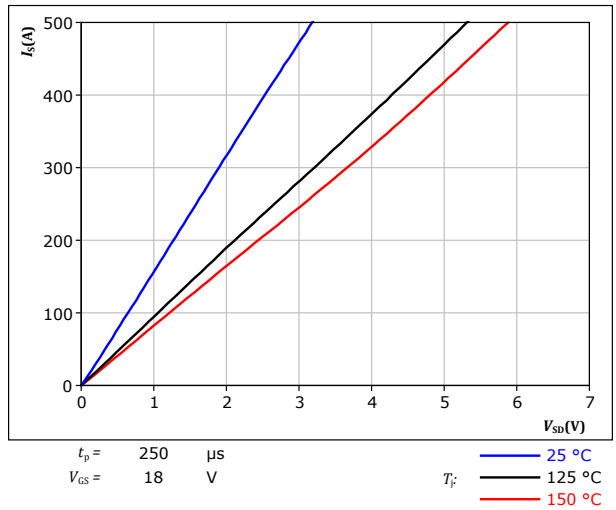


figure 15. MOSFET

Typical reverse drain current characteristics

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





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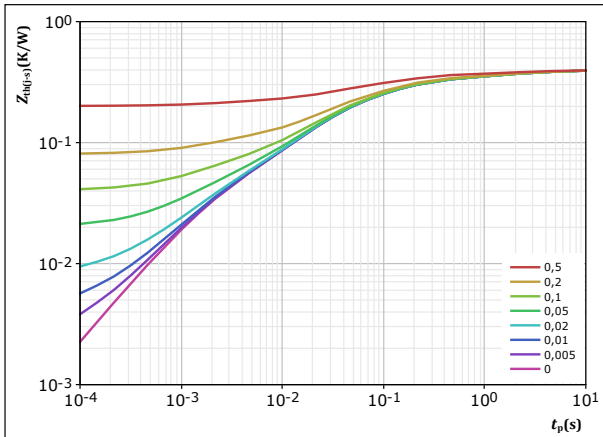
Outer Boost Switch Characteristics

figure 16.

MOSFET

Transient thermal impedance as a function of pulse width

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



$$D = t_p / T$$

$$R_{th(j-a)} = 0,395 \text{ K/W}$$

MOSFET thermal model values

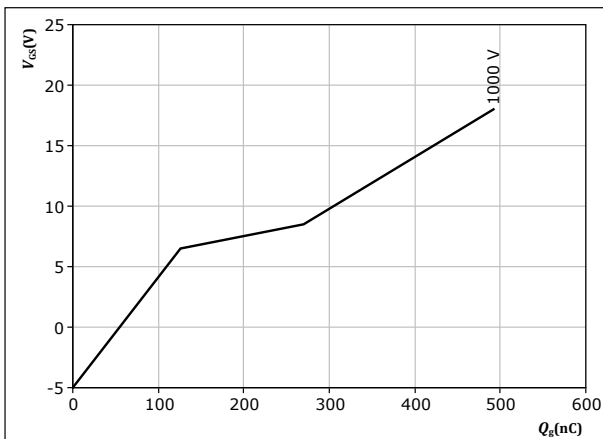
R (K/W)	τ (s)
2,87E-02	7,60E+00
5,76E-02	1,10E+00
1,57E-01	1,16E-01
1,30E-01	2,33E-02
2,75E-02	1,72E-03

figure 18.

MOSFET

Gate voltage vs gate charge

$$V_{GS} = f(Q_g)$$



$$I_D = 180 \text{ A}$$

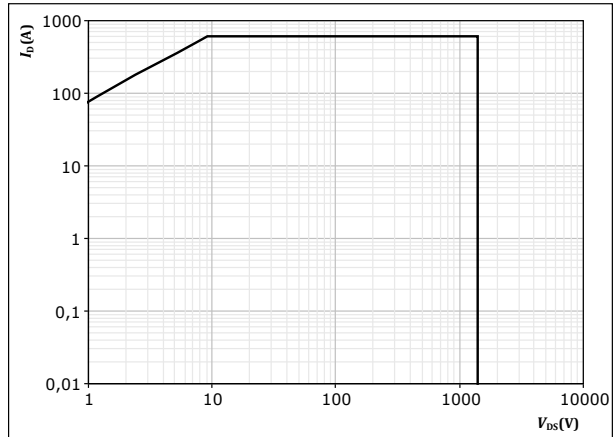
$$T_j = 25 \text{ }^{\circ}\text{C}$$

figure 17.

MOSFET

Safe operating area

$$I_D = f(V_{DS})$$



D = single pulse

$$T_s = 80 \text{ }^{\circ}\text{C}$$

$$V_{GS} = 18 \text{ V}$$

$$T_j = T_{jmax}$$



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Outer Boost Diode Characteristics

figure 19.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

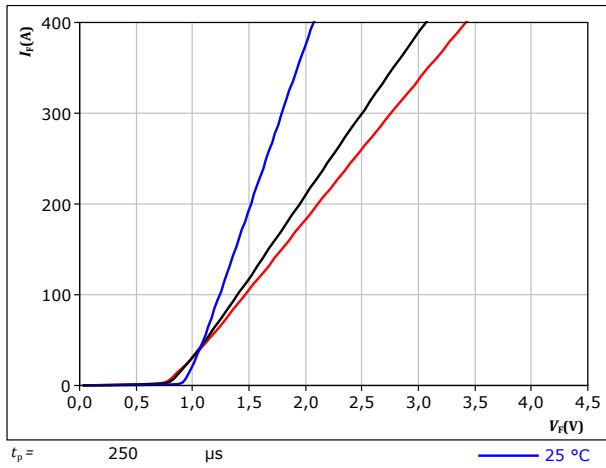
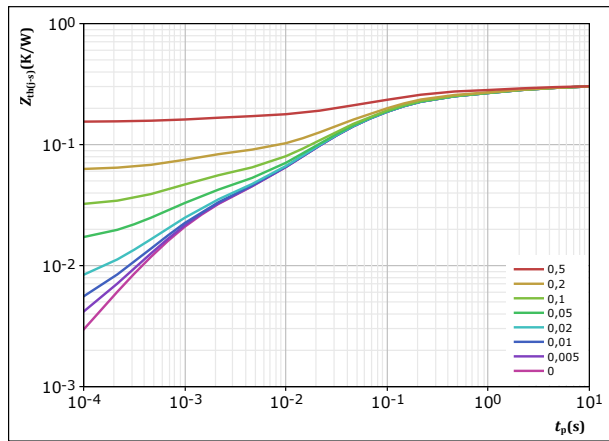


figure 20.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T
$R_{th(j-s)} =$	0,303 K/W
FWD thermal model values	
R (K/W)	τ (s)
2,78E-02	6,25E+00
4,81E-02	9,88E-01
1,29E-01	1,05E-01
7,78E-02	2,27E-02
2,52E-02	9,62E-04



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Outer Boost Sw. Protection Diode Characteristics

figure 21.

Rectifier

Typical forward characteristics

$$I_F = f(V_F)$$

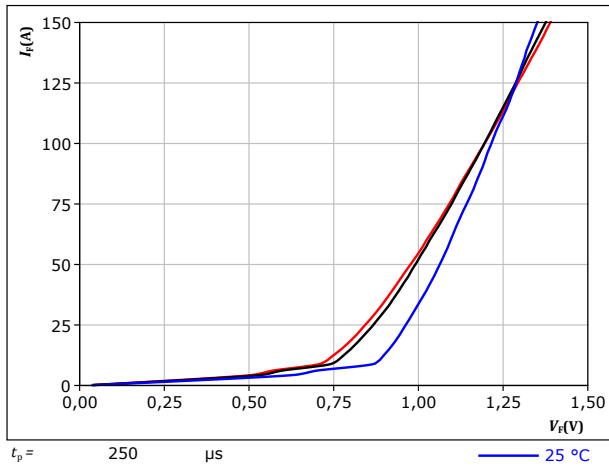
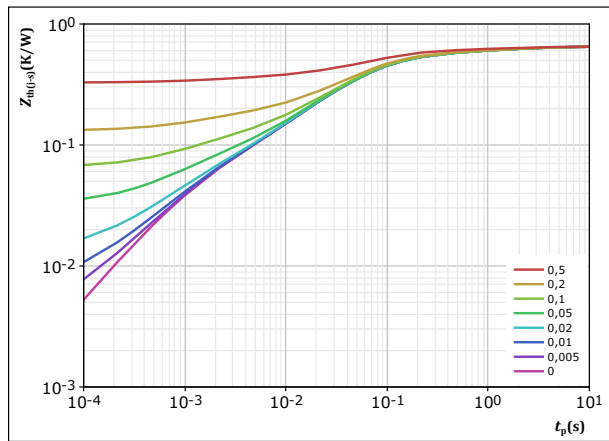


figure 22.

Rectifier

Transient thermal impedance as a function of pulse width

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



Rectifier thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
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



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Aux Diode H Characteristics

figure 23. FWD

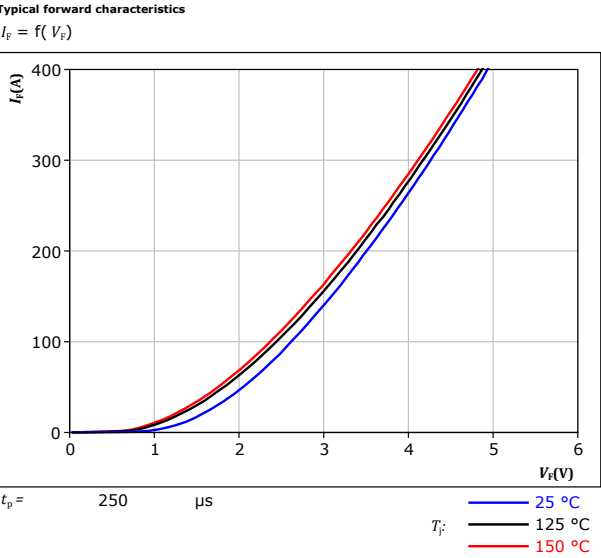
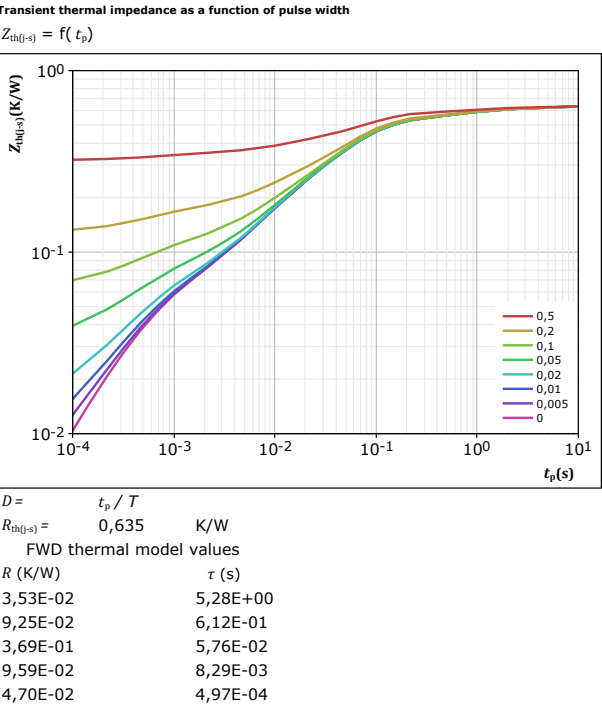


figure 24. FWD





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Aux Diode L Characteristics

figure 25.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

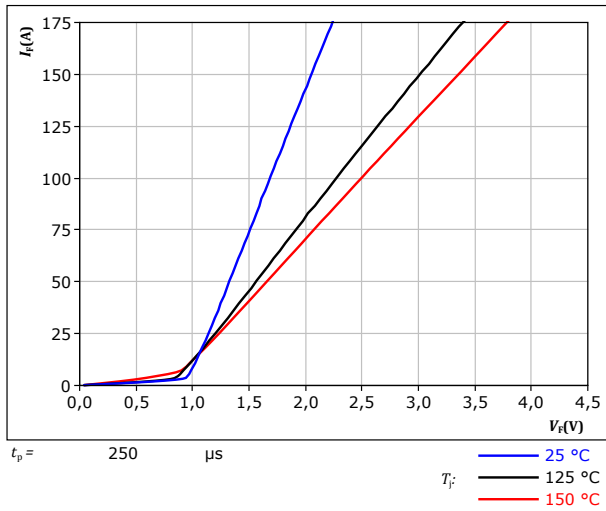
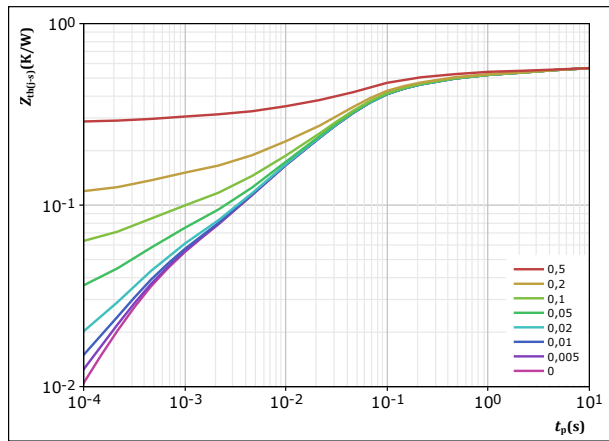


figure 26.

FWD

Transient thermal impedance as a function of pulse width

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





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datasheet

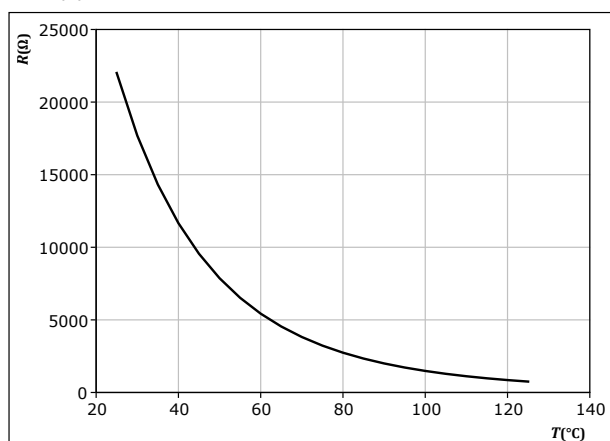
Thermistor Characteristics

figure 27.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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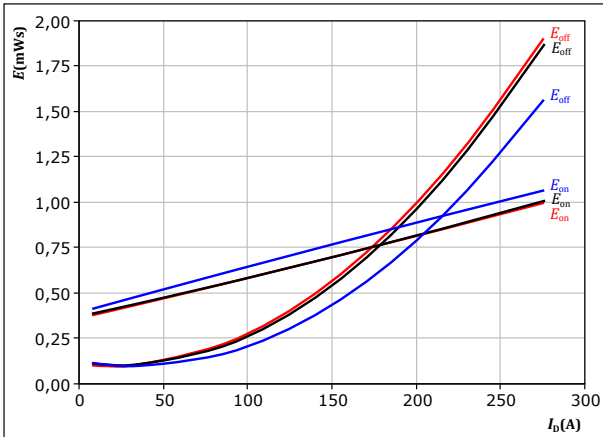
Inner Boost Switching Characteristics

figure 28.

MOSFET

Typical switching energy losses as a function of drain current

$$E = f(I_D)$$



With an inductive load at

$V_{DS} = 800 \text{ V}$
 $V_{GS} = -5/18 \text{ V}$
 $R_{gon} = 1 \text{ } \Omega$
 $R_{goff} = 1 \text{ } \Omega$

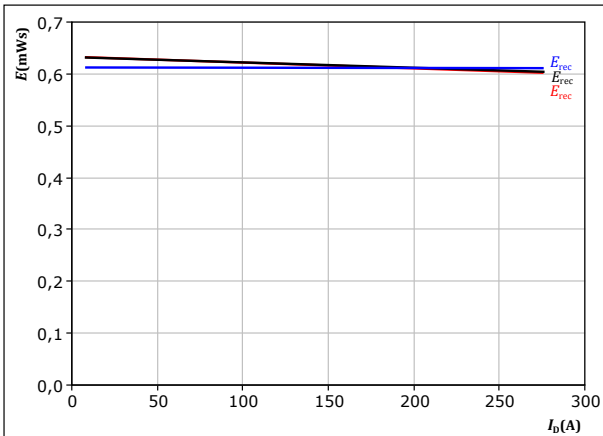
T_j : 25 °C
125 °C
150 °C

figure 30.

FWD

Typical reverse recovered energy loss as a function of drain current

$$E_{rec} = f(I_D)$$



With an inductive load at

$V_{DS} = 800 \text{ V}$
 $V_{GS} = -5/18 \text{ V}$
 $R_{gon} = 1 \text{ } \Omega$

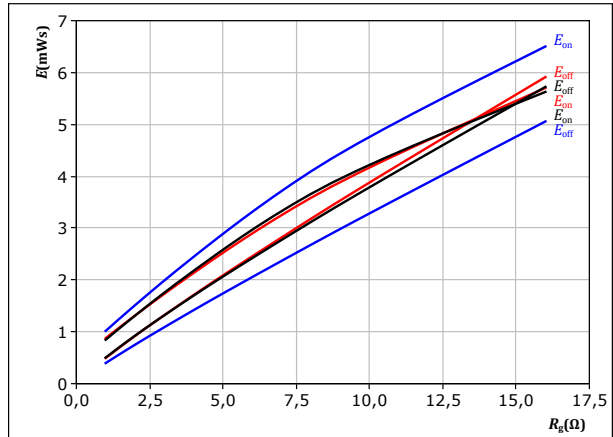
T_j : 25 °C
125 °C
150 °C

figure 29.

MOSFET

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

$$E = f(R_g)$$



With an inductive load at

$V_{DS} = 800 \text{ V}$
 $V_{GS} = -5/18 \text{ V}$
 $I_D = 150 \text{ A}$

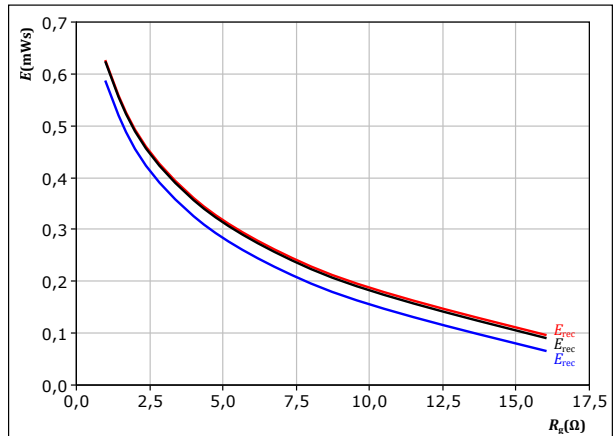
T_j : 25 °C
125 °C
150 °C

figure 31.

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

$V_{DS} = 800 \text{ V}$
 $V_{GS} = -5/18 \text{ V}$
 $I_D = 150 \text{ A}$

T_j : 25 °C
125 °C
150 °C



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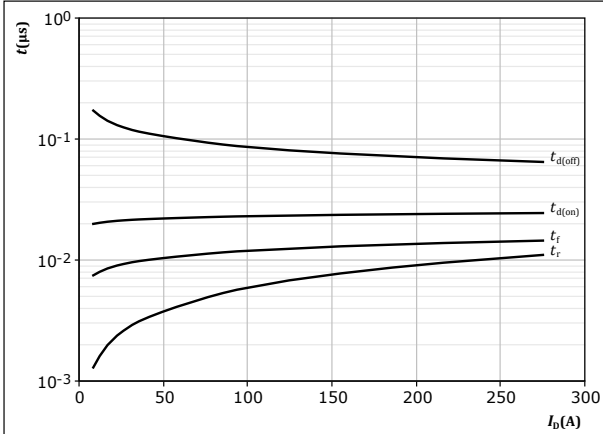
30-EX14B2A007WS01-PS29F28Z datasheet

Inner Boost Switching Characteristics

figure 32.

MOSFET

Typical switching times as a function of drain current
 $t = f(I_D)$



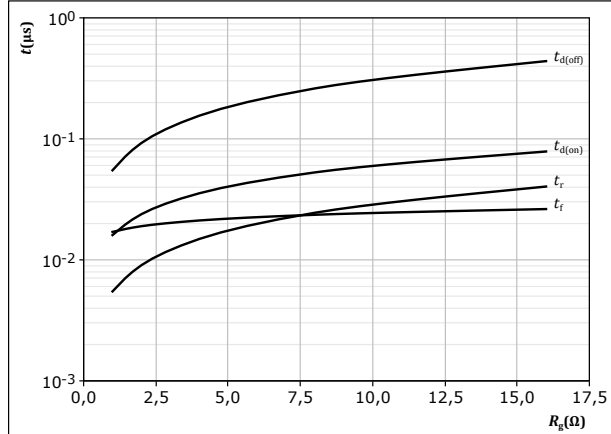
With an inductive load at

$T_j = 150$ °C
 $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 $R_{goff} = 1$ Ω

figure 33.

MOSFET

Typical switching times as a function of MOSFET turn on gate resistor
 $t = f(R_g)$



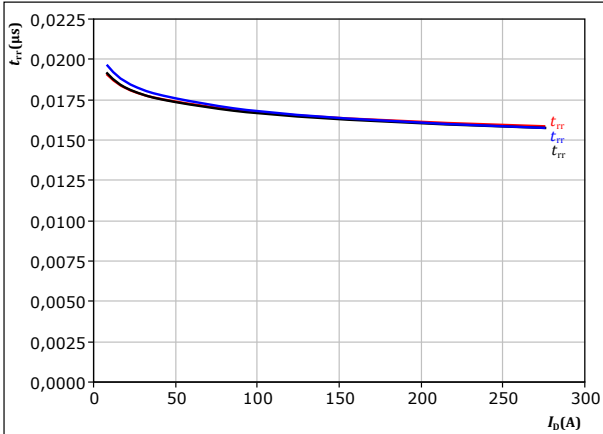
With an inductive load at

$T_j = 150$ °C
 $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A

figure 34.

FWD

Typical reverse recovery time as a function of drain current
 $t_{rr} = f(I_D)$



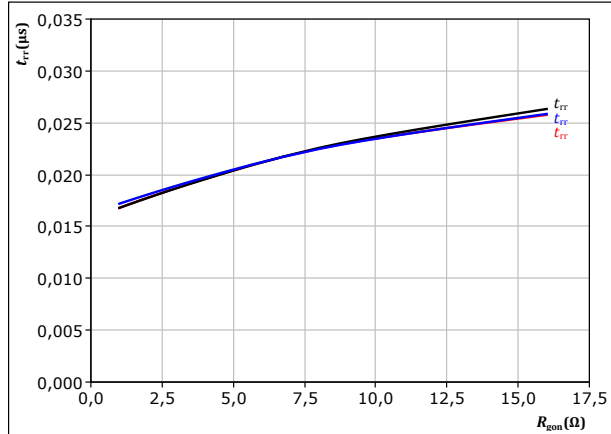
At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω

T_j : — 25 °C
— 125 °C
— 150 °C

figure 35.

FWD

Typical reverse recovery time as a function of MOSFET turn on gate resistor
 $t_{rr} = f(R_{gon})$



At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A

T_j : — 25 °C
— 125 °C
— 150 °C



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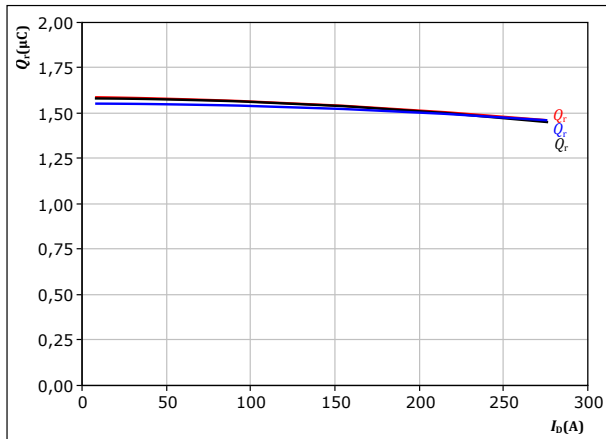
datasheet

Inner Boost Switching Characteristics

figure 36. FWD

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$

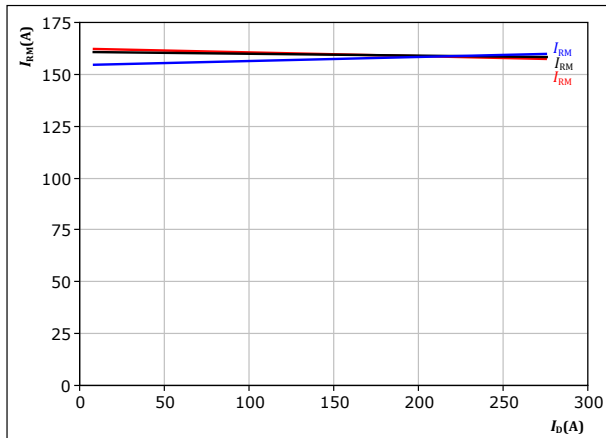


At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 T_j : 25 °C
125 °C
150 °C

figure 38. FWD

Typical peak reverse recovery current as a function of drain current

$$I_{RM} = f(I_D)$$

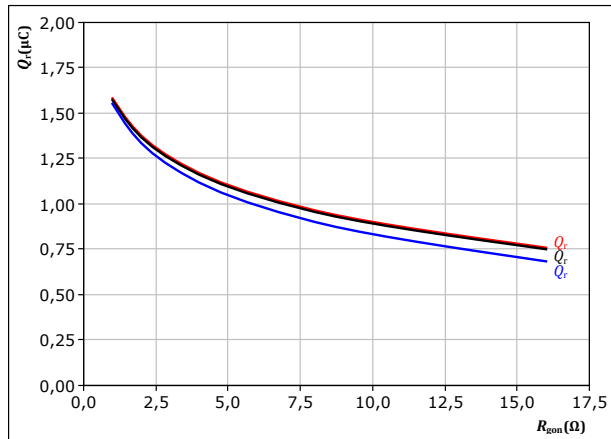


At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 T_j : 25 °C
125 °C
150 °C

figure 37. FWD

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

$$Q_r = f(R_{gon})$$

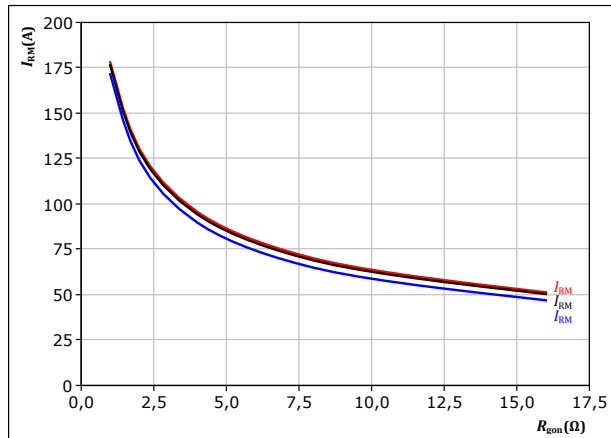


At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A
 T_j : 25 °C
125 °C
150 °C

figure 39. 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
 $V_{GS} = -5/18$ V
 $I_D = 150$ A
 T_j : 25 °C
125 °C
150 °C

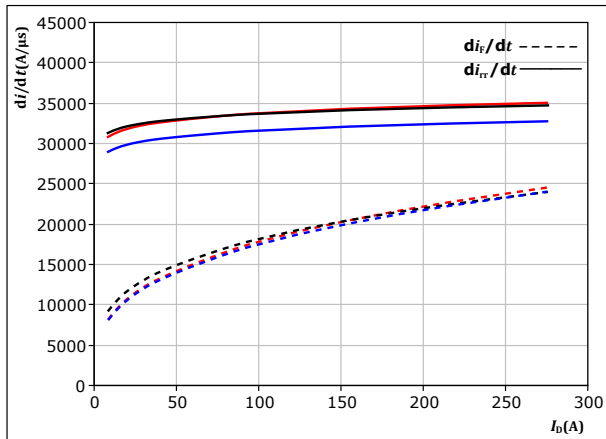


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Inner Boost Switching Characteristics

figure 40. FWD

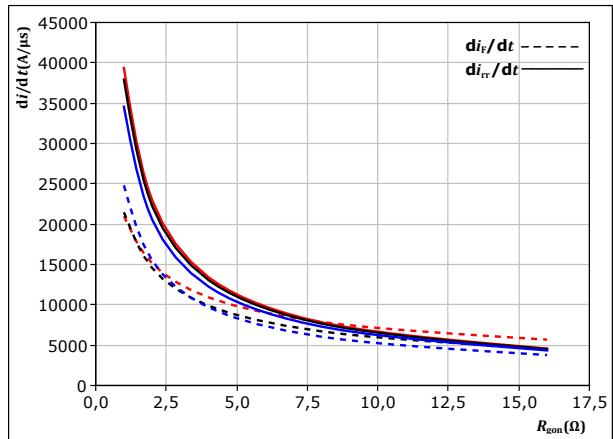
Typical rate of fall of forward and reverse recovery current as a function of drain current
 $di_f/dt, di_r/dt = f(I_D)$



At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 $T_j = 25$ °C
 125 °C
 150 °C

figure 41. FWD

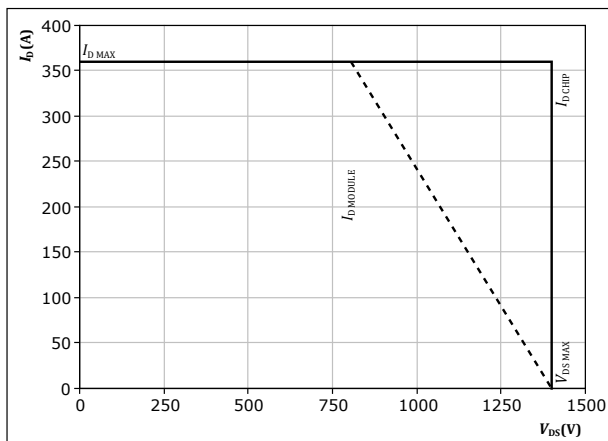
Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor
 $di_f/dt, di_r/dt = f(R_{gon})$



At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A
 $T_j = 25$ °C
 125 °C
 150 °C

figure 42. MOSFET

Reverse bias safe operating area
 $I_D = f(V_{DS})$



At $T_j = 150$ °C
 $R_{gon} = 1$ Ω
 $R_{goff} = 1$ Ω



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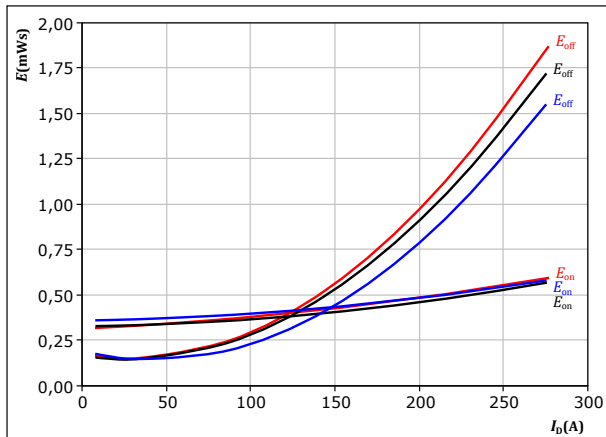
30-EX14B2A007WS01-PS29F28Z datasheet

Outer Boost Switching Characteristics

figure 43. MOSFET

Typical switching energy losses as a function of drain current

$$E = f(I_D)$$



With an inductive load at

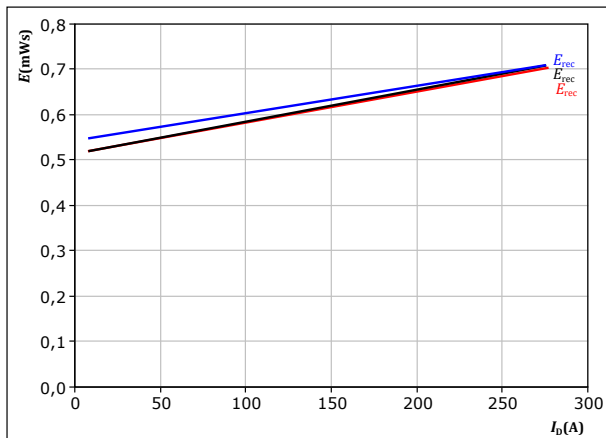
$V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 $R_{goff} = 1$ Ω

T_j : 25 °C
125 °C
150 °C

figure 45. FWD

Typical reverse recovered energy loss as a function of drain current

$$E_{rec} = f(I_D)$$



With an inductive load at

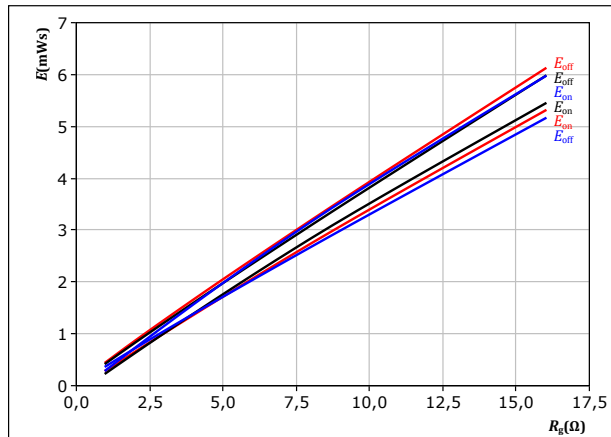
$V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω

T_j : 25 °C
125 °C
150 °C

figure 44. MOSFET

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

$$E = f(R_g)$$



With an inductive load at

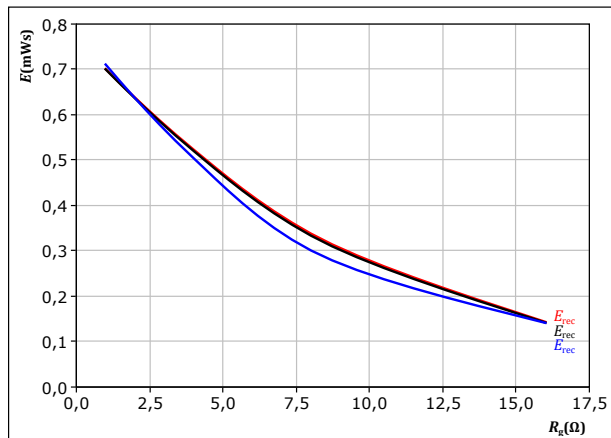
$V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A

T_j : 25 °C
125 °C
150 °C

figure 46. 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
 $V_{GS} = -5/18$ V
 $I_D = 150$ A

T_j : 25 °C
125 °C
150 °C



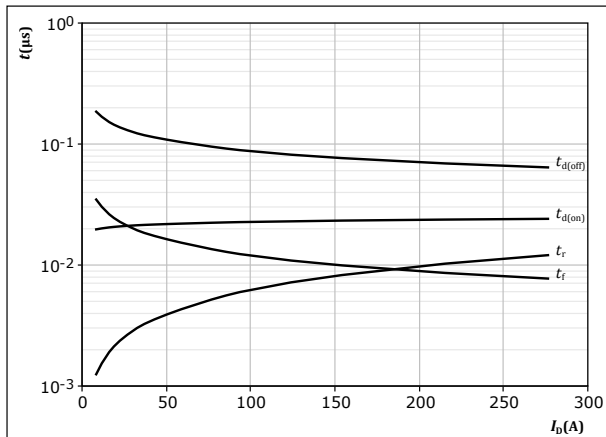
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Outer Boost Switching Characteristics

figure 47. MOSFET

Typical switching times as a function of drain current
 $t = f(I_D)$

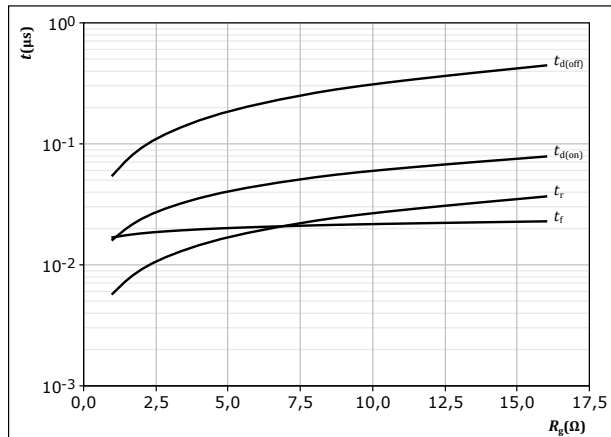


With an inductive load at

$T_j = 150$ °C
 $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 $R_{goff} = 1$ Ω

figure 48. MOSFET

Typical switching times as a function of MOSFET turn on gate resistor
 $t = f(R_g)$

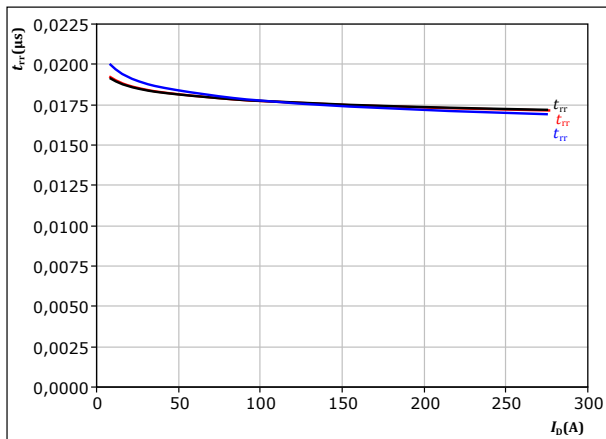


With an inductive load at

$T_j = 150$ °C
 $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A

figure 49. FWD

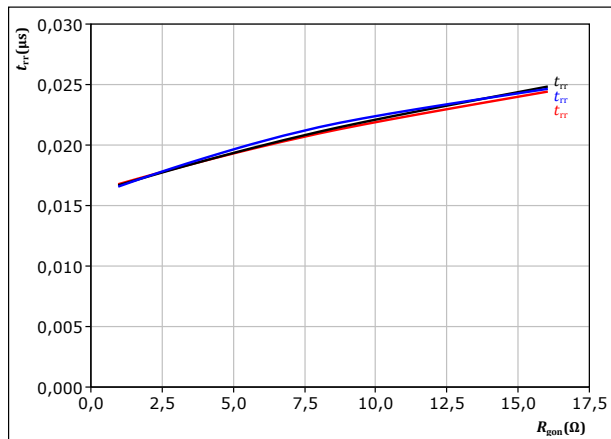
Typical reverse recovery time as a function of drain current
 $t_{rr} = f(I_D)$



At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 50. FWD

Typical reverse recovery time as a function of MOSFET turn on gate resistor
 $t_{rr} = f(R_{gon})$



At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)



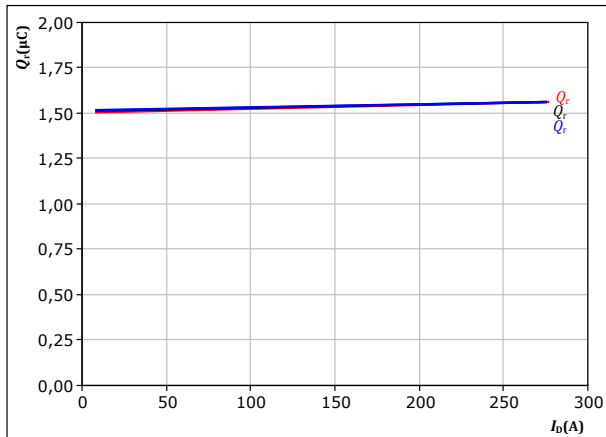
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Outer Boost Switching Characteristics

figure 51. FWD

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$

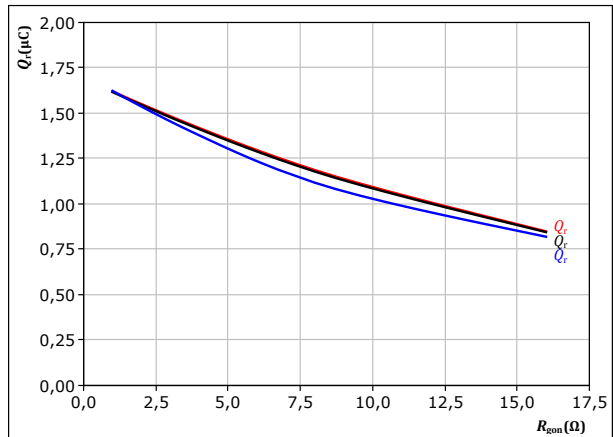


At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 T_j : 25 °C
125 °C
150 °C

figure 52. FWD

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

$$Q_r = f(R_{gon})$$

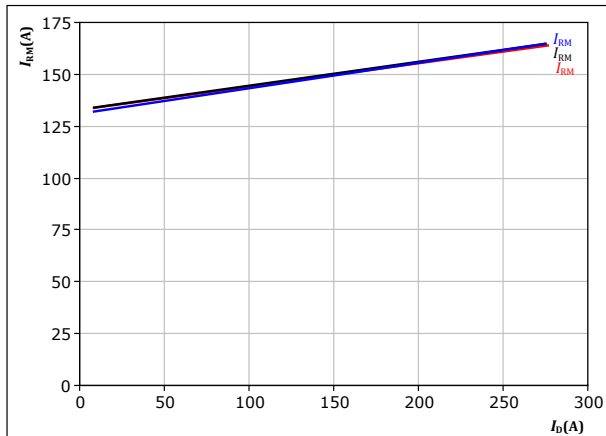


At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A
 T_j : 25 °C
125 °C
150 °C

figure 53. FWD

Typical peak reverse recovery current as a function of drain current

$$I_{RM} = f(I_D)$$

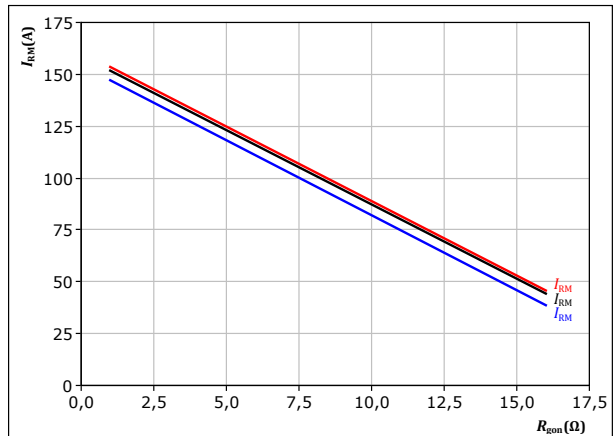


At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 T_j : 25 °C
125 °C
150 °C

figure 54. 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
 $V_{GS} = -5/18$ V
 $I_D = 150$ A
 T_j : 25 °C
125 °C
150 °C

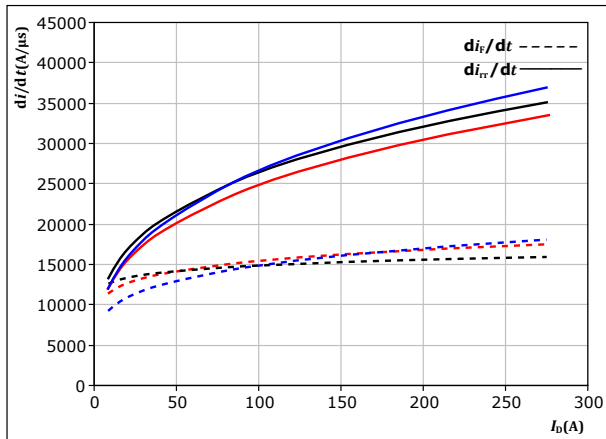


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Outer Boost Switching Characteristics

figure 55. FWD

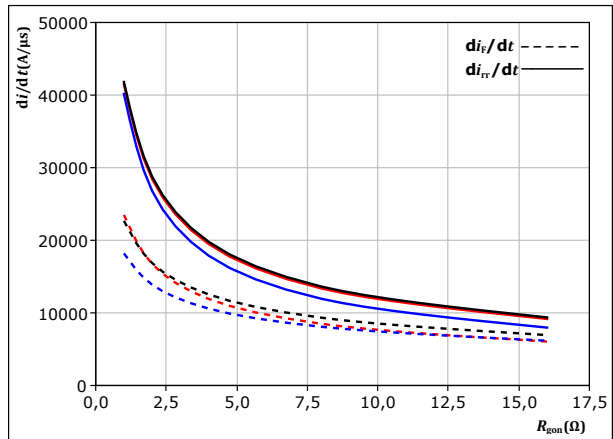
Typical rate of fall of forward and reverse recovery current as a function of drain current
 $di_f/dt, di_r/dt = f(I_D)$



At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $R_{gon} = 1$ Ω
 $T_j = 25$ °C
 125 °C
 150 °C

figure 56. FWD

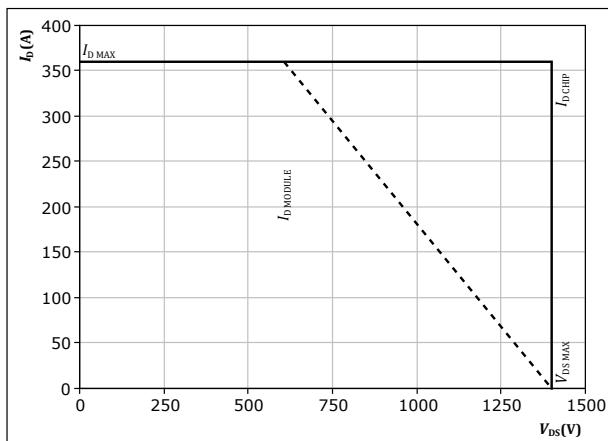
Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor
 $di_f/dt, di_r/dt = f(R_{gon})$



At $V_{DS} = 800$ V
 $V_{GS} = -5/18$ V
 $I_D = 150$ A
 $T_j = 25$ °C
 125 °C
 150 °C

figure 57. MOSFET

Reverse bias safe operating area
 $I_D = f(V_{DS})$



At $T_j = 150$ °C
 $R_{gon} = 1$ Ω
 $R_{goff} = 1$ Ω



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Switching Definitions

figure 58. MOSFET

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

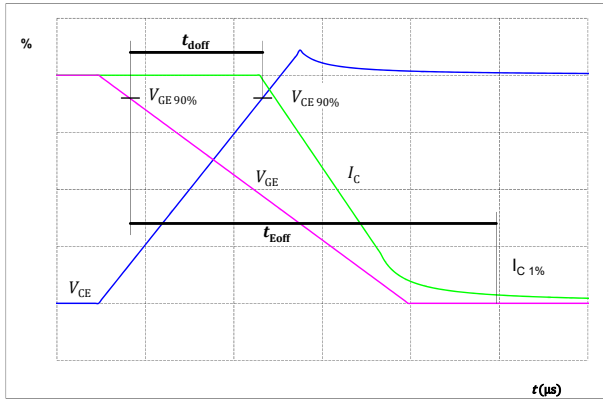


figure 59. MOSFET

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

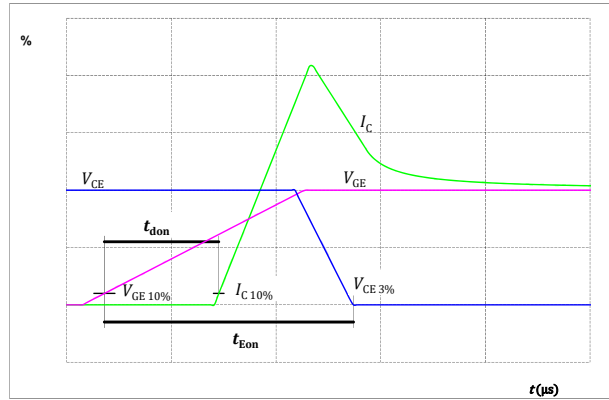


figure 60. MOSFET

Turn-off Switching Waveforms & definition of t_f

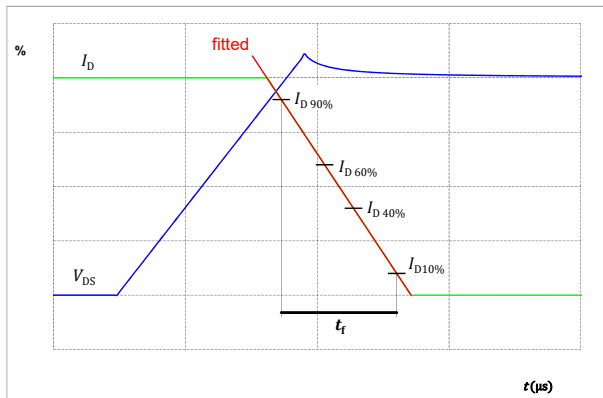
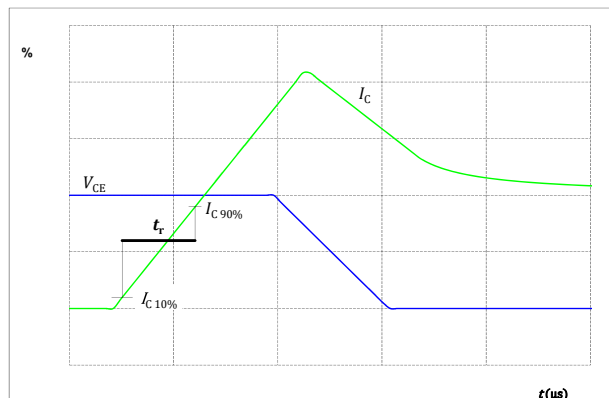


figure 61. MOSFET

Turn-on Switching Waveforms & definition of t_r





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Switching Definitions

figure 62.

FWD

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

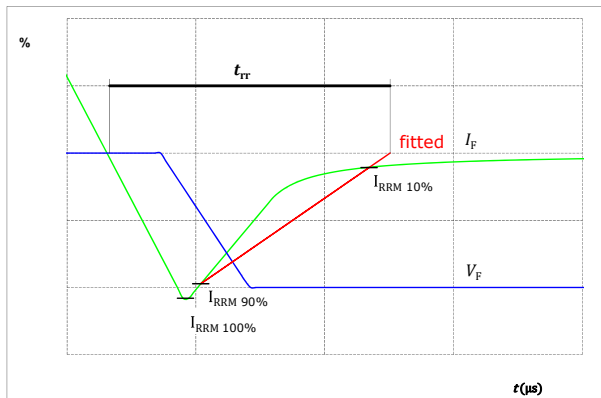


figure 63.

FWD

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

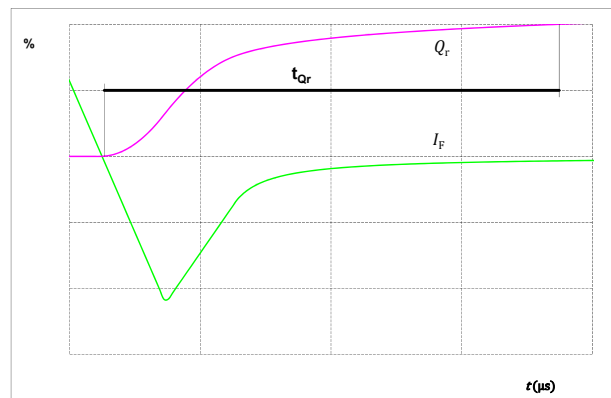
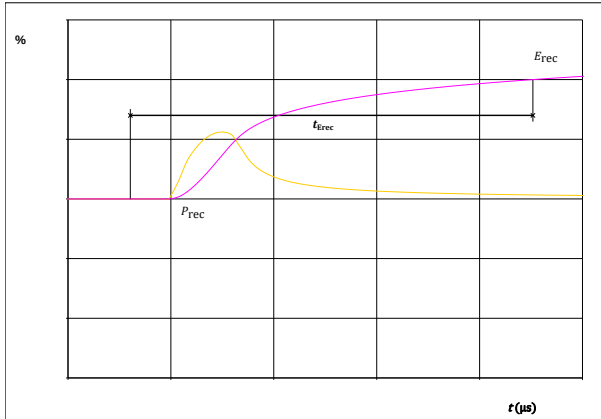


figure 64.

FWD

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





datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	30-EX14B2A007WS01-PS29F28Z
With thermal paste (5,2 W/mK, PTM6000HV)	30-EX14B2A007WS01-PS29F28Z-/7/

[illegible]

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

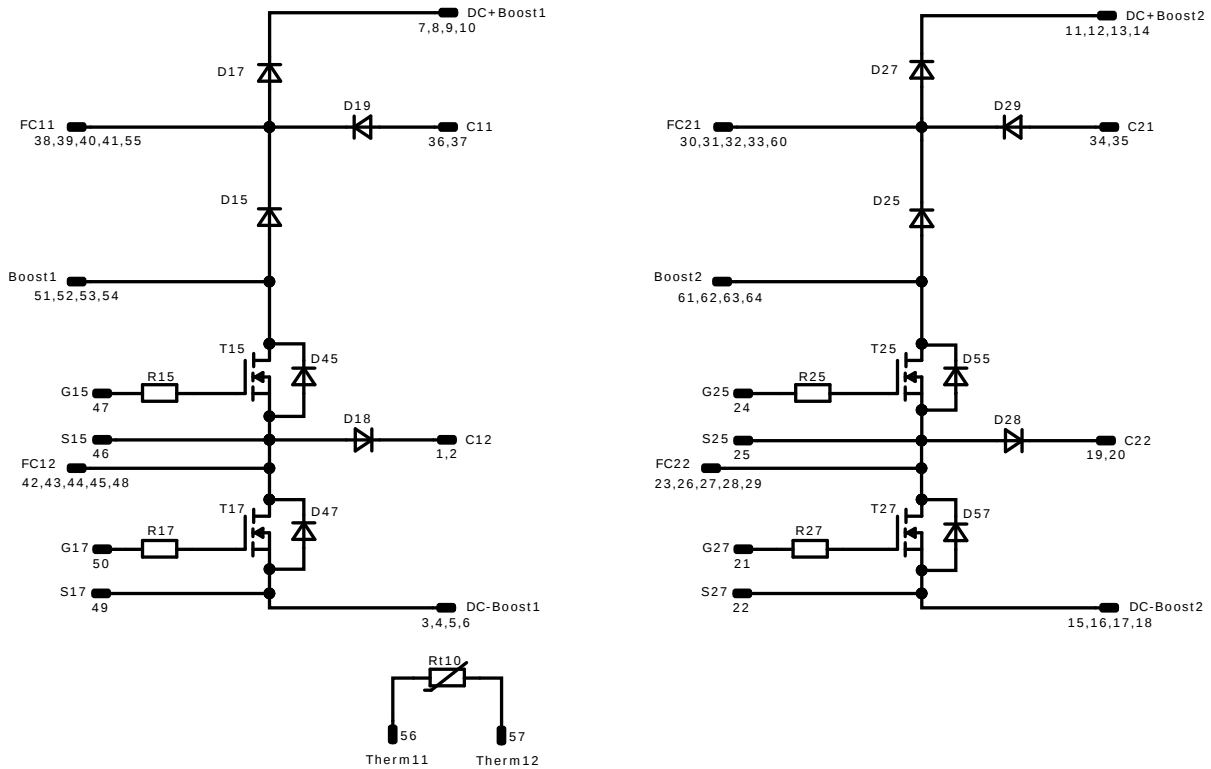
Technical drawing showing the top and bottom views of the module's outline. The top view shows a rectangular board with various components and dimensions. The bottom view shows the underside of the board with mounting holes and dimensions. Dimensions are given in mm.



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Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T15, T25	MOSFET	1400 V	6,67 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	6,67 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	



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

Handling instruction
Handling instructions for <i>flow</i> E3BP packages see vincotech.com website.

Package data
Package data for <i>flow</i> E3BP packages see vincotech.com website.

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

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

Document No.:	Date:	Modification:	Pages
30-EX14B2A007WS01-PS29F28Z-D1-14	2 Sep. 2026	Initial Release	
30-EX14B2A007WS01-PS29F28Z-D2-14	16 Sep. 2026	Change Boost Diodes and Aux Diode L	

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