Vincotech

10-FY12NMA009ME-PG09F18Z
datasheet

***flow*MNPC 1 SiC** **1200 V / 8,67 mΩ**

Topology features

- Integrated DC capacitor
- Kelvin Emitter for improved switching performance
- Low inductive commutation loop
- Mixed Voltage Neutral Point Clamped Topology (T-Type)
- SiC MOSFET
- Temperature sensor

Component features

- Fast intrinsic diode with low reverse recovery
- High blocking voltage with low on-resistance
- High speed switching with low capacitance

Housing features

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

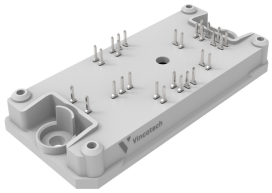
Target applications

- Charging Stations
- Energy Storage Systems
- Solar Inverters
- UPS

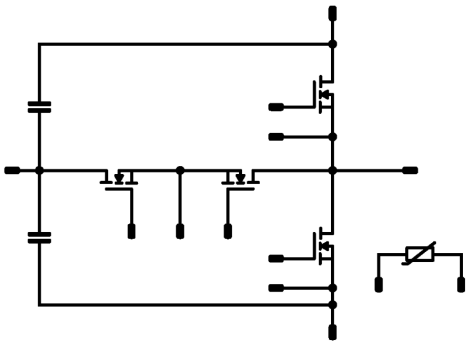
Types

- 10-FY12NMA009ME-PG09F18Z

flow 1 12 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Buck Switch				
Drain-source voltage	V_{DSS}		1200	V
Drain current (DC current)	I_D	T_j = T_{jmax} T_s = 80 °C	112	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	456	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	218	W
Gate-source voltage	V_{GSS}	static	-4 / 15	V
		dynamic	-8 / 19	V
Maximum Junction Temperature	T_{jmax}		175	°C
Boost Switch				
Drain-source voltage	V_{DSS}		650	V
Drain current (DC current)	I_D	T_j = T_{jmax} T_s = 80 °C	103	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	528	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	179	W
Gate-source voltage	V_{GSS}	static	-4 / 15	V
		dynamic	-8 / 19	V
Maximum Junction Temperature	T_{jmax}		175	°C
Capacitor (DC)				
Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55 ... 125	°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	6000	V
Creepage distance			>12,7	mm
Clearance			8,34	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	
Buck Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		15		114	25 175	6,07	8,67 16,34	11,3[1]	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,0321	25	1,8	2,7	3,6	V
Gate to Source Leakage Current	I_{GSS}		15	0		25		30	750	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25		3	150	µA
Internal gate resistance	r_g							1,37		Ω
Gate charge	Q_g		-4/15	800	114	25		408		nC
Short-circuit input capacitance	C_{iss}	f = 100 kHz	0	1000	0	25		10410		pF
Short-circuit output capacitance	C_{oss}							330		
Reverse transfer capacitance	C_{rss}							27		
Diode forward voltage	V_{SD}		0		58,5	25		4,8		V
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,44		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} = 4 Ω R_{goff} = 4 Ω	-5/15	350	96	25 125 150		36,8 35,16 35,03		ns
Rise time	t_r					25 125 150		18,44 16,54 16,15		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		101,4 110,46 112,77		ns
Fall time	t_f					25 125 150		16,25 17,44 16,44		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,561 µC Q_{rFWD}=0,938 µC Q_{rFWD}=1,06 µC				25 125 150		0,493 0,432 0,435		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,556 0,538 0,543		mWs
Peak recovery current	I_{RRM}	di/dt=7220 A/µs di/dt=6698 A/µs di/dt=7617 A/µs				25 125 150		49,96 78,18 86,16		A
Reverse recovery time	t_{rr}					25 125 150		18,82 20,48 20,95		ns
Recovered charge	Q_r					25 125 150		0,561 0,938 1,06		µC
Reverse recovered energy	E_{rec}					25 125 150		0,152 0,291 0,335		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		6819,94 13059,1 15848,77		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	$r_{DS(on)}$		15		70,4	25 175		11,25 15	15[1]	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,01936	25	1,8	2,6	3,6	V
Gate to Source Leakage Current	I_{GSS}		15	0		25		40	400	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	650		25		4	128	µA
Internal gate resistance	r_g							0,75		Ω
Gate charge	Q_g		-4/15	400	70,4	25		252		nC
Short-circuit input capacitance	C_{iss}	f = 1 Mhz	0	600	0	25		6400		pF
Short-circuit output capacitance	C_{oss}							400		
Reverse transfer capacitance	C_{rss}							32		
Diode forward voltage	V_{SD}		0		35,2	25		4,8		V
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,53		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} = 4 Ω R_{goff} = 4 Ω	-5/15	350	58	25 125 150		22,64 21,7 21,59		ns
Rise time	t_r					25 125 150		10,74 9,27 9,07		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		68,96 73,74 74,41		ns
Fall time	t_f					25 125 150		25,05 21,29 19,19		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,767 µC Q_{rFWD}=1,12 µC Q_{rFWD}=1,31 µC				25 125 150		0,408 0,398 0,406		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,119 0,118 0,117		mWs
Peak recovery current	I_{RRM}	di/dt=6060 A/µs di/dt=6001 A/µs di/dt=6624 A/µs				25 125 150		64,89 78,11 83,91		A
Reverse recovery time	t_{rr}					25 125 150		21,06 24,89 26,89		ns
Recovered charge	Q_r					25 125 150		0,767 1,12 1,31		µC
Reverse recovered energy	E_{rec}					25 125 150		0,143 0,25 0,304		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		8454,49 6603,94 7294,47		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	
Capacitor (DC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		100		nF
Tolerance							-10		10	%
Dissipation factor		f = 1 kHz				25		2,5		%
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

(1) Value at chip level

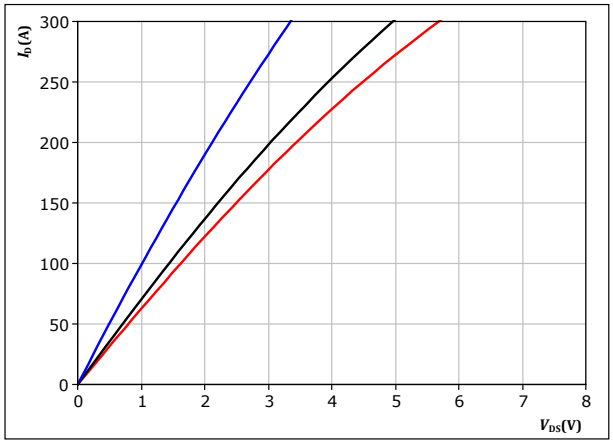
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics including $R_{DD'} + R_{SS'}$

$I_D = f(V_{DS})$

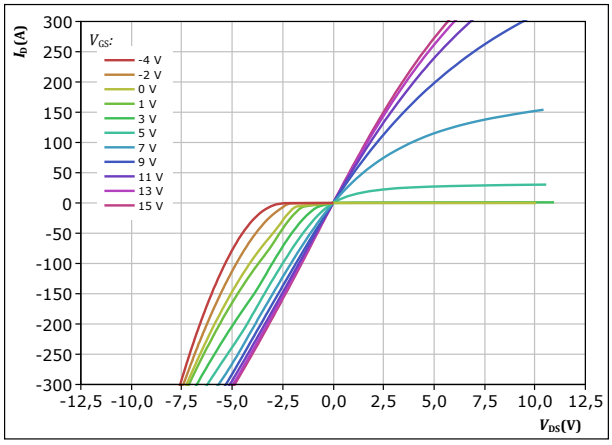


t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics including $R_{DD'} + R_{SS'}$

$I_D = f(V_{DS})$



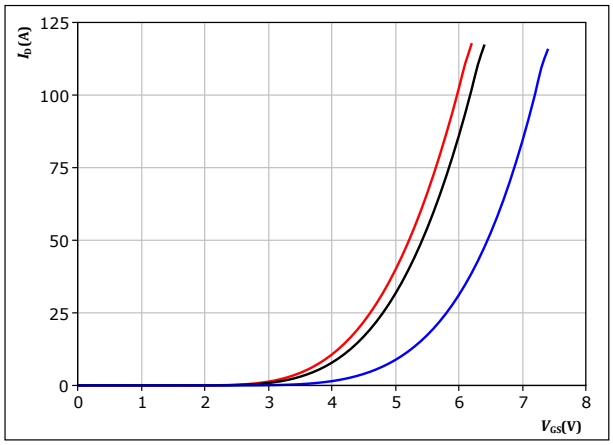
t_p =	250	µs
T_j =	150	°C

V_{GS} from -4 V to 15 V in steps of 2 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

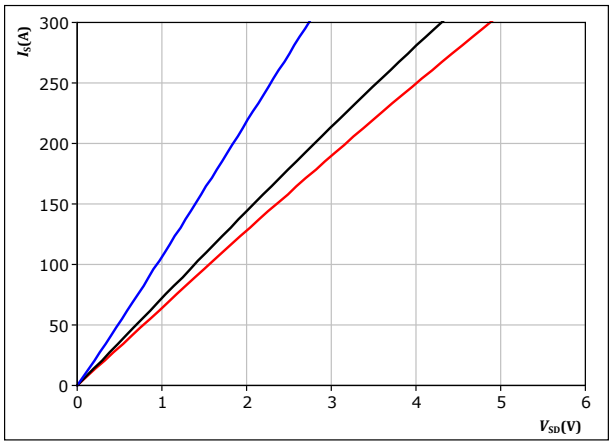


t_p =	250	µs		
V_{DS} =	20	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

Typical reverse drain current characteristics including $R_{DD'} + R_{SS'}$

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



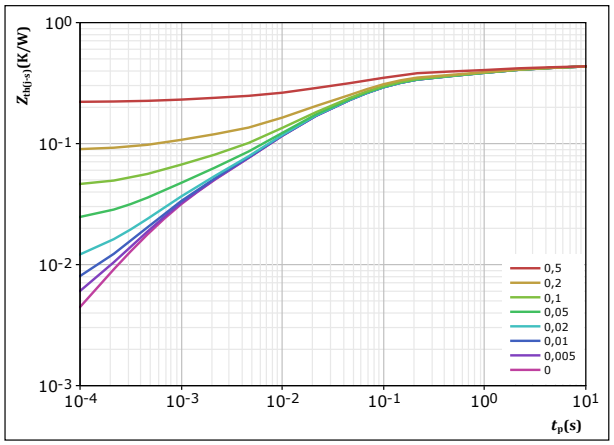
t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

Buck 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

$R_{th(j-s)} =$ 0,435 K/W

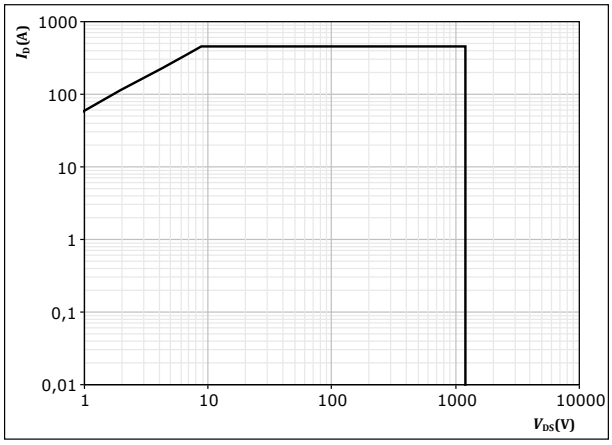
MOSFET thermal model values

R (K/W)	τ (s)
4,35E-02	5,21E+00
7,08E-02	7,84E-01
2,07E-01	6,44E-02
9,19E-02	1,01E-02
2,75E-02	8,02E-04

figure 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



$D =$ single pulse

$T_s =$ 80 °C

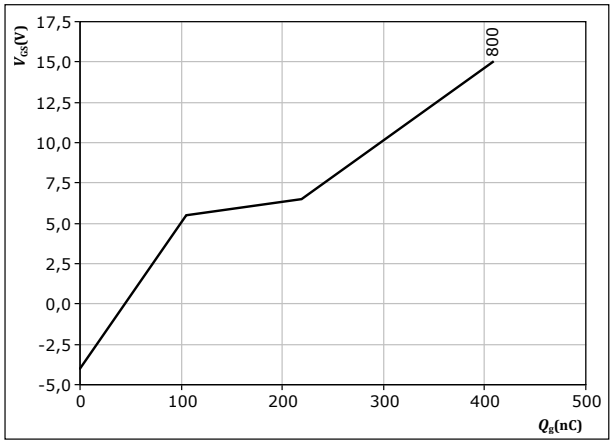
$V_{GS} =$ 15 V

$T_j =$ T_{jmax}

figure 7. **MOSFET**

Gate voltage vs gate charge

$V_{GS} = f(Q_g)$



$I_D =$ 114 A

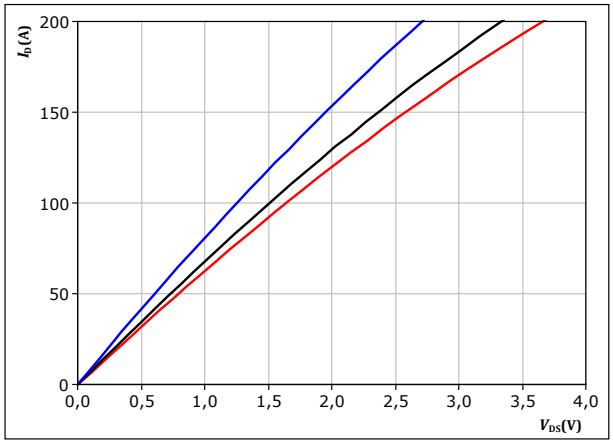
$T_j =$ 25 °C

Boost Switch Characteristics

figure 8. **MOSFET**

Typical output characteristics including $R_{DD'} + R_{SS'}$

$I_D = f(V_{DS})$

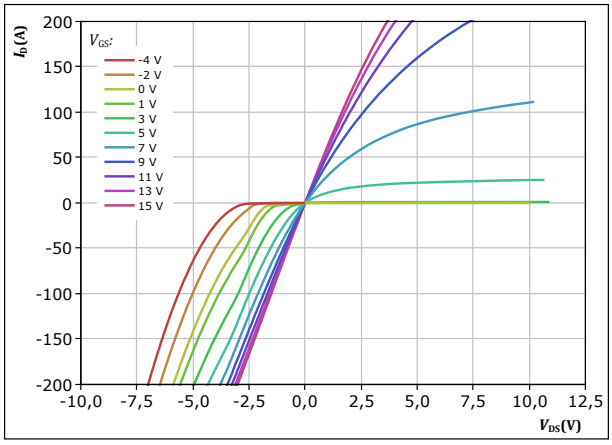


t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 9. **MOSFET**

Typical output characteristics including $R_{DD'} + R_{SS'}$

$I_D = f(V_{DS})$



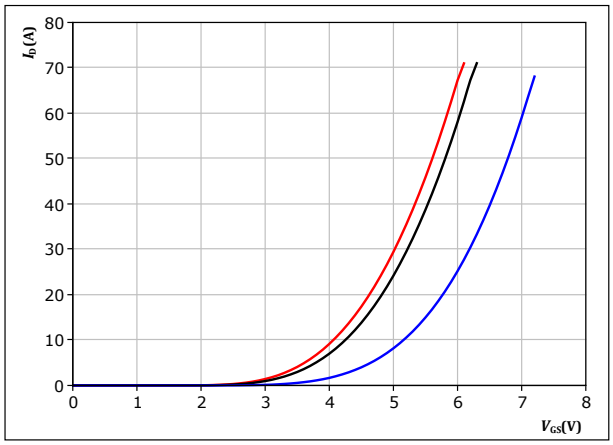
t_p =	250	µs
T_j =	150	°C

V_{GS} from -4 V to 15 V in steps of 2 V

figure 10. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

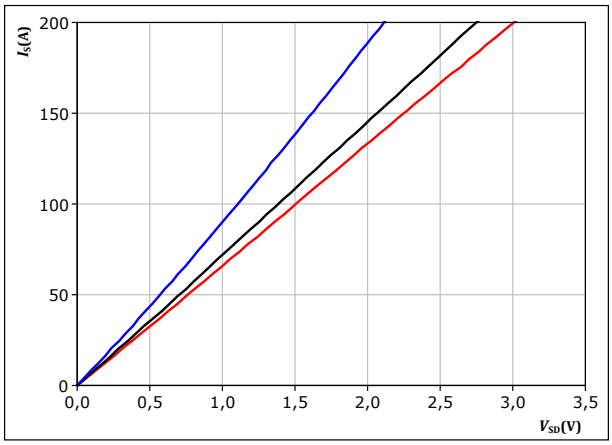


t_p =	250	µs		
V_{DS} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 11. **MOSFET**

Typical reverse drain current characteristics including $R_{DD'} + R_{SS'}$

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



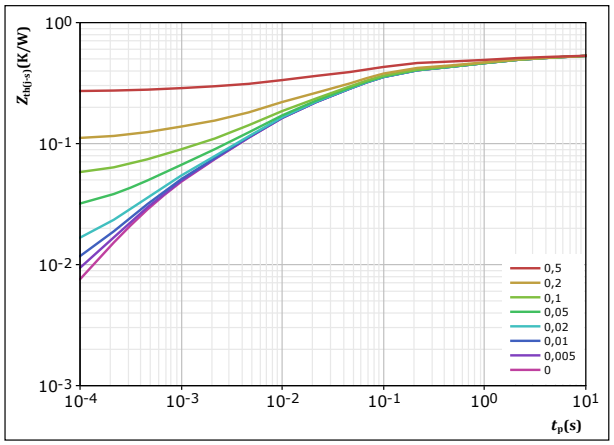
t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

Boost Switch Characteristics

figure 12. **MOSFET**

Transient thermal impedance as a function of pulse width

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



$D =$ t_p / T

$R_{th(j-s)} =$ 0,532 K/W

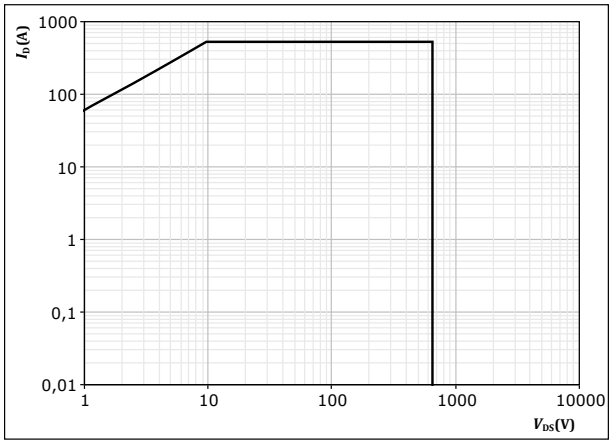
MOSFET thermal model values

R (K/W)	τ (s)
6,14E-02	5,37E+00
9,54E-02	7,79E-01
2,37E-01	5,71E-02
1,13E-01	6,20E-03
3,29E-02	5,65E-04

figure 13. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



$D =$ single pulse

$T_s =$ 80 °C

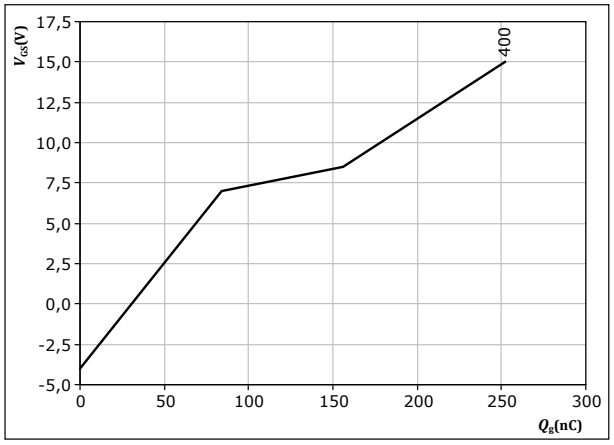
$V_{GS} =$ 15 V

$T_j =$ T_{jmax}

figure 14. **MOSFET**

Gate voltage vs gate charge

$V_{GS} = f(Q_g)$



$I_D =$ 70.4 A

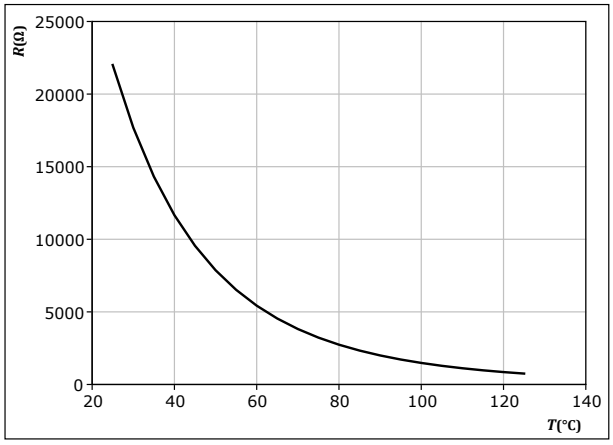
$T_j =$ 25 °C

Thermistor Characteristics

figure 15. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

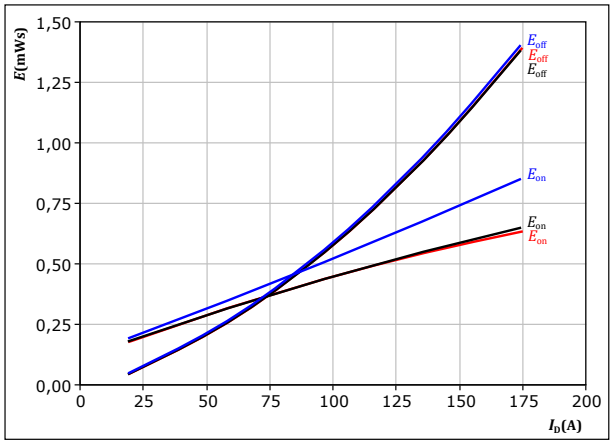


Buck Switching Characteristics

figure 16. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



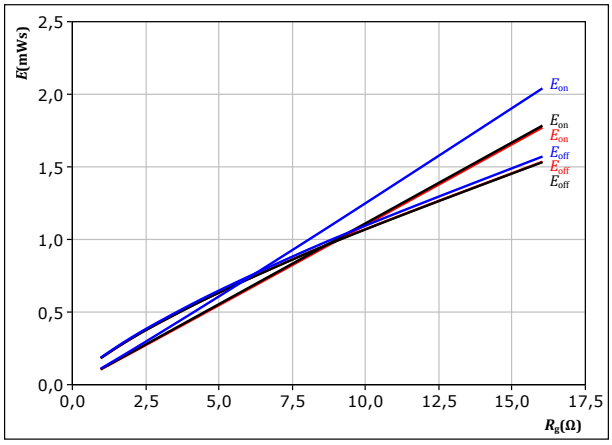
With an inductive load at

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

figure 17. **MOSFET**

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

$E = f(R_g)$



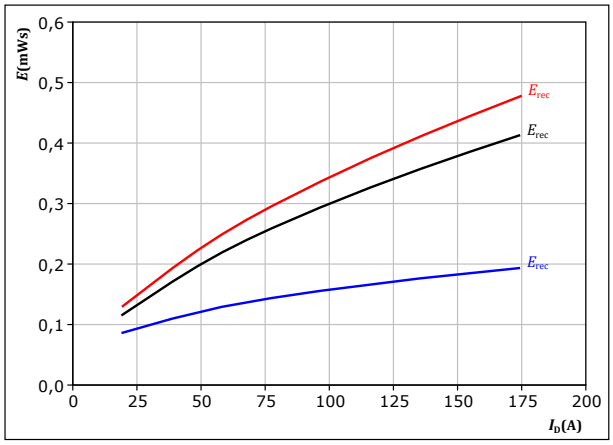
With an inductive load at

V_{DS} =	350	V	T_j: 25 °C
V_{GS} =	-5/15	V	125 °C
I_D =	96	A	150 °C

figure 18. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



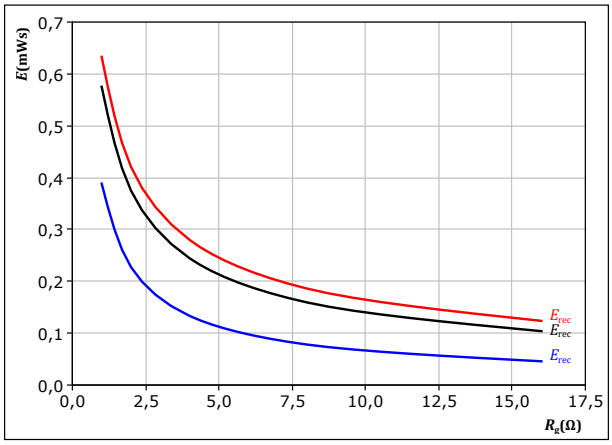
With an inductive load at

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

figure 19. **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

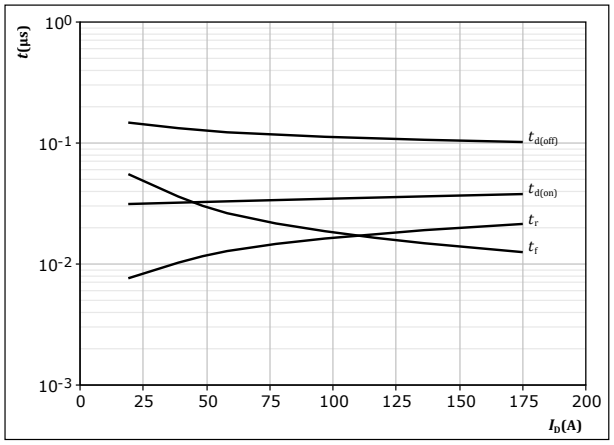
V_{DS} =	350	V	T_j: 25 °C
V_{GS} =	-5/15	V	125 °C
I_D =	96	A	150 °C

Buck Switching Characteristics

figure 20. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



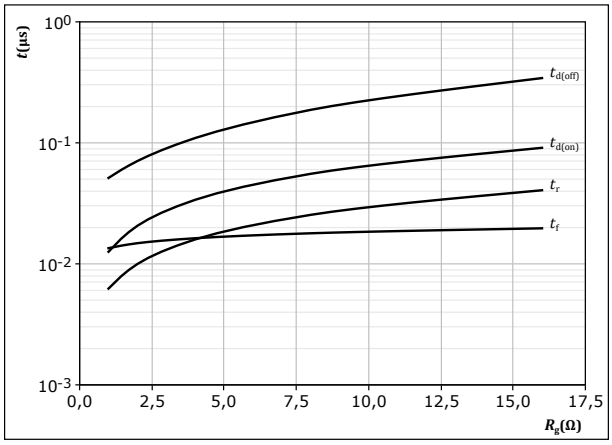
With an inductive load at

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

figure 21. **MOSFET**

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

$t = f(R_g)$



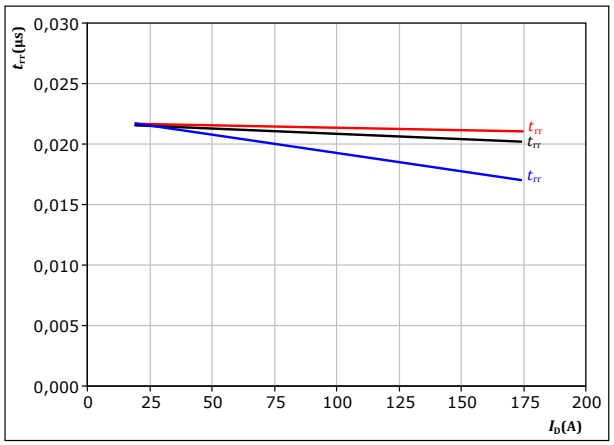
With an inductive load at

T_j =	150	°C
V_{DS} =	350	V
V_{GS} =	-5/15	V
I_D =	96	A

figure 22. **MOSFET**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



At

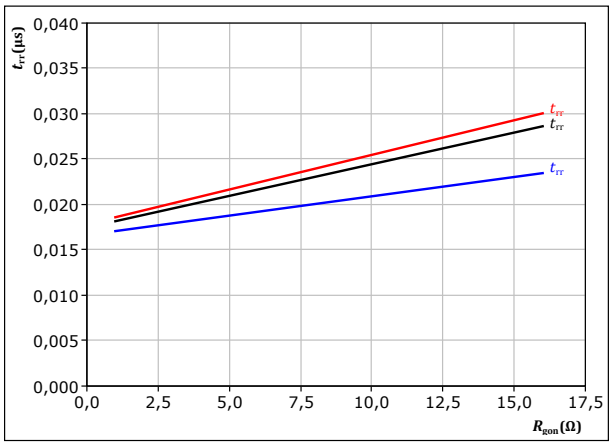
V_{DS} =	350	V
V_{GS} =	-5/15	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 23. **MOSFET**

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

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



At

V_{DS} =	350	V
V_{GS} =	-5/15	V
I_D =	96	A

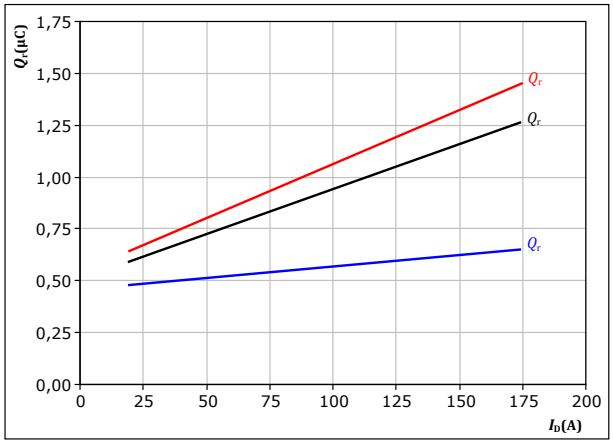
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 24. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

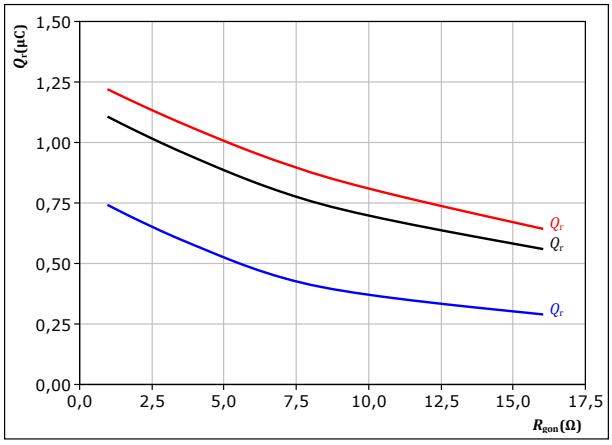


At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-5/15	V		125 °C
	R_{gon} =	4	Ω		150 °C

figure 25. **MOSFET**

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

$Q_r = f(R_{gon})$

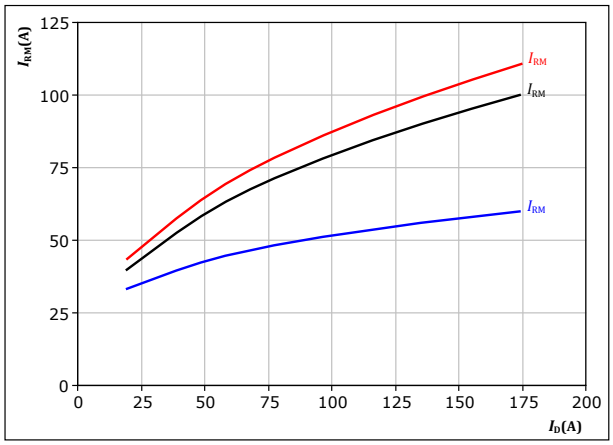


At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-5/15	V		125 °C
	I_D =	96	A		150 °C

figure 26. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

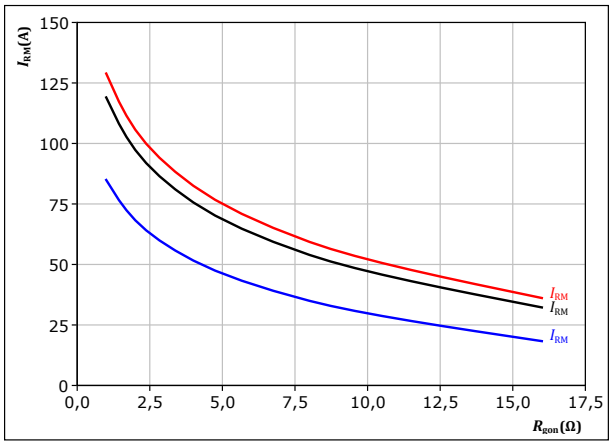


At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-5/15	V		125 °C
	R_{gon} =	4	Ω		150 °C

figure 27. **MOSFET**

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

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



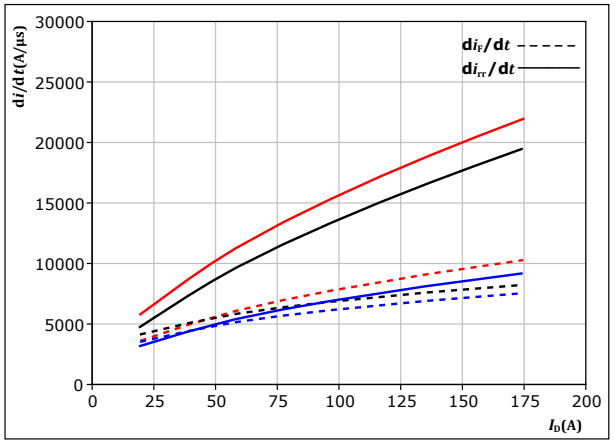
At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-5/15	V		125 °C
	I_D =	96	A		150 °C

Buck Switching Characteristics

figure 28. **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)

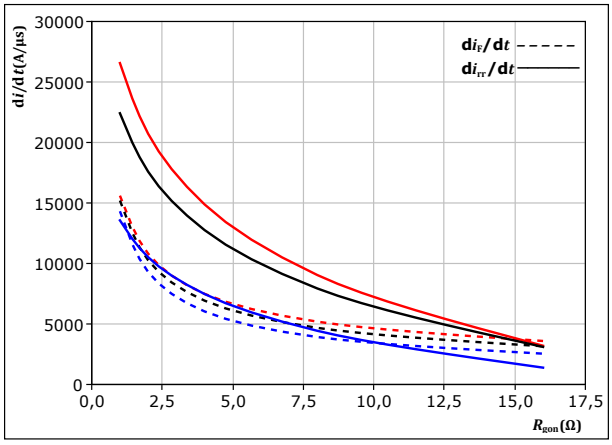


At	V_{DS} =	350	V		
	V_{GS} =	-5/15	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 29. **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})

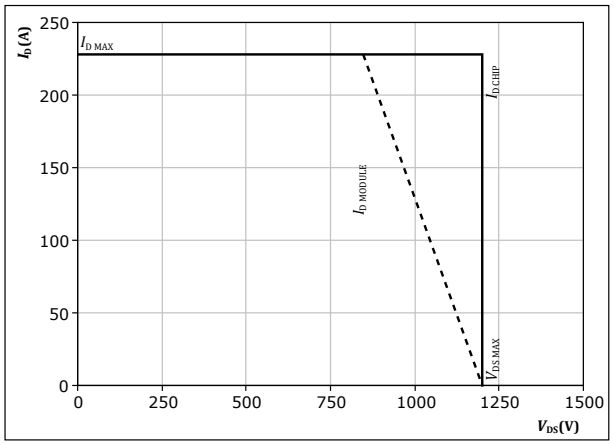


At	V_{DS} =	350	V		
	V_{GS} =	-5/15	V	T_j:	25 °C
	I_D =	96	A		125 °C
					150 °C

figure 30. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



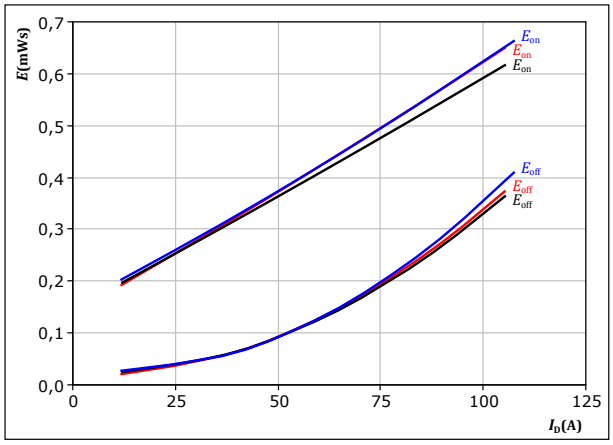
At	T_j =	150	°C
	R_{gon} =	4	Ω
	R_{goff} =	4	Ω

Boost Switching Characteristics

figure 31. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



With an inductive load at

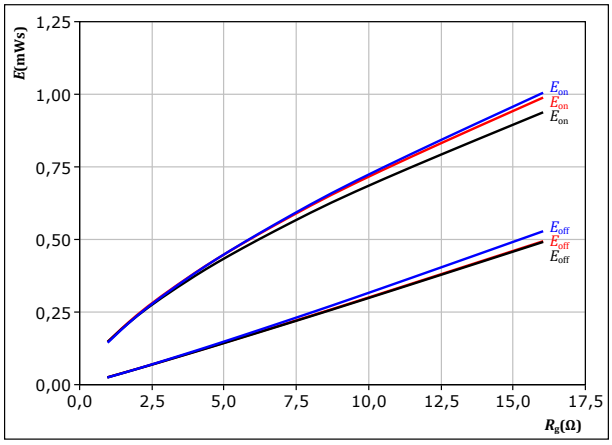
V_{DS} =	350	V	
V_{GS} =	-5/15	V	
R_{gon} =	4	Ω	
R_{goff} =	4	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 32. **MOSFET**

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

$E = f(R_g)$



With an inductive load at

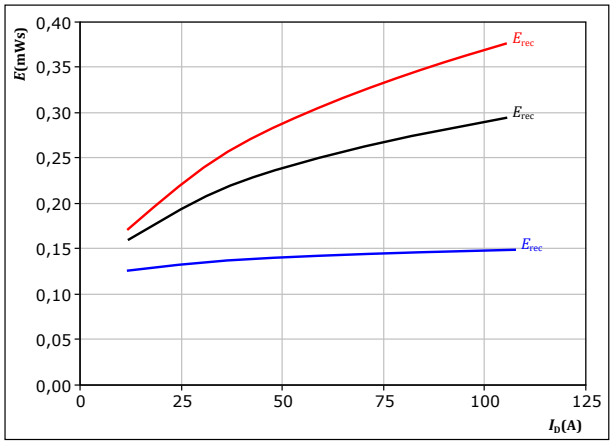
V_{DS} =	350	V	
V_{GS} =	-5/15	V	
I_D =	58	A	

T_j: 25 °C, 125 °C, 150 °C

figure 33. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



With an inductive load at

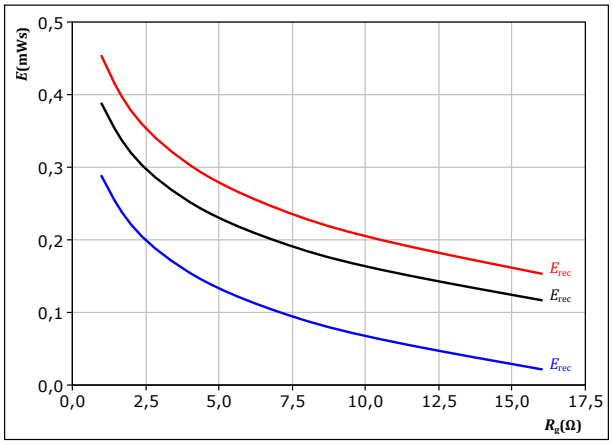
V_{DS} =	350	V	
V_{GS} =	-5/15	V	
R_{gon} =	4	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 34. **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} =	350	V	
V_{GS} =	-5/15	V	
I_D =	58	A	

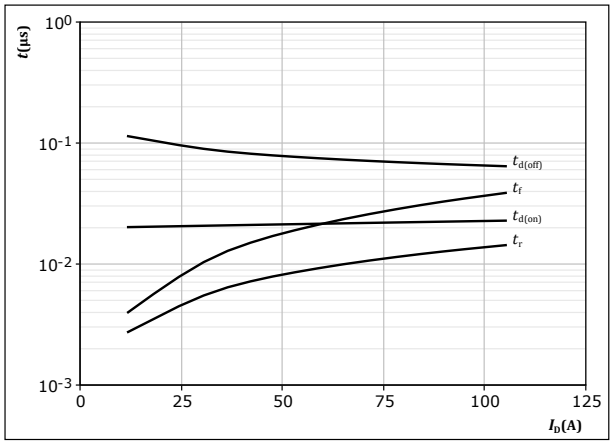
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 35. **MOSFET**

Typical switching times as a function of drain current

t = f(I_D)



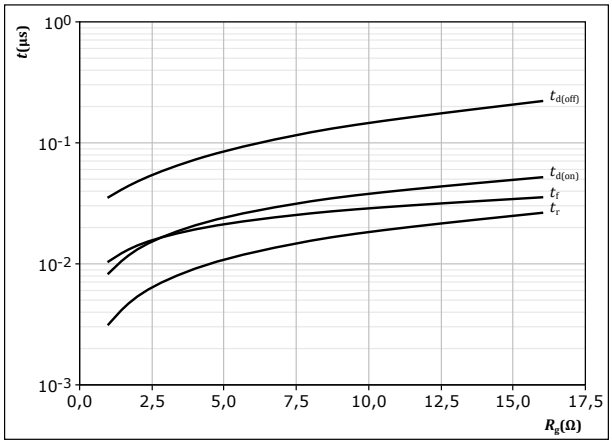
With an inductive load at

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

figure 36. **MOSFET**

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

t = f(R_g)



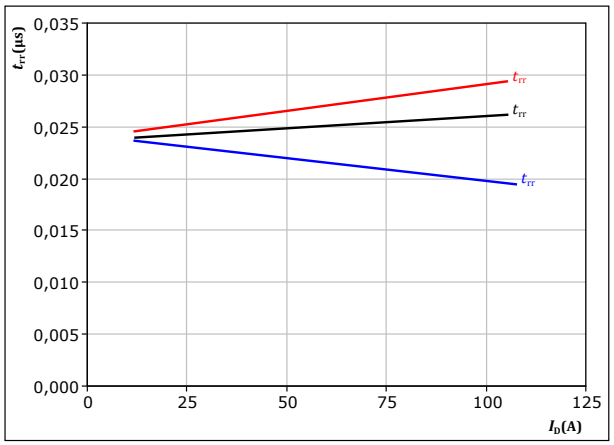
With an inductive load at

T_j =	150	°C
V_{DS} =	350	V
V_{GS} =	-5/15	V
I_D =	58	A

figure 37. **MOSFET**

Typical reverse recovery time as a function of drain current

t_{rr} = f(I_D)

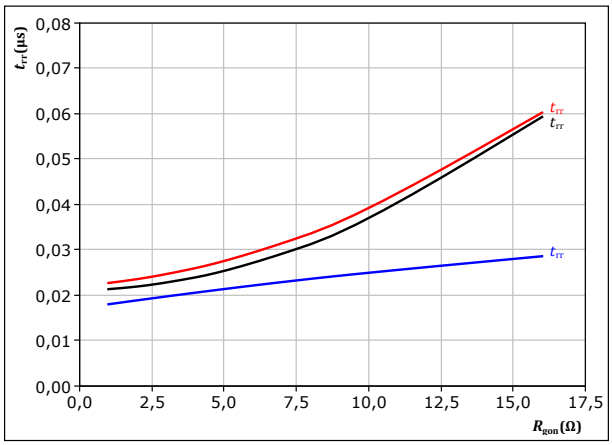


At	V_{DS} =	350	V	
	V_{GS} =	-5/15	V	T_j: 25 °C
	R_{gon} =	4	Ω	125 °C
				150 °C

figure 38. **MOSFET**

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

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



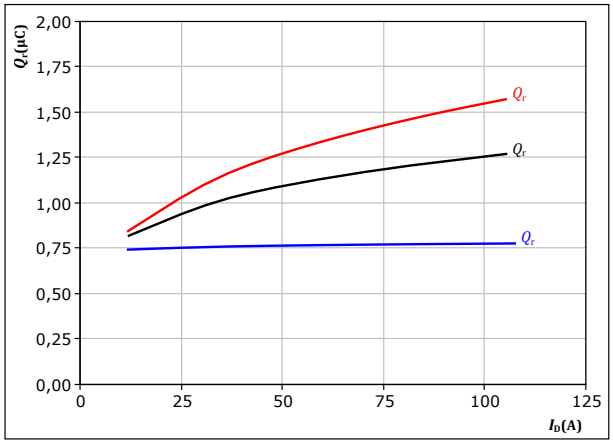
At	V_{DS} =	350	V	
	V_{GS} =	-5/15	V	T_j: 25 °C
	I_D =	58	A	125 °C
				150 °C

Boost Switching Characteristics

figure 39. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

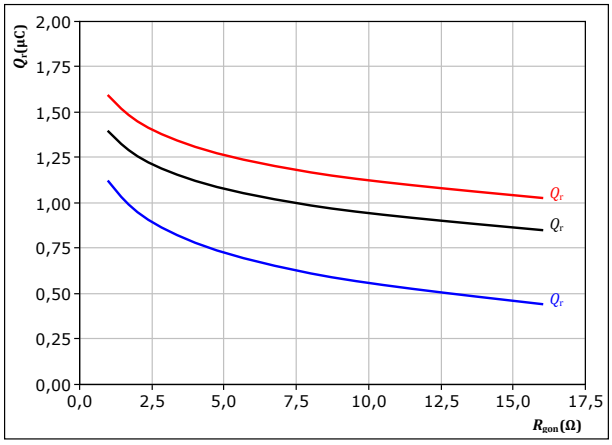


At					
V_{DS} =	350	V			
V_{GS} =	-5/15	V	T_j:	125 °C	150 °C
R_{gon} =	4	Ω			

figure 40. **MOSFET**

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

$Q_r = f(R_{gon})$

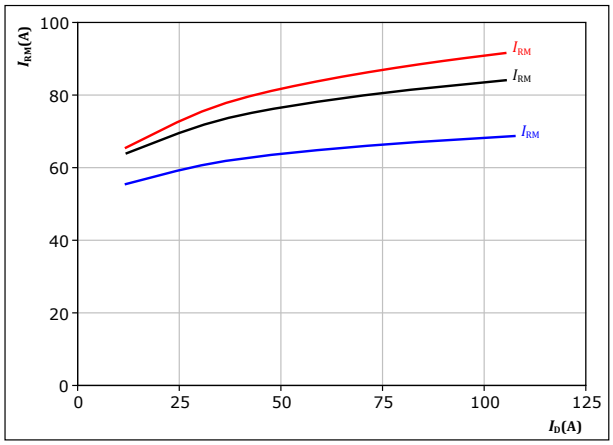


At					
V_{DS} =	350	V			
V_{GS} =	-5/15	V	T_j:	125 °C	150 °C
I_D =	58	A			

figure 41. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

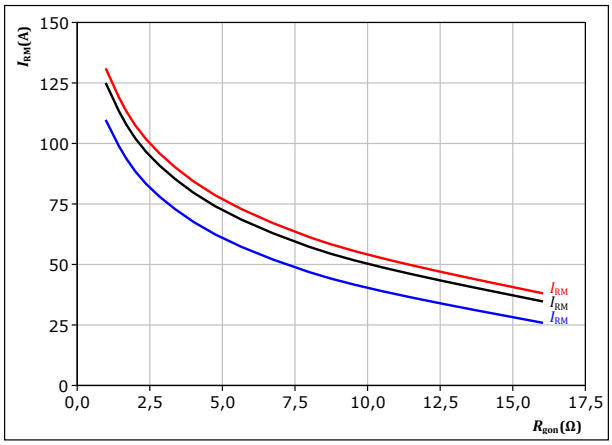


At					
V_{DS} =	350	V			
V_{GS} =	-5/15	V	T_j:	125 °C	150 °C
R_{gon} =	4	Ω			

figure 42. **MOSFET**

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

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



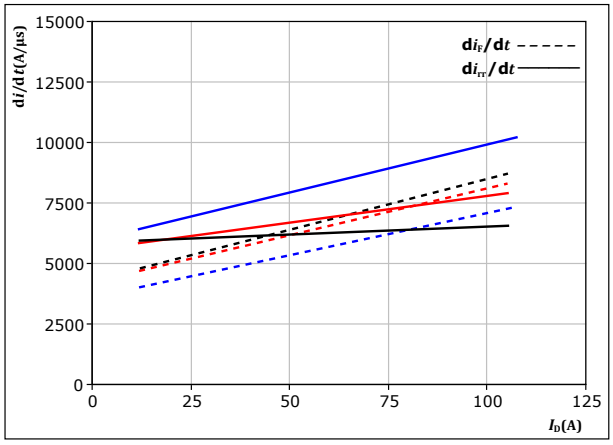
At					
V_{DS} =	350	V			
V_{GS} =	-5/15	V	T_j:	125 °C	150 °C
I_D =	58	A			

Boost Switching Characteristics

figure 43. **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)

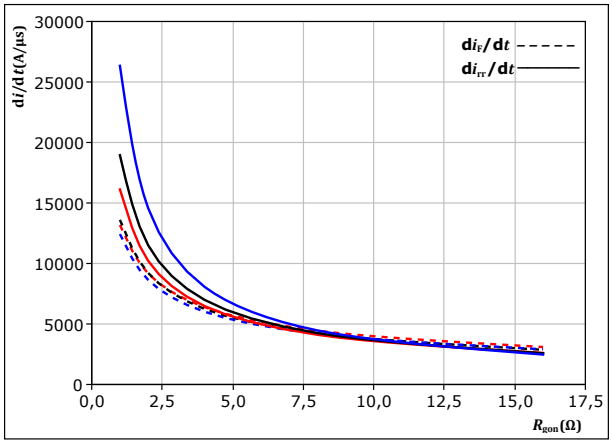


At				
	V_{DS} =	350	V	
	V_{GS} =	-5/15	V	
	R_{gon} =	4	Ω	
	T_j:			25 °C
				125 °C
				150 °C

figure 44. **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})

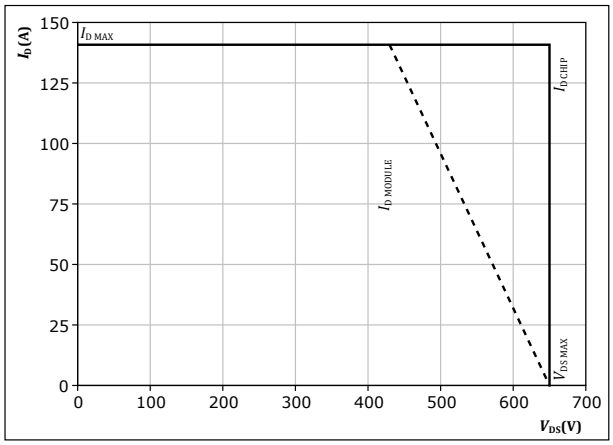


At				
	V_{DS} =	350	V	
	V_{GS} =	-5/15	V	
	I_D =	58	A	
	T_j:			25 °C
				125 °C
				150 °C

figure 45. **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 46. MOSFET

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

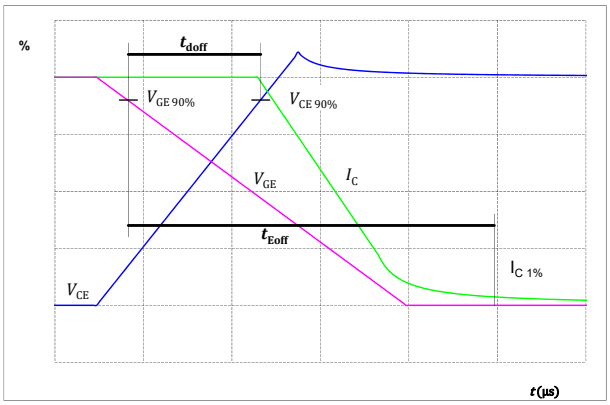


figure 47. MOSFET

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

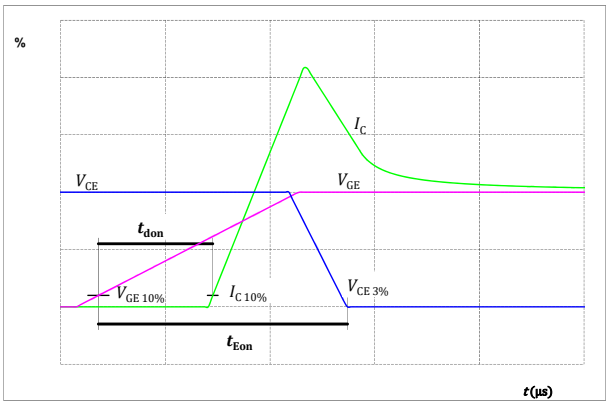


figure 48. MOSFET

Turn-off Switching Waveforms & definition of t_f

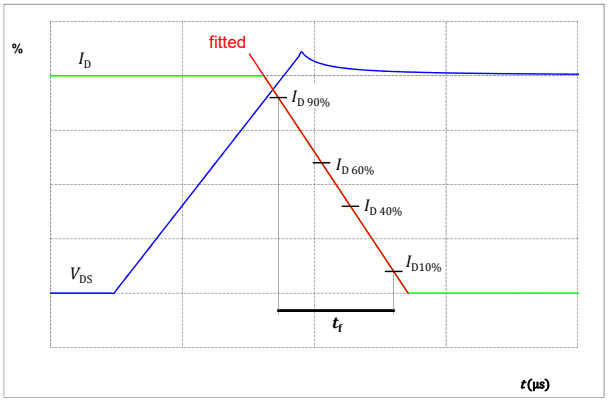
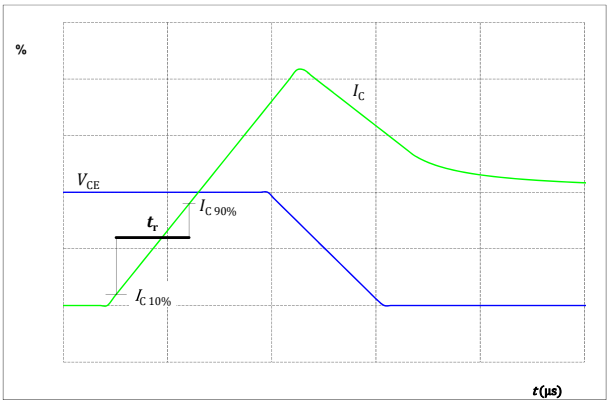


figure 49. MOSFET

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 50. **FWD**

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

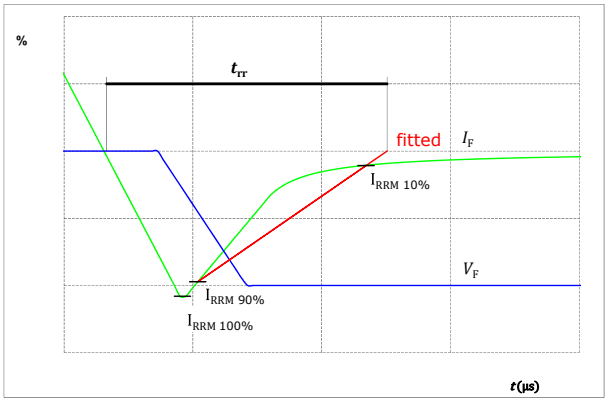


figure 51. **FWD**

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

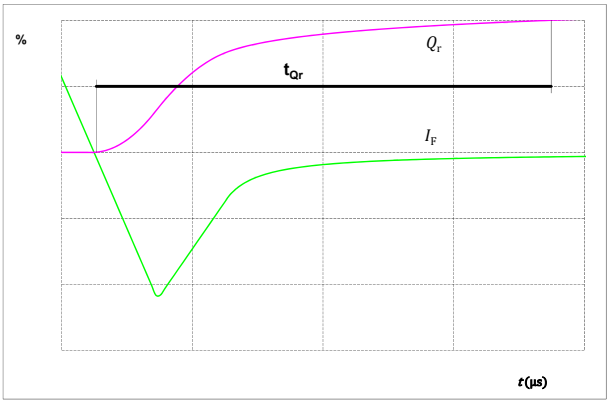
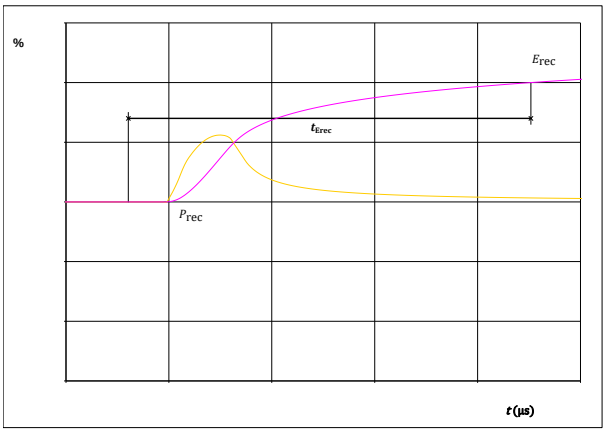


figure 52. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	10-FY12NMA009ME-PG09F18Z
With thermal paste (5,2 W/mK, PTM6000HV)	10-FY12NMA009ME-PG09F18Z-/7/

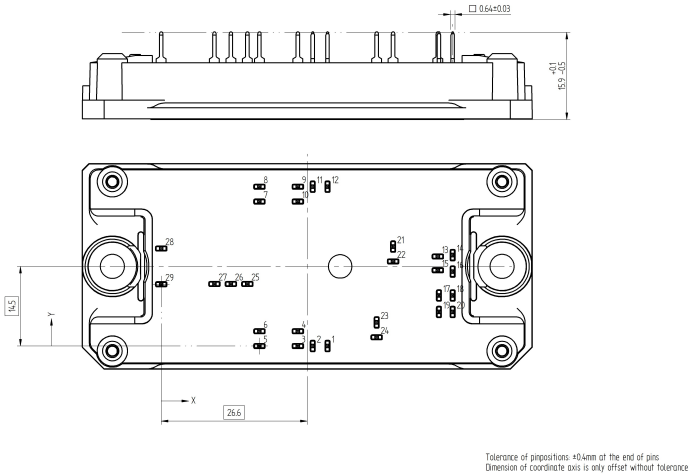
Marking

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

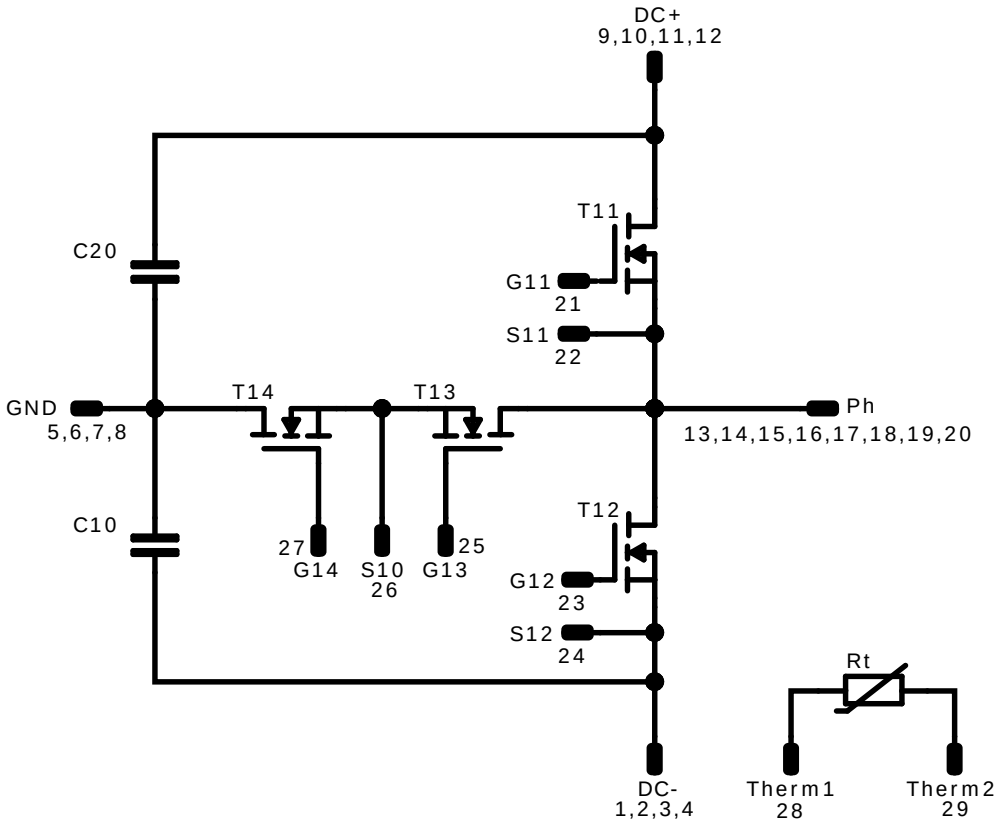
Outline

Pin table [mm]

Pin	X	Y	Function
1	30,3	0	DC-
2	27,6	0	DC-
3	24,9	0	DC-
4	24,9	2,7	DC-
5	17,9	0	GND
6	17,9	2,7	GND
7	17,9	26,3	GND
8	17,9	29	GND
9	24,9	29	DC+
10	24,9	26,3	DC+
11	27,6	29	DC+
12	30,3	29	DC+
13	50,4	16,3	Ph
14	53,1	16,55	Ph
15	50,4	13,8	Ph
16	53,1	13,55	Ph
17	50,6	9,2	Ph
18	53,1	9,2	Ph
19	50,6	6,2	Ph
20	53,1	6,2	Ph
21	42,25	18,1	G11
22	42,25	15,4	S11
23	39,25	4,3	G12
24	39,25	1,6	S12
25	15,7	11,3	G13
26	12,7	11,3	S10
27	9,7	11,3	G14
28	0	17,75	Therm1
29	0	11,25	Therm2



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T13	MOSFET	1200 V	8,67 mΩ	Buck Switch	
T14, T12	MOSFET	650 V	11,25 mΩ	Boost Switch	
C10, C20	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-FY12NMA009ME-PG09F18Z-D1-14	9 Oct. 2025	Initial Release	