Vincotech

30-EP232PB004ME01-PR09F07T
datasheet

flowDUAL E3BP SiC **2300 V / 3 mΩ**

Topology features

- Temperature sensor
- Half Bridge

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

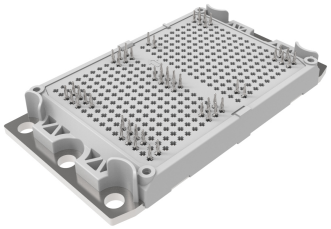
Target applications

- Charging Stations
- Energy Storage Systems
- General
- Power Supply
- Solar Inverters
- UPS

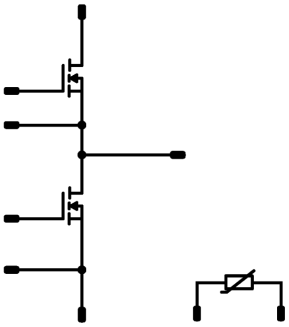
Types

- 30-EP232PB004ME01-PR09F07T

flow E3BP 12 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Half-Bridge Switch				
Drain-source voltage	V_{DSS}		2300	V
Drain current (DC current)	I_D	T_j = T_{jmax} T_s = 80 °C	275	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	1328	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	758	W
Gate-source voltage	V_{GSS}	static	-4 / 15	V
		dynamic	-8 / 19	V
Maximum Junction Temperature	T_{jmax}		175	°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			>12,7	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	
Half-Bridge Switch										
Static										
Drain-source on-state resistance(1)	$r_{DS(on)}$		15		552	25 125		3,75 10,88	4,88	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,152	25	1,8	2,5	3,6	V
Gate to Source Leakage Current	I_{GSS}		15	0		25		80	800	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	2300		25		8	80	µA
Internal gate resistance	r_g							1,25		Ω
Gate charge	Q_g		-4/15	1500	552	25		1176		nC
Short-circuit input capacitance	C_{iss}	f = 100 kHz	0	1500	0	25		48000		pF
Short-circuit output capacitance	C_{oss}							816		
Reverse transfer capacitance	C_{rss}							80		
Diode forward voltage	V_{SD}		0		280	25		5,5		V
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,13		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	-4/15	1500	560	25 125 150		146,04 130,82 128,37		ns
Rise time	t_r					25 125 150		91,61 83,2 82,11		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		506,85 542,31 552,46		ns
Fall time	t_f					25 125 150		56,18 56,92 56,64		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=1,94 µC Q_{rFWD}=12,19 µC Q_{rFWD}=18,23 µC				25 125 150		90,98 90,1 95,13		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		77,79 78,29 77,94		mWs
Peak recovery current	I_{RRM}	di/dt=9864 A/µs di/dt=7155 A/µs di/dt=7392 A/µs				25 125 150		112,05 132,21 175,48		A
Reverse recovery time	t_{rr}					25 125 150		30,06 187,08 181,35		ns
Recovered charge	Q_r					25 125 150		1,94 12,19 18,23		µC
Reverse recovered energy	E_{rec}					25 125 150		0,439 9,8 14,76		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		11131,04 498,75 3483,27		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	
Thermistor										
Static										
Rated resistance	R					25		5		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 493 Ω				100	-5		5	%
Power dissipation	P							245		mW
Power dissipation constant	d					25		1,4		mW/K
B-value	$B_{(25/50)}$	Tol. ±2 %						3375		K
B-value	$B_{(25/100)}$	Tol. ±2 %						3437		K
Vincotech Thermistor Reference									K	

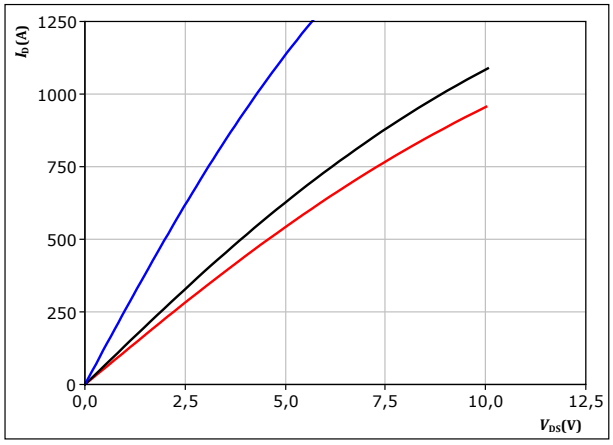
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Half-Bridge Switch Characteristics

figure 1. **MOSFET**

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

$I_D = f(V_{DS})$

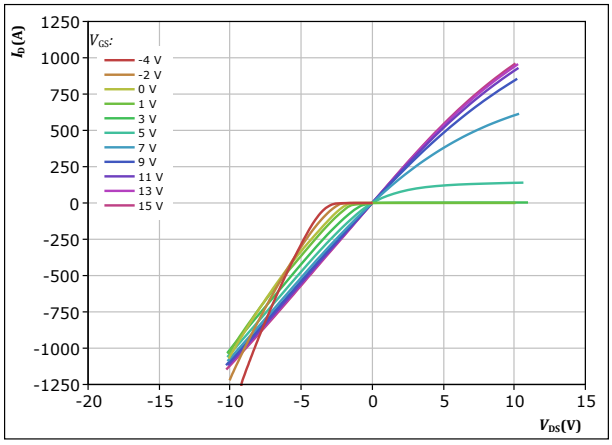


t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

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

$I_D = f(V_{DS})$



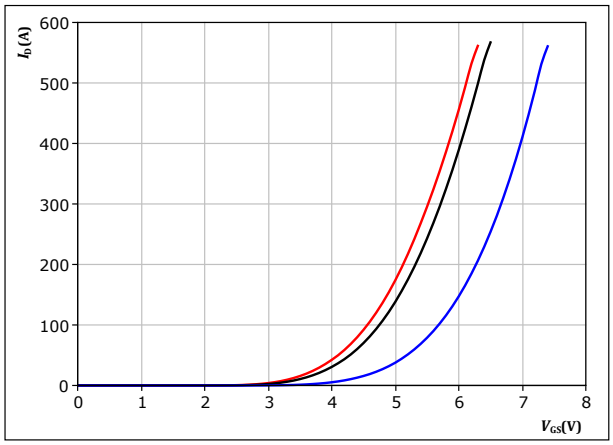
t_p =	250	µs
T_j =	150	°C

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

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

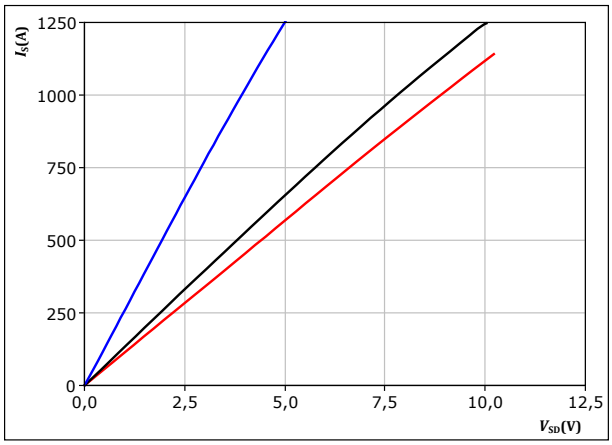


t_p =	250	µs		
V_{DS} =	24	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

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

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



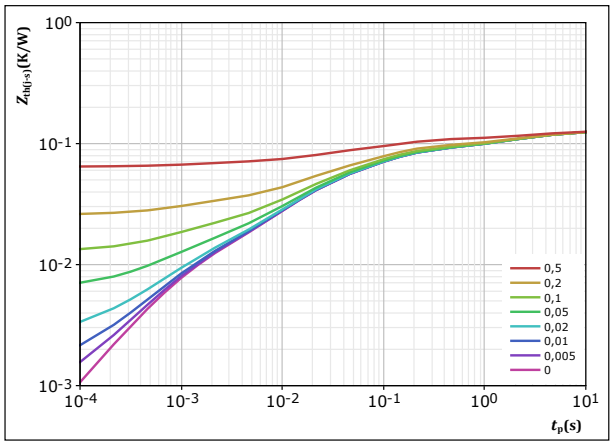
t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

Half-Bridge 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

$R_{th(j-s)} =$ 0,125 K/W

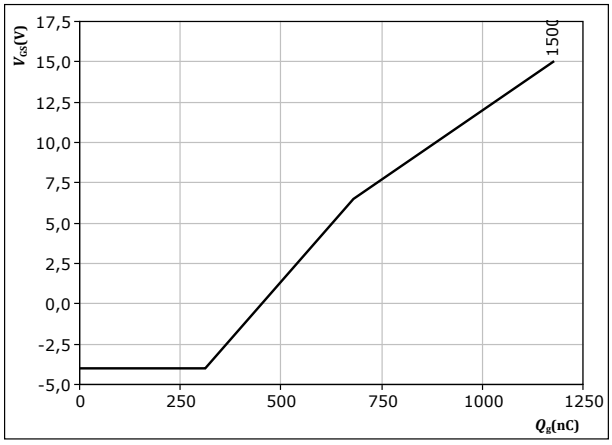
MOSFET thermal model values

R (K/W)	τ (s)
1,72E-02	7,20E+00
2,60E-02	1,61E+00
4,68E-02	9,59E-02
3,06E-02	1,52E-02
8,14E-03	9,50E-04

figure 6. **MOSFET**

Gate voltage vs gate charge

$V_{GS} = f(Q_g)$



$I_D =$ 400 A

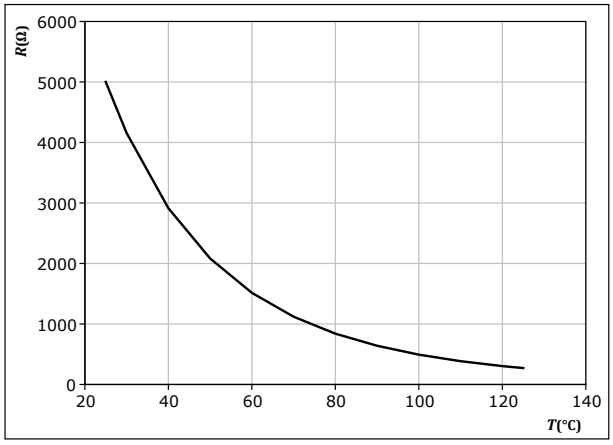
$T_j =$ 25 °C

Thermistor Characteristics

figure 7. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

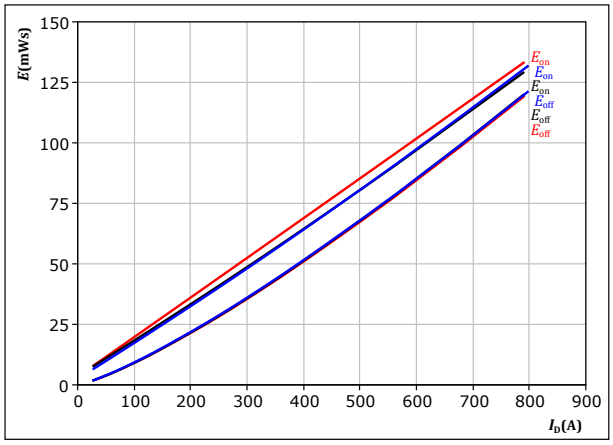


Half-Bridge Switching Characteristics

figure 8. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



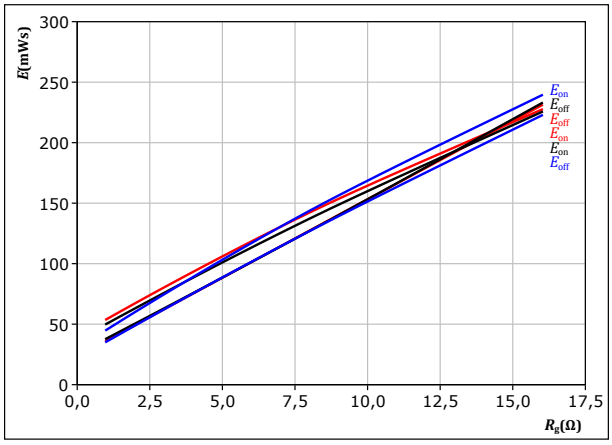
With an inductive load at

			T_j:	
V_{DS} =	1500	V		25 °C
V_{GS} =	-4/15	V		125 °C
R_{gon} =	4	Ω		150 °C
R_{goff} =	4	Ω		

figure 9. **MOSFET**

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

$E = f(R_g)$



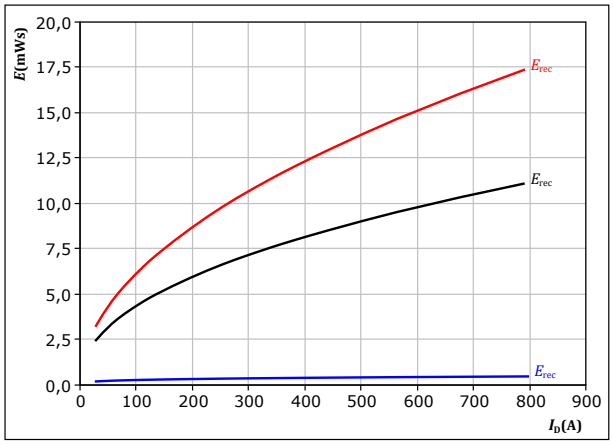
With an inductive load at

			T_j:	
V_{DS} =	1500	V		25 °C
V_{GS} =	-4/15	V		125 °C
I_D =	560	A		150 °C

figure 10. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



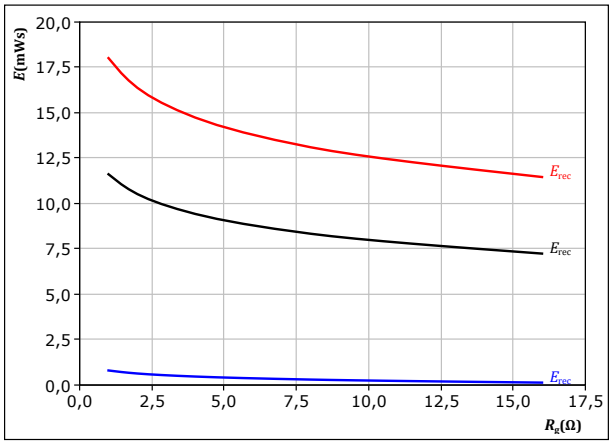
With an inductive load at

			T_j:	
V_{DS} =	1500	V		25 °C
V_{GS} =	-4/15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 11. **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

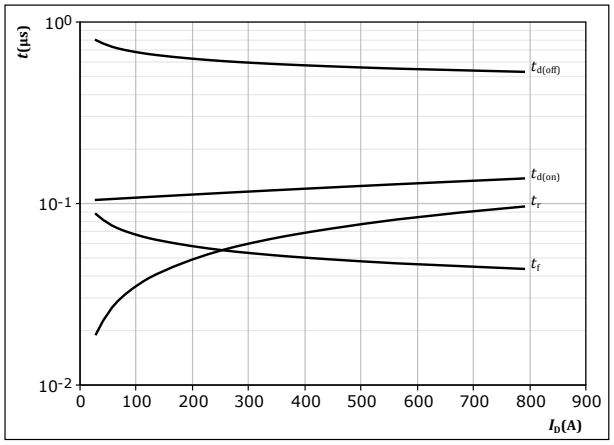
			T_j:	
V_{DS} =	1500	V		25 °C
V_{GS} =	-4/15	V		125 °C
I_D =	560	A		150 °C

Half-Bridge Switching Characteristics

figure 12. **MOSFET**

Typical switching times as a function of drain current

t = f(I_D)



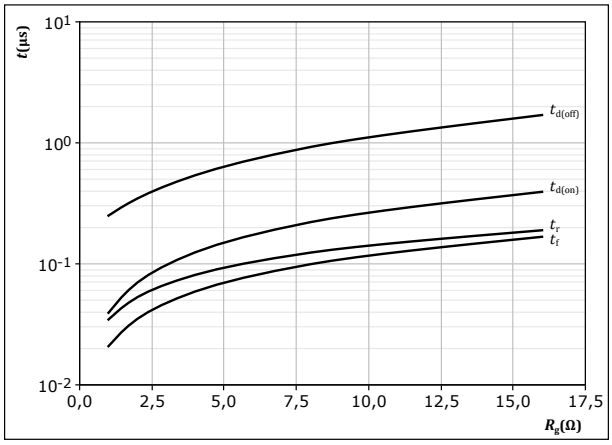
With an inductive load at

T_j =	150	°C
V_{DS} =	1500	V
V_{GS} =	-4/15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 13. **MOSFET**

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

t = f(R_g)



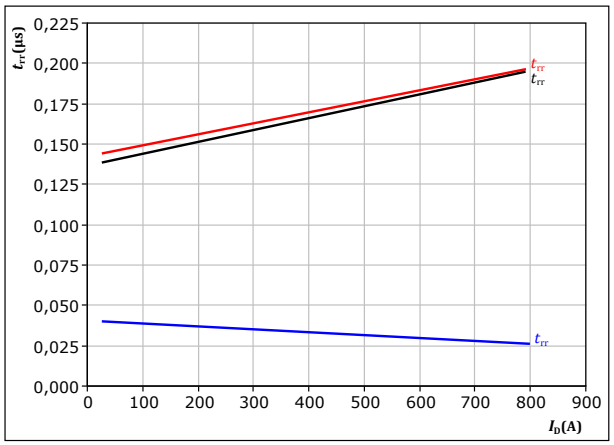
With an inductive load at

T_j =	150	°C
V_{DS} =	1500	V
V_{GS} =	-4/15	V
I_D =	560	A

figure 14. **MOSFET**

Typical reverse recovery time as a function of drain current

t_{rr} = f(I_D)



At

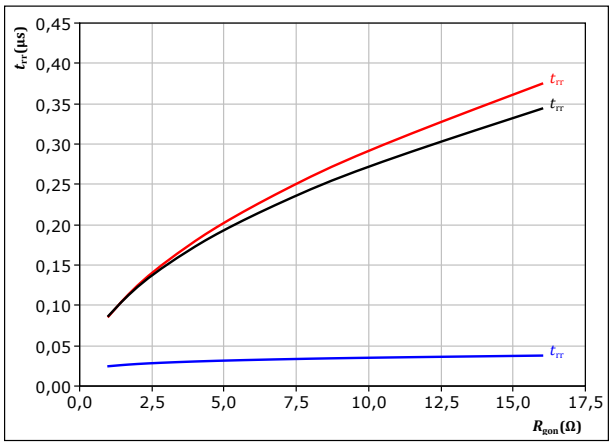
V_{DS} =	1500	V
V_{GS} =	-4/15	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 15. **MOSFET**

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

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



At

V_{DS} =	1500	V
V_{GS} =	-4/15	V
I_D =	560	A

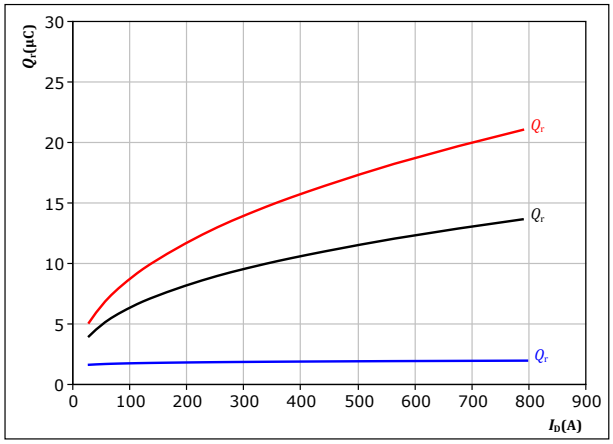
T_j: 25 °C, 125 °C, 150 °C

Half-Bridge Switching Characteristics

figure 16. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

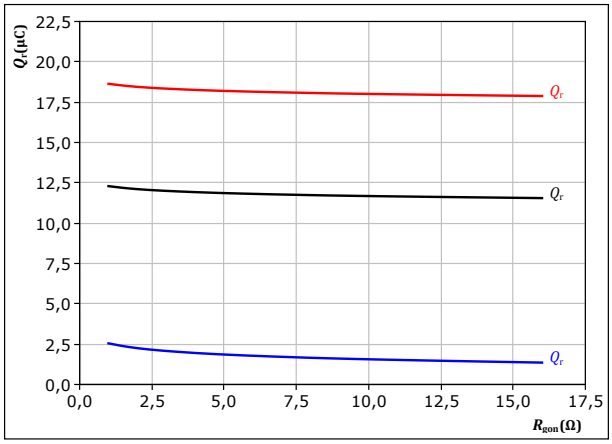


At					
V_{DS} =	1500	V			
V_{GS} =	-4/15	V	T_j:	125 °C	
R_{gon} =	4	Ω		150 °C	

figure 17. **MOSFET**

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

$Q_r = f(R_{gon})$

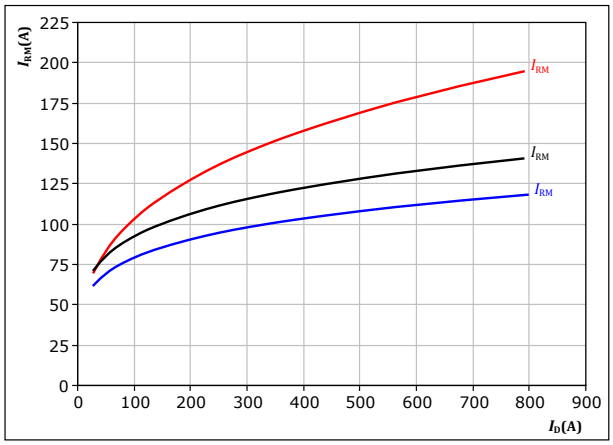


At					
V_{DS} =	1500	V			
V_{GS} =	-4/15	V	T_j:	125 °C	
I_D =	560	A		150 °C	

figure 18. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

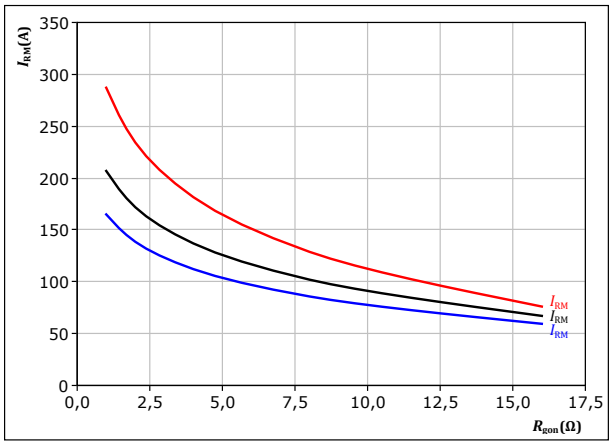


At					
V_{DS} =	1500	V			
V_{GS} =	-4/15	V	T_j:	125 °C	
R_{gon} =	4	Ω		150 °C	

figure 19. **MOSFET**

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

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



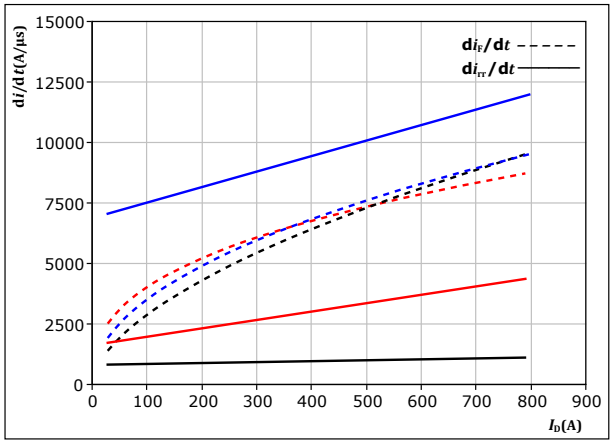
At					
V_{DS} =	1500	V			
V_{GS} =	-4/15	V	T_j:	125 °C	
I_D =	560	A		150 °C	

Half-Bridge Switching Characteristics

figure 20. **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)

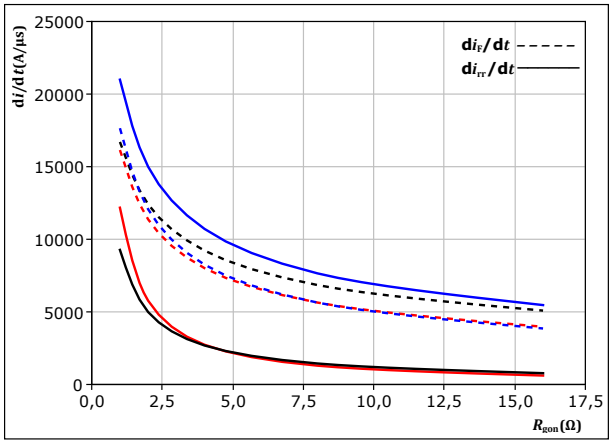


At				
	V_{DS} =	1500	V	
	V_{GS} =	-4/15	V	
	R_{gon} =	4	Ω	
	T_j:			25 °C
				125 °C
				150 °C

figure 21. **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})

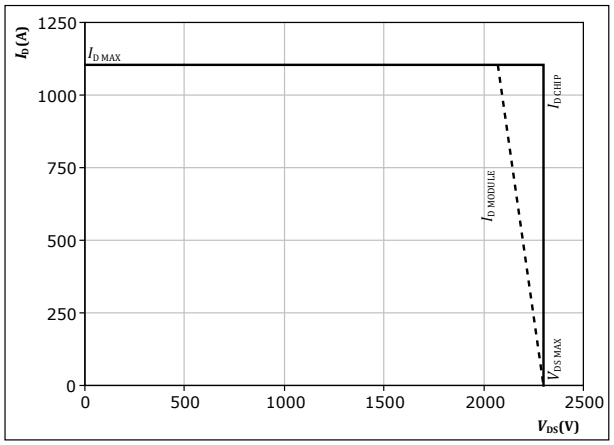


At				
	V_{DS} =	1500	V	
	V_{GS} =	-4/15	V	
	I_D =	560	A	
	T_j:			25 °C
				125 °C
				150 °C

figure 22. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



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

Half-Bridge Switching Definitions

figure 23. **MOSFET**

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

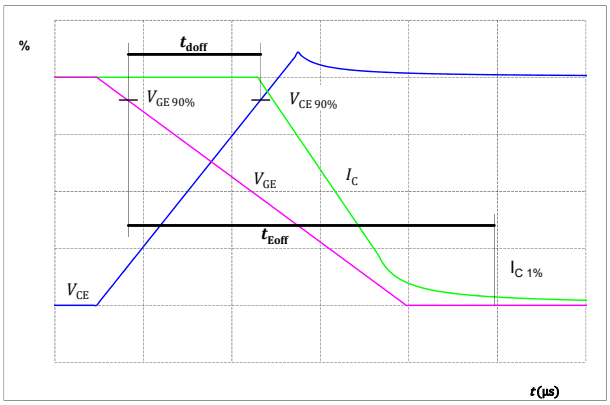


figure 24. **MOSFET**

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

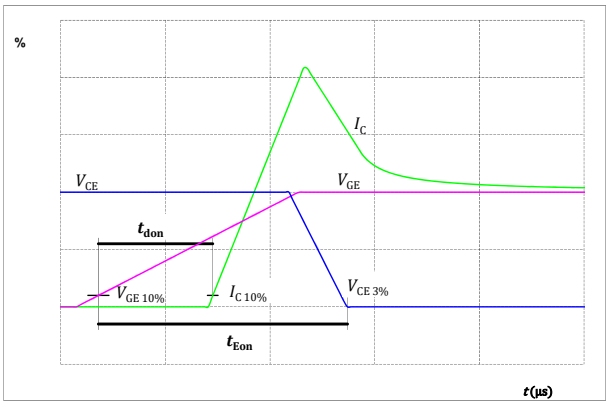


figure 25. **MOSFET**

Turn-off Switching Waveforms & definition of t_f

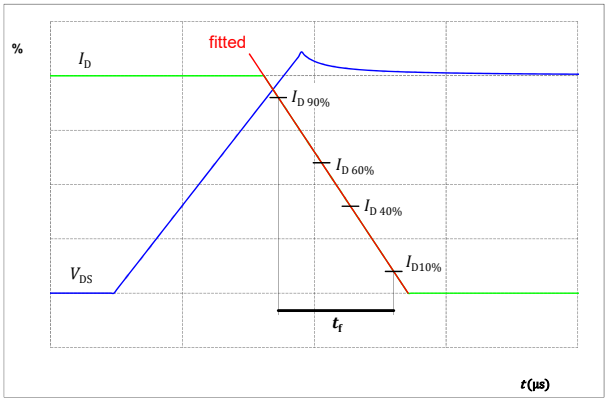
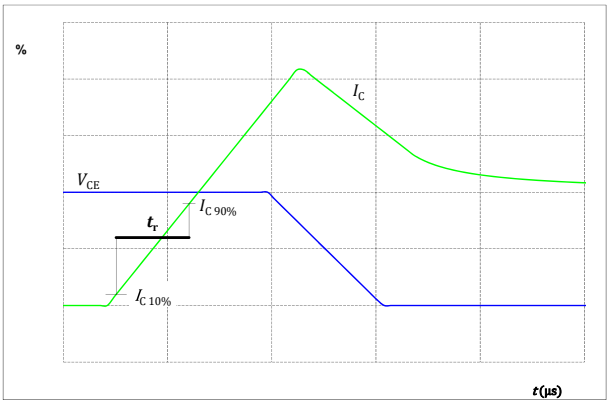


figure 26. **MOSFET**

Turn-on Switching Waveforms & definition of t_r



Half-Bridge Switching Definitions

figure 27. **FWD**

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

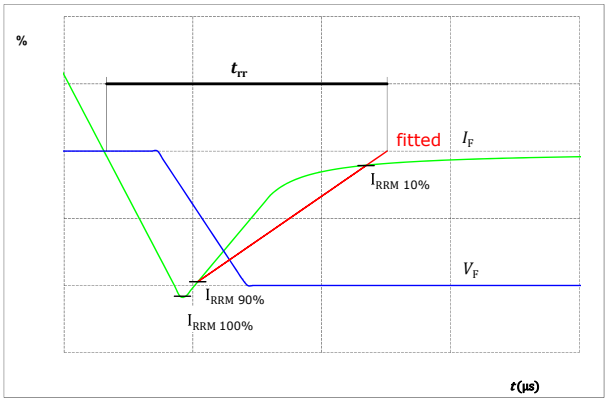


figure 28. **FWD**

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

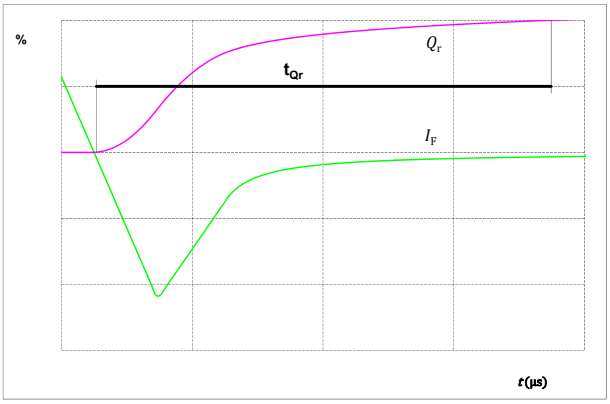
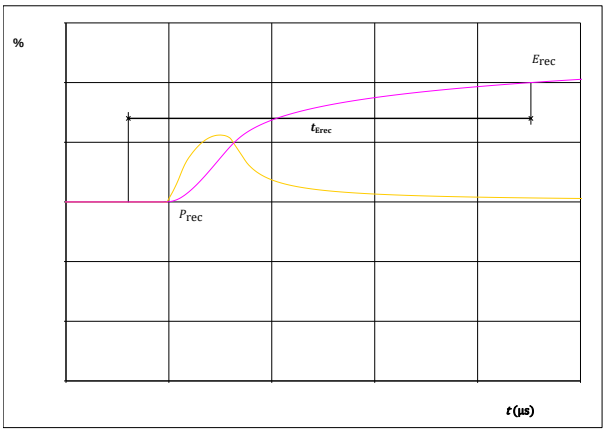


figure 29. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	30-EP232PB004ME01-PR09F07T
With thermal paste (5,2 W/mK, PTM6000HV)	30-EP232PB004ME01-PR09F07T-/7/

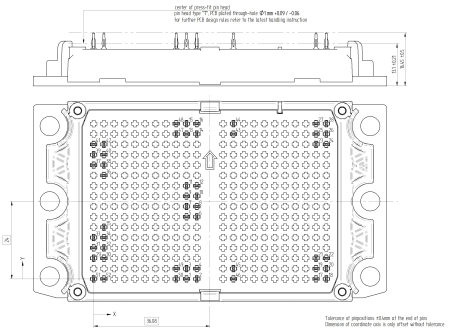
Marking

	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		

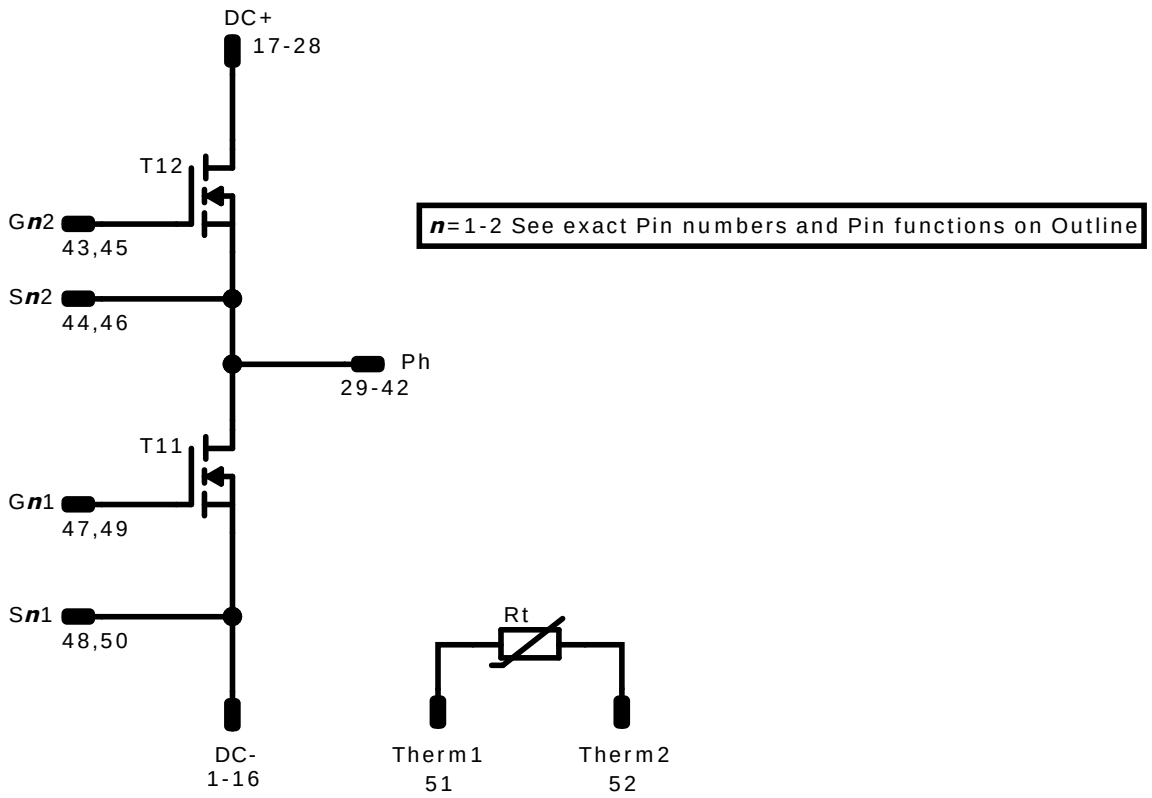
Outline

Pin table [mm]

Pin	X	Y	Function	27	68,96	48	DC+
1	28,8	0	DC-	28	72,16	48	DC+
2	32	0	DC-	29	0	6,4	Ph
3	28,8	3,2	DC-	30	3,2	6,4	Ph
4	32	3,2	DC-	31	0	9,6	Ph
5	28,8	19,2	DC-	32	3,2	9,6	Ph
6	32	19,2	DC-	33	0	12,8	Ph
7	28,8	22,4	DC-	34	3,2	12,8	Ph
8	32	22,4	DC-	35	3,2	16	Ph
9	28,8	25,6	DC-	36	3,2	32	Ph
10	32	25,6	DC-	37	0	35,2	Ph
11	28,8	28,8	DC-	38	3,2	35,2	Ph
12	32	28,8	DC-	39	0	38,4	Ph
13	28,8	44,8	DC-	40	3,2	38,4	Ph
14	32	44,8	DC-	41	0	41,6	Ph
15	28,8	48	DC-	42	3,2	41,6	Ph
16	32	48	DC-	43	43,36	44,8	G12
17	68,96	0	DC+	44	43,36	48	S12
18	72,16	0	DC+	45	43,36	3,2	G22
19	68,96	3,2	DC+	46	43,36	0	S22
20	72,16	3,2	DC+	47	25,6	44,8	G11
21	68,96	6,4	DC+	48	25,6	48	S11
22	72,16	6,4	DC+	49	25,6	3,2	G21
23	68,96	41,6	DC+	50	25,6	0	S21
24	72,16	41,6	DC+	51	0	0	Therm1
25	68,96	44,8	DC+	52	3,2	0	Therm2
26	72,16	44,8	DC+				



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	MOSFET	2300 V	3,75 mΩ	Half-Bridge Switch	Parallel devices with separate control. Values apply to complete device.
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.

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 4000VAC/1min isolation voltage. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
30-EP232PB004ME01-PR09F07T-D1-14	17 Oct. 2025	Initial Release	