



Vincotech

10-EZ124PA018MR-LR09F08T

datasheet

fastPACK E1 SiC

1200 V / 18 mΩ

Topology features

- Kelvin Emitter for improved switching performance
- Temperature sensor

Component features

- Easy paralleling
- Low on-resistance
- Fast switching speed
- Fast recovery body diode

Housing features

- Base isolation: Al₂O₃
- Convex shaped substrate for superior thermal contact
- Compact housing
- CTI600 housing material
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

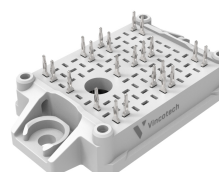
Target applications

- Charging Stations

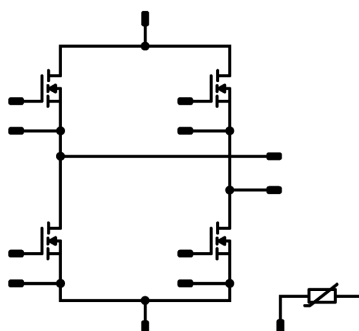
Types

- 10-EZ124PA018MR-LR09F08T

flow E1 12 mm housing



Schematic





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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
H-Bridge Switch				
Drain-source voltage	V_{DS}		1200	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	49	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	168	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	102	W
Gate-source voltage	V_{GS}	static	-4 / 21	V
		dynamic	-4 / 23	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* $t_p = 2\text{ s}$	6000	V
Creepage distance			>12,7	mm
Clearance			8,62	mm
Comparative Tracking Index	CTI		≥ 600	

*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	

H-Bridge Switch

Static

Drain-source on-state resistance ⁽¹⁾	$r_{DS(on)}$		18		42	25 150		18 36	22,5	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,0222	25	2,8	3,5	4,8	V
Gate to Source Leakage Current	I_{GSS}		21	0		25			200	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25		2	160	μA
Internal gate resistance	r_g							0,5		Ω
Gate charge	Q_g	0/18	800	42	25			182		nC
Gate to source charge	Q_{GS}							40		
Gate to drain charge	Q_{GD}							48		
Short-circuit input capacitance	C_{iss}	$f = 1$ Mhz	0	800	0	25		4670		pF
Short-circuit output capacitance	C_{oss}							140		
Reverse transfer capacitance	C_{rss}							10		
Diode forward voltage	V_{SD}		0		42	25		3,3		V

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,93		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		
Dynamic											
Turn-on delay time	$t_{d(on)}$	$R_{gon} = 16\ \Omega$ $R_{goff} = 16\ \Omega$	0/15	600	64	25		53,53		ns	
						125		44,49			
						150		43,03			
Rise time	t_r					25		46,28			
		125					34,92		ns		
		150					32,78				
Turn-off delay time	$t_{d(off)}$	25					118,75				
		125					143,95		ns		
		150					149,47				
Fall time	t_f	25					15,66				
		125					17,11		ns		
		150		18,11							
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD}=0,378\ \mu C$ $Q_{tFWD}=0,591\ \mu C$ $Q_{tFWD}=0,757\ \mu C$		25		1,81			mWs		
				125		1,32					
				150		1,3					
Turn-off energy (per pulse)	E_{off}			25		0,907			mWs		
				125		0,948					
				150		0,973					
Peak recovery current	I_{RRM}	$di/dt=1780\ A/\mu s$ $di/dt=2562\ A/\mu s$ $di/dt=2506\ A/\mu s$		25		24,7			A		
			125		32,85						
			150		37,76						
Reverse recovery time	t_{rr}		25		25,82						
			125		29,11		ns				
		150		31,62							
Recovered charge	Q_r	25		0,378			μC				
		125		0,591							
		150		0,757							
Reverse recovered energy	E_{rec}	25		0,08			mWs				
		125		0,175							
		150		0,24							
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$	25		2768,88			A/ μs				
		125		3442,63							
		150		4088,41							



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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	

Thermistor

Static

Rated resistance	R					25		5		kΩ
Deviation of R100	$\Delta_{R/R}$	$R_{100} = 499 \Omega$				100	3,2		3,3	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,3		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1 \%$						3380		K
Vincotech Thermistor Reference									V	

⁽¹⁾ Value at chip level

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



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H-Bridge Switch Characteristics

figure 1. MOSFET

Typical output characteristics including $R_{DS(on)} + R_{DS}$

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

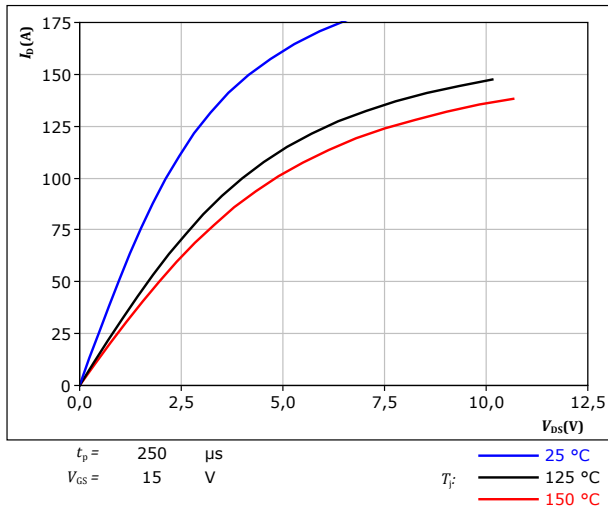


figure 2. MOSFET

Typical output characteristics including $R_{DS(on)} + R_{DS}$

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

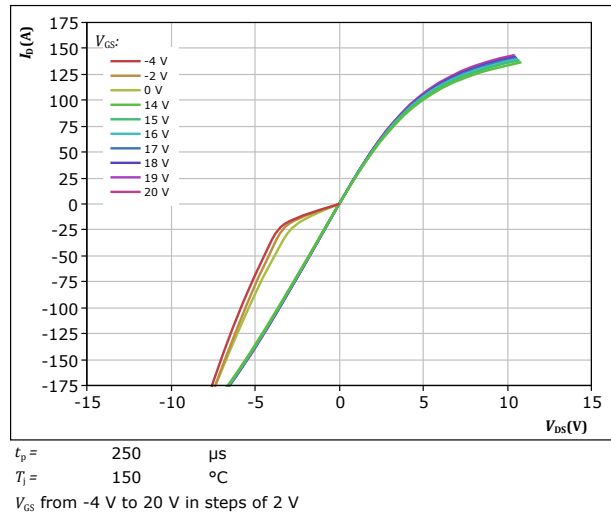


figure 3. MOSFET

Typical transfer characteristics

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

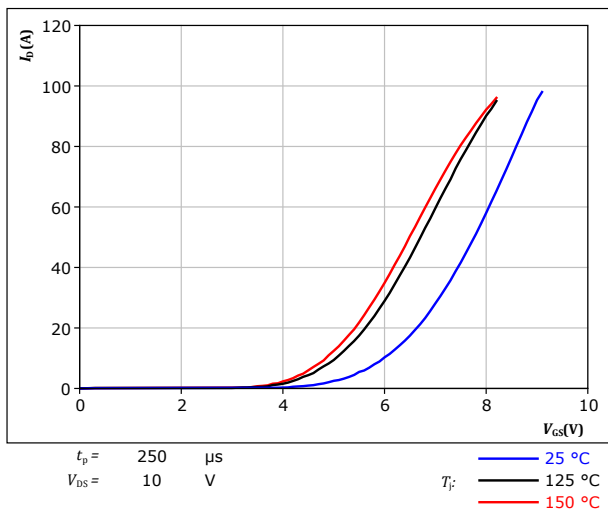
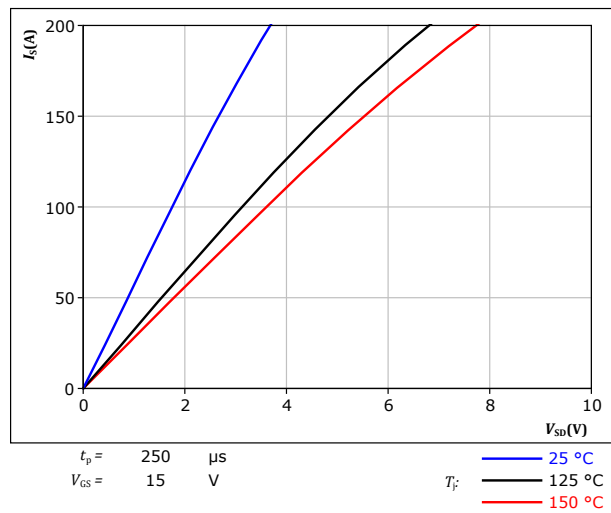


figure 4. MOSFET

Typical reverse drain current characteristics including $R_{DS(on)} + R_{DS}$

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



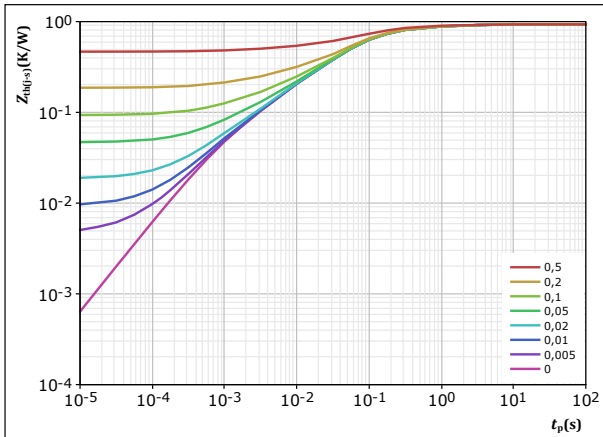


H-Bridge Switch Characteristics

figure 5. MOSFET

Transient thermal impedance as a function of pulse width

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



$$D = t_p / T$$

$$R_{th(j-a)} = 0,933 \text{ K/W}$$

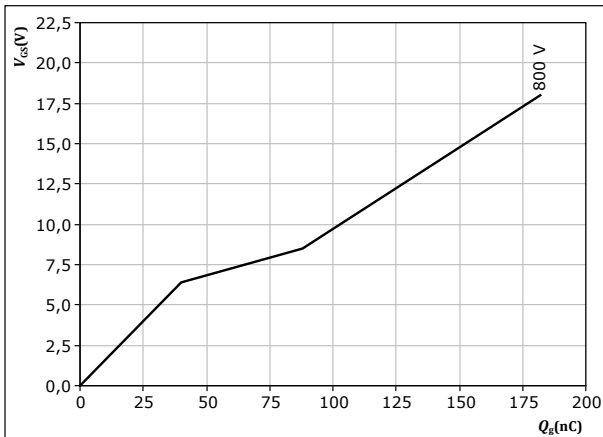
MOSFET thermal model values

R (K/W)	τ (s)
6,95E-02	2,25E+00
1,91E-01	2,69E-01
5,21E-01	6,22E-02
1,15E-01	7,38E-03
3,66E-02	9,33E-04

figure 7. MOSFET

Gate voltage vs gate charge

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



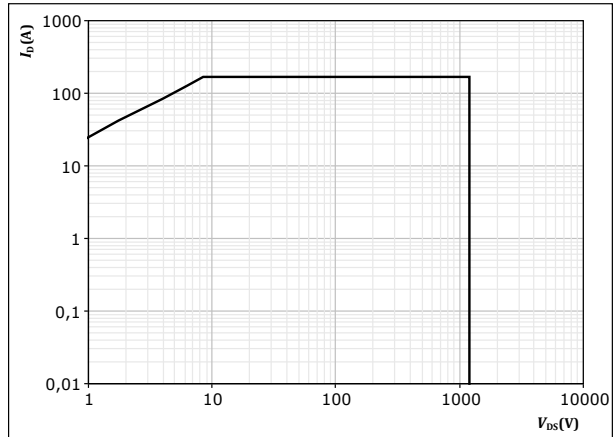
$$I_D = 42 \text{ A}$$

$$T_j = 25 \text{ °C}$$

figure 6. MOSFET

Safe operating area

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



D = single pulse

$$T_s = 80 \text{ °C}$$

$$V_{GS} = 15 \text{ V}$$

$$T_j = T_{jmax}$$



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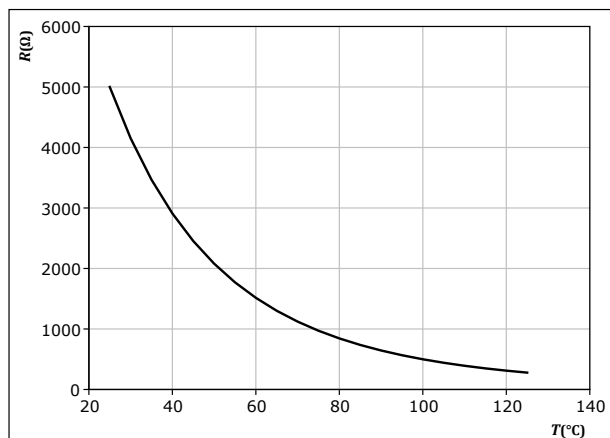
Thermistor Characteristics

figure 8.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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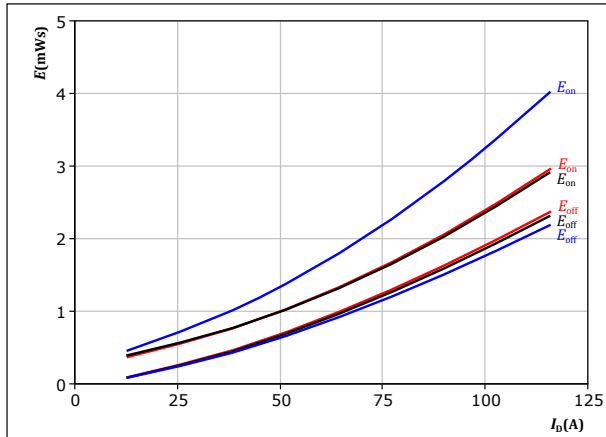
H-Bridge Switching Characteristics

figure 9.

MOSFET

Typical switching energy losses as a function of drain current

$$E = f(I_D)$$



With an inductive load at

$V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $R_{gon} = 16$ Ω
 $R_{goff} = 16$ Ω

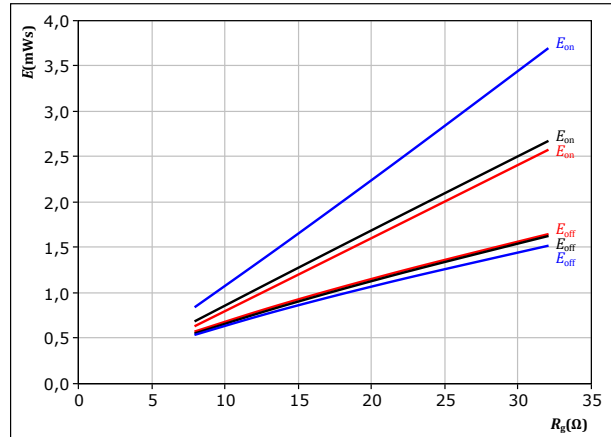
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 10.

MOSFET

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

$$E = f(R_g)$$



With an inductive load at

$V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $I_D = 64$ A

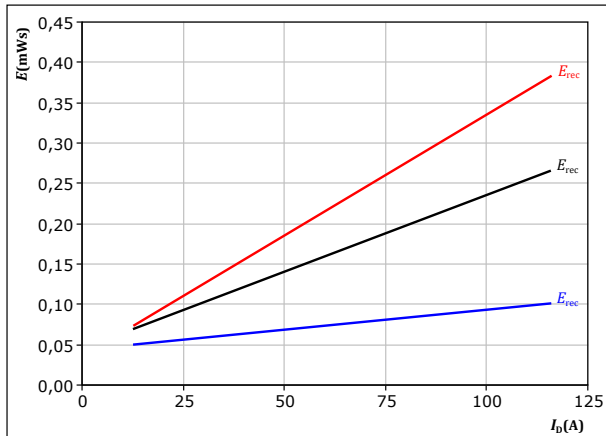
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 11.

MOSFET

Typical reverse recovered energy loss as a function of drain current

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



With an inductive load at

$V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $R_{gon} = 16$ Ω

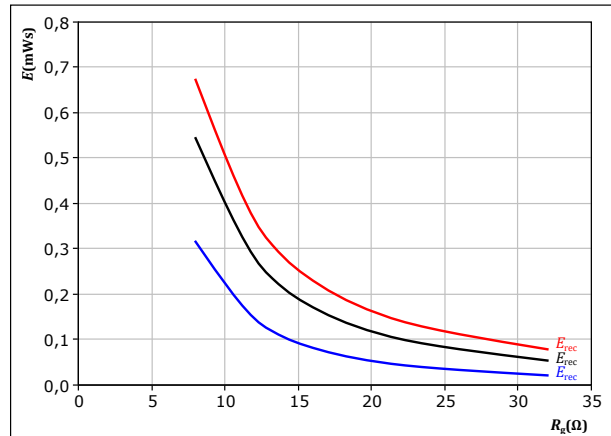
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 12.

MOSFET

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

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



With an inductive load at

$V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $I_D = 64$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



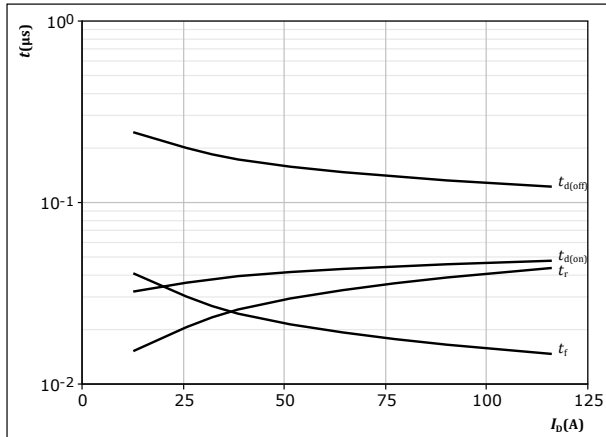
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H-Bridge Switching Characteristics

figure 13. MOSFET

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

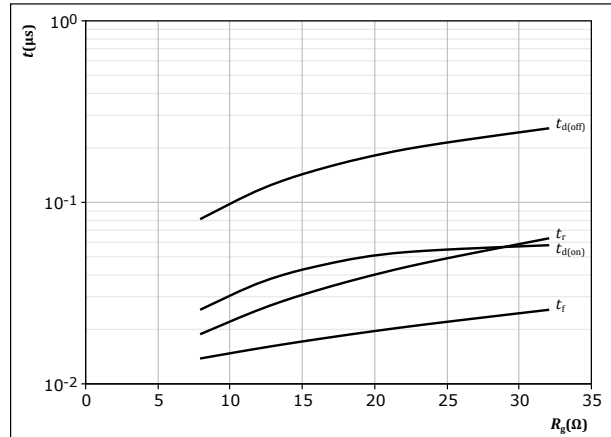


With an inductive load at

$T_j = 150$ °C
 $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $R_{gon} = 16$ Ω
 $R_{goff} = 16$ Ω

figure 14. MOSFET

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

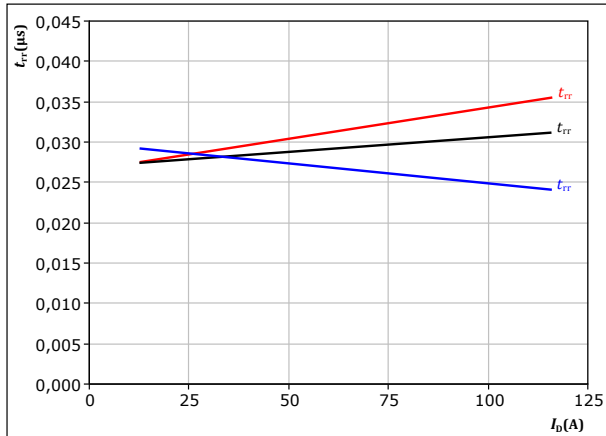


With an inductive load at

$T_j = 150$ °C
 $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $I_D = 64$ A

figure 15. MOSFET

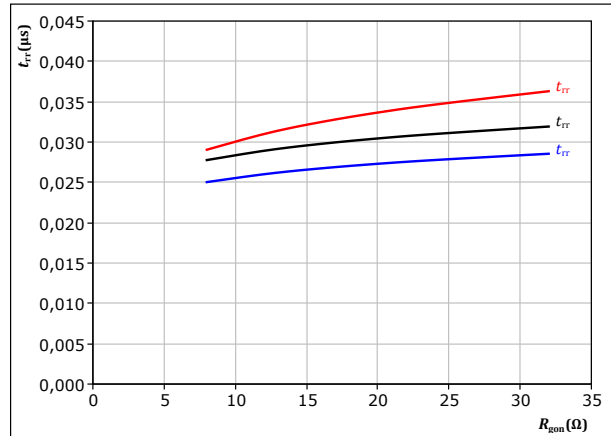
Typical reverse recovery time as a function of drain current
 $t_{rr} = f(I_D)$



At $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $R_{gon} = 16$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 16. MOSFET

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



At $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $I_D = 64$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)



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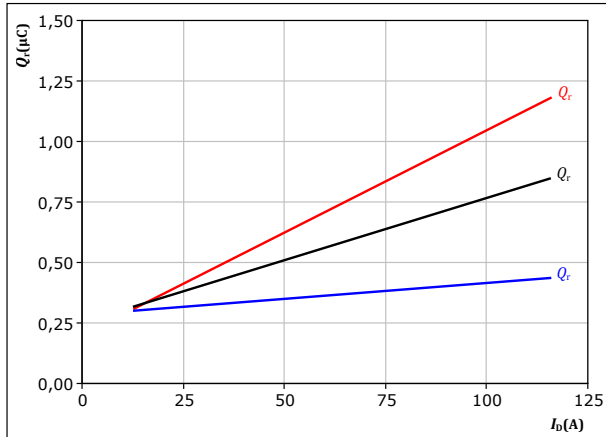
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H-Bridge Switching Characteristics

figure 17. MOSFET

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$

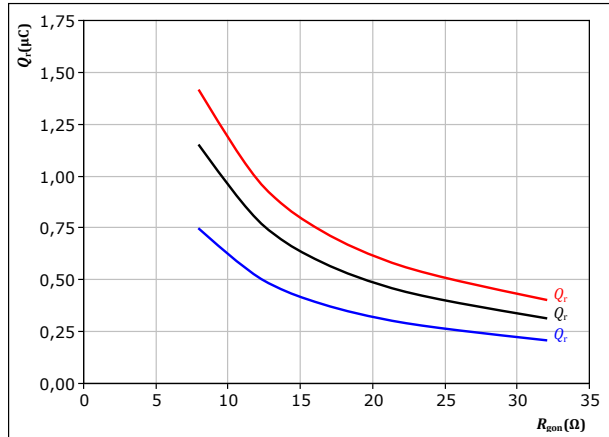


At $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $R_{gon} = 16$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 18. MOSFET

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

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

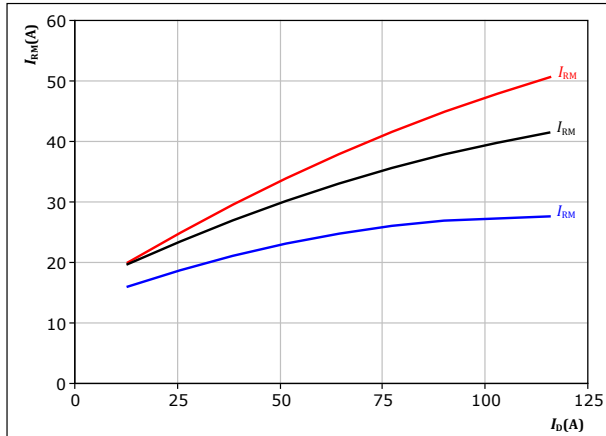


At $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $I_D = 64$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 19. MOSFET

Typical peak reverse recovery current as a function of drain current

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

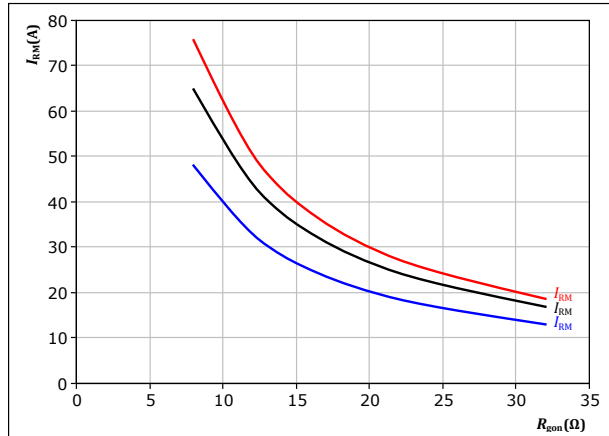


At $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $R_{gon} = 16$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 20. MOSFET

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

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



At $V_{DS} = 600$ V
 $V_{GS} = 0/15$ V
 $I_D = 64$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)



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H-Bridge Switching Characteristics

figure 21. MOSFET

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

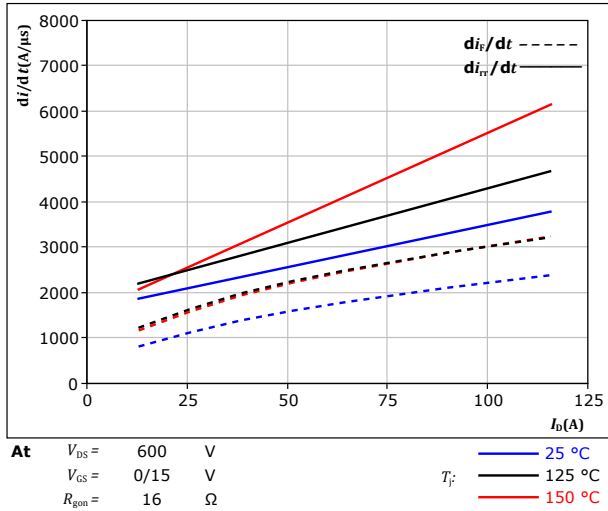


figure 23. MOSFET

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

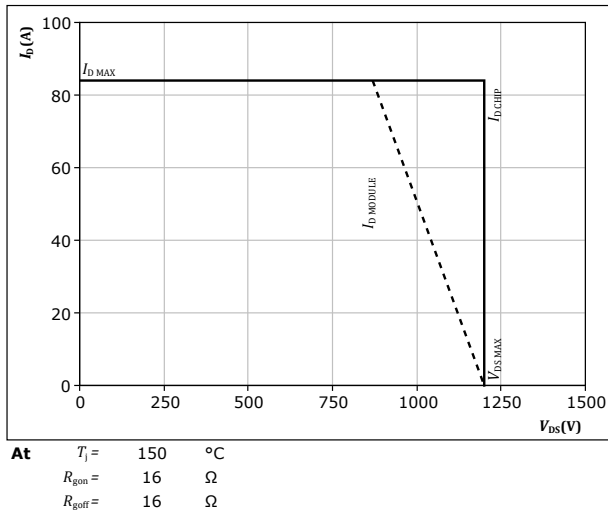
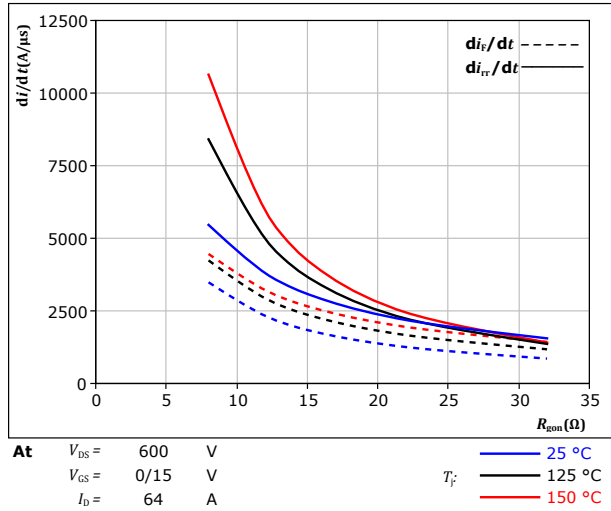


figure 22. MOSFET

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





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H-Bridge Switching Definitions

figure 24. MOSFET

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



figure 25. MOSFET

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



figure 26. MOSFET

Turn-off Switching Waveforms & definition of t_f

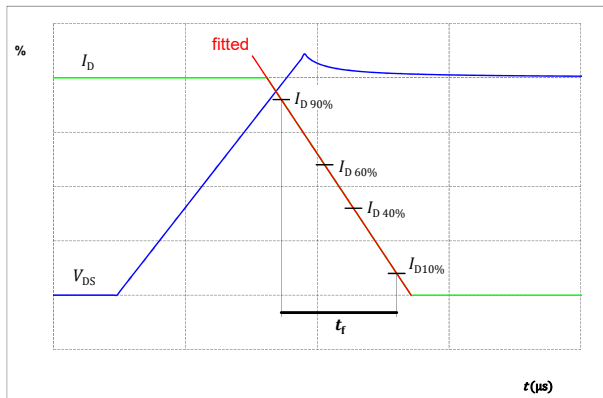
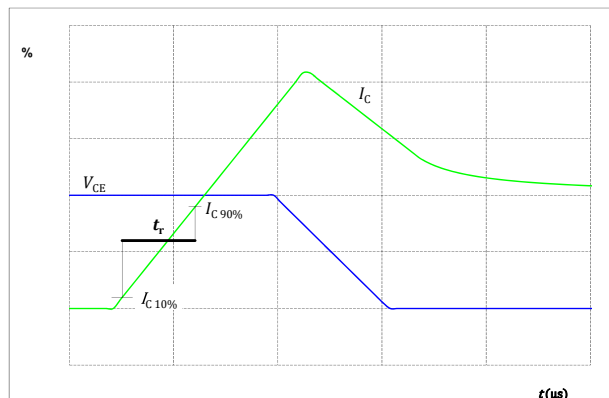


figure 27. MOSFET

Turn-on Switching Waveforms & definition of t_r





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H-Bridge Switching Definitions

figure 28. FWD

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

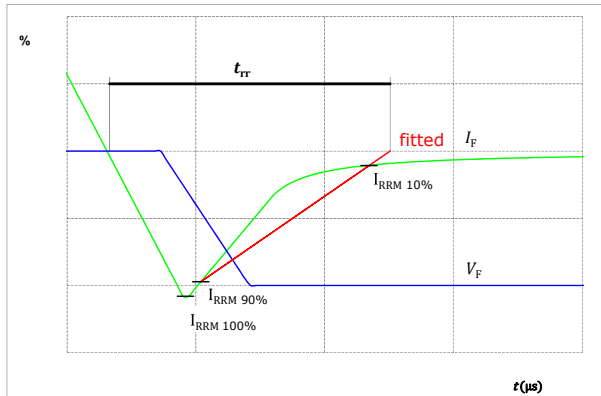


figure 29. FWD

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

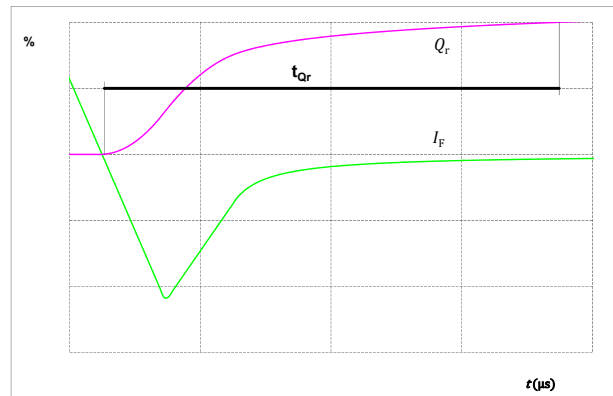
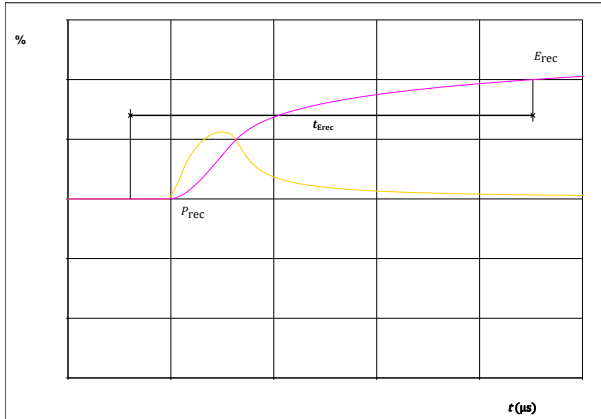


figure 30. FWD

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






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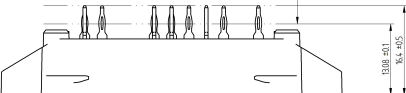
datasheet

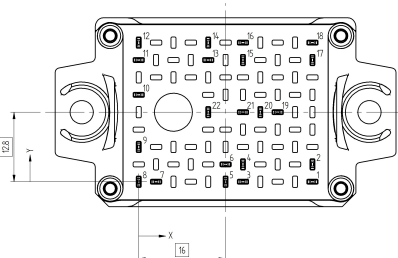
Ordering Code	
Version	Ordering Code
Without thermal paste	10-EZ124PA018MR-LR09F08T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EZ124PA018MR-LR09F08T-/7/

Marking						
	Text	Name	Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNNNN- TTTTT	WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code	
		TTTTTTTV	LLLLL	SSSS	WWYY	

Pin table [mm]			
Pin	X	Y	Function
1	32	0	Ph2
2	32	3,2	Ph2
3	19,2	0	S13
4	19,2	3,2	G13
5	16	0	S11
6	16	3,2	G11
7	3,2	0	Ph1
8	0	0	Ph1
9	0	6,4	Therm2
10	0	16	Therm1
11	0	22,4	DC+
12	0	25,6	DC+
13	12,8	22,4	G12
14	12,8	25,6	S12
15	19,2	22,4	G14
16	19,2	25,6	S14
17	32	22,4	DC+
18	32	25,6	DC+
19	25,6	12,8	DC-
20	22,4	12,8	DC-
21	19,2	12,8	DC-
22	12,8	12,8	DC-

center of press-fit pin head
pin head type "T": PCB plated through-hole $\varnothing 1\text{mm} \pm 0,09 / -0,06$
for further PCB design rules refer to the latest handling instruction



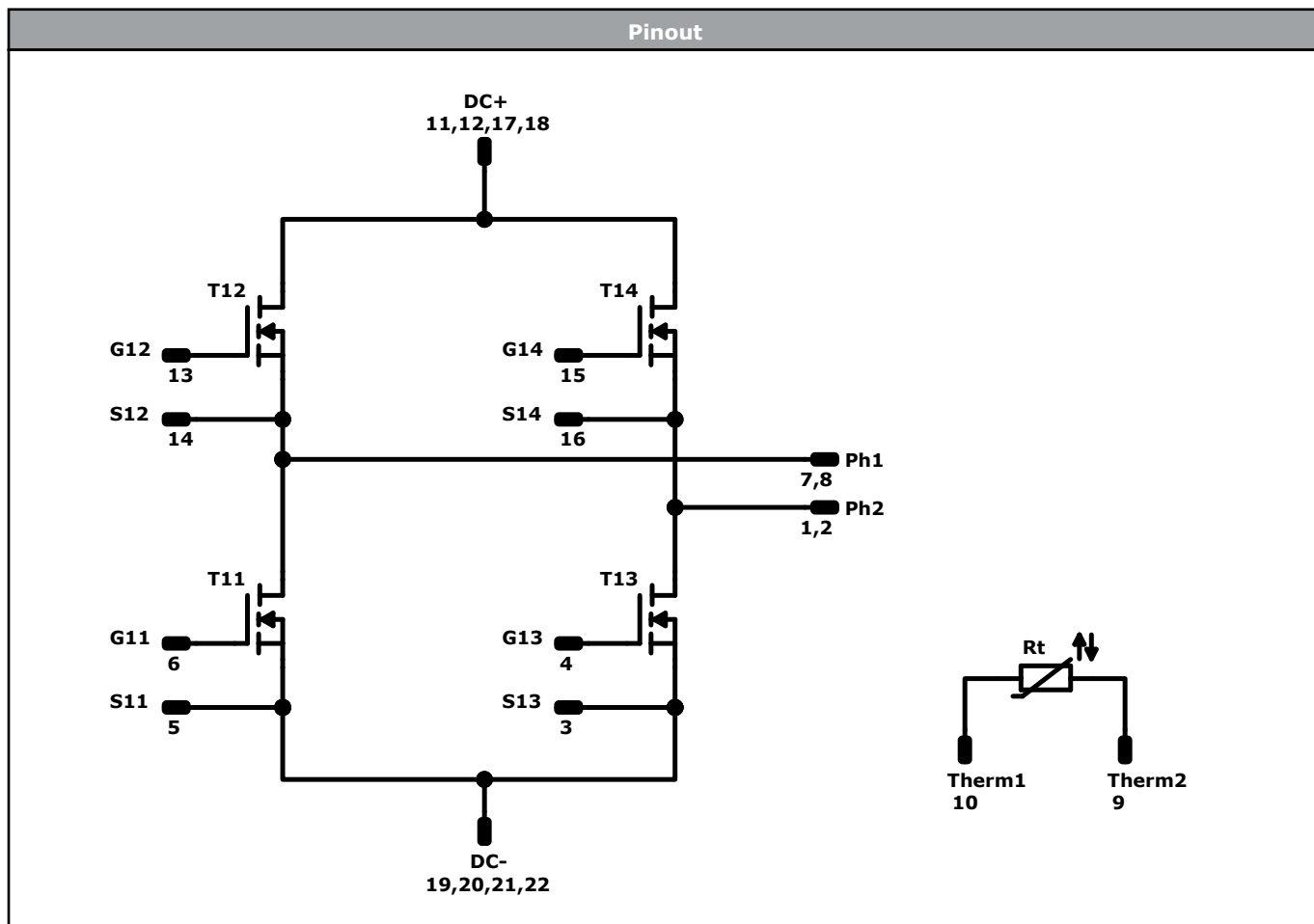


Tolerance of pinposition: $\pm 0,4\text{mm}$ at the end of pins
Dimension of coordinate axis is only offset without tolerance



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datasheet




Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14	MOSFET	1200 V	18 mΩ	H-Bridge Switch	
Rt	Thermistor			Thermistor	



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Packaging instruction				
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ	Sample
Handling instruction				
Handling instructions for <i>flow</i> E1 packages see vincotech.com website.				
Package data				
Package data for <i>flow</i> E1 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 $T_{j,sp}=175^{\circ}\text{C}$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.				

Document No.:	Date:	Modification:	Pages
10-EZ124PA018MR-LR09F08T-D2-14	29 Aug. 2025	Update Vgss and typical Rdson of the Inverter Switch	

DISCLAIMER

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