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: Al_2O_3
- 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

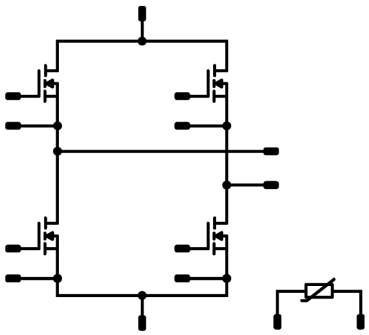
- Charging Stations

Types

- 10-EZ124PA018MR-LR09F08T

flow E1 12 mm housing

Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
H-Bridge Switch				
Drain-source voltage	V_{DSS}		1200	V
Drain current (DC current)	I_D	T_j = T_{jmax} T_s = 80 °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 °C	102	W
Gate-source voltage	V_{GSS}	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 s	6000	V
Creepage distance			>12,7	mm
Clearance			8,62	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	
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							182		
Gate to source charge	Q_{GS}		0/18	800	42	25		40		nC
Gate to drain charge	Q_{GD}							48		
Short-circuit input capacitance	C_{iss}							4670		
Short-circuit output capacitance	C_{oss}	f = 1 Mhz	0	800	0	25		140		pF
Reverse transfer capacitance	C_{rss}							10		
Diode forward voltage	V_{SD}		0		42	25		3,3		V
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,93		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} = 16 Ω R_{goff} = 16 Ω	0/15	600	64	25 125 150		53,53 44,49 43,03		ns
Rise time	t_r					25 125 150		46,28 34,92 32,78		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		118,75 143,95 149,47		ns
Fall time	t_f					25 125 150		15,66 17,11 18,11		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,378 µC Q_{rFWD}=0,591 µC Q_{rFWD}=0,757 µC				25 125 150		1,81 1,32 1,3		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,907 0,948 0,973		mWs
Peak recovery current	I_{RRM}	di/dt=1780 A/µs di/dt=2562 A/µs di/dt=2506 A/µs				25 125 150		24,7 32,85 37,76		A
Reverse recovery time	t_{rr}					25 125 150		25,82 29,11 31,62		ns
Recovered charge	Q_r					25 125 150		0,378 0,591 0,757		µC
Reverse recovered energy	E_{rec}					25 125 150		0,08 0,175 0,24		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2768,88 3442,63 4088,41		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} = 499 Ω				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. ±1 %						3380		K
Vincotech Thermistor Reference									V	

(1) Value at chip level

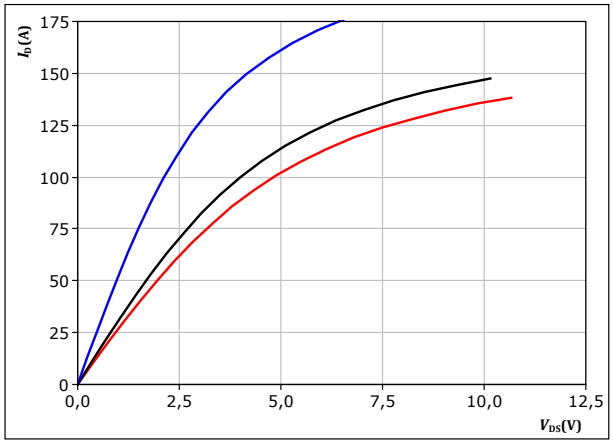
(2) Only valid with pre-applied Vincotech thermal interface material.

H-Bridge Switch Characteristics

figure 1. **MOSFET**

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

$I_D = f(V_{DS})$

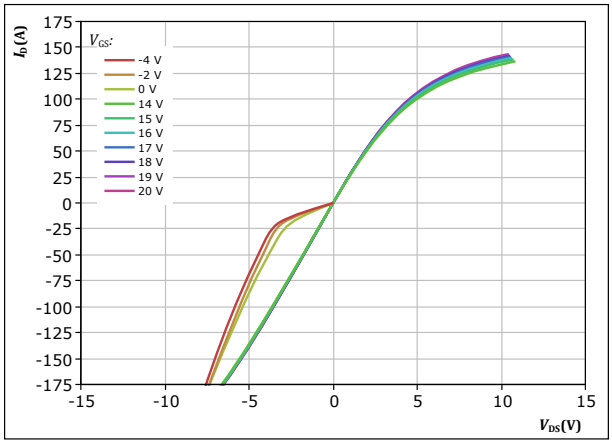


t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

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

$I_D = f(V_{DS})$



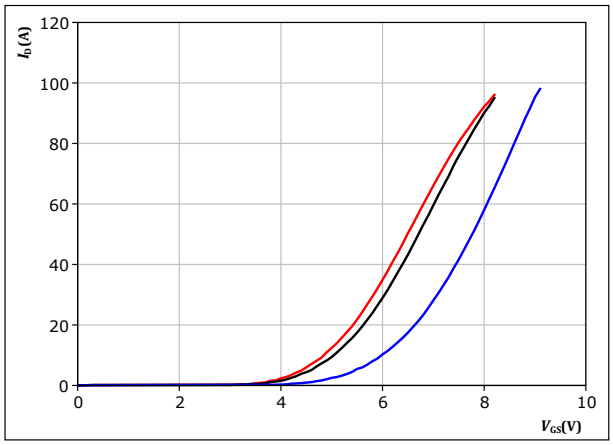
t_p =	250	µs
T_j =	150	°C

V_{GS} from -4 V to 20 V in steps of 2 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

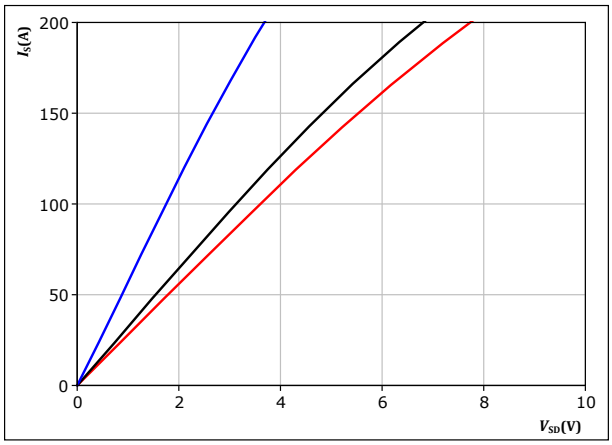


t_p =	250	µs		
V_{DS} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

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

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



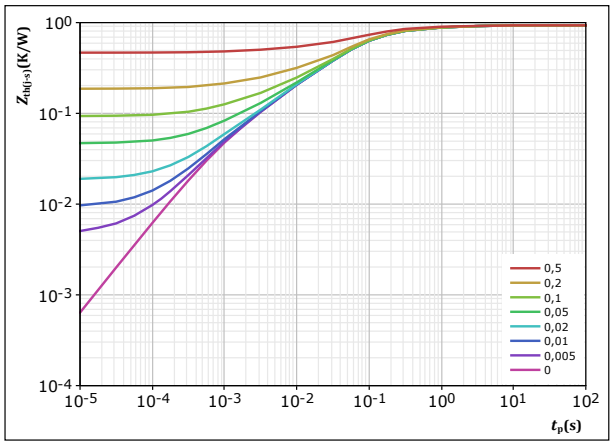
t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

H-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

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

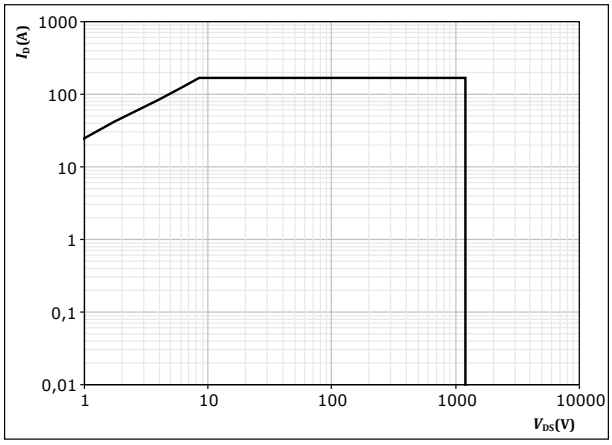
MOSFET thermal model values

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 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



$D =$ single pulse

$T_s =$ 80 °C

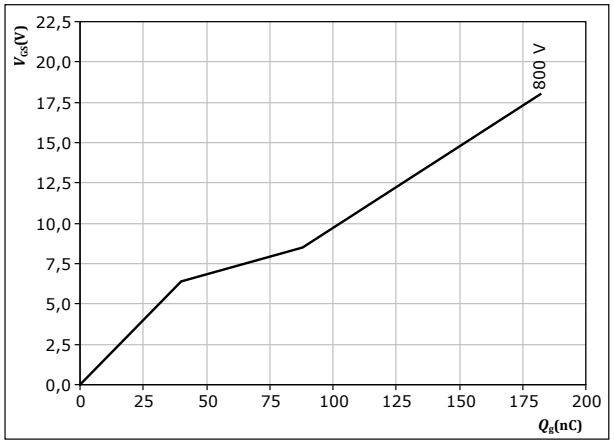
$V_{GS} =$ 15 V

$T_j =$ T_{jmax}

figure 7. **MOSFET**

Gate voltage vs gate charge

$V_{GS} = f(Q_g)$



$I_D =$ 42 A

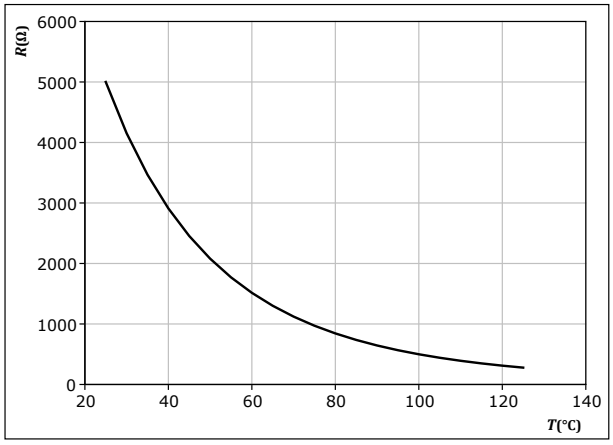
$T_j =$ 25 °C

Thermistor Characteristics

figure 8. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

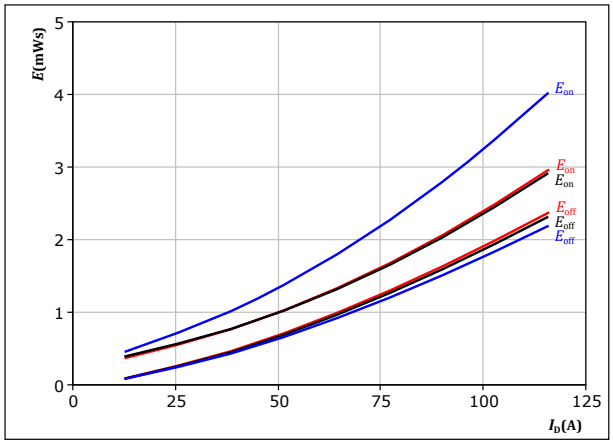


H-Bridge Switching Characteristics

figure 9. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



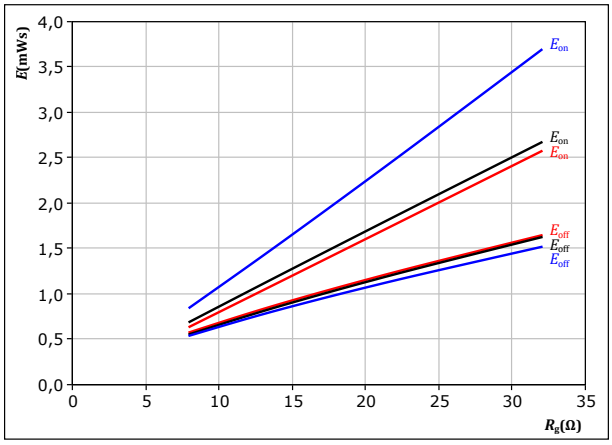
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
R_{gon} =	16	Ω		150 °C
R_{goff} =	16	Ω		

figure 10. **MOSFET**

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

$E = f(R_g)$



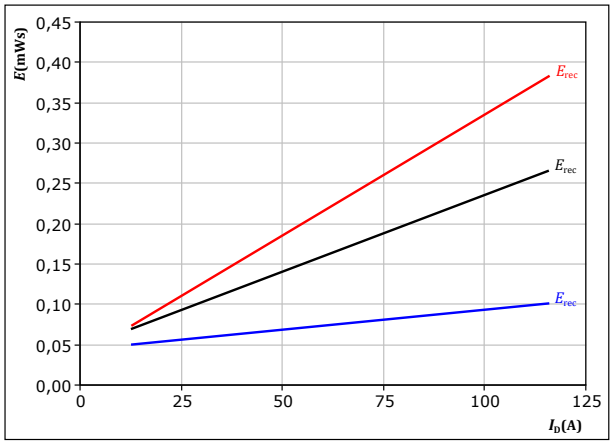
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
I_D =	64	A		150 °C

figure 11. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



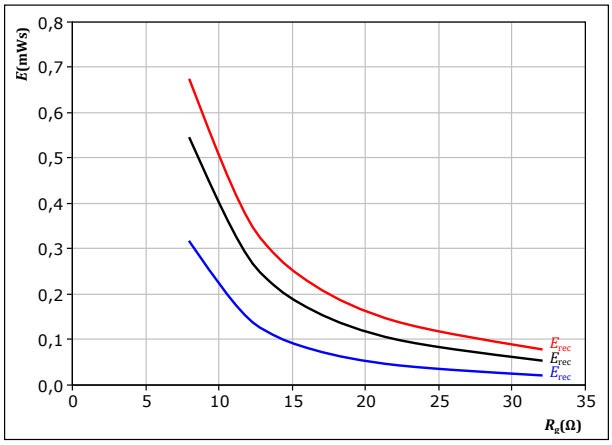
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
R_{gon} =	16	Ω		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

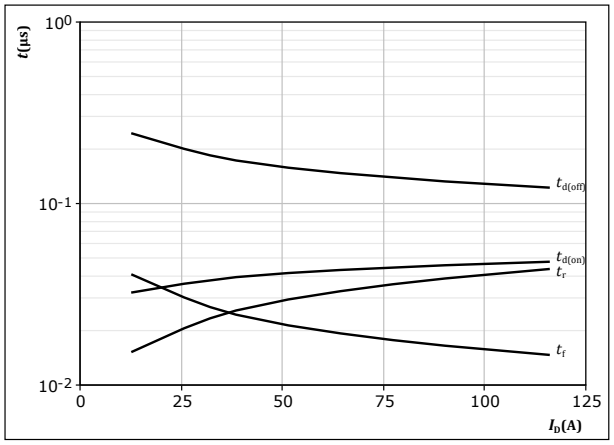
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
I_D =	64	A		150 °C

H-Bridge Switching Characteristics

figure 13. **MOSFET**

Typical switching times as a function of drain current

t = f(I_D)



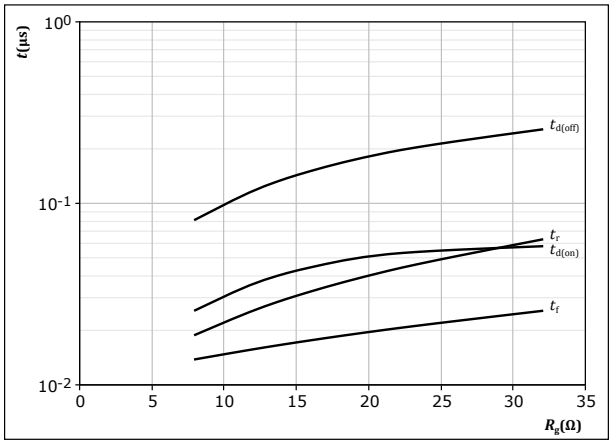
With an inductive load at

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)



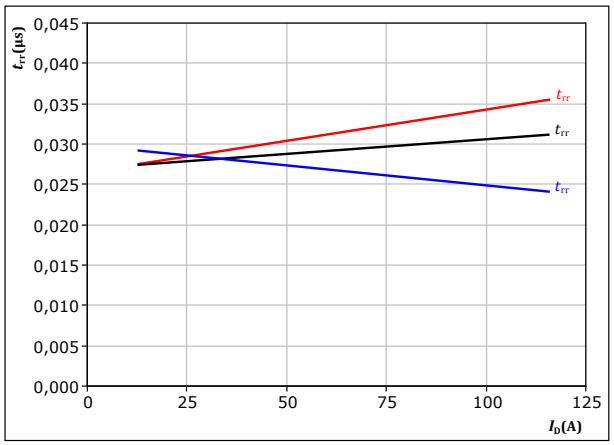
With an inductive load at

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

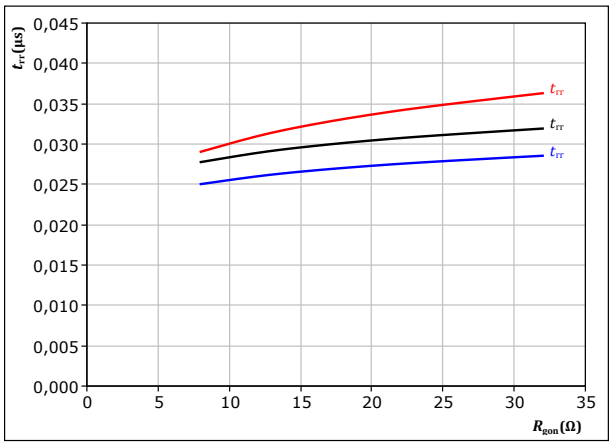
V_{DS} =	600	V
V_{GS} =	0/15	V
R_{gon} =	16	Ω

T_j: 25 °C, 125 °C, 150 °C

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

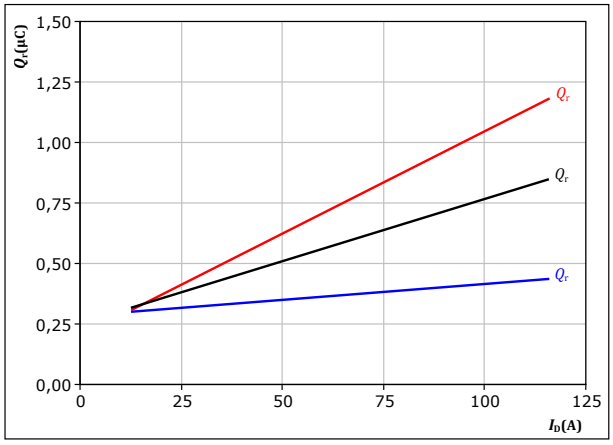
T_j: 25 °C, 125 °C, 150 °C

H-Bridge Switching Characteristics

figure 17. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

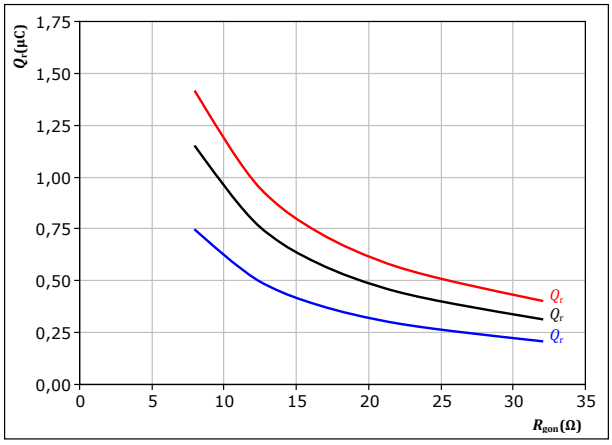


At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C, 125 °C, 150 °C
	R_{gon} =	16	Ω		

figure 18. **MOSFET**

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

$Q_r = f(R_{gon})$

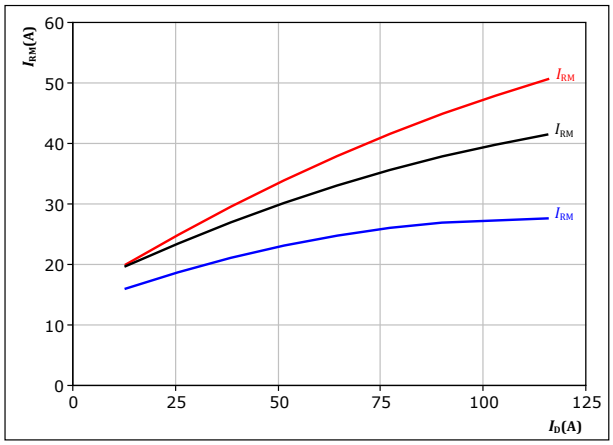


At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C, 125 °C, 150 °C
	I_D =	64	A		

figure 19. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

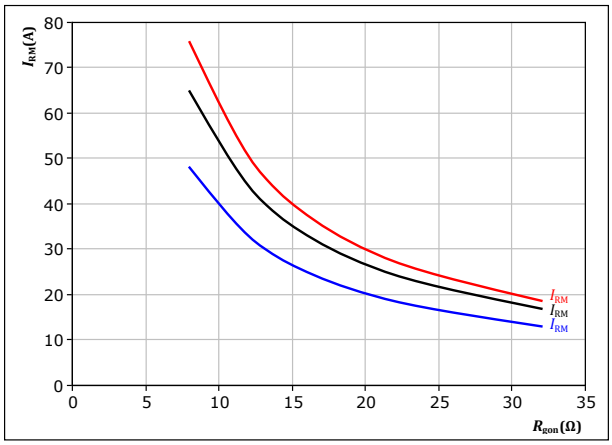


At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C, 125 °C, 150 °C
	R_{gon} =	16	Ω		

figure 20. **MOSFET**

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

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



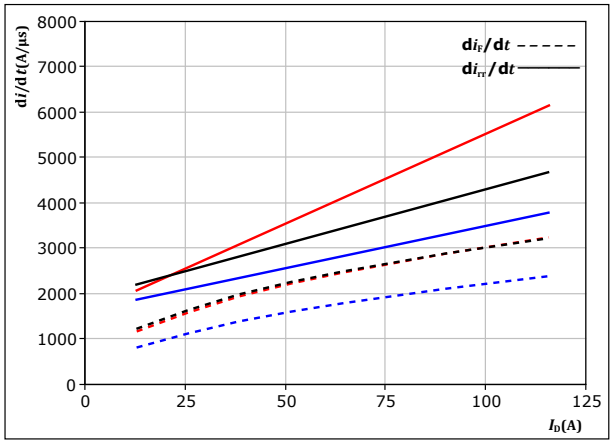
At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C, 125 °C, 150 °C
	I_D =	64	A		

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_{rr}/dt = f(I_D)

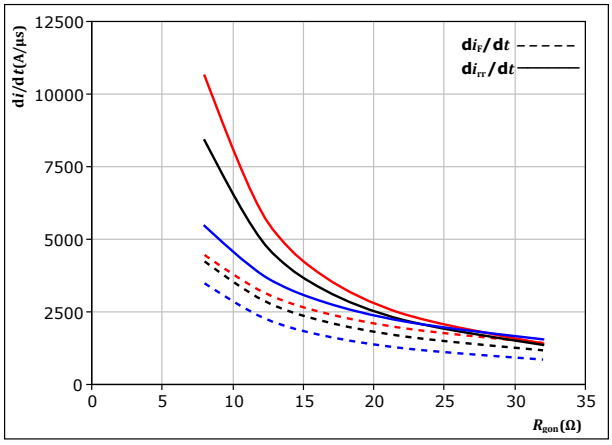


At				
	V_{DS} =	600	V	
	V_{GS} =	0/15	V	
	R_{gon} =	16	Ω	
	T_j:			25 °C
				125 °C
				150 °C

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_{rr}/dt = f(R_{gon})

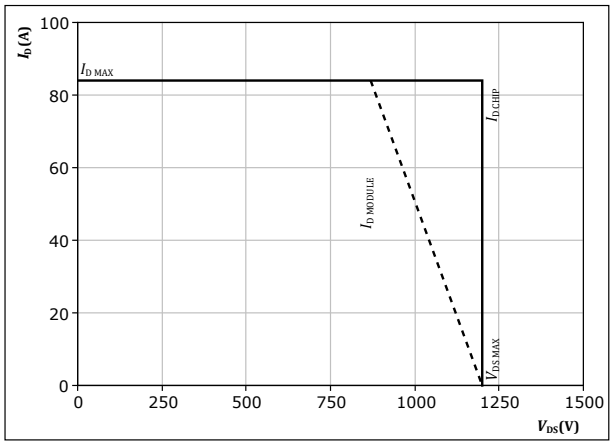


At				
	V_{DS} =	600	V	
	V_{GS} =	0/15	V	
	I_D =	64	A	
	T_j:			25 °C
				125 °C
				150 °C

figure 23. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



At			
	T_j =	150	°C
	R_{gon} =	16	Ω
	R_{goff} =	16	Ω

H-Bridge Switching Definitions

figure 24. MOSFET

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

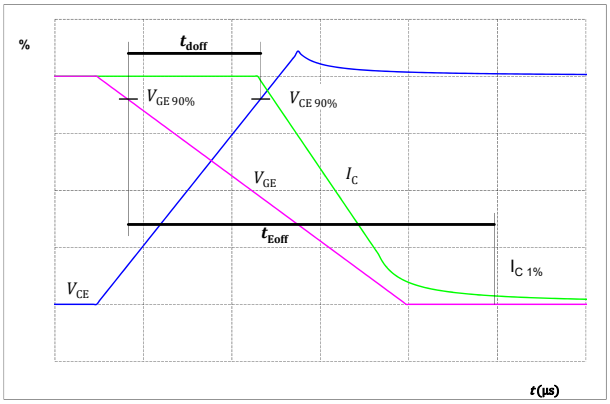


figure 25. MOSFET

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

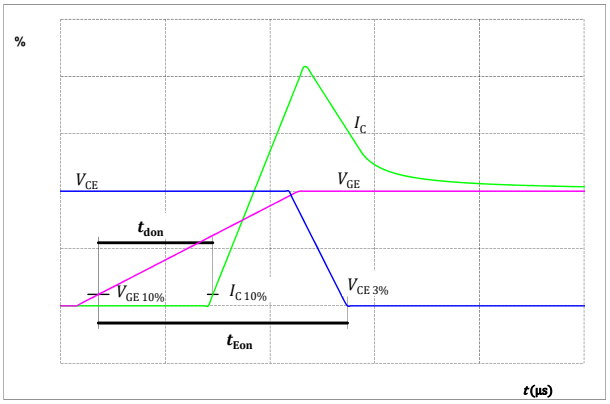


figure 26. MOSFET

Turn-off Switching Waveforms & definition of t_f

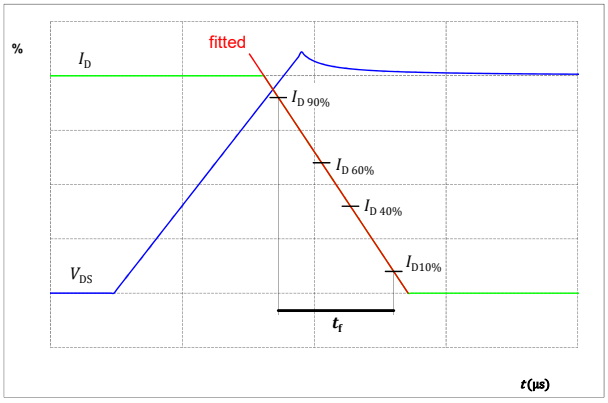
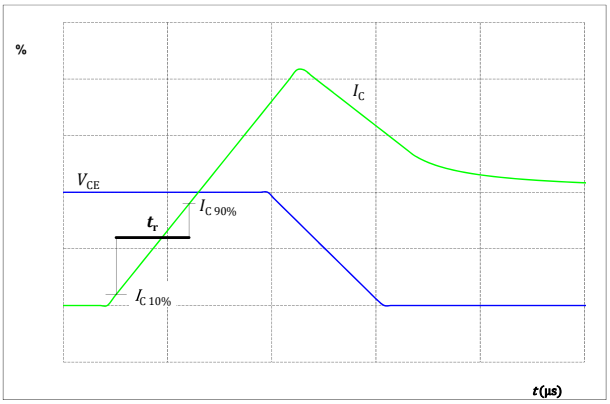


figure 27. MOSFET

Turn-on Switching Waveforms & definition of t_r



H-Bridge Switching Definitions

figure 28. **FWD**

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

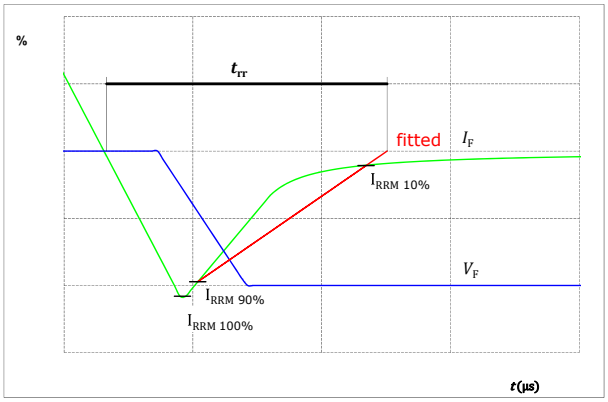


figure 29. **FWD**

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

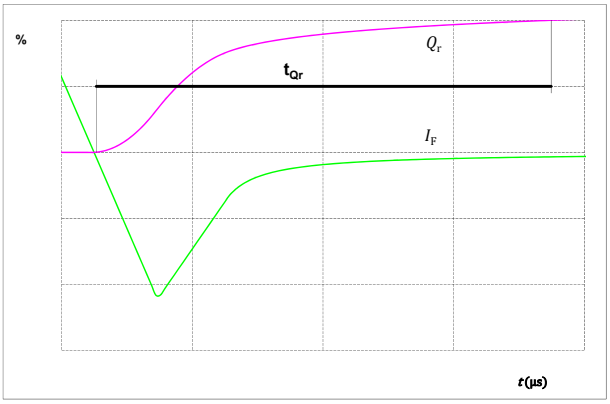
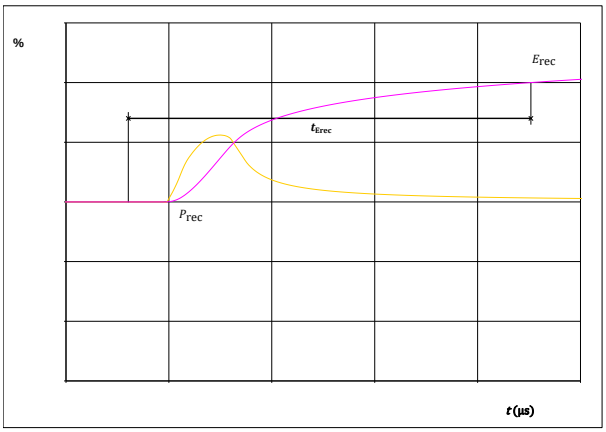


figure 30. **FWD**

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



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

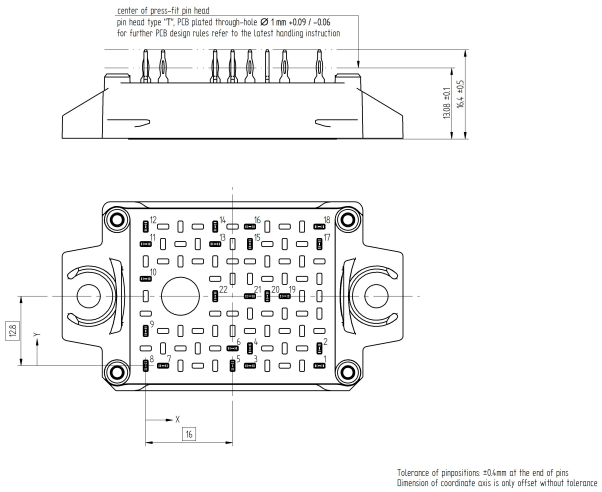
Marking

	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		

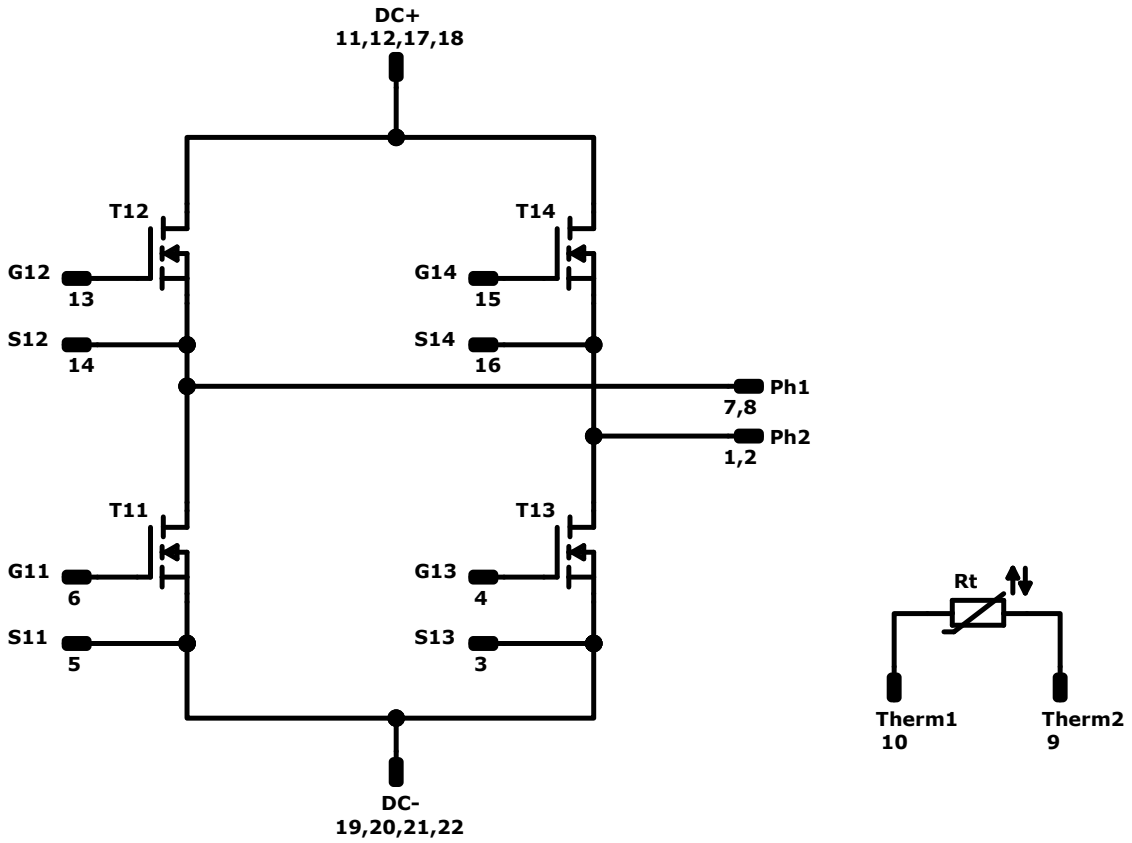
Outline

Pin table [mm]

Pin	X	Y	Function
1	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-



Pinout



Identification

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

Packaging instruction				
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* E1 packages see vincotech.com website.

Package data
Package data for *flow* 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 $T_{j,op}$=175°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	