Vincotech

10-FZ074PA080CR-L622F68
10-PZ074PA080CR-L622F68Y
datasheet

fast PACK 0 MOS **650 V / 80 mΩ**

Features

- High speed HBridge
- High efficiency MOS
- Enhanced body diode
- Integrated capacitors
- Thermistor

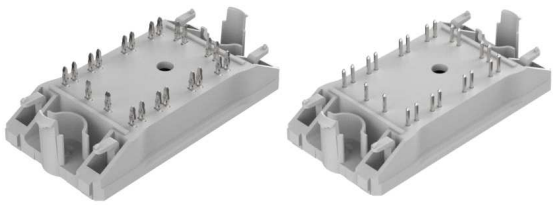
Target applications

- Power Supply
- Solar Inverters
- UPS
- Welding & Cutting

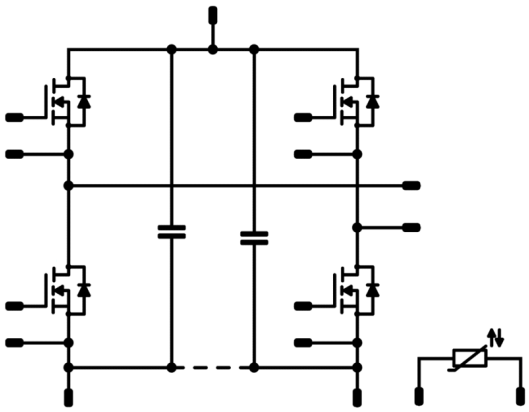
Types

- 10-FZ074PA080CR-L622F68
- 10-PZ074PA080CR-L622F68Y

flow 0 12 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
H-Bridge Switch				
Drain-source voltage	V_{DSS}		650	V
Drain current	I_D	$T_j = T_{jmax}$ T_s = 80 °C	18	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	137	A
Avalanche energy, single pulse	E_{AS}	I_D = 8,7 A V_{DD} = 50 V	1160	mJ
Avalanche energy, repetitive	E_{AR}	I_D = 8,7 A V_{DD} = 50 V	1,76	mJ
Avalanche current, repetitive	I_{AR}	t_p limited by T_{jmax} $P_{AV} = E_{AR}$ * f	8,7	A
MOSFET dv/dt ruggedness	dv/dt	V_{DS} = 0/480 V	50	V/ns
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	87	W
Gate-source voltage	V_{GSS}		±20	V
Reverse diode dv/dt	dv/dt		50	V/ns
Maximum Junction Temperature	T_{jmax}		150	°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	Condition	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
		AC Voltage t_p = 1 min	2500	V
Creepage distance			min. 12,7	mm
Clearance			9,55	mm
Comparative Tracking Index	CTI		> 200	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions					Value			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	$r_{DS(on)}$		10		17,6	25 125		78 159	80	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$			0,00176	25	3,5	4	4,5	V
Gate to Source Leakage Current	I_{GSS}		20	0		25			100	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	650		25			3,5	µA
Internal gate resistance	r_g							0,75		Ω
Gate charge	Q_g							167		
Gate to source charge	Q_{GS}		0	480	26,3	25		32		nC
Gate to drain charge	Q_{GD}							87		
Short-circuit input capacitance	C_{iss}							5030		
Short-circuit output capacitance	C_{oss}	f= 1 MHz	0	100		25		215		pF
Reverse transfer capacitance	C_{rss}							115		
Reverse Diode Static										
Diode forward voltage	V_{SD}				26,3	25		0,9		V
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 125		369 325		
Rise time	t_r	R_{goff} = 8 Ω R_{gon} = 128 Ω				25 125		155 171		ns
Turn-off delay time	$t_{d(off)}$					25 125		189 200		
Fall time	t_f		±15	350	20	25 125		10 10		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 1 µC Q_{rFWD} = 2,9 µC				25 125		2,022 3,434		mWs
Turn-off energy (per pulse)	E_{off}					25 125		0,070 0,076		
Peak recovery current	I_{RRM}					25 125		13 23		A
Reverse recovery time	t_{rr}					25 125		130 232		ns
Recovered charge	Q_r	di/dt = 116 A/µs di/dt = 113 A/µs	±15	350	20	25 125		0,978 2,949		µC
Reverse recovered energy	E_{rec}					25 125		0,027 0,067		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125		1269 2249		A/µs

Characteristic Values

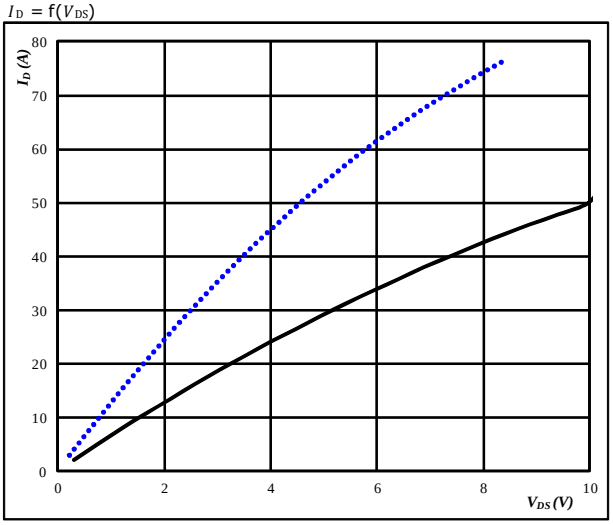
Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Capacitor (DC)										
Capacitance	C							150		nF
Tolerance							-10		+10	%
Dissipation factor		f = 1 kHz				25			2,5	%
Thermistor										
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		5		mW
Power dissipation constant						25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %				25		3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %				25		4000		K
Vincotech NTC Reference									I	

H-Bridge Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

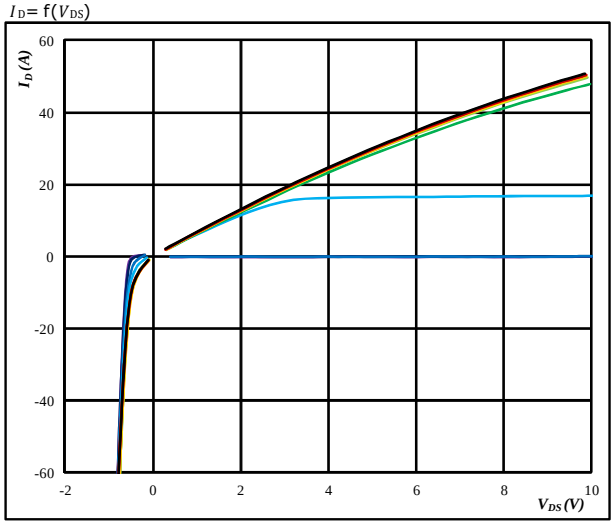


t_p =	250	µs		25 °C	
V_{GS}=	20	V	T_j:	125 °C	

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

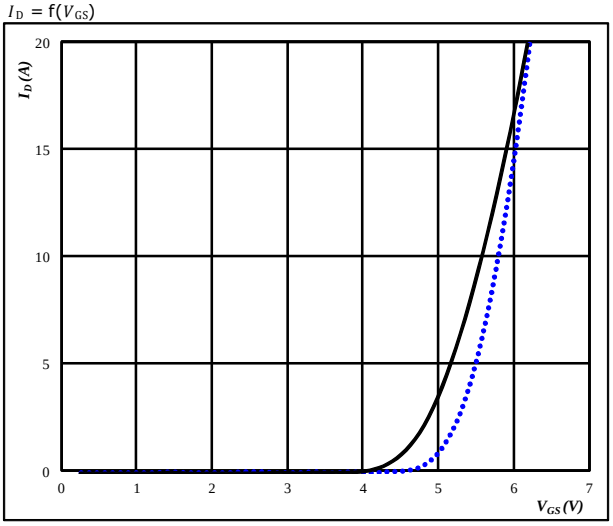


t_p =	250	µs
T_j =	125	°C
V_{GS} from	0 V to 20 V in steps of 2 V	

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

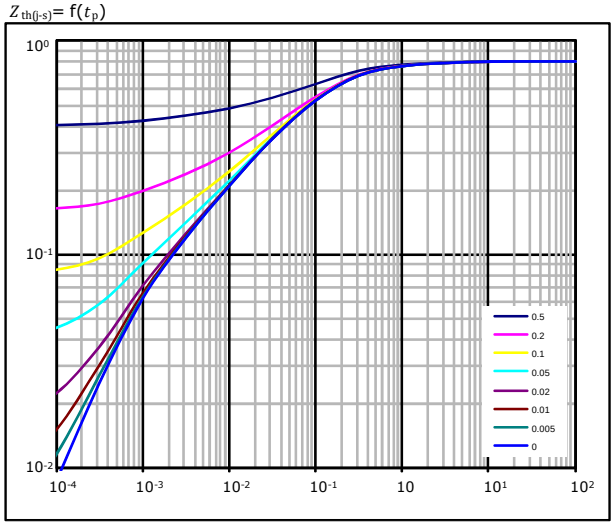


t_p =	100	µs		25 °C	
V_{DS} =	0	V	T_j:	125 °C	

figure 4. **MOSFET**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,80	K/W

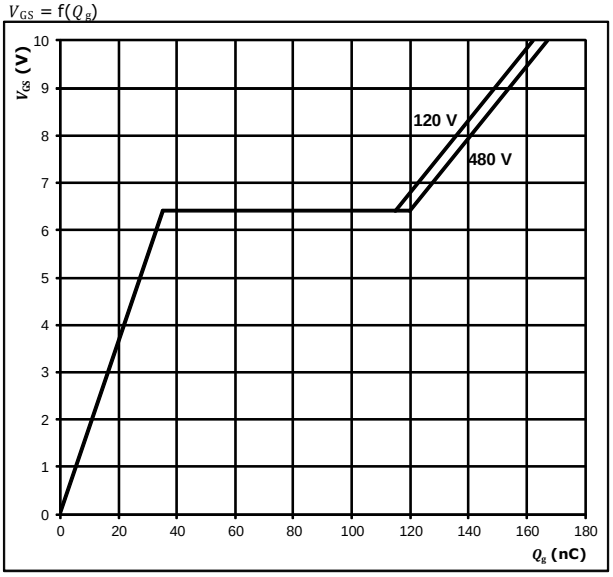
R (K/W)	Tau(s)
3,70E-02	4,80E+00
1,11E-01	1,06E+00
3,45E-01	2,27E-01
1,67E-01	8,51E-02
8,10E-02	1,25E-02
6,04E-02	1,03E-03

H-Bridge Switch Characteristics

figure 5. **MOSFET**

Gate voltage vs Gate charge

$V_{GS} = f(Q_g)$



At

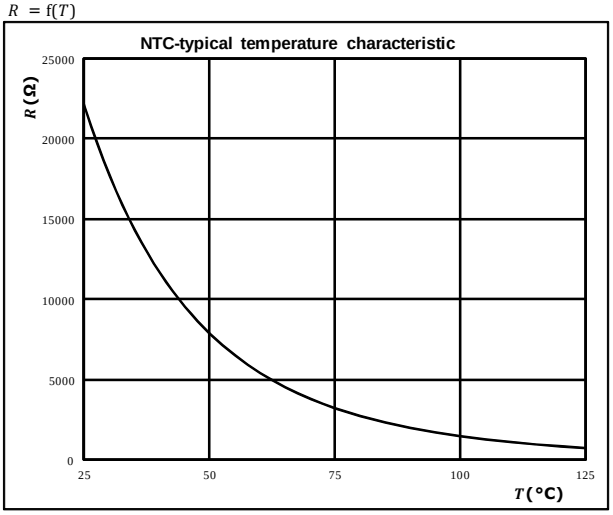
I_C= 18 A

Thermistor Characteristics

figure 1. **Thermistor**

Typical NTC characteristic as a function of temperature

$R = f(T)$

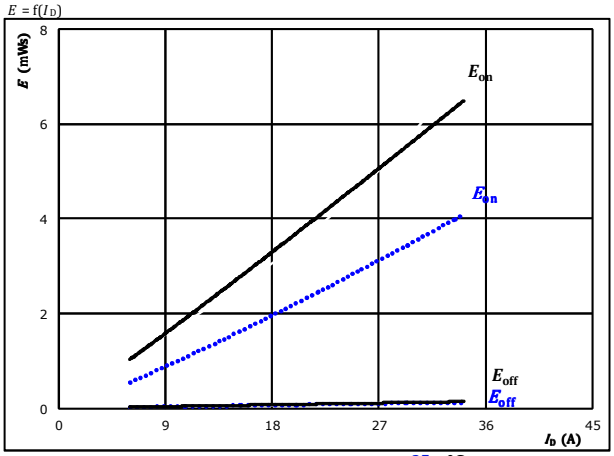


H-Bridge Switching Characteristics

figure 1. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



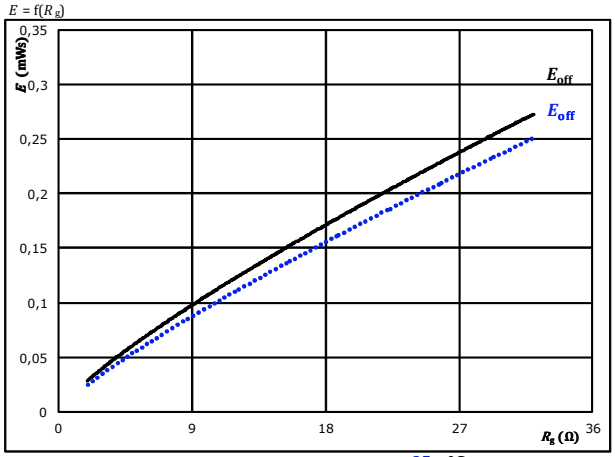
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C	·····
V_{GS} =	±15	V		125 °C	———
R_{gon} =	128	Ω			
R_{goff} =	8	Ω			

figure 2. **MOSFET**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



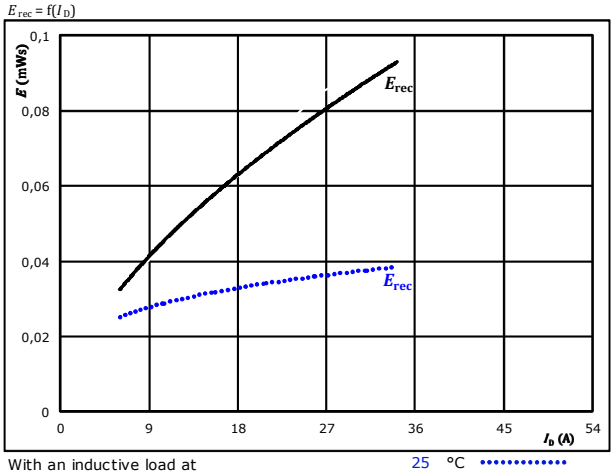
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C	·····
V_{GS} =	±15	V		125 °C	———
I_D =	20	A			

figure 3. **FWD**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



With an inductive load at

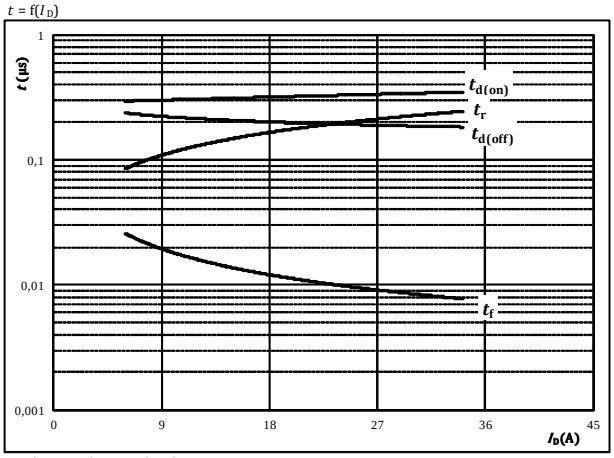
V_{DS} =	600	V	T_j:	25 °C	·····
V_{GS} =	±15	V		125 °C	———
R_{gon} =	128	Ω			

H-Bridge Switching Characteristics

figure 4. MOSFET

Typical switching times as a function of drain current

$t = f(I_D)$



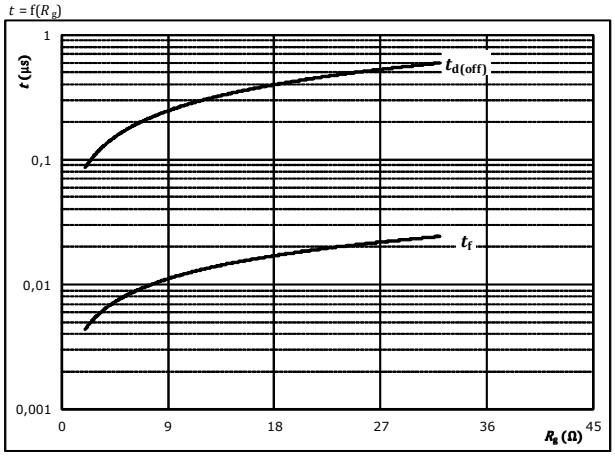
With an inductive load at

T_j =	125	°C
V_{DS} =	600	V
V_{GS} =	±15	V
R_{gon} =	128	Ω
R_{goff} =	8	Ω

figure 5. MOSFET

Typical switching times as a function of gate resistor

$t = f(R_g)$



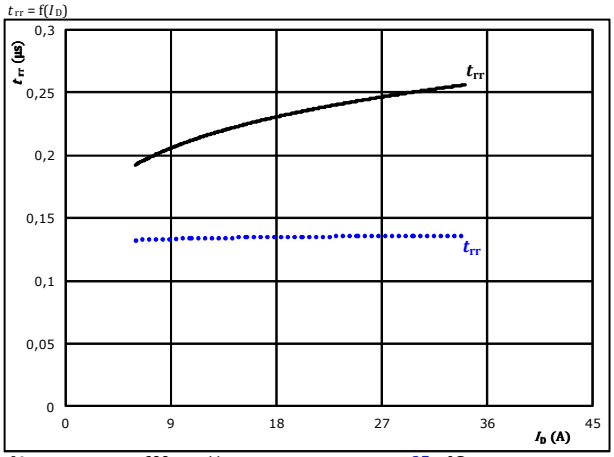
With an inductive load at

T_j =	125	°C
V_{DS} =	600	V
V_{GS} =	±15	V
I_D =	20	A

figure 6. FWD

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



At

V_{DS} =	600	V		25	°C
V_{GS} =	±15	V	T_j:	125	°C
R_{gon} =	128	Ω			

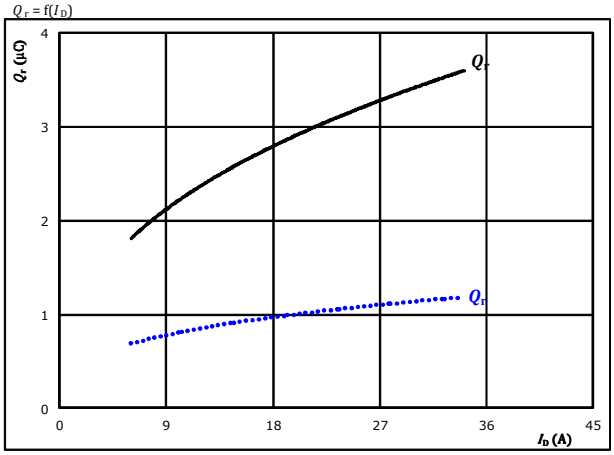
H-Bridge Switching Characteristics

c

figure 7. **FWD**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

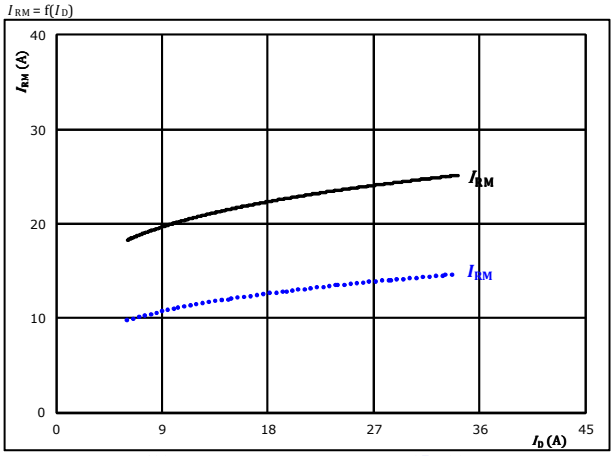


At	V_{DS} =	600	V		25 °C	•••••••••••••
	V_{GS} =	±15	V	T_j:	125 °C	———
	R_{gon} =	128	Ω			

figure 8. **FWD**

Typical peak reverse recovery current current as a function of drain current

$I_{RM} = f(I_D)$



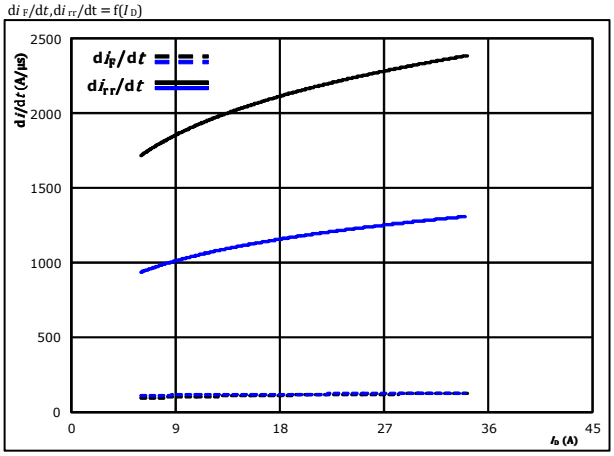
At	V_{DS} =	600	V		25 °C	•••••••••••••
	V_{GS} =	±15	V	T_j:	125 °C	———
	R_{gon} =	128	Ω			

H-Bridge Switching Characteristics

figure 9. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of drain current

$di_F/dt, di_{rr}/dt = f(I_D)$

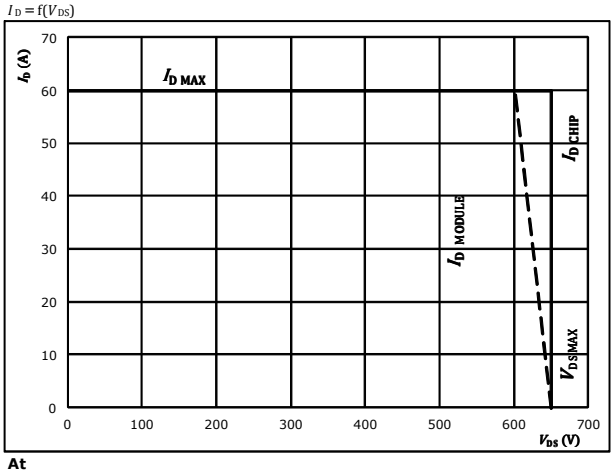


At	V_{DS} =	600	V	25 °C	
	V_{GS} =	±15	V	T_j: 125 °C	
	R_{gon} =	128	Ω		

figure 10. **MOSFET**

Reverse bias safe operating area

$I_D = f(V_{DS})$



At

T_j =	150	°C
R_{gon} =	128	Ω
R_{goff} =	8	Ω

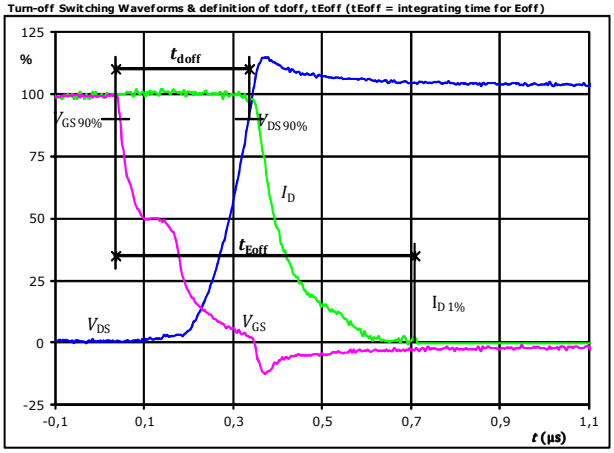
H-Bridge Switching Characteristics

General conditions

T_j	=	125 °C
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

figure 1. MOSFET

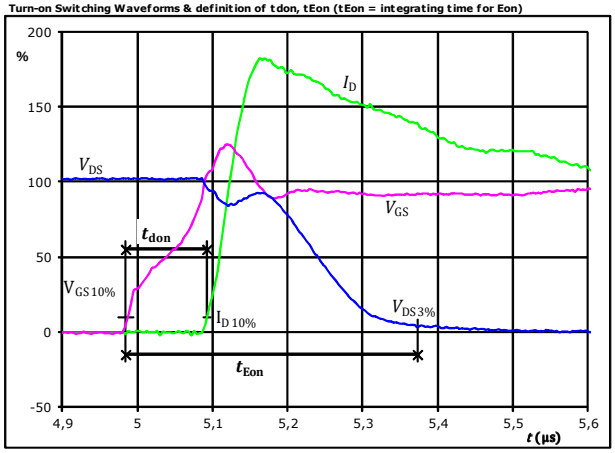
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GS}(0\%)$ =	-15	V
$V_{GS}(100\%)$ =	15	V
$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	100	A
t_{doff} =	0,291	µs
t_{Eoff} =	0,673	µs

figure 2. MOSFET

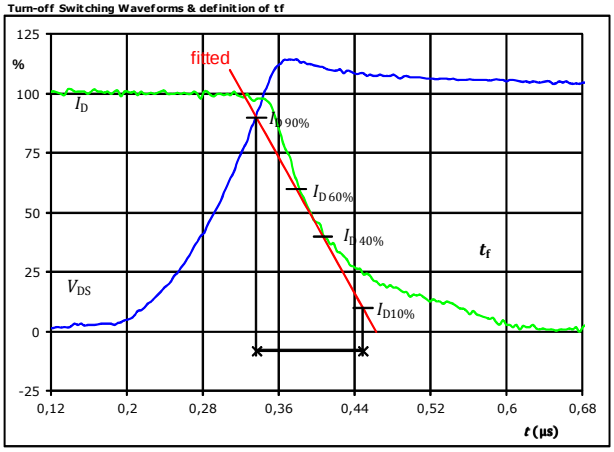
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GS}(0\%)$ =	-15	V
$V_{GS}(100\%)$ =	15	V
$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	100	A
t_{don} =	0,106	µs
t_{Eon} =	0,388	µs

figure 3. MOSFET

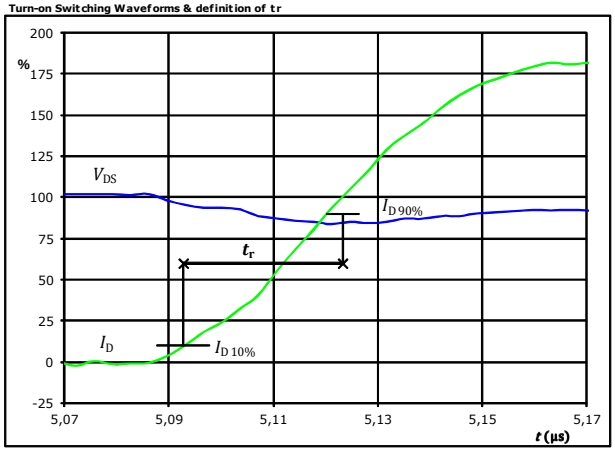
Turn-off Switching Waveforms & definition of tf



$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	100	A
t_f =	0,111	µs

figure 4. MOSFET

Turn-on Switching Waveforms & definition of tr

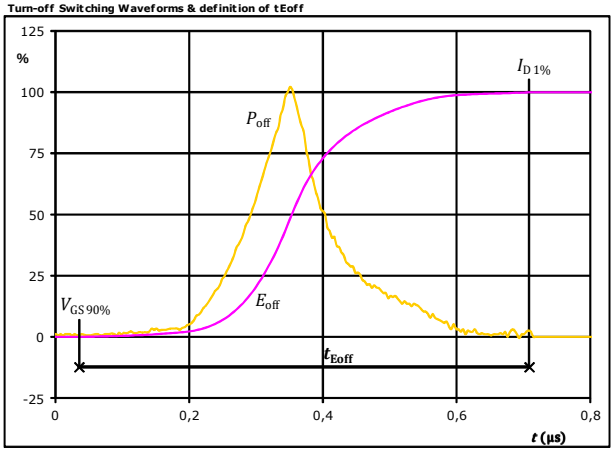


$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	100	A
t_r =	0,027	µs

H-Bridge Switching Characteristics

figure 5. **MOSFET**

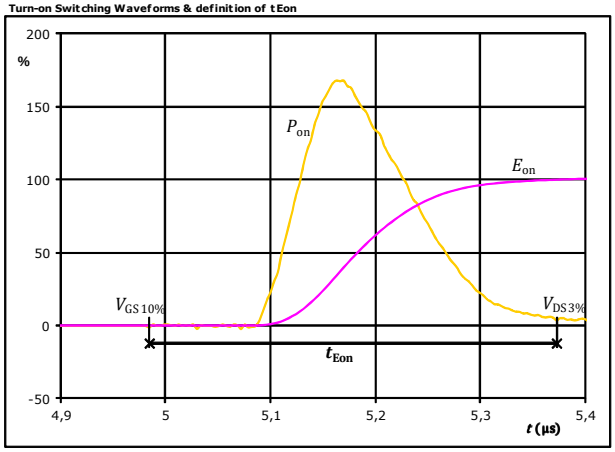
Turn-off Switching Waveforms & definition of tEoff



$P_{off}(100\%)$ =	59,91	kW
$E_{off}(100\%)$ =	8,87	mJ
t_{Eoff} =	0,67	µs

figure 6. **MOSFET**

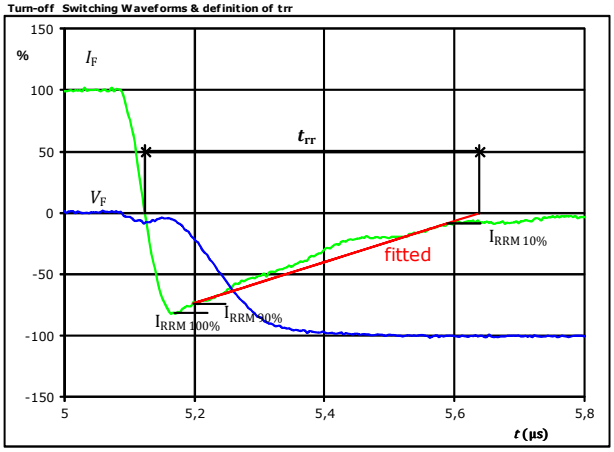
Turn-on Switching Waveforms & definition of tEon



$P_{on}(100\%)$ =	59,91	kW
$E_{on}(100\%)$ =	12,48	mJ
t_{Eon} =	0,39	µs

figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

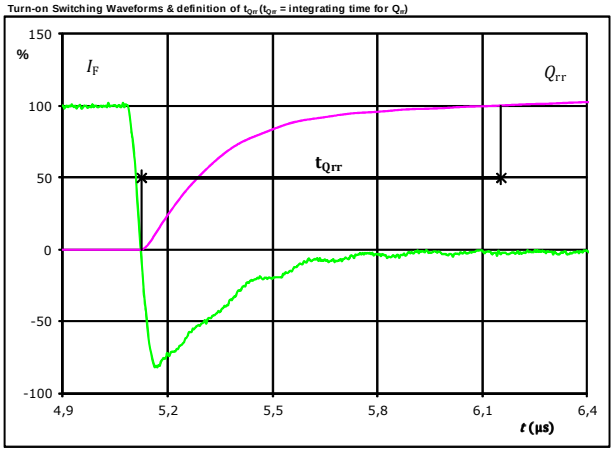


$V_F(100\%)$ =	600	V
$I_F(100\%)$ =	100	A
$I_{RRM}(100\%)$ =	-83	A
t_{rr} =	0,510	µs

H-Bridge Switching Characteristics

figure 8. **FWD**

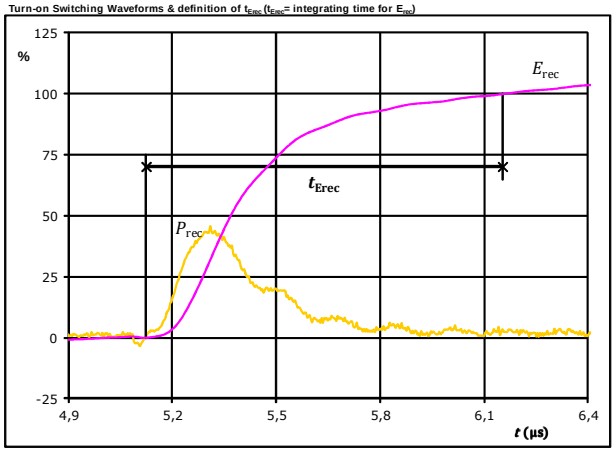
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_F (100%) =	100	A
Q_{rr} (100%) =	20,73	µC
t_{Qrr} =	1,03	µs

figure 9. **FWD**

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



P_{rec} (100%) =	59,91	kW
E_{rec} (100%) =	7,85	mJ
t_{Erec} =	1,03	µs

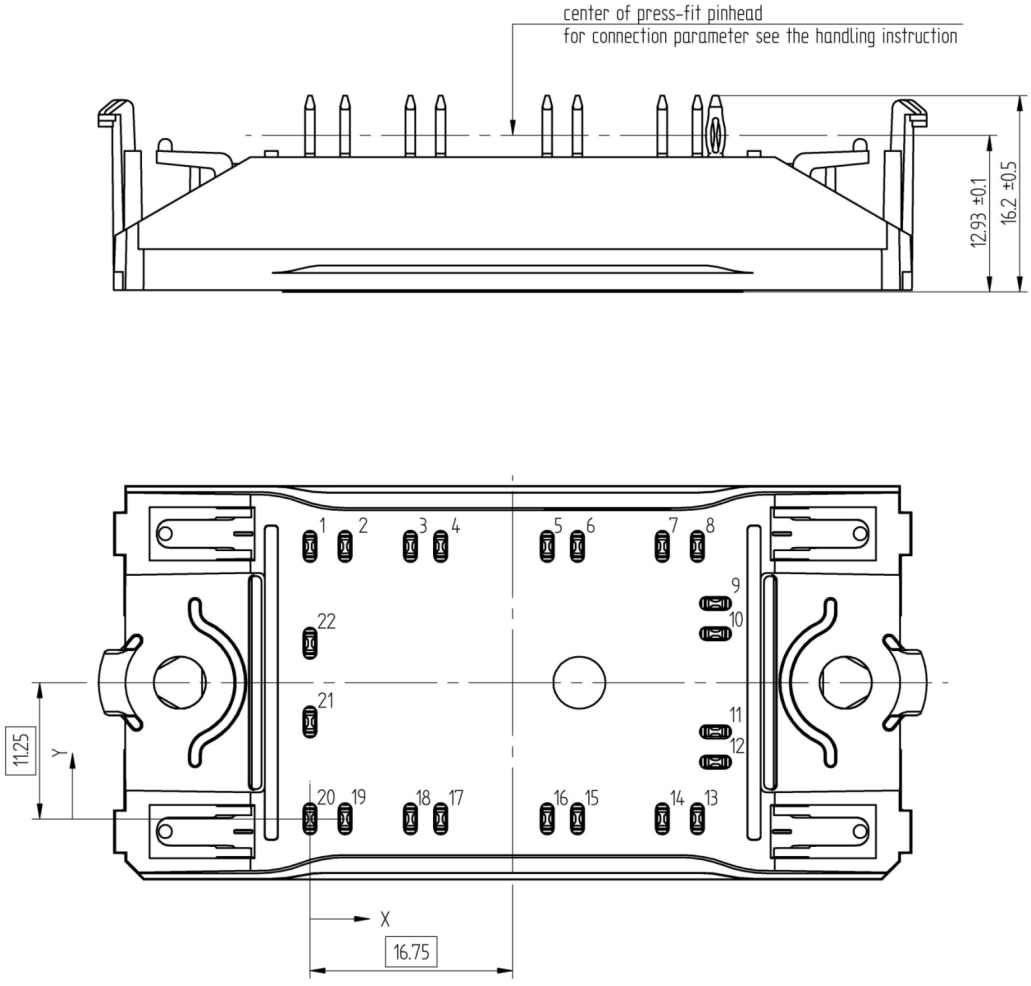
Ordering Code & Marking

Version	Ordering Code
without thermal paste 12 mm housing with solder pins	10-FZ074PA080CR-L622F68
with thermal paste 12 mm housing with solder pins	10-FZ074PA080CR-L622F68-/3/
without thermal paste 12 mm housing with press-fit pins	10-PZ074PA080CR-L622F68Y
with thermal paste 12 mm housing with press-fit pins	10-PZ074PA080CR-L622F68Y-/3/

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

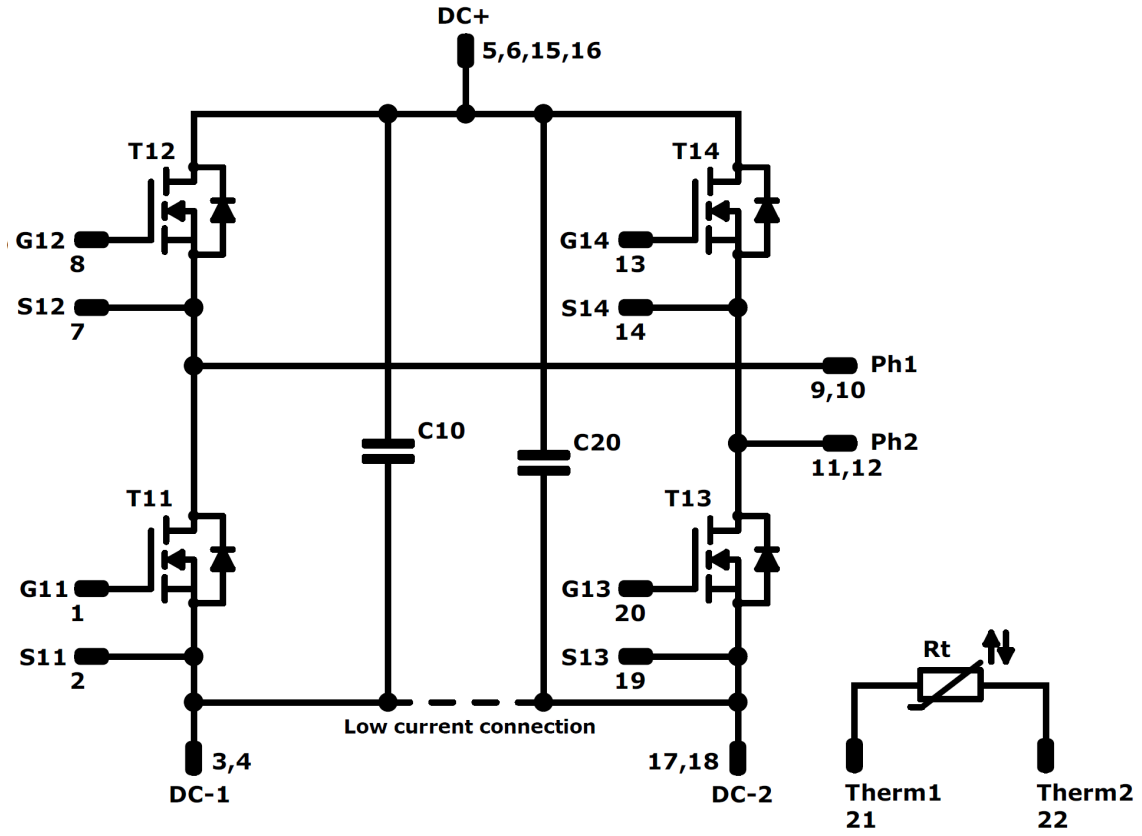
Outline

Pin table			
Pin	X	Y	Function
1	0	22,5	G11
2	2,9	22,5	S11
3	8,3	22,5	DC-1
4	10,8	22,5	DC-1
5	19,6	22,5	DC+
6	22,1	22,5	DC+
7	29,1	22,5	S12
8	32	22,5	G12
9	33,5	17,8	Ph1
10	33,5	15,3	Ph1
11	33,5	7,2	Ph2
12	33,5	4,7	Ph2
13	32	0	G14
14	29,1	0	S14
15	22,1	0	DC+
16	19,6	0	DC+
17	10,8	0	DC-2
18	8,3	0	DC-2
19	2,9	0	S13
20	0	0	G13
21	0	8	Therm1
22	0	14,5	Therm2



Tolerance of pinpositions: ±0,5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11-T14	MOSFET	650 V	80 mΩ	H-Bridge Switch	
C10 , C20	Capacitor			Capacitor (DC)	
Rt	NTC			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 135	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 0 packages see vincotech.com website.

Package data
Package data for *flow* 0 packages see vincotech.com website.

UL recognition and file number
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-xZ074PA080CR-L622F68x-D1-14	12 Jul. 2017		