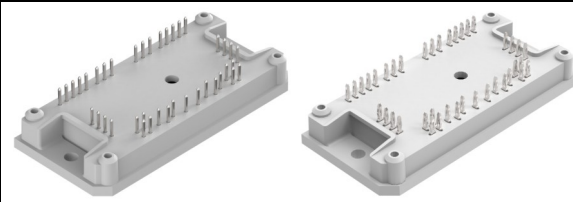
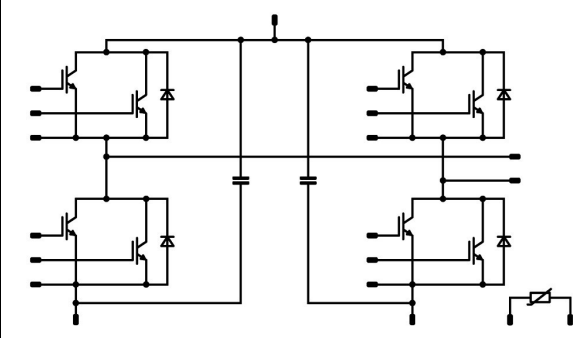




Vincotech

10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
datasheet

fastPACK 1 H C		650 V / 100 A
Features • High-efficient H-Bridge • Open emitter topology • Integrated capacitors • Integrated thermistor • Low inductive 12mm housing		flow 1 12 mm housing Solder pinsPress-fit pins
Target applications • SMPS • Solar • Welding		Schematic
Types • 10-FY074PA100SM-L583F08 • 10-PY074PA100SM-L583F08Y		

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	79	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	133	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum junction temperature	T_{jmax}		175	°C



Vincotech

10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
datasheet

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Inverter Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	59	A
Repetitive peak forward current	I_{FRM}		120	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	83	W
Maximum junction temperature	T_{jmax}		175	°C

DC Link Capacitance

Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55...+125	°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
		AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			min. 12,7	mm
Clearance		Solder pin / Press-fit pin	7,66 / 7,92	mm
Comparative Tracking Index	CTI		> 200	

*100 % tested in production



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10-PY074PA100SM-L583F08Y
 datasheet

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	

Inverter Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,001	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		100	25 125	1	1,63 1,78	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			80	μA
Gate-emitter leakage current	I_{GES}		20	0		25			240	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25	25			6000		pF
Output capacitance	C_{oes}							100		
Reverse transfer capacitance	C_{res}							22		
Gate charge	Q_g		15	520	100	25		240		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						0,72		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \Omega$ $R_{goff} = 4 \Omega$	-5 / 15	350	100	25 125 150		45 48 46		ns
Rise time	t_r					25 125 150		12 14 14		
Turn-off delay time	$t_{d(off)}$					25 125 150		99 109 115		
Fall time	t_f					25 125 150		7 10 11		
Turn-on energy (per pulse)	E_{on}					25 125 150		1,075 1,562 1,732		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,790 1,115 1,220		



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 datasheet

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	

Inverter Diode

Static

Forward voltage	V_F				60	25 125 150		1,48 1,40 1,37	1,92	V
Reverse leakage current	I_R			650		25			3,2	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK (PSX)}$						1,15		K/W
-------------------------------------	---------------	--	--	--	--	--	--	------	--	-----

Dynamic

Peak recovery current	I_{RRM}	$di/dt = 5830 \text{ A/}\mu\text{s}$ $di/dt = 5814 \text{ A/}\mu\text{s}$ $di/dt = 5804 \text{ A/}\mu\text{s}$	-5 / 15	350	100	25 125 150		76 96 101		A
Reverse recovery time	t_{rr}					25 125 150		67 112 124		ns
Recovered charge	Q_r					25 125 150		2,634 5,010 5,803		μC
Reverse recovered energy	E_{rec}					25 125 150		0,693 1,334 1,556		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		832 1072 1062		A/μs

DC Link Capacitance

Capacitance	C							200		nF
Tolerance							-10		+10	%
Dissipation factor		$f = 1 \text{ kHz}$				25			2,5	%

Thermistor

Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	P					25		5		mW
Power dissipation constant						25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1 \%$				25		3962		K
B-value	$B_{(25/100)}$	Tol. $\pm 1 \%$				25		4000		K
Vincotech NTC Reference									I	



Vincotech

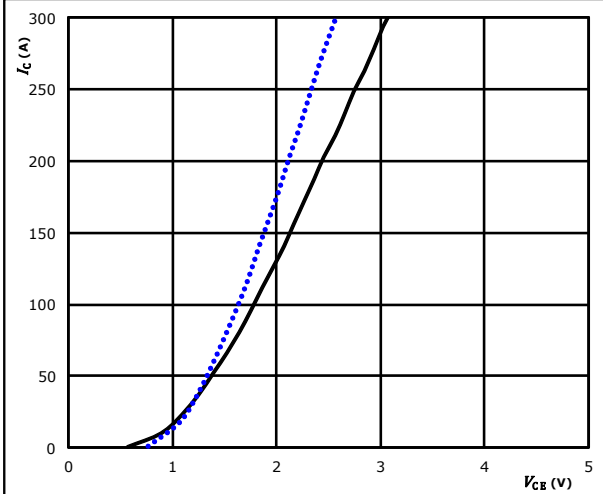
10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
 datasheet

Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

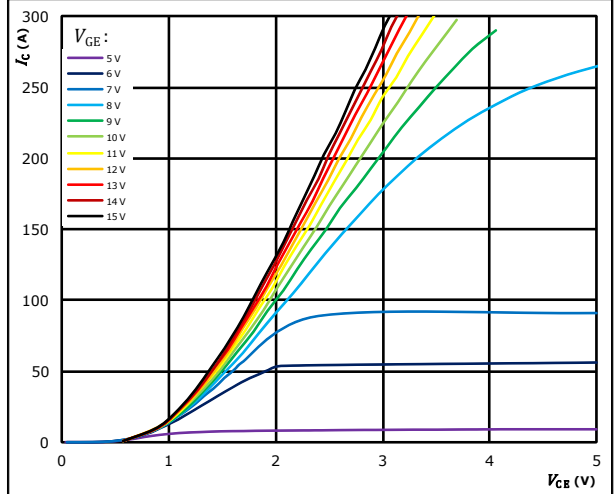


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j: 25 \text{ } ^\circ C$ (dotted blue line)
 $125 \text{ } ^\circ C$ (solid black line)

figure 2. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

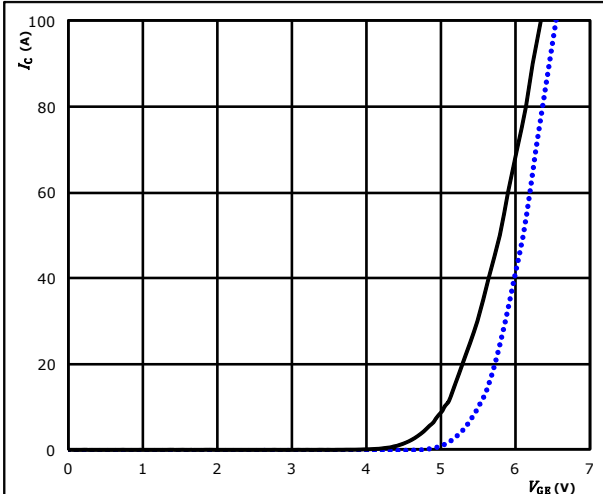


$t_p = 250 \mu s$
 $T_j = 125 \text{ } ^\circ C$
 V_{GE} from 5 V to 19 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

$$I_C = f(V_{GE})$$

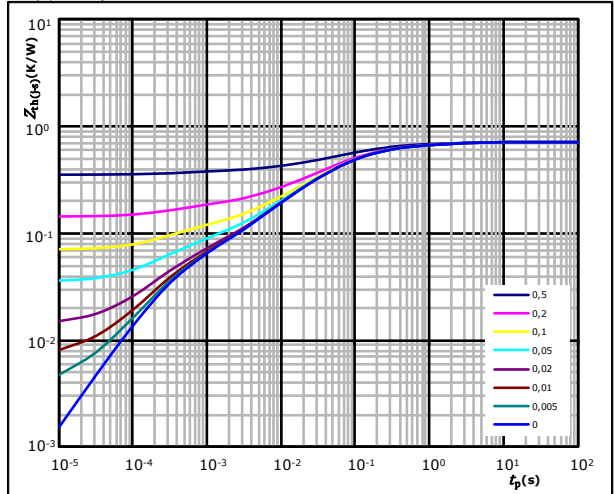


$t_p = 100 \mu s$
 $V_{CE} = 10 V$
 $T_j: 25 \text{ } ^\circ C$ (dotted blue line)
 $125 \text{ } ^\circ C$ (solid black line)

figure 4. IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$
 $R_{th(j-s)} = 0,72 \text{ K/W}$

IGBT thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
7,52E-02	1,73E+00
1,31E-01	2,44E-01
3,01E-01	6,32E-02
1,21E-01	1,39E-02
4,30E-02	3,50E-03
4,35E-02	3,33E-04



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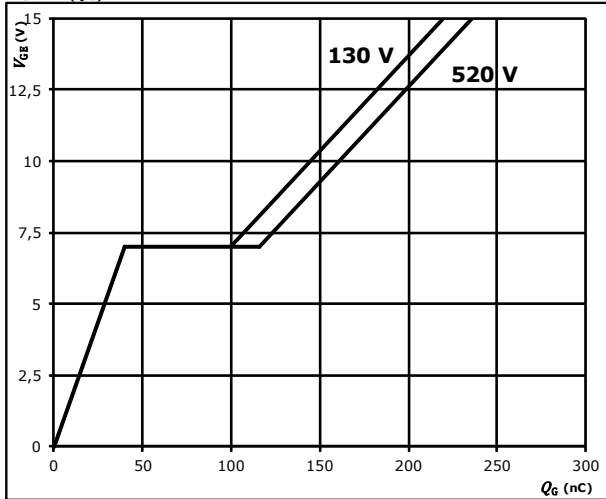
10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
 datasheet

Inverter Switch Characteristics

figure 5. IGBT

Gate voltage vs gate charge

$$V_{GE} = f(Q_G)$$

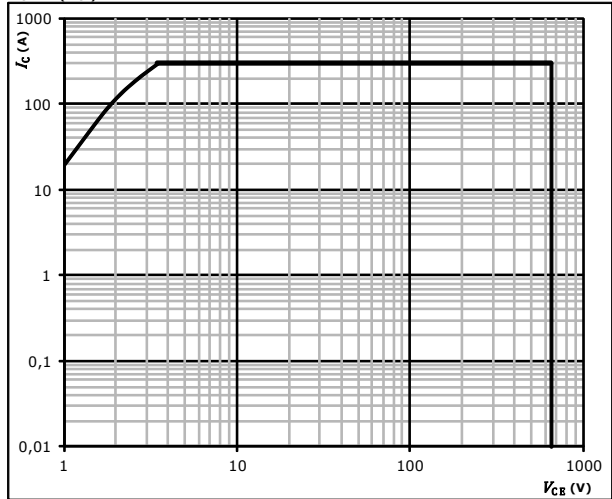


$I_C = 100$ A

figure 6. IGBT

Safe operating area

$$I_C = f(V_{CE})$$



$D =$ single pulse
 $T_s = 80$ °C
 $V_{GE} = \pm 15$ V
 $T_j = T_{jmax}$



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 datasheet

Inverter Diode Characteristics

figure 1. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

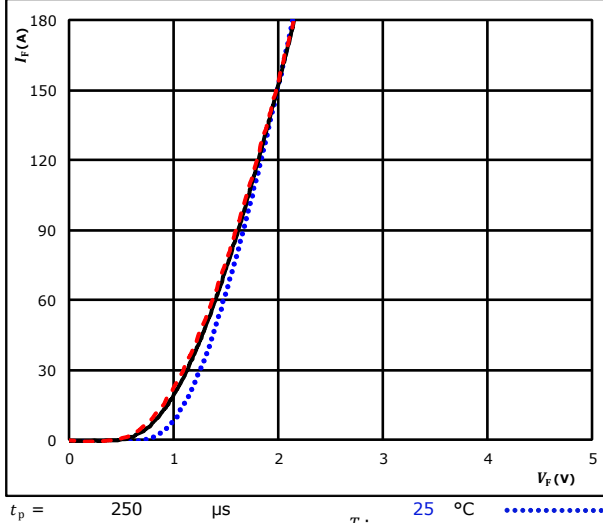
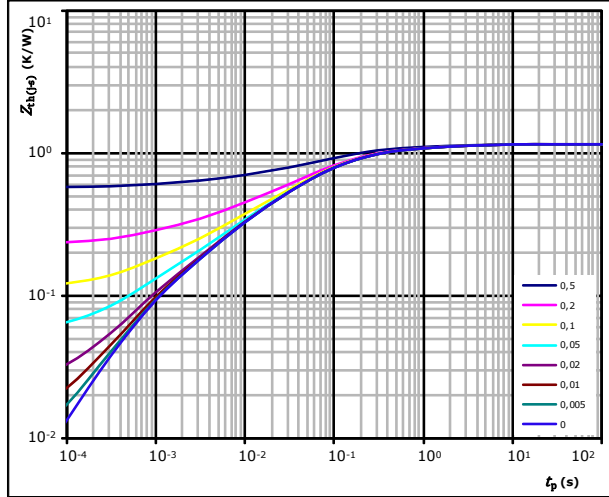


figure 2. FWD

Transient thermal impedance as a function of pulse width

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

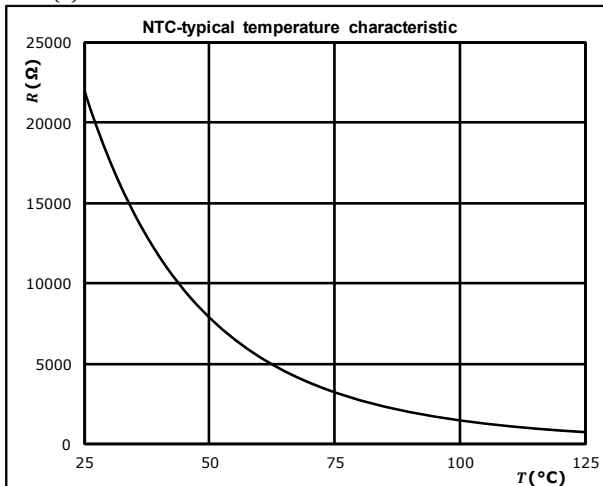


Thermistor Characteristics

figure 1. Thermistor

Typical NTC characteristic as a function of temperature

$$R = f(T)$$





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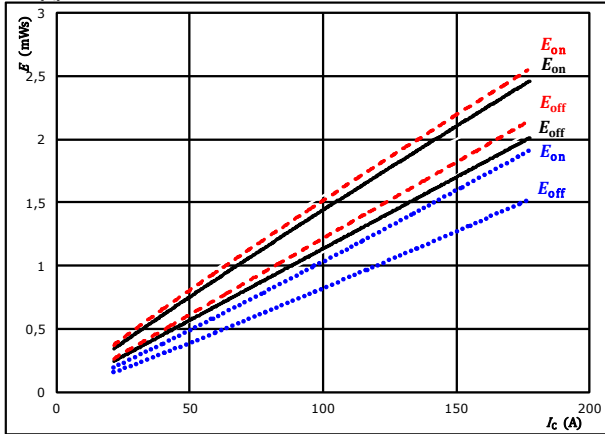
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10-PY074PA100SM-L583F08Y
 datasheet

Inverter Switching Characteristics

figure 1. IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 350$ V

$V_{GE} = -5 / 15$ V

$R_{gon} = 4$ Ω

$R_{goff} = 4$ Ω

T_j :

25 °C

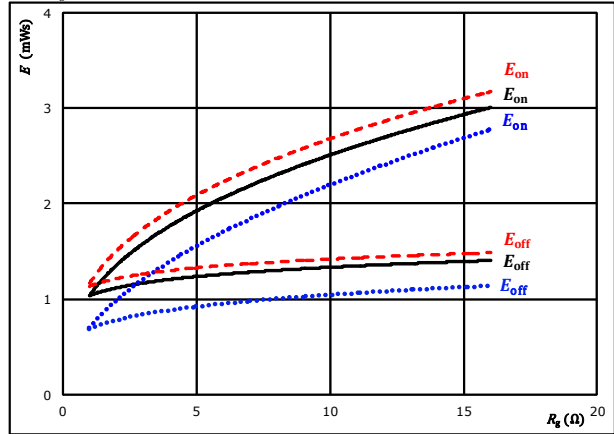
125 °C

150 °C

figure 2. IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 350$ V

$V_{GE} = -5 / 15$ V

$I_C = 100$ A

T_j :

25 °C

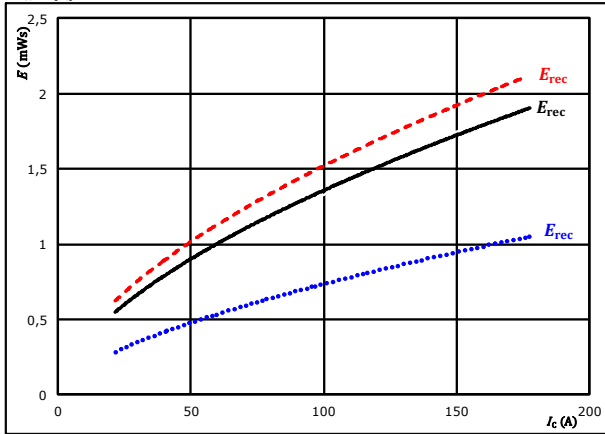
125 °C

150 °C

figure 3. FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

$V_{CE} = 350$ V

$V_{GE} = -5 / 15$ V

$R_{gon} = 4$ Ω

T_j :

25 °C

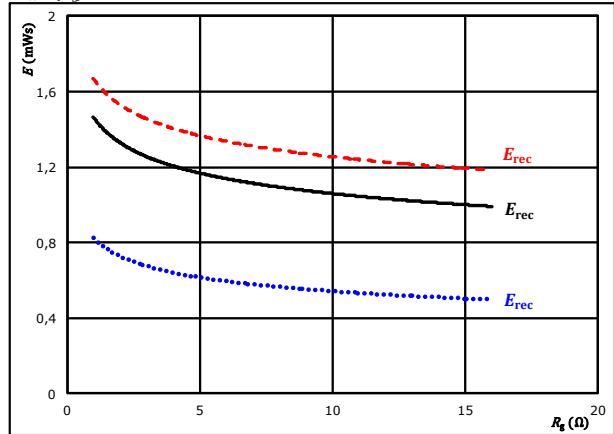
125 °C

150 °C

figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 350$ V

$V_{GE} = -5 / 15$ V

$I_C = 100$ A

T_j :

25 °C

125 °C

150 °C



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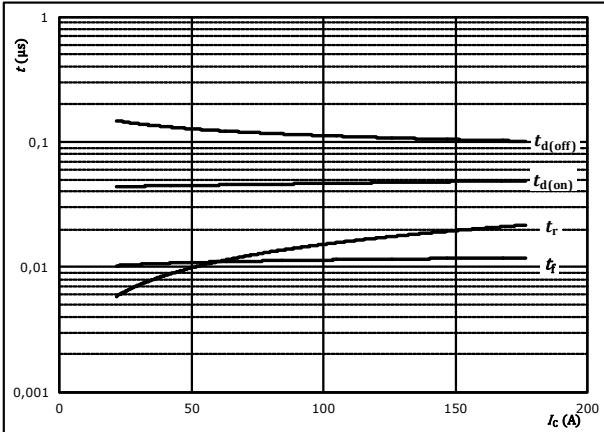
10-FY074PA100SM-L583F08 10-PY074PA100SM-L583F08Y datasheet

Inverter Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



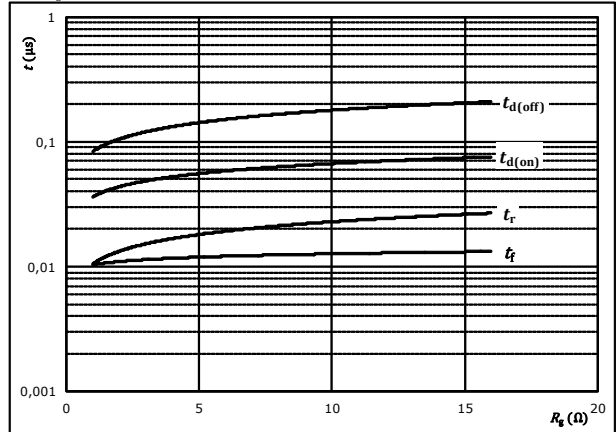
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



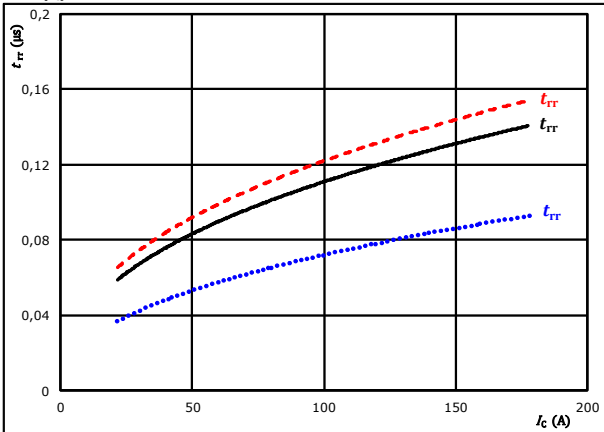
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $I_C = 100$ A

figure 7. FWD

Typical reverse recovery time as a function of collector current

$$t_{rr} = f(I_C)$$



With an inductive load at

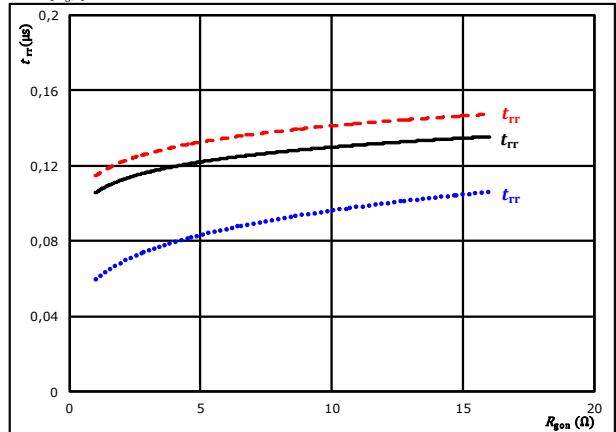
$V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $R_{gon} = 4$ Ω

T_j : 25 °C (dotted blue)
125 °C (solid black)
150 °C (dashed red)

figure 8. FWD

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

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $I_C = 100$ A

T_j : 25 °C (dotted blue)
125 °C (solid black)
150 °C (dashed red)



Vincotech

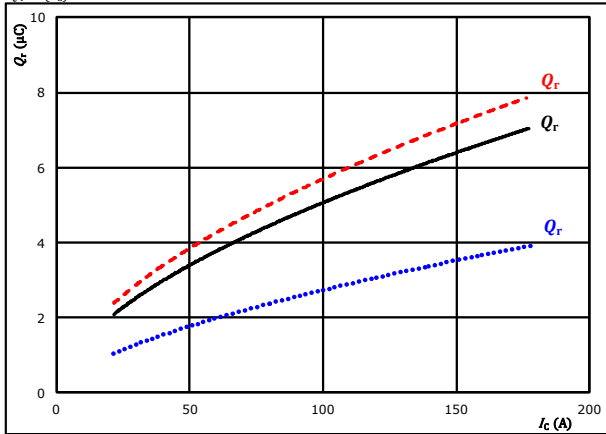
10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
 datasheet

Inverter Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_C)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $R_{gon} = 4$ Ω

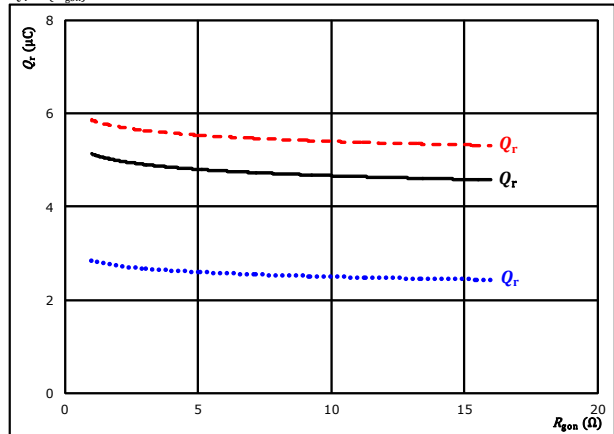
T_j :

25 °C (dotted blue)
 125 °C (solid black)
 150 °C (dashed red)

figure 10. FWD

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

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



With an inductive load at

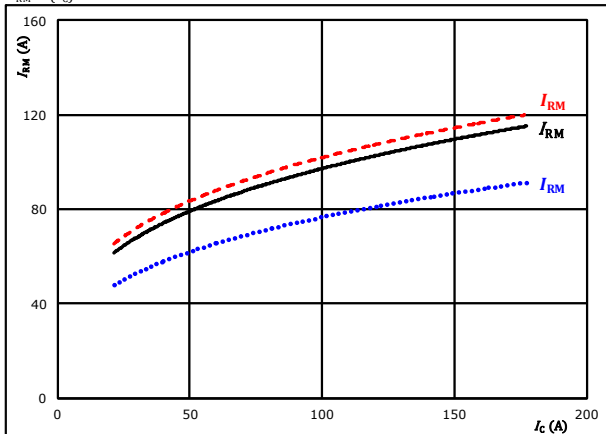
$V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $I_C = 100$ A

T_j : 25 °C (dotted blue)
 125 °C (solid black)
 150 °C (dashed red)

figure 11. FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $R_{gon} = 4$ Ω

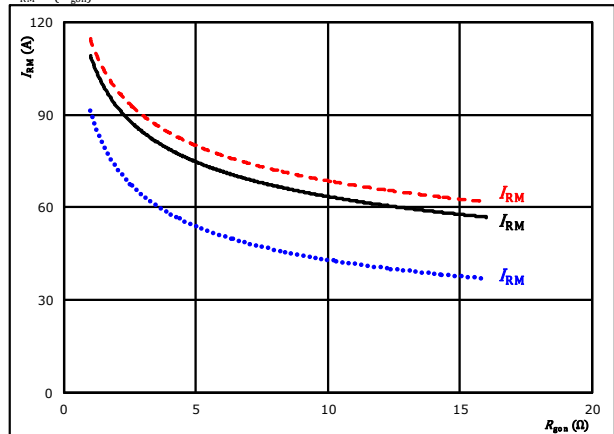
T_j :

25 °C (dotted blue)
 125 °C (solid black)
 150 °C (dashed red)

figure 12. FWD

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

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $I_C = 100$ A

T_j : 25 °C (dotted blue)
 125 °C (solid black)
 150 °C (dashed red)



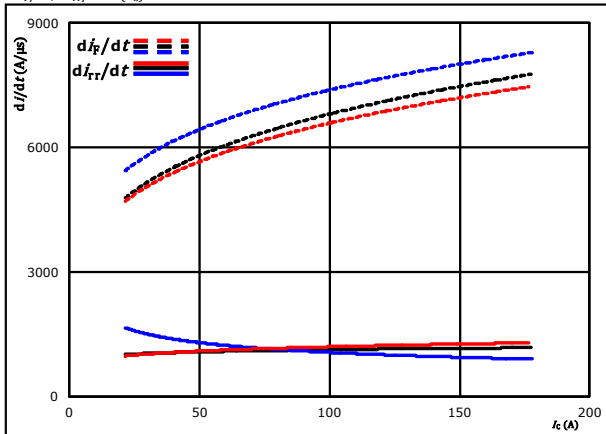
Vincotech

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 datasheet

Inverter Switching Characteristics

figure 13. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_F/dt, di_{rr}/dt = f(I_C)$

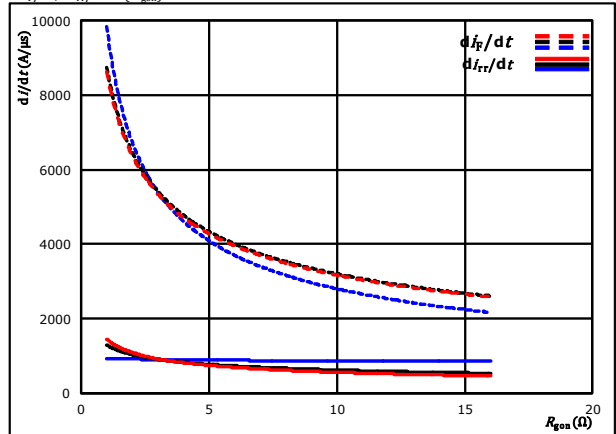


With an inductive load at

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

figure 14. FWD

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



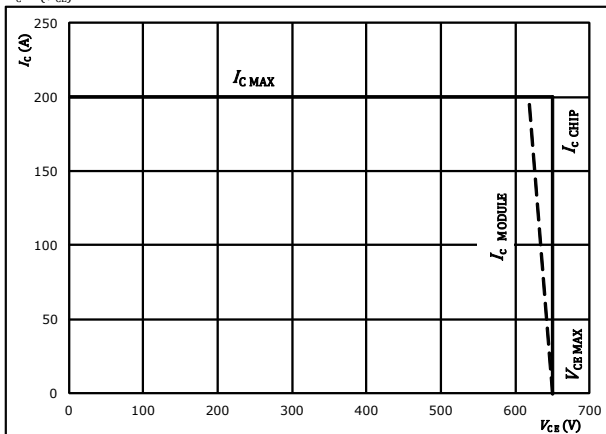
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5 / 15$ V
 $I_C = 100$ A
 $T_j: 25$ °C
 125 °C
 150 °C

figure 15. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

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



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 datasheet

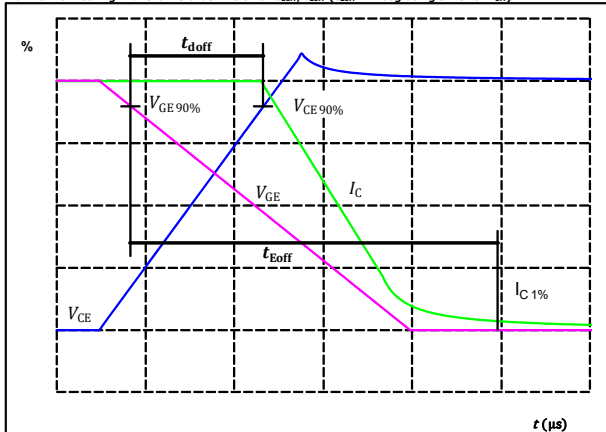
Inverter Switching Definitions

General conditions

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

figure 1. IGBT

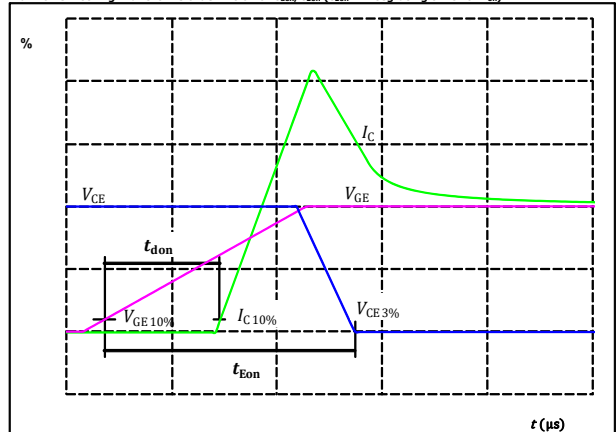
Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff} (t_{Eoff} = integrating time for E_{off})



$V_{GE}(0\%) =$	-5	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	100	A
$t_{doff} =$	109	ns

figure 2. IGBT

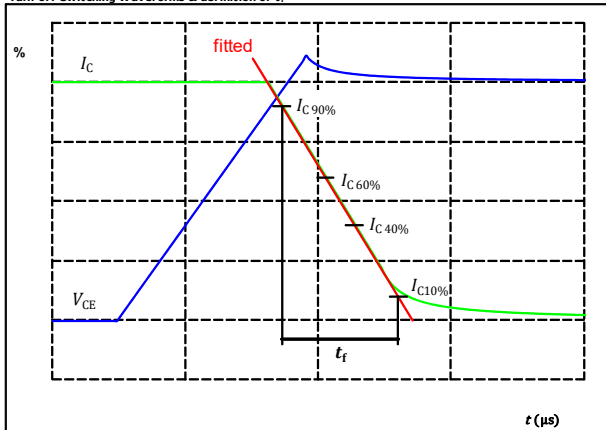
Turn-on Switching Waveforms & definition of t_{don} , t_{Eon} (t_{Eon} = integrating time for E_{on})



$V_{GE}(0\%) =$	-5	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	100	A
$t_{don} =$	48	ns

figure 3. IGBT

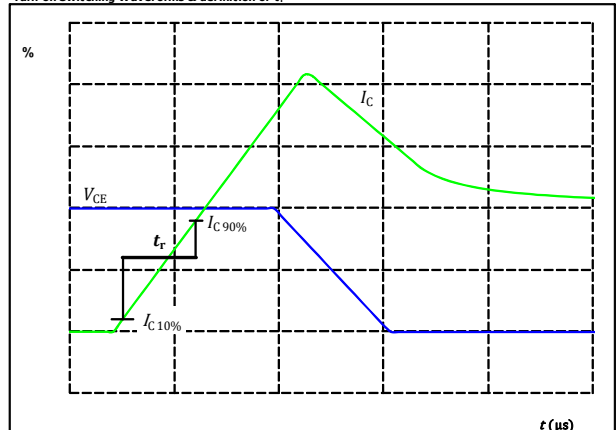
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%) =$	350	V
$I_C(100\%) =$	100	A
$t_f =$	10	ns

figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r



$V_C(100\%) =$	350	V
$I_C(100\%) =$	100	A
$t_r =$	14	ns



Vincotech

10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
 datasheet

Inverter Switching Characteristics

figure 5. FWD

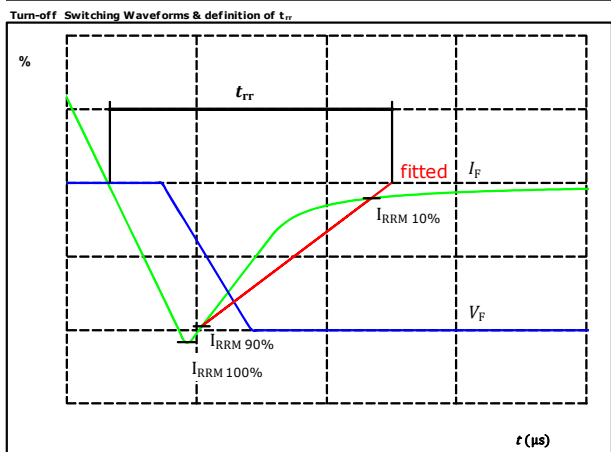
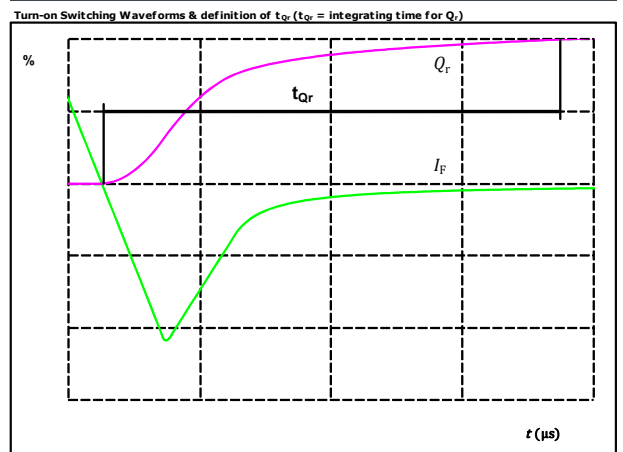


figure 6. FWD





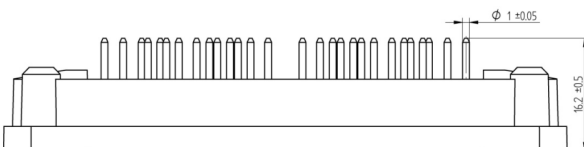
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10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
datasheet

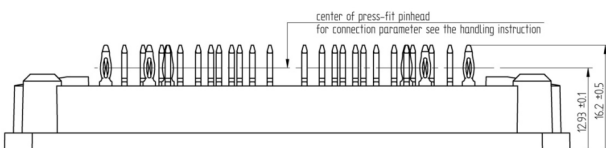
Ordering Code & Marking									
Version			Ordering Code						
without thermal paste 12 mm housing with solder pins			10-FY074PA100SM-L583F08						
without thermal paste 12 mm housing with Press-fit pins			10-PY074PA100SM-L583F08Y						
			Text	Name		Date code	UL & VIN	Lot	Serial
				NN-NNNNNNNNNNNNNN-TTTTWW		WWYY	UL VIN	LLLLL	SSSS
			Datamatrix	Type&Ver	Lot number	Serial	Date code		
				TTTTTWW	LLLLL	SSSS	WWYY		

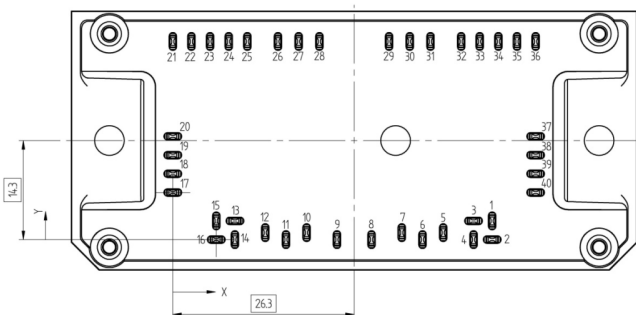
Pin table			
Pin	X	Y	Function
1	46,3	2,7	DC-2
2	46,3	0	DC-2
3	43,6	2,7	DC-2
4	43,6	0	DC-2
5	39,2	1	G13-a
6	36,2	0	S13
7	33,2	1	G13-b
8	28,8	0	Therm2
9	23,8	0	Therm1
10	19,4	1	G11-b
11	16,4	0	S11
12	13,4	1	G11-a
13	9	2,7	DC-1
14	9	0	DC-1
15	6,3	2,7	DC-1
16	6,3	0	DC-1
17	0	6,8	DC+
18	0	9,5	DC+
19	0	12,2	DC+
20	0	14,9	DC+
21	0	28,6	Ph1
22	2,7	28,6	Ph1
23	5,4	28,6	Ph1
24	8,1	28,6	Ph1
25	10,8	28,6	Ph1
26	15,25	28,6	G12-a
27	18,25	28,6	S12
28	21,25	28,6	G12-b
29	31,35	28,6	G14-b
30	34,35	28,6	S14
31	37,35	28,6	G14-a
32	41,8	28,6	Ph2
33	44,5	28,6	Ph2
34	47,2	28,6	Ph2
35	49,9	28,6	Ph2
36	52,6	28,6	Ph2
37	52,6	14,9	DC+
38	52,6	12,2	DC+
39	52,6	9,5	DC+
40	52,6	6,8	DC+

L583F08



L583F08Y



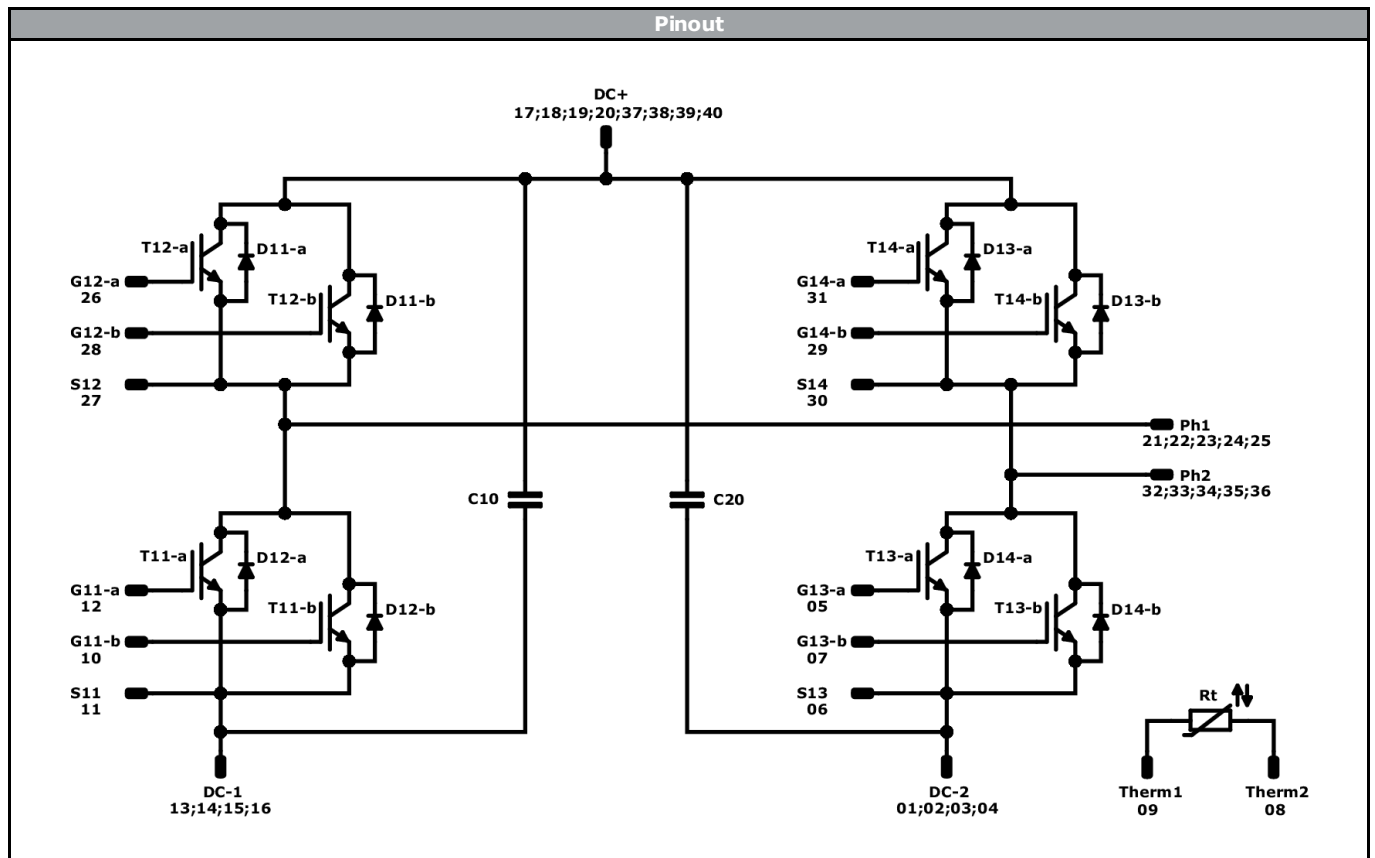


Tolerance of pinpositions: ±0.5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



Vincotech

10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
datasheet



Identification					
ID	Component	Voltage	Current	Function	Comment
T11-a, T11-b, T12-a, T12-b, T13-a, T13-b T14-a, T14-b	IGBT	650 V	100 A	Inverter Switch	Parallel devices with separate control. Values apply to complete device.
D11-a, D11-b, D12-a, D12-b, D13-a, D13-b D14-a, D14-b	FWD	650 V	60 A	Inverter Diode	Parallel devices. Values apply to complete device.
C10, C20	Capacitor	630 V		DC Link Capacitance	
Rt	NTC			Thermistor	



Vincotech

10-FY074PA100SM-L583F08
10-PY074PA100SM-L583F08Y
datasheet

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

Handling instruction
Handling instructions for <i>flow 1</i> packages see vincotech.com website.

Package data
Package data for <i>flow 1</i> 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-xY074PA100SM-L583F08x-D3-14	11 Dec. 2018	Isolation voltage Clearance Change of Inverter Diode Change of Thermistor	2 2 2, 4, 7, 8, 9, 10, 11 4, 7

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.