



### fastPACK 1 GaN

650 V / 10 mΩ

#### Topology features

- Kelvin Emitter for improved switching performance
- Integrated DC capacitor
- Open Emitter configuration
- Temperature sensor

#### Component features

- Fast and controllable fall and rise times
- GaN enhancement mode power switch
- Zero reverse recovery Q<sub>rr</sub>

#### Housing features

- Base isolation: Al<sub>2</sub>O<sub>3</sub>
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Solder pin

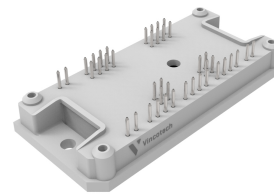
#### Target applications

- Charging Stations
- Power Supply
- UPS
- Welding & Cutting

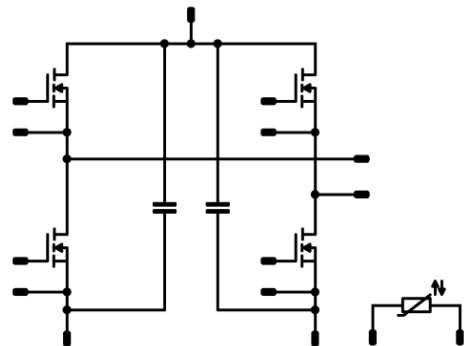
#### Types

- 10-FY074PC010GN-PL85F08

#### flow 1 12 mm housing



#### Schematic





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**10-FY074PC010GN-PL85F08**  
target datasheet

## Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
<b>Inverter Switch</b>				
Drain-source voltage	$V_{DSS}$		650	V
Drain current (DC current)	$I_D$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	64	A
Peak drain current	$I_{DM}$	$t_p$ limited by $T_{jmax}$	150	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	85	W
Gate-source voltage	$V_{GSS}$		-10 / 7	V
		dynamic	-20 / 10	
Maximum Junction Temperature	$T_{jmax}$		150	°C

## Capacitor (DC)

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
Creepage distance			>12,7	mm
Clearance			>12,7	mm
Comparative Tracking Index	CTI		≥ 600	

\*100 % tested in production



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**10-FY074PC010GN-PL85F08**  
target datasheet

### 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		

#### Inverter Switch

##### Static

Drain-source on-state resistance	$r_{DS(on)}$		6		50	25 125		9,27 18,5	15 <sup>(1)</sup>	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,04	25	1,1	1,7	2,6	V
Gate to Source Leakage Current	$I_{GSS}$		6	0		25		911	2000	μA
Zero Gate Voltage Drain Current	$I_{DSS}$		0	650		25		11	100	μA
Internal gate resistance	$r_g$							None		Ω
Gate charge	$Q_g$		0/6	400	50	25		34,3		nC
Short-circuit input capacitance	$C_{iss}$	$f = 100$ kHz	0	400	0	25		1409		pF
Short-circuit output capacitance	$C_{oss}$							423		
Reverse transfer capacitance	$C_{rss}$							4		

##### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,82		K/W
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##### Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 1$ Ω $R_{goff} = 1$ Ω	-4/6	350	150	25		9,14		ns
						125		9,6		
Rise time	$t_r$					25		3,19		
						125		4,06		
Turn-off delay time	$t_{d(off)}$					25		13,57		
						125		13,03		
Fall time	$t_f$			25		1,28		ns		
				125		1,43				
Turn-on energy (per pulse)	$E_{on}$					25		0,378		mWs
						125		0,414		
Turn-off energy (per pulse)	$E_{off}$					25		0,051		mWs
						125		0,058		



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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		

### Capacitor (DC)

#### Static

Capacitance	$C$	DC bias voltage = 0 V				25		132		nF
Tolerance							-10		10	%
Dissipation factor		$f = 1$ kHz				25		0,1		%

### Thermistor

#### Static

Rated resistance	$R$					25		22		kΩ
Deviation of R100	$A_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	$P$					25		130		mW
Power dissipation constant	$d$					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1$ %						3962		K
B-value	$B_{(25/100)}$	Tol. $\pm 1$ %						4000		K
Vincotech Thermistor Reference									I	

(1) Value at chip level

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

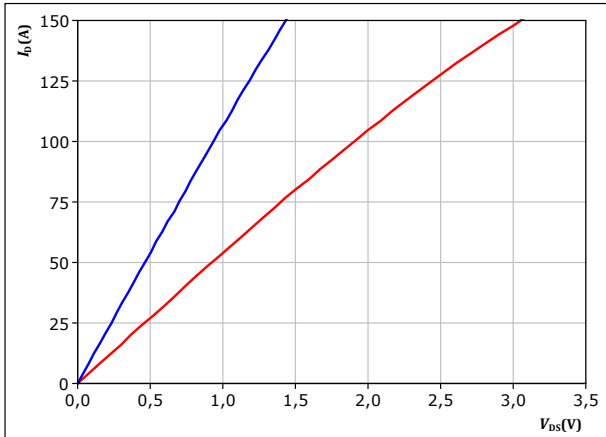


## Inverter Switch Characteristics

figure 1. MOSFET

Typical output characteristics

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

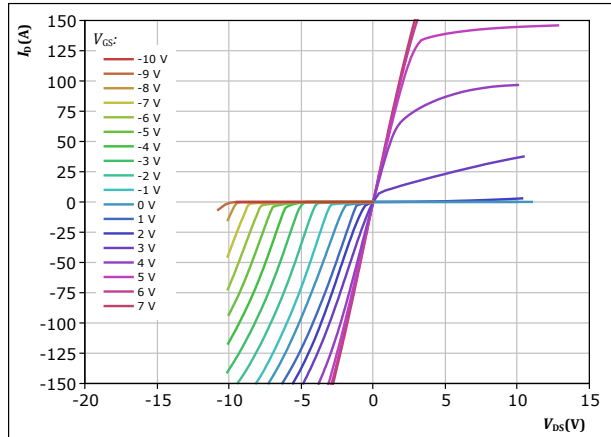


$t_p = 250\ \mu\text{s}$   
 $V_{GS} = 6\ \text{V}$   
 $T_j: 25\text{ °C}$  (blue),  $125\text{ °C}$  (red)

figure 2. MOSFET

Typical output characteristics

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

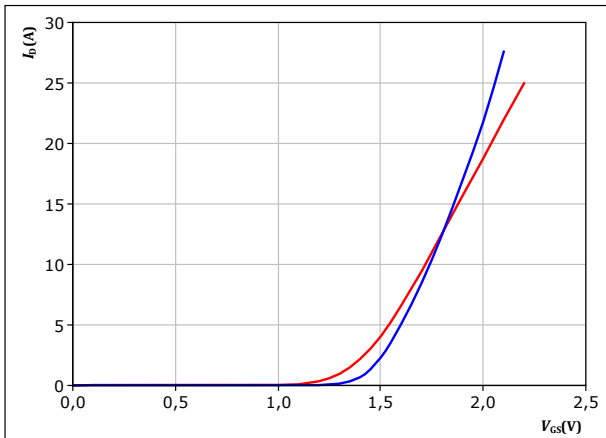


$t_p = 250\ \mu\text{s}$   
 $T_j = 125\text{ °C}$   
 $V_{GS}$  from -10 V to 7 V in steps of 1 V

figure 3. MOSFET

Typical transfer characteristics

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

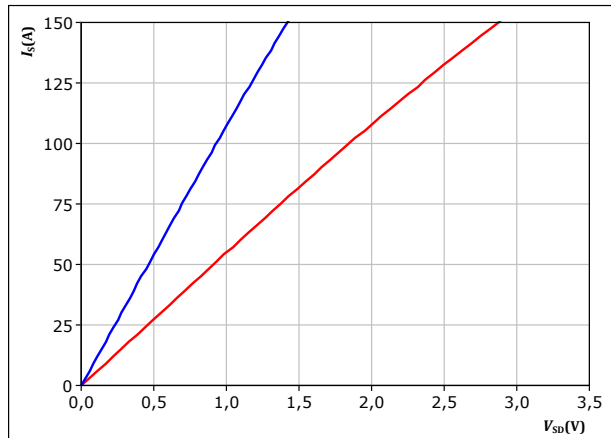


$t_p = 250\ \mu\text{s}$   
 $V_{DS} = 10\ \text{V}$   
 $T_j: 25\text{ °C}$  (blue),  $125\text{ °C}$  (red)

figure 4. MOSFET

Typical reverse drain current characteristics

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



$t_p = 250\ \mu\text{s}$   
 $V_{GS} = 6\ \text{V}$   
 $T_j: 25\text{ °C}$  (blue),  $125\text{ °C}$  (red)

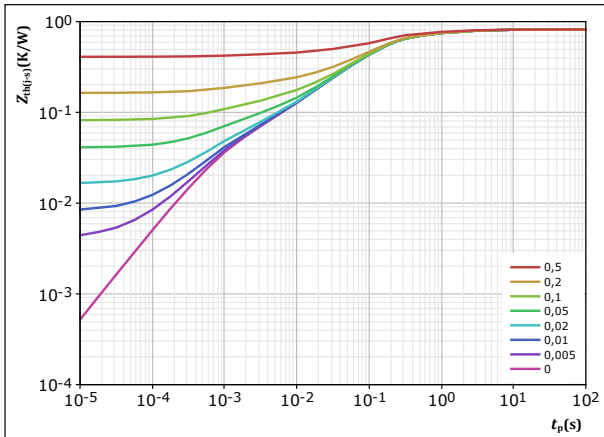


## Inverter Switch Characteristics

figure 5. MOSFET

Transient thermal impedance as a function of pulse width

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



$$D = \frac{t_p}{T}$$

$$R_{th(j-c)} = 0,819 \text{ K/W}$$

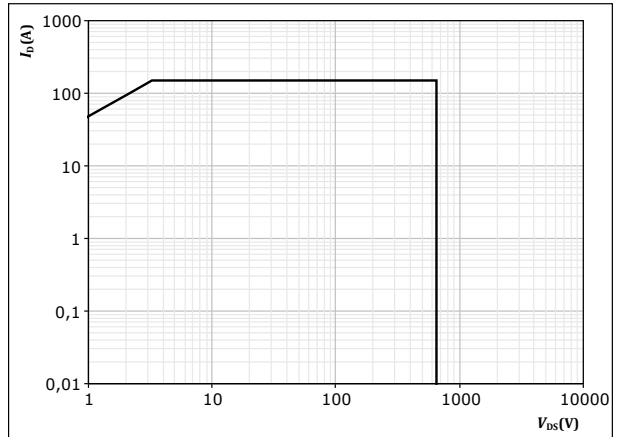
MOSFET thermal model values

R (K/W)	$\tau$ (s)
4,05E-02	4,93E+00
1,59E-01	7,02E-01
5,02E-01	1,14E-01
7,75E-02	1,22E-02
4,01E-02	9,71E-04

figure 6. MOSFET

Safe operating area

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



D = single pulse

$$T_s = 80 \text{ } ^\circ\text{C}$$

$$V_{GS} = 6 \text{ V}$$

$$T_i = T_{jmax}$$

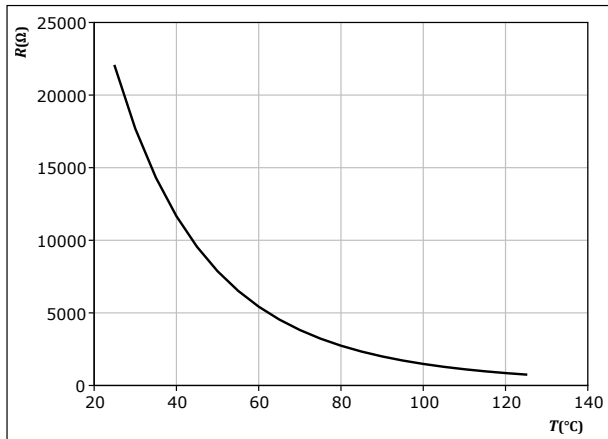


## Thermistor Characteristics

figure 7. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$

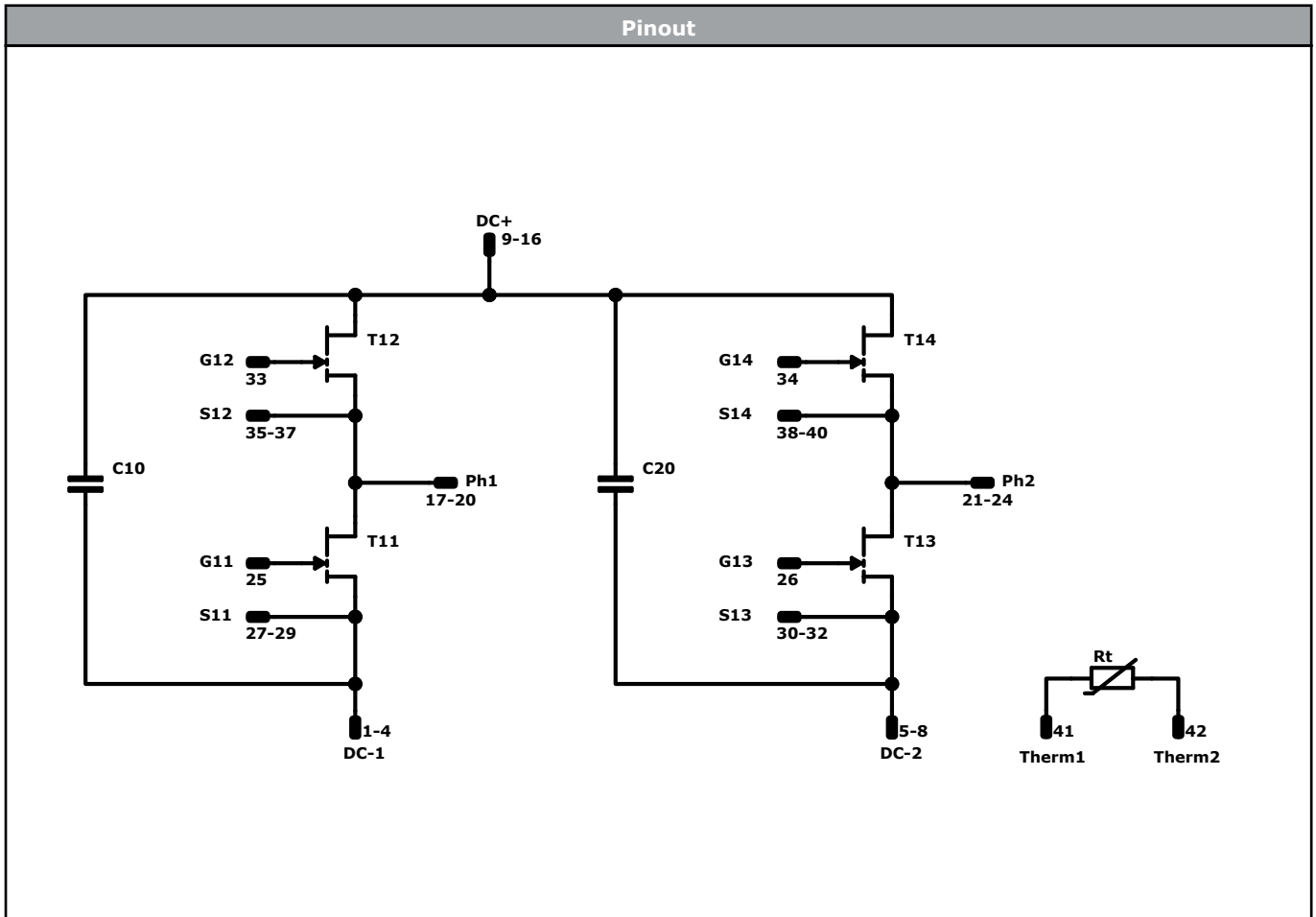








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Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14	MOSFET	650 V	10 mΩ	Inverter Switch	
C10, C20	Capacitor	630 V		Capacitor (DC)	
Rt	Thermistor			Thermistor	



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.

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 $T_{j,op}=175^{\circ}C$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.



Document No.:	Date:	Modification:	Pages
10-FY074PC010GN-PL85F08-T1-14	7 Jun. 2024	Initial Release	

Product status definition		
Datasheet Status	Product Status	Definition
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.

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