10-FZ076PA030I7-P864F08
datasheet

Vincotech

flowPACK 0	650 V / 30 A

Topology features

- Inverter
- Kelvin Emitter for improved switching performance
- Temperature sensor

Component features

- Easy paralleling
- Low collector emitter saturation voltage
- Low turn-off losses
- Positive temperature coefficient

Housing features

- Base isolation: Al_2O_3
- Clip-in, reliable mechanical connection, qualified for wave soldering
- Convex shaped substrate for superior thermal contact
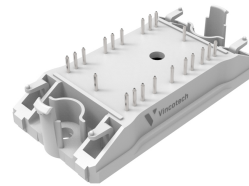- Thermo-mechanical push-and-pull force relief
- Solder pin

Target applications
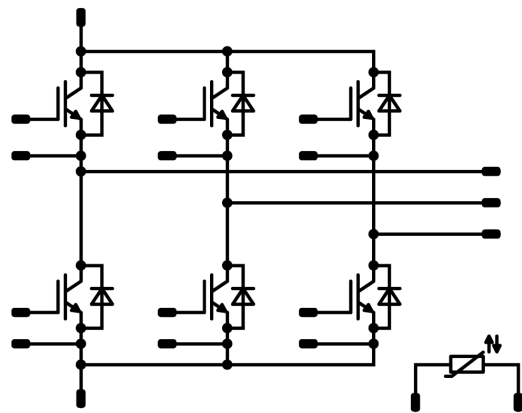
- General Purpose Drives
- Heat Pumps
- Industrial Drives

Types

- 10-FZ076PA030I7-P864F08

flow 0 12 mm housing

Schematic

Vincotech

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Inverter Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	35	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	59	W
Gate-emitter voltage	V_{GES}			±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 400 V	T_j = 150 °C	3	μs
Maximum junction temperature	T_{jmax}			175	°C
Inverter Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	31	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	50	W
Maximum junction temperature	T_{jmax}			175	°C

Module Properties

Thermal Properties

Parameter	Symbol	Conditions		Value	Unit
Storage temperature	T_{stg}			-40...+125	°C
Operation temperature under switching condition	T_{jop}			-40...+(T_{jmax} - 25)	°C

Isolation Properties

Parameter	Symbol	Conditions		Value	Unit
Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	6000	V
Creepage distance				>12,7	mm
Clearance				9,1	mm
Comparative Tracking Index	CTI			≥ 200	

*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	
Inverter Switch									
Static									
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$		0,0003	25	4,35	5	5,65	V
Collector-emitter saturation voltage	V_{CEsat}	15		30	25 125 150		1,38 1,48 1,51	1,65[1]	V
Collector-emitter cut-off current	I_{CES}	0	650		25			20	µA
Gate-emitter leakage current	I_{GES}	0	650		25			100	nA
Internal gate resistance	r_{g}						None		Ω
Input capacitance	C_{ies}						1900		pF
Output capacitance	C_{oes}	f = 1 Mhz	0	25	25		62		pF
Reverse transfer capacitance	C_{res}						20		pF
Gate charge	Q_{g}	V_{CC} = 520 V	15		30	25		180		nC
Thermal									
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)					1,62		K/W
Dynamic									
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	±15	350	40	25 125 150		37,89 39,44 39,68		ns
Rise time	t_{r}					25 125 150		12,89 15,25 16,16		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		96,29 117,28 121,05		ns
Fall time	t_{f}					25 125 150		36,35 63,64 70,38		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,758 µC Q_{rFWD}=1,55 µC Q_{rFWD}=1,74 µC				25 125 150		0,522 0,708 0,758		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,599 0,888 0,964		mWs

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 Diode

Static

Parameter	Symbol	Conditions				Values			Unit
Forward voltage	V_{F}			30	25 125 150		1,72 1,62 1,58	2[1]	V
Reverse leakage current	I_{R}	V_{r} = 650 V			25			20	µA

Thermal

Parameter	Symbol	Conditions				Values			Unit
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)					1,91		K/W

Dynamic

Parameter	Symbol	Conditions				Values			Unit
Peak recovery current	I_{RM}				25 125 150		18,64 24,77 26,25		A
Reverse recovery time	t_{rr}				25 125 150		79,6 121,7 131,89		ns
Recovered charge	Q_{r}	di/dt=1646 A/µs di/dt=2292 A/µs di/dt=1939 A/µs	±15	350	40	25 125 150		0,758 1,55 1,74		µC
Reverse recovered energy	E_{rec}				25 125 150		0,16 0,346 0,391		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$				25 125 150		185,15 261,92 252,71		A/µs

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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		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω			100	-5		5	%
Power dissipation	P				25		130		mW
Power dissipation constant	d				25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %					3962		K
B-value	$B_{(25/100)}$	Tol. ±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. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

$t_p =$	250	µs		25 °C	
$V_{GE} =$	15	V	T_j:	125 °C	
				150 °C	
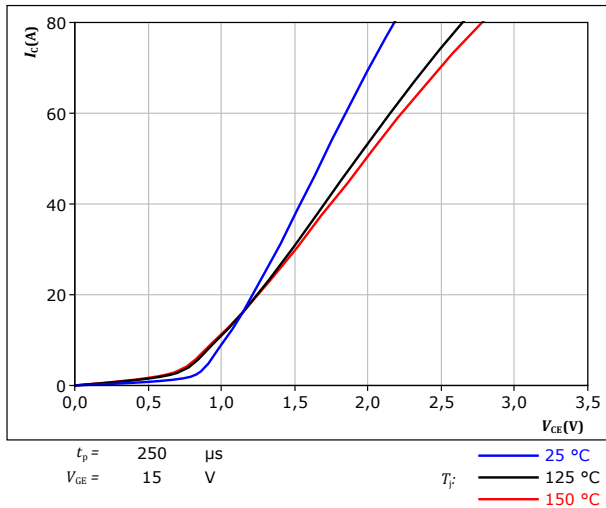
figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

V_{GE}:
7 V
8 V
9 V
10 V
11 V
12 V
13 V
14 V
15 V
16 V
17 V
18 V
19 V
20 V

$t_p =$	250	µs	
$T_j =$	150	°C	
V_{GE} from 7 V to 20 V in steps of 1 V			
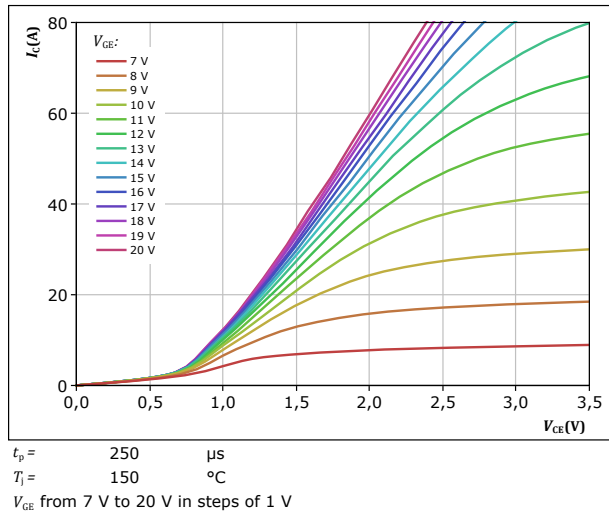
figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

$t_p =$	250	µs		25 °C	
$V_{CE} =$	29	V	T_j:	125 °C	
				150 °C	
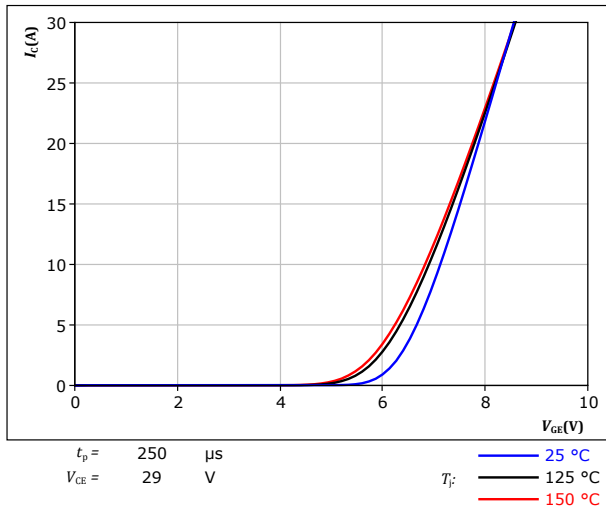
figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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

0,5
0,2
0,1
0,05
0,02
0,01
0,005
0

$D =$		t_p / T	
$R_{th(j-s)} =$	1,616	K/W	
IGBT thermal model values			

R (K/W)	τ (s)
2,47E-02	3,02E+01
1,79E-01	7,15E-01
9,29E-01	6,45E-02
3,44E-01	7,82E-03
1,49E-01	6,76E-04
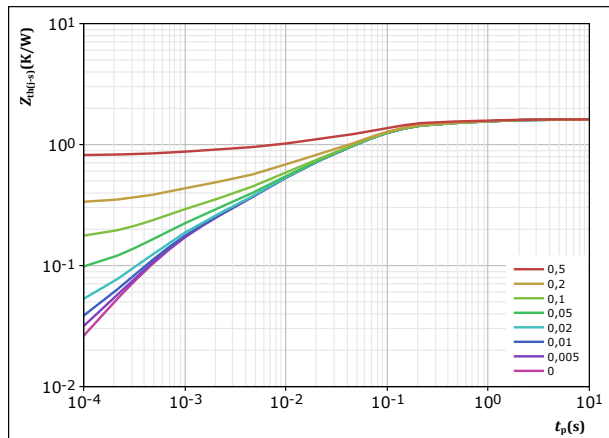
Inverter Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})
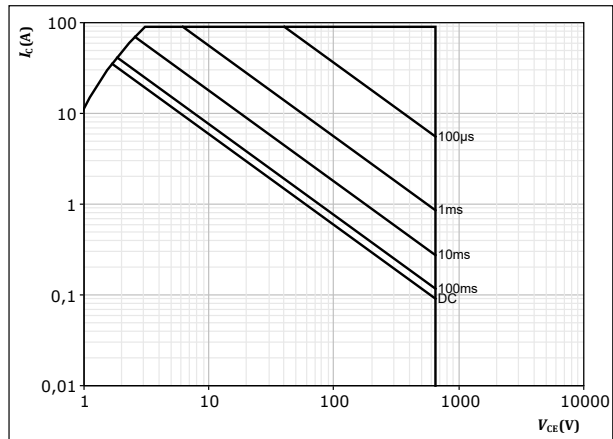
D = single pulse

T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 6. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)
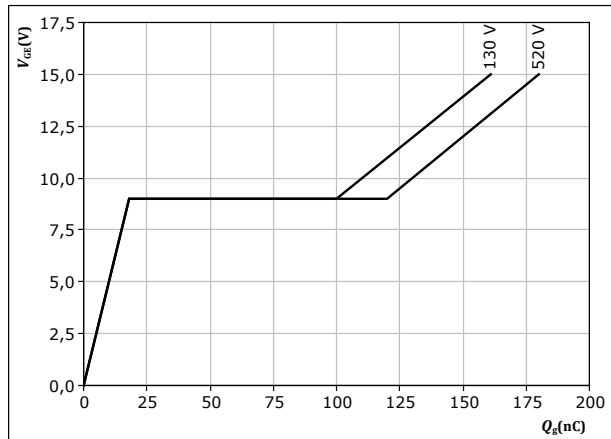
I_C =	30	A
T_j =	25	°C

Inverter Diode Characteristics

figure 7.   **FWD**

Typical forward characteristics

$I_F = f(V_F)$

$t_p =$	250	µs

T_j: — 25 °C

       — 125 °C

       — 150 °C
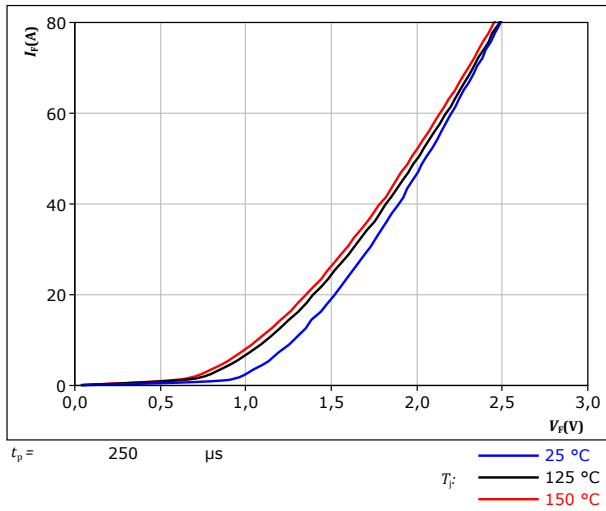
figure 8.   **FWD**

Transient thermal impedance as a function of pulse width

$Z_{th(j-s)} = f(t_p)$
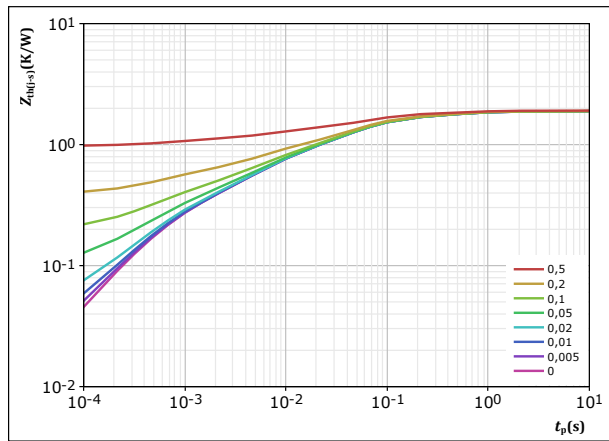
$D =$	t_p / T	
$R_{th(j-s)} =$	1,911	K/W

FWD thermal model values

R (K/W)	τ (s)
6,64E-02	3,15E+01
3,02E-01	3,91E-01
9,23E-01	4,67E-02
4,34E-01	5,37E-03
2,13E-01	5,51E-04

Thermistor Characteristics

figure 9.	Thermistor

Typical NTC characteristic as function of temperature
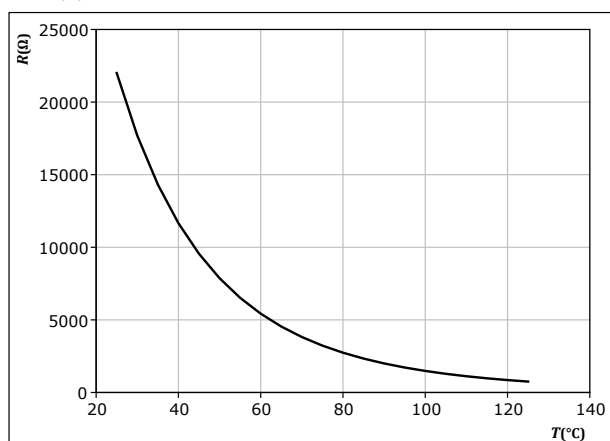
$R_T = f(T)$

Inverter Switching Characteristics

figure 10.   IGBT

**Typical switching energy losses as a function of collector current**

$E = f(I_C)$

With an inductive load at

				T_j:	25 °C
V_{CE} =	350	V			125 °C
V_{GE} =	±15	V			150 °C
R_{gon} =	4	Ω			
R_{goff} =	4	Ω			

figure 11.   IGBT

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

$E = f(R_g)$
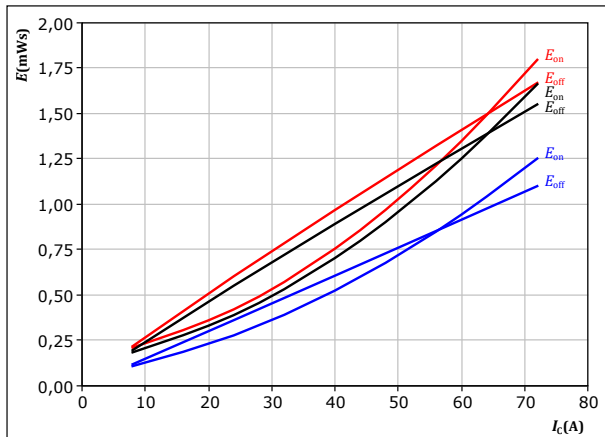
With an inductive load at

				T_j:	25 °C
V_{CE} =	350	V			125 °C
V_{GE} =	±15	V			150 °C
I_C =	40	A			

figure 12.   FWD

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$
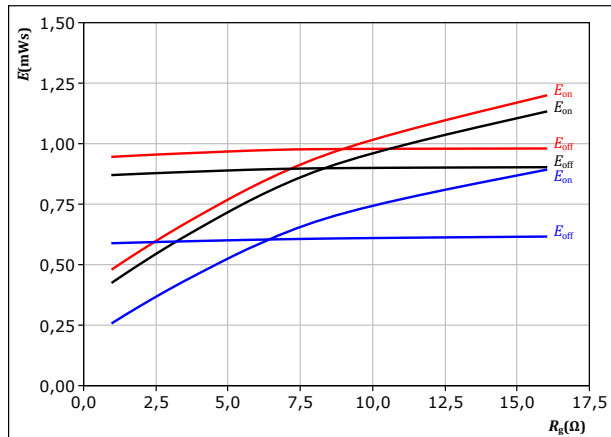
With an inductive load at

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

figure 13.   FWD

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

$E_{rec} = f(R_g)$
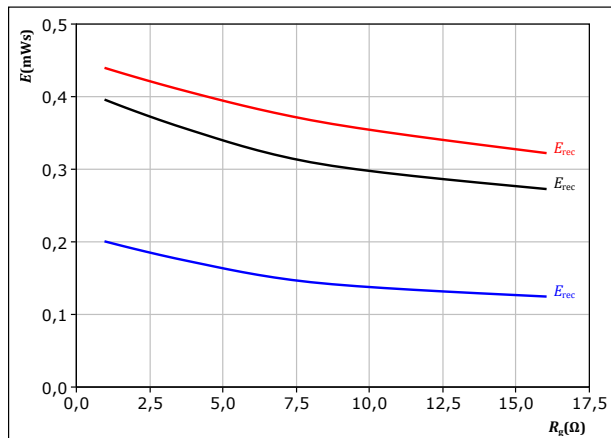
With an inductive load at

				T_j:	25 °C
V_{CE} =	350	V			125 °C
V_{GE} =	±15	V			150 °C
I_C =	40	A			

Inverter Switching Characteristics

figure 14.	IGBT

Typical switching times as a function of collector current

$t = f(I_C)$
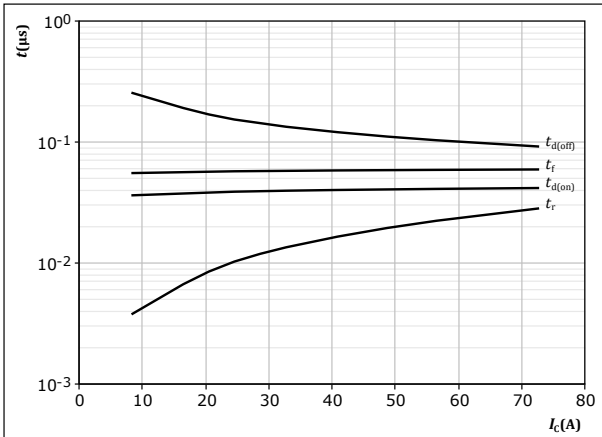
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 15.	IGBT

Typical switching times as a function of IGBT turn on gate resistor

$t = f(R_g)$
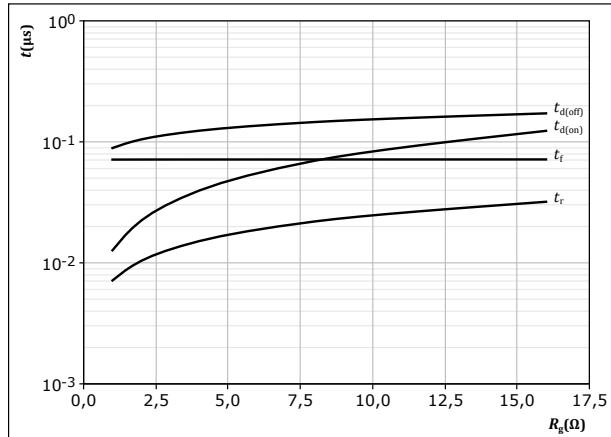
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	40	A

figure 16.	FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$
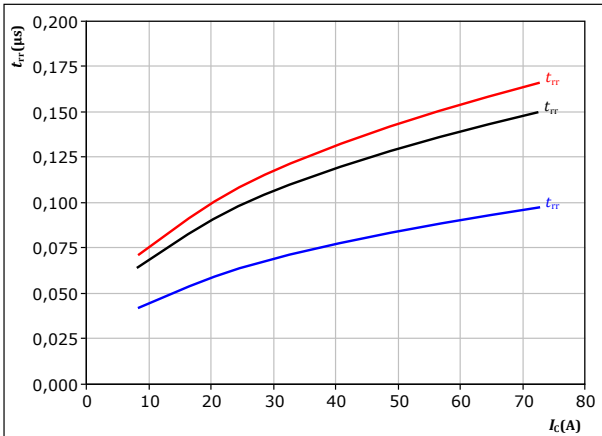
With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j:	25 °C
	125 °C
	150 °C

figure 17.	FWD

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

$t_{rr} = f(R_{gon})$
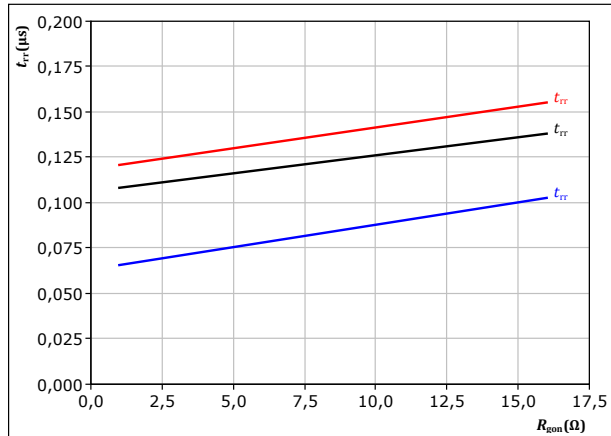
With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	40	A

T_j:	25 °C
	125 °C
	150 °C

Inverter Switching Characteristics

figure 18.   **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_c)$

With an inductive load at

$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$R_{gon} =$	4	Ω

T_j: 25 °C / 125 °C / 150 °C

figure 19.   **FWD**

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

$Q_r = f(R_{gon})$
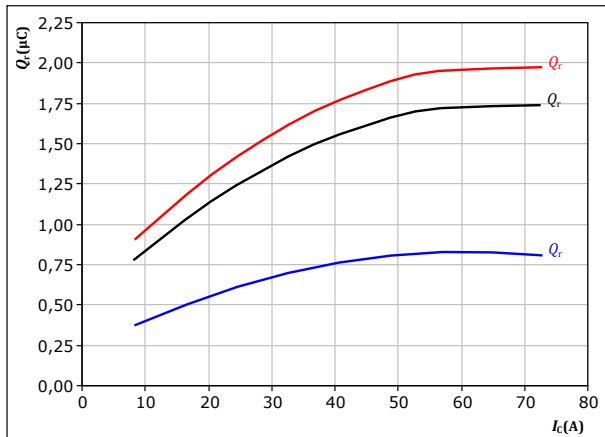
With an inductive load at

$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$I_C =$	40	A

T_j: 25 °C / 125 °C / 150 °C

figure 20.   **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$
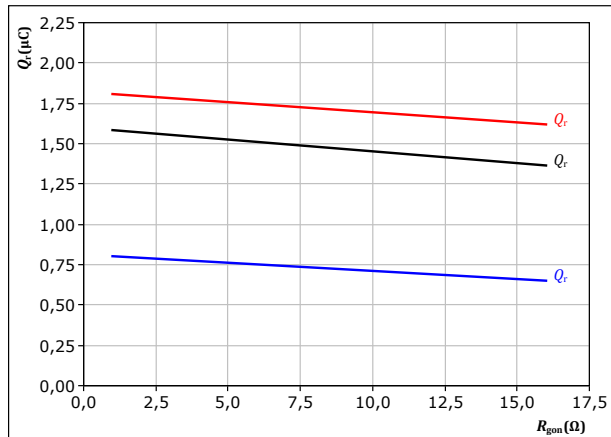
With an inductive load at

$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$R_{gon} =$	4	Ω

T_j: 25 °C / 125 °C / 150 °C

figure 21.   **FWD**

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

$I_{RM} = f(R_{gon})$
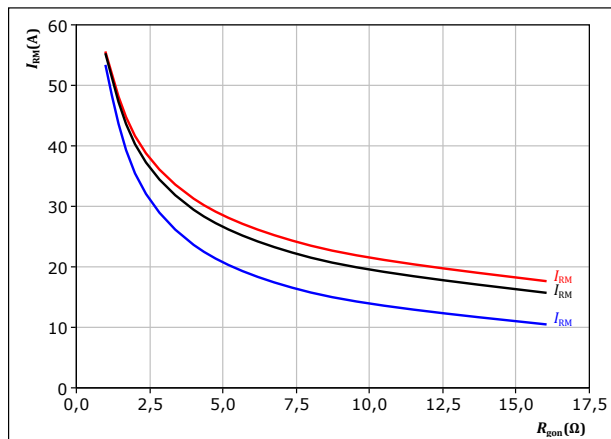
With an inductive load at

$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$I_C =$	40	A

T_j: 25 °C / 125 °C / 150 °C

Inverter Switching Characteristics

figure 22. **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)
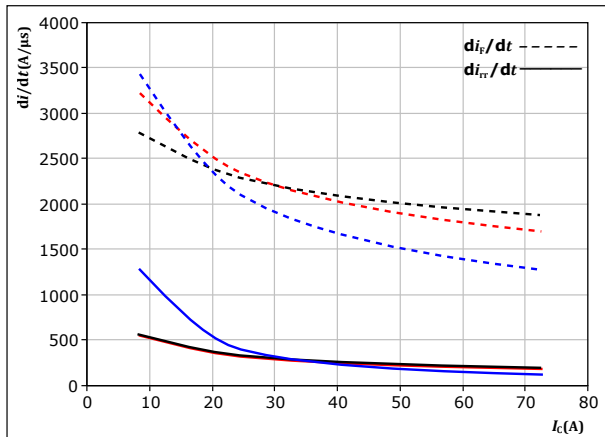
With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: — 25 °C — 125 °C — 150 °C

figure 23. **FWD**

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})
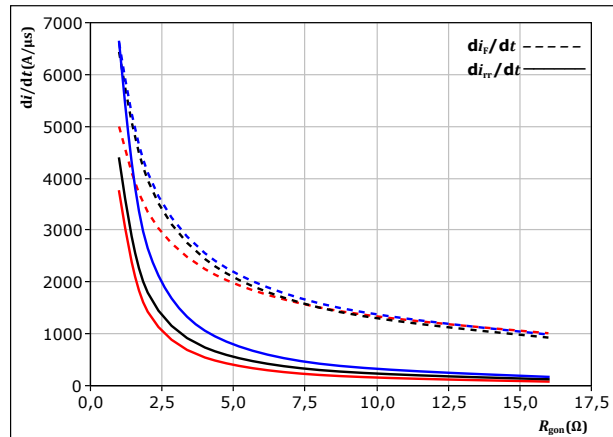
With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	40	A

T_j: — 25 °C — 125 °C — 150 °C

figure 24. **IGBT**

Reverse bias safe operating area
I_C = f(V_{CE})

At
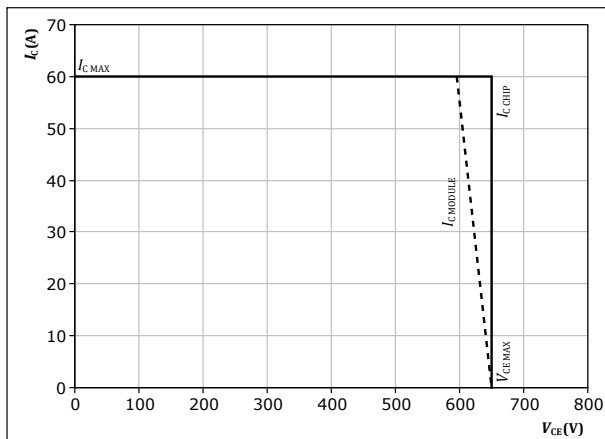
T_j =	150	°C
R_{gon} =	4	Ω
R_{goff} =	4	Ω

Inverter Switching Definitions

figure 25.   **IGBT**

Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{tEoff} = integrating time for E_{off})
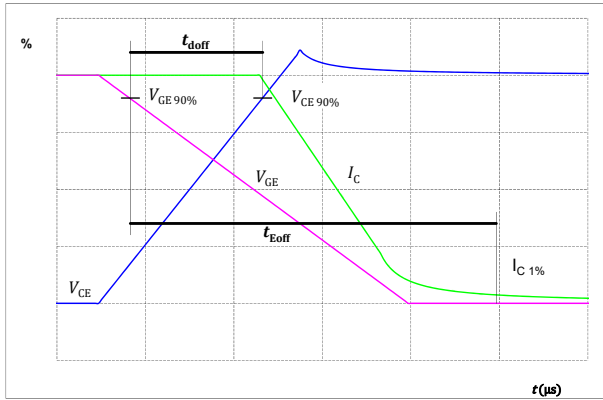
figure 26.   **IGBT**

Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})
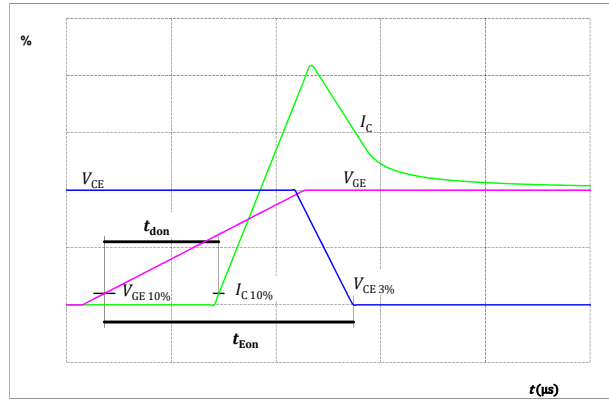
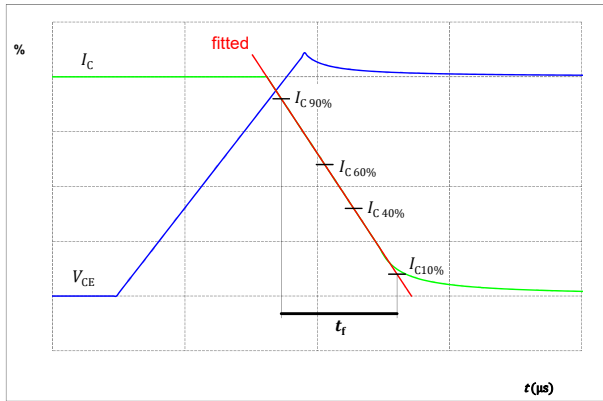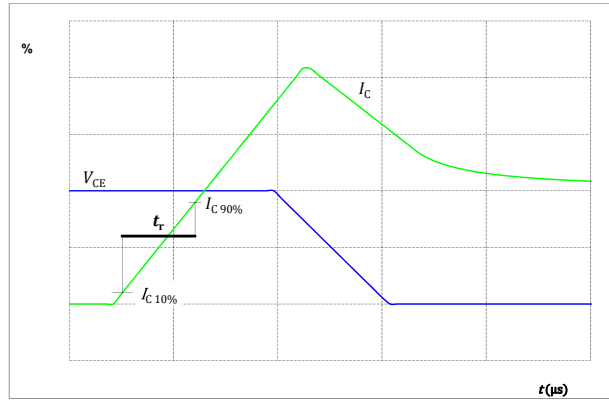**figure 27.**   **IGBT**

Turn-off Switching Waveforms & definition of t_f

figure 28.   **IGBT**

Turn-on Switching Waveforms & definition of t_r

Inverter Switching Definitions

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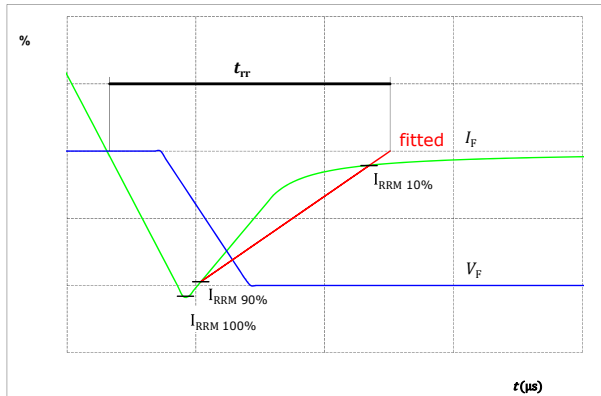
Turn-on Switching Waveforms & definition of t_{Qr} **(** t_{Qr} **= integrating time for** Q_r **)**
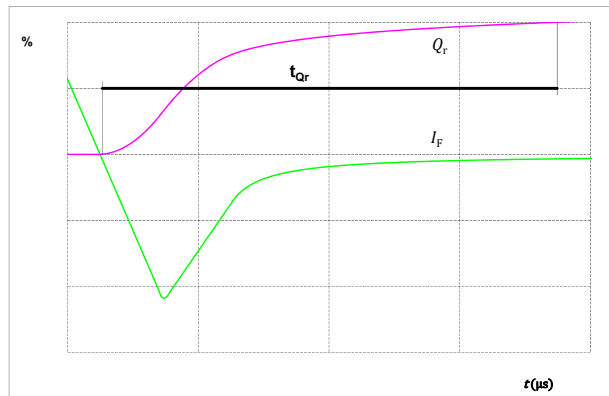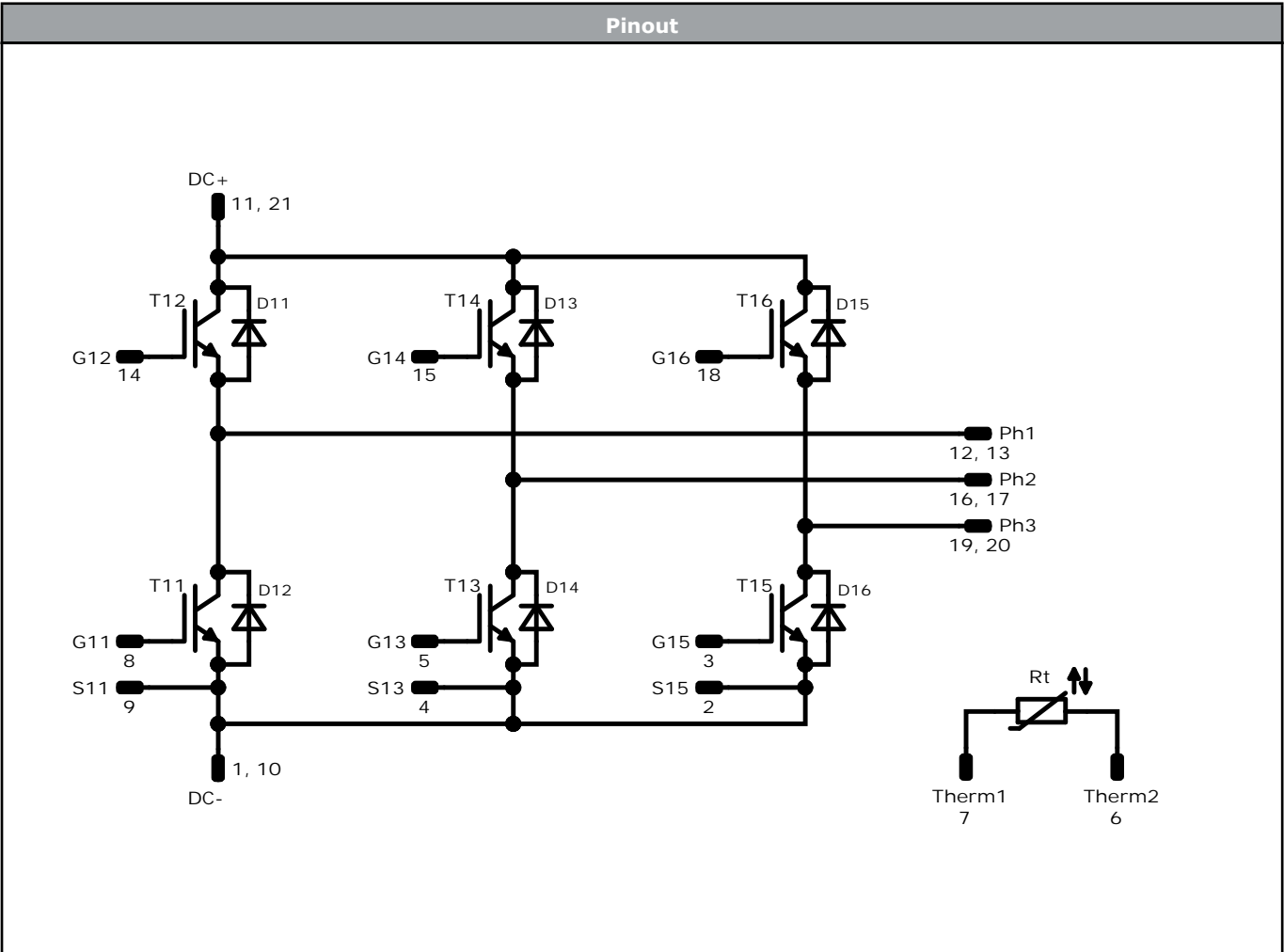
Vincotech

Ordering Code	
Version	**Ordering Code**
Without thermal paste	10-FZ076PA030I7-P864F08
With thermal paste (5,2 W/mK, PTM6000HV)	10-FZ076PA030I7-P864F08-/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**	
		TTTTTTTVV	LLLLL	SSSS	WWYY	

Outline

Pin table [mm]			
Pin	X	Y	Function
1	33,3	0	DC-
2	30,7	0	S15
3	27,9	0	G15
4	23,85	0	S13
5	21,05	0	G13
6	15,95	0	Therm2
7	9,6	0	Therm1
8	5,4	0	G11
9	2,6	0	S11
10	0	0	DC-
11	0	11,15	DC+
12	0	22,3	Ph1
13	2,6	22,3	Ph1
14	5,5	22,3	G12
15	13,1	22,3	G14
16	15,9	22,3	Ph2
17	19,4	22,3	Ph2
18	27,7	22,3	G16
19	30,7	22,3	Ph3
20	33,3	22,3	Ph3
21	33,3	11,15	DC+

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, T12, T13, T14, T15, T16	IGBT	650 V	30 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	650 V	30 A	Inverter Diode	
Rt	Thermistor			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.

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.	®UL

Document No.:	**Date:**	**Modification:**	**Pages**
10-FZ076PA030I7-P864F08-D1-14	20 Feb. 2026	Initial Release	