



<i>flow</i> PACK 2	1200 V / 75 A
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #ccc; margin: 0;"><b>Features</b></p> <ul style="list-style-type: none"> <li>IGBT M7 technology with low <math>V_{CEsat}</math> and improved EMC behavior</li> <li>Open emitter configuration</li> <li>Compact and low inductive design</li> <li>Built-in NTC</li> </ul> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #ccc; margin: 0;"><b>Target applications</b></p> <ul style="list-style-type: none"> <li>Industrial Drives</li> <li>Power Supply</li> <li>UPS</li> </ul> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #ccc; margin: 0;"><b>Types</b></p> <ul style="list-style-type: none"> <li>30-P2126PA075M7-L288F79Y</li> <li>30-F2126PA075M7-L288F79</li> </ul> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #ccc; margin: 0;"><i>flow</i> 2 17 mm housing</p> <div style="display: flex; justify-content: space-around; align-items: center;"> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>Press-fit pins</span> <span>Solder pins</span> </div> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #ccc; margin: 0;"><b>Schematic</b></p> </div>

## Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
<b>Inverter Switch</b>				
Collector-emitter voltage	$V_{CES}$		1200	V
Collector current	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	93	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	150	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	191	W
Gate-emitter voltage	$V_{GES}$		±20	V
Maximum junction temperature	$T_{jmax}$		175	°C



## Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
<b>Inverter Diode</b>				
Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Continuous (direct) forward current	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	89	A
Repetitive peak forward current	$I_{FRM}$		200	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	165	W
Maximum junction temperature	$T_{jmax}$		175	°C

## Module Properties

### Thermal Properties

Storage temperature	$T_{stg}$		-40...+125	°C
Operation temperature under switching condition	$T_{top}$		-40...( $T_{jmax} - 25$ )	°C

### Isolation Properties

Isolation voltage	$V_{isol}$	DC Test Voltage $t_p = 2\text{ s}$	4000	V
Creepage distance			min. 12,7	mm
Clearance			min. 12,7	mm
Comparative Tracking Index	CTI		> 200	



## Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		$V_{GS}$ [V]	$V_{GE}$ [V]	$V_{DS}$ [V]	$I_D$ [A]	$T_j$ [°C]	Min	Typ	Max	

### Inverter Switch

#### Static

Parameter	Symbol	$V_{GE} = V_{CE}$	$V_{GS}$ [V]	$V_{CE}$ [V]	$I_D$ [A]	$T_j$ [°C]	Min	Typ	Max	Unit
Gate-emitter threshold voltage	$V_{GE(th)}$				0,0075	25	5,4	6	6,6	V
Collector-emitter saturation voltage	$V_{CESat}$		15		75	25 125 150		1,55 1,70 1,75	2,05	V
Collector-emitter cut-off current	$I_{CES}$		0	1200		25			110	μA
Gate-emitter leakage current	$I_{GES}$		20	0		25			500	nA
Internal gate resistance	$r_g$							4		Ω
Input capacitance	$C_{ies}$							16000		pF
Output capacitance	$C_{oes}$		0	10		25		480		
Reverse transfer capacitance	$C_{res}$							190		
Gate charge	$Q_g$		15	600	75	25		490		nC

#### Thermal

Parameter	Symbol	Material	$\lambda$	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material	$\lambda = 3,4$ W/mK	K/W

#### Dynamic

Parameter	Symbol	$R_{goff}$	$R_{gon}$	$I_D$ [A]	$T_j$ [°C]	25	125	150	Unit	
Turn-on delay time	$t_{d(on)}$	$R_{goff} = 2 \Omega$ $R_{gon} = 2 \Omega$	$\pm 15$	600	75	197	208	212	ns	
Rise time	$t_r$					29	38	39		
Turn-off delay time	$t_{d(off)}$					203	233	242		
Fall time	$t_f$					86	113	111		
Turn-on energy (per pulse)	$E_{on}$					5,559	7,819	8,496		mWs
Turn-off energy (per pulse)	$E_{off}$					5,076	6,804	7,285		



## Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		$V_{GE}$ [V]	$V_{CE}$ [V]	$I_C$ [A]	$T_j$ [°C]	Min	Typ	Max		

### Inverter Diode

#### Static

Parameter	Symbol	Conditions	Value	Unit
Forward voltage	$V_F$	$V_{GE}$ [V] $V_{GS}$ [V]	100 25 125 150	V

#### Thermal

Parameter	Symbol	Conditions	Value	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK	0,58	K/W

#### Dynamic

Parameter	Symbol	Conditions	Value	Unit	
Peak recovery current	$I_{RRM}$	$\pm 15$ 600 75	25 125 150	A	
Reverse recovery time	$t_{rr}$		25 125 150	278 432 459	ns
Recovered charge	$Q_r$		25 125 150	8,539 13,394 15,308	$\mu$ C
Reverse recovered energy	$E_{rec}$		25 125 150	3,195 5,193 5,995	mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$		25 125 150	802 614 544	A/ $\mu$ s

### Thermistor

Parameter	Symbol	Conditions	Value	Unit
Rated resistance	$R$		25	k $\Omega$
Deviation of $R_{100}$	$\Delta_{R/R}$	$R_{100} = 1486 \Omega$	100	%
Power dissipation	$P$		25	mW
Power dissipation constant			25	mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 3\%$	25	K
B-value	$B_{(25/100)}$	Tol. $\pm 3\%$	25	K
Vincotech NTC Reference				B

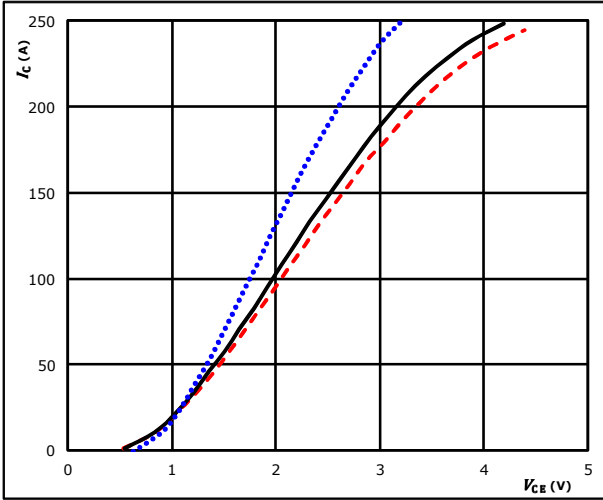


## Inverter Switch Characteristics

**figure 1.** IGBT

Typical output characteristics

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

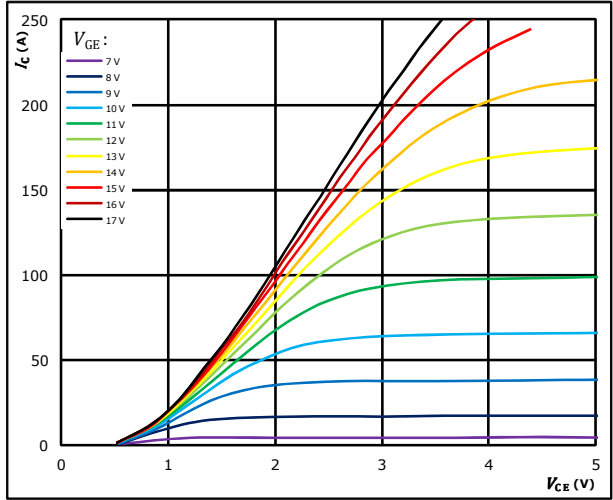


$t_p = 250 \mu\text{s}$   $V_{GE} = 15 \text{ V}$   $T_j: 25 \text{ }^\circ\text{C}$  (dotted blue)  
 $125 \text{ }^\circ\text{C}$  (solid black)  
 $150 \text{ }^\circ\text{C}$  (dashed red)

**figure 2.** IGBT

Typical output characteristics

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

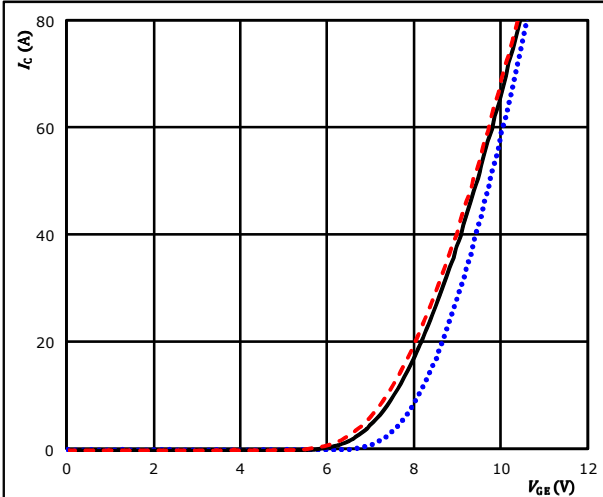


$t_p = 250 \mu\text{s}$   $T_j = 150 \text{ }^\circ\text{C}$   
 $V_{GE}$  from 7 V to 17 V in steps of 1 V

**figure 3.** IGBT

Typical transfer characteristics

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

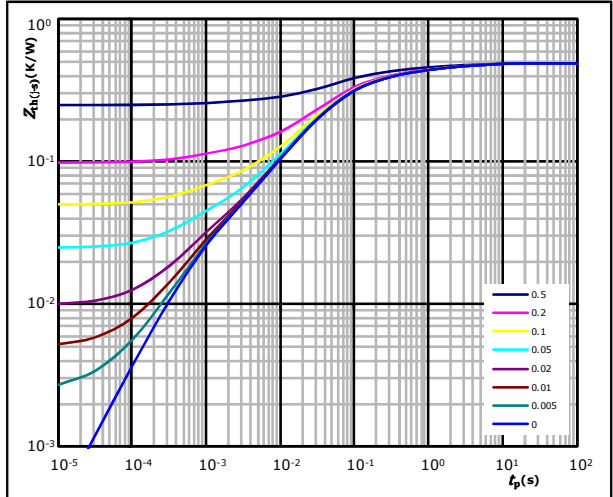


$t_p = 100 \mu\text{s}$   $V_{CE} = 10 \text{ V}$   $T_j: 25 \text{ }^\circ\text{C}$  (dotted blue)  
 $125 \text{ }^\circ\text{C}$  (solid black)  
 $150 \text{ }^\circ\text{C}$  (dashed red)

**figure 4.** IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$   
 $R_{th(j-s)} = 0,50 \text{ K/W}$

IGBT thermal model values

$R$ (K/W)	$\tau$ (s)
4,16E-02	4,25E+00
5,55E-02	8,53E-01
1,25E-01	1,69E-01
2,12E-01	3,95E-02
4,29E-02	8,08E-03
2,08E-02	7,43E-04

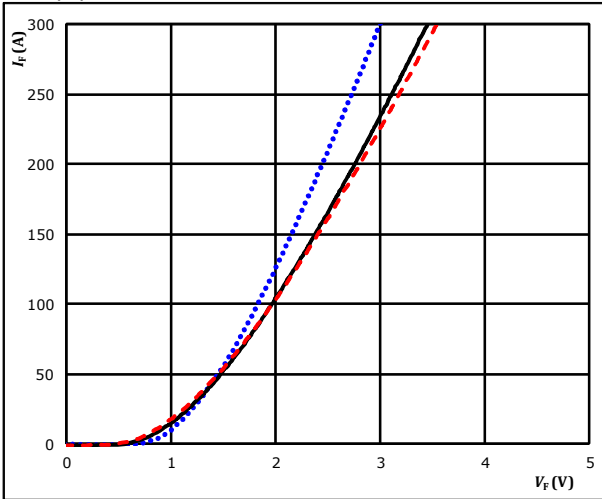


## Inverter Diode Characteristics

**figure 1.** FWD

Typical forward characteristics

$$I_F = f(V_F)$$



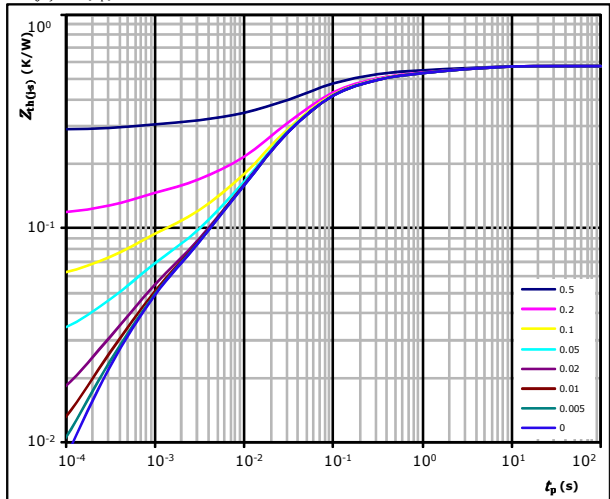
$t_p = 250 \mu s$

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

**figure 2.** FWD

Transient thermal impedance as a function of pulse width

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



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

$$R_{th(j-s)} = 0,58 \text{ K/W}$$

FWD thermal model values

$R$ (K/W)	$\tau$ (s)
4,89E-02	3,41E+00
7,07E-02	4,06E-01
2,02E-01	7,46E-02
1,90E-01	2,27E-02
3,24E-02	3,47E-03
3,35E-02	4,78E-04

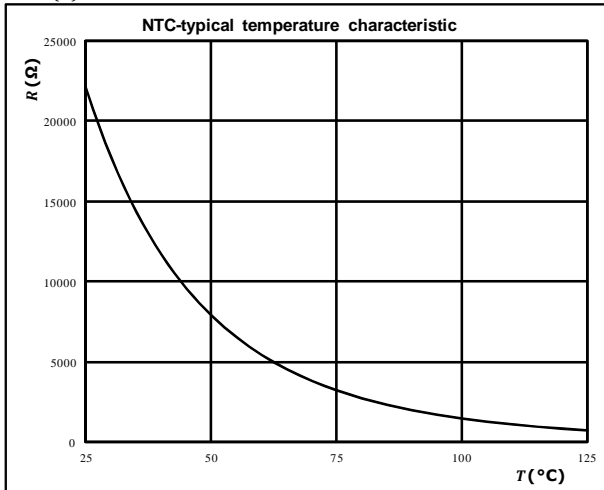


## Thermistor Characteristics

figure 1. Thermistor

Typical NTC characteristic  
as a function of temperature

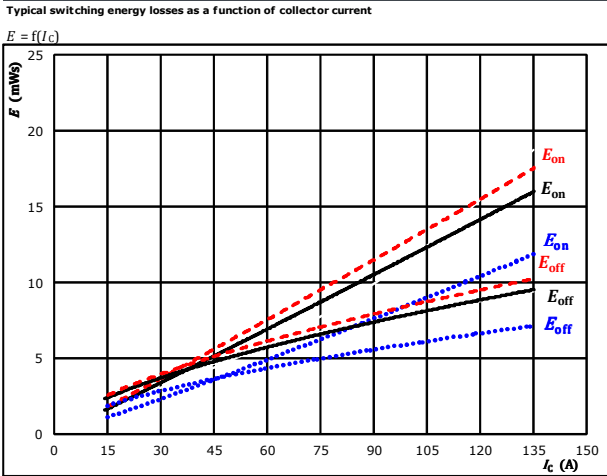
$$R = f(T)$$





## Switching Characteristics

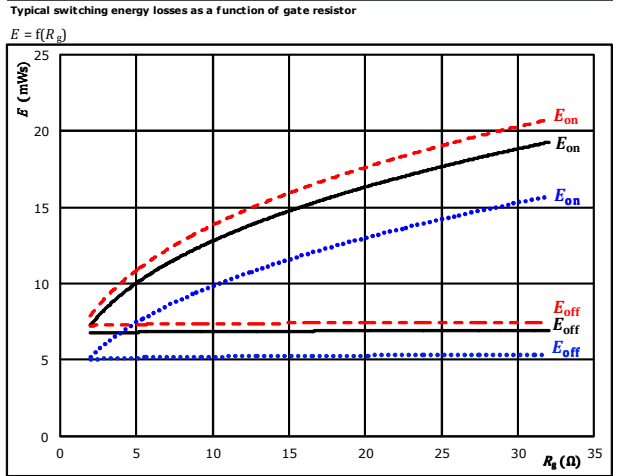
**figure 1.** IGBT



With an inductive load at

$V_{CE} = 600$ V	$T_j: 25$ °C	.....
$V_{GE} = \pm 15$ V	$125$ °C	————
$R_{g\text{on}} = 2$ Ω	$150$ °C	- - - -
$R_{g\text{off}} = 2$ Ω		

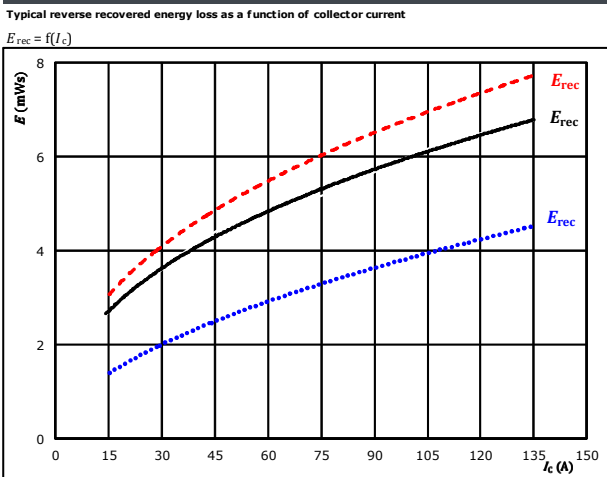
**figure 2.** IGBT



With an inductive load at

$V_{CE} = 600$ V	$T_j: 25$ °C	.....
$V_{GE} = \pm 15$ V	$125$ °C	————
$I_C = 75$ A	$150$ °C	- - - -

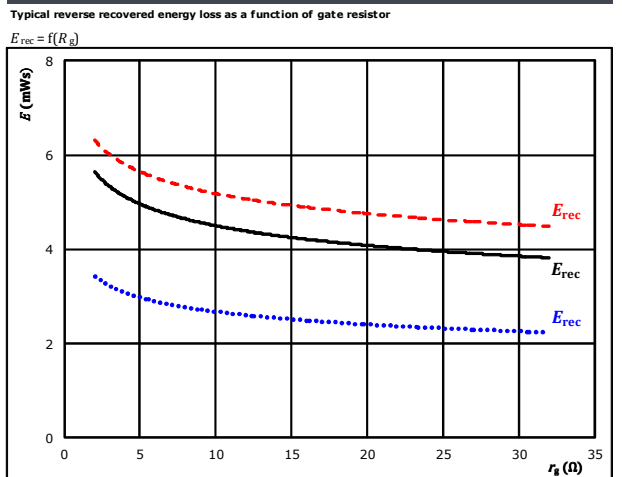
**figure 3.** FWD



With an inductive load at

$V_{CE} = 600$ V	$T_j: 25$ °C	.....
$V_{GE} = \pm 15$ V	$125$ °C	————
$R_{g\text{on}} = 2$ Ω	$150$ °C	- - - -

**figure 4.** FWD



With an inductive load at

$V_{CE} = 600$ V	$T_j: 25$ °C	.....
$V_{GE} = \pm 15$ V	$125$ °C	————
$I_C = 75$ A	$150$ °C	- - - -





Vincotech

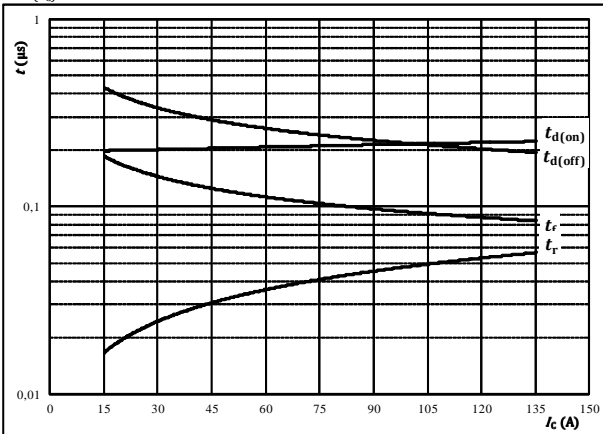
**30-P2126PA075M7-L288F79Y**  
**30-F2126PA075M7-L288F79**  
 datasheet

## Switching Characteristics

**figure 5.** IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



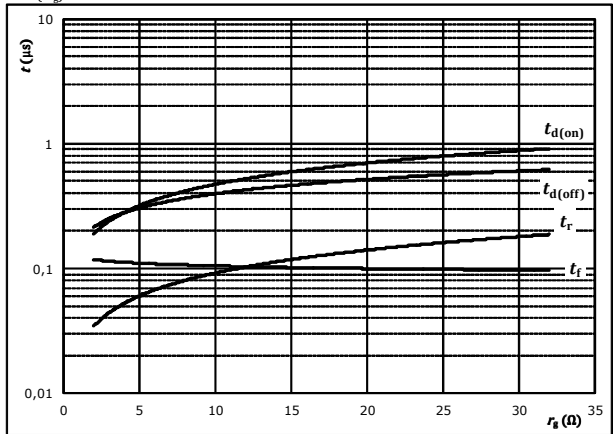
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{g(on)} =$	2	Ω
$R_{g(off)} =$	2	Ω

**figure 6.** IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



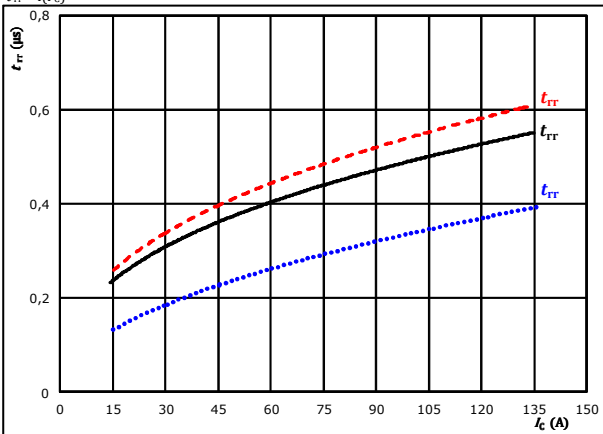
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$I_C =$	75	A

**figure 7.** FWD

Typical reverse recovery time as a function of collector current

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

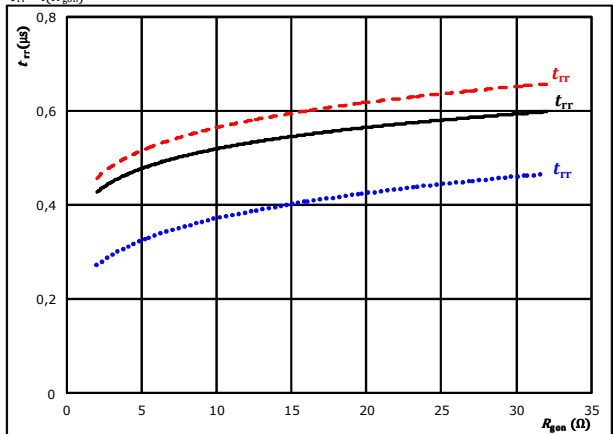


At	$V_{CE} =$	600	V	$T_j:$	25 °C	.....
	$V_{GE} =$	±15	V		125 °C	————
	$R_{g(on)} =$	2	Ω		150 °C	-----

**figure 8.** FWD

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

$$t_{rr} = f(R_{g(on)})$$



At	$V_{CE} =$	600	V	$T_j:$	25 °C	.....
	$V_{GE} =$	±15	V		125 °C	————
	$I_C =$	75	A		150 °C	-----

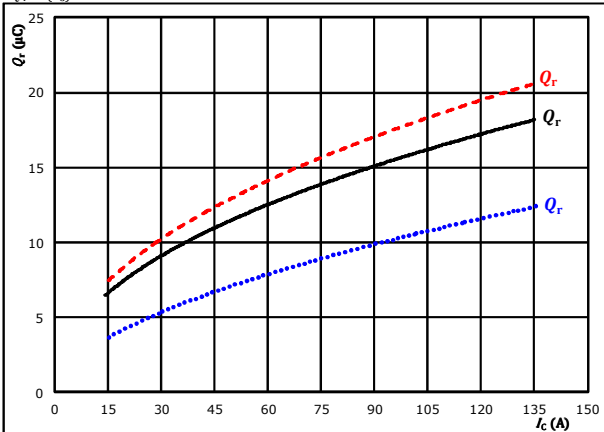


## Switching Characteristics

**figure 9.** FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$

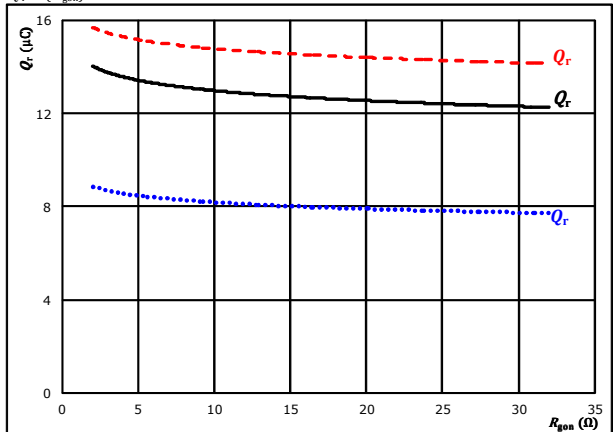


At  $V_{CE} = 600$  V  $T_j = 25$  °C (dotted blue)  
 $V_{GE} = \pm 15$  V  $T_j = 125$  °C (solid black)  
 $R_{gpn} = 2$  Ω  $T_j = 150$  °C (dashed red)

**figure 10.** FWD

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

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

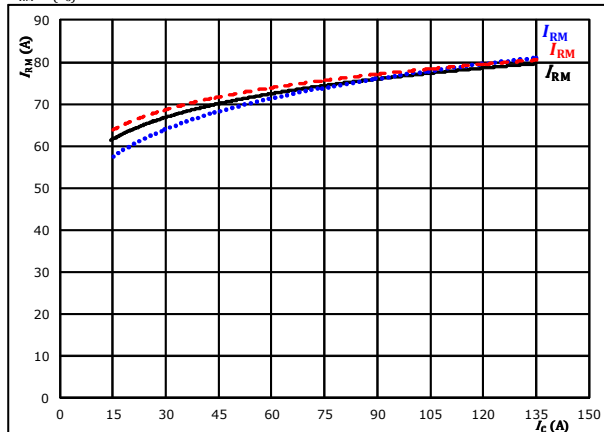


At  $V_{CE} = 600$  V  $T_j = 25$  °C (dotted blue)  
 $V_{GE} = \pm 15$  V  $T_j = 125$  °C (solid black)  
 $I_c = 75$  A  $T_j = 150$  °C (dashed red)

**figure 11.** FWD

Typical peak reverse recovery current as a function of collector current

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

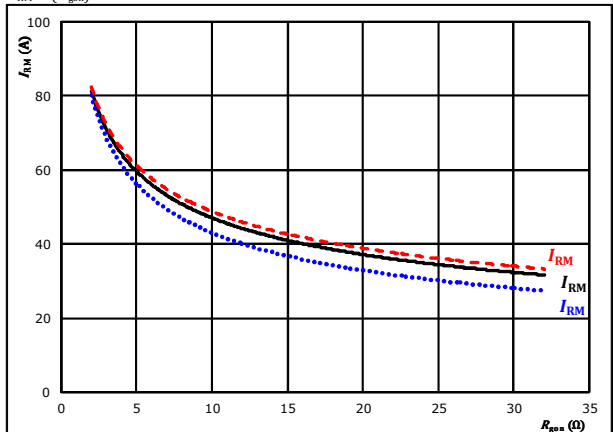


At  $V_{CE} = 600$  V  $T_j = 25$  °C (dotted blue)  
 $V_{GE} = \pm 15$  V  $T_j = 125$  °C (solid black)  
 $R_{gpn} = 2$  Ω  $T_j = 150$  °C (dashed red)

**figure 12.** FWD

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

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



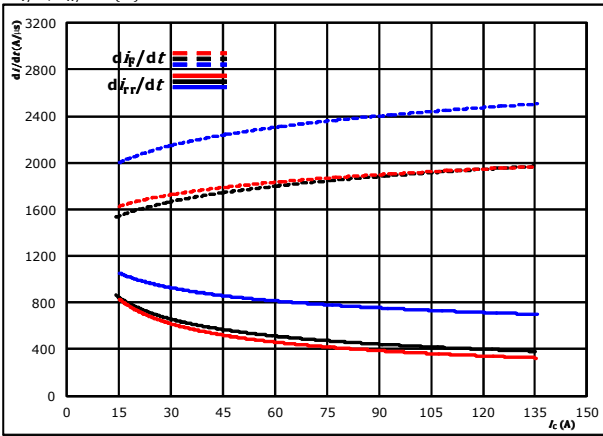
At  $V_{CE} = 600$  V  $T_j = 25$  °C (dotted blue)  
 $V_{GE} = \pm 15$  V  $T_j = 125$  °C (solid black)  
 $I_c = 75$  A  $T_j = 150$  °C (dashed red)



### Switching Characteristics

**figure 13.** FWD

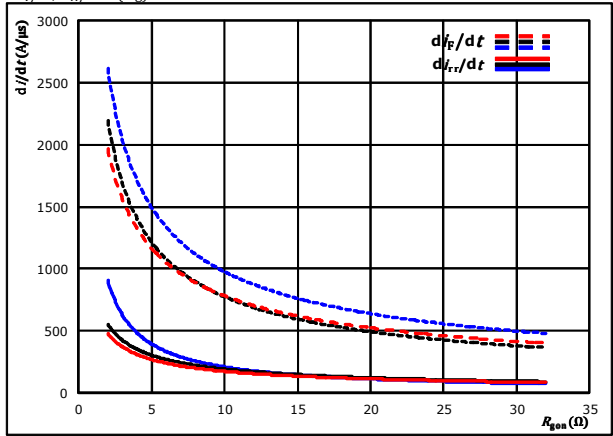
Typical rate of fall of forward and reverse recovery current as a function of collector current  
 $di_f/dt, di_{rr}/dt = f(I_c)$



At  $V_{CE} = 600$  V  $T_j = 25$  °C .....  
 $V_{GE} = \pm 15$  V  $T_j = 125$  °C ———  
 $R_{g(on)} = 2$  Ω  $T_j = 150$  °C - - - -

**figure 14.** FWD

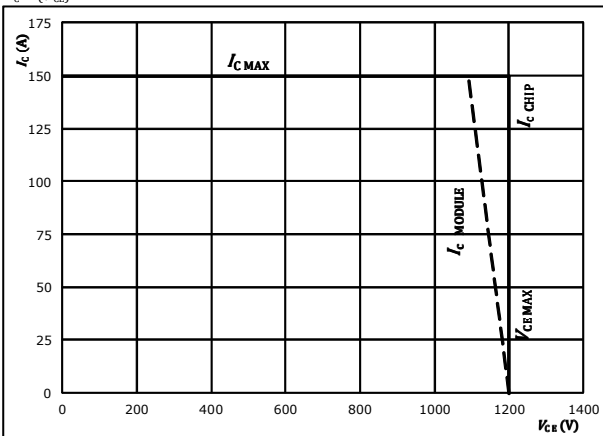
Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor  
 $di_f/dt, di_{rr}/dt = f(R_{g(on)})$



At  $V_{CE} = 600$  V  $T_j = 25$  °C .....  
 $V_{GE} = \pm 15$  V  $T_j = 125$  °C ———  
 $I_c = 75$  A  $T_j = 150$  °C - - - -

**figure 15.** IGBT

Reverse bias safe operating area  
 $I_c = f(V_{CB})$



At  $T_j = 175$  °C  
 $R_{g(on)} = 2$  Ω  
 $R_{g(off)} = 2$  Ω

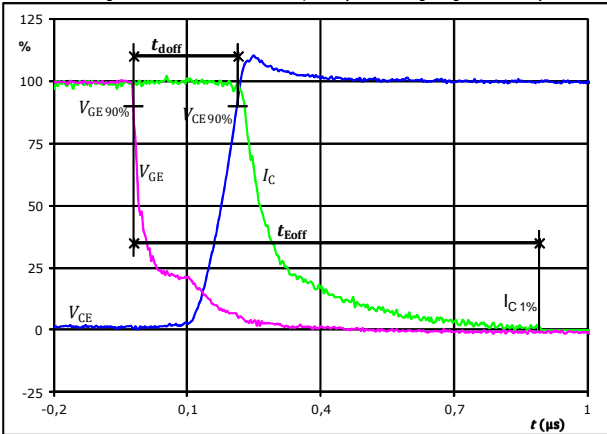


## Switching Definitions

General conditions		
$T_j$	=	125 °C
$R_{gon}$	=	2 $\Omega$
$R_{goff}$	=	2 $\Omega$

figure 1. IGBT

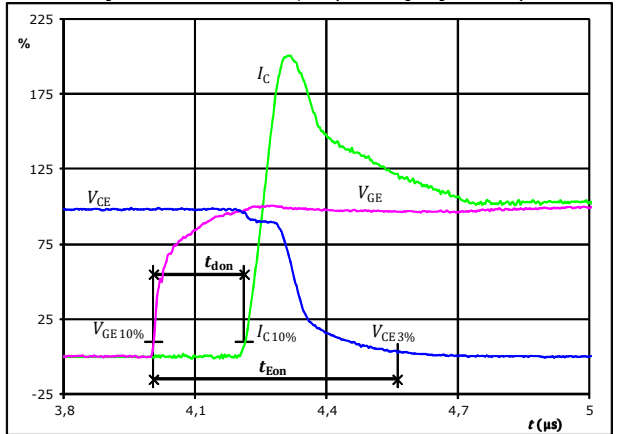
Turn-off Switching Waveforms & definition of  $t_{doff}$ ,  $t_{Eoff}$  ( $t_{Eoff}$  = integrating time for  $E_{off}$ )



$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	600	V
$I_C(100\%) =$	76	A
$t_{doff} =$	0,233	$\mu s$
$t_{Eoff} =$	0,913	$\mu s$

figure 2. IGBT

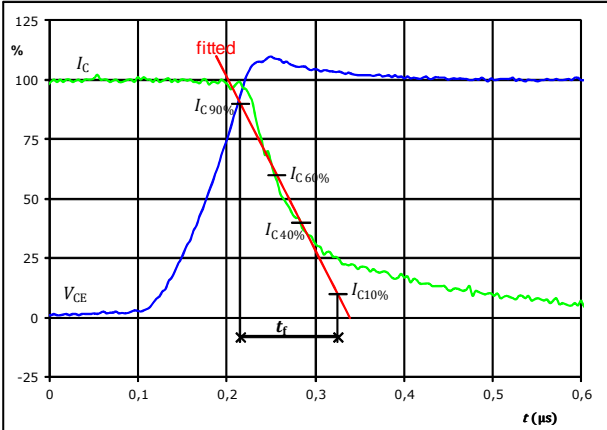
Turn-on Switching Waveforms & definition of  $t_{don}$ ,  $t_{Eon}$  ( $t_{Eon}$  = integrating time for  $E_{on}$ )



$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	600	V
$I_C(100\%) =$	76	A
$t_{don} =$	0,208	$\mu s$
$t_{Eon} =$	0,556	$\mu s$

figure 3. IGBT

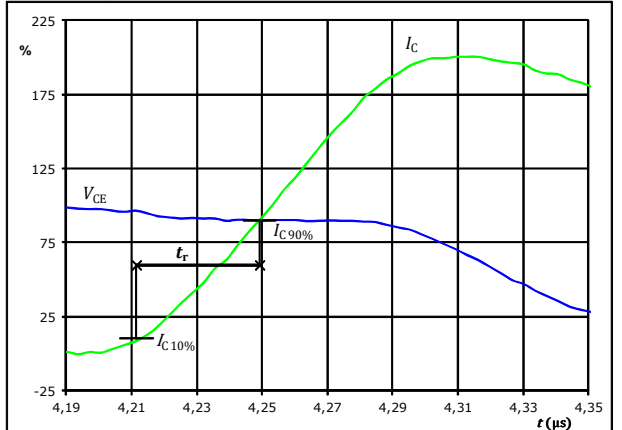
Turn-off Switching Waveforms & definition of  $t_f$



$V_C(100\%) =$	600	V
$I_C(100\%) =$	76	A
$t_f =$	0,113	$\mu s$

figure 4. IGBT

Turn-on Switching Waveforms & definition of  $t_r$



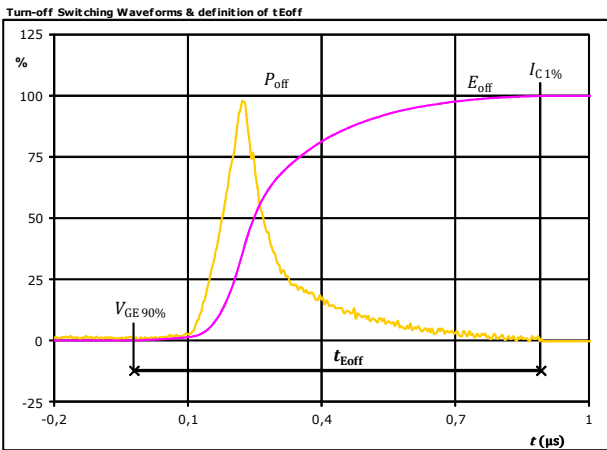
$V_C(100\%) =$	600	V
$I_C(100\%) =$	76	A
$t_r =$	0,038	$\mu s$



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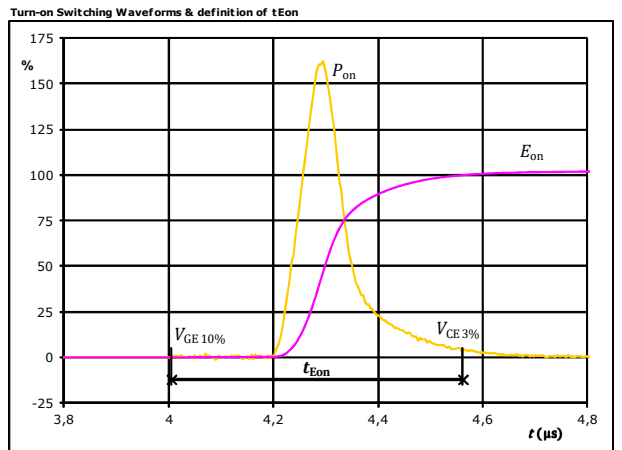
## Switching Characteristics

**figure 5.** IGBT



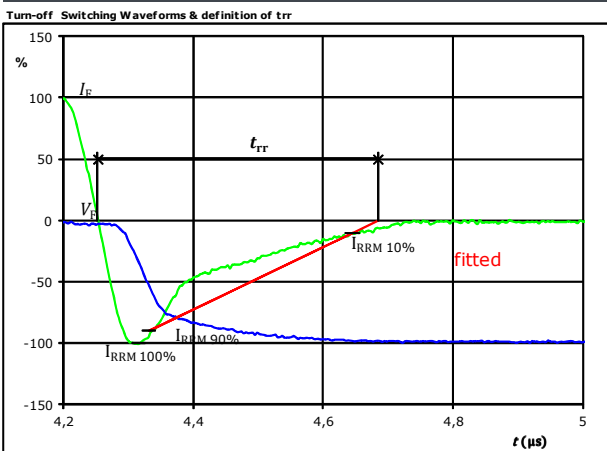
$P_{off}(100\%) = 45,36$  kW  
 $E_{off}(100\%) = 6,80$  mJ  
 $t_{Eoff} = 0,91$  μs

**figure 6.** IGBT



$P_{on}(100\%) = 45,36$  kW  
 $E_{on}(100\%) = 7,82$  mJ  
 $t_{Eon} = 0,56$  μs

**figure 7.** FWD



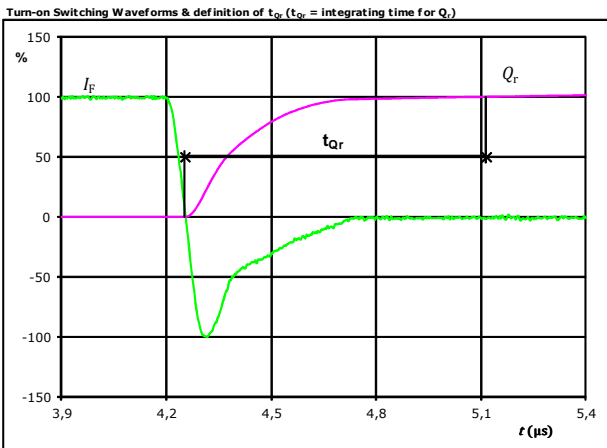
$V_F(100\%) = 600$  V  
 $I_F(100\%) = 76$  A  
 $I_{RRM}(100\%) = -77$  A  
 $t_{rr} = 0,432$  μs



Vincotech

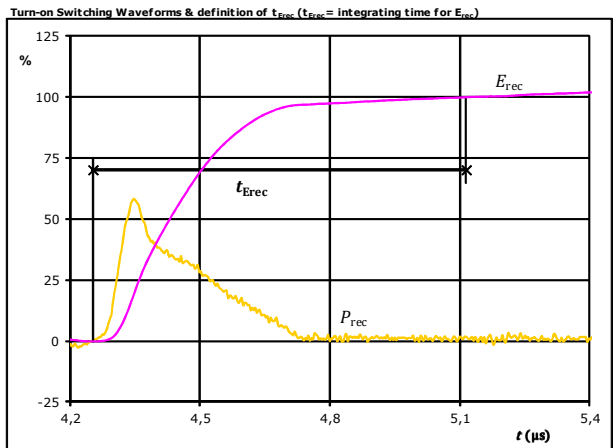
## Switching Characteristics

**figure 8.** FWD



$I_F$ (100%) =	76	A
$Q_r$ (100%) =	13,39	$\mu\text{C}$
$t_{Qr}$ =	0,86	$\mu\text{s}$

**figure 9.** FWD



$P_{rec}$ (100%) =	45,36	kW
$E_{rec}$ (100%) =	5,19	mJ
$t_{Erec}$ =	0,86	$\mu\text{s}$



**30-P2126PA075M7-L288F79Y**  
**30-F2126PA075M7-L288F79**  
 datasheet

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Ordering Code & Marking								
Version			Ordering Code					
without thermal paste 17mm housing Press-fit pins			30-P2126PA075M7-L288F79Y					
with thermal paste 17mm housing Press-fit pins			30-P2126PA075M7-L288F79Y-/3/					
without thermal paste 17mm housing Solder pins			30-F2126PA075M7-L288F79					
with thermal paste 17mm housing Solder pins			30-F2126PA075M7-L288F79-/3/					
NN-NNNNNNNNNNNN TTTTWW WWYY UL VIN LLLLL SSSS			<b>Text</b>	<b>Name</b>	<b>Date code</b>	<b>UL &amp; VIN</b>	<b>Lot</b>	<b>Serial</b>
				N-NNNNNNNNNNNN-TTTTWW	WWYY	UL VIN	LLLLL	SSSS
			<b>Datamatrix</b>	<b>Type&amp;Ver</b>	<b>Lot number</b>	<b>Serial</b>	<b>Date code</b>	
				TTTTTWW	LLLLL	SSSS	WWYY	

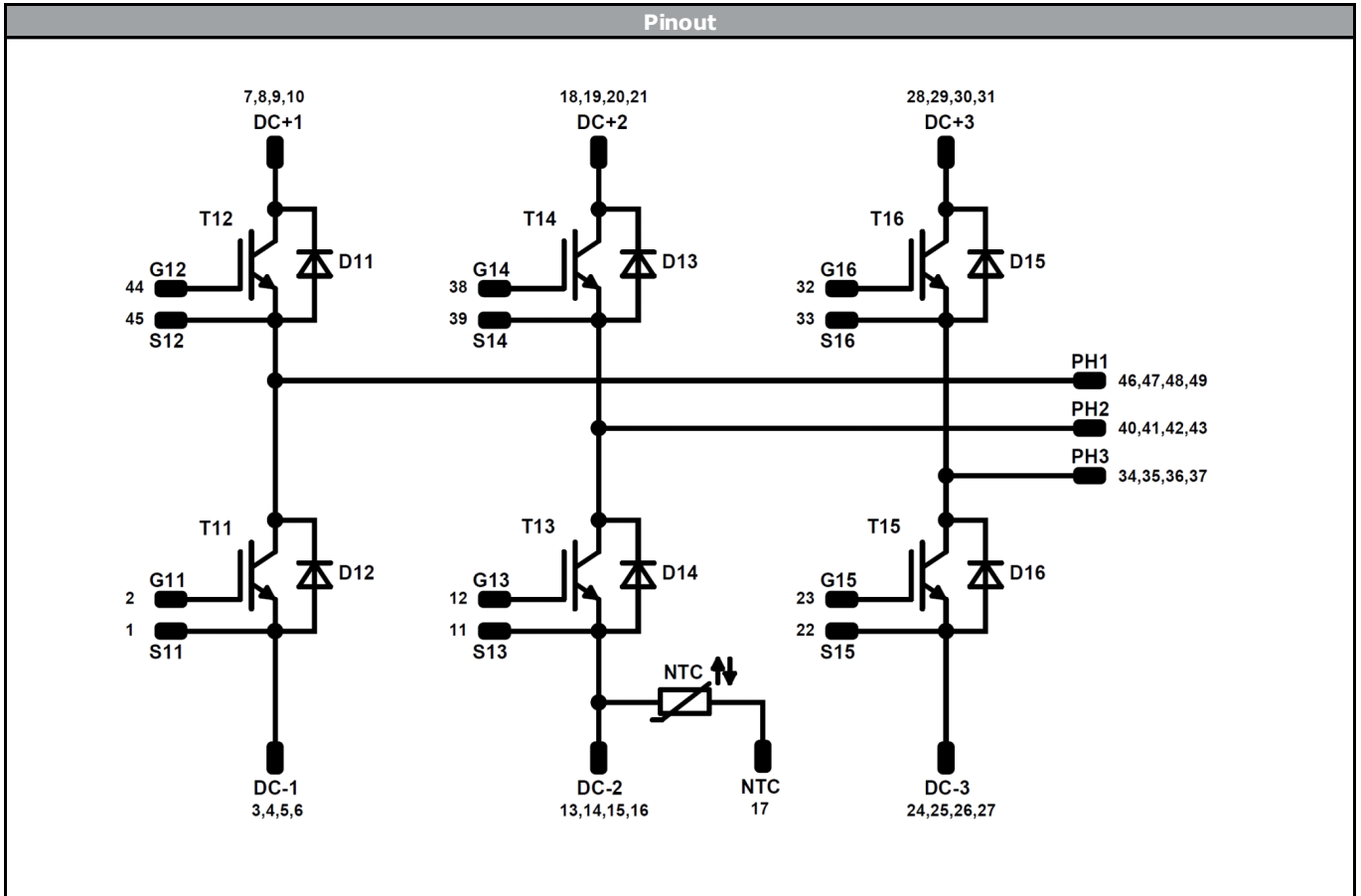
Pin table [mm]				Outline	
Pin	X	Y	Function		
1	0,9	0	S11		
2	0,9	3	G11		
3	3,9	0	DC-1		
4	3,9	2,7	DC-1		
5	3,9	5,4	DC-1		
6	6,6	0	DC-1		
7	15,2	0	DC+1		
8	15,2	2,7	DC+1		
9	17,9	0	DC+1		
10	17,9	2,7	DC+1		
11	26,2	0	S13		
12	26,2	3	G13		
13	29,2	0	DC-2		
14	29,2	2,7	DC-2		
15	29,2	5,4	DC-2		
16	31,9	0	DC-2		
17	32,2	4,05	NTC		
18	40,5	0	DC+2		
19	40,5	2,7	DC+2		
20	43,2	0	DC+2		
21	43,2	2,7	DC+2		
22	51,5	0	S15		
23	51,5	3	G15		
24	54,5	0	DC-3		
25	54,5	2,7	DC-3		
26	54,5	5,4	DC-3		
27	57,2	0	DC-3		
28	65,8	0	DC+3		
29	65,8	2,7	DC+3		
30	68,5	0	DC+3		
31	68,5	2,7	DC+3		
32	64,7	36	G16		
33	61,7	36	S16		
34	58,7	36	PH3		
35	56	36	PH3		
36	53,3	36	PH3		
37	50,6	36	PH3		
38	39,4	36	G14		
39	36,4	36	S14		
40	33,4	36	PH2		
41	30,7	36	PH2		
42	28	36	PH2		
43	25,3	36	PH2		
44	14,1	36	G12		
45	11,1	36	S12		
46	8,1	36	PH1		
47	5,4	36	PH1		
48	2,7	36	PH1		
49	0	36	PH1		

center of press-fit pinhead  
for connection parameter see the handling instruction

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



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<b>Identification</b>					
<b>ID</b>	<b>Component</b>	<b>Voltage</b>	<b>Current</b>	<b>Function</b>	<b>Comment</b>
T11 , T12 , T13 , T14 , T15 , T16	IGBT	1200 V	75 A	Inverter Switch	
D11 , D12 , D13 , D14 , D15 , D16	FWD	1200 V	100 A	Inverter Diode	
NTC	Thermistor			Thermistor	






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Packaging instruction			
Standard packaging quantity (SPQ) 36	>SPQ	Standard	<SPQ Sample

Handling instruction
Handling instructions for <i>flow 2</i> packages see vincotech.com website.

Package data
Package data for <i>flow 2</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
30-x2126PA075M7-L288F79x-D2-14	07 Mar. 2019	flow2 frame modification Added solder pin variant	1,15

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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.

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