



### flowPACK 2

1200 V / 100 A

#### Topology features

- 3xHalf Bridge
- Open Emitter configuration
- Kelvin Emitter for improved switching performance
- Temperature sensor

#### Component features

- Easy paralleling
- High speed switching
- Low switching losses

#### Housing features

- Base isolation: Al<sub>2</sub>O<sub>3</sub>
- Convex shaped baseplate for superior thermal contact
- Cu baseplate
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

#### Target applications

- Elevator Drives
- Industrial Drives
- Servo Drives

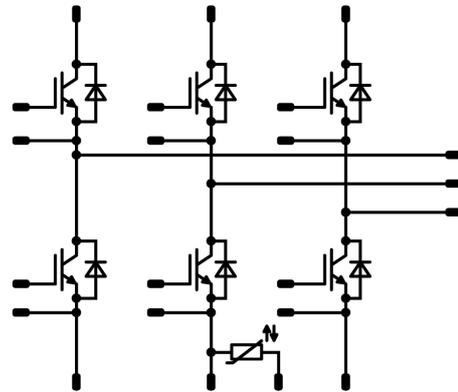
#### Types

- 30-P2126PA100SH-L289F49Y

#### flow 2 17 mm housing



#### Schematic





Vincotech

**30-P2126PA100SH-L289F49Y**  
datasheet

## Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
<b>Inverter Switch</b>				
Collector-emitter voltage	$V_{CES}$		1200	V
Collector current (DC current)	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	105	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	300	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	269	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Short circuit ratings	$t_{SC}$	$V_{GE} = 15\text{ V}$ , $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$	10	$\mu\text{s}$
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

## Inverter Diode

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	77	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	550	A
Surge current capability	$I^2t$		1513	$\text{A}^2\text{s}$
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	161	W
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

## Module Properties

### Thermal Properties

Storage temperature	$T_{stg}$		-40...+125	$^{\circ}\text{C}$
Operation temperature under switching condition	$T_{jop}$		-40...+( $T_{jmax} - 25$ )	$^{\circ}\text{C}$

### 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		$\geq 200$	

\*100 % tested in production



### 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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0034	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		100	25 125 150	1,78	2,05 2,37	2,42 <sup>(1)</sup>	V
Collector-emitter cut-off current	$I_{CES}$		0	1200		25			2	μA
Gate-emitter leakage current	$I_{GES}$		20	0		25			240	nA
Internal gate resistance	$r_g$							2		Ω
Input capacitance	$C_{ies}$	$f = 1 \text{ Mhz}$	0	25		25		5540		pF
Reverse transfer capacitance	$C_{res}$							320		pF
Gate charge	$Q_g$		±15		0	25		760		nC

##### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						0,35		K/W
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##### Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 2 \Omega$ $R_{goff} = 2 \Omega$	±15	600	100	25		63,84		ns
Rise time	$t_r$					125		67,56	ns	
						150		68,11		
						25		19,11		
Turn-off delay time	$t_{d(off)}$					125		21,51	ns	
						150		23,11		
						25		154,1		
Fall time	$t_f$					125		215,62	ns	
						150		229,88		
						25		39,97		
Turn-on energy (per pulse)	$E_{on}$					$Q_{tFWD} = 3,77 \mu\text{C}$			mWs	
						$Q_{tFWD} = 8,88 \mu\text{C}$		3		
		$Q_{tFWD} = 10,46 \mu\text{C}$		4,46						
Turn-off energy (per pulse)	$E_{off}$				mWs					
				5,23						
				4,37						
				7,04						
				7,98						



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**30-P2126PA100SH-L289F49Y**  
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		
<b>Inverter Diode</b>										
<b>Static</b>										
Forward voltage	$V_F$				100	25 125 150		2,3 2,38 2,31	2,52 <sup>(1)</sup> 2,47 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_r = 1200$ V				25 150		8800	120 17700	μA
<b>Thermal</b>										
Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,59		K/W
<b>Dynamic</b>										
Peak recovery current	$I_{RM}$					25 125 150		123,65 146,88 154,84		A
Reverse recovery time	$t_{rr}$					25 125 150		56,33 205,17 220,13		ns
Recovered charge	$Q_r$	$di/dt=5288$ A/μs $di/dt=4609$ A/μs $di/dt=4438$ A/μs	±15	600	100	25 125 150		3,77 8,88 10,46		μC
Reverse recovered energy	$E_{rec}$					25 125 150		1,26 3,47 4,06		mWs
Peak rate of fall of recovery current	$(di_r/dt)_{max}$					25 125 150		6299,45 5200,7 4749,99		A/μs



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### Characteristic Values

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

### 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	

<sup>(1)</sup> Value at chip level

<sup>(2)</sup> Only valid with pre-applied Vincotech thermal interface material.

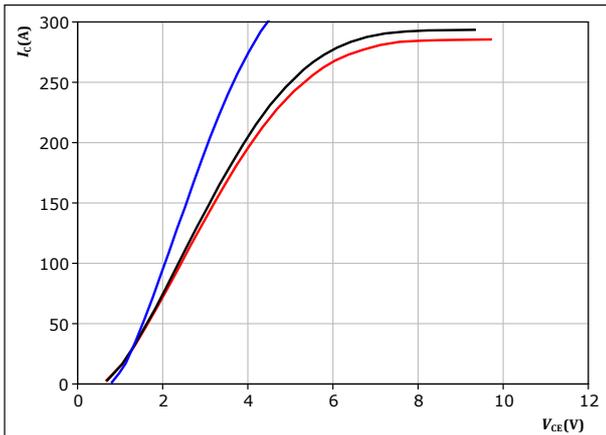


## Inverter Switch Characteristics

**figure 1.** IGBT

Typical output characteristics

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

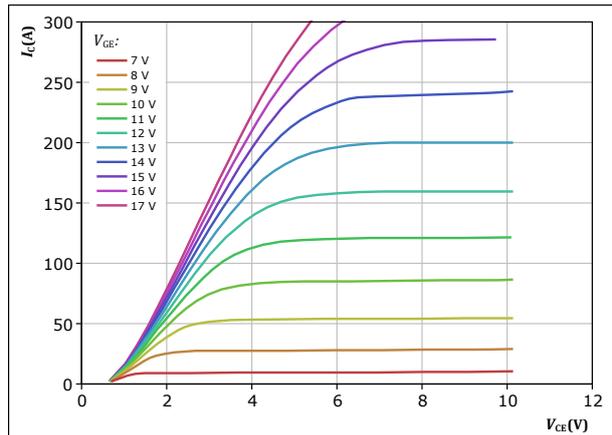


$t_p = 250 \mu s$   
 $V_{GE} = 15 V$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

**figure 2.** IGBT

Typical output characteristics

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

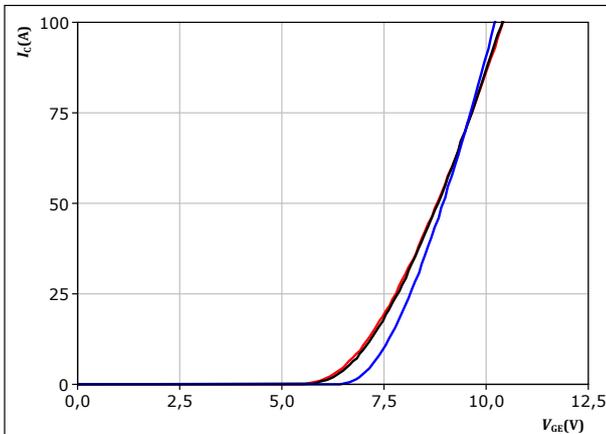


$t_p = 250 \mu s$   
 $T_j = 150 \text{ °C}$   
 $V_{GE}$  from 7 V to 17 V in steps of 1 V

**figure 3.** IGBT

Typical transfer characteristics

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

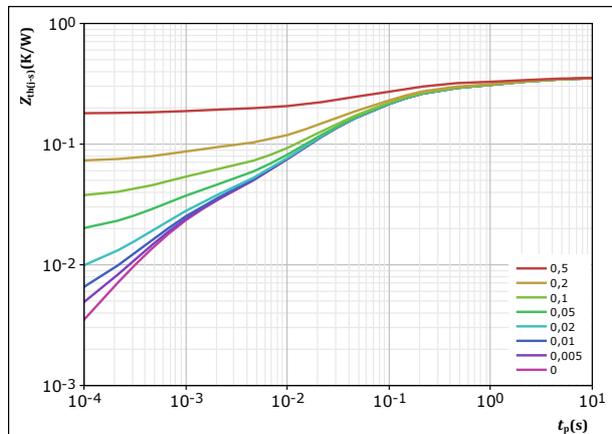


$t_p = 250 \mu s$   
 $V_{CE} = 10 V$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

**figure 4.** IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$   
 $R_{th(j-s)} = 0,354 \text{ K/W}$

IGBT thermal model values

R (K/W)	$\tau$ (s)
2,42E-02	8,05E+00
6,10E-02	1,26E+00
1,61E-01	1,07E-01
8,86E-02	1,89E-02
2,38E-02	7,76E-04



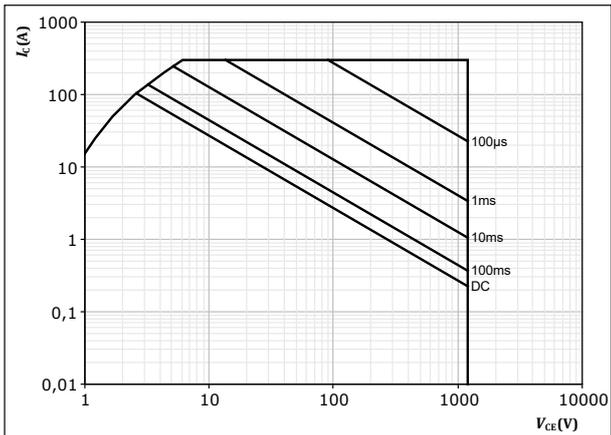
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## Inverter Switch Characteristics

figure 5. IGBT

Safe operating area

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



$D =$  single pulse

$T_s = 80$  °C

$V_{CE} = 15$  V

$T_j = T_{jmax}$



### Inverter Diode Characteristics

figure 6. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

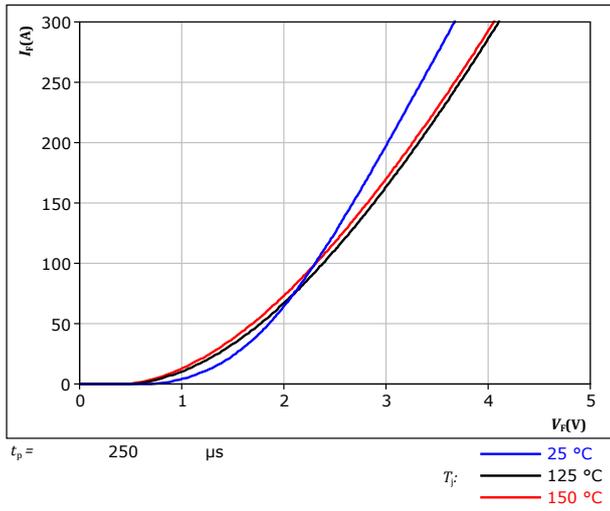
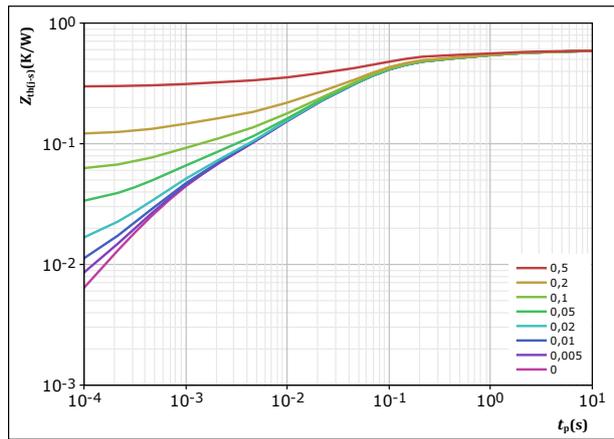


figure 7. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$   
 $R_{th(j-s)} = 0,589 \text{ K/W}$   
 FWD thermal model values

R (K/W)	$\tau$ (s)
3,41E-02	5,80E+00
9,71E-02	6,97E-01
3,29E-01	6,16E-02
9,43E-02	9,02E-03
4,05E-02	7,89E-04

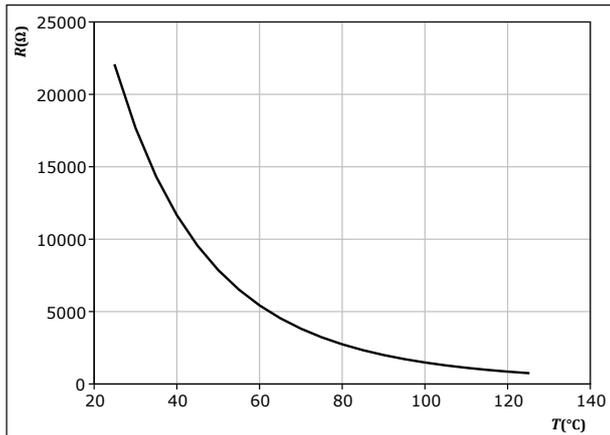


## Thermistor Characteristics

figure 8. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$

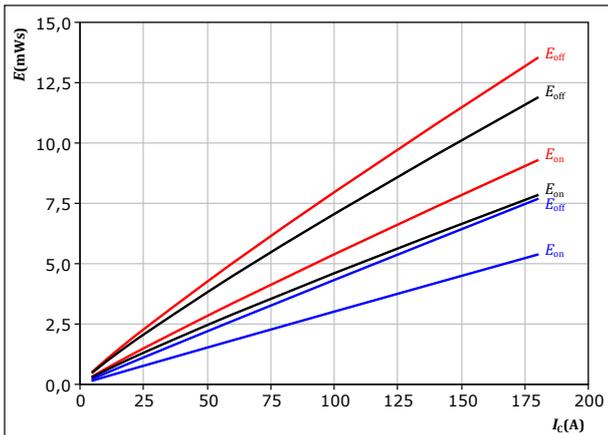




## Inverter Switching Characteristics

**figure 9.** IGBT

Typical switching energy losses as a function of collector current  
 $E = f(I_c)$

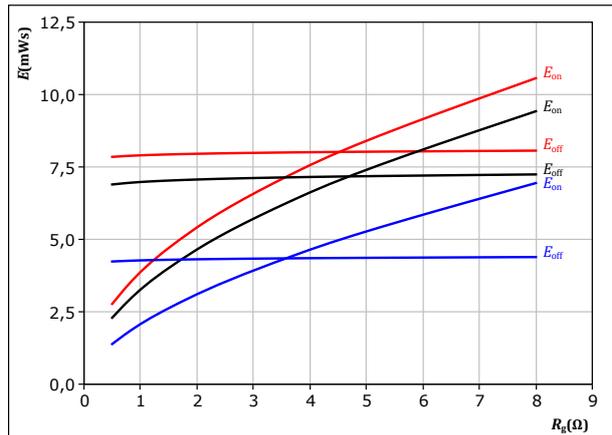


With an inductive load at

$V_{CE} =$	600	V	$T_j:$	— 25 °C
$V_{GE} =$	±15	V		— 125 °C
$R_{gon} =$	2	Ω		— 150 °C
$R_{goff} =$	2	Ω		

**figure 10.** IGBT

Typical switching energy losses as a function of IGBT turn on gate resistor  
 $E = f(R_g)$

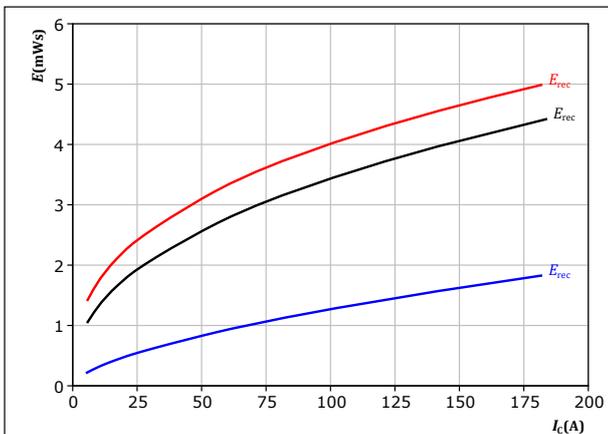


With an inductive load at

$V_{CE} =$	600	V	$T_j:$	— 25 °C
$V_{GE} =$	±15	V		— 125 °C
$I_c =$	100	A		— 150 °C

**figure 11.** FWD

Typical reverse recovered energy loss as a function of collector current  
 $E_{rec} = f(I_c)$

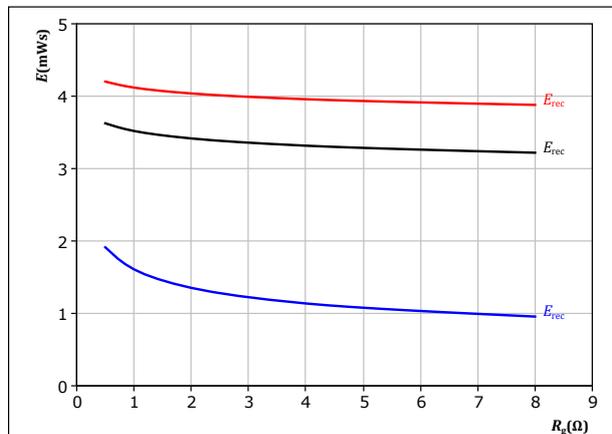


With an inductive load at

$V_{CE} =$	600	V	$T_j:$	— 25 °C
$V_{GE} =$	±15	V		— 125 °C
$R_{gon} =$	2	Ω		— 150 °C

**figure 12.** 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

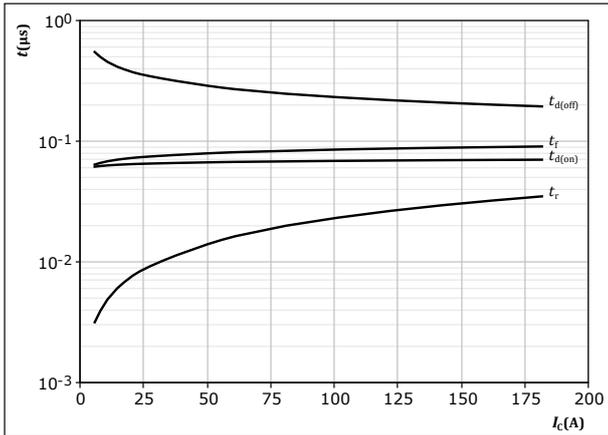
$V_{CE} =$	600	V	$T_j:$	— 25 °C
$V_{GE} =$	±15	V		— 125 °C
$I_c =$	100	A		— 150 °C



## Inverter Switching Characteristics

**figure 13.** IGBT

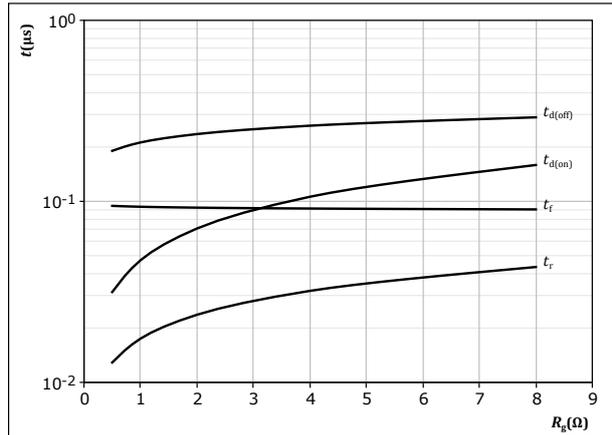
Typical switching times as a function of collector current  
 $t = f(I_c)$



With an inductive load at  
 $T_j = 150 \text{ }^\circ\text{C}$   
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 2 \text{ } \Omega$   
 $R_{goff} = 2 \text{ } \Omega$

**figure 14.** IGBT

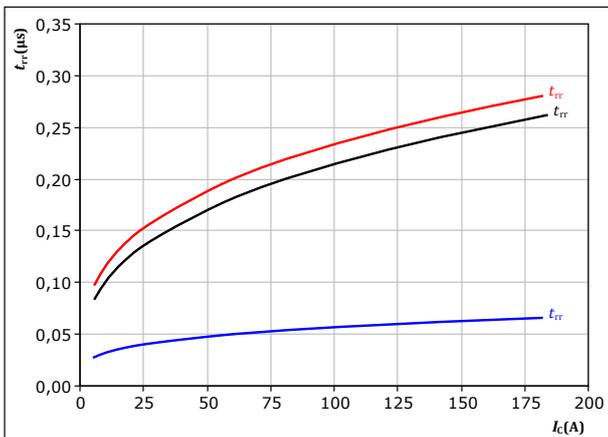
Typical switching times as a function of IGBT turn on gate resistor  
 $t = f(R_g)$



With an inductive load at  
 $T_j = 150 \text{ }^\circ\text{C}$   
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 100 \text{ A}$

**figure 15.** FWD

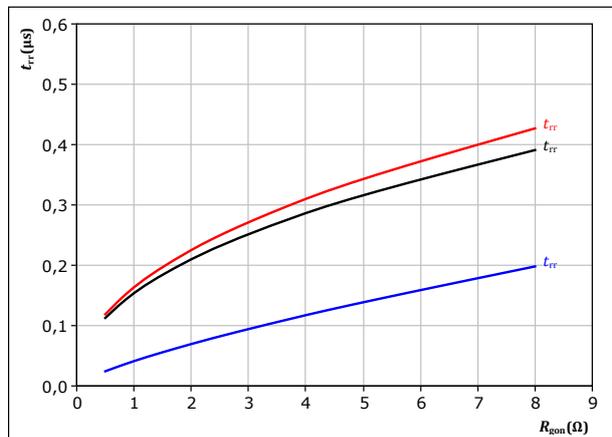
Typical reverse recovery time as a function of collector current  
 $t_{rr} = f(I_c)$



With an inductive load at  
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 2 \text{ } \Omega$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

**figure 16.** FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor  
 $t_{rr} = f(R_{gon})$



With an inductive load at  
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 100 \text{ A}$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

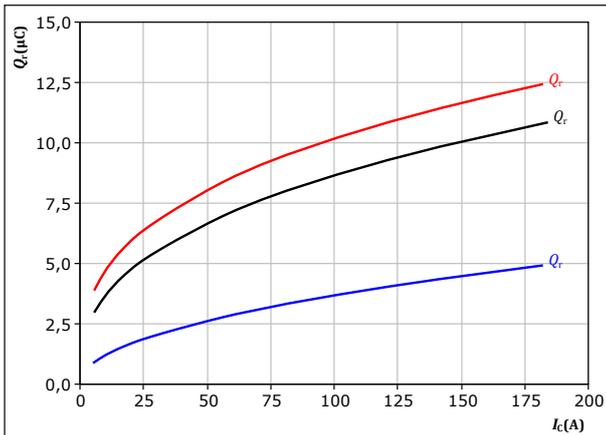


## Inverter Switching Characteristics

**figure 17.** FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

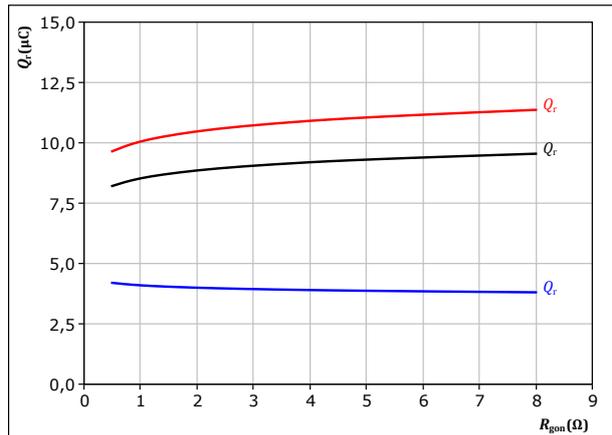
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 2 \ \Omega$

$T_j$ : — 25 °C  
— 125 °C  
— 150 °C

**figure 18.** FWD

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

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



With an inductive load at

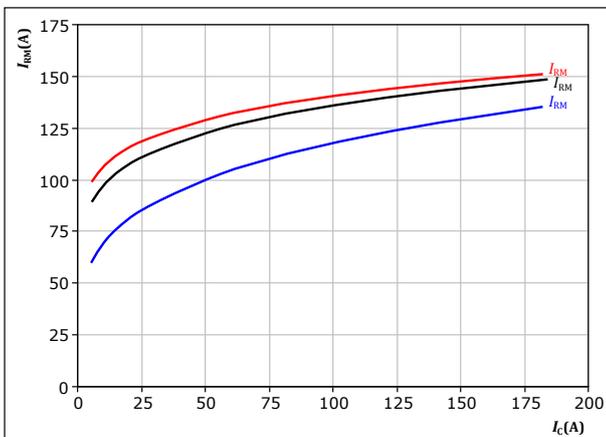
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 100 \text{ A}$

$T_j$ : — 25 °C  
— 125 °C  
— 150 °C

**figure 19.** FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

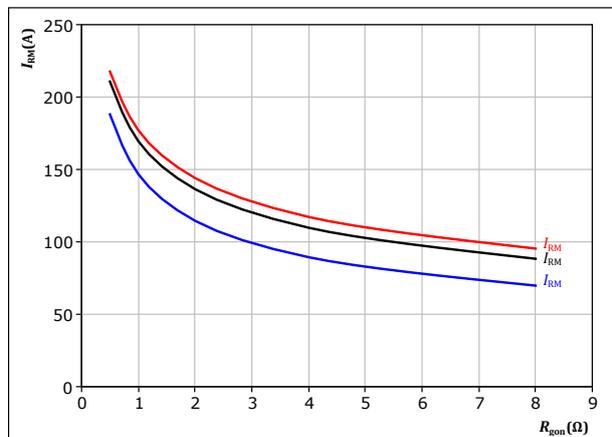
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 2 \ \Omega$

$T_j$ : — 25 °C  
— 125 °C  
— 150 °C

**figure 20.** 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

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 100 \text{ A}$

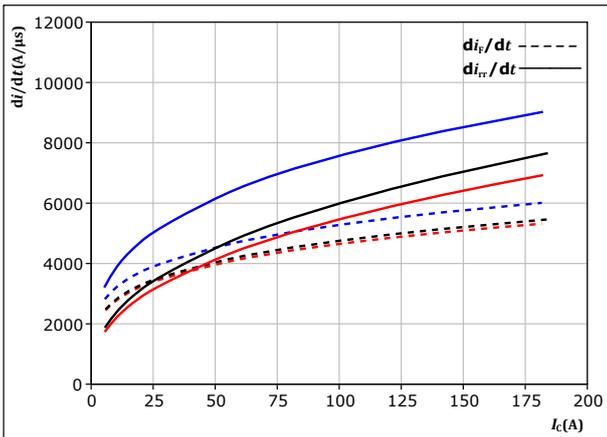
$T_j$ : — 25 °C  
— 125 °C  
— 150 °C



## Inverter Switching Characteristics

**figure 21.** FWD

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

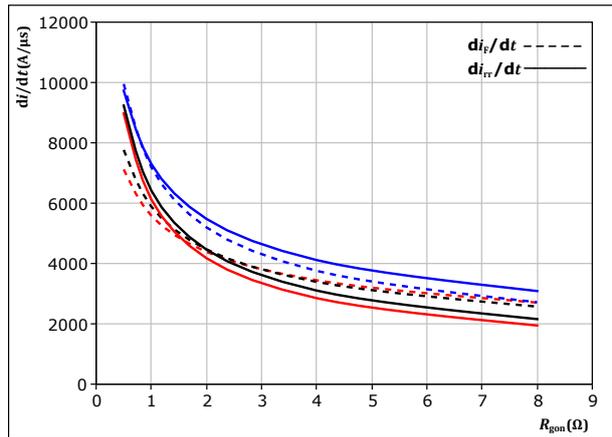


With an inductive load at

$V_{CE} =$	600	V	$T_j:$	25 °C
$V_{GE} =$	±15	V		125 °C
$R_{gon} =$	2	Ω		150 °C

**figure 22.** FWD

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



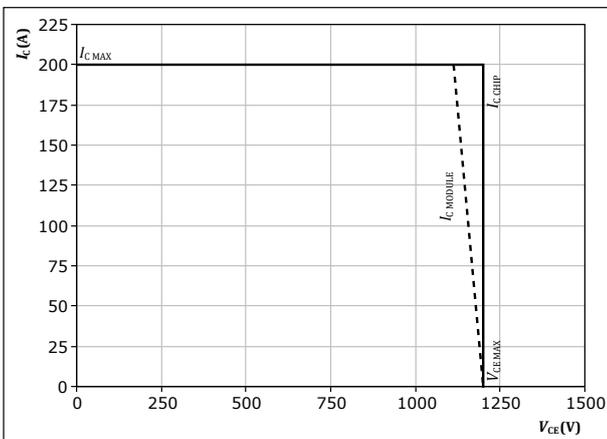
With an inductive load at

$V_{CE} =$	600	V	$T_j:$	25 °C
$V_{GE} =$	±15	V		125 °C
$I_C =$	100	A		150 °C

**figure 23.** IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



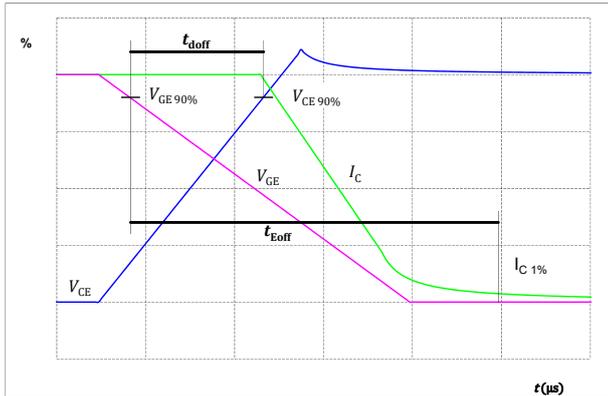
**At**

$T_j =$	150	°C
$R_{gon} =$	2	Ω
$R_{goff} =$	2	Ω

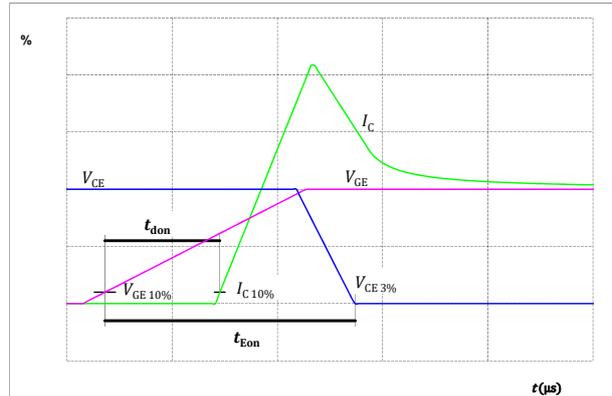


## Inverter Switching Definitions

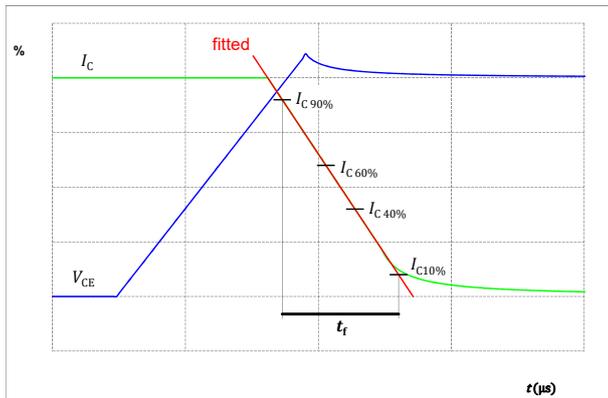
**figure 24.** IGBT  
Turn-off Switching Waveforms & definition of  $t_{doff}$ ,  $t_{Eoff}$  ( $t_{Eoff}$  = integrating time for  $E_{off}$ )



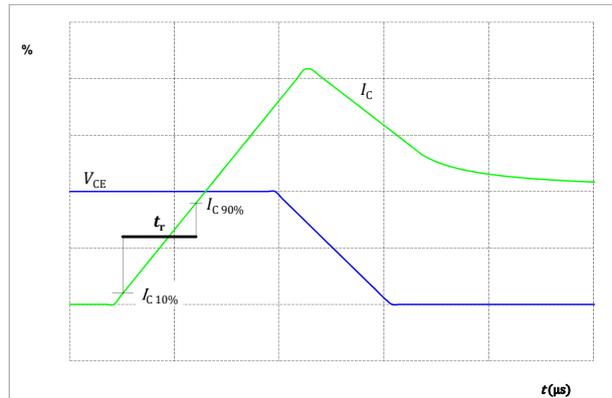
**figure 25.** IGBT  
Turn-on Switching Waveforms & definition of  $t_{don}$ ,  $t_{Eon}$  ( $t_{Eon}$  = integrating time for  $E_{on}$ )



**figure 26.** IGBT  
Turn-off Switching Waveforms & definition of  $t_f$



**figure 27.** IGBT  
Turn-on Switching Waveforms & definition of  $t_r$





### Inverter Switching Definitions

figure 28. FWD

Turn-off Switching Waveforms & definition of  $t_{rr}$

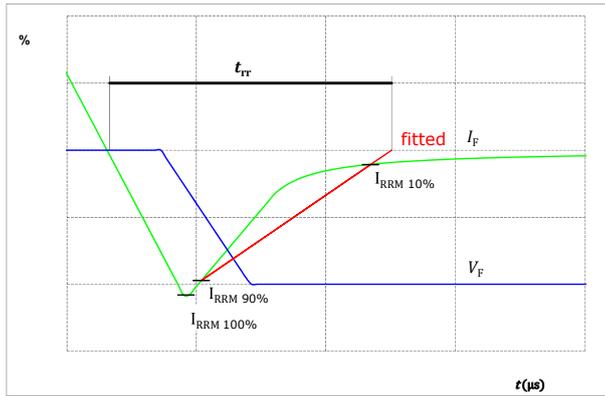
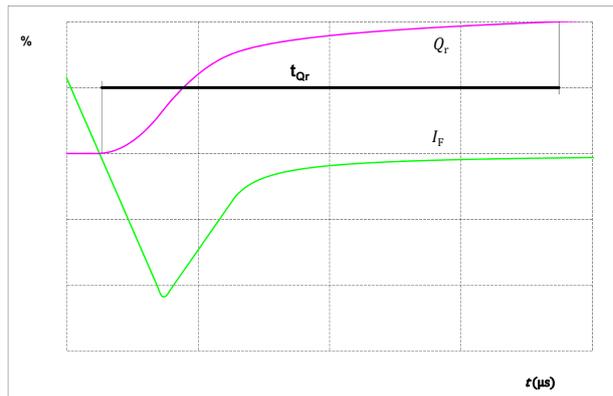


figure 29. FWD

Turn-on Switching Waveforms & definition of  $t_{Qr}$  ( $t_{Qr}$  = integrating time for  $Q_r$ )





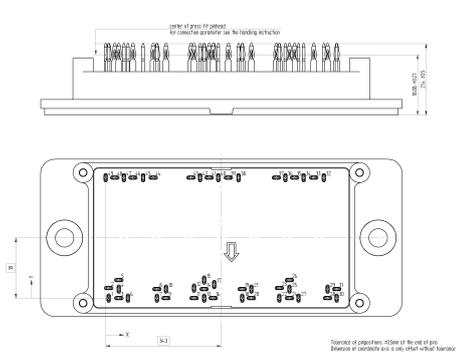
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**30-P2126PA100SH-L289F49Y**  
datasheet

Ordering Code	
<b>Version</b>	<b>Ordering Code</b>
Without thermal paste	30-P2126PA100SH-L289F49Y
With thermal paste (3,4 W/mK, PSX-P7)	30-P2126PA100SH-L289F49Y-/3/

Marking						
	<b>Text</b>	<b>Name</b> NN-NNNNNNNNNNNNNN- TTTTTVV	<b>Date code</b> WWYY	<b>UL &amp; VIN</b> UL VIN	<b>Lot</b> LLLLL	<b>Serial</b> SSSS
	<b>Datamatrix</b>	<b>Type&amp;Ver</b> TTTTTTVV	<b>Lot number</b> LLLLL	<b>Serial</b> SSSS	<b>Date code</b> WWYY	

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

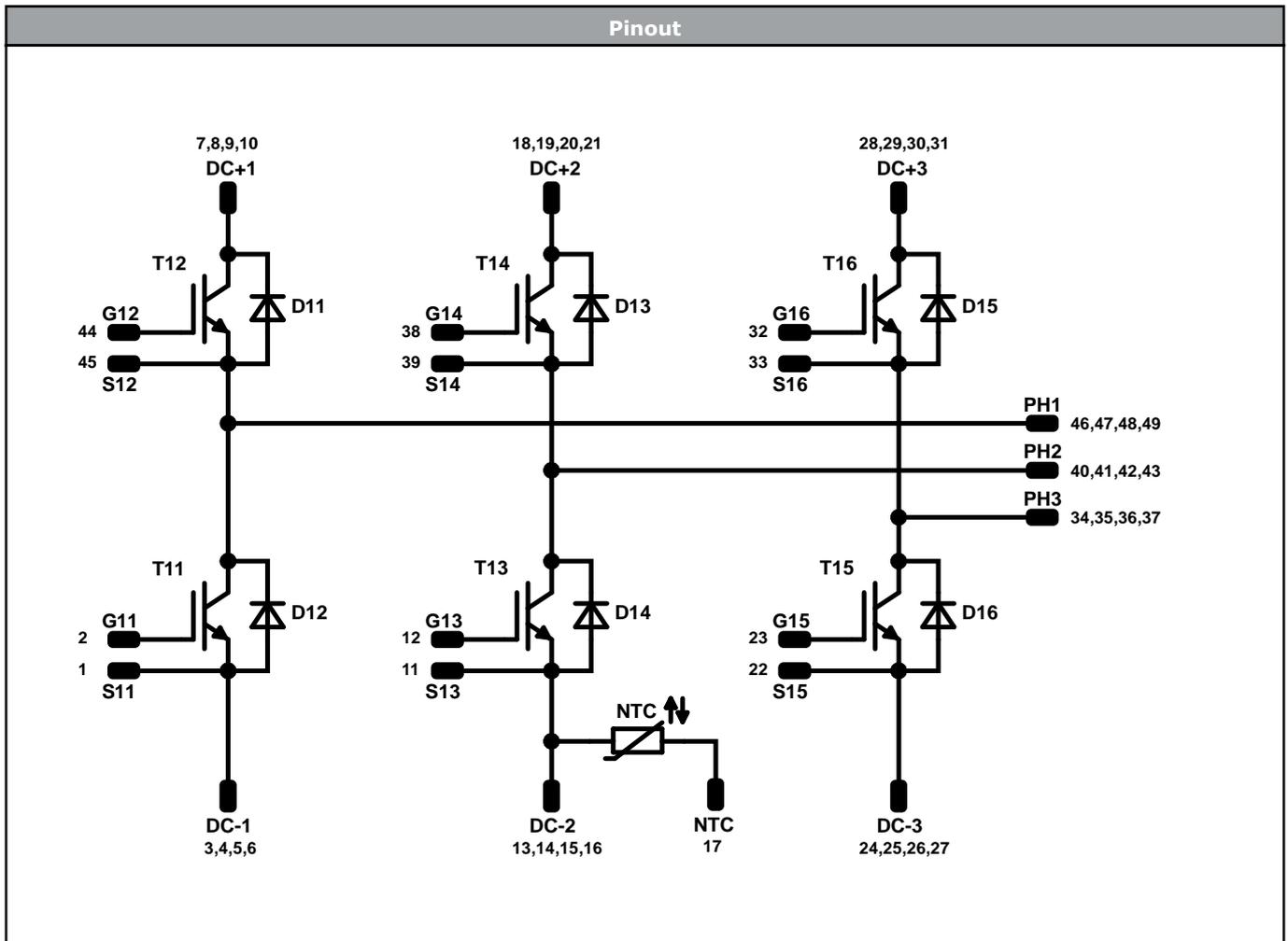


Center of pins (P) parallel to connector pins for the handling instruction

Tolerance of coprocessors: ±0.05mm of the rest of pins  
Tolerance of coprocessors: ±0.1mm of the rest of pins



Vincotech



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



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.

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
30-P2126PA100SH-L289F49Y-D1-14	21 Jan. 2026	Initial Release	

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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.