



Vincotech

# 30-PQ126PA100M7-L289F77T

datasheet

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
- Low turn-off losses
- Low collector emitter saturation voltage
- Positive temperature coefficient
- Short tail current
- Switching optimized for EMC

## 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

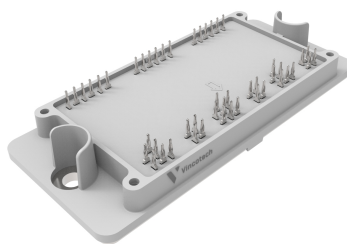
## Target applications

- Industrial Drives

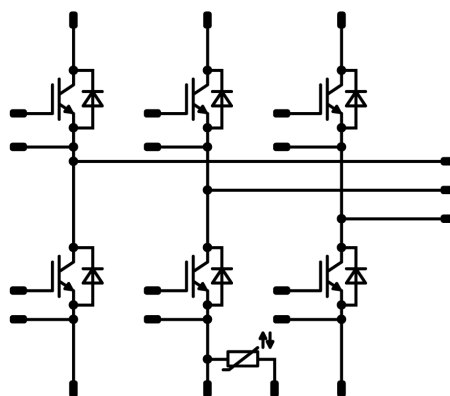
## Types

- 30-PQ126PA100M7-L289F77T

## flow 2 12 mm housing



## Schematic





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## 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)	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	111	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	200	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	232	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Short circuit ratings	$t_{SC}$	$V_{GE} = 15\text{ V}$ , $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$	9,5	$\mu\text{s}$
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

## Inverter Diode

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	87	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	200	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	165	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		$\geq 600$	

\*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	$V_{GE(th)}$			10	0,01	25	5,4	6	6,6	V
Collector-emitter saturation voltage	$V_{CEsat}$		15		100	25 125 150		1,61 1,82 1,91	1,85 <sup>(1)</sup>	V
Collector-emitter cut-off current	$I_{CES}$		0	1200		25			100	µA
Gate-emitter leakage current	$I_{GES}$		20	0		25			200	nA
Internal gate resistance	$r_g$							None		Ω
Input capacitance	$C_{ies}$	0	10		25			21000		pF
Output capacitance	$C_{oes}$							700		pF
Reverse transfer capacitance	$C_{res}$							280		pF
Gate charge	$Q_g$	$V_{CC} = 600$ V	0/15		100	25		700		nC

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,41		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	25 125 150		118,2 118,2 117,6		ns
Rise time	$t_r$					25 125 150		10,2 12,4 13,4		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		173,6 200,4 205,6		ns
Fall time	$t_f$					25 125 150		82,85 96,38 106,77		ns
Turn-on energy (per pulse)	$E_{on}$					25 125 150		3,26 4,87 5,37		mWs
Turn-off energy (per pulse)	$E_{off}$					25 125 150		6,6 8,77 9,49		mWs



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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 Diode

#### Static

Forward voltage	$V_F$				100	25 125 150		1,82 1,96 1,97	2,1 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_i = 1200$ V				25			40	µA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,58		K/W
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#### Dynamic

Peak recovery current	$I_{RM}$	$di/dt=9387$ A/µs $di/dt=7872$ A/µs $di/dt=8350$ A/µs	$\pm 15$	600	100	25 125 150		178,25 165,9 164,61		A
Reverse recovery time	$t_{rr}$					25 125 150		149,24 311,54 339,17		ns
Recovered charge	$Q_r$					25 125 150		11,6 17,27 19,18		µC
Reverse recovered energy	$E_{rec}$					25 125 150		5,14 7,75 8,59		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		4044 2649 2147		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	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				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.



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## Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

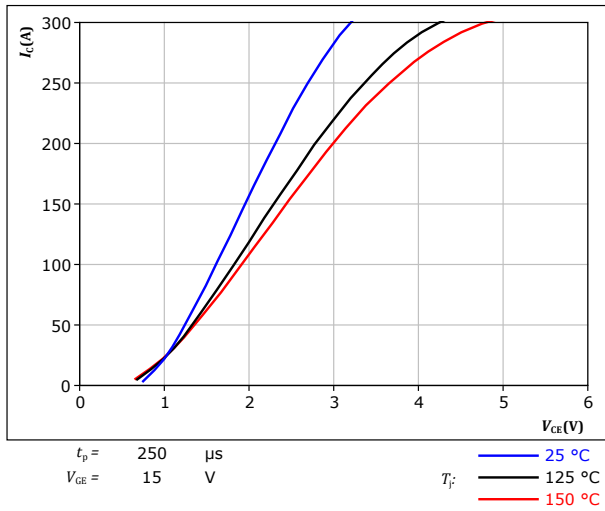


figure 2. IGBT

Typical output characteristics

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

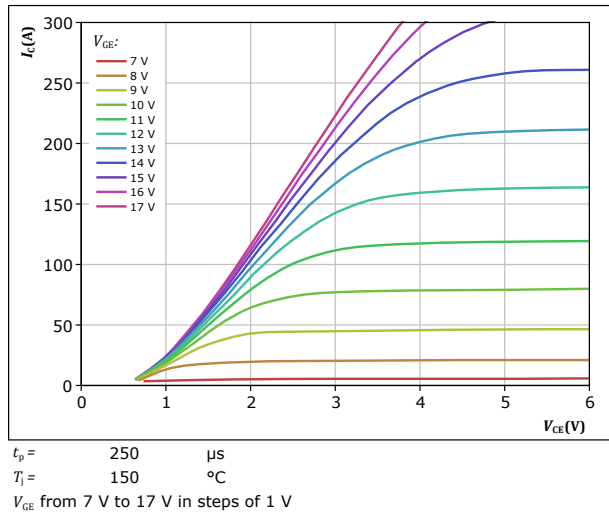


figure 3. IGBT

Typical transfer characteristics

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

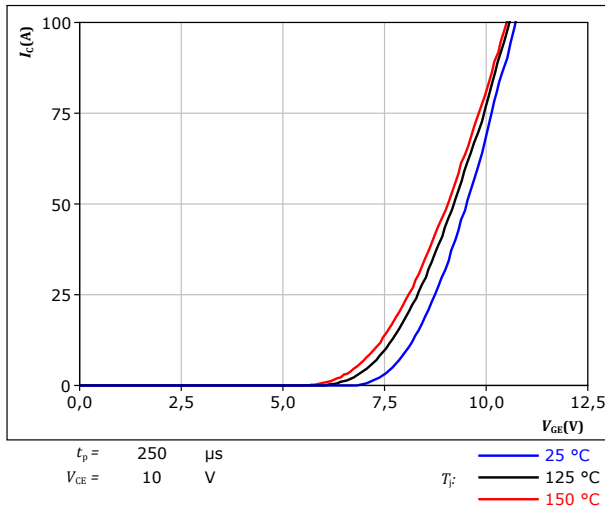
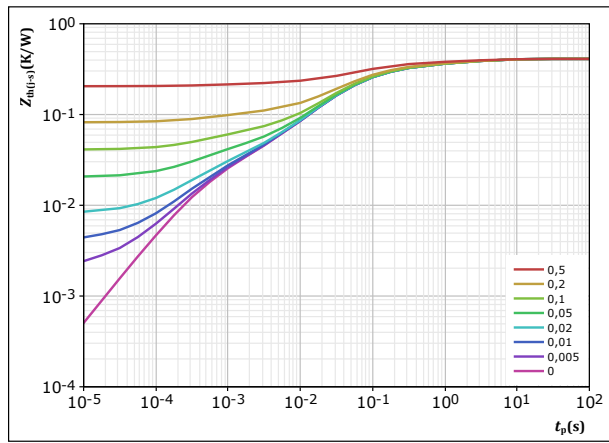


figure 4. IGBT

Transient thermal impedance as a function of pulse width

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





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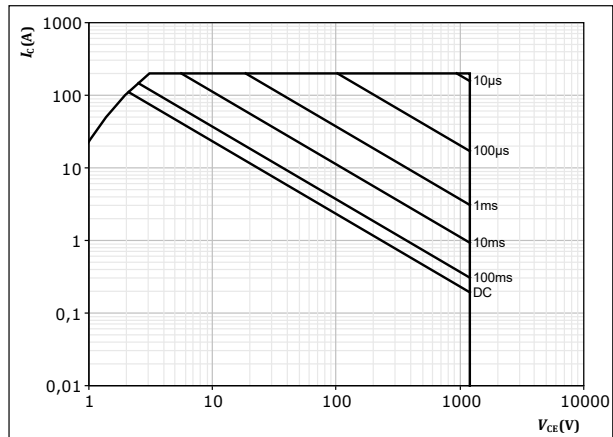
datasheet

## Inverter Switch Characteristics

figure 5. IGBT

Safe operating area

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

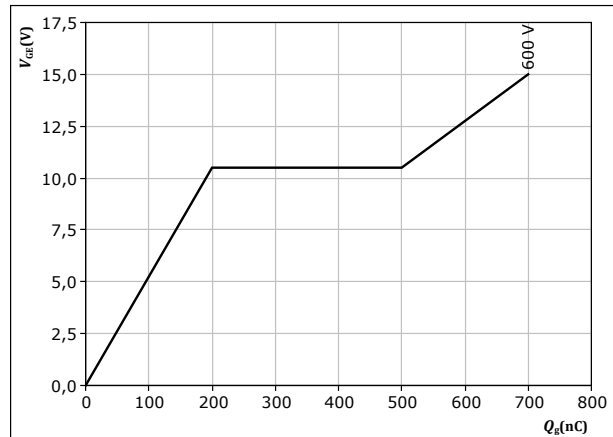


$D =$  single pulse  
 $T_s = 80$  °C  
 $V_{GE} = 15$  V  
 $T_j = T_{jmax}$

figure 6. IGBT

Gate voltage vs gate charge

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



$I_C = 100$  A  
 $T_j = 25$  °C



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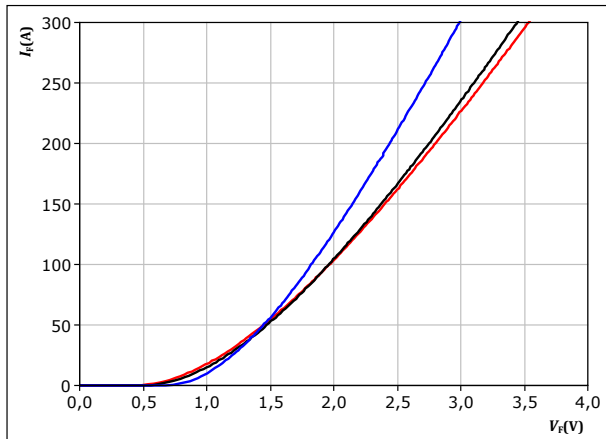
datasheet

## Inverter Diode Characteristics

figure 7. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



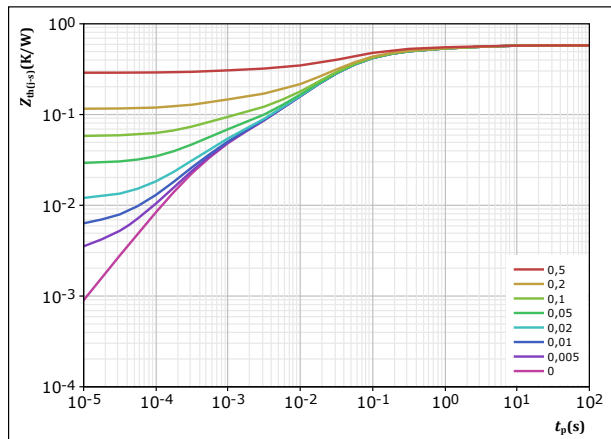
$t_p = 250 \mu s$

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

figure 8. FWD

Transient thermal impedance as a function of pulse width

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



$D =$	$t_p / T$	
$R_{th(j-s)} =$	0,578	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	





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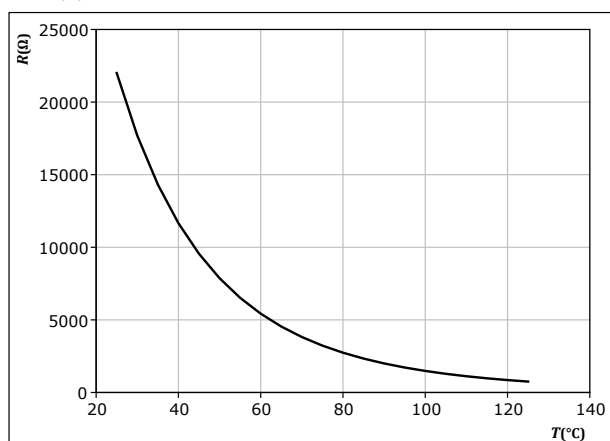
## Thermistor Characteristics

figure 9.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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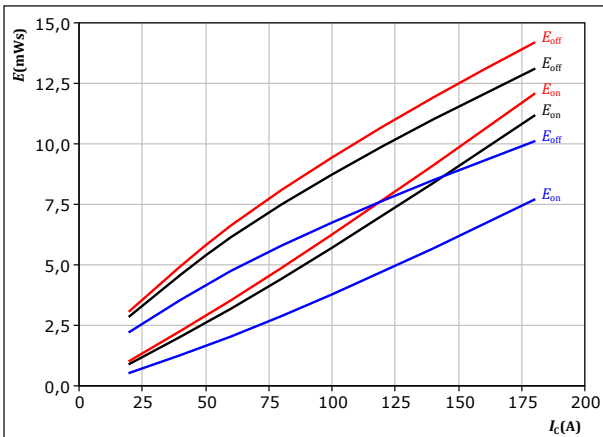
## Inverter Switching Characteristics

figure 10.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

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

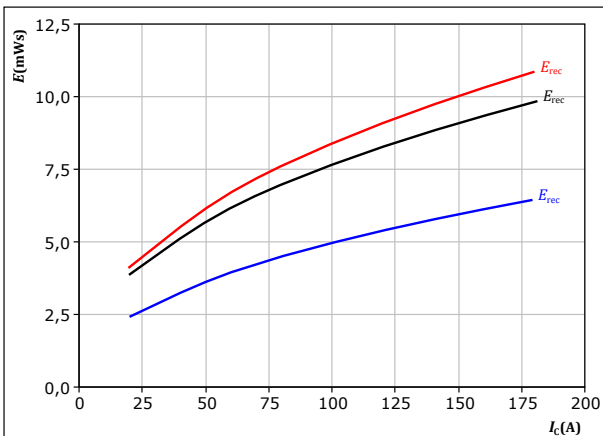
$T_j$ : 25 °C  
125 °C  
150 °C

figure 12.

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

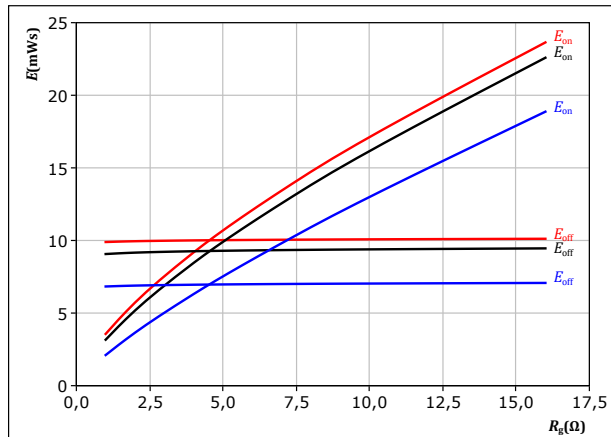
$T_j$ : 25 °C  
125 °C  
150 °C

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

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

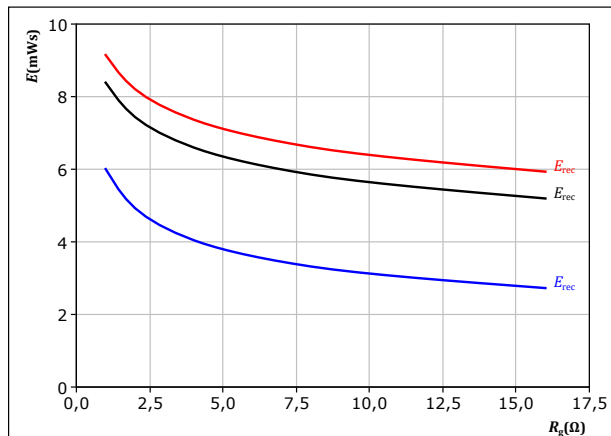
$T_j$ : 25 °C  
125 °C  
150 °C

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

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

$T_j$ : 25 °C  
125 °C  
150 °C



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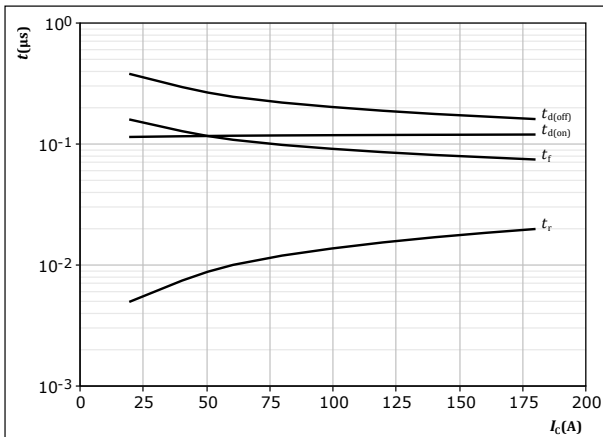
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### Inverter Switching Characteristics

figure 14.

IGBT

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



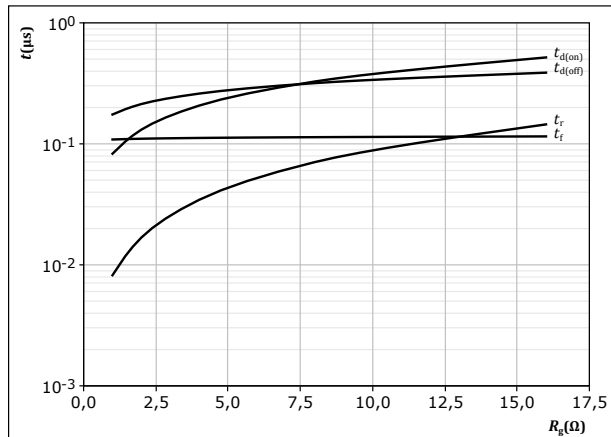
With an inductive load at

$T_j = 150$  °C  
 $V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$  Ω  
 $R_{goff} = 2$  Ω

figure 15.

IGBT

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



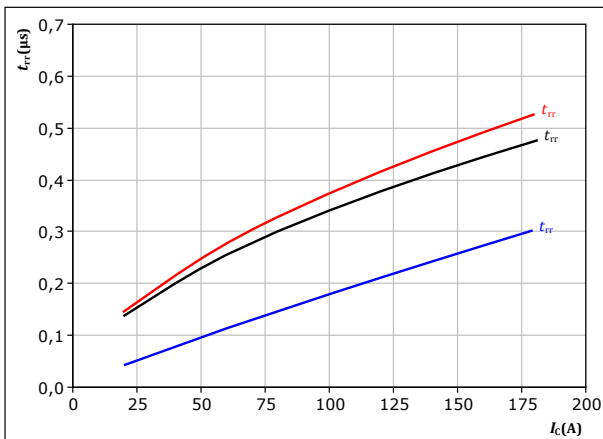
With an inductive load at

$T_j = 150$  °C  
 $V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_c = 100$  A

figure 16.

FWD

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



With an inductive load at

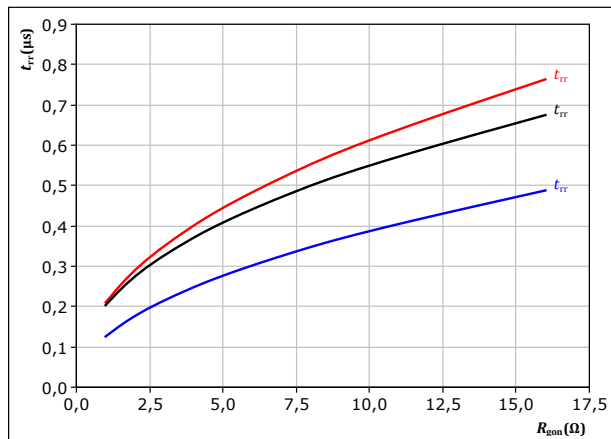
$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$  Ω

$T_j$ :  
— 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

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

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



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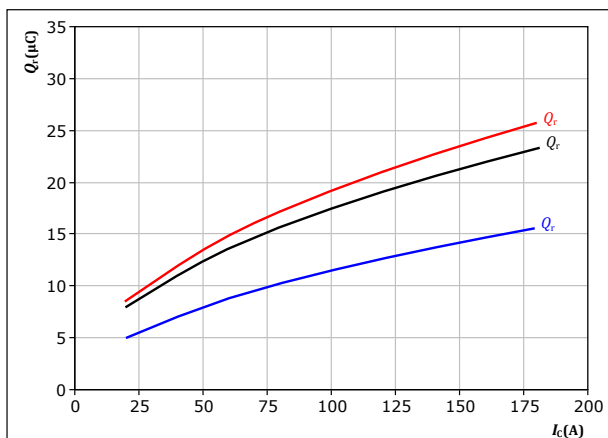
## Inverter Switching Characteristics

figure 18.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

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

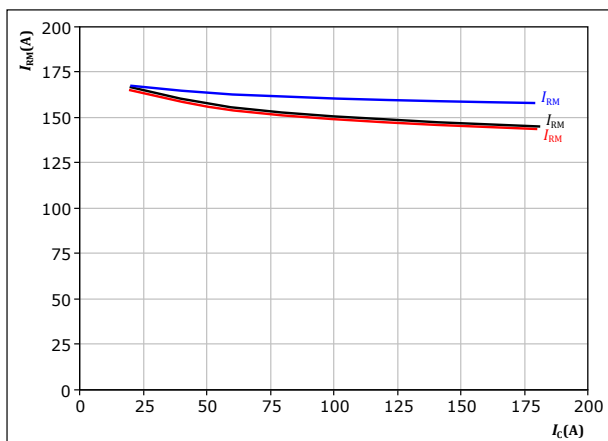
$T_j$ : 25 °C  
125 °C  
150 °C

figure 20.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

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

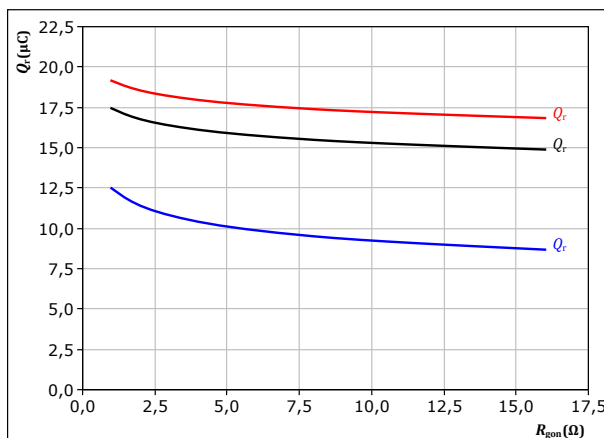
$T_j$ : 25 °C  
125 °C  
150 °C

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

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

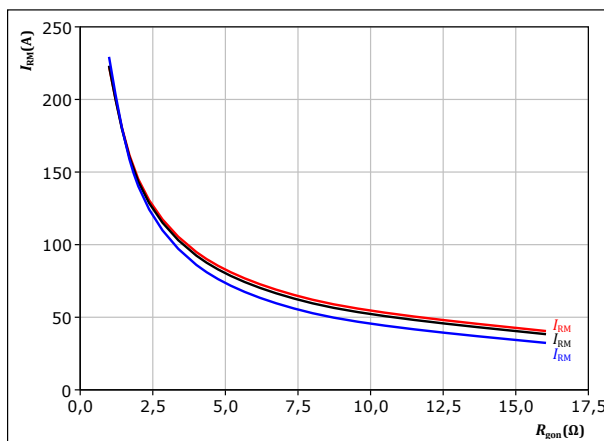
$T_j$ : 25 °C  
125 °C  
150 °C

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

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

$T_j$ : 25 °C  
125 °C  
150 °C



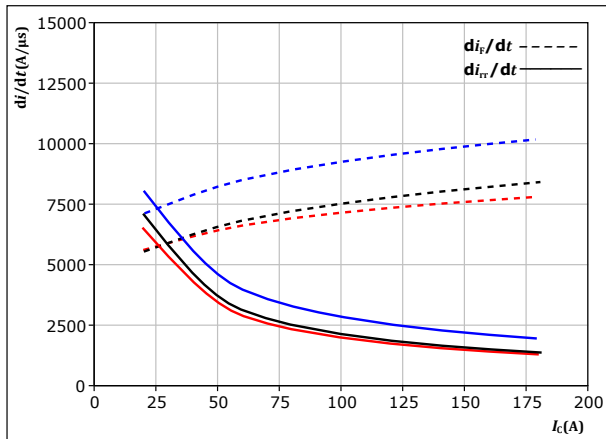
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### Inverter Switching Characteristics

figure 22. FWD

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



With an inductive load at

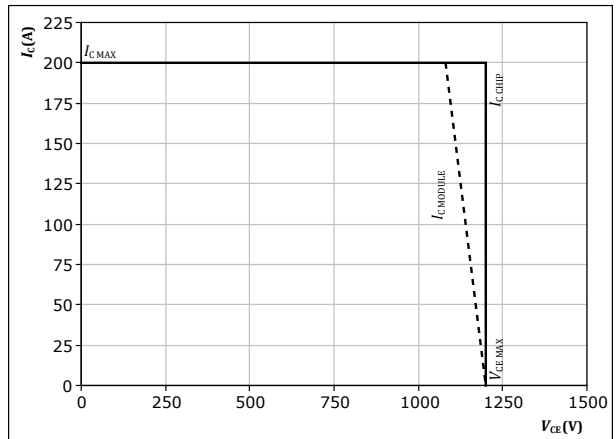
$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$  Ω

$T_j$ : 25 °C  
125 °C  
150 °C

figure 24. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



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



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## Inverter Switching Definitions

figure 25. IGBT

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

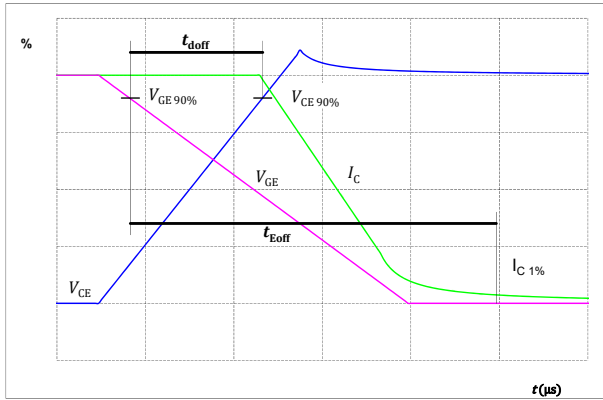


figure 26. IGBT

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

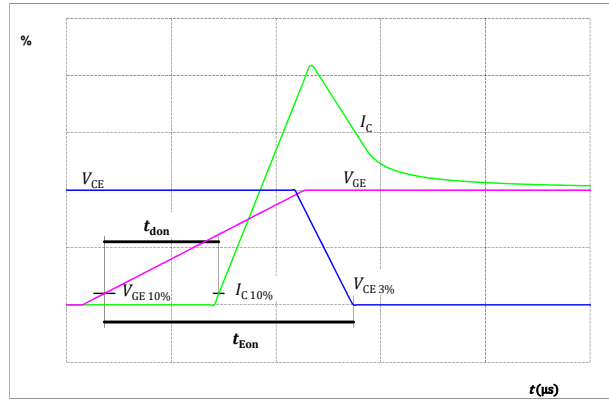


figure 27. IGBT

Turn-off Switching Waveforms & definition of  $t_f$

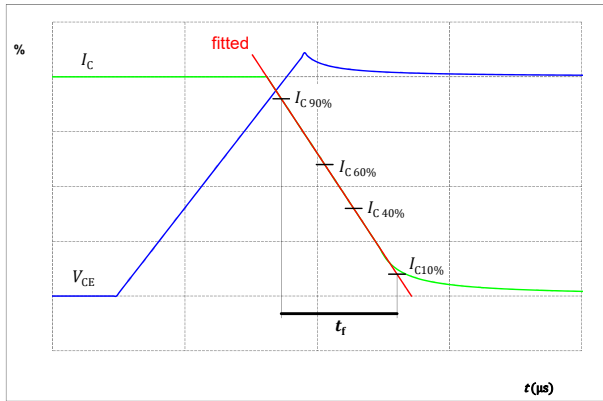
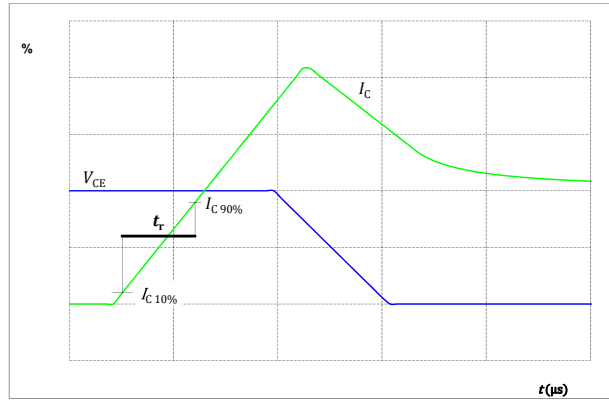


figure 28. IGBT

Turn-on Switching Waveforms & definition of  $t_r$





FWD

FWD

A graph showing the normalized current  $I_F$  (green curve) and normalized voltage  $Q_r$  (magenta curve) versus time  $t$  in microseconds. The y-axis is labeled with a percentage sign (%). The x-axis is labeled  $t(\mu s)$ . The voltage curve  $Q_r$  starts at 0% and rises exponentially towards 100%. The current curve  $I_F$  starts at 100%, drops to a minimum, and then rises back towards 100%. A horizontal black line segment is drawn at the 50% level, labeled  $t_{QR}$ , representing the time interval from the start of the voltage rise to the point where it reaches 50%.



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Ordering Code	
Version	Ordering Code
Without thermal paste	30-PQ126PA100M7-L289F77T
With thermal paste (3,4 W/mK, PSX-P7)	30-PQ126PA100M7-L289F77T-/3/

Marking						
	Text	Name	Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNNNN- TTTTUVV	WWYY	UL VIN	LLLL	SSSS
	Datamatrix	Type&Ver TTTTTTVV	Lot number LLLLL	Serial SSSS	Date code 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				

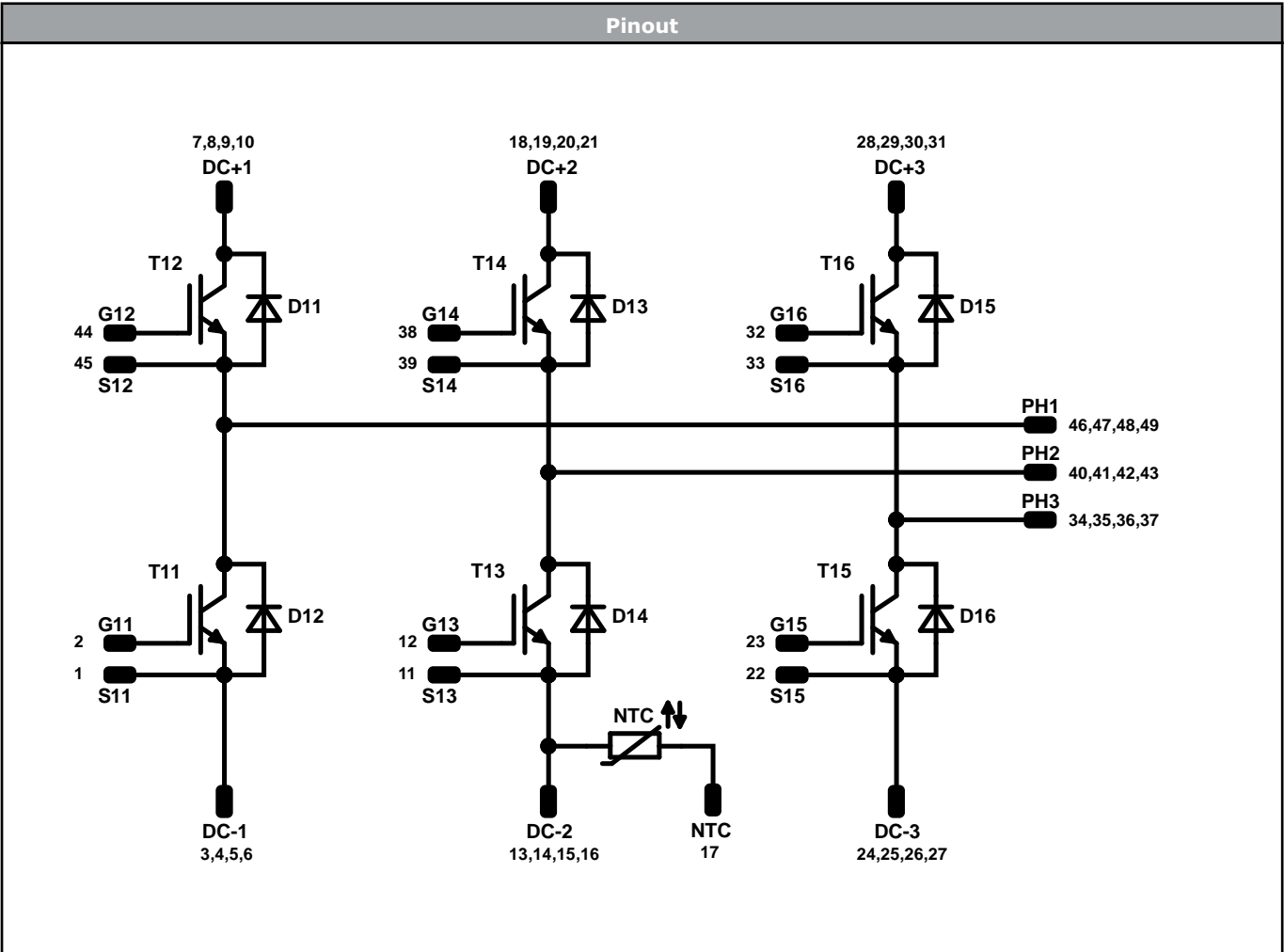
Dimensions of preparation will be at the end of pins  
Dimension of package will be at the end of pins





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30-PQ126PA100M7-L289F77T  
datasheet



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	



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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.

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



Document No.:	Date:	Modification:	Pages
30-PQ126PA100M7-L289F77T-D1-14	12 Nov. 2025	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.