



Vincotech

# 10-EY126PA050M704-L196F76T

datasheet

flowPACK E2

1200 V / 50 A

## Topology features

- Inverter
- Open Emitter configuration
- 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:  $\text{Si}_3\text{N}_4$
- Convex shaped substrate for superior thermal contact
- Compact housing
- CTI600 housing material
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

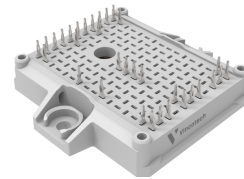
## Target applications

- Elevator Drives
- Industrial Drives
- Servo Drives

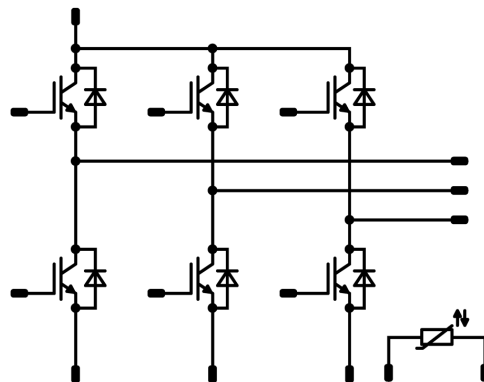
## Types

- 10-EY126PA050M704-L196F76T

## flow E2 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)	$I_C$	$T_j = T_{jmax}$ $T_s \leq 80\text{ °C}$	100 <sup>(1)</sup>	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	100	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	196	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	°C

<sup>(1)</sup> limited by  $I_{CRM}$

## Inverter Diode

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	69	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	100	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	144	W
Maximum junction temperature	$T_{jmax}$		175	°C

## Module Properties

### Thermal Properties

Storage temperature	$T_{stg}$		-40...+125	°C
Operation temperature under switching condition	$T_{jop}$		-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			9,33	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	0,005	25	5,4	6	6,6	V
Collector-emitter saturation voltage	$V_{CEsat}$		15		50	25 125 150		1,55 1,77 1,83	1,9 <sup>(2)</sup>	V
Collector-emitter cut-off current	$I_{CES}$		0	1200		25			0,09	mA
Gate-emitter leakage current	$I_{GES}$		20	0		25			0,5	μA
Internal gate resistance	$r_g$							None		Ω
Input capacitance	$C_{ies}$	0	10	25				10000		pF
Output capacitance	$C_{oes}$							350		pF
Reverse transfer capacitance	$C_{res}$							130		pF
Gate charge	$Q_g$	$V_{CC} = 600$ V	0/15		50	25		380		nC

#### Thermal

Thermal resistance junction to sink <sup>(3)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,48		K/W
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#### Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	$\pm 15$	600	50	25 125 150		171,8 170,2 168,53		ns
Rise time	$t_r$					25 125 150		56,7 58 59,51		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		183,51 210,7 217,81		ns
Fall time	$t_f$					25 125 150		98,09 123,88 131,48		ns
Turn-on energy (per pulse)	$E_{on}$					25 125 150		4,74 5,92 6,28		mWs
Turn-off energy (per pulse)	$E_{off}$					25 125 150		3,64 4,89 5,38		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	$V_F$				50	25 125 150		1,66 1,78 1,79	2,1 <sup>(2)</sup>	V
Reverse leakage current	$I_R$	$V_i = 1200$ V				25			40	µA

#### Thermal

Thermal resistance junction to sink <sup>(3)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,66		K/W
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#### Dynamic

Peak recovery current	$I_{RM}$	$di/dt=650$ A/µs $di/dt=618$ A/µs $di/dt=630$ A/µs	$\pm 15$	600	50	25 125 150		28,34 32,84 33,99		A
Reverse recovery time	$t_{rr}$					25 125 150		283,49 446,79 476,89		ns
Recovered charge	$Q_r$					25 125 150		3,79 6,38 7,04		µC
Reverse recovered energy	$E_{rec}$					25 125 150		1,26 2,37 2,64		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		267,43 166,83 173,65		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		5		k $\Omega$
Deviation of R100	$\Delta_{R/R}$	$R_{100} = 493 \Omega$				100	-5		5	%
Power dissipation	$P$							245		mW
Power dissipation constant	$d$					25		1,4		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 2 \%$						3375		K
B-value	$B_{(25/100)}$	Tol. $\pm 2 \%$						3437		K
Vincotech Thermistor Reference									K	

<sup>(2)</sup> Value at chip level

<sup>(3)</sup> Only valid with pre-applied Vincotech thermal interface material.



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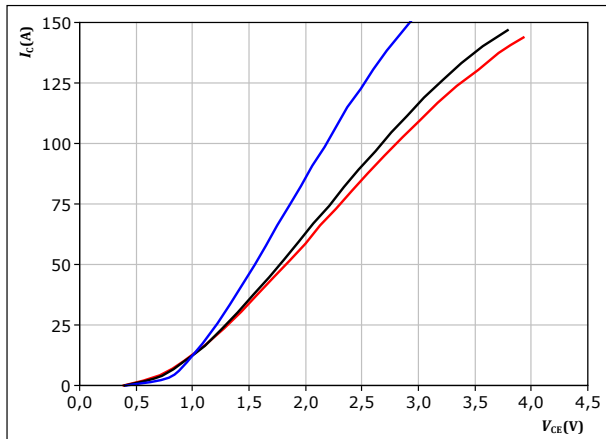
# 10-EY126PA050M704-L196F76T datasheet

## Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

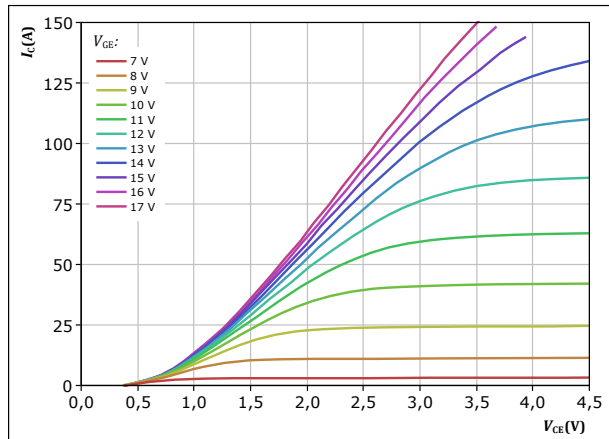


$t_p = 250 \mu s$   
 $V_{GE} = 15 V$   
 $T_j:$  25 °C, 125 °C, 150 °C

figure 2. IGBT

Typical output characteristics

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

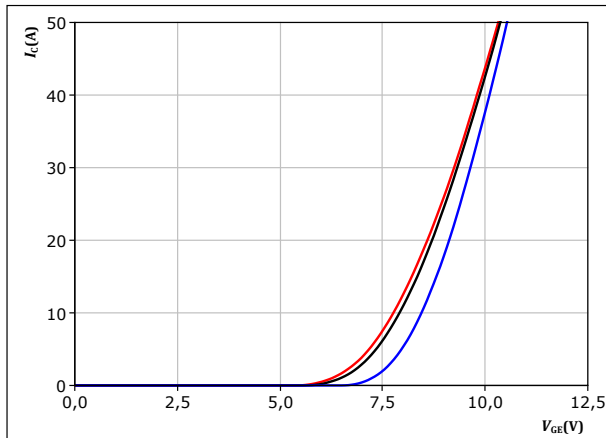


$t_p = 250 \mu s$   
 $T_j = 150 ^\circ C$   
 $V_{GE}$  from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

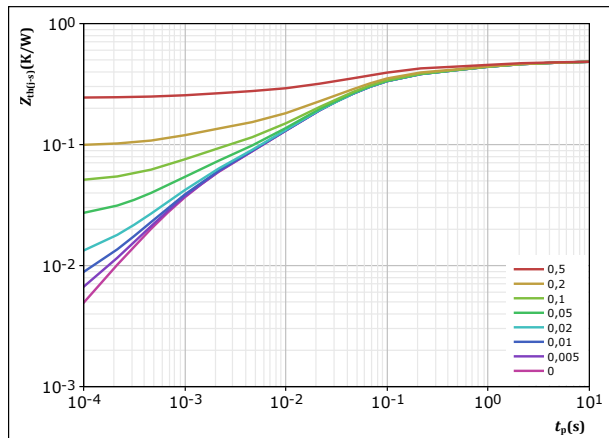


$t_p = 250 \mu s$   
 $V_{CE} = 10 V$   
 $T_j:$  25 °C, 125 °C, 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$   
 $R_{th(j-s)} = 0,484 K/W$   
IGBT thermal model values  

$R (K/W)$	$\tau (s)$
3,50E-02	4,42E+00
9,28E-02	6,31E-01
2,25E-01	5,74E-02
9,33E-02	1,22E-02
4,06E-02	1,03E-03



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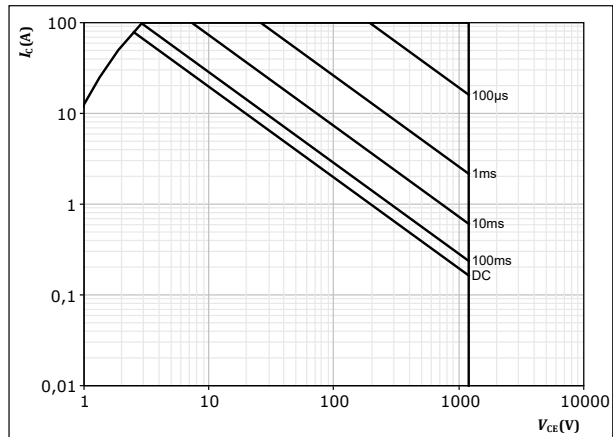
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## Inverter Switch Characteristics

figure 5. IGBT

Safe operating area

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

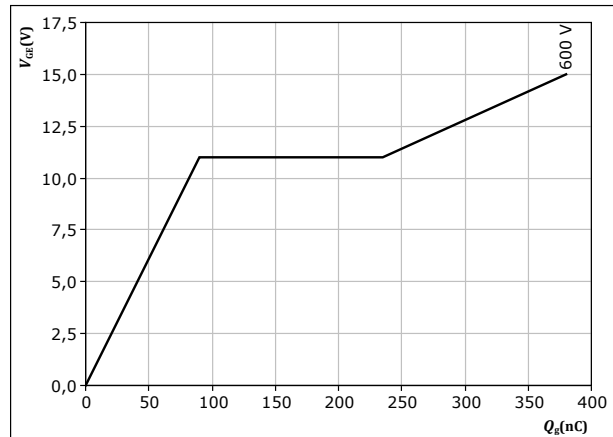


$D = \text{single pulse}$   
 $T_s = 80 \text{ } ^\circ\text{C}$   
 $V_{GE} = 15 \text{ V}$   
 $T_j = T_{jmax}$

figure 6. IGBT

Gate voltage vs gate charge

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



$I_C = 50 \text{ A}$   
 $T_j = 25 \text{ } ^\circ\text{C}$



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## Inverter Diode Characteristics

figure 7.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

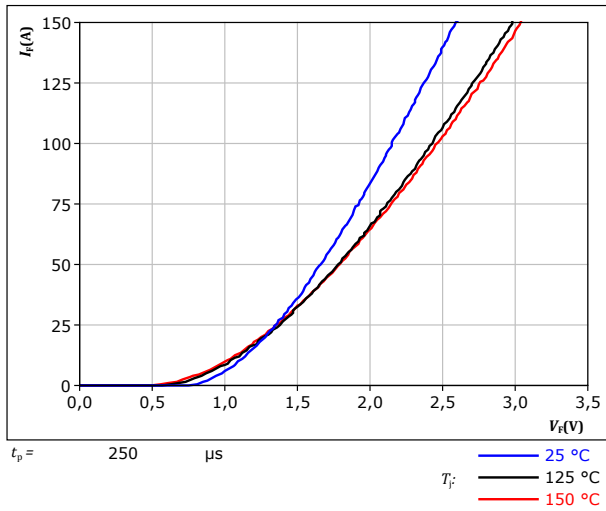
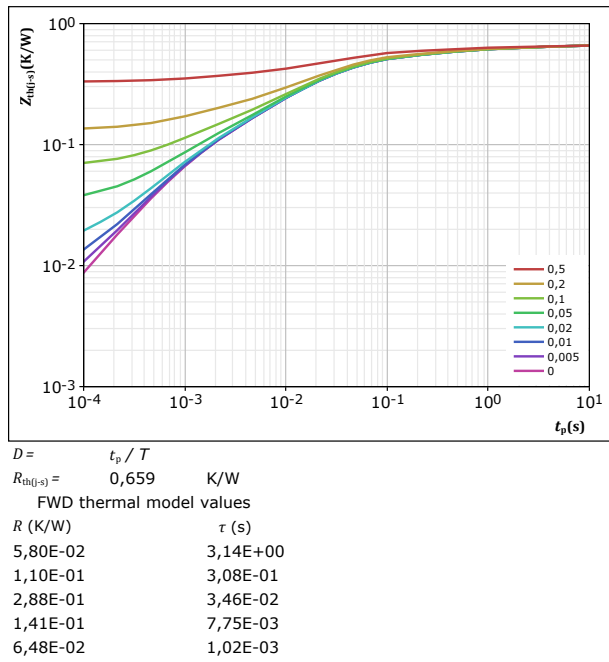


figure 8.

FWD

Transient thermal impedance as a function of pulse width

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







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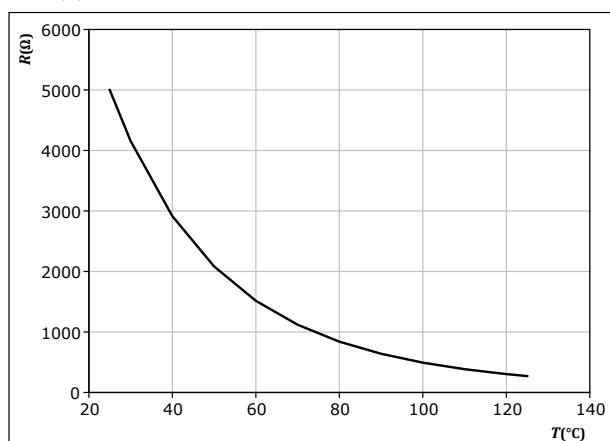
## Thermistor Characteristics

figure 9.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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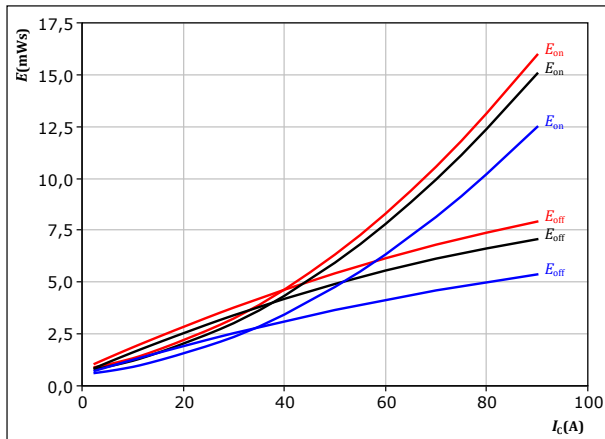
## Inverter Switching Characteristics

figure 10.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 8 \text{ } \Omega$   
 $R_{goff} = 8 \text{ } \Omega$

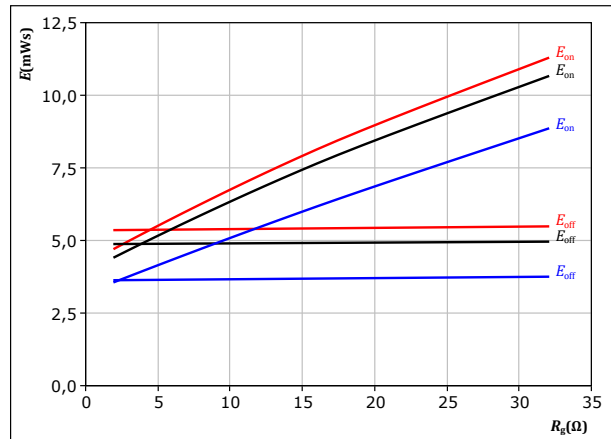
$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

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

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_C = 50 \text{ A}$

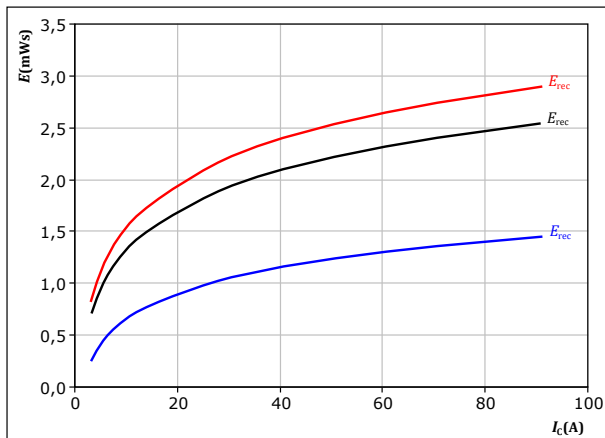
$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

figure 12.

FWD

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_C)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 8 \text{ } \Omega$

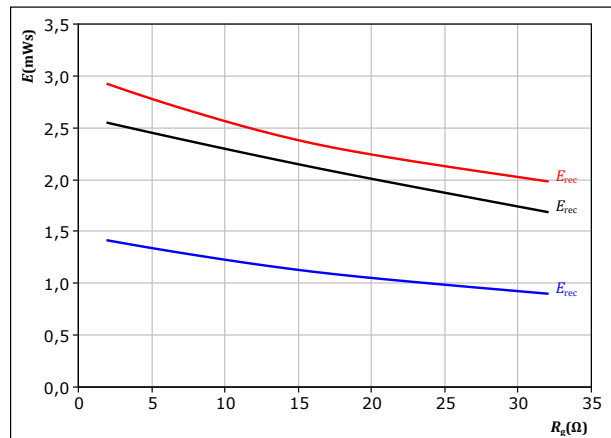
$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

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

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_C = 50 \text{ A}$

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



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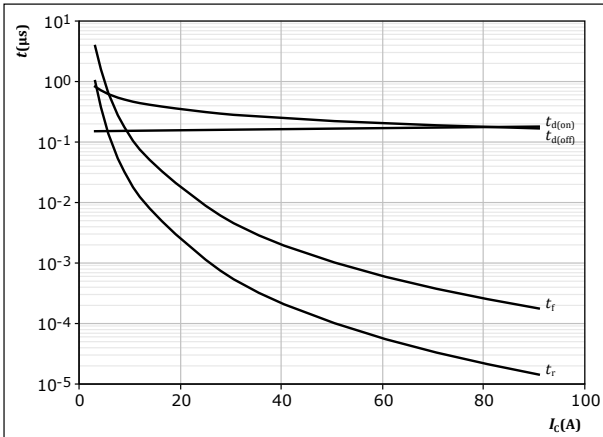
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datasheet

## Inverter Switching Characteristics

figure 14.

IGBT

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



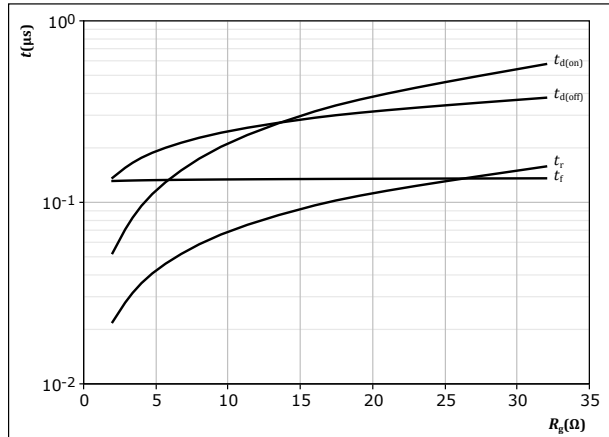
With an inductive load at

$T_j = 150$  °C  
 $V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 8$  Ω  
 $R_{goff} = 8$  Ω

figure 15.

IGBT

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



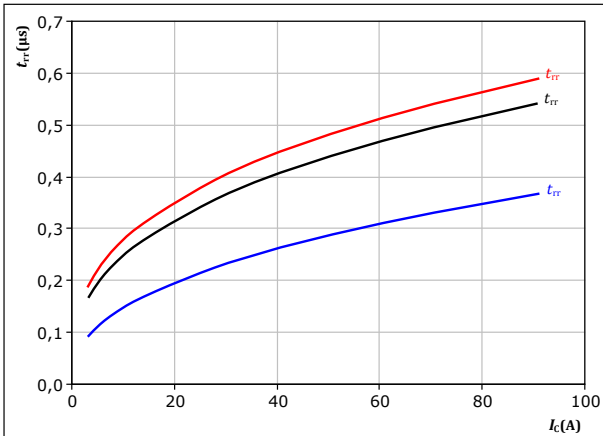
With an inductive load at

$T_j = 150$  °C  
 $V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_C = 50$  A

figure 16.

FWD

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



With an inductive load at

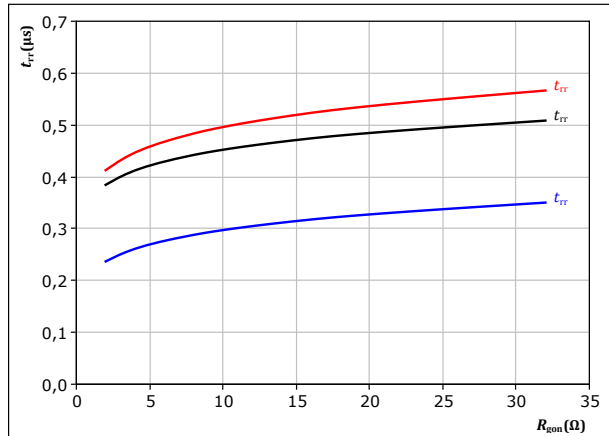
$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 8$  Ω

$T_j$ : — 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  
 $I_C = 50$  A

$T_j$ : — 25 °C  
— 125 °C  
— 150 °C



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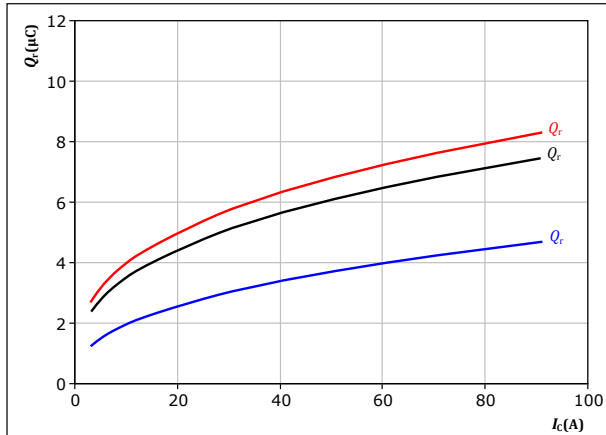
## Inverter Switching Characteristics

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  
 $R_{gon} = 8$  Ω

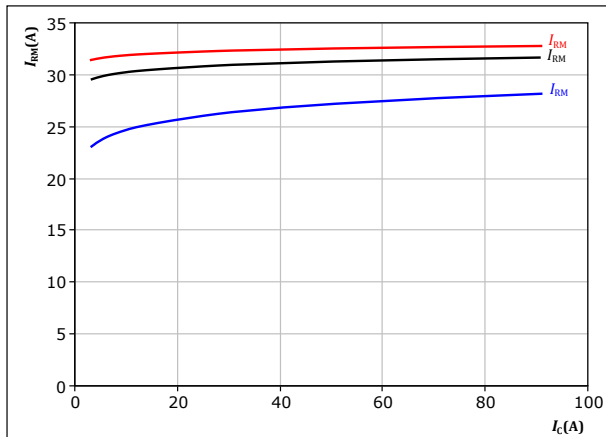
$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

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  
 $R_{gon} = 8$  Ω

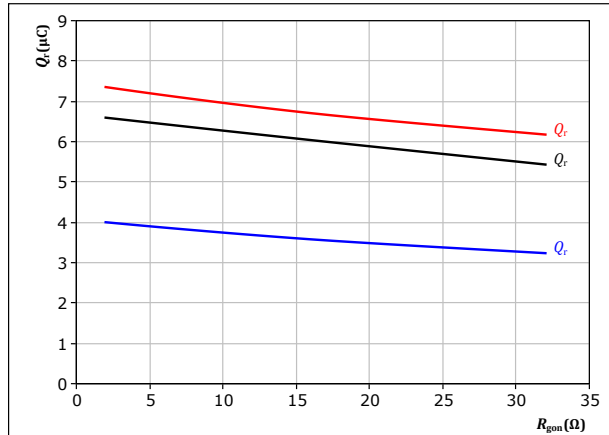
$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

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  
 $I_c = 50$  A

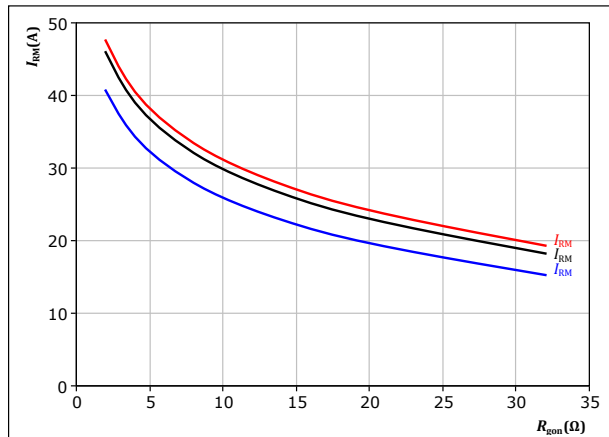
$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

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  
 $I_c = 50$  A

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



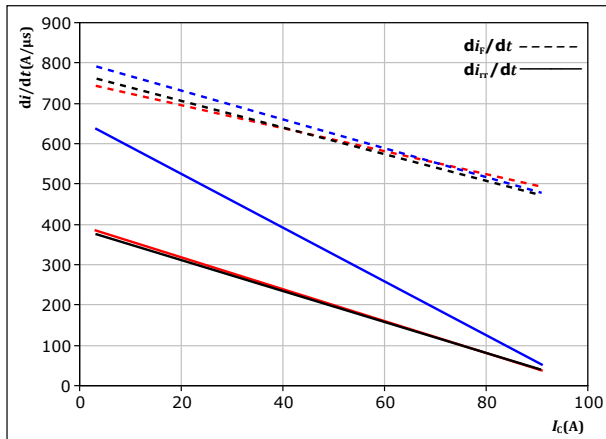
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## Inverter Switching Characteristics

figure 22. FWD

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



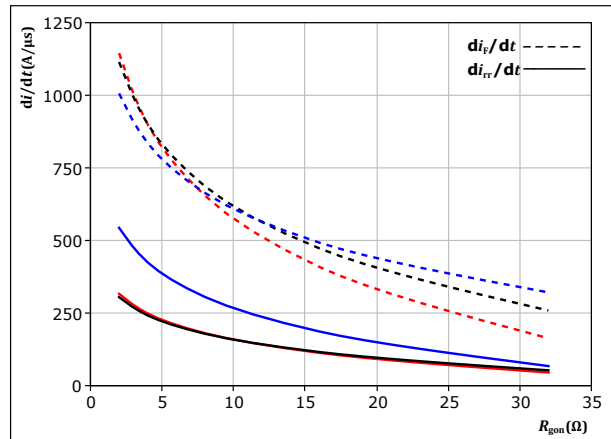
With an inductive load at

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 8 \text{ } \Omega$

$T_j$ : 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  
 $di_f/dt, di_r/dt = f(R_{gon})$



With an inductive load at

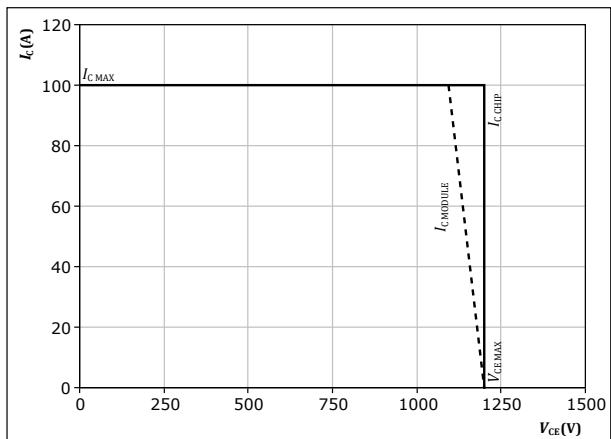
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_C = 50 \text{ A}$

$T_j$ : 25 °C  
125 °C  
150 °C

figure 24. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At  $T_j = 150 \text{ } ^\circ\text{C}$   
 $R_{gon} = 8 \text{ } \Omega$   
 $R_{goff} = 8 \text{ } \Omega$



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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  $E_{off}$ )

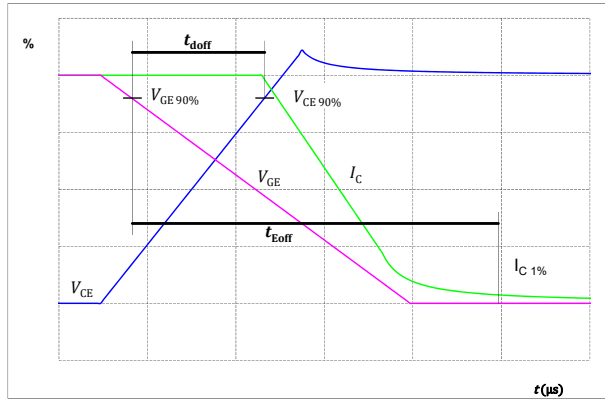


figure 26. IGBT

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

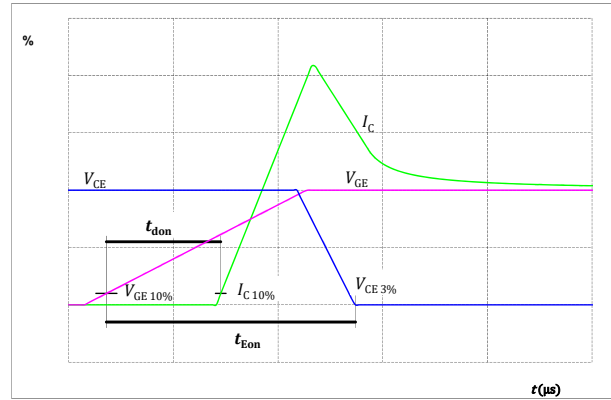


figure 27. IGBT

Turn-off Switching Waveforms & definition of  $t_f$

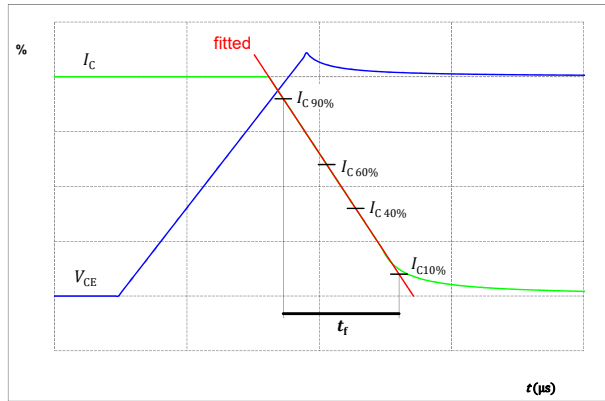
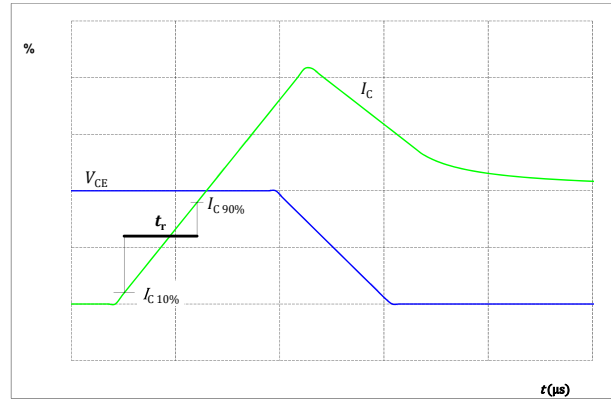


figure 28. IGBT

Turn-on Switching Waveforms & definition of  $t_r$





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## Inverter Switching Definitions

figure 29.

FWD

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

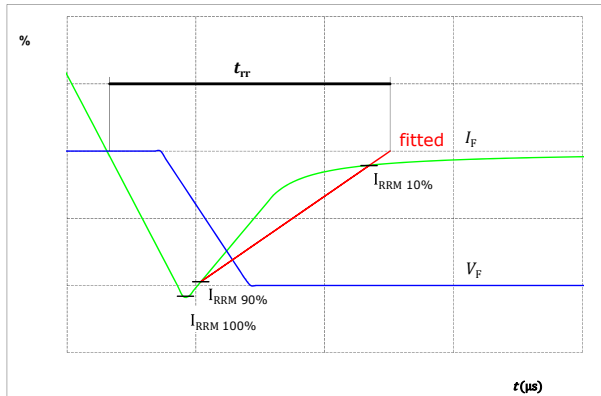
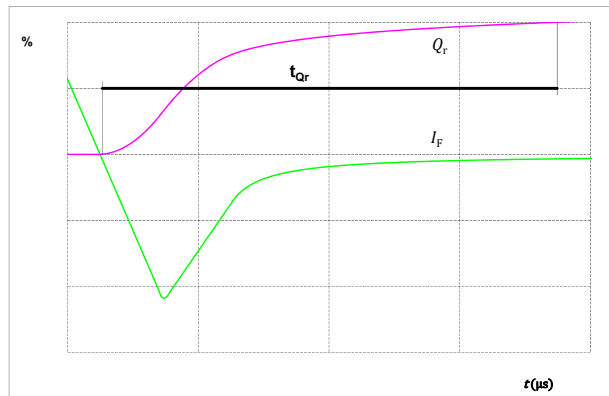


figure 30.

FWD



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





**10-EY126PA050M704-L196F76T**  
datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-EY126PA050M704-L196F76T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EY126PA050M704-L196F76T-/7/

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

### Pin table [mm]

Pin	X	Y	Function
1	32	3,2	G16
2	32	0	Ph3
3	28,8	0	Ph3
4	25,6	0	Ph3
5	19,2	0	Ph2
6	16	0	Ph2
7	12,8	0	Ph2
8	12,8	3,2	G14
9	6,4	0	Ph1
10	3,2	0	Ph1
11	0	0	Ph1
12	0	3,2	G12
13	0	19,2	Therm1
14	0	28,8	Therm2
15	0	44,8	G11
16	0	48	DC-1
17	3,2	48	DC-1
18	6,4	48	DC-1
19	9,6	48	DC-1
20	12,8	48	DC-2
21	12,8	44,8	G13
22	16	48	DC-2
23	19,2	48	DC-2
24	22,4	48	DC-2
25	22,4	44,8	G15
26	25,6	48	DC-3
27	28,8	48	DC-3
28	32	48	DC-3
29	32	44,8	DC-3
30	12,8	25,6	DC+
31	12,8	22,4	DC+
32	12,8	19,2	DC+
33	12,8	16	DC+

### Outline

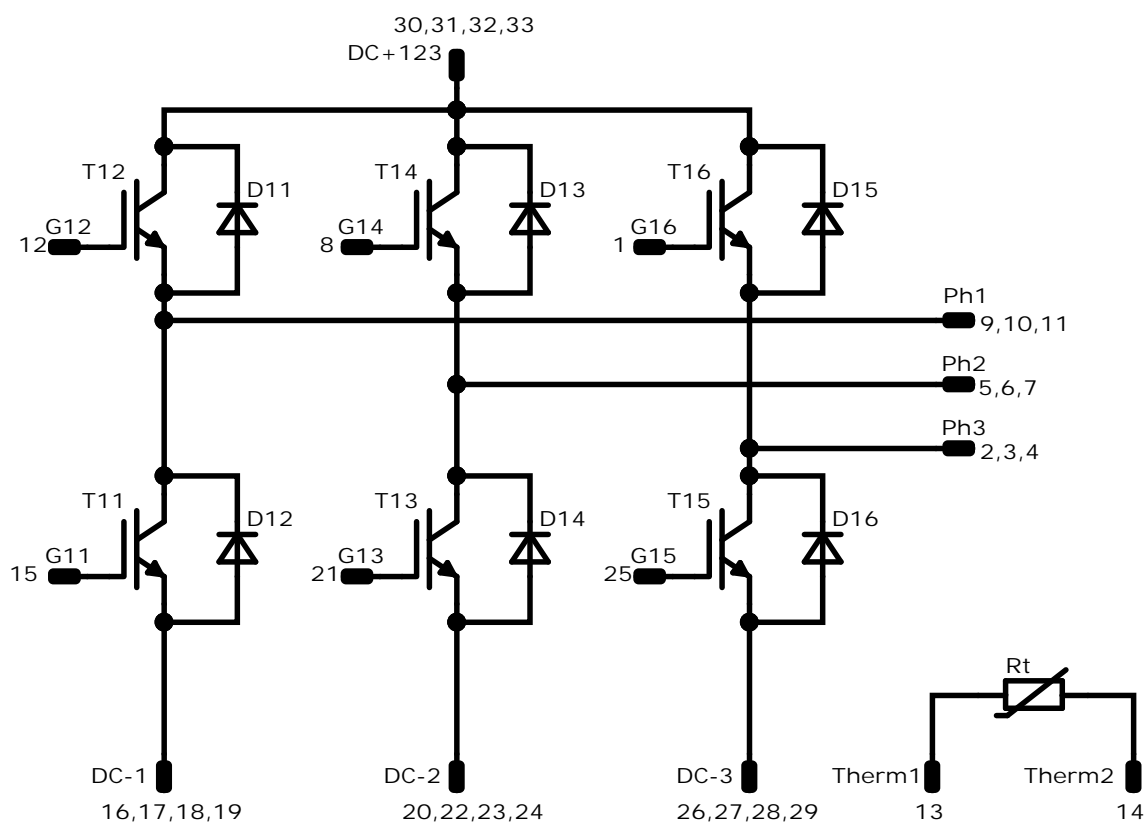
The technical drawing shows the PCB outline with dimensions in mm. The top view shows a rectangular board with mounting tabs on the left and right sides. The bottom view shows the same board with a central circular hole and a grid of pin locations. Dimensions include a total width of 100.0 ± 0.1 mm, a total height of 54.0 ± 0.1 mm, and a central hole diameter of 11.0 ± 0.06 mm. The pin locations are marked with small circles and labeled with pin numbers 1 through 33. The drawing also indicates a tolerance of ±0.03 mm for the pin locations.





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Pinout




Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	1200 V	50 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	1200 V	50 A	Inverter Diode	
Rt	Thermistor			Thermistor	



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10-EY126PA050M704-L196F76T  
datasheet

Packaging instruction				
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ	Sample
Handling instruction				
Handling instructions for <i>flow</i> E2 packages see vincotech.com website.				
Package data				
Package data for <i>flow</i> E2 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
10-EY126PA050M704-L196F76T-D1-14	27 Aug. 2025	Initial Release	

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