



Vincotech

# 10-PC124PA030MS-L629F76Y

datasheet

fastPACK 0 SiC

1200 V / 30 mΩ

## Topology features

- Dual halfbridge
- Integrated DC capacitor
- Kelvin Emitter for improved switching performance
- Open Emitter configuration
- Temperature sensor

## Component features

- High Blocking Voltage with low drain source on state resistance
- High speed SiC-MOSFET technology
- Resistant to Latch-up

## Housing features

- Base isolation: Al<sub>2</sub>O<sub>3</sub>
- Clip-in, reliable mechanical connection, qualified for wave soldering
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

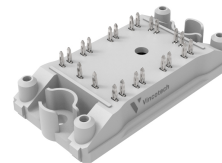
## Target applications

- Charging Stations
- Energy Storage Systems
- Power Supply
- Solar Inverters
- UPS
- Welding & Cutting

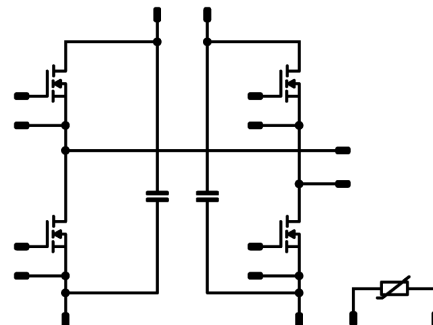
## Types

- 10-PC124PA030MS-L629F76Y

## flow 0 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>				
Drain-source voltage	$V_{DS}$		1200	V
Drain current (DC current)	$I_D$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	40	A
Peak drain current	$I_{DM}$	$t_p$ limited by $T_{jmax}$	160	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	76	W
Gate-source voltage	$V_{GSS}$	static	-5 / 18	V
		dynamic	-10 / 22	V
Maximum Junction Temperature	$T_{jmax}$		175	°C

## Capacitor (DC)

Maximum DC voltage	$V_{MAX}$		1000	V
Operation Temperature	$T_{op}$		... 125	°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			9,19	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

Drain-source on-state resistance	$r_{DS(on)}$		18		40	25 125 150		33,2 41,4 45,7	45 <sup>(1)</sup>	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,004	25	1,7	2,25	2,75	V
Gate to Source Leakage Current	$I_{GSS}$		22	0		25			100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$		0	1200		25			10	μA
Internal gate resistance	$r_g$							2		Ω
Gate charge	$Q_g$		-5/18	800	40	25		108		nC
Short-circuit input capacitance	$C_{iss}$	$f = 500 \text{ kHz}$	0	800	0	25		2600		pF
Short-circuit output capacitance	$C_{oss}$							135		
Reverse transfer capacitance	$C_{rss}$							6		
Diode forward voltage	$V_{SD}$		0		40	25		4,1		V

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (PTM)						1,25		K/W
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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		
Dynamic											
Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	-4/18	600	40	25		20,36		ns	
						125		18,04			
						150		16,98			
Rise time	$t_r$					25		14,58		ns	
						125		12,51			
						150		12,43			
Turn-off delay time	$t_{d(off)}$					25		55,52		ns	
						125		65,02			
						150		67,29			
Fall time	$t_f$					25		15,92		ns	
						125		15,87			
						150		16			
Turn-on energy (per pulse)	$E_{on}$	$Q_{tFWD}=0,234 \mu C$ $Q_{tFWD}=0,67 \mu C$ $Q_{tFWD}=0,807 \mu C$	25		0,719		mWs				
			125		0,832						
			150		0,885						
Turn-off energy (per pulse)	$E_{off}$		25		0,097		mWs				
			125		0,11						
			150		0,114						
Peak recovery current	$I_{RRM}$	$di/dt=2630 A/\mu s$ $di/dt=3888 A/\mu s$ $di/dt=3810 A/\mu s$	25		27,29		A				
			125		38,48						
			150		42,85						
Reverse recovery time	$t_{rr}$		25		15,72		ns				
			125		28,55						
			150		29,11						
Recovered charge	$Q_r$		25		0,234		$\mu C$				
			125		0,67						
			150		0,807						
Reverse recovered energy	$E_{rec}$		25		0,013		mWs				
			125		0,121						
			150		0,156						
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$	25		4187,26		A/ $\mu s$					
		125		1992,84							
		150		2874,64							



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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	

### Capacitor (DC)

#### Static

Capacitance	$C$	DC bias voltage = 0 V				25		2,2		nF
Tolerance							-5		5	%
Dissipation factor		$f = 1$ kHz				25		1,5		%

### Thermistor

#### Static

Rated resistance	$R$					25		22		k $\Omega$
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.

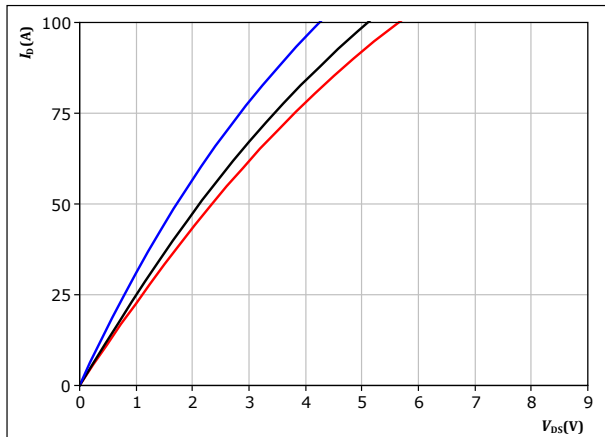


## Inverter Switch Characteristics

figure 1. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$

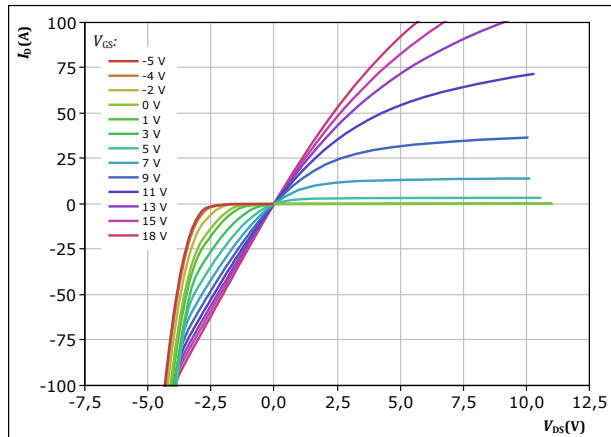


$t_p = 250 \mu s$   
 $V_{GS} = 18 V$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

figure 2. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$

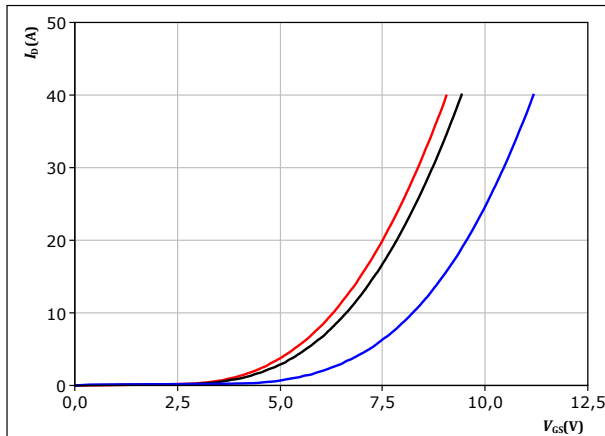


$t_p = 250 \mu s$   
 $T_j = 150 ^\circ C$   
 $V_{GS}$  from -5 V to 18 V in steps of 1 V

figure 3. MOSFET

Typical transfer characteristics

$$I_D = f(V_{GS})$$

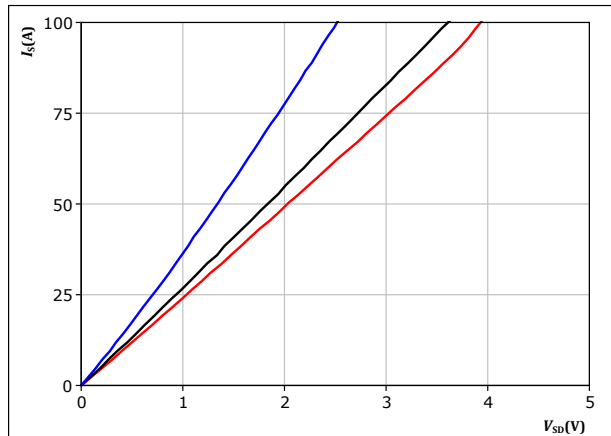


$t_p = 250 \mu s$   
 $V_{DS} = 10 V$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

figure 4. MOSFET

Typical reverse drain current characteristics

$$I_{SD} = f(V_{SD})$$



$t_p = 250 \mu s$   
 $V_{GS} = 18 V$   
 $T_j:$  — 25 °C  
— 125 °C  
— 150 °C

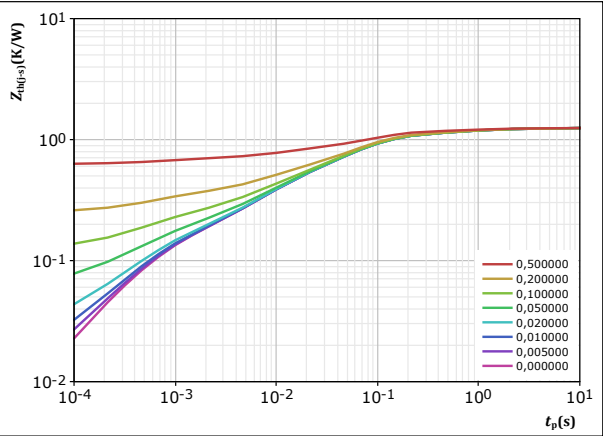


Inverter Switch Characteristics

figure 5. MOSFET

Transient thermal impedance as a function of pulse width

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

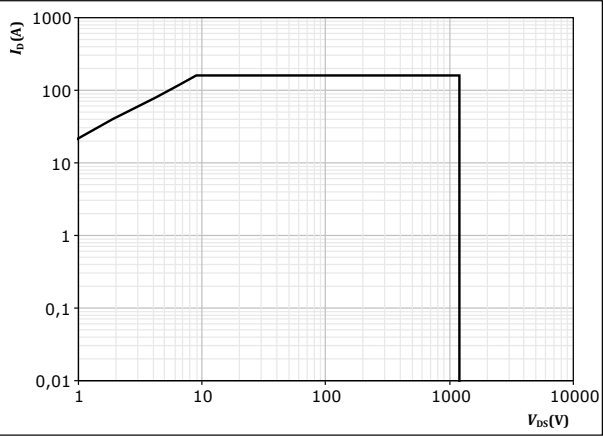


$D =$	$t_p / T$
$R_{th(j-a)} =$	1,247 K/W
MOSFET thermal model values	
$R$ (K/W)	$\tau$ (s)
3,94E-02	4,92E+00
1,67E-01	5,65E-01
6,96E-01	6,37E-02
2,35E-01	7,82E-03
1,14E-01	5,59E-04

figure 6. MOSFET

Safe operating area

$I_D = f(V_{DS})$



$D =$	single pulse
$T_s =$	80 °C
$V_{GS} =$	18 V
$T_j =$	$T_{jmax}$



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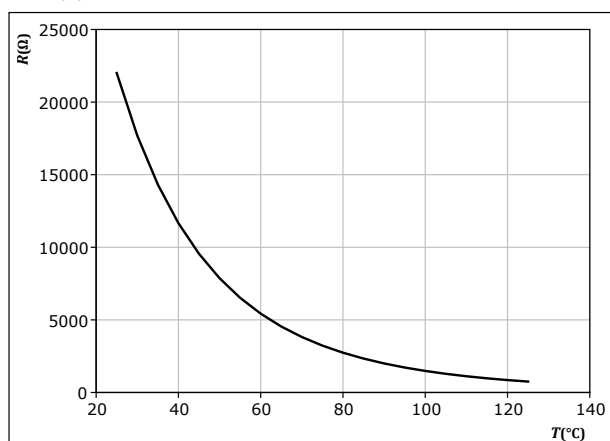
## Thermistor Characteristics

figure 7.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$







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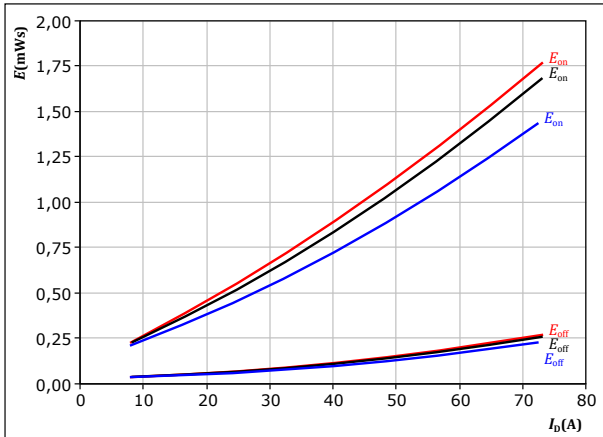
## Inverter Switching Characteristics

figure 8.

MOSFET

Typical switching energy losses as a function of drain current

$$E = f(I_D)$$



With an inductive load at

$V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/18 \text{ V}$   
 $R_{gon} = 8 \text{ } \Omega$   
 $R_{goff} = 8 \text{ } \Omega$

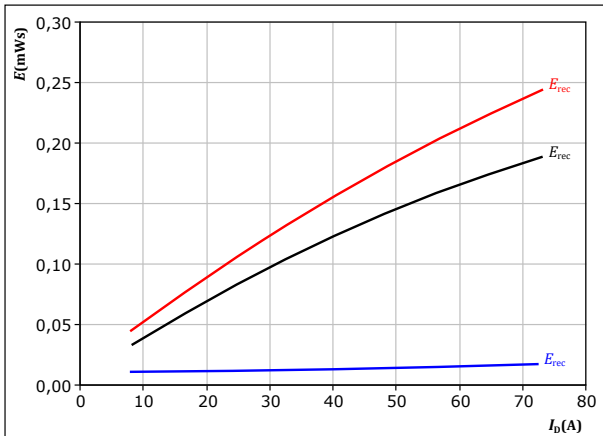
$T_j$ : 25 °C  
125 °C  
150 °C

figure 10.

MOSFET

Typical reverse recovered energy loss as a function of drain current

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



With an inductive load at

$V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/18 \text{ V}$   
 $R_{gon} = 8 \text{ } \Omega$

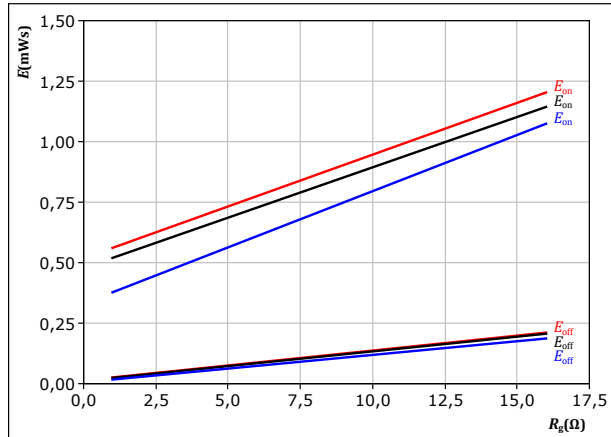
$T_j$ : 25 °C  
125 °C  
150 °C

figure 9.

MOSFET

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

$$E = f(R_g)$$



With an inductive load at

$V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/18 \text{ V}$   
 $I_D = 40 \text{ A}$

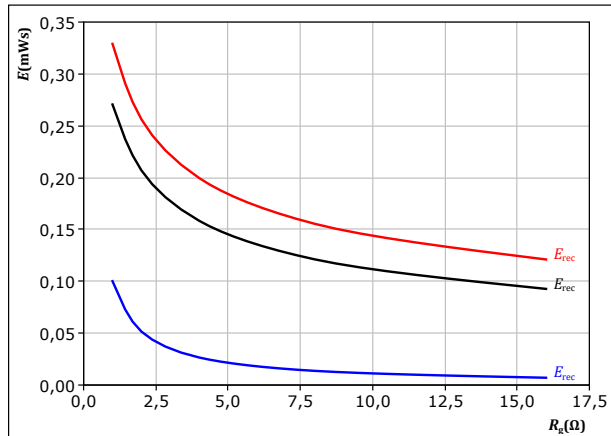
$T_j$ : 25 °C  
125 °C  
150 °C

figure 11.

MOSFET

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

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



With an inductive load at

$V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/18 \text{ V}$   
 $I_D = 40 \text{ A}$

$T_j$ : 25 °C  
125 °C  
150 °C



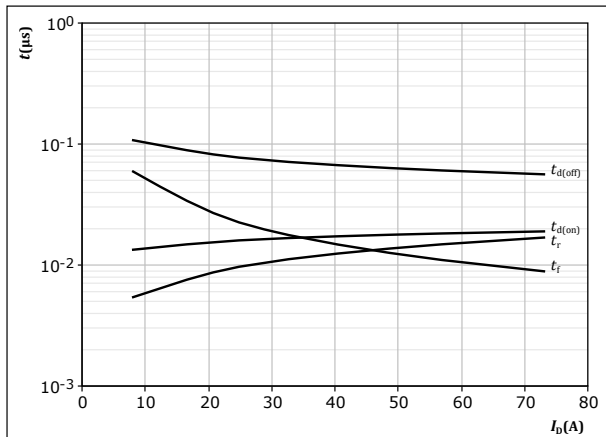
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## Inverter Switching Characteristics

figure 12. MOSFET

Typical switching times as a function of drain current  
 $t = f(I_D)$

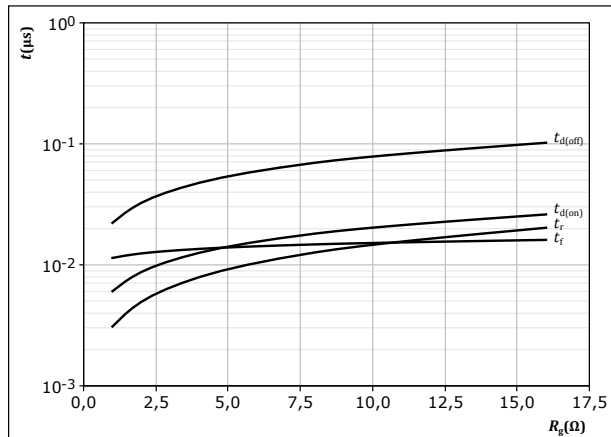


With an inductive load at

$T_j = 150$  °C  
 $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $R_{gon} = 8$  Ω  
 $R_{goff} = 8$  Ω

figure 13. MOSFET

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

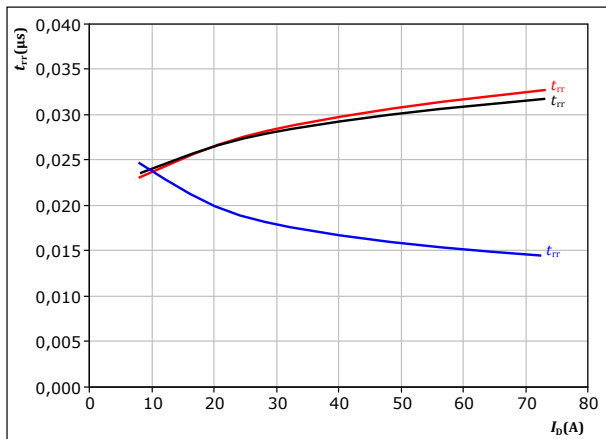


With an inductive load at

$T_j = 150$  °C  
 $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $I_D = 40$  A

figure 14. MOSFET

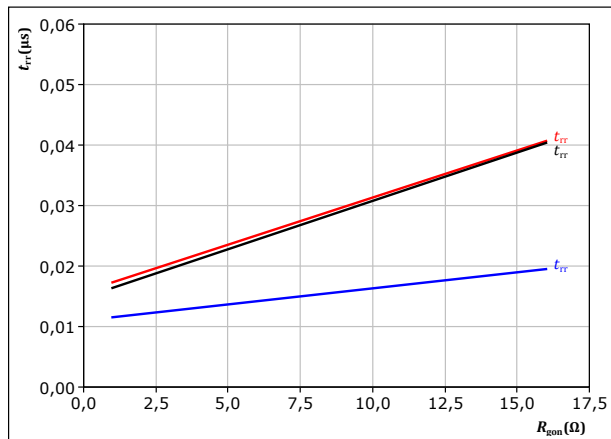
Typical reverse recovery time as a function of drain current  
 $t_{rr} = f(I_D)$



At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $R_{gon} = 8$  Ω  
 $T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 15. MOSFET

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



At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $I_D = 40$  A  
 $T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)



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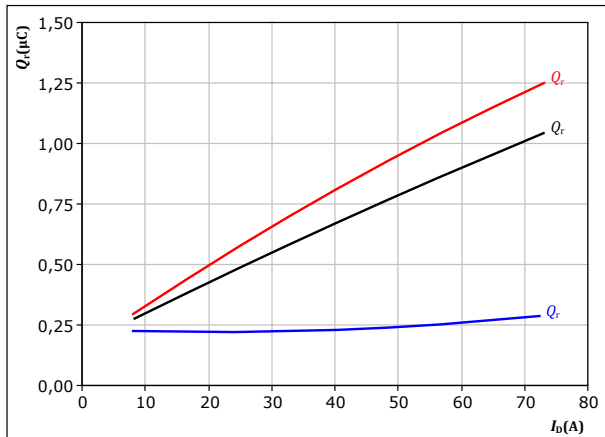
# 10-PC124PA030MS-L629F76Y datasheet

## Inverter Switching Characteristics

figure 16. MOSFET

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$

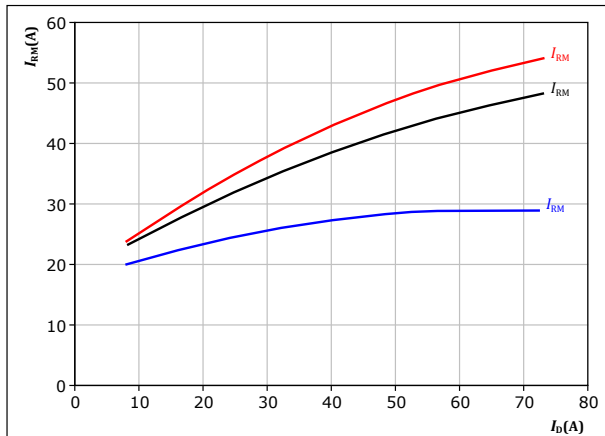


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $R_{gon} = 8$   $\Omega$   
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 18. MOSFET

Typical peak reverse recovery current as a function of drain current

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

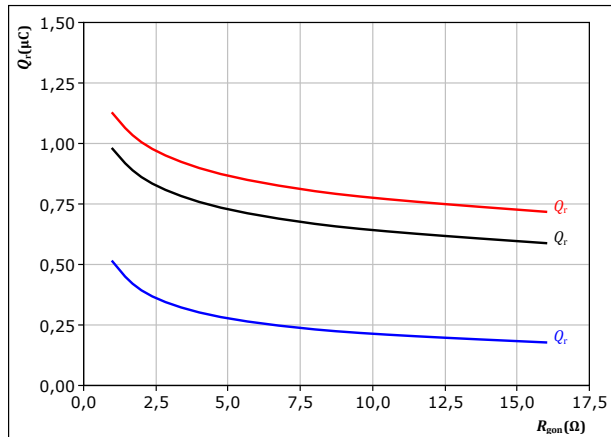


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $R_{gon} = 8$   $\Omega$   
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 17. MOSFET

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

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

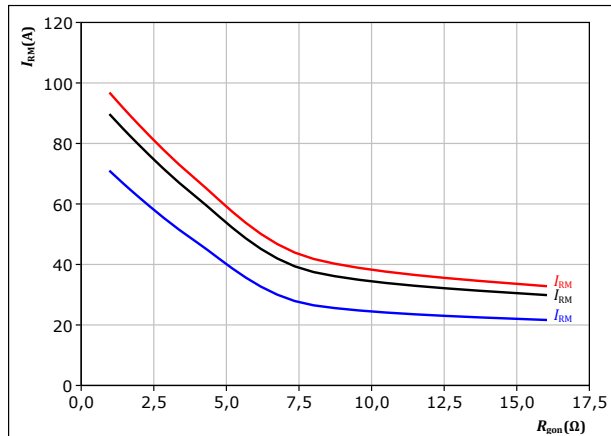


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $I_D = 40$  A  
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 19. MOSFET

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

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



At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $I_D = 40$  A  
 $T_j$ : 25 °C  
125 °C  
150 °C



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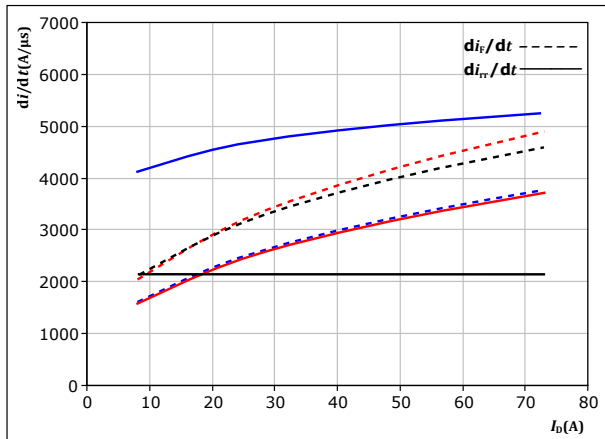
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datasheet

## Inverter Switching Characteristics

figure 20. MOSFET

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

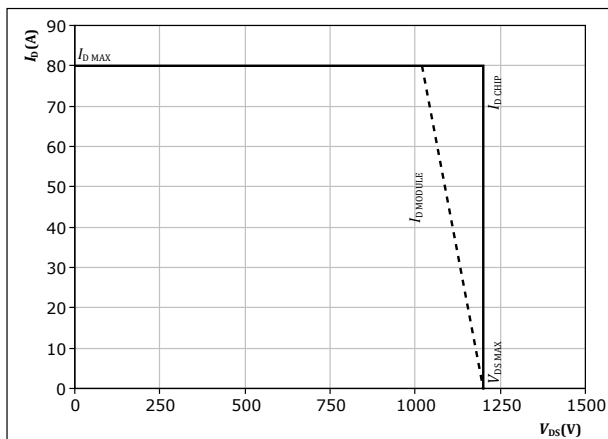


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $R_{gon} = 8$   $\Omega$   
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 22. MOSFET

Reverse bias safe operating area

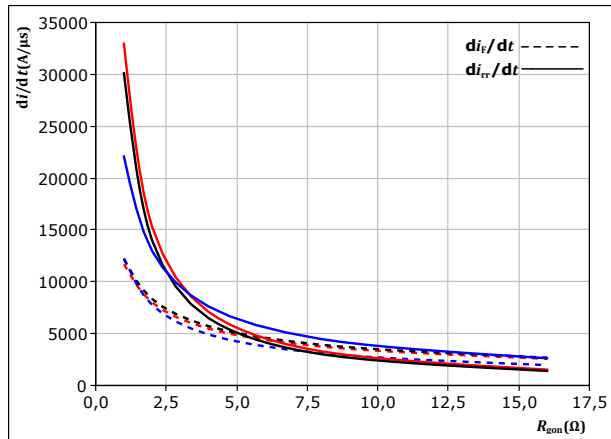
$I_D = f(V_{DS})$



At  $T_j = 150$  °C  
 $R_{gon} = 8$   $\Omega$   
 $R_{goff} = 8$   $\Omega$

figure 21. MOSFET

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



At  $V_{DS} = 600$  V  
 $V_{GS} = -4/18$  V  
 $I_D = 40$  A  
 $T_j$ : 25 °C  
125 °C  
150 °C



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## Inverter Switching Definitions

figure 23. MOSFET

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

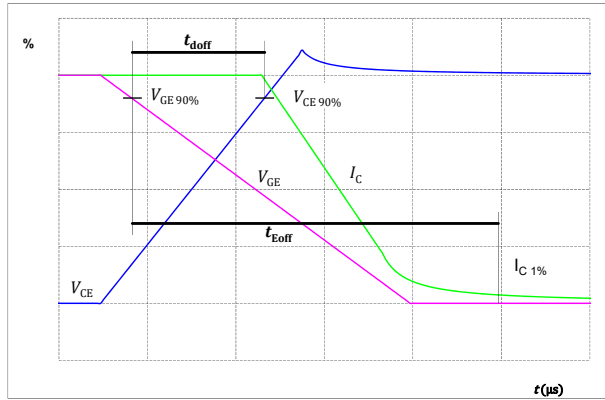


figure 25. MOSFET

Turn-off Switching Waveforms & definition of  $t_f$

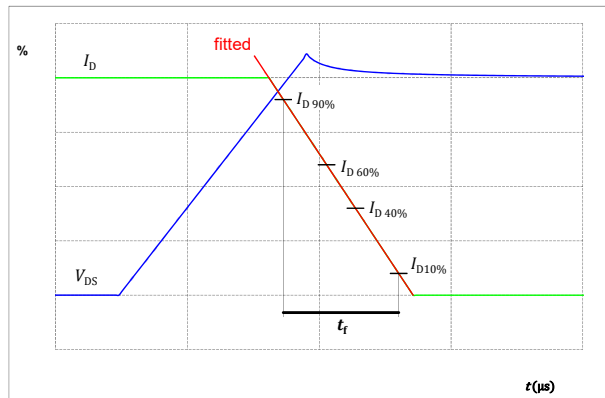


figure 24. MOSFET

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

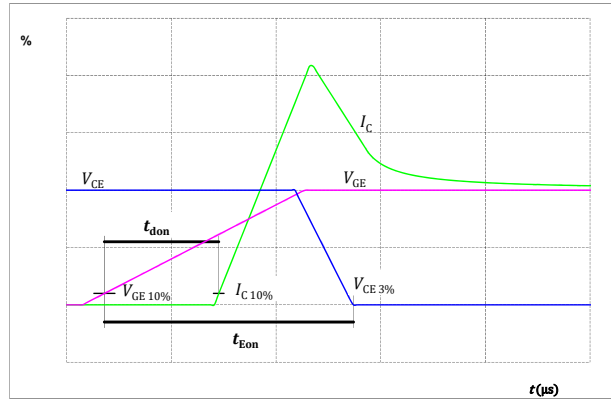
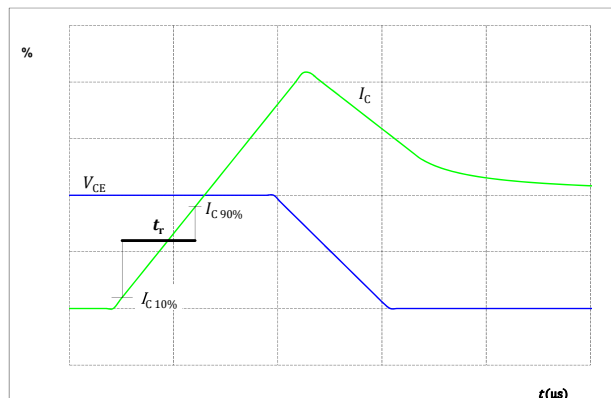


figure 26. MOSFET

Turn-on Switching Waveforms & definition of  $t_r$





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## Inverter Switching Definitions

figure 27. FWD

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

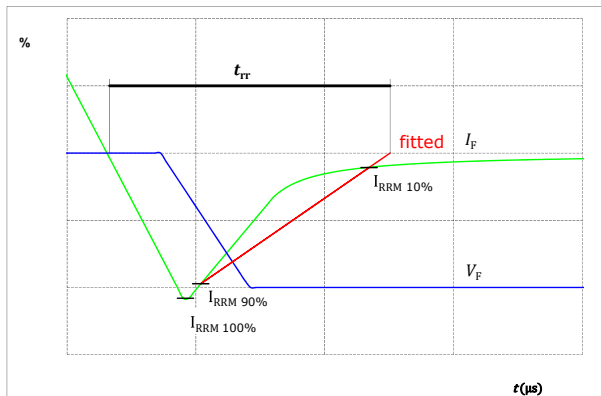


figure 28. FWD

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

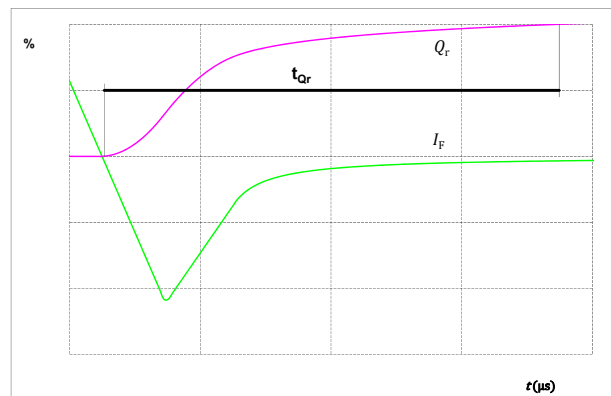
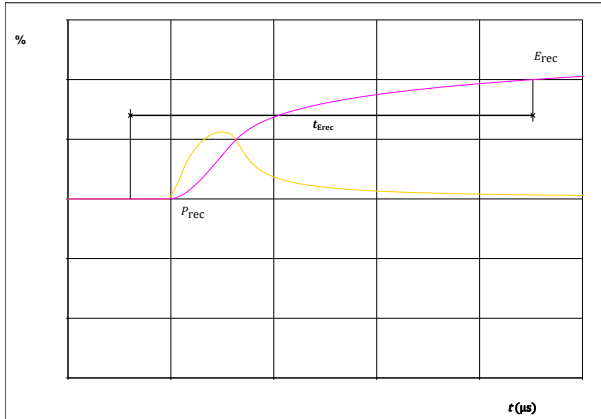


figure 29. FWD

Turn-on Switching Waveforms & definition of  $t_{Erec}$  ( $t_{Erec}$  = integrating time for  $E_{rec}$ )





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Ordering Code	
Version	Ordering Code
Without thermal paste	10-PC124PA030MS-L629F76Y
With thermal paste (5,2 W/mK, PTM6000HV)	10-PC124PA030MS-L629F76Y-/7/

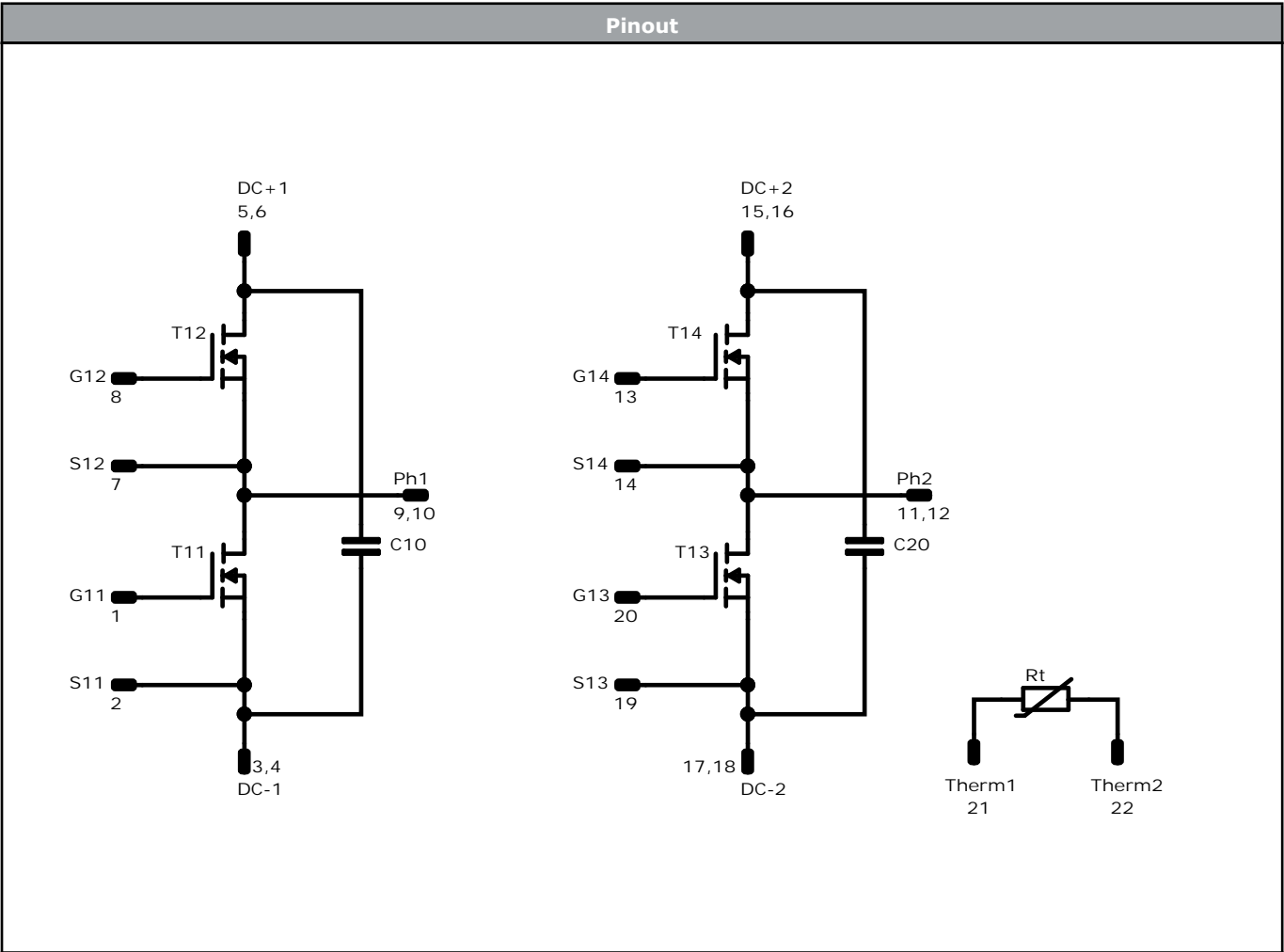
Marking						
	Text	Name	Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNNNN- TTTTIVV	WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver TTTTTIVV	Lot number LLLLL	Serial SSSS	Date code WWYY	

## Outline

Pin table [mm]

Pin	X	Y	Function
1	0	22,5	G11
2	2,9	22,5	S11
3	8,3	22,5	DC-1
4	10,8	22,5	DC-1
5	19,6	22,5	DC+1
6	22,1	22,5	DC+1
7	29,1	22,5	S12
8	32	22,5	G12
9	33,5	17,8	Ph1
10	33,5	15,3	Ph1
11	33,5	7,2	Ph2
12	33,5	4,7	Ph2
13	32	0	G14
14	29,1	0	S14
15	22,1	0	DC+2
16	19,6	0	DC+2
17	10,8	0	DC-2
18	8,3	0	DC-2
19	2,9	0	S13
20	0	0	G13
21	0	8	Therm1
22	0	14,5	Therm2

Tolerance of pinpositions:  $\pm 0,5\text{mm}$  at the end of pins  
Dimension of coordinate axis is only offset without tolerance




Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14	MOSFET	1200 V	30 mΩ	Inverter Switch	
C10, C20	Capacitor	1000 V		Capacitor (DC)	
Rt	Thermistor			Thermistor	





Vincotech

**10-PC124PA030MS-L629F76Y**  
datasheet

Packaging instruction				
Standard packaging quantity (SPQ) 135	>SPQ	Standard	<SPQ	Sample
Handling instruction				
Handling instructions for <i>flow 0</i> packages see vincotech.com website.				
Package data				
Package data for <i>flow 0</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
10-PC124PA030MS-L629F76Y-D1-14	27 Aug. 2025	Initial Release	

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As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
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.