



Vincotech

# 10-PC124PA026ME-L629F91Y

datasheet

fastPACK 0 SiC

1200 V / 26 mΩ

## Topology features

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

## Component features

- Fast intrinsic diode with low reverse recovery
- High blocking voltage with low on-resistance
- High speed switching with low capacitance

## 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

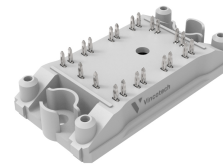
## Target applications

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

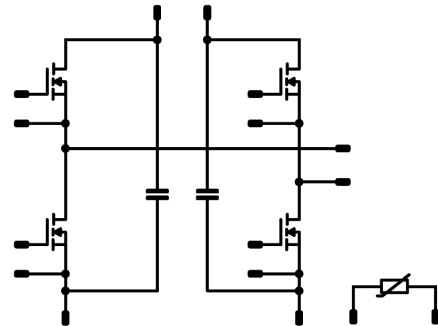
## Types

- 10-PC124PA026ME-L629F91Y

## 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
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### Inverter Switch

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 $T_{jmax}$	152	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	75	W
Gate-source voltage	$V_{GSS}$	static	-4 / 15	V
		dynamic	-8 / 19	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 <sup>(1)</sup>	$r_{DS(on)}$		15		38	25 175	18,2	26 49	33,8	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,0107	25	1,8	2,7	3,6	V
Gate to Source Leakage Current	$I_{GSS}$		15	0		25		10	250	nA
Zero Gate Voltage Drain Current	$I_{DSS}$		0	1200		25		1	50	μA
Internal gate resistance	$r_g$							4,1		Ω
Gate charge	$Q_g$		-4/15	800	38	25		136		nC
Short-circuit input capacitance	$C_{iss}$	$f = 100$ kHz	0	1000	0	25		3470		pF
Short-circuit output capacitance	$C_{oss}$							110		
Reverse transfer capacitance	$C_{rss}$							9		
Diode forward voltage	$V_{SD}$		0		19,5	25		4,8		V

**Thermal**

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						1,27		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	$t_{d(on)}$	$R_{gon} = 4\ \Omega$ $R_{goff} = 4\ \Omega$	-4/15	600	38	25 125 150		20,41 19,12 18,69		ns	
Rise time	$t_r$					25 125 150		7,47 7,06 7,13		ns	
Turn-off delay time	$t_{d(off)}$					25 125 150		54,85 60,36 61,51		ns	
Fall time	$t_f$					25 125 150		15,82 15,02 14,13		ns	
Turn-on energy (per pulse)	$E_{on}$	$Q_{rFWD}=0,34\ \mu C$ $Q_{rFWD}=0,6\ \mu C$ $Q_{rFWD}=0,778\ \mu C$				25 125 150		0,414 0,445 0,468		mWs	
Turn-off energy (per pulse)	$E_{off}$					25 125 150		0,178 0,193 0,199		mWs	
Peak recovery current	$I_{RRM}$	$di/dt=5949\ A/\mu s$ $di/dt=7222\ A/\mu s$ $di/dt=7517\ A/\mu s$				25 125 150		43,51 56,18 63,33		A	
Reverse recovery time	$t_{rr}$					25 125 150		13,45 19,14 21,44		ns	
Recovered charge	$Q_r$					25 125 150		0,34 0,6 0,778		$\mu C$	
Reverse recovered energy	$E_{rec}$					25 125 150		0,112 0,246 0,333		mWs	
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		8165,91 6915,65 6797,43		A/ $\mu s$	



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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.



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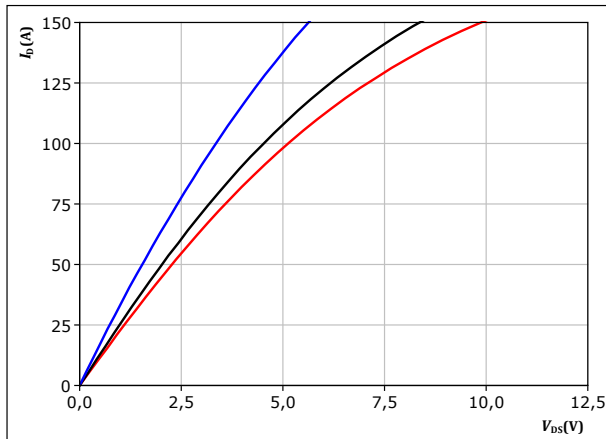
# 10-PC124PA026ME-L629F91Y datasheet

## Inverter Switch Characteristics

figure 1. MOSFET

Typical output characteristics including  $R_{DS(on)} + R_{DS(off)}$

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

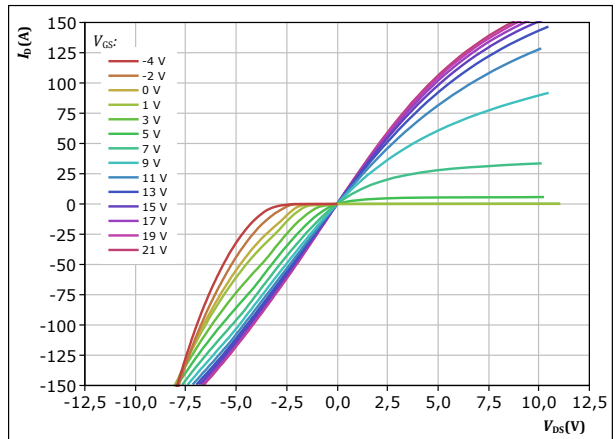


$t_p = 250 \mu s$   
 $V_{GS} = 15 V$   
 $T_j: 25^\circ C, 125^\circ C, 150^\circ C$

figure 2. MOSFET

Typical output characteristics including  $R_{DS(on)} + R_{DS(off)}$

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

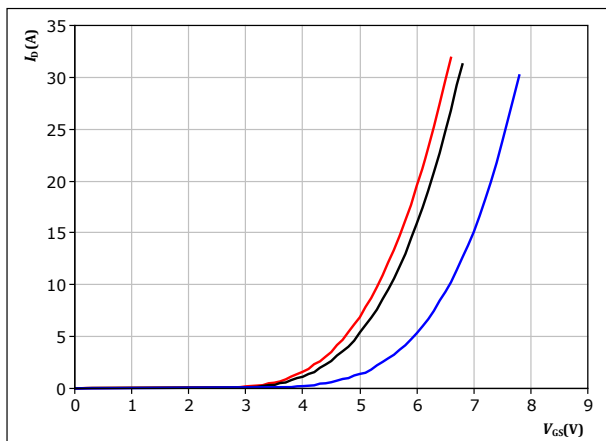


$t_p = 250 \mu s$   
 $T_j = 150^\circ C$   
 $V_{GS}$  from -4 V to 21 V in steps of 2 V

figure 3. MOSFET

Typical transfer characteristics

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

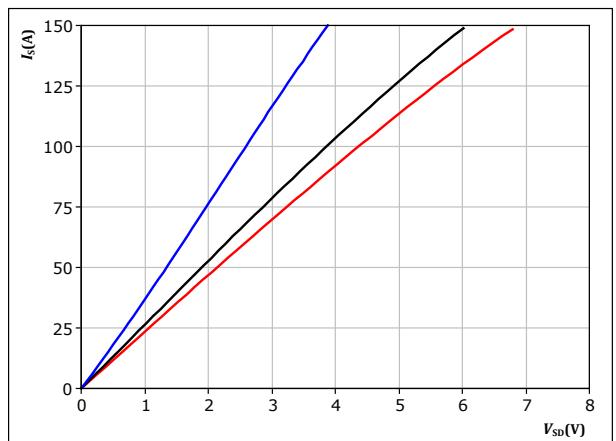


$t_p = 250 \mu s$   
 $V_{DS} = 20 V$   
 $T_j: 25^\circ C, 125^\circ C, 150^\circ C$

MOSFET

Typical reverse drain current characteristics including  $R_{DS(on)} + R_{DS(off)}$

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



$t_p = 250 \mu s$   
 $V_{GS} = 15 V$   
 $T_j: 25^\circ C, 125^\circ C, 150^\circ C$



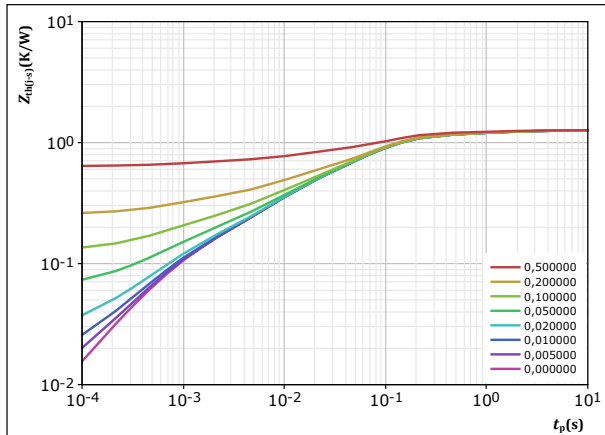
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## Inverter Switch Characteristics

figure 5. MOSFET

Transient thermal impedance as a function of pulse width

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

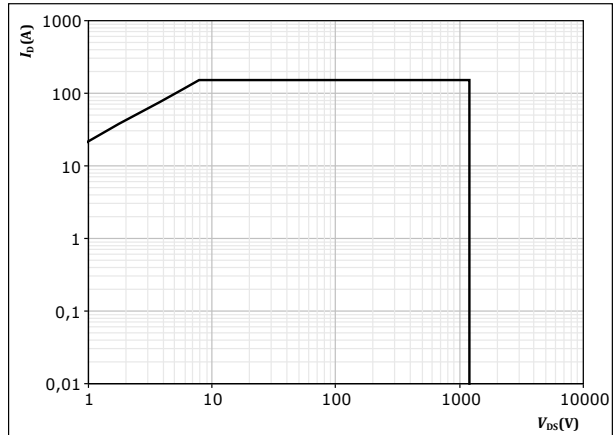


$D =$	$t_p / T$
$R_{th(j-a)} =$	1,267 K/W
MOSFET thermal model values	
$R$ (K/W)	$\tau$ (s)
4,09E-02	7,07E+00
1,32E-01	7,50E-01
7,64E-01	7,88E-02
2,42E-01	8,81E-03
9,63E-02	7,62E-04

figure 6. MOSFET

Safe operating area

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

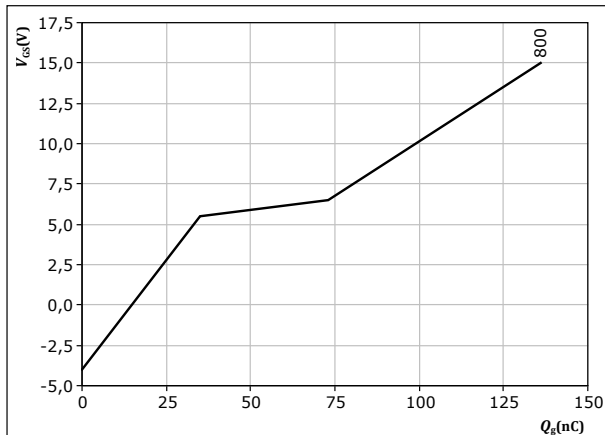


$D =$	single pulse
$T_a =$	80 °C
$V_{GS} =$	15 V
$T_j =$	$T_{jmax}$

figure 7. MOSFET

Gate voltage vs gate charge

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



$I_D =$	38 A
$T_j =$	25 °C



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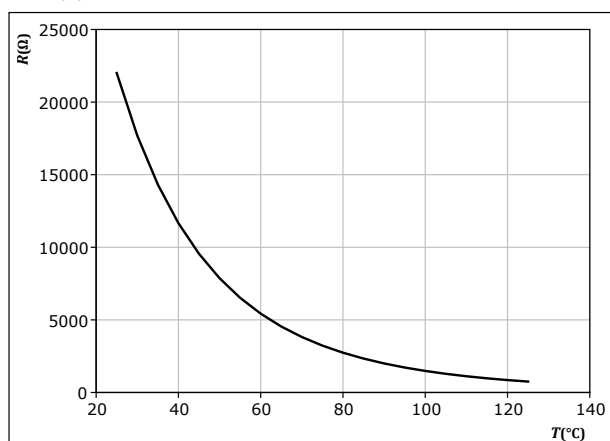
## Thermistor Characteristics

figure 8.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$







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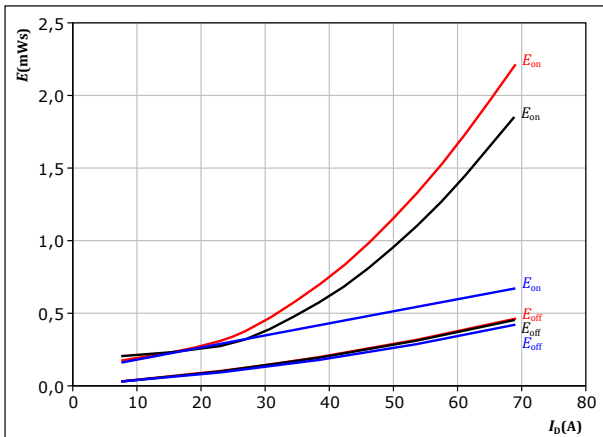
## Inverter Switching Characteristics

figure 9.

MOSFET

Typical switching energy losses as a function of drain current

$$E = f(I_D)$$



With an inductive load at

$V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 4$   $\Omega$   
 $R_{goff} = 4$   $\Omega$

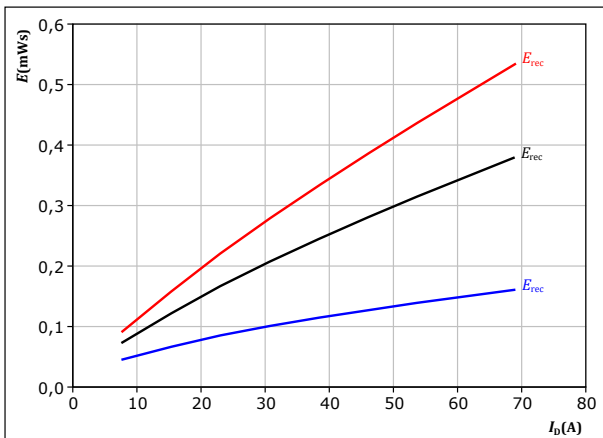
$T_j$ : 25 °C  
125 °C  
150 °C

figure 11.

MOSFET

Typical reverse recovered energy loss as a function of drain current

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



With an inductive load at

$V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 4$   $\Omega$

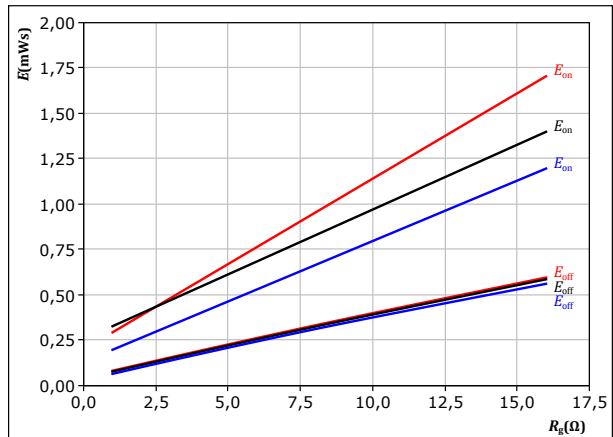
$T_j$ : 25 °C  
125 °C  
150 °C

figure 10.

MOSFET

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

$$E = f(R_g)$$



With an inductive load at

$V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $I_D = 38$  A

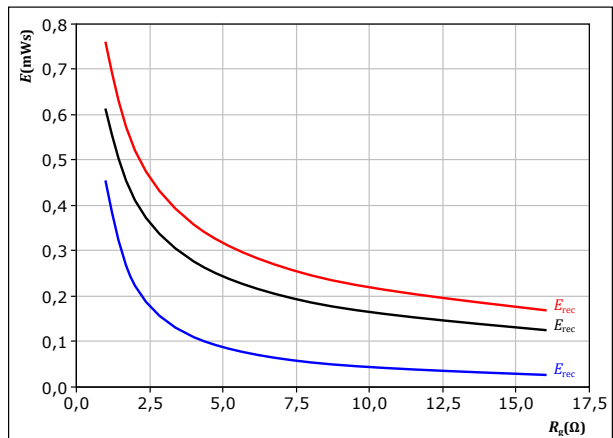
$T_j$ : 25 °C  
125 °C  
150 °C

figure 12.

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

$V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $I_D = 38$  A

$T_j$ : 25 °C  
125 °C  
150 °C



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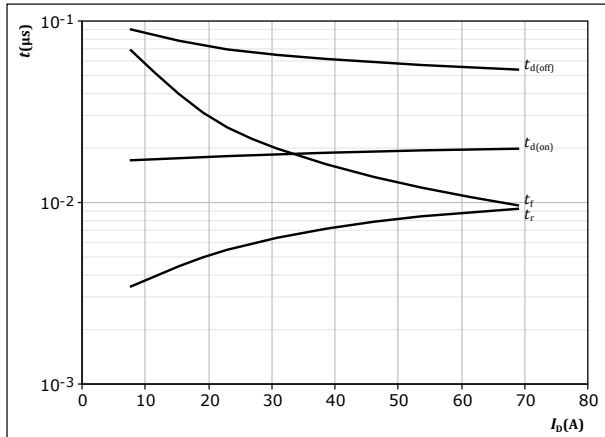
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## Inverter Switching Characteristics

figure 13.

MOSFET

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



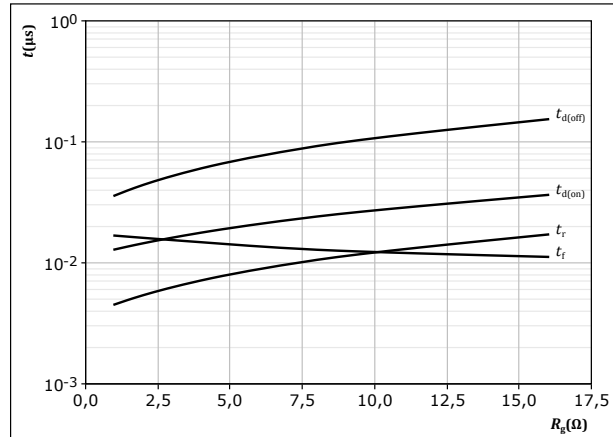
With an inductive load at

$T_j = 150$  °C  
 $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 4$   $\Omega$   
 $R_{goff} = 4$   $\Omega$

figure 14.

MOSFET

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



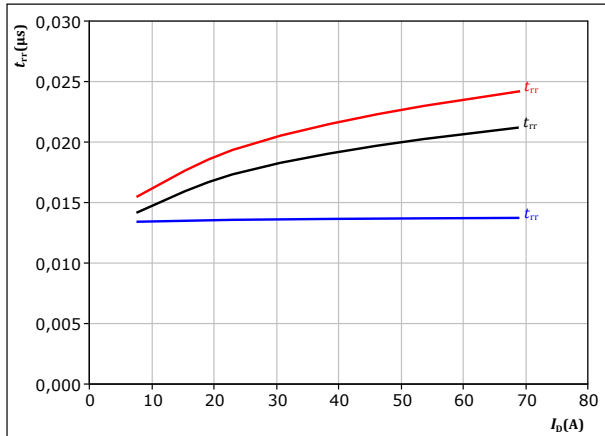
With an inductive load at

$T_j = 150$  °C  
 $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $I_D = 38$  A

figure 15.

MOSFET

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

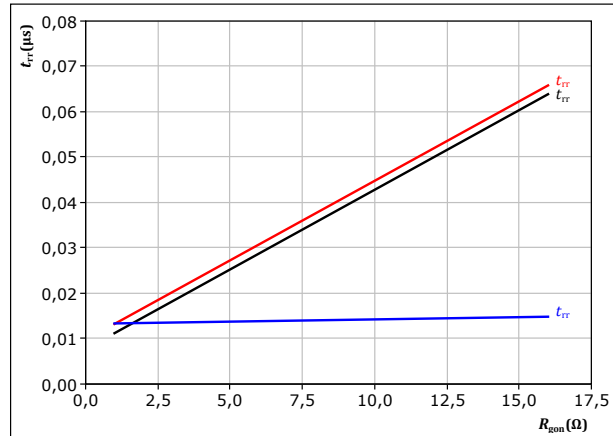


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 4$   $\Omega$   
 $T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 16.

MOSFET

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



At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $I_D = 38$  A  
 $T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)



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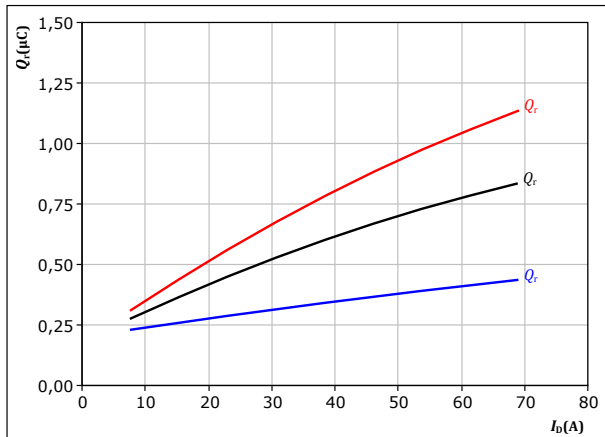
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## Inverter Switching Characteristics

figure 17. MOSFET

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$

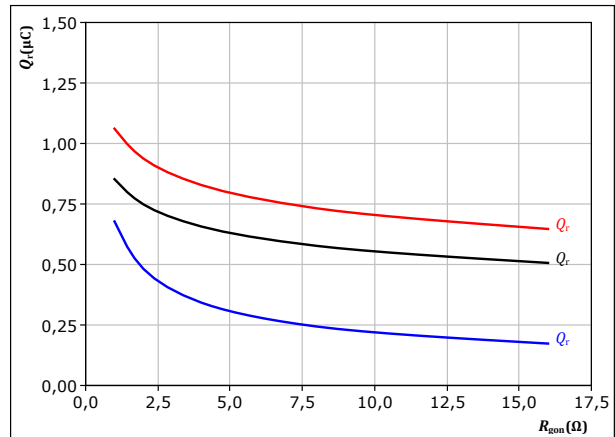


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 4$  Ω  
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 18. MOSFET

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

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

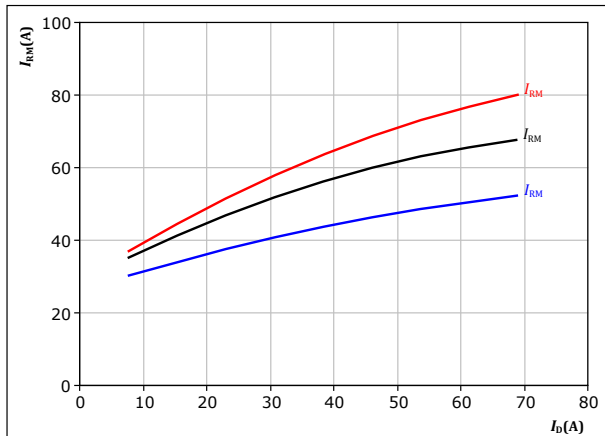


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $I_D = 38$  A  
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 19. MOSFET

Typical peak reverse recovery current as a function of drain current

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

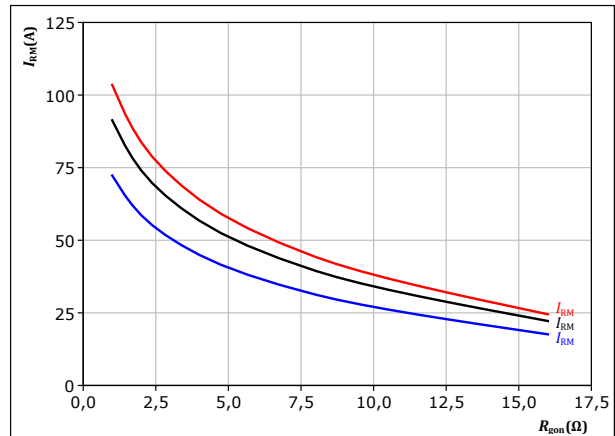


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 4$  Ω  
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 20. 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  
 $V_{GS} = -4/15$  V  
 $I_D = 38$  A  
 $T_j$ : 25 °C  
125 °C  
150 °C



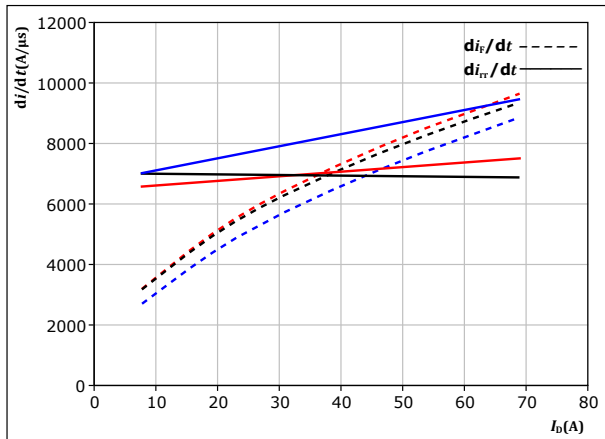
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## Inverter Switching Characteristics

figure 21. MOSFET

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

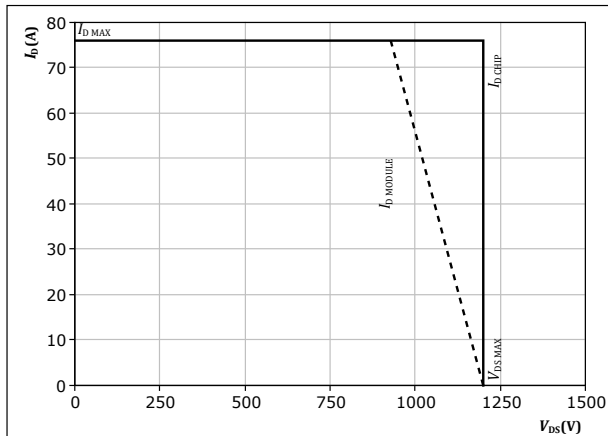


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 4$   $\Omega$   
 $T_j = 25$  °C  
 $T_j = 125$  °C  
 $T_j = 150$  °C

figure 23. MOSFET

Reverse bias safe operating area

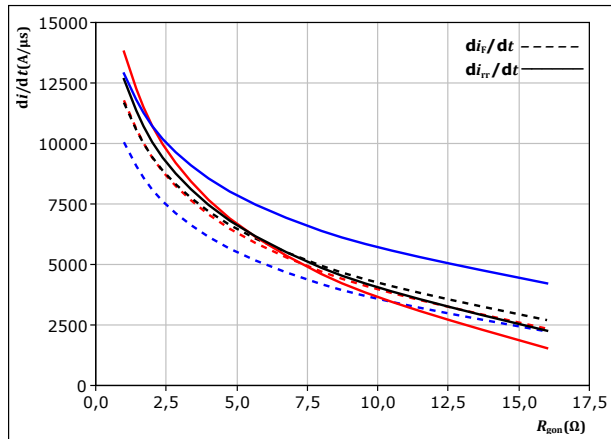
$I_D = f(V_{DS})$



At  $T_j = 150$  °C  
 $R_{gon} = 4$   $\Omega$   
 $R_{goff} = 4$   $\Omega$

figure 22. 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  
 $V_{GS} = -4/15$  V  
 $I_D = 38$  A  
 $T_j = 25$  °C  
 $T_j = 125$  °C  
 $T_j = 150$  °C



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## Inverter Switching Definitions

figure 24. MOSFET

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

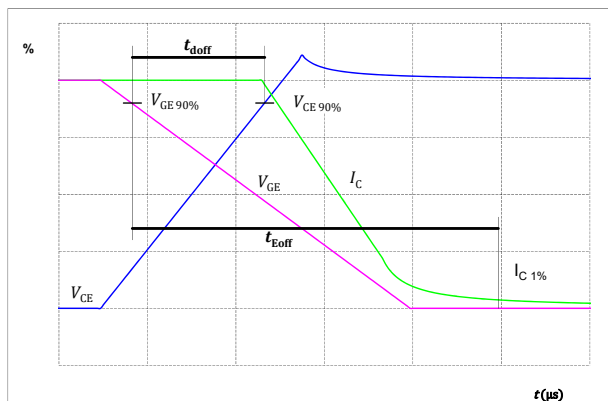


figure 25. MOSFET

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

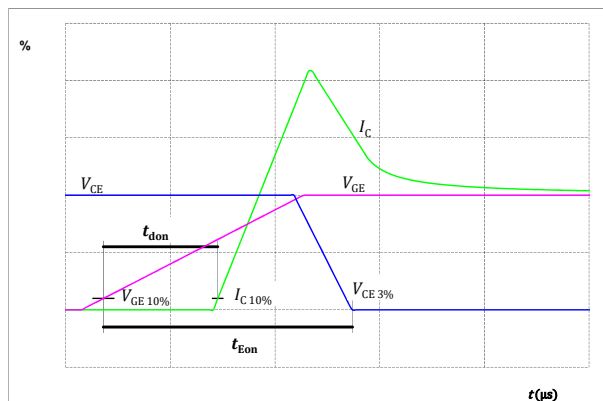


figure 26. MOSFET

Turn-off Switching Waveforms & definition of  $t_f$

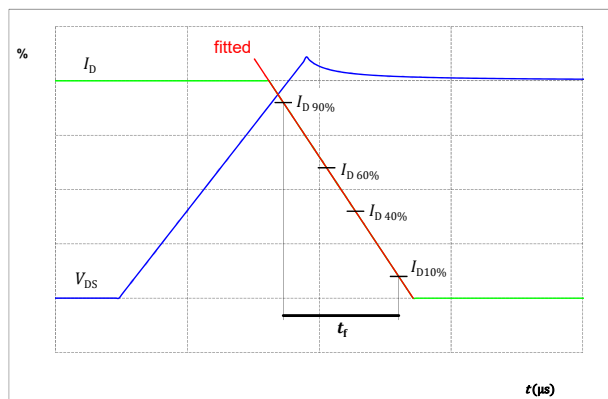
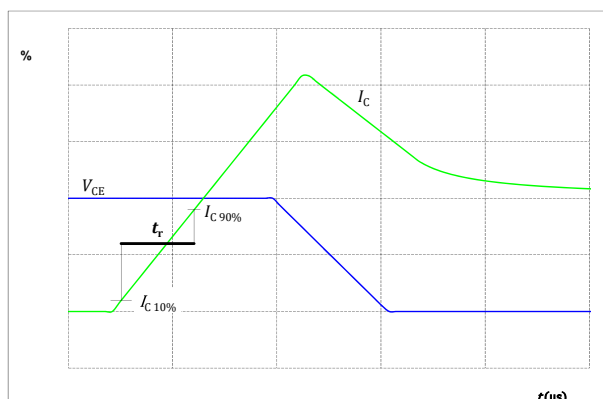


figure 27. MOSFET

Turn-on Switching Waveforms & definition of  $t_r$





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## Inverter Switching Definitions

figure 28.

FWD

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



figure 29.

FWD

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

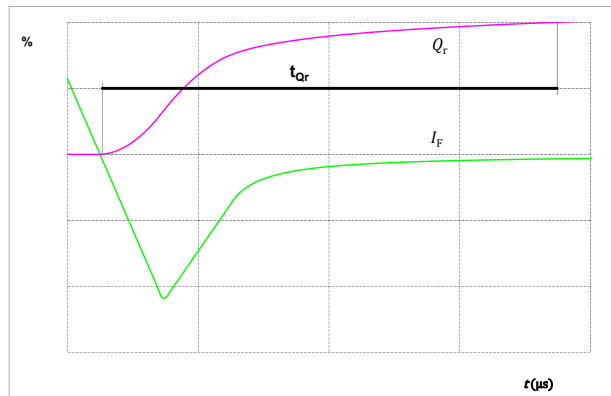
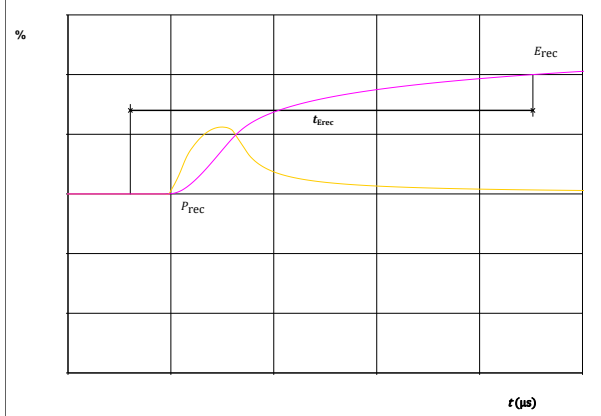


figure 30.

FWD

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





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# 10-PC124PA026ME-L629F91Y

datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-PC124PA026ME-L629F91Y
With thermal paste (5,2 W/mK, PTM6000HV)	10-PC124PA026ME-L629F91Y-/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	

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

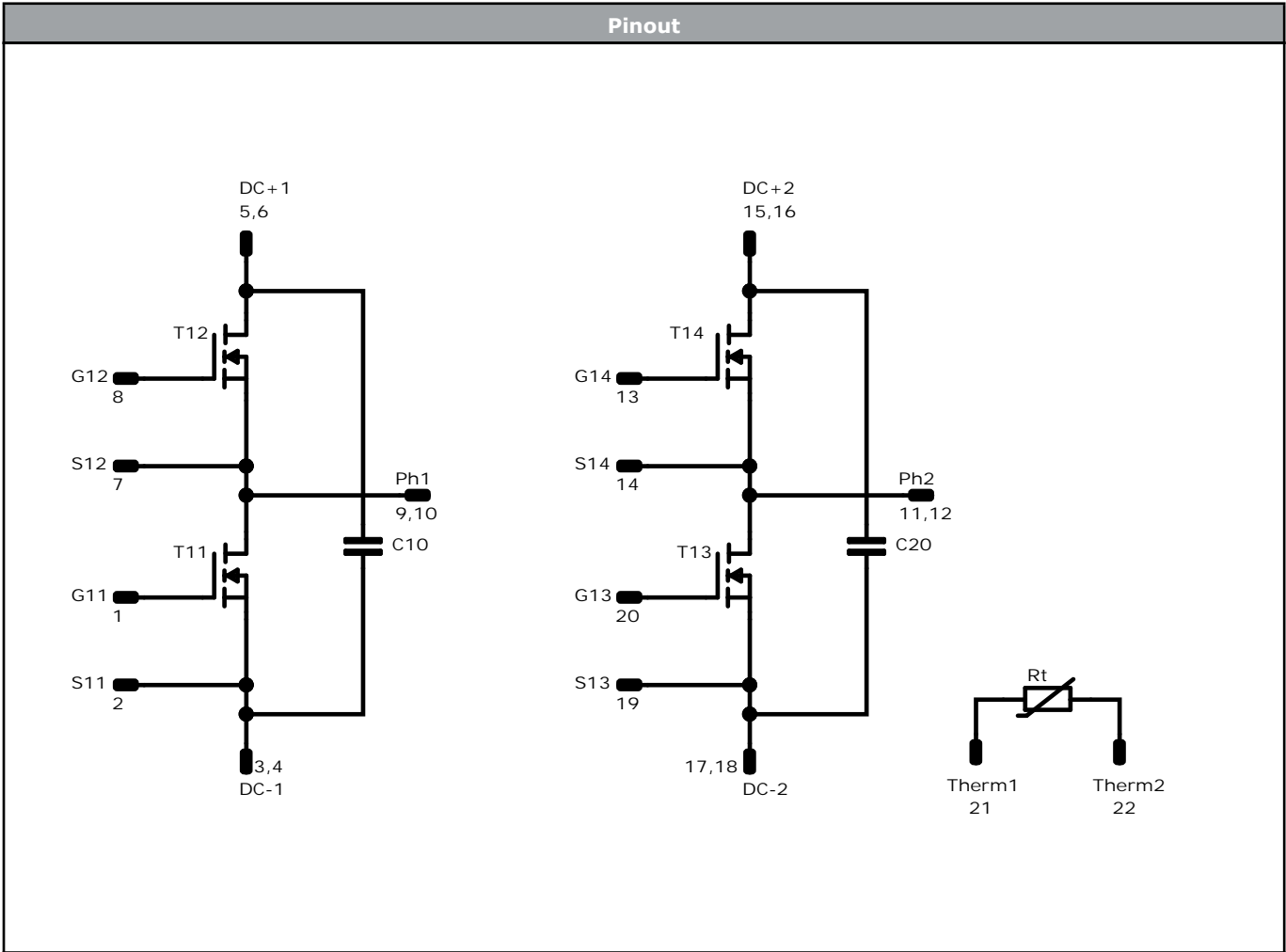
### Outline

The drawing shows a component with a rectangular body and four mounting feet. The top view shows pins 1 through 14, and the bottom view shows pins 15 through 22. Dimensions are given in millimeters. The X-axis is horizontal, and the Y-axis is vertical. A note indicates the center of the press-fit pinhead for connection parameters. A tolerance note at the bottom right states: Tolerance of pinpositions: ±0.5mm at the end of pins. Dimension of coordinate axis is only offset without tolerance.



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datasheet



Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14	MOSFET	1200 V	26 mΩ	Inverter Switch	
C10, C20	Capacitor	1000 V		Capacitor (DC)	
Rt	Thermistor			Thermistor	





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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-PC124PA026ME-L629F91Y-D1-14	1 Jun. 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.