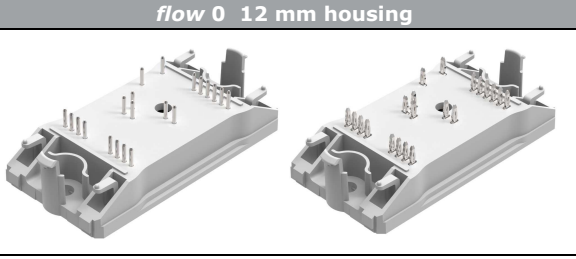
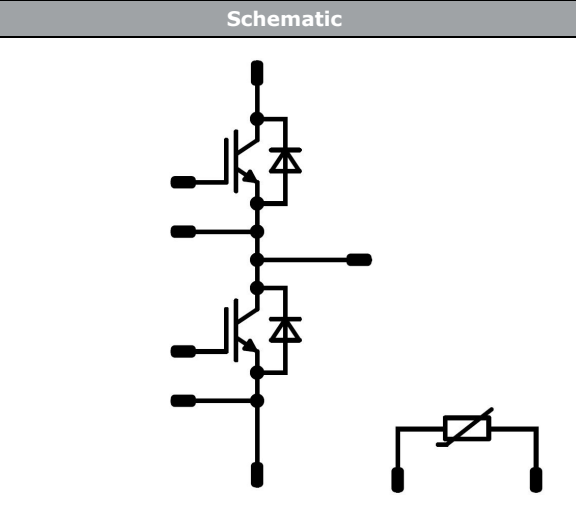




Vincotech

10-FZ122PB100SH01-M819F38
10-PZ122PB100SH01-M819F38Y
 datasheet

<i>flow</i> PHASE 0 + NTC	1200 V / 100 A
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #cccccc; margin: 0;">Features</p> <ul style="list-style-type: none"> High efficiency IGBT4 half-bridge Full current FWD Thermistor </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #cccccc; margin: 0;">Target applications</p> <ul style="list-style-type: none"> Industrial Drives Power Supply Solar Inverters UPS Welding & Cutting </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #cccccc; margin: 0;">Types</p> <ul style="list-style-type: none"> 10-FZ122PB100SH01-M819F38 10-PZ122PB100SH01-M819F38Y </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #cccccc; margin: 0;"><i>flow</i> 0 12 mm housing</p>  </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #cccccc; margin: 0;">Schematic</p>  </div>

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Half-Bridge Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C		100	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	267	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$ $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$	10	µs
Maximum junction temperature	T_{jmax}		175	°C



Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Half-Bridge Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	80	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	550	A
Surge current capability	I^2t		1513	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	176	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
		AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			min. 12,7	mm
Clearance		12 mm housing solder pin / Press-fit pin	9,12 / 9,54	mm
Comparative Tracking Index	CTI		> 200	

*100 % tested in production



Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	

Half-Bridge Switch

Static

Parameter	Symbol	Conditions	V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$				0,0038	25	5,1	5,8	6,4	V
Collector-emitter saturation voltage	V_{CEsat}		15			100	25 150	1,78	1,95 2,39	2,42	V
Collector-emitter cut-off current	I_{CES}		0	1200			25			1,3	μA
Gate-emitter leakage current	I_{GES}		20	0			25			120	nA
Internal gate resistance	r_g								7,5		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25			25		6150		pF
Reverse transfer capacitance	C_{res}								345		

Thermal

Parameter	Symbol	Conditions	V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{600} = 220 \text{ W/mk}$ (KU-ALF5)							0,36		K/W

Dynamic

Parameter	Symbol	Conditions	V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	$R_{gon} = 2 \Omega$ $R_{goff} = 2 \Omega$	± 15	600	100	100	25		145		ns
Rise time	t_r						125		158		
							150		162		
							25		30		
Turn-off delay time	$t_{d(off)}$						125		34		
							150		35		
		25		226							
Fall time	t_f	125		280							
		150		296							
		25		28							
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 6,6 \mu C$ $Q_{tFWD} = 13,6 \mu C$ $Q_{tFWD} = 16,4 \mu C$	± 15	600	100	100	25		5,418		mWs
							125		8,228		
							150		9,217		
Turn-off energy (per pulse)	E_{off}						25		4,109		
							125		6,315		
							150		6,928		



Vincotech

10-FZ122PB100SH01-M819F38
10-PZ122PB100SH01-M819F38Y
 datasheet

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit	
		V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max			
		V_{GS} [V]	V_{DS} [V]	I_D [A]							
			V_F [V]	I_F [A]							
Half-Bridge Diode											
Static											
Forward voltage	V_F			100	25 150	1	2,47 2,45	2,6		V	
Reverse leakage current	I_R			1200	25 150			120 17700		μA	
Thermal											
Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{foil}=220$ W/mk (KU-ALF5)						0,54			K/W
Dynamic											
Peak recovery current	I_{RRM}				25 125 150		89 110 120			A	
Reverse recovery time	t_{rr}				25 125 150		190 363 401			ns	
Recovered charge	Q_r	$di/dt = 3733$ A/μs $di/dt = 3472$ A/μs $di/dt = 3322$ A/μs	±15	600	100		6,580 13,640 16,374			μC	
Reverse recovered energy	E_{rec}				25 125 150		2,444 5,408 6,456			mWs	
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$				25 125 150		3570 2623 2154			A/μs	
Thermistor											
Rated resistance	R				25		22			kΩ	
Deviation of R_{100}	$\Delta_{R/R}$	$R_{100} = 1484$ Ω			100	-5		5		%	
Power dissipation	P				25		5			mW	
Power dissipation constant					25		1,5			mW/K	
B-value	$B_{(25/50)}$	Tol. ±1 %			25		3962			K	
B-value	$B_{(25/100)}$	Tol. ±1 %			25		4000			K	
V_{in} cotech NTC Reference									I		

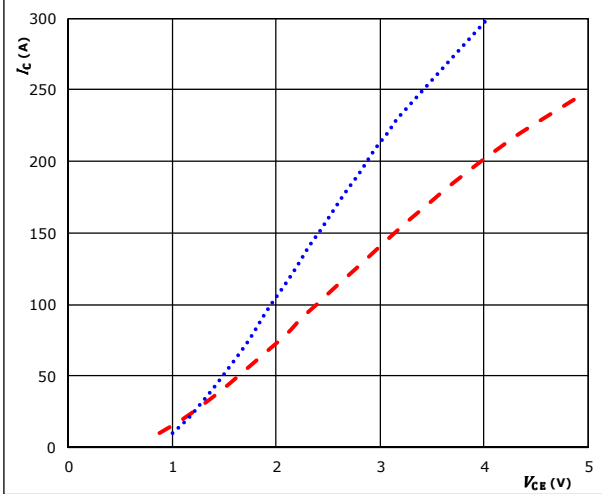


Half-Bridge Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

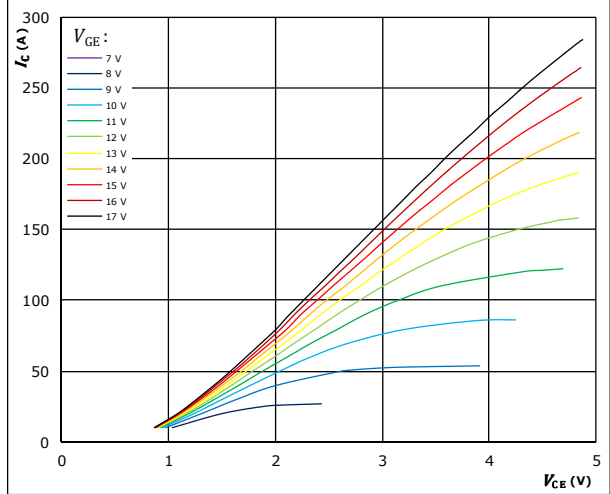


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j: 25 \text{ } ^\circ C$ (blue dotted line)
 $150 \text{ } ^\circ C$ (red dashed line)

figure 2. IGBT

Typical output characteristics

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

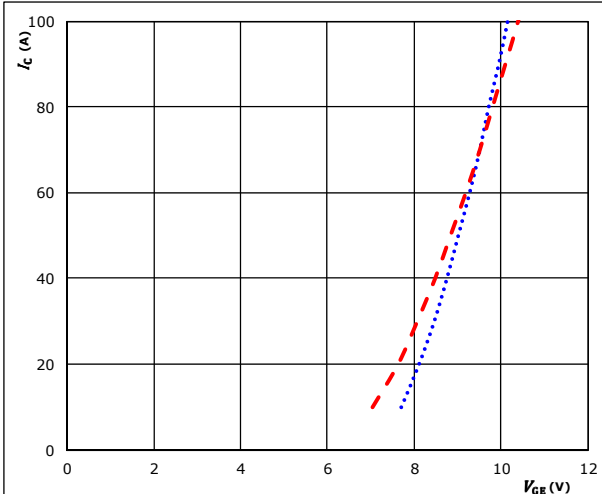


$t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

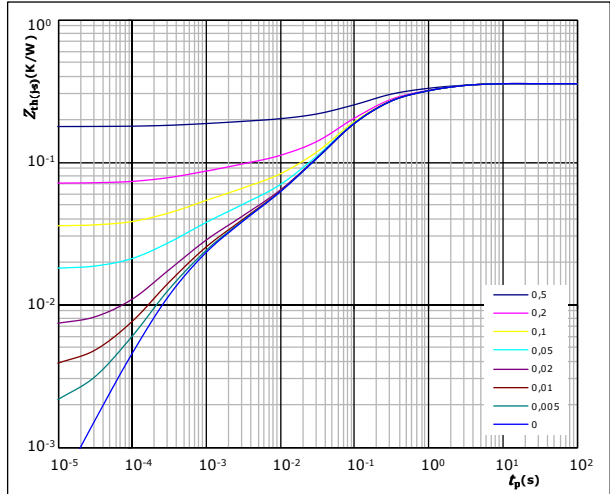


$t_p = 100 \mu s$
 $V_{CE} = 0 V$
 $T_j: 25 \text{ } ^\circ C$ (blue dotted line)
 $150 \text{ } ^\circ C$ (red dashed line)

figure 4. IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$
 $R_{th(j-s)} = 0,36 \text{ K/W}$

IGBT thermal model values

R (K/W)	τ (s)
6,77E-02	1,58E+00
1,04E-01	2,42E-01
1,38E-01	7,23E-02
1,82E-02	8,54E-03
1,72E-02	1,30E-03
1,02E-02	3,02E-04

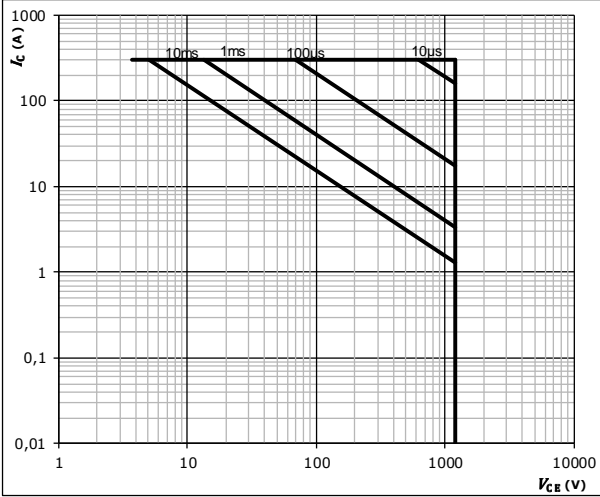


Half-Bridge Switch Characteristics

figure 6. IGBT

Safe operating area

$I_C = f(V_{CE})$



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

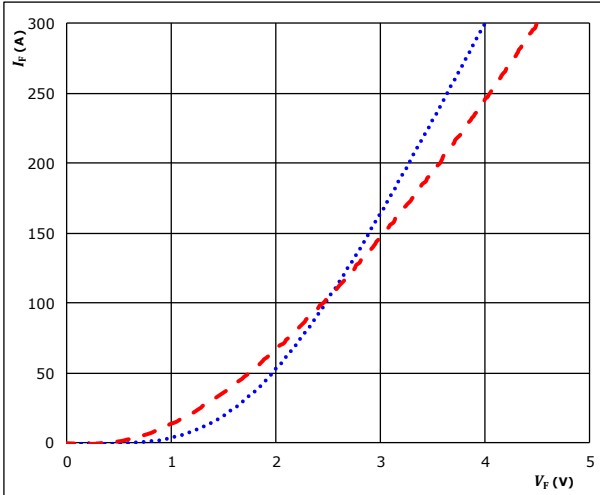


Half-Bridge Diode Characteristics

figure 1. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

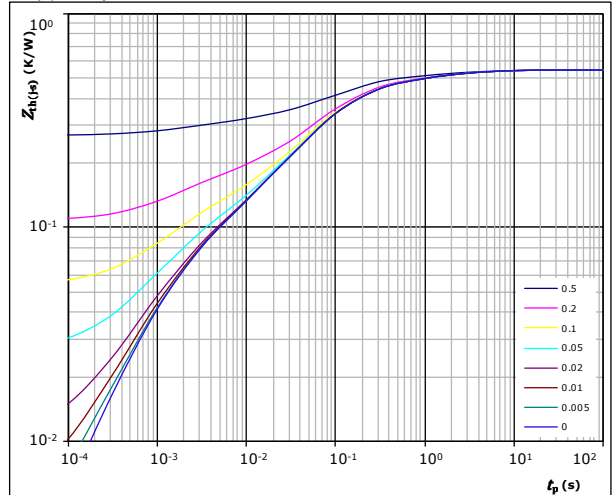


$t_p = 250 \mu s$
 $T_j: 25 \text{ } ^\circ\text{C}$ (dotted blue line)
 $150 \text{ } ^\circ\text{C}$ (dashed red line)

figure 2. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,54 \text{ K/W}$

FWD thermal model values

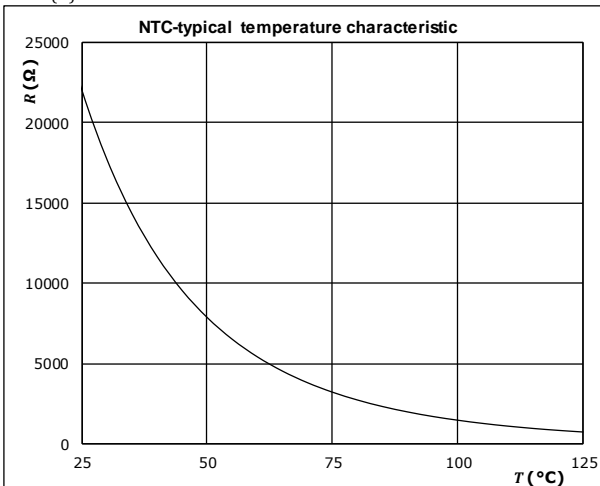
$R \text{ (K/W)}$	$\tau \text{ (s)}$
3,32E-02	3,99E+00
7,18E-02	8,03E-01
1,35E-01	1,54E-01
1,90E-01	5,92E-02
4,68E-02	9,53E-03
4,94E-02	1,82E-03
1,37E-02	5,67E-04

Thermistor Characteristics

figure 1. Thermistor

Typical NTC characteristic as a function of temperature

$$R = f(T)$$

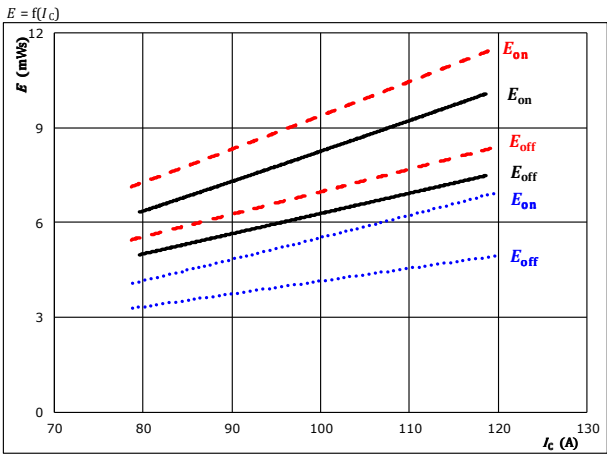




Inverter Switching Characteristics

figure 1. IGBT

Typical switching energy losses as a function of collector current

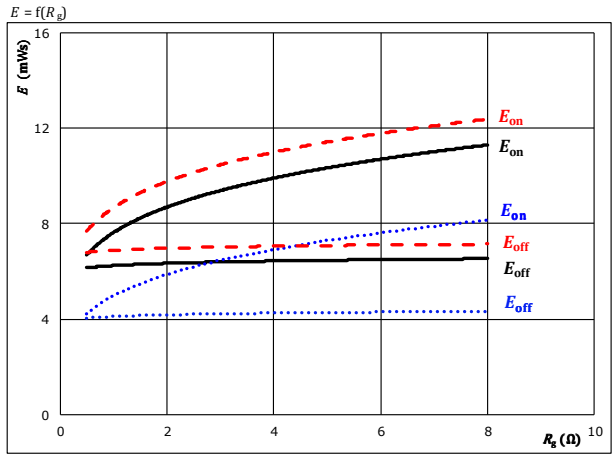


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω

T_j : 25 °C (dotted blue line)
 125 °C (solid black line)
 150 °C (dashed red line)

figure 2. IGBT

Typical switching energy losses as a function of gate resistor

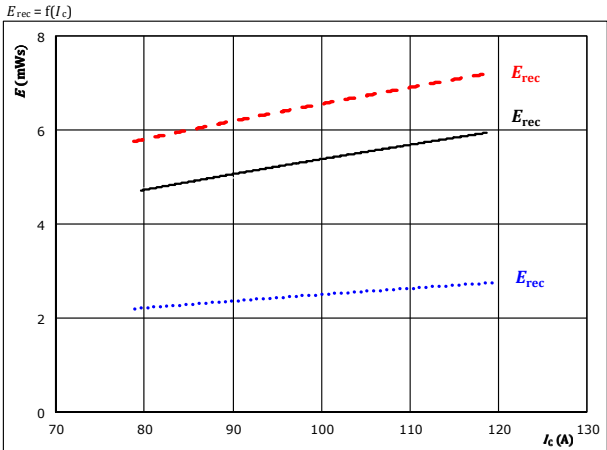


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 100$ A

T_j : 25 °C (dotted blue line)
 125 °C (solid black line)
 150 °C (dashed red line)

figure 3. FWD

Typical reverse recovered energy loss as a function of collector current

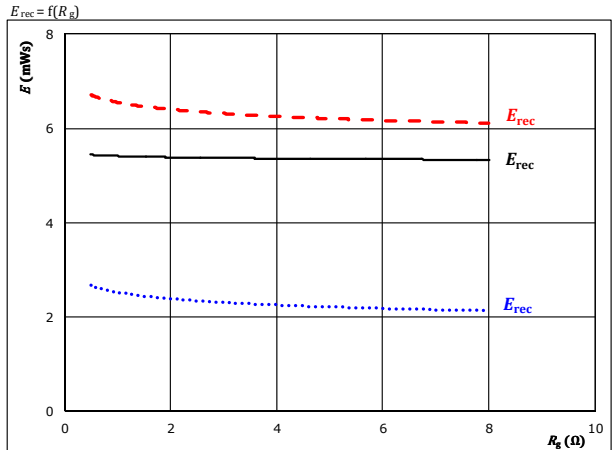


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω

T_j : 25 °C (dotted blue line)
 125 °C (solid black line)
 150 °C (dashed red line)

figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor



With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 100$ A

T_j : 25 °C (dotted blue line)
 125 °C (solid black line)
 150 °C (dashed red line)



Inverter Switching Characteristics

figure 5. IGBT
 Typical switching times as a function of collector current

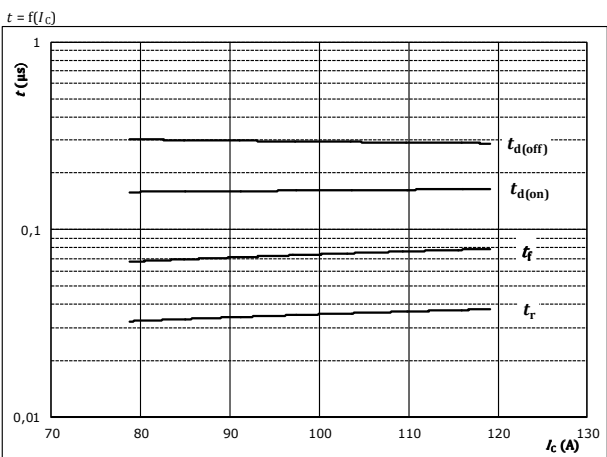


figure 6. IGBT
 Typical switching times as a function of gate resistor

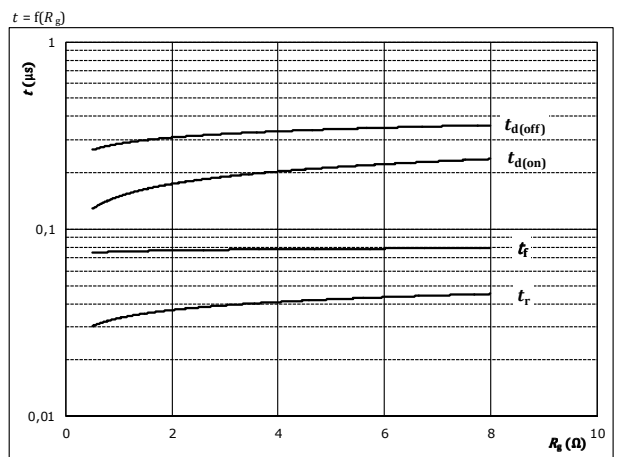


figure 7. FWD
 Typical reverse recovery time as a function of collector current

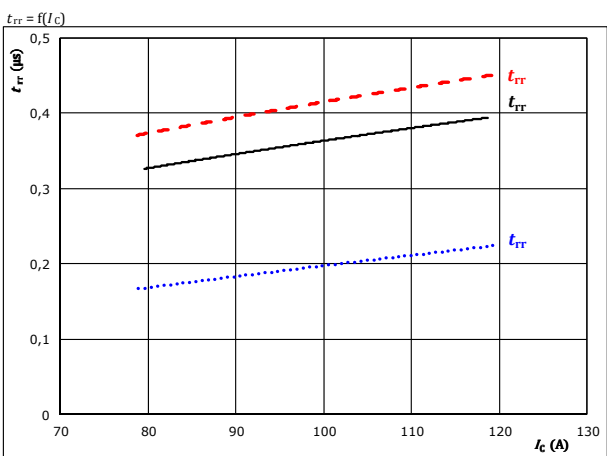
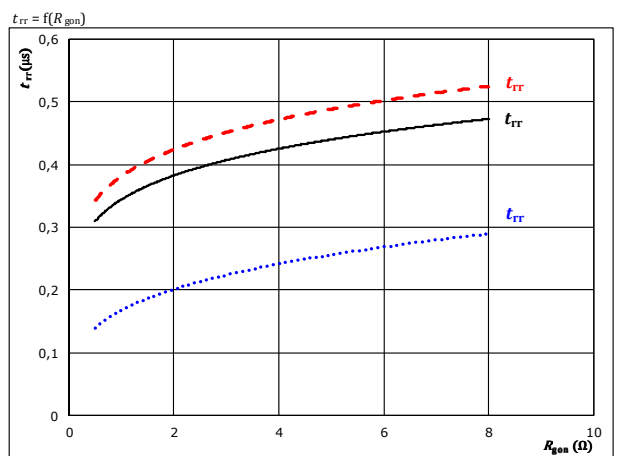


figure 8. FWD
 Typical reverse recovery time as a function of IGBT turn on gate resistor



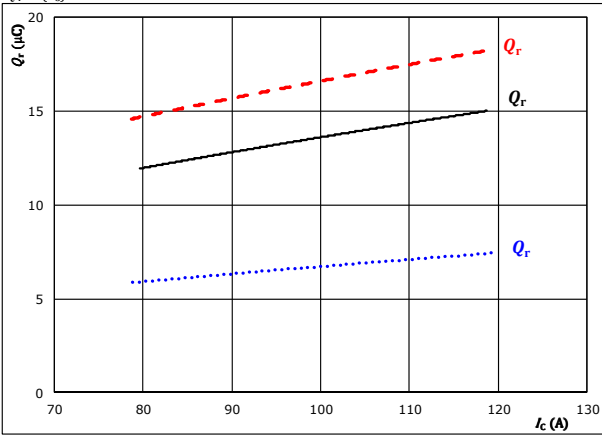


Inverter Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$

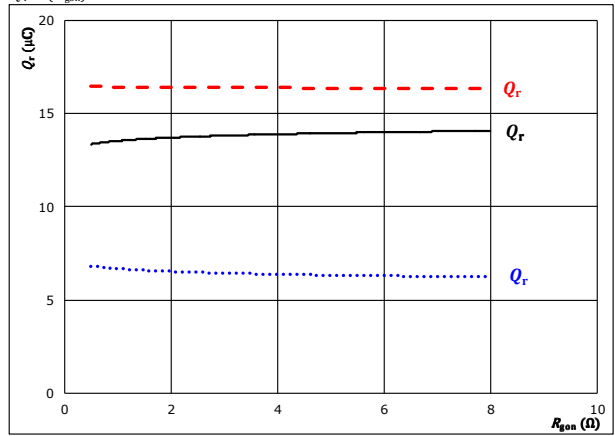


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gpn} = 2$ Ω
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 10. FWD

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

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

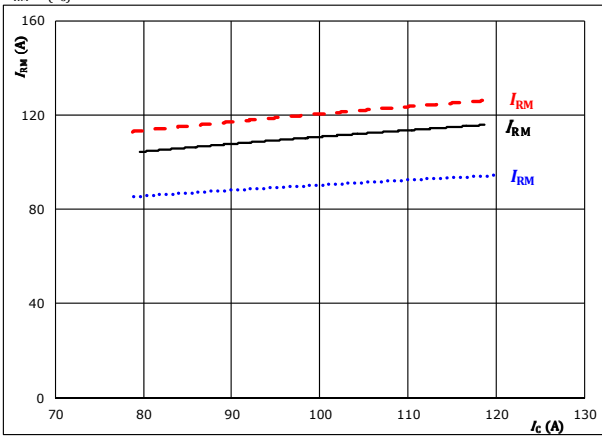


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 11. FWD

Typical peak reverse recovery current current as a function of collector current

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

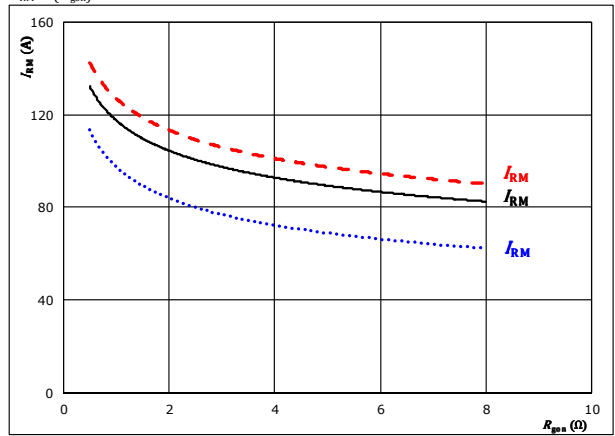


With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gpn} = 2$ Ω
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 12. FWD

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

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



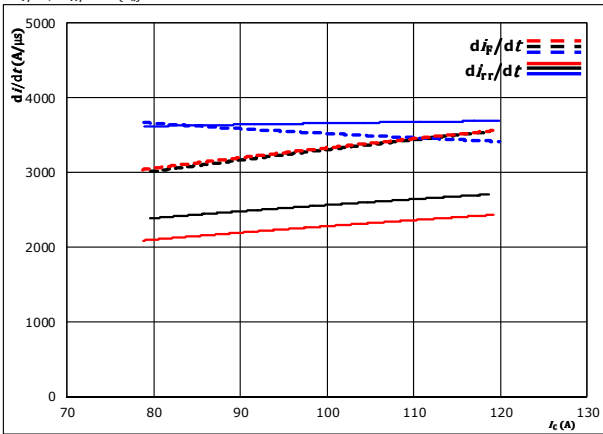
With an inductive load at
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)



Inverter Switching Characteristics

figure 13. FWD

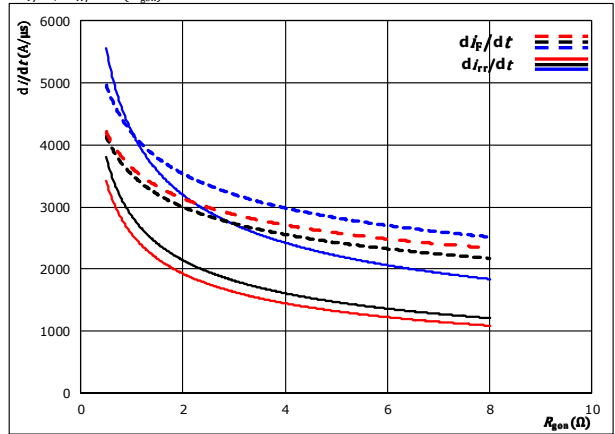
Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_{rr}/dt = f(I_c)$



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

figure 14. FWD

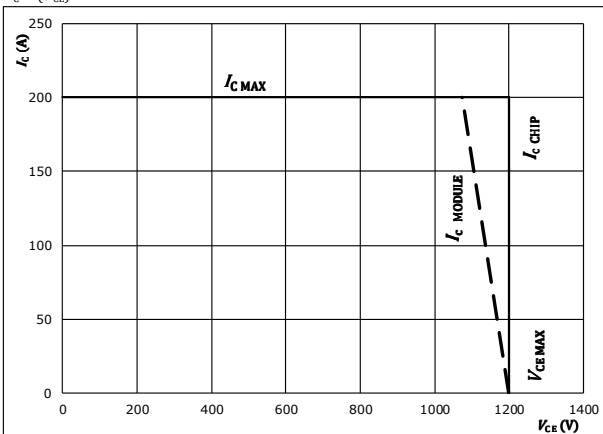
Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor
 $di_f/dt, di_{rr}/dt = f(R_{gon})$



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 15. IGBT

Reverse bias safe operating area
 $I_c = f(V_{CE})$



At
 $T_j = 125$ °C
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω



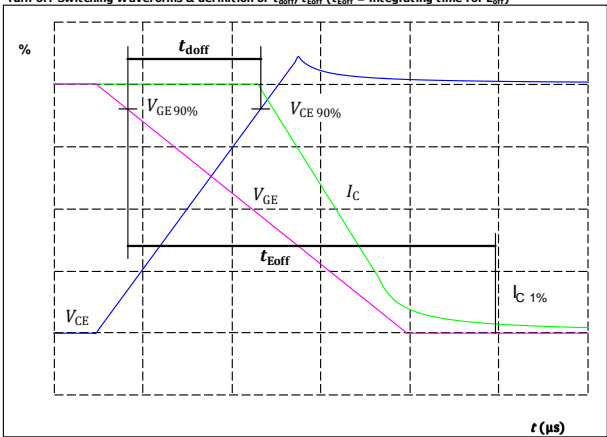
Inverter Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	2 Ω
R_{goff}	=	2 Ω

figure 1. IGBT

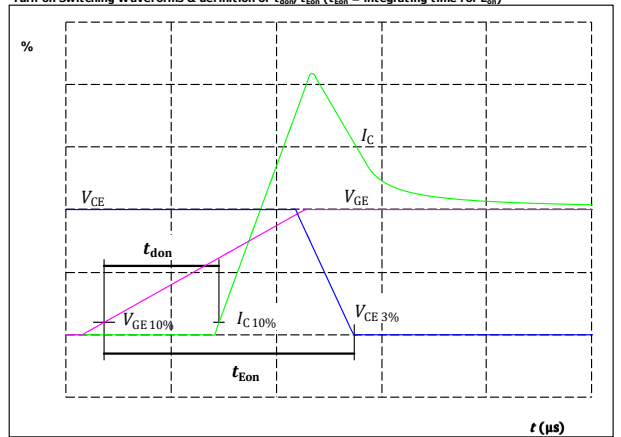
Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff} (t_{Eoff} = integrating time for E_{off})



$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	600	V
$I_C(100\%) =$	100	A
$t_{doff} =$	280	ns

figure 2. IGBT

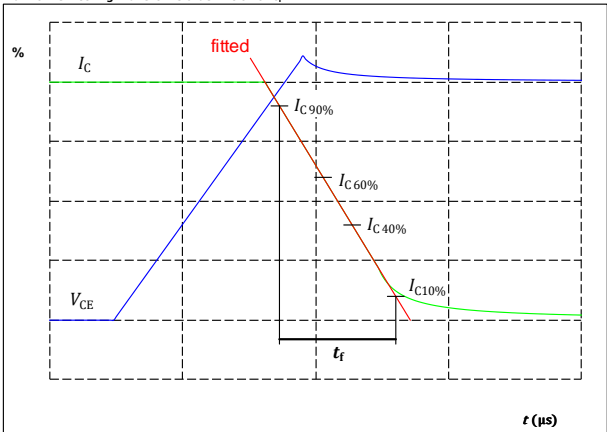
Turn-on Switching Waveforms & definition of t_{don} , t_{Eon} (t_{Eon} = integrating time for E_{on})



$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	600	V
$I_C(100\%) =$	100	A
$t_{don} =$	158	ns

figure 3. IGBT

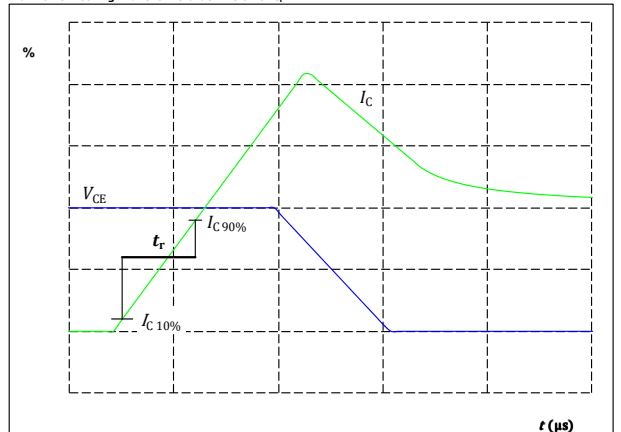
Turn-off Switching Waveforms & definition of t_r



$V_C(100\%) =$	600	V
$I_C(100\%) =$	100	A
$t_r =$	68	ns

figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r



$V_C(100\%) =$	600	V
$I_C(100\%) =$	100	A
$t_r =$	34	ns

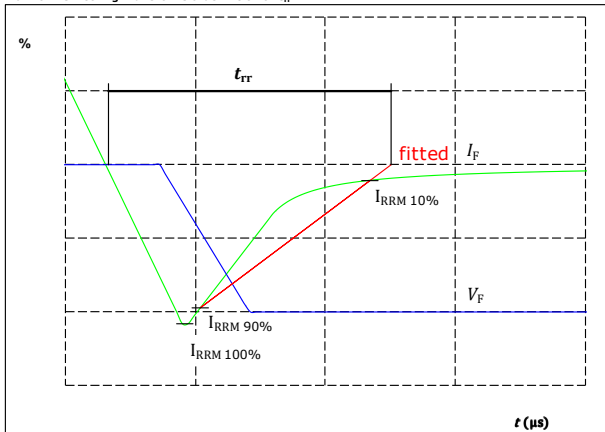


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10-FZ122PB100SH01-M819F38
10-PZ122PB100SH01-M819F38Y
 datasheet

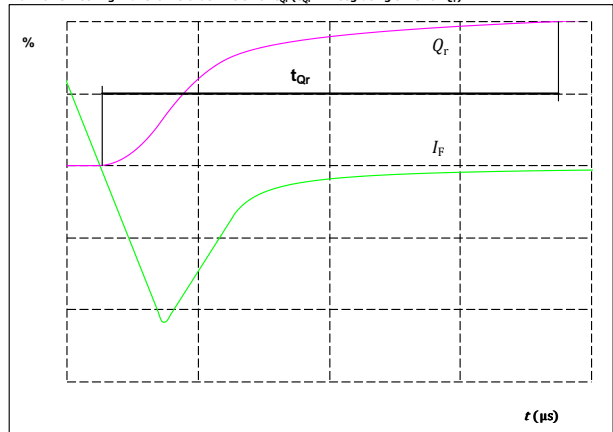
Inverter Switching Characteristics

figure 5. FWD
 Turn-off Switching Waveforms & definition of t_{rr}



$V_F(100\%) =$	600	V
$I_F(100\%) =$	100	A
$I_{RRM}(100\%) =$	110	A
$t_{rr} =$	363	ns

figure 6. FWD
 Turn-on Switching Waveforms & definition of t_{qr} (t_{qr} = integrating time for Q_r)



$I_F(100\%) =$	100	A
$Q_r(100\%) =$	13,64	μC



10-FZ122PB100SH01-M819F38
10-PZ122PB100SH01-M819F38Y
 datasheet

Vincotech

Ordering Code & Marking																																
Version			Ordering Code																													
without thermal paste 12 mm housing with solder pins			10-FZ122PB100SH01-M819F38																													
without thermal paste 12 mm housing with Press-fit pins			10-PZ122PB100SH01-M819F38Y																													
<table border="1"> <thead> <tr> <th rowspan="2">Text</th> <th colspan="2">Name</th> <th>Date code</th> <th>UL & VIN</th> <th>Lot</th> <th>Serial</th> </tr> <tr> <td colspan="2">NN-NNNNNNNNNNNNNN-TTTTTWW</td> <td>WWYY</td> <td>UL VIN</td> <td>LLLLL</td> <td>SSSS</td> </tr> </thead> <tbody> <tr> <td rowspan="2">Datamatrix</td> <th>Type&Ver</th> <th>Lot number</th> <th>Serial</th> <th>Date code</th> <td></td> <td></td> </tr> <tr> <td>TTTTTWW</td> <td>LLLLL</td> <td>SSSS</td> <td>WWYY</td> <td></td> <td></td> </tr> </tbody> </table>							Text	Name		Date code	UL & VIN	Lot	Serial	NN-NNNNNNNNNNNNNN-TTTTTWW		WWYY	UL VIN	LLLLL	SSSS	Datamatrix	Type&Ver	Lot number	Serial	Date code			TTTTTWW	LLLLL	SSSS	WWYY		
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Pin table			
Pin	X	Y	Function
1	0	0	DC-
2	0	2,3	DC-
3	0	4,6	DC-
4	0	6,9	DC-
5	0	15,6	DC+
6	0	17,9	DC+
7	0	20,2	DC+
8	0	22,5	DC+
9	13,85	16,45	G12
10	16,75	16,45	S12
11	33,5	11,5	Ph
12	33,5	9,2	Ph
13	33,5	6,9	Ph
14	33,5	4,6	Ph
15	33,5	2,3	Ph
16	33,5	0	Ph
17	13,85	13,55	Ph
18	19,55	4,95	S11
19	19,55	7,85	G11
20	33,5	22,5	Therm1
21	26,1	22,5	Therm2

The outline drawings show the component from three perspectives: a top view, a side view, and a bottom view. The top view shows the 21 pins arranged in two rows, with dimensions for pin positions and a coordinate system (X, Y). The side view shows the component's height and pin diameter. The bottom view shows the component's footprint and mounting features.

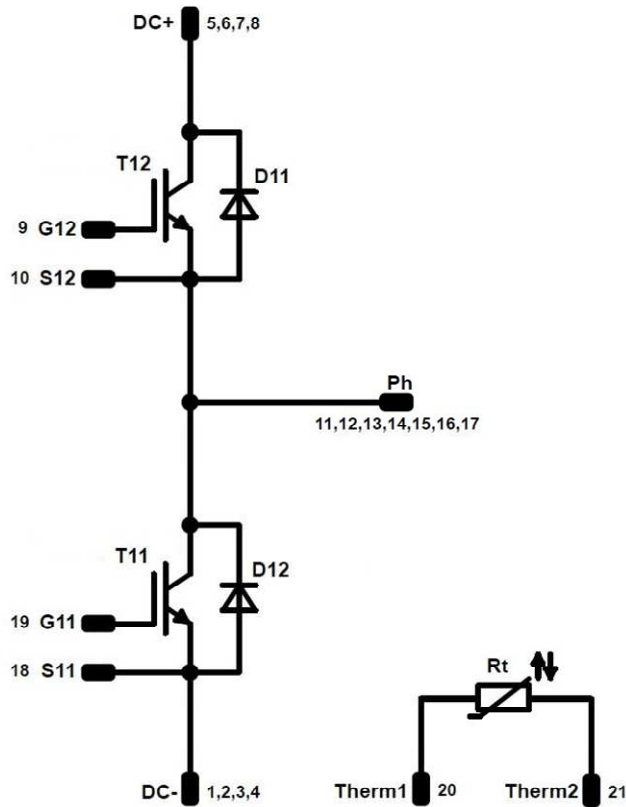
Tolerance of pinpositions: ±0,5mm at the end of pins
 Dimension of coordinate axis is only offset without tolerance



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10-FZ122PB100SH01-M819F38
10-PZ122PB100SH01-M819F38Y
 datasheet

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	1200 V	100 A	Half-Bridge Switch	
D11, D12	FWD	1200 V	100 A	Half-Bridge Diode	
Rt	NTC			Thermistor	




Vincotech

10-FZ122PB100SH01-M819F38
10-PZ122PB100SH01-M819F38Y
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.

UL recognition and file number
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website. 

Document No.:	Date:	Modification:	Pages
10-xZ122PB100SH01-M819F38x-D1-14	21 Aug. 2018	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.