
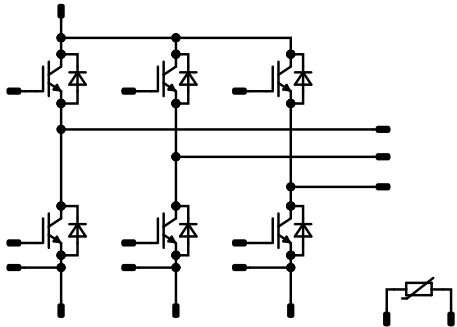




<b>flowPACK E1</b>		<b>1200 V / 25 A</b>	
<b>Features</b>		<b>flow E1 12 mm housing</b>	
<ul style="list-style-type: none"><li>• Trench IGBT4 chip technology</li><li>• Compact design</li><li>• Integrated NTC</li></ul>			
<b>Target applications</b>		<b>Schematic</b>	
<ul style="list-style-type: none"><li>• Industrial Drives</li><li>• UPS</li></ul>			
<b>Types</b>			
<ul style="list-style-type: none"><li>• 10-EZ126PA025SC-L858F48T</li></ul>			



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**10-EZ126PA025SC-L858F48T**  
datasheet

## 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)	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	34	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	75	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	96	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Short circuit ratings	$t_{SC}$	$V_{GE} = 15\text{ V}$ , $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$	10	$\mu\text{s}$
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

## Inverter Diode

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	31	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	50	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	66	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
Isolation voltage	$V_{isol}$	AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			>12,7	mm
Clearance			8,62	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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00085	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		25	25 125 150	1,58	1,83 2,12 2,18	2,07 <sup>(1)</sup>	V
Collector-emitter cut-off current	$I_{CES}$		0	1200		25			2,4	μA
Gate-emitter leakage current	$I_{GES}$		20	0		25			120	nA
Internal gate resistance	$r_g$							None		Ω
Input capacitance	$C_{ies}$	$f = 1 \text{ Mhz}$	0	25		25		1450		pF
Reverse transfer capacitance	$C_{res}$							50		pF
Gate charge	$Q_g$		15		0	25		200		nC

##### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						0,99		K/W
--	---------------	---	--	--	--	--	--	------	--	-----

##### Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 16 \Omega$ $R_{goff} = 16 \Omega$	±15	600	27	25		62,6		ns
Rise time	$t_r$					125		62,4	ns	
						150		62,8		
						25		32,4		
Turn-off delay time	$t_{d(off)}$					125		34,2	ns	
						150		34,2		
		25		180,6						
Fall time	$t_f$	125		236	ns					
		150		255,6						
		25		84,28						
Turn-on energy (per pulse)	$E_{on}$	$Q_{tFWD} = 2,2 \mu\text{C}$ $Q_{tFWD} = 4,12 \mu\text{C}$ $Q_{tFWD} = 4,77 \mu\text{C}$				25		1,99	mWs	
						125		2,79		
						150		3,02		
Turn-off energy (per pulse)	$E_{off}$					25		1,52	mWs	
						125		2,4		
						150		2,74		



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datasheet

### 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		
<b>Inverter Diode</b>										
<b>Static</b>										
Forward voltage	$V_F$				25 125 150	1,35	1,9 1,9 1,88	2,05 <sup>(1)</sup>		V
Reverse leakage current	$I_R$	$V_r = 1200$ V				25			5,2	μA
<b>Thermal</b>										
Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,44		K/W
<b>Dynamic</b>										
Peak recovery current	$I_{RRM}$					25 125 150		15,66 19,3 20,2		A
Reverse recovery time	$t_{rr}$					25 125 150		278,92 444,27 504,3		ns
Recovered charge	$Q_r$	$di/dt=707$ A/μs $di/dt=565$ A/μs $di/dt=683$ A/μs	±15	600	27	25 125 150		2,2 4,12 4,77		μC
Reverse recovered energy	$E_{rec}$					25 125 150		0,806 1,59 1,87		mWs
Peak rate of fall of recovery current	$(di_r/dt)_{max}$					25 125 150		99,04 96,55 84,72		A/μs



### Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		$V_{GS}$ [V]	$V_{GE}$ [V]	$V_{DS}$ [V]	$V_{CE}$ [V]	$T_j$ [°C]	Min	Typ	Max	

### Thermistor

#### Static

Rated resistance	$R$					25		5		kΩ
Deviation of $R_{100}$	$A_{R/R}$	$R_{100} = 493 \Omega$				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>(1)</sup> Value at chip level

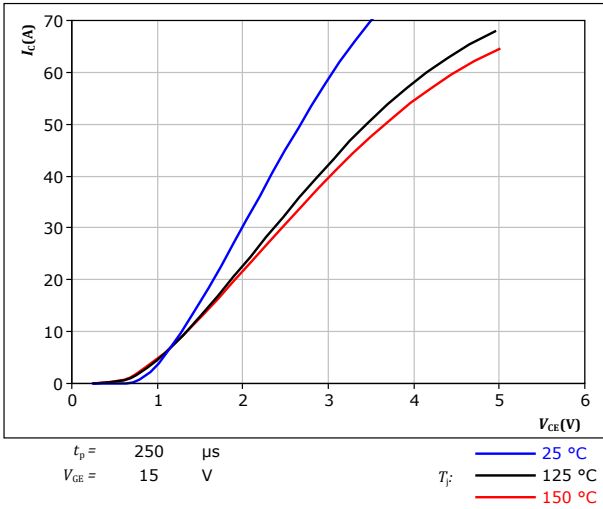
<sup>(2)</sup> Only valid with pre-applied Vincotech thermal interface material.



## Inverter Switch Characteristics

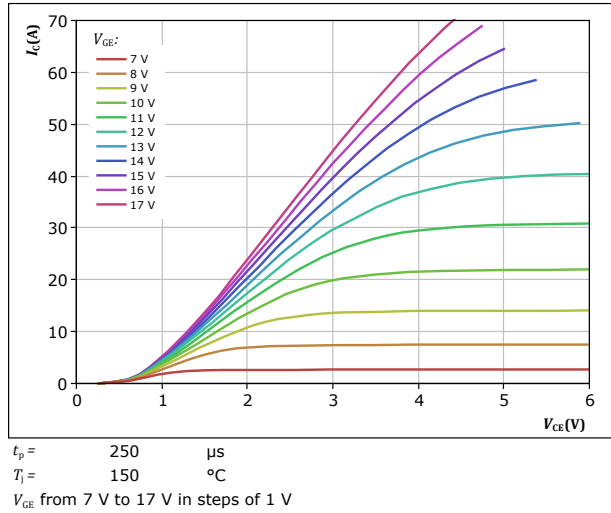
**figure 1.** IGBT

Typical output characteristics  
 $I_C = f(V_{CE})$



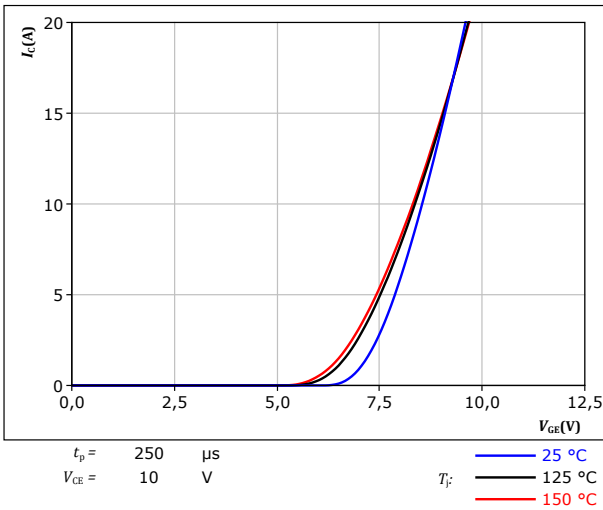
**figure 2.** IGBT

Typical output characteristics  
 $I_C = f(V_{CE})$



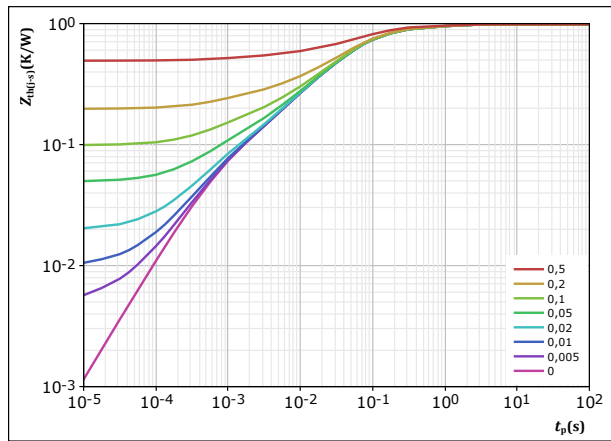
**figure 3.** IGBT

Typical transfer characteristics  
 $I_C = f(V_{GE})$



**figure 4.** IGBT

Transient thermal impedance as a function of pulse width  
 $Z_{th(j-s)} = f(t_p)$



$D = t_p / T$   
 $R_{th(j-s)} = 0,987 \text{ K/W}$

IGBT thermal model values

R (K/W)	$\tau$ (s)
1,10E-01	8,55E-01
4,47E-01	8,90E-02
2,86E-01	2,76E-02
8,93E-02	5,06E-03
5,44E-02	6,62E-04



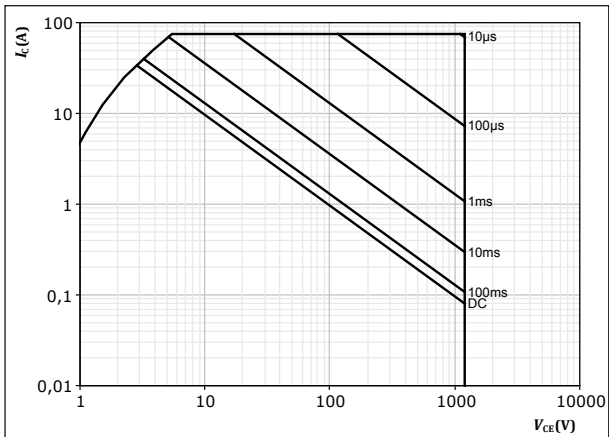
Vincotech

## 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  
 $T_j = T_{jmax}$



### Inverter Diode Characteristics

figure 6. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

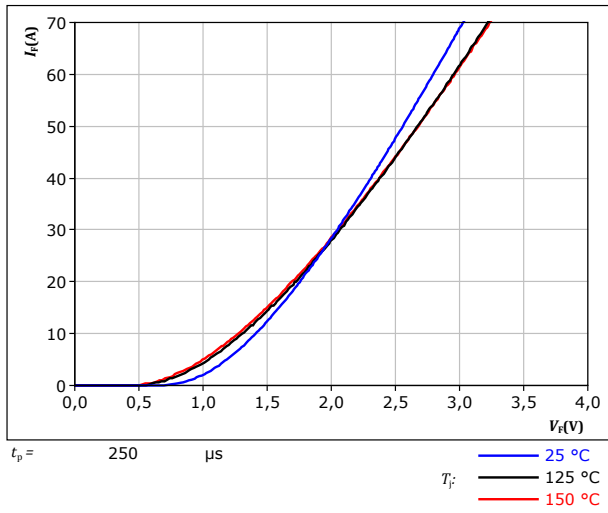
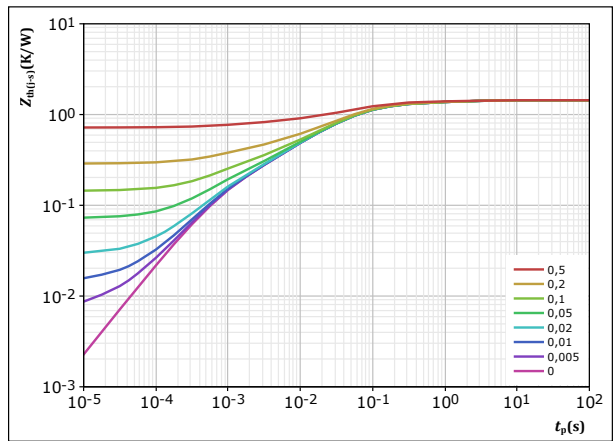


figure 7. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$   
 $R_{th(j-s)} = 1,439$  K/W  
 FWD thermal model values

R (K/W)	$\tau$ (s)
9,20E-02	2,28E+00
1,26E-01	3,18E-01
5,59E-01	6,71E-02
3,61E-01	2,27E-02
1,79E-01	5,09E-03
1,23E-01	7,30E-04



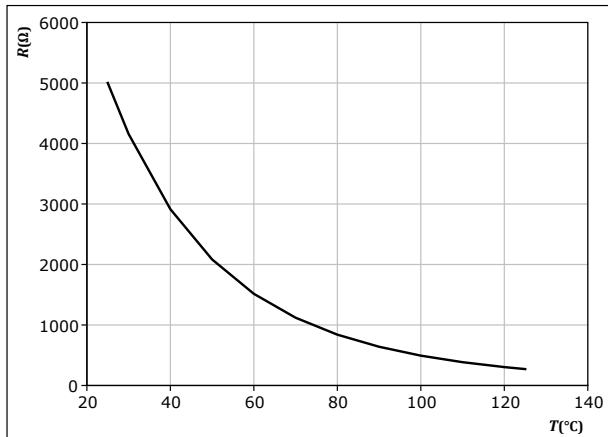


## Thermistor Characteristics

figure 8. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$

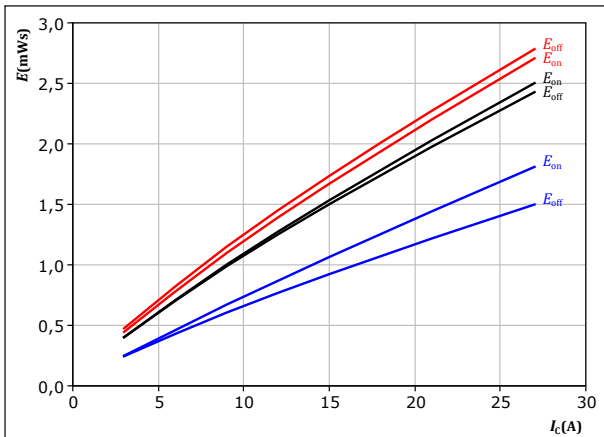




## Inverter Switching Characteristics

**figure 9.** IGBT

Typical switching energy losses as a function of collector current  
 $E = f(I_c)$

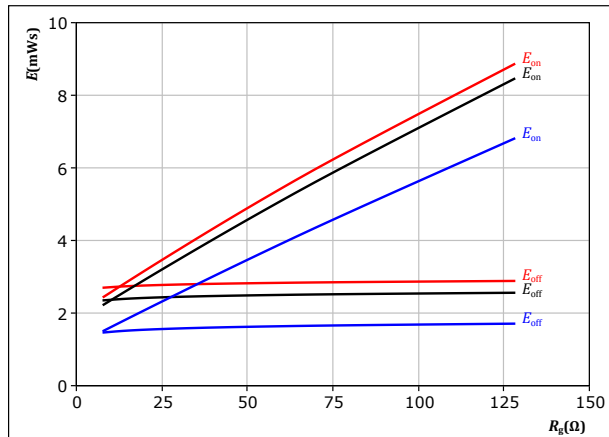


With an inductive load at

$V_{CE} = 600$ V	$T_j = 25$ °C
$V_{GE} = \pm 15$ V	$T_j = 125$ °C
$R_{g(on)} = 16$ Ω	$T_j = 150$ °C
$R_{g(off)} = 16$ Ω	

**figure 10.** IGBT

Typical switching energy losses as a function of gate resistor  
 $E = f(R_g)$

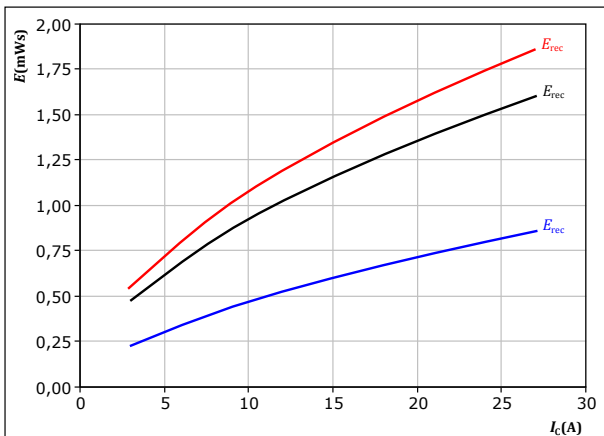


With an inductive load at

$V_{CE} = 600$ V	$T_j = 25$ °C
$V_{GE} = \pm 15$ V	$T_j = 125$ °C
$I_c = 27$ A	$T_j = 150$ °C

**figure 11.** FWD

Typical reverse recovered energy loss as a function of collector current  
 $E_{rec} = f(I_c)$

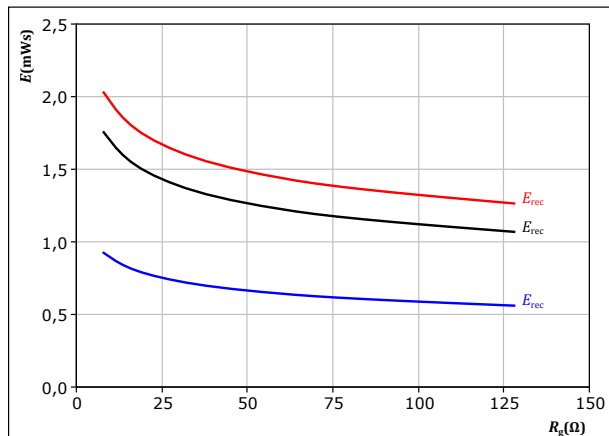


With an inductive load at

$V_{CE} = 600$ V	$T_j = 25$ °C
$V_{GE} = \pm 15$ V	$T_j = 125$ °C
$R_{g(on)} = 16$ Ω	$T_j = 150$ °C

**figure 12.** FWD

Typical reverse recovered energy loss as a function of gate resistor  
 $E_{rec} = f(R_g)$



With an inductive load at

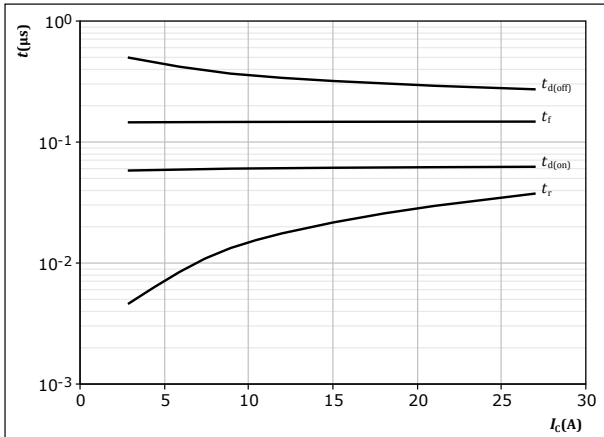
$V_{CE} = 600$ V	$T_j = 25$ °C
$V_{GE} = \pm 15$ V	$T_j = 125$ °C
$I_c = 27$ A	$T_j = 150$ °C



## Inverter Switching Characteristics

**figure 13.** IGBT

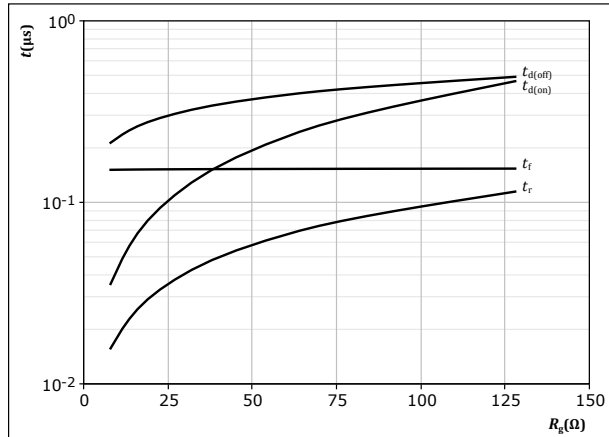
Typical switching times as a function of collector current  
 $t = f(I_c)$



With an inductive load at  
 $T_j = 150 \text{ }^\circ\text{C}$   
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 16 \text{ } \Omega$   
 $R_{goff} = 16 \text{ } \Omega$

**figure 14.** IGBT

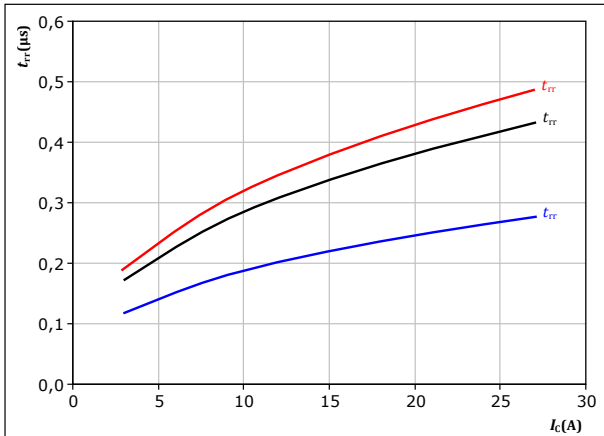
Typical switching times as a function of gate resistor  
 $t = f(R_g)$



With an inductive load at  
 $T_j = 150 \text{ }^\circ\text{C}$   
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 27 \text{ A}$

**figure 15.** FWD

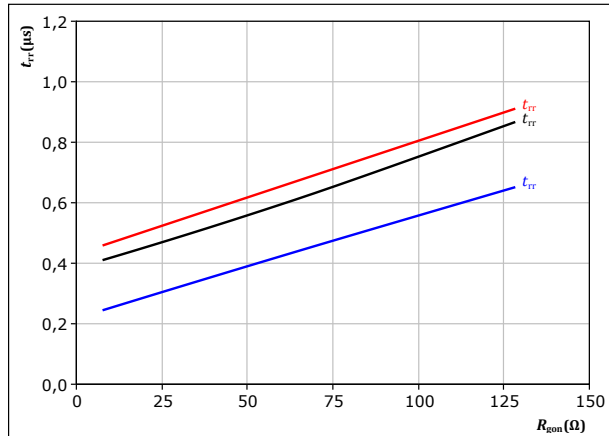
Typical reverse recovery time as a function of collector current  
 $t_{rr} = f(I_c)$



With an inductive load at  
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 16 \text{ } \Omega$   
 $T_j: \text{ } \text{---} 25 \text{ }^\circ\text{C}$   
 $\text{---} 125 \text{ }^\circ\text{C}$   
 $\text{---} 150 \text{ }^\circ\text{C}$

**figure 16.** FWD

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



With an inductive load at  
 $V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 27 \text{ A}$   
 $T_j: \text{ } \text{---} 25 \text{ }^\circ\text{C}$   
 $\text{---} 125 \text{ }^\circ\text{C}$   
 $\text{---} 150 \text{ }^\circ\text{C}$

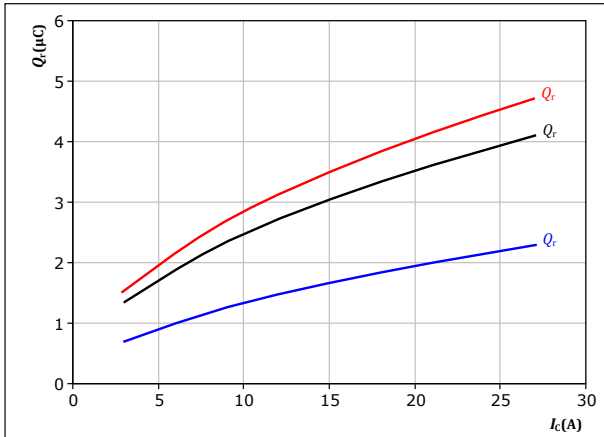


## Inverter Switching Characteristics

figure 17. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

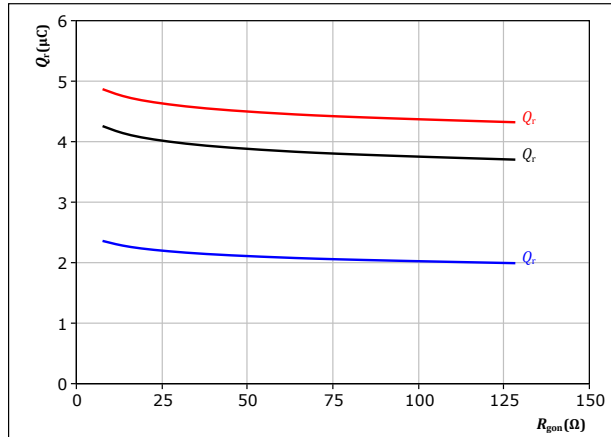
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 16 \ \Omega$

$T_j$ :  $25 \text{ }^\circ\text{C}$  (blue)  
 $125 \text{ }^\circ\text{C}$  (black)  
 $150 \text{ }^\circ\text{C}$  (red)

figure 18. FWD

Typical recovered charge as a function of turn on gate resistor

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



With an inductive load at

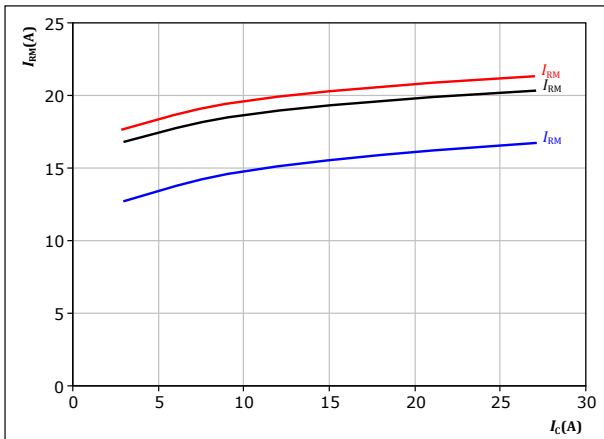
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 27 \text{ A}$

$T_j$ :  $25 \text{ }^\circ\text{C}$  (blue)  
 $125 \text{ }^\circ\text{C}$  (black)  
 $150 \text{ }^\circ\text{C}$  (red)

figure 19. FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

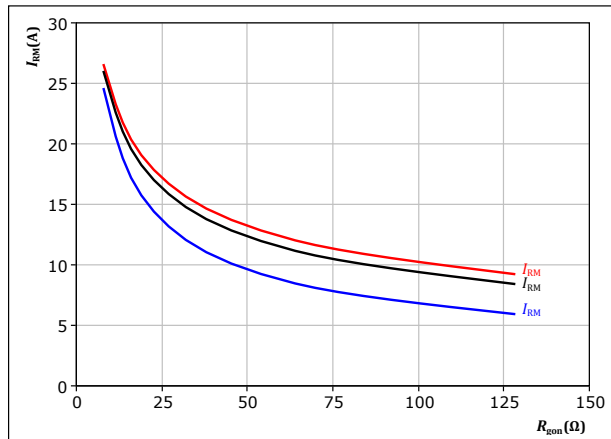
$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 16 \ \Omega$

$T_j$ :  $25 \text{ }^\circ\text{C}$  (blue)  
 $125 \text{ }^\circ\text{C}$  (black)  
 $150 \text{ }^\circ\text{C}$  (red)

figure 20. FWD

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

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



With an inductive load at

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_c = 27 \text{ A}$

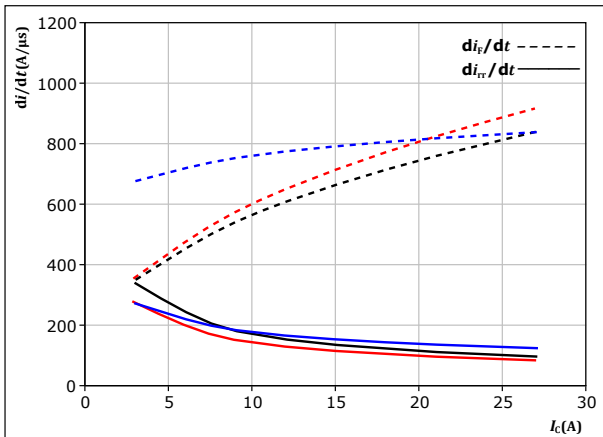
$T_j$ :  $25 \text{ }^\circ\text{C}$  (blue)  
 $125 \text{ }^\circ\text{C}$  (black)  
 $150 \text{ }^\circ\text{C}$  (red)



## Inverter Switching Characteristics

**figure 21.** FWD

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

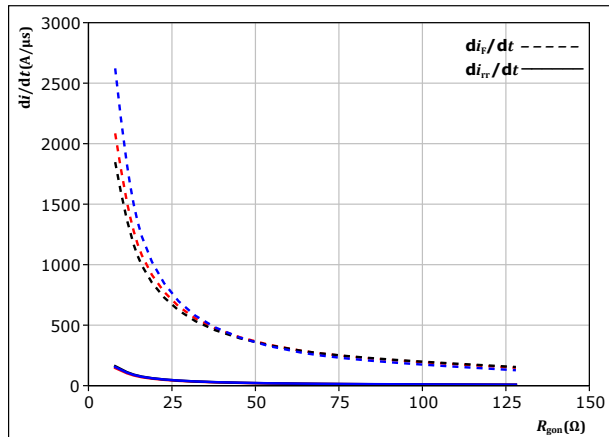


With an inductive load at

$V_{CE} =$	600	V	$T_j =$	25 °C
$V_{GE} =$	±15	V		125 °C
$R_{gon} =$	16	Ω		150 °C

**figure 22.** FWD

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

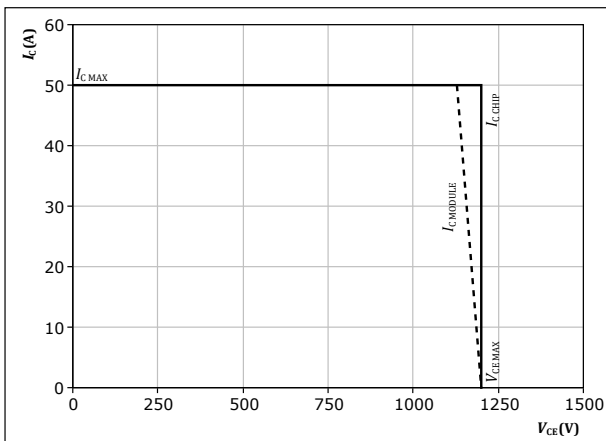


With an inductive load at

$V_{CE} =$	600	V	$T_j =$	25 °C
$V_{GE} =$	±15	V		125 °C
$I_c =$	27	A		150 °C

**figure 23.** IGBT

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



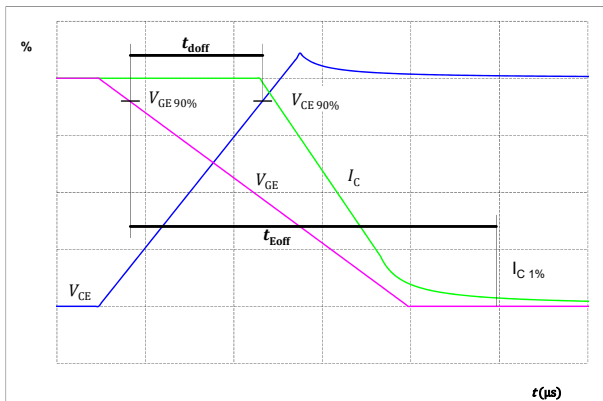
At

$T_j =$	150	°C
$R_{gon} =$	16	Ω
$R_{goff} =$	16	Ω

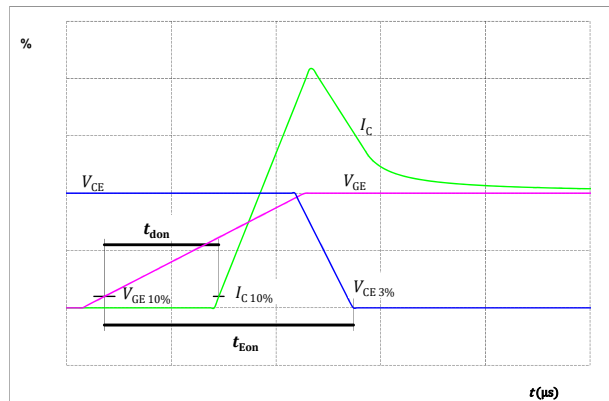


## Inverter Switching Definitions

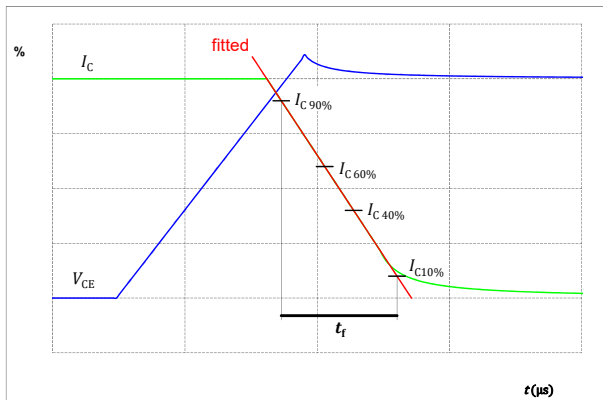
**figure 24.** IGBT  
Turn-off Switching Waveforms & definition of  $t_{doff}$ ,  $t_{Eoff}$  ( $t_{Eoff}$  = integrating time for  $E_{off}$ )



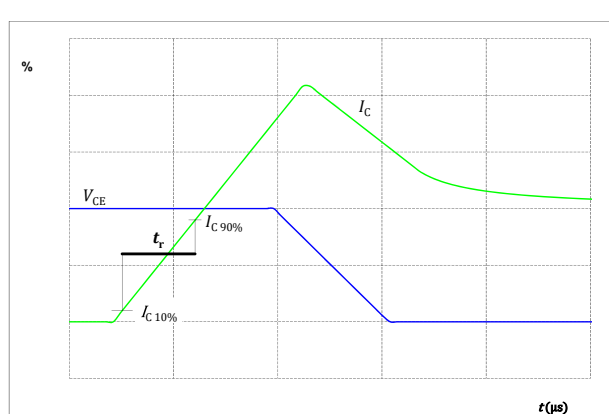
**figure 25.** IGBT  
Turn-on Switching Waveforms & definition of  $t_{don}$ ,  $t_{Eon}$  ( $t_{Eon}$  = integrating time for  $E_{on}$ )



**figure 26.** IGBT  
Turn-off Switching Waveforms & definition of  $t_f$



**figure 27.** IGBT  
Turn-on Switching Waveforms & definition of  $t_r$





### Inverter Switching Definitions

figure 28. FWD

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

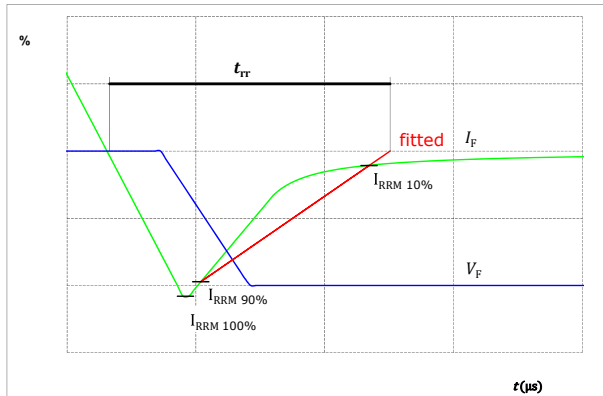
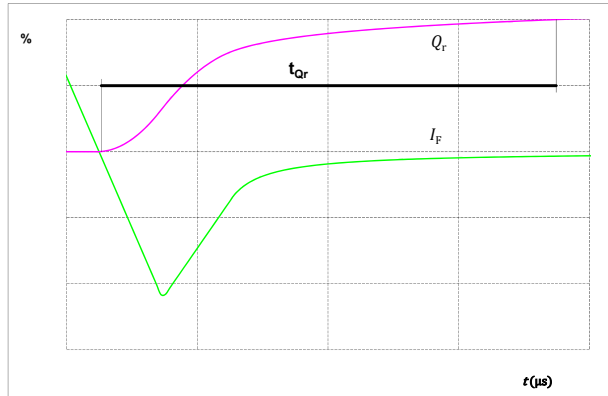


figure 29. FWD

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






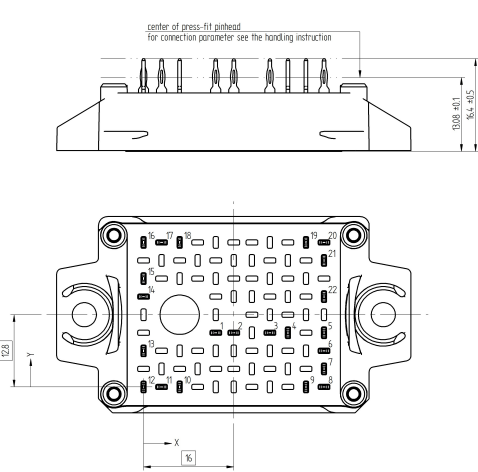
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**10-EZ126PA025SC-L858F48T**  
datasheet

Ordering Code	
<b>Version</b>	<b>Ordering Code</b>
Without thermal paste	10-EZ126PA025SC-L858F48T
With thermal paste	10-EZ126PA025SC-L858F48T-/3/

Marking						
	<b>Text</b>	<b>Name</b> NN-NNNNNNNNNNNNNN- TTTTTV WWYY UL VIN LLLLL SSSS	<b>Date code</b> WWYY	<b>UL &amp; VIN</b> UL VIN	<b>Lot</b> LLLLL	<b>Serial</b> SSSS
	<b>Datamatrix</b>	<b>Type&amp;Ver</b> TTTTTTTV	<b>Lot number</b> LLLLL	<b>Serial</b> SSSS	<b>Date code</b> WWYY	

Pin table [mm]				Outline
Pin	X	Y	Function	
1	12,8	9,6	DC+	
2	16	9,6	DC+	
3	22,4	9,6	Therm1	
4	25,6	9,6	Therm2	
5	32	9,6	DC-2	
6	32	6,4	S13	
7	32	3,2	DC-1	
8	32	0	S11	
9	28,8	0	G11	
10	6,4	0	Ph1	
11	3,2	0	Ph1	
12	0	0	G12	
13	0	6,4	G14	
14	0	16	Ph2	
15	0	19,2	Ph2	
16	0	25,6	G16	
17	3,2	25,6	Ph3	
18	6,4	25,6	Ph3	
19	28,8	25,6	G15	
20	32	25,6	S15	
21	32	22,4	DC-3	
22	32	16	G13	

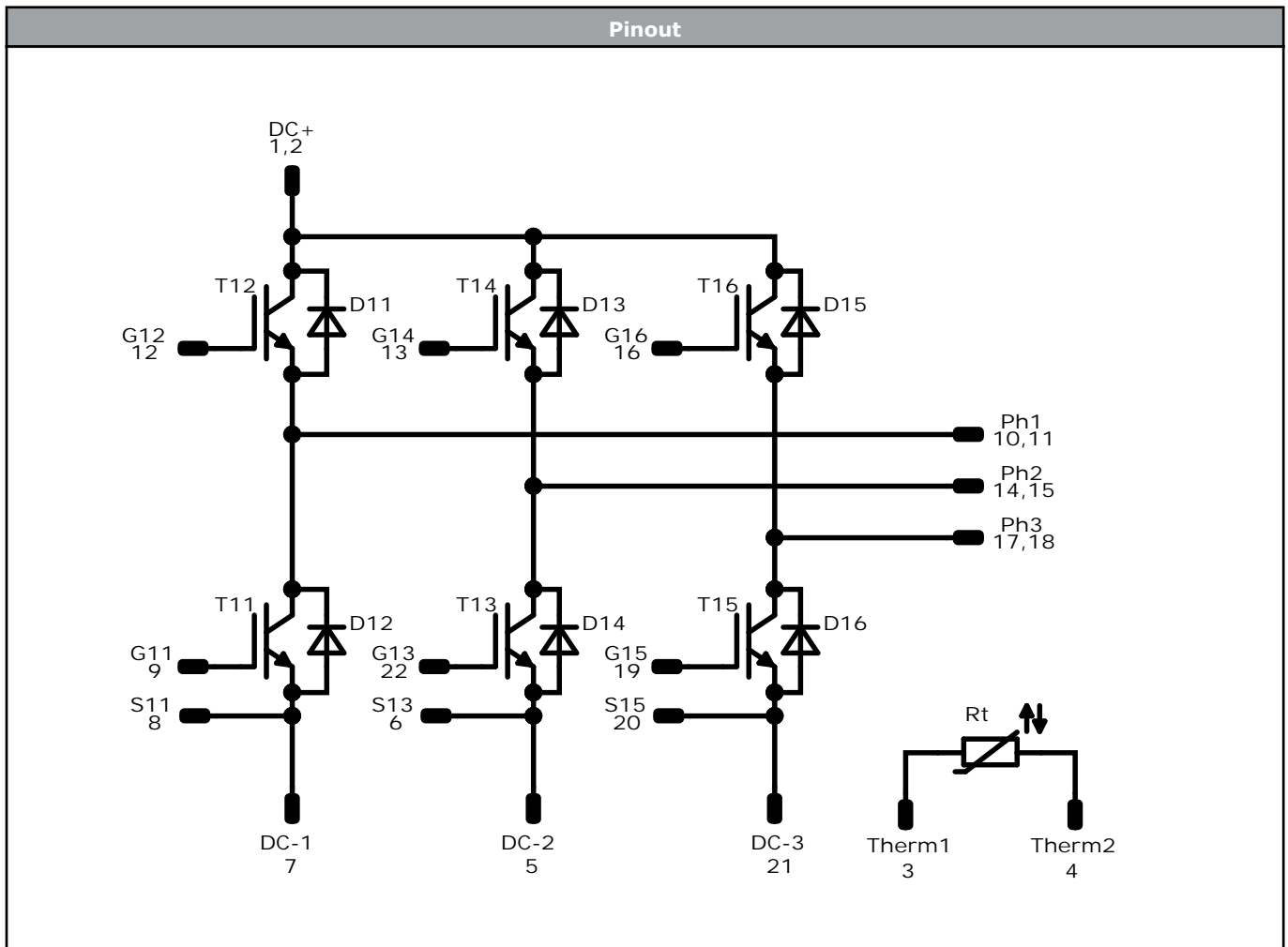


Tolerance of pinpositions: ±0,4mm at the end of pins.  
Dimension of coordinate axis is only official without tolerance





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Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	1200 V	25 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	1200 V	25 A	Inverter Diode	
Rt	NTC			Thermistor	




Packaging instruction				
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for <i>flow</i> E1 packages see vincotech.com website.

Package data
Package data for <i>flow</i> E1 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 certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website. 

Document No.:	Date:	Modification:	Pages
10-EZ126PA025SC-L858F48T-D5-14	2 Mar. 2021	Correct Rth of Inverter Switch	

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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.

单击下面可查看定价，库存，交付和生命周期等信息

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