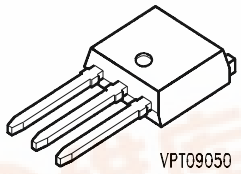
SIEMENS

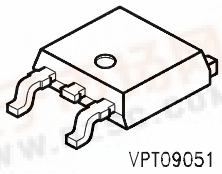
Preliminary data

SPD02N60
SPU02N60

SIPMOS® Power Transistor

- N-Channel
- Enhancement mode
- Avalanche rated





Pin 1	Pin 2	Pin 3
G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	@ VGS	Package	Ordering Code
SPD02N60	600 V	2 A	5.5 Ω	V_{GS} = 10 V	P-TO252	Q67040-S4133
SPU02N60					P-TO251	Q67040-S4127-A2

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current T_C = 25 °C T_C = 100 °C	I_D	 2 1.3	A
Pulsed drain current T_C = 25 °C	I_{Dpulse}	8	
Avalanche energy, single pulse I_D = 2 A, V_{DD} = 50 V, R_{GS} = 25 Ω, T_j = 25 °C	E_{AS}	135	mJ
Gate source voltage	V_{GS}	±20	V
Power dissipation T_C = 25 °C	P_{tot}	55	W
Operating temperature	T_j	-55 ... +150	°C
Storage temperature	T_{stg}	-55 ... +150	
IEC climatic category; DIN IEC 68-1		55/150/56	

Electrical Characteristics

Parameter at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Thermal Characteristics					
Thermal resistance, junction - case	R_{thJC}	-		2.25	K/W
Thermal resistance, junction - ambient	R_{thJA}	-	100	-	
SMD version, device on PCB: @ min. footprint @ 6 cm^2 cooling area[1)]	R_{thJA}	 - -	 50 tbd	 - -	
Static Characteristics					
Drain- source breakdown voltage V_{GS} = 0 V, I_D = 0.25 mA	$V_{(BR)DSS}$	600	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D = 1 mA	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current V_{DS} = 600 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = 600 V, V_{GS} = 0 V, T_j = 150 °C	I_{DSS}	 - -	 0.1 -	 1 100	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-state resistance V_{GS} = 10 V, I_D = 1.3 A	$R_{DS(on)}$	-	4.2	5.5	Ω

1 Device on 50mm*50mm*1.5mm epoxy PCB FR4 with 6 cm2 (one layer, 70µm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics

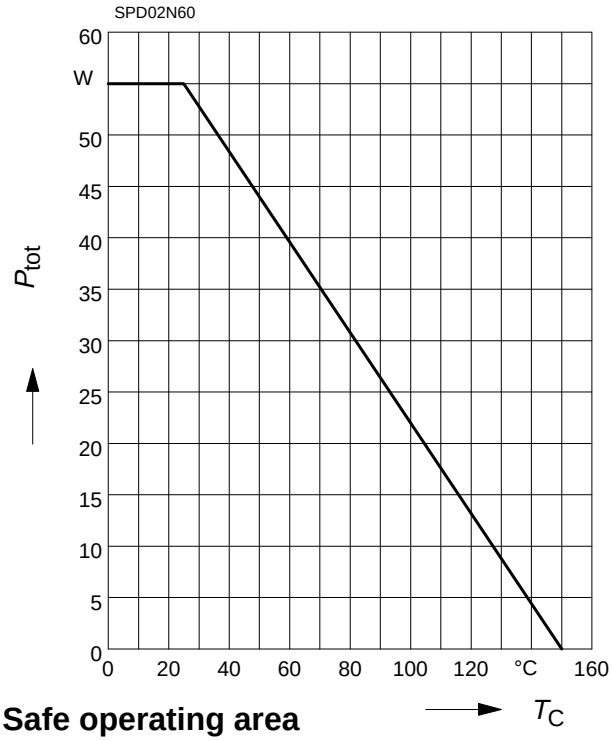
Parameter at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS}\geq 2*I_D*R_{DS(on)max}$, I_D = 1.3 A	g_{fs}	1	1.8	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	350	460	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	40	60	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	15	22	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 1.5 A, R_G = 50 Ω	$t_{d(on)}$	-	10	15	ns
Rise time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 1.5 A, R_G = 50 Ω	t_r	-	25	40	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 1.5 A, R_G = 50 Ω	$t_{d(off)}$	-	35	50	
Fall time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 1.5 A, R_G = 50 Ω	t_f	-	25	35	

Electrical Characteristics

Parameter at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current T_C = 25 °C	I_S	-	-	2	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	8	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 4 A	V_{SD}	-	0.85	1.4	V
Reverse recovery time V_R = 100 V, I_F=I_S , di_F/dt = 100 A/µs	t_{rr}	-	300	450	ns
Reverse recovery charge V_R = 100 V, I_F=I_S , di_F/dt = 100 A/µs	Q_{rr}	-	2.3	3.45	µC

Power Dissipation

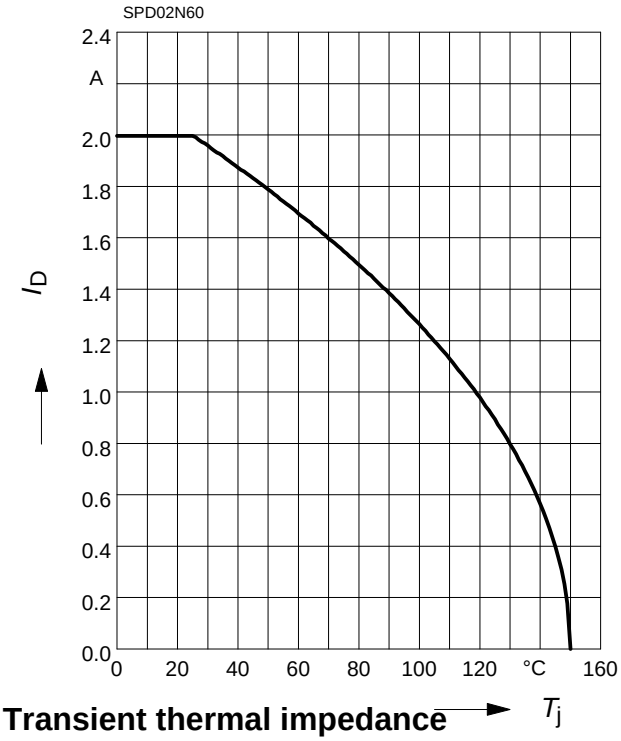
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

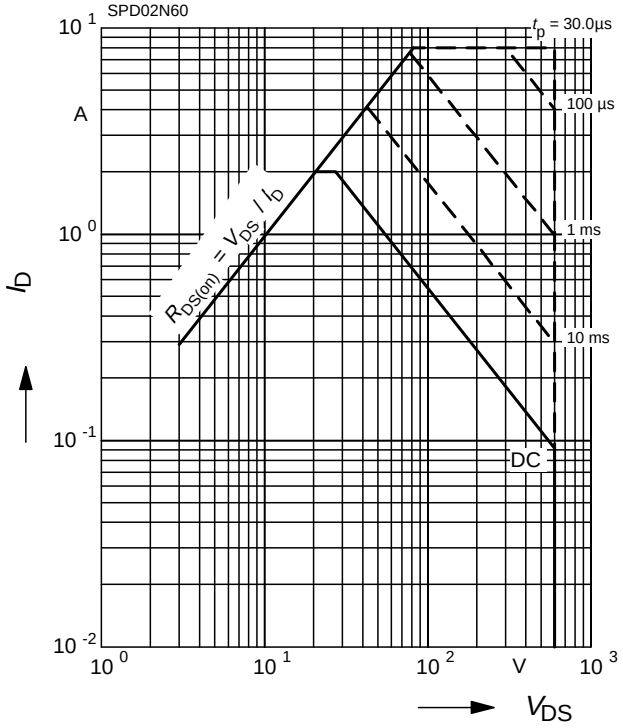
parameter: $V_{GS} \geq 10$ V



Safe operating area

$I_D = f(V_{DS})$

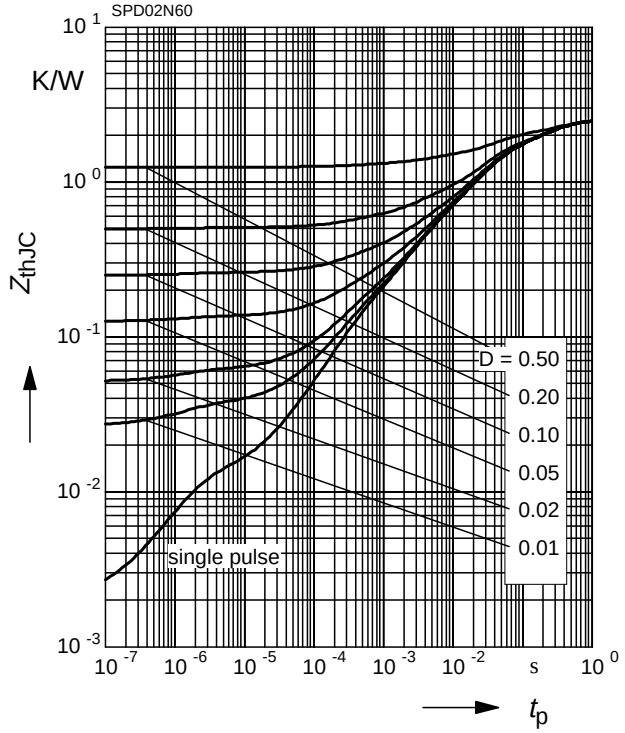
parameter : $D = 0$, $T_C = 25$ °C



Transient thermal impedance

$Z_{thJC} = f(t_p)$

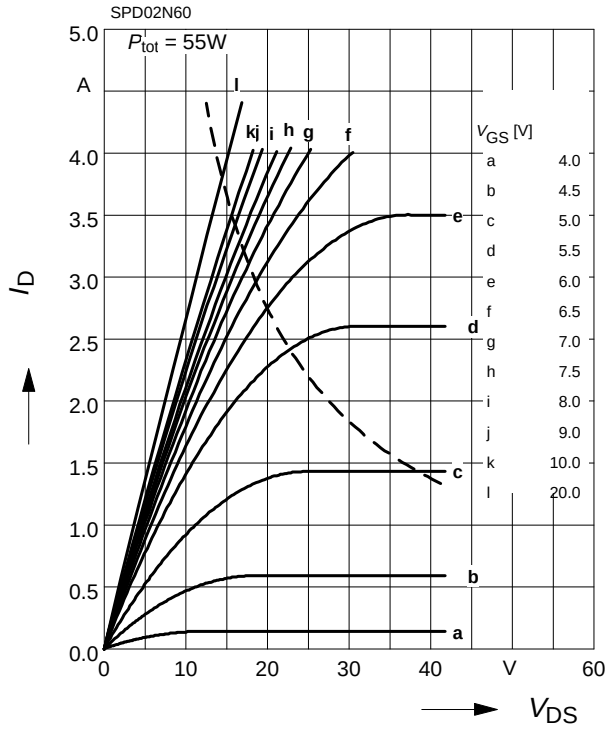
parameter : $D = t_p / T$



Typ. output characteristics

$I_D = f(V_{DS})$

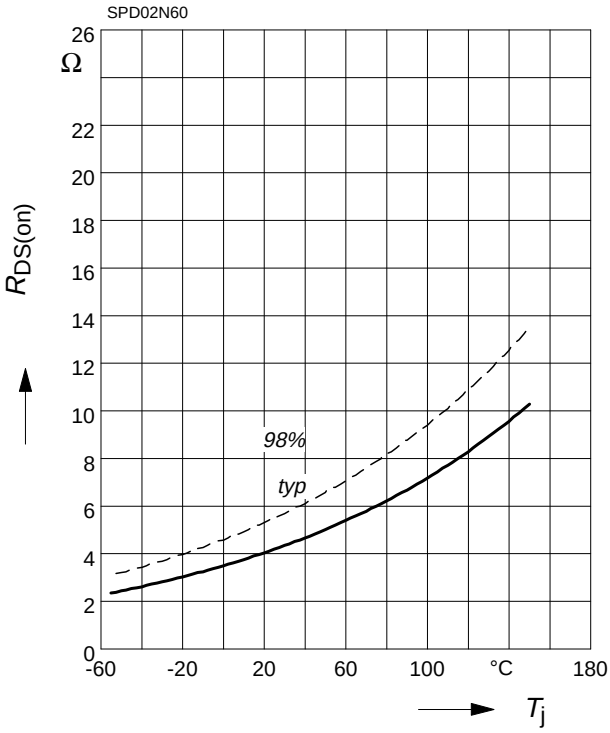
parameter: t_p = 80 µs



Drain-source on-resistance

$R_{DS(on)} = f(T_j)$

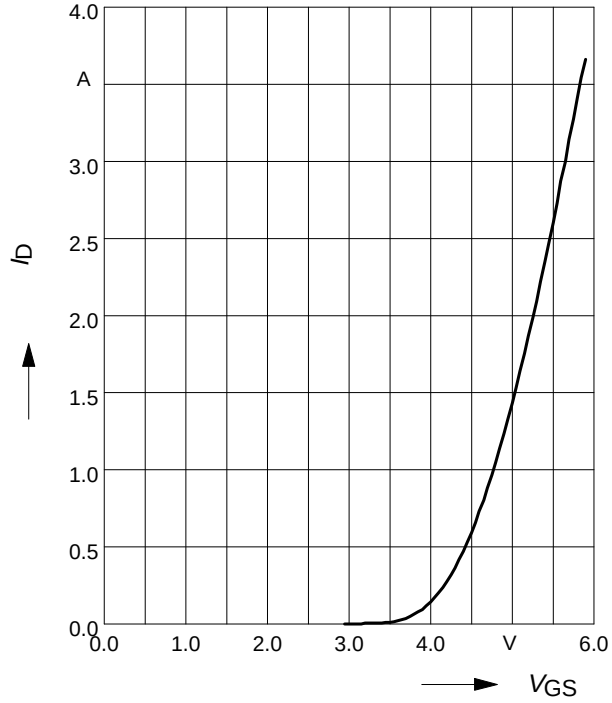
parameter : I_D = 1.3 A, V_{GS} = 10 V



Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: t_p = 80 µs

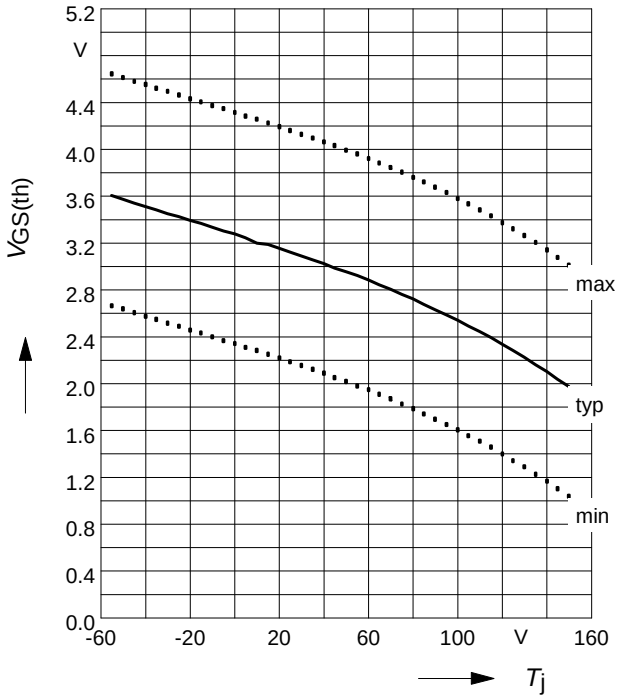
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Gate threshold voltage

$V_{GS(th)} = f(T_j)$

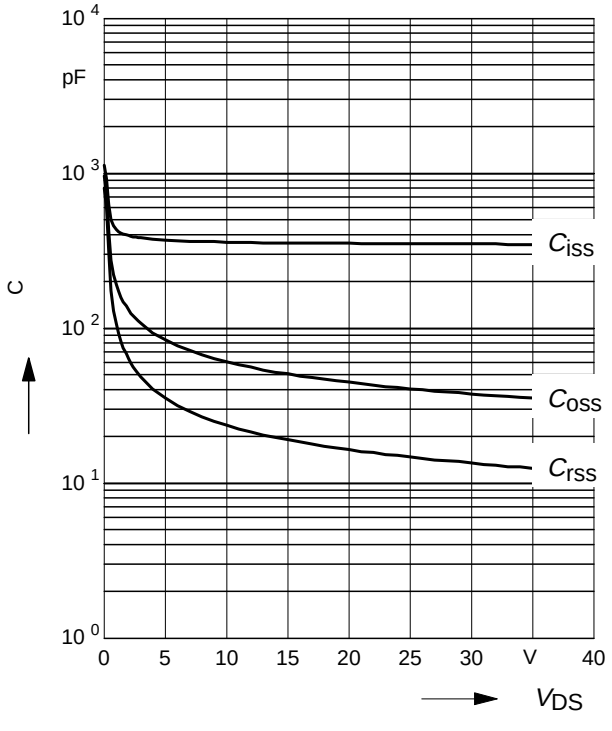
parameter : $V_{GS} = V_{DS}, I_D$ = 1 mA



Typ. capacitances

***C* = f(V_{DS})**

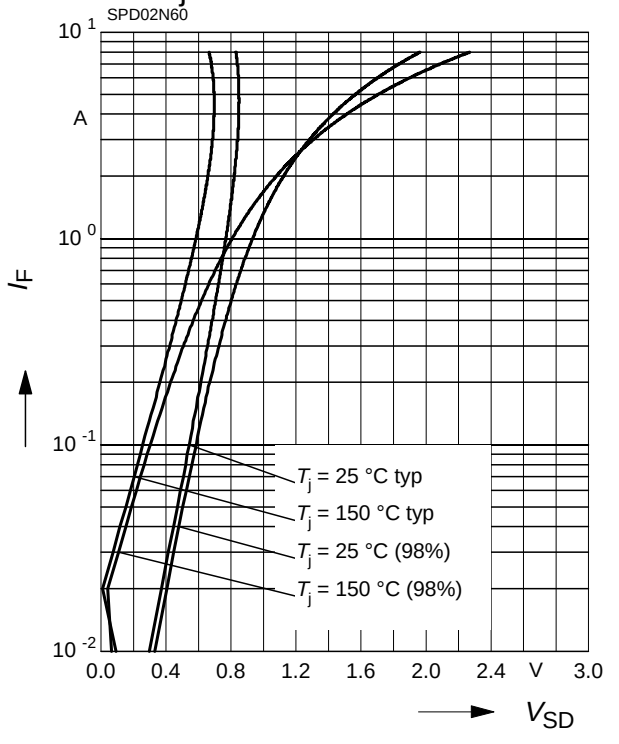
Parameter: V_{GS}=0 V, f=1 MHz



Forward characteristics of reverse diode

$I_F = f(V_{SD})$

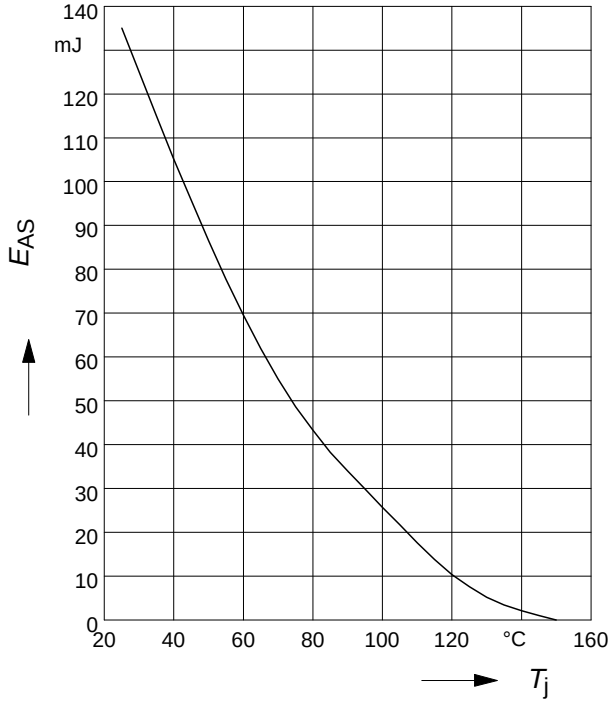
parameter: T_j , tp = 80 µs



Avalanche Energy $E_{AS} = f(T_j)$

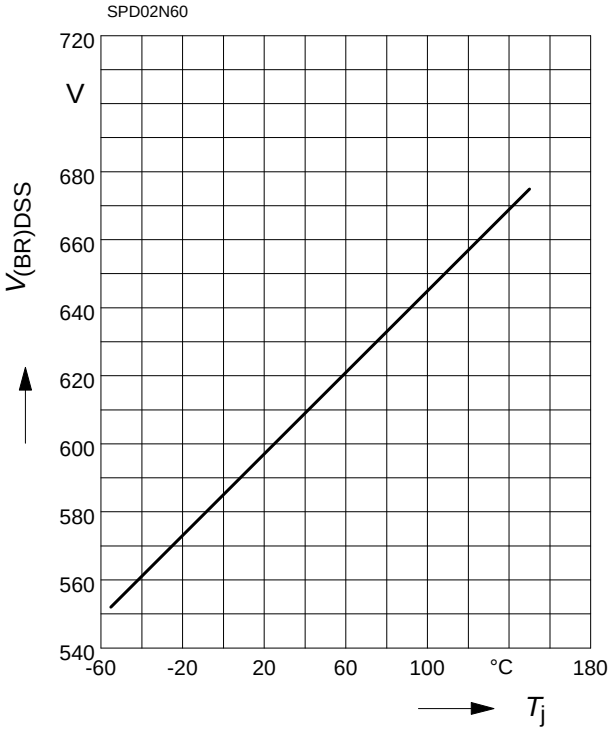
parameter: I_D = 2 A, V_{DD} = 50 V

R_{GS} = 25 Ω



Drain-source breakdown voltage

$V_{(BR)DSS} = f(T_j)$



Edition 7.97
Published by Siemens AG,
Bereich Halbleiter Vetrieb,
Werbung, Balanstraße 73,
81541 München

Attention please!

As far as patents or other rights of third parties are concerned, liability is only assumed for components, not for applications, processes and circuits implemented within components or assemblies.
The information describes a type of component and shall not be considered as warranted characteristics.
Terms of delivery and rights to change design reserved.
For questions on technology, delivery and prices please contact the Semiconductor Group Offices in Germany or the Siemens Companies and Representatives worldwide (see address list).
Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Siemens Office, Semiconductor Group.
Siemens AG is an approved CECC manufacturer.

Packing

Please use the recycling operators known to you. We can also help you - get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

Components used in life-support devices or systems must be expressly authorized for such purpose!

Critical components[1] of the Semiconductor Group of Siemens AG, may only be used in life-support devices or systems[2] with the express written approval of the Semiconductor Group of Siemens AG.

1)A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

2)Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain and/or protecf human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.