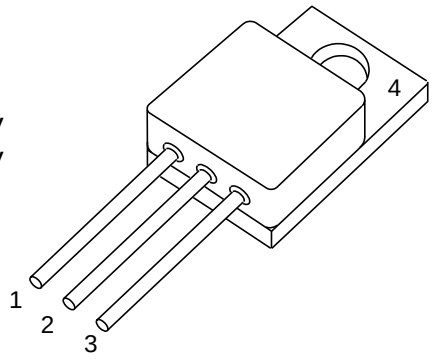
HiRel RadHard Power-MOS

- Low $R_{DS(on)}$
- Single Event Effect (SEE) hardened
  LET 85, Range: 118µm LET 55, Range: 90µm
  V_{GS} = -10V, V_{DS} = 250V V_{GS} = -15V, V_{DS} = 250V
  V_{GS} = -15V, V_{DS} = 120V V_{GS} = -20V, V_{DS} = 160V
- Total Ionisation Dose (TID) hardened
  100 kRad approved
- Hermetically sealed
- N-channel



Type	Marking	Pin Configuration 1	2	3	4	Package
BUY25CS45B-01	-	D	S	G	Not connected	TO-254AA

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain Source Voltage	V_{DS}	250	V
Gate Source Voltage	V_{GS}	+/- 20	V
Drain Gate Voltage	V_{DG}	250	V
Continuous Drain Current T_C = 25 °C T_C = 100 °C	I_D	 45 29	A
Continuous Source Current	I_S	45	A
Drain Current Pulsed, t_p limited by T_{jmax}	I_{DM}	180	Apk
Total Power Dissipation [1)]	P_{tot}	208	W
Junction Temperature	T_J	-55 to + 150	°C
Operating and Storage Temperature	T_{op}	-55 to + 150	°C
Avalanche Energy	E_{AS}	380	mJ

Thermal Characteristics

Thermal Resistance (Junction to Case)	$R_{th\ JC}$	0.6	K/W
Soldering Temperature	T_{sol}	250	°C

Notes.:

1) For $T_S \leq 25°C$. For $T_S > 25°C$ derating is required.

Electrical Characteristics, at T_A=25°C; unless otherwise specified

Parameter	Symbol	Values		Unit
		min.	max.	
DC Characteristics				
Breakdown Voltage Drain to Source I_D = 0.25mA, V_{GS} = 0V	B_{VDSS}	250	-	V
Gate Threshold Voltage I_D = 1.0mA, $V_{DS} \geq V_{GS}$	$V_{GS(th)}$	2.0	4.0	V
Gate to Source Leakage Current V_{DS} = 0V, V_{GS} = +/- 20V	I_{GSS}	-	+/-100	nA
Drain Current V_{DS} = 200V, V_{GS} = 0V	I_{DSS}	-	25	µA
Drain Source On Resistance [1] V_{GS} = 10V, I_D = 29A	$r_{DS(ON)}$	-	0.05	Ω
Source Drain Diode, Forward Voltage [1), 2)] V_{GS} = 0V, I_S = 45A	V_{SD}	-	1.4	V
AC Characteristics				
Turn-on Delay Time V_{DD} = 50% V_{DS}, I_D = 29A, R_G = 4.7Ω	$t_{d(ON)}$	-	50	ns
Rise Time V_{DD} = 50% V_{DS}, I_D = 29A, R_G = 4.7Ω	t_r	-	95	ns
Turn-off Delay Time V_{DD} = 50% V_{DS}, I_D = 29A, R_G = 4.7Ω	$t_{d(OFF)}$	-	80	ns
Fall Time V_{DD} = 50% V_{DS}, I_D = 29A, R_G = 4.7Ω	t_f	-	75	ns
Reverse Recovery Time V_{DD} < 50% V_{DS}, I_D = 45A	t_{rr}	-	600	ns
Common Source Input Capacitance V_{DS} = 100V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	3.5	6.5	nF
Common Source Output Capacitance V_{DS} = 100V, V_{GS} = 0V, f = 1.0MHz	C_{oss}	250	400	pF
Common Source Reverse Transfer Capacitance V_{DS} = 100V, V_{GS} = 0V, f = 1.0MHz	C_{rss}	5	20	pF
Total Gate Charge V_{DD} = 50% V_{DS}, V_{GS} = 10V, I_D = 45A	Q_G	-	100	nC

Notes.:

1) Pulsed Measurement: Pulse Width < 300µs, Duty Cycle <2.0%.
2) Measured within 2.0 mm of case.

Electrical Characteristics

at T_A=125°C; unless otherwise specified

Parameter	Symbol	Values		Unit
		min.	max.	
DC Characteristics				
Gate Threshold Voltage I_D = 1.0mA, $V_{DS} \geq V_{GS}$	$V_{GS(th)}$	1.5	-	V
Gate to Source Leakage Current V_{DS} = 0V, V_{GS} = +/- 20V	I_{GSS}	-	+/-200	nA
Drain Current V_{DS} = 200V, V_{GS} = 0V	I_{DSS}	-	250	µA
Drain Source On Resistance [1)] V_{GS} = 10V, I_D = 29A	$r_{DS(ON)}$	-	0.09	Ω

Notes.:

1) Pulsed Measurement: Pulse Width < 300µs, Duty Cycle <2.0%.

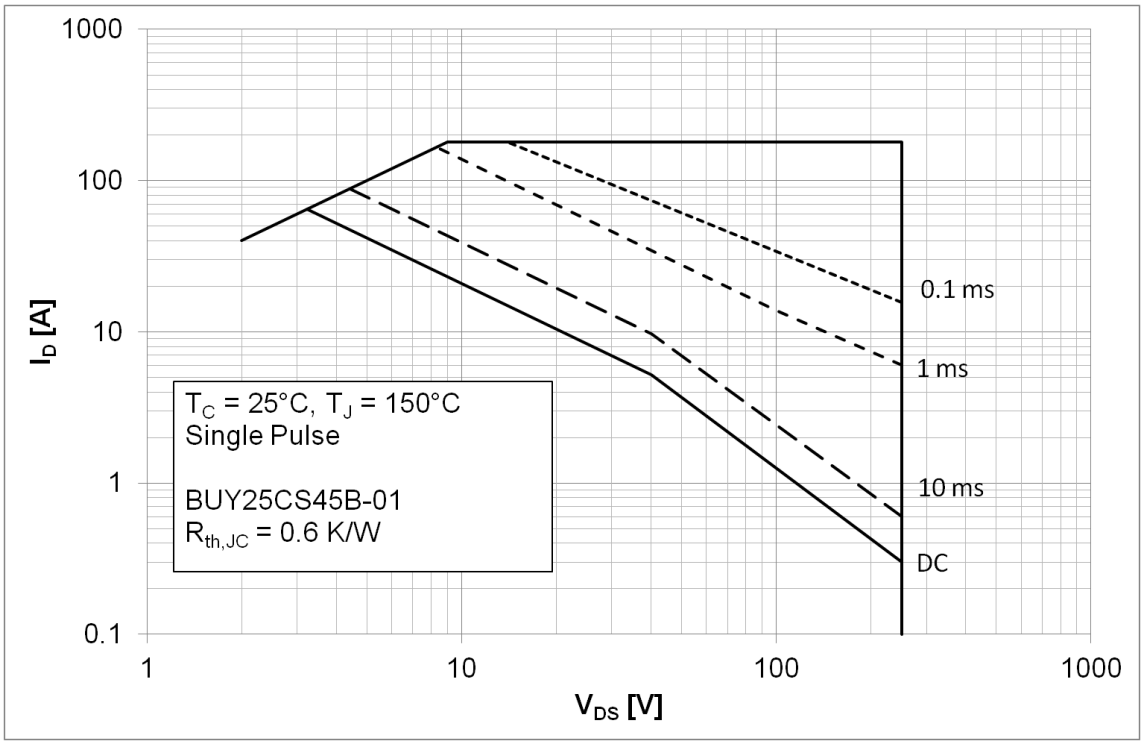
Electrical Characteristics

at T_A=-55°C; unless otherwise specified

Parameter	Symbol	Values		Unit
		min.	max.	
DC Characteristics				
Gate Threshold Voltage I_D = 1.0mA, $V_{DS} \geq V_{GS}$	$V_{GS(th)}$	-	5.0	V

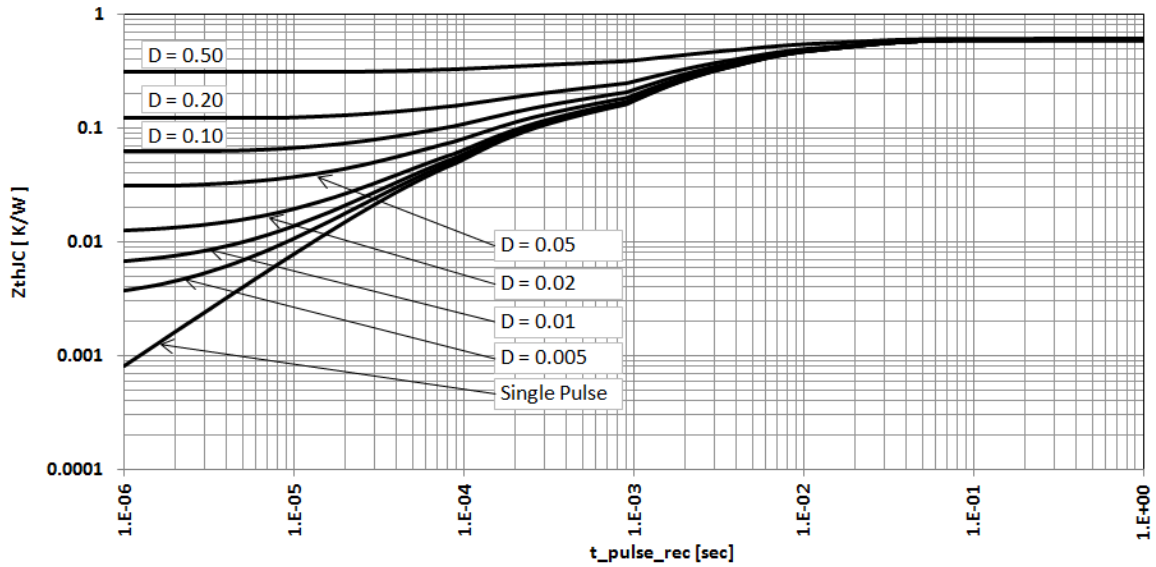
1 Safe operating area

$I_D = f(V_{DS})$; $T_C = 25°C$
parameter: t_p



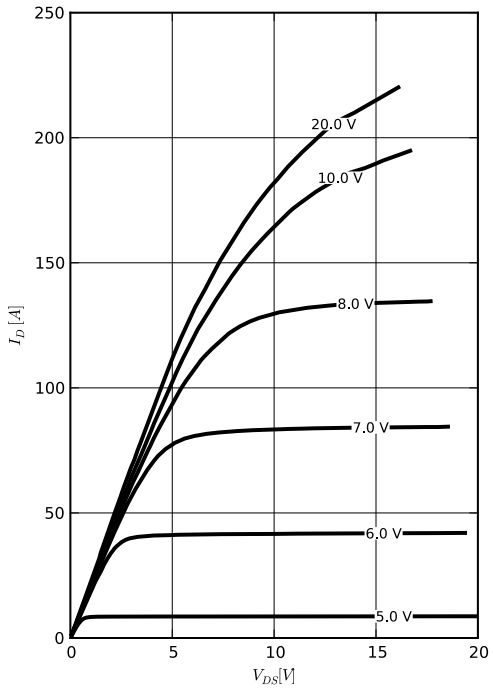
2 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$
parameter: $D = t_p/T$



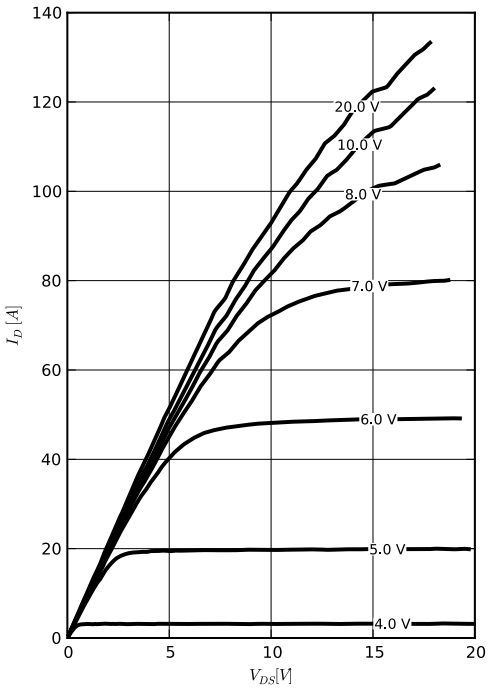
3 Typ. output characteristics

$I_D = f(V_{DS})$; $T_j = 25$ °C
parameter: V_{GS}



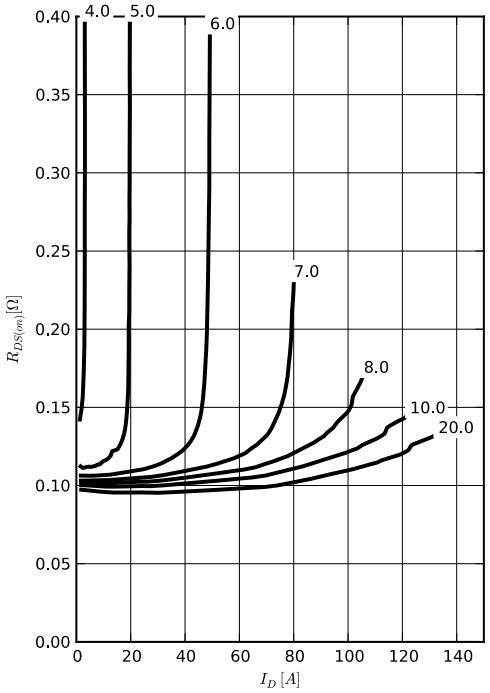
4 Typ. output characteristics

$I_D = f(V_{DS})$; $T_j = 150$ °C
parameter: V_G



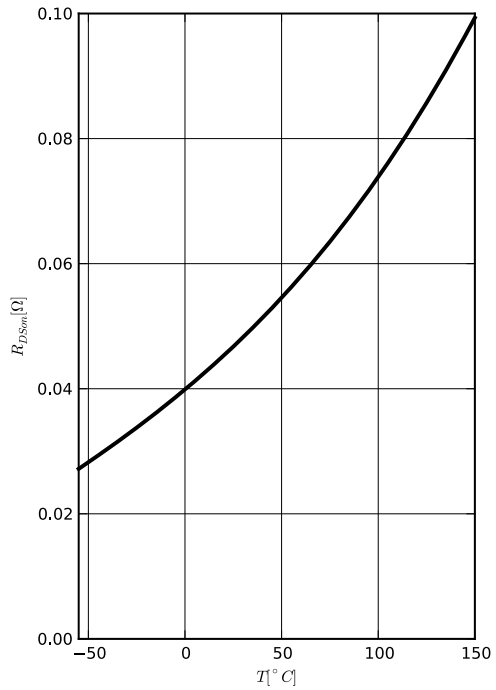
5 Typ. drain-source on-state resistance

$R_{DS(on)} = f(I_D)$; $T_j = 150$ °C
parameter: V_{GS}



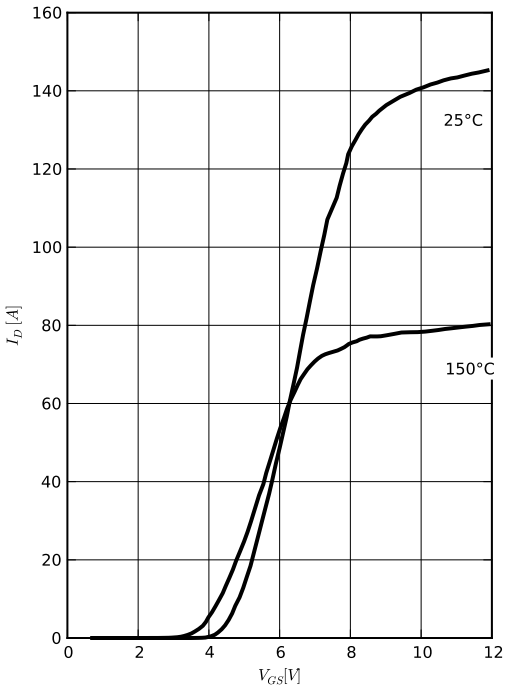
6 Typ. drain-source on-state resistance

$R_{DS(on)} = f(T_j)$
I_D=29A



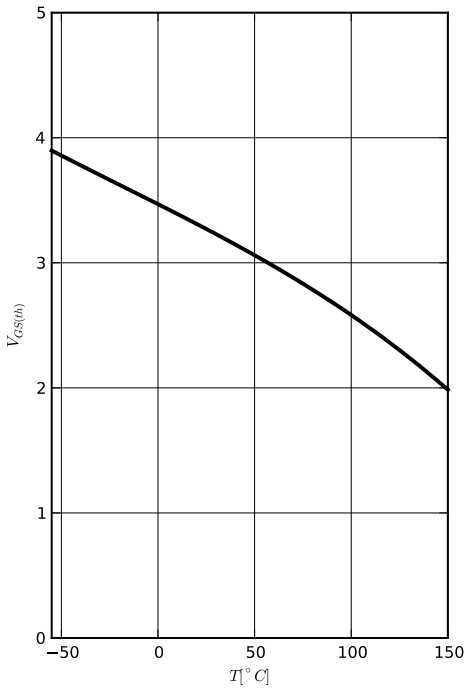
7 Typ. transfer characteristics

$I_D = f(V_{GS})$; $|VDS| > 2\ |I_D|\ R_{DS(on)max}$
parameter: T_j



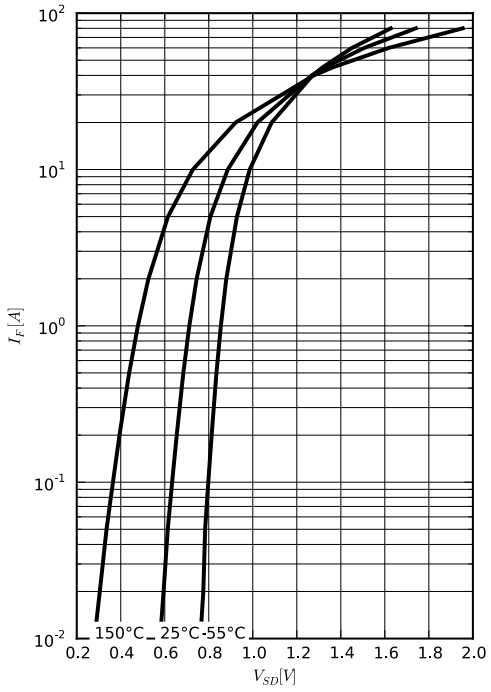
8 Typ. gate threshold voltage

$I_D=f(T_j)$
I_D = 1mA



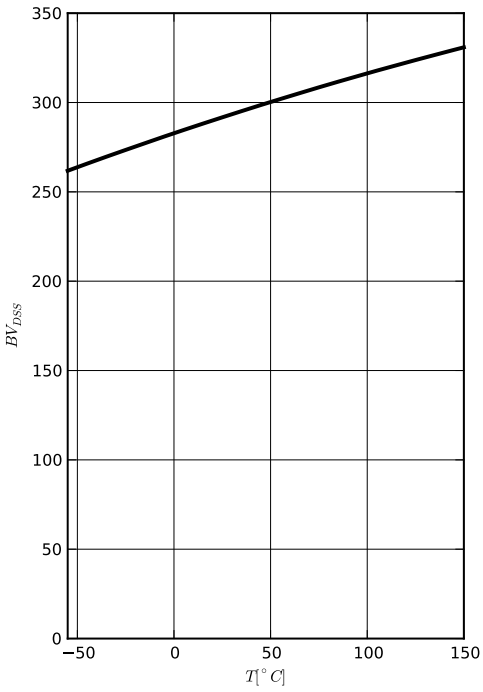
9 Typ. forward characteristics of reverse diode

$I_F = f(V_{SD})$
parameter: T_j



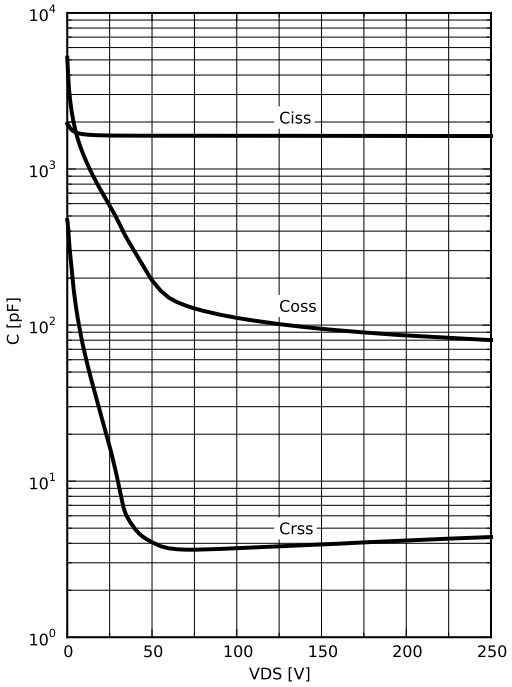
10 Typ. drain-source breakdown voltage

$BV_{DSS} = f(T_j)$
I_D = 250µA



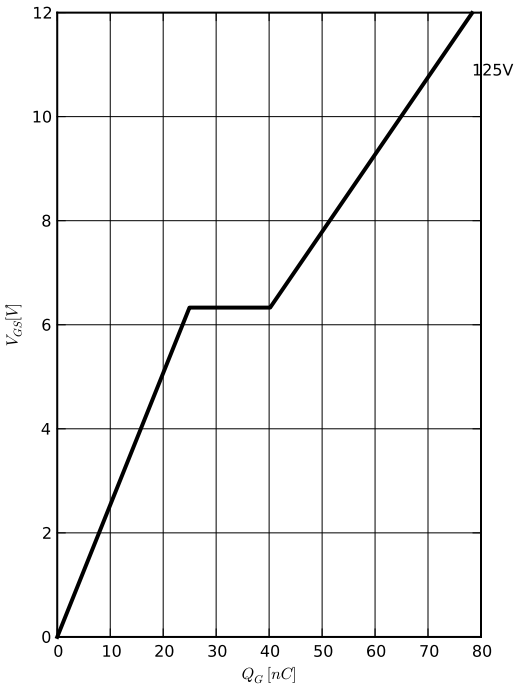
11 Typ. capacitances

C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz

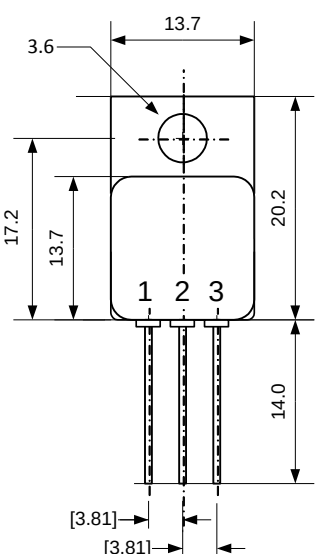


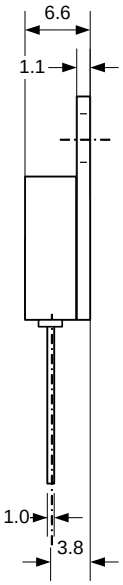
12 Typ. gate charge

V_{GS} = f(Q_{gate}); ID = 45.0 A pulsed
parameter: V_{DD}



TO-254AA Package





Dimensions are typical [mm]

Edition 2015-03
Published by
Infineon Technologies AG
85579 Neubiberg, Germany

Caution

This package contains beryllia. Therefore it must not be in any form machined, grinded, sanded, polished or any other mechanical operation which will produce dust and particles.

Attention please!

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics (“Beschaffenheitsgarantie“). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of a third party.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (www.infineon.com).

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the expressed written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system.

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