

20V 6.8A N-Channel Enhancement Mode Power MOSFET

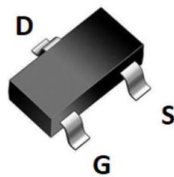
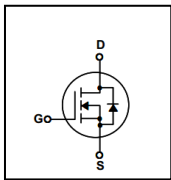
General Description

This Power MOSFET has been developed using advanced trench process, which is specifically designed to minimize input capacitance and gate charge. This renders the device suitable for use as primary switch in advanced high-efficiency isolated DC-DC converters for telecom and computer applications, and applications with low gate charge driving requirements.

FEATURES

- $R_{DS(ON)} \leq 21m\Omega$ @ $V_{GS}=4.5V, I_D=4A$
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

SYMBOL



SOT-23 top view

ASSEMBLY MESSAGE

Product Name	Marking	Package	Packaging
BXT210N02M	2312	SOT-23	Reel

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ C$ unless otherwise noted)

Parameter		Symbol	Rating	Unit
			SOT-23	
Drain-Source Voltage		V_{DSS}	20	V
Drain Current	Continuous ($T_C = 25^\circ C$)	I_D	6.8	A
	Continuous ($T_C = 100^\circ C$)		4.4	A
Drain Current	Pulsed (Note1)	I_{DM}	27.2	A
Gate-Source Voltage		V_{GSS}	± 12	V
Power Dissipation	$T_C = 25^\circ C$	P_D	1.6	W
Maximum Junction Temperature		T_J	150	$^\circ C$
Storage Temperature Range		T_{STG}	-55 to 150	$^\circ C$

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.	Unit
		SOT-23	
Thermal Resistance, Junction-to- Ambient	R _{θJA}	78	°C / W

ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise Noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V, ID=250μA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	VDS=20V, VGS=0V			1	μA
Gate-Body Leakage Current, Forward	I _{GSS}	VGS=12V			100	nA
Gate-Body Leakage Current, Reverse		VGS=-12V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	VGS(TH)	VDS=VGS, ID=250μA	0.5	0.7	1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	VGS=4.5V, ID=4A		16	21	mΩ
		VGS=2.5V, ID=3A		20	30	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	VDS=10V, VGS=0V, f=1.0MHz		520		pF
Output Capacitance	C _{OSS}			90		pF
Reverse Transfer Capacitance	C _{RSS}			73		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	t _{D(ON)}	VDD=10V, ID=3.5A, VGS = 4.5V, RG=3Ω		3.2		ns
Turn-ON Rise Time	t _R			8		ns
Turn-OFF Delay Time	t _{D(OFF)}			22		ns
Turn-OFF Fall-Time	t _F			7		ns
Total Gate Charge(Note2)	Q _G	VDS =10V, VGS =4.5V, ID =3.5A		12.1		nC
Gate Source Charge	Q _{GS}			1		nC
Gate Drain Charge	Q _{GD}			2		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V _{SD}	IS=6.8A, VGS=0V			1.2	V
Diode Continuous Forward Current	I _S				6.8	A

Note: 2. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

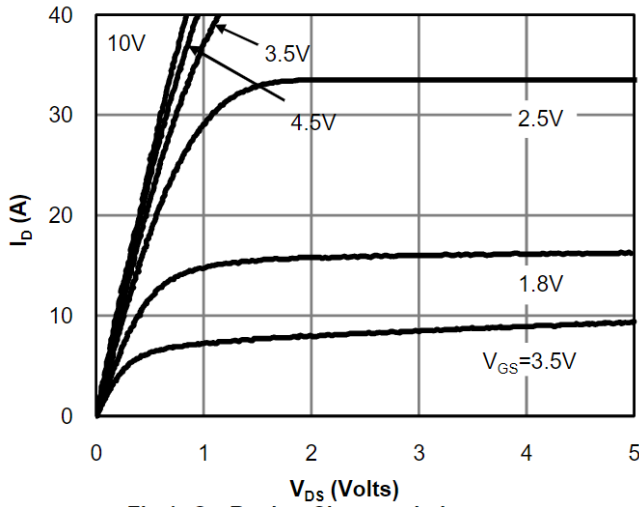


Fig 1: On-Region Characteristics

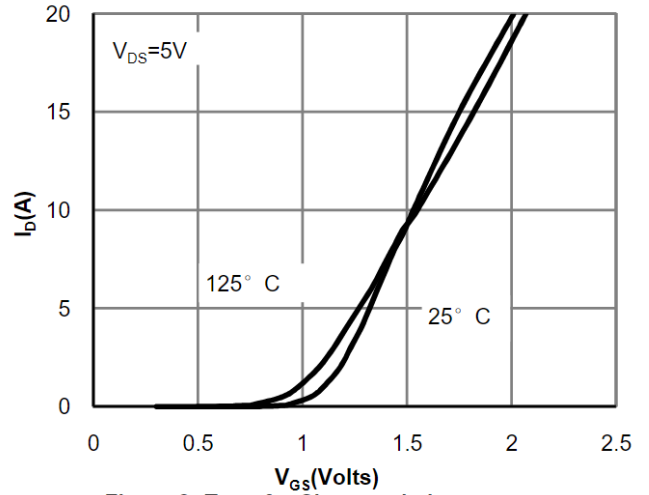


Figure 2: Transfer Characteristics

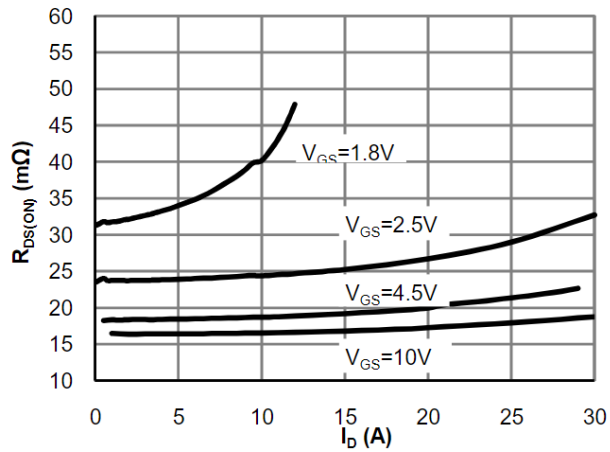


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

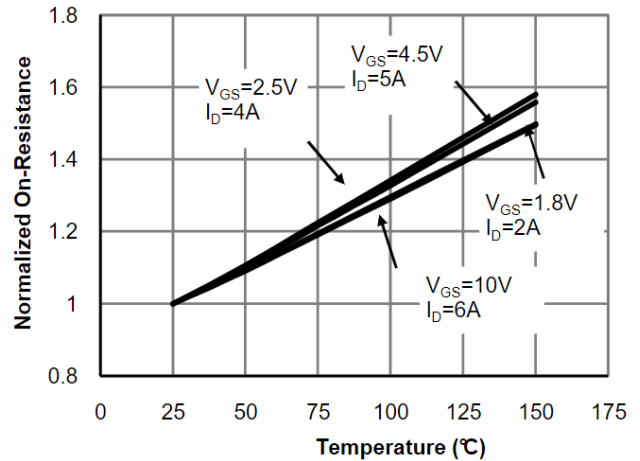


Figure 4: On-Resistance vs. Junction Temperature

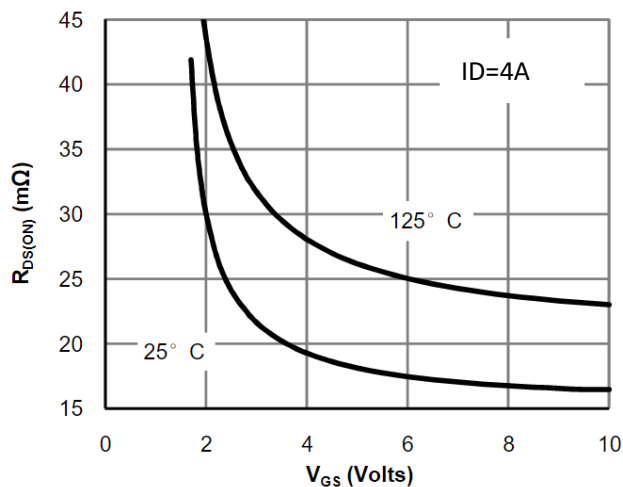


Figure 5: On-Resistance vs. Gate-Source Voltage

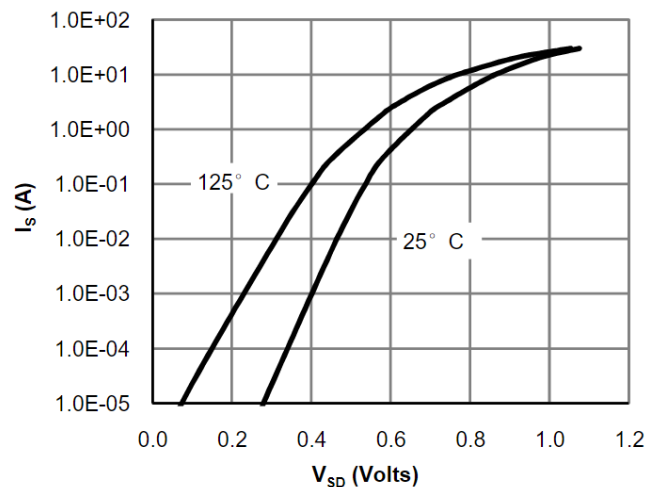


Figure 6: Body-Diode Characteristics

TYPICAL CHARACTERISTICS(Cont.)

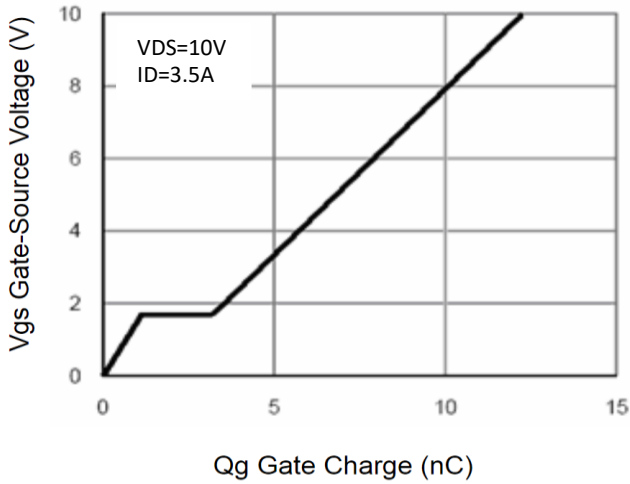


Figure 7: Gate-Charge Characteristics

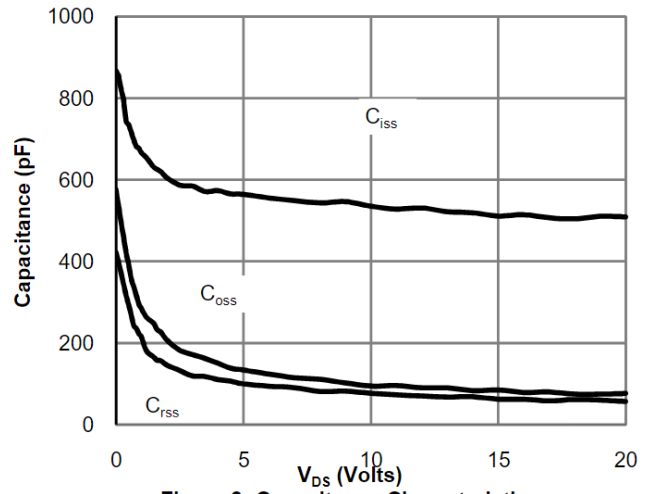


Figure 8: Capacitance Characteristics

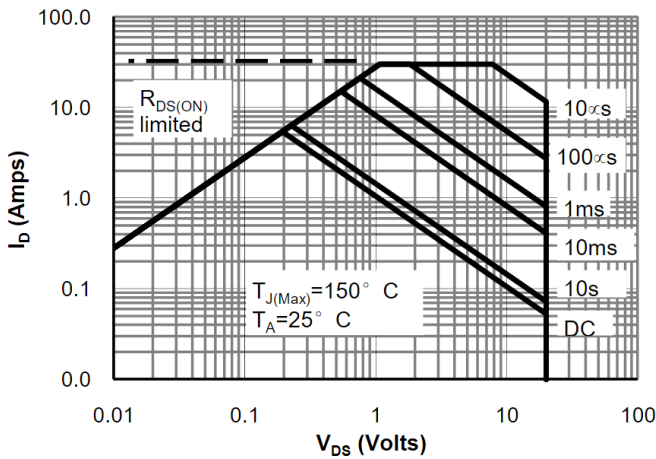
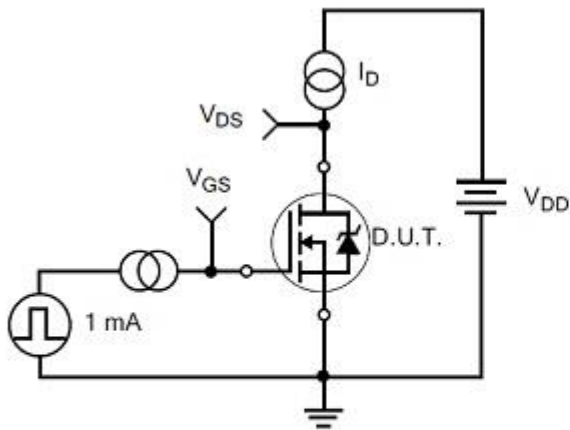
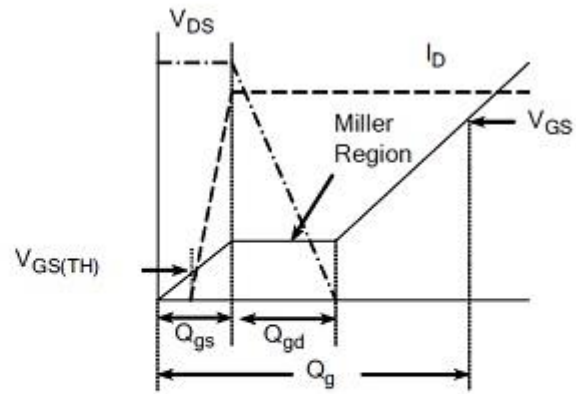


Figure 9: Maximum Forward Biased Safe Operating Area

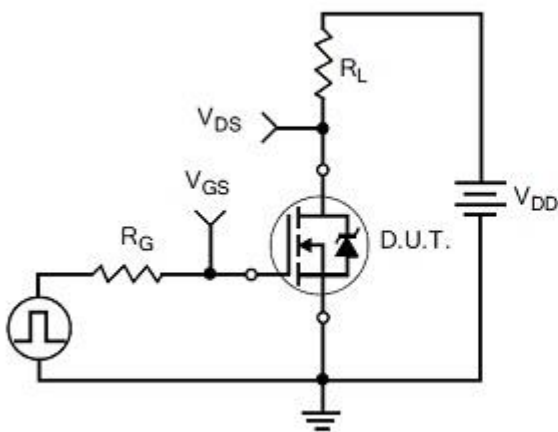
TEST CIRCUITS AND WAVEFORMS



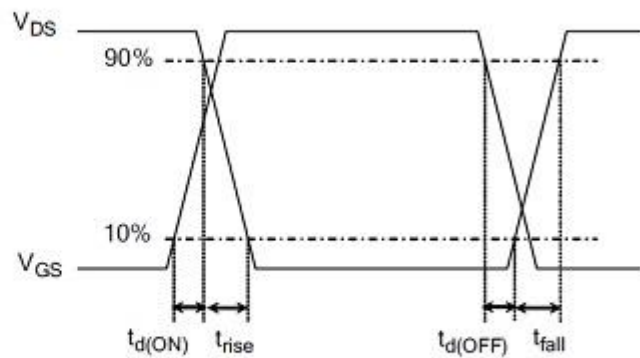
Gate Charge Test Circuit



Gate Charge Waveform

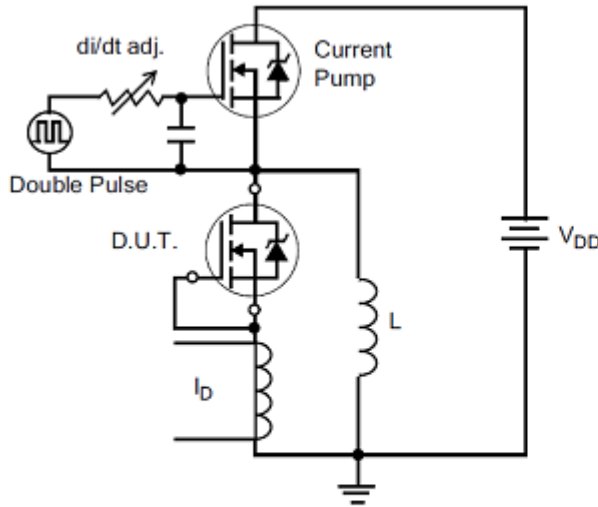


Resistive Switching Test Circuit

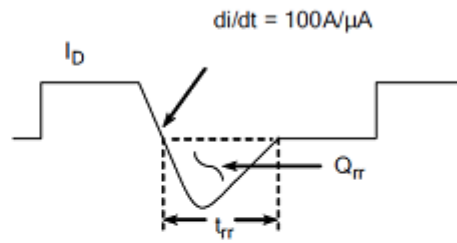


Resistive Switching Waveforms

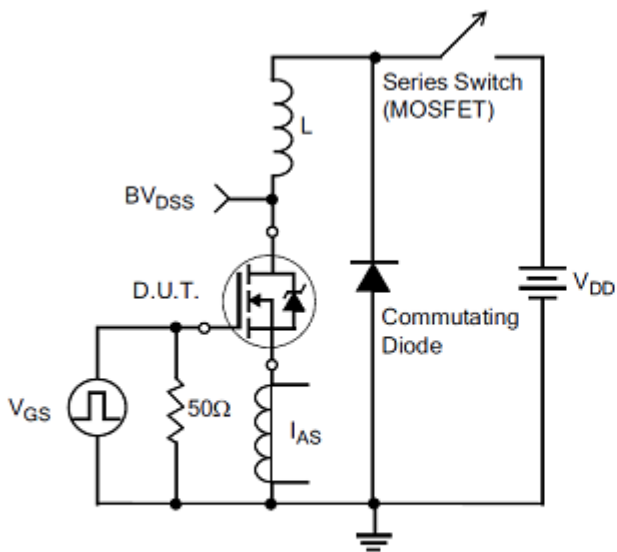
TEST CIRCUITS AND WAVEFORMS(Cont.)



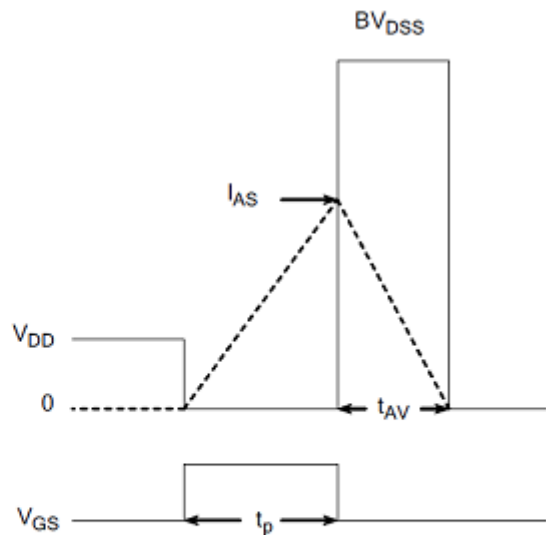
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



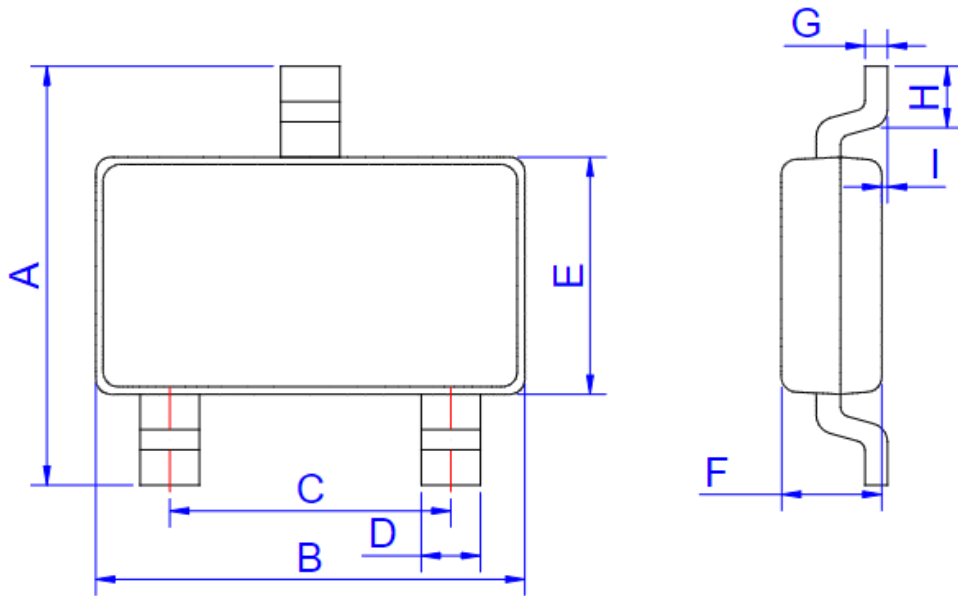
Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Unclamped Inductive Switching Waveforms

SOT-23 Package



SOT-23

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.250	2.550	0.089	0.100
B	2.800	3.000	0.110	0.118
C	1.800	2.000	0.071	0.079
D	0.300	0.500	0.012	0.020
E	1.200	1.400	0.047	0.055
F	0.900	1.150	0.035	0.045
G		0.200		0.008
H	0.200		0.008	
I	0.000	0.150	0.000	0.006

Revision history**Document revision history**

Date	Revision	Changes
25-Oct-2020	1.0	First release

Disclaimers:

Bridgelux WuXi has made reasonable commercial efforts to ensure that the information given in this data sheet is correct. However, it must clearly be understood that such information is for guidance only and does not constitute any representation or form part of any offer or contract.

For documents and material available from this data sheet, Bridgelux WuXi does not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product, technology or process disclosed hereunder.

Bridgelux WuXi reserves the rights to at its own discretion to make any changes or improvements to this data sheet. Unless said data sheet is incorporated into the formal contract, any customer should not rely on the information as any specification or product parameters duly committed by Bridgelux WuXi. Customers are hereby advised to verify that the information contained herein is current and complete before the entering of any contract or acknowledgement of any purchase order. Accordingly, all products specified hereunder shall be sold subject to Bridgelux WuXi's terms and conditions supplied at the time of order acknowledgement. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

Bridgelux WuXi does not warrant or convey any license either expressed or implied under its patent rights, nor the rights of others. Reproduction of information contained herein shall be only permissible if such reproduction is without any modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice. Bridgelux WuXi is not responsible or liable for such altered documentation.

Resale of Bridgelux WuXi's products with statements different from or beyond the parameters stated by Bridgelux WuXi for that product or service voids all express or implied warranties for the associated Bridgelux WuXi's product or service and is unfair and deceptive business practice. Bridgelux WuXi is not responsible or liable for any such statements.

Bridgelux WuXi's products are not authorized for use as critical components in life support devices or systems without the express written approval of Bridgelux WuXi. 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, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a 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.