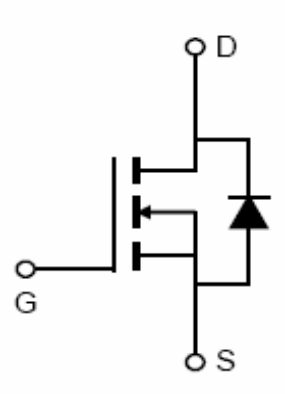
WLE095R150

N-Channel Super Trench Power MOSFET

Description

The WLE095R150 is SGT MOSFET designed for high current switching applications. Both conduction and switching power losses are minimized due to an extremely low combination of RDS(ON) and Qg. This device is ideal for high-frequency switching and synchronous rectification.



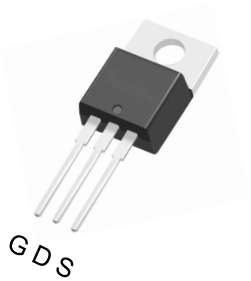
Schematic Diagram

Application

- Power Management in Telecom., Industrial Automation, CE
- Motor Driving in Power Tool, E-vehicle, Robotics
- Current Switching in DC/DC & AC/DC (SR) Sub-systems

General Features

- V_{DS} =150V,I_D =120A
  $R_{DS(ON)}$=8.9mΩ , typical @ V_{GS}=10V
- Ultra-low RDS(ON)
- Low Gate Charge
- High Current Capability
- 100% UIS Tested, 100% Rg Tested



TO-220

TO-263

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (@Note1)	I_D	120	A
Drain Current-Continuous(TC=100℃) (@Note1)	I_D	90	A
Pulsed Drain Current (@Note2)	I_{DM}	335	A
Avalanche Current (@Note3)	I_{AS}	65	A
Power Dissipation (TC=25℃) (@Note4)	P_D	180	W
Power Dissipation (TC=100℃) (@Note4)		71	
Avalanche energy (@Note3)	E_{AS}	211	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Performance

Parameter	Symbol	Typ.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	45	℃/W
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	0.55	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA		150	165	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120V, V_{GS} = 0V		-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V		-	-	±100	nA
On Characteristics							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA		2.0	3.0	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	TO-220	-	9.0	11	mΩ
			TO-263		8.9	11	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=20A			20	-	S
Dynamic Characteristics (@Note5)							
Input Capacitance	C_{lss}	V_{DS}=75V,V_{GS}=0V, F=1.0MHz		-	3609	-	PF
Output Capacitance	C_{oss}			-	348	-	PF
Reverse Transfer Capacitance	C_{rss}			-	4.8	-	PF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		-	1.2	-	Ω
Switching Characteristics (@Note5)							
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=75V,V_{GS}=10V RL=3.75Ω,Rg=6Ω		-	18	-	nS
Turn-on Rise Time	t_r			-	19	-	nS
Turn-Off Delay Time	$t_{d(off)}$			-	50	-	nS
Turn-Off Fall Time	t_f			-	17	-	nS
Total Gate Charge	Q_g	V_{DS}=75V,I_D=20A , V_{GS}=10V		-	47	-	nC
Gate-Source Charge	Q_{gs}			-	15		nC
Gate-Drain Charge	Q_{gd}			-	8		nC
Drain-Source Diode Characteristics							
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=1A		-	0.7	1.0	V
Diode Forward Current	I_S	T_C = 25°C		-	-	179	A
Body Diode Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 20A di/dt = 100A/μs		-	93	-	nS
Body Diode Reverse Recovery Charge	Qrr			-	363	-	nC

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 150°C.
3. This single-pulse measurement was taken under the following condition [L = 100μH, V_{GS} = 10V, V_{DS} = 75V] while its value is limited by T_{J_Max} = 150°C.
4. The power dissipation P_D is based on T_{J_Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

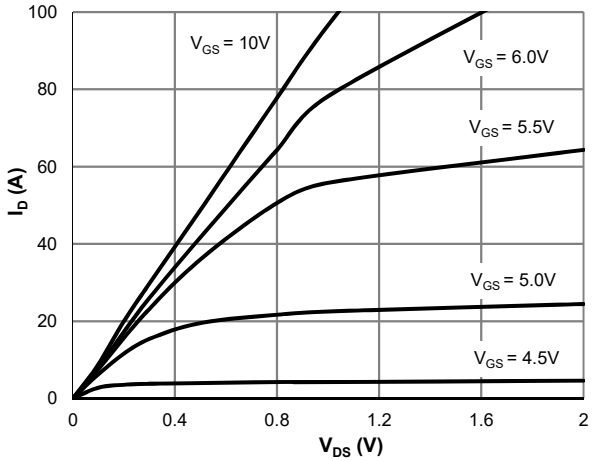


Figure 1: Saturation Characteristics

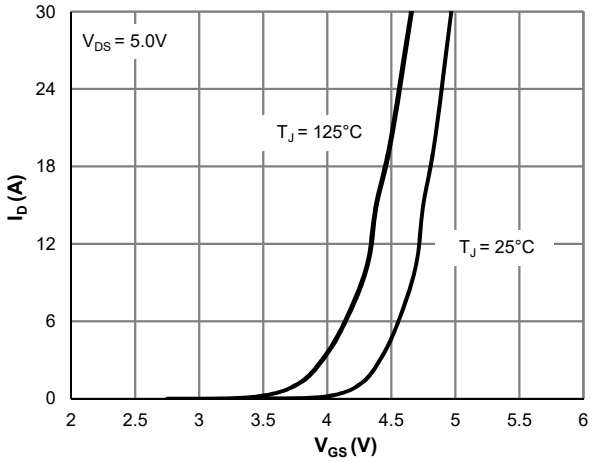


Figure 2: Transfer Characteristics

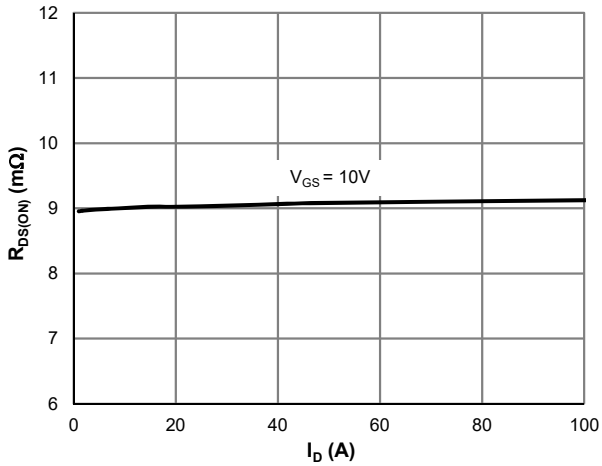


Figure 3: $R_{DS(ON)}$ vs. Drain Current

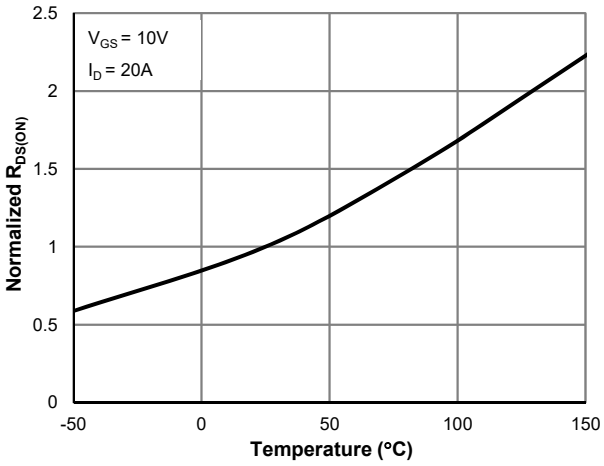


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

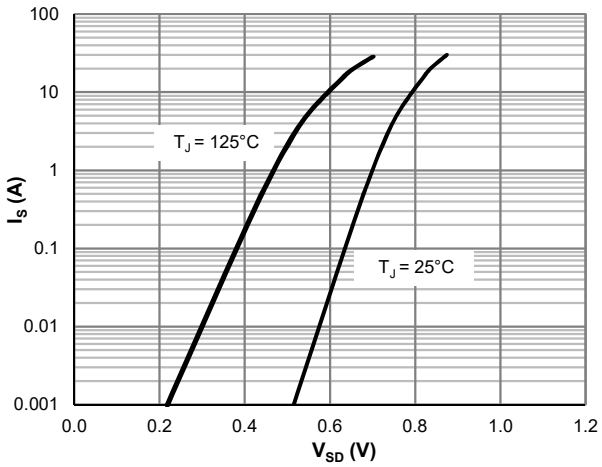


Figure 5: Body-Diode Characteristics

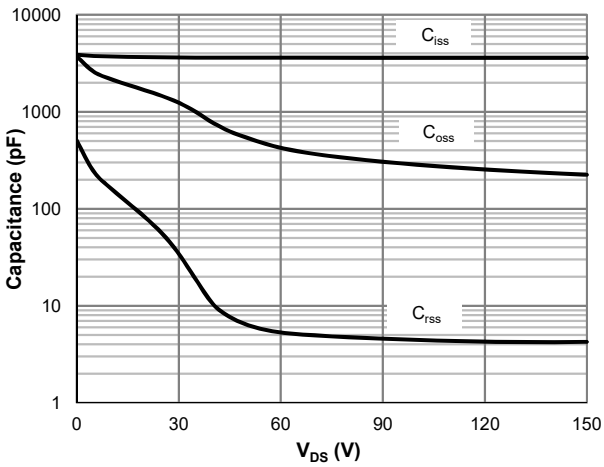


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

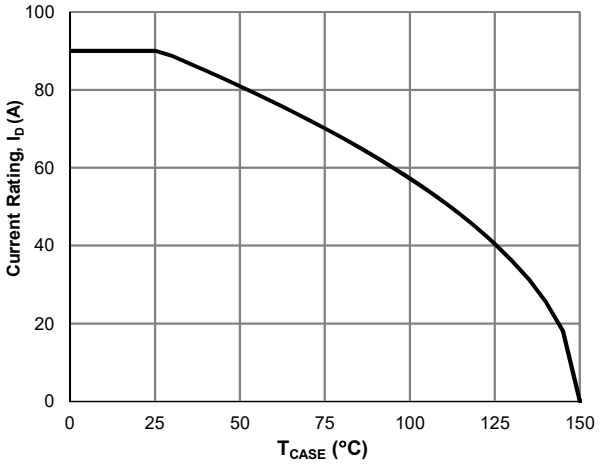


Figure 7: Current De-rating

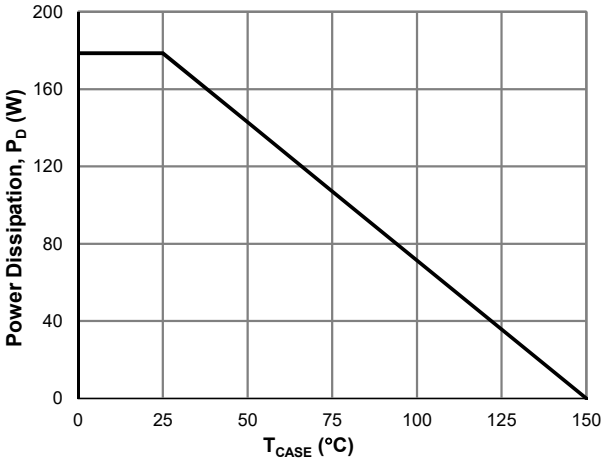


Figure 8: Power De-rating

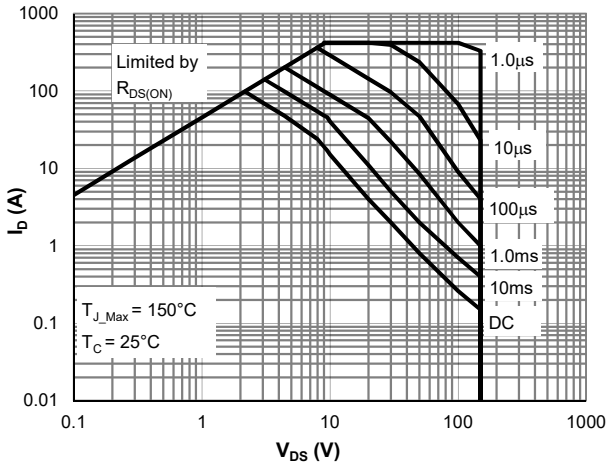


Figure 9: Maximum Safe Operating

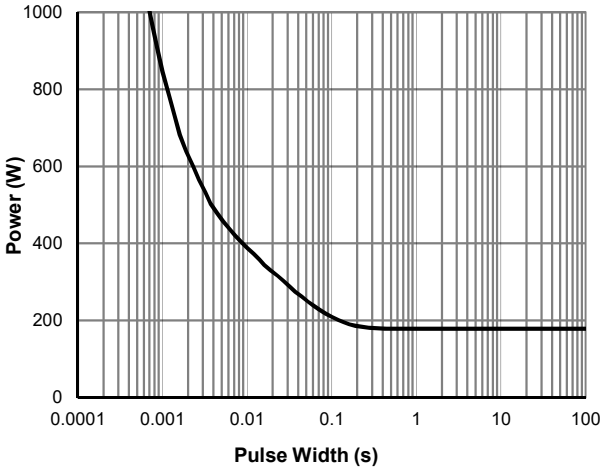


Figure 10: Single Pulse Power Rating, Junction-to-Case

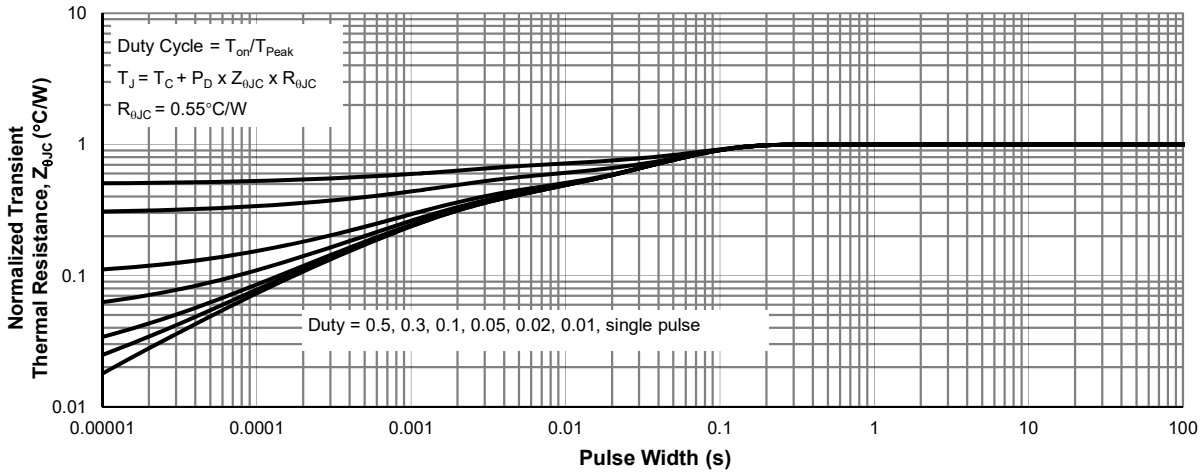
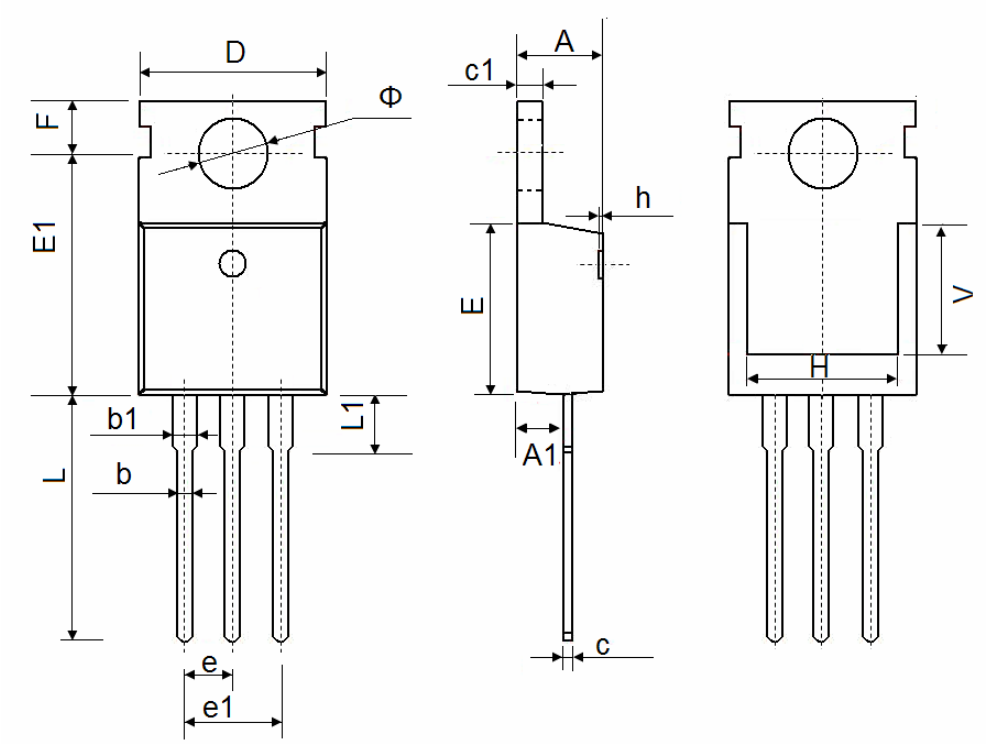


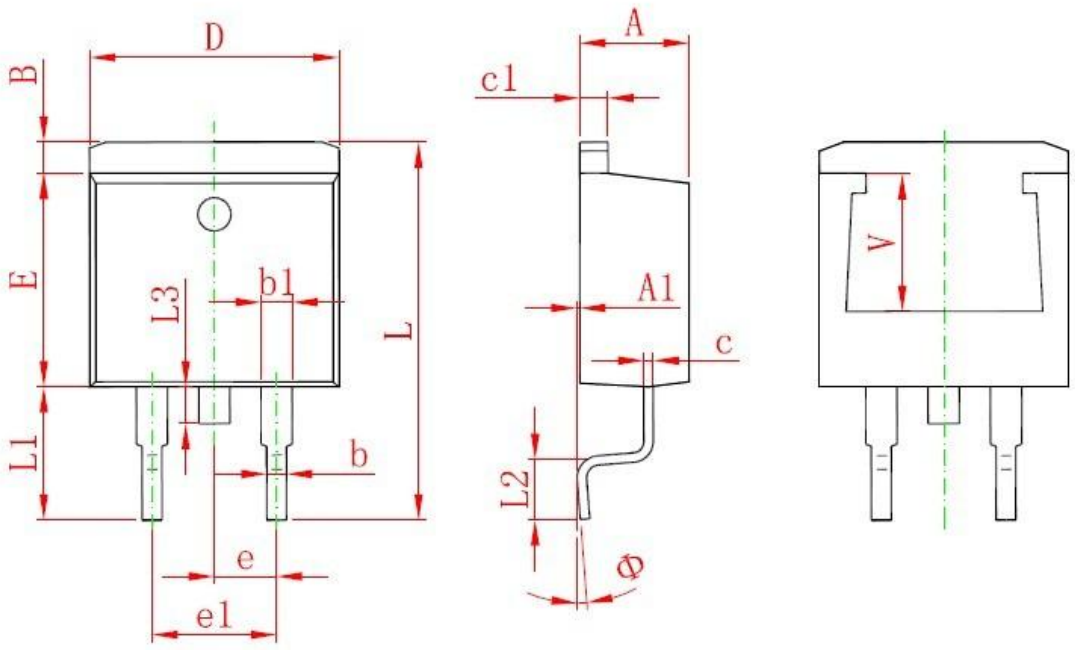
Figure 11: Normalized Maximum Transient Thermal Impedance

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

TO-263-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF.		0.220REF.	
Φ	0°	8°	0°	8°

Disclaimer

Brunei has made reasonable commercial efforts to ensure that the information given in this datasheet 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 datasheet,Bruneidoes not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product, technology or process disclosed hereunder.

Bruneireserves the rights to at its own discretion to make any changes or improvements to this datasheet. Unless said datasheet is incorporated into the formal contract, any customer should not rely on the information as any specification or product parameters duly committed by Brunei 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 Brunėi 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.

Brunei 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. Brunei is not responsible or liable for such altered documentation.

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

Brunėi s products are not authorized for use as critical components in life support devices or systems without the express written approval of Brunei. 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.