

500V N-Channel MOSFET



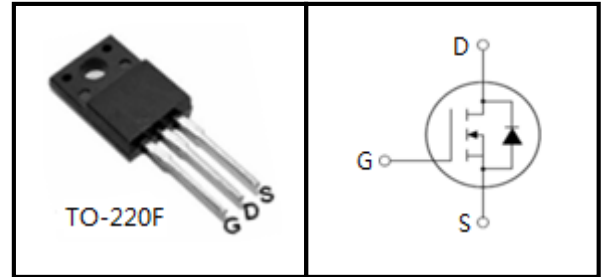
Lead Free Package and Finish

FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)



Device Marking and Package Information		
Device	Package	Marking
RS15N50F	TO-220F	RS15N50F

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	500	V
Continuous Drain Current	I_D	15	A
Pulsed Drain Current (note1)	I_{DM}	60	A
Gate-Source Voltage	V_{GSS}	± 30	V
Single Pulse Avalanche Energy (note2)	E_{AS}	405	mJ
Avalanche Current (note1)	I_{AR}	9	A
Repetitive Avalanche Energy (note1)	E_{AR}	54	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	70	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.78	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	500	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 500V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	μA
		$V_{DS} = 400V, V_{GS} = 0V, T_J = 125^\circ\text{C}$	--	--	100	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 30V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, V_{DS} = 250\mu\text{A}$	3.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 7.5A$	--	0.35	0.42	Ω
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$	--	1398	--	pF
Output Capacitance	C_{oss}		--	148	--	
Reverse Transfer Capacitance	C_{rss}		--	16	--	
Total Gate Charge	Q_g	$V_{DD} = 400V, I_D = 15A,$ $V_{GS} = 10V$	--	44	--	nC
Gate-Source Charge	Q_{gs}		--	8.6	--	
Gate-Drain Charge	Q_{gd}		--	21	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 250V, I_D = 15A,$ $R_G = 25\Omega$	--	30	--	ns
Turn-on Rise Time	t_r		--	12	--	
Turn-off Delay Time	$t_{d(off)}$		--	95	--	
Turn-off Fall Time	t_f		--	22	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	15	A
Pulsed Diode Forward Current	I_{SM}		--	--	60	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 15A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_F = 15A,$ $di_F/dt = 100A/\mu\text{s}$	--	380	--	ns
Reverse Recovery Charge	Q_{rr}		--	4.5	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 9A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

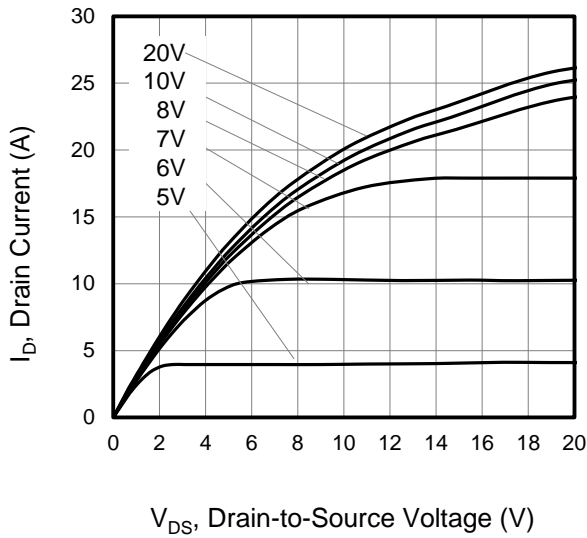


Figure 2. On-Resistance vs. Drain Current

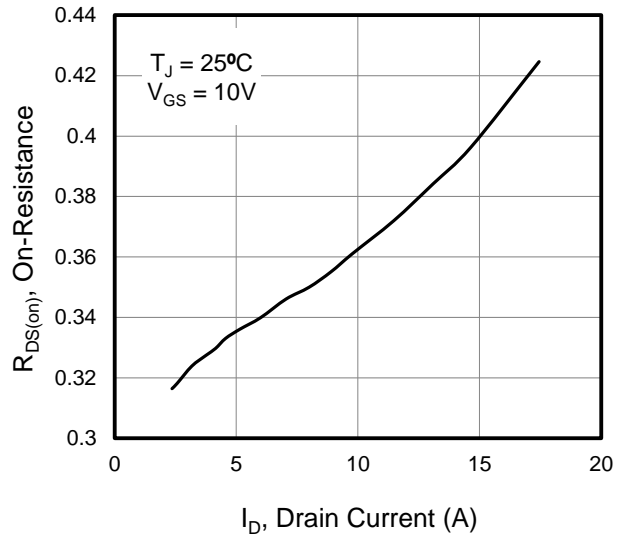


Figure 3. BV_{DSS} vs. Temperature

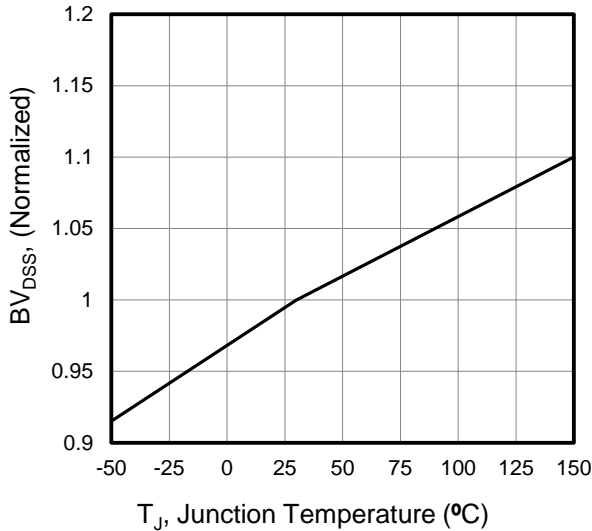


Figure 4. On-Resistance vs. Temperature

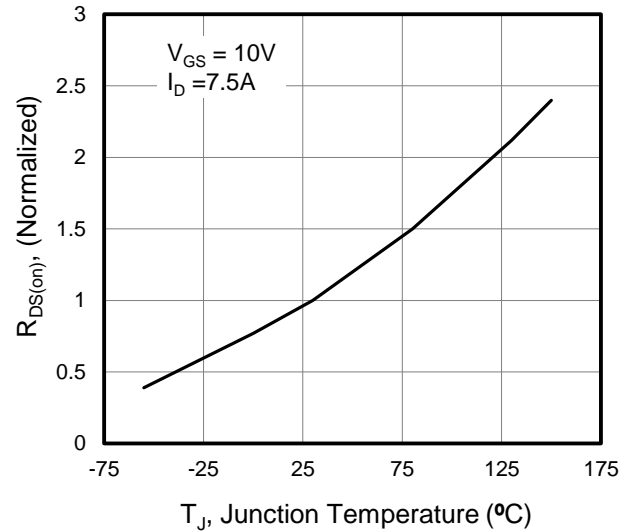


Figure 5. Gate Charge

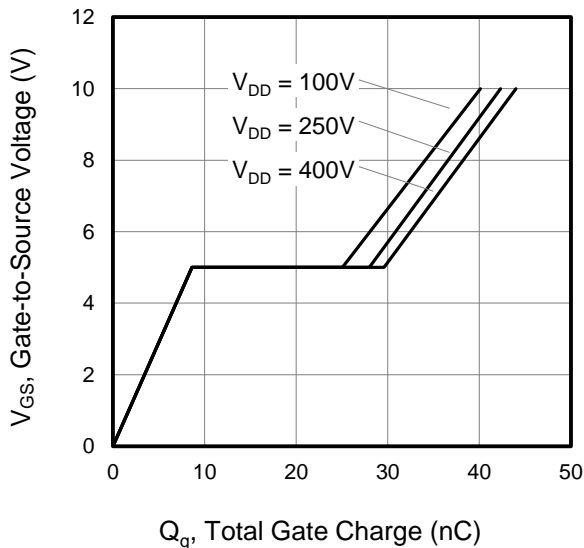
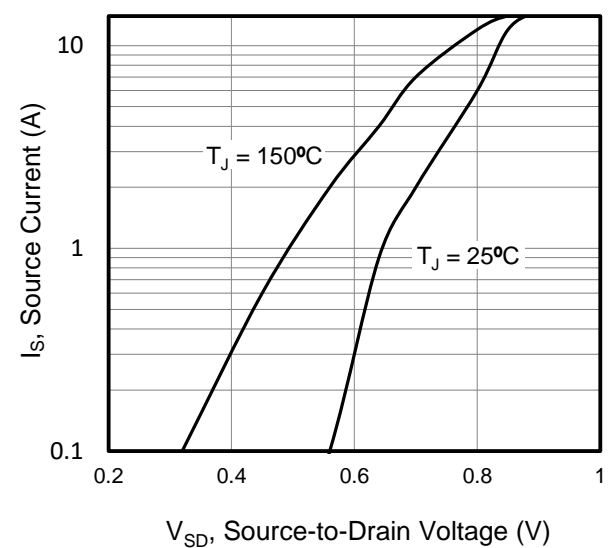


Figure 6. Body Diode Forward Voltage



Typical Characteristics $T_J = 25^{\circ}\text{C}$, unless otherwise noted

Figure 7. Capacitance

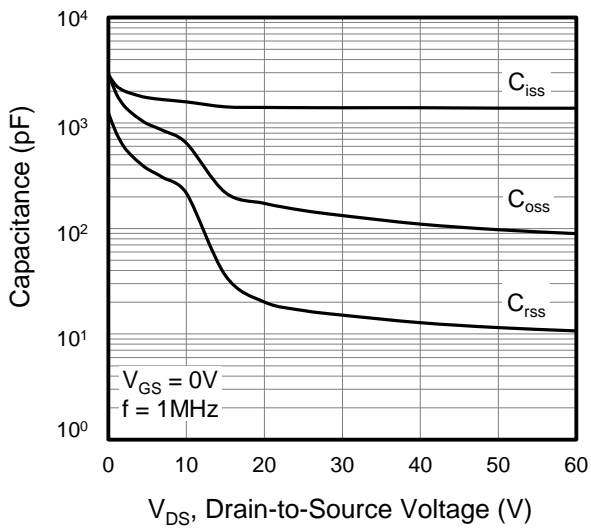


Figure 8. Transient Thermal Impedance

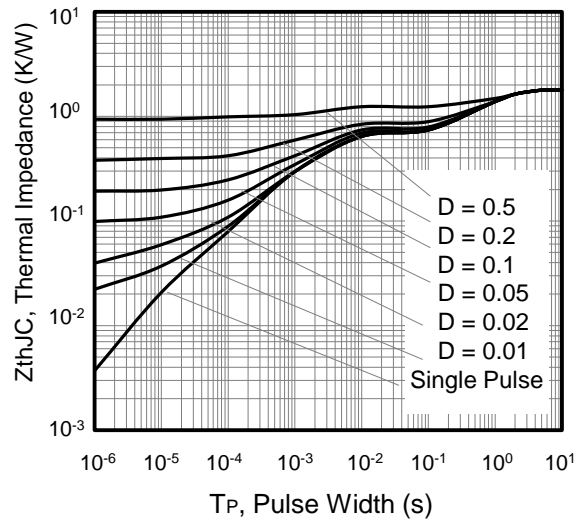


Figure A: Gate Charge Test Circuit and Waveform

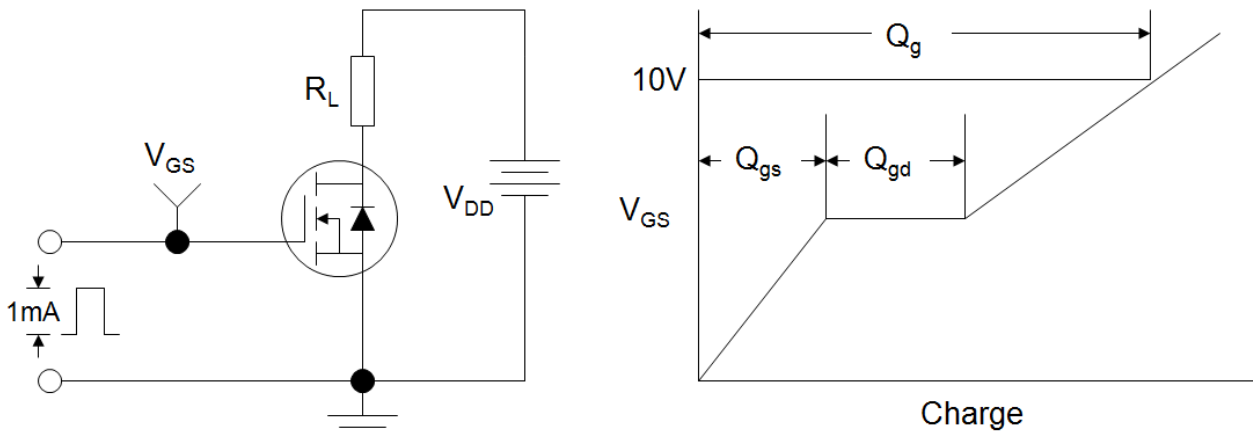


Figure B: Resistive Switching Test Circuit and Waveform

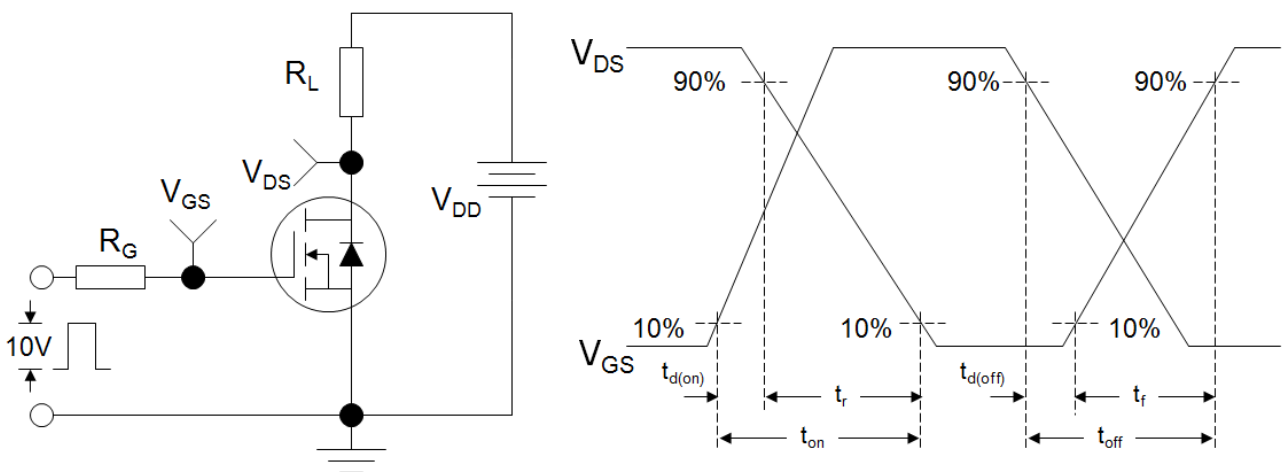
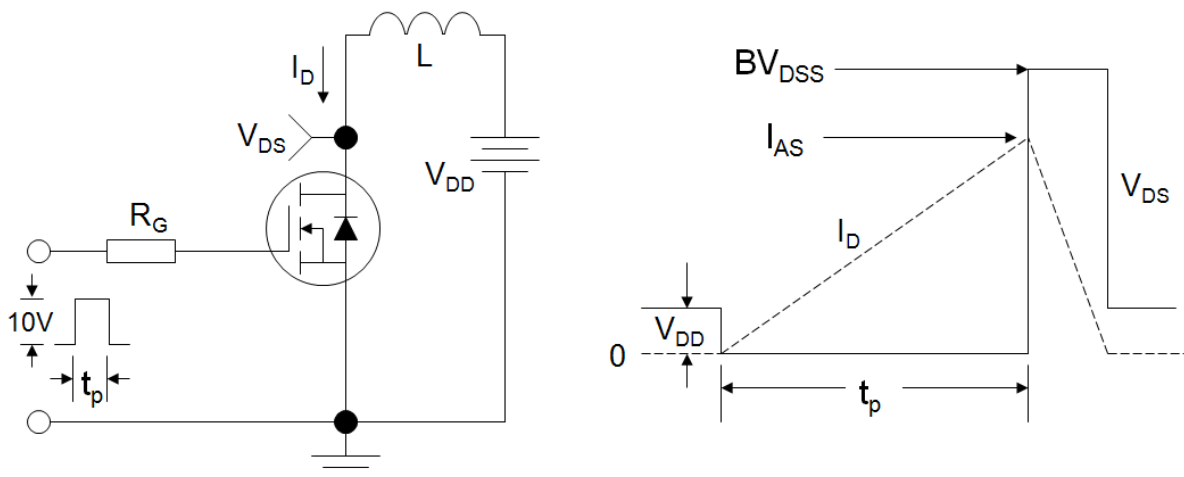
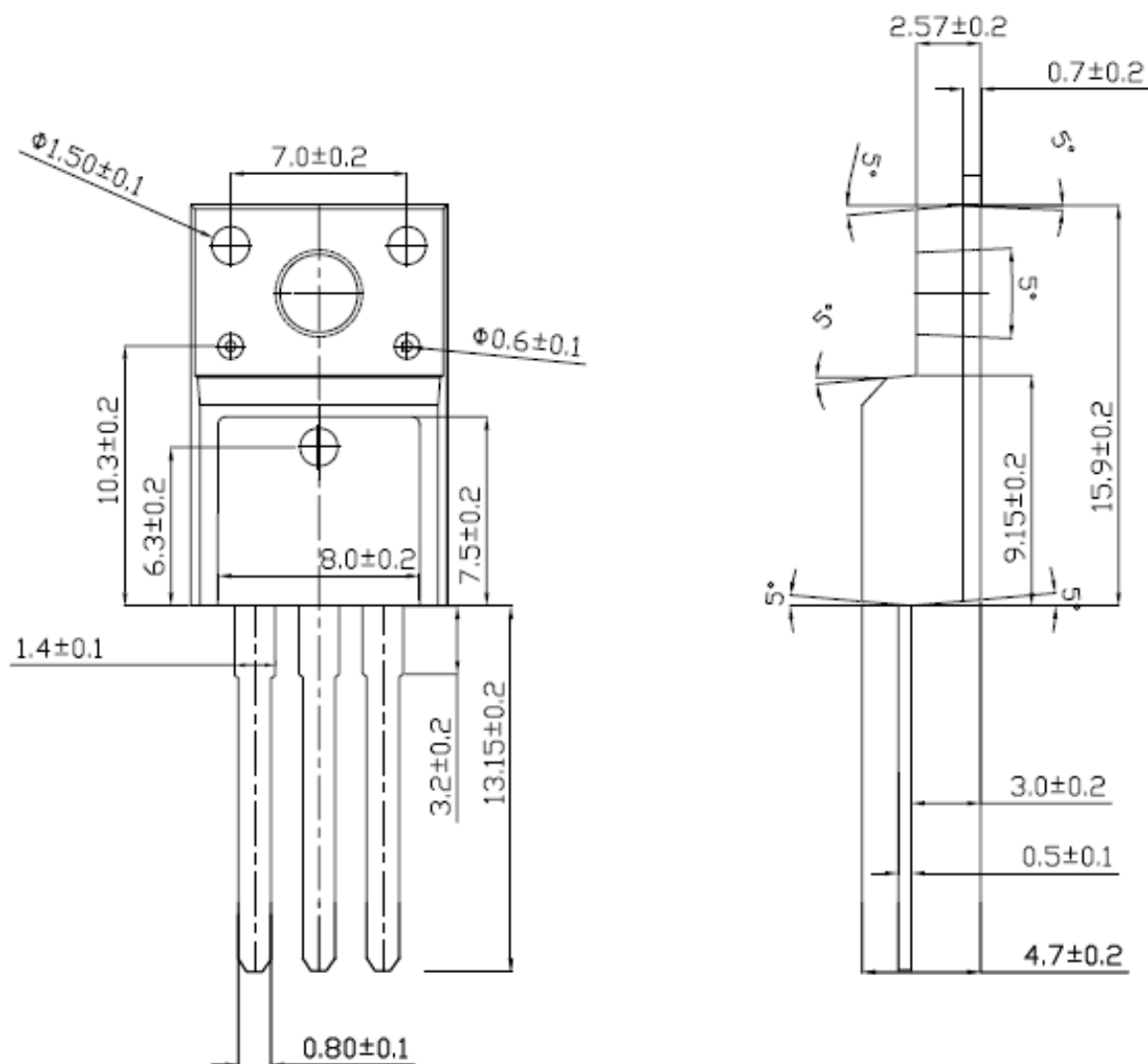


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



TO-220F



Disclaimers:

GuangDong Reasunos Semiconductor Technology CO.,LTD(Reasunos)reserves the right to make changes without notice in order to improve reliability,function or design and to discontinue any product or service without notice .Customers should obtain the latest relevant information before orders and should verify that such information in current and complete.All products are sold subject to Reasunos's terms and conditions supplied at the time of order acknowledgement.

GuangDong Reasunos Semiconductor Technology CO.,LTD warrants performance of its hardware products to the specifications at the time of sale.Testing, reliability and quality control are used to the extene Reasunos deems necessary to support this warrantee. Except where agreed upon by contractual agreement,testing of all parameters of each product is not necessarily performed.

GuangDong Reasunos Semiconductor Technology CO.,LTD does not assume any liability arising from the use of any product or circuit designs described herein.Customers are responsible for their products and applications using Reasunos's components.To minimize risk,customers must provide adequate design and operating safeguards.

GuangDong Reasunos Semiconductor Technology CO.,LTD does not warrant or convey any license either expressed or implied under its patent rights,nor the rights of others.Reproduction of information in Reasunos's data sheeets or data books is permissible only if reproduction is without modification oralteration.Reproduction of this information with any alteration is an unfair and deceptive business practice.GuangDong Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such altered documentation.

Resale of Reasunos's products with statements different from or beyond the parameters stated by GuangDong Reasunos Semiconductor Technology CO.,LTD for that product or service voids all express or implied warranties for the associated Reasunos's product or service and is unfair and deceptive business practice.GuangDong Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such statements.

Life Support Policy:

GuangDong Reasunos Semiconductor Technology CO.,LTD's Products are not authorized for use as critical components in life support devices or systems without the expressed written approval of GuangDong Reasunos Semiconductor Technology CO.,LTD.

As used herein:

1.Life support devices or systems are devices or systems which:

- a.are intended for surgical implant into the human body,
- b.support or sustain life,
- c.whose failuer to when properly used in accordance with instructions for used provided in the laeling,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 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.