



### FEATURES

- UL 60950 recognized for reinforced insulation pending
- High transient voltage withstand capability
- Ultra wide input voltage range of 16-160VDC
- Externally settable hold up time with additional capacitor
- DC OK/Power Fail signal
- Short circuit protection
- Over Temperature protection
- Over voltage protection

### DESCRIPTION

The RUW series is particularly suitable for use in applications in railway, industry or telecommunication where variable input voltages or high transient voltages are present. With an ultra wide input voltage range of 16-160VDC, the RUW series is capable of withstanding surges from 24,36,48,72, 90 and 110V systems, largely eliminating the requirement for input protection circuitry.

Optional features include a Power Fail/DC OK signal and circuitry to facilitate long hold-up times with a small external capacitor across  $\pm V_{in}$  pins.

### SELECTION GUIDE

Order Code <sup>1</sup>	Input Voltage	Output Voltage	Output Current		Output Power	MTTF <sup>3</sup>
			Min.	Max.	Max.	
	Nom.	V	A	A	W	kHrs
RUW15SL12C	SL	12	0.125	1.25	15	1550
RUW15SL12HC	SL	12	0.125	1.25	15	959
RUW15SL24C	SL	24	0.0625	0.625	15	1094
RUW15SL24HC	SL	24	0.0625	0.625	15	1176

### INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range <sup>2</sup>	Continuous operation SL I/P types	16		160	V
Input standby current				10	mA

### INPUT CURRENT (10% Load)

Order Code	Input Voltage									Units
	16	24	48	60	72	96	110	132	160	V
RUW15SL12C	0.135	0.088	0.044	0.035	0.030	0.023	0.022	0.018	0.015	mAp-p
RUW15SL12HC	0.146	0.093	0.048	0.038	0.032	0.025	0.024	0.021	0.018	
RUW15SL24C	0.160	0.102	0.053	0.043	0.036	0.029	0.028	0.025	0.021	
RUW15SL24HC	0.146	0.098	0.049	0.039	0.033	0.027	0.025	0.022	0.018	

### INPUT REFLECTED RIPPLE

Order Code	Input Voltage						Units
	16	24	48	72	110	160	V
RUW15SL12C	332.8	309.2	184.8	155.2	138.8	119.6	mAp-p
RUW15SL12HC	292.4	236.8	142.4	107	86.5	76.3	
RUW15SL24C	406.4	387.6	249.6	195.6	167.5	138.8	
RUW15SL24HC	446.4	291.2	176.4	157.2	101.8	82.7	

### OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage set point error			0.8	1.5	%V <sub>OUT</sub>
Overall voltage envelope			3.0		%V <sub>OUT</sub>
Line regulation	RUW15SL12C			0.5	%
	RUW15SL12HC & RUW15SL24HC			0.2	
	RUW15SL24C			0.25	
Load regulation	10-100% Load			0.25	%
Ripple & noise	BW = 20MHz (24V <sub>IN</sub> to 110V <sub>IN</sub> )	12V <sub>OUT</sub> types			mVp-p
		24V <sub>OUT</sub> types			
Transient response	Peak deviation (20-100% & 100-20% swing)		3.0		%V <sub>OUT</sub>
	Settling time		1.5		ms
Start delay	From remote on/off RUWSLXXC		TBD		ms
	From application of V <sub>IN</sub> RUWSLXXC		TBD		
Overvoltage protection			110%		V <sub>OUT</sub>
Short circuit protection	Continuous				

1. Part numbers ending HC include optional Power Fail /DC OK signal and circuitry to facilitate long hold up time.

2. Will operate down to 14V for 100ms as required by EN 50155 (24V system).

3. Using Telecordia Issue 1 method I case 1 operating temperature 25C

All specifications typical at T<sub>A</sub>=25°C and rated output current unless otherwise specified.



EFFICIENCY											
Order Code	Input Voltage										Units
	24		48		72		110		160		V
	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	
RUW15SL12C	75.6	77.1	76.2	78.2	74.1	77.3	72.6	76.3	65.7	71.7	%
RUW15SL12HC	75.6	77.1	72.4	75.9	70.8	75.4	69.6	74.5	63.1	69.6	
RUW15SL24C	76.7	77.7	77.5	78.6	76.5	77.8	74.3	76	66.3	70.1	
RUW15SL24HC	70.4	75	72.6	77.3	72.2	76.9	70.9	75.2	63.8	69.2	

GENERAL CHARACTERISTICS						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Switching frequency			100		kHz	
Remote on/off pin functionality	Module on		OPEN			
	Module off	0		0.5	V	


ABSOLUTE MAXIMUM RATINGS	
Input voltage, SL input types	170V
Remote On/Off	20V ±5V

APPLICATION NOTES	
Output Capacitors	
The RUW series does not require output capacitors to meet datasheet specification. To meet datasheet specifications, total output capacitance should not exceed:	
Output Voltage (V)	Max. Recommended Output Capacitance (µF)
12	470
15	220

ISOLATION CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 second	4000			VAC
Resistance	VISO = 500VDC		2		GΩ
Capacitance	12V <sub>out</sub> types		60		pF
	24V <sub>out</sub> types		76		

ENVIRONMENTAL CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Ambient temperature	See derating graph	-40		85	°C
Storage		-50		125	°C
Thermal protection	Operates at case temperature		120		°C
Case temperature rise above ambient	100% load, still air, see derating graph		40		°C

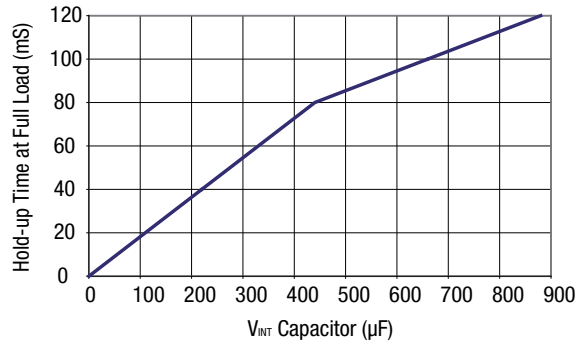
SAFETY
UL 60950 for reinforced insulation pending.

RoHS COMPLIANCE INFORMATION	
	<p>This series is compatible with RoHS soldering systems with a peak wave solder temperature of 260°C for 10 seconds. The pin termination finish on this product series is a Gold flash (0.05-0.10 micron) over Nickel Preplate. The series is backward compatible with Sn/Pb soldering systems. Tinned tabs are provided along the case edges to provide mechanical support through slots in the PCB. Hand soldering of these tabs may be necessary to ensure satisfactory joint quality.</p> <p>For further information, please visit <a href="http://www.murata-ps.com/rohs">www.murata-ps.com/rohs</a></p>

## OPTIONAL FEATURES

### Hold-up

Hold-up time is dependent on the value of capacitance across  $-V_{INT}$  and  $+V_{INT}$ . The graph below shows the approximate hold-up time for a given capacitance. The active hold-up feature typically requires 60 seconds to fully reset between supply interruptions. Capacitor voltage rating should be 100V<sub>DC</sub> minimum.

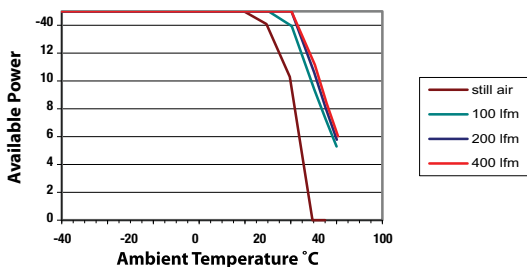


### Power Fail Warning Details

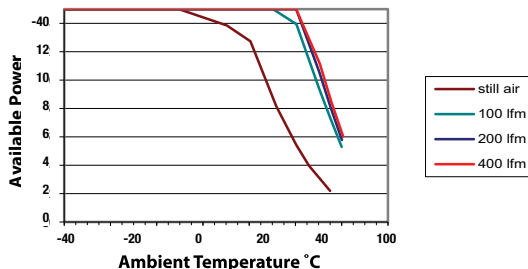
The optional Power Fail/DC OK signal gives an advance warning of loss of output after input failure (typically 2ms) and an indication that the output voltage is within specification.

## THERMAL DERATING GRAPHS

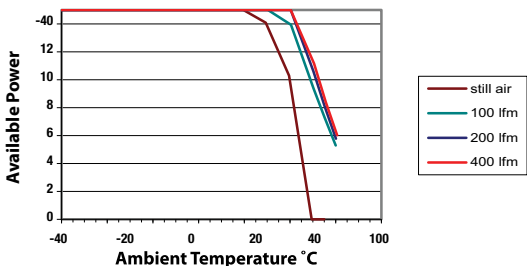
**RUW15SL12C**



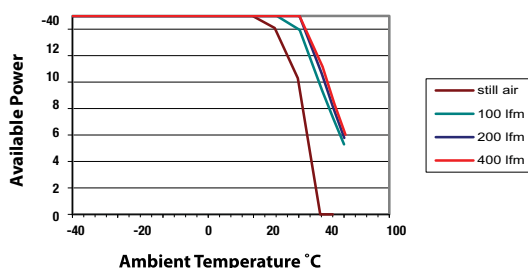
**RUW15SL12HC**



**RUW15SL24C**

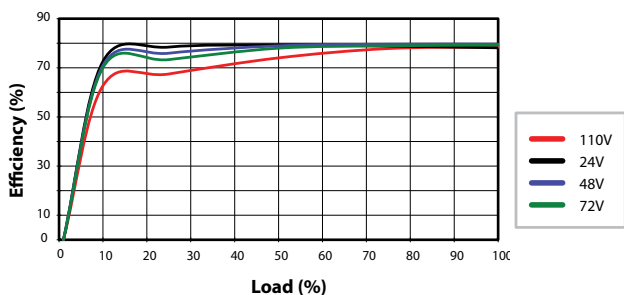


**RUW15SL24HC**

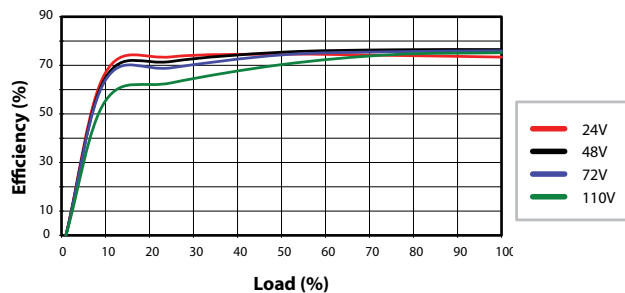


## EFFICIENCY GRAPHS

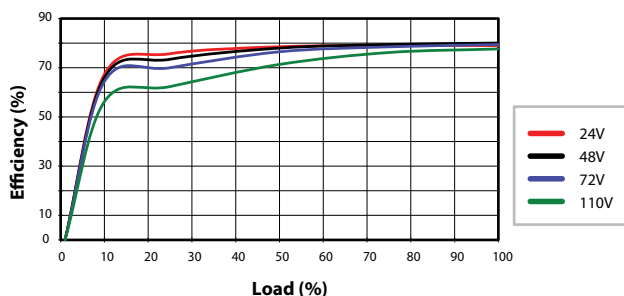
**RUW15SL12C**



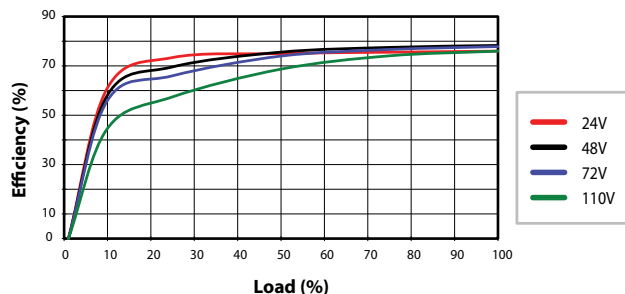
**RUW15SL12HC**



**RUW15SL24C**

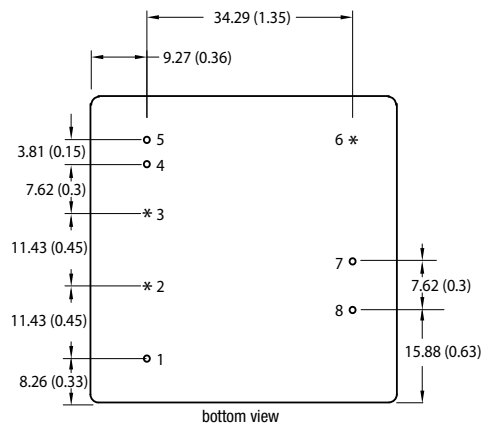
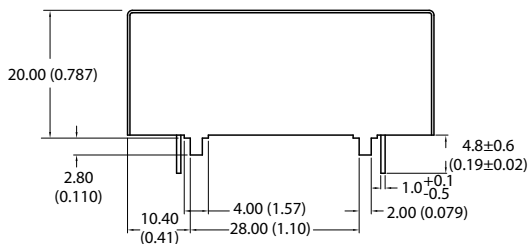
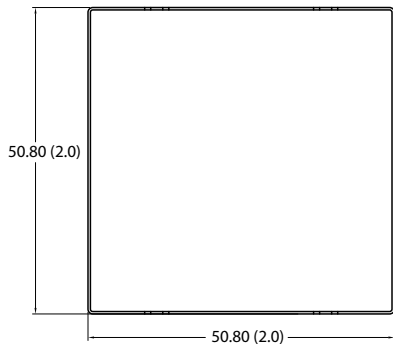


**RUW15SL24HC**



**PACKAGE SPECIFICATIONS**

**Mechanical Dimensions**



\*Optional pins  
All dimensions in mm ±0.5 (inches ±0.02) unless otherwise specified.

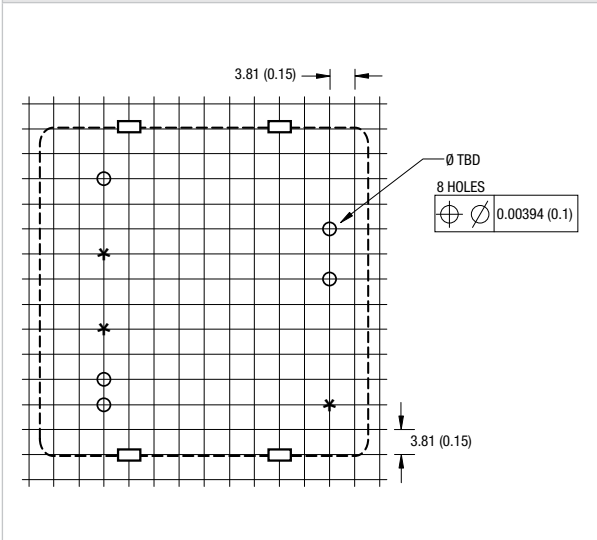
**PIN CONNECTIONS**

Pin	Function
1	REMOTE ON/OFF†
2	-V <sub>INT</sub> *
3	+V <sub>INT</sub> *
4	-V <sub>IN</sub>
5	+V <sub>IN</sub>
6	PF/DC OK*
7	+V <sub>OUT</sub>
8	-V <sub>OUT</sub>

Weight: 105g Typ.  
All pins on a 3.81 (0.15) pitch and within ± 0.25 (0.01) of true position.  
Unless otherwise stated all dimensions are in mm (inches) ± 0.25 (0.01).

† Remote ON/OFF is referenced to input.

**RECOMMENDED FOOTPRINT DETAILS**



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ISO 9001 and 14001 REGISTERED



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Refer to: <http://www.murata-ps.com/requirements/>**

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