

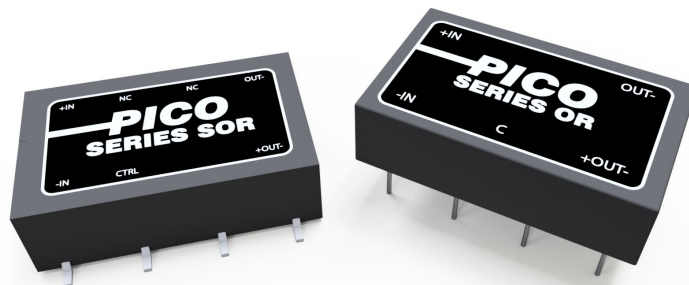
Series OR & SOR

2.5W Isolated Regulated Low Profile DC-DC Converter

PICO
Electronics, Inc.

PRODUCT OVERVIEW

The OR & SOR series are isolated DC-DC converter with wide input range, tight regulation in a low profile package and feature shutdown control. Single and dual isolated output models are standard. They can operate up to 2.5W over the temperature range of -25°C to +70°C without derating, a heat sink or active cooling.



FEATURES

- Up to 2.5W output at +70°C ambient
- Low profile – 0.300" height
- Up to 3:1 input voltage range
- 3.3 to 28V output models
- Control feature
- 1500V Input/output isolation
- Single and dual isolated output
- No heat sink or derating required

Contact Pico for part number of available options:

- Expanded operating temp: -55°C to +85°C
- Select screening per MIL-STD-883:
 - Stabilization Bake
 - Temperature Cycle
 - Burn-In
- Special Input Voltage, Output Voltage, Isolation Voltage or Output Power

OR	E	28	S
MOUNTING TYPE	INPUT VOLTAGE RANGE	NOM. OUTPUT VOLTAGE	NUMBER OF OUTPUTS
OR = THROUGH HOLE SOR = SURFACE MOUNT	E = 5 to 15V F = 8 to 24V A = 18 to 36V	3.3 = 3.3V 5 = 5V 5.2 = 5.2V 9 = 9V 12 = 12V 15 = 15V 24 = 24V 28 = 28V	S = SINGLE D = DUAL

MODEL LIST**SINGLE OUTPUTS**

Through Hole	Surface Mount	Output Voltage [VDC]	Output Current		Output Power [W]	Efficiency ⁽¹⁾ [%] typ.	Input Current ⁽¹⁾ [%] typ.	Line Regulation [±%] max	Load Regulation 25-100% [±%] max	Output Voltage Tolerance ⁽¹⁾ [±%]
			Min. [mA]	Max. [mA]						
ORE3.3S	SORE3.3S	3.3	36.4	364	1.2	69	174	2.00	2.50	1.50
ORE5S	SORE5S	5	30	300	1.5	70	215	1.75	1.75	0.75
ORE5.2S	SORE5.2S	5.2	28.8	288	1.5	70	215	1.75	1.75	0.75
ORE9S	SORE9S	9	16.7	167	1.5	75	200	1.50	1.25	0.50
ORE12S	SORE12S	12	12.5	125	1.5	77	195	1.25	1.00	0.50
ORE15S	SORE15S	15	10	100	1.5	77	195	1.25	1.00	0.50
ORE24S	SORE24S	24	6.3	63	1.5	77	195	1.00	0.75	0.50
ORE28S	SORE28S	28	5.4	54	1.5	78	190	0.75	0.75	0.50
ORF3.3S	SORF3.3S	3.3	45.5	455	1.5	72	130	3.00	3.00	2.00
ORF5S	SORF5S	5	40	400	2.0	74	170	1.50	1.75	0.75
ORF5.2S	SORF5.2S	5.2	38.4	384	2.0	74	170	1.50	1.75	0.75
ORF9S	SORF9S	9	22.2	222	2.0	76	165	1.25	1.25	0.50
ORF12S	SORF12S	12	16.7	167	2.0	77	160	1.00	1.00	0.50
ORF15S	SORF15S	15	13.3	133	2.0	78	160	1.00	1.00	0.50
ORF24S	SORF24S	24	8.3	83	2.0	78	160	1.00	0.75	0.50
ORF28S	SORF28S	28	7.1	71	2.0	79	155	0.75	0.75	0.50
ORA3.3S	SORA3.3S	3.3	45.5	455	1.5	72	77	2.00	3.00	2.00
ORA5S	SORA5S	5	40	400	2.0	76	98	1.00	1.75	0.75
ORA5.2S	SORA5.2S	5.2	38.4	384	2.0	76	98	1.00	1.75	0.75
ORA9S	SORA9S	9	27.8	278	2.5	78	120	0.75	1.25	0.50
ORA12S	SORA12S	12	20.8	208	2.5	78	120	0.75	1.00	0.50
ORA15S	SORA15S	15	16.7	167	2.5	79	115	0.75	1.00	0.50
ORA24S	SORA24S	24	10.4	104	2.5	80	115	0.75	0.75	0.50
ORA28S	SORA28S	28	8.9	89	2.5	80	115	0.50	0.75	0.50

Note 1: Tested at nominal input voltage and full output load.

MODEL LIST**DUAL OUTPUT**

Through Hole	Surface Mount	Output Voltage Per Output [VDC]	Output Current Per Output		Output Power Per Output [W]	Efficiency ⁽¹⁾ [%] typ.	Input Current ⁽¹⁾ [%] typ.	Line Regulation [%] max	Load Regulation 25-100% [%] max	Output Voltage Tolerance ⁽¹⁾ [%]
			Min. [mA]	Max. [mA]						
ORE5D	SORE5D	5	15	150	0.75	70	215	1.75	1.75	0.75
ORE9D	SORE9D	9	8.4	84	0.75	75	200	1.50	1.25	0.50
ORE12D	SORE12D	12	6.3	63	0.75	77	195	1.25	1.00	0.50
ORE15D	SORE15D	15	5	50	0.75	77	195	1.25	1.00	0.50
ORE24D	SORE24D	24	3.2	32	0.75	77	195	1.00	0.75	0.50
ORE28D	SORE28D	28	2.7	27	0.75	78	190	0.75	0.75	0.50
ORF5D	SORF5D	5	20	200	1.00	74	170	1.50	1.75	0.75
ORF9D	SORF9D	9	11.1	111	1.00	76	165	1.25	1.25	0.50
ORF12D	SORF12D	12	8.4	84	1.00	77	160	1.00	1.00	0.50
ORF15D	SORF15D	15	6.7	67	1.00	78	160	1.00	1.00	0.50
ORF24D	SORF24D	24	4.2	42	1.00	78	160	1.00	0.75	0.50
ORF28D	SORF28D	28	3.6	36	1.00	79	155	0.75	0.75	0.50
ORA5D	SORA5D	5	20	200	1.00	76	98	1.00	1.75	0.75
ORA9D	SORA9D	9	13.9	139	1.25	78	120	0.75	1.25	0.50
ORA12D	SORA12D	12	10.4	104	1.25	78	120	0.75	1.00	0.50
ORA15D	SORA15D	15	8.4	84	1.25	79	115	0.75	1.00	0.50
ORA24D	SORA24D	24	5.2	52	1.25	80	115	0.75	0.75	0.50
ORA28D	SORA28D	28	4.5	45	1.25	80	115	0.50	0.75	0.50

Note 1: Tested at nominal input voltage and full output load.

Note 2: Dual output loads must be balanced.

SPECIFICATIONS (Nominal V_{IN} , Full Load, $T_A = +25^{\circ}\text{C}$, 1 hour warm up unless otherwise specified)**INPUT**

Parameter	Condition	Min.	Typ.	Max.	Units
Input Voltage Range	ORE/SORE models	5	10	15	VDC
	ORF/SORF models	8	16	24	
	ORA/SORA models	18	27	36	

OUTPUT

Parameter	Condition		Min.	Typ.	Max.	Units
Output Ripple	1MHz bandwidth, with 0.1μF ceramic capacitor	9V to 24V output models	-	-	150	mVp-p
		All other output models	-	-	200	

ENVIRONMENTAL

Parameter	Condition	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient without derating	-25	-	+70	$^{\circ}\text{C}$
Storage Temperature Range	Ambient	-55	-	+125	$^{\circ}\text{C}$
Temperature Coefficient		-	-	0.02	$\%/^{\circ}\text{C}$
Cooling	Free Air Convection				

GENERAL

Parameter	Condition	Min.	Typ.	Max.	Units
Isolation Voltage	Input to output	500	-	-	VDC
	OUT1 to OUT2	500	-	-	
Switching Frequency		-	100	-	kHz
Size (L x W x H)	Series OR	1.12 x 0.7 x 0.3 (28.448 x 17.78 x 7.62)			inches (mm)
	Series SOR	1.12 x 0.7 x 0.35 (28.448 x 17.78 x 8.89)			
Weight	Series OR	-	8.5	-	grams
	Series SOR	-	10	-	
Case	Glass Reinforced Polymer				
Potting	Vacuum Impregnated Epoxy				
Tube Packaging (W x H x L)	1.03 x 0.74 x 20 (26.162 x 18.796 x 508)				inches (mm)
Moisture Sensitivity Level	Series SOR	IPC / JEDEC J-STD-020, Level 3			

PROTECTION & FEATURES

Parameter	Condition	Min.	Typ.	Max.	Units
Short Circuit	Temporary				
Shutdown (C)	Non-latched shutdown, Self-recovery	Shutdown	Connect to -IN		
		Restart	OPEN		

SPECIFICATIONS (Nominal V_{IN} , Full Load, $T_A = +25^{\circ}\text{C}$, 1 hour warm up unless otherwise specified)**DESIGNED TO MEET**

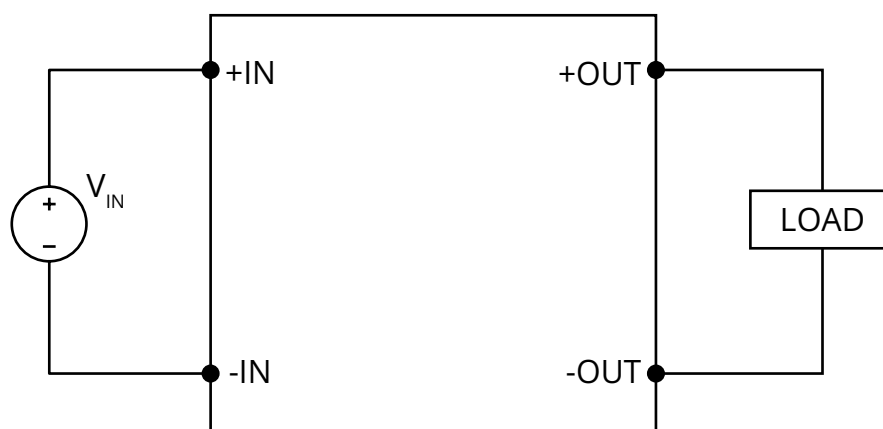
Test	Referenced Standard	Description
Vibration	MIL-STD-202	Method 204, Vibration, High Frequency, Condition D
Shock	MIL-STD-202	Method 213, Shock (Specified Pulse), Condition I
Humidity	MIL-STD-202	Method 106, Moisture Resistance
Altitude	MIL-STD-202	Method 105, Barometric Pressure (Reduced), Condition D

OPTIONS AVAILABLE – CONTACT PICO FOR PART NUMBER

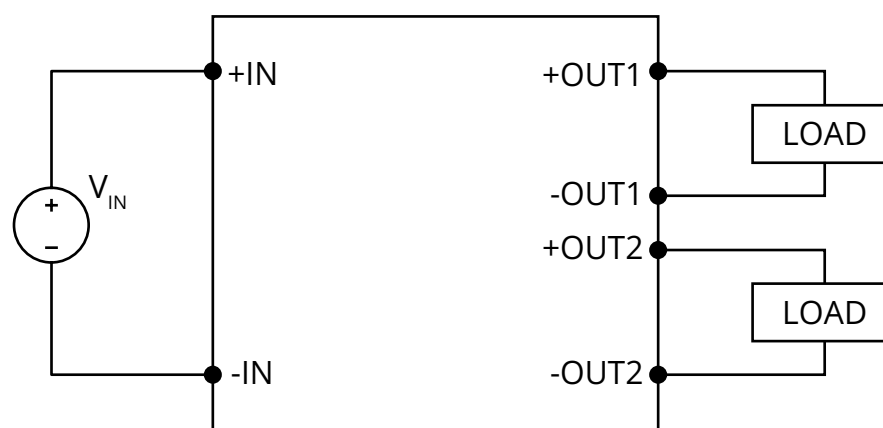
Parameter	Referenced Standard	Description
Stabilization Bake	MIL-STD-883	Referenced Method 1008 Non-operating maximum storage temperature for 24 hours
Temperature Cycle	MIL-STD-883	Referenced Method 1010 Non-operating at temperature extremes, 15 mins/temp, 10 cycles
Burn-In	MIL-STD-883	Referenced Method 1015 Max operating temperature for 160 hours
Expanded Ambient Operating Temperature		-55°C to +85°C

TYPICAL CONNECTION CIRCUIT

SINGLE OUTPUT



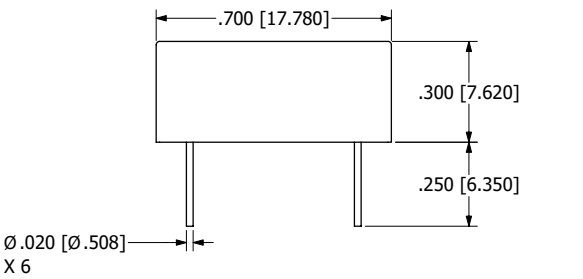
DUAL OUTPUT



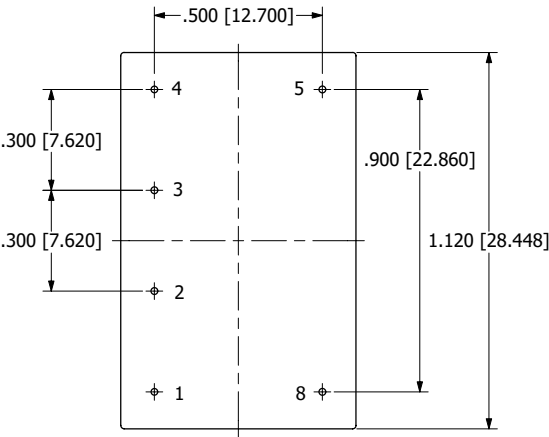
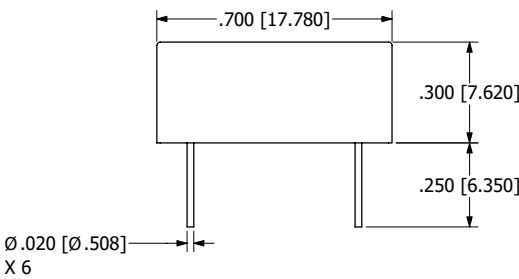
MECHANICAL DRAWINGS

SERIES OR - THROUGH HOLE

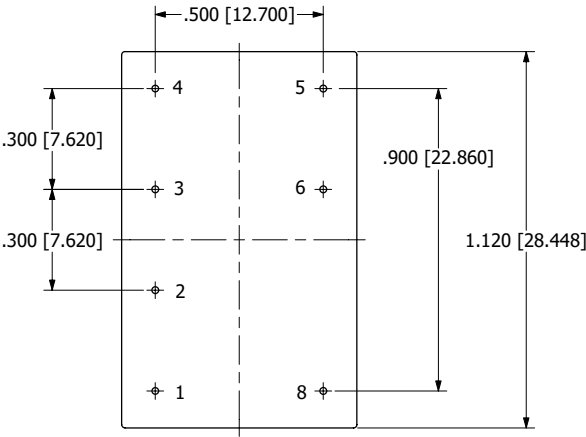
SINGLE OUTPUT



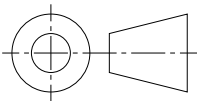
DUAL OUTPUT



BOTTOM VIEW

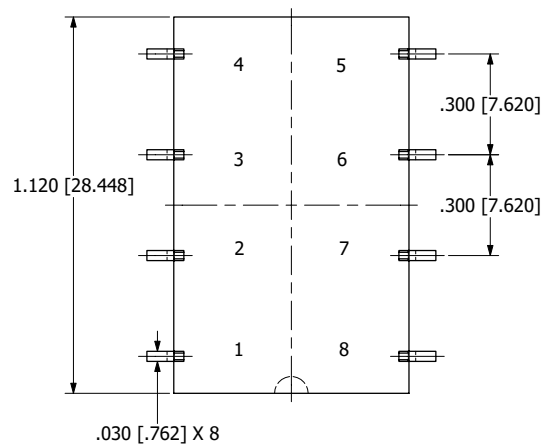
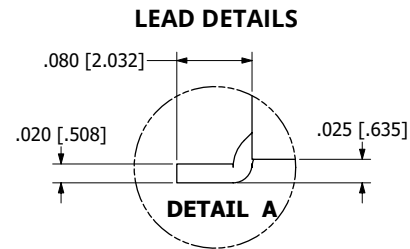
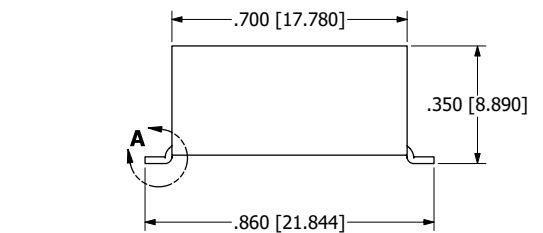


BOTTOM VIEW



MECHANICAL DRAWINGS

SERIES SOR - SUFRACE MOUNT



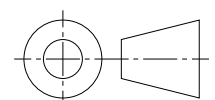
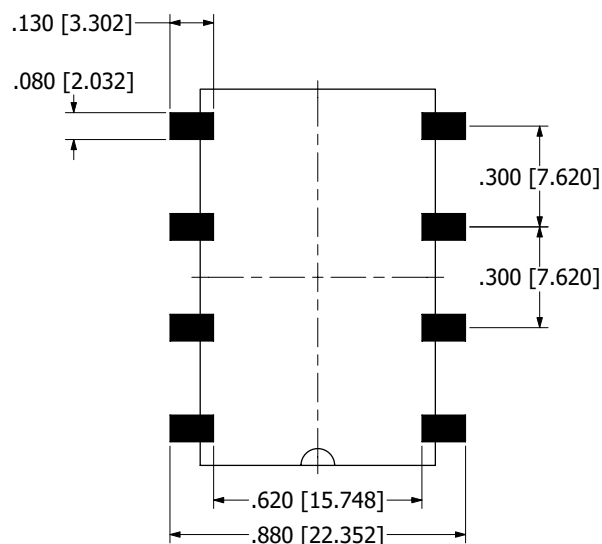
BOTTOM VIEW

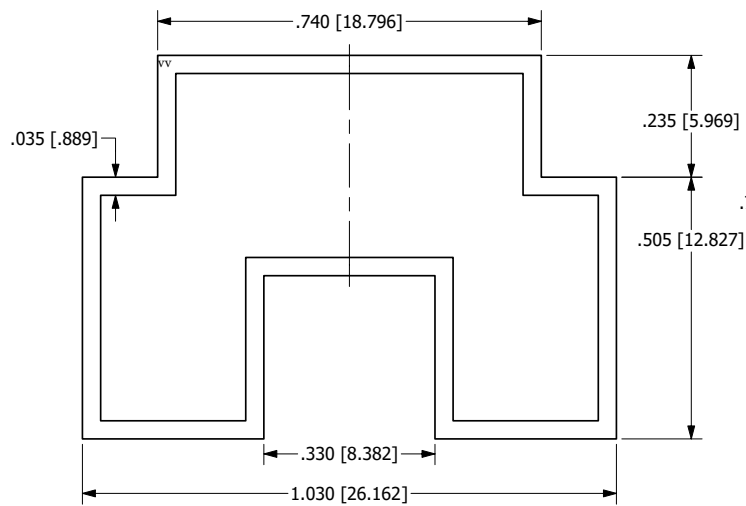
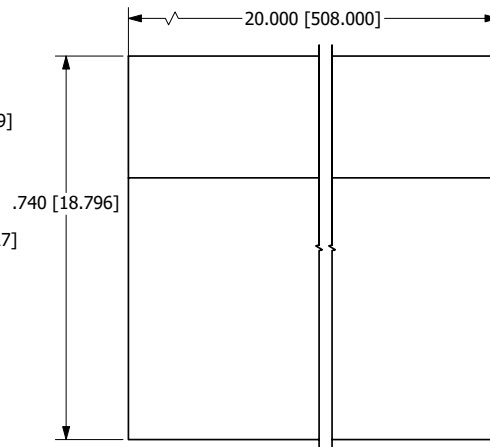
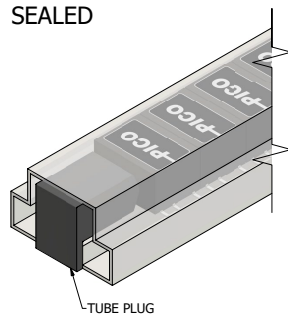
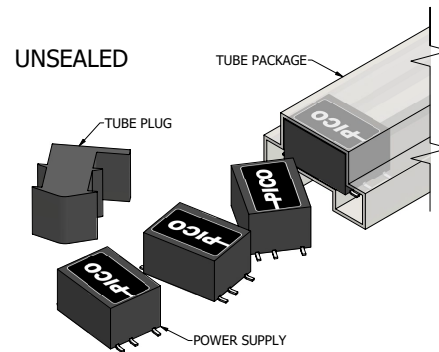
PIN	FUNCTION	
	SINGLE	DUAL
1	-IN	
2	CTRL	
3	+OUT	+OUT1
4	-OUT	-OUT1
5	-OUT	-OUT2
6	N/C	+OUT2
7	N/C	
8	+IN	

NOTES

a. ALL DIMENSIONS ARE IN INCHES, [] = MM

RECOMMENDED LAND PATTERN DIMENSIONS - SERIES SOR



TUBE PACKAGING**PLAN VIEW****ELEVATION VIEW****SEALED****UNSEALED**

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