Surface Mount Sense Resistors



OARS, OARS-XP, OARSZ Series

- Flexible leads for thermal expansion
- Open-air design reduces PCB heating
- Values down to 1milliohm
- Element TCR ±20ppm/°C
- Zero-ohm 65A jumper version
- RoHS compliant



Electrical Data

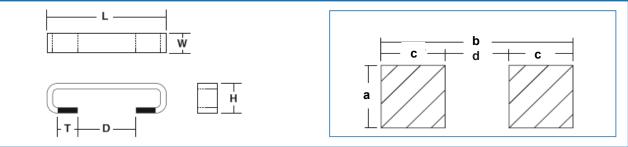
		OARS1	OARS3	OARS-XP
Power rating at 70°C ambient, or 140°C terminal temperature	watts	2	3	5
Resistance range	ohms	R002 to R050	R002 to R015	R001 to R025
Resistance Tolerance	%		≤ R002: 5, > R002: 1, 5	
Standard Values (Enquire for unlisted values)	milliohms	2, 3, 4, 5, 10, 15, 20, 22, 25, 30, 40, 50	2, 3, 4, 5, 10, 15	1, 2, 2.5, 5, 7.5, 10, 20, 25
Inductance	nH		<10	
Ambient temperature range	°C		-55 to +160	

		OARS-1Z	Comments
Current rating at 25°C ambient	amps	65	
Max residual resistance	milliohms	0.3	Zero-ohm jumper
Ambient temperature range	°C	-55 to +160	-

Physical Data

Dimensions (mm) and recommended solder pads									
Туре	L	Н	Т	D	W	a nom.	b nom.	C nom.	d nom.
OARS1/3 > R003, OARS-1Z	11.18	3.05 ±0.76		4.83	3.18	4.07			
OARS1/3 - R003	±0.38 3.51	2.36	±0.76 ±0.38	±0.38	4.07	9.37	3.07	3.23	
OARS1/3 - R002	11.56 ±0.38	±0.76	±0.25	4.7 ±0.76	3.56 ±0.38	4.45			0.20
OARS-XP	10.7 to 12.0*	2.28 to 4.57*		4.83 ±0.76	6.35 ±0.38	7.24	9.58	3.18	

* Dependent on ohmic value



General Note

TT electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT electronics' own data and is considered accurate at time of going to print.





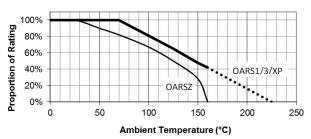




Performance Data (AEC-Q200)

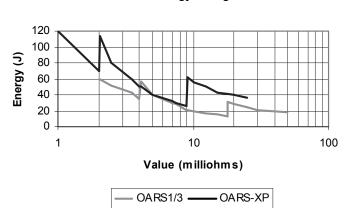
	OARS1/3	<r004< th=""><th>R004 to R015</th><th>>R015</th></r004<>	R004 to R015	>R015		
	OARS-XP	<r002< th=""><th>R002 to R007</th><th>>R007</th></r002<>	R002 to R007	>R007		
TCR (-55 to 125°C)	ppm/°C	240	40	40		
Thermal Shock	ΔR%	0.75	0.75	0.75		
High Temp. Exposure (125°C)	ΔR%	1.75	0.5	1		
Temp. Cycling (-40 to 125°C)	ΔR%	1	1	0.75		
Operational Life	ΔR%	2	1	1		
Biased Humidity	ΔR%	0.75	0.5	0.5		
Mechanical Shock	ΔR%	1.5	1	1		
Vibration	ΔR%	1	1	1		
Terminal Strength		Meets JIS-C-6429				
Solvent Resistance		Meets MIL-STD-002 Method 215				
Solderability		Meets J-STD-002 Method B				

Temperature Derating



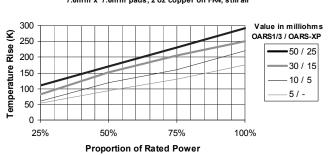
Note: For OARS1/3/XP this relates to power rating, for OARSZ it relates to current rating.

Pulse Energy Rating

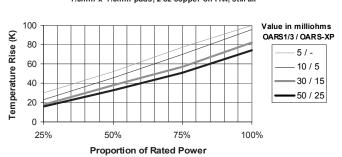


Note: This graph relates to single pulses of short duration (≤ 100ms). Higher energy limits apply for longer pulses and overloads

Hot Spot Temperature Rise 7.6mm x 7.6mm pads, 2 oz copper on FR4, still air



Joint Temperature Rise 7.6mm x 7.6mm pads, 2 oz copper on FR4, still air



Note: Temperature rise data are given here for typical mounting conditions. Actual figures depend on PCB copper weight, mounting pad size, track width and substrate type. Also, the open air format responds better to forced air cooling than chip format resistors. For values below 5 milliohms allowance should be made for heat generated in the copper tracks themselves. Application-specific guidance is available on request.

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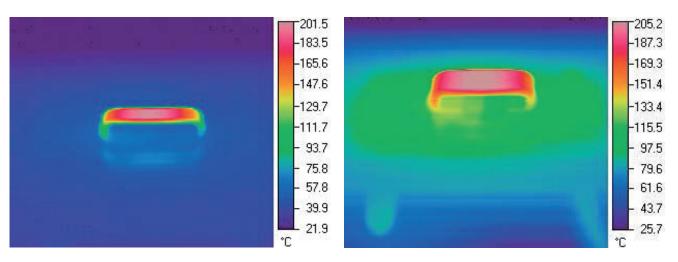








Thermal Performance Examples



OARS1-R005 at 2W

OARSXP-R0025 at 5W

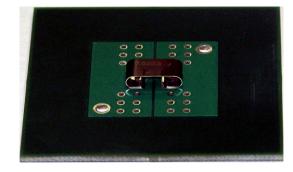
These thermal images were taken under ambient conditions of still air at 25°C with the components mounted on horizontal standard test boards as defined below.

JEDEC standard circuit board:

2" (50.8mm) square FR4

2 outer power planes, 2 ounce (70μ) Cu 1" (25.4mm) square exposed

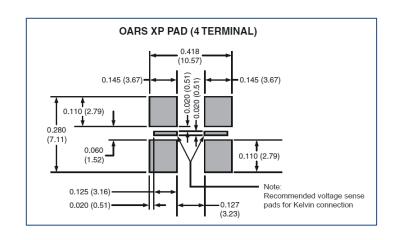
2 inner signal planes, 1 ounce (35μ) Cu (continuous planes)



In contrast to the flat chip format, the OARS format keeps the hot spot thermally distant from the solder j oints and reduces undesirable heat delivery into the PCB. Further thermal images for other ohmic values and power dissipations are available on request.

Kelvin (4 Terminal) Mounting

For high precision applications a Kelvin (4 Terminal) mounting method is recommended. An example to illustrate the design principle is shown. High current connections are made to the two pairs of larger pads, whilst the voltage sense connections are made to the two smaller central pads.



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Construction

Copper terminations are welded to resistance alloy strip which is then formed. Value adjustment is achieved by control of width, without the need for subsequent abrasion or notch trimming. Pb-free termination finish is 96% Sn / 4% Ag alloy.

Flammability

The resistor will not burn or emit incandescent particles under any condition of applied temperature or overload.

The parts are legend marked with ohmic value and tolerance code.

Packaging Data

Dimensions (mm)									
Туре	Α	В	С	D	E	F	G		
OARS1/3, OARS-1Z	4.32±0.08	11.7±0.08				8±0.1			
OARS-XP-R001	7.21±0.1	11.94±0.1	24±0.3	24±0.3	24±0.3	11.5±0.1	1.75±0.1	12±0.1	4±0.1
OARS-XP >R001	7.2110.1	11.56±0.1				12±0.1			
	- 0	— F —	— G —						







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Ordering Procedure

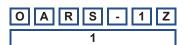
This product has two valid part numbers:

European (Welwyn) Part Numbers: OARS1-R01JI (OARS1, 10 milliohms ±5%, Pb-free)

OARS-1Z (OARS-1Z, Pb-free)



1	2	3	4	
Туре	Value	Tolerance	Termination &	Packing
OARS1	3-5 characters	F = ±1%	I = Pb-free, Tap	e & Reel
OARS3	See Electrical Data R = ohms	$J = \pm 5\%$	OARS1, OARS3	1900/reel
OARS-XP			OARS-XP	1200/reel

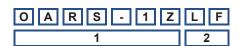


1	
Туре	
OARS-1Z	No value or tolerance applies. Termination is Pb-free. Packing is Tape & Reel, 1900/reel.

USA (IRC) Part Numbers: OARS1R010JLF (OARS1, 10 milliohms ±5%, Pb-free) OARS-1ZLF (OARS-1Z, Pb-free)



1	2	3	4	
Type	Value	Tolerance	Termination &	Packing
OARS1	4/5 characters	F = ±1%	LF = Pb-fr	ee
OARS3	See Electrical Data	$J = \pm 5\%$	OARS1, OARS3	1900/reel
OARS-XP	R = ohms		OARS-XP	1200/reel



1		2
Туре		Termination & Packing
OARS-1Z	No value or tolerance applies.	LF= Pb-free, Tape & Reel, 1900/reel.



