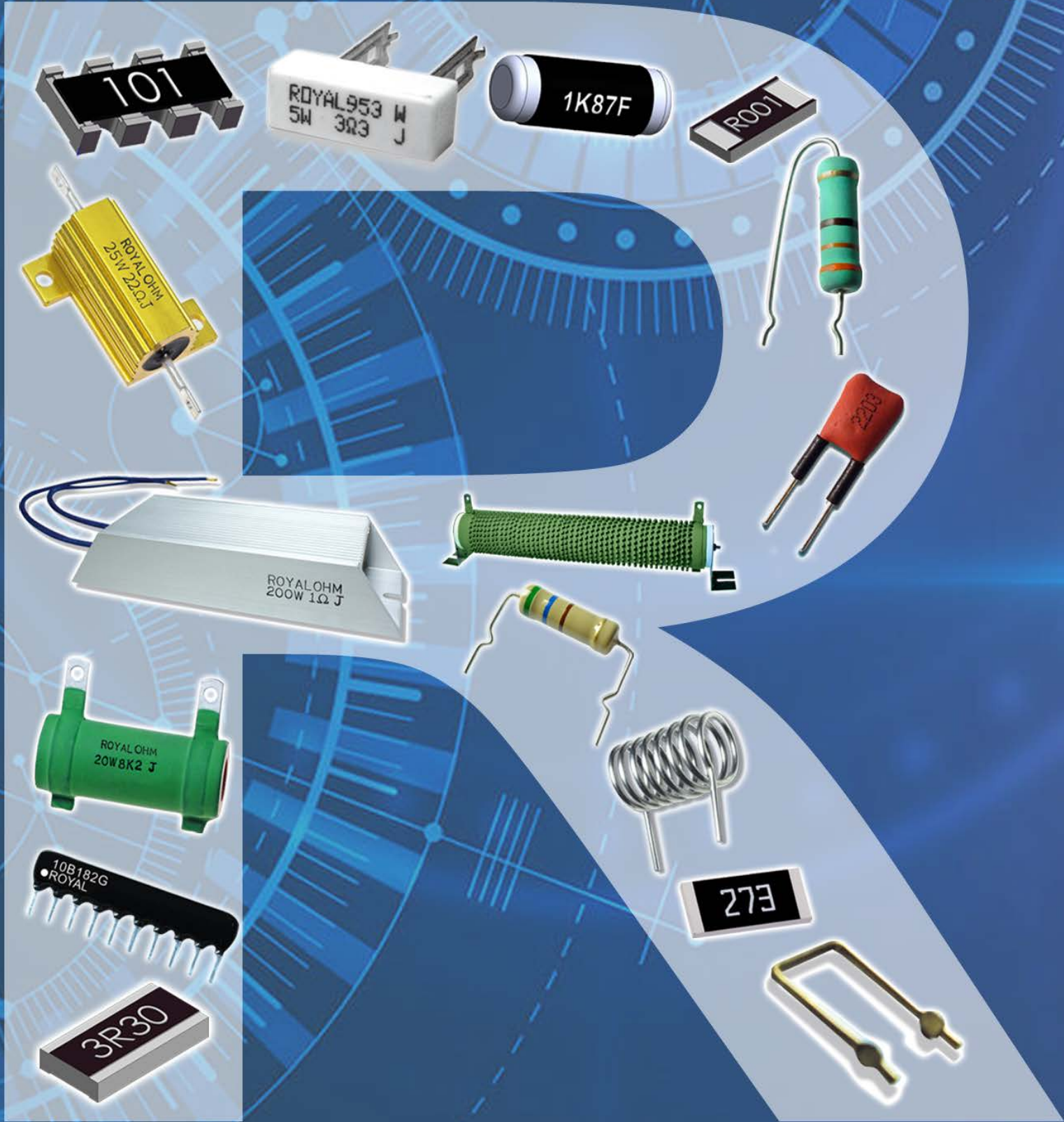




IATF 16949 : 2016



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Resistors Specialist



# Product List

Series	Power Rating	Value Range	Tol	T.C.R. PPM/°C & REMARKS
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## CHIP RESISTORS

### General Purpose

01005, 0201, 0402, 0603,  
0805, 1206, 1210, 1812,  
2010, 2512  
High ohmic value available in sizes  
0603,0805,1206,1210



RMC

1/32W	0Ω/0.01Ω	±1%
~	~	±2%
1W	100MΩ	±5%

0.01Ω~0.015Ω:±1500PPM/°C  
0.0154Ω~0.03Ω: ±1000PPM/°C  
0.033Ω~0.976Ω: ±800PPM/°C  
1Ω~10Ω: ±200PPM/°C  
>10Ω~10M: ±100PPM/°C  
>10M~100M: ±200PPM/°C  
(01005, 0201, 0402 & 0603 refer to  
catalog)

### Wide Terminal

(AEC-Q200 Compliant)  
WR08, WR12, WR20, WR18, WR25



WR

1/3W	0Ω/10mΩ	±1%
~	~	±5%
3W	1MΩ	

Depends on size and value range

### Anti-Surge (AEC-Q200 Compliant)

AS02, AS03, AS05, AS06, AS07,  
AS10, AS12



AS

1/8W	1Ω	±5%
~	~	±10%
2W	10MΩ	±20%

1Ω~10Ω: ±400PPM/°C  
>10Ω~10MΩ: ±100PPM/°C

### High Precision Anti-Surge

(AEC-Q200 Compliant)  
PS02, PS03, PS05, PS06, PS07,  
PS10, PS12



PS

1/8W	0.1Ω	±1%
~	~	±5%
2W	10MΩ	

PS02: 1Ω~10Ω: ±400PPM/°C  
>11Ω~100Ω: ±200PPM/°C  
>100Ω: ±100PPM/°C  
Other sizes: ±100PPM/°C

### Anti-Electrostatic Discharge

(AEC-Q200 Compliant)  
ES01, ES02, ES03, ES05,  
ES06, ES07



ES

1/20W	1Ω	±1%
~	~	±5%
1/2W	10MΩ	

1Ω~10Ω: ±200PPM/°C  
>10Ω~10MΩ: ±100PPM/°C  
(ES01 refer catalog)

### High Power (AEC-Q200 Compliant)

HP02, HP03, HP05, HP06, HP07, HP10,  
HP11, HP12



HP

1/10W	0Ω/0.01Ω	±1%
~	~	±5%
2W	10MΩ	

Depends on size and value range

### Ultra High Power

(AEC-Q200 Compliant)  
SP10, SP12, SP17, SP20, SP27  
(Product design Patent no.: I566261)



SP

1W	1Ω	±1%
~	~	±5%
6W	10MΩ	

1Ω~10Ω: ±200PPM/°C  
>10Ω~10MΩ: ±100PPM/°C

### High Voltage (AEC-Q200 Compliant)

HV03, HV05, HV06, HV07, HV10, HV12  
Anti sulfurized available - VS12



HV

1/10W	36KΩ	±1%
~	~	±5%
1W	10MΩ	

±100PPM/°C

### High Quality Anti-Sulfurized (NS) / Anti-Sulfurized Automotive (NQ)

(AEC-Q200 Compliant)  
0201, 0402, 0603, 0805, 1206,  
1210, 2010, 2512



NQ  
NS

1/20W	0Ω/1Ω	±1%
~	~	±5%
1W	10MΩ	

1Ω~10Ω: ±200PPM/°C  
>10Ω: ±100PPM/°C  
(NQ01, NS01 refer to catalog)

### Chip Array (Convex)

2D02, 2D03, 4D02, 4D03, 4DP3, 16P8



Array

1/16W	0Ω/1Ω	±1%
~	~	±5%
1/10W	1MΩ	

±200PPM/°C  
(4D03 ,4DP3, 16P8 refer to  
catalog)

### Chip Array Anti-Sulfurized

(AEC-Q200 Compliant)  
2S02, 4S02, 4S03



Array

1/16W	0Ω/10Ω	±1%
~	~	±5%
	1MΩ	

±200PPM/°C  
(4S03 refer to catalog)

### Chip Array (Concave)

2C02, 4C02, 4C03, 2F01, 4F01



Array

1/20W	0Ω/1Ω	±1%
~	~	±5%
1/16W	1MΩ	

±200PPM/°C  
(4C03 refer to catalog)

### Automotive (CQ) / Automotive High Power (HQ) (AEC-Q200 Compliant)

0201, 0402, 0603, 0805, 1206, 1210,  
2010, 2512



HQ  
CQ

1/20W	0Ω/1Ω	±1%
~	~	±5%
1W	10MΩ	

0201: 1Ω ~ 10Ω ±400PPM/°C  
0402 ~ 2512:  
1Ω~10Ω ±200PPM/°C  
>10Ω ±100PPM/°C

### Automotive Low Resistance

(AEC-Q200 Compliant)  
CS02, CS03, CS05, CS06, CS07,  
CS10, CS11, CS12



CS

1/8W	10mΩ	±1%
~	~	±5%
1W	1Ω	

Depends on size and value range





# Product List

		Series	Power Rating	Value Range	Tol	T.C.R. PPM/°C & REMARKS
<b>Metal Foil</b> MS02, MS03, MS05, MS06, MS17		MS	1/4W ~ 1W	2.5mΩ ~ 50mΩ	±1%	Depends on size and value range
<b>Metal Film Low Resistance</b> TL01, TL02, TL03, TL05, TL06, TL07, TL10, TL12		TL	1/10W ~ 3W	10mΩ ~ 10Ω	±0.5% ±1% ±2% ±5%	±50PPM/°C ±100PPM/°C ±150PPM/°C ±200PPM/°C
<b>Low T.C.R</b> LT02, LT03, LT05, LT06		LT	1/16W ~ 1/4W	1Ω ~ 1MΩ	±0.25% ±0.5% ±1%	±50PPM/°C ±100PPM/°C
<b>Metal Strip LR12</b> (AEC-Q200 Compliant)		LR	1W ~ 3W	1mΩ ~ 350mΩ	±1% ~ ±5%	±50PPM/°C
<b>Metal Alloy Low Resistance</b> ML05, ML06, ML12, ML25, ML28, ML27		ML	1W ~ 5W	0.2mΩ ~ 500mΩ	±0.5% ±1% ±2% ±5%	±50PPM/°C ±75PPM/°C ±100PPM/°C
<b>Complete Pb-Free</b> PF0A, PF01, PF02, PF03, PF05, PF06, PF07, PF11, PF10, PF12		PF	1/32W ~ 1W	1Ω ~ 10MΩ	±1% ~ ±5%	1Ω~10Ω: ±400PPM/°C >10Ω~100Ω: ±200PPM/°C >100Ω: ±100PPM/°C (PF0A, PF01 refer to catalog)
<b>High Precision Thin Film</b> TC02, TC03, TC05, TC06, TC07, TC10, TC12		TC	1/16W ~ 3/4W	2.49Ω ~ 1.5MΩ	±0.1% ±0.25% ±0.5% ±1%	±10PPM/°C ±15PPM/°C ±25PPM/°C ±50PPM/°C

## CHIP / THROUGH HOLE RESISTORS KIT

<b>Album Type</b> *Std SMD *CQ, HP, SP12 *CFR, MFR, MOR		Album	1/16W ~ 3W	E-6 E-12 E-24 E-96	±1% ±2% ±5%	E Series and value range will depend on the resistor type
<b>Plastic Bag Type</b> CFR, MFR, MOR		Plastic Bag	1/16W ~ 1W	E-6 E-12 E-24	±1% ±2% ±5%	Customize KIT is available upon request

## NETWORK RESISTORS - SIL

<b>Resistor Network</b> 4-14 PINS		RNL RPL	1/8W ~ 1/3W	10Ω ~ 1MΩ	±2% ±5%	<50Ω: ±250PPM/°C 50Ω~1MΩ: ±200PPM/°C >1MΩ: ±250PPM/°C (RPL refer to catalog)
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## MELF RESISTORS & JUMPER

<b>Carbon Film - MELF</b> 0204, 0207, 0309		MCxx	1/4W ~ 2W	1Ω ~ 5.1MΩ	±2% ±5%	1Ω~100KΩ: ±350PPM/°C 101KΩ~500KΩ: ±700PPM/°C 501KΩ~1MΩ: ±1000PPM/°C 1MΩ~5.1MΩ: ±1500PPM/°C
<b>Metal Film - MELF</b> 0102, 0204, 0207, 0309		Mxx	1/8W ~ 2W	0.1Ω ~ 10MΩ	±0.10% ±0.25% ±0.5% ±1% ±2% ±5%	±15PPM/°C ±25PPM/°C ±50PPM/°C ±100PPM/°C
<b>Moulded MELF (Metal Film)</b> 0207		D27	1/2W	10Ω ~ 1MΩ	±0.10% ±0.25% ±0.5% ±1% ±2% ±5%	±15PPM/°C ±25PPM/°C ±50PPM/°C ±100PPM/°C ±200PPM/°C

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			Series	Power Rating	Value Range	Tol	T.C.R. PPM/°C & REMARKS
<b>Fusible Wire Wound MELF (0309)</b>	<b>New</b>		FW39	1W	0.47Ω ~ 820Ω	±2% ±5%	≤1Ω: ±400PPM/°C >1Ω: ±200PPM/°C
<b>Jumper Wire</b>			ZW	φ0.45mm ~ φ1.20mm	0Ω	N/A	N/A
<b>Zero Ohm</b>			ZOC ZOT	1/8W ~ 1/4W	0Ω	N/A	ZOC (Ceramic Rod) ZOT (Steel Rod) <b>ZOC 1/4W is EOL</b>

## THROUGH HOLE RESISTORS




<b>Carbon Film</b>			CFR	1/8W ~ 3W	1Ω ~ 10MΩ	±2% ±5% ±10%	≤10Ω:±300PPM/°C 11Ω~99KΩ:±450PPM/°C 100KΩ~1MΩ:0~-700PPM/°C 1.1MΩ~10MΩ:0~-1500PPM/°C
<b>Precision Metal Film</b>			MFR	1/8W ~ 3W	1Ω ~ 10MΩ	±0.1% ±0.25% ±0.5% ±1% ±2% ±5%	±15PPM/°C ±25PPM/°C ±50PPM/°C ±100PPM/°C ±200PPM/°C
<b>Metal Oxide</b>			MOR	1/4W ~ 9W	0.1Ω ~ 680KΩ	±2% ±5% ±10%	±350PPM/°C
<b>Fusible</b>	(UL Approved - No. E306074)		FRN	1/4W ~ 3W	0.22Ω ~ 10KΩ	±2% ±5% ±10%	±350PPM/°C
<b>Metal Glaze Film</b>	(UL Approved - No. E364163)		MGR	1/4W ~ 3W	1KΩ ~ 100MΩ	±1% ±5%	±200PPM/°C
<b>Power Metal</b>			PMR	1W ~ 3W	0.56Ω ~ 10MΩ	±1% ±2% ±5%	±200PPM/°C ±350PPM/°C ±400PPM/°C
<b>Wire-Wound</b>			KNP	1/2W ~ 10W	0.01Ω ~ 60KΩ	±1% ±2% ±5%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Fusible Wire-Wound</b>	(UL Approved - No. E306074)		KNPU	1W ~ 7W	0.47Ω ~ 240Ω	±5%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Anti-Surge Wire-Wound</b>	High Power-small body size Available!		KNPA	1/2W ~ 10W	10Ω ~ 15KΩ	±1% ±2% ±5%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Fusible Wire-Wound Fixed</b>	Anti surge available - FWRA (UL Approved - No. E306074)		FWR FWRA	1W ~ 3W	0.47Ω ~ 470Ω	±5%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Terminal Wire-Wound</b>			KNH KNHA KNS	2W ~ 100W	0.4Ω ~ 50KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Thermal Fusing Wire-Wound</b>			TFR	1W	2.2Ω ~ 4.7Ω	±5% ±10%	±400PPM/°C

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# Product List

		Series	Power Rating	Value Range	Tol	T.C.R. PPM/°C & REMARKS
<b>Metal Glazed Film Fixed Resistors</b> Patent No.: 1581275		RC06 RC06-1	0.25W	1Ω ~ 10MΩ	±1% ±5%	1Ω ~ 10Ω: ±400PPM/°C 11Ω ~ 100Ω: ±200PPM/°C >100Ω: ±100PPM/°C
<b>Terminal Type Metal Oxide</b>		TMOR TMOV	3W ~ 7W	10Ω ~ 43KΩ	±5%	<20Ω: ±400PPM/°C ≥20Ω: ±350PPM/°C
<b>Forming Type</b> Panaset, Avisert, Formed		CFR MFR MOR FRN KNP	1/8W ~ 5W	10Ω ~ 1MΩ	±5% ±10%	Depends on resistor type, size and value. <a href="#">Refer to catalog</a>



## CEMENT TYPE RESISTORS

<b>Axial Leaded</b>		PRW PRWA PRWC PRWC-1	1W ~ 25W	0.1Ω ~ 200KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Radial Leaded</b>		PRM PRMA PRMB PRS	2W ~ 25W	0.1Ω ~ 200KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Radial Terminal</b>		PRZ PRV PRT PRU	5W ~ 50W	0.1Ω ~ 200KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±300PPM/°C
<b>Vertical or Axial</b>		PRWI	4W ~ 17W	0.1Ω ~ 39KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±350PPM/°C
<b>Thermal Fusible</b>		FTR	1.4W ~ 5.2W	0.22Ω ~ 1.8KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±350PPM/°C
<b>Power Flat Alloy</b>		PFA	2W ~ 10W	0.01Ω ~ 3.3Ω	±5% ±10%	≥0.1Ω: ±350PPM/°C (<0.1Ω pls contact us)

## SHUNT & COIL RESISTORS

<b>Shunt</b>		CSR	4.5A ~ 50A	3mΩ ~ 50mΩ	±2% ±5% ±10%	±400PPM/°C
<b>Coil</b>		CSC	4A ~ 12A	3mΩ ~ 50mΩ	±5% ±10%	Depends on value range

## INDUSTRIAL POWER RESISTORS

<b>Power Dissipation Mount</b>		PDMS PDM	5W ~ 100W	0.01Ω ~ 35KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±350PPM/°C
<b>Power (Ribbon) Wire-Wound</b>		QH QL QR QRZG	20W ~ 2500W	0.2Ω ~ 200KΩ	±5% ±10%	<20Ω: ±400PPM/°C ≥20Ω: ±350PPM/°C





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# Product List

		Series	Power Rating	Value Range	Tol	T.C.R. PPM/°C & REMARKS
<b>Aluminum Case High Power Wire-Wound</b>		HEWR HBWR	60W ~ 2000W	0.5Ω ~ 15KΩ	±5% ~ ±10%	±350PPM/°C
<b>Thermal Fuse Wire-Wound (Blower Fan Resistor)</b>		ASSY	12V	0.1Ω ~ 10Ω	±10%	±350PPM/°C
<b>SURFACE MOUNT RESISTORS</b>						
<b>Surface Mount Wirewound Power Resistors</b> <span style="color: red;">New</span>		PWR	1W	1Ω ~ 200Ω	±5%	1Ω≤R≤10Ω: ≤±50PPM/°C 10Ω<R≤200Ω: ≤±20PPM/°C
<b>Metal Strip Plastic Surface Mount Resistors</b> <span style="color: red;">New</span>		MP19	7W	3mΩ ~ 60mΩ	±1% ~ ±5%	±50PPM/°C

\*\*Customized design capability

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