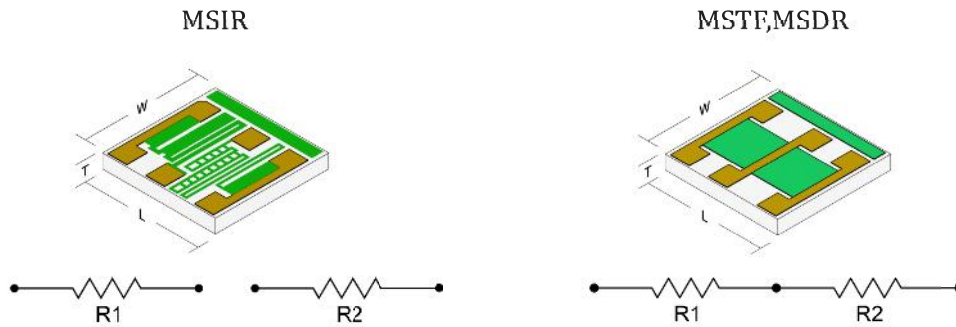


DUAL CHIP RESISTORS



Mini-Systems, Inc. **Dual Resistor** series supplies the design engineer with two discrete resistors on a single chip with either a common or isolated node. This configuration is ideal for applications where a **closely matched tolerance, TCR and tracking** are critical and space is a premium. This series provides the **high stability, low noise, tight tolerance, ratio tracking, low TCR** and TC tracking of Mini-Systems, Inc. proven Thin Film process. Connection to associated circuitry is accomplished by wire bonding to terminations located on the top side.

CASE SIZE	STYLE	LAYOUT	VALUES	DIMENSIONS		RESISTANCE RANGE			POWER RATING ¹ Per Resistor			
				L (±0.003") [±0.076mm]	W (±0.003") [±0.076mm]	Low Values All Substrates NiCr or TaN (Std. TCR Only) (Tol.±0.1%)	NiCr or [TaN] on Si or Quartz	NiCr or [TaN] on Al ₂ O ₃ , BeO or AlN	Quartz	Si, Al ₂ O ₃	AlN	BeO
0303	MSTF 3	Center Tapped	R1 = R2	0.030" [0.762]	0.030" [0.762]	2Ω < 4Ω Total	4Ω - 2MΩ [2.5MΩ] Total	2Ω - 250kΩ [325kΩ] Total	25mW	125mW	500mW	1W
0303	MSDR 3	Center Tapped	R1 ≤ R2	0.030" [0.762]	0.030" [0.762]	1Ω < 2Ω Per Res	2Ω - 1MΩ [1.2MΩ] Per Res	1Ω - 125kΩ [160kΩ] Per Res	25mW	125mW	500mW	1W
0303	MSIR 3	Isolated	R1 ≤ R2	0.030" [0.762]	0.030" [0.762]	1Ω < 2Ω Per Res	2Ω - 1MΩ [1.2MΩ] Per Res	1Ω - 125kΩ [160kΩ] Per Res	25mW	125mW	500mW	1W
0404	MSDR 4	Center Tapped	R1 ≤ R2	0.040" [1.016]	0.040" [1.016]	1Ω < 2Ω Per Res	2Ω - 4MΩ [6MΩ] Per Res	1Ω - 125kΩ [160kΩ] Per Res	25mW	125mW	500mW	1W
0404	MSIR 4	Isolated	R1 ≤ R2	0.040" [1.016]	0.040" [1.016]	1Ω < 2Ω Per Res	2Ω - 4MΩ [6MΩ] Per Res	1Ω - 125kΩ [160kΩ] Per Res	25mW	125mW	500mW	1W

¹ Power Rating at 70°C derated linearly to 0% at 150°C

PART NUMBER DESIGNATION

10001 ¹								
MSDR	4	A	N	10001/20001	F	RD	CG	
STYLE	TYPE	SUBSTRATE	RESISTOR FILM	OHMIC VALUE	TOLERANCE	RATIO	OPTION	
MSDR	SEE	A = Alumina	T = Tantalum Nitride	R1 / R2	S = ±0.01%	RA = ±0.01%	D = ±5ppm/°C	
MSIR	TABLE	S = Silicon	N = NiChrome	5-Digit Number:	Q = ±0.05%	RB = ±0.05%	C = ±10ppm/°C	
MSTF		Q = Quartz		1st 4 digits are significant	B = ±0.1%	RC = ±0.10%	B = ±25ppm/°C	
		B = BeO		with "R" as decimal point	D = ±0.5%	RE = ±0.25%	A = ±50ppm/°C	
		N = AlN		when required. 5th digit	F = ±1%	RD = ±0.50%	F = ±100ppm/°C	
				represents number of zeros.	G = ±2%	RF = ±1%	E = Aluminum Pads	
					J = ±5%	RN = No Ratio	G = Gold Bond Pads	
					K = ±10%		GB = Gold Back	
							TR = Tape & Reel	

EXAMPLE: MSDR-4-AN - 10001/20001F-RD- CG

MSDR-4 Series, Alumina, NiChrome, 10kΩ / 20kΩ, ±1% Tol., ±0.50% Ratio, ±10ppm/°C, Gold

¹ Use for MSTF 3 where R1 = R2. All other styles R1 ≤ R2



THIN FILM DIVISION

ISO 9001 CERTIFIED
20 DAVID ROAD
NORTH ATTLEBORO, MA 02760
EMAIL: msithin@Mini-SystemsInc.com
WEB: www.Mini-SystemsInc.com
PHONE: 508-695-0203 FAX: 508-695-6076



8041 Rev. A

DUAL CHIP RESISTORS

SUBSTRATE CHARACTERISTICS

SUBSTRATE MATERIAL	Available Thickness	Dielectric Constant @ 1MHz	Thermal Conductivity W/m•K	Current Noise	
				101Ω to 250kΩ	≤ 100Ω > 250kΩ
99.6% Alumina	0.005" - 0.025"	9.9	28	-35 dB	-30 dB
Silicon (with 12kÅ SiO ₂)	0.005" - 0.015"	N/A (SiO ₂ 3.9)	149 (SiO ₂ 1.38)	-40 dB	-30 dB
Quartz	0.005" - 0.010"	3.75	1.3	-40 dB	-30 dB
Beryllium Oxide	0.010" - 0.025"	6.7	300	-30 dB	-20 dB
Aluminum Nitride	0.010" - 0.025"	9.0	140 - 177	-30 dB	-20 dB

RESISTOR CHARACTERISTICS

RESISTOR FILM	Passivation	Standard TCR	TCR Optional To	TCR Tracking
Tantalum Nitride	Ta ₂ O ₅ (Self Passivating)	±150 ppm/°C	±10 ppm/°C	±2ppm/°C
NiChrome	SiO ₂	±25 ppm/°C	±5 ppm/°C	±2ppm/°C

GENERAL CHARACTERISTICS

Resistance Range	1Ω to 6MΩ
Resistance Tolerance	±0.01% to ±10%
Termination Material	Gold (Standard) Aluminum (Optional)
Termination Size	0.0035" Square Min. - Value Dependent
Backing Material	Bare Substrate (Standard) Gold (Optional)
Standard Thickness	0.010" ±0.003"
Operating Temperature	-55°C to +150°C
Storage Temperature	-65°C to +150°C
Operating Frequency	DC to 500MHz
Thickness	0.010" (0.254mm)

PERFORMANCE SPECIFICATIONS

PROPERTY	TEST CONDITION	REQUIRED LIMITS	MSI TYPICAL LIMITS
SHORT TERM OVERLOAD	2.5xWVDC(6.25xRATED POWER)MIL-PRF-55342, +25°C, 5 SEC	±0.25 MAX ΔR/R	±0.10 MAX ΔR/R
HIGH TEMP EXPOSURE	+150°C, 100HRS	±0.20 MAX ΔR/R	±0.03 MAX ΔR/R
THERMAL SHOCK	MIL-STD 202, METHOD 107	±0.25 MAX ΔR/R	±0.10 MAX ΔR/R
MOISTURE RESISTANCE	MIL-STD 202, METHOD 106	±0.40 MAX ΔR/R	±0.10 MAX ΔR/R
STABILITY	MIL-STD 202 METHOD 108, 2000 HRS, +70°C, RATED POWER	±0.50 MAX ΔR/R	±0.10 MAX ΔR/R

All MSDR, MSTF, MSIR Series parts are produced on the same manufacturing line using the same materials and processes as parts manufactured to MIL-PRF-55342



MINI SYSTEMS INC.
MADE IN AMERICA
SINCE 1968

THIN FILM DIVISION

ISO 9001 CERTIFIED
20 DAVID ROAD
NORTH ATTLEBORO, MA 02760
EMAIL: msithin@Mini-SystemsInc.com
WEB: www.Mini-SystemsInc.com
PHONE: 508-695-0203 FAX: 508-695-6076

