Thin Film Technology Corp.

Product Family: Anti-Sulfur Thick Film Chip Resistors

Part Number Series: D1TFAS Series

Construction:

- High purity alumina substrate
- 100% matte tin over Ni terminations
- Halogen free
- RoHS compliant and Pb free
- EIA-977-B 105°C Anti-Sulfur Resistant

Features:

- 0402, 0603, 0805, 1206 & 1210 English case sizes
- Power up to 1/3W
- Resistance from 1Ω to 10MΩ + Jumpers available
- TCR down to ±100ppm/°C
- Tolerance down to ±1.0.%
- Moisture Sensitivity Level (MSL) = 1

Description:

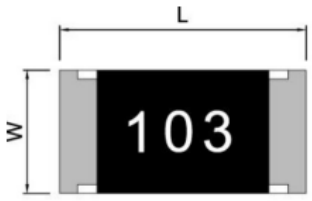
These anti-sulfur thick film resistors are engineered for server applications and environments prone to sulfur exposure. With robust construction, they ensure reliable performance by resisting corrosion and degradation caused by sulfur, making them ideal for electronic systems deployed in challenging conditions where sulfur contamination is a concern.

Part Numbering: Ex: D1TFAS0603R1002F-T5

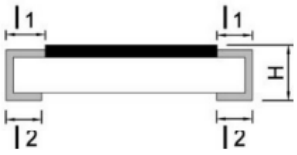
Series Name	English Size (Metric Size)	Temp. Coefficient of Resistance (TCR)	Resistance Value	Resistance Tolerance	T&R Packaging Quantity
D1TFAS	**0402** (1005) **0603** (1608) **0805** (2012) **1206** (3216) **1210** (3225)	**R** = ±100ppm/°C **S** = ±200ppm/°C **W** = 200/+400ppm/°C	4 digits with the first 3 being significant. The last digit specifies the number of zeros. "R" denotes decimal position as necessary Ex. **16R4** = 16.4Ω **2001** = 2kΩ **JUMP** = Jumper	**F** = ±1.0% **J** = ±5.0%	**-T5** = 5,000 **-T10** = 10,000 (see electrical table)

Product Dimensions:

Top



Side



All dimensions are in inches, mm in parentheses.

Dimension (Metric)	L	W	H	I_1	I_2
D1TFAS0402 (1005)	0.039 ±0.002 (1.00 ±0.05)	0.020 ±0.002 (0.50 ±0.05)	0.014 ±0.002 (0.35 ±0.05)	0.008 ±0.004 (0.20 ±0.10)	0.010 ±0.004 (0.25 ±0.10)
D1TFAS0603 (1608)	0.063 ±0.004 (1.60 ±0.10)	0.031 ±0.004 (0.80 ±0.10)	0.018 ±0.006 (0.45 ±0.15)	0.012 ±0.004 (0.30 ±0.10)	0.012 ±0.006 (0.30 ±0.15)
D1TFAS0805 (2012)	0.079 ±0.004 (2.00 ±0.10)	0.049 ±0.004 (1.25 ±0.10)	0.020 ±0.006 (0.50 ±0.15)	0.016 ±0.008 (0.40 ±0.20)	0.016 ±0.008 (0.40 ±0.20)
D1TFAS1206 (3216)	0.122 ±0.004 (3.10 ±0.10)	0.063 ±0.004 (1.60 ±0.10)	0.024 ±0.006 (0.60 ±0.15)	0.020 ±0.008 (0.50 ±0.20)	0.018 ±0.008 (0.45 ±0.20)
D1TFAS1210 (3225)	0.122 ±0.004 (3.10 ±0.10)	0.102 ±0.004 (2.60 ±0.10)	0.022 ±0.004 (0.55 ±0.10)	0.020 ±0.008 (0.50 ±0.20)	0.020 ±0.008 (0.50 ±0.20)

Electrical Specifications:

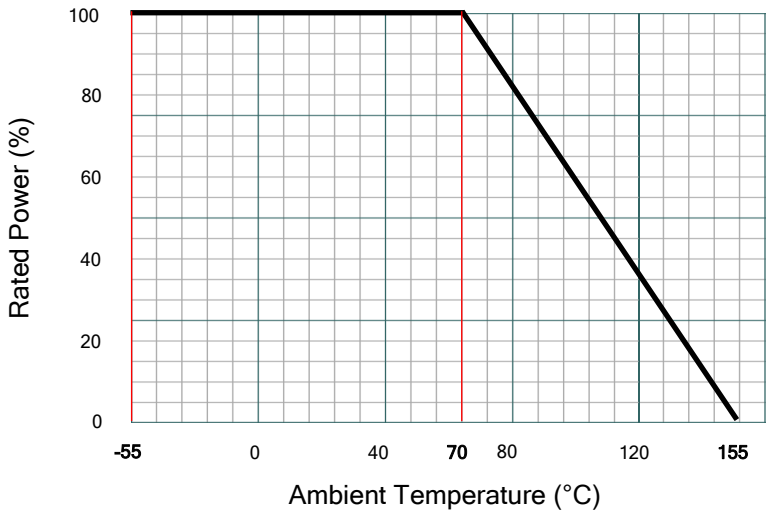
Type	D1TFAS0402			D1TFAS0603		
Metric Size	1005			1608		
Power Rating	1/16W (0.063W)			1/10W (0.10W)		
Resistance Range	1Ω~10Ω	10Ω~1MΩ	1MΩ~10MΩ	1Ω~10Ω	10Ω~1MΩ	1MΩ~10MΩ
Resistance Tolerance % (code)	±1.0%(F), ±5.0%(J)					
TCR ppm/°C (code)	200/+400(W)	±100(R)	±200(S)	200/+400(W)	±100(R)	±200(S)
Max. Operating Voltage	50V			75V		
Max. Overload Voltage	100V			150V		
Operating Temp. Range	-55°C ~ +155°C					
Packaging (code)	10,000 pcs/reel (-T10)			5,000 pcs/reel (-T5)		

Type	D1TFAS0805			D1TFAS1206			D1TFAS1210		
Metric Size	2012			3216			3225		
Power Rating	1/8W (0.125W)			1/4W (0.25W)			1/3W (0.33W)		
Resistance Range	1Ω~10Ω	10Ω~1MΩ	1MΩ~10MΩ	1Ω~10Ω	10Ω~1MΩ	1MΩ~10MΩ	1Ω~10Ω	10Ω~1MΩ	1MΩ~10MΩ
Resistance Tolerance % (code)	±1.0%(F), ±5.0%(J)								
TCR ppm/°C (code)	200/+400 (W)	±100(R)	±200(S)	200/+400 (W)	±100(R)	±200(S)	200/+400 (W)	±100(R)	±200(S)
Max. Operating Voltage	150V			200V					
Max. Overload Voltage	300V			400V					
Operating Temp. Range	-55°C ~ +155°C								
Packaging (code)	5,000 pcs/reel (-T5)								

Conditions for Jumper:

Type	D1TFAS0402	D1TFAS0603	D1TFAS0805	D1TFAS1206	D1TFAS1210
Metric Size	1005	1608	2012	3216	3225
Max. Current	3A		10A		
Resistance Value	50mΩ Max				

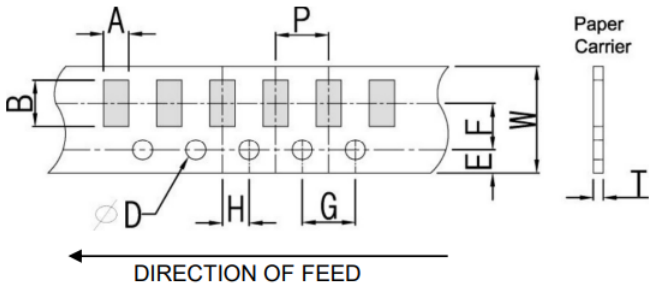
Power Derating Curve:



Reliability Specifications:

Test	Procedure	Specification
Short Time Overload **IEC-60115-1 4.13**	Applied voltage: 2.5X rated voltage or 2X maximum operating voltage, whichever is less. Test duration: 5 seconds	±0.50% +0.05Ω
Resistance to Soldering Heat **IEC-60115-1 4.18**	Dip into 270°C±5°C solder bath until fully immersed 10 ±1 seconds	±0.50% +0.05Ω
Load Life **MIL-STD-202, Method 210**	Test Temperature: 125°C±2°C Applied power: 35% of operational power rated voltage Test period: 1000 hours	±1.0% +0.05Ω
Moisture Load Life **MIL-STD-202, Method 103**	Test Condition: 85°C/85 RH Applied power: 10% or rated power Test period: 1000 hours with power cycling	±1.0% +0.05Ω
Temperature Cycle **JESD22, Method JA-104**	-55°C ~+155°C, 5-10 minute dwell, 1,000 cycles	±0.50% +0.05Ω
High Temperature Exposure **MIL-STD-202, Method 108**	Test Temperature: 155°C±3°C No load Test period: 1000 hours	±1.0% +0.05Ω
Mechanical Shock **MIL-STD-202, Method 213**	1/2 sine pulse 1,500 peak Velocity 15.4 ft./second	Within specified product tolerance
Vibration **MIL-STD-202, Method 204**	5 G's for 20 minutes 3 orientations 12 cycles	±1.0% +0.05Ω
Solderability	Dip into 235°C solder bath until fully immersed (SAC solder) 2 ±0.5 seconds	Minimum 95% coverage of new solder
Flower of Sulfur **EIA-977-B**	Temperature: 107.5°C ±2.5°C Duration: 750hrs	ΔR/R max. ±2.0% after sulfuration test

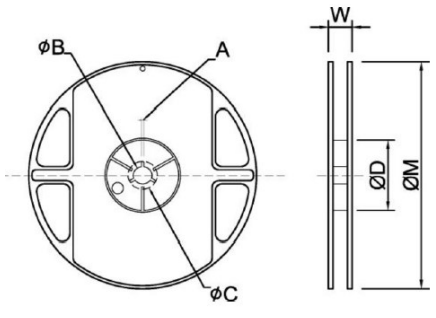
Paper Tape Dimensions:



All dimensions are in mm.

Type	A	B	W	E	F	G	H	T	ΦD	P
D1TFAS0402	0.70 ±0.10	1.20 ±0.10	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.45 ±0.10	1.50-0/+0.10	2.00 ±0.10
D1TFAS0603	1.05 ±0.20	1.80 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.60 ±0.10	1.50-0/+0.10	4.00 ±0.10
D1TFAS0805	1.55 ±0.20	2.30 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.75 ±0.10	1.50-0/+0.10	4.00 ±0.10
D1TFAS1206	1.90 ±0.20	3.50 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.75 ±0.10	1.50-0/+0.10	4.00 ±0.10
D1TFAS1210	2.85 ±0.20	3.50 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.75 ±0.10	1.50-0/+0.10	4.00 ±0.10

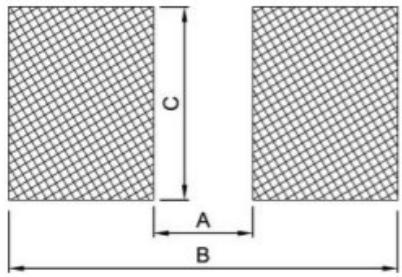
Reel Dimensions:



All dimensions are in mm.

Type	A	ΦB	ΦC	ΦD	W	ΦM
D1TFAS0402	2.00 ±0.50	13.5 ±1.00	21.0 ±1.00	60.0 ±1.00	11.5 ±2.00	178 ±2.00
D1TFAS0603						
D1TFAS0805						
D1TFAS1206						
D1TFAS1210						

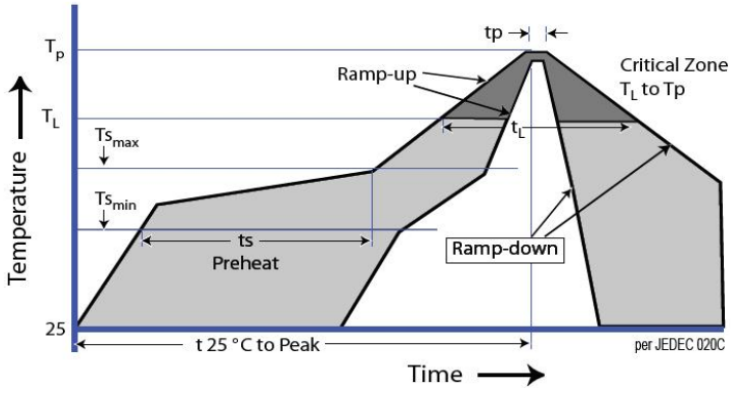
Recommended Land Pattern:



All dimensions are in mm.

Type	A	B	C
D1TFAS0402	0.60	1.60	0.70
D1TFAS0603	0.80	2.40	1.00
D1TFAS0805	1.30	2.90	1.40
D1TFAS1206	2.20	4.20	1.70
D1TFAS1210	2.00	4.40	2.70

Soldering Profile:



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts_{max} to Tp)	3 °C/second max.
Preheat	
- Temperature Min (Ts_{min})	150 °C
- Temperature Max (Ts_{max})	200 °C
- Time (ts_{min} to ts_{max})	60-180 seconds
Time maintained above:	
- Temperature (T_L)	217 °C
- Time (t_L)	60-150 seconds
Peak Temperature (T_p)	260 +0 °C
Time within 5 °C of actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

Marking Information:

0402 : no marking

0603 : 3 digits code

0805~1206 : 3 digits code (5%)

0805~1206 : 4 digits code (1% and below)

Standard E96 Values and 0603 Resistance Codes																								
R-Value	100	102	105	107	110	113	115	118	121	124	127	130	133	137	140	143	147	150	154	158	162	165	169	174
Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
R-Value	178	182	187	191	196	200	205	210	215	221	226	232	237	243	249	255	261	267	274	280	287	294	301	309
Code	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
R-Value	316	324	332	340	348	357	365	374	383	392	402	412	422	432	442	453	464	475	487	499	511	523	536	549
Code	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
R-Value	562	576	590	604	619	634	649	665	681	698	715	732	750	768	787	806	825	845	866	887	909	931	953	976
Code	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96

E96 Multiplier Code						
Code	A	B	C	D	E	F
Multiplier	10^0	10^1	10^2	10^3	10^4	10^5

Examples of 0603~1206 : 3 digits code for E24 values (±5%)						
R-Value	4.7Ω	33Ω	470Ω	5.6KΩ	62KΩ	680KΩ
Code	4R7	330	471	562	623	684

Examples of 0805~1206: 4 digits code for type							
R-Value	5.6Ω	10Ω	22.6Ω	100Ω	1.1KΩ	10KΩ	332KΩ	1MΩ
Code	5R60	10R0	22R6	1000	1101	1002	3323	1004

Storage Conditions:

Environment Conditions:

Products should be stored under the following environmental conditions.

- Temperature: +5 to +35°C
- Humidity: 45 to 85% relative humidity
- Do not keep products in environments where they may be subject to particulate contamination or harmful gases such as sulfuric acid or hydrogen chloride as it may cause oxidization on electrodes, resulting in poor solderability.
- Products should be stored in a space that does not expose it to high temperatures, vibration, or direct sunlight.
- Products should be stored in the original airtight packaging until use.