



Frontier Electronics Corp.®

SMD CURRENT SENSE THICK FILM CHIP RESISTORS

F SERIES





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FEATURES & APPLICATIONS

- High power rating
- High reliability
- Low Profile
- RoHS compliant
- Battery chargers
- DC/DC converters
- Power Supplies (Linear and switch-mode)
- Stepper Motor Controller
- Computers

ORDERING INFORMATION

1206	F	J	R005	G	T	C	S
Size	Series	Wattage	Resistance	Tolerance	Packaging	Termination	Code
0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 2010 (5025) 2512 (6432)	F: Thick Film	C: 1/8 W (0603 & 0402) D: 1/4 W (0805) F: 1/2 W (1206 & 1210)) H: 1 W (2010) J: 2 W (2512)	5% (E24): 2 Significant digits followed by No. of zeros. 4R7: 4.7Ω 101: 100Ω 103: 10KΩ Jumper:000 1% (E24 + E96) 3 Significant digits followed by No. of zeros 10R0:10Ω 1001:1KΩ 3302:33KΩ Jumper:0000	X: Jumper B: ±0.1% D: ±0.5% F: ±1% J: ±5%	T: Paper Carrier 7" Reel E: Embossed Carrier 7" Reel R: Embossed Carrier 10" Reel	C: Tin (Sn)	S: Standard

VALUES

Size	Power Rating @ 70°C Max. (W)	Tolerance B (0.1%), D (0.5%), F (1%), J (5%)	TCR (ppm/°C)	Resistance (Ω)
2512	2	B, D, F (E24 + E96) & J (E24)	±100 (1→1M)	0, 1→1M
2010	2	B, D, F (E24 + E96) & J (E24)	±100 (1→1M)	0, 1→1M
1210	0.5	B, D, F (E24 + E96) & J (E24)	±100 (1→1M)	0, 1→1M
1206	0.5	B, D, F (E24 + E96) & J (E24)	±100 (1→1M) & 200 (1M→10M)	0, 1→10M
0805	0.25	B, D, F (E24 + E96) & J (E24)	±100 (1→1M) & ±150 (1M→10M)	0, 1→10M
0603	0.125	B, D, F (E24 + E96) & J (E24)	±100 (1→1M) & ±150 (1M→10M)	0, 1→1M
0402	0.125	B, D, F (E24 + E96) & J (E24)	±100 (1→1M) & -200/+400 (1M→10M)	0, 1→1M

a) Rated Continue Working Voltage (RCWV) = $(P \times R)^{1/2}$. Rated Continue Working Current (I) = $(P/R)^{1/2}$

b) RCWV: Working Voltage(V), I: Current(A), P: Rated Power (W), R: Resistance Value (Ohms)

c) R-value might be variance depend on soldering conditions. It is strongly suggested to use the recommend solder pad to design your circuits

JUMPERS

Size	Power Rating (W)	DCR Max. (mΩ)	Rated Current (A)	Peak Current (A)
2512	2	20	10	25
2010	1	20	7	17.5
1210	0.5	20	5	12.5
1206	0.5	20	5	12.5
0805	0.25	20	4	10
0603	0.125	20	2	5
0402	0.125	50	1.5	3.8

OPERATION AND STORAGE TEMPERATURE

As a Component

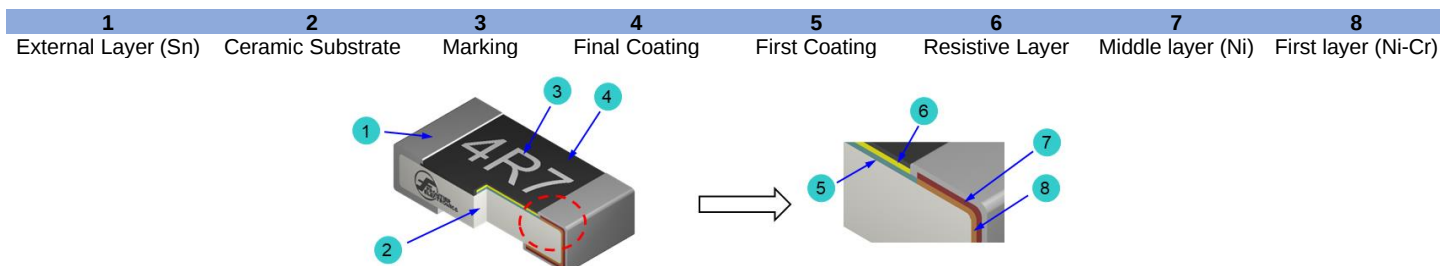
Operation Temperature Range: -55 to +155 °C

Storage Temperature Range: -55 to +155 °C

Original Packaging

Storage Temperature Range: +5 ~ +40 °C, Humidity: 30 to 70% relative humidity

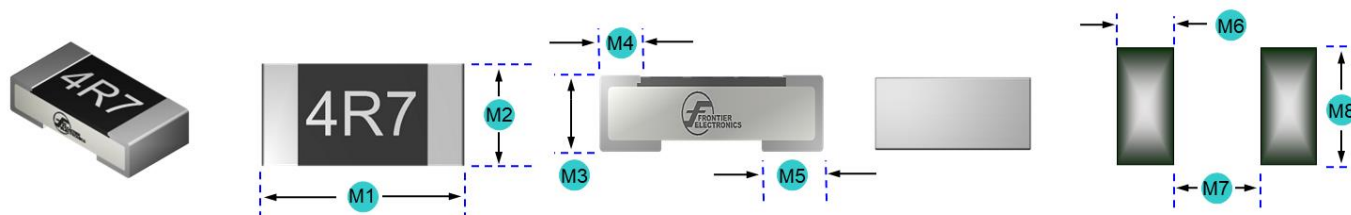
CONSTRUCTION



DIMENSIONS

SIZE	M1	M2	M3	M4	M5	M6	M7	M8
2512	6.30 (0.248)	3.10 (0.122)	0.60 (0.024)	0.60 (0.024)	1.80 (0.071)	2.45 (0.096)	2.7 (0.106)	3.7 (0.146)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.15 (±0.006)	±0.25 (±0.01)	±0.25 (±0.01)	Typ.	Typ.	Typ.
2010	5.00 (0.197)	2.50 (0.098)	0.60 (0.024)	0.60 (0.024)	0.60 (0.024)	1.5 (0.059)	3.8 (0.15)	3 (0.118)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.10 (±0.004)	±0.25 (±0.01)	±0.25 (±0.01)	Typ.	Typ.	Typ.
1210	3.10 (0.122)	1.60 (0.063)	0.55 (0.022)	0.50 (0.02)	0.50 (0.02)	1.3 (0.051)	2.1 (0.083)	1.8 (0.071)
Tol.	±0.15 (±0.006)	±0.15 (±0.006)	±0.10 (±0.004)	±0.25 (±0.01)	±0.25 (±0.01)	Typ.	Typ.	Typ.
1206	3.10 (0.122)	2.50 (0.098)	0.55 (0.022)	0.50 (0.02)	0.50 (0.02)	1.3 (0.051)	2.1 (0.083)	3 (0.118)
Tol.	±0.15 (±0.006)	±0.15 (±0.006)	±0.10 (±0.004)	±0.25 (±0.01)	±0.25 (±0.01)	Typ.	Typ.	Typ.
0805	2.00 (0.079)	1.25 (0.049)	0.50 (0.02)	0.40 (0.016)	0.40 (0.016)	1.15 (0.045)	1.2 (0.047)	1.3 (0.051)
Tol.	±0.10 (±0.004)	±0.10 (±0.004)	±0.15 (±0.006)	±0.20 (±0.008)	±0.20 (±0.008)	Typ.	Typ.	Typ.
0603	1.60 (0.063)	0.80 (0.031)	0.45 (0.018)	0.30 (0.012)	0.30 (0.012)	1 (0.039)	1 (0.039)	0.9 (0.035)
Tol.	±0.10 (±0.004)	±0.10 (±0.004)	±0.15 (±0.006)	±0.10 (±0.004)	±0.15 (±0.006)	Typ.	Typ.	Typ.
0402	1.00 (0.039)	0.50 (0.02)	0.35 (0.014)	0.20 (0.008)	0.25 (0.01)	0.635 (0.025)	0.63 (0.025)	0.5 (0.02)
Tol.	±0.05 (±0.002)	±0.05 (±0.002)	±0.05 (±0.002)	±0.10 (±0.004)	±0.10 (±0.004)	Typ.	Typ.	Typ.

mm (In)

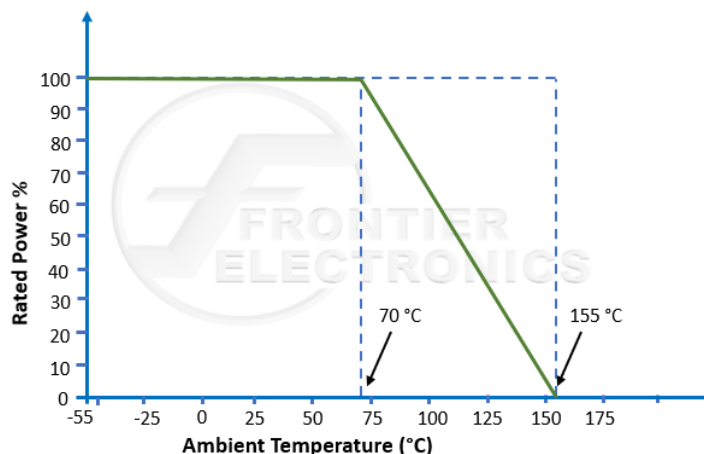


MARKING

SIZE	RESISTANCE CODE	MARKING
For Sizes of 0603 and above the mark will have 4 characters for tolerance up to 1% and 3 characters for tolerances greater than 1%. No mark will be placed for the 0402 size. Jumpers: will be marked with 4 zeros for sizes of 2512 and 2010, and 3 zeros for sizes of 1210, 1206, 0805 and 0603. No mark will be placed for the 0402 size	4 characters making 1.3Ω = 1R30 15Ω = 15R0 10,000Ω = 1002	15R0
	3 characters making 1.3Ω = 1R3 15Ω = 150 10,000Ω = 103	150



DERATING CURVE



The maximum amount of power that the resistor can dissipate without failing or degrading. This rating is based on the ambient temperature. Other factors affecting its performance are: Size, construction and Material.

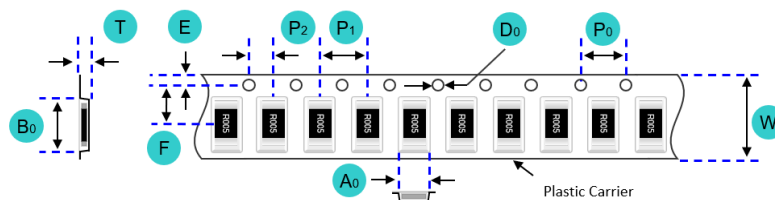
PACKAGING

Size	Ao	Bo	W	F	E	P1	P2	P0	D	T
2512	3.6 (0.142)	6.9 (0.272)	12 (0.472)	5.5 (0.217)	1.75 (0.069)	4 (0.157)	4 (0.157)	2 (0.079)	1.55 (0.061)	1.2 (0.047)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.30 (±0.012)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.05 (±0.002)	Max (Max)
2010	2.8 (0.11)	5.5 (0.217)	12 (0.472)	5.5 (0.217)	1.75 (0.069)	4 (0.157)	4 (0.157)	2 (0.079)	1.55 (0.061)	1 (0.039)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.30 (±0.012)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.05 (±0.002)	Max (Max)
1206	2 (0.079)	3.6 (0.142)	8 (0.315)	3.5 (0.138)	1.75 (0.069)	4 (0.157)	4 (0.157)	2 (0.079)	1.55 (0.061)	1 (0.039)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.30 (±0.012)	±0.20 (±0.008)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.05 (±0.002)	Max (Max)
1210	3 (0.118)	3.6 (0.142)	8 (0.315)	3.5 (0.138)	1.75 (0.069)	4 (0.157)	4 (0.157)	2 (0.079)	1.55 (0.061)	1 (0.039)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.30 (±0.012)	±0.20 (±0.008)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.05 (±0.002)	Max (Max)
0805	1.65 (0.065)	2.4 (0.094)	8 (0.315)	3.5 (0.138)	1.75 (0.069)	4 (0.157)	4 (0.157)	2 (0.079)	1.55 (0.061)	1 (0.039)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.30 (±0.012)	±0.20 (±0.008)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.05 (±0.002)	Max (Max)
0603	1.1 (0.043)	1.9 (0.075)	8 (0.315)	3.5 (0.138)	1.75 (0.069)	4 (0.157)	4 (0.157)	2 (0.079)	1.55 (0.061)	0.65 (0.026)
Tol.	±0.20 (±0.008)	±0.20 (±0.008)	±0.30 (±0.012)	±0.20 (±0.008)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.05 (±0.002)	±0.05 (±0.002)
0402	0.7 (0.028)	1.2 (0.047)	8 (0.315)	3.5 (0.138)	1.75 (0.069)	2 (0.079)	4 (0.157)	1 (0.039)	1.55 (0.061)	0.4 (0.016)
Tol.	±0.10 (±0.004)	±0.10 (±0.004)	±0.30 (±0.012)	±0.20 (±0.008)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.10 (±0.004)	±0.05 (±0.002)	±0.05 (±0.002)

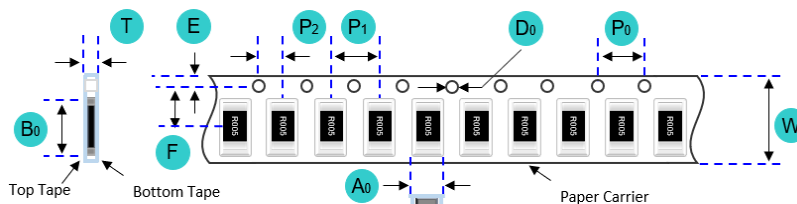
mm (In)

2512 and 2010 Plastic Embossed Carrier
1206, 1210, 0805, 0603, 0402 Paper Carrier

Plastic carrier

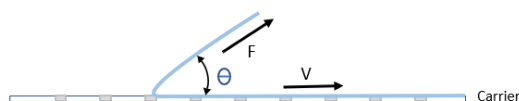


Paper Carrier



Top Cover Tape Removing Force

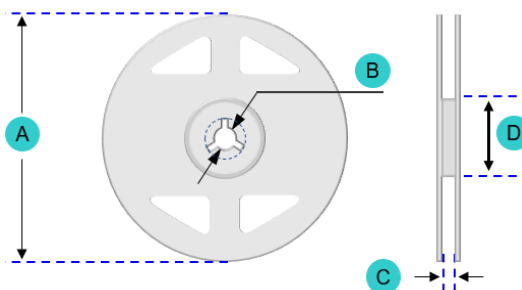
- Speed: around 300 mm/min
- Force: 0.1N Min. and 0.7N Max.
- Angle: 15° Max.



Reel Dimensions

Size	Reel Qty	A	B	C	D
1206,1210, 0805, 0603 & 0402	7" Reel 5Kpcs, 10Kpcs for 0402	178	13	12.4	60
	Paper Carrier (8mm)	(7.008)	(0.512)	(0.488)	(2.362)
	Tol.	±2.0 (±0.079)	±0.2 (±0.008)	±1.0 (±0.039)	±1.0 (±0.039)
2512 & 2010	7" Reel 4Kpcs	178	13	9	60
	Plastic Carrier (12mm)	(7.008)	(0.512)	(0.354)	(2.362)
	Tol.	±2.0 (±0.079)	±0.2 (±0.008)	±0.5 (±0.02)	±1.0 (±0.039)

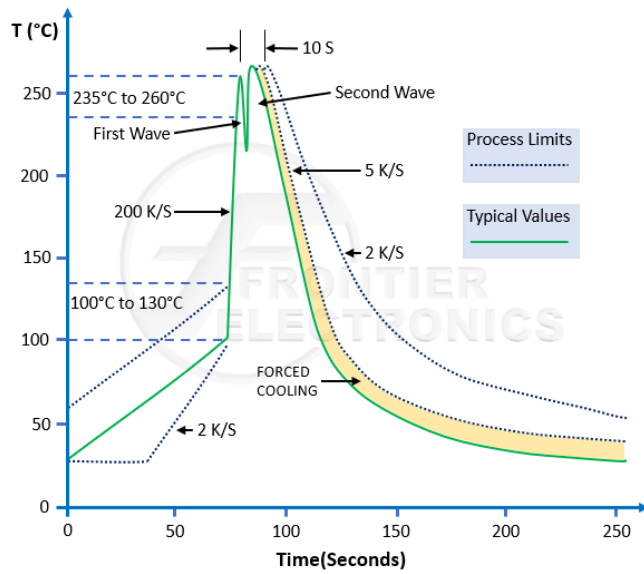
mm (In)





SOLDER PROFILES

SOLDER WAVE



REFLOW

