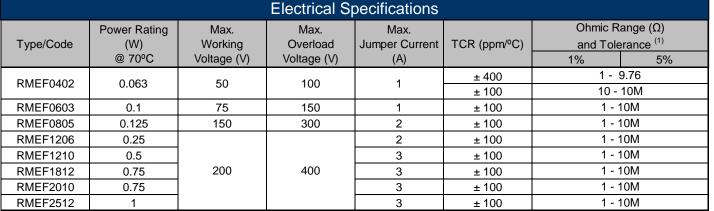
## General Purpose Thick Film Chip Resistor 100% RoHS Compliant Without Exemption

### Features:

- Nickel barrier terminations standard
- Power derating from 100% at 70°C to zero at +155°C
- AEC-Q200 compliant
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant



(1) Tighter tolerances available. Contact Stackpole Electronics.

Operating temperature range is -55°C to +155°C

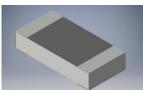
Electrical Specifications - Jumper					
Type/Code	Max Overload Current (A) <1 second and 1 time	Jumper Resistance Value ( $\Omega$ )			
RMEF0402					
RMEF0603	3				
RMEF0805					
RMEF1206		0.05 Max.			
RMEF1210	10				
RMEF2010	10				
RMEF2512					

		Mechan	ical Specification	าร		
		≥ 103				
Type/Code	L	W	Н	I <sub>1</sub>	l <sub>2</sub>	Unit
RMEF0402	$0.039 \pm 0.0039$ 1.00 ± 0.10	$0.020 \pm 0.0020$ $0.50 \pm 0.05$	$0.012 \pm 0.0020$ $0.30 \pm 0.05$	$\begin{array}{r} 0.006 \pm 0.004 \\ 0.15 \pm 0.10 \end{array}$	$0.008 \pm 0.004$ $0.20 \pm 0.10$	inches mm
RMEF0603	$0.063 \pm 0.008$ 1.60 $\pm 0.20$	$0.031 \pm 0.006$ $0.80 \pm 0.15$	$0.016 \pm 0.004$ $0.40 \pm 0.10$	$\begin{array}{r} 0.012 \pm 0.008 \\ 0.30 \pm 0.20 \end{array}$	$0.012 \pm 0.004$ $0.30 \pm 0.10$	inches mm
RMEF0805	$0.079 \pm 0.008$ 2.00 ± 0.20	$0.049 \pm 0.006$ 1.25 ± 0.15	$0.020 \pm 0.006$ $0.50 \pm 0.15$	$0.012 \pm 0.006$ $0.30 \pm 0.15$	$0.016 \pm 0.006$ $0.40 \pm 0.15$	inches mm

**Resistive Product Solutions** 

Stackpole Electronics, Inc.





### General Purpose Thick Film Chip Resistor 100% RoHS Compliant Without Exemption

# Stackpole Electronics, Inc. Resistive Product Solutions

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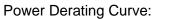
Mechanical Specifications (cont.)						
Type/Code	L	W	н	l <sub>1</sub>	l <sub>2</sub>	Unit
RMEF1206	0.120 ± 0.004	0.063 ± 0.008	0.022 ± 0.006	0.016 ± 0.008	0.020 ± 0.008	inches
RIVIEF 1200	$3.05 \pm 0.10$	$1.60 \pm 0.20$	$0.55 \pm 0.15$	$0.40 \pm 0.20$	$0.50 \pm 0.20$	mm
RMEF1210	$0.120 \pm 0.004$	$0.098 \pm 0.008$	$0.022 \pm 0.006$	$0.020 \pm 0.008$	$0.020 \pm 0.008$	inches
RIVIEF 1210	$3.05 \pm 0.10$	$2.50 \pm 0.20$	$0.55 \pm 0.15$	$0.50 \pm 0.20$	$0.50 \pm 0.20$	mm
RMEF1812	$0.177 \pm 0.004$	0.122 ± 0.008	$0.022 \pm 0.002$	$0.022 \pm 0.008$	$0.028 \pm 0.008$	inches
RIVIEF 1012	$4.50 \pm 0.10$	$3.10 \pm 0.20$	$0.55 \pm 0.05$	$0.55 \pm 0.20$	$0.70 \pm 0.20$	mm
RMEF2010	$0.197 \pm 0.008$	$0.098 \pm 0.008$	$0.022 \pm 0.004$	$0.024 \pm 0.008$	$0.024 \pm 0.008$	inches
RIVIEF2010	$5.00 \pm 0.20$	$2.50 \pm 0.20$	$0.55 \pm 0.10$	$0.60 \pm 0.20$	$0.60 \pm 0.20$	mm
RMEF2512	$0.248 \pm 0.008$	0.126 ± 0.008	$0.022 \pm 0.004$	$0.024 \pm 0.008$	$0.024 \pm 0.008$	inches
RIVIEP 2012	$6.30 \pm 0.20$	$3.20 \pm 0.20$	$0.55 \pm 0.10$	$0.60 \pm 0.20$	$0.60 \pm 0.20$	mm

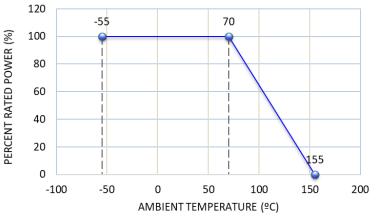
	Performance Characteristics						
Test	Test Method	Procedure	Requirements				
Temperature Coefficient of Resistance (TCR)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25/-55°C and 25°C/+155°C, 25°C is the reference temperature	As per specification				
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. overload voltage whichever is less for 5 seconds. Jumper: Overload current for 5 seconds 0402/0603/0805 = 2.5A 1206/1210/1812/2010/2512 = 5A	1%: ± (1 + 0.05 Ω) 5%: ± (2% + 0.1 Ω) Jumper: Max 0.05 Ω after test				
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260 ± 5°C for 30 seconds	Individual leaching area ≤ 5% Total leaching area ≤ 10%				
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260 ± 5°C for seconds	1%: ± (0.5% + 0.05 Ω) 5%: ± (1% + 0.05 Ω)				
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55ºC to +155ºC, 5 cycles	1%: ± (0.5% + 0.05 Ω) 5%: ± (1% + 0.05 Ω)				
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor is immersed into isopropyl alcohol of 20~25°C for 60 seconds. Then the resistor is left in the room for 48 hours.	1%: ± (0.5% + 0.05 Ω) 5%: ± (0.5% + 0.05 Ω) Jumper: Max. 0.05 Ω after test				
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40 ± 2°C, 90~95% R.H. RCWV or Max working voltage whichever is less for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF".	1%: ± (1% + 0.05 Ω) 5%: ± (2% + 0.05 Ω) Jumper: Max. 0.1 Ω after test				
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70 ± 2°C, RCWV or Max working voltage whichever is less for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF"	1%: ± (1% + 0.05 Ω) 5%: ± (3% + 0.1 Ω) Jumper: Max. 0.1 Ω after test				
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute.	≥ 10G Ω				
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D: 0402, 0603, 0805 = 5 mm 1206, 1210, 1812 = 3 mm 2010, 2512 = 2 mm	1%: ± (1% + 0.05 Ω) 5%: ± (1% + 0.05 Ω)				

General Purpose Thick Film Chip Resistor 100% RoHS Compliant Without Exemption

## Stackpole Electronics, Inc.

**Resistive Product Solutions** 





Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70°C. For operation at ambient temperature in excess of 70°C, the load should be derated in accordance with figure of derating curve.

#### Voltage Rating or Current Rating

Resistance range  $\geq 1 \Omega$ 

Rated Voltage: The resistor shall have a DC continuous working voltage of a RMS AC continuous working voltage at commercial line frequency and have form corresponding to the power rating, as determined formula as following:

 $E(RCWV) = \sqrt{PxR}$ 

E=Rated voltage (V) P=Power rating (W) R=Nominal resistance (Ω)

	Recomme	ended Pad Layout		
	-			
Size	А	В	С	Unit
RMEF0402	0.024	0.063	0.028	inches
KIWIEF0402	0.60	1.60	0.70	mm
RMEF0603	0.031	0.094	0.039	inches
RIMEF0003	0.80	2.40	1.00	mm
RMEF0805	0.051	0.114	0.055	inches
RIMEF0805	1.30	2.90	1.40	mm
RMEF1206	0.087	0.165	0.067	inches
RIVIEF 1200	2.20	4.20	1.70	mm
RMEF1210	0.079	0.173	0.106	inches
RIVIEF1210	2.00	4.40	2.70	mm
RMEF1812	0.122	0.233	0.118	inches
NIVIEF 1012	3.11	5.91	3.00	mm
RMEF2010	0.150	0.260	0.106	inches
	3.80	6.60	2.70	mm
RMEF2512	0.193	0.319	0.134	inches
	4.90	8.10	3.40	mm

Repetitive Pulse Information

(This information is for reference only and is not guaranteed performance.)

If repetitive pulses are applied to resistors, pulse wave form must be less than "Pulse limiting voltage", "Pulse limiting current" or "Pulse limiting wattage" calculated by the formula below.

 $Vp = K\sqrt{P \times R \times T/t}$  $lp = K\sqrt{P/R \times T/t}$  $Pp = K^{2} \times P \times T/t$ 

Where: Vp: Pulse limiting voltage (V)

- lp: Pulse limiting current (A)
- Pp: Pulse limiting wattage (W)
- P: Power rating (W)
- R: Nominal resistance (ohm)
- T: Repetitive period (sec)
- t: Pulse duration (sec)
- K: Coefficient by resistors type (refer to below matrix)
- [Vr: Rated Voltage (V), Ir: Rated Current (A)]

Note 1: If T > 10  $\rightarrow$  T = 10 (sec), T / t > 1000  $\rightarrow$  T / t = 1000

Note 2: If T > 10 and T / t > 1000, "Pulse Limiting power (Single pulse) is applied

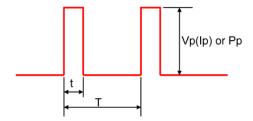
Note 3: If Vp < Vr (Ip < Ir or Pp < P), Vr (Ir, P) is Vp (Ip, Pp)

Note 4: Pulse limiting voltage (current, wattage) is applied at less than rated ambient temperature. If ambient temperature is more than the rated temperature (70°C), please decrease power rating according to "Power Derating Curve"

Note 5: Please assure sufficient margin for use period and conditions for "Pulse limiting voltage"

Note 6: If the pulse waveform is not square wave, please judge after transform the waveform into square wave according to the "Waveform Transformation to Square Wave".

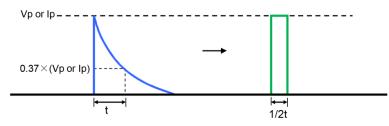
Coefficient (K) Matrix				
Resistor Type	К			
R < 10 Ω	0.50			
10 Ω ≤ R < 100 Ω	0.45			
100 Ω ≤ R < 1K Ω	0.35			
1K Ω ≤ R < 10K Ω	0.25			
10K Ω ≤ R	0.20			



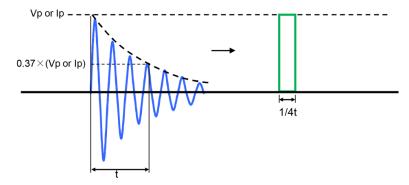
**Resistive Product Solutions** 

Waveform Transformation to Square Wave

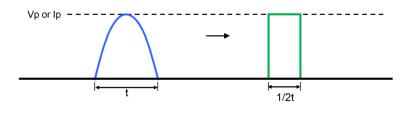
1. Discharge curve wave with time constant "t"  $\rightarrow$  Square wave



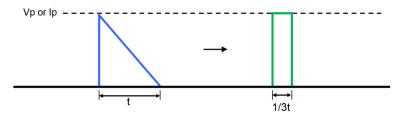
2. Damping oscillation wave with time constant of envelope "t"  $\rightarrow$  Square wave



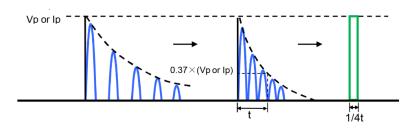
3. Half-wave rectification wave  $\rightarrow$  Square wave



4. Triangular wave  $\rightarrow$  Square wave



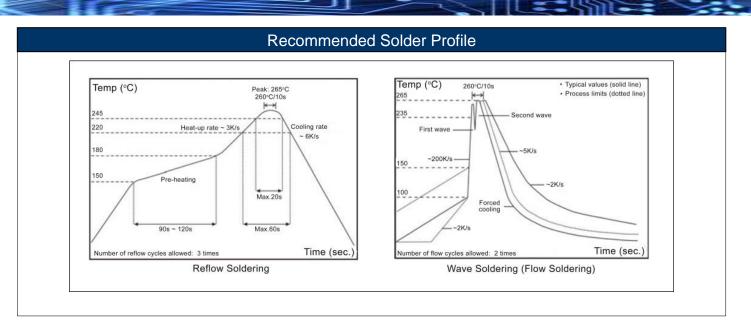
5. Special wave  $\rightarrow$  Square wave



General Purpose Thick Film Chip Resistor 100% RoHS Compliant Without Exemption

## Stackpole Electronics, Inc.

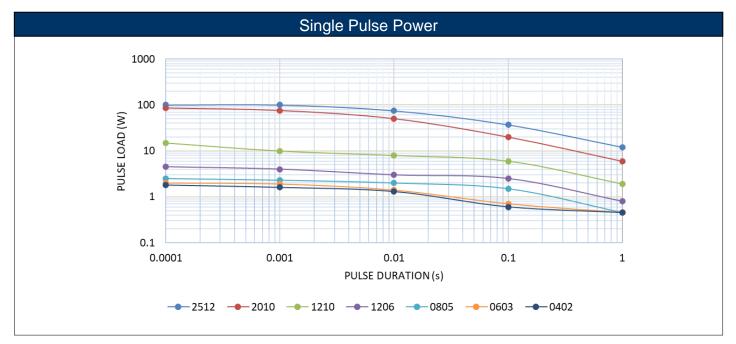
**Resistive Product Solutions** 



Rework temperature (hot air equipment): 350°C, 3~5 seconds

Recommended reflow methods: IR, vpor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements



The data provided are for reference only. They are typical performance for this product but are not guaranteed. The actual pulse handling of each individual resistor may vary depending on a variety of factors including resistance tolerance and resistance value. Stackpole Electronics, Inc. assumes no liability for the use of this information. Customers should validate the performance of these products in their applications. Contact Stackpole marketing to discuss specific pulse application requirements.

General Purpose Thick Film Chip Resistor 100% RoHS Compliant Without Exemption

## Stackpole Electronics, Inc. Resistive Product Solutions

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	Packaging Specifications								
						WØ			
Туре		Size(*)	А	ØB	ØC	ØD	W	ØM	Unit
RMEF0402	7"	10 K/Reel					0.453 ± 0.079 11.50 ± 2.00		inches mm
RMEF0603 RMEF0805 RMEF1206 RMEF1210	7"	5 K/Reel				2.362 ± 0.039 60.00 ± 1.00	0.453 ± 0.079 11.50 ± 2.00	7.008 ± 0.079 178.00 ± 2.00	inches mm
RMEF2010 RMEF2512 RMEF1812	7"	4 K/Reel					0.630 ± 0.079 16.00 ± 2.00		inches mm

(\*) Larger reel sizes may be available. Contact Stackpole Electronics.

		Taping Spec	ifications – Pape	r Tape		
	ď			<b>1</b>   H		
Size	А	В	W	E	F	Unit
RMEF0402	0.028 ± 0.004 0.70 ± 0.10	$0.047 \pm 0.004$ 1.20 ± 0.10				inches mm
RMEF0603	$0.041 \pm 0.008$ $1.05 \pm 0.20$	$0.071 \pm 0.008$ $1.80 \pm 0.20$				inches mm
RMEF0805	0.061 ± 0.008 1.55 ± 0.20	$0.091 \pm 0.008$ 2.30 ± 0.20	$0.315 \pm 0.008$ $8.00 \pm 0.20$	$0.069 \pm 0.004$ 1.75 ± 0.10	$0.138 \pm 0.002$ $3.50 \pm 0.05$	inches mm
RMEF1206	$0.075 \pm 0.008$ 1.90 ± 0.20	$0.138 \pm 0.008$ $3.50 \pm 0.20$				inches mm
RMEF1210	$0.112 \pm 0.008$ 2.85 ± 0.20	$0.138 \pm 0.008$ $3.50 \pm 0.20$				inches mm
Size	G	Н	Т	ØD	Р	Unit
RMEF0402			$0.018 \pm 0.004$ $0.45 \pm 0.10$		0.079 ± 0.004	inches mm
RMEF0603			$0.024 \pm 0.004$ $0.60 \pm 0.10$		2.00 ± 0.10	inches mm
RMEF0805	$0.157 \pm 0.004$ $4.00 \pm 0.10$	$0.079 \pm 0.002$ 2.00 ± 0.05	$0.030 \pm 0.004$ $0.75 \pm 0.10$	0.059 +0.004/-0 1.50 +0.10/-0		inches mm
RMEF1206			$0.030 \pm 0.004$ $0.75 \pm 0.10$		$0.157 \pm 0.004$ $4.00 \pm 0.10$	inches mm
RMEF1210			$0.030 \pm 0.004$ $0.75 \pm 0.10$			inches mm

General Purpose Thick Film Chip Resistor 100% RoHS Compliant Without Exemption

## Stackpole Electronics, Inc.

**Resistive Product Solutions** 

Taping Specifications – Plastic Tape							
Size	А	В	W	E	F	G	Unit
RMEF2010	0.110 ± 0.008 2.80 ± 0.20	$0.220 \pm 0.008$ 5.60 ± 0.20					inches mm
RMEF2512	0.134 ± 0.008 3.40 ± 0.20	0.264 ± 0.008 6.70 ± 0.20	0.472 ± 0.004 12.00 ± 0.10	0.069 ± 0.004 1.75 ± 0.10	$0.217 \pm 0.002$ 5.50 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	inches mm
RMEF1812	$0.130 \pm 0.008$ $3.30 \pm 0.20$	0.181 ± 0.008 4.60 ± 0.20					inches mm
Size	Н	Т	ØD	ØD1	T1	Р	Unit
RMEF2010							inches mm
RMEF2512	$0.079 \pm 0.002$ 2.00 ± 0.05	$0.009 \pm 0.004$ $0.23 \pm 0.10$	0.059 +0.004/-0 1.50 +0.10/-0	$0.059 \pm 0.004$ 1.50 ± 0.10	$0.033 \pm 0.006$ $0.85 \pm 0.15$	0.157 ± 0.004 4.00 ± 0.10	inches mm
RMEF1812							inches mm

### Part Marking Specifications



**1% Marking** The nominal resistance is marked on the surface of the overcoating with the use of 4 digit markings. 0201 and 0402 are not marked.



**5% Marking** The nominal resistance is marked on the surface of the overcoating with the use of 3 digit markings. 0201 and 0402 are not marked.

For shared E24/E96 values, 1% tolerance product may be marked with three digit marking instead of the standard four digit marking for all other E96 values. All E24 values available in 1% tolerance are also marked with three digit marking.

### Mark Instructions for 0603 1% Chip Resistors (per EIA-J)

A two-digit number is assigned to each standard R-Value (E96) as shown in the chart below. This is followed by one alpha character which is used as a multiplier. Each letter "Y" – "F" represents a specific multiplier as follows:

Y = 0.1	X = 1	A = 10	B = 100
C = 1000	D(d) = 10000	E = 100000	F = 1000000

General Purpose Thick Film Chip Resistor 100% RoHS Compliant Without Exemption

EXAMPLE:

Chip Marking	Explanation	Value
01B	01 means 10.0 and B = 100	10.0 x 100 = 1 K ohm
25C	25 means 17.8 and C = 1,000	17.8 x 1,000 = 17.8 K ohm
93D	93 means 90.9 and D = 10,000	90.9 x 10,000 = 909 K ohm

E96											
1%	#	1%	#	1%	#	1%	#	1%	#	1%	#
10.0	01	14.7	17	21.5	33	31.6	49	46.4	65	68.1	81
10.2	02	15.0	18	22.1	34	32.4	50	47.5	66	69.8	82
10.5	03	15.4	19	22.6	35	33.2	51	48.7	67	71.5	83
10.7	04	15.8	20	23.2	36	34.0	52	49.9	68	73.2	84
11.0	05	16.2	21	23.7	37	34.8	53	51.1	69	75.0	85
11.3	06	16.5	22	24.3	38	35.7	54	52.3	70	76.8	86
11.5	07	16.9	23	24.9	39	36.5	55	53.6	71	78.7	87
11.8	08	17.4	24	25.5	40	37.4	56	54.9	72	80.6	88
12.1	09	17.8	25	26.1	41	38.3	57	56.2	73	82.5	89
12.4	10	18.2	26	26.7	42	39.2	58	57.6	74	84.5	90
12.7	11	18.7	27	27.4	43	40.2	59	59.0	75	86.6	91
13.0	12	19.1	28	28.0	44	41.2	60	60.4	76	88.7	92
13.3	13	19.6	29	28.7	45	42.2	61	61.9	77	90.9	93
13.7	14	20.0	30	29.4	46	43.2	62	63.4	78	93.1	94
14.0	15	20.5	31	30.1	47	44.2	63	64.9	79	95.3	95
14.3	16	21.0	32	30.9	48	45.3	64	66.5	80	97.6	96

### **RoHS Compliance**

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status								
Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)		
RMEF	General Purpose Thick Film Surface Mount Chip Resistor 100% Lead Free	SMD	YES	100% Matte Sn over Ni	Always	Always		

### "Conflict Metals" Commitment

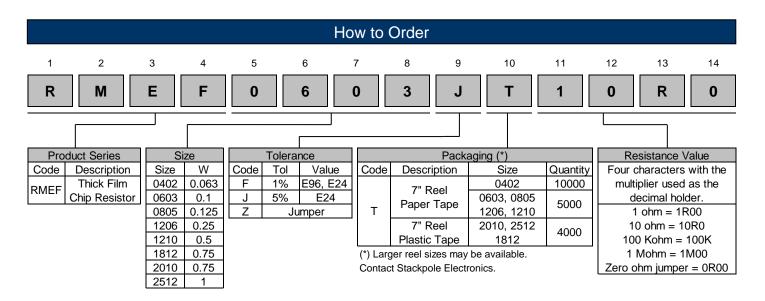
We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

### Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

### Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.



## **Mouser Electronics**

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## SEI Stackpole:

RMEF0402FT10R	0 RMEF0402FT10R	2 RMEF0402FT11K	8 RMEF0402FT11R	5 RMEF0402FT12R0
RMEF0402FT143K	RMEF0402FT158R	RMEF0402FT16K5	RMEF0402FT187K	RMEF0402FT187R
RMEF0402FT1K43	RMEF0402FT221R	RMEF0402FT301K	RMEF0402FT322R	RMEF0402FT32K4
RMEF0402FT40K2	RMEF0402FT442R	RMEF0402FT4K32	RMEF0402FT4K42	RMEF0402FT576R
RMEF0402FT63R4	RMEF0402FT698K	RMEF0402FT698R	RMEF0402FT71K5	RMEF0402FT78R7
RMEF0402FT7K15	RMEF0402FT845R	RMEF0402JT1M30	RMEF0402JT330R	RMEF0402JT3M90
RMEF0603FT11R3	RMEF0603FT15K4	RMEF0603FT182R	RMEF0603FT187K	RMEF0603FT1K40
RMEF0603FT1K43	RMEF0603FT200K	RMEF0603FT221K	RMEF0603FT240K	RMEF0603FT25K5
RMEF0603FT25R5	RMEF0603FT280R	RMEF0603FT300K	RMEF0603FT300R	RMEF0603FT32K4
RMEF0603FT357K	RMEF0603FT37R4	RMEF0603FT3K30	RMEF0603FT442K	RMEF0603FT442R
RMEF0603FT47R0	RMEF0603FT52R3	RMEF0603FT576K	RMEF0603FT69K8	RMEF0603FT7K15
RMEF0603FT84K5	RMEF0603FT909R	RMEF0603FT90K9	RMEF0603JT1M50	RMEF0603JT2K00
RMEF0603JT36K0	RMEF0603JT430K	RMEF0603JT560R	RMEF0603JT750K	RMEF0805FT10R2
RMEF0805FT11R8	RMEF0805FT187K	RMEF0805FT200R	RMEF0805FT226K	RMEF0805FT23R2
RMEF0805FT240R	RMEF0805FT34R0	RMEF0805FT37R4	RMEF0805FT3K32	RMEF0805FT44K2
RMEF0805FT4K87	RMEF0805FT53R6	RMEF0805FT69R8	RMEF0805FT750K	RMEF0805FT7K50
RMEF0805FT806K	RMEF0805FT84K5	RMEF0805FT9K09	RMEF0805JT120K	RMEF0805JT120R
RMEF0805JT18K0	RMEF0805JT20K0	RMEF0805JT2K20	RMEF0805JT56R0	RMEF0805JT750K
RMEF1206FT133K	RMEF1206FT174K	RMEF1206FT205K	RMEF1206FT205R	RMEF1206FT226K
RMEF1206FT226R	RMEF1206FT243R	RMEF1206FT287K	RMEF1206FT287R	RMEF1206FT2K37