### Surface Mount Type

Series: HA Type: V

■ Features Endurance: 105°C 1000-2000h

5.4 mm height (≦ \( \phi \).3)

Vibration-proof product is available upon request.(\( \phi \)8\( \)

RoHS directive compliant(Parts No:EEE\*)

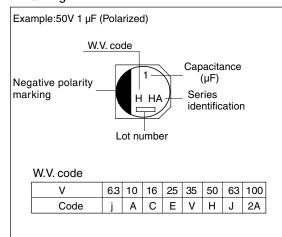


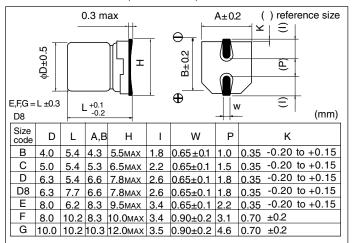
#### ■ Specifications

Category temp. range					-40	to +1	05°C				
Rated W.V. Range		6.3 to 100 V .DC									
Nominal Cap. Range					0.1	to 150	)0 μ F				
Capacitance Tolerance					±20,	±30 %	(120H	z/+20°	°C)		
DC Leakage Current	I ≦ 0.01 CV	or 3(μ	A) af	ter 2 m	ninutes	(Wh	icheve	r is gre	eater)		
tan δ	Please see t	he att	ached	stand	ard pro	ducts	list				
Characteristics	W.V. (V)	6.3	10	16	25	35	50	63	100		
at Low Temperature	-25 / +20 °C	4	3	2	2	2	2	3	3	(Impedance ratio at 120 Hz)	
at Low Temperature	-40 / +20 °C	8	6	4	4	3	3	4	4		
	After applying rated working voltage for 1000 hours for B~D8 sizes, 2000 hours for E~G sizes										
	+105±2°C and then being stabilized at +20°C, capacitors shall meet the following limits.										
	Capacitance	chang	je ±	±30% of initial measured value E~G case sizes and B~D of 6.3V							
Endurance			±20% of initial measured value for other case sizes								
	tan δ			≤300% of initial measured value E~G case sizes and B~D of 6.3V ≤200% of initial measured value for other case sizes							
	DC leakage	curren		≤≥00% of initial measured value for other case sizes ≤initial specified value							
-	ļ				•			nltano	annli	ed and then being stabilized	
Shelf Life	at +20°C, ca	pacito	rs sha	II mee	t the lir	nits sp	ecified	in End	duranc	e (With voltage treatment)	
		-								perature profile.) and then	
	being stabiliz	zed at	+20°C	capa	citor sl	nall me	et the	followi	ng lim	its.	
Resistance to	Capacitance						ured va			7	
Soldering Heat	$tan \delta$	Chan			specif			liue		1	
	DC leakage	CURREN			specifi					+	
	DO ICARAGE	curren	= ا	aı	opooiii	ou vaic					

#### ■ Marking

#### ■ Dimensions in mm (not to scale)





#### ■ Case size

Cap. (µF) W.V.(V)	6.3 (0J)	10 (1A)	16 (1C)	25 (1E)	35 (1V)	50 (1H)	63(1J)	100(2A)
0.1 to 2.2						В		
3.3						В		E
4.7				В	В	С		F(E)
10			В	C(B)	C(B)	D	E	F
22	В	(B)	C(B)	D(C)	D(C)	E	F(E)	G(F)
33	(B)	C(B)	(C)	D(C)	E(D)	(E)F,D8	G	G
47	C(B)	(C)	D(C)	E(D)	F(E)	G(F),D8	G(F)	(G)
100	D(C)	E(D)	(D)	F, D8(E)	G(F),D8	G(F)		
220	(D)	F,D8	G(F),D8	G(F)	Ġ(F)	Ğ		
330	F, D8		G(F)	G(F)	Ġ			
470	(F)	G(F)	G(F)	Ġ				
680			G					
1000	G(F)	G						
1500	Ġ							

### ■ Standard Products

		1 1000	Case siz	e	Specifi	cation	Part No.		Part No.		Min.	Endurance
W.V.	Cap. (±20%)	Dia.	Length	Size	Ripple current	tan δ	(RoHS: not compliant)		(RoHS: compliant)		Packagng Q'ty	
	(±20 /6)			Code	(120Hz) (+105°C)	(120Hz) (+20°C)	not compliant)	Reflow	complianty	Re	Taping	
(V)	(µF)	(mm)	(mm)		(m A)	( /		low		Reflow	(pcs)	(hours)
	22	4	5.4	В	29	0.30	EEVHA0J220R	(1)	EEEHA0J220R	(4)	2000	1000
	33	4	5.4	В	29	0.35	EEVHA0J330WR	(1)	EEEHA0J330WR	(4)	2000	1000*
	47	4	5.4	В	36	0.35	EEVHA0J470WR	(1)	EEEHA0J470WR	(4)	2000	1000*
		5	5.4	С	46	0.30	EEVHA0J470R	(1)	EEEHA0J470R	(4)	1000	1000
	100	5	5.4	С	47	0.35	EEVHA0J101WR	(1)	EEEHA0J101WR	(4)	1000	1000*
6.3		6.3	5.4	D	71	0.30	EEVHA0J101P	(1)	EEEHA0J101P	(4)	1000	1000 1000*
	220	6.3	5.4	D	74	0.35	EEVHA0J221WP	(1)	EEEHA0J221WP	(4)	1000	
	330	6.3	7.7	D8	105	0.30	EEVHA0J331XP	(1)	EEEHA0J331XP	(4)	900	1000 2000*
	470	8 8	10.2	F	230	0.35	EEVHA0J331P	(2)	EEEHA0J331P EEEHA0J471UP	(5) (5)	500 500	2000*
	1000	<u> </u>	10.2 10.2	F F	300	0.35 0.35	EEVHA0J471UP EEVHA0J102UP	(2)	EEEHA0J102UP	(5)	500	2000*
	1000	10	10.2	G	400	0.35	EEVHA0J1020P	(2)	EEEHA0J102P	(5)	500	2000*
	1500	10	10.2	G	480	0.35	EEVHA0J152P	(2)	EEEHA0J152P	(5)	500	2000*
	22	4	5.4	В	28	0.30	EEVHA1A220WR	(1)	EEEHA1A220WR	(4)	2000	1000
	33	4	5.4	В	29	0.30	EEVHA1A330WR	(1)	EEEHA1A330WR	(4)	2000	1000
		5	5.4	С	43	0.22	EEVHA1A330R	(1)	EEEHA1A330R	(4)	1000	1000
	47	5	5.4	С	43	0.30	EEVHA1A470WR	(1)	EEEHA1A470WR	(4)	1000	1000
10	100	6.3	5.4	D	71	0.30	EEVHA1A101WP	(1)	EEEHA1A101WP	(4)	1000	1000
		8	6.2	Е	110	0.26	EEVHA1A101P	(2)	EEEHA1A101P	(5)	1000	2000*
	220	6.3	7.7	D8	105	0.22	EEVHA1A221XP	(1)	EEEHA1A221XP	(4)	900	1000
		8	10.2	F	160	0.26	EEVHA1A221P	(2)	EEEHA1A221P	(5)	500	2000*
	470	8	10.2	F	200	0.26	EEVHA1A471UP	(2)	EEEHA1A471UP	(5)	500	2000*
		10	10.2	G	270	0.26	EEVHA1A471P	(2)	EEEHA1A471P	(5)	500	2000*
	1000	10	10.2	G	400	0.26	EEVHA1A102P	(2)	EEEHA1A102P	(5)	500	2000*
	10	4	5.4	В	28	0.16	EEVHA1C100R	(1)	EEEHA1C100R	(4)	2000	1000
	22	4	5.4	В	28	0.26	EEVHA1C220WR	(1)	EEEHA1C220WR	(4)	2000	1000
		5 -	5.4	С	39	0.16	EEVHA1C220R	(1)	EEEHA1C220R	(4)	1000	1000
	33	5	5.4	С	35	0.26	EEVHA1C330WR	(1)	EEEHA1C330WR	(4)	1000	1000
	47	5	5.4	С	39	0.26	EEVHA1C470WR	(1)	EEEHA1C470WR EEEHA1C470P	(4) (4)	1000	1000
1	100	6.3 6.3	5.4 5.4	D D	70	0.16 0.26	EEVHA1C470P EEVHA1C101WP	(1)	EEEHA1C101WP	(4)	1000	1000
16	220	6.3	7.7	D8	70 105	0.26	EEVHA1C221XP	(1)	EEEHA1C221XP	(4)	900	1000
	220	0.5 8	10.2	F	150	0.10	EEVHA1C221UP	(2)	EEEHA1C221UP	(5)	500	2000
		10	10.2	G	210	0.20	EEVHA1C221P	(2)	EEEHA1C221P	(5)	500	2000
	330	8	10.2	F	170	0.20	EEVHA1C331UP	(2)	EEEHA1C331UP	(5)	500	2000
		10	10.2	G	230	0.20	EEVHA1C331P	(2)	EEEHA1C331P	(5)	500	2000
	470	8	10.2	F	340	0.20	EEVHA1C471UP	(2)	EEEHA1C471UP	(5)	500	2000
		10	10.2	G	340	0.20	EEVHA1C471P	(2)	EEEHA1C471P	(5)	500	2000
	680	10	10.2	G	380	0.20	EEVHA1C681P	(2)	EEEHA1C681P	(5)	500	2000
	4.7	4	5.4	В	22	0.14	EEVHA1E4R7R	(1)	EEEHA1E4R7R	(4)	2000	1000
25	10	4	5.4	В	22	0.20	EEVHA1E100WR	(1)	EEEHA1E100WR	(4)	2000	1000
		5	5.4	С	28	0.14	EEVHA1E100R	(1)	EEEHA1E100R	(4)	1000	1000
	22	5	5.4	С	35	0.20	EEVHA1E220WR	(1)	EEEHA1E220WR	(4)	1000	1000

An explanation of the taping dimensions can be found on page 84.

Reflow profiles can be found on page 86.

<sup>\*</sup> Endurance capacitance change ±30%, tan δ 300% of initial measured value.

	Standard	Products
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	illualu	Produc	Case size	<u> </u>	Specif	ication	Part No.		Part No.		Min.	Endurance
W.V.	Cap.			Size	Ripple	tan δ	(RoHS:		(RoHS:		Packagng	Linduranioc
	(±20%)	Dia.	Length	Code	current (120Hz)	(120Hz)	not compliant)	R	compliant)	я	Q'ty	
(V)	(μF)	(mm)	(mm)		(+105°Ć) (m A)	(+20°C)		Reflow		Reflow	Taping (pcs)	(hours)
	22	6.3	5.4	D	55	0.14	EEVHA1E220P	(1)	EEEHA1E220P	(4)	1000	1000
	33	5	5.4	С	45	0.20	EEVHA1E330WR	(1)	EEEHA1E330WR	(4)	1000	1000
	33	6.3	5.4	D	65	0.14	EEVHA1E330P	(1)	EEEHA1E330P	(4)	1000	1000
	47	6.3	5.4	D	70	0.20	EEVHA1E470WP	(1)	EEEHA1E470WP	(4)	1000	1000
		8	6.2	Е	91	0.16	EEVHA1E470P	(2)	EEEHA1E470P	(5)	1000	2000*
25		6.3	7.7	D8	91	0.14	EEVHA1E101XP	(1)	EEEHA1E101XP	(4)	900	1000
	100	8	6.2	E	91	0.16	EEVHA1E101UP	(2)	EEEHA1E101UP	(5)	1000	2000*
		8	10.2	F	130	0.16	EEVHA1E101P	(2)	EEEHA1E101P	(5)	500	2000*
	220	8	10.2	F	160	0.16	EEVHA1E221UP	(2)	EEEHA1E221UP	(5)	500	2000*
	220	10	10.2	G	190	0.16	EEVHA1E221P	(2)	EEEHA1E221P	(5)	500	2000*
		8	10.2	F	180	0.16	EEVHA1E331UP	(2)	EEEHA1E331UP	(5)	500	2000*
	330	10	10.2	G	340	0.16	EEVHA1E331P	(2)	EEEHA1E331P	(5)	500	2000*
	470	10	10.2	G	360	0.16	EEVHA1E471P	(2)	EEEHA1E471P	(5)	500	2000*
	4.7	4	5.4	В	22	0.12	EEVHA1V4R7R	(1)	EEEHA1V4R7R	(4)	2000	1000
	10	4	5.4	В	22	0.16	EEVHA1V100WR	(1)	EEEHA1V100WR	(4)	2000	1000
	10	5	5.4	С	30	0.12	EEVHA1V100R	(1)	EEEHA1V100R	(4)	1000	1000
	00	5	5.4	С	35	0.16	EEVHA1V220WR	(1)	EEEHA1V220WR	(4)	1000	1000
	22	6.3	5.4	D	60	0.12	EEVHA1V220P	(1)	EEEHA1V220P	(4)	1000	1000
[	00	6.3	5.4	D	42	0.16	EEVHA1V330WP	(1)	EEEHA1V330WP	(4)	1000	1000
35	33	8	6.2	Е	84	0.14	EEVHA1V330P	(2)	EEEHA1V330P	(5)	1000	2000*
	47	8	6.2	Е	84	0.14	EEVHA1V470UP	(2)	EEEHA1V470UP	(5)	1000	2000*
	47	8	10.2	F	98	0.14	EEVHA1V470P	(2)	EEEHA1V470P	(5)	500	2000*
		6.3	7.7	D8	84	0.12	EEVHA1V101XP	(1)	EEEHA1V101XP	(4)	900	1000
	100	8	10.2	F	120	0.14	EEVHA1V101UP	(2)	EEEHA1V101UP	(5)	500	2000*
		10	10.2	G	160	0.14	EEVHA1V101P	(2)	EEEHA1V101P	(5)	500	2000*
	000	8	10.2	F	170	0.14	EEVHA1V221UP	(2)	EEEHA1V221UP	(5)	500	2000 <b>*</b>
	220	10	10.2	G	210	0.14	EEVHA1V221P	(2)	EEEHA1V221P	(5)	500	2000*
	330	10	10.2	G	250	0.14	EEVHA1V331P	(2)	EEEHA1V331P	(5)	500	2000*
	0.1	4	5.4	В	1	0.12	EEVHA1HR10R	(1)	EEEHA1HR10R	(4)	2000	1000
	0.22	4	5.4	В	2	0.12	EEVHA1HR22R	(1)	EEEHA1HR22R	(4)	2000	1000
	0.33	4	5.4	В	3	0.12	EEVHA1HR33R	(1)	EEEHA1HR33R	(4)	2000	1000
	0.47	4	5.4	В	5	0.12	EEVHA1HR47R	(1)	EEEHA1HR47R	(4)	2000	1000
	1	4	5.4	В	10	0.12	EEVHA1H1R0R	(1)	EEEHA1H1R0R	(4)	2000	1000
	2.2	4	5.4	В	16	0.12	EEVHA1H2R2R	(1)	EEEHA1H2R2R	(4)	2000	1000
[	3.3	4	5.4	В	16	0.12	EEVHA1H3R3R	(1)	EEEHA1H3R3R	(4)	2000	1000
50	4.7	5	5.4	С	23	0.12	EEVHA1H4R7R	(1)	EEEHA1H4R7R	(4)	1000	1000
	10	6.3	5.4	D	35	0.12	EEVHA1H100P	(1)	EEEHA1H100P	(4)	1000	1000
	22	8	6.2	E	70	0.12	EEVHA1H220P	(2)	EEEHA1H220P	(5)	1000	2000*
	7	6.3	7.7	D8	70	0.12	EEVHA1H330XP	(1)	EEEHA1H330XP	(4)	900	1000
	33	8	6.2	E	70	0.12	EEVHA1H330UP	(2)	EEEHA1H330UP	(5)	1000	2000*
		8	10.2	F	91	0.12	EEVHA1H330P	(2)	EEEHA1H330P	(5)	500	2000*
		6.3	7.7	D8	63	0.12	EEVHA1H470XP	(1)	EEEHA1H470XP	(4)	900	1000
	47	8	10.2	F	95	0.12	EEVHA1H470UP	(2)	EEEHA1H470UP	(5)	500	2000*
		10	10.2	G	100	0.12	EEVHA1H470P	(2)	EEEHA1H470P	(5)	500	2000*

An explanation of the taping dimensions can be found on page 84.

Reflow profiles can be found on page 86.

<sup>\*</sup> Endurance capacitance change  $\pm 30\%$ ,  $\tan \delta$  300% of initial measured value.

<ul><li>Standard</li></ul>	Products
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W.V. Car		1 1000	Case size	Э	Specific	ation	Part No.		Part No.		Min.	Endurance
W.V.	Cap. (±20%)	Dia.	Length	Size Code	Ripple current (120Hz)	tan δ (120Hz)	(RoHS: not compliant)		(RoHS: compliant)	П	Packaging Q'ty	
(V)	(µF)	(mm)	(mm)		(+105°C) (m A)	(+20°C)		Reflow		Reflow	Taping (pcs)	(hours)
50	100	8	10.2	F	110	0.12	EEVHA1H101UP	(2)	EEEHA1H101UP	(5)	500	2000*
30		10	10.2	G	120	0.12	EEVHA1H101P	(2)	EEEHA1H101P	(5)	500	2000*
	220	10	10.2	G	150	0.12	EEVHA1H221P	(2)	EEEHA1H221P	(5)	500	2000*
	10	8	6.2	Е	25	0.18	EEVHA1J100P	(2)	EEEHA1J100P	(5)	1000	2000*
	22	8	6.2	Е	25	0.18	EEVHA1J220UP	(2)	EEEHA1J220UP	(5)	500	2000*
63		8	10.2	F	30	0.18	EEVHA1J220P	(2)	EEEHA1J220P	(5)	500	2000*
00	33	10	10.2	G	45	0.18	EEVHA1J330P	(2)	EEEHA1J330P	(5)	500	2000*
	47	8	10.2	F	45	0.18	EEVHA1J470UP	(2)	EEEHA1J470UP	(5)	500	2000*
		10	10.2	G	50	0.18	EEVHA1J470P	(2)	EEEHA1J470P	(5)	500	2000*
	3.3	8	6.2	E	30	0.18	EEVHA2A3R3P	(2)	EEEHA2A3R3P	(5)	1000	2000*
	4.7	8	6.2	Е	30	0.18	EEVHA2A4R7UP	(2)	EEEHA2A4R7UP	(5)	1000	2000*
		8	10.2	F	50	0.18	EEVHA2A4R7P	(2)	EEEHA2A4R7P	(5)	500	2000*
100	10	8	10.2	F	55	0.18	EEVHA2A100P	(2)	EEEHA2A100P	(5)	500	2000*
100	22	8	10.2	F	55	0.18	EEVHA2A220UP	(2)	EEEHA2A220UP	(5)	500	2000*
		10	10.2	G	60	0.18	EEVHA2A220P	(2)	EEEHA2A220P	(5)	500	2000*
	33	10	10.2	G	65	0.18	EEVHA2A330P	(2)	EEEHA2A330P	(5)	500	2000*
	47	10	10.2	G	65	0.18	EEVHA2A470UP	(2)	EEEHA2A470UP	(5)	500	2000*

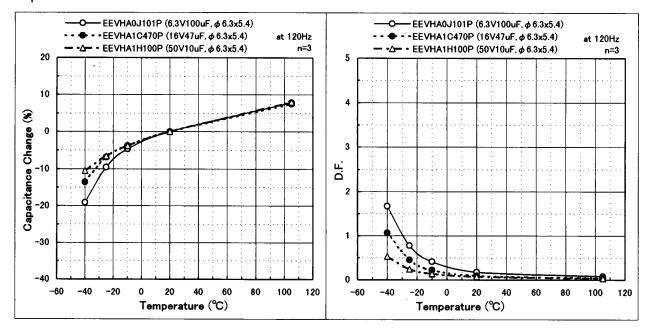
An explanation of the taping dimensions can be found on page 84. Reflow profiles can be found on page 86.

#### ■ Frequency Correction Factor of Rated Ripple Current

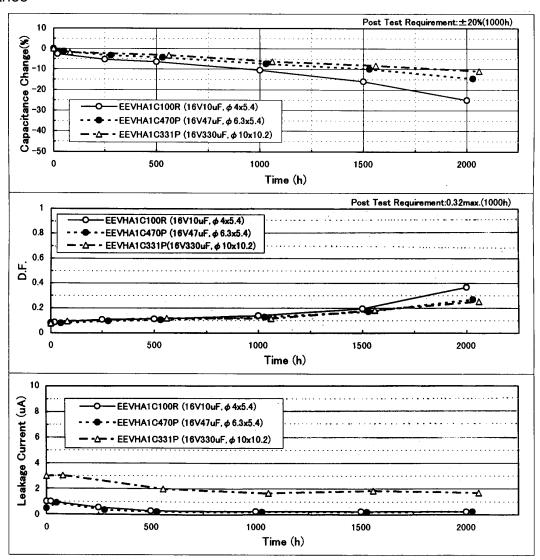
		Frequency (Hz)							
	50,60 120 1k 10l								
coefficient	0.70	1.0	1.3	1.7					

<sup>\*</sup> Endurance capacitance change ±30%, tan δ 300% of initial measured value.

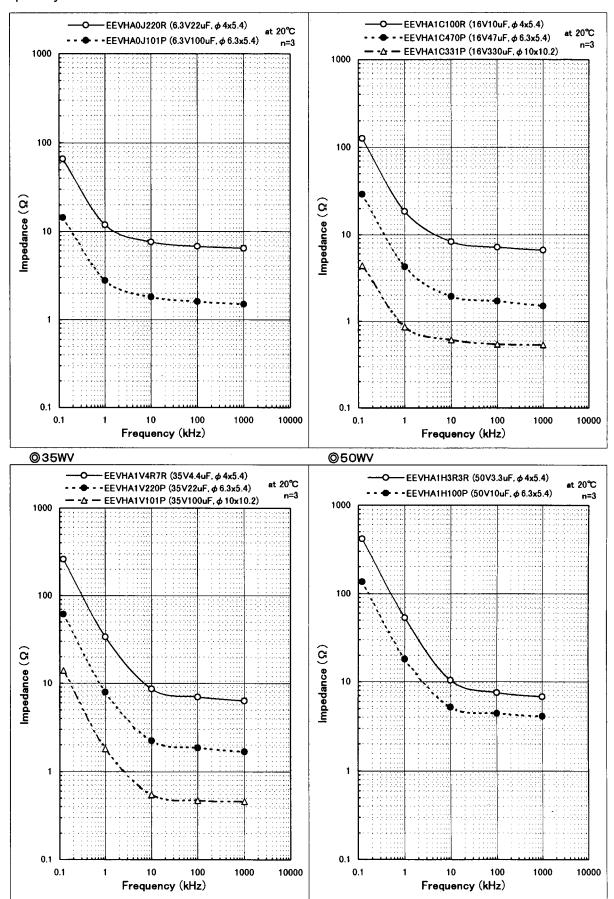
### ■ Temperature Characteristics



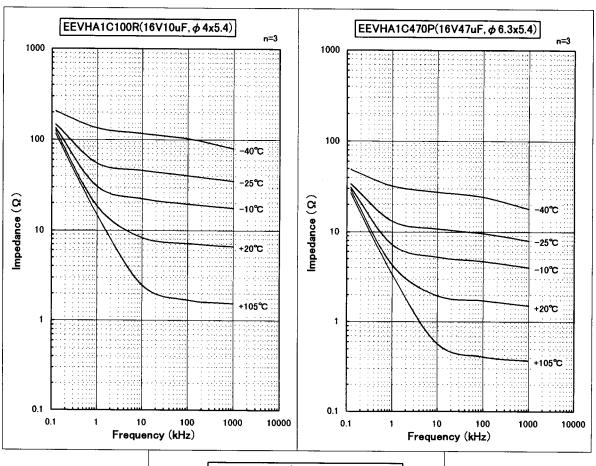
#### ■ Endurance

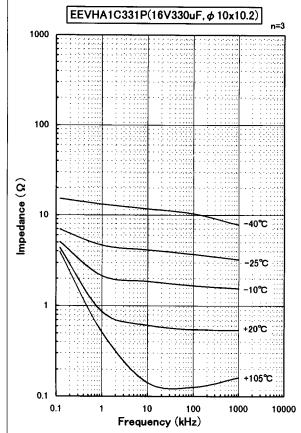


### ■ Frequency Characteristics



### ■ Temperature Characteristics





Pre-fix	Suffix	Case Diameter	RoHS	Terminal		Reflow C	Condition	Reflow Chart
TIE-IIX Sull		Case Diameter	Compliant	Finish	Pea	ak Temperature	Time above 200	Reliow Chart
	R	3mm to 5mm	No	Sn-Pb	240	for 5 seconds	20 seconds	(1) Fig.1
ECE-V	Р	6mm	No	Sn-Pb	240	for 5 seconds	20 seconds	(1) Fig.1
	Р	8mm to 10mm	No	Sn-Pb	230	for 5 seconds	20 seconds	(2) Fig.2
	R	4mm to 5mm	No	Sn-Pb	240	for 5 seconds	20 seconds	(1) Fig.1
	Р	6mm	No	Sn-Pb	240	for 5 seconds	20 seconds	(1) Fig.1
	Р	8mm to 10mm	No	Sn-Pb	230	for 5 seconds	20 seconds	(2) Fig.2
EEV-	0	Q 12.5mm	Yes	Sn	230	for 5 seconds	20 seconds	(2) Fig.2 (Except for EB series)
	Q	12.511111	162		230		20 Seconds	(3) Fig.3 (EB series only)
	М	16mm to 18mm	Yes		230	for 5 seconds	20 seconds	(2) Fig.2 (Except for EB series)
	IVI	TOTHIN TO TOTHIN	res	Sn	230	ior 5 seconds	20 seconds	(3) Fig.3 (EB series only)
	R	3mm to 5mm	Yes	Sn-Bi	250	for 5 seconds	60 seconds	(4) Fig.4
EEE-	Р	6mm	Yes	Sn-Bi	250	for 5 seconds	60 seconds	(4) Fig.4
	Р	8mm to 10mm	Yes	Sn-Bi	235	for 5 seconds	60 seconds	(5) Fig.5

