

FrelTec GmbH

Mathildenstr. 10A
82319 Starnberg
Germany

Wire Wound SMD Power Inductor SMD

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SMD

Wire Wound SMD Power Inductor

SPECIFICATION

Part Number

195	3010*		S*	151*	M*	E02
Type	Size		Feature Type	Value	Tolerance	Packing
195 : Wire Wound SMD Power Inductor	2520	2,5×2,0×1,0	S: Standard Type	The value is given in μH "N" indicates the decimal point for nH and "U" indicates the decimal point for μH . When higher than 100 μH the last digit is the multiplier which denotes the number of zero following	M : $\pm 20\%$	L05: Embossed tape and reel for 5k pcs (13"reel) size 4010
	2522	2,5×2,0×1,2				
	3010	3,0×3,0×1,0				L03 : Embossed tape and reel for 3k pcs (13"reel) size 4018, 4020
	3012	3,0×3,0×1,2				
	3015	3,0×3,0×1,5				
	4010	4,0×4,0×1,0				
	4012	4,0×4,0×1,2				
	4018	4,0×4,0×1,8				
	4020	4,0×4,0×2,0				
	4030	4,0×4,0×3,0				
	5012	5,0×5,0×1,2				L0Y : Embossed tape and reel for 2,5k pcs (13"reel) size 5020, 6020
	5020	5,0×5,0×2,0				
	5040	5,0×5,0×4,0			N: $\pm 30\%$	
	6020	6,0×6,0×2,0				
	6028	6,0×6,0×2,8				
	6045	6,0×6,0×4,5				L02: Embossed tape and reel for 2k pcs (13"reel) size 4030, 6028
	8040	8,0×8,0×4,0		Example:		
	8065	8,0×8,0×6,5				L0X : Embossed tape and reel for 1,5k pcs (13"reel) size 5040, 6045
				10N : 10 nH		
				3U3 : 3300 nH		L01: Embossed tape and reel for 1k pcs (13"reel) size 8040, 8050
				U68 : 680 nH		L0S: Embossed tape and reel for 700 pcs (13"reel) size 8065
				151 : 150 μH	* not all combination is possible	E02 : Embossed tape and reel for 2k pcs (7"reel) size 2520, 2522, 3010, 3012, 3015

All products according to RoHS (2011/65/EU)

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Dimensions:

Fig. 1

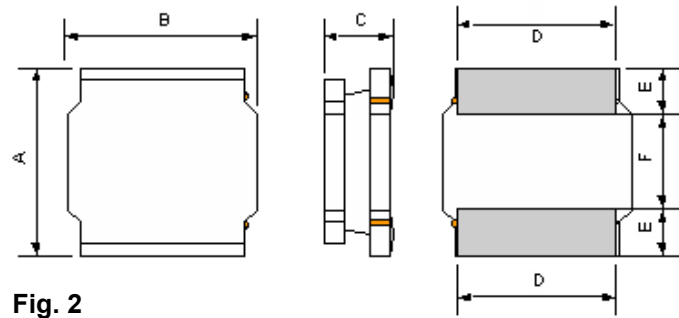
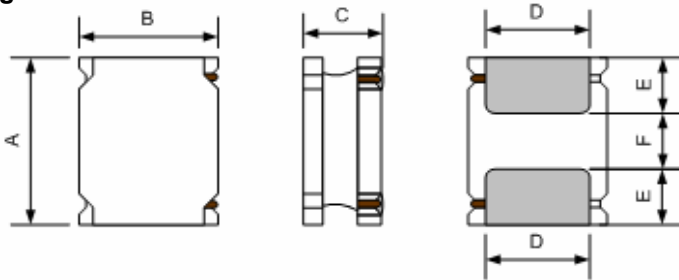


Fig. 3

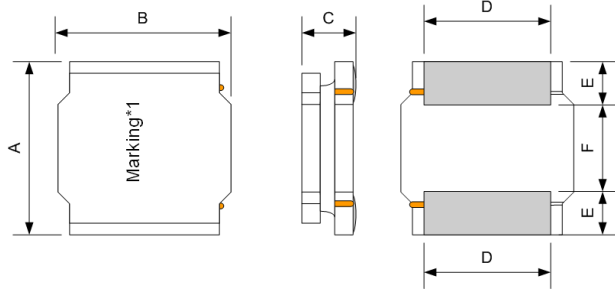
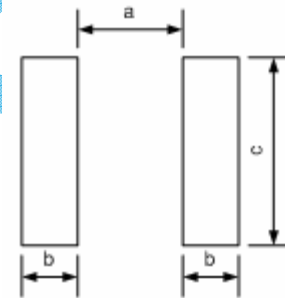
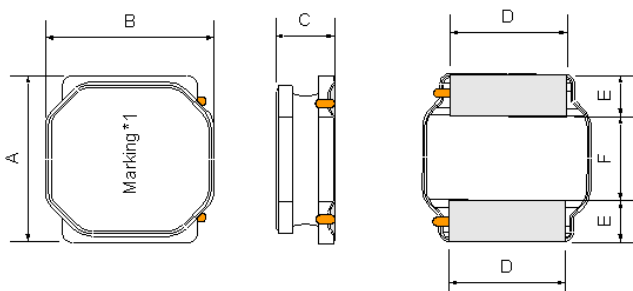


Fig. 2

Fig. 4



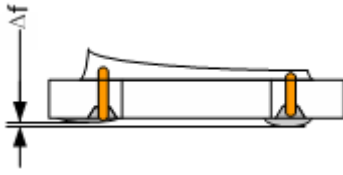
Series	Shape	A	B	C	D	E	F	a Typ.	b Typ.	c Typ.
2520S	Fig.1	2,5±0,1	2,0±0,1	1,0Max,	1,5±0,2	0,80±0,2	0,80±0,2	0,80	0,85	2,0
2522S	Fig.1	2,5±0,1	2,0±0,1	1,2Max,	1,5±0,2	0,80±0,2	0,80±0,2	0,80	0,85	2,0
3010S	Fig.2	3,0±0,2	3,0±0,2	1,0Max,	2,5±0,2	0,75±0,2	1,5±0,2	1,5	0,8	2,7
3012S	Fig.2	3,0±0,2	3,0±0,2	1,2Max,	2,5±0,2	0,75±0,2	1,5±0,2	1,5	0,8	2,7
3015S	Fig.2	3,0±0,2	3,0±0,2	1,5Max,	2,5±0,2	0,75±0,2	1,5±0,2	1,5	0,8	2,7
4010S	Fig.3	4,0±0,2	4,0±0,2	1,0Max,	3,3±0,2	0,95±0,2	2,1±0,2	1,9	1,1	3,7
4012S	Fig.3	4,0±0,2	4,0±0,2	1,2Max,	3,3±0,2	0,95±0,2	2,1±0,2	1,9	1,1	3,7
4018S	Fig.3	4,0±0,2	4,0±0,2	1,8Max,	3,3±0,2	0,95±0,2	2,1±0,2	1,9	1,1	3,7
4020S	Fig.3	4,0±0,2	4,0±0,2	2,0Max,	3,3±0,2	0,95±0,2	2,1±0,2	1,9	1,1	3,7
4030S	Fig.3	4,0±0,2	4,0±0,2	3,0Max,	3,3±0,2	0,95±0,2	2,1±0,2	1,9	1,1	3,7
5012S	Fig.4	5,0±0,2	5,0±0,2	1,2Max,	4,0±0,2	1,25±0,2	2,5±0,2	2,3	1,4	4,2
5020S	Fig.4	5,0±0,2	5,0±0,2	2,0Max,	4,0±0,2	1,25±0,2	2,5±0,2	2,3	1,4	4,2
5040S	Fig.4	5,0±0,2	5,0±0,2	4,0Max,	4,0±0,2	1,25±0,2	2,5±0,2	2,3	1,4	4,2
6020S	Fig.3	6,0±0,3	6,0±0,3	2,0Max,	4,9±0,3	1,55±0,3	2,9±0,3	2,8	1,7	5,7
6028S	Fig.3	6,0±0,3	6,0±0,3	2,8Max,	4,9±0,3	1,55±0,3	2,9±0,3	2,8	1,7	5,7
6045S	Fig.3	6,0±0,3	6,0±0,3	4,5Max,	4,9±0,3	1,55±0,3	2,9±0,3	2,8	1,7	5,7
8040S	Fig.3	8,0±0,3	8,0±0,3	4,2Max,	6,3±0,3	2,00±0,3	4,0±0,3	3,8	2,2	7,5
8065S	Fig.4	8,0±0,3	8,0±0,3	6,5Max,	6,3±0,3	2,00±0,3	4,0±0,3	3,8	2,2	7,5

All products are printed with Marking except the 2520S, 2522S, 3010S, 3012S and 3015S series

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Δf : Clearance between terminal and the surface of plate must be 0,1mm and 0,2mm for 5020+5040+6020+6028+6045+6045+8040+8065 max when coil is placed on a flat plate.

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Electrical Characteristics

Part Number	Inductance	Min. Self-resonant frequency	DC Resistance		Saturation Current		Heat Rating Current		Marking
	0,1MHz/1V		Max.	Typ.	Max.	Typ.	Max.	Typ.	
Units	µH	MHz	Ω	Ω	A	A	A	A	
1952520SU47NE02	0,47±30%	206	0,056	0,047	2,50	3,35	2,35	2,56	N/A
1952520SU56NE02	0,56±30%	160	0,072	0,06	2,90	3,20	2,00	2,18	N/A
1952520SU68NE02	0,68±30%	129	0,074	0,062	2,20	2,75	2,00	2,18	N/A
1952520S1U0NE02	1,0±30%	100	0,108	0,09	1,85	2,20	1,65	1,80	N/A
1952520S1U5NE02	1,5±30%	81	0,182	0,152	1,80	2,10	1,30	1,42	N/A
1952520S2U2NE02	2,2±30%	61	0,209	0,174	1,20	1,60	1,20	1,31	N/A
1952520S3U3ME02	3,3±20%	47	0,328	0,273	1,05	1,30	0,90	0,98	N/A
1952520S4U7ME02	4,7±20%	42	0,563	0,469	0,95	1,15	0,70	0,76	N/A
1952520S5U6ME02	5,6±20%	35	0,563	0,469	0,80	0,95	0,73	0,80	N/A
1952520S6U8ME02	6,8±20%	31	0,896	0,747	0,78	0,92	0,59	0,64	N/A
1952520S100ME02	10±20%	27	1,092	0,910	0,65	0,78	0,50	0,55	N/A
1952522SU47NE02	0,47±30%	160	0,061	0,047	3,82	4,27	2,15	2,34	N/A
1952522SU68NE02	0,68±30%	140	0,074	0,057	3,28	3,68	1,95	2,13	N/A
1952522S1U0NE02	1,0±30%	110	0,090	0,069	2,59	2,90	1,93	2,10	N/A
1952522S1U2NE02	1,2±30%	100	0,129	0,099	2,38	2,67	1,46	1,59	N/A
1952522S1U5ME02	1,5±20%	97	0,147	0,113	2,24	2,51	1,40	1,53	N/A
1952522S2U2ME02	2,2±20%	69	0,216	0,166	1,85	2,07	1,15	1,25	N/A
1952522S2U7ME02	2,7±20%	63	0,239	0,184	1,72	1,92	1,09	1,19	N/A
1952522S3U3ME02	3,3±20%	62	0,264	0,203	1,61	1,80	1,04	1,13	N/A
1952522S3U6ME02	3,6±20%	53	0,348	0,268	1,46	1,64	0,90	0,98	N/A
1952522S4U3ME02	4,3±20%	51	0,377	0,290	1,37	1,53	0,87	0,95	N/A
1952522S4U7ME02	4,7±20%	47	0,377	0,290	1,12	1,25	0,84	0,92	N/A
1952522S5U1ME02	5,1±20%	44	0,500	0,385	1,23	1,37	0,75	0,82	N/A
1952522S5U6ME02	5,6±20%	38	0,538	0,414	1,11	1,25	0,73	0,80	N/A
1952522S6U2ME02	6,2±20%	38	0,542	0,417	1,03	1,16	0,73	0,80	N/A
1952522S6U8ME02	6,8±20%	38	0,581	0,447	0,98	1,09	0,69	0,75	N/A
1952522S7U5ME02	7,5±20%	35	0,611	0,470	0,97	1,09	0,68	0,74	N/A
1952522S8U2ME02	8,2±20%	36	0,658	0,506	0,98	1,10	0,65	0,71	N/A
1952522S9U1ME02	9,1±20%	34	0,690	0,531	0,91	1,02	0,62	0,68	N/A
1952522S100ME02	10±20%	34	0,690	0,531	0,79	0,88	0,62	0,68	N/A
1952522S120ME02	12±20%	28	1,075	0,827	0,78	0,88	0,51	0,56	N/A
1952522S150ME02	15±20%	25	1,591	1,224	0,68	0,77	0,42	0,46	N/A
1952522S220ME02	22±20%	20	1,976	1,520	0,53	0,59	0,38	0,41	N/A
1953010S1U0NE02	1,0±30%	180	0,085	0,065	1,40	2,10	1,45	1,80	N/A
1953010S1U2NE02	1,2±30%	137	0,085	0,065	1,25	1,70	1,45	1,80	N/A
1953010S1U5NE02	1,5±30%	120	0,104	0,080	1,27	1,70	1,30	1,60	N/A
1953010S2U2NE02	2,2±30%	100	0,143	0,110	1,15	1,50	1,09	1,40	N/A
1953010S2U7NE02	2,7±30%	90	0,169	0,130	1,00	1,20	1,02	1,40	N/A
1953010S3U3NE02	3,3±30%	74	0,189	0,145	0,97	1,20	0,96	1,20	N/A

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1953010S3U6ME02	3,6±20%	67	0,215	0,165	0,95	1,20	0,90	1,10	N/A
1953010S4U7ME02	4,7±20%	59	0,293	0,225	0,75	1,05	0,77	1,10	N/A
1953010S5U6ME02	5,6±20%	40	0,322	0,248	0,58	0,65	0,70	1,05	N/A
1953010S6U8ME02	6,8±20%	42	0,397	0,305	0,55	0,72	0,66	0,96	N/A
1953010S8U2ME02	8,2±20%	23	0,520	0,400	0,55	0,7	0,58	0,7	N/A
1953010S100ME02	10±20%	39	0,52	0,400	0,55	0,75	0,58	0,70	N/A
1953010S120ME02	12±20%	36	0,657	0,505	0,43	0,65	0,52	0,67	N/A
1953010S150ME02	15±20%	30	0,793	0,610	0,42	0,57	0,47	0,57	N/A
1953010S220ME02	22±20%	28	1,209	0,930	0,35	0,48	0,38	0,52	N/A
1953010S270ME02	27±20%	25	1,404	1,080	0,30	0,45	0,35	0,50	N/A
1953010S330ME02	33±20%	18	2,015	1,550	0,29	0,42	0,30	0,55	N/A
1953010S390ME02	39±20%	18	2,275	1,750	0,28	0,38	0,28	0,53	N/A
1953010S430ME02	43±20%	18	2,340	1,800	0,23	0,36	0,27	0,52	N/A
1953010S470ME02	47±20%	18	2,535	1,950	0,22	0,35	0,26	0,52	N/A
1953010S510ME02	51±20%	18	2,86	2,200	0,21	0,33	0,25	0,48	N/A
1953010S560ME02	56±20%	16	3,016	2,320	0,21	0,28	0,24	0,35	N/A
1953012SU22NE02	0,22±30%	321	0,022	0,017	5,30	6,00	3,00	3,30	N/A
1953012SU82NE02	0,82±30%	180	0,039	0,030	2,05	2,80	2,47	3,00	N/A
1953012S1U0NE02	1,0±30%	120	0,052	0,040	1,87	2,80	2,20	2,70	N/A
1953012S1U2NE02	1,2±30%	120	0,059	0,045	2,22	2,50	2,01	2,20	N/A
1953012S1U5NE02	1,5±30%	110	0,059	0,045	1,62	1,90	2,01	2,20	N/A
1953012S1U8NE02	1,8±30%	90	0,082	0,063	1,30	1,90	1,65	1,80	N/A
1953012S2U2NE02	2,2±30%	84	0,098	0,075	1,20	1,90	1,55	1,70	N/A
1953012S2U4NE02	2,4±30%	100	0,088	0,068	1,15	1,50	1,60	1,70	N/A
1953012S2U7ME02	2,7±20%	65	0,110	0,085	1,14	1,50	1,48	1,50	N/A
1953012S3U3ME02	3,3±20%	64	0,130	0,100	1,05	1,50	1,36	1,40	N/A
1953012S3U6ME02	3,6±20%	36	0,130	0,100	1,05	1,50	1,36	1,40	N/A
1953012S3U9ME02	3,9±20%	61	0,189	0,145	1,00	1,30	1,24	1,30	N/A
1953012S4U7ME02	4,7±20%	61	0,156	0,120	0,90	1,00	1,24	1,30	N/A
1953012S6U8ME02	6,8±20%	61	0,247	0,190	0,75	0,90	0,98	1,10	N/A
1953012S100ME02	10±20%	42	0,345	0,265	0,60	0,88	0,83	0,90	N/A
1953012S120ME02	12±20%	32	0,449	0,345	0,48	0,67	0,73	0,84	N/A
1953012S150ME02	15±20%	27	0,468	0,360	0,45	0,62	0,71	0,77	N/A
1953012S180ME02	18±20%	25	0,709	0,545	0,43	0,59	0,58	0,65	N/A
1953012S220ME02	22±20%	23	0,839	0,645	0,42	0,52	0,53	0,59	N/A
1953012S270ME02	27±20%	21	1,131	0,870	0,35	0,48	0,47	0,51	N/A
1953012S330ME02	33±20%	18	1,138	0,875	0,36	0,46	0,46	0,50	N/A
1953012S360ME02	36±20%	18	1,235	0,950	0,34	0,44	0,44	0,48	N/A
1953012S390ME02	39±20%	18	1,729	1,330	0,30	0,39	0,37	0,41	N/A
1953012S470ME02	47±20%	14	1,885	1,450	0,27	0,35	0,35	0,40	N/A
1953012S560ME02	56±20%	9	1,79 4	1,380	0,26	0,33	0,28	0,40	N/A
1953012S680ME02	68±20%	7	2,171	1,670	0,24	0,29	0,33	0,37	N/A
1953012S820ME02	82±20%	7	3,302	2,540	0,17	0,27	0,27	0,31	N/A

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1953012S101ME02	100±20%	5	3,718	2,860	0,21	0,23	0,25	0,29	N/A
1953015SU50NE02	0,50±30%	162	0,039	0,030	3,90	4,20	2,60	2,80	N/A
1953015S1U0NE02	1,0±30%	150	0,039	0,030	2,32	2,80	2,35	2,50	N/A
1953015S1U2NE02	1,2±30%	110	0,052	0,040	2,21	3,10	1,95	2,30	N/A
1953015S1U5NE02	1,5±30%	100	0,065	0,050	2,30	2,70	1,70	2,20	N/A
1953015S1U8NE02	1,8±30%	92	0,065	0,050	1,75	2,20	1,70	2,20	N/A
1953015S2U2NE02	2,2±30%	86	0,078	0,060	1,60	2,00	1,60	2,00	N/A
1953015S2U7NE02	2,7±30%	64	0,098	0,075	1,52	1,90	1,43	1,90	N/A
1953015S3U3ME02	3,3±20%	68	0,104	0,080	1,32	1,81	1,36	1,60	N/A
1953015S3U6ME02	3,6±20%	59	0,137	0,105	1,28	1,60	1,20	1,50	N/A
1953015S3U9ME02	3,9±20%	47	0,137	0,105	1,20	1,40	1,20	1,50	N/A
1953015S4U3ME02	4,3±20%	53	0,150	0,115	1,20	1,40	1,14	1,30	N/A
1953015S4U7ME02	4,7±20%	46	0,163	0,125	1,10	1,40	1,09	1,30	N/A
1953015S5U1ME02	5,1±20%	49	0,173	0,133	1,00	1,20	1,05	1,20	N/A
1953015S6U2ME02	6,2±20%	46	0,254	0,195	1,00	1,20	0,86	1,00	N/A
1953015S6U8ME02	6,8±20%	39	0,260	0,200	0,85	1,10	0,85	1,10	N/A
1953015S100ME02	10±20%	41	0,325	0,250	0,72	0,92	0,77	0,90	N/A
1953015S120ME02	12±20%	32	0,416	0,320	0,70	0,90	0,68	0,89	N/A
1953015S150ME02	15±20%	30	0,455	0,350	0,66	0,88	0,65	0,72	N/A
1953015S180ME02	18±20%	23	0,559	0,430	0,56	0,72	0,59	0,72	N/A
1953015S220ME02	22±20%	23	0,598	0,460	0,52	0,68	0,57	0,69	N/A
1953015S270ME02	27±20%	22	0,949	0,730	0,48	0,56	0,45	0,56	N/A
1953015S330ME02	33±20%	20	1,066	0,820	0,44	0,53	0,43	0,51	N/A
1953015S390ME02	39±20%	14	1,294	0,995	0,41	0,55	0,39	0,44	N/A
1953015S430ME02	43±20%	16	1,378	1,060	0,37	0,43	0,37	0,48	N/A
1953015S470ME02	47±20%	14	1,625	1,250	0,35	0,43	0,35	0,44	N/A
1953015S560ME02	56±20%	13	1,664	1,280	0,33	0,42	0,34	0,41	N/A
1953015S620ME02	62±20%	13	2,093	1,610	0,30	0,40	0,30	0,41	N/A
1953015S680ME02	68±20%	11	3,510	2,700	0,28	0,37	0,23	0,31	N/A
1953015S101ME02	100±20%	7,2	4,043	3,110	0,23	0,25	0,21	0,25	N/A
1953015S151ME02	150±20%	4,5	4,940	3,800	0,18	0,22	0,19	0,23	N/A
1954010S1U0NL05	1,0±30%	104	0,067	0,056	2,00	2,30	1,90	2,40	1R0
1954010S1U5NL05	1,5±30%	71	0,084	0,070	1,68	2,00	1,70	2,00	1R5
1954010S2U2ML05	2,2±20%	52	0,102	0,085	1,20	1,50	1,50	2,00	2R2
1954010S3U3ML05	3,3±20%	42	0,120	0,100	1,10	1,40	1,40	1,80	3R3
1954010S4U7ML05	4,7±20%	30	0,168	0,140	0,95	1,10	1,20	1,50	4R7
1954010S6U8ML05	6,8±20%	26	0,240	0,200	0,80	0,95	1,00	1,20	6R8
1954010S100ML05	10±20%	19	0,360	0,300	0,62	0,75	0,75	1,00	100
1954010S150ML05	15±20%	17	0,516	0,430	0,54	0,61	0,60	0,85	150
1954010S220ML05	22±20%	11	0,684	0,570	0,45	0,52	0,50	0,75	220
1954012SU82NL0R	0,82±30%	150	0,065	0,050	3,02	3,30	1,65	2,50	R82
1954012S1U0NL0R	1,0±30%	120	0,065	0,050	2,61	3,20	1,65	2,50	1R0
1954012S1U5NL0R	1,5±30%	90	0,085	0,065	2,10	2,70	1,46	2,20	1R5
1954012S1U8NL0R	1,8±30%	88	0,104	0,080	2,12	2,60	1,32	1,90	1R8

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1954012S2U2NL0R	2,2±30%	74	0,104	0,080	1,76	2,30	1,32	1,90	2R2
1954012S2U7NL0R	2,7±30%	71	0,117	0,090	1,90	2,30	1,25	1,70	2R7
1954012S3U3NL0R	3,3±30%	60	0,143	0,110	1,72	2,10	1,12	1,60	3R3
1954012S3U6NL0R	3,6±30%	57	0,143	0,110	1,20	1,70	1,12	1,60	3R6
1954012S4U3NL0R	4,3±30%	54	0,182	0,140	1,58	1,70	1,00	1,50	4R3
1954012S4U7NL0R	4,7±30%	50	0,163	0,125	1,15	1,80	1,05	1,50	4R7
1954012S5U1NL0R	5,1±30%	50	0,201	0,155	1,55	1,60	0,95	1,50	5R1
1954012S5U6NL0R	5,6±30%	42	0,182	0,140	1,00	1,60	1,00	1,20	5R6
1954012S6U8ML0R	6,8±20%	40	0,257	0,198	0,85	1,40	0,84	1,20	6R8
1954012S100ML0R	10±20%	33	0,345	0,265	0,80	1,10	0,77	1,00	100
1954012S120ML0R	12±20%	32	0,377	0,290	0,66	1,00	0,70	0,95	120
1954012S150ML0R	15±20%	25	0,442	0,340	0,56	0,80	0,64	0,85	150
1954012S180ML0R	18±20%	23	0,611	0,470	0,55	0,75	0,55	0,80	180
1954012S220ML0R	22±20%	20	0,763	0,587	0,46	0,70	0,49	0,75	220
1954012S270ML0R	27±20%	18	0,936	0,720	0,50	0,70	0,45	0,60	270
1954012S330ML0R	33±20%	17	1,053	0,810	0,42	0,60	0,42	0,58	330
1954012S360ML0R	36±20%	14	1,170	0,900	0,40	0,50	0,40	0,56	360
1954012S390ML0R	39±20%	16	1,430	1,100	0,55	0,66	0,37	0,50	390
1954012S470ML0R	47±20%	12	1,430	1,100	0,35	0,50	0,37	0,50	470
1954012S560ML0R	56±20%	11	1,625	1,250	0,33	0,45	0,33	0,46	560
1954012S680ML0R	68±20%	11	2,535	1,950	0,38	0,45	0,27	0,45	680
1954012S820ML0R	82±20%	11	2,782	2,140	0,28	0,40	0,26	0,36	820
1954018SU47NL03	0,47±30%	155	0,018	0,014	4,30	5,20	4,00	4,50	R47
1954018SU68NL03	0,68±30%	128	0,026	0,020	4,90	5,60	3,30	3,80	R68
1954018S1U0NL03	1,0±30%	80	0,033	0,025	4,80	5,20	2,00	3,30	1R0
1954018S1U5NL03	1,5±30%	65	0,039	0,030	3,35	4,00	1,80	3,20	1R5
1954018S1U8NL03	1,8±30%	54	0,044	0,034	3,00	3,40	2,00	2,80	1R8
1954018S2U2ML03	2,2±20%	52	0,059	0,045	2,70	3,20	1,65	2,60	2R2
1954018S3U3ML03	3,3±20%	44	0,091	0,070	2,45	2,90	1,23	2,10	3R3
1954018S4U7ML03	4,7±20%	34	0,117	0,090	1,70	2,20	1,20	1,80	4R7
1954018S6U8ML03	6,8±20%	29	0,143	0,110	1,45	2,00	1,06	1,50	6R8
1954018S100ML03	10±20%	24	0,234	0,180	1,30	1,60	0,84	1,20	100
1954018S150ML03	15±20%	19	0,325	0,250	0,94	1,10	0,65	1,00	150
1954018S220ML03	22±20%	16	0,468	0,360	0,80	0,88	0,59	0,85	220
1954018S330ML03	33±20%	12	0,689	0,530	0,56	0,75	0,49	0,72	330
1954018S470ML03	47±20%	10	0,845	0,650	0,57	0,70	0,42	0,65	470
1954018S680ML03	68±20%	8,3	1,300	1,000	0,47	0,51	0,32	0,52	680
1954018S101ML03	100±20%	6,5	2,275	1,750	0,40	0,44	0,25	0,41	101
1954018S151ML03	150±20%	5,5	3,250	2,500	0,31	0,34	0,22	0,36	151
1954018S221ML03	220±20%	4	5,200	4,000	0,27	0,30	0,17	0,27	221
1954020SU24ML03	0,24±20%	283	0,014	0,011	10,5	12,5	4,50	5,20	R24
1954020SU33NL03	0,33±30%	223	0,016	0,013	7,50	8,50	3,30	4,90	R33
1954020SU47NL03	0,47±30%	160	0,029	0,022	7,00	7,50	3,30	3,70	R47
1954020SU68NL03	0,68±30%	120	0,036	0,028	6,40	6,60	2,80	3,30	R68
1954020S1U0NL03	1,0±30%	75	0,038	0,029	4,78	5,20	2,15	3,20	1R0
1954020S1U2NL03	1,2±30%	72	0,038	0,029	5,10	5,60	2,15	3,20	1R2

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1954020S1U5NL03	1,5±30%	71	0,046	0,035	4,45	4,90	1,98	3,00	1R5
1954020S2U2NL03	2,2±30%	49	0,052	0,040	3,40	3,70	1,85	2,80	2R2
1954020S3U3ML03	3,3±20%	44	0,091	0,070	3,20	3,50	1,40	2,50	3R3
1954020S3U6ML03	3,6±20%	49	0,072	0,055	2,80	3,00	1,54	2,50	3R6
1954020S4U7ML03	4,7±20%	42	0,098	0,075	2,35	2,50	1,34	2,00	4R7
1954020S5U1ML03	5,1±20%	42	0,111	0,085	2,30	2,50	1,27	1,80	5R1
1954020S5U6ML03	5,6±20%	30	0,117	0,090	2,20	2,40	1,22	1,80	5R6
1954020S6U2ML03	6,2±20%	36	0,150	0,115	2,15	2,30	1,08	1,60	6R2
1954020S6U8ML03	6,8±20%	33	0,163	0,125	2,20	2,40	1,04	1,60	6R8
1954020S7U5ML03	7,5±20%	30	0,150	0,115	1,85	2,00	1,08	1,50	7R5
1954020S8U2ML03	8,2±20%	27	0,163	0,125	1,75	1,90	1,04	1,40	8R2
1954020S100ML03	10±20%	26	0,215	0,165	1,60	1,70	0,90	1,20	100
1954020S120ML03	12±20%	26	0,228	0,175	1,50	1,60	0,88	1,20	120
1954020S150ML03	15±20%	24	0,299	0,230	1,35	1,50	0,77	1,10	150
1954020S220ML03	22±20%	15	0,455	0,350	1,05	1,10	0,62	0,87	220
1954020S270ML03	27±20%	14	0,709	0,545	1,02	1,10	0,50	0,70	270
1954020S330ML03	33±20%	11	0,715	0,550	0,85	0,93	0,49	0,68	330
1954020S390ML03	39±20%	11	0,845	0,650	0,82	0,90	0,46	0,64	390
1954020S430ML03	43±20%	10	0,858	0,660	0,77	0,85	0,45	0,63	430
1954020S470ML03	47±20%	10	0,923	0,710	0,74	0,81	0,44	0,61	470
1954020S510ML03	51±20%	10	0,975	0,750	0,70	0,77	0,42	0,59	510
1954020S560ML03	56±20%	10	1,040	0,800	0,66	0,72	0,41	0,57	560
1954020S620ML03	62±20%	9,6	1,170	0,900	0,65	0,71	0,39	0,52	620
1954020S680ML03	68±20%	7,7	1,380	1,060	0,61	0,67	0,36	0,50	680
1954020S750ML03	75±20%	7,7	1,510	1,160	0,70	0,77	0,35	0,49	750
1954020S820ML03	82±20%	7,2	1,520	1,170	0,50	0,55	0,34	0,47	820
1954020S101ML03	100±20%	6,3	2,020	1,550	0,48	0,53	0,31	0,43	101
1954030SU68NL02	0,68±30%	130	0,013	0,010	6,80	8,00	4,56	5,10	R68
1954030SU91NL02	0,91±30%	100	0,017	0,013	6,25	6,80	4,15	4,70	R91
1954030S1U0NL02	1,0±30%	70	0,018	0,014	5,26	5,70	4,15	4,70	1R0
1954030S1U2NL02	1,2±30%	80	0,020	0,015	5,80	6,30	3,82	4,20	1R2
1954030S1U5NL02	1,5 ±30%	62	0,026	0,020	4,84	5,30	3,34	3,60	1R5
1954030S1U8NL02	1,8±30%	60	0,033	0,025	4,50	5,00	3,20	3,30	1R8
1954030S2U2NL02	2,2±30%	52	0,039	0,030	4,90	5,80	2,95	3,20	2R2
1954030S3U3ML02	3,3±20%	38	0,052	0,040	3,30	3,60	2,40	2,60	3R3
1954030S3U9ML02	3,9±20%	32	0,074	0,057	3,00	3,30	2,10	2,30	3R9
1954030S4U3ML02	4,3±20%	37	0,072	0,055	2,95	3,20	2,10	2,30	4R3
1954030S4U7ML02	4,7±20%	31	0,078	0,060	2,90	3,20	2,00	2,30	4R7
1954030S5U6ML02	5,6±20%	30	0,085	0,065	2,60	2,80	1,95	2,10	5R6
1954030S6U8ML02	6,8±20%	24	0,117	0,090	2,75	3,00	1,60	1,70	6R8
1954030S7U5ML02	7,5±20%	26	0,111	0,085	2,20	2,40	1,65	1,80	7R5
1954030S8U2ML02	8,2±20%	26	0,117	0,090	2,10	2,30	1,60	1,70	8R2
1954030S100ML02	10±20%	21	0,130	0,100	1,95	2,40	1,50	1,60	100
1954030S120ML02	12±20%	18	0,176	0,135	1,70	1,80	1,30	1,40	120
1954030S150ML02	15±20%	16	0,247	0,190	1,65	1,80	1,11	1,20	150
1954030S180ML02	18±20%	10	0,260	0,200	1,40	1,50	1,10	1,20	180
1954030S220ML02	22±20%	10	0,293	0,225	1,30	1,40	1,00	1,20	220
1954030S330ML02	33±20%	10	0,429	0,330	1,10	1,20	0,84	0,92	330

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1954030S360ML02	36±20%	9,8	0,436	0,335	1,05	1,10	0,83	0,91	360
1954030S390ML02	39±20%	10	0,566	0,435	1,03	1,10	0,73	0,80	390
1954030S470ML02	47±20%	8,4	0,579	0,445	0,95	1,00	0,72	0,80	470
1954030S510ML02	51±20%	8,4	0,611	0,470	0,90	1,13	0,70	0,80	510
1954030S560ML02	56±20%	8,4	0,722	0,555	0,85	0,94	0,65	0,71	560
1954030S620ML02	62±20%	7,0	0,760	0,585	0,80	0,99	0,63	0,70	620
1954030S680ML02	68±20%	7,0	1,128	0,868	0,72	0,80	0,52	0,57	680
1954030S750ML02	75±20%	6,3	1,326	1,020	0,70	0,88	0,48	0,53	750
1954030S820ML02	82±20%	5,6	1,378	1,060	0,66	0,72	0,47	0,52	820
1954030S910ML02	91±20%	5,6	1,430	1,100	0,65	0,71	0,46	0,50	910
1954030S101ML02	100±20%	5,6	1,495	1,150	0,60	0,73	0,45	0,49	101
1954030S121ML02	120±20%	5,4	1,755	1,350	0,55	0,60	0,42	0,46	121
1954030S151ML02	150±20%	4,0	2,340	1,800	0,50	0,55	0,30	0,35	151
1954030S221ML02	220±20%	4,2	3,25	2,50	0,40	0,50	0,35	0,40	221
1954030S471KL02	470±10%	2,0	9,360	7,200	0,30	0,35	0,20	0,23	471
1954030S501ML02	500±20%	2,0	9,027	6,944	0,28	0,30	0,15	0,20	501
1954030S681ML02	680±20%	1,2	9,854	7,580	0,19	0,20	0,14	0,18	681
1955012S1U0NL0R	1,0±30%	103	0,068	0,057	4,40	4,70	2,00	2,40	1R0
1955012S1U5NL0R	1,5±30%	68	0,086	0,072	3,70	3,80	1,90	2,20	1R5
1955012S2U2NL0R	2,2±30%	50	0,108	0,09	3,10	3,20	1,70	2,00	2R2
1955012S3U3NL0R	3,3±30%	34	0,151	0,126	2,40	2,60	1,40	1,70	3R3
1955012S4U7NL0R	4,7±30%	31	0,197	0,164	2,20	2,30	1,30	1,50	4R7
1955012S6U8ML0R	6,8±20%	22	0,294	0,245	1,70	1,90	1,00	1,20	6R8
1955012S100ML0R	10±20%	17	0,413	0,344	1,40	1,50	0,85	1,00	100
1955012S150ML0R	15±20%	13	0,523	0,436	1,20	1,30	0,80	0,92	150
1955012S220ML0R	22±20%	16	0,858	0,780	0,88	0,98	0,60	0,68	220
1955020SU22NL0Y	0,22±30%	280	0,011	0,009	9,00	12,00	5,30	6,00	R22
1955020SU24NL0Y	0,24±30%	248	0,011	0,009	8,00	10,00	5,30	6,00	R24
1955020SU47NL0Y	0,47±30%	160	0,017	0,013	6,15	6,70	4,60	5,00	R47
1955020SU56NL0Y	0,56±30%	137	0,022	0,017	8,50	9,60	3,80	4,20	R56
1955020SU68ML0Y	0,68±30%	120	0,022	0,017	5,50	6,00	4,00	4,40	R68
1955020SU75NL0Y	0,75±30%	117	0,022	0,017	5,50	6,00	4,00	4,40	R75
1955020S1U0NL0Y	1,0±30%	114	0,026	0,020	4,10	5,00	3,80	4,10	1R0
1955020S1U2NL0Y	1,2±30%	83	0,029	0,022	4,50	4,90	3,55	3,90	1R2
1955020S1U5NL0Y	1,5±30%	68	0,034	0,026	4,10	4,50	3,20	3,50	1R5
1955020S2U2NL0Y	2,2±30%	57	0,042	0,032	3,20	4,00	2,90	3,10	2R2
1955020S2U7NL0Y	2,7±30%	52	0,049	0,038	2,90	3,50	2,70	2,90	2R7
1955020S3U0NL0Y	3,0±30%	49	0,049	0,038	2,55	2,80	2,70	2,90	3R0
1955020S3U3NL0Y	3,3±30%	46	0,056	0,043	2,55	3,00	2,50	2,70	3R3
1955020S3U6NL0Y	3,6±30%	43	0,056	0,043	2,80	3,00	2,50	2,70	3R6
1955020S3U9NL0Y	3,9±30%	40	0,056	0,043	2,30	2,80	2,50	2,70	3R9
1955020S4U3ML0Y	4,3±20%	37	0,074	0,057	2,50	3,00	2,20	2,40	4R3
1955020S4U7ML0Y	4,7±20%	37	0,074	0,057	2,50	2,70	2,20	2,40	4R7
1955020S5U1ML0Y	5,1±20%	32	0,083	0,064	2,25	2,60	2,05	2,20	5R1
1955020S5U6ML0Y	5,6±20%	32	0,083	0,064	2,30	2,50	2,05	2,20	5R6
1955020S6U8ML0Y	6,8±20%	30	0,108	0,083	2,05	2,20	1,80	1,90	6R8
1955020S7U5ML0Y	7,5±20%	26	0,117	0,090	1,85	2,00	1,75	1,90	7R5
1955020S8U2ML0Y	8,2±20%	26	0,127	0,098	1,85	2,00	1,65	1,80	8R2

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1955020S9U1ML0Y	9,1±20%	24	0,143	0,110	1,70	1,80	1,55	1,70	9R1
1955020S100ML0Y	10±20%	24	0,143	0,110	1,70	1,80	1,55	1,70	100
1955020S120ML0Y	12±20%	22	0,182	0,140	1,50	1,60	1,40	1,50	120
1955020S150ML0Y	15±20%	20	0,215	0,165	1,35	1,40	1,25	1,30	150
1955020S180ML0Y	18±20%	16	0,260	0,200	1,25	1,30	1,15	1,20	180
1955020S220ML0Y	22±20%	14	0,294	0,226	1,15	1,20	1,10	1,20	220
1955020S330ML0Y	33±20%	10	0,507	0,390	0,92	1,00	0,90	0,99	330
1955020S470ML0Y	47±20%	7	0,680	0,523	0,77	0,84	0,77	0,84	470
1955020S560ML0Y	56±20%	6	0,819	0,630	0,77	0,84	0,70	0,77	560
1955020S680ML0Y	68±20%	6	0,962	0,740	0,65	0,70	0,64	0,70	680
1955020S820ML0Y	82±20%	6	1,158	0,965	0,65	0,75	0,50	0,60	820
1955020S101ML0Y	100±20%	6	1,430	1,100	0,53	0,58	0,53	0,58	101
1955020S121ML0Y	120±20%	6	1,755	1,350	0,42	0,53	0,40	0,50	121
1955020S201ML0Y	200±20%	4,5	2,600	2,00 0	0,30	0,33	0,40	0,45	201
1955040S1U0NLOX	1,0 ±30%	117	0,016	0,012	7,35	8,20	4,90	5,10	1R0
1955040S1U2NLOX	1,2±30%	110	0,021	0,016	6,50	7,10	4,15	4,30	1R2
1955040S1U5NLOX	1,5±30%	86	0,020	0,015	6,30	7,30	4,30	4,80	1R5
1955040S1U8MLOX	1,8±20%	55	0,021	0,016	5,50	6,40	4,15	4,30	1R8
1955040S2U2NLOX	2,2±30%	50	0,025	0,019	4,90	5,60	3,80	4,30	2R2
1955040S2U7NLOX	2,7±30%	37	0,029	0,022	4,30	5,10	3,60	4,10	2R7
1955040S3U0NLOX	3±30%	37	0,029	0,022	4,15	4,80	3,60	4,20	3R0
1955040S3U3NLOX	3,3 ±30%	32	0,031	0,024	3,95	4,60	3,40	3,90	3R3
1955040S3U9NLOX	3,9 ±30%	29	0,035	0,027	3,55	4,20	3,20	3,70	3R9
1955040S4U7NLOX	4,7±30%	28	0,039	0,030	3,50	3,90	3,00	3,30	4R7
1955040S5U6MLOX	5,6±20%	27	0,046	0,035	3,00	4,10	2,80	3,10	5R6
1955040S6U8MLOX	6,8±20%	21	0,056	0,043	2,90	3,50	2,50	2,80	6R8
1955040S8U2MLOX	8,2±20%	20	0,062	0,048	2,70	3,00	2,30	2,60	8R2
1955040S100MLOX	10±20%	18	0,083	0,064	2,35	2,90	2,10	2,40	100
1955040S150MLOX	15±20%	13	0,112	0,086	2,00	2,30	2,00	2,10	150
1955040S220MLOX	22±20%	11	0,168	0,129	1,60	1,90	1,50	1,60	220
1955040S330MLOX	33±20%	9	0,244	0,188	1,30	1,50	1,20	1,40	330
1955040S470MLOX	47±20%	7	0,354	0,272	1,10	1,30	1,00	1,10	470
1955040S680MLOX	68±20%	6	0,520	0,400	0,90	1,10	0,80	0,90	680
1956020SU50NLOY	0,50±30%	120	0,018	0,014	4,50	6,00	4,00	5,00	R50
1956020SU68NLOY	0,68±30%	115	0,022	0,017	6,55	7,80	3,80	4,80	R68
1956020SU82NLOY	0,82±30%	110	0,022	0,017	5,30	6,30	3,80	4,80	R82
1956020S1U0NLOY	1,0±30%	100	0,026	0,020	4,15	5,00	3,50	4,40	1R0
1956020S1U2NLOY	1,2±30%	88	0,029	0,022	5,90	7,00	3,20	4,00	1R2
1956020S1U5NLOY	1,5±30%	79	0,029	0,022	4,25	5,10	3,20	4,00	1R5
1956020S1U8NLOY	1,8±30%	68	0,036	0,028	4,85	5,80	2,75	3,50	1R8
1956020S2U0NLOY	2,0±30%	65	0,046	0,035	4,10	4,90	2,60	3,30	2R0
1956020S2U2NLOY	2,2±30%	61	0,036	0,028	3,75	4,50	2,75	3,50	2R2
1956020S2U7NLOY	2,7±30%	56	0,046	0,035	3,90	4,60	2,60	3,30	2R7
1956020S3U3NLOY	3,3±30%	51	0,046	0,035	3,15	3,70	2,60	3,30	3R3
1956020S3U9NLOY	3,9±30%	45	0,064	0,049	3,25	3,90	2,10	2,60	3R9

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1956020S4U3NLOY	4,3±30%	44	0,064	0,049	2,70	3,20	2,10	2,60	4R3
1956020S4U7NLOY	4,7±30%	41	0,075	0,058	3,00	3,60	2,00	2,50	4R7
1956020S5U6NLOY	5,6±30%	36	0,075	0,058	2,40	2,90	1,90	2,40	5R6
1956020S6U2NLOY	6,2±30%	31	0,103	0,079	2,30	2,70	1,80	2,30	6R2
1956020S6U8NLOY	6,8±30%	31	0,103	0,079	2,20	2,60	1,80	2,30	6R8
1956020S8U2NLOY	8,2±30%	27	0,137	0,105	2,10	2,50	1,40	1,80	8R2
1956020S100MLOY	10±20%	27	0,137	0,105	1,75	2,10	1,40	1,80	100
1956020S120MLOY	12±20%	25	0,156	0,120	1,45	1,70	1,30	1,60	120
1956020S150MLOY	15±20%	21	0,189	0,145	1,20	1,40	1,20	1,50	150
1956020S180MLOY	18±20%	18	0,234	0,180	1,20	1,40	1,08	1,40	180
1956020S220MLOY	22±20%	16	0,265	0,204	1,05	1,20	1,00	1,30	220
1956020S330MLOY	33±20%	11	0,390	0,300	0,95	1,10	0,84	1,05	330
1956020S470MLOY	47±20%	10	0,559	0,430	0,70	0,90	0,80	0,90	470
1956020S331MLOY	330±20%	3	3,419	2,630	0,27	0,33	0,33	0,39	331
1956028SU82NL02	0,82	97	0,016	0,012	6,50	9,00	5,20	6,00	R82
1956028S1U0NL02	1,0	70	0,013	0,010	5,75	7,00	5,20	5,70	1R0
1956028S1U2NL02	1,2	69	0,017	0,013	6,40	7,50	4,58	5,00	1R2
1956028S1U5NL02	1,5	65	0,017	0,013	6,00	6,60	4,58	5,00	1R5
1956028S2U2NL02	2,2	48	0,026	0,020	5,10	5,60	3,75	4,10	2R2
1956028S2U7NL02	2,7	48	0,026	0,02	3,80	4,10	3,75	4,10	2R7
1956028S3U3NL02	3,3	41	0,033	0,025	4,15	4,50	3,48	3,80	3R3
1956028S4U7NL02	4,7	35	0,039	0,030	3,00	3,30	3,08	3,40	4R7
1956028S5U1NL02	5,1	32	0,056	0,043	3,20	3,50	2,60	2,80	5R1
1956028S6U2ML02	6,2	30	0,061	0,047	3,05	3,30	2,40	2,60	6R2
1956028S6U8ML02	6,8	27	0,061	0,047	2,60	3,00	2,40	2,60	6R8
1956028S8U2ML02	8,2	24	0,072	0,055	2,30	2,50	2,25	2,50	8R2
1956028S9U1ML02	9,1	24	0,096	0,074	2,55	2,80	2,15	2,40	9R1
1956028S100ML02	10	23	0,094	0,072	2,04	2,50	1,95	2,40	100
1956028S120ML02	12	18	0,104	0,080	1,80	2,00	1,85	2,00	120
1956028S150ML02	15	18	0,163	0,125	1,75	1,90	1,45	1,60	150
1956028S180ML02	18	15	0,156	0,120	1,52	1,80	1,45	1,60	180
1956028S220ML02	22	14	0,182	0,140	1,45	1,80	1,40	1,60	220
1956028S270ML02	27	13	0,202	0,155	1,50	1,60	1,32	1,40	270
1956028S330ML02	33	12	0,241	0,185	1,35	1,50	1,22	1,30	330
1956028S360ML02	36	11	0,280	0,215	1,25	1,40	1,13	1,20	360
1956028S390ML02	39	11	0,293	0,225	1,25	1,40	1,10	1,20	390
1956028S470ML02	47	9,5	0,410	0,315	1,15	1,30	1,06	1,10	470
1956028S560ML02	56	8,2	0,449	0,345	1,05	1,20	0,89	1,00	560
1956028S680ML02	68	7,7	0,468	0,360	0,80	0,95	0,86	0,95	680
1956028S750ML02	75	7,7	0,533	0,410	0,90	0,99	0,81	0,90	750
1956028S820ML02	82	7,7	0,650	0,500	0,80	0,88	0,70	0,77	820
1956028S101ML02	100	7,1	0,650	0,500	0,65	0,71	0,70	0,77	101
1956028S401ML02	400	2,8	2,808	2,160	0,30	0,33	0,40	0,45	401
1956028S102ML02	1000	1,5	7,540	5,800	0,18	0,22	0,23	0,26	102
1956045SU47NLOX	0,47	155	0,008	0,006	15,00	16,50	6,50	6,60	R47

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1956045SU56NL0X	0,56	142	0,008	0,006	15,00	14,00	6,50	7,50	R56
1956045SU68NL0X	0,68	99	0,008	0,006	11,00	12,00	5,70	6,50	R68
1956045SU82NL0X	0,82	140	0,010	0,008	10,35	11,00	5,90	6,50	R82
1956045S1U0NL0X	1,0	100	0,014	0,011	9,85	10,00	5,14	5,60	1R0
1956045S1U2NL0X	1,2	100	0,013	0,010	8,35	9,10	5,40	5,90	1R2
1956045S1U3NL0X	1,3	100	0,013	0,010	8,35	9,10	5,40	5,90	1R3
1956045S1U5NL0X	1,5	65	0,016	0,012	8,80	9,70	4,95	5,40	1R5
1956045S1U8NL0X	1,8	74	0,016	0,012	7,60	8,40	4,95	5,40	1R8
1956045S2U2NL0X	2,2	52	0,018	0,014	6,75	7,40	4,60	5,00	2R2
1956045S2U3NL0X	2,3	60	0,027	0,021	6,00	6,60	3,50	3,80	2R3
1956045S2U7NL0X	2,7	38	0,020	0,015	5,75	6,30	4,30	4,70	2R7
1956045S3U0NL0X	3	35	0,026	0,020	5,60	6,20	3,80	4,20	3R0
1956045S3U3NL0X	3,3	32	0,027	0,021	5,90	6,20	3,70	4,00	3R3
1956045S3U6NL0X	3,6	28	0,027	0,021	5,25	5,70	3,70	4,00	3R6
1956045S4U3ML0X	4,3	23	0,030	0,023	4,45	4,90	3,50	3,80	4R3
1956045S4U5ML0X	4,5	24	0,034	0,026	4,97	5,50	3,30	3,60	4R5
1956045S4U7ML0X	4,7	24	0,034	0,026	4,97	5,50	3,30	3,60	4R7
1956045S5U1ML0X	5,1	23	0,034	0,026	4,40	4,80	3,30	3,60	5R1
1956045S5U6ML0X	5,6	23	0,038	0,029	4,15	4,60	3,15	3,40	5R6
1956045S6U2ML0X	6,2	26	0,040	0,031	4,43	4,80	3,00	3,30	6R2
1956045S6U3ML0X	6,3	26	0,040	0,031	4,43	4,70	3,00	3,30	6R3
1956045S6U8ML0X	6,8	20	0,040	0,031	3,90	4,30	3,00	3,30	6R8
1956045S7U5ML0X	7,5	18	0,044	0,034	3,50	3,80	2,90	3,20	7R5
1956045S8U2ML0X	8,2	21	0,056	0,043	3,90	4,30	2,60	2,80	8R2
1956045S9U1ML0X	9,1	17	0,056	0,043	3,35	3,70	2,60	2,80	9R1
1956045S100ML0X	10	15	0,062	0,048	3,20	3,50	2,45	2,70	100
1956045S120ML0X	12	13	0,075	0,058	2,80	3,00	2,20	2,40	120
1956045S150ML0X	15	12	0,088	0,068	2,50	2,70	2,05	2,20	150
1956045S180ML0X	18	10	0,105	0,081	2,20	2,40	1,85	2,00	180
1956045S220ML0X	22	10	0,116	0,089	2,05	2,20	1,80	2,00	220
1956045S270ML0X	27	9,2	0,133	0,102	1,90	2,10	1,65	1,80	270
1956045S300ML0X	30	7,8	0,172	0,132	1,70	1,80	1,50	1,60	300
1956045S330ML0X	33	7,8	0,178	0,137	1,65	1,80	1,45	1,60	330
1956045S360ML0X	36	7,8	0,225	0,173	1,62	1,80	1,40	1,50	360
1956045S390ML0X	39	7,8	0,234	0,180	1,50	1,60	1,25	1,40	390
1956045S430ML0X	43	7,7	0,260	0,200	1,63	1,80	1,20	1,30	430
1956045S470ML0X	47	6,4	0,260	0,200	1,40	1,50	1,20	1,30	470
1956045S510ML0X	51	6,4	0,269	0,207	1,35	1,50	1,15	1,20	510
1956045S560ML0X	56	6,4	0,287	0,221	1,30	1,40	1,10	1,20	560
1956045S620ML0X	62	6,4	0,306	0,235	1,25	1,40	1,10	1,20	620
1956045S680ML0X	68	6,4	0,376	0,289	1,20	1,30	1,00	1,10	680
1956045S750ML0X	75	5	0,397	0,305	1,15	1,20	0,95	1,00	750
1956045S820ML0X	82	4,9	0,443	0,341	1,05	1,10	0,90	0,99	820
1956045S910ML0X	91	4,9	0,467	0,359	1,00	1,10	0,85	0,94	910
1956045S101ML0X	100	4,2	0,563	0,433	0,95	1,00	0,80	0,88	101
1956045S121ML0X	120	4,2	0,629	0,484	0,85	0,94	0,77	0,85	121

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1956045S151ML0X	150	4,2	0,754	0,580	0,80	0,88	0,70	0,77	151
1956045S221ML0X	220	3,5	1,084	0,834	0,70	0,77	0,59	0,65	221
1956045S331ML0X	330	2,8	1,651	1,270	0,57	0,63	0,57	0,63	331
1956045S471ML0X	470	2,0	2,340	1,800	0,50	0,56	0,42	0,48	471
1956045S681ML0X	680	1,7	3,250	2,500	0,42	0,46	0,33	0,38	681
1956045S102ML0X	1000	1,4	5,850	4,500	0,30	0,35	0,30	0,35	102
1956045S152ML0X	1500	0,8	8,450	6,500	0,24	0,27	0,21	0,24	152
1958040SU82NL01	0,82±30%	94	0,010	0,008	13,8	16,0	6,30	6,90	R82
1958040S1U0NL01	1,0±30%	89	0,010	0,008	9,85	14,0	6,30	6,90	1R0
1958040S1U2NL01	1,2±30%	59	0,013	0,010	10,0	14,0	5,65	6,20	1R2
1958040S1U5NL01	1,5±30%	67	0,013	0,010	8,15	11,0	5,65	6,20	1R5
1958040S2U0NL01	2,0±30%	43	0,016	0,012	9,25	10,0	5,15	5,60	2R0
1958040S2U2NL01	2,2±30%	41	0,016	0,012	7,10	8,00	5,15	5,60	2R2
1958040S3U0NL01	3±30%	32	0,018	0,014	6,10	7,00	4,70	5,20	3R0
1958040S3U3NL01	3,3±30%	27	0,022	0,017	6,50	7,00	4,40	4,80	3R3
1958040S3U6NL01	3,6±30%	30	0,022	0,017	7,52	8,50	4,35	4,80	3R6
1958040S3U9NL01	3,9±30%	26	0,022	0,017	5,75	6,50	4,35	4,80	3R9
1958040S4U7NL01	4,7±30%	24	0,025	0,019	5,90	6,50	4,10	4,50	4R7
1958040S5U1NL01	5,1±30%	22	0,025	0,019	4,70	5,40	4,05	4,40	5R1
1958040S5U6NL01	5,6±30%	24	0,027	0,021	6,00	6,90	3,85	4,20	5R6
1958040S6U2NL01	6,2±30%	20	0,027	0,021	4,45	5,10	3,85	4,20	6R2
1958040S6U8ML01	6,8±20%	20	0,031	0,024	4,55	5,20	3,60	4,00	6R8
1958040S8U2ML01	8,2±20%	17	0,034	0,026	4,20	4,80	3,45	3,80	8R2
1958040S100ML01	10±20%	15	0,038	0,029	3,60	4,10	3,30	3,60	100
1958040S120ML01	12±20%	13	0,053	0,041	3,50	4,00	2,80	3,00	120
1958040S150ML01	15±20%	12	0,061	0,047	2,95	3,40	2,60	2,80	150
1958040S180ML01	18±20%	11	0,069	0,053	2,70	3,10	2,40	2,60	180
1958040S220ML01	22±20%	9,5	0,090	0,069	2,40	2,70	2,10	2,30	220
1958040S270ML01	27±20%	9,2	0,101	0,078	2,15	2,50	2,00	2,20	270
1958040S330ML01	33±20%	7,8	0,126	0,097	2,05	2,40	1,80	2,00	330
1958040S360ML01	36±20%	7,8	0,133	0,102	2,00	2,30	1,75	1,90	360
1958040S390ML01	39±20%	7,8	0,139	0,107	1,95	2,20	1,70	1,90	390
1958040S430ML01	43±20%	7,8	0,147	0,113	1,90	2,20	1,65	1,80	430
1958040S470ML01	47±20%	6,4	0,177	0,136	1,75	2,00	1,55	1,70	470
1958040S510ML01	51±20%	6,4	0,185	0,142	1,70	1,90	1,50	1,60	510
1958040S560ML01	56±20%	6,4	0,192	0,148	1,55	1,70	1,45	1,60	560
1958040S620ML01	62±20%	6,4	0,237	0,182	1,50	1,60	1,30	1,40	620
1958040S680ML01	68±20%	4,9	0,255	0,196	1,45	1,60	1,25	1,40	680
1958040S750ML01	75±20%	4,9	0,274	0,211	1,35	1,50	1,20	1,30	750
1958040S820ML01	82±20%	5,9	0,293	0,225	1,30	1,40	1,15	1,20	820
1958040S910ML01	91±20%	4,9	0,354	0,272	1,20	1,30	1,05	1,10	910
1958040S101ML01	100±20%	4,2	0,377	0,290	1,15	1,30	1,00	1,10	101
1958040S121ML01	120±20%	3,5	0,434	0,334	1,05	1,10	0,95	1,00	121

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1958040S151ML01	150±20%	3,5	0,533	0,410	1,10	1,20	0,85	0,94	151
1958040S181ML01	180±20%	3,5	0,676	0,520	0,95	1,15	0,83	0,92	181
1958040S221ML01	220±20%	3,5	0,779	0,599	0,85	0,94	0,80	0,88	221
1958040S331ML01	330±20%	2,8	1,156	0,889	0,68	0,75	0,64	0,70	331
1958040S471ML01	470±20%	2,1	1,625	1,250	0,60	0,70	0,50	0,60	471
1958065S1U0ML0S	1,0±20%	96	0,011	0,008	20,0	22,0	7,00	8,00	1R0
1958065S3U3ML0S	3,3±20%	27	0,018	0,015	9,50	10,00	5,10	5,90	3R3
1958065S4U7ML0S	4,7±20%	18	0,022	0,018	8,50	9,50	4,70	5,40	4R7
1958065S5U6ML0S	5,6±20%	17	0,026	0,022	8,00	9,00	4,50	5,20	5R6
1958065S6U8ML0S	6,8±20%	16	0,026	0,022	7,50	8,00	4,50	5,20	6R8
1958065S8U2ML0S	8,2±20%	15	0,031	0,026	7,00	7,70	4,20	4,80	8R2
1958065S100ML0S	10±20%	13	0,044	0,037	8,00	8,90	3,20	3,70	100
1958065S220ML0S	22±20%	8	0,072	0,060	4,30	4,80	2,70	3,10	220
1958065S101ML0S	100±20%	3,1	0,280	0,233	2,00	2,40	1,35	1,45	101
1958065S151ML0S	150±20%	2,5	0,440	0,353	1,60	2,00	0,95	1,10	151
1958065S221ML0S	220±20%	2,0	0,656	0,547	1,20	1,50	0,80	0,90	221
1958065S331ML0S	330±20%	1,7	0,840	0,700	1,00	1,20	0,75	0,85	331
1958065S471ML0S	470±20%	1,4	1,560	1,300	1,00	1,20	0,55	0,65	471
1958065S102ML0S	1000±20%	1,1	2,820	2,35	0,65	0,73	0,40	0,45	102
1958065S152ML0S	1500±20%	0,7	4,380	3,650	0,54	0,60	0,32	0,37	152
1958065S222ML0S	2200±20%	0,7	6,000	5,000	0,45	0,51	0,27	0,31	222
1958065S332ML0S	3300±20%	0,7	8,760	7,300	0,36	0,40	0,23	0,26	332
1958065S472ML0S	4700±20%	0,4	14,58	12,15	0,29	0,33	0,18	0,20	472
1958065S682ML0S	6800±20%	0,4	22,44	18,70	0,26	0,29	0,14	0,16	682
1958065S103ML0S	10000±20%	0,4	27,36	22,80	0,20	0,23	0,13	0,15	103

1: All test data is referenced to 20°C ambient;

2: Rated current: Isat or Irms, whichever is smaller;

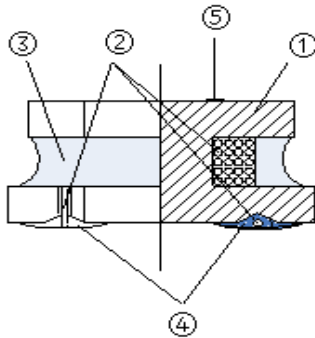
*3: Isat: DC current at which the inductance drops approximate 30% from its value without current;

*4: Irms: DC current that causes the temperature rise ($\Delta T = 40^\circ\text{C}$) from 20°C ambient.

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Wire Wound SMD Power Inductor

SMD Structure of product



No.	Components	Material
1	Ferrite Core	Ni-Zn Ferrite
2	Wire	Polyurethane system enameled copper wire
3	Magnetic Glue	Epoxy resin and magnetic powder
4	Electrodes	AgNiSn or FeNiCu +Sn Alloy
5	Marking	Nitrocellulose (where marking available)
	Outer Electrodes	Top surface solder coating: Sn96.5%/Ag3.0%/Cu0.5%

Test and Measurement Procedures

1 Test Conditions

Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

- Ambient Temperature: $20 \pm 15^\circ\text{C}$
- Relative Humidity: $65 \pm 20\%$
- Air Pressure: 86kPa to 106kPa

If any doubt on the results, measurements/tests should be made within the following limits:

- Ambient Temperature: $20 \pm 2^\circ\text{C}$
- Relative Humidity: $65 \pm 5\%$
- Air Pressure: 86kPa to 106kPa

2 Visual Examination

- Inspection Equipment: 10X microscope

3 Electrical Test

3.1 Inductance (L)

- Refer to product table. Test equipment: WK3260B LCR meter or equivalent.
- Test Frequency and Voltage: refers to tables electrical characteristics.

3.2 Direct Current Resistance (DCR)

- Refer to tables electrical characteristics.
- Test equipment: HIOKI 3540 or equivalent.

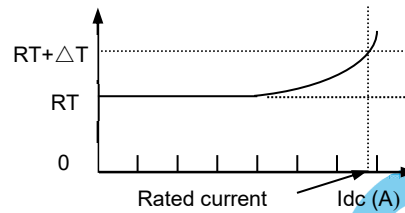
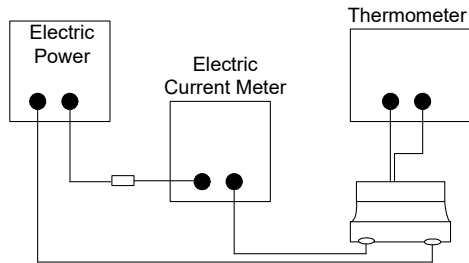
3.3 Saturation Current (Isat)

- Refer to tables electrical characteristics.
- Test equipment: WK3260B LCR meter or equivalent.
- Definition of saturation current (Isat): DC current at which the inductance drops approximate 30% from its value without current.

3.4 Temperature rise current (Irms)

- Refer to tables electrical characteristics.
- Test equipment (see Fig. below): Electric Power, Electric current meter, Thermometer.
- Measurement method
 - Set test current to be 0 mA.
 - Measure initial temperature of choke surface.

3. Gradually increase current and measure choke temperature for corresponding current.
4. Definition of Temperature rise current: DC current that causes the temperature rise (ΔT) from ambient temperature



3.5 Self-resonant frequency (SRF) (where applicable)

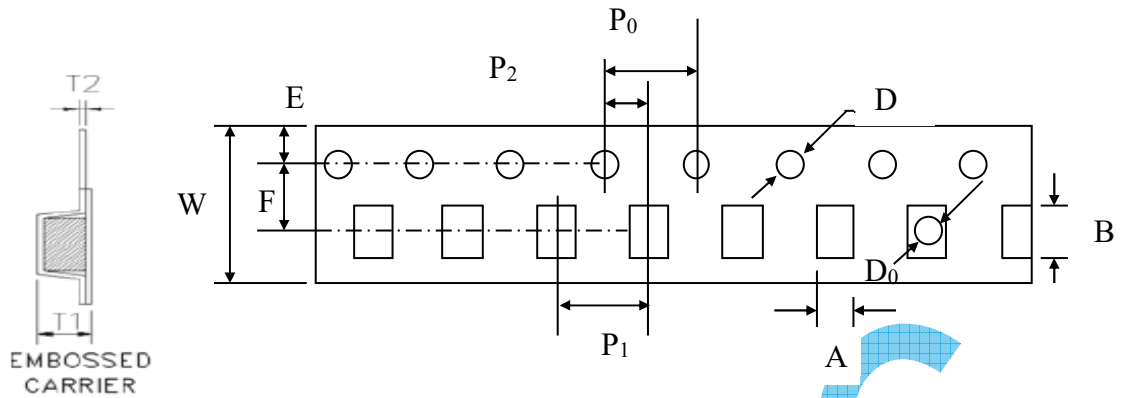
- a. Refer to tables electrical characteristics.
- b. Test equipment: Agilent E4991A+16197 or equivalent

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Wire Wound SMD Power Inductor

SMD Tape Dimensions



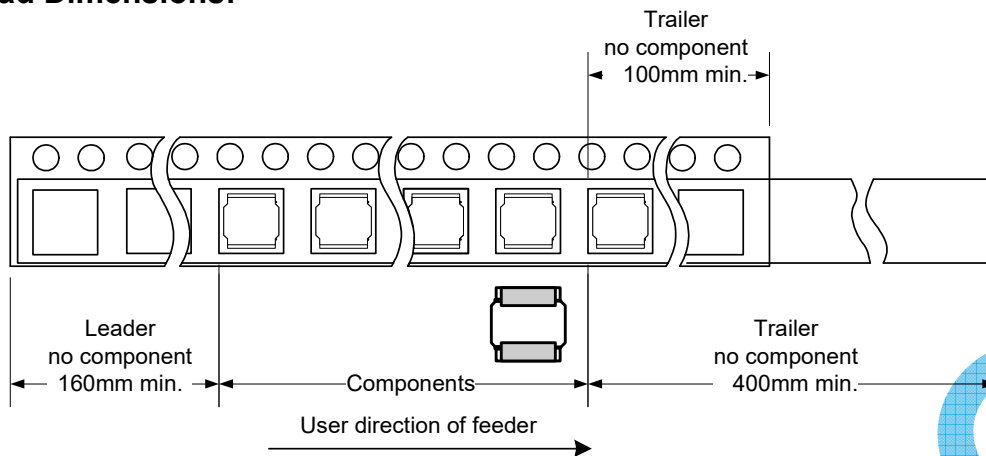
Series	A	B	W	E	F	P ₀	P ₁	P ₂	D	T ₂	T ₁
2520S	2,35±0,05	2,65±0,05	8,0±0,1	1,75±0,1	3,5±0,05	4,0±0,1	4,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,25±0,03	1,2±0,05
2522S	2,35±0,05	2,65±0,05	8±0,3	1,75±0,1	3,5±0,05	4,0±0,1	4,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,25±0,03	1,4±0,1
3010S	3,3±0,1	3,3±0,1	8,0±0,3	1,75±0,1	3,5±0,05	4,0±0,1	4,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,25±0,03	1,4±0,1
3012S	3,3±0,1	3,3±0,1	8,0±0,3	1,75±0,1	3,5±0,05	4,0±0,1	4,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,25±0,03	1,6±0,1
3015S	3,3±0,1	3,3±0,1	8,0±0,3	1,75±0,1	3,5±0,05	4,0±0,1	4,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,25±0,03	1,9±0,1
4010S	4,3±0,1	4,3±0,1	12,0±0,3	1,75±0,1	5,5±0,05	4,0±0,1	8,0±0,1	2,0±0,05	1,5+0,1/-0,0	0,35±0,03	1,4±0,1
4012S	4,3±0,1	4,3±0,1	12,0±0,3	1,75±0,1	5,5±0,05	4,0±0,1	8,0±0,1	2,0±0,05	1,5+0,1/-0,0	0,35±0,03	1,4±0,1
4018S	4,3±0,1	4,3±0,1	12,0±0,3	1,75±0,1	5,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,-0,1	0,35±0,03	2,1±0,1
4020S	4,3±0,1	4,3±0,1	12,0±0,3	1,75±0,1	5,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,4±0,03	2,4±0,1
4030S	4,3±0,1	4,3±0,1	12,0±0,3	1,75±0,1	5,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,4±0,03	3,2±0,1
5012S	5,3±0,1	5,3±0,1	12,0±0,3	1,75±0,1	5,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,35±0,03	1,4±0,1
5020S	5,4±0,1	5,4±0,1	12,0±0,3	1,75±0,1	5,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,35±0,03	2,2±0,1
5040S	5,3±0,1	5,3±0,1	12,0±0,3	1,75±0,1	5,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,4±0,03	4,2±0,1
6020S	6,3±0,1	6,3±0,1	16,0±0,3	1,75±0,1	7,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,4±0,03	2,5±0,1
6028S	6,4±0,1	6,4±0,1	16,0±0,3	1,75±0,1	7,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,4±0,03	3,3±0,1
6045S	6,4±0,1	6,4±0,1	16,0±0,3	1,75±0,1	7,5±0,1	4,0±0,1	8,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,4±0,03	4,7±0,1
8040S	8,35±0,1	8,35±0,1	16,0±0,3	1,75±0,1	7,5±0,1	4,0±0,1	12,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,4±0,03	4,4±0,1
8065S	8,30±0,1	8,30±0,1	16,0±0,3	1,75±0,1	7,5±0,1	4,0±0,1	12,0±0,1	2,0±0,1	1,5+0,1/-0,0	0,5±0,03	6,7±0,1

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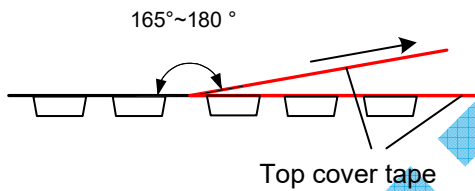
Wire Wound SMD Power Inductor

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Lead Dimensions:



Maximum two chip cavities missing product may exist in a reel but they may not be consecutive two cavities.



Peel-off strength: 10~100gf size 2522, 2520, 3010, 3012 and 3015 other 10~130gf.

Peel-off angle: 165°~180°

Peel-off speed: 300mm/min

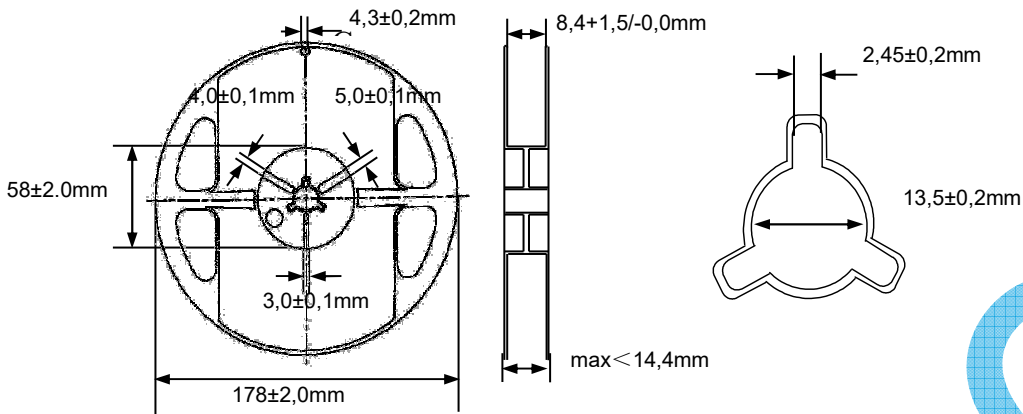
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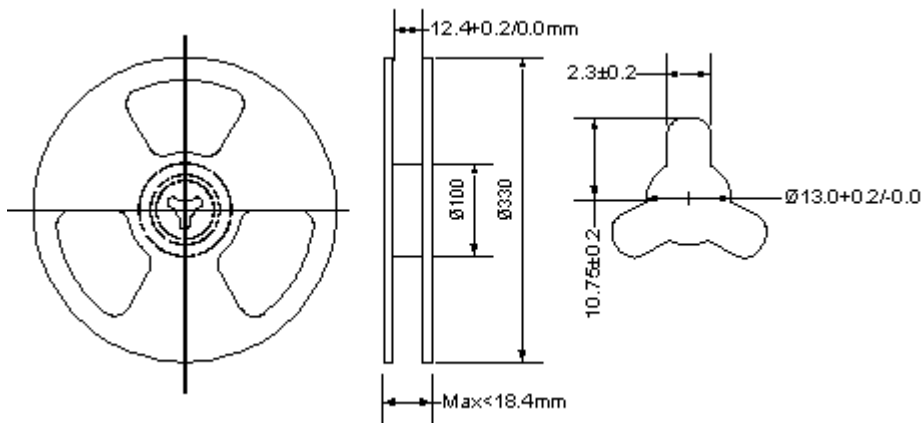
SMD

Reel Dimensions

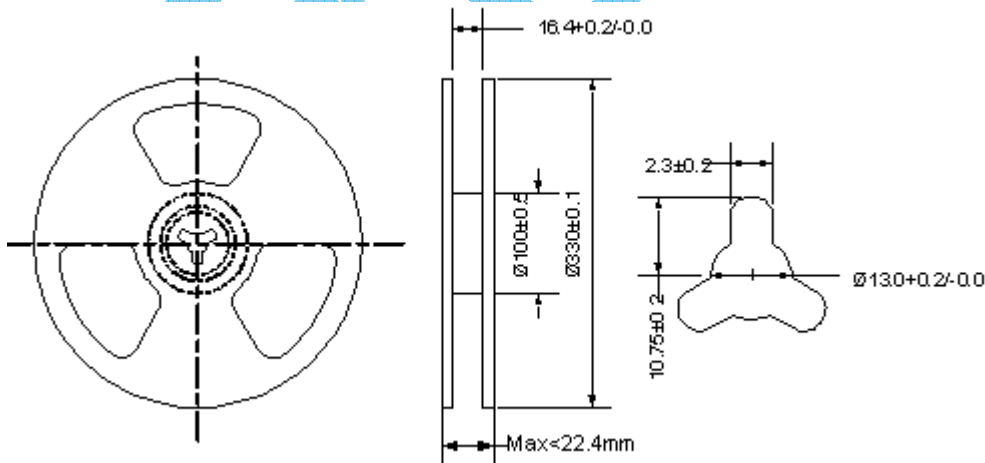
2520, 2522, 3010, 3012, 3015



4010, 4012, 4018, 4020, 4030, 5012, 5020, 5040



6020, 6028, 6045, 8040, 8065



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Wire Wound SMD Power Inductor

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Stock period

The performance of these products, including the solderability, is guaranteed for 12 month, provided that they remain packed as they were when delivered and stored at a temperature of maximum 40°C (minimum -10°C) and a relative humidity less than 70%RH

The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to dust of harmful gas (e.g. HCl, sulfurous gas of H₂S).

Packaging material may be deformed if package are stored where they are exposed to heat of direct sunlight.

Operating and storage temperature range

(individual chip without packing):): -40°C ~ +125°C, 125°C (Including Self-heating)

Handing

Keep the products away from all magnets and magnetic objects.

Be careful not to subject the products to excessive mechanical shocks.

Please avoid applying impact to the products after mounted on pc board.

Avoid ultrasonic cleaning.

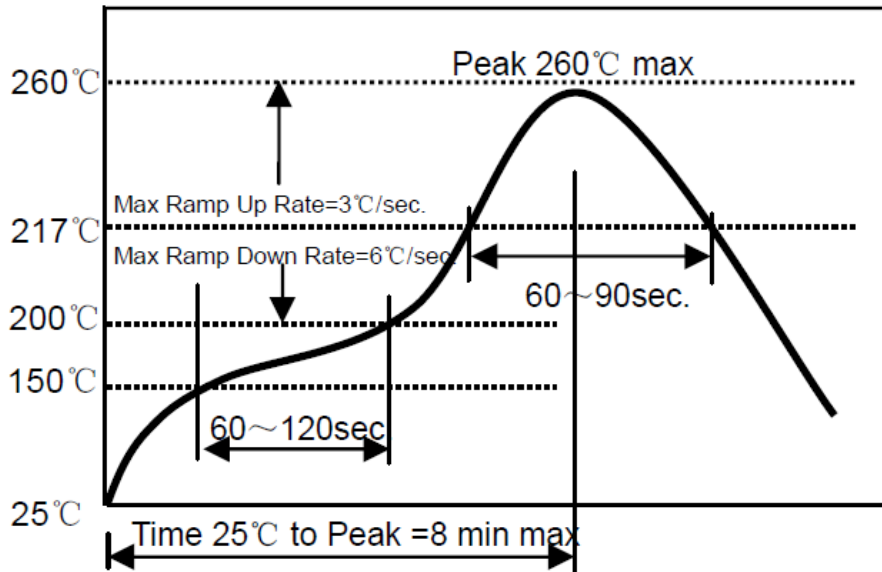
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Wire Wound SMD Power Inductor

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Lead Free Reflow Soldering Profile



1~2 °C/sec. Ramp

Pre-heating: 150~200°C/60~120 sec.

Time above 217°C: 60~90sec

Peak temperature: 260°C

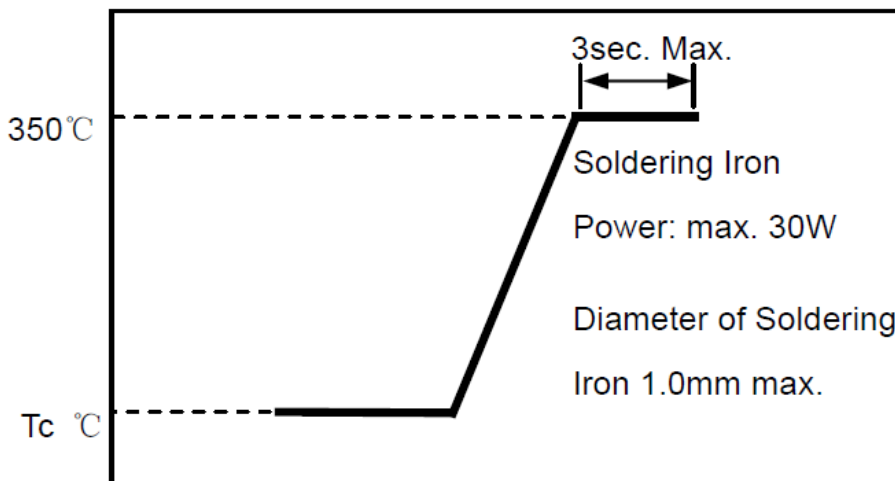
Max time at max temp. 5s.

Solder paste: Sn/3,0Ag/0,5Cu

Max.2 times for reflowing

Applicable soldering process to this product is reflow soldering only.

Iron Soldering Profile



Iron soldering power: Max.30W.

Pre-heating: 150°C / 60sec.

Soldering Tip temperature: 350°C Max.

Soldering time: 3sec Max.

Solder paste: Sn/3,0Ag/0,5Cu.

Max.1 times for iron soldering.

3/17/2021

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Please read cautions and warnings and important notes at the end of this document.

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Take care not to apply the tip of the soldering iron to the terminal electrodes.

Recommended conditions for repair by soldering iron:

Preheat the circuit board with product to repair at 150°C for about 1 minute.

Put soldering iron on the land-pattern.

Soldering iron's temperature: 350°C maximum/Duration: 3 seconds maximum/1 time for each terminal.

The soldering iron should not directly touch the inductor.

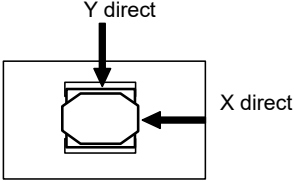
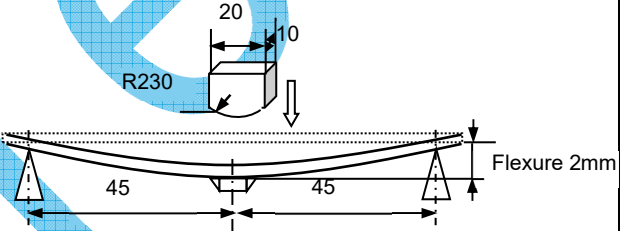
Product once removed from the circuit board may not be used again.

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Wire Wound SMD Power Inductor

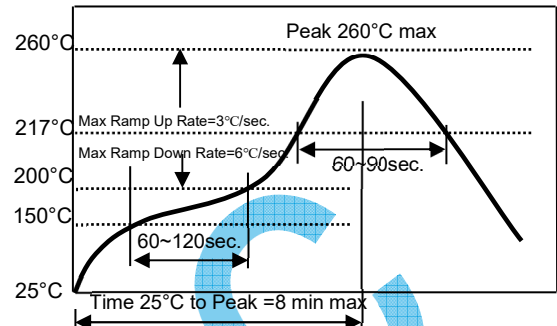
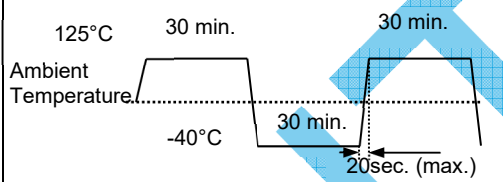
SMD Reliability Test

Items	Requirements	Test Methods and Remarks
Terminal Strength	No removal or split of the termination or other defects shall occur. 	<ol style="list-style-type: none"> ① Solder the inductor to the testing jig (glass epoxy board shown using leadfree solder. Then apply a force in the direction of the arrow. ② 10N force. ③ Keep time: 5s.
Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> ① Solder the inductor to the test jig (glass epoxy board shown) Using a leadfree solder. Then apply a force in the direction shown. ② Flexure: 2mm. ③ Pressurizing Speed: 0,5mm/sec. ④ Keep time: 30 sec. ⑤ Test boards size: 100x40x1,0 
Vibration	<ol style="list-style-type: none"> ① No visible mechanical damage. ② Inductance change: Within $\pm 10\%$ 	<ol style="list-style-type: none"> ① Solder the inductor to the testing jig (glass epoxy board shown) using leadfree solder. ② The inductor shall be subjected to a simple harmonic motion having total amplitude of 1,5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. ③ The frequency range from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).
Temperature	Inductance change within $\pm 20\%$	Temperature range: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$ Reference temperature: $+20^{\circ}\text{C}$
Solderability	90% or more of electrode area shall be coated by new solder.	<ol style="list-style-type: none"> ① The test samples shall be dipped in flux, and then immersed in molten solder. ② Solder temperature: $245 \pm 5^{\circ}\text{C}$ ③ Duration: 5 ± 1 sec. ④ Solder: Sn/3,0Ag/0,5Cu ⑤ Flux: 25% resin and 75% ethanol in weight ⑥ Immersion depth: all sides of mounting terminal shall be immersed

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<p>Resistance to Soldering Heat</p>	<p>① No visible mechanical damage. ② Inductance change: Within $\pm 10\%$.</p>	<p>① Re-flowing Profile ② Test board thickness: 1,0mm ③ Test board material: glass epoxy resin ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring</p> 
<p>Thermal Shock</p>	<p>① No mechanical damage. ② Inductance change: Within $\pm 10\%$.</p> 	<p>① Temperature, Time: $-40\pm 3^\circ\text{C}$ for 30 ± 3 min \rightarrow 125°C for 30 ± 3 min. ② Transforming interval: 20 sec.(max.). ③ Tested cycle: 100 cycles. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>Resistance to Low Temperature</p>	<p>① No mechanical damage. ② Inductance change: Within $\pm 10\%$.</p>	<p>① Temperature: $-40\pm 3^\circ\text{C}$ ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>Resistance to High Temperature</p>	<p>① No mechanical damage. ② Inductance change: Within $\pm 10\%$.</p>	<p>① Temperature: $125\pm 2^\circ\text{C}$ ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>Damp Heat</p>	<p>① No visible mechanical damage. ② Inductance change: Within $\pm 10\%$.</p>	<p>① Temperature: $60\pm 2^\circ\text{C}$ ② Humidity: 90% to 95% RH. ③ Duration: 1000^{+24} hours. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>Loading Under Damp Heat</p>	<p>① No mechanical damage. ② Inductance change within $\pm 10\%$</p>	<p>① Temperature: $60\pm 2^\circ\text{C}$ ② Humidity: 90% to 95% RH. ③ Applied current: Rated current. ④ Duration: 1000^{+24} hours. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>Loading at High Temperature</p>	<p>① No visible mechanical damage. ② Inductance change within $\pm 10\%$</p>	<p>① Temperature: $85\pm 2^\circ\text{C}$ ② Duration: 1000^{+24} hours. ③ Applied current: Rated current. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>

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