Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

REMINDERS

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Please note that Taiyo Yuden Co., Ltd. shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this catalog or individual specification.

- Please contact Taiyo Yuden Co., Ltd. for further details of product specifications as the individual specification is available.
- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.
- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,(automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance. Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN' s official sales channel").

It is only applicable to the products purchased from any of TAIYO YUDEN's official sales channel.

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TAIYO YUDEN 2013

REFLOW

PARTS NUMBE	2 0 1 6 Τ 1 0 J Δ ② ③ ④ ⑤ ⑥	$\Delta=$ Blank space	
①Series name		④Nominal induct	ance
Code	Series name	Code	Nominal inductance [μ H]
LBM	Wound chip inductor for signal line	(example)	
		R12	0.12
2)Dimensions(L>	< W)	1R0	1.00
Code	Dimensions (L × W) [mm]	100	10
2016	2.0×1.6	101	100
③Packaging		%R=Decimal po	int
Code	Packaging	⑤Inductance tole	erance
Т	Taping	Code	Inductance tolerance
		J	$\pm 5\%$

⑥Internal code

-	T		ounting and solde	ring conditio	ons should be chec these products is			c
\mathcal{M}	e	Тур	e	А	В	С	1 ļ	
		LBM2	016	0.6	1.0	1.8	•	
						Uni	t:mm	
Tumo		w					Standard quantity [pcs]	
Туре	L	٧٧		1	e	Pape	r tape	Embossed tape
_BM2016	2.0±0.2	1.6±0.2	1.6:	±0.2	0.5 ± 0.2		_	2000
	(0.08 ± 0.008)	(0.063 ± 0.008)	(0.063)	±0.008)	(0.02 ± 0.008)			2000
								Unit:mm(inch)

-	-	

Parts number	EHS	Nominal inductance [µ H]	Inductance tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance $[\Omega](\pm 30\%)$	Rated current [mA] (max.)	Measuring frequency [MHz]
LBM 2016TR12J	R₀HS	0.12	±5%	30	600	0.13	610	25.2
BM 2016TR15J	RoHS	0.15	±5%	30	550	0.15	570	25.2
.BM 2016TR18J	RoHS	0.18	±5%	30	500	0.15	560	25.2
BM 2016TR22J	RoHS	0.22	±5%	30	450	0.20	520	25.2
.BM 2016TR27J	RoHS	0.27	±5%	30	425	0.21	510	25.2
BM 2016TR33J	RoHS	0.33	±5%	30	400	0.21	490	25.2
BM 2016TR39J	RoHS	0.39	±5%	30	375	0.26	440	25.2
.BM 2016TR47J	RoHS	0.47	±5%	30	350	0.26	430	25.2
.BM 2016TR56J	RoHS	0.56	±5%	30	300	0.29	410	25.2
.BM 2016TR68J	RoHS	0.68	±5%	30	270	0.32	400	25.2
.BM 2016TR82J	RoHS	0.82	±5%	30	250	0.34	390	25.2
.BM 2016T1R0J	RoHS	1.0	±5%	30	220	0.38	385	7.96
.BM 2016T1R2J	RoHS	1.2	±5%	30	180	0.41	370	7.96
BM 2016T1R5J	RoHS	1.5	±5%	30	135	0.47	350	7.96
BM 2016T1R8J	RoHS	1.8	±5%	30	100	0.48	345	7.96
BM 2016T2R2J	RoHS	2.2	±5%	30	75	0.54	340	7.96
BM 2016T2R7J	RoHS	2.7	±5%	30	55	0.59	310	7.96
BM 2016T3R3J	RoHS	3.3	±5%	30	48	0.68	290	7.96
BM 2016T3R9J	RoHS	3.9	±5%	30	43	0.74	275	7.96
BM 2016T4R7J	RoHS	4.7	±5%	30	40	0.78	270	7.96
BM 2016T5R6J	RoHS	5.6	±5%	25	36	0.88	255	7.96
.BM 2016T6R8J	RoHS	6.8	±5%	25	33	0.97	240	7.96
BM 2016T8R2J	RoHS	8.2	±5%	25	30	1.1	225	7.96
BM 2016T100J	RoHS	10	±5%	25	27	1.2	215	2.52
BM 2016T120J	RoHS	12	±5%	25	23	1.4	200	2.52
BM 2016T150J	RoHS	15	±5%	25	20	1.5	190	2.52
BM 2016T180J	RoHS	18	±5%	25	18	2.5	150	2.52
BM 2016T220J	RoHS	22	±5%	25	17	2.8	140	2.52
BM 2016T270J	R₀HS	27	±5%	25	16	3.2	130	2.52
BM 2016T330J	RoHS	33	±5%	25	15	3.6	125	2.52
BM 2016T390J	RoHS	39	±5%	20	14	3.9	120	2.52
BM 2016T470J	RoHS	47	±5%	20	13	4.1	115	2.52
BM 2016T560J	RoHS	56	±5%	20	12	5.9	95	2.52
BM 2016T680J	R₀HS	68	±5%	20	11	7.0	90	2.52
.BM 2016T820J	RoHS	82	±5%	20	10	7.7	85	2.52
BM 2016T101J	RoHS	100	±5%	15	9.0	8.0	80	0.796

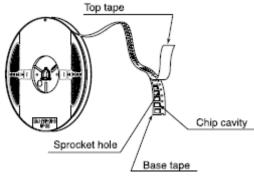
WIRE-WOUND CHIP INDUCTORS (LB SERIES), WIRE-WOUND CHIP POWER INDUCTORS (CB SERIES), WIRE-WOUND CHIP INDUCTORS FOR SIGNAL LINES (LB SERIES M TYPE)

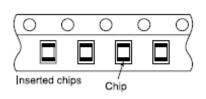
PACKAGING

①Minimum Quantity					
T	Standard Qu	antity [pcs]			
Туре	Paper Tape	Embossed Tape			
LB C3225	_	1000			
CB C3225		1000			
LB 3218	—	2000			
LB R2518					
LB C2518					
LB 2518	-	2000			
CB 2518					
CB C2518					
LBM2016					
LB C2016					
LB 2016	—	2000			
CB 2016					
CB C2016					
LB 2012					
LB C2012					
LB R2012	—	3000			
CB 2012					
CB C2012					
CB L2012	4000	_			
LB 1608	4000	_			
LBMF1608	_	3000			
CBMF1608		3000			

②Tape material



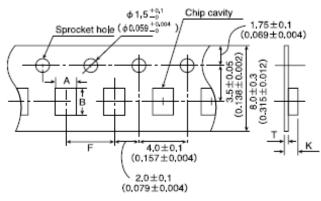




③Taping Dimensions

Embossed Tape(0.315 inches wide)

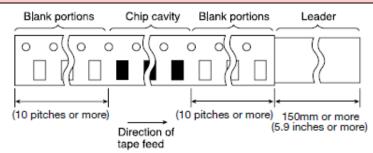
Card board carrier tape(0.315 inches wide)



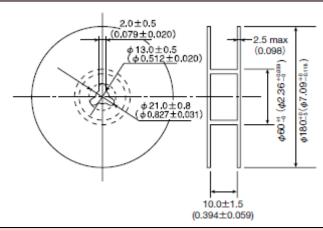


T	Chip o	cavity	Insertion pitch	Tape th	ickness
Туре	A	В	F	Т	К
LBM2016	1.75 ± 0.1 (0.069 ± 0.004)	2.1 ± 0.1 (0.083 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	1.9max. (0.075max.)
LB C3225 CB C3225	2.8±0.1 (0.110±0.004)	3.5 ± 0.1 (0.138 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	4.0max. (0.157max.)
LB 3218	2.1±0.1 (0.083±0.004)	3.5 ± 0.1 (0.138 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	2.2max. (0.087max.)
LB 2518 CB 2518 LB C2518 CB C2518 LB R2518 LB R2518	2.15±0.1 (0.085±0.004)	2.7±0.1 (0.106±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	2.2max. (0.087max.)
LB 2016 CB 2016 LB C2016 CB C2016	1.75±0.1 (0.069±0.004)	2.1±0.1 (0.083±0.004)	4.0±0.1 (0.157±.004)	0.3±0.05 (0.012±0.002)	1.9max. (0.075max.)
LB 2012 CB 2012 LB C2012 CB C2012 LB R2012 LB R2012	1.45±0.1 (0.057±0.004)	2.25±0.1 (0.089±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.010±0.002)	1.45max. (0.057max.)
CB L2012	1.55 ± 0.1 (0.061 ± 0.004)	2.3±0.1 (0.091±0.004)	4.0±0.1 (0.157±0.004)	1.1max. (0.043max.)	1.1max. (0.043max.)
LB 1608	$ \begin{array}{r} 1.0 \pm 0.1 \\ (0.039 \pm 0.004) \end{array} $	1.8±0.1 (0.071±0.004)	4.0±0.1 (0.157±0.004)	1.1max. (0.043max.)	1.1max. (0.043max.)
LBMF1608 CBMF1608	$ \begin{array}{r} 1.1 \pm 0.1 \\ (0.043 \pm 0.004) \end{array} $	1.9±0.1 (0.075±0.004)	4.0±0.1 (0.157±0.004)	0.25 ± 0.05 (0.010 ± 0.002)	1.2max. (0.047max.)
					Unit:mm(inch)

④Leader and Blank Portion

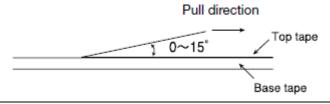


⑤Reel Size



6 Top Tape Strength

The top tape requires a peel-off force 0.2 to 0.7N in the direction of the arrow as illustrated below.





WIRE-WOUND CHIP INDUCTORS (LB SERIES), WIRE-WOUND CHIP POWER INDUCTORS (CB SERIES), WIRE-WOUND CHIP INDUCTORS FOR SIGNAL LINES (LB SERIES M TYPE)

RELIABILITY DATA

ature Range					
LB, LBC, LBR, LBMF Series					
CB, CBC, CBL, CBMF Series	$-40 \sim +105^{\circ}$ C (Including self-generated heat)				
LBM Series					
ture Range(after soldering)					
LB, LBC, LBR, LBMF Series					
CB, CBC, CBL, CBMF Series					
LBM Series					
LB, CB Series:					
Please refer the term of "7. storage conditions" in precaution	ins.				
LB, LBC, LBR, LBMF Series					
CB, CBC, CBL, CBMF Series	Within the specified tolerance				
LBM Series					
LB, LBC, LBR, LBMF Series					
CB, CBC, CBL, CBMF Series	Within the specified tolerance				
LBM Series					
LB•LBC•LBR•CB•CBC•CBL•LBMF•CBMF•LBM Series	-				
Measuring equipmet :LCR Mater(HP4285A or its	equivalent)				
LB, LBC, LBR, LBMF Series					
CB, CBC, CBL, CBMF Series					
LBM Series	Within the specified tolerance				
LBM Series					
Measuring equipment : LCR Mater (HP4285A or its e	quivalent)				
	Within the specified tolerance				
LDM Series					
t Methods and narks Measuring equipment : DC Ohmmeter (HIOKI 3227 or its equivalent)					
<u>I</u>					
equency					
LB, LBC, LBR, LBMF Series					
LB, LBC, LBR, LBMF Series					
LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series	Within the specified tolerance				
	LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series ture Range (after soldering) LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series LB, CB Series : Please refer the term of "7. storage conditions" in precaution LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series LB, LBC, LBR, LBMF Series LBM Series LB, LBC, LBR, LBMF Series LB, LBC, CBL, CBMF Series LB, LBC, LBR, CBMF Series LBM Series LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series				

8.Temperature Char	8.Temperature Characteristic				
	LBM2016				Inductance change : Within±5%
	LB1608	LB2012	LBR2012	CB2012	Inductance change : Within±20%
	CBL2012	LB2016	CB2016	LB2518	
Specified Value	LBR2518	CB2518	LBC3225	CBC3225	
	LBMF1608	CBMF1608	LBC2016	CBC2016	Inductance change : Within±25%
	LBC2518	CBC2518	LB3218		
	LBC2012	CBC2012			Inductance change : Within±35%
Test Methods and	Change of	maximum inductan	ce deviation in	step 1-5	
Remarks	Stop	Tempe	erature(°C)		
	Step	Step LB, CB Series			
	1	20			
	2		-40		
	3	20(Referen	ce temperature	e)	
	4	+85(Maximum o	perating tempe	erature)	
	5		20		

9.Rasistance to Fle	Rasistance to Flexure of Substrate					
	LB, LBC, LBR, LBMF Series					
Specified Value	CB, CBC, CBL, CBMF Series	No damage.				
	LBM Series					
Test Methods and	Warp : 2mm(LB+LBC+LBR+CB+CBC+CBL+LBM+L	BMF•CBMF Series)				
Remarks	Test substrate : Board according to JIS C0051 Thickness : 0.8mm(LB • LBMF • CBMF1608) : 1.0mm (Others) Pressing jig 10 10 R5 45±2mm 45±2mm					

10.Body Strength	0.Body Strength						
	LB, LBC, LBR, LBMF Series						
Specified Value	CB, CBC, CBL, CBMF Series	No damage.					
	LBM Series						
Test Methods and	LB·LBC·LBR·CB·CBC·CBL·LBM						
Remarks	Applied force : 10N						
	Duration : 10sec.						
	LB1608+LBMF1608+CBMF1608						
	Applied force : 5N	Applied force : 5N					
	Duration : 10sec.						

11.Adhesion of terminal electrode						
	LB, LBC, LBR, LBI	MF Series				
Specified Value	CB, CBC, CBL, CE	MF Series	No abnormality.			
	LBM Series					
Test Methods and Remarks	Applied force Duration Test substrate LB1608 • CBMF160	•CBC•CBL•LBM•LBMF•CBMF : 10N to X and Y directions : 5 sec. : Printed board 8•LBMF1608 : 5N toX and Y directions : 5 sec. : Printed board				

12.Resistance to vi	12.Resistance to vibration					
	LB, LBC, LBR, LBMF	Series	Inductance change : Within±10%			
Specified Value	CB, CBC, CBL, CBMF	- Series	No significant abnormality in appearance.			
opeomed value	LBM Series		Inductance change : Within±5% No significant abnormality in appearance.			
Test Methods and	LB·LBR·LBC·CB·CE	B·LBR·LBC·CB·CBC·CBL·LBM·LBMF·CBMF : According to JIS C5102 clause 8.2.				
Remarks	Vibration type	: A				
	Directions	: 2 hrs each in X, Y and Z directions	. Total:6 hrs			
	Freuency range	: 10 to 55 to 10 Hz(1min.)				
	Amplitude	: 1.5mm				
	Mounting method	: Soldering onto printed board				
	Recovery					

13.Drop test		
	LB, LBC, LBR, LBMF Series	
Specified Value	CB, CBC, CBL, CBMF Series	—
	LBM Series	

14.Solderability			
	LB, LBC, LBR, LBMF Se	ries	
Specified Value	CB, CBC, CBL, CBMF S	eries	At least 90% of surface of terminal electrode is covered by new
	LBM Series		
Test Methods and	LB·LBC·LBR·CB·CBC	•CBL•LBM•LBMF•CBMF:	
Remarks	Solder temperature	: 245±5°C	
	Duration	:5±0.5sec	
	Flux	: Methanol solution with 25% of cold	ophony

15.Resistance to so	Idering	
	LB, LBC, LBR, LBMF Series	- Inductance change : Within±10%
Specified Value	CB, CBC, CBL, CBMF Series	
	LBM Series	Inductance change : Within $\pm 5\%$
Test Methods and Remarks	LB·LBC·LBR·CB·CBC·CBL·LBM·LBMF·CBMF: 3 times of reflow oven at 230°C MIN for 40sec. with peak temperature at 260 °C for 5sec.	

16.Resisitance to solvent			
	LB, LBC, LBR, LBMF Series		
Specified Value	CB, CBC, CBL, CBMF Series	No significant abnormality in appearance	
	LBM Series		
Test Methods and Remarks	Solvent temperature: Room temperatureType of solvent: Isopropyl alcoholCleaning conditions: 90s. Immersion and cleaning.		

17.Thermal shock		
	LB, LBC, LBR, LBMF Series	Inductance change : Within±10% No significant abnormality in appearance.
Specified Value	CB, CBC, CBL, CBMF Series	
	LBM Series	
Test Methods and Remarks	LB·LBC·LBR·CB·CBC·CBL·LBM·LBMF·CBMF: -40~+85°C, maintain times 30min. ,100 cycle Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	



18.Damp heat life te	est		
Specified Value	LB, LBC, LBR, LBMF Series		
	CB, CBC, CBL, CBMF Series		Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
	LBM Series		
Test Methods and Remarks	Temperature Humidity Duration Recovery	: 60±2°C : 90∼95%RH : 1000 hrs : At least 2 hrs of recovery under th	ne standard condition after the test, followed by the measurement within 48 hrs.

19.Loading under damp heat life test				
	LB, LBC, LBR, LB	MF Series		
	CB, CBC, CBL, CBMF Series		☐ Inductance change : Within±10% — No significant abnormality in appearance.	
Specified Value	LBM Series			
Test Methods and	Temperature	: 60±2°C		
Remarks	Humidity	: 90 ~ 95%RH		
	Duration	: 1000 hrs		
	Applied current	: Rated current		
	Recovery	: At least 2 hrs of recovery under the st	andard condition after the test, followed by the measurement within 48 hrs.	

20.High temperature	e life test		
	LB, LBC, LBR, L	BMF Series	
Specified Value	CB, CBC, CBL, CBMF Series		Inductance change : Within±10% No significant abnormality in appearance.
	LBM Series		
Test Methods and	Temperature	: 85±2°C	
Remarks	Duration	: 1000 hrs	
	Recovery	: At least 2 hrs of recovery under the st	andard condition after the test, followed by the measurement within 48 hrs.

21.Loading at high t	emperature life test		
Specified Value	LB, LBC, LBR, LBMF Series		Inductance change : Within±10% (LBC3225 Series : Within±20%) No significant abnormality in appearance.
	CB, CBC, CBL, CBMF Series		
	LBM Series		
Test Methods and	Temperature	: 85±2°C	
Remarks	Duration	: 1000 hrs	
	Applied current	: Rated current	
	Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement		andard condition after the test, followed by the measurement within 48 hrs.

22.Low temperature	e life test		
	LB, LBC, LBR, LB	MF Series	
Specified Value	CB, CBC, CBL, CBMF Series		Inductance change : Within±10% No significant abnormality in appearance.
	LBM Series		
Test Methods and	Temperature	: -40±2°C	
Remarks	Duration	: 1000 hrs	
	Recovery	: At least 2 hrs of recovery under the sta	ndard condition after the test, followed by the measurement within 48 hrs.

23.Standard condit	ion	
	LB, LBC, LBR, LBMF Series	Standard test conditions
	CB, CBC, CBL, CBMF Series	Unless specified, Ambient temperature is $20 \pm 15^{\circ}$ C and the Relative
Specified Value	LBM Series	humidity is 65±20%. If there is any doubt about the test results, further measurement shall be had within the following limits: Ambient Temperature: 20±2°C Relative humidity: 65±5% Inductance value is based on our standard measurement systems.

WIRE-WOUND CHIP INDUCTORS (LB SERIES), WIRE-WOUND CHIP POWER INDUCTORS (CB SERIES), WIRE-WOUND CHIP INDUCTORS FOR SIGNAL LINES (LB SERIES M TYPE)

PRECAUTIONS

1. Circuit Design	
Precautions	 Operating environment The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.

2. PCB Design	
Precautions	 Land pattern design 1. Please contact any of our offices for a land pattern, and refer to a recommended land pattern of a right figure or specifications.
Technical considerations	PRECAUTIONS [Recommended Land Patterns] Surface Mounting • Mounting and soldering conditions should be checked beforehand. • Applicable soldering process to those products is reflow soldering only.

3. Considerations for automatic placement		
Precautions	 Adjustment of mounting machine 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards. 2. Mounting and soldering conditions should be checked beforehand. 	
Technical considerations	1. When installing products, care should be taken not to apply distortion stress as it may deform the products.	

4. Soldering	
Precautions	 Reflow soldering(LB and CB Types) 1. For reflow soldering with either leaded or lead-free solder, the profile specified in "point for controlling" is recommended. Recommended conditions for using a soldering iron 1. Put the soldering iron on the land-pattern. Soldering iron's temperature - Below 350°C Duration-3 seconds or less. The soldering iron should not come in contact with inductor directly.
Technical considerations	 Reflow soldering(LB and CB Types) Reflow profile Peak Temp: 260+0/-5°C Pre-heat zone Pre-heat zone Point To sec Max Point To se

Precautions Cleaning conditions Washing by supersonic waves shall be avoided. Technical ♦ Cleaning conditions	5. Cleaning	
Technical Cleaning conditions	Precautions	
considerations If washed by supersonic waves, the products might be broken.		



6. Handling	
Precautions	 Handling Keep the inductors away from all magnets and magnetic objects. Breakaway PC boards (splitting along perforations) When splitting the PC board after mounting inductors, care should be taken not to give any stresses of deflection or twisting to the board. Board separation should not be done manually, but by using the appropriate devices. Mechanical considerations Please do not give the inductors any excessive mechanical shocks.
Technical considerations	 Handling 1. There is a case that a characteristic varies with magnetic influence. Breakaway PC boards (splitting along perforations) 1. Planning pattern configurations and the position of products should be carefully performed to minimize stress. Mechanical considerations 1. There is a case to be damaged by a mechanical shock.

7. Storage conditions	
Precautions	 Storage To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled. Recommended conditions
Technical considerations	 Storage 1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.