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信号系巻線チップインダクタ

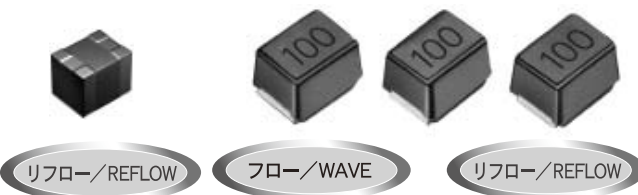
WOUND CHIP INDUCTORS

FOR SIGNAL LINE

LB SERIES M TYPE

LE SERIES M TYPE

| | | |
|-----------------|--------------|--|
| OPERATING TEMP. | LBM2016 TYPE | -25~+105°C (製品自己発熱含む) (Including self-generated heat) |
| | LEM2520 TYPE | -40~+85°C |



特長 FEATURES

LBM2016

- ・下面電極構造を採用により、高いQ化および狭公差化を実現しました。信号系用途の回路設計に適した巻線チップインダクタです。

LEM2520

- ・アキシャルリード形インダクタの製造工程・基本構造を継承した量産性に優れた高品質のインダクタ

LBM2016 Series

- ・ High Q and narrow tolerance are achieved by adopting bottom-surface electrode structure. Wound Chip Inductors that are suit for module design of signal line uses.

LEM2520 Series

- ・ A high-quality inductor that is simple to mass-produce and conforms to the same production process and basic construction as an axial lead type inductor.

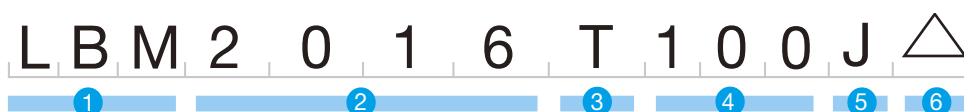
用途 APPLICATIONS

- ・ DSC / DVC / HDD、液晶、携帯電話、ゲーム機器、各種映像機器、各種通信機器など

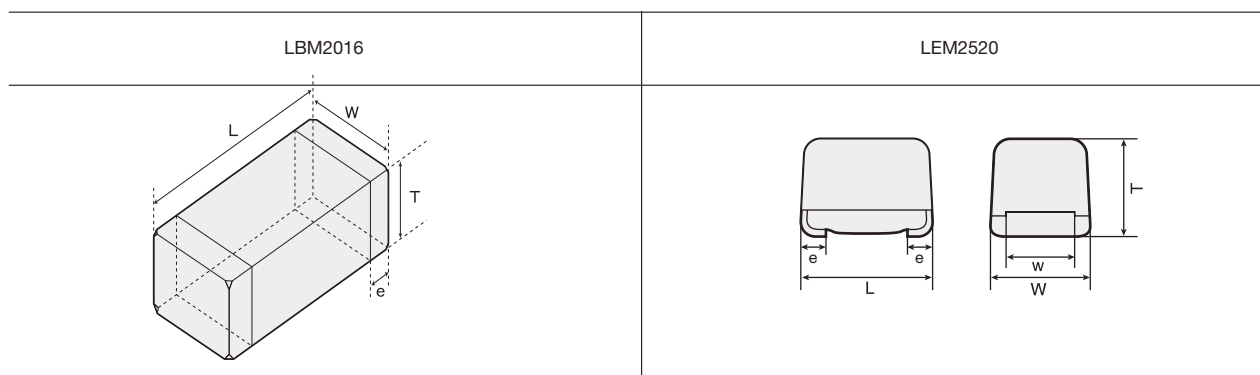
- ・ DSC/DVC/HDD, LCD, portable telephones, game equipments. Various audio-visual equipments, various communication equipments, etc.

形名表記法 ORDERING CODE

| | | | |
|--|---------------------------------------|---|---|
| 1 形式 LBM 信号系巻線チップインダクタ LEM 信号系巻線チップインダクタ | 3 梱包 T テーピング | 4 公称インダクタンス [μH] 例 R12 0.12 1R0 1.00 100 10.0 | 5 インダクタンス許容差 J ±5% K ±10% |
| 2 外形寸法 [mm] 2016 2.0×1.6 2520 2.5×2.0 | 6 当社管理記号 △ 標準品 △=スペース | | |



| | | | |
|--|---|--|--|
| 1 Type LBM Wound chip inductor for signal line LEM Wound chip inductor for signal line | 3 Packaging T Tape & Reel | 4 Nominal Inductance [μH] example R12 0.12 1R0 1.00 100 10.0 | 5 Inductance Tolerances J ±5% K ±10% |
| 2 External Dimensions [mm] 2016 2.0×1.6 2520 2.5×2.0 | 6 Internal code △ Standard Products △=Blank space | | |



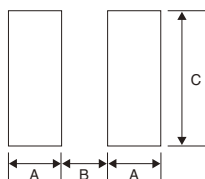
| Type | L | W | T | e | w |
|---------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| LBM2016 | 2.0±0.2 (0.08±0.008) | 1.6±0.2 (0.063±0.008) | 1.6±0.2 (0.063±0.008) | 0.5±0.2 (0.02±0.008) | |
| LEM2520 | 2.5±0.2 (0.098±0.008) | 2.0±0.2 (0.079±0.008) | 1.8±0.2 (0.071±0.008) | 0.45 (0.018) | 1.4±0.1 (0.055±0.004) |

Unit : mm (inch)

推奨ランドパターン Recommended Land Patterns

実装上の注意

- ・実装状態を確認の上ご使用下さいませようお願いいたします。
- ・本製品のはんだ付けは、リフローはんだ工法に限ります。
(LBのみの適用)
- ・推奨ランドパターン



| TYPE | A | B | C |
|---------|-----|-----|-----|
| LBM2016 | 0.7 | 0.8 | 1.8 |
| LEM2520 | 0.9 | 1.5 | 1.5 |

Unit : mm

Surface Mounting

- ・ Mounting and soldering conditions should be checked beforehand.
- ・ Applicable soldering process to this products is reflow soldering only.
(LB only)
- ・ Recommended Land Patterns

概略バリエーション AVAILABLE INDUCTANCE RANGE

| Range | | Type | LBM2016 | | LEM2520 | |
|------------------------|-----------------|------|----------------|---------------------|----------------|-----------------|
| 一般タイプ Ordinary type | Inductance (μH) | 0.12 | Idc[mA] 610 | Rdc±30% [Ω] 0.13 | Idc[mA] 520 | Rdc max 0.37 |
| | | 1.0 | 385 | 0.38 | 245 | 1.10 |
| | | 10 | 215 | 1.20 | 155 | 3.50 |
| | | 100 | 80 | 8.00 | 60 | 21.00 |
| | | | 100 μH | | 100 μH | |

| 代 表 値 Examples | Inductance | Idc [mA] | | Rdc [Ω] | |
|-------------------|------------|-------------------|-------------------|-------------------|-------------------|
| | | LBM2016 (max.) | LEM2520 (max.) | LBM2016 (±30%) | LEM2520 (max.) |
| | 0.12 μH | 610 | 520 | 0.13 | 0.37 |
| | 1.00 μH | 385 | 245 | 0.38 | 1.10 |
| | 10.0 μH | 215 | 155 | 1.20 | 3.50 |
| | 100 μH | 80 | 60 | 8.00 | 21.0 |

セクションガイド
Selection Guide

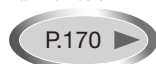
アイテム一覧
Part Numbers

特性図
Electrical Characteristics

梱包
Packaging

信頼性
Reliability Data

使用上の注意
Precautions



etc

LBM2016 TYPE

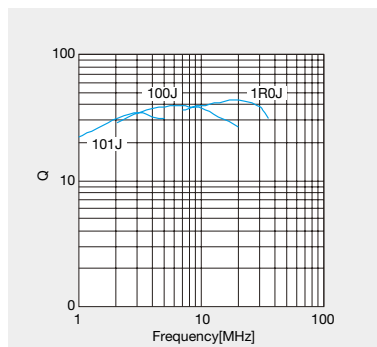
| 形 名 Ordering code | | EHS (Environmental Hazardous Substances) | 公称 インダクタンス Inductance [μH] | インダクタンス 許容差 Inductance Tolerance | Q値 Q VALUE (min.) | 自己共振 周波数 Self-resonant frequency [MHz] min. | 直流抵抗 DC Resistance [Ω] ±30% | 定格電流 Rated current [mA] (max.) | 測 定 周波数 Measuring frequency [MHz] |
|----------------------|--|---|-------------------------------------|---|-------------------------|--|---|--|---|
| LB M2016TR12J | | RoHS | 0.12 | ±5% | 30 | 600 | 0.13 | 610 | 25.2 |
| LB M2016TR15J | | RoHS | 0.15 | | | 550 | 0.15 | 570 | |
| LB M2016TR18J | | RoHS | 0.18 | | | 500 | 0.15 | 560 | |
| LB M2016TR22J | | RoHS | 0.22 | | | 450 | 0.20 | 520 | |
| LB M2016TR27J | | RoHS | 0.27 | | | 425 | 0.21 | 510 | |
| LB M2016TR33J | | RoHS | 0.33 | | | 400 | 0.21 | 490 | |
| LB M2016TR39J | | RoHS | 0.39 | | | 375 | 0.26 | 440 | |
| LB M2016TR47J | | RoHS | 0.47 | | | 350 | 0.26 | 430 | |
| LB M2016TR56J | | RoHS | 0.56 | | | 300 | 0.29 | 410 | |
| LB M2016TR68J | | RoHS | 0.68 | | | 270 | 0.32 | 400 | |
| LB M2016TR82J | | RoHS | 0.82 | | | 250 | 0.34 | 390 | |
| LB M2016T1R0J | | RoHS | 1.0 | | | 220 | 0.38 | 385 | |
| LB M2016T1R2J | | RoHS | 1.2 | | | 180 | 0.41 | 370 | 7.96 |
| LB M2016T1R5J | | RoHS | 1.5 | | | 135 | 0.47 | 350 | |
| LB M2016T1R8J | | RoHS | 1.8 | | | 100 | 0.48 | 345 | |
| LB M2016T2R2J | | RoHS | 2.2 | | | 75 | 0.54 | 340 | |
| LB M2016T2R7J | | RoHS | 2.7 | | | 55 | 0.59 | 310 | |
| LB M2016T3R3J | | RoHS | 3.3 | | | 48 | 0.68 | 290 | |
| LB M2016T3R9J | | RoHS | 3.9 | | | 43 | 0.74 | 275 | |
| LB M2016T4R7J | | RoHS | 4.7 | | | 40 | 0.78 | 270 | |
| LB M2016T5R6J | | RoHS | 5.6 | | 25 | 36 | 0.88 | 255 | |
| LB M2016T6R8J | | RoHS | 6.8 | | | 33 | 0.97 | 240 | |
| LB M2016T8R2J | | RoHS | 8.2 | | | 30 | 1.10 | 225 | |
| LB M2016T100J | | RoHS | 10 | | | 27 | 1.20 | 215 | |
| LB M2016T120J | | RoHS | 12 | | | 23 | 1.4 | 200 | |
| LB M2016T150J | | RoHS | 15 | | | 20 | 1.5 | 190 | |
| LB M2016T180J | | RoHS | 18 | | | 18 | 2.5 | 150 | |
| LB M2016T220J | | RoHS | 22 | | | 17 | 2.8 | 140 | |
| LB M2016T270J | | RoHS | 27 | | | 16 | 3.2 | 130 | |
| LB M2016T330J | | RoHS | 33 | | | 15 | 3.6 | 125 | |
| LB M2016T390J | | RoHS | 39 | | 20 | 14 | 3.9 | 120 | 2.52 |
| LB M2016T470J | | RoHS | 47 | | | 13 | 4.1 | 115 | |
| LB M2016T560J | | RoHS | 56 | | | 12 | 5.9 | 95 | |
| LB M2016T680J | | RoHS | 68 | | | 11 | 7.0 | 90 | |
| LB M2016T820J | | RoHS | 82 | | | 10 | 7.7 | 85 | |
| LB M2016T101J | | RoHS | 100 | | 15 | 9.0 | 8.0 | 80 | 0.796 |

LEM2520 TYPE

| 形 名 Ordering code | | EHS (Environmental Hazardous Substances) | 公称 インダクタンス Inductance [μH] | インダクタンス 許容差 Inductance Tolerance | Q min. | 自己共振 周波数 Self-resonant frequency [MHz] min. | 直流抵抗 DC Resistance [Ω] max. | 定格電流 Rated current [mA] max. | 測 定 周波数 Measuring frequency [MHz] |
|----------------------|--|---|-------------------------------------|---|-----------|--|---|---------------------------------------|---|
| LEM 2520 TR12K | | RoHS | 0.12 | ±10% | 30 | 600 | 0.37 | 520 | 25.2 |
| LEM 2520 TR15K | | RoHS | 0.15 | | | 550 | 0.42 | 480 | |
| LEM 2520 TR18K | | RoHS | 0.18 | | | 500 | 0.46 | 460 | |
| LEM 2520 TR22K | | RoHS | 0.22 | | | 450 | 0.52 | 430 | |
| LEM 2520 TR27K | | RoHS | 0.27 | | | 425 | 0.56 | 420 | |
| LEM 2520 TR33K | | RoHS | 0.33 | | | 400 | 0.60 | 400 | |
| LEM 2520 TR39K | | RoHS | 0.39 | | | 375 | 0.65 | 375 | |
| LEM 2520 TR47K | | RoHS | 0.47 | | | 350 | 0.68 | 350 | |
| LEM 2520 TR56K | | RoHS | 0.56 | | | 300 | 0.75 | 325 | |
| LEM 2520 TR68K | | RoHS | 0.68 | | | 270 | 0.85 | 300 | |
| LEM 2520 TR82K | | RoHS | 0.82 | | | 250 | 1.00 | 260 | |
| LEM 2520 T1R0J | | RoHS | 1.0 | ±5% | 30 | 220 | 1.10 | 245 | 7.96 |
| LEM 2520 T1R2J | | RoHS | 1.2 | | | 180 | 1.20 | 230 | |
| LEM 2520 T1R5J | | RoHS | 1.5 | | | 135 | 1.30 | 220 | |
| LEM 2520 T1R8J | | RoHS | 1.8 | | | 100 | 1.45 | 210 | |
| LEM 2520 T2R2J | | RoHS | 2.2 | | | 75 | 1.55 | 200 | |
| LEM 2520 T2R7J | | RoHS | 2.7 | | | 55 | 1.70 | 195 | |
| LEM 2520 T3R3J | | RoHS | 3.3 | | | 48 | 1.90 | 185 | |
| LEM 2520 T3R9J | | RoHS | 3.9 | | | 43 | 2.10 | 180 | |
| LEM 2520 T4R7J | | RoHS | 4.7 | | | 40 | 2.30 | 175 | |
| LEM 2520 T5R6J | | RoHS | 5.6 | | 25 | 36 | 2.50 | 170 | 2.52 |
| LEM 2520 T6R8J | | RoHS | 6.8 | | | 33 | 2.70 | 165 | |
| LEM 2520 T8R2J | | RoHS | 8.2 | | | 30 | 3.05 | 160 | |
| LEM 2520 T100J | | RoHS | 10 | | | 27 | 3.50 | 155 | |
| LEM 2520 T120J | | RoHS | 12 | | | 23 | 3.80 | 150 | |
| LEM 2520 T150J | | RoHS | 15 | | | 20 | 4.40 | 140 | |
| LEM 2520 T180J | | RoHS | 18 | | | 18 | 4.80 | 130 | |
| LEM 2520 T220J | | RoHS | 22 | | | 17 | 5.50 | 125 | |
| LEM 2520 T270J | | RoHS | 27 | | | 16 | 6.30 | 115 | |
| LEM 2520 T330J | | RoHS | 33 | | | 15 | 7.10 | 110 | |
| LEM 2520 T390J | | RoHS | 39 | | 20 | 14 | 9.50 | 90 | |
| LEM 2520 T470J | | RoHS | 47 | | | 13 | 11.10 | 80 | |
| LEM 2520 T560J | | RoHS | 56 | | | 12 | 12.10 | 75 | |
| LEM 2520 T680J | | RoHS | 68 | | | 11 | 16.60 | 70 | |
| LEM 2520 T820J | | RoHS | 82 | | 15 | 10 | 19.00 | 65 | |
| LEM 2520 T101J | | RoHS | 100 | | | 9 | 21.00 | 60 | 0.796 |

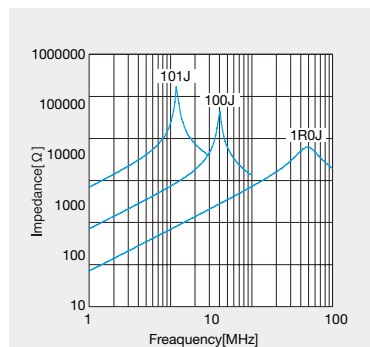
●LBM2016

Q-周波数特性 Q-Characteristics

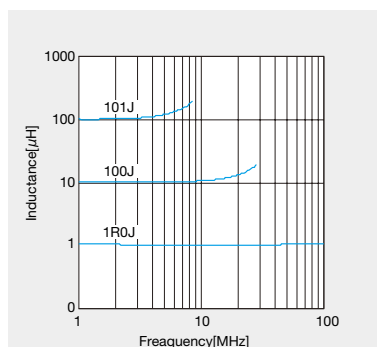


インピーダンス周波数特性

Impedance-vs-Frequency characteristics



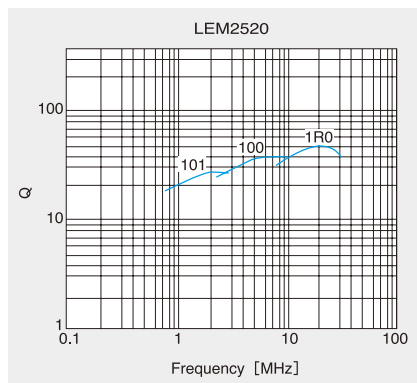
インダクタンス周波数特性 Inductance-vs-Frequency characteristics



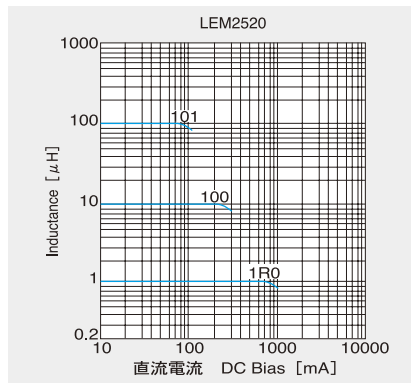
●LEM2520

Q-周波数特性例 Q-Characteristics

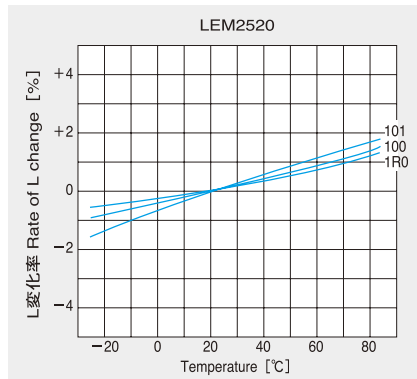
一般タイプ Ordinary type (Measured by HP4285A + 42851A)

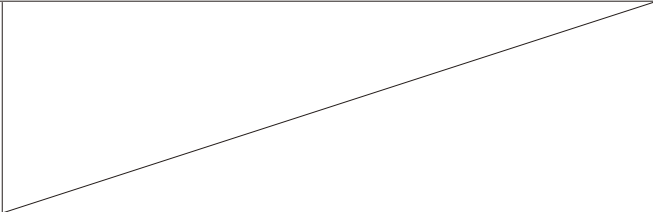


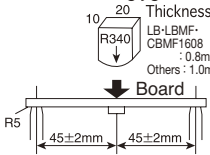
直流重量特性例 DC Bias characteristics (Measured by HP4285A + 42841A)

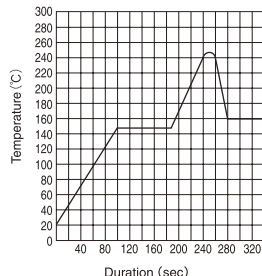


温度特性例 Temperature characteristics (Measured by HP4285A + 42851A)



| Item | Specified Value | | | | | | | | | Test Methods and Remarks |
|-------------------------------|--------------------------------|--|-------------------------------|--------------------|----------------------------|--|---------|--------------------------------|--|---|
| | LEM2520 | LB3218 LB2518 LB2016 LB2012 LB1608 LBMF1608 | LBC2518 LBC2016 LBC2012 | LBR2518 LBR2012 | CB2518 CB2016 CB2012 | CBC3225 CBC2518 CBC2016 CBC2012 | CBL2012 | CBMF1608 | LBM2016 | |
| 1.Operating temperature Range | -40～+85℃ | -25～+105℃ (Including self-generated heat) | | | | | | | | |
| 2.Storage | -40～+85℃ | | | | | | | | | |
| 3.Rated Current | Within the specified tolerance | | | | | | | | | LEM・LB・LBC・LBMF・LBM Series The maximum DC value having inductance decrease within 10% and temperature increase within 20℃ by the application of DC bias. LBR Series The maximum DC value having inductance decrease within 20% and temperature increase within 20℃ by the application of DC bias. CB・CBC・CBL・CBMF Series The maximum DC value having inductance decrease within 30% and temperature increase within 40℃ by the application of DC bias. |
| 4.Inductance | Within the specified tolerance | | | | | | | | | LEM Series R12～101 : Measuring equipment : LCR Meter (HP4285A+42851A or its equivalent) Measuring frequency : Specified frequency LB・LBC・LBR・CB・CBC・CBL・LBMF・CBMF・LBM Series : Measuring equipment : LCR Mater (HP4285A or its equivalent) |
| 5.Q | Within the specified tolerance |  | | | | | | Within the specified tolerance | LEM Series R12～101 : Measuring equipment : LCR Meter (HP4285A+42851A or its equivalent) Measuring frequency : Specified frequency LBM Series : Measuring equipment : LCR Mater (HP4285A or its equivalent) | |
| 6.DC Resistance | Within the specified tolerance | | | | | | | | | LEM・LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF Series : Measuring equipment : DC Ohmmeter (HIOKI 3227 or its equivalent) |
| 7.Self-Resonant Frequency | Within the specified tolerance | | | | | | | | | LEM2520 : Measuring equipment : Impedance analyzer (HP4291A or its equivalent) LB・LBC・LBR・CB・CBC・CBL・LBMF・CBMF Series : Measuring equipment : Impedance analyzer (HP4291A or its equivalent) LBM Series : Measuring equipment : Network analyzer (HP8720B or its equivalent) |

| Item | Specified Value | | | | | | | | | Test Methods and Remarks | | | | | | | | | | | | |
|---|--|--|---|----------------------------------|----------------------------------|--|----------------------------------|--|---|--|------|------------------|---|----|---|-----|---|----------------------------|---|-------------------------------------|---|----|
| | LEM2520 | LB3218 LB2518 LB2016 LB1608 LBMF1608 | LBC2518 LBC2016 LBC2012 | LBR2518 LBR2012 | CB2518 CB2016 CB2012 | CBC3225 CBC2518 CBC2016 CBC2012 | CBL2012 | CBMF1608 | LBM2016 | | | | | | | | | | | | | |
| 8.Temperature Characteristic | Inductance change: Within±5% | Inductance change: Within±15% LBMF1608 LB3218 Inductance change: Within±20% | LBC2518 LBC2016 Inductance change: Within±20% LBC2012 Inductance change: Within±30% | Inductance change: Within±15% | Inductance change: Within±15% | CBC3225 CBC2518 CBC2016 Inductance change: Within±20% CBC2012 Inductance change: Within±30% | Inductance change: Within±15% | Inductance change: Within±20% | Inductance change: Within±5% | Change of maximum inductance deviation in step 1—5 <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>20</td></tr><tr><td>2</td><td>−25</td></tr><tr><td>3</td><td>20 (Reference temperature)</td></tr><tr><td>4</td><td>+85 (Maximum operating temperature)</td></tr><tr><td>5</td><td>20</td></tr></table> | Step | Temperature (°C) | 1 | 20 | 2 | −25 | 3 | 20 (Reference temperature) | 4 | +85 (Maximum operating temperature) | 5 | 20 |
| Step | Temperature (°C) | | | | | | | | | | | | | | | | | | | | | |
| 1 | 20 | | | | | | | | | | | | | | | | | | | | | |
| 2 | −25 | | | | | | | | | | | | | | | | | | | | | |
| 3 | 20 (Reference temperature) | | | | | | | | | | | | | | | | | | | | | |
| 4 | +85 (Maximum operating temperature) | | | | | | | | | | | | | | | | | | | | | |
| 5 | 20 | | | | | | | | | | | | | | | | | | | | | |
| 9.Rasistance to Flex- ure of Substrate | No damage. | | | | | | | | | Warp: 2mm (LB, LBC, LBR, CB, CBC, CBL, LBM, LBMF, CBF Series) : 3mm (LEM2520) Test substrate: Printed board According to JIS C0051 <div>Pressig jig </div> | | | | | | | | | | | | |
| 10.Body Strength | No damage. | | | | | | | | | LB・LBC・LBR・CB・CBC・CBL・LBM・LEM2520 Applied force : 10N Duration : 10sec. LB1608・LBMF1608・CBMF1608 Applied force : 5N Duration : 10sec. | | | | | | | | | | | | |
| 11.Self Resonant Frequency | Inductance change : Within—10% | | | Inductance change: Within—20% | Inductance change : Within—30% | | | Inductance change: Within—10% | Measure inductance with application of rated current using LCR metre to cmpare it with the initial value. | | | | | | | | | | | | | |
| 12.Adhesion of terminal electrode | No abnormality. | | | | | | | | | LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF・LEM2520 Applied force : 10N to X and Y directions Duration : 5 sec. Test substrate : Printed board | | | | | | | | | | | | |
| 13.Resistance to vibration | Inductance change: Within±5% No significant abnormality in appearance. | Inductance change : Within±10% No significant abnormality in appearance. | | | | | | Inductance change: Within±5% No significant abnormality in appearance. | LEM・LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF : According to JIS C5102 clause 8.2. Vibration type : A Directions : 2 hrs each in X, Y and Z directions. Total : 6 hrs Frequency range : 10 to 55 to 10 Hz (1min.) Amplitude : 1.5mm Mounting method : Soldering onto printed board Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs. | | | | | | | | | | | | | |

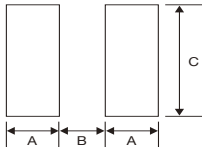
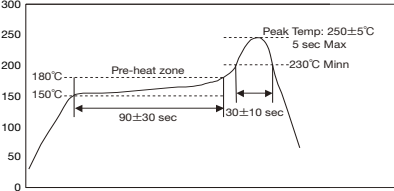
| Item | Specified Value | | | | | | | | | Test Methods and Remarks | |
|---------------------------------|--|--|--|--------------------|----------------------------|--|---|--|---------|--------------------------|---|
| | LEM2520 | LB3218 LB2518 LB2016 LB2012 LB1608 LBMF1608 | LBC2518 LBC2016 LBC2012 | LBR2518 LBR2012 | CB2518 CB2016 CB2012 | CBC3225 CBC2518 CBC2016 CBC2012 | CBL2012 | CBMF1608 | LBM2016 | | |
| 14.Drop test | Inductance change : Within±5% No significant abnormality in appearance. | | | | | | | | | | LEM : Acceleration : 980m/sec ² Duration : 6msec Number of times : 6 sides × 3 times Mounting method : Soldering onto printed board Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs. |
| | | | | | | | | | | | |
| 15.Solderability | At least 90% of surface of terminal electrode is covered by new solder. | | | | | | | | | | LEM : Solder temperature : 230±5℃ Duration : 5±0.5sec. Flux : Methanol solution with 25% of colophony LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF : Solder temperature : 245±5℃ Duration : 5±0.5sec Flux : Methanol solution with 25% of colophony |
| 16.Resistance to soldering heat | Inductance change : Within±10% No significant abnormality in appearance. | LB3218 LB2518 LB2016 LB2012 LB1608 Inductance change : Within±10% No significant abnormality in appearance. LBMF1608 Inductance change : Within±20% No significant abnormality in appearance. | Inductance change : within ±10% No significant abnormality in appearance. | | | Inductance change : Within±20% No significant abnormality in appearance. | Inductance change : Within±5% No significant abnormality in appearance. | LEM : Reflow condition 3 times of reflow over at 220±5℃ for 40sec. MAX, With Peak temperature at 240±5℃ for 5 sec. MAX. (Refer to a Profile of chart below.)  Flow condition Solder temperature : 260±5℃ Duration : 10±1sec. Once LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF : 3 times of reflow oven at 230℃ MIN for 40sec. with peak temperature at 260±5℃ for 5sec. | | | |
| 17.Resistance to solvent | No significant abnormality in appearance | | | | | | | | | | Solvent temperature : Room temperature Type of solvent : Isopropyl alcohol (LEM2520・LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF) Cleaning conditions : 90s. Immersion and cleaning. (LEM2520・LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF) |

| Item | Specified Value | | | | | | | | | Test Methods and Remarks | | | | | | | | |
|--------------------------------|--|---|-------------------------------|--------------------|--|--|---------|---|--|--------------------------|------------------|----------------|---|-----|----|---|-----|----|
| | LEM2520 | LB3218 LB2518 LB2016 LB2012 LB1608 LBMF1608 | LBC2518 LBC2016 LBC2012 | LBR2518 LBR2012 | CB2518 CB2016 CB2012 | CBC3225 CBC2518 CBC2016 CBC2012 | CBL2012 | CBMF1608 | LBM2016 | | | | | | | | | |
| 18.Thermal shock | Inductance change : Within±10% Q→ R12~4R7 : 30min. 5R6~330 : 25min. 390~820 : 20min. 101 : 15min. | Inductance change :Within±10% No significant abnormality in appearance. | | | | | | | LEM : Conditions for 1cycle <table><tr><td>Step</td><td>Temperature (°C)</td><td>Duration (min)</td></tr><tr><td>1</td><td>—40</td><td>30</td></tr><tr><td>2</td><td>+85</td><td>30</td></tr></table> Number of cycle : 100 cycle Recovery : At least 1 hr of recovery the standard condition after the removal from test chamber, followed by measurement within 2 hrs. 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. | Step | Temperature (°C) | Duration (min) | 1 | —40 | 30 | 2 | +85 | 30 |
| Step | Temperature (°C) | Duration (min) | | | | | | | | | | | | | | | | |
| 1 | —40 | 30 | | | | | | | | | | | | | | | | |
| 2 | +85 | 30 | | | | | | | | | | | | | | | | |
| 19.Damp heat | Inductance change : Within±10% Q→ R12~4R7 : 30min. 5R6~330 : 25min. 390~820 : 20min. 101 : 15min. | Inductance change :Within±10% No significant abnormality in appearance. | | | | | | | Temperature : 60±2°C Humidity : 90~95%RH Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs. | | | | | | | | | |
| 20.Loading under damp heat | Inductance change : Within±10% Q→ R12~4R7 : 30min. 5R6~330 : 25min. 390~820 : 20min. 101 : 15min. | Inductance change : Within±10% No significant abnormality in appearance. | | | | | | | LEM・LB・LBC・CB・CBC・CBL・LBM・LBMF・CBMF : Temperature : 60±2°C Humidity : 90~95%RH 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 within 48 hrs. | | | | | | | | | |
| 21.High temperature life test | Inductance change : Within±10% Q→ R12~4R7 : 30min. 5R6~330 : 25min. 390~820 : 20min. 101 : 15min. | | | | Inductance change :Within±10% No significant abnormality in appearance. | | | LEM・CB・CBC・CBL・LBM・CBMF : Temperature : 85±2°C Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs. | | | | | | | | | | |
| 22.Loading at high temperature | | | | | | | | | | | | | | | | | | |

| Item | Specified Value | | | | | | | | | Test Methods and Remarks |
|------------------------------|---|--|-------------------------------|--------------------|----------------------------|--|---------|----------|---|--------------------------|
| | LEM2520 | LB3218 LB2518 LB2016 LB2012 LB1608 LBMF1608 | LBC2518 LBC2016 LBC2012 | LBR2518 LBR2012 | CB2518 CB2016 CB2012 | CBC3225 CBC2518 CBC2016 CBC2012 | CBL2012 | CBMF1608 | LBM2016 | |
| 23.Low temperature life test | Inductance change : Within±10% Q→ R12~4R7 : 30min. 5R6~330 : 25min. 390~820 : 20min. 101 : 15min. | Inductance change :Within±10% No significant abnormality in appearance. | | | | | | | LEM・LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF Temperature : -40±2℃ Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs. | |
| 24.Standard condition | Standard test condition : Unless otherwise specified,temperature is 20±15℃, and 65±20% of relative humidity.When there are question concerning measurement result : In order to provide correlation date, the test shall be condition of 20±2℃ of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value. | | | | | | | | | |

PRECAUTIONS

LEM Type, LB Type, CB Type

| Stages | Precautions | Technical considerations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|------|---|---|---|------|------|-----|-----|--------|------|-----|-----|------|-----|-----|------|------|-----|-----|-----|------|-----|-----|-----|---------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|
| 1.Circuit Design | <p>Operating environment,</p> <p>1.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.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.PCB Design | <p>Land pattern design</p> <p>1.Please contact any of our offices for a land pattern, and refer to a recommended land pattern of a right figure or specifications.</p> | <p>PRECAUTIONS</p> <p>【Recommended Land Patterns】</p> <p>Surface Mounting</p> <ul style="list-style-type: none">Mounting and soldering conditions should be checked beforehand.Applicable soldering process to this products is reflow soldering only. Unit : mmRecommended Land Patterns <div><table><thead><tr><th>TYPE</th><th>A</th><th>B</th><th>C</th></tr></thead><tbody><tr><td>1608</td><td>0.55</td><td>0.7</td><td>1.0</td></tr><tr><td>MF1608</td><td>0.55</td><td>0.8</td><td>1.0</td></tr><tr><td>2012</td><td>0.7</td><td>0.8</td><td>1.45</td></tr><tr><td>2016</td><td>0.7</td><td>0.8</td><td>1.8</td></tr><tr><td>2518</td><td>0.8</td><td>1.2</td><td>2.0</td></tr><tr><td>LEM2520</td><td>0.9</td><td>1.5</td><td>1.5</td></tr><tr><td>3218</td><td>1.0</td><td>1.6</td><td>2.0</td></tr><tr><td>3225</td><td>1.0</td><td>1.6</td><td>2.7</td></tr></tbody></table></div> | TYPE | A | B | C | 1608 | 0.55 | 0.7 | 1.0 | MF1608 | 0.55 | 0.8 | 1.0 | 2012 | 0.7 | 0.8 | 1.45 | 2016 | 0.7 | 0.8 | 1.8 | 2518 | 0.8 | 1.2 | 2.0 | LEM2520 | 0.9 | 1.5 | 1.5 | 3218 | 1.0 | 1.6 | 2.0 | 3225 | 1.0 | 1.6 | 2.7 |
| TYPE | A | B | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1608 | 0.55 | 0.7 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MF1608 | 0.55 | 0.8 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2012 | 0.7 | 0.8 | 1.45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2016 | 0.7 | 0.8 | 1.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2518 | 0.8 | 1.2 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LEM2520 | 0.9 | 1.5 | 1.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3218 | 1.0 | 1.6 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3225 | 1.0 | 1.6 | 2.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.Considerations for automatic placement | <p>Adjustment of mounting machine</p> <p>1.Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2.Mounting and soldering conditions should be checked beforehand.</p> | <p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.Soldering | <p>Wave soldering (LEM Type only)</p> <p>1.For wave soldering,please apply conditions meeting the range of the specied conditions in our catalog or the relevant specifications.</p> <p>Reflow soldering (LB and CB Types)</p> <p>1.For reflow soldering with either leaded or lead-free solder,the profile specified in "point for controlling" is recommended.</p> <p>Reflow soldering (LEM)</p> <p>1.For reflow soldering, please apply conditions meeting the range of the specified conditions in our catalog or the relevant specifications.</p> <p>Recommended conditions for using a soldering iron</p> <p>1.Put the soldering iron on the land-pattern.</p> <p>Soldering iron's temperature-Below 350°C Duration-3 seconds or less</p> <p>The soldering iron should not come in contact with inductor directly.</p> | <p>1.Components can be damaged by excessive heat whre soldering conditions exceed the specified range.</p> <p>1.Reflow profile</p> <div></div> <p>1.Components can be damaged by excessive heat whre soldering conditions exceed the specified range.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.Cleaning | <p>Cleaning conditions</p> <p>LEM Type, LB Type, CB Type</p> <p>1.Washing by supersonic waves shall be avoided.</p> | <p>LEM Type, LB Type, CB Type</p> <p>1.If washing by supersonic waves, supersonic waves may cause broken products.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.Handling | <p>Handling</p> <p>1.Keep the inductors away from all magnets and magnetic objects.</p> <p>Breakaway PC boards (splitting along perforations)</p> <p>1.When splitting the PC board after mounting inductors, care should be taken not to give any stresses of deflection or twisting to the board.</p> <p>2.Board separation should not be done manually, but by using the appropriate devices.</p> <p>Mechanical considerations</p> <p>1.Please do not give the inductors any excessive mechanical shocks.</p> | <p>1.There is a case that a characteristic varies with magnetic influence.</p> <p>1.Planning pattern configurations and the position of products should be carefully performed to minimize stress.</p> <p>1.There is a case to be damaged by a mechanical shock.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7.Storage conditions | <p>Storage</p> <p>1.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.</p> <p>Recommended conditions</p> <p>Ambient temperature 0~40°C</p> <p>Humidity Below 70% RH</p> <p>The ambient temperature must be kept below 30°C Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, LE type inductors should be used within one year from the time of delivery.</p> <p>LB type</p> <p>Please should be used within 6 months from the time of delivery.</p> <p>LE type</p> <p>In case of storage over 6 months, solderability shall be checked before actual usage.</p> | <p>1. Under a high temperature and humidity environment, problems suchas reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/package materials may take place.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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FERRITE PRODUCTS