SWITCH MODE POWER SUPPLY INDUCTOR RESOURCE HANDBOOK

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INTRODUCTION

The **Resource Handbook**, exclusively devoted to inductors for switch mode applications, was prepared by the Engineering Staff, to provide the design engineer with the most comprehensive listing of inductors for power output filters, series mode power, common mode line filtering, and current sense applications. The multiplicity of input and output voltages, load currents, number of secondary windings, frequency of operation, etc., makes it virtually impossible to compile a similar type listing of power transformers for switch mode power supplies.

The handbook is a comprehensive collection of eight switch mode power supply inductor catalogs, accompanied by sufficient technical data and selection techniques, to enable sound engineering decisions. Over 600 power inductors are listed in the first six catalogs. Each catalog is prepared for a single type of core material, and they are arranged in ascending order according to the relative price of the core material. See Figure 1 for a graphical presentation of the relative properties of the different core materials. The last two catalogs describe standard common mode chokes and current sense inductors.

Extensive revisions have been made in the 2nd Edition of the **Switch Mode Power Supply Inductor Resource Handbook.** The **Selection Tables** have been completely revised and reorganized to simplify the selection process. We welcome comments, suggestions or criticism about this new edition. Please direct any comments or recommendations to the Director of Engineering.

POWER INDUCTORS

Information is supplied within the **Resource Handbook** to assist the applications engineer in the proper selection of size, core material type, and mechanical configuration of switch mode power inductors. A **Reference Table** (Table 1) provides relative data concerning cost, energy storage capability, and core loss. Figure 1, **Relative Merit of Core Material Types,** displays information graphically for core costs, energy storage factors, and core loss in a graphical manner.

The final choice of a power inductor invariably results in a compromise of objectives, such as smallest size, lowest loss, or minimum cost. These options are divergent, and simultaneous optimization of all such factors is impossible. While a selection from one of the tables can be made and used without modification, over 600 inductors are presented (with associated data) in a manner that permits a very “individualized” and cost-effective solution. Call the Director of Engineering for assistance in arriving at the correct design for an application. For your convenience, an **Inductor Inquiry Form** (found on the last four pages of this publication) may be completed and sent by FAX to the Company.

All of the power inductors (chokes), listed on pages 6 through 29, have a full, tightly spaced single layer winding on a toroidal core, using powdered composition ferromagnetic technology. All of these cores are composed of finely divided powders of ferrous or molybdenum permalloy alloys, mixed with suitable insulating binder material. Small distributed gaps are thereby introduced in the magnetic path that greatly decreases the effective permeability and increases the energy storage capability of the inductor. The distributed gap in powdered toroidal cores results in significantly lower radiated fields than that found with discrete gapped magnetic structures, such as those commonly found in chokes made with ferrite or silicon iron cores. Single layer toroidal windings also have minimum distributed capacitance and high self-resonant frequency for good high-frequency noise rejection.

For most medium to high-frequency, high DC current inductors found in the output filters of switch mode power supplies, the AC ripple current is low compared to the DC bias current (less than 10%). In these instances, core loss is not a dominant factor, and temperature rise is largely dependent on copper loss and surface area of the inductor.

Inductors in this handbook are manufactured from materials that are conservatively rated for 130 ºC temperature class. They can be manufactured for higher continuous temperature operation by special order.

POWER INDUCTOR SELECTION TABLES

Six standard series of power inductors are identified by the type of core material used, and each series is composed of fifteen or sixteen core sizes. There are six or seven inductor values per core size. Additionally, the **Selection Tables** allow a choice of three to five different physical variations. For reference ease, physical dimensions are repeated for each core size on the page adjacent to the table. While there appears to be a great degree of redundancy between series, it is unnecessary to refer to a common table of dimensions for the physical sizes.

Progressing through the handbook from front to back, the tables are organized by increasing cost of core material. Each table offers a wide latitude of core sizes, arranged in ascending order by the energy storage factor [**$\frac{1}{2}L\cdot I^2$**].

All of the reactors have tightly spaced single layer windings, wound with various wire sizes that are practical for self lead type terminations. The nominal inductance values without DC current, are based on the maximum number of turns that can be wound in a single layer on the core.

Description of Data Given in the Selection Tables for Power Inductors. The following is a definition of the information given in the fourteen column **Selection Tables** on pages 6 through 29 of this handbook:

Part Number (Column 1): The Part Number contains identification of core type, core size, and inductance in microhenrys, to which is added a prefix, specifying the physical construction style. See “How to Order” information on page 5.

$\frac{1}{2}L\cdot I^2$ (Column 2): Energy storage capability of the inductor in microjoules, where:

L = Inductance (μH): This value is 50% of the initial inductance with no DC bias current

I = The DC current (amps) that will cause a 50% reduction in inductance from the value at 0 DC current

“L” NO DC (Column 3): Inductance (μH) ±15% with no DC bias. This value is equal to the inductance that will be obtained from the maximum number of turns of the appropriate wire size that can be wound in a single layer on the toroid. A ±15% tolerance is applied to this inductance value to allow for variations in core permeability and physical positioning of the wire.

DCR MAX. (Column 4): Maximum DC resistance of the winding in ohms.

DCI MAX. (Column 5): Maximum continuous current in amperes, based on a current density for the copper magnet wire of 250 circular mils/amp. The real limiting factor for the maximum continuous current, apart from the DC current saturation effect, is the temperature rise. The maximum DC current shown in the **Selection Tables** will generally result in a temperature rise not to exceed 40 ºC. However, the ultimate temperature rise depends on such factors as mounting method, ambient temperature, and whether cooled by convection or forced air.

"L" WITH DCI (Column 6): The nominal Inductance (µH) with the maximum DC current listed in **DCI MAX** (Column 5). A tolerance of ± 20% should be applied to allow for variations in core permeability and the effects of DC current.

TEST LEVEL (Column 7): The AC test level in volts rms, at 10 kHz, used for measuring the inductance values that are given in the **Selection Tables**. For the effects of AC voltage level, see Footnote (5) to Table 1, **REFERENCE TABLE for Selection of Power Inductors**.

DCI (Amps) FOR % DECREASE IN "L" (Columns 8 - 13): The DC current in amperes that results in the indicated percentage decrease in inductance. Shaded zones are used where DC currents are in excess of that listed in the **DCI MAX.** column. While a reactor would not normally be selected for operation in these areas, the data is supplied to allow interpolation and understanding of the manner in which inductance decreases with increasing DC current.

LEAD DIA. (Column 14): The lead diameter, in inches, will be that given in the **Selection Tables**, unless values are specifically shown on the associated mechanical configuration drawing.

POWER INDUCTOR SELECTION PROCEDURE

The **REFERENCE TABLE for Selection of Power Inductors,** Table 1 has been provided to assist the engineer in selecting the most cost effective design for his application. In order to properly use the **Selection Tables** found on pages 6 - 29, it is important to understand the principles of their arrangement.

1. There are 15 to 16 different inductor sizes for each of six core material types. The energy storage capacity varies directly with the physical size, and is dependent on the type of core material. The core sizes are designated by a letter A to Y and arranged in ascending order according to their size and consequently, their energy storage capacity.

2. Inductors are arranged and referenced by their energy storage capacity when operating with a DC current that will cause a 50% decrease from the 0 DC Bias inductance. It is not likely that the final requirement and selection will be at this high of an operating level. Because there are an infinite number of inductance and current requirements, but only a discrete number of core sizes, core materials, and practical winding combinations, a number of choices can normally be found in one or more **Selection Tables**. Only one choice is optimum in view of all considerations.

The following selection process is recommended:

1. Refer to Table 1 and Figure 1 for the relative merits of the different types of core materials. Determine whether price or core loss is of primary consideration.

   a. **Smallest Size and Lowest Cost:** Normally, the least expensive device will result from the use of the smallest core that will meet the necessary electrical parameters, using Core Material Types 13, 11, 17, 14, 21, and 18, in that order.

   b. **Core loss:** As a rule of thumb, where the AC ripple current is in excess of 10% to 15% of the DC current, it is suggested that Material Types 18, 14, 21, 17, 13, & 11, be considered in that order. Table 1 lists the relative core loss factors, measured at 50 khz and 100khz, and at a flux density of 1000 gauss. Figure 1 graphically displays this information for operation at 50 khz. It is not within the scope of the handbook to provide the necessary technical information for consideration of all aspects related to AC excitation. It is recommended that the Engineering Department be contacted for assistance, should core loss appear to be a significant factor.

2. Compute the product **$\frac{1}{2}L\cdot I^2$** where**:**

   L = required inductance (microhenrys) with DC bias

   I = DC bias current (amperes)

3. Start with the **Selection Table** for the Core Material Type, determined in Step 1 above. Refer to the second column and locate a group of inductance listings (either six or seven values, separated by horizontal lines, for a particular core size) where the **$\frac{1}{2}L\cdot I^2$,** shown in the 2nd column, equals or exceeds the value computed in Step 2, above. Table 1 indicates the range of energy storage factors that is possible for each type of core material.

4. Scan the **DCI MAX.** (5th Column) and **"L" WITH DCI** (6th Column) for an inductance value that equals or exceeds the required minimum inductance with a **DCI MAX** that is equal to or greater than the actual DC current level. Although the storage capacity of the core may be in excess of that actually required, it may not be possible to obtain the inductance because of winding considerations (wire size and the maximum number of turns that can be wound in a single layer on the core). If the core size will provide the minimum inductance with the required DC current, move up in the table to determine if a smaller core size will also work. The smaller the core, the less expensive it will be. If the minimum inductance with DC current cannot be obtained with the original core size selection (Step 3, above), move down the table (increasing in core size) until the appropriate inductance is found. In some cases, it may be necessary to move to other **Selection Tables** on succeeding pages.

   a. **DC Resistance:** If the DC resistance, and the associated power dissipation is a driving consideration, always select the smallest inductance listing within a core material grouping that will provide the necessary inductance at the largest **DCI MAX.** listing. Where even lower DC resistances are needed for a given inductance and DC current, examine other core materials and larger core sizes.

5. Determine if the selected inductor is within the physical size limitations. If the inductor is too large, go to other core materials that are listed on succeeding pages. It is possible that none of the listings in this handbook will provide sufficient inductance, although the core material type and size is well within the calculated energy storage capacity [**$\frac{1}{2}L\cdot I^2$**] requirement. This is because all of the cores are wound with maximum number of turns that can be wound in a single layer. In some cases, a multiple layer winding might be required to simultaneously meet the inductance with DC current and a restrictive size specification. In such cases, please call our engineering department for assistance in arriving at the most cost-effective solution.

The following numerical example is used to illustrate the selection process described in the foregoing section:

Find the lowest cost inductor that will have:

a. 40 µH minimum at 5 amps DC.
b. A DC resistance of 0.025 ohms maximum
c. PC Mounting with maximum dimensions of 1.375" diameter x .75" high
e. The rms value of the AC excitation level is less that 15% of the DC Current.

Step 1. Calculate the required Energy Storage Factor. Calculate the product:

$$\frac{1}{2}(L\cdot I)^2 = 0.5 \times 40\ \mu H \times 5^2\ \text{amperes}^2 = 500\ \text{microjoules}$$

(continued on page 4)

Figure 1

RELATIVE MERIT OF CORE MATERIAL TYPES

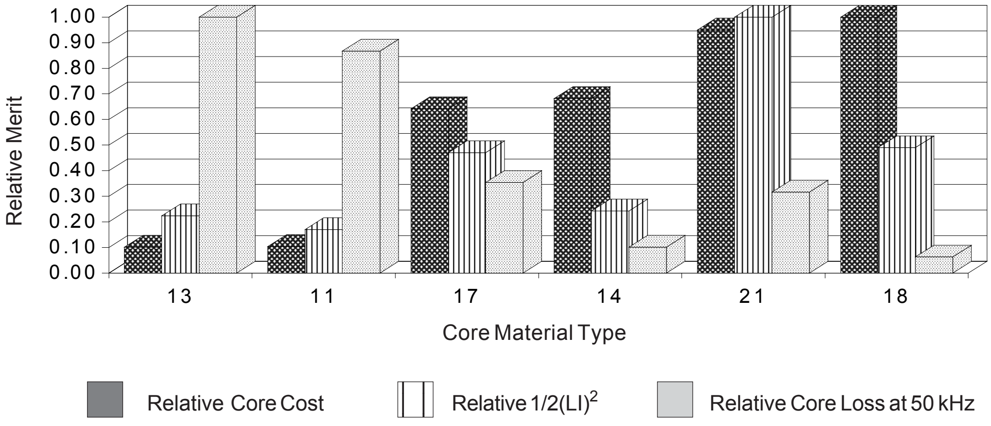

Table 1

REFERENCE TABLE

For Selection of Power Inductors

CORE MATERIAL TYPE		13	11	17	14	21	18
PAGE NUMBERS	(2)	6 - 9	10 -13	14 - 17	18 - 21	22 -25	26 - 29
RELATIVE CORE PRICE	(3)	0.10	0.10	0.64	0.68	0.95	1.00
ENERGY STORAGE (½[L·I]²)	(4)	75 - 11025	55 - 8175	200 - 26300	105 - 13500	430 - 56000	205 - 27350
"L" STABILITY with AC	(5)	180%	208%	19%	2%	13%	1%
"B" (gauss) for INIT PERM	(5)	20	20	20	40	20	40
"B" (gauss) for MAX PERM	(5)	4300	5200	2500	700	2500	700
CORE LOSS at 50 khz	(6)	1.00	0.87	0.35	0.10	0.32	0.06
CORE LOSS at 100 khz	(6)	2.60	2.16	1.66	0.21	1.21	0.18

Table 1 Footnotes:

Note (1) The relative ratio of the core material with the best characteristic is shown shaded in the appropriate column.

Note (2) Refers to the page number of the **Selection Table** on pages 6 through 29.

Note (3) **RELATIVE CORE PRICE**: The ratio of the core material price to the highest priced material is shown in this row for comparison purposes. The lowest priced material has the lowest ratio of 0.1 It is listed in the shaded area of the column for Core Material Type 13. The ratios in this table represent a composite average for all sizes. The actual ratios become larger as the core size increases.

Note (4) **ENERGY STORAGE (½L·I²)** in microjoules, where:

L = Inductance (μH): This value is 50% of the initial inductance with no DC bias current

I = The DC current (amps) that will cause a 50% reduction in inductance from the value at 0 DC current

Note (5) **"L" STABILITY with AC:** The permeability of core materials increases from an initial permeability (μ_o) to a maximum, after which it continues to drop as the material is driven toward the saturation flux density. Because the ripple current is normally low in switch mode power supplies, the inherent non-linearity with AC drive level is usually insignificant. As a filter reactor, an increase in inductance will improve the low-frequency filtering. The permeability, and hence the inductance, will increase by the percentage change shown in the **Reference Table**. Values shown, represent the percent increase in inductance that occurs due to an increase in flux density from the **B (gauss) for INIT PERM** (AC test level given in the ***Selection Table*** for measuring inductance) to **B (gauss) for MAX PERM** (Level at which permeability and inductance are increased to the maximum). The flux density is directly proportional to the AC excitation level. For example, the test level for inductor, **13F147 on page 6 is 0.124 V_{rms}. The AC excitation level that will result in maximum inductance is:

$$E_{test} = \frac{(4300\ \text{gauss})}{(20\ \text{gauss})} \times (0.124\ \text{V}) = 26.66V_{rms}$$

and at this level, the inductance will be:

$$L_{max} = 147.0\ \mu\text{H} + \left[\frac{180\%}{100\%} \times 147.0\ \mu\text{H}\right]$$

$$= 411.6\ \mu\text{H}$$

Note (6) **CORE LOSS at 50 kHz** and **CORE LOSS at 100 kHz:** For comparative purposes, all core loss data is listed as a ratio of the core loss of the material in question to that of Material #13 (highest loss) at 50 kHz. Core loss ratios at either frequency are given for AC excitation levels of 1000 gauss and are referenced to the 50 kHz core loss for Core Material Type #13. The change in core loss between 50 kHz and 100 kHz for a given type of material, as well as the difference between the type of core materials, can readily be seen.

Step 2. Determine material type. Refer to Table 1, **REFERENCE TABLE for the Selection of Power Inductors.** Core Material Type 13 has the lowest relative core price, and cores in this series have Energy Storage Capacities up to 11025 microjoules which is much greater than the calculated requirement of 500 microjoules. Table 1 shows that this series starts on page 6.

Step 3. Locating the starting point. Go to the **Selection Table** on page 6. As a starting point, Core Size "E" of Material Type 13 has energy storage capacities of over 500 microjoules, however it can readily be seen that a minimum inductance of 40 µH with 5.0 amperes DC will not be obtainable with a single layer winding on this core.

Step 4. Inspect the larger core sizes ("F", "G", "J", etc.) in the same manner. The **13G68.7 has an **"L" NO DC** equal to 68.7 µH ± 15%, and the inductance will only decrease to 41.2 µH with a DC current of 6.5 amperes. Actually, the DCI will only be 5.0 amperes, so the inductance with DCI will be greater than 41.2 µH. By inspection of the **DCI (Amps) FOR % DECREASE IN "L"** columns, it can be seen that the inductance with DC current will drop by 30% at 4.74 amperes and 40% with 6.33 amperes. Rough interpolative inspection shows the drop with 5.0 amperes is only about 32% to 33%. This would equate to an inductance of approximately 46 µH with the required DC current.

Step 5. Interpolate the inductance with DC current. Conventional interpolative methods may be used to determine the percentage drop in inductance with 5.0 amperes DC. The linearity is sufficient for reasonably accurate interpolation between any 5% to 10% change in inductance versus the associated incremental change in DC current.

a. **Calculating the percentage decrease in inductance due to DC current.** To arrive at the inductance of the **13G68.7 with 5.0 amperes DC by interpolation, first calculate the percent decrease in inductance from the value without DC current.

$$\Delta L = \left[\frac{(I_{dc} - I_1)}{(I_2 - I_1)} \times (P_2 - P_1)\right] + P_1, \quad \text{or} \qquad (1)$$

$$\Delta L = \left[\frac{(5.0 - 4.74)}{(6.33 - 4.74)} \text{ X } 10\%\right] + 30\% = 31.64\%, \text{ where}$$

ΔL = percent decrease in inductance from that value without DC bias,
I_{dc} = the required DC current in amperes (5.0 amps in this example),
I_1 = largest current in the table that is less than or equal to the required DC current (4.74 amps),
I_2 = smallest current in the table that is greater than or equal to the required DC current (6.33 amps),
P_1 = the percentage from the table for I_1 (30%), and
P_2 = the percentage from the table at I_2 (40%).

b. **Converting to percentage of initial inductance.** Equation (1) can be converted from "percent decrease of" to the "percent of" initial inductance by subtracting the answer, converted to a fraction, from the number "1", i.e.,

$$\Delta L_{dc} = 1 - \frac{\Delta L(\%)}{100\%} \qquad (2)$$

$$\Delta L_{dc} = 1 - \frac{31.64}{100} = .6836$$

c. **Applying practical tolerances.** To allow for variations in permeability, a tolerance of ±20% should be applied to the calculated or listed value of inductance with DC current. This tolerance provides ±15% tolerance for the inductance without DC current plus an additional ±5% for variations in the ΔL_{dc} characteristics of the core material. The nominal inductance ±20% of **13G68.7, with 5.0 amperes DC, can then be calculated using the results of equation (2):

$$L_{dc} = \Delta L_{dc} \times L_o \qquad (3)$$

$$L_{dc} = 0.6836 \times 68.7\ \mu H$$

$$= 46.97\ \mu H, \text{ where}$$

L_o = the **"L" NO DC** value in the **Selection Table**, and
L_{dc} = the fraction found in equation (2).

Step 6. Determining the minimum possible inductance of the **13G68.7 with 5.0 amperes DC. Since a tolerance of ±20% would apply to the L_{dc}, the calculated value will have to be decreased by ±20% to arrive at the minimum possible inductance. In the case of the **13G68.7, the lowest possible value with 5.0 amperes DC would be:

$$L_{min} = 0.8 \times 46.97\ \mu H = 37.58\ \mu H$$

Although the **13G68.7 would normally meet the requirement of 40 µH minimum, there would be no assurance that every inductor would remain above that minimum value.

Step 7. Decision time! In the preceding steps, we have found an inductor with the following features:

a. An inductance without DC current of 68.7 µH ± 15%, and 46.9 µH ± 20% with 5.0 amperes of DC current. The minimum inductance with DCI would be 37.58 µH. The nominal inductance with DC current is greater than the minimum 40 µH that was originally specified, but it is conceivable (while not too likely) that some inductors could fall below this value.

b. The maximum DCR, as listed in the **Selection Table,** is 0.0282 ohms.

c. Physical Style "NA" or "NB" meets the mechanical requirements.

The **13G68.7 Inductor is the most cost-effective choice, if one can modify the original conditions to accept the possibility that a few inductors might have a little less inductance than 40 µH with 5.0 amps DC, and if it would be acceptable if some inductors might exceed the maximum DC resistance by 3.2 milliohm. If the original conditions are "cast in concrete," then proceed to Step 8.

Step 8. Continued search. By applying the ± 20% tolerance to the minimum inductance required with DC current, we should search for an inductor that will provide a minimum inductance with DC current of:

$$L_{dc} = \frac{L_{rqd}}{100\% - 20\%} \qquad (4)$$

$$L_{dc} = \frac{40\ \mu H}{0.8}$$

$$= 50\ \mu H$$

a. Inspect the selection Table for Core Material Type 13 for other inductances in larger core size groups, while remaining within the size limitations. If an appropriate inductor cannot be found, continue to the next type core material catalog.

b. Following the same procedures, use the succeeding **Selection Table** for the next type of core material. In this case, it is the **Selection Table** for Core Type 11 that starts on page 10. It can be quickly recognized that none of the inductors, listed for Core Material Type 11, are usable to meet all of the constraints.

Step 9. Final Selection of Core Material, Size, and Inductance. Refer to the next **Selection Table** for Core Material Type 17 on page 14. Starting with Core Size D, which has energy storage factors over 500 microjoules, proceed downward, looking for an inductance that will meet all requirements. The first inductor that will do the job is the **17G61.0. Calculate the actual minimum inductance with 5.0 amperes DC by repeating the calculations of Steps 5 and 6. Let's review the results of those calculations and compare the performance of this inductor with the original requirement:

Table 2

	REQUIRED	ACTUAL
Inductance with 0 DCI (µH)	N/A	61.0
Nominal Inductance with 10 ADC (µH)	N/A	44.2
Nominal Inductance with 5 ADC (µH)	N/A	51.2
Minimum Inductance with 5 ADC (µh)	40.0	40.9
Maximum DCR (ohms)	0.025	0.0129
Maximum Diameter (inches)	1.375	1.250
Maximum Height (inches)	0.750	0.680

The chosen inductor meets all of the original electrical and physical requirements of the application, including the tolerance allowance for minimum inductance with DC current. Of equal importance, **it is the most cost-effective selection.**

Step 10. An optional fine tuning process. For the foregoing example, there is little that one can do to improve upon the selection, since the minimum inductance with DC current (allowing for tolerances) is only slightly greater than the required value. Occasions may arise where it is desirable to choose a custom inductance value to reduce the DCR to the lowest possible value. While the foregoing is not a fitting example, it will be used to explain the fine tuning process.

a. **Allowing for the ±20% tolerance**, the actual required minimum inductance with DC current, was determined from equation (4) to be 50 µH.

b. **Choosing a custom inductance part number**. The necessary **"L" NO DC** can be calculated by dividing the 50 µH by 0.839 (ΔL_{dc}) which was determined by using equation (2) for **17G61.0. The formula is shown below as equation (5). The quotient or value is 59.59 µH ±15%. The custom part number would be **17G59.6. **There is no price penalty for the selection of a customized part number.**

$$L_{0dc} = \frac{L_{dc}}{\Delta L_{dc}}, \text{ where} \qquad (5)$$

L_{dc} = inductance as defined in equation (4)

c. **Calculating the lower DCR value** for the custom selected **17G59.6. Calculate the new DC resistance, using equation (6) below:

$$R_{max} = R\sqrt{\frac{L_{0dc}}{L_0}} \qquad (6)$$

$$R_{max} = R\sqrt{\frac{59.6}{61.0}}$$

$$R_{max} = .0128 \text{ ohms, where}$$

R = DCR in ohms as listed for L_0 in **DCR MAX** column of the **Selection Table**

In the beginning of Step 10, the comment was made that this was not a good example of gaining a significant decrease in DC resistance by the selection of a custom part number. However, this is not always the case, and the example was used to illustrate the methods of choosing a custom part number and calculating the resulting minimum DC resistance.

Step 11. Calculating the AC test level (Optional). The AC test level in volts rms is proportional to the turns, and to the square root of the inductance without dc bias. Therefore, the AC test level at 10 khz for the NA17G59.6 inductor is:

$$V_{rms} = 0.076 \text{ V} \times \sqrt{\frac{59.6\ \mu H}{61.0\ \mu H}} = 0.075 \text{ V}$$

Step 12. For ordering purposes, the final part number for the power inductor is:

NA17G59.6, where

NA = The physical shape and size shown on page 15
17 = THe final choice of the core material type
G = The selected core size
59.6 = The inductance ±15% in µH without DCI. This is a calculated value using the foregoing procedure to detemine the most "cost-effective" solution.

The single layer wound toroidal configuration offers numerous advantages for switch mode power supply chokes, but it is not a panacea. The required electrical and mechanical parameters may necessitate multi-layer windings or other than toroidal construction. It is not within the scope of this or any publication to catalog a massive series of inductors, and to provide the means for making the most cost-effective choice from all types of configurations.

Because of practical considerations, only a limited amount of information is supplied in this handbook regarding core and AC winding losses. If problems or questions arise as to the effectiveness of a selection, or if an inductor can not be found to meet the necessary parameters, we encourage a direct dialog with our engineering personnel. They will be happy to advise on the appropriateness of a selection, or to assist in the design of special configurations.

COMMON MODE LINE FILTERING INDUCTORS

Common Mode Inductors are most often used to eliminate line transmitted noise, such as that caused by transistors, SCR's, etc., in switch mode regulated power supplies. Interference caused by multiple equipment on a common power line can be minimized by the "split-winding" design, thus reducing the inherent conducted noise to an acceptable level. Standard inductances from 0.04 to 20.0 mh are available. The standard maximum operating temperature is 130 °C.

CURRENT SENSE INDUCTORS

Current transformers are used to sense a current in a conductor and provide a voltage that is proportional to that current, while providing high voltage isolation. These current transformers are suitable for switch mode power supply applications. They are rated for 130 °C operating temperature. Center tap models are available.

Designed for PC mounting, these inductors are supplied as open type, on rugged epoxy bases, or fully encapsulated case styles.

HOW TO ORDER INFORMATION

This handbook is intended to allow the design engineer to find the most "cost-effective" solution when designing inductors for switch mode power supplies. The proper choice of a power inductor can only be made after using the technical data contained within to perform "normalized" calculations. Multilayer windings should be considered when a choice cannot be found that meets all requirements. In such cases, contact the factory for assistance.

For your convenience, **Inquiry Forms** for the power, common mode and current sense inductors may be found on pages 33 through 36. These forms may be copied and used to enter specific requirements. Fax the form to the engineering department for the evaluation of a selection or requesting design assistance.

In the case of common mode and current sense inductors, the selection process and the identification of the appropriate part number is rather straight forward. The mechanics of the selection of power inductors is outlined in much of the foregoing material, and the final part number takes the following form: