



**ACME Electronics Corporation**  
**越峯電子材料股份有限公司**

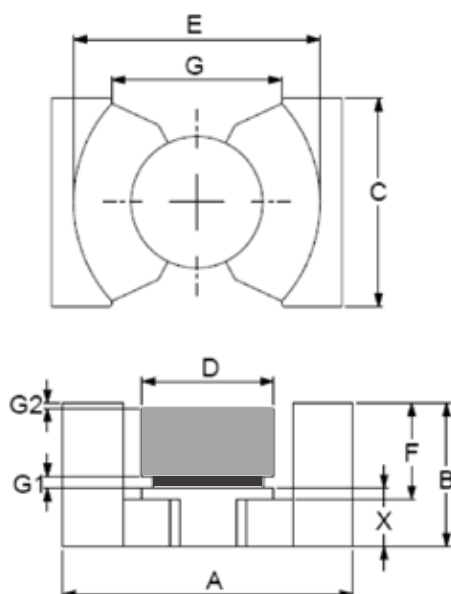
## **Multi-gap Composite Core**

# **P453 PQH40/40-AG**

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## Multi-gap Composite Core PQH40/40-AG



### Core dimensions:

|          |              |
|----------|--------------|
| <b>A</b> | 40.64 ± 0.60 |
| <b>B</b> | 20.00 ± 0.15 |
| <b>C</b> | 28.00 ± 0.50 |
| <b>D</b> | 15.00 ± 0.30 |
| <b>E</b> | 36.80 ± 0.60 |
| <b>F</b> | 14.85 ± 0.15 |
| <b>G</b> | 29.00 ± 0.50 |
| <b>X</b> | 5.45 ± 0.20  |

### Application Fields:

1.

PFC Choke

2.

High Inductance

3.

High Current Power Inductor

### Characteristics:

| $\Sigma L/A$           | $L_e$   | $A_e$                 | $A_{min}$            | $V_e$                | $W_t/set$ |
|------------------------|---------|-----------------------|----------------------|----------------------|-----------|
| 0.511 mm <sup>-1</sup> | 96.8 mm | 189.5 mm <sup>2</sup> | 172.3mm <sup>2</sup> | 18350mm <sup>3</sup> | 110 g     |

| Material                                  | Part no.            | G1 (mm) | G2 (mm) | Inductance Factor<br>$A_L$ (nH/N <sup>2</sup> ) |
|-------------------------------------------|---------------------|---------|---------|-------------------------------------------------|
| Housing core<br>P453<br>ROD core<br>AG060 | P453PQH40/40G144-AG | 0.40    | 0.20    | 144 ±10%                                        |
|                                           | P453PQH40/40G112-AG | 0.60    | 0.30    | 112 ±10%                                        |
|                                           | P453PQH40/40G80-AG  | 1.00    | 0.50    | 80 ±10%                                         |

Custom  $A_L$  values, air gaps, and materials are available upon request.

## Wide Temperature/Low Loss Material

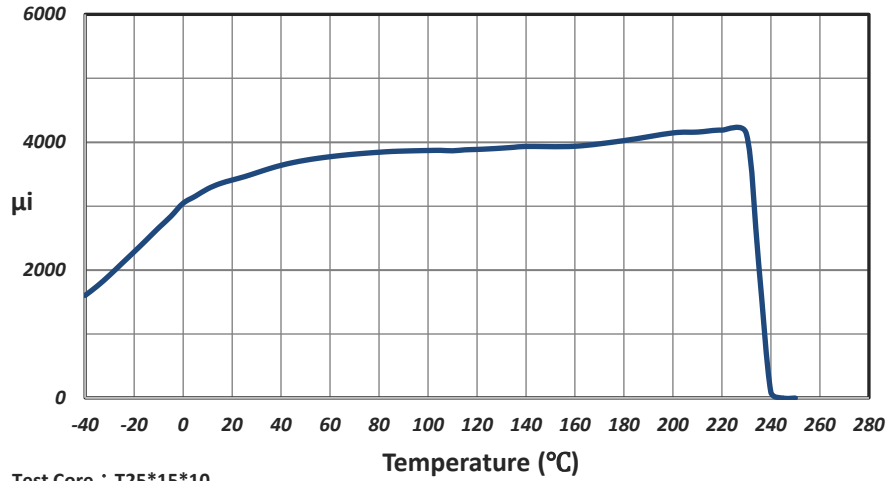
# P453

### Material properties:

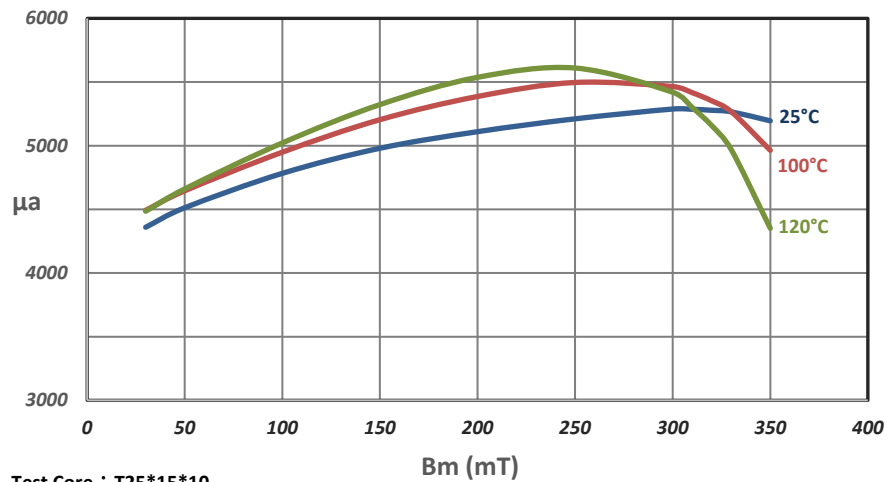
|                              | Symbol         | Unit                 | Measuring Conditions |           |       | <b>P453</b>                     |
|------------------------------|----------------|----------------------|----------------------|-----------|-------|---------------------------------|
|                              |                |                      | Freq.                | Flux den. | Temp. |                                 |
| Initial Permeability         | $\mu_i$        |                      | 10kHz                | 0.25mT    | 25°C  | <b>3500 <math>\pm</math>25%</b> |
| Amplitude Permeability       | $\mu_a$        |                      | 25kHz                | 200mT     | 25°C  | <b>&gt; 5000</b>                |
|                              |                |                      |                      |           | 100°C | <b>&gt; 5000</b>                |
| Power Loss                   | Pv             | kW/m <sup>3</sup>    | 100kHz               | 200mT     | 25°C  | <b>230</b>                      |
|                              |                |                      |                      |           | 100°C | <b>260</b>                      |
|                              |                |                      | 300kHz               | 100mT     | 25°C  | <b>240</b>                      |
|                              |                |                      |                      |           | 100°C | <b>300</b>                      |
|                              |                |                      | 500kHz               | 50mT      | 25°C  | <b>145</b>                      |
|                              |                |                      |                      |           | 100°C | <b>180</b>                      |
| Saturation Flux Density      | Bs             | mT                   | 10kHz                | 1200A/m   | 25°C  | <b>535</b>                      |
|                              |                |                      |                      |           | 100°C | <b>425</b>                      |
| Remanence                    | Br             | mT                   | 10kHz                | 1200A/m   | 25°C  | <b>67</b>                       |
|                              |                |                      |                      |           | 100°C | <b>60</b>                       |
| Coercivity                   | Hc             | A/m                  | 10kHz                | 1200A/m   | 25°C  | <b>8</b>                        |
|                              |                |                      |                      |           | 100°C | <b>7</b>                        |
| Hysteresis Material Constant | $\eta_B$       | 10 <sup>-6</sup> /mT | 10kHz                | 1.5-3.0mT | 25°C  | <b>&lt; 0.6</b>                 |
| Disaccommodation Factor      | D <sub>F</sub> | 10 <sup>-6</sup>     | 10kHz                | < 0.25mT  | 25°C  | <b>&lt; 1</b>                   |
| Curie Temperature            | T <sub>c</sub> | °C                   |                      |           |       | <b>&gt; 215</b>                 |
| Resistivity                  | $\rho$         | $\Omega$ m           |                      |           |       | <b>5.00</b>                     |
| Density                      | d              | g/cm <sup>3</sup>    |                      |           |       | <b>4.90</b>                     |

## Wide Temperature/Low Loss Material P453

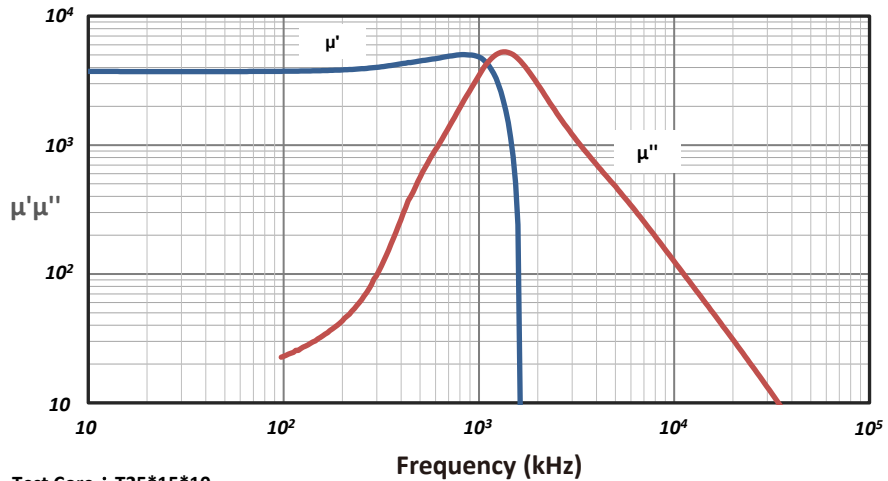
Initial Permeability vs Temperature



Amplitude Permeability vs Flux Density (Bm)

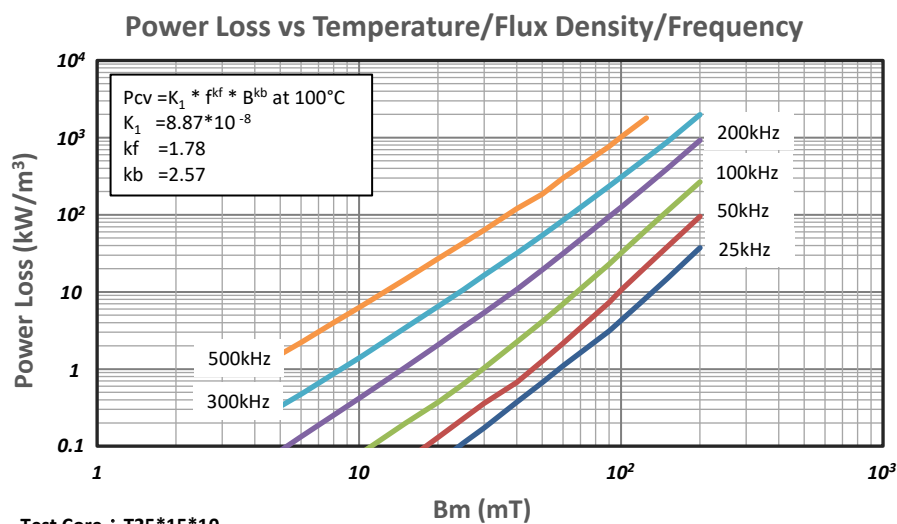


Complex Permeability vs Frequency

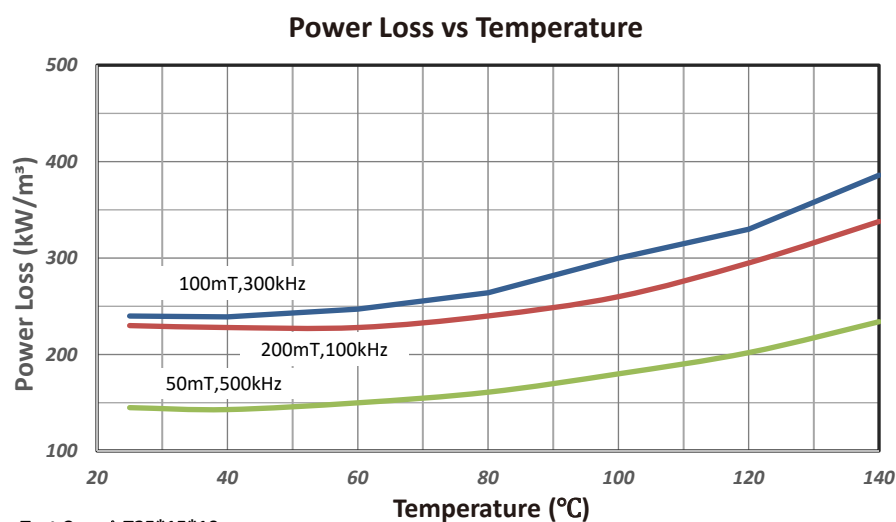


## Wide Temperature/Low Loss Material

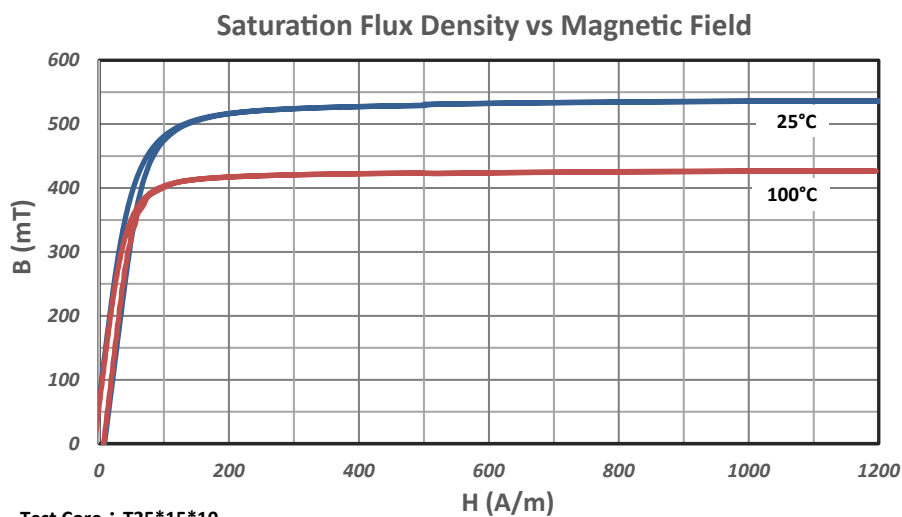
### P453



Test Core : T25\*15\*10



Test Core : T25\*15\*10



Test Core : T25\*15\*10

# AG series

## Features

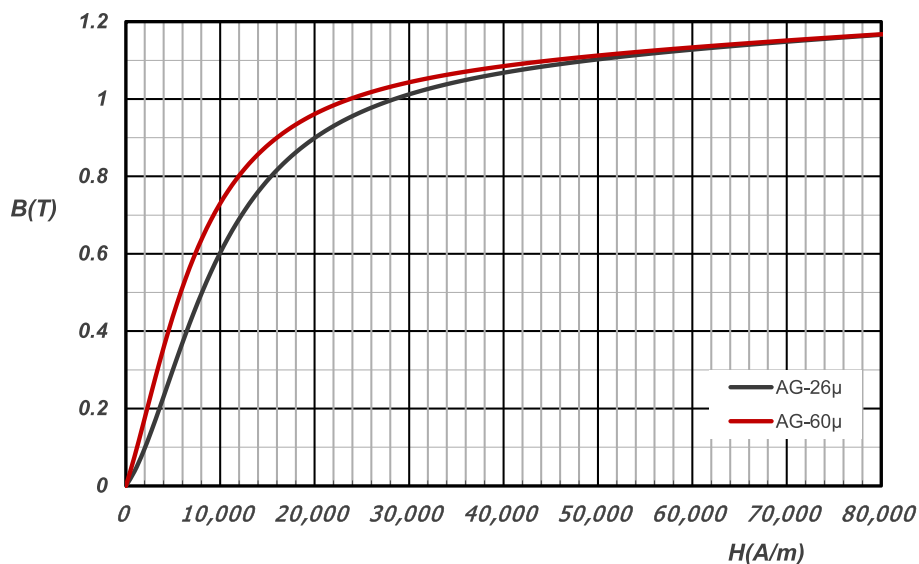
- ◆ Lowest core loss characteristics
- ◆ Good DC-bias performance
- ◆ Excellent temp. and freq. stability

## Applications

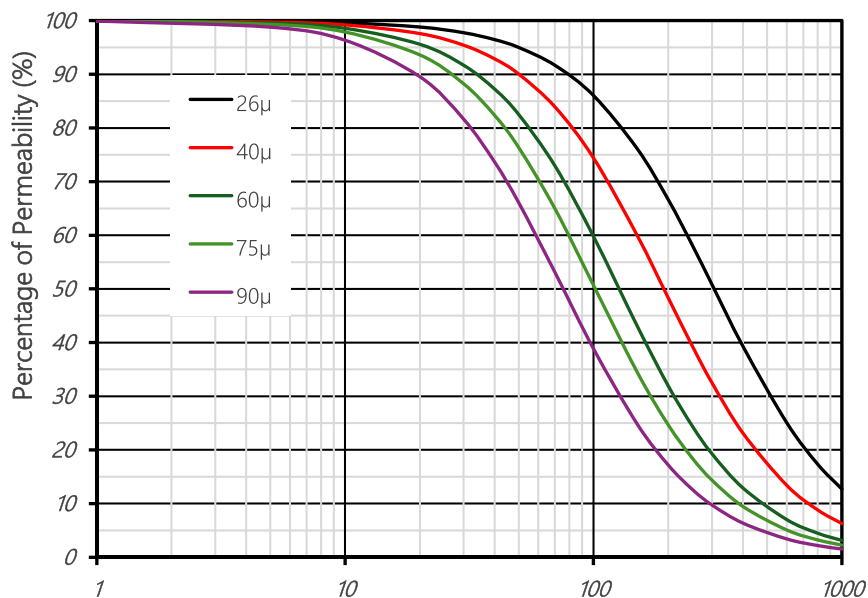
- ◆ Server power supply
- ◆ PFC inductor
- ◆ >50kHz power applications

| Property<br>Material             | Permeability | Bs (Tesla) | Core Loss<br>(@50kHz, 1000G) | DC-Bias<br>(% of 60μ@100Oe) |
|----------------------------------|--------------|------------|------------------------------|-----------------------------|
| AG<br>Fe-Si-Al<br>(Gas atomized) | 26-90        | 1.2        | 250kW/m <sup>3</sup>         | 60%                         |

**Saturation Flux Density vs Magnetic Field**



**Percent Initial Permeability vs DC Magnetizing Force**



## Material Characteristics

### AG series

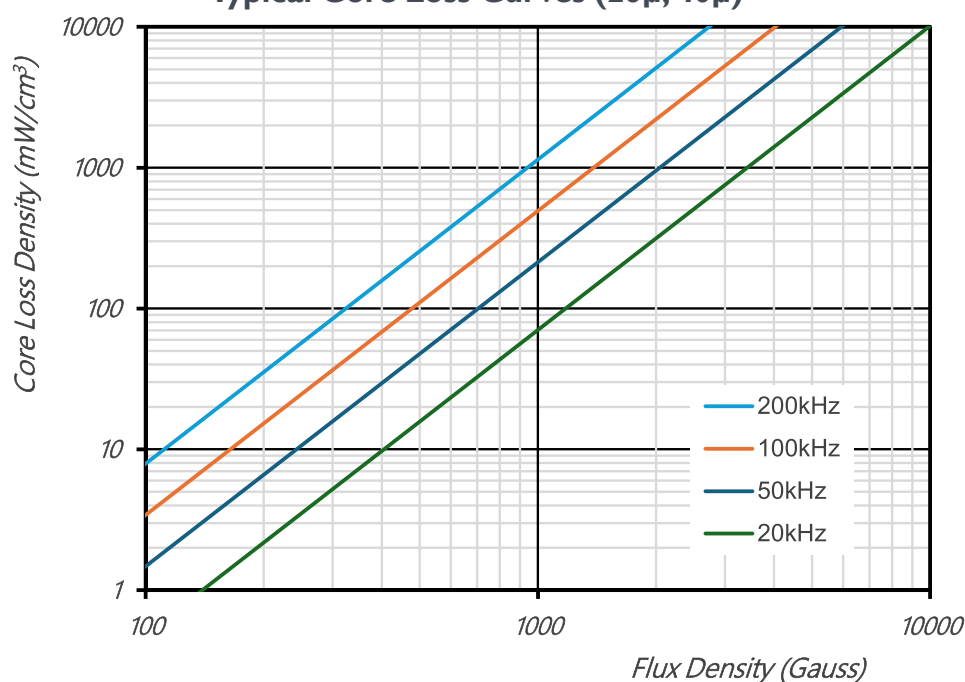
The curve fitting process gives rise to the following core loss density  $P_v(\text{mW}/\text{cm}^3)$  equation:

$$P_v(\text{mW}/\text{cm}^3) = C_m \cdot f^x \cdot B^y$$

\*frequency(f) unit in kHz and flux density(B) unit in kGauss

| $\mu_e$       | $C_m$ | x    | y    |
|---------------|-------|------|------|
| 26 & 40       | 1.872 | 1.21 | 2.16 |
| 60 & 75<br>90 | 0.935 | 1.43 | 2.13 |

Typical Core Loss Curves (26 $\mu$ , 40 $\mu$ )



Typical Core Loss Curves (60 $\mu$ , 75 $\mu$ , 90 $\mu$ )

