UP to DATE

Improved broadband material T38

1. Introduction

Today, broadband material with initial permeability μ_i=10.000 is a conventional material offered by many vendors. EPCOS T38 has been an industry benchmark for many years.

New applications, such as xDSL, require improved properties beyond μ_i.

A new, unique combination of properties by keeping basic material composition was achieved through newest technological improvement in powder development. Due to the downward compatibility of the existing material, the name T38 will remain for all products.

2. Advantages

Doubling of permeability roll-off frequency along with overall improvement frequency of the frequency response (Fig. 1).
Significant decrease of hysteresis material constant nB (i.e. harmonic distortion) over a broad temperature range (Fig. 2)
Remarkable increase of saturation flux density Bs for improved DC-bias behaviour (Fig. 3).
Dramatic improvement of mechanical behaviour (strength and fracture toughness) for less chipping and mechanical failure after assembly.

3. Technical data

Material Data

			T38 new	T38 old
	Symbol	Unit		
Initial permeability (T = 25 oC)	μ_i		10000 +- 30 %	10000 +- 30 %
Meas. field strength Flux density (near saturation, f=10kHz)	H B_S (25 °C) B_S (100 °C)	A/m MT MT	1200 **430** **260**	1200 380 240
Coercitive field strength (f = 10 kHz)	H_C (25 °C) H_C (100 °C)	A/m A/m	8 7	9 6
Relative loss factor 10 kHz 100 kHz	tan δ/μ_i	10^{-6} 10^{-6}	< 2 < 20	- -
Hysteresis material constant	η_B	10^{-6}/mT	**< 0.3**	< 1.4
Curie temperature	T_C	°C	> 130	> 130
Mean value of α_F at 25 ... 55 °C	α_F	10^{-6}/K	- 0.20	- 0.4
Density (typical values)		kg/m^3	4970	4900
Resistivity	ρ	Ωm	0.1	0.1

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Distribution:
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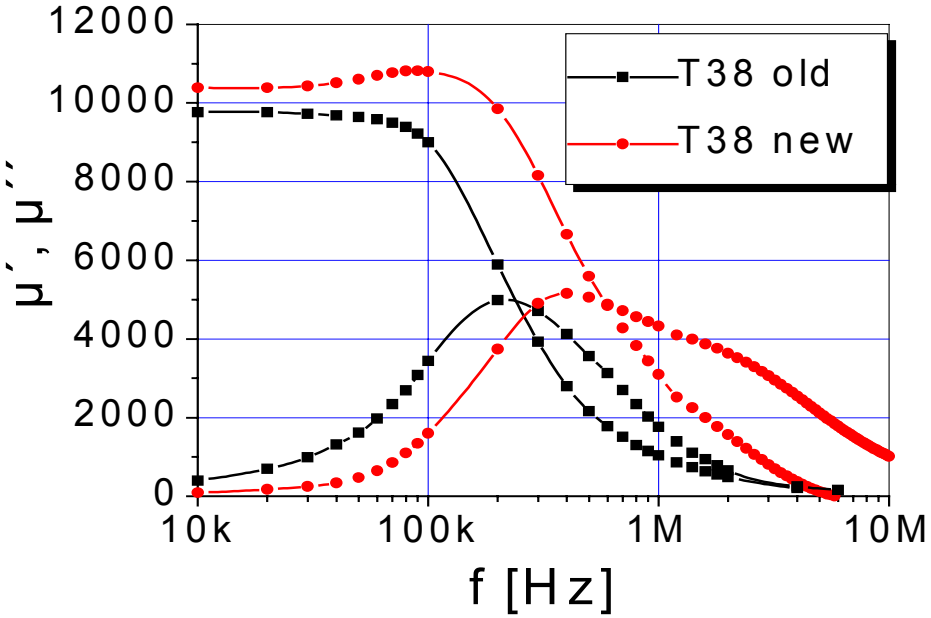

Fig. 1: Complex permeability vs. frequency (typical values)

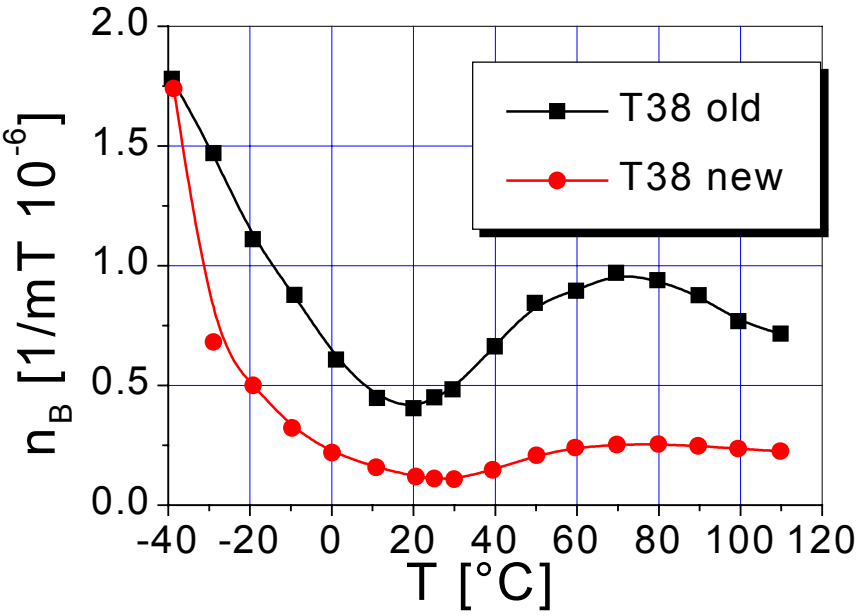

Fig. 2: Hysteresis material constant vs. temperature (typical values)

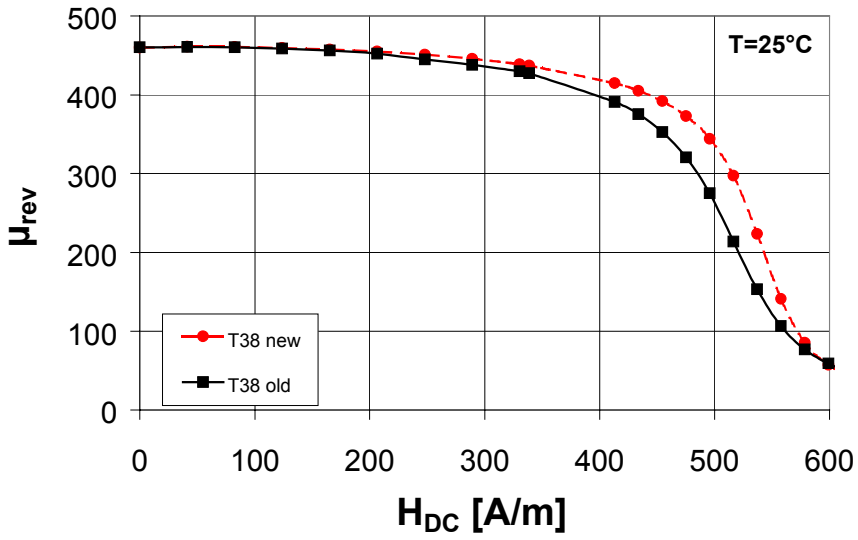

Fig. 3: μrev vs. H_{DC} at room temperature

4. Transition Period

The phase in of the new powder started in 9/99 and will be completed by 5/00. As per today all EP-cores and E-cores (<E8.8) are in production. By date code, traceability is guaranteed at all times.

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