

Evaluating ferrite materials with optimized performance under real-world conditions

Presented by:
Fair-Rite Products

John Lynch
Director of Engineering

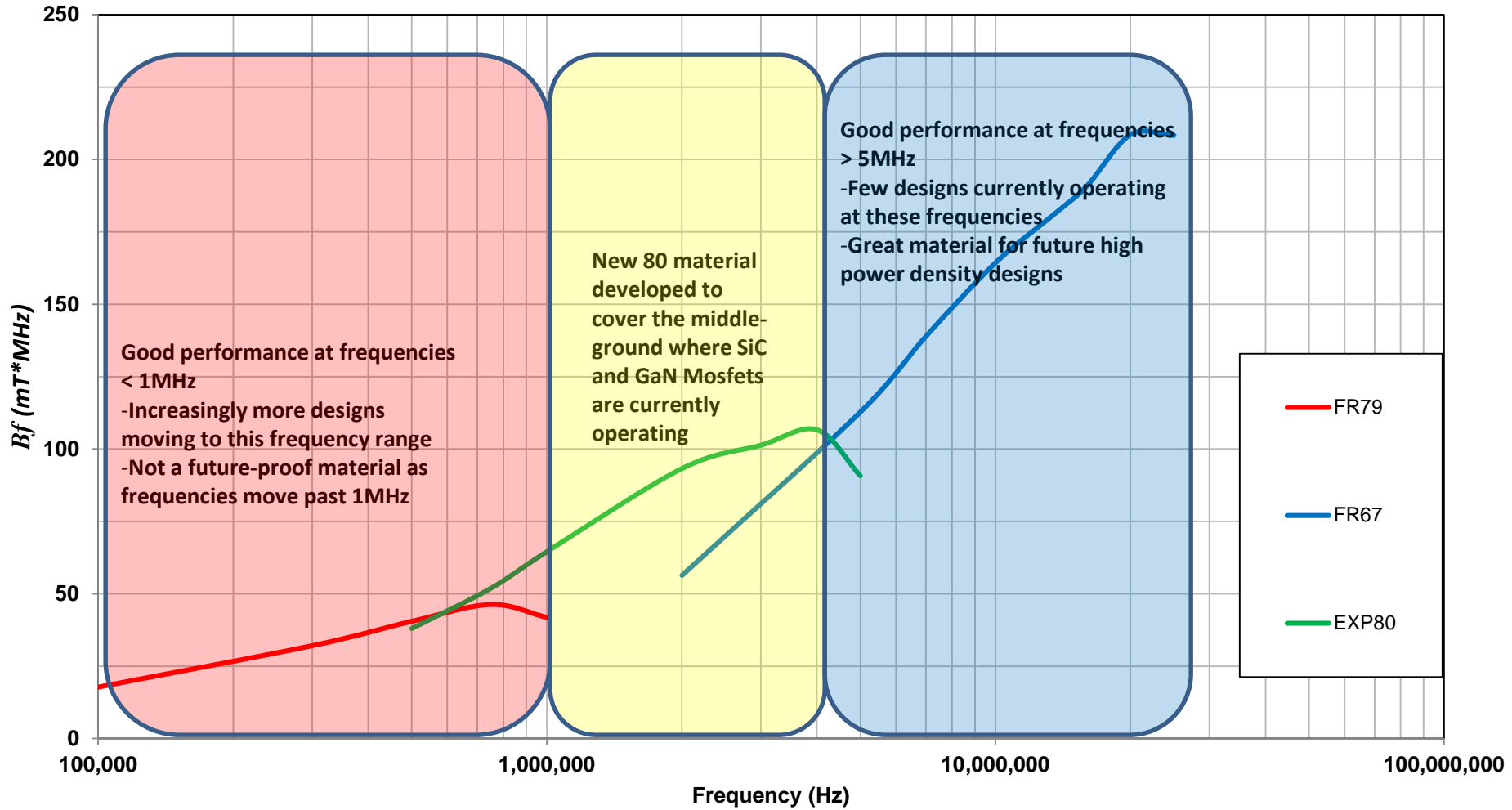
Michael Arasim
Engineering Lab Team Leader

DESIGN

DEVELOP

DELIVER

Performance Factor(500mW/cc) for Fair-Rite's Materials

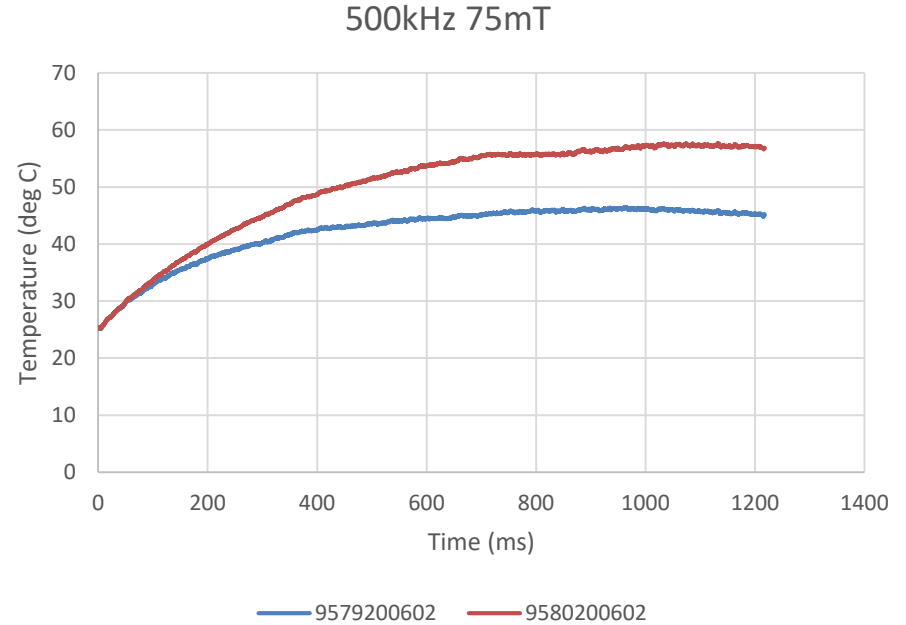
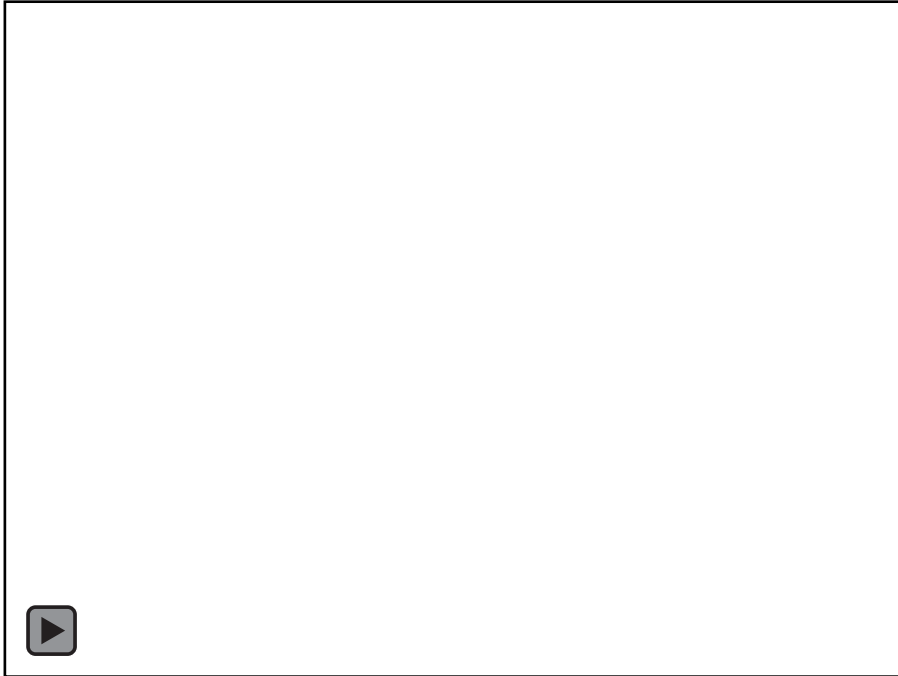


DESIGN

DEVELOP

DELIVER

500kHz 75mT



Max Temperature

79 Material EQ20

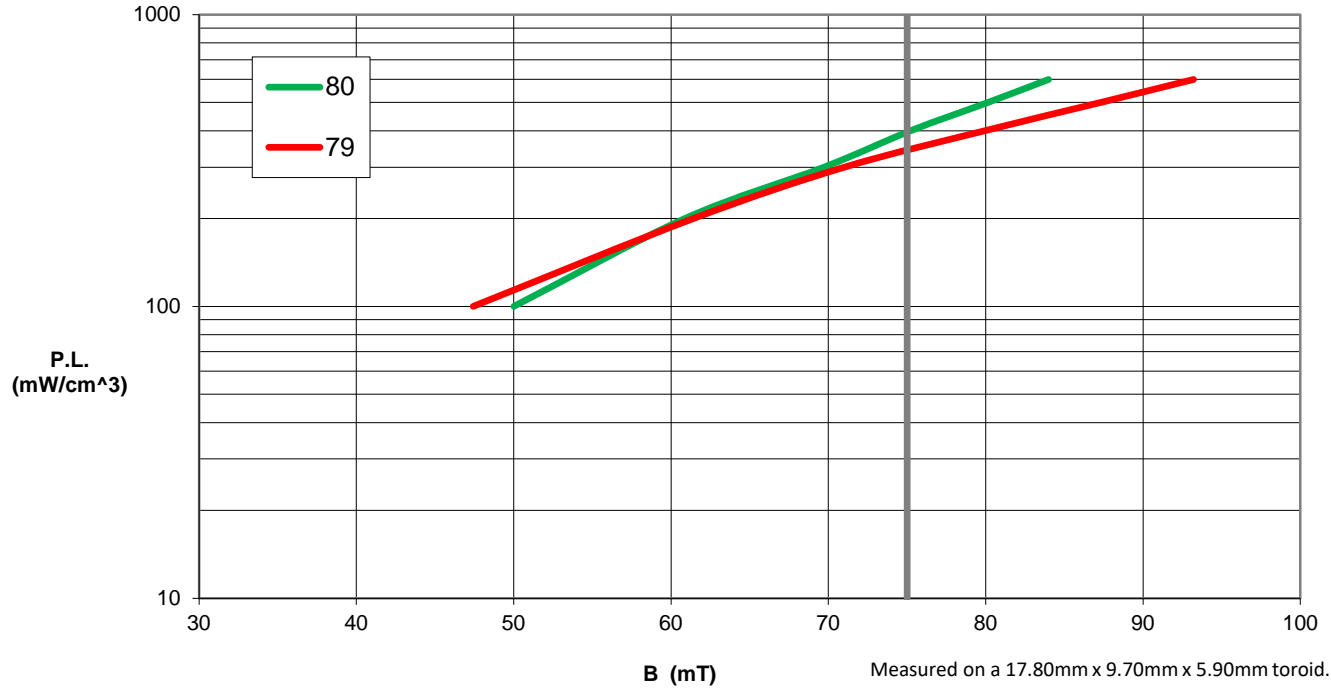
80 Material EQ20

45.1°C

56.8°C

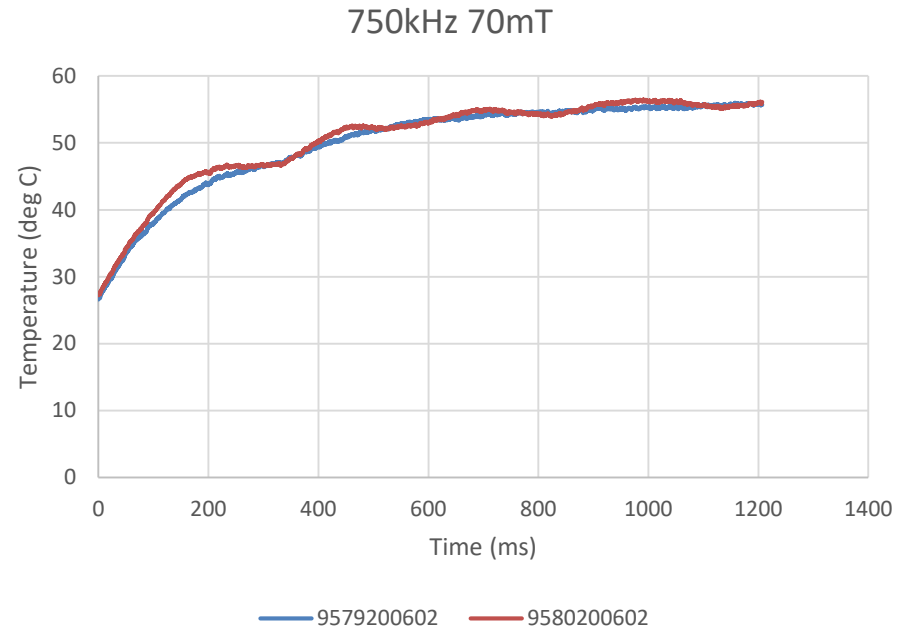
Final Temperature
Difference = 11.7°C.

500kHz Power Loss vs Flux Density at 25°C



	79	80
Core	EQ20	EQ20
Ve(cm³)	2.00	2.00
Frequency(kHz)	500	500
Flux Density(mT)	75	75
Pv (mW/cm³)	350	600
T (degrees C)	45.1	56.8
A _L (nH)	2440	1210

750kHz 70mT



Max Temperature

79 Material EQ20

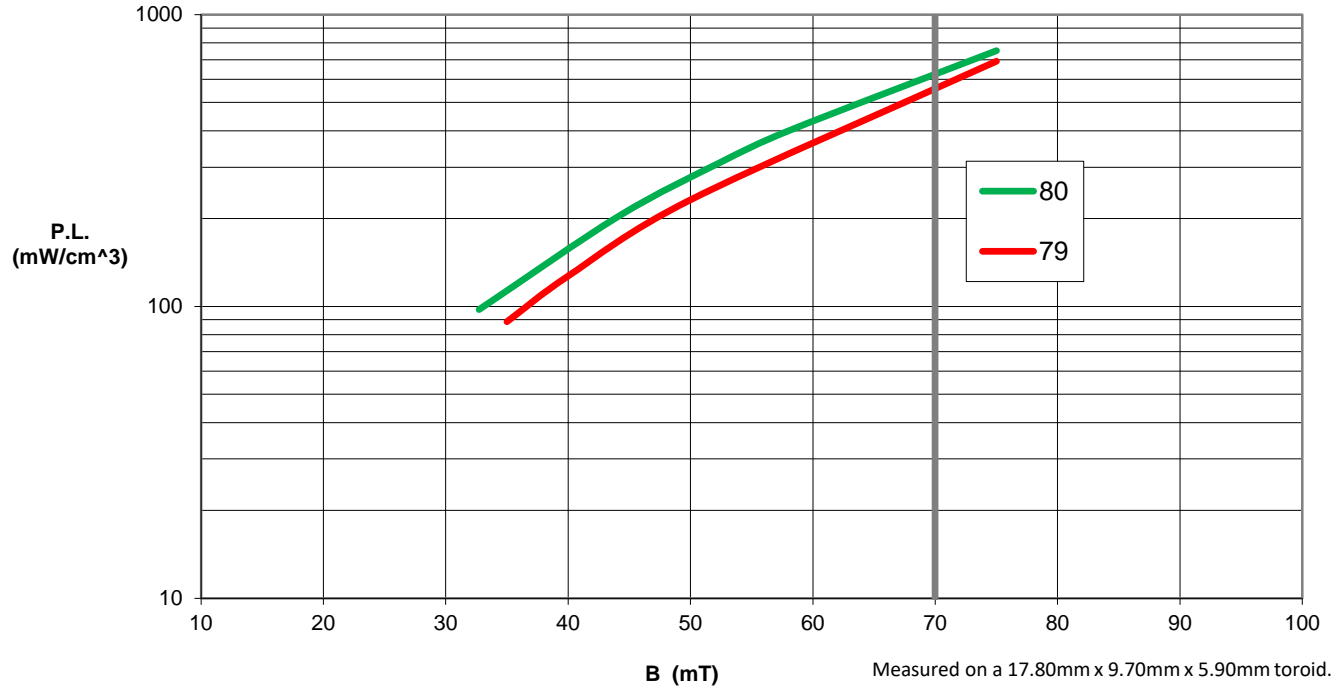
55.7°C

80 Material EQ20

56.1°C

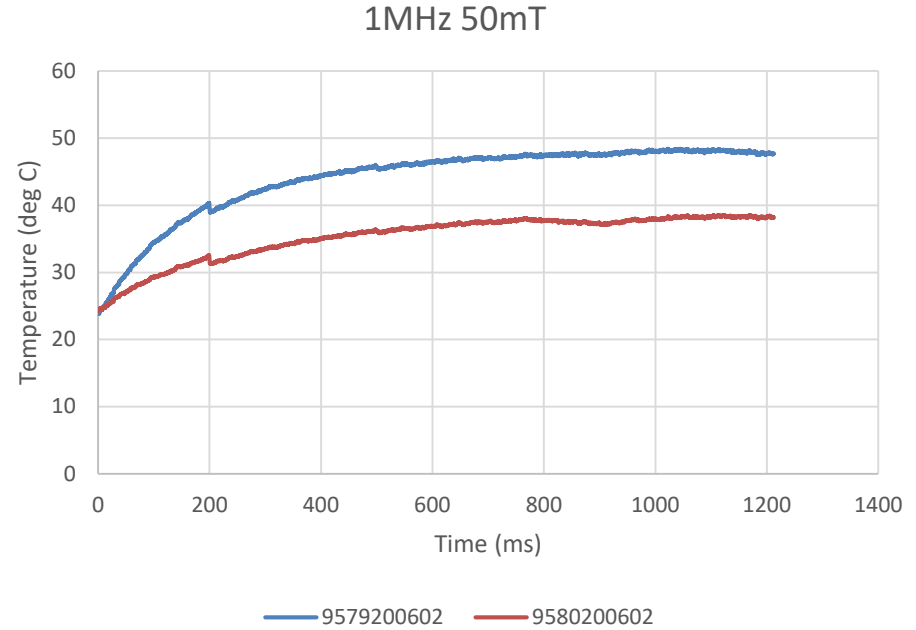
Final Temperature
Difference = 0.4°C.

750kHz Power Loss vs Flux Density at 25°C



	79	80
Core	EQ20	EQ20
Ve(cm ³)	2.00	2.00
Frequency(kHz)	750	750
Flux Density(mT)	70	70
Pv (mW/cm ³)	500	600
T (degrees C)	55.7	56.1
A _L (nH)	2440	1210

1MHz 50mT



Max Temperature

79 Material EQ20

80 Material EQ20

47.7°C

38.2°C

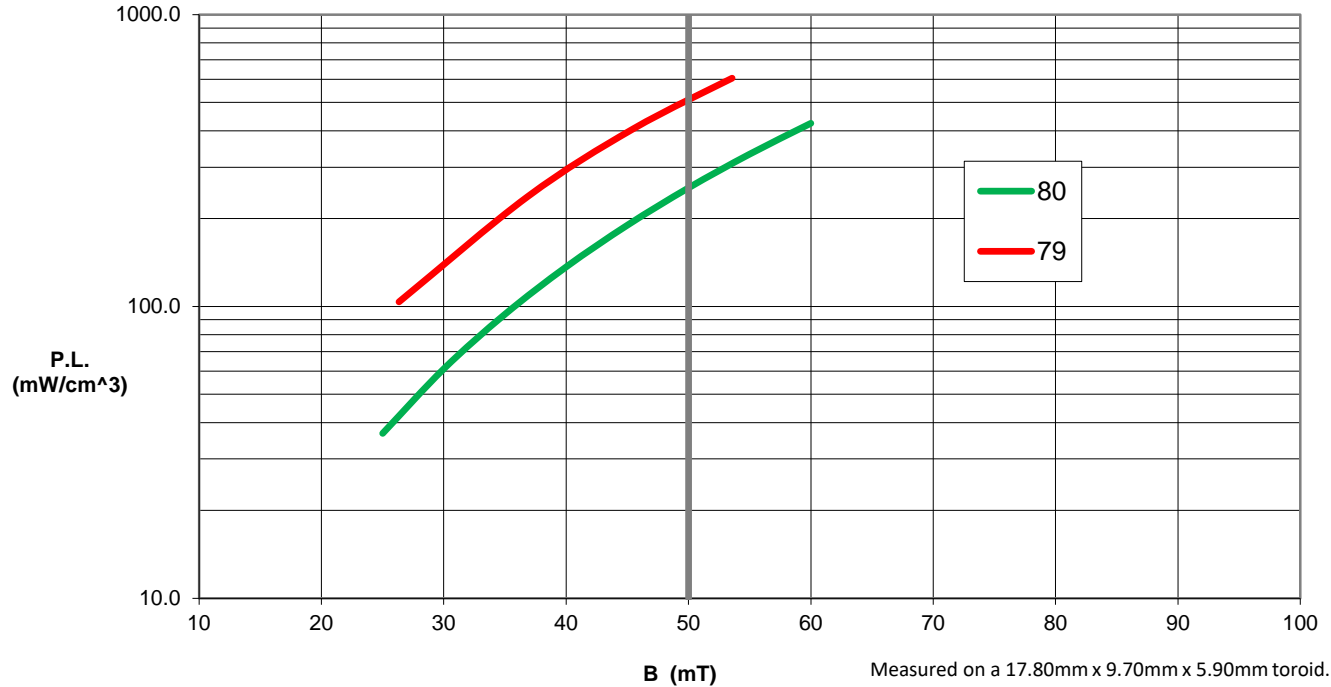
Final Temperature
Difference = 9.5°C.

DESIGN

DEVELOP

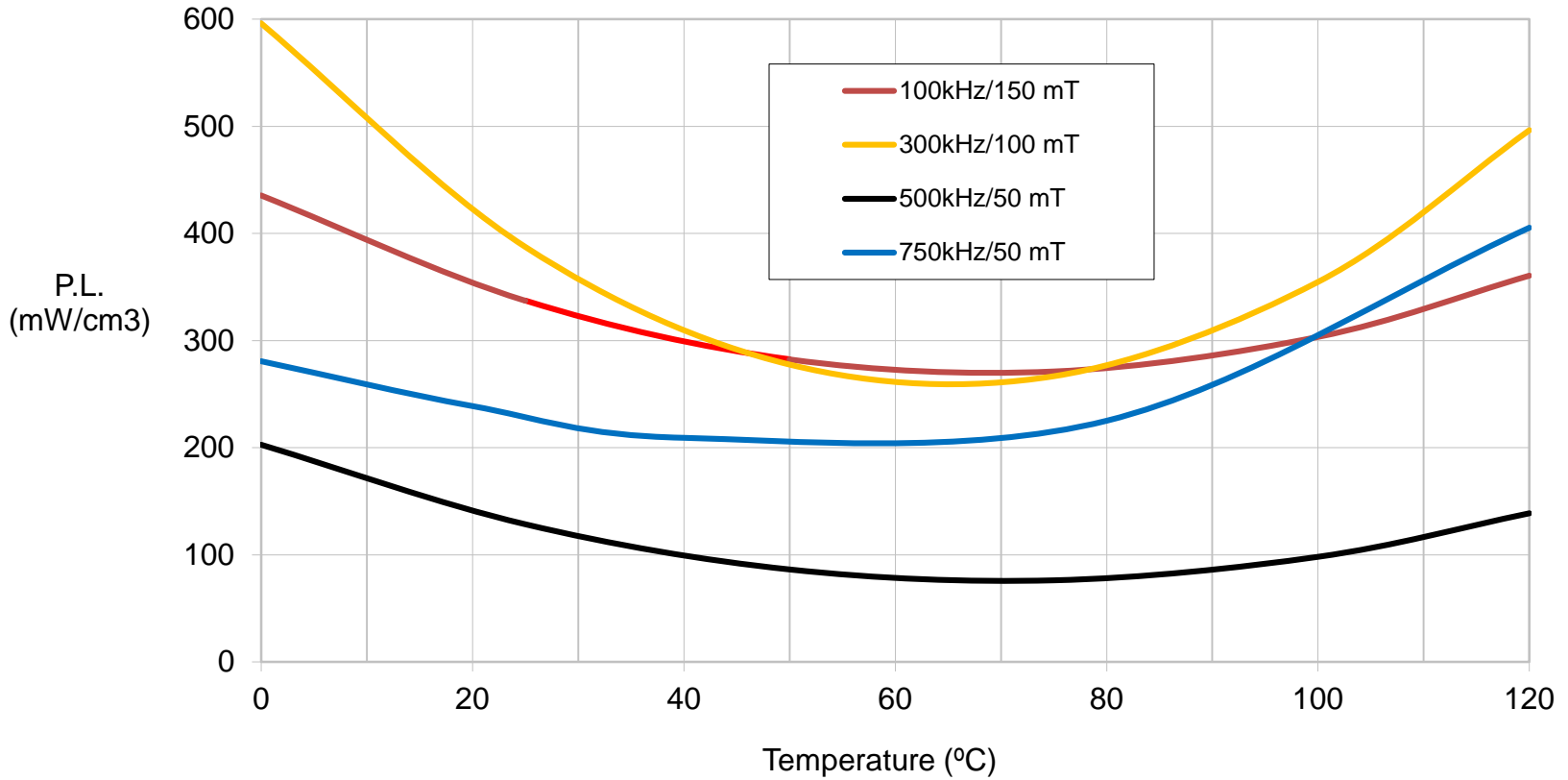
DELIVER

1MHz Power Loss vs Flux Density at 25°C

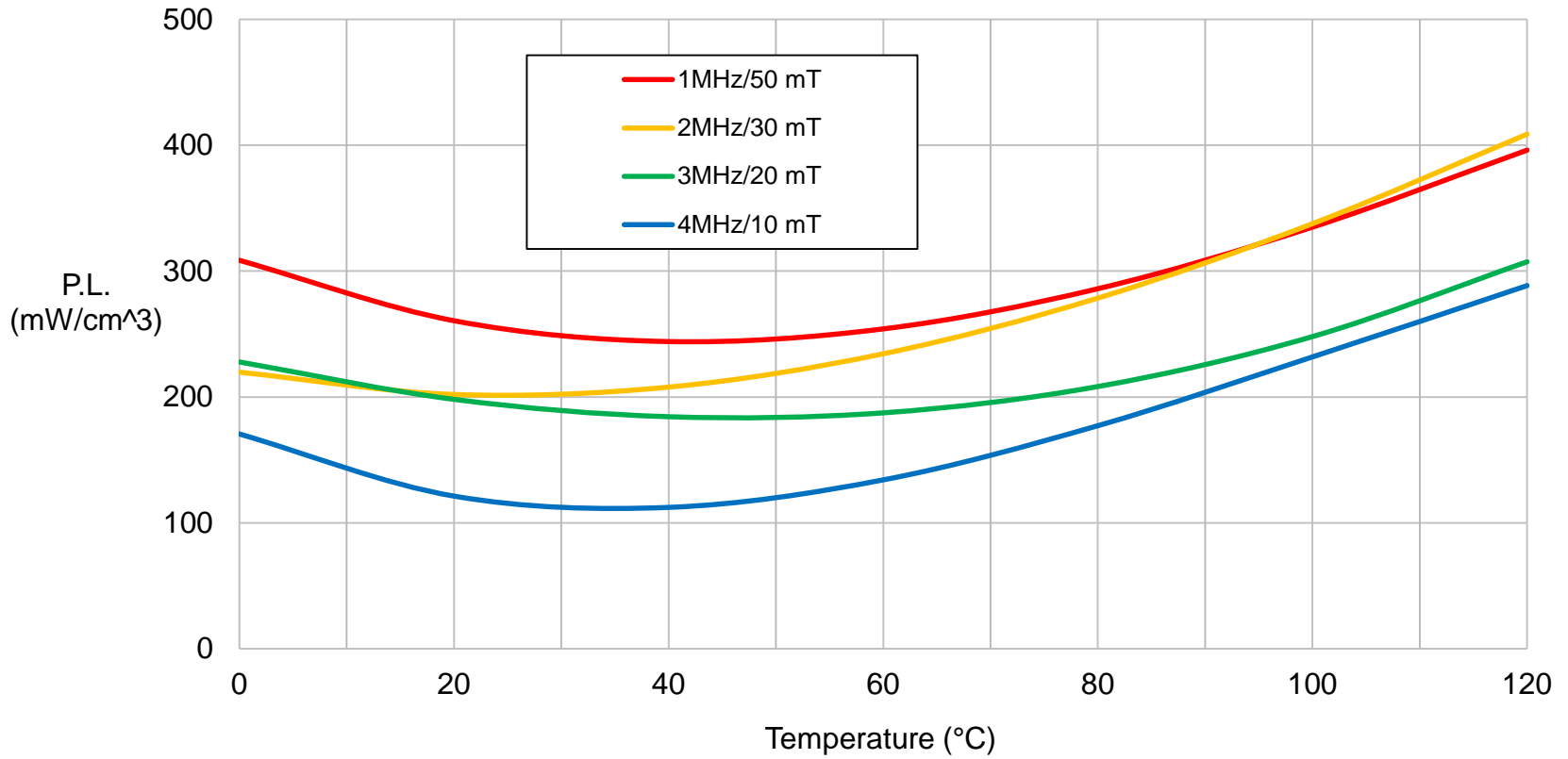


	79	80
Core	EQ20	EQ20
Ve(cm ³)	2.00	2.00
Frequency(MHz)	1	1
Flux Density(mT)	50	50
Pv (mW/cm ³)	420	260
T (degrees C)	47.7	38.2
A _L (nH)	2440	1210

79 Material Power Loss vs Temperature



80 Material Power Loss vs Temperature



Summary

- Market moving toward higher frequency with smaller core sizes.
- Materials developed to cover the higher frequencies:
 - 79 material ($f < 1\text{MHz}$)
 - 80 material ($1\text{-}5\text{MHz}$), newly developed
 - 67 material ($f > 5\text{MHz}$), optimized
- 79, 80, and 67 offer:
 - Stable permeability with increased flux densities and DC currents over frequency.
 - Low power loss density at higher frequencies covering a range from 500kHz to over 10MHz.
 - Stable power loss densities over temperature.
- Fair-Rite currently offers toroids and EQ cores and continues to add new parts.
- Custom parts and evaluation kits available upon request.

