

Ultrasonic transducer S3850

DATA SHEET

Intended use

An electro-magnetic acoustic transducer S3850 for the couplant-free transmitting and receiving ultrasonic shear waves by the novel pulse magnetization technology can be used for thickness measurements by A1270 EMAT.

Main technical specifications

Type of transducer:	straight beam electro-magnetic acoustic transducer for generating ultrasonic shear waves with radial polarization
Nominal frequency:	4 MHz
Ultrasonic aperture diameter:	8 mm
Inspection range:	1 up to 75 mm
Lift-off / through-coating thickness:	up to 1 mm (for inspection range up to 50 mm)
Maximal excitation pulse voltage:	500 V
Maximal voltage of the pulse magnetization:	12 V
Duration of the magnetization pulse, max.:	1.5 ms
Direct current resistance of the signal inductor:	2.8 ± 0.1 Ohm
Operating temperature range:	from -20 to $+60^{\circ}\text{C}$
Overall dimensions:	23x29 mm
Cable length:	1000 ± 10 mm
Weight with the cable:	220 gr



Measurement conditions and equipment used

Temperature 24°C , rel. humidity 85%

Generator transmitting signal: unipolar square pulse with amplitude $400\text{ V} \pm 40\text{ V}$, pulse duration 130 ± 13 ns by 50 % of the maximum voltage amplitude.

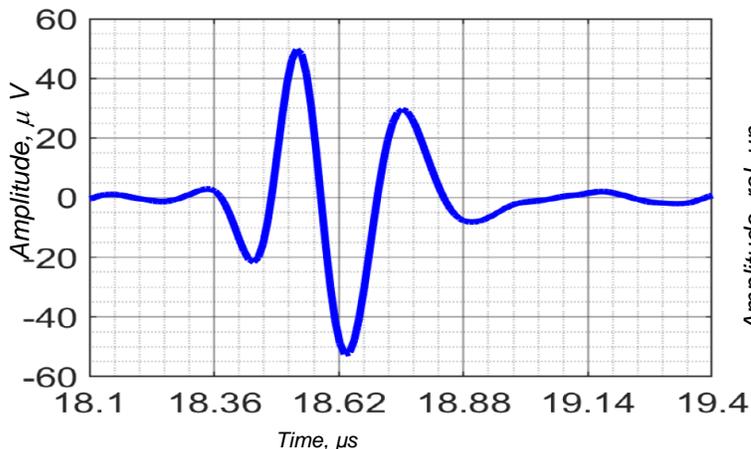
Calibration sample: CO-2, steel 20, serial number 006, longitudinal wave velocity 5930 m/s, shear waves velocity 3247 m/s.

Reference signal: backwall echo-signal on CO-2 at 59 mm depth.

Artificially induced interference: blank thermal noise with effective amplitude 1 mV induced by inductance coil located close by the transducer protector surface.

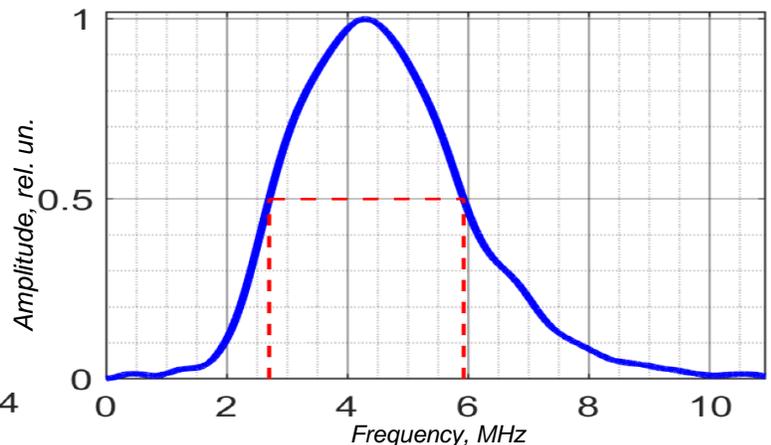
Measured characteristics

Shape of the measured pulse



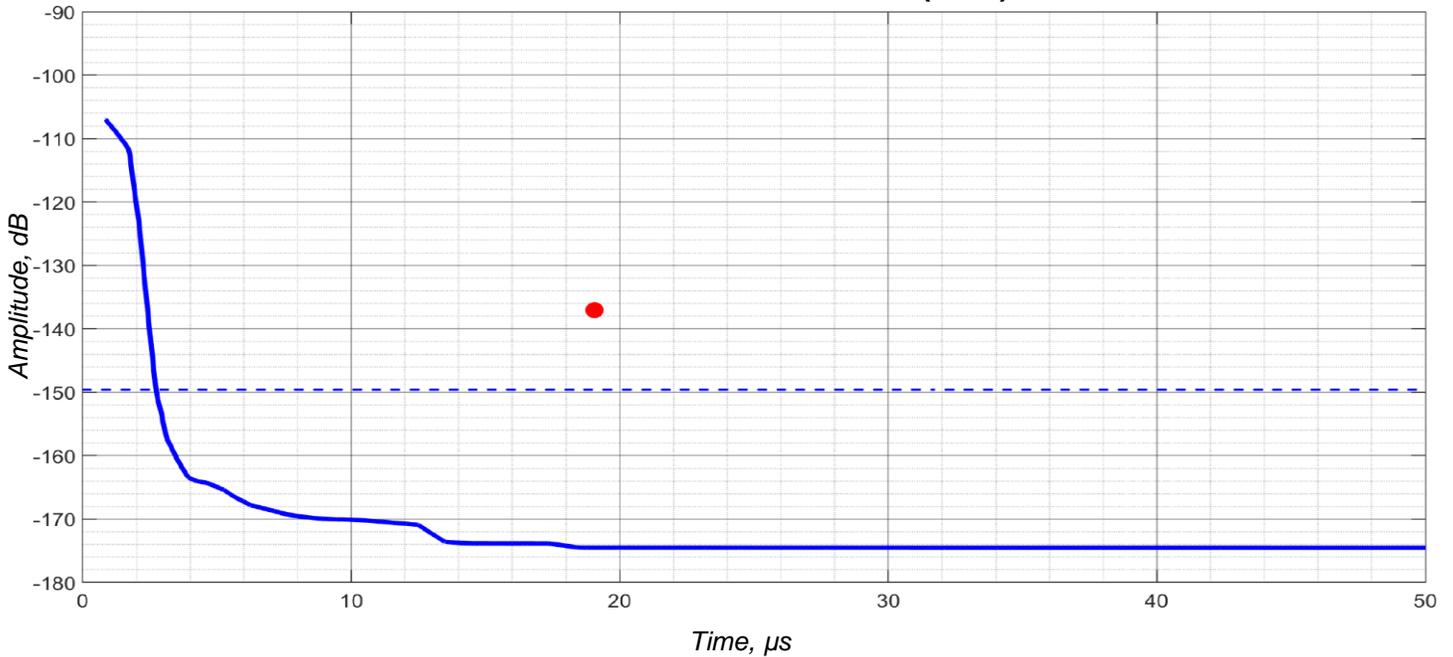
Duration of the echo pulse:	0.62 μs
Echo-Pulse amplitude:	52.2 μV
Band width:	3.2 MHz
Relative band width:	75 %

Amplitude frequency response



Maximum AFR frequency f_p :	4.3 MHz
Lower AFR frequency f_l :	2.7 MHz
Upper AFR frequency f_u :	5.9 MHz
Operating AFR frequency f_c :	4.3 MHz

Reverberation noise curve (RNC)

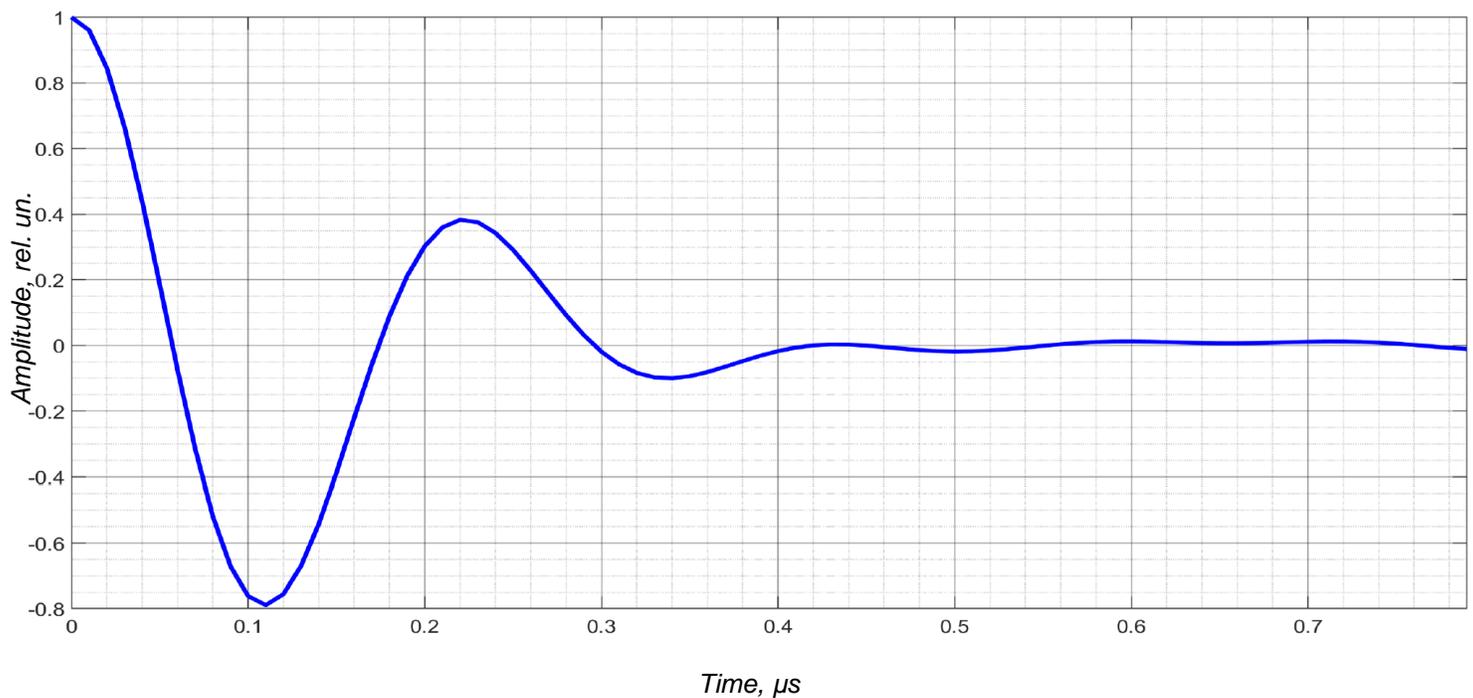


Signal-to-noise ratio between the backwall signal in the reference block and transducer self-noise: = 37 dB

Signal-to-noise ratio between the backwall signal in the reference block and transducer self-noise in presence of electromagnetic noise: 13 dB

RNC level at 5 μs: - 165 dB

Auto-correlation function (ACF)



Main lobe maximum of ACF: 0.38

Time shift of the main lobe maximum of ACF: 0.22μs