

# 传感器应用材料

## Materials for sensor applications

| 产品名称 Material  |  | Sonox® P5                                    | Sonox® P502                          | Sonox® P504                          | Sonox® P508                          |
|--|--|--|--------------------------------------|--------------------------------------|--------------------------------------|
| <b>介电性能 Dielectric properties</b>  |  |  |                                      |                                      |                                      |
| 相对介电常数 $\epsilon_r$<br>Relative permittivity $\epsilon_r$                                  | $\epsilon_{33}^T/\epsilon_0$<br>$\epsilon_{33}^S/\epsilon_0$<br>$\epsilon_{11}^T/\epsilon_0$<br>$\epsilon_{11}^S/\epsilon_0$ | 1850<br>865<br>1850<br>1220                  | 1850<br>875<br>1950<br>1260          | 1730<br>835<br>1920<br>1085          | 1500<br>625<br>1700<br>900           |
| 介电损耗因子 $\tan \delta$<br>Dielectric dissip. factor $\tan \delta$                            | $10^{-3}$  | 20,0   | 12,5                                 | 12,0                                 | 18,0                                 |
| 居里温度 $T_c$ Curie temperature $T_c$   | °C   | 340  | 335                                  | 350                                  | 340                                  |
| <b>机电性能 Electromechanical properties</b>   |  |  |                                      |                                      |                                      |
| 频率常数<br>Frequency constant   | $N_p$<br>$N_t$<br>$N_1$<br>$N_3$   | KHz × mm<br>2030<br>1900<br>1380<br>1310     | 2020<br>2030<br>1325<br>1260         | 2020<br>2035<br>1320<br>1250         | 2050<br>2090<br>1340<br>1300         |
| 耦合系数<br>Coupling coefficient   | $k_p$<br>$k_{31}$<br>$k_{33}$<br>$k_t$<br>$k_{15}$   | 0,62<br>0,34<br>0,73<br>0,49<br>0,72         | 0,62<br>0,33<br>0,72<br>0,48<br>0,74 | 0,59<br>0,32<br>0,71<br>0,51<br>0,66 | 0,61<br>0,35<br>0,72<br>0,58<br>0,71 |
| 充电常数<br>Charge constant  | $d_{33}$<br>$d_{31}$<br>$d_{15}$   | $10^{-12}$ C/N<br>450<br>-180<br>550         | 440<br>-185<br>560                   | 390<br>-157<br>530                   | 440<br>-165<br>550                   |
| 电压常数 $g_{33}$<br>Voltage constant $g_{33}$   |  | $10^{-3}$ Vm/N<br>27,5                       | 26,9                                 | 25,5                                 | 33,1                                 |
| <b>机械性能 Mechanical properties</b>  |  |  |                                      |                                      |                                      |
| 弹性顺度<br>Elastic compliance   | $S_{11}^E$<br>$S_{33}^E$   | $10^{-12}$ m <sup>2</sup> /N<br>17,1<br>19,0 | 18,5<br>20,7                         | 16,3<br>17,5                         | 17,0<br>19,0                         |
| 弹性刚度<br>Elastic stiffness  | $C_{33}^D$<br>$C_{55}^D$   | $10^{10}$ N/m <sup>2</sup><br>14,5<br>5,8    | 15,7<br>6,5                          | 14,9<br>4,4                          | 15,8<br>6,0                          |
| 密度 $\rho$ Density $\rho$   |  | $10^3$ kg/m <sup>3</sup><br>7,65             | 7,74                                 | 7,65                                 | 7,80                                 |
| 机械品质因子 $Q_m$<br>Mechan. quality factor $Q_m$   |  | 90   | 80                                   | 90                                   | 60                                   |
| <b>稳定性 Stability</b>   |  |  |                                      |                                      |                                      |
| 温度系数 $\alpha_k$<br>详细信息见下页<br>Temperature coefficient $\alpha_k$<br>(Details see overleaf) |  | $10^{-4}/K^{-1}$                             |                                      |                                      |                                      |
| 老化率<br>Aging rate  | $C_\epsilon$<br>$C_f$<br>$C_k$   | %/每十倍程<br>%/Decade<br>-2,3<br>0,3<br>0,1     | -0,3<br>0,15<br>0,2                  | -0,4<br>0,4<br>0,1                   | -0,3<br>0,2<br>-0,1                  |

备注：压电陶瓷材料的关键参数信息请参照产品介绍“高性能陶瓷的压电应用”第35页

Note: For information on the key figures of piezo ceramic materials see the glossary on p. 35 of the leaflet „Advanced ceramics in Piezo Applications“

# 压电性能与温度的关系

## Thermal dependency of piezo electric characteristics

