$$p(\underline{x} \mid \underline{\mu}, \underline{\Sigma}) = \frac{1}{(2\pi)^{\frac{D}{2}} |\underline{\Sigma}|^{\frac{1}{2}}} \exp\left(-\frac{1}{2}(\underline{x}-\underline{\mu})^T \underline{\Sigma}^{-1} (\underline{x}-\underline{\mu})\right)$$

$$\log\left(p(\underline{x} \mid \underline{\mu}, \underline{\Sigma})\right) \propto \underline{\mu}^T \underline{\Sigma}^{-1} \underline{x} - \frac{1}{2}\underline{\mu}^T \underline{\Sigma}^{-1} \underline{\mu}$$

$$\frac{\partial \log(p)}{\partial \underline{\mu}} = \underline{\Sigma}^{-1} \underline{x} - \underline{\Sigma}^{-1} \underline{\mu}$$

$$\frac{\partial \log(p)}{\partial \underline{\mu}} = -\underline{\Sigma}^{-1}$$

$$\therefore \underline{F} = \underline{\Sigma}^{-1}$$