# QVault TPM

## Quantum Resistant Certified Trusted Platform Module (TPM)

Quantum Resistant, flash-memory-based, firmware upgradable Trusted Platform Module compliant with TPM 2.0 & FIPS 140-3 requirements. Built on a powerful RISC-V Common Criteria EAL5+ hardware platform.

**Trusted Boot**
Ensures system integrity during startup

**Device Attestation**
Protect against alterations of identity & device integrity

**Secure Authentication**
For devices, users, and platforms

**IoT Device Security**
Protects connected devices from unauthorized access

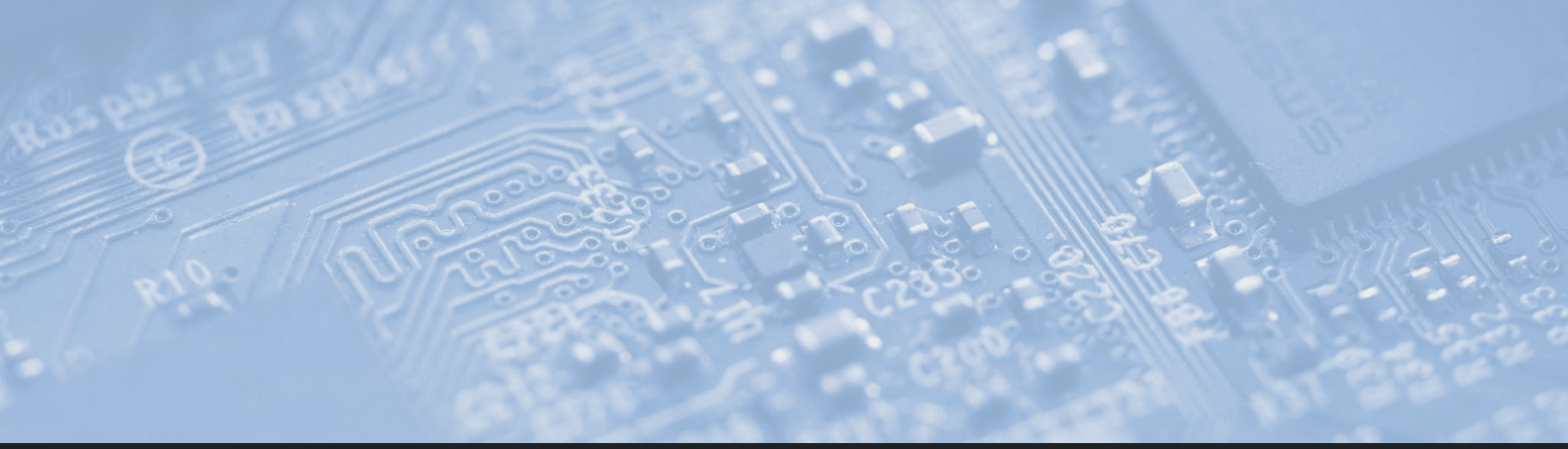
**Cryptographic Key Management**
Secure generation, storage, and management of cryptographic keys

**Data Integriy Protection**
Ensures data integrity and authenticity


COMMON CRITERIA CERTIFIED EAL4+

**TPM 2.0**

FIPS 140-3™



## Security Features

- Physical and Environmental Protections:
  - Active shield for physical tamper protection
  - Monitors for voltage, temperature, frequency and light conditions to detect tampering
- Side-Channel Attack Resistance
- Fault Injection Resistance
- Random Number Generation: FIPS SP800-90A DRBG & FIPS SP800-90B TRNG Entropy Source
- Pre-provisioning:
  - Three Endorsement Keys & Certificates (RSA 2048, ECC NIST P-256, ECC NIST P-384)
  - Three 2048-bit RSA key pairs
  - PQC Keys (ML-KEM-1024 & ML-DSA-44)
- Fault-tolerant firmware loader for safe updates

## Memory and Storage

- Flash-based memory with error correction
- Up to 50KB free NVM for secure data storage
- Data retention of up to 15 years, with write/erase endurance of 200,000 cycles

## Interfaces and Communication

- I²C Interface up to 1 Mb/s
- SPI Interface up to 33 MHz
- Automatic Detection of the Communication Interface
- 4 GPIOs

## Cryptographic Services

The QVault TPM provides a broad range of cryptographic services designed to support security needs across multiple industries:

- RSA:
  - Key generation (1024, 2048, 3072, 4096-bit)
  - Encryption: RSAES-OAEP, RSAES-PKCS1-v1_5
  - Signing: RSASSA-PSS, RSASSA-PKCS1-v1_5
- AES
  - 128/192/256-bit encryption, with modes like ECB, CBC, GCM, CFB
- Elliptic Curve Cryptography (ECC):
  - Supported curves: NIST P-256 and P-384
  - Key generation, ECDH (key exchange), ECDSA (signing)
- Hash Functions:
  - SHA1, SHA2 (256/384), and SHA3 (256/384)
- Message Authentication:
  - MAC using SHA1, SHA2, and SHA3

## Electrical Characteristic

- Supply Voltage: 1.62 V to 3.6 V
- Operating Temperature Range: -40°C to 105°C
- Electrostatic Discharge (ESD) Protection: Up to 2 kV (HBM)