ST25DV-PWM product presentation

July 2018
Main ST25DV-PWM Market Segments

**Smart Industry**
- Industrial Lighting
- Motor control

**Smart City**
- Street Lighting
- Building Lighting (offices, museums…)

*Image*
ST25DV-PWM Key Use Cases

Product configuration

• Parameter settings
• Simple and Flexible

Servicing & Maintenance

• Update parameters in the field
• Easy to use and Adaptable
ST25DV-PWM in Lighting Market

**High-end segment**

- Previous: Connector + Resistor with manual operation
- New: ST25DV-I2C ISO15693 tag
- MCU (32-bit) PWM
- LED power stage (MOSFET)
- With MCU on board

**Low-end segment**

- Previous: Connector + Resistor with manual operation
- New: ST25DV-PWM ISO15693 tag
- MCU (32-bit) PWM
- LED driver IC (analog)
- Without MCU on board

Patents pending
Typical NFC Type 5 Range

- **ISO15693 (26kb/s)**
  - Up to 7cm (3in.)

- **ST25DV-PWM EEPROM**
  - Up to 1m (3ft)
ST25DV-PWM Dynamic NFC Tag

Use cases
- Industrial applications like Lighting LED driver, Motor control

Key Features
- ISO15693 and NFC Type V
- 2K-bit memory
- Up to 2 PWM signal (push pull)
- Up to 15 bits resolution (62.5ns resolution step)
- Power Supply 1.8V - 5.5V
- -40°C to +105°C (PWM) temperature range
- TruST25 digital signature

Key Benefits
- 2 in 1 chip, putting NFC connectivity with PWM functionality
- Cost optimized solution to address low end Lighting market
  - Significant BOM reduction as no MCU is required to drive the system
2 product options

1x PWM version

2kbit memory size

ISO 15693

PWM generator

Vcc

PWM1

Vss

ICRef = 0x38 for 1x PWM

2x PWM version

2kbit memory size

ISO 15693

PWM generator

Vcc

PWM2

PWM1

Vss

ICRef = 0x39 for 2x PWM

8 pins packages for both version ➔ pin to pin compatibility
Memory Mapping & Password Management

- **EEPROM density**
  - 2k-bit
- **User EEPROM area configurable in 1 or 2 areas**
  - Each area is individually read-/write- protected by password command
    - 64 bit password 1 area
    - 2x 32-bit password 2 areas
- **PWM control area**
  - Individually read/write protected by **32 bit password**
- **System EEPROM area**
  - Access protected by **32 bit password**
- **Specific block used to store a 64 bit UID**
  - Its value is written by ST on the production line
- **Dedicated area to store the Digital Signature**

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**User + System Area**

- **Area 1**
  - UID (ICref)
  - PWM ctrl area
  - Digital Signature
  - System Area (including conf)

- **Area 2**
  - UID (ICref)
  - PWM ctrl area
  - Digital Signature
  - System Area (including conf)

**Independent PWM configuration registers (enable, period, pulse width) are accessible through dedicated PWM password**
## Dynamic NFC / RFID Tags Series

<table>
<thead>
<tr>
<th>Feature</th>
<th>ST25DV-PWM series</th>
<th>ST25DV-I2C series</th>
<th>M24LR series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contactless Interface</td>
<td>ISO15693 NFC Type 5</td>
<td>ISO15693 NFC Type 5</td>
<td>ISO15693 NFC compatible</td>
</tr>
<tr>
<td>RF range</td>
<td>Long range (up to 1m)</td>
<td>Long range (up to 1m)</td>
<td>Long range (up to 1m)</td>
</tr>
<tr>
<td>RF speed</td>
<td>26kbps</td>
<td>26kbps</td>
<td>26kbps</td>
</tr>
<tr>
<td>Serial Interface</td>
<td>No</td>
<td>I2C @1MHz</td>
<td>I2C @400kHz</td>
</tr>
<tr>
<td>Fast Transfer mode</td>
<td>No</td>
<td>Yes (256B buffer)</td>
<td>No</td>
</tr>
<tr>
<td>Energy Harvesting</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital output</td>
<td>2x PWM</td>
<td>OD or CMOS GPO</td>
<td>Open-Drain GPO</td>
</tr>
<tr>
<td>Extra features</td>
<td>-</td>
<td>Low Power mode</td>
<td>-</td>
</tr>
<tr>
<td>Memory format</td>
<td>EEPROM data</td>
<td>EEPROM data</td>
<td>EEPROM data</td>
</tr>
<tr>
<td>Memory size</td>
<td>2k-bit</td>
<td>4k / 16k / 64k-bit</td>
<td>4k / 16k / 64k-bit</td>
</tr>
<tr>
<td>Data protection</td>
<td>Password 64-bit</td>
<td>Password 64-bit</td>
<td>Password 32-bit</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40°C to +85°C (105°C RF)</td>
<td>-40°C to +85°C (105°C RF)</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Package</td>
<td>SO8 / TSSOP8</td>
<td>SO8 / TSSOP8 / FPN8 / FPN12 / WLCSP10 / SBN12 *</td>
<td>SO8 / TSSOP8 / FPN8</td>
</tr>
</tbody>
</table>

* SBN12: Die form, sawn and Bumped wafer, 120µm thickness, inkless 8” wafer
## PWM Features Summary

### PWM characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clock Frequency</strong></td>
<td>Target 16MHz</td>
</tr>
<tr>
<td><strong>Clock accuracy</strong></td>
<td>+/- 10% (over temperature range)</td>
</tr>
<tr>
<td><strong>PWM signal output</strong></td>
<td>1 port or 2 ports product version</td>
</tr>
<tr>
<td><strong>PWM frequency</strong></td>
<td>from 488Hz to 31.25kHz</td>
</tr>
<tr>
<td><strong>PWM resolution</strong></td>
<td>62.5ns (step)</td>
</tr>
<tr>
<td></td>
<td>from 9-bits @ 31.25kHz</td>
</tr>
<tr>
<td></td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>12-bits @ 3.9kHz</td>
</tr>
<tr>
<td></td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>to 15-bits @ 488Hz</td>
</tr>
<tr>
<td><strong>Vcc supply</strong></td>
<td>1.8V to 5.5V</td>
</tr>
<tr>
<td><strong>PWM sinking current</strong></td>
<td>up to 4mA output driver across Vcc supply range</td>
</tr>
<tr>
<td><strong>Start up time</strong></td>
<td>&lt; 3ms</td>
</tr>
</tbody>
</table>
ST25DV-PWM Evaluation Board

ST25DV-PWM discovery kit

- **ST25DV02K-W2** Dynamic NFC tag IC
- 49x26mm 8 turns antenna
- PWM frequency and duty cycle through Android App or PC Software
- Duty cycle illustration with LED ramp
- Connector to ST25DV-DISCOVERY kit to monitor the PWM signal on display

ST25DV-PWM-eSET
ST25DV-PWM - Innovation for Industrial

Coming soon

- NFC Forum Type 5 for smartphone interface
- RFID ISO15693 for factory programming and track & trace
- 2 x PWM outputs
- TruST25 digital signature
- Large operating voltage 1.8-5.5V
- Industrial temperature range -40°C / +105°C
- Coming soon: NFC certification & 10-y longevity program
- 4 patents pending to protect ST & customers
- Turn-key evolutive discovery kit

Innovative

Application specific

- Lighting
- Motor control
- Other industrial
<table>
<thead>
<tr>
<th>ST25DV-PWM</th>
<th>Package</th>
<th>2k-bit – 1xPWM</th>
<th>2k-bit – 2xPWM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic NFC / RFID tag</td>
<td>SO8</td>
<td>ST25DV02K-W1R8S3</td>
<td>ST25DV02K-W2R8S3</td>
</tr>
<tr>
<td>RF ISO15693 + PWM IF</td>
<td>TSSOP8</td>
<td>ST25DV02K-W1R8T3</td>
<td>ST25DV02K-W2R8T3</td>
</tr>
<tr>
<td>+ Extended temperature</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Thank You!

Solutions for NFC / RFID Tags and Readers