RH850/D1L and RH850/D1M
Solution for Hybrid Clusters

Highly scalable MCU family supports cluster and head-up display applications over various car segments with high performance graphics at low cost.

Features
The D1x series offer a single-chip solution to control graphics instrument clusters. With its two sub-series, D1L and D1M, the D1x family offers highest scalability to cover classical instrument clusters as well as clusters featuring 2.5D TFT displays up to 1280 x 480 pixel resolution.

All family members offer
- Up to 6 x stepper motor control and sound generation (incl. PCM)
- Various internal memory sizes up to 5 MB Flash and 512 kB RAM
- Fast external serial NOR-Flash interface
- Car interfaces like CAN-FD and LIN

RH850/D1M offers additionally
- Up to 3 MB internal Video RAM
- 2.5D graphics subsystem (GPU)
- Specific graphics accelerators like JPEG and RLE decompression
- External high-speed DRAM interfaces
- Up to two independant Video in and out channels
- Ethernet-AVB and MOST interfaces

D1x Line-up

<table>
<thead>
<tr>
<th>Video RAM</th>
<th>D1L</th>
<th>D1M</th>
</tr>
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<tbody>
<tr>
<td>Internal + External</td>
<td>D1M2H</td>
<td></td>
</tr>
<tr>
<td>Internal + External</td>
<td>D1M2</td>
<td></td>
</tr>
<tr>
<td>Internal + External</td>
<td>D1M1H</td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td>D1M1</td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td>D1L2 (H)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>D1L1</td>
<td></td>
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</tbody>
</table>
**Benefits**

**Internal Memory**
D1x was built on the new 40 nm MONOS technology, thus two basic advantages could be implemented: The small transistor gate size allows big internal memories as well for internal FlashROM as for internal SRAM.

**Integrated Interfaces**
The D1M sub-series supports various Video Out display interfaces like RSDS/TCON and LVDS to reduce the need for external converters.

**Video Dithering**
The video output unit supports 8-bit to 6-bit video data dithering. This hardware low cost dithering allows smooth 8-bit colour fading even on 6-bit low cost colour displays.

**Safety and Security**
Considering increased OEM requirements on functional safety and security, the D1x follows the ISO26262 standard and features a comprehensive safety architecture including intelligent monitoring of safety-critical display contents. Various security mechanisms compatible to SHE allow protection against device cloning or manipulation.

**On Chip Voltage Regulator**
Low current consumption allows integrated core voltage regulators. Therefore no further external core voltage regulator has to be added.

**Reduced PCB Layers**
Both package types: QFP and BGA use extra large pitch sizes 0.5 mm pitch at QFP and 1 mm pitch at BGA packages allow to use lower cost PCBs.

**Block Diagram**

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