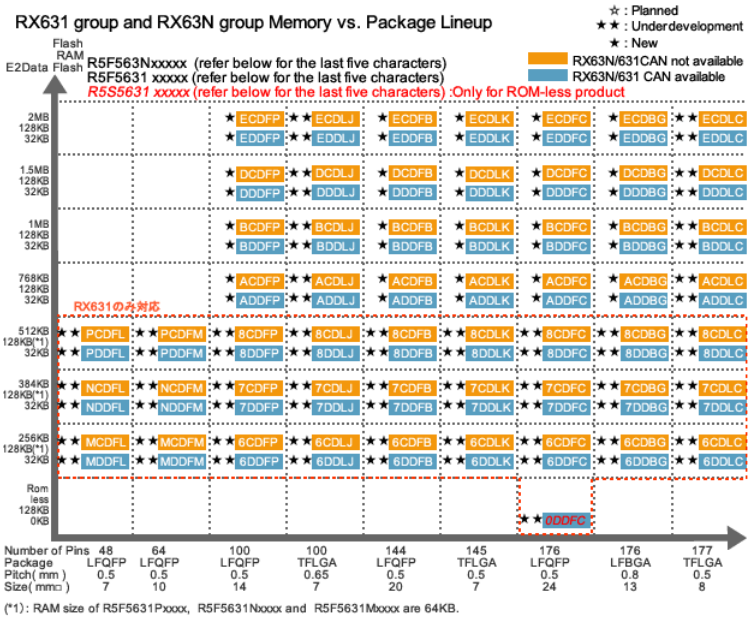
# RX63N, 631

## Overview of the RX63N/RX631 Group

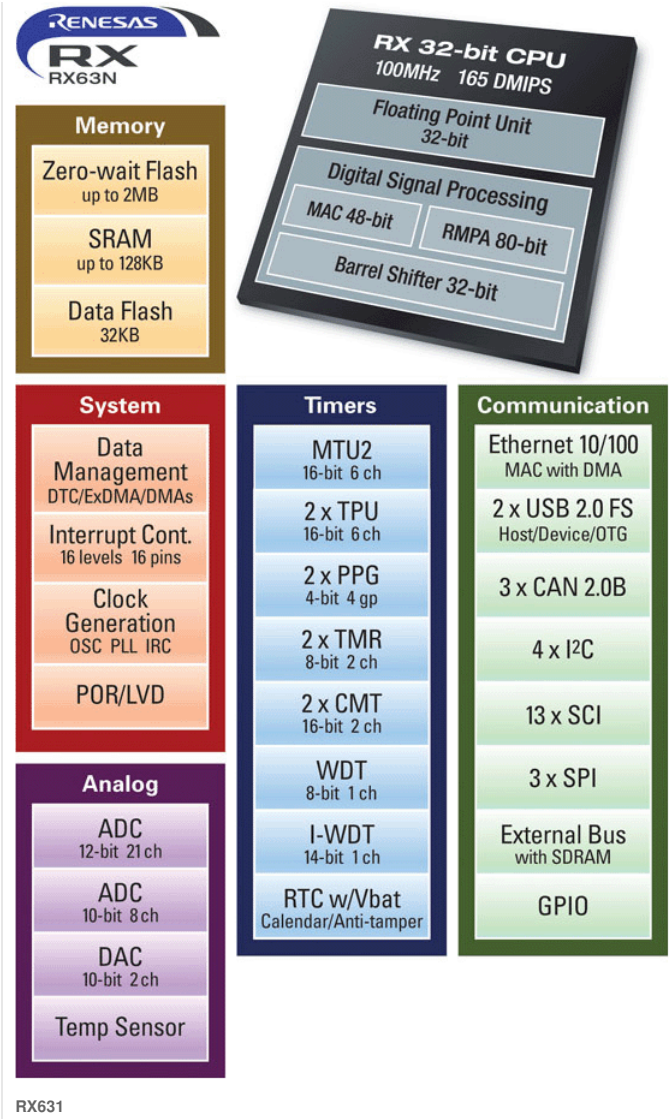
The RX63N/RX631 Group incorporates communication functions suitable for networking equipment, such as Ethernet controller, USB 2.0 full-speed (function, host, or OTG selectable), and CAN. In addition, with a RTC (Real-Time Clock) that can operate on a dedicated power supply as a low power feature, standby power consumption can be reduced by approximately 90% compared to existing products. The selection of on-chip memory has been expanded from ROMless to 2 MB, and even smaller-sized packages are available. This makes possible mounting in anything from large-scale systems to small-scale/small-space devices.

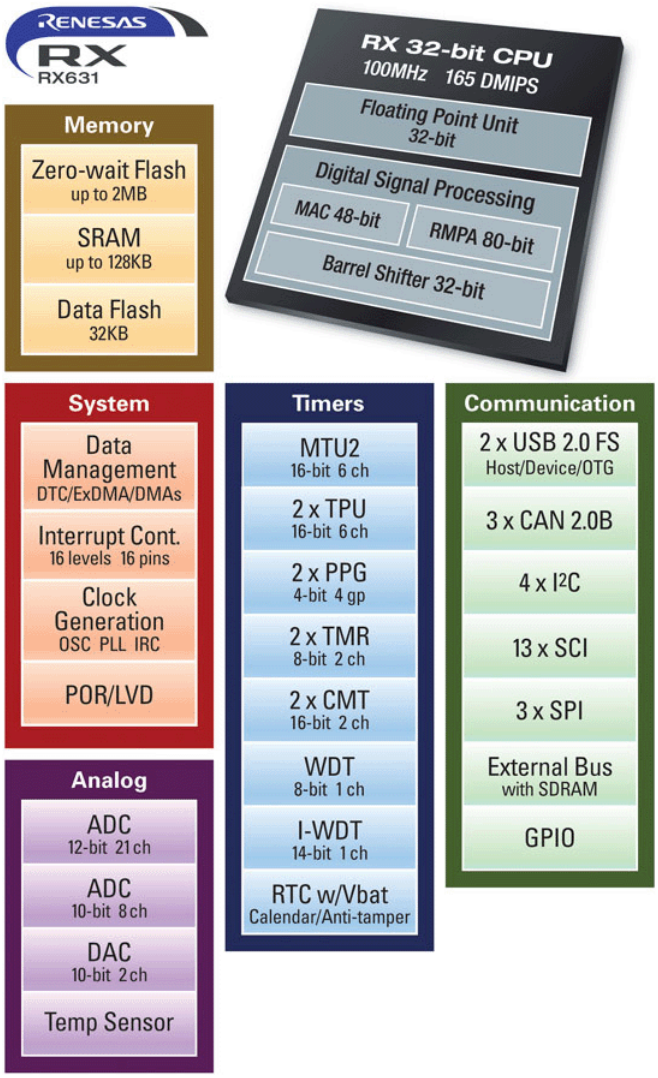
## Memory vs. Package Lineup




## RX63N/RX631 Group Block Diagrams

RX63N


RENESAS
RX
RX63N
RX 32-bit CPU
100MHz 165 DMIPS
Floating Point Unit
32-bit
Digital Signal Processing
MAC 48-bit
RMPA 80-bit
Barrel Shifter 32-bit
Memory
Zero-wait Flash
up to 2MB
SRAM
up to 128KB
Data Flash
32KB
System
Data Management
DTC/ExDMA/DMAs
Interrupt Cont.
16 levels 16 pins
Clock Generation
OSC PLL IRC
POR/LVD
Analog
ADC
12-bit 21 ch
ADC
10-bit 8 ch
DAC
10-bit 2 ch
Temp Sensor
Timers
MTU2
16-bit 6 ch
2 x TPU
16-bit 6 ch
2 x PPG
4-bit 4 gp
2 x TMR
8-bit 2 ch
2 x CMT
16-bit 2 ch
WDT
8-bit 1 ch
I-WDT
14-bit 1 ch
RTC w/Vbat
Calendar/Anti-tamper
Communication
Ethernet 10/100
MAC with DMA
2 x USB 2.0 FS
Host/Device/OTG
3 x CAN 2.0B
4 x I2C
13 x SCI
3 x SPI
External Bus
with SDRAM
GPIO
RX631




**RX63N/RX631 Group Specifications**

| item | RX63N/RX631 Group |
|---|---|
| CPU core | RX CPU<br>General registers: 32-bit x 16<br>Multiplier: 32-bit multiplier<br>Divider: Yes<br>Multiply-accumulator: Yes (two types: memory-to-memory operations and register-to-register operations) |
| Maximum operating frequency | 100MHz |
| Power supply voltage | 2.7 to 3.6V |
| Floating-point processing unit | Single-precision floating-point processing unit<br>(Supports add/subtract/compare/multiply/divide and other instructions) |
| Flash ROM<br>(for program storage) | Max. 2MB |
| Flash ROM (for data storage) | Max. 32KB |
| RAM | Max. 128KB |
| On-chip peripheral functions | External bus: 177/176-pin(32bit@50MHz), 145/144-pin (16bit@50MHz), Under 100-pin PKG（16bit@25MHz)<br>DMAC: 4 channels<br>Direct memory access controller designed exclusively (EXDMAC) x 2 channels:Over 100-pin PKG Only<br>Data transfer controller (DTC)<br>16-bit multifunction timer pulse unit: 177/176/145/144-pin: 12 channels; Under 100-pin: 6 channels<br>Multifunction timer pulse unit 2: 6 channels<br>Port output enable 2<br>Programmable pulse generator: Max. 32-bit output<br>8-bit timer: 4 channels<br>Compare match timer: 4 channels |

| | |
|---|---|
| | Real-time clock (RTC): Except 48-pin PKG<br>Watchdog timer<br>Independent watchdog timer<br>Serial communication interface (SCIc): 177/176/145/144-pin: 12 channels; 100-pin: 8 channels; 64-pin: 5 channels; 48-pin:4 channels<br>Serial communication interface (SCId)<br>I²C bus interface: 177/176/145/144-pin:4 channels;100-pin:2 channels; 64/48-pin:1 channel<br>Serial peripheral interface (RSPI): 177/176/145/144-pin:3 channels;Under 100-pin:2 channels<br>USB 2.0 full-speed (Host/function/OTG): 177/176-pin: 2 channels; up to 145-pin: 1 channels<br>Ethernet controller*1<br>DMA controller for Ethernet controller (EDMAC)*1<br>CAN*2 : Max. 3 channels<br>IEBus x 1 ch（IEB）<br>12-bit A/D converter: 177/176/145/144-pin: 21 channels; 100-pin: 14 channels; 64-pin: 12 channels;48-pin: 8 channels<br>10-bit A/D converter: Over 100-pin;8 channels<br>10-bit D/A converter: 177/176/145/144-pin: 2 channels; 100/64-pin: 1channel<br>Temperature sensor<br>CRC calculator<br>Power-on reset circuit (POR)<br>Voltage detection circuit (LVD) |
| On-chip debugging function | Yes (with trace function) |
| Low power consumption modes | 4 modes<br>Sleep mode<br>All-module clock stop mode<br>Software standby mode<br>Deep software standby mode |
| Packages | LQFP64, LQFP80, LGA85, LQFP100, LGA100, LQFP144, LGA145, BGA176, LQFP176, LGA177, LQFP48 |

*1 RX63N Group (Over 100-pin PKG) only.
*2 Part number differs between with CAN/without CAN versions.

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**Product Lineup:**

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167 matches
(1 to 100 are displayed.)

Items per page 100  1 2

| Compare / Document | Part No | Buy or Sample | Program Memory (KB) | RAM (KB) | Pin Count | Operating Voltage Min (V) | Production Status | Package Code |
|---|---|---|---|---|---|---|---|---|
| | R5F5631BDDFB | - | 1024 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| | R5F5631BCDFB | - | 1024 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| | R5F563NBDDFB | - | 1024 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| | R5F563NBCDFB | - | 1024 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| | R5F563NADDFB | - | 768 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| | R5F563NACDFB | - | 768 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| | R5F5631PDDFM | - | 512 | 64 | 64 | 2.7 | Under Development | PLQP0064KB-A (FP-64KV) |
| | R5F563NEDDFC | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| | R5F563NECDFC | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | | R5F563NDDDFC | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F563NDCDFC | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F563NBDDFC | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F563NBCDFC | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F563NADDFC | - | 768 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F563NACDFC | - | 768 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631EDDFC | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631ECDFC | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631DDDFC | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631DCDFC | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631BDDFC | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631BCDFC | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631ADDFC | - | 768 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631ACDFC | - | 768 | 128 | 176 | 2.7 | Mass Production | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F563NEDDFB | - | 2048 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F563NECDFB | - | 2048 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F563NDDDFB | - | 1536 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F563NDCDFB | - | 1536 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F5631EDDFB | - | 2048 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F5631ECDFB | - | 2048 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F5631DDDFB | - | 1536 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F5631DCDFB | - | 1536 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F5631ADDFB | - | 768 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | | R5F5631ACDFB | - | 768 | 128 | 144 | 2.7 | Mass Production | PLQP0144KA-A (FP-144LV) |
| ☐ | | R5F5631DDDFP | - | 1536 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631BDDFP | - | 1024 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631BCDFP | - | 1024 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NADDFP | - | 768 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631ADDFP | - | 768 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631ACDFP | - | 768 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NACDFP | - | 768 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631EDDFP | - | 2048 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631ECDFP | - | 2048 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631DCDFP | - | 1536 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NEDDFP | - | 2048 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NECDFP | - | 2048 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NDDDFP | - | 1536 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NDCDFP | - | 1536 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NBDDFP | - | 1024 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NBCDFP | - | 1024 | 128 | 100 | 2.7 | Mass Production | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631EDDBG | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F563NADDBG | - | 768 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F563NACDBG | - | 768 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F563NEDDBG | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F563NECDBG | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F563NDDDBG | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |

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|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | | R5F563NDCDBG | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F563NBDDBG | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F563NBCDBG | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631ECDBG | - | 2048 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631DDDBG | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631DCDBG | - | 1536 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631BDDBG | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631BCDBG | - | 1024 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631ADDBG | - | 768 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631ACDBG | - | 768 | 128 | 176 | 2.7 | Mass Production | PLBG0176GA-A (BP-176V) |
| ☐ | | R5F5631PCDFL | - | 512 | 64 | 48 | 2.7 | Under Development | PLQP0048KB-A (48P6Q-A) |
| ☐ | | R5F5631PDDFL | - | 512 | 64 | 48 | 2.7 | Under Development | PLQP0048KB-A (48P6Q-A) |
| ☐ | | R5F5631NCDFL | - | 384 | 64 | 48 | 2.7 | Under Development | PLQP0048KB-A (48P6Q-A) |
| ☐ | | R5F5631NDDFL | - | 384 | 64 | 48 | 2.7 | Under Development | PLQP0048KB-A (48P6Q-A) |
| ☐ | | R5F5631MCDFL | - | 256 | 64 | 48 | 2.7 | Under Development | PLQP0048KB-A (48P6Q-A) |
| ☐ | | R5F5631MDDFL | - | 256 | 64 | 48 | 2.7 | Under Development | PLQP0048KB-A (48P6Q-A) |
| ☐ | | R5F5631PCDFM | - | 512 | 64 | 64 | 2.7 | Under Development | PLQP0064KB-A (FP-64KV) |
| ☐ | | R5F5631NCDFM | - | 384 | 64 | 64 | 2.7 | Under Development | PLQP0064KB-A (FP-64KV) |
| ☐ | | R5F5631NDDFM | - | 384 | 64 | 64 | 2.7 | Under Development | PLQP0064KB-A (FP-64KV) |
| ☐ | | R5F5631MCDFM | - | 256 | 64 | 64 | 2.7 | Under Development | PLQP0064KB-A (FP-64KV) |
| ☐ | | R5F5631MDDFM | - | 256 | 64 | 64 | 2.7 | Under Development | PLQP0064KB-A (FP-64KV) |
| ☐ | | R5S56310DDFC | - | 0 | 128 | 176 | 2.7 | Under Development | PLQP0176KB-A (FP-176EV) |
| ☐ | | R5F5631ECDLJ | - | 2048 | 128 | 100 | 2.7 | Under Development | PTLG0100JA-A (100F0G) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | | R5F5631EDDLJ | - | 2048 | 128 | 100 | 2.7 | Under Development | PTLG0100JA-A (100F0G) |
| ☐ | | R5F5631DCDLJ | - | 1536 | 128 | 100 | 2.7 | Under Development | PTLG0100JA-A (100F0G) |
| ☐ | | R5F5631DDDLJ | - | 1536 | 128 | 100 | 2.7 | Under Development | PTLG0100JA-A (100F0G) |
| ☐ | | R5F5631BCDLJ | - | 1024 | 128 | 100 | 2.7 | Under Development | PTLG0100JA-A (100F0G) |
| ☐ | | R5F5631BDDLJ | - | 1024 | 128 | 100 | 2.7 | Under Development | PTLG0100JA-A (100F0G) |
| ☐ | | R5F563NECDLJ | - | 2048 | 128 | 100 | 2.7 | Under Development | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NEDDLJ | - | 2048 | 128 | 100 | 2.7 | Under Development | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NDCDLJ | - | 1536 | 128 | 100 | 2.7 | New Products | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NDDDLJ | - | 1536 | 128 | 100 | 2.7 | New Products | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NBCDLJ | - | 1024 | 128 | 100 | 2.7 | Under Development | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NBDDLJ | - | 1024 | 128 | 100 | 2.7 | Under Development | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NACDLJ | - | 768 | 128 | 100 | 2.7 | Under Development | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F563NADDLJ | - | 768 | 128 | 100 | 2.7 | Under Development | PLQP0100KB-A (FP-100UV) |
| ☐ | | R5F5631ECDLK | - | 2048 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F5631EDDLK | - | 2048 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F5631DCDLK | - | 1536 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F5631DDDLK | - | 1536 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F5631BCDLK | - | 1024 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F5631BDDLK | - | 1024 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F5631ACDLK | - | 768 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F5631ADDLK | - | 768 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |
| ☐ | | R5F563NECDLK | - | 2048 | 128 | 145 | 2.7 | Mass Production | PTLG0145KA-A (145F0G) |