

瑞萨 通用IC

电源线性 / 通用线性 / 通用逻辑

综合产品目录

Renesas General-Purpose ICs

Power Management Linear ICs / General-Purpose Linear ICs / General-Purpose Logic ICs

General Catalog

Linear&Logic

为了美丽的地球——。

无所不在。

Innovation for a beautiful planet... Both here and there.

EVERY WHERE

全新的瑞萨解决方案。低功耗化的顶尖应用。

The beauty of solutions from Renesas. Achieving reduced power consumption in advanced applications.



• Green Stream Solution
控制功率(能量)的转化,进一步消减功耗的解决方案。
These solutions control the flow of power (energy) and
contribute to reduced power consumption overall.



全新的瑞萨解决方案以广泛的商品群, 为环保社会做贡献。

The new Renesas offers a broad range of product lineups that contribute to an eco-friendly society.

电源线性
Power Management Linear ICs

单片机外围
Peripheral ICs for MCUs

标准逻辑
Standard Logic ICs

通用ASSPs
General Purpose ASSPs

应用
Applications

外形
Package Dimensions

型号
Product Numbers

封装
Packing

产品类别图

Product category map

通用线性 General-Purpose Linear ICs

电源 IC Power Management ICs

- 绝缘型开关电源IC...⁰⁵
Power Management ICs for Insulated Switching Power Supplies

将AC转换成DC
Converts AC to DC.
- PFC电源IC...⁰⁷
Power Management ICs for PFC

改善AC转换成DC的功率因数
Improves the power factor when converting from AC to DC.
- 照明用LED驱动器...⁰⁹
LED Drivers for Lighting Fixtures

将AC转换成DC以点亮LED
Convert AC to DC for LED Lamp
- MOSFET内置集成SiP...¹⁰
SiPs with Integrated MOSFETs
- DC/DC电源IC...¹¹
ICs for DC/DC Power Supplies

将DC电压转换成其他的DC电压
Converts one DC voltage to another DC voltage.
- 闪光灯充电IC...¹³
ICs for strobe capacitor charger
- 并联稳压器...¹⁴
Shunt Regulators

生成基准电压
Generates a reference voltage.
- 串联稳压器（三脚稳压器）...¹⁶
Series Regulators (3-Pin Regulators)

方便的本地低压电源
Convenient local low-voltage power source.

电池 IC Battery ICs

- 充电控制IC...¹⁸
Charge Control ICs

控制电池充电
Controls battery charging functions.
- 电池保护IC...¹⁹
Battery Protection ICs

控制电池保护
Controls battery protection functions.

检测器 IC/ 系统管理器 Detector ICs/System Organizers

- 专用复位IC...²⁰
Special Reset ICs

控制电源顺序
Controls the power supply sequence.
- 单功能复位IC...²⁰
Single-Function Reset ICs
- 多功能复位IC...²⁰
Multifunction Reset ICs

监控电源
Monitors the power supply.

数据转换器 Data Converters

- D/A转换器...²¹
D/A Converters

保持各种设定
Store various settings.

标准线性 Standard Linear ICs

- 运算放大器/比较器...²³
Operational Amplifiers/Comparators

处理传感器等的微弱信号
或放大输出进行外部驱动
Boosts weak signals from sensors, etc., performs external drive by amplifying output, and so on.

低电压逻辑 General-Purpose Logic ICs

低电压逻辑 Low-Voltage Logic ICs

- HD/RD74LVC系列...³¹
HD/RD74LVC Series
- HD74LV-A系列...³²
HD74LV-A Series

以低工作电压组合逻辑，降低功耗
Logic ICs with a low operating voltage for reduced power consumption.
- HD74SSTV系列...³³
HD74SSTV Series

5V 标准逻辑 5V Standard Logic ICs

- HD74LS系列
HD74LS Series
- HD74BC系列
HD74BC Series
- HD74AC系列
HD74AC Series
- HD74HC系列
HD74HC Series

按以往的逻辑电平组合逻辑电路
Logic circuits supporting conventional-level logic operations.

单一逻辑 Unilogic ICs

- 74LV-A LVT-A 1G/1GW/2G 74LV-A LVT-A 1G/1GW/2G...³⁰
- 74LVC 1G/2G/3G 74LVC 1G/2G/3G...³⁰
- 74ALVC 1G/2G 74ALVC 1G/2G...³⁰
- 74HC 1G/2G 74HC 1G/2G...³⁰

增加无法插入SoC的逻辑部分
For adding logic circuits not included in an SoC.

高耐压逻辑 High-Voltage Logic ICs

- RD74HV1G RD74HV1G...³²
- RD74HV8T RD74HV8T...³²
- 高耐压逻辑驱动器...³²
High-Voltage Logic Drivers

通过单片机的逻辑输出驱动外部执行器
Drives external actuators using logic output from an MCU.

LED 驱动器 LED Drivers

- 显示、照明用LED驱动器...²⁶
Display/Illumination LED Drivers

点亮LED
Illuminates LEDs.

通用 ASSP General-Purpose ASSPs

- I/O扩展器...³⁵
I/O Expanders

扩展单片机的输入/输出端口
Expands the I/O ports of an MCU.
- 电平移位器...²⁸
Level Shifters

将外围电路的逻辑电平转换成单片机SoC的工作电平
Converts the peripheral circuit logic level to the operation level of the MCU or SoC.
- SSCG用时钟发生器...³³
Clock Generators for SSCGs

扩散辐射频谱以抑制干扰
Spread the emission spectrum and suppresses interference.
- HD74LV CZ系列...³¹
HD74LV CZ Series

通电时拔插电路板
Enables removal or insertion of boards while the power is on.
- IGBT驱动器...⁴¹
IGBT Drivers

点亮闪光灯
Illuminates a camera flash unit.
- 高速总线开关...³⁵
High-Speed Bus Switches

接口 Interface ICs

- RS422/423用IC, IEEE 485/488 接口...³⁴
ICs for RS422/433, IEEE 485/488 Interface ICs
- CCD/MOS驱动器...³⁴
CCD/MOS Drivers

驱动外部总线
Drives an external bus.

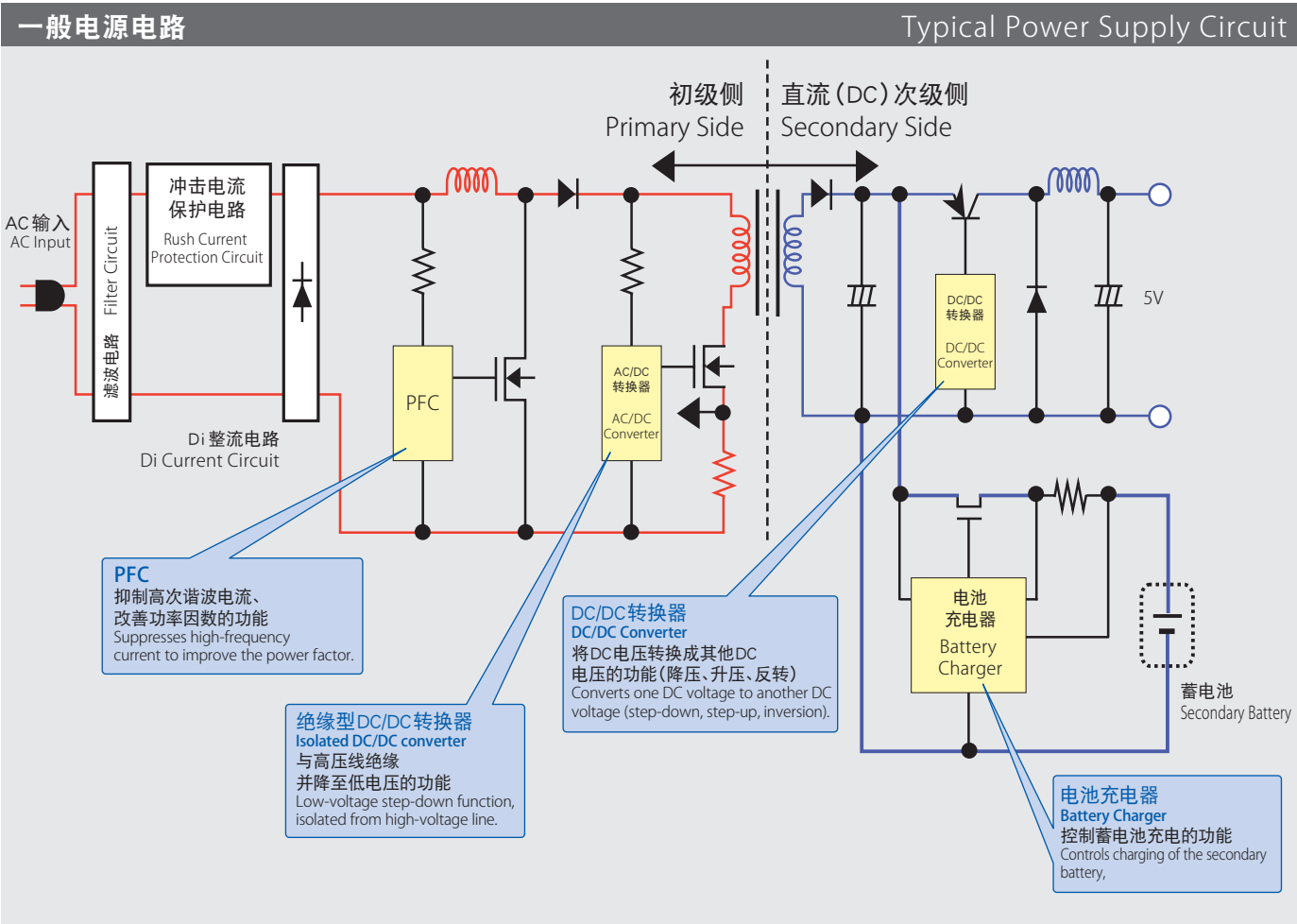
●请通过以下链接了解详细内容。 ●For details, see the following URL.

<http://cn.renesas.com/search/> http://cn.renesas.com/support/search_guide/child/para_search_help_child.jsp <http://hk.renesas.com/search/>

http://cn.renesas.com/products/standard_ic/index.jsp <http://www.renesas.com/en/gpsp>

电源线性(绝缘型开关稳压器控制器)

Power Management Linear ICs (Insulated Switching Regulator Controllers)



绝缘型开关稳压器控制器

Insulated Switching Regulator Controllers

型号 Part No.	用途 Application	PFC 功能 PFC Function	DTC 功能 DTC Function	① 过电流 保护功能 Overcurrent Protection Function	② 过电压 保护功能 Overvoltage Protection Function	③ Remote On/Off	④ Soft Start	⑤ 延时调整 Adjustable Delay Timer fmax [MHz]	Fmax (MHz)
R2A20121	全桥控制， 高效电源用 Full bridge control, for high-efficiency applications	—	—	pulse by pulse			yes	yes	2.0
R2A20124A	全桥 / 高效电源， 实现小负载模式 Full bridge/for high-efficiency applications, support for light-load mode	—	—	pulse by pulse		yes	yes	yes	1.0
M51995/6/8	V 模式、正激式 小功率用 V-mode, forward, for low-power applications	—	—	pulse by pulse/ Timer Latch/v	yes	—	—		0.5
M62213/281	DC/DC 转换器等 的本地电源 Local power supply for DC/DC converters, etc.	—	—	pulse by pulse/ Timer Latch/v	yes		yes		0.7
M62235	回扫稳压器 Flyback regulator			yes	yes				

功能说明

Description of Functions

①过电流保护功能

Overcurrent Protection Function

Pulse by pulse: 对每个脉冲限制 PWM 脉冲宽度以进行保护。
The PWM pulse width is limited one pulse at a time to provide protection.

Timer Latch: 长时间持续处于过电流状态时，视为升压二极管的故障而停止脉冲的功能。
A function that stops pulse output when an overcurrent state has continued for a long period under the assumption that the boost diode has failed.

One shot: 持续处于过电流状态时，维持一定时间的保护工作后自动恢复。
When an overcurrent state is ongoing, protection operation continues for a fixed period of time, followed by automatic recovery.

②过电压保护功能

Overvoltage Protection Function

因负载故障等电压过大时，启动过电压保护以保护电源电路。
When the voltage is excessively large due to a problem such as a multifunction in the load, the overvoltage protection function operates to protect the power supply circuit.

③远程开 / 关

Remote ON/OFF

可远程开 / 关电源。
通过系统控制器发出的控制信号，启动 / 停止输出。
转换器
Enables the power supply to be turned on and off remotely. Output is started and stopped according to a control signal from the system controller.

④Soft Start

该系统在通电时逐渐增大 PWM 输出脉冲宽度，防止由 DC/DC 转换器输出骤然上升引起的过冲。通过在 DB 管脚上增加 CST，可实现该功能。
A system that gradually increases the PWM output pulse width after power-on to prevent overshooting due to a sudden rise in the DC/DC converter output. This function can be enabled by adding a CST to the DB pin.

⑤远程开 / 关

Adjustable Delay Timer

通过外接电阻调整各输出间的时间延迟 TD1、TD2，可实现 ZVS (零电压开关)。
Enables zero voltage switching (ZVS) by adjusting output time delay TD1 and TD2 by means of external resistors.



瑞萨汇总并介绍各类电源应用。
http://cn.renesas.com/applications/key_technology/power_supply/index.jsp
请登陆 xxxx 寻找最佳解答。



Renesas introduce various power supply applications.
http://hk.renesas.com/applications/key_technology/power_supply/index.jsp
Please access and look for optimum solutions.

低噪、高效交错PFC IC

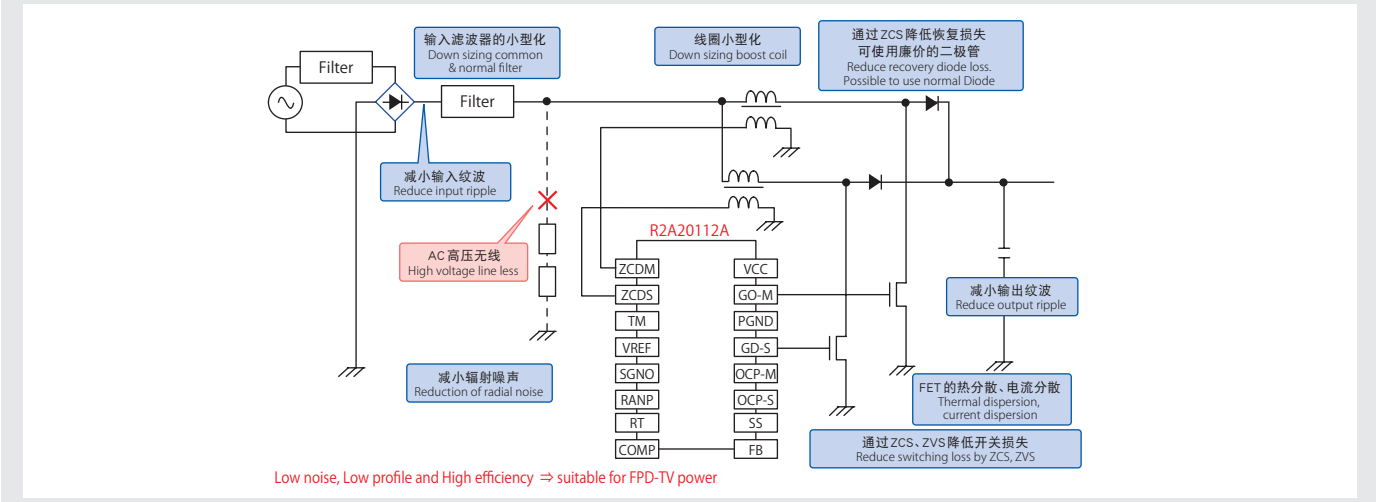
Low-Noise, High-Efficiency Interleaved PFC ICs

机型比较表															Features of Renesas PFC IC's												
型号 Part No.	① Mode	Interleave Technology	ZCD winding less	④ ZCD open detector	⑤ Current limiter timer latch	Constant Power Limiter	Multi input less	③ Dynamic OVP	⑥ Brown Out	⑦ OVP2	Vref accuracy		Light Load Efficiency	Soft Start	OVP / OCP, UVLO	Package											
R2A20114A	CCM	Yes			Yes			Yes	Yes	Yes	1.6%	Yes	Phase drop	Yes	Yes	SOP20 LQFP40											
R2A20104	CCM	Yes			Yes			Yes	Yes	Yes	1.6%	Yes	Phase drop	Yes	Yes	SOP20 LQFP40											
R2A20115	CCM					Yes		Yes	Yes		1.6%	Yes		Yes	Yes	SOP-16											
R2A20131	CCM							Yes	Yes		1.5%	Yes	LTB	Yes	Yes	SOP-16											
R2A20112A	CRM	Yes		Yes			Yes	Yes			4.0%	Yes		Yes	Yes	SOP-16											
R2A20118A	CRM	Yes			Yes		Yes	Yes	Yes	Yes	1.5%	Yes		Yes	Yes	SOP-20											
R2A20132	CRM	Yes		Yes	Yes		Yes		Yes	Yes	1.5%	Yes	Slave drop LTB		Yes	SOP-20											
R2A20113A	CRM		Yes				Yes	Yes			3.0%	Yes			Yes	SOP-8											
R2A20133A R2A20133B	CRM		Yes				Yes	Yes		Yes	1.5%	Yes			Yes	SOP-8											

临界导通模式交错PFC的框图和系统优点

Block diagrams & System merits

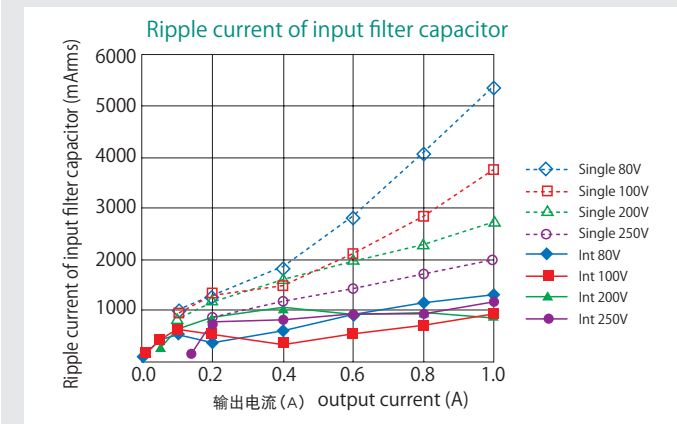
① 临界导通模式交错PFC的系统优点 (R2A20117)
System merits of CRM Interleave PFC IC



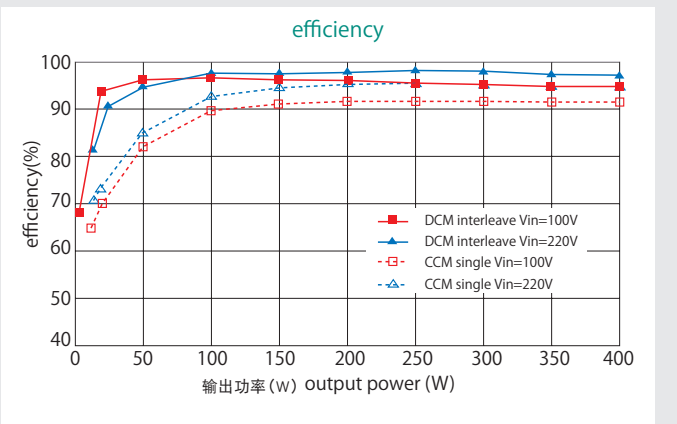
工作特性测定结果

Evaluation results

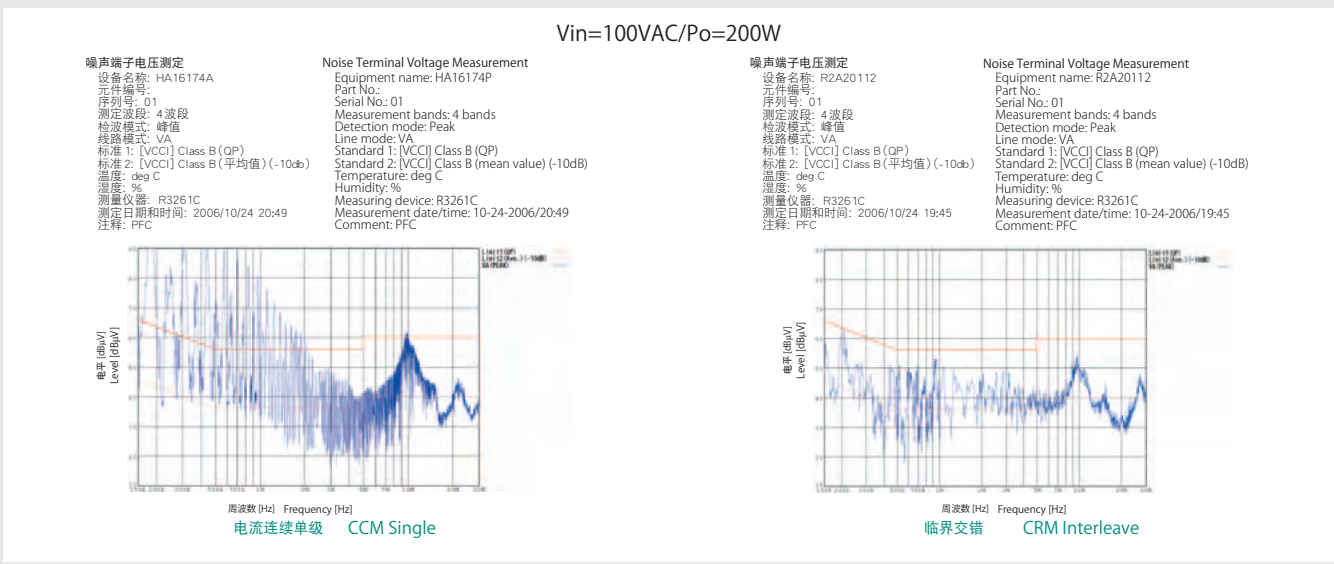
① 纹波电流比较 (临界单级与交错)
Ripple current comparison (CRM single vs. Interleave)



① 效率比较 (电流连续单级与临界交错)
Efficiency comparison (CCM single vs. CRM Interleave)



① 开关噪声比较 (电流连续单级与临界交错)
Switching noise comparison (CCM single vs. CRM Interleave)



各种保护功能

Functions for protecting systems & IC's

② 反馈开环检测
Feedback loop open detection

除稳定工作时的过电压保护外, 还自行检测反馈断线时和反馈管脚接地等异常, 停止输出脉冲。
使用该功能, 可防止大电容和功率 MOS 损坏于未然。
Built over voltage protection. And lose feedback loop detection can stop Output pulse.
Therefore, bulk capacitor & MOSFET are not broken.

以往方式 Conventional IC
输出电压 PFC out voltage
反馈环未正常工作。
高电压异常上升。
导致高耐压电容损坏。
Feedback loop is down case,
bulk voltage is going to
abnormal voltage.
Then capacitor is broken.
不常本功能的旧型 IC
Conventional IC
without this function

R2A20112
输出电压 PFC out voltage
检测反馈断线、反馈管脚接地等异常。
停止脉冲。
The feedback loop disconnection
is detected, and stop pulse.
检测反馈断线、反馈管脚接地等异常。
防止因破坏大容量电容和 MOSFET。
Prevention from destruction of
bulk capacitor and MOSFET.

③ 动态 OVP
Dynamic over voltage protection

除检测到过电压时停止脉冲的静态 OVP 外, 还配备了动态 OVP 功能。通过在前方释放误差放大器输出电容。
缩短栅门开启时间, 限制峰值电流, 从而防止过电压。
即使在启动、负载变动等过渡时期发生过冲, 也不会停止输出脉冲。因此可防止音频噪声。
R2A20112 has "Dynamic" and "Static" OVP. Dynamic OVP is doing discharge
error AMP voltage gradually when over voltage happened.
Because of this, it is possible to void audible noise caused by suddenly pulse stop.

通过动态 OVP 平缓地限制电流。
因此骤然截断电流时不会发出音频噪声。
Reduce of a potential of
Audible noise.

④ 从属 ZCD 信号开路 / 短路保护功能
Slave ZCD Signal Open/Short Protection Function

长时间持续从属再启动模式工作时, 认定 ZCD 线路处于开路等异常状态, 停止 (锁存) GD 脉冲。
Halts GD pulses when slave restart mode operation continues for a long time under the assumption that the ZCD line is in an abnormal state.

计数器
约 100ms at 10kHz (1024 count)

GD 脉冲
GD pulses

再启动模式工作
Restart mode operation

使用内部计数器统计再启动次数。连续 1024 次
变成再启动状态时停止 GD 脉冲 (锁存)。
The number of restarts are counted by an internal counter,
and GD pulses are halted when the restart state has
continued for 1,024 restarts (latch type).

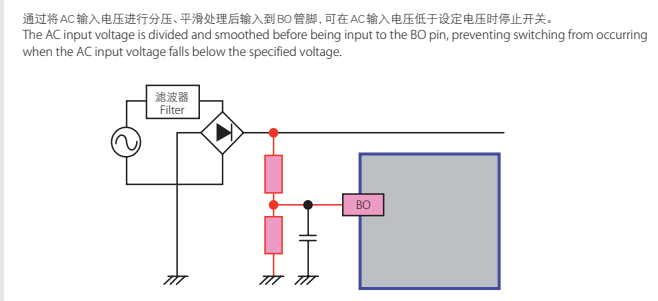
⑤ OCP 定时器锁存
OCP Timer Latch

长时间持续 OCP 工作时, 认定升压二极管处于短路等异常状态, 停止 (锁存) GD 脉冲。
Halts GD pulses when OCP operation continues for a long time under the assumption that the boost diode is in an abnormal state.

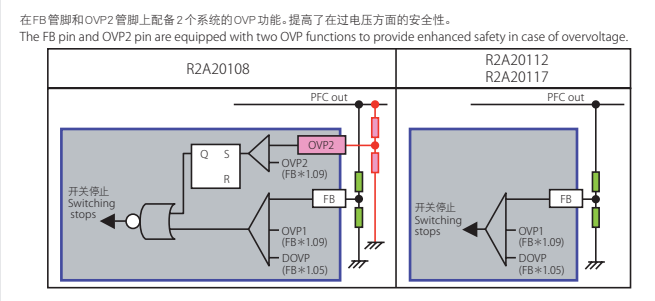
OCP 电平
OCP level
Vout 下降
Vout down
OCP 故障
OCP fault
二极管
Diode
短路
Short
GD 脉冲
GD pulses

变成 OCP 状态时, 开始充电。管脚电压达到 3.18V 时, 停止 GD 脉冲。
充电时间可通过 TL 管脚外接电容调整。
Charging starts when OCP operation starts, and GD pulses are halted when
the pin voltage reaches 3.18V. The charging time can be adjusted by
connecting an external capacitor to the TL pin.

⑥ 掉电功能
Brownout Function



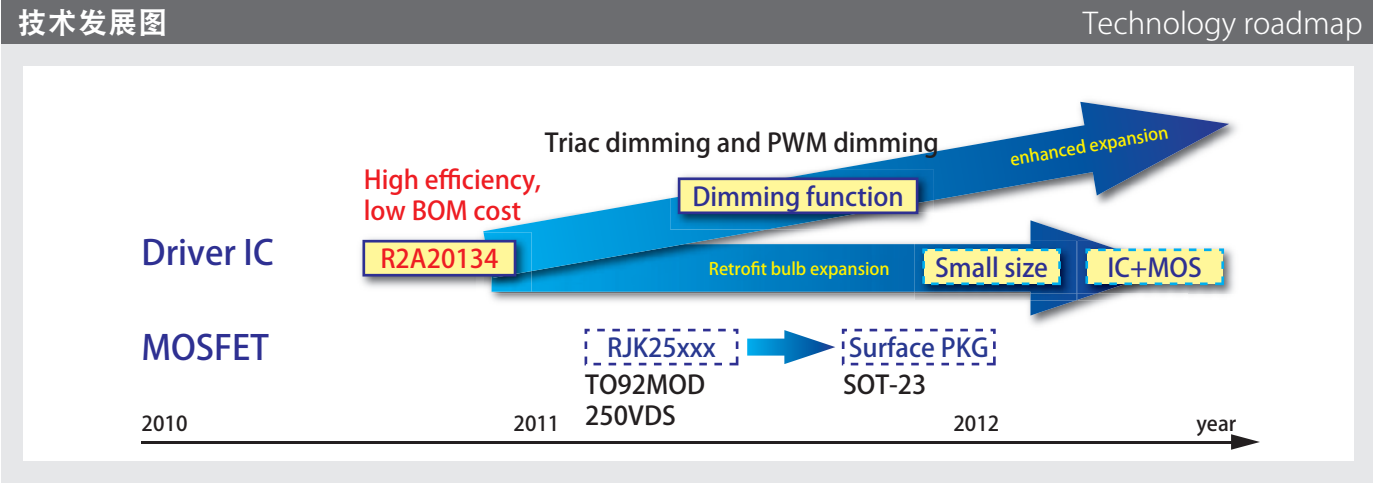
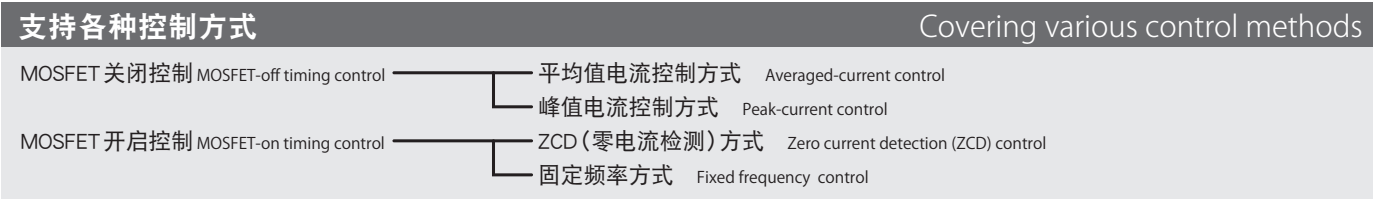
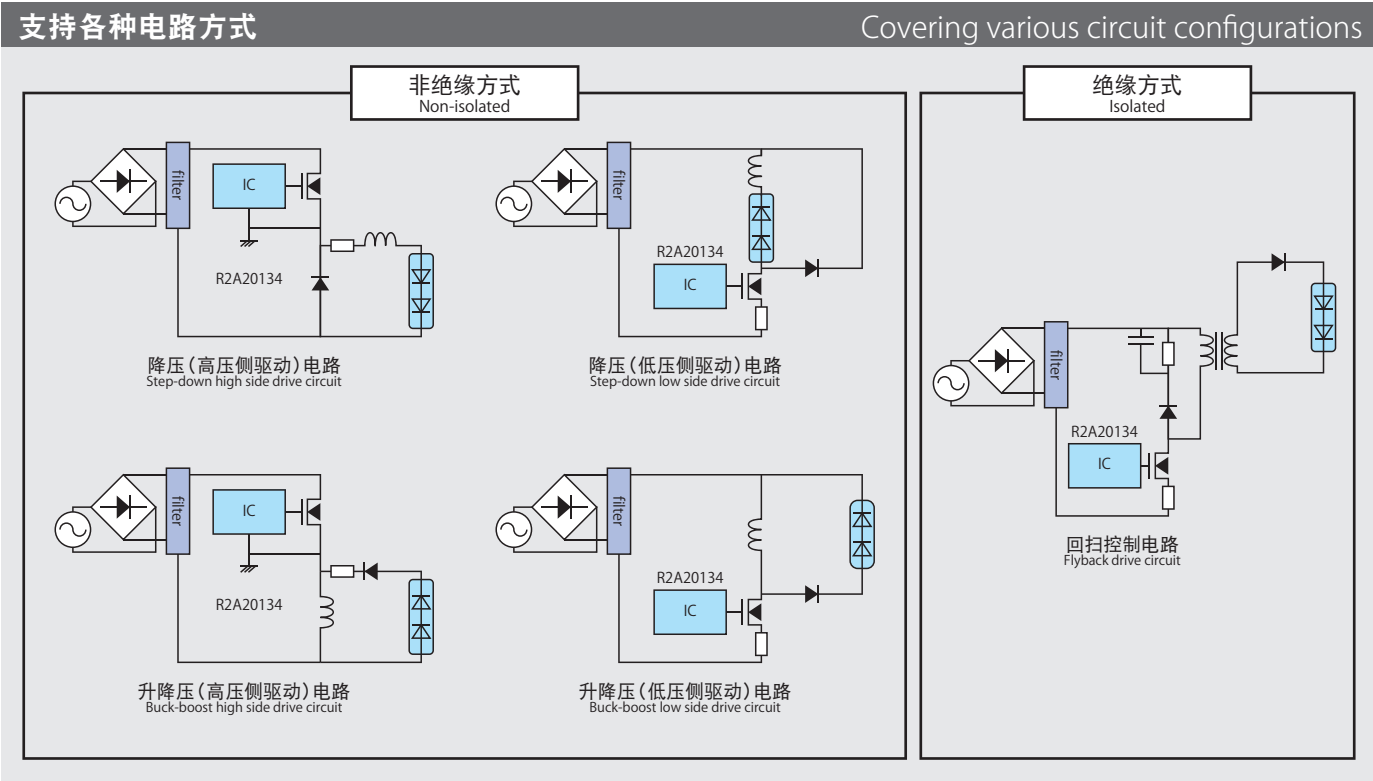
⑦ OVP2 功能
OVP2 Function



R2A20134 的特点

Features of R2A20134

- 支持各种电路结构和控制方式，可应对广泛的市场要求。
- 采用非绝缘方式 [降压 (高压侧驱动) 电路]，实现高效率 (92%)、高功率因数 (0.94) (本公司评价底板)。
 - 可采用简单的电路结构以及低耐压 MOSFET，降低 BOM 成本。
- Provides compatibility with a variety of circuit configurations and control methods to support a wide range of market requirements.
- Non-isolated topology and step-down high-side drive for high efficiency (92%) and high power factor (0.94) (Renesas evaluation board).
 - Enables reduced BOM cost through use of simple circuit configuration and MOSFETs with low voltage tolerance rating.



电源线性 (POL)

Power Management Linear ICs (POL Converters)

将本地电源分配到负载的附近以提高电源质量、减小放射噪声是高性能设备的趋势。产品系列包括 POL 用的开关稳压器控制器 IC 与开关元件的组合，以及内置 MOS 的 SiP R2J20702。

There is a trend in high-performance equipment toward placement of a local power supply close to the load to improve power supply quality and reduce noise emission. Renesas Electronics offers a lineup of devices for such applications, including switching regulator controller ICs for use in combination with switching elements as POL converters and the R2J20702, a SiP with integrated MOS.

PWM 控制器—MOSFET 集成 SiP (POL - SiP) R2J20702NP R2J20702NP PWM Controller SiP with Integrated MOSFET (POL-SiP) PWM

- 经过最佳化设计的同步整流式 PWM 控制器、功率 MOSFET 集于一体，实现高效率、节省空间
- 推荐输入电压范围：8V ~ 14V (控制电路可在 5V 电压下工作)
- 支持大电流输出：最大 40A
- 内置 0.6V、1% 的高精度基准电压源
- 工作频率设定范围：200kHz ~ 1MHz
- 通过峰值电流控制，实现高速响应
- 电流共享功能 (最多 5 个器件并联运行)
- 可单级工作 / 双相工作 / 多通道工作 (跟踪启动功能)
- 内置自举 SBD
- 内带开 / 关控制、过电流时瞬间中断保护功能 (Hiccup 电路)
- 设计支持工具、各种评价底板完备
- 小型封装：QFN-56 引脚 (8mm × 8mm)

- Integrates mutually optimized synchronous rectification PWM controller and power MOSFETs for high efficiency and reduced size
- Recommended input voltage range: 8V to 14V (supports control circuit operation at 5V)
- Support for large-current output: Max. 40A
- Integrated 0.6V reference voltage generator with 1% accuracy
- Wide operating frequency setting range: 200kHz to 1MHz
- Peak current control for high responsiveness
- Current sharing function (parallel operation of up to 5 devices)
- Support for single operation, 2-phase operation, and multichannel operation (tracking startup function)
- Integrated bootstrap SBD
- Integrated on/off control and overvoltage momentary cutoff function (hiccup circuit)
- Design support tools and evaluation boards available
- Compact package: OFN 56-pin (8mm × 8mm)

The figure includes an efficiency graph showing Efficiency (%) vs Output Current (A) from 0 to 40A. The efficiency peaks at approximately 92% for 10A and then gradually decreases to about 86% at 40A. The conditions are Vin=12V, Vout=1.8V, fsw=500kHz, L=0.32uH, Cout=600uF, No Air-Flow. To the right is a detailed pin configuration diagram for the R2J20702NP, showing pins for REG5, SYNC, CT, IREF, ON/OFF, REG5, DRV5, VCN, BOOT, VIN, SW, VOUT(1.8V), PGND, CS, RAMP, Ishare, FB, EOC, TRK-SS, and SGND.

POL 转换器 / 控制器 POL Converters/Controllers

型号 Part No.	结构 Configuration	转换方式 Conversion Type	工作电压范围 Operating Voltage Range	整流方式 Rectification Type	输出电压 Output Voltage	振荡频率 Oscillation Frequency	输出 MOSFET Output MOSFET	其他功能 Other Functions	封装 Package		
									TSSOP	QFN	CSP
R2J20702NP	POL SiP	降压 Voltage step-down	7.4 to 16V	同步整流 Synchronous rectification	40A 0.8~5.0V	to 1MHz	内置 Yes	① 开 / 关控制 ② OCP Hiccup 功能 On/off control, OCP hiccup function	—	NP (56)	—

① 开 / 关控制 On/Off Control

通过开 / 关控制，在低电平或开路时停止 IC 功能，并关闭 MOS FET。On/off control allows stopping IC function and turning off the MOSFETs when in the low-level or open state.

② OCP Hiccup 功能 OCP Hiccup Function

CS 管脚电压超过 1.5V 时，OCP hiccup 功能启动，关闭 IC 和 MOS FET。另外，TRK-SS 管脚通过内部电路下拉至 SGND。IC 关闭期间，RES 信号持续 1024 次，此后由软启动状态开始开关工作。When the CS pin voltage exceeds 1.5V, the OCP hiccup function shuts off the IC and the MOSFETs. Also, the TRK-SS pin is pulled down to SGND by an internal circuit. The RES signal continues for 1,024 times while the ICs off, then switching operation starts from the soft start state.

电源线性 (DC/DC 相关) 功能列表

Description of Power Management Linear IC (DC/DC) Functions

通用 DC/DC 转换器				Multi Purpose DC/DC Converters								
型号 Part No.	应用 Application	工作电 压范围 Operating Voltage Range	消耗电流 Current Consumption	输出 Output			振荡频率 Oscillation Frequency	最大开启 占空比 Max. On Duty	其他功能 Other Functions	封装 Package		
				形式 Type	输出电压 Output Voltage	输出电流 Output Current				DIP	SOP	SSOP
M5291	升压 降压 极性反转	2.5~40V	1.4mA	集电极开路 Open collector		200mA	100Hz~ 100kHz	85.7%	① 峰值电流限制电路 peak current limiter circuit	P (8)	FP (10)	— GP (8)
M62212	Voltage step-up, voltage step-down, polarity reversal	2.5~18V					~300kHz	0 ~ 100% (通过 DTC 管脚设定) (Set by DTC pin)	② 输出短路保护 output short protection ③ 开 / 关控制 on/off control			
M62211	升压 降压 极性反转 背光控制	2.5~35V	1.3mA					150mA	~500kHz		② 双输入优先控制 2-input priority control ③ 开 / 关控制 on/off control ② 输出短路保护 output short protection	P (14)
M62215	Voltage step-up, voltage step-down, polarity reversal, backlight control	8.6~25V	9.5mA	图腾柱型 Totem pole		±1A		90%	② 双输入优先控制 2-input priority control ③ 开 / 关控制 on/off control ② 输出短路保护 output short protection ④ DTC			
M62216	升压 降压 Voltage step-up, voltage step-down	0.9~15V	850μA	集电极开路 Open collector	可变 Variable	100mA	~155kHz	87%	③ 开 / 关控制 on/off control	—	FP (8)	GP (8)
HA16114	降压 极性反转 Voltage step-down, polarity reversal	3.9~40V	8.5mA	图腾柱型 Totem pole		±1A	~600kHz	0 ~ 100% (通过 DB 管脚设定) (Set by DB pin)	③ 开 / 关控制 on/off control ⑥ Pulse by pulse CLM ⑦ 定时器式间歇工作功能 timer-controlled intermittent operation function, external input synchronous operation, (HA16114/120) ⑤ 软启动 soft start, external input synchronous operation ⑧ 快速关断功能 quick shut function ⑨ Vref 过电压保护功能 Vref overvoltage protection function	P (16)	FP (16)	—
HA16120	升压 Voltage step-up									—	—	—
HA16116	通道 1: 降压 极性反转 通道 2: 降压 CH1: Voltage step-down, polarity reversal CH2: Voltage step-down									—	FP (20)	—
HA16121	通道 1: 降压 极性反转 通道 2: 升压 CH1: Voltage step-down, polarity reversal CH2: Voltage step-up									—	—	—

输出电压固定型 DC/DC 转换器							Fixed-Output-Voltage DC/DC Converters						
型号 Part No.	应用 Application	工作电 压范围 Operating Voltage Range	消耗电流 Current Consumption	输出 Output			振荡频率 Oscillation Frequency	最大开启 占空比 Max. On Duty	其他功能 Other Functions	封装 Package			
				形式 Type	输出电压 Output Voltage	输出电流 Output Current				SIP	SOP	SOT	
M62220	降压 Voltage step-down	4~15V	660μA	集电极开路 Open collector	220: 3.3V	100mA	110kHz	90%	过电流保护电路 Overcurrent protection circuit	L(5)	FP(8)	—	
M62270			500μA		270: 3.3V					—	—	GP(5)	
M62290		6~15V	780μA		5.0V	120kHz	L(5)			FP(8)	—		
M62291			570μA				—			—	GP(5)		
M62292 M62293		4~15V	1.0mA		292: 3.3/1.8V 293: 3.3/2.5V	30mA	110kHz			2个系统（输入电压及3.3V输出） 电压检测功能 Dual-voltage (input voltage & 3.3V output) detection function	—	FP(8)	—

多路 DC/DC 转换器 Multi DC/DC Converters

型号 Part No.	Ch. No.	转换方式 Conversion Type	工作电压 范围 Operating Voltage Range	输出 电压 (Typ.) Output Voltage (Typ.)	输出电流 (最大) Output Current(max.)		整流方式 Rectification Type	内置元件 Integrated Parts			振荡频率 (最大) Oscillation Frequency (max.)	最大开启 占空比 Max. On Duty	用途 Application	其他功能 Other Functions	封装 Package
					1L-ion	2AA		MOS FET	Load SW	相位补偿 Phase Compensator					QFN
R2A20016	CH1	升压 Voltage step-up	1.5 to 5.5V	5.0V	600mA	400mA	同步整流 Synchronous rectification	内置 Yes	内置 Yes	内置 Yes	2MHz	90%	Motor	③ 开 / 关控制 on/off control	NP (40)
	CH2	降压 Voltage step-down		1.8V	600mA	400mA	同步整流 Synchronous rectification	内置 Yes	—	内置 Yes		100%	SDRAM	⑤ 软启动 soft start	
	CH3	降压 Voltage step-down		1.0V	600mA	400mA	同步整流 Synchronous rectification	内置 Yes	—	内置 Yes	1MHz	95%	I/O, AFE	② 输出短路保护 output short protection	
	CH4	升降压 Voltage step-up/step-down		3.3V	500mA	350mA	同步整流 Synchronous rectification	内置 Yes	—	内置 Yes			CCD(+)	⑩ 过电压保护 overvoltage protection	
	CH5	升压 Voltage step-up		13V	50mA	30mA	Di 整流 Di rectification	内置 Yes	内置 Yes	内置 Yes	500kHz	90%	CCD(-)	⑪ 过电流保护 overcurrent protection	
	CH6	极性反转 Polarity reversal		-7.5V	100mA	100mA	Di 整流 Di rectification	内置 Yes	—	内置 Yes			背光调光 backlight brightness adjustment		
	CH7	升压 Voltage step-up		4LEDs(20mA)	35mA	30mA	Di 整流 Di rectification	内置 Yes	内置 Yes	内置 Yes			LCD BL	电压检测器 voltage detector PFM/PWM 切换 PFM/PWM switching	

① 峰值电流限制电路
Peak Current Limiter Circuit

将电流检测用电阻 RSC 连接到指定的引脚间，进行峰值电流检测。过电流通过导致 RSC 的电压下降达到 0.3V (标准) 以上时，输往振荡电容的充电电流会迅速增大，将输出开关的开启时间缩短到最小，并让其关闭。
Peak current detection is accomplished by connecting a resistor (RSC) between designated pins. When an overcurrent condition causes the RSC voltage to drop more than 0.3V (standard), the charge current to the oscillation capacitor increases suddenly, minimizing the output switch's on period and turning off output.

② 输出短路保护
Output Short Protection

监控输出端子电压，当其低于规定值时，关断电源。
The output pin voltage is monitored, and the power supply is shut down when it drops below a specified value.

③ 开 / 关控制
On/Off Control

可远程开 / 关电源。通过系统控制器发出的控制信号，启动 / 停止输出。
Enables the power supply to be turned on and off remotely. Output is started and stopped according to a control signal from the system controller.

④ DTC (空载时间控制)
DTC (Dead Time Control)

通过延迟电路推迟输出的上升，以便在启动时等到输入电源稳定后再进行输出。
At startup, a delay circuit prevents the output from rising until the input power supply stabilizes.

⑤ 软启动
Soft Start

该系统在通电时逐渐增大 PWM 输出脉冲宽度，防止由 DC/DC 转换器输出骤然上升引起的过冲。通过在 DB 引脚上增加 CST，可实现该功能。
A system that gradually increases the PWM output pulse width after power-on to prevent overshooting due to a sudden rise in the DC/DC converter output. This function can be enabled by adding a CST to the DB pin.

⑥ Pulse by pulse CLM

对每个脉冲限制 PWM 脉冲宽度，以进行保护。
The PWM pulse width is limited one pulse at a time to provide protection.

⑦ 定时器式间歇工作功能
Timer-Controlled Intermittent Operation Function

连续为过电流时，通过 TM 引脚和开 / 关引脚使 IC 间歇工作，可构成下降特性陡峭的电源。
When a continuing overcurrent condition exists, the TM and ON/OFF pins are used to make the IC operate intermittently. This makes it possible to configure a power supply with sharp drop-off characteristics.

⑧ 快速关断功能
Quick Shut Function

快速关断是在 IC 关闭时通过对各引脚的电压进行复位，快速关闭 PWM 脉冲输出的功能。
The quick shut function resets the pin voltages when the IC is turned off, causing PWM pulse output to halt immediately.

⑨ Vref 过电压保护功能
Vref Overvoltage Protection Function

Vref 输入也内置过电压保护电路，防止过大输入流入 Vref 引脚破坏其内部。
The Vref input also has an on-chip overvoltage protection circuit that prevents excessive voltage from entering via the Vref pin and damaging the device internally.

⑩ 过电压保护功能
Overvoltage Protection Function

因负载故障等电压过大时，启动过电压保护，保护电源电路。
When the voltage is excessively large due to a problem such as a multifunction in the load, the overvoltage protection function operates to protect the power supply circuit.

⑪ 过电流保护
Overcurrent Protection

为避免输出电流过大而进行限制。有垂直下降特性和折返下降特性两种方式。
This function limits the output current to prevent it from becoming excessive. There are two types: one with a with vertical drop-off characteristics and one with "hook-back" drop-off characteristics.

电源良好功能
Power Good Function

该功能是显示转换器供给正常输出电压的引脚，如存在电源输出可能超出调节范围的情况，会变成“低”。
This is a pin that indicates when the converter is supplying the normal output voltage. It is driven low in cases where it is necessary to indicate the possibility that the power supply output is outside the regulation range.

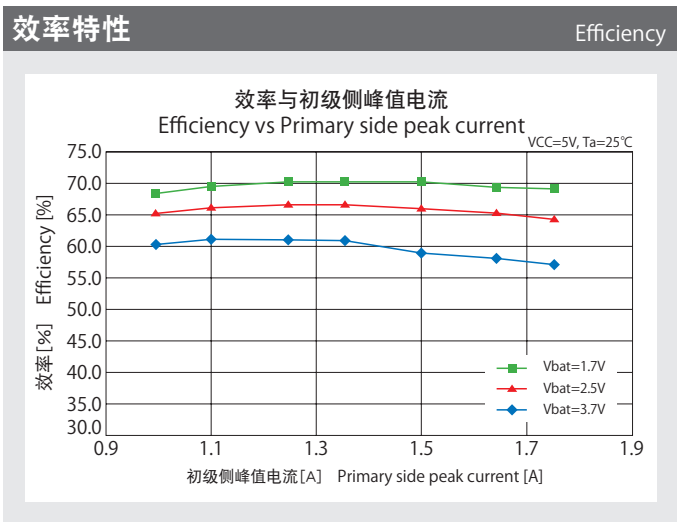
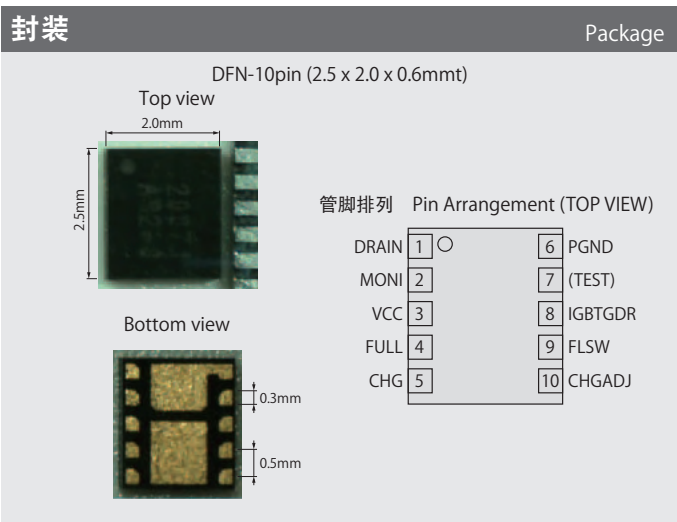
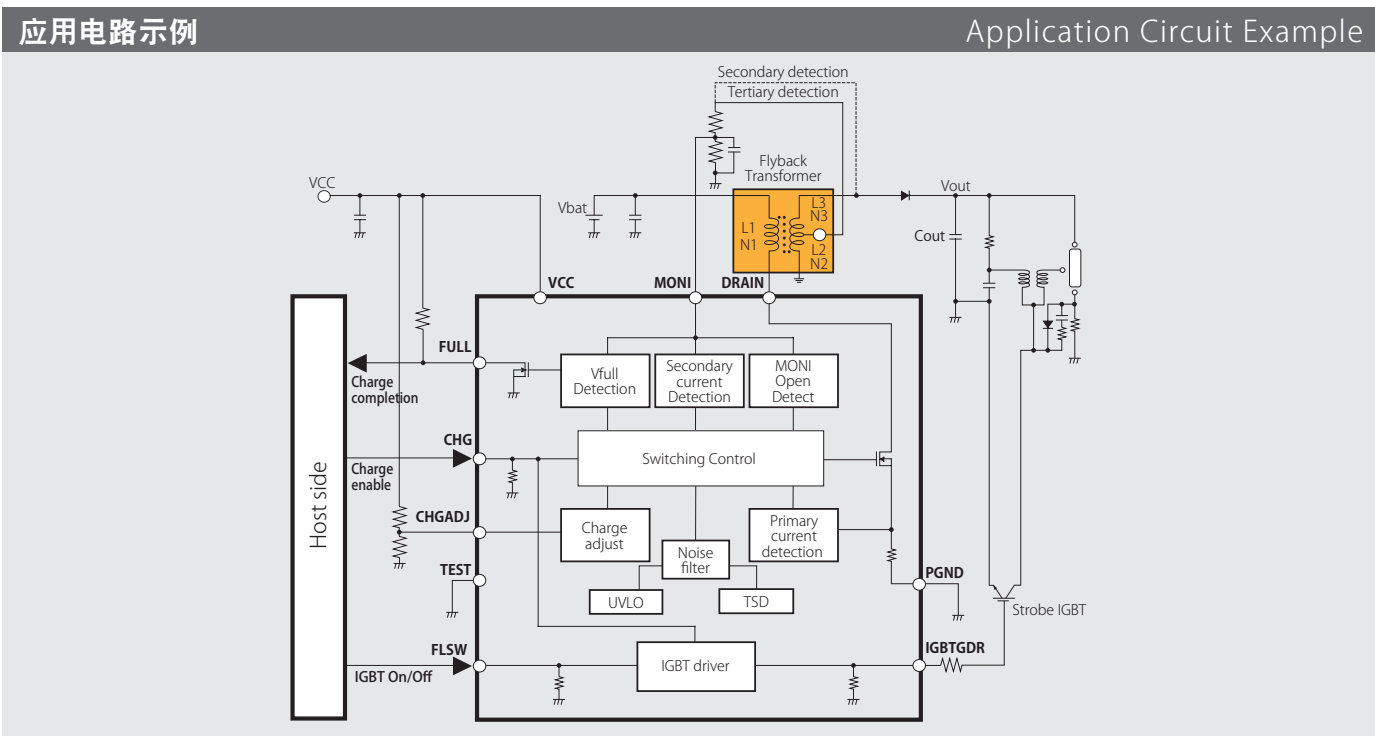
内置 IGBT 驱动器 闪光灯用电容器充电 IC【R2J20071BNS】 Photoflash capacitor charger IC with IGBT driver R2J20071BNS

特点

- 使用回扫变压器的自激振荡方式
- 充电结束检测可选择从变压器三级侧的间接检测方式，以及从变压器二次侧的直接检测方式
- 高精度终止电压检测电压: 1.0V±1.0%
- 小型封装: DFN-10 (2.5 × 2.0 × 0.6mmt)
- 内置电源开关用 高耐压 (60V)、低导通电阻 (0.2Ω) Nch MOSFET
- 充实的保护功能
 - 低电压保护功能 (UVLO)
 - 热关断功能
 - Nch MOSFET 最大关断时间限制
 - 变压器 (二级侧、三级侧) 开路保护电路
- 通过向 CHGADJ 管脚输入电压, 可改变变压器初级侧电流
- IGBT 驱动器针对瑞萨闪光灯 IGBT 的特性实现最佳化

Features

- Self-oscillation method with fly-back transformer.
- The charge completion is detected by indirect detection method with tertiary-winding or direct detection method with secondary-winding.
- High precision charge completion detection voltage 1.0V+/-1.0%
- Small package :DFN-10 (2.5 x 2.0 x 0.6mmt)
- Built-in high voltage(60V) and Low Ron(0.2ohm) Nch MOSFET for Power Switch.
- Various protect functions
 - Low voltage protection
 - Thermal shutdown
 - Maximum off time limitation for Nch MOSFET
 - Overcharge protection for open winding
 - Primary side current is adjustable by inputting the DC voltage to CHGADJ terminal.
- IGBT driver is adjusted to Renesas's strobe IGBT.



并联稳压器 IC 产品系列 New Shunt Regulator IC Lineup

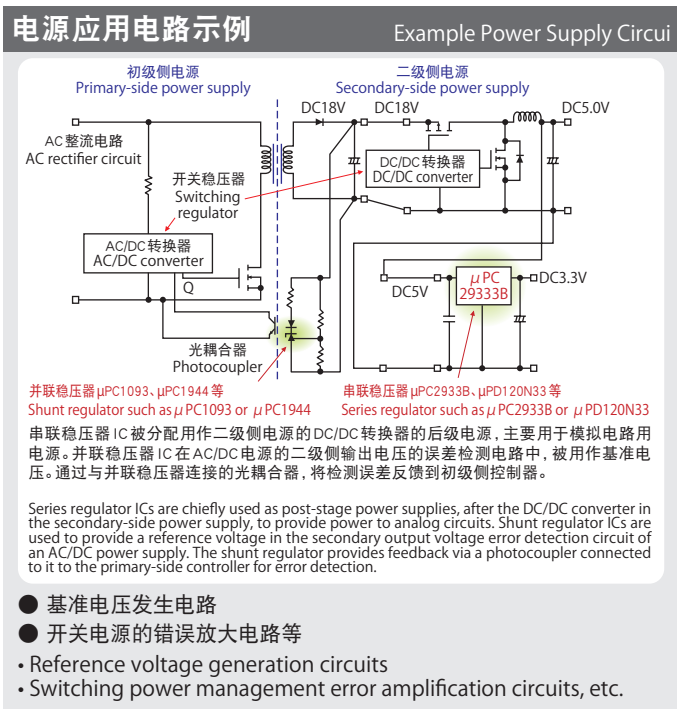
瑞萨电子为应对所有电子设备电源的输出电压检测和单片机 A/D 输入的基准电压源等需求, 备有并联稳压器 IC HA17431 系列和 μ PC1093、1943~45 以及串联稳压器。HA17431G 系列是支持高耐压、高精度、小型化的产品系列, μ PC1093、1943~45 是面向小型封装和低电压产品拓展的产品系列。

For applications such as output voltage detection in all sorts of electronic devices and as reference voltage sources for A/D input, Renesas Electronics supplies a variety of shunt regulator ICs, including the HA17431 Series and the μ PC1093, μ PC1943, μ PC1944, and μ PC1945 Series. The HA17431G Series delivers high-voltage and high-precision characteristics in a compact package, while the μ PC1093, μ PC1943, μ PC1944, and μ PC1945 Series include compact-package and low-voltage models.

HA17431G 系列的特点 Renesas HA17431G Series Features

- 相对于以往产品实现了高耐压、高精度兼备
 - 阴极最大电压 (V_{kmax}): 40V
 - 基准电压 (V_{ref} 25°C)
 - : 2.500V±0.5% (A 型)
 - : 2.500V±1.0% (标准型)
- 以有利于设备小型化的小型表面安装封装为首, 拥有丰富的封装类型
 - 表面安装式: MPAKV、MPAK-5V、UPAK
 - 插入型: TO-92
 - K-REF 管脚反转式: HA17432G (UPAK)

- Achieve both high voltage and high accuracy compared to conventional product.
 - Max. cathode voltage (V_{kmax}): 40V
 - Reference voltage (V_{ref} at 25°C)
 - : 2.500V±0.5% (A type)
 - : 2.500V±1.0% (Standard type)
- Abundant variations in packages including small surface mounting package for equipment downsizing.
 - Surface mounting type: MPAKV, MPAK-5V, UPAK
 - Through hole type: TO-92
 - K-REF pin reversed type: HA17432G (UPAK)



产品系列

Product Lineup

项目 Item		低电压 (1.25V) 型 Low voltage type (1.25V)		标准电压 (2.5V) 型 Standard voltage type (2.5V)				
		HA17L431A	HA17L431	HA17431V	HA17431H	HA17431A	HA17431GA	HA17431G
基准电压 Reference voltage	Vref(V)	1.240	1.240	2.500	2.500	2.495	2.500	2.500
阴极最大电压 Maximum cathode voltage	VKA(V)	16	16	16	36	40	40	40
阴极连续电流 Continuous cathode current	IK(mA)	-30~+50	-30~+50	-50~+50	-50~+50	-100~+150	-50~+100	-50~+100
基准电压精度 Reference voltage accuracy	(%)	±1	±1.5	±1	±1	±2.2	±0.5	±1.0
工作温度范围 Operating temperature range	Topr(°C)	-20~+85	-20~+85	-20~+85	-20~+85	-20~+85	-40~+85	-40~+85
封装 Package	MPAK	HA17L431ALTP HA17L432ALTP	—	HA17431VLTP HA17432VLTP	HA17431HLTP HA17432HLTP	—	HA17431GLTPA	HA17431GLTP
	MPAK-5	HA17L431ALP	—	HA17431VLP	HA17431HLP	—	HA17431GLPA	HA17431GLP
	TO-92	HA17L431AP	—	HA17431VP	HA17431HP	HA17431PNA	HA17431GPA	HA17431GP
	TO-92MOD	—	—	—	—	HA17431PA	—	—
	UPAK	—	HA17L431UP HA17L432UP	HA17431VUP HA17432VUP	HA17431HUP HA17432HUP	HA17431UA HA17432UA	—	HA17431GUP HA17432GUP

封装外形和管脚排列

External Package Dimensions and Pin Arrangement

Package	MPAKV		MPAK-5V		UPAK	
管脚排列 Pin Arrangement (Top view) *1						
型号 Part No.	HA17431GLTP HA17431GLTPA HA17431HLTP HA17431VLTTP HA17431ALTP	HA17432HLTP HA17432VLTTP HA17L432ALTP	HA17431GLP HA17431GLPA HA17431HLP	HA17L431VLP	HA17L431ALP	HA17431GUP HA17431UA HA17431HUP HA17431VUP HA17L431UP

Package	TO-92	TO-92MOD
管脚排列 Pin Arrangement (Top view) *1		
型号 Part No.	HA17431GP HA17431GPA HA17431PNA HA17431HP HA17431VP HA17L431AP	HA17431PA

*1 R : 基准 Reference
A : 阳极 Anode
K : 阴极 Cathode
NC : 未连接 No Connection
PS : 内置光耦合器用旁路电阻 (2kΩ) Built-in Photocoupler Bypass Resistor (2 kΩ)

外形 Package	外形尺寸 (mm) Size	脚距 (mm) Pin pitch (mm)	容许损失 (mW) Power dissipation (mW)	封装缩写 Abbreviation
MPAKV	1.5x2.95x1.1	(0.95)	150	LTP
MPAK-5V	1.6x2.9x1.1	0.95	150	LP
UPAK	2.5x4.5x1.5	1.5	385	UP
TO-92	5.0x4.8x3.8	1.27	500	P, PN
TO-92MOD	8.0x4.8x3.8	1.27	800	P

符号 Symbol (HA17431VLP)

其他并联稳压器 IC

Other shunt regulator ICs

并联稳压器 IC 被广泛用于开关电源的反馈电路和基准电压源。

Shunt regulator ICs are widely used as feedback circuits in switching power supplies and as reference voltage sources.

μPC1093,1943~45的特点

Features of μPC1093, μPC1943, μPC1944, and μPC1945 Series

产品系列包括标准 2.5V 基准电压的 μPC1093 (等同于其他公司的 431) 和 1.26V 低基准电压产品

The product lineup includes the μPC1093 with a standard 2.5V reference voltage (equivalent to 431 from other vendors) and models with a low reference voltage of 1.26V.

并联稳压器 IC 产品系列

Shunt Regulator IC Lineup

并联稳压器 IC
Shunt regulator ICs

标准型
Standard type

低电压型
Low-voltage type

低电压、小型
Low-voltage, compact type

μPC1093
(支持 2.5V 基准电压、5V 输出)
(Support for reference voltage of 2.5V and 5V output)

μPC1943, μPC1944
(支持 1.26V 基准电压、3.3V 输出)
(Support for reference voltage of 1.26V and 3.3V output)

μPC1945
(支持 1.26V 基准电压、1.8V~3.3V 超低电压输出)
(Support for reference voltage of 1.26V and ultralow-voltage output of 1.8V to 3.3V)

并联稳压器 IC								
Shunt Regulator ICs								
品名 Product Name	输出电流 (A) Output Current (A)	基准电压 (V) Reference Voltage (V)	精度 (%) Accuracy (%)	输入电压 (V) 输出电压可变范围 (V) Output Voltage Variable Range (V)	绝对最大额定值 Absolute Maximum Characteristics		外形 Package	备注 Remarks
μPC1093	0.15	2.495	±2	2.5 ~ 36	37	0.48	8 管脚 SOP 8-pin SOP	—
						2 *1	SOT-89	
						0.51 *2	SC-74A	
μPC1943	0.05	1.26	±2.6	1.26 ~ 24	25	1.6 *1	SC-62	支持 3V 电源 For 3V power supplies
μPC1944	0.05	1.26	±2.6	1.26 ~ 24	25	0.385	8 管脚 SOP 8-pin SOP	支持 3V 电源 (与 μPC1093 管脚兼容) For 3V power supplies (pin-compatible with μPC1093)
						1.6 *1	SOT-89	
μPC1945	0.015	1.26	±2	1.26 ~ 5	6	0.09	SC-74A	支持 1.8V 电源 For 1.8V power supplies

*1: 装载于 16cm² × 0.7mm 陶瓷电路板上时 *2: 装载于 75mm² × 0.7mm 陶瓷电路板上时

*1: When mounted on 16 cm² × 0.7 mm ceramic substrate *2: When mounted on 75 mm² × 0.7 mm ceramic substrate

Power Management Linear ICs

Shunt Type

串联稳压器 IC

Series Regulator ICs

串联稳压器 IC 外接元件少, 被广泛用于简易的供电电源。另外, 由于串联稳压器 IC 的噪声特性优越, 适用于对噪声敏感的模拟电路的供电电源。

Series regulator ICs require few external elements and are widely used as simple power supplies. Due to their excellent noise characteristics, series regulator ICs are suitable for supplying power to analog circuits that are sensitive to noise.

串联稳压器 产品系列

Series Regulator Lineup

除标准型的稳压器以外, 产品系列还包括输入 / 输出间电压差小的低饱和型 (LDO)、低功耗的 CMOS 型

备有 0.1A~2A 的广泛输出电流

备有 1V~1.5V 的广泛输出电压

In addition to standard type regulators , low-saturation type (LDO) products with minimal input-output voltage difference and low-power CMOS type products are available.

Wide range of output current specifications, from 0.1A to 2A

Wide range of output voltage specifications, from 1V to 1.5V

串联稳压器 IC
Series regulator ICs

标准型
Standard type

低饱和型
Low-saturation type

μPC78Lxx 系列等
μPC78Lxx Series, etc.

μPC29xx 系列等
μPC29xxA 系列等 μPC29xxB 系列
μPC29xx Series, etc. μPC29xxB Series

CMOS 稳压器
CMOS regulator

低电压、低功耗
Low voltage, low power consumption

开 / 关功能
On/off function

μPD120Nxx 系列
Vo=1.5V~3.3V Io=300mA 输出
μPD120Nxx Series
Vo = 1.5V to 3.3V, Io = 300mA output

μPD121A10 系列 *
Vo=0.95V ~ 1.15V Io=2.0A 输出
μPD121WxxA 系列 *
Vo=1.8V ~ 3.3V,ADJ Io=1.5A 输出
μPD12115 *
Vo=1.5V Io=1.0A 输出
μPD121A10 Series*
Vo=0.95V to 1.15V, Io = 2.0A output
μPD121WxxA Series*
Vo=1.8V to 3.3V, adj., Io = 1.5A output
μPD12115*
Vo=1.5V Io=1.0A output

标准型三脚稳压器

Standard Type Three-Pin Regulators

类型 Type	品名 Product Name	输出电流 (A) Output Current (A)	输出电压 (V) Output Voltage (V)											绝对最大额定值 Absolute Maximum Characteristics		外形 Package	
			3.3	4	5	6	7	8	9	10	12	15	18	24	输入电压 (V) Input Voltage (V)	总损失 (W)* Total Loss (W)*2	
正电压 Positive voltage	μPC78Lxx	0.1			○	○	○	○		○	○	○			30 *1	2 *3	SOT-89
	μPC305	0.05		输出电压可变范围: 4.5V~30V Output voltage variable range: 4.5V to 30V											40	0.44	8 管脚 SOP 8-pin SOP

*1: 10V、12V、15V 输出产品的输入电压 (绝对最大额定值) 为 35V。
*2: 受内部电路的限制。 *3: 装载于 16cm² (厚 0.7mm) 陶瓷电路板上时。
*1 : The input voltage (absolute maximum) is 35V for products with 10V, 12V, or 15V output.
* 2 : Limited by internal circuit characteristics.
* 3 : When mounted on 16 cm² (0.7 mm thick) ceramic substrate

CMOS 稳压器

CMOS Regulators

品名 Product Name	输出电流 (A) Output Current (A)	输出电压 (V) Output Voltage (V)							绝对最大额定值 Absolute Maximum Characteristics		外形 Package	特点 Features
		1.0	1.5	1.8	2.5	3.3	5.0	ADJ	输入电压 (V) Input Voltage (V)	总损失 (W)*1 Total Loss (W)*1		
μPD120Nxx	0.3		○	○	○	○			6	2 *2 0.51 *3	SOT-89 SC-74A	—
μPD121A10	2.0	○							6	10	TO-252 5pin	带开 / 关功能 On/off function
μPD121WxxA	1.5			○	○	○		○	6	10	TO-252 5pin	带开 / 关功能 On/off function
μPD12115	1.0		○						6	10	TO-252 5pin	带开 / 关功能 On/off function

*1: 受内部电路的限制。 *2: 装载于 16cm² × 0.7mm 陶瓷电路板上时 *3: 装载于 75mm² × 0.7mm 陶瓷电路板上时

*1: Limited by internal circuit characteristics. *2: When mounted on 16cm² × 0.7mm ceramic substrate *3:When mounted on 75mm² × 0.7mm ceramic substrate

15

16

电源线性
Power Management Linear ICs

低饱和型稳压器

Low-Saturation Regulators

品名 Product Name	输出电流 (A) Output Current (A)	输出电压 (V) Output Voltage (V)																绝对最大额定值 Absolute Maximum Characteristics		外形 Package	特点 Features	
		1.8	2.5	2.6	3	3.3	4	5	6	7	7.8	8	9	10	12	15	18	24	输入电压 (V) Input Voltage (V)			总损耗 (W)*1 Total Loss (W)*1
μ PC29Lxx	0.1				○	○	○	○											16	2 *2	SOT-89	低饱和和三管脚 Low-saturation, 3-pin
μ PC29Mxx	0.5				○				○	○		○	○	○	○				20	10	SC-64	低饱和和三管脚 Low-saturation, 3-pin
																		10		SC-63		
μ PC29M33A μ PC29M05A	0.5					○		○											20	10	SC-64	低饱和和三管脚 Low-saturation, 3-pin
																		10		SC-63		
μ PC29xx	1.0				○				○	○		○	○	○	○				20	10	SC-64	低饱和和三管脚 Low-saturation, 3-pin
																		10		SC-63		
μ PC2918 μ PC2925 μ PC2926	1.0	○	○	○															20	10	SC-64	低饱和和三管脚 Low-saturation, 3-pin
																		10		SC-63		
μ PC2933A μ PC2905A	1.0					○		○											20	10	SC-64	低饱和和三管脚 Low-saturation, 3-pin
																		10		SC-63		
μ PC29xxB	1.0	○	○			○		○											16	10	SC-64	低饱和和三管脚 Low-saturation, 3-pin
																				10	SC-63	
																				10	TO-252	
μ PC29Sxx	0.1									○									20	0.48	8 管脚 SOP	带开 / 关功能 On/off function
μ PC3033/05	1					○		○											8	12.5	TO-126	带开 / 关功能 On/off function

*1: 受内部电路的限制。 *2: 装载于 16cm² × 0.7mm 陶瓷电路板上时
*1: Limited by internal circuit characteristics. *2: When mounted on 16 cm² × 0.7 mm ceramic substrate

HA 17 系列 三脚稳压器 IC
HA17 Series Three-Pin Regulator ICs

三脚稳压器 IC 不受输入电压变化的影响, 始终供给稳定的输出电压。
适用于音响设备的电源、多路输出开关稳压器不稳定电压的稳定化以及各种控制设备的电源。

These 3-Pin Regulators IC Lineup always supply a stable output voltage, unaffected by fluctuations in the input voltage. They are suitable for use in audio equipment power supplies, for stabilization of unstable voltages of multi-output switching regulators, and for power supplies of various kinds of control devices.

特点 Features

- 输出电压等级多样
- 内置各种保护电路: 电流限制电路、芯片结温限制电路、内部功耗限制电路
- 工作温度范围广: Ta=-40~+85℃
- Variety of output voltage grades
- Various built-in protection circuits: current limiting circuit, chip junction temperature limiting circuit, internal power dissipation limiting circuit
- Wide operating temperature range: Ta=-40 to +85℃

串联稳压器 Series Regulators

- 适用于精密小容量电源 (~20W)
- 产生的噪声极少
- 电路设计简单

• Suitable for precision, high-stability, low-capacity power supplies (up to 20 W)

• Extremely low noise generation

• Facilitate circuit design

固定输出稳压器电路示例 Example of Fixed-Output Regulator Circuit

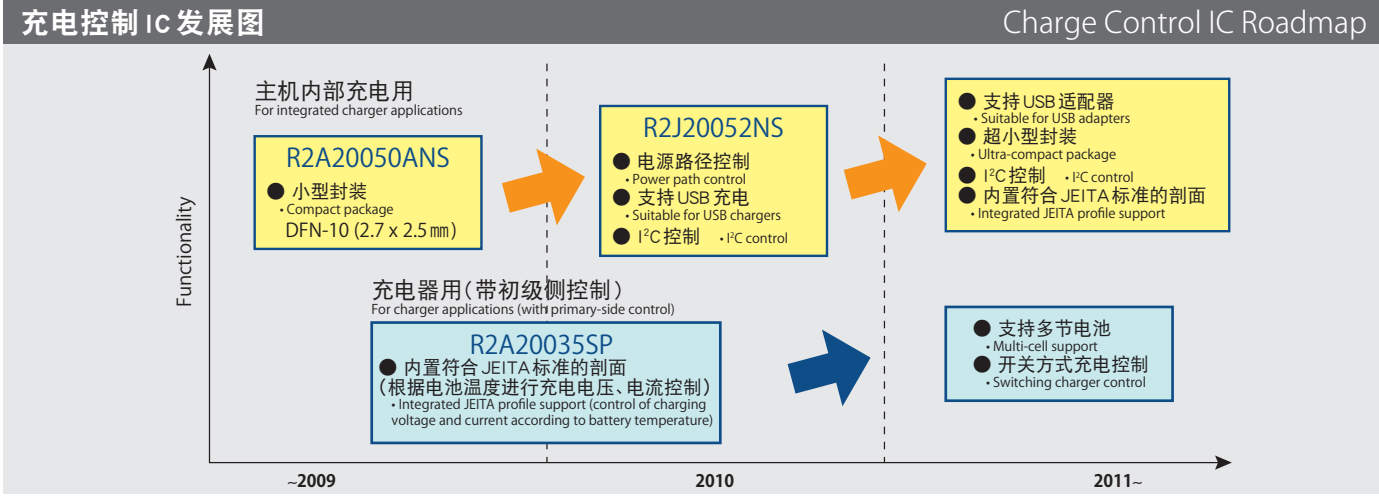
产品系列 Lineup

输出电压 (V) Output voltage	电流 (mA) Current	Package	
		UPAK(SOT89)	TO-92MOD
5.0	100	HA178L05UA	HA178L05/A/P/PA
8	100	HA178L08UA	HA178L08/A/P/PA
12	100	HA178L12UA	HA178L12/A/PA
15	100	HA178L15UA	HA178L15/A/P
-5	100	HA179L05U	HA179L05/P
-8	100	HA179L08U	HA179L08/P
-12	100	HA179L12U	HA179L12/P
-15	100	HA179L15U	HA179L15/P

输出电压范围和等级 Output Voltage Precision & Grade

Grade	HA178Lxx Series	HA179Lxx Series
Standard	±8%	±4%
A Grade	±5%	—

电源线性 (电池)
Power Management Linear ICs (for Battery Chargers)



充电控制 IC 产品系列 Charge Control IC Lineup

Part No.	Bat. Type		Vcc(V)	Charge control voltage (V)	Function										Protection							Package
	Li-ion	Ni-MH			On-chip MOS FET	On-chip current sense resistor	Primary control	MCU I/F	LED driving output	Battery identification	AC adaptor detection	Settable charge termination	Trickle charge	Re-charge	Over-discharge detection	Over-voltage detection	Over current detection	Battery temperature detection	Safety timer	Thermal protection	Compulsory charge stop	
M62237	○	○	2.5-15	1.25																		SOP8
R2S20035	○		2.8-5.5	4.20	○	○	○		2		○	○	○		○	○	○	○	○	○		SSOP20
M62244	○		3.0-6.5	4.20					2		○		○	○	○	○	○	○	○		○	SSOP20
M62245	○		3.0-6.5	4.20					2		○		○	○	○	○	○	○	○			SSOP16
M62249	○		4.75-6.1	4.20	○				1		○		○	○	○	○	○	○	○		○	QFN28
M62253A	○		5.0-15	4.10/4.20					2			○	○	○	○			○				SSOP16
R2S20030	○		4.75-6	4.20	○	○			1			○	○	○		○		○	○	○		QFN28
R2A20050A	○		4.0-5.8	4.20	○	○			1		○		○	○	○	○		○	○	○		DFN10
M62242	○		5.3-15	4.10/4.20				○		○			○	○	Realized with MCU							SSOP16

功能说明 Description of Functions

① 电池连接检测功能
Battery Connection Detection Function

输出 TH 管脚电压。TH 管脚兼备电池连接检测和电池温度检测两种功能, 通过单片机辨别有无电池以及电池温度。
Outputs the TH pin voltage. The TH pin is used for both battery connection detection and battery temperature detection, and the MCU determines from the output whether or not a battery is connected and, if so, its temperature.

② 适配器连接检测功能
AC Adaptor Connection Detection Function

使用 Adpt SW 管脚检测适配器, 该管脚变成“H”, 则认定有适配器。另外, 由于适配器模式优先, 即使在充电过程中, 一旦 Adpt SW 管脚变成“H”, 也会停止充电, 并切换到适配器模式。
The Adpt SW pin is used for AC adaptor detection. An adaptor is determined to be connected when this pin is driven high. Note that adaptor mode has priority, so if the Adpt SW pin goes high when charging is in progress, charging stops and operation switches to adaptor mode.

③ 芯片温度检测功能
Temperature Detection Function

向 Tdet 管脚输入外接上拉电阻 (用于 Vccref) 和外部热敏电阻的分割电压。通过该电压检测电池温度。
The voltage divided by an externally connected pull-up resistor (to Vccref) and an external thermistor resistance is input to the Tdet pin. This voltage is used to determine the temperature.

④ 强制停止充电功能
Forced Charge Stop

通过将 STP 管脚设定为“L”, 可强制停止充电。此时 LED 熄灭, 各定时器被初始化。
This function enables charging to be forcibly stopped by driving the STP pin low. At this time an LED goes dark and the timers are initialized.

笔记本电脑用智能电池系统【R2J24020F/50F**】

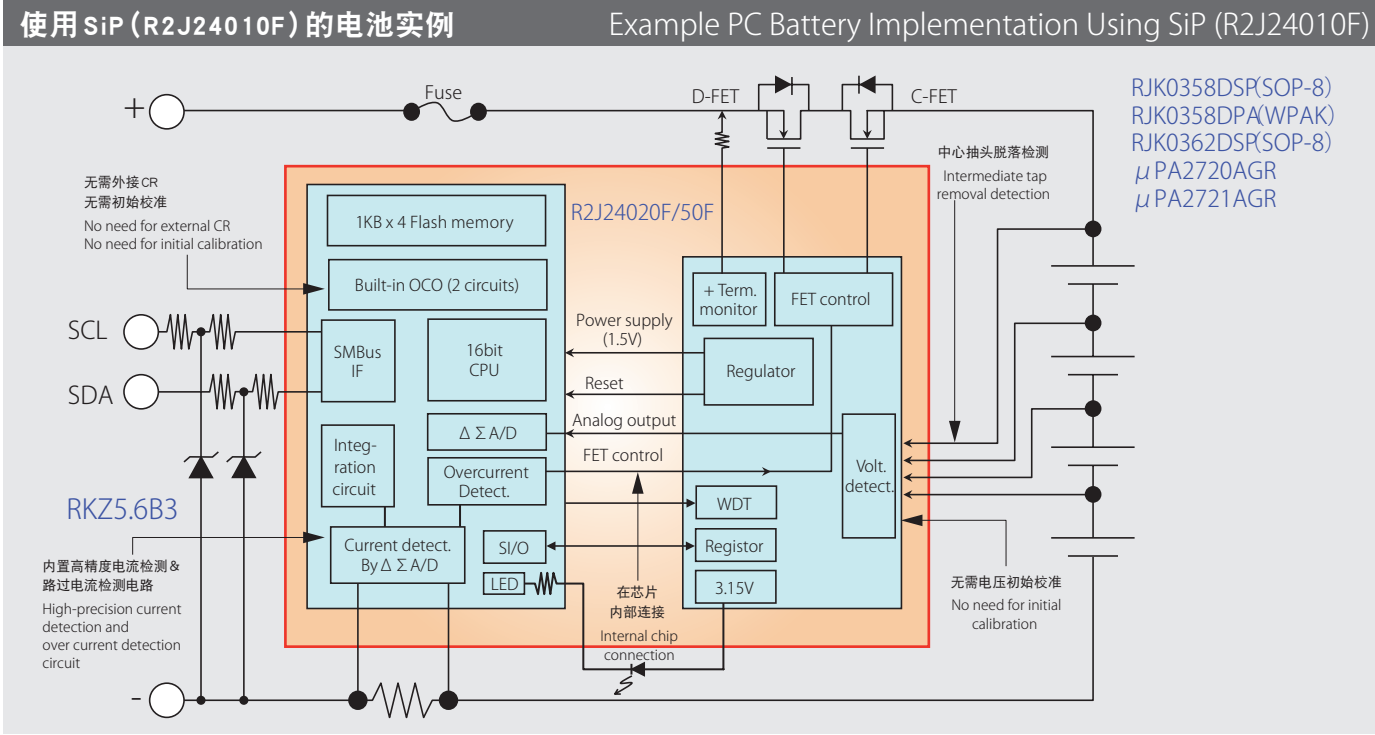
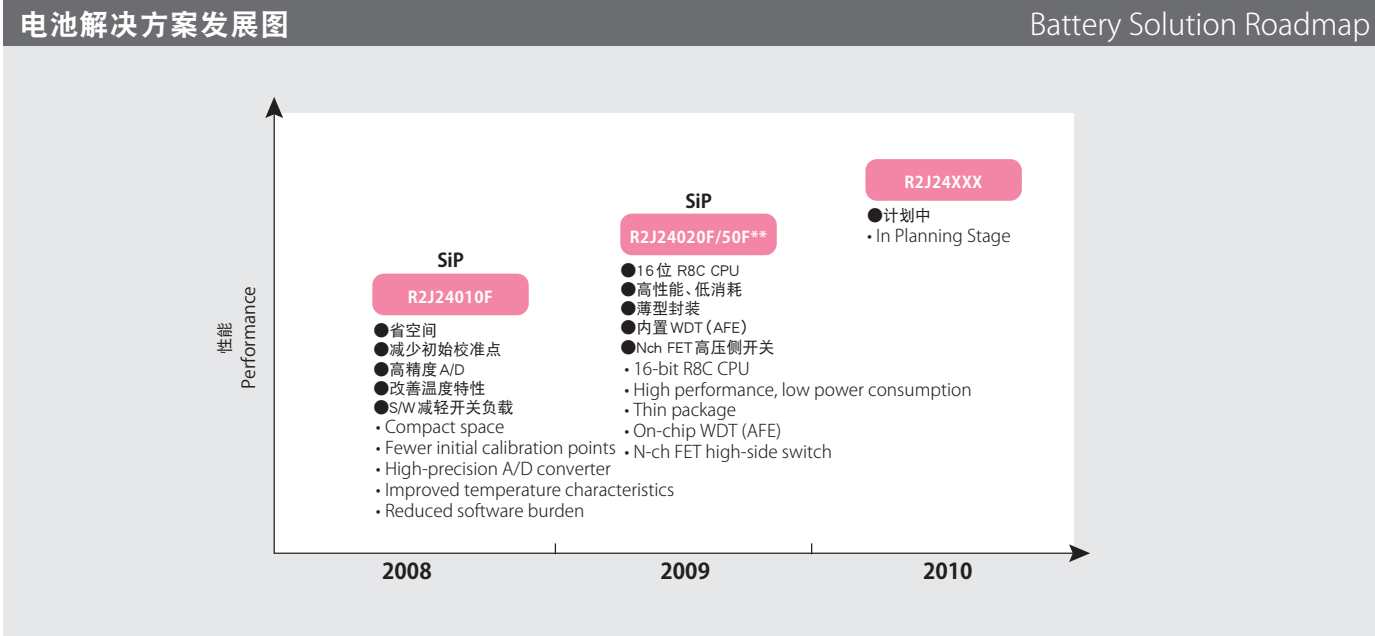
Smart Battery System for Notebook PC “R2J24020F/50F**”

以单一封装实现高精度电池余量管理、电池保护
High-precision battery charge remaining management and battery protection functions in a single package

特点Features

- 16 位 R8C CPU 内核→实现低消耗化
- 高精度 A/D 转换器→提高余量精度检测精度，并降低功耗
- 薄型封装→TSSOP48 (R2J24050F**)

- 16Bit R8C CPU core→Low power consumption
- High Precision A/D converter for more exact battery remaining detection and reduction of power consumption
- Smaller and Thinner package→TSSOP48(R2J24050F**)



**：开发中 Under Development

电源监控

Power Supply Monitoring

瑞萨电子为满足客户的各种需求，备有多功能型的众多产品，如电压检测精度为±1%且低消耗电流的CMOS单功能型、可在高电源电压条件下使用的双极单功能型，以及用于控制多电源接通顺序的定序器等。

Renesas Electronics produces a variety of peripheral ICs in response to a range of customer requirements, including single-function CMOS type devices with a voltage detection accuracy of ±1% and low current consumption, single-function bipolar type devices supporting high power supply voltages, and multifunction type devices such as sequencers for controlling the power-on sequence of multiple power supplies.

复位 ICReset ICs

● 可在高电源电压条件下使用的单功能型
Single-Function Devices Supporting High Power Supply Voltages

分类 Category	型号 Part No. *2	封装 Package FP	检测电压 Vs(V) Detection Voltage (Vs (V)) *1
电源电压检测 (延迟时间可变) Power supply voltage detection (variable delay time)	RNA51953AFP	○	可通过外接电阻改变 Variable by using external resistor
	RNA51953BFP	○	
输入电压检测 (延迟时间可变) Input voltage detection (variable delay time)	RNA51957AFP	○	
	RNA51957BFP	○	
	RNA51958AFP	○	
	RNA51958BFP	○	

● 检测精度为±1%且低消耗电流的单功能型
Single-Function Devices with ±1% Voltage Detection Accuracy and Low Current Consumption

检测电压 Vs(V) Detection Voltage (Vs (V))	漏极开路 Open Drain	CMOS	封装 Package LP
5.0		RNA51B50FLP	○
4.6	RNA51A46FLP		○
4.5	RNA51A45FLP		○
4.4	RNA51A44FLP		○
3.1	RNA51A31FLP		○
3.0	RNA51A30FLP		○
2.9	RNA51A29FLP		○
2.8	RNA51A28FLP		○
2.7	RNA51A27FLP	RNA51B27FLP	○
2.6	RNA51A26FLP		○
1.4		RNA51B14FLP	○

● 可支持多电源定序器等之多功能型
Multifunction Devices Such as Sequencers for Multiple Power Supplies

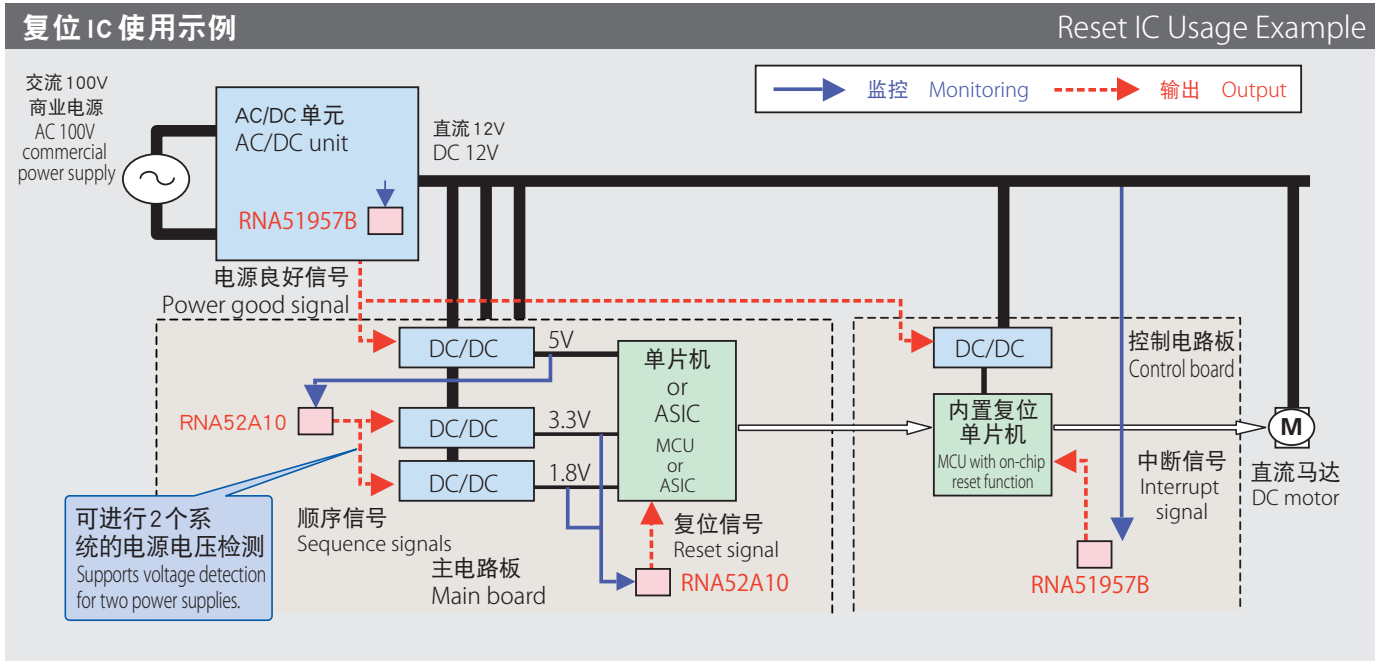
分类 Category	型号 Part No.	功能 Function	封装 Package	
			MM	US
2通道-CMOS复位 2-channel CMOS reset	RNA52A10	基准电压 1.00V 检测电压可变 Reference voltage: 1.00V Variable detection voltage	○	
电源顺序控制器 Power supply sequence controller	RNA50C27A	启动时 3.3V→1.8V、 结束时 1.8V→3.3V 的电 Power supply sequence: Startup: 3.3V → 1.8V Shutdown: 1.8V → 3.3V	○	○

● 存储器备份用 ASSP
ASSPs for Memory Backup

分类 Category	型号 Part No.	功能 Function	封装 Package US
备用控制器 Standby controller	RD3ST24	使单片机处于备用状态 Puts MCU into standby state	○

封装缩写 Package Codes

FP : PRSP0008DE-C LP : MPAK-5V MM : MMPAK-8 US : SSOP-8



自动调整、高速、高精度控制的关键是数字模拟混装。

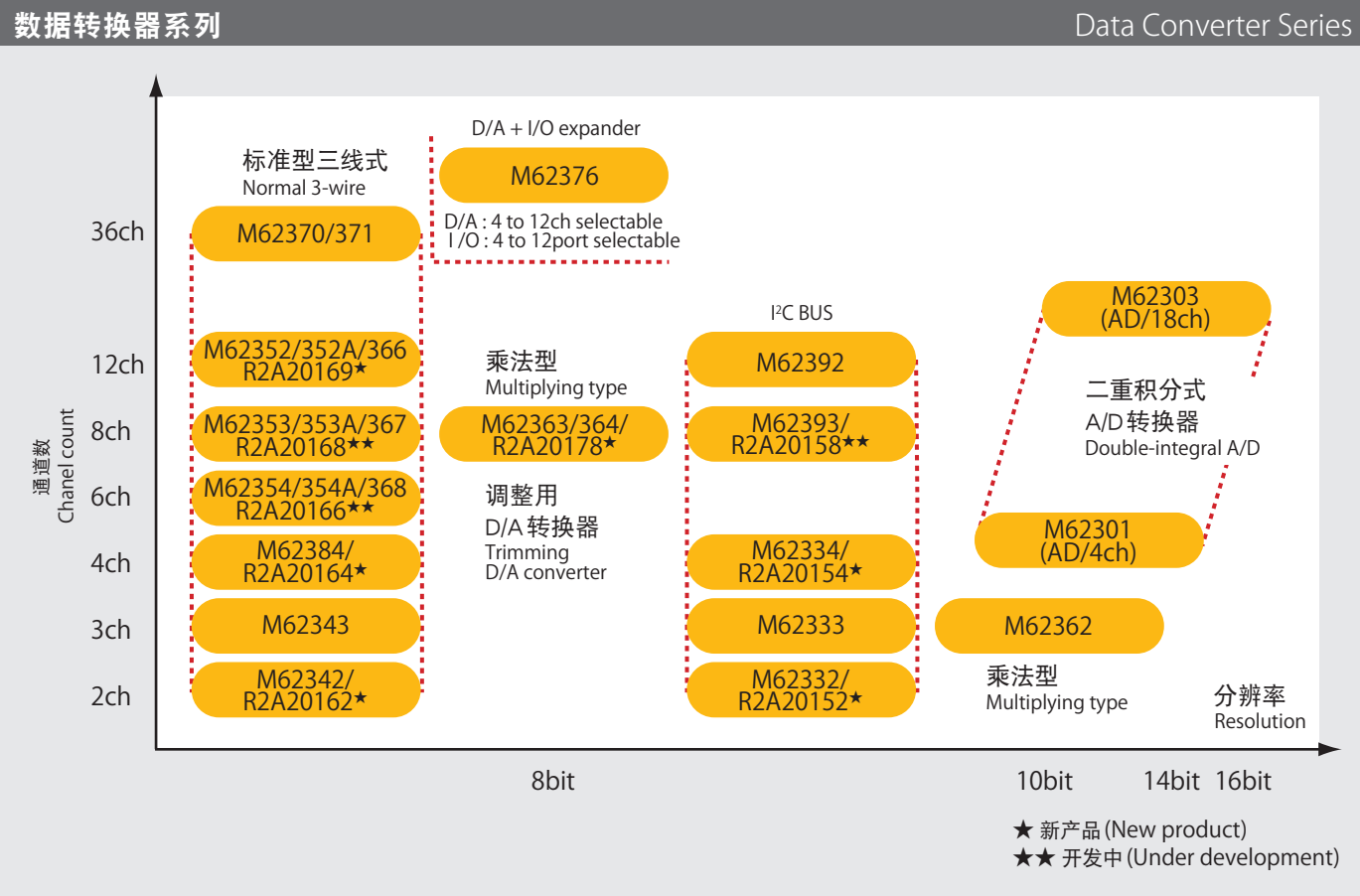
Mixed digital/analog capability: the dicisive factor in automatic adjustment and high-speed,high-precision control

它是从100kHz到1MHz的中低速调整用D/A转换器，并将2～36通道纳入单个封装。
通过采用专利技术的CMOS模拟电路、模式设计，无需特殊工艺和微调等，即可实现高精度。

These are D/A converters for trimming applications with 2 to 36 channels incorporated in one package, operating at low/medium speeds of 100 kHz to 1 MHz. The use of CMOS analog circuitry and pattern design employing patented technologies enables high precision to be achieved without using special processes, trimming, etc.

特点	Features
●调整用D/A转换器引领世界	•World's top runner in trimming D/A converter market
●种类丰富 (DAC)	•Wide selection of variations(DAC)
•通道数: 2～36通道	-Number of channels: 2 to 36
•分辨率: 8～12位	-Resolution: 8 to 12 bits
•总线形式: 三线式、I ² C方式	-Bus type: Three-wire,I ² C
•电源电压: 备有3V、5V系列	-Power supply voltage: 3V,5V systems available
●拥有少通道D/A转换器产品系列	•Fewer channel D/A converter lineup available

目标市场领域	Applicable Market Areas
●手机、DVC、DSC、监视器、TV、打印机、CD-R等	
•Mobile phone,DVCs,DSCs,monitors,TVs,printers,CD-R,etc.	



单片机外围 (D/A 转换器)

Peripheral ICs for MCUs (D/A Converters)

D/A 转换器产品一览表 List of D/A Converters

型号 Part No.	电源 电压 (V) Power Supply Voltage (V)	分辨率 (位) Resolution (Bits)	D/A 输出 通道数 D/A Output Channels	串行总线 Serial Bus	D/A 缓冲 放大器 D/A Buffer Amplifier	建立时间 (μs(max.)) Settling Time (μs (Max.))	偏移 (LSB) Offset (LSB)	封装 (管脚数) Package (Pin Count)						补充 Remarks
								SOP (FP/SP)	TSSOP (SA)/ LSSOP (GP)	LQFP (GP)	VSP (HP)	DIP (P)	SON (NA)/ QFN (NS)	
M62332/M62337	2.7-5.5	8	2	I ² C	有 Yes	(300)*1	1	8	—	—	—	8	—	
M62333/M62338	2.7-5.5	8	3	I ² C	有 Yes	(300)*1	1	8	—	—	—	8	—	
M62334/M62339	2.7-5.5	8	4	I ² C	有 Yes	(300)*1	1	8	—	—	—	8	—	
R2A20152	2.7-5.5	8	2	I ² C	有 Yes	(300)*1	1	8	—	—	—	—	8	开发中 Under development
R2A20154	2.7-5.5	8	4	I ² C	有 Yes	(300)*1	1	8	—	—	—	—	8	新产品 New product
M62342	2.7-5.5	8	2	三线式 3-line	有 Yes	300	1	8	8	—	8	8	—	
R2A20162	2.7-5.5	8	2	三线式 3-line	有 Yes	150	1	8	8	—	—	—	8	新产品 New product
M62343	2.7-5.5	8	3	三线式 3-line	有 Yes	300	1	8	8	—	—	8	—	
M62352/M62352A*2	4.5-5.5	8	12	三线式 3-line	有 Yes	300	1	20	20	—	—	20	—	
M62353/M62353A*2	4.5-5.5	8	8	三线式 3-line	有 Yes	300	1	16	16	—	—	16	—	
M62354/M62354A*2	4.5-5.5	8	6	三线式 3-line	有 Yes	300	1	14	16	—	—	14	—	
R2A20169	2.7-5.5	8	12	三线式 3-line	有 Yes	150	1	20	20	—	—	—	20	新产品 New product
R2A20168	2.7-5.5	8	8	三线式 3-line	有 Yes	150	1	16	16	—	—	—	16	开发中 Under development
R2A20166	2.7-5.5	8	6	三线式 3-line	有 Yes	150	1	—	16	—	—	—	16	开发中 Under development
R2A20164	2.7-5.5	8	4	三线式 3-line	有 Yes	150	1	—	16	—	—	—	16	新产品 New product
M62362	4.5-5.5	10	3	三线式 3-line	无 No	20	0	16	—	—	—	14	—	乘法型 Multiplier type
M62363	4.5-5.5	8	8	三线式 3-line	无 No	5	0	24	—	—	—	—	—	乘法型 Multiplier type
M62364	2.7-5.5	8	8	三线式 3-line	有 Yes	300	0	24	24	—	—	—	—	乘法型 Multiplier type
R2A20178	2.7-5.5	8	8	三线式 3-line	有 Yes	300	0	24	—	—	—	—	24	乘法型, 开发中 Multiplier type, under development
M62366	2.7-3.6	8	12	三线式 3-line	有 Yes	300	1	—	20	—	—	—	—	
M62367	2.7-3.6	8	8	三线式 3-line	有 Yes	300	1	16	16	—	—	—	—	
M62368	2.7-3.6	8	6	三线式 3-line	有 Yes	300	1	—	16	—	—	—	—	
M62370	2.7-5.5	8	36	三线式 3-line	有 Yes	300	1	—	—	48	—	—	—	
M62371	2.7-5.5	8	36	三线式 3-line	有 Yes	300	1	—	—	48	—	—	—	
M62383	4.5-5.5	8	2ch × 2	三线式 3-line	有 Yes	20	0	24	—	—	—	—	—	
M62384	2.7-5.5	8	4	三线式 3-line	有 Yes	10	0	16	—	—	—	—	—	
M62392	4.5-5.5	8	12	I ² C	有 Yes	(300)*1	1	24	—	—	—	24	—	
M62393	4.5-5.5	8	8	I ² C	有 Yes	(300)*1	1	20	—	—	—	20	—	
R2A20158	2.7-5.5	8	8	I ² C	有 Yes	(300)*1	1	—	—	—	—	—	20	开发中 Under development

*1: I²C 总线型的 D/A 转换器由于没有 LD 信号 (从串行接口的移位寄存器发送到 D/A 转换器的传送信号), 所以没有规定建立时间。
设计上, 将从最后数据传送的第 8 次时钟脉冲下降沿到模拟输出电压确定为止的时间定为 300μs (参考值)。
*2: 型号末尾为 A 的产品 (TTL 电平输入版) 封装只有 LSSOP。
*1: I²C bus type D/A converters have no LD signal (a signal transferred from the shift register of the serial interface to the D/A converter), so no settling time is stipulated.
They are designed such that the duration from the falling edge of the 8th clock pulse of the final data transfer to the establishment of the analog output voltage is 300μs (as a reference value).
*2: Items with a product No. ending in A (TTL level input) are available in an LSSOP package only.

通用CMOS、运算放大器和比较器 IC 系列

General-Purpose CMOS, Op-Amp. and Comparator ICs Series

产品理念Products Concept

备有适应低电压工作、低功耗、省空间化需求的产品。

We offer a lineup of products combining low-voltage operation, low power consumption, and compact size.

用途Applications

●移动设备 (DSC 等)
●传感器信号放大、检测 (保健器材等)
●信号控制用开关
●低功耗电源的过电压检测 (监视器)

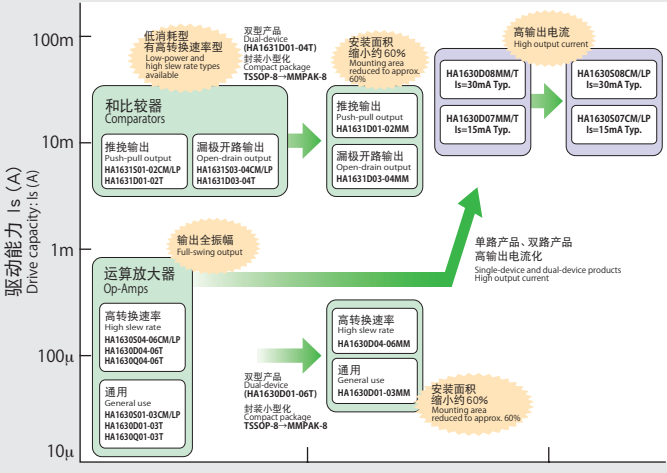


• Portable device (DSC, etc.)
• Amplification and detection of sensor signal (health machine, etc.)
• Signal controlling switch
• Detection of overvoltage of low-power electric source (monitor)

特点Features

- 装载于超小型封装中, 有助于节省空间 (CMPAK-5、MPAK-5、MMPAK-8、TSSOP-14)
- 低电压工作、低消耗电流, 最适合使用电池的设备 (VDD=1.8 ~ 5.5V、IDD: 15 ~ 800mA、高输出型为 2.7 ~ 5.5V)
 - 输出全振幅 (运算放大器) VOH= 2.9Vmin (VDD=3V 时)
 - 低输入偏移电压 (运算放大器) VIO = 4mVmax.
 - 低输入偏流 IIB = 1pA (typ.)
 - 工作温度范围 Topr = -40 ~ +85°C
 - 备有高输出电流 15mAtp/30mAtp.
- Ultra-small package saves you space (CMPAK-5, MPAK-5, MMPAK-8, TSSOP-14)
- Low-voltage operation and low current dissipation most suitable for battery-use device (VDD=1.8 to 5.5V, IDD: 15 to 800μA, The high output type supports 2.7 to 5.5V.)
 - Output full swing (operational amplifier) VOH= 2.9Vmin (at VDD=3V)
 - Low input offset voltage (operational amplifier) VIO= 4mVmax
 - Low input bias current IIB= 1pA (typ.)
 - Operating temperature range Topr= -40 to +85°C
 - 15mA typ./30mA typ. (HA1630S/D07.08) high-current-output versions available.

系列拓展Series Evolution



产品系列Lineup

●运算放大器 Op-Amps

电源电压 Power supply voltage	输入偏移电压 Input offset voltage	电源电流 Power supply current	转换速率 Slew rate	输出驱动电流 Output drive current	型号 Part No.			
VDD(V)	VIO max. (mV)	IOP typ. (μA)	SR typ. (V/μs)	IS typ. (mA)	通道数 No. of channels			
					Single	Dual	Quad	
通用 General Purpose	1.8 to 5.5	4	15 /ch	0.125	0.01	HA1630S01	HA1630D01	HA1630Q01
			50 /ch	0.5	0.05	HA1630S02	HA1630D02	HA1630Q02
			100 /ch	1	0.1	HA1630S03	HA1630D03	HA1630Q03
			200 /ch	2	0.2	HA1630S04	HA1630D04	HA1630Q04
			400 /ch	4	0.4	HA1630S05	HA1630D05	HA1630Q05
			800 /ch	8	0.8	HA1630S06	HA1630D06	HA1630Q06
高输出 High-power	2.7 to 5.5	6	60 /ch	1.0	15	HA1630S07	HA1630D07	
			170 /ch	1.5	30	HA1630S08	HA1630D08	
封装 Package					CMPAK-5V & MPAK-5V	MMPAK-8	TSSOP-14	

●比较器 Comparators

电源电压 Power supply voltage	输入偏移电压 Input offset voltage	电源电流 Power supply current	响应时间 Response time	输出结构 Output configuration	输出电流 Output current	型号 Part No.	
VDD(V)	VIO max. (mV)	IOP typ. (μA)	TPH/TPH typ. (μs)		IOP VDD=3V (mA)	通道数 No. of channels	
						Single	Dual
1.8 to 5.5	5	5 /ch	1.2 / 0.6	推挽 Push-pull	14 / 13	HA1631S01	HA1631D01
		50 /ch	0.3 / 0.2			HA1631S02	HA1631D02
		5 /ch	- / 0.6	漏极开路 Open drain	14 / -	HA1631S03	HA1631D03
		50 /ch	- / 0.2			HA1631S04	HA1631D04
		封装 Package					

通用双极型运算放大器和比较器 IC 系列

General-Purpose Bipolar Op-Amp and Comparator ICs

μPC 系列 产品系列 μ

μPC Series Product Lineup

产品类型 Product Type	8pin		14pin	封装类型 Package Type	工作温度 Operating Temperature min/max (°C)	电源电压 v ± Power Supply Voltage min/max (V)	输入偏移电压 Input Offset Voltage Vio max.(mV) note1.	输入偏流 Input Bias Current Ib max.(nA) note1.	SR typ.(V/μs) or Response Time typ. (μs) note1,2.	
	Single (1ch)	Dual (2ch)	Quad (4ch)							
单电源 Single power supply		μPC1251MP-KAA		TSSOP(2.8×2.9)	-40/+125°C	3/30	7	250	0.25	
		μPC1251GR-9LG	μPC451GR-9LG	TSSOP	-40/+125°C	3/30	7	250	0.25	
		μPC1251G2	μPC451G2	SOP	-40/+85°C	3/30	7	250	0.25	
		μPC358GR-9LG	μPC324GR-9LG	TSSOP	-40/+85°C	3/30	7	250	0.25	
		μPC358G2	μPC324G2	SOP	-20/+80°C	3/30	7	250	0.25	
高速单电源 High-speed single power supply		μPC842GR-9LG	μPC844GR-9LG	TSSOP	-40/+125°C	3/32	5	500	7	
		μPC842G2	μPC844G2	SOP	-40/+85°C	3/32	5	500	7	
		μPC4742GR-9LG	μPC4744GR-9LG	TSSOP	-40/+85°C	3/32	5	500	7	
			μPC452G2	SOP	-40/+85°C	3/32	7	250	0.8	
			μPC3403G2	SOP	-20/+80°C	3/32	7	250	0.8	
低噪声 Low-noise		μPC4570GR-9LG	μPC4574GR-9LG	TSSOP	-40/+85°C	±4/±16	5	400/1000	7/6	
		μPC4570G2	μPC4574G2	SOP	-20/+80°C	±4/±16	5	400/1000	7/6	
		μPC258G2	μPC458G2	SOP	-40/+85°C	±4/±16	6/5	500/300	1/1.6	
		μPC4558G2	μPC4741G2	SOP	-20/+80°C	±4/±16	6/5	500/300	1/1.6	
		μPC259G2		SOP	-40/+85°C	±4/±16	6	500	2.8	
		μPC4560G2		SOP	-20/+80°C	±4/±16	6	500	2.8	
		μPC4572G2		SOP	-20/+80°C	±2/±7	5	400	6	
		μPC803G2	μPC804G2	SOP	-40/+85°C	±5/±16	15	0.4	13	
		μPC4082G2	μPC4084G2	SOP	-20/+80°C	±5/±16	15	0.4	13	
		μPC821G2	μPC822G2	μPC824G2	SOP	-40/+85°C	±5/±16	10	0.2	13
J-FET 输入 J-FET input		μPC4071G2	μPC4072G2	μPC4074G2	SOP	-20/+80°C	±5/±16	10	0.2	13
		μPC831G2	μPC832G2	μPC834G2	SOP	-40/+85°C	±2/±16	10	0.1	3
		μPC4061G2	μPC4062G2	μPC4064G2	SOP	-20/+80°C	±2/±16	10	0.1	3
		μPC811G2	μPC812G2		SOP	-40/+85°C	±5/±16	2.5/3	0.2	15
		μPC4091G2	μPC4092G2		SOP	-20/+80°C	±5/±16	2.5/3	0.2	15
		μPC813G2	μPC814G2		SOP	-40/+85°C	±5/±16	2.5/3	0.2	25
		μPC4093G2	μPC4094G2		SOP	-20/+80°C	±5/±16	2.5/3	0.2	25
			μPC835MN-KAA		TSSOP(3×3)	-40/+85°C	±5/±16	3	0.2	5.5
	通用 General-purpose	μPC151G2	μPC251G2		SOP	-40/+85°C	±7.5/±16	6	200	0.5
		μPC741G2	μPC1458G2		SOP	-20/+80°C	±7.5/±16	6	200	0.5
单电源 Single power supply		μPC277MP-KAA		TSSOP(2.8×2.9)	-40/+125°C	2/32	5	250	1.8	
		μPC277GR-9LG	μPC177GR-9LG	TSSOP	-40/+125°C	2/32	5	250	1.8/1.6	
		μPC277G2	μPC177G2	SOP	-40/+85°C	2/32	5	250	1.3	
		μPC393GR-9LG	μPC339GR-9LG	TSSOP	-40/+125°C	2/32	5	250	1.8/1.6	
		μPC393G2	μPC339G2	SOP	-40/+85°C	2/32	5	250	1.3	
高速 High-speed	μPC271G2			SOP	-40/+85°C	±4/±16	7.5	250	0.2	
	μPC311G2			SOP	-20/+80°C	±4/±16	7.5	250	0.2	

注 1. 有多个数值时, 左侧为通道数少的产品数值, 右侧为通道数多的产品数值。
note1. When multiple values are listed, the figure on the left applies to products with fewer channels and that on the right to products with more channels.

注 2. SR 指运算放大器的转换速率, Response time 指比较器的脉冲响应时间。
note2. "SR" indicates the slew rate of an op-amp, and "response time" refers to the pulse response time of a comparator.

HA 17 系列 通用双极型运算放大器和比较器 IC
HA17 Series General-Purpose Bipolar Op-Amp and Comparator ICs

特点

●备有国际标准互换产品
●种类丰富的封装 (DP-8/14、SOP-8/14、TSSOP-8/14)

仕様 Specifications

	运算放大器 Op-Amps		比较器 Comparators	
	HA17358A (双路) HA17358A(Dual)	HA17324A (四路) HA17324A(Quad)	HA17393A (双路) HA17393A(Dual)	HA17399A (四路) HA17399A(Quad)
输入偏移电压 Input offset voltage	Vio typ.=3mV		Vio typ.=2mV	
电源电压 Power supply voltage	Vcc max=32V		Vcc max=36V	
消耗电流 Dissipation current	Icc typ.=0.8mA			
同相输入电压 In-phase input voltage	Vin=-0.3~+Vcc			
吸收电流 Sink current	losink typ=20mA	losink typ=20mA	losink typ=16mA	
源电流 Source current	losource typ=40mA	losource typ=40mA	*losink(Vol=2.5V), losource(Voh=10V)	
工作温度 Operating temperature	-40°C~+85°C			

* 还备有通信工业用HA17901A、902A、903A、904A。
* HA17901A、902A、903A and 904A models for communications industry use are also available.

●比较器 Comparators

通道数 Number of Channels	型号 Part No.	封装 Package
双路 Dual (2ch)	HA17358A	DIP-8
	HA17358AF	JEITA SOP-8
	HA17358ARP	JEDEC SOP-8
	HA17358AT	TSSOP-8
四路 Quad (4ch)	HA17324A	DIP-14
	HA17324AF	JEITA SOP-14
	HA17324ARP	JEDEC SOP-14
	HA17324AT	TSSOP-14

通道数 Number of Channels	型号 Part No.	封装 Package
双路 Dual (2ch)	HA17393A	DIP-8
	HA17393AF	JEITA SOP-8
	HA17393ARP	JEDEC SOP-8
	HA17393AT	TSSOP-8
四路 Quad (4ch)	HA17339A	DIP-14
	HA17339AF	JEITA SOP-14
	HA17339ARP	JEDEC SOP-14
	HA17339AT	TSSOP-14

单片机外围 (LED 驱动)
Peripheral ICs for MCUs (LED Drivers)

单片机等控制系统作为系统输出显示时,不仅是LCD显示屏之类的扫描型显示屏,使用LED等发光元件显现也是非常重要的手段。这种LED驱动有恒压驱动(只是开关)和恒流驱动两种方式,恒压驱动会有电源电压引起的输出变化,但由于驱动简单,在低成本方面应用广泛。

另一方面,恒流驱动方式不论电源电压如何变化,都会保持一定的亮度,因此适用于细微的色调变化会引发问题的用途(例如娱乐设备用显示)另外,驱动多个LED时会把LED以串并行方式连接,由于白色LED的电压降在3至3.6V附近,串联时需要较高的电压(15V或24V)因此需要高耐压驱动器。并联时,每个LED需要10至20mA的驱动能力。瑞萨通过可进行多路并联驱动且输出耐压高的器件、具有锁存输入功能、移位寄存器的串行/并行功能以及采用新开发的SpAS方式※的产品等广泛的产品系列提供支持。

※: SpAS 方式 LED 驱动器在使用SCI 接口点亮多个LED 时, 通过向LED 分配地址, 可锁定某一点进行细微控制。(SpAS: SCI protocol with Address Selected system)

In addition to scan-type displays such as LCD panels, LEDs and other light emitting elements are an important means for indicating output from control systems such as MCUs. Two types of devices are used to drive LEDs: constant-voltage drivers (simple switches) and constant-current drivers. Output varies with the power supply voltage when constant-voltage drive is used, but this method is widely used in low-cost applications due to its simplicity. In contrast, constant-current drive has the advantage of unvarying brightness regardless of fluctuations in the power supply voltage, making it suitable for applications (such as game machines) where subtle color changes would cause problems. Either series or parallel connection can be used to drive multiple LEDs. Since white LEDs have a voltage drop of 3V to nearly 3.6V, high voltage is necessary when they are connected in series, and the driver used must have a high voltage tolerance. When the LEDs are connected in parallel, a drive capacity of 10mA to 20mA per LED is necessary. Renesas Electronics offers a wide-ranging lineup of LED driver ICs, including high-output devices that can also accommodate parallel connection of many LEDs, devices with latch input, devices with a serial-parallel function using a shift register, and newly developed SpAS* devices.

Note: With an SpAS type LED driver, an SCI interface is used to illuminate multiple LEDs. Each LED is assigned an address, allowing for fine-grained control focusing on specific points. (SpAS stands for "SCI protocol with address selected.")

图 1 Vcc=3.3V、耐压 3.3V 的驱动器
Figure 1 Driver with Vcc = 3.3V, Voltage output standing = 3.3V

施加于LED上的电压为3.3V, 因此白色LED不亮。
(Vcc=5V 驱动器也难以点亮。)
The applied voltage is 3.3V, which is not sufficient to illuminate a white LED. (Also difficult for a driver with Vcc=5V.)

图 2 Vcc=3.3V、耐压 24V 的驱动器
Figure 2 Driver with Vcc = 3.3V, Voltage output standing = 24V

4 个白色 LED 串联连接也可以轻松驱动。
Drives four white LEDs connected in series with power to spare.

开发发展图 Development Roadmap

支持 RGB RGB support
串行输入、并行输出 Serial input, parallel output
单色 Single color

2008 2009 2010~

RD40LD003FP 规格 8 位, 释放恒流 RD40LD003FP Specifications 8-bit, releases constant current

- SpAS (SCI+ 通用端口)
- 工作速度 :5Mbps
- 电源电压 :3.0~5.5V
- 输出耐压 :40V
- 恒流输出 :35mA (最大)
- 恒流精度 :管脚间 ± 4%
IC 间 ±10%
- TTL 电平输入
- 滞后 ∠0.9V (Vcc=4.5V)
- PWM256 灰度
- 规格温度 : -40°C~85°C
- 封装 SOP-20
(7.8 × 12.6[mm] 835mW)

- SpAS (SCI + general ports)
- Operating speed: 5Mbps
- Power supply voltage: 3.0V to 5.5V
- Output voltage tolerance: 40V
- Constant current output: 35mA (max.)
- Constant current accuracy: ±4% between pins, ±10% between ICs
- TTL level input
- Hysteresis: ∠0.9V
- PWM: 256 gradations
- Specification temperature: -40°C to 85°C
- Package: SOP-20 (7.8 × 12.6 [mm], 835mW)

LED 的串联 LEDs connected in series

B,G: 3.7 × 5 = 18.5V
R : 3.7 × 5 = 18.5V
V=24V
S-in CLK Latch Enable S-out

娱乐设备的大多LED都安装在面积电路板上, 如果使用以往的移位寄存器进行串并转换, 布线方面限制较多, 且易受噪声影响。在这种情况下, 通过采用基于SCI的地址选择方式实现了稳定驱动的SpAS方式LED驱动器较为适合。

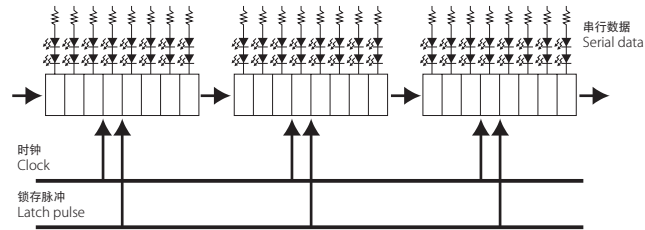
In game machines a large number of LEDs are typically mounted on a board with a large area. Using conventional serial-parallel conversion employing shift registers requires a large number of control lines and is very susceptible to noise. An SpAS type LED driver, which provides stable drive by means of SCI-based address selection, is ideal in such cases.

主要的LED用高功能IC

Main High-Functionality ICs

型号 Part No.	bit	功能 Function	突发传送 Burst Transfer	④ 上电 / 掉电保护 Power Up/Down Protection	⑤ 灰度控制 Gradation Control	驱动方式 Drive Type	传送速度 Transfer Speed	上拉 / 下拉电阻 Pull-Up/Down Resistors	支持输入 信号电平 Supported Input Signal Levels	最大 输出耐压 Output Voltage Tolerance (Max.)	输出电流 Output Current	PKG
RD15LD74A	8	通过带清零的锁存器保持数据 Data protection by latch with clear	无 No	—	无 No	恒压 Constant voltage	—	—	3.3/5.0	15V	200mA	SDIP-20, DIP-20, TSSOP-20
RD30LD06A	8	通过带清除功能的D型触发器保持数据 Data protection by D-type F/F with clear	无 No	—	无 No	⑥恒流 Constant current	—	—	3.3/5.0	30V	30mA	SOP-20
RD30LDT595	8	①移位寄存器 串并功能 Shift register serial-parallel function	无 No	○	无 No	内置PWM Constant voltage	12.5Mbps	内置 Yes	3.3/5.0	30V	100mA	DIP-16 SOP-16
RD30LDT3595	24	移位寄存器 串并功能 Shift register serial-parallel function	无 No	○	无 No	内置PWM Constant voltage	12.5Mbps	内置 Yes	3.3/5.0	30V	100mA	SSOP-36
RD40LD003FP	8	②SpAS方式 串并功能 SpAS serial-parallel function	③DMAC	Power On Reset	内置PWM(256) On-chip PWM	恒压 Constant current	5Mbps	—	3.3/5.0	40V	35mA	SOP-20

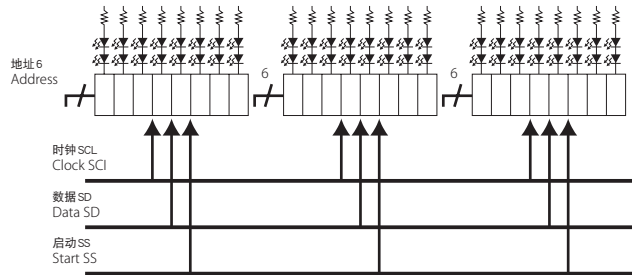
①移位寄存器串并转换
Shift Register Serial-Parallel Function



移位寄存器串并转换可通过级连轻松增设，且结构简单，因此应用广泛。但想要大面积显示多个LED时，安装较为困难，并需要注意避免发生误动作。(串行数据必须如一笔写成一般连贯地连接到下一串数据，如果不考虑时钟和锁存脉冲的延迟以及歪斜的影响进行布线，就会发生误动作。)RD30LDT595/3595为数据输入加装了施密特电路，从而降低了噪声的影响。

Serial-parallel conversion using shift registers is widely used because it allows easy extension using cascade connections and its operating principle is simple. Nevertheless, in cases where a many LEDs are arranged over a large area, mounting can become complex and care must be taken to avoid malfunction. (Since the serial data must pass through a single line of sequential connections, delays and skews in the clock and latch pulses must be taken into account in the layout in order to avoid malfunction.) The RD30LDT595 and RD30LDT3595 pass the input data through a Schmitt circuit to reduce the effects of noise.

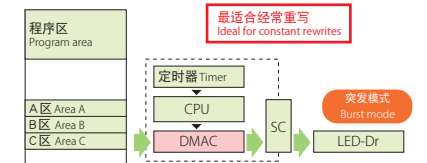
②SpAS:SCI protocol with Address Selected system,



使用SpAS方式时，数据和时钟一般都以并行方式连接，布线长度易于保持一致，不会受到延迟以及歪斜的影响而发生误动作。另外，因为没有连接限制，想要大面积显示多个LED时，也很容易安装。最多可并联连接64个LED以进行扩展。

由于采用通用性强的时钟同步串行，可与单片机轻松连接。Basically, in an SpAS system the data and clock signals are connected in parallel, so it is easy to ensure that they are the same length and thereby eliminate concerns about the effect of delays and skews. The lack of restrictions on connections allows for a simple mounting layout even when many LEDs are arranged over a large area. If expansion is required, up to 64 SpAS LED drivers may be connected in parallel. The widely used clock synchronous serial format simplifies connections to the MCU.

③DMAC



使用单片机上标准安装的DMAC(直接内存存取)功能，可组合存储区进行传送，因此可以简化程序。通常可使用单片机内置的DMAC，在突发模式下传送数据，因此很容易重写。

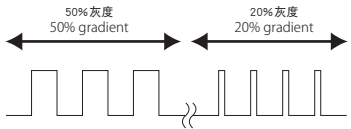
By using the direct memory access controller (DMAC), which is a standard function of most MCUs, programs can be simplified by combining memory areas for data transfer operations. Using the DMAC of a standard MCU, data rewrites can be simplified by transferring the data in burst mode.

④上电 / 掉电保护
Power Up/Down Protection

接通及切断电源时，可能会在电源的上升期间及下降期间发生误动作，导致LED点亮。使用上电 / 掉电保护功能，不论使能输入状态如何，低VCC时输出会变成高阻抗状态进行保护，以免LED点亮。

Malfunction during the power-on or power-off period can cause LEDs to illuminate erroneously. The power up/down protection function prevents this by keeping output in the high-impedance state when VCC is low, regardless of whether or not an enable signal is being input.

⑤灰度控制
Gradation Control



通过恒流驱动⑥，在保持正确亮度的同时，以PWM方式进行256级灰度控制。由于能保持正确的相对亮度，可以显现阴影部分和淡色调。

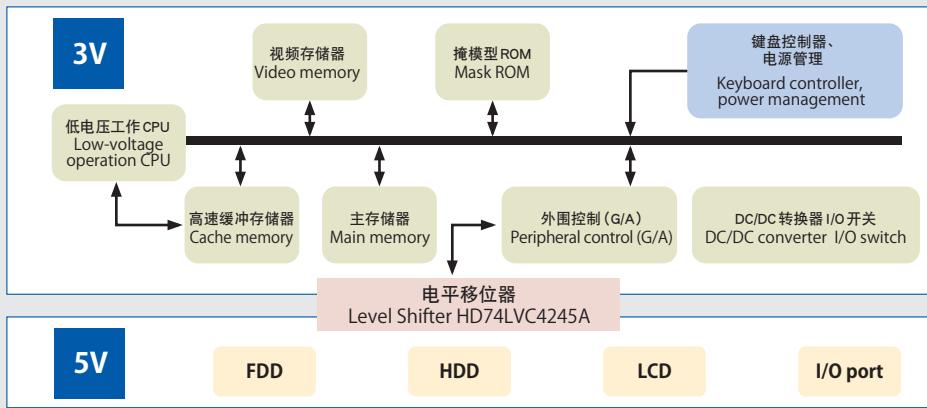
Constant-current drive ⑥ maintains the correct brightness while PWM allows adjustment in 256 gradations. The correct relative brightness is maintained, allowing for accurate expression of shadows and pale colors.

备有高速电平移位器、降低放射噪声的时钟发生器以及称得上是国际标准品的接口IC等广泛的产品。

A wide range of products are available, including high-speed level shifters, clock generators that reduce emission noise, and world standard interface ICs.

电脑等电平移位用途

Level Shifting Use in Personal Computer, etc.



该IC在同一电路板上使用2个电源电压时，进行信号电平转换。另外，还实现了电源管理，在系统的备用模式下切断子区块的电源，从而降低功耗。(HD74LVC4245A)

This IC performs signal level conversion when two power supply voltages are used on the same board. It can also implement power management that cuts the subclock power supply and reduces power dissipation when the system is in standby mode. (74LVC4245A)

支持不同电压间的高速双向转换，所有输入 / 输出都具有容许功能。
Support for high-speed two-way conversion between different voltages, plus provision of a tolerant function for all input/output

Ex. Memory	电平移位器 (电平转换用) Level Shifters (for Level Transfer)	Ex. CPU
Vcc=1.2~2.7V	HD74ALVC166245A (VccA=1.2~2.7V, VccB=1.4~3.6V) 可进行1.2V ↔ 3.6V的转换 1.2V ↔ 3.6V conversion capability	Vcc=1.4~3.6V
Vcc=1.4~3.6V	HD74ALVC165245A (VccA=1.4~3.6V, VccB=1.2~2.7V) 可进行1.2V ↔ 3.6V的转换 1.2V ↔ 3.6V conversion capability	Vcc=1.2~2.7V
Vcc=5V	HD74LVC4245A (VccA=5V, VccB=3.3V)	Vcc=3.3V
Vcc=5V	HD74LVCC4245A (VccA=5V, VccB=3.3V)	Vcc=3.3V
Vcc=2.3~3.6V	HD74LVCC3245A (VccA=2.3~3.6V, VccB=3~5.5V)	Vcc=3~5.5V

高速电平移位器产品系列

High-Speed Level Shifter Lineup

Part No.	Bits	Input/Output Tolerant	VccA*	VccB	Tpd(max)	Drive Capability	Package
HD74ALVC166245A	16	○	2.5V	3.3V	4.4ns	24mA	TSSOP-48
			1.8V	3.3V	6.2ns	24mA	
			1.5V	2.5V	6.0ns	18mA	
			1.2V	1.5V	5.0ns (Typ)	4mA	
HD74ALVC165245A	16	○	3.3V	2.5V	4.4ns	24mA	TSSOP-48
			3.3V	1.8V	6.2ns	24mA	
			2.5V	1.5V	6.0ns	18mA	
			1.5V	1.2V	5.5ns (Typ)	4mA	
HD74LVC4245A	8	○	5+/-0.5V	2.7 to 3.6V	7ns	24mA	TSSOP-24
HD74LVCC4245A	8	○	5+/-0.5V	2.7 to 5.5V	7ns	24mA	
HD74LVCC3245A	8	○	2.5+/-0.2V	3.3+/-0.3V	11ns	8mA	
			2.7 to 3.6V**	3.3+/-0.3V**	8ns	12mA	
			2.7 to 3.6V	5+/-0.5V	7ns	24mA	
HD151015	9	×	3V	5V	10ns	12mA	
			2.7V	4.5V	12ns	12mA	

注 *: LVC系列和HD15015的控制(DIR,OE)管脚为VccA系列, ALVC系列的控制管脚为VccB。*: VccA ≤ VccB。
Note *: Control pins (DIR, OE) are VccA on the LVC Series and HD15015, and VccB on the ALVC Series. **: VccA ≤ VccB.

标准逻辑

Standard Logic ICs

单一逻辑

超小型 / 轻量封装上配备 1 ~ 3 个栅极。

One to Three Gates in Ultra-Small, Lightweight Packages.

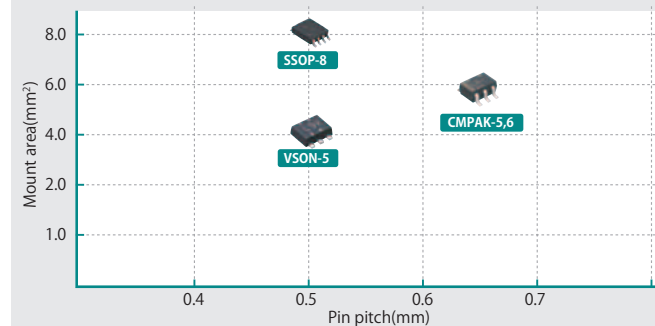
随着电子设备日趋便携化,对逻辑 IC 小型化、轻量化的要求也越来越高。而单一逻辑就能满足这种需求,它在 1 ~ 3 个栅极中配备逻辑,安装面积约为 SOP 的 1/20。不仅能有效利用电路板上的空间,还能轻松进行布线设计。另外,修正电路板时增加逻辑也很简单。

As portable electronic products become ever more compact, there is a constant demand for smaller and lighter logic ICs. The solution to this demand is provided by Uni-Logic ICs, containing from one to three logic gates in a package with a mounting area approximately 1/20 that of an SOP. As well as making efficient use of on-board space, these devices facilitate wiring design. And board modifications can be achieved simply by adding logic.

封装比较

Package Comparison

省去系统的多余部分, 缩小安装面积。
Eliminates wasted space by reducing the mounting area.

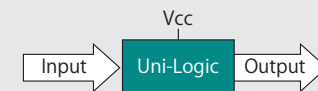


单一逻辑 IC 的单向电平移位对应表

Unidirectional Level Shifting Using Uni-Logic IC

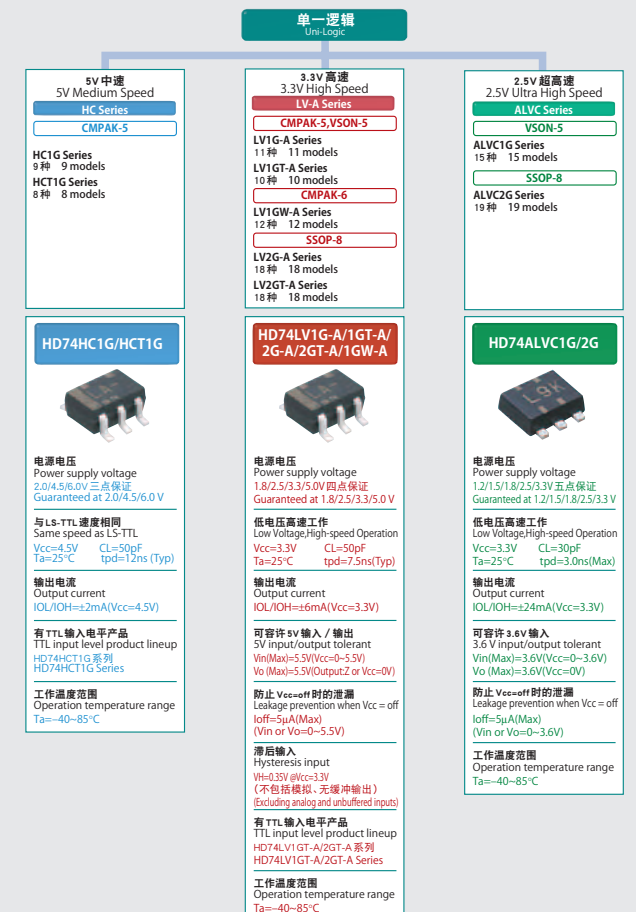
Input	Output Vcc	5.0V	3.3V	2.5V	1.8V	1.5V	1.2V
5.0V			LV-A	LV-A	LV-A		
3.3V		HCT,LV-AT*		LV-A,ALVC	LV-A,ALVC	ALVC	ALVC
2.5V		HCT,LV-AT*	HCT,LV-AT* ALVC		LV-A,ALVC	ALVC	ALVC
1.8V			LV-AT*	LV-A,ALVC		ALVC	ALVC
1.5V					LV-A,ALVC		ALVC
1.2V						ALVC	

HC: HD74HC1G Series, HCT: HD74HCT1G Series,
LV-AT*: HD74LV1GT/2GT-A Series
LV-A: HD74LV1G/1GW/2G-A Series
ALVC: HD74ALVC1G/2G Series



单一逻辑系列

Uni-Logic Family

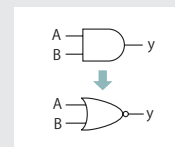


多功能栅极

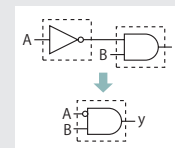
Configurable Multiple Function Gate

通过变更接线, 在一个产品中实现多个功能 One product realizes various logic functions by changing connection of input pins.

一个 IC 包含各种栅功能
Cover various gate functions by one IC
可对应突然发生的规格变更。
Convenient when a specification
change is made suddenly.



2个输入中的一个变成反相输入的栅极
The gate where one input turned into
an inverted input among 2 inputs.
可节省空间。
Inverted input enables one
space saving from two pieces.



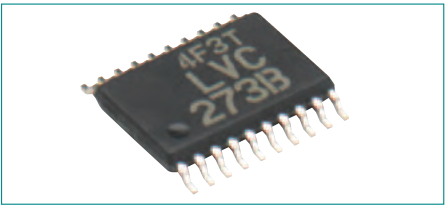
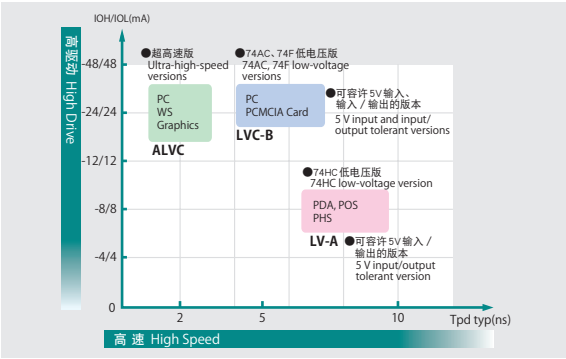
支持功能列表 Applicable Function

Lineup	Applicable function (CMPAK-6pin)						
HD74LV1GW57ACM							
HD74LV1GW58ACM							
HD74LV1GW97ACM							
HD74LV1GW98ACM							

低电压产品为系统带来各种益处。
Low-Voltage Products Offering a Variety of System Benefits.

低电压标准逻辑 IC 针对便携系统，不仅实现了小型化、低功耗化，还支持高性能化。在实现 3V 驱动的同时，发挥出与 5V 标准逻辑 IC 同等甚至更高的性能，噪声特性良好，并可用于 5V/3V 混合系统等，兼具使用方便性。

These low-voltage standard logic ICs meet the demands of portable systems for small size and low power dissipation together with high performance. These devices offer such user-friendly features as performance equivalent to or exceeding that of 5 V standard logic ICs on a drive voltage of only 3 V, good noise characteristics, and usability in mixed 5 V/3 V systems.



高速型 LVC 系列
High-Speed Type LVC Series

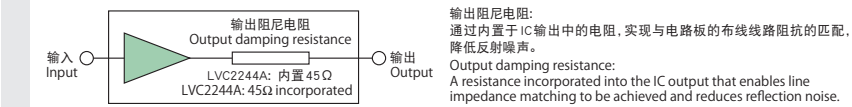
RD74LVC-B 系列 / HD74LVC 系列
RD74LVC-B Series / HD74LVC Series

性能	Performance	特点			Features
高速低功耗、低电压工作化 RD74LVC-B and HD74LVC series products combine high-speed operation with reduced power and voltage requirements.		支持低电压 Suitable for low-voltage operation Vcc=1.65 V~5.5V	高速化 High-speed operation tpd=4 ns (typ) [Vcc=3.3 V, Ta=25°C]	低泄漏、低消耗电流 Low leakage and low current consumption lin, Ioff=5mA (max)	所有类型可容许输入 / 输出 All models support insertion output tolerant

产品系列		Lineup		
Function	Part No.	LVC-B Package		Pin
		SOP(E)	TSSOP	
栅极 Gate	00B	○	○	14
	02B	○	○	14
	04B	○	○	14
	08B	○	○	14
	14B	○	○	14
	32B	○	○	14
译码器 / 选择器 / 多路复用器 Decoder/Selector/Multiplexer	138B	○	○	16
	139B	○	○	16
触发器 / 锁存 Flip-Flop/Latch	74B	○	○	14
	273B	○	○	20
	373B	○	○	20
	374B	○	○	20
	573B	○	○	20
	574B	○	○	20
	16373B	—	○	48
	16374B	—	○	48
	125B	○	○	14
	126B	○	○	14
缓冲器 Buffer	240B	○	○	20
	244B	○	○	20
	245B	○	○	20
	540B	○	○	20
	541B	○	○	20
	16240B	—	○	48
	16244B	—	○	48
	16245B	—	○	48
	16246B	—	○	48
	16247B	—	○	48

SOP (E): JEITA 规格
SOP (E): JEITA specification

LVC2244A 产品 内置降低反射噪声的输出阻尼电阻
LVC2244A Products with Built-In Output Damping Resistance for Reducing Reflection Noise



输出阻尼电阻:
通过内置于 IC 输出中的电阻, 实现与电路板的布线线路阻抗的匹配, 降低反射噪声。
Output damping resistance:
A resistance incorporated into the IC output that enables line impedance matching to be achieved and reduces reflection noise.

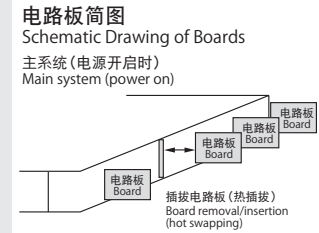
产品系列 Product Lineup		Package	
8 位产品 8-bit Products	Part No.	Function	Pin
8 位产品 8-bit Products	HD74LVC240A	线驱动器 / 接收器 Line driver/receiver	20
	HD74LVC244A	线驱动器 / 接收器 Line driver/receiver	20
	HD74LVC245A	收发器 Transceiver	20
	HD74LVC246A	收发器 Transceiver	20
16 位产品 16-bit Products	HD74LVC16240A	线驱动器 / 接收器 Line driver/receiver	48
	HD74LVC16244A	线驱动器 / 接收器 Line driver/receiver	48
	HD74LVC16245A	收发器 Transceiver	48
	HD74LVC16246A	收发器 Transceiver	48

*FP:SOP(JEITA) T:TSSOP

LVCZxxxA 产品支持热插拔的 CMOS 逻辑 IC
LVCZxxxA Products CMOS Logic ICs Supporting Hot Swapping

该 IC 支持热插拔, 在 IC 电源开 / 关时将输出变为高阻抗状态。“HD74LVCZxxxA 产品”通过上拉 / 下拉保护功能, 在 0V ~ 2V 的电源电压下将输出变为 Hi-Z 状态, 从而防止系统误动作。除热插拔以外, 对于在电源开 / 关时保证工作的系统也很有效。

These ICs support hot swapping, with output being driven to the high- impedance state when IC power is turned ON or OFF. HD74LVCZxxxA products employ a Power Up/Down protection function that prevents erroneous system operation by driving output to the Hi-Z state in a power supply voltage range of 0 V to 2 V. In addition to hot swapping, this is also useful for systems whose operation is to be guaranteed when power is turned ON or OFF.



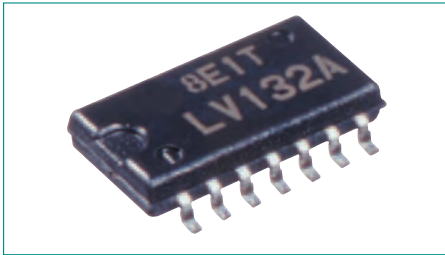
产品系列 Product Lineup		Package	
8 位产品 8-bit Products	Part No.	Function	Pin
8 位产品 8-bit Products	HD74LVCZ240A	线驱动器 / 接收器 Line driver/receiver	20
	HD74LVCZ244A	线驱动器 / 接收器 Line driver/receiver	20
	HD74LVCZ245A	收发器 Transceiver	20
	HD74LVCZ246A	收发器 Transceiver	20
16 位产品 16-bit Products	HD74LVCZ16240A	线驱动器 / 接收器 Line driver/receiver	48
	HD74LVCZ16244A	线驱动器 / 接收器 Line driver/receiver	48
	HD74LVCZ16245A	收发器 Transceiver	48
	HD74LVCZ16246A	收发器 Transceiver	48

*FP:SOP(JEITA) T:TSSOP

LV-A 系列
LV-A Series

该系列在 LV 系列基础上的向上兼容产品, 提高了开关速度并改善了功能, 产品系列也更为齐全。

The LV-A Series comprises LV Series based and upward-compatible devices offering improved switching speed and functions, available in an extended lineup.

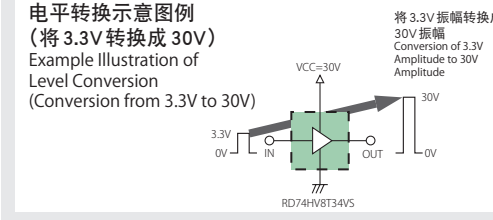
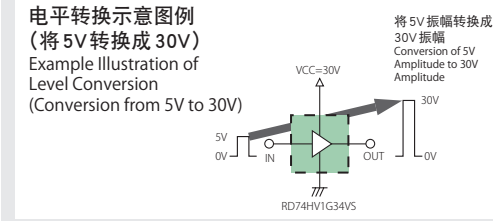


性能	Performance	特点	Features
保证特性的电压 Characteristics guaranteed voltage Vcc=2.5V、3.3V、5.0V 三点保证 3-point guarantee: Vcc = 2.5 V, 3.3 V, 5.0 V	低消耗电流 Low current dissipation 备用时的消耗电流: Icc = 20μA Standby current dissipation: Icc = 20μA	低噪声 Low noise VOLP<0.8V(Typ)[Vcc=3.3V,Ta=25°C] VOHV>2.0V(Typ)[Vcc=3.3V,Ta=25°C]	可容许 5V 输入 / 输出 5V input/output tolerant
开关性能 Switching performance tpd=7ns(typ) [Vcc=3.3V, Ta=25°C]	保证 IOFF、输出歪斜 IOFF, output skew guaranteed	静电耐压、耐门锁 Electrostatic withstand voltage, latchup resistance 与 HC 系列相同 Same as HC Series	
驱动能力 Drive capability IOH/IOH=-8/8mA 在 5V 电压下工作的 IOH/IOH=-16/16mA 输出电源 IOH/IOH=-16/16 mA[Vcc=5V]output current			

HD74LV-A 系列					HD74LV-A Series				
Function	Part No.	Package		Pin	Function	Part No.	Package		Pin
		SOP(E)	TSSOP				SOP(E)	TSSOP	
栅极 Gate	00A	○	○	14	触发器 / 锁存器 Flip-Flop/Latch	74A	○	○	14
	02A	○	○	14		273A	○	○	20
	04A	○	○	14		373A	○	○	20
	U04A	○	○	14		374A	○	○	20
	05A	○	○	14		573A	○	○	20
	06A	○	○	14		574A	○	○	20
	07A	○	○	14	移位寄存器 Shift Register	166A	○	○	16
	08A	○	○	14		595A	○	○	16
	10A	○	○	14	计数器 Counter	161A	○	○	16
	11A	○	○	14		163A	○	○	16
	14A	○	○	14		393A	○	○	14
	20A	○	○	14		4040A	○	○	16
	21A	○	○	14	多谐振荡器 Multivibrator	123A	○	○	16
	27A	○	○	14		221A	○	○	16
	32A	○	○	14	总线缓冲器 / 收发器 Bus Buffer/Transceiver	125A	○	○	14
	86A	○	○	14		126A	○	○	14
	132A	○	○	14		240A	○	○	20
译码器 / 选择器 / 多路复用器 Decoder/Selector/Multiplexer	138A	○	○	16		244A	○	○	20
	139A	○	○	16		245A	○	○	20
	157A	○	○	16		540A	○	○	20
模拟开关 Analog Switch	4051A	○	○	16		541A	○	○	20
	4053A	○	○	16					
	4066A	○	○	14					

SOP (E): JEITA 规格
SOP (E): JEITA specification

高耐压逻辑 RD74HV1G 系列 / RD74HV8T 系列
High-Voltage Logic IC RD74HV1G Series/RD74HV8T Series



型号 Part No.	功能 Function	电路 / 封装 Circuits/ Package	电源 (Vcc) 电压范围 (Vcc) Power Supply (Vcc) Voltage Range	输入逻辑 电平 Input Logic Level	封装 Package	容许损失 (W) Allowable Loss (W)	输出形式 Output Format
RD74HV1G00VS	High-Voltage 2-input NAND Gate	1	10 ~ 30V	5.0V	VSON-5	0.2	CMOS 输出 CMOS Output
RD74HV1G02VS	High-Voltage 2-input NOR Gate	1	10 ~ 30V	5.0V	VSON-5	0.2	
RD74HV1G04VS	High-Voltage Inverter Gate	1	10 ~ 30V	5.0V	VSON-5	0.2	
RD74HV1G08VS	High-Voltage 2-input AND Gate	1	10 ~ 30V	5.0V	VSON-5	0.2	
RD74HV1G32VS	High-Voltage 2-input OR Gate	1	10 ~ 30V	5.0V	VSON-5	0.2	
RD74HV1G34VS	High-Voltage Buffer Gate	1	10 ~ 30V	5.0V	VSON-5	0.2	
RD74HV8T04	High-Voltage 8-bit Inverter Buffer	8	10 ~ 30V	3.3V	SOP-20	0.8	
RD74HV8T34	High-Voltage 8-bit Buffer Gates	8	10 ~ 30V	3.3V	SOP-20	0.8	
RD74HV8T06	High-Voltage 8-bit Inverter Buffer	8	10 ~ 30V	3.3V	SOP-20	0.8	
RD74HV8T07	High-Voltage 8-bit Buffer Gates	8	10 ~ 30V	3.3V	SOP-20	0.8	

亟需解决EMI噪声。

EMI Noise Solutions are Urgently Needed.

- 伴随系统频率变高，EMI噪声成为了大问题。
- EMI噪声一般被认为会给电子设备造成影响，近年来各国的限制日趋严格。（美国：FCC，欧洲：CE，日本：VCCI）
- 为降低EMI噪声，瑞萨推出了采用扩展频谱技术的SSCG系列产品。
- 这种扩展频谱技术通过微调输出频率，使能量扩散，从而改善了EMI特性。



- EMI noise is becoming an increasingly severe problem due to the higher system operating frequencies used in the latest equipment.
- EMI noise is generally thought to adversely affect other electronic equipment, and recently, the regulations limiting EMI emissions have become increasingly strict in many countries around the world. (USA: FCC, Europe: CE, Japan: VCCI)
- Renesas is releasing the SSCG Series that adopts spread spectrum technology to reduce EMI noise.
- This spread spectrum technology modulates the output frequency slightly and thus diffuses the energy to improve the EMI characteristics.

* SSCG: Spread Spectrum Clock Generator EMI: Electro Magnetic Interference

SSCG的优点

Advantages of SSCG

以往的EMI解决方法

●加强金属屏蔽

●通过CR元件调谐

●变更电路板设计

使用SSCG的优点

●无需变更电路板设计或增加新元件

●稳定的EMI性能，无需依靠技术人员的经验

●大幅缩短系统开发时间

Conventional EMI Solutions

• Improved metal shielding

• Tuning the resistor and capacitor component values

• Changing the circuit board design

Advantages of Using SSCG

• No circuit board design changes, and no new components are required.

• Stable EMI performance that does not depend on the skill and experience of system engineers.

• Significant reductions in the system development period.

EASY to REDUCE

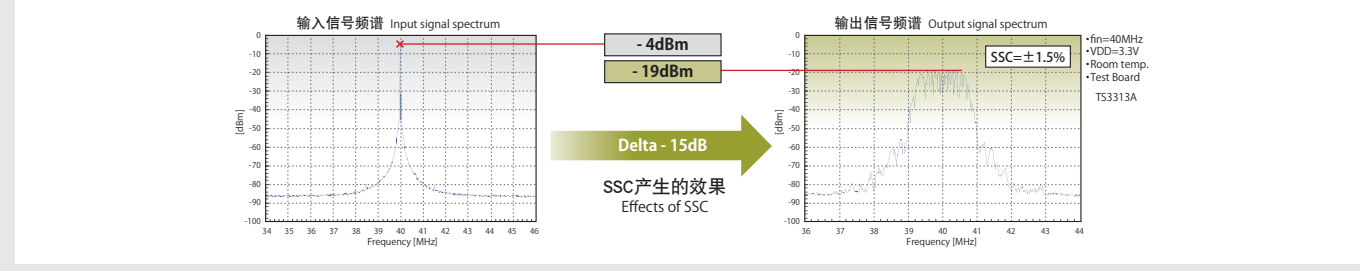
使用SSCG, 可轻松降低EMI

EMI can be reduced easily by using SSCG.

扩展频谱技术

Spread Spectrum Technology

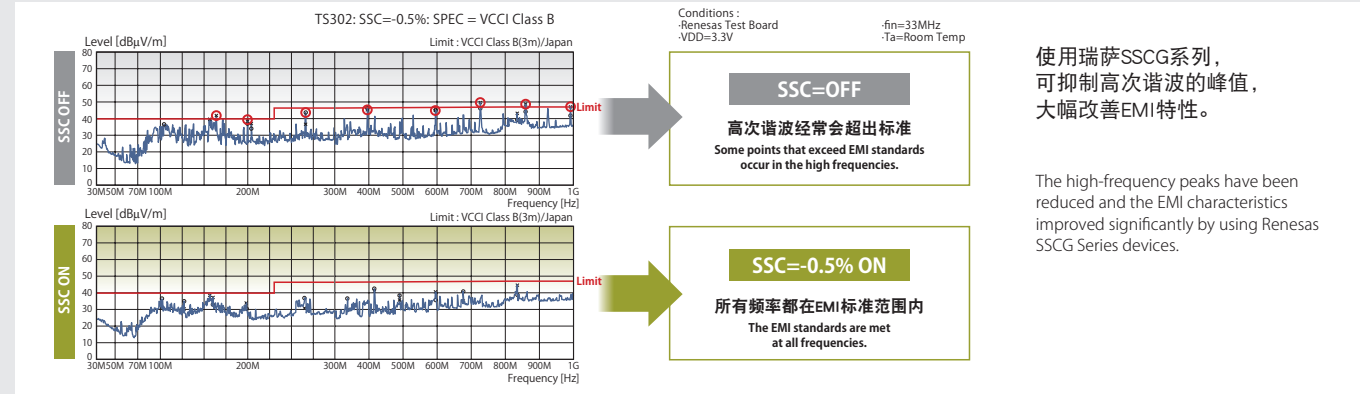
运用扩展频谱技术调制后的输出，会降低频谱的峰值。
The height of the peak in the energy spectrum is reduced when the output is modulated.



SSCG的效果

Effects of SSCG

EMI测定结果 Actual EMI Test Results



使用瑞萨SSCG系列，可抑制高次谐波的峰值，大幅改善EMI特性。
The high-frequency peaks have been reduced and the EMI characteristics improved significantly by using Renesas SSCG Series devices.

http://cn.renesas.com/products/standard_ic/logic/clock_generator/index.jsp

RD151TS33XXA系列 产品系列

RD151TS33XXA Series Lineup

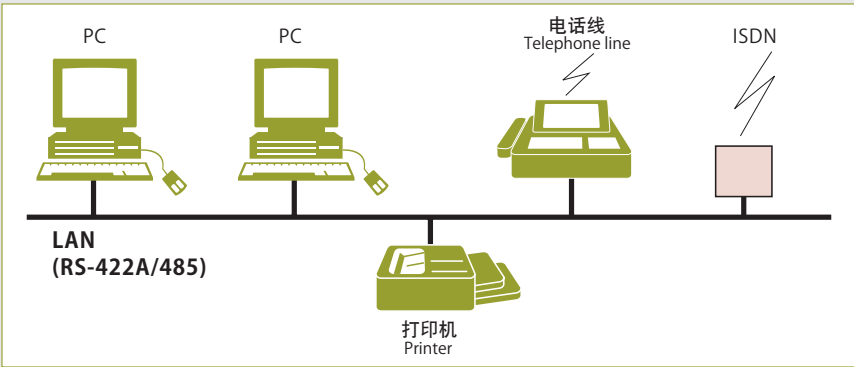
输出频率：覆盖10MHz~160MHz的广泛频率，各自备有中心扩频/向下扩频调制。可根据用途选择最适合的产品。

Output frequency: Covering a wide range of frequencies from 10MHz to 160MHz, and providing respective center/down spread modulation. Most suitable products for application can be selected.

中心扩频产品型号 Central spread Product part no.	RD151 TS3312A	RD151 TS3313A	RD151 TS3314A	RD151 TS3315A	RD151 TS3316A
向下扩频产品型号 Down spread Product part no.	RD151 TS3322A	RD151 TS3323A	RD151 TS3324A	RD151 TS3325A	RD151 TS3326A
输出频率 Output frequency	10 - 20 MHz	20 - 40 MHz	40 - 80 MHz	80 - 160 MHz	40 - 80 MHz
输入频率 Input frequency	10 - 20 MHz	20 - 40 MHz	20 - 40 MHz	20 - 40 MHz	40 - 80 MHz
倍增 (输入: 输出) Multiplication (input: output)	1 : 1	1 : 1	1 : 2	1 : 4	1 : 1
电源电压 Power supply voltage	3.3V typ.				
SSC% (中心) SSC%(Center)	OFF, ±0.5%, ±1.5%				
SSC% (向下) SSC%(Down)	OFF, -1.0%, -3.0%				
Cycle to Cycle Jitter	100 ps typ.				
Slew Rate	0.7 V/ns @15pF		0.8 V/ns @15pF	2.0 V/ns @15pF	0.8 V/ns @15pF

串行接口

Serial Interface



产品系列包括适用于电脑间等的高速、长距离接口并符合RS-422A标准的接口IC，以及支持高性能RS-485的低功耗CMOS版。（HD26/29系列）
Also the power-saving CMOS edition that is compatible with the high-function RS-485, and the interface IC based on the RS-422A, which is suitable for high-speed, long-distance interfaces between PCs are lined up. (HD 26/29 series)

HD151系列 HD151 Series

Function	Part No.	Package		Pin
		SOP(E)	TSSOP	
液晶显示屏用交流信号计数器 Liquid Crystal Panel Alternation Signal Counter	151011	—	○	20
Centronics接口 Centronics Interface	151005	○	—	20

SOP (E) : JEITA规格
SOP (E): JEITA specification

HD26/29系列 HD26/29 Series

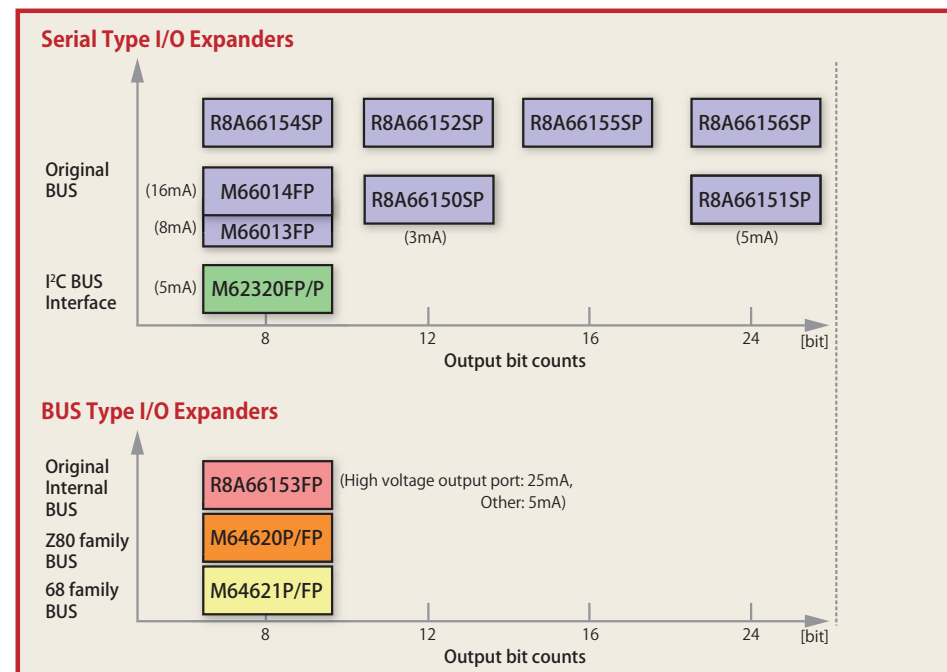
Function	Part No.	Package		Pin
		DIP	SOP(E)	
RS-422A/423A标准 RS-422A/423A Standard	26C31	—	○	16
	26C32A	○	○	16
	26LS31	○	—	16
	26LS32	○	○	16
	26LS32A	○	—	16
	29050	○	—	16
CCD/MOS驱动器 CCD/MOS Driver	29026A	○	—	8
	29027	○	—	8
	29029	○	—	8

I/O 扩展器

I/O Expanders

I/O 扩展器用于扩展单片机端口，非常方便。备有 I2C 总线和并行总线产品系列。

I/O expanders are a convenient way to extend the ports of an MCU. Our lineup includes products with I2C bus and parallel bus support.



高速总线开关

High-Speed Bus Switches

250ps 开关速度。一口气达到 8 倍的超高速。

250 ps Switching Speed. Ultra-High 8-Fold Speed at a Stroke.

总线开关

Bus Switch

- 250ps 的延迟时间实现高速总线系统的构建
- 电路内部几乎不消耗功率，实现低功耗
- 通过采用输入和输出之间用开/关连接的结构，进行输入/输出切换时无需切换方向
- 支持 5V ⇒ 3.3V 的电平转换、部分掉电
- 250 ps delay time enabling the construction of high-speed bus systems
- Almost no power is consumed within the circuit, for low power dissipation
- Structure providing on/off linkage between input and output eliminates the need for direction switching in input/output switching
- 5 V ⇒ 3.3 V level transfer, partial power-down support

支持部分掉电的输入 / 输出特性

Input/Output Characteristics Supporting Partial Power-Down

HD74CBT 系列支持部分掉电（局部断电）。由于 NMOS 关断时没有泄漏电流，因此部分掉电时可彻底隔离 Vcc=OFF 系统和 Vcc=ON 系统。即使 HD74CBT 的电源变为关，功能也不会改变。

The HD74CBT Series supports partial power-down operation (partial power supply stoppage). As there is no leakage current at the time of NMOS switch-off, the Vcc = OFF and Vcc = ON systems are totally isolated in partial power-down mode. Functions remain unchanged when HD74CBT power is turned off.

总线开关系列 (HD74CBT1G125/126CM)

Bus Switch Series (HD74CBT1G125/126CM)

信号开 / 关 (低导通电阻: 5Ω (typ), 超高速: 250ps)
Signal on/off (Low on-resistance: 5Ω (typ), ultra-high speed: 250ps)

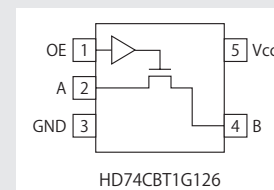
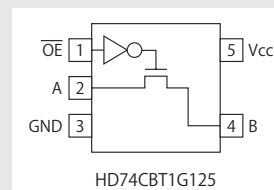
支持部分掉电

开关: 关断或电源关断时, 变成高阻抗

Partial power-down support SW: High impedance at off or power-off

小型 CMPAK-5 封装

Small CMPAK-5 package

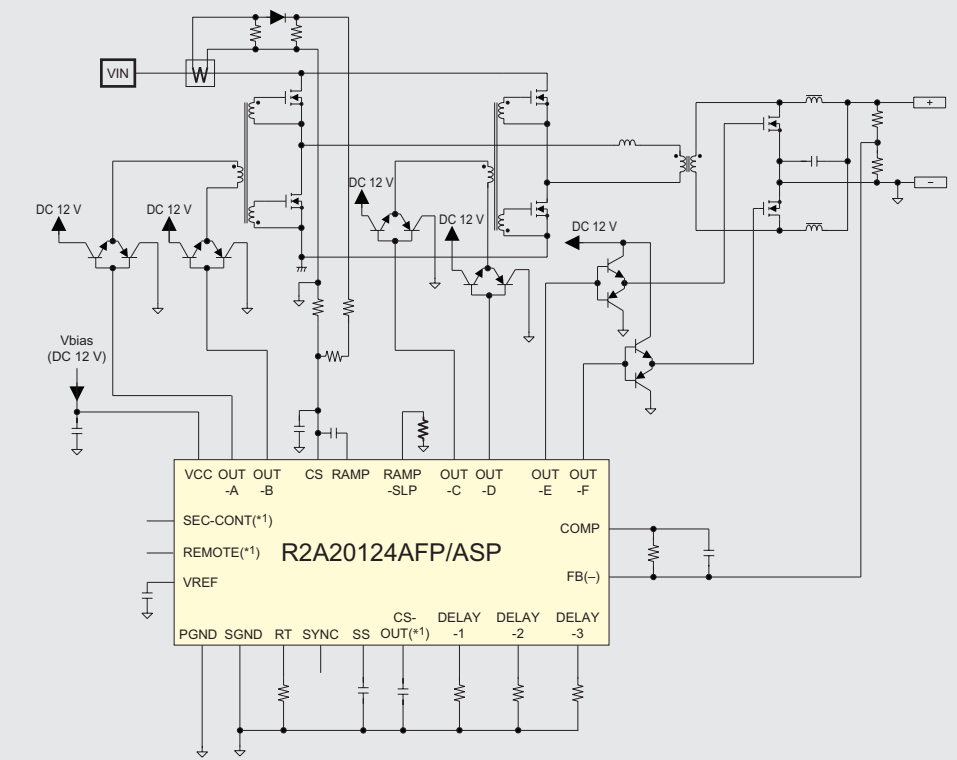


带 PFC 功能的 PWM 电源 / 低电压工作 DC/DC 转换器 /
非绝缘型板上 DC/DC 转换器

PWM Power Supply with PFC Function, Low-Voltage DC/DC Converter,
Uninsulated On-Board DC/DC Converter

绝缘型 DC/DC 转换器
(全桥相移)

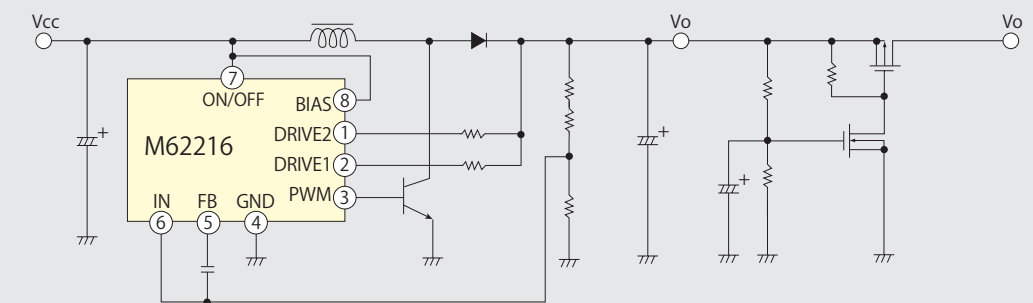
Isolated DC/DC converter
(full-bridge, phase shift)



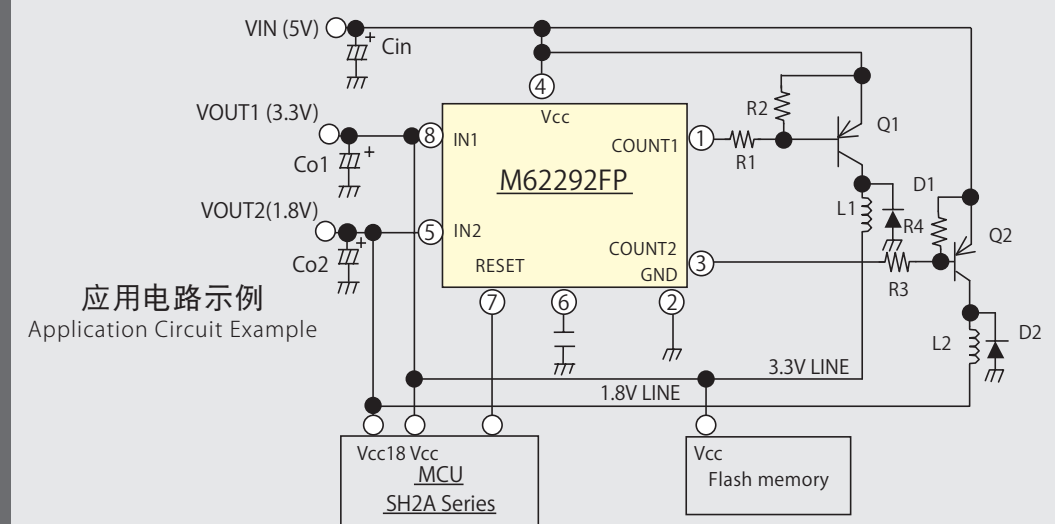
Note: *1. Only R2A20124AFP

低电压工作
DC/DC 转换器

Low-Voltage DC/DC
Converter

非绝缘性板上
DC/DC 转换器

Uninsulated On-Board
DC/DC Converter



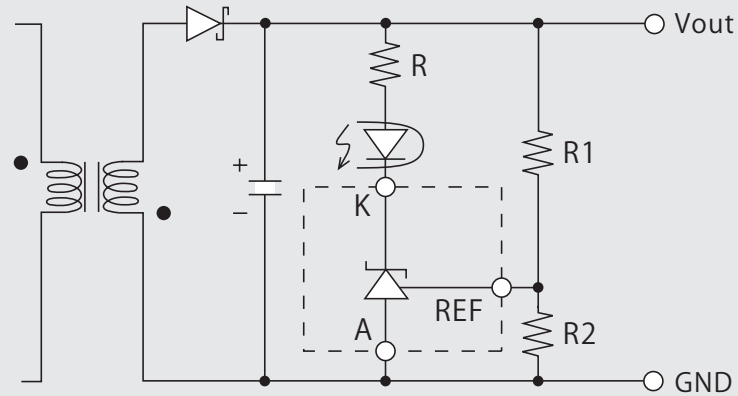
应用电路示例
Application Circuit Example

带PFC功能的PWM电源 /
低电压工作DC/DC转换器/非绝缘型板上DC/DC转换器

PWM Power Supply with PFC Function, Low-Voltage DC/DC Converter,
Uninsulated On-Board DC/DC Converter

生成开关电源的二级侧误差放大电路的基准电压

Generating the reference voltage for the secondary side error amplification circuit of a switching power supply.

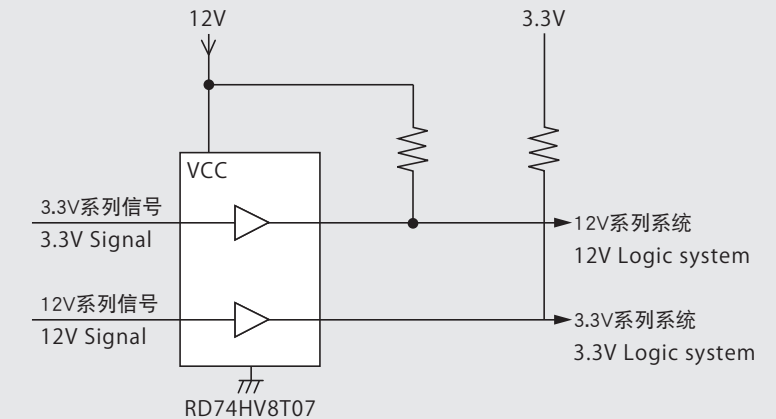


电源的基准电压 / 备用控制 / 复位

Power Supply Reference Voltage, Standby Control, Reset

连接3.3V系列和12V系列的逻辑系统

Interface between 3.3V LOGIC system to 12V LOGIC system.

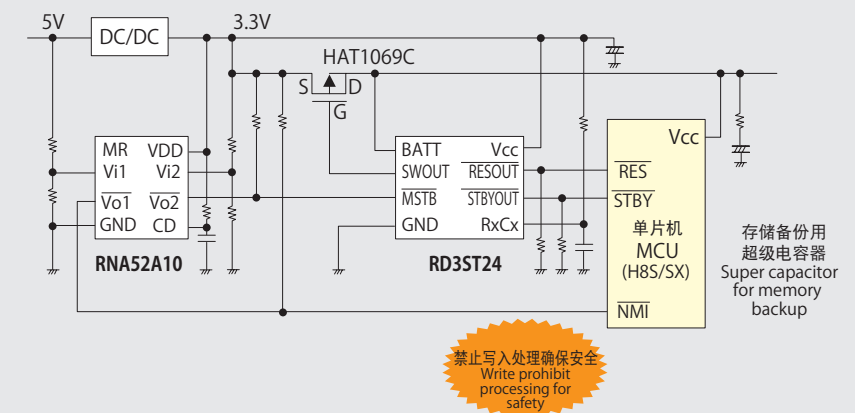


控制单片机的硬件备用

Controlling the hardware standby mode of an MCU.

多功能复位IC在硬件备用前禁止写入存储器处理的电路示例

Circuit Example Using a Multifunction Reset IC for Memory Write Prohibit Processing Before Hardware Standby



只要有效利用H8S/SX的硬件备用功能，就能够保持内置存储器的数据。

通过与备用控制器（RD3ST24）组合使用，可更轻松地完成电路。

使用RNA52A10，可在禁止写入处理后转移到备用模式，因此能够更安全地保持数据。

The hardware standby function of the H8S/SX can be used to maintain data in on-chip memory.

Using a standby controller (RD3ST24) in combination enables a simpler circuit design.

When the RNA52A10 is used, data can be maintained in memory with a higher degree of safety because the transition to standby mode can be made after write prohibit processing.

※该电路仅为参考示例，实际使用时请予事先进行充分验证后再予以使用。

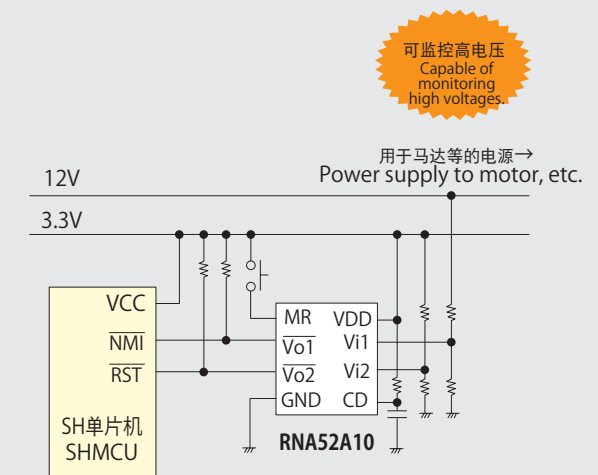
Note: This circuit diagram is intended for reference only. Careful verification should be performed before actually using this design in a system.

监控电源电压

Monitoring the power supply voltage.

多功能复位IC用于多电源的应用示例

Multiple Power Supply Application Example of Multifunction Reset IC



可监控与“RNA52A10MM”的供给电源分属不同系统的电压。

例如，可以监控马达驱动侧的电源，在电压下降时点亮警报灯等。

The power supply to the RNA52A10MM enables monitoring of a separate voltage.

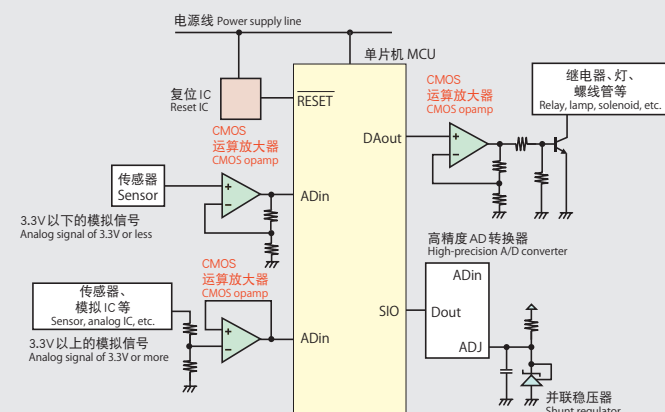
For example, it is possible to monitor a motor drive power supply and have a warning lamp light when a voltage drop occurs.

※该电路仅为参考示例，实际使用时请予事先进行充分验证后再予以使用。

Note: This circuit diagram is intended for reference only. Careful verification should be performed before actually using this design in a system.

处理微弱信号 / 驱动执行器

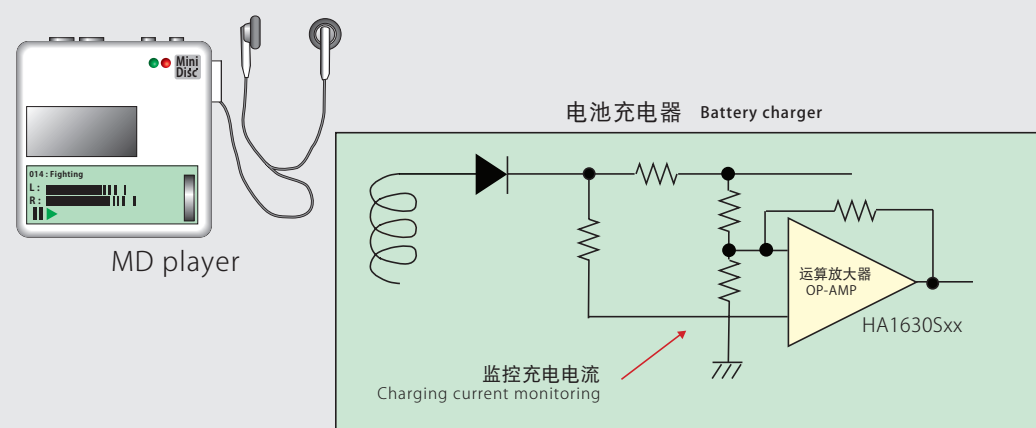
Handling weak signals.
Driving an actuator.



监控电池充电器的充电电流

Monitoring the charge current of a battery charger.

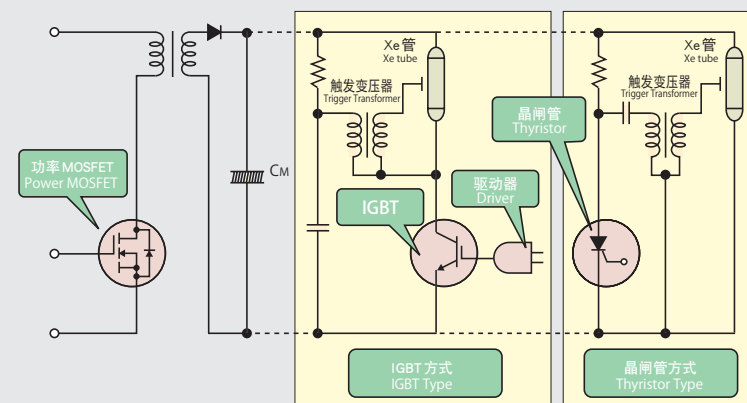
使用示例 (电源电路)
ex. (Power supply circuit)



驱动闪光灯

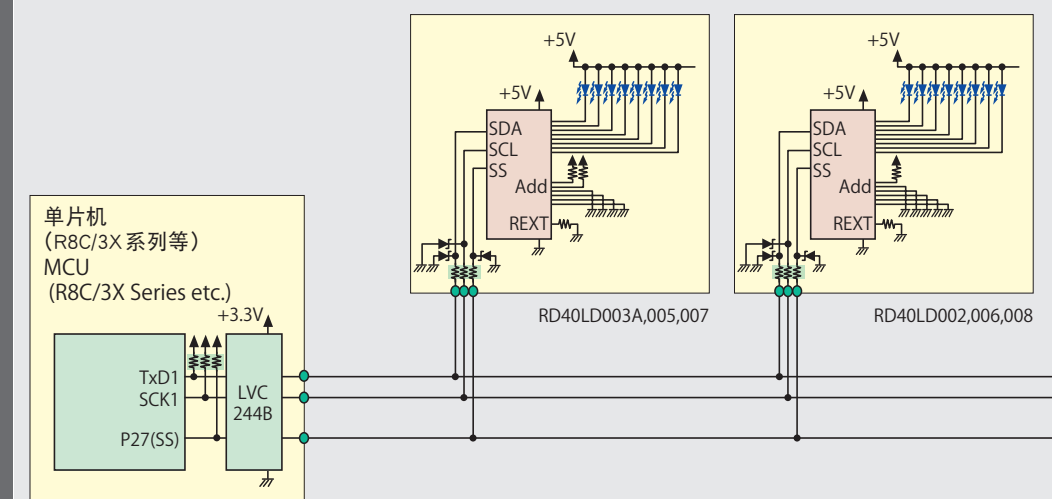
Driving a camera flash unit.

闪光灯电路示例
Sample Strobe Circuit



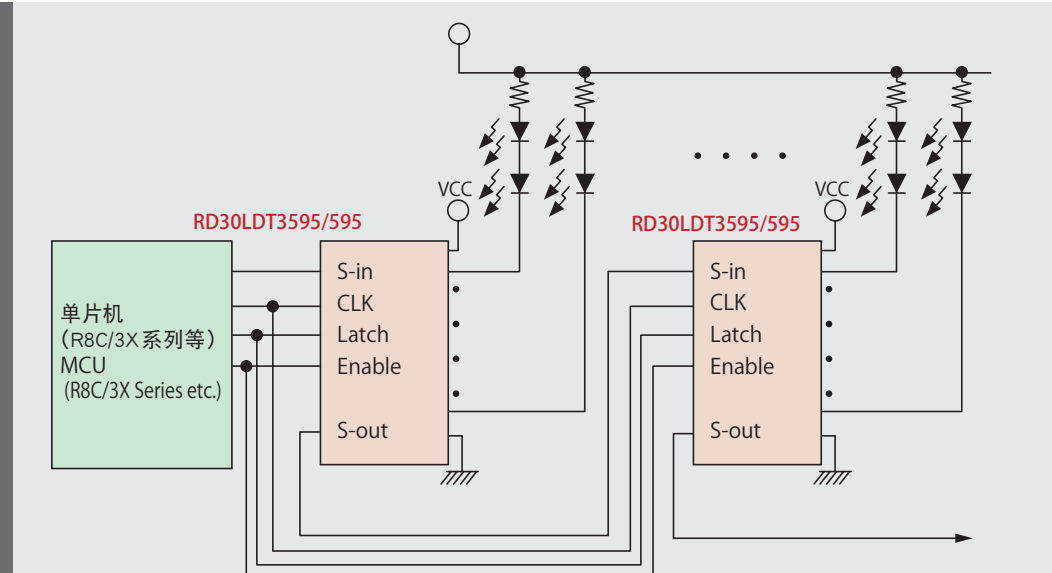
以 SpAS 方式点亮 LED

Illuminating LEDs using an SpAS system.



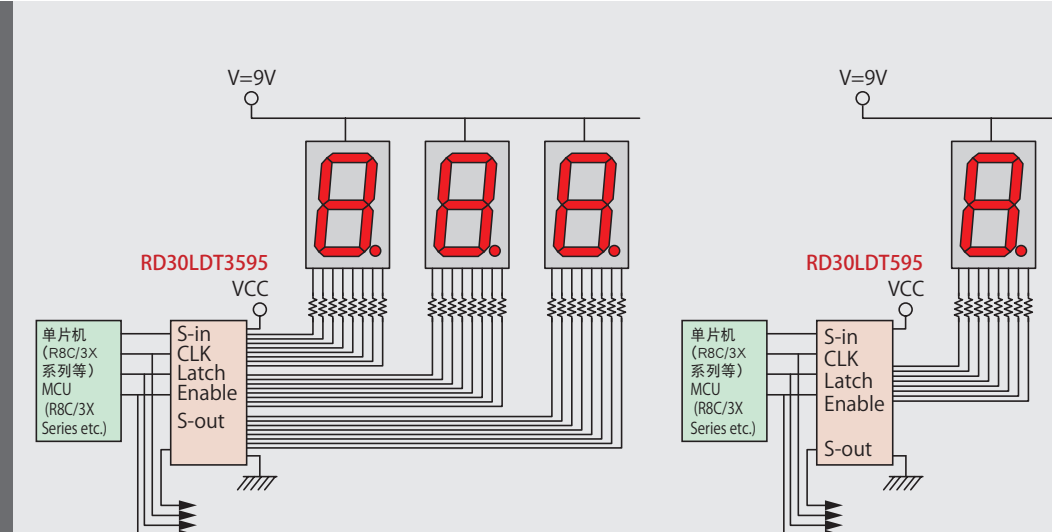
通过串并转换点亮 LED

Illuminating LEDs using serial-parallel conversion.



点亮 7 段 LED

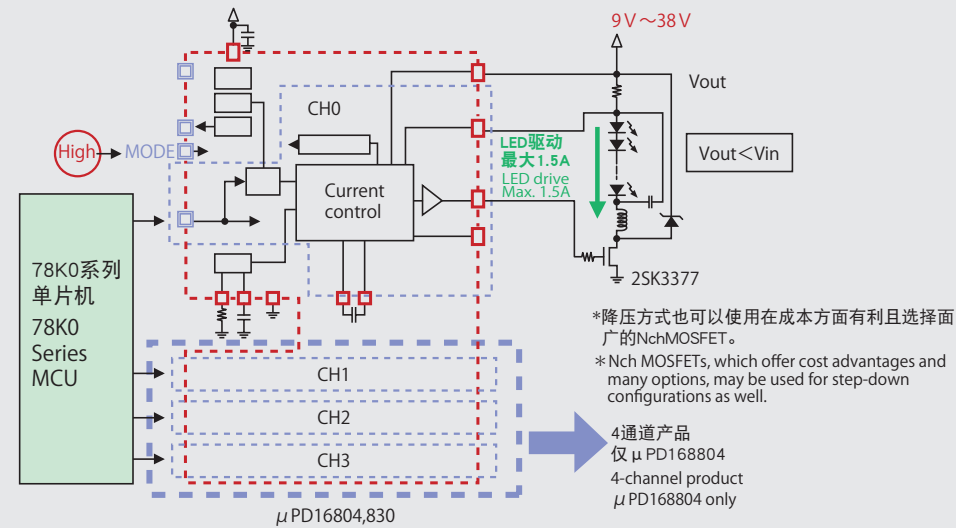
Illuminating 7-segment LEDs.



降低电压
点亮LED照明Lowering the voltage
for LED illumination.

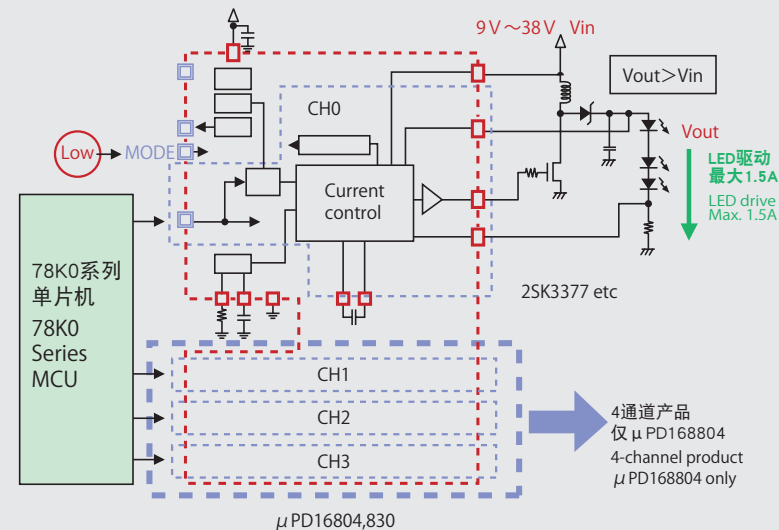
应用电路示例（降压模式）

Application Circuit Example (Voltage Step-Down Mode)

升高电压
点亮LED照明Raising the voltage for
LED illumination.

应用电路示例（升压模式）

Application Circuit Example (Voltage Step-Up Mode)

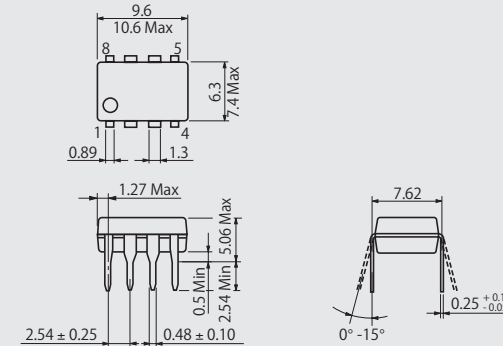


封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units: mm)

DIP

DP-8B

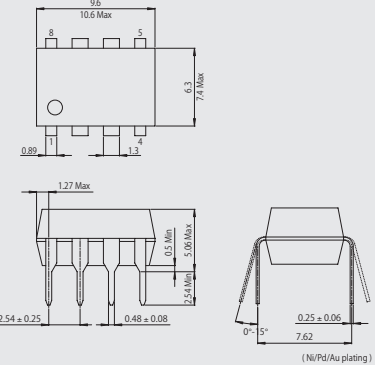
PRDP0008AF-A



DIP

DP-8FV

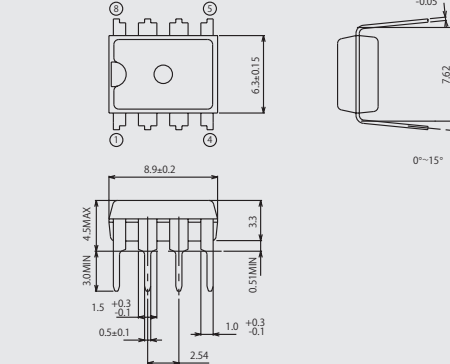
PRDP0008AF-B



DIP

8P4

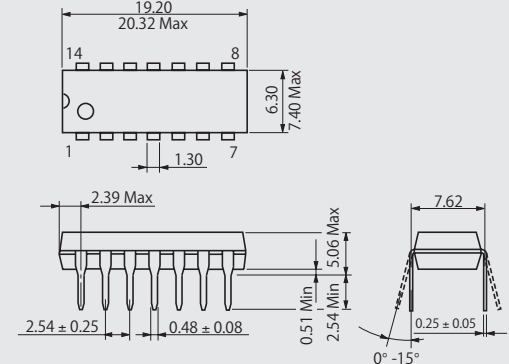
PRDP0008AA-A



DIP

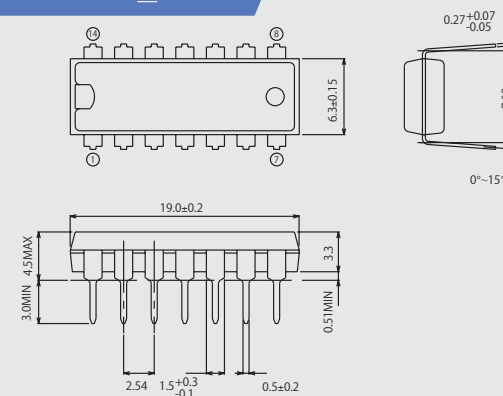
DP-14AV

PRDP0014AB-B



DIP

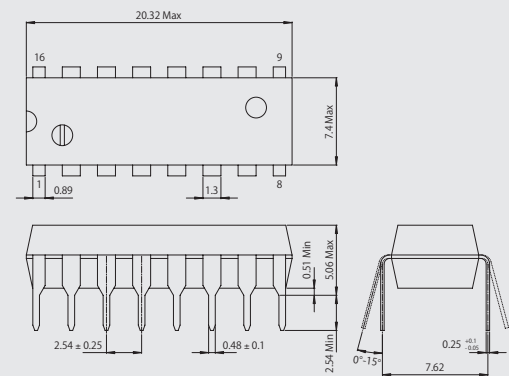
14P4



DIP

DP-16E

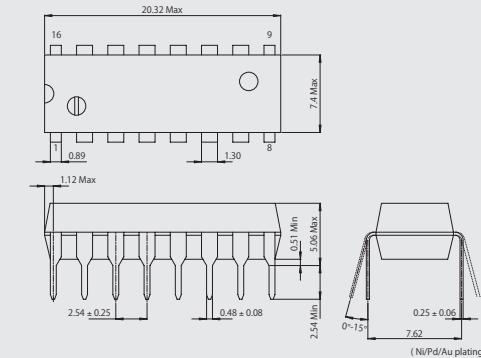
PRDP0016AE-A



DIP

DP-16FV

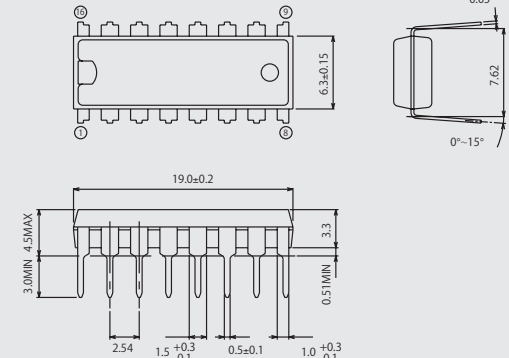
PRDP0016AE-B



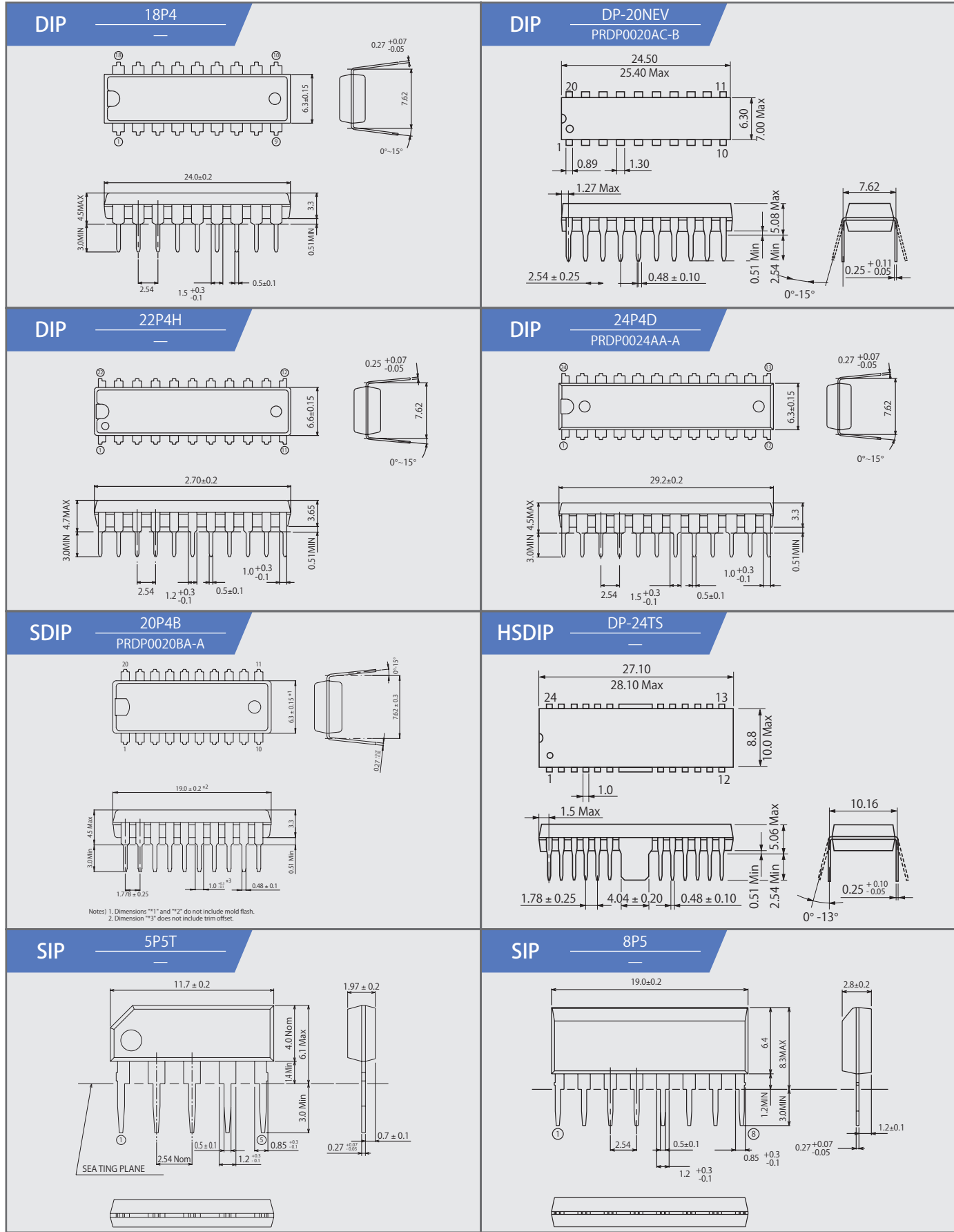
DIP

16P4

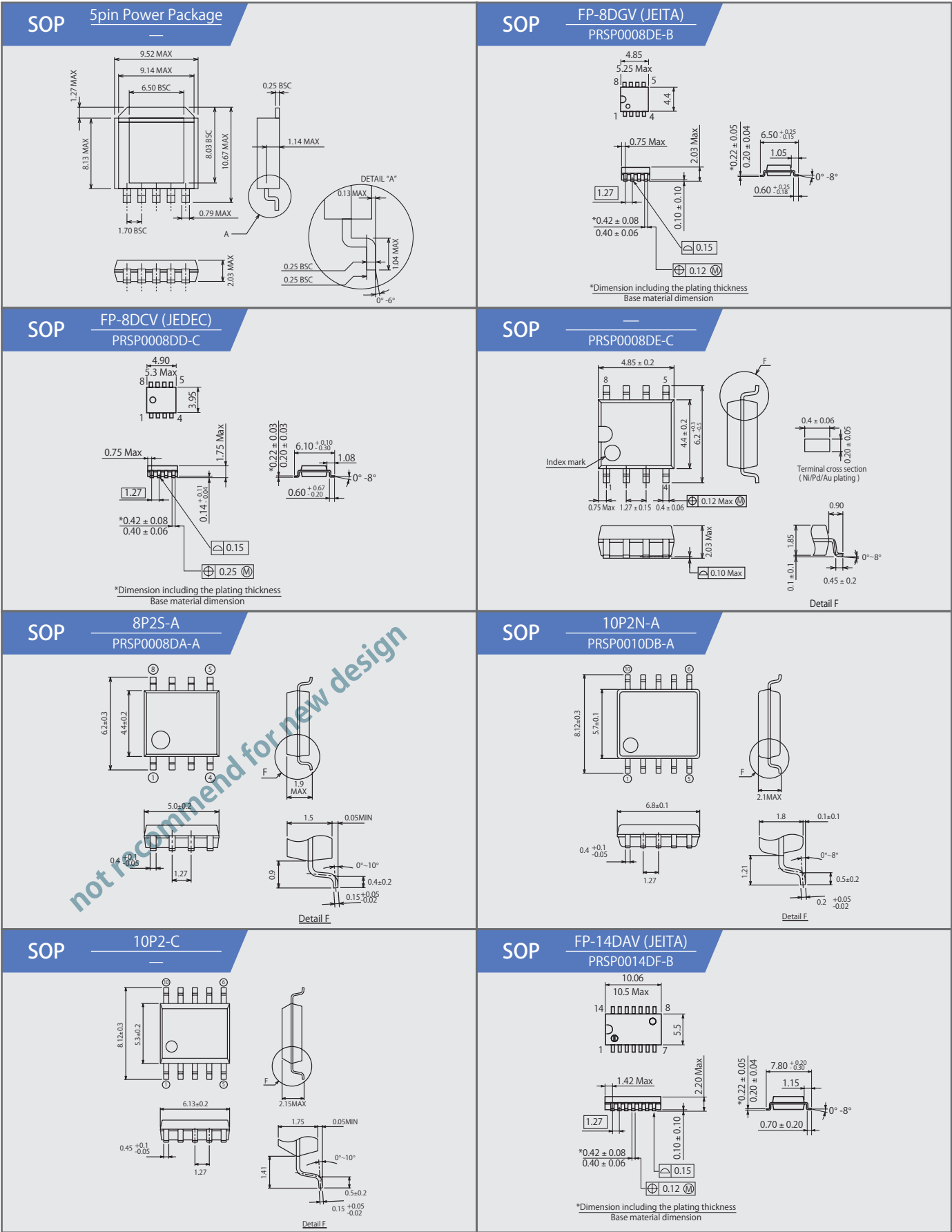
PRDP0016AA-A



封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)



封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)



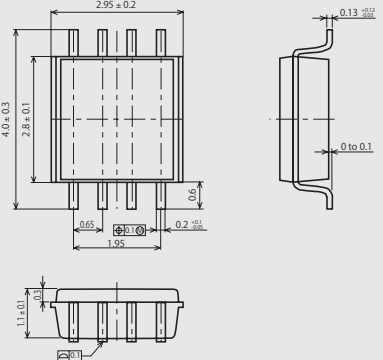
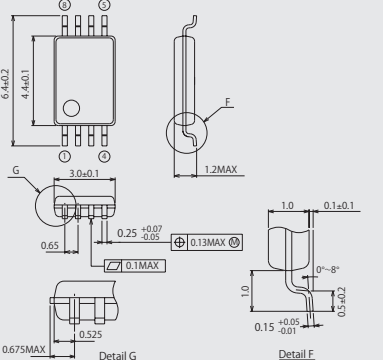
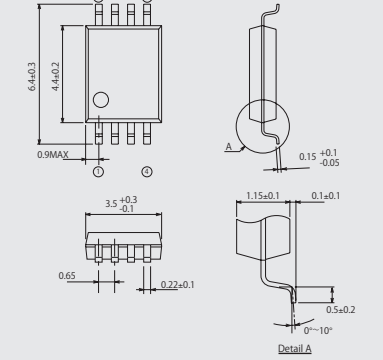
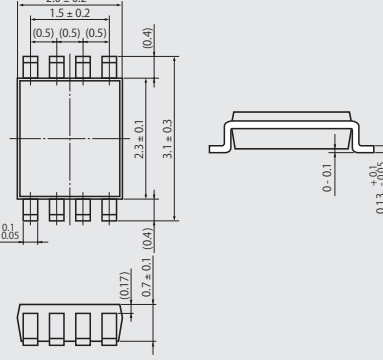
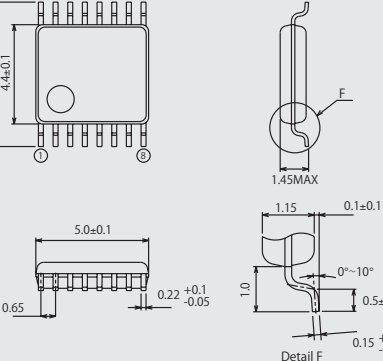
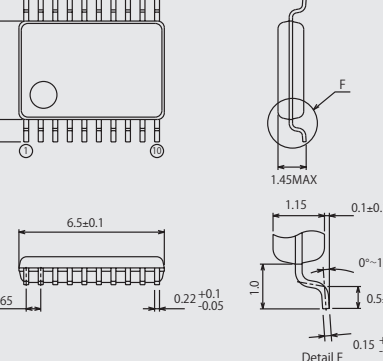
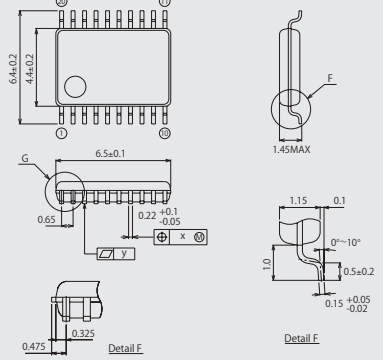
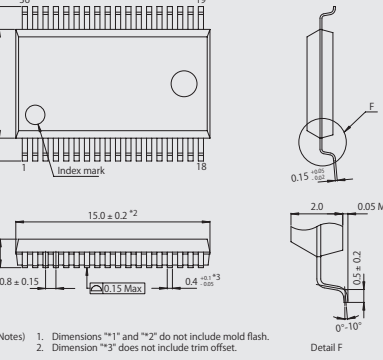
封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)

SOP FP-14DNV (JEDEC) PRSP0014DE-A *Ni/Pd/Au plating	SOP 14P2P-A Detail F
SOP 14P2N-A PRSP0014DD-A Detail F	SOP FP-16DAV (JEITA) PRSP0016DH-B *Dimension including the plating thickness Base material dimension
SOP FP-16DNV (JEDEC) PRSP0016DG-A *Ni/Pd/Au plating	SOP 16P2S-A Detail F
SOP 16P2N-A PRSP0016DE-A Detail F	SOP FP-20DAV (JEITA) PRSP0020DD-B *Dimension including the plating thickness Base material dimension

封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)

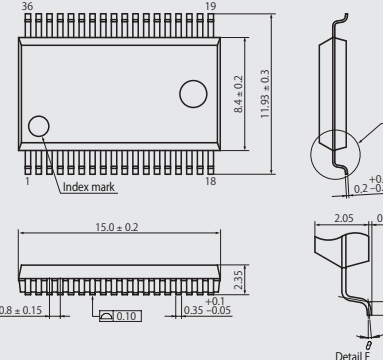
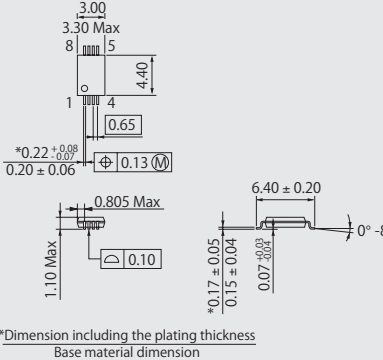
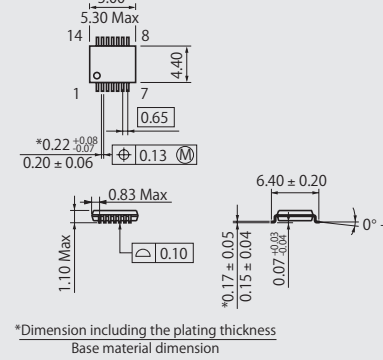
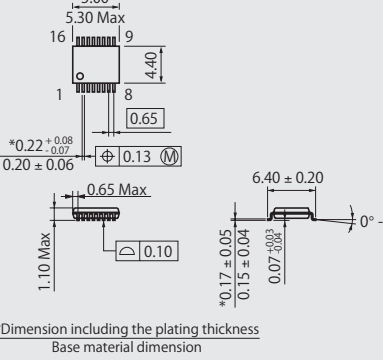
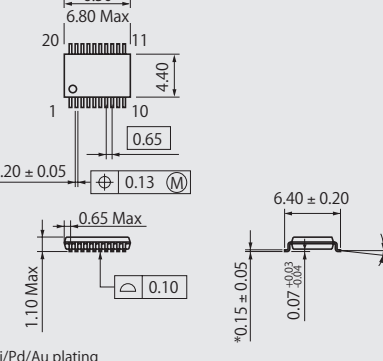
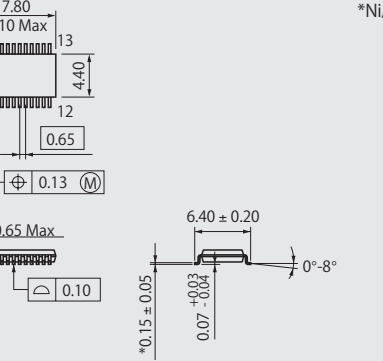
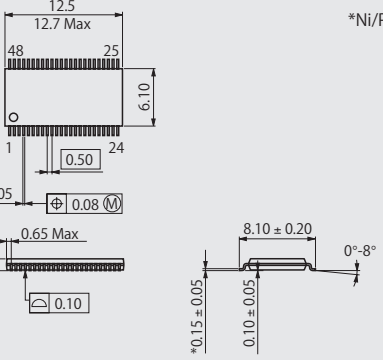
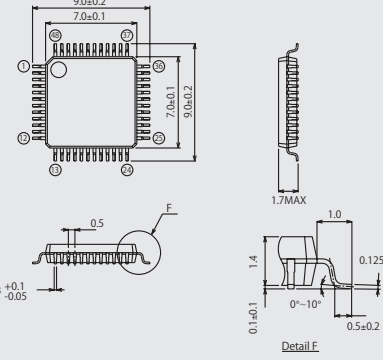
SOP FP-20DBV (JEDEC) PRSP0020DC-A *Ni/Pd/Au plating	SOP 20P2X-A Detail F
SOP 20P2N-A PRSP0020DA-A Detail F	SOP 24P2E-A PLSP0024JA-A Detail F
SOP 24P2Q-A PRSP0024GA-A Detail F	SOP 24P2N-B Detail F
SOP 24P2V-A Detail F	HSOP FP-26DT (JEITA) *Dimension including the plating thickness Base material dimension

封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units: mm)

HSOP MMPAK-8 PLSP0008JC-A 	SSOP 8P2J-A PTSP0008JA-A 
SSOP 8P2X-A — 	SSOP TTP-8DBV PVSP0008KA-A 
SSOP 16P2E-A PLSP0016JA-A 	SSOP 20P2E-A — 
SSOP 20P2F-A PLSP0020JB-A 	SSOP 36P2R-A PRSP0036GA-A 

Notes) 1. Dimensions "1" and "2" do not include mold flash.
2. Dimension "3" does not include trim offset.

封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units: mm)

SSOP 36P2R-D PRSP0036GA-B 	TSSOP TTP-8DAV PTSP0008JC-B 
TSSOP TTP-14DV PTSP0014JA-B 	TSSOP TTP-16DAV PTSP0016JB-A 
TSSOP TTP-20DAV PTSP0020JB-A 	TSSOP TTP-24DBV(JEITA) PTSP0024JB-A 
TSSOP TTP-48DBV(JEITA) PTSP0048KA-A 	QFP 48P6D-A — 

*Ni/Pd/Au plating

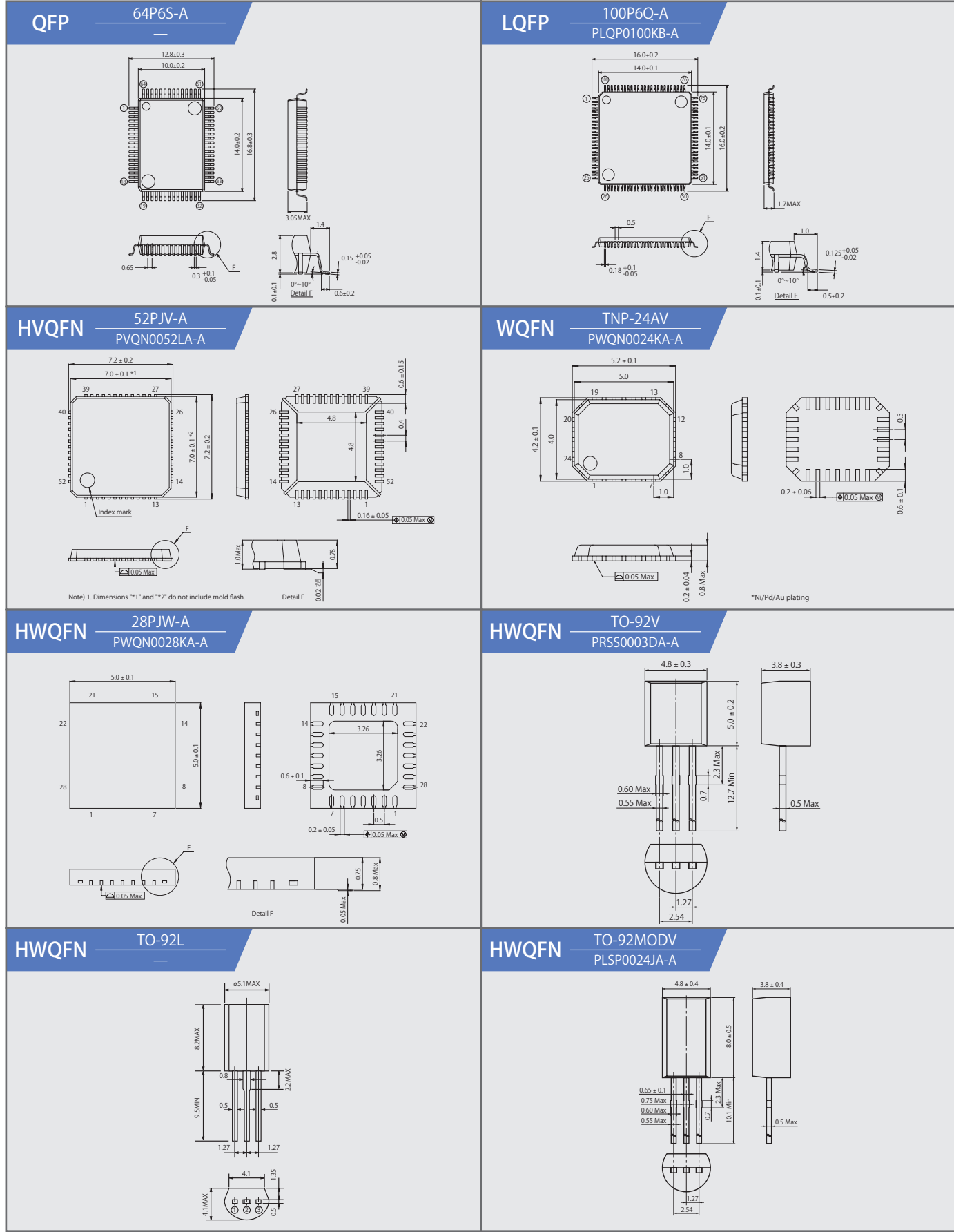
*Ni/Pd/Au plating

外形

外形 8

Package Dimensions 8

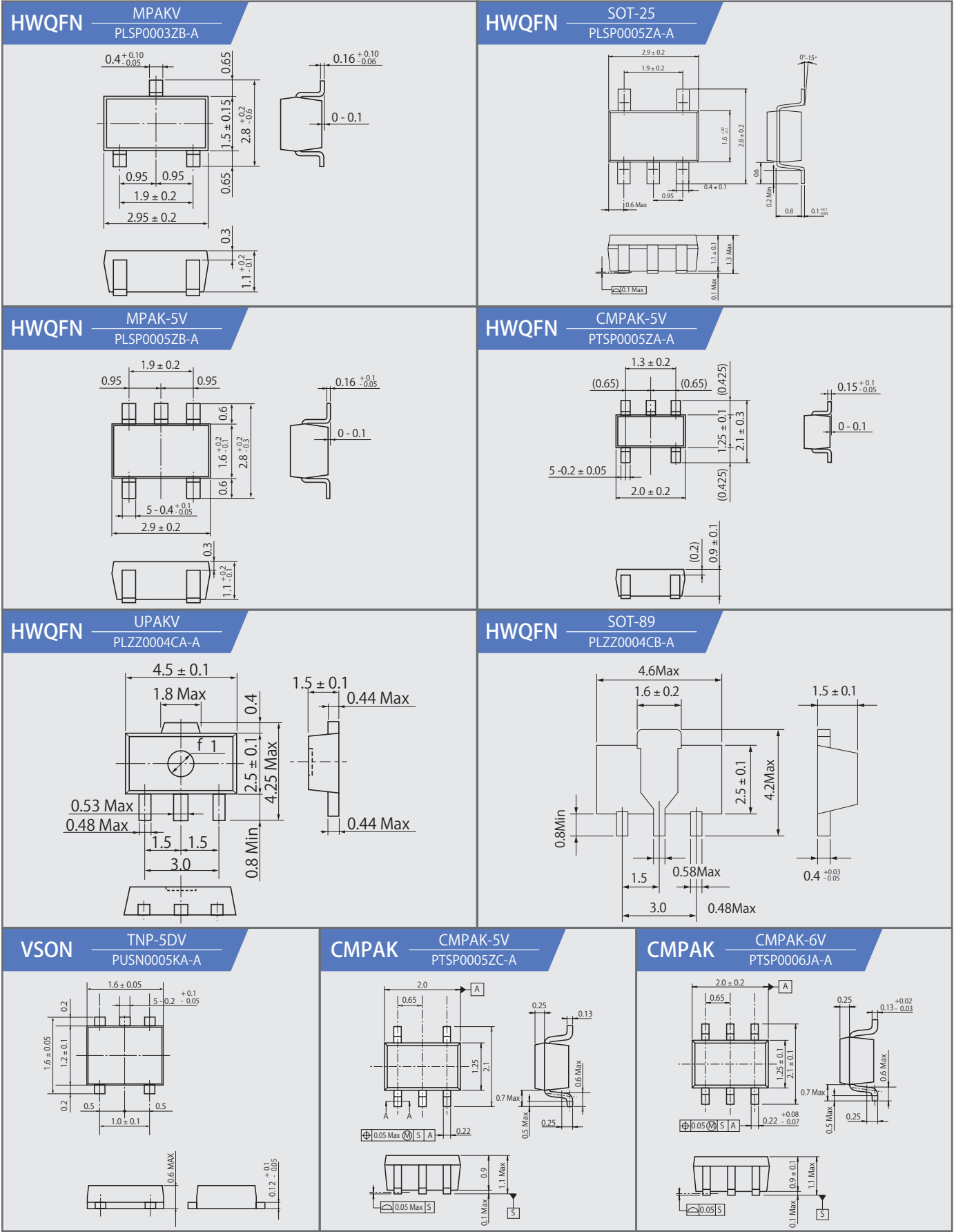
封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)



Package Dimensions

Package Dimensions 9

封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)

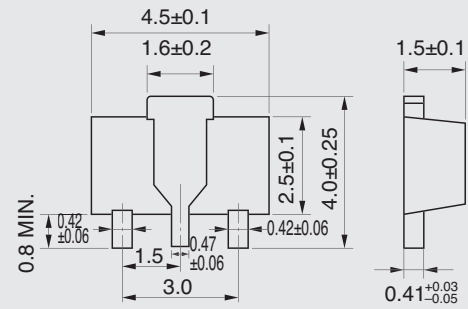


外形 10

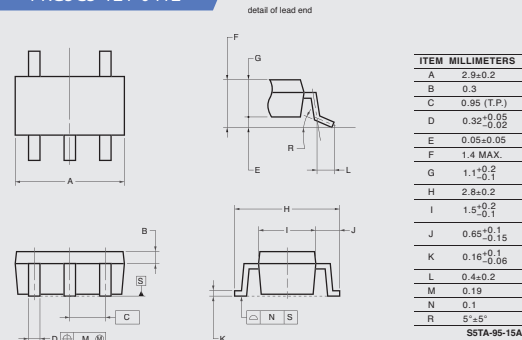
Package Dimensions 10

封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)

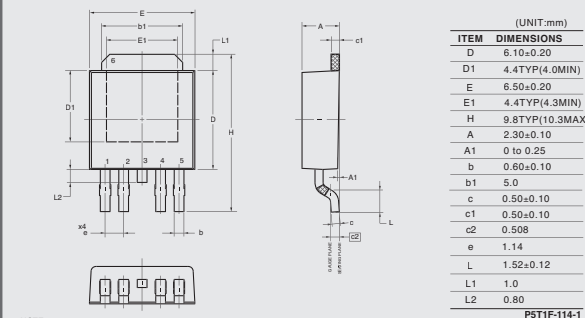
SOT-89 3Pin POMM(SOT-89)
PKG3C4-212-0432



SOT-457 5Pin MM(SOT-457)
PKG5C3-121-0412

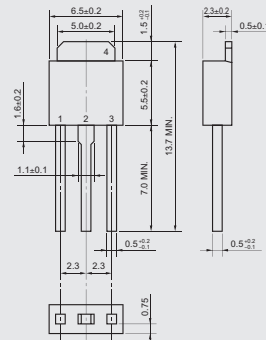


TO-252 5Pin MP-3ZK(TO-252)
PKG5J5-313-0422

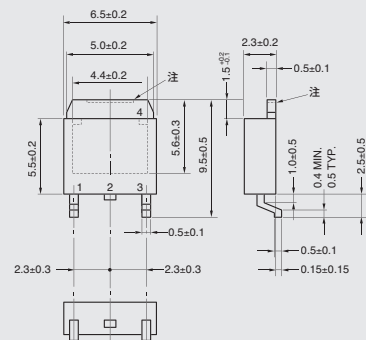


NOTE
1. **503** No Plating areas

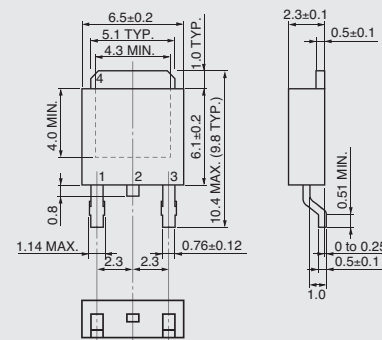
TO-251 MP-3(TO-251)
PKG3J5-112-0431



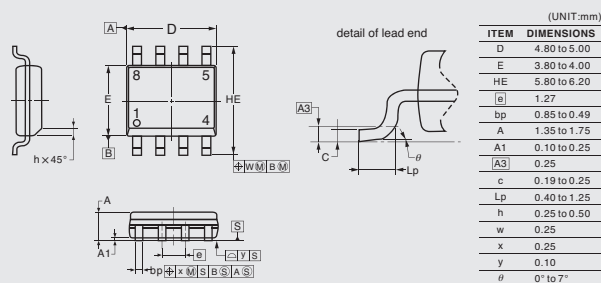
TO-252 — $\frac{\text{MP-3Z(TO-252)}}{\text{PKG3J5-212-0431}}$



TO-252 MP-3ZK(TO-252)
PKG3J5-312-0431



SOP 8Pin SOP(3.1×4.9)
PKG8MF-PAA-0408

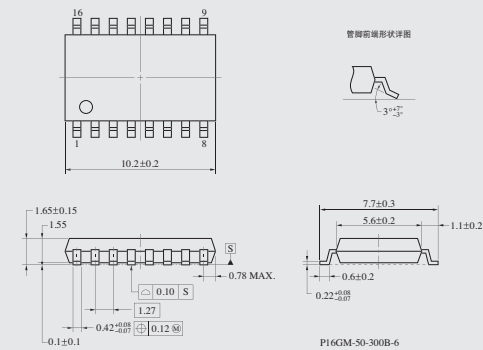


外形 11

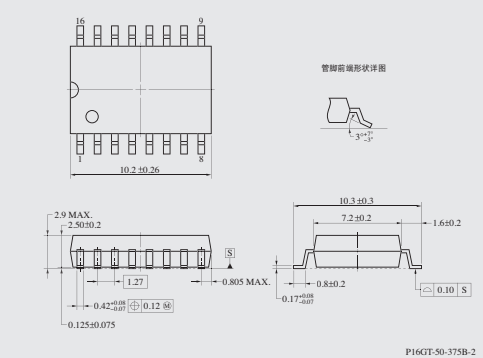
Package Dimensions 11

封装名称	Package Name	(单位: mm)
封装代码	Package Code	(Units : mm)

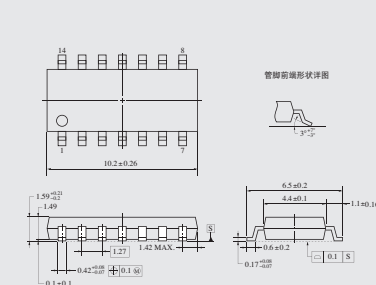
SOP 16Pin SOP(300ml)
PKG16GS-0403



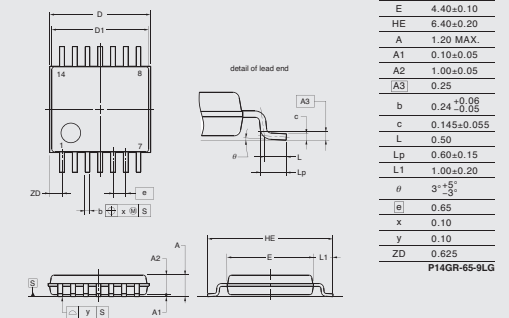
SOP 16Pin SOP(375ml)
PKG16GT-0106



SOP 14Pin SOP(225ml)
PKG14GR-AND-0103

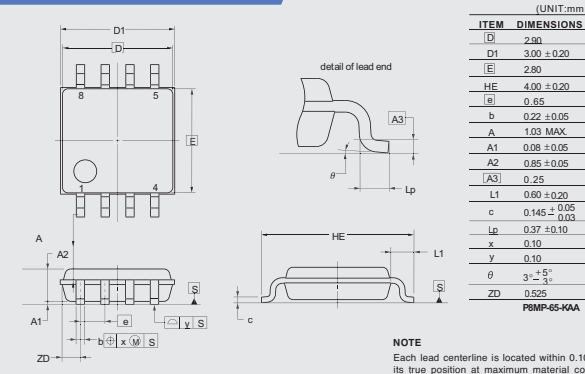


TSSOP 14Pin TSSOP(225ml)
PKG14GR-9LG-0405



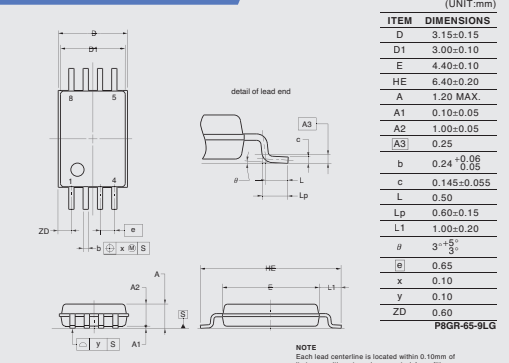
NOTE
Each lead centerline is located within 0.10mm of its true position at maximum material condition.

TSSOP 8Pin TSSOP(2.8×2.9)
PKG8MP-KAA-0405



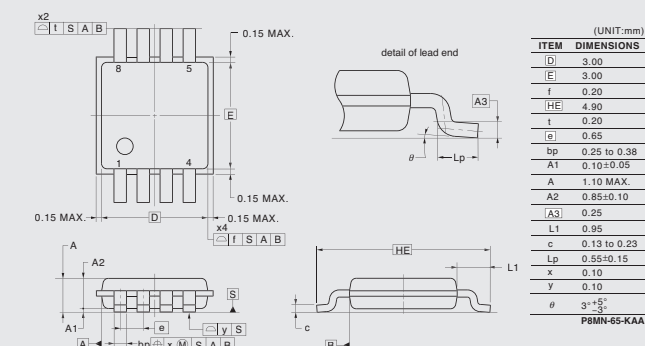
NOTE
Each lead centerline is located within 0.10 mm of its true position at maximum material condition.

TSSOP 8Pin TSSOP(225ml)
PKG8GR-9JG-0405



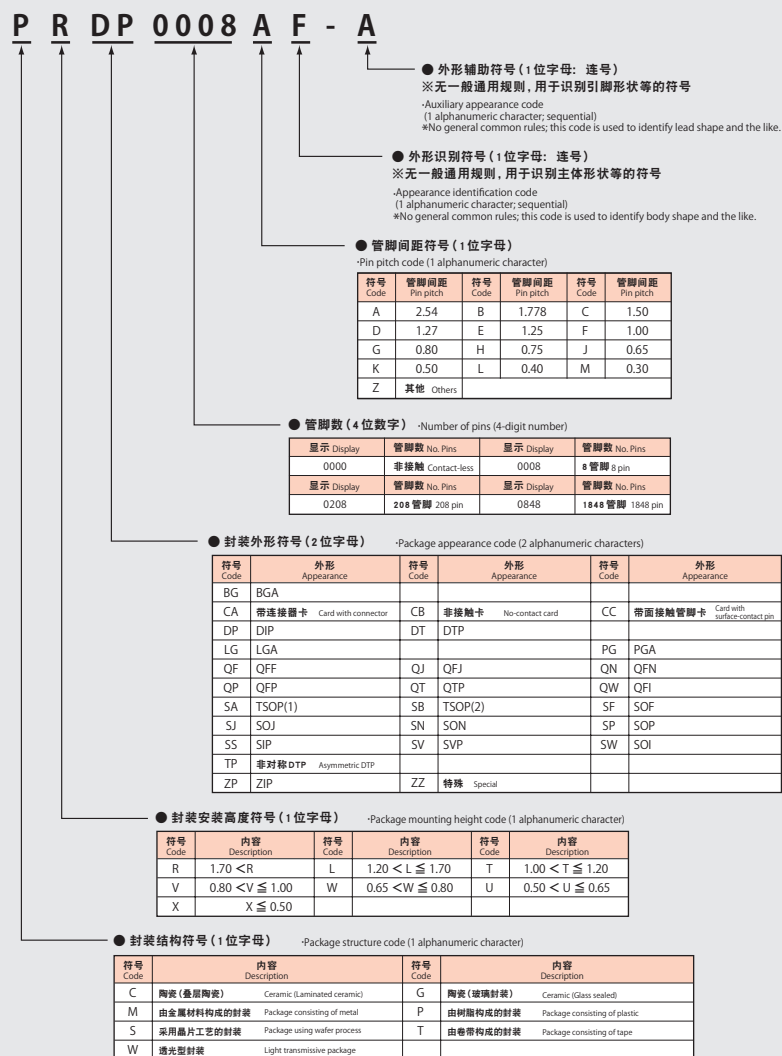
NOTE
Each lead centerline is located within 0.10mm of

TSSOP 8Pin TSSOP(3×3)
PKG8MN-KAA-0405



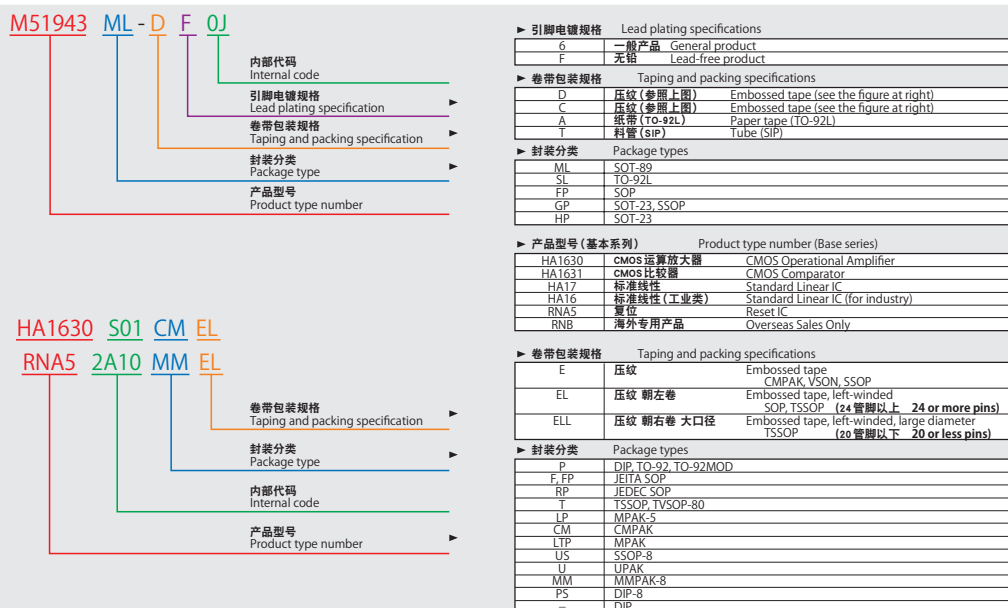
P8MN-65-KAA

瑞萨新封装代码 Renesas New Package Code Destination



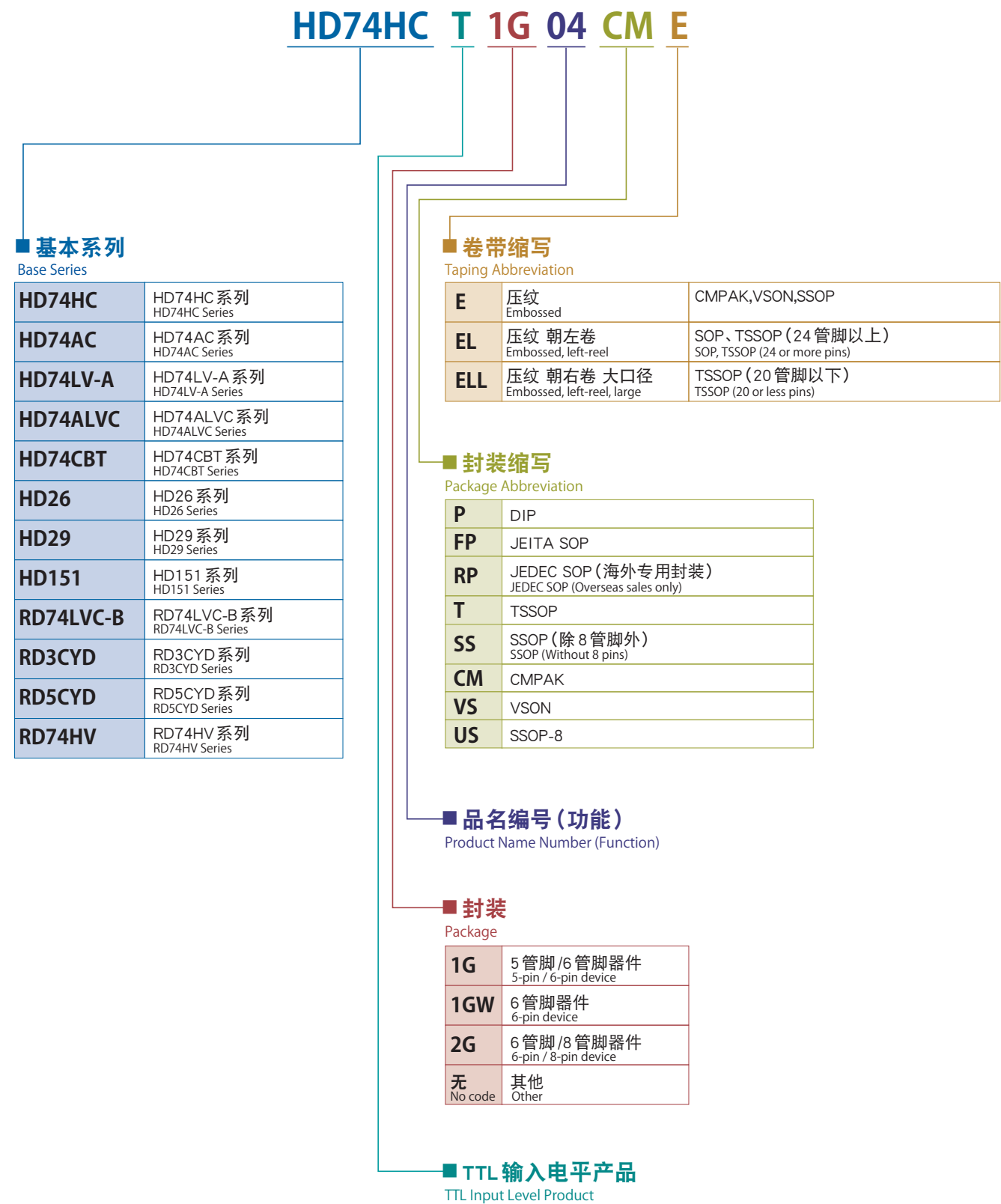
型号命名方法

Part No. Composition



标准逻辑 型号命名方法

Standard Logic Part No. Composition



注: HD74LV1G/2G的TTL输入产品为LV1GT/2GT。
Note: TTL input versions of the HD74LV1G/2G are the LV1GT/2GT.

串联稳压器的命名 Part No. Destination of Series Regulators

μ	PC	29	M	33	A	T	μ	PC	12	1	W	18	A	T1F
①	②	④	⑤	⑥	⑦		①	②	③	④	⑤	⑥	⑦	
①产品分类 Product category		③附加功能 Additional functions		⑤输出电压 Output voltage		⑦封装 Package								
C : 双极集成电路 Bipolar integrated circuits		0 : 无 None		00 : 可变 Variable		T : SC-63 or SOT-89								
D : CMOS集成电路 CMOS integrated circuits		1 : ON/OFF		10 : 1.0V or 10V 15 : 1.5V or 15V 18 : 1.8V or 18V		T1D : TO-252(3管脚) TO-252(Pin 3)								
②系列名称		④输出电流 Output Current												
[双极型 Bipolar type]		L : 100mA		25 : 2.5V		HB : SC-64								
78 : 正电压 Standard positive voltage		N : 300mA		33 : 3.3V		TA : SC-74A								
29 : 低输出低饱和正电压 Low-power LDO positive voltage		M : 500mA		05 : 5.0V		T1B : SOT-89								
[CMOS型 CMOS type]		无 No representation : 1A				T1F : TO-252(5管脚) TO-252(Pin 5)								
12 : 正电压 CMOS positive voltage		A : 2A												
		W : 1.5A												

开关稳压器的命名 Part No. Destination of Switching Regulators

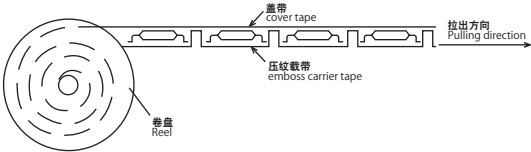
μ	PC	1933	GR
①	②	③	
①产品分类 Product category		②产品序列号 Product serial number	
C : 双极集成电路 Bipolar integrated circuits			
D : CMOS集成电路 CMOS integrated circuits			
		③封装 Package	
		C, CX : DIP	
		G, GR, GS : SOP	
		W : 晶片 wafer	

运算放大器和比较器的命名 Part No.Destination of Op Amp & Comparators

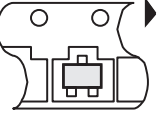
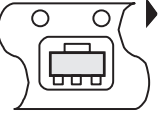
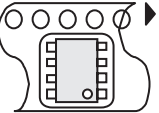
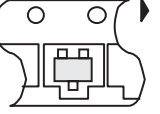
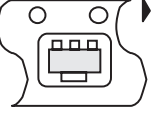
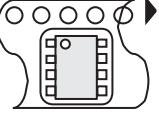
μ	PC	358	GR-9LG
①	②	③	
①产品分类 Product category		②产品序列号 Product serial number	
双极模拟IC Bipolar integrated circuits		· 温度扩展产品（或通信工业用） 适用独有的产品序列号 Temperature spec expanding products or industrial use products apply particular products serial number. (例) 1251、451、258等 · 一般用途的产品采用第一供应商的产品序列号 General use products apply those of first source manufacturers (例 Example) 3 5 8, 3 2 4, 4 5 5 8 etc.	
		③封装 Package	
		GR-9LG : TSSOP	
		MN-KAA : TSSOP(3×3)	
		MP-KAA : TSSOP(2.8×2.9)	
		G2 : SOP(225mil)	
		C : DIP(300mil)	

Package		Packing Unit (pcs/reel)	Symbol	Appearance	Magazine	
					(pcs/Stick)	(pcs/Inner Box)
SOP (JEITA)	FP-8DGV	2,500	-EL	卷带拉出方向→ Pulling direction  (Part No.) + (-EL)	100	1000
	FP14DAV/ 16DAV	2,000			50	1000
	FP-20DAV				40	1000
SOP (JEDEC)	FP-8DCV	2,500	-EL	卷带拉出方向→ Pulling direction  (Part No.) + (-EL)	—	—
	FP-14DNV	2,500			—	2500
TSSOP	TTP-8DAV	3,000	EL	卷带拉出方向→ Pulling direction  (Part No.) + (EL) or (-EL)	—	—
	TTP-14DV	2,000	ELL		—	2000
MMPAK-8		3,000	EL	卷带拉出方向→ Pulling direction  (Part No.) + (-EL)	—	—
UPAKV		1,000 or 1,000×4	-TL	卷带拉出方向→ Pulling direction  (Part No.) + (-TL)	25	2500
MPAK-5V MPAKV CMPAK-5V		3,000	-EL	卷带拉出方向→ Pulling direction  (Part No.) + (-EL)	—	—
TO-92/ TO-92MODV		2,500 (pcs/BOX)	-TZ	放大图 an enlargement  (Part No.) + (-TZ) Z字形装箱 Zigzag Box (EIAJ-RC-1008B)	—	—
DIP	DP-8	—	—	—	50	1000
	DP-14/16	—	—		25	1000
	DP-20	—	—		20	1000

※“EL”、“-TL”(UPAKV的)是朝左卷的压纹带。
※料盒发货产品为1000个的整数倍,带包装产品为各卷盘所含的数量。
Products with “-EL” and “-TL” (UPAKV) are the counterclockwise-reeled emboss-tape type.
Please order the products in multiples of 1000 in magazines.
Please order the products in packing units for shipment in reel.

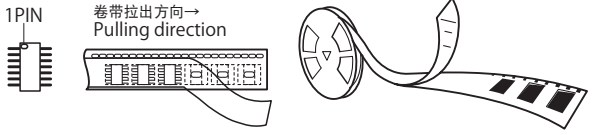
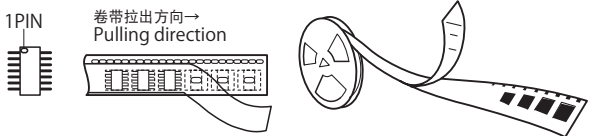
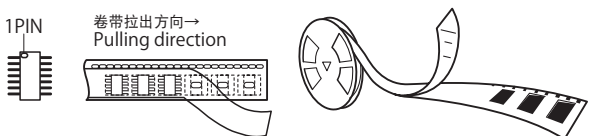
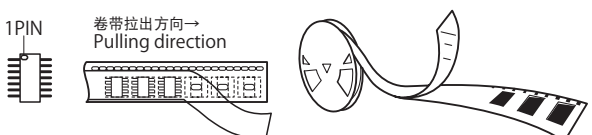
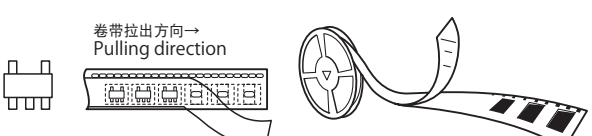
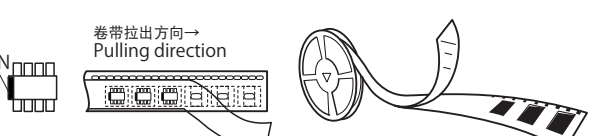


Package	Emboss Taping (pcs/reel)		Tube (pcs/stick)		Tube (pcs/inner box)		Tray (pcs/tray)		Tray (pcs/inner box)	
	Normal	Moisture-proof	Normal	Moisture-proof	Normal	Moisture-proof	Normal	Moisture-proof	Normal	Moisture-proof
SIP	5P5P		45		4950					
DIP	8P5		25		2500					
	8P4		50		2250 or 2000					
	14P4		25		1125 or 1000					
	16P4		25		1125 or 1000					
	18P4		20		900 or 800					
	20P4		20		900 or 800 or 720					
	22P4H		17		765 or 680					
			19							
	24P4D		16		720 or 640					
	20P4B		25		1125 or 1000					
SDIP										
SOP	8P2S-A	3000	100		15000					
	10P2-C	2000	80	80	8000 or 4800	1920 or 2560				
	10P2N-A	2000	70	70	7000	2240 or 4200				
	14P2P-A	3000	60	60	9000	1800				
	14P2N-A	2000	50	50	5000	1600 or 3000				
	16P2S-A	3000	50		7500					
	16P2N-A	1000	50	50	5000	1600 or 3000				
	20P2N-A	2000	40	40	4000	1280 or 2400				
	24P2N-B	2000	35	35	3500	1120 or 2100				
	24P2V-A	1000	30	30	2400	1800				
	8P2J-A									
	16P2E-A	3000 or 2500	90	90	2160	900				
SSOP	20P2E-A	4000 or 2500 or 500	70	70	1680	4000				
			80	80	7680	4000				
	24P2E-A	2500	60	60	5760	600				
			65			6240				
	24P2Q-A	2000	50	50	5000	1600 or 3000				
	36P2R-A	1000	35	35	2100	350 or 980				
LQFP	48P6D-A	1000					250		1250	720

C 指示T ₁ 方向 Indicates T ₁ direction			
D 指示T ₂ 方向 Indicates T ₂ direction			

通用逻辑卷带

General-Purpose Logic Taping Specifications

Package		Packing Configurations	Packing Unit (pcs/reel)	Symbol	Appearance
SOP (JEITA)	SOP-8* (FP)	料盒 (以1000个为单位) 卷带 Magazines (Multiples of 1000) Taping	2500	EL	
	SOP-14* (FP)		2000		
	SOP-16* (FP)				
	SOP-20* (FP)				
SOP (JEDEC)	SOP-8 (RP)	料盒 (以1000个为单位) 卷带 Magazines (Multiples of 1000) Taping	2500	EL	
	SOP-14* (RP)				
	SOP-16* (RP)				
	SOP-20* (RP)		1000		
TSSOP (JEITA)	TSSOP-14 (T)	卷带 Taping	2000	ELL	
	TSSOP-16 (T)				
	TSSOP-20 (T)				
	TSSOP-24 (T) TSSOP-48 (T)	卷带 Taping	1000	EL	
CMPAK VSON	CMPAK-5,6(CM) VSON-5(VS)	卷带 Taping	3000	E	
SSOP	SSOP-8 (US)	卷带 Taping	3000	E	
	SSOP-36 (FP)		1000	HO	

EL/ELL是朝左卷的压纹带。
EL/ELL is the counterclockwise-reeled emboss-tape type.

DIP 仅为料盒发货, TSSOP、CMPAK、VSON、SSOP 仅为卷带发货, SOP 支持料盒和卷带两种方式。
Products in DIP will be shipped in magazines only, and products in TSSOP, CMPAK, VSON, SSOP will be shipped in taping only, and products in SOP will be shipped in both magazines and taping.

: 料盒发货时, 请以“1000个的整数倍”为单位订货。(对象产品为带“”号产品和DIP产品。)

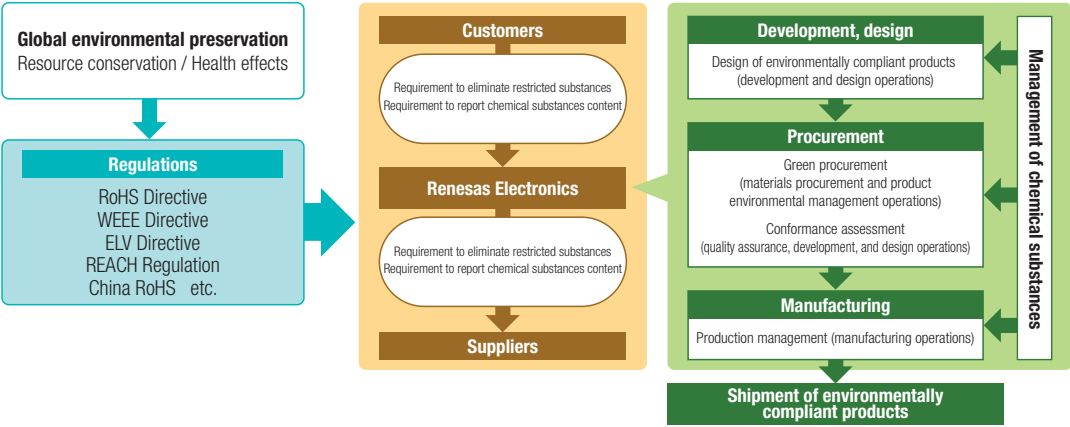
: Please order the products in multiples of 1000 for shipment in magazines (applicable only to “” and DIP).

Environmental Considerations for Renesas Electronics Products

Renesas Electronics is working actively to improve product environmental quality in all aspects of its business operations, including product design, materials procurement, manufacturing, and shipping.

- Design**
- **Development of environmentally compliant products through product environmental assessment**
Making products more resource and energy efficient (more compact, higher integration, reduced power consumption, extended service life)
Reducing environmental load due to chemicals (management of chemical content of products)
 - **Compliance with domestic and international product environmental regulations**
EU RoHS Directive, China RoHS, ELV Directive, REACH Regulation

< Renesas Product Environmental Quality Management Sequence >



- Procurement**
- Thoroughgoing green procurement activities
 - Investigation and confirmation of chemical content of procured parts and materials
- Manufacturing**
- Prevention of inclusion or contamination by prohibited chemicals in products (process management)
 - Reduction of CO₂ emissions (reduction of PFC output and energy usage), reduction of environmental load from chemicals used in manufacturing, reduction of waste materials
- Shipping**
- Reduction of volume of packing materials (expanding reuse of plastic packaging materials)
 - Reduction of energy consumption in transport (improving overall efficiency of distribution)

Compliance with customer requirements Transmission of information such as chemical content of products

RoHS : Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
WEEE : Waste Electrical and Electronic Equipment

ELV : End of Life Vehicles
REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals

Renesas Green Device Accreditation System

Renesas green device definitions:
Renesas Electronics defines green devices as products that reduce environmental impact by more than a specified amount over their life cycle, which includes procurement, production, distribution, use, and disposal, as determined at the R&D and design stage according to the company's internal environmental standards. Renesas Electronics recognizes three green device ranks for each fiscal year.

a) Green devices:
Products having a “FactorX” score of 1 or higher after completion of a product environmental assessment (at completion of development) and an improvement ratio of 10% or greater.

b) Supergreen devices:
Products that have been assigned a “FactorX” score after completion of a product environmental assessment (at completion of development) and an improvement ratio that place them among the top 20 products.

c) Ultragreen devices:
Products selected from among the supergreen devices as having environmental performance that is No. 1 in the industry or extremely high, or products that combine high environmental performance with excellence in another aspect such that they are considered to contribute substantially to boosting the presence of Renesas Electronics.

瑞萨电子通过网站为客户的开发提供全方位的综合支持。

根据用途检索的客户
瑞萨进一步充实了应用实例。

- 移动设备 / 网络
- 电脑和电脑外围设备
- 民用电子设备
- 保健器材
- 汽车
- 产业、楼宇管理
- 元器件技术

客户可从以上类别中检索符合目的要求的产品实例。

知道产品名称的客户
可从首页利用检索功能立即找到目标内容。

- 1 关键字 / 型号检索**
可利用关键字在站内检索，或者根据型号显示产品信息和数据表。
- 2 参数检索功能更丰富(高级产品选择)**
根据不同的产品类别 _ 子类别，再加上各种产品特性等检索条件，可在最短的时间内连接到您需要的产品信息。
- 3 文档检索**
可根据关键字、产品类别和文档类型进行检索。
- 4 检索中心**
关键字检索、参数检索、文档检索、样品代码检索、FAQ 检索、其他公司同等品检索等，各种检索汇集于一个页面。可选择最合适的检索方法获得所需信息。

根据类别检索的客户
从通用 IC 的首页，可根据不同的系列，找到电源 IC、单片机外围运算放大器和比较器、各种转换器 IC、逻辑 IC 等类别。此外，利用左侧的导航菜单也可立即找到通用 IC 相关文档。



● 其他强大功能

支持信息
Support Information

瑞萨电子以提供模拟数据、常见问题解答、举办研讨会、受理网站垂询等形式，根据客户需求提供全方位综合支持。

Renesas VP

利用在线设计支持工具功率 MOSFET 的工程师瑞萨 VP，只要在 Buck Designer 中输入客户的使用条件，即可用图形显示并确认与降压转换器最匹配的功率 MOSFET 组合及其特性。

用户注册
User Registration

通过因特网为您提供的样品系列齐全。用户登录后可请求需要的样品。

<http://cn.renesas.com>

http://cn.renesas.com/products/standard_ic/

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The Renesas Electronics website provides comprehensive support for your development work.

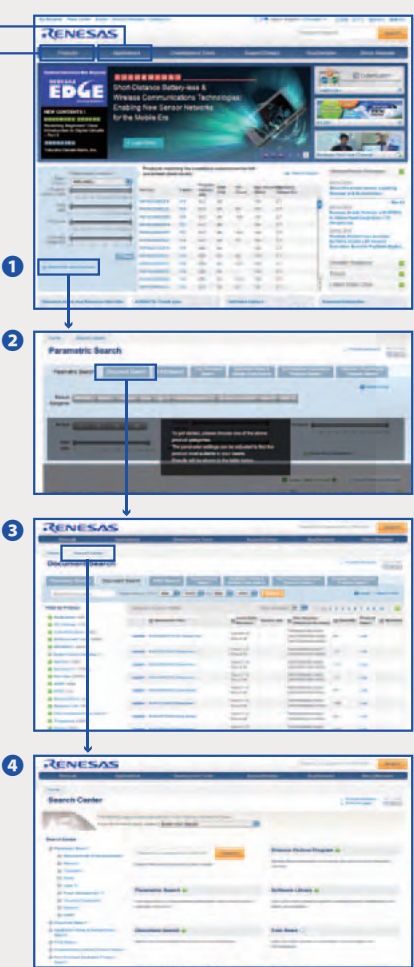
Searching by Application
The selection of application examples on the Renesas Electronics website has been further enhanced. You can search for product examples among the following categories.

- Mobile/networking
- PCs and PC peripherals
- Consumer electronics
- Healthcare
- Automotive
- Industrial/building management
- Elemental technologies

Searching by Product Name
By using the search function on the top page you can go directly to the content that interests you.

- 1 Keyword/Part No. Search**
You can search the contents of the website by entering keywords or enter a part number to view a listing of product information, data sheets, and more.
- 2 Enhanced Parametric Search (Advanced Product Selector)**
You can specify the product category and subcategory and quickly locate the product information you need by narrowing your search according to a variety of product characteristics.
- 3 Document Search**
You can search for documents by keyword, document category, or document type.
- 4 Search Center**
The Search Center gives you quick access from a single page to powerful search functions, including Keyword Search, Parametric Search, Document Search, Software Library, FAQ Search, and Non-Renesas Equivalent Product Search. Use the optimal search tool to locate exactly the information you require.

Searching by Category
From the standard IC top page you can search for content arranged by product series from among categories such as power ICs, op-amps and comparators for use with MCUs, converter ICs, and logic ICs. In addition, you can use the navigation panel on the left to locate documentation related to standard ICs.



Support Information

We aim to offer a total support package to meet customers' needs through the provision of simulation data, FAQ, seminars, inquiries via the Web, and so on.

Renesas VP

The Buck Designer section of Renesas VP enables you to enter your usage conditions to obtain a listing of the optimal power MOSFETs for your buck converter and a graphical display of its simulated characteristics.

User Registration

MyRenesas Registration provide rich information about Renesas by mail-magazine and various premium supports.

<http://www.renesas.com/index.jsp>

Overseas <http://www.renesas.com/en/gpsp>

Renesas Electronics Corporation

Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

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Renesas Electronics America Inc.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
 Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
 Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
 Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
 Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
 Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
 Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
 Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei, Taiwan
 Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

1 harbourFront Avenue, #06-10, Keppel Bay Tower, Singapore 098632
 Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
 Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.

11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
 Tel: +82-2-558-3737, Fax: +82-2-558-5141