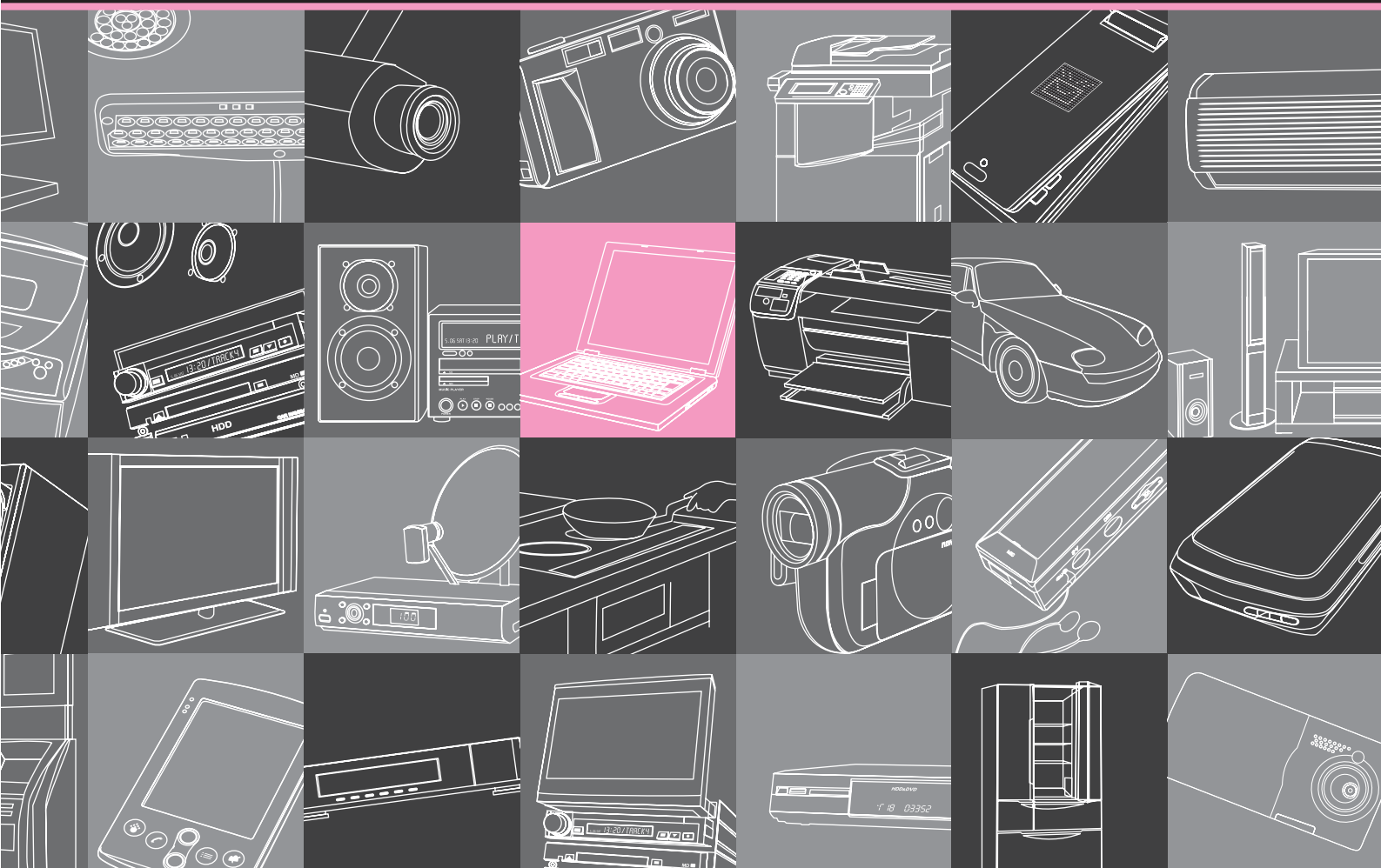




Notebook PCs

- General Purpose ICs
- Video and Imaging ICs
- Audio ICs
- IT Equipment ICs
- Consumer Product ICs
- Automotive ICs
- Discrete Semiconductors
- Optoelectronics
- Modules

APPLICATION GUIDE 2009 1st



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ROHM's devices optimized for notebook PC which is a required item of active life.



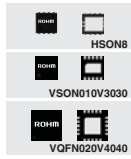
Power Supply

ISi Nch FET built in for ultra-low saturation

Ultra LDO with Built-in FET

BD35□□ series (0.5 to 4.0A)

Ideal for chipset power supplies requiring up to 4A. Original control method utilized for the industry's fastest response time. Vdrop (max.) less than 0.3V, even at high currents.

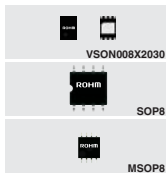


ISi Optimized for high-speed data transfer

Termination Regulators for DDR-SDRAMs

BD353□ series

ROHM DDR-SDRAM termination linear regulators were developed for high speed data transmission between DDR-SDRAM memory and GMCH.

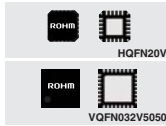


ISi H³reg™ ensures fast response and high efficiency

Switching Regulators for DDR-SDRAM Cores

BD9533EKN (1ch SLLM H³reg™ controller)
BD9535MUV (2ch SLLM H³reg™ controller)
New BD95242MUV (2ch SLLM H³reg™ controller + LDO)

Original SLLM (Simple Load Light Mode) control results in high efficiency, even during suspend mode. Stable output is ensured, even during sudden load changes.

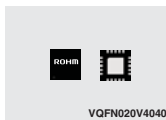


ISi The benchmark in secondary regulators

Switching Regulators with Built-in FET

BD9130EFJ (2A)
New BD9132MUV (3A)
☆ BD9137MUV (4A)

The BD91□□ series of step-down current mode switching regulators feature fast response and high efficiency in a compact, space-saving package, making them ideal for use as secondary regulators.



Di Simultaneous low V_F, low I_R and high ESD

Schottky Barrier Diodes

RSX101VA-30 (V_{RM}=30V, I_O=1A)
RSX071VA-30 (V_{RM}=30V, I_O=0.7A)
RSX051VA-30 (V_{RM}=30V, I_O=0.5A)



R Superior resistance temperature coefficient ideal for current detection

Ultra-low Ohmic Chip Resistors for Current Detection

PMR series (1608 to 6432 size)

Resistance range : 1mΩ to 10mΩ
A metallic resistive element is utilized for greater rated power.

New UCR10 series (2012 size)

Resistance range : 11mΩ to 100mΩ
High rated power : 0.33W



Em Ideal for noise suppression in power supply lines.

Three-terminal EMI filters

MCF18 series (1608 [0603] size)

Supports rated currents up to 4A in the 1608 size.
Low internal resistance (20mΩ Max.) ensures low loss.



Tc Noise reduction in high frequency circuits and near power supplies

Tantalum Capacitors

<Conductive polymer type> TCO/TCTO series

M case (1608 size) 15μF Max. (TCTO series)
P case (2012 size) 47μF Max. (TCTO series)
AL case (3216 Low profile size) 100μF Max. (TCTO series)
A case (3216 size) 68μF Max. (TCO series)
B case (3528 size) 330μF Max. (TCO series)

Modifying the cathode material results in lower ESR and reduced risk of combustion.



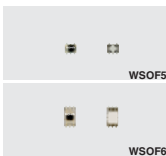
LCD Display

ISi Improves visibility and reduces power consumption in notebook PCs and displays

High Performance Ambient Light Sensor ICs

BH1600FVC (Analog output)
BH1710FVC (Digital output)
BH1603FVC (High accuracy analog output)
BH1715FVC (High accuracy digital output)

The lineup includes current output types and units featuring 16bit serial output. Intelligently adjusts the brightness based on ambient conditions automatically for optimum visibility.



LED Brightness and package optimized for backlighting

High Brightness /High Heat Dissipation White LEDs

Top view type
PSML2 (SMLK series)

New Side view type
PSML-S / PSML-ST

Compact types available (t=0.8mm, 2.15mm).



ISi Efficiently drives backlight LEDs for maximum visibility and battery life

LED Drivers built-in Current Driver

BD6586MUV
4-line constant current driver with internal FET (Input voltage: 2.7V to 5.5V)
BD6583MUV-A
6-line constant current driver with external FET (Input voltage: 2.7V to 22V)
☆ BD6593MUV
8-line constant current driver with internal FET (Input voltage: 4.2V to 26V)
☆ BD6150MUV
6-line constant current driver with internal FET (Input voltage: 4.2V to 26V)

Features include a broad input voltage range and PWM dimming. High efficiency operation contributes to lower power consumption.



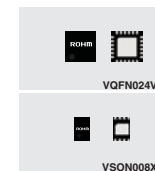
Speaker Amplifier/Headphone Amplifier

ISi Class D speaker amps prolong battery life

2.5W Monaural Class-D Speaker Amplifier for Differential Analog Input

☆ BD5472MUV (Stereo, built-in 3.3V regulator)
☆ BD5632NUX (Monaural, 6dB gain)
☆ BD5634NUX (Monaural, 12dB gain)
☆ BD5638NUX (Monaural, 18dB gain)

Multiple protection circuits built in for ultra-high reliability. High efficiency operation ensures little heat generation. Popping noise suppression circuit also integrated.



Develop a wide range of high-performance devices for commercial and public use with market-tested high reliability products from ROHM.



Fan Motor



Compact + Low Power Consumption + Quiet Operation
= #1 Market Share*

Fan Motor Drivers

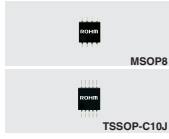
BH6799FVM (Voltage control type)

BD6989FVM (PWM control type)

New

BD6963AFUJ (Low power PWM control type)

Low power consumption and quiet drive designed for fan motors in notebook PCs. The industry standard in fan motor drivers.



*ROHM study



AC Adapter



Significantly reduced switching loss

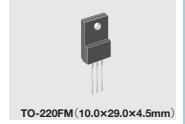
High Voltage Resistance MOSFETs

R5007ANX ($V_{DSS}=500V$, $I_D=7A$, TO-220FM)

R5016ANX ($V_{DSS}=500V$, $I_D=16A$, TO-220FM)

R6008ANX ($V_{DSS}=600V$, $I_D=8A$, TO-220FM)

R6010ANX ($V_{DSS}=600V$, $I_D=10A$, TO-220FM)



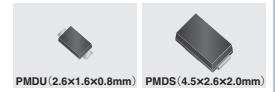
A newly developed low $R_{DS(on)}$ process is utilized for dramatically improved switching speed - 30% higher than conventional products.



Industry's fastest recovery ensures ultra-low heat generation

Fast Recovery Diodes

RF series



Proprietary technology utilized for the industry's fastest switching speed with low V_f .



Wireless LAN



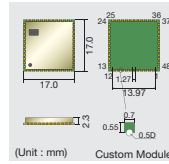
Modularization enables easy integration

IEEE802.11b/g-compliant Wireless LAN Module

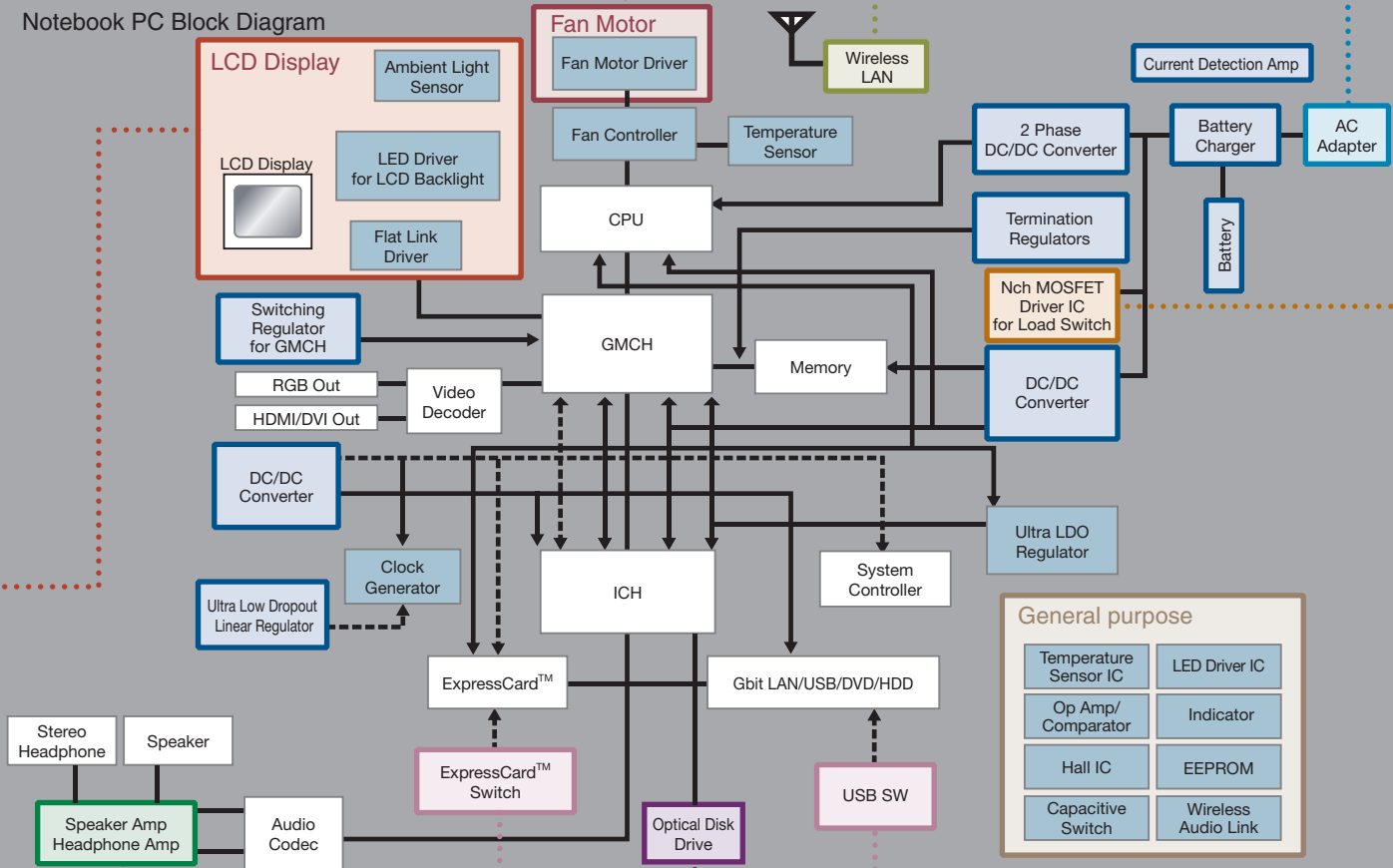
New

BW9419

IEEE802.11b/g compatibility and built-in IEEE802.11i security engine simplify host-side software development (i.e. device drivers).



Notebook PC Block Diagram



Optical Disk Drive



Original element configuration enables stable output and high durability.
Ideal for thin pickups.

Laser Diodes

<Dual Wave Laser Diodes>

RLD2WMSGZ4

(10mW/655nm, 240mW (pulse)/782nm, high heat dissipation frame)

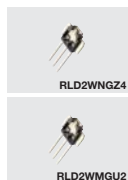
• CD : Recording, Playback

• DVD : Playback

RLD2WMGU2

(350mW (pulse)/662nm, 380mW (pulse)/782nm, high heat dissipation frame)

• CD, DVD High-speed recording, Playback



Multiple package types ensure compatibility with a wide range of detection requirements.

Transmission-type Photointerrupters

New

RPI-0128 (2.4x1.6mm, t=1.8mm)

• The world smallest class
RPI-0126 (2.8x1.8mm, t=2.0mm)

• Wide gap (1.2mm)

RPI-0226 (4.4x2.7mm, t=2.95mm)

• 2mm gap surface mount type

• Integrated position detection function

• Double mold structure improves quality and reliability





Load Switch

LSI **Compatible with NMOS switches for lower power consumption**
MOSFET Controller IC

BD2270HFV

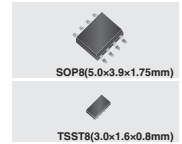
Integrates a driver circuit for powering an external NMOSFET. Utilizing an external NMOSFET makes it possible to easily customize the current specifications to suit set needs.



HVSOF6

Tr **Expanded lineup**
Middle Power MOSFETs

- RSS130N03 ($V_{DSS}=30V, I_D=13A, SOP8$)
- SP8K4 ($V_{DSS}=30V, I_D=9A, SOP8 \times 2$)
- New** RT1E060RN ($V_{DSS}=30V, I_D=6A, TSST8$)
- New** TT8K3 ($V_{DSS}=30V, I_D=3A, TSST8 \times 2$)



SOP8(5.0x3.9x1.75mm)

TSST8(3.0x1.6x0.8mm)

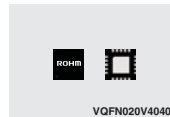


Interface

LSI **Ideal for ExpressCard™ control**
Power Switch ICs for ExpressCard™

- New** BD4156MUV (Compact, high power)
- BD4153FV (with OC Flag)
- BD4154FV (Standard type)
- BD4155FV (Compatible with logic input)

A soft start function, charging circuit, status monitor, and multiple protection circuits are built into a single chip, enabling high reliability power control.



VQFN020V4040

Di **Positive/negative surge protection on a single chip**
Bi-Directional Zener Diodes

- RSB16V ($V_Z=14.4$ to $17.6V$)
- RSB18V ($V_Z=16.2$ to $19.8V$)
- RSB27V ($V_Z=26.2$ to $32.0V$)
- And more

Reduces mounting area by 50%



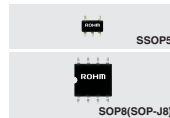
UMD2(1.7x1.25x0.7mm)

LSI **Built-in protection circuits enable safer designs**
USB High Side Switch ICs

- BD204□FJ, BD205□FJ, **New** BD206□FJ
(Standard 1ch/2ch high side switch series)

- New** BD22□□G
(Ultra-compact 1ch high side switch series)

A low ON-resistance MOSFET switch and multiple protection circuits are integrated into a monolithic solution. Easily configure a load switch with full protection functionality for various interfaces, including USB and memory cards.



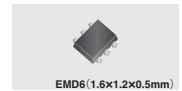
SSOP5

SOP8(SOP-J8)

Di **Optimized for high-speed data transfer**
Low Capacitance Zener Diodes

- RSB12JS2 ($V_Z=9.6$ to $14.4V$)
- RSB12Z ($V_Z=9.6$ to $14.4V$)
- RSB12W ($V_Z=9.6$ to $14.4V$)
- And more

Low Ct (1pF).
Two elements are incorporated into a single package, reducing mounting area.



EMD6(1.6x1.2x0.5mm)

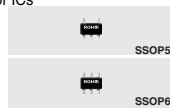


General Purpose

LSI **High precision internal temperature detection**
Compact, High Accuracy Thermostat Temperature Sensor ICs

- BDE□□□□G series (3-step detection temperature switching)
- BDF□□□□G series (9-step detection temperature switching)

All required functions, including a temperature detection element and high accuracy reference voltage source, are integrated into a single chip, enabling temperature detection without complicated circuit designs.



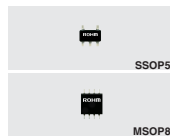
SSOP5

SSOP6

LSI **Low power consumption**
General-purpose CMOS Operational Amplifiers

- BU7241G (Single circuit input/output full swing)
- BU7242FVM (Dual circuit input/output full swing)
- New** BD7541G (Single circuit high voltage type)
- New** BD7542FVM (Single circuit high voltage type)
- New** BU7441G (Single circuit low voltage type)
- New** BU7442FVM (Single circuit high voltage type)

Comparators are also available.



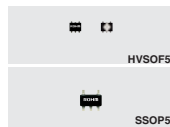
SSOP5

MSOP8

LSI **Design high precision switches with magnetic sensor ICs**
Hall ICs for Magnetic Switches

- BU52021HFV
(HVSOF5 package : 1.6x1.6x0.6Max. mm)
- New** BU52025G
(SSOP5 package : 2.9x2.8x1.25Max. mm)

Contactless method eliminates malfunctions due to physical deterioration inherent with mechanical switches.



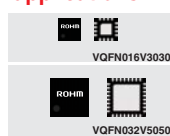
HVSOF5

SSOP5

LSI **Configure cutting-edge touch screen applications**
Capacitive Sensor Switch Control ICs

- BU21010MUV (8ch)
- BU21008MUV (16ch)

ROHM offers 8ch/16ch capacitive switch controller ICs that enable touch switch control via simple register settings.



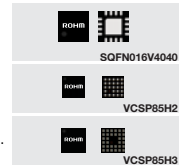
VQFN016V3030

VQFN032V5050

LSI **Designed for keyboard backlighting**
Individual Control LED Driver ICs

- New** BD1606MVV (3-system individual control)
- BD2802GU (6ch illumination)
- ☆ BD2812GU (6ch illumination with step-up circuit)

Brilliant key backlighting effects with virtually no MCU load.



SQFN016V4040

VCSF85H2

VCSF85H3

Tr **Energy-saving**
Low Voltage 1.5V Drive MOSFETs

- <ECOMOS™ series>
- RUQ050N02 ($V_{DSS}=20V, I_D=5A, TSMT6$)
- RZQ050P01 ($V_{DSS}=-12V, I_D=-5A, TSMT6$)

- New low voltage front-end process utilized for low 1.5V drive.
- Industry's lowest $R_{DS(on)}$.
- Reduces overall energy consumption.

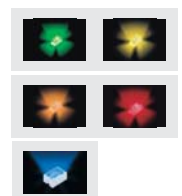


TSMT6(2.0x1.6x0.85mm)

LED **Broad range of colors and sizes**
Light Sources for Indicators

- SML-512 series
(1.6x0.8x0.55mm)
- SML-212 series
(2.0x1.25x0.8mm)
- SML-01 series
(3.0x2.0x1.3mm)

Reflector-type models are also offered.



IC Product Specifications

Power Supply

Nch FET Ultra LDO (Integrated FET)

Nch FET Ultra LDO for PC Chipsets

Part No.	Input voltage (V)	Output voltage (V)	Voltage precision (%)	Output current (A)	Overcurrent protection	NRCS (soft start)
New BD3550HFN	4.3 to 5.5	Variable (0.65 to 2.7)	±1	0.5	✓	Variable
BD3551HFN	4.3 to 5.5	Variable (0.65 to 2.7)	±1	1.0	✓	Variable
BD3552HFN	4.3 to 5.5	Variable (0.65 to 2.7)	±1	2.0	✓	Variable
BD3508MUV	4.3 to 5.5	Variable (0.65 to 2.7)	±1	3.0	✓	Variable

Nch FET Ultra LDO for PC Chipsets with Power Good

Part No.	Input voltage (V)	Output voltage (V)	Voltage precision (%)	Output current (A)	Overcurrent protection	NRCS (soft start)
New BD3540NUV	3.0 to 5.5	Variable (0.65 to 2.7)	±1	0.5	✓	Variable
New BD3541NUV	3.0 to 5.5	Variable (0.65 to 2.7)	±1	1.0	✓	Variable
☆ BD3542NUV	3.0 to 5.5	Variable (0.65 to 2.7)	±1	2.0	✓	Variable
New BD3512MUV	4.3 to 5.5	Variable (0.65 to 2.7)	±1	3.0	✓	Variable
BD3509MUV	4.3 to 5.5	Variable (0.65 to 2.7)	±1	4.0	✓	Variable

Termination Regulators for DDR-SDRAMs

Part No.	Input voltage (V)	Output voltage (V)	Voltage precision (%)	V _{IT} output current (A)	V _{ISER} output current (mA)	NRCS (soft start)
BD3532F	4.3 to 5.5	0.75 to 1.25	±30	±3.0	±20	✓
BD3531F	4.5 to 5.5	0.75 to 1.25	±30	±1.5	±10	None
BD3533F	2.7 to 5.5	0.75 to 1.25	±30	±1.0	±20	✓
BD3533FVM	2.7 to 5.5	0.75 to 1.25	±30	±1.0	±20	✓
BD3533HFN	2.7 to 5.5	0.75 to 1.25	±30	±1.0	±20	✓
BD3537F	4.75 to 5.25	0.60 to 1.60	±20	±1.8	None	✓
New BD3538F	2.7 to 5.5	0.75 to 1.25	±30	±1.0	±20	✓
New BD3538FVM	2.7 to 5.5	0.75 to 1.25	±30	±1.0	±20	✓
New BD3538HFN	2.7 to 5.5	0.75 to 1.25	±30	±1.0	±20	✓
New BD3539FVM	2.7 to 5.5	0.75 to 0.90	±15	±1.0	±10	✓
☆ BD3539NUX	2.7 to 5.5	0.75 to 0.90	±15	±1.0	±10	✓
☆ BD35390FJ	2.7 to 5.5	0.75 to 1.25	±15	±1.0	None	✓

Switching Regulators for DDR-SDRAM Cores

Switching Regulators for DDR-SDRAM Cores

Part No.	Input voltage (V)	Output voltage (V)	Reference voltage accuracy (%)	Output current (A)	NRCS (soft start)
BD9533EKN	4.5 to 5.5	4.5 to 28.0	±1	Depend on external FET	Variable
BD9535MUV	4.5 to 5.5	3.0 to 28.0	±1	Depend on external FET	Variable

Main Power Supply ICs for Note PC (Linear Regulator Integrated)

Part No.	Input voltage (V)	Output voltage (V)	Reference voltage accuracy (%)	Output current (A)	Termination resistors output (V)	SLLM/QLLM	NRCS (soft start)
New BD95242MUV	(Built-in 5V Reg)	7.0 to 25	±1	2.0 to 5.5	±1	3.3/5.0	✓/✓

Switching Regulators with Built-in FET

Part No.	Number of outputs	Supply voltage (V)	Output current (A)	Output voltage (V)	Reference voltage accuracy (%)	Operating temperature (°C)
BD9130NV	1	2.7 to 5.5	2.0	Variable (1.0 to 2.5)	±1.5	-25 to +105
New BD9132MUV	1	2.7 to 5.5	3.0	Variable (1.0 to 2.5)	±1.5	-40 to +105
☆ BD9137MUV	1	2.7 to 5.5	4.0	Variable (0.8 to 3.3)	±1.5	-40 to +105

LCD Display

High Performance Ambient Light Sensor ICs

Analog Current Output Type Ambient Light Sensor ICs

Part No.	Output type	Supply voltage (V)	Sensitivity variations (%)	Output Sensitivity gain	Illuminance measurement range (lx)	Temperature operating range (°C)
BH1600FVC	Current (Source)	2.4 to 3.6	±35	2 steps	0 to 50,000	-30 to +85
BH1603FVC	Current (Source)	2.4 to 5.5	±15	3 steps	0 to 100,000	-40 to +85

Digital 16bit Serial Output Type Ambient Light Sensor ICs

Part No.	Output type	Supply voltage (V)	Sensitivity Variations (%)	I/O Voltage	Illuminance measurement range (lx)	Temperature operating range (°C)
BH1710FVC	I ² C I/F	2.4 to 3.6	±38	1.65 to V _{CC}	0 to 65,000	-30 to +85
BH1715FVC	I ² C I/F	2.4 to 3.6	±15	1.65 to V _{CC}	0 to 65,000	-40 to +85

Built-in Current Driver LED Drivers

Part No.	Supply voltage (V)	LEDs	Output voltage (V)	Output current (mA)	Switching frequency (MHz)
BD6583MUV-A	3.1 to 22	72 Max. (12 connected in series x 4 lines) V _f restrictions exist	43.0 Max.	25 (Per 1 line)	1.0
BD6586MUV	3.1 to 5.5	24 Max. (6 connected in series x 4 lines) V _f restrictions exist	24.0 Max.	25 (Per 1 line)	1.0
☆ BD6593MUV	4.2 to 26.0	80 Max. (10 connected in series x 8 lines) V _f restrictions exist	40.0 Max.	30 (Per 1 line)	1.25/0.75
☆ BD6150MUV	4.2 to 26.0	80 Max. (10 connected in series x 8 lines) V _f restrictions exist	40.0 Max.	30 (Per 1 line)	1.25/0.75

Speaker Amplifier/Headphone Amplifier

High Performance 2.5W Class-D Speaker Amplifier for Portable Equipments

2.5W Monaural Class-D Speaker Amplifier for Differential Analog Input

Part No.	Supply voltage (V)	Power dissipation (W)	Quiescent current (mA)	Voltage gain (dB)	Output power (W)
☆ BD5632NUX	2.5 to 5.5	0.52	2.7 (V _{CC} =3.6V)	6	0.85 (V _{CC} =3.6V, R _L =4Ω)
☆ BD5634NUX	2.5 to 5.5	0.52	2.7 (V _{CC} =3.6V)	12	0.85 (V _{CC} =3.6V, R _L =4Ω)
☆ BD5638NUX	2.5 to 5.5	0.52	2.7 (V _{CC} =3.6V)	18	0.85 (V _{CC} =3.6V, R _L =4Ω)

2.5W+2.5W Class-D Speaker Amplifier for Differential Analog Input

Part No.	Supply voltage (V)	Power dissipation (W)	Quiescent current (mA)	Voltage gain (dB)	Output power (W)	Max LDO current (mA)
☆ BD5472MUV	4.5 to 5.5	0.7	5.8 (V _{CC} =5V)	6/12/18/24 (Variable)	2.5 (V _{CC} =5V, R _L =4Ω)	200

Fan Motor

Fan Motor Drivers

Part No.	Supply voltage (V)	I _O Max. (mA)	Power Tr.	Output saturation voltage (V)	Speed control	Hall bias voltage (V)
BH6799FVM	2.0 to 6.0	1000	CMOS	Upper and Lower 0.32(I _O =250mA)	—	1.3
BD6989FVM	2.9 to 8.0	800	DMOS	Upper and Lower 0.4(I _O =250mA)	Direct PWM	—
New BD6963AFUJ	2.5 to 5.5	1000	CMOS	Upper and Lower 0.4(I _O =300mA)	Direct PWM	1.3

Wireless LAN

IEEE802.11b/g compliant Wireless LAN Module

Part No.	Power Supply (V)	Host I/F	IEEE802.11b/g
New BW9419	3.0 to 3.6	SPI/SDIO	Yes

Load Switch

MOSFET Controller IC

Part No.	Supply voltage (V)	Current consumption (μA)	Control input logic	Gate terminal output voltage (V)	Output turn on time Gate terminal V _{GS} >=4V	Load discharge circuit (Ω)
BD2270HFV	2.7 to 5.5	50	H Active H>2.45V/L<1.35V	13.5 at V _{CC} =5.0	130μs	200

Interface

Power Switch ICs for ExpressCard™

Part No.	Input voltage (V)	Number of output channel	On Resistance (mΩ)	Output current (A)	NRCS (Soft start)
BD4153FV	3.0 to 3.6/3.0 to 3.6/1.35 to 1.65	3ch	35(3.3V)/100(3.3V)/42(1.5V)	1.3/0.275/0.65	Variable
BD4154FV	3.0 to 3.6/3.0 to 3.6/1.35 to 1.65	3ch	42(3.3V)/120(3.3V)/45(1.5V)	1.3/0.275/0.65	Fixed
BD4155FV	3.0 to 3.6/3.0 to 3.6/1.35 to 1.65	3ch	42(3.3V)/120(3.3V)/45(1.5V)	1.3/0.275/0.65	Fixed
New BD4156MUV	3.0 to 3.6/3.0 to 3.6/1.35 to 1.65	3ch	42(3.3V)/120(3.3V)/45(1.5V)	1.3/0.275/0.65	Fixed

USB High Side Switch ICs

1ch Small Current Output USB High Side Switch ICs

Part No.	Input voltage (V)	Current consumption (μA)	On Resistance (mΩ)	Control input logic	Over current detection (A)	Output turn on time 10%→90%(ms)
BD2055AFJ	2.7 to 5.5	90	80	H Active H>2.0V/L<0.8V	0.5	1.2
BD2045AFJ	2.7 to 5.5	90	80	L Active H>2.0V/L<0.8V	0.5	1.2

1ch Large Current Output USB High Side Switch ICs

Part No.	Input voltage (V)	Current consumption (μA)	On Resistance (mΩ)	Control input logic	Over current detection (A)	Output turn on time 10%→90%(ms)
New BD2061AFJ	2.7 to 5.5	90	80	L Active H>2.0V/L<0.8V	1.5	1.2
New BD2065AFJ	2.7 to 5.5	90	80	H Active H>2.0V/L<0.8V	1.5	1.2
BD2051AFJ	2.7 to 5.5	90	80	H Active H>2.0V/L<0.8V	1.0	1.2

2ch Small Current Output USB High Side Switch ICs

Part No.	Input voltage (V)	Current consumption (μA)	On Resistance (mΩ)	Control input logic	Over current detection (A)	Output turn on time 10%→90%(ms)
BD2056AFJ	2.7 to 5.5	110	100	H Active H>2.0V/L<0.8V	0.5	1.8
BD2046AFJ	2.7 to 5.5	110	100	L Active H>2.0V/L<0.8V	0.5	1.8

2ch Large Current Output USB High Side Switch ICs

Part No.	Input voltage (V)	Current consumption (μA)	On Resistance (mΩ)	Control input logic	Over current detection (A)	Output turn on time 10%→90%(ms)
BD2052AFJ	2.7 to 5.5	110	100	H Active H>2.0V/L<0.8V	1.00	1.8
BD2042AFJ	2.7 to 5.5	110	100	L Active H>2.0V/L<0.8V	1.00	1.8

1ch Small Current Output Power Management ICs

Part No.	Input voltage (V)	Current consumption (μA)	On Resistance (mΩ)	Control input logic	Limited current level (A)	Output turn on time Gate terminal 10%→90%(ms)
BD2202G	2.7 to 3.6	70	150	H Active H>2.0V/L<0.8V	0.4 (Latch type)	1.2
BD2206G	2.7 to 3.6	70	150	H Active H>2.0V/L<0.8V	1.05 (Latch type)	1.2
New BD2224G	2.7 to 5.5	110	150	H Active H>2.0V/L<0.8V	0.5 (Auto recovery type)	1.0
New BD2225G	2.7 to 5.5	110	150	L Active H>2.0V/L<0.8V	0.5 (Auto recovery type)	1.0

General Purpose

Compact, High Accuracy Thermostat Temperature Sensor ICs

Part No.	Types	Detected temperature range (°C)	Detected temperature changeable step (°C)	Detected temperature changeable step (°C)	Output type	
BDE□□□0G series	-20°C to +120°C 10°C step 15 types	-25 to +125	±5	±5	Open Drain	L
☆ BDE□□□1G series					H	
☆ BDE□□□2G series					L	
☆ BDE□□□3G series					H	
BDF□□□0G series	-20°C to +120°C 20°C step 8 types	-30 to +130	±2.5	±10	Open Drain	L

General-purpose CMOS Operational Amplifiers

Low Voltage Operation CMOS Operational Amplifier

Part No.	Supply voltage (V)	Circuit current (μA)	Input offset voltage (mV)	Output current (mA)	Slew rate (V/μs)	Gain band width (MHz)
BU7241G	1.8 to 5.5	70	1	10	0.4	0.9
BU7242FVM	1.8 to 5.5	180	1	10	0.4	0.9
New BU7441G	1.7 to 5.5	50	1	6	1.0	1.0
New BU7442FVM	1.7 to 5.5	100	1	6	0.3	0.6

High Voltage Operating CMOS Operational Amplifiers : Input / Output Full Swing

Part No.	Supply voltage (V)	Circuit current (μA)	Input offset voltage (mV)	Output current (mA)	Slew rate (V/μs)	Gain band width (MHz)
New BD7541G	5 to 14.5	180	1	4	0.3	0.6
New BD7542FVM	5 to 14.5	400	1	4	0.3	0.6

Hall ICs for Magnetic Switches

Part No.	Supply voltage (V)	Operate Point (mT)	Hysteresis (mT)	Period (ms)	Supply current(Avg.) (μA)	Output
BU52021HFV	2.40 to 3.6	+/-3.7	0.8	50	8.0	CMOS
New BU52025G	2.40 to 3.6	+/-3.7	0.8	50	8.0	CMOS

☆ : Under development

IC Product Specifications

Capacitive Sensor Swirch Control ICs

Part No.	Supply voltage (V)	Sensor input ch	LED control ch	Interface	Slider/ Gesture detection
BU21010MUV	2.5 to 3.3(Analog) 1.7 to 3.3(Digital)	Max. 8ch	Max. 4ch	I ² C BUS	speed/direction/ long pushing
BU21008MUV	2.5 to 3.3(Analog) 1.7 to 3.3(Digital)	Max. 16ch	Max. 8ch	I ² C BUS	speed/direction/ long pushing

Individual LED control driver ICs

Part No.	Supply voltage (V)	LEDs	Lighting control	Interface	DC/DC
BD1606MUV	2.7 to 5.5	6 Max.	3-system individual control	I ² C	Yes
New BD2802GU	2.7 to 5.5	6 Max.	illumination	I ² C	No
New BD2812GU	2.7 to 5.5	6 Max.	illumination	I ² C	Yes

Discrete Product Specifications

Power Supply/AC Adapter

High Voltage Resistance MOSFETs

Part No.	Package	Polarity	V _{DS} (V)	I _D (A)	P _D (W) (T _C =25°C)	R _{DS(on)} Typ. (mΩ) V _{GS} =10V	Q _g (nC)	Driving voltage (V)
RS007ANX	TO-220FM	Nch	500	7	40	0.8	10	10
RS016ANX			500	16	50	0.21	10	
R6008ANX			600	8	50	0.6	10	
R6010ANX			600	10	50	0.43	10	

MOSFETs

Part No.	Package	Polarity	V _{DS} (V)	I _D (A)	P _D (W) (T _a =25°C)	R _{DS(on)} Typ. (mΩ) V _{GS} =2.5V V _{GS} =4V V _{GS} =4.5V V _{GS} =10V	Q _g (nC)	Driving voltage (V)		
SP8K62	SOP8	Nch+Nch	30	6	2	33	30	24	7.6	4
RRS090N03		Nch	30	9	2	18	17	14	12	4

Fast Recovery Diodes

Part No.	Package	V _{RM} (V)	I _O (A)	IFSM (A)	VF (V)	IF (A)	IR (mA)	VR (V)
RF071MS	PMDU	200	0.7	15	0.85	0.7	10	200
RF081M2S	PMDU	200	0.8	20	0.95	0.8	10	200
RF081L2S	PMDS	200	1	20	0.98	1	10	200
RF101L2S	PMDS	200	1	20	0.87	1	10	200
RF101L4S	PMDS	400	1	25	1.25	1	10	400
RF08L6S	PMDS	600	0.8	20	1.3	0.8	10	600
RF2L6S	PMDS	600	1.5	40	1.55	1.5	10	600

Schottky Barrier Diodes

Part No.	Package	V _{RM} (V)	I _O (A)	IFSM (A)	VF (V)	IF (A)	IR (mA)	VR (V)
RSX051VA-30	TUMD2	30	1	5	0.47	1	0.2	30
RSX071VA-30	TUMD2	30	0.7	5	0.42	1	0.2	30
RSX101VA-30	TUMD2	30	0.5	5	0.39	1	0.2	30

LCD Display

High Brightness / High Heat Top view

Part No.	Package	Emitting color	VF (V)	IF (mA)	Brightness (cd)
SMLK15WBFPW1	PSML2	White	3.8	100	6
SMLK26WBGEW1	PSML2	White	3.2	80	5.6

Discrete Product Specifications

High Brightness / High Heat Side view

Part No.	Package	Emitting color	VF (V)	IF (mA)	Brightness (cd)
t=2.15mm Side view type	PSML-S	White	3.8	100	6.2
t=0.8mm Side view type	PSML-ST	White	3.2	20	2

Load Switch

MOSFETs

Part No.	Package	Polarity	V _{DS} (V)	I _D (A)	P _D (W) (T _a =25°C)	R _{DS(on)} Typ. (mΩ) V _{GS} =2.5V V _{GS} =4V V _{GS} =4.5V V _{GS} =10V	Q _g (nC)	Driving voltage (V)		
RSS130N03	SOP8	Nch	30	13	2	7.9	7.4	5.9	25	4
SP8K4	SOP8	Nch+Nch	30	9	2	17	16	12	15	4
New RT1E060RN	TSST8	Nch	30	6	1.25	25	22	18	8.6	4
New TT8K3	TSST8	Nch+Nch	30	3	1.25	60	55	42	3.7	4

Interface

Low Capacitance Zener Diodes

Part No.	Package	P (mW)	Vz (V)	Iz (mA)
RSB12JS2	EMD6	150	9.6 to 14.4	5
RSB12Z	VMD3	100	9.6 to 14.4	5
RSB12W	EMD3	150	9.6 to 14.4	5
CDZC6.8B	VMN2	100	6.65 to 6.93	5
EDZC6.8B	EMD2	150	6.65 to 6.93	5
EMZC6.8N	EMD3	150	6.47 to 7.14	5
VMZT6.8N	VMD3	150	6.47 to 7.14	5
UMZC6.8N	UMD3	200	6.47 to 7.14	5
STZC6.8N	SMD3	200	6.47 to 7.14	5
EMZT6.8E	EMD5	150	6.47 to 7.14	5

Bi-Directional Zener Diodes

Part No.	Package	P (mW)	Vz (V)	Iz (mA)
RSB6.8F2	UMD3	200	5.78 to 7.82	1
RSB16F2	UMD3	200	14.4 to 17.6	1
RSB18F2	UMD3	200	16.2 to 19.8	1
RSB27F2	UMD3	200	26.2 to 32.0	1
RSB6.8CS	VMN2	100	5.78 to 7.82	1
RSB6.8S	EMD2	150	5.78 to 7.82	1
RSB6.8G	VMD2	100	5.78 to 7.82	1
RSB6.6S	EMD2	150	4.76 to 6.44	1
RSB16V	UMD2	200	14.4 to 17.6	1
RSB18V	UMD2	200	16.2 to 19.8	1
RSB27V	UMD2	200	26.2 to 32.0	1

General Purpose

MOSFETs

Part No.	Package	Polarity	V _{DS} (V)	I _D (A)	P _D (W) (T _a =25°C)	R _{DS(on)} Typ. (mΩ) V _{GS} =1.5V V _{GS} =2.5V V _{GS} =4V V _{GS} =4.5V V _{GS} =10V	Q _g (nC)	Driving voltage (V)	
RUQ050N02	TSMT6	Nch	20	5	1.25	40	27	22	1.5
RZQ050P01	TSMT6	Pch	-12	-5	1.25	44	26	19	1.5
RK7002B	SST3	Nch	60	0.115	0.2	7.5 Max.	7.5 Max.	5	
RHU002N06	UMT3	Nch	60	0.2	0.2	2.8	1.7	4	
2SK3018	UMT3	Nch	30	0.1	0.2	7	5	2.5	
2SK3019	EMT3	Nch	30	0.1	0.15	7	5	2.5	
UM6K1N	UMT6	Nch+Nch	30	0.1	0.15	7	5	2.5	
EM6K1	EMT6	Nch+Nch	30	0.1	0.15	7	5	2.5	

Bipolar Transistors

Part No.	Package	Polarity	V _{CEO} (V)	I _C (A)	P _C (W) (T _a =25°C)	h _{FE}
2SA1576A	UMT3	PNP	-50	-0.15	0.2	120 to 390
2SC4081	UMT3	NPN	50	0.15	0.5	120 to 390

Digital Transistors

Part No.	Package	Polarity	V _{CE} (V)	I _O (mA)	P _D (W) (T _a =25°C)	GI	R ₁ / R ₂ (kΩ)
DTA114EUA	UMT3	PNP	-50	-50	0.2	30 or more	10 / 10
DTA144EUA	UMT3	PNP	-50	-30	0.2	68 or more	47 / 47
DTC114EUA	UMT3	NPN	50	50	0.2	30 or more	10 / 10
DTC144EUA	UMT3	NPN	50	30	0.2	68 or more	47 / 47

☆ : Under development

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