Excellence in Electronics

ROHM

Car Audio

General Purpose ICs

Video and Imaging ICs

Audio ICs

IT Equipment ICs

Consumer Product ICs

Automotive ICs

Discrete Semiconductors

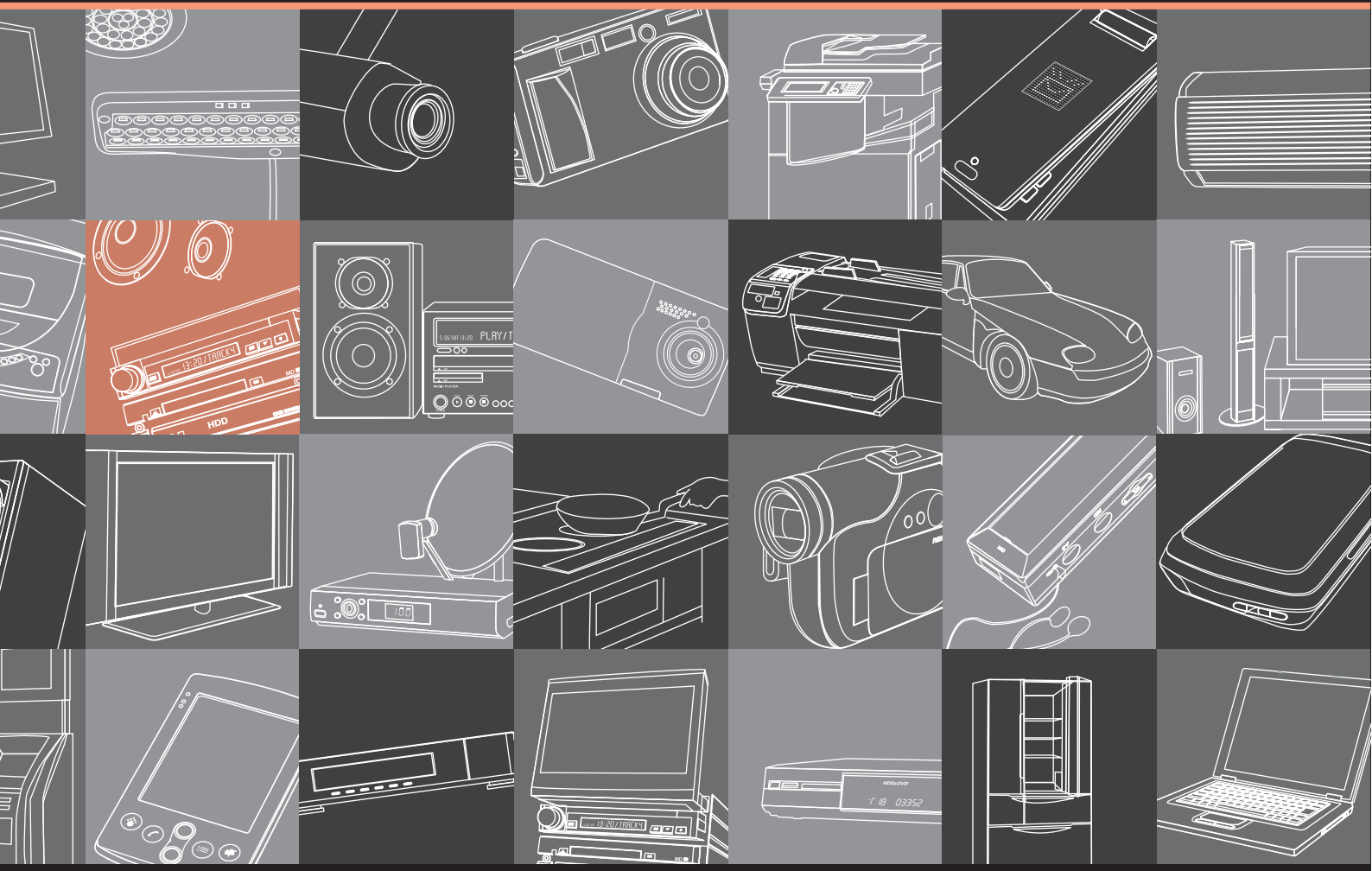
Optoelectronics

Modules

Pb Free
ROHM Electronic Components

RoHS
Directive Compliance

APPLICATION GUIDE 2009 1st



www.rohm.com

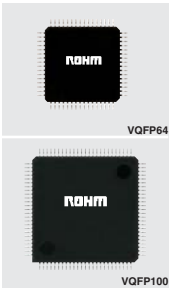
Optimize your audio environment
ROHM Car Audio Products

Optical disc drive block

Hi-Fi audio on a single chip
Digital signal processor ICs for CD player systems

BU9542KV
BU9543KV
BU9547KV

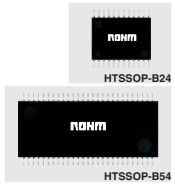
Features include an integrated pre-servo amp for CD-R/RW playback. Models equipped with MP3 playback functionality and a Class D headphone amp are also available.



High quality car entertainment
System motor driver IC series for CD/DVD players

New **BD822□EFVseries** (5-in-4 linear motor driver ICs for CD players)
New **BD821□EFVseries** (6ch single-chip motor driver ICs for DVD players)

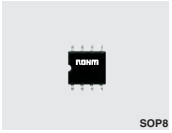
A broad lineup is offered, including linear and PWM types, in multiple packages, from compact to power models equipped with a heat sink.



Save energy with ultra-low current consumption
H-bridge driver series for brush motors

BD621□series
BD622□series
BD623□series

These series incorporate CMOS transistor output with PWM drive.



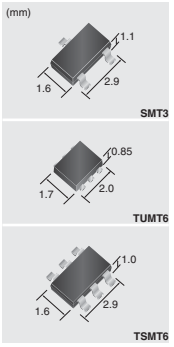
Ideal for laser diode driver circuits
Bipolar transistors

2SA2119K (VCEO=–12V, IC=–0.5A, SMT3)
US6T8 (VCEO=–12V, IC=–1.5A, TUMT6 : Dual)
QST8 (VCEO=–12V, IC=–1.5A, TSMT6 : Dual)

MOSFET

US6J2 (VDSS=–20V, ID=–1A, TUMT6 : Dual)

Optimized for Blu-ray applications.



Advanced device technology ensures high reliability operation
Dual-wavelength, high temperature resistant laser diode

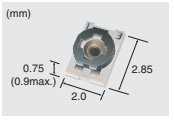
Under development **RLD2WMNL2**

The RLD2WMNL2 features stable operation and reduced current consumption at high temperatures.

Ultra-low-profile contributes to thinner, more compact devices
Chip trimmer potentiometer

MVR21IXBRN

This 0.75mm thin potentiometer features easy adjustment (via standard screwdriver) and a wide operating temperature range (–55°C to +125°C).

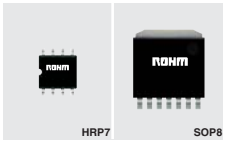


Power supply block

Ready high efficiency battery voltage supply
Switching regulators with built-in FET

BD9001F, BD9781HFP
New **BD9006F/HFP**
New **BD9007F/HFP**

The built-in power MOSFET facilitates lower power consumption, high efficiency designs.



Total power supply support
System power supply IC series for use in automotive electronics (car AV)

New **BD4917-V11,** New **BD4914-V4**
New **BD49191FM,** New **BD49181-V12**

This low current consumption series, featuring low dark current, is optimized for car audio and navigation systems.

Stable, high accuracy power supply
LDO regulators

BA□□CC0 series Under Development **BD□□COA series**
BA□□DD0 series Under Development **BD□□DOA series**
BA□□BC0 series
BD□□KA5 series

Suitable for all component sets including car stereo systems and TV sets.

High reliability car audio power
Power management IC series for automotive applications

<Regulators>
BD357□ series
BD394□ series
BD393□ series

<Watchdog Timer Reset ICs>
BD37A□□ series
BD87A□□ series
BD99A41F

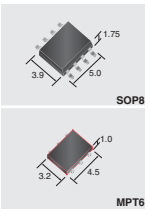
<Regulator + Watchdog Timer Reset IC>
BD300□ series

Designed for car electronics requiring high reliability, including automotive body, ITS, and entertainment systems.

Providing high efficiency with the industry's lowest ON-resistance
MOSFET

New **RRS075P03** (VDSS=–30V, ID=–7.5A, SOP8)
SP8K63 (VDSS=30V, ID=7A, SOP8 : Dual)
MP6K61 (VDSS=30V, ID=5A, MPT6 : Dual)
MP6K62 (VDSS=30V, ID=6A, MPT6 : Dual)

Low RDS(on), low Qg



In-house components ensure high reliability
DC/DC converter modules

*Custom modules

ROHM offers customized product to meet market needs.

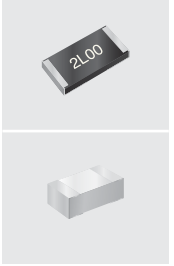
Optimized for current detection
Ultra-low ohmic chip resistors for current detection

PMR series (1608[0603] – 6432[2512]size)

Offered in a wide range of power ratings, from 1mΩ to 10mΩ. A metallic resistive element is utilized for greater power handling capability.

New **UCR10 series (2012[0805]size)**

Superior power dissipation. Available from 11mΩ to 100mΩ.



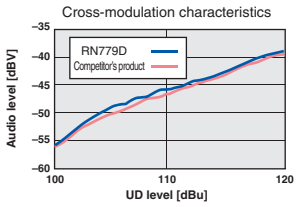
ROHM's products for car audio feature superior reliability, increased energy savings, and improved space efficiency, making them ideal for car audio systems and other mobile audio environments.

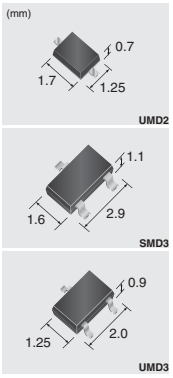
Tuner block

Switching and attenuator types
PIN diodes

RN771V (Ct=0.9pF max./rF=7Ω max., UMD2)
RN779D (Ct=0.9pF max./rF=7Ω max., SMD3)
RN779F (Ct=0.9pF max./rF=7Ω max., UMD3)

Low cross-modulation distortion ideal for AM circuits.





Indicator/Operation block

Aesthetic car audio
Chip LEDs

<High brightness chip LEDs>
SML-512(A) series (1.6 0.8mm, t=0.55mm)
SML-212(A) series (2.0 1.25mm, t=0.8mm)

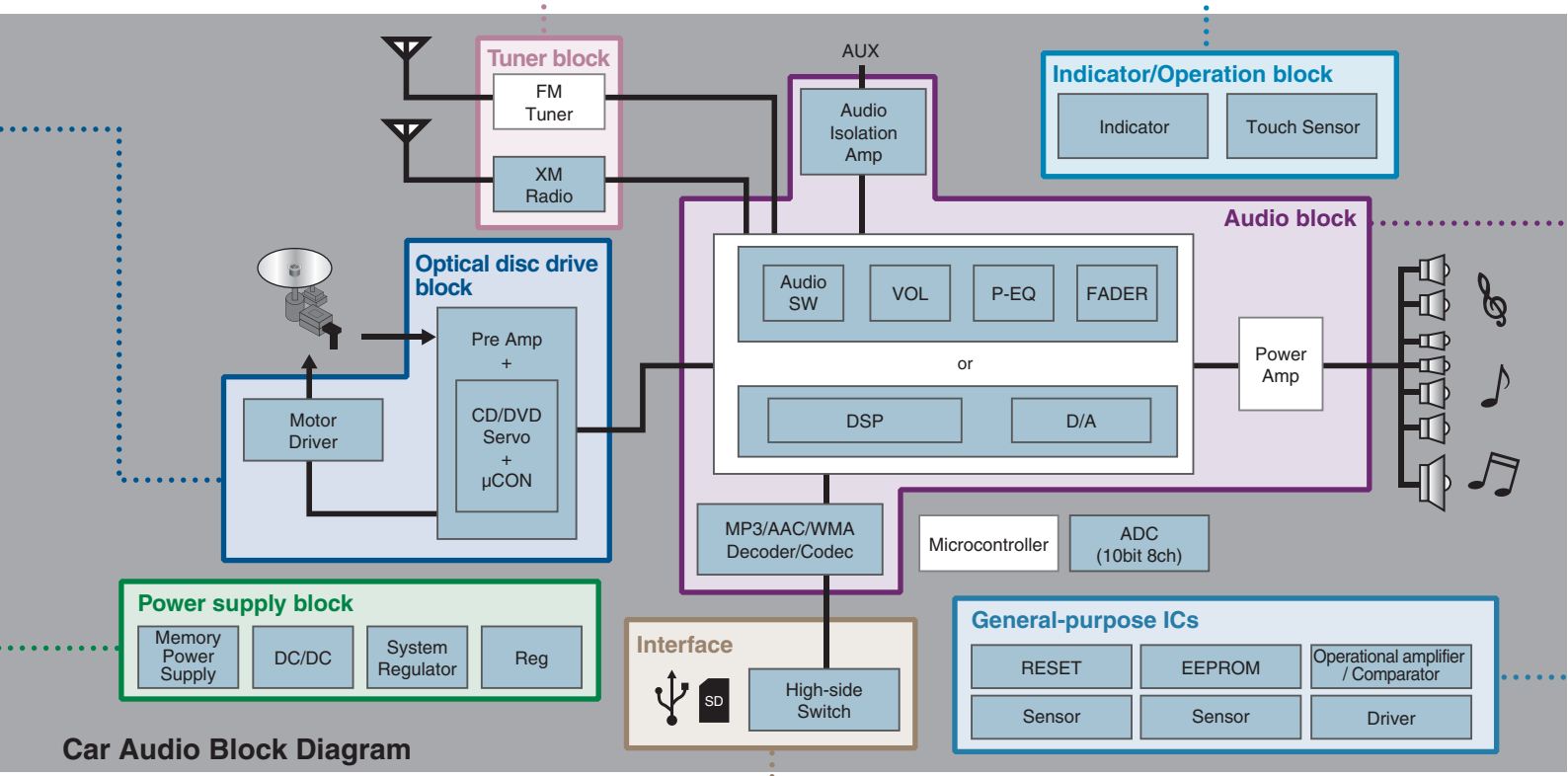
For exacting automotive specifications

<Low current chip LEDs>
SML-512BC5T (1.6 0.8mm, t=0.55mm)
SML-311 series (1.6 0.8mm, t=0.8mm)
SML-211 series (2.0 1.25mm, t=0.8mm)

Low current consumption

<Chip LEDs with reflector>
SML-M10 series (2.0 1.25mm, t=0.8mm)
SML-T10 series (1.6 0.8mm, t=0.5mm)

1.5 times brighter than conventional chip LEDs in the industry's smallest size. A wide variety of colors is offered for greater customization.



Car Audio Block Diagram

Interface

Protection circuits built in for improved safety
Power management switch ICs

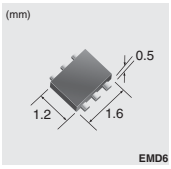
BD2051AFJ
BD2052AFJ
New **BD6538G**

A low ON-resistance MOSFET switch and multiple protection circuits are integrated into a single chip.

Optimized for high-speed data transfer
Low capacitance

RSB12JS2 (Vz=9.6 to 14.4V)
RSB12Z (Vz=9.6 to 14.4V)
RSB12W (Vz=9.6 to 14.4V)

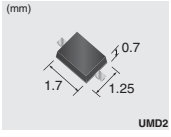
Low Ct (1pF)
Two elements are incorporated into a single package, reducing mounting area.



Mounting area reduced by half*
*Compared to conventional diodes
Bi-directional Zener diodes

RSB16V (Vz=14.4 to 17.6V)
RSB18V (Vz=16.2 to 19.8V)
RSB27V (Vz=26.2 to 32.0V)

ROHM bidirectional Zener diodes absorb both positive and negative surges, making them ideal for surge protection in CAN and LIN bus applications.



Audio block

IC Monolithic memory audio playback solution
USB host audio decoder ICs

New **BU9428KV**
New **BU943□ series**

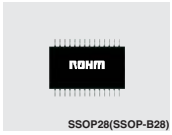
ROHM's all-in-one chip ICs incorporate a USB host, file system, audio decoder, and system controller on a single chip.


VQFP64

IC High fidelity sound processing
Sound processor series for car audios

BD348□ series
BD347□ series

Advanced circuitry is built in to prevent switching noises (i.e. during volume changes), while common substrate and software ensure broad compatibility.


SSOP28(SSOP-B28)

IC High performance audio
Digital sound processors for car audio

New **BU9402-□□ series**

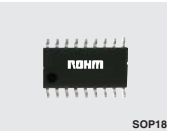
A high fidelity ADC/DAC is integrated into a monolithic programmable DSP.


SQFP-T80C

IC Compatible with a wide variety of sets
Audio accessory ICs

BA3121F, BA3131FS
BA3835F, BA3830F, BA3834F

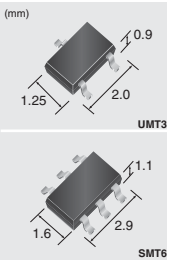
ROHM audio accessory ICs enable configuration of a whole host of applications, including 3-input selectors, ground isolation amps, and band-pass filters for spectrum analyzers.


SOP18

Tr Excellent muting characteristics
Digital transistors

DTC614TU
(Vcc=20V, Io=0.6A, R1=10kΩ/R2=None, UMT3)
DTC623TU
(Vcc=20V, Io=0.6A, R1=2.2kΩ/R2=None, UMT3)
DTC643TU
(Vcc=20V, Io=0.6A, R1=4.7kΩ/R2=None, UMT3)
IMH23
(DTC643T□ 2, SMT6 : Dual)

Features include low Ron (half of conventional), high GI (5 times the norm), and large VBE (12V vs. 5V).



UMT3 / SMT6

General-purpose ICs

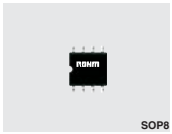
IC Remarkably high reliability
High reliability series EEPROMs

<85°C Lineup>
BR24L□□ series
BR24S□□□ series
BR25L□□0 series
BR25S□□□ series
BR93L□□ series

<105°C Lineup>
BR24A□□ series
BR93A□□ series

<125°C Lineup>
BR25H□□0 series
BR93H□□ series

ROHM's high reliability EEPROM series utilize unique double-cell construction, double reset function, and gold wire-pad connections with high surge capability.


SOP8

IC High reliability + High accuracy
Reset ICs

BD48□□ series
BD49□□ series
BD52□□ series
BD53□□ series
BD45□□□ series
BD46□□□ series
BU48□□ series
BU49□□ series
BU42□□ series
BU43□□ series
BD47□□G series

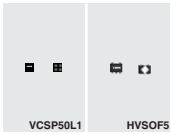
Features include high voltage detection accuracy (±1%), low current consumption, compact, low-profile package types, and a wide detection voltage range.


SSOP5

IC Configure compact, high reliability contactless switches
Ultra-small Hall ICs

BU5200□ series (Open/close switch, WLCSP)
BU5201□ series (Open/close switch, bottom-terminal package)
New **BU52040HFV (Bipolar latch type)**

Contactless method strong against physical degradation, providing a greater level of reliability.


VCSP50L1 / HVSOF5

IC High precision temperature detection
Compact, high accuracy temperature sensor ICs

BD1020HFV (Analog output type)
BDE□□□□ series (Thermostat type)
Under development **BDJ□□□1 series (Thermostat type/Ultra-small package)**

Multiple circuits are integrated, including a temperature detection element and high precision reference voltage supply, simplifying design of highly accurate temperature detection circuits.


SSOP6 / HVSOF5

IC Compact, low noise opamps
General-purpose operational amplifier series

BA4558R family
BA4560R family
BA4580R family
BA15218 family
BA14741 family
BA15532 family

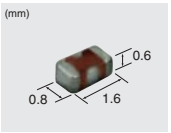
ROHM's lineup of opamps and comparators include low noise, low power consumption CMOS opamps as well as ground sense opamps.


MSOP8

EMI Ideal for noise suppression in power supply lines
Three-terminal EMI filters

New **MCF18 series (1608[0603] size)**

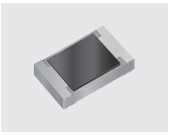
Supports rated currents up to 4A in the 1608 size. Low internal resistance (20mΩ max.) ensures low loss.



R Guaranteed 3kV surge resistance
Anti-surge chip resistors

ESR series (1608[0603] – 3225[1210] size)

This series features a rated current twice that of conventional products, making it possible to use more compact resistors.



Tc Extensive lineup of compact, large capacitance capacitors
Tantalum capacitors

<Conductive polymer type>TCTO/TCO series

Conductive polymers utilized at the cathode significantly reduce ESR, along with smoke generation and combustibility. ROHM's TCTO series are offered in low profile packages (1.2mm max.) in capacitances up to 100uF, reducing the size required.

AL case (3216 – 12[1206] low profile size) 100μF max.
P case (2012 – 12[0805]size) 10μF max.
A case (3216 – 12[1206]size) 47μF max.
B case (3528 – 21[1411]size) 330μF max.

<Built-in open function type>TCFG series

The integrated open function cuts off the circuit during excessive heat/current generation, reducing the possibility of combustion and/or smoking.

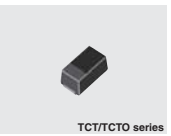
P case (2012 – 12[0805]size) 22μF max.
A case (3216 – 12[1206]size) 47μF max.
B case (3528 – 21[1411]size) 220μF max.
C case (6032 – 27[2412]size) ☆220μF max.
D case (7343 – 30[2917]size) ☆330μF max.

<Bottom surface electrode type>TCT series

The bottom surface electrode configuration enables twice the capacitance in the same sized package.

M case (1608 – 09[0603]size) 47μF max.
P case (2012 – 12[0805]size) ☆220μF max.
AS case (3216 – 10[1206]ultra-low profile size) ☆220μF max.
AL case (3216 – 12[1206]low profile size) ☆330μF max.
CL case (6032 – 15[2412]low profile size) ☆470μF max.

(☆Under development)


TCO/TCFG series / TCT/TCTO series

IC Product Specifications

Optical Disk Drive

Digital Signal Processor ICs for CD Player Systems

Part No.	Power Supply Voltage (V)	Function	Virtual Surround	CD-R/RW Compatible	Audio Equalizer
BU9542KV	I/O type : 2.7 to 3.6 CORE type : 1.4 to 1.65	RF+DSP+DAC+MP3	Available	Yes	Available
BU9543KV	I/O type : 2.7 to 3.6 CORE type : 1.4 to 1.65	RF+DSP+DAC	Available	Yes	Available
BU9547KV	I/O type : 2.7 to 3.6 CORE type : 1.4 to 1.65	RF+DSP+DAC+S/PDIF	Available	Yes	Available

System Motor Drivers for CD/DVD Drives

4ch System Motor Drivers

Part No.	Power Supply Voltage(V)	Output Dynamic Range (V)	Driver Output Mute	Low Power Protection	Abnormal Input Protection	Thermal Protection
New **BD822□EFV** series	4.5 to 14.0	6.0(V_{CC}=8V,R_L=8Ω)	Available	Available	Available	Available

6ch System Motor Drivers

Product No.	Power Supply Voltage(V)	Output Dynamic Range (V)	Low Power Protection	Abnormal Input Protection	Short-circuit Protection	Pickup Protection	Thermal Protection
New **BD821□EFV** series	4.5 to 14.0	4.1(AV_M=5V,I_O=500mA)/ 6.5(V_{CC}=8V,I_O=500mA)	Available	Available	Available	Available	Available

H-bridge Driver Series for Brush Motors

Part No.	CH	Voltage Resistance(V)	Supply Voltage (V)	Output Current (A)	Output Operation Mode
BD621□series	1 or 2	7	3.0 to 5.5	0.5/1.0/2.0	Foward/Reverse/Standby(Idling)/Brake
BD622□series	1 or 2	18	6 to 15	0.5/1.0/2.0	Foward/Reverse/Standby(Idling)/Brake
BD623□series	1 or 2	36	6 to 32	0.5/1.0/2.0	Foward/Reverse/Standby(Idling)/Brake

Power Supply

Switching Regulators with Built-in FET

Part No.	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Frequency Accuracy (%)
BD9001F	7 to 48	2.0	1 to V_{IN}	±20
BD9781HFP	7 to 35	4.0	1 to V_{IN}	±20
New **BD9006F/HFP**	7 to 35	2.0	0.8 to V_{IN}	±5
New **BD9007F/HFP**	7 to 35	2.0	0.8 to V_{IN}	±20

System Power Supply ICs for Automotive

Part No.	Function	Output Voltage (V)	Reset Voltage (V)	Detection Function/Other
New **BD4917-V11**	1ch for microcontroller, 1A 2ch	3.3/5.0/Variable	3.7	Detector 2ch
New **BD4914-V4**	1ch for microcontroller, other 3ch	5.0/8.12/7.9/10.3	–	High-side SW 3ch
New **BD49191FM**	2ch for microcontroller, other 3ch	3.3 2/5.0/8.0/10.0	3.3/2.4	High-side SW 2ch
New **BD49181-V12**	2ch for microcontroller, other 2ch	3.3 2/5.0/8.0	–	Detector 1ch

LDO Regulators

Standard LDO Regulators

Part No.	Output	Output Voltage (V)	Output Voltage Accuracy (%)	Output Current (A)	Max. Voltage (V)	Protection Circuit
BA□□CC0 series	Fixed	3.0/3.3/5.0/6.0/7.0/ 8.0/9.0/10/12/15	±2	1	35	Overvoltage/Overcurrent/ Temperature
BA□□CC0W series	Fixed Switch	3.0/3.3/5.0/6.0/7.0/ 8.0/9.0/10/12	±2	1	35	Overvoltage/Overcurrent/ Temperature
BA□□DD0 series	Fixed	1.5/1.8/2.5/3.0/3.3/ 5.0/9.0/12/16	±1	2	35	Overvoltage/Overcurrent/ Temperature
BA□□DD0W series	Fixed Switch	1.5/1.8/2.5/3.0/3.3/ 5.0/9.0/12/16	±1	2	35	Overvoltage/Overcurrent/ Temperature

Standard Variable Output LDO Regulators

Part No.	Output Voltage (V)	Output Voltage Accuracy (%)	Output Current (A)	Max. Voltage (V)	Protection Circuit
BA00CC0W series	3.0 to 15.0	±2	1	35	Overvoltage/Overcurrent/ Temperature
BA00DD0W series	1.5 to 16.0	±1	2	35	Overvoltage/Overcurrent/ Temperature

Secondary LDO Regulators for Local Power Supplies

Part No.	Output	Output Voltage (V)	Output Voltage Accuracy (%)	Output Current (A)	Max. Voltage (V)	Protection Circuit
BD□□KA5 series	Fixed	1.0/1.2/1.5/1.8/2.5/ 3.0/3.3	±1	0.5	7	Overcurrent/ Temperature
BD□□KA5W series	Fixed Switch	1.0/1.2/1.5/1.8/2.5/ 3.0/3.3	±1	0.5	7	Overcurrent/ Temperature
BA□□BC0 series	Fixed	1.5/1.8/2.5/3.0/3.3/ 5.0/6.0/7.0/8.0/9.0/10	±2	1	18	Overcurrent/ Temperature
BA□□BC0W series	Fixed Switch	1.5/1.8/2.5/3.0/3.3/ 5.0/6.0/7.0/8.0/9.0/10	±2	1	18	Overcurrent/ Temperature

Secondary Variable Output LDO Regulators for Local Power Supplies

Part No.	Output Voltage (V)	Output Voltage Accuracy (%)	Output Current (A)	Max. Voltage (V)	Protection Circuit
BD00KA5W series	Variable 1.0 to 4.0	±1	0.5	7	Overcurrent/Temperature
BA00BC0W series	Variable 1.5 to 12.0	±2	1	18	Overcurrent/Temperature

Power Management ICs for Automotive Body Control

High Voltage LDO Regulators

Part No.	Output Voltage (V)	Output Voltage Accuracy (%)	Output Current (A)	Max. Voltage (V)	Operating Temperature (°C)
New **BD357□**series	3.3/5.0/Variable	±2 (Ta=−40~+125°C)	0.5	50	−40 to +125

LDO Regulators

Part No.	Output Voltage (V)	Output Voltage Accuracy (%)	Output current (A)	Max. voltage (V)	Operating temperature (°C)
BD394□series	3.3/5.0	±2 (Ta=25°C)	0.5	36	−40 to +125

Regulators with Reverse Polarity Protection

Part No.	Output Voltage (V)	Output Voltage Accuracy (%)	Output current (A)	Max. voltage (V)	Operating temperature (°C)
BD393□series	3.3/5.0/8.0	±2 (Ta=25°C)	0.5	36/−15	−40 to +125

Voltage Detector ICs with Watchdog Timer

Part No.	Detection Voltage (V)	Output Voltage Accuracy (%)	RESET active voltage range(V)	WDT active voltage range(V)	Operating temperature (°C)
BD37A□□ series	1.9/4.1	±1.5 (Ta=25°C)	1.0 to 10	2.5 to 10	−40 to +105
BD87A□□ series	2.8/2.9/3.4/4.1	±1.5 (Ta=25°C)	1.0 to 10	2.5 to 10	−40 to +105
BD99A41F	4.1	±1.5 (Ta=25°C)	1.0 to 10	2.5 to 10	−40 to +105

Regulators with Voltage Detector and Watchdog Timer

Part No.	LDO		Reset		Max. Voltage (V)	Operating Temperature (°C)
	Output Voltage(V)	Output Current(A)	Detection Voltage(V)	Output Voltage Accuracy (%)		
BD300□series	5	0.5	Variable/4.5	±2	50	−40 to +125

Interface

Power Management Switch ICs

Large Current Output USB High Side Switch ICs

Part No.	CH	Input Voltage (V)	Current Consumption (μA)	ON Resistance(V_{DD}=5V) (mΩ)	Overcurrent Detection (A)
BD2051AFJ	1	2.7 to 5.5	90	80	1.0
BD2052AFJ	2	2.7 to 5.5	110	100	1.0

Small Current Output Power Management Switch IC

Part No.	Input Voltage (V)	Current Consumption (μA)	ON Resistance (mΩ)	Output Current (A)	Overcurrent Detection (A)
New **BD6538G**	2.7 to 5.5	110	150	0.5	0.75

Audio

USB Host Audio Decoder ICs

Part No.	SD	Display Information	MP3	WMA	AAC
New **BU9428KV**	–	Folder number File number Playing time Folder name File name TAG(Artist Album Title)	✓	–	–
BU9435KV	MMC SD miniSD microSD SDHC		✓	–	–
New **BU9437AKV**	MMC SD miniSD microSD SDHC		✓	✓	–
New **BU9438KV**	MMC SD miniSD microSD SDHC		✓	✓	✓

Sound Processors for Car Audio

Sound Processors with Built-in 2-band Equalizer

Part No.	Input Selector		Input Gain (dB)	Volume (dB)	Fader Volume (dB)
	Single Input	Differential Amplifier Input			
BD3482FS	3	1	0 to 20 (1dB/step)	+12 to −40 (1dB/step)	0 to −62,− ∞ (1dB/step)

Sound Processors with Built-in 3-band Equalizer

Part No.	Input Selector		Input Gain (dB)	Volume (dB)	Fader Volume (dB)	Subwoofer (dB)
	Single Input	Differential Amplifier Input				
BD3488FS	3	1	0 to 20 (1dB/step)	+15 to −79,− ∞ (1dB/step)	+15 to −79,− ∞ (1dB/step)	+15 to −79,− ∞ (1dB/step)

5.1ch/7.1ch Sound Processors with Built-in Micro-step Volume

Part No.	Input Selector	Volume	Volume Ch.	Tone
BD3474KS2	12	+24 to −95dB 10.5dB/step	6	BASS, TREBLE

Digital Sound Processors for Car Audio

Part No.	Supply Voltage (V)	Program ROM	Data RAM	Digital Input Select Stereo	P-EQ
New **BU9402-□□** series	3.0 to 3.6	5K 32bit	3K 32bit	Stereo 4	4ch 9-band

Audio Accessory ICs

Audio Amp with 3-input Selector

Part No.	Supply Voltage (V)	Circuit Current (mA)	Open Loop Gain (dB)	THD (%)	Channel Separation (dB)
BA3131FS	6.0 to 16.0	4.9	110	0.0025	115

Ground Isolation Amplifier

Part No.	Supply Voltage (V)	Circuits	THD (%)	Noise level (μVrms)	Channel Separation (dB)
BA3121F	4.0 to 18.0	2	0.002	3.5	82

Bandpass Filters for Spectrum Analyzer Display

Part No.	Supply Voltage (V)	Band	Input Mix Amplifier	Maximum Output (V)	B.P.F Center Frequency (Hz)
BA3835F	4.5 to 6.5	5	✓	4.8	105/340/1k/3.4k/10.5k
BA3830F	4.5 to 8.0	6	✓	4.2	63/150/330/1k/3.3k/10k
BA3834F	4.5 to 6.5	7	✓	4.8	68/170/420/1k/2.4k/5.9k/14.4k

General-purpose ICs

High reliability EEPROMs

I²C BUS

Part No.	Density (bit)	Supply Voltage Range (V)	Operating Temperature Range(°C)	Lifetime (No. or Rewrites) (Ta=25°C)	Data Retention (years) (Ta=25°C)
BR24L□□ series	1K to 64K	1.8 to 5.5	−40 to +85	10^6	40
BR24S□□□ series	8K to 256K	1.7 to 5.5	−40 to +85	10^6	40
BR24A□□ series	1K to 64K	2.5 to 5.5	−40 to +105	10^6	40

SPI BUS

Part No.	Density (bit)	Supply Voltage Range (V)	Operating Temperature Range(°C)	Lifetime (No. or Rewrites) (Ta=25°C)	Data Retention (years) (Ta=25°C)
BR25L□□0 series	1K to 64K	1.8 to 5.5	−40 to +85	10^6	40
BR25S□□□ series	16K to 256K	1.7 to 5.5	−40 to +85	10^6	40
BR25H□□0 series	1K to 32K	2.5 to 5.5	−40 to +125	10^6	40

Microwire BUS

Part No.	Density (bit)	Supply Voltage Range (V)	Operating Temperature Range(°C)	Lifetime (No. or Rewrites) (Ta=25°C)	Data Retention (years) (Ta=25°C)
BR93L□□ series	1K to 16K	1.8 to 5.5	−40 to +85	10^6	40
BR93A□□ series	1K to 16K	2.5 to 5.5	−40 to +105	10^6	40
BR93H□□ series	2K to 16K	2.7 to 5.5	−40 to +125	10^6	40

Voltage Detector ICs

CMOS Voltage Detector ICs

Part No.	Series	Output Voltage Accuracy (%)	Voltage Detection(V)	Detection Step(V)	Output Type	"H"counter Timer Delay Time Setting(ms)
BD48□□series	Standard	±1	2.3 to 6.0	0.1	Open drain	–
BD49□□series	Standard	±1	2.3 to 6.0	0.1	CMOS	–
BD52□□series	Free delay time setting	±1	2.3 to 6.0	0.1	Open drain	–
BD53□□series	Free delay time setting	±1	2.3 to 6.0	0.1	CMOS	–
BD45□□□ series	Counter timer built-in	±1	2.3 to 4.8	0.1	Open drain	50/100/200
BD46□□□ series	Counter timer built-in	±1	2.3 to 4.8	0.1	CMOS	50/100/200
BU48□□series	Low voltage standard	±1	0.9 to 4.8	0.1	Open drain	–
BU49□□series	Low voltage standard	±1	0.9 to 4.8	0.1	CMOS	–
BU42□□series	Low voltage free delay time setting	±1	0.9 to 4.8	0.1	Open drain	–
BU43□□series	Low voltage free delay time setting	±1	0.9 to 4.8	0.1	CMOS	–

IC Product Specifications

Bipolar Voltage Detector ICs

Part No.	Output voltage Accuracy (%)	Voltage Detection (V)	Detection Step (V)	Output Type
BD47□□G series	±1	1.9 to 4.6	0.1	Open collector

Ultra-small Hall ICs

Bipolar Detection Hall ICs

Part No.	Supply Voltage (V)	Operating Magnetic Flux Density (mT)	Hysteresis (mT)	Pulse Driving Cycle (ms)	Current Consumption(Typ.) (μA)	Output Type
BU52001GUL	2.40 to 3.3	+/–3.7	0.8	50	8.0	CMOS
BU52011HFV	1.65 to 3.3	+/–3.0	0.9	50	5.0	CMOS

Bipolar Detection Hall ICs (With Polarity Discrimination Output)

Part No.	Supply Voltage (V)	Operating Magnetic Flux Density (mT)	Hysteresis (mT)	Pulse Driving Cycle (ms)	Current Consumption(Typ.) (μA)	Output Type
BU52004GUL	2.40 to 3.3	+/–3.7	0.8	50	8.0	CMOS
BU52014HFV	1.65 to 3.3	+/–3.0	0.9	50	5.0	CMOS

Unipolar Detection Hall ICs

Part No.	Supply Voltage (V)	Operating Magnetic Flux Density (mT)	Hysteresis (mT)	Pulse Driving Cycle (ms)	Current Consumption(Typ.) (μA)	Output Type
BU52002GUL	2.40 to 3.3	3.7	0.8	50	6.5	CMOS
BU52003GUL	2.40 to 3.3	–3.7	0.8	50	6.5	CMOS
BU52012HFV	1.65 to 3.3	3.0	0.9	50	3.5	CMOS
BU52013HFV	1.65 to 3.3	–3.0	0.9	50	3.5	CMOS

Bipolar Latch Hall IC

Part No.	Supply Voltage (V)	Operating Magnetic Flux Density (mT)	Hysteresis (mT)	Pulse Driving Cycle (ms)	Current Consumption(Typ.) (μA)	Output Type
New **BU52040HFV**	1.65 to 3.3	+/–3.0	6.0	0.5	200	CMOS

Compact High Accuracy Temperature Sensor ICs

Analog Output Temperature Sensor IC

Part No.	Supply Voltage (V)	Current Consumption (μA)	Temperature Accuracy(°C) Ta=30°C	Temperature Accuracy(°C) Ta=–30, 100°C	Output Voltage (Ta=30°C, VDD=3V)
BD1020HFV	2.4 to 5.5	4.0	±1.0	±2.0	1.300

Thermostat Output Temperature Sensor ICs with Variable Detection Temperature

Part No.	Detect Temperature (°C)	Supply Voltage (V)	Current Consumption (μA)	Detect Temperature Accuracy(°C) Ta=–25°C~+115°C	Detect Temperature Accuracy(°C) Ta=–+125°C
BDE□□□□ series	–25 to +125	2.9 to 5.5	16	±4.0	±5.0

Thermostat Output Temperature Sensor ICs with Built-in Power Down Function

Part No.	Detect Temperature (°C)	Output Type	Supply Voltage (V)	Current Consumption (μA)	Detect Temperature accuracy(°C)
☆**BDJ□□□1** series	55 to 90	Open Drain Active High	2.4 to 5.5	7.5	±2.5

☆ : Under development

General-purpose Operational Amplifier / Comparator Series

Low Noise Operational Amplifiers

Part No.	Supply Voltage (V)	Circuit Current (mA)	Input Offset Voltage (mV)	Slew Rate (V/μs)	Gain Bandwidth (MHz)
BA4558R family	±4~±15	3.0	0.5	1.0	2.0
BA4560R family	±4~±15	3.0	0.5	4.0	4.0
BA4580R family	±2~±16	6.0	0.3	5.0	5.0
BA15218 family	±2~±16	5.0	0.5	3.0	10
BA14741 family	±2~±18	3.5	1	1.0	2.0
BA15532 family	±4~±21	8.0	0.5	8.0	20

Discrete Product Specifications

Optical Disk Drive

Bipolar Transistors

Part No.	Package	Polarity	VCEO (V)	IC (A)	PC(W) (Ta=25°C)	hFE
2SA2119K	SMT3	PNP	–12	–0.5	0.2	270 to 680
QST8	TSMT6	PNP+PNP	–12	–1.5	0.5	270 to 680
US6T8	TUMT6	PNP+PNP	–12	–1.5	0.4	270 to 680

Power supply

MOSFETs

Part No.	Package	Polarity	VDSS (V)	ID (A)	PD(W) (Ta=25°C)	RDS(on) Typ. (mΩ) VGS=2.5V	VGS=4V	VGS=4.5V	VGS=10V	Qg (nC)	Drive Voltage (V)
New **RRS075P03**	SOP8	Pch	–30	–7.5	2	–	25	22	15	21	4
SP8K63	SOP8	Nch+Nch	30	7	2	–	27	25	20	8.5	4
MP6K61	MPT6	Nch+Nch	30	5	2	–	55	50	36	4	4
MP6K62	MPT6	Nch+Nch	30	6	2	–	33	30	24	7.6	4
US6J2	TUMT6	Pch+Pch	–20	–1	1	570	310	280	–	2.1	2.5

Tuner

PIN Diodes

Part No.	Package	VR (V)	IF (mW)	Ct(pF) max.	VR(V)	f(MHz)	rF(Ω) max.	IF(mA)	f(MHz)
RN771V	UMD2	50	50	0.9	35	1	7	10	100
RN779D	SMD3	50	50	0.9	35	1	7	10	100
RN779F	UMD3	50	50	0.9	35	1	7	10	100

Interface

Low Capacitance Zener Diodes

Part No.	Package	P (W)	Vz(V) max.	Iz(mA)	Ct(pF) max.	f(MHz)
RSB12JS2	EMD6	0.15	9.6 to 14.4	5	1	1
RSB12W	EMD3	0.15	9.6 to 14.4	5	1	1
RSB12Z	VMD3	0.1	9.6 to 14.4	5	1	1

Bi-directional Zener Diode

Part No.	Package	P (W)	Vz(V) max.	Iz(mA)
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

Audio

Digital Transistors

Part No.	Package	Polarity	VCEO (V)	IC (A)	PC(W) (Ta=25°C)	hFE	R1/R2
DTC614TU	UMT3	NPN	20	0.6	0.2	820 to 2700	10kΩ/none
DTC623TU	UMT3	NPN	20	0.6	0.2	820 to 2700	2.2kΩ/none
DTC643TU	UMT3	NPN	20	0.6	0.2	820 to 2700	4.7kΩ/none
IMH23	SMT6	NPN+NPN	20	0.6	0.2	820 to 2700	4.7kΩ/none

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