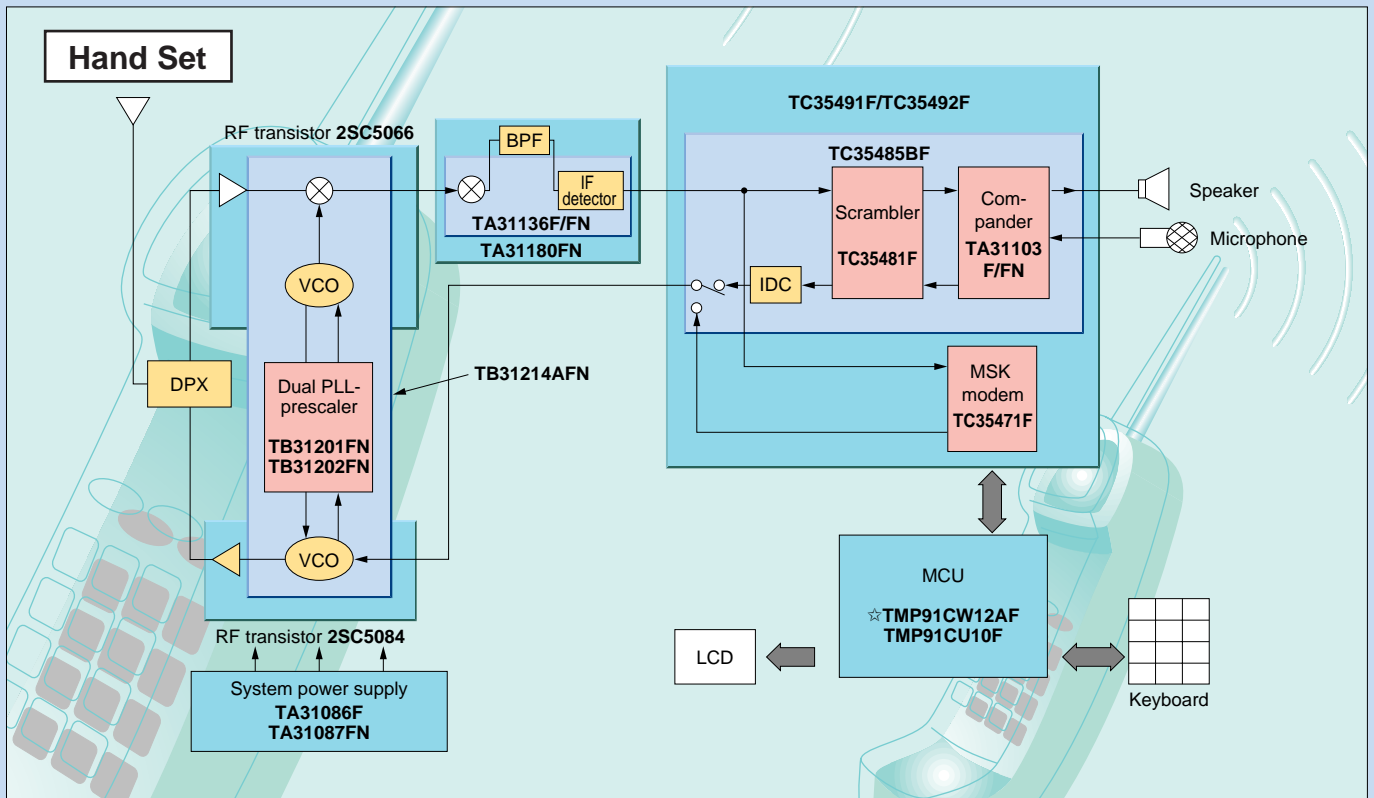


Japan Analog Cordless Telephones



☆: Under development

Japan Analog Cordless Telephones

■ New Microwave Transistors $f_T = 7$ GHz Band Transistors

Applications	Device	Electrical Characteristics											Package
		f_T (typ.)			$ S_{21} ^2$ (typ.)				NF (typ.)				
		(GHz)	V_{CE} (V)	I_C (mA)	(dB)	V_{CE} (V)	I_C (mA)	f (GHz)	(dB)	V_{CE} (V)	I_C (mA)	f (GHz)	
Low-current applications	2SC5064	7	5	10	12	5	10	1	1.1	5	3	1	S-MINI
	2SC5065	7	5	10	12	5	10	1	1.1	5	3	1	USM
	2SC5066	7	5	10	12	5	10	1	1.1	5	3	1	SSM
	2SC5066FT	7	5	10	12	5	10	1	1.1	5	3	1	TESM
High-current applications	2SC5084	7	10	20	11	10	20	1	1.1	10	5	1	S-MINI
	2SC5085	7	10	20	11	10	20	1	1.1	10	5	1	USM
	2SC5086	7	10	20	11	10	20	1	1.1	10	5	1	SSM
	2SC5086FT	7	10	20	11	10	20	1	1.1	10	5	1	TESM
	2SC5087	7	10	20	13	10	20	1	1.1	10	5	1	SMQ
	2SC5088	7	10	20	13	10	20	1	1.1	10	5	1	USQ
Intermediate-current applications	2SC5463	7	8	15	12	8	15	1	1.1	8	5	1	USM
	2SC5464	7	8	15	12	8	15	1	1.1	8	5	1	SSM
	2SC5464FT	7	8	15	12	8	15	1	1.1	8	5	1	TESM
Ultra-high-current applications	MT3S04T	7	3	7	12.5	3	20	1	1.2	3	7	1	TESM

■ Mixers and IF Detectors

Device	Mixer operating frequency (MHz)	Recommended IF frequency (KHz)	Frequency detector	RSSI function	Noise detection	Other	Operating power supply voltage (V)	Package (pitch: mm)
TA31136F	10 to 100	450, 455	○	○	○		1.8 to 5.5	SSOP16 (1.00)
TA31136FN		450, 455	○	○	○			SSOP16 (0.65)
TA31180FN	21.3	—	○	○	○	2nd IF filter and detection coil not required		SSOP24 (0.65)

■ Prescaler/PLL

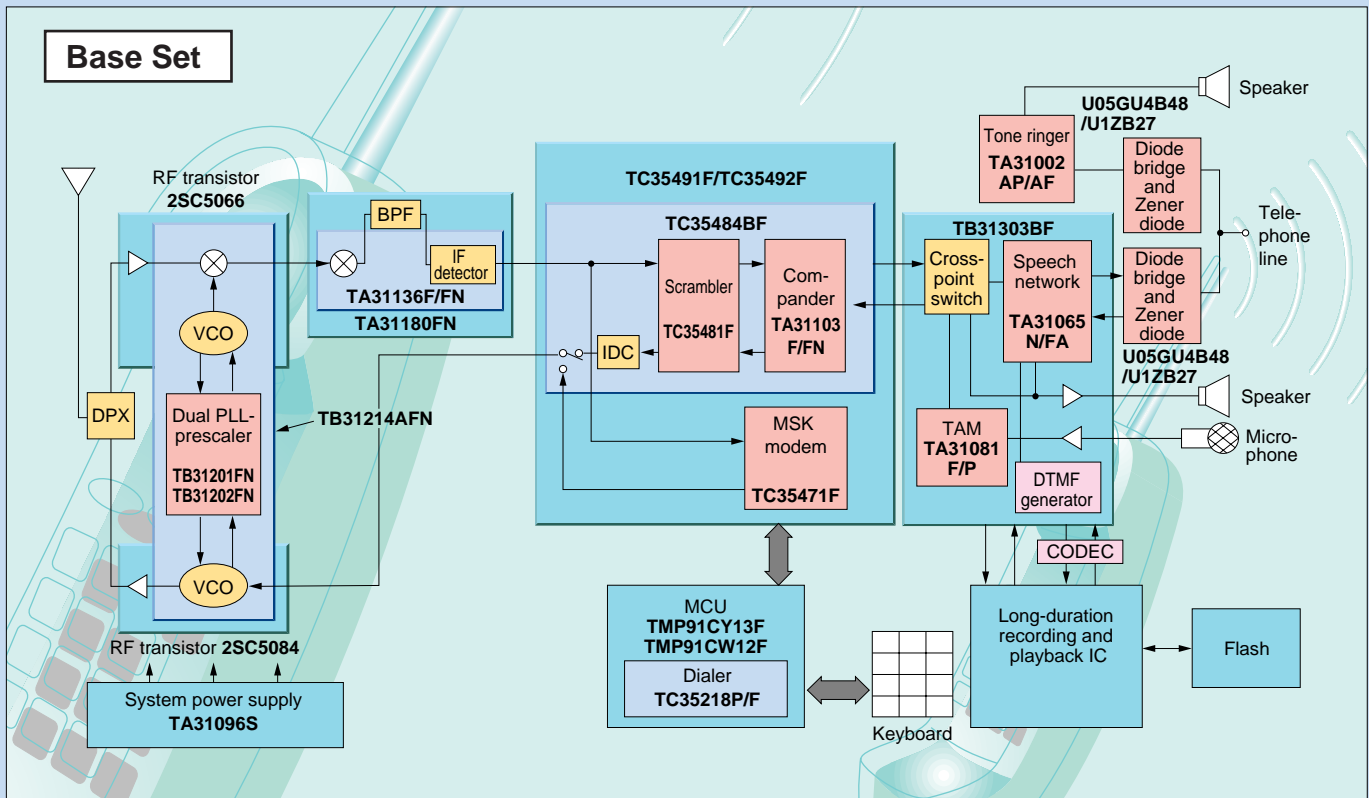
Device	Operating frequency (MHz)	VCO oscillation transistor	Standby control	Crystal oscillator circuit	Other	Operating power supply voltage (V)	Package (pitch: mm)
TB31202FN/BFN	200 to 520 (CH1)	—	○	○	—	2.0 to 5.5	SSOP16 (0.65)
TB31214AFN	200 to 520 (CH2)	○	○	○	1st Mixer		SSOP24 (0.65)

■ Companders

Device	Operating voltage range	Compression ratio	Package (pitch: mm)
TA31103F	2.7 to 8.0	2 : 1	SSOP24 (1.00)
TA31103FN			SSOP24 (0.65)

■ Baseband Signal Processors

Device	Functions	Baseband filter			Companders	MSK modem		Operating power supply voltage (V)	Demonstration board	Package
		IDC	Scrambler	European filter		1200 bps	2400 bps			
TC35481F	Scrambler	○	○	○			2.7 to 5.5	○	SOP20	
TC35484BF	2in1	○	○	○	○		2.7 to 5.5	○	QFP44	
TC35485BF	2in1	○	○	○	○		1.8 to 3.6	○	QFP44	
TC35491F	3in1	○	○	○	○	○	1.8 to 5.5	○	QFP44	
TC35492F	3in1	○	○	○	○	○	1.8 to 5.5	○	QFP60	
TC35453F	3in1	○	○	○	○	○	1.8 to 5.5	○	QFP44	
TC35493F	3in1	○	○	○	○	○	1.8 to 5.5	○	QFP60	
TC35470AF	MSK modem				○	○	1.8 to 5.5	○	SOP16	
TC35471F	MSK modem				○	○	1.8 to 5.5	○	SOP16	



■ MCU

Device	ROM (bytes)	RAM (bytes)	Instruction execution time (ns)	I/O ports	Operating voltage (V)	Functions	Package	One-time PROM
TMP91CU10F	96K	3K	296	80	2.0 to 3.6	AD converter (10 bits x 8 ch)	QFP100 (14 mm x 14 mm) (1.4 mm thick)	TMP91PW10F
TMP91CW12F	128K	4K	160	81	2.7 to 5.5			TMP91PW12F
☆TMP91CW12AF			150	1.8 to 3.6	—			
TMP91CY13F	256K	8K	250	94	2.7 to 3.6	AD converter (10 bits x 12 ch)	QFP120 (14 mm x 14 mm)	TMP91FY13F (Flash E ² PROM)

■ Speech Networks

Device	Receiver	Pad control	Branch performance	V/L boost	MF/BEEP input	Crosspoint switch	Speaker amp	Other	Package (pitch: mm)
TA31065N/FA	Ceramic and low-impedance type	Linear-variable method	Especially excellent	○	○	—	—	—	SDIP20/SSOP24 (1.0)
TA31068F			Excellent	—	Two other systems	—	—		SSOP24 (1.0)
TB31303BF			—	—	○	○	○		Speech-processing, single-chip IC with built-in DTMF generator

■ Tone Ringers

Device	Output format, others	Control method	Oscillation starting voltage	Package (pitch: mm)
TA31002AP/AF	Single output	Variable oscillation starting current type	16 V	DIP8/SOP8 (1.27)
TA31075AS/AF	Differential output, high sound pressure type		11 V	SIP9/SSOP10 (1.0)
TA31076S/F	Single output, operating voltage: 50 V, with ring detect function		12.4 V	SIP9/SSOP10 (1.0)

■ System Power Supplies

Device	Output voltage	Output terminals	Alarm/reset function	Other	Package (pitch: mm)
TA31086F	3.2 V	3	○	—	
TA31087FN	2.2 V	2	○	Watchdog timer	
TA31096S	5.0 V	1	○	Backup battery switch	

☆: Under development

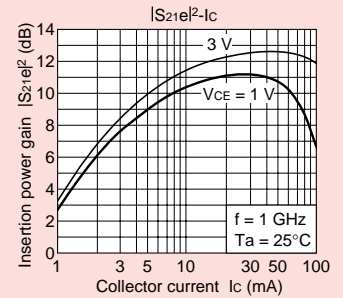
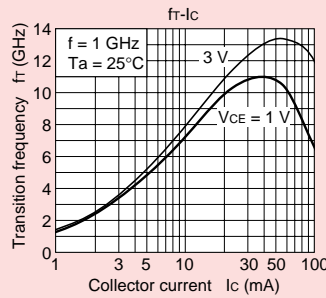
Japan Analog Cordless Telephones

▶ $f_T = 7$ GHz Band Transistors: MT3S04 Series

- Products developed for low-voltage applications have been added to the existing lineup.
- Low noise and high gain
- Optimum for VHF / UHF band high-frequency amplifiers, mixers and oscillation circuits.

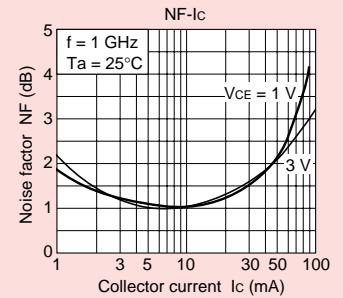
■ Lineup

	Device	Package
High-current applications	2SC5084	S-MINI
	2SC5085	USM
	2SC5086	SSM
	2SC5086FT	TESM
	2SC5087	SMQ
Low-current applications	2SC5088	USQ
	2SC5064	S-MINI
	2SC5065	USM
	2SC5066	SSM
	2SC5066FT	TESM
Intermediate-current applications	2SC5463	USM
	2SC5464	SSM
	2SC5464FT	TESM
Ultra-high-current applications	MT3S04	S-MINI
	MT3S04U	USM
	MT3S04S	SSM
	MT3S04T	TESM
	MT4S04	SMQ
MT4S04U	USQ	



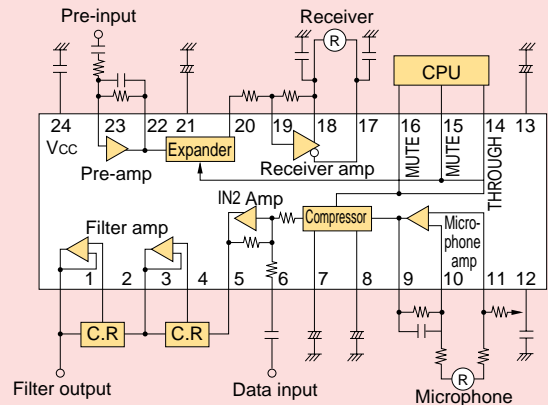
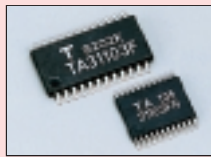
■ High-frequency Characteristics (Typ.)

Device	Measurement frequency	NF(dB)	$ S_{21e} ^2$ (dB)
2SC5065	500 MHz	1.0	17
	1 GHz	1.1	12
2SC5085	500 MHz	1.0	16.5
	1 GHz	1.1	11
2SC5463	500 MHz	1.0	17.5
	1 GHz	1.1	12
MT3S04T	1 GHz (VCE = 3 V)	1.2	12.5
	1 GHz (VCE = 1 V)	1.3	9.5



▶ Componders: TA31103F / FN

- Main application: Cordless phones
- Compressor and expander built into a single chip for noise reduction
- Built-in receiver amp enables accommodation of both ceramic and dynamic receivers
- Two built-in filter buffer amps
- Built-in microphone amp and pre-amp, while mute function operates independently for the compressor and expander
- Operating power supply voltage: $V_{CC} = 2.7$ to 8.0 V
- Low current consumption: $I_{CC} = 6.0$ mA typ. ($V_{CC} = 3$ V, $T_a = 25^\circ\text{C}$)
- Compact package: 24-pin SSOP (1.00/0.65 mm pitch)



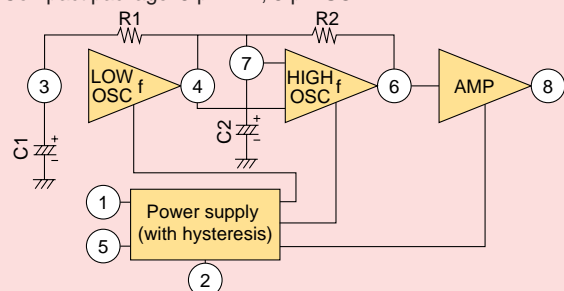
▶ Speech Network with Built-in Crosspoint Switch: TB31303BF (for Speaker Phones)

- Applications: Cordless answer phones, answer phones
- Built-in DTMF generator (min: 2 V operation, can be operated by receiving power from telephone line)
- Crosspoint switch operated by serial data control and voice processing speech network for cassette tape integrated onto a single chip
- Built-in speaker amp (load: 32Ω , 16Ω)
- Battery save function (Max: $5 \mu\text{A}$ at $V_{CC} = 5$ V)
- Built-in digital attenuator: For receiver (3 levels), for speaker (16 levels)
- Built-in external power circuit (power supplied from telephone line for the CPU) and excellent crosstalk characteristics during low line current
- Package: 64-pin QFP (0.65 mm pitch)



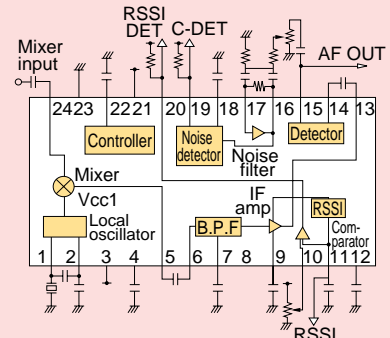
▶ Tone Ringers: TA31002AP / AF

- Low current consumption during no-load
- Variable oscillation frequency
- Built-in threshold circuit eliminates erroneous operation caused by power supply noise and resonance produced by rotary dialing
- Few externally connected components
- Compact package: 8-pin DIP, 8-pin SOP



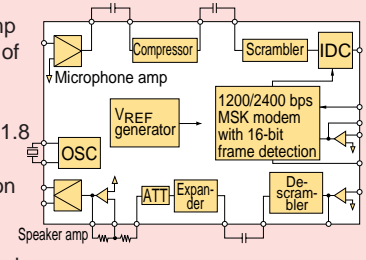
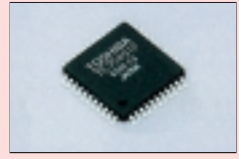
IF Detector IC: TA31180FN

- Application: Cordless phones
- Eliminates the need for an externally connected ceramic filter and discriminator
- Low-voltage operation: $V_{cc} = 1.8$ to 5.5 V
- High sensitivity: 12 dB sensitivity $20 \text{ dB}\mu\text{VEMF}$ (50Ω input)
- Built-in noise detection circuit
- RSSI function
- Compact package: 24-pin SSOP (0.65 mm pitch)



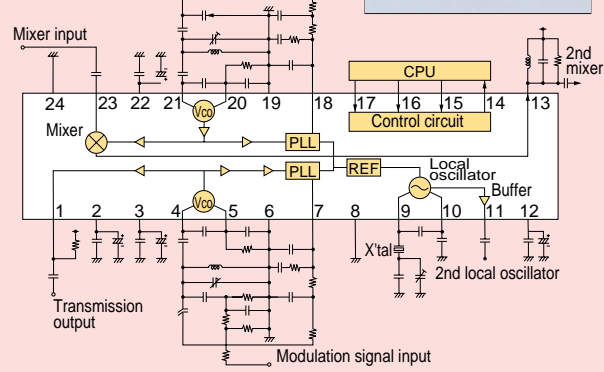
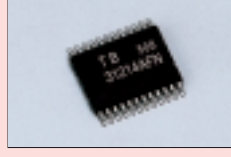
Baseband Signal Processor: TC35491F

- Built-in compander
- Built-in scrambler circuit for prevention of wiretapping
- 1200/2400 bps MSK modem (with 16-bit frame detection)
- Built-in IDC (limiter, splatter filter)
- Built-in speaker amp (direct drive of 600Ω dynamic speakers and ceramic speakers)
- Built-in microphone amp
- Selection of four kinds of carrier frequencies
- Selectable operating power supply voltage (1.8 to 3.6 V/ 2.7 to 5.5 V)
- Low power consumption by COMS: 6.0 mA typ. ($@3.6 \text{ V}$)
- Package: 44-pin flat package



PLL Frequency Synthesizer: TB31214AFN

- PLL, VCO and 1st mixer integrated onto a single chip
- Low-voltage operation: $V_{cc} = 2.0$ to 5.5 V ($V_{cc} = 2.0$ to 5.5 V at -10°C and above)
- Low power consumption: $I_{cc} = 16 \text{ mA (typ.)}$
- Constant current output type charge pump allows output current to be changed by serial data
- Use of a bipolar circuit for the reference oscillation circuit enables the providing of a stable crystal oscillator circuit
- Independent standby control for sending and receiving
- Compact package: 24-pin SSOP (0.65 mm pitch)



16-bit Microcontrollers for Low-voltage and Low-power-consumption Operation: TLCS-900/L1 Series

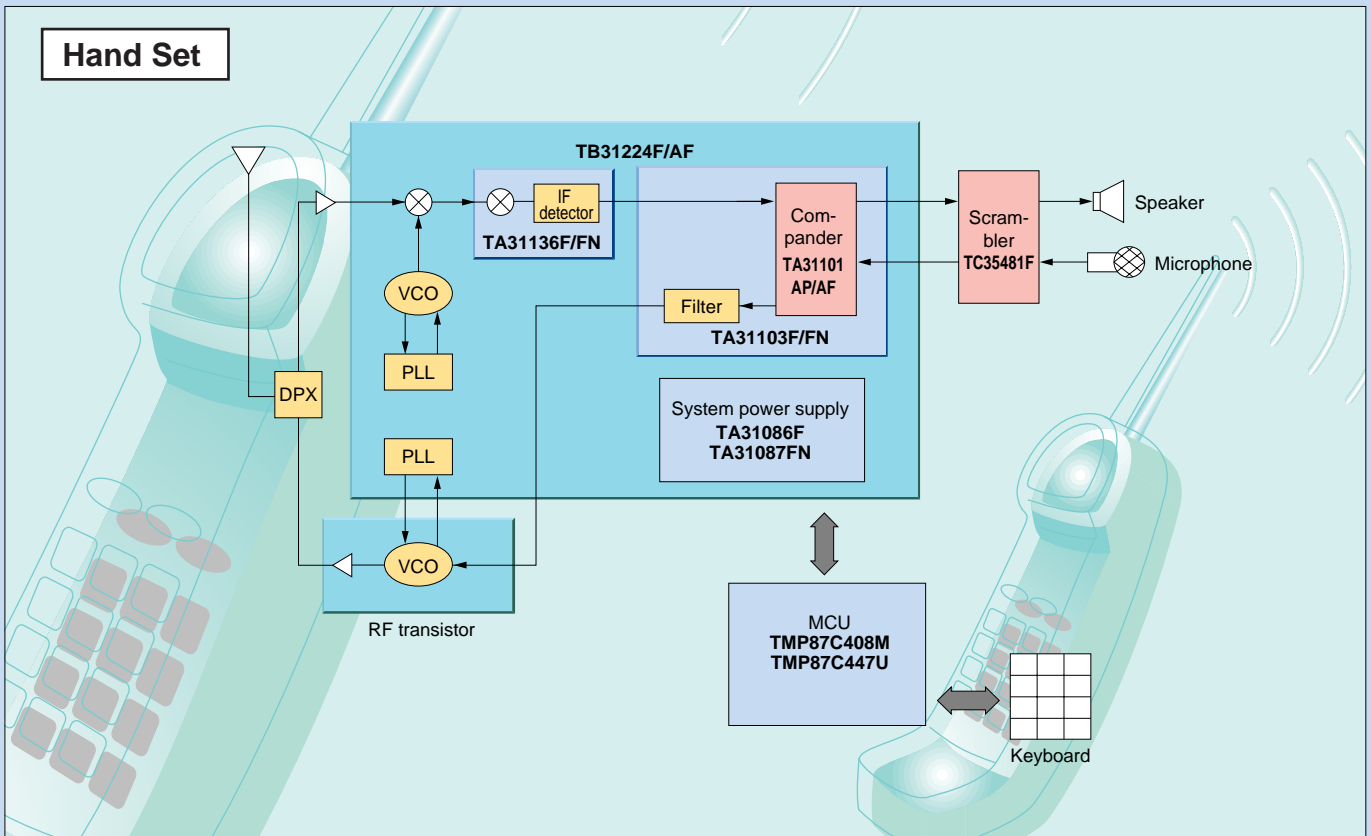
Members of the TLCS-900/L1 series are able to realize systems offering low power consumption equal to 1/6 that of previous products through the use of a low-power-consumption design optimum for portable devices, while also achieving low-voltage operation of only 1.8 V.

- Low-voltage operation: 1.8 to 5.5 V
- Low power consumption: 3.0 mA (when operating at 3.0 V and 16 MHz)
- Low noise (equipped with EMC register)
 - EMI: 30% better than our previous products
 - EMS: Noise filter and protect register
- Inherits the TLCS-900 architecture
- 32-bit configuration, general-purpose register able to be used for address calculation and reduction of code size
- Numerous general-purpose registers for flexible compiler code generation and reduced code size
- Register bank system optimum for real-time processing
- Linear address space: 16M bytes

* Please refer to the section on microcontrollers (p. 24) for further details on each product.

46/49 MHz Cordless Phones

CORDLESS PHONE



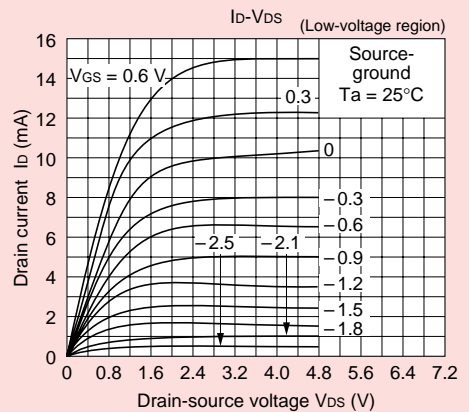
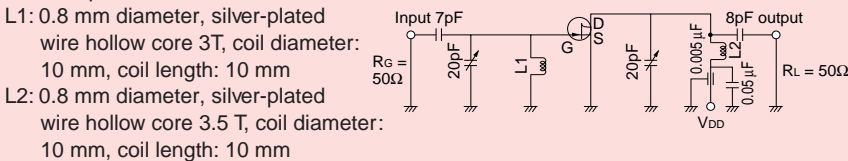
RF Amp: 2SK210

[For 3 V Power Supplies]

- For RF amps from the VHF band to 100 MHz
- S-MINI package (2.9 mm x 1.5 mm)
- High power gain: $G_{PS} = 24 \text{ dB}$ @ $V_{DD} = 10 \text{ V}$, $f = 100 \text{ MHz}$
- Low noise: $NF = 1.8 \text{ dB}$ @ $V_{DD} = 10 \text{ V}$, $f = 100 \text{ MHz}$

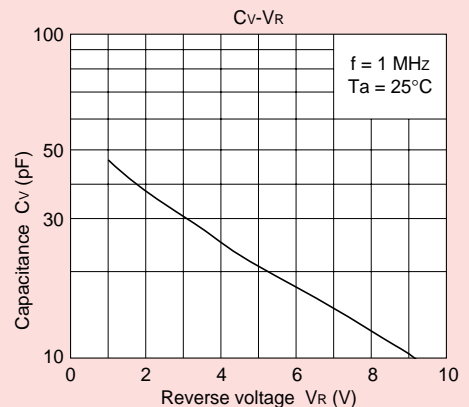


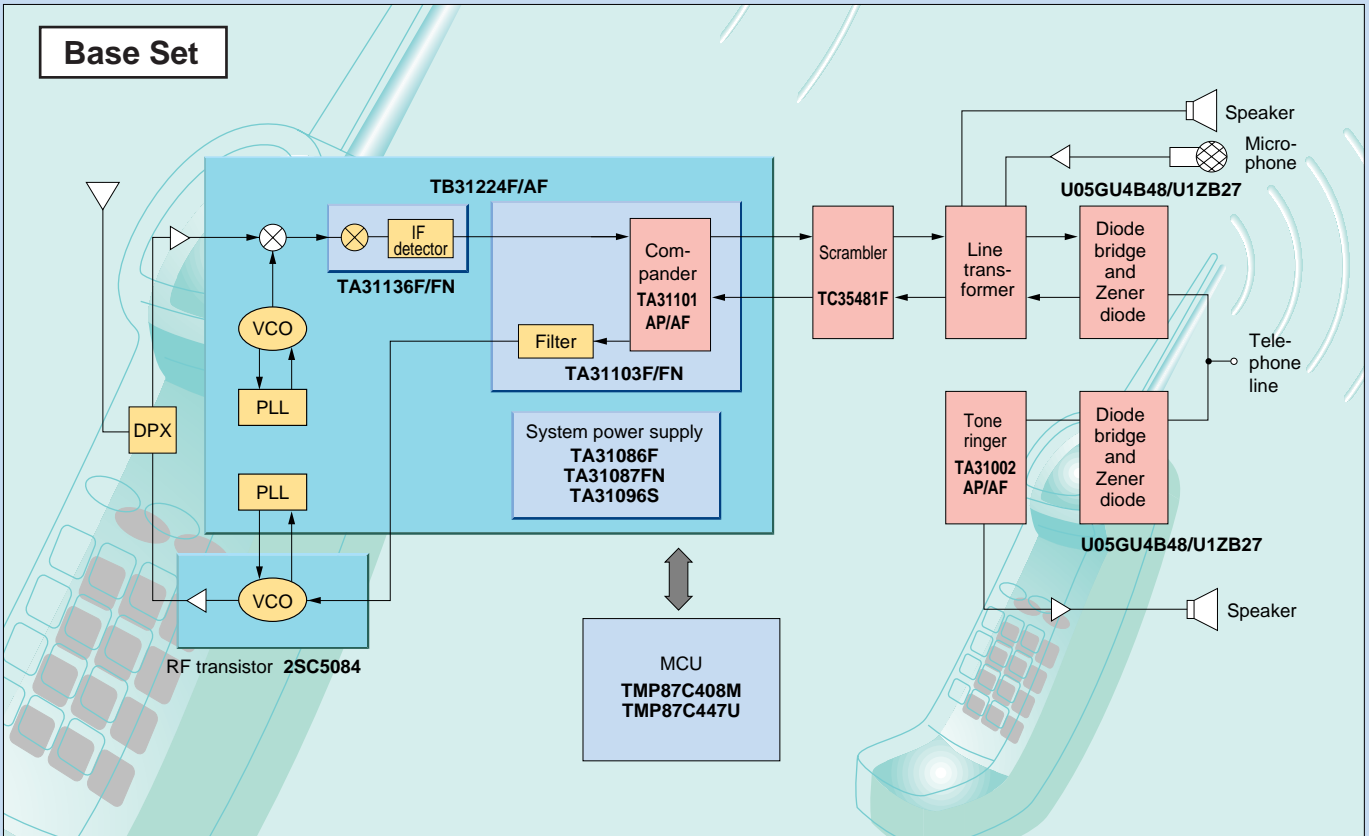
MHz Output Gain and Noise Factor Measurement Circuits



Varicap Diode: 1SV228

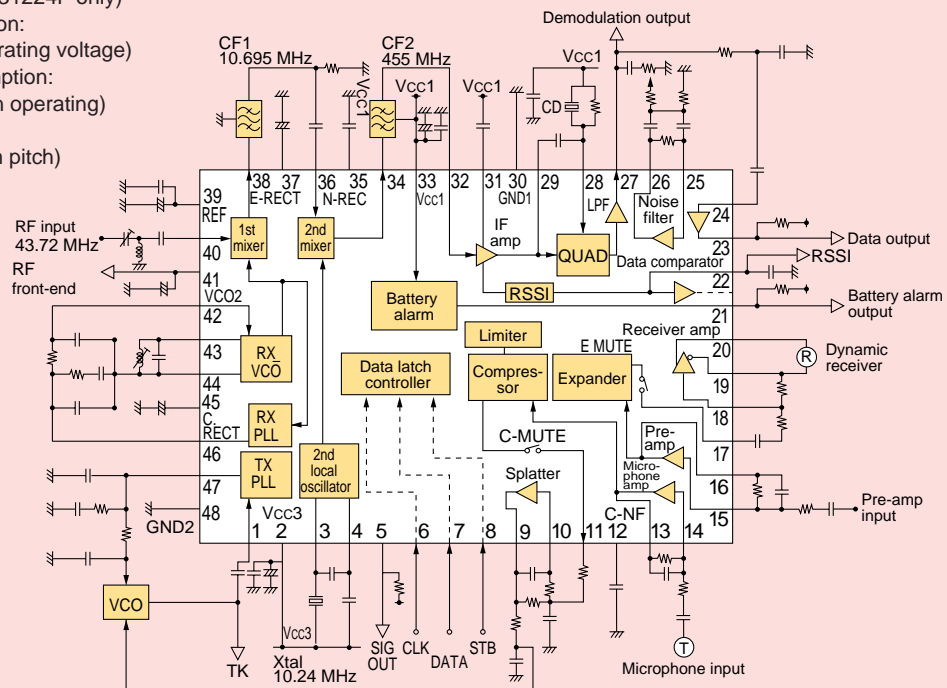
- For frequency tuning from the FM band to 100 MHz
- S-MINI package (2.9 mm x 1.5 mm)
- Capacitance $C_{3V} = 30.5 \text{ pF}$ @ $V_R = 3 \text{ V}$
- Capacitance change ratio: $C_{3V}/C_{8V} = 2.1 \text{ min.}$
- Series resistance: $r_s = 0.3 \Omega$ typ.



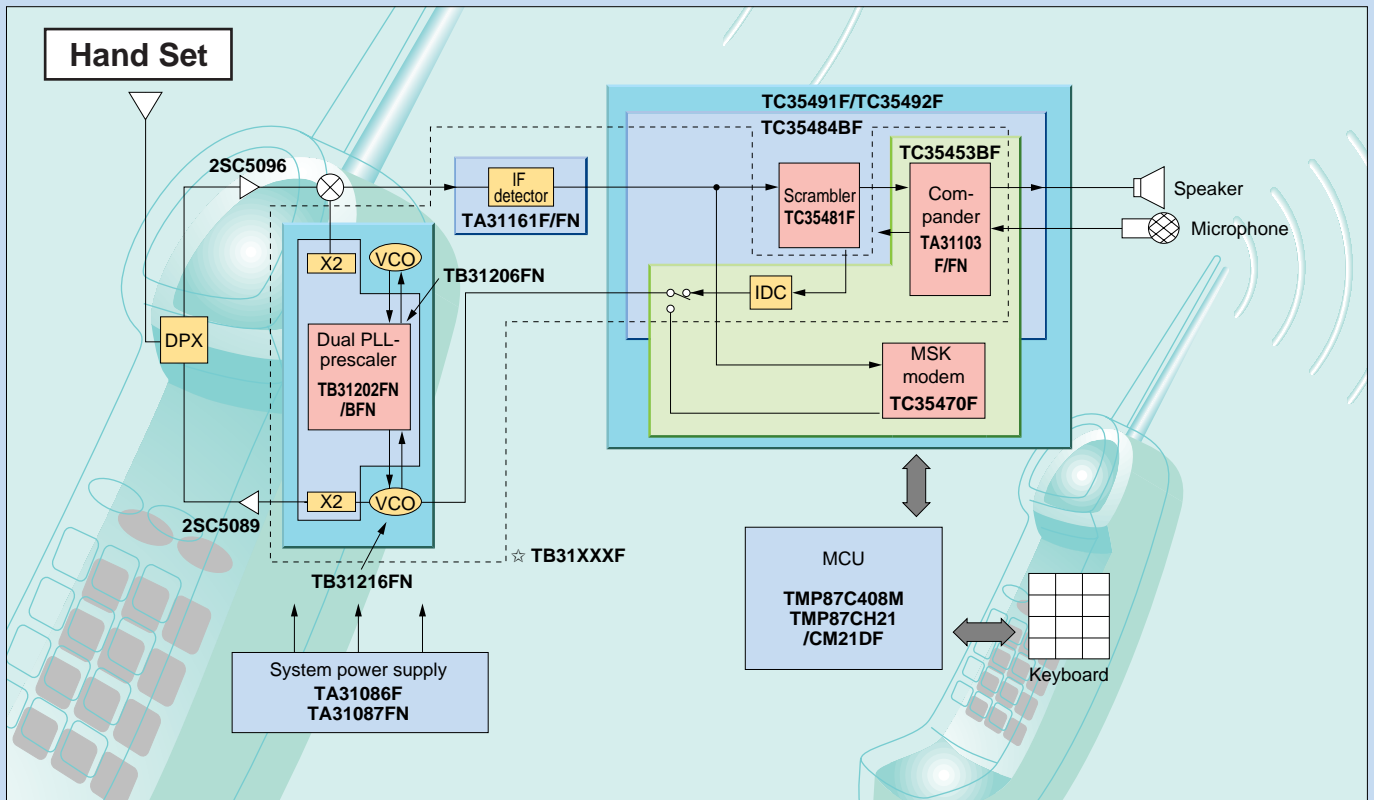


RF Single-chip ICs: TB31224F/AF

- RF section of CT0 cordless phones integrated onto a single chip
- Control by serial data
- RX amp regulator: 2.0 V
- Easily compatible with 25 ch
- Built-in battery alarm function
- Combination of noise detection function and RSSI function enables high-speed and stable channel scanning
- Default function (TB31224F only)
- Low-voltage operation:
Vcc = 2 V (min. operating voltage)
- Low current consumption:
Icc = 12.5 mA (when operating)
- Compact package:
48-pin QFP (0.8 mm pitch)



900 MHz Analog Cordless Phones (Wide Band)



900 MHz Analog Cordless Lineup

New Microwave Transistors $f_T = 10$ GHz Band Transistors

Applications	Device	Electrical Characteristics											Package
		ft (typ.)			$ S_{21} ^2$ (typ.)			NF (typ.)					
		(GHz)	V _{CE} (V)	I _c (mA)	(dB)	V _{CE} (V)	I _c (mA)	f (GHz)	(dB)	V _{CE} (V)	I _c (mA)	f (GHz)	
High-current applications	2SC5089	10	8	20	7	8	20	2	1.7	8	5	2	S-MINI
	2SC5090	10	8	20	7	8	20	2	1.7	8	5	2	USM
	2SC5091	10	8	20	7	8	20	2	1.7	8	5	2	SSM
	2SC5091FT	10	8	20	7	8	20	2	1.7	8	5	2	TESM
	2SC5092	10	8	20	10	8	20	2	1.8	8	5	2	SMQ
Low-current applications	2SC5093	10	8	20	9.5	8	20	2	1.8	8	5	2	USQ
	2SC5094	10	6	7	7.5	6	7	2	1.8	6	3	2	S-MINI
	2SC5095	10	6	7	7.5	6	7	2	1.8	6	3	2	USM
	2SC5096	10	6	7	7.5	6	7	2	1.8	6	3	2	SSM
	2SC5096FT	10	6	7	7.5	6	7	2	1.8	6	3	2	TESM
	2SC5097	10	6	7	10	6	7	2	1.8	6	3	2	SMQ
Ultra-high-current applications	MT3S03T	10	3	10	8	3	20	2	1.4	3	7	2	TESM

Mixers and IF Detectors

Device	Mixer operating frequency (MHz)	Recommended IF frequency (KHz)	Frequency detector	RSSI function	Noise detection	Other	Operating power supply voltage (V)	Package (pitch: mm)
TA31161FN	40 to 300	10.7 MHz	○	○	○		2.3 to 5.5	SSOP16 (0.65)
TA31188FN	21.325	—	○	○	○	2nd IF filter and detection coil not required	1.8 to 5.5	SSOP24 (0.65)

Prescaler-PLL

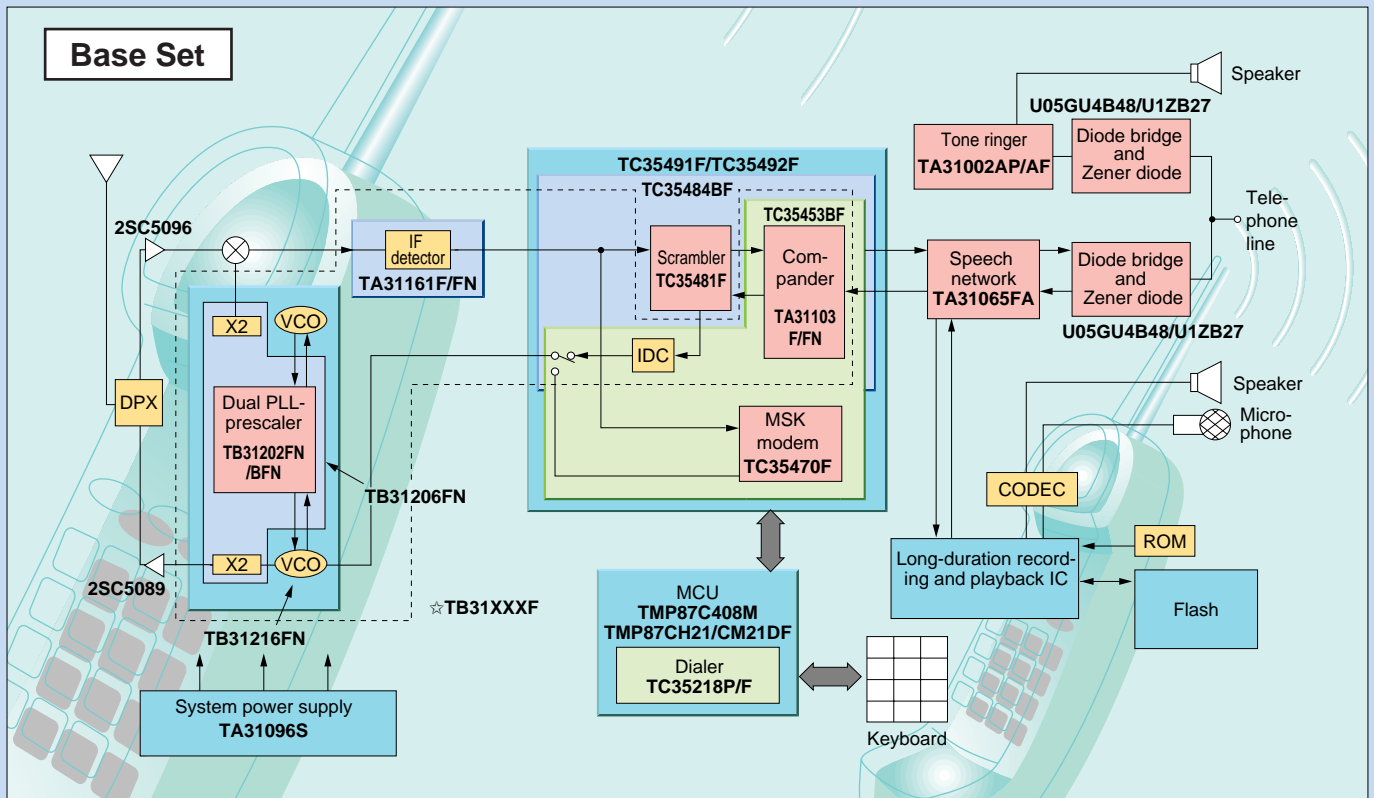
Device	Operating frequency (MHz)	VCO oscillation transistor	Standby control	Crystal oscillator circuit	Other	Operating power supply voltage (V)	Package (pitch: mm)
TB31202FN/BFN	200 to 520 (CH1) 200 to 520 (CH2)	○	○	○	—	2.0 to 5.5	SSOP16 (0.65)
TB31206FN	520 to 1100 (CH1) 520 to 1100 (CH2)	○	○	○	—	2.7 to 5.5	SSOP16 (0.65)
TB31216FN	750 to 1050 (CH1) 750 to 1050 (CH2)	○	○	○	—	2.7 to 5.5	SSOP24 (0.65)

Companders

Device	Operating voltage range	Compression ratio	Package (pitch: mm)
TA31103F	2.7 to 8.0	2 : 1	SSOP24 (1.00)
TA31103FN	2.7 to 8.0	2 : 1	SSOP24 (0.65)

Baseband Signal Processors

Device	Functions	Baseband filter				MSK modem		Operating power supply voltage (V)	Demonstration board	Package
		IDC	Scrambler	European filter	Companders	1200 bps	2400 bps			
TC35481F	Scrambler		○					2.7 to 5.5	○	SOP20
TC35484BF	2in1	○	○					2.7 to 5.5	○	QFP44
TC35485BF	2in1	○	○					1.8 to 3.6	○	QFP44
TC35491F	3in1	○	○			○	○	1.8 to 5.5	○	QFP44
TC35492F	3in1	○	○			○	○	1.8 to 5.5	○	QFP60
TC35453F	3in1	○	○			○	○	1.8 to 5.5	○	QFP44
TC35493F	3in1	○	○			○	○	1.8 to 5.5	○	QFP60
TC35470AF	MSK modem					○	○	1.8 to 5.5		SOP16
TC35471F	MSK modem					○	○	1.8 to 5.5		SOP16



☆: Under development

■ MCU

Device	ROM (bytes)	RAM (bytes)	Instruction execution time (μs)	I/O	Operating voltage (V)	Functions	Package	One-time PROM
TMP87C408M	4K	256	0.50 0.95	22	4.5 to 5.5	AD converter	SOP28	TMP87P808M
TMP87CH/CM21F/DF	16K/32K	1K	0.50/122 (0.95/122)	52	(2.7 to 5.5)	LCD driver (32seg*4com) AD converter	QFP80 (12 mm X 12 mm)	TMP87PP21F/DF

■ Speech Networks

Device	Receiver	Pad control	Branch performance	V _L boost	MF input	BEEP input	Package
TA31065N/FA	Ceramic and low-impedance type	Linear-variable method	Especially excellent	○	○	○	SDIP20/SSOP24
TA31033P/F	Low-impedance type			—	○	—	DIP16/SOP16
TA31033AP				—	○	—	DIP16

■ Tone Ringers

Device	Output format, others	Control method	Oscillation starting voltage	Package (pitch: mm)
TA31002AP/AF	Single output	Variable oscillation starting current type	16 V	DIP8/SOP8 (1.27)
TA31075AS/AF	Differential output, high sound pressure type		11 V	SIP9/SSOP10 (1.0)
TA31076S/F	Single output, operating voltage: 50 V, with ring detect function		12.4 V	SIP9/SSOP10 (1.0)

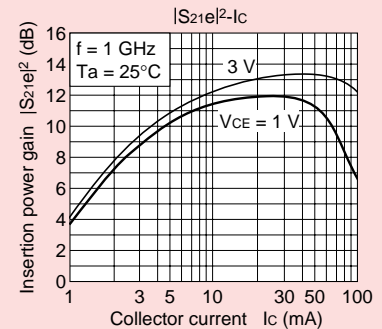
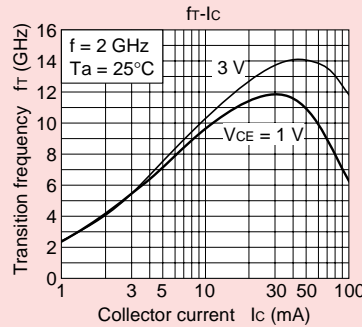
■ System Power Supplies

Device	Output voltage	Output terminals	Alarm/reset function	Other	Package (pitch: mm)
TA31086F	3.2 V	3	○		SSOP16 (1.00)
TA31087FN	2.2 V	2	○	Watchdog timer	SSOP16 (0.65)
TA31096S	5.0 V	1	○	Backup battery switch	SIP9 (1.27)

900 MHz Analog Cordless Phones (Wide Band)

▶ FT = 10 GHz Band Transistors: MT3S03 Series

- Low-voltage types have been developed in addition to the conventional lineup.
- Low noise and high gain
- Optimum for UHF-band, high-frequency amps, mixers and oscillation circuits.

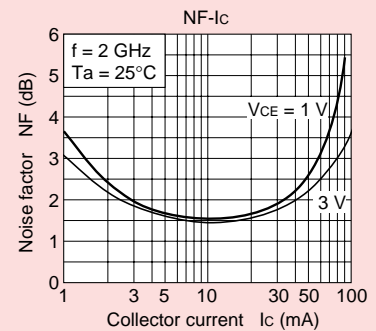


■ Lineup

	Device	Package
High-current type	2SC5089	S-MINI
	2SC5090	USM
	2SC5091	SSM
	2SC5091FT	TESM
	2SC5092	SMQ
Low-current type	2SC5093	USQ
	2SC5094	S-MINI
	2SC5095	USM
	2SC5096	SSM
	2SC5096FT	TESM
Ultra-high-current type	2SC5097	SMQ
	2SC5098	USQ
	MT3S03	S-MINI
	MT3S03U	USM
	MT3S03S	SSM
	MT3S03T	TESM
	MT4S03	SMQ
	MT4S03U	USQ

■ Frequency Characteristics (Typ.)

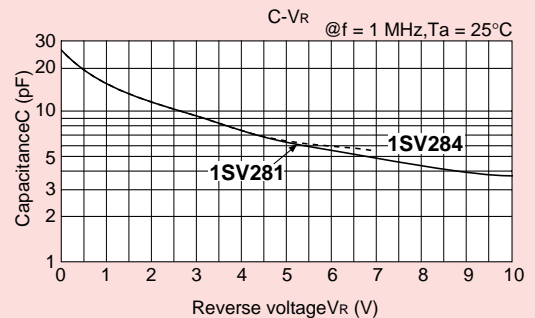
Device	Measurement frequency	NF (dB)	$ S_{21e} ^2$ (dB)
2SC5089	1 GHz	1.1	13
	2 GHz	1.7	7
2SC5094	1 GHz	1.4	13
	2 GHz	1.8	7.5
MT3S03T	2 GHz (Vce = 3 V)	1.4	8
	2 GHz (Vce = 1 V)	1.7	5.5



▶ Varicap Diodes for VCO

- Realize high conversion ratio at low voltage for VHF and UHF bands
- Ultra-compact ESC package
Resin portion size: Employs an ultra-compact package measuring 1.2 x 0.8 x 0.6 mm
- A flat lead is used for improved stability during mounting.

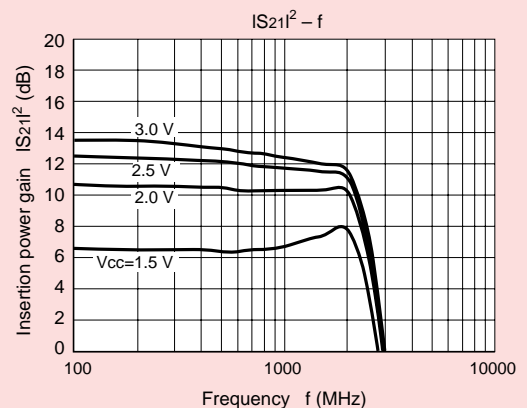
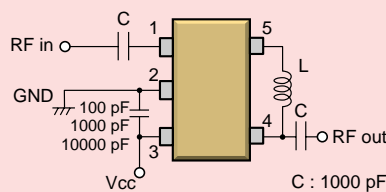
ESC	Applications	Characteristics
1SV281	VHF/UHF VCO	$C_{1V} = 16\text{pF}$, $n = 2.0$, $r_s = 0.28\Omega$
1SV284	VHF/UHF VCO	$C_{1V} = 16\text{pF}$, $n = 2.0$, $r_s = 0.22\Omega$



▶ Bipolar Broad-band Amps: TA4011F (SMV) / TA4011FU (USV)

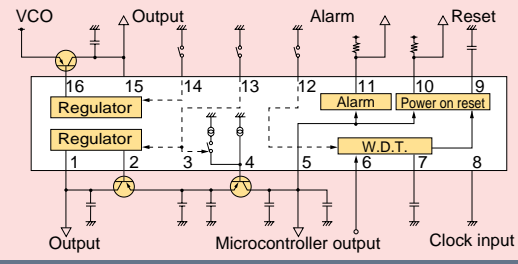
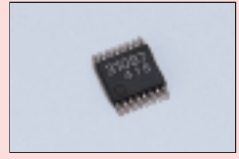
- Power supply voltage: $V_{CC} = 1.5$ to 3 V
- Circuit current: $I_{CC} = 3.5$ mA (@ $V_{CC} = 2$ V)
- Bandwidth: BW = 2.4 GHz (@ $V_{CC} = 2$ V)
- Power gain: $|S_{21}|^2 = 10$ dB (@ $V_{CC} = 2$ V, @ $f = 1.5$ GHz)
- Noise factor: NF = 6.5 dB (@ $V_{CC} = 2$ V, @ $f = 1.5$ GHz)
- Output power: $P_{o1dB} = -6$ dBmW (@ $V_{CC} = 2$ V, @ $f = 1.5$ GHz)
- 5-pin SSOP (SMV/USV) package

■ Measurement Circuit



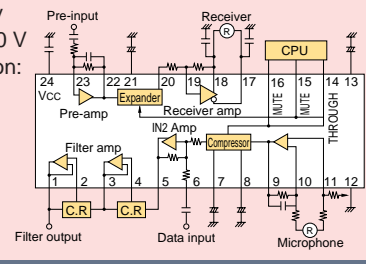
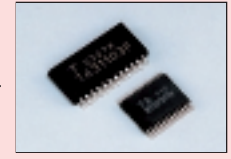
System Power Supply (Cordless Phones): TA31087FN

- Main application: Cordless phone hand sets
- Built-in watchdog timer
- Two independent regulators
- Output voltage: 2.2 V (typ.)
- Battery detection function
- Power on reset circuit
- Battery save function
- Ultra-compact package: 16-pin SSOP (0.65 mm pitch)



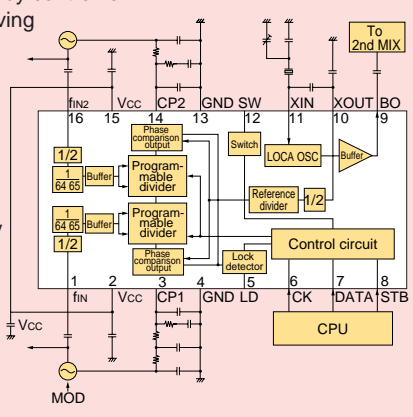
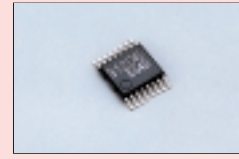
Companders: TA31103F/FN

- Main application: Cordless phones
- Compressor and expander built into a single chip for noise reduction
- Built-in receiver amp enables accommodation of both ceramic and dynamic receivers
- Two built-in filter buffer amps
- Built-in microphone amp and pre-amp, while mute function operates independently for the compressor and expander
- Operating power supply voltage: $V_{cc} = 2.7$ to 8.0 V
- Low current consumption: $I_{cc} = 6.0$ mA typ. ($V_{cc} = 3$ V, $T_a = 25^\circ\text{C}$)
- Compact package: 24-pin SSOP (1.00/0.65 mm pitch)



Dual Prescaler+PLL Operating at 1100 MHz: TB31206FN

- Two channels of prescaler and PLL for sending and receiving integrated onto a single chip.
- Input frequency: 520 to 1100 MHz
- Input sensitivity: 92 to 107 dB μ V
- Charge pump output uses a constant current output circuit making it possible to change output current with serial data.
- Independent standby control for sending and receiving by serial data
- Current consumption: 16.5 mA (when operating with 2 channels) (typ.)
- Operating voltage range: 2.7 to 5.5 V
- Package: 16-pin SSOP (0.65 mm pitch)



28-pin, Compact 8-bit Microcontroller: TMP87C408M

The TMP87C408M is a compact, 8-bit microcontroller that seals an 8-bit AD converter, serial interface and other features in a compact, 28-pin SOP package.

- Built-in ROM: 4K bytes
- Built-in RAM: 256 bytes
- Minimum instruction execution time: 0.95 μ s (when operating at 4.2 MHz and 2.7 to 5.5 V), 0.50 μ s (when operating at 8 MHz and 4.5 to 5.5 V)
- Built-in 8-bit AD converter: 8 channels
- 8-bit serial interface
- Package: 28-pin SOP
- OTP: TMP87P808M

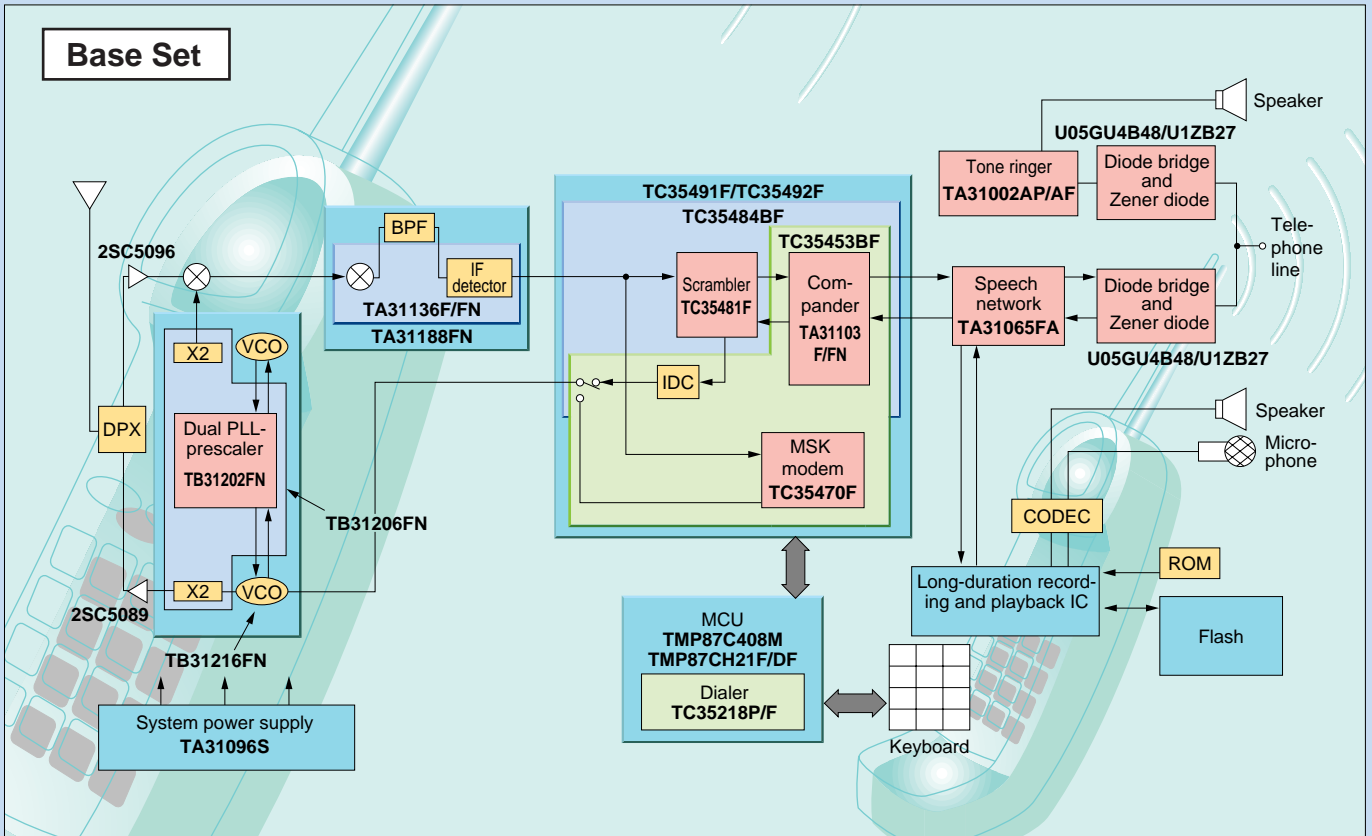
8-bit Microcontrollers with Built-in LCD Driver: TMP87CH21 / CM21F / DF

The TMP87CH21/CM21DF are 8-bit microcontrollers perfect for application in telephones, sealing an LCD driver, 8-bit AD converter and other features in a compact package measuring 12 mm x 12 mm.

- Built-in ROM: 32K/16K bytes
- Built-in RAM: 1K byte
- Minimum instruction execution time: 0.95 μ s (when operating at 4.2 MHz and 2.7 to 5.5 V), 0.50 μ s (when operating at 8 MHz and 4.5 to 5.5 V), 122 μ s (when operating at 32.8 KHz and 1.8 to 5.5 V)
- LCD driver: 32 to 12 seg x 4 com
- Built-in 8-bit AD converter: 8 channels
- 8-bit serial interface
- Package: 80-pin QFP (12 mm x 12 mm, 0.5 mm pitch)
- OTP: TMP87PP21F/DF

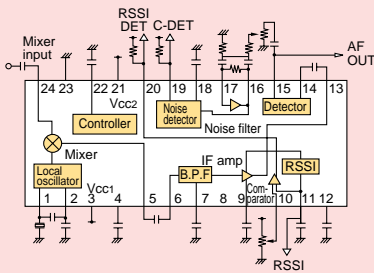
900 MHz Analog Cordless Phones (Narrow Band)

CORDLESS PHONE



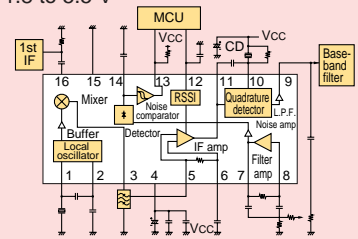
IF Detector IC: TA31188FN

- Main application: Cordless phones
- Eliminates the need for an externally connected ceramic filter and discriminator
- Low-voltage operation: $V_{cc} = 1.8$ to 5.5 V
- High sensitivity: 12 dB sensitivity $16 \text{ dB}\mu\text{VEMF}$ (50Ω input)
- Built-in noise detection circuit
- RSSI function
- Compact package: 24-pin SSOP (0.65 mm pitch)



FM-IF Detectors Operating at 1.8 V: TA31136F/FN

- RSSI circuit and noise detection function contained in a 16-pin compact package.
- Excellent detection output and RSSI output temperature characteristics.
- Mixer operating frequency: 10 to 100 MHz
- Mixer intercept point: $96 \text{ dB}\mu\text{V}$ (typ.)
- 12 dB sensitivity: $11 \text{ dB}\mu\text{VEMF}$ (50Ω input) (typ.)
- Operating voltage range: 1.8 to 5.5 V
- Package: 16-pin SSOP (1.00/0.65 mm pitch)



520 MHz Operation Dual Prescaler / PLL: TB31202FN / BFN

- Two channels of prescaler and PLL for sending and receiving integrated onto a single chip.
- Input frequency: 200 to 520 MHz
- Input sensitivity: 93 to 107 $\text{dB}\mu\text{V}$
- Charge pump output uses a constant current output circuit making it possible to change output current with serial data.
- Independent standby control for sending and receiving by serial data
- Current consumption: 8 mA (when operating with 2 channels) (typ.)
- Operating voltage range: 1.9 to 5.5 V
- Package: 16-pin SSOP (0.65 mm pitch)



TB31202BFN Block Diagram

