

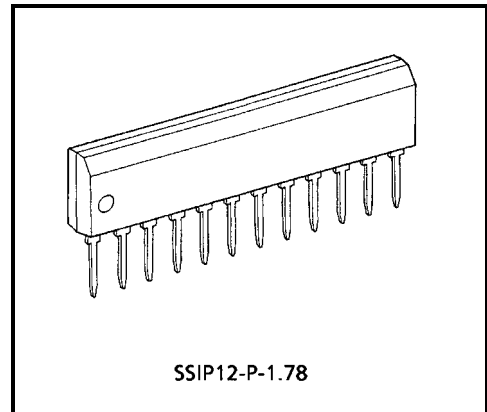
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8721ASN

DUAL SIF SYSTEM FOR TV

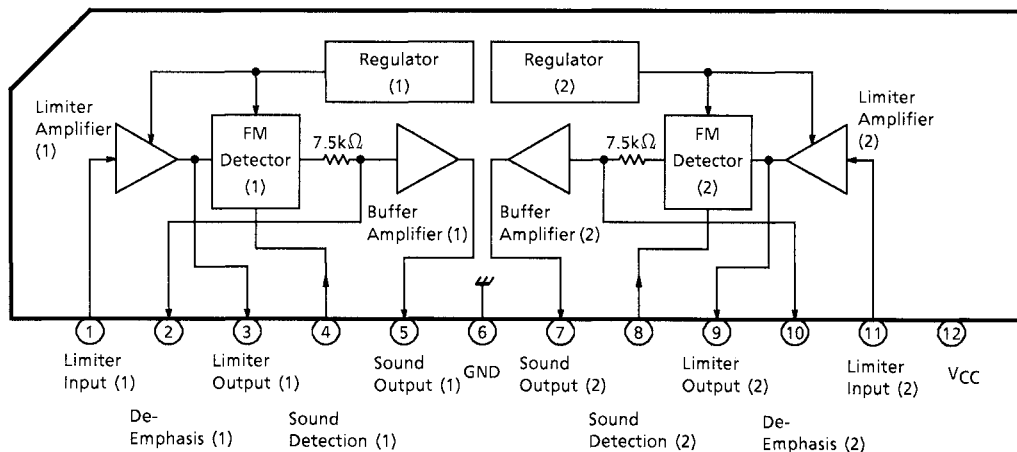
FEATURES

- Two channel SIF circuit (The 2ch demodulation circuit can be configured in combination with the TA8712N or TA8796N.)
- Three stage limiter amplifier
- Quadrature type detection circuit
- No-adjustment type FM detector circuit by ceramic discriminator



Weight : 0.71g (Typ.)

BLOCK DIAGRAM



000707EBA1

• TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.

In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..

• The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.

• The products described in this document are subject to the foreign exchange and foreign trade laws.

• The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.

• The information contained herein is subject to change without notice.

TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
1	Limiter Input (1)	A sound carrier is input from SAW filter.	
2 5	De-Emphasis (1) Sound Output (1)	The De-Emphasis time constant is defined by external capacitor. This is an FM detector circuit output terminal.	
3 4	Limiter Output (1) SoundDetection(1)	This is a connection terminal of sound detection coil. This will be of no-adjustment type by using ceramic discriminator. A sound muting will be performed by connecting pin 4 to GND.	
6	SIF GND	Connect a bypass capacitor between this pin and SIF V _{CC} of pin 12.	—

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
7 10	Sound Output (2) De-Emphasis (2)	This is an FM detector circuit output terminal. The De-Emphasis time constant is defined by external capacitor.	
8 9	Sound Detection (2) Limiter Output (2)	This is a connection terminal of sound detection coil. This will be of no-adjustment type by means of ceramic discriminator. A sound muting will be performed by connecting pin 8 to GND.	
11	Limiter Input (2)	A sound carrier is input from the SAW filter.	
12	SIF V _{CC}	Connect a bypass capacitor between this pin and SIF GND of pin 6.	—

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	15	V
Power Dissipation	P _D (Note)	890	mW
Operating Temperature	T _{opr}	-20~75	°C
Storage Temperature	T _{stg}	-55~150	°C

Note: When using the device at above Ta=25°C, decrease the power dissipation by 7.14mW for each increase of 1°C.

RECOMMENDED SUPPLY VOLTAGE

PIN No.	PIN NAME	MIN.	TYP.	MAX.	UNIT
12	V _{CC}	8.1	9.0	9.9	V

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS (Unless otherwise specified V_{CC}=9V, Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	I _{CC}	1	—	13	18	23	mA
Terminal Voltage	V ₁	1	—	2.7	3.0	3.3	V
	V ₂		—	4.1	5.1	6.1	
	V ₃		—	2.7	3.7	4.7	
	V ₄		—	2.3	2.9	3.6	
	V ₅		—	3.5	4.5	5.5	
	V ₇		—	3.5	4.5	5.5	
	V ₈		—	2.3	2.9	3.6	
	V ₉		—	2.7	3.7	4.7	
	V ₁₀		—	4.1	5.1	6.1	
	V ₁₁		—	2.7	3.0	3.3	

AC CHARACTERISTICS

(When using the specified coil unless otherwise specified, $V_{CC}=9V$, $T_a=25^\circ C$)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Audio Frequency Output Level (Note 1)	V_{OD1}	2	$f_o=4.5MHz$, $V_i=100dB\mu V$	350	500	700	mV_{rms}
	V_{OD2}		$f_o=4.724MHz$, $V_i=100dB\mu V$	350	500	700	
Audio Frequency Distortion Rate (Note 2)	THD1	2	$f_o=4.5MHz$	—	0.2	1.0	%
	THD2		$f_o=4.724MHz$	—	0.2	1.0	
Limiting Sensitivity (Note 3)	V_{LIM1}	2	When output V_{OD1} is $-3dB$.	—	—	50	$dB\mu V$
	V_{LIM2}		When output V_{OD2} is $-3dB$.	—	—	50	
AMR (Note 4)	AMR1	2	$f_o=4.5MHz$, $AM=30\%$	40	50	—	dB
	AMR2		$f_o=4.724MHz$, $AM=30\%$	40	50	—	
Audio Frequency Bandwidth (Note 5)	AF_{BW1}	2	$-3dB$ bandwidth	± 70	—	—	kHz
	AF_{BW2}		$-3dB$ bandwidth	± 70	—	—	
S / N Ratio (Note 6)	S / N1	2	$f_o=4.5MHz$, CW against FM 25kHz / dev	60	—	—	dB
	S / N2		$f_o=4.724MHz$, CW against FM 25kHz / dev	60	—	—	
Crosstalk Between Sound Outputs (Note 7)	CR1	2	SIF1 $f_o=4.5MHz$, $f_m=400Hz$ SIF2 $f_o=4.724MHz$, CW	60	—	—	dB
	CR2		SIF1 $f_o=4.5MHz$, CW SIF2 $f_o=4.724MHz$, $f_m=400Hz$	60	—	—	
Limiter Input Resistance (Note 8)	R_{i1} , R_{i2}	2	—	0.75	1.0	1.25	k Ω

TEST CONDITION

Note 1: Audio Frequency Output Level

Limiter input

V_{OD1} : $f_o=4.5MHz$, $100dB\mu V$, $f_m=400Hz$, 100% (25kHz / dev) FM modulation

V_{OD2} : $f_o=4.724MHz$, $100dB\mu V$, $f_m=400Hz$, 100% (25kHz / dev) FM modulation

After the above input, measure the output level of sound output.

Note 2: Audio Frequency Distortion Rate

Measure the distortion rate of sound output by distortion meter under the condition of Note 1.

Note 3: Limiting Sensitivity

Limiter input

V_{LIM1} : $f_o=4.5MHz$, variable level, $f_m=400Hz$, 100% (25kHz / dev) FM modulation

V_{LIM2} : $f_o=4.724MHz$, variable level, $f_m=400Hz$, 100% (25kHz / dev) FM modulation

After the above input, measure the output level of sound output. Measure the input level of Note 1 output level at $-3dB$.

Note 4: AMR
 Limiter input
 AMR1 : $f_0=4.5\text{MHz}$, $100\text{dB}\mu\text{V}$, $f_m=400\text{Hz}$, 30% AM modulation
 AMR2 : $f_0=4.724\text{MHz}$, $100\text{dB}\mu\text{V}$, $f_m=400\text{Hz}$, 30% AM modulation
 After the above input, measure the output level of sound output. (AMout)
 Calculate the ratio of the output level of Note 1.

$$\text{AMR} = 20\lambda\log \frac{\text{AMout}}{\text{VOD}}$$

Note 5: Audio Frequency Bandwidth
 Limiter input
 AFBW1 : f_0 variable (center 4.5MHz), $100\text{dB}\mu\text{V}$, $f_m=400\text{Hz}$, 100% (25kHz / dev) FM modulation
 AFBW2 : f_0 variable (center 4.724MHz), $100\text{dB}\mu\text{V}$, $f_m=400\text{Hz}$,
 100% (25kHz / dev) FM modulation
 After the above input, measure the output level of sound output. Calculate the frequency width when the output level of Note 1 becomes -3dB by changing the f_0 frequency high and low.

Note 6: S / N Ratio
 Limiter input
 S / N (1) : $f_0=4.5\text{MHz}$, $100\text{dB}\mu\text{V}$ CW
 S / N (2) : $f_0=4.724\text{MHz}$, $100\text{dB}\mu\text{V}$ CW
 After the above input, measure the output level of sound output (S / N out). Calculate the ratio of the output level of Note 1.

$$\text{S / N} = 20\lambda\log \frac{\text{VOD}}{\text{S / N out}}$$

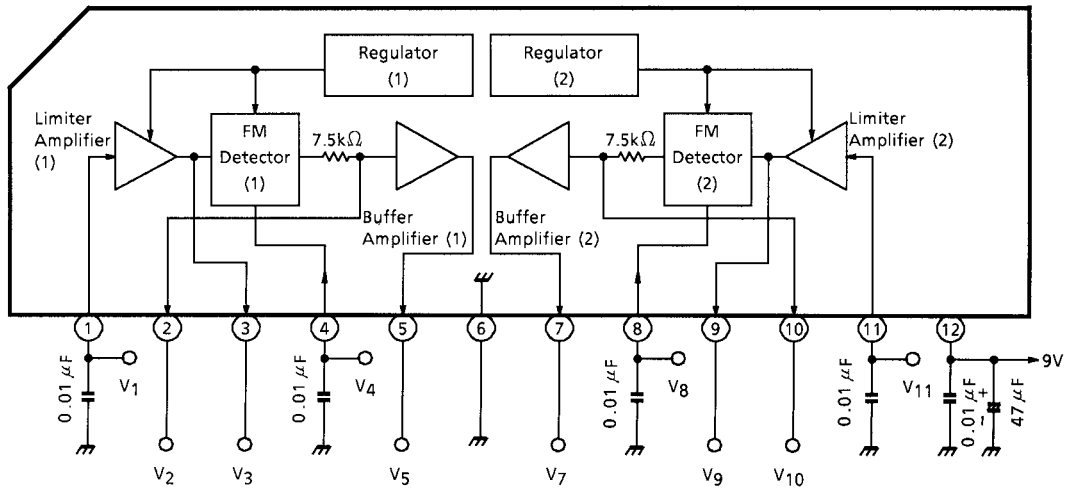
Note 7: Cross Talk between sound outputs
 Limiter input
 CR1: $\left[\begin{array}{l} \text{SIF1 } f_0=4.5\text{MHz}, 100\text{dB}\mu\text{V}, f_m=400\text{Hz} \\ \text{SIF2 } f_0=4.724\text{MHz}, 100\text{dB}\mu\text{V}, \text{CW} \end{array} \right.$
 CR2: $\left[\begin{array}{l} \text{SIF1 } f_0=4.5\text{MHz}, 100\text{dB}\mu\text{V}, \text{CW} \\ \text{SIF2 } f_0=4.724\text{MHz}, 100\text{dB}\mu\text{V}, f_m=400\text{Hz} \end{array} \right.$
 After the above input, measure the output leakage level of sound output.

$$\text{CR1 (2)} = 20\lambda\log \frac{\text{SIF 1 (2)}}{\text{SIF 2 (1)}}$$

Note 8: Limiter input resistance
 Measure the resistance of limiter input terminal by impedance analyzer.

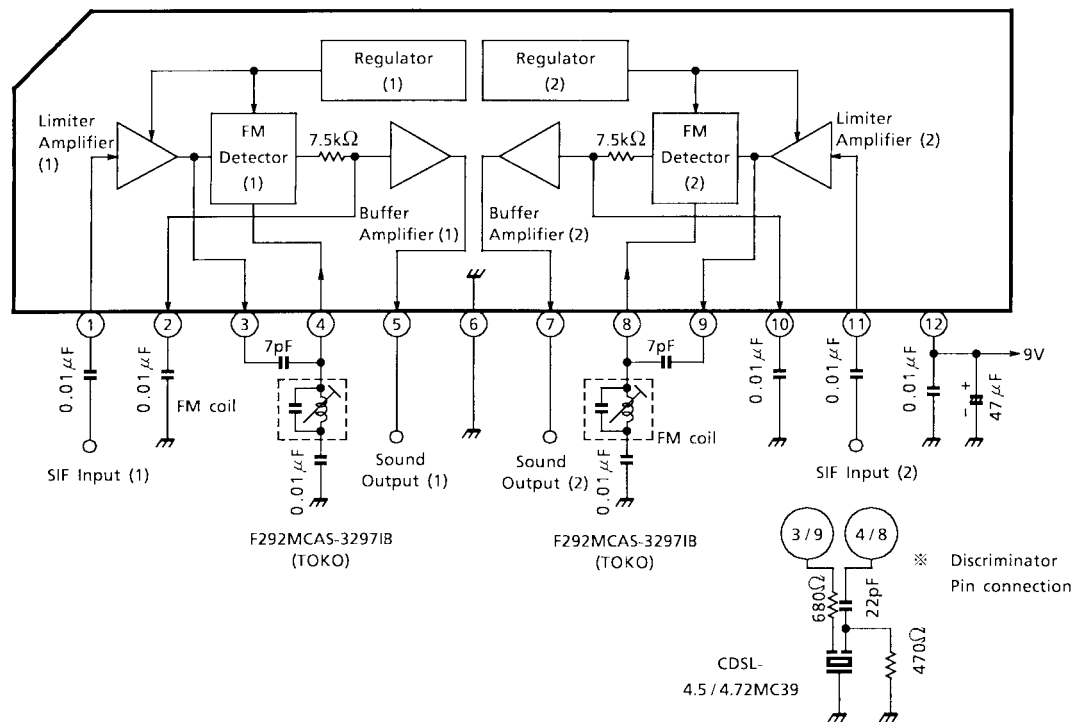
TEST CIRCUIT 1

DC characteristics



TEST CIRCUIT 2

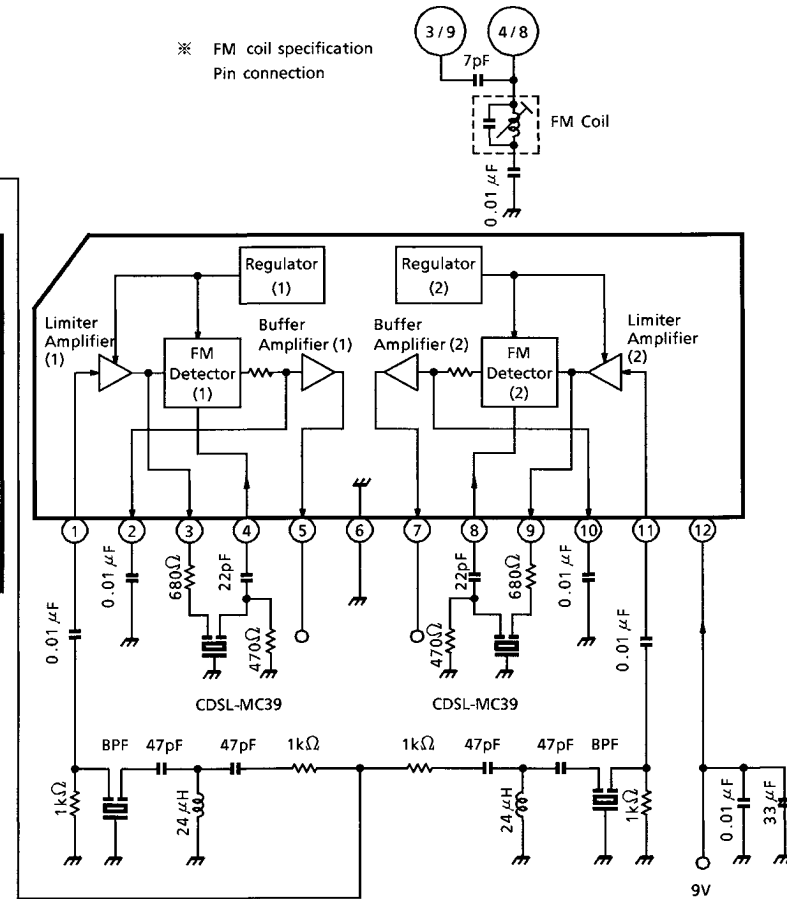
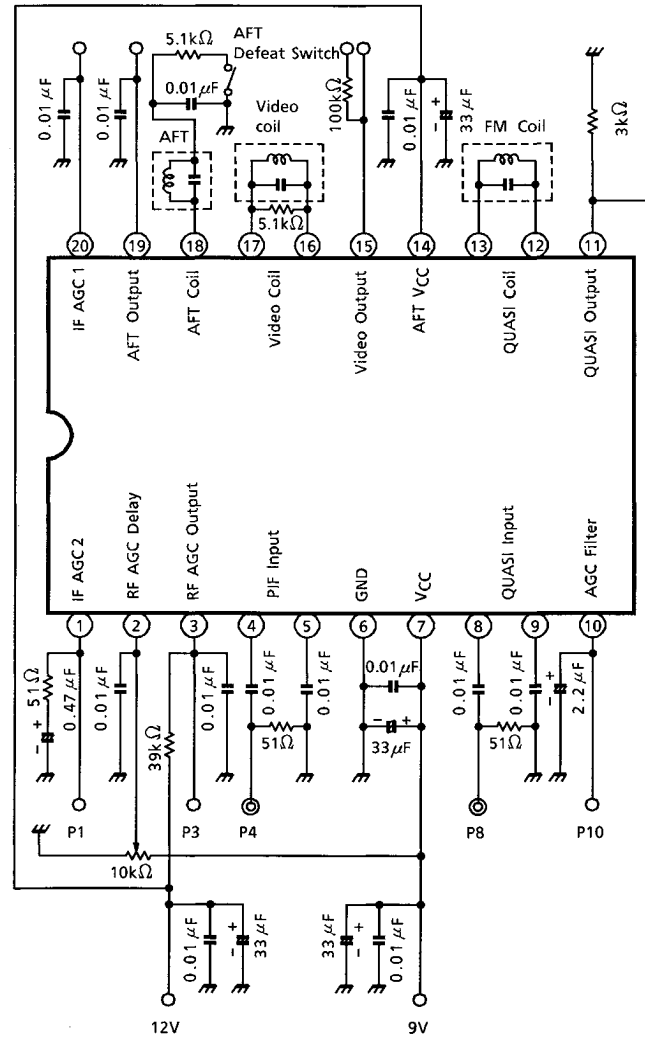
AC characteristics



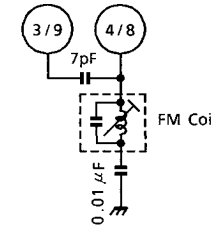
APPLICATION CIRCUIT

TA8712N /TA8796N

TA8721ASN



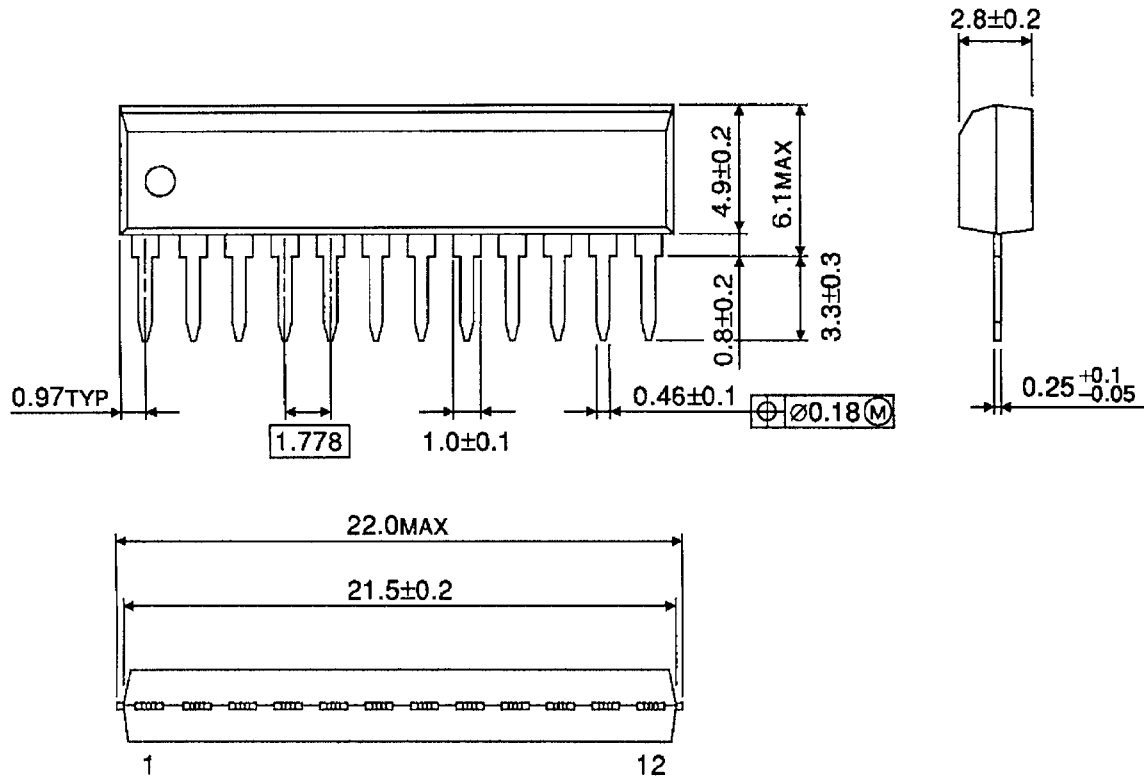
※ FM coil specification
Pin connection



PACKAGE DIMENSIONS

SSIP12-P-1.78

Unit: mm



Weight : 0.71g (Typ.)