

BIPOLAR ANALOG INTEGRATED CIRCUIT

μ PC8217TU

SILICON MMIC LNA + MIX IC FOR 1.9 GHz PHS

DESCRIPTION

The μ PC8217TU is a silicon monolithic integrated circuit designed for use as LNA (Low Noise Amplifier) + Mixer for 1.9 GHz PHS. This IC manufactured using our 30 GHz f_{max} UHS0 (Ultra High Speed Process) silicon bipolar process.

This device is packaged in surface mount 8-pin lead-less minimold package.

FEATURES

- Low noise : NF = 4.2 dBm TYP.
- High Gain : CG = 22.5 dB TYP.
- Low Current Consumption : I_{CC} = 11.5 mA TYP.
- Packaged in 8-pin lead-less minimold (2.0 × 2.2 × 0.5 mm) suitable for high-density surface mounting

APPLICATION

- 1.9 GHz applications (Example : PHS etc.)

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
μ PC8217TU-E2	8-pin lead-less minimold	8217	<ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 5, 6, 7, 8 face the perforation side of the tape • Qty 5 kpcs/reel

Remark To order evaluation samples, contact your nearby sales office.

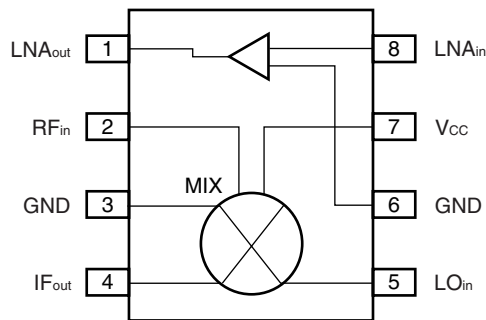
Part number for sample order: μ PC8217TU

Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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 Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM

(Top View)



ABSOLUTE MAXIMUM RATINGS (T_A = +25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Ratings	Unit
Supply Voltage (LNA)	V _{CC (LNAout)}		3.6	V
Supply Voltage (MIX)	V _{CC (IFout)}		3.6	V
Circuit Current	I _{CC}		23	mA
Maximum Input Power (LNA)	P _{LNAin}		+10	dBm
Maximum Input Power (MIX)	P _{LOin}		+10	dBm
Operating Ambient Temperature	T _A		-30 to +70	°C
Storage Temperature	T _{stg}		-55 to +150	°C
Power Dissipation of Package	P _D	Note	1.06	W

Note Mounted on 33 × 21 × 0.4 mm epoxy glass PWB

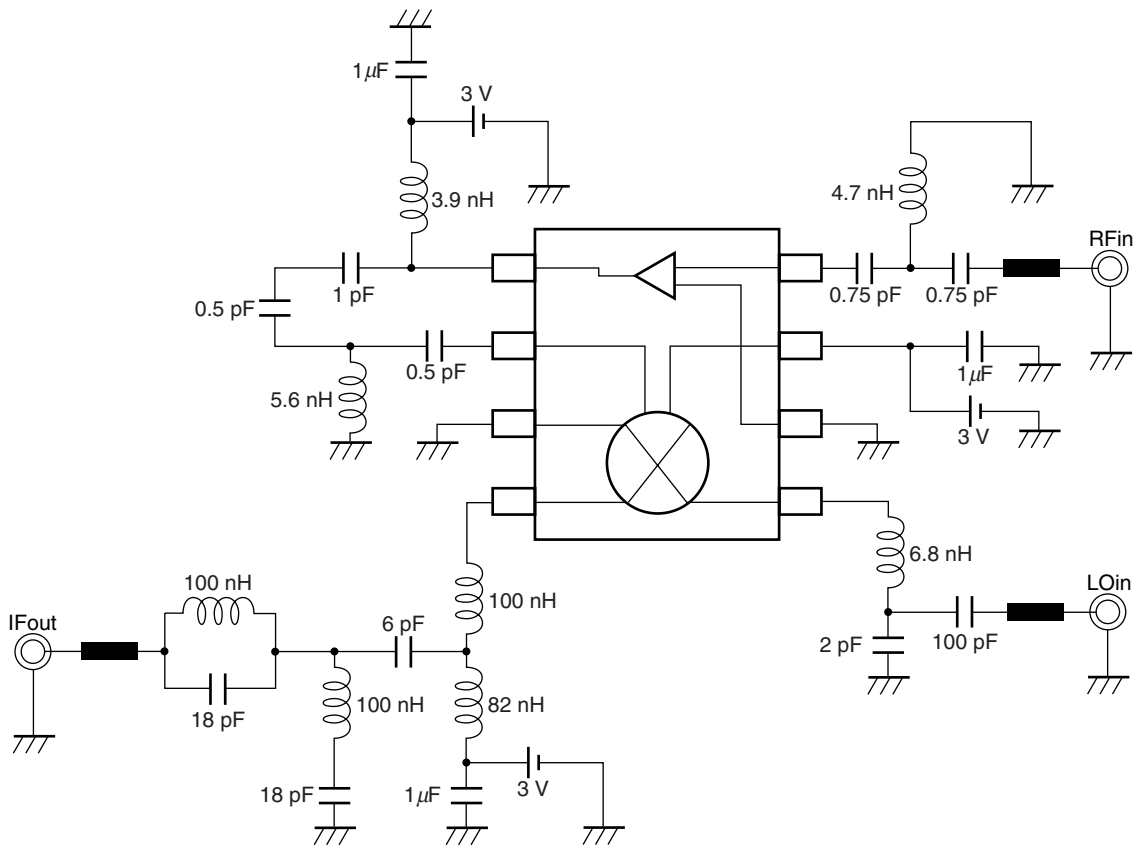
RECOMMENDED OPERATING RANGE

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Supply Voltage (LNA)	V _{CC (LNAout)}		2.7	3.0	3.3	V
Supply Voltage (MIX)	V _{CC (IFout)}		2.7	3.0	3.3	V
Operating Ambient Temperature	T _A		-30	+25	+70	°C
RF Input Frequency (MIX)	f _{RFin}		1.8	1.9	2.0	GHz
Local Input Power	P _{LOin}		-15	-10	-5	dBm

ELECTRICAL CHARACTERISTICS ($V_{CC} = 3.0\text{ V}$, $T_A = +25^\circ\text{C}$, $Z_S = Z_L = 50\ \Omega$, $f_{RF} = 1.9\text{ GHz}$, $f_{IF} = 240\text{ MHz}$, $f_{LO} = 1.66\text{ GHz}$, $P_{LO} = -10\text{ dBm}$, unless otherwise specified)

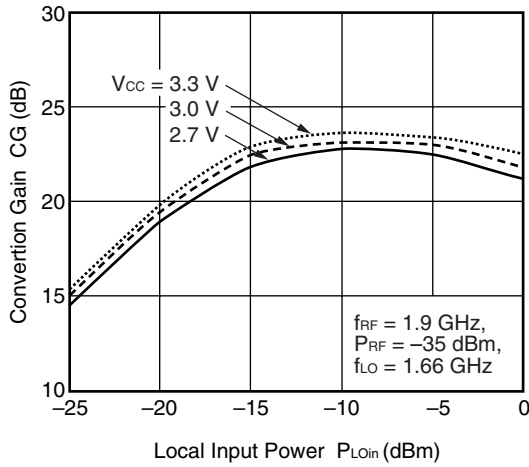
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Current Consumption	I_{CC}	No Signal	8.5	11.5	15.0	mA
Conversion Gain	CG	$P_{RFIn} = -35\text{ dBm}$	17.2	22.5	27.5	dB
Noise Figure	NF	SSB	-	4.2	5.3	dB
Input 3rd Order Distortion Intercept Point	IIP_3	$f_{RF1} = 1.9\text{ GHz}$, $f_{RF2} = 1.9006\text{ GHz}$, $P_{RF} = -35\text{ dBm/ tone}$	-17	-15	-	dBm
Image Rejection Ratio	IMR	$f_{RF1} = 1.9\text{ GHz}$, $f_{RF2} = 1.42\text{ GHz}$, $P_{RF} = -35\text{ dBm/ tone}$	30	36	-	dBc
1/2 IF Ratio	1/2 IFR	$f_{RF1} = 1.9\text{ GHz}$, $f_{RF2} = 1.78\text{ GHz}$, $P_{RF} = -35\text{ dBm/ tone}$, 240 MHz out	40	50	-	dBc
Local Leak	LoLeak	RF Port	-	-49	-	dBm

TEST CIRCUIT



TYPICAL CHARACTERISTICS (TA = +25°C, unless otherwise specified)

CONVERSION GAIN vs. LOCAL INPUT POWER



NOISE FIGURE vs. LOCAL INPUT POWER

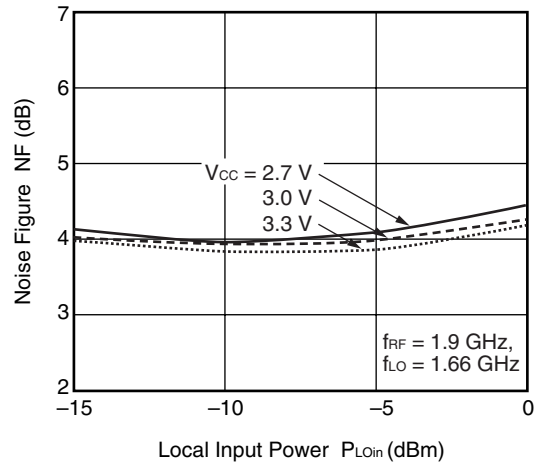


IMAGE REJECTION RATIO vs. LOCAL INPUT POWER

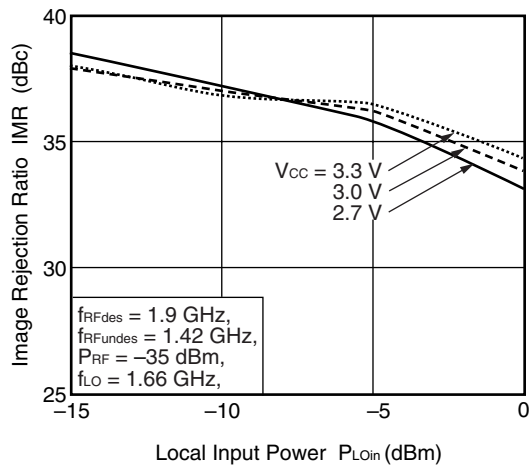
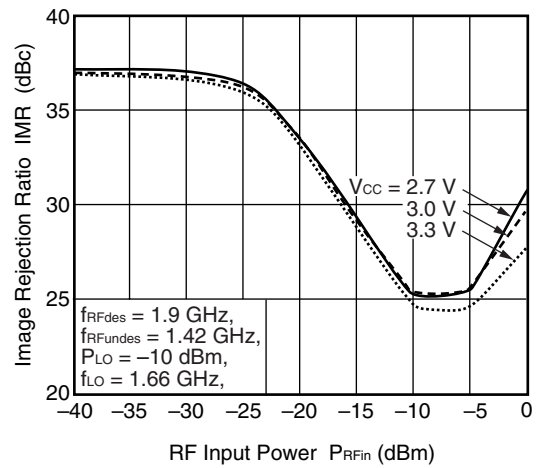
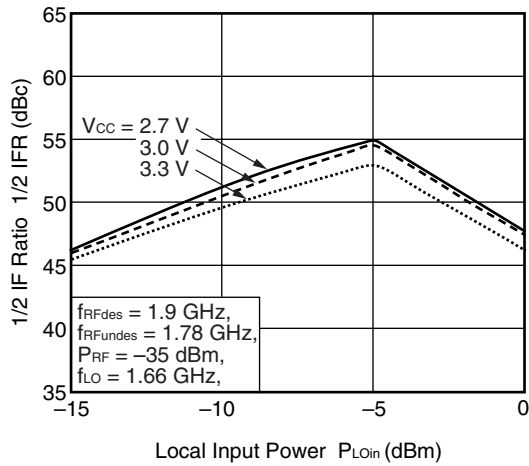


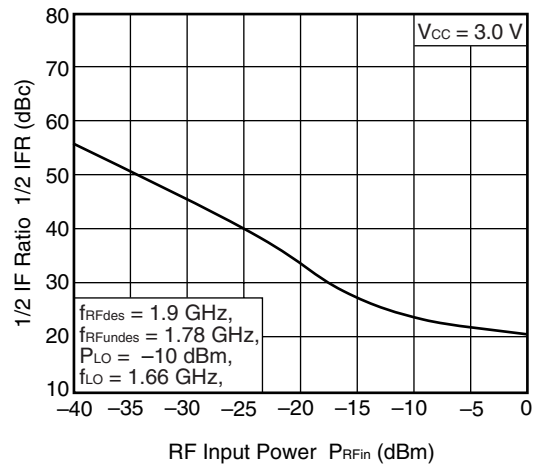
IMAGE REJECTION RATIO vs. RF INPUT POWER



1/2 IF Ratio vs. LOCAL INPUT POWER

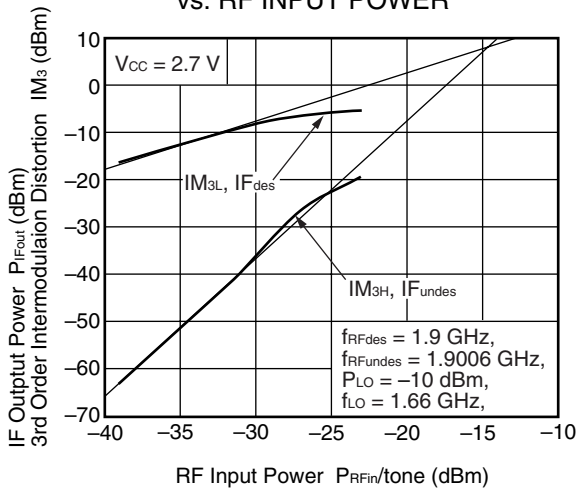


1/2 IF Ratio vs. RF INPUT POWER

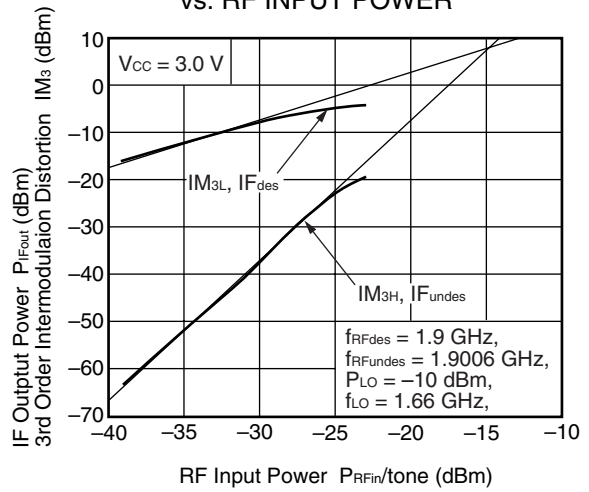


Remark The graphs indicate nominal characteristics.

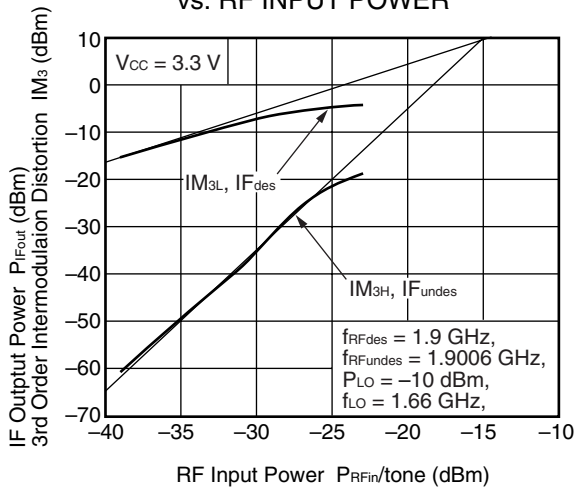
IF OUTPUT POWER, IM₃
vs. RF INPUT POWER



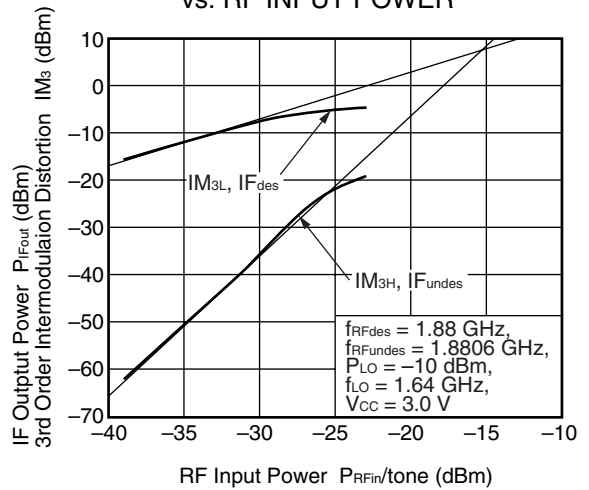
IF OUTPUT POWER, IM₃
vs. RF INPUT POWER



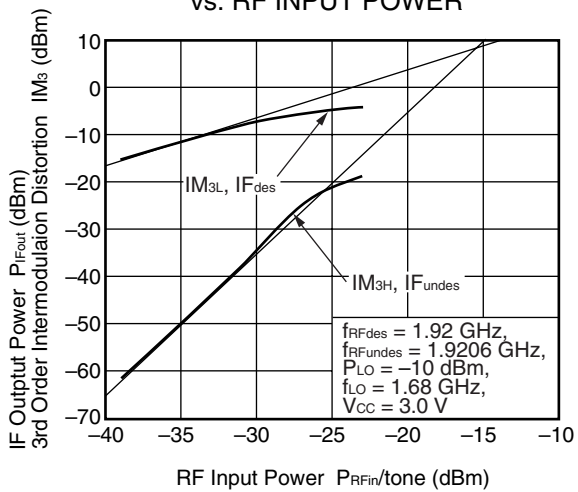
IF OUTPUT POWER, IM₃
vs. RF INPUT POWER



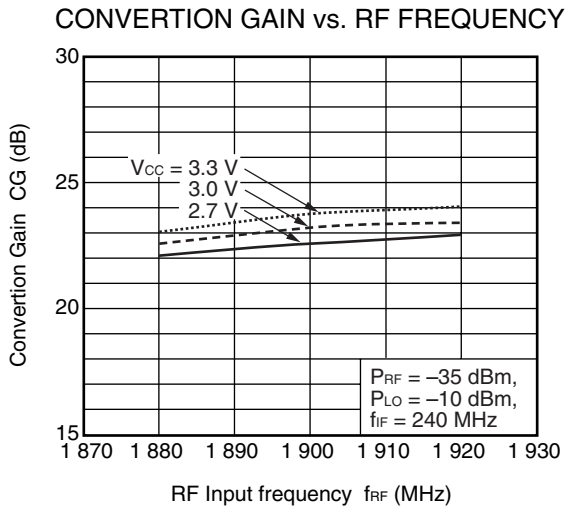
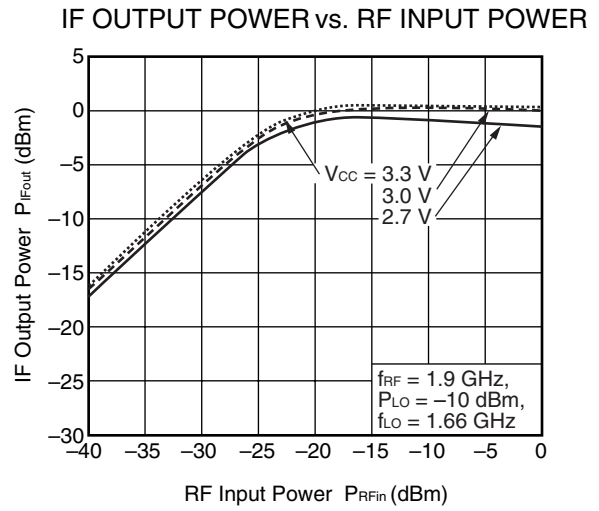
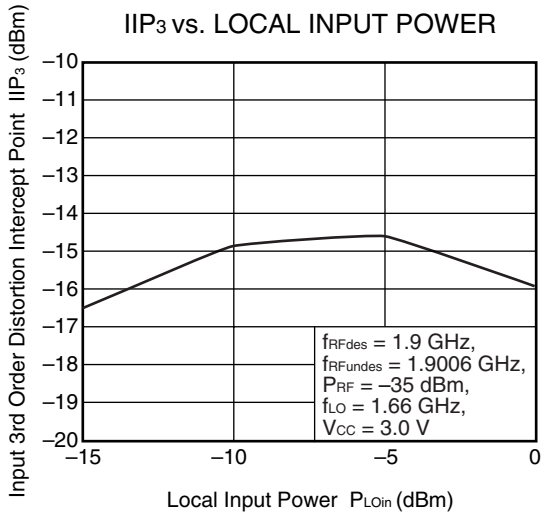
IF OUTPUT POWER, IM₃
vs. RF INPUT POWER



IF OUTPUT POWER, IM₃
vs. RF INPUT POWER



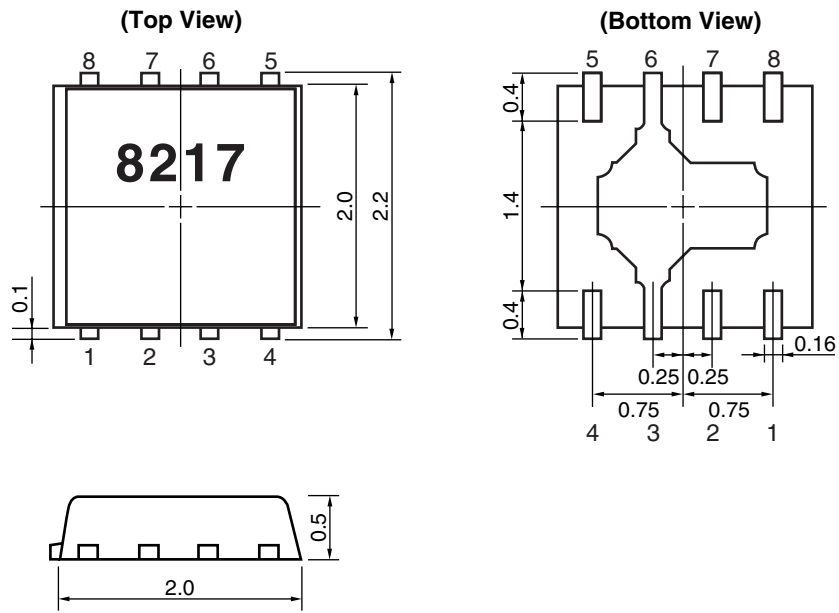
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PACKAGE DIMENSIONS

8-PIN LEAD-LESS MINIMOLD (UNIT: mm)



NOTES ON CORRECT USE

- (1) Observe precautions for handling because of electro-static sensitive devices.
- (2) Form a ground pattern as widely as possible to minimize ground impedance (to prevent undesired oscillation).
All the ground pins must be connected together with wide ground pattern to decrease impedance difference.
- (3) The bypass capacitor should be attached to Vcc line.

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Soldering Method	Soldering Conditions	Condition Symbol
Infrared Reflow	Peak temperature (package surface temperature) : 260°C or below Time at peak temperature : 10 seconds or less Time at temperature of 220°C or higher : 60 seconds or less Preheating time at 120 to 180°C : 120±30 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	IR260
VPS	Peak temperature (package surface temperature) : 215°C or below Time at temperature of 200°C or higher : 25 to 40 seconds Preheating time at 120 to 150°C : 30 to 60 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	VP215
Wave Soldering	Peak temperature (molten solder temperature) : 260°C or below Time at peak temperature : 10 seconds or less Preheating temperature (package surface temperature) : 120°C or below Maximum number of flow processes : 1 time Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	WS260
Partial Heating	Peak temperature (pin temperature) : 350°C or below Soldering time (per side of device) : 3 seconds or less Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	HS350

Caution Do not use different soldering methods together (except for partial heating).

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