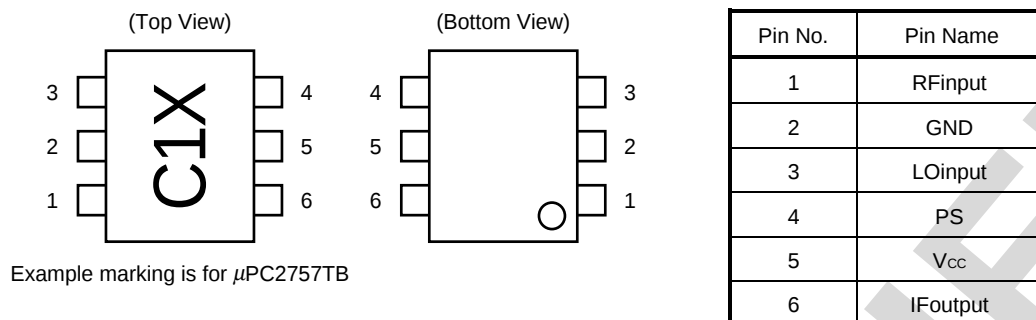


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1. PIN CONNECTIONS

 μ PC2757TB, μ PC2758TB in common2. PRODUCT LINE-UP ($T_A = +25^\circ\text{C}$, $V_{CC} = V_{PS} = 3.0\text{ V}$, $Z_S = Z_L = 50\ \Omega$)

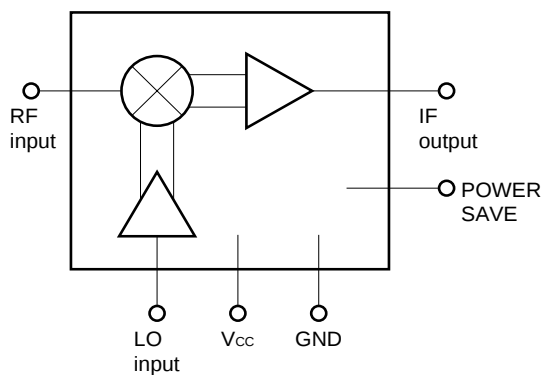
Part No. \ Items	No RF I_{CC} (mA)	900 MHz SSB · NF (dB)	1.5 GHz SSB · NF (dB)	1.9 GHz SSB · NF (dB)	900 MHz CG (dB)	1.5 GHz CG (dB)	1.9 GHz CG (dB)	900 MHz IIP ₃ (dBm)	1.5 GHz IIP ₃ (dBm)	1.9 GHz IIP ₃ (dBm)
μ PC2757T	5.6	10	10	13	15	15	13	-14	-14	-12
μ PC2757TB										
μ PC2758T	11	9	10	13	19	18	17	-13	-12	-11
μ PC2758TB										
μ PC8112T	8.5	9	11	11	15	13	13	-10	-9	-7
μ PC8112TB										

Items Part No.	900 MHz P _{O(sat)} (dBm)	1.5 GHz P _{O(sat)} (dBm)	1.9 GHz P _{O(sat)} (dBm)	900 MHz RF _{LO} (dB)	1.5 GHz RF _{LO} (dB)	1.9 GHz RF _{LO} (dB)	IF Output Configuration	Packages
μPC2757T	-3	-	-8	-	-	-	Emitter follower	6-pin minimold
μPC2757TB								6-pin super minimold
μPC2758T	+1	-	-4	-	-	-		6-pin minimold
μPC2758TB								6-pin super minimold
μPC8112T	-2.5	-3	-3	-80	-57	-55	Open collector	6-pin minimold
μPC8112TB								6-pin super minimold

Remark Typical performance. Please refer to ELECTRICAL CHARACTERISTICS in detail.

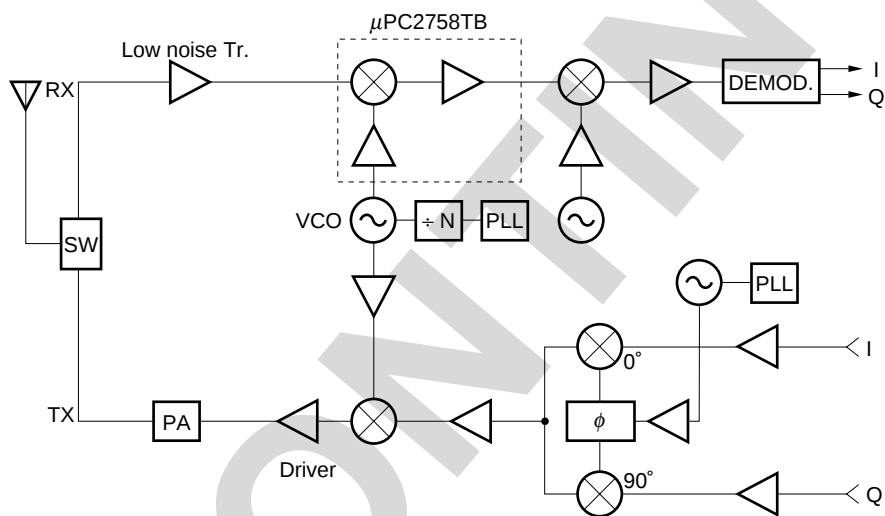
Cautions 1. The μ PC2757 and μ PC2758's IIP₃ are calculated with $\Delta IM_3 = 3$ which is the same IM₃ inclination as μ PC8112. On the other hand, OIP₃ of Standard characteristics in page 7 is cross point IP.

2. This document is to be specified for μ PC2757TB, μ PC2758TB. The other part number mentioned in this document should be referred to the data sheet of each part number.

3. INTERNAL BLOCK DIAGRAM (μ PC2757TB, μ PC2758TB in common)

4. SYSTEM APPLICATION EXAMPLE

DIGITAL CELLULAR TELEPHONE



5. PIN EXPLANATION (Both μ PC2757TB, 2758TB)

Pin No.	Pin Name	Applied Voltage (V)	Pin Voltage (V) Note	Function and Application	Internal Equivalent Circuit								
1	RFinput	–	1.2	This pin is RF input for mixer designed as double balance type. This circuit contributes to suppress spurious signal with minimum LO and bias power consumption. Also this symmetrical circuit can keep specified performance insensitive to process-condition distribution.									
2	GND	GND	–	This pin is ground of IC. Must be connected to the system ground with minimum inductance. Ground pattern on the board should be formed as wide as possible. (Track length should be kept as short as possible.)	–								
3	LOinput	–	1.3	This pin is LO input for local buffer designed as differential amplifier. Recommendable input level is –15 to 0 dBm. Also this symmetrical circuit can keep specified performance insensitive to process-condition distribution.									
4	PS	Vcc or GND	–	This pin is for power-save function. This pin can control ON/OFF operation with bias as follows; <table border="1"><thead><tr><th></th><th>Bias: V</th><th>Operation</th></tr></thead><tbody><tr><td rowspan="2">V_{PS}</td><td>≥ 2.5</td><td>ON</td></tr><tr><td>0 to 0.5</td><td>OFF</td></tr></tbody></table> Rise time/fall time using this pin are approximately 10 μs.		Bias: V	Operation	V _{PS}	≥ 2.5	ON	0 to 0.5	OFF	
	Bias: V	Operation											
V _{PS}	≥ 2.5	ON											
	0 to 0.5	OFF											
5	Vcc	2.7 to 3.3	–	Supply voltage 3.0 ±0.3 V for operation. Must be connected bypass capacitor. (example: 1 000 pF) to minimize ground impedance.	–								
6	IFoutput	–	1.7	This pin is output from IF buffer amplifier designed as single-ended push-pull type. This pin is assigned for emitter follower output with low-impedance. In the case of connecting to high-impedance stage, please attach external matching circuit.									

Note Each pin voltage is measured at Vcc = 3.0 V

6. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Ratings	Unit
Supply Voltage	V _{CC}	T _A = +25°C	5.5	V
★ Power Dissipation of Package Allowance	P _D	Mounted on 50 × 50 × 1.6 mm double sided copper clad epoxy glass board at T _A = +85°C	270	mW
Operating Ambient Temperature	T _A		−40 to +85	°C
Storage Temperature	T _{stg}		−55 to +150	°C
PS Pin Voltage	V _{PS}	T _A = +25°C	5.5	V

7. RECOMMENDED OPERATING RANGE

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	V _{CC}	2.7	3.0	3.3	V
Operating Ambient Temperature	T _A	−40	+25	+85	°C
LO Input Power	P _{LOin}	−15	−10	0	dBm

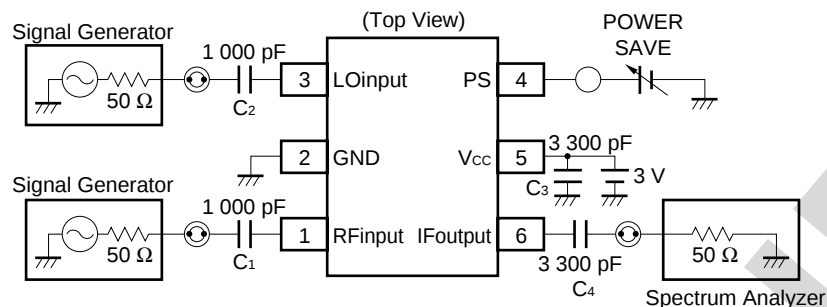
8. ELECTRICAL CHARACTERISTICS (T_A = +25°C, V_{CC} = V_{PS} = 3.0 V, P_{LOin} = −10 dBm, Z_S = Z_L = 50 Ω)

Parameter	Symbol	Conditions	μ PC2757TB			μ PC2758TB			Unit
			MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Circuit Current	I _{CC}	No input signal	3.7	5.6	7.7	6.6	11	14.8	mA
RF Input Frequency	f _{RFin}	CG ≥ (CG1 −3 dB) f _{IFout} = 130 MHz constant	0.1	–	2.0	0.1	–	2.0	GHz
IF Output Frequency	f _{IFout}	CG ≥ (CG1 −3 dB) f _{RFin} = 0.8 GHz constant	20	–	300	20	–	300	MHz
Conversion Gain 1	CG1	f _{RFin} = 0.8 GHz, f _{IFout} = 130 MHz P _{RFin} = −40 dBm, Upper local	12	15	18	16	19	22	dB
Conversion Gain 2	CG2	f _{RFin} = 2.0 GHz, f _{IFout} = 250 MHz P _{RFin} = −40 dBm, Lower local	10	13	16	14	17	20	dB
SSB Noise Figure 1	SSB • NF1	f _{RFin} = 0.8 GHz, f _{IFout} = 130 MHz, SSB mode, Upper local	–	10	13	–	9	12	dB
SSB Noise Figure 2	SSB • NF2	f _{RFin} = 2.0 GHz, f _{IFout} = 250 MHz, SSB mode, Lower local	–	13	16	–	13	15	dB
Saturated Output Power 1	P _{O(sat)} 1	f _{RFin} = 0.8 GHz, f _{IFout} = 130 MHz P _{RFin} = −10 dBm, Upper local	−11	−3	–	−7	+1	–	dBm
Saturated Output Power 2	P _{O(sat)} 2	f _{RFin} = 2.0 GHz, f _{IFout} = 250 MHz P _{RFin} = −10 dBm, Lower local	−11	−8	–	−7	−4	–	dBm

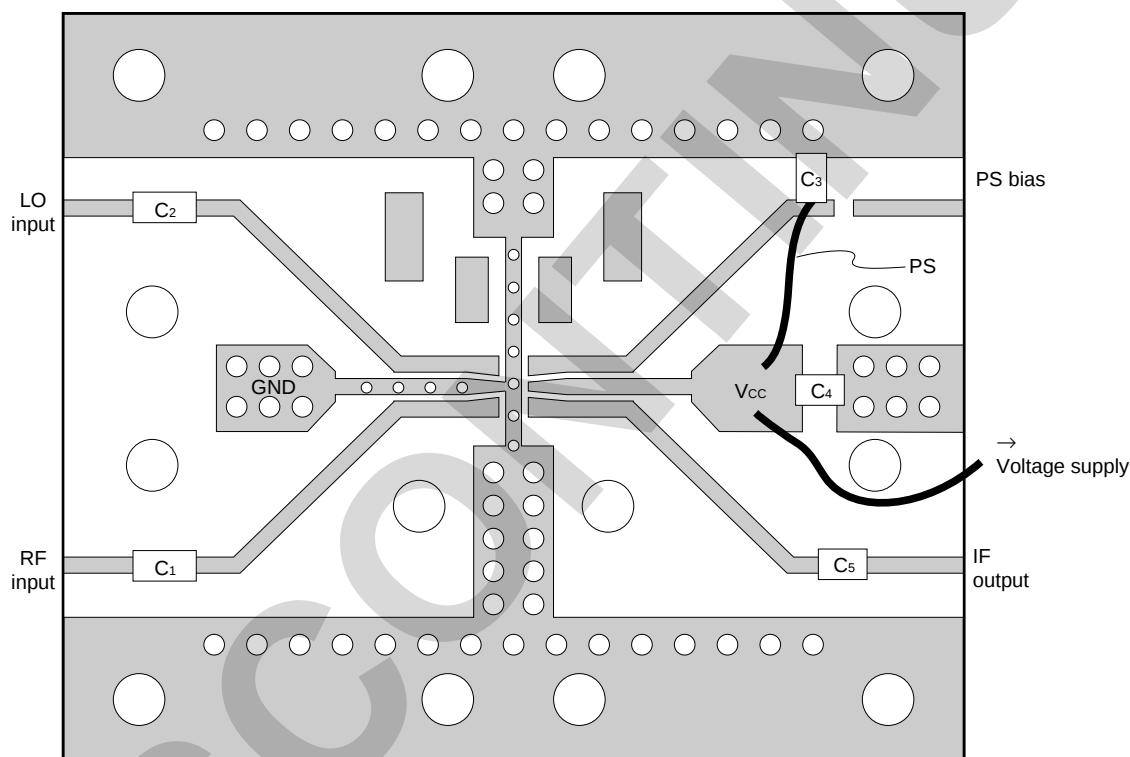
9. STANDARD CHARACTERISTICS FOR REFERENCE**(Unless otherwise specified: $T_A = +25^\circ\text{C}$, $V_{CC} = V_{PS} = 3.0\text{ V}$, $P_{LOin} = -10\text{ dBm}$, $Z_S = Z_L = 50\ \Omega$)**

Parameter	Symbol	Conditions	Reference Value		Unit
			μ PC2757TB	μ PC2758TB	
3rd Order Distortion Output Intercept Point	OIP ₃	$f_{RFin} = 0.8\text{ to }2.0\text{ GHz}$, $f_{Fout} = 0.1\text{ GHz}$, Cross point IP	+5	+11	dBm
LO Leakage at RF pin	LO _{rf}	$f_{LOin} = 0.8\text{ to }2.0\text{ GHz}$	-35	-30	dBm
LO Leakage at IF pin	LO _{if}	$f_{LOin} = 0.8\text{ to }2.0\text{ GHz}$	-23	-15	dBm
Circuit Current at Power Save Mode	I _{cc(PS)}	$V_{PS} = 0.5\text{ V}$	0.1	0.1	μA

10. TEST CIRCUIT

 μ PC2757TB, μ PC2758TB

★ 11. ILLUSTRATION OF THE TEST CIRCUIT ASSEMBLED ON EVALUATION BOARD



Component List

No.	Value
C ₁ , C ₂	1 000 pF
C ₃ to C ₅	3 300 pF

Notes 1. 35 × 42 × 0.4 mm double sided copper clad polyimide board.

2. Back side: GND pattern

3. Solder plated on pattern

4. °O: Through holes

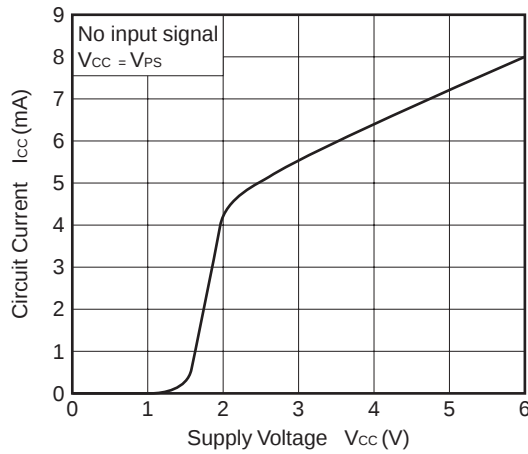
Application explanation

This IC is guaranteed on the test circuit constructed with 50 Ω equipment and transmission line.

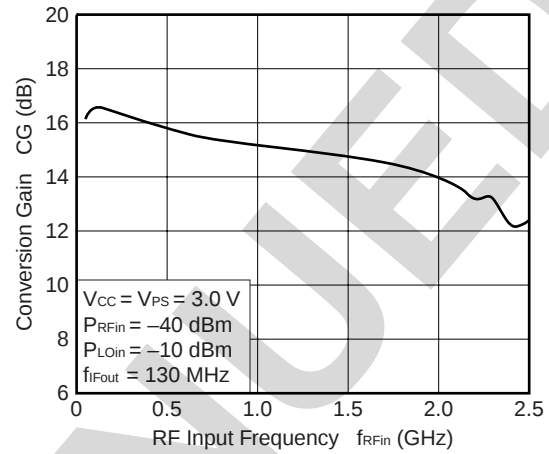
This IC, however, does not have 50 Ω input/output impedance, but electrical characteristics such as conversion gain and intermodulation distortion are described herein on these conditions without impedance matching. So, you should understand that conversion gain and intermodulation distortion at input level will vary when you improve VS of RF input with external circuit (50 Ω termination or impedance matching.)

12. TYPICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, on Measurement Circuit)12.1 μ PC2757TB

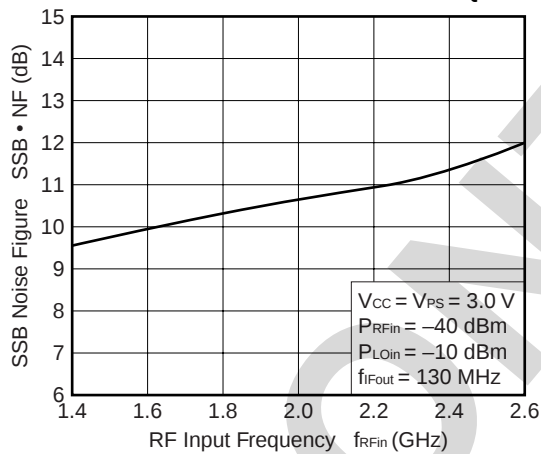
CIRCUIT CURRENT vs. SUPPLY VOLTAGE



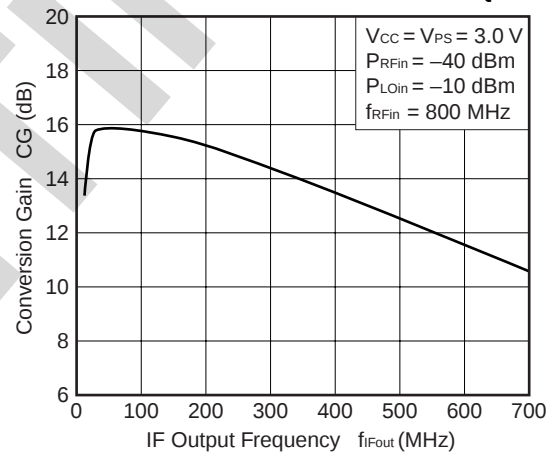
CONVERSION GAIN vs. RF INPUT FREQUENCY



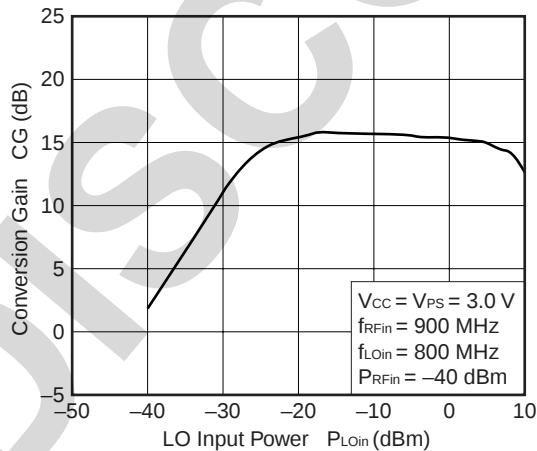
SSB NOISE FIGURE vs. RF INPUT FREQUENCY



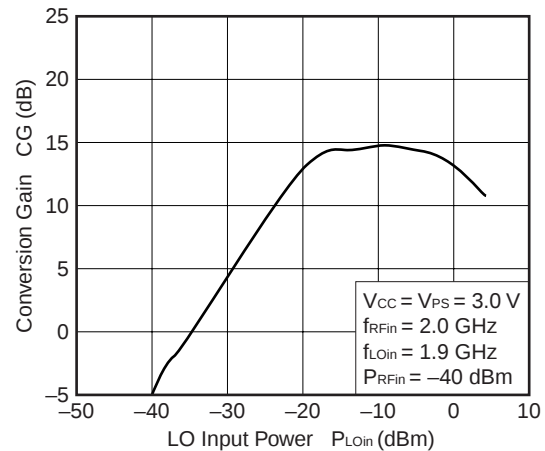
CONVERSION GAIN vs. IF OUTPUT FREQUENCY

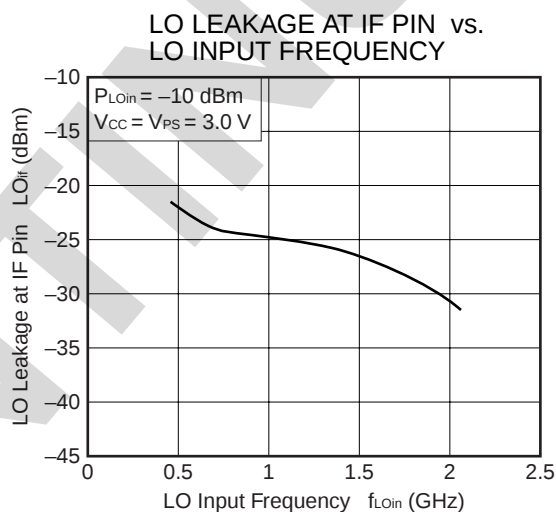
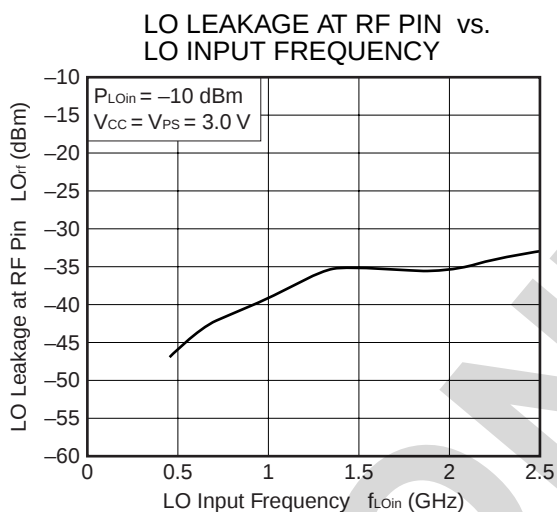
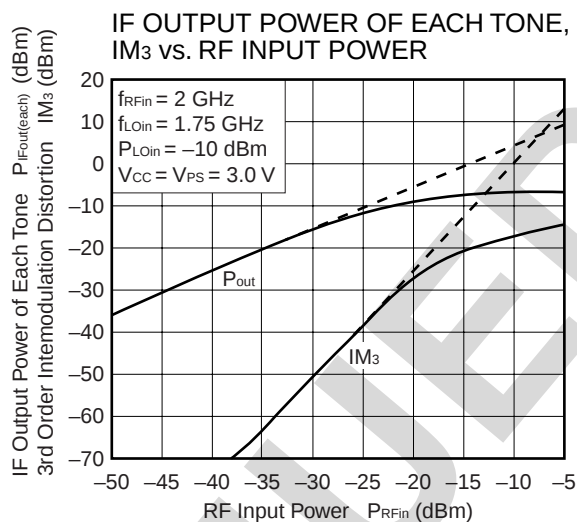
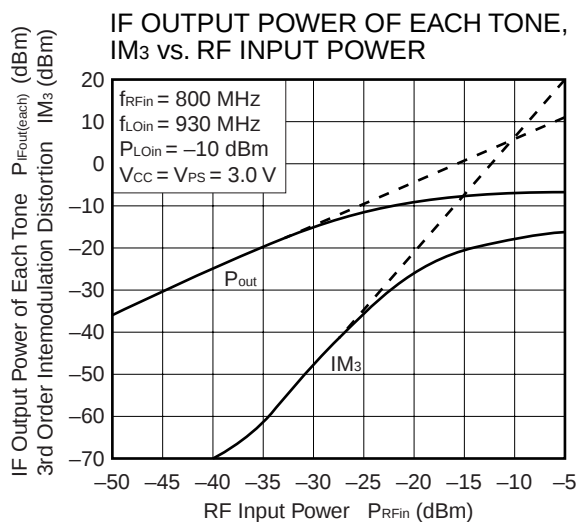


CONVERSION GAIN vs. LO INPUT POWER



CONVERSION GAIN vs. LO INPUT POWER

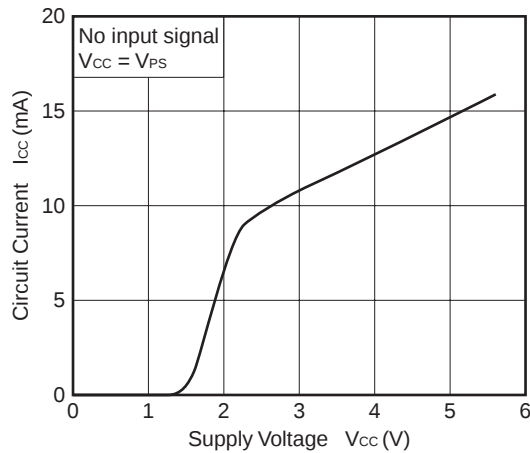




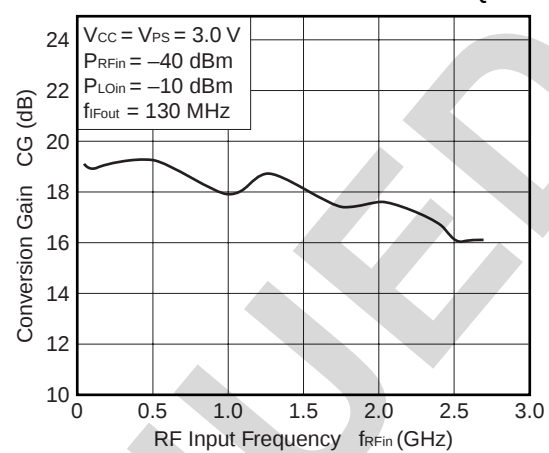
Remark The graphs indicate nominal characteristics.

12.2 μ PC2758TB

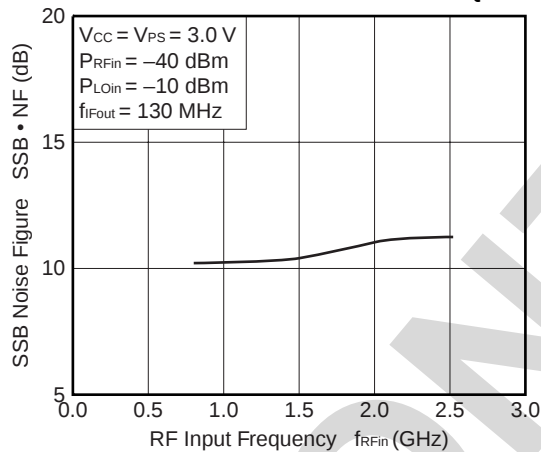
CIRCUIT CURRENT vs. SUPPLY VOLTAGE



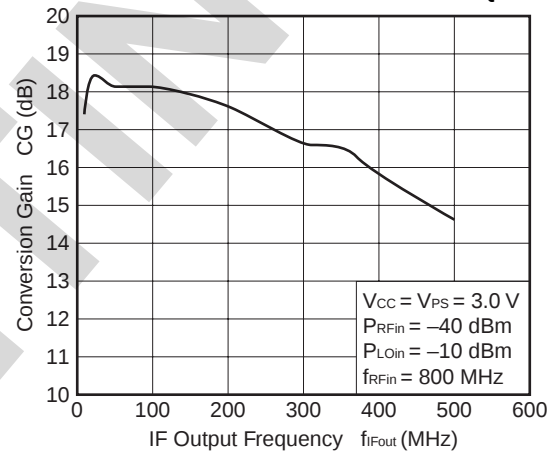
CONVERSION GAIN vs. RF INPUT FREQUENCY



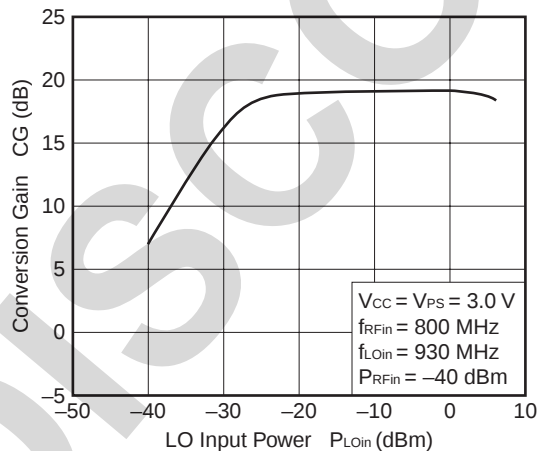
SSB NOISE FIGURE vs. RF INPUT FREQUENCY



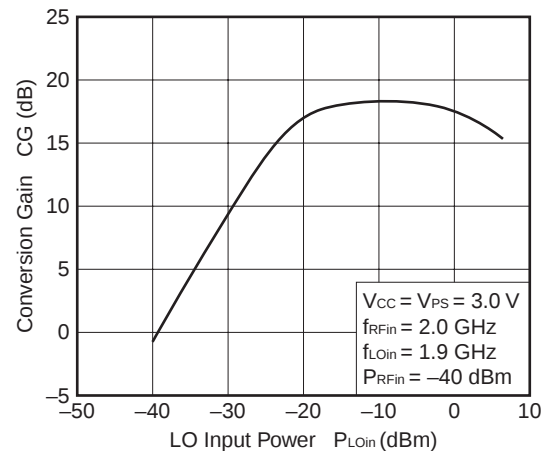
CONVERSION GAIN vs. IF OUTPUT FREQUENCY

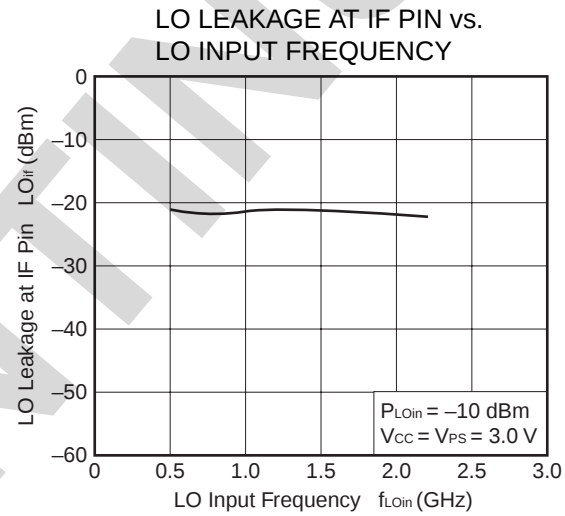
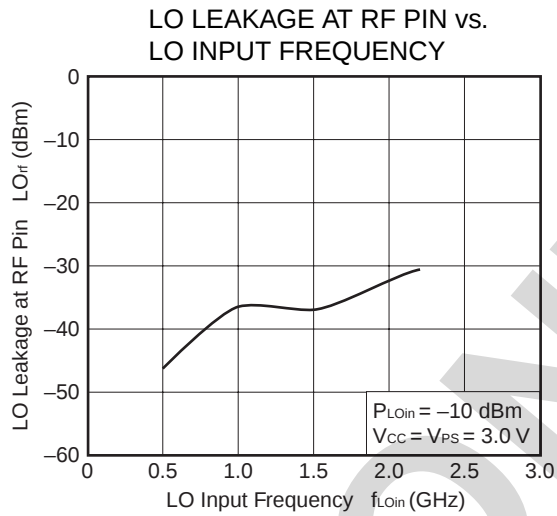
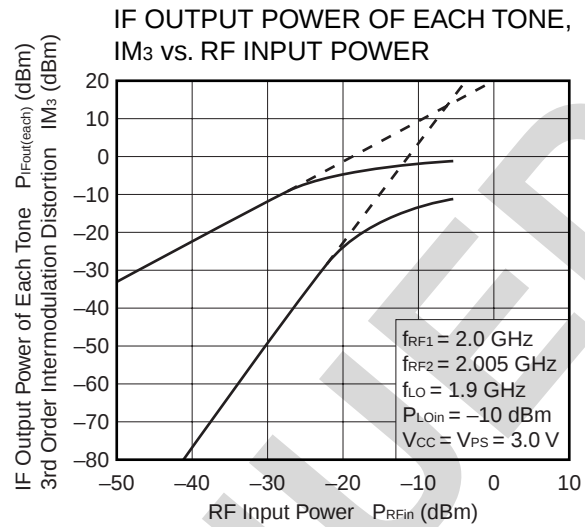
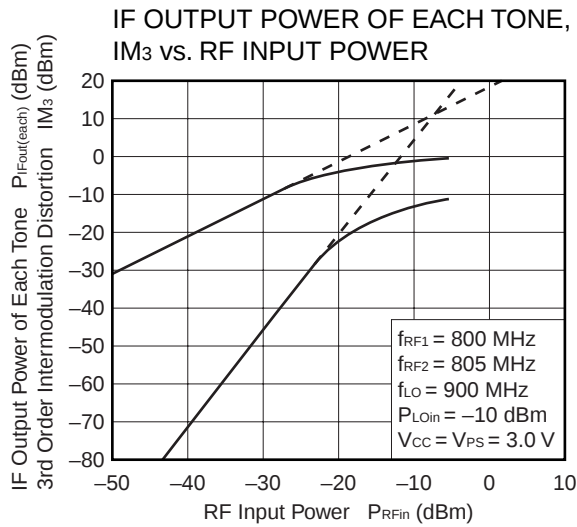


CONVERSION GAIN vs. LO INPUT POWER



CONVERSION GAIN vs. LO INPUT POWER



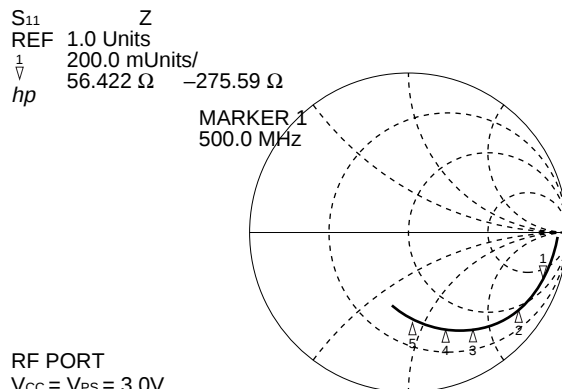


Remark The graphs indicate nominal characteristics.

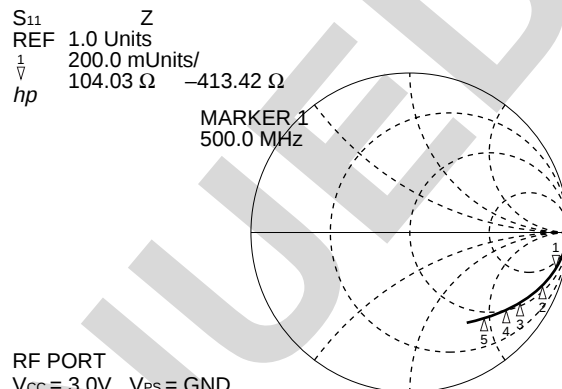
13. S-PARAMETERS

13.1 μ PC2757TB

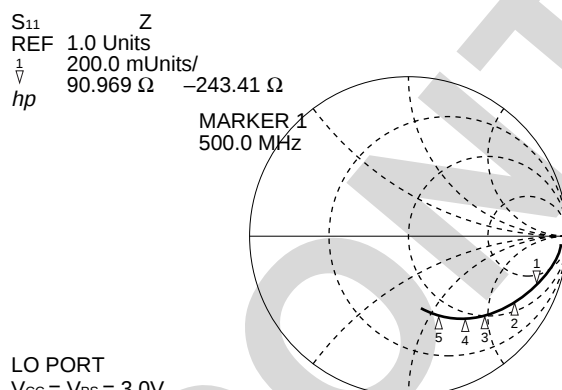
Calibrated on pin of DUT



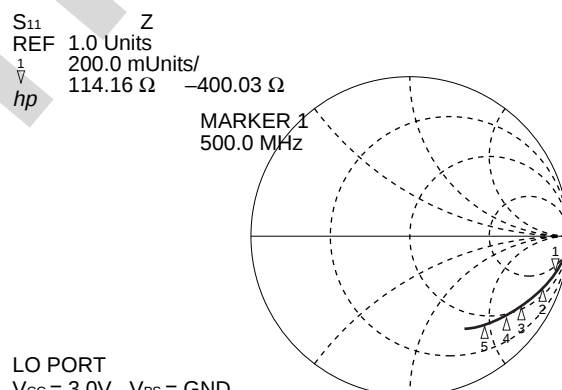
RF PORT
 $V_{CC} = V_{PS} = 3.0V$
 1:500 MHz 56.422 Ω -j275.59 Ω
 2:900 MHz 38.68 Ω -j152.71 Ω
 3:1 500 MHz 31.699 Ω -j88.102 Ω
 4:1 900 MHz 29.209 Ω -j65.926 Ω
 5:2 500 MHz 29.209 Ω -j44.758 Ω



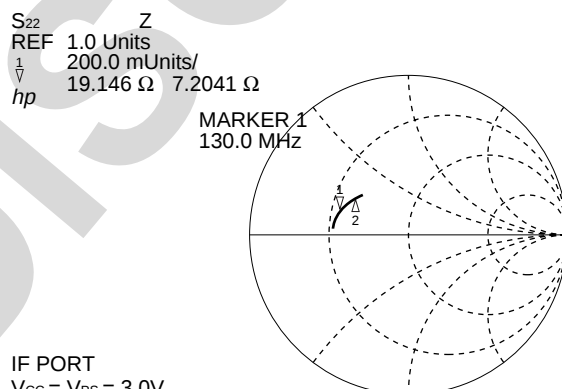
RF PORT
 $V_{CC} = 3.0V$ $V_{PS} = GND$
 1:500 MHz 104.03 Ω -j413.42 Ω
 2:900 MHz 74.82 Ω -j243.06 Ω
 3:1 500 MHz 59.266 Ω -j154.98 Ω
 4:1 900 MHz 51.227 Ω -j124.55 Ω
 5:2 500 MHz 43.996 Ω -j95.117 Ω



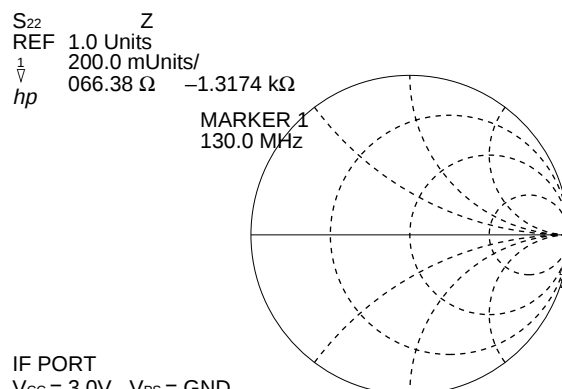
LO PORT
 $V_{CC} = V_{PS} = 3.0V$
 1:500 MHz 90.969 Ω -j243.41 Ω
 2:900 MHz 67.828 Ω -j150.32 Ω
 3:1 500 MHz 51.488 Ω -j97.273 Ω
 4:1 900 MHz 44.621 Ω -j77.352 Ω
 5:2 500 MHz 39.627 Ω -j56.738 Ω



LO PORT
 $V_{CC} = 3.0V$ $V_{PS} = GND$
 1:500 MHz 114.16 Ω -j400.03 Ω
 2:900 MHz 75.133 Ω -j242.73 Ω
 3:1 500 MHz 53.516 Ω -j154.21 Ω
 4:1 900 MHz 44.789 Ω -j124.74 Ω
 5:2 500 MHz 37.004 Ω -j93.828 Ω



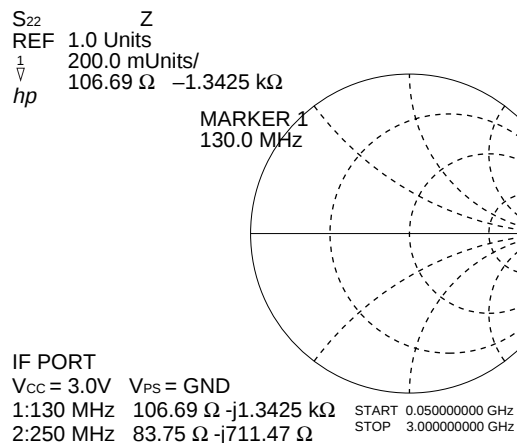
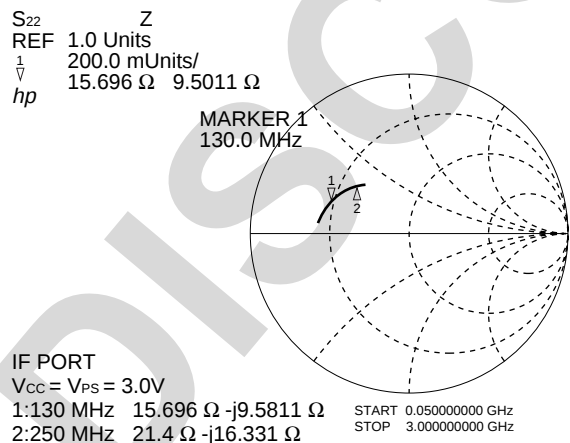
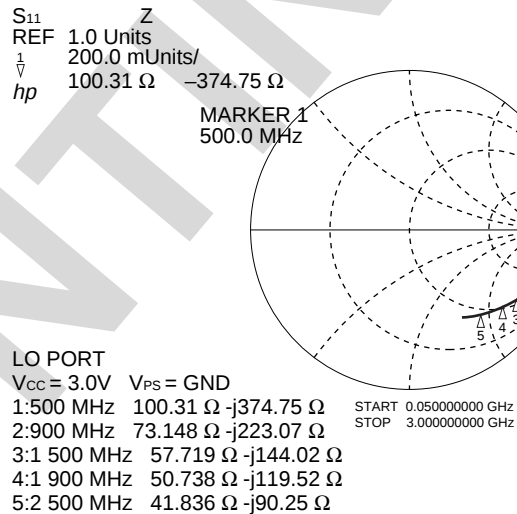
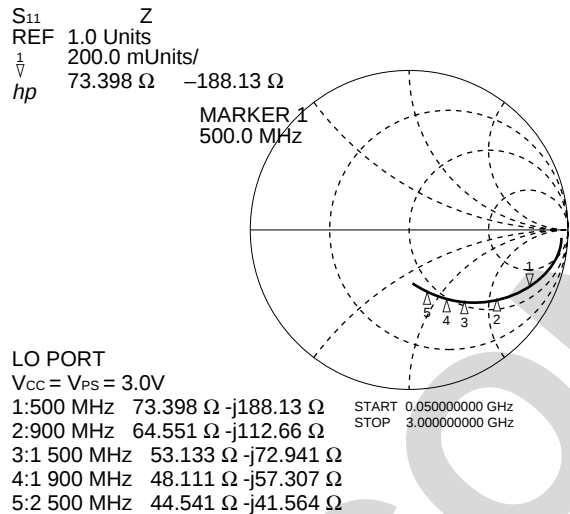
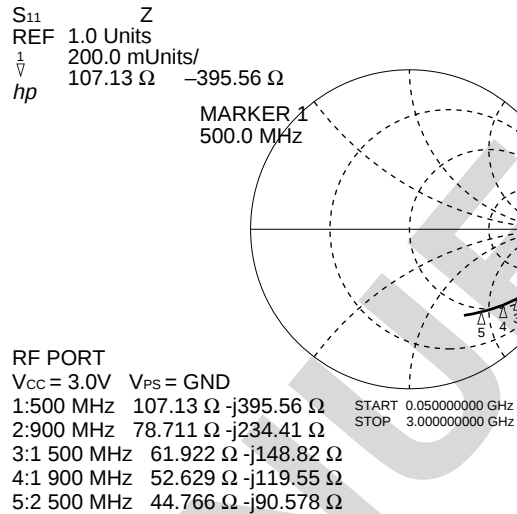
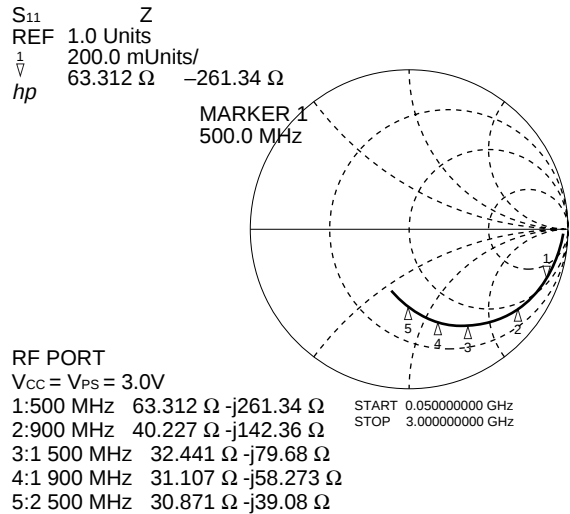
IF PORT
 $V_{CC} = V_{PS} = 3.0V$
 1:130 MHz 19.146 Ω -j7.2041 Ω
 2:250 MHz 22.73 Ω -j12.909 Ω



IF PORT
 $V_{CC} = 3.0V$ $V_{PS} = GND$
 1:130 MHz 66.38 Ω -j1.3174 k Ω
 2:250 MHz 88.281 Ω -j725.41 Ω

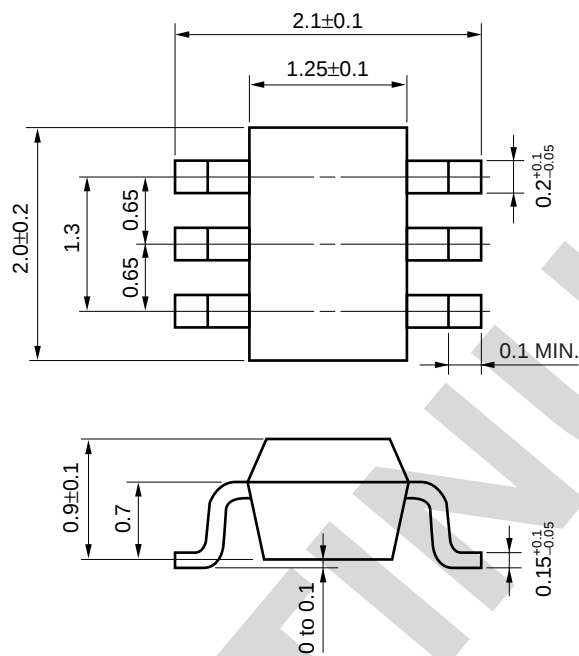
13.2 μ PC2758TB

Calibrated on pin of DUT



★ 14. PACKAGE DIMENSIONS

6-PIN SUPER MINIMOLD (UNIT: mm)



15. NOTE ON CORRECT USE

- (1) Observe precautions for handling because of electrostatic sensitive devices.
- (2) Form a ground pattern as widely as possible to minimize ground impedance (to prevent undesired oscillation).
Keep the track length of the ground pins as short as possible.
- (3) Connect a bypass capacitor (example: 1 000 pF) to the V_{CC} pin.
- (4) The DC cut capacitor must be attached to input pin.

16. RECOMMENDED SOLDERING CONDITIONS

This product should be soldered under the following recommended conditions.

Soldering Method	Soldering Condition	Recommended Condition Symbol
Infrared Reflow	Package peak temperature: 235°C or below Time: 30 seconds or less (at 210°C) Count: 3, Exposure limit: None ^{Note}	IR35-00-3
VPS	Package peak temperature: 215°C or below Time: 40 seconds or less (at 200°C) Count: 3, Exposure limit: None ^{Note}	VP15-00-3
Wave Soldering	Soldering bath temperature: 260°C or below Time: 10 seconds or less Count: 1, Exposure limit: None ^{Note}	WS60-00-1
Partial Heating	Pin temperature: 300°C Time: 3 seconds or less (per side of device) Exposure limit: None ^{Note}	—

Note After opening the dry pack, keep it in a place below 25°C and 65% RH for the allowable storage period.

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

For details of recommended soldering conditions for surface mounting, refer to information document SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL (C10535E).

NOTICE

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