onsemi

RF Transistor

10 V, 70 mA, f_T = 7 GHz, NPN Single MCP

2SC5226A

Features

- Low-noise: NF = 1.0 dB Typ (f = 1 GHz)
- High Gain: $|S21e|^2 = 12 \text{ dB Typ} (f = 1 \text{ GHz})$
- High Cut-off Frequency: $f_T = 7$ GHz Typ
- This is a Pb–Free Device

Specifications

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Symbol	Parameter	Value	Unit
V _{CBO}	Collector-to-Base Voltage	20	V
V _{CEO}	Collector-to-Emitter Voltage	10	V
V _{EBO}	Emitter-to-Base Voltage	2	V
Ι _C	Collector Current	70	mA
P _C	Collector Dissipation	150	mW
Tj	Junction Temperature	150	°C
Tstg	Storage Temperature	–55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



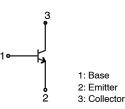
SC-70 / MCP3 CASE 419AJ

MARKING DIAGRAM



LN = Specific Device Code

ELECTRICAL CONNECTION



ORDERING INFORMATION

Device	Package	Shipping [†]
2SC5226A-4-TL-E	MCP3 (Pb–Free)	3,000 / Tape & Reel
2SC5226A-5-TL-E	MCP3 (Pb-Free)	3,000 / Tape & Reel

+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, <u>BRD8011/D</u>.

2SC5226A

ELECTRICAL CHARACTERISTICS (T_A = 25° C)

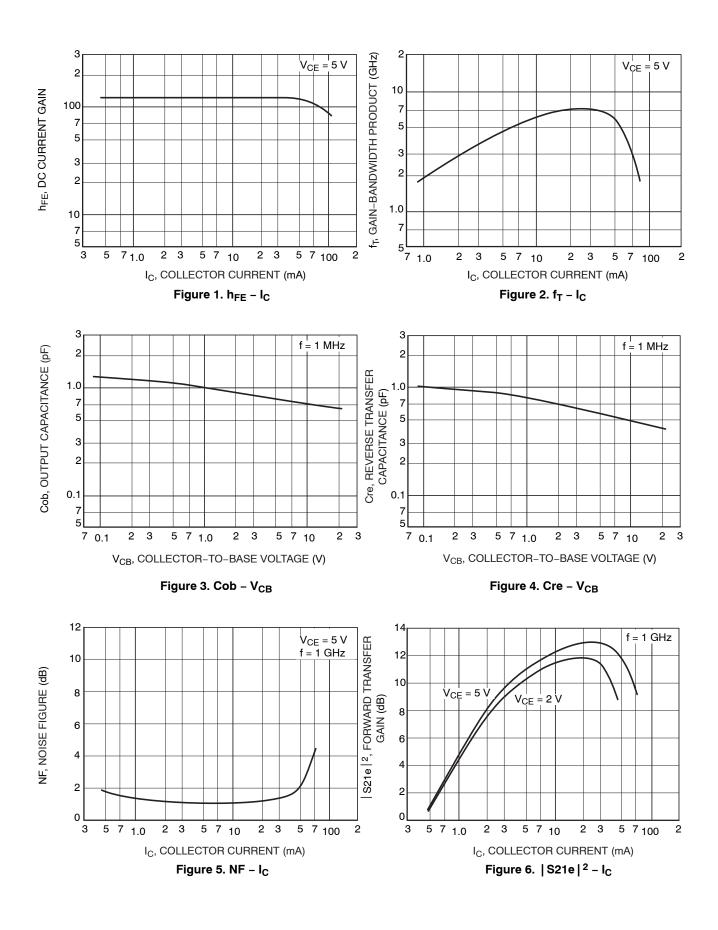
Parameter	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} = 10 V, I _E = 0 A	-	-	1.0	μA
Emitter Cutoff Current	I _{EBO}	V _{EB} = 1 V, I _C = 0 A	-	-	10	μA
DC Current Gain	hFE	$V_{CE} = 5 \text{ V}, \text{ I}_{C} = 20 \text{ mA}$	60*	-	270*	
Gain-Bandwidth Product	f _T	$V_{CE} = 5 \text{ V}, \text{ I}_{C} = 20 \text{ mA}$	5	7	-	GHz
Output Capacitance	Cob	V _{CB} = 10 V, f = 1 MHz	-	0.75	1.2	pF
Reverse Transfer Capacitance	Cre		-	0.5	-	pF
Forward Transfer Gain	S21e ² 1	V_{CE} = 5 V, I _C = 20 mA, f = 1 GHz	9	12	-	dB
	S21e ² 2	$V_{CE} = 2 \text{ V}, \text{ I}_{C} = 3 \text{ mA}, \text{ f} = 1 \text{ GHz}$	-	8	-	dB
Noise Figure	NF	$V_{CE} = 5 \text{ V}, \text{ I}_{C} = 7 \text{ mA}, \text{ f} = 1 \text{ GHz}$	-	1.0	1.8	dB

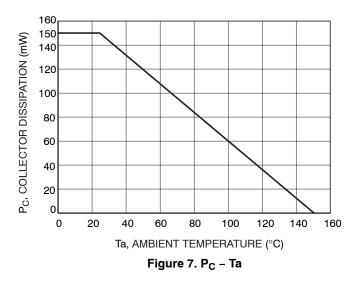
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

* The 2SC5226A is classified by 20 mA hFE as follows:

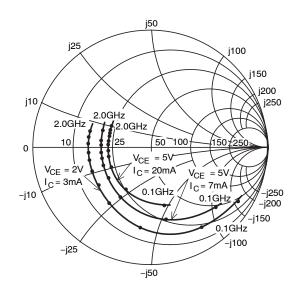
Rank	3	4	5
h _{FE}	60 to 120	90 to 180	135 to 270

2SC5226A



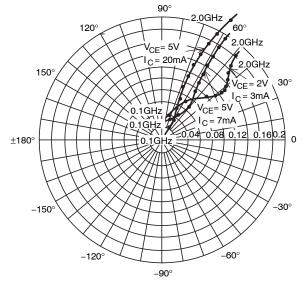


2SC5226A



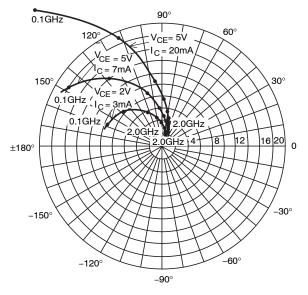
f = 100 MHz, 200 MHz to 2000 MHz (200 MHz Step)





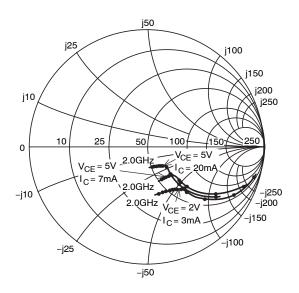
f = 100 MHz, 200 MHz to 2000 MHz (200 MHz Step)

Figure 10.



f = 100 MHz, 200 MHz to 2000 MHz (200 MHz Step)

Figure 9.



f = 100 MHz, 200 MHz to 2000 MHz (200 MHz Step)

Figure 11.

S Parameters (Common Emitter)

V_{CE} = 5 V, I_{C} = 7 mA, Z_{O} = 50 Ω

Freq(MHz)	S11	∠S11	S21	∠ S21	S12	∠S12	S22	∠ S22
100	0.720	-46.0	17.973	148.5	0.030	68.5	0.880	-23.6
200	0.612	-80.9	13.927	127.3	0.047	57.1	0.697	-37.6
400	0.497	-121.3	8.656	105.0	0.066	51.3	0.479	-47.6
600	0.456	-143.5	6.080	92.8	0.079	52.9	0.382	-50.5
800	0.440	-157.6	4.725	84.3	0.094	55.4	0.339	-51.8
1000	0.436	-167.5	3.864	77.0	0.110	56.8	0.323	-53.4
1200	0.434	-176.1	3.258	70.3	0.126	57.9	0.312	-55.8
1400	0.433	176.6	2.847	64.5	0.143	58.4	0.304	-58.3
1600	0.433	170.9	2.329	57.4	0.160	58.9	0.296	-62.0
1800	0.434	165.0	2.252	54.2	0.178	58.6	0.293	-65.0
2000	0.439	159.6	2.057	49.2	0.197	58.1	0.294	-68.1

V_{CE} = 5 V, I_{C} = 20 mA, Z_{O} = 50 Ω

Freq(MHz)	S11	∠S11	S21	∠ S21	S12	∠S12	S22	∠ S22
100	0.481	-78.8	29.795	132.9	0.022	63.9	0.707	-38.2
200	0.420	-119.2	19.008	112.2	0.033	60.8	0.470	-51.1
400	0.391	-151.6	10.416	95.4	0.052	64.7	0.296	-55.3
600	0.386	-166.4	7.084	86.6	0.071	67.2	0.236	-56.1
800	0.381	-175.9	5.407	80.1	0.092	68.4	0.213	-56.6
1000	0.382	178.2	4.401	74.1	0.114	67.8	0.208	-57.9
1200	0.385	172.1	3.701	68.5	0.134	66.8	0.204	-60.7
1400	0.388	166.7	3.217	63.6	0.156	65.6	0.202	-63.5
1600	0.390	162.1	2.839	58.8	0.176	64.0	0.199	-67.9
1800	0.391	156.7	2.534	54.3	0.197	62.4	0.197	-71.2
2000	0.394	152.1	2.319	50.1	0.219	60.6	0.197	-74.2

 V_{CE} = 2 V, I_{C} = 3 mA, Z_{O} = 50 Ω

Freq(MHz)	S11	∠S11	S21	∠ S21	S12	∠S12	S22	∠ S22
100	0.858	-32.4	9.413	157.2	0.040	72.6	0.945	-16.5
200	0.782	-60.7	8.187	138.5	0.070	59.2	0.833	-29.3
400	0.653	-101.1	5.855	113.8	0.101	44.5	0.637	-43.2
600	0.588	-126.5	4.337	98.4	0.114	39.1	0.515	-50.0
800	0.557	-143.7	3.444	87.7	0.122	38.0	0.454	-53.8
1000	0.543	-156.3	2.871	78.5	0.130	38.6	0.426	-57.1
1200	0.536	-166.8	2.446	70.5	0.137	40.3	0.407	-60.3
1400	0.533	-175.5	2.145	63.5	0.146	42.5	0.393	-63.8
1600	0.527	177.0	1.904	57.1	0.155	45.0	0.382	-68.0
1800	0.525	170.3	1.714	51.7	0.168	47.3	0.379	-72.0
2000	0.528	163.8	1.564	45.9	0.183	49.2	0.378	-75.8

Land Pattern Example

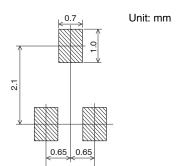
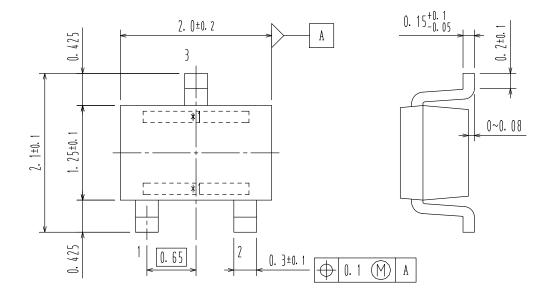


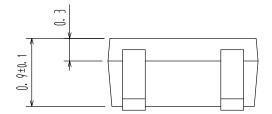
Figure 12. Land Pattern Example



SC-70 / MCP3 CASE 419AJ ISSUE O

DATE 30 NOV 2011





DOCUMENT NUMBER:	98AON65442E	Electronic versions are uncontrolled except when accessed directly from the Document Repository Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.				
DESCRIPTION:	SC-70 / MCP3	PAGE 1 OF 1				

ON Semiconductor and where trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

© Semiconductor Components Industries, LLC, 2019

onsemi, ONSEMI, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at <u>www.onsemi.com/site/pdf/Patent-Marking.pdf</u>. onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or indental damages. Buyer is responsible for its products and applications using onsemi products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by onsemi. "Typical" parameters which may be provided in onsemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification. Buyer shall indemnify and hold onsemi and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs,

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation onsemi Website: www.onsemi.com ONLINE SUPPORT: <u>www.onsemi.com/support</u> For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales