RF Transistor

10 V, 70 mA, f_T = 1.5 GHz, NPN Single CP

15GN03CA

SC−59 / CP3
CASE 318BJ

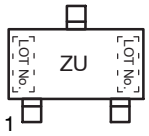
Features

- High Cut−off Frequency: f_T = 1.5 GHz typ.
- High Gain: $|S21e|^2$ = 13 dB typ. (f = 0.4 GHz)
- This is a Pb−Free Device

Applications

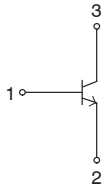
- VHF, RF, MIXER, OSC, IF Amplifier

MARKING DIAGRAM



ZU = Specific Device Code

ELECTRICAL CONNECTION



1: Base
2: Emitter
3: Collector

ABSOLUTE MAXIMUM RATINGS (at T_A = 25°C)

Parameter	Symbol	Ratings	Unit
Collector−to−Base Voltage	V_{CBO}	20	V
Collector−to−Emitter Voltage	V_{CEO}	10	V
Emitter−to−Base Voltage	V_{EBO}	3	V
Collector Current	I_C	70	mA
Collector Dissipation	P_C	200	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	−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.

ORDERING INFORMATION

Device	Package	Shipping†
15GN03CA−TB−E	SC−59/CP3 (Pb−Free)	3000 / 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, BRD8011/D.

ELECTRICAL CHARACTERISTICS (at T_A = 25°C)

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	V_{CB} = 10 V, I_E = 0 A	–	–	0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 2 V, I_C = 0 A	–	–	1	μA
DC Current Gain	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	100	–	180	
Gain−Bandwidth Product	f_T	V_{CE} = 5 V, I_C = 20 mA	1.0	1.5	–	GHz
Output Capacitance	Cob	V_{CB} = 10 V, f = 1 MHz	–	0.95	1.25	pF
Reverse Transfer Capacitance	Cre		–	0.65	–	pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE} = 5 V, I_C = 20 mA, f = 0.4 GHz	10	13	–	dB
Noise Figure	NF	V_{CE} = 3 V, I_C = 2 mA, f = 0.4 GHz	–	1.6	–	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.

TYPICAL CHARACTERISTICS

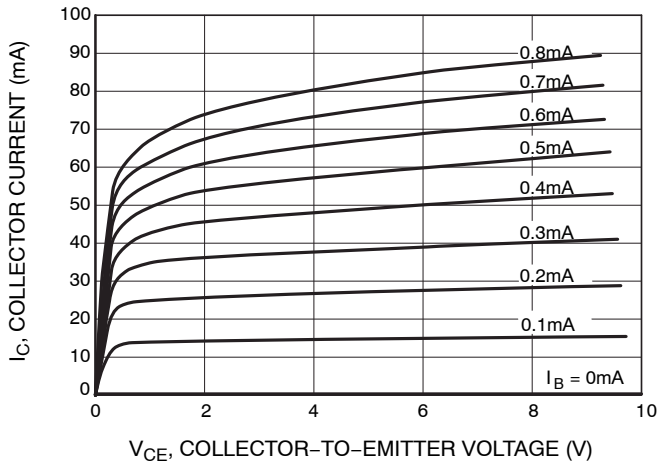


Figure 1. $I_C - V_{CE}$

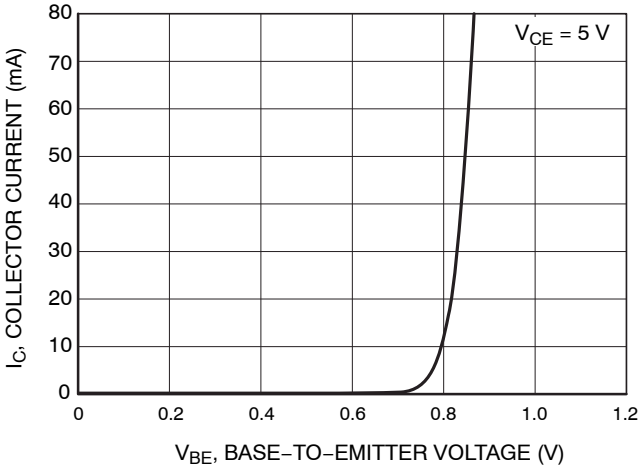


Figure 2. $I_C - V_{BE}$

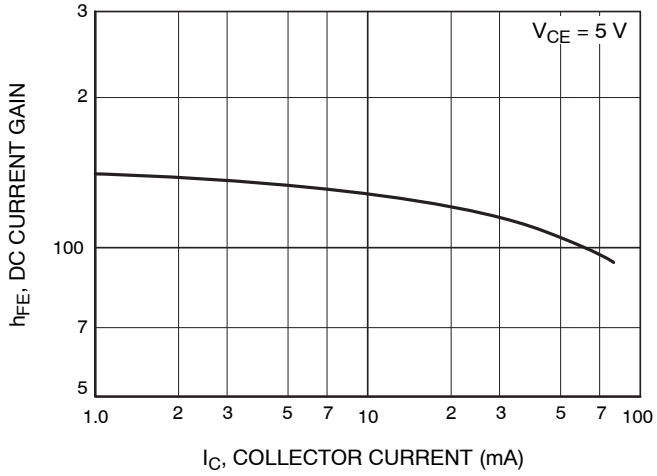


Figure 3. $h_{FE} - I_C$

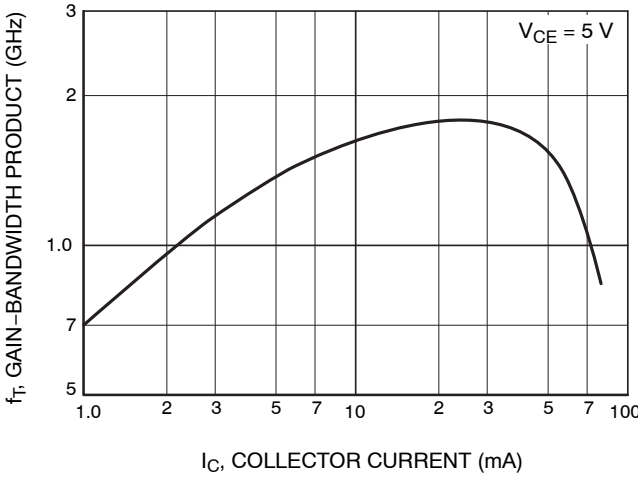


Figure 4. $f_T - I_C$

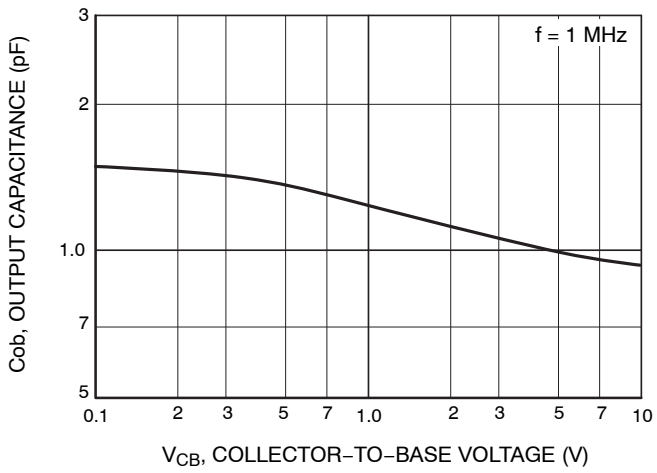


Figure 5. Cob – V_{CB}

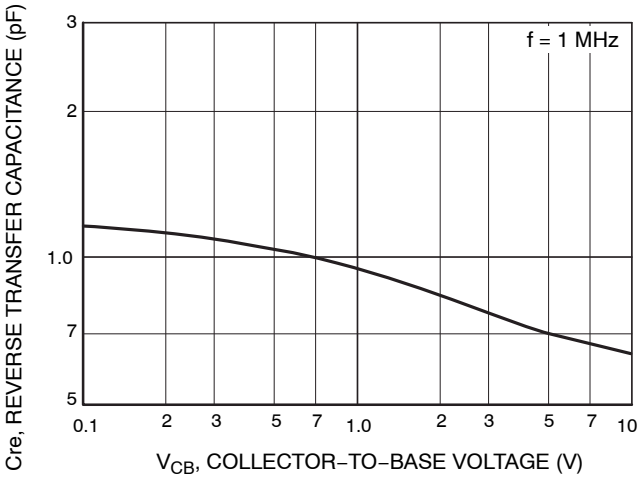


Figure 6. Cre – V_{CB}

TYPICAL CHARACTERISTICS (CONTINUED)

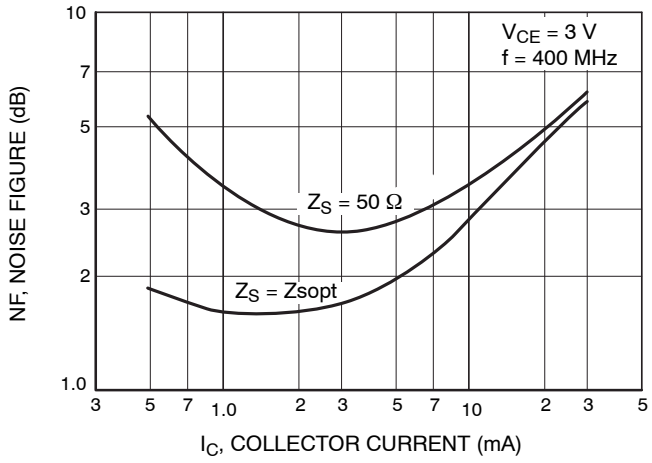


Figure 7. NF – I_C

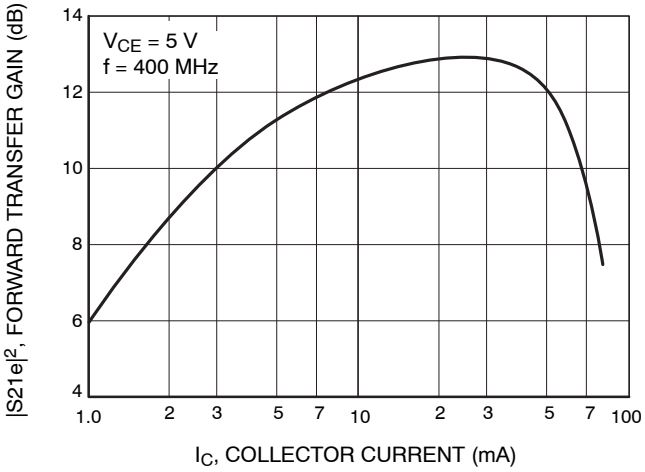


Figure 8. $|S21e|^2$ – I_C

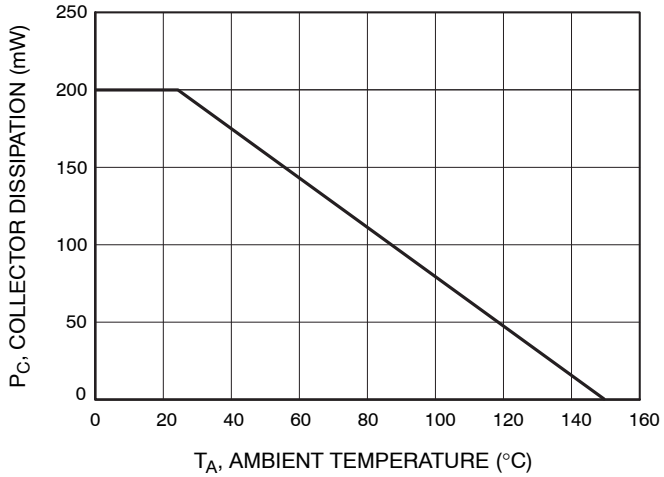


Figure 9. P_C – T_A

LAND PATTERN EXAMPLE

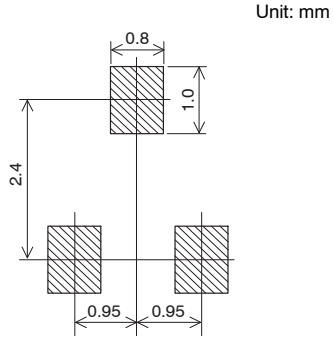


Figure 10. Land Pattern Example

S PARAMETERS (COMMON EMITTER)

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
V_{CE} = 5 V, I_C = 1 mA, Z_O = 50 Ω								
100	0.918	−34.17	3.328	154.00	0.040	67.14	0.963	−9.32
200	0.816	−63.46	2.833	133.91	0.063	50.52	0.897	−15.61
300	0.719	−87.48	2.349	118.47	0.075	39.90	0.847	−19.59
400	0.650	−106.66	1.974	106.31	0.081	33.68	0.816	−22.72
500	0.603	−123.45	1.709	96.50	0.081	30.41	0.795	−25.65
600	0.579	−137.17	1.492	88.62	0.078	30.45	0.785	−28.56
700	0.562	−149.31	1.328	81.55	0.074	30.61	0.779	−31.42
800	0.557	−159.59	1.197	75.34	0.070	34.97	0.777	−34.68
900	0.557	−168.64	1.094	70.12	0.068	41.63	0.773	−38.02
1000	0.560	−176.38	1.003	65.13	0.066	50.34	0.773	−41.22
V_{CE} = 5 V, I_C = 3 mA, Z_O = 50 Ω								
100	0.799	−55.14	7.483	141.00	0.033	59.88	0.886	−14.45
200	0.641	−93.26	5.412	118.03	0.047	44.28	0.773	−18.84
300	0.553	−118.80	4.036	104.19	0.050	40.23	0.719	−21.00
400	0.512	−136.73	3.182	94.58	0.052	40.73	0.693	−22.61
500	0.492	−150.89	2.627	86.95	0.055	44.74	0.683	−24.93
600	0.488	−161.99	2.244	80.86	0.056	49.28	0.677	−27.44
700	0.487	−171.08	1.958	75.25	0.059	55.44	0.675	−30.18
800	0.492	−178.68	1.749	70.37	0.063	62.40	0.675	−33.31
900	0.502	174.60	1.575	65.89	0.068	67.82	0.674	−36.39
1000	0.508	168.93	1.433	61.61	0.078	74.10	0.677	−39.25
V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω								
100	0.703	−69.63	10.162	132.63	0.030	54.51	0.821	−16.94
200	0.550	−109.80	6.625	110.25	0.037	43.19	0.704	−19.31
300	0.490	−133.75	4.733	98.16	0.041	44.91	0.660	−20.36
400	0.464	−149.68	3.666	89.82	0.045	49.05	0.643	−21.83
500	0.458	−161.66	3.003	83.25	0.049	56.14	0.635	−23.97
600	0.460	−170.95	2.537	77.83	0.054	60.18	0.632	−26.46
700	0.465	−178.51	2.212	72.71	0.058	65.91	0.631	−29.05
800	0.472	174.93	1.962	68.10	0.067	71.03	0.633	−32.06
900	0.482	169.11	1.764	64.09	0.075	76.57	0.634	−35.26
1000	0.491	164.18	1.602	59.88	0.085	78.96	0.635	−38.26
V_{CE} = 5 V, I_C = 10 mA, Z_O = 50 Ω								
100	0.568	−91.34	13.492	121.50	0.022	51.19	0.729	−18.79
200	0.463	−130.04	7.837	102.18	0.030	50.01	0.628	−18.37
300	0.435	−149.86	5.435	92.29	0.035	56.54	0.598	−18.84
400	0.427	−162.69	4.153	85.23	0.041	59.99	0.587	−20.20
500	0.431	−171.77	3.374	79.57	0.047	67.05	0.586	−22.36
600	0.438	−179.07	2.842	74.63	0.055	70.37	0.585	−24.64
700	0.446	174.71	2.460	69.90	0.062	74.51	0.587	−27.44
800	0.457	169.18	2.181	65.54	0.072	78.16	0.588	−30.30
900	0.469	164.67	1.954	61.61	0.080	80.51	0.592	−33.49
1000	0.482	160.55	1.775	57.60	0.092	82.60	0.596	−36.43

S PARAMETERS (COMMON EMITTER) (continued)

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
V_{CE} = 5 V, I_C = 15 mA, Z_O = 50 Ω								
100	0.506	−103.02	14.843	116.40	0.020	52.22	0.680	−19.13
200	0.433	−139.11	8.300	98.87	0.027	55.27	0.595	−17.41
300	0.418	−156.74	5.691	89.86	0.032	60.47	0.571	−17.79
400	0.416	−167.49	4.336	83.26	0.040	65.01	0.567	−19.20
500	0.423	−175.59	3.518	77.72	0.047	70.77	0.564	−21.38
600	0.434	177.94	2.949	72.99	0.056	75.36	0.566	−23.76
700	0.441	172.60	2.558	68.36	0.064	77.18	0.566	−26.43
800	0.454	167.70	2.257	64.14	0.073	80.34	0.573	−29.43
900	0.468	163.21	2.026	60.20	0.084	82.23	0.576	−32.58
1000	0.478	159.35	1.833	56.21	0.094	82.82	0.579	−35.40
V_{CE} = 5 V, I_C = 20 mA, Z_O = 50 Ω								
100	0.473	−110.94	15.555	113.24	0.018	48.75	0.651	−18.99
200	0.420	−144.96	8.504	96.80	0.025	55.46	0.577	−16.75
300	0.412	−160.51	5.806	88.35	0.032	64.32	0.556	−16.94
400	0.412	−170.47	4.415	81.97	0.040	69.43	0.553	−18.38
500	0.423	−177.81	3.567	76.52	0.047	73.49	0.552	−20.62
600	0.434	176.33	2.998	72.06	0.054	76.85	0.554	−23.22
700	0.443	171.32	2.597	67.40	0.064	79.43	0.555	−25.76
800	0.457	166.61	2.289	62.99	0.075	80.21	0.562	−28.77
900	0.470	162.56	2.044	58.98	0.084	82.61	0.567	−31.92
1000	0.484	159.03	1.849	54.97	0.095	83.62	0.572	−34.90
V_{CE} = 5 V, I_C = 30 mA, Z_O = 50 Ω								
100	0.444	−121.15	16.032	109.59	0.018	56.45	0.620	−18.33
200	0.414	−151.46	8.590	94.42	0.023	58.54	0.558	−15.68
300	0.413	−164.93	5.826	86.42	0.031	69.33	0.543	−15.93
400	0.418	−173.75	4.420	80.00	0.040	71.41	0.541	−17.58
500	0.429	179.87	3.560	74.72	0.048	75.89	0.545	−19.95
600	0.442	174.95	2.980	69.97	0.056	78.14	0.546	−22.37
700	0.454	170.06	2.575	65.31	0.067	79.78	0.550	−25.11
800	0.467	165.62	2.268	61.02	0.077	81.97	0.556	−27.94
900	0.485	161.83	2.027	57.14	0.086	83.95	0.563	−31.50
1000	0.497	158.27	1.829	53.02	0.096	84.97	0.570	−34.37
V_{CE} = 5 V, I_C = 50 mA, Z_O = 50 Ω								
100	0.436	−135.54	15.112	105.16	0.016	53.23	0.591	−16.61
200	0.431	−160.16	7.915	91.13	0.021	62.83	0.547	−14.06
300	0.439	−170.89	5.332	83.37	0.030	71.57	0.538	−15.05
400	0.447	−177.86	4.022	77.04	0.039	75.43	0.538	−16.92
500	0.462	176.77	3.231	71.43	0.046	77.82	0.543	−19.30
600	0.477	172.03	2.708	66.71	0.057	81.23	0.548	−22.35
700	0.490	167.59	2.318	61.92	0.065	82.45	0.553	−25.43
800	0.507	163.59	2.037	57.52	0.076	84.13	0.559	−28.69
900	0.523	159.90	1.813	53.42	0.087	86.15	0.566	−32.45
1000	0.539	156.32	1.629	49.36	0.099	87.07	0.573	−35.73

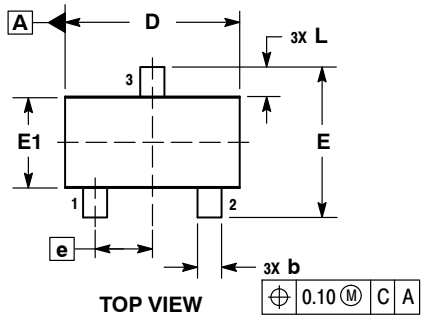
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®

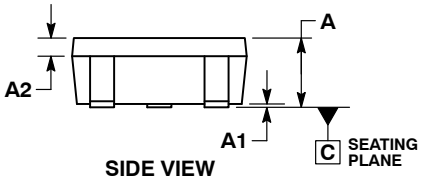
SCALE 2:1

SC−59 / CP3
CASE 318BJ
ISSUE O

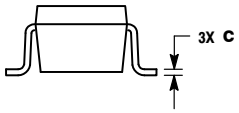
DATE 09 JAN 2015



TOP VIEW



SIDE VIEW

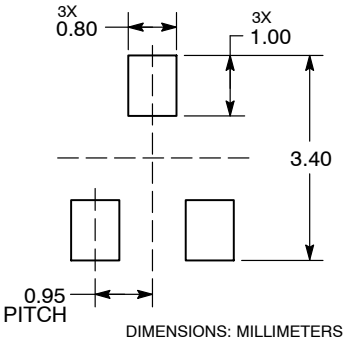


END VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER SIDE.
4. DIMENSIONS D AND E1 ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.20 FROM THE TIP.

	MILLIMETERS	
DIM	MIN	MAX
A	0.95	1.35
A1	0.00	0.10
A2	0.20	0.40
b	0.35	0.50
c	0.10	0.20
D	2.75	3.05
E	2.30	2.70
E1	1.35	1.65
e	0.95 BSC	
L	0.35	0.75

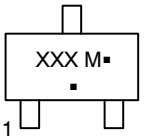
RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

DOCUMENT NUMBER:	98AON94458F	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−59 / CP3		PAGE 1 OF 1

ADDITIONAL INFORMATION

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