BF1215

Dual N-channel dual gate MOSFET

Rev. 01 — 6 May 2010 Product data sheet

1. Product profile

1.1 General description

The BF1215 is a combination of two dual gate MOSFET amplifiers with shared source lead, shared gate2 lead and an integrated switch.

The source and substrate are interconnected. Internal bias circuits enable DC stabilization and a very good cross modulation performance during AGC. Integrated diodes between the gates and source protect against excessive input voltage surges. The transistor is availiable as a SOT363 micro-miniature plastic package.

CAUTION

This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features and benefits

- Two low noise gain controlled amplifiers in a single package; one with full internal bias and one with partial internal bias
- Superior cross modulation performance during AGC
- High forward transfer admittance to input capacitance ratio
- Suitable for VHF and UHF applications: both amplifiers are optimized for VHF applications.
- Internal switch reduces external components

1.3 Applications

- Gain controlled low noise amplifiers for VHF and UHF applications with a 5 V supply
  - Digital and analog television tuners
  - Professional communication equipment

1.4 Quick reference data

Table 1. Quick reference data for amplifier A and B

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	DC		-	-	6	V
I_D	drain current	DC		-	-	30	mA
P_{tot}	total power dissipation	$T_{sp} \leq 107$ °C	[1]	-	-	180	mW
$\|y_{fs}\|$	forward transfer admittance	f = 100 MHz; T_j = 25 °C; I_D = 19 mA		23	27	38	mS
$C_{iss(G1)}$	input capacitance at gate1	f = 100 MHz	[2]	-	2.5	-	pF
C_{rss}	reverse transfer capacitance	f = 100 MHz	[2]	-	27	-	fF
NF	noise figure	f = 400 MHz; $Y_S = Y_{S(opt)}$		-	1.5	-	dB
		f = 800 MHz; $Y_S = Y_{S(opt)}$		-	1.9	-	dB
Xmod	cross modulation	input level for k = 1 % at 40 dB AGC; f_w = 50 MHz; f_{unw} = 60 MHz	[3]	105	107	-	dBμV
T_j	junction temperature			-	-	150	°C

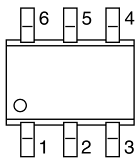
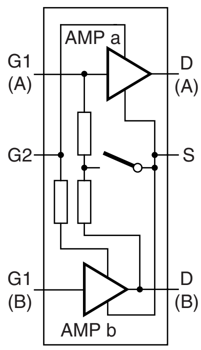
[1] T_{sp} is the temperature at the soldering point of the source lead.

[2] Calculated from S-parameters.

[3] Measured in Figure 32 and Figure 33 test circuits.

2. Pinning information

Table 2. Discrete pinning

Pin	Description	Simplified outline	Graphic symbol
1	gate1 (amplifier A)		 sym033
2	gate2		
3	gate1 (amplifier B)		
4	drain (amplifier B)		
5	source		
6	drain (amplifier A)		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BF1215	-	plastic surface-mounted package; 6 leads	SOT363

4. Marking

Table 4. Marking

Type number	Marking	Description
BF1215	M4p	made in Hong Kong
	M4t	made in Malaysia
	M4w	made in China

5. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
Per MOSFET					
V_{DS}	drain-source voltage	DC	-	6	V
I_D	drain current	DC	-	30	mA
I_{G1}	gate1 current		-	±10	mA
I_{G2}	gate2 current		-	±10	mA
P_{tot}	total power dissipation	$T_{sp} \leq 107$ °C [1]	-	180	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		-	150	°C

[1] T_{sp} is the temperature at the soldering point of the source lead.

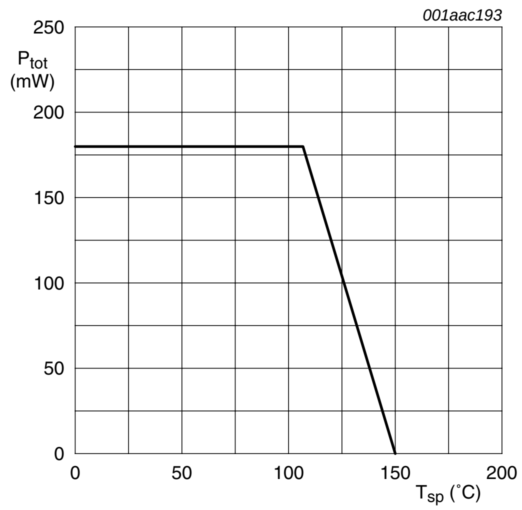


Fig 1. Power derating curve

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point		240	K/W

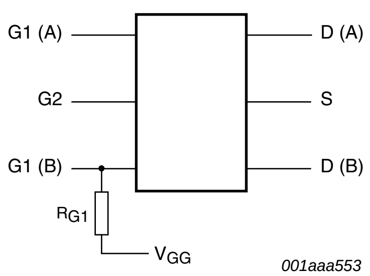
7. Static characteristics

Table 7. Static characteristics
T_j = 25 °C.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per MOSFET; unless otherwise specified							
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{G1-S} = V_{G2-S} = 0$ V; $I_D = 10$ μA					
		amplifier A		6	-	-	V
		amplifier B		6	-	-	V
$V_{(BR)G1-SS}$	gate1-source breakdown voltage	$V_{G2-S} = V_{DS} = 0$ V; $I_{G1-S} = 10$ mA		6	-	10	V
$V_{(BR)G2-SS}$	gate2-source breakdown voltage	$V_{G1-S} = V_{DS} = 0$ V; $I_{G2-S} = 10$ mA		6	-	10	V
$V_{F(S-G1)}$	forward source-gate1 voltage	$V_{G2-S} = V_{DS} = 0$ V; $I_{S-G1} = 10$ mA		0.5	-	1.5	V
$V_{F(S-G2)}$	forward source-gate2 voltage	$V_{G1-S} = V_{DS} = 0$ V; $I_{S-G2} = 10$ mA		0.5	-	1.5	V
$V_{G1-S(th)}$	gate1-source threshold voltage	$V_{DS} = 5$ V; $V_{G2-S} = 4$ V; $I_D = 100$ μA		0.3	-	1.0	V
$V_{G2-S(th)}$	gate2-source threshold voltage	$V_{DS} = 5$ V; $V_{G1-S} = 5$ V; $I_D = 100$ μA		0.4	-	1.0	V
I_{DS}	drain-source current	$V_{G2-S} = 4$ V; $V_{DS(B)} = 5$ V; $R_{G1} = 39$ kΩ					
		amplifier A: $V_{DS(A)} = 5$ V	[1]	-	-	19.5	mA
		amplifier B	[2]	-	-	23	mA
I_{G1-S}	gate1 cut-off current	$V_{G2-S} = 0$ V; $V_{DS(A)} = V_{DS(B)} = 0$ V					
		amplifier A: $V_{G1-S(A)} = 5$ V		-	-	50	nA
		amplifier B: $V_{G1-S(B)} = 5$ V		-	-	50	nA
I_{G2-S}	gate2 cut-off current	$V_{G2-S} = 4$ V; $V_{DS(A)} = V_{DS(B)} = 0$ V; $V_{G1-S(A)} = V_{G1-S(B)} = 0$ V		-	-	20	nA

[1] R_{G1} connects gate1 amplifier B to $V_{GG} = 0$ V, see Figure 2.

[2] R_{G1} connects gate1 amplifier B to $V_{GG} = 5$ V, see Figure 2.



$V_{GG} = 5$ V: amplifier A is off; amplifier B is on.

$V_{GG} = 0$ V: amplifier A is on; amplifier B is off.

Fig 2. Functional diagram

8. Dynamic characteristics

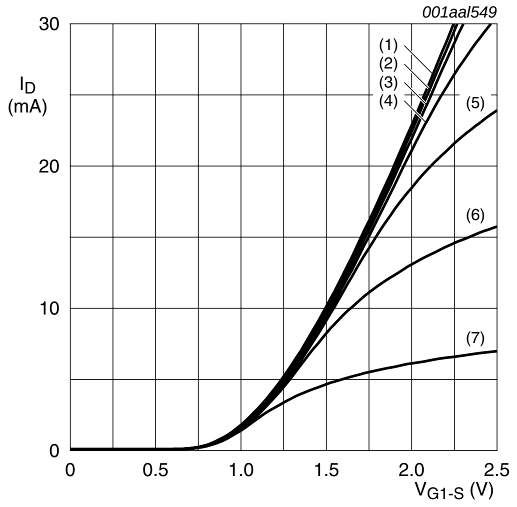
Table 8. Dynamic characteristics for amplifier A and B
Common source; T_{amb} = 25 °C; $V_{G2\text{-}S}$ = 4 V; V_{DS} = 5 V; I_D = 19 mA.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$\|y_{fs}\|$	forward transfer admittance	f = 100 MHz; T_j = 25 °C		23	27	38	mS
$C_{iss(G1)}$	input capacitance at gate1	f = 100 MHz	[1]	-	2.5	-	pF
$C_{iss(G2)}$	input capacitance at gate2	f = 100 MHz	[1]	-	2.5	-	pF
C_{oss}	output capacitance	f = 100 MHz	[1]	-	0.8	-	pF
C_{rss}	reverse transfer capacitance	f = 100 MHz	[1]	-	27	-	fF
G_{tr}	transducer power gain	amplifier A: $B_S = B_{S(opt)}$; $B_L = B_{L(opt)}$	[1]				
		f = 200 MHz; G_S = 2 mS; G_L = 0.5 mS		30	34	38	dB
		f = 400 MHz; G_S = 2 mS; G_L = 1 mS		26	30	34	dB
		f = 800 MHz; G_S = 3.3 mS; G_L = 1 mS		22	26	30	dB
		amplifier B: $B_S = B_{S(opt)}$; $B_L = B_{L(opt)}$	[1]				
		f = 200 MHz; G_S = 2 mS; G_L = 0.5 mS		30	34	38	dB
		f = 400 MHz; G_S = 2 mS; G_L = 1 mS		26	31	34	dB
		f = 800 MHz; G_S = 3.3 mS; G_L = 1 mS		22	26	30	dB
NF	noise figure	f = 11 MHz; G_S = 20 mS; B_S = 0 S		-	-	6	dB
		f = 400 MHz; $Y_S = Y_{S(opt)}$		-	1.5	-	dB
		f = 800 MHz; $Y_S = Y_{S(opt)}$		-	1.9	-	dB
Xmod	cross modulation	input level for k = 1 %; f_w = 50 MHz; f_{unw} = 60 MHz	[2]				
		at 0 dB AGC		95	104	-	dBμV
		at 10 dB AGC		-	100	-	dBμV
		at 20 dB AGC		-	104	-	dBμV
		at 40 dB AGC		105	107	-	dBμV

[1] Calculated from S-parameters.

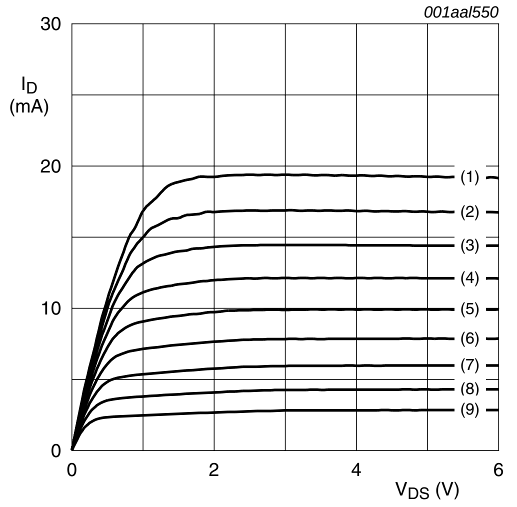
[2] Measured in Figure 32 and Figure 33 test circuits.

8.1 Graphics for amplifier A



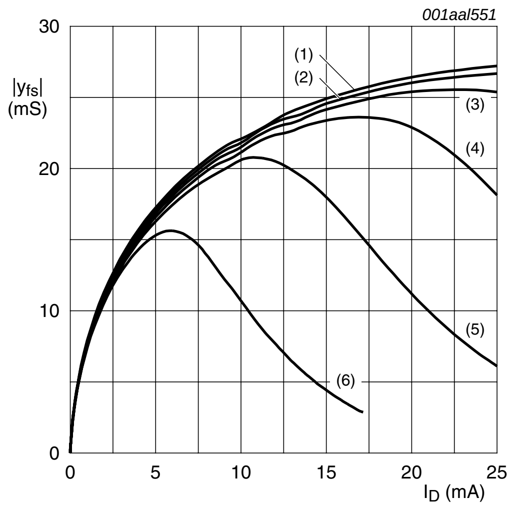
(1) V_{G2-S} = 4 V.
(2) V_{G2-S} = 3.5 V.
(3) V_{G2-S} = 3 V.
(4) V_{G2-S} = 2.5 V.
(5) V_{G2-S} = 2 V.
(6) V_{G2-S} = 1.5 V.
(7) V_{G2-S} = 1 V.
$V_{DS(A)}$ = 5 V; $V_{G1-S(B)}$ = $V_{DS(B)}$ = 0 V; T_j = 25 °C.

Fig 3. Amplifier A transfer characteristics; typical values



(1) $V_{G1-S(A)}$ = 1.9 V.
(2) $V_{G1-S(A)}$ = 1.8 V.
(3) $V_{G1-S(A)}$ = 1.7 V.
(4) $V_{G1-S(A)}$ = 1.6 V.
(5) $V_{G1-S(A)}$ = 1.5 V.
(6) $V_{G1-S(A)}$ = 1.4 V.
(7) $V_{G1-S(A)}$ = 1.3 V.
(8) $V_{G1-S(A)}$ = 1.2 V.
(9) $V_{G1-S(A)}$ = 1.1 V.
V_{G2-S} = 4 V; $V_{G1-S(B)}$ = $V_{DS(B)}$ = 0 V; T_j = 25 °C.

Fig 4. Amplifier A output characteristics; typical values



(1) $V_{G2\text{-}S}$ = 4 V.

(2) $V_{G2\text{-}S}$ = 3.5 V.

(3) $V_{G2\text{-}S}$ = 3 V.

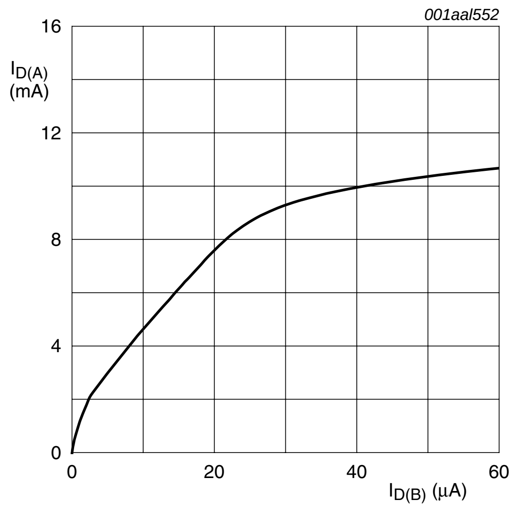
(4) $V_{G2\text{-}S}$ = 2.5 V.

(5) $V_{G2\text{-}S}$ = 2 V.

(6) $V_{G2\text{-}S}$ = 1.5 V.

$V_{DS(A)}$ = 5 V; $V_{G1\text{-}S(B)}$ = $V_{DS(B)}$ = 0 V; T_j = 25 °C.

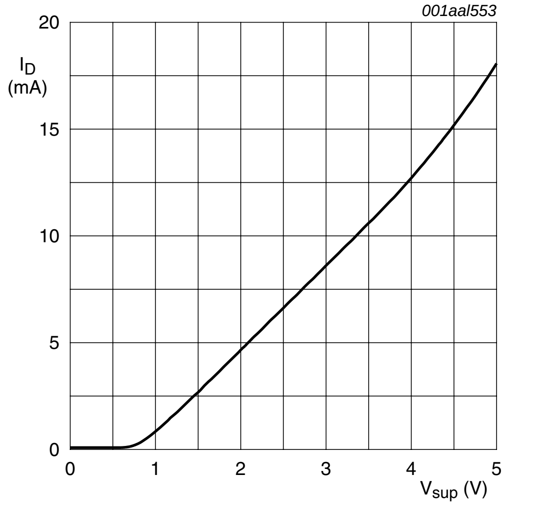
Fig 5. Amplifier A forward transfer admittance as a function of drain current; typical values



$V_{DS(A)}$ = 5 V; $V_{G2\text{-}S}$ = 4 V; $V_{DS(B)}$ = 5 V; $V_{G1\text{-}S(B)}$ = 0 V; T_j = 25 °C.

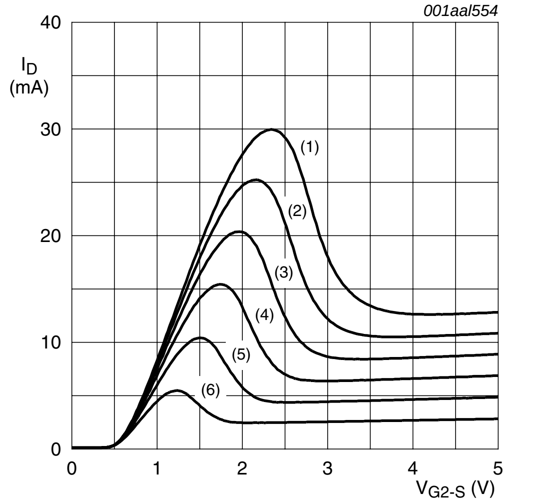
$I_{D(B)}$ = internal gate1 current = current on pin drain (amplifier B) if MOSFET (B) is switched off.

Fig 6. Amplifier A drain current as a function of internal gate1 current; typical values



$V_{DS(A)} = V_{DS(B)} = V_{sup}$; $V_{G2\text{-}S} = 4$ V; $T_j = 25$ °C;
$R_{G1} = 39$ kΩ (connected to ground); see Figure 2.

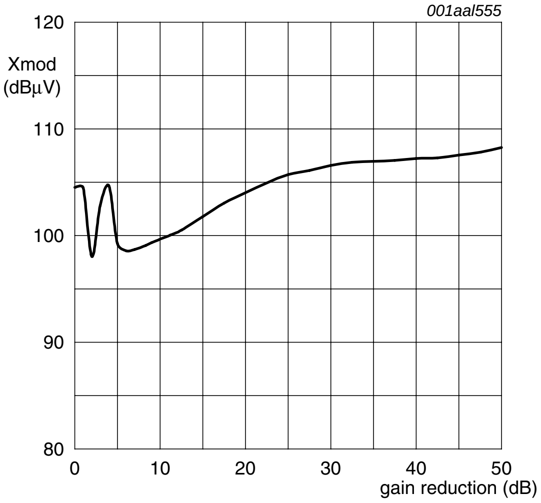
Fig 7. Amplifier A drain current as a function of the supply voltage to amplifiers A and B; typical values



(1) $V_{DS(B)} = 4$ V.
(2) $V_{DS(B)} = 3.5$ V.
(3) $V_{DS(B)} = 3$ V.
(4) $V_{DS(B)} = 2.5$ V.
(5) $V_{DS(B)} = 2$ V.
(6) $V_{DS(B)} = 1.5$ V.

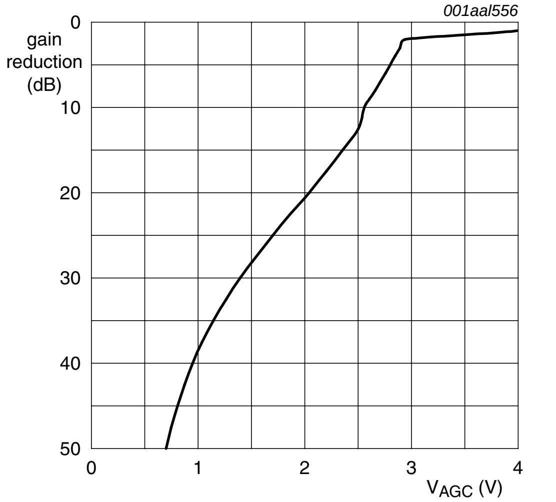
$V_{DS(A)} = 5$ V; $V_{G1\text{-}S(B)} = 0$ V; gate1 (amplifier A) is open;
$T_j = 25$ °C.

Fig 8. Amplifier A drain current as a function of gate2 voltage; typical values



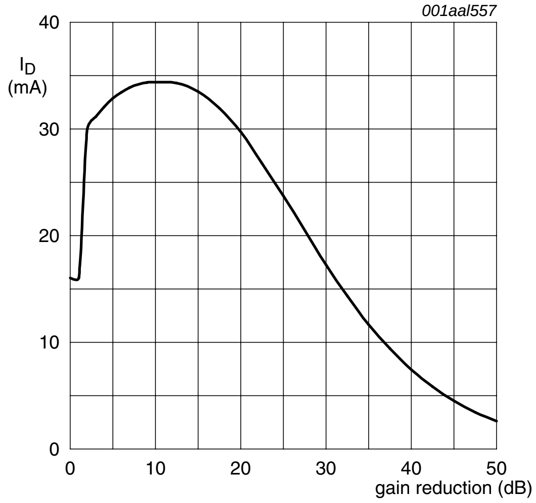
$V_{DS(A)} = V_{DS(B)} = 5$ V; $V_{G1\text{-}S(B)} = 0$ V; $f_w = 50$ MHz;
$f_{unw} = 60$ MHz; $T_{amb} = 25$ °C; see Figure 32.

Fig 9. Amplifier A unwanted voltage for 1 % cross modulation as a function of gain reduction; typical values



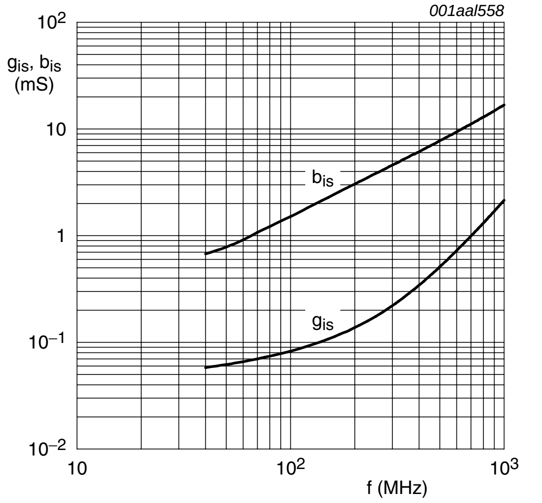
$V_{DS(A)} = V_{DS(B)} = 5$ V; $V_{G1\text{-}S(B)} = 0$ V; f = 50 MHz;
$T_j = 25$ °C; see Figure 32.

Fig 10. Amplifier A gain reduction as a function of AGC voltage; typical values



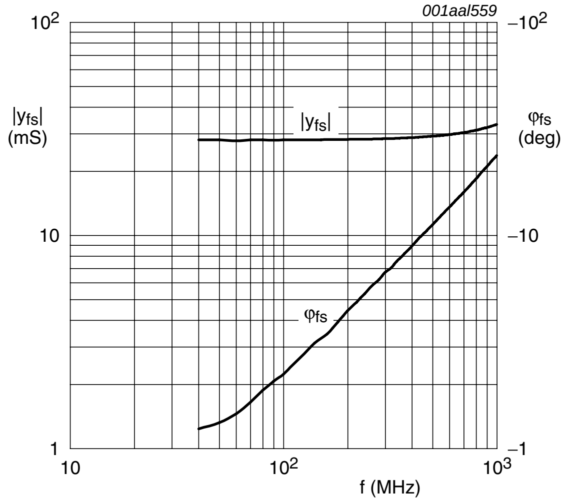
$V_{DS(A)} = V_{DS(B)} = 5$ V; $V_{G1\text{-}S(B)} = 0$ V; f = 50 MHz;
$T_j = 25$ °C; see Figure 32.

Fig 11. Amplifier A drain current as a function of gain reduction; typical values



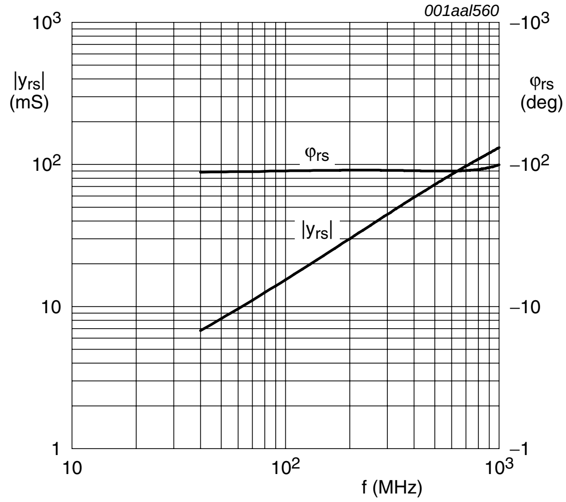
$V_{DS(A)} = 5$ V; $V_{G2\text{-}S} = 4$ V; $V_{DS(B)} = V_{G1\text{-}S(B)} = 0$ V;
$I_{D(A)} = 19$ mA; $T_j = 25$ °C.

Fig 12. Amplifier A input admittance as a function of frequency; typical values



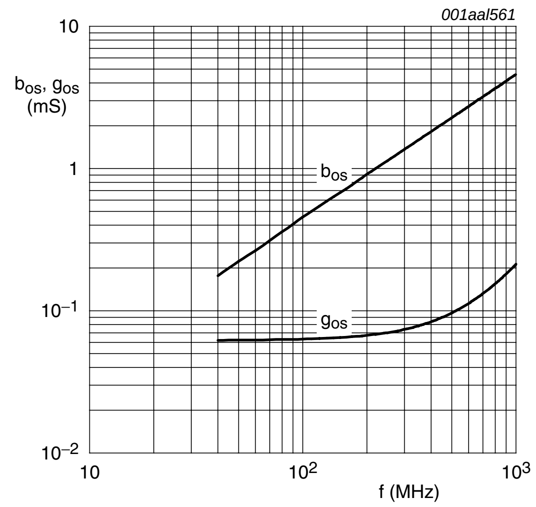
$V_{DS(A)} = 5$ V; $V_{G2\text{-}S} = 4$ V; $V_{DS(B)} = V_{G1\text{-}S(B)} = 0$ V;
$I_{D(A)} = 19$ mA; $T_j = 25$ °C.

Fig 13. Amplifier A forward transfer admittance and phase as a function of frequency; typical values



$V_{DS(A)} = 5$ V; $V_{G2\text{-}S} = 4$ V; $V_{DS(B)} = V_{G1\text{-}S(B)} = 0$ V;
$I_{D(A)} = 19$ mA; $T_j = 25$ °C.

Fig 14. Amplifier A reverse transfer admittance and phase as a function of frequency; typical values



$V_{DS(A)} = 5$ V; $V_{G2\text{-}S} = 4$ V; $V_{DS(B)} = V_{G1\text{-}S(B)} = 0$ V; $I_{D(A)} = 19$ mA; $T_j = 25$ °C.

Fig 15. Amplifier A output admittance as a function of frequency; typical values

8.2 Scattering parameters for amplifier A

Table 9. Scattering parameters for amplifier A

$V_{DS(A)} = 5$ V; $V_{G2\text{-}S} = 4$ V; $I_{D(A)} = 19$ mA; $V_{DS(B)} = 0$ V; $V_{G1\text{-}S(B)} = 0$ V; $T_{amb} = 25$ °C; typical values.

f (MHz)	s_{11}		s_{21}		s_{12}		s_{22}	
	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)
50	0.992	−4.61	2.80	175.87	0.00078	95.65	0.993	−1.38
100	0.991	−8.79	2.80	172.12	0.00145	83.73	0.994	−2.76
200	0.986	−17.57	2.77	164.25	0.00292	78.53	0.992	−5.50
300	0.977	−26.11	2.74	156.52	0.00415	73.60	0.991	−8.21
400	0.966	−34.46	2.69	148.98	0.00528	69.27	0.989	−10.91
500	0.952	−42.75	2.64	141.49	0.00620	64.79	0.986	−13.58
600	0.936	−50.92	2.58	134.13	0.00691	60.71	0.984	−16.22
700	0.920	−58.79	2.50	127.01	0.00733	57.37	0.982	−18.86
800	0.902	−66.40	2.43	120.04	0.00758	54.40	0.979	−21.47
900	0.881	−73.87	2.36	113.24	0.00763	52.13	0.978	−24.00
1000	0.861	−81.10	2.28	106.69	0.00749	50.46	0.976	−26.55

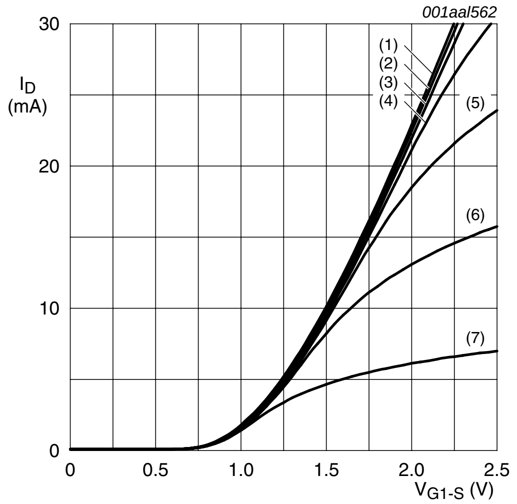
8.3 Noise data for amplifier A

Table 10. Noise data for amplifier A

$V_{DS(A)} = 5$ V; $V_{G2\text{-}S} = 4$ V; $I_{D(A)} = 19$ mA; $V_{DS(B)} = 0$ V; $V_{G1\text{-}S(B)} = 0$ V; $T_{amb} = 25$ °C; typical values; unless otherwise specified.

f (MHz)	NF_{min} (dB)	Γ_{opt}		r_n (ratio)
		(ratio)	(degree)	
400	0.9	0.810	27.95	0.884
800	1.4	0.697	56.50	0.717

8.4 Graphics for amplifier B



(1) V_{G2-S} = 4 V.

(2) V_{G2-S} = 3.5 V.

(3) V_{G2-S} = 3 V.

(4) V_{G2-S} = 2.5 V.

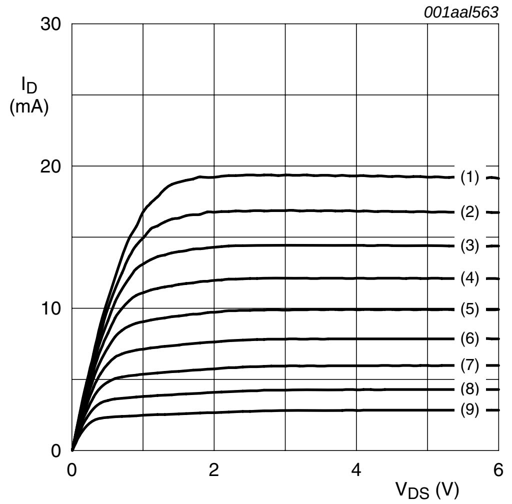
(5) V_{G2-S} = 2 V.

(6) V_{G2-S} = 1.5 V.

(7) V_{G2-S} = 1 V.

$V_{DS(B)}$ = 5 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; T_j = 25 °C.

Fig 16. Amplifier B transfer characteristics; typical values



(1) $V_{G1-S(B)}$ = 1.9 V.

(2) $V_{G1-S(B)}$ = 1.8 V.

(3) $V_{G1-S(B)}$ = 1.7 V.

(4) $V_{G1-S(B)}$ = 1.6 V.

(5) $V_{G1-S(B)}$ = 1.5 V.

(6) $V_{G1-S(B)}$ = 1.4 V.

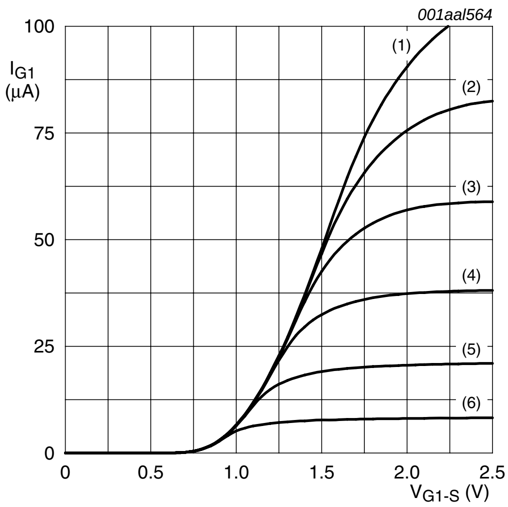
(7) $V_{G1-S(B)}$ = 1.3 V.

(8) $V_{G1-S(B)}$ = 1.2 V.

(9) $V_{G1-S(B)}$ = 1.1 V.

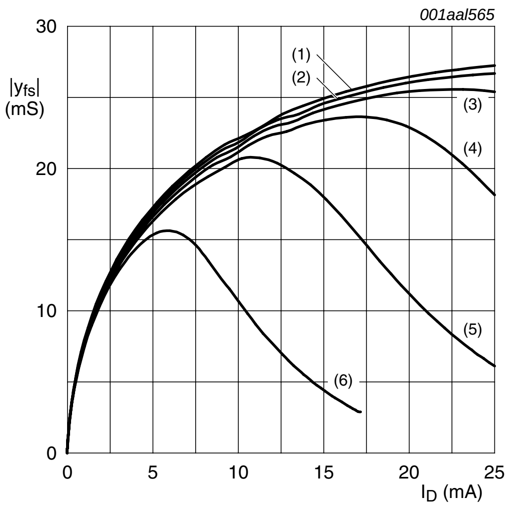
V_{G2-S} = 4 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; T_j = 25 °C.

Fig 17. Amplifier B output characteristics; typical values



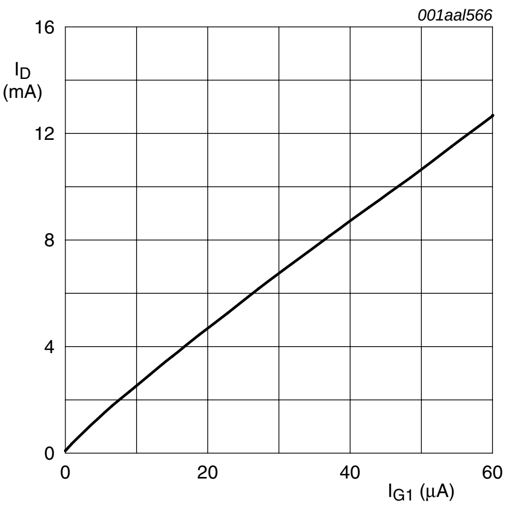
(1) V_{G2-S} = 4 V.
(2) V_{G2-S} = 3.5 V.
(3) V_{G2-S} = 3 V.
(4) V_{G2-S} = 2.5 V.
(5) V_{G2-S} = 2 V.
(6) V_{G2-S} = 1.5 V.
(7) V_{G2-S} = 1 V.
$V_{DS(B)}$ = 5 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; T_j = 25 °C.

Fig 18. Amplifier B gate1 current as a function of gate1 voltage; typical values



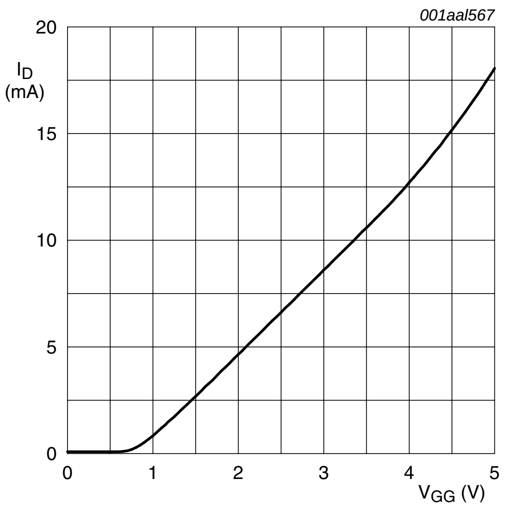
(1) V_{G2-S} = 4 V.
(2) V_{G2-S} = 3.5 V.
(3) V_{G2-S} = 3 V.
(4) V_{G2-S} = 2.5 V.
(5) V_{G2-S} = 2 V.
(6) V_{G2-S} = 1.5 V.
$V_{DS(B)}$ = 5 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; T_j = 25 °C.

Fig 19. Amplifier B forward transfer admittance as a function of drain current; typical values



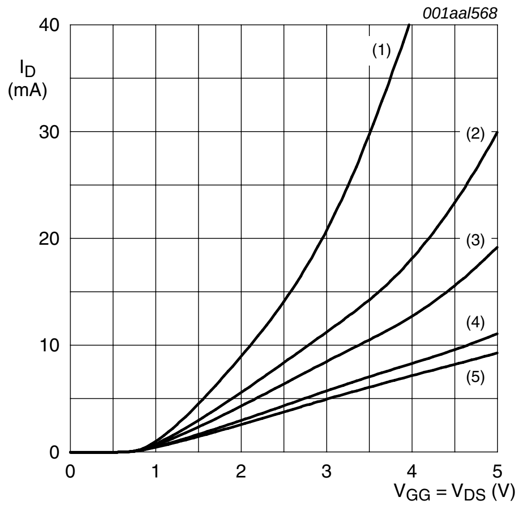
$V_{DS(B)}$ = 5 V; V_{G2-S} = 4 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V;
T_j = 25 °C.

Fig 20. Amplifier B drain current as a function of gate1 current; typical values



$V_{DS(B)}$ = 5 V; V_{G2-S} = 4 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V;
T_j = 25 °C; R_{G1} = 39 kΩ (connected to V_{GG}); see Figure 2.

Fig 21. Amplifier B drain current as a function of gate1 supply voltage; typical values



(1) R_{G1} = 12 kΩ.

(2) R_{G1} = 27 kΩ.

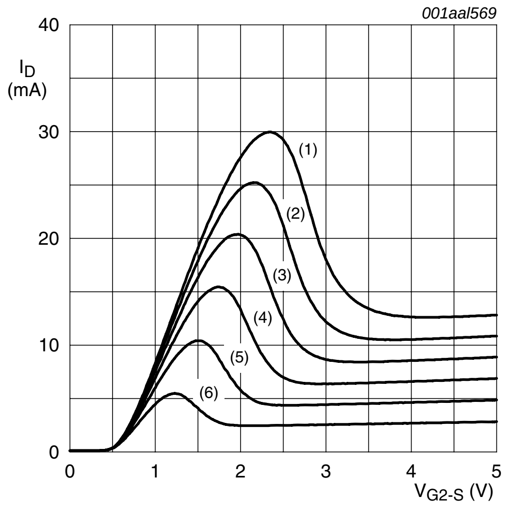
(3) R_{G1} = 39 kΩ.

(4) R_{G1} = 67 kΩ.

(5) R_{G1} = 80 kΩ.

$V_{G2\text{-}S}$ = 4 V; $V_{DS(A)}$ = $V_{G1\text{-}S(A)}$ = 0 V; T_j = 25 °C; R_{G1} is connected to V_{GG}; see Figure 2.

Fig 22. Amplifier B drain current as a function of gate1 supply voltage and drain supply voltage; typical values



(1) V_{GG} = 4.0 V.

(2) V_{GG} = 3.5 V.

(3) V_{GG} = 3.0 V.

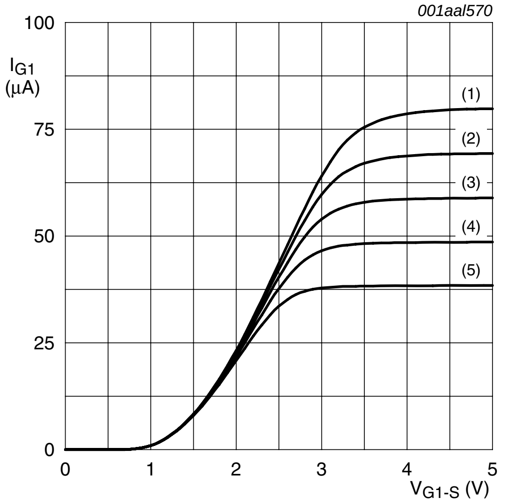
(4) V_{GG} = 2.5 V.

(5) V_{GG} = 2.0 V.

(6) V_{GG} = 1.5 V.

$V_{DS(B)}$ = 5 V; $V_{DS(A)}$ = $V_{G1\text{-}S(A)}$ = 0 V; T_j = 25 °C; R_{G1} = 39 kΩ (connected to V_{GG}); see Figure 2.

Fig 23. Amplifier B drain current as a function of gate2 voltage; typical values



(1) V_{GG} = 5.0 V.

(2) V_{GG} = 4.5 V.

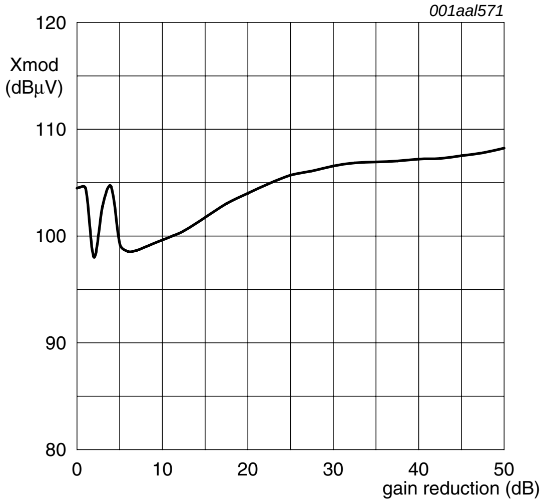
(3) V_{GG} = 4.0 V.

(4) V_{GG} = 3.5 V.

(5) V_{GG} = 3.0 V.

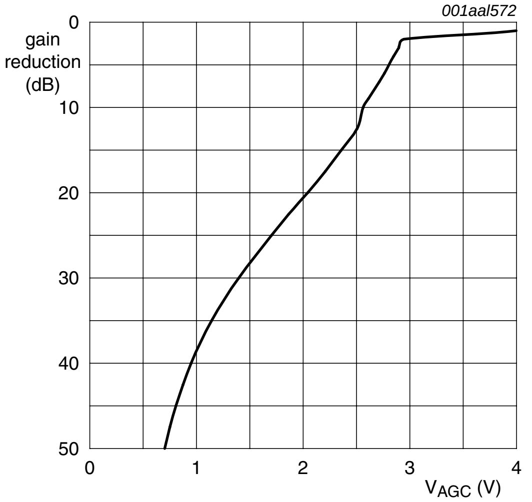
$V_{DS(B)}$ = 5 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; T_j = 25 °C; R_{G1} = 39 kΩ (connected to V_{GG}); see Figure 2.

Fig 24. Amplifier B gate1 current as a function of gate2 voltage; typical values



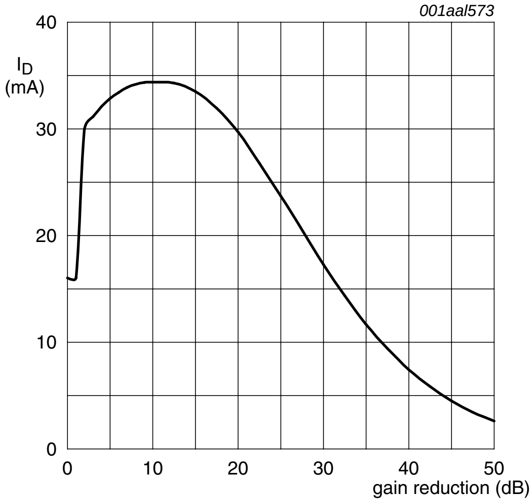
$V_{DS(B)}$ = 5 V; V_{GG} = 5 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; R_{G1} = 39 kΩ (connected to V_{GG}); f_w = 50 MHz; f_{unw} = 60 MHz; T_{amb} = 25 °C; see Figure 33.

Fig 25. Amplifier B unwanted voltage for 1 % cross modulation as a function of gain reduction; typical values



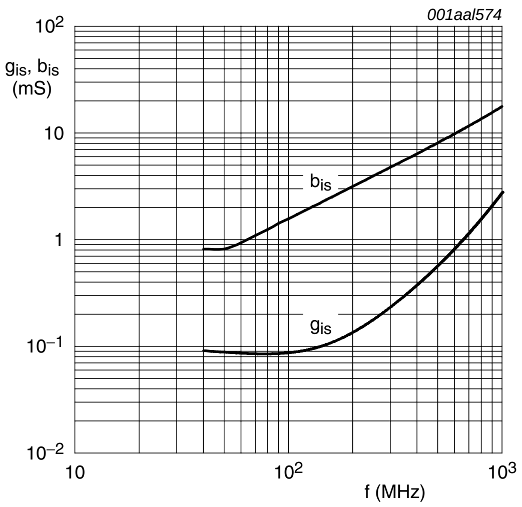
$V_{DS(B)}$ = 5 V; V_{GG} = 5 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; R_{G1} = 39 kΩ (connected to V_{GG}); f = 50 MHz; T_{amb} = 25 °C; see Figure 33.

Fig 26. Amplifier B gain reduction as a function of AGC voltage; typical values



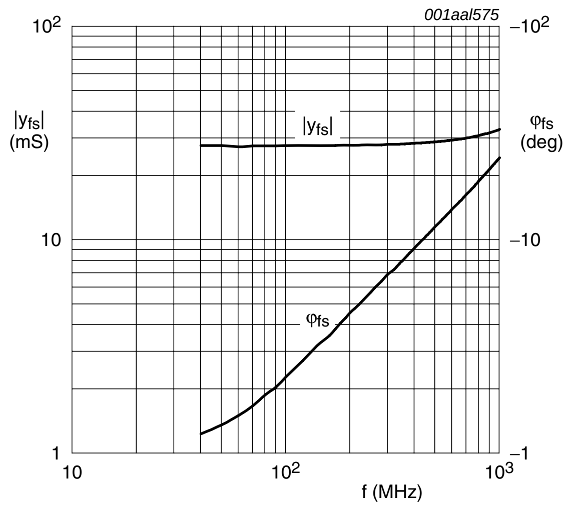
$V_{DS(B)}$ = 5 V; V_{GG} = 5 V; $V_{DS(A)}$ = $V_{G1-S(A)}$ = 0 V; R_{G1} = 39 kΩ (connected to V_{GG}); f = 50 MHz; T_{amb} = 25 °C; see Figure 33.

Fig 27. Amplifier B drain current as a function of gain reduction; typical values



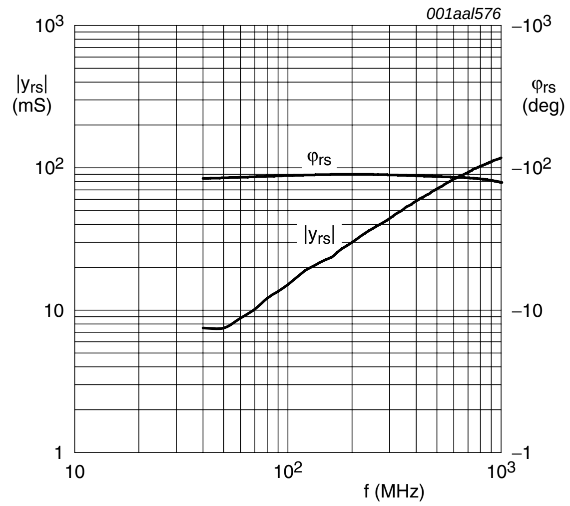
$V_{DS(B)}$ = 5 V; $V_{G2\text{-}S}$ = 4 V; $V_{DS(A)}$ = $V_{G1\text{-}S(A)}$ = 0 V;
$I_{D(B)}$ = 19 mA; T_j = 25 °C.

Fig 28. Input admittance as a function of frequency; typical values



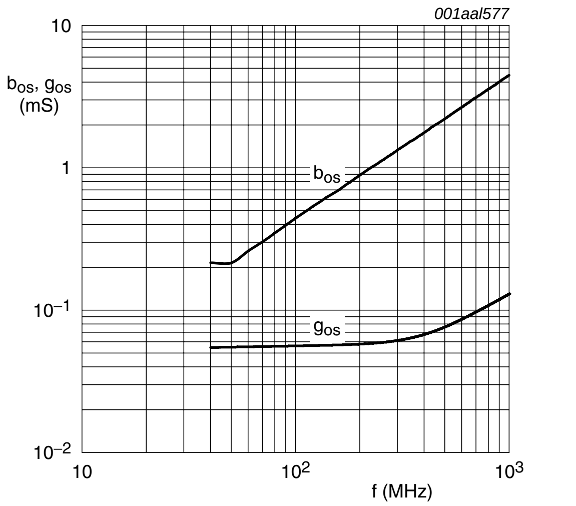
$V_{DS(B)}$ = 5 V; $V_{G2\text{-}S}$ = 4 V; $V_{DS(A)}$ = $V_{G1\text{-}S(A)}$ = 0 V;
$I_{D(B)}$ = 19 mA; T_j = 25 °C.

Fig 29. Forward transfer admittance and phase as a function of frequency; typical values



$V_{DS(B)}$ = 5 V; $V_{G2\text{-}S}$ = 4 V; $V_{DS(A)}$ = $V_{G1\text{-}S(A)}$ = 0 V;
$I_{D(B)}$ = 19 mA; T_j = 25 °C.

Fig 30. Reverse transfer admittance and phase as a function of frequency; typical values



$V_{DS(B)}$ = 5 V; $V_{G2\text{-}S}$ = 4 V; $V_{DS(A)}$ = $V_{G1\text{-}S(A)}$ = 0 V;
$I_{D(B)}$ = 19 mA; T_j = 25 °C.

Fig 31. Output admittance as a function of frequency; typical values

8.5 Scattering parameters for amplifier B

Table 11. Scattering parameters for amplifier B

$V_{DS(B)}$ = 5 V; V_{G2-S} = 4 V; $I_{D(B)}$ = 15 mA; $V_{DS(A)}$ = 0 V; $V_{G1-S(A)}$ = 0 V; T_{amb} = 25 °C; typical values.

f (MHz)	s_{11}		s_{21}		s_{12}		s_{22}	
	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)
50	0.987	−4.68	2.77	175.73	0.00074	100.59	0.992	−1.47
100	0.983	−8.74	2.75	171.97	0.00147	85.47	0.992	−3.03
200	0.979	−17.33	2.73	164.04	0.00291	83.85	0.991	−6.07
300	0.970	−25.74	2.70	156.20	0.00422	82.04	0.989	−9.06
400	0.961	−33.99	2.66	148.55	0.00547	80.56	0.987	−12.03
500	0.948	−42.21	2.60	140.92	0.00654	79.15	0.986	−14.99
600	0.932	−50.29	2.54	133.41	0.00744	78.33	0.983	−17.97
700	0.917	−58.13	2.47	126.14	0.00822	78.46	0.981	−20.93
800	0.900	−65.75	2.40	119.00	0.00890	78.92	0.978	−23.84
900	0.981	−73.19	2.33	112.02	0.00947	80.11	0.977	−26.71
1000	0.962	−80.36	2.25	105.26	0.00997	81.84	0.975	−29.63

8.6 Noise data for amplifier B

Table 12. Noise data for amplifier B

$V_{DS(B)}$ = 5 V; V_{G2-S} = 4 V; $I_{D(B)}$ = 19 mA; $V_{DS(A)}$ = 0 V; $V_{G1-S(A)}$ = 0 V; T_{amb} = 25 °C; typical values; unless otherwise specified.

f (MHz)	NF_{min} (dB)	Γ_{opt}		r_n (Ω)
		(ratio)	(deg)	
400	1.1	0.755	27.61	0.860
800	1.6	0.659	56.19	0.712

9. Test information

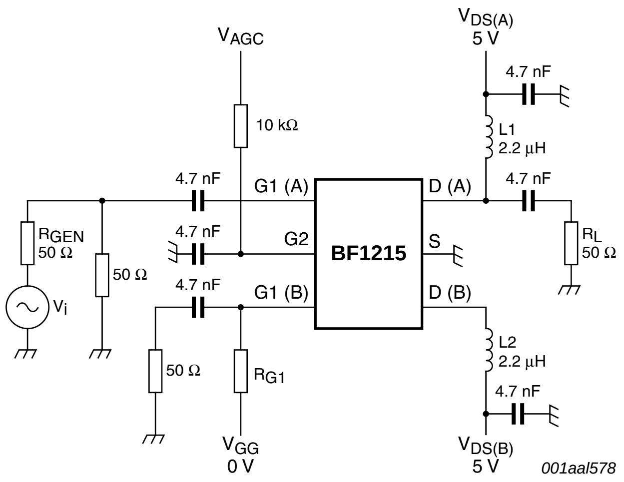


Fig 32. Cross-modulation test set-up for amplifier A.

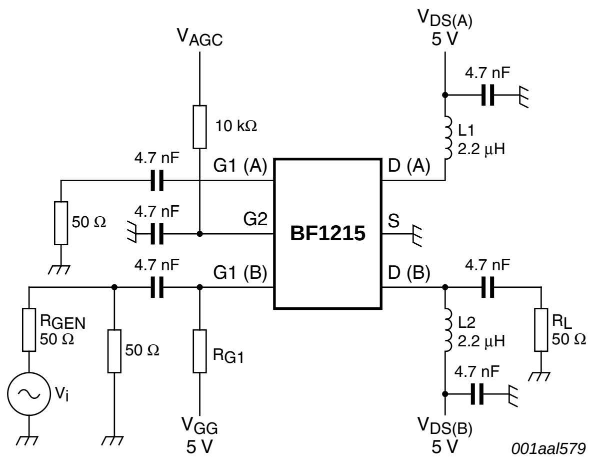
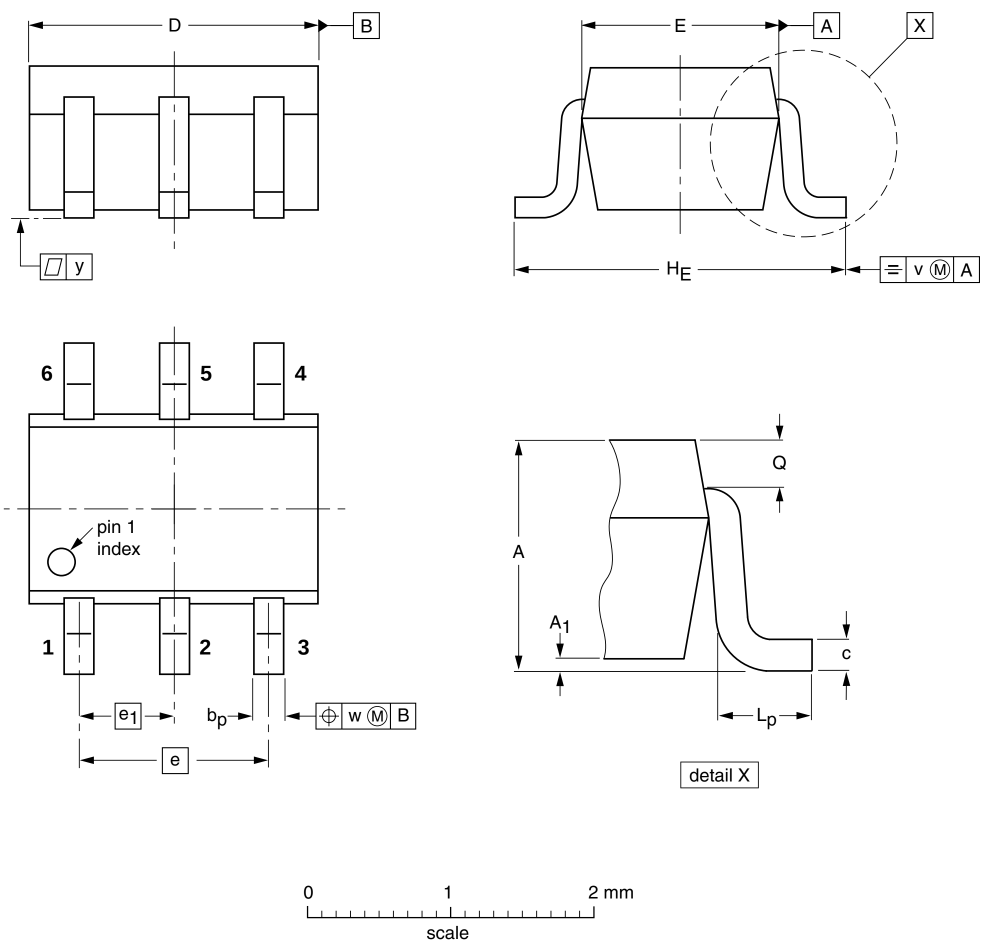


Fig 33. Cross-modulation test set-up for amplifier B.

10. Package outline

Plastic surface-mounted package; 6 leads **SOT363**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT363			SC-88			04-11-08 06-03-16

Fig 34. Package outline SOT363

11. Abbreviations

Table 13. Abbreviations

Acronym	Description
AGC	Automatic Gain Control
DC	Direct Current
MOSFET	Metal-Oxide-Semiconductor Field-Effect Transistor
UHF	Ultra High Frequency
VHF	Very High Frequency

12. Revision history

Table 14. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BF1215_1	20100506	Product data sheet	-	-

13. Legal information

13.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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15. Contents

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