

DATA SHEET

BF998WR

N-channel dual-gate MOS-FET

Product specification
Supersedes data of 1995 Apr 25

1997 Sep 05



N-channel dual-gate MOS-FET

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FEATURES

- High forward transfer admittance
- Short channel transistor with high forward transfer admittance to input capacitance ratio
- Low noise gain controlled amplifier up to 1 GHz.

APPLICATIONS

- VHF and UHF applications with 12 V supply voltage, such as television tuners and professional communications equipment.

DESCRIPTION

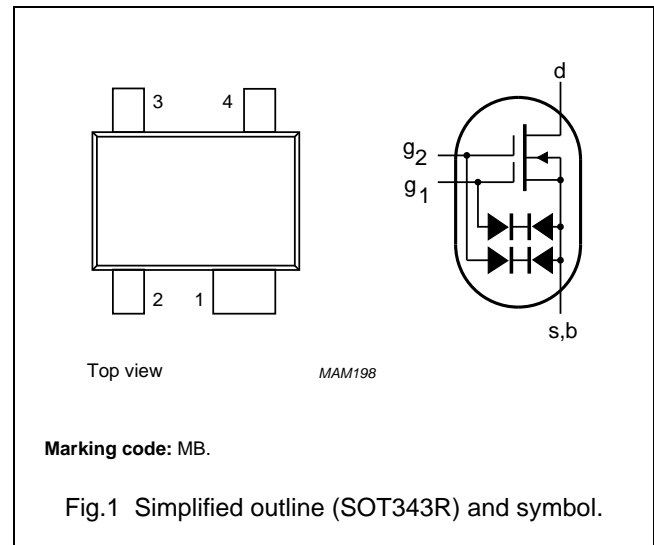
Depletion type field-effect transistor in a plastic microminiature SOT343R package with source and substrate interconnected. The transistor is protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

CAUTION

The device is supplied in an antistatic package. The gate-source input must be protected against static discharge during transport or handling.

PINNING

| PIN | SYMBOL | DESCRIPTION |
|-----|----------------|-------------|
| 1 | s, b | source |
| 2 | d | drain |
| 3 | g ₂ | gate 2 |
| 4 | g ₁ | gate 1 |



QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--------------------|--------------------------------|-------------|------|------|------|------|
| V _{DS} | drain-source voltage | | – | – | 12 | V |
| I _D | drain current | | – | – | 30 | mA |
| P _{tot} | total power dissipation | | – | – | 300 | mW |
| T _j | operating junction temperature | | – | – | 150 | °C |
| y _{fs} | forward transfer admittance | | – | 24 | – | mS |
| C _{ig1-s} | input capacitance at gate 1 | | – | 2.1 | – | pF |
| C _{rs} | reverse transfer capacitance | f = 1 MHz | – | 25 | – | fF |
| F | noise figure | f = 800 MHz | – | 1 | – | dB |

N-channel dual-gate MOS-FET

BF998WR

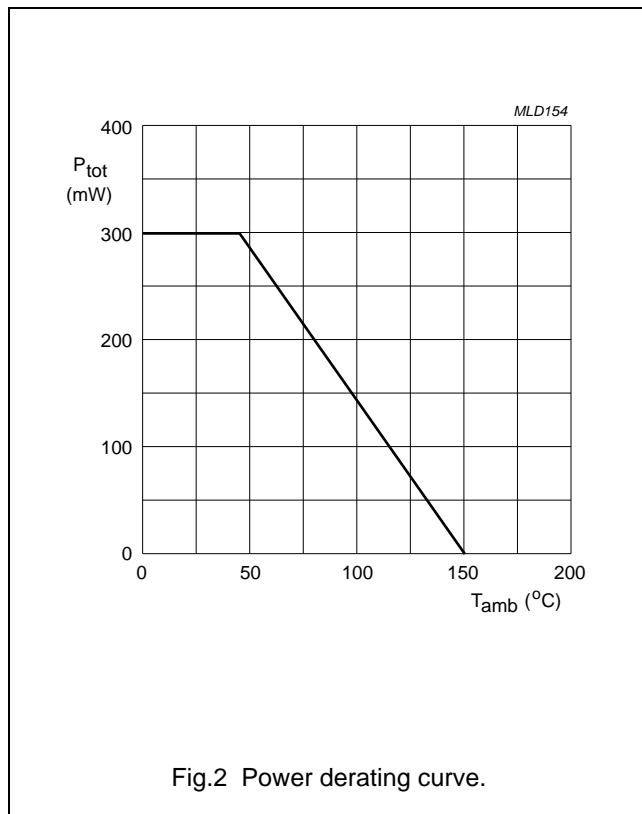
LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|--------------------------------|--|------|----------|------------------|
| V_{DS} | drain-source voltage | | – | 12 | V |
| I_D | drain current | | – | 30 | mA |
| I_{G1} | gate 1 current | | – | ± 10 | mA |
| I_{G2} | gate 2 current | | – | ± 10 | mA |
| P_{tot} | total power dissipation | up to $T_{amb} = 45\text{ }^\circ\text{C}$; see Fig.2; note 1 | – | 300 | mW |
| T_{stg} | storage temperature | | –65 | +150 | $^\circ\text{C}$ |
| T_j | operating junction temperature | | – | +150 | $^\circ\text{C}$ |

Note

1. Device mounted on a printed-circuit board.



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BF998WR

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|------------------------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1 | 350 | K/W |
| $R_{th\ j-s}$ | thermal resistance from junction to soldering point | note 2; $T_s = 90\text{ °C}$ | 200 | K/W |

Notes

1. Device mounted on a printed-circuit board.
2. T_s is the temperature at the soldering point of the source lead.

STATIC CHARACTERISTICS

$T_j = 25\text{ °C}$; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------------|---------------------------------|---|------|------|------|
| $V_{(BR)G1-SS}$ | gate 1-source breakdown voltage | $V_{G2-S} = V_{DS} = 0$; $I_{G1-S} = 10\text{ mA}$ | 6 | 20 | V |
| $V_{(BR)G2-SS}$ | gate 2-source breakdown voltage | $V_{G1-S} = V_{DS} = 0$; $I_{G2-S} = 10\text{ mA}$ | 6 | 20 | V |
| $V_{(P)G1-S}$ | gate 1-source cut-off voltage | $V_{G2-S} = 4\text{ V}$; $V_{DS} = 8\text{ V}$; $I_D = 20\text{ }\mu\text{A}$ | – | –2.5 | V |
| $V_{(P)G2-S}$ | gate 2-source cut-off voltage | $V_{G1-S} = 0$; $V_{DS} = 8\text{ V}$; $I_D = 20\text{ }\mu\text{A}$ | – | –2 | V |
| I_{DSS} | drain-source current | $V_{G2-S} = 4\text{ V}$; $V_{DS} = 8\text{ V}$; $V_{G1-S} = 0$ | 2 | 18 | mA |
| I_{G1-SS} | gate 1 cut-off current | $V_{G2-S} = V_{DS} = 0$; $V_{G1-S} = 5\text{ V}$ | – | 50 | nA |
| I_{G2-SS} | gate 2 cut-off current | $V_{G1-S} = V_{DS} = 0$; $V_{G2-S} = 5\text{ V}$ | – | 50 | nA |

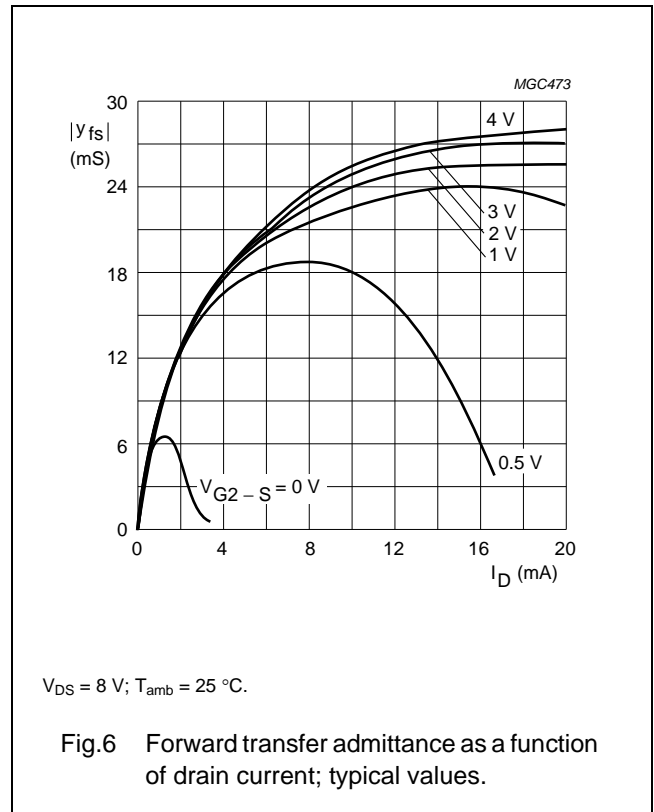
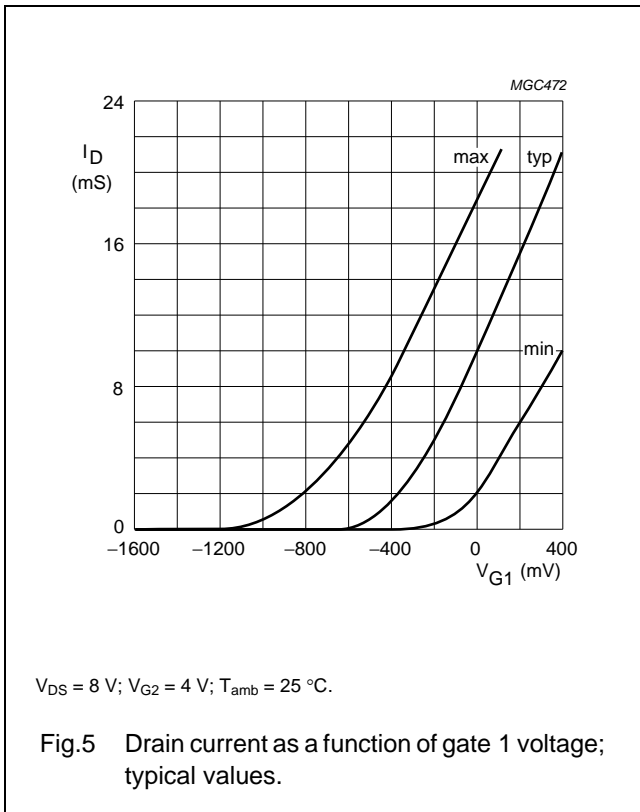
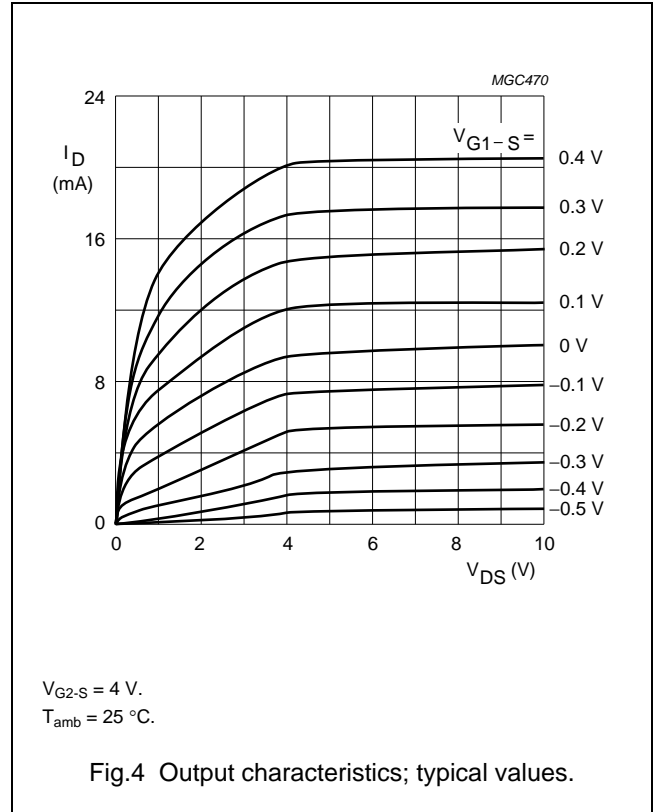
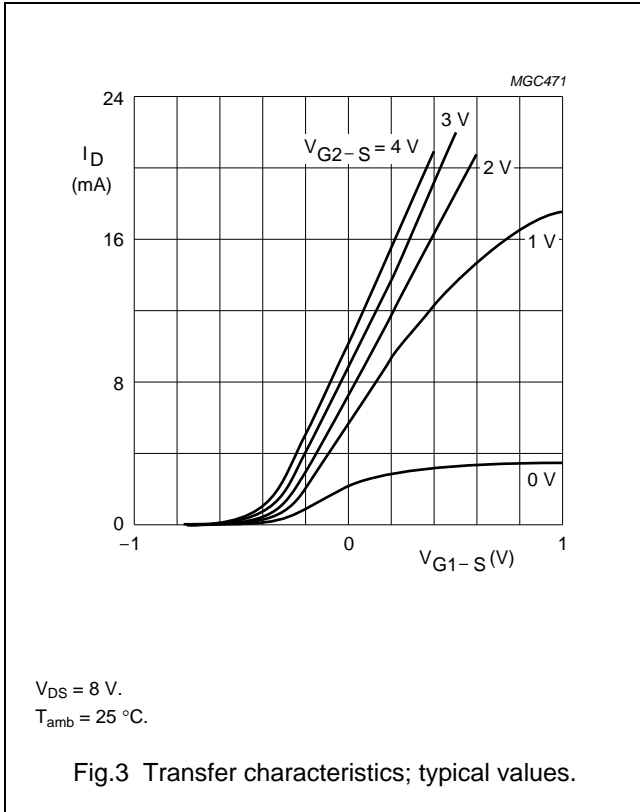
DYNAMIC CHARACTERISTICS

Common source; $T_{amb} = 25\text{ °C}$; $V_{G2-S} = 4\text{ V}$; $I_D = 10\text{ mA}$; $V_{DS} = 8\text{ V}$; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------|------------------------------|---|------|------|------|------|
| $ y_{fs} $ | forward transfer admittance | pulsed; $T_j = 25\text{ °C}$ | 22 | 25 | – | mS |
| C_{ig1-s} | input capacitance at gate 1 | $f = 1\text{ MHz}$ | – | 2.1 | 2.5 | pF |
| C_{ig2-s} | input capacitance at gate 2 | $f = 1\text{ MHz}$ | – | 1.2 | – | pF |
| C_{os} | drain-source capacitance | $f = 1\text{ MHz}$ | – | 1.05 | – | pF |
| C_{rs} | reverse transfer capacitance | $f = 1\text{ MHz}$ | – | 25 | – | fF |
| F | noise figure | $f = 200\text{ MHz}$; $G_S = 2\text{ mS}$; $B_S = B_{Sopt}$ | – | 0.6 | – | dB |
| | | $f = 800\text{ MHz}$; $G_S = 3.3\text{ mS}$; $B_S = B_{Sopt}$ | – | 1 | – | dB |

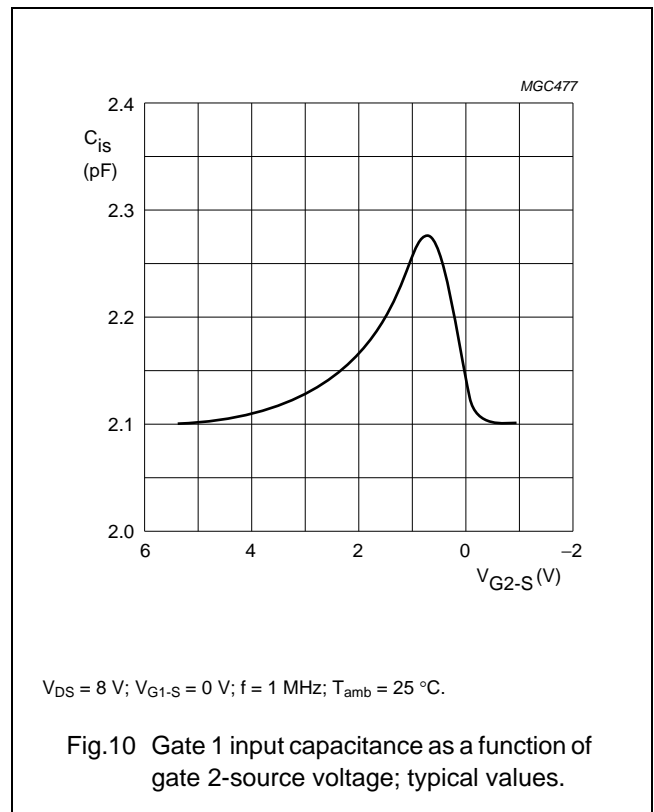
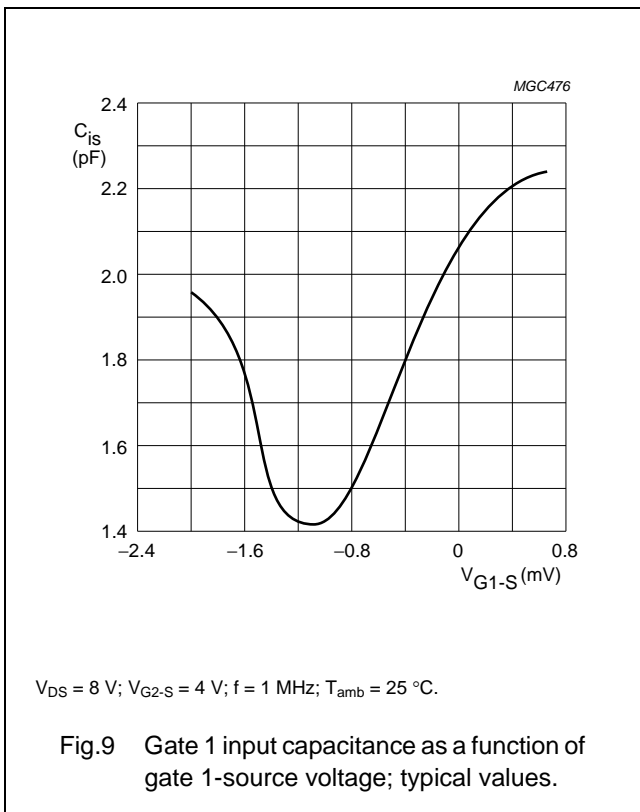
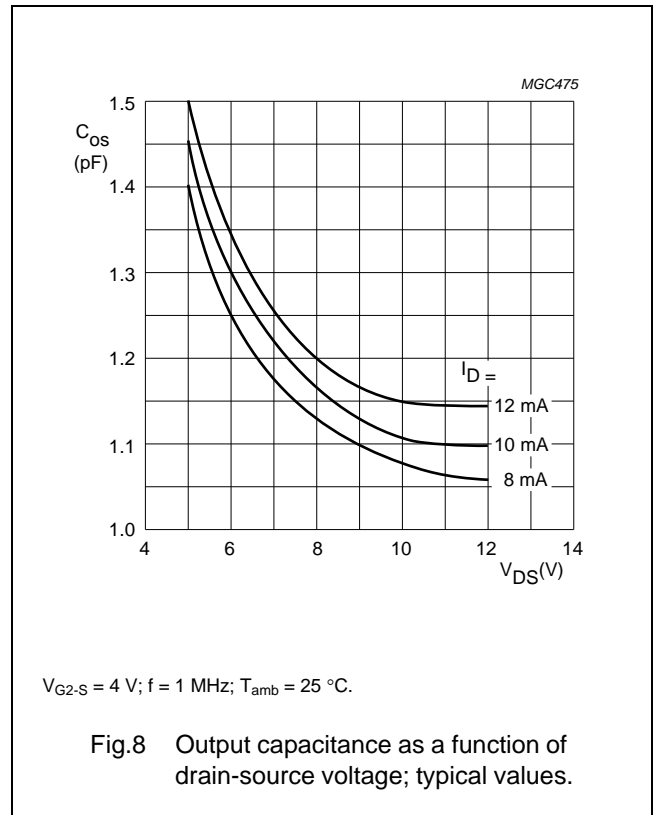
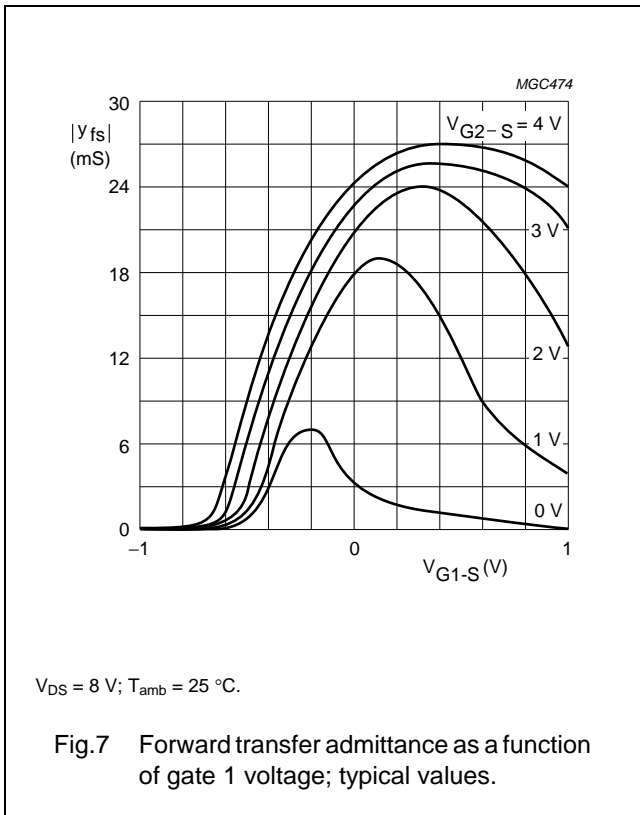
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BF998WR



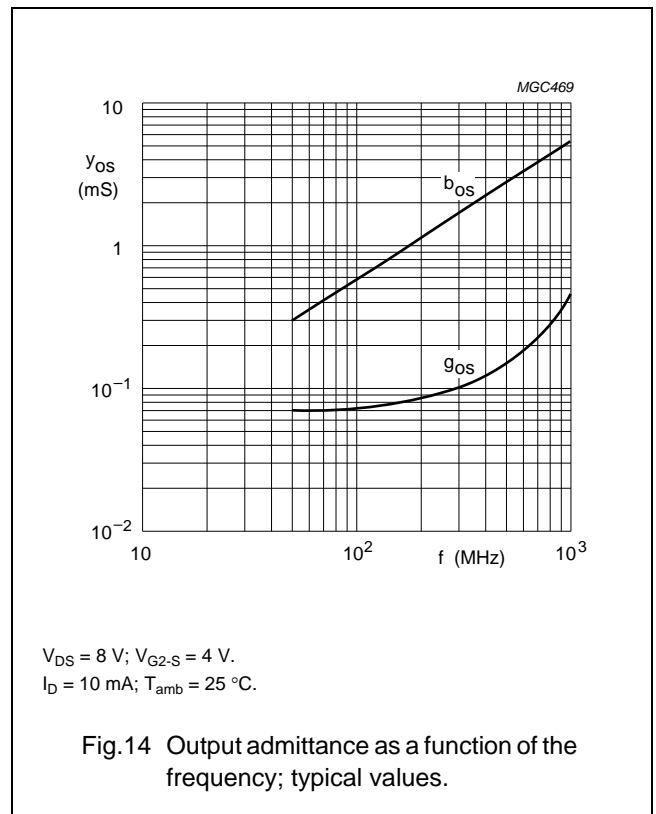
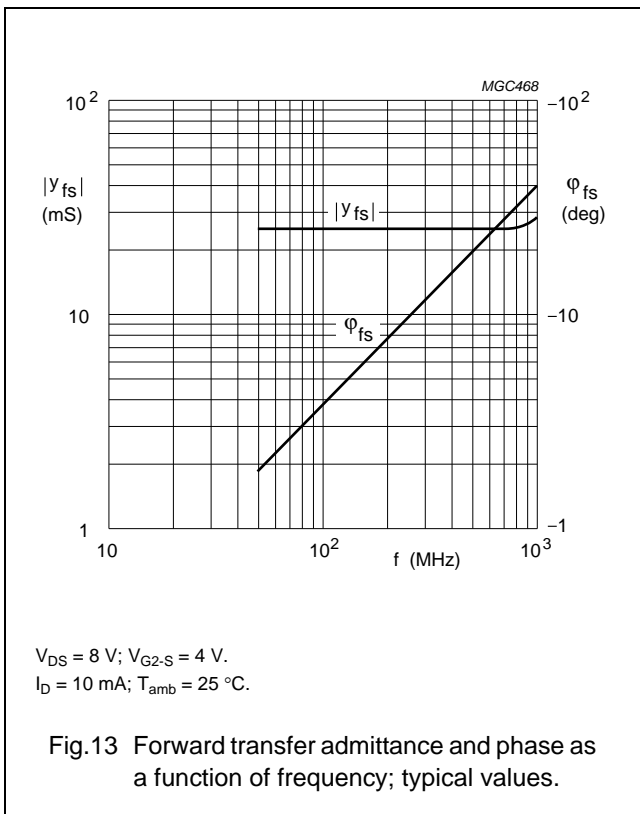
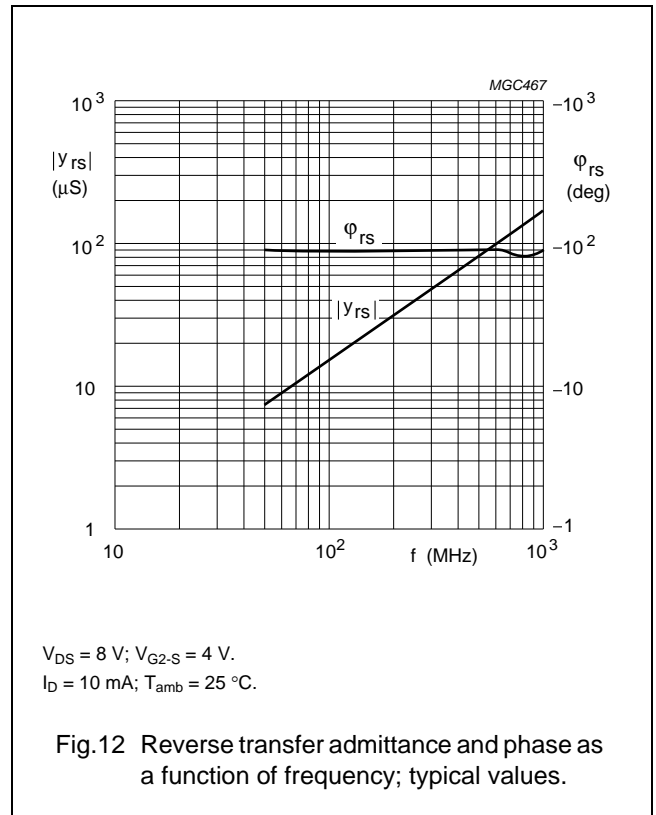
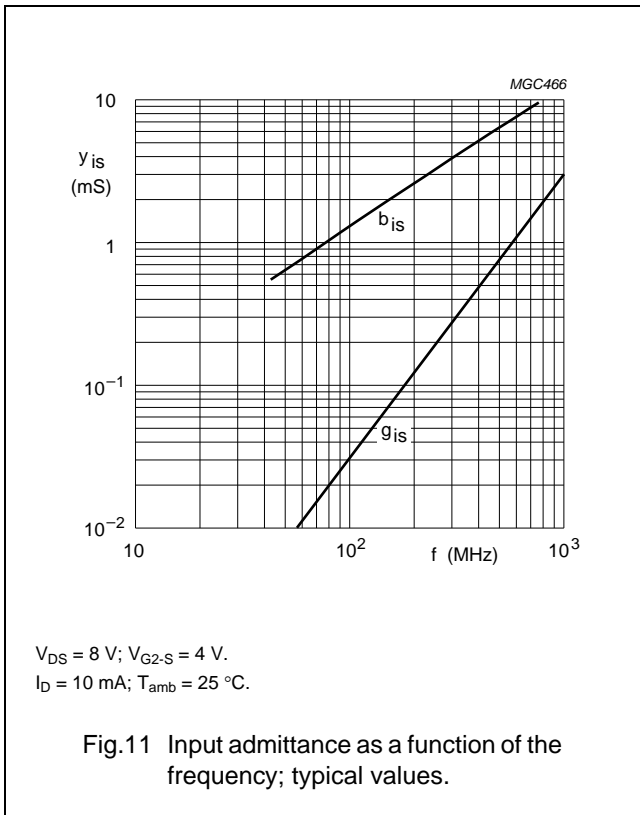
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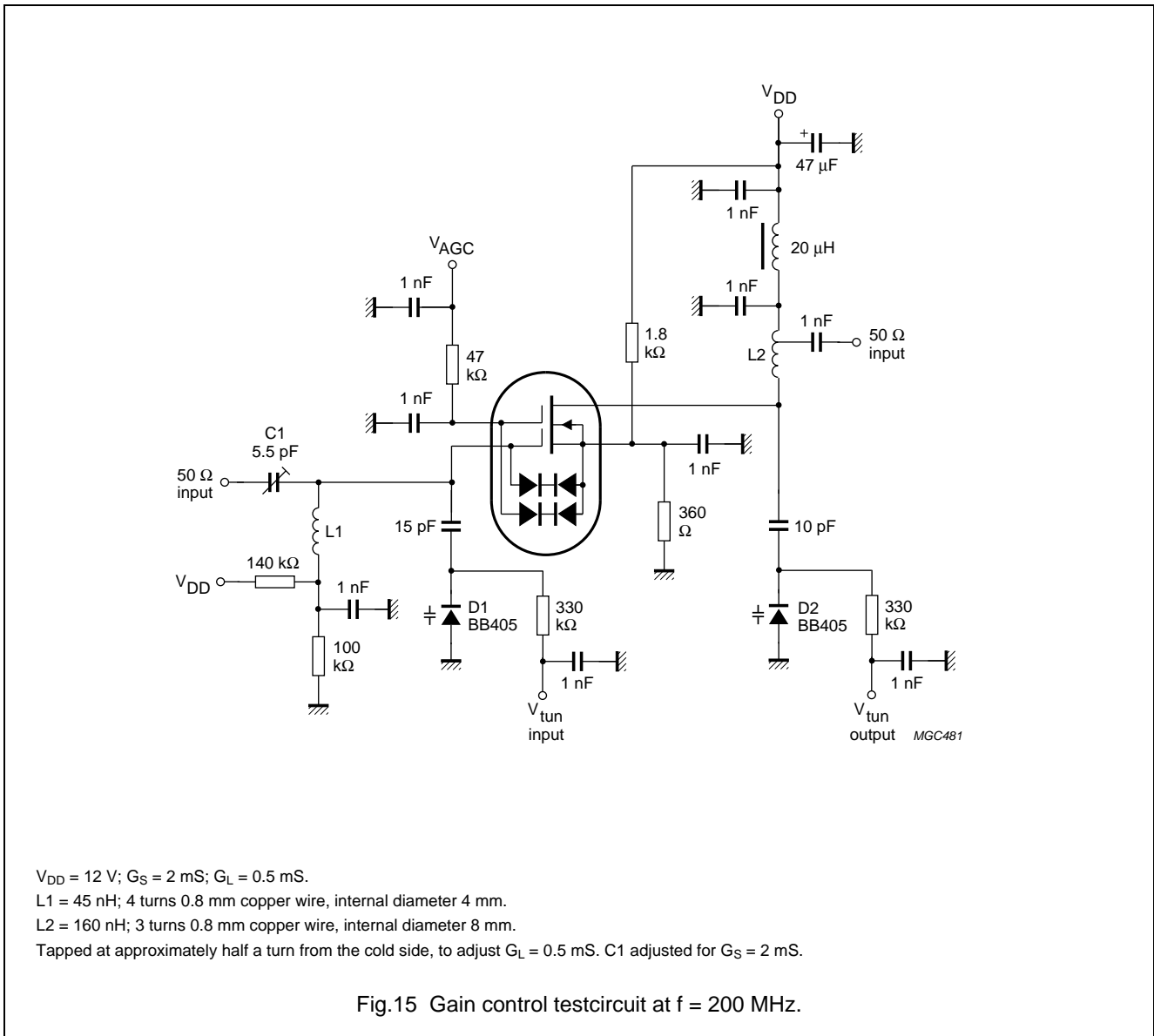
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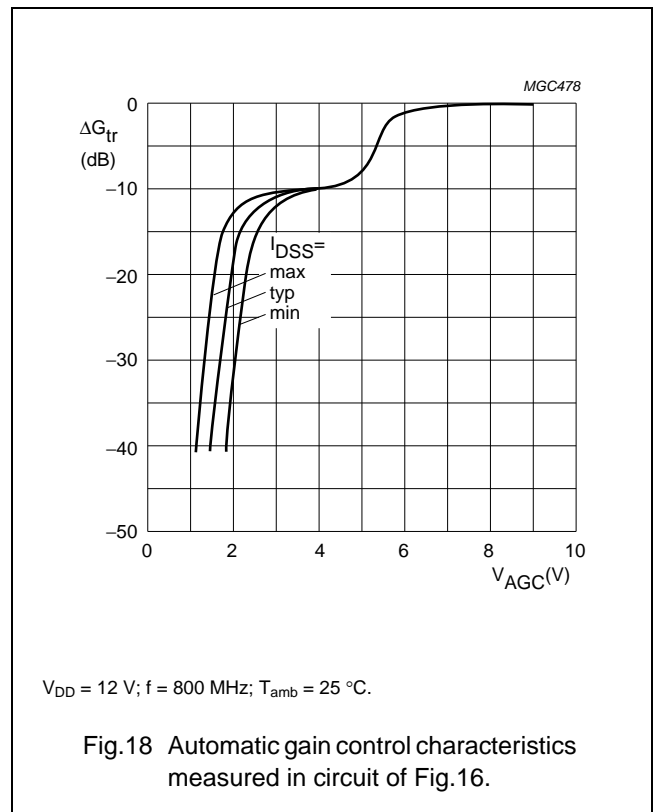
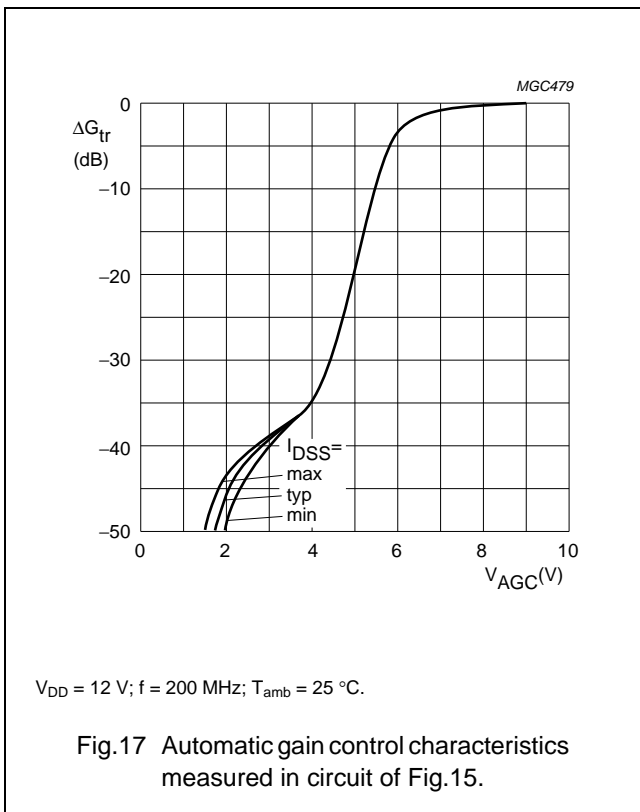
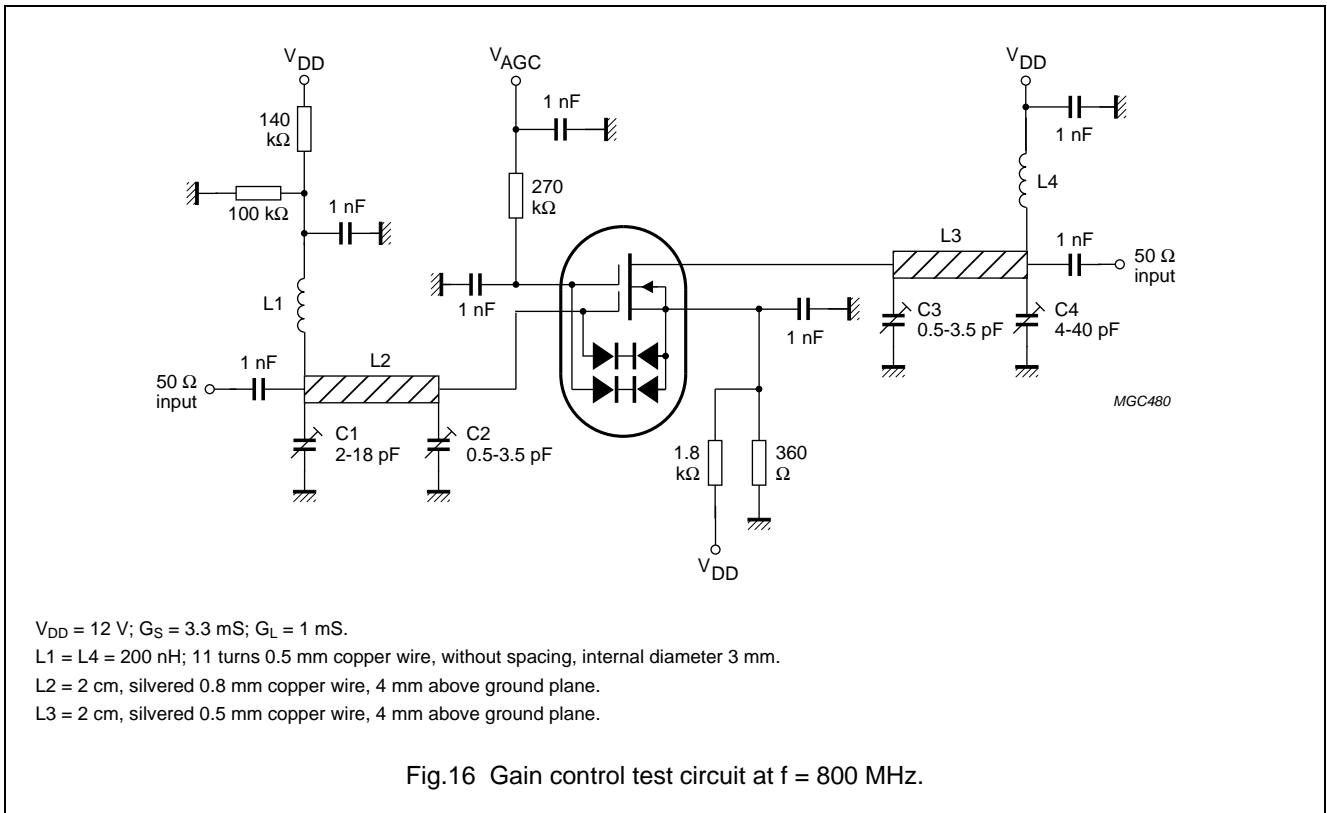
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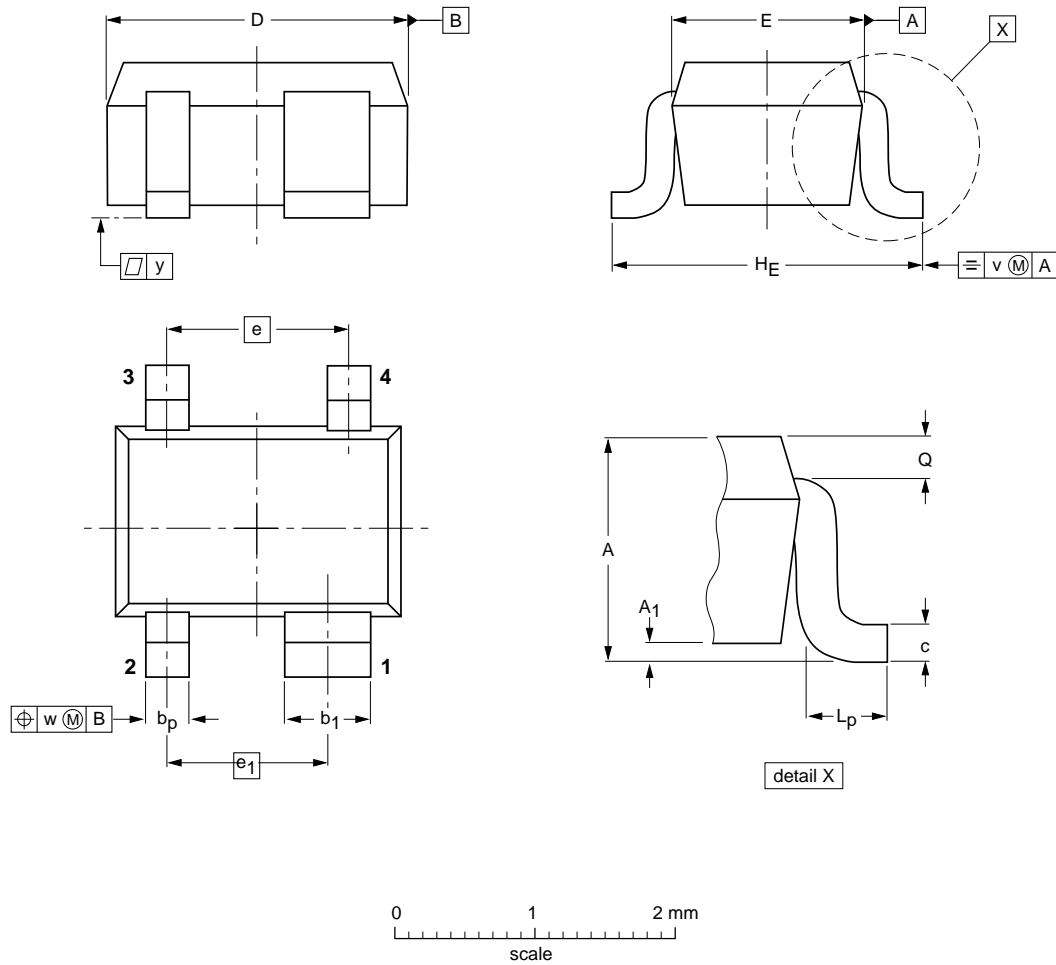
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BF998WR

PACKAGE OUTLINE

Plastic surface-mounted package; reverse pinning; 4 leads

SOT343R



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ max | b _p | b ₁ | c | D | E | e | e ₁ | H _E | L _p | Q | v | w | y |
|------|------------|-----------------------|----------------|----------------|--------------|------------|--------------|-----|----------------|----------------|----------------|--------------|-----|-----|-----|
| mm | 1.1 0.8 | 0.1 | 0.4 0.3 | 0.7 0.5 | 0.25 0.10 | 2.2 1.8 | 1.35 1.15 | 1.3 | 1.15 | 2.2 2.0 | 0.45 0.15 | 0.23 0.13 | 0.2 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|------|--|------------------------|----------------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT343R | | | | | | 97-05-21 06-03-16 |

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BF998WR

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|--------------------------------|-------------------------------|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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N-channel dual-gate MOS-FET

BF998WR

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