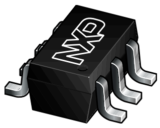


# PMBFJ620

## Dual N-channel field-effect transistor

**Rev. 3 — 6 March 2014** **Product data sheet**

## 1. Product profile

### 1.1 General description

Two N-channel symmetrical junction field-effect transistors in a SOT363 package.

**CAUTION**

This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

### 1.2 Features and benefits

- Two field effect transistors in a single package
- Low noise
- Interchangeability of drain and source connections
- High gain.

### 1.3 Applications

- AM input stage in car radios
- VHF amplifiers
- Oscillators and mixers.

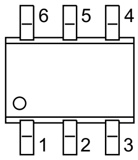
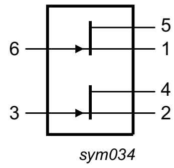
### 1.4 Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Per FET** | | | | | | |
| $V_{DS}$ | drain-source voltage | | - | - | ±25 | V |
| $V_{GSoff}$ | gate-source cut-off voltage | $V_{DS}$ = 10 V; $I_D$ = 1 μA | −2 | - | −6.5 | V |
| $I_{DSS}$ | drain current | $V_{GS}$ = 0 V; $V_{DS}$ = 10 V | 24 | - | 60 | mA |
| $P_{tot}$ | total power dissipation | $T_s \leq 90$ °C | - | - | 190 | mW |
| $\lvert y_{fs} \rvert$ | forward transfer admittance | $V_{DS}$ = 10 V; $I_D$ = 10 mA | 10 | - | - | mS |

## 2. Pinning information

**Table 2. Discrete pinning information**

| Pin | Description | Simplified outline | Symbol |
|---|---|---|---|
| 1 | source (1) |   |   |
| 2 | source (2) | | |
| 3 | gate (2) | | |
| 4 | drain (2) | | |
| 5 | drain (1) | | |
| 6 | gate (1) | | |

## 3. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMBFJ620 | - | plastic surface-mounted package; 6 leads | SOT363 |

## 4. Marking

**Table 4. Marking**

| Type number | Marking code [1] |
|---|---|
| PMBFJ620 | A8* |

[1] * = p: made in Hong Kong.
* = t: made in Malaysia.
* = W: made in China.

# 5. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

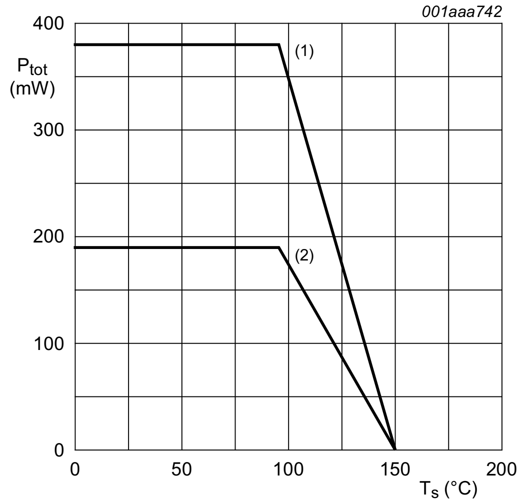
| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| **Per FET** | | | | | |
| $V_{DS}$ | drain-source voltage | | - | ±25 | V |
| $V_{GSO}$ | gate-source voltage | open drain | - | –25 | V |
| $V_{GDO}$ | gate-drain voltage | open source | - | –25 | V |
| $I_G$ | forward gate current (DC) | | - | 50 | mA |
| $P_{tot}$ | total power dissipation | $T_s \leq 90$ °C | - | 190 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | - | 150 | °C |

# 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol | Parameter | Conditions | Typ | Unit |
|---|---|---|---|---|
| $R_{th(j-s)}$ | thermal resistance from junction to soldering points | single loaded [1] | 315 | K/W |
| | | double loaded [1] | 160 | K/W |

[1] $T_s$ is the temperature at the soldering point of the gate pins, see Figure 1.




(1) Double loaded.

(2) Single loaded.

**Fig 1. Power derating curve.**

# 7. Static characteristics

**Table 7. Characteristics**

*$T_j$ = 25 °C unless otherwise specified.*

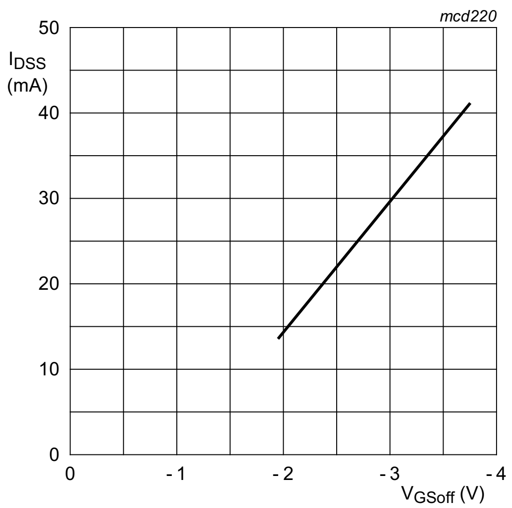
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Per FET** | | | | | | |
| $V_{(BR)GSS}$ | gate-source breakdown voltage | $I_G$ = −1 μA; $V_{DS}$ = 0 V | −25 | - | - | V |
| $V_{GSoff}$ | gate-source cut-off voltage | $I_D$ = 1 μA; $V_{DS}$ = 10 V | −2 | - | −6.5 | V |
| $V_{GSS}$ | gate-source forward voltage | $I_G$ = 1 mA; $V_{DS}$ = 0 V | - | - | 1 | V |
| $I_{DSS}$ | drain-source leakage current | $V_{DS}$ = 10 V; $V_{GS}$ = 0 V | 24 | - | 60 | mA |
| $I_{GSS}$ | gate-source leakage current | $V_{GS}$ = −15 V; $V_{DS}$ = 0 V | - | - | −1 | nA |
| $R_{DSon}$ | drain-source on-state resistance | $V_{GS}$ = 0 V; $V_{DS}$ = 100 mV | - | 50 | - | Ω |
| $\lvert y_{fs} \rvert$ | common source forward transfer admittance | $I_D$ = 10 mA; $V_{DS}$ = 10 V | 10 | - | - | mS |
| $\lvert y_{os} \rvert$ | common source output admittance | $I_D$ = 10 mA; $V_{DS}$ = 10 V | - | - | 250 | μS |

# 8. Dynamic characteristics

**Table 8. Characteristics**

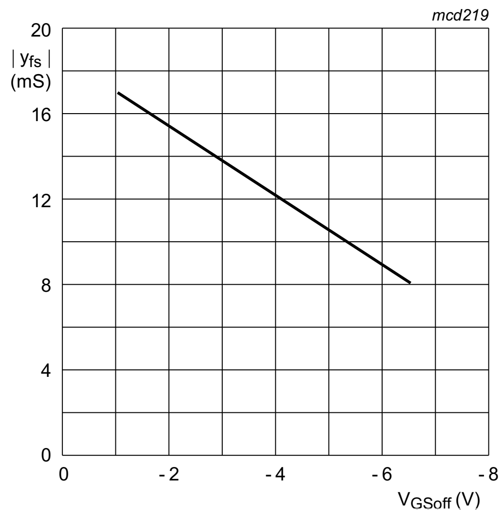
*$T_j$ = 25 °C unless otherwise specified.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Per FET** | | | | | | |
| $C_{iss}$ | input capacitance | $V_{DS}$ = 10 V; $V_{GS}$ = −10 V; f =1 MHz | - | 3 | 5 | pF |
| | | $V_{DS}$ = 10 V; $V_{GS}$ = 0 V; $T_{amb}$ = 25 °C | - | 6 | - | pF |
| $C_{rss}$ | reverse transfer capacitance | $V_{DS}$ = 0 V; $V_{GS}$ = −10 V; f = 1 MHz | - | 1.3 | 2.5 | pF |
| $g_{is}$ | common source input conductance | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 100 MHz | - | 200 | - | μS |
| | | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 450 MHz | - | 3 | - | mS |
| $g_{fs}$ | common source transfer conductance | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 100 MHz | - | 13 | - | mS |
| | | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 450 MHz | - | 12 | - | mS |
| $g_{rs}$ | common source reverse conductance | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 100 MHz | - | −30 | - | μS |
| | | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 450 MHz | - | −450 | - | μS |
| $g_{os}$ | common source output conductance | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 100 MHz | - | 150 | - | μS |
| | | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 450 MHz | - | 400 | - | μS |
| $V_n$ | equivalent input noise voltage | $V_{DS}$ = 10 V; $I_D$ = 10 mA; f = 100 Hz | - | 6 | - | nV/√Hz |



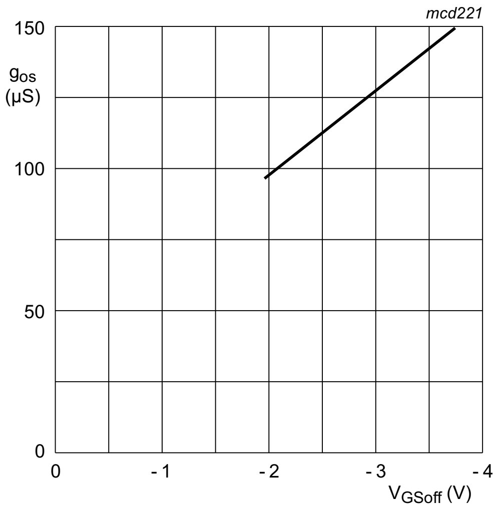

$V_{DS}$ = 10 V; $T_j$ = 25 °C.

**Fig 2. Drain current as a function of gate-source cut-off voltage; typical values.**



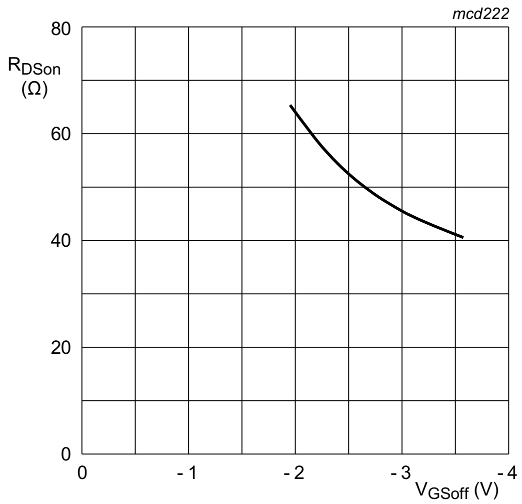

$V_{DS}$ = 10 V; $I_D$ = 10 mA; $T_j$ = 25 °C.

**Fig 3. Common source forward transfer admittance as a function of gate-source cut-off voltage; typical values.**



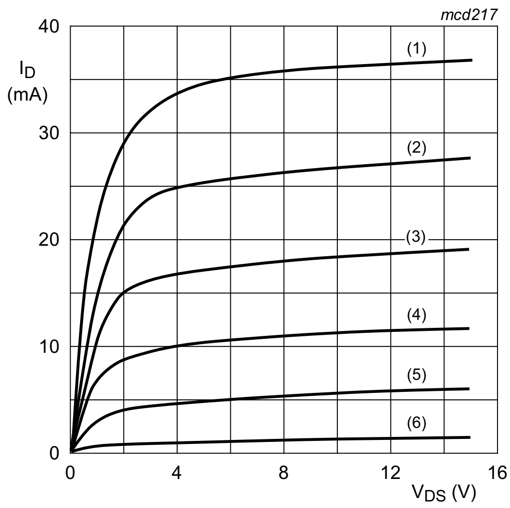

$V_{DS}$ = 10 V; $I_D$ = 10 mA; $T_j$ = 25 °C.

**Fig 4. Common-source output conductance as a function of gate-source cut-off voltage; typical values.**




$V_{DS}$ = 100 mV; $V_{GS}$ = 0 V; $T_j$ = 25 °C.

**Fig 5. Drain-source on-state resistance as a function of gate-source cut-off voltage; typical values.**




$T_j$ = 25 °C.

(1) $V_{GS}$ = 0 V

(2) $V_{GS}$ = −0.5 V

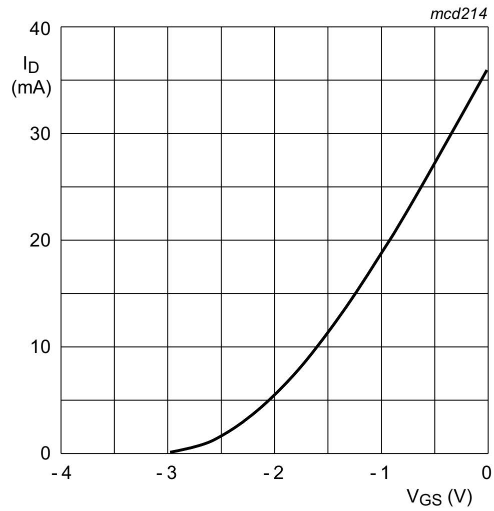
(3) $V_{GS}$ = −1 V

(4) $V_{GS}$ = −1.5 V

(5) $V_{GS}$ = −2 V

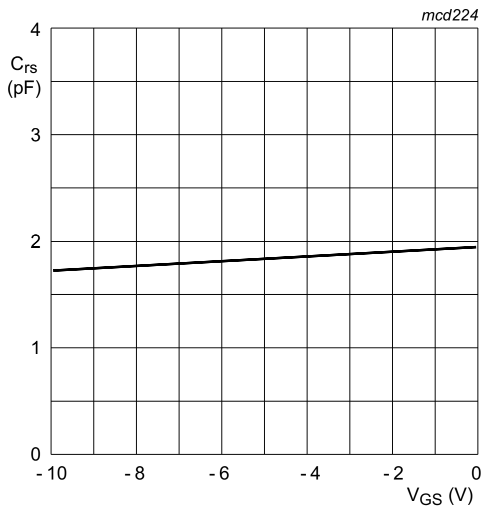
(6) $V_{GS}$ = −2.5 V

**Fig 6. Typical output characteristics.**



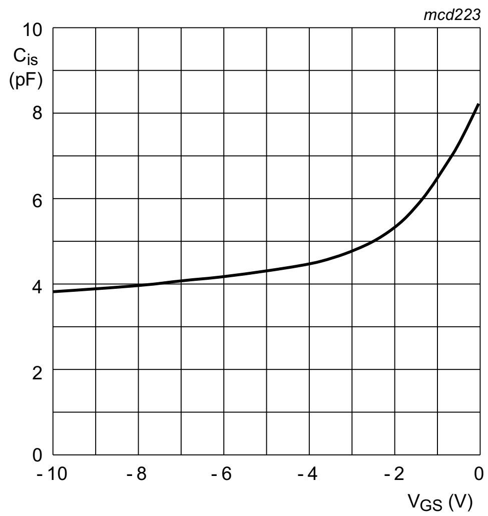

$V_{DS}$ = 10 V; $T_j$ = 25 °C.

**Fig 7. Typical transfer characteristics.**



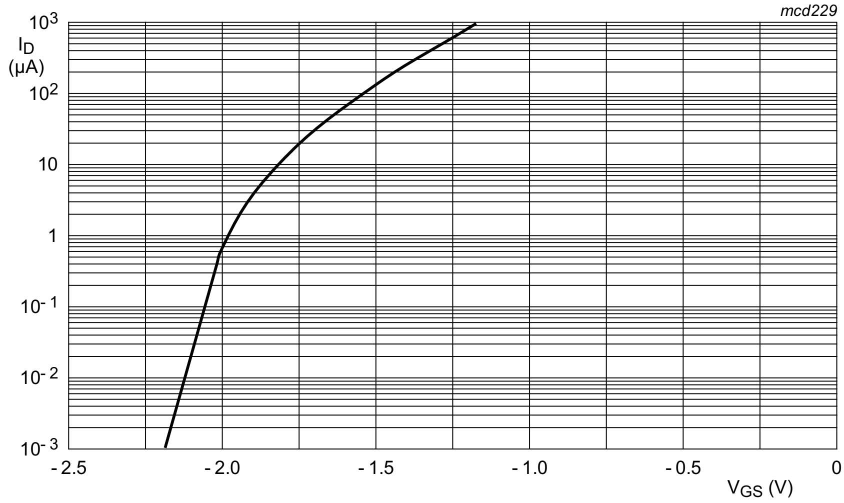

$V_{DS}$ = 10 V; $T_j$ = 25 °C.

**Fig 8. Reverse transfer capacitance as a function of gate-source voltage; typical values.**



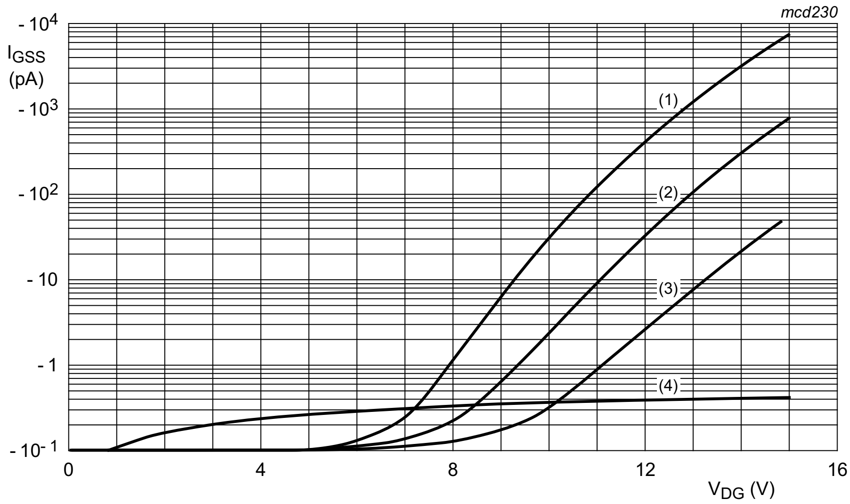

$V_{DS}$ = 10 V; $T_j$ = 25 °C.

**Fig 9. Input capacitance as a function of gate-source voltage; typical values.**




$V_{DS}$ = 10 V; $T_j$ = 25 °C.

**Fig 10. Drain current as a function of gate-source voltage; typical values.**




$T_j$ = 25 °C.

(1) $I_D$ = 10 mA

(2) $I_D$ = 1 mA

(3) $I_D$ = 100 μA

(4) $I_{GSS}$

**Fig 11. Gate current as a function of drain-gate voltage; typical values.**

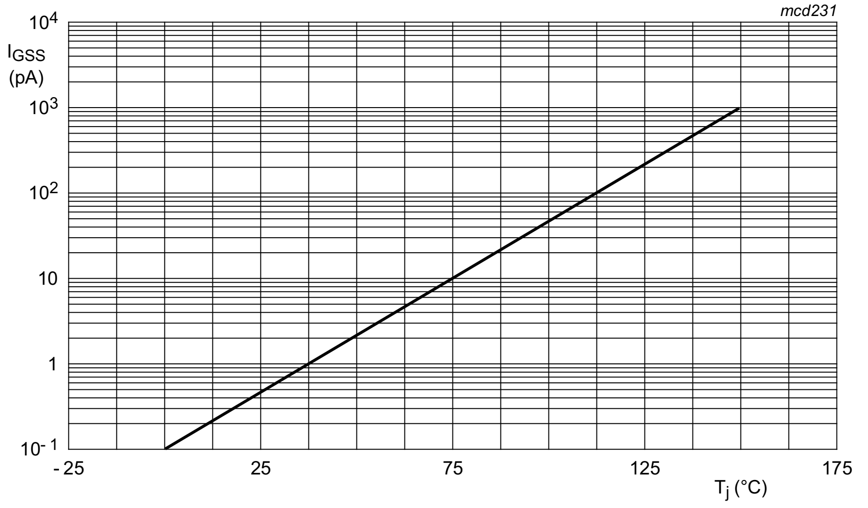
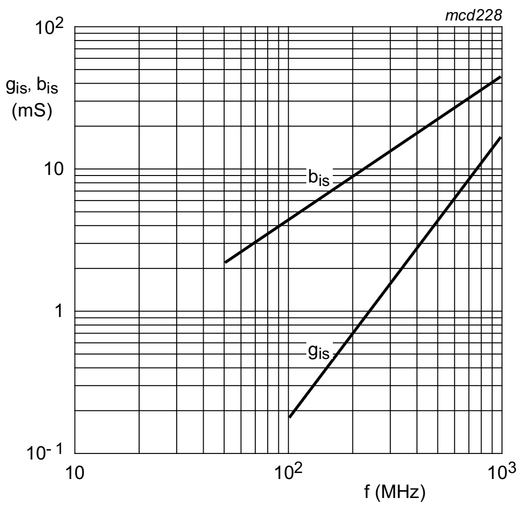
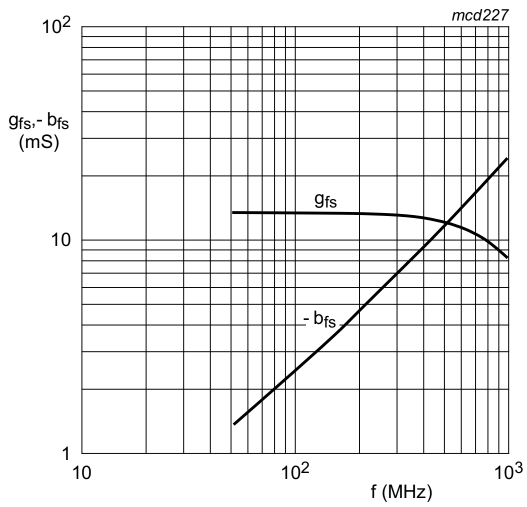



**Fig 12. Gate current as a function of junction temperature; typical values.**



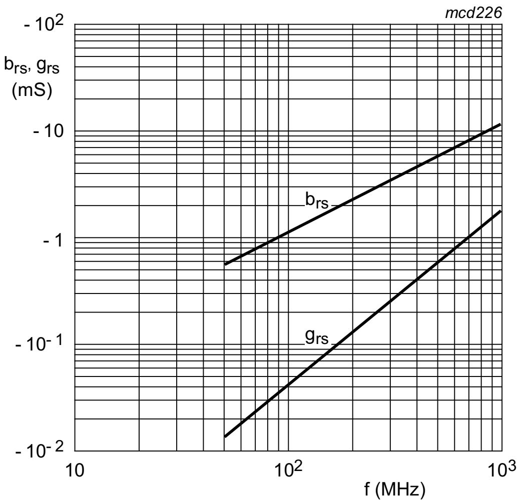

$V_{DS}$ = 10 V; $I_D$ = 10 mA; $T_{amb}$ = 25 °C.

**Fig 13. Input admittance as a function of frequency; typical values.**



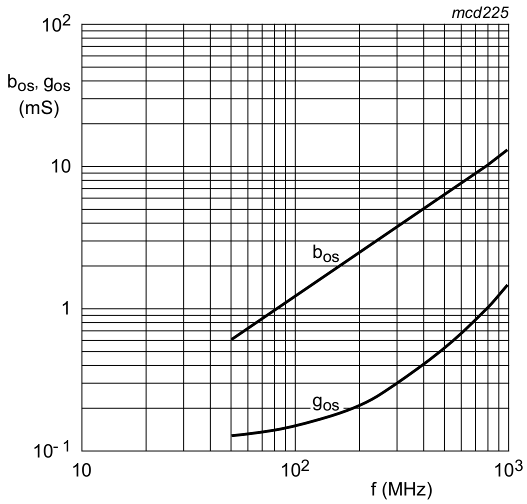

$V_{DS}$ = 10 V; $I_D$ = 10 mA; $T_{amb}$ = 25 °C.

**Fig 14. Forward transfer admittance as a function of frequency; typical values.**




$V_{DS}$ = 10 V; $I_D$ = 10 mA; $T_{amb}$ = 25 °C.

**Fig 15. Reverse transfer admittance as a function of frequency; typical values.**

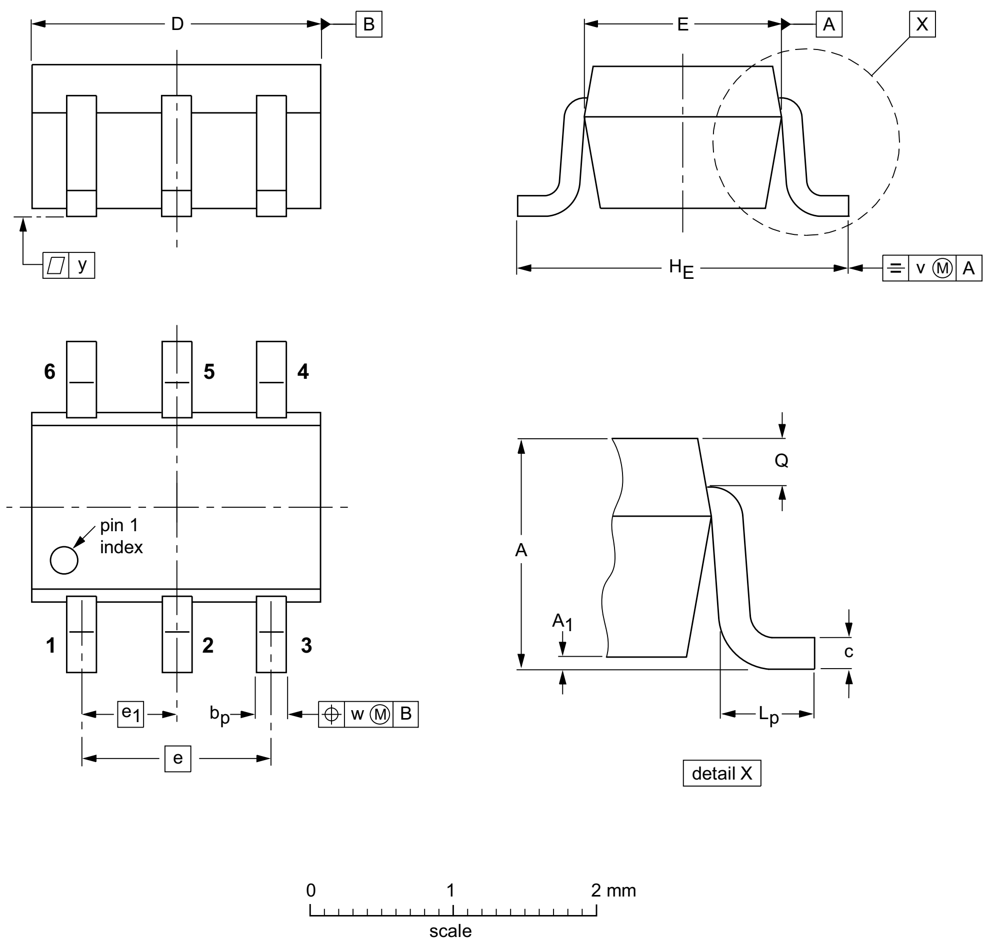



$V_{DS}$ = 10 V; $I_D$ = 10 mA; $T_{amb}$ = 25 °C.

**Fig 16. Output admittance as a function of frequency; typical values.**

## 9. 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<br>0.8 | 0.1 | 0.30<br>0.20 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.25<br>0.15 | 0.2 | 0.2 | 0.1 |

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

Fig 17. Package outline.

## 10. Revision history

**Table 9. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMBFJ620 v.3 | 20140306 | Product data sheet | - | PMBFJ620 v.2 |
| Modifications: | • Table 5 on page 3: correction parameter $V_{GDO}$<br>• Figure 6 on page 6: figure notes list added<br>• Figure 11 on page 7: figure notes list added | | | |
| PMBFJ620 v.2 | 20110915 | Product data sheet | - | PMBFJ620 v.1 |
| PMBFJ620 v.1<br>(9397 750 13006) | 20040511 | Product data sheet | - | - |

# 11. Legal information

## 11.1 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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## 12. Contact information

For more information, please visit: **http://www.nxp.com**

For sales office addresses, please send an email to: **salesaddresses@nxp.com**

## 13. Contents





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Date of release: 6 March 2014

Document identifier: PMBFJ620