

# DATA SHEET

## **J308; J309; J310**

**N-channel silicon field-effect  
transistors**

Product specification  
Supersedes data of April 1995  
File under Discrete Semiconductors, SC07

1996 Jul 30

# N-channel silicon field-effect transistors

# J308; J309; J310

### FEATURES

- Low noise
- Interchangeability of drain and source connections
- High gain.

### APPLICATIONS

- AM input stage in car radios
- UHF/VHF amplifiers, oscillators and mixers.

### DESCRIPTION

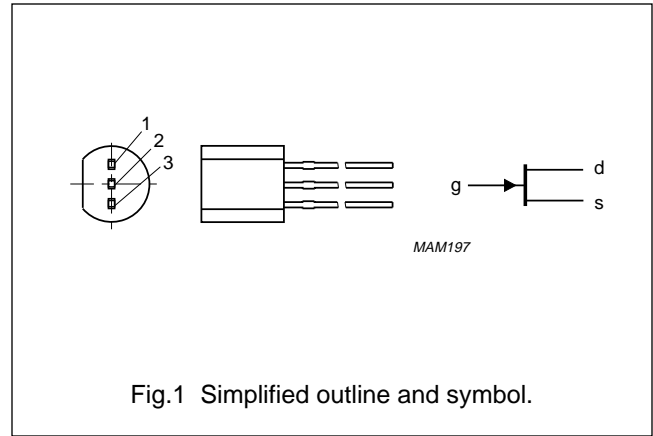
N-channel symmetrical silicon junction field-effect transistors in a TO-92 package.

### PINNING - TO-92

PIN	SYMBOL	DESCRIPTION
1	g	gate
2	s	source
3	d	drain

**CAUTION**

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



### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	±25	V
$V_{GSoff}$	gate-source cut-off voltage	$V_{DS} = 10\text{ V}; I_D = 1\ \mu\text{A}$			
	J308		–1	–6.5	V
	J309		–1	–4	V
	J310		–2	–6.5	V
$I_{DSS}$	drain current	$V_{GS} = 0; V_{DS} = 10\text{ V}$			
	J308		12	60	mA
	J309		12	30	mA
	J310		24	60	mA
$P_{tot}$	total power dissipation	up to $T_{amb} = 50\text{ °C}$	–	400	mW
$ y_{fs} $	forward transfer admittance	$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}$	10	–	mS

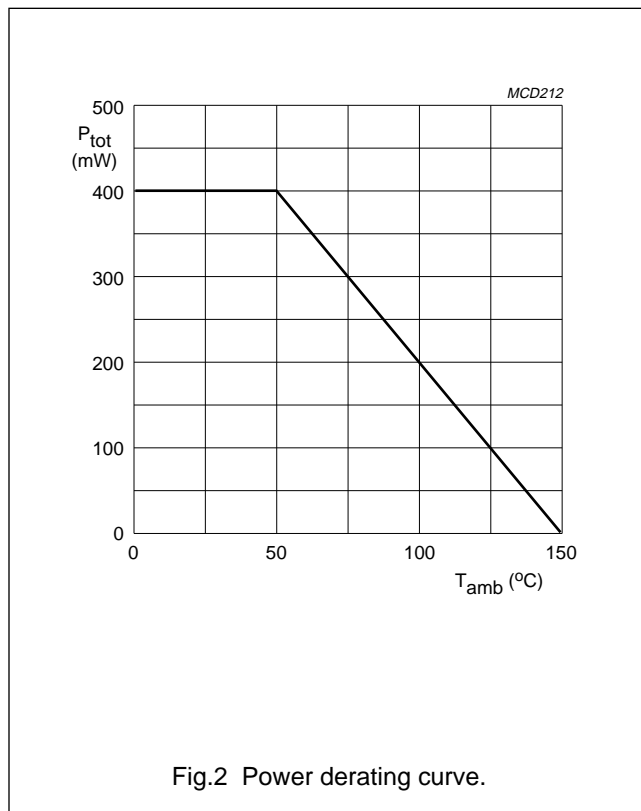
## N-channel silicon field-effect transistors

J308; J309; J310

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	$\pm 25$	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	up to $T_{amb} = 50\text{ }^{\circ}\text{C}$	–	400	mW
$T_{stg}$	storage temperature		–65	150	$^{\circ}\text{C}$
$T_j$	operating junction temperature		–	150	$^{\circ}\text{C}$



## N-channel silicon field-effect transistors

J308; J309; J310

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient; note 1	250	K/W

## Note

1. Device mounted on an FR4 printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm × 10 mm.

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = -1\ \mu\text{A}$ ; $V_{DS} = 0$	-25	–	–	V
$V_{GSoff}$	gate-source cut-off voltage	$I_D = 1\ \mu\text{A}$ ; $V_{DS} = 10\ \text{V}$				V
	J308		-1	–	-6.5	V
	J309		-1	–	-4	V
	J310		-2	–	-6.5	V
$V_{GSS}$	gate-source forward voltage	$I_G = 1\ \text{mA}$ ; $V_{DS} = 0$	–	–	1	V
$I_{DSS}$	drain current	$V_{DS} = 10\ \text{V}$ ; $V_{GS} = 0$				
	J308		12	–	60	mA
	J309		12	–	30	mA
	J310		24	–	60	mA
$I_{GSS}$	gate leakage current	$V_{GS} = -15\ \text{V}$ ; $V_{DS} = 0$	–	–	-1	nA
$R_{DSon}$	drain-source on-state resistance	$V_{GS} = 0$ ; $V_{DS} = 100\ \text{mV}$	–	50	–	$\Omega$
$ y_{fs} $	forward transfer admittance	$I_D = 10\ \text{mA}$ ; $V_{DS} = 10\ \text{V}$	10	–	–	mS
$ y_{os} $	common source output admittance	$I_D = 10\ \text{mA}$ ; $V_{DS} = 10\ \text{V}$	–	–	250	$\mu\text{S}$

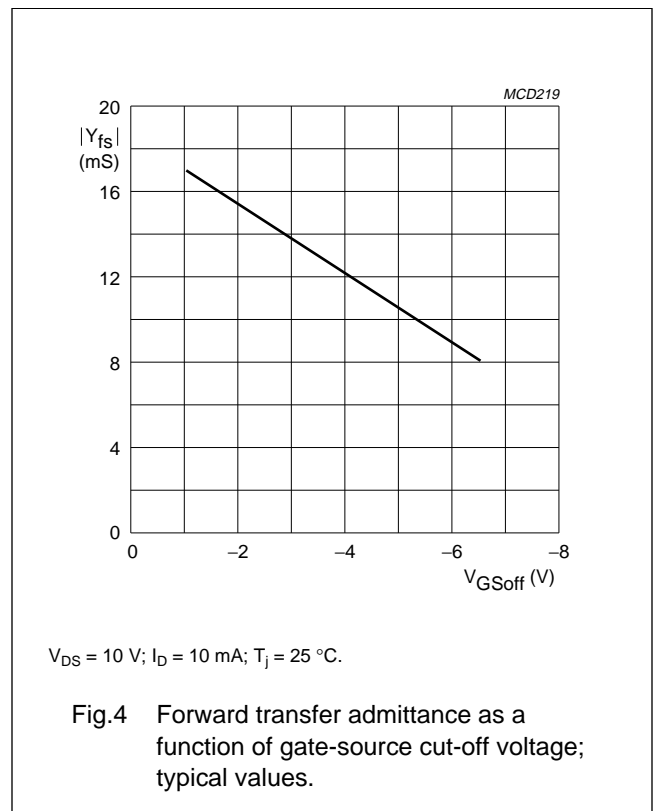
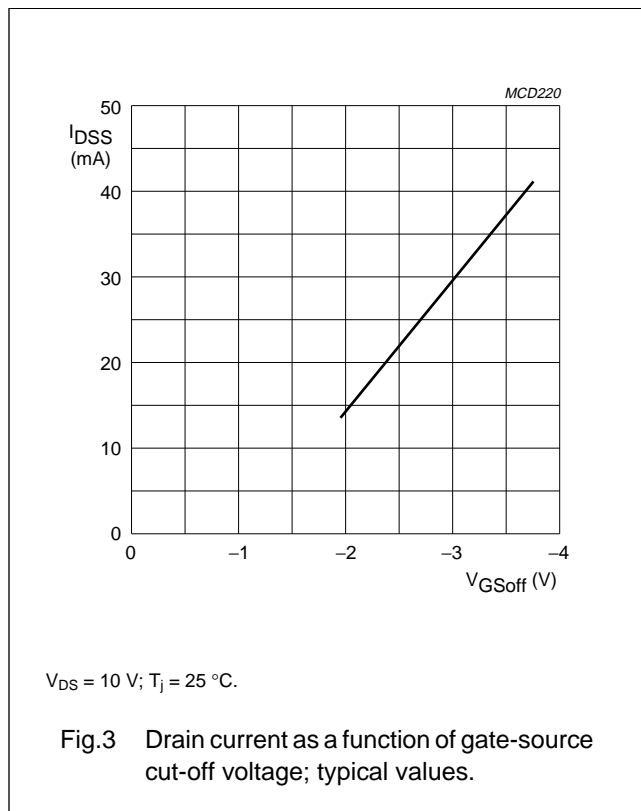
N-channel silicon field-effect transistors

J308; J309; J310

**DYNAMIC CHARACTERISTICS**

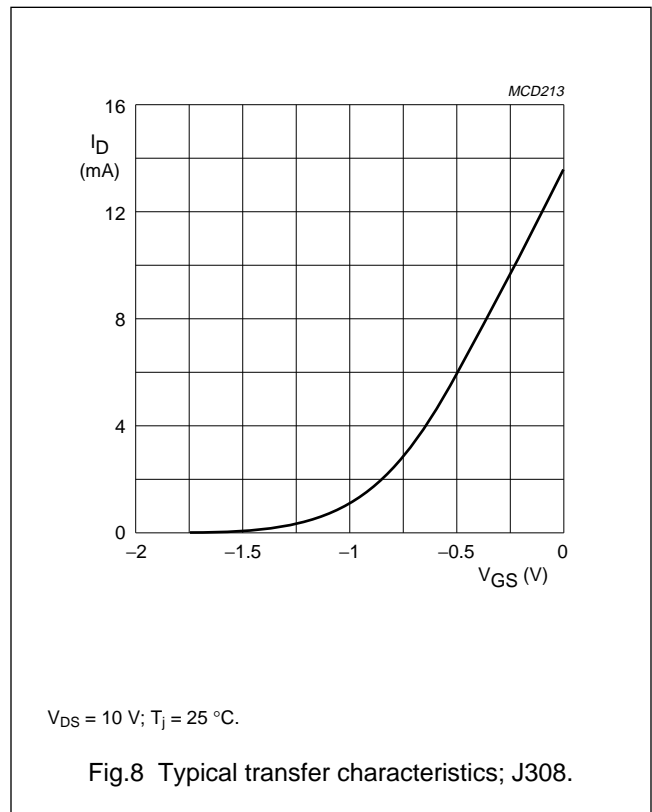
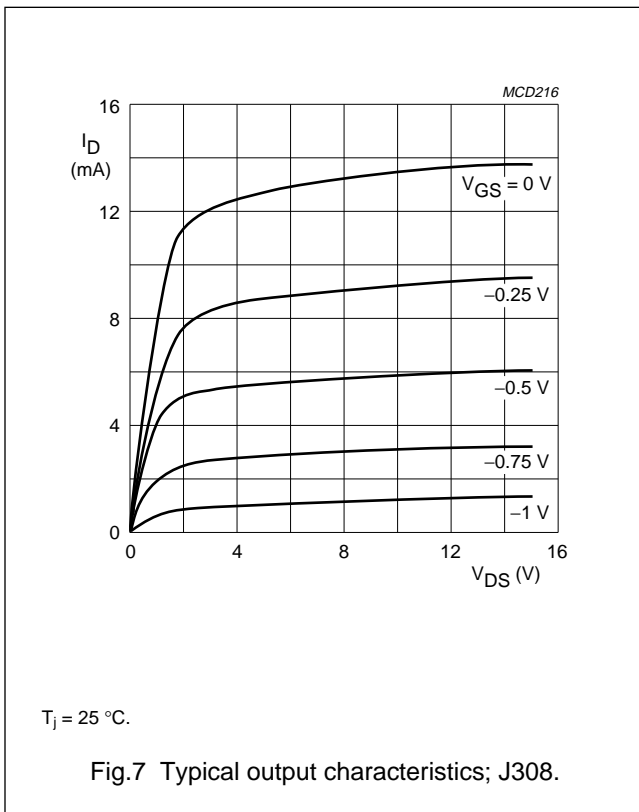
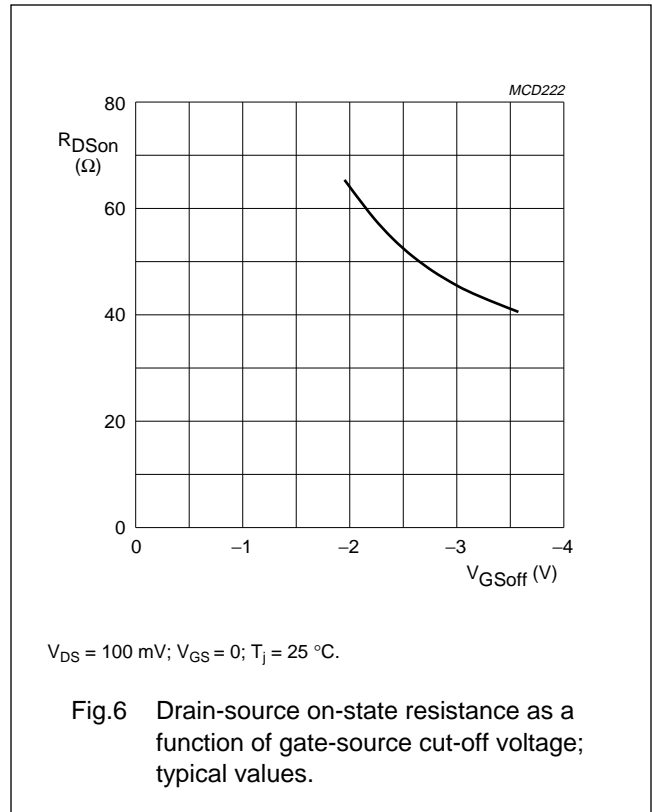
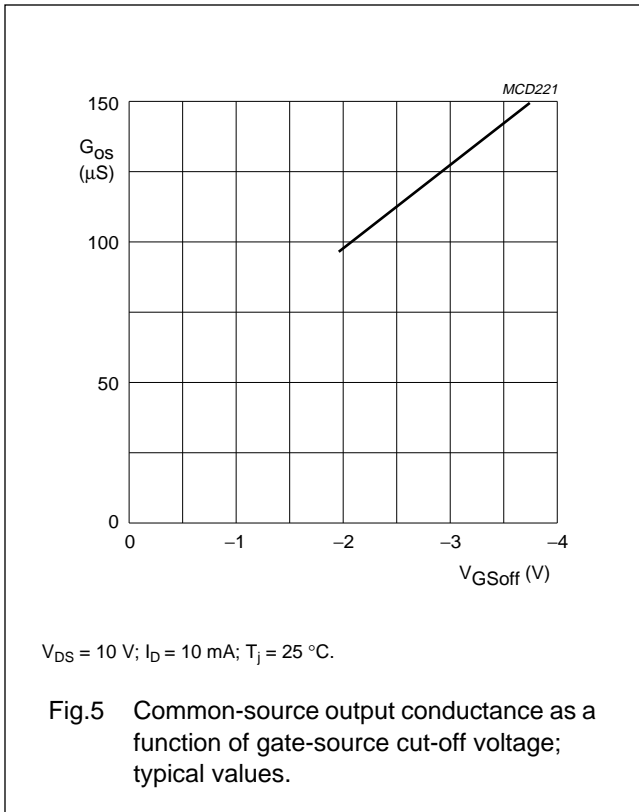
$T_j = 25\text{ }^\circ\text{C}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$C_{is}$	input capacitance	$V_{DS} = 10\text{ V}; V_{GS} = -10\text{ V}; f = 1\text{ MHz}$	3	5	pF
		$V_{DS} = 10\text{ V}; V_{GS} = 0; T_{amb} = 25\text{ }^\circ\text{C}$	6	–	pF
$C_{rs}$	reverse transfer capacitance	$V_{DS} = 0; V_{GS} = -10\text{ V}; f = 1\text{ MHz}$	1.3	2.5	pF
$g_{is}$	common source input conductance	$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 100\text{ MHz}$	200	–	$\mu\text{S}$
		$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 450\text{ MHz}$	3	–	mS
$g_{fs}$	common source transfer conductance	$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 100\text{ MHz}$	13	–	mS
		$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 450\text{ MHz}$	12	–	mS
$g_{rs}$	common source reverse conductance	$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 100\text{ MHz}$	–30	–	$\mu\text{S}$
		$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 450\text{ MHz}$	–450	–	$\mu\text{S}$
$g_{os}$	common source output conductance	$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 100\text{ MHz}$	150	–	$\mu\text{S}$
		$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 450\text{ MHz}$	400	–	$\mu\text{S}$
$V_n$	equivalent input noise voltage	$V_{DS} = 10\text{ V}; I_D = 10\text{ mA}; f = 100\text{ Hz}$	6	–	nV/ $\sqrt{\text{Hz}}$



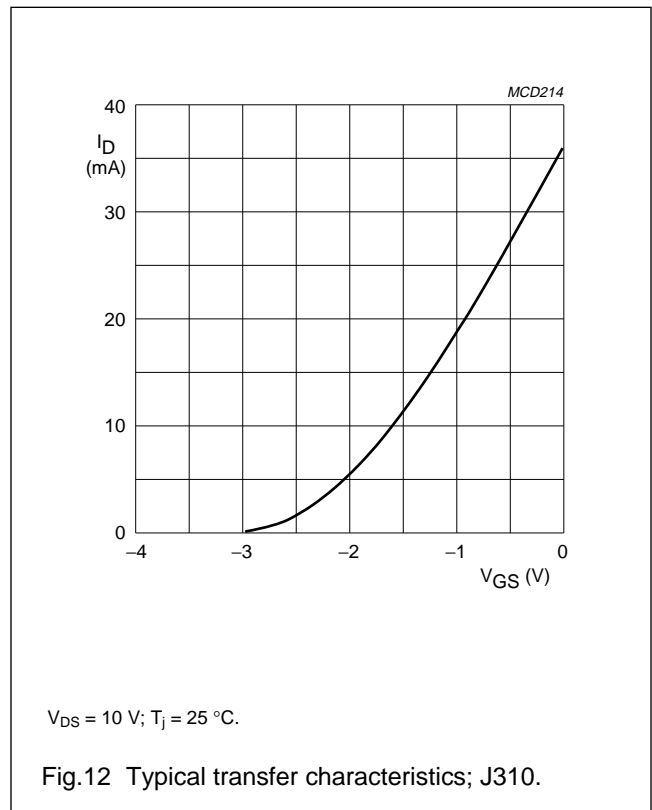
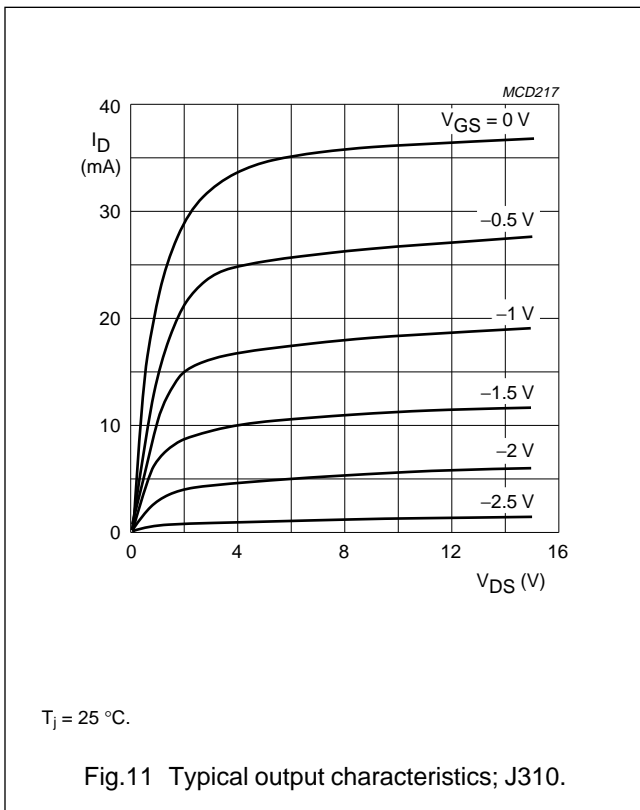
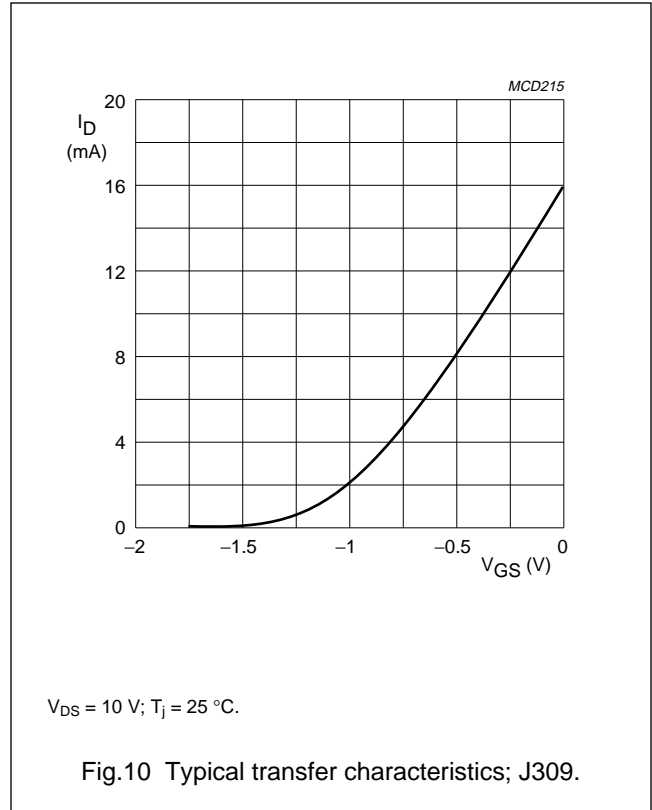
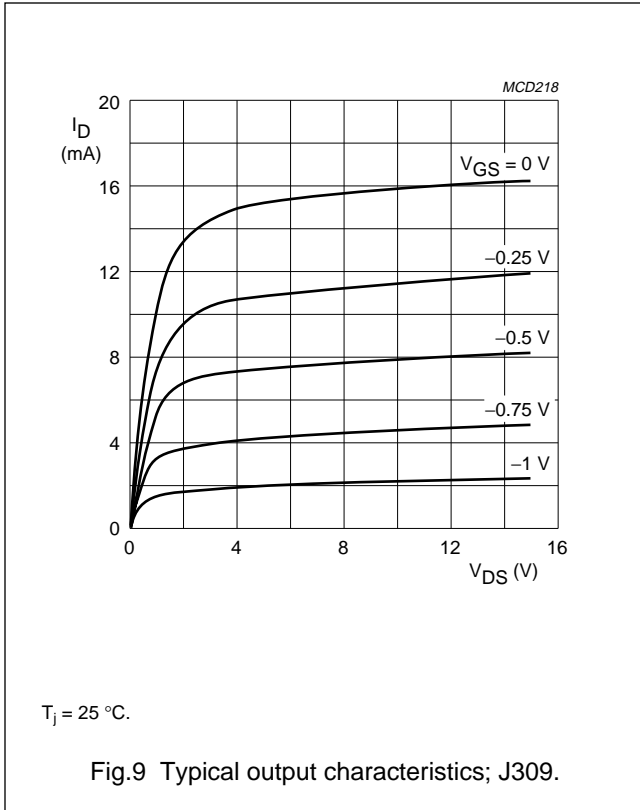
N-channel silicon field-effect transistors

J308; J309; J310



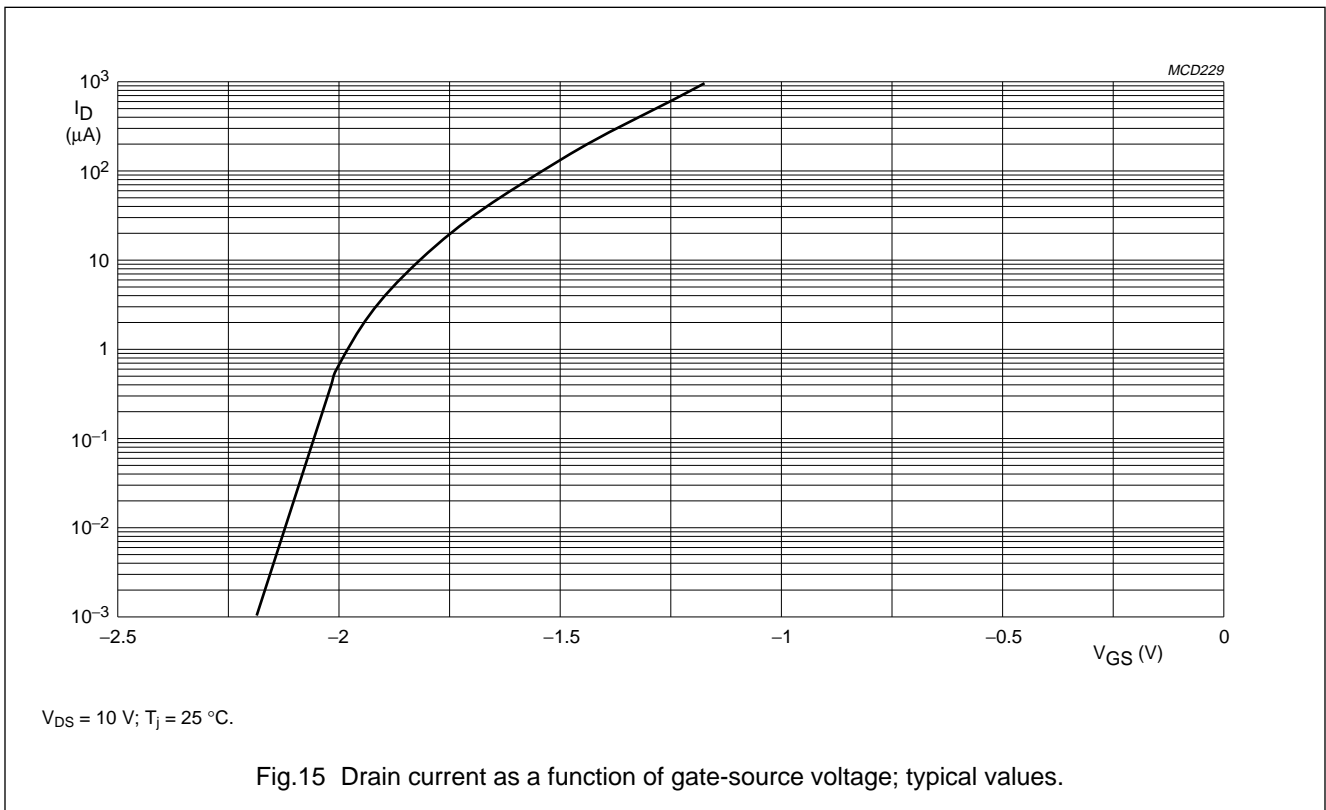
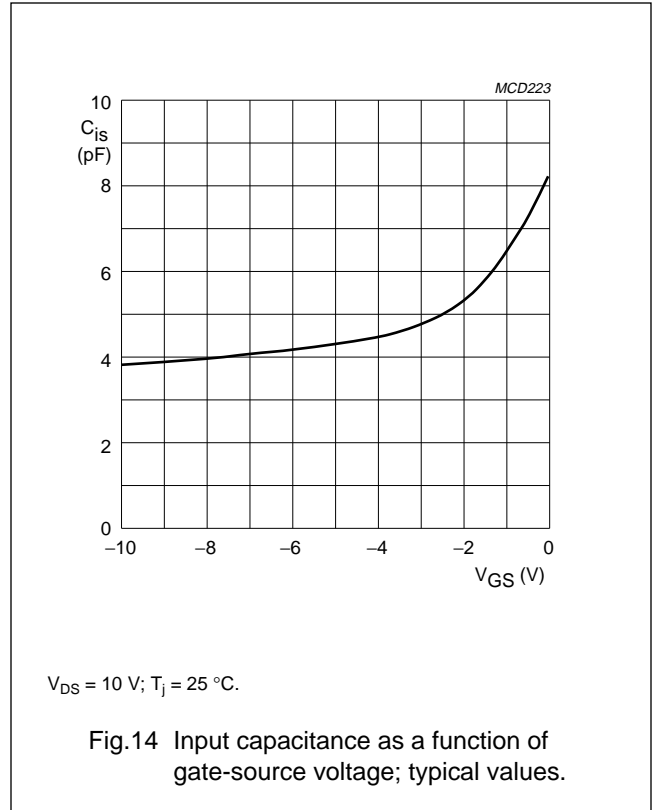
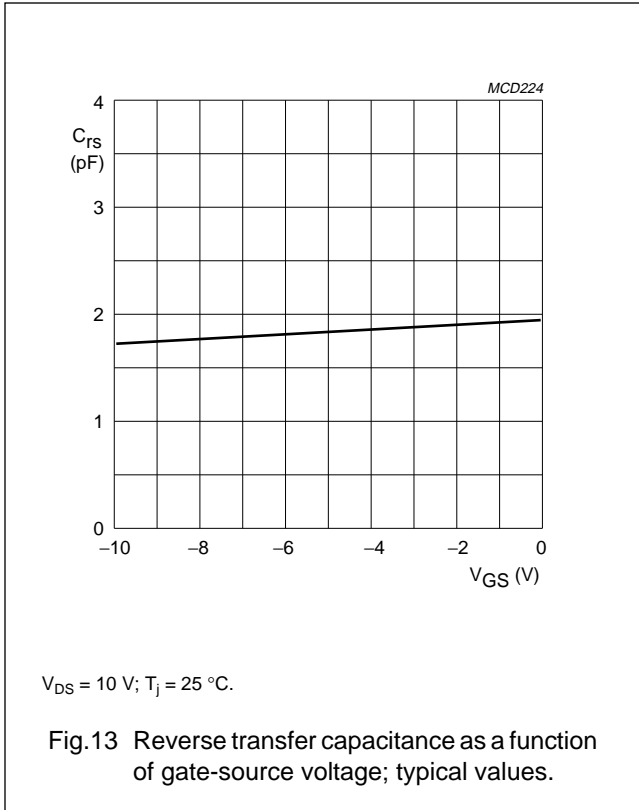
N-channel silicon field-effect transistors

J308; J309; J310



N-channel silicon field-effect transistors

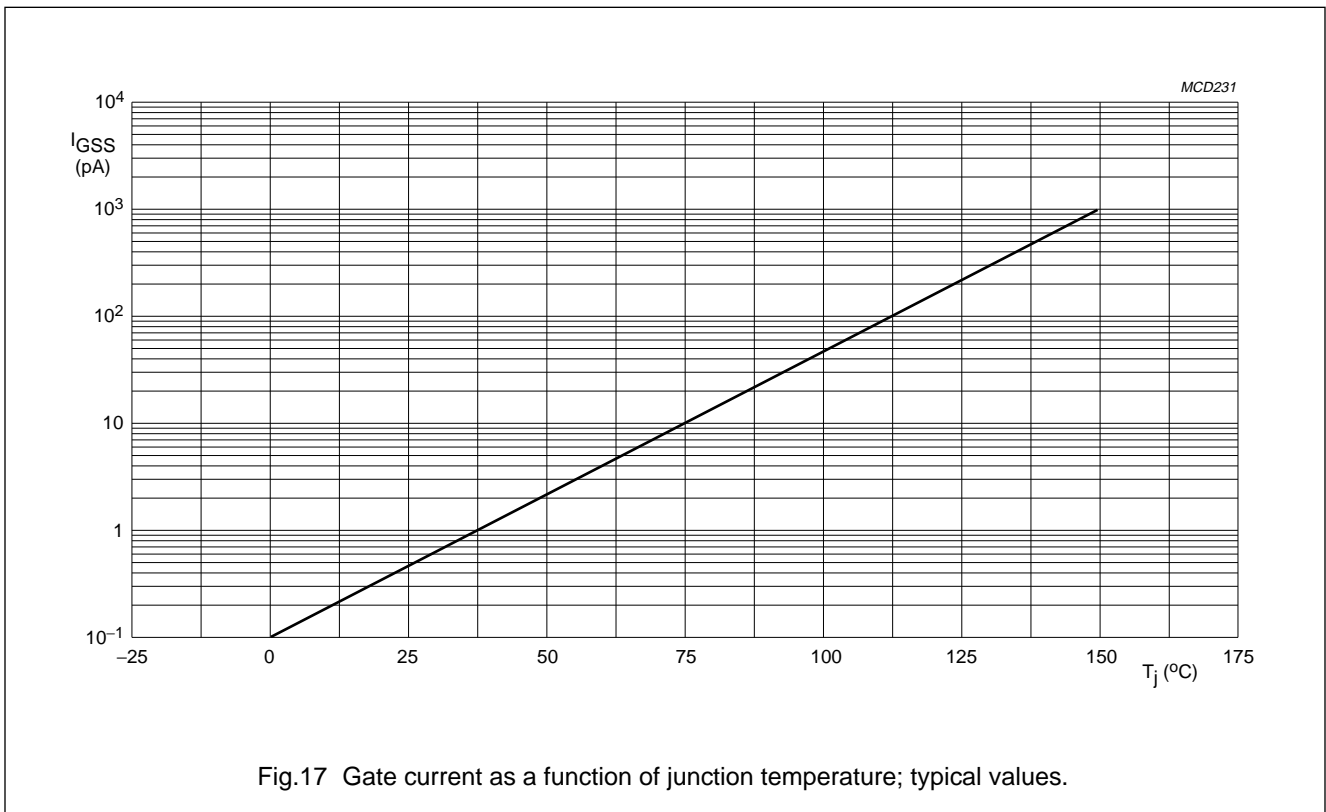
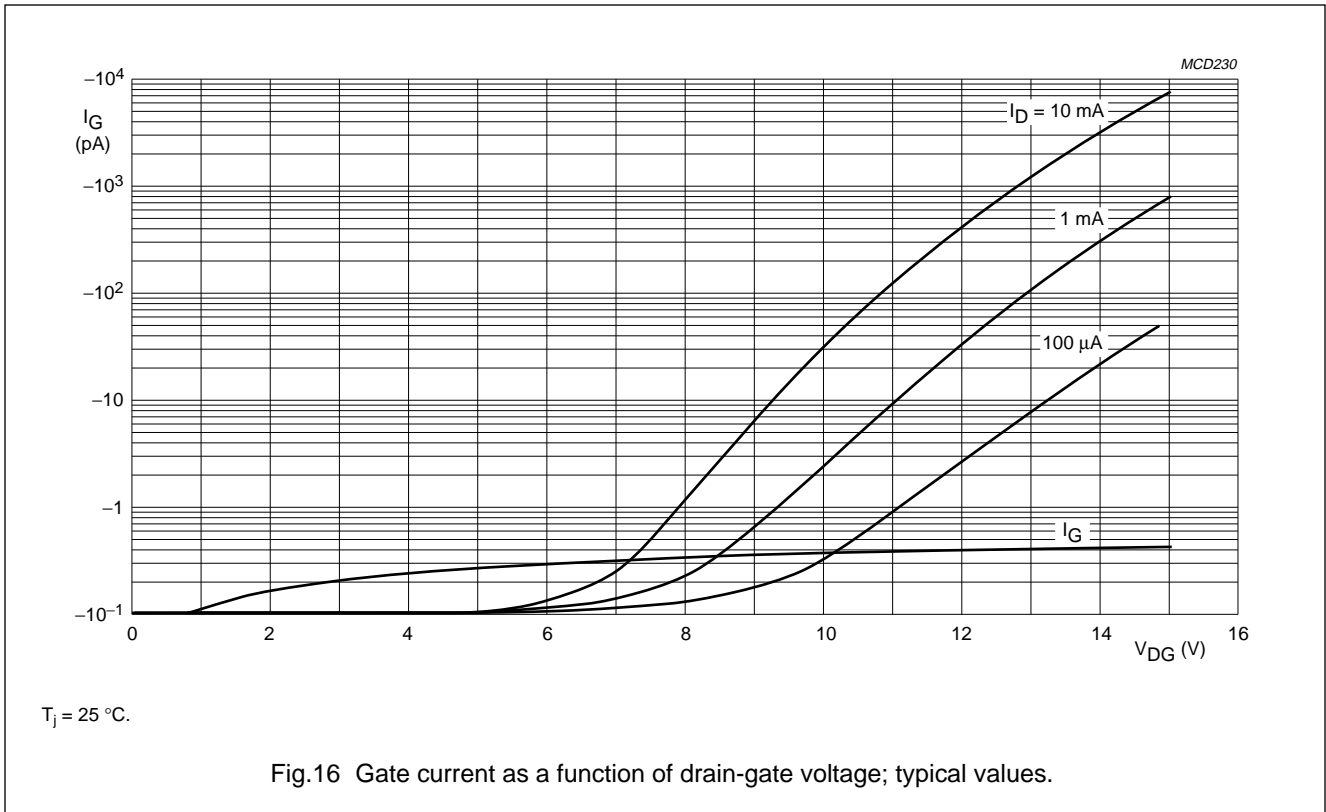
J308; J309; J310





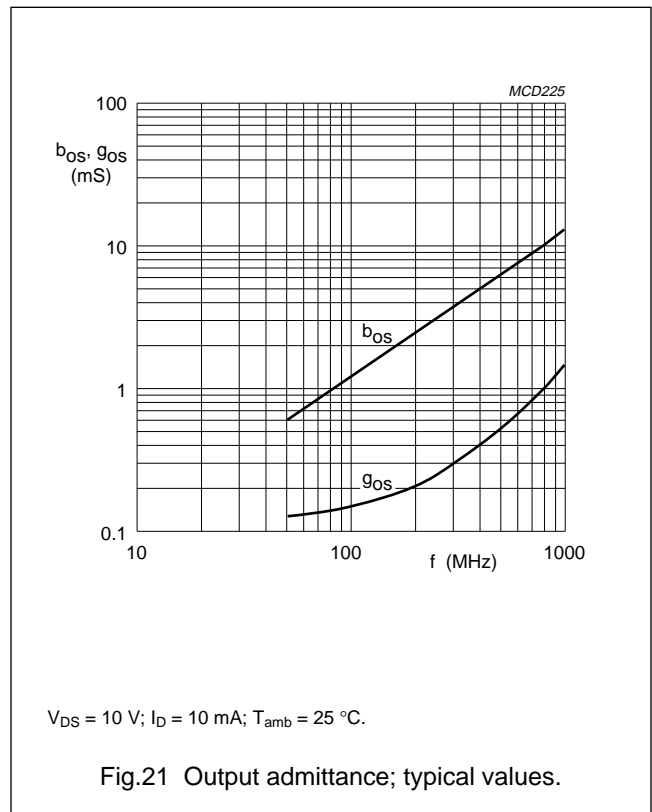
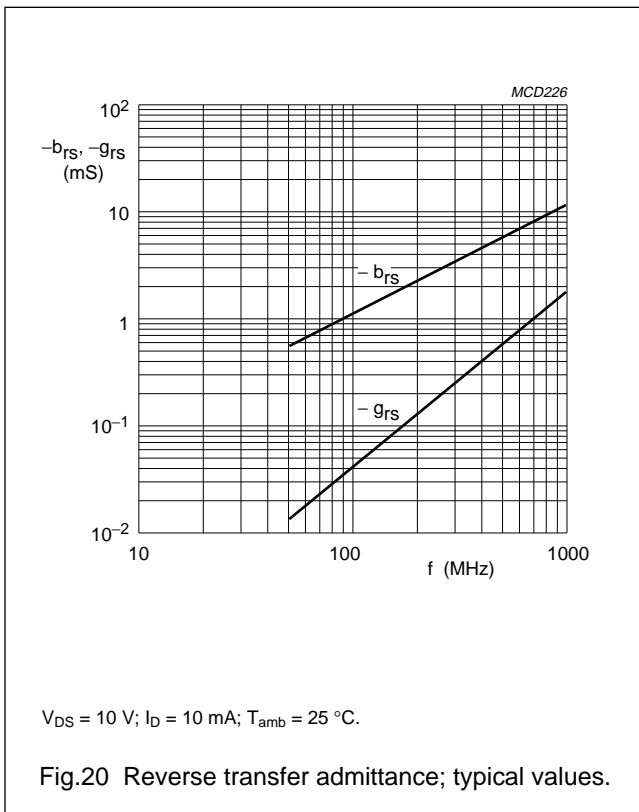
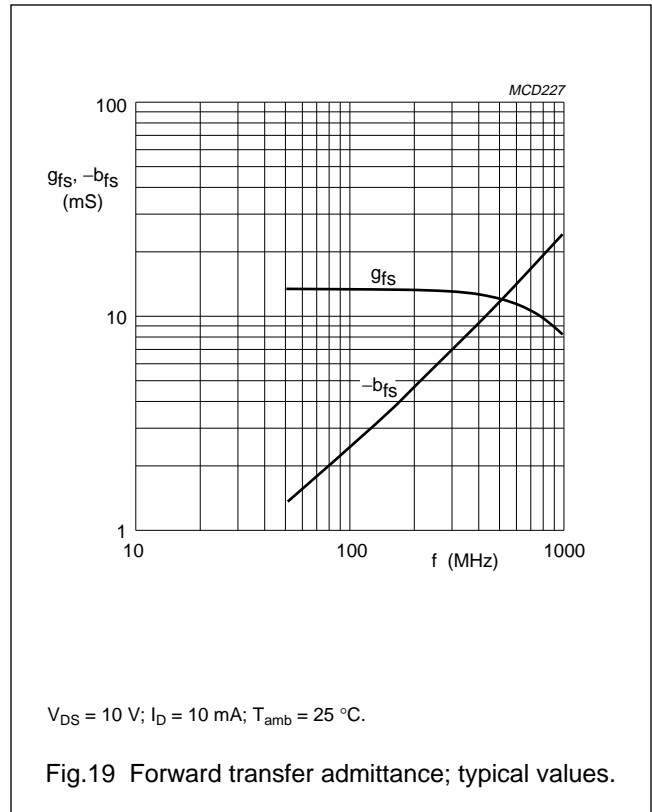
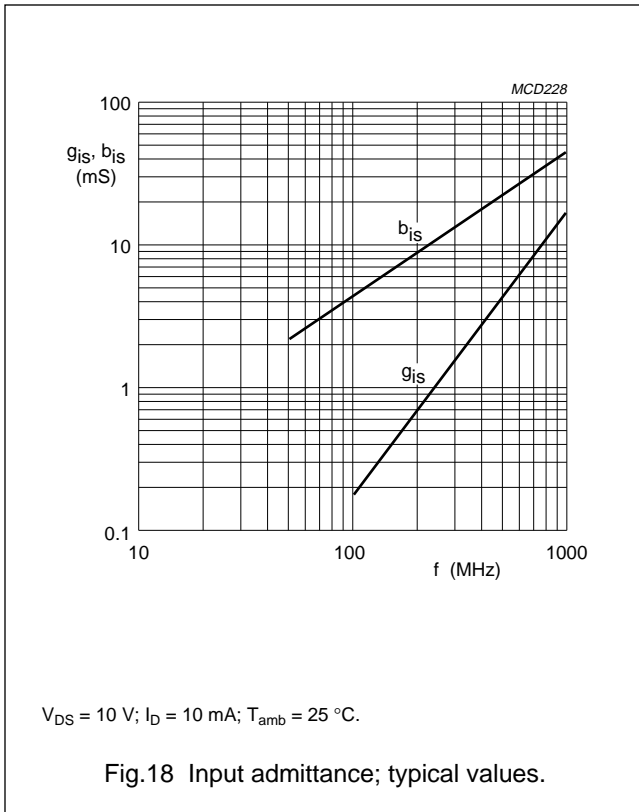
N-channel silicon field-effect transistors

J308; J309; J310



N-channel silicon field-effect transistors

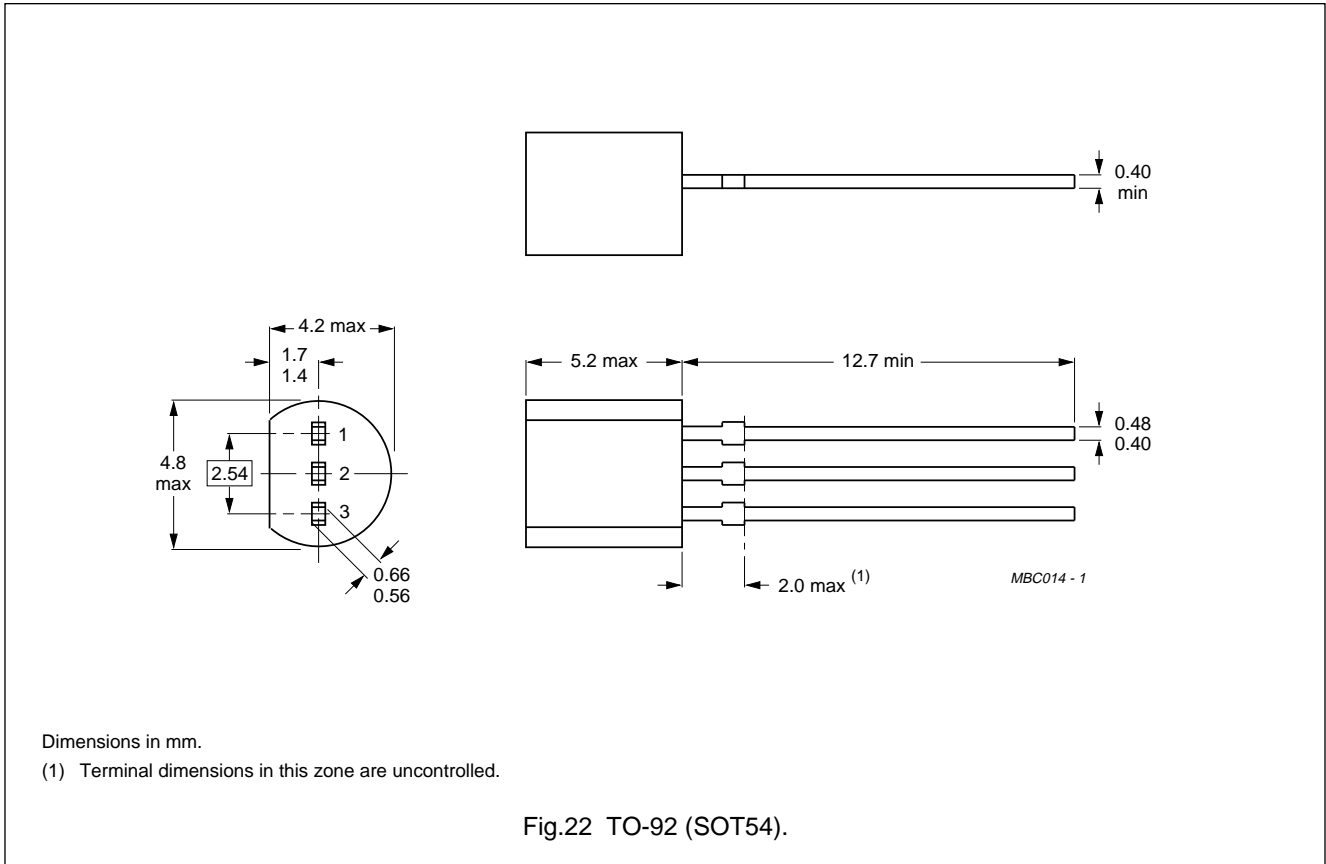
J308; J309; J310



# N-channel silicon field-effect transistors

J308; J309; J310

## PACKAGE OUTLINE



## N-channel silicon field-effect transistors

J308; J309; J310

**DEFINITIONS**

<b>Data Sheet Status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

**LIFE SUPPORT APPLICATIONS**

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.