N-channel silicon junction FETs — J108; J109; J110

FEATURES

- High speed switching
- Interchangeability of drain and source connections
- Low R_{DSon} at zero gate voltage (<8 Ω for J108).

APPLICATIONS

- Analog switches
- Choppers and commutators.

DESCRIPTION

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

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

PINNING - TO-92

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

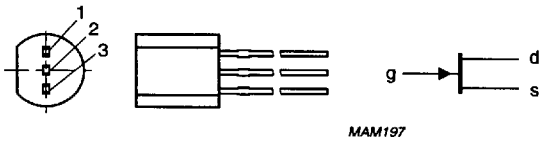


Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	±25	V
V_{GSoff}	gate-source cut-off voltage	I_D = 1 μA; V_{DS} = 5 V			
	J108		–3	–10	V
	J109		–2	–6	V
	J110		–0.5	–4	V
I_{DSS}	drain current	V_{GS} = 0; V_{DS} = 5 V			
	J108		80	–	mA
	J109		40	–	mA
	J110		10	–	mA
P_{tot}	total power dissipation	up to T_{amb} = 50 °C	–	400	mW

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
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	up to T_{amb} = 50 °C	–	400	mW
T_{stg}	storage temperature		–65	150	°C
T_j	operating junction temperature		–	150	°C

THERMAL CHARACTERISTICS

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

STATIC CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)GSS}$	gate-source breakdown voltage	I_G = –1 μA; V_{DS} = 0	–	–	–25	V
V_{GSoff}	gate-source cut-off voltage	I_D = 1 μA; V_{DS} = 5 V				V
	J108		–3	–	–10	V
	J109		–2	–	–6	V
	J110		–0.5	–	–4	V
I_{DSS}	drain current	V_{GS} = 0; V_{DS} = 15 V				
	J108		80	–	–	mA
	J109		40	–	–	mA
	J110		10	–	–	mA
I_{GSS}	gate leakage current	V_{GS} = –15 V; V_{DS} = 0	–	–	–3	nA
I_{DSX}	drain-source cut-off current	V_{GS} = –10 V; V_{DS} = 5 V	–	–	3	nA
R_{DSon}	drain-source on-state resistance	V_{GS} = 0; V_{DS} = 100 mV				
	J108		–	–	8	Ω
	J109		–	–	12	Ω
	J110		–	–	18	Ω

DYNAMIC CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C_{is}	input capacitance	V_{DS} = 0; V_{GS} = −10 V; f = 1 MHz	15	30	pF
		V_{DS} = 0; V_{GS} = 0; f = 1 MHz; T_{amb} = 25 °C	50	85	pF
C_{rs}	reverse transfer capacitance	V_{DS} = 0; V_{GS} = −10 V; f = 1 MHz	8	15	pF
Switching times; see Fig.2					
t_d	delay time	note 1	2	–	ns
t_{on}	turn-on time		4	–	ns
t_s	storage time		4	–	ns
t_{off}	turn-off time		6	–	ns

Note

1. Test conditions for switching times are as follows:
   V_{DD} = 1.5 V; V_{GS} = 0 to V_{GSoff} (all types)
   V_{GSoff} = −12 V; R_L = 100 Ω (J108)
   V_{GSoff} = −7 V; R_L = 100 Ω (J109)
   V_{GSoff} = −5 V; R_L = 100 Ω (J110).

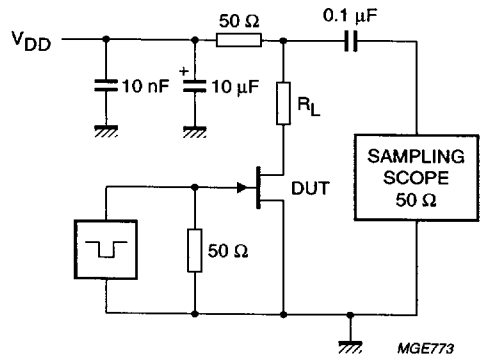


Fig.2 Switching circuit.

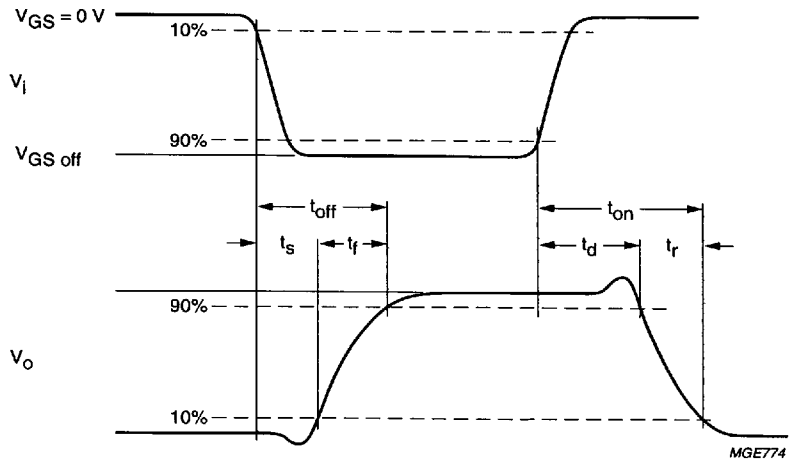
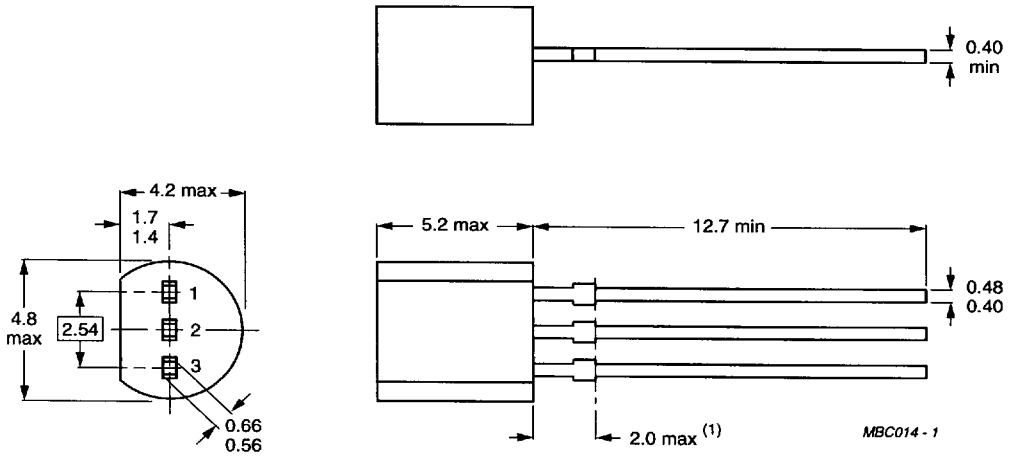


Fig.3 Input and output waveforms.

PACKAGE OUTLINE



Dimensions in mm.

(1) Terminal dimensions in this zone are uncontrolled.

Fig.4 TO-92 (SOT54).