N-channel silicon field-effect transistors

BSJ108; BSJ109; BSJ110

FEATURES

- High-speed switching
- Interchangeability of drain and source connections
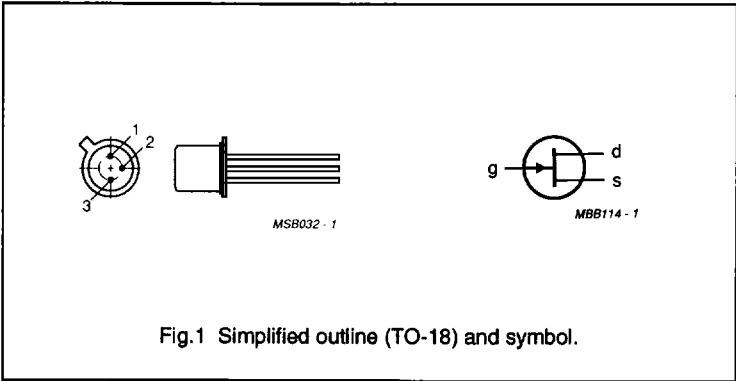- Low $R_{DS(on)}$ at zero gate voltage.

DESCRIPTION

Silicon symmetrical n-channel junction FETs in a TO-18 envelope, designed for use in such applications as analog switches, choppers, commutators, etc.

PINNING

PIN	DESCRIPTION
1	source
2	drain
3	gate

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_{DS}$	drain-source voltage		–	25	V
I_{DSS}	drain current				
	BSJ108		80	–	mA
	BSJ109		40	–	mA
	BSJ110		10	–	mA
P_{tot}	total power dissipation	up to $T_{amb} = 50\ °C$	–	275	mW
$R_{DS(on)}$	drain-source on-resistance	$V_{DS} = 0.1\ V$; $V_{GS} = 0$			
	BSJ108		–	8	Ω
	BSJ109		–	12	Ω
	BSJ110		–	18	Ω
$-V_{GS(off)}$	gate-source cut-off voltage	$I_D = 1\ \mu A$; $V_{DS} = 5\ V$			
	BSJ108		3	10	V
	BSJ109		2	6	V
	BSJ110		0.5	4	V

Fig.1 Simplified outline (TO-18) and symbol.

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_{DS}$	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	DC forward gate current		–	50	mA
P_{tot}	total power dissipation	up to $T_{amb} = 50\ °C$	–	275	mW
T_{stg}	storage temperature range		–65	150	°C
T_j	junction temperature		–	150	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
$R_{th\ j\text{-}a}$	from junction to ambient (note 1)	360 K/W

Note

1. Device mounted on printed circuit board, maximum lead length 4 mm, mounting pad for the drain lead 10 mm x 10 mm.

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$-V_{(BR)GSS}$	gate-source breakdown voltage	$-I_G = 1\ \mu A;\ V_{DS} = 0$	–	25	V
$-V_{GS(off)}$	gate-source cut-off voltage	$I_D = 1\ \mu A;\ V_{DS} = 5\ V$			
	BSJ108		3	10	V
	BSJ109		2	6	V
	BSJ110		0.5	4	V
I_{DSS}	drain current	$V_{DS} = 15\ V;\ V_{GS} = 0$			
	BSJ108		80	–	mA
	BSJ109		40	–	mA
	BSJ110		10	–	mA
$-I_{GSS}$	reverse gate current	$-V_{GS} = 15\ V;\ V_{DS} = 0$	–	3	nA
I_{DSX}	drain-source cut-off current	$V_{DS} = 5\ V;\ -V_{GS} = 10\ V$	–	3	nA
$R_{DS(on)}$	drain-source on-resistance	$V_{DS} = 0.1\ V;\ V_{GS} = 0$			
	BSJ108		–	8	Ω
	BSJ109		–	12	Ω
	BSJ110		–	18	Ω

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DYNAMIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

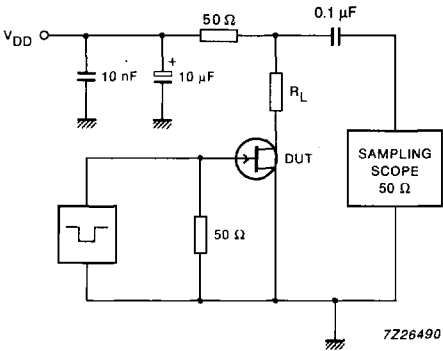| SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C_{iss}	input capacitance	V_{DS} = 0; $-V_{GS}$ = 10 V; f = 1 MHz	15	30	pF
		V_{DS} = 0; $-V_{GS}$ = 0; T_{amb} = 25 °C; f = 1 MHz	50	85	pF
C_{rss}	feedback capacitance	V_{DS} = 0; $-V_{GS}$ = 10 V; f = 1 MHz	8	15	pF
Switching times; test conditions: V_{DD} = 1.5 V; V_{GS} = 0 to $V_{GS(off)}$; R_L = 100 Ω; $-V_{GS(off)}$ = 12 V (BSJ108), 7 V (BSJ109) and 5 V (BSJ110); (see also Figs 2 and 3)					
t_{on}	turn-on time		4	–	ns
t_{off}	turn-off time		6	–	ns
t_d	delay time		2	–	ns
t_s	storage time		4	–	ns

Fig.2 Switching times test circuit.
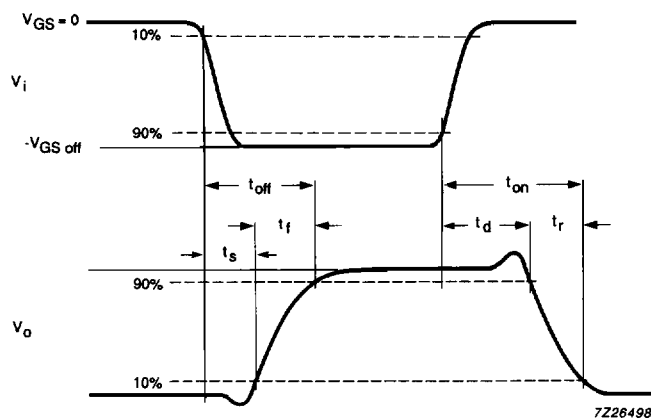
N-channel silicon field-effect transistors

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Fig.3 Input and output waveforms.