

## 2 CHANNEL MULTIPLEXER

The M009 is a 2 channel multiplexer constructed on a single monolithic chip using P-channel low threshold silicon gate technology. The device is available in 8-lead metal case similar to Jedec TO-99.

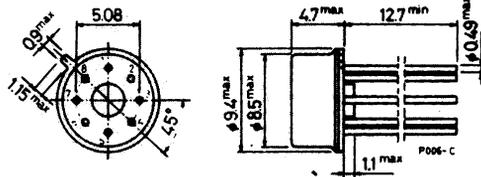
### ABSOLUTE MAXIMUM RATINGS

$V_{DS}$	Drain to source voltage	-10 to 0.3	V
$V_{GS}$	Gate to source voltage	-35 to 0.3	V
$V_{GD}$	Gate to drain voltage	-25 to 0.3	V
$T_{stg}$	Storage temperature range	-65 to 150	°C
$T_{op}$	Operating temperature range	0 to 70	°C

ORDERING NUMBER: M 009 T1

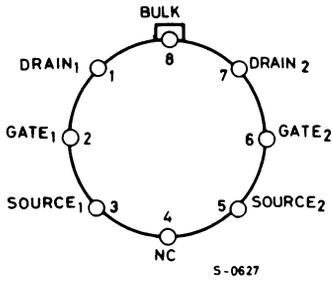
### MECHANICAL DATA

Dimensions in mm

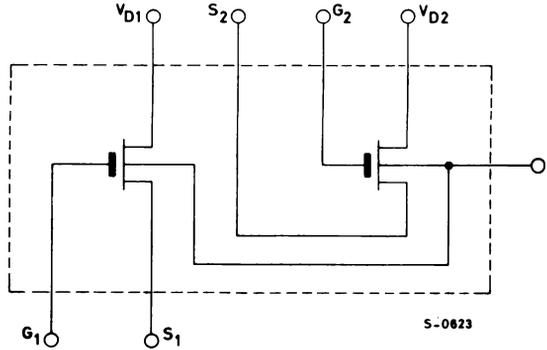


# M 009

## PIN CONNECTIONS (top view)



## SCHEMATIC DIAGRAM



## STATIC ELECTRICAL CHARACTERISTICS ( $T_{amb} = 0$ to $70^{\circ}\text{C}$ unless otherwise specified)

Parameter	Test conditions	Values			Unit
		Min.	Typ.	Max.	
$V_i$ Analog input voltage	$V_{GS} = -20\text{V}$ $V_{BULK} = 10\text{V}$			$\pm 10$	V
$V_{THO}$ Threshold voltage	$V_{DS} = V_{GS}$ $I_{DS} = 100 \mu\text{A}$ $V_{BS} = 0$	-1		-2.5	V
$R_{DS}$ Drain to source on resistance	$V_{GS} = -10\text{V}$ $I_{DS} = 10 \text{mA}$ $V_{BS} = 0$		20	50	$\Omega$
	$V_{GS} = -20\text{V}$ $I_{DS} = 10 \text{mA}$ $V_{BS} = 0$		13	30	$\Omega$
$I_{GL}$ Gate leakage current	$V_{GS} = -10\text{V}$ $V_{DS} = 0$ $V_{BS} = 0$			-1	nA
$I_{DL}$ Drain leakage current	$V_{DS} = -5\text{V}$ $V_{GS} = 0$ $V_{BS} = 0$			-20	nA
$I_D$ Drain current	$V_{GS} = V_{DS} = -5\text{V}$ $V_{BS} = 0$		-60		mA

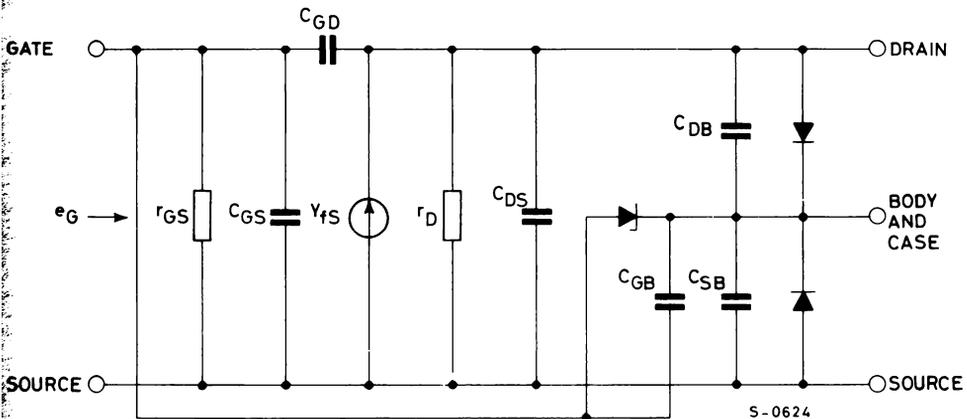
## DYNAMIC ELECTRICAL CHARACTERISTICS ( $T_{amb} = 0$ to $70^{\circ}\text{C}$ unless otherwise specified)

Parameter	Test conditions	Values			Unit
		Min.	Typ.	Max.	
$Y_{fs}$ Forward transadmittance	$V_{DS} = -3\text{V}$ $V_{BS} = 0\text{V}$ $V_{GS} = -10\text{V}$		12.000		$\mu\text{mho}$
$C_{DS}^*$ Drain to source capacitance	$V_{DS} = 0$ $V_{IPP} = 15\text{ mV}$ $f = 1\text{ MHz}$		0.15	0.20	$\mu\text{F}$
$C_{GD}^*$ Gate to drain capacitance	$V_{GD} = 0$ $V_{IPP} = 15\text{ mV}$ $f = 1\text{ MHz}$		2	3	$\mu\text{F}$
$C_{GS}^*$ Gate to source capacitance	$V_{GS} = 0$ $V_{IPP} = 15\text{ mV}$ $f = 1\text{ MHz}$		2	3	$\mu\text{F}$
$C_{SB}^*$ Source to body capacitance	$V_{SB} = 0$ $V_{IPP} = 15\text{ mV}$ $f = 1\text{ MHz}$		8	10	$\mu\text{F}$
$C_{DB}^*$ Drain to body capacitance	$V_{DB} = 0$ $V_{IPP} = 15\text{ mV}$ $f = 1\text{ MHz}$		8	10	$\mu\text{F}$
$C_{GB}^*$ Gate to body capacitance	$V_{GB} = 0$ $V_{IPP} = 15\text{ mV}$ $f = 1\text{ MHz}$		4	6	$\mu\text{F}$

\* This parameter is periodically sampled and not 100% tested.

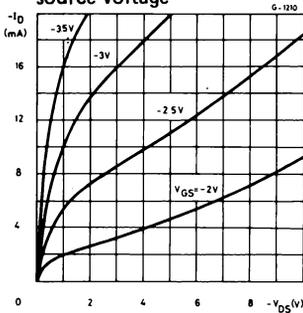
## SMALL SIGNAL EQUIVALENT CIRCUIT

Conditions:  $V_{GS} = -10\text{V}$ ,  $V_{DS} = -3\text{V}$ ,  $V_{BS} = 0$ )  $I \approx 150\text{ mA}$

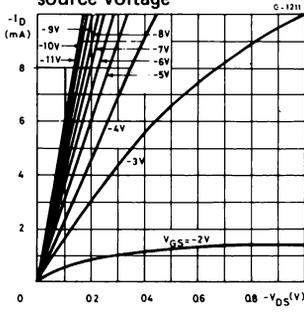


Symbol	Characteristics	Typical values	Unit
Diodes	All diodes are to be considered perfect diodes		
$r_{GS}$	Gate to source leakage resistance and diode leakage resistance	$10^{10}$	$\Omega$
$r_D$	Dynamic drain resistance	0.5	$k\Omega$
$C_{GS}$	Gate to source capacitance	2	$pF$
$C_{GD}$	Gate to drain capacitance	2	$pF$
$C_{DS}$	Drain to source capacitance	0.15	$pF$
$C_{GB}$	Gate to body capacitance	6	$pF$
$C_{DB}$	Drain to body capacitance	40	$pF$
$C_{SB}$	Source to body capacitance	10	$pF$
$Y_{fs}$	Forward transadmittance	12.000	$\mu mho$

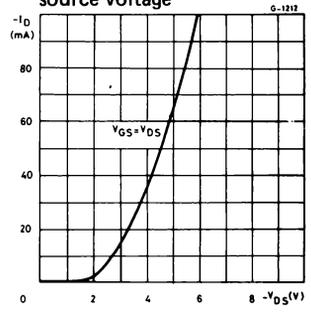
Drain current vs. drain to source voltage



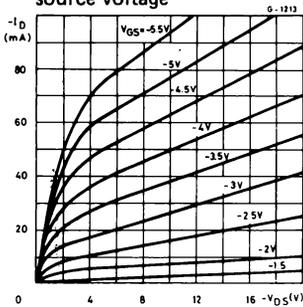
Drain current vs. drain to source voltage



Drain current vs. drain to source voltage

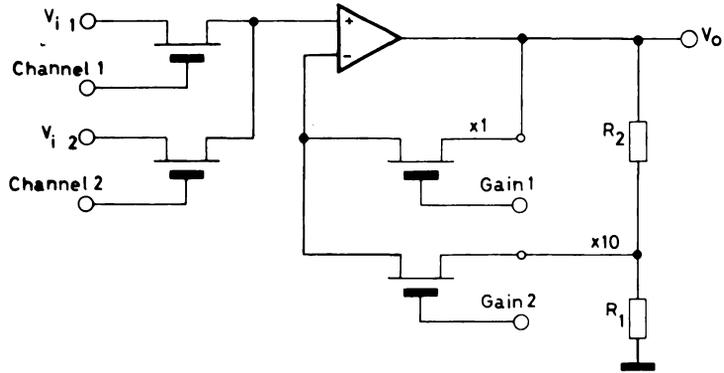


Drain current vs. drain to source voltage



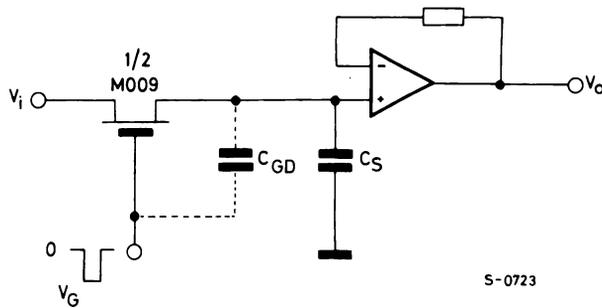
## TYPICAL APPLICATIONS

### Variable gain amplifier with multiplexed inputs



S-0724

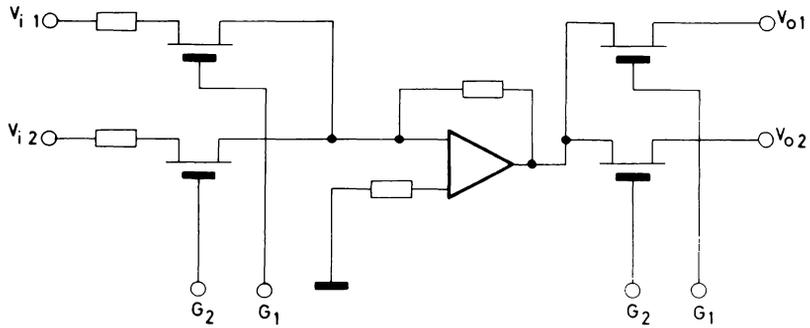
### Sample and hold



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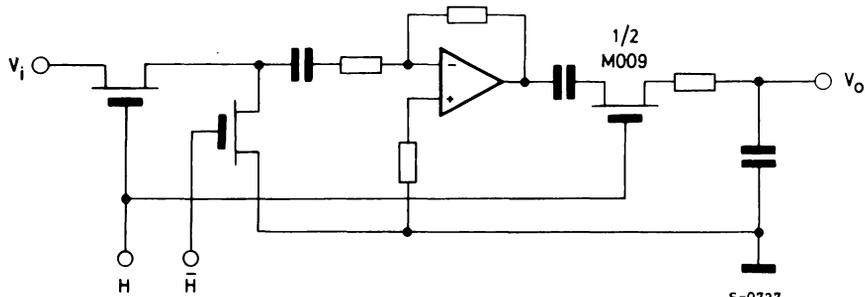
## TYPICAL APPLICATIONS (continued)

### Multiplexing - demultiplexing



S-0721

### Series parallel chopper (low direct voltage amplification)



S-0727