

**MFE209**  
N-CHANNEL DUAL-GATE  
SILICON-NITRIDE PASSIVATED  
MOS FIELD-EFFECT TRANSISTOR

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSX}$	20	Vdc
Drain-Gate Voltage	$V_{DG1}$	30	Vdc
	$V_{DG2}$	30	Vdc
Gate Current	$I_{G1R}$	-10	mAdc
	$I_{G1F}$	10	
	$I_{G2R}$	-10	
	$I_{G2F}$	10	
Drain Current — Continuous	$I_D$	30	mAdc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	300	mW
		1.71	mW/°C
Storage Channel Temperature Range	$T_{stg}$	-65 to +200	°C
Operating Channel Temperature	$T_{channel}$	200	°C
Lead Temperature, 1/16" From Seated Surface for 10 Seconds	$T_L$	260	°C

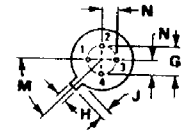
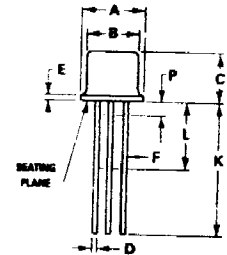
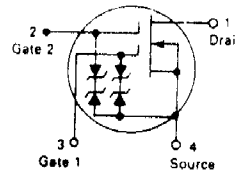
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Drain-Source Breakdown Voltage ( $I_D = 10 \mu\text{Adc}$ , $V_{G1S} = -4.0 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ )	$V_{(BR)DSX}$	20	—	—	Vdc
Gate 1 — Source Breakdown Voltage ( $I_{G1} = 10 \text{ mAdc}$ , $V_{G2S} = V_{DS} = 0$ )	$V_{(BR)G1SSF}$	7.0	—	22	Vdc
Gate 1 — Source Reverse Breakdown Voltage ( $I_{G1} = -10 \text{ mAdc}$ , $V_{G2S} = V_{DS} = 0$ )	$V_{(BR)G1SSR}$	-7.0	—	-22	Vdc
Gate 2 — Source Forward Breakdown Voltage ( $I_{G2} = 10 \text{ mAdc}$ , $V_{G1S} = V_{DS} = 0$ )	$V_{(BR)G2SSF}$	7.0	—	22	Vdc
Gate 2 — Source Reverse Breakdown Voltage ( $I_{G2} = -10 \text{ mAdc}$ , $V_{G1S} = V_{DS} = 0$ )	$V_{(BR)G2SSR}$	-7.0	—	-22	Vdc
Gate 1 — Source Cutoff Voltage ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 50 \mu\text{Adc}$ )	$V_{G1S(off)}$	-0.1	—	4.0	Vdc
Gate 2 — Source Cutoff Voltage ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G1S} = 0$ , $I_D = 50 \mu\text{Adc}$ )	$V_{G2S(off)}$	-0.1	—	4.0	Vdc
Gate 1 — Terminal Forward Current ( $V_{G1S} = 6.0 \text{ Vdc}$ , $V_{G2S} = V_{DS} = 0$ )	$I_{G1SSF}$	—	—	20	nAdc
Gate 1 — Terminal Reverse Current ( $V_{G1S} = -6.0 \text{ Vdc}$ , $V_{G2S} = V_{DS} = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{G1SSR}$	—	—	-20 -10	nAdc $\mu\text{Adc}$
Gate 2 — Terminal Forward Current ( $V_{G2S} = 6.0 \text{ Vdc}$ , $V_{G1S} = V_{DS} = 0$ )	$I_{G2SSF}$	—	—	20	nAdc
Gate 2 — Terminal Reverse Current ( $V_{G2S} = -6.0 \text{ Vdc}$ , $V_{G1S} = V_{DS} = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{G2SSR}$	—	—	-20 -10	nAdc $\mu\text{Adc}$
<b>ON CHARACTERISTICS</b>					
Gate 1 — Zero Voltage Drain Current ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G1S} = 0$ , $V_{G2S} = 4.0 \text{ Vdc}$ )	$I_{DSS}$	5.0	—	30	mAdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Forward Transfer Admittance ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 10 \text{ mAdc}$ , $f = 1.0 \text{ kHz}$ )	$Y_{fs}$	10	13	20	mmhos
Input Capacitance ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 5.0 \text{ mAdc}$ , $f = 1.0 \text{ MHz}$ )	$C_{iss}$	—	4.5	7.0	pF
Reverse Transfer Capacitance ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 5.0 \text{ mAdc}$ , $f = 1.0 \text{ MHz}$ )	$C_{rss}$	0.005	0.023	0.03	pF
Output Capacitance ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 5.0 \text{ mAdc}$ , $f = 1.0 \text{ MHz}$ )	$C_{oss}$	0.5	2.0	4.0	pF
Common-Source Noise Figure (Figure 11) ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 10 \text{ mAdc}$ , $f = 500 \text{ MHz}$ )	NF	—	4.5	6.0	dB
Common-Source Power Gain (Figure 11) ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 10 \text{ mAdc}$ , $f = 500 \text{ MHz}$ )	$G_{ps}$	10	13	20	dB
Bandwidth ( $V_{DS} = 15 \text{ Vdc}$ , $V_{G2S} = 4.0 \text{ Vdc}$ , $I_D = 10 \text{ mAdc}$ , $f = 500 \text{ MHz}$ )	BW	7.0	—	17	MHz

TO-72



PIN 1 DRAIN  
2. GATE 2  
3. GATE 1  
4. SOURCE  
SUBSTRATE  
AND CASE



NOTE: ALL RULES AND NOTES ASSOCIATED WITH TO-72 OUTLINE SHALL APPLY.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.32	5.33	0.170	0.210
D	0.41	0.53	0.016	0.021
E	—	0.76	—	0.030
F	0.41	0.48	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	—	0.500	—
L	0.35	—	0.250	—
M	45° BSC		45° BSC	
N	1.27	—	0.050	BSC
P	—	1.27	—	0.050

All JEDEC dimensions and notes apply.



Quality Semi-Conductors