



SD210, SD211, SD212, SD213, SD214, SD215

N-CHANNEL ENHANCEMENT-MODE D-MOS FET SWITCHES

ORDERING INFORMATION

TO-206AF (TO-72) Package	SD210DE	SD211DE	SD212DE	SD213DE	SD214DE	SD215DE
Shorting Rings	SD210DE/R	SD211DE/R	SD212DE/R	SD213DE/R	SD214DE/R	SD215DE/R
Sorted Chips in Carriers	SD210CHP	SD211CHP	SD212CHP	SD213CHP	SD214CHP	SD215CHP

FEATURES

- High Input to Output Isolation—120dB typical
- Low feedthrough and feedback transients
- Low Inter-electrode Capacitances

APPLICATIONS

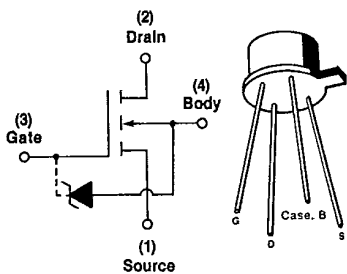
- +30V Switch Drivers—SD210, SD211
- ±10V Analog Switches—SD214, SD215
- ±5V Analog Switches—SD212, SD213

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C unless otherwise noted)

PARAMETER	SD210	SD211	SD212	SD213	SD214	SD215	UNIT
Breakdown Voltages							
V _{DS}	+30	+30	+10	+10	+20	+20	Vdc
V _{SD}	+10	+10	+10	+10	+20	+20	Vdc
V _{DB}	+30	+30	+15	+15	+25	+25	Vdc
V _{SB}	+15	+15	+15	+15	+25	+25	Vdc
V _{GS}	±40	-15	±40	-15	±40	-25	Vdc
		+25		+25		+30	Vdc
V _{GB}	±40	-0.3	±40	-0.3	±40	-0.3	Vdc
		+25		+25		+30	Vdc
V _{GD}	±40	-30	±40	-15	±40	-25	Vdc
		+25		+25		+30	Vdc

I _D	Continuous Drain Current	50mA
P _T	Power Dissipation (at or below T _C = +25°C)	1.2W
	Linear Derating Factor	12mW/°C
P _D	Power Dissipation (at or below T _A = +25°C)	300mW
	Linear Derating Factor	3.0mW/°C
T _J	Operating Junction Temperature Range	-55 to +125°C
T _S	Storage Temperature Range	-65 to +175°C

SCHEMATIC DIAGRAM

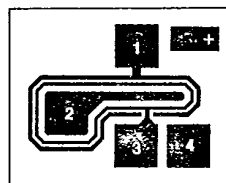


Body Internally connected to Case.
Diode protection on SD211/SD213/SD215 only.

PACKAGE DIMENSIONS (TO-72) TO-206AF

(See Package 3)

CHIP CONFIGURATION



PAD
1—Source
2—Drain
3—Gate
4—Diode

For SD211/213/215CHP bond Gate and Diode to common point. Body is backside contact.
Dimensions: .022 × .025 × .013 inches

T-35-25



SD210, SD211, SD212,
SD213, SD214, SD215

ELECTRICAL CHARACTERISTICS (T_A = +25°C unless otherwise noted)

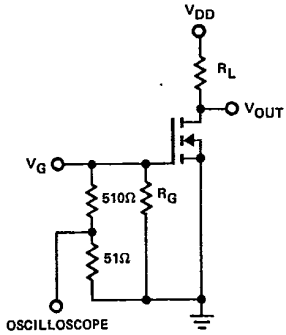
#	PARAMETER	SD210, SD211			SD212, SD213			SD214, SD215			UNIT	TEST CONDITIONS	
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX			
1	BV _{DS} Drain-Source Breakdown Voltage	30	35								V	I _D = 10μA V _{GS} = V _{BS} = 0	
2		10	25		10	25		20	25		V	I _D = 10nA V _{GS} = V _{BS} = -5V	
3	BV _{SD} Source-Drain Breakdown Voltage	10			10			20			V	I _S = 10nA V _{GD} = V _{BD} = -5V	
4	BV _{DB} Drain-Substrate Breakdown Voltage	15			15			25			V	I _D = 10nA, V _{GB} = 0 Source OPEN	
5	BV _{SB} Source-Substrate Breakdown Voltage	15			15			25			V	I _S = 10μA, V _{GB} = 0 Drain OPEN	
6	I _{D (off)} Drain-Source OFF Current			10			10				nA	V _{DS} = 10V V _{GS} = V _{BS} = -5V	
7									10		nA	V _{DS} = 20V	
8	I _{S (off)} Source-Drain OFF Current			10			10				nA	V _{SD} = 10V V _{GD} = V _{BD} = -5V	
9									10		nA	V _{SD} = 20V	
10	I _{GBS} Gate-Body Leakage Current	SD210		0.1							nA	V _{GB} = ±40V V _{DB} = V _{SB} = 0	
11		SD212				0.1					nA		
12		SD214							0.1		nA		
13		SD211			10						μA		V _{GB} = 25V
14		SD213					10				μA		V _{GB} = 30V
15	SD215							10		μA	V _{GB} = 30V		
16	V _{GS (th)} Gate Threshold Voltage	0.5	1.0	2.0	0.1		2.0	0.1	1.0	2.0	V	V _{DS} = V _{GS} , I _D = 1μA, V _{SB} = 0	
17	r _{DS (on)} Drain-Source ON Resistance		50	70		50	70		50	70	ohms	V _{GS} = 5V I _D = 1mA	
18			30	45		30	45		30	45	ohms	V _{GS} = 10V V _{SB} = 0	
19	g _{fs} Common-Source Forward Transcond.	10	12		10	12		10	12		mmhos	V _{DS} = 10V, I _D = 20mA f = 1KHz, V _{SB} = 0	
20	C _(gs + gd + gb) Gate Node Capacitance		2.4	3.5		2.4	3.5		2.4	3.5	pF	V _{DS} = 10V V _{GS} = V _{BS} = -15V f = 1MHz	
21	C _(gd + db) Drain Node Capacitance		1.3	1.5		1.3	1.5		1.3	1.5	pF		
22	C _(gs + sb) Source Node Capacitance		3.5	4.0		3.5	4.0		3.5	4.0	pF		
23	C _(dg) Reverse Transfer Capacitance		0.3	0.5		0.3	0.5		0.3	0.5	pF		
24	t _{d(on)} Turn ON Delay Time		0.7	1.0		0.7	1.0		0.7	1.0	nSec	V _{DD} = 5V, V _{G(on)} = 10V R _L = 680Ω, R _G = 51Ω	
25	t _r Rise Time		0.8	1.0		0.8	1.0		0.8	1.0			
26	t _{off} Turn OFF Time		10			10			10				

TOPAZ
SEMICONDUCTOR

SD210, SD211, SD212
SD213, SD214, SD215

T-35-25

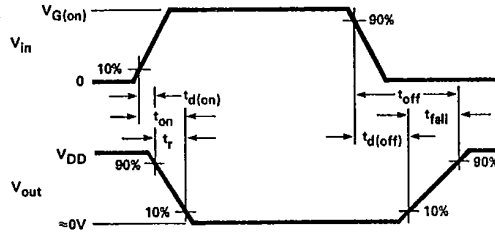
SWITCHING TIMES TEST CIRCUIT



INPUT PULSE
 $t_r < 0.5 \text{ nSEC}$
PULSE WIDTH - 100 nSEC

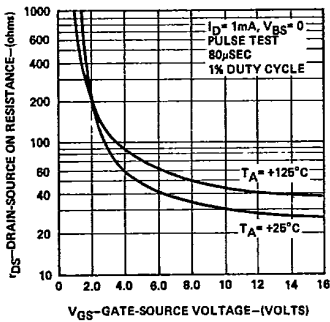
SAMPLING OSCILLOSCOPE
 $t_s < 0.36 \text{ nSEC}$
 $R_{in} > 1M\Omega$
 $C_{in} < 2.0 \text{ pF}$

TEST WAVEFORMS

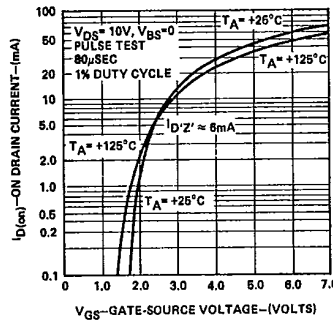


TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = +25^\circ\text{C}$ unless otherwise specified)

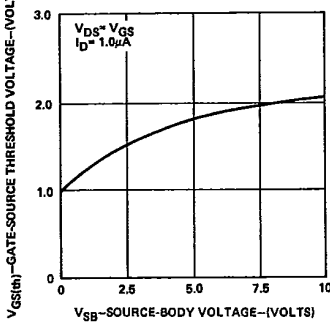
DRAIN-SOURCE ON RESISTANCE
—VS—
GATE-SOURCE VOLTAGE



ON DRAIN CURRENT
—VS—
GATE-SOURCE VOLTAGE



GATE-SOURCE THRESHOLD VOLTAGE
—VS—
SOURCE-BODY VOLTAGE



FORWARD TRANSCONDUCTANCE
—VS—
ON DRAIN CURRENT

