INTERSIL

DG126, DG129, DG133, DG134, DG140, DG141, DG151, DG152, DG153, DG154 2-Channel Drivers with SPST and DPST FET Switches

FEATURES

- Each channel complete—interfaces with most integrated logic
- Low OFF power dissipation, 1 mW
- Switches analog signals up to 20 volts peak-to-peak
- Low $r_{DS(ON)}$, 10 ohms max on DG140/A and DG141/A
- Switching times improved 100% – 'A' Versions.

GENERAL DESCRIPTION

These switching circuits contain two channels in one package, each channel consisting of a driver circuit controlling a SPST or DPST junction FET switch. The driver interfaces DTL, TTL or RTL logic signals for multiplexing, commutating, and D/A converter applications, which permits logic design directly with the switch function. Logic "1" at the input turns the FET switch ON, and logic "0" turns it OFF.

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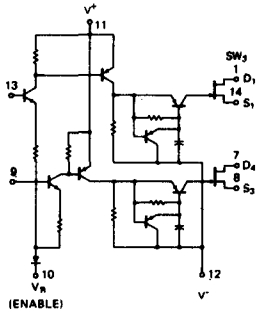
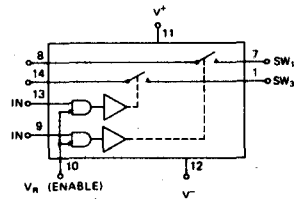
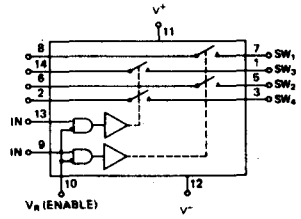
SCHEMATIC AND LOGIC DIAGRAMS (Outline Dwgs DD, FD-2, JD)

DUAL SPST

DG133($r_{DS(ON)}$ = 30 Ω)
DG134($r_{DS(ON)}$ = 80 Ω)
DG141($r_{DS(ON)}$ = 10 Ω)
DG151($r_{DS(ON)}$ = 15 Ω)
DG152($r_{DS(ON)}$ = 50 Ω)

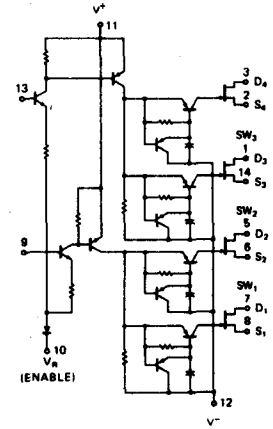






DUAL DPST

DG126($r_{DS(ON)}$ = 80 Ω)
DG129($r_{DS(ON)}$ = 30 Ω)
DG140($r_{DS(ON)}$ = 10 Ω)
DG153($r_{DS(ON)}$ = 15 Ω)
DG154($r_{DS(ON)}$ = 50 Ω)



ORDERING INFORMATION

DG126 A K

- K = Package
  - K = 14-Pin CERDIP
  - L = 14-Pin Flat Pack
  - P = 14-Pin Ceramic DIP (Special Order Only)
- A = Temperature Range
  - A = Military −55°C to +125°C
  - B = Industrial −20°C to +80°C
- DG126 = Device Chip Type

ABSOLUTE MAXIMUM RATINGS

Analog Signal Voltage (V_A – V^- or V^+ – V_A) 30V
Total Supply Voltage (V^+ – V^-) 36V
Pos. Supply Voltage to Ref. Voltage (V^+ – V_R) 25V
Ref. Voltage to Neg. Supply Voltage (V_R – V^-) 22V
Power Dissipation (Note) . . . . . 750 mW
Current (any terminal) . . . . . 30 mA

Storage Temperature . . . . . –65 to +150°C
Operating Temperature . . . . . –55 to +125°C
Lead Temperature (Soldering, 10 sec) . . . . . 300°C

NOTE: Dissipation rating assumes device is mounted with all leads welded or soldered to printed circuit board in ambient temperature below 70°C. For higher temperature, derate at rate of 10 mW/°C.

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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ELECTRICAL CHARACTERISTICS PER CHANNEL

Applied voltages for all test: DG126, DG129, DG133, DG134, DG140, DG141 (V^+ = +12V, V^- = –18V, V_R = 0) and DG151, DG152, DG153, DG154 (V^+ = +15V, V^- = –15V, V_R = 0). Input test condition which guarantees FET switch ON and OFF as specified is used for output and power supply specifications.

	SYMBOL (NOTE)	CHARACTERISTIC	TYPE	ABSOLUTE MAX. LIMIT –55°	25°	125°	UNITS	TEST CONDITIONS
INPUT	$V_{IN(ON)}$	Input Voltage–On	All Circuits	2.9 min	2.5 min	2.0 min	Volts	V_2 = –12V
	$V_{IN(OFF)}$	Input Voltage–Off		1.4	1.0	0.6	Volts	V_2 = –12V
	$I_{IN(ON)}$	Input Current		120	60	60	µA	V_{IN} = 2.5V
	$I_{IN(OFF)}$	Input Leakage Current		0.1	0.1	2	µA	V_{IN} = 0.8V
SWITCH OUTPUT	$r_{DS(ON)}$	Drain-Source On Resistance	DG126, DG134	80	80	150	Ω	
			DG129, DG133	30	30	50	Ω	V_D = 10V, I_S = 1 mA
			DG140, DG141	10	10	20	Ω	V_D = 10V, I_S = –10 mA
			DG151, DG153	15	15	30	Ω	V_D = 7.5V, I_S = 1 mA
			DG152, DG154	50	50	100	Ω	
	$I_{D(ON)} + I_{S(ON)}$	Drive Leakage Current	DG126, DG129, DG133, DG134		2	100	nA	$V_D = V_S$ = –10V
	$I_{S(OFF)}$	Source Leakage Current			1	100	nA	V_S = 10V, V_D = –10V
	$I_{D(OFF)}$	Drain Leakage Current			1	100	nA	V_D = 10V, V_S = –10V
	$I_{D(ON)} + I_{S(ON)}$	Drive Leakage Current	DG140, DG141		2	100	nA	$V_D = V_S$ = –10V
	$I_{S(OFF)}$	Source Leakage Current			10	1000	nA	V_S = 10V, V_D = –10V
	$I_{D(OFF)}$	Drain Leakage Current			10	1000	nA	V_D = 10V, V_S = –10V
	$I_{D(ON)} + I_{S(ON)}$	Drive Leakage Current	DG151, DG153		2	500	nA	$V_D = V_S$ = –7.5V
	$I_{S(OFF)}$	Source Leakage Current			10	1000	nA	V_S = 7.5V, V_D = –7.5V
	$I_{D(OFF)}$	Drain Leakage Current			10	1000	nA	V_D = 7.5V, V_S = –7.5V
	$I_{D(ON)} + I_{S(ON)}$	Drive Leakage Current	DG152, DG154		2	500	nA	$V_D = V_S$ = –7.5V
	$I_{S(OFF)}$	Source Leakage Current			2	200	nA	V_S = 7.5V, V_D = –7.5V
	$I_{D(OFF)}$	Drain Leakage Current			2	200	nA	V_D = 7.5V, V_S = –7.5V
POWER SUPPLY	$I_{1(ON)}$	Positive Power Supply Drain Current	All Circuits		3		mA	One Driver ON, V_{IN} = 2.5V
	$I_{2(ON)}$	Negative Power Supply Drain Current			–1.8		mA	
	$I_{R(ON)}$	Reference Power Supply Drain Current			–1.4		mA	
	$I_{1(OFF)}$	Positive Power Supply Leakage Current			25		µA	Both Drivers OFF, V_{IN} = 0.8V
	$I_{2(OFF)}$	Negative Power Supply Leakage Current			–25		µA	
	$I_{R(OFF)}$	Reference Power Supply Leakage Current			–25		µA	

NOTE: (OFF) and (ON) subscript notation refers to the conduction state of the FET switch for the given test.

ELECTRICAL CHARACTERISTICS PER CHANNEL (cont.)

	SYMBOL (NOTE)	CHARACTERISTIC	TYPE	ABSOLUTE MAX. LIMIT -55°	ABSOLUTE MAX. LIMIT 25°	ABSOLUTE MAX. LIMIT 125°	UNITS	TEST CONDITIONS
SWITCHING	t_{ON}	Turn-On Time	DG126, DG129 DG133, DG134 DG152, DG154		600		ns	See Below
			DG126, DG129 DG133, DG134 DG152, DG154		300	500	ns	
	t_{OFF}	Turn-Off Time	DG126, DG129 DG133, DG134 DG152, DG154		1.6		µs	See Below
			DG126, DG129 DG133, DG134 DG152, DG154		0.8	1.2	µs	
	t_{ON}	Turn-On Time	DG140, DG141 DG151, DG153		1.0		µs	See Below
			DG140, DG141 DG151, DG153		0.5	0.8	µs	
	t_{OFF}	Turn-Off Time	DG140, DG141 DG151, DG153		2.5		µs	See Below
			DG140, DG141 DG151, DG153		1.25	1.8	µs	
POWER	P_{ON}	ON Driver Power	All Circuits		175		mW	Both Inputs V_{IN} = 2.5V
	P_{OFF}	OFF Driver Power			1		mW	Both Inputs V_{IN} = 1V

NOTE: (OFF) and (ON) subscript notation refers to the conduction state of the FET switch for the given test.

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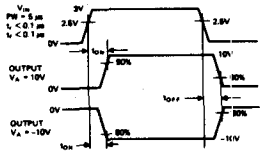
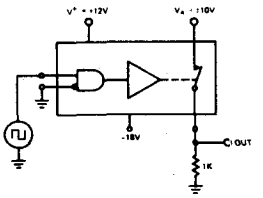
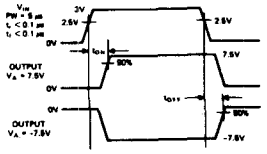
SWITCHING TIMES (at 25°C)

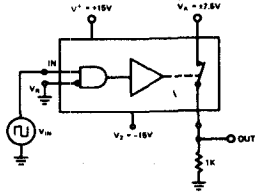
DG126, 129, 133, 134, 140, 141



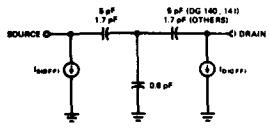


DG151, 152, 153, 154

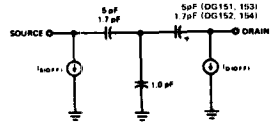




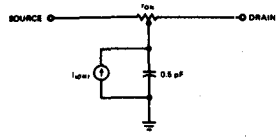
OFF MODEL



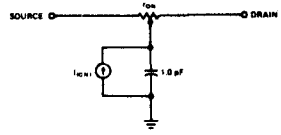
OFF MODEL



ON MODEL



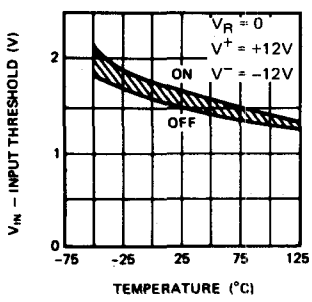
ON MODEL



TYPICAL CHARACTERISTICS (per channel)

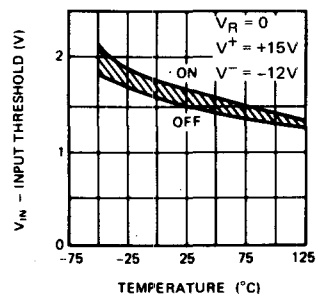
DG126, 129, 133, 134, 140, 141

V_{IN} THRESHOLD vs TEMPERATURE

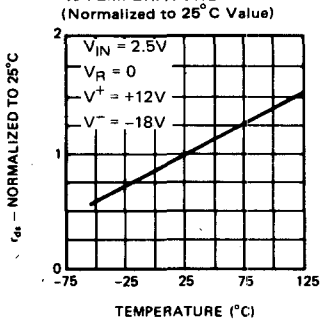


DG151, 152, 153, 154

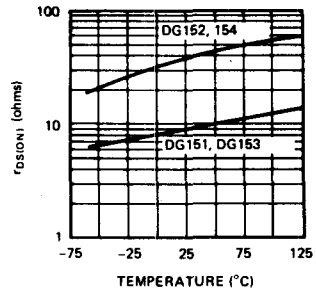
V_{IN} THRESHOLD vs TEMPERATURE



$r_{DS(ON)}$ vs TEMPERATURE (Normalized to 25°C Value)

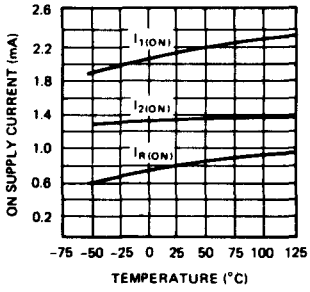


$r_{DS(ON)}$ vs TEMPERATURE

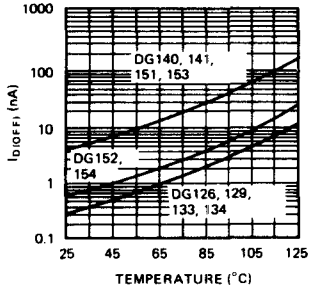


ALL CIRCUITS

ON SUPPLY CURRENT vs TEMPERATURE



$I_{D(OFF)}$ vs TEMPERATURE



OFF SUPPLY CURRENT vs TEMPERATURE