ABSOLUTE MAXIMUM RATINGS*

Voltage on Any Pin Relative to Ground	-0.7V to +7.0V
Operating Temperature	-40° to +85°C
Storage Temperature	-55°C to +125°C
Soldering Temperature	See J-STD-020A Specification

* This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED DC OPERATING CONDITIONS (-40°C to +85°C)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Voltage	V_{CC}	+2.7		5.5	V	1
Input Logic 1	V_{IH}	2.0		V_{CC}+0.5	V	1,2
Input Logic 0	V_{IL}	-0.5		+0.8	V	1,2
Resistor Inputs	L,H,W	GND-0.5		V_{CC}+0.5	V	2
Analog Ground	AGND	GND-0.5		GND+0.5	V	14

DC ELECTRICAL CHARACTERISTICS (-40°C to +85°C; V_{CC}=2.7V to 5.5V)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Current	I_{CC}			2000	mA	12
Input Leakage	I_{LI}	-1		+1	mA	3
Wiper Resistance	R_W		400	1000	W	
Wiper Current	I_W			1	mA	
Logic 1 Output Current @2.4V	I_{OH}	-1.0			mA	2
Logic 0 Output Current @0.4V	I_{OL}			4	mA	2
Standby Current: 3 Volts			22		mA	15
5 Volts			42	80	mA	
Power-Up Time	t_{PU}		50		ms	9

ANALOG RESISTOR CHARACTERISTICS (-40°C to +85°C; V_{CC}=2.7V to 5.5V)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
End to End Resistor Tolerance		-20		+20	%	17
Absolute Tolerance		-1		+1	dB	11
Inter-channel Matching		-0.5		+0.5	dB	6
Tap-to-Tap Tolerance		-0.25		+0.25	dB	7,16
-3 dB Cutoff Frequency	f_{CUTOFF}		700 kHz		kHz	
Temperature Coefficient			750		ppm/°C	
Total Harmonic Distortion (V_{IN}=1V_{RMS}, 1 kHz, Tap = -6 dB)	THD		0.002		%	16
Output Noise (20 Hz to 20 kHz, Grounded Input, Tap=-6 dB)			2.2		mV_{RMS}	
Digital Feedthrough (20 Hz to 20 kHz, Tap=-6 dB)			-90		dB	16
Interchannel Isolation (20 Hz to 20kHz, Tap=-6 dB)			-100		dB	16
Mute Control Active	Mute		-90		dB	

CAPACITANCE (-40°C to +85°C; V_{CC}=2.7V to 5.5V)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Input Capacitance	C_{IN}			5	pF	8
Output Capacitance	C_{OUT}			7	pF	8

AC ELECTRICAL CHARACTERISTICS (-40°C to +85°C; V_{CC}=2.7V to 5.5V)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
CLK Frequency	f_{CLK}	DC		10	MHz	10,13
Width of CLK Pulse	t_{CH}	50			ns	10,13
Data Setup Time	t_{DC}	30			ns	10,13
Data Hold Time	t_{CDH}	10			ns	10,13
Propagation Delay Time Low to High Level Clock to Output	t_{PLH}			50	ns	10,13
Propagation Delay Time Low to High Level	t_{PLH}			50	ns	10,13
$\overline{RST}$ High to Clock Input High	t_{CC}	50			ns	10,13
$\overline{RST}$ Low to Clock Input High	t_{HLT}	50			ns	10,13
CLK Rise Time	t_{CR}			50	ns	10,13
$\overline{RST}$ Inactive	t_{RLT}	200			ns	10,13

AC ELECTRICAL CHARACTERISTICS (PUSHBUTTON INPUTS)

(-40°C to +85°C; V_{CC}=2.7V to 5.5V)

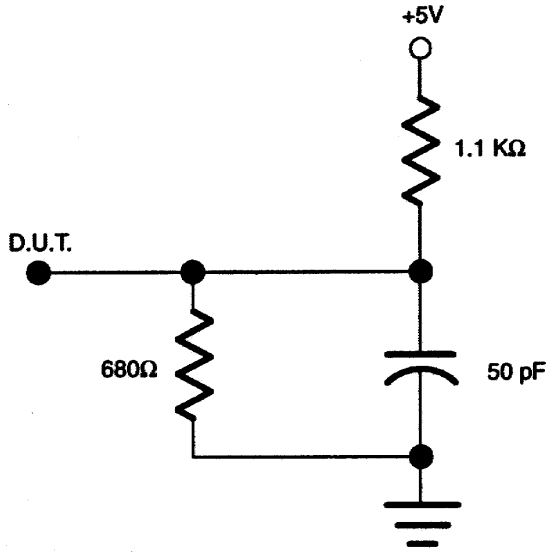
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Single Pulse Input	t_{CPW}	1		DC	ms	3,5,13
Repetitive Input Pulse High Time	t_{HPW}	1		DC	ms	3,5,13
Continuous Input Pulse	t_{CCP}	1		DC	s	3,5,13

NOTES:

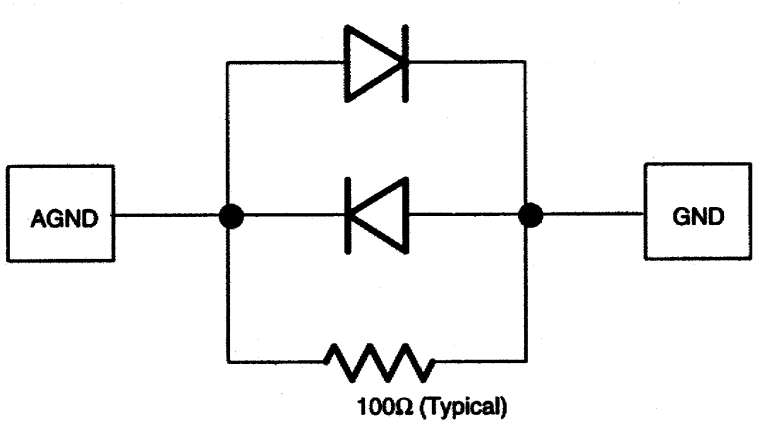
1. All voltages are referenced to ground.
2. Valid for V_{CC}=5V only.
3. Both UCx and DCx inputs are internally pulled up with a 50K resistance.
4. Capacitance values apply at 25°C.
5. Input pulse width is the minimum time required for an input to cause an increment or decrement. If the UCx or DCx inputs is held active for longer than 1 second, subsequent increments or decrements will occur on 100 ms intervals until the inputs UCx, DCx are released. t_{HLT} timing tolerances for pushbutton control is ±30%.
6. Inter-channel matching is used to determine the relative voltage difference in dB between the same tap position on each potentiometer. The DS1802 is specified for ±0.5 dB inter-channel matching.

7. Tap-to-tap tolerance is used to determine the change in voltage between successive tap positions. The DS1802 is specified for ±0.25 dB tap-to-tap tolerance.
8. Typical values are for T_A=25°C and nominal supply voltage.
9. Power-up time is the time for all pushbutton inputs to be stable and active once power has reached a valid level, 2.7V min.
10. See Figure 6.
11. Absolute tolerance is used to determine measured wiper voltage vs. expected wiper voltage as determined by wiper position. The DS1802 is bounded by ±1 dB absolute tolerance.
12. Maximum current specifications are based on clock rate, active-current zero-crossing detection, and pushbutton activation. See Figure 8 for clock rate vs. current specification.
13. Valid for V_{CC}=3V or 5V.
14. See Figure 10.
15. Standby current levels apply when all inputs are driven to appropriate supply levels.
16. These parameters are characterized and not 100% tested.
17. Valid at 25°C only.

DIGITAL OUTPUT LOAD Figure 9



INTERNAL GROUND CONNECTIONS Figure 10



NOTE: GND and AGND must be tied to the same voltage level.