

MILITARY SPECIFICATION

MICROCIRCUITS, LINEAR, REGULATING, PULSE WIDTH MODULATOR, MONOLITHIC SILICON

Reactivated after 30 April 2004 and may be used for either new or existing design acquisition.
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This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product herein shall consist of this specification sheet and MIL-PRF-38535.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic silicon, pulse width modulator microcircuits. Two product assurance classes and a choice of case outlines and lead finishes are provided and are reflected in the complete part number. For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3)

1.2 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-38535, and as specified herein.

1.2.1 Device types. The device types are as follows:

<u>Device type</u>	<u>Circuit</u>
01	Regulating, pulse width modulator
02	Regulating, pulse width modulator
03	Regulating, pulse width modulator
04	Regulating, pulse width modulator

1.2.2 Device class. The device class is the product assurance level as defined in MIL-PRF-38535.

1.2.3 Case outlines. The case outlines are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
E	GDIP1-T16 or CDIP2-T16	16	Dual in line
V	GDIP1-T18 or CDIP2-T18	18	Dual in line

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, 3990 East Broad St., Columbus, OH 43216-5000, or email linear@dsccl.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil .

1.3 Absolute maximum ratings.

Input voltage	42 V
Collector supply voltage:	
Device type 01	42 V
Device types 02, 03, 04	37 V
Output current (each output):	
Device type 01	±100 mA
Device types 02, 03, 04	±200 mA
Reference output current	-50 mA
Oscillator charging current	-5 mA
Logic inputs	-0.3 V to V_{REF}
Analog inputs	-0.3 V to V_{IN}
Lead temperature (soldering, 10 seconds)	+300°C.
Storage temperature range	-65°C to +150°C
Junction temperature (T_J)	+150°C

1.4 Recommended operating conditions.

Input voltage range :	
Device type 01	+8 V to +40 V, class B
Device types 02 and 04 <u>1/</u>	+8 V to +40 V, class S
Device type 03 <u>1/</u>	+8 V to +30 V, class B
Device type 04 <u>1/</u>	+8 V to +27 V, class S
Device type 05 <u>1/</u>	+8 V to +20 V, class B
Device type 06 <u>1/</u>	+8 V to +20 V, class S
Oscillator frequency range :	
Device type 01	10 kHz to 200 kHz
Device types 02 and 04	150 kHz to 300 kHz
Device type 03	100 kHz to 350 kHz
Collector supply voltage:	
Device type 01	+4.5 V to +40 V
Device type 02, 03, and 04	+4.5 V to +35 V
Operating temperature range	-55°C to +125°C

1.5 Power and thermal characteristics.

Package	Case outline	Maximum allowable power dissipation	Maximum θ_{JC}	Maximum θ_{JA}
16 lead dual in line	E	250 mW at $T_A = +125^\circ\text{C}$	60°C/W	100°C/W
18 lead dual in line	V	250 mW at $T_A = +125^\circ\text{C}$	42°C/W	100°C/W

1/ +8 V to +35 V operation is allowed if the maximum junction temperature is not exceeded. Heat sinking may be required.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard for Microelectronics.

MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or www.dodssp.daps.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. Microcircuits furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturers list before contract award (see 4.3 and 6.4).

3.2 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535 and as specified herein or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein.

3.3.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.3.2 Functional block diagrams. The functional block diagrams shall be as specified on figure 2.

3.3.3 Schematic circuits. The schematic circuits shall be maintained by the manufacturer and made available to the qualifying activity and the preparing activity upon request.

3.3.4 Case outlines. The case outlines shall be as specified in 1.2.3.

3.4 Lead material and finish. The lead material and finish shall be in accordance with MIL-PRF-38535 (see 6.6).

3.5 Electrical performance characteristics. The electrical performance characteristics are as specified in table I, and apply over the full recommended ambient operating temperature range, unless otherwise specified.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $V_{IN} = 20 \text{ V dc}$, $R_T = 2 \text{ k}\Omega \pm 0.1 \%$ $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Error amplifier section						
Input offset voltage	V_{IO}	$V_{CM} = 2.5 \text{ V}$	01	-5	5	mV
Input bias current	I_{IB}	$V_{CM} = 2.5 \text{ V}$	01	.01	10	μA
Input offset current	I_{IO}	$V_{CM} = 2.5 \text{ V}$	01	-1	1	μA
Compensation current (sink)	I_{COS1}	$V_{IN(I)} - V_{IN(NI)} \geq 150 \text{ mV}$, $T_C = +25^\circ\text{C}$	01	65	170	μA
Compensation current (source)	I_{COS2}	$V_{IN(IN)} - V_{IN(I)} \geq 150 \text{ mV}$, $T_C = +25^\circ\text{C}$	01	-170	-65	μA
Common mode rejection	CMR	$1.8 \text{ V} \leq V_{CM} \leq 3.4 \text{ V}$	01	70		dB
Open loop voltage gain	A_{VS}	$T_C = +25^\circ\text{C}$	01	72		dB
		$T_C = -55^\circ\text{C}, +125^\circ\text{C}$		68		
Unity gain bandwidth	GBW	$T_C = +25^\circ\text{C}$, see figure 5	01	2		MHz
Reference section						
Output voltage	V_{REF}		01	4.8	5.2	V
Line regulation	V_{RLINE}	$8 \text{ V} \leq V_{IN} \leq 40 \text{ V}$	01	-20	20	mV
Load regulation	V_{RLOAD}	$-20 \text{ mA} \leq I_{REF} \leq 0 \text{ mA}$	01	-50	50	mV
Ripple rejection	$\Delta V_{IN} / \Delta V_{REF}$	$V_{IN} = 20 \text{ V}$, $e_i = 1 \text{ V rms}$, $f = 2400 \text{ Hz}$, $T_C = +25^\circ\text{C}$	01	50		dB
Short circuit current limit	$I_{OS} \underline{1/}$	$t \leq 25 \text{ ms}$, $V_{REF} = 0 \text{ V}$, $T_C = +125^\circ\text{C}$	01	-120		mA
		$t \leq 25 \text{ ms}$, $V_{REF} = 0 \text{ V}$, $T_C = -55^\circ\text{C}, +25^\circ\text{C}$		-190		
Output noise voltage	N_O	$10 \text{ Hz} \leq f \leq 10 \text{ kHz}$, $T_C = +25^\circ\text{C}$	01		200	$\mu\text{V rms}$
Oscillator section						
Maximum frequency	f_{OSC} (MAX)	$R_T = 2 \text{ k}\Omega \pm 0.1 \%$, $C_T = 0.001 \text{ }\mu\text{F} \pm 1.0 \%$	01	250		kHz
Initial frequency Oscillator Frequency	f_{OSC1}	$T_C = +25^\circ\text{C}$	01	47	58	kHz
	f_{OSC2}	$T_C = +125^\circ\text{C}$		45	60	
	f_{OSC3}	$T_C = -55^\circ\text{C}$		45	60	
Frequency change with voltage	$\Delta f_{OSC1} / \Delta V_{IN}$	$8 \text{ V} \leq V_{IN} \leq 40 \text{ V}$, $T_C = +25^\circ\text{C}$	01	-2	2	%

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions $V_{IN} = 20 \text{ V dc}$, $R_T = 2 \text{ k}\Omega \pm 0.1 \%$ $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Oscillator section - continued						
Output amplitude	V_{OSC}		01	2.4		V
Output pulse width	t_{PW}		01	0.3		μs
Ramp voltage	V_{RAMP}		01	3.0	3.8	V
Saturation voltage	V_{SAT} (OSC)	$I_{CT} = 5 \text{ mA}$, $V_{OSC} = 5 \text{ V}$, $T_C = +25^\circ\text{C}$	01	0.7	1.1	V
Comparator section						
Duty cycle adjust <u>2/</u> range	$t_{ON} /$ t_{OSC}	Min value: $V_{CM} = 2.5 \text{ V}$, $V_{comp} = 0.5 \text{ V}$	01		0.001	%
		Max value: $V_{CM} = 2.5 \text{ V}$, $V_{comp} = 3.8 \text{ V}$		45	50	
Output section <u>3/</u>						
Collector leakage current	I_{CEX}	$V_C = 40 \text{ V}$	01		10	μA
Saturation voltage	V_{SAT}	$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$, $I_C = 50 \text{ mA}$	01		2.0	V
Emitter output voltage	V_{EO}	$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$, $T_C = +25^\circ\text{C}$, $V_C = 20 \text{ V}$, $I_E = -50 \text{ mA}$	01	17		V
Rise time	$t_{R(tr)}$	$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$, $R_C = 2 \text{ k}\Omega$, $V_C = 20 \text{ V}$, $T_C = +25^\circ\text{C}$, $C_L = 15 \text{ pF}$	01		0.4	μs
Fall time	$t_{R(tf)}$	$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$, $R_C = 2 \text{ k}\Omega$, $V_C = 20 \text{ V}$, $T_C = +25^\circ\text{C}$, $C_L = 15 \text{ pF}$	01		0.2	μs

See footnotes at end of table.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $V_{IN} = 20 \text{ V dc}$, $R_T = 2 \text{ k}\Omega \pm 0.1 \%$ $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Shutdown circuit section						
Sense voltage	V_{SEN}	$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$, $V_{EOA} = 2 \text{ V}$, $T_C = +25^\circ\text{C}$	01	190	210	mV
		$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$, $V_{EOA} = 2 \text{ V}$, $T_C = -55^\circ\text{C}$, $+125^\circ\text{C}$		165	235	
Shutdown <u>4/</u>	V_{SD} (HI)	$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$	01	1.4		V
	V_{SD} (LO)	$V_{IN(NI)} - V_{IN(I)} \geq 150 \text{ mV}$			0.4	
Total standby current section						
Total standby current	I_{IN}	$V_{IN} = 40 \text{ V}$	01		10	mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions $V_{IN} = 20 \text{ V dc}$, $R_T = 3.6 \text{ k}\Omega \pm 0.1 \%$, $R_D = 0 \text{ k}\Omega$, $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$, $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Reference section						
Output voltage	V_{REF}	$T_C = -55^\circ\text{C}$, $+125^\circ\text{C}$	02, 04	5.0	5.2	V
		$T_C = +25^\circ\text{C}$		5.05	5.15	
Line regulation	V_{RLINE}	$V_{IN} = 8 \text{ V to } 35 \text{ V}$	02, 04	-30	30	mV
Load regulation	V_{RLOAD}	$I_{REF} = 0 \text{ to } -20 \text{ mA}$	02, 04	-50	50	mV
Short circuit current	$I_{OS} \text{ 1/}$	$V_{REF} = 0 \text{ V}$, $t < 25 \text{ ms}$	02, 04	-125		mA
Output noise voltage	N_O	$10 \text{ Hz} \leq f \leq 10 \text{ kHz}$	02, 04		200	$\mu\text{V rms}$
Ripple rejection	$\Delta V_{IN} / \Delta V_{REF}$	$V_{IN} = 20 \text{ V}$, $+1 \text{ V rms}$, $f = 2400 \text{ Hz}$, $T_C = +25^\circ\text{C}$	02, 04	50		dB
Oscillator section						
Initial frequency	f_{OSC}	$T_C = +25^\circ\text{C}$	02, 04	37.5	42.5	kHz
Oscillator frequency over temperature	f_{OSC2}	$T_C = -55^\circ\text{C}$, $+125^\circ\text{C}$	02, 04	36	44	kHz
Saturation voltage	$V_{SAT} \text{ (OSC)}$	$I_{DIS} = 5 \text{ mA}$, $V_{OSC} = 5 \text{ V}$, $T_C = +25^\circ\text{C}$	02, 04	0.5	1.1	V
Clock amplitude	V_{OSC}		02, 04	3.0		V
Clock pulse width	t_{PW}	$T_C = -55^\circ\text{C}$, $+25^\circ\text{C}$	02, 04	0.3	1.0	μs
		$T_C = +125^\circ\text{C}$		0.3	1.4	
Ramp voltage	V_{RAMP}		02, 04	3.0	3.6	V
Voltage stability	$\Delta f_{OSC1} / \Delta V_{IN}$	$V_{IN} = 8 \text{ V to } 35 \text{ V}$, $T_C = +25^\circ\text{C}$	02, 04	-1	1	%
Minimum frequency	$f_{OSC} \text{ (MIN)}$	$R_T = 150 \text{ k}\Omega \pm 0.1 \%$, $C_T = 0.1 \text{ }\mu\text{F} \pm 1.0 \%$, $R_D = 0 \text{ k}\Omega$	02, 04		150	Hz
Maximum frequency	$f_{OSC} \text{ (MAX)}$	$R_T = 2 \text{ k}\Omega \pm 0.1 \%$, $C_T = 0.001 \text{ }\mu\text{F} \pm 1.0 \%$, $R_D = 0 \text{ k}\Omega$	02, 04	300		kHz
Sync <u>4/</u>	$V_{SYNC} \text{ (LO)}$		02, 04		0.8	V
	$V_{SYNC} \text{ (HI)}$			2.8		
Sync input current	I_{SYNC}	Sync voltage = 3.5 V	02, 04		2.5	mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions $V_{IN} = 20 \text{ V dc}$, $R_T = 3.6 \text{ k}\Omega \pm 0.1 \%$ $R_D = 0 \text{ k}\Omega$, $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Error amplifier section						
Input offset voltage	V_{IO}		02, 04	-5	5	mV
Input bias current	I_{IB}		02, 04	.01	10	μA
Input offset current	I_{IO}		02, 04	-1	1	μA
Open loop voltage gain	A_{VS}	$V_{CM} = 2.5 \text{ V}$	02, 04	60		dB
Common mode rejection	CMR	$V_{CM} = 1.5 \text{ V to } 5.2 \text{ V}$	02, 04	60		dB
Supply voltage rejection ratio	PSRR	$V_{IN} = 8 \text{ V to } 35 \text{ V}$	02, 04	60		dB
Unity gain bandwidth	GBW	$A_V = 0 \text{ dB}$, see figure 5, $T_C +25^\circ\text{C}$	02, 04	2		MHz
Output high level	V_{HI}		02, 04	3.8		V
Output low level	V_{LO}		02, 04		0.5	V
P.W.M. comparator section						
Maximum duty cycle	t_{onMAX} / t_{OSC}	$V_{COMP} = 3.6 \text{ V}$ <u>2/</u>	02, 04	45	50	%
Minimum duty cycle	t_{onMIN} / t_{OSC}	$V_{COMP} = 0.6 \text{ V}$ <u>2/</u>	02, 04		0.001	%
Output section <u>5/</u>						
Output low	V_{OL}	$I_{SINK} = 20 \text{ mA}$	02, 04		0.4	V
		$I_{SINK} = 100 \text{ mA}$			2.0	
Output high	V_{OH}	$I_{SOURCE} = -20 \text{ mA}$	02, 04	18		V
		$I_{SOURCE} = -100 \text{ mA}$		17		
Under voltage lockout	V_{UL}		02, 04	6	8	V
Shutdown delay	t_{SD}	$T_C = -55^\circ\text{C}$, $+25^\circ\text{C}$, $V_{SD} = 3 \text{ V}$	02, 04		500	ns
		$T_C = +125^\circ\text{C}$, $V_{SD} = 3 \text{ V}$			700	
Rise time	$t_{R(tr)}$		02, 04		600	ns
Fall time	$t_{R(tf)}$		02, 04		300	ns
V_C standby current	I_C	$V_C = 35 \text{ V}$	02		200	μA

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions $V_{IN} = 20 \text{ V dc}$, $R_T = 3.6 \text{ k}\Omega \pm 0.1 \%$ $R_D = 0 \text{ k}\Omega$, $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Soft start section						
Soft start current	I_{SS}	$V_{SD} = 0 \text{ V}$	02, 04	-80	-25	μA
Shutdown input current	I_{SD}	$V_{SD} = 2.5 \text{ V}$	02, 04		1	mA
Soft start voltage	V_{SS}	$V_{SD} = 2 \text{ V}$	02, 04		0.6	V
Shutdown voltage 4/	$V_{SD}(\text{LO})$		02, 04		0.5	V
	$V_{SD}(\text{HI})$			1.6		
Total supply current	I_{IN}	$T_C = -55^\circ\text{C}$, $+25^\circ\text{C}$, $V_{IN} = 35 \text{ V}$	02, 04		20	mA
		$T_C = +125^\circ\text{C}$, $V_{IN} = 35 \text{ V}$			18	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions $V_{IN} = 15 \text{ V dc}$, $R_T = 4.12 \text{ k}\Omega \pm 0.01 \%$ $R_D = 0 \text{ k}\Omega$, $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Reference section						
Reference output voltage	V_{REF}		03	4.9	5.1	V
Line regulation	V_{RLINE}	$V_{IN} = 8 \text{ V to } 35 \text{ V}$	03	-20	20	mV
Load regulation	V_{RLOAD}	$I_{LOAD} = 0 \text{ to } -20 \text{ mA}$	03	-30	30	mV
Short circuit current	$I_{OS} \text{ 1/}$	$V_{REF} = 0 \text{ V}$, $t < 25 \text{ ms}$	03	-125		mA
Output noise voltage	N_O	$10 \text{ Hz} \leq f \leq 10 \text{ kHz}$, $T_C = +25^\circ\text{C}$	03		200	$\mu\text{V rms}$
Ripple rejection	$\Delta V_{IN} / \Delta V_{REF}$	$V_{IN} = 15 \text{ V}$, $+1 \text{ V rms}$, $T_C = +25^\circ\text{C}$, sinewave at 2.4 kHz	03	50		dB
Oscillator section 6/						
Initial frequency	f_{OSC}	$T_C = +25^\circ\text{C}$	03	38	42	kHz
Voltage stability	$\Delta f_{OSC} / \Delta V_{IN}$	$8 \text{ V} \leq V_{IN} \leq 35 \text{ V}$	03	-1	1	%
Oscillator frequency	f_{OSC2}	$T_C = -55^\circ\text{C}$, $+125^\circ\text{C}$	03	36	44	kHz
Minimum frequency	$f_{OSC} \text{ (MIN)}$	$R_T = 150 \text{ k}\Omega \pm 0.1 \%$, $C_T = 0.20 \text{ }\mu\text{F} \pm 1.0 \%$, $R_D = 0 \text{ k}\Omega$	03		100	Hz
Maximum frequency	$f_{OSC} \text{ (MAX)}$	$R_T = 2 \text{ k}\Omega \pm 0.1 \%$, $C_T = 1.0 \text{ nF} \pm 1.0 \%$, $R_D = 0 \text{ k}\Omega$	03	350		kHz
Clock width	t_{PW}	$T_C = -55^\circ\text{C}$, $+25^\circ\text{C}$	03		2	μs
		$T_C = +125^\circ\text{C}$			3	
Sawtooth peak voltage	V_{RP}	$V_{IN} = 35 \text{ V}$	03	2.5	3.5	V
Sawtooth valley voltage	V_{RV}	$V_{IN} = 8 \text{ V}$	03	0.45		V
Error amplifier section						
Input offset voltage	V_{IO}	$V_{CM} = 2.5 \text{ V}$	03	-5	5	mV
Input bias current	I_{IB}	$V_{CM} = 2.5 \text{ V}$	03	-1		μA
Input offset current	I_{IO}	$V_{CM} = 2.5 \text{ V}$	03	-0.5	0.5	μA
Open loop voltage gain	A_{VS}		03	60		dB
Common mode rejection	CMR	$V_{CM} = 0 \text{ to } 5.2 \text{ V}$	03	70		dB

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions $V_{IN} = 15\text{ V dc}$, $R_T = 4.12\text{ k}\Omega \pm 0.01\%$ $R_D = 0\text{ k}\Omega$, $C_T = 0.01\text{ }\mu\text{F} \pm 0.1\%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Error amplifier section – continued						
Supply voltage rejection ratio	PSRR	$V_{IN} = 8\text{ V to }35\text{ V}$, $V_{CM} = 2.5\text{ V}$	03	66		dB
Unity gain bandwidth	GBW	$A_V = 0\text{ dB}$, see figure 5, $T_C = +25^\circ\text{C}$	03	2		MHz
Output high level	V_{HI}	$V_{pin1} - V_{pin2} \geq 150\text{ mV}$, $I_{COMP} = -100\text{ }\mu\text{A}$	03	3.6		V
Output low level	V_{LO}	$V_{pin1} - V_{pin2} \geq 150\text{ mV}$, $I_{COMP} = 100\text{ }\mu\text{A}$	03		0.4	V
P.W.M. comparator section						
Maximum duty cycle	t_{onMAX} / t_{OSC}	$V_{COMP} = 3.6\text{ V}$ <u>2/</u>	03	45	50	%
Minimum duty cycle	t_{onMIN} / t_{OSC}	$V_{COMP} = 0.4\text{ V}$ <u>2/</u>	03		0.001	%
Output drivers section <u>7/</u>						
Saturation voltage	$V_{CE(SAT)}$	$V_C = 15\text{ V}$, $I_{SINK} = 20\text{ mA}$	03		0.3	V
		$V_C = 15\text{ V}$, $I_{SINK} = 100\text{ mA}$			2.0	
Output high	V_{OH}	$V_C = 15\text{ V}$, $I_{SOURCE} = -20\text{ mA}$	03	12.5		V
		$V_C = 15\text{ V}$, $I_{SOURCE} = -100\text{ mA}$		12.0		
Shutdown delay	t_{SD}	$V_C = 15\text{ V}$, $T_C = -55^\circ\text{C}$, $+25^\circ\text{C}$	03		0.5	μs
		$V_C = 15\text{ V}$, $T_C = +125^\circ\text{C}$			0.7	
Rise time	$t_{R(tr)}$	$V_C = 15\text{ V}$	03		0.3	μs
Fall time	$t_{R(tf)}$	$V_C = 15\text{ V}$	03		0.2	μs
V_C standby current	I_C	$V_C = 35\text{ V}$	03		150	μA
Digital ports: $\overline{\text{SYNC}}$, $\overline{\text{RESET}}$, $\overline{\text{SHUTDOWN}}$						
High input current	I_{IH}	$V_{IH} = 2.4\text{ V}$	03	-200		μA
Low input current	I_{IL}	$V_{IL} = 0.4\text{ V}$	03	-360		μA
High output voltage	V_{OHP}	$I_{SOURCE} = 40\text{ }\mu\text{A}$	03	2.4		V
Low output voltage	V_{OLP}	$I_{SINK} = 3.6\text{ mA}$	03		0.4	V
Current limit comparator section						
Sense voltage	V_S		03	80	120	mV
Input bias current	I_{IBS}		03	-10		μA

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions $V_{IN} = 15 \text{ V dc}$, $R_T = 4.12 \text{ k}\Omega \pm 0.01 \%$ $R_D = 0 \text{ k}\Omega$, $C_T = 0.01 \text{ }\mu\text{F} \pm 0.1 \%$ $-55^\circ\text{C} \leq T_C \leq +125^\circ\text{C}$ unless otherwise specified	Device type	Limits		Units
				Min	Max	
Soft start section						
Error clamp voltage	V_{EC}		03		0.4	V
Capacitor charging current	I_{CS}		03	-150	-50	μA
Under voltage lockout section						
Reset output (low) voltage	$V_R \text{ (LO)}$	$V_{REF} = 3.8 \text{ V}$	03		0.4	V
Reset output (high) voltage	$V_R \text{ (HI)}$	$V_{REF} = 4.8 \text{ V}$	03	2.4		V
Power consumption section						
Standby current	I_{IN}	$\overline{\text{SHUTDOWN}} = 0.4 \text{ V}$, $V_{IN} = 35 \text{ V}$, $T_C = -55^\circ\text{C}$, $+25^\circ\text{C}$	03		30	mA
		$\overline{\text{SHUTDOWN}} = 0.4 \text{ V}$, $V_{IN} = 35 \text{ V}$, $T_C = +125^\circ\text{C}$			25	

1/ Continuous short circuit limits will be less than indicated test limits.

2/ t_{OSC} is the period of the output waveform.

3/ Each output transistor shall be tested for all parameters listed.

4/ This is a go-no-go test, the limit values are used for input voltages.

5/ Each output shall be tested for all parameters listed. $V_C = 20 \text{ V}$ unless otherwise specified.

6/ A $2.7 \text{ k}\Omega$ pullup resistor is added from the Sync pin to V_{REF} to limit the effects of stray capacitance in automatic test equipment.

7/ Each output shall be tested for all parameters listed $V_C = 15 \text{ V}$ unless otherwise specified.

8/ Only use the Shutdown pin, not the Sync pin, to deactivate the device.

3.6 Electrical test requirements. Electrical test requirements for each device class shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table III.

3.7 Marking. Marking shall be in accordance with MIL-PRF-38535.

3.8 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 52 (see MIL-PRF-38535, appendix A).

TABLE II. Electrical test requirements.

MIL-PRF-38535 test requirements	Subgroups (see table III)	
	Class S devices	Class B devices
Interim electrical parameters	1	1
Final electrical test parameters	1*, 2, 3, 4, 5, 6	1*, 2, 3, 4, 5, 6
Group A test requirements	1, 2, 3, 4, 5, 6, 7, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 9, 10, 11
Group B electrical test parameters when using the method 5005 QCI option	1, 2, 3, and table IV delta limits	N/A
Group C end-point electrical parameters	1, 2, 3, and table IV delta limits	1 and table IV delta limits
Group D end-point electrical parameters	1, 2, 3	1

*PDA applies to subgroup 1.

4. VERIFICATION.

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not effect the form, fit, or function as described herein.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38535, and shall be conducted on all devices prior to qualification and quality conformance inspection. The following additional criteria shall apply:

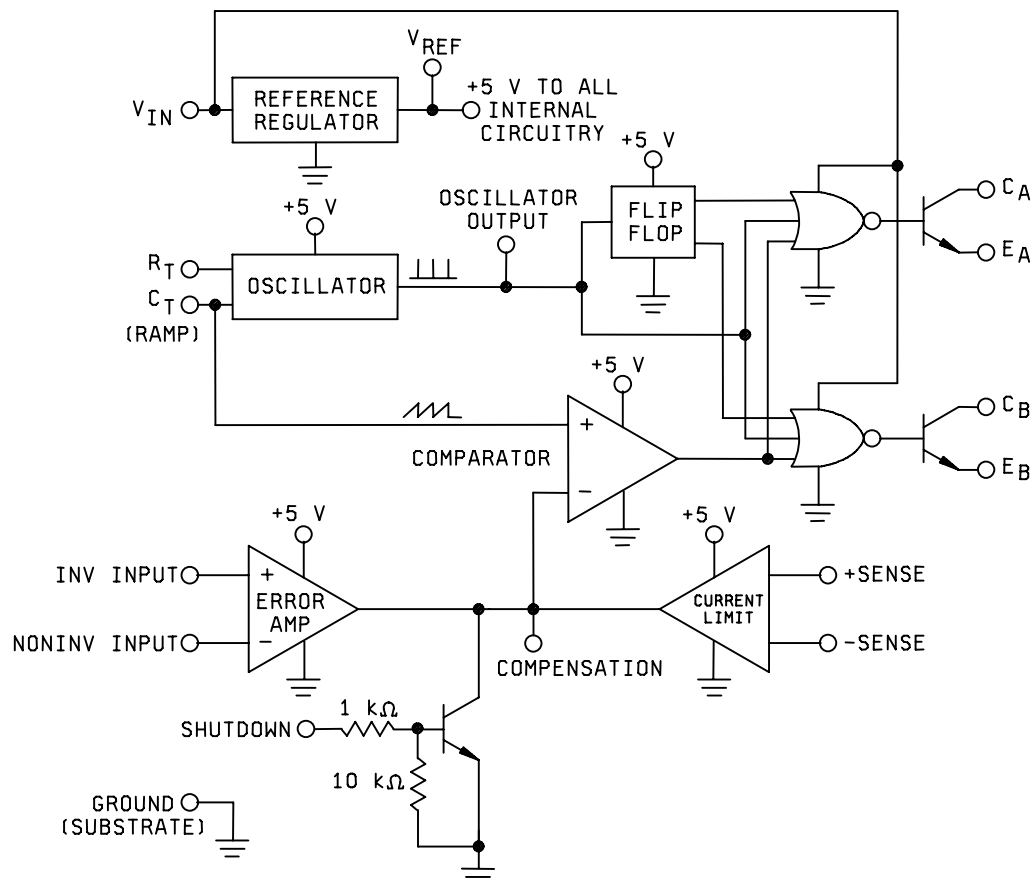
- a. The burn-in test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.
- b. Interim and final electrical test parameters shall be as specified in table II, except interim electrical parameters test prior to burn-in is optional at the discretion of the manufacturer.
- c. Additional screening for space level product shall be as specified in MIL-PRF-38535.

4.3 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-38535.

Device types	01	02 and 04	03 and 04
Case outlines	E	E	V
Terminal number	Terminal symbol		
1	INV INPUT	INV INPUT	+ERROR
2	NONINV INPUT	NONINV INPUT	-ERROR
3	OSC OUTPUT	SYNC	COMP
4	+CUR LIM SENSE	OSC OUTPUT	C _{SS}
5	-CUR LIM SENSE	C _T	$\overline{\text{RESET}}$
6	R _T	R _T	-CURRENT SENSE
7	C _T	DISCHARGE	+CURRENT SENSE
8	GND	SOFT START	$\overline{\text{SHUTDOWN}}$
9	COMPENSATION	COMPENSATION	R _T
10	SHUTDOWN	SHUTDOWN	C _T
11	EMITTER A	OUTPUT A	R _D
12	COLLECTOR A	GROUND	$\overline{\text{SYNC}}$
13	COLLECTOR B	V _C	OUTPUT A
14	EMITTER B	OUTPUT B	V _C
15	V _{IN}	V _{IN}	GROUND
16	V _{REF}	V _{REF}	OUTPUT B
17	---	---	V _{IN}
18	---	---	V _{REF}

Figure 1. Terminal connections.

DEVICE TYPE 01

FIGURE 2. Functional block diagram.

DEVICE TYPES 02 AND 04

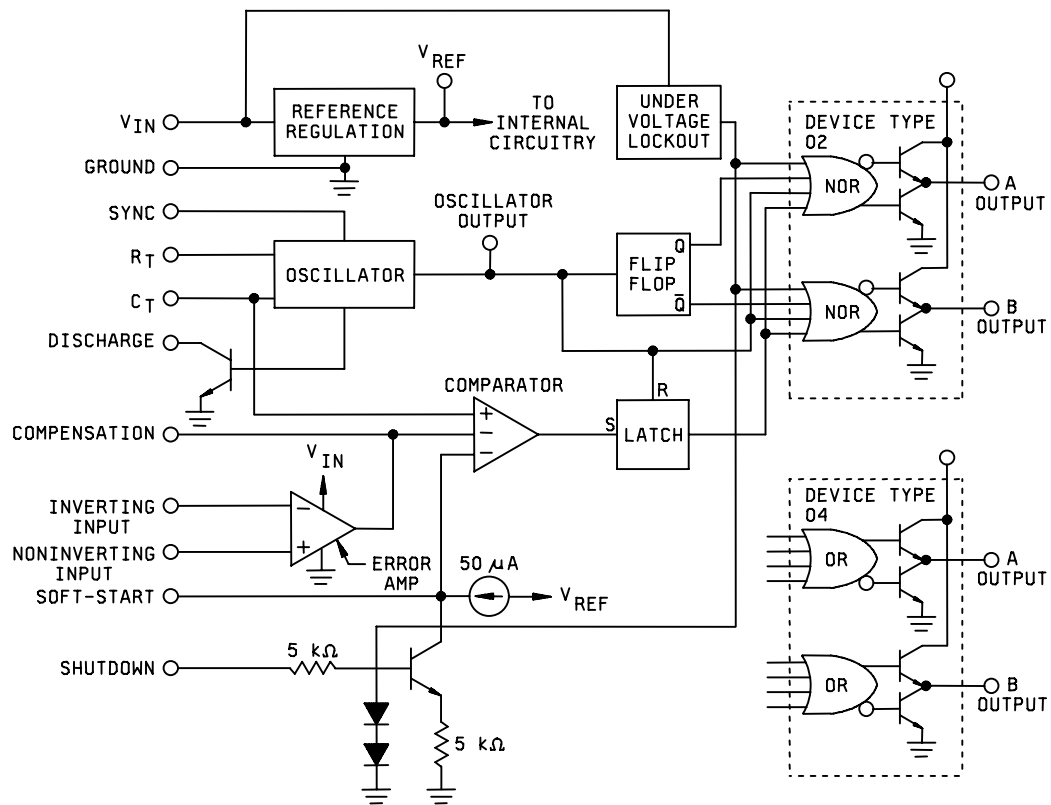
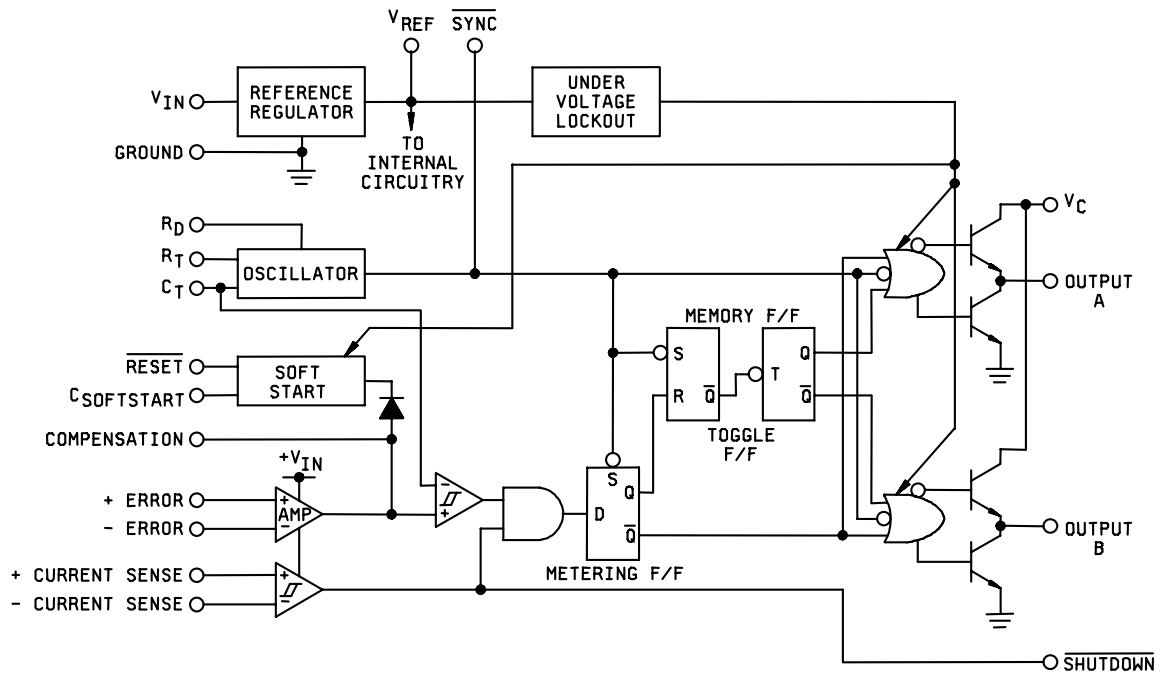
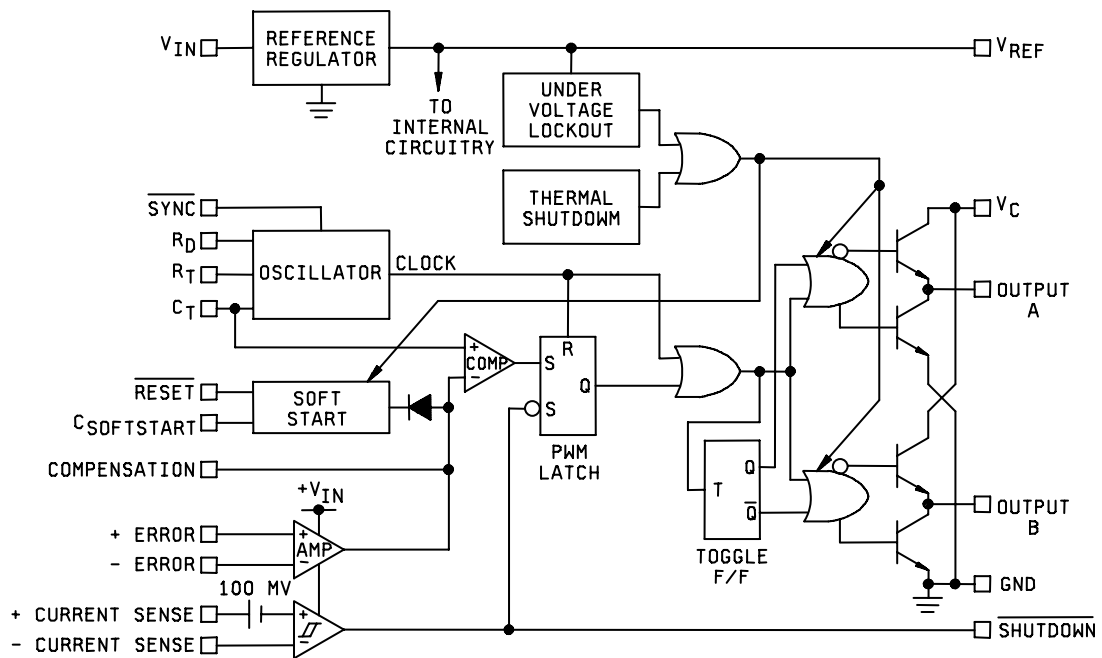


FIGURE 2. Functional block diagram - Continued.

DEVICE TYPE 03

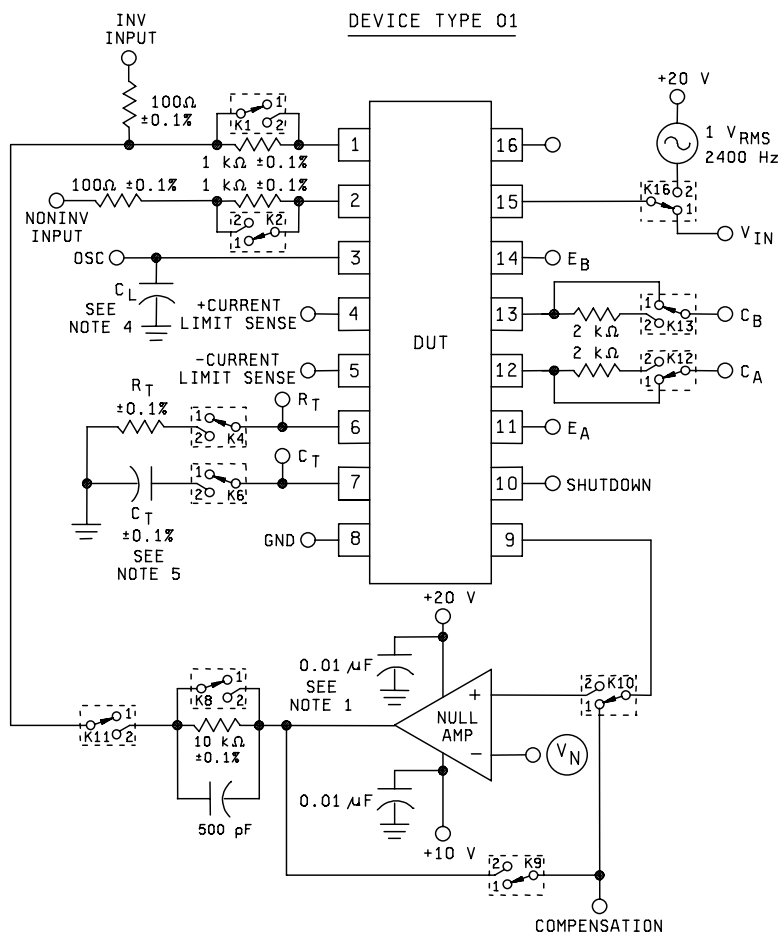
FIGURE 2. Functional block diagram – Continued.

DEVICE TYPE 03
(UNITRODE/TEXAS INSTRUMENTS)



NOTE: The oscillator's $\overline{SYNC}$ (pin 12) is not connected to the output gates.

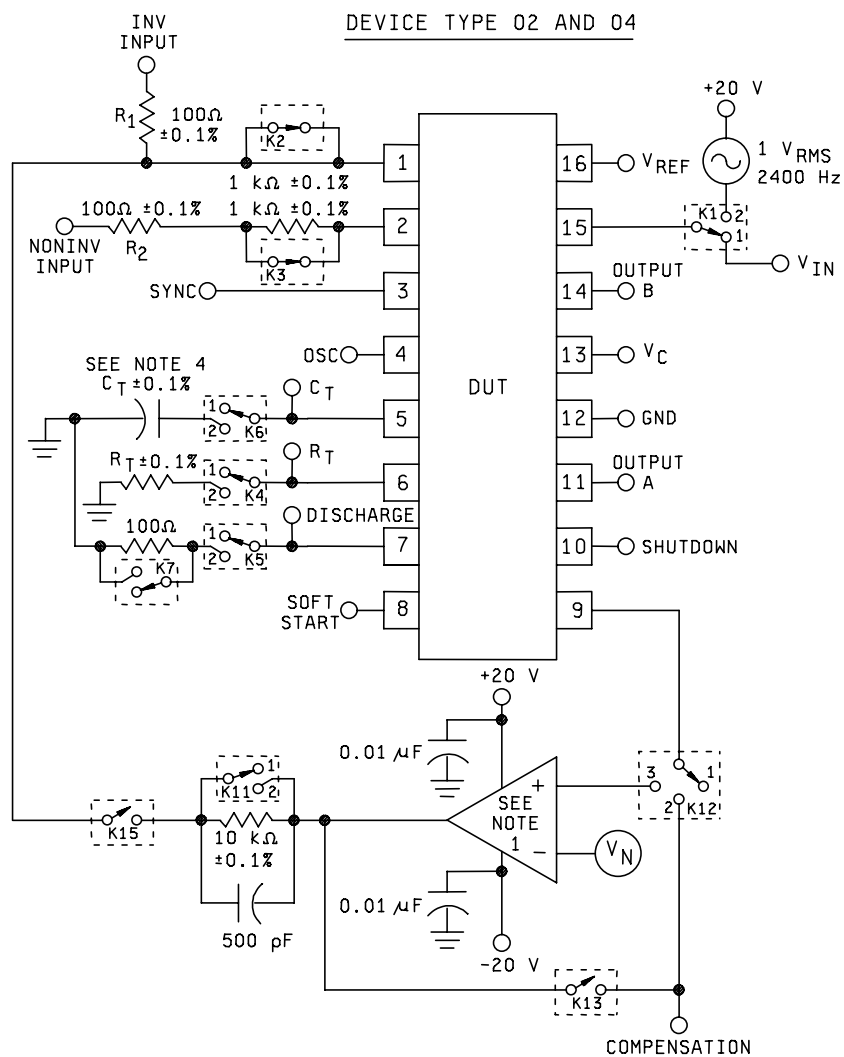
FIGURE 2. Functional block diagram – Continued.



NOTES:

1. Operational amplifier is M38510/13502 or similar.
2. Resistors are $\pm 1\%$ and capacitors are $\pm 10\%$ unless otherwise specified.
3. $V_N = 2.5\text{ V}$ unless otherwise specified in table III.
4. $C_L \leq 20\text{ pF}$ (including probe and jig capacitance).
5. $\pm 1.0\%$ for $t_{OSC}(\text{max})$ test.

FIGURE 3. Test circuit for static and dynamic tests.



NOTES:

1. Operational amplifier is M38510/13502 or similar.
2. Resistors are $\pm 1\%$ and capacitors are $\pm 10\%$ unless otherwise specified.
3. $V_N = 2.5\text{ V}$ unless otherwise specified in table III.
4. $\pm 1.0\%$ for $f_{osc}(\text{min})$ and $f_{osc}(\text{max})$ test.

FIGURE 3. Test circuit for static and dynamic tests – Continued.



NOTES:

- Operational amplifier is M38510/13502 or similar.
- Resistors are $\pm 1\%$ and capacitors are $\pm 10\%$ unless otherwise specified.
- $V_N = 2.5\text{ V}$ unless otherwise specified in table III.
- $\pm 1.0\%$ for $f_{OSC}(\text{min})$ and $f_{OSC}(\text{max})$ test.

FIGURE 3. Test circuit for static and dynamic tests – Continued.

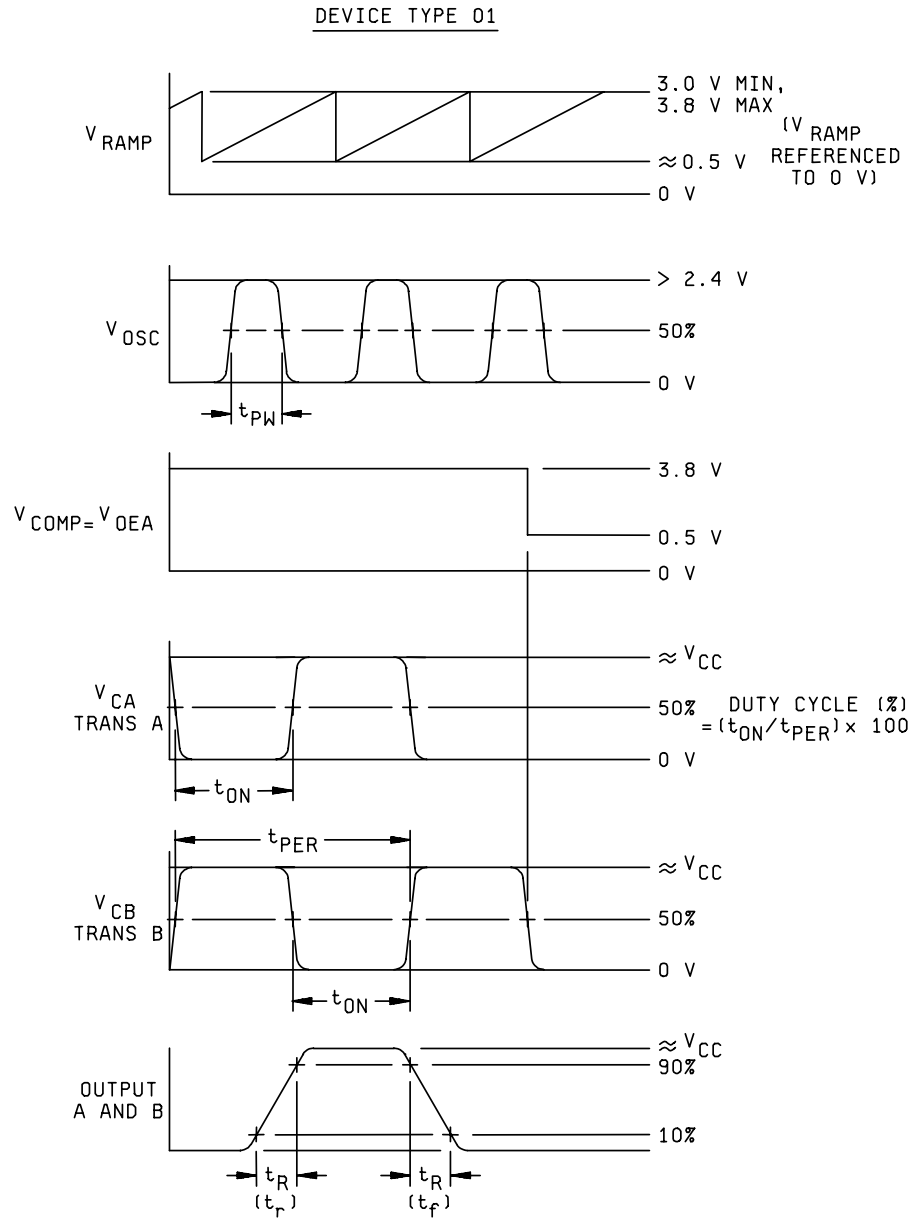
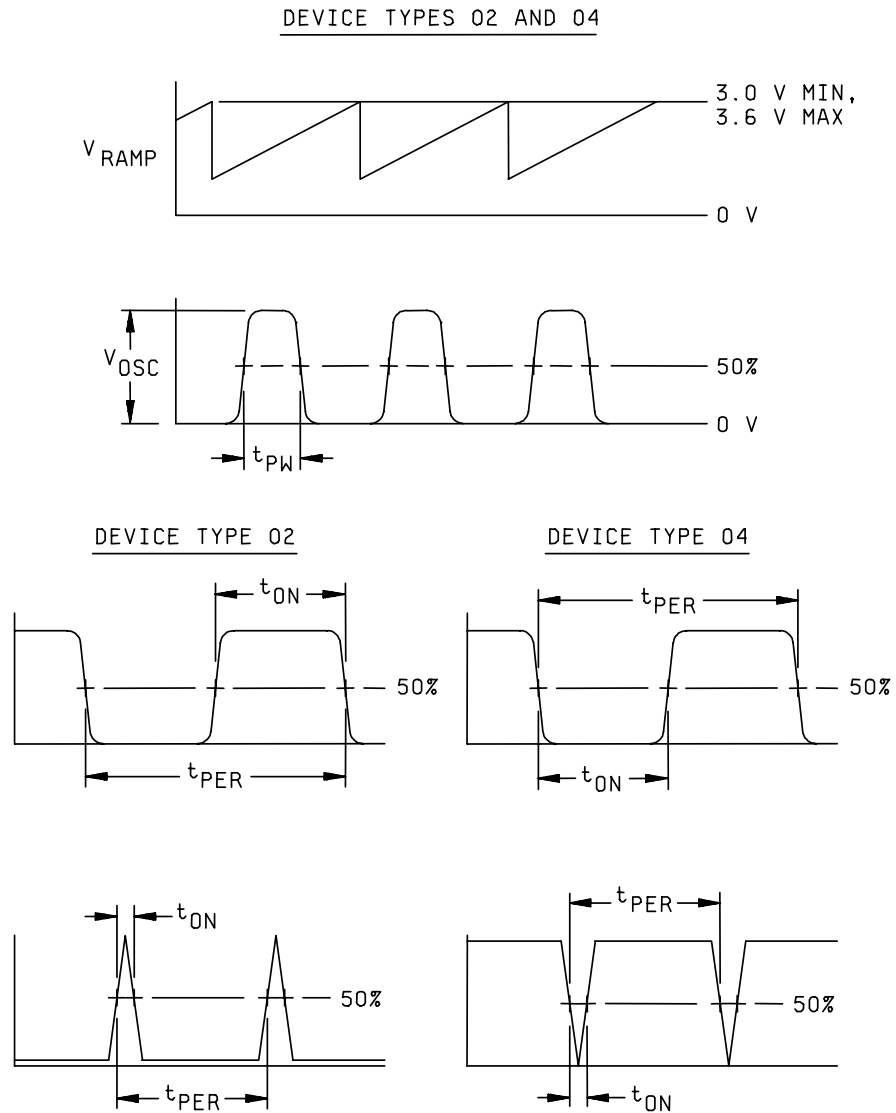


FIGURE 4. Test waveforms.



- a. Maximum duty cycle
- b. Approximate minimum duty cycle (actual = 0%). Duty cycle (%) = $(t_{ON} / t_{PER}) \times 100$.

FIGURE 4. Test waveforms – Continued.

DEVICE TYPES 02 AND 04

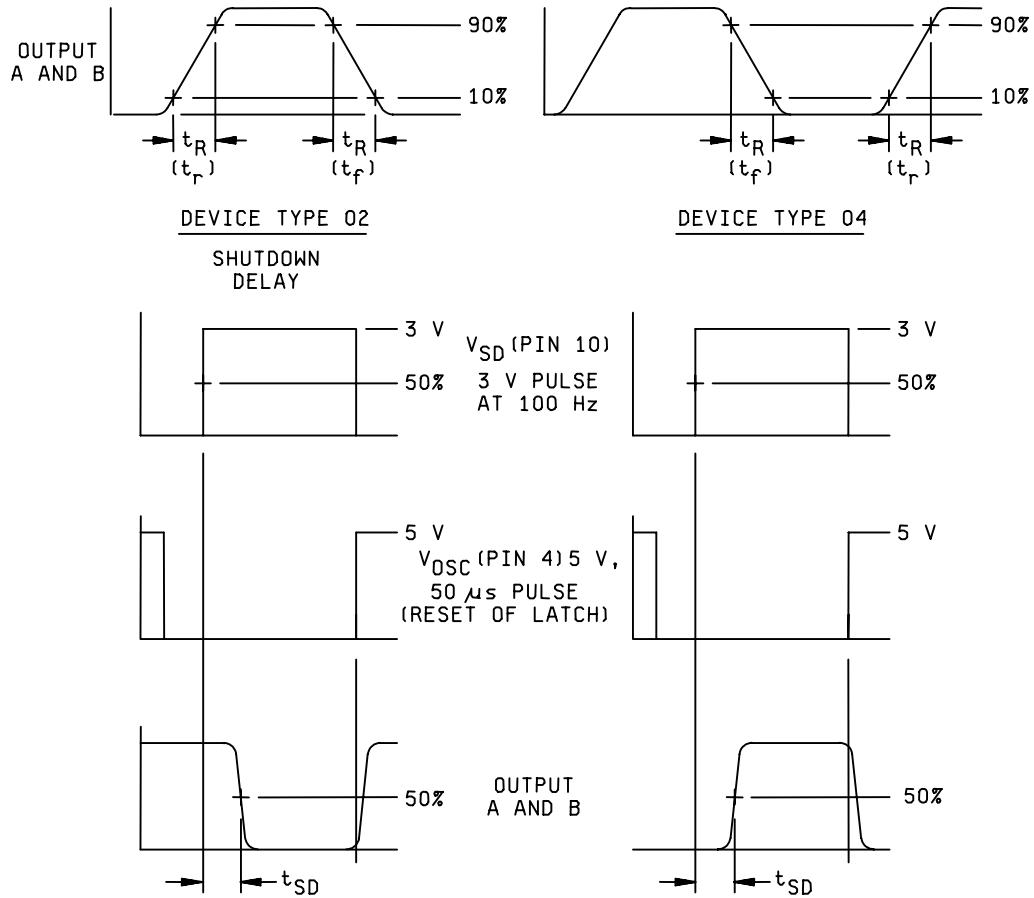


FIGURE 4. Test waveforms – Continued.

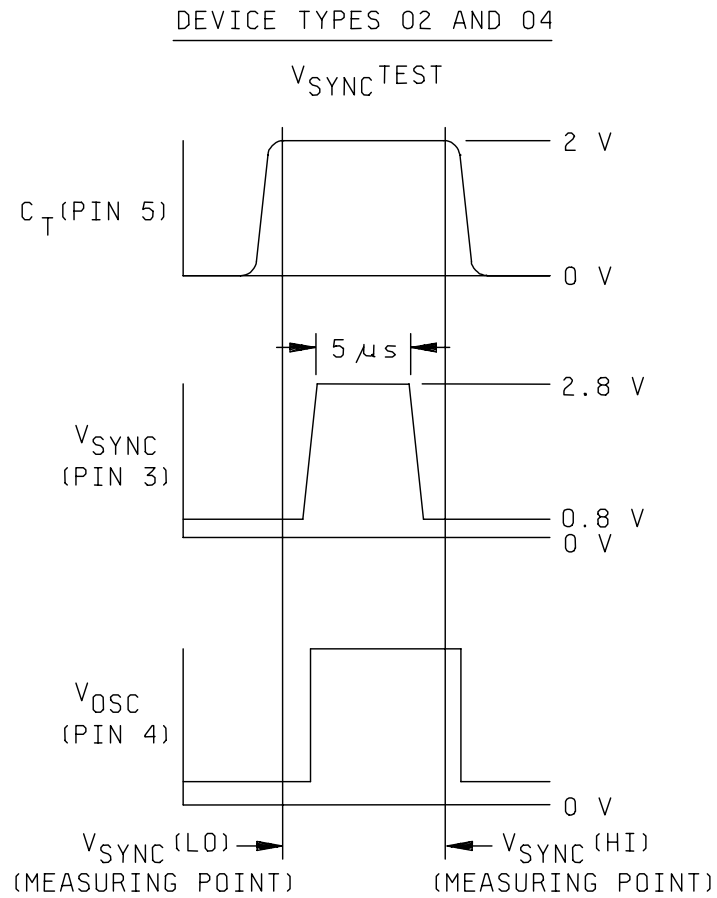
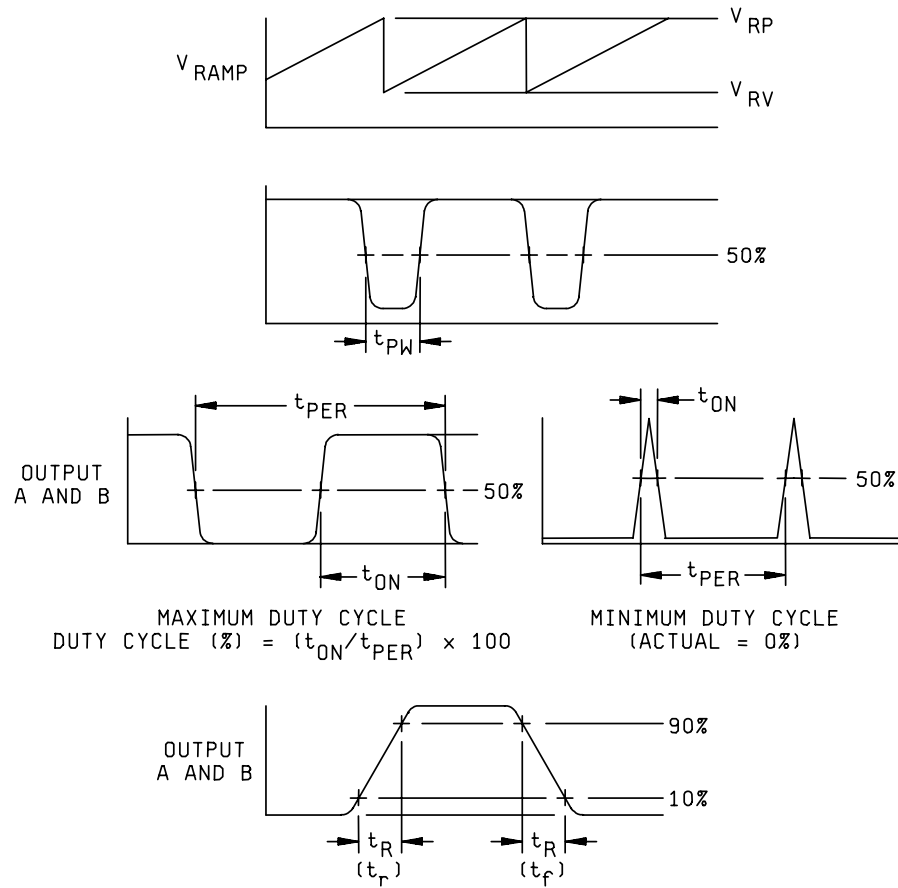


FIGURE 4. Test waveforms – Continued.

DEVICE TYPE 03FIGURE 4. Test waveforms – Continued.

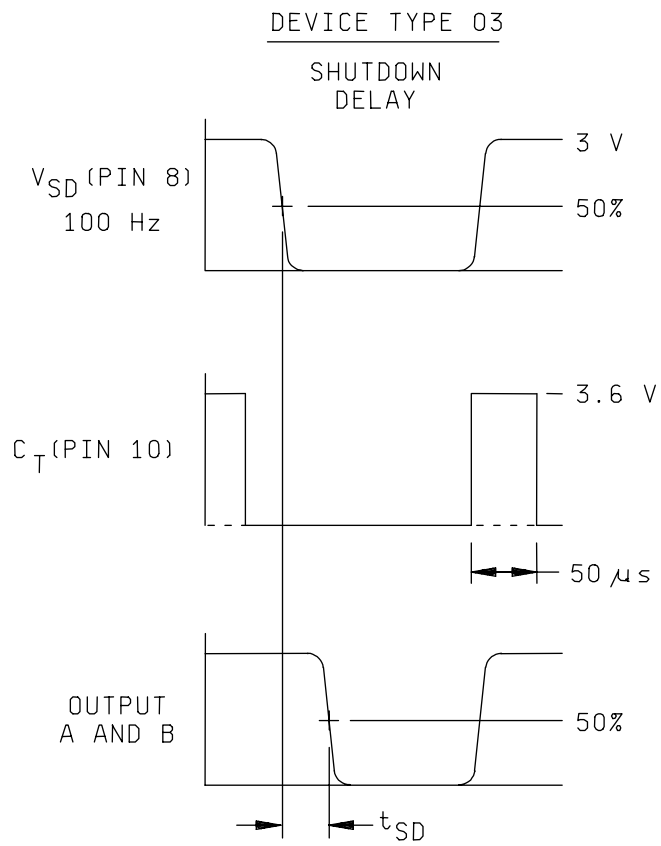
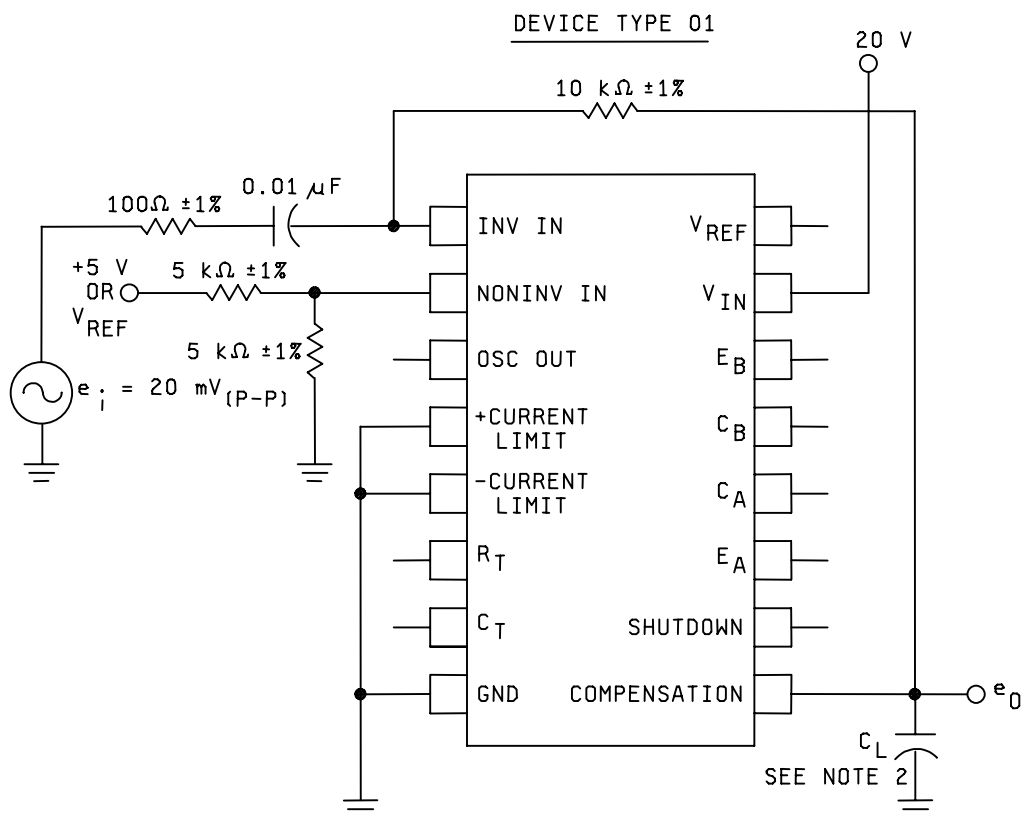


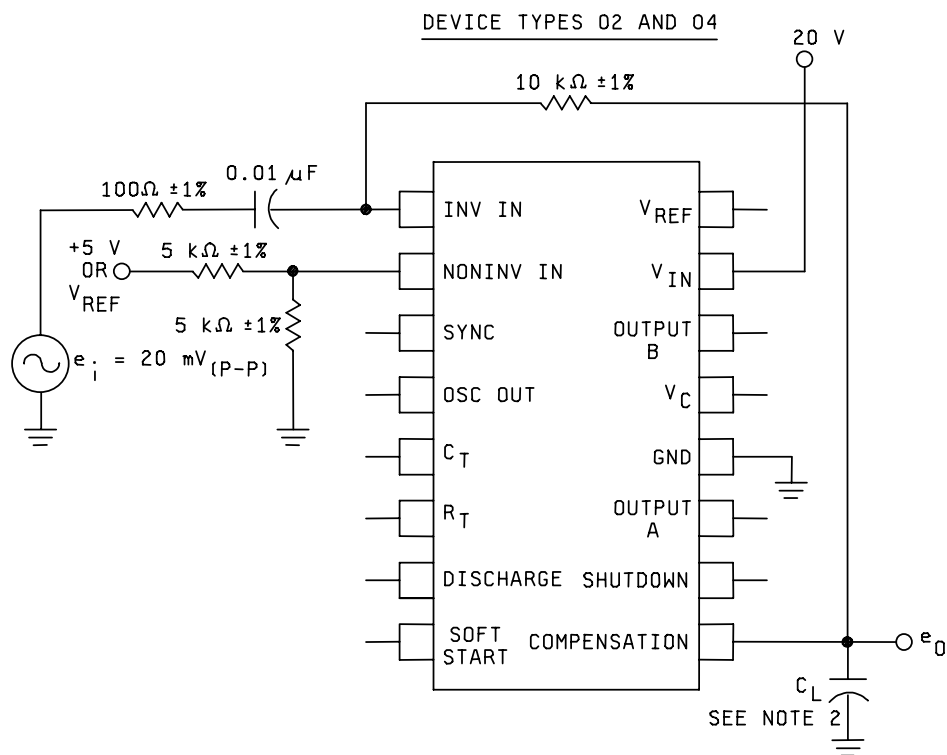
FIGURE 4. Test waveforms – Continued.



NOTES:

1. G_{BW} is measured by increasing signal frequency (starting at 100 kHz) until $e_O = 20 \text{ mV}_{(P-P)}$. The frequency at which this occurs is G_{BW} .
2. (C_L) capacitance load = 20 pF, -10%, on e_O including scope probe and jig capacitance.
3. Alternative method: Set signal frequency (e_i) to the G_{BW} minimum limit if $e_O \geq 20 \text{ mV}_{(P-P)}$ then G_{BW} is $\geq$ the minimum limit.

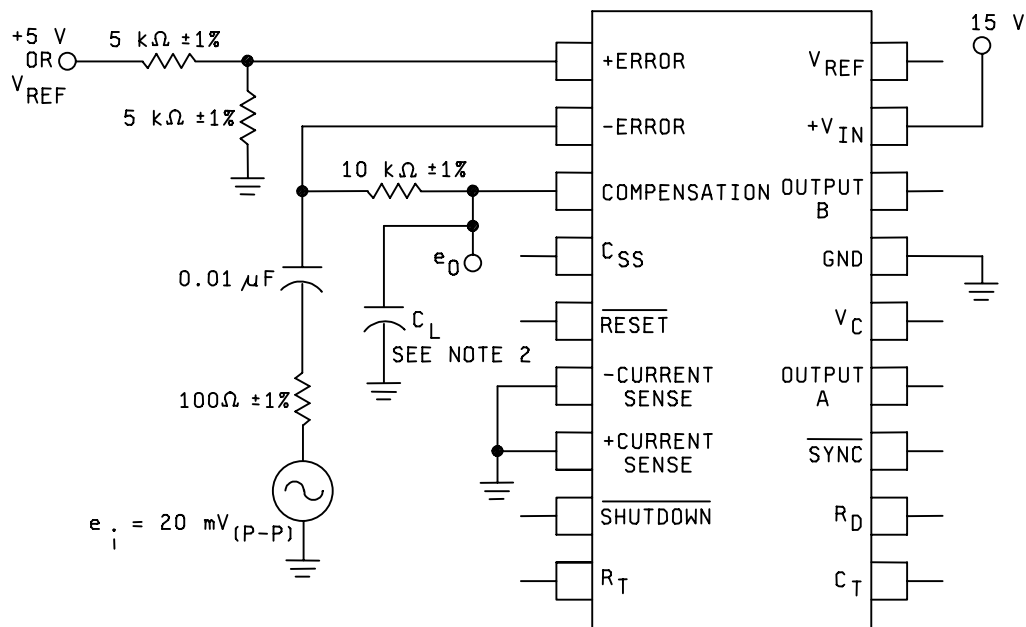
FIGURE 5. Unity gain bandwidth test circuit.



NOTES:

1. G_{BW} is measured by increasing signal frequency (starting at 100 kHz) until $e_o = 20 \text{ mV (P-P)}$. The frequency at which this occurs is G_{BW} .
2. (C_L) capacitance load = 20 pF, -10%, on e_o including scope probe and jig capacitance.
3. Alternative method: Set signal frequency (e_i) to the G_{BW} minimum limit if $e_o \geq 20 \text{ mV (P-P)}$ then G_{BW} is $\geq$ the minimum limit.

FIGURE 5. Unity gain bandwidth test circuit – Continued.

DEVICE TYPE 03

NOTES:

1. G_{BW} is measured by increasing signal frequency (starting at 100 kHz) until $e_O = 20\text{ mV(P-P)}$. The frequency at which this occurs is G_{BW} .
2. (C_L) capacitance load = 20 pF, -10%, on e_O including scope probe and jig capacitance.
3. Alternative method: Set signal frequency (e_i) to the G_{BW} minimum limit if $e_O \geq 20\text{ mV(P-P)}$ then G_{BW} is $\geq$ the minimum limit.

FIGURE 5. Unity gain bandwidth test circuit – Continued.

TABLE III. Group A inspection for device type 01.

Subgroup		Symbol	Test no.	Adapter pin numbers															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Tc = +25°C	V _{IO}	1	INV INPUT 2.5 V	NONINV INPUT 2.5 V	OSC	+CL GND	-CL GND	Q _{RT}	T	GND	COMP	SHUT DOWN	C EA	C A	E B	V B	V IN	REF
		+I _{IB}	2	"	"		"	"			"							"	
		-I _{IB}	3	"	"		"	"			"							"	
		I _{COS1}	4	2.575 V	2.425 V		"	"				"	I ₁ to 2.5 V		"				
		I _{COS2}	5	2.425 V	2.575 V		"	"				"	I ₂ to 2.5 V		"				
		I _{IO}	6																
		CMR	7	1.8 V 3.4 V	1.8 V 3.4 V		GND	GND			GND							20 V	
		V _{REF}	8	2.5 V	2.5 V		"	"				"						"	
		V _{RLINE}	9	"	"		"	"				"						8 V	
				"	"		"	"				"						40 V	-20 mA
2	Tc = +125°C	V _{RLOAD}	10	"	"		"	"			"							20 V	0 V
		I _{OS}	11	"	"		"	"			"							"	
		V _{SAT (OSC)}	12	"	"	5 V	"	"		5 mA	"							"	
		I _{CEX(A)}	13	"	"		"	"			"		1.4 V	GND	40 V			"	
		I _{CEX(B)}	14	"	"		"	"			"		1.4 V			40 V	GND	"	
		V _{SAT(A)}	15	2.425 V	2.575 V	1/	"	"				"			GND	50 mA		"	
		V _{SAT(B)}	16	"	"	"	"	"			"						50 mA	GND	"
		V _{EO(A)}	17	"	"	"	"	"			"				-50 mA	20 V		"	
		V _{EO(B)}	18	"	"	"	"	"			"						20 V	-50 mA	"
		I _{IN}	19	2.5 V	2.5 V		"	"			"								40 V
3	Tc = +125°C	V _{IO}	20	2.5 V	2.5 V		GND	GND			GND							20 V	
		+I _{IB}	21	"	"		"	"			"							"	
		-I _{IB}	22	"	"		"	"			"							"	
		I _{IO}	23																
		CMR	24	1.8 V 3.4 V	1.8 V 3.4 V		GND	GND			GND								20 V
		V _{REF}	25	2.5 V	2.5 V		"	"			"							"	
		V _{RLINE}	26	"	"		"	"			"							8 V	
				"	"		"	"			"							40 V	-20 mA
		V _{RLOAD}	27	"	"		"	"			"							20 V	0 V
		I _{OS}	28	"	"		"	"			"							"	
		I _{CEX(A)}	29	"	"		"	"			"		1.4 V	GND	40 V			"	
		I _{CEX(B)}	30	"	"		"	"			"		1.4 V			40 V	GND	"	
		V _{SAT(A)}	31	2.425 V	2.575 V	1/	"	"			"			GND	50 mA			"	
		V _{SAT(B)}	32	"	"	"	"	"			"						50 mA	GND	"
		I _{IN}	33	2.5 V	2.5 V		"	"			"								40 V
34 to 47		All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 2, T _C = +125°C. Except for I _{OS} at -55°C. The minimum limit is -190 mA.																	
Tc = -55°C																			
See footnote at end of table.																			

See footnote at end of table.

TABLE III. Group A inspection for device type 01 – Continued.

Subgroup	Symbol	Test no.	Energized relays				Equations and notes	Limits		Unit
				No.	Value	Unit		Min	Max	
1 T _c = +25°C	V _{IO}	1	K1, K2, K9, K10, K11	9	E1	V	V _{IO} = (E1 – 2.5 V) / 101	-5	5	mV
	+I _{IB}	2	K1, K9, K10, K11	9	E2	"	+I _{IB} = (E1 – E2) / 101000	0.01	10	μA
	-I _{IB}	3	K2, K9, K10, K11	9	E3	"	-I _{IB} = (E3 – E1) / 101000	0.01	10	μA
	I _{COS1}	4		9	I1	μA	I _{COS1} = I1	65	170	μA
	I _{COS2}	5		9	I2	"	I _{COS2} = I2	-170	-65	μA
	I _{IO}	6					I _{IO} = (+I _{IB}) – (-I _{IB})	-1	1	μA
	CMR	7	K1, K2, K9, K10, K11	9	E4	V	CMR = 20 log [(3.4 – 1.8) 101 / (E5 – E4 – 1.6)]	70		dB
	V _{REF}	8		9	E5	"				
	V _{RLINE}	9		16	E6	"	V _{REF} = E6	4.8	5.2	V
				"	E7	"	V _{RLINE} = E8 – E7	-20	20	mV
				"	E8	"				
	V _{RLOAD}	10		"	E9	"	V _{RLOAD} = E9 – E6	-50	50	mV
	I _{OS}	11		"	I3	mA	I _{OS} = I3	-190		mA
	V _{SAT} (OSC)	12		7	E10	V	V _{SAT} (OSC) = E10	0.7	1.1	V
	I _{CEX} (A)	13		12	14	μA	I _{CEX} (A) = I4		10	μA
	I _{CEX} (B)	14		13	15	μA	I _{CEX} (B) = I5		10	μA
	V _{SAT} (A)	15		12	E11	V	V _{SAT} (A) = E11		2.0	V
	V _{SAT} (B)	16		13	E12	"	V _{SAT} (B) = E12		2.0	V
	V _{EO} (A)	17		11	E13	"	V _{EO} (A) = E13	17		V
	V _{EO} (B)	18		14	E14	"	V _{EO} (B) = E14	17		V
	I _{IN}	19		15	I6	mA	I _{IN} = I6		10	mA
2 T _c = +125°C	V _{IO}	20	K1, K2, K9, K10, K11	9	E15	V	V _{IO} = (E15 – 2.5 V) / 101	-5	5	mV
	+I _{IB}	21	K1, K9, K10, K11	9	E16	"	+I _{IB} = (E15 – E16) / 101000	0.01	10	μA
	-I _{IB}	22	K2, K9, K10, K11	9	E17	"	-I _{IB} = (E17 – E15) / 101000	0.01	10	μA
	I _{IO}	23					I _{IO} = (+I _{IB}) – (-I _{IB})	-1	1	μA
	CMR	24	K1, K2, K9, K10, K11	9	E18	V	CMR = 20 log [(3.4 – 1.8) 101 / (E19 – E18 – 1.6)]	70		dB
				9	E19	"				
	V _{REF}	25		16	E20	"	V _{REF} = E20	4.8	5.2	V
	V _{RLINE}	26		"	E21	"	V _{RLINE} = E22 – E21	-20	20	mV
				"	E22	"				
	V _{RLOAD}	27		"	E23	"	V _{RLOAD} = E23 – E20	-50	50	mV
	I _{OS}	28		"	I7	mA	I _{OS} = I7	-120		mA
3 T _c = -55°C	I _{CEX} (A)	29		12	I8	μA	I _{CEX} (A) = I8		10	μA
	I _{CEX} (B)	30		13	I9	μA	I _{CEX} (B) = I9		10	μA
	V _{SAT} (A)	31		12	E24	V	V _{SAT} (A) = E24		2.0	V
	V _{SAT} (B)	32		13	E25	"	V _{SAT} (B) = E25		2.0	V
	I _{IN}	33		15	I10	mA	I _{IN} = I10		10	mA
		34 to 47								

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 – Continued.

Subgroup	Symbol	Test no.	Adapter pin numbers																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
4 Tc = +25°C	A _V S	48	INV INPUT 2.5 V	NONINV INPUT 2.5 V	OSC	+CL	-CL	CRT	T	GND	COMP	SHUT DOWN	C EA	C A	E B	V B	V _{IN}	REF	
	ΔV _{IN} / ΔV _{REF}	49	"	"						GND							20 V		
	f _{OSC} (MAX)	50	"	"		GND	GND	2 kΩ	.001 μF	"							20 V		
	f _{OSC1}	51	"	"		"	"	"	3/	"							20 V		
	Δf _{OSC1} / ΔV _{IN}	52	"	"		"	"	"	.01 μF	"							20 V + 1 V rms		
	V _{OSC}	53	2.5 V	2.5 V		"	"	"	"	"							20 V		
	V _{RAMP}	54				"	"	"	"	"							20 V		
	V _{SEN}	55	2.425 V	2.575 V			"	"	"	"							20 V		
	V _{SD} (HI)	56	"	"		GND	"	"	"	"			1.4 V	GND		GND	20 V		
	V _{SD} (LO)	57	"	"		"	"	"	"	"			0.4 V	"		"	"		
5 Tc = +125°C	A _V S	58	2.5 V	2.5 V		GND	GND			GND							20 V		
	f _{OSC} (MAX)	59	"	"		"	"			"							20 V		
	f _{OSC2}	60	"	"		GND	GND	2 kΩ	.001 μF	"							20 V		
	V _{OSC}	61	2.5 V	2.5 V		"	"	"	3/	"							20 V		
	V _{RAMP}	62	"	"		"	"	"	.01 μF	"							20 V		
	V _{SEN}	63	2.425 V	2.575 V		"	"	"	"	"							20 V		
	V _{SD} (HI)	64	"	"		GND	"		"	"		1.4 V	GND		GND	20 V			
	V _{SD} (LO)	65	"	"		"	"		"	"		0.4 V	"		"	"	20 V		
				All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 5, Tc = +125°C.															
	6 Tc = -55°C	GBW	74																
No		75	2.5 V	2.5 V		GND	GND			GND							20 V		
t _{pw}		76	2.5 V	2.5 V		GND	GND	2 kΩ	.01 μF	"							20 V		
t _{ON} (A) _{MAX} / t _{OSC}		77	V _{CM} = 2.5 V			"	"	"	"	"	3.8 V		"	"	"	"	"		
t _{ON} (A) _{MIN} / t _{OSC}		78	"			"	"	"	"	"	0.5 V		"	"	"	"	"		
t _{ON} (B) _{MAX} / t _{OSC}		79	"			"	"	"	"	"	3.8 V		"	"	"	"	"		
t _{ON} (B) _{MIN} / t _{OSC}		80	"			"	"	"	"	"	0.5 V		"	"	"	"	"		
t _r (t _r) _A		81	2.425 V	2.575 V		"	"	"	"	"							"		
t _r (t _r) _A		82	"			"	"	"	"	"							"		
t _r (t _r) _B		83	"			"	"	"	"	"							"		
9 Tc = +25°C	t _r (t _r) _B	84	"			"	"	"	"	"							"		

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 – Continued.

Subgroup	Symbol	Test no.	Energized relays	Equations and notes			Limits		Unit
				No.	Value	Unit	Min	Max	
4 T _c = +25°C	A _{VS}	48	K1, K2, K9, K10, K11	9	E37	V	72		dB
	ΔV _{IN} / ΔV _{REF}	49	K1, K2, K9, K10, K11	9	E38	"			dB
	f _{OSC} (MAX)	50	K4, K6	3	f1	kHz	250		kHz
	f _{OSC1}	51	"	"	f2	"	47	58	kHz
	Δf _{OSC1} / ΔV _{IN}	52	"	"	f3	"	-2	2	%
	V _{OSC}	53	"	"	E40	"	2.4		V
	V _{RAMP}	54	"	7	E41	"	3.0	3.8	V
	V _{SEN}	55	"	4	E42	"	190	210	mV
	V _{SD} (HI)	56	K6	9	E43	"		0.5	V
	V _{SD} (LO)	57	K6	"	E44	mA	3.6		V
5 T _c = +125°C	A _{VS}	58	K1, K2, K9, K10, K11	9	E45	V	68		dB
	f _{OSC} (MAX)	59	K1, K2, K9, K10, K11	9	E46	"			dB
	f _{OSC2}	60	"	3	f5	kHz	250		kHz
	V _{OSC}	61	"	"	E47	V	45	60	kHz
	V _{RAMP}	62	"	7	E48	V	2.4		V
	V _{SEN}	63	"	4	E49	V	3.0	3.8	V
	V _{SD} (HI)	64	K6	9	E50	V	165	235	mV
	V _{SD} (LO)	65	K6	"	E51	V		0.5	V
		66 to 73					3.6		V
6 T _c = -55°C	GBW	74					2		MHz
	No	75		16	E59	μV rms		200	μV rms
	tpw	76	K4, K6, K12, K13	3	t1	μs	0.3		μs
	ton(A)MAX / tosc	77	"	12	t2, tper	"	45	50	%
	ton(A)MIN / tosc	78	"	12	t3, tper	"		0.001	%
	ton(B)MAX / tosc	79	"	13	t4, tper	"	45	50	%
	ton(B)MIN / tosc	80	"	13	t5, tper	"		0.001	%
	tr(tp)A	81	"	12	t6	"		0.4	μs
	tr(tp)A	82	"	12	t7	"		0.2	"
	tr(tp)B	83	"	13	t8	"		0.4	"
7 T _c = +25°C	tr(tp)B	84	"	13	t9	"		0.2	"

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 – Continued.

Subgroup	Symbol	Test no.	Adapter pin numbers															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10 T _c = +125°C			INV INPUT 2.5 V	NONINV INPUT 2.5 V	OSC	+C _L	ƒ _{CL}	C T	T	GND	COMP	SHUT DOWN	C EA	C A	E B	V B	V _{IN}	REF
	t _{pw}	85				GND	2 kΩ	.01 μF	GND				GND	20 V	20 V	GND	20 V	
	t _{ON(A)MAX} / t _{OSC}	86	V _{CM} = 2.5 V								3.8 V							
	t _{ON(A)MIN} / t _{OSC}	87									0.5 V							
	t _{ON(B)MAX} / t _{OSC}	88									3.8 V							
	t _{ON(B)MIN} / t _{OSC}	89									0.5 V							
11 T _c = -55°C		90 to 94	All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 10, T _c = +125°C.															

1/ V_{OSC} = 5 V, 50 μs pulse. Pulse V_{OSC} to switch output transistor (which is on).

2/ Measure V_{COMP} with V_N = 1.8 V and V_N = 3.4 V.

3/ The capacitor shall be polystyrene 0.01 μF tuned with a mica capacitor to ±0.1 %.

4/ Adjust V +C.L. sense until V_{COMP} = 2 V.

5/ See figure 4.

TABLE III. Group A inspection for device type 01 – Continued.

Subgroup	Symbol	Test no.	Energized relays	Limits			Unit
				No.	Value	Unit	
10 Tc = +125°C	tpw	85	K4, K6, K12, K13	3	t10	μs	μs
	ton(A)MAX / tosc	86	"		t11, tper	"	
	ton(A)MIN / tosc	87	"		t12, tper	"	
	ton(B)MAX / tosc	88	"		t13, tper	"	
	ton(B)MIN / tosc	89	"		t14, tper	"	
11 Tc = -55°C		90 to 94					

TABLE III. Group A inspection for device types 02 and 04.

Subgroup	Symbol	Test no.	Adapter pin numbers																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1 T _C = +25°C	V _{REF}	1	(-) INPUT 2.5 V	(+) INPUT 2.5 V	Sync	OSC	R _{CT}	T	DIS-CHG	SS	COMP	SHUT-DOWN	O/P A	GND	V _C	O/P B	V _{IN}	REF	
	V _{RLINE}	2	"	"										"			20 V		
			"	"										"			8 V		
	V _{RLOAD}	3	"	"										"			35 V		
	I _{OS}	4	"	"										"			20 V	-20 mA	
	I _C	5	"	"								1.6 V		"	35 V		20 V	0 V	
	V _{OL(A)}	6	GND	V _{REF} 2									20 mA	"	20 V		20 V		
	V _{OL(A)}	7	"	"		"							100 mA	"	"		"		
	V _{OL(B)}	8	"	"		"								"	"	20 mA	"		
	V _{OL(B)}	9	"	"		"								"	"	100 mA	"		
	V _{OH(A)}	10	"	"		"								-20 mA	"		"		
	V _{OH(A)}	11	"	"		"								-100 mA	"		"		
	V _{OH(B)}	12	"	"		"									"		-20 mA	"	
	V _{OH(B)}	13	"	"		"									"		-100 mA	"	
	V _{IO}	14	2.5 V	2.5 V											"			"	
	+I _{IB}	15	"	"											"			"	
	-I _{IB}	16	"	"											"			"	
	I _{IO}	17													"				
	CMR	18	W _{CM}	CM											GND			20 V	
	I _{IN}	19	2.5 V	2.5 V											"			35 V	
	V _{SAT(OSC)}	20	2.5 V	2.5 V		5 V				5 mA					"			20 V	
	V _{HI}	21	GND	5.1 V											"			"	
	V _{LO}	22	5.1 V	GND											"			"	

See footnotes at end of table.

TABLE III. Group A inspection for device types 02 and 04 – Continued.

Subgroup	Symbol	Test no.	Energized relays	Equations and notes			Limits		Unit
				No.	Value	Unit	Min	Max	
1 Tc = +25°C	VREF	1		16	E1	V	5.05	5.15	V
	VRLINE	2		"	E2	"	-30	30	mV
					E3	"			
	VRLOAD	3		"	E4	"	-50	50	mV
	Ios	4		"	I1	mA	-125		mA
	Ic	5		13	I2	μA		200	μA
	VOL(A)	6		11	E5	V		0.4	V
	VOL(A)	7		11	E6	"		2.0	"
	VOL(B)	8		14	E7	"		0.4	"
	VOL(B)	9		14	E8	"		2.0	"
	VOH(A)	10		11	E9	"	18		"
	VOH(A)	11		11	E10	"	17		"
	VOH(B)	12		14	E11	"	18		"
	VOH(B)	13		14	E12	"	17		"
	VIO	14	K12 (pos. 3), K13, K15	9	E13	"	-5	5	mV
	+IIB	15	K3, K12 (pos. 3), K13, K15	"	E14	"	0.01	10	μA
	-IIB	16	K2, K12 (pos. 3), K13, K15	"	E15	"	0.01	10	μA
	IIO	17					-1	1	μA
	CMR	18	K12 (pos. 3), K13, K15	9	E16	V	60		dB
	IIN	19		15	I3	mA		20	mA
	VSAT(OSC)	20		5	E17	V	0.5	1.1	V
	VHI	21	K12 (pos. 3)	9	E18	"	3.8		"
	VLO	22	"	"	E19	"		0.5	"

See footnotes at end of table.

TABLE III. Group A inspection for device types 02 and 04 – Continued.

Subgroup	Symbol	Test no.	Adapter pin numbers															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2 T _C = +125°C	V _{REF}	23	(-) INPUT 2.5 V	(+) INPUT 2.5 V	Sync	OSC	R _{CT}	T	DIS-CHG	SS	COMP	SHUT-DOWN	O/P A	GND	V _C	O/P B	V _{IN}	REF
	V _{RLINE}	24	"	"										GND			20 V	
			"	"										"			8 V	
			"	"													35 V	
	V _{RLOAD}	25	"	"										"			20 V	-20 mA
	I _{OS}	26	"	"										"			20 V	0 V
	I _C	27	"	"								1.6 V		"			30 V	
	V _{OL(A)}	28	GND	V _{REF} 2		J							20 mA	"	35 V		20 V	
	V _{OL(A)}	29	"	"		"							100 mA	"	20 V		"	
	V _{OL(B)}	30	"	"		"								"	"	20 mA	"	
	V _{OL(B)}	31	"	"		"								"	"	100 mA	"	
	V _{OH(A)}	32	"	"		"							-20 mA	"	"		"	
	V _{OH(A)}	33	"	"		"							-100 mA	"	"		"	
	V _{OH(B)}	34	"	"		"								"	"	-20 mA	"	
	V _{OH(B)}	35	"	"		"								"	"	-100 mA	"	
	V _{IO}	36	2.5 V	2.5 V										"			"	
	+I _{IB}	37	"	"										"			"	
	-I _{IB}	38	"	"										"			"	
	I _{IO}	39																
	CMR	40	V _{CM} 2.5 V	CM 2.5 V										GND			20 V	
	I _{IN}	41												"			35 V	
	V _{HI}	42	GND	5.1 V										"			20 V	
	V _{LO}	43	5.1 V	GND										"			20 V	
3 T _C = -55°C		44 to 64	All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 2, T _C = +125°C. Except for I _{IN} at -55°C. The maximum limit is 20 mA.															

See footnotes at end of table.

TABLE III. Group A inspection for device types 02 and 04 – Continued.

Subgroup	Symbol	Test no.	Energized relays				Equations and notes	Limits		Unit
				No.	Value	Unit		Min	Max	
2 T _C = +125°C	V _{REF}	23		16	E20	V	V _{REF} = E20	5.05	5.2	V
	V _{RLINE}	24		"	E21	"	V _{RLINE} = E22 – E21	-30	30	mV
				"	E22	"				
	V _{RLOAD}	25		"	E23	"	V _{RLOAD} = E23 – E20	-50	50	mV
	I _{OS}	26		"	I4	mA	I _{OS} = I4	-125		mA
	I _C	27		13	I5	μA	I _C = I5		200	μA
	V _{OL(A)}	28		11	E24	V	V _{OL(A)} = E24		0.4	V
	V _{OL(A)}	29		11	E25	"	V _{OL(A)} = E25		2.0	"
	V _{OL(B)}	30		14	E26	"	V _{OL(B)} = E26		0.4	"
	V _{OL(B)}	31		14	E27	"	V _{OL(B)} = E27		2.0	"
	V _{OH(A)}	32		11	E28	"	V _{OH(A)} = E28	18		"
	V _{OH(A)}	33		11	E29	"	V _{OH(A)} = E29	17		"
	V _{OH(B)}	34		14	E30	"	V _{OH(B)} = E30	18		"
	V _{OH(B)}	35		14	E31	"	V _{OH(B)} = E31	17		"
	V _{IO}	36	K12 (pos. 3), K13, K15	9	E32	"	V _{IO} = (E32 – 2.5) / 101	-5	5	mV
	+I _{IB}	37	K3, K12 (pos. 3), K13, K15	"	E33	"	+I _{IB} = (E32 – E33) / 101000	0.01	10	μA
	-I _{IB}	38	K2, K12 (pos. 3), K13, K15	"	E34	"	-I _{IB} = (E34 – E32) / 101000	0.01	10	μA
3 T _C = -55°C	I _{IO}	39					I _{IO} = (+ I _{IB}) – (- I _{IB})	-1	1	μA
	CMR	40	K12 (pos. 3), K13, K15	9	E35	V	$\frac{3}{2}$	60		dB
	I _{IN}	41		15	I6	mA	I _{IN} = I6		18	mA
	V _{HI}	42	K12 (pos. 2)	9	E36	V	V _{HI} = E36	3.8		V
	V _{LO}	43	"	"	E37	V	V _{LO} = E37		0.5	V
		44 to 64								

See footnotes at end of table.

TABLE III. Group A inspection for device types 02 and 04 – Continued.

Subgroup	Symbol	Test no.	Adapter pin numbers															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
4 Tc = +25°C	$\Delta V_{IN} / \Delta V_{REF}$	65	(-) INPUT 2.5 V	(+) INPUT 2.5 V	Sync	OSC	R CT	T	DIS-CHG	SS	COMP	SHUT-DOWN	O/P A	GND	V C	O/P B	V IN	REF
	fOSC	66	"	"			.01 μ F	3.6 k Ω	0 Ω					"			20 V + 1 V rms	
	VOSC	67	"	"			"	"	"					"			20 V	.01 μ F to GND
	V RAMP	68	"	"			"	"	"					"			"	
	$\Delta f_{OSC1} / \Delta V_{IN}$	69	"	"			"	"	"					"			8 V	"
			"	"			"	"	"					"			35 V	"
	fOSC(MIN)	70	"	"			.1 μ F	150 k Ω	"					"			20 V	"
	fOSC(MAX)	71	"	"			.001 μ F	2 k Ω	"					"			"	"
	V SYNC(LO)	72	"	"										"			"	"
	V SYNC(HI)	73	"	"										"			"	"
	I SYNC	74	"	"	3.5 V									"			"	"
	I SS	75	"	"						0 V				"			"	"
	I SD	76	"	"									0 V	"			"	"
	V SS	77	"	"									2 V	"			"	"
	V SD(LO)	78	"	"			.01 μ F	3.6 k Ω	0 Ω			3.6 V	$\bar{G}$ /	"	20 V		"	"
	V SD(HI)	79	"	"			.01 μ F	3.6 k Ω	0 Ω			3.6 V	$\bar{I}$ /	"	20 V		"	"
	A VS	80	"	"										"			"	"
	5 Tc = +125°C	PSRR	81	5.1 V	5.1 V										"			8 V
fOSC		82	2.5 V	2.5 V			.01 μ F	3.6 k Ω	0 Ω					"			35 V	.01 μ F to GND
VOSC		83	"	"			"	"	"					"			"	"
V RAMP		84	"	"			"	"	"					"			"	"
fOSC(MIN)		85	"	"			.1 μ F	150 k Ω	"					"			"	"
fOSC(MAX)		86	"	"			.001 μ F	2 k Ω	"					"			"	"
V SYNC(LO)		87	"	"										"			"	"
V SYNC(HI)		88	"	"										"			"	"
I SYNC		89	"	"	3.5 V									"			"	"
I SS		90	"	"						0 V				"			"	"
I SD		91	"	"								0 V		"			"	"
V SS		92	"	"								2 V		"			"	"
V SD(LO)		93	"	"			.01 μ F	3.6 k Ω	0 Ω		3.6 V	$\bar{G}$ /	"	"	20 V		"	"
V SD(HI)		94	"	"			.01 μ F	3.6 k Ω	0 Ω		3.6 V	$\bar{I}$ /	"	"	20 V		"	"
A VS		95	"	"										"			"	"
PSRR		96	5.1 V	5.1 V										"			8 V	
														"			35 V	

See footnotes at end of table.

TABLE III. Group A inspection for device types 02 and 04 – Continued.

Subgroup	Symbol	Test no.	Energized relays	Equations and notes			Limits		Unit
				No.	Value	Unit	Min	Max	
4 T _c = +25°C	$\Delta V_{IN} / \Delta V_{REF}$	65	K1	16	E56	μV rms	50		dB
	f _{OSC}	66	K4, K5, K6, K7	4	f1	kHz	37.5	42.5	kHz
	V _{OSC}	67	"	4	E57	V	3.0		V
	V _{RAMP}	68	"	5	E58	V	3.0	3.6	V
	$\Delta f_{OSC1} / \Delta V_{IN}$	69	"	4	f2	kHz	-1	1	%
				4	f3	kHz			
	f _{OSC(MIN)}	70	"	4	f4	Hz		150	Hz
	f _{OSC(MAX)}	71	"	4	f5	kHz	300		kHz
	V _{SYNC(LO)}	72							
	V _{SYNC(HI)}	73						0.8	V
	I _{SYNC}	74					2.8		V
	I _{SS}	75		3	I10	mA		2.5	mA
	I _{SD}	76		8	I11	μA	-80	-25	μA
	V _{SS}	77		10	I12	mA		1	mA
5 T _c = +125°C				8	E59	V		0.6	V
	V _{SD(LO)}	78	K4, K5, K6, K7	11 and 14				0.5	V
	V _{SD(HI)}	79	K4, K5, K6, K7	11 and 14			1.6		V
	A _{VS}	80	K12 (pos. 3), K13, K15	9	E60	V	60		dB
	PSRR	81	K12 (pos. 3), K13, K15	"	E61	"	60		dB
				"	E62	"			
	f _{OSC2}	82	K4, K5, K6, K7	4	f6	kHz	36	44	kHz
	V _{OSC}	83	"	4	E63	V	3.0		V
	V _{RAMP}	84	"	5	E64	V	3.0	3.6	V
	f _{OSC(MIN)}	85	"	4	f7	Hz		150	Hz
	f _{OSC(MAX)}	86	"	4	f8	kHz	300		kHz
	V _{SYNC(LO)}	87						0.8	V
	V _{SYNC(HI)}	88							V
	I _{SYNC}	89					2.8		V
	I _{SS}	90		3	I13	mA		2.5	mA
	I _{SD}	91		8	I14	μA	-80	-25	μA
	V _{SS}	92		10	I15	mA		1	mA
	V _{SD(LO)}	93		8	E65	V		0.6	V
	V _{SD(HI)}	94						0.5	V
	A _{VS}	95	K12 (pos. 3), K13, K15	9	E66	V	1.6		V
							60		dB
	PSRR	96	K12 (pos. 3), K13, K15	"	E67	"	60		dB
			"	"	E68	"			

See footnotes at end of table.

TABLE III. Group A inspection for device types 02 and 04 – Continued.

Subgroup	Symbol	Test no.	Adapter pin numbers															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
			(-) INPUT	(+) INPUT	Sync	OSC	R CT	T	DIS-CHG	SS	COMP	SHUT-DOWN	O/P A	GND	V _C	O/P B	V _{IN}	REF
6		97 to	All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 5, T _C = +125°C.															
T _C = -55°C		112												GND			20 V	
7	G _{AW}	113	e _i														"	
T _C = +25°C	N _O	114	2.5 V	2.5 V														
9	I _{PW}	115	2.5 V	2.5 V			.01 μF	3.6 kΩ	0 Ω								20 V	
T _C = +25°C	t _{ON(A)MAX} / t _{OSC}	116	"	"			"	"	"		3.6 V	GND	4/	"	20 V	4/	"	
	t _{ON(B)MAX} / t _{OSC}	117	"	"			"	"	"		3.6 V	"	"	"	"	"	"	
	t _{ON(A)MIN} / t _{OSC}	118	"	"			"	"	"		0.6 V	"	"	"	"	"	"	
	t _{ON(B)MIN} / t _{OSC}	119	"	"			"	"	"		0.6 V	"	"	"	"	"	"	
	V _{UL}	120	GND	V _{REF} 2		—/								"	V _{IN} 9		—/	
	t _{SD(A)}	121	"	"		"								"	20 V		20 V	
	t _{SD(B)}	122	"	"		"								"	20 V		20 V	
	t _{tr(A)}	123	2.5 V	2.5 V			.01 μF	3.6 kΩ	0 Ω		3.6 V	GND		GND	20 V		20 V	
	t _{tr(A)}	124	"	"			"	"	"		"	"		"	"		"	
	t _{tr(B)}	125	"	"			"	"	"		"	"		"	"		"	
	t _{tr(B)}	126	"	"			"	"	"		"	"		"	"		"	
10	I _{PW}	127	2.5 V	2.5 V			.01 μF	3.6 kΩ	0 Ω					"				
T _C = +125°C	t _{ON(A)MAX} / t _{OSC}	128	"	"			"	"	"		3.6 V	GND	4/	"	20 V	4/	"	
	t _{ON(B)MAX} / t _{OSC}	129	"	"			"	"	"		3.6 V	"	"	"	"	"	"	
	t _{ON(A)MIN} / t _{OSC}	130	"	"			"	"	"		0.6 V	"	"	"	"	"	"	
	t _{ON(B)MIN} / t _{OSC}	131	"	"			"	"	"		0.6 V	"	"	"	"	"	"	
	V _{UL}	132	GND	V _{REF} 2		—/								"	V _{IN} 9		—/	
	t _{SD(A)}	133	"	"		"								"	20 V		20 V	
	t _{SD(B)}	134	"	"		"								"	20 V		20 V	
	t _{tr(A)}	135					.01 μF	3.6 kΩ	0 Ω		3.6 V	GND		GND	20 V		20 V	
	t _{tr(A)}	136					"	"	"		3.6 V	"		"	"		"	
	t _{tr(B)}	137					"	"	"		0.6 V	"		"	"		"	
	t _{tr(B)}	138					"	"	"		0.6 V	"		"	"		"	

See footnotes at end of table.

TABLE III. Group A inspection for device types 02 and 04 – Continued.

Subgroup	Symbol	Test no.	Energized relays	Equations and notes			Limits		Unit
				No.	Value	Unit	Min	Max	
6 T _c = -55°C		97 to 112							
	GBW	113							MHz
	No	114		16	E75	μV rms	2	200	μV rms
7 T _c = +25°C	tpw	115	K4, K5, K6, K7	4	t1	μs	0.3	1.0	μs
	ton(A)MAX / tosc	116	K4, K5, K6, K7, K11, K12 (pos. 2)	11	t2, tper	"	45	50	%
	ton(A)MAX / tosc	117	"	14	t3, tper	"	45	50	%
9 T _c = +25°C	ton(B)MIN / tosc	118	"	11	t4, tper	"		0.001	%
	ton(B)MIN / tosc	119	"	14	t5, tper	"		0.001	%
	V _{UL}	120		15	E76	V	6	8	V
10 T _c = +125°C	tsd(A)	121		11	t6	ns		500	ns
	tsd(B)	122		14	t7	ns		500	ns
	tr(tr)A	123	K4, K5, K6, K7, K11, K12 (pos. 2)	11	t8	"		600	ns
	tr(tr)A	124	"	11	t9	"		300	"
	tr(tr)B	125	"	14	t10	"		600	"
	tr(tr)B	126	"	14	t11	"		300	"
	tpw	127	K4, K5, K6, K7	4	t12	μs	0.3	1.4	μs
	ton(A)MAX / tosc	128	K4, K5, K6, K7, K11, K12 (pos. 2)	11	t13, tper	"	45	50	%
	ton(B)MAX / tosc	129	"	14	t14, tper	"	45	50	%
	ton(A)MIN / tosc	130	"	11	t15, tper	"		0.001	%
	ton(B)MIN / tosc	131	"	14	t16, tper	"		0.001	%
	V _{UL}	132		15	E77	V	6	8	V
11 T _c = -55°C	tsd(A)	133		11	t17	ns		700	ns
	tsd(B)	134		14	t18	ns		700	ns
	tr(tr)A	135	K4, K5, K6, K7, K11, K12 (pos. 2)	11	t19	"		600	ns
	tr(tr)A	136	"	11	t20	"		300	"
	tr(tr)B	137	"	14	t21	"		600	"
	tr(tr)B	138	"	14	t22	"		300	"
		139 to 151							

See footnotes at end of table.

TABLE III. Group A inspection for device type 03.

Subgroup	Symbol	Test no.	Adapter pin numbers															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
			(+) ERROR	(-) ERROR	COMP	CSS	RESET	-C.S.	+C.S.	SHUT DOWN	C R T	R T	D	SYNC	O/P A	V _C	GND	O/P B
1 T _C = +25°C	V _{REF}	1	GND	GND				GND	GND								GND	
	V _{RLINE}	2	"	"				"	"								"	
	V _{RLOAD}	3	"	"				"	"								"	
	I _{OS}	4	"	"				"	"								"	
	V _{CE(SAT)A}	5	"	"				"	"	GND					20 mA	15 V	"	
		6	"	"				"	"	"					100 mA	"	"	
	V _{CE(SAT)B}	7	"	"				"	"	"						"	"	20 mA
		8	"	"				"	"	"						"	"	100 mA
	V _{OH(A)}	9	V _{REF}	"				"	"			11/			-20 mA	"	"	
		10	"	"				"	"			"			-100 mA	"	"	
	V _{OH(B)}	11	"	"				"	"			"				"	"	-20 mA
		12	"	"				"	"			"				"	"	-100 mA
	I _C	13	GND	"						GND						35 V	"	
	I _{IN}	14	GND	"						0.4 V							"	35 V
	V _{IO}	15	2.5 V R1 = 100 Ω	2.5 V R2 = 100 Ω													"	15 V
	+I _{IB}	16	"	"													"	
	-I _{IB}	17	"	"													"	
	I _{IO}	18															"	
	CMR	19	0 V 100 Ω 5.2 V 100 Ω	0 V 100 Ω 5.2 V 100 Ω													"	15 V
	I _{IH} (SD)	20	GND	GND				GND	GND	2.4 V to am- meter							"	
	I _{IL} (SD)	21	"	"				"	"	0.4 V to am- meter							"	
	V _{OH} P(SD)	22	"	"				"	"	-40 μA							"	
	V _{OL} P(SD)	23	"	"				"	"	3.6 mA							"	
	I _{IH} (R)	24	"	"			2.4 V to am- meter	"	GND								"	
	I _{IL} (R)	25	"	"			0.4 V to am- meter	"	"								"	
	V _{OH} P(R)	26	"	"			-40 μA	"	"								"	
	V _{OL} P(R)	27	"	"			3.6 mA	"	"								"	3.8 V

See footnotes at end of table.

TABLE III. Group A inspection for device type 03 - Continued.

Subgroup	Symbol	Test no.	Energized relays				Equations and notes	Limits		Unit
				No.	Value	Unit		Min	Max	
1 T _c = +25°C	V _{REF}	1		18	E1	V	V _{REF} = E1	4.9	5.1	V
	V _{RLINE}	2		"	E2	"	V _{RLINE} = E3 - E2	-20	20	mV
				"	E3	"				
	V _{RLOAD}	3		"	E4	"	V _{RLOAD} = E4 - E1	-30	30	mV
	I _{OS}	4		"	I1	mA	I _{OS} = I1	-125		mA
	V _{CE(SAT)A}	5		13	E5	V	V _{CE(SAT)A} = E5		0.3	V
		6		13	E6	"	V _{CE(SAT)A} = E6		2.0	"
	V _{CE(SAT)B}	7		16	E7	V	V _{CE(SAT)B} = E7		0.3	V
		8		16	E8	"	V _{CE(SAT)B} = E8		2.0	"
	V _{OH(A)}	9		13	E9	"	V _{OH(A)} = E9	12.5		"
		10		13	E10	"	V _{OH(A)} = E10	12.0		"
	V _{OH(B)}	11		16	E11	"	V _{OH(B)} = E11	12.5		"
		12		16	E12	"	V _{OH(B)} = E12	12.0		"
	I _C	13		14	I2	μA	I _C = I2		150	μA
	I _{IN}	14		17	I3	mA	I _{IN} = I3		30	mA
	V _{IO}	15	K3 (pos. 3), K4, K6	3	E13	V	V _N = 2.5 V, V _{IO} = (E13 - 2.5) / 201	-5	5	mV
	+I _{IB}	16	K1, K3 (pos. 3), K4, K6	"	E14	"	V _N = 2.5 V, +I _{IB} = (E13 - E14) / 201000	-1		μA
	-I _{IB}	17	K2, K3 (pos. 3), K4, K6	"	E15	"	V _N = 2.5 V, -I _{IB} = (E15 - E13) / 201000	-1		μA
	I _{IO}	18					I _{IO} = (-I _{IB}) - (+I _{IB})	-0.5	0.5	μA
	CMR	19	K3 (pos. 3), K4, K6	3	E16	V	$\frac{12}{12}$	60		dB
			K3 (pos. 3), K4, K6	3	E17	"				
	I _{IH} (SD)	20		8	I4	μA	I _{IH} (SD) = I4	-200		μA
	I _{IL} (SD)	21		8	I5	μA	I _{IL} (SD) = I5	-360		μA
	V _{OH(P)(SD)}	22	"	"	E18	V	V _{OH(P)(SD)} = E18	2.4		V
	V _{OL(P)(SD)}	23		"	E19	V	V _{OL(P)(SD)} = E19		0.4	"
	I _{IH} (R)	24		5	I6	μA	I _{IH} (R) = I6	-200		μA
	I _{IL} (R)	25		"	I7	μA	I _{IL} (R) = I7	-360		μA
	V _{OH(P)(R)}	26		"	E20	V	V _{OH(P)(R)} = E20	2.4		V
	V _{OL(P)(R)}	27		"	E21	V	V _{OL(P)(R)} = E21		0.4	V

See footnotes at end of table.

TABLE III. Group A inspection for device type 03 - Continued.

Subgroup		Symbol	Test no.	Adapter pin numbers																	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
				(+) ERROR	(-) ERROR	COMP	CSS	RESET	-C.S.	+C.S.	SHUT DOWN	C RT	R T	D	SYNC	O/P A	V _C	GND	O/P B	V _{IN}	REF
1		I _{IH} ($\bar{S}$)	28	GND	GND				GND	GND				≤ 0.5 V		2.4 V to am- meter		GND		15 V	
	T _C = +25°C	I _{IL} ($\bar{S}$)	29	"	"				"	"				"		0.4 V to am- meter		"		15 V	
		V _{OH} P($\bar{S}$)	30	"	"					"	"			"		-40 μA		"		15 V	
		V _{OL} P($\bar{S}$)	31	"	"					"	"			≥ 3.6 V		3.6 mA		"		15 V	
2			32 to 62	All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 1, T _C = +25°C.																	
3	T _C = +125°C		63 to 93	Except for I _{OS} , the minimum limit is -100 mA and I _{IN} the maximum limit is 25 mA.																	
4	T _C = -55°C			All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 1, T _C = +25°C.																	
T _C = +25°C		ΔV _{IN} / ΔV _{REF}	94	GND	GND				GND	GND								GND		15 V +1 V rms at 2.4 kHz	
		f _{OSC}	95	"	"				"	"		4.12 kΩ	.01 μF	0 Ω	2.7 kΩ to V _{REF}		15 V	"		15 V	
		V _{RV}	96	"	"				"	"		"	"	"	"			"		8 V	
		V _{RP}	97	"	"				"	"		"	"	"	"			"		35 V	
		Δf _{OSC} / ΔV _{IN}	98	"	"				"	"		"	"	"	"		15 V	"		8 V	
				"	"				"	"		"	"	"	"		"	"		35 V	
		f _{OSC} (MIN)	99	"	"				"	"		150 kΩ	0.2 μF	"	"	"	"	"		15 V	
		f _{OSC} (MAX)	100	"	"				"	"			2 kΩ	1.0 nF	"	"	"	"		"	
		A _{VS}	101	2.5 V R1 = 100 Ω	2.5 V R2 = 100 Ω					"	"							"		"	
		PSRR	102	"	"															8 V	
		V _S	103	150 mV	GND					GND								"		35 V	
		+I _{BS}	104	"	"					"								"		15 V	
		-I _{BS}	105	"	"					"								"		"	
		V _{EC}	106	GND	"				0.4 V	"	"							"		"	
		I _{CS}	107	"	150 mV		0 V			"	"							"		"	
		V _R (LOW)	108	"	GND					"	"							"		3.8 V	3.8 V
		V _R (HIGH)	109	"	"					"	"							"		4.8 V	4.8 V
		V _{HI}	110	150 mV	"	-100 μA				"	"							"		15 V	
	V _{LO}	111	GND	150 mV	100 μA												"		"		

See footnotes at end of table.

TABLE III. Group A inspection for device type 03 - Continued.

Subgroup	Symbol	Test no.	Energized relays	Limits			Equations and notes	Limits		Unit
				No.	Value	Unit		Min	Max	
1 T _C = +25°C	I _{IH} ($\bar{S}$)	28		12	18	μA	I _{IH} ($\bar{S}$) = I8	-200		μA
	I _{IL} ($\bar{S}$)	29		"	19	"	I _{IL} ($\bar{S}$) = I9	-360		μA
	V _{OHP} ($\bar{S}$)	30		"	E22	V	V _{OHP} ($\bar{S}$) = E22	2.4		V
	V _{OLP} ($\bar{S}$)	31		"	E23	"	V _{OLP} ($\bar{S}$) = E23		0.4	"
2 T _C = +125°C		32 to 62								
3 T _C = -55°C		63 to 93								
4 T _C = +25°C	ΔV _{IN} / ΔV _{REF}	94	K13	18	E70	μV rms	ΔV _{IN} / ΔV _{REF} = 20 Log (ΔV _{IN} / ΔV _{REF})	50		dB
	f _{OSC}	95	K5, K7, K9	13	f1	kHz	f _{OSC} = 2(f1)	38	42	kHz
	V _{RV}	96	"	10	E71	V	V _{RV} = E71	0.45		V
	V _{RP}	97	"	10	E72	V	V _{RP} = E72	2.5	3.5	V
	Δf _{OSC} / ΔV _{IN}	98	"	13	f2	kHz	Δf _{OSC} / ΔV _{IN} = (f2 - f3) / f2 x 100	-1	1	%
			"	13	f3	kHz				
	f _{OSC(MIN)}	99	"	13	f4	Hz	f _{OSC(MIN)} = [f4] * 2		100	Hz
	f _{OSC(MAX)}	100	"	16	f5	kHz	f _{OSC(MAX)} = [f5] * 2	350		kHz
	A _{VS}	101	K3 (pos. 3), K4, K6	3	E73	V	$\frac{13}{13}$	60		dB
	PSRR	102	"	"	E74	"	$\frac{14}{14}$	66		dB
			"	"	E75	"				
	V _S	103	K11, K12	7	E76	"	V _S = E76 $\frac{15}{15}$	60	120	mV
	+I _{BS}	104	"	7	I28	μA	+I _{BS} = I28	-10		μA
	-I _{BS}	105	"	6	I29	μA	-I _{BS} = I29	-10		μA
	V _{EC}	106		4	E77	V	V _{EC} = E77		0.4	V
	I _{CS}	107		4	I30	μA	I _{CS} = I30	-150	-50	μA
	V _{R(LOW)}	108		5	E78	V	V _{R(LOW)} = E78		0.4	V
	V _{R(HIGH)}	109		5	E79	"	V _{R(HIGH)} = E79	2.4		V
	V _{HI}	110	K3 (pos. 2)	3	E80	"	V _{HI} = E80	3.6		V
	V _{LO}	111	K3 (pos. 2)	3	E81	"	V _{LO} = E81		0.4	V

See footnotes at end of table.

TABLE III. Group A inspection for device type 03 - Continued.

Subgroup	Symbol	Test no.	Adapter pin numbers																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5 T _C = +125°C	fosc2	112	(+) ERROR	(-) ERROR	COMP	CSS	RESET	-C.S.	+C.S.	SHUT DOWN	C R _T	R T	D	<u>SYNC</u>	O/P A	V _C	GND	O/P B	V _{IN}	REF
			GND	GND				GND	GND		GND	GND	4.12 kΩ	.01 μF	0 Ω	2.7 kΩ to V _{REF}		GND		15 V
6 T _C = -55°C T _C = +25°C 9 T _C = +25°C		113 to 128	All test parameters, test conditions, equations, and test limits remaining are identical with tests 96 through 111 specified in table III, subgroup 4, T _C = +25°C.																	
		129 to 145	All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 5, T _C = +125°C.																	
	NO	146	GND	GND					GND	GND							GND		15 V	
	GBW	147	GND	GND					GND	GND		4.12 kΩ	.01 μF	0 Ω	2.7 kΩ to V _{REF}		GND		15 V	
	t _{pw}	148	GND	GND					GND	GND							GND		15 V	
	t _{SD} (A)	149	150 mV	"					"	"			<u>11/</u>			15 V	"		"	
	t _{SD} (B)	150	150 mV	"					"	"			<u>11/</u>			15 V	"		"	
	t _{ON} (A) MAX / t _{OSC}	151	GND	"	3.6 V				"	"		4.12 kΩ	.01 μF	0 Ω			"	"		
	t _{ON} (A) MIN / t _{OSC}	152	"	"	0.4 V				"	"		"	"	"			"	"		
	t _{ON} (B) MAX / t _{OSC}	153	"	"	3.6 V				"	"		"	"	"			"	"		
10 T _C = +125°C	t _{ON} (B) MIN / t _{OSC}	154	"	"	0.4 V			"	"		"	"	"			"	"			
	t _{OSC}	155	"	"	"			"	"		"	"	"			"	"			
	t _r (tr)A	156	"	"	"			"	"		"	"	"			"	"			
	t _r (tr)A	157	"	"	"			"	"		"	"	"			"	"			
	t _r (tr)B	158	"	"	"			"	"		"	"	"			"	"			
	t _r (tr)B	159	GND	GND				GND	GND		4.12 kΩ	.01 μF	0 Ω	2.7 kΩ to V _{REF}		GND		15 V		
	t _{pw}	160	150 mV	"				"	"			<u>11/</u>				15 V	"			
	t _{SD} (A)	161	150 mV	"				"	"			<u>11/</u>				15 V	"			
11 T _C = -55°C		162 to 169	All test parameters, test conditions, equations, and test limits remaining are identical with tests 151 through 158 specified in table III, subgroup 9, T _C = +25°C.																	
		170 to 180	All test parameters, test conditions, equations, and test limits are identical with those specified in table III, subgroup 9, T _C = +25°C.																	

See footnotes at end of table.

TABLE III. Group A inspection for device type 03 - Continued.

Subgroup	Symbol	Test no.	Energized relays				Equations and notes	Limits		Unit
				No.	Value	Unit		Min	Max	
5 Tc = +125°C	fosc2	112	K5, K7, K9	13	f6	kHz	fosc2 = [f6] * 2	36	44	kHz
		113 to 128								
6 Tc = -55°C		129 to 145								
7 Tc = +25°C	No	146		18	E106	µV rms	No = E106		200	µV rms
	GBW	147					GBW = fei when eo – ei, see figure 5	2		MHz
9 Tc = +25°C	tpw	148	K5, K7, K9	12	t1	µs	tpw = t1 16/		2	µs
	tSD(A)	149		8 to 13	t2	"	tSD(A) = t2 16/		0.5	"
	tSD(B)	150		8 to 16	t3	"	tSD(B) = t3 16/		0.5	"
	tON(A) MAX / tOSC	151	K3 (pos. 2), K5, K7, K8, K9, K11, K12	13	t4,	"	tON(A) MAX / tOSC = t4 / tper x 100 16/	45	50	%
	tON(A) MIN / tOSC	152	"	13	t5,	"	tON(A) MIN / tOSC = t5 / tper x 100 16/		0.001	"
	tON(B) MAX / tOSC	153	"	16	t6,	"	tON(B) MAX / tOSC = t6 / tper x 100 16/	45	50	"
	tON(B) MIN / tOSC	154	"	16	t7,	"	tON(B) MIN / tOSC = t7 / tper x 100 16/		0.001	"
	tR(t)A	155	"	13	t8	"	tR(t)A = t8		0.3	µs
	tR(t)A	156	"	13	t9	"	tR(t)A = t9		0.2	"
	tR(t)B	157	"	16	t10	"	tR(t)B = t10		0.3	"
10 Tc = +125°C	tR(t)B	158	"	16	t11	"	tR(t)B = t11		0.2	"
	tpw	159	K5, K7, K9	12	t12	µs	tpw = t12 16/		3	µs
	tSD(A)	160		8 to 16	t13	"	tSD(A) = t13 16/		0.7	"
	tSD(B)	161		8 to 13	t14	"	tSD(B) = t14 16/		0.7	"
11 Tc = -55°C		162 to 169								
		170 to 180								

See footnotes at end of table.

TABLE III. Group A inspection - Continued.

NOTES:

1/ This test applies to device type 02 only.

2/ 5 V, 50 μ s pulse, toggles the "on state" between transistors A and B.

3/ Vary V_{CM} from 1.5 V to 5.2 V and measure change on pin 9, $V_N = 2.5$ V.

Equation for CMR test is : $CMR = 20 \text{ Log } | \Delta V_{CM} (101) / (\Delta EX - \Delta V_{CM}) |$

Test 18, $\Delta EX = \Delta E16$

Test 40, $\Delta EX = \Delta E35$

Test 61, $\Delta EX = \Delta E53$

4/ Load resistance on outputs A and B ≥ 1 k Ω .

5/ 0.8 V to 2.8 V transition on V_{SYNC} must cause a transition in V_{OSC} .

2.8 V to 0.8 V transition on V_{SYNC} must not cause a transition in V_{OSC} .

6/ Apply 0.5 V to the shutdown pin, output should be on. (Device type 02 either output > 2.5 V)
(Device type 04 either output < 2.5 V).

7/ Apply 1.6 V to the shutdown pin, output should be off. (Device type 02 both outputs < 2.5 V)
(Device type 04 both outputs > 2.5 V).

8/ Equation for PSRR is as follows with $V_N = 5.1$ V:

$PSRR = 20 \text{ Log } | \Delta V_{IN} (101) / (EX - EY) |$

Test 81, $(EX - EY) = (E61 - E62)$

Test 96, $(EX - EY) = (E67 - E68)$

Test 112, $(EX - EY) = (E73 - E74)$

9/ Increase $V_{IN} =$ from 5 V to the point where outputs are on: (Device type 02 on state = either output > 2.5 V),
(device type 04 on state = either output < 2.5 V).

10/ Device type 02, $t_{SD} = t_{output(low)} - t_{pin 10(high)}$.

Device type 04, $t_{SD} = t_{output(high)} - t_{pin 10(high)}$.

11/ Apply a 3.6 V, 50 μ s pulse to C_T to switch output transistor (which is on).

TABLE III. Group A inspection - Continued.

NOTES:

12/ $V_N = 2.5 \text{ V}$. Equation for CMR is as follows:

$$\text{CMR} = 20 \text{ Log } [5.2 \text{ V (201) } / | (\text{EX} - \text{EY} - 5.2) |]$$

Test number 19: EX = E17, EY = E16

Test number 50: EX = E40, EY = E39

Test number 81: EX = E63, EY = E62

13/ $V_N = 0.5 \text{ V to } 3.5 \text{ V}$. Equation for A_{VS} is as follows:

$$A_{VS} = 20 \text{ Log } (\Delta V_N (201) / | \Delta \text{EX} |)$$

Test number 101: $\Delta \text{EX} = \text{E73}$

Test number 118: $\Delta \text{EX} = \text{E84}$

Test number 135: $\Delta \text{EX} = \text{E95}$

14/ $V_N = 2.5 \text{ V}$. Equation for PSRR is as follows:

$$\text{PSRR} = 20 \text{ Log } [\Delta V_{IN} (201) / | (\text{EX} - \text{EY}) |]$$

Test number 102: $(\text{EX} - \text{EY}) = (\text{E75} - \text{E74})$

Test number 119: $(\text{EX} - \text{EY}) = (\text{E86} - \text{E85})$

Test number 136: $(\text{EX} - \text{EY}) = (\text{E97} - \text{E96})$

15/ Increase voltage on +C.S. until V shutdown $\leq 0.4 \text{ V}$. Record V +C.S.

16/ See figure 4.

4.4 Technology Conformance inspection (TCI). Technology conformance inspection shall be in accordance with MIL-PRF-38535 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table III of MIL-PRF-38535 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroup 8 shall be omitted.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of MIL-PRF-38535.

4.4.3 Group C inspection. Group C inspection shall be in accordance with table IV of MIL-PRF-38535 and as follows:

- a. End point electrical parameters shall be as specified in table II herein.
- b. The steady-state life test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
- c. Special subgroups shall be added to group C inspection requirements for class B devices, and shall consist of the tests, conditions, and limits of subgroups 10 and 11 as specified in table III herein.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535. End point electrical parameters shall be as specified in table II herein.

4.5 Methods of inspection. Methods of inspection shall be specified and as follows.

4.5.1 Voltage and current. All voltage values given are referenced to the external zero reference level of the supply. Currents values given for conventional current and are positive when flowing into the referenced terminal.

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

TABLE IV. Group C end-point electrical parameters. $T_C = +25^\circ\text{C}$

Device type	Test	Limits		Unit	Delta	Unit
		Min	Max			
All	V_{IO}	---	5	mV	± 0.7	mV
All	I_{IB}	0.1	10.0	μA	± 1	μA
01	V_{REF}	4.8	5.2	V	± 20	mV
02, 04	V_{REF}	5.0	5.2	V	± 20	mV
03	V_{REF}	4.9	5.1	V	± 20	mV

6. NOTES

6.1 Intended use. Microcircuits conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- Title, number, and date of the specification.
- Pin and compliance identifier, if applicable (see 1.2).
- Requirements for delivery of one copy of the conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
- Requirements for certificate of compliance, if applicable.
- Requirements for notification of change of product or process to acquiring activity in addition to notification of the qualifying activity, if applicable.
- Requirements for failure analysis (including required test condition of MIL-STD-883, method 5003), corrective action and reporting of results, if applicable.
- Requirements for product assurance options.
- Requirements for special carriers, lead lengths, or lead forming, if applicable. These requirements should not affect the part number. Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.
- Requirements for "JAN" marking.
- Packaging requirements (see 5.1).

6.3 Superseding information. The requirements of MIL-M-38510 have been superseded to take advantage of the available Qualified Manufacturer Listing (QML) system provided by MIL-PRF-38535. Previous references to MIL-M-38510 in this document have been replaced by appropriate references to MIL-PRF-38535. All technical requirements now consist of this specification and MIL-PRF-38535. The MIL-M-38510 specification sheet number and PIN have been retained to avoid adversely impacting existing government logistics systems and contractor's parts lists.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML-38535 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DSCC-VQ, 3990 E. Broad Street, Columbus, Ohio 43123-1199.

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6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535 and MIL-STD-1331.

6.6 Logistic support. Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2), lead material and finish A (see 3.4). Longer length leads and lead forming should not affect the part number.

6.7 Substitutability. The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification will functionally replace the listed generic-industry type. Generic-industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-38510 device types and may have slight physical variations in relation to case size. The presence of this information should not be deemed as permitting substitution of generic-industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-PRF-38535.

<u>Military device type</u>	<u>Generic-industry type</u>
01	1524
02	1525A
03	1526
04	1527A

6.8 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:	Preparing activity:
Army – CR	DLA - CC
Navy - EC	
Air Force - 11	Project 5962-2037
DLA – CC	
Review activities:	
Army - MI, SM	
Navy - AS, CG, SH, TD	
Air Force – 03, 19, 99	

NOTE: The activities listed above were interested in this document as of this date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIT Online database at www.dodssp.daps.mil.