

MILITARY SPECIFICATION
MICROCIRCUITS, LINEAR, NEGATIVE, VOLTAGE REGULATORS, MONOLITHIC SILICON

This specification is approved for use by all Departments and Agencies of the Department of Defense.

Reactivated after 29 January 2004 and may be used for either new or existing design acquisition.

The requirement 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 fixed output, monolithic silicon, negative, voltage regulators. Two product assurance classes and a choice of case outlines and lead finish are provided for each type 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).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 should be as shown in the following:

<u>Device type</u>	<u>Circuit</u>	<u>Case outline letter</u>
01	Voltage regulator, -5 volts at 0.5 A	X
02	Voltage regulator, -12 volts at 0.5 A	X
03	Voltage regulator, -15 volts at 0.5 A	X
04	Voltage regulator, -24 volts at 0.5 A	X
05	Voltage regulator, -5 volts at 1.0 A	Y
06	Voltage regulator, -12 volts at 1.0 A	Y
07	Voltage regulator, -15 volts at 1.0 A	Y
08	Voltage regulator, -24 volts at 1.0 A	Y

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>
X	See figure 1	3	Can
Y	See figure 2	2	Flange mount

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 emailed to linear@dscclia.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:

Device types 01, 02, 03, 05, 06, and 07	-35 V dc
Device types 04 and 08	-40 V dc
Lead temperature (soldering, 60 seconds)	+300°C
Storage temperature range	-65°C to +150°C
Junction temperature (T _J)	+150°C <u>1/</u>

1.4 Recommended operating conditions.

Input voltage range:

Device types 01 and 05	-8 V dc to -25 V dc
Device types 02 and 06	-15 V dc to -28 V dc
Device types 03 and 07	-18.5 V dc to -35 V dc
Device types 04 and 08	-28 V dc to -38 V dc
Ambient operating temperature range (T _A)	-55°C to +125°C

1.5 Power and thermal characteristics.

T _A = T _S	Case	Max θ_{JA}	Maximum P _D without heat sink	Max θ_{JC}	Maximum P _D with heat sink	Max θ_{C-S} <u>2/</u>
125°C <u>3/</u>	X	140°C/W	0.18 W	40°C/W	0.5 W	10°C/W
	Y	35°C/W	0.71 W	4°C/W	5.6 W	0.5°C/W
25°C	X	140°C/W	0.89 W	40°C/W	2.50 W	10°C/W
	Y	35°C/W	3.60 W	4°C/W	28.00 W	0.5°C/W
-55°C	X	140°C/W	1.50 W	40°C/W	4.00 W	10°C/W
	Y	35°C/W	5.80 W	4°C/W	45.00 W	0.5°C/W

1/ The device is protected by a thermal shutdown circuit which is designed to turn off the output transistor whenever the device junction temperature is in excess of 150°C.

2/ This value represents the maximum allowable thermal impedance of a heat sink to remain within the above thermal ratings.

3/ Based on T_J = 150°C and specified values of θ_{JC} and θ_{JA} .

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 shall take 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 Case outlines. The case outlines shall be as specified in 1.2.3 and on figures 1 and 2.

3.3.2 Block diagram and terminal connections. The block diagrams and terminal connections shall be as specified on figures 3 and 4.

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 (DSCC-VA) upon request.

3.4 Lead material and finish. Lead material and finish shall be in accordance with MIL-PRF-38535 or as follows:

Type X	
Nickel	50-53 percent
Manganese	0.60 percent, maximum
Silicon	0.30 percent, maximum
Carbon	0.10 percent, maximum
Chromium	0.25 percent, maximum
Cobalt	0.50 percent, maximum
Phosphorous	0.025 percent, maximum
Sulfur	0.025 percent, maximum
Aluminum	0.10 percent maximum
Iron	Remainder

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

3.5 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full operating ambient temperature range of -55°C to $+125^{\circ}\text{C}$.

3.5.1 Stability. If the device is located an appreciable distance from the power supply filter, a $2.0\ \mu\text{F}$ solid tantalum bypass capacitor should be connected as close to the device V_{CC} input as possible to suppress oscillation. A $2.0\ \mu\text{F}$ solid tantalum bypass capacitor is recommended on the device output. Output current oscillations are likely to occur in the current limit operating mode with high input voltages ($V_{\text{IN}} < -18\ \text{V dc}$). Since load currents of less than 5 mA may result in a loss of voltage regulation, regulators should be preloaded with 5 mA of load current in lightly loaded applications.

3.5.2 Test limit. The test limits specified in tables I and III apply only for the stated test conditions (example, 2 percent duty cycle), which essentially keep the junction temperature constant. In most applications the junction temperature will greatly exceed the 25°C ambient or sink temperature; thus devices may not perform within the 25°C specified limits.

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 I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Output voltage	V _{OUT}	V _{IN} = -8 V	I _L = 5 mA, 0.5 A	01	-5.25	-4.75	V
		V _{IN} = -20 V	I _L = 5 mA, 0.5 A		-5.25	-4.75	
		V _{IN} = -30 V	I _L = 5 mA, I _L = 50 mA		-5.25	-4.75	
		V _{IN} = -10 V	I _L = 5 mA, T _A = 150°C		-5.30	-4.70	
Line regulation	V _{RLINE}	-30 V ≤ V _{IN} ≤ -8 V	I _L = 50 mA	01	-150	150	mV
		-25 V ≤ V _{IN} ≤ -8 V	I _L = 350 mA		-50	50	
Load regulation	V _{RLOAD}	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	01	-100	100	mV
		V _{IN} = -30 V	5 mA ≤ I _L ≤ 50 mA		-150	150	
Standby current drain	I _{SCD}	V _{IN} = -10 V	I _L = 5 mA	01	0.5	3.0	mA
		V _{IN} = -30 V	I _L = 5 mA		0.5	4.0	
Standby current drain change (versus line voltage)	ΔI _{SCD} (line)	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	01	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI _{SCD} (load)	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	01	-0.5	0.5	mA
Output short circuit current	I _{OS}	V _{IN} = -25 V		01	0.00	1.50	A
		V _{IN} = -30 V			0.00	1.00	
Peak output current	I _{PK}	V _{IN} = -8 V, forced ΔV _{OUT} = 0.48 V, see figure 6		01	0.5	2.0	A

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Ripple rejection	$\Delta V_{IN} / \Delta V_{OUT}$	V _{IN} = -10 V, e _i = 1 V _{rms} , at f = 2400 Hz	I _L = 125 mA, meter BW 10 Hz to 10 kHz, see figure 7	01	45		dB
Output noise voltage	V _{NO}	V _{IN} = -10 V, see figure 8	I _L = 50 mA, T _A = 25°C	01		250	μV _{rms}
Thermal regulation	V _{RTH}	V _{IN} = -15 V	I _L = 500 mA, T _A = 25°C	01	-50	50	mV
Voltage start-up	V _{START}	V _{IN} = -20 V	R _L = 10 Ω, see figure 11	01	-5.25	-4.75	V
Line transient response	$\Delta V_{OUT} / \Delta V_{IN}$	V _{IN} = -10 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	01		30	mV/V
Load transient response	$\Delta V_{OUT} / \Delta I_L$	V _{IN} = -10 V, see figure 10	I _L = 50 mA, ΔI _L = 200 mA, T _A = 25°C	01		2.5	mV/mA
Output voltage	V _{OUT}	V _{IN} = -15 V	I _L = 5 mA, 0.5 A	02	-12.60	-11.40	V
		V _{IN} = -27 V	I _L = 5 mA, 0.5 A		-12.60	-11.40	
		V _{IN} = -35 V	I _L = 5 mA, 50 mA		-12.60	-11.40	
		V _{IN} = -17 V	I _L = 5 mA, T _A = 150°C		-12.72	-11.28	
Line regulation	V _{RLINE}	-35 V ≤ V _{IN} ≤ -15 V	I _L = 50 mA	02	-360	360	mV
		-32 V ≤ V _{IN} ≤ -15 V	I _L = 350 mA		-120	120	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Load regulation	V _{RLOAD}	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	02	-240	240	mV
		V _{IN} = -35 V	5 mA ≤ I _L ≤ 50 mA		-360	360	
Standby current drain	I _{SCD}	V _{IN} = -17 V	I _L = 5 mA	02	0.5	3.0	mA
		V _{IN} = -35 V	I _L = 5 mA		0.5	4.0	
Standby current drain change (versus line voltage)	ΔI _{SCD} (line)	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	02	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI _{SCD} (load)	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	02	-0.5	0.5	mA
Output short circuit current	I _{OS}	V _{IN} = -25 V		02	0.00	1.50	A
		V _{IN} = -35 V			0.00	1.00	
Peak output current	I _{PK}	V _{IN} = -15 V, forced ΔV _{OUT} = 1.13 V, see figure 6		02	0.5	2.0	A
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	V _{IN} = -17 V, e _i = 1 Vrms, at f = 2400 Hz	I _L = 125 mA, meter BW 10 Hz to 10 kHz, see figure 7	02	50		dB
Output noise voltage	V _{NO}	V _{IN} = -17 V, see figure 8	I _L = 50 mA, T _A = 25°C	02		600	μVrms
Thermal regulation	V _{RTH}	V _{IN} = -22 V	I _L = 500 mA, T _A = 25°C	02	-120	120	mV
Voltage start-up	V _{START}	V _{IN} = -27 V	R _L = 24 Ω, see figure 11	02	-12.60	-11.40	V

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Line transient response	$\Delta V_{OUT} / \Delta V_{IN}$	V _{IN} = -17 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	02		30	mV/V
Load transient response	$\Delta V_{OUT} / \Delta I_L$	V _{IN} = -17 V, see figure 10	I _L = 50 mA, ΔI _L = 200 mA, T _A = 25°C	02		2.5	mV/mA
Output voltage	V _{OUT}	V _{IN} = -18.5 V	I _L = 5 mA, 0.5 A	03	-15.75	-14.25	V
		V _{IN} = -30 V	I _L = 5 mA, 0.5 A		-15.75	-14.25	
		V _{IN} = -35 V	I _L = 5 mA, 50 mA		-15.75	-14.25	
		V _{IN} = -20 V	I _L = 5 mA, T _A = 150°C		-15.90	-14.10	
Line regulation	V _{RLINE}	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 350 mA	03	-150	150	mV
Load regulation	V _{RLOAD}	V _{IN} = -20 V	5 mA ≤ I _L ≤ 500 mA	03	-300	300	mV
		V _{IN} = -35 V	5 mA ≤ I _L ≤ 50 mA		-450	450	
Standby current drain	I _{SCD}	V _{IN} = -20 V	I _L = 5 mA	03	0.5	3.0	mA
		V _{IN} = -35 V	I _L = 5 mA		0.5	4.0	
Standby current drain change (versus line voltage)	ΔI _{SCD} (line)	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 5 mA	03	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI _{SCD} (load)	V _{IN} = -20 V	5 mA ≤ I _L ≤ 500 mA	03	-0.5	0.5	mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Output short circuit current	I _{OS}	V _{IN} = -25 V		03	0.00	1.50	A
		V _{IN} = -35 V			0.00	1.00	
Peak output current	I _{PK}	V _{IN} = -18.5 V, forced ΔV _{OUT} = 1.43 V, see figure 6		03	0.5	2.0	A
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	V _{IN} = -20 V, e _i = 1 Vrms, at f = 2400 Hz	I _L = 125 mA, meter BW 10 Hz to 10 kHz, see figure 7	03	50		dB
Output noise voltage	V _{NO}	V _{IN} = -20 V, see figure 8	I _L = 50 mA, T _A = 25°C	03		700	μVrms
Thermal regulation	V _{RTH}	V _{IN} = -25 V	I _L = 500 mA, T _A = 25°C	03	-150	150	mV
Voltage start-up	V _{START}	V _{IN} = -30 V	R _L = 30 Ω, see figure 11	03	-15.75	-14.25	V
Line transient response	ΔV _{OUT} / ΔV _{IN}	V _{IN} = -20 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	03		30	mV/V
Load transient response	ΔV _{OUT} / ΔI _L	V _{IN} = -20 V, see figure 10	I _L = 50 mA, ΔI _L = 200 mA, T _A = 25°C	03		2.5	mV/mA
Output voltage	V _{OUT}	V _{IN} = -28 V	I _L = 5 mA, 0.5 A	04	-25.20	-22.80	V
		V _{IN} = -38 V	I _L = 5 mA, 0.5 A		-25.20	-22.80	
		V _{IN} = -40 V	I _L = 5 mA, 50 mA		-25.20	-22.80	
		V _{IN} = -30 V	I _L = 5 mA, T _A = 150°C		-25.44	-22.56	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/</u> <u>2/</u> <u>3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Line regulation	V _{RLINE}	-40 V ≤ V _{IN} ≤ -28 V	I _L = 50 mA	04	-720	720	mV
		-38 V ≤ V _{IN} ≤ -28 V	I _L = 350 mA		-240	240	
Load regulation	V _{RLOAD}	V _{IN} = -30 V	5 mA ≤ I _L ≤ 500 mA	04	-480	480	mV
		V _{IN} = -40 V	5 mA ≤ I _L ≤ 50 mA		-720	720	
Standby current drain	I _{SCD}	V _{IN} = -30 V	I _L = 5 mA	04	0.5	4.0	mA
		V _{IN} = -40 V	I _L = 5 mA		0.5	4.0	
Standby current drain change (versus line voltage)	ΔI _{SCD} (line)	-40 V ≤ V _{IN} ≤ -28 V	I _L = 5 mA	04	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI _{SCD} (load)	V _{IN} = -30 V	5 mA ≤ I _L ≤ 500 mA	04	-0.5	0.5	mA
Output short circuit current	I _{OS}	V _{IN} = -30 V		04	0.00	1.25	A
		V _{IN} = -40 V			0.00	1.00	
Peak output current	I _{PK}	V _{IN} = -28 V, forced ΔV _{OUT} = 2.28 V, see figure 6		04	0.5	2.0	A
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	V _{IN} = -30 V, e _i = 1 V _{rms} , at f = 2400 Hz	I _L = 125 mA, meter BW 10 Hz to 10 kHz, see figure 7	04	50		dB
Output noise voltage	V _{NO}	V _{IN} = -30 V, see figure 8	I _L = 50 mA, T _A = 25°C	04		1000	μV _{rms}

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Thermal regulation	V _{RTH}	V _{IN} = -34 V	I _L = 500 mA, T _A = 25°C	04	-240	240	mV
Voltage start-up	V _{START}	V _{IN} = -38 V	R _L = 48 Ω, see figure 11	04	-25.20	-22.80	V
Line transient response	ΔV _{OUT} / ΔV _{IN}	V _{IN} = -30 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	04		30	mV/V
Load transient response	ΔV _{OUT} / ΔI _L	V _{IN} = -30 V, see figure 10	I _L = 50 mA, ΔI _L = 200 mA, T _A = 25°C	04		2.5	mV/mA
Output voltage	V _{OUT}	V _{IN} = -8 V	I _L = 5 mA, 1.0 A	05	-5.25	-4.75	V
		V _{IN} = -20 V	I _L = 5 mA, 1.0 A		-5.25	-4.75	
		V _{IN} = -30 V	I _L = 5 mA, 0.1 A		-5.25	-4.75	
		V _{IN} = -10 V	I _L = 5 mA, T _A = 150°C		-5.30	-4.70	
Line regulation	V _{RLINE}	-30 V ≤ V _{IN} ≤ -8 V	I _L = 0.1 A	05	-150	150	mV
		-25 V ≤ V _{IN} ≤ -8 V	I _L = 0.5 A		-75	75	
Load regulation	V _{RLOAD}	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	05	-100	100	mV
		V _{IN} = -30 V	5 mA ≤ I _L ≤ 0.1 A		-150	150	
Standby current drain	I _{SCD}	V _{IN} = -10 V	I _L = 5 mA	05	0.5	3.0	mA
		V _{IN} = -30 V	I _L = 5 mA		0.5	4.0	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Standby current drain change (versus line voltage)	ΔI_{SCD} (line)	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	05	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI_{SCD} (load)	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	05	-0.5	0.5	mA
Output short circuit current	I _{OS}	V _{IN} = -25 V		05	0.00	3.50	A
		V _{IN} = -30 V			0.00	2.00	
Peak output current	I _{PK}	V _{IN} = -8 V, forced ΔV _{OUT} = 0.48 V, see figure 6		05	1.0	4.50	A
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	V _{IN} = -10 V, e _i = 1 V _{rms} , at f = 2400 Hz	I _L = 350 mA, meter BW 10 Hz to 10 kHz, see figure 7	05	45		dB
Thermal regulation	V _{RTH}	V _{IN} = -15 V	I _L = 1.0 A, T _A = 25°C	05	-50	50	mV
Output noise voltage	V _{NO}	V _{IN} = -10 V	I _L = 0.1 A	05		250	μV _{rms}
Voltage start-up	V _{START}	V _{IN} = -20 V	R _L = 5 Ω, see figure 11	05	-5.25	-4.75	V
Line transient response	ΔV _{OUT} / ΔV _{IN}	V _{IN} = -10 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	05		30	mV/V
Load transient response	ΔV _{OUT} / ΔI _L	V _{IN} = -10 V, see figure 10	I _L = 100 mA, ΔI _L = 400 mA, T _A = 25°C	05		2.5	mV/mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Output voltage	V _{OUT}	V _{IN} = -15 V	I _L = 5 mA, 1.0 A	06	-12.60	-11.40	V
		V _{IN} = -27 V	I _L = 5 mA, 1.0 A		-12.60	-11.40	
		V _{IN} = -35 V	I _L = 5 mA, 0.1 A		-12.60	-11.40	
		V _{IN} = -17 V	I _L = 5 mA, T _A = 150°C		-12.72	-11.40	
Line regulation	V _{RLINE}	-35 V ≤ V _{IN} ≤ -15 V	I _L = 0.1 A	06	-360	360	mV
		-32 V ≤ V _{IN} ≤ -15 V	I _L = 0.5 A		-120	120	
Load regulation	V _{RLOAD}	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	06	-240	240	mV
		V _{IN} = -35 V	5 mA ≤ I _L ≤ 0.1 A		-360	360	
Standby current drain	I _{SCD}	V _{IN} = -17 V	I _L = 5 mA	06	0.5	3.0	mA
		V _{IN} = -35 V	I _L = 5 mA		0.5	4.0	
Standby current drain change (versus line voltage)	ΔI _{SCD} (line)	-32 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	06	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI _{SCD} (load)	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	06	-0.5	0.5	mA
Output short circuit current	I _{OS}	V _{IN} = -32 V		06	0.00	3.50	A
		V _{IN} = -35 V			0.00	2.00	
Peak output current	I _{PK}	V _{IN} = -15 V, forced ΔV _{OUT} = 1.13 V, see figure 6		06	1.0	4.0	A

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	V _{IN} = -17 V, e _i = 1 Vrms, at f = 2400 Hz	I _L = 350 mA, meter BW 10 Hz to 10 kHz, see figure 7	06	50		dB
Output noise voltage	V _{NO}	V _{IN} = -17 V, see figure 8	I _L = 0.1 A, T _A = 25°C	06		600	μVrms
Thermal regulation	V _{RTH}	V _{IN} = -22 V	I _L = 1.0 A, T _A = 25°C	06	-120	120	mV
Voltage start-up	V _{START}	V _{IN} = -27 V	R _L = 12 Ω, see figure 11	06	-12.60	-11.40	V
Line transient response	ΔV _{OUT} / ΔV _{IN}	V _{IN} = -17 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	06		30	mV/V
Load transient response	ΔV _{OUT} / ΔI _L	V _{IN} = -17 V, see figure 10	I _L = 100 mA, ΔI _L = 400 mA, T _A = 25°C	06		2.5	mV/mA
Output voltage	V _{OUT}	V _{IN} = -18.5 V	I _L = 5 mA, 1.0 A	07	-15.75	-14.25	V
		V _{IN} = -30 V	I _L = 5 mA, 1.0 A		-15.75	-14.25	
		V _{IN} = -35 V	I _L = 5 mA, 0.1 A		-15.75	-14.25	
		V _{IN} = -20 V	I _L = 5 mA, T _A = 150°C		-15.90	-14.10	
Line regulation	V _{RLINE}	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 0.5 A	07	-150	150	mV
Load regulation	V _{RLOAD}	V _{IN} = -20 V	5 mA ≤ I _L ≤ 1.0 A	07	-300	300	mV
		V _{IN} = -35 V	5 mA ≤ I _L ≤ 0.1 A		-450	450	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Standby current drain	I _{SCD}	V _{IN} = -20 V	I _L = 5 mA	07	0.5	3.0	mA
		V _{IN} = -35 V	I _L = 5 mA		0.5	4.0	
Standby current drain change (versus line voltage)	ΔI _{SCD} (line)	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 5 mA	07	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI _{SCD} (load)	V _{IN} = -20 V	5 mA ≤ I _L ≤ 1.0 A	07	-0.5	0.5	mA
Output short circuit current	I _{OS}	V _{IN} = -20 V		07	0.00	3.50	A
		V _{IN} = -35 V			0.00	2.00	
Peak output current	I _{PK}	V _{IN} = -18.5 V, forced ΔV _{OUT} = 1.43 V, see figure 6		07	1.0	4.0	A
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	V _{IN} = -20 V, e _i = 1 V _{rms} , at f = 2400 Hz	I _L = 350 mA, meter BW 10 Hz to 10 kHz, see figure 7	07	50		dB
Output noise voltage	V _{NO}	V _{IN} = -20 V, see figure 8	I _L = 0.1 A	07		700	μV _{rms}
Thermal regulation	V _{RTH}	V _{IN} = -25 V	I _L = 1.0 A, T _A = 25°C	07	-150	150	mV
Voltage start-up	V _{START}	V _{IN} = -30 V	R _L = 15 Ω, see figure 11	07	-15.75	-14.25	V
Line transient response	ΔV _{OUT} / ΔV _{IN}	V _{IN} = -20 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	07		30	mV/V

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Load transient response	$\Delta V_{OUT} / \Delta I_L$	V _{IN} = -20 V, see figure 10	I _L = 100 mA, ΔI_L = 400 mA, T _A = 25°C	07		2.5	mV/mA
Output voltage	V _{OUT}	V _{IN} = -28 V	I _L = 5 mA, 1.0 A	08	-25.20	-22.80	V
		V _{IN} = -38 V	I _L = 5 mA, 1.0 A		-25.20	-22.80	
		V _{IN} = -40 V	I _L = 5 mA, 0.1 A		-25.20	-22.80	
		V _{IN} = -30 V	I _L = 5 mA, T _A = 150°C		-25.44	-22.56	
Line regulation	V _{RLINE}	-40 V ≤ V _{IN} ≤ -28 V	I _L = 0.1 A	08	-720	720	mV
		-38 V ≤ V _{IN} ≤ -28 V	I _L = 0.5 A		-240	240	
Load regulation	V _{RLOAD}	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	08	-480	480	mV
		V _{IN} = -40 V	5 mA ≤ I _L ≤ 0.1 A		-720	720	
Standby current drain	I _{SCD}	V _{IN} = -30 V	I _L = 5 mA	08	0.5	4.0	mA
		V _{IN} = -40 V	I _L = 5 mA		0.5	4.0	
Standby current drain change (versus line voltage)	ΔI_{SCD} (line)	-40 V ≤ V _{IN} ≤ -28 V	I _L = 5 mA	08	-1.0	1.0	mA
Standby current drain change (versus load current)	ΔI_{SCD} (load)	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	08	-0.5	0.5	mA
Output short circuit current	I _{OS}	V _{IN} = -30 V		08	0.00	3.00	A
		V _{IN} = -40 V			0.00	2.00	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/ 3/</u> -55°C ≤ T _A ≤ +125°C see figure 5 and 3.5 unless otherwise specified		Device type	Limits		Unit
					Min	Max	
		Input voltage	Load current				
Peak output current	I _{PK}	V _{IN} = -28 V, forced ΔV _{OUT} = 2.28 V, see figure 6		08	1.0	4. 0	A
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	V _{IN} = -30 V, e _i = 1 V _{rms} , at f = 2400 Hz	I _L = 350 mA, meter BW 10 Hz to 10 kHz, see figure 7	08	50		dB
Output noise voltage	V _{NO}	V _{IN} = -30 V, see figure 8	I _L = 0.1 A, T _A = +25°C	08		1000	μV _{rms}
Thermal regulation	V _{RTH}	V _{IN} = -34 V	I _L = 1.0 A, T _A = 25°C	08	-240	240	mV
Voltage start-up	V _{START}	V _{IN} = -38 V	R _L = 24 Ω, see figure 11	08	-25.20	-22.80	V
Line transient response	ΔV _{OUT} / ΔV _{IN}	V _{IN} = -30 V, V _{PULSE} = -3.0 V, see figure 9	I _L = 5 mA, T _A = 25°C	08		30	mV/V
Load transient response	ΔV _{OUT} / ΔI _L	V _{IN} = -30 V, see figure 10	I _L = 100 mA, ΔI _L = 400 mA, T _A = 25°C	08		2.5	mV/mA

1/ All tests performed at $T_A = 125^{\circ}\text{C}$ may at the manufacturer's option, be performed at $T_A = 150^{\circ}\text{C}$.
Specifications for $T_A = 125^{\circ}\text{C}$ shall then apply at $T_A = 150^{\circ}\text{C}$.

2/ In any test sequence in which I_{OS} and I_{PK} are tested, they shall be followed by the voltage start up test.

3/ Recovery of output voltage after the output short circuit test is not guaranteed.

4. VERIFICATION.

4.1 Sampling and inspection. Sampling and inspection procedures should 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. For class S and B devices, an additional burn-in screen shall be performed to test the operation of the thermal shutdown circuit. This screen shall be performed after serialization (3.1.8 of method 5004 of MIL-STD-883) and before interim electrical parameters (pre burn-in, 3.1.9 of method 5004 of MIL-STD-883). The requirements of 3.2.3 of method 1015 of MIL-STD-883 shall apply to this screen except the devices need not be tested in an oven.
- b. 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.
- c. 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.
- d. Additional screening for space level product shall be as specified in MIL-PRF-38535.
- e. Constant acceleration (method 2001 of MIL-STD-883); test condition B shall be used for case Y.

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

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. Subgroups 8, 9, 10, and 11 shall be omitted in table II of method 5005 of MIL-STD-883 shall be omitted.

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

- a. End point electrical parameters shall be as specified in table II herein.
- b. When using the method 5005 option, constant acceleration for class S (method 2001 of MIL-STD-883); test condition B shall be used for case Y.

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.

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 <u>1/</u>	1,2,3	1,2,3
Group A test requirements	1,2,3,4,5,6,7	1,2,3,4,5,6,7
Group B electrical test parameters when using the method 5005 QCI option	1,2,3, and table IV delta limits	N/A
Group C electrical parameters	1,2,3, and table IV delta limits	1 and table IV delta limits
Additional electrical subgroups for group C periodic inspections	Not applicable	None
Group D end point electrical parameters	1,2,3	1

1/ PDA applies to subgroup 1.

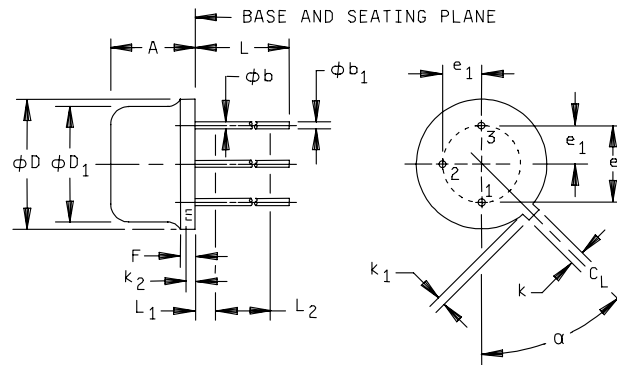
4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535 and as follows:

- a. End point electrical parameters shall be as specified in table II herein.
- b. Constant acceleration (method 2001 of MIL-STD-883); test condition B shall be used for case Y.

4.5 Methods of inspection. Methods of inspection shall be as 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 voltage. Currents values given are for conventional current and are positive when flowing into the referenced terminal.

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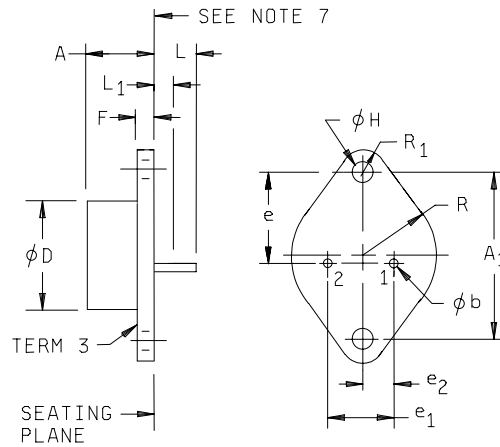
Dimensions					
Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.165	.185	4.19	4.70	
ϕb	.016	.019	0.41	0.48	3
ϕb_1	.016	.021	0.41	0.53	3
ϕD	.335	.370	8.51	9.40	
ϕD_1	.305	.335	7.75	8.51	
e	.200	T.P.	5.08	T.P.	5
e_1	.100	T.P.	2.54	T.P.	5
F	---	.050	---	1.27	
k	.028	.034	0.71	0.86	
k_1	.029	.045	0.74	1.14	4
k_2	.009	.041	0.23	1.04	
L	.500	---	12.70	---	
L_1	---	.050	---	1.27	
L_2	.250	---	6.35	---	
α	45°	T.P.	45°	T.P.	5

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only and are based upon 1.00 inch = 25.4 mm.
3. (All leads) ϕb applies between L_1 and L_2 . ϕb_1 applies between L_2 and .500 (12.70 mm) from the reference plane. Diameter is uncontrolled in L_1 and beyond .500 (12.70 mm) from the reference plane.
4. Measured from the maximum diameter of the product.
5. Leads having a maximum diameter .019 (0.48 mm) measured in gauging plane .054 (1.37 mm) + .001 (0.03 mm) - .000 (0.00 mm) below the base plane of the product shall be within .007 (0.18 mm) of their true position relative to a maximum width tab.
6. The product may be measured by direct methods or by gauge.

FIGURE 1. Case outline X.

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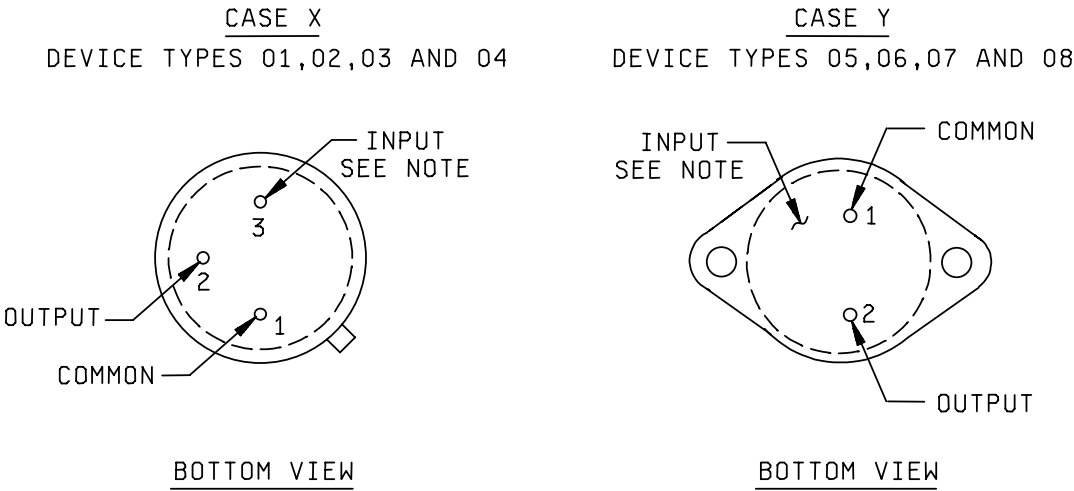


Dimensions					
Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.250	.450	6.35	11.43	
A ₁	1.177	1.197	29.90	30.40	
phi b	.038	.043	0.97	1.09	3,7
phi D	---	.875	---	22.22	
e	.655	.675	16.64	17.14	
e ₁	.420	.440	10.67	11.18	
e ₂	.205	.225	5.21	5.72	
F	.060	.135	1.52	3.43	
phi H	.151	.161	3.84	4.09	5,6
L	.312	.500	7.92	12.70	4
L ₁	---	.050	---	1.27	3,5
R	.495	.525	12.57	13.34	
R ₁	.131	.188	3.33	4.78	

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only and are based upon 1.00 inch = 25.4 mm.
3. (Two leads) phi b applies between L₁ and .500 (12.70 mm) from the seating plane.
Diameter is uncontrolled in L₁ and beyond .500 (12.70 mm) from the seating plane.
4. Two leads.
5. Two holes.
6. Two holes located at true position within diameter .010 (0.25 mm).
7. Leads having a maximum diameter .043 (1.09 mm) measured in gauging plane .054 (1.37 mm) + .001 (0.03 mm) - .000 (0.00 mm) below the seating plane shall be located at true position within diameter .014 (0.36 mm).
8. The mounting surface of the header shall be flat to convex within .003 (0.08 mm) inside a .930 (23.62 mm) diameter circle on the center of the header and flat to convex within .006 (0.15 mm) overall.

FIGURE 2. Case outline Y.



NOTE: Case is connected to input.

FIGURE 3. Terminal connections.

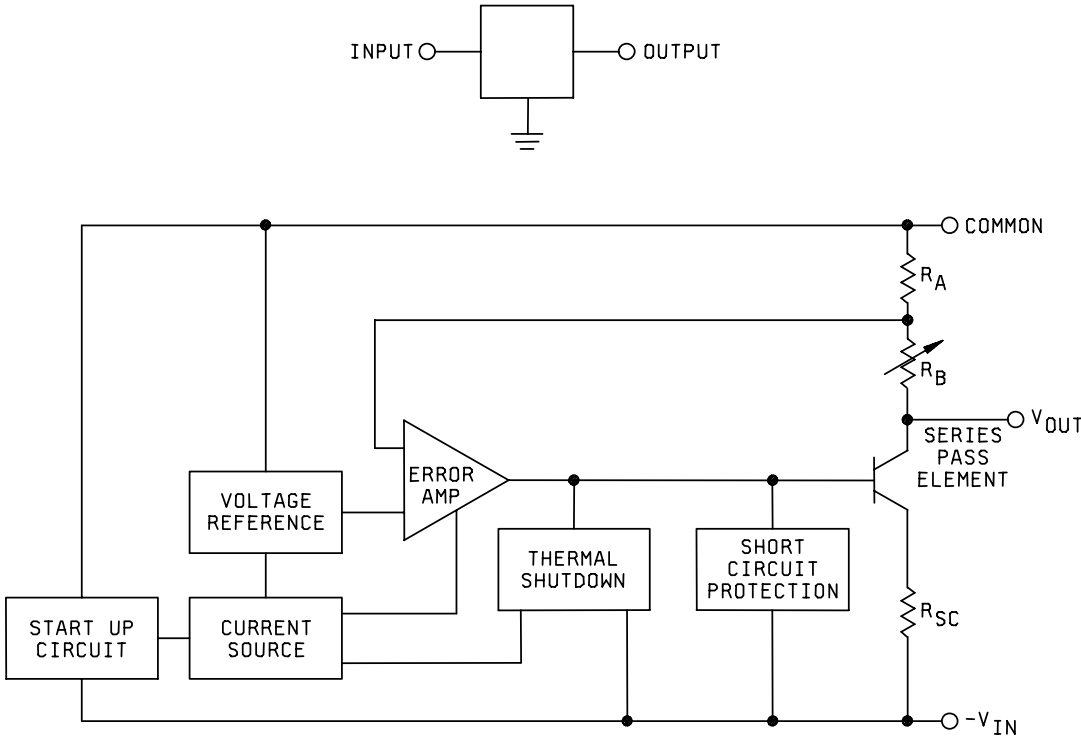
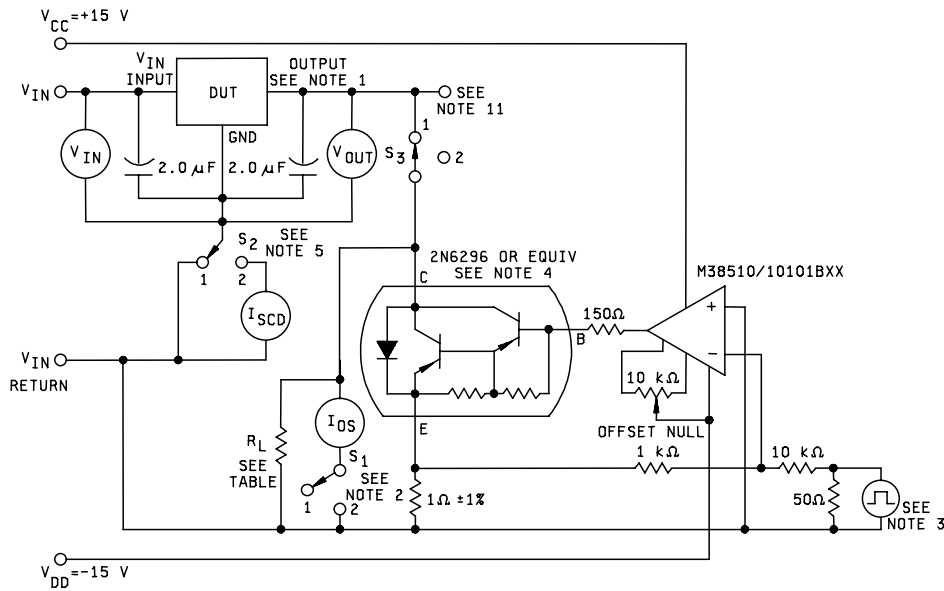


FIGURE 4. Block diagram.

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Device types	01	02	03	04	05	06	07	08
R_L	1 k Ω	2.4 k Ω	3 k Ω	4.8 k Ω	1 k Ω	2.4 k Ω	3 k Ω	4.8 k Ω

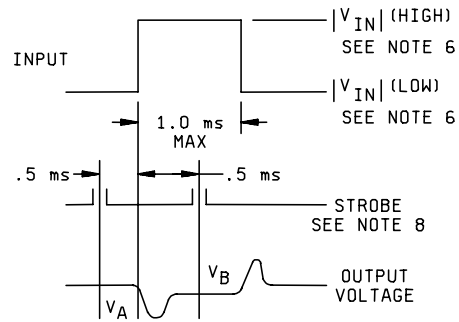
NOTES:

- Output terminal must utilize a Kelvin connection.
- S_1 : Position 2 for I_{OS} test. Position 1 for all other tests.
- Load currents of 5 mA shall be established via the load resistor R_L . All other load currents shall be established via the pulse load circuit. The pulse generator has the following characteristics:
 - Pulse amplitude = $10 I_L V$.
 - Pulse width = 1.0 ms
 - Duty cycle = 2% (maximum).

Load current is determined by the voltage across the 1 Ω resistor. Measurements shall be made 0.5 ms after the start of the pulse.
- An alternate drive circuit for 2N6296 transistor may be used to develop the proper load current through the 1 Ω resistor.
- Use position 2 of S_2 for I_{SCD} , ΔI_{SCD} tests only.
- $V_{IN(LOW)}$ and $V_{IN(HIGH)}$ per table III.
- $V_{RLINE} = V_B - V_A$.
- The output voltage is sampled at the specified intervals. Strobe pulse with is 100 μs maximum.
- I_L minimum and I_L maximum per table III.
- $V_{RLOAD} = V_D - V_C$; $V_{RTH} = V_E - V_D$.
- Alternate point for applying load circuit directly with automatic test equipment (place S_3 in position 2).

FIGURE 5. Test circuit for static tests.

LINE REGULATION WAVEFORMS



LOAD REGULATION AND THERMAL REGULATION WAVEFORMS

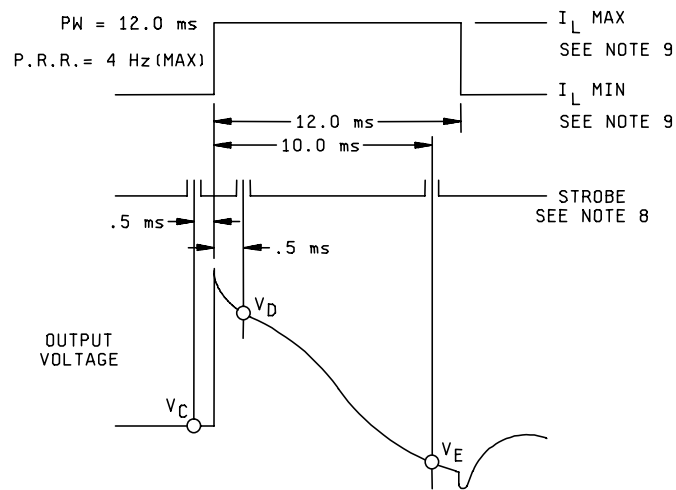
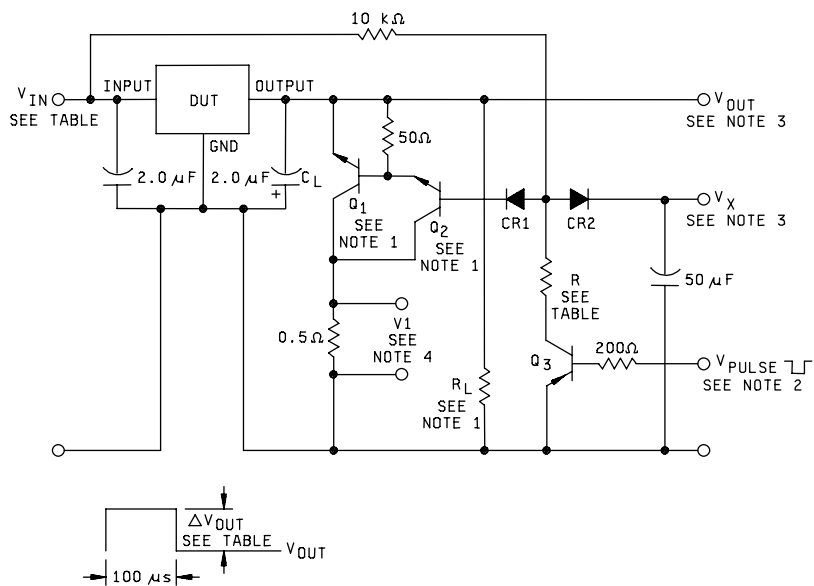


FIGURE 5. Test circuit for static tests – Continued.

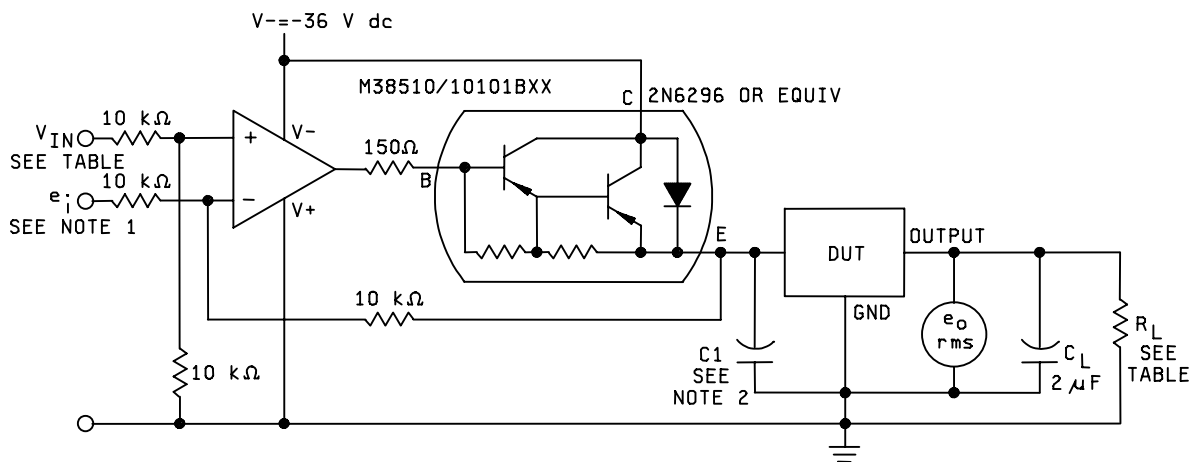


Device types	01, 05	02, 06	03, 07	04, 08
V_{IN}	-8 V	-15 V	-18.5 V	-28 V
ΔV_{OUT}	0.48 V	1.13 V	1.43 V	-2.28 V
R	110 Ω	300 Ω	390 Ω	680 Ω
R_L	1.0 k Ω	2.4 k Ω	3.0 k Ω	4.8 k Ω

NOTE:

1. Q1 = 2N5347 or equivalent.
2. Q2 = 2N3108 or equivalent.
Q3 = TX 2N4033 or equivalent.
CR1 = 1N3873 or equivalent.
CR2 = 1N3873 or equivalent.
3. The pulse, V_{PULSE} , has the following characteristics:
Pulse width = 100 μ s
Pulse repetition rate = 200 Hz.
Pulse amplitude = -5 V.
4. Adjust V_X for a forced output voltage condition during application of V_{PULSE} .
5. Kelvin connections shall be made directly to the 0.5 Ω resistor. The peak current is $I_{PK} = 2 V_I$ (amps).

FIGURE 6. Peak output current test circuit.

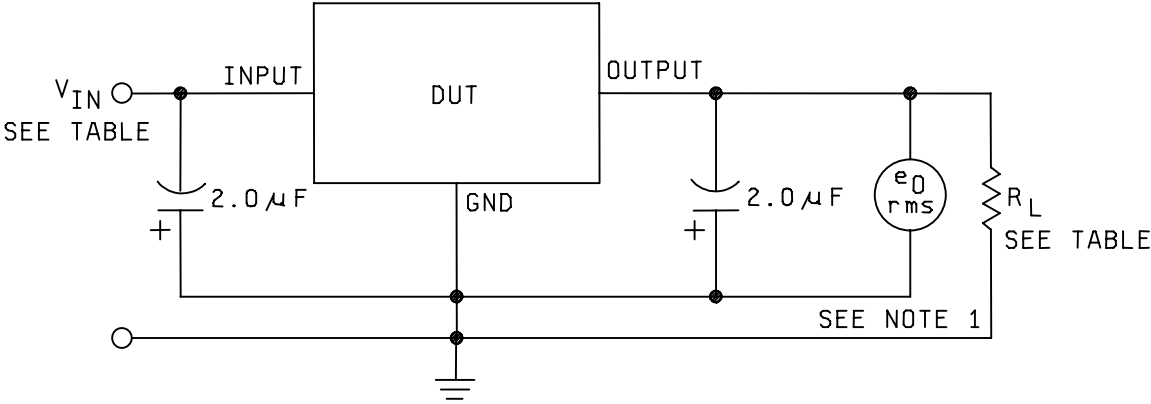


Device types	01	02	03	04	05	06	07	08
V_{IN}	-10 V	-17 V	-20 V	-30 V	-10 V	-17 V	-20 V	-30 V
R_L	40.2 Ω	95.3 Ω	121 Ω	191 Ω	14.3 Ω	34 Ω	43.2 Ω	68.1 Ω

NOTES:

1. $e_i = 1$ Vrms at $f = 2400$ Hz (measured at the input terminals of device under test (DUT)).
Ripple rejection (dB) = $20 \log (e_{irms} / e_{orms})$.
2. c_i shall be minimum value to prevent oscillations of the device under test.
The maximum value of c_i shall be $2.0 \mu\text{F}$.
3. R_L shall be type RER 70 or equivalent.

FIGURE 7. Ripple rejection test circuit.

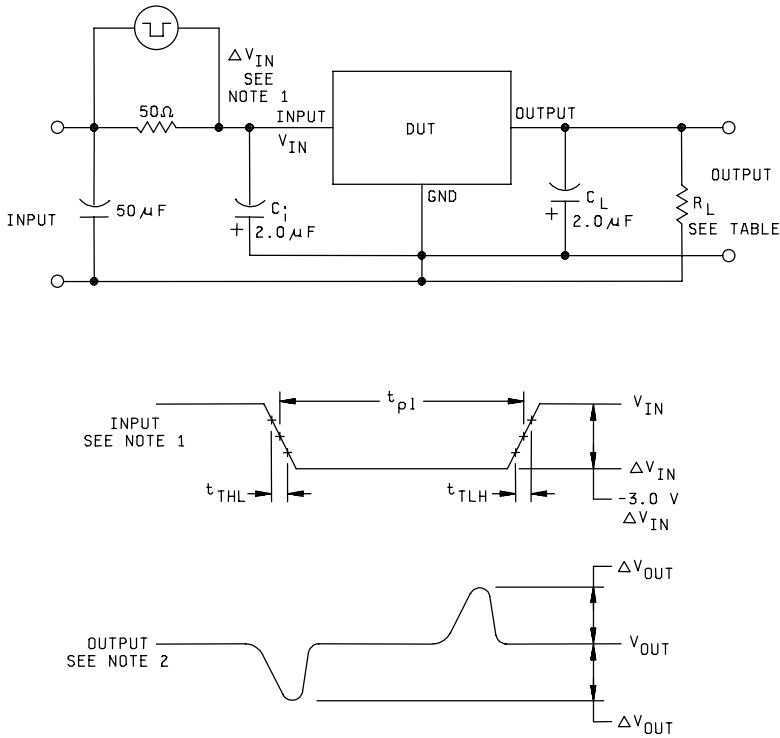


Device types	01	02	03	04	05	06	07	08
V_L	-10 V	-17 V	-20 V	-30 V	-10 V	-17 V	-20 V	-30 V
R_L	100 Ω	237 Ω	301 Ω	475 Ω	49.9 Ω	121 Ω	150 Ω	237 Ω

NOTES:

1. The meter for measuring $e_{0 \text{ rms}}$ shall have a minimum bandwidth from 10 Hz to 10 kHz and shall measure true rms voltages.
2. $N_0 = e_{0 \text{ rms}}$.
3. R_L shall be type RER 70 or equivalent.

FIGURE 8. Noise test circuit.



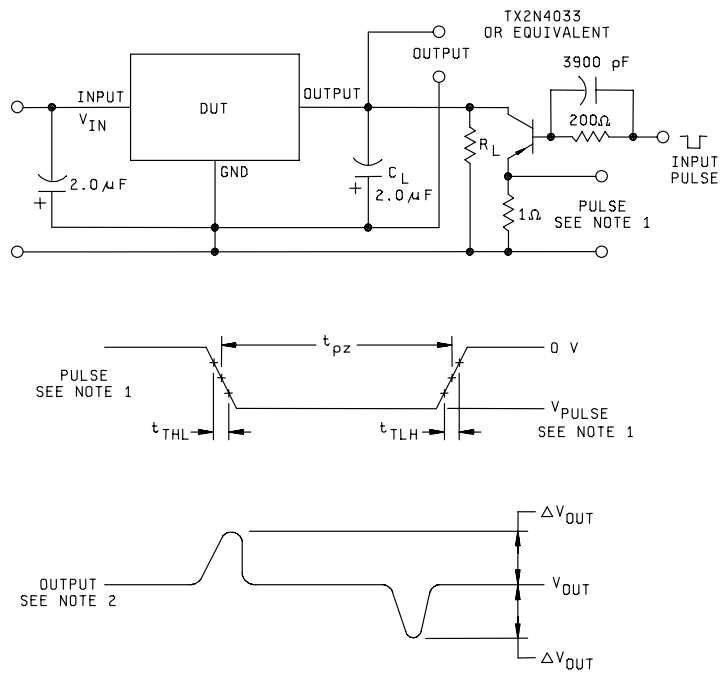
Device types	01, 05	02, 06	03, 07	04, 08
V_{IN}	-10 V	-17 V	-20 V	-30 V
R_L	1.0 kΩ	2.4 kΩ	3.0 kΩ	4.8 kΩ

NOTES:

1. The pulse characteristics shall be established under load while the DUT is operating.
 $t_{TLH} = t_{THL} = 5.0 \mu s$
 $\Delta V_{IN} = V_{IN} - 3.0 V$
 $t_{p1} = 25 \mu s$ at 3% duty cycle.
2. $\Delta V_{OUT} = 90 mV$ maximum (this guarantees the specification limit of 30 mV/V).
3. Oscilloscope minimum bandwidth shall be 5 MHz.
4. R_L shall be type RER 70 or equivalent.

FIGURE 9. Line transient response test circuit.

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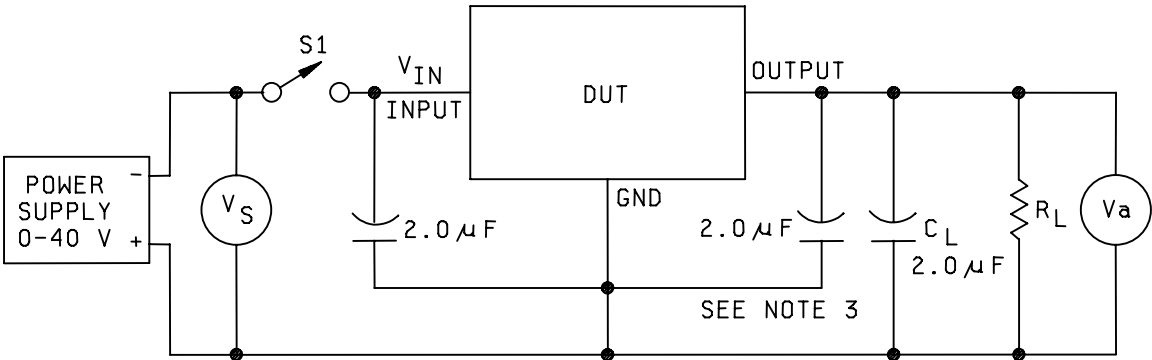


Device types	01	02	03	04	05	06	07	08
V_L	-10 V	-17 V	-20 V	-30 V	-10 V	-17 V	-20 V	-30 V
R_L	100 Ω	243 Ω	301 Ω	487 Ω	49.9 Ω	121 Ω	150 Ω	243 Ω

NOTES:

- The pulse characteristics shall be established under load while the DUT is operating.
 $t_{TLH} = t_{THL} = 1.0 \mu s$
 $t_{p2} = 25 \mu s$ at 3% duty cycle.
 $V_{PULSE} = -0.2 V$ for device types 01, 02, 03, and 04.
 $V_{PULSE} = -0.4 V$ for device types 05, 06, 07, and 08.
- $\Delta V_{OUT} = 500 mV$ maximum for device types 01 – 04.
 $\Delta V_{OUT} = 1000 mV$ maximum for device types 05 – 08.
(These values guarantee the specified limits for load transient response).
- Oscilloscope minimum bandwidth shall be 5 MHz.
- Load resistor R_L is type RER 70 or equivalent.

FIGURE 10. Load transient response test circuit.



Device types	01	02	03	04	05	06	07	08
R_L for $I_L = I_L (\text{max})$	10 Ω	24 Ω	30 Ω	48 Ω	5 Ω	12 Ω	15 Ω	24 Ω
V_S	-20 V	-27 V	-30 V	-38 V	-20 V	-27 V	-30 V	-38 V

NOTES:

1. Operate S1 with a 2% duty cycle (maximum).
2. Closure time for S1 shall be 11 ms. Measurements shall be made in the interval 0.5 ms to 10 ms after the start of the pulse.
3. All capacitors shall be solid tantalum.

FIGURE 11. Voltage start-up test circuit.

TABLE III. Group A inspection for all device type 01.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
1 T _A = +25°C	V _{OUT}	1	V _{IN} = -8 V	I _L = 5 mA	-5.25	-4.75	V		
		2		I _L = 500 mA	“	“			
		3	V _{IN} = -20 V	I _L = 5 mA	“	“			
		4		I _L = 500 mA	“	“			
		5	V _{IN} = -30 V	I _L = 5 mA	“	“			
		6		I _L = 50 mA	“	“			
	V _{RLINE}	7	-30 V ≤ V _{IN} ≤ -8 V	I _L = 50 mA	-150	150	mV	See figure 5 waveforms V _B = V _A	
		8	-25 V ≤ V _{IN} ≤ -8 V	I _L = 350 mA	-50	50			
	V _{RLOAD}	9	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	-100	100	mV	See figure 5 waveforms V _D = V _C	
		10	V _{IN} = -30 V	5 mA ≤ I _L ≤ 50 mA	-150	150			
	I _{SCD}	11	V _{IN} = -10 V	I _L = 5 mA	0.5	3.0	mA		
		12	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	13	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₁₂ – I ₁₃	
	I _{SCD} (load)	14	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₁₁ – I ₁₄	
	I _{OS}	15	V _{IN} = -25 V		0.00	1.50	A		
		16	V _{IN} = -30 V		0.00	1.00			
	I _{PK}	17	V _{IN} = -8 V; forced ΔV _{OUT} = 0.48 V		0.5	2.0	A	See figure 6	
	V _{START}	18	V _{IN} = -20 V	R _L = 10 Ω	-5.25	-4.75	V	See figure 11	
	V _{RTH}	19	V _{IN} = -15 V	I _L = 500 mA	-50	50	mV	See figure 5 V _E = V _D	

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

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
2 T _A = +125°C	V _{OUT}	20	V _{IN} = -8 V	I _L = 5 mA	-5.25	-4.75	V		
		21		I _L = 500 mA	“	“			
		22	V _{IN} = -20 V	I _L = 5 mA	“	“			
		23		I _L = 500 mA	“	“			
		24	V _{IN} = -30 V	I _L = 5 mA	“	“			
		25		I _L = 50 mA	“	“			
	V _{RLINE}	26	-30 V ≤ V _{IN} ≤ -8 V	I _L = 50 mA	-150	150	mV	See figure 5 waveforms V _B = V _A	
		27	-25 V ≤ V _{IN} ≤ -8 V	I _L = 350 mA	-50	50			
	V _{RLOAD}	28	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	-100	100	mV	See figure 5 Waveforms V _D = V _C	
		29	V _{IN} = -30 V	5 mA ≤ I _L ≤ 50 mA	-150	150			
	I _{SCD}	30	V _{IN} = -10 V	I _L = 5 mA	0.5	3.0	mA		
		31	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	32	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₃₁ – I ₃₂	
	I _{SCD} (load)	33	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₃₀ – I ₃₃	
	I _{OS}	34	V _{IN} = -25 V		0.00	1.50	A		
		35	V _{IN} = -30 V		0.00	1.00			
	I _{PK}	36	V _{IN} = -8 V; forced ΔV _{OUT} = 0.48 V		0.5	2.0	A	See figure 6	
	V _{START}	37	V _{IN} = -20 V	R _L = 10 Ω	-5.25	-4.75	V	See figure 11	
2 T _A = +150°C	V _{OUT}	38	V _{IN} = -10 V	I _L = 5 mA	-5.30	-4.70	mV		

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

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
3 T _A = -55°C	V _{OUT}	39	V _{IN} = -8 V	I _L = 5 mA	-5.25	-4.75	V	
		40		I _L = 500 mA	“	“		
		41	V _{IN} = -20 V	I _L = 5 mA	“	“		
		42		I _L = 500 mA	“	“		
		43	V _{IN} = -30 V	I _L = 5 mA	“	“		
		44		I _L = 50 mA	“	“		
	V _{RLINE}	45	-30 V ≤ V _{IN} ≤ -8 V	I _L = 50 mA	-150	150	mV	See figure 5 waveforms V _B = V _A
		46	-25 V ≤ V _{IN} ≤ -8 V	I _L = 350 mA	-50	50		
	V _{RLOAD}	47	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	-100	100	mV	See figure 5 waveforms V _C = V _D
		48	V _{IN} = -30 V	5 mA ≤ I _L ≤ 50 mA	-150	150		
	I _{SCD}	49	V _{IN} = -10 V	I _L = 5 mA	0.5	3.0	mA	
		50	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0		
	I _{SCD} (line)	51	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₅₀ – I ₅₁
	I _{SCD} (load)	52	V _{IN} = -10 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₄₉ – I ₅₂
	I _{OS}	53	V _{IN} = -25 V		0.00	1.50	A	
		54	V _{IN} = -30 V		0.00	1.00		
	I _{PK}	55	V _{IN} = -8 V; forced ΔV _{OUT} = 0.48 V		0.5	2.0	A	See figure 6
	V _{START}	56	V _{IN} = -20 V	R _L = 10 Ω	-5.25	-4.75	V	See figure 11
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	57	V _{IN} = -10 V, e _i = 1 V rms at f = 2400 Hz	I _L = 125 mA	45		dB	See figure 7, meter BW 10 Hz to 10 kHz

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

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 $T_A = 125^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	58	$V_{\text{IN}} = -10\text{ V}$, $e_i = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_L = 125\text{ mA}$	45		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 $T_A = -55^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	59	$V_{\text{IN}} = -10\text{ V}$, $e_i = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_L = 125\text{ mA}$	45		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 $T_A = 25^{\circ}\text{C}$	V_{NO}	60	$V_{\text{IN}} = -10\text{ V}$	$I_L = 50\text{ mA}$		250	$\mu\text{V rms}$	See figure 8
	$\Delta V_{\text{OUT}} / \Delta V_{\text{IN}}$	61	$V_{\text{IN}} = -10\text{ V}$, $V_{\text{PULSE}} = -3.0\text{ V}$	$I_L = 5\text{ mA}$		30	mV/V	See figure 9
	$\Delta V_{\text{OUT}} / \Delta I_L$	62	$V_{\text{IN}} = -10\text{ V}$	$I_L = 5\text{ mA}$ $\Delta I_L = 200\text{ mA}$		2.5	mV/mA	See figure 10

TABLE III. Group A inspection for all device type 02.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
1 T _A = +25°C	V _{OUT}	1	V _{IN} = -15 V	I _L = 5 mA	-12.60	-11.40	V		
		2		I _L = 500 mA	"	"			
		3	V _{IN} = -27 V	I _L = 5 mA	"	"			
		4		I _L = 500 mA	"	"			
		5	V _{IN} = -35 V	I _L = 5 mA	"	"			
		6		I _L = 50 mA	"	"			
	V _{RLINE}	7	-35 V ≤ V _{IN} ≤ -15 V	I _L = 50 mA	-360	360	mV	See figure 5 waveforms V _B = V _A	
		8	-32 V ≤ V _{IN} ≤ -15 V	I _L = 350 mA	-120	120			
	V _{RLOAD}	9	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	-240	240	mV	See figure 5 waveforms V _C = V _D	
		10	V _{IN} = -35 V	5 mA ≤ I _L ≤ 50 mA	-360	360			
	I _{SCD}	11	V _{IN} = -17 V	I _L = 5 mA	0.5	3.0	mA		
		12	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	13	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₁₂ – I ₁₃	
	I _{SCD} (load)	14	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₁₁ – I ₁₄	
	I _{OS}	15	V _{IN} = -32 V		0.00	1.50	A		
		16	V _{IN} = -35 V		0.00	1.00			
	I _{PK}	17	V _{IN} = -15 V; forced ΔV _{OUT} = 1.13 V		0.5	2.0	A	See figure 6	
	V _{START}	18	V _{IN} = -27 V	R _L = 24 Ω	-12.60	-11.40	V	See figure 11	
	V _{RTH}	19	V _{IN} = -22 V	I _L = 500 mA	-120	120	mV	See figure 5 waveforms	

TABLE III. Group A inspection for all device type 02 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes		
			see figure 5, unless otherwise specified		Min	Max				
			Input voltage	Load current						
2 T _A = +125°C	V _{OUT}	20	V _{IN} = -15 V	I _L = 5 mA	-12.60	-11.40	V			
		21		I _L = 500 mA	"	"				
		22	V _{IN} = -27 V	I _L = 5 mA	"	"				
		23		I _L = 500 mA	"	"				
		24	V _{IN} = -35 V	I _L = 5 mA	"	"				
		25		I _L = 50 mA	"	"				
	V _{RLINE}	26	-35 V ≤ V _{IN} ≤ -15 V	I _L = 50 mA	-360	360	mV	See figure 5 waveforms V _B = V _A		
		27	-32 V ≤ V _{IN} ≤ -15 V	I _L = 350 mA	-120	120				
	V _{RLOAD}	28	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	-240	240	mV	See figure 5 waveforms V _C = V _D		
		29	V _{IN} = -35 V	5 mA ≤ I _L ≤ 50 mA	-360	360				
	I _{SCD}	30	V _{IN} = -17 V	I _L = 5 mA	0.5	3.0	mA			
		31	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0				
	I _{SCD} (line)	32	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₃₁ – I ₃₂		
	I _{SCD} (load)	33	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₃₀ – I ₃₃		
	I _{OS}	34	V _{IN} = -32 V		0.00	1.50	A	See figure 6		
		35	V _{IN} = -35 V		0.00	1.00				
	I _{PK}	36	V _{IN} = -15 V; forced ΔV _{OUT} = 1.13 V		0.5	2.0	A	See figure 6		
	V _{START}	37	V _{IN} = -27 V	R _L = 24 Ω	-12.60	-11.40	V	See figure 11		
2 T _A = +150°C	V _{OUT}	38	V _{IN} = -17 V	I _L = 5 mA	-12.72	-11.28	V			

TABLE III. Group A inspection for all device type 02 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes		
			see figure 5, unless otherwise specified		Min	Max				
			Input voltage	Load current						
3 T _A = -55°C	V _{OUT}	39	V _{IN} = -15 V	I _L = 5 mA	-12.60	-11.40	V			
		40		I _L = 500 mA	“	“				
		41	V _{IN} = -27 V	I _L = 5 mA	“	“				
		42		I _L = 500 mA	“	“				
		43	V _{IN} = -35 V	I _L = 5 mA	“	“				
		44		I _L = 50 mA	“	“				
	V _{RLINE}	45	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	-360	360	mV	See figure 5 waveforms V _B = V _A		
		46	-32 V ≤ V _{IN} ≤ -15 V	I _L = 350 mA	-120	120				
	V _{RLOAD}	47	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	-240	240	mV	See figure 5 waveforms V _C = V _D		
		48	V _{IN} = -35 V	5 mA ≤ I _L ≤ 50 mA	-360	360				
	I _{SCD}	49	V _{IN} = -17 V	I _L = 5 mA	0.5	3.0	mA			
		50	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0				
	I _{SCD} (line)	51	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₅₀ – I ₅₁		
	I _{SCD} (load)	52	V _{IN} = -17 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₄₉ – I ₅₂		
	I _{OS}	53	V _{IN} = -32 V		0.00	1.50	A			
		54	V _{IN} = -35 V		0.00	1.00				
	I _{PK}	55	V _{IN} = -15 V; forced ΔV _{OUT} = 1.13 V		0.5	2.0	A	See figure 6		
	V _{START}	56	V _{IN} = -27 V	R _L = 24 Ω	-12.60	-11.40	V	See figure 11		
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	57	V _{IN} = -17 V, e _i = 1 V rms at f = 2400 Hz	I _L = 125 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz		

TABLE III. Group A inspection for all device type 02 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 $T_A = 125^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	58	$V_{\text{IN}} = -17\text{ V}$, $e_i = 1\text{ V rms at}$ $f = 2400\text{ Hz}$	$I_L = 125\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 $T_A = -55^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	59	$V_{\text{IN}} = -17\text{ V}$, $e_i = 1\text{ V rms at}$ $f = 2400\text{ Hz}$	$I_L = 125\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 $T_A = 25^{\circ}\text{C}$	V_{NO}	60	$V_{\text{IN}} = -17\text{ V}$	$I_L = 50\text{ mA}$		600	$\mu\text{V rms}$	See figure 8
	$\Delta V_{\text{OUT}} / \Delta V_{\text{IN}}$	61	$V_{\text{IN}} = -17\text{ V}$, $V_{\text{PULSE}} = -3.0\text{ V}$	$I_L = 5\text{ mA}$		30	mV/V	See figure 9
	$\Delta V_{\text{OUT}} / \Delta I_L$	62	$V_{\text{IN}} = -17\text{ V}$	$I_L = 50\text{ mA}$ $\Delta I_L = 200\text{ mA}$		2.5	mV/mA	See figure 10

TABLE III. Group A inspection for all device type 03.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
1 $T_A = +25^{\circ}\text{C}$	V_{OUT}	1	$V_{\text{IN}} = -18.5\text{ V}$	$I_L = 5\text{ mA}$	-15.75	-14.25	V	
		2		$I_L = 500\text{ mA}$	"	"		
		3	$V_{\text{IN}} = -30\text{ V}$	$I_L = 5\text{ mA}$	"	"		
		4		$I_L = 500\text{ mA}$	"	"		
		5	$V_{\text{IN}} = -35\text{ V}$	$I_L = 5\text{ mA}$	"	"		
		6		$I_L = 50\text{ mA}$	"	"		
	V_{RLINE}	7	$-35\text{ V} \leq V_{\text{IN}} \leq -18.5\text{ V}$	$I_L = 350\text{ mA}$	-150	150	mV	See figure 5 waveforms $V_B = V_A$
	V_{RLOAD}	8	$V_{\text{IN}} = -20\text{ V}$	$5\text{ mA} \leq I_L \leq 500\text{ mA}$	-300	300	mV	See figure 5 waveforms $V_C = V_D$
		9	$V_{\text{IN}} = -35\text{ V}$	$5\text{ mA} \leq I_L \leq 50\text{ mA}$	-450	450		
	I_{SCD}	10	$V_{\text{IN}} = -20\text{ V}$	$I_L = 5\text{ mA}$	0.5	3.0	mA	
		11	$V_{\text{IN}} = -35\text{ V}$	$I_L = 5\text{ mA}$	0.5	4.0		
	I_{SCD} (line)	12	$-35\text{ V} \leq V_{\text{IN}} \leq -18.5\text{ V}$	$I_L = 5\text{ mA}$	-1.0	1.0	mA	$\Delta I_{\text{SCD}} = I_{11} - I_{12}$
	I_{SCD} (load)	13	$V_{\text{IN}} = -20\text{ V}$	$5\text{ mA} \leq I_L \leq 500\text{ mA}$	-0.5	0.5	mA	$\Delta I_{\text{SCD}} = I_{10} - I_{13}$
	I_{OS}	14	$V_{\text{IN}} = -25\text{ V}$		0.00	1.50	A	
		15	$V_{\text{IN}} = -35\text{ V}$		0.00	1.00		
	I_{PK}	16	$V_{\text{IN}} = -18.5\text{ V}$; forced $\Delta V_{\text{OUT}} = 1.43\text{ V}$		0.5	2.0	A	See figure 6
	V_{START}	17	$V_{\text{IN}} = -30\text{ V}$	$R_L = 30\ \Omega$	-15.75	-14.25	V	See figure 11
	V_{RTH}	18	$V_{\text{IN}} = -25\text{ V}$	$I_L = 500\text{ mA}$	-150	150	mV	See figure 5, $V_E = V_D$

TABLE III. Group A inspection for all device type 03 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
2 T _A = +125°C	V _{OUT}	19	V _{IN} = -18.5 V	I _L = 5 mA	-15.75	-14.25	V	
		20		I _L = 500 mA	“	“		
		21	V _{IN} = -30	I _L = 5 mA	“	“		
		22		I _L = 500 mA	“	“		
		23	V _{IN} = -35 V	I _L = 5 mA	“	“		
		24		I _L = 50 mA	“	“		
	V _{RLINE}	25	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 350 mA	-150	150	mV	See figure 5 waveforms V _B = V _A
	V _{RLOAD}	26	V _{IN} = -20 V	5 mA ≤ I _L ≤ 500 mA	-300	300	mV	See figure 5 waveforms V _C = V _D
		27	V _{IN} = -35 V	5 mA ≤ I _L ≤ 50 mA	-450	450		
	I _{SCD}	28	V _{IN} = -20 V	I _L = 5 mA	0.5	3.0	mA	
		29	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0		
	I _{SCD} (line)	30	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₂₉ – I ₃₀
	I _{SCD} (load)	31	V _{IN} = -20 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₂₈ – I ₃₁
	I _{OS}	32	V _{IN} = -25 V		0.00	1.50	A	
		33	V _{IN} = -35 V		0.00	1.00		
	I _{PK}	34	V _{IN} = -18.5 V; forced ΔV _{OUT} = 1.43 V		0.5	2.0	A	See figure 6
	V _{START}	35	V _{IN} = -30 V	R _L = 30 Ω	-15.75	-14.25	V	See figure 11
2 T _A = +150°C	V _{OUT}	36	V _{IN} = -20 V	I _L = 5 mA	-15.90	-14.10	V	

TABLE III. Group A inspection for all device type 03 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
3 T _A = -55°C	V _{OUT}	37	V _{IN} = -18.5 V	I _L = 5 mA	-15.75	-14.25	V	
		38		I _L = 500 mA	“	“		
		39	V _{IN} = -30 V	I _L = 5 mA	“	“		
		40		I _L = 500 mA	“	“		
		41	V _{IN} = -35 V	I _L = 5 mA	“	“		
		42		I _L = 50 mA	“	“		
	V _{RLINE}	43	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 350 mA	-150	150	mV	See figure 5 waveforms V _B = V _A
	V _{RLOAD}	44	V _{IN} = -20 V	5 mA ≤ I _L ≤ 500 mA	-300	300	mV	See figure 5 waveforms V _C = V _D
		45	V _{IN} = -35 V	5 mA ≤ I _L ≤ 50 mA	-450	450		
	I _{SCD}	46	V _{IN} = -20 V	I _L = 5 mA	0.5	3.0	mA	
		47	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0		
	I _{SCD} (line)	48	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₄₇ – I ₄₈
	I _{SCD} (load)	49	V _{IN} = -20 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₄₆ – I ₄₉
	I _{OS}	50	V _{IN} = -25 V		0.00	1.50	A	
		51	V _{IN} = -35 V		0.00	1.00		
	I _{PK}	52	V _{IN} = -18.5 V; forced ΔV _{OUT} = 1.43 V		0.5	2.0	A	See figure 6
	V _{START}	53	V _{IN} = -30 V	R _L = 30 Ω	-15.75	-14.25	V	See figure 11
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	54	V _{IN} = -20 V, e _i = 1 V rms at f = 2400 Hz	I _L = 125 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz

TABLE III. Group A inspection for all device type 03 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 T _A = 125°C	ΔV _{IN} / ΔV _{OUT}	55	V _{IN} = -20 V, e _i = 1 V rms at f = 2400 Hz	I _L = 125 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 T _A = -55°C	ΔV _{IN} / ΔV _{OUT}	56	V _{IN} = -20 V, e _i = 1 V rms at f = 2400 Hz	I _L = 125 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 T _A = 25°C	V _{NO}	57	V _{IN} = -20 V	I _L = 50 mA		700	μV rms	See figure 8
	ΔV _{OUT} / ΔV _{IN}	58	V _{IN} = -20 V, V _{PULSE} = -3.0 V	I _L = 5 mA		30	mV/V	See figure 9
	ΔV _{OUT} / ΔI _L	59	V _{IN} = -20 V	I _L = 50 mA ΔI _L = 200 mA		2.5	mV/mA	See figure 10

TABLE III. Group A inspection for all device type 04.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
1 $T_A = +25^{\circ}\text{C}$	V_{OUT}	1	$V_{\text{IN}} = -28\text{ V}$	$I_L = 5\text{ mA}$	-25.20	-22.80	V		
		2		$I_L = 500\text{ mA}$	"	"			
		3	$V_{\text{IN}} = -38\text{ V}$	$I_L = 5\text{ mA}$	"	"			
		4		$I_L = 500\text{ mA}$	"	"			
		5	$V_{\text{IN}} = -40\text{ V}$	$I_L = 5\text{ mA}$	"	"			
		6		$I_L = 50\text{ mA}$	"	"			
	V_{RLINE}	7	$-40\text{ V} \leq V_{\text{IN}} \leq -28\text{ V}$	$I_L = 50\text{ mA}$	-720	720	mV	See figure 5 waveforms $V_B = V_A$	
		8	$-38\text{ V} \leq V_{\text{IN}} \leq -28\text{ V}$	$I_L = 350\text{ mA}$	-240	240			
	V_{RLOAD}	9	$V_{\text{IN}} = -30\text{ V}$	$5\text{ mA} \leq I_L \leq 500\text{ mA}$	-480	480	mV	See figure 5 waveforms $V_C = V_D$	
		10	$V_{\text{IN}} = -40\text{ V}$	$5\text{ mA} \leq I_L \leq 50\text{ mA}$	-720	720			
	I_{SCD}	11	$V_{\text{IN}} = -30\text{ V}$	$I_L = 5\text{ mA}$	0.5	4.0	mA		
		12	$V_{\text{IN}} = -40\text{ V}$	$I_L = 5\text{ mA}$	0.5	4.0			
	I_{SCD} (line)	13	$-40\text{ V} \leq V_{\text{IN}} \leq -28\text{ V}$	$I_L = 5\text{ mA}$	-1.0	1.0	mA	$\Delta I_{\text{SCD}} = I_{12} - I_{13}$	
	I_{SCD} (load)	14	$V_{\text{IN}} = -30\text{ V}$	$5\text{ mA} \leq I_L \leq 500\text{ mA}$	-0.5	0.5	mA	$\Delta I_{\text{SCD}} = I_{11} - I_{14}$	
	I_{OS}	15	$V_{\text{IN}} = -30\text{ V}$		0.00	1.25	A		
		16	$V_{\text{IN}} = -40\text{ V}$		0.00	1.00			
	I_{PK}	17	$V_{\text{IN}} = -28\text{ V}$; forced $\Delta V_{\text{OUT}} = 2.28\text{ V}$		0.5	2.0	A	See figure 6	
	V_{START}	18	$V_{\text{IN}} = -38\text{ V}$	$R_L = 48\text{ }\Omega$	-25.20	-22.80	V	See figure 11	
	V_{RTH}	19	$V_{\text{IN}} = -34\text{ V}$	$I_L = 500\text{ mA}$	-240	240	mV	See figure 5, $V_E = V_D$	

TABLE III. Group A inspection for all device type 04 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
2 T _A = +125°C	V _{OUT}	20	V _{IN} = -28 V	I _L = 5 mA	-25.20	-22.80	V		
		21		I _L = 500 mA	“	“			
		22	V _{IN} = -38	I _L = 5 mA	“	“			
		23		I _L = 500 mA	“	“			
		24	V _{IN} = -40 V	I _L = 5 mA	“	“			
		25		I _L = 50 mA	“	“			
	V _{RLINE}	26	-40 V ≤ V _{IN} ≤ -28 V	I _L = 50 mA	-720	720	mV	See figure 5 Waveforms V _B = V _A	
		27	-38 V ≤ V _{IN} ≤ -28 V	I _L = 350 mA	-240	240			
	V _{RLOAD}	28	V _{IN} = -30 V	5 mA ≤ I _L ≤ 500 mA	-480	480	mV	See figure 5 Waveforms V _C = V _D	
		29	V _{IN} = -40 V	5 mA ≤ I _L ≤ 50 mA	-720	720			
	I _{SCD}	30	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0	mA		
		31	V _{IN} = -40 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	32	-40 V ≤ V _{IN} ≤ -28 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₃₁ – I ₃₂	
	I _{SCD} (load)	33	V _{IN} = -30 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₃₀ – I ₃₃	
	I _{OS}	34	V _{IN} = -30 V		0.00	1.25	A		
		35	V _{IN} = -40 V		0.00	1.00			
	I _{PK}	36	V _{IN} = -28 V; forced ΔV _{OUT} = 2.28 V		0.5	2.0	A	See figure 6	
	V _{START}	37	V _{IN} = -38 V	R _L = 48 Ω	-25.40	-22.80	V	See figure 11	
2 T _A = +150°C	V _{OUT}	38	V _{IN} = -30 V	I _L = 5 mA	-25.44	-22.56	V		

TABLE III. Group A inspection for all device type 04 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes		
			see figure 5, unless otherwise specified		Min	Max				
			Input voltage	Load current						
3 T _A = -55°C	V _{OUT}	39	V _{IN} = -28 V	I _L = 5 mA	-25.20	-22.80	V			
		40		I _L = 500 mA	"	"				
		41	V _{IN} = -38 V	I _L = 5 mA	"	"				
		42		I _L = 500 mA	"	"				
		43	V _{IN} = -40 V	I _L = 5 mA	"	"				
		44		I _L = 50 mA	"	"				
	V _{RLINE}	45	-40 V ≤ V _{IN} ≤ -28 V	I _L = 50 mA	-720	720	mV	See figure 5 waveforms V _B = V _A		
		46	-38 V ≤ V _{IN} ≤ -28 V	I _L = 350 mA	-240	240				
	V _{RLOAD}	47	V _{IN} = -30 V	5 mA ≤ I _L ≤ 500 mA	-480	480	mV	See figure 5 waveforms V _C = V _D		
		48	V _{IN} = -40 V	5 mA ≤ I _L ≤ 50 mA	-720	720				
	I _{SCD}	49	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0	mA			
		50	V _{IN} = -40 V	I _L = 5 mA	0.5	4.0				
	I _{SCD} (line)	51	-40 V ≤ V _{IN} ≤ -28 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₅₀ – I ₅₁		
	I _{SCD} (load)	52	V _{IN} = -30 V	5 mA ≤ I _L ≤ 500 mA	-0.5	0.5	mA	ΔI _{SCD} = I ₄₉ – I ₅₂		
	I _{OS}	53	V _{IN} = -30 V		0.00	1.25	A			
		54	V _{IN} = -40 V		0.00	1.00				
	I _{PK}	55	V _{IN} = -28 V; forced ΔV _{OUT} = 2.28 V		0.5	2.0	A	See figure 6		
	V _{START}	56	V _{IN} = -38 V	R _L = 48 Ω	-25.40	-22.80	V	See figure 11		
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	57	V _{IN} = -30 V, e _i = 1 V rms at f = 120 Hz	I _L = 125 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz		

TABLE III. Group A inspection for all device type 04 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 $T_A = 125^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	58	$V_{\text{IN}} = -30\text{ V}$, $e_{\text{i}} = 1\text{ V rms at}$ $f = 120\text{ Hz}$	$I_{\text{L}} = 125\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 $T_A = -55^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	59	$V_{\text{IN}} = -30\text{ V}$, $e_{\text{i}} = 1\text{ V rms at}$ $f = 120\text{ Hz}$	$I_{\text{L}} = 125\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 $T_A = 25^{\circ}\text{C}$	V_{NO}	60	$V_{\text{IN}} = -30\text{ V}$	$I_{\text{L}} = 50\text{ mA}$		1000	$\mu\text{V rms}$	See figure 8
	$\Delta V_{\text{OUT}} / \Delta V_{\text{IN}}$	61	$V_{\text{IN}} = -30\text{ V}$, $V_{\text{PULSE}} = -3.0\text{ V}$	$I_{\text{L}} = 5\text{ mA}$		30	mV/V	See figure 9
	$\Delta V_{\text{OUT}} / \Delta I_{\text{L}}$	62	$V_{\text{IN}} = -30\text{ V}$	$I_{\text{L}} = 50\text{ mA}$ $\Delta I_{\text{L}} = 200\text{ mA}$		2.5	mV/mA	See figure 10

TABLE III. Group A inspection for all device type 05.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
1 T _A = +25°C	V _{OUT}	1	V _{IN} = -8 V	I _L = 5 mA	-5.25	-4.75	V		
		2		I _L = 1.0 A	"	"			
		3	V _{IN} = -20 V	I _L = 5 mA	"	"			
		4		I _L = 1.0 A	"	"			
		5	V _{IN} = -30 V	I _L = 5 mA	"	"			
		6		I _L = 0.1 A	"	"			
	V _{RLINE}	7	-30 V ≤ V _{IN} ≤ -8 V	I _L = 0.1 A	-150	150	mV	See figure 5 waveforms V _B = V _A	
		8	-25 V ≤ V _{IN} ≤ -8 V	I _L = 0.5 A	-75	75			
	V _{RLOAD}	9	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	-100	100	mV	See figure 5 waveforms V _C = V _D	
		10	V _{IN} = -30 V	5 mA ≤ I _L ≤ 0.1 A	-150	150			
	I _{SCD}	11	V _{IN} = -10 V	I _L = 5 mA	0.5	3.0	mA		
		12	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	13	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₁₂ – I ₁₃	
	I _{SCD} (load)	14	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₁₁ – I ₁₄	
	I _{OS}	15	V _{IN} = -25 V		0.00	3.50	A		
		16	V _{IN} = -30 V		0.00	2.00			
	I _{PK}	17	V _{IN} = -8 V; forced ΔV _{OUT} = 0.48 V		1.0	4.50	A	See figure 6	
	V _{START}	18	V _{IN} = -20 V	R _L = 5 Ω	-5.25	-4.75	V	See figure 11	
	V _{RTH}	19	V _{IN} = -15 V	I _L = 1.0 A	-50	50	mV	See figure 5, V _E = V _D	

TABLE III. Group A inspection for all device type 05 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
2 T _A = +125°C	V _{OUT}	20	V _{IN} = -8 V	I _L = 5 mA	-5.25	-4.75	V		
		21		I _L = 1.0 A	“	“			
		22	V _{IN} = -20	I _L = 5 mA	“	“			
		23		I _L = 1.0 A	“	“			
		24	V _{IN} = -30 V	I _L = 5 mA	“	“			
		25		I _L = 0.1 A	“	“			
	V _{RLINE}	26	-30 V ≤ V _{IN} ≤ -8 V	I _L = 0.1 A	-150	150	mV	See figure 5 waveforms V _B = V _A	
		27	-25 V ≤ V _{IN} ≤ -8 V	I _L = 0.5 A	-75	75			
	V _{RLOAD}	28	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	-100	100	mV	See figure 5 waveforms V _C = V _D	
		29	V _{IN} = -30 V	5 mA ≤ I _L ≤ 0.1 A	-150	150			
	I _{SCD}	30	V _{IN} = -10 V	I _L = 5 mA	0.5	3.0	mA		
		31	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	32	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₃₁ – I ₃₂	
	I _{SCD} (load)	33	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₃₀ – I ₃₃	
	I _{OS}	34	V _{IN} = -25 V		0.00	3.50	A		
		35	V _{IN} = -30 V		0.00	2.00			
	I _{PK}	36	V _{IN} = -8 V; forced ΔV _{OUT} = 0.48 V		1.0	4.50	A	See figure 6	
	V _{START}	37	V _{IN} = -20 V	R _L = 5 Ω	-5.25	-4.75	V	See figure 11	
2 T _A = +150°C	V _{OUT}	38	V _{IN} = -10 V	I _L = 5 mA	-5.30	-4.70	V		

TABLE III. Group A inspection for all device type 05 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
3 T _A = -55°C	V _{OUT}	39	V _{IN} = -8 V	I _L = 5 mA	-5.25	-4.75	V		
		40		I _L = 1.0 A	"	"			
		41	V _{IN} = -20 V	I _L = 5 mA	"	"			
		42		I _L = 1.0 A	"	"			
		43	V _{IN} = -30 V	I _L = 5 mA	"	"			
		44		I _L = 0.1 A	"	"			
	V _{RLINE}	45	-30 V ≤ V _{IN} ≤ -8 V	I _L = 0.1 A	-150	150	mV	See figure 5 waveforms V _B = V _A	
		46	-25 V ≤ V _{IN} ≤ -8 V	I _L = 0.5 A	-75	75			
	V _{RLOAD}	47	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	-100	100	mV	See figure 5 waveforms V _C = V _D	
		48	V _{IN} = -30 V	5 mA ≤ I _L ≤ 0.1 A	-150	150			
	I _{SCD}	49	V _{IN} = -10 V	I _L = 5 mA	0.5	3.0	mA		
		50	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	51	-30 V ≤ V _{IN} ≤ -8 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₅₀ – I ₅₁	
	I _{SCD} (load)	52	V _{IN} = -10 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₄₉ – I ₅₂	
	I _{OS}	53	V _{IN} = -25 V		0.00	3.50	A		
		54	V _{IN} = -30 V		0.00	2.00			
	I _{PK}	55	V _{IN} = -8 V; forced ΔV _{OUT} = 0.48 V		1.0	4.50	A	See figure 6	
	V _{START}	56	V _{IN} = -20 V	R _L = 5 Ω	-5.25	-4.75	V	See figure 11	
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	57	V _{IN} = -10 V, e _i = 1 V rms at f = 2400 Hz	I _L = 350 mA	45		dB	See figure 7, meter BW 10 Hz to 10 kHz	

TABLE III. Group A inspection for all device type 05 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 $T_A = 125^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	58	$V_{\text{IN}} = -10\text{ V}$, $e_i = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_L = 350\text{ mA}$	45		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 $T_A = -55^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	59	$V_{\text{IN}} = -10\text{ V}$, $e_i = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_L = 350\text{ mA}$	45		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 $T_A = 25^{\circ}\text{C}$	V_{NO}	60	$V_{\text{IN}} = -10\text{ V}$	$I_L = 0.1\text{ A}$		250	$\mu\text{V rms}$	See figure 8
	$\Delta V_{\text{OUT}} / \Delta V_{\text{IN}}$	61	$V_{\text{IN}} = -10\text{ V}$, $V_{\text{PULSE}} = -3.0\text{ V}$	$I_L = 5\text{ mA}$		30	mV/V	See figure 9
	$\Delta V_{\text{OUT}} / \Delta I_L$	62	$V_{\text{IN}} = -10\text{ V}$	$I_L = 100\text{ mA}$ $\Delta I_L = 400\text{ mA}$		2.5	mV/mA	See figure 10

TABLE III. Group A inspection for all device type 06.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
1 T _A = +25°C	V _{OUT}	1	V _{IN} = -15 V	I _L = 5 mA	-12.60	-11.40	V		
		2		I _L = 1.0 A	“	“			
		3	V _{IN} = -27 V	I _L = 5 mA	“	“			
		4		I _L = 1.0 A	“	“			
		5	V _{IN} = -35 V	I _L = 5 mA	“	“			
		6		I _L = 0.1 A	“	“			
	V _{RLINE}	7	-35 V ≤ V _{IN} ≤ -15 V	I _L = 0.1 A	-360	360	mV	See figure 5 waveforms V _B = V _A	
		8	-32 V ≤ V _{IN} ≤ -15 V	I _L = 0.5 A	-120	120			
	V _{RLOAD}	9	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	-240	240	mV	See figure 5 waveforms V _C = V _D	
		10	V _{IN} = -35 V	5 mA ≤ I _L ≤ 0.1 A	-360	360			
	I _{SCD}	11	V _{IN} = -17 V	I _L = 5 mA	0.5	3.0	mA		
		12	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	13	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₁₂ – I ₁₃	
	I _{SCD} (load)	14	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₁₁ – I ₁₄	
	I _{OS}	15	V _{IN} = -32 V		0.00	3.50	A		
		16	V _{IN} = -35 V		0.00	2.00			
	I _{PK}	17	V _{IN} = -15 V; forced ΔV _{OUT} = 1.13 V		1.0	4.0	A	See figure 6	
	V _{START}	18	V _{IN} = -27 V	R _L = 12 Ω	-12.60	-11.40	V	See figure 11	
	V _{RTH}	19	V _{IN} = -22 V	I _L = 1.0 A	-120	120	mV	See figure 5, V _E = V _D	

TABLE III. Group A inspection for all device type 06 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
2 T _A = +125°C	V _{OUT}	20	V _{IN} = -15 V	I _L = 5 mA	-12.60	-11.40	V		
		21		I _L = 1.0 A	“	“			
		22	V _{IN} = -27	I _L = 5 mA	“	“			
		23		I _L = 1.0 A	“	“			
		24	V _{IN} = -35 V	I _L = 5 mA	“	“			
		25		I _L = 0.1 A	“	“			
	V _{RLINE}	26	-35 V ≤ V _{IN} ≤ -15 V	I _L = 0.1 A	-360	360	mV	See figure 5 waveforms V _B = V _A	
		27	-32 V ≤ V _{IN} ≤ -15 V	I _L = 0.5 A	-120	120			
	V _{RLOAD}	28	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	-240	240	mV	See figure 5 waveforms V _C = V _D	
		29	V _{IN} = -35 V	5 mA ≤ I _L ≤ 0.1 A	-360	360			
	I _{SCD}	30	V _{IN} = -17 V	I _L = 5 mA	0.5	3.0	mA		
		31	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	32	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₃₁ – I ₃₂	
	I _{SCD} (load)	33	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₃₀ – I ₃₃	
	I _{OS}	34	V _{IN} = -32 V		0.00	3.50	A		
		35	V _{IN} = -35 V		0.00	2.00			
	I _{PK}	36	V _{IN} = -15 V; forced ΔV _{OUT} = 1.13 V		1.0	4.0	A	See figure 6	
	V _{START}	37	V _{IN} = -27 V	R _L = 12 Ω	-12.60	-11.40	V	See figure 11	
2 T _A = +150°C	V _{OUT}	38	V _{IN} = -17 V	I _L = 5 mA	-12.72	-11.28	V		

TABLE III. Group A inspection for all device type 06 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
3 T _A = -55°C	V _{OUT}	39	V _{IN} = -15 V	I _L = 5 mA	-12.60	-11.40	V	
		40		I _L = 1.0 A	"	"		
		41	V _{IN} = -27 V	I _L = 5 mA	"	"		
		42		I _L = 1.0 A	"	"		
		43	V _{IN} = -35 V	I _L = 5 mA	"	"		
		44		I _L = 0.1 A	"	"		
	V _{RLINE}	45	-35 V ≤ V _{IN} ≤ -15 V	I _L = 0.1 A	-360	360	mV	See figure 5 waveforms V _B = V _A
		46	-32 V ≤ V _{IN} ≤ -15 V	I _L = 0.5 A	-120	120		
	V _{RLOAD}	47	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	-240	240	mV	See figure 5 waveforms V _C = V _D
		48	V _{IN} = -35 V	5 mA ≤ I _L ≤ 0.1 A	-360	360		
	I _{SCD}	49	V _{IN} = -17 V	I _L = 5 mA	0.5	3.0	mA	
		50	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0		
	I _{SCD} line	51	-35 V ≤ V _{IN} ≤ -15 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₅₀ – I ₅₁
	I _{SCD} load	52	V _{IN} = -17 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₄₉ – I ₅₂
	I _{OS}	53	V _{IN} = -32 V		0.00	3.50	A	
		54	V _{IN} = -35 V		0.00	2.00		
	I _{PK}	55	V _{IN} = -15 V; forced ΔV _{OUT} = 1.13 V		1.0	4.0	A	See figure 6
	V _{START}	56	V _{IN} = -27 V	R _L = 12 Ω	-12.60	-11.40	V	See figure 11
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	57	V _{IN} = -17 V, e _i = 1 V rms at f = 2400 Hz	I _L = 350 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz

TABLE III. Group A inspection for all device type 06 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 $T_A = 125^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	58	$V_{\text{IN}} = -17\text{ V}$, $e_{\text{i}} = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_{\text{L}} = 350\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 $T_A = -55^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	59	$V_{\text{IN}} = -17\text{ V}$, $e_{\text{i}} = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_{\text{L}} = 350\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 $T_A = 25^{\circ}\text{C}$	V_{NO}	60	$V_{\text{IN}} = -17\text{ V}$	$I_{\text{L}} = 0.1\text{ A}$		600	$\mu\text{V rms}$	See figure 8
	$\Delta V_{\text{OUT}} / \Delta V_{\text{IN}}$	61	$V_{\text{IN}} = -17\text{ V}$, $V_{\text{PULSE}} = -3.0\text{ V}$	$I_{\text{L}} = 5\text{ mA}$		30	mV/V	See figure 9
	$\Delta V_{\text{OUT}} / \Delta I_{\text{L}}$	62	$V_{\text{IN}} = -17\text{ V}$	$I_{\text{L}} = 100\text{ mA}$ $\Delta I_{\text{L}} = 400\text{ mA}$		2.5	mV/mA	See figure 10

TABLE III. Group A inspection for all device type 07.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
1 $T_A = +25^{\circ}\text{C}$	V_{OUT}	1	$V_{\text{IN}} = -18.5\text{ V}$	$I_L = 5\text{ mA}$	-15.75	-14.25	V	
		2		$I_L = 1.0\text{ A}$	"	"		
		3	$V_{\text{IN}} = -30\text{ V}$	$I_L = 5\text{ mA}$	"	"		
		4		$I_L = 1.0\text{ A}$	"	"		
		5	$V_{\text{IN}} = -35\text{ V}$	$I_L = 5\text{ mA}$	"	"		
		6		$I_L = 0.1\text{ A}$	"	"		
	V_{RLINE}	7	$-35\text{ V} \leq V_{\text{IN}} \leq -18.5\text{ V}$	$I_L = 0.5\text{ A}$	-150	150	mV	See figure 5 waveforms $V_B = V_A$
	V_{RLOAD}	8	$V_{\text{IN}} = -20\text{ V}$	$5\text{ mA} \leq I_L \leq 1.0\text{ A}$	-300	300	mV	See figure 5 waveforms $V_C = V_D$
		9	$V_{\text{IN}} = -35\text{ V}$	$5\text{ mA} \leq I_L \leq 0.1\text{ A}$	-450	450		
	I_{SCD}	10	$V_{\text{IN}} = -20\text{ V}$	$I_L = 5\text{ mA}$	0.5	3.0	mA	
		11	$V_{\text{IN}} = -35\text{ V}$	$I_L = 5\text{ mA}$	0.5	4.0		
	I_{SCD} (line)	12	$-35\text{ V} \leq V_{\text{IN}} \leq -18.5\text{ V}$	$I_L = 5\text{ mA}$	-1.0	1.0	mA	$\Delta I_{\text{SCD}} = I_{11} - I_{12}$
	I_{SCD} (load)	13	$V_{\text{IN}} = -20\text{ V}$	$5\text{ mA} \leq I_L \leq 1.0\text{ A}$	-0.5	0.5	mA	$\Delta I_{\text{SCD}} = I_{10} - I_{13}$
	I_{OS}	14	$V_{\text{IN}} = -20\text{ V}$		0.00	3.50	A	
		15	$V_{\text{IN}} = -35\text{ V}$		0.00	2.00		
	I_{PK}	16	$V_{\text{IN}} = -18.5\text{ V}$; forced $\Delta V_{\text{OUT}} = 1.43\text{ V}$		1.0	4.0	A	See figure 6
	V_{START}	17	$V_{\text{IN}} = -30\text{ V}$	$R_L = 15\text{ }\Omega$	-15.75	-14.25	V	See figure 11
	V_{RTH}	18	$V_{\text{IN}} = -25\text{ V}$	$I_L = 1.0\text{ A}$	-150	150	mV	See figure 5, $V_E = V_D$

TABLE III. Group A inspection for all device type 07 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
2 T _A = +125°C	V _{OUT}	19	V _{IN} = -18.5 V	I _L = 5 mA	-15.75	-14.25	V	
		20		I _L = 1.0 A	“	“		
		21	V _{IN} = -30	I _L = 5 mA	“	“		
		22		I _L = 1.0 A	“	“		
		23	V _{IN} = -35 V	I _L = 5 mA	“	“		
		24		I _L = 0.1 A	“	“		
	V _{RLINE}	25	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 0.5 A	-150	150	mV	See figure 5 waveforms V _B = V _A
	V _{RLOAD}	26	V _{IN} = -20 V	5 mA ≤ I _L ≤ 1.0 A	-300	300	mV	See figure 5 waveforms V _C = V _D
		27	V _{IN} = -35 V	5 mA ≤ I _L ≤ 0.1 A	-450	450		
	I _{SCD}	28	V _{IN} = -20 V	I _L = 5 mA	0.5	3.0	mA	
		29	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0		
	I _{SCD} (line)	30	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₂₉ – I ₃₀
	I _{SCD} (load)	31	V _{IN} = -20 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₂₈ – I ₃₁
	I _{OS}	32	V _{IN} = -20 V		0.00	3.50	A	
		33	V _{IN} = -35 V		0.00	2.00		
	I _{PK}	34	V _{IN} = -18.5 V; forced ΔV _{OUT} = 1.43 V		1.0	4.0	A	See figure 6
	V _{START}	35	V _{IN} = -30 V	R _L = 15 Ω	-15.75	-14.25	V	See figure 11
2 T _A = +150°C	V _{OUT}	36	V _{IN} = -20 V	I _L = 5 mA	-15.90	-14.10	V	

TABLE III. Group A inspection for all device type 07 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
3 T _A = -55°C	V _{OUT}	37	V _{IN} = -18.5 V	I _L = 5 mA	-15.75	-14.25	V	
		38		I _L = 1.0 A	“	“		
		39	V _{IN} = -30 V	I _L = 5 mA	“	“		
		40		I _L = 1.0 A	“	“		
		41	V _{IN} = -35 V	I _L = 5 mA	“	“		
		42		I _L = 0.1 A	“	“		
	V _{RLINE}	43	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 0.5 A	-150	150	mV	See figure 5 waveforms V _B = V _A
	V _{RLOAD}	44	V _{IN} = -20 V	5 mA ≤ I _L ≤ 1.0 A	-300	300	mV	See figure 5 waveforms V _C = V _D
		45	V _{IN} = -35 V	5 mA ≤ I _L ≤ 0.1 A	-450	450		
	I _{SCD}	46	V _{IN} = -20 V	I _L = 5 mA	0.5	3.0	mA	
		47	V _{IN} = -35 V	I _L = 5 mA	0.5	4.0		
	I _{SCD} (line)	48	-35 V ≤ V _{IN} ≤ -18.5 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₄₇ – I ₄₈
	I _{SCD} (load)	49	V _{IN} = -20 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₄₆ – I ₄₉
	I _{OS}	50	V _{IN} = -20 V		0.00	3.50	A	
		51	V _{IN} = -35 V		0.00	2.00		
	I _{PK}	52	V _{IN} = -18.5 V; forced ΔV _{OUT} = 1.43 V		1.0	4.0	A	See figure 6
	V _{START}	53	V _{IN} = -30 V	R _L = 15 Ω	-15.75	-14.25	V	See figure 11
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	54	V _{IN} = -20 V, e _i = 1 V rms at f = 2400 Hz	I _L = 350 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz

TABLE III. Group A inspection for all device type 07 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 $T_A = 125^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	55	$V_{\text{IN}} = -20\text{ V}$, $e_{\text{i}} = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_{\text{L}} = 350\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 $T_A = -55^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	56	$V_{\text{IN}} = -20\text{ V}$, $e_{\text{i}} = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_{\text{L}} = 350\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 $T_A = 25^{\circ}\text{C}$	V_{NO}	57	$V_{\text{IN}} = -20\text{ V}$	$I_{\text{L}} = 0.1\text{ A}$		700	$\mu\text{V rms}$	See figure 8
	$\Delta V_{\text{OUT}} / \Delta V_{\text{IN}}$	58	$V_{\text{IN}} = -20\text{ V}$, $V_{\text{PULSE}} = -3.0\text{ V}$	$I_{\text{L}} = 5\text{ mA}$		30	mV/V	See figure 9
	$\Delta V_{\text{OUT}} / \Delta I_{\text{L}}$	59	$V_{\text{IN}} = -20\text{ V}$	$I_{\text{L}} = 100\text{ mA}$ $\Delta I_{\text{L}} = 400\text{ mA}$		2.5	mV/mA	See figure 10

TABLE III. Group A inspection for all device type 08.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
1 T _A = +25°C	V _{OUT}	1	V _{IN} = -28 V	I _L = 5 mA	-25.20	-22.80	V		
		2		I _L = 1.0 A	“	“			
		3	V _{IN} = -38 V	I _L = 5 mA	“	“			
		4		I _L = 1.0 A	“	“			
		5	V _{IN} = -40 V	I _L = 5 mA	“	“			
		6		I _L = 0.1 A	“	“			
	V _{RLINE}	7	-40 V ≤ V _{IN} ≤ -28 V	I _L = 0.1 A	-720	720	mV	See figure 5 waveforms V _B = V _A	
		8	-38 V ≤ V _{IN} ≤ -28 V	I _L = 0.5 A	-240	240			
	V _{RLOAD}	9	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	-480	480	mV	See figure 5 waveforms V _C = V _D	
		10	V _{IN} = -40 V	5 mA ≤ I _L ≤ 0.1 A	-720	720			
	I _{SCD}	11	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0	mA		
		12	V _{IN} = -40 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	13	-40 V ≤ V _{IN} ≤ -28 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₁₂ – I ₁₃	
	I _{SCD} (load)	14	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₁₁ – I ₁₄	
	I _{OS}	15	V _{IN} = -30 V		0.00	3.00	A		
		16	V _{IN} = -40 V		0.00	2.00			
	I _{PK}	17	V _{IN} = -28 V; forced ΔV _{OUT} = 2.28 V		1.0	4.0	A	See figure 6	
	V _{START}	18	V _{IN} = -38 V	R _L = 24 Ω	-25.20	-22.80	V	See figure 11	
	V _{RTH}	19	V _{IN} = -34 V	I _L = 1.0 A	-240	240	mV	See figure 5, V _E = V _D	

TABLE III. Group A inspection for all device type 08 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
2 T _A = +125°C	V _{OUT}	20	V _{IN} = -28 V	I _L = 5 mA	-25.20	-22.80	V		
		21		I _L = 1.0 A	“	“			
		22	V _{IN} = -38	I _L = 5 mA	“	“			
		23		I _L = 1.0 A	“	“			
		24	V _{IN} = -40 V	I _L = 5 mA	“	“			
		25		I _L = 0.1 A	“	“			
	V _{RLINE}	26	-40 V ≤ V _{IN} ≤ -28 V	I _L = 0.1 A	-720	720	mV	See figure 5 waveforms V _B = V _A	
		27	-38 V ≤ V _{IN} ≤ -28 V	I _L = 0.5 A	-240	240			
	V _{RLOAD}	28	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	-480	480	mV	See figure 5 waveforms V _C = V _D	
		29	V _{IN} = -40 V	5 mA ≤ I _L ≤ 0.1 A	-720	720			
	I _{SCD}	30	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0	mA		
		31	V _{IN} = -40 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	32	-40 V ≤ V _{IN} ≤ -28 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₃₁ – I ₃₂	
	I _{SCD} (load)	33	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₃₀ – I ₃₃	
	I _{OS}	34	V _{IN} = -30 V		0.00	3.00	A		
		35	V _{IN} = -40 V		0.00	2.00			
	I _{PK}	36	V _{IN} = -28 V; forced ΔV _{OUT} = 2.28 V		1.0	4.0	A	See figure 6	
	V _{START}	37	V _{IN} = -38 V	R _L = 24 Ω	-25.40	-22.80	V	See figure 11	
2 T _A = +150°C	V _{OUT}	38	V _{IN} = -30 V	I _L = 5 mA	-25.44	-22.56	V		

TABLE III. Group A inspection for all device type 08 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes	
			see figure 5, unless otherwise specified		Min	Max			
			Input voltage	Load current					
3 T _A = -55°C	V _{OUT}	39	V _{IN} = -28 V	I _L = 5 mA	-25.20	-22.80	V		
		40		I _L = 1.0 A	"	"			
		41	V _{IN} = -38 V	I _L = 5 mA	"	"			
		42		I _L = 1.0 A	"	"			
		43	V _{IN} = -40 V	I _L = 5 mA	"	"			
		44		I _L = 0.1 A	"	"			
	V _{RLINE}	45	-40 V ≤ V _{IN} ≤ -28 V	I _L = 0.1 A	-720	720	mV	See figure 5 waveforms V _B = V _A	
		46	-38 V ≤ V _{IN} ≤ -28 V	I _L = 0.5 A	-240	240			
	V _{RLOAD}	47	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	-480	480	mV	See figure 5 waveforms V _C = V _D	
		48	V _{IN} = -40 V	5 mA ≤ I _L ≤ 0.1 A	-720	720			
	I _{SCD}	49	V _{IN} = -30 V	I _L = 5 mA	0.5	4.0	mA		
		50	V _{IN} = -40 V	I _L = 5 mA	0.5	4.0			
	I _{SCD} (line)	51	-40 V ≤ V _{IN} ≤ -28 V	I _L = 5 mA	-1.0	1.0	mA	ΔI _{SCD} = I ₅₀ – I ₅₁	
	I _{SCD} (load)	52	V _{IN} = -30 V	5 mA ≤ I _L ≤ 1.0 A	-0.5	0.5	mA	ΔI _{SCD} = I ₄₉ – I ₅₂	
	I _{OS}	53	V _{IN} = -30 V		0.00	3.00	A		
		54	V _{IN} = -40 V		0.00	2.00			
	I _{PK}	55	V _{IN} = -28 V; forced ΔV _{OUT} = 2.28 V		1.0	4.0	A	See figure 6	
	V _{START}	56	V _{IN} = -38 V	R _L = 24 Ω	-25.20	-22.80	V	See figure 11	
4 T _A = +25°C	ΔV _{IN} / ΔV _{OUT}	57	V _{IN} = -30 V, e _i = 1 V rms at f = 2400 Hz	I _L = 350 mA	50		dB	See figure 7, meter BW 10 Hz to 10 kHz	

TABLE III. Group A inspection for all device type 08 – Continued.

Subgroup	Symbol	Test no.	Conditions		Limits		Unit	Notes
			see figure 5, unless otherwise specified		Min	Max		
			Input voltage	Load current				
5 $T_A = 125^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	58	$V_{\text{IN}} = -30\text{ V}$, $e_{\text{i}} = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_{\text{L}} = 350\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
6 $T_A = -55^{\circ}\text{C}$	$\Delta V_{\text{IN}} / \Delta V_{\text{OUT}}$	59	$V_{\text{IN}} = -30\text{ V}$, $e_{\text{i}} = 1\text{ V rms}$ at $f = 2400\text{ Hz}$	$I_{\text{L}} = 350\text{ mA}$	50		dB	See figure 7, meter BW 10 Hz to 10 kHz
7 $T_A = 25^{\circ}\text{C}$	V_{NO}	60	$V_{\text{IN}} = -30\text{ V}$	$I_{\text{L}} = 0.1\text{ A}$		1000	$\mu\text{V rms}$	See figure 8
	$\Delta V_{\text{OUT}} / \Delta V_{\text{IN}}$	61	$V_{\text{IN}} = -30\text{ V}$, $V_{\text{PULSE}} = -3.0\text{ V}$	$I_{\text{L}} = 5\text{ mA}$		30	mV/V	See figure 9
	$\Delta V_{\text{OUT}} / \Delta I_{\text{L}}$	62	$V_{\text{IN}} = -30\text{ V}$	$I_{\text{L}} = 100\text{ mA}$ $\Delta I_{\text{L}} = 400\text{ mA}$		2.5	mV/mA	See figure 10

TABLE IV. Group C end point electrical parameters. ($T_A = +25^{\circ}\text{C}$, $\pm V_{CC} = \pm 15\text{ V}$)

Device type	Characteristic	Symbol	Delta limits <u>1/</u>	Limits		Units
				Min	Max	
01, 05	Output voltage	V_{OUT}	$\pm 50\text{ mV}$	-5.25	-4.75	V
	Standby current drain	I_{SCD}	$\pm 20\%$	0.5	4.0	mA
02, 06	Output voltage	V_{OUT}	$\pm 120\text{ mV}$	-12.60	-11.40	V
	Standby current drain	I_{SCD}	$\pm 20\%$	0.5	4.0	mA
03, 07	Output voltage	V_{OUT}	$\pm 150\text{ mV}$	-15.75	-14.25	V
	Standby current drain	I_{SCD}	$\pm 20\%$	0.5	4.0	mA
04, 08	Output voltage	V_{OUT}	$\pm 240\text{ mV}$	-25.20	-22.80	V
	Standby current drain	I_{SCD}	$\pm 20\%$	0.5	4.0	mA

1/ Delta limits apply to the measured value (see delta limit definition in MIL-PRF-38535).

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 or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military's service 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.

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:

- a. Title, number, and date of the specification.
- b. Pin and compliance identifier, if applicable (see 1.2).
- c. 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.
- d. Requirements for certificate of compliance, if applicable.
- e. Requirements for notification of change of product or process to contracting activity in addition to notification to the qualifying activity, if applicable.
- f. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action, and reporting of results, if applicable.
- g. Requirements for product assurance options.
- h. 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.
- i. Requirements for "JAN" marking.
- j. 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.

6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535, MIL-HDBK-1331, and as follows:

- 6.5.1 Line regulation. The change in output voltage for a specified change in input voltage (V_{RLINE}).
- 6.5.2 Load regulation. The change in output voltage for a specified change in load current (V_{RLOAD}).
- 6.5.3 Ripple rejection. The ratio of the peak to peak input ripple voltage to the peak to peak output ripple voltage ($\Delta V_{OUT} / \Delta V_{IN}$).
- 6.5.4 Output noise voltage. The rms output noise voltage with constant load and no input ripple (V_{NO}).
- 6.5.5 Standby current drain. The supply current drawn by the regulator with no output load or with a 1 k Ω output load.
- 6.5.6 Input voltage range. The range of supply voltage over which the regulator will operate.
- 6.5.7 Output voltage range. The range of output voltage over which the regulator will operate.
- 6.5.8 Transient response. The closed-loop step function response of the regulator under small-signal conditions.

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	LM120H-05, 79M05
02	LM120H-12, 79M12
03	LM120H-15, 79M15
04	LM120H-24, 79M24
05	LM120K-05, 7905
06	LM120K-12, 7912
07	LM120K-15, 7915
08	LM120K-24, 7924

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:

Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:

DLA - CC

Project 5962-2016

Review activities:

Army – MI, SM
Navy – AS, CG, MC, SH, TD
Air Force – 03, 19, 99

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