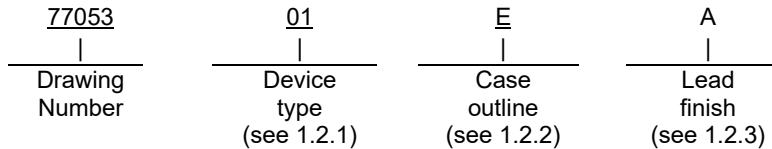


1. SCOPE

1.1 Scope. This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

1.2 Part or Identifying Number (PIN). The complete PIN is as shown in the following example:



1.2.1 Device type(s). The device type(s) identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	DG201A	Quad SPST analog switch
02	HI-201	Quad SPST analog switch, with dielectric isolation

1.2.2 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>
2	CQCC1-N20	20	Square leadless chip carrier package
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line package
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
X	CDFP4-F16	16	Flat pack

1.2.3 Lead finish. The lead finish is as specified in MIL-PRF-38535, appendix A.

1.3 Absolute maximum ratings.

Supply voltage (between V+ and V-):	
Device type 01	44 V dc
Device type 02	40 V dc
Digital input voltage (VIN):	
Device type 01	V- -0.3 V dc to V+
Device type 02	V- -4 V dc to V+ +4 V dc
Analog input voltage (VS)	V- -2 V dc to V+ +2 V dc
Current (any terminal except S or D):	
Device type 01	30 mA
Device type 02	25 mA
Continuous current, S or D:	
Device type 01	20 mA
Device type 02	25 mA
Peak current, S or D (pulsed at 1 ms, 10 percent duty cycle maximum):	
Device type 01	70 mA
Device type 02	40 mA
Storage temperature range	-65°C to +150°C

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1.3 Absolute maximum ratings – continued.

Power dissipation (PD)	750 mW ^{1/}
Lead temperature (soldering, 10 seconds)	+275°C
Thermal resistance, junction-to-case (θJC).....	See MIL-STD-1835
Junction temperature (T _J):	
Device type 01	+150°C
Device type 02	+175°C
V+ to ground:	
Device type 01	+25 V
Device type 02	+20 V
V- to ground:	
Device type 01	-25 V
Device type 02	-20 V

1.4 Recommended operating conditions.

Positive supply voltage (V+)	+15 V dc
Negative supply voltage (V-).....	-15 V dc
Minimum digital high level input voltage (V _{IH})	+2.4 V dc
Maximum digital low level input voltage (V _{IL})	+0.8 V dc
Ambient operating temperature range (T _A)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

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

DEPARTMENT OF DEFENSE SPECIFICATION

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

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at <https://quicksearch.dla.mil/>).

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

^{1/} For case E, derate at 12 mW/°C above T_A = +75°C. For case 2, F and X, derate at 10 mW/°C above T_A = +75°C.

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3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein. Product built to this drawing that is produced by a Qualified Manufacturer Listing (QML) certified and qualified manufacturer or a manufacturer who has been granted transitional certification to MIL-PRF-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-PRF-38535. This QML flow as documented in the Quality Management (QM) plan may make modifications to the requirements herein. These modifications shall not affect form, fit, or function of the device. These modifications shall not affect the PIN as described herein. A "Q" or "QML" certification mark in accordance with MIL-PRF-38535 is required to identify when the QML flow option is used.

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

3.2.1 Case outline. The case outline shall be in accordance with 1.2.4 herein.

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

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-PRF-38535, appendix A. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked.

3.5.1 Certification/compliance mark. A compliance indicator "C" shall be marked on all non-JAN devices built in compliance to MIL-PRF-38535, appendix A. The compliance indicator "C" shall be replaced with a "Q" or "QML" certification mark in accordance with MIL-PRF-38535 to identify when the QML flow option is used.

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-HDBK-103 (see 6.6 herein). The certificate of compliance submitted to DLA Land and Maritime-VA prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38535, appendix A and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DLA Land and Maritime-VA shall be required for any change that affects this drawing.

3.9 Verification and review. DLA Land and Maritime, DLA Land and Maritime's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ TA ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits <u>2/</u>		Unit
					Min	Max	
Analog signal range	V _S	<u>3/</u>	1, 2, 3	All		±15	V
Drain-source ON resistance	R _{DS(ON)}	V _D = ±10 V, V _{IN} = 0.8 V,	1, 3	01		175	Ω
		I _D = ±1 mA	2			250	
		V _S = ±10 V, V _{IN} = 0.8 V, I _D = ±1 mA,	1	02		70	
		all unused channels, V _A = 2.4 V	2, 3			100	
Off input leakage current	I _{S(OFF)}	V _{IN} = 2.4 V, V _S = ±14 V,	1	All		±2	nA
		V _D = ±14 V	2, 3			±100	
Off output leakage current	I _{D(OFF)}	V _{IN} = 2.4 V, V _S = ±14 V	1	01		±1	nA
				02		±2	
			2, 3	All		±100	
On leakage current	I _{D(ON)}	V _{IN} = 0.8 V, V _D = V _S = ±14 V	1	01		±1	nA
				02		±2	
			2, 3	All		±200	
Low level input voltage	V _{IL}		1, 2, 3	All		0.8	V
High level input voltage	V _{IH}		1, 2, 3	All	2.4		V
Low level input leakage current	I _{IL}	V _{IN} = 0 V	1	01		±1	μA
			2			±10	
		V _{IN} = 0.8 V	1	02		±0.5	
			2, 3			±1	
High level input leakage current	I _{IH}	V _{IN} = 2.4 V, 15 V	1	01		±1	μA
			2			±10	
			1	02		±0.5	
			2, 3			±1	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – continued.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ TA ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits <u>2/</u>		Unit
					Min	Max	
Switch ON time	tON	RL = 1 kΩ, CL = 35 pF, VIH = +3 V, VIL = 0 V	9, 10, 11	01		1000	ns
		RL = 1 kΩ, CL = 100 pF, VIH = +4 V, VIL = 0 V	9 10, 11	02		600 800	
Switch OFF time	tOFF	RL = 1 kΩ, CL = 35 pF, VIH = +3 V, VIL = 0 V	9 10, 11	01		500 650	ns
		RL = 1 kΩ, CL = 100 pF, VIH = +4 V, VIL = 0 V	9 10, 11	02		500 650	
		RL = 1 kΩ, CL = 35 pF, VIH = +3 V, VIL = 0 V	9 10, 11	01		500 650	
		RL = 1 kΩ, CL = 100 pF, VIH = +4 V, VIL = 0 V	9 10, 11	02		500 650	
Positive supply current	I+	VIN = 0 V	1, 2	01		4	mA
			3			6.5	
		VIN = 5 V	1, 2	01		3	
			3			4.5	
		VIN = 0.8 V	1, 2	02		1.5	
			3			2	
		VIN = 2.4 V	1, 2	02		1.5	
			3			2	
Negative supply current	I-	VIN = 0 V	1, 2	01		-4	mA
			3			-6.5	
		VIN = 5 V	1, 2	01		-3	
			3			-4.5	
		VIN = 0.8 V	1, 2	02		-1.5	
			3			-2	
		VIN = 2.4 V	1, 2	02		-1.5	
			3			-2	

1/ Unless otherwise specified, V+ = +15 V dc and V- = -15 V dc.

2/ The limiting terms “min” (minimum) and “max” (maximum) shall be considered to apply to magnitudes only. Negative current shall be defined as conventional current flow out of a device terminal.

3/ Guaranteed, if not tested, to the limits specified.

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Device type	01		02	
Case outlines	E, F, and X	2	E	2
Terminal number	Terminal symbol			
1	IN ₁	NC	IN ₁	NC
2	D ₁	IN ₁	D ₁	IN ₁
3	S ₁	D ₁	S ₁	D ₁
4	V-	S ₁	V-	S ₁
5	GND	V-	GND	V-
6	S ₄	NC	S ₄	NC
7	D ₄	GND	D ₄	GND
8	IN ₄	S ₄	IN ₄	S ₄
9	IN ₃	D ₄	IN ₃	D ₄
10	D ₃	IN ₄	D ₃	IN ₄
11	S ₃	NC	S ₃	NC
12	NC	IN ₃	VREF ^{1/}	IN ₃
13	V+	D ₃	V+	D ₃
14	S ₂	S ₃	S ₂	S ₃
15	D ₂	NC	D ₂	VREF ^{1/}
16	IN ₂	NC	IN ₂	NC
17	---	V+	---	V+
18	---	S ₂	---	S ₂
19	---	D ₂	---	D ₂
20	---	IN ₂	---	IN ₂

^{1/} VREF is normally floating, but voltage up to 10 V can be applied to raise the threshold voltage.

FIGURE 1. Terminal connections.

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4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition A, B, C, D, or E. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
- b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, 6, 7, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
 - (1) Test condition A, B, C, D, or E. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (in accordance with MIL-STD-883, method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 9
Group A test requirements (method 5005)	1, 2, 3, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1

* PDA applies to subgroup 1.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535, appendix A.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished using DD Form 1692, Engineering Change Proposal, or email communication.

6.4 Record of users. Military and industrial users shall inform DLA Land and Maritime when a system application requires configuration control and the applicable SMD to that system. DLA Land and Maritime will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DLA Land and Maritime-VA, telephone (614) 692-8108.

6.5 Comments. Comments on this drawing should be directed to DLA Land and Maritime-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0591.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-HDBK-103 and QML-38535. The vendors listed in MIL-HDBK-103 and QML-38535 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DLA Land and Maritime-VA.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 22-11-18

Approved sources of supply for SMD 77053 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DLA Land and Maritime-VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DLA Land and Maritime maintains an online database of all current sources of supply at <https://landandmaritimeapps.dla.mil/programs/smcr/>.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>	Reference military specification PIN
77053012C	<u>3/</u>	DG201AAZ/883B	
7705301EA	1ES66	DG201AAK/883B	M38510/12302BEA
7705301FA	<u>3/</u>	DG201AAL/883	
7705301XC	<u>3/</u>	DG201AAL/883B	
77053022C	1ES66	HI4-201/883B	
7705302EA	1ES66	HI1-201/883B	
	34371	HI1-201/883	

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the vendor to determine its availability.
- 2/ **Caution.** Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.
- 3/ Not available from an approved source of supply.

Vendor CAGE
number

1ES66

34371

Vendor name
and address

Maxim Integrated
160 Rio Robles
San Jose, CA 95134

Renesas Electronics America, Inc.
1650 Robert J. Conlan Blvd. NE
Palm Bay, FL 32905-3406

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