

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
C	Add device types 02 and 03. Editorial changes throughout.	94-05-03	M. A. FRYE
D	Paragraph 1.2.2, case outline X, change descriptive designator from "CQCC2-N28B" to "CQCC1-N28B". Table I: Input offset voltage test, V _{OS} , change minimum limit from "-10 mV" to "-15 mV" and change maximum limit from "+10 mV" to "+15 mV". Table I: start threshold, V _{START} , fro device type 01, change maximum limit from "+9.6 V" to "+9.7 V". Changes in accordance with N.O.R. 5962-R196-94.	94-06-02	M. A. FRYE
E	Terminal connections, add case outline 2 to device types 02 and 03. Changes in accordance with N.O.R. 5962-R202-95.	95-10-05	M. A. FRYE
F	Table I, start up current test, I _{START} ; for the max value of "0.3" add "02, 03" in device type column. Changes in accordance with N.O.R. 5962-R160-97.	97-01-07	R. MONNIN
G	Add device class V devices. Redrawn. - ro	00-06-08	R. MONNIN
H	Add case outline "F". Make correction to the V _{OH1} test condition under the Error amplifier section as specified in table I. - ro	02-07-19	R. MONNIN
J	Drawing updated to reflect current requirements. - ro	07-11-14	R. HEBER
K	Add device types 04 and 05. -rrp	08-12-03	R. HEBER
L	Under Table I; output source current test, move the -0.5 mA limit from the min column to the max column, I _{LIM} delay to output test, add footnote 2/. Update boilerplate paragraphs to current MIL-PRF-38535 requirements. - ro	10-11-30	C. SAFFLE
M	Add temperature stability test to Table I for device type 04. - ro	12-09-07	C. SAFFLE
N	Add case outline Y and RHA requirements for device type 05. - ro	17-01-09	C. SAFFLE



REV																				
SHEET																				
REV	N	N	N	N	N	N														
SHEET	15	16	17	18	19	20														

REV STATUS OF SHEETS	REV	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14				

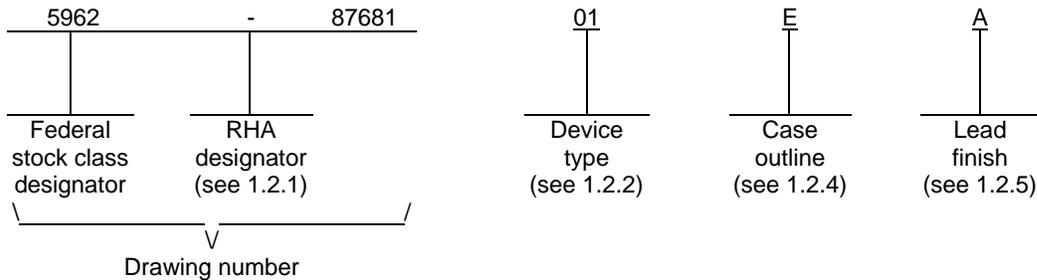
PMIC N/A	PREPARED BY MARCIA B. KELLEHER	<p align="center">DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990 http://www.landandmaritime.dla.mil</p>																	
<p align="center">STANDARD MICROCIRCUIT DRAWING</p> <p>THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE</p> <p align="center">AMSC N/A</p>	CHECKED BY ROBERT R. EVANS																		
	APPROVED BY MICHAEL A. FRYE	<p align="center">MICROCIRCUIT, LINEAR, HIGH SPEED PULSE WIDTH MODULATOR CONTROLLER, MONOLITHIC SILICON</p>																	
	DRAWING APPROVAL DATE 88-02-09																		
	REVISION LEVEL N	SIZE A	CAGE CODE 67268	5962-87681															
SHEET 1 OF 20																			

1. SCOPE

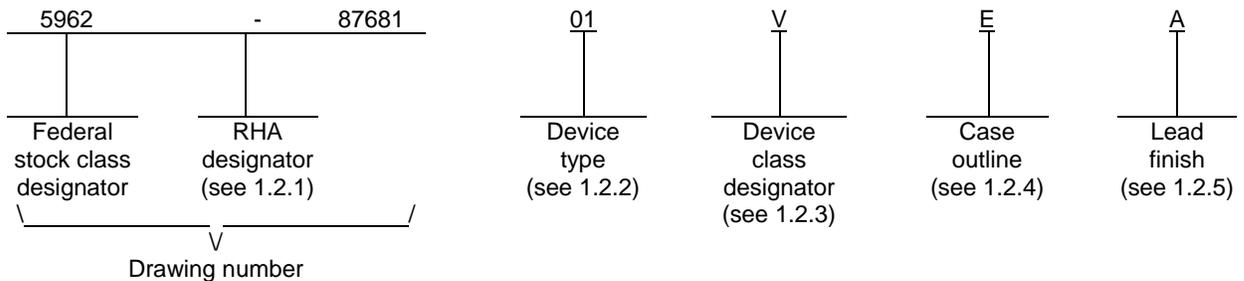
1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device class Q and M) and space application (device class V). A choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of Radiation Hardness Assurance (RHA) levels is reflected in the PIN.

1.2 PIN. The PIN is as shown in the following examples.

For device class M and Q:



For device class V:



1.2.1 RHA designator. Device classes Q and V RHA marked devices meet the MIL-PRF-38535 specified RHA levels and are marked with the appropriate RHA designator. Device class M RHA marked devices meet the MIL-PRF-38535, appendix A specified RHA levels and are marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 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	1825	High speed PWM controller
02	1825A	High speed PWM controller
03	1825B	High speed PWM controller
04	1825-SP	High speed PWM controller
05	1825A-SP	High speed PWM controller

1.2.3 Device class designator. The device class designator is a single letter identifying the product assurance level as listed below. Since the device class designator has been added after the original issuance of this drawing, device classes M and Q designators will not be included in the PIN and will not be marked on the device.

<u>Device class</u>	<u>Device requirements documentation</u>
M	Vendor self-certification to the requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A
Q or V	Certification and qualification to MIL-PRF-38535

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 2

1.2.4 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
X	CQCC1-N28B	28	Square leadless chip carrier with thermal pads
Y	See figure 1	16	Flat pack
2	CQCC1-N20	20	Square leadless chip carrier

1.2.5 Lead finish. The lead finish is as specified in MIL-PRF-38535 for device classes Q and V or MIL-PRF-38535, appendix A for device class M.

1.3 Absolute maximum ratings. ^{1/}

Supply voltage (VCC):	
Device types 01 and 04	30 V dc
Device types 02, 03, and 05	22 V dc
DC output current, source or sink	0.5 A
Pulse output current, source or sink (0.5 μs):	
Device types 01, 02, 03, and 04	2.0 A
Device type 05	2.2 A
Analog input voltage:	
NONINVERTING, INVERTING, and RAMP pins	-0.3 V dc to 7.0 V dc
SOFT START and CURRENT LIMIT / SD pins	-0.3 V dc to 6.0 V dc
Power ground:	
Device type 05	±0.2 V
Clock output current	-5.0 mA
Error amplifier output current	5.0 mA
Soft start sink current	20 mA
Oscillator charging current	-5.0 mA
Power dissipation (PD) (all packages)	1.0 W ^{2/ 3/}
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T _J)	+150°C
Thermal resistance, junction-to-case (θ _{JC})	See MIL-STD-1835

1.4 Recommended operating conditions.

Supply voltage range:	
Device types 01 and 04	10 V dc to 30 V dc
Device types 02, 03, and 05	12 V dc to 22 V dc
Sink/source output current (continuous or time average):	
Device types 04 and 05	0 mA to 100 mA
Reference load current:	
Device types 04 and 05	0 mA to 10 mA
Ambient operating temperature range (T _A)	-55°C to +125°C

- ^{1/} Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.
- ^{2/} For case outline E, derate linearly above T_A = +60°C at 11 mW/°C; for case outlines 2 and X, derate linearly above T_A = 40°C at 9 mW/°C; for case outline F, derate linearly above T_A = +60°C at 8 mW/°C.
- ^{3/} Must withstand the added PD due to short circuit test, e.g., ISC.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 3

1.5 Radiation features.

Device type 05:

Maximum total dose available (low dose rate = 10 mrad(Si)/s) 30 krad(Si) 4/ 5/

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 <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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.

4/ The manufacturer supplying device type 05 has performed low dose rate irradiation test at condition D and radiation end point limits for the noted parameters are guaranteed only for the conditions as specified in MIL-STD-883, methods 1019, condition D for total dose of 30 krad(Si).

5/ The device type 05 may exhibit enhanced low dose rate sensitivity(ELDRS) effects in a space environment. However, post irradiation electrical parametric limits remain within the pre-irradiation specifications limits during low dose rate testing at TID level 30 krad(Si)

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 4

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements for device classes Q and V 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. The individual item requirements for device class M shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein for device classes Q and V or MIL-PRF-38535, appendix A and herein for device class M.

3.2.1 Case outlines. The case outlines shall be in accordance with 1.2.4 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Block diagrams. The block diagrams shall be as specified on figure 3.

3.2.4 Radiation exposure circuit. The radiation exposure circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing and acquiring activity upon request.

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

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

3.5 Marking. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked. For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device. For RHA product using this option, the RHA designator shall still be marked. Marking for device classes Q and V shall be in accordance with MIL-PRF-38535. Marking for device class M shall be in accordance with MIL-PRF-38535, appendix A.

3.5.1 Certification/compliance mark. The certification mark for device classes Q and V shall be a "QML" or "Q" as required in MIL-PRF-38535. The compliance mark for device class M shall be a "C" as required in MIL-PRF-38535, appendix A.

3.6 Certificate of compliance. For device classes Q and V, a certificate of compliance shall be required from a QML-38535 listed manufacturer in order to supply to the requirements of this drawing (see 6.6.1 herein). For device class M, 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 6.6.2 herein). The certificate of compliance submitted to DLA Land and Maritime-VA prior to listing as an approved source of supply for this drawing shall affirm that the manufacturer's product meets, for device classes Q and V, the requirements of MIL-PRF-38535 and herein or for device class M, the requirements of MIL-PRF-38535, appendix A and herein.

3.7 Certificate of conformance. A certificate of conformance as required for device classes Q and V in MIL-PRF-38535 or for device class M in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change for device class M. For device class M, notification to DLA Land and Maritime-VA of change of product (see 6.2 herein) involving devices acquired to this drawing is required for any change that affects this drawing.

3.9 Verification and review for device class M. For device class M, 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.

3.10 Microcircuit group assignment for device class M. Device class M devices covered by this drawing shall be in microcircuit group number 110 (see MIL-PRF-38535, appendix A).

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 5

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/2/</u> -55°C ≤ T _A ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Reference section							
Output voltage	V _{REF}	T _J = +25°C, I _O = 1.0 mA	1	All	5.05	5.15	V
Line regulation	V _{RLINE}	10 V < V _{CC} < 30 V	1,2,3	01,04		±20	mV
		12 V < V _{CC} < 20 V		02,03, 05		±15	
Load regulation	V _{RLOAD}	1.0 mA < I _O < 10 mA	1,2,3	All		±20	mV
Long term stability <u>3/</u>	ΔV _{REF} / Δt	T _J = +125°C, t = 1000 hrs.	2	01,02, 03		±25	mV
Total output variation	VOM1	I _O = -1.0 mA, V _{CC} = 10 V	1,2,3	01,04	5.00	5.20	V
		I _O = -1.0 mA, V _{CC} = 12 V		02,03			
				05			
	VOM2	I _O = -1.0 mA, V _{CC} = 30 V		01, 04	5.00	5.20	
		I _O = -1.0 mA, V _{CC} = 20 V		02,03			
				05			
	VOM3	I _O = -10 mA, V _{CC} = 10 V		01,04	5.00	5.20	
		I _O = -10 mA, V _{CC} = 12 V		02,03			
				05			
	VOM4	I _O = -10 mA, V _{CC} = 30 V		01,04	5.00	5.20	
		I _O = -10 mA, V _{CC} = 20 V		02,03			
				05			
Short-circuit current	I _{SC}	V _{REF} = 0 V	1,2,3	01,04	15	100	mA
				02,03, 05	30	90	
Oscillator section							
Initial accuracy	f _o	T _J = +25°C	4	01,04	360	440	kHz
				02,03, 05	375	425	
		RT = 6.6 kΩ, CT = 220 pF, T _A = 25°C		05	0.9	1.1	MHz
Voltage stability	Δf _o / ΔV	10 V < V _{CC} < 30 V	4,5,6	01,04		±2.0	%
		12 V < V _{CC} < 20 V		02,03, 05		±1.0	

See footnotes at end of table.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 6

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ TA ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit	
					Min	Max		
Oscillator section – Continued.								
Temperature stability			4,5,6	04		16	%	
Total variation	fOM1	VCC = 10 V	4,5,6	01,04	340	460	kHz	
		VCC = 12 V		02,03				
	fOM2	VCC = 30 V		05	350	450		
		VCC = 20 V		01,04	340	460		
	fOM3	VCC = 12 V, RT = 6.6 kΩ, CT = 220 pF		02,03	0.82	1.18		MHz
				05				
fOM4	VCC = 20 V, RT = 6.6 kΩ, CT = 220 pF	05	0.82	1.18				
Clock out high	VCLK(H)		1,2,3	01,04	3.9		V	
				02,03, 05	3.7			
Clock out low	VCLK(L)		1,2,3	01,04		2.9	V	
				02,03, 05		0.2		
Ramp voltage, peak <u>3/</u>	Vim		1,2,3	All	2.6	3.0	V	
Ramp voltage, valley <u>3/</u>	Viv		1,2,3	All	0.6	1.25	V	
Ramp voltage, valley <u>3/</u> to peak	Vivp		1,2,3	01,02, 03,04	1.6	2.1	V	
				05	1.55	2.0		
Oscillator discharge current	IOSC	RT = OPEN, VCT = 2 V	1,2,3	05	8.5	11	mA	
Error amplifier section								
Input offset voltage	VOS	VCM = 3.0 V, VO = 3.0 V	1,2,3	01,02, 03	-15	15	mV	
				04,05	-10	10		
Input bias current	IIB	VCM = 3.0 V, VO = 3.0 V	1,2,3	All		3.0	μA	
Input offset current	IOS	VCM = 3.0 V, VO = 3.0 V	1,2,3	All		±1.0	μA	
Open loop gain	AVOL	1.0 V < VO < 4.0 V	4,5,6	All	60		dB	

See footnotes at end of table.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 7

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ T _A ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Error amplifier section – Continued.							
Common-mode rejection ratio	CMRR	1.5 V < V _{CM} < 5.5 V, V _{OUT} = 3.0 V	4,5,6	All	75		dB
Power supply rejection ratio	PSRR	10 V < V _{CC} < 30 V, V _{OUT} = 3.0 V	4,5,6	01,04	85		dB
		12 V < V _{CC} < 20 V, V _{OUT} = 3.0 V		02,03, 05	85		
Output sink current	I _{O(SINK)}	E/A OUT voltage = 1.0 V	1,2,3	All	1.0		mA
Output source current	I _{O(SOURCE)}	E/A OUT voltage = 4.0 V	1,2,3	All		-0.5	mA
Output high voltage	VOH1	E/A OUT current = -0.5 mA	1,2,3	All	4.0	5.0	V
Output low voltage	VOL1	E/A OUT current = 1.0 mA	1,2,3	All	0	1.0	V
Unity gain <u>3/</u> bandwidth	BW		4,5,6	01	3.0		MHz
Gain bandwidth <u>3/</u> product	GBWP	F = 200 kHz	4,5,6	02,03, 05	6.0		MHz
				04	5.0		
Slew rate <u>3/</u>	SR		4,5,6	01,02, 03	6.0		V/μs
				04	4.0		
				05	5.0		
PWM comparator section.							
RAMP bias current	IBRAMP	RAMP voltage = 0 V	1,2,3	01,04		-5.0	μA
				02,03, 05		-8.0	
Duty cycle range	DC(range)		1,2,3	01,02, 03,04	0	80	%
				05	0	85	
E/A OUT zero dc threshold voltage	VTH	RAMP voltage = 0 V	1,2,3	01,02, 03,04	1.1		V
				05	1.1	1.4	

See footnotes at end of table.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 8

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ TA ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
PWM comparator section – Continued.							
Delay to output <u>3/</u>	tD1	VEAOUT = 5 V to 0 V step	9,10,11	01,04		100	ns
				02,03		80	
				05		120	
Soft-start/duty cycle clamp section							
Charge current	ICHG	SOFT START voltage = 0.5 V	1,2,3	01,04	3.0	20	μA
		SOFT START voltage = 2.5 V		02,03, 05	8.0	20	
Discharge current	IDCHG	SOFT START voltage = 1.0 V	1,2,3	01,04	1.0		mA
		SOFT START voltage = 2.5 V		02,03, 05	0.10	0.35	
Current limit / shutdown section							
CURRENT LIMIT / SD bias current	IB	0 V < CURRENT LIMIT / SD voltage < 4.0 V	1,2,3	01,04, 05	-15	15	μA
Current limit threshold	VLIMIT		1,2,3	01,04	0.9	1.1	V
Shutdown threshold	VSHTDN		1,2,3	01,04	1.25	1.55	V
Delay to output <u>3/</u>	tD2		9,10,11	01,04		100	ns
Current limit / start sequence / fault section							
Restart threshold	VRS		1,2,3	02,03, 05		0.5	V
I LIM bias current	IBLIM	0 V < V I LIM < 2 V	1,2,3	02,03		15	μA
		0 V < V I LIM < 1.5 V		05		15	
Current limit threshold	VLIMIT		1,2,3	02,03, 05	0.95	1.05	V
Over current threshold	VOVER		1,2,3	02,03, 05	1.14	1.26	V
I LIM delay to output <u>3/</u>	tD3	VILIM = 0 V to 2 V step	1,2,3	02,03		80	ns
				05		80	

See footnotes at end of table.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 9

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ TA ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output section.							
Output low level	VOL2	IOUT = 20 mA	1,2,3	01,02, 03,04		0.4	V
				05		0.45	
		IOUT = 200 mA		All		2.2	
Output high level	VOH2	IOUT = -20 mA	1,2,3	01,04	13.0		V
		IOUT = -200 mA				12.0	
Output high saturation voltage	VHSAT	IOUT = -20 mA	1,2,3	02,03, 05		2.9	V
		IOUT = -200 mA				3	
Collector leakage	ILC	VC = 30 V	1,2,3	01,04, 05		500	μA
UVLO output low saturation	VOLS	IO = 20 mA	1,2,3	02,03		1.2	V
Rise / fall time <u>3/</u>	tr	CL = 1.0 nF	9,10,11	01		60	ns
				02,03, 05		45	
				04		75	
Under-voltage lockout section.							
Start threshold	VSTART		1,2,3	01	8.8	9.7	V
				02	8.4	9.6	
				03		17.0	
				04	8.8	9.6	
				05	8.3	9.6	
Stop threshold	VSTOP		1,2,3	03	9		V
UVLO hysteresis	VHYS		1,2,3	02,04	0.4	1.2	V
				03	5.0	7.0	
				05	0.4	1.25	

See footnotes at end of table.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 10

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ TA ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Supply current section.							
Start up current	I _{START}	V _{CC} = 8.0 V	1,2,3	01,04		2.5	mA
		V _C = V _{CC} = V _{TH} (start) – 0.5 V		02,03, 05		0.3	
Supply current	I _{CC}	INVERTING INPUT, RAMP, and CURRENT LIMIT / SD voltage = 0 V, NONINVERTING INPUT voltage = 1.0 V	1,2,3	01,04		33	mA
				02,03, 05		36	

1/ Unless otherwise specified, characteristics apply at RT = 3.65 kΩ, CT = 1.0 nF. VCC = 15 V for device types 01 and 04 and VCC = 12 V for device types 02, 03, and 05.

2/ RHA device type 05 supplied to this drawing has been characterized through all levels M, D and P of irradiation of test condition D. However, device type 05 is only tested at the “P” level. Post irradiation electrical limits falls within the limits specified in table I values unless otherwise. When performing post irradiation electrical measurement for any RHA level, TA = +25°C.

3/ Guaranteed, if not tested, to the specified limits in table I herein.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 11

Case outline Y

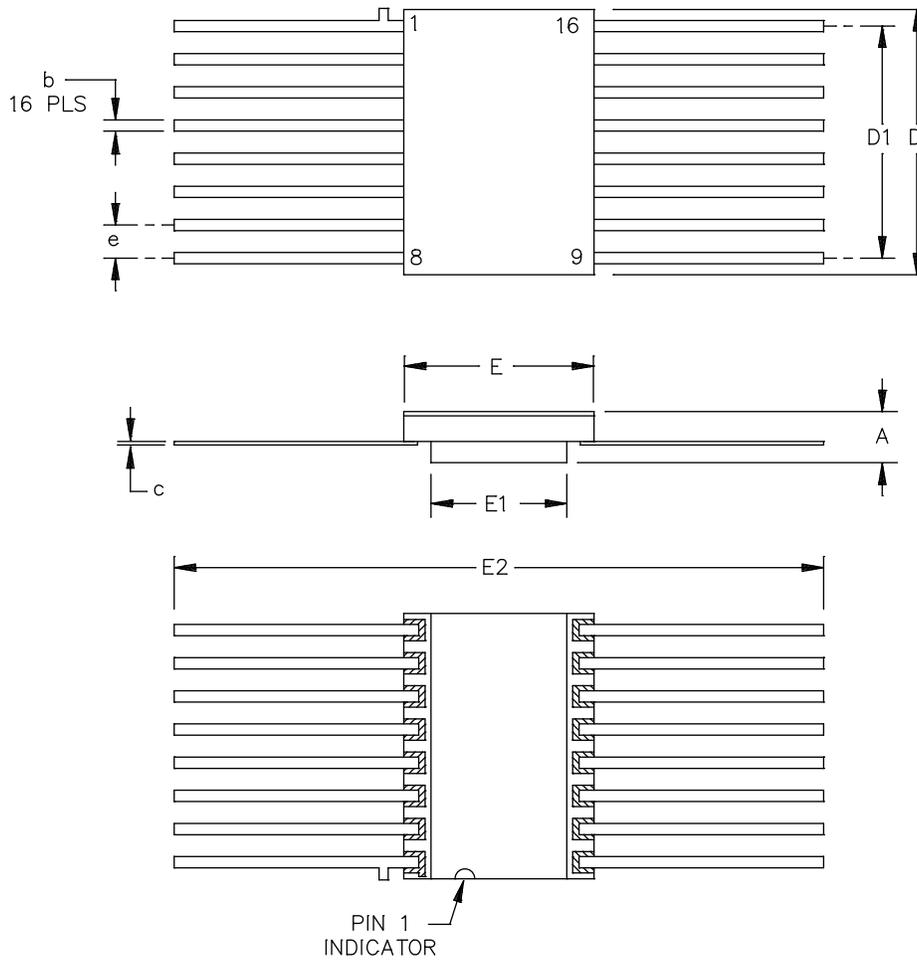


FIGURE 1. Case outline.

**STANDARD
MICROCIRCUIT DRAWING**
DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990

SIZE
A

5962-87681

REVISION LEVEL
N

SHEET
12

Case outline Y – continued.

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.070	0.084	1.779	2.133
b	0.015	0.019	0.382	0.482
c	0.004	0.007	0.097	0.177
D	0.380	0.410	9.652	10.414
D1	0.350	---	8.890	---
E	0.281	0.293	7.137	7.442
E1	0.199	0.211	5.055	5.359
E2	0.960	1.000	24.384	25.400
e	0.047	0.053	1.190	1.350

NOTES:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only.
2. This package is hermetically sealed with a metal lid. Lid and cavity are electrically isolated.
3. The terminals are gold plated.

FIGURE 1. Case outline - Continued.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 13

Device types	01, 02, 03, 04, 05	01	02, 03	01, 02, 03, 04
Case outlines	E and Y	F	X	2
Terminal number	Terminal symbol			
1	INVERTING INPUT	INVERTING INPUT	NC	NC
2	NONINVERTING INPUT	NONINVERTING INPUT	INVERTING INPUT	INVERTING INPUT
3	E/A INPUT	E/A INPUT	NONINVERTING INPUT	NONINVERTING INPUT
4	CLOCK	CLOCK	NC	E / A OUT
5	RT	RT	NC	CLOCK
6	CT	CT	E / A OUT	NC
7	RAMP	RAMP	CLK / LEB	RT
8	SOFT START	SOFT START	NC	CT
9	CURRENT LIMIT / SD	CURRENT LIMIT / SD	RT	RAMP
10	GROUND	GROUND	CT	SOFT START
11	OUT A	OUT A	NC	NC
12	POWER GROUND	POWER GROUND	NC	CURRENT LIMIT / SD
13	Vc	Vc	RAMP	GROUND
14	OUT B	OUT B	SOFT START	OUT A
15	VCC	VCC	NC	POWER GROUND
16	VREF	VREF	CURRENT LIMIT / SD	NC
17	---	---	GROUND	Vc
18	---	---	NC	OUT B
19	---	---	NC	VCC
20	---	---	OUT A	VREF
21	---	---	POWER GROUND	---
22	---	---	NC	---
23	---	---	Vc	---
24	---	---	OUT B	---
25	---	---	NC	---
26	---	---	NC	---
27	---	---	VCC	---
28	---	---	VREF	---

NC = No connection

FIGURE 2. Terminal connections.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 14

Device types 01, 04

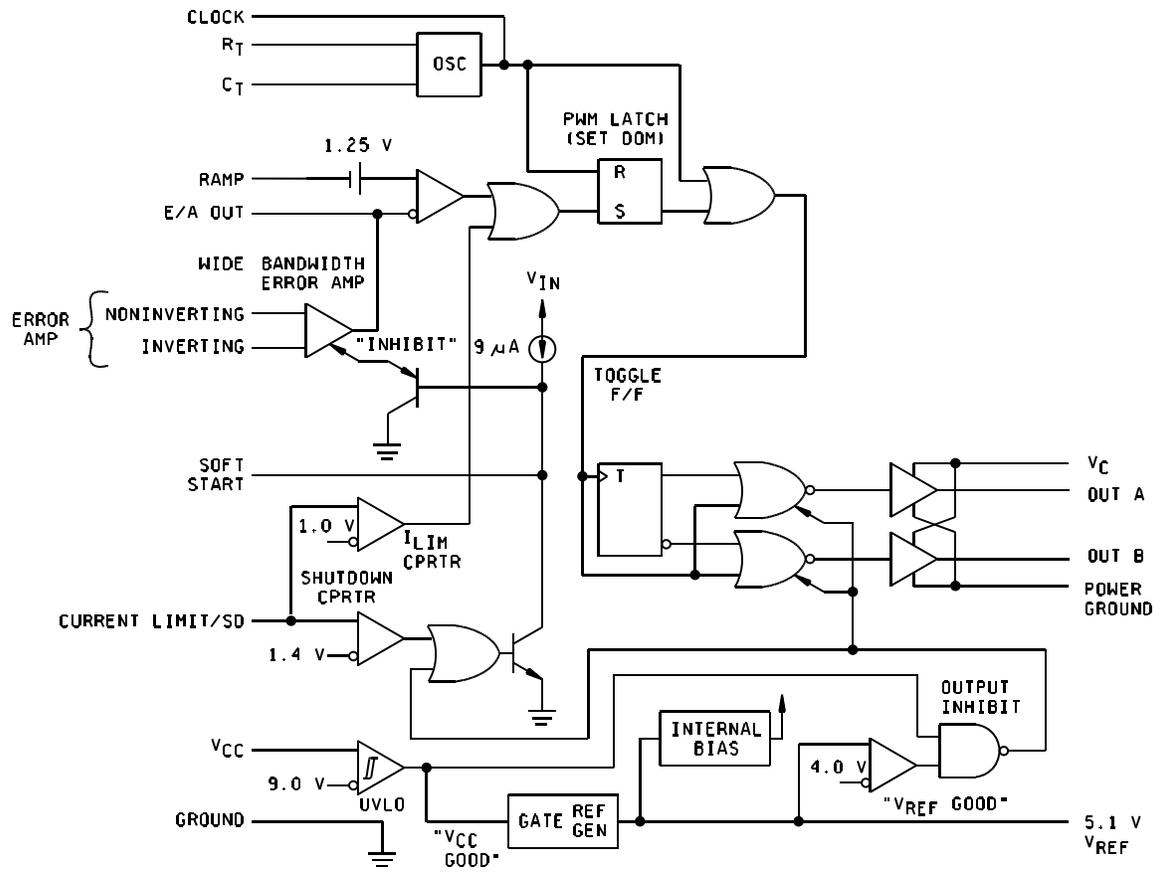


FIGURE 3. Block diagram.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 15

Device types 02, 03, and 05

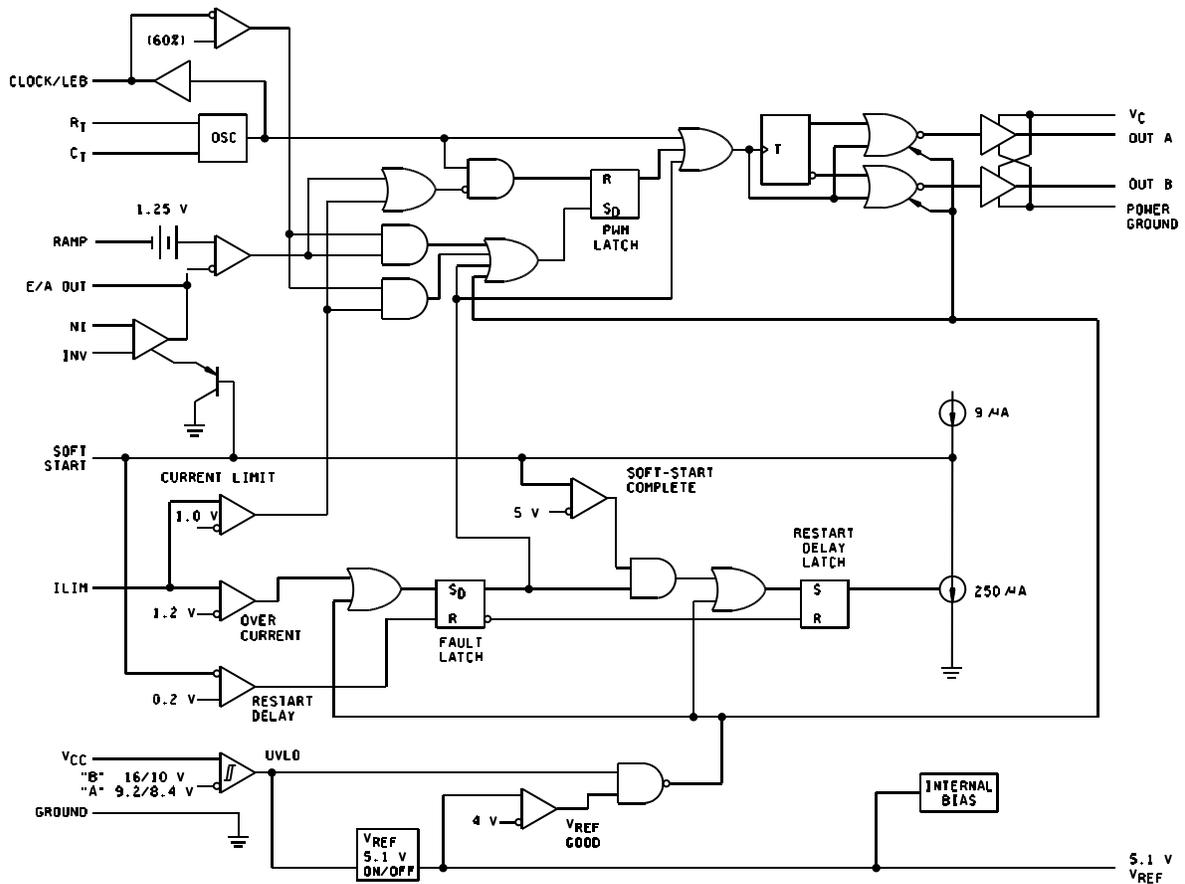


FIGURE 3. Block diagram – Continued.

**STANDARD
MICROCIRCUIT DRAWING**
DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990

SIZE
A

5962-87681

REVISION LEVEL
N

SHEET
16

4. VERIFICATION

4.1 Sampling and inspection. For device classes Q and V, sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein. For device class M, sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 Screening. For device classes Q and V, screening shall be in accordance with MIL-PRF-38535, and shall be conducted on all devices prior to qualification and technology conformance inspection. For device class M, screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection.

4.2.1 Additional criteria for device class M.

- a. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition A, B, C, or D. 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.
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
- b. Interim and final electrical test parameters shall be as specified in table IIA herein.

4.2.2 Additional criteria for device classes Q and V.

- a. The burn-in test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document revision level control of 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 method 1015 of MIL-STD-883.
- b. Interim and final electrical test parameters shall be as specified in table IIA herein.
- c. Additional screening for device class V beyond the requirements of device class Q shall be as specified in MIL-PRF-38535, appendix B.

4.3 Qualification inspection for device classes Q and V. Qualification inspection for device classes Q and V shall be in accordance with MIL-PRF-38535. Inspections to be performed shall be those specified in MIL-PRF-38535 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

4.4 Conformance inspection. Technology conformance inspection for classes Q and V shall be in accordance with MIL-PRF-38535 including groups A, B, C, D, and E inspections and as specified. Quality conformance inspection for device class M shall be in accordance with MIL-PRF-38535, appendix A and as specified herein. Inspections to be performed for device class M shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection.

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

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 17

TABLE IIA. Electrical test requirements.

Test requirements	Subgroups (in accordance with MIL-STD-883, method 5005, table I)	Subgroups (in accordance with MIL-PRF-38535, table III)	
	Device class M	Device class Q	Device class V
Interim electrical parameters (see 4.2)	1	1	1,4
Dynamic burn-in test	Required	Required	Required
Final electrical parameters (see 4.2)	1,2,3,4 <u>1/</u>	1,2,3,4 <u>1/</u>	1,2,3,4 <u>1/</u> <u>2/</u>
Group A test requirements (see 4.4)	1,2,3,4,5,6, <u>3/</u> 9,10,11	1,2,3,4,5,6, <u>3/</u> 9,10,11	1,2,3,4,5,6, <u>3/</u> 9,10,11
Group C end-point electrical parameters (see 4.4)	1,2,3	1,2,3	1,2,3,4 <u>2/</u>
Group D end-point electrical parameters (see 4.4)	1,2,3	1,2,3	1,2,3
Group E end-point electrical parameters (see 4.4)	---	1, 7, 9	1, 7, 9

1/ PDA applies to subgroup 1.

2/ Delta limits as specified in table IIB shall be required where specified, and the delta limits shall be computed with reference to the previous interim electrical parameters.

3/ Subgroups 9, 10, and 11 are guaranteed if not tested.

TABLE IIB. Burn-in and operating life test delta parameters. TA = +25°C 1/

Parameters <u>2/</u>	Symbol	Device types	Delta limits
Reference output voltage	VREF	04, 05	±50 mV
Oscillator accuracy (RT = 3.65 kΩ, CT = 1 nF)	f _o	04	±40 kHz
Oscillator accuracy (RT = 6.6 kΩ, CT = 220 pF)	f _o	05	±50 kHz
Oscillator discharge current	I _{OSC}	05	±0.5 mA
Error amp input bias current	I _{IB}	04, 05	±0.5 μA
Supply current	I _{CC}	04, 05	±2 mA

1/ 240 hour burn-in and 1,000 hour operating group C life test.

2/ These parameters shall be recorded before and after the required burn-in and life test to determine delta limits

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 18

4.4.2 Group C inspection. The group C inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.2.1 Additional criteria for device class M. Steady-state life test conditions, method 1005 of MIL-STD-883:

- a. Test condition A, B, C, or D. 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.
- b. $T_A = +125^{\circ}\text{C}$, minimum.
- c. Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.4.2.2 Additional criteria for device classes Q and V. 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 test circuit shall be maintained under document revision level control by the device manufacturer's 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 method 1005 of MIL-STD-883.

4.4.3 Group D inspection. The group D inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.4 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein).

- a. End-point electrical parameters shall be as specified in table IIA herein.
- b. For device classes Q and V, the devices or test vehicle shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38535 for the RHA level being tested. For device class M, the devices shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38535, appendix A for the RHA level being tested. All device classes must meet the postirradiation end-point electrical parameter limits as defined in table I at $T_A = +25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, after exposure, to the subgroups specified in table IIA herein.

4.4.4.1 Total dose irradiation testing. Total dose irradiation testing shall be performed in accordance with MIL-STD-883 method 1019, condition D for device type 05 and as specified herein.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535 for device classes Q and V or MIL-PRF-38535, appendix A for device class M.

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.

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

6.2 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.

6.3 Record of users. Military and industrial users should inform DLA Land and Maritime when a system application requires configuration control and which SMD's are applicable 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 microelectronic devices (FSC 5962) should contact DLA Land and Maritime-VA, telephone (614) 692-8108.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 19

6.4 Comments. Comments on this drawing should be directed to DLA Land and Maritime-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0540.

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

6.6 Sources of supply.

6.6.1 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in MIL-HDBK-103 and QML-38535. The vendors listed in QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DLA Land and Maritime-VA and have agreed to this drawing.

6.6.2 Approved sources of supply for device class M. Approved sources of supply for class M are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 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.

STANDARD MICROCIRCUIT DRAWING DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A		5962-87681
		REVISION LEVEL N	SHEET 20

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 17-01-09

Approved sources of supply for SMD 5962-87681 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> /
5962-8768101EA	34333	SG1825CJ883B
	01295	UC1825J883B
5962-87681012A	34333	SG1825CL883B
	01295	UC1825L883B
5962-8768101QFA	01295	UC1825W883B
5962-8768101VEA	01295	UC1825JQMLV
5962-8768101V2A	01295	UC1825LQMLV
5962-8768101V2C	<u>3</u> /	UC1825L/QMLV
5962-8768102EA	01295	UC1825AJ883B
5962-8768102XA	<u>3</u> /	UC1825ALP883B
5962-87681022A	01295	UC1825AL883B
5962-8768102VEA	01295	UC1825AJQMLV
5962-8768102V2A	01295	UC1825ALQMLV
5962-8768103EA	<u>3</u> /	UC1825BJ/883B
5962-8768103XA	<u>3</u> /	UC1825BLP883B
5962-87681032A	<u>3</u> /	UC1825BL/883B

STANDARD MICROCIRCUIT DRAWING BULLETIN - Continued

DATE: 17-01-09

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-8768104VEA	01295	UC1825J-SP
5962-8768104V2A	01295	UC1825FK-SP
5962-8768105VEA	01295	UC1825AJ-SP
5962P8768105VEA	01295	UC1825AJ-RHA
5962P8768105VYC	01295	UC1825AHKT-RHA

- 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

Vendor name
and address

01295

Texas Instruments, Incorporated
Semiconductor Group
8505 Forest Lane
P.O. Box 660199
Dallas, TX 75243

34333

Microsemi Analog Mixed Signal Group
11861 Western Avenue
Garden Grove, CA 92841-2119

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