REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Add new device type 09. Update boilerplate to current requirements. Corrections throughout. - CFS	06-12-11	Thomas M. Hess
B	Update boilerplate paragraphs to current requirements. - phn	12-02-14	Thomas M. Hess
C	Update boilerplate to current MIL-PRF-38535 requirements. - PHN	18-06-25	Thomas M. Hess
D	Update boilerplate paragraphs to current VID description requirements. - PHN	23-11-20	Muhammad A. Akbar

CURRENT DESIGN ACTIVITY CAGE CODE 16236
HAS CHANGED NAMES TO:
DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990

Prepared in accordance with ASME Y14.24

Vendor item drawing

REV																						
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REV STATUS OF PAGES	**REV**		D	D	D	D	D	D	D	D	D	D	D									
	PAGE		1	2	3	4	5	6	7	8	9	10	11									

PMIC N/A	**PREPARED BY** Phu H. Nguyen	**DEFENSE SUPPLY CENTER, COLUMBUS** **COLUMBUS, OHIO 43218-3990** **https://www.dla.mil/landandmaritime**
Original date of drawing YY-MM-DD 03-06-18	**CHECKED BY** Phu H. Nguyen **APPROVED BY** Thomas M. Hess	**TITLE** MICROCIRCUIT, LINEAR, ULTRALOW-NOISE, HIGH PSRR, FAST RF 200-mA LOW-DROPOUT LINEAR REGULATORS, MONOLITHIC SILICON
	SIZE A / **CODE IDENT. NO.** 16236	**DWG NO.** **V62/03634**
	REV D	**PAGE** 1 **OF** 11

AMSC N/A

5962-V012-24

1. SCOPE

1.1 Scope. This drawing documents the general requirements of ultralow-noise, high PSRR, fast RF 200 mA, low dropout linear regulators, with an operating junction temperature range of -40°C to +125°C for device types 01 through 08, and an operating junction temperature range of -55°C to +125°C for device type 09.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

V62/03634	01	Y	E
Drawing number	Device type (See 1.2.1)	Case outline (See 1.2.2)	Lead finish (See 1.2.3)

1.2.1 Device type(s). 1/

Device Type	Generic	Output voltage	Circuit function
01	TPS79301-EP	+1.2 V to 5.5 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
02	TPS79318-EP	+1.8 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
03	TPS79325-EP	+2.5 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
04	TPS79328-EP	+2.8 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
05	TPS793285-EP	+2.85 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
06	TPS79330-EP	+3.0 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
07	TPS79333-EP	+3.3 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
08	TPS793475-EP	+4.75 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.
09	TPS79301-EP	+1.2 V to 5.5 V	Ultra low noise, high PSRR, fast RF 200 mA low dropout linear regulator.

1.2.2 Case outline(s). The case outlines are as specified herein.

Outline letter	Number of pins	JEDEC PUB 95	Package style
X	6	JEDEC MO-178	Plastic small outline
Y	5	JEDEC MO-178	Plastic small outline

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

Finish designator	Material
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
F	Tin-lead alloy
Z	Other

1/ Users are cautioned to review the manufacturers data manual for additional user information relating to these devices.

1.3 Absolute maximum ratings. 1/

Input voltage range (V_I) ..... -0.3 V to +6.0 V 2/
Voltage range at EN ..... -0.3 V to V_I + 0.3 V
Voltage on OUT ..... -0.3 V to +6.0 V
Peak output current ..... Internally limited
ESD rating, HBM ..... 2 kV
ESD rating, CDM ..... 500 V
Continuous total power dissipation..... See dissipation rating table
Operating virtual junction temperature range (T_J):
Device types 01 through 08 ..... -40°C to 125°C
Device type 09..... -55°C to 125°C
Storage temperature range (T_{STG})..... -65°C to 150°C

Dissipation Rating Table – Ambient Temperatures

Board	Case outline	$R_{\theta JC}$	$R_{\theta JA}$	Derating factor Above T_A = 25°C	$T_A \leq 25°C$ Power rating	T_A = 70°C Power rating	T_A = 85°C Power rating
Low K 3/	X, Y	63.75°C/W	256°C/W	3.906 mW/°C	391 mW	215 mW	156 mW
High K 4/	X, Y	63.75°C/W	178.3°C/W	5.609 mW/°C	561 mW	308 mW	224 mW

2. APPLICABLE DOCUMENTS

JEDEC – SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at https://www.jedec.org.)

1/ Stresses beyond those listed under “absolute maximum rating” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
2/ All voltage values are with respect to network terminal ground.
3/ The JEDEC low K (1s) board design used to derive this data was a 3-inch x 3-inch, two layer board with 2 ounce copper traces on top of the board.
4/ The JEDEC high K (2s2p) board design used to derive this data was a 3-inch x 3-inch, multilayer board with 1 ounce internal power and ground planes and 2 ounce copper traces on top and bottom of the board.

3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

A. Manufacturer's name, CAGE code, or logo
B. Pin 1 identifier
C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outlines. The case outlines shall be as shown in 1.2.2 and on figure 1.

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

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

TABLE I. Electrical performance characteristics. 1/

Test	Test conditions Devices 01 – 08: T_J = -40°C to 125°C Device 09: T_J = -55°C to 125°C $V_I = V_{O(Typ)} + 1$ V, I_O = 1 mA, EN = V_I, C_O = 10 µF, $C_{(byp)}$ = 0.01 µF unless otherwise specified		Device type	Limits		Unit
				Min	Max	
Input voltage, V_I 2/			All	2.7	5.5	V
Continuous output current, I_O 3/			All	0	200	mA
Operating junction temperature, T_J			01 - 08	-40	125	°C
			09	-55	125	
Output voltage	0 µA < I_O < 200 mA, 1.22 V ≤ V_O ≤ 5.2 V 4/		01	0.98 V_O	1.02 V_O	V
	T_J = 25°C		02	1.8 Typ		
	0 µA < I_O < 200 mA, 2.8 V ≤ V_I ≤ 5.5 V			1.764	1.836	
	T_J = 25°C		03	2.5 Typ		
	0 µA < I_O < 200 mA, 3.5 V ≤ V_I ≤ 5.5 V			2.450	2.550	
	T_J = 25°C		04	2.8 Typ		
	0 µA < I_O < 200 mA, 3.8 V ≤ V_I ≤ 5.5 V			2.744	2.856	
	T_J = 25°C		05	2.85 Typ		
	0 µA < I_O < 200 mA, 3.85 V ≤ V_I ≤ 5.5 V			2.793	2.907	
	T_J = 25°C		06	3.0 Typ		
	0 µA < I_O < 200 mA, 4.0 V ≤ V_I ≤ 5.5 V			2.94	3.06	
	T_J = 25°C		07	3.3 Typ		
	0 µA < I_O < 200 mA, 4.3 V ≤ V_I ≤ 5.5 V			3.234	3.366	
	T_J = 25°C		08	4.75 Typ		
	0 µA < I_O < 200 mA, 5.25 V ≤ V_I ≤ 5.5 V			4.655	4.845	
	0 µA < I_O < 200 mA, 1.22 V ≤ V_O ≤ 5.2 V 4/		09	0.97 V_O	1.025 V_O	
Quiescent current (GND current)	0 µA < I_O < 200 mA, T_J = 25°C		All	170 Typ		µA
	0 µA < I_O < 200 mA,		All		220	
Load regulation	0 µA < I_O < 200 mA, T_J = 25°C		All	5.0 Typ		mV
Output voltage line regulation ($\Delta V_O/V_O$) 5/	V_O + 1 V < V_I ≤ 5.5 V, T_J = 25°C		All	0.05 Typ		%/V
	V_O + 1 V < V_I ≤ 5.5 V				0.12	
Output noise voltage	BW = 200 Hz to 100 kHz, I_O = 200 mA, T_J = 25°C	$C_{(byp)}$ = 0.001 µF	04	55 Typ		μV_{RMS}
		$C_{(byp)}$ = 0.0047 µF		36 Typ		
		$C_{(byp)}$ = 0.01 µF		33 Typ		
		$C_{(byp)}$ = 0.1 µF		32 Typ		
Time, start up	R_L = 14 Ω C_O = 1 µF, T_J = 25°C	$C_{(byp)}$ = 0.001 µF	04	50 Typ		µs
		$C_{(byp)}$ = 0.0047 µF		70 Typ		
		$C_{(byp)}$ = 0.01 µF		100 Typ		
Output current limit	V_O = 0 V 4/		All	285	600	mA
Standby current	EN = 0 V, 2.7 V ≤ V_I ≤ 5.5 V		All		1	µA

See notes at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

Test	Test conditions Devices 01 – 08: T_J = -40°C to 125°C Device 09: T_J = -55°C to 125°C $V_I = V_{O(Typ)} + 1$ V, I_O = 1 mA, EN = V_I, C_O = 10 µF, $C_{(byp)}$ = 0.01 µF unless otherwise specified	Device type	Limits		Unit
			Min	Max	
High level enable input voltage	2.7 V < V_I < 5.5 V	All	2.0		V
Low level enable input voltage	2.7 V < V_I < 5.5 V			0.7	V
Input current (EN)	EN = 0		-1	1	µA
Input current (FB)	FB = 1.8 V	01, 09		1	µA
Power supply ripple rejection	f = 100 Hz, T_J = 25°C, I_O = 10 mA	04	70 Typ		dB
	f = 100 Hz, T_J = 25°C, I_O = 200 mA		68 Typ		
	f = 10 kHz, T_J = 25°C, I_O = 200 mA		70 Typ		
	f = 100 kHz, T_J = 25°C, I_O = 200 mA		43 Typ		
Dropout voltage 6/	I_O = 200 mA, T_J = 25°C	04	120 Typ		mV
	I_O = 200 mA			200	
	I_O = 200 mA, T_J = 25°C	05	120 Typ		
	I_O = 200 mA			200	
	I_O = 200 mA, T_J = 25°C	06	112 Typ		
	I_O = 200 mA			200	
	I_O = 200 mA, T_J = 25°C	07	102 Typ		
	I_O = 200 mA			180	
	I_O = 200 mA, T_J = 25°C	08	77 Typ		
	I_O = 200 mA			125	
UVLO threshold	V_{CC} rising	All	2.25	2.65	V
UVLO hysteresis	V_{CC} rising, T_J = 25°C	All	100 Typ		mV

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/ To calculate the minimum input voltage for your maximum output current, use the following formula:
$V_I(min) = V_O(max) + V_{DO}$ (max load).

3/ Continuous output current and operating junction temperature are limited by internal protection circuitry, but it is not recommended that the device operate under conditions beyond those specified in this table for extended periods of time.

4/ The minimum IN operating voltage is 2.7 V or $V_{O(Typ)}$ + 1V, whichever is greater. The maximum IN voltage is 5.5 V. The maximum output current is 200 mA.

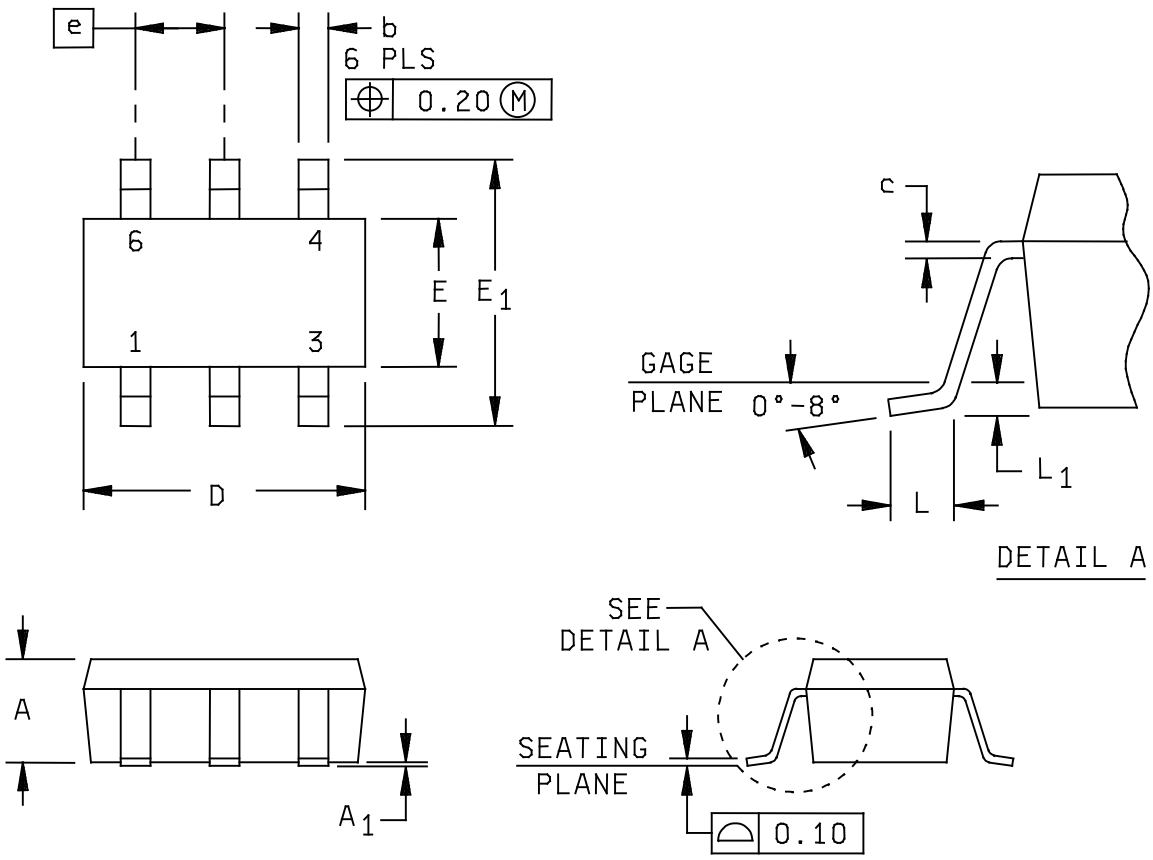
5/ If $V_O \leq 2.5$ V then V_{imin} = 2.7 V, V_{Imax} = 5.5 V:

$$\text{Line Reg. (mV)} = (\%/V) \times \frac{V_O(V_{Imax} - 2.7V)}{100} \times 1000$$

If $V_O \geq 2.5$ V then $V_{Imin} = V_O + 1$ V, V_{imax} = 5.5 V.

6/ IN voltage equals $V_{O(Typ)}$ – 100 mV; Device type 03 dropout voltage is limited by the input voltage range limitations.

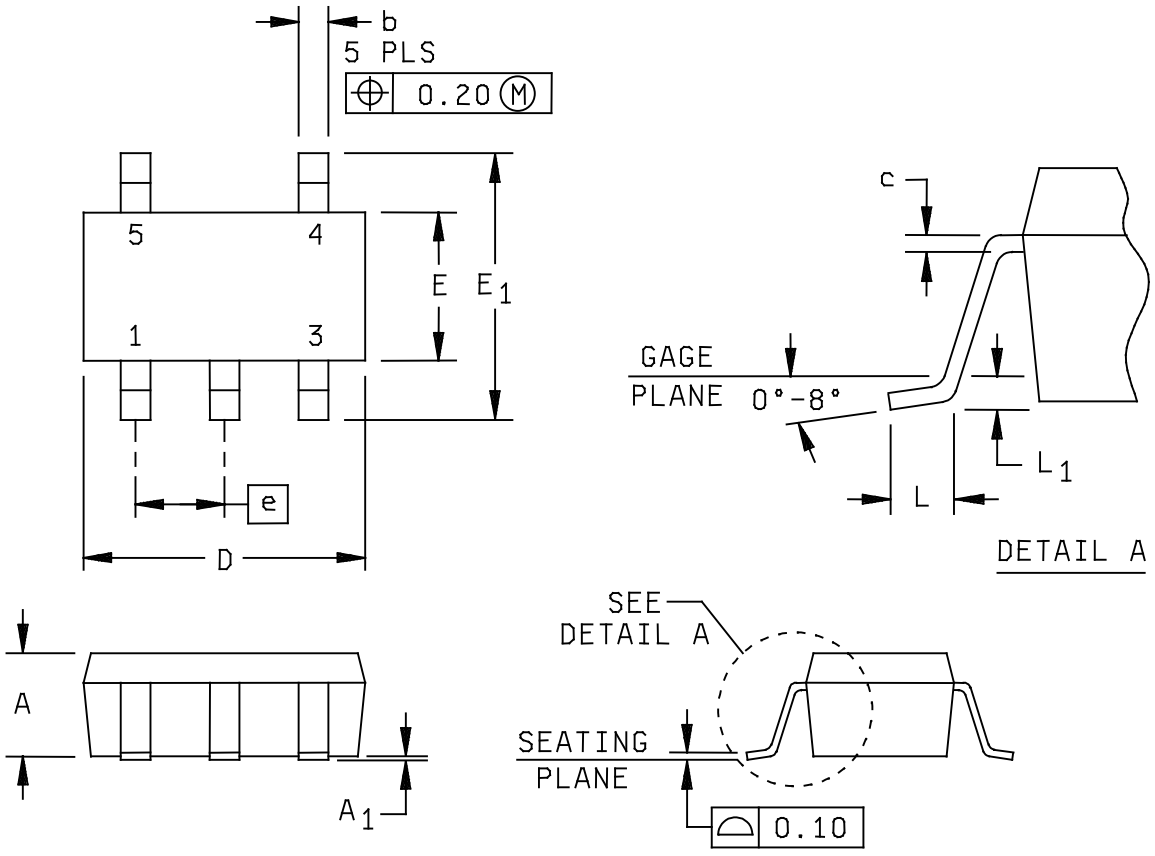
Case X



Notes:
1. All linear dimensions are in millimeters.
2. This drawing is subject to change without notice.
3. Body dimensions do not include mold flash or protrusions.
4. Leads 1, 2, 3 may be wider than leads 4, 5, 6 for package orientation.
5. Falls within JEDEC MO-178 variation AB, except minimum lead width.

FIGURE 1. Case outlines.

Case Y



Notes:
1. All linear dimensions are in millimeters.
2. This drawing is subject to change without notice.
3. Body dimensions do not include mold flash or protrusions.
4. Leads 1, 2, 3 may be wider than leads 4, 5 for package orientation.
5. Falls within JEDEC MO-178 variation AA.

FIGURE 1. Case outlines - Continued.

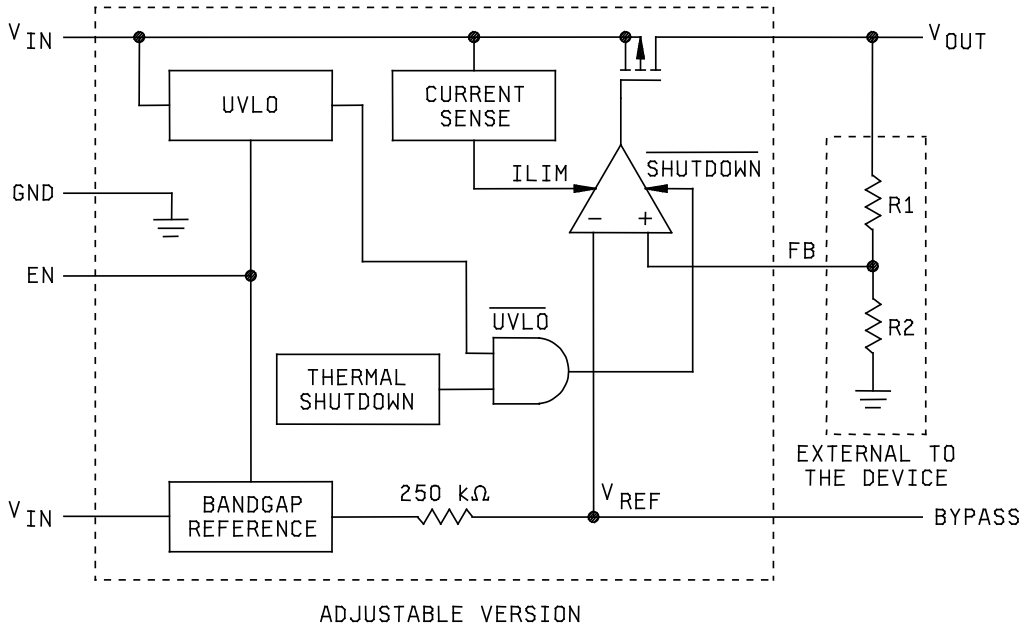
Cases X, Y

	Millimeters	
Symbol	Min	Max
A	0.95	1.45
A1	0.05	
b	0.25	0.50
c	0.15 NOM	
D	2.80	3.00
E	1.50	1.70
E1	2.60	3.00
e	0.95 Typ	
L	0.35	0.55

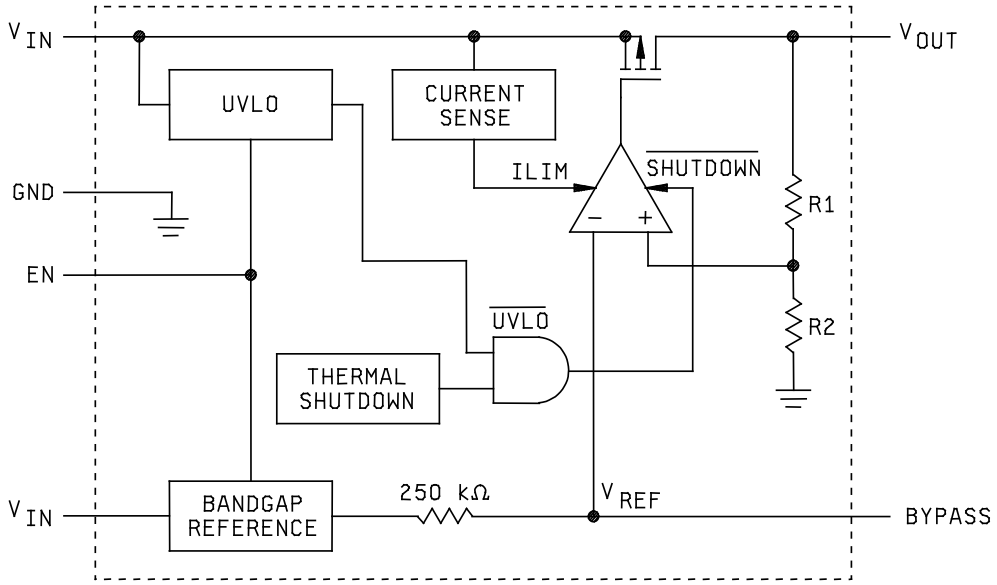
FIGURE 1. Case outline - Continued.

Terminal number	Case X	Case Y
	Terminal symbol	Terminal symbol
1	IN	IN
2	GND	GND
3	EN	EN
4	BYPASS	BYPASS
5	FB	OUT
6	OUT	

FIGURE 2. Terminal connections.



ADJUSTABLE VERSION



FIXED VERSION

FIGURE 3. Block diagrams

4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at https://landandmaritimeapps.dla.mil/programs/smcr/.

Vendor item drawing administrative control number 1/	Device manufacturer CAGE code	Vendor part number 2/	Symbol
V62/03634-01YE	01295	TPS79301DBVREP	PGVE
V62/03634-02XE	01295	TPS79318DBVREP	PHHE
V62/03634-03XE	3/	TPS79325DBVREP	PGWE
V62/03634-04XE	3/	TPS79328DBVREP	PGXE
V62/03634-05XE	3/	TPS793285DBVREP	PHIE
V62/03634-06XE	3/	TPS79330DBVREP	PGYE
V62/03634-07XE	01295	TPS793333DBVREP	PHUE
V62/03634-08XE	01295	TPS793475DBVREP	PHJE
V62/03634-09XE	01295	TPS79301MDBVREP	PMBM

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.
2/ The DBVR indicates tape and reel of 3000 parts.
3/ This device is not available from an approved source of supplied.

CAGE code	Source of supply
01295	Texas Instruments, Inc. Semiconductor Group 8505 Forest Lane P.O. Box 660199 Dallas, TX 75243