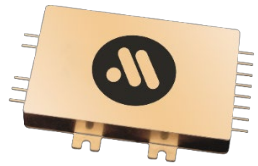
M3GB Series
28V Input, Single and Dual Output

Part Numbers: M3GB2803R3S, M3GB2805S, M3GB2812S, M3GB2815S, M3GB2805D, M3GB2807D, M3GB2812D, M3GB2815D



Datasheet

The M3GB-Series of DC-DC converters are second generation design of the legacy M3G-Series product family but with enhanced overall performance. M3GB-Series is form, fit and functional equivalent to the first generation M3G-Series. It is designed to be backward compatible to the M3G-Series with the addition of an output voltage adjustment pin for the single output models. Much the same as the original M3G-Series, these converters are radiation hardened, high reliability converters designed for extended operation in hostile environments. Their small size and low weight make them ideal for applications such as geostationary earth orbit satellites and deep space probes. They exhibit a high tolerance to total ionizing dose, single event effects and environmental stresses such as temperature extremes, mechanical shock, and vibration.

The converters incorporate a fixed frequency single ended forward topology with magnetic feedback and an internal EMI filter that utilizes multilayer ceramic capacitors that are subjected to extensive lot screening for optimum reliability. These converters are capable of meeting the conducted emissions and conducted susceptibility requirements of MIL-STD-461C without any additional components. External inhibit and synchronization input and output allow these converters to be easily incorporated into larger power systems. They are enclosed in a hermetic 3" x 2" x 0.475" package constructed of an Aluminum/Silicon-Carbide (Al/SiC) base and an Alloy 48 ring frame and they weigh less than 100 grams. The package utilizes rugged ceramic feed-through copper core pins and is sealed using parallel seam welding.

Manufactured in a facility fully qualified to MIL-PRF-38534, these converters are fabricated utilizing DLA Land and Maritime qualified processes. For available screening options, refer to device screening table in the data sheet. Non-flight versions of the M3GB-Series converters are available for system development purposes. Variations in electrical specifications and screening to meet custom requirements can be accommodated.

Features

- Total Dose > 200kRads (Si), Typically Usable to > 300kRads (Si)
- SEE Hardened to LET Up to 82MeV·cm^2/mg
- Internal EMI filter; Converter Capable of Meeting MIL-STD-461C CE03
- Low Weight < 100g
- Magnetically Coupled Feedback
- 18V to 50VDC Input Range
- Up to 40W Output Power
- Single and Dual Output Models Include 3.3, 5, 12, 15, ±5, ±12, and ±15V
- High Efficiency - to 83%
- -55°C to +125°C Operating Temperature Range
- 100MΩ at 100VDC Isolation
- Under-Voltage Lockout
- Short Circuit and Overload Protection
- Remote Sense on Single Output Models
- Adjustable Output Voltage for all Models
- Synchronization Input and Output
- External Inhibit
- > 7,000,000-hour MTBF
- Standard Microcircuit Drawings Available

Revision History

Revision	Description	Release Date
1.0	M3GB Series Datasheet Release	05/08/2015
2.0	Updated Output Voltage Adjustment for Single / Dual Output Models to adjust op voltage lower	11/10/2015
3.0	Updated based on ECO-1110_27442	06/22/2016
4.0	Updated based on ECO-1110_28492	10/26/2018
5.0	Updated based on ECO-1110_29267	04/01/2019
6.0	Updated based on ECO-1110_29564	11/11/2019
7.0	Updated based on ECO-1110_29731	05/13/2020
8.0	Updated based on ECO-1110_30003	02/05/2021
9.0	Updated based on ECO-1110_30377	07/28/2021
10.0	Updated based on ECO-1110_30779	05/09/2022
11.0	Updated M3GB2815D SMD Part Numbering	04/04/2025

Table of Contents

List of Figures

List of Tables

1.0 Circuit Description

The M3BG-Series converters utilize a single-ended forward topology with resonant reset. The nominal switching frequency is 500kHz. Electrical isolation and tight output regulation are achieved through the use of a magnetically coupled feedback. Voltage feed-forward with duty factor limiting provides high line rejection.

An internal EMI filter allows the converter to meet the conducted emissions requirements of MIL-STD-461C on the input power leads. A two-stage output filter reduces the typical output ripple to less than 20mV peak-to-peak.

Output current is limited under any load fault condition to approximately 125% of rated. An overload condition causes the converter output to behave like a constant current source with the output voltage dropping below nominal. The converter will resume normal operation when the load current is reduced below the current limit point. This protects the converter from both overload and short circuit conditions.

An under-voltage lockout circuit prohibits the converter from operating when the line voltage is too low to maintain the output voltage. The converter will not start until the line voltage rises to approximately 16.5 volts and will shut down when the input voltage drops below 15.3 volts. The 1.2V of hysteresis reduces the possibility of line noise interfering with the converter’s start-up and shut down.

An external inhibit port is provided to control converter operation. The nominal threshold relative to the input return (pin 2) is 1.4V. If 2.0 volts or greater are applied to the Inhibit pin (pin 3) then the converter will operate normally. A voltage of 0.8V or less will cause converter to shut-down. The pin may be left open for normal operation and has a nominal open circuit voltage of 4.0V.

Synchronization input and output allow multiple converters to operate at a common switching frequency. Converters can be synchronized to one another or to an externally provided clock. This can be used to eliminate beat frequency noise or to avoid creating noise at certain frequencies for sensitive systems.

Remote sense is provided on the single output models to compensate for voltage drops in the interconnects between the converter and the load. The output voltage of dual output models can be adjusted by a single external resistor.

2.0 Design Methodology

The M3GB-Series was developed using a proven conservative design methodology which includes selecting radiation tolerant and established reliability components and fully de-rating to the requirements of MIL-STD-1547 and MIL-STD-975 (except for the CDR type ceramic capacitors, where capacitors with 50V ratings may be used with voltage stresses of less than 10V). Careful sizing of decoupling capacitors and current limiting resistors minimizes the possibility of photo-current burn-out. Heavy de-rating of the radiation hardened power MOSFET virtually eliminates the possibility of SEGR and SEB. A magnetic feedback circuit is utilized instead of opto-couplers to minimize temperature, radiation and aging sensitivity. PSPICE and RadSPICE were used extensively to predict and optimize circuit performance for both beginning and end-of-life. Thorough design analyses include Radiation Susceptibility (TREE), Worst Case, Stress, Thermal, Failure Modes and Effects (FMEA) and Reliability (MTBF).

3.0 Specifications

Table 1. Absolute Maximum Ratings and Recommended Operating Conditions			
Absolute Maximum Ratings		**Recommended Operating Conditions**	
Input Voltage	-0.5V to +80VDC[1]	**Input Voltage**	+18VDC to +60VDC
Output Power	Internally Limited	**Input Voltage[2]**	+18VDC to +45VDC
Lead Temperature	+300°C for 10 seconds	**Output Power**	0 to Max. Rated
Operating Temperature	-55°C to +135°C	**Operating Temperature[3]**	-55°C to +125°C
Storage Temperature	-55°C to +135°C	**Storage Temperature[2]**	-55°C to +70°C

Table 2. Electrical Performance Characteristics

-55°C ≤ T_{CASE} ≤ +125°C, -40V ≤ V_{IN} ≤ +40V Unless Otherwise Specified

Parameter	Group A Subgroups	Test Conditions	Min	Nom	Max	Unit
Input Voltage			18	28	50	V
Output Voltage		I_{OUT} = 100% Rated Load, Note 4				
M3GB2803R3S	1		3.29	3.31	3.33	
M3GB2805S	1		4.99	5.01	5.03	
M3GB2812S	1		11.95	12.0	12.05	
M3GB2815S	1		14.94	15.0	15.06	
M3GB2805D	1		±4.99	±5.01	±5.03	
M3GB2807D	1		±6.97	±7.0	±7.03	
M3GB2812D	1		±11.95	±12.0	±12.05	V
M3GB2815D	1		±14.94	±15.0	±15.06	
M3GB2803R3S	2,3		3.26		3.34	
M3GB2805S	2,3		4.95		5.05	
M3GB2812S	2,3		11.88		12.12	
M3GB2815S	2,3		14.85		15.15	
M3GB2805D	2,3		±4.95		±5.05	
M3GB2807D	2,3		±6.93		±7.07	
M3GB2812D	2,3		±11.88		±12.12	
M3GB2815D	2,3		±14.85		±15.15	

Table 2. Electrical Performance Characteristics Cont.						
$-55°C < T_{CASE} \leq +85°C$, V_{IN} = 120VDC ±5%, CL = 0 Unless Otherwise Specified						
Parameter	**Group A Subgroups**	**Test Conditions**	**Min**	**Nom**	**Max**	**Unit**
Output Power	1,2,3	V_{IN} = 18, 28, 50V, Note 2				
M3GB2803R3S			0		30	W
All Others			0		40	
Output Current	1,2,3	V_{IN} = 18, 28, 50V, Note 2				
M3GB2803R3S			0		9.10	
M3GB2805S			0		8.00	
M3GB2812S			0		3.34	
M3GB2815S			0		2.67	A
M3GB2805D		Either Output, Note 3	0		6.40	
M3GB2807D		Either Output, Note 3	0		4.57	
M3GB2812D		Either Output, Note 3	0		2.67	
M3GB2815D		Either Output, Note 3	0		2.14	
Line Regulation	1,2,3	V_{IN} = 18, 28, 50V				
Single		I_{OUT} = 0, 50, 100% Rated Load	-10		-10	mV
Dual		Note 4	-20		-20	
Load Regulation	1,2,3	V_{IN} = 18, 28, 50V I_{OUT} = 0, 50, 100% Rated Load Note 4	-0.5		0.5	%
Cross Regulation	1,2,3	Duals Only, Note 5				
M3GB2805D		V_{IN} = 18, 28, 50V	-5.0		5.0	
M3GB2807D			-4.0		4.0	%
M3GB2812D			-2.0		2.0	
M3GB2815D			-2.0		2.0	
Input Current	1,2,3	I_{OUT} = 0, Pin 3 Open		50	80	mA
		Pin 3 Shorted to Pin 2		2.0	5.0	
Switching Frequency	1,2,3	Sync. Input (Pin 4) Open	475	500	525	kHz

Table 2. Electrical Performance Characteristics Cont.						
$-55°C < T_{CASE} \leq +85°C$, V_{IN} = 120VDC ±5%, CL = 0 Unless Otherwise Specified						
Parameter	**Group A Subgroups**	**Test Conditions**	**Min**	**Nom**	**Max**	**Unit**
Output Ripple	1,2,3	I_{OUT} = 100% Rated Load, Notes 4,6				
M3GB2803R3S				15	35	
M3GB2805S				20	50	
M3GB2812S				25	60	
M3GB2815S				25	80	
M3GB2805D				20	50	
M3GB2807D				25	55	mVpp
M3GB2812D				30	60	
M3GB2815D				30	80	
Efficiency	1,2,3	I_{OUT} = 100% Rated Load, Note 4				
M3GB2803R3S			72	75		
M3GB2805S			78	80		
M3GB2812S			77	80		
M3GB2815S			77	81		%
M3GB2805D			78	80		
M3GB2807D			78	80		
M3GB2812D			79	81		
M3GB2815D			79	82		
Enable/Inhibit Input		Note 1				
Open Circuit Voltage			3.0		5.0	V
Drive Current (Sink)					100	µA
Voltage Range			-0.5		50	V
Synchronization Input		Ext. Clock on Sync. Input				
Frequency Range		(Pin 4), Note 1	450		600	kHz
Pulse High Level			4.0		10	V
Pulse Low Level			-0.5		0.5	V
Pulse Transition Time			40			V / µs

Table 2. Electrical Performance Characteristics Cont.						
-55°C < T_{CASE} ≤ +85°C, V_{IN} = 120VDC ±5%, CL = 0 Unless Otherwise Specified						
Parameter	**Group A Subgroups**	**Test Conditions**	**Min**	**Nom**	**Max**	**Unit**
Synchronization Input Pulse Duty Cycle		Ext. Clock on Sync. Input (Pin 4), Note 1	20		80	%
Current Limit Point Expressed as a percentage of full rated load current	1,2,3	V_{OUT} = 90% of Nominal, Note 4	118	125	130	%
Power Dissipation Load Fault	1,2,3	Short Circuit, Overload, Note 8		12	18	W
Output Response to Step Load Changes	4,5,6	Half Load to/from Full Load Notes 4, 9	-300		300	mVpk
Recovery Time Step Load Changes	4,5,6	Half Load to/from Full Load Notes 4, 9, 10		50	200	µs
Output Response to Step Line Changes		22V to/from 34V I_{OUT} = 100% Rated Load Notes, 1,4,11	-200		200	mVpk
Recovery Time Step Line Changes		22V to/from 34V I_{OUT} = 100% Rated Load Notes, 1,4,11		50	200	µs
Under Voltage Threshold	1,2,3					
Release (On) (UVR)			16.3		16.7	V
Lockout (Off) (UVLO)			15.0		15.6	
Turn-On Response	4,5,6	No Load, Full Load, Notes 4,12				
Overshoot					2.0	%
Turn-On Delay			1.0		5.0	ms
Capacitive Load		I_{OUT} = 100% Rated Load,				
M3GB2803R3S		No Effect on DC Performance,			2200	
M3GB2805S		Notes 1,4,7			1000	
M3GB2812S		Each Output on Duals			180	
M3GB2815S					120	µF
M3GB2805D					500	
M3GB2807D					300	

Table 2. Electrical Performance Characteristics Cont.						
-55°C < T_{CASE} ≤ +85°C, V_{IN} = 120VDC ±5%, CL = 0 Unless Otherwise Specified						
Parameter	**Group A Subgroups**	**Test Conditions**	**Min**	**Nom**	**Max**	**Unit**
Capacitive Load		I_{OUT} = 100% Rated Load,				
M3GB2812D		No Effect on DC Performance,			90	µF
M3GB2815D		Notes 1,4,7, Each Output on Duals			60	
Line Rejection		I_{OUT} = 100% Rated Load, DC to 50kHz, Notes 1,4	40	60		dB
Isolation	1	Input to Output or Any Pin to Case Except Pin 6, Test at 500VDC	100			MΩ
Device Weight					100	G
MTBF		MIL-HDBK-217FS, SF, 35°C	7.0×10^6			Hrs.

Notes to Electrical Performance Characteristics:

1. Parameter is guaranteed to the limits specified in table I by design, but not tested. Limits apply to the operating range specified in table I, unless otherwise specified. No Group A subgroups are specified for this test.
2. Parameter verified during line and load regulation tests.
3. Limit represents 80% of total rated output current. To achieve rated output power, the remaining 20% of the total rated output current must be provided by the other output.
4. Load current split equally between outputs on dual output models.
5. Cross regulation is measured with 20% rated load on output under test while changing the load on the other output from 20% to 80% of rated.
6. Guaranteed for a D.C. to 20MHz bandwidth. Tested using a 20kHz to 10MHz bandwidth.
7. Capacitive load may be any value from 0 to the maximum limit without compromising dc performance. A capacitive load in excess of the maximum limit may interfere with the proper operation of the converter's overload protection, causing erratic behavior during turn-on.
8. Overload power dissipation is defined as the device power dissipation with the load set such that

1\. V_{OUT} = 90% of nominal.

9. Load step transition time ≥10 µs.
10. Recovery time is measured from the initiation of the transient to where V_{OUT} has returned to within ± 1% of its steady state value.
11. Line step transition time ≥100 µs.
12. Turn-on delay time from either a step application of input power or a logic low to a logic high transition on the inhibit pin (pin 3) to the point where V_{OUT} = 90% of nominal.
13. Although operation at temperatures between +85°C and +125°C is guaranteed, no parametric limits are specified.

4.0 Block Diagram

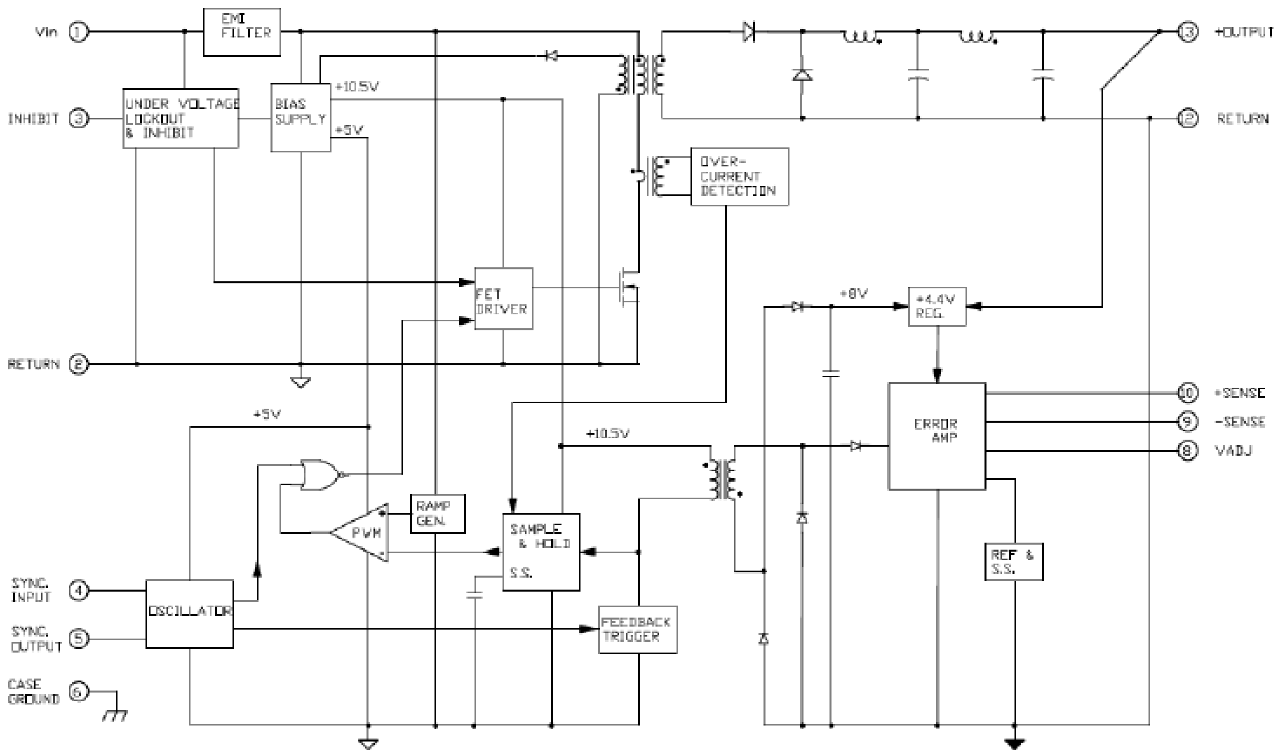


Figure 1. Single Output

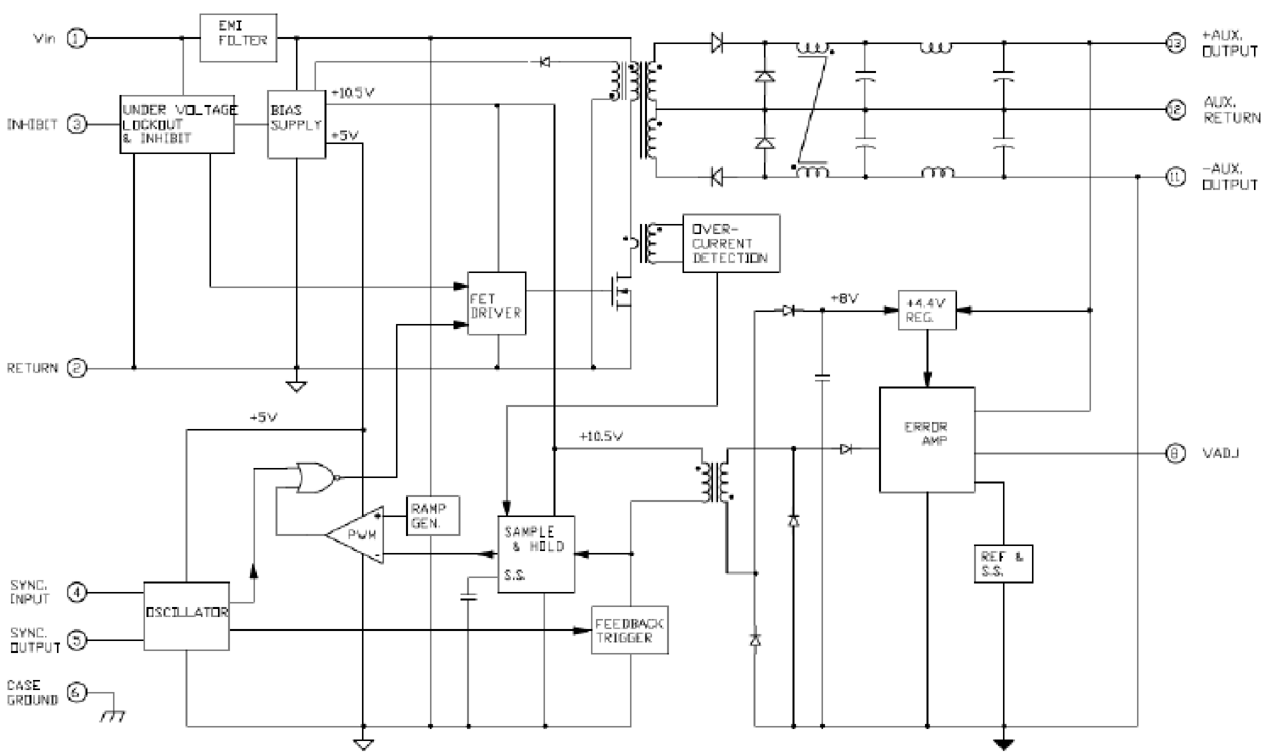


Figure 2. Single Output

5.0 Typical Curves

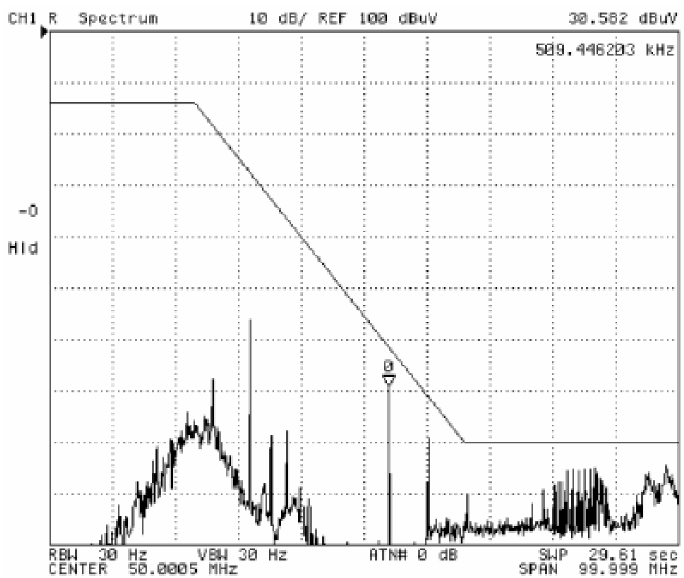


Figure 3. Typical Conducted Emission, Positive Lead

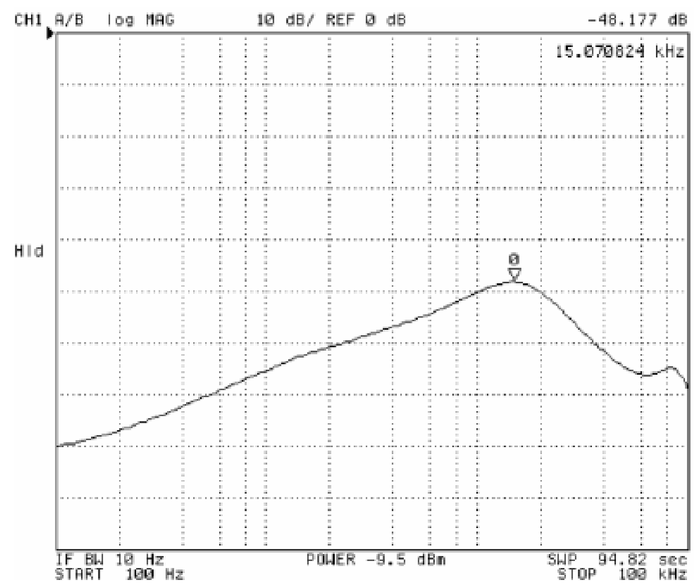


Figure 4. Typical Line Rejection

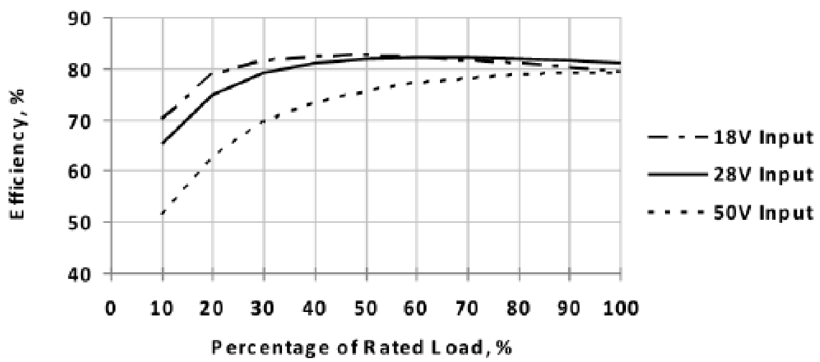


Figure 5. Typical Efficiency at 25°C, M3GB2805S

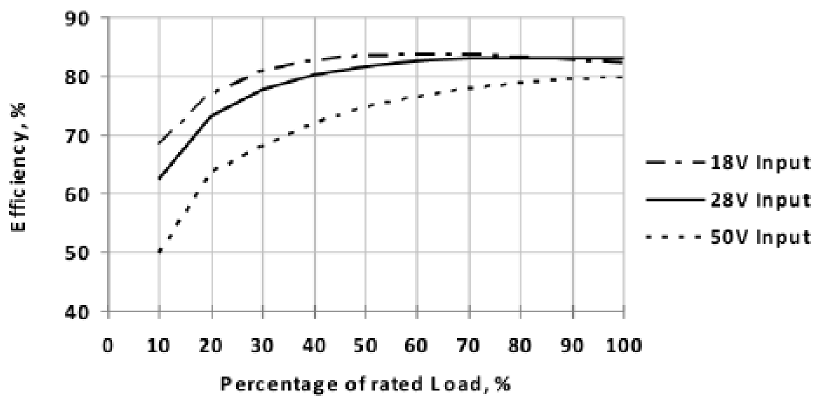


Figure 6. Typical Efficiency at 25°C, M3GB2815D

6.0 Radiation Performance

Table 3. Radiation Performance Characteristics				
Test	**Condition**	**Min**	**Typ**	**Unit**
Total Ionizing Dose (Gamma)	MIL-STD-883, Method 1019 Operating Bias Applied During Exposure, Full Rated Load, V_{IN} = 28V	200	300	kRads (Si)
Dose Rate (Gamma Dot) Temporary Saturation Survival	MIL-STD-883, Method 1023 (or MIL-STD-883 Method 1020) Operating Bias Applied During Exposure Full Rated Load, V_{IN} = 28V	1E8 4E10	1E11	Rads (Si) / sec
Neutron Fluence	MIL-STD-883, Method 1017	8E12	1E13	Neutrons/cm^2
Single Event Effects SEU, SEL, SEGR, SEB	Heavy Ions (LET) Operating Bias Applied During Exposure Full Rated Load, V_{IN} = 18, 28, 50V	82		MeV·cm^2/mg

7.0 Application Notes

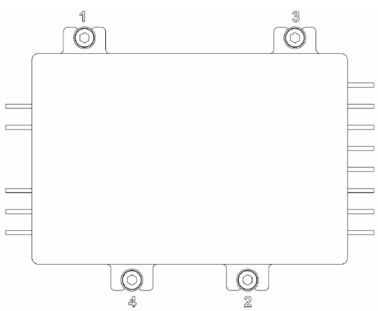
7.1 Attachment of the Converter

The following procedure is recommended for mounting the converter for optimum cooling and to circumvent any potential damage to the converter.

Ensure that flatness of the plate where M3GB converter to be mounted is no greater than 0.003” per linear inch. It is recommended that a thermally conductive gasket is used to promote the thermal transfer and to fill any voids existing between the two surfaces. Micross recommends Sil-Pad 2000 with the thickness of 0.010". The shape of the gasket should match the footprint of the converter including the mounting flanges. The gasket is available. The M3GB-Series converter requires either M3 or 4-40 size screws of attachment purposes.

The procedure for mounting the converter is as follows:

1. Check the mounting surfaces and remove foreign material, burrs if any or anything that may interfere with the attachment of the converter.
2. Place the gasket on the surface reserved for the converter and line it up with the mounting holes.
3. Place the converter on the gasket and line both up with mounting holes.
4. Install screws using appropriate washers and tighten by hand (~ 4 in·oz) in the sequence shown below.



5. Tighten the screws with an appropriate torque driver. Torque the screws up to 6 in·lb in the sequence shown above

7.2 Output Voltage Adjustment

Single Output:

To adjust the output voltage of the single output models, a resistor (R_{ADJ}) is connected between the Adjust pin (Pin 8) and either the positive or negative remote sense pins, depending on whether the output voltage is to be adjusted higher or lower than the nominal set-point. This allows the outputs to be reliably adjusted by approximately +10% to -20% of the nominal output voltage. Refer to Fig. 7 and use equations provided to calculate the required resistance (R_{ADJ}).

Note: The output voltage adjust equation does not work as described for the 3.3V Single model. The adjust range for 3.3V model is limited to 3.252V to 3.460V.

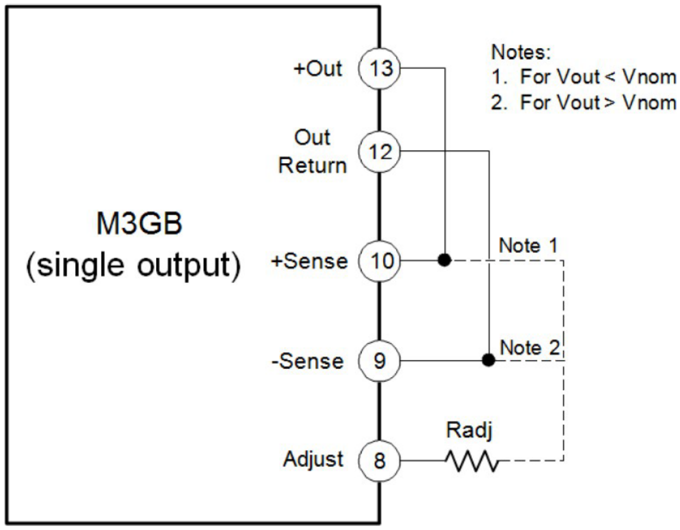


Figure 7. Configuration for Adjusting Single Output Voltage

For All Single Output Models, to adjust the output voltages higher:

$$R_{ADJ} = \frac{10 \times (V_{NOM} - 2.5)}{V_{OUT} - V_{NOM}} - 50$$

Where: R_{ADJ} is in kOhms

R_{ADJ} is connected to the -Out pin and $V_{NOM} < V_{OUT} < 1.1V_{NOM}$ (Fig. 7, Note 2)
V_{NOM} is the nominal output voltage with the Adjust Pin left open
V_{OUT} is the desired output voltage

For All Single Output Models, to adjust the output voltages lower:

$$R_{ADJ} = \frac{4 \times (V_{NOM} - 2.5) \times (V_{OUT} - 2.5)}{V_{NOM} - V_{OUT}} - 50$$

Where: R_{ADJ} is in kOhms

R_{ADJ} is connected to the +Out pin and $0.8V_{NOM} < V_{OUT} < V_{NOM}$ (Fig. 7, Note 1)
V_{NOM} is the nominal output voltage with the Adjust Pin left open
V_{OUT} is the desired output voltage

Dual Output:

The dual output voltage of the dual output models, a resistor (R_{ADJ}) is connected between the Adjust pin (Pin 8) and either output. This allows the outputs to be reliably adjusted by approximately +10% to -20% of the nominal output voltage. Refer to Fig. 8 and use equations provided to calculate the required resistance (R_{ADJ}).

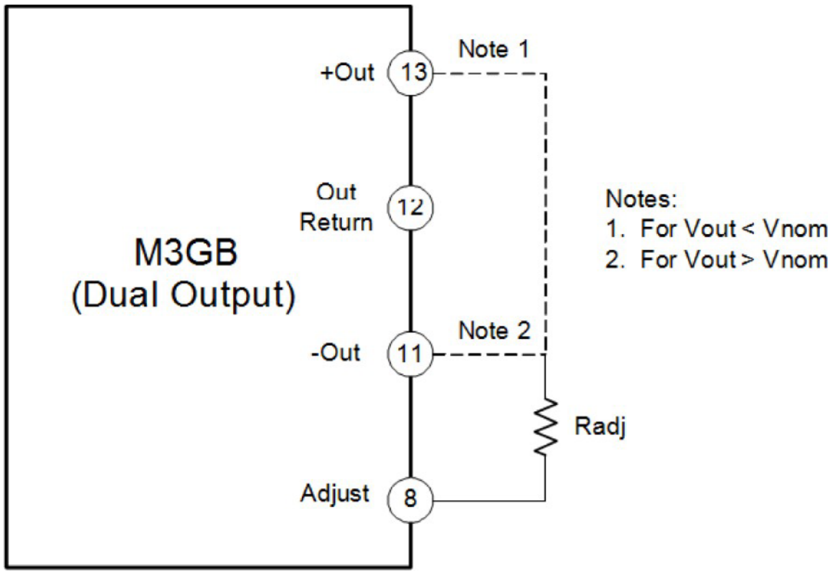


Figure 8. Configuration for Adjusting Dual Output Voltage

For All Dual Output Models, to adjust the output voltages higher:

$$R_{ADJ} = \frac{10 \times (V_{NOM} - 1.25)}{V_{OUT} - V_{NOM}} - 75$$

Where: R_{ADJ} is in kOhms

R_{ADJ} is connected to the -Out pin and $V_{NOM} < V_{OUT} < 1.1V_{NOM}$ (Fig. 8, Note 2)
V_{NOM} is the nominal output voltage with the Adjust Pin left open
V_{OUT} is the desired magnitude of the output voltages

For All Dual Output Models, to adjust the output voltages lower:

$$R_{ADJ} = \frac{8 \times (V_{NOM} - 1.25) \times (V_{OUT} - 1.25)}{V_{NOM} - V_{OUT}} - 75$$

Where: R_{ADJ} is in kOhms

R_{ADJ} is connected to the +Out pin and $0.8V_{NOM} < V_{OUT} < V_{NOM}$ (Fig. 8, Note 1)
V_{NOM} is the nominal output voltage with the Adjust Pin left open
V_{OUT} is the desired magnitude of the output voltages

8.0 Mechanical Outlines

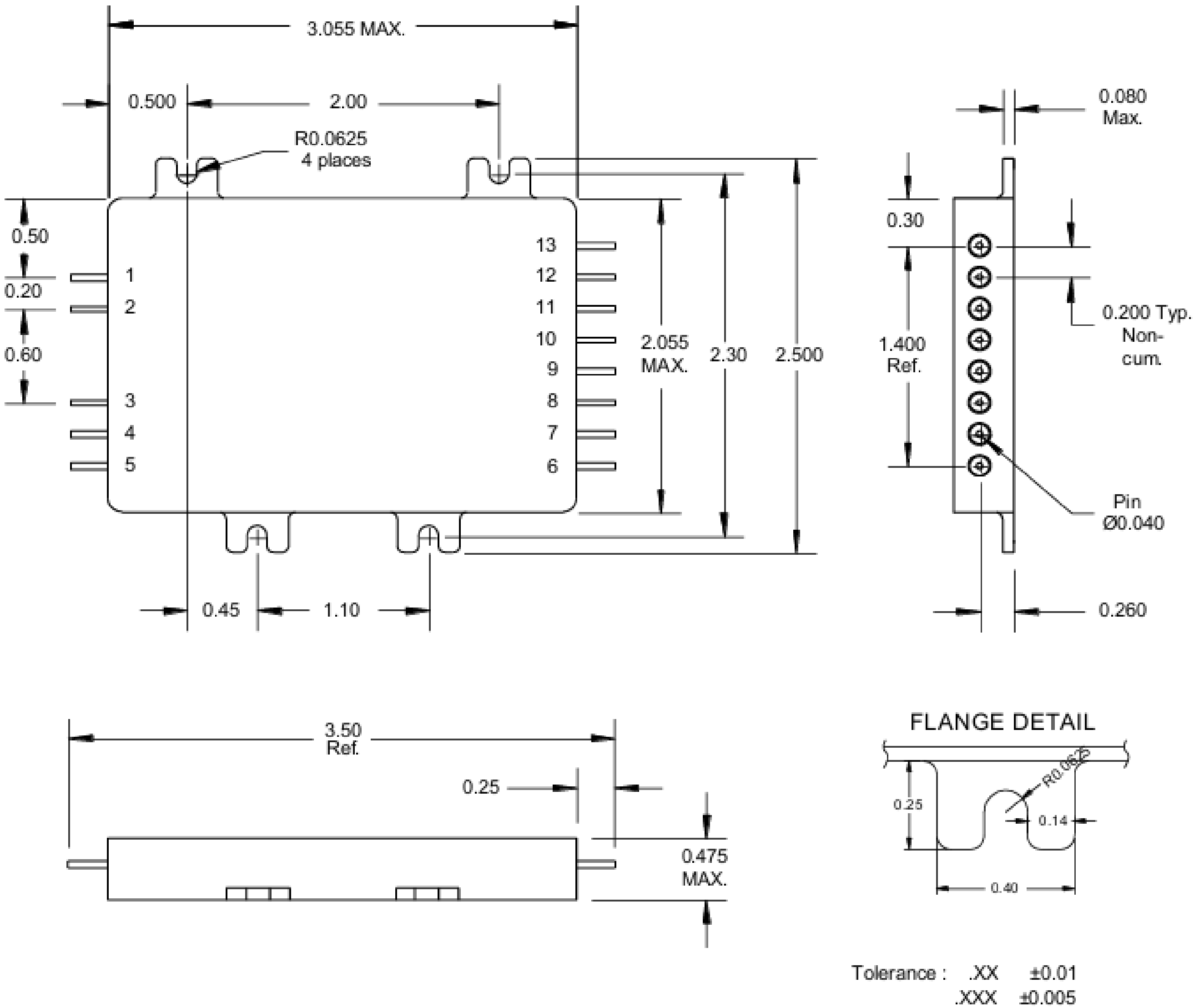


Figure 9. Package Outline

9.0 Pin Designation

Table 4. Pin Designation (Single/Dual)			
Pin #	**Designation**	**Pin #**	**Designation**
1	V_{IN}	8	V_{ADJ}
2	Input Return	9	- Sense / NC
3	Inhibit	10	+ Sense / NC
4	Sync. Input	11	NC / - Output
5	Sync. Output	12	Output Return
6	Case Ground	13	+ Output
7	NC		

10.0 Device Screening

Table 5. Device Screening					
Requirement		**/EM①**	**/CK② and /KP⑥**	**5962-xxxxxxxKyy③**	**5962-RxxxxxxxKyy④**
Compliance Level	MIL-PRF-38534	-	K Level Compliant	Class K SMD	Class K RHA SMD
Certification Mark		-	CK	QML	QML
Screening Requirement	MIL-STD-883 Method	-	-	-	-
Temperature Range	-	Room Temperature	-55°C to +85°C	-55°C to +85°C	-55°C to +85°C
Element Evaluation	MIL-PRF-38534	N/A	Class K	Class K	Class K ⑤
Non-Destructive Bond Pull	2023	N/A	Yes	Yes	Yes
Internal Visual	2017	Defined	Yes	Yes	Yes
Temperature Cycle	1010	N/A	Cond C	Cond C	Cond C
Constant Acceleration	2001, Y1 Axis	N/A	3000Gs	3000Gs	3000Gs
PIND	2020	N/A	Cond A	Cond A	Cond A
Burn-In	1015	N/A	320hrs at 125°C (2 x 160hrs)	320hrs at 125°C (2 x 160hrs)	320hrs at 125°C (2 x 160hrs)

Table 5. Device Screening Cont.					
Requirement		**/EM①**	**/CK② and /KP⑥**	**5962-xxxxxxxKyy③**	**5962-RxxxxxxxKyy④**
Final Electrical (Group A)	MIL-PRF-38534 & Specification	Room Temperature	-55°C, +25°C, +85°C	-55°C, +25°C, +85°C	-55°C, +25°C, +85°C
PDA	MIL-PRF-38534	N/A	2%	2%	2%
Seal, Fine, and Gross	1014	N/A	Cond CH	Cond CH	Cond CH
Radiographic	2012	N/A	Yes	Yes	Yes
External Visual	2009	Defined	Yes	Yes	Yes

Notes:

1. EM" grade shall only be form, fit and function equivalent to its Flight Model (FM) counterpart for electrical evaluation, and it may not meet the radiation performance. The EM Model shall not be expected to comply with MIL-PRF-38534 flight quality/workmanship standards, and configuration control. An EM build may use electrical equivalent commercial grade components.
2. "CK" grade is the flight model (FM) compliant to K Level screening as defined in the DLA Land and Maritime MIL-PRF-38534 requirements, but is not necessarily a DLA Land and Maritime qualified SMD per MIL-PRF-38534. The governing document for this part number designator is the datasheet (this document). Radiation rating as stated in the "Radiation Performance Characteristics" section, is verified by analysis and test per internal procedure. The part is marked with the base part number and the "CK" certification mark.
3. "Class K SMD" grade has a DLA qualified SMD per DLA MIL-PRF-38534 Class K which is the governing document for this part. The part is marked with the base part number, the SMD part number and the "QML" certification mark.
4. "Class K RHA SMD" grade has a DLA qualified SMD per MIL-PRF-38534 Class K with a RHA Level Designator per MIL-PRF-38534 and the governing document of this part is the DLA SMD. The part is marked with the base part number, the SMD part number and the "QML" certification mark.
5. "Class K RHA SMD" Element Evaluation is screened to Class K requirements with additional Radiation Lot Acceptance Testing (RLAT) screening per the DLA MILPRF-38534 approved RHA Test Plan.

11.0 Ordering Information

Table 6. Ordering Information			
Reference Base Model	**Part Number**	**Lead Finish**	**RHA**
M3GB2803R3S/CKA	5962-0321801KXA	Solder Dipped	No
M3GB2803R3S/CKC	5962-0321801KXC	Gold Plated	No
M3GB2803R3S/CKRA	5962R0321801KXA	Solder Dipped	Yes
M3GB2803R3S/CKRC	5962R0321801KXC	Gold Plated	Yes
M3GB2805S/CKA	5962-0321901KXA	Solder Dipped	No
M3GB2805S/CKC	5962-0321901KXC	Gold Plated	No
M3GB2805S/CKRA	5962R0321901KXA	Solder Dipped	Yes
M3GB2805S/CKRC	5962R0321901KXC	Gold Plated	Yes
M3GB2812S/CKA	5962-0322101KXA	Solder Dipped	No
M3GB2812S/CKC	5962-0322101KXC	Gold Plated	No
M3GB2812S/CKRA	5962R0322101KXA	Solder Dipped	Yes
M3GB2812S/CKRC	5962R0322101KXC	Gold Plated	Yes
M3GB2815S/CKA	5962-0322201KXA	Solder Dipped	No
M3GB2815S/CKC	5962-0322201KXC	Gold Plated	No
M3GB2815S/CKRA	5962R0322201KXA	Solder Dipped	Yes
M3GB2815S/CKRC	5962R0322201KXC	Gold Plated	Yes
M3GB2805D/CKA	5962-0322301KXA	Solder Dipped	No
M3GB2805D/CKC	5962-0322301KXC	Gold Plated	No
M3GB2805D/CKRA	5962R0322301KXA	Solder Dipped	Yes
M3GB2805D/CKRC	5962R0322301KXC	Gold Plated	Yes
M3GB2807D/CKA	5962-0322302KXA	Solder Dipped	No
M3GB2807D/CKC	5962-0322302KXC	Gold Plated	No
M3GB2807D/CKRA	5962R0322302KXA	Solder Dipped	Yes
M3GB2807D/CKRC	5962R322302KXC	Gold Plated	Yes
M3GB2812D/CKA	5962-0322401KXA	Solder Dipped	No
M3GB2812D/CKC	5962-0322401KXC	Gold Plated	No
M3GB2812D/CKRA	5962R0322401KXA	Solder Dipped	Yes
M3GB2812D/CKRC	5962R0322401KXC	Gold Plated	Yes
M3GB2815D/CKA	5962-1021602KXA	Solder Dipped	No
M3GB2815D/CKC	5962-1021602KXC	Gold Plated	No
M3GB2815D/CKRA	5962R1021602KXA	Solder Dipped	Yes
M3GB2815D/CKRC	5962R1021602KXC	Gold Plated	Yes

12.0 Part Ordering

M3GB | 28 | 05 | S | /CK | R | A

Series: M3GB

Nominal input voltage

28	28 V

Output voltage

15	15 V
12	12 V
07	7 V
05	5 V
03R3	3.3 V

Output

S	Single
D	Dual

Screening level

EM, CK	See device screening above

Radiation assurance level

Blank	Not applicable
R	100 krad(Si) TID

Lead finish

C	Gold plated (/CK)
A	Solder dipped (/CK)
Blank	Based on availability (EM)