

# MCH/MGH Single and Dual DC/DC Converters

28 VOLT INPUT – 1.5 WATT

## FEATURES

- -55°C to +125°C operation
- 12 to 50 VDC input
- Fully isolated
- Magnetic feedback
- Fixed frequency 370 kHz typ.
- Topology – Current Mode Flyback
- 80 V for up to 120 ms transient protection (70 V for 15 V single and dual models)
- Inhibit function
- Indefinite short circuit protection
- Undervoltage lockout
- Up to 79% efficiency (MGH models)



## MODELS

### VDC OUTPUT

| SINGLES   | DUALS |
|-----------|-------|
| 5         | ±5    |
| 5.2 (MCH) | ±12   |
| 12        | ±15   |
| 15        |       |

## MCH SERIES™ SINGLE & DUAL DC/DC CONVERTERS

With a miniature footprint of just 0.8 square inches, the MCH Series™ of DC/DC converters delivers 1.5 watts of output power while saving significant board real estate. The wide input voltage range of 12 to 50 VDC accepts the varying voltages of military, aerospace, or space bus power and tightly regulates output voltages to protect downstream components. Transient protection of 80 volts for up to 120 milliseconds exceeds the requirements of MIL-STD-704A for the 5, 5.2, and 12 volt single models and the 12 volt dual model. The 15 volt single and dual converters will withstand transients of up to 70 volts for up to 120 milliseconds.

## CONVERTER DESIGN

MCH Series DC/DC converters incorporate a continuous flyback topology with a constant switching frequency of approximately 370 kHz. Current-mode pulse width modulation (PWM) provides output voltage regulation. Output error voltage is magnetically fed back to the input side of the PWM to regulate output voltage. Regulation is also affected by the load; refer to the Electrical Characteristics tables on the following pages.

Dual models regulate the negative output with magnetic coupling to the positive output. Up to 80% of the total load may be on one output providing that the other output carries a minimum of 20% of the total load. The dual models can be used at double the output voltage by connecting the load between positive and negative outputs, leaving the common unconnected. (ex: MCH2805D can be used as a 10 VDC output.)

## INHIBIT FUNCTION

When an open collector TTL logic low is applied to the inhibit terminal, pin 7, the converter shuts down and lowers the output voltage to near zero and input current to as low as 2.3 mA. Leaving the terminal open or applying an open collector TTL logic high will enable the converter.

## PROTECTION FEATURES

Undervoltage lockout prevents the MCH Series converters from operating below approximately 8 VDC input voltage to keep system current levels smooth, especially during initialization or re-start operations. All models include a soft-start function to prevent large current draw and minimize overshoot. The converters also provide short circuit protection by restricting the current.

## MIL-STD-461

Use Interpoint's FMSA-461 EMI filter to pass the CE03 requirements of MIL-STD-461C.

## CONVENIENT PACKAGING

The MCH Series converters are packaged in hermetically sealed, projection-welded metal cases which provide EMI/RFI shielding.

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

### MGH SERIES™ SINGLE & DUAL DC/DC CONVERTERS

The MGH Series™ of DC/DC converters delivers 1.5 watts of output power in a labor saving surface mount package. The wide input voltage range of 12 to 50 VDC accepts the varying voltages of military, aerospace, or space applications. Single output converters feature outputs of 5, 12, or 15 volts while dual output models feature outputs of  $\pm 5$ ,  $\pm 12$ , or  $\pm 15$  volts. Transient protection of 80 volts for up to 120 milliseconds exceeds the requirements of MIL-STD-704A for the 5 and 12 volt single and dual models. The 15 volt single and dual converters will withstand transients of up to 70 volts for up to 120 milliseconds.

### CONVERTER DESIGN

MGH Series DC/DC converters incorporate a continuous flyback topology with a constant switching frequency of approximately 370 kHz. Output voltage regulation is accomplished on the primary side using current-mode pulse width modulation (PWM). Regulation is affected by the output load; refer to the specifications tables for more information.

For dual output models, up to 80% of the total load may be on one output providing the other output carries a minimum of 20% of the total load. The dual models can be used at double the output voltage by connecting the load between positive and negative outputs, leaving the common unconnected. As an example the MGH2805D (5 volt dual output) can be used as a 10 VDC output.

### INHIBIT FUNCTION

When an open collector TTL logic low is applied to the inhibit terminal, pin 18, the converter shuts down and lowers the output voltage to near zero and input current to as low 2.3 mA. Leaving the terminal open or applying an open collector TTL logic high will enable the converter.

### PROTECTION FEATURES

Undervoltage lockout prevents the MGH Series converters from operating below approximately 8 VDC input voltage to keep system current levels smooth, especially during initialization or re-start operations. All models include a soft-start function to prevent large current draw and minimize overshoot. The MGH Series of converters also provide short circuit protection by limiting the current to approximately 125% of full load.

### MIL-STD-461

Use Interpoint's FMGA-461 EMI filter to pass the CE03 requirements of MIL-STD-461C.

### SURFACE MOUNT PACKAGE

MGH DC/DC converters can be surface mounted with pick-and-place equipment or manually. It is recommended that the case be attached with flexible epoxy adhesive or silicone which is thermally conductive ( $>1$  watt /meter/ $^{\circ}$ K).

Internal components are soldered with SN96 (melting temperature  $221^{\circ}\text{C}$ ) to prevent damage during reflow. Maximum reflow temperature for surface mounting the MGH converter is  $220^{\circ}\text{C}$  for a maximum of 30 seconds. SN60, 62, or 63 are the recommended types of solder. Hand soldering should not exceed  $300^{\circ}\text{C}$  for 10 seconds per pin.

The hermetically sealed metal cases are available in two different lead configurations. See case B for dimensions and options.

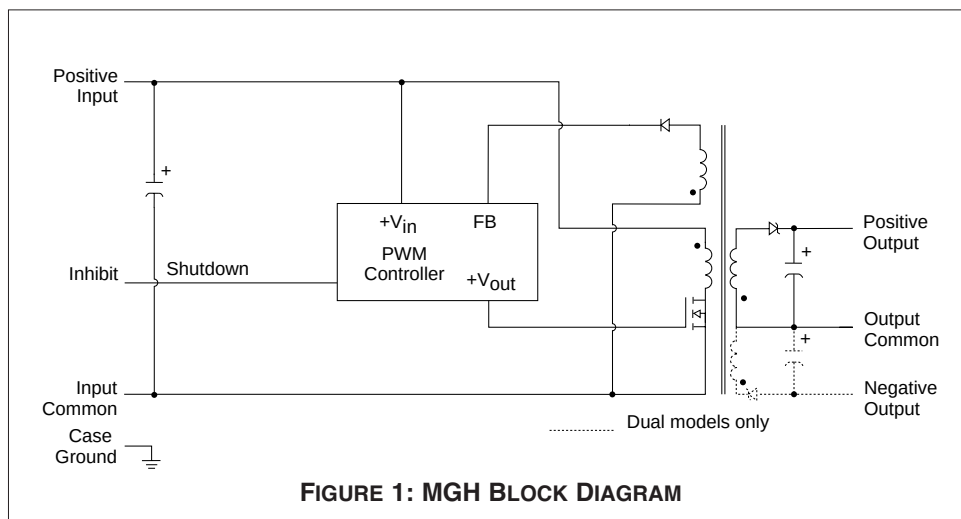


FIGURE 1: MGH BLOCK DIAGRAM

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

### OPERATING CONDITIONS AND CHARACTERISTICS

#### Input Voltage Range

- 12 to 50 VDC continuous
- 80 V for 120 msec transient
- (70 V for 15 V single and dual models)

#### Output Power

- 1.5 W

#### Capacitive Load

- 200  $\mu$ F single output models
- 100  $\mu$ F each output, dual output models

#### Lead Soldering Temperature

- Reflow 220°C 30 sec. max
- SN60, 62 or 63 recommended solder
- Hand solder 300°C 10 sec. max per lead

#### Storage Temperature Range (Case)

- -65°C to +150°C

#### Case Operating Temperature (Tc)

- -55°C to +125°C full power
- -55°C to +135°C absolute

#### Derating Output Power/Current (Tc)

- Linearly from 100% at 125°C to 0% at 135°C

#### Output Voltage Temperature Coefficient

- 100 ppm/°C typical

#### Input to Output Capacitance

- 100 to 170 pF typical

#### Current Limit

- 125% of full load typical

#### Isolation

- 100 megohm minimum at 500 V

#### Audio Rejection

- 40 dB typical

#### Conversion Frequency (kHz)

- 25°C
- 300 min, 370 typ, 450 max
- -55°C to +125°C
- 270 min, 370 typ, 470 max

#### Inhibit Pin Voltage (unit enabled)

- 7 to 12 V

#### Undervoltage Lockout

- 8 V input typical

### INHIBIT

#### Inhibit – TTL Open Collector

- Logic low (output disabled)
- Logic low voltage  $\leq 0.8$  V
- Inhibit pin current 1 mA max
- Referenced to input common
- Logic high (output enabled) open collector

### MECHANICAL AND ENVIRONMENTAL

#### Size (maximum)

MCH models 0.980 x 0.805 x 0.270 inches (24.89 x 20.45 x 6.86 mm)  
See case A2 for dimensions.

MGH models 1.010 x 0.880 x 0.250 inches (25.65 x 22.35 x 6.35 mm)

Shown on page one with "gull wing" lead option, also available with straight leads. See case B for dimensions and options.

#### Weight (maximum)

12 grams typical

#### Screening

Standard, ES, or 883 (Class H, QML). See "883, Class H, QML Products – Element Evaluation" and "883, Class H, QML Products – Environmental Screening" for more information.

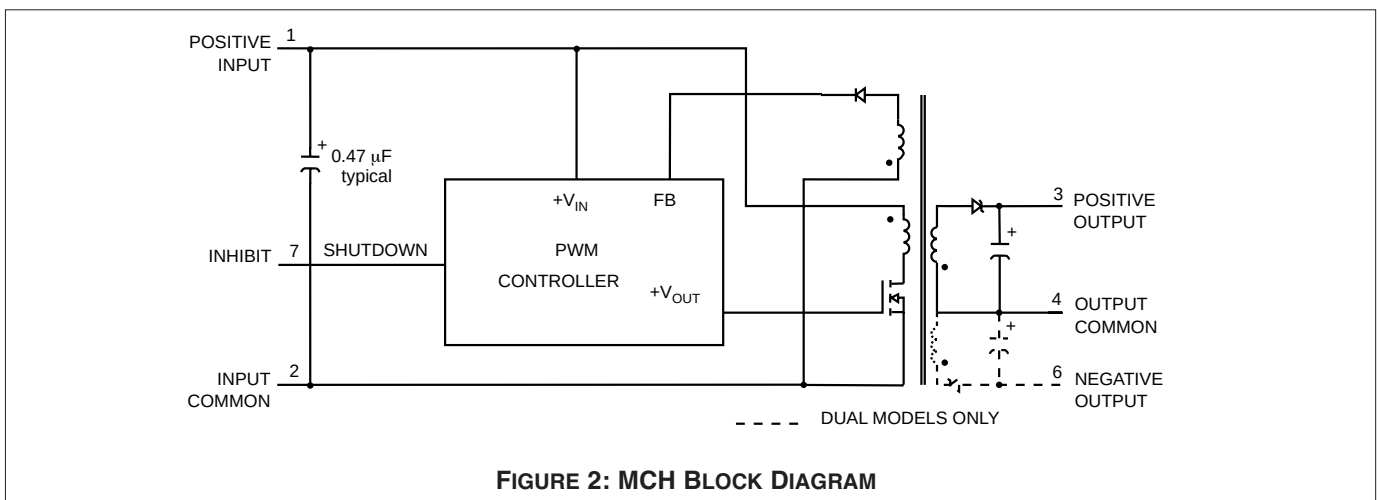


FIGURE 2: MCH BLOCK DIAGRAM

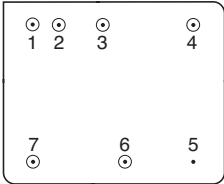
# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

### PIN OUT MCH MODELS

| Pin | Single Output   | Dual Output     |
|-----|-----------------|-----------------|
| 1   | Positive Input  | Positive Input  |
| 2   | Input Common    | Input Common    |
| 3   | Positive Output | Positive Output |
| 4   | Output Common   | Output Common   |
| 5   | Case Ground     | Case Ground     |
| 6   | No connection   | Negative Output |
| 7   | Inhibit         | Inhibit         |

Squared corner and dot on top of cover indicate pin one.



See case A2 for dimensions.

**FIGURE 3: MCH PIN OUT**

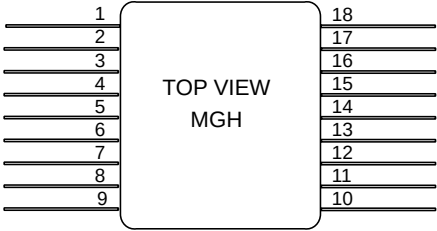
### PINS NOT IN USE

|                                                    |                        |
|----------------------------------------------------|------------------------|
| Inhibit (INH1, INH2)                               | Leave unconnected      |
| Pin 2, 12, 15, 16, 17<br>(pins with no connection) | Ground to input common |

### PIN OUT MGH MODELS

| Pin        | Single Output   | Dual Output     |
|------------|-----------------|-----------------|
| 1          | Positive Input  | Positive Input  |
| 2          | No connection   | No connection   |
| 3          | Input Common    | Input Common    |
| 4, 5       | Positive Output | Positive Output |
| 6, 7       | Case Ground     | Case Ground     |
| 8, 9       | Output Common   | Output Common   |
| 10, 11     | Case Ground     | Case Ground     |
| 12         | No connection   | No connection   |
| 13, 14     | No connection   | Negative Output |
| 15, 16, 17 | No connection   | No connection   |
| 18         | Inhibit         | Inhibit         |

To meet specified performance, all pins must be connected except "No Connection" pins.



Differently colored glass bead around pin one or dimple in header (bottom or side of case) indicates pin one. Cover marking is oriented with pin one at the upper right corner.

See case B for dimensions and "gull-wing" option.

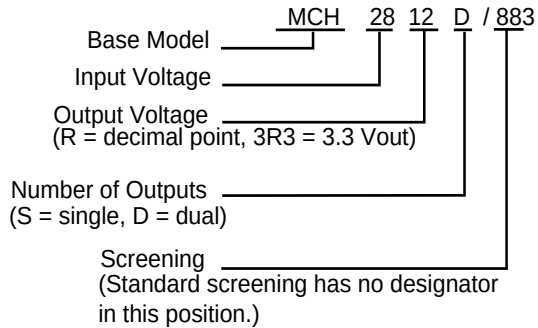
**FIGURE 4: MGH PIN OUT**

# MCH/MGH Single and Dual DC/DC Converters

**28 VOLT INPUT – 1.5 WATT**

**MCH Model Selection Table (see next page for MGH options)**

## MODEL NUMBERING KEY



## SMD NUMBERS

### STANDARD MICROCIRCUIT DRAWING (SMD)

### MCH SERIES SIMILAR PART

|                 |              |
|-----------------|--------------|
| 5962-9569601HXC | MCH2805S/883 |
| 5962-9569701HXC | MCH2812S/883 |
| 5962-9569801HXC | MCH2815S/883 |
| 5962-9570201HXC | MCH2805D/883 |
| 5962-9570301HXC | MCH2812D/883 |
| 5962-9570401HXC | MCH2815D/883 |

For exact specifications for an SMD product, refer to the SMD drawing. SMDs can be downloaded from:  
<http://www.dscc.dla.mil/programs/smcr>

## Model Selection

**MCH28**

*Base model*

*Vout value*

*number of outputs*

*case option*

*screening*

Choose one from each of the following rows

**Vout value**

for singles: 5, 5R2, 12, 15

duals: 5, 12, 15

"R" = decimal point, 3R3 = 3.3 VDC

**Number of outputs**

S (single) or D (dual)

**Case option**

standard (case A2, leave blank)

**Screening**

standard screening, leave blank

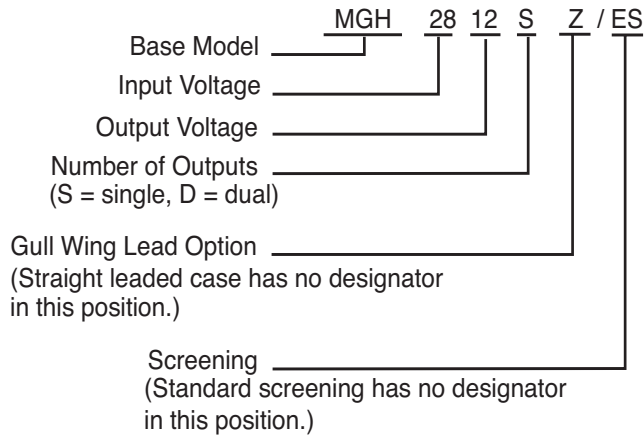
/ES (ES screening), /883 (Class H, QML)

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

MGH Model Selection Table (see previous page for MCH options)

### MODEL NUMBERING KEY



### SMD NUMBERS

| STANDARD MICROCIRCUIT<br>DRAWING (SMD) | MCH/MGH SERIES<br>SIMILAR PART |
|----------------------------------------|--------------------------------|
| 5962-9569601HYC                        | MGH2805S/883                   |
| 5962-9569701HYC                        | MGH2812S/883                   |
| 5962-9569801HYC                        | MGH2815S/883                   |
| 5962-9570201HYC                        | MGH2805D/883                   |
| 5962-9570301HYC                        | MGH2812D/883                   |
| 5962-9570401HYC                        | MGH2815D/883                   |

For exact specifications for an SMD product, refer to the SMD drawing. For the gull wing lead option, replace the Y in the SMD number (HYC) with a Z (HZC). SMDs can be downloaded from <http://www.dscccols.com/programs/smcr>

## Model Selection

MGH28  
Base model               Vout value               number of outputs               screening

Choose one from each of the following rows

|                          |                                    |                                         |
|--------------------------|------------------------------------|-----------------------------------------|
| <b>Vout value</b>        | singles: 5, 12, 15                 | duals: 5, 12, 15                        |
|                          | "R" = decimal point, 3R3 = 3.3 VDC |                                         |
| <b>Number of outputs</b> | S (single) or D (dual)             |                                         |
| <b>Screening</b>         | standard screening, leave blank    | /ES (ES screening), /883 (Class H, QML) |

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

**Electrical Characteristics: 25°C Tc, 28 VDC Vin, 100% load, unless otherwise specified.**

| MCH SINGLE OUTPUT MODELS          |                                                       | MCH2805S |      |      | MCH2812S |     |       | MCH2815S |      |       | UNITS  |
|-----------------------------------|-------------------------------------------------------|----------|------|------|----------|-----|-------|----------|------|-------|--------|
| PARAMETER                         | CONDITIONS                                            | MIN      | TYP  | MAX  | MIN      | TYP | MAX   | MIN      | TYP  | MAX   |        |
| OUTPUT VOLTAGE <sup>2</sup>       | Tc = 25°C                                             | 4.95     | 5    | 5.05 | 11.88    | 12  | 12.12 | 14.85    | 15   | 15.15 | VDC    |
|                                   | Tc = -55°C TO +125°C                                  | 4.80     | 5    | 5.20 | 11.52    | 12  | 12.48 | 14.40    | 15   | 15.60 |        |
| OUTPUT CURRENT                    | V <sub>IN</sub> = 12 TO 50 VDC                        | —        | —    | 300  | —        | —   | 125   | —        | —    | 100   | mA     |
| OUTPUT POWER                      | V <sub>IN</sub> = 12 TO 50 VDC                        | 0        | —    | 1.5  | 0        | —   | 1.5   | 0        | —    | 1.5   | W      |
| OUTPUT RIPPLE VOLTAGE             | 10 kHz - 2 MHz                                        | —        | 45   | 150  | —        | 50  | 200   | —        | 35   | 150   | mV p-p |
|                                   | Tc = -55°C TO +125°C                                  | —        | 65   | 300  | —        | 70  | 300   | —        | 50   | 250   |        |
| LINE REGULATION                   | V <sub>IN</sub> = 12 TO 50 VDC                        | —        | 35   | 120  | —        | 60  | 250   | —        | 70   | 350   | mV     |
|                                   | Tc = -55°C TO +125°C                                  | —        | 40   | 120  | —        | 70  | 250   | —        | 80   | 350   |        |
| LOAD REGULATION                   | 10% TO FULL LOAD                                      | —        | 350  | 800  | —        | 600 | 1400  | —        | 700  | 1600  | mV     |
|                                   | Tc = -55°C TO +125°C                                  | —        | 380  | 800  | —        | 640 | 1400  | —        | 760  | 1600  |        |
|                                   | 50% TO FULL <sup>1</sup>                              | —        | 100  | 200  | —        | 145 | 300   | —        | 165  | 350   |        |
|                                   | Tc = -55°C TO +125°C                                  | —        | 115  | 300  | —        | 160 | 400   | —        | 185  | 450   |        |
| INPUT VOLTAGE                     | CONTINUOUS                                            | 12       | 28   | 50   | 12       | 28  | 50    | 12       | 28   | 50    | VDC    |
| NO LOAD TO FULL                   | TRANSIENT <sup>1</sup> 120 ms                         | 0        | —    | 80   | 0        | —   | 80    | 0        | —    | 70    | V      |
| INPUT CURRENT                     | NO LOAD                                               | —        | 5.5  | 11   | —        | 6.0 | 12    | —        | 6.0  | 12    | mA     |
|                                   | Tc = -55°C TO +125°C                                  | —        | 6.0  | 11   | —        | 6.5 | 12    | —        | 6.5  | 12    |        |
|                                   | INHIBITED                                             | —        | 2.3  | 3.5  | —        | 2.3 | 3.5   | —        | 2.3  | 3.5   |        |
|                                   | Tc = -55°C TO +125°C                                  | —        | 2.4  | 3.5  | —        | 2.4 | 3.5   | —        | 2.4  | 3.5   |        |
| INPUT RIPPLE CURRENT <sup>3</sup> | 10k Hz - 10 MHz                                       | —        | 100  | 200  | —        | 100 | 200   | —        | 100  | 200   | mA p-p |
|                                   | Tc = -55°C TO +125°C                                  | —        | 130  | 250  | —        | 150 | 250   | —        | 150  | 250   |        |
| EFFICIENCY                        | Tc = 25°C                                             | 72       | 77   | —    | 74       | 79  | —     | 74       | 79   | —     | %      |
|                                   | Tc = -55°C TO +125°C                                  | 69       | 75   | —    | 72       | 77  | —     | 72       | 77   | —     |        |
| LOAD FAULT <sup>4,5</sup>         | POWER DISSIPATION                                     | —        | 1.3  | 2.0  | —        | 2.0 | 3.2   | —        | 2.3  | 3.7   | W      |
|                                   | Tc = -55°C TO +125°C                                  | —        | 1.4  | 2.3  | —        | 2.2 | 3.5   | —        | 2.5  | 4.0   |        |
|                                   | RECOVERY <sup>1</sup>                                 | —        | 3.0  | 15   | —        | 3.5 | 20    | —        | 4.0  | 20    | ms     |
|                                   | Tc = -55°C TO +125°C                                  | —        | 3.5  | 15   | —        | 3.5 | 20    | —        | 4.0  | 20    |        |
| STEP LOAD RESPONSE <sup>6</sup>   | 50 %-100%- 50% LOAD TRANSIENT                         | -500     | 185  | 500  | -700     | 350 | 700   | -700     | 350  | 700   | mV pk  |
|                                   | Tc = -55°C TO +125°C                                  | -500     | 185  | 500  | -800     | 380 | 800   | -800     | 380  | 800   |        |
|                                   | RECOVERY                                              | —        | 125  | 500  | —        | 130 | 500   | —        | 140  | 600   | μs     |
|                                   | Tc = -55°C TO +125°C                                  | —        | 125  | 600  | —        | 130 | 600   | —        | 180  | 750   |        |
| STEP LINE RESPONSE <sup>6</sup>   | 12 TO 50 TO 12 V <sub>IN</sub> TRANSIENT <sup>1</sup> | -500     | 170  | 500  | -1000    | 400 | 1000  | -850     | 400  | 850   | mV pk  |
|                                   | Tc = -55°C TO +125°C                                  | -500     | 180  | 500  | -1000    | 400 | 1000  | -850     | 450  | 850   |        |
|                                   | RECOVERY <sup>1</sup>                                 | —        | 0.75 | 4.0  | —        | 0.6 | 3.0   | —        | 0.47 | 2.5   | ms     |
|                                   | Tc = -55°C TO +125°C                                  | —        | 0.75 | 4.0  | —        | 0.6 | 3.0   | —        | 0.5  | 2.5   |        |
| START-UP                          | DELAY                                                 | —        | 7    | 40   | —        | 7   | 40    | —        | 7    | 40    | ms     |
|                                   | Tc = -55°C TO +125°C                                  | —        | 10   | 40   | —        | 10  | 40    | —        | 10   | 40    |        |
|                                   | OVERSHOOT <sup>1</sup>                                | —        | 0    | 150  | —        | 0   | 350   | —        | 0    | 450   | mV pk  |
|                                   | Tc = -55°C TO +125°C                                  | —        | 0    | 150  | —        | 0   | 350   | —        | 0    | 450   |        |
| CAPACITIVE LOAD <sup>1</sup>      |                                                       |          |      |      |          |     |       |          |      |       |        |

Notes:

1. **Guaranteed by design, not tested.**

2. Specified at 50% total P<sub>out</sub>.

3. Lin = 2 μH.

4. Maximum duration of short circuit: 25°C— 90 seconds, 125°C – 30 seconds.

5. Load fault is a short circuit (<50 mohms). Recovery is into resistive full load.

6. Transition ≥ 10 μs. Recovery = time to settle to within 1% of Vout final value.

7. Max. spec indicates 80% of the converter's total power, available from either output.

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

Electrical Characteristics: 25°C T<sub>c</sub>, 28 VDC V<sub>in</sub>, 100% load, unless otherwise specified.

| MGH SINGLE OUTPUT MODELS                                          |                                   | MGH2805S |      |      | MGH2812S |     |       | MGH2815S |      |       | UNITS  |
|-------------------------------------------------------------------|-----------------------------------|----------|------|------|----------|-----|-------|----------|------|-------|--------|
| PARAMETER                                                         | CONDITIONS                        | MIN      | TYP  | MAX  | MIN      | TYP | MAX   | MIN      | TYP  | MAX   |        |
| OUTPUT VOLTAGE <sup>1</sup>                                       | T <sub>c</sub> = 25°C             | 4.95     | 5    | 5.05 | 11.88    | 12  | 12.12 | 14.85    | 15   | 15.15 | VDC    |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | 4.80     | 5    | 5.20 | 11.52    | 12  | 12.48 | 14.40    | 15   | 15.60 |        |
| OUTPUT CURRENT                                                    | V <sub>IN</sub> = 12 to 50 VDC    | 0        | —    | 300  | 0        | —   | 125   | 0        | —    | 100   | mA     |
| OUTPUT POWER                                                      | V <sub>IN</sub> = 12 to 50 VDC    | 0        | —    | 1.5  | 0        | —   | 1.5   | 0        | —    | 1.5   | W      |
| OUTPUT RIPPLE VOLTAGE                                             | 10 kHz - 2 MHz                    | —        | 45   | 150  | —        | 50  | 200   | —        | 35   | 150   | mV p-p |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 65   | 300  | —        | 70  | 300   | —        | 50   | 250   |        |
| LINE REGULATION                                                   | V <sub>IN</sub> = 12 to 50 VDC    | —        | 35   | 100  | —        | 60  | 200   | —        | 70   | 300   | mV     |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 40   | 120  | —        | 70  | 250   | —        | 80   | 350   |        |
| LOAD REGULATION                                                   | 10% TO FULL LOAD                  | —        | 350  | 700  | —        | 600 | 1300  | —        | 700  | 1500  | mV     |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 380  | 800  | —        | 640 | 1400  | —        | 760  | 1600  |        |
|                                                                   | 50% TO FULL LOAD                  | —        | 100  | 200  | —        | 145 | 300   | —        | 165  | 350   |        |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 115  | 300  | —        | 160 | 400   | —        | 185  | 450   |        |
| INPUT VOLTAGE<br>NO LOAD TO FULL                                  | CONTINUOUS                        | 12       | 28   | 50   | 12       | 28  | 50    | 12       | 28   | 50    | VDC    |
|                                                                   | TRANSIENT 120 ms                  | 0        | —    | 80   | 0        | —   | 80    | 0        | —    | 70    | V      |
| INPUT CURRENT                                                     | NO LOAD                           | —        | 5.5  | 10   | —        | 6.0 | 10    | —        | 6.0  | 11    | mA     |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 6.0  | 11   | —        | 6.5 | 12    | —        | 6.5  | 12    |        |
|                                                                   | FULL LOAD                         | —        | 70   | 74   | —        | 68  | 72    | —        | 68   | 72    |        |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 73   | 78   | —        | 70  | 74    | —        | 70   | 74    |        |
|                                                                   | INHIBITED                         | —        | 2.3  | 3.2  | —        | 2.3 | 3.2   | —        | 2.3  | 3.2   |        |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 2.4  | 3.5  | —        | 2.4 | 3.5   | —        | 2.4  | 3.5   |        |
| INPUT RIPPLE CURRENT <sup>2</sup>                                 | 10k Hz - 10 MHz                   | —        | 100  | 200  | —        | 100 | 200   | —        | 100  | 200   | mA p-p |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 130  | 250  | —        | 150 | 250   | —        | 150  | 250   |        |
| EFFICIENCY                                                        | T <sub>c</sub> = 25°C             | 72       | 77   | —    | 74       | 79  | —     | 74       | 79   | —     | %      |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | 69       | 75   | —    | 72       | 77  | —     | 72       | 77   | —     |        |
| LOAD FAULT <sup>3, 4</sup>                                        | POWER DISSIPATION                 | —        | 1.3  | 2.0  | —        | 2.0 | 3.2   | —        | 2.3  | 3.7   | W      |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 1.4  | 2.3  | —        | 2.2 | 3.5   | —        | 2.5  | 4.0   |        |
|                                                                   | RECOVERY                          | —        | 3.0  | 12   | —        | 3.5 | 15    | —        | 4.0  | 18    | ms     |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 3.5  | 15   | —        | 3.5 | 20    | —        | 4.0  | 20    |        |
| STEP LOAD RESPONSE <sup>5</sup><br>50 %–100%– 50%                 | TRANSIENT                         | –400     | 185  | 400  | –700     | 350 | 700   | –700     | 350  | 700   | mV pk  |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | –500     | 185  | 500  | –800     | 380 | 800   | –800     | 380  | 800   |        |
|                                                                   | RECOVERY                          | —        | 125  | 500  | —        | 130 | 500   | —        | 140  | 600   | μs     |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 125  | 600  | —        | 130 | 600   | —        | 180  | 750   |        |
| STEP LINE RESPONSE <sup>5</sup><br>12 TO 50 TO 12 V <sub>IN</sub> | TRANSIENT                         | –400     | 170  | 400  | –900     | 400 | 900   | –750     | 400  | 750   | mV pk  |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | –500     | 180  | 500  | –1000    | 400 | 1000  | –850     | 450  | 850   |        |
|                                                                   | RECOVERY                          | —        | 0.75 | 3.0  | —        | 0.6 | 2.5   | —        | 0.47 | 2.0   | ms     |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 0.75 | 4.0  | —        | 0.6 | 3.0   | —        | 0.5  | 2.5   |        |
| START-UP<br>0 TO 28 VDC                                           | DELAY                             | —        | 7    | 20   | —        | 7   | 20    | —        | 7    | 20    | ms     |
|                                                                   | T <sub>c</sub> = -55°C TO +125°C  | —        | 10   | 40   | —        | 10  | 40    | —        | 10   | 40    |        |
|                                                                   | OVERSHOOT                         | —        | 0    | 100  | —        | 0   | 250   | —        | 0    | 300   | mV pk  |
|                                                                   | T <sub>c</sub> = -55°C TO +1 25°C | —        | 0    | 150  | —        | 0   | 350   | —        | 0    | 450   |        |

### Notes

- Specified at 50% of full load.
- Lin = 2 μH
- Max. duration of short circuit: 25°C– 90 seconds; 125°C – 30 seconds.

- Load fault is a short circuit (<50 mohms). Recovery into resistive full load.
- Input step transition ≥ 10 μs. Recovery is time to settle to within 1% of V<sub>out</sub> final value.



# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

Electrical Characteristics: 25°C Tc, 28 VDC Vin, 100% load, unless otherwise specified.

| MCH DUAL OUTPUT MODELS                                          |                                  | MCH2805D |      |       | MCH2812D |       |        | MCH2815D |     |        | UNITS  |
|-----------------------------------------------------------------|----------------------------------|----------|------|-------|----------|-------|--------|----------|-----|--------|--------|
| PARAMETER                                                       | CONDITIONS                       | MIN      | TYP  | MAX   | MIN      | TYP   | MAX    | MIN      | TYP | MAX    |        |
| OUTPUT VOLTAGE <sup>2</sup>                                     | T <sub>c</sub> = 25°C            | ±4.95    | ±5   | ±5.05 | ±11.88   | ±12   | ±12.12 | ±14.85   | ±15 | ±15.15 | VDC    |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | ±4.80    | ±5   | ±5.20 | ±11.52   | ±12   | ±12.48 | ±14.40   | ±15 | ±15.60 |        |
| OUTPUT CURRENT <sup>7</sup>                                     | V <sub>IN</sub> = 12 TO 50 VDC   | 0        | ±150 | 240   | 0        | ±62.5 | 100    | 0        | ±50 | 80     | mA     |
| OUTPUT POWER                                                    | V <sub>IN</sub> = 12 TO 50 VDC   | 0        | —    | 1.5   | 0        | —     | 1.5    | 0        | —   | 1.5    | W      |
| OUTPUT RIPPLE<br>VOLTAGE +V <sub>OUT</sub><br>-V <sub>OUT</sub> | 10 kHz - 2 MHz                   | —        | 35   | 150   | —        | 35    | 150    | —        | 30  | 150    | mV p-p |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 50   | 250   | —        | 40    | 250    | —        | 35  | 250    |        |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 50   | 250   | —        | 40    | 250    | —        | 35  | 250    |        |
| LINE REGULATION <sup>8</sup>                                    | V <sub>IN</sub> = 12 TO 50 VDC   | —        | 10   | 50    | —        | 100   | 300    | —        | 165 | 500    | mV     |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 20   | 100   | —        | 110   | 400    | —        | 180 | 650    |        |
| LOAD REGULATION <sup>9</sup><br>±V <sub>OUT</sub>               | 10% TO FULL                      | —        | 300  | 600   | —        | 550   | 1100   | —        | 600 | 1300   | mV     |
|                                                                 | -55°C TO +125°C                  | —        | 350  | 700   | —        | 570   | 1200   | —        | 630 | 1400   |        |
|                                                                 | 50% TO FULL <sup>1</sup>         | —        | 80   | 200   | —        | 115   | 250    | —        | 125 | 300    |        |
|                                                                 | -55°C TO +125°C                  | —        | 100  | 300   | —        | 130   | 350    | —        | 135 | 400    |        |
| INPUT VOLTAGE<br>NO LOAD TO FULL<br>INPUT CURRENT               | CONTINUOUS                       | 12       | 28   | 50    | 12       | 28    | 50     | 12       | 28  | 50     | VDC    |
|                                                                 | TRANSIENT <sup>1</sup> 120 ms    | 0        | —    | 80    | 0        | —     | 80     | 0        | —   | 70     | V      |
| INPUT CURRENT                                                   | NO LOAD                          | —        | 5.0  | 10    | —        | 7.5   | 13     | —        | 7.5 | 13     | uF     |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 6.0  | 12    | —        | 8.0   | 14     | —        | 8.0 | 14     |        |
|                                                                 | INHIBITED                        | —        | 2.3  | 3.2   | —        | 2.3   | 3.2    | —        | 2.3 | 3.2    |        |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 2.4  | 3.5   | —        | 2.4   | 3.5    | —        | 2.4 | 3.5    |        |
| INPUT RIPPLE <sup>3</sup><br>CURRENT                            | 10 kHz - 10 MHz                  | —        | 100  | 200   | —        | 115   | 200    | —        | 90  | 200    | mA p-p |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 130  | 250   | —        | 150   | 250    | —        | 120 | 250    |        |
| EFFICIENCY                                                      | T <sub>c</sub> = 25°C            | 73       | 77   | —     | 73       | 77    | —      | 72       | 76  | —      | %      |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | 70       | 75   | —     | 70       | 75    | —      | 69       | 74  | —      |        |
| LOAD FAULT <sup>4,5</sup>                                       | POWER DISSIPATION                | —        | 1.4  | 2.2   | —        | 2.5   | 3.8    | —        | 2.7 | 4.1    | W      |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 1.6  | 2.5   | —        | 2.7   | 4.2    | —        | 3.0 | 4.5    |        |
|                                                                 | RECOVERY <sup>1</sup>            | —        | 3.7  | 15    | —        | 3.2   | 15     | —        | 4.0 | 15     | ms     |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 3.8  | 20    | —        | 3.2   | 20     | —        | 4.0 | 20     |        |
| STEP LOAD<br>RESPONSE <sup>6</sup> ± V <sub>OUT</sub>           | 50 %–100%– 50% LOAD              |          |      |       |          |       |        |          |     |        | mV pk  |
|                                                                 | TRANSIENT                        | –300     | 130  | 300   | –600     | 250   | 600    | –600     | 250 | 600    |        |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | –400     | 140  | 400   | –700     | 260   | 700    | –700     | 270 | 700    |        |
|                                                                 | RECOVERY                         | —        | 100  | 400   | —        | 165   | 700    | —        | 50  | 200    | μs     |
| -55°C TO +125°C                                                 | —                                | 100      | 500  | —     | 165      | 800   | —      | 50       | 300 |        |        |
| STEP LINE<br>RESPONSE <sup>6</sup> ± V <sub>OUT</sub>           | 12 TO 50 TO 12 V <sub>IN</sub>   |          |      |       |          |       |        |          |     |        | mV pk  |
|                                                                 | TRANSIENT <sup>1</sup>           | –250     | 125  | 250   | –500     | 240   | 500    | –500     | 220 | 500    |        |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | –300     | 130  | 300   | –600     | 250   | 600    | –600     | 230 | 600    |        |
|                                                                 | RECOVERY <sup>1</sup>            | —        | 0.6  | 2.5   | —        | 0.9   | 3.0    | —        | 0.6 | 3.0    | ms     |
| T <sub>c</sub> = -55°C TO +125°C                                | —                                | 0.6      | 3.0  | —     | 0.9      | 4.0   | —      | 0.7      | 4.0 |        |        |
| START-UP<br>0 TO 28 VDC, ± V <sub>OUT</sub>                     | DELAY                            | —        | 8    | 25    | —        | 8     | 25     | —        | 8   | 25     | ms     |
|                                                                 | T <sub>c</sub> = -55°C TO +125°C | —        | 10   | 45    | —        | 10    | 45     | —        | 10  | 45     |        |
|                                                                 | OVERSHOOT <sup>1</sup>           | —        | 0    | 100   | —        | 0     | 250    | —        | 0   | 750    | mV pk  |
| T <sub>c</sub> = -55°C TO +125°C                                | —                                | 0        | 150  | —     | 0        | 350   | —      | 0        | 900 |        |        |
| CAPACITIVE LOAD                                                 |                                  |          |      |       |          |       |        |          |     |        | uF     |

Notes:

1. Guaranteed by design, not tested.

2. Specified at 50% balanced load.

3. Lin = 2 μH.

4. Maximum duration of short circuit: 25°C— 90 seconds, 125°C – 30 seconds.

5. Load fault is a short circuit (<50 mohms). Recovery is into resistive full load, with one output shorted at a time.

6. Transition ≥ 10 μs. Recovery = time to settle to within 1% of Vout final value.

7. Max. spec indicates 80% of the converter's total power, available from either output.

8. Specification applies to both + and – Vout.

9. Although no minimum load is required, at no load the output voltage may increase up to 15%.

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

Electrical Characteristics: 25°C Tc, 28 VDC Vin, 100% load, unless otherwise specified.

| MGH DUAL OUTPUT MODELS                                          |                                        | MGH2805D       |           |                | MGH2812D         |            |                  | MGH2815D         |            |                  | UNITS  |
|-----------------------------------------------------------------|----------------------------------------|----------------|-----------|----------------|------------------|------------|------------------|------------------|------------|------------------|--------|
| PARAMETER                                                       | CONDITIONS                             | MIN            | TYP       | MAX            | MIN              | TYP        | MAX              | MIN              | TYP        | MAX              |        |
| OUTPUT VOLTAGE <sup>1</sup>                                     | Tc = 25°C<br>Tc = -55°C TO +125°C      | ±4.95<br>±4.80 | ±5<br>±5  | ±5.05<br>±5.20 | ±11.88<br>±11.52 | ±12<br>±12 | ±12.12<br>±12.48 | ±14.85<br>±14.40 | ±15<br>±15 | ±15.15<br>±15.60 | VDC    |
| OUTPUT CURRENT <sup>2</sup>                                     | V <sub>IN</sub> = 12 to 50 VDC         | 0              | ±150      | 240            | 0                | ±62.5      | 100              | 0                | ±50        | 80               | mA     |
| OUTPUT POWER                                                    | V <sub>IN</sub> = 12 to 50 VDC         | 0              | —         | 1.5            | 0                | —          | 1.5              | 0                | —          | 1.5              | W      |
| OUTPUT RIPPLE<br>VOLTAGE +V <sub>OUT</sub><br>-V <sub>OUT</sub> | 10 kHz - 2 MHz                         | —              | 35        | 150            | —                | 35         | 150              | —                | 30         | 150              | mV p-p |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 50        | 250            | —                | 40         | 250              | —                | 35         | 250              |        |
|                                                                 | 10 kHz - 2 MHz<br>Tc = -55°C TO +125°C | —              | 35<br>50  | 150<br>250     | —                | 35<br>40   | 150<br>250       | —                | 30<br>35   | 150<br>250       |        |
| LINE REGULATION <sup>3</sup>                                    | V <sub>IN</sub> = 12 to 50 VDC         | —              | 10        | 50             | —                | 100        | 300              | —                | 165        | 500              | V      |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 20        | 100            | —                | 110        | 400              | —                | 180        | 650              |        |
| LOAD<br>REGULATION <sup>3, 4</sup>                              | 10% TO FULL LOAD                       | —              | 300       | 600            | —                | 550        | 1100             | —                | 600        | 1300             | mV     |
|                                                                 | -55°C TO +125°C                        | —              | 350       | 700            | —                | 570        | 1200             | —                | 630        | 1400             |        |
|                                                                 | 50% TO FULL LOAD<br>-55°C TO +125°C    | —              | 80<br>100 | 200<br>300     | —                | 115<br>130 | 250<br>350       | —                | 125<br>135 | 300<br>400       |        |
| CROSS<br>REGULATION <sup>5</sup>                                | -V <sub>OUT</sub>                      | —              | —         | 400            | —                | —          | 500              | —                | —          | 500              | mV     |
| INPUT VOLTAGE<br>NO LOAD TO FULL                                | CONTINUOUS                             | 12             | 28        | 50             | 12               | 28         | 50               | 12               | 28         | 50               | VDC    |
|                                                                 | TRANSIENT 120 ms                       | 0              | —         | 80             | 0                | —          | 80               | 0                | —          | 70               | V      |
| INPUT CURRENT                                                   | NO LOAD                                | —              | 5.0       | 10             | —                | 7.5        | 13               | —                | 7.5        | 13               | mA     |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 6.0       | 12             | —                | 8.0        | 14               | —                | 8.0        | 14               |        |
|                                                                 | FULL LOAD                              | —              | 69        | 73             | —                | 70         | 73               | —                | 71         | 74               |        |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 72        | 77             | —                | 71         | 77               | —                | 72         | 78               |        |
|                                                                 | INHIBITED                              | —              | 2.3       | 3.2            | —                | 2.3        | 3.2              | —                | 2.3        | 3.2              | mA     |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 2.4       | 3.5            | —                | 2.4        | 3.5              | —                | 2.4        | 3.5              |        |
| INPUT RIPPLE <sup>6</sup><br>CURRENT                            | 10 kHz - 10 MHz                        | —              | 100       | 200            | —                | 115        | 200              | —                | 90         | 200              | mA p-p |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 130       | 250            | —                | 150        | 250              | —                | 120        | 250              |        |
| EFFICIENCY                                                      | Tc = 25°C                              | 73             | 77        | —              | 73               | 77         | —                | 72               | 76         | —                | %      |
|                                                                 | Tc = -55°C TO +125°C                   | 70             | 75        | —              | 70               | 75         | —                | 69               | 74         | —                |        |
| LOAD FAULT <sup>7,8</sup>                                       | POWER DISSIPATION                      | —              | 1.4       | 2.2            | —                | 2.5        | 3.8              | —                | 2.7        | 4.1              | W      |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 1.6       | 2.5            | —                | 2.7        | 4.2              | —                | 3.0        | 4.5              |        |
|                                                                 | RECOVERY                               | —              | 3.7       | 15             | —                | 3.2        | 15               | —                | 4.0        | 15               | ms     |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 3.8       | 20             | —                | 3.2        | 20               | —                | 4.0        | 20               |        |
| STEP LOAD<br>RESPONSE <sup>9</sup>                              | TRANSIENT                              | -300           | 130       | 300            | -600             | 250        | 600              | -600             | 250        | 600              | mV pk  |
|                                                                 | Tc = -55°C TO +125°C                   | -400           | 140       | 400            | -700             | 260        | 700              | -700             | 270        | 700              |        |
|                                                                 | RECOVERY                               | —              | 100       | 400            | —                | 165        | 700              | —                | 50         | 200              | μs     |
| ± V <sub>out</sub><br>50%–100%–50%                              | -55°C TO +125°C                        | —              | 100       | 500            | —                | 165        | 800              | —                | 50         | 300              |        |
|                                                                 | TRANSIENT                              | -250           | 125       | 250            | -500             | 240        | 500              | -500             | 220        | 500              | mV pk  |
|                                                                 | Tc = -55°C TO +125°C                   | -300           | 130       | 300            | -600             | 250        | 600              | -600             | 230        | 600              |        |
| STEP LINE<br>RESPONSE <sup>19</sup>                             | RECOVERY                               | —              | 0.6       | 2.5            | —                | 0.9        | 3.0              | —                | 0.6        | 3.0              | ms     |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 0.6       | 3.0            | —                | 0.9        | 4.0              | —                | 0.7        | 4.0              |        |
|                                                                 | 12 TO 50 TO 12 V <sub>IN</sub>         | —              | 0.6       | 3.0            | —                | 0.9        | 4.0              | —                | 0.7        | 4.0              |        |
| START-UP<br>0 TO 28 VDC, ± V <sub>out</sub>                     | DELAY                                  | —              | 8         | 25             | —                | 8          | 25               | —                | 8          | 25               | ms     |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 10        | 45             | —                | 10         | 45               | —                | 10         | 45               |        |
|                                                                 | OVERSHOOT                              | —              | 0         | 100            | —                | 0          | 250              | —                | 0          | 750              | mV pk  |
|                                                                 | Tc = -55°C TO +125°C                   | —              | 0         | 150            | —                | 0          | 350              | —                | 0          | 900              |        |

Notes:

- Specified at 50% load.
- Max. spec indicates 80% of the converter's total available power. This 80% is available from either output.
- Specification applies to both + and -V<sub>out</sub>.
- Although no minimum load is required, at no load the output voltage may increase up to 15%.
- Cross regulation is specified as the effect on -V<sub>out</sub> for the following percent

ages of total output power: +Po = 20% and  
-Po = 80% to +Po=80% and -Po=20%

6. Lin = 2 μH.

7. Max. duration of short circuit: 25°C – 90 seconds; 125°C – 30 seconds.

8. Load fault is a short circuit (<50 mohms). Recovery into resistive full load.

9. Input step transition ≥ 10 μs. Recovery is time to settle to within 1% of V<sub>out</sub> final value.

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

Typical Performance Curves: 25°C T<sub>c</sub>, 28 VDC V<sub>in</sub>, 100% load, unless otherwise specified.

### MCH SINGLE AND DUAL OUTPUT MODELS

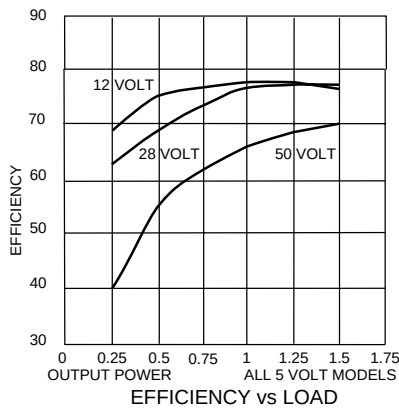


FIGURE 5

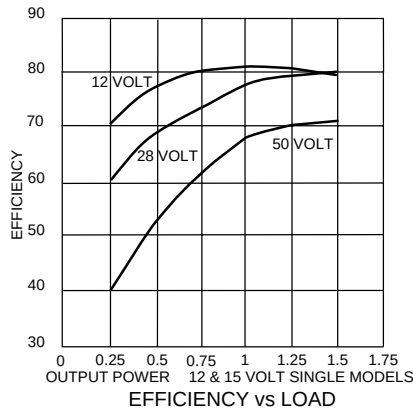


FIGURE 6

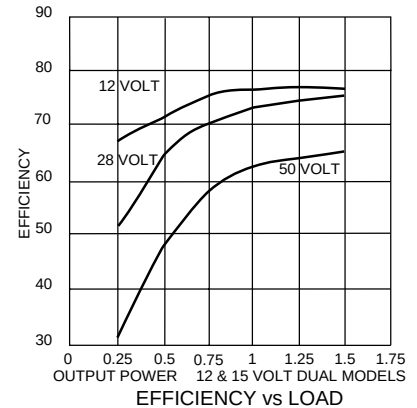


FIGURE 7

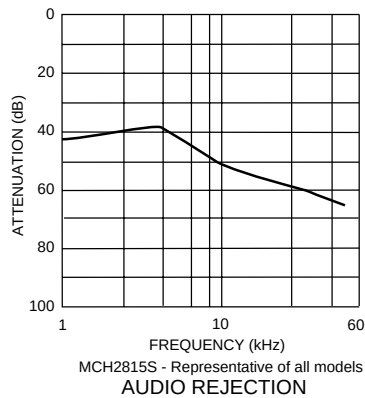


FIGURE 8

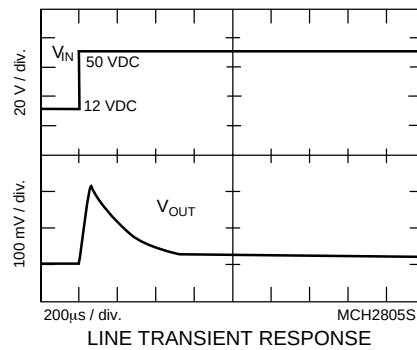


FIGURE 9

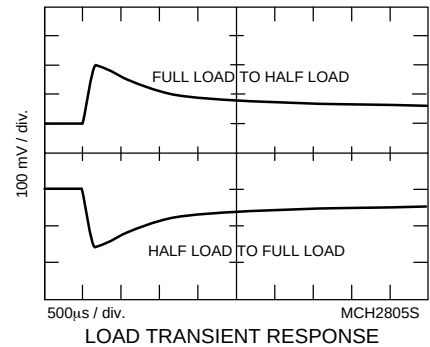


FIGURE 10

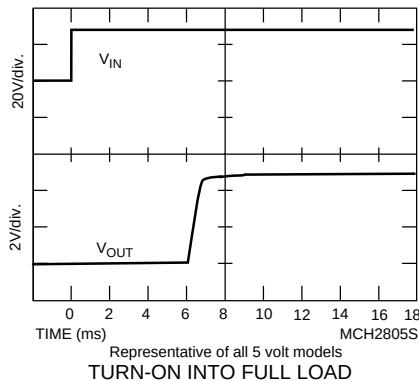


FIGURE 11

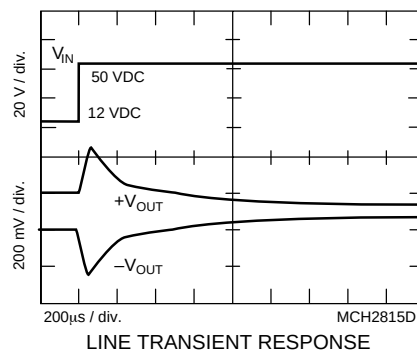


FIGURE 12

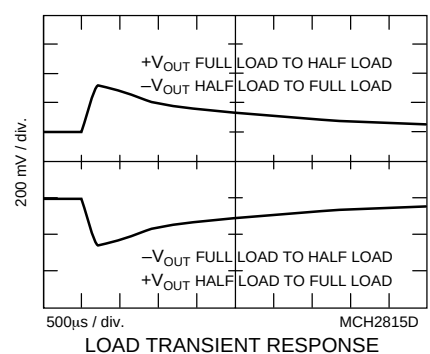


FIGURE 13

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

Typical Performance Curves: 25°C T<sub>c</sub>, 28 VDC V<sub>in</sub>, 100% load, unless otherwise specified.

### MCH SINGLE AND DUAL OUTPUT MODELS (CONT.)

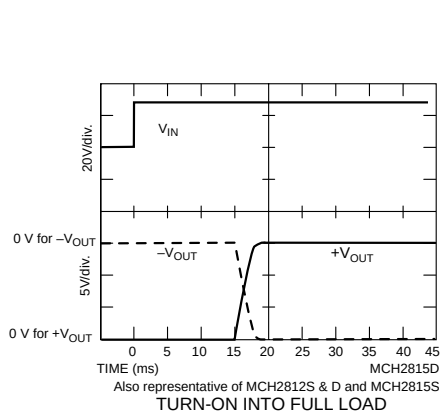


FIGURE 14

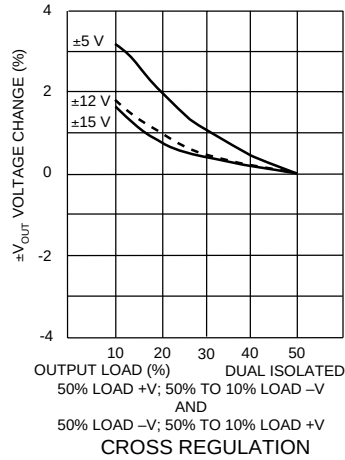


FIGURE 15

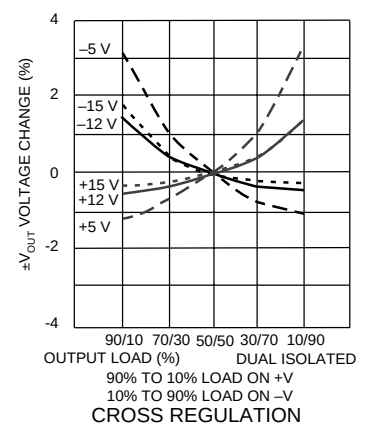


FIGURE 16

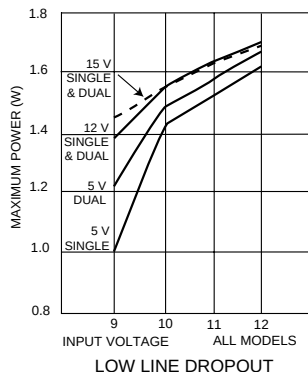


FIGURE 17

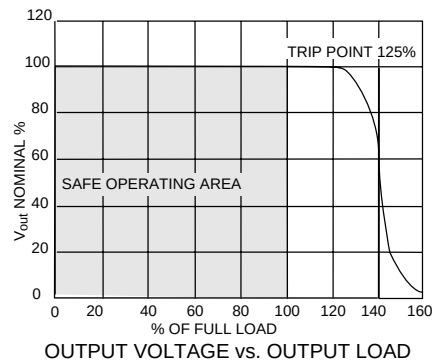


FIGURE 18

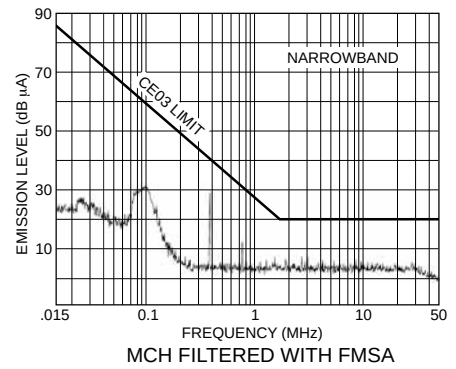


FIGURE 19

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

Typical Performance Curves: 25°C T<sub>c</sub>, 28 VDC V<sub>in</sub>, 100% load, unless otherwise specified.

### MGH SINGLE AND DUAL OUTPUT MODELS

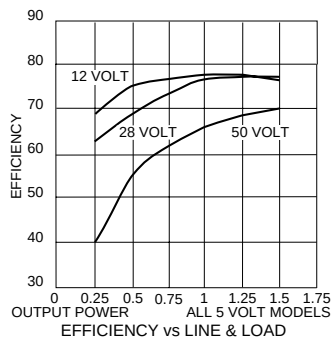


FIGURE 20

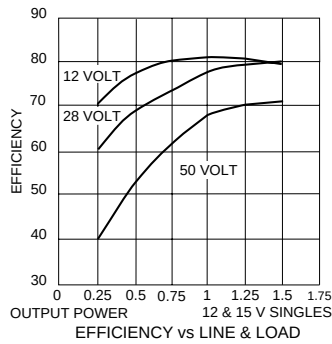


FIGURE 21

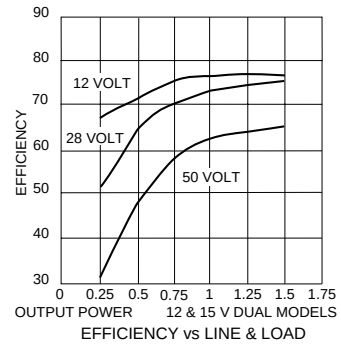


FIGURE 22

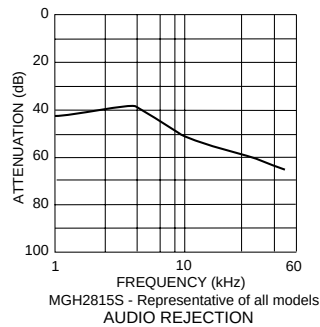


FIGURE 23

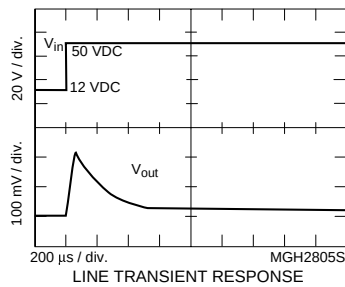


FIGURE 24

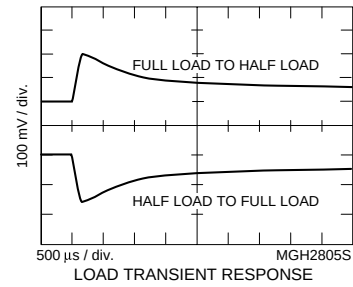


FIGURE 25

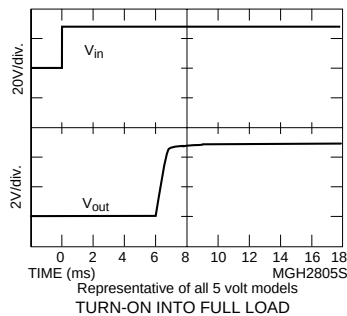


FIGURE 26

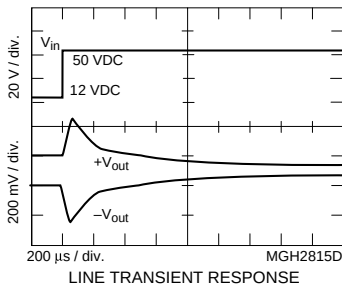


FIGURE 27

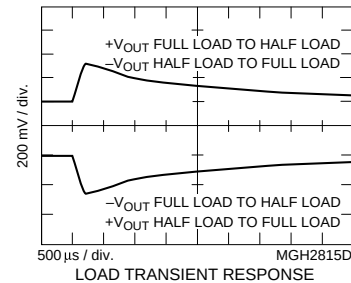


FIGURE 28

# MCH/MGH Single and Dual DC/DC Converters

## 28 VOLT INPUT – 1.5 WATT

Typical Performance Curves: 25°C T<sub>c</sub>, 28 VDC V<sub>in</sub>, 100% load, unless otherwise specified.

### MGH SINGLE AND DUAL OUTPUT MODELS (CONT.)

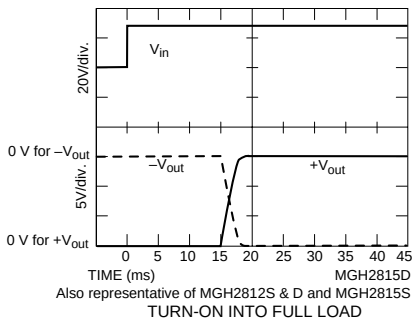


FIGURE 29

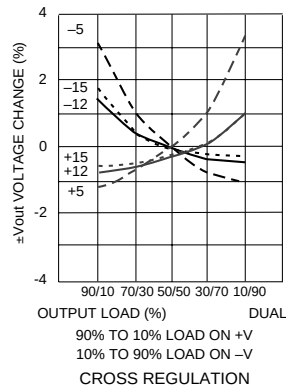


FIGURE 30

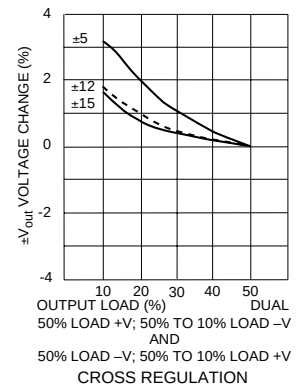


FIGURE 31

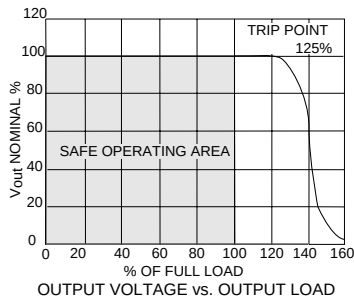
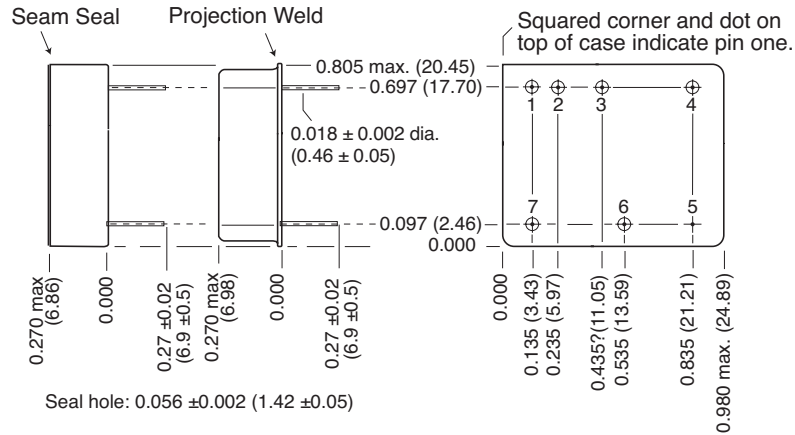


FIGURE 32

# MCH/MGH Single and Dual DC/DC Converter Cases

## 28 VOLT INPUT – 1.5 WATT

### BOTTOM VIEW CASE A2



#### Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places  
 ±0.01 (0.3) for two decimal places  
 unless otherwise specified

#### CAUTION

Heat from reflow or wave soldering may damage the device.

Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin

#### Materials

Header Kovar/Nickel/Gold  
 Cover Kovar/Nickel  
 Pins Kovar/Nickel/Gold matched glass seal

Case A2, Rev C, 20060110

Please refer to the numerical dimensions for accuracy. All information is believed to be accurate, but no responsibility is assumed for errors or omissions. Interpoint reserves the right to make changes in products or specifications without notice.

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**FIGURE 33: CASE A2**

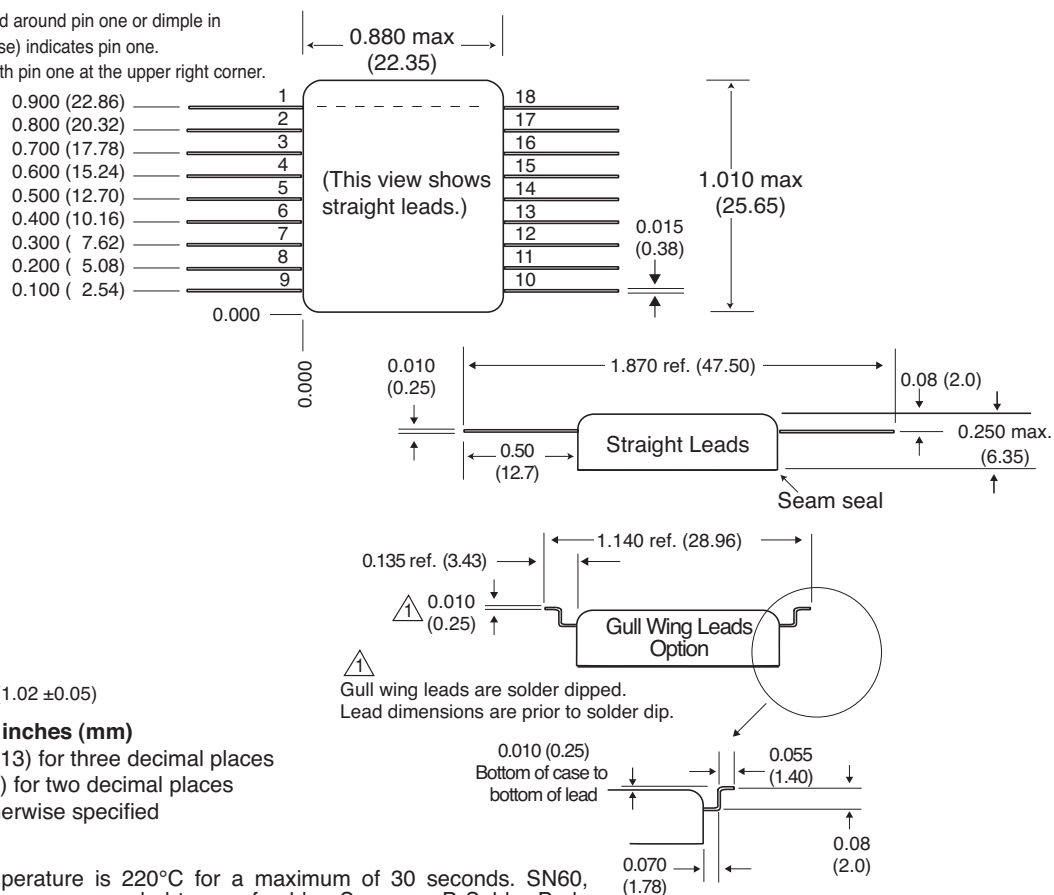
# MCH/MGH Single and Dual DC/DC Converter Cases

## 28 VOLT INPUT – 1.5 WATT

### TOP VIEW CASE B

Differently colored glass bead around pin one or dimple in header (bottom or side of case) indicates pin one.

Cover marking is oriented with pin one at the upper right corner.



Seal hole: 0.040 ±0.002 (1.02 ±0.05)

#### Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places  
±0.01 (0.3) for two decimal places  
unless otherwise specified

#### CAUTION

Maximum reflow temperature is 220°C for a maximum of 30 seconds. SN60, SN62, or SN63 are the recommended types of solder. See case B Solder Pads for Solder Mask instructions.

Hand soldering should not exceed 300°C for 10 seconds per pin.

#### Materials

Header Kovar/Nickel/Gold  
Cover Kovar/Nickel  
Pins Kovar/Nickel/Gold matched glass seal

Case B, Rev C, November 9, 2005

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FIGURE 34: CASE B



## MCH/MGH Single and Dual DC/DC Converters

28 VOLT INPUT – 1.5 WATT

### 883, CLASS H, QML PRODUCTS – ELEMENT EVALUATION

| ELEMENT EVALUATION<br><br>TEST PERFORMED<br>(COMPONENT LEVEL)             | STANDARD<br>(NON-QML) <sup>1</sup> |                | CLASS H,<br>QML  |                |
|---------------------------------------------------------------------------|------------------------------------|----------------|------------------|----------------|
|                                                                           | M/S <sup>2</sup>                   | P <sup>3</sup> | M/S <sup>2</sup> | P <sup>3</sup> |
| Element Electrical (probe)                                                | yes                                | no             | yes              | yes            |
| Element Visual                                                            | no                                 | no             | yes              | yes            |
| Internal Visual                                                           | no                                 | no             | yes              | no             |
| Final Electrical                                                          | no                                 | no             | yes              | yes            |
| Wire Bond Evaluation <sup>4</sup>                                         | no                                 | no             | yes              | yes            |
| SLAM™/C-SAM:<br>Input Capacitors only<br>(Add'l test, not req. by H or K) | no                                 | no             | no               | yes            |

**Definitions:**

Element Evaluation: Component testing/screening per MIL-STD-883 as determined by MIL-PRF-38534

SLAM™: Scanning Laser Acoustic Microscopy

C-SAM: C - Mode Scanning Acoustic Microscopy

**Notes:**

1. Non-QML products do not meet all of the requirements of MIL-PRF-38534
2. M/S = Active components (Microcircuit and Semiconductor Die)
3. P = Passive components
4. Not applicable to EMI filters that have no wire bonds

# MCH/MGH Single and Dual DC/DC Converters

28 VOLT INPUT – 1.5 WATT

## 883, CLASS H, QML PRODUCTS – ENVIRONMENTAL SCREENING

| TEST                                                                                                                              | 125°C<br>STANDARD<br>non-QML | 125°C<br>/ES<br>non-QML | Class H<br>/883<br>QML |
|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------|------------------------|
| Pre-cap Inspection<br>Method 2017, 2032                                                                                           | yes                          | yes                     | yes                    |
| Temperature Cycle (10 times)<br>Method 1010, Cond. C, -65°C to 150°C, ambient<br>Method 1010, Cond. B, -55°C to 125°C, ambient    | no<br>no                     | no<br>yes               | yes<br>no              |
| Constant Acceleration<br>Method 2001, 3000 g<br>Method 2001, 500g                                                                 | no<br>no                     | no<br>yes               | yes<br>no              |
| Burn-In<br>Method 1015, 160 hours at 125°C case, typical<br>96 hours at 125°C case, typical                                       | no<br>no                     | no<br>yes               | yes<br>no              |
| Final Electrical Test MIL-PRF-38534, Group A<br>Subgroups 1 through 6: -55°C, +25°C, +125°C case<br>Subgroups 1 and 4: +25°C case | no<br>yes                    | no<br>yes               | yes<br>no              |
| Hermeticity Test<br>Fine Leak, Method 1014, Cond. A<br>Gross Leak, Method 1014, Cond. C<br>Gross Leak, Dip ( $1 \times 10^{-3}$ ) | no<br>no<br>yes              | yes<br>yes<br>no        | yes<br>yes<br>no       |
| Final Visual Inspection<br>Method 2009                                                                                            | yes                          | yes                     | yes                    |

Test methods are referenced to MIL-STD-883 as determined by MIL-PRF-38534.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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