

12.5-30 Watt Hybrid

Features

- Completely self contained Thick Film Hybrid DC-DC Converter
- Built-in EMI input filter meets MIL-STD-461C requirements CE01, CE03, CS01, CS02 and CS06
- "Inhibit-not" function
- Power on soft start
- Fully isolated, input to output
- Single, double and triple outputs
- Short circuit protection
- 200 kHz operation for low ripple and fast response
- No external filter caps required
- Hermetically sealed package

Specifications

INPUT: 16 to 24 VDC nominal

Range: 8 to 40 VDC continuous

Unit will start up at $V_{in} > 9.5$ VDC

OUTPUT: for $V_{in} < 16$ VDC, the output power linearly derates to 1/2 full output power at $V_{in} = 8$ VDC

ISOLATION:

Input to case: 500 VDC

Input to output: 500 VDC

Output to case: 100 VDC

ENVIRONMENT:

Storage temperature: -55°C to +150°C

Shock: 50 G's

Acceleration: 500 G's

Vibration: 30 G's

Grade M:

Full Power Output at $T_{case} = +85^{\circ}\text{C}$

Linearly derates to zero at $T_{case} = +115^{\circ}\text{C}$

Grade E:

Full Power Output at $T_{case} = +125^{\circ}\text{C}$

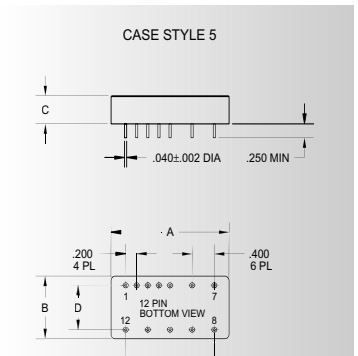
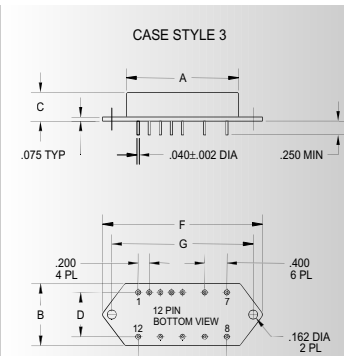
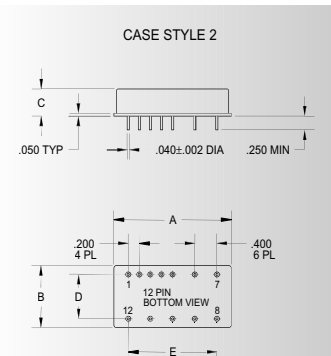
Linearly derates to zero at $T_{case} = +135^{\circ}\text{C}$

WEIGHT: 75 grams typical

| SINGLE OUTPUT DEVICES | | 3378-S03.3 (20W) | | | 3378-S05 (30W) | | | 3378-S05.2 (30W) | | | 3378-S12 (30W) | | |
|-----------------------|--|------------------|------|-------|----------------|------|------|------------------|------|-------|----------------|-------|-------|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| Output voltage | — | +3.2 | +3.3 | +3.4 | +4.9 | +5.0 | +5.1 | +5.1 | +5.2 | +5.3 | +11.9 | +12.0 | +12.1 |
| Output current | $V_{in} = 16$ to 40 VDC | — | — | 6.06A | — | — | 6A | — | — | 5.76A | — | — | 2.5A |
| Efficiency | $P_{out} = \text{max rated load}$ | 66% | 69% | — | 71% | 74% | — | 71% | 74% | — | 78% | 82% | — |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in} = 16$ to 40 VDC | — | 10mV | 30mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 20mV | 100mV |
| Load regulation | $P_{out} = 10\%$ to F.L. | — | 10mV | 30mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 20mV | 100mV |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 30 | 65 | — | 40 | 85 | — | 40 | 85 | — | 60 | 150 |

| SINGLE OUTPUT DEVICES | | 3378-S15 (30W) | | | 3378-S28 (30W) | | | | |
|-----------------------|--|----------------|-------|-------|----------------|-------|-------|--|--|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | | |
| Output voltage | — | +14.9 | +15.0 | +15.1 | +27.8 | +28.0 | +28.2 | | |
| Output current | $V_{in} = 16$ to 40 VDC | — | — | 2A | — | — | 1.07A | | |
| Efficiency | $P_{out} = \text{max rated load}$ | 79% | 83% | — | 78% | 82% | — | | |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in} = 16$ to 40 VDC | — | 25mV | 125mV | — | 50mV | 250mV | | |
| Load regulation | $P_{out} = 10\%$ to F.L. | — | 25mV | 125mV | — | 50mV | 250mV | | |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 75 | 180 | — | 150 | 350 | | |

| Model No. | Case Style | Pin Count | Mounting |
|-----------|------------|-----------|---|
| 3378 | 2 | 12 | Solder Sealed Flangeless PCB Mount |
| 3378 | F | 12 | Solder Sealed PCB Mount with Flange |
| 3378 | I | 12 | Seam Weld Flangeless PCB Mount |
| 3378 | IF | 12 | Seam Weld PCB Mount with Flange |
| 3378 | WF | 8 | Seam Weld Chassis Mount with Flange |
| 3378 | PB | 10 | Solder Sealed Flangeless PCB Stud Mount |
| 3378 | PE | 12 | Seam Weld Flangeless PCB Stud Mount |



TOLERANCES: ALL DIMENSIONS ±0.01 EXCEPT F = MAX, C = +0.01/-0.02; DRAWINGS IN INCHES.

Case Dimensions

Units: inches | millimeters

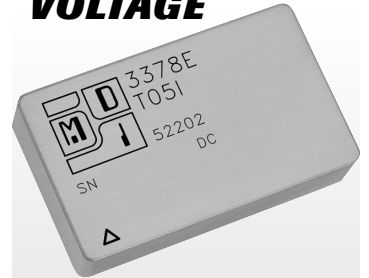
| Case Style | A | B | C | D | E | F | G |
|------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 2 | 2.200 55.880 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | — — | — — |
| 3 F | 2.200 55.880 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | 2.960 75.184 | 2.610 66.294 |
| 5 I | 2.225 56.515 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | — — | — — |
| 6 IF | 2.225 56.515 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | 2.960 75.184 | 2.610 66.294 |
| 8 WF | 2.225 56.515 | 1.710 43.434 | 0.495 12.573 | — — | 1.600 40.640 | 2.960 75.184 | 2.610 66.294 |
| 10 PB | 2.225 56.515 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | — — | — — |
| 12 PE | 2.225 56.515 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | — — | — — |

DC-DC CONVERTERS

FULL FEATURE SERIES

3378

LOW INPUT VOLTAGE

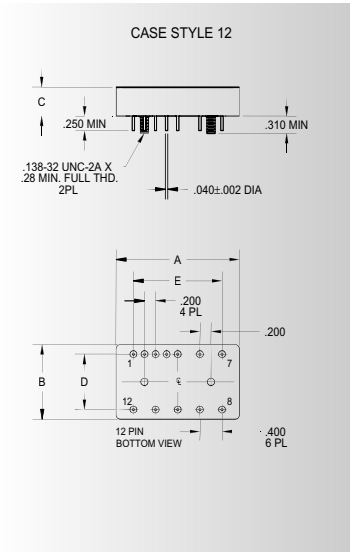
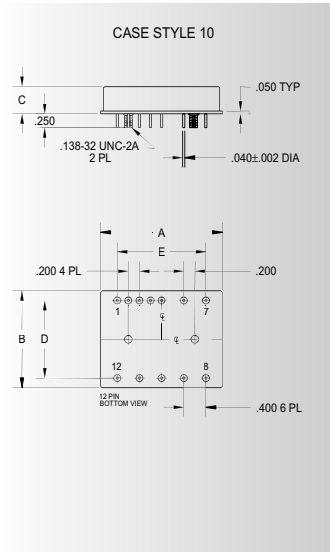
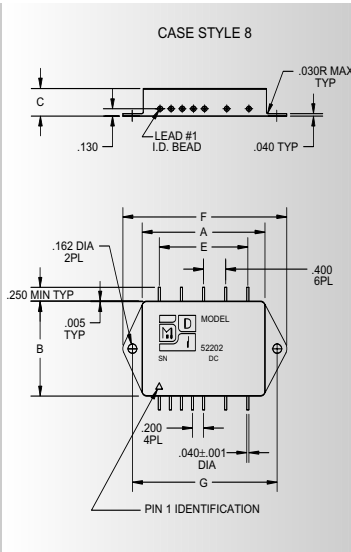
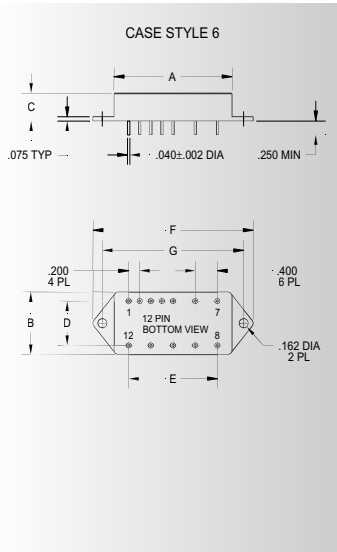


8-40 VDC

| DUAL OUTPUT DEVICES | | 3378-D05 (30W) | | | 3378-D12 (30W) | | | 3378-D15 (30W) | | |
|---------------------|--|----------------|-------------|-------------|----------------|-------------|--------------|----------------|-------------|--------------|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| Output voltage | $+I_{out} = -I_{out}$ | +4.9 | +5.0 | +5.1 | +11.9 | +12.0 | +12.1 | +14.9 | +15.0 | +15.1 |
| | | -4.9 | -5.0 | -5.1 | -11.9 | -12.0 | -12.1 | -14.9 | -15.0 | -15.1 |
| Output current* | $V_{in} = 16$ to 40 VDC | ± 150 mA | — | ± 3 A | ± 95 mA | — | ± 1.25 A | ± 76 mA | — | ± 1 A |
| Efficiency | $P_{out} = \text{max rated load}$ | 72% | 76% | — | 78% | 82% | — | 79% | 83% | — |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in} = 16$ to 40 VDC | — | ± 10 mV | ± 50 mV | — | ± 20 mV | ± 100 mV | — | ± 25 mV | ± 125 mV |
| | | — | ± 10 mV | ± 50 mV | — | ± 20 mV | ± 100 mV | — | ± 25 mV | ± 125 mV |
| Load regulation† | $P_{out} = 10\%$ to F.L. | — | ± 10 mV | ± 50 mV | — | ± 20 mV | ± 100 mV | — | ± 25 mV | ± 125 mV |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 40 | 85 | — | 60 | 150 | — | 75 | 180 |
| | | — | 40 | 85 | — | 60 | 150 | — | 75 | 180 |

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

| TRIPLE OUTPUT DEVICES | | 3378-T3.3/5 (12.5W) | | | 3378-T3.3/12 (17.5W) | | | 3378-T3.3/15 (17.5W) | | | 3378-T05 (12.5W) | | | 3378-T12 (17.5W) | | | 3378-T15 (17.5W) | | |
|-----------------------|--|---------------------|------|--------------|----------------------|-------|--------------|----------------------|-------|--------------|------------------|------|--------------|------------------|-------|--------------|------------------|-------|--------------|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| Output voltage | $+I_{out} = -I_{out}$ | +3.2 | +3.3 | +3.4 | +3.2 | +3.3 | +3.4 | +3.2 | +3.3 | +3.4 | +4.9 | +5.0 | +5.1 | +4.9 | +5.0 | +5.1 | +4.9 | +5.0 | +5.1 |
| | | -4.9 | -5.0 | -5.1 | -11.9 | -12.0 | -12.1 | -14.9 | -15.0 | -15.1 | -4.9 | -5.0 | -5.1 | -11.9 | -12.0 | -12.1 | -14.9 | -15.0 | -15.1 |
| Output current | $V_{in} = 16$ to 40 VDC | 300mA | — | 3A | 300mA | — | 3A | 300mA | — | 3A | 90mA | — | 2A | 90mA | — | 2A | 90mA | — | 2A |
| | | ± 40 mA | — | ± 250 mA | ± 40 mA | — | ± 312 mA | ± 32 mA | — | ± 250 mA | ± 40 mA | — | ± 250 mA | ± 40 mA | — | ± 312 mA | ± 32 mA | — | ± 250 mA |
| Efficiency | $P_{out} = \text{max rated load}$ | 65% | 68% | — | 65% | 68% | — | 65% | 68% | — | 66% | 69% | — | 71% | 74% | — | 71% | 74% | — |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in} = 16$ to 40 VDC | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV |
| | | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV |
| Load regulation | $P_{out} = 10\%$ to F.L. | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV |
| | | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 30 | 65 | — | 30 | 65 | — | 30 | 65 | — | 40 | 85 | — | 40 | 85 | — | 40 | 85 |
| | | — | — | 50 | — | — | 50 | — | — | 50 | — | — | 50 | — | — | 50 | — | — | 50 |



| 3378-SXX output <24 VDC | | | 3378-SXX output ≥24 VDC | | | 3378-DXX | | | 3378-TXX | | |
|-------------------------|-------------|--------|-------------------------|-------------|--------|----------|-------------|-------|-------------|--------|-----------------|
| Pin | Function | Pin | Pin | Function | Pin | Pin | Function | Pin | Function | Pin | Function |
| Pin 1 | bit | Pin 7 | Pin 1 | bit | Pin 7 | Pin 1 | bit | Pin 1 | bit | Pin 7 | + input |
| Pin 2 | inhibit not | Pin 8 | Pin 2 | inhibit not | Pin 8 | Pin 2 | inhibit not | Pin 2 | inhibit not | Pin 8 | main output |
| Pin 3 | soft start | Pin 9 | Pin 3 | soft start | Pin 9 | Pin 3 | soft start | Pin 3 | soft start | Pin 9 | main output ret |
| Pin 4 | sync | Pin 10 | Pin 4 | sync | Pin 10 | Pin 4 | sync | Pin 4 | sync | Pin 10 | + dual output |
| Pin 5 | N/C | Pin 11 | Pin 5 | N/C | Pin 11 | Pin 5 | N/C | Pin 5 | N/C | Pin 11 | dual output ret |
| Pin 6 | input ret | Pin 12 | Pin 6 | input ret | Pin 12 | Pin 6 | input ret | Pin 6 | input ret | Pin 12 | - dual output |

Please specify **GRADE LEVEL** for your application. Industrial grade units will be shipped if no option is specified.

- M** +85°C military
- E** +125°C military