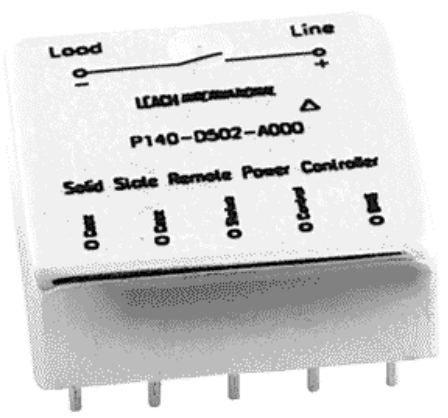
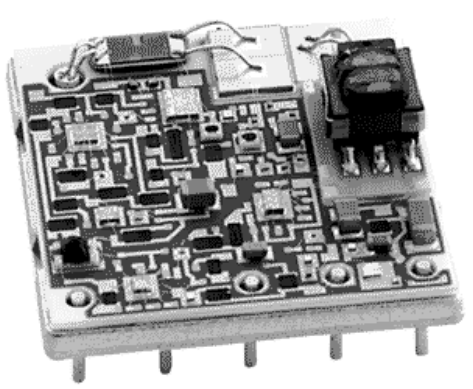
**ENGINEERING DATA SHEET**

# P140 SERIES

*SOLID STATE POWER CONTROLLER*
*28 VDC, 1PNO-WITH CURRENT OR VOLTAGE STATUS OUTPUT*
*1, 2, 4, 5, 7, 7.5 AND 10 AMP RATINGS*



SIZE: 25.7 x 25.7 x 9.7 mm

## DESCRIPTION

This LEACH Solid State Power Controller features reliable, trouble free switching together with real short circuit and overload protection. Load current is sensed and shutdown initiated within microseconds. A status signal is derived from the load current value or load voltage value and is reported via an optically isolated status output.

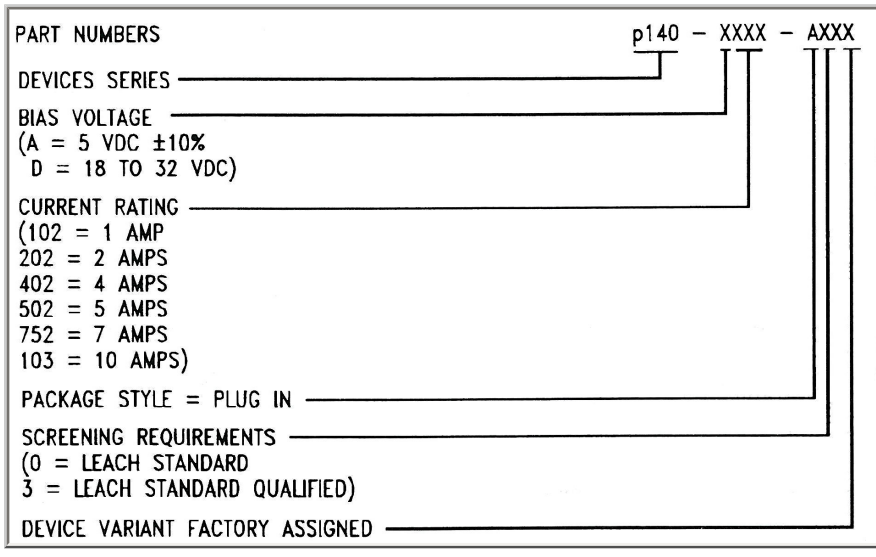
Designed to operate in 28VDC systems, these devices do not require derating for any load type.

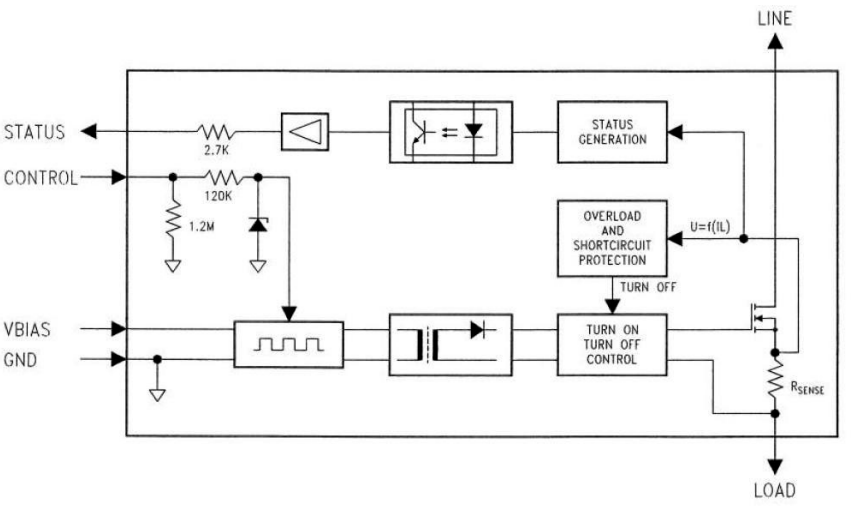
They are hermetically sealed, in a metal package.
For other ratings and operating voltages, please consult LEACH.

## FEATURES

- No derating for all types of loads up to 85° C
- Very low voltage drop
- No heat sink required
- Extremely small size
- Fast acting
- Built-in overload and short circuit protection
- Trip free
- Wide BIAS Voltage range
- Fully isolated bias, control and status
- Real load current status
- Exceeds MIL-P-81653 requirements

## BLOCK DIAGRAM




Esterline Power Systems

*Featuring LEACH© power and control solutions*
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Data sheets are for initial product selection and comparison. Contact Esterline Power Systems prior to choosing a component.

| **Typical values are at 25 ± 5°C INPUT** | **5 VOLT BIAS** | | | **28 VOLT BIAS** | | | | |
|---|---|---|---|---|---|---|---|---|
| Specification | Min. | Typ. | Max. | Min. | Typ. | Max. | Unit | Note |
| BIAS On Voltage | 4.5 | | 5.5 | 18 | | 32 | V | 1,2 |
| BIAS On Current | | | 20 | | | 13 | mA | 3 |
| BIAS Off Current | | | 1 | | | 3 | mA | 3 |
| CONTROL voltage "on" | 2.4 | | 32 | 2.4 | | 32 | V | |
| CONTROL voltage "off" | -0.3 | | 0.8 | -0.3 | | 0.8 | V | |
| CONTROL current "on" | | | 0.3 | | | 0.3 | mA | 4 |
| CONTROL current "off" | | | -20 | | | -20 | µA | |
| Transients (BIAS Input) | | | 15 | | | 50 | V | 5 |

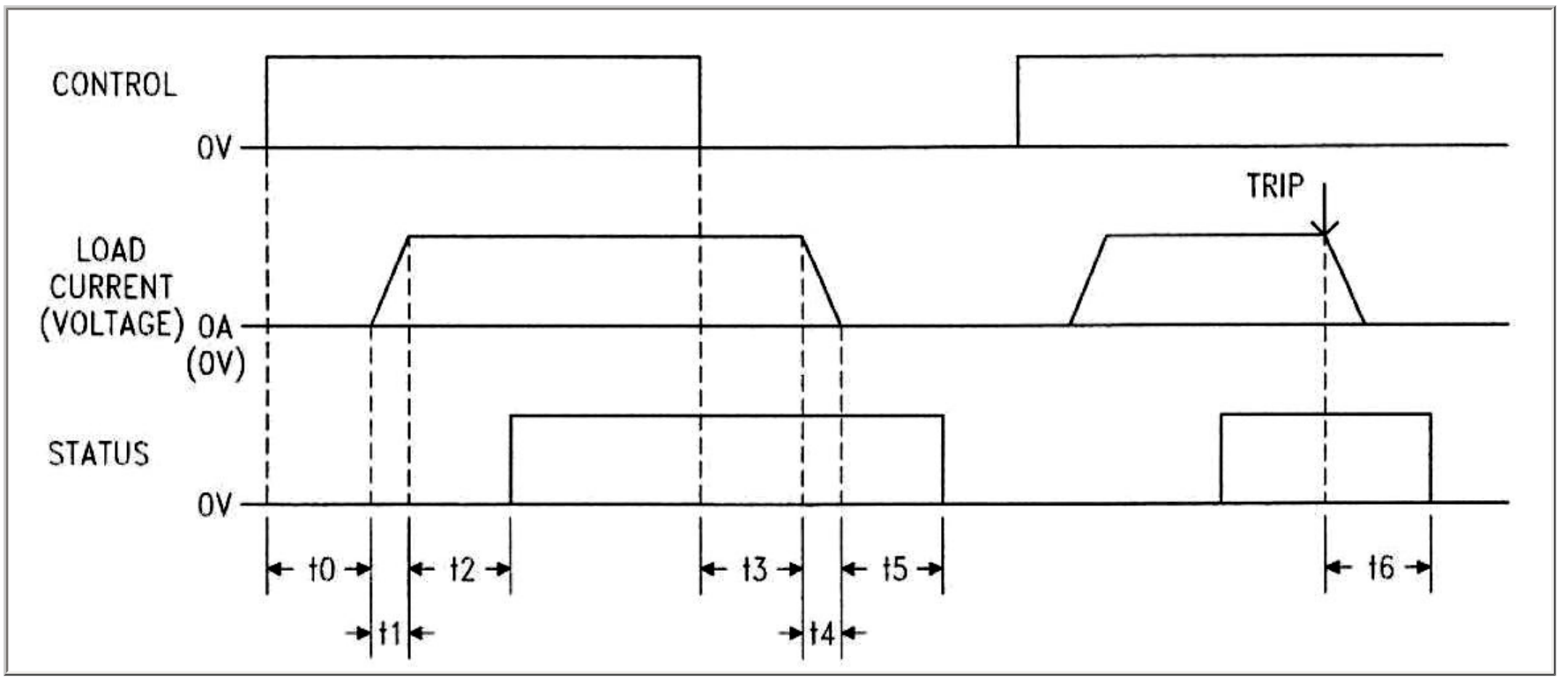
Notes:
1. Bias voltage must be a step function.
2. No reverse polarity protection.
3. BIAS voltage is 5.0 V or 28 V respectively.
4. At 32 V, typical at 5 V.
5. Maximum duration 50 ms, duty cycle =1%, repetition rate 1 Hz.

| **POWER OUTPUT** | | | | | |
|---|---|---|---|---|---|
| Specification | Min. | Typ. | Max. | Unit | Note |
| Load current | 0 | | 100 | % Irated | 1 |
| "ON" state voltage drop | | 100 | 200 | mV | 2 |
| "OFF" state line voltage | | | 32 | V | 3 |
| Leakage current | | | 100 | µA | 4 |
| Transients | | | +50 | V | 5 |
| Isolat Voltage | 500 | | | Vrms | 8 |
| Insulation Resistance | 100 | 1000 | | MΩ | 9 |
| Spikes | -600 | | +600 | V | 6 |
| Trip current | 107 | 110 | 120 | % Irated | 7 |

Notes:
1. Observe thermal derating cure. Available ratings see front page.
2. For 4 amp and higher current versions maximum voltage drop is 300 mV. Load current is 100% rated current.
3. Reverse polarity is not blocked and may damage the SSPC.
4. At 100° C and 28V.
5. Maximum duration 50 ms, duty cycle =1%, repetition rate 1 Hz.
6. Time per MIL-P-81653.
7. See "Trip characteristics".
8. 60 Hz, 10.5 BIAS, CONTROL, STATUS and GND tied together; LINE and Load tied together. Tested between GND, LINE and CASE at sea level.
9. At ±500VDC ±10% between GND, LINE, and CASE.

| **STATUS OUTPUT** | | | | | |
|---|---|---|---|---|---|
| Specification | Min. | Typ. | Max. | Unit | Note |
| STATUS voltage "high" | 3.5 | | 5.5 | V | |
| STATUS voltage "low" | | | 0.3 | V | |
| STATUS Pick-up current | | | 25 | % | 1 |
| STATUS Drop-out current | 15 | | | % | 1 |
| STATUS Pick-up voltage | 99 | | | % | 2, 3 |
| STATUS Drop-out voltage | | | 1 | % | 2, 4 |
| STATUS output impedance | 2.5 | 2.7 | 3.0 | K Ω | |

Notes:
1. Current sensed. Percentage of rated current.
2. Voltage sensed. Percentage of applied line voltage across the load.
3. Normal "on" condition.
4. Normal "off" or "tripped off" condition.

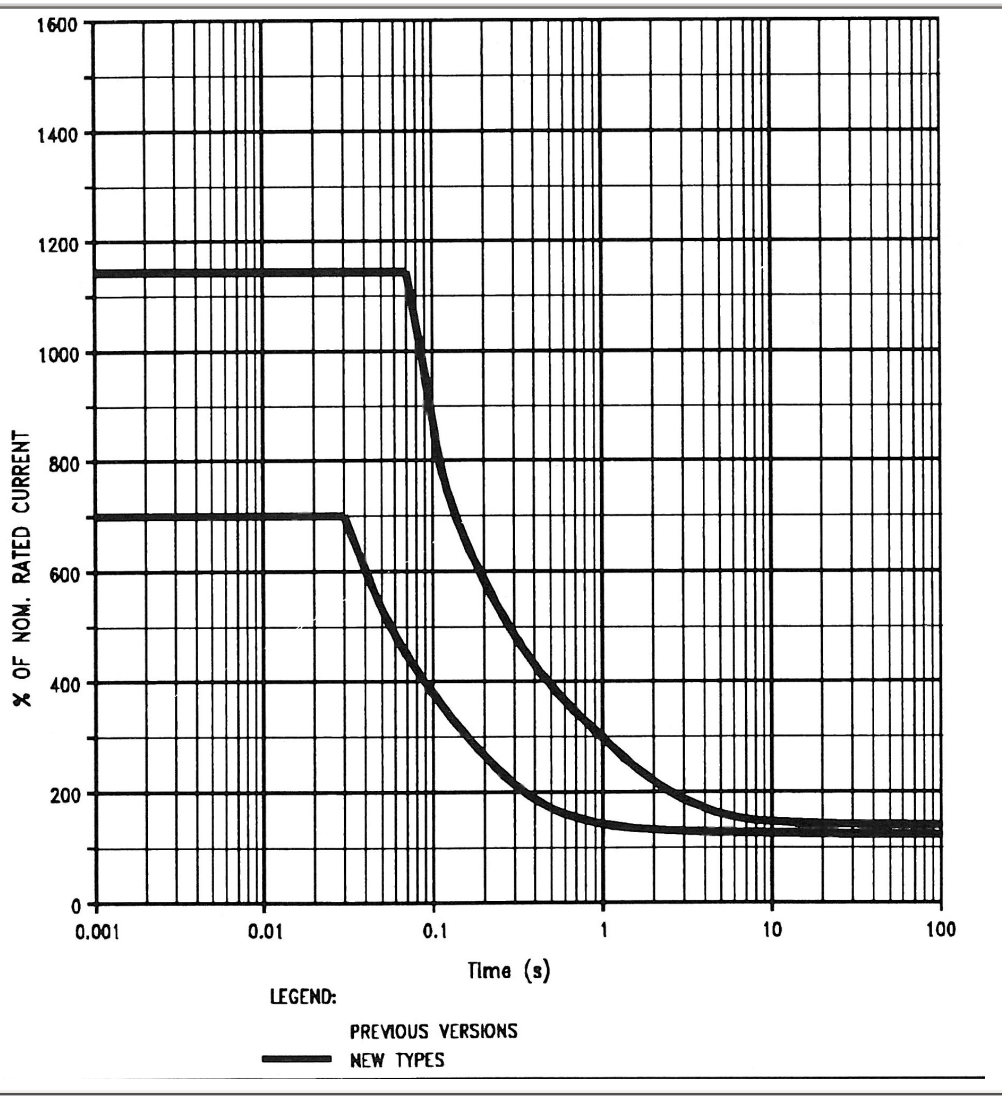



| Parameter | Symbol | Max | Unit | Note |
|---|---|---|---|---|
| Turn on delay | t0 | 200 | µs | 2 |
| Load current rise time | t1 | 50 | µs | 2 |
| Load to STATUS on delay | t2 | 100 | µs | 2 |
| Turn off delay | t3 | 200 | µs | 2 |
| Load current fall time | t4 | 50 | µs | 2 |
| Load to STATUS off delay | t5 | 100 | µs | 2 |
| Overload STATUS response | t6 | 100 | µs | 3 |

Notes:
1. All timing measurements are taken from/to 10% and/or 90% terminated with a resistive rated load.
2. At 100% rated current
3. At 250% rated current

"STATUS" is active high. $V_{BIAS}$ is 5.0 V or 28 V respectively. Rated resistive load; measurements taken between 10% and 90% points.

## TRIP CHARACTERISTIC



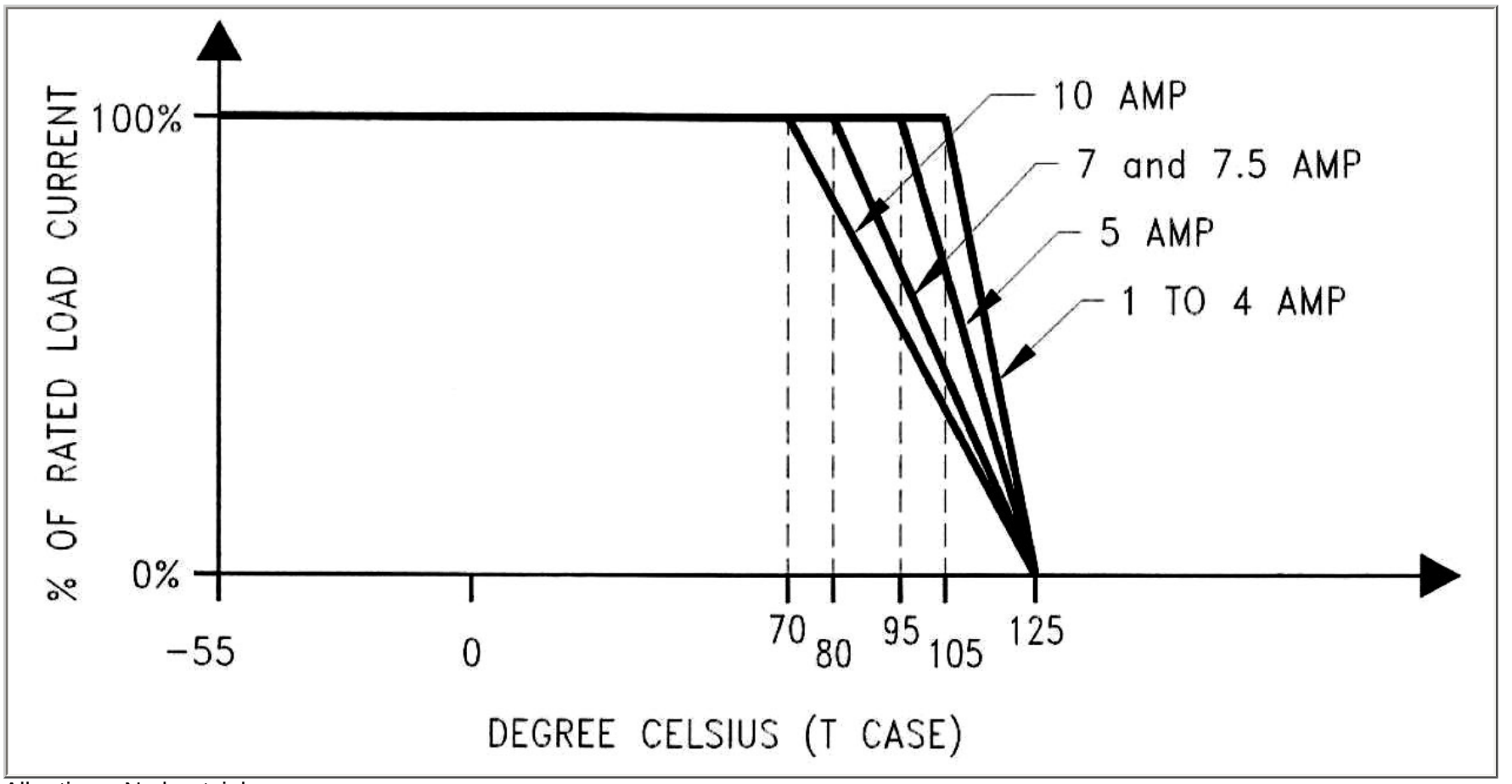
## ENVIRONMENTAL DATA

**P140 SERIES**

| Specification | Min. | Max. | Unit | Note |
|---|---|---|---|---|
| Operational Temp. Range | -55 | 105 | ° C | 1, 2 |
| Storage Temp. Range | -55 | 125 | ° C | |
| Thermal Resistance, Junction to case | | 20 | ° C/W | |
| Max. Junction Temperature of Output Stage | | 150 | ° C | |
| Vibration | 30 g, 96....2000 hz | | | 3 |
| Acceleration | 27 g | | | 4 |
| Shock | 20 g, 6...9 ms | | | 5 |
| MTBF | 880000 | | h | 6 |
| Altitude | 80000 | | ft | |

Notes:
1. See thermal derating curve
2. Case temperature
3. MIL-STD-883, Method 2007, 20-2000 Hz
4. MIL-STD-883, Method 2001
5. MIL-STD-883, Method 2002, 0.5 ms
6. Per MIL-HDBK-217E, Quality level B-1, AUT environmental at ±25°C

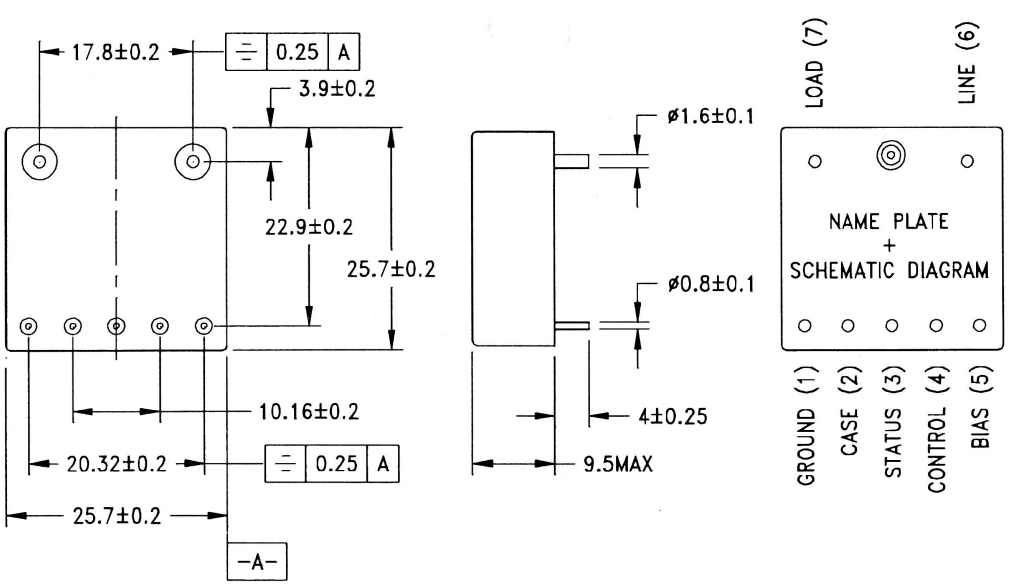
## THERMAL DERATING




All ratings: No heatsink

## PHYSICAL DATA (in mm)

. Case Finish: 1 and 2 amp versions Tin Plated. 4 amp version and above matte black painted
. Terminals: Tin Plated
. Mass: 20 grams max. (all ratings)




**This engineering data sheet is designed for initial selection and comparison of products. While every effort is made to ensure the accuracy of all data, each part number, and its application, must be controlled by a Product Control Drawing (PCD).**