

# SIMPLE SWITCHER® Power Modules for Military

Highly reliable solutions for rugged military conditions.

[national.com/switcher](http://national.com/switcher)

SIMPLE SWITCHER power modules optimize system efficiency, increase power density, and deliver robust system performance. The power modules integrate the control circuitry, a shielded inductor, MOSFETs, and small passives in an easy-to-use package. Packaged in a completely enclosed plastic molding, the modules feature leads and a single exposed metal bottom ideal for harsh environments.



## High Reliability

- Guaranteed and tested to perform at IC junction temperatures ranging from -40° C to 125° C
- Single exposed bottom offer best-in-class thermal performance and leads offer board-to-device stress relief from varying ambient temperatures
- Excellent thermal performance eliminates the need for external heat sinks and fans
- Semiconductor integrated circuit level reliability and performance for rugged environments
- Fully RoHS compliant

## Robust System Performance

- Guaranteed low EMI performance will not interfere with sensitive analog signal paths
- Low output voltage ripple for powering noise-sensitive transceiver and signaling ICs
- Excellent transient performance for fast response to varying load conditions
- Self-protected against output overvoltage and short circuit conditions

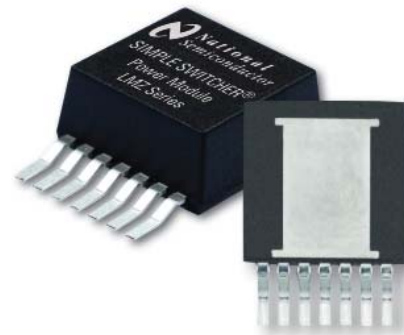
## High Energy Efficiency

- Up to 94% peak efficiency using synchronous DC-DC switching reduces system heat generation and energy costs



## Fast Development Time

- Innovative packaging similar to TO-263 makes design easy, similar to a Linear Dropout Regulator (LDO)
- Highly integrated solution simplifies board layout and design qualification, lowers manufacturing and overall risk
- Compatible with pick-and-place manufacturing used for TO-263 packages
- Easy to hand solder for quick prototyping
- Complies with EN55022 Class B radiated EMI standards
- Pin-to-pin compatibility and identical footprint for different load currents within each module series maximizes design reusability



## DESIGN MADE EASY



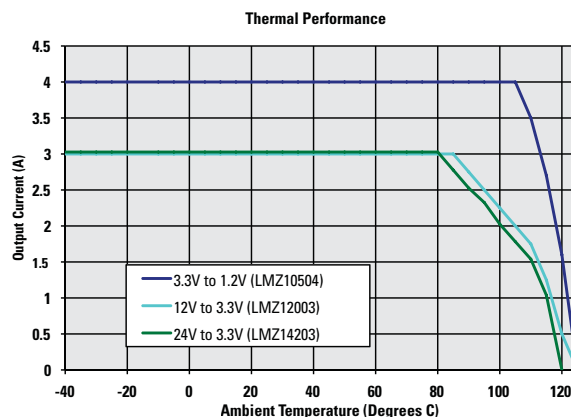
 **National**  
Semiconductor

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## Target Military Applications

- Military communications
- Telemetry
- Sensing and control systems
- Weapon systems
- Radar and Lidar



LMZ12003 & LMZ14203 thermal performance measured on 3" x 1.7" four layer board, 1 oz. copper  
 LMZ10504 thermal performance measured on 2.25" x 2.25" four layer board, 1 oz. copper

## 3.3V and 5V Input Rail Devices

| Device   | Output Current | Input Voltage | Output Voltage | Output Voltage Ripple (3.3V to 1.2V) | Peak Efficiency (3.3V to 1.2V) | Package Dimensions (including leads) | EMI Certification | Pricing (500u) |
|----------|----------------|---------------|----------------|--------------------------------------|--------------------------------|--------------------------------------|-------------------|----------------|
| LMZ10505 | 5A             | 2.95V to 5.5V | 0.8V to 5V     | 10 mV pk-pk                          | 91%                            | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$7.60         |
| LMZ10504 | 4A             | 2.95V to 5.5V | 0.8V to 5V     | 10 mV pk-pk                          | 91%                            | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$7.10         |
| LMZ10503 | 3A             | 2.95V to 5.5V | 0.8V to 5V     | 8 mV pk-pk                           | 90.7%                          | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$6.60         |

## 12V Input Rail Devices

| Device   | Output Current | Input Voltage | Output Voltage | Output Voltage Ripple (12V to 3.3V) | Peak Efficiency (12V to 3.3V) | Package Dimensions (including leads) | EMI Certification | Pricing (500u) |
|----------|----------------|---------------|----------------|-------------------------------------|-------------------------------|--------------------------------------|-------------------|----------------|
| LMZ12003 | 3A             | 4.5V to 20V   | 0.8V to 6V     | 25 mV pk-pk                         | 90%                           | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$7.25         |
| LMZ12002 | 2A             | 4.5V to 20V   | 0.8V to 6V     | 18 mV pk-pk                         | 90.5%                         | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$6.00         |
| LMZ12001 | 1A             | 4.5V to 20V   | 0.8V to 6V     | 13 mV pk-pk                         | 90.5%                         | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$5.25         |

## 24V Input Rail Devices

| Device   | Output Current | Input Voltage | Output Voltage | Output Voltage Ripple (24V to 3.3V) | Peak Efficiency (24V to 3.3V) | Package Dimensions (including leads) | EMI Certification | Pricing (500u) |
|----------|----------------|---------------|----------------|-------------------------------------|-------------------------------|--------------------------------------|-------------------|----------------|
| LMZ14203 | 3A             | 6V to 42V     | 0.8V to 6V     | 29 mV pk-pk                         | 86.5%                         | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$9.50         |
| LMZ14202 | 2A             | 6V to 42V     | 0.8V to 6V     | 20 mV pk-pk                         | 87%                           | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$7.50         |
| LMZ14201 | 1A             | 6V to 42V     | 0.8V to 6V     | 17 mV pk-pk                         | 87%                           | 7-pin TZA<br>10.16 x 13.77 x 4.57mm  | EN55022 (Class B) | \$6.50         |

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