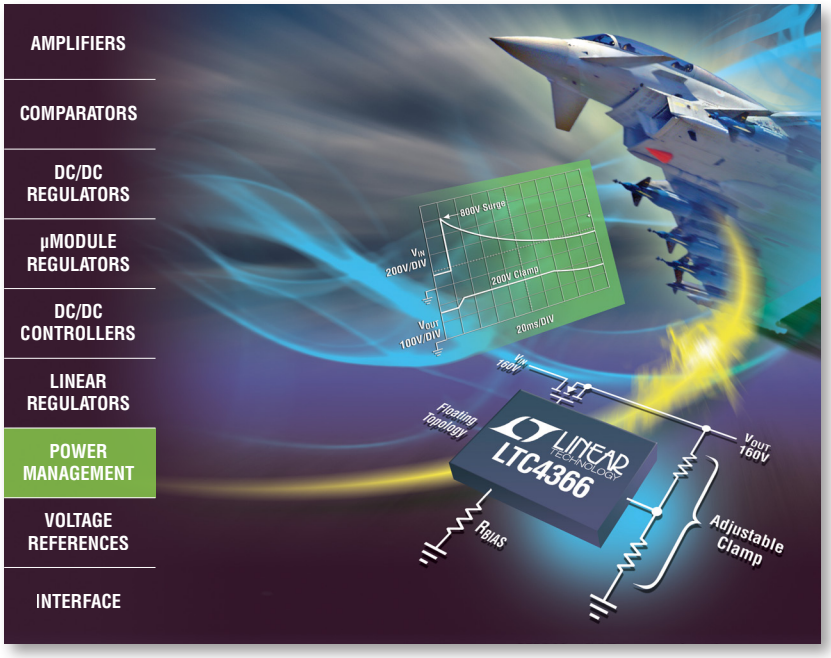
Military Plastic Products



Linear Technology's military plastic (MP) grade products provide a COTS (commercial off the shelf) solution with guaranteed performance over extended operating temperatures for use in applications subject to very harsh environmental conditions.

Grade	25°C Test	Maximum Temperature Test	Minimum Temperature Test
C	100%	70°C Sample Test, S/S 125 to 315/0 (1)	0°C Sample Test, S/S 125 to 315/0 (1)
E	100%	85°C Sample Test, S/S 125 to 315/0 (1)	0°C Sample Test, S/S 125 to 315/0 (1)
I	100%	85°C to 125°C Sample Test (2), S/S 1000/0	–40°C Sample Test, S/S 1000/0
H	100%	100% Test at 125°C or 150°C (2)	–40°C Sample Test, S/S 1000/0
MP	**100%**	**100% Test at 125°C or 150°C (2)**	**100% Test at –55°C**

S/S = Sample Size, (315/0 = Sample of 315, pass on 0 rejects) (1) Sample size depends on lot size (2) Test temperature defined on data sheet

MP-Grade Enhancements

- Additional Inspection Operations
- Tighter In-Process Controls
- Temperature Cycling to Remove Infant Mortality Failures
- 100% Electrical Testing to Guarantee Data Sheet Performance
- Enhanced Reliability Monitoring Program
- Fully Characterized Over the Military Temperature Range

Standard Features for All Product Grades

- Extensive Qualification Exceeding the Requirements of AEC-Q100
- Tin-Lead or Lead-Free Finish
- Full Assembly and Fab Lot Traceability Using Device Trace Code or Paperwork
- One Standard Baseline Manufacturing Flow for Each Device Type

LINEAR TECHNOLOGY

Products for Harsh Environments

	Product Grade	Quality Level	Packaging	Usage
RH	Radiation Hardened	MIL-PRF-38535 Class V or LTC Equivalent SCD	Hermetic SnPb	Space Missions ITAR Controlled
JAN	Joint Army Navy	MIL-M-38510 Class Level S	Hermetic SnPb	Support for Legacy Space Systems
M	Military	Military-Temp/ MIL-STD-883/SMD	Hermetic SnPb	Support for Legacy Military Systems
MP	Military Plastic	Enhanced Testing, Screening and Inspection	Plastic Pb Free or SnPb	COTS for Harsh Military Applications
H	High Temperature	Optional Automotive Screening Flow	Plastic Pb Free or SnPb	Upgrade from Industrial Flow
X	Extreme Temperature	100% Electrical Test at 200°C	Hermetic Pb Free	Oil & Gas Applications
DICE	Dice	Commercial, MILDICE, RHDICE	Unpackaged	Hybrid and MCMs

Linear Technology has supplied high performance analog integrated circuits to the aerospace and defense industry for 30 years and continues to dedicate resources to support the specialized needs of the market. This ongoing commitment is underpinned by exceptional long-term support of legacy products and industry leading quality and reliability.

Quality Certifications

- MIL-PRF-38535 Class Q and V
- JAN Microcircuit Certification (QPL) Class S and B
- TS16949 Certification
- ISO9001 and ISO14001 Certification
- Stack International Certification
- PURE (Plastic Used in Rugged Environments) Council Certification

Linear Technology Commitment

- Non-Obsolescence Policy
- Innovative Products in Special Product Grades
- Lifetime Warranty on all Integrated Circuits
- Continued Availability of SnPb Terminal Finish

ACCELERATED HIGH TEMPERATURE OPERATING LIFE (HTOL) TEST RESULTS	
FIT Rate	**0.08**
Number of Total Failures	5
Total HTOL Sample Size from Q1 2004 to Q2 2012	153,977
Equivalent Device Hours at 55°C	76,896,663,593

(1) Assumes Activation Energy = 1.0 Electron Volts
(2) Failure Rate Equivalent to 55°C, 60% Confidence Level
(3) 1 FIT = 1 Failure in One Billion Hours
Note: FIT rate calculation based on JEDEC Standard JESD 85