National Semiconductor

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Plastic Packages

National Semiconductor offers a wide variety of plastic packages for through-hole and surface mount applications. Many of these plastic packages provide cost-effective solutions to achieving greater board density (surface-mount packages) and high performance. Plastic packages are extensively used in commercial applications.

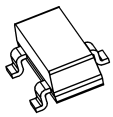
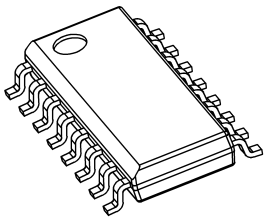
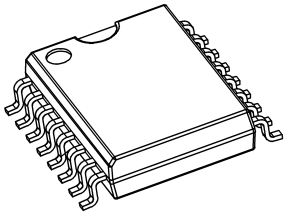
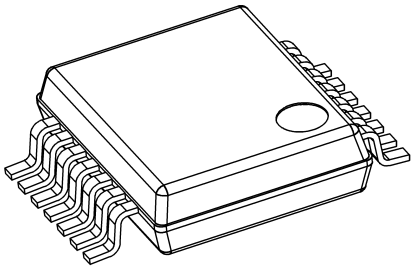
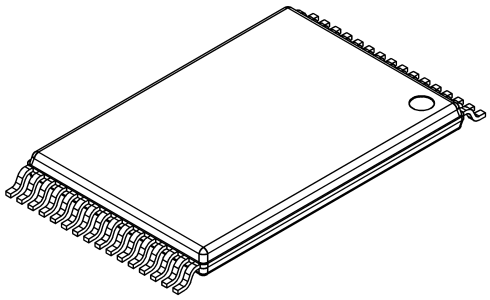
Today National offers molded plastic packages. The primary materials used in a plastic package are a leadframe, die attach material, bond wire, mold compound and a lead finish. In order to provide plastic package solutions which do not sacrifice reliability or functionality, National continues to improve on the materials used, whether focusing on leadframe composition for increased thermal conductivity or low stress mold compound used for large die applications or low moisture absorption mold compounds for improved reliability.

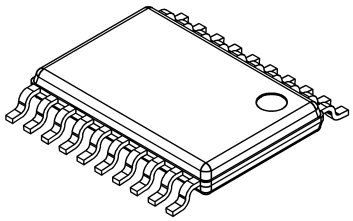
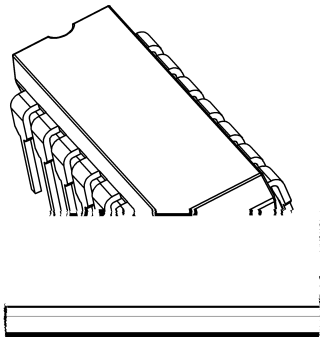
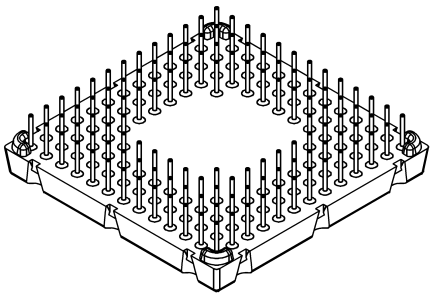
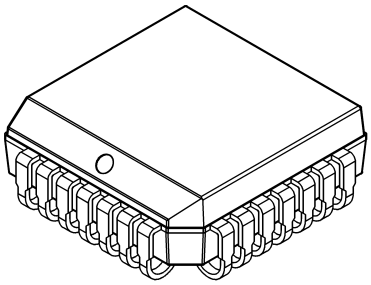
National offers through hole DIP configurations in the molded dual-in-line package (MDIP) style. Other through hole package styles include the plastic pin grid array (PPGA) packages and various plastic TOs.

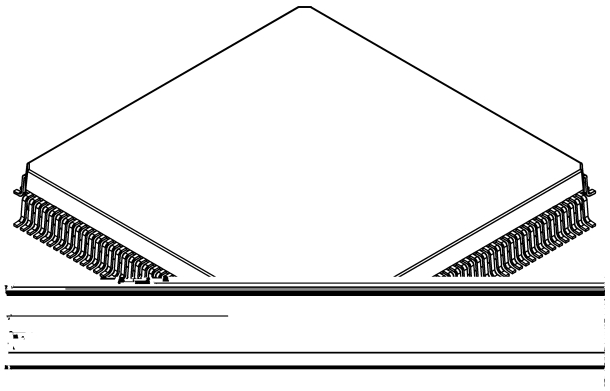
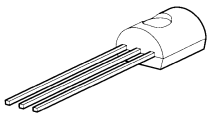
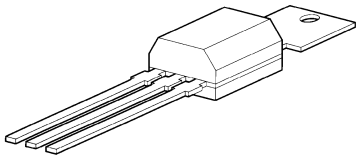
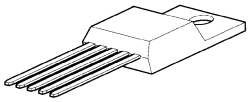
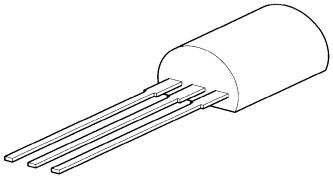
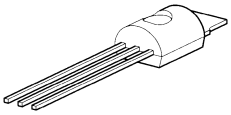
Many plastic surface mount packages are offered by National. Various plastic TO packages are formed for surface mount application (TO-263). Dual-in-line packages such as the small outline package (SOP), the shrink small outline package (SSOP), the thin small outline package (TSOP) and the thin shrink small outline package (TSSOP) are available in lower lead counts. Applications requiring higher density and increased lead count use quad packages such as the plastic leaded chip carrier (PLCC), the plastic quad flatpak (PQFP) and the thin plastic quad pack package(TQFP).

Recent improvements in the surface mount packages include exposed pad thin packages for improved thermal and electrical performance. These packages have the same footprint as the standard thin packages. Other improvements include the introduction of the small body size packages such as the SOT-23, SOT-223 and the SC-70 package outlines

The following table provides configuration and characteristic data regarding each of the plastic package offered by National.

Package Configuration	Package Characteristics
Plastic Small Outline Transistor (SOT-23) 	• Surface Mount Package • Gull Wing Lead Configuration • Solder Plate Lead Finish • Molded Package
Plastic Small Outline Package (SOP)  **Narrow Body**  **Wide Body**	• Surface Mount Package • Gull Wing Lead Configuration • Solder Plate Lead Finish • Molded Package • EIAJ and JEDEC Package Styles • Footprint Compatible with Ceramic Small Outline Package (SOIC)
Plastic Shrink Small Outline Package (SSOP) 	• Surface Mount Package • Gull Wing Lead Configuration • Solder Plate Lead Finish • Molded Package • EIAJ and JEDEC Package Styles
Plastic Thin Small Outline Package, Type I (TSOP) 	• Surface Mount Package • Gull Wing Lead Configuration • Solder Plate Lead Finish • Molded Package • EIAJ Package Style

Package Configuration	Package Characteristics
Plastic Thin Shrink Small Outline Package (TSSOP) 	• Surface Mount Package • Gull Wing Lead Configuration • Solder Plate Lead Finish • Molded Package • EIAJ Package Styles
Molded Dual-In-Line Package (MDIP) 	• Through Hole Package • Solder Plate or Solder Dip Lead Finish • Molded Package • Footprint Compatible with Ceramic Sidebrazed Dual-In-Line Package (SB and Cerdip) • Can be Thermally Enhanced • Half Lead Package Option
Plastic Pin Grid Array (PPGA) 	• Through Hole Package • Solder DIP Lead Finish • Molded Package • Footprint Compatible CPGA
Plastic Leaded Chip Carrier (PLCC) 	• Surface Mount Package • J-Bend Lead Configuration • Solder Plate Lead Finish • Molded Package • Footprint Compatible with Ceramic Leadless Chip Carrier (LCC) and Ceramic Quad J-Bend (CQJB) • Can be Thermally Enhanced

Package Configuration	Package Characteristics
Plastic Quad Flatpak (PQFP) 	• Surface Mount Package • Gull Wing Lead Configuration • Solder Plate Lead Finish • Molded Package • Can be Thermally Enhanced • High Density Package Application
TO-92 	• Through Hole Package • Solder Plate Lead Finish • Molded Plastic Package
TO-202 	• Through Hole Package or Chassis Mounting • Solder Plate Lead Finish • Molded Plastic Package
TO-220 	• Through Hole Package or Chassis Mounting • Solder Plate Lead Finish • Molded Plastic Package • Designed with Heat Sink for High Power Applications
TO-226 	• Through Hole Package • Solder Plate Lead Finish • Molded Plastic Package
TO-237 	• Through Hole Package • Solder Plate Lead Finish • Molded Plastic Package

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