

I. ORDERING INFORMATION

Contact the sales office or distributor in your area for ordering information. Visit www.linear.com/contact for a complete list.

Apply for credit and purchase through Linear Express at www.linear.com/purchase or buy directly on-line with a credit card.

II. RoHS COMPLIANCE AND LEAD (Pb) FREE PRODUCTS

Visit www.linear.com/leadfree for more information.

- a. In compliance with international Reduction of Hazardous Substances (RoHS) mandates, Linear Technology supplies Lead-Free Matte Tin terminal plated products on all Plastic Packages (Excluding Hermetic Packages). Devices with Lead Free terminal plating will have the same basic part numbers with the suffix #PBF (lead-free) or #TRPBF (tape-and-reel lead-free)) on the container labels. Matte Tin is LTC's standard terminal finish, although solder plated products will continue to be available for the foreseeable future.
- b. Lead (Pb) Free ordering examples.

Example 1.

Ordering a part in shipping tubes with a Lead (Pb) Free lead finish:

| | |
|----------------------------|---------------------------|
| Lead (Pb) Free Part | Solder Plated Part |
| LT3481EMSE#PBF | LT3481EMSE |

Example 2.

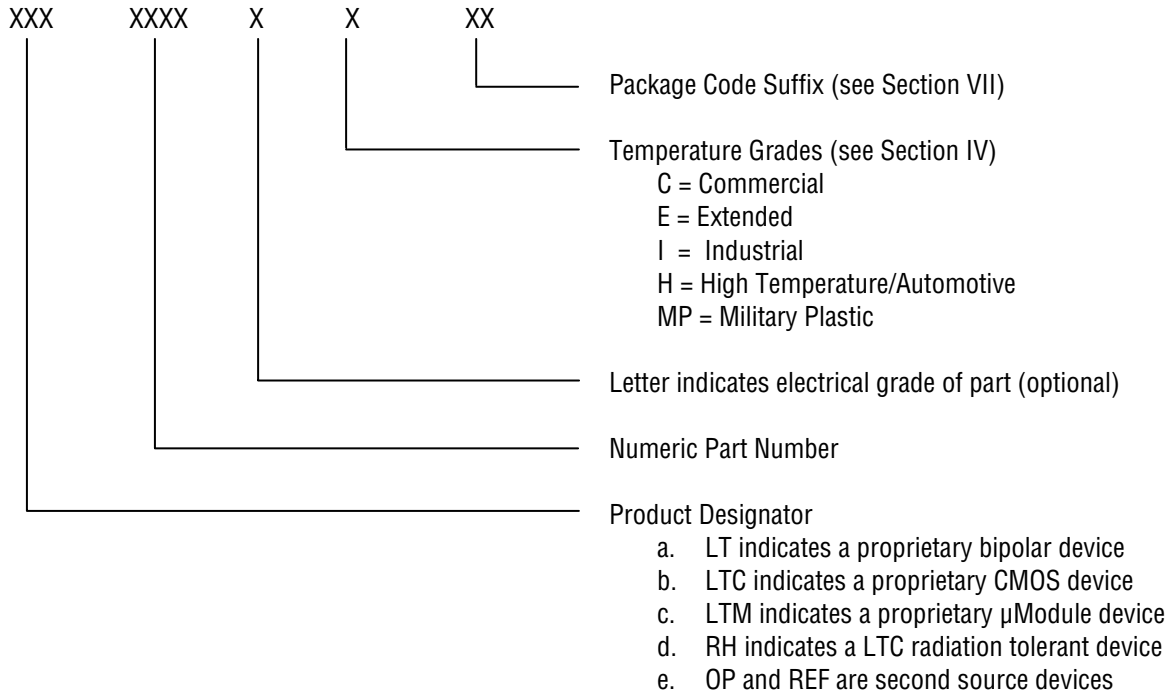
Ordering a part in tape and reel with a Lead (Pb) Free lead finish:

| | |
|----------------------------|---------------------------|
| Lead (Pb) Free Part | Solder Plated Part |
| LT3481EMSE#TRPBF | LT3481EMSE#TR |

- c. Lead (Pb) Free Markings
JEDEC Standard JESD97 defines various Lead (Pb) Free categories with symbols e1 through e7. The symbol e3 applies to products with a Matte Tin (Sn) terminal finish. Since LTC Lead (Pb) Free products have a Matte Tin (Sn) terminal finish, the symbol e3 is added to the product top marking of larger packages, where space permits. On packages that are too small to accommodate the e3, a "<" symbol is added to the device at the pin 1 location. Lead (Pb) free 2mm x 2mm and 3mm x 2mm packages are identified by rearranging the trace code marking of the device. These Lead (Pb) Free marking indicators were implemented starting with datecode 0514. However, we will continue to ship Pb-Free product, from our existing stock, which was marked prior to 0514 without the indicator.

GENERAL ORDERING INFORMATION

III. PART NUMBER EXPLANATION



IV. TEMPERATURE GRADES

| Temperature Grade | Temperature Range T_{MIN} to T_{MAX} | Room Temp Test (25°C) | Cold Temp Test at T_{MIN} | Hot Temp Test at T_{MAX} |
|-------------------------------------|---|--------------------------|--------------------------------|-------------------------------|
| C – Commercial | 0°C to 70°C | 100% | Sample | Sample |
| E – Extended | -40°C to 85°C | 100% | Assured by Design | Sample |
| I – Industrial | -40°C to 85°C | 100% | Sample, Zero Rejects | Sample, Zero Rejects |
| H – High Temperature/ Automotive | -40°C up to 140°C | 100% | Sample, Zero Rejects | Sample, Zero Rejects |
| MP – Military Plastic | -55°C to 125°C | 100% | 100% | 100% |

V. RELIABILITY PROGRAMS

Linear Technology Corporation currently offers the following reliability programs:

- QML/JAN S devices processed to 38510 slash sheets
- “R-Flow” burn-in programs for commercial temperature devices (contact factory)
- Radiation tolerant products using LTC’s proprietary radiation hardening process (RHXXXX)

GENERAL ORDERING INFORMATION

VI. TAPE AND REEL

For more information visit www.linear.com/tapeandreeel

Tape and Reel packaging is ordered with a '#TRPBF' suffix for lead free finish parts, or a '#TR' suffix for lead based finish parts. See the Tape and Reel document for reel quantities by package type. Some packages are available in 500 unit reels through designated sales channels. These packages are noted in the document. 500 unit reels are ordered with a '#TRMPBF' or '#TRM' suffix.

VII. PACKAGE CODE SUFFIXES

| Suffix Designator | Package Name | Number of Leads | Package Dimensions |
|-------------------|--------------------|-----------------|--------------------|
| DC | DFN | 3, 4, 6 or 8 | 2mm x 2mm |
| DCB | DFN | 6 or 8 | 2mm x 3mm |
| DD | DFN | 8, 10 or 12 | 3mm x 3mm |
| DDB | DFN | 8, 10 or 12 | 3mm x 2mm |
| DE | DFN | 12 or 14 | 4mm x 3mm |
| DH | DFN | 16 | 5mm x 5mm |
| DHC | DFN | 16 | 5mm x 3mm |
| DHD | DFN | 16 | 5mm x 4mm |
| DJC | DFN | 22 | 6mm x 3mm |
| F | TSSOP | 14 | 4.9mm x 4.4mm |
| F | TSSOP | 20 | 6.4mm x 4.4mm |
| FE | TSSOP, exposed pad | 16 | 4.9mm x 4.4mm |
| FE | TSSOP, exposed pad | 20 | 6.4mm x 4.4mm |
| FE | TSSOP, exposed pad | 28 | 9.6mm x 4.4mm |
| FW | TSSOP | 48 | 12.4mm x 6.1mm |
| FW | TSSOP | 56 | 13.9mm x 6.1mm |
| G | SSOP | 16, 20 | 5.9mm x 5.3mm |
| G | SSOP | 24 | 7.9mm x 5.3mm |
| G | SSOP | 28 | 9.9mm x 5.3mm |

| Suffix Designator | Package Name | Number of Leads | Package Dimensions |
|-------------------|---------------------------------|-----------------|--------------------------|
| G | SSOP | 36 | 12.5mm x 5.3mm |
| GN | SSOP | 16 | 4.8mm x 3.8mm (150 mils) |
| GN | SSOP | 20, 24 | 8.6mm x 3.8mm |
| GN | SSOP | 28 | 9.8mm x 3.8mm |
| GW | SSOP | 36 | 15.3mm x 7.6mm (300mils) |
| GW | SSOP | 48 | 17.7mm x 7.6mm |
| H | TO-52, TO-39 or TO-46 Metal Can | 2, 3 or 4 | |
| H | TO-5 Metal Can | 8 or 10 | |
| L | LLC (Leadless Chip Carrier) | 20 | 7.1mm x 10.7mm |
| LS | LLC (Leadless Chip Carrier) | 20 | 8.9mm x 8.9mm |
| M | DD Pak | 3 | |
| MS | MSOP | 8 or 10 | 3mm x 3mm |
| MSE | MSOP, exposed pad | 8 or 10 | 3mm x 3mm |

GENERAL ORDERING INFORMATION

| Suffix Designator | Package Name | Number of Leads | Package Dimensions |
|-------------------|--------------|-----------------|--------------------------|
| N | DIP | 20 | 26.9mm x 7.6mm |
| N | DIP | 14,16 | 19.6mm x 7.6mm |
| N | DIP | 18 | 23.4mm x 7.6mm |
| N | DIP | 24 | 32.5mm x 7.6mm |
| N8 | DIP | 8 | 10.2mm x 7.6mm (300mils) |
| NW | DIP | 36 | 37mm x 15.2mm (600mils) |
| P | TO-3P | 3 | Similar to TO-247 |
| Q | DD Pak | 5 | |
| R | DD Pak | 7 | |
| S | SOIC | 8 | 4.8mm x 3.8mm (150 mils) |
| S | SOIC | 14 | 8.6mm x 3.8mm |
| S | SOIC | 16 | 9.8mm x 3.8mm |
| S3 | SOT-23 | 3 | 2.1mm x 2.8mm* |
| S4 | SOT-23 | 4 | 2.1mm x 2.8mm* |
| S5 | ThinSOT | 5 | 2.8mm x 2.9mm* |
| S6 | ThinSOT | 6 | 2.8mm x 2.9mm* |
| SC | SC-70 | 6 or 8 | 1.8mm x 1.8mm |
| ST | SOT-223 | 3 | 6.3mm x 6.7mm |

| Suffix Designator | Package Name | Number of Leads | Package Dimensions |
|-------------------|--------------|------------------|--------------------------|
| SW | Wide SOIC | 16 | 10.1mm x 7.6mm (300mils) |
| SW | Wide SOIC | 18 | 11.4mm x 7.6mm |
| SW | Wide SOIC | 20 | 12.6mm x 7.6mm |
| SW | Wide SOIC | 24 | 15.2mm x 7.6mm |
| SW | Wide SOIC | 28 | 17.7mm x 7.6mm |
| T | TO-220 | 3, 5 or 7 | |
| TS | ThinSOT | 8 | 2.8mm x 2.9mm* |
| UD | QFN | 16 or 20 | 3mm x 3mm |
| UDC | QFN | 20 OR 24 | 3mm x 4mm |
| UE | DFN | 12 | 4mm x 3mm |
| UF | QFN | 16, 20, 24 or 28 | 4mm x 4mm |
| UFD | QFN | 20, 24 or 28 | 4mm x 5mm |
| UFE | QFN | 38 | 4mm x 6mm |
| UH | QFN | 32 | 5mm x 5mm |
| UHE | QFN | 36 | 5mm x 6mm |
| UHF | QFN | 38 | 5mm x 7mm |
| UHH | QFN | 56 | 5mm x 9mm |
| UJ | QFN | 40 | 6mm x 6mm |
| UK | QFN | 48 | 7mm x 7mm |
| UKG | QFN | 52 | 7mm x 8mm |
| UP | QFN | 64 | 9mm x 9mm |
| V | LGA | ** | ** |
| Z | TO-92 | 3 | |

*Includes leads

** See data sheet for number of LGA pads and package dimensions