LM3253

PRODUCT BRIEF High-Current Step-Down Converter for 2G/3G/4G RF Power Amplifiers

Check for Samples: LM3253

FEATURES

- **High-Efficiency PFM and PWM modes with Internal Synchronous Rectification**
- **Analog Bypass Function with Low Dropout Resistance (45 mΩ typ.)**
- **Dynamically Adjustable Output Voltage, 0.4V to 3.6V (typ.), in PFM and PWM Modes**
- **3.0A Maximum Load Current in PWM Mode**
- **2.7 MHz (average) PWM Switching Frequency**
- **Modulated Switching Frequency to aid Rx Band Compliance**
- **Operates from a Single Li-ion Cell (2.7V to 5.5V)**
- **ACB reduces inductor requirements and size**
- **Minimum total solution size by using small footprint and case size inductor and capacitors**
- **16-bump thin micro SMD Package**
- **Current and Thermal Overload Protection**

APPLICATIONS

- **USB Datacards**
- **Cellular Phones**
- **Hand-Held Radios**
- **RF PC Cards**
- **Battery-Powered RF Devices**

DESCRIPTION

The LM3253 is a DC-DC converter optimized for powering multi-mode 2G/3G/4G RF power amplifiers (PAs) from a single Lithium-Ion cell. The LM3253 steps down an input voltage from 2.7V to 5.5V to a dynamically adjustable output voltage of 0.4V to 3.6V. The output voltage is set through a VCON analog input that adjusts the output voltage to ensure efficient operation at all power levels of the RF PA. The LM3253 is optimized for USB datacard applications.

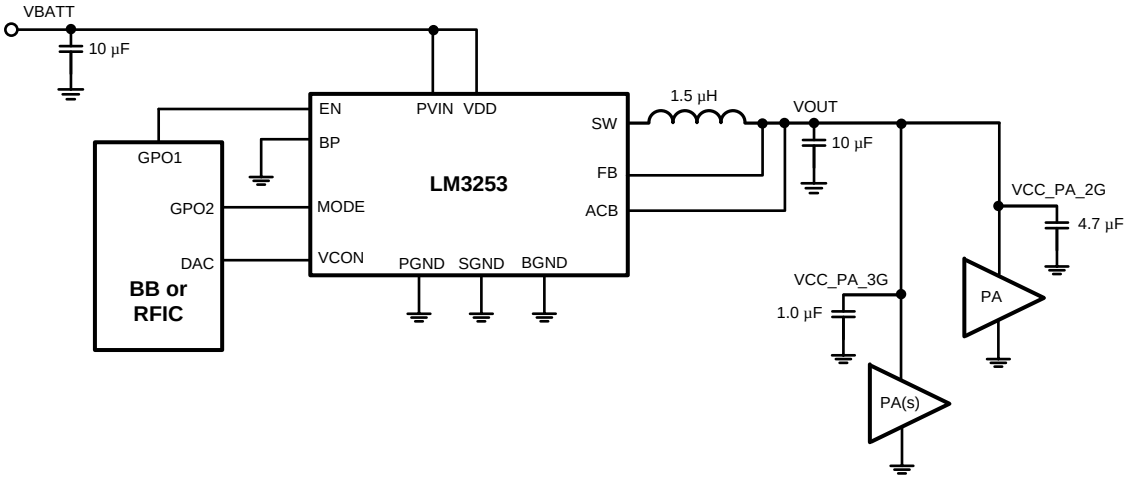
The LM3253 operates in constant frequency PWM mode producing a small and predictable amount of output voltage ripple. This enables best ECTEL power requirements in GMSK and EDGE spectral compliance, with the minimal amount of filtering and excess headroom. When operating in PFM mode, the LM3253 enables the lowest DG09 current consumption and therefore maximizes system efficiency.

The LM3253 has a unique **A**ctive **C**urrent assist and analog **B**ypass (ACB) feature to minimize inductor size without any loss of output regulation for the entire battery voltage and RF output power range, until dropout. ACB provides a parallel current path, when needed, to limit the maximum inductor current to 1.84A (typ.) while still driving a 3.0A load. The ACB also enables operation with minimal dropout voltage. The LM3253 is available in a small 2 mm x 2 mm chip-scale 16-bump micro SMD package.

Notice: This document is not a datasheet. For more information regarding this product or to order samples, please contact your local Texas Instruments sales office.

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Typical System Application Diagram



PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
LM3253TME/NOPB	ACTIVE	DSBGA	YFQ	16	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	
LM3253TMX/NOPB	ACTIVE	DSBGA	YFQ	16	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	

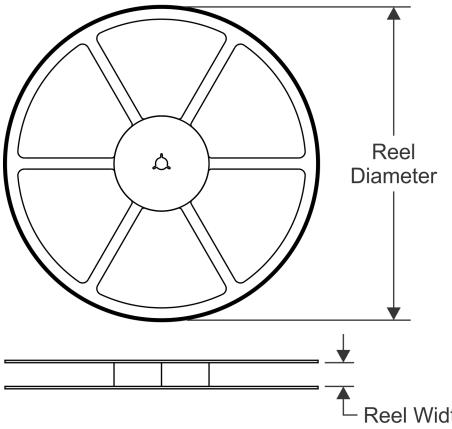
(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

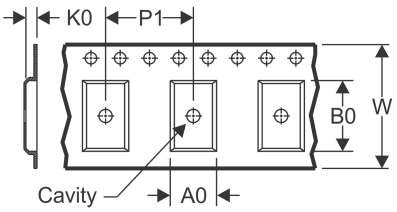
(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

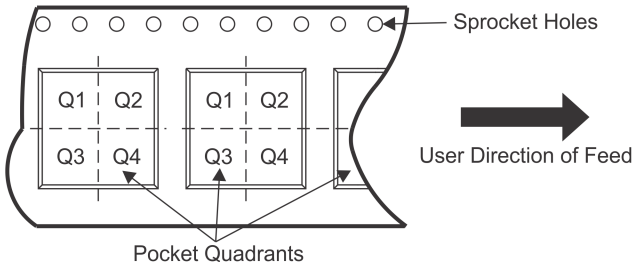


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

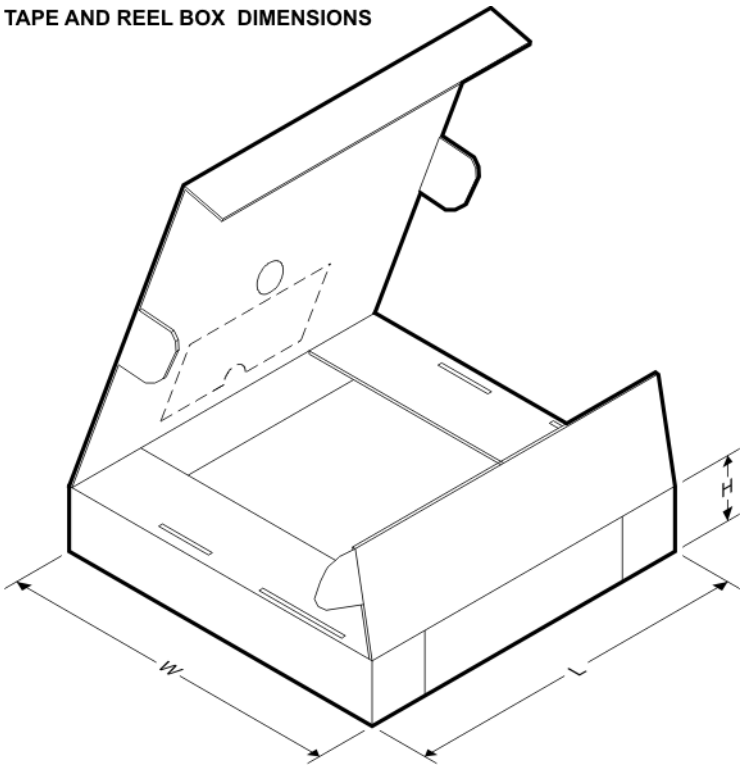
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
LM3253TME/NOPB	DSBGA	YFQ	16	250	178.0	8.4	2.18	2.18	0.76	4.0	8.0	Q1
LM3253TMX/NOPB	DSBGA	YFQ	16	3000	178.0	8.4	2.18	2.18	0.76	4.0	8.0	Q1

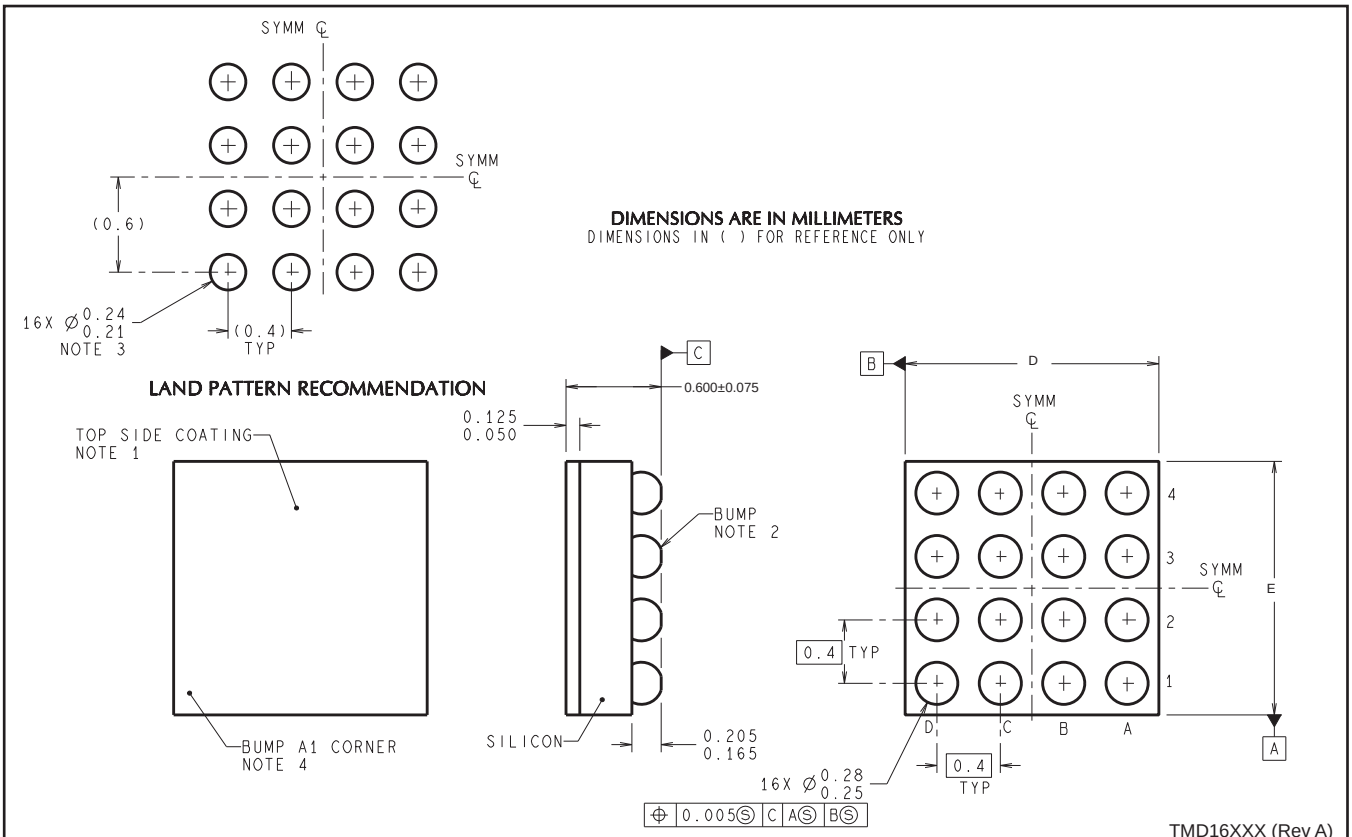
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LM3253TME/NOPB	DSBGA	YFQ	16	250	203.0	190.0	41.0
LM3253TMX/NOPB	DSBGA	YFQ	16	3000	206.0	191.0	90.0

YFQ0016



NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
B. This drawing is subject to change without notice.

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