QUALCOMM

Q3036M-16L 1.6 GHz PLL FREQUENCY SYNTHESIZER
Preliminary Information

The QUALCOMM Q3036M-16L is the military version of the Q3036 PLL family. The Q3036M-16L is a single chip solution for Phase Locked Loop (PLL) Frequency Synthesizers. Requiring only a single +5V supply, the Q3036 is highly integrated and contains all the necessary elements, with the exception of the VCO and loop filter components, to build a PLL Frequency Synthesizer operating from UHF through L-Band.

The block diagram for the Q3036 is shown in Figure 1. Its major components, described in detail in the Q3036 Technical Data Sheet, are:

- high speed line receivers
- ÷10/11 dual modulus prescaler
- 7-bit M and 4-bit A pulse swallow counter
- 4-bit reference counter
- digital phase/frequency comparator
- out-of-lock detection circuitry
- TTL/+5V CMOS-compatible parallel or 8-bit data bus interface

Figure 2 shows how the Q3036's highly integrated architecture greatly simplifies the design of UHF through L-Band synthesizers.

The Q3036 is fabricated using a three metalization layer, double polysilicon oxide-isolated silicon bipolar process. Its architecture provides breakthrough prescaler and phase/frequency detector performance for high frequency operation and low phase noise, permitting PLL designs with smaller VCO division ratios. The Q3036 design makes possible wider loop bandwidths yielding faster settling times and lower VCO phase noise contributions.

The Q3036M-16L is packaged in a 44-pin hermetically sealed ceramic leaded chip carrier (CLDCC). The device is screened in accordance with MIL-STD-883, class B, revision C according to method 5004.

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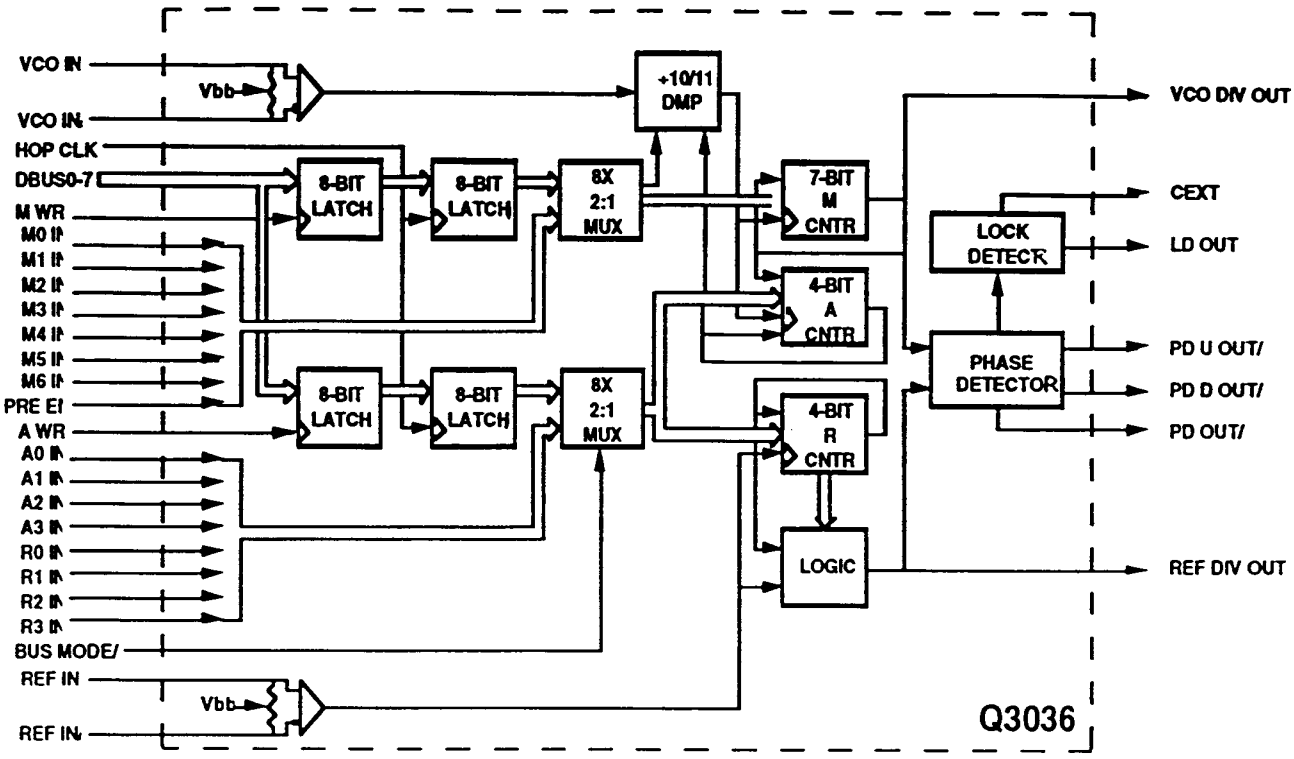


Figure 1. Q3036 Block Diagram

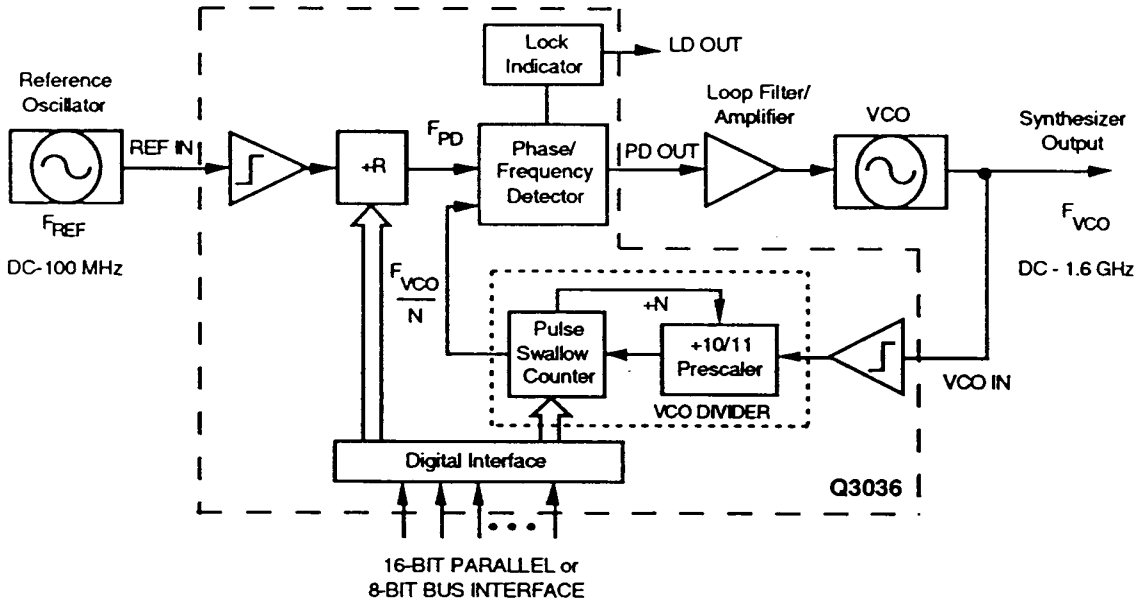


Figure 2. Q3036 in a PLL Frequency Synthesizer System

The maximum sustainable junction temperature for the device is 125°C, requiring a reduced ambient test condition (and a reduced ambient operating condition). Based on testing, the Q3036M-16L can be safely rated for continuous operation in still ambient air at 85°C. Higher ambient conditions may be possible if active cooling and other means to convect thermal energy away from the part are provided. It is the customer's responsibility to perform the necessary thermal calculations for operation above 85°C.

TECHNICAL SPECIFICATIONS

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS
Storage Temperature	T_{STO}	-55	+150	°C
Operating Temperature	T_A	-55	+85	°C
Junction Temperature (T<50 hours)	T_J		+175	°C
Supply Voltage (GND0,GND)	V_{CC}	0	+7.0	V
Voltage on any Input Pin (GND0,GND)*	V_{IN}	-0.5	V_{CC}+5	V
Continuous Output Current	I_{OUT}	25		mA
Surge Output Current	I_{OUT}	200		mA
AC Voltage on any Differential Input	V_{IN}		900	mV_P

* Except differential inputs, which must be AC-coupled.

Note: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note: For operation at case temperatures less than -40°C, a ten second warm-up period is required for device to meet the full operating conditions.

Operating Conditions

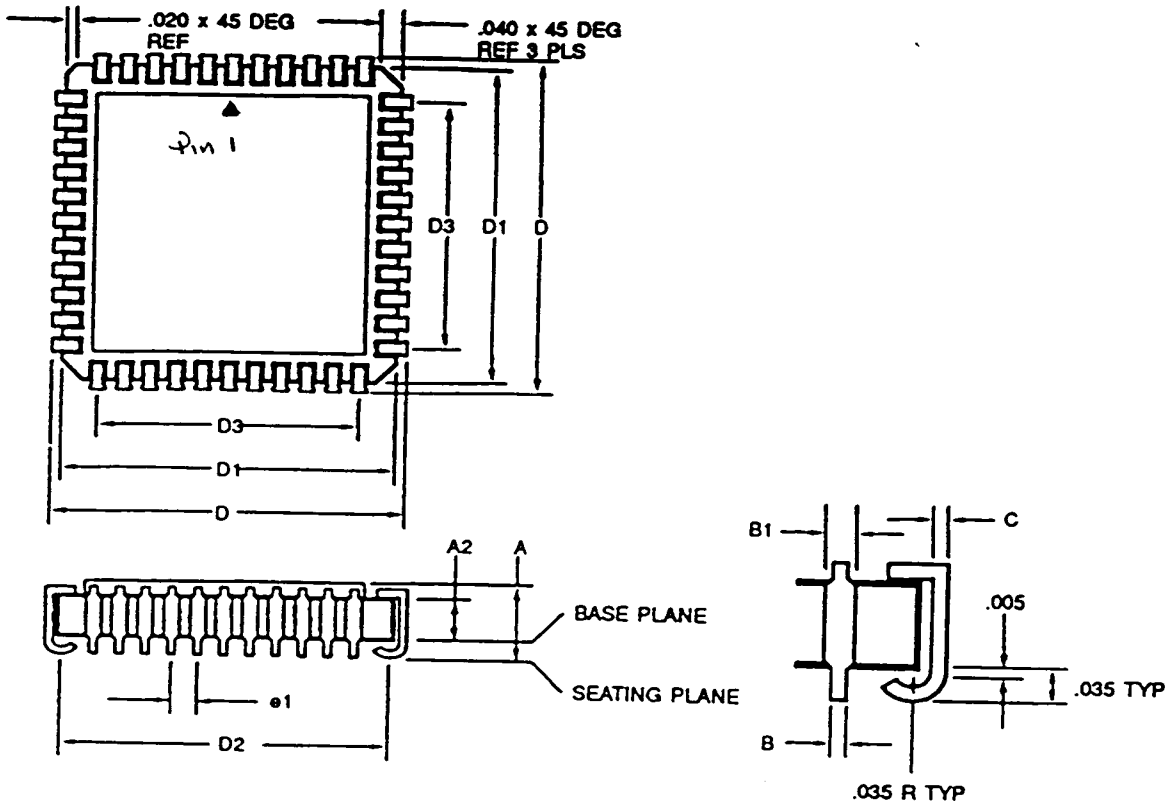
PARAMETERS	SYMBOL	MIN	TYPICAL	MAX	UNITS
Operating Temperature	T_A	-55		+85	°C
Supply Voltage	V_{CC}	4.50		5.50	V
Junction to Case Resistance	θ_{JC}*		14.5		°C/W

* θ_{JC} measured using socketed part in a controlled Flouroinert bath.

DC Electrical Specifications[1]

PARAMETERS	SYMBOL	MIN	TYPICAL	MAX	UNITS
ECL High Output Voltage	V_{OH}	V_{CC}-1050	V_{CC} -955	V_{CC}-820	mV
ECL Low Output Voltage	V_{OL}[2]	V_{CC}-1880	V_{CC}-1705	V_{CC}-1620	mV
ECL Low Output Voltage	V_{OL}[3]		V_{CC}-2855		mV
TTL Low Output Voltage	V_{OL}			50[4]	mV
TTL High Input Voltage	V_{IN}	2000		V_{CC}	mV
TTL Low Input Voltage	V_{IL}	0		800	mV
TTL High Input Current	I_{IH}			1.0	mA
TTL Low Input Current	I_{IL}	-0.4			mA
TTL High Output Current	I_{OH}[5]			500	uA
Supply Current	I_S		336	420	mA
Power Dissipation	P_D		1.7	2.2	W

Notes:
1 For V_{CC} = +5±0.5V; GND = 0V(GND); T_J= -40 to +125° C, T_A=-40 to +85° C.
2 Applies to REF DIV OUT and VCO DIV OUT ECL outputs terminated through 50 ohms to (V_{CC}-2.0V).
3 Applies to PD OUT/, PD U OUT/, PD D OUT/ ECL outputs terminated through 50 ohms to (V_{CC}-2.0V). There is a +1.6 mV/°C temperature coefficient on the low voltage level of these outputs, with zero compensation at T_{JC} = 35 ° C (nominal room temperature).
4 Open collector type output, sinking I_{OUT}=25 mA.
5 Open collector, V_{OH} = 2V.



Dimension	Inches	
	Min	Max
A	.113 Ref	
A2	.062	.078
B	.017 Typ	
B1	.030 Typ	
C	.006	.010
D	.680	.700
D1	.640	.660
D2	.610	.650
D3	.490	.510
e1	.050 Typ	

Q3036M-16L 44-pin CLDCC Outline Drawing

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