

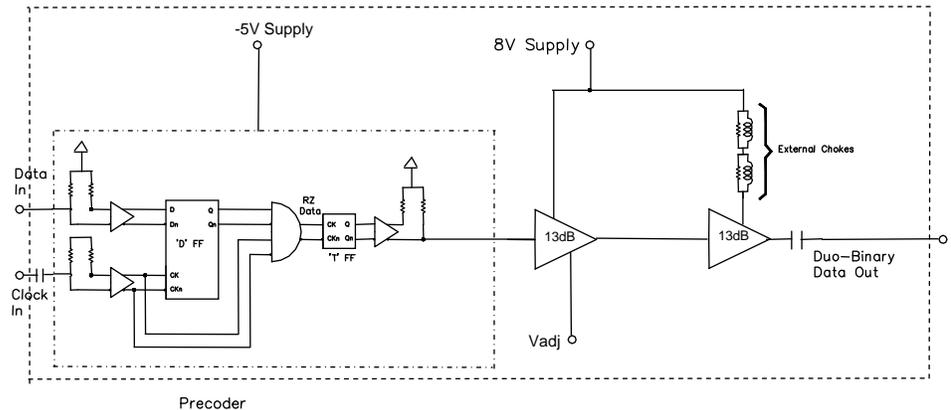
Duobinary Encoder and Driver Amplifier

Description

The iT6144 is a RoHS-6-compliant integrated duobinary encoder and driver in a compact, surface-mount package for optical 300-pin module and linecard transponders used in long-haul applications. The device converts an electrical 10 Gb/s NRZ signal into an equivalent duobinary signal, then amplifies it to drive a “filtered” LiNbO₃ modulator. The iT6144’s duobinary output level is adjustable from 6 to 10.5 V_{pp}, which is sufficient to reach 2*V_{pi} of most LiNbO₃ modulators and provide margin for loop control to track variations caused by temperature and aging. Single-ended clock and data inputs eliminate the need for phase-matched traces, simplifying the board layout. The clock input and duobinary output are AC-coupled in the package. The data input should be AC-coupled outside the package. The device is housed in a rugged, RoHS-6-compliant, ceramic package.

Features

- Compact duobinary conversion and transmitter drive functions
- Supports external Bessel filter and pre-filtered modulator applications
- Adjustable AC coupled output voltage from 6.0 to 10.5 V_{pp}
- Power dissipation: 3.3 W with +8 V and -5 V supply voltages
- Single-ended, AC-coupled data and clock inputs
- RoHS-6-compliant, 7x8 mm² (0.278 x 0.315 mil²) SMT ceramic package with bottom pad grounding and heat sinking

Device Diagram

Absolute Maximum Ratings

Symbol	Parameter	Minimum	Maximum	Unit
V _{dd}	+8 VDC supply input		10	V
V _{ee}	-5 VDC supply input	-6		V
V _{g1}	First gate negative supply voltage	-2	0	V
V _{g2}	Second gate negative supply voltage	-2	0	V
V _{adj}	Output voltage adjustment	-3	+2	V
T _{base}	Base operating temperature		85	°C
T _{st}	Storage temperature		125	°C



iT6144 Duobinary Encoder and Driver Amplifier

Recommended Operating Conditions

1. The iT6144 is a heat-down device. This means that the primary heat conduction path for the package is through the base of the package. Proper PCB thermal design is required. The design will depend upon the particular application: considering orientation, airflow, and other physical and mechanical constraints.

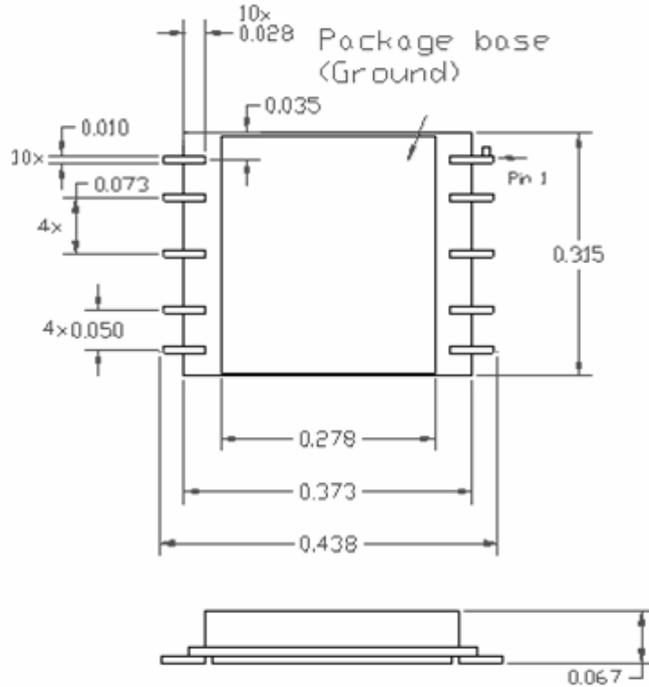
Symbol	Parameter	Min	Typ	Max	Units
Vdd	Positive supply voltage	7.6	8	8.4	V
Idd	Positive supply current	260	330	370	mA
Vee	Negative supply voltage	-4.75	-5	-5.25	V
Iee	Negative supply current	105	115	125	mA
Vadj	Output voltage adjustment	-1.5		0	V
Iadj	Current of output voltage adjustment		≈ 0		mA
Vg1	First gate negative supply voltage	-1.3	-1	-0.8	V
Ig1	First gate negative supply current		≈ 0		mA
Vg2	Second gate negative supply voltage	-0.35	-0.55	-0.75	V
Ig2			≈ 0		mA
Tbase		0		75	°C

Electrical Characteristics

At ambient temperature

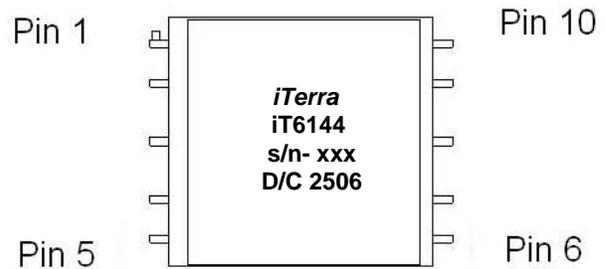
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input data rate	DIN_dr		9.9		11.5	Gb/s
Input clock frequency	CLK_f		9.9		11.5	GHz
Clock and data input amplitude (AC coupled)	Vin_pp		350		1000	mVpp
Data-clock phase margin	PH_d-c			290		Deg.
Maximum output voltage amplitude (AC coupled)	Vout_max	Level adjust control set to maximum			10.5	Vpp
Minimum output voltage amplitude (AC coupled)	Vout_min	Level adjust control set to min.	6.0			Vpp
Jitter	J			1.6	2	ps RMS

"G" Package Dimensions (in inches)



Pad Assignments

Pad #	Function
1	Vg1
2	Vadj
3	Data in
4	Clock in
5	Vee
6	Vg2
7	DBout
8	NC
9	Vdd
10	Vdd (choke)
Base	Ground



Data-in should be AC coupled externally
 Note: Clock-in is internally AC coupled
 Rzout is internally AC coupled