DATA SHEET

GTL2020/GTL2021/GTL2022/GTL2023
32-bit GTL terminator with octal enables

Product specification

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32-bit GTL terminator with octal enables

GTL2020/GTL2021/ GTL2022/GTL2023

FEATURES

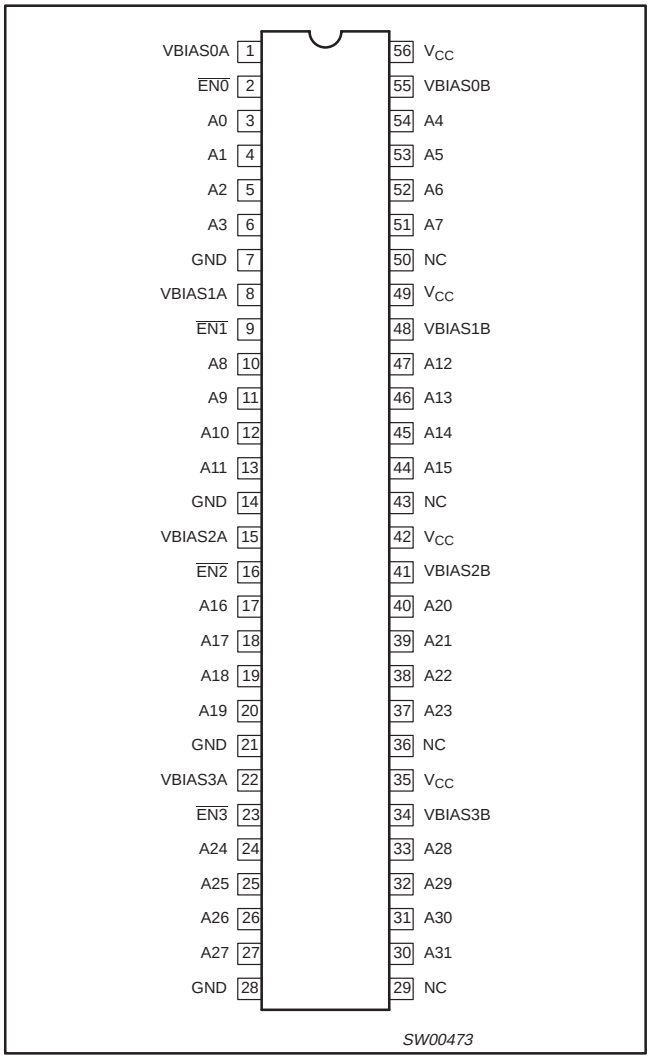
- GTL2020 r_{ON} is 56 Ω typical connected to 1.5 V V_{BIAS}
- GTL2021 r_{ON} is 75 Ω typical connected to 1.5 V V_{BIAS}
- GTL2022 r_{ON} is 100 Ω typical connected to 1.5 V V_{BIAS}
- GTL2023 r_{ON} is 150 Ω typical connected to 1.5 V V_{BIAS}
- Low power: 50 μW
- Switching speed: 5 ns max.
- Channel on capacitance: 3 pF
- V_{CC} operating range: +5 V ±10%
- Latch-up protection passes Class II JESD78
- ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115, and 1000 V CDM per JESD22-C101
- Available in TSSOP56 package

DESCRIPTION

The GTL202x series are 32-bit bus switches with GTL termination and octal output enables. The GTL202x is intended to provide GTL bus termination in multi-processor environments.

The enable pins allow the system control to disconnect the bus termination. When the bus switch is enabled, a 56, 75, 100 or 150 Ω series resistance is connected to the GTL Vbias.

PIN CONFIGURATION



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS T_{amb} = 25°C; GND = 0V	TYPICAL	UNIT
$t_{PE/PD}$	Bus enable/disable	C_L = 20 pF, R_L = 500 Ω	2.5	nS
C_{ON}	Input capacitance switch on	V_{IN} = 0 V	3	pF
C_{OFF}	Input capacitance switch off	V_{IN} = 0 V	6	pF

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE	DWG NUMBER
56-Pin Plastic TSSOP Type II	–40°C to +85°C	GTL2020 DGG	SOT364-1
56-Pin Plastic TSSOP Type II	–40°C to +85°C	GTL2021 DGG	SOT364-1
56-Pin Plastic TSSOP Type II	–40°C to +85°C	GTL2022 DGG	SOT364-1
56-Pin Plastic TSSOP Type II	–40°C to +85°C	GTL2023 DGG	SOT364-1

LOGIC DIAGRAM

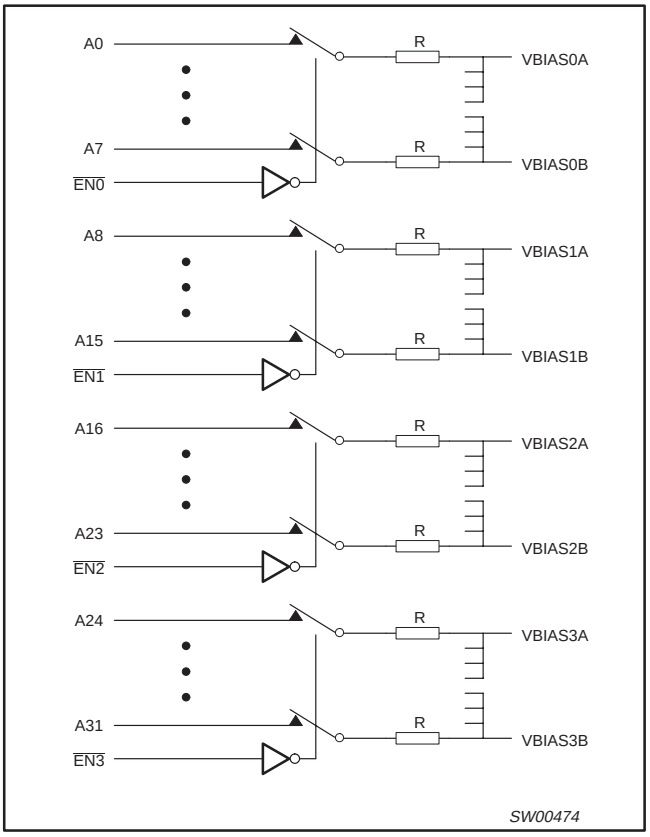


Figure 1.

FUNCTION TABLE

$\overline{ENn}$	SWITCH
L	ON
H	OFF

NOTES:
When enabled:
Ports Ax connect to V_{BIASnA}
Ports Ay connect to V_{BIASnB}
Where:
X = 0–3, 8–11, 16–19, 24–27
Y = 4–7, 12–15, 20–23, 28–31

ABSOLUTE MAXIMUM RATINGS[1]

Above which the useful life may be impaired. For user guidelines, not tested.

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V_{CC}	Supply voltage to ground potentials	Inputs and V_{CC} only	–0.5 to +7.0	V
V_I	DC input voltage		–0.5 to +7.0	V
T_{stg}	Storage temperature range		–65 to +150	°C
T_{amb}	Ambient temperature range with power applied		–40 to +85	°C

NOTE:
1. Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. this is a stress rating only and functional operation of the device at these or any conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN.	TYP.[1]	MAX.	
V_{IH}	TTL input HIGH voltage	Control Inputs	2.0	—	—	V
V_{IL}	TTL input LOW voltage	Control Inputs	—	—	0.8	V
V_{CC}	DC supply voltage		4.5	—	5.5	V
V_{IH}	High-level input voltage (control pin)		2.0	—	—	V
V_{IL}	Low-level input voltage (control pin)		—	—	0.8	V
V_{BIAS}	DC supply voltage		1.35	—	1.65	V
T_{amb}	Operating free-air temperature range		–40	—	+85	°C

DC ELECTRICAL CHARACTERISTICS

V_{CC} = 5 V ±10%; T_{amb} = –40°C to +85°C

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN.	TYP.[1]	MAX.	
I_I	Control inputs	V_{CC} = 5.5 V, V_I = V_{CC} or GND	—	0.1	±1	µA
	Switch inputs	V_{CC} = 5.5 V, V_I = 1.65 V, V_{BIAS} = 0 V	—	0.01	±1	µA
V_{IK}	Input clamp voltage	V_{CC} = 4.5 V, I_{IK} = –18 mA	—	–0.85	–1.2	V
r_{ON}	GTL2020 switch on resistance	V_{CC} = MIN, V_{IN} = 0 V, V_{BIAS} = 1.5 V	42	56	70	Ω
	GTL2021 switch on resistance	V_{CC} = MIN, V_{IN} = 0 V, V_{BIAS} = 1.5 V	64	75	92	Ω
	GTL2022 switch on resistance	V_{CC} = MIN, V_{IN} = 0 V, V_{BIAS} = 1.5 V	80	100	120	Ω
	GTL2023 switch on resistance	V_{CC} = MIN, V_{IN} = 0 V, V_{BIAS} = 1.5 V	125	150	175	Ω
C_{IN}	Input capacitance ENx pins	V_{IN} = 0 V	—	5.6	—	pF
C_{ON}	Input capacitance, switch on	V_{IN} = 0 V	—	3	—	pF
C_{OFF}	Input capacitance, switch off	V_{IN} = 0 V	—	6	—	pF
I_{CC}	Power supply quiescent	V_{BIAS} = 1.5 OE = 0 V or V_{CC}	—	—	10	µA
ΔI_{CC}	Additional supply current per input pin[2]	V_{CC} = 4.5 V to 5.5 V; one input at V_{CC} –3.0 V, other inputs at V_{CC} or GND	—	0.1	0.5	mA

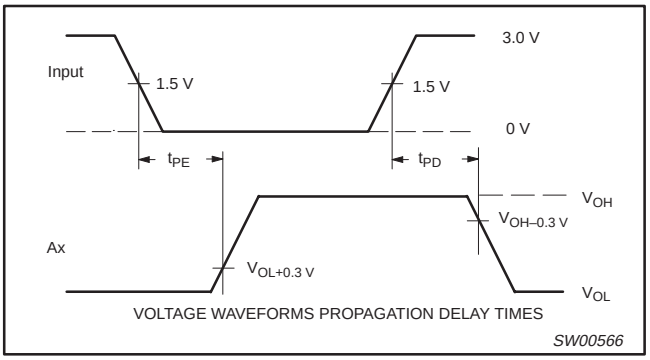
NOTES:
1. Typical values are shown at V_{CC} = 5.0 V, +25°C ambient and maximum loading.
2. This is the increase in supply current for each LVTTL input at the specified voltage level other than V_{CC} or GND.

AC ELECTRICAL CHARACTERISTICS

V_{CC} = 5 V ±10%; T_{amb} = –40°C to +85°C; t_r = t_f = 2.5 nS

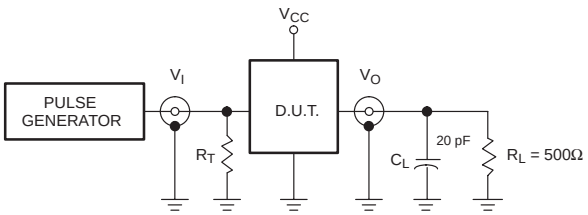
SYMBOL	PARAMETER		WAVEFORM	TEST CONDITIONS	LIMITS			UNIT
					MIN.	TYP.	MAX.	
t_{PE}	Bus enable	GTL2020	1	C_L = 20 pF, R_L = 500 Ω	1	–	3	ns
t_{PD}	Bus disable		1	C_L = 20 pF, R_L = 500 Ω	1	–	3	ns
t_{PE}	Bus enable	GTL2021	1	C_L = 20 pF, R_L = 500 Ω	1	–	3	ns
t_{PD}	Bus disable		1	C_L = 20 pF, R_L = 500 Ω	1	–	3	ns
t_{PE}	Bus enable	GTL2022	1	C_L = 20 pF, R_L = 500 Ω	1	–	3	ns
t_{PD}	Bus disable		1	C_L = 20 pF, R_L = 500 Ω	1	–	4	ns
t_{PE}	Bus enable	GTL2023	1	C_L = 20 pF, R_L = 500 Ω	1	–	5	ns
t_{PD}	Bus disable		1	C_L = 20 pF, R_L = 500 Ω	1	–	5	ns

AC WAVEFORMS



Waveform 1.

TEST CIRCUIT



Test Circuit for switching times

DEFINITIONS

R_L = Load resistor

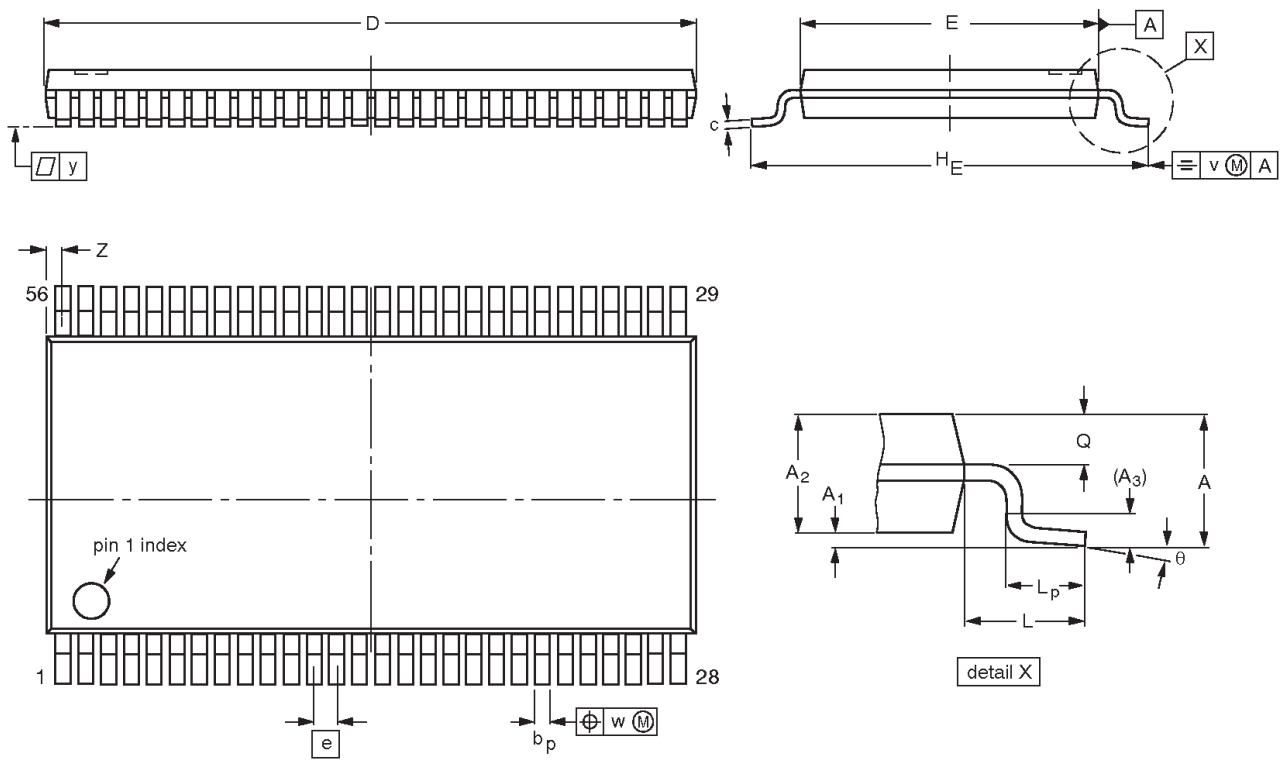
C_L = Load capacitance includes jig and probe capacitance

R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.

SW00565

Figure 2.

TSSOP56: plastic thin shrink small outline package; 56 leads; body width 6.1mm SOT364-1



DIMENSIONS (mm are the original dimensions).

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	Q	v	w	y	Z	θ
mm	1.2	0.15 0.05	1.05 0.85	0.25	0.28 0.17	0.2 0.1	14.1 13.9	6.2 6.0	0.5	8.3 7.9	1.0	0.8 0.4	0.50 0.35	0.25	0.08	0.1	0.5 0.1	8^o 0^o

Notes

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES					EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ				
SOT364-1		MO-153EE					~~93-02-03~~ 95-02-10

Data sheet status

Data sheet status	Product status	Definition [1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

[1] Please consult the most recently issued datasheet before initiating or completing a design.

Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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