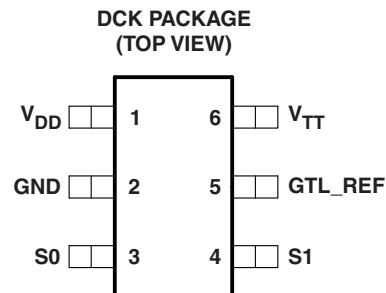


SELECTABLE GTL VOLTAGE REFERENCE

FEATURES

- V_{DD} Range: 3.0 V to 3.6 V
- V_{TT} Range: 1 V to 1.3 V
- Provides Selectable GTL V_{REF}
 - $0.615 \times V_{TT}$
 - $0.63 \times V_{TT}$
 - $0.65 \times V_{TT}$
 - $0.67 \times V_{TT}$
- $\pm 1\%$ Resistor Ratio Tolerance
- Ambient Temperature Range: -40°C to 85°C
- ESD Protection Exceeds the Following Levels Tests (Tested Per JESD-22):
 - 2500-V Human-Body Model (A114-B, Class II)
 - 250-V Machine Model (A115-A)
 - 1500-V Charged-Device Model (C101)



DESCRIPTION/ORDERING INFORMATION

The SN74GTL3004 provides for a selectable GTL Voltage Reference (GTL V_{REF}). The value of the GTL V_{REF} can be adjusted using S0 and S1 select pins.

The S0 and S1 pins contain glitch-suppression circuitry for excellent noise immunity. When left floating, the S0 and S1 control input pins have 100-k Ω pullups that set the GTL V_{REF} default value to the $0.67 \times V_{TT}$ ratio (S0 = 1 and S1 = 1).

ORDERING INFORMATION

T_A	PACKAGE ⁽¹⁾⁽²⁾	ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	SOT (SC70) – DCK Tape and reel	SN74GTL3004DCKR	2TK

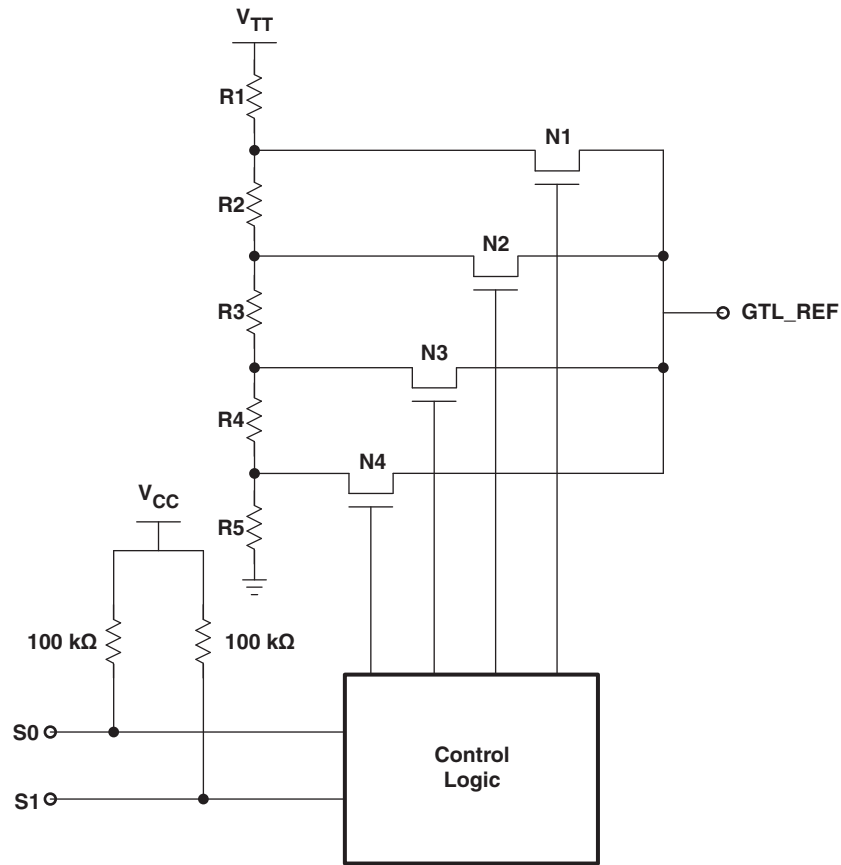
(1) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.

(2) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.



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LOGIC DIAGRAM



FUNCTION TABLE

S1	S0	RATIO SET
0	0	$0.615 \times V_{TT}$
0	1	$0.63 \times V_{TT}$
1	0	$0.65 \times V_{TT}$
1	1	$0.67 \times V_{TT}$

ABSOLUTE MINIMUM AND MAXIMUM RATINGS⁽¹⁾

over operating free-air temperature range (unless otherwise noted)

		MIN	MAX	UNIT
V _{DD}	Power supply voltage range	-0.3	4.6	V
V _{TT}	Termination voltage range ⁽²⁾	-0.3	4.6	V
V _{IN}	Control input voltage range ⁽²⁾	-0.3	V _{DD} + 0.3	V
V _{GTL_REF}	Resistor output voltage range ⁽²⁾	-0.3	V _{DD} + 0.3	V
I _{IK}	Input clamp current	V _{IN} < 0		-18 mA
I _{OK}	Output clamp current	V _O < 0		-18 mA
Continuous current through V _{DD} or GND				100 mA
θ _{JA}	Package thermal impedance ⁽³⁾	DCK package		259 °C/W
T _{stg}	Storage temperature range	-65	150	°C

- (1) Stresses beyond 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 beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.

RECOMMENDED OPERATING CONDITIONS⁽¹⁾

PARAMETER		MIN	TYP	MAX	UNIT
V _{DD}	Power supply voltage	3	3.3	3.6	V
V _{TT}	Termination voltage	1	1.1	1.3	V
V _{IH}	High-level control input voltage	V _{DD} × 0.65			V
V _{IL}	Low-level control input voltage			V _{DD} × 0.35	V
V _I	Control input voltage	0		V _{DD}	V
I _{OUT}	I _{GTL_REF} , G _T _REF output current	0		10	μA
PW	Control input pulse width	110			ns
T _A	Operating free-air temperature	-40		85	°C

- (1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow of Floating CMOS Inputs*, literature number SCBA004.

ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range, T_A = -40°C to 85°C, V_{DD} = 3.3 V ±10%, GND = 0 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V _{IK}	Control	V _{DD} = 3.6 V, I _{IN} = -18 mA			-1.8	V
I _{IN}	Control	V _{DD} = 3.6 V, V _{IN} = GND			43	μA
I _{DD}		V _{DD} = 3.6 V, V _{IN} = GND, I _O = 0 mA			85	μA
R	End-to-end resistance	V _{DD} = 3.6 V, V _{TT} = 1.1 V, I _O = 0 mA	4.25	7.12	10.6	kΩ
	GTL V _{REF} accuracy ⁽¹⁾	I _O = 0 μA, See Figure 1	-1		1	%
		I _O = 10 μA, See Figure 1	-7		7	

- (1) GTL V_{REF} accuracy is used to compare measured GTL_VREF voltage versus expected GTL_VREF voltage as determined by control inputs S0 and S1. The resistor ratio tolerance is incorporated into this parameter.

SWITCHING CHARACTERISTICS

over recommended operating free-air temperature range, T_A = -40°C to 85°C, V_{DD} = 3.3 V ±10%, GND = 0 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
PSR	Power supply rejection			-58		dB
	Pulse rejection				40	ns

PARAMETER MEASUREMENT INFORMATION

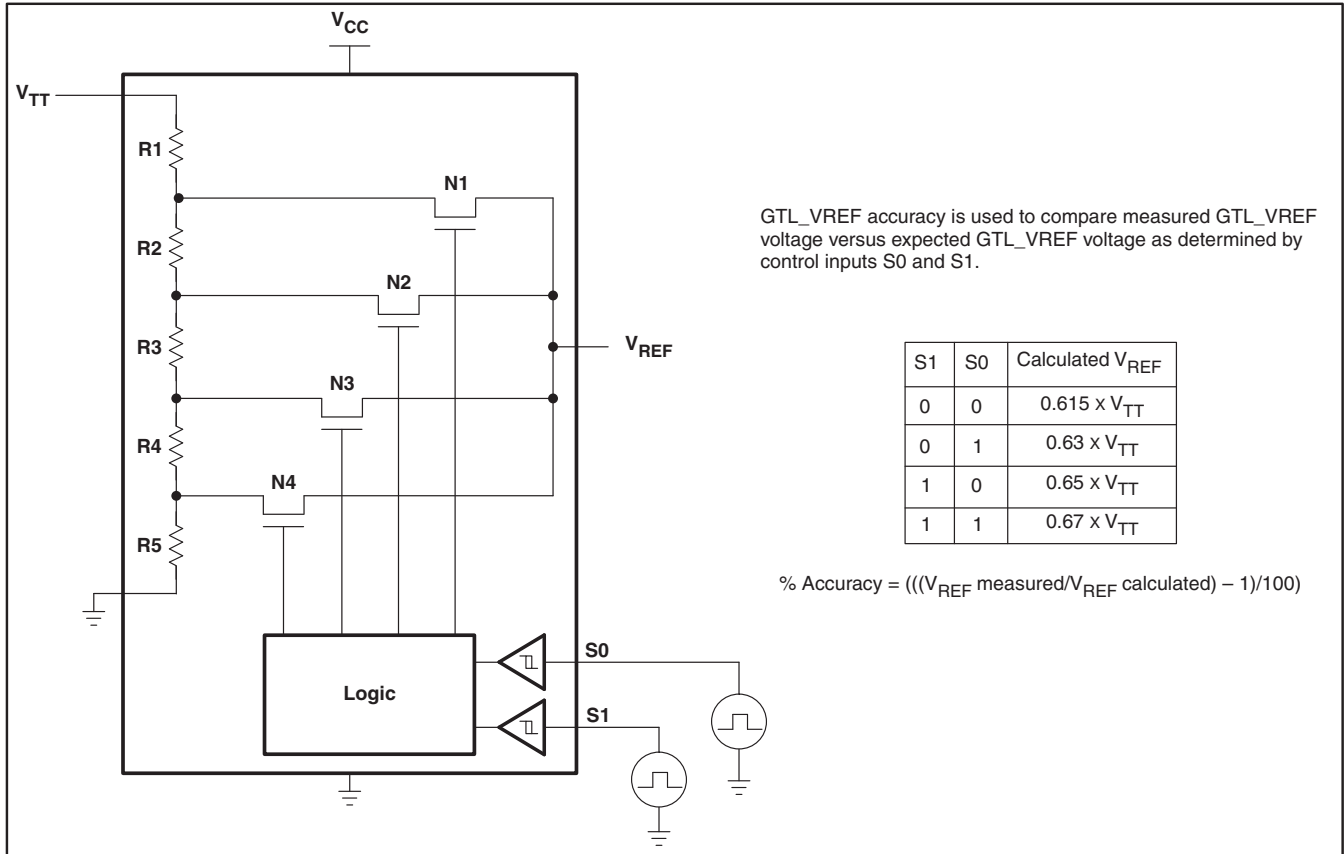


Figure 1. GTL_REF Accuracy

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74GTL3004DCKR	ACTIVE	SC70	DCK	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	2TK	Samples

(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.

OBSELETE: 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.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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TAPE AND REEL INFORMATION

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
SN74GTL3004DCKR	SC70	DCK	6	3000	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74GTL3004DCKR	SC70	DCK	6	3000	205.0	200.0	33.0

DCK (R-PDSO-G6)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
 - Publication IPC-7351 is recommended for alternate designs.
 - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.

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