4-Bit Dual-Supply Level Translator

Product Preview
T30LMXT3V4T244, T30LMXT3V4T240, T30LMXT3V4T3144

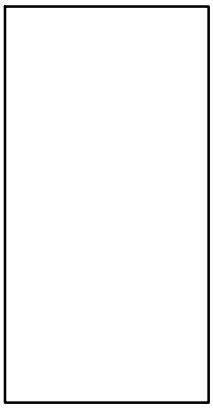
The T30LMXT3V4T244 / T30LMXT3V4T240 / T30LMXT3V4T3144 are 4-bit configurable dual-supply level translators with 3-state outputs. The A and B ports are designed to track two different power supply rails, V_{CCA} and V_{CCB} respectively. Both supply rails are configurable from 0.9 V to 3.6 V allowing universal voltage level translation between the A to B ports.

The T30LMXT3V4T244 is a 4-bit level translator that allows non-inverting translations from A to B ports. The T30LMXT3V4T240 is a 4-bit level translator that allows inverting translations from A to B ports. The T30LMXT3V4T3144 is a 4-bit level translator that allows 3 bits of non-inverting translations from A to B ports and 1 bit of non-inverting translation from B to A.

The output enable pin ($\overline{OE}$), when High, disables all the output ports by putting them in 3-state. The $\overline{OE}$ pin is designed to track V_{CCA}.

Features

- Wide V_{CCA} and V_{CCB} Operating Range: 0.9 V to 3.6 V
- Balanced Output Drive: ±24 mA @ 3.0 V
- High-Speed w/ Balanced Propagation Delay: 2.8 ns max at 3.0 to 3.6 V
- Input/Output Pins OVT to 3.6 V
- Non-preferential V_{CC} Sequencing
- Outputs at 3-State until Active V_{CC} is Reached
- Partial Power-Off Protection
- Outputs Switch to 3-State with either V_{CC} at GND
-



T30LMXT3V4T244

T30LMXT3V4T240

Figure 1. Logic Diagrams

Figure 2. Pin Assignments (Top View)

MAXIMUM RATINGS

Symbol	Rating		Value	Condition	Unit
V_{CCA}, V_{CCB}	DC Supply Voltage		ï0.5 to +4.3		V
V_I	DC Input Voltage	$\overline{OE}$, A, B	ï0.5 to +4.3		V
V_O	DC Output Voltage	(Power Down Mode) A, B	ï0.5 to +4.3	$V_{CCA} = V_{CCB} = 0$	V
		(3 ïState Mode) A, B	ï0.5 to +4.3		
		(Active Mode) A	ï0.5 to V_{CCA}+0.5		
		(Active Mode) B	ï0.5 to V_{CCB}+0.5		
I_{IK}	DC Input Diode Current		ï50	V_I < GND	mA
I_{OK}	DC Output Diode Current		ï50	V_O < GND	mA
I_O	DC Output Source/Sink Current		±50		mA
I_{CC}	DC Supply Current Per Supply Pin		±100		mA
I_{GND}	DC Ground Current per Ground Pin		±100		mA
T_{STG}	Storage Temperature Range		ï65 to +150		°C
θ_{JA}	Thermal Resistance (Note 1)	SOIC ï14 TSSOP ï14 UQFN12		116 150 143	°C/W
P_D	Power Dissipation in Still Air	SOIC ï14 TSSOP ï14 UQFN12		1077 833 875	mW
MSL	Moisture Sensitivity Level			Level 1	ï
F_R	Flammability Rating	Oxygen Index: 28 to 34		UL 94 V ï0 @ 0.125 in	ï
V_{ESD}	ESD Withstand Voltage (Note 2)	Human Body Model Charged Device Model		2 1	kV
$I_{LATCHUP}$	Latchup Performance (Note 3)			±100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Measured with minimum pad spacing on an FR4 board, using 76mm ïby ï114mm, 2 ï

DC ELECTRICAL CHARACTERISTICS ï INPUT VOLTAGES

Symbol	Parameter	Test Condi-tions	Port	V_{CCA} (V)		T_A = ï40°C to +85°C			T_A = ï40°C to +125°C		Unit
						Min	Typ (Note 4)	Max	Min	Max	
						2.0					

DC ELECTRICAL CHARACTERISTICS ï OUTPUT VOLTAGES

Symbol	Parameter	Test Conditions	V_{CCA} (V)	V_{CCB} (V)	T_A = ï40°C to +85°C			T_A = ï40°C to +125°C		Unit
					Min	Typ (Note 4)	Max	Min	Max	
V_{OH}	Output HIGH Voltage	$V_I = V_{IH}$ or V_{IL}:								V
		I_{OH} = ï100 µA A	0.9 ï 3.6	0.9 ï 3.6	V_{CCA} ï 0.1	ï	ï	V_{CCA} ï 0.1	ï	
		B	0.9 ï 3.6	0.9 ï 3.6	V_{CCB} ï 0.1	ï	ï	V_{CCB} ï 0.1	ï	
		I_{OH} = ï0.5 mA	0.9	0.9	0.7	ï	ï	0.7	ï	
		I_{OH} = ï3 mA	1.1	1.1	0.85	ï	ï	0.85	ï	
		I_{OH} = ï6 mA	1.4	1.4	1.05	ï	ï	1.05	ï	
		I_{OH} = ï8 mA	1.65	1.65	1.2	ï	ï	1.2	ï	
		I_{OH} = ï12 mA	2.3	2.3	1.8	ï	ï	1.8	ï	
			2.7	2.7	2.2	ï	ï	2.2	ï	
		I_{OH} = ï18 mA	2.3	2.3	1.7	ï	ï	1.7	ï	
			3.0	3.0	2.4	ï	ï	2.4	ï	
		I_{OH} = ï24 mA	3.0	3.0	2.2					

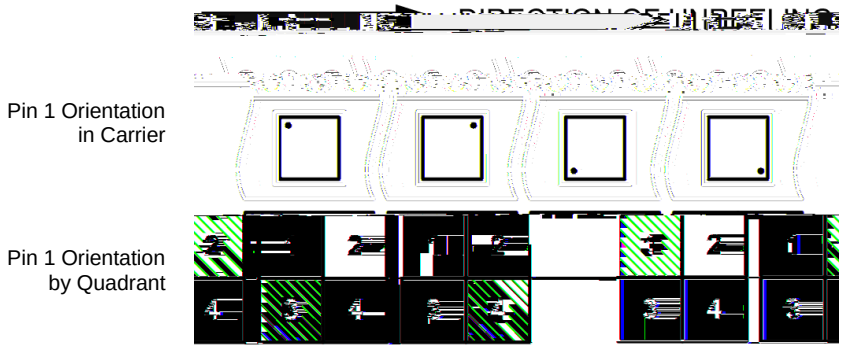
ORDERING INFORMATION

Device	Marking	Package	Pin 1 Quadrant	Shipping †
T30LMXT3V4T244MU2TAG	TBD	UQFN12	1	3000 Units / Tape & Reel
T30LAXT3V4T244MU2TAG*	TBD	UQFN12	1	3000 Units / Tape & Reel
T30LMXT3V4T244DR2G (Contact onsemi sales)	TBD	SOIC ï14	TBD	2500 Units / Tape & Reel
T30LMXT3V4T244DTR2G (Contact onsemi sales)	TBD	TSSOP ï14	TBD	2500 Units / Tape & Reel
T30LMXT3V4T240MU2TAG	TBD	UQFN12	1	3000 Units / Tape & Reel
T30LMXT3V4T240DR2G (Contact onsemi sales)	TBD	SOIC ï14	TBD	2500 Units / Tape & Reel
T30LMXT3V4T240DTR2G (Contact onsemi sales)	TBD	TSSOP ï14	TBD	2500 Units / Tape & Reel
T30LMXT3V4T3144MU2TAG	TBD	UQFN12	1	3000 Units / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

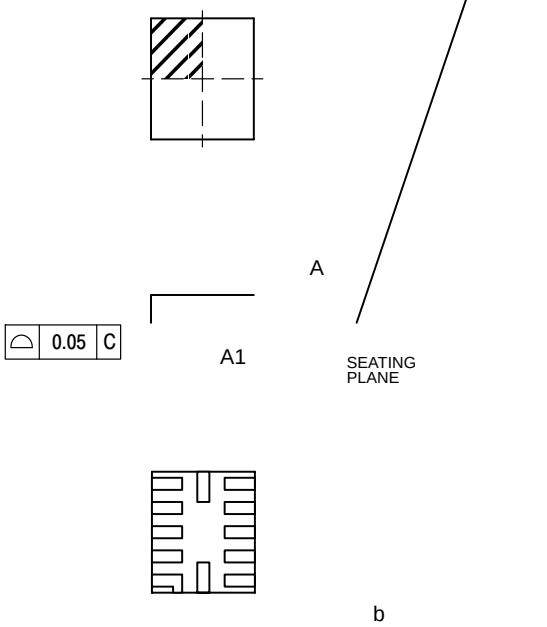
*For Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC ïQ100 Qualified and PPAP Capable.

Pin 1 Orientation in Tape and Reel



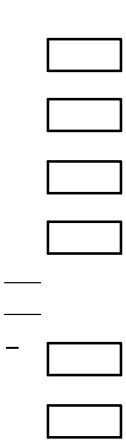
PACKAGE DIMENSIONS

UQFN12 1.7x2.0, 0.4P
CASE 523AE
ISSUE A



PACKAGE DIMENSIONS

SOIC ï14
D SUFFIX
CASE 751A ï03
ISSUE L



PACKAGE DIMENSIONS

TSSOP ï14
DT SUFFIX
CASE 948G
ISSUE C

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.NOTES:

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
B	4.30	4.50	0.169	0.177
C	ï ï ï	1.20	ï ï ï	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.50	0.60	0.020	0.024
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0	8	0	8