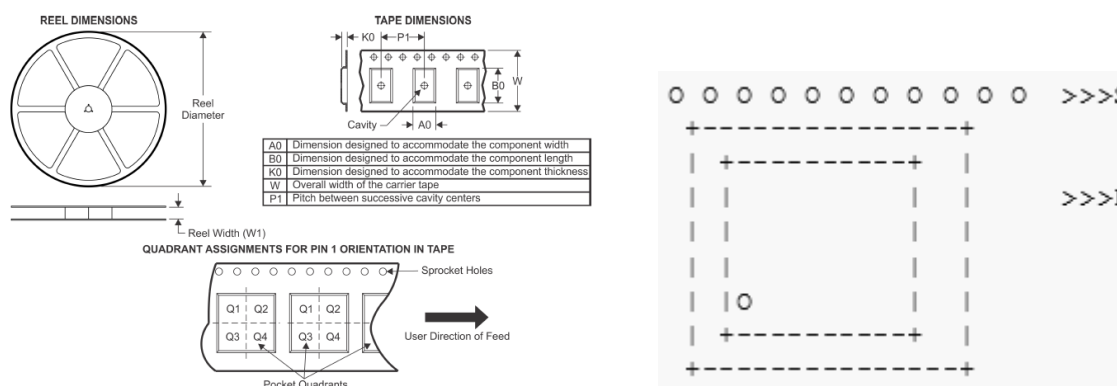


Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TL431BQDBZRQ1	SOT-23	DBZ	3	3000	179.0	8.4	3.15	2.95	1.22	4.0	8.0	Q3

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TL431BQDBZRQ1	SOT-23	DBZ	3	3000	203.0	203.0	35.0

TAPE AND REEL INFORMATION



Marking picture	vendor Name	Part No.	Marking Rule
T3FU	TI	TL431BQDBZRQ1	the marking " T3FU" represents the device name, by identifying units marking T3FU correctly to determine device

TI Part	*拆分部位名称	*均质材料名称	物质名称	*CAS No.	*物质重量	Content Rate(%) (均质材料中的含量)
	Disassembly Unit/component description	Homogeneous Material Name.	Substance Name		Substance Mass. (mg)	
TL431BQDBZRQ1	Bond Wire	Other Nonferrous Metals and Alloys	Calcium	7440-70-2	0.000001	0.00428
		Precious Metals	Gold	7440-57-5	0.023366	99.99572
	Die Attach Adhesive	Precious Metals	Silver	7440-22-4	0.09772	77.00006
		Thermoplastics	Epoxy	85954-11-6	0.029189	22.999945
	Lead Frame	Copper and Its Alloys	Copper	7440-50-8	4.726422	97.452
		Copper and Its Alloys	Iron	7439-89-6	0.11543	2.38
		Copper and Its Alloys	Phosphorus	7723-14-0	0.001843	0.038
		Zinc and Its Alloys	Zinc	7440-66-6	0.006305	0.13
	Lead Frame Plating	Nickel and Its Alloys	Nickel	7440-02-0	0.14268	95.12
		Precious Metals	Gold	7440-57-5	0.00117	0.78
		Precious Metals	Palladium	7440-05-3	0.00615	4.1
	Mold Compound	Other Inorganic Materials	Fused Silica	60676-86-0	4.949102	87
		Other Plastics and Rubber	Carbon Black	1333-86-4	0.005689	0.100007
		Thermoplastics	Epoxy	85954-11-6	0.733832	12.899994
	Semiconductor Device	Ceramics / Glass	Doped Silicon	7440-21-3	0.450449	100

Basic Information		Result
Device Part Number		TL431BQDBZRQ1
Wafer fab information, process type and node		SFAB
Wafer process was qualified and released to production or not.		Mature
Products have been applied with this wafer process?		Yes
Is there any part from the same wafer process family have been used in customer?		YES
Wafer Process Capability(SPC)		Meet SPC Spec
Is there any wafer process CPK<1.33? If yes, please list it and provide the improvement plan.		NO
Chip ID:Do you have chip ID or die ID for this device?		NO
Assembly Factory, Package type		TI Subcon QFN
Package Size (Length*Width*Height)		1.3x2.92x1.22mm
Ball/Lead pitch		0.96MM
Is there any part from the same package family have been used in customer? If yes, please list the part number.		YES
Wire Bonding (Only for Wire Bonding Package)	Wire composition	Au
	Wire diameter	1.0mil
Assembly Process Capability(SPC)		Meet spc spec
Is there any assembly process CPK<1.33? If yes, please list it and provide the improvement plan.		NO
Range of Operation Temperature (Ta, Tj or Tc)		-40~125C
Storage Temperature range		-65 ~ 150C
Storage limit		1years at customer side
Max.Junctioin Temperature		150C
IFR, Intrinsic Failure Rate, FIT		0.7FIT@60%CL
MSL, Moisture Sensitive Level		MSL 1
Theta ja, jc and jb	Θja	334.7°C/W
	Θjc	113.5 °C/W
	Θjb	67.6°C/W
ESD (HBM、CDM, for all pin)	HBM	2000
	CDM	1000

Latch-Up (At max. Ambient Temperature)	Meet qual test requirement
Test Factory	TI Subcon
If the chip is new process or new design, And some Lifetime limit test(Test to fail or beyond JEDEC standard) had been down. Please specify the test condition and result details.	NO
Wafer reliability Qualification Report, including: TDDb, HCI, NBTI, PBTI, EM, SM .etc	YES
Package Qualification Report, including: PC, THB, HAST, UHAST, HTSL, TC, BLTC, DT, Bend, PDT, PVT .etc	See TI.com qual report
Device Qualification Report, including: ELFR, HTOL, LTOL, ASER, SSER, ESD-HBM, ESD-CDM, LU .etc	See TI.com qual report
The device should be done reliability monitoring. Please provide the latest Reliability Monitoring Report, including: PC, THB, HAST, UHAST, TC, HTSL, HTOL .etc	ORT test based on package
Characterization report, follow JESD86	Refer to datasheet

Check Items for TL431BQDBZRQ1		Result
Surface plating/ coating material	Composition	NIPDAU
	Thickness(μm)	Confidential
Basic metal		Cu
Package standard		JEDEC
Weight of component (g)		0.0113
Weight/ available P&P area≤0.06g/mm2		Yes
coplanarity	coplanarity during reflow process	refer to datasheet
Pin1 Mark point	Is there any pin1 Mark point in the top side of component?	Yes
	Is the pin1 mark point sole? (if not, pls. give the relationship between mark and terminals)	Yes
	Is there any specific location number of terminals in the component specification?	Yes

	Component orientation can be Identified by mounting machine or AOI?	Yes
seal	Is there any hole or gap in package body, flux enter package inside form the hole or gap, resulting in function fail	NO
exposed Non-insulator on component body	Whether there exists non-insulator at no soldering position. Are non-insulator and adjacent soldering pin the same circuit?	NO
	Have Dimension and Position of non-insulator been indicated in component spec.	Yes
Are matters RoHS compliant listed below? (please refer to "sheet7 RoHS Compliant" in this file) Lead, Cd, Hg, Cr VI, PBB, PBDE Lead-free		Yes
Is it Halogen-free		Yes
Relative humidity (%)		$\geq 20\% \& \leq 70\%$
Temperature (°C)		$\geq -10^{\circ}\text{C} \& \leq 35^{\circ}\text{C}$
Maximum storage time (month)		Follow MSL rating rules Allowed 1 year stored at customer side
Packaging type		卷带料 Reel tape and real
Position of component pin 1 in packing		Q3
Packaging height(K0)		1.22
Packaging width(W)		8mm
component pitch:P1		4mm
ESD packaging		Yes
Rollover rate $\leq 0.05\%$ in packing		Yes
Maximum component rotation for punched $\leq 10^{\circ}$		Yes
tray packing Baking conditions: $125^{\circ}\text{C}@24\text{h}$		Yes
reel tape packing Baking conditions: $40^{\circ}\text{C}@192\text{h}$		Yes
Can reel tape packing meet EIA 481 standard?		EIA
MSL		1
Baking requirement if moisture meets J-STD-033?		Yes

Moisture sensitive level at level 2 and level 2 above, moisture sensitive protection must include: moisture sensitive indicator card, desiccant, moisture sensitive grade logo	Yes
Manual soldering conditions: soldering iron tip temperature 400°C time ≥ 5s。 Or hot gun temperature 340°C time ≥ 10s	Yes
Maximum soldering times ≥ 3	Yes
Can heat resistance of SMT components meet JSTD020D. (should focus on the classification of temperature and reflow profiles, that is table 4-1, 4-2 and 5-2, please refer to sheet 6 J-STD-020D in this file)	Yes
Maximum pick-and-place pressure (N)	Yes
Whether the welding process and design requirements of component have all written to the component specifications	Yes
Whether Pad & stencil design as Mandatory requirements in component spec?	recommended
Whether the device has special requirements for the reflow temperature ramp-up rate and ramp-down rate? Customer follow J-STD-002 standard	No
Are there other mandatory requirements in component spec?	No
Solder ability test report	Yes
Board level reliability test report	No

Qualification summary for:	TL431BQDBZRQ1
Report date:	06/17/2020

Type	AEC Q100 test #	Test spec	Min lot qty	SS / lot	Test name	Condition	Result
Test group A - accelerated environment stress test							
THB/HAST	A2	JESD22-A101/JESD22-A110	3	77	Temperature humidity-bias or biased HAST	THB 85C/85%RH for 1000 hours or HAST 110C/85%RH for 264 hours or equivalent	Pass
AC/UHAST	A3	JESD22-A102/JESD22-A118	3	77	Autoclave or unbiased HAST	AC 121C for 96 hours or UHAST 110C/85%RH for 264 hours or equivalent	Pass
TC	A4	JESD22-A104	3	77	Temperature cycle	Per grade requirements. See data sheet.	Pass
TC-WBP	A4	MIL-STD883 method 2011	1	30	Post temp cycle bond pull	Per requirements	Pass
HTSL	A6	JESD22-A103	1	45	High temp storage bake	Per grade requirements. See data sheet.	Pass
Test group B - accelerated lifetime simulation test							
HTOL	B1	JESD22-A108	3	77	High temperature operating life	Per grade requirements. See data sheet.	Pass
ELFR	B2	AEC Q100-008	3	800	Early life failure rate	Per grade requirements. See data sheet.	Pass
Test group C - package assembly integrity tests							
WBS	C1	AEC Q100-001	1	30	Wire bond shear	Cpk > 1.67	Pass
WBP	C2	MIL-STD883 method 2011	1	30	Wire bond pull	Cpk > 1.67	Pass
SD	C3	JEDEC J-STD-002 D	1	15	Solderability	>95% lead coverage	Pass
PD	C4	JESD22-B100 and B108	3	10	Physical dimensions	Cpk > 1.67	Pass
Test group D - die fabrication reliability tests							
EM	D1	—	—	—	Electromigration	Per technology requirements	Pass
Tddb	D2	—	—	—	Time dependent dielectric breakdown	Per technology requirements	Pass
HCI	D3	—	—	—	Hot carrier injection	Per technology requirements	Pass
NBTI	D4	—	—	—	Negative bias temperature instability	Per technology requirements	Pass
Test group E - electrical verification							
HBM	E2	AEC Q100-002	1	3	Electrostatic discharge - human body model	Per AEC Q100-002	See data sheet
CDM	E3	AEC Q100-011	1	3	Electrostatic discharge - charged device model	Per AEC Q100-011	See data sheet
LU	E4	AEC Q100-004	1	6	Latch-up	Per AEC Q100-004	Pass
ED	E5	AEC Q100-009	3	30	Electrical distributions	Per AEC Q100-009	Pass