

## ISE4028 REV E1 Bill of Materials

Designator	Quantity	Value	PartNumber	Manufacturer	Description	PackageReference
!PCB1	1		ISE4028	Any	Printed Circuit Board	
C1, C5, C29, C33, C35, C36	6	0.1uF	C1005X7R1H104K	TDK	CAP, CERM, 0.1 $\mu$ F, 50 V, +/- 10%, X7R, 0402	0402
C2, C3	2	4.7uF	GRM31CR71H475KA12L	MuRata	CAP, CERM, 4.7 $\mu$ F, 50 V, +/- 10%, X7R, 1206	1206
C4	1	1000pF	C1210C102KGRACTU	Kemet	CAP, CERM, 1000 pF, 2000 V, +/- 10%, X7R, 1210	1210
C6, C7	2	47uF	GRM32ER71A476KE15L	MuRata	CAP, CERM, 47 $\mu$ F, 10 V, +/- 10%, X7R, 1210	1210
C8	1	0.082uF	GRM155R71C823KA88D	MuRata	CAP, CERM, 0.082 $\mu$ F, 16 V, +/- 10%, X7R, 0402	0402
C9, C12	2	0.1uF	GRM155R71C104KA88D	MuRata	CAP, CERM, 0.1uF, 16V, +/-10%, X7R, 0402	0402
C10, C13	2	1uF	C1608X7R1C105K	TDK	CAP, CERM, 1uF, 16V, +/-10%, X7R, 0603	0603
C11, C14	2	10uF	C2012X7R0J106M125AB	TDK	CAP, CERM, 10 $\mu$ F, 6.3 V, +/- 20%, X7R, 0805	0805
C15, C16, C19, C20	4	2200pF	C1005X7R1H222K	TDK	CAP, CERM, 2200pF, 50V, +/-10%, X7R, 0402	0402
C17, C18	2	12pF	GRM1555C1E120JA01D	MuRata	CAP, CERM, 12 pF, 25 V, +/- 5%, C0G/NP0, 0402	0402
C21, C22	2	10pF	GRM1555C1H100JA01D	MuRata	CAP, CERM, 10 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402
C23	1	4.7uF	C2012X7R1A475M	TDK	CAP, CERM, 4.7 $\mu$ F, 10 V, +/- 20%, X7R, 0805	0805
C24	1	470000uF	DMF3Z5R5H474M3DTA0	MuRata	CAP, Electric Double Layer, 470000uF, 4.2 V, +/- 20%, 0.045 ohm, Electrical Double Layer Capacitor, Body 21.5x14.5mm, Pitch 3.5mm SMD	Electrical Double Layer Capacitor, Body 21.5x14.5mm, Pitch 3.5mm
C25	1	2.2uF	C2012X7R1C225K	TDK	CAP, CERM, 2.2 $\mu$ F, 16 V, +/- 10%, X7R, 0805	0805
C26, C27, C38	3	1uF	C1608X7R1C105K	TDK	CAP, CERM, 1 $\mu$ F, 16 V, +/- 10%, X7R, 0603	0603
C28, C31, C32	3	0.01uF	C1005X7R1C103K	TDK	CAP, CERM, 0.01 $\mu$ F, 16 V, +/- 10%, X7R, 0402	0402
C30	1	0.1uF	C3216X7R2E104K	TDK	CAP, CERM, 0.1 $\mu$ F, 250 V, +/- 10%, X7R, 1206	1206
C34	1	0.047uF	C1005X7R1C473K	TDK	CAP, CERM, 0.047 $\mu$ F, 16 V, +/- 10%, X7R, 0402	0402
C37	1	1uF	GRM55DR72E105KW01L	MuRata	CAP, CERM, 1 $\mu$ F, 250 V, +/- 10%, X7R, 2220	2220
D1	1	40V	B240-13-F	Diodes Inc.	Diode, Schottky, 40 V, 2 A, SMB	SMB
D2	1	36V	SMAJ36CA	Littelfuse	Diode, TVS, Bi, 36 V, 400 W, SMA	SMA
D3	1	60V	B560C-13-F	Diodes Inc.	Diode, Schottky, 60 V, 5 A, SMC	SMC
D4, D5	2	Neutral White	GW CSSRM1.PC-MTNP-5L7N-1	OSRAM	LED, Neutral White, SMD	3x3mm
D6	1	Red	SML-P12UTT86	Rohm	LED, Red, SMD	LED, 1x2x.6mm
H1, H2, H3, H4	4		NY PMS 440 0025 PH	B&F Fastener Supply	Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	Screw
H5, H6, H7, H8	4		1902C	Keystone	Standoff, Hex, 0.5"L #4-40 Nylon	Standoff
J1, J3, J6, J9, J10	5		800-10-002-10-001000	Mill-Max	Header, 100mil, 2x1, TH	Header, 2x1, 100mil, TH
J2	1		PJ-002AH-SMT-TR	CUI Inc.	Power Jack, SMT	14.8x11x12.6mm
J4	1	2x1	1715721	Phoenix Contact	Conn Term Block, 2POS, 5.08mm, TH	2POS Terminal Block
J5	1		502774-0891	Molex	Connector, micro SD Card, 1.1 mm, R/A, SMT	SMD, 14-Leads, Body 15x14.3mm, Pitch 1.1mm
J7	1		800-10-003-10-001000	Mill-Max	Header, 3x1, 100mil, SMT	Header, 3x1, 100mil, TH
J8	1		SBH11-PBPC-D07-ST-BK	Sullins Connector Solutions	Header (shrouded), 100 mil, 7x2, Gold plated, TH	7x2 Shrouded Header
L1	1	4.7uH	SRP7030-4R7FM	Bourns	Inductor, Flat Wire, Powdered Iron, 4.7 $\mu$ H, 5 A, 0.035 ohm, SMD	7.6x3x6.5mm
L2	1		DLW5BTM102TQ2K	MuRata	Coupled inductor, 2.5 A, 0.034 ohm, SMD	SMD, 5x5mm

Designator	Quantity	Value	PartNumber	Manufacturer	Description	PackageReference
L3	1	330 ohm	BLM18SG331TN1D	MuRata	1.5A Ferrite Bead, 330 ohm @ 100MHz, SMD	0603
L4	1	4.7uH	XFL4020-472MEB	Coilcraft	Inductor, Shielded, Composite, 4.7 uH, 2.7 A, 0.05 ohm, SMD	4x2x4mm
Q1, Q2	2	20V	CSD15571Q2	Texas Instruments	MOSFET, N-CH, 20 V, 10 A, SON 2x2mm	SON 2x2mm
R1	1	28.0k	CRCW040228K0FKED	Vishay-Dale	RES, 28.0 k, 1%, 0.063 W, 0402	0402
R2	1	34.0k	CRCW040234K0FKED	Vishay-Dale	RES, 34.0 k, 1%, 0.063 W, 0402	0402
R3, R4, R5, R9, R12	5	10.0k	CRCW040210K0FKED	Vishay-Dale	RES, 10.0 k, 1%, 0.063 W, 0402	0402
R6, R7, R10, R11	4	47.5k	CRCW060347K5FKEA	Vishay-Dale	RES, 47.5k ohm, 1%, 0.1W, 0603	0603
R8, R30, R31	3	100k	CRCW0402100KFKED	Vishay-Dale	RES, 100 k, 1%, 0.063 W, 0402	0402
R13, R14, R32	3	0	CRCW04020000Z0ED	Vishay-Dale	RES, 0 ohm, 5%, 0.063W, 0402	0402
R15, R16	2	0	CRCW25120000Z0EG	Vishay-Dale	RES, 0, 5%, 1 W, 2512	2512
R18	1	0	CRCW04020000Z0ED	Vishay-Dale	RES, 0, 5%, 0.063 W, 0402	0402
R20, R21	2	0.075	CSR1206FK75L0	Stackpole Electronics Inc	RES, 0.075, 1%, 0.5 W, 1206	1206
R22	1	909k	CRCW0402909KFKED	Vishay-Dale	RES, 909 k, 1%, 0.063 W, 0402	0402
R23	1	1.21k	CRCW04021K21FKED	Vishay-Dale	RES, 1.21 k, 1%, 0.063 W, 0402	0402
R24	1	2.74k	CRCW04022K74FKED	Vishay-Dale	RES, 2.74 k, 1%, 0.063 W, 0402	0402
R25	1	4.02k	CRCW04024K02FKED	Vishay-Dale	RES, 4.02 k, 1%, 0.063 W, 0402	0402
R26	1	18.7k	CRCW040218K7FKED	Vishay-Dale	RES, 18.7 k, 1%, 0.063 W, 0402	0402
R27	1	12.4k	CRCW040212K4FKED	Vishay-Dale	RES, 12.4 k, 1%, 0.063 W, 0402	0402
R28	1	6.98k	CRCW04026K98FKED	Vishay-Dale	RES, 6.98 k, 1%, 0.063 W, 0402	0402
R29	1	6.19k	CRCW04026K19FKED	Vishay-Dale	RES, 6.19 k, 1%, 0.063 W, 0402	0402
S1, S2, S3, S4	4		4-1437565-1	TE Connectivity	Switch, Tactile, SPST-NO, 0.05A, 12V, SMT	SW, SPST 6x6 mm
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5, SH-J6	6		881545-2	TE Connectivity	Shunt, 100mil, Gold plated, Black	Shunt 2 pos. 100 mil
TP1, TP2	2	Black	5001	Keystone	Test Point, Miniature, Black, TH	Black Miniature Testpoint
TP3, TP4, TP9, TP10	4	Yellow	5004	Keystone	Test Point, Miniature, Yellow, TH	Yellow Miniature Testpoint
TP5, TP6, TP7, TP8	4	Orange	5003	Keystone	Test Point, Miniature, Orange, TH	Orange Miniature Testpoint
TP11, TP12	2	White	5002	Keystone	Test Point, Miniature, White, TH	White Miniature Testpoint
U1	1		LMR14030SDDAR	Texas Instruments	40 V, 3.5 A Simple Switcher, 2.2 Mhz Step-Down Regulator with 40 uA Quiescent Current, DDA0008E	DDA0008E
U2	1		MSP430FR5969IRGZ	Texas Instruments	Mixed Signal Microcontroller, RGZ0048B	RGZ0048B
U3, U4, U5, U6, U7, U8, U9, U10, U11	9		TPD1E10B06DPYR	Texas Instruments	ESD in 0402 Package with 10 pF Capacitance and 6 V Breakdown, 1 Channel, -40 to +125 degC, 2-pin X2SON (DPY), Green (RoHS & no Sb/Br)	DPY0002A
U12	1		LM3550SPX/NOPB	Texas Instruments	5A Flash LED Driver with Automatic VLED and ESR Detection for Mobile Camera Systems, NHU0020A	NHU0020A
U13	1		DRV2700RGPR	Texas Instruments	Piezo Driver with Integrated Boost Converter, RGP0020D	RGP0020D
U14	1		LMV344IPW	Texas Instruments	R-R Out Quad Op Amp, PW0014A	PW0014A
U15	1		TPD6F003DQDR	Texas Instruments	EMI Filter for Display Interface, 6 Channels, -40 to +85 degC, 12-pin WSON (DQD), Green (RoHS & no Sb/Br)	DQD0012A
Y1	1		CM8V-T1A 32.768kHz 9.0pF +/-20ppm TA QC	Micro Crystal AG	Tuning Fork Crystal, 32.768kHz, 9pf, SMD	SMT, 2X.6X1.2mm
Y2	1		NX3225GD-8MHZ-STD-CRA-3	NDK	Crystal, 8MHz, 5pF, SMD	3.2x1.0x2.5mm
FID1, FID2, FID3, FID4, FID5, FID6	0		N/A	N/A	Fiducial mark. There is nothing to buy or mount.	Fiducial
J11, LS1	0		800-10-002-10-001000	Mill-Max	Header, 100mil, 2x1, TH	Header, 2x1, 100mil, TH

Designator	Quantity	Value	PartNumber	Manufacturer	Description	PackageReference
R17	0	0	CRCW06030000Z0EA	Vishay-Dale	RES, 0, 5%, 0.1 W, 0603	0603
R19	0	0	CRCW04020000Z0ED	Vishay-Dale	RES, 0, 5%, 0.063 W, 0402	0402

## IMPORTANT NOTICE FOR TI REFERENCE DESIGNS

Texas Instruments Incorporated ("TI") reference designs are solely intended to assist designers ("Buyers") who are developing systems that incorporate TI semiconductor products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, evaluation and judgment in designing Buyer's systems and products.

TI reference designs have been created using standard laboratory conditions and engineering practices. **TI has not conducted any testing other than that specifically described in the published documentation for a particular reference design.** TI may make corrections, enhancements, improvements and other changes to its reference designs.

Buyers are authorized to use TI reference designs with the TI component(s) identified in each particular reference design and to modify the reference design in the development of their end products. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI REFERENCE DESIGNS ARE PROVIDED "AS IS". TI MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE REFERENCE DESIGNS OR USE OF THE REFERENCE DESIGNS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. TI DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO TI REFERENCE DESIGNS OR USE THEREOF. TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY BUYERS AGAINST ANY THIRD PARTY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON A COMBINATION OF COMPONENTS PROVIDED IN A TI REFERENCE DESIGN. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY AND WHETHER OR NOT TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, ARISING IN ANY WAY OUT OF TI REFERENCE DESIGNS OR BUYER'S USE OF TI REFERENCE DESIGNS.

TI reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques for TI components are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

Reproduction of significant portions of TI information in TI data books, data sheets or reference designs is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards that anticipate dangerous failures, monitor failures and their consequences, lessen the likelihood of dangerous failures and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in Buyer's safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed an agreement specifically governing such use.

Only those TI components that TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components that have **not** been so designated is solely at Buyer's risk, and Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.