

# Bill of Materials

TI DESIGNS

TIDA-00609

Item	Qty	Reference	Value	Part Description	Manufacturer	Manufacturer Part Number	Alternate Part	PCB Footprint	Note
1	1	U1		PROCESSOR SUPERVISORY CIRCUITS 2.93V 200ms	TEXAS INSTRUMENTS	TPS3825-33DBVR			
2	1	U2		USB STREAMING CONTROLLER TQFP48-PFB ROHS	TEXAS INSTRUMENTS	TAS1020BPFB			
3	1	U3		192kHz DIG AUDIO TRANSCEIVER W/STEREO ADC AND ROUTING LQFP48-PT ROHS	TEXAS INSTRUMENTS	PCM9211PTR			
4	1	U4		24 BIT 96/192kHz 6-IN 8-OUT CODEC DIFF IN/OUT HTQFP64-PAP ROHS	TI/BURR-BROWN	PCM3168APAP			
5	1	U5		CODEC WCSP81-YZF ROHS	TEXAS INSTRUMENTS	TLV320AIC3262IYZFR			
6	1	U6		HTSSOP56-DCA ROHS	TEXAS INSTRUMENTS	TAS5548DCA			
7	1	U7		ROHS	TEXAS INSTRUMENTS	MSP430F5510IRGZR			
8	1	U8		QFN32-RGJ ROHS	TEXAS INSTRUMENTS	TCA6424ARGJR			
9	2	U9, EP1		SERIAL EEPROM I2C 512K 400kHz TSSOP8-ST ROHS	MICROCHIP	24LC512-I/ST			
10	1	U11		LO VOLT 8 BIT I2C EXPANDER INTERRUPT RESET UQFN16-RSV,ROHS	TEXAS INSTRUMENTS	TCA6408ARSVR			
11	6	U12, U13, U14, U15, U16, U18		SOT553-DRL5 ROHS	TEXAS INSTRUMENTS	SN74LVC1G125DRLR			
12	1	U17		QFN12-RUE ROHS	TEXAS INSTRUMENTS	TCA6507RUE			
13	1	U19		DATAFLASH MEMORY 4MB SPI CONTROL UDFN8 ROHS	ADESTO TECHNOLOGIES	AT45DB041E-MHN2B-T			
14	2	A, PROF-A		LED BLUE SMD0603 2.85V 5mA ROHS	OSRAM OPTO	LB Q39G-L2N2-35-1		SMD0603	
15	2	B, PROF-B		LED RED SMD0603 2.1V 10mA ROHS	LITE-ON INC.	LTST-C190EKT		SMD0603	
16	5	BUF1, BUF2, BUF3, BUF4, BUF5		DUAL BUFFER GATE SOT553-DRL6 ROHS	TEXAS INSTRUMENTS	SN74LVC2G34DRLR			
17	2	D1, D2		SUPER FAST RECTIFIER DIODE 50V 2A SMA ROHS	DIODES INC	ES2AA-13-F			
18	2	D3, D5		SCHOTTKY BARRIER RECTIFIER 60V 3A SMA ROHS	DIODES INC	B360A-13-F			
19	1	D4		SCHOTTKY DIODE 30V 3A SOD-128_M-FLAT ROHS	TOSHIBA	CMS01(TE12L,Q,M)			
20	2	ET, OVF		LED YELLOW SMD0402 2.1V 10mA ROHS	ROHM SEMICONDUCTOR	SML-P12YTT86		SMD0402	
21	2	INV1, INV2		SINGLE INVERTER GATE SCHMITT-TRIGGER SOT553-	TEXAS INSTRUMENTS	SN74LVC1G14DRLR			
22	7	MUX1, MUX3, MUX4, MUX5, MUX6, MUX7, MUX8		MUX/DATA SELECTOR 2 TO 1 VSSOP8-DCU ROHS	TEXAS INSTRUMENTS	SN74LVC2G157DCUR			
23	2	MUX2A, MUX2B		DUAL SPDT ANALOG SWITCH 0.5 OHM LO-VOLT	TEXAS INSTRUMENTS	LMS4684LD/NOPB			
24	2	OA1, OA2		SOUNDPASS HI-PERF QUAD AUDIO OP AMP SOP14-D	TEXAS INSTRUMENTS	OPA4134UA			
25	1	OPTO-IN		PHOTOLINK FIBER OPTIC RECEIVER 2.4-5.5V 15MB	EVERLIGHT ELECTRONICS	PLR135/T10			
26	1	OPTO-OUT		PHOTOLINK FIBER OPTIC TRANSMITTER 2.4-5.5V	EVERLIGHT ELECTRONICS	PLT133/T10W			
27	1	OSC1		OSCILLATOR SMT 6.0MHz 3.3V OUT-ENABLE ROHS	CTS FREQUENCY CONTROLS	625L3I006M00000			
28	1	Q1		TRANSISTOR NPN GENERAL PURPOSE 40V 1A SOT23 DBV3 ROHS	DIODES INC.	MMBT2222A-7-F			
29	2	Q2, Q3		TRANSISTOR-NPN PREBIASED 10K SOT23-DBV3 ROHS	DIODES INC.	DDTC114TCA-7-F			
30	3	SW1, SW2, SW3		IC LVL-TRANSL I2C BUS REP,US8-DCU,ROHS	TEXAS INSTRUMENTS	TCA9406DCUR			

Item	Qty	Reference	Value	Part Description	Manufacturer	Manufacturer Part Number	Alternate Part	PCB Footprint	Note
31	3	USB, ANALOG, OPTICAL		LED, WHITE 2.9V SMD0805 ROHS	PANASONIC	LNJ037X8ARA		SMD0805	
32	3	VALID, USB-LOCK, SPDIF-LOCK		LED BLUE SMD0402 2.9V 10mA ROHS	ROHM SEMICONDUCTOR	SMLP12BC7TT86		SMD0402	
33	1	VR1		VOLT REG 3.3V 400MA LDO CAP FREE NMOS SOT23-DBV5 ROHS	TEXAS INSTRUMENTS	TPS73633DBVT			
34	1	VR2		DC-DC CONVERTER 3.5A 28V 1MHz ECO-MODE SO8-DDA ROHS	TEXAS INSTRUMENTS	TPS54332DDA			
35	1	VR3		VOLT-REG STEP-UP SIMPLE SWITCHER 24V OUT 2.1A SOT23-DBV5 ROHS	TEXAS INSTRUMENTS	LMR62421XMFE/NOPB			
36	1	VR4		VOLT REG LDO 5V 1A VIN=2.7-10V WSON6-NGG0006A ROHS	TEXAS INSTRUMENTS	LP38690SD-5.0/NOPB			
37	1	VR5		VOLT REG LDO 3.3V 1A VIN=2.7-10V SOP8-D ROHS	TEXAS INSTRUMENTS	TPS76833QD			
38	1	VR6		VOLT REG 1.8V 400MA LDO CAP FREE NMOS SOT23-DBV5 ROHS	TEXAS INSTRUMENTS	TPS73618DBVT			
39	1	Y1		CRYSTAL SMT-ABM10 24.576MHz 4 PIN 10PFD FUNDAMENTAL ROHS	ABRACON	ABM10-24.576MHZ-E20-T			
40	1	Y2		CRYSTAL SMD-ABM8G SERIES 12.288MHz 30ppm 18PFD ROHS	ABRACOM	ABM8G-12.288MHZ-18-D2Y-T			
41	1	Y3		CRYSTAL SMD0805 TF20 SERIES 32.768KHz 20ppm 12PFD ROHS	CTS	TF202P32K7680		SMD0805	
42	3	3.3V, 5.0V, ZERO		LED GREEN SMD0402 2.1V 10mA ROHS	ROHM SEMICONDUCTOR	SML-P12MTT86		SMD0402	
43	1	C1		CAP SMD1210 CERM 4.7UF 50V 10% X7R ROHS	KEMET	C1210X475K5RACTU		SMD1210	
44	1	C2		CAP SMD0402 CERM 8200PFD 10% 25V X7R ROHS	MURATA	GRM155R71E822KA01D		SMD0402	
45	1	C3		CAP SMD0603 CERM 27PFD 50V 5% NPO ROHS	KEMET	C0603C270J5GACTU		SMD0603	
46	2	C4, C106		CAP SMD0402 CERM 1000pfd 5% 50V COG ROHS	MURATA	GRM1555C1H102JA01D		SMD0402	
47	1	C5		CAP SMD0402 CERM 0.1ufd 50V 20% X7R ROHS	TDK CORP	C1005X7R1H104M050BB		SMD0402	
48	1	C6		CAP SMD0805 CERM 22UF 6.3V 20% X5R ROHS	TDK	C2012X5R0J226M		SMD0805	
49	40	C7, C9, C12, C14, C108, C110, C123, C127, C129, C200, C207, C214, C221, C229, C231, C237, C238, C239, C240, C241, C242, C246, C247, C251, C252, C256, C257, C265, C268, C271, C314, C316, C318, C320, C322, C331, C337, C406, C411, C415		CAP SMD0603 CERM 10ufd 10V 10% X5R ROHS	TDK CORP	C1608X5R1A106K		SMD0603	
50	10	C8, C38, C244, C245, C249, C250, C254, C255, C259, C260		CAP SMD0402 CERM 680PFD 5% 50V NPO ROHS	MURATA	GRM1555C1H681JA01D		SMD0402	
51	4	C10, C111, C335, C336		CAP SMD0402 CERM 1.0UF 10V 10% X5R ROHS	TDK CORP	C1005X5R1A105K		SMD0402	
52	93	C11, C13, C15, C18, C19, C20, C21, C22, C23, C24, C37, C39, C40, C41, C42, C43, C44, C45, C46, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C103, C107, C109, C112, C113, C114, C115, C116, C117, C118, C119, C120, C124, C128, C130, C131, C132, C133, C134, C135, C136, C137, C138, C139, C140, C141, C142, C143, C145, C146, C147, C230, C232, C266, C267, C269, C270, C272, C273, C274, C275, C300, C301, C304, C305, C306, C313, C315, C317, C319, C321, C323, C324, C332, C338, C407, C410, C412, C413, C414, C416, C701, C702		CAP SMD0402 CERM 0.1UF 16V X7R 10% ROHS	MURATA	GRM155R71C104KA88J		SMD0402	
53	1	C16		CAP SMD0402 CERM 0.01ufd 16V 10% X7R ROHS	AVX	0402YC103KAT2A		SMD0402	

Item	Qty	Reference	Value	Part Description	Manufacturer	Manufacturer Part Number	Alternate Part	PCB Footprint	Note
54	3	C17, C333, C334		CAP SMD0402 CERM 2.2UF 10V 10% X5R ROHS	TDK CORP	C1005X5R1A225K		SMD0402	
55	4	C25, C28, C31, C34		CAP SMD0402 CERM 2200PFD 50V 10% X7R ROHS	TDK CORP.	C1005X7R1H222K		SMD0402	
56	8	C26, C27, C29, C30, C32, C33, C35, C36		CAP SMD0402 CERM 0.022UF 16V X7R 10% ROHS	MURATA	GRM155R71C223KA01D		SMD0402	
57	2	C101, C102		CAP SMD0402 CERM 47pfd 50V 5% COG ROHS	JOHANSON	500R07N470JV4T		SMD0402	
58	1	C105		CAP SMD0402 CERM 100pfd 50V 5% NPO ROHS	YAGEO	CC0402JRNPO9BN101		SMD0402	
59	2	C121, C122		CAP SMD0402 CERM 27PFD 5% 50V COG ROHS	MURATA	GRM1555C1H270JA01D		SMD0402	
60	1	C125		CAP SMD0402 CERM 0.068ufd 50V 10% X7R ROHS	TDK CORP	CGA2B3X7R1H683K		SMD0402	
61	3	C126, C402, C404		CAP SMD0402 CERM 4700pfd 25V 10% X7R ROHS	YAGEO	CC0402KRX7R8BB472		SMD0402	
62	2	C201, C202		CAP SMD0402 CERM 12PFD 50V NPO 5% ROHS	MURATA	GRM1555C1H120JZ01D		SMD0402	
63	1	C203		CAP SMD0402 CERM 0.22UF 6.3V 10% X5R ROHS	TDK CORP	C1005X5R0J224		SMD0402	
64	4	C243, C248, C253, C258		CAP SMD0402 CERM 3300PFD 10% 50V X7R ROHS	MURATA	GRM155R71H332KA01D		SMD0402	
65	6	C307, C308, C309, C310, C311, C312		CAP SMD0402 CERM 0.47UF 25V 10% X5R ROHS	TDK CORP	C1005X5R1E474K		SMD0402	
66	2	C403, C405		CAP SMD0402 CERM 0.047UF 16V 10% X7R ROHS	TAIYO YUDEN	EMK105B7473KV-F		SMD0402	
67	2	C408, C409		CAP SMD0402 CERM 33pF 5% 50V COG ROHS	MURATA	GRM1555C1H330JA01D		SMD0402	
68	5	R1, R4, R7, R13, R105		RESISTOR SMD0402 THICK FILM 3.09K OHM 1% 1/16W ROHS	YAGEO	RC0402FR-073K09L		SMD0402	
69	8	R2, R5, R11, R14, R102, R221, R222, R223		RESISTOR SMD0402 1.50K OHMS 1% 1/16W ROHS	STACKPOLE ELECTRONICS	RMCF0402FT1K50		SMD0402	
70	38	R3, R6, R12, R15, R116, R117, R118, R120, R153, R154, R155, R156, R157, R158, R159, R160, R252, R259, R266, R273, R279, R306, R309, R310, R409, R410, R411, R412, R413, R414, R415, R416, R417, R418, R419, R420, R421, R426		RESISTOR SMD0402 THICK FILM 47.0 OHMS 1% 1/16W ROHS	YAGEO	RC0402FR-0747RL		SMD0402	
71	1	R8		RESISTOR SMD0402 THICK FILM 511 OHMS 1% 1/16W ROHS	YAGEO	RC0402FR-07511RL		SMD0402	
72	15	R9, R107, R144, R249, R250, R256, R257, R263, R264, R270, R271, R280, R281, R401, R427		RESISTOR SMD0402 360 1/16W 1% ROHS	VISHAY	CRCW0402360RFKED		SMD0402	
73	3	R114, R115, R128		RESISTOR SMD0402 THICK FILM 4.70K OHMS 1% 1/16W ROHS	YAGEO	RC0402FR-074K7L		SMD0402	
74	8	R16, R17, R18, R19, R22, R23, R24, R25		RESISTOR SMD0402 THICK FILM 200K OHMS 1% 1/16W ROHS	YAGEO	RC0402FR-07200KL		SMD0402	
75	5	R20, R21, R274, R275, R404		RESISTOR SMD0603 ZERO OHMS 1/10W ROHS	STACKPOLE ELECTRONICS	RMCF0603ZT0R00		SMD0603	
76	10	R26, R27, R28, R36, R38, R39, R40, R41, R42, R43		RESISTOR SMD0402 47.0K OHMS 1% 1/16W ROHS	STACKPOLE ELECTRONICS	RMCF0402FT47K0		SMD0402	
77	7	R29, R35, R49, R50, R278, R407, R422		RESISTOR SMD0402 10.0K OHMS 1% 1/16W ROHS	VISHAY	CRCW040210K0FKED		SMD0402	
78	2	R30, R406		RESISTOR SMD0402 1.0M OHMS 1% 1/16W ROHS	STACKPOLE ELECTRONICS	RMCF0402FT1M00		SMD0402	
79	4	R31, R32, R324, R325		RESISTOR SMD0402 THICK FILM 2.21K OHMS 1% 1/16W ROHS	YAGEO	RC0402FR-072K21L		SMD0402	
80	1	R44		RESISTOR SMD0402 169K OHMS 1% 1/16W ROHS	VISHAY	CRCW0402169FKED		SMD0402	
81	1	R45		RESISTOR SMD0402 73.2K OHMS 1% 1/16W ROHS	VISHAY	CRCW040273K2FKED		SMD0402	
82	1	R46		RESISTOR SMT 0402 1% 1/16W 26.7K ROHS	VISHAY	CRCW040226K7FKED		SMD0402	

Item	Qty	Reference	Value	Part Description	Manufacturer	Manufacturer Part Number	Alternate Part	PCB Footprint	Note
83	1	R47		RESISTOR SMD0402 10.2K OHMS 1% 1/16W ROHS	VISHAY	CRCW040210K2FKED		SMD0402	
84	1	R48		RESISTOR SMD0402 2.43K 1/16W 1% ROHS	VISHAY	CRCW04022K43FKED		SMD0402	
85	1	R51		RESISTOR SMT 0402 34.0K OHMS 1% 1/16W ROHS	VISHAY	CRCW040234K0FKED		SMD0402	
86	1	R52		RESISTOR SMD0402 THICK FILM 249K OHMS 1/10W 1% ROHS	PANASONIC	RC0402FR-07249KL		SMD0402	
87	2	R101, R405		RESISTOR SMD0402 THICK FILM 15.0K OHM 1% 1/16W ROHS	YAGEO	RC0402FR-0715KL		SMD0402	
88	10	R103, R104, R301, R302, R303, R304, R305, R315, R322, R323		RESISTOR SMD0402 THICK FILM 27.4 OHMS 1/10W 1% ROHS	PANASONIC	ERJ-2RKF27R4X		SMD0402	
89	1	R106		RESISTOR SMD0402 THICK FILM 100K OHMS 1/16W 1% ROHS	PANASONIC	ERJ-2RKF1003X		SMD0402	
90	5	R110, R139, R147, R148, R311		RESISTOR SMD0402 4.99K 1%,1/16W ROHS	PANASONIC	ERJ-2RKF4991X		SMD0402	
91	1	R140		RESISTOR SMD0603 10.0K 1% THICK FILM 1/10W ROHS	PANASONIC	ERJ-3EKF1002V		SMD0603	
92	1	R141		RESISTOR SMD0603 75 OHMS 1% 1/10W ROHS	VISHAY	CRCW060375R0FKEA		SMD0603	
93	1	R142		RESISTOR SMD0603 1.0 OHMS 1% THICK FILM 1/10W ROHS	PANASONIC	ERJ-3GEYJ1R0V		SMD0603	
94	1	R143		RESISTOR SMD0402 THICK FILM 680 OHMS 1% 1/16W ROHS	YAGEO	RC0402FR-07680RL		SMD0402	
95	9	R200, R201, R242, R243, R244, R277, R312, R326, R710		ZERO OHM JUMPER SMT 0402 0 OHM 1/16W,5% ROHS	VISHAY	CRCW04020000Z0ED		SMD0402	
96	2	R202, R219		RESISTOR SMD0402 1.00K 1%,1/16W ROHS	PANASONIC	ERJ-2RKF1001X		SMD0402	
97	2	R203, R220		RESISTOR SMD0402 THICK FILM 200 OHMS 1% 1/16W ROHS	YAGEO	RC0402FR-07200RL		SMD0402	
98	8	R246, R247, R253, R254, R260, R261, R267, R268		RESISTOR SMD0402 THICK FILM 7.50K OHM 1% 1/16W ROHS	YAGEO	RC0402FR-077K5L		SMD0402	
99	8	R248, R251, R255, R258, R262, R265, R269, R272		RESISTOR SMD0402 5.60K 1/16W 1% ROHS	PANASONIC	ERJ-2RKF5601X		SMD0402	
100	12	R307, R308, R313, R314, R316, R317, R318, R319, R320, R321, R329, R330		RESISTOR SMD0402 THICK FILM 33.0 OHMS 1/10W 1% ROHS	PANASONIC	ERJ-2RKF33R0X		SMD0402	
101	1	R332		RESISTOR SMD0603 221 OHMS 1% 1/10W ROHS	VISHAY	CRCW0603221RFKEA		SMD0603	
102	2	R402, R403		RESISTOR SMD0402 THICK FILM 470 OHMS 1/10W 1% ROHS	PANASONIC	ERJ-2RKF4700X		SMD0402	
103	1	L1		SHIELDED POWER INDUCTOR 6.8uH 3.6A ROHS	COIL CRAFT	XAL4030-682MEB			
104	1	L2		POWER INDUCTOR SMT 2.2uH 2.6A 47mOHMS ROHS	BOURNS	SDR0403-2R2ML			
105	5	FB1, FB2, FB3, FB4, FB5		FERRITE CHIP, 220 OHMS 2A 100MHZ SMD 0603 ROHS	TDK	MPZ1608S221A		SMD0603	
106	4	AIN1, AIN2, HP-OUT, MIC-IN		JACK AUDIO-STEREO MINI(3.5MM ,3-COND SMT-RA ROHS	CUI STACK	SJ-3523-SMT			
107	4	AIN3, AIN4, AOUT1, AOUT2		HEADER 2 PIN, PCB 2.0MM ROHS	NORCOMP	26630201RP2			
108	1	COAX		JACK, RCA 3-PIN PCB-RA BLACK ROHS	SWITCHCRAFT	PJRN1X1U01X			
109	1	J1		CONNECTOR SMT/THU 100 POS+GND QSS SERIES ROHS	SAMTEC	QSS-050-01-F-D-A			
110	1	J2		JACK USB FEMALE TYPEB MICRO SMT-RA 5PIN ROHS	MOLEX	47346-0001			
111	1	J3		HEADER THRU MALE 2X2 PIN 100LS 120 TAIL GOLD ROHS	SULLINS	PBC02DAAN			
112	1	J4		HEADER THRU MALE 2X5 PIN 100LS 120 TAIL GOLD ROHS	SULLINS	PBC05DAAN			

Item	Qty	Reference	Value	Part Description	Manufacturer	Manufacturer Part Number	Alternate Part	PCB Footprint	Note
113	1	J5		SOCKET HEADER 1x4 FEMALE-RA 50LS ROHS	MILL-MAX	851-43-004-20-001000			
114	1	J6		CONNECTOR MICROSD-SMD PUSH-PUSH SERIES 2900 ROHS	3M	2908-05WB-MG			
115	3	GND, GND1, GND2		PC TESTPOINT, BLACK, ROHS	KEystone ELECTRONICS	5001			
116	7	DIN, SCL, SDA, BCLK, DOUT, LRCK, MCLK		PC TESTPOINT, ORANGE, ROHS	KEystone ELECTRONICS	5003			
117	3	4V, +5V, +5V-USB		PC TESTPOINT, RED, ROHS	KEystone ELECTRONICS	5000			
118	6	MODE, VOL+, VOL-, INPUT, RESET, PROFILE		SWITCH, MOM, 160G SMT 4X3MM ROHS	E-SWITCH	TL1015AF160QG			
<b>ITEMS 119-120 ARE STANDOFFS AT THE CORNERS AND UNDER THE BOARD</b>									
119	4	STANDOFFS (NO SUBSTITUTES ALLOWED)		STANDOFF M3x25mm 5mm DIA HEX ALUM F-F ROHS	KEystone ELECTRONICS	24438			
120	4	STANDOFF HARDWARE		PHILIPS PANHEAD STAINLESS STEEL ROHS	APM-HEXSEAL	RM3X8MM 2701			
<b>ITEMS 121-122 ARE MOUNTED ABOVE THE BOARD ON EACH SIDE OF J1</b>									
121	2	J1 STANDOFFS (NO SUBSTITUTES ALLOWED)		STANDOFF M3x0.5mm HEX 5mm LENGTH ALUMINUM M-M ROHS	SAMTEC	SO-0515-02-02			
122	2	J1 HARDWARE		THUMBNUt M3x0.5x6mm BRASS ROHS	MCMASter-CARR	96115A420			
<b>ITEMS 123-124 ARE MOUNTED BELOW THE BOARD</b>									
123	2	J1 HARDWARE		WASHER FLAT #4 0.219" OD 0.032" THICK STEEL ROHS	TE CONNECTIVITY	5205820-3			
124	2	J1 HARDWARE		NUT HEX M3 2.4mm THICK STEEL ROHS	DURATOOL	M3-HFST-Z100-			
<b>DO NOT POPULATE</b>									
	46					C417, C418, C419, C420, C421, C422, C423, C424, C425, C426, C427, C428, C703, C705, C706, C707, C708, C709, C710, HPL+, HPR+, LRCKO, MCLKO, P1+, P1-, P2+, P2-, P3+, P3-, P4+, P4-, P5+, P6+, P7+, P7-, P8+, P8-, R10, R33, R34, R276, R327, R328, SCKO, SDOUT-5548, VLD			

## 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.