

Item No.	Designator	Quantity	Value	Part Number	Manufacturer	Description	Package name	Standard dimensions mm (inch)	Not Mounted
1	IC1	1		HT45F0058	Holtek	Induction Cooker Flash MCU	16-pin NSOP		
2	IC2	1		PN8044	Chipown	Non-isolated PFM Converter	DIP-8		
3	IC3	1		L4931CZ50-AP	STMicroelectronics	LDO Voltage Regulator	TO-92-3		
4	Q1	1		GT20N135SRA	TOSHIBA	IGBT, 1350 V, 40 A	TO-247		
5	Q2, Q3	2		TBC847	TOSHIBA	NPN Transistor, 50 V, 0.15 A	SOT-23		
6	Q4	1		TBC857	TOSHIBA	PNP Transistor, -50 V, -0.15 A	SOT-23		
7	Q5	1		2SC6135	TOSHIBA	NPN Transistor, 50 V, 1 A	SOT-323F (UFM)		
8	D1, D3, D6, D7, D8, D9, D10, D12	8		US1M	DIODES	Rectifier Diode, 1000 V, 1 A		2.29 x 4.00	
9	D2	1		GBJ2010	DIODES	Bridge Diode, 1000 V, 20 A		Through Hole	
10	D4	1		KDZV5.1B	ROHM	Zenner Diode, 5.1 V, 1 W		1.50 x 2.50	
11	D5	1		CRZ18	TOSHIBA	Zenner Diode, 18 V, 0.7 W	S-FLAT	1.6 x 3.5	
12	D11	1		SMAZ5V1	DIODES	Zenner Diode, 5.1 V		2.29 x 4.00	
13	L1	1	300 μ H	MGB16G30-81-P100Y	ueno	10 A, 139 mOhm			
14	C1	1	0.24 μ F	1BH424D1200-10	BM cap	Metalized polypropylene film, 630 VAC, \pm 5 %		Through Hole	
15	C2, C3	2	5 μ F	1BH550D400-15	BM cap	Metalized polypropylene film, 275 VAC, X2, \pm 5 %		Through Hole	
16	C4	1	0.1 μ F	890324023023CS	Wurth	Metalized polypropylene film, 275 VAC, X2, \pm 10 %		Through Hole	
17	C5, C9, C14	3	1 μ F			Ceramic, 50 V, \pm 10 %		2.0 x 1.25 (0805)	
18	C6, C10, C15	3	330 pF			Ceramic, 50 V, \pm 10 %		2.0 x 1.25 (0805)	
19	C7, C13, C17, C19, C21	5	0.1 μ F			Ceramic, 50 V, \pm 10 %		2.0 x 1.25 (0805)	
20	C8	1	1000 pF	562R5GAD10	Vishay	Ceramic, 1 kV, \pm 20 %		Through Hole	
21	C11	1	240 pF			Ceramic, 50 V, \pm 10 %		2.0 x 1.25 (0805)	
22	C12	1	4.7 μ F	EKMQ451ELL4R7MJC 5S	NIPPON CHEMI-CON	Aluminum Electrolytic, 450 V, \pm 20 %		Through Hole	

Item No.	Designator	Quantity	Value	Part Number	Manufacturer	Description	Package name	Standard dimensions mm (inch)	Not Mounted
23	C16	1	4.7 μ F	EKYA500ELL4R7ME1 1D	NIPPON CHEMI- CON	Aluminum Electrolytic, 50 V, \pm 20 %		Through Hole	
24	C18	1	0.027 μ F			Ceramic, 50 V, \pm 10 %		2.0 x 1.25 (0805)	
25	C20	1	220 pF			Ceramic, 50 V, \pm 10 %		2.0 x 1.25 (0805)	
26	C22	1	470 μ F	EKYA350ELL471MJ16 S	NIPPON CHEMI- CON	Aluminum Electrolytic, 35 V, \pm 20 %		Through Hole	
27	C23	1	220 μ F	EKYA350ELL221MHB 5D	NIPPON CHEMI- CON	Aluminum Electrolytic, 35 V, \pm 20 %		Through Hole	
28	C24, C25, C27	3	100 μ F	EKYA350ELL101MF1 1D	NIPPON CHEMI- CON	Aluminum Electrolytic, 35 V, \pm 20 %		Through Hole	
29	C26	1	10 μ F			Ceramic, 10 V, \pm 10 %		2.0 x 1.25 (0805)	
30	R1, R8, R26, R28, R33, R34, R35, R36	8	470 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
31	R2, R6, R9, R10, R15, R18, R22	7	110 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
32	R3, R4, R20, R23	4	68 Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
33	R5	1	150 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
34	R7	1	3.3 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
35	R11, R19, R44	3	10 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
36	R12	1	100 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
37	R13	1	0 Ω			2 A		3.2 x 1.6 (1206)	
38	R14	1	20 m Ω	MSR-5 R02 F	Arcol	Shunt \pm 1 %, 5 W		Through Hole	
39	R16	1	220 Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
40	R17	1	82 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
41	R21	1	75 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
42	R24	1	68 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
43	R25	1	10 k Ω			\pm 1 %, 250 mW		3.2 x 1.6 (1206)	
44	R27	1	1.3 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
45	R29, R52	2	2 k Ω			\pm 5 %, 250 mW		3.2 x 1.6 (1206)	
46	R31	1	5.1 k Ω			\pm 1 %, 250 mW		3.2 x 1.6 (1206)	
47	R32	1	22 Ω	WS2M22R0J	Bourns	\pm 20 %, 2 W		Through Hole	

Item No.	Designator	Quantity	Value	Part Number	Manufacturer	Description	Package name	Standard dimensions mm (inch)	Not Mounted
48	R37	1	9.1 k Ω			± 1 %, 250 mW		3.2 x 1.6 (1206)	
49	R38	1	47 k Ω			± 5 %, 250 mW		3.2 x 1.6 (1206)	
50	R40	1	3.3 k Ω			± 1 %, 250 mW		3.2 x 1.6 (1206)	
51	R41	1	4.3 k Ω			± 1 %, 250 mW		3.2 x 1.6 (1206)	
52	R42	1	14 k Ω			± 1 %, 250 mW		3.2 x 1.6 (1206)	
53	R43	1	20 k Ω			± 5 %, 250 mW		3.2 x 1.6 (1206)	
54	R47	1	56 k Ω			± 1 %, 250 mW		3.2 x 1.6 (1206)	
55	R50, R56	2	20 Ω			± 5 %, 250 mW		3.2 x 1.6 (1206)	
56	R53, R54, R55	3	1 k Ω			± 5 %, 250 mW		3.2 x 1.6 (1206)	
57	R62	1	390 Ω			± 1 %, 250 mW		3.2 x 1.6 (1206)	
58	BZ1	1		PKM13EPYH4002-B0	Murata	Buzzer, 4 kHz		Through Hole	
59	F1	1		0034.3128.TR	SCHURTER	Fuse, 250 VAC, 12.5 A		Through Hole	
60	RTH1	1		NTHS1206N01N1003 KE	Vishay	Thermistor, 100k, B3964		3.2 x 1.6 (1206)	
61	RV1	1		MOV-14D561K	Bourns	Varistor, 560 V		Through Hole	
62	T1	1		S9369	SCITEC	CH Transformer		Through Hole	
63	CN1-1, CN1-2	2		4902	KEYSTONE	Connector		Through Hole	
64	CN2	1		B03B-XASK-1-A	JST	Connector		Through Hole	
65	CN3	1		T4B-SQ	JST	Header		Through Hole	
66	CN4	1		B04B-XASK-1-A	JST	Connector		Through Hole	
67	CN5	1		B02B-XASK-1-A	JST	Connector		Through Hole	
68	CN6	1		T3B-SQ	JST	Header		Through Hole	
69	JP1	1		T2B-SQ	JST	Header		Through Hole	
70	J3, J6, J7, J8	4				Jumper, l=20.0 mm		Through Hole	
71	J5, J9, J10, J11, J14	5				Jumper, l=15.0 mm		Through Hole	
72	J12, J13	2				Jumper, l=10.0 mm		Through Hole	
73	J15	1				Jumper, l=5.0 mm		Through Hole	
74	J16, J17, J18, J19, J20, J21, J22, J24,	12				Jumper, 2 A		3.2 x 1.6 (1206)	

Item No.	Designator	Quantity	Value	Part Number	Manufacturer	Description	Package name	Standard dimensions mm (inch)	Not Mounted
	J25, J26, J27, J28								

Terms of Use

This terms of use is made between Toshiba Electronic Devices and Storage Corporation ("We") and customers who use documents and data that are consulted to design electronics applications on which our semiconductor devices are mounted ("this Reference Design"). Customers shall comply with this terms of use. Please note that it is assumed that customers agree to any and all this terms of use if customers download this Reference Design. We may, at its sole and exclusive discretion, change, alter, modify, add, and/or remove any part of this terms of use at any time without any prior notice. We may terminate this terms of use at any time and for any reason. Upon termination of this terms of use, customers shall destroy this Reference Design. In the event of any breach thereof by customers, customers shall destroy this Reference Design, and furnish us a written confirmation to prove such destruction.

1. Restrictions on usage

1. This Reference Design is provided solely as reference data for designing electronics applications. Customers shall not use this Reference Design for any other purpose, including without limitation, verification of reliability.
2. This Reference Design is for customer's own use and not for sale, lease or other transfer.
3. Customers shall not use this Reference Design for evaluation in high or low temperature, high humidity, or high electromagnetic environments.
4. This Reference Design shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.

2. Limitations

1. We reserve the right to make changes to this Reference Design without notice.
2. This Reference Design should be treated as a reference only. We are not responsible for any incorrect or incomplete data and information.
3. Semiconductor devices can malfunction or fail. When designing electronics applications by referring to this Reference Design, customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of semiconductor devices could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Customers must also refer to and comply with the latest versions of all relevant our information, including without limitation, specifications, data sheets and application notes for semiconductor devices, as well as the precautions and conditions set forth in the "Semiconductor Reliability Handbook".
4. When designing electronics applications by referring to this Reference Design, customers must evaluate the whole system adequately. Customers are solely responsible for all aspects of their own product design or applications. WE ASSUME NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.
5. No responsibility is assumed by us for any infringement of patents or any other intellectual property rights of third parties that may result from the use of this Reference Design. No license to any intellectual property right is granted by this terms of use, whether express or implied, by estoppel or otherwise.
6. THIS REFERENCE DESIGN IS PROVIDED "AS IS". WE (a) ASSUME NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (b) DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO THIS REFERENCE DESIGN, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.

3. Export Control

Customers shall not use or otherwise make available this Reference Design for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). This Reference Design may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of this Reference Design are strictly prohibited except in compliance with all applicable export laws and regulations.

4. Governing Laws

This terms of use shall be governed and construed by laws of Japan.

ご利用規約

本規約は、お客様と東芝デバイス&ストレージ株式会社（以下「当社」といいます）との間で、当社半導体製品を搭載した機器を設計する際に参考となるドキュメント及びデータ（以下「本リファレンスデザイン」といいます）の使用に関する条件を定めるものです。お客様は本規約を遵守しなければなりません。本リファレンスデザインをダウンロードすることをもって、お客様は本規約に同意したものとみなされます。なお、本規約は変更される場合があります。当社は、理由の如何を問わずいつでも本規約を解除することができます。本規約が解除された場合は、お客様は、本リファレンスデザインを破棄しなければなりません。またお客様が本規約に違反した場合は、お客様は、本リファレンスデザインを破棄し、その破棄したことを証する書面を当社に提出しなければなりません。

第1条 禁止事項

お客様の禁止事項は、以下の通りです。

1. 本リファレンスデザインは、機器設計の参考データとして使用されることを意図しています。信頼性検証など、それ以外の目的には使用しないでください。
2. 本リファレンスデザインを販売、譲渡、貸与等しないでください。
3. 本リファレンスデザインは、高温・多湿・強電磁界などの対環境評価には使用できません。
4. 本リファレンスデザインを、国内外の法令、規則及び命令により、製造、使用、販売を禁止されている製品に使用しないでください。

第2条 保証制限等

1. 本リファレンスデザインは、技術の進歩などにより予告なしに変更されることがあります。
2. 本リファレンスデザインは参考用のデータです。当社は、データおよび情報の正確性、完全性に関して一切の保証をいたしません。
3. 半導体素子は誤作動したり故障したりすることがあります。本リファレンスデザインを参考に機器設計を行う場合は、誤作動や故障により生命・身体・財産が侵害されることのないように、お客様の責任において、お客様のハードウェア・ソフトウェア・システムに必要な安全設計を行うことをお願いします。また、使用されている半導体素子に関する最新の情報（半導体信頼性ハンドブック、仕様書、データシート、アプリケーションノートなど）をご確認の上、これに従ってください。
4. 本リファレンスデザインを参考に機器設計を行う場合は、システム全体で十分に評価し、お客様の責任において適用可否を判断して下さい。当社は、適用可否に対する責任を負いません。
5. 本リファレンスデザインは、その使用に際して当社及び第三者の知的財産権その他の権利に対する保証または実施権の許諾を行うものではありません。
6. 当社は、本リファレンスデザインに関して、明示的にも黙示的にも一切の保証（機能動作の保証、商品性の保証、特定目的への合致の保証、情報の正確性の保証、第三者の権利の非侵害保証を含むがこれに限らない。）をせず、また当社は、本リファレンスデザインに関する一切の損害（間接損害、結果的損害、特別損害、付随的損害、逸失利益、機会損失、休業損、データ喪失等を含むがこれに限らない。）につき一切の責任を負いません。

第3条 輸出管理

お客様は本リファレンスデザインを、大量破壊兵器の開発等の目的、軍事利用の目的、あるいはその他軍事用途の目的で使用してはなりません。また、お客様は「外国為替及び外国貿易法」、「米国輸出管理規則」等、適用ある輸出関連法令を遵守しなければなりません。

第4条 準拠法

本規約の準拠法は日本法とします。