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IT1337E/FN

USB2.0 Single LUN Multi Card Reader Controller (SD/MS/SM/xD Combo)

Preliminary Specification V0.9.1

ITE TECH. INC.

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Revision History

Date	Revision	Description
12/19/2007	0.8	Initial preliminary release
1/31/2008	0.9	1. Update preliminary release with new package information 2. Update Electrical Characteristics
2/12/2008	0.9a	Change 48-pin assignment for SM_CLE, SM_ALE and SM_CD signals
3/19/2008	0.9b	Specify MD only support on –L64 package.
4/15/2008	0.9c	Describe dual regulators (5V to 3.3V and 3.3V to 1.8V) built-in information
12/29/2008	0.9.1	Changed to ITE P/N. and Revision code Package Information: Removed 32-pin QFN and 64-pin LQFP package and added 24-pin QFN.

CONTENTS

FIGURES

TABLES

1. Features

- **Complies with USB Specification Rev.2.0 for Bus Power Operation**
  - High-speed USB 2.0 interface; backward compatible with USB 1.1
  - Integrated USB 2.0 Transceiver Macro cell Interface (UTMI) and Serial Interface Engine (SIE)
  - Supports bus powered and self powered modes
- **Complies with USB Mass Storage Class Bulk-Only Transport Specification Rev.1.0**
- **MSC Bulk-Only Interface: Control, Bulk IN, Bulk OUT and Interrupt Endpoints for Mass Storage Class**
- **Embedded High Speed 8051 8-bit Microcontroller**
  - 30MHz operating speed, 1 clock per instruction cycle
  - 32K bytes ROM and 256 bytes internal RAM
  - 1.75K bytes external RAM
  - USB/SD Card ISP mechanism for firmware code upgrade
  - Watch dog timer for system recovery
- **Supports Multiple Flash Card Interfaces and the Latest Flash Card Specification**
  - MultiMediaCard™ (MMC) card spec. Rev. 4.2 (1/4/8-bit) and SecureDigital™ (SD) card Rev. 2.0. @48MHz operating speed. Compliant with high-speed 52MHz MMCPlus™ (HS-MMC) and high-speed 50MHz HS-SD, high capacity HC-SD (SDHC) specifications
  - Memory Stick™ PRO-HG Duo card format spec. Rev.1.01 (8-bit) @60MHz operation peed
  - Memory Stick™ (MS) card format spec. Rev. 1.43 and Memory Stick PRO™ (MS PRO) card format spec Rev. 1.03 (4-bit) @40MHz operating speed
  - SmartMedia™(SM) card spec. Rev. 1.0 and xD-Picture Card™ card spec. Rev. 1.2
- **High Performance Hardware Engine**
- **1K Bytes DMA Ping-pong Buffer for Automatically Multi-sectors Burst Read/Write with Cards**
- **1T High Speed 8051 CPU Runs at 30MHz Operating Speed Reduces Overheads of Command Parsing**
- **High Efficient DMA Hardware Engine Improves Transfer Rate between USB and Flash Card Interfaces**
- **Integrates 2 MOSFET Switches for Power Supplies of Up to 2 Flash Card Slots**
  - Short circuit protection (Enabled by EEPROM configuration)
  - Inrush current control (Enabled by EEPROM configuration)
- **Customized VID/PID, Serial Number and String Information by External Serial EEPROM**
- **Serial EEPROM can be ISP by USB**
- **Two Pins of Serial EEPROM Interface can be Used for Optional LUN Configuration Setting If No EEPROM Exists**
- **Built-in 5V to 3.3V and 3.3V to 1.8V Dual Regulator and POR Circuit**
- **Built-in and Programmable Pull Up/Pull Down Resistances for Card Interfaces and GPIO**
- **On Board 12MHz Crystal Driver Circuit**
- **5V Operating Power Supply**
- **48-Pin LQFP / 24-Pin QFN**

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2. General Description

The IT1337E/FN is a USB 2.0 Single Slot Flash Card Reader Controller by a highly integrated single chip solution that enables users to enjoy high-speed transmission between buses of USB 2.0 and versatile flash card interfaces with up-to-date specification for each.

The IT1337E/FN enables PC/NB, MFP, DVD, TV… that with USB 2.0 to read/write various type of flash media cards including Security Digital™ (SD), MiniSD™, MicroSD, TransFlash™ (T-Flash), High Capacity SD (SDHC), MultiMediaCard™ (MMC), Reduced Size MultiMediaCard™ (RS-MMC), High Speed MMC (HS-MMC), MMCmobile™, MMCplus™, MMCmicro, High Capacity MMC (HC-MMC), Memory Stick™ (MS), , Memory Stick Duo™ (MS Duo), High Speed Memory Stick™ (HS MS), Memory Stick PRO™ (MS PRO), Memory Stick PRO™ Duo (MS PRO Duo), Memory Stick PRO™-HG Duo (MS PRO-HG Duo) Memory Stick ROM, Memory Stick Micro (M2™), SmartMedia™ (SM), and xD-Picture Card™ on a single chip.

The IT1337E/FN integrates a high speed 1T 8051 microprocessor and a high efficiency DMA hardware engine for the best data transfer performance between USB and flash card interfaces. Bedsides, it also builds in five MOSFET switches for power control of each card and POR (Power On Reset) circuit to save BOM cost. A serial EEPROM interface is provided to store customized information such as VID/PID, serial number, string, LUN number corresponding supported card type, LED number and blinking style… and so on.

The IT1337E/FN complies with USB specification Rev. 2.0 and USB Mass Storage Class specification Rev. 1.0 such as to be easily supported without additional driver under Windows XP/2000/ME, Mac OS 9.x above, and Linux Kernel 2.4 above. With device driver installed, it can be supported on Windows 98/98SE and Mac OS 8.x as well.

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3. Application Note

3.1 Application

USB 2.0 single LUN All-in-one multi flash card reader
PC/NB, MFP, DVD, STB, HDTV, MCPC builds in with USB host and requires flash card accesses

3.2 S1(EE_CLK) and S0(EE_SDA) Setting Information

Table 3-1. S1(EE_CLK) and S2(EE_SDA) Jumper Setting Information

Applications	LUN0	LUN1	Applied Part No.	S1 (EE_SCL)	S0 (EE_SDA)
Single LUN	SD/MMC/MS/SM/xD	NA	IT1337E-48	1	1*
Single LUN	SD/MS/MMC	NA	IT1337FN-24	1	1*

* S0 should be “0” if xD logo and/or power saving feature are required. Please contact ITE Tech. Inc. for detail setting information with S1 and S0

Note:

1. 0: Pull Low, 1: Open, 2: Capacitance to GND.
2. Other configurations of S1, S0 setting are reserved.

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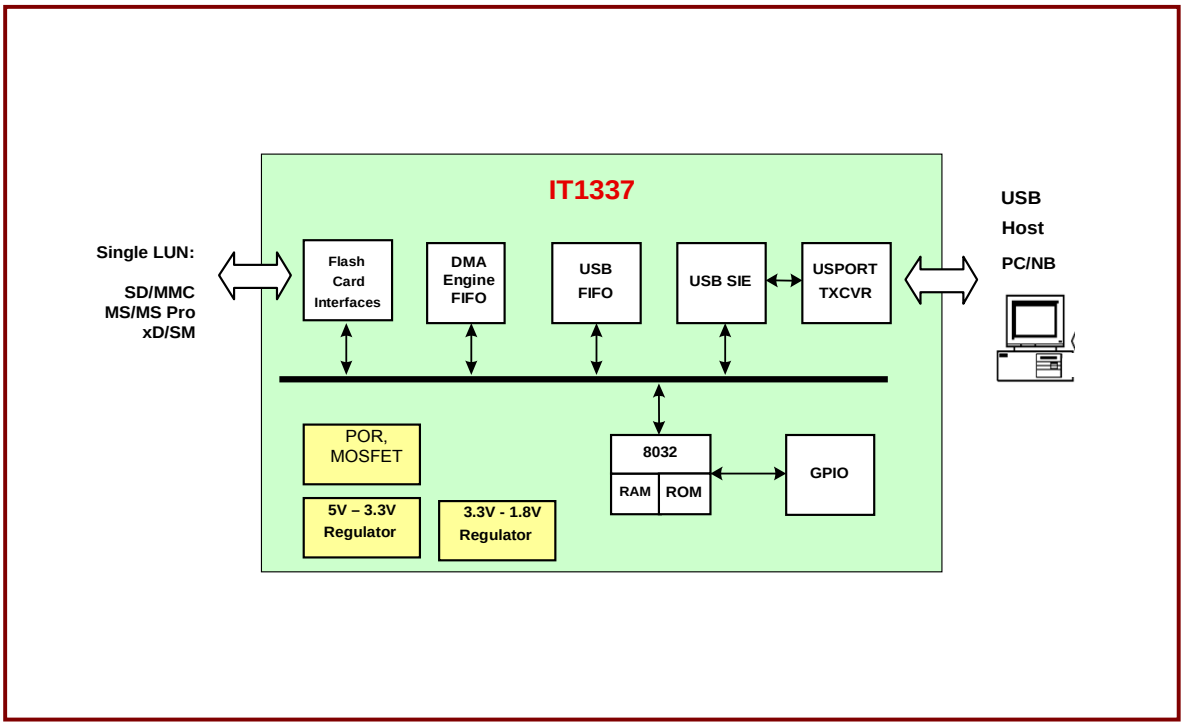
4. Block Diagram



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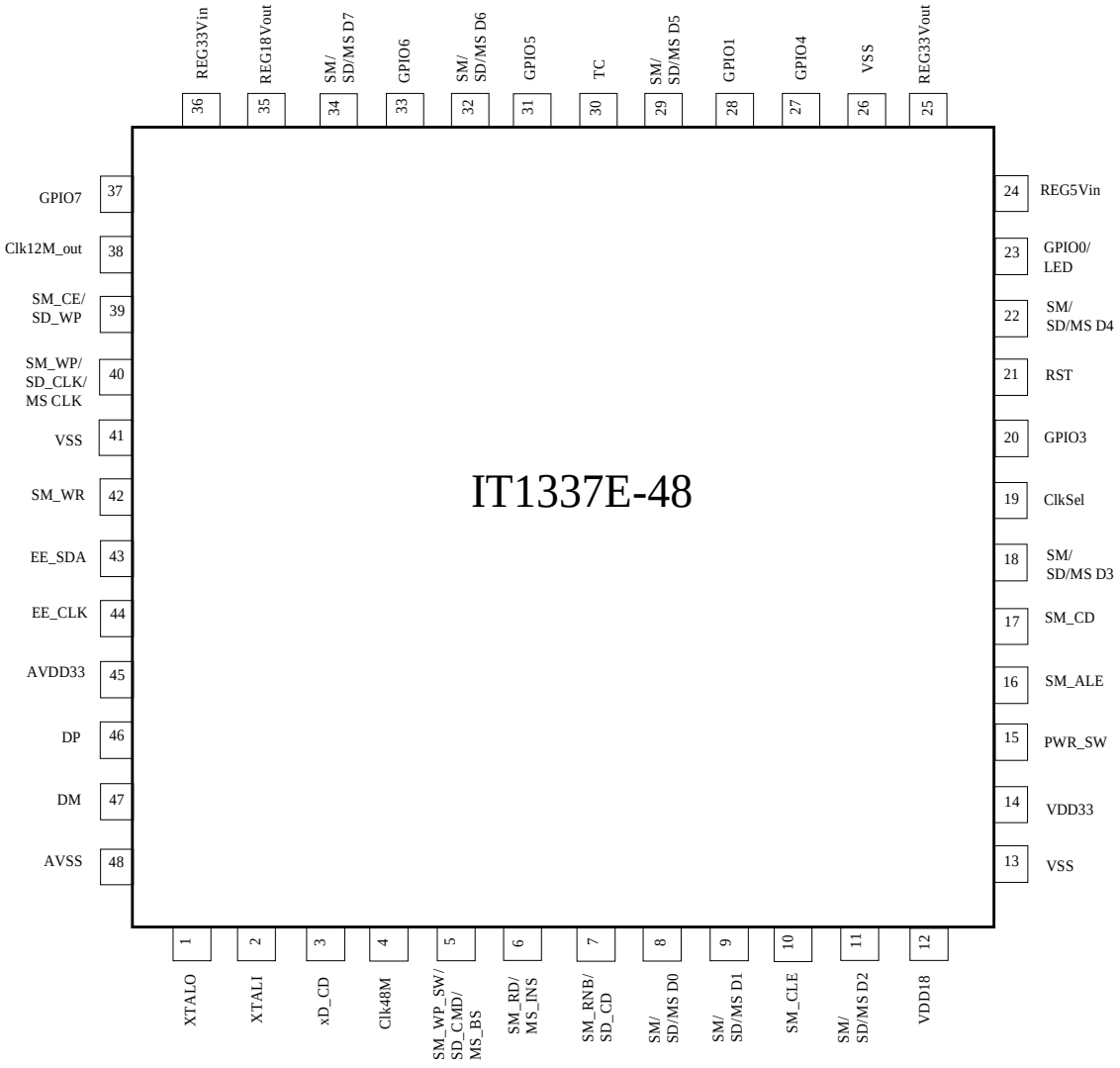
5. Pin Configuration

5.1 IT1337E-48 Pin Configuration



5.2 IT1337FN-24 Pin Configuration

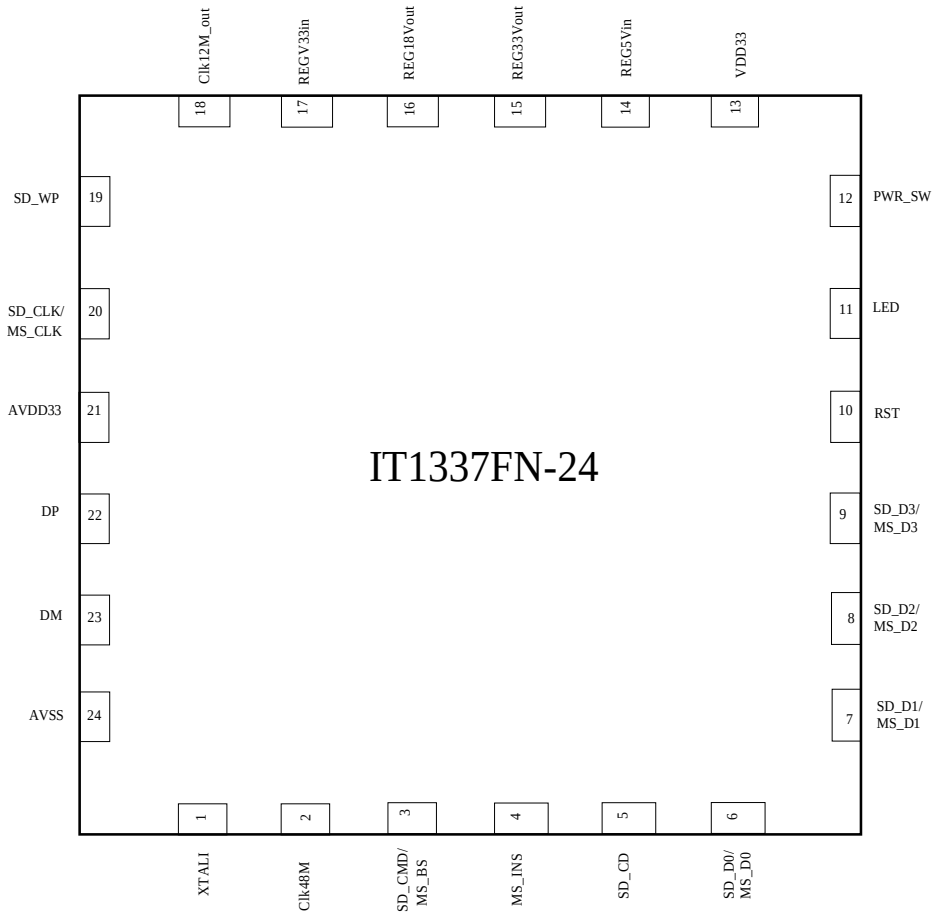


Table 5-1. IT1337E-48 Pins Listed in Numeric Order

Pin	Signal	Pin	Signal	Pin	Signal
1	XTALO	17	SM_CD	33	GPIO6
2	XTALI	18	SM/SD/MS D3	34	SM/SD/MS D7
3	xD_CD	19	ClkSel	35	REG18Vout
4	Clk48M	20	GPIO3	36	REG33Vin
5	SM_WP_SW/SD_CMD/MS_BS	21	RST	37	GPIO7
6	SM_RD/MS_INS	22	SM/SD/MS D4	38	Clk12M_out
7	SM_RNB/SD_CD	23	GPIO0/LED	39	SM_CE/SD_WP
8	SM/SD/MS D0	24	REG5Vin	40	SM_WP/SD_CLK/MS_CLK
9	SM/SD/MS D1	25	REG33Vout	41	VSS
10	SM_CLE	26	VSS	42	SM_WR
11	SM/SD/MS D2	27	GPIO4	43	EE_SDA
12	VDD18	28	GPIO1	44	EE_CLK
13	VSS	29	SM/SD/MS D5	45	AVDD33
14	VDD33	30	TC	46	DP
15	PWR_SW	31	GPIO5	47	DM
16	SM_ALE	32	SM/SD/MS D6	48	AVSS

Table 5-2. IT1337E -48 Pins Listed in Alphabetical Order

Signal	Pin	Signal	Pin	Signal	Pin
AVDD33	45	PWR_SW	15	SM_CE/SD_WP	39
AVSS	48	REG18Vout	35	SM_CLE	10
Clk12M_out	38	REG33Vin	36	SM_RD/MS_INS	6
Clk48M	4	REG33Vout	25	SM_RNB/SD_CD	7
ClkSel	19	REG5Vin	24	SM_WP/SD_CLK/MS_CLK	40
DM	47	RST	21	SM_WP_SW/SD_CMD/MS_BS	5
DP	46	SM/SD/MS D0	8	SM_WR	42
EE_CLK	44	SM/SD/MS D1	9	TC	30
EE_SDA	43	SM/SD/MS D2	11	VDD18	12
GPIO0/LED	23	SM/SD/MS D3	18	VDD33	14
GPIO1	28	SM/SD/MS D4	22	VSS	13
GPIO3	20	SM/SD/MS D5	29	VSS	26
GPIO4	27	SM/SD/MS D6	32	VSS	41
GPIO5	31	SM/SD/MS D7	34	xD_CD	3
GPIO6	33	SM_ALE	16	XTALI	2
GPIO7	37	SM_CD	17	XTALO	1

Table 5-3. IT1337FN-24 Pins Listed in Numeric Order

Pin	Signal	Pin	Signal
1	XTALI	13	VDD33
2	Clk48M	14	REG5Vin
3	SD_CMD/MS_BS	15	REG33Vout
4	MS_INS	16	REG18Vout
5	SD_CD	17	REG33Vin
6	SD_D0/MS_D0	18	Clk12M_out
7	SD_D1/MS_D1	19	SD_WP
8	SD_D2/MS_D2	20	SD_CLK/MS_CLK
9	SD_D3/MS_D3	21	AVDD33
10	RST	22	DP
11	LED	23	DM
12	PWR_SW	24	AVSS

Table 5-4. IT1337FN-24 Pins Listed in Alphabetical Order

Signal	Pin	Signal	Pin
AVDD33	21	REG5Vin	14
AVSS	24	RST	10
Clk12M_out	18	SD_CD	5
Clk48M	2	SD_CLK/MS_CLK	20
DM	23	SD_CMD/MS_BS	3
DP	22	SD_D0/MS_D0	6
LED	11	SD_D1/MS_D1	7
MS_INS	4	SD_D2/MS_D2	8
PWR_SW	12	SD_D3/MS_D3	9
REG18Vout	16	SD_WP	19
REG33Vin	17	VDD33	13
REG33Vout	15	XTALI	1

6. Pin Description

6.1 IO Type Notation

Notation	Description
CMOS 3-state	CMOS level IO with tri-state™ control
Schmitt trigger	CMOS Input with Schmitt Hysteresis level
Power	Power/Ground
Analog	Analog Signaling
I	Input
O	Output
IO	Bi-directional
Rpu = 10K	10K Ohm equipped with default pull up
Rpd = 10K	10K Ohm equipped with default pull down
Rpu = 50K	50K Ohm equipped with default pull up
Rpd = 50K	50K Ohm equipped with default pull down

6.2 IT1337E/FNE-48 Pin Description

Pin(s) No.	Symbol	IO	IO Type	Rpu	Rpd	Description
1	XTALO	O	Analog	--	--	***12MHz Crystal Output***
2	XTALI	I	Analog	--	--	***12MHz Crystal Input***
3	xD_CD	IO	CMOS 3-state	50K	--	***xD-Picture Card Card Detect***
4	Clk48M	I	CMOS 3-state	--	--	***External 48MHz Clock Input***
5	SM_WP_SW/ SD_CMD/ MS_BS	IO	CMOS 3-state	50K	--	***SmartMedia Card Write Protect Switch / SD/MMC Card Command Signal / Memory Stick Card Bus State Signal***
6	SM_RD/ MS_INS	IO	CMOS 3-state	50K	--	***SmartMedia Card Read Enable / Memory Stick Card Insertion Signal***
7	SM_RNB/ SD_CD	IO	CMOS 3-state	50K	--	***SmartMedia Card Ready/Busy Signal / SD/MMC Card Card Detect***
8	SM/SD/MS D0	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 0***
9	SM/SD/ MS D1	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 1***
10	SM_CLE	IO	CMOS 3-state	--	--	***SmartMedia Card Command Latch Enable***
11	SM/SD/ MS D2	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 2***
12	VDD18	--	Power	--	--	***Internal Core 1.8V Power***
13	VSS	--	Power	--	--	***Digital Ground***
14	VDD33	--	Power	--	--	***3.3V Digital Power***
15	PWR_SW	--	Power	--	--	***Power MOSFET***
16	SM_ALE	IO	CMOS 3-state	--	--	***SmartMedia Card Address Latch Enable***

Pin(s) No.	Symbol	IO	IO Type	R_{pu}	R_{pd}	Description
17	SM_CD	IO	CMOS 3-state	--	--	***SmartMedia Card Card Detect***
18	SM/SD/ MS D3	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 3***
19	ClkSel	IO	CMOS 3-state	--	--	***Clock Select*** ClkSel=0 selects the Clk48M clock input and Clk12M_out pin should be connected to XTALI pin.
20	GPIO3	IO	CMOS 3-state	50K	--	***GPIO Port1 Bit 3***
21	RST	I	Schmitt trigger	--	--	***Chip Reset and Active Low***
22	SM/SD/MS D4	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 4***
23	GPIO0/ LED	IO	CMOS 3-state	50K	--	***GPIO Port1 Bit 0 /*** ***Operating LED Indicator***
24	REG5Vin	--	Power	--	--	***Regulator 5V Power Input***
25	REG33Vout	--	Power	--	--	***Regulator 3.3V Power Output***
26	VSS	--	Power	--	--	***Digital Ground***
27	GPIO4	IO	CMOS 3-state	50K	--	***GPIO Port1 Bit 4***
28	GPIO1	IO	CMOS 3-state	50K	--	***GPIO Port1 Bit 1***
29	SM/SD/MS D5	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 5***
30	TC	I	Schmitt trigger	--	--	***Chip Test Mode Enable and Active High*** This pin should be connected to ground in the normal mode.
31	GPIO5	IO	CMOS 3-state	50K	--	***GPIO Port1 Bit 4***
32	SM/SD/ MS D6	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 6***
33	GPIO6	IO	CMOS 3-state	50K	--	***GPIO Port1 Bit 6***
34	SM/SD/ MS D7	IO	CMOS 3-state	--	--	***SM/SD/MS Card Data Bit 7***
35	REG18Vout	--	Power	--	--	***Regulator 1.8V Power Output*** Connects capacitors to ground.
36	REG33Vin	--	Power	--	--	***Regulator 3.3V Power Input***
37	GPIO7	IO	CMOS 3-state	50K	--	***GPIO Port1 Bit 7***
38	Clk12M_out	O	CMOS 3-state	--	--	***12MHz Clock Output If ClkSel=0***
39	SM_CE/ SD_WP	IO	CMOS 3-state	50K	--	***SmartMedia Card Card Enable /*** ***SD/MMC Card Write Protect***
40	SM_WP/ SD_CLK/ MS_CLK	O	CMOS 3-state	--	--	***SmartMedia Card Write Protect Signal /*** ***SD/MMC Card Clock /*** ***Memory Stick Card Clock***
41	VSS	P	Power	--	--	***3.3V Digital Ground***
42	SM_WR	O	CMOS 3-state	--	--	***SmartMedia Card Write Enable***
43	EE_SDA	IO	CMOS 3-state	10K	--	***EEPROM Serial Data*** S0 for configuration setting.
44	EE_CLK	O	CMOS 3-state	10K	--	***EEPROM Clock*** S1 for configuration setting.
45	AVDD33	--	Power	--	--	***Analog 3.3V Power***
46	DP	IO	Analog	--	--	***USB DP Signal***
47	DM	IO	Analog	--	--	***USB DM Signal***
48	AVSS	--	Power	--	--	***Analog 3.3V Ground***

6.3 IT1337E/FNFN-24 Pin Description

Pin(s) No.	Symbol	IO	IO Type	R_{pu}	R_{pd}	Description
1	XTALI	I	Analog	--	--	***12MHz Clock Input***
2	Clk48M	I	CMOS 3-state	--	--	***External 48MHz Clock Input***
3	SD_CMD/ MS_BS	IO	CMOS 3-state	50K	--	***SD/MMC Card Command Signal / Memory Stick Card Bus State Signal***
4	MS_INS	I	CMOS 3-state	50K	--	***Memory Stick Card Insertion Signal***
5	SD_CD	I	CMOS 3-state	50K	--	***SD/MMC Card Card Detect***
6	SD_D0/ MS_D0	IO	CMOS 3-state	--	--	***SD/MMC Card Data Bit 0 / Memory Stick Card Data Bit 0***
7	SD_D1/ MS_D1	IO	CMOS 3-state	--	--	***SD/MMC Card Data Bit 1 / Memory Stick Card Data Bit 1***
8	SD_D2/ MS_D2	IO	CMOS 3-state	--	--	***SD/MMC Card Data Bit 2 / Memory Stick Card Data Bit 2***
9	SD_D3/ MS_D3	IO	CMOS 3-state	--	--	***SD/MMC Card Data Bit 3 Memory Stick Card Data Bit 3***
10	RST	I	Schmitt trigger	--	--	***Chip Reset and Active Low***
11	LED	O	CMOS 3-state	--	--	***Operating LED Indicator***
12	PWR_SW	--	Power	--	--	***Power MOSFET***
13	VDD33	--	Power	--	--	***3.3V Digital Power***
14	REG5Vin	--	Power	--	--	***Regulator 5V Power Input***
15	REG33Vout	--	Power	--	--	***Regulator 3.3V Power Output***
16	REG18Vout	--	Power	--	--	***Regulator 1.8V Power Output*** Connects capacitors to ground.
17	REG33Vin	--	Power	--	--	***Regulator 3.3V Power Input***
18	Clk12M_out	O	CMOS 3-state	--	--	***12MHz Clock Output.***
19	SD_WP	O	CMOS 3-state	--	--	***SD/MMC Card Write Protect***
20	SD_CLK/ MS_CLK	O	CMOS 3-state	--	--	***SD/MMC Card Clock / Memory Stick Card Clock***
21	AVDD33	--	Power	--	--	***Analog 3.3V Power***
22	DP	IO	Analog	--	--	***USB DP Signal***
23	DM	IO	Analog	--	--	***USB DM Signal***
24	AVSS	--	Power	--	--	***Analog 3.3V Ground***

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7. DC Characteristics

Absolute Maximum Ratings

Operating Temperature T_A (ambient) ..... 0°C to +70°C

REG5Vin Supply Voltage ..... 0V to +5.25V

VDD33 Supply Voltage ..... 0V to +3.6V

Voltage on Input, NC or I/O Pins (Relative to Vss)

..... 0V to +3.6V

Storage Temperature ..... -40°C to +125°C

Junction Temperature ..... +125°C

Comments

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to this device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied, and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

DC Electrical Characteristics (Operation Condition VDD33=3.0V~3.6V, Tj=0°C~115°C)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
REG5Vin	Regulator Supply Voltage		4.75	5.0	5.25	V
V_{IH}	Input High Voltage	VDD33=3.3V, VDD18=1.8V	2.0	--	3.6	V
V_{IL}	Input Low Voltage	VDD33=3.3V, VDD18=1.8V	0	--	0.8	V
V_{OH}	Output High Voltage	VDD33=3.3V,IOH = -2mA~ -16mA	2.4	--	--	V
V_{OL}	Output Low Voltage	VDD33=3.3V,IOL = 2mA ~ 16mA	--	--	0.4	V
VT+	Schmitt Trigger Low to High Threshold Voltage	VDD33 = 3.3V	0.8	1.1	--	V
VT-	Schmitt Trigger High to Low Threshold Voltage	VDD33 = 3.3V	--	1.6	2.0	V
IIN	Input Leakage Current	VDD33 = 3.3V, VDD18 = 1.8V	-10	±1	+10	uA
Ioz	Tri-state Output Leakage Current	VDD33 = 3.3V, VDD18 = 1.8V	-10	±1	+10	uA
Icc	Operating current	VDD33 = 3.3V, VDD18 = 1.8V, without card insertion	--	30	--	mA
Isusp	Suspend current	VDD33 = 3.3V, VDD18 = 1.8V	--	350	--	uA
Rpud	Pull-up/Pull-down Resistance	VDD33 = 3.3V, VDD18 = 1.8V	-50	--	+50	%

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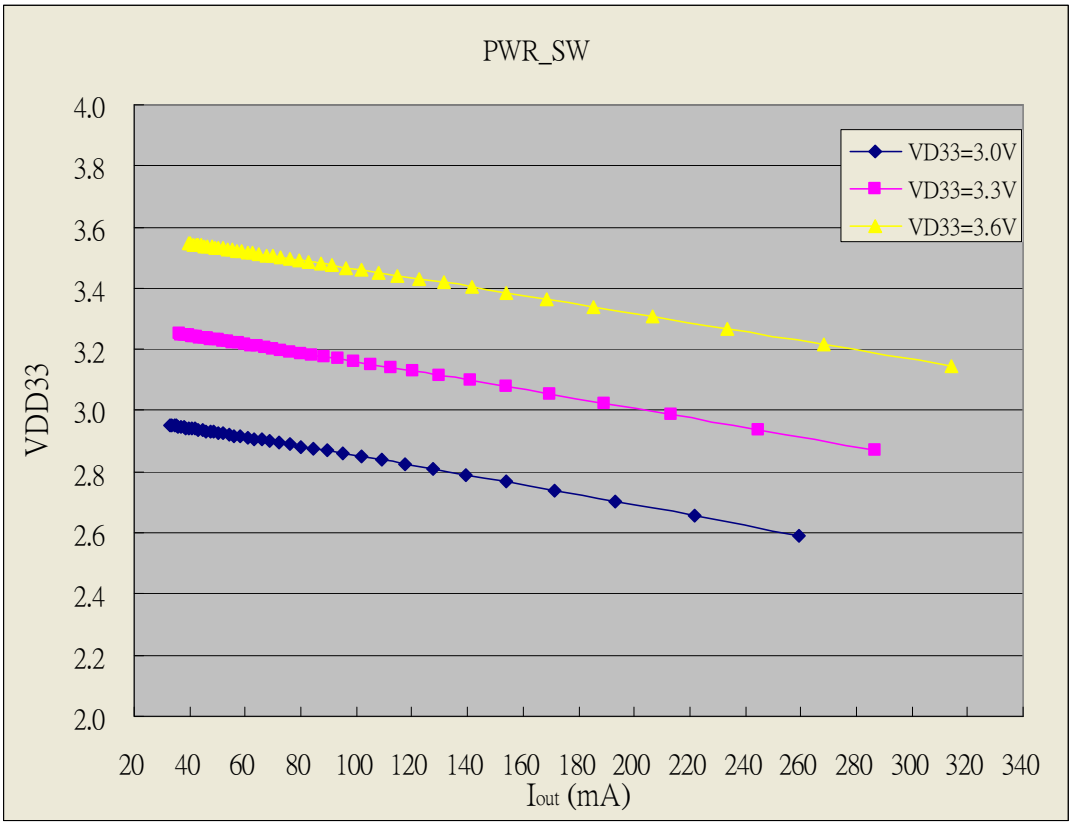
8. Power MOSFET Characteristics

8.1 PWR_SW

Table 8-1. Power MOSFET Characteristics of PWR_SW

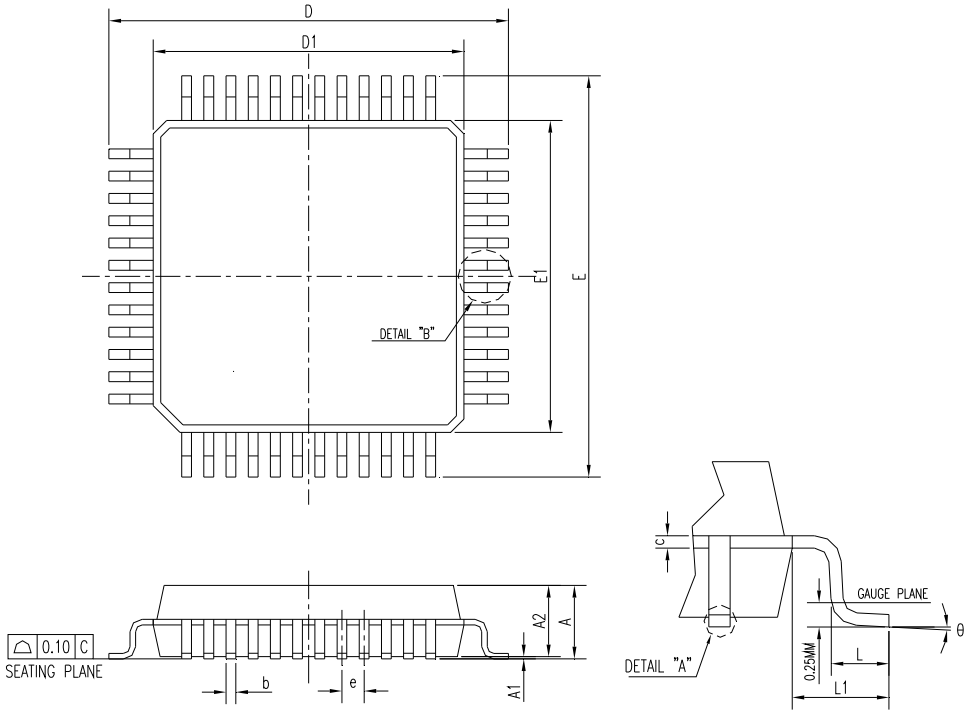
Symbol	Parameter	Condition	Min	Typ	Max	Unit
I_{out}	Output Driving Current	VDD33=3.3V	--	--	200	mA
V_{out}	Output Voltage	VDD33 = 3.3V, Iout = 200mA	3.0	--	--	V
V_{th}	Threshold Output Voltage for Short-Circuit Protection	VDD33 = 3.3V	2.5	--	2.7	V
R_{on}	Switch on Resistance	VDD33 = 3.3V, Iout = 200mA	--	1.5	--	Ω
T_R	Turn-on Rise Time	VDD33 = 3.3V	--	3	--	ns

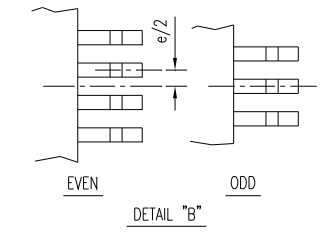
Figure 8-1. Power MOSFET I-V Curve of PWR_SW



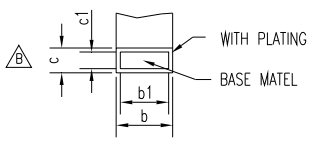
9. Package Information

48-Pin LQFP Outline Dimensions unit: inches/mm





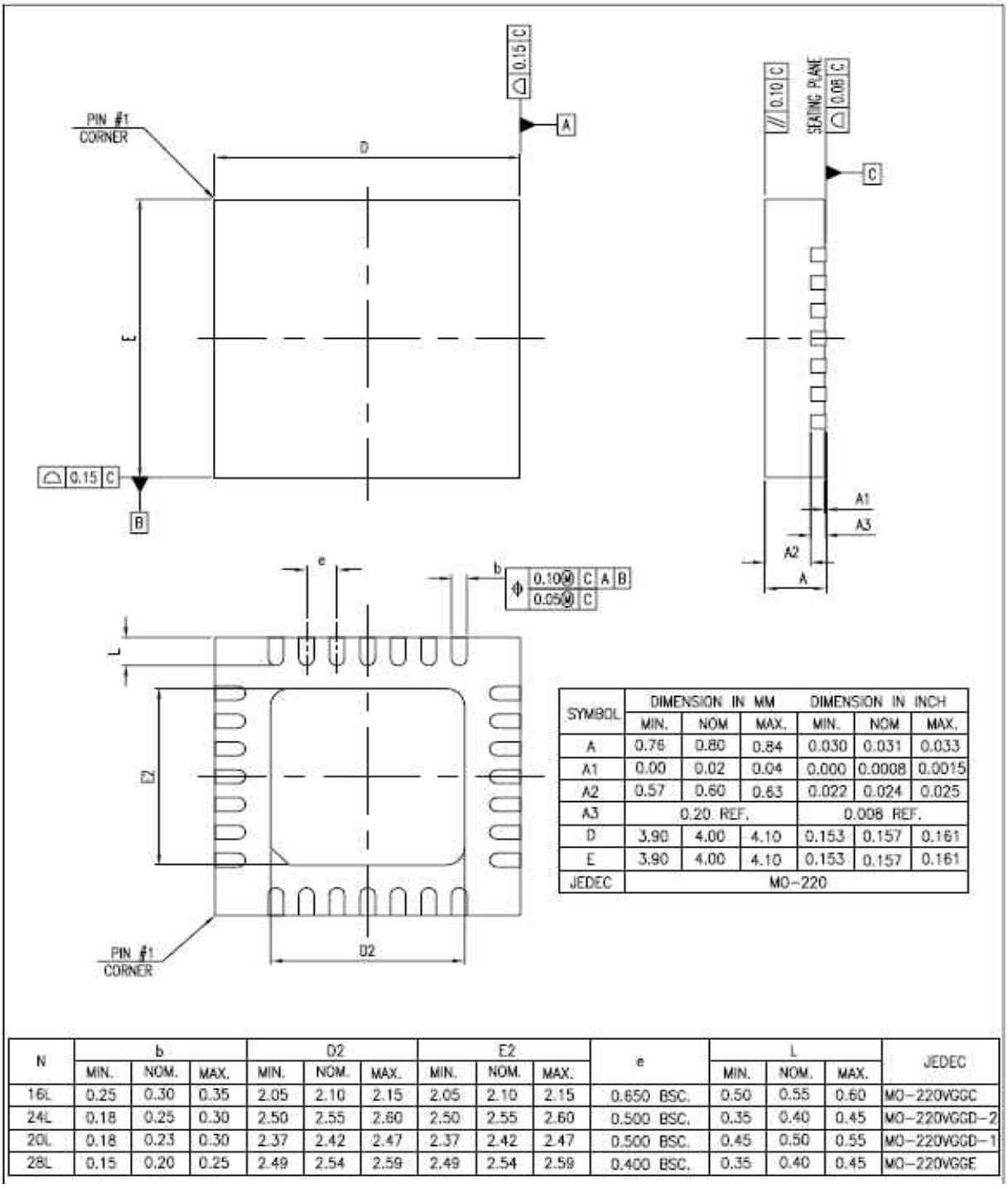
SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.
A			1.60			0.063
A1	0.05		0.15	0.002		0.006
A2	1.35	1.40	1.45	0.053	0.055	0.057
D	8.90	9.00	9.10	0.350	0.354	0.358
D1	6.90	7.00	7.10	0.272	0.276	0.280
E	8.90	9.00	9.10	0.350	0.354	0.358
E1	6.90	7.00	7.10	0.272	0.276	0.280
B c	0.178 TYP.			0.007 TYP.		
c1	0.127 TYP.			0.005 TYP.		
L	0.50	0.60	0.70	0.020	0.024	0.028
L1	1.00 REF.			0.039 REF.		
θ	0	3.5	7	0	3.5	7
JEDEC						



	b (MM)			b1 (MM)			e (MM)			JEDEC
N	MIN.	NOM	MAX.	MIN.	NOM	MAX.	MIN.	NOM	MAX.	
48L	0.19	0.22	0.25	0.17	0.20	0.23	0.50 BSC.			

DETAIL "A"

24-Pin QFN Outline Dimensions unit: inches/mm



SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.
A	0.76	0.80	0.84	0.030	0.031	0.033
A1	0.00	0.02	0.04	0.000	0.0008	0.0015
A2	0.57	0.60	0.63	0.022	0.024	0.025
A3	0.20 REF.			0.008 REF.		
D	3.90	4.00	4.10	0.153	0.157	0.161
E	3.90	4.00	4.10	0.153	0.157	0.161
JEDEC	MO-220					

N	b			D2			E2			e	L			JEDEC
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.	
16L	0.25	0.30	0.35	2.05	2.10	2.15	2.05	2.10	2.15	0.650 BSC.	0.50	0.55	0.60	MO-220VGGC
24L	0.18	0.25	0.30	2.50	2.55	2.60	2.50	2.55	2.60	0.500 BSC.	0.35	0.40	0.45	MO-220VGGD-2
20L	0.18	0.23	0.30	2.37	2.42	2.47	2.37	2.42	2.47	0.500 BSC.	0.45	0.50	0.55	MO-220VGGD-1
28L	0.15	0.20	0.25	2.49	2.54	2.59	2.49	2.54	2.59	0.400 BSC.	0.35	0.40	0.45	MO-220VGGE

10. Ordering Information

Part No.	Description	Package Type
IT1337E-48	USB2.0 Single Lun Multi Flash Card Reader Controller (SD/MMC/MS Pro HG/xD/SM)	48-Pin LQFP 7mm x 7mm x 1.4mm
IT1337FN-24	USB2.0 Single Lun SD/MS Flash Card Reader Controller (SD/MMC/MS)	24-Pin QFN 4mm x 4mm x 0.8mm

ITE also provides RoHS compliant component. Please mark "-L" at the end of the Part No. when the parts ordered are RoHS compliant.

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ITE TECH. INC. TERMS AND CONDITIONS OF SALE (Rev: 2005)

0. PARTIES

ITE Tech. Inc. ("Seller") is a company headquartered in Taiwan, Republic of China, and incorporated under laws of Republic of China, Buyer is a company or an entity, purchasing product from ITE Tech. Inc..

1. ACCEPTANCE OF TERMS

BUYER ACCEPTS THESE TERMS (i) BY WRITTEN ACCEPTANCE (BY PURCHASE ORDER OR OTHERWISE), OR (ii) BY FAILURE TO RETURN GOODS DESCRIBED ON THE FACE OF THE PACKING LIST WITHIN FIVE DAYS OF THEIR DELIVERY.

2. DELIVERY

(a) Delivery will be made Free Carrier (Incoterms), Seller's warehouse, Science-Based Industrial Park, Hsinchu, Taiwan.
(b) Title to the goods and the entire risk will pass to Buyer upon delivery to carrier.
(c) Shipments are subject to availability. Seller shall make every reasonable effort to meet the date(s) quoted or acknowledged; and if Seller makes such effort, Seller will not be liable for any delays.

3. TERMS OF PAYMENT

(a) Terms are as stated on Seller's quotation, or if none are stated, net thirty (30) days. Accounts past due will incur a monthly charge at the rate of one percent (1%) per month (or, if less, the maximum allowed by applicable law) to cover servicing costs.
(b) Seller reserves the right to change credit terms at any time in its sole discretion.

4. LIMITED WARRANTY

(a) Seller warrants that the goods sold will be free from defects in material and workmanship and comply with Seller's applicable published specifications for a period of ninety (90) days from the date of Seller's delivery. Within the warranty period and by obtaining a return number from Seller, Buyer may request replacement or repair for defective goods.
(b) Goods or parts which have been subject to abuse (including without limitation repeated or extended exposure to conditions at or near the limits of applicable absolute ratings) misuse, accident, alteration, neglect, or unauthorized repair or improper application are not covered by any warranty. No warranty is made with respect to custom products or goods produced to Buyer's specifications (unless specifically stated in a writing signed by Seller).
(c) No warranty is made with respect to goods used in devices intended for use in applications where failure to perform when properly used can reasonably be expected to result in significant injury (including, without limitation, navigation, aviation or nuclear equipment, or for surgical implant or to support or sustain life) and Buyer agrees to indemnify, defend, and hold harmless Seller from all claims, damages and liabilities arising out of any such uses.
(d) This Paragraph 4 is the only warranty by Seller with respect to goods and may not be modified or amended except in writing signed by an authorized officer of Seller.
(e) Buyer acknowledges and agrees that it is not relying on any applications, diagrams or circuits contained in any literature, and Buyer will test all parts and applications under extended field and laboratory conditions. Notwithstanding any cross-reference or any statements of compatibility, functionality, interchangeability, and the like, the goods may differ from similar goods from other vendors in performance, function or operation, and in areas not contained in the written specifications, or as to ranges and conditions outside such specifications; and Buyer agrees that there are no warranties and that Seller is not responsible for such things.
(f) EXCEPT AS PROVIDED ABOVE, SELLER MAKES NO WARRANTIES OR CONDITIONS, EXPRESS, IMPLIED, OR STATUTORY; AND SELLER EXPRESSLY EXCLUDES AND DISCLAIMS ANY WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OR APPLICATION.

5. LIMITATION OF LIABILITY

(a) Seller will not be liable for any loss, damage or penalty resulting from causes beyond its reasonable control, including but not limited to delay by others, force majeure, acts of God, or labor conditions. In any such event, the date(s) for Seller's performance will be deemed extended for a period equal to any delay resulting.
(b) THE LIABILITY OF SELLER ARISING OUT OF THE CONTRACT OR ANY GOODS SOLD WILL BE LIMITED TO REFUND OF THE PURCHASE PRICE OR REPLACEMENT OF PURCHASED GOODS (RETURNED TO SELLER FREIGHT PRE-PAID) OR, WITH SELLER'S PRIOR WRITTEN CONSENT, REPAIR OF PURCHASED GOODS.
(c) Buyer will not return any goods without first obtaining a customer return order number.
(d) AS A SEPARATE LIMITATION, IN NO EVENT WILL SELLER BE LIABLE FOR COSTS OF SUBSTITUTE GOODS; FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL OR INDIRECT DAMAGES; OR LOSS OF USE, OPPORTUNITY, MARKET POTENTIAL, AND/OR PROFIT ON ANY THEORY (CONTRACT, TORT, FROM THIRD PARTY CLAIMS OR OTHERWISE). THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY REMEDY.
(e) No action against Seller, whether for breach, indemnification, contribution or otherwise, shall be commenced more than one year after the cause of action has accrued, or more than one year after either the Buyer, user or other person knew or with reasonable diligence should have known of the matter or of any claim of dissatisfaction or defect involved; and no such claim may be brought unless Seller has first been given commercially reasonable notice, a full written explanation of all pertinent details, and a good faith opportunity to resolve the matter.
(f) BUYER EXPRESSLY AGREES TO THE LIMITATIONS OF THIS PARAGRAPH 5 AND TO THEIR REASONABLENESS.

6. SUBSTITUTIONS AND MODIFICATIONS

Seller may at any time make substitutions for product ordered which do not materially and adversely affect overall performance with the then current specifications in the typical and intended use. Seller reserves the right to halt deliveries and shipments and alter specifications and prices without notice. Buyer shall verify that the literature and information is current before purchasing.

7. CANCELLATION

The purchase contract may not be canceled by Buyer except with written consent by Seller and Buyer's payment of reasonable cancellation charges (including but not be limited to expenses already incurred for labor and material, overhead, commitments made by Seller, and a reasonable profit).

8. INDEMNIFICATION

Seller will, at its own expense, assist Buyer with technical support and information in connection with any claim that any parts as shipped by Seller under the purchase order infringe any valid and enforceable copyright, or trademark, provided however, that Buyer (i) gives immediate written notice to Seller, (ii) permits Seller to participate and to defend if Seller requests to do so, and (iii) gives Seller all needed information, assistance and authority. However, Seller will not be responsible for infringements resulting from anything not entirely manufactured by Seller, or from any combination with products, equipment, or materials not furnished by Seller. Seller will have no liability with respect to intellectual property matters arising out of products made to Buyer's specifications, code, or designs.
Except as expressly stated in this Paragraph 8 or in another writing signed by an authorized officer, Seller makes no representations and/or warranties with respect to intellectual and/or industrial property and/or with respect to claims of infringement.
Except as to claims Seller agrees in writing to defend, BUYER WILL INDEMNIFY, DEFEND AND HOLD HARMLESS SELLER FROM ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING ATTORNEYS FEES) AGAINST AND/OR ARISING OUT OF GOODS SOLD AND/OR SHIPPED HEREUNDER.

9. NO CONFIDENTIAL INFORMATION

Seller shall have no obligation to hold any information in confidence except as provided in a separate non-disclosure agreement signed by both parties.

10. ENTIRE AGREEMENT

(a) These terms and conditions are the entire agreement and the only representations and understandings between Seller and Buyer, and no addition, deletion or modification shall be binding on Seller unless expressly agreed to in written and signed by an officer of Seller.
(b) Buyer is not relying upon any warranty or representation except for those specifically stated here.

11. APPLICABLE LAW

The contract and all performance and disputes arising out of or relating to goods involved will be governed by the laws of R.O.C. (Taiwan, Republic of China), without reference to the U.N. Convention on Contracts for the International Sale of Goods or to conflict of laws principles. Buyer agrees at its sole expense to comply with all applicable laws in connection with the purchase, use or sale of the goods provided hereunder and to indemnify Seller from any failure by Buyer to so comply. Without limiting the foregoing, Buyer certifies that no technical data or direct products thereof will be made available or re-exported, directly or indirectly, to any country to which such export or access is prohibited or restricted under R.O.C. laws or U.S. laws or regulations, unless prior authorization is obtained from the appropriate officials and agencies of the government as required under R.O.C. or U.S. laws or regulations.

12. JURISDICTION AND VENUE

The courts located in Hsinchu, Taiwan, Republic of China, will have the sole and exclusive jurisdiction and venue over any dispute arising out of or relating to the contract or any sale of goods hereunder. Buyer hereby consents to the jurisdiction of such courts.

13. ATTORNEYS' FEES

Reasonable attorneys' fees and costs will be awarded to the prevailing party in the event of litigation involving and/or relating to the enforcement or interpretation of the contract and/or any goods sold under it.