

IT5225FN

**Type C DFP Controller with 15W Power Switch for
USB 3.2 Gen2 x2**

**Preliminary Specification V0.3.4.2
(For D Version)**

ITE TECH. INC.

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Revision History

The contents below indicate the change between this version and the previous version only. The revision history shown in the previous version will not remain in the following table.

Section	Revision	Page No.
8	Operating Temperature Modified Original: 0-70°C Modified: -40-85°C	17
8	VBUS SW and VCONN SW Soft Start Time Modified	18

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CONTENTS

1. Features	1
2. General Description.....	3
3. Block Diagram	5
4. Pin Configuration.....	7
5. Pin Description	9
6. SMBUS Interface.....	11
6.1 Overview.....	11
6.1.1 Device Address.....	11
6.1.2 Data Transfer	11
7. Type-C Register	13
7.1 Overview.....	13
7.2 Register Description	13
7.2.1 Auto/Test Mode Register (ATMR)	13
7.2.2 Rp Level Register (RPLR)	13
7.2.3 TypeC Attach Status Register (TCASR).....	13
7.2.4 Power Switch OCP Status Register (PSOCPSR)	14
7.2.5 PCH Data Control Register Byte 1(PCHDCRB1).....	15
7.2.6 PCH Data Status Register Byte 1(PCHDSRB1).....	15
7.2.7 PCH Data Status Register Byte 2(PCHDSRB2).....	15
8. DC Characteristics	17
9. AC Characteristics.....	19
10. Package Information	23
11. Ordering Information	25
12. Top Marking Information	27

FIGURES

Figure 4-1. IT5225 Top View (16-QFN).....	7
Figure 6-1. Example of SMBUS Timings for Control Register Write Operation	12
Figure 6-2. Example of SMBUS Timings for Control Register Read Operation.....	12
Figure 9-1. Definition of Timings for SCL/SDA.....	19
Figure 9-2. Definition of RESET_N Timing.....	19

TABLES

Table 4-1. Pins Listed in Numeric Order	7
Table 5-1. Pin Description	9
Table 6-1. SMBUS Device Address	11
Table 7-1. List of System Registers.....	13
Table 9-1. SCL/SDA AC Table	19
Table 9-2. Fast-mode plus AC Table.....	20

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1. Features

- CC Attach/Detach function with DFP controller
- 0.9A/1.5A/3A USB Type C current capability
- 5V *3A power switch of VBUS
- VCONN power switch (300 mA)
- With OTP function @ 155 degree (Junction Temp.)
- Short circuits protection to VBUS and VCONN pin
- SMBUS interface operation mode and 1 port structure
- Support Intel PD to PCH command and registers
- Temperature Range
- -40°C ~ 85°C
- Package
- 16-pin QFN (3mmx3mm)

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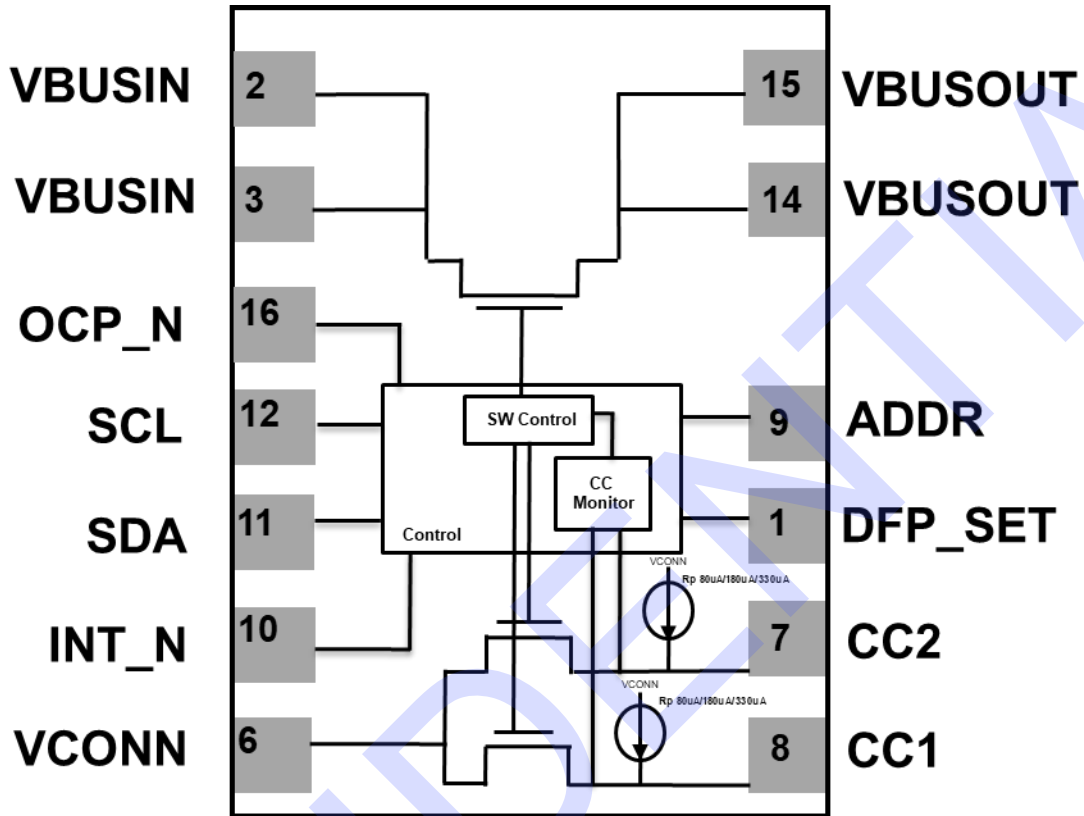
2. General Description

IT5225FN is a USB Type C DFP (Downstream Facing Port) controller and 5V power switch for VBUS and VCONN power. Support USB type C current for Default (0.9A)/1.5A/3A current capability of VBUS charging. It is a 1 port structure and use SMBUS interface.

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3. Block Diagram

IT5225 DX (I2C, 1 Port)



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4. Pin Configuration

Figure 4-1. IT5225 Top View (16-QFN)

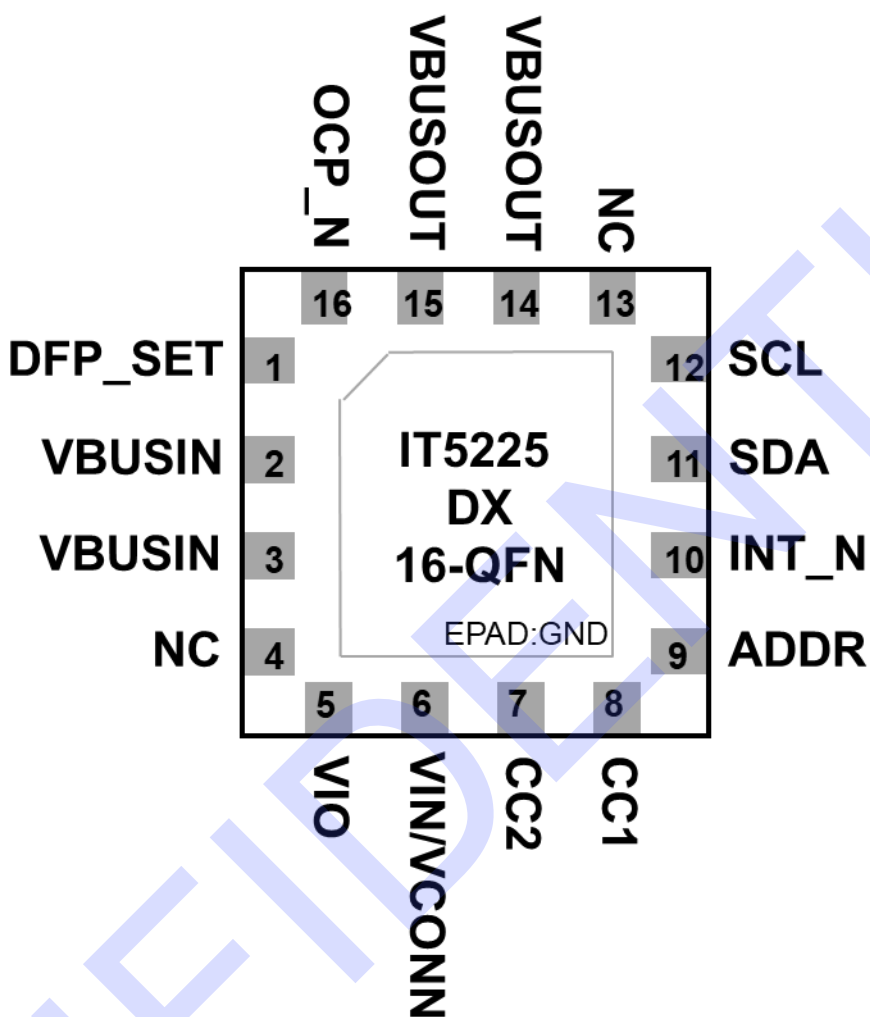


Table 4-1. Pins Listed in Numeric Order

Pin	Signal	Pin	Signal
1	DFP_SET	9	ADDR
2	VBUSIN	10	INT_N
3	VBUSIN	11	SDA
4	NC	12	SCL
5	VIO	13	NC
6	VIN/VCONN	14	VBUSOUT
7	CC2	15	VBUSOUT
8	CC1	16	OCP_N

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5. Pin Description

Table 5-1. Pin Description

Pin(s) No.	Symbol	Attribute	Power	Description
1	DFP_SET	I	-	USB Type C VBUS current configuration setting. High = 1.5A, Float = 0.9A, Low = 3A.
2	VBUSIN	PW	5V	VBUS input power supply
3	VBUSIN	PW	5V	VBUS input power supply
4	NC	-	-	No Connection
5	VIO	PW	1.8V-5V	PW for internal PADS of PIN SCL and SDA and INT_N and OCP_N.
6	VIN/VCONN	PW	5V	PW for chip and VCONN PW.
7	CC2	I/O	-	Analog I/O connects to the USB Type-C receptacle CC2 pin.
8	CC1	I/O	-	Analog I/O connects to the USB Type-C receptacle CC1 pin.
9	ADDR	I	-	SMBUS Address setting pin.
10	INT_N	OD	-	Open drain logic. Interrupt event alert.
11	SDA	OD	-	Open drain logic. SMBUS protocol control data.
12	SCL	OD	-	Open drain logic. SMBUS protocol control clock.
13	NC	-	-	No Connection
14	VBUSOUT	O	5V	Power switch 5V output from VBUSIN PIN.
15	VBUSOUT	O	5V	Power switch 5V output from VBUSIN PIN.
16	OCP_N	OD	-	Open drain logic. Flag for VBUS OCP Status.

Notes: I/O cell types are described below:

- I: Input PAD
- OD: Open-Drain Output PAD
- IO: Input/ Output PAD
- PW: Power PAD

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6. SMBUS Interface

6.1 Overview

The IT5225 is available with an SMBUS Block R/W –compatible interface. The serial interface supports two transfer types, SMBUS Block Write, and SMBUS Block Read.

6.1.1 Device Address

The IT5225 can support 2 different device addresses by setting ADDR to 5V/Float or GND.

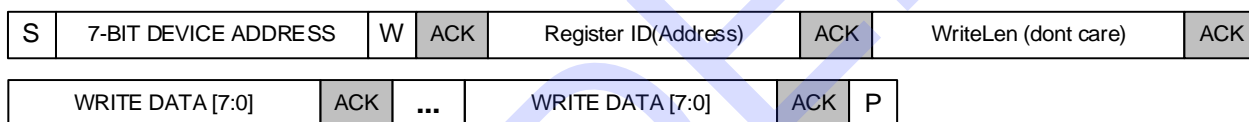
Table 6-1. SMBUS Device Address

Input	SMBUS Slave Address – 7bit (1, 0, 1, 0, 1, ADDR, 0)
ADDR	
L	54h
H	56h

6.1.2 Data Transfer

The 8-bit control register can be read/write over the SMBUS. The IT5225 supports the following two types of transfers. The related protocol and timing diagrams are shown below.

SMBUS Block Write Control Register



SMBUS Block Read Control Register

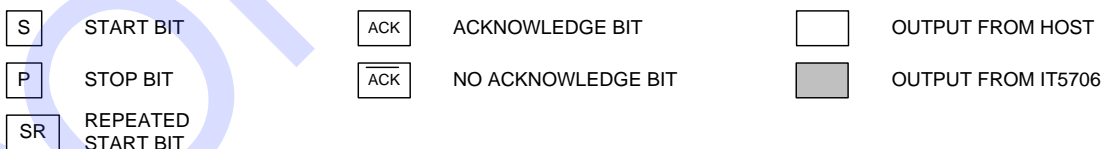
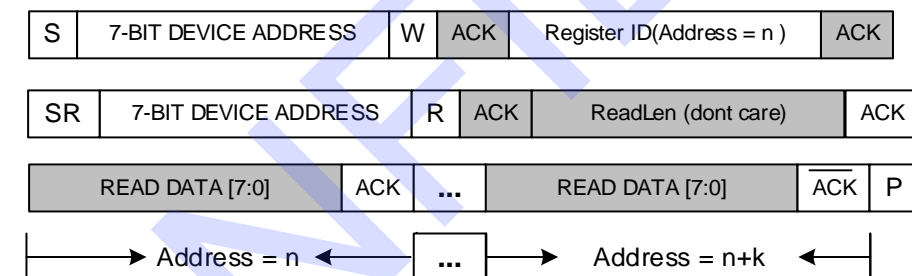


Figure 6-1. Example of SMBUS Timings for Control Register Write Operation

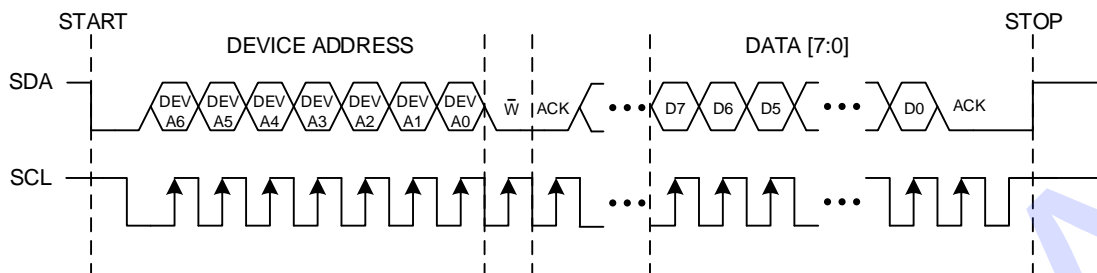
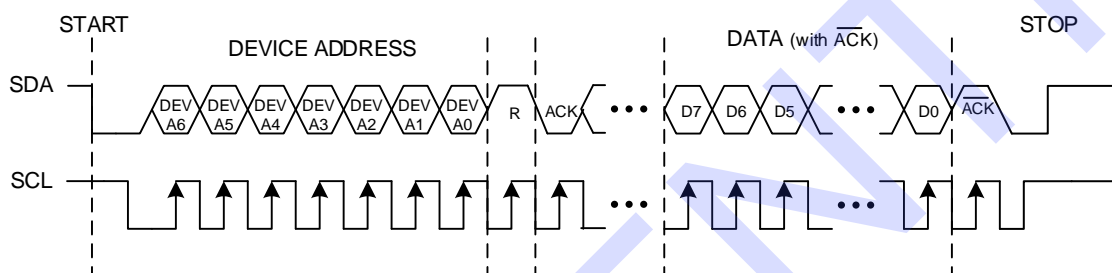


Figure 6-2. Example of SMBUS Timings for Control Register Read Operation



7. Type-C Register

7.1 Overview

The Type-C registers provide Type-C interrupt and include PD to Intel PCH registers.

7.2 Register Description

The following table lists all of the IT5225 type-c registers. The base address is **0x40**

Table 7-1. List of System Registers

Register Name	R/W	Address
Auto/Test Mode Register (ATMR)	R/W	0x00
Rp Level Register (RPLR)	R/W	0x03
TypeC Attach Status Register (TCASR)	R	0x0B
Power Switch OCP Status Register (PSOCPSR)	R	0x0C
PCH Data Control Register Byte 1 (PCHDCRB1)	R/WC	0x10
PCH Data Status Register Byte 1 (PCHDSRB1)	R	0x1F
PCH Data Status Register Byte 2 (PCHDSRB2)	R	0x20

7.2.1 Auto/Test Mode Register (ATMR)

Address Offset 0x00

Bit	R/W	Default	Description
7-5	-	-	Reserved
4-3	R/W	3h	ITE Reserved should use default value
2	R/W	1b	Rp Set 1'b0: Rp set by RPLR(type-c base+0x03[1:0]) 1'b1: Rp fixed (by #DFP_SET pin at power on initial)
1-0	R/W	3h	ITE Reserved should use default value

7.2.2 Rp Level Register (RPLR)

Address Offset 0x03

Bit	R/W	Default	Description
7	-	-	Reserved
6-4	R/W	0h	ITE Reserved should use default value
3-2	-	-	Reserved
1-0	R/W	0h	Rp Level 2'b00: Default Mode (0.9A). 2'b01: 1.5A Mode. 2'b11: 3A Mode. Others: Reserved

7.2.3 TypeC Attach Status Register (TCASR)

Address Offset 0x0B

Bit	R/W	Default	Description
7-5	-	-	Reserved
4	R	0b	Type-C Disable Mode While in disable mode, VBUS/Vconn switch is turned off and all CC pin are high impedance. 1'b0: Normal operation 1'b1: Disable mode
3	R	0b	Cable Detected 1'b0: No cable detected 1'b1: Cable detected
2	R	0b	Debug Attach (Debug Assert) 1'b0: Not attached 1'b1: Attached
1	R	0b	Audio Attach (Audio Assert) 1'b0: Not attached 1'b1: Attached
0	R	0b	Source Attach (Sink Assert) 1'b0: Not attached 1'b1: Attached

7.2.4 Power Switch OCP Status Register (PSOCP SR)

Address Offset 0x0C

Bit	R/W	Default	Description
7	R	0b	VBUS/Vconn Switch Fault When this status is 1, OCP pin will drive low. 1'b0: not fault. 1'b1: fault. (typec_base+0x0F[0] write 1 to clear it)
6	R	0b	Vconn Switch Status 1'b0: switch off 1'b1: switch on (write this bit 1 can re-open Vconn switch)
5	R	0b	Vconn OCP Status 1'b0: no OCP 1'b1: OCP (typec_base+0x0F[0] write 1 to clear it)
4	R	0b	Vconn SC(Short Circuit) Status 1'b0: no SC 1'b1: SC (typec_base+0x0F[0] write 1 to clear it)
3	-	-	Reserved
2	R	0b	VBUS Switch Status 1'b0: switch off 1'b1: switch on (write this bit 1 can re-open Vbus switch)
1	R	0b	VBUS OCP Status 1'b0: no OCP 1'b1: OCP (typec_base+0x0F[0] write 1 to clear it)
0	R	0b	VBUS SC(Short Circuit) Status 1'b0: no SC 1'b1: SC (typec_base+0x0F[0] write 1 to clear it)

7.2.5 PCH Data Control Register Byte 1(PCHDCRB1)

Address Offset 0x10

Bit	R/W	Default	Description
7-3	-	-	Reserved
2	R/WC	0b	SMBUS_INT_ACK 1'b0: Do nothing. 1'b1: SoC acknowledge for the interrupt.
1-0	-	-	Reserved

7.2.6 PCH Data Status Register Byte 1(PCHDSRB1)

Address Offset 0x1F

Bit	R/W	Default	Description
7	R	0b	USB_Data_Role 1'b0: DFP 1'b1: UFP (Debug Attach will set to 1)
6	R	0b	USB Connection Status-3 1'b0: No USB connection 1'b1: USB connection (Debug/Audio/SRC Attach will set to 1)
5	R	0b	USB Connection Status-2 1'b0: No USB connection 1'b1: USB connection (Debug/Audio/SRC Attach will set to 1)
4	R	0b	USB Connection Status-1 1'b0: No USB connection 1'b1: USB connection (Debug/Audio/SRC Attach will set to 1)
3-2	-	-	Reserved
1	R	0b	Orientation 1'b0: Normal 1'b1: Flipped
0	R	0b	Device Status 1'b0: No connection 1'b1: Connection (SRC Attach will set to 1)

7.2.7 PCH Data Status Register Byte 2(PCHDSRB2)

Address Offset 0x20

Bit	R/W	Default	Description
7-5	-	-	Reserved
4	R	0b	Debug Accessory Mode 1'b0: No Debug accessory mode 1'b1: Debug accessory mode
3-0	-	-	Reserved

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8. DC Characteristics

Absolute Maximum Ratings*

Power Supply (VIN)	-0.3V to 5.25V
Power Supply (VIO)	1.71V to 5.25V
Input Voltage	-0.3V to 5.25V
Output Voltage.....	-0.3V to 5.25V
Operating Temperature	-40°C to 85°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 Conditions Ta= -40°C~85°C)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Supply						
VIN/VCONN	Supply Voltage	-	4.75	5	5.25	V
VIO	Supply Voltage	PW for internal PADs of PIN SCL and SDA and INT_N and OCP_N.	1.71	1.8/3.3 /5	5.25	V
I _{VIN}	Supply Current	Operating mode under plug	-	<600	-	uA
		Operating mode under unplug	-	2	-	uA
V _{POR}	Power-on Reset Voltage of High Threshold	-	-	3.5	-	V
	Power-on Reset Voltage of Low Threshold	-	-	3.0	-	V
Input SCL; Input / Output SCL/SDA/INT_N						
V _{IL}	Low-level Input Voltage		-	-	0.3*VIO	V
V _{IH}	High-level Input Voltage		0.7*VIO	-	-	V
V _{OL}	Low-level Output Voltage		-	-	0.4	V
I _{OL}	Low-level Output Current	V _{OL} =0.4V	-	8	-	mA
CC1/CC2 Rp Current Source – DFP Controller						
I _{SRC}	Sourcing Current	DFP_SET = FLOAT	64	80	96	uA
		DFP_SET = 5V	165.6	180	194.4	uA
		DFP_SET = 0V	303.6	330	356.4	uA
Over Temperature Protection						
T _{TH_OTPSD1}	Temperature Threshold for Device Shutdown	-	-	155	-	°C
	Hysteresis		-	-	20	°C
T _{TH_OTPSD2}	Temperature Threshold for VBUSOUT/VCONN	-	-	135	-	°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
	to CC1/CC2 Switch Shutdown Hysteresis				20	°C
VBUS Power Switch						
R _{ON_VBUSSW}	On resistance	T _J =25°C, I _{out} =3A		35		mΩ
I _{ocp_3A}	Over current protection	DFP_SET = 0V		3.6		A
I _{ocp_1.5A}	Over current protection	DFP_SET = 5V		1.8		A
I _{ocp_0.9A}	Over current protection	DFP_SET = FLOAT		1.2		A
R _{ODISCHAGE}	Discharge resistance	VBUSIN=4V, UFP signature remove from CC line		500		Ω
R _{BLEED}	Bleed discharge resistance	VBUSIN=4V, No UFP signature on CC line		150		kΩ
VCONN to CC1/CC2 Power Switch						
R _{ON_VCONNSW}	On resistance	T _J =25°C, I _{out} =3A		350		mΩ
I _{ocp_VCONN}	Over current protection			350		mA

Switching Characteristics (Operation Conditions Ta= -40°C~85°C)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
VBUS Power Switch						
T _{ON}	Output voltage turn-on time	VBUSIN=5V, C _L =1uF, R _L =100Ω		4.5		ms
T _{OFF}	Output voltage turn-off time			0.5		ms
VCONN to CC1/CC2 Power Switch						
T _{ON}	Output voltage turn-on time	VCONN=5V, C _L =1uF, R _L =100Ω		4.5		ms
T _{OFF}	Output voltage turn-off time			0.5		ms

9. AC Characteristics

Figure 9-1. Definition of Timings for SCL/SDA

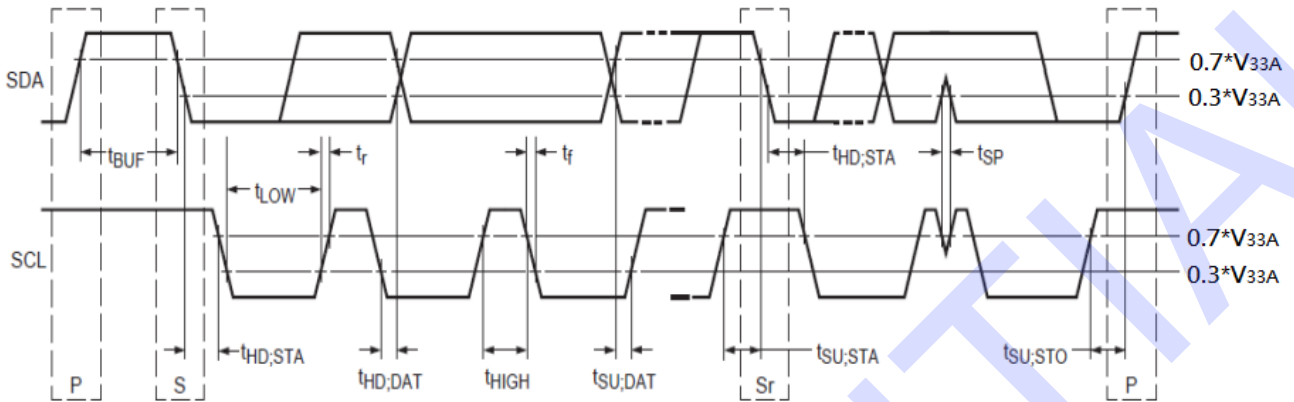


Figure 9-2. Definition of RESET_N Timing

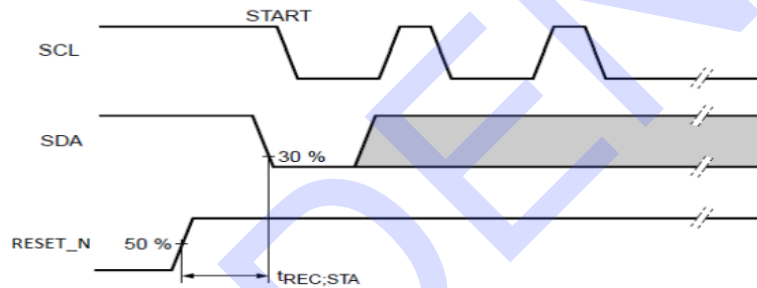


Table 9-1. SCL/SDA AC Table

Symbol	Parameter	Conditions	Standard-mode		Fast-mode		Unit
			Min.	Max.	Min.	Max.	
t_{PD}	Propagation Delay	From SDA to SDx, or SCL to SCx	-	0.3	-	0.3	ns
f_{SCL}	SCL Clock Frequency	-	0	100	0	400	kHz
t_{BUF}	Bus Free Time between STOP and START Condition	-	4.7	-	1.3	-	us
$t_{HD,STA}$	Hold Time (repeated) START Condition	-	4	-	0.6	-	us
t_{LOW}	Low Period of SCL Clock	-	4.7	-	1.3	-	us
t_{HIGH}	High Period of SCL Clock	-	4	-	0.6	-	us
$t_{SU,STA}$	Set-up Time for Repeated START Condition	-	4.7	-	1.3	-	us
$t_{SU,STO}$	Set-up Time for STOP Condition	-	4	-	0.6	-	us
$t_{HD,DAT}$	Data Hold Time	-	0	3.45	0	0.9	us
$t_{SU,DAT}$	Data Set-up Time	-	250	-	100	-	ns

Symbol	Parameter	Conditions	Standard-mode		Fast-mode		Unit
			Min.	Max.	Min.	Max.	
t _r	Rise Time of Both SDA and SCL Signals	-	-	1000	-	300	ns
t _f	Fall Time of Both SDA and SCL Signals	-	-	300	-	300	ns
C _b	Capacitive Load for Each Bus Line	-	-	400	-	400	pF
t _{SP}	Pulse Width of Spikes Required to Be Suppressed by Input Filter	-	-	50	-	50	ns
t _{VD;DAT}	Data Valid Time	HIGH-to-LOW	-	1	-	1	us
		LOW-to-HIGH	-	0.6	-	0.6	us
t _{VD;ACK}	Data Valid Acknowledge Time	-	-	1	-	1	us
RESET_N							
t _{REC;STA}	Recovery Time to START Condition	-	5	-	5	-	ms

Table 9-2. Fast-mode plus AC Table

Symbol	Parameter	Conditions	Fast-mode plus		Unit
			Min.	Max.	
t _{PD}	Propagation Delay	From SDA to SDx, or SCL to SCx	-	0.3	ns
f _{SCL}	SCL Clock Frequency	-	0	1000	KHz
t _{BUF}	Bus Free Time Between STOP and START Condition	-	0.5	-	us
t _{HD;STA}	Hold Time (Repeated) START condition	-	0.26	-	us
t _{LOW}	Low Period of SCL Clock	-	0.5	-	us
t _{HIGH}	High Period of SCL Clock	-	0.26	-	us
t _{SU;STA}	Set-up Time for Repeated START condition	-	0.26	-	us
t _{SU;STO}	Set-up Time for STOP Condition	-	0.26	-	us
t _{HD;DAT}	Data Hold Time	-	0	-	us
t _{SU;DAT}	Data Set-up Time	-	50	-	ns
t _r	Rise Time of Both SDA and SCL Signals	-	-	120	ns
t _f	Fall Time of Both SDA and SCL Signals	-	20+0.1C _b	120	ns
C _b	Capacitive Load for Each Bus Line	-	-	550	pF
t _{SP}	Pulse Width of Spikes Required to Be Suppressed by Input Filter	-	0	50	ns
t _{VD;DAT}	Data Valid Time	HIGH-to-LOW	-	0.45	us
		LOW-to-HIGH	-	0.45	us

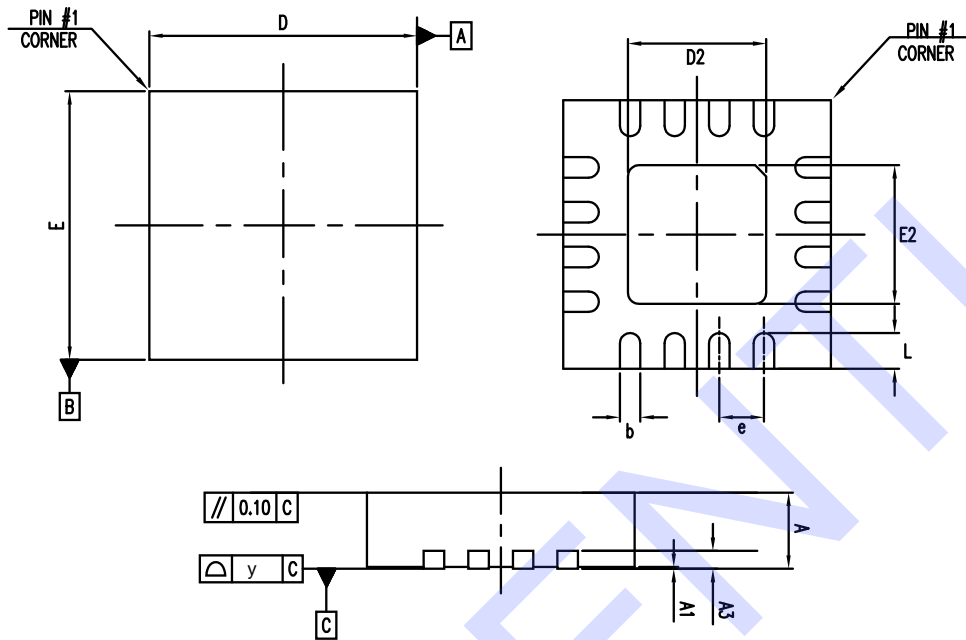
Symbol	Parameter	Conditions	Fast-mode plus		Unit
			Min.	Max.	
t _{VD;ACK}	Data Valid Acknowledge Time	-	-	0.45	us
RESET_N					
t _{REC;STA}	Recovery Time to START Condition	-	5	-	ms

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10. Package Information

QFN 16(3*3) Package Outline Dimensions

unit: inches/mm



Symbol	Dimensions in inches			Dimensions in mm		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.031	0.033	0.039	0.80	0.85	1.0
A1	0.000	0.001	0.002	0.00	0.02	0.05
A3	0.008 REF			0.20 REF		
b	0.007	0.009	0.012	0.18	0.23	0.30
D	0.114	0.118	0.122	2.90	3.00	3.10
D2	0.053	0.059	0.065	1.35	1.50	1.65
E	0.114	0.118	0.122	2.90	3.00	3.10
E2	0.053	0.059	0.065	1.35	1.50	1.65
e	0.020 BSC			0.50 BSC		
L	0.012	0.016	0.020	0.30	0.40	0.50
y	--	--	0.003	--	--	0.08

Notes:

1. Controlling dimensions: Millimeter
2. Reference document: JEDEC MO-220
3. Take SMT into consideration, please use the minimum number of D2's and E2's dimensions.

DI-SAW-QFN16(3*3)v4

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11. Ordering Information

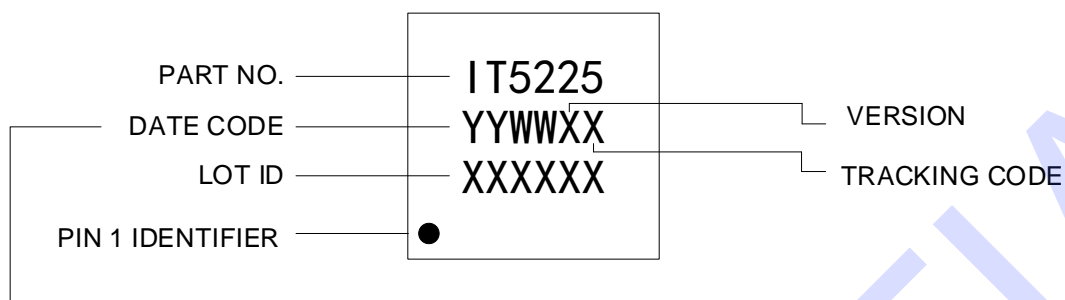
Part No.	Packing	Package
IT5225FN/DX(R)	Tape and Reel	QFN 16 (3*3)

All green components provided are in compliance with RoHS, and Halogen-Free.

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12. Top Marking Information

IT5225FN (QFN16)



(YY: Year WW: Week)
e.g. YYWW = 2307 → The seventh week of the year 2023

ITE TECH. INC. TERMS AND CONDITIONS OF SALE (Rev: 2022)

0. PARTIES

ITE Tech. Inc. ("Seller") is a company headquartered in Taiwan Region, and incorporated under laws of Taiwan Region, 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

Otherwise specified in the order agreed by Seller, delivery will be made Free Carrier (Incoterms), Seller's warehouse, Science-Based Industrial Park, Hsinchu, Taiwan Region.

- (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

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 by its conditions 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 Taiwan Region, 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 applicable laws (including but not limited to the United States Export Administration Regulations), unless prior authorization is obtained from the appropriate officials and/or agencies of the government as required.

12. JURISDICTION AND VENUE

The courts located in Hsinchu, Taiwan Region, 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.