ILITEK
I Love Innovation

ILI9882T

In-cell IC Integrates TFT LCD Driver and Capacitive Touch Controller into a Two Chip Cascade Display Resolution 1600(RGB) x 2560 Support 10-point Touch Capability & Active Stylus

Power On/Off Sequence

Application Notes

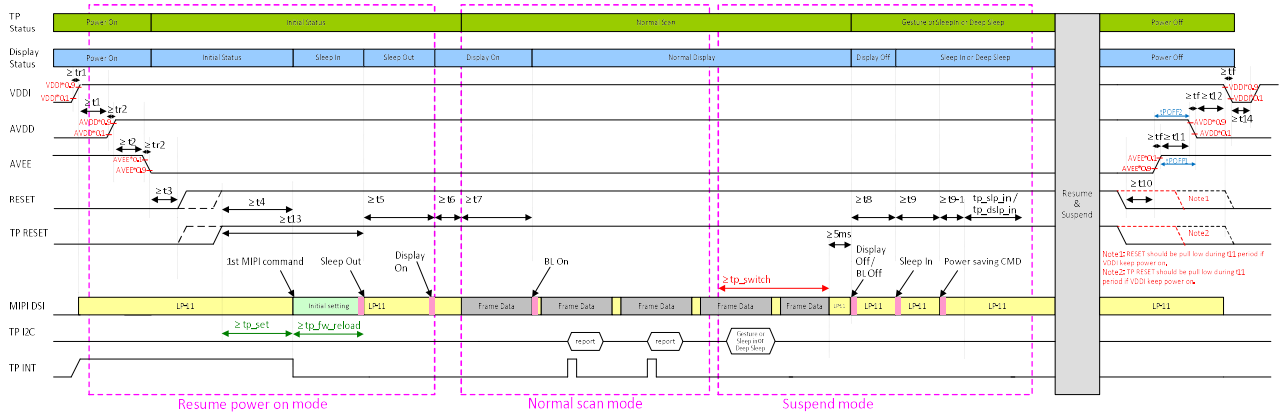
Version: V0.4
Date: Mar. 09. 2023

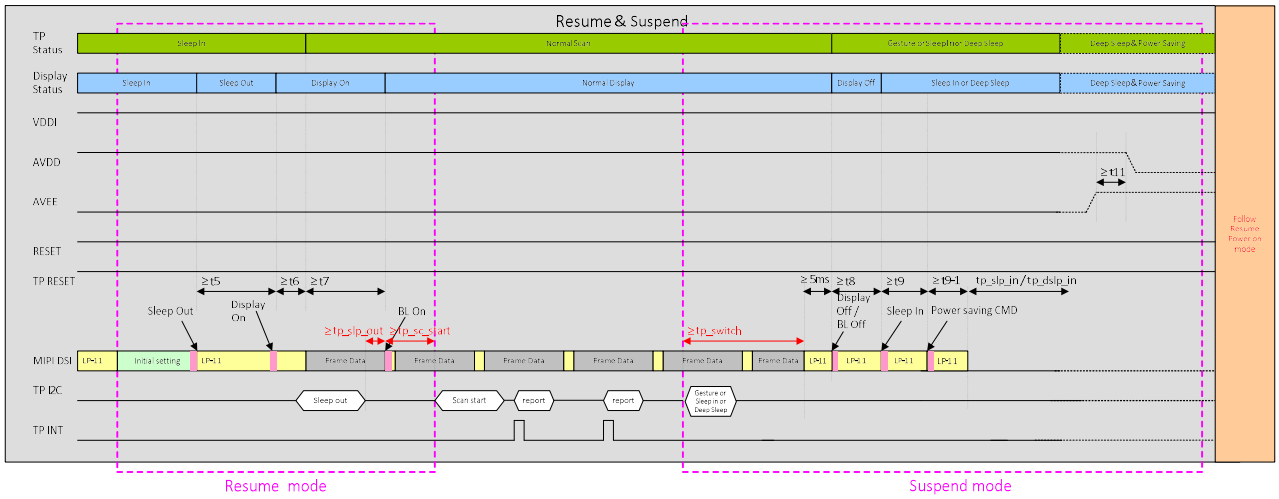
ILI TECHNOLOGY CORP.
8F., No.1, Taiyuan 2nd St., Jhubei City, Hsinchu County 302, Taiwan (R.O.C.);
Tel.886-3-5600099; Fax.886-3-5600055
http://www.ilitek.com

1. Power On/Off Sequence

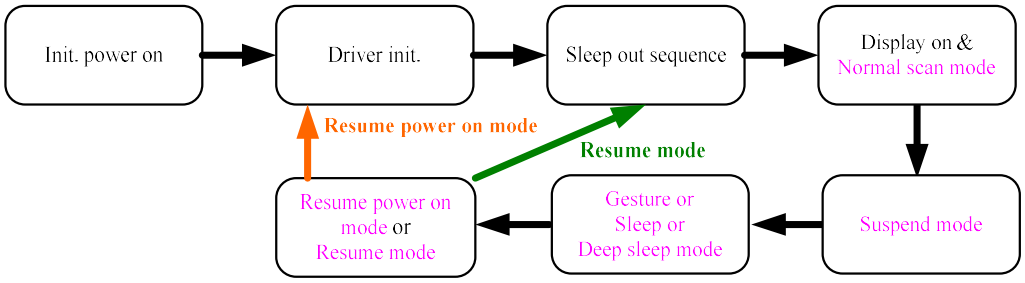
1.1 Normal mode

The power sequence of normal mode





The flow chart of normal mode



The external power status of normal mode

External Power Status	VDDI	AVDD	AVEE	Note
Gesture Mode	On	On	On	VDDI/AVDD/AVEE must be kept power in gesture mode.
Sleep In Mode	On	On/Off	On/Off	VDDI must be kept power in sleep in mode.
Deep Sleep Mode	On/Off	On/Off	On/Off	All external power can turn off for power saving.

The TP I/O power status of normal mode

Power	TP RESET	TP SDA	TP SCL	TP INT	Note
0	0	X	X	X	Power down
1	0	High	High	High	TP sleep in
1	1	I2C function	I2C function	Input NP	Normal operating

* NP : no pull(disable pull up/pull down)

Normal Mode	Min.	Typ.	Max.	Note
tr1 (ms)	0.05	-	20	VDDI rising time
tr2 (ms)	0.1	-	20	AVDD, AVEE rising time
tf (ms)	0.05	-	20	External power falling time
t1 (ms)	1	-	-	
t2 (ms)	1	-	-	
t3 (ms)	1	-	-	
t4 (ms)	10	-	-	DDI OTP reload. RESET to first command in display sleep in mode time.
t5 (ms)	60	-	-	Sleep Out Sequence
t6 (ms)	0	-	-	
t7 (ms)	50	-	-	
t8 (ms)	16.67	-	-	Depend on frame rate.
t9 (ms)	80	-	-	Sleep In Sequence *The min. time of sleep in should be longer than panel power off request
t9-1 (ms)	5			Extra power saving command for Gesture or Sleep in mode Page6_D0h = 0x0A Page6_D1h = 0x02 Page6_03h = 0xF0 Delay 1ms Page6_D1h = 0x00
t10 (ms)	1	-	-	
t11 (ms)	0	-	-	AVDD≧|AVEE| *No limitation for t11
tPOFF2 (ms)	0.05	-	-	AVEE 90% to AVDD 90%
tPOFF1 (ms)	0.05	-	-	AVEE 10% to AVDD 10%
t12 (ms)	0	-	-	
t13 (ms)	47	-	-	TP RESET to 1st TP CMD delay time
t14(ms)	10	-	-	Delay time between VDDI power off to power on
tp_set (ms)	10	-	-	TP OTP reload
tp_fw_reload (ms)	200	-	-	Flash reload
tp_slp_out (ms)	0	-	-	Resume timing
tp_sc_start (ms)	10	-	-	
tp_switch (ms)	40	-	-	
tp_slp_in (ms)	60	-	-	Entry Sleep mode wait time

tp_dslp_in (ms)	60	-	-	Entry Deep Sleep mode wait time

*Resume Power On mode : If resume AVDD & AVEE power off, please follow Resume power on mode.

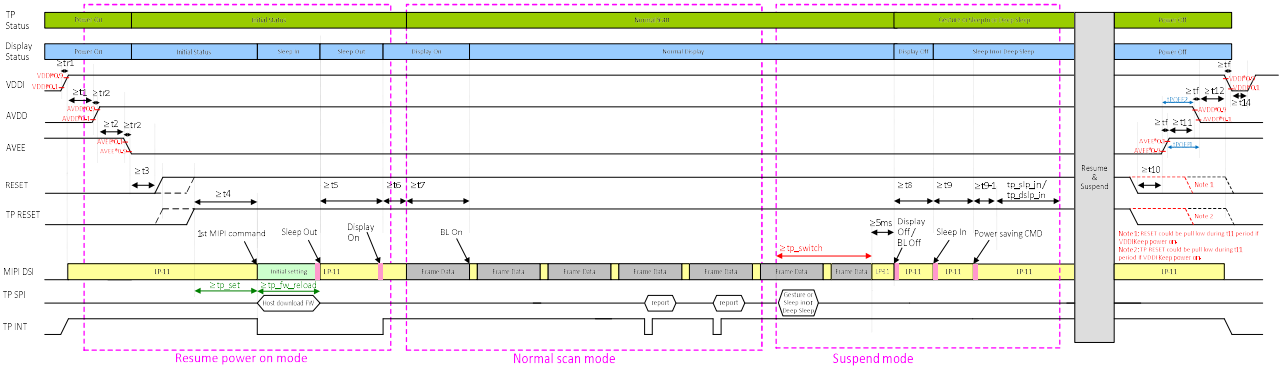
* Before VDDI power on, please make sure VDDI, VDD, VDD_TP are under 100mV for 10ms.

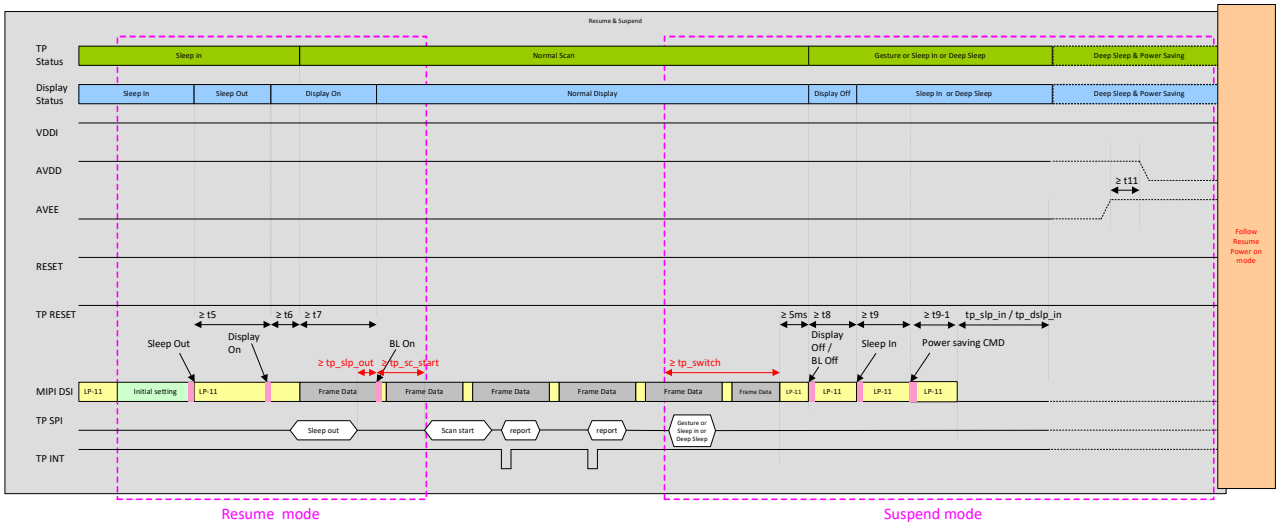
* When sleep in mode, RESET & TP RESET can keep low after AVDD & AVEE power off.

* Exit Deep Sleep mode : Entry deep sleep mode and AVDD & AVEE power off, please follow Resume power on mode.

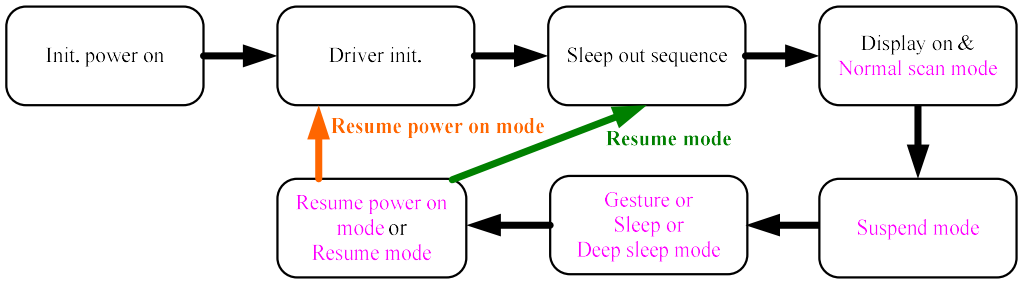
1.2 Host Download Mode

The power sequence of host download mode





The flow chart of host download mode



The external power status of host download mode

External Power Status	VDDI	AVDD	AVEE	Note
Gesture Mode	On	On	On	VDDI/AVDD/AVEE must be kept power in gesture mode.
Sleep In Mode	On	On/Off	On/Off	VDDI must be kept power in sleep in mode.
Deep Sleep Mode	On/Off	On/Off	On/Off	All external power can turn off for power saving.

The TP I/O power status of host download mode

Power	TP RESET	TP SPI CS	TP SPI SCLK	TP SPI MISO	TP SPI MOSI	TP INT	Note
0	0	X	X	X	X	X	Power down
1	0	High	Low	Output	Low	High	TP sleep in
1	1	SPI function	SPI function	SPI function	SPI function	Input NP	Normal operating

* NP : no pull(disable pull up/pull down)

Host Download Mode	Min.	Typ.	Max.	Note
tr1 (ms)	0.05	-	20	VDDI rising time
tr2 (ms)	0.1	-	20	AVDD, AVEE rising time
tf (ms)	0.05	-	20	External power falling time
t1 (ms)	1	-	-	
t2 (ms)	1	-	-	
t3 (ms)	1	-	-	
t4 (ms)	10	-	-	DDI OTP reload. RESET to first command in display sleep in mode time.
t5 (ms)	60	-	-	Sleep Out Sequence
t6 (ms)	0	-	-	
t7 (ms)	50	-	-	
t8 (ms)	16.67	-	-	Depend on frame rate.
t9 (ms)	80	-	-	Sleep In Sequence *The min. time of sleep in should be longer than panel power off request
t9-1 (ms)	5			Extra power saving command for Gesture or Sleep in mode Page6_D0h = 0x0A Page6_D1h = 0x02 Page6_03h = 0xF0 Delay 1ms Page6_D1h = 0x00
t10 (ms)	1	-	-	
t11 (ms)	0	-	-	AVDD≧|AVEE| *No limitation for t11
tPOFF2 (ms)	0.05	-	-	AVEE 90% to AVDD 90%
tPOFF1 (ms)	0.05	-	-	AVEE 10% to AVDD 10%
t12 (ms)	0	-	-	
t14 (ms)	10	-	-	Delay time between VDDI power off to power on
tp_set (ms)	10	-	-	TP OTP reload
tp_fw_reload (ms)	200	-	-	Host download
tp_slp_out (ms)	0	-	-	
tp_sc_start (ms)	10	-	-	
tp_switch (ms)	10	-	-	
tp_slp_in (ms)	60	-	-	Entry Sleep mode wait time
tp_dslp_in (ms)	60	-	-	Entry Deep Sleep mode wait time

* Resume Power On mode : If resume AVDD & AVEE power off, please follow Resume power on mode.

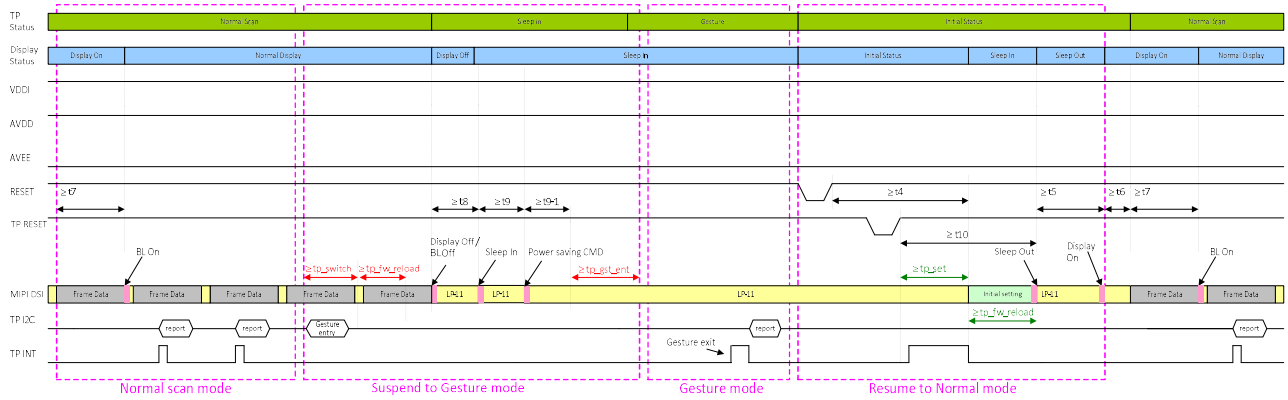
* Before VDDI power on, please make sure VDDI, VDD, VDD_TP are under 100mV for 10ms.

* When sleep in mode, RESET & TP RESET can keep low after AVDD & AVEE power off.

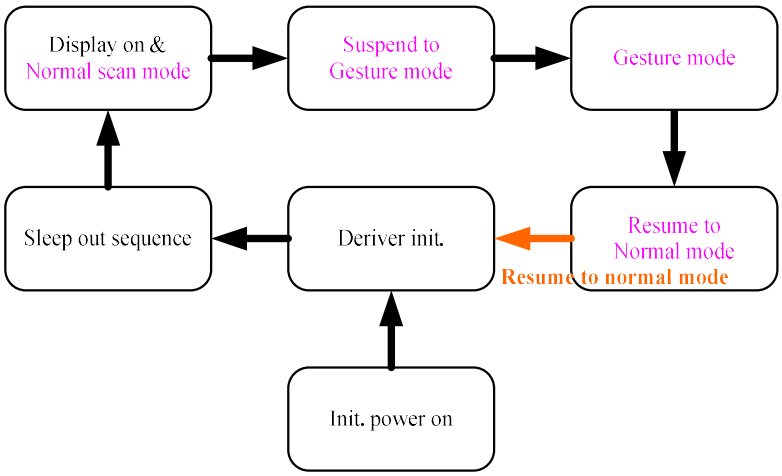
* Exit Deep Sleep mode : Entry deep sleep mode and AVDD & AVEE power off, please follow Resume power on mode.

1.3 Low Power Wakeup Gesture Mode

The power sequence of low power wakeup gesture mode



The flow chart of low power wakeup gesture mode



Note : The recommended proximity flow of LPWG see chapter 1.5 Proximity flow Type A

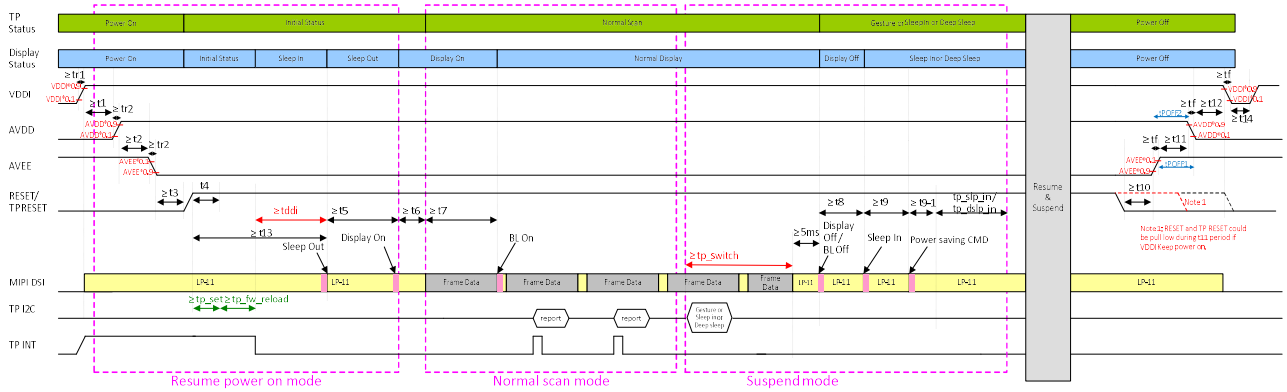
The external power status of low power wakeup gesture mode

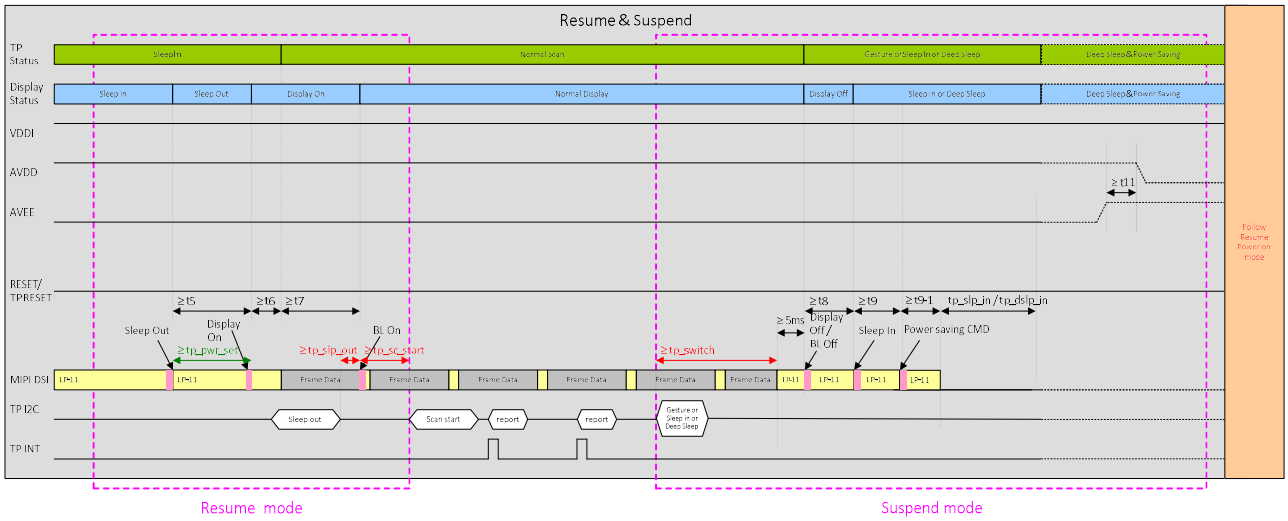
External Power Status	VDDI	AVDD	AVEE	Note
Gesture Mode	On	On	On	VDDI/AVDD/AVEE must be kept power in gesture mode.

Low Power Wakeup Gesture Mode	Min.	Typ.	Max.	Note
t4 (ms)	10	-	-	DDI OTP reload. RESET to first command in display sleep in mode time.
t5 (ms)	60	-	-	Sleep Out Sequence
t6 (ms)	0	-	-	
t7 (ms)	50	-	-	
t8 (ms)	16.67	-	-	Depend on frame rate.
t9 (ms)	80	-	-	Sleep In Sequence *The min. time of sleep in should be longer than panel power off request
t9-1 (ms)	5			Extra power saving command for Gesture or Sleep in mode Page6_D0h = 0x0A Page6_D1h = 0x02 Page6_03h = 0xF0 Delay 1ms Page6_D1h = 0x00
t10 (ms)	47	-	-	TP RESET to 1st TP CMD delay time(Flash)
tp_set (ms)	10	-	-	TP OTP reload
tp_fw_reload (ms)	200	-	-	Flash reload
tp_switch (ms)	40	-	-	
tp_gst_ent (ms)	60	-	-	Entry Gesture mode wait time

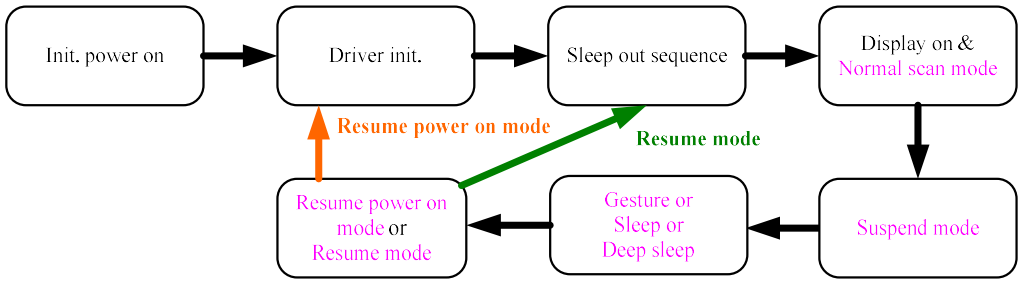
1.4 FW Code Include Initial Code Mode

The power sequence of FW code include initial code mode





The flow chart of FW code include initial code mode



The external power status of FW code include initial code mode

External Power Status	VDDI	AVDD	AVEE	Note
Gesture Mode	On	On	On	VDDI/AVDD/AVEE must be kept power in gesture mode.
Sleep In Mode	On	On/Off	On/Off	VDDI must be kept power in sleep in mode.
Deep Sleep Mode	On/Off	On/Off	On/Off	All external power can turn off for power saving.

FW Code Include Initial Code Mode	Min.	Typ.	Max.	Note
tr1 (ms)	0.05	-	20	VDDI rising time
tr2 (ms)	0.1	-	20	AVDD, AVEE rising time
tf (ms)	0.05	-	20	External power falling time
t1 (ms)	1	-	-	
t2 (ms)	1	-	-	
t3 (ms)	1	-	-	
t4 (ms)	10	-	-	DDI OTP reload
t5 (ms)	60	-	-	Sleep Out Sequence
t6 (ms)	0	-	-	
t7 (ms)	50	-	-	
t8 (ms)	16.67	-	-	Depend on frame rate.
t9 (ms)	80	-	-	Sleep In Sequence *The min. time of sleep in should be longer than panel power off request
t9-1 (ms)	5			Extra power saving command for Gesture or Sleep in mode Page6_D0h = 0x0A Page6_D1h = 0x02 Page6_03h = 0xF0 Delay 1ms Page6_D1h = 0x00
t10 (ms)	1	-	-	
t11 (ms)	0	-	-	AVDD≧|AVEE| *No limitation for t11
tPOFF2 (ms)	0.05	-	-	AVEE 90% to AVDD 90%
tPOFF1(ms)	0.05	-	-	AVEE 10% to AVDD 10%
t12 (ms)	0	-	-	
t13 (ms)	47+tddi	-	-	TP RESET to 1st TP/MIPI CMD delay time. *tddi : FW reload ddi initial code length
t14 (ms)	10	-	-	Delay time between VDDI power off to power on
tp_set (ms)	10	-	-	
tp_fw_reload (ms)	200	-	-	
tddi (ms)	10us / 1byte			FW reload ddi initial code
tp_slp_out (ms)	0	-	-	Resume timing
tp_sc_start (ms)	10	-	-	

tp_switch (ms)	40	-	-	
tp_slp_in (ms)	60	-	-	Entry Sleep mode wait time
tp_dslp_in (ms)	60	-	-	Entry Deep Sleep mode wait time

* Resume Power On mode : If resume AVDD & AVEE power off, please follow Resume power on mode

* Example initial code 10 byte, ddi_ini_reload need 0.1ms

* When sleep in mode, RESET & TP RESET can keep low after AVDD & AVEE power off.

* Before VDDI power on, please make sure VDDI, VDD, VDD_TP are under 100mV for 10ms.

2. Revision History

Version No.	Date	Page	Description
V0.1	2022/05/06	All	New creation.
V0.2	2022/06/29	3~15	Add t9-1 timing.
V0.3	2022/07/14	13,14,18,19,20	Remove proximity chapter
V0.4	2023/03/09	3~15	Change TP_SC_Stop to TP_switch