LDS6104/6124

PureTouch™* Capacitive Touch Sensor IC Configuration Registers
Detailed Register Information and Default Values

Purpose:
The purpose of this document is to provide detail on the registers available for configuration and performance optimization of the LDS6104 and 6124 devices

Scope:
This register document covers the LDS6104 (8-channel touch controller) and the LDS6124 (8-channel touch controller with integrated LED drivers). ***The other members of the LDS61xx family have their own Detailed Register documents as the relevant bit locations vary by device.***

Required Initialization:
Not all registers need to be initialized under normal usage conditions, as the default conditions may be appropriate and certain functions and features may not be used in the application.

However, the following registers should be initialized in all cases, as their proper configuration is necessary for fundamental operation.

- **0x00A: DCM configuration**
  - Pin C3/DCM7 is set as a DCM pin by default. It must be reset during initialization if not used as a DCM pin
- **0x041 and 0x042: Touch Sensor Enable**
  - Only those channels to be used as sensor input should be set to the "1" state. All other bits in these registers (including reserved/unused bits) should be set to "0"
- **0x043 and 0x044: Touch Interrupt Enable**
  - To enable proper interrupt operation, these registers should be configured identically to the Touch Sensor Enable registers 0x041 and 0x042
- **0x061-0x072 (non-contiguous, memory page 1): Touch Threshold Levels**
  - Sets the touch threshold levels which affect the sensitivity of each sensor.
  - ***Register 0x05F should be set to Memory Page 1 prior to writing to these registers***

If using Low Power/Sleep mode, the following registers should be initialized:

- **0x055: Idle Configuration**
  - Set value to 24 (dec) to enable sleep period configuration (0x056) in 1ms increments using default 1024 decimation rate
- **0x056: Sleep Period Configuration**
  - Sets the sleep period between scan cycles. See the LDS61xx AN1 application note for more information
- **0x003: Sleep Wait**
  - Sets the time the device will wait after the last touch before reverting back to Low Power mode

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Recommended Initialization:

The following registers are recommended to be initialized for optimized operation.

- **0x04E: SELC_Unit Configuration**
  - Determines SELC unit steps utilized during calibration process. Use of adaptive SELC algorithm will accelerate calibration process. Recommended register setting: 5000h.
- **0x051: Ambient Calibration**
  - Determines how quickly ambient calibration occurs when no-touch value drifts above/below the plus/minus noise region. Recommended register setting: 0A1Fh.
- **0x052: Recalibration Configuration**
  - Sets the delay before a recalibration is initiated when capacitive signal is above the ambient threshold and below the touch threshold. The default IC value (99 decimal) results in a delay of "0.8s x # of active sensor channels". When few sensor channels are utilized, this may result in too short a delay. This delay should be at least 4-5s to avoid calibrating out an approaching finger.
- **0x053: Stuck Touch**
  - Determines how quickly forced recalibration occurs when touch persists for abnormally long length of time. Optimal setting depends upon usage model.
- **0x061-0x072 (non-contiguous, memory page 0): Initial SELC**
  - Sets the starting value for SELC for each sensor. Loading initial SELC values for each sensor will result in faster recalibration times. Recommended setting determined during prototype stage.
- **0x075: Touch Hysteresis**
  - Sets the amount of capacitance value units below Touch Threshold to still be considered a continuation of current/active touch. Recommended register setting: 0005h to 000Ah.

By default, the INTB (Interrupt) pin is configured as an active-low CMOS output, with a fixed duration of 2us when a touch or untouch event occurs. INTB may also be configured as active high (0x008 bit 15 = 1) and as an open drain output requiring a pull-up or pull-down resistor (0x008 bit 3 = 1), depending upon system requirements.

Finally, INTB may also be configured in "Read Reset" mode (0x008 bit 1 = 1), in which case Touch Status Register 0x045 must be read in order to release/reset the INTB pin. Read Reset mode corresponds to the default INTB mode of operation of IDT's LDS60xx family of products.

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Functional Groupings

Function	Register	Description
RESET	0x000 0x001	Cold Reset Software Reset
POWER	0x002 0x055 0x056 0x003	Normal Operation, Low Power Mode, Shutdown Idle Time - For Low Power Mode Sleep Configuration Sleep Wait
INTERRUPT	0x008 0x043-0x044	INTERRUPT Configuration Touch Interupt Enable
GPIO	0x009	GPIO Config
DCM	0x00A	DCM Mode
MANUFACTURER ID	0x01F	Manufacturer/Product Family ID
TOUCH CONFIGURATION	0x040 0x041 - 0x042 0x05F	Touch mode - All touches reported, Strongest Touch, Dual Strongest Touches Touch Sensor Enable Touch Parameter Memory Page Selection
TOUCH STATUS	0x045 - 0x046 0x084 - 0x0C9 (non-contiguous)	Touch Status Cap Value (Read Only)
THRESHOLD SETTING (SENSITIVITY)	0x05F 0x061 - 0x072	Touch Parameter Memory Page Selection - Touch threshold conditions Touch Threshold Value (Memory Page 1)
LED CONFIGURATION	0x021-0x02F (non-contiguous) 0x031-0x038 (non-contiguous) 0x03E 0x03F	LEDx - Min Current, Max Current, Assignment; Latency; Effect Selection LEDx Effect Configuration LED Manual Mode Configuration LED Driver Enable Configuration
BUILT-IN SLIDER/SCROLL	0x04B 0x074	Slider/Scroll Position and Direction Reading Slider/Scroll Enable
CALIBRATION & SELC	0x04E 0x050 0x051 0x052 0x053 0x05F 0x061 - 0x072 (non-contiguous) 0x084 - 0x0C9 (non-contiguous)	SELC Step Size, Ambient Calibration Enable, Calibration Status Calibration Timeout Ambient Calibration Recalibration Configuration Stuck Touch (Forced Recalibration) Touch Paramater Page Selection Calibration Parameters (Memory Pages 0, 2, 3, and 4) SELC Value (Read Only)
STRONGEST TOUCH CONFIGURATION	0x040 0x057 0x075	Strongest Touch Enable Strongest Touch Replacement Time Strongest Touch Hysteresis
RELATIVE STRONGEST\ TOUCH	0x076	Relative Strongest Touch Mode Enable
UNDEBOUNCE	0x076	# of consecutive scan cycles required before untouch is recognized
DEBOUNCE	0x057	Debounce time criteria
HYSERESIS	0x075	Touch Hysteresis Value + Strongest Touch Hysteresis
GUARD/SUPPRESS CHANNEL	0x07C-0x07D 0x07E-0x07F	Guard Channel Enable Guard Channel Mask
NOISE IMMUNITY	0x077	Set to 8001 (hex) for optimal noise filtering.

Detailed Register Information and Default Values

	Reset															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x000	W	Cold Reset															
0x001	W	Software Reset															

Register Name	Position	Description	Function	Remark
COLD RESET		Hardware reset	Any value invokes HW reset (all configuration registers revert to default)	
SOFT RESET		Software reset	Any value invokes SW reset (keeps user settings, but recalibrates)	

	POWER															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x002	R/W							Internal	Internal							LP	SHUTDOWN
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
LP	[1]	power saving mode	0 : Normal mode, 1 : Low Power Mode	
SHUTDOWN	[0]	shutdown mode	0 : Normal mode, 1 : Shutdown mode (only Serial I/F bus active)	

	SLEEP WAIT															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x003	R/W	SLEEP WAIT															
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
SLEEP WAIT	[15:0]	Full Power to Low Power wait time	Wait time = SLEEP WAIT x Scan Cycle Time (Scan Cycle Time = ~2ms x # of active sensors)	

	INTB Config															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x008	R/W	INT_POL	Internal										INTB DRIVE			INTB MODE	
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
INT_POL	[15]	interrupt polarity	0 : active Low, 1: active High	
INTB DRIVE	[4:3]	interupt drive	0x0 : CMOS output 0x1 : OPEN-DRAIN output (pull up resistor required)	
INTB MODE	[1:0]	interupt signaling type	00: Fixed Duration Mode (INTB pin drives for 2us Fixed Duration) 01: Internal mode 1x: Read Reset Mode (INTB pin drives until Register 0x045 is read)	

	GPIO Config															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x009	R/W												GPIO Input Config			GPI/O	
Default Values	0002h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

Register Name	Position	Description	Function	Remark
GPIO Input Config	[4:2]	GPIO input configuration	0x0 : not used 0x1 : negative level-sensitive 0x2 : positive level-sensitive 0x3 : not used 0x4 : not used 0x5 : negative edge-triggered 0x6 : positive edge-triggered 0x7 : both edge-triggered	
GPI/O	[1:0]	GPIO state	0x0 : not used 0x1 : input 0x2 : active low output 0x3 : active high output	

Detailed Register Information and Default Values

	DCM Config																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x00A	R/W							Internal	DCM7	Internal				DCM6-DCM4			Internal
Default Values	0100h	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
DCM Enable	[8], [3:1]	DCM Function Enable	0 : disable, 1: enable	

	MID															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x01F	R	Internal								Manufacturer ID				Device ID			
Default Values	00F2h	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0

Register Name	Position	Description	Function	Remark
Manufacturer ID	[7:4]	IDT PureTouch	IDT PureTouch = 1111	
Device Family ID	[3:0]	LDS61xx Family	LDS61xx Family = 0010	

	LED_LED0															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x021	R/W	LED0 Max Current					LED0 Min Current						LED0 Assignment				
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	LED_LED1															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x022	R/W	LED1 Max Current					LED1 Min Current						LED1 Assignment				
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	LED_LED2															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x023	R/W	LED2 Max Current					LED2 Min Current						LED2 Assignment				
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	LED_LED3															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x028	R/W	LED3 Max Current					LED3 Min Current						LED3 Assignment				
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
LED Max Current	[15:11]	LED Maximum Current Drive	Driving Current = Register Value * 0.25 [mA]	
LED Min Current	[10:6]	LED Minimum Current Drive	Driving Current = Register Value * 0.25 [mA]	
LED Assignment	[4:0]	Touch Sensor Association	Touch Sensor Number - **SEE LOOKUP TABLE**	

LDS6124 Touch Sensor Assignment Lookup Table

Touch Sensor#	Bit [4:0] Assignment
C0	00001
C1	00010
C2	00011
C3	01000

Touch Sensor#	Bit [4:0] Assignment
C4/LED0	01011
C5/LED1	01100
C6/LED2	01101
C7/LED3	10010

	LED Driver Latency Config																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x02E	R/W									LED Driver Latency Time							
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
LATENCY_TIME	[7:0]	Latency time in 5ms increments	LED Driver Delay time = Value * 5 [ms]	

	LED Effect Waveform Config																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x02F	R/W	EN_DOFF	EN_DON	Internal						LED Active/Period 2 Timer							
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
EN_DOFF	[15]	Dimming off enable	0 : disable, 1: enable	
EN_DON	[14]	Dimming on enable	0 : disable, 1: enable	
ACTIVE_TIME	[7:0]	LED Active/Period 2 Timer	Time = ACTIVE_TIME * 5ms	

Detailed Register Information and Default Values

	LED0 Effect Configuration (Period 1/3)																	
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x031	R/W	LED0 Effect				LED0 Period 1						LED0 Period 3					
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	LED1 Effect Configuration (Period 1/3)																	
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x032	R/W	LED1 Effect				LED1 Period 1						LED1 Period 3					
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	LED2 Effect Configuration (Period 1/3)																	
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x033	R/W	LED2 Effect				LED2 Period 1						LED2 Period 3					
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	LED3 Effect Configuration (Period 1/3)																	
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x038	R/W	LED3 Effect				LED3 Period 1						LED3 Period 3					
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	**Position**	**Description**	**Function**	**Remark**
LEDx Effect	[15:14]	LED driver operation mode	0 : Linear (Dimming) mode 1 : Pulsate mode 2: Flash Mode 3 : Reserved	
LEDx Period 1	[11:6]	Period 1 Timer (see LED effect diagram for Period 1 significance)	Timer Value = value * 5ms * # of steps ** # of steps = (max current - min current) / 0.25	
LEDx Period 3	[5:0]	Period 3 Timer (see LED effect diagram for Period 1 significance)	Timer Value = value * 5ms * # of steps ** # of steps = (max current - min current) / 0.25	

	LED Manual Mode Config																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x03E	R/W	EN_MAN	Gang					Internal	LED3	Internal				LED Manual Control (LED2-LED0)			Internal
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	**Position**	**Description**	**Function**	**Remark**
EN_MAN	[15]	LED manual mode enable	0 : disable, 1: enable manual control, MAN_CTRL controls each LED channel	
GANG	[14]	LED gang mode	0 : normal mode, 1: Single LED event results in all LED turning on	
MAN_CTRL	[8], [3:1]	Manual LED on/off control for each LED channel	0 : manual LED off, 1 : manual LED on	

	LED Driver Enable Configuration																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x03F	R/W							Internal	LED3	Internal				LED Driver Enable (LED2-LED0)			Internal
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

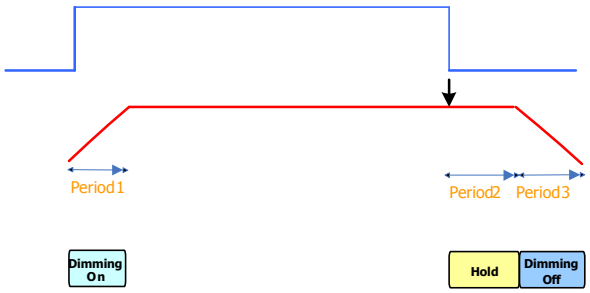
Register Name	**Position**	**Description**	**Function**	**Remark**
LED_ENABLE	[8], [3:1]	LED driver enable	0 : Disable 1 : Enable (LED enable bit dominates over Touch Sensor Enable in 0x042)	

	TOUCH CONFIG																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x040	R/W	TCH_ENABLE	Internal					BUTTON_MODE				Internal		READY	Decimation		
Default Values	8030h	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0

Register Name	**Position**	**Description**	**Function**	**Remark**
TCH_ENABLE	[15]	Touch Function Enable	0 : Touch function in idle state, 1: Touch function in active state	
BUTTON_MODE	[9:8]	Touch Preference Mode (Strongest Touch Modes)	0x0 : Unrestricted mode, All touches reported 0x1 : Strongest Touch Mode 0x2 : Two Strongest Touches Mode 0x3 : reserved	
DEVICE_READY	[3]	Device Ready	0 : Self initialization state, 1: OK for host communication If DEVICE_READY=0, all bits except DEVICE_READY should be ignored.	Read Only Bit
Decimation	[2:0]	CDC decimation	**0x0 : 1024 (default)** 0x1 : 512 0x2 : 256 0x3 : 128 0x4 : 2048	Consult IDT representative if decimation is changed from 1024 default

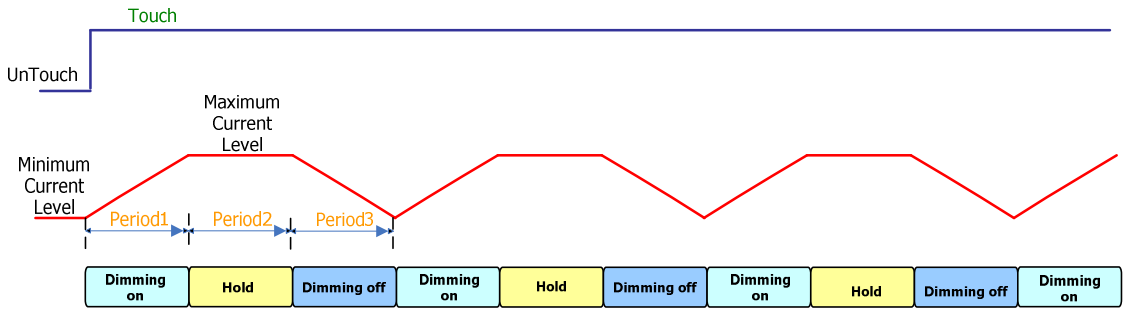
LED Effect Diagrams

Dimming Effect



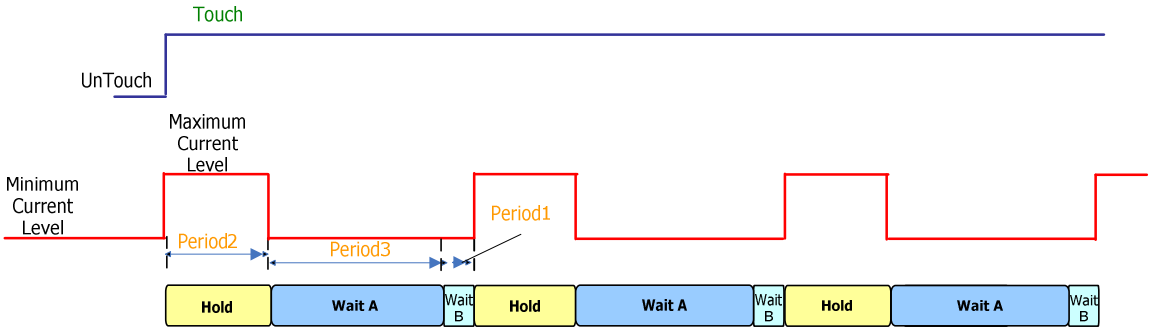
Dimming Effect Timers:
Period 1*: Dimming On Time
Period 2: Active/Hold Time (After Touch is Removed)**
Period 3*: Dimming Off Time
*: Individual Timer per LED
**: Universal Timer for All LEDs

Pulsate Effect:



Pulsate Effect Timers:
Period 1*: Dimming On Time
Period 2: Hold Time at Max Current**
Period 3*: Dimming Off Time
*: Individual Timer per LED
**: Universal Timer for All LEDs

Flash Effect:



Flash Effect Timers:
Period 1*: Second Wait Time (Wait B)
Period 2: Hold Time at Max Current**
Period 3*: First Wait Time (Wait A)
*: Individual Timer per LED
**: Universal Timer for All LEDs

Detailed Register Information and Default Values

	Touch Sensor Enable (Channels 0-3)																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x041	R/W							Internal	C3	Internal				C2-C0			Internal
Default Values	000Eh	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0

	Touch Sensor Enable (Channels 4-7)																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x042	R/W							Internal	C7	Internal				C6-C4			Internal
Default Values	0100h	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Register Name	**Position**	**Description**	**Function**	**Remark**
TOUCH_ENBL	[8], [3:1]	Touch enable for each channel	0 : Channel disabled as touch sensor 1 : Channel enabled as touch sensor (may be overridden by LED Enable) DCM register 0x00A has priority over 0x041 in case of dual assignment	

	INTERRUPT ENABLE (Channels 0-3)																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x043	R/W							Internal	C3	Internal				INT Enable (C2-C0)			Internal
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	INTERRUPT ENABLE (Channels 4-7)																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x044	R/W							Internal	C7	Internal				INT Enable (C6-C4)			Internal
Default Values	0100h	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Register Name	**Position**	**Description**	**Function**	**Remark**
TOUCH_INT_EN	[8], [3:1]	Touch interrupt enable for each channel	0 : disable 1 : enable	

	TOUCH STATUS (Channels 0-3)																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x045	R							Internal	C3	Internal				Touch Status (C2-C0)			Internal
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	TOUCH STATUS (Channels 4-7)																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x046	R	GPI_INT						Internal	C7	Internal				Touch Status (C6-C4)			Internal
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	**Position**	**Description**	**Function**	**Remark**
GPI_INT	[15]	GPI interrupt status	0 : no GPI interrupt, 1 : GPI interrupt (Used if GPIO is configured as input via Register 0x009)	
TOUCH_INT_STS	[8], [3:1]	Touch interrupt status for each channel	Indicates which touch sensor channel was activated by a touch when INTB signal is triggered	

	SCROLL STATUS																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x04B	R/W	Internal	Internal							SCROLL_INT	DIR_ENBL	SCROLL_DIR	POSITION_ID				
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	**Position**	**Description**	**Function**	**Remark**
SCROLL_INT	[7]	Scroll/Slider Touch Interrupt	0 : Not Touched 1 : Position Interrupt Status	Read Only
DIR_ENBL	[6]	Scroll/Slider Touch Direction Enable(Active) Status	0 : Not movement 1 : Direction Enable(Active)	
SCROLL_DIR	[5]	Scroll/Slider Touch Direction Status	0 : Low/Left/CCW Direction 1 : High/Right/CW Direction	Read Only
POSITION_ID	[4:0]	Scroll/Slider Touch Position ID	- Value : 0 (Not Used for Scroll/Slider Input Type) - Value : 1~8 (Scroll/Slider Touch Position ID)	Read Only

Detailed Register Information and Default Values

	SELC CONFIG and CALIBRATION STATUS																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x04E	R/W	Internal	ACTIVE	AMB_DIS	Internal									SELC_UNIT			
Default Values	0002h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

Register Name	Position	Description	Function	Remark
ACTIVE	[14]	touch calibration status	0 : in calibration state 1 : calibration finished	Read Only Bit
AMB_DIS	[13]	ambient calibration disable	0 : ambient calibration active 1 : disable ambient calibration	Optional disabling of ambient cal
SELC_UNIT	[3:0]	SELC change amount during calibration	0 : adaptive SELC tracking algorithm used others : During tracking, SELC changes its value by the amount of SELC_UNIT	Refer to 6100 AN2 App Note

	CALIBRATION TIMEOUT																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x050	R/W	Internal	Internal							CALIB_TIMEOUT							
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
CALIB_TIMEOUT	[7:0]	calibration timeout limit	0x0 : infinite 0x1 : when calibration iteration reaches CALIB_TIMEOUT, tracking is done.	

	AMBIENT CALIBRATION																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x051	R/W	CNT_DEC_LIMIT								CNT_INC_LIMIT							
Default Values	1F1Fh	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1

Register Name	Position	Description	Function	Remark
CNT_DEC_LIMIT	[15:8]	Value determines how quickly ambient calibration is triggered (negative side)	0x0 : INVALID others : count limit	
CNT_INC_LIMIT	[7:0]	Value determines how quickly ambient calibration is triggered (posative side)	0x0 : INVALID others : count limit	

	RECALIBRATION CONFIGURATION																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x052	R/W						RECAL_DELAY										
Default Values	0063h	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1

Register Name	Position	Description	Function	Remark
RECAL_DELAY	[10:0]	Wait time prior to forced recalibration when cap value above ambient threshold but below touch threshold (i.e. not an actual touch)	wait time = (RECAL_DELAY+1) * single round time * 4 Max time = 16.4s (1 ch) to 131s (8ch)	Default is 0.8s x # of active ch with 1024 decimation

	STUCK TOUCH																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x053	R/W						CNT_TOUCH_LIMIT										
Default Values	0063h	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1

Register Name	Position	Description	Function	Remark
CNT_TOUCH_LIMIT	[10:0]	Wait time prior to forced recalibration when cap value is above threshold level (stuck touch scenario)	wait time = (CNT_TOUCH_LIMIT+1) * single round period * 4 Max time = 16.4s (1 ch) to 131s (8ch)	Default is 0.8s x # of active ch with 1024 decimation

Detailed Register Information and Default Values

	IDLE CONFIG															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x055	R/W	MAX_DEACT_IDLE															
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
MAX_DEACT_IDLE	[15:0]	staying IDLE time during inactive touch channel selected	Idle time = (MAX_DEACT_IDLE+1) * OSC period (2us) All channels treated as inactive during Sleep Period	Init file must set this to 24(dec) to enable 1ms increments of SLEEP_TIME with 1024 decimation

	SLEEP CONFIG															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x056	R/W	SLEEP TIME															
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
SLEEP_TIME	[15:0]	# of ms of desired sleep time	Determines duty cycle between active (full power) and sleep (reduced power) that determines average current consumption in low power mode	Init file must set 0x055 to 24(dec) to enable 1ms increments of SLEEP_TIME with 1024 decimation

	DEBOUNCE AND STRONGEST TOUCH CONFIGURATION															
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x057	R/W	DEBOUNCE				REPLACEMENT_TIME											
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
DEBOUNCE	[15:12]	# of consecutive scan cycles required before first touch is recognized	Debounce time criteria required to register first touch Time = DEBOUNCE x scan cycle time, where scan cycle time is equal to 2ms x # of active sensors	
REPLACEMENT_TIME	[11:0]	# of consecutive scan cycles required for new touch with strongest signal to replace current strongest touch	Strongest Touch Mode (Absolute or Relative) option to minimize frequent toggling between two touches of comparable strength Time = REPLACEMENT_TIME x scan cycle time, where scan cycle time is equal to 2ms x # of active sensors	Set to "0" for Two Strongest Touch

Detailed Register Information and Default Values

	TOUCH PARAMETER PAGE SELECTION																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x05F	R/W	0:initial SELC, 1: touch threshold, 2:ambient threshold, 3:minus noise level, 4:plus noise level														PAGE	
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
PAGE	[2:0]	indirect memory access address	0 : Initial SELC (May be used to accelerate calibration times) Please refer to 6100 AN2 app note for detaills 1 : Touch Threshold (# capacitive units above baseline to activate touch) 2 : Ambient Threshold (Defines region, along with touch threshold, within which recalibration is delayed by RECAL_DELAY 0x052) 3 : Minus Noise Level (Defines - region within which baseline may vary without triggering an ambient recalibration) 4 : Plus Noise Level (Defines + region within which baseline may vary without triggering an ambient recalibration)	Refer to 6100 AN2 App Note

	TOUCH PARAMETERS																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x061	W						Touch0 PARAM[10:0]										
0x062	W						Touch1 PARAM[10:0]										
0x063	W						Touch2 PARAM[10:0]										
0x068	W						Touch3 PARAM[10:0]										
0x06B	W						Touch4 PARAM[10:0]										
0x06C	W						Touch5 PARAM[10:0]										
0x06D	W						Touch6 PARAM[10:0]										
0x072	W						Touch7 PARAM[10:0]										
Default Values (PAGE=0)	00B8h	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0
Default Values (PAGE=1)	0028h	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Default Values (PAGE=2)	000Ah	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Default Values (PAGE=3)	0003h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Default Values (PAGE=4)	0003h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Register Name	Position	Description	Function	Remark
Touch PARAM	[10:0]	multiplexed touch parameter	0 : Initial SELC (May be used to accelerate calibration times) Please refer to 6100 AN2 app note for detaills 1 : Touch Threshold (# capacitive units above baseline to activate touch) 2 : Ambient Threshold (Defines region, along with touch threshold, within which recalibration is delayed by RECAL_DELAY 0x052) 3 : Minus Noise Level (Defines - region within which baseline may vary without triggering an ambient recalibration) 4 : Plus Noise Level (Defines + region within which baseline may vary without triggering an ambient recalibration)	Refer to 6100 AN2 App Note

	SCROLL/SLIDER CHANNEL ENABLE																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x074	R/W	INT_SEL	Internal						SCE C3	Internal				Scroll Channel Enable (C2-C0)			Internal
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
INT_SEL	[15]	SCROLL/SLIDER Touch channel Interrupt Enable	0 : disable, 1: enable	
SCROLL_CH[3]	[8]	channel 3 Scroll/Slider Touch Enable	0 : disable, 1: enable	
SCROLL_CH[2]	[3]	channel 2 Scroll/Slider Touch Enable	0 : disable, 1: enable	
SCROLL_CH[1]	[2]	channel 1 Scroll/Slider Touch Enable	0 : disable, 1: enable	
SCROLL_CH[0]	[1]	channel 0 Scroll/Slider Touch Enable	0 : disable, 1: enable	

Detailed Register Information and Default Values

	TOUCH HYSTERESIS																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x075	R/W	STR_HYSTERESIS[15:8]								HYSTERESIS[7:0]							
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
STR_HYSTERESIS	[15:8]	Strongest Touch Hysteresis value	Extra/additional capacitance value required for new strongest touch to replace current strongest touch. For example, if STR_HYSTERESIS is set to a value of 15 (decimal), the capacitance value required to displace the current strongest touch must be at least 15 capacitance units higher than the current value of the current strongest touch.	
HYSTERESIS	[7:0]	Touch Hysteresis Value (# of cap value units permitted to decrease below Touch Threshold while still maintaining touch status)	Value range : 0~255 Example: Assuming baseline value of 510 and Touch Threshold setting of 40, capacitive value above 550 triggers an initial touch event. If HYSTERESIS value is set to "15", then the sensor capacitive value may go as low as 535 (550-35) and still be considered as original touch.	

	RELATIVE STRONGEST AND UNDEBOUNCE																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x076	R/W	RELATIVE_EN	INTERNAL											UN_DEBOUNCE [3:0]			
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
RELATIVE_EN	[15]	Relative Strongest Touch Mode	0 : disable, 1: enable	
UN_DEBOUNCE	[3:0]	# of consecutive scan cycles required before UNtouch is recognized	Debounce time required for UNtouch event to be recognized Time = DEBOUNCE x scan cycle time, where scan cycle time is equal to 2ms x # of active sensors	

	NOISE IMMUNITY ENABLE																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x077	R/W	NI_ENBL	INTERNAL			NI_OPTION											
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
Noise Immunity EN	[15]	Enable Noise Immunity	0 : disable, 1: enable. ***Recommended Value = 1***	Set to "1"
Noise Immunity Option	[11:0]	Noise Immunity Option	Setting Options. ***Recommended Value = 1***	Set to "1"

	Guard Channel Enable Register [C0~C6]																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x07C	R/W	Internal		GUARD_CH[6:4]			Internal		GC3	Internal				GUARD_CH[2:0]			INTERNAL
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
GUARD_CH[6]	[13]	channel 6 guard channel enable	0 : disable, 1: enable	
GUARD_CH[5]	[12]	channel 5 guard channel enable	0 : disable, 1: enable	
GUARD_CH[4]	[11]	channel 4 guard channel enable	0 : disable, 1: enable	
GUARD_CH[3]	[8]	channel 3 guard channel enable	0 : disable, 1: enable	
GUARD_CH[2]	[3]	channel 2 guard channel enable	0 : disable, 1: enable	
GUARD_CH[1]	[2]	channel 1 guard channel enable	0 : disable, 1: enable	
GUARD_CH[0]	[1]	channel 0 guard channel enable	0 : disable, 1: enable	

	Guard Channel Enable Register [C7]																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x07D	R/W													INTERNAL	GC7	Internal	
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
GUARD_CH[7]	[2]	channel 7 guard channel enable	0 : disable, 1: enable	

Detailed Register Information and Default Values

	Guard Channel Mask Register [C0-C6]																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x07E	R/W	Internal		GUARD_MSK[6:4]			Internal		G_MSK3	Internal				GUARD_MSK[2:0]			INTERNAL
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
GUARD_MSK[6]	[13]	channel 6 guard mask enable	0 : disable, 1: enable	
GUARD_MSK[5]	[12]	channel 5 guard mask enable	0 : disable, 1: enable	
GUARD_MSK[4]	[11]	channel 4 guard mask enable	0 : disable, 1: enable	
GUARD_MSK[3]	[8]	channel 3 guard mask enable	0 : disable, 1: enable	
GUARD_MSK[2]	[3]	channel 2 guard mask enable	0 : disable, 1: enable	
GUARD_MSK[1]	[2]	channel 1 guard mask enable	0 : disable, 1: enable	
GUARD_MSK[0]	[1]	channel 0 guard mask enable	0 : disable, 1: enable	

	Guard Channel Mask Register [C7]																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x07F	R/W													INTERNAL	G_MSK7	Internal	
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Register Name	Position	Description	Function	Remark
GUARD_MSK[7]	[2]	channel 7 guard mask enable	0 : disable, 1: enable	

	Cap Value and SELC Value																
Register Address	**Direction**	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0x084	R						Touch0 Cap										
0x085	R	Touch0 SELP					Touch0 SELC										
0x088	R						Touch1 Cap										
0x089	R	Touch1 SELP					Touch1 SELC										
0x08C	R						Touch2 Cap										
0x08D	R	Touch2 SELP					Touch2 SELC										
0x0A0	R						Touch3 Cap										
0x0A1	R	Touch3 SELP					Touch3 SELC										
0x0AC	R						Touch4 Cap										
0x0AD	R	Touch4 SELP					Touch4 SELC										
0x0B0	R						Touch5 Cap										
0x0B1	R	Touch5 SELP					Touch5 SELC										
0x0B4	R						Touch6 Cap										
0x0B5	R	Touch6 SELP					Touch6 SELC										
0x0C8	R						Touch7 Cap										
0x0C9	R	Touch7 SELP					Touch7 SELC										
Default Values	0000h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

6024 Silver Creek Valley Road
San Jose, California 95138
http://www.idt.com

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