Data Sheet

Type Description : USB Type-C PD 3.0 Controller

Product Name : EST5183A

Reversion : V0.11

Reversion Date : May, 2018

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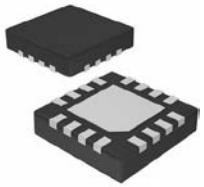
GENERAL DESCRIPTION

EST.5183A is a USB Type-C controller that complies with the latest USB Type-C and PD standards, which provides connection and polarity detection of Configuration Channel (CC). It can also be used in many upstream and downstream facing port applications. Through integration of all the required port terminations and threshold comparators required in all the Type-C port types, the EST.5183A provides a platform that can easily support any of the Type-C port types. The EST.5183A also fully supports the increased power capabilities of the Type-C connector by implementing all the required components to detect the Type-C charging current levels as a device and to drive the required CC levels as a host. The Biphase Mark Code (BMC) PD block enables full support for alternative interfaces of the Type-C specification.

PIN CONFIGURATION

SOP-16L

SSOP-16L



QFN16L(4x4)

FEATURE LIST

USB Power Delivery (PD3.0) Controller

- Support USB Type-C DFP Mode Configuration for Host.
- Supports the programmable power supply(PPS) PDOs.
- Support PDO_SEL pins to change the request power consumption.

USB Type-C Specification Compliant

- Support Connection Detection on CC Pin.
- Detect USB Cable Plug Attach.
- Cable Orientation and Role Detection.
- Pull-up Resistor (Rp) Integrated.

Port Power Switch

- EN_VBUS pin could enable the USB Power Switches for VBUS voltage.
- DIS_CHARGE VBUS Voltage could be performed by DIS_CHARGE Pin.
- Built-in shunt regulator.
- External N-MOSFET switches VBUS voltage.
- Support Over Current Protection (OCP).
- Support Over Voltage Protection (OVP).
- Support Over Temperature Protection (OTP)
- SOP-16,SSOP–16 Package
- QFN-16 Package

TYPICAL APPLICATIONS

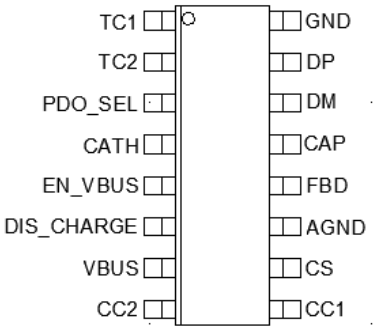
- Battery chargers for smart phones and tablets
- USB power output ports such as car chargers,notebooks or PC.

ORDERING INFORMATION

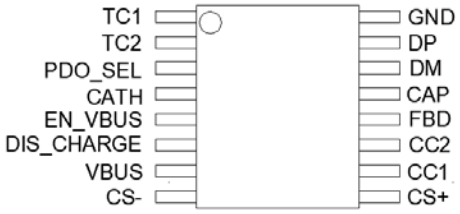
ORDER NUMBER	Package	Shipping	Top Marking
EST.5183AS	SOP-16L(Pb-free)	Tube	5183AS
EST.5183AR	SSOP-16L(Pb-free)	Tape & Reel	5183AR
EST.5183AN	QFN16L(4x4) (Pb-free)	Tape & Reel	5183AN

*Design Guarantee: The device is guaranteed to meet the specifications from 0°C to 70°C. Specifications over the –40°C to 85°C operating temperature range are assured by design, characterization and correlation with the statistical process controls.

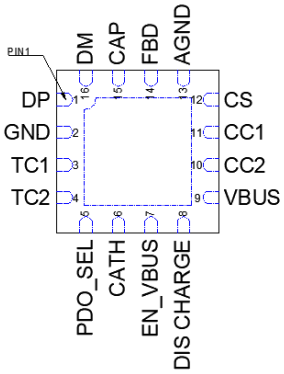
PIN CONFIGURATION



SOP-16L



SSOP-16L



QFN4*4-16L

PIN DESCRIPTION

INst,5v - TTL level input pin with schmitt trigger, 5V tolerance
OD24,5v - Output pin with 24 mA source-sink capability, 5V tolerance
AIN - Analog Input pin
AIO - Analog Input / output pin
P - Power pi

Pin No			Pin Name	Type	Description
SOP-16	SSOP-16	QFN16			
1	1	3	TC1	AIN	Temperature sensor input.
2	2	4	TC2	AIN	Temperature sensor input.
3	3	5	PDO_SEL	AIN	PDO selection, see below control true table for detail:
4	4	6	CATH	AIO	cathode of shunt regulator.
5	5	7	EN_VBUS	$OD_{24st,5v}$	Control the Source side USB power switches for VBUS Voltage, tolerance with high voltage 30V.
6	6	8	DIS_CHARGE	$OD_{24st,5v}$	The USB power switch DIS_CHARGE VBUS voltage, tolerance with high voltage 30V.
7	7	9	VBUS	P	VBUS with tolerance 30V.For sensing voltage regulation.
11	8	13	CS-/AGND	P	Current sense negative: For sensing current regulation
10	9	12	CS/CS+	AIN	Current sense pin: For sensing current regulation.
9	10	11	CC1	AIO	Configuration channel 1, input/output to Type-C CC or VCONN pin, for USB Type-C equipment ommunication.
8	11	10	CC2	AIO	Configuration channel 2, input/output to Type-C CC or VCONN pin, for USB Type-C equipment ommunication.
12	12	14	FBD	AIO	Feedback Drive Pin or current control pin (1uA/step) for setting the correct charging voltage along with the external power chip.
13	13	15	CAP	P	Connection point for an external bypass capacitor for internally generated supply voltage 3.3V.
14	14	16	DM	AIO	USB negative data-channel to external USB device.
15	15	1	DP	AIO	USB positive data-channel to external USB device.
16	16	2	GND	P	Ground.

ELECTRICAL CHARACTERISTICS REQUEST

Absolute Characteristics Request

SYMBOL	PARAMETER	RATINGS	UNIT
VI	CA, CS, TC1, TC2	-0.5 to 3.6	V
VO	VBUS, EN_VBUS, DIS_CHARGE, CATH	-0.5 to 30	V
VIO	CC1, CC2, DP, DM, FBD, PDO_SEL	-0.5 to 5.5	V
T_{STG}	Maximum storage temperature	-65 ~ +150	°C
T_j	Operating Temperature	-40 to +85(2)	°C
MSL	Moisture Sensitivity Level	LEVEL 3	
V_{ESD}	ESD Protection level (Human Body Model)	±2	KV

(1): If ICs are stressed beyond the limits listed in the “absolute maximum ratings”, they may be permanently destroyed. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
(2):Design Guarantee

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V	Operating voltage	VCONN	4.5	5	5.5	V
		HV_ST	3.0	5	30	V
Vthreshold	Comparator threshold voltage	3.0A mode	1.16	1.23	1.31	V
		1.5A mode	0.61	0.66	0.7	
		Default mode	0.15	0.2	0.25	
Ip	DFP current source	3.0A mode	304	330	356	µA
		1.5A mode	166	180	194	
		Default mode	64	80	96	
$IN_{st,5v}$ - TTL level input pin with Schmitt trigger, 5V tolerance						
V_{IL}	Input Low Voltage				0.8	V
V_{IH}	Input High Voltage		2.0			V
I_{LIH}	Input High Leakage	VIN=VCC			+1	µA
I_{LIL}	Input Low Leakage	VIN=0V	-1			µA
OD24,5v-Open-drain output with 24mA sink capability, 5V tolerance						
I_{OL}	Output Low Current	VOL=0.4V		-24		mA

TOP MARKING SPECIFICATION

EST Logo
YYXX : Date code
Device Name
XXXX : Trace Code

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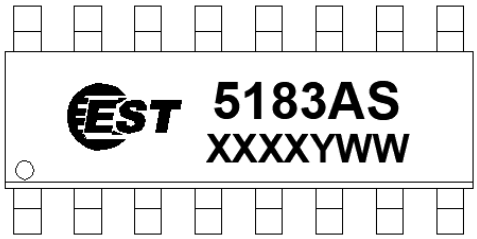
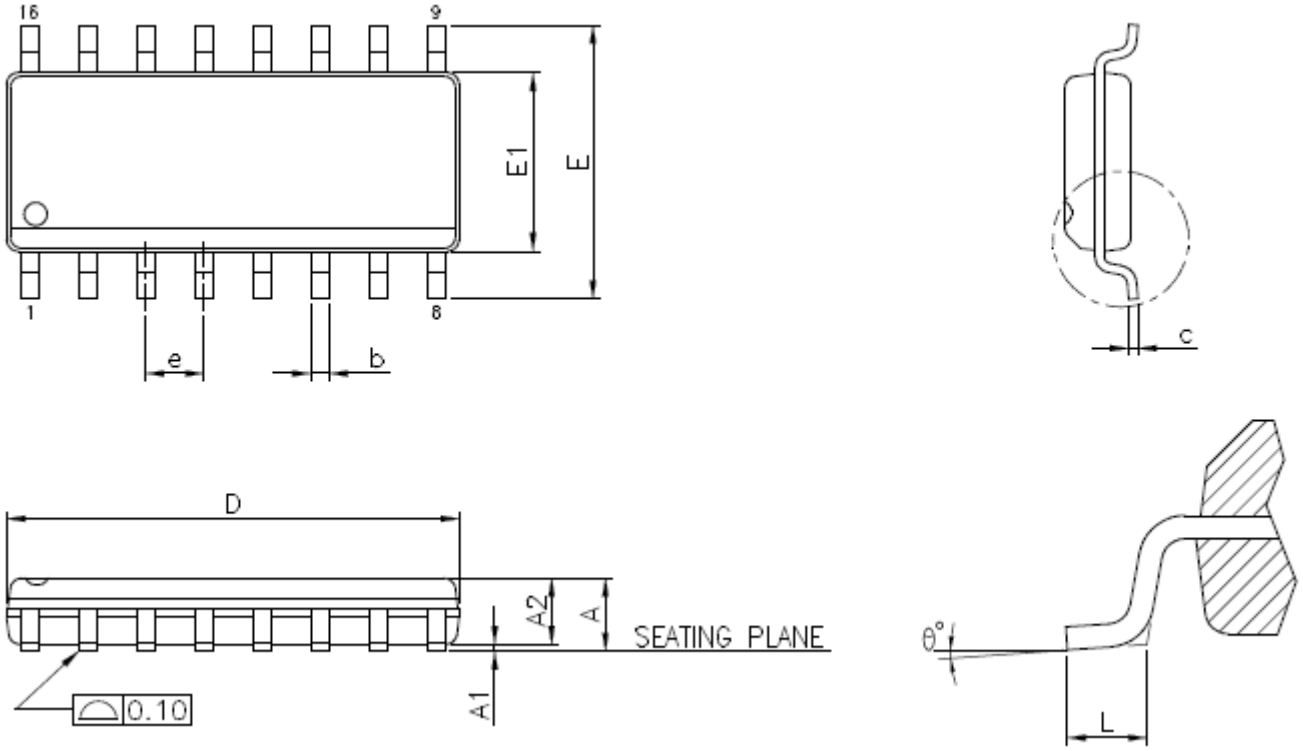


Device Name
XXXX : Trace Code
Y : Year
XX : Weeks

CAUTION
This integrated circuit has been designed carefully in the ESD protection ability. Failure to observe proper handling and installation procedures may cause damage. Recommend that all integrated circuits should be handled with appropriate precautions.

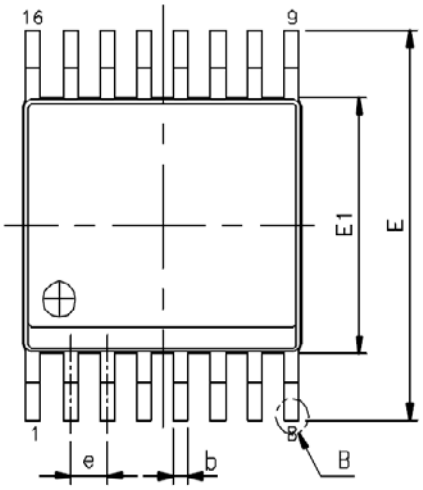
PACKAGE DIMENSIONS

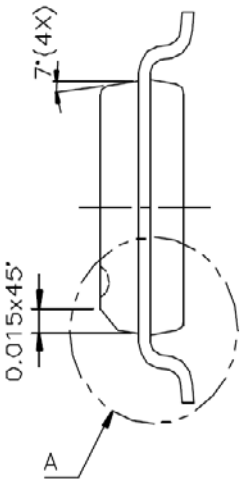
SOP-16L



Symbols	Dimensions In inch		Dimensions In millimeters	
	Min.	Max.	Min.	Max.
A	------	0.072	------	1.837
A1	0.004	0.010	0.095	0.263
A2	0.047	------	1.187	------
b	0.012	0.021	0.294	0.535
c	0.004	0.010	0.095	0.263
D	0.390 BSC		9.900 BSC	
E	0.236 BSC		6.000 BSC	
E1	0.154 BSC		3.900 BSC	
e	0.050 BSC		1.270 BSC	
L	0.015	0.052	0.380	1.333
θ	0°	8°	0°	8°

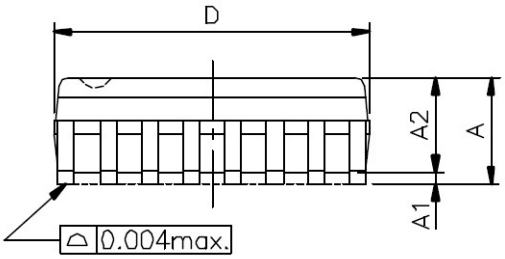
SSOP-16L



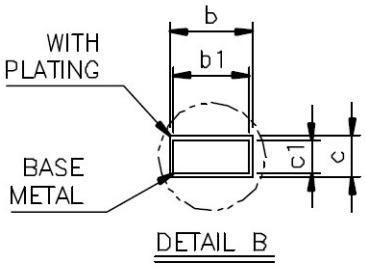


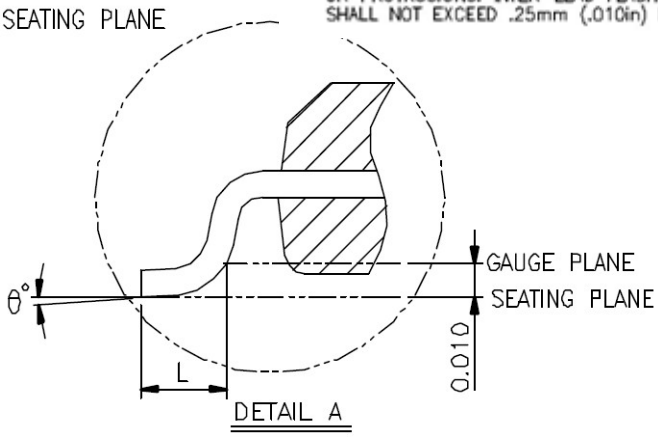
SYMBOLS	MIN.	MAX.
A	0.053	0.069
A1	0.004	0.010
A2	–	0.059
b	0.008	0.012
b1	0.008	0.011
c	0.007	0.010
c1	0.007	0.009
D	0.189	0.197
E1	0.150	0.157
E	0.228	0.244
L	0.016	0.050
e	0.025 BASIC	
θ°	0	8

UNIT : INCH

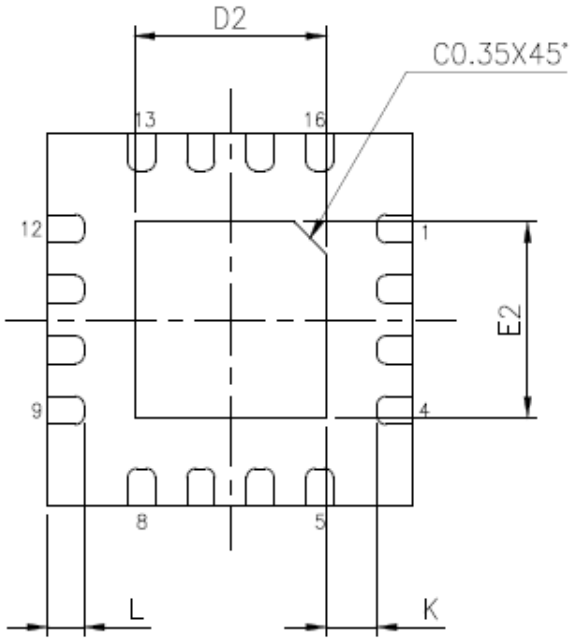


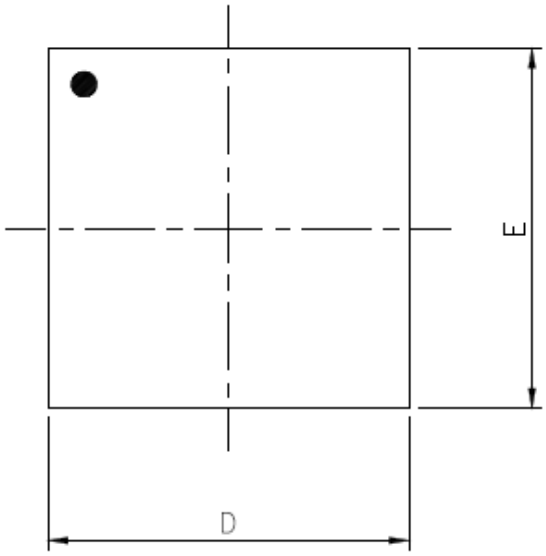
NOTES:
1.JEDEC OUTLINE : MO-137 AB
2.DIMENSIONS "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED .15mm (.006in) PER SIDE.
3.DIMENSIONS "E" DOES NOT INCLUDE INTER-LEAD FLASH, OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED .25mm (.010in) PER SIDE.



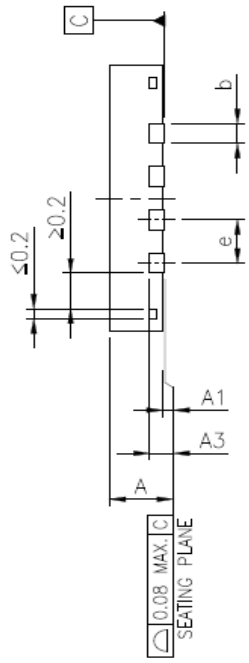


QFN-16 (4X4)





PKG CODE	WQFN(X416)		
SYMBOLS	MIN.	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.002	0.05
A3	0.203 REF.		
b	0.25	0.02	0.05
D	4.00 BSC		
E	4.00 BSC		
e	0.65 BSC		
K	0.2		



	D2			E2			L		
PAD SIZE	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
114X11*	2.60	2.65	2.7	2.6	2.65	2.7	0.35	0.40	0.45