Single USB Charger Adapter Emulator with Analog Switch

FEATURES

- USB2.0 Analog Switch
- 3.5Ω On-Resistance
- 5.0pF On-Capacitance
- 4.5~5.5V Single Supply Operation
- CLK Pin Control Charger and Data Mode
- Open Drain Pins for Mode indication
- Automatic USB charger Identification Circuit
- Support 2.1A Apple® Devices fast charging
- Support Samsung Galaxy Tab Devices fast Charging
- Support BC1.2 & YD/T 1591-2009 Charging Spec
- Available in MSOP10 Package

APPLICATIONS

- Type-C USB Cable
- Type-C Adapter
- USB Wall Adapter

DESCRIPTION

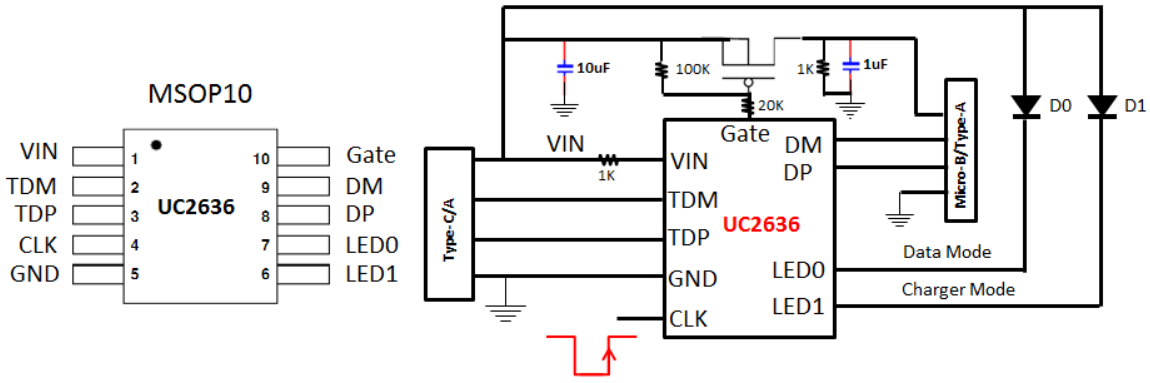
The UC2636 is latest USB adapter emulators with analog switch. It can achieve USB automatic host charger identification circuitry for USB dedicated chargers and data communication by CLK pin.

The UC2636 achieve mode change by Gate with a external PMOS to reduce system cost .

The UC2636 integrated automatic USB charger identification circuit allow mobile power supply, In-Car charger, USB wall adapters, travel chargers, and other dedicated chargers to identify themselves as a USB dedicated charger to USB devices, like Apple charger to Apple products, Samsung charger to Samsung Galaxy Tab & Phone, and BC1.2 charger to HTC, SONY, LG, BlackBerry, Lenovo, Coolpad, ZTE, Huawei and other legacy D+/D- short detection devices.

The UC2636 feature two LED pins for indicate charging mode or data communication mode.

UC2636 MSOP10 PACKAGE and SIMPLIFIED APPLICATION



ORDING INFORMATION

Part Number	Package Type	Package Qty	Op Temp(°C)
UC2636	MSOP10	3000	-40~85

ABSOLUTE MAXIMUM RATINGS (1)

Over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		MIN	MAX	UNIT
supply voltage range	IN	-0.3	6	V
Input voltage range	DP,DM, TDP, TDM	-0.3	5.8	
Continuous output sink current	TDP,TDM,DP,DM input current		35	mA
Continuous output source current	TDP,TDM,DP,DM output current		35	
ESD rating, Human Body Model (HBM)	IN, LED,LED1,GATE,CLK		2	kV
	DP, DM		4	
ESD rating, Charging Device Model (CDM)			500	V
Operating Junction Temperature	T_J	-40	125	°C
Storage Temperature Range	T_{stg}	-65	150	

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

THERMAL CHARACTERISTICS

over operating free-air temperature range (unless otherwise noted)

THERMAL METRIC			UNIT
θ_{JA}	Package thermal impedance(1)	84	°C/W

(1) The package thermal impedance is calculated in accordance with JESD 51-7.

RECOMMENDED OPERATING CONDITIONS

PARAMETER		MIN	MAX	UNIT
V_{IN}	Input voltage of IN	4.5	5.5	V
$V_{DP/DM/TDP/TDM}$	DP/DM/TDP/TDM data line input voltage		5.5	
$I_{DP/DM/TDP/TD,}$	Continuous sink/source current		±10	mA
T_J	Operating Junction Temperature	-40	125	°C

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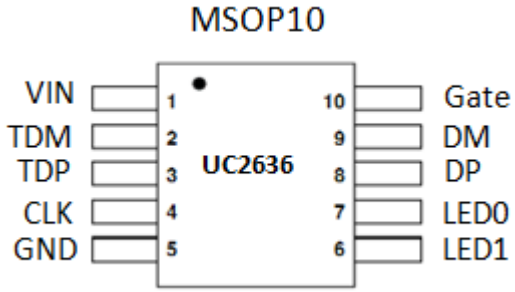
PINOUT



PIN FUNCTIONS

NO.	NAME	TYPE(1)	DESCRIPTION
1	VIN	P/I	Power supply/Input voltage connected to Power Switch; connect a 1 µF or greater ceramic capacitor from IN to GND as close to the IC as possible
2	TDM	O	DM date line to connector, output for hand-shake voltage to host
3	TDP	O	DP date line to connector, output for hand-shake voltage to host
4	CLK	I	Mode Change Control, Rising Edge is Effective for Mode Change
5	GND	G	Ground connection
6	LED1	O	Open Drain Output for LED
7	LED0	O	Open Drain Output for LED
8	DP	O/I	DP date line to connector, output for hand-shake voltage to portable equipment, high impedance while disabled
9	DM	O/I	DM data line to connector, input for hand-shake voltage from portable equipment high impedance while disabled
10	Gate	O	

(1) G = Ground, I = Input, O = Output, P = Power

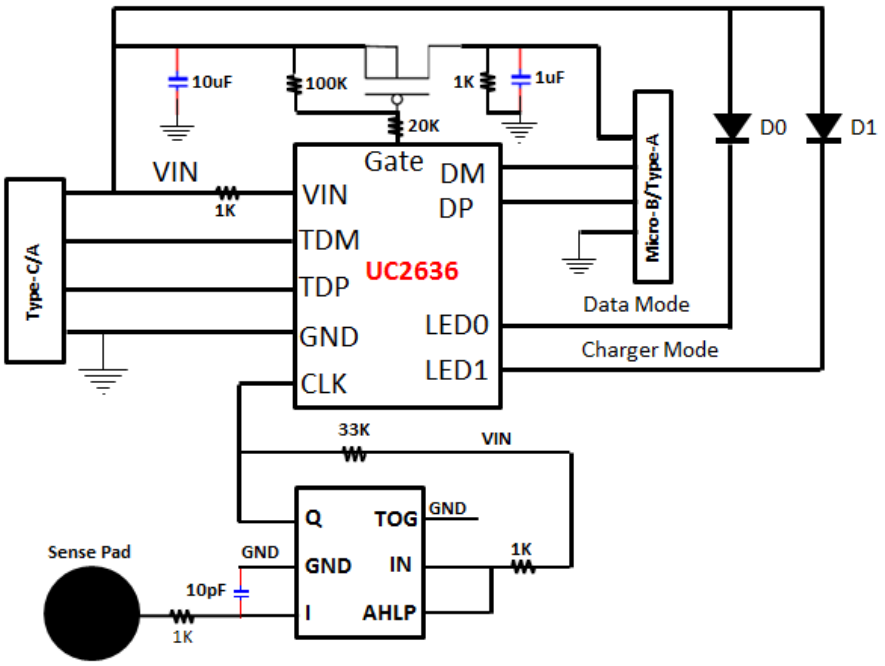
ELECTRICAL CHARACTERISTICS

Conditions are **-40°C ≤ (T_J =T_A) ≤ 125°C and 4.5 V ≤ V_{IN} ≤ 5.5 V unless otherwise noted. Typical value is at 25°C. All voltages are with respect to GND unless otherwise noted.**

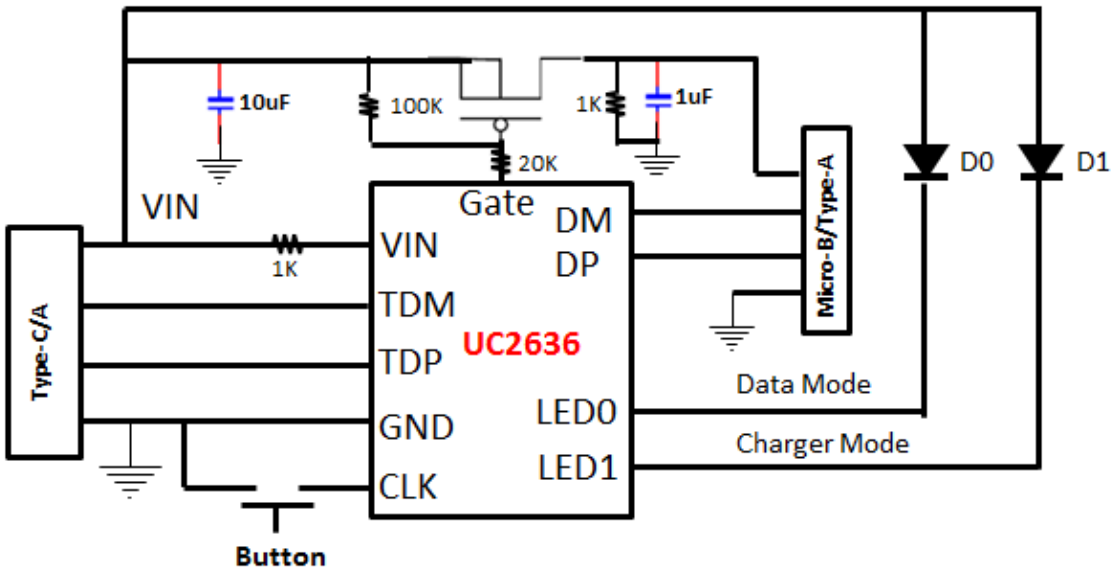
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
UNDERVOLTAGE LOCKOUT						
V_{UVLO}	IN rising UVLO threshold voltage		3.7	3.9	4.1	V
	Hysteresis			100		mV
SUPPLY CURRENT						
I_{IN}	IN supply current			130	250	μA
BC 1.2 DCP MODE (SHORT)						
R_{DPM_SHORT}	DP / DM shorting resistance			125	200	Ω
R_{DCHG_SHORT}	Resistors connected DP /DM to GND after hand-shaking			200	400	kΩ
$V_{DPL\_TH\_DETACH}$	DP low threshold while detaching BC1.2 devices		310	330	350	mV
$V_{DPL\_TH\_DETACH\_HYS}$	hysteresis			50		mV
IPAD MODE 2.1A Mode (SEL=1 or Floating)						
V_{DP_IPAD}	DP output voltage		2.55	2.7	2.85	V
V_{DM_IPAD}	DM output voltage		1.9	2.0	2.1	V
R_{DP_IPAD}	DP output impedance	I_{DP} = -5uA	20	30	40	kΩ
R_{DM_IPAD}	DM output impedance	I_{DM} = -5uA	20	30	40	kΩ
Galaxy Tab MODE						
V_{DP_GAL}	DP output voltage		1.10	1.2	1.30	V
V_{DM_GAL}	DM output voltage		1.10	1.2	1.30	
R_{DP_GAL}	DP output impedance	I_{DP} = -5uA	80	105	130	kΩ
R_{DM_GAL}	DM output impedance	I_{DM} = -5uA	80	105	130	
Analog Switch						
R_{ON}	On Resistance			3.5		Ω
C_{ON}	On Capacitance			5.0		pF
I_{LKG}	Off leakage current			0	250	nA
BW	-3dB Bandwidth			750		MHz

APPLICATION SCHEMATIC

Touch Solution:

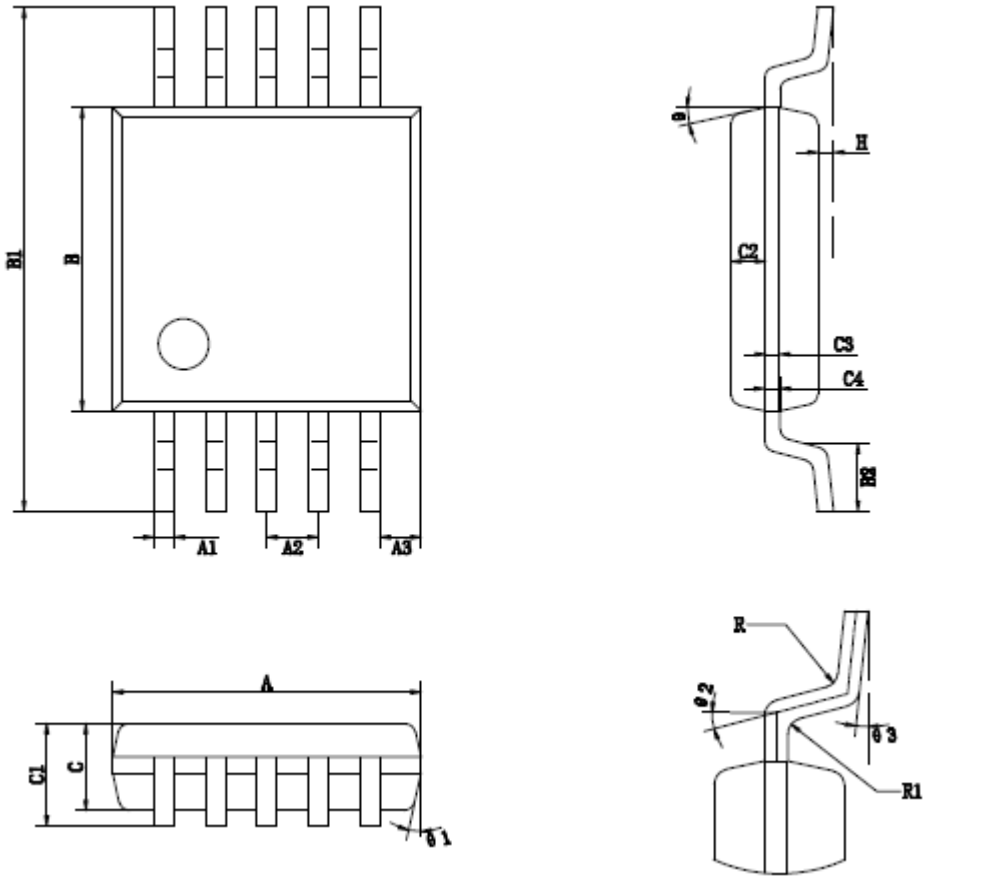


Button Solution



PACKAGE INFORMATION

MSOP10



尺寸 / 标注	最小(mm)	最大(mm)	尺寸 / 标注	最小(mm)	最大(mm)
A	2.90	3.10	C3	0.152	
A1	0.18	0.25	C4	0.15	0.23
A2	0.50TYP		H	0.02	0.15
A3	0.40TYP		θ	15° TYP4	
B	2.90	3.10	θ1	12° TYP4	
B1	4.70	5.10	θ2	14° TYP	
B2	0.45	0.75	θ3	0° ～ 6°	
C	0.75	0.95	R	0.15TYP	
C1	--	1.10	R1	0.15TYP	
C2	0.328TYP				