USB Charger Emulator with Adjustable Power Switch

FEATURES

- 4.5V~5.5V Single Supply Operation.
- Automatic USB charger Identification Circuit.
- UC2631/UC2632 Support Apple® Devices fast charging. (Apple® 2.1A / 1.0A mode)
- Support Samsung Galaxy Tab Devices fast Charging. (Samsung® 2.1A mode)
- Support BC1.2 & YD/T 1591-2009 Charging Spec. (DCP® 1.0A mode)
- Available in SOT23-6 Package.

APPLICATIONS

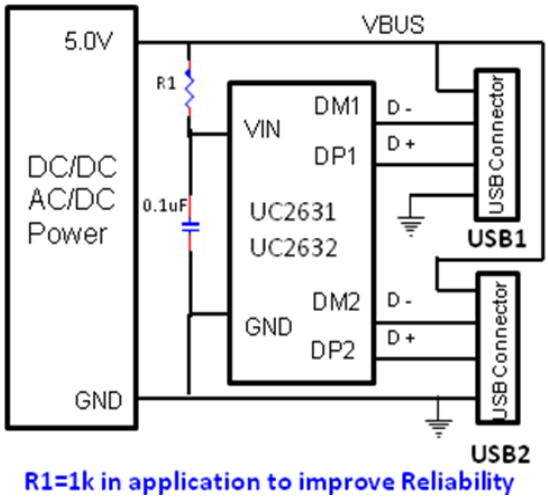
- Power Bank/Car Charger
- USB Wall Adapter
- Travel Charger

DESCRIPTION

The UC2631/UC2632 is single/dual USB adapter emulators with automatic host charger identification circuitry for USB dedicated chargers.

The devices 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 & Smart Phone, and BC1.2 charger to HTC, SONY, LG, BlackBerry, Lenovo, Coolpad, ZTE, Huawei and other legacy D+/D- short detection devices.

PACKAGE AND APPLICATION



R1=1k in application to improve Reliability

PART NO. TABLE

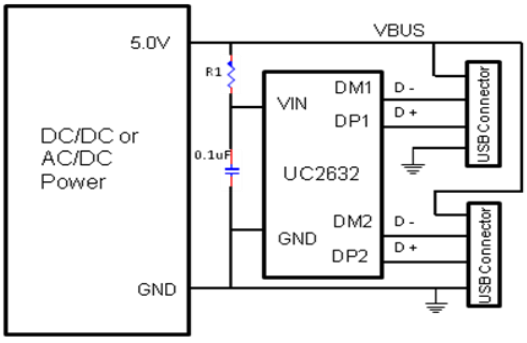
Part No.	Dual/Single	Apple 10W	Apple 5W	SS 10W	DCP 5W
UC2631	Single	Support	Support	Support	Support
UC2632	Dual	Support	Support	Support	Support

10W Single/Dual USB Charger Adapter Emulator

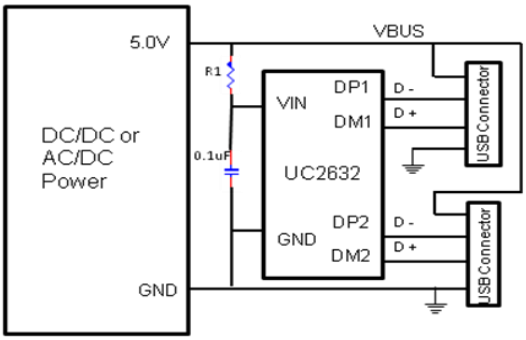
ORDING INFORMATION

Part Number	Package Type	Package Qty	Op Temp(℃)
UC2631	SOT23-6	3000	-40~85
UC2632	SOT23-6	3000	-40~85

APPLICATION SCHEMATIC



2×10W Application



2×5W Application

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	DP1,DM1,DP2,DM2	-0.3	5.8	
Continuous output sink current	DP1,DP2 input current, DM1,DM2 input current		35	mA
Continuous output source current	DP1,DP2 output current, DM1,DM2 output current		35	
ESD rating, Human Body Model (HBM)	IN		2	kV
	DP1,DP2,DM1,DM2		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)	180	℃/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
$V_{DP1/DP2}$	D+ data line input voltage		5.5	
$V_{DM1/DM2}$	D- data line input voltage		5.5	
$I_{DP1/DP2}$	Continuous sink/source current		±10	mA
$I_{DM1/DM2}$	Continuous sink/source current		±10	
T_J	Operating Junction Temperature	-40	125	°C

PINOUT

PIN FUNCTIONS

NO.	NAME	TYPE(1)	DESCRIPTION
1	DP1	O/I	DP date line to connector, output for hand-shake voltage to portable equipment, high impedance while disabled
2	GND	G	Ground connection
3	NC (UC2631)	NC	No Connection
	DP2 (UC2632)	O/I	DP date line to connector, output for hand-shake voltage to portable equipment, high impedance while disabled
4	NC (UC2631)	NC	No Connection
	DM2 (UC2632)	O/I	DM data line to connector, input for hand-shake voltage from portable equipment high impedance while disabled
5	IN	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
6	DM1	O/I	DM data line to connector, input for hand-shake voltage from portable equipment high impedance while disabled

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

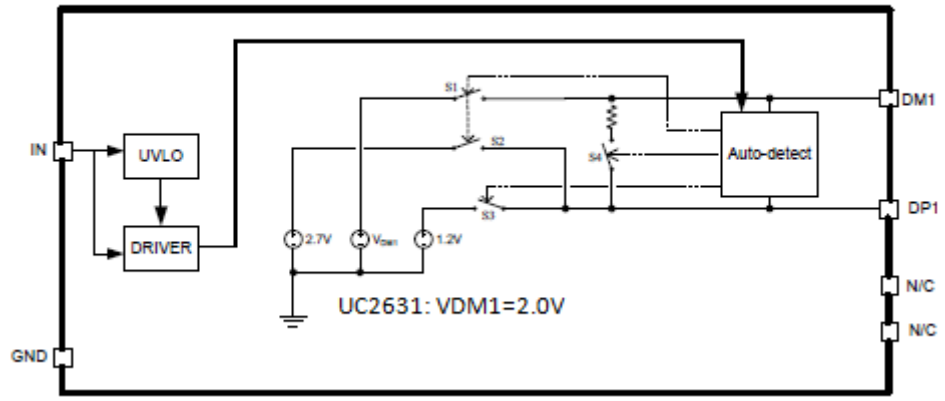
ELECTRICAL CHARACTERISTICS

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.

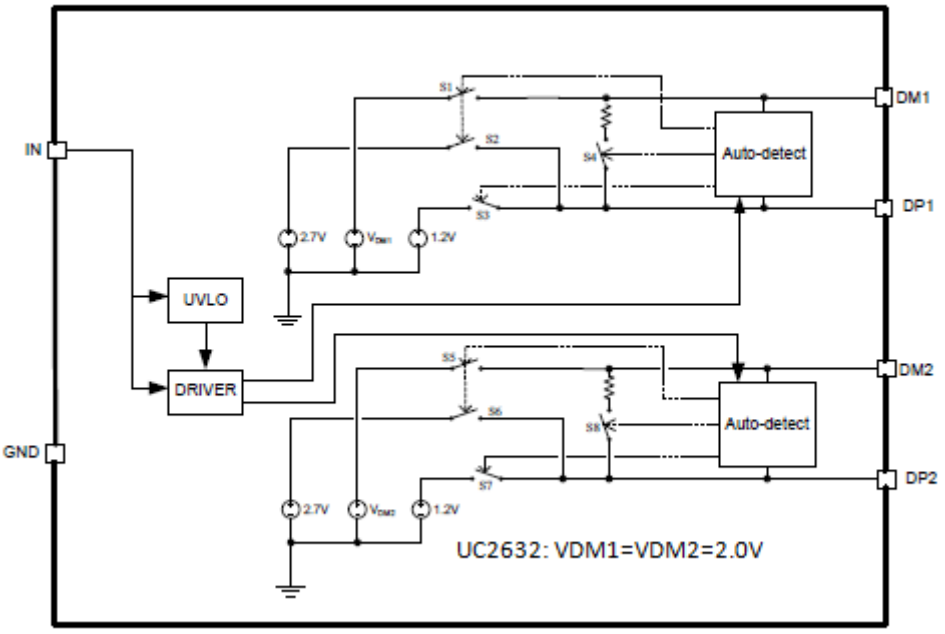
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
UNDERVOLTAGE LOCKOUT						
V_{UVLO}	IN rising UVLO threshold voltage		3.9	4.1	4.3	V
	Hysteresis			100		mV
SUPPLY CURRENT						
I_{IN}	IN supply current			160	250	μA
BC 1.2 DCP MODE (SHORT)						
R_{DPM_SHORT}	DP / DM shorting resistance	V_{D+} = 0.8V, I_{D-} = 1mA,		125	200	Ω
R_{DCHG_SHORT}	Resistors connected DP /DM to GND after hand-shaking	V_{D+} = 0.8V		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(UC2631/UC2632)						
V_{DP_IPAD}	DP1/DP2 output voltage		2.54	2.7	2.86	V
V_{DM_IPAD}	DM1/DM2 output voltage		1.89	2.0	2.11	V
R_{DP_IPAD}	DP1/DP2 output impedance	I_{D+} = -5uA	20	30	40	kΩ
R_{DM_IPAD}	DM1/DM2 output impedance	I_{D-} = -5uA	20	30	40	kΩ
Galaxy Tab MODE						
V_{DP_GAL}	DP1/DP2 output voltage		1.1	1.2	1.3	V
V_{DM_GAL}	DM1/DM2 output voltage		1.1	1.2	1.3	
R_{DP_GAL}	DP1/DP2 output impedance	I_{D+} = -5uA	80	105	130	kΩ
R_{DM_GAL}	DM1/DM2 output impedance	I_{D-} = -5uA	80	105	130	

FUNCTIONAL BLOCK DIAGRAM

UC2631 Block Diagram



UC2632 Block Diagram



PACKAGE INFORMATION

SOT23-6