High-speed CAN Transceiver

UM3851S8S ***SOP8***
UM3851S8E ***SOP8***
UM3851S8 ***SOP8***
UM3851DA ***DFN8 3.0×3.0***

1 Description

The UM3851 is a high-speed CAN transceiver that provides an interface between a Controller Area Network (CAN) protocol controller and the physical two-wire CAN bus. The transceiver is designed for high-speed CAN applications in the automotive industry, providing differential transmit and receive capability to (a microcontroller with) a CAN protocol controller. The UM3851 offers improved ElectroMagnetic Compatibility (EMC) and ElectroStatic Discharge (ESD) performance, and also features:

- Ideal passive behavior to the CAN bus when the supply voltage is off.
- UM3851S8 and UM3851DA can be interfaced directly to microcontrollers with 3.3V or 5V supply voltage.

The UM3851 implements the CAN physical layer as defined in ISO 11898-2:2016 and SAE J2284-1 to SAE J2284-5. This implementation enables reliable communication in the CAN FD fast phase at data rates up to 5 Mbit/s. These features make the UM3851 an excellent choice for all types of HS-CAN networks, in nodes that do not require a standby mode with wake-up capability via the bus.

2 Applications

- Automotive Industry
- Industrial Control
- Wireless Infrastructure

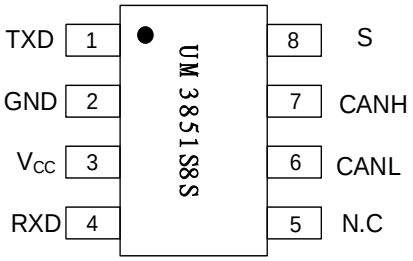
3 Features

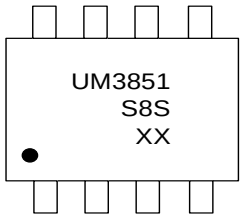
- ISO 11898-2:2016 and SAE J2284-1 to SAE J2284-5 compliant
- Timing guaranteed for data rates up to 5 Mbit/s in the CAN FD fast phase
- Suitable for 12V and 24V systems
- V_{IO} input on UM3851S8 and UM3851DA allows for direct interfacing with 3.3V or 5V microcontrollers (available in SOP8 and very small DFN8 packages respectively)
- EN input on UM3851S8E allows the microcontroller to switch the transceiver to a very low-current Off mode
- Transceiver disengages from the bus when not powered up (zero load)
- High ElectroStatic Discharge (ESD) handling capability on the bus pins
- Transmit Data (TXD) dominant time-out function
- Undervoltage detection on pins V_{CC} and V_{IO}
- Thermally protected

4 Ordering Information

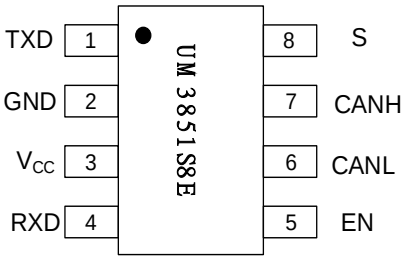
Part Number	Temp. Range	Marking Code	Package Type	Shipping Qty
UM3851S8S	-40℃ to +125℃	UM3851S8S	SOP8	3000pcs/13Inch Tape & Reel
UM3851S8E	-40℃ to +125℃	UM3851S8E	SOP8	3000pcs/13Inch Tape & Reel
UM3851S8	-40℃ to +125℃	UM3851S8	SOP8	3000pcs/13Inch Tape & Reel
UM3851DA	-40℃ to +125℃	3851	DFN8 3.0×3.0	3000pcs/13Inch Tape & Reel

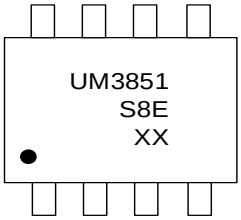
5 Pin Configuration and Function



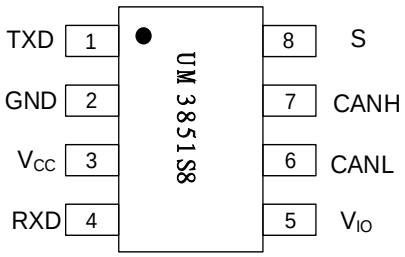


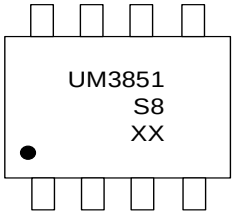
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UM3851S8S
SOP-8



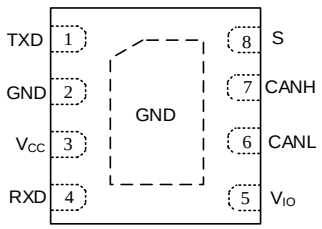


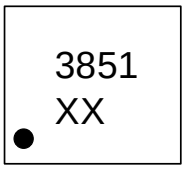
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UM3851S8E
SOP-8





XX: Week Code
UM3851S8
SOP-8





XX:Week Code
UM3851DA
DFN8 3.0×3.0

5 Pin Configuration and Function (continued)

Table 5-1. Pin Functions

Pin No.	Symbol	Description
1	TXD	Transmit data input
2	GND	Ground (Note 1)
3	V_{CC}	Supply voltage
4	RXD	Receive data output; reads out data from the bus lines
5	N.C.	Not connected; in UM3851S8S version
5	EN	Enable control input; UM3851S8E only
5	V_{IO}	Supply voltage for I/O level adapter; UM3851S8 and UM3851DA only
6	CANL	LOW-level CAN bus line
7	CANH	HIGH-level CAN bus line
8	S	Silent mode control input

Note1： DFN8 3.0×3.0 package die supply ground is connected to both the GND pin and the exposed center pad. The GND pin must be soldered to board ground. For enhanced thermal and electrical performance, it is recommended that the exposed center pad also be soldered to board ground.

6 Specifications

6.1 Absolute Maximum Ratings

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

Parameter	Symbol	Conditions	Min	Max	Unit
Voltage on pin x （Note1）	V_X	On pins CANH, CANL	-44	+44	V
		On any other pin	-0.3	+6	V
Voltage between pin CANH and pin CANL	$V_{(CANH-CANL)}$		-27	+27	V
Virtual junction temperature range	T_{VJ}	（Note2）	-40	+150	℃
Storage temperature	T_{STG}		-55	+150	℃

Note 1: The device can sustain voltages up to the specified values over the product lifetime, provided applied voltages (including transients) never exceed these values.

Note 2: In accordance with IEC 60747-1. An alternative definition of virtual junction temperature is: $T_{VJ} = T_{amb} + P \times R_{th(VJ-A)}$, where $Rth_{(VJ-A)}$ is a fixed value to be used for the calculation of T_{VJ}. The rating for T_{VJ} limits the allowable combinations of power dissipation (P) and ambient temperature (T_{amb}).

6.2 Thermal Characteristic (Note 1)

Symbol	Parameter	SOP8			DFN8	Unit
		UM3851 S8S	UM3851 S8E	UM3851 S8	UM3851 DA	
θ_{JA}	Junction-to-ambient thermal resistance	110	110	110	55	℃/W

Note 1: According to IEC 60747-1.

6.3 Electrical Characteristics (Static)

T_J = -40℃ to +125℃; V_{CC} = 4.5V to 5.5V; V_{IO} = 2.8V to 5.5V (Note 1); R_L = 60Ω unless specified otherwise; All voltages are defined with respect to ground; Positive currents flow into the IC (Note 2).

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply；pin V_{CC}						
Supply Voltage	V_{CC}		4.5	-	5.5	V
Supply Current	I_{CC}	Off mode (UM3851S8E) EN=GND			8	μA
		Silent mode;S=V_{CC}	0.1	1	2.5	mA
		Normal mode				
		Recessive;V_{TXD} =V_{IO} (Note 3)	-	5	10	mA
		Dominant;V_{TXD} = 0V	-	50	70	mA
		Dominant; V_{TXD}=0V; short circuit on bus lines; - 3 V<(V_{CANH}=V_{CANL})<+18V	2.5	80	110	mA
Undervoltage detection voltage on pin V_{CC}	$V_{uvd(VCC)}$		3.5	–	4.5	V
I/O level adaptor supply; pin V_{IO} (Note 1)						
Supply voltage on pin VIO	V_{IO}		2.8	-	5.5	V
Supply current on pin V_{IO}	I_{IO}	Normal/Silent mode				
		Recessive; V_{TXD} = V_{IO} (Note 3)	-	80	250	μA
		Dominant; V_{TXD} = 0V	-	350	500	μA
Undervoltage detection voltage on pin V_{IO}	$V_{uvd(VIO)}$		1.3	2.0	2.7	V
Mode control inputs; pins S and EN (Note 4)						
HIGH-level input voltage	V_{IH}	(Note 5)	0.7V_{IO} (Note 3)	-	V_{IO}+ 0.3 (Note 3)	V
LOW-level input voltage	V_{IL}		-0.3	-	0.3V_{IO} (Note 3)	V
HIGH-level input current	I_{IH}	V_S = V_{IO}; V_{EN} = V_{IO} (Note 3)	1	4	10	μA
LOW-level input current	I_{IL}	V_S = 0 V; V_{EN} = 0 V	-1	0	+1	μA

6.3 Electrical Characteristics (Static) (continued)

T_J = -40°C to +125°C; V_{CC} = 4.5V to 5.5V; V_{IO} = 2.8V to 5.5V (Note 1); R_L = 60Ω unless specified otherwise; All voltages are defined with respect to ground; Positive currents flow into the IC (Note 2).

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
CAN transmit data input; pin TXD						
HIGH-level input voltage	V_{IH}	(Note 5)	$0.7V_{IO}$ (Note 3)	-	V_{IO}+0.3 (Note 3)	V
LOW-level input voltage	V_{IL}		-0.3	-	$0.3V_{IO}$ (Note 3)	V
HIGH-level input current	I_{IH}	$V_{TXD} = V_{IO}$ (Note 3)	-5	0	+5	μA
LOW-level input current	I_{IL}	Normal mode; V_{TXD} = 0 V	-260	-150	-30	μA
Input capacitance	Ci	(Note 6)	-	5	10	pF
CAN receive data output; pin RXD						
HIGH-level output current	I_{OH}	$V_{RXD} = V_{IO}$ - 0.4V (Note 3)	-8	-3	-1	mA
LOW-level output current	I_{OL}	V_{RXD} = 0.4V;bus dominant	2	5	12	mA
Bus lines; pins CANH and CANL						
Dominant output voltage	$V_{O(dom)}$	V_{TXD} = 0 V; t < $t_{to(dom)TXD}$				
		Pin CANH; R_L = 50Ω to 65Ω	2.75	3.5	4.5	V
		Pin CANL; R_L = 50Ω to 65Ω	0.5	1.5	2.25	V
Transmitter dominant voltage symmetry	$V_{dom(TX)sym}$	$V_{dom(TX)sym} = V_{CC}$-V_{CANH} - V_{CANL}	-400	-	+400	mV
Transmitter voltage symmetry	V_{TXsym}	V_{TXsym}= V_{CANH} + V_{CANL} (Note 6); f_{TXD} = 250 kHz, 1MHz and 2.5MHz (Note 7); V_{CC} = 4.75V to 5.25 V; C_{SPLIT} = 4.7 nF	$0.9V_{CC}$	-	$1.1V_{CC}$	V

6.3 Electrical Characteristics (Static) (continued)

T_J = -40°C to +125°C; V_{CC} = 4.5V to 5.5V; V_{IO} = 2.8V to 5.5V (Note 1); R_L = 60Ω unless specified otherwise; All voltages are defined with respect to ground; Positive currents flow into the IC (Note 2).

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Differential output voltage	$V_{O(dif)}$	Dominant: Normal mode; V_{TXD} = 0V; $t < t_{to(dom)TXD}$; V_{CC} = 4.75V to 5.25V				
		R_L = 45Ω to 65Ω	1.5	-	3	V
		R_L = 45Ω to 70Ω	1.5	-	3.3	V
		R_L = 2240Ω	1.5	-	5	V
		Recessive; no load				
		Normal mode: V_{TXD} = V_{IO} (Note 3)	-50	-	+50	mV
Recessive output voltage	$V_{O(rec)}$	Normal/Silent mode; V_{TXD} = V_{IO} (Note 3) no load	2	0.5V_{CC}	3	V
Differential receiver threshold voltage	$V_{th(RX)dif}$	Normal/Silent mode; -30V≤ V_{CANL}≤+30V; -30V≤ V_{CANH}≤+30V	0.5	0.7	0.9	V
Receiver recessive voltage	$V_{rec(RX)}$	Normal/Silent mode; -30V≤ V_{CANL}≤+30V; -30V≤ V_{CANH}≤+30V	-4	-	0.5	V
Receiver dominant voltage	$V_{dom(RX)}$	Normal/Silent mode; -30V≤ V_{CANL}≤+30V; -30V≤ V_{CANH}≤+30V	0.9	-	9.0	V
Differential receiver hysteresis voltage	$V_{hys(RX)dif}$	Normal/Silent mode; -30V≤ V_{CANL}≤+30V; -30V≤ V_{CANH}≤+30V	50	120	200	mV
Dominant short-circuit output current	$I_{O(sc)dom}$	V_{TXD} = 0 V; $t < t_{to(dom)TXD}$; V_{CC} = 5V				
		Pin CANH; V_{CANH} = -15V to+40V	-100	-70	-40	mA
		Pin CANL; V_{CANL} = -15V to +40V	40	70	100	mA
Recessive short-circuit output current	$I_{O(sc)rec}$	Normal/Silent mode; V_{TXD} = V_{IO} (Note 3); V_{CANH}= V_{CANL}= -27V to +32 V	-5	-	+5	mA
Leakage current	I_L	V_{CC} = V_{IO} = 0 V or V_{CC} = V_{IO} = shorted to ground via 47kΩ; V_{CANH} = V_{CANL} = 5 V	-5	0	+5	μA

6.3 Electrical Characteristics (Static) (continued)

T_J = -40℃ to +125℃; V_{CC} = 4.5V to 5.5V; V_{IO} = 2.8V to 5.5V (Note 1); R_L = 60Ω unless specified otherwise; All voltages are defined with respect to ground; Positive currents flow into the IC (Note 2).

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input resistance	R_i	-2 V≤ V_{CANL} ≤ +7 V; (Note 6) -2 V≤ V_{CANH} ≤ +7 V	15	24	40	kΩ
Input resistance deviation	ΔR_i	-2 V≤ V_{CANL} ≤ +7 V; (Note 6) -2 V≤ V_{CANH} ≤ +7 V	-1	-	+1	%
Differential input resistance	$R_{i(dif)}$	-2 V≤ V_{CANL} ≤ +7 V; (Note 6) -2 V≤ V_{CANH} ≤ +7 V	30	48	80	kΩ
Common-mode input capacitance	$C_{i(cm)}$	(Note 6)	-	-	20	pF
Differential input capacitance	$C_{i(dif)}$	(Note 6)	-	-	10	pF
Temperature protection						
Shutdown junction temperature	$T_{j(sd)}$	(Note 6)	-	170	-	℃
ESD Ratings						

Parameter	Symbol		Value	Unit
Electrostatic discharge voltage	V_{ESD}	Human Body Model (HBM)		
		At pins CANH and CANL	±8	kV
		At any other pin	±4	kV

Note 1： Only UM3851S8 and UM3851DA have a V_{IO} pin. In transceivers without a V_{IO} pin, the V_{IO} input is internally connected to V_{CC}.

Note 2： All parameters are guaranteed over the operating junction temperature range by design. Factory testing uses correlated test conditions to cover the specified temperature and power supply voltage range.

Note 3： V_{IO} = V_{CC} for the non-V_{IO} product variants UM3851S8E

Note 4： Only UM3851S8E has an EN pin.

Note 5： Maximum value assumes V_{CC} < V_{IO}; if V_{CC} > V_{IO}, the maximum value will be V_{CC} + 0.3 V.

Note 6： Not tested in production; guaranteed by design.

Note 7： The test circuit used to measure the bus output voltage symmetry (which includes C_{SPLIT}) is shown in Figure 10-4.

6.4 Switching Characteristics

T_J = -40℃ to +125℃; V_{CC} = 4.5V to 5.5V; V_{IO} = 2.8V to 5.5V (Note 1)； R_L = 60Ω unless specified otherwise. All voltages are defined with respect to ground. Positive currents flow into the IC (Note 2).

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Transceiver timing; pins CANH, CANL, TXD and RXD； see Figure 10-3 and Figure 7-1						
Delay time from TXD to bus dominant	$t_{d(TXD-busdom)}$	Normal mode	-	65	-	ns
Delay time from TXD to bus recessive	$t_{d(TXD-busrec)}$	Normal mode	-	90	-	ns
Delay time from bus dominant to RXD	$t_{d(busdom-RXD)}$	Normal/Silent mode	-	60	-	ns
Delay time from bus recessive to RXD	$t_{d(busrec-RXD)}$	Normal/Silent mode	-	65	-	ns
Delay time from TXD LOW to RXD LOW	$t_{d(TXDL-RXDL)}$	Normal mode: versions with V_{IO} pin	40	-	250	ns
		Normal mode: other versions	40	-	220	ns
Delay time from TXD HIGH to RXD HIGH	$t_{d(TXDH-RXDH)}$	Normal mode: versions with V_{IO} pin	40	-	250	ns
		Normal mode: other versions	40	-	220	ns
Transmitted recessive bit width	$t_{bit(bus)}$	$t_{bit(TXD)}$ = 500 ns (Note 3)	435	-	530	ns
		$t_{bit(TXD)}$ = 200 ns (Note 3)	155	-	210	ns
Bit time on pin RXD	$t_{bit(RXD)}$	$t_{bit(TXD)}$ = 500 ns (Note 3)	400	-	550	ns
		$t_{bit(TXD)}$ = 200 ns (Note 3)	120	-	220	ns
Receiver timing symmetry	Δt_{rec}	$t_{bit(TXD)}$ = 500 ns	-65	-	+40	ns
		$t_{bit(TXD)}$ = 200 ns	-45	-	+15	ns
TXD dominant time-out time	$t_{to(dom)TXD}$	V_{TXD} = 0V; Normal mode (Note 4)	0.3	1	5	ms

Note 1： Only UM3851S8 and UM3851DA have a V_{IO} pin. In transceivers without a V_{IO} pin, the V_{IO} input is internally connected to V_{CC}.

Note 2： All parameters are guaranteed over the operating junction temperature range by design. Factory testing uses correlated test conditions to cover the specified temperature and power supply voltage range.

Note 3： See Figure 7-2.

Note 4： Minimum value of 0.8ms required according to SAE J2284; 0.3ms is allowed according to ISO11898-2:2016 for legacy devices.

7 Parameter Measurement Information

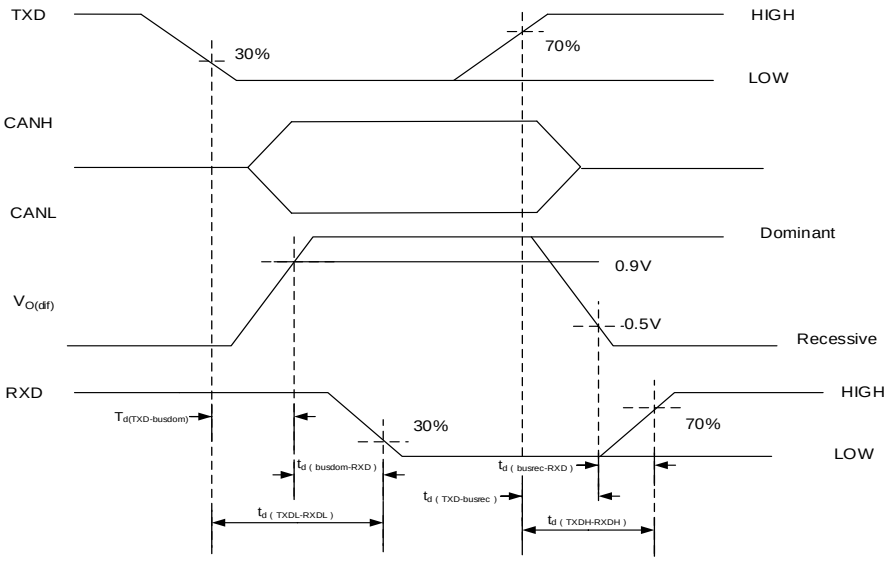


Figure 7-1. CAN transceiver timing diagram

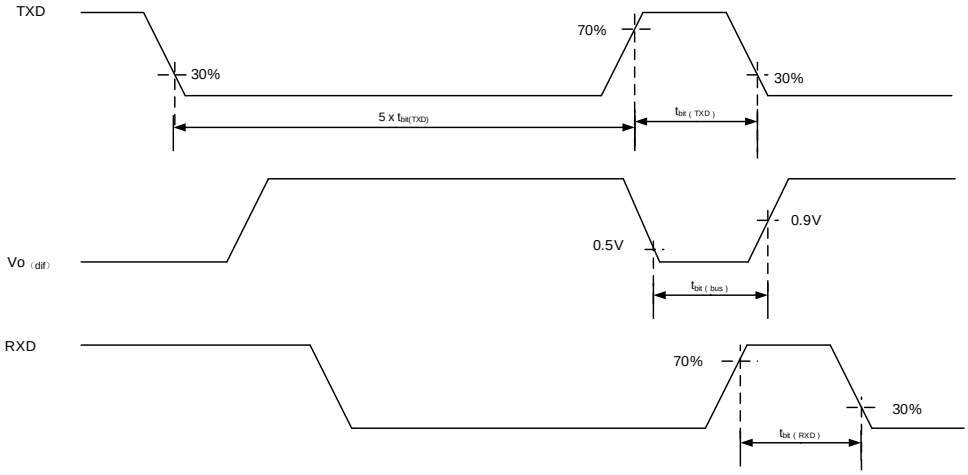
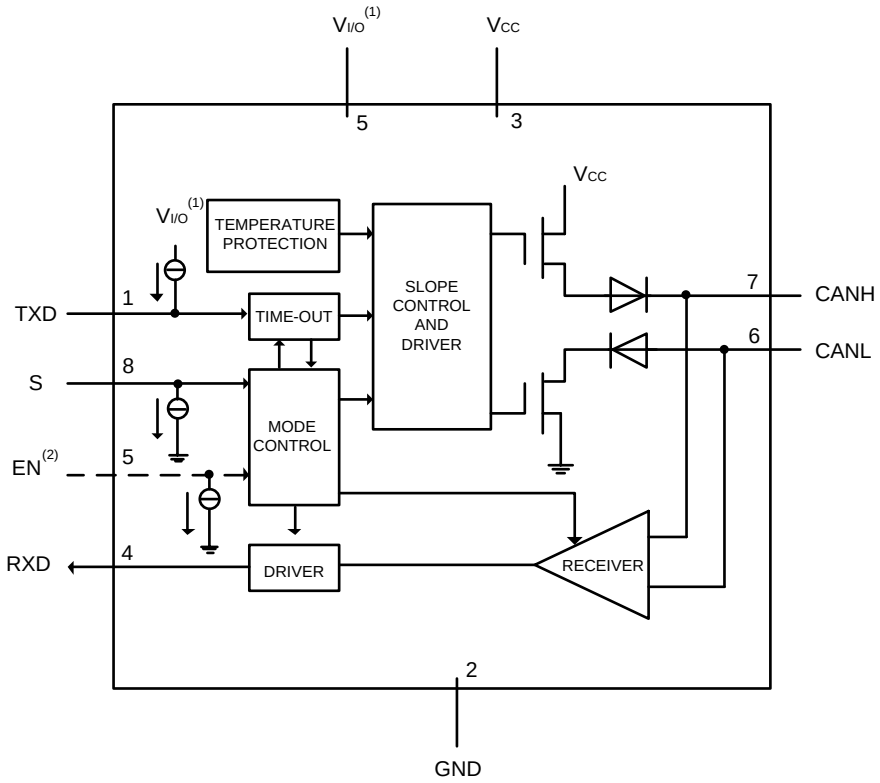


Figure 7-2. CAN FD timing definitions according to ISO 11898-2:2016

8 Detailed Functional Block Diagram



(1) In a transceiver without a V_{IO} pin, the V_{IO} input is internally connected to V_{CC}.
(2) Only present in the UM3851S8E.

Figure 8-1. Block diagram

9 Detailed Description

9.1 Functional Description

The UM3851 is a high-speed CAN stand-alone transceiver with Silent mode. It combines the functionality of transceiver with improved EMC and ESD handling capability. Improved slope control and high DC handling capability on the bus pins provides additional application flexibility. The UM3851 is available in three versions, distinguished only by the function of pin 5:

- The UM3851S8 and UM3851DA allow for direct interfacing to microcontrollers with supply voltages down to 3.3 V
- The UM3851S8E allows the transceiver to be switched to a very low-current Off mode.

9.2 Operating modes

The UM3851 supports two operating modes, Normal and Silent, which are selected via pin S. An additional Off mode is supported in the UM3851S8E via pin EN. See Table 9-1 for a description of the operating modes under normal supply conditions.

9.2 Operating modes (continued)

Table 9-1. Operating modes

Mode	Inputs			Outputs	
	Pin EN (Note 1)	Pin S	Pin TXD	CAN driver	Pin RXD
Normal	HIGH	LOW	LOW	dominant	Active (Note 2)
	HIGH	LOW	HIGH	recessive	Active (Note 2)
Silent	HIGH	HIGH	X (Note 3)	recessive	Active (Note 2)
Off (Note 1)	LOW	X (Note 3)	X (Note 3)	floating	floating

Note 1: Only available on the UM3851S8E.
Note 2: LOW if the CAN bus is dominant, HIGH if the CAN bus is recessive.
Note 3: 'X' = Don't care.

Normal mode： A LOW level on pin S selects Normal mode. In this mode, the transceiver is able to transmit and receive data via the bus lines CANH and CANL (see Figure 8-1 for the block diagram). The differential receiver converts the analog data on the bus lines into digital data which is output to pin RXD. The slopes of the output signals on the bus lines are controlled internally and are optimized in a way that guarantees the lowest possible ElectroMagnetic Emission (EME).

Silent mode： A HIGH level on pin S selects Silent mode. In Silent mode the transmitter is disabled, releasing the bus pins to recessive state. All other IC functions, including the receiver, continue to operate as in Normal mode. Silent mode can be used to prevent a faulty CAN controller from disrupting all network communications.

Off mode： A LOW level on pin EN of UM3851S8E selects Off mode. In Off mode the entire transceiver is disabled, allowing the microcontroller to save power when CAN communication is not required. The bus pins are floating in Off mode, making the transceiver invisible to the rest of the network.

9.3 Fail-Safe Features

TXD dominant time-out function： A 'TXD dominant time-out' timer is started when pin TXD is set LOW. If the LOW state on pin TXD persists for longer than $t_{to(dom)TXD}$, the transmitter is disabled, releasing the bus lines to recessive state. This function prevents a hardware and/or software application failure from driving the bus lines to a permanent dominant state (blocking all network communications). The TXD dominant time-out timer is reset when pin TXD is set HIGH. The TXD dominant time-out time also defines the minimum possible bit rate of 20 kbit/s.

Internal biasing of TXD, S and EN input pins： Pin TXD has an internal pull-up to V_{IO} and pins S and EN (UM3851S8E) have internal pull-downs to GND. This ensures a safe, defined state in case one or more of these pins is left floating.

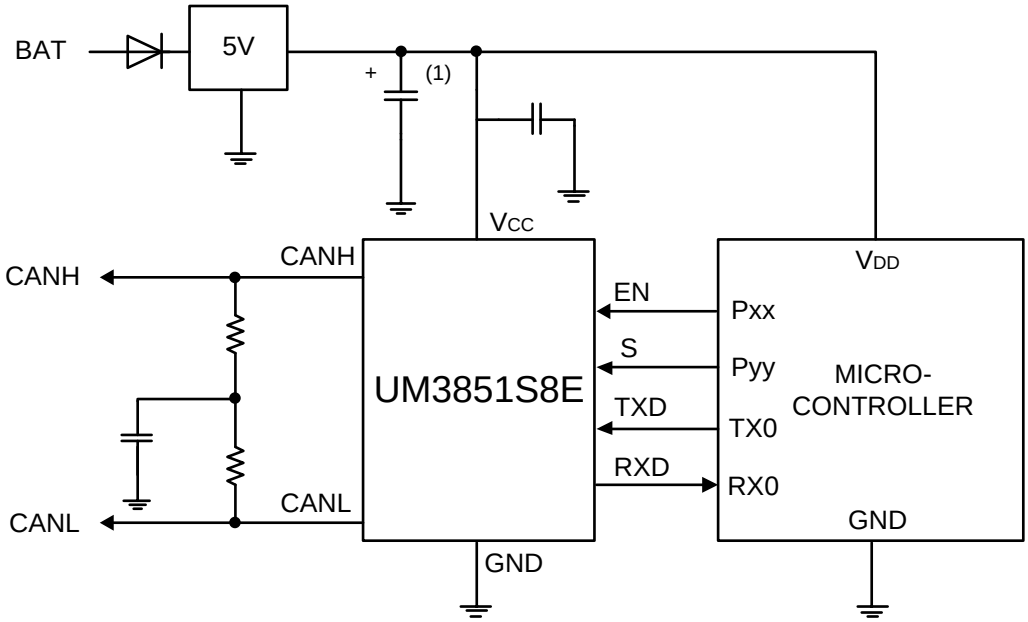
Undervoltage detection on pins V_{CC} and V_{IO}： Should V_{CC} or V_{IO} drop below their respective undervoltage detection levels ($V_{uvd(VCC)}$ and $V_{uvd\ (VIO)}$), the transceiver will switch off and disengage from the bus (zero load) until V_{CC} and V_{IO} have recovered.

Overtemperature protection： The output drivers are protected against overtemperature conditions. If the operating junction temperature exceeds the shutdown junction temperature, $T_{j(sd)}$, the output drivers will be disabled until the operating junction temperature falls below $T_{j(sd)}$ and TXD becomes recessive again. Including the TXD condition ensures that output driver oscillations due to temperature drift are avoided.

V_{IO} supply pin

There are three versions of the UM3851 available, only differing in the function of a single pin. Pin 5 is either an enable control input (EN), a V_{IO} supply pin or is not connected. Pin V_{IO} on the UM3851S8 and UM3851DA should be connected to the microcontroller supply voltage (see Figure 10-2). This will adjust the signal levels of pins TXD, RXD and S to the I/O levels of the microcontroller. For versions of the UM3851 without a V_{IO} pin, the V_{IO} input is internally connected to V_{CC}. This sets the signal levels of pins TXD, RXD and S to levels compatible with 5V microcontrollers.

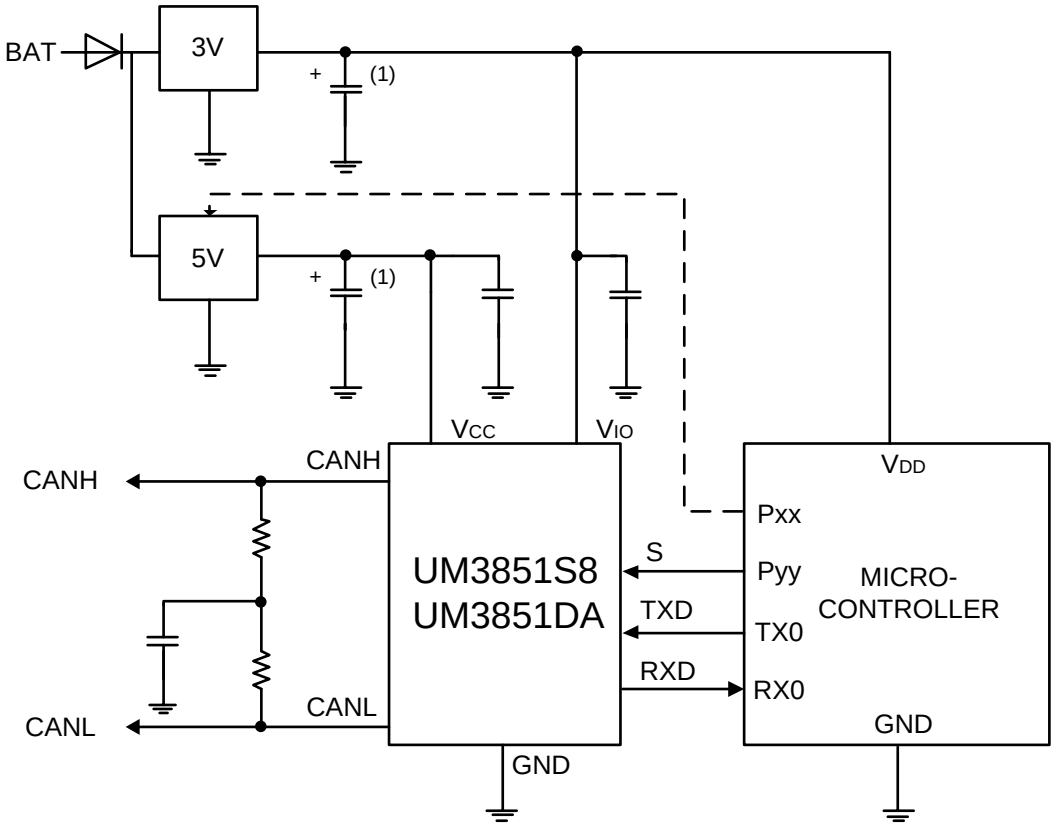
10 Application Information



(1) Optional, depends on regulator.

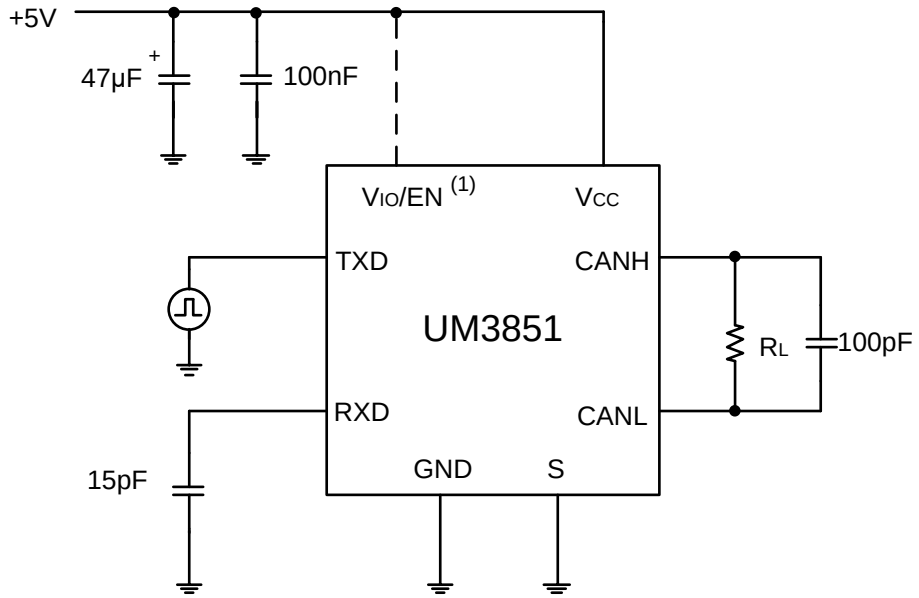
Figure 10-1. Typical application of the UM3851S8E

10 Application Information (continued)



(1) Optional, depends on regulator.

Figure 10-2. Typical application of the UM3851S8 or UM3851DA.



(1) For versions with a V_{IO} pin UM3851S8 or UM3851DA or an EN pin (UM3851S8E), these inputs are connected to pin V_{CC}.

Figure 10-3. Timing test circuit for CAN transceiver

10 Application Information (continued)

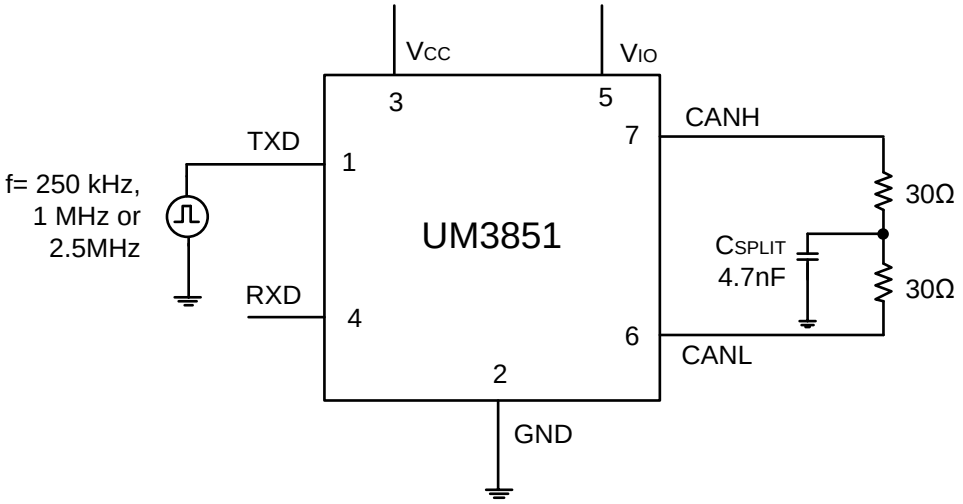
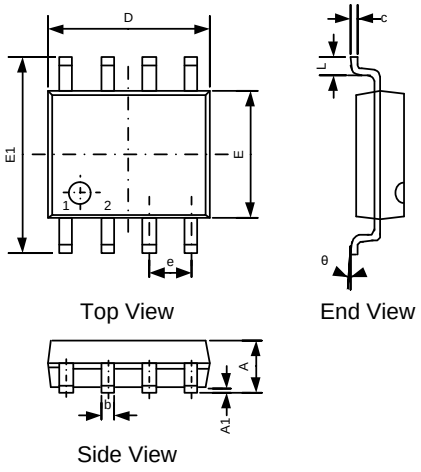


Figure 10-4. Test circuit for measuring transceiver driver symmetry

11 Package Information

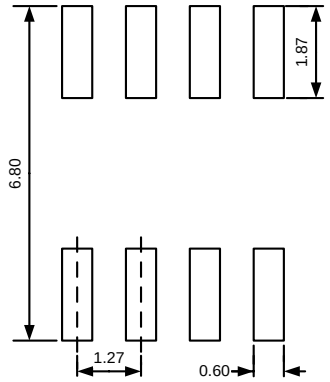
SOP8

Outline Drawing



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	-	-	1.75	-	-	0.069
A1	0.00	-	0.25	0.000	-	0.010
b	0.30	-	0.51	0.012	-	0.020
c	0.15	-	0.25	0.006	-	0.010
D	4.70	4.90	5.10	0.185	0.193	0.200
E	3.70	3.90	4.10	0.148	0.154	0.164
E1	5.80	-	6.25	0.228	-	0.250
e	1.27BSC			0.050 BSC		
L	0.40	-	1.27	0.016	-	0.050
θ	0 °	-	8 °	0 °	-	8 °

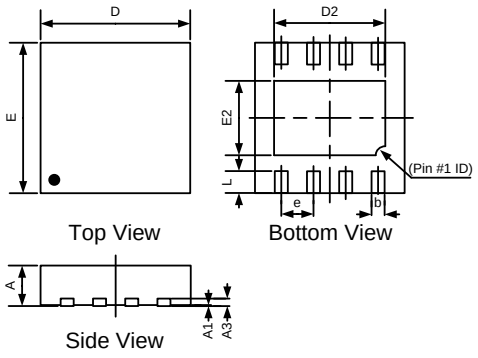
Land Pattern



NOTES:
1. Unit: mm;
2. General tolerance ±0.05mm unless otherwise specified;
3. The layout is just for reference.

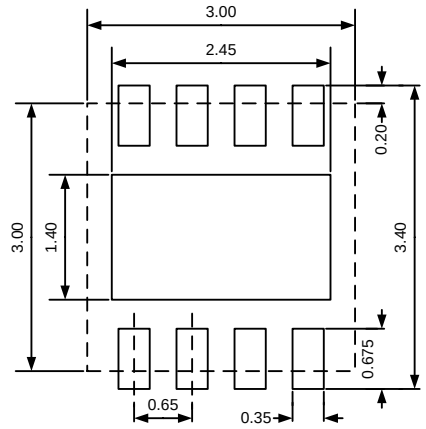
DFN8 3.0×3.0

Outline Drawing



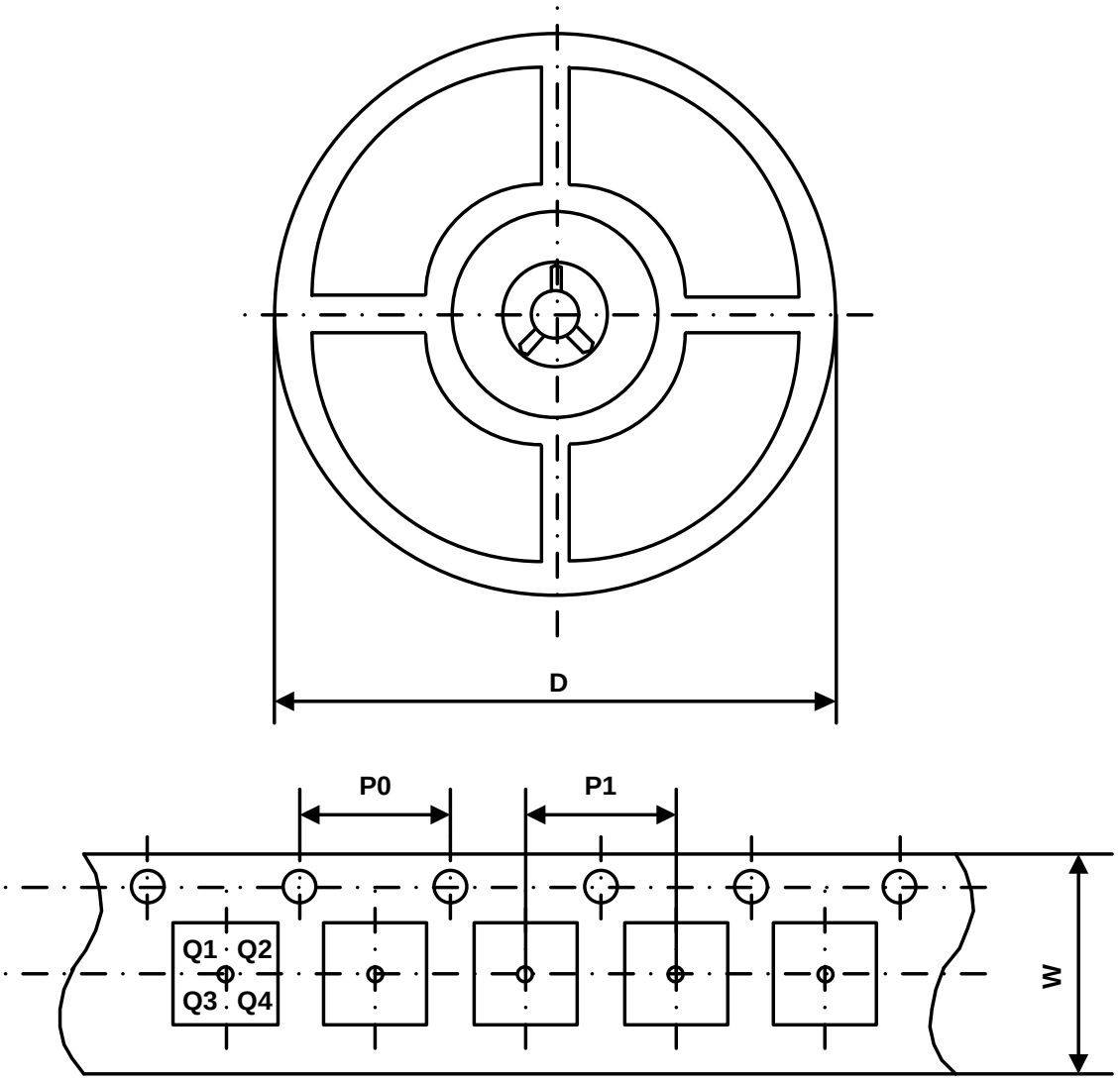
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.57	-	0.80	0.022	-	0.031
A1	0.00	-	0.05	0.000	-	0.002
A3	0.20REF			0.008REF		
b	0.20	-	0.35	0.008	-	0.014
D	2.90	3.00	3.10	0.114	0.118	0.122
D2	2.15	-	2.60	0.085	-	0.104
E	2.90	3.00	3.10	0.114	0.118	0.122
E2	1.40	-	1.75	0.055	-	0.069
e	0.65BSC			0.026BSC		
L	0.30	-	0.60	0.012	-	0.024

Land Pattern



NOTES:
1. Unit: mm;
2. General tolerance ±0.05mm unless otherwise specified;
3. The layout is just for reference.

12 Packing Information



Part Number	Package Type	Carrier Width (W)	Pitch (P0)	Pitch (P1)	Reel Size (D)	PIN 1 Quadrant
UM3851S8S	SOP8	12 mm	4 mm	8 mm	330 mm	Q1
UM3851S8E	SOP8	12 mm	4 mm	8 mm	330 mm	Q1
UM3851S8	SOP8	12 mm	4 mm	8 mm	330 mm	Q1
UM3851DA	DFN8 3.0×3.0	12 mm	4 mm	8 mm	330 mm	Q1

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