低供电电流，3 V至5.5V、250 kbps，3发/5收
具备增强ESD保护功能的智能型 RS-232 收发器

UM3243EEAS/UM3243EEASR/
UM3243EEUS/UM3243EESS/UM3243EEQA

描述

UM3243系列是电源电压为+3V至+5.5V，包含3个发射器和5个接收器的RS-232收发器，具有自动断电和低供电电流的特点。当接收器输入端没有检测到有效的RS-232电平信号时，电荷泵电路和驱动器将断电。断开RS-232电缆或关闭所连外围设备的发射器电源也将进入关断模式。当任何一个RS-232接收器输入端被施加有效电平时，芯片将再次开启。自动关断模式有助于在不改变现有系统的情况下节省电能。

UM3243收发器采用稳压非连续模式两倍电荷泵电源和低压差发射器，+3V至+5.5V电压单电源提供真正的RS-232性能，并确保数据传输速率为250kbps。

UM3243在3.3V工作电压下只需四个0.1μF电容器，并可在+2.7V至+5.5V输入电压范围内工作。这些器件非常适合需要标准的RS-232性能的3.3V系统、3.3V和5.0V混合系统或5.0V系统，并且在电源电压低至2.7V时，能够提供符合EIA/TIA-562标准的±3.7V电压。

UM3243包括一个始终有效的同相接收器。该接收器可在关机状态下监控外设（如调制解调器）。UM3243还包括一个始终有效的$\overline{\text{INVALID}}$输出，用于指示接收器输入上RS-232的有效信号电平和唤醒UART。UM3243还具有增强ESD保护功能，能够耐受±8kV 人体放电模式和±8kV IEC61000-4-2接触放电。

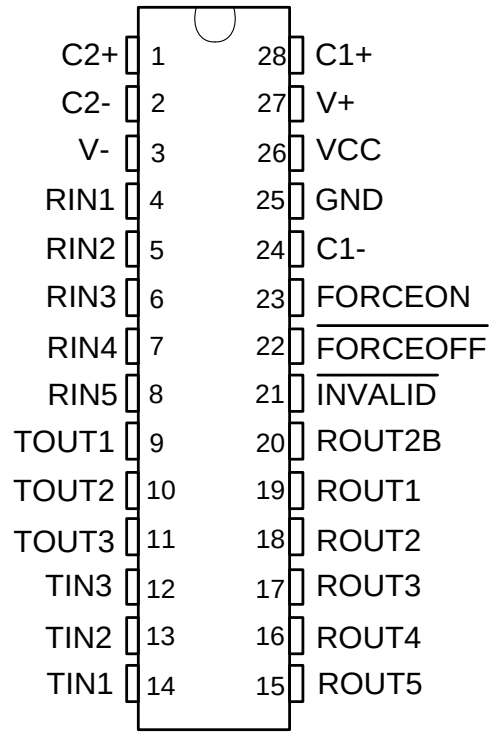
应用

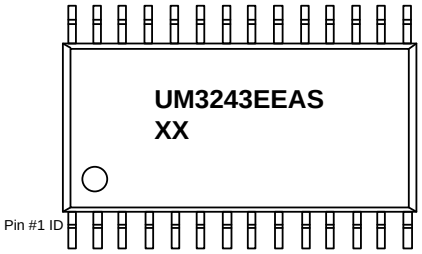
- 工业控制器和仪器仪表
- 笔记本电脑、掌上电脑和便携式电脑
- 网络路由器和交换机
- 外设
- 打印机、PDA和POS

特性

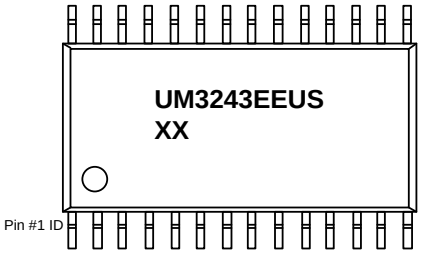
- 通过+3.0V至+5.5V电源供电，符合真正的 EIA/TIA-232-F标准
- 在电源电压低至2.7V时，提供符合EIA/TIA-562标准的±3.7V电压
- 自动关断功能，在没有检测到有效RS-232信号时禁用驱动器输出
- 250kbps最小传输速率
- 低关断电流：0.1μA（典型值）
- 在3.3V电源电压下，接受5V逻辑输入
- 闩锁性能(Latch-Up)超过200mA
- RS-232总线引脚具备增强ESD保护：
  ±8kV，人体放电模型
  ±8kV，IEC61000-4-2 接触放电
- 采用 SSOP28、TSSOP28、SOP28 和 QFN32 封装

Pin Configurations

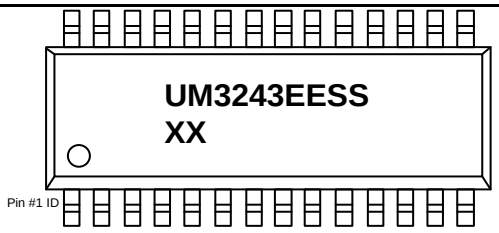




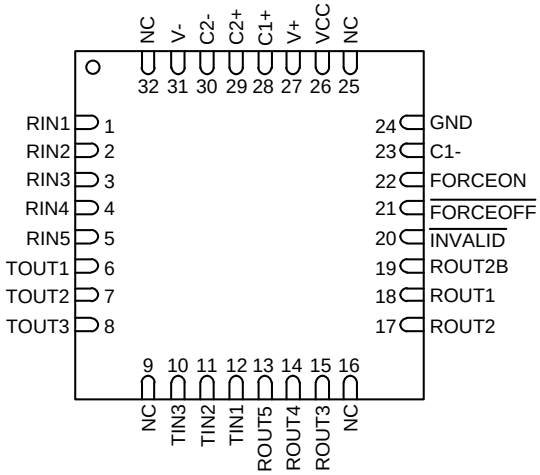
XX: Week Code
UM3243EEAS/UM3243EEASR
SSOP28

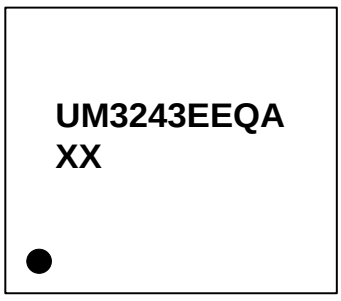


XX: Week Code
UM3243EEUS
TSSOP28



XX: Week Code
UM3243EESS
SOP28





XX: Week Code
UM3243EEQA
QFN32 5.0×5.0

Pin Description

Pin No.		Pin Name	Function
UM3243EEAS/EEASR/ EEUS/EESS	UM3243EEQA		
1	29	C2+	Positive Terminal of Inverting Charge-Pump Capacitor
2	30	C2-	Negative Terminal of Inverting Charge-Pump Capacitor
3	31	V-	Negative Voltage Generated by the Charge Pump
4-8	1-5	RIN_	RS-232 Receiver Inputs
9, 10, 11	6, 7, 8	TOUT_	RS-232 Transmitter Outputs
12, 13, 14	10, 11, 12	TIN_	TTL/CMOS Transmitter Inputs
15-19	13, 14, 15, 17, 18	ROUT_	TTL/CMOS Receiver Outputs
20	19	ROUT2B	Non-Inverting Receiver Output—active in Power-Off
21	20	$\overline{\text{INVALID}}$	Output of the Valid Signal Detector. $\overline{\text{INVALID}}$ is enabled high if a valid RS-232 level is present on any receiver inputs.
22	21	$\overline{\text{FORCEOFF}}$	Drive low to shut down transmitters and on-board power supply. This overrides all Automatic circuitry and FORCEON (See Function Tables).
23	22	FORCEON	Drive high to override automatic circuitry keeping transmitters on (FORCEOFF must be high) (See Function Tables).
24	23	C1-	Negative Terminal of the Voltage Doubler Charge-Pump Capacitor
25	24	GND	Ground
26	26	V_{CC}	+3.0V to +5.5V Supply Voltage
27	27	V+	Positive Voltage Generated by the Charge Pump
28	28	C1+	Positive Terminal of the Voltage Doubler Charge-Pump Capacitor
-	9, 16, 25, 32	NC	Not connected.

Ordering Information

Part Number	Temp. Range	Package Type	Shipping Qty
UM3243EEAS	-40℃ to +85℃	SSOP28	48pcs/Tube
UM3243EEASR	-40℃ to +85℃	SSOP28	2000pcs/13Inch Tape & Reel
UM3243EEUS	-40℃ to +85℃	TSSOP28	3000pcs/13Inch Tape & Reel
UM3243EESS	-40℃ to +85℃	SOP28	25pcs/Tube
UM3243EEQA	-40℃ to +85℃	QFN32 5.0×5.0	3000pcs/13Inch Tape & Reel

Absolute Maximum Ratings (Note 1)

Symbol	Parameter		Value	Unit
V_{CC}	Supply Voltage on V_{CC}		-0.3 to +6	V
V_+	Voltage on V_+		(V_{CC}-0.3) to +7.5	V
V_-	Voltage on V_-		-7.5 to +0.3	V
	Voltage on TIN_, $\overline{\text{FORCEOFF}}$, FORCEON		-0.3 to +6V	V
	Voltage on ROUT_, $\overline{\text{INVALID}}$, ROUT2B		-0.3 to (V_{CC}+0.3)	V
	Voltage on RIN_		±30	V
	Voltage on TOUT_		(V_--0.3) to (V_++0.3)	V
	Short-Circuit Duration, TOUT_ to GND		Continuous	
P_D	Continuous Power Dissipation at T_A=70℃	SSOP28	762	mW
		TSSOP28	696	
		SOP28	1000	
		QFN32	1500	
T_A	Operating Temperature Range		-40 to +85	℃
T_{STG}	Storage Temperature Range		-65 to +165	℃
T_L	Maximum Lead Temperature for Soldering 10 Seconds		+300	℃

Note 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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics

(V_{CC}=+3.0V to +5.5V, C1- C4=0.1μF, T_A=T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A=25℃)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
DC CHARACTERISTICS (V_{CC}=+3.3V or +5V, T_A=25℃)							
Supply Voltage		V_{CC}=3.3V		3.0	3.3	3.6	V
		V_{CC}=5.0V		4.5	5.0	5.5	
Supply Current, Auto Power-Off	I_{CC}	All RIN_ Open, $\overline{FORCEON}$=GND, $\overline{FORCEOFF}$=V_{CC}			0.1	10	μA
Supply Current, Forced Power-Off		$\overline{FORCEOFF}$=GND			0.1	10	μA
Supply Current, Normal		FORCEON=FORCEOFF=V_{CC}, Other Input NC, All Outputs with No Load			0.6	1.0	mA
LOGIC INPUTS							
Input Logic Threshold Low		TIN_, FORCEON, $\overline{FORCEOFF}$				0.8	V
Input Logic Threshold High		TIN_, FORCEON, $\overline{FORCEOFF}$	V_{CC}=3.3V	2.0			V
			V_{CC}=5.0V	2.4			
Input Hysteresis	V_{hys}				0.2		V
Input Leakage Current	I_{IL}	FORCEON, $\overline{FORCEOFF}$			±0.01	±1.0	μA
		TIN_	Transmitter Disabled		±0.01	±1.0	μA
			Transmitter Enabled		±1	±5	μA
LOGIC OUTPUTS							
Output Voltage Low	V_{OL}	$\overline{INVALID}$, ROUT2B, ROUT_	I_{OL}=1.6mA			0.4	V
Output Voltage High	V_{OH}		I_{OH}=-1.0mA	V_{CC}-0.6	V_{CC}-0.1		V
Output Leakage Current	I_{OL}	ROUT_	Receivers Disabled, Connected to V_{CC} or GND		±0.05	±10	μA

Electrical Characteristics (Continued)

(V_{CC}=+3.0V to +5.5V, C1- C4=0.1μF, T_A=T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A=25℃)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
RECEIVER INPUTS							
Input Voltage Range				-30		30	V
Input Threshold Low		RIN_	V_{CC}=3.3V	0.8	1.15		V
			V_{CC}=5.0V	0.8	1.55		
Input Threshold High			V_{CC}=3.3V		1.35	2	V
			V_{CC}=5.0V		1.75	2	
Input Hysteresis	V_{hys}				0.2		V
Input Resistance	R_i	T_A=+25℃		3	5	7	kΩ
TRANSMITTER OUTPUTS							
Output Voltage Swing	V_{OUT}	All Transmitter Outputs Loaded with 3kΩ to Ground		±5.0	±5.4		V
Output Short-Circuit Current	I_{OS}	Short to V_{CC} , GND or Other TXD Pin	V_{CC}=3.3V		±20	±40	mA
			V_{CC}=5.0V		±30	±50	mA
Output Leakage Current	I_{OL}	Transmitter Disabled, Connected to V+ or V-			±1	±10	μA

Electrical Characteristics (Continued)

(V_{CC}=+3.0V to +5.5V, C1- C4=0.1μF, T_A=T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A=25℃)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
TIMING CHARACTERISTICS							
Maximum Data Rate		R_L=3kΩ to 7kΩ, C_L=50pF to 1000pF, One Transmitter Switching			250		kbps
Receiver Propagation Delay	t_{PLH}, t_{PHL}	C_L=150pF Figure 4	All Parts, Normal Operation		0.15		μs
Receiver Skew	$\lvert t_{PHL}-t_{PLH} \rvert$					0.1	μs
Receiver Output Enable Time	t_{EN}	C_L=150pF, R_L=3kΩ Figure 5				0.2	μs
Receiver Output Disable Time	t_{DIS}					0.2	μs
Transmitter Propagation Delay	t_{PLH}, t_{PHL}	R_L=3kΩ, C_L=2500pF, All Transmitters Loaded Figure 3			1.3		μs
Transmitter Skew	$\lvert t_{PHL}-t_{PLH} \rvert$					0.25	μs
Transition-Region Slew Rate	SR(tr)	T_A=+25℃, V_{CC}=3.3V, R_L=3kΩ to 7kΩ, C_L=50pF to 1000pF, Measured from -3V to +3V or +3V to -3V, Figure 2		5	15	30	V/μs
ESD AND LATCH UP PERFORMANCE							
RIN_, TOUT_ ESD-Protection Voltage		Human Body Model			±8		kV
		IEC61000-4-2, Contact Discharge			±8		
Other Pins ESD-Protection Voltage		Human Body Model			±2		kV
Latch Up Performance		JEDEC Standard No.78D			±200		mA

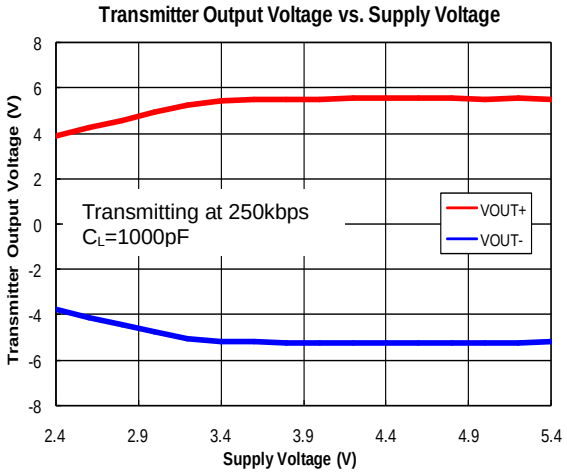
Auto Power-Off Electrical Characteristics

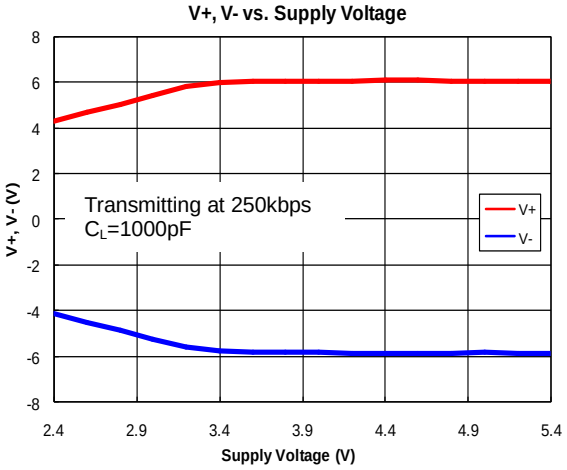
Over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (Figure 6)

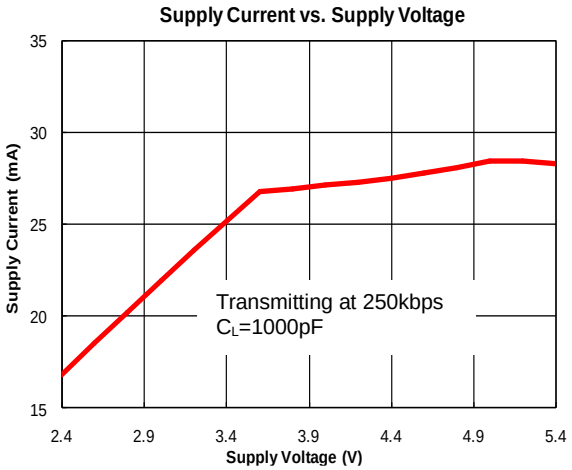
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Receiver Input Positive Threshold to INVALID Output High	$V_{IT+(valid)}$	FORCEON=GND, FORCEOFF=V_{CC}			2.7	V
Receiver Input Negative Threshold to INVALID Output High	$V_{IT-(valid)}$	FORCEON=GND, FORCEOFF=V_{CC}	-2.7			V
Receiver Input Threshold to INVALID Output Low	$V_{T(invalid)}$	FORCEON=GND, FORCEOFF=V_{CC}	-0.3		0.3	V
Receiver Positive or Negative Threshold to INVALID High	t_{valid}	FORCEON=GND, FORCEOFF=V_{CC}, V_{CC}=5V, Figure 6		1		μs
Receiver Positive or Negative Threshold to INVALID Low	$t_{invalid}$	FORCEON=GND, FORCEOFF=V_{CC}, V_{CC}=5V, Figure 6		30		μs
Receiver Edge to Charge Pump Setup	t_{en}	FORCEON=GND, FORCEOFF=V_{CC}, V_{CC}=5V, Figure 6		150		μs

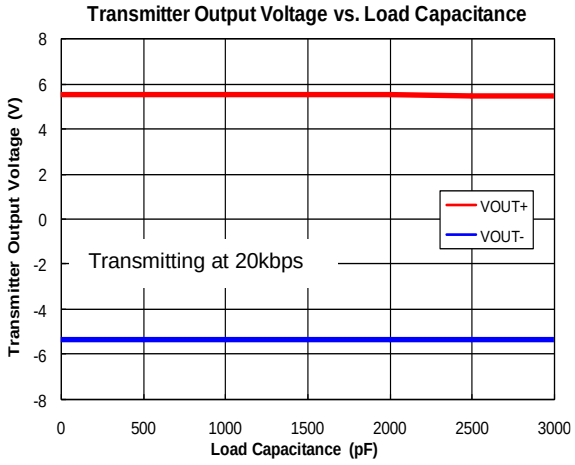
Typical Operating Characteristics

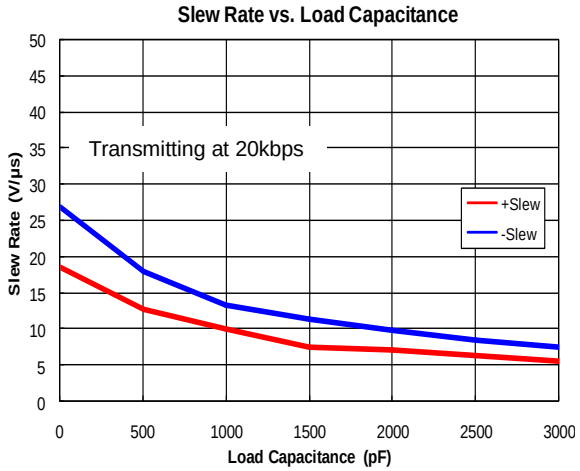
(V_{CC}=+3.3V, 0.47μF capacitors, all transmitters loaded with 3kΩ and C_L, T_A=25℃, unless otherwise noted.)

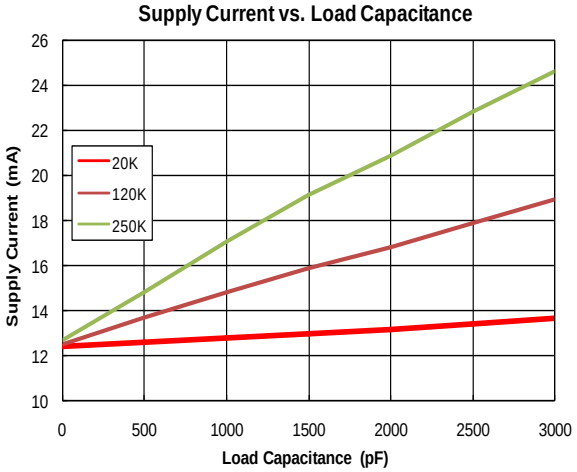





Supply Current vs. Supply Voltage
Supply Current (mA)
35
30
25
20
15
2.4
2.9
3.4
3.9
4.4
4.9
5.4
Supply Voltage (V)
Transmitting at 250kbps
CL=1000pF

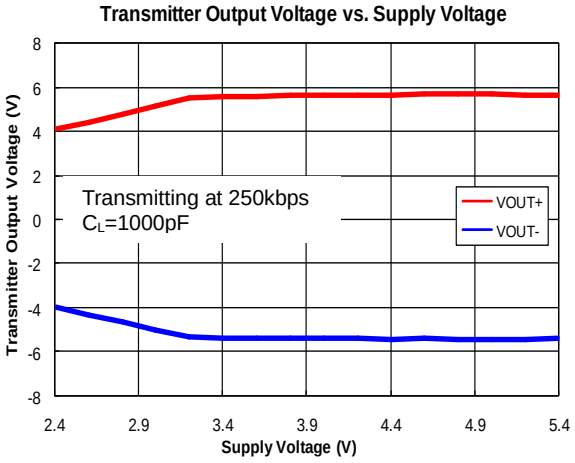

Transmitter Output Voltage vs. Load Capacitance
Transmitter Output Voltage (V)
8
6
4
2
0
-2
-4
-6
-8
0
500
1000
1500
2000
2500
3000
Load Capacitance (pF)
VOUT+
VOUT-
Transmitting at 20kbps

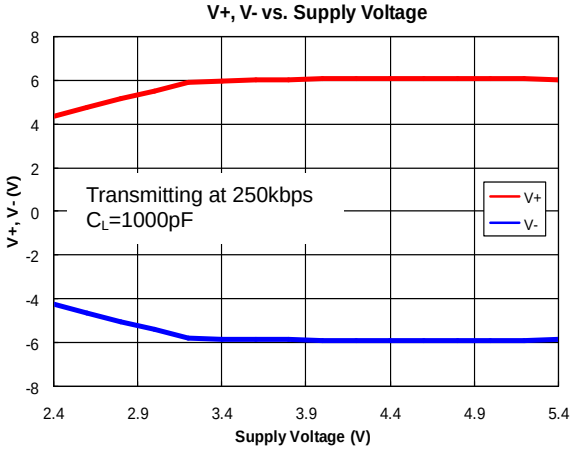

Slew Rate vs. Load Capacitance
Slew Rate (V/μs)
50
45
40
35
30
25
20
15
10
5
0
0
500
1000
1500
2000
2500
3000
Load Capacitance (pF)
Transmitting at 20kbps
+Slew
-Slew


Supply Current vs. Load Capacitance
Supply Current (mA)
26
24
22
20
18
16
14
12
10
0
500
1000
1500
2000
2500
3000
Load Capacitance (pF)
20K
120K
250K

Typical Operating Characteristics (Continued)

(V_{CC}=+3.3V, 250kbps data rate, 0.47μF capacitors, all transmitters loaded with 5kΩ and C_L, T_A=25℃, unless otherwise noted.)





Function Tables

Table 1. Each Transmitter (Note 2)

INPUTS				OUTPUT	TRANSMITTER STATUS
TIN	FORCEON	$\overline{\text{FORCEOFF}}$	VALID RIN RS-232 LEVEL	TOUT	
X	X	L	X	Z	Forced Power-Off
L	H	H	X	H	Normal Operation with Forced Power-On
H	H	H	X	L	
L	L	H	Yes	H	Normal Operation with Auto Power-On
H	L	H	Yes	L	
X	L	H	No	Z	Auto Power-Off

Note 2: H=high level, L=low level, X=irrelevant, Z=high impedance

Table 2. Each Receiver (Note 3)

INPUTS			OUTPUT	RECEIVER STATUS
RIN	FORCEON	$\overline{\text{FORCEOFF}}$	ROUT	
X	X	L	Z	Forced Power-Off
L	X	H	H	Normal Operation
H	X	H	L	
Open	X	H	H	

Table 3. ROUT2B and Outputs $\overline{\text{INVALID}}$ (Note 3)

INPUTS				OUTPUTS		OUTPUT STATUS
VALID RIN RS-232 LEVEL	RIN2	FORCEON	$\overline{\text{FORCEOFF}}$	$\overline{\text{INVALID}}$	ROUT2B	
Yes	L	X	X	H	L	Always Active
Yes	H	X	X	H	H	
Yes	Open	X	X	H	L	
No	Open	X	X	L	L	

Note 3: H=high level, L=low level, X=irrelevant, Z=high impedance (off), Open=input disconnected or connected driver off

Logic Diagram

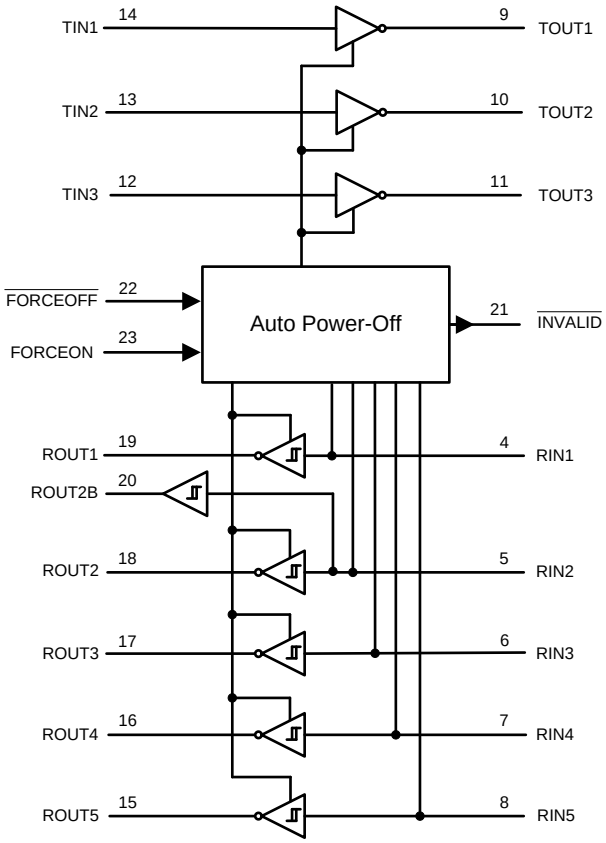
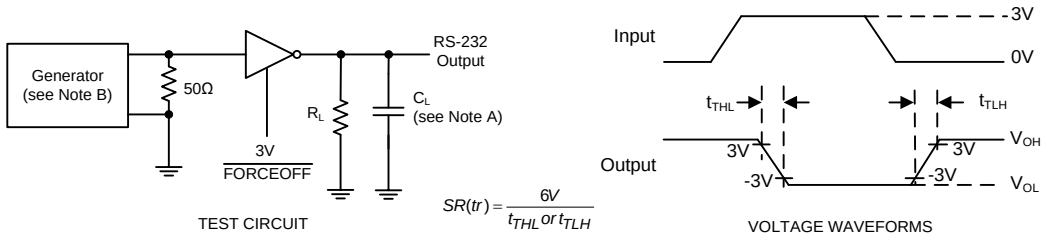


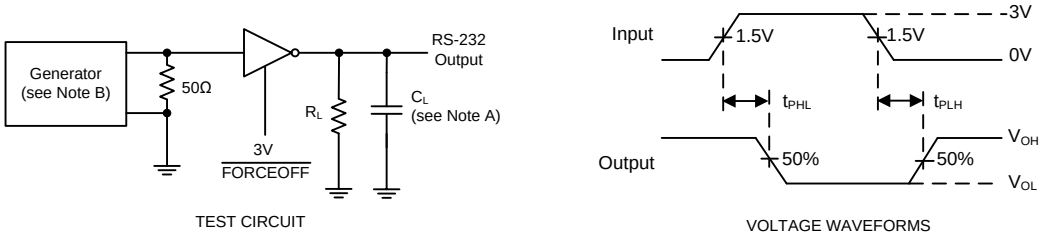
Figure 1

Parameter Measurement Information



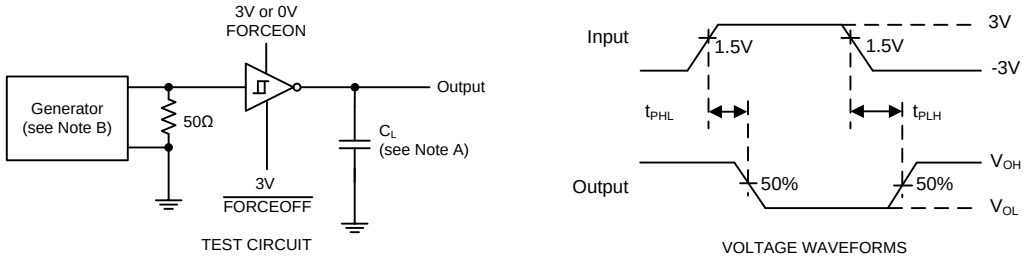
NOTES: A. C_L includes probe and jig capacitance.
B. The pulse generator has the following characteristics: Z_O=50Ω, 50% duty cycle, t_r≤10ns, t_f≤10ns.

Figure 2. Transmitter Slew Rate



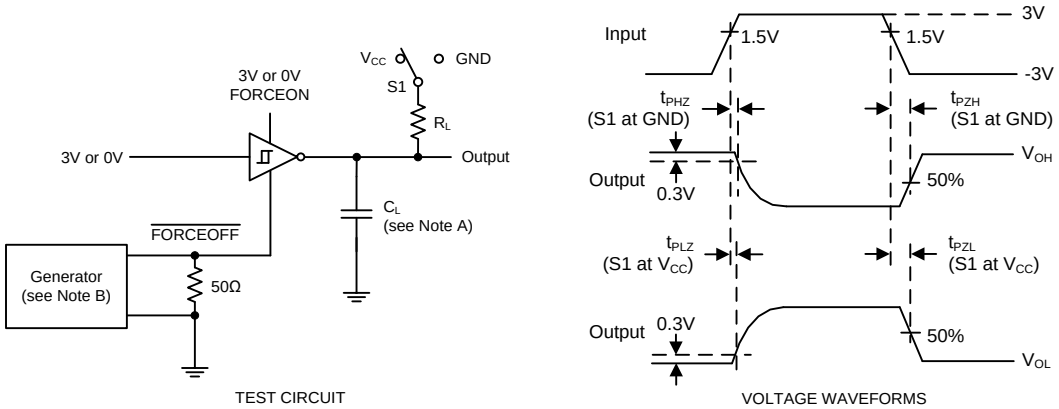
NOTES: A. C_L includes probe and jig capacitance.
B. The pulse generator has the following characteristics: PRR=250kbit/s, Z_O=50Ω, 50% duty cycle, t_r≤10ns, t_f≤10ns.

Figure 3. Transmitter Pulse Skew



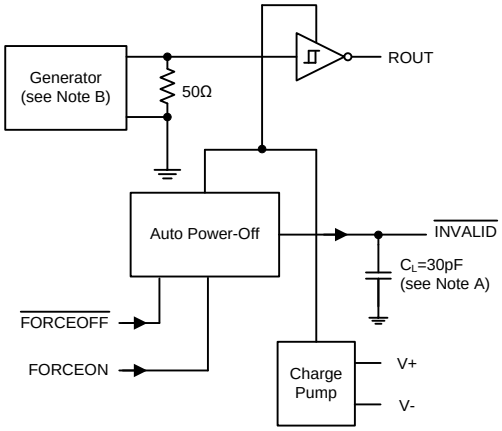
NOTES: A. C_L includes probe and jig capacitance.
B. The pulse generator has the following characteristics: Z_O=50Ω, 50% duty cycle, t_r≤10ns, t_f≤10ns.

Figure 4. Receiver Propagation Delay Times

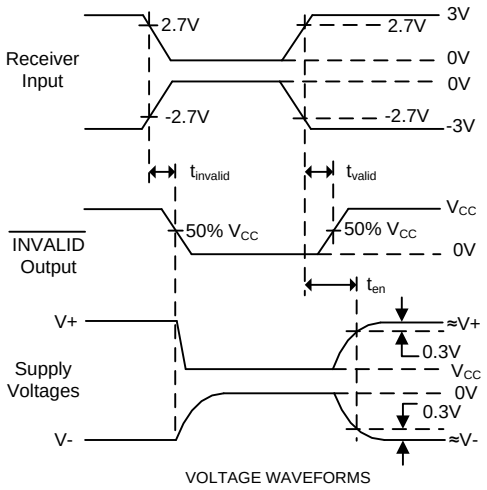


NOTES: A. C_L includes probe and jig capacitance.
B. The pulse generator has the following characteristics: Z_O=50Ω, 50% duty cycle, t_r≤10ns, t_f≤10ns.
C. t_{PLZ} and t_{PHZ} are the same as t_{dis}.
D. t_{PZL} and t_{PZH} are the same as t_{en}.

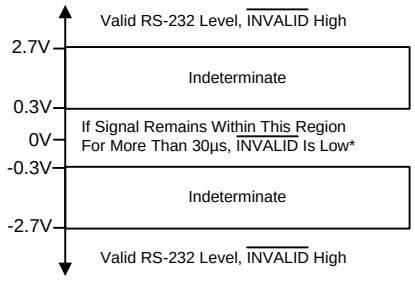
Figure 5. Receiver Enable and Disable Times



TEST CIRCUIT



VOLTAGE WAVEFORMS



* Auto Power-Off disables transmitters and reduces supply current to 1µA.

NOTES: A. C_L includes probe and jig capacitance.
B. The pulse generator has the following characteristics: PRR=5kbit/s, Z_O=50Ω, 50% duty cycle, $t_r \leqslant 10$ns, $t_f \leqslant 10$ns.

Figure 6. $\overline{\text{INVALID}}$ Propagation Delay Times and Supply Enabling Time

Typical Operating Circuits

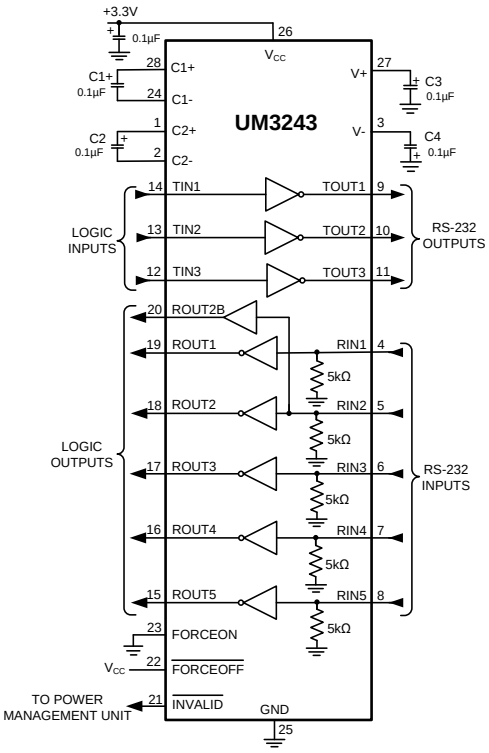


Figure 7

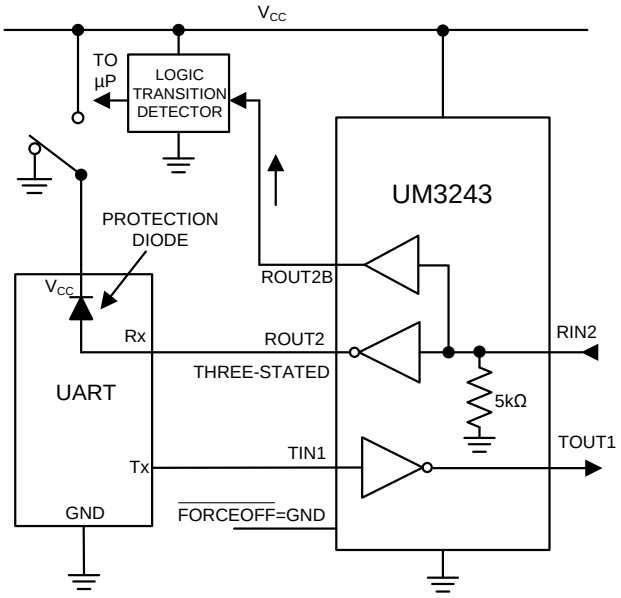
Application Information

RS-232 Receivers

The UM3243's receivers convert RS-232 signals to CMOS-logic output levels. All receivers have inverting three-state outputs and can be active or inactive. The UM3243's receivers are high-impedance when the part is in Forced Power-Off mode ($\overline{\text{FORCEOFF}}$=low).

The UM3243 features an always-active complementary output (ROUT2B). ROUT2B monitors receiver activity while the other receivers are high-impedance. This allows Ring Indicator to be monitored without forward biasing other devices connected to the receiver outputs. This is ideal for systems where V_{CC} drops to 0 in Power-Off to accommodate peripherals such as UARTs (Figure 8).

The UM3243 features an $\overline{\text{INVALID}}$ output that is enabled low when no valid RS-232 signal levels have been detected on all receiver inputs. $\overline{\text{INVALID}}$ is functional in any mode (Figure 6).



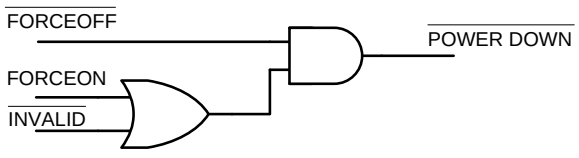
UM3243: In Power-Off, ROUT2B is used to monitor external devices and ROUT2 is three-stated, eliminating a current path through the UART's protection diode.

Figure 8. The UM3243 detects RS-232 activity when the UART and interface are powered off.

Auto Power-Off and Wakeup

The UM3243 achieves a 0.1µA supply current Auto Power-Off feature, which operates when FORCEON is low and $\overline{\text{FORCEOFF}}$ is high. When the device senses no valid signal levels on all receiver inputs for $t_{invalid}$ time (typically 30µs), the onboard charge pump and drivers are powered off, reducing supply current to 0.1µA. This occurs if the RS-232 cable is disconnected or the connected peripheral transmitters are turned off. The device turns on again when a valid level is applied to any RS-232 receiver input for t_{valid} time (typically 1µs). The charge pump will set up after t_{en} time (typically 150µs). As a result, the system saves power without changes to the existing system.

Table 3 and Figure 9 summarize the UM3243 operating modes. FORCEON and $\overline{\text{FORCEOFF}}$ override Auto Power-Off. When neither control is asserted, the IC will select between these states automatically, based on receiver input levels. Figure 6 depicts valid and invalid RS-232 receiver levels and timing diagram for Auto Power-Off operation.



$\overline{\text{INVALID}}$ is an internally generated signal that is used by the Auto Power-Off logic and appears as an output of the device.

$\overline{\text{POWER DOWN}}$ is only an internal signal. It controls the operational status of the transmitters and the power supplies.

Figure 9. UM3243 Auto Power-Off Logic

RS-232 Transmitters

The transmitters are inverting level translators that convert CMOS-logic levels to EIA/TIA-232 levels. They guarantee a 250kbps data rate with worst-case loads of 3kΩ in parallel with 1000pF, providing compatibility with PC-to-PC communication software. Transmitters can be paralleled to drive multiple receivers. In Power-Off mode (See Table 1), the transmitters are disabled and the outputs are forced into a high-impedance state.

Dual Charge Pump Voltage Converter and Capacitor Selection

The UM3243's internal power supply consists of a regulated dual charge pump that provides output voltages of +6V (doubling charge pump) and -6V (inverting charge pump), over the +3.0V to +5.5V V_{CC} range. The charge pump operates in discontinuous mode: if the output voltage is less than 6V, the charge pump is enabled; if the output voltage exceeds 6V, the charge pump is disabled. The charge pump requires a flying capacitor (C1, C2) and a reservoir capacitor (C3, C4) to generate the V+ and V- supplies.

The capacitor type used for C1–C4 is not critical for proper operation; either polarized or non-polarized capacitors may be used. The charge pump requires 0.1μF capacitors for 3.3V operation. For other supply voltages, refer to Table 4 for required capacitor values. Do not use values smaller than those listed in Table 4. Increasing the capacitor values (e.g., by a factor of 2) reduces ripple on the transmitter outputs and slightly reduces power consumption. When using the minimum required capacitor values, make sure the capacitor value does not degrade excessively with temperature. If in doubt, use capacitors with a larger nominal value. The capacitor's equivalent series resistance (ESR) usually rises at low temperatures and influences the amount of ripple on V+ and V-.

Table 4. Required Capacitor Values

V_{CC} (V)	C1, C2, C3, C4 (μF)
3.15 to 3.6	0.1
4.5 to 5.5	0.1
3.0 to 5.5	0.47
2.4 to 3.0	0.47

High Data Rates

The UM3243 maintains the RS-232 ±5.0V minimum transmitter output voltage even at high data rates. Figure 10 shows a transmitter loopback test circuit. Figure 11 shows a loopback test result at 120kbps, and Figure 12 shows the same test at 250kbps. For Figure 11, all three transmitters were driven simultaneously at 120kbps into RS-232 loads in parallel with 1000pF. For Figure 12, a single transmitter was driven at 250kbps, and all three transmitters were loaded with an RS-232 receiver in parallel with 1000pF.

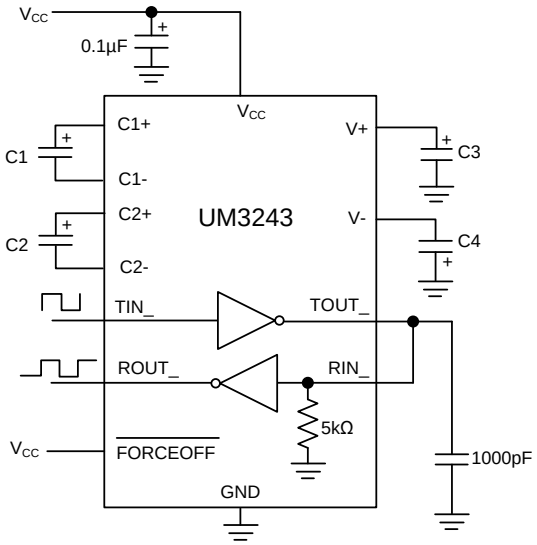


Figure 10. Loopback Test Circuit

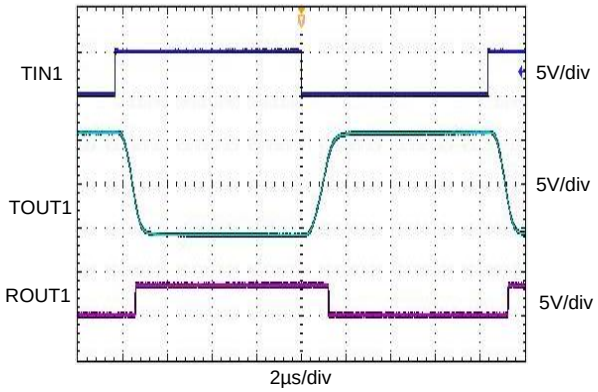


Figure 11. Loopback Test Result at 120kbps

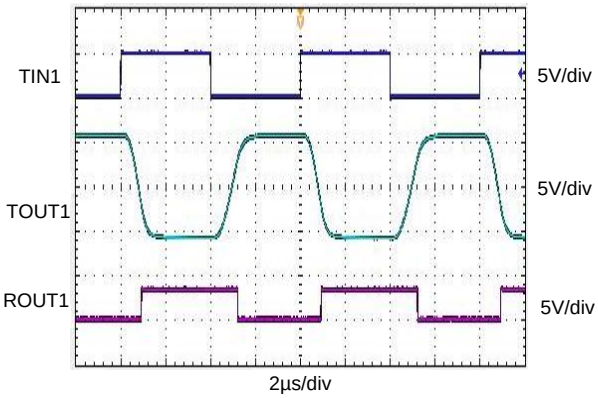
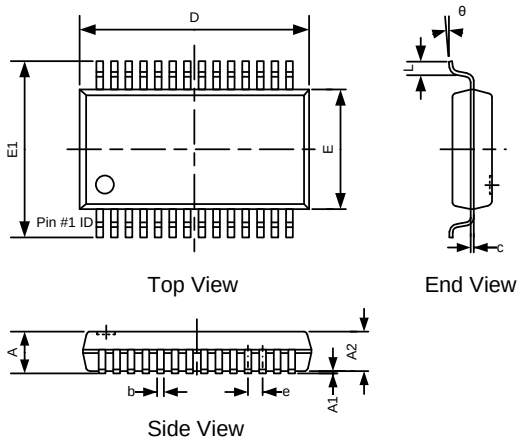


Figure 12. Loopback Test Result at 250kbps

Package Information

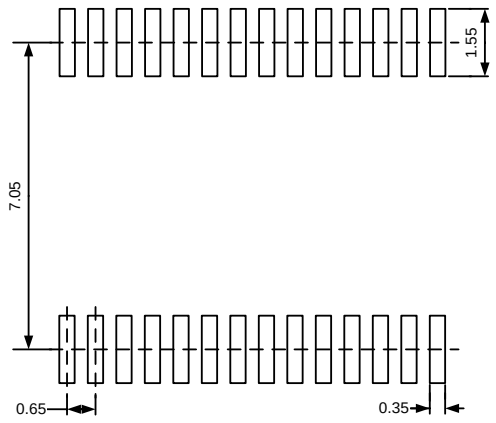
SSOP28

Outline Drawing



Symbol	DIMENSIONS					
	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	-	-	2.00	-	-	0.079
A1	0.05	-	-	0.002	-	-
A2	1.65	1.75	1.85	0.065	0.069	0.073
b	0.22	0.30	0.38	0.009	0.012	0.015
c	0.09	0.17	0.25	0.004	0.007	0.010
D	9.90	10.20	10.50	0.390	0.402	0.413
E	5.00	5.30	5.60	0.197	0.209	0.220
E1	7.40	7.80	8.20	0.291	0.307	0.323
e	0.65BSC			0.026BSC		
L	0.55	0.75	0.95	0.022	0.030	0.037
θ	0 °	-	8 °	0 °	-	8 °

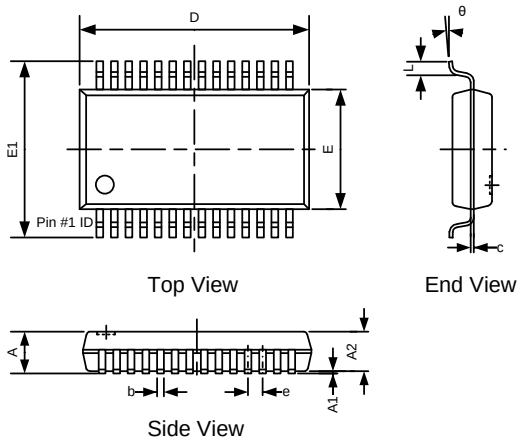
Land Pattern



NOTES:
1. Compound dimension: 10.20×5.30;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

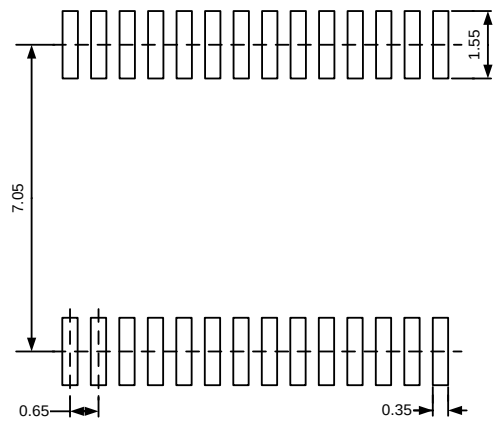
SSOP28

Outline Drawing



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	-	-	2.00	-	-	0.079
A1	0.05	-	-	0.002	-	-
A2	1.65	1.75	1.85	0.065	0.069	0.073
b	0.22	0.30	0.38	0.009	0.012	0.015
c	0.09	0.17	0.25	0.004	0.007	0.010
D	9.90	10.20	10.50	0.390	0.402	0.413
E	5.00	5.30	5.60	0.197	0.209	0.220
E1	7.40	7.80	8.20	0.291	0.307	0.323
e	0.65BSC			0.026BSC		
L	0.55	0.75	0.95	0.022	0.030	0.037
θ	0 °	-	8 °	0 °	-	8 °

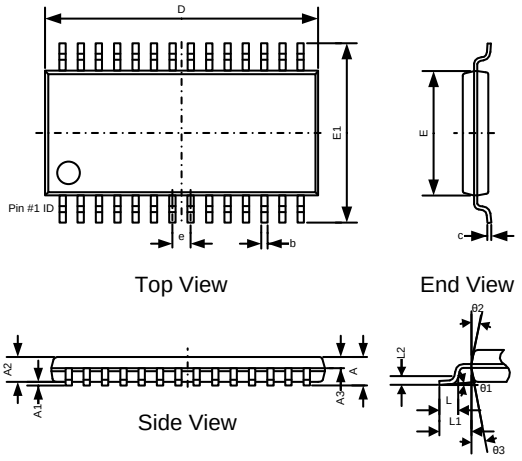
Land Pattern



NOTES:
1. Compound dimension: 10.20×5.30;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

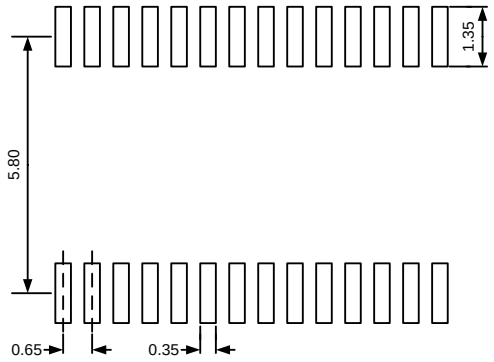
TSSOP28

Outline Drawing



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	-	-	1.20	-	-	0.047
A1	0.05	-	0.15	0.002	-	0.006
A2	0.80	-	1.05	0.031	-	0.041
A3	0.34	0.44	0.54	0.013	0.017	0.021
b	0.19	-	0.30	0.007	-	0.012
c	0.09	-	0.20	0.004	-	0.008
D	9.60	9.70	9.80	0.378	0.382	0.386
E	4.30	4.40	4.50	0.169	0.173	0.177
E1	6.20	6.40	6.60	0.244	0.252	0.260
e	0.65BSC			0.026BSC		
L	0.45	0.60	0.75	0.018	0.024	0.030
L1	1.00REF			0.039REF		
L2	0.25BSC			0.010BSC		
θ1	0°	-	8°	0°	-	8°
θ2	10°	12°	14°	10°	12°	14°
θ3	10°	12°	14°	10°	12°	14°

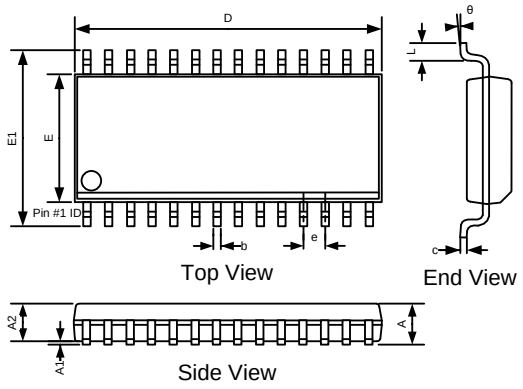
Land Pattern



NOTES:
1. Compound dimension: 9.70×4.40;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

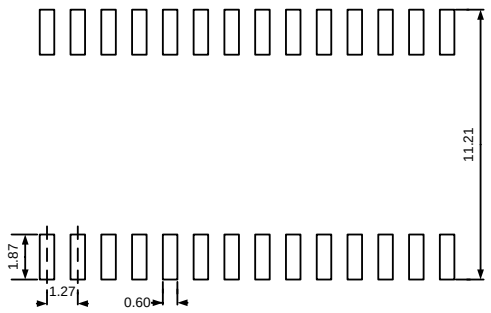
SOP28

Outline Drawing



Symbol	DIMENSIONS					
	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	2.35	2.55	2.80	0.093	0.100	0.110
A1	0.10	0.20	0.30	0.004	0.008	0.012
A2	2.25	-	2.65	0.089	-	0.104
b	0.33	-	0.54	0.013	-	0.021
c	0.15	-	0.33	0.006	-	0.013
D	17.40	-	18.10	0.685	-	0.713
E	7.40	7.55	7.70	0.291	0.297	0.303
E1	10.20	10.40	10.61	0.402	0.409	0.418
e	1.27BSC			0.050BSC		
L	0.40	-	1.27	0.016	-	0.050
θ	0 °	-	8 °	0 °	-	8 °

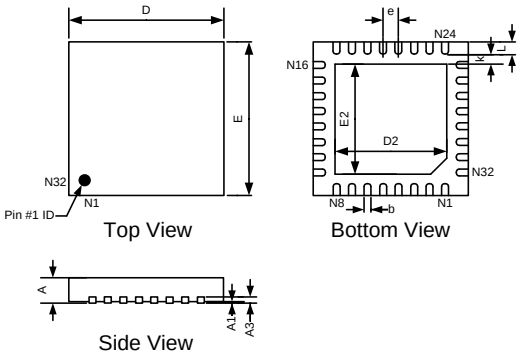
Land Pattern



NOTES:
1. Compound dimension: 17.75×7.55;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

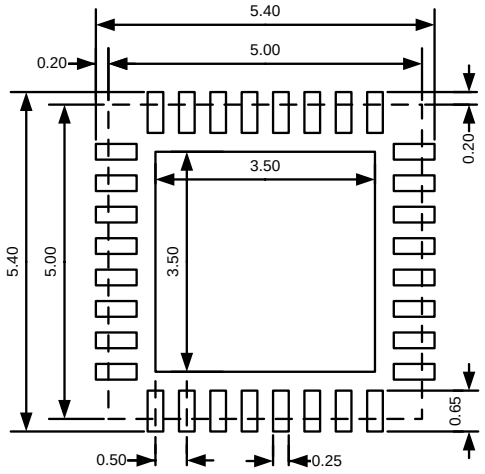
QFN32 5.0×5.0

Outline Drawing



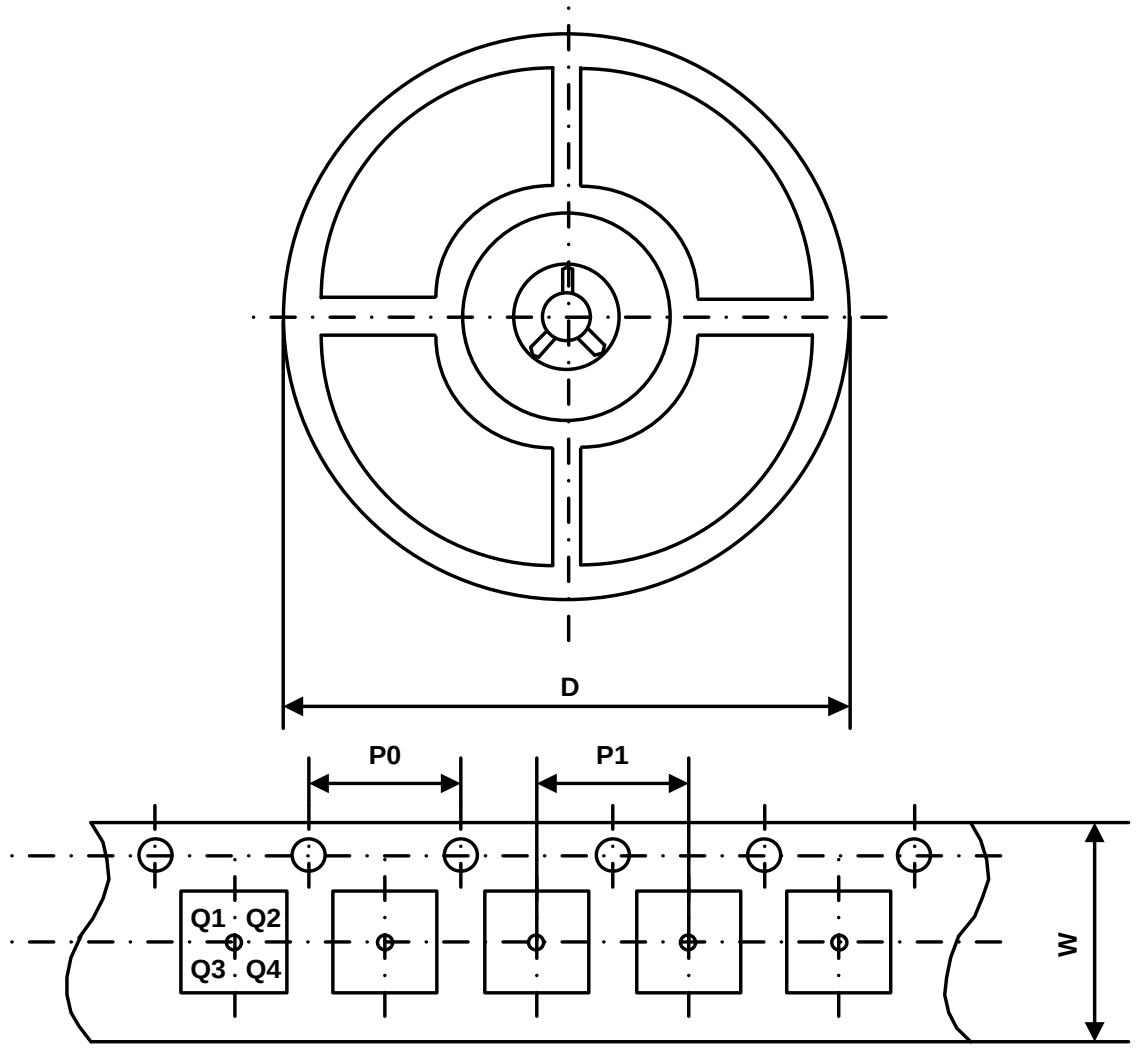
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	0.02	0.05	0.000	0.0008	0.002
A3	0.20REF			0.008REF		
b	0.20	0.25	0.30	0.008	0.010	0.012
D	4.90	5.00	5.10	0.193	0.197	0.201
D2	3.30	-	3.60	0.130	-	0.142
E	4.90	5.00	5.10	0.193	0.197	0.201
E2	3.30	-	3.60	0.130	-	0.142
e	0.50TYP			0.020TYP		
k	0.20	-	-	0.008	-	-
L	0.30	0.40	0.50	0.012	0.016	0.020

Land Pattern



NOTES:
1. Compound dimension: 5.00×5.00;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Packing Information



Part Number	Package Type	Carrier Width (W)	Pitch (P0)	Pitch (P1)	Reel Size (D)	PIN 1 Quadrant
UM3243EEASR	SSOP28	16 mm	4 mm	12 mm	330 mm	Q1
UM3243EEUS	TSSOP28	16 mm	4 mm	8 mm	330 mm	Q1
UM3243EEQA	QFN32 5.0×5.0	12 mm	4 mm	8 mm	330 mm	Q1

GREEN COMPLIANCE

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