

20 FORCEOFF

19 Vcc

18 GND

16 **RIN1** 

13 DIN1

12 DIN2

11 INVALID

17 DOUT1

15 ROUT1

14 FORCEON

**DB OR PW PACKAGE** 

(TOP VIEW)

1

READY

 $C1+\Pi_2$ 

V+**[**]3

 $C1-\Pi4$ 

C2+[5

 $C2-\Pi 6$ 

DOUT2<sup>8</sup>

RIN2

ROUT2 10

 $V = \Pi 7$ 

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**FEATURES** 

- ESD Protection for RS-232 I/O Pins
  - ±15 kV Human-Body Model (HBM)
  - ±8 kV IEC 61000-4-2, Contact Discharge
  - ±8 kV IEC 61000-4-2, Air-Gap Discharge
- 300-µA Operating Supply Current
- 1-µA Low-Power Standby (With Receivers Active) Mode
- Designed to Transmit at a Data Rate of 460 kbps
- Auto-Powerdown Plus Option Features Flexible Power-Saving Mode
- Operates From a Single 2.25-V to 3-V V<sub>CC</sub> Supply

#### **APPLICATIONS**

- Battery-Powered Systems
- PDAs
- Cellular Phones
- Notebooks
- Hand-Held Equipment
- Pagers

### **DESCRIPTION/ORDERING INFORMATION**

The TRS3318 is a dual-driver, dual-receiver, RS-232 compatible transceiver. The device features auto-powerdown plus and enhanced electrostatic discharge (ESD) protection integrated into the chip. Driver output and receiver input are protected to  $\pm 8$  kV using the IEC 61000-4-2 Air-Gap Discharge method,  $\pm 8$  kV using the IEC 61000-4-2 Contact Discharge method, and  $\pm 15$  kV using the Human-Body Model (HBM).

The device operates at a data rate of 460 kbps. The transceiver has a proprietary low-dropout driver output stage enabling RS-232-compatible operation from a 2.25-V to 3-V supply with a dual charge pump. The charge pump requires only four 0.1- $\mu$ F capacitors and features a logic-level output (READY) that asserts when the charge pump is regulating and the device is ready to begin transmitting.

The TRS3318 achieves a  $1-\mu$ A supply current using the auto-powerdown feature. This device automatically enters a low-power power-down mode when the RS-232 cable is disconnected or the drivers of the connected peripherals are inactive for more than 30 s. The device turns on again when it senses a valid transition at any driver or receiver input. Auto-powerdown saves power without changes to the existing BIOS or operating system.

This device is available in two space-saving packages: 20-pin SSOP and 20-pin TSSOP.

Flexible control options for power management are featured when the serial port and driver inputs are inactive. The auto-powerdown plus feature functions when FORCEON is low and FORCEOFF is high. During this mode of operation, if the device does not sense valid signal transitions on all receiver and driver inputs for approximately 30 s, the built-in charge pump and drivers are powered down, reducing the supply current to 1  $\mu$ A. By disconnecting the serial port or placing the peripheral drivers off, auto-powerdown plus can be disabled when FORCEON and FORCEOFF are high. With auto-powerdown plus enabled, the device activates automatically when a valid signal is applied to any receiver or driver input. INVALID is high (valid data) if any receiver input voltage is greater than 2.7 V or less than -2.7 V, or has been between -0.3 V and 0.3 V for less than 30  $\mu$ s (typical number).



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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#### **ORDERING INFORMATION**

T <sub>A</sub>	PAC	KAGE <sup>(1)(2)</sup>	ORDERABLE PART NUMBER	TOP-SIDE MARKING
000 1- 7000	SSOP – DB	Tube of 70 TRS3318CDB		RV18C
	330P - DB	Reel of 2000	TRS3318CDBR	- RVIOC
0°C to 70°C		Tube of 70	TRS3318CPW	D)/400
	TSSOP – PW	Reel of 2000	TRS3318CPWR	RV18C
		Tube of 70	TRS3318IDB	D)/101
4000 to 0500	SSOP – DB	Reel of 2000	TRS3318IDBR	
–40°C to 85°C		Tube of 70	TRS3318IPW	D)/401
	TSSOP – PW Reel of 2000		TRS3318IPWR	- RV18I

(1) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.

(2) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.

	INPUT CO	ONDITIONS			OUTPUT	STATES		
FORCEON	FORCEOFF	RECEIVER OR DRIVER EDGE WITHIN 30 s	VALID RS-232 LEVEL PRESENT AT RECEIVER	DRIVER	RECEIVER	INVALID	READY	OPERATING MODE
	•	•	Auto-Powerd	own Plus Co	onditions		r	
Н	Н	No	No	Active	Active	L	н	Normal operation, auto-powerdown plus disabled
Н	Н	No	Yes	Active	Active	Н	Н	Normal operation, auto-powerdown plus disabled
L	Н	Yes	No	Active	Active	L	Н	Normal operation, auto-powerdown plus enabled
L	Н	Yes	Yes	Active	Active	Н	Н	Normal operation, auto-powerdown plus enabled
L	Н	No	No	Z	Active	L	L	Power down, auto-powerdown plus enabled
L	Н	No	Yes	Z	Active	Н	L	Power down, auto-powerdown plus enabled
Х	L	х	No	Z	Active	L	L	Manual power down
Х	L	х	Yes	Z	Active	Н	L	Manual power down
			Auto-Powe	erdown Cond	litions			
INVALID	INVALID	x	No	Z	Active	L	L	Power down, auto-powerdown enabled
INVALID	INVALID	х	Yes	Active	Active	Н	Н	Normal operation, auto-powerdown enabled

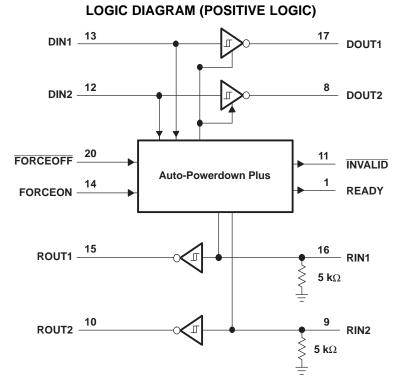
#### FUNCTION TABLE<sup>(1)</sup>

(1) H = high level, L = low level, X = irrelevant, Z = high impedance

2



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#### **TERMINAL FUNCTIONS**

TERMI	NAL	DESCRIPTION
NAME	NO.	DESCRIPTION
C1+	2	Positive voltage-doubler charge-pump capacitor
C1–	4	Negative voltage-doubler charge-pump capacitor
C2+	5	Positive inverting charge-pump capacitor
C2-	6	Negative inverting charge-pump capacitor
DIN	12, 13	CMOS driver inputs
DOUT	8, 17	RS-232 driver outputs
FORCEOFF 20 Force-off input, active low. Drive low to power down transmitters, receivers, and charge pump. This over auto-powerdown and FORCEON (see Function Table).		Force-off input, active low. Drive low to power down transmitters, receivers, and charge pump. This overrides auto-powerdown and FORCEON (see Function Table).
FORCEON	14	Force-on input, active high. Drive high to override auto-powerdown, keeping transmitters and receivers on (FORCEOFF must be high) (see Function Table).
GND	18	Ground
INVALID	11	Valid signal detector output, active low. A logic high indicates that a valid RS-232 level is present on a receiver input.
READY	1	Ready to transmit output, active high. READY is enabled high when V– goes below –3.5 V and the device is ready to transmit.
RIN	9, 16	RS-232 receiver inputs
ROUT	10, 15	CMOS receiver outputs
V+	3	$2 \times V_{CC}$ generated by the charge pump
V–	7	$-2 \times V_{CC}$ generated by the charge pump
V <sub>CC</sub>	19	2.25-V to 3-V single-supply voltage



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# Absolute Maximum Ratings<sup>(1)</sup>

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

			MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage range		-0.3	6	V
V+	Positive supply voltage range <sup>(2)</sup>		-0.3	7	V
V–	Negative supply voltage range <sup>(2)</sup>		-7	0.3	V
V+ + IV–I	Supply voltage differential <sup>(2)</sup>			13	V
.,		DIN, FORCEON, FORCEOFF to GND	-0.3	6	V
VI	Input voltage	RIN to GND		±25	v
N/	O stand we like we	DOUT to GND		±13.2	V
Vo	Output voltage	ROUT, INVALID, READY to GND	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	V	
	Short-circuit duration	DOUT to GND		Continuous	
		16-pin SSOP (derate 7.14 mW/°C above 70°C)		571	
	Continuous power dissipation $(T_A = 70^{\circ}C)$	20-pin SSOP (derate 8 mW/°C above 70°C		640	mW
	(14 - 70 0)	20-pin TSSOP (derate 7 mW/°C above 70°C)		571 640 559	
T <sub>stg</sub>	Storage temperature range		-65	Continuous 571 640 559	°C
	Lead temperature (soldering, 10 s)			300	°C

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.
We have have not implied and the stress of the device at the stress of the device reliability.

(2) V+ and V- can have maximum magnitudes of 7 V, but their absolute difference cannot exceed 13 V.

## **Recommended Operating Conditions**

#### See Figure 4

				MIN	NOM	MAX	UNIT
	Supply voltage			2.25	2.5	3	V
V <sub>IH</sub>	Driver and control high-level input voltage	DIN, FORCEOFF, FORCEON	$V_{CC}$ = 2.5 V to 3 V	$0.7 \times V_{CC}$		5.5	V
V <sub>IL</sub>	Driver and control low-level input voltage	DIN, FORCEOFF, FORCEON	$V_{CC}$ = 2.5 V to 3 V	0		$0.3 \times V_{CC}$	V
VI	Receiver input voltage			-25		25	V
т.	Operating free-air temperature	TRS3318C		0		70	°C
IA		TRS3318I		-40		3 5.5 0.3 × V <sub>CC</sub> 25	C

## **Electrical Characteristics**

 $V_{CC}$  = 2.25 V to 3 V, C1–C4 = 0.1  $\mu F,$   $T_A$  =  $T_{MIN}$  to  $T_{MAX}$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP <sup>(1)</sup>	MAX	UNIT
DC Characteristics ( $V_{CC}$ = 2.5 V, $T_A$	= 25°C)				
Auto-powerdown plus supply current	FORCEON = GND, $\overline{\text{FORCEOFF}} = V_{CC}$ , All RIN and DIN idle		1	10	μA
Auto-powerdown supply current	FORCEOFF = GND		1	10	μA
Supply current	FORCEON = $\overline{\text{FORCEOFF}}$ = V <sub>CC</sub> , No load		0.3	2	mA

(1) Typical values are at  $V_{CC}$  = 2.5 V,  $T_A$  = 25°C.

## **ESD** Protection

PARAMETER	TEST CONDITIONS	TYP	UNIT
	Human-Body Model (HBM)	±15	
RIN, DOUT	IEC 61000-4-2 Air-Gap Discharge method	±8	kV
	Human-Body Model (HBM)	±8	



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# **DRIVER SECTION**

#### **Electrical Characteristics**

over recommended ranges of supply voltage and operating free-air temperature,

 $V_{CC}$  = 2.25 V to 3 V, C1–C4 = 0.1  $\mu$ F, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub> (unless otherwise noted) (see Figure 4)

	PARAMETER	TEST CONDITIONS	MIN	TYP <sup>(1)</sup>	MAX	UNIT
V <sub>hys</sub>	Driver input hysteresis			0.3		V
lon	Input leakage current	FORCEON, DIN, FORCEOFF		±0.01	±1	μA
Vom	Output voltage swing	All driver outputs loaded with 3 k $\Omega$ to ground	±3.7	±4		V
r <sub>O</sub>	Output resistance	$V_{CC} = 0$ , Driver output = $\pm 2 V$	300	10M		Ω
los	Output short-circuit current <sup>(2)</sup>			±25	±60	mA
I <sub>off</sub>	Output leakage current	$V_{CC}$ = 0 or 2.25 V to 3 V, $V_{OUT}$ = ±12 V, Drivers disabled			±25	μA

Typical values are at  $V_{CC}$  = 2.5 V,  $T_A$  = 25°C. (1)

(2)Short-circuit durations should be controlled to prevent exceeding the device absolute power dissipation ratings, and not more than one output should be shorted at a time.

## **Switching Characteristics**

over recommended ranges of supply voltage and operating free-air temperature,  $V_{CC}$  = 2.25 V to 3 V, C1–C4 = 0.1  $\mu$ F, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub> (unless otherwise noted) (see Figure 1)

	PARAMETER	TEST CONDITIONS	MIN	TYP <sup>(1)</sup>	MAX	UNIT
	Maximum data rate	$R_L = 3 \text{ k}\Omega$ , $C_L = 1000 \text{ pF}$ , One transmitter switching	460			kbps
t <sub>PHL</sub> - t <sub>PLH</sub>	Driver skew <sup>(2)</sup>			100		ns
SR(tr)	Transition-region slew rate	$\label{eq:VCC} \begin{array}{l} V_{CC} = 2.5 \ V, \ T_A = 25^\circ C, \ R_L = 3 \ k\Omega \ to \ 7 \ k\Omega, \\ \mbox{Measured from 3 V to } -3 \ V \ or \ -3 \ V \ to \ 3 \ V, \\ C_L = 150 \ pF \ to \ 2500 \ pF \end{array}$	4		30	V/µs

(1) Typical values are at V<sub>CC</sub> = 2.5 V, T<sub>A</sub> = 25°C. (2) Pulse skew is defined as  $|t_{PLH} - t_{PHL}|$  of each channel of the same device.

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### **RECEIVER SECTION**

#### **Electrical Characteristics**

over recommended ranges of supply voltage and operating free-air temperature,

 $V_{CC}$  = 2.25 V to 3 V, C1–C4 = 0.1  $\mu$ F, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub> (unless otherwise noted) (see Figure 4)

	PARAMETER	TEST CONDITIONS	MIN	TYP <sup>(1)</sup>	MAX	UNIT
VI	Input voltage range		-25		25	V
V <sub>IT+</sub>	Input voltage threshold low	$T_A = 25^{\circ}C$			$0.3 \times V_{CC}$	V
V <sub>IT</sub>	Input voltage threshold high	$T_A = 25^{\circ}C$	$0.7 \times V_{CC}$			V
V <sub>hys</sub>	Input hysteresis			0.3		V
r <sub>i</sub>	Input resistance	$T_A = 25^{\circ}C$	3	5	7	kΩ
I <sub>off</sub>	Output leakage current			±0.05	±10	μA
V <sub>OL</sub>	Output voltage low	I <sub>OUT</sub> = 0.5 mA			$0.1\times V_{CC}$	V
V <sub>OH</sub>	Output voltage high	I <sub>OUT</sub> = -0.5 mA	$0.9  imes V_{CC}$			V

(1) Typical values are at  $V_{CC}$  = 2.5 V,  $T_A$  = 25°C.

### **Switching Characteristics**

over recommended ranges of supply voltage and operating free-air temperature,

 $V_{CC}$  = 2.25 V to 3 V, C1–C4 = 0.1  $\mu$ F, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub> (unless otherwise noted) (see Figure 4)

	PARAMETER	TEST CONDITIONS	TYP <sup>(1)</sup>	UNIT
t <sub>PHL</sub>	Receiver propagation delay	RIN to ROUT, $C_1 = 150 \text{ pF}$	0.175	
t <sub>PLH</sub>	Receiver propagation delay	$RIN 10 ROOT, C_{L} = 150 \text{ pr}$	0.175	μs
t <sub>PHL</sub> - t <sub>PLH</sub>	Receiver skew <sup>(2)</sup>		50	ns

(1)

Typical values are at V<sub>CC</sub> = 2.5 V, T<sub>A</sub> = 25°C. Pulse skew is defined as  $|t_{PLH} - t_{PHL}|$  of each channel of the same device. (2)

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# **AUTO-POWERDOWN PLUS SECTION**

#### **Electrical Characteristics**

over recommended ranges of supply voltage and operating free-air temperature,

 $V_{CC}$  = 2.25 V to 3 V, C1–C4 = 0.1 µF,  $T_A = T_{MIN}$  to  $T_{MAX}$  (unless otherwise noted) (see Figure 4)

PARAMETER	TEST CONDITIONS	MIN	MAX	UNIT
Receiver input threshold to INVALID high	Positive threshold		2.7	V
	Negative threshold	-2.7		v
Receiver input threshold INVALID low		-0.3	0.3	V
INVALID, READY voltage low	I <sub>OUT</sub> = 0.5 mA		$0.1\times V_{CC}$	V
INVALID, READY voltage high	$I_{OUT} = -0.5 \text{ mA}$	$0.8  imes V_{CC}$		V

#### **Switching Characteristics**

over recommended ranges of supply voltage and operating free-air temperature,

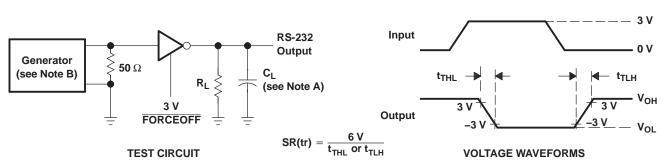
 $V_{CC}$  = 2.25 V to 3 V, C1–C4 = 0.1 µF, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub> (unless otherwise noted) (see Figure 4)

	PARAMETER	TEST CONDITIONS	MIN	TYP <sup>(1)</sup>	MAX	UNIT
t <sub>INVH</sub>	Receiver positive or negative threshold to INVALID high	$V_{CC} = 2.5 V$		1		μs
t <sub>INVL</sub>	Receiver positive or negative threshold to INVALID low	V <sub>CC</sub> = 2.5 V		30		μs
t <sub>WU</sub>	Receiver or driver edge to driver enabled	V <sub>CC</sub> = 2.5 V		100		μs
t <sub>AUTOPRDN</sub>	Receiver or driver edge to driver shutdown	V <sub>CC</sub> = 2.5 V	15	30	60	S

(1) Typical values are at  $V_{CC}$  = 2.5 V,T<sub>A</sub> = 25°C.

7

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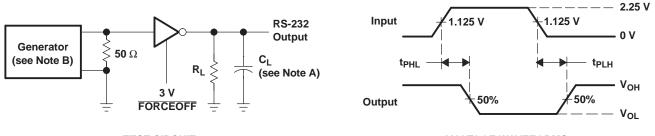


PARAMETER MEASUREMENT INFORMATION

NOTES: A. C<sub>L</sub> includes probe and jig capacitance.

B. The pulse generator has the following characteristics: PRR = 250 kbit/s,  $Z_0$  = 50  $\Omega$ , 50% duty cycle,  $t_r \le 10$  ns,  $t_f \le 10$  ns.

Figure 1. Driver Slew Rate



TEST CIRCUIT

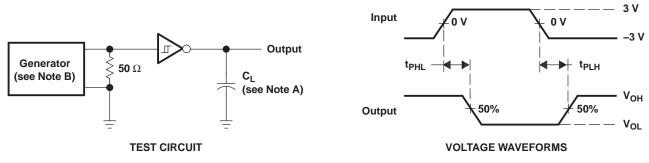
**VOLTAGE WAVEFORMS** 

IEXAS

RUMENTS

NOTES: A. C<sub>L</sub> includes probe and jig capacitance. B. The pulse generator has the following characteristics: PRR = 250 kbit/s,  $Z_O = 50 \Omega$ , 50% duty cycle,  $t_f \le 10$  ns.  $t_f \le 10$  ns.

Figure 2. Driver Pulse Skew

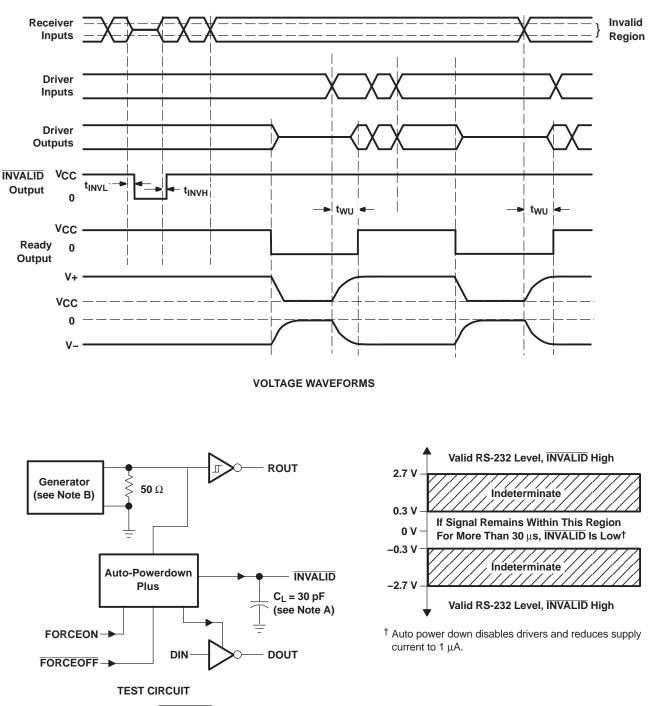


NOTES: A. C<sub>L</sub> includes probe and jig capacitance. B. The pulse generator has the following characteristics:  $Z_0 = 50 \Omega$ , 50% duty cycle,  $t_r \le 10$  ns,  $t_f \le 10$  ns.

## Figure 3. Receiver Propagation Delay Times



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PARAMETER MEASUREMENT INFORMATION

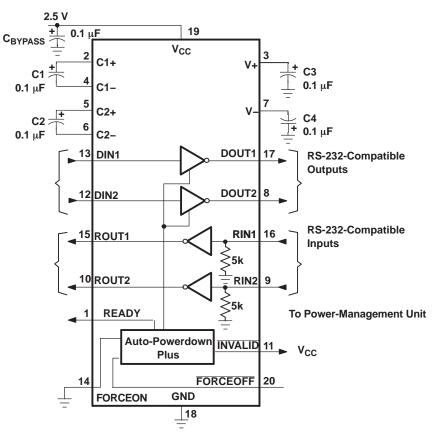


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#### **APPLICATION INFORMATION**



**Figure 5. Typical Application Circuit** 

26-Sep-2007

# PACKAGING INFORMATION

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	e Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
TRS3318CDB	ACTIVE	SSOP	DB	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318CDBG4	ACTIVE	SSOP	DB	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318CDBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318CDBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318CPW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318CPWG4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318CPWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318CPWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IDB	ACTIVE	SSOP	DB	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IDBG4	ACTIVE	SSOP	DB	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IDBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IDBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IPW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IPWG4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IPWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TRS3318IPWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)



<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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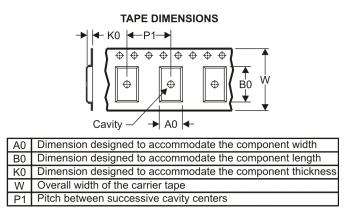
# PACKAGE MATERIALS INFORMATION

www.ti.com

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# TAPE AND REEL INFORMATION





# QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TRS3318CDBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
TRS3318CPWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1
TRS3318IDBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
TRS3318IPWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1

TEXAS INSTRUMENTS

www.ti.com

# PACKAGE MATERIALS INFORMATION

5-May-2011



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TRS3318CDBR	SSOP	DB	20	2000	346.0	346.0	33.0
TRS3318CPWR	TSSOP	PW	20	2000	346.0	346.0	33.0
TRS3318IDBR	SSOP	DB	20	2000	346.0	346.0	33.0
TRS3318IPWR	TSSOP	PW	20	2000	346.0	346.0	33.0

PW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



NOTES:

A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.  $\beta$ . This drawing is subject to change without notice.

Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.

Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.

E. Falls within JEDEC MO-153



# **MECHANICAL DATA**

MSSO002E - JANUARY 1995 - REVISED DECEMBER 2001

# DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
- D. Falls within JEDEC MO-150



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