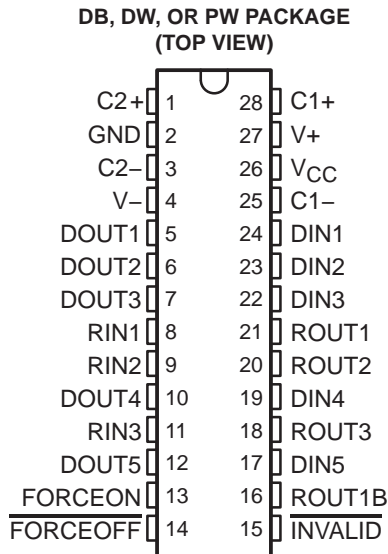


# SN65C3238, SN75C3238

## 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

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- **Auto-powerdown Plus**
- **Operate With 3-V to 5.5-V  $V_{CC}$  Supply**
- **Always-Active Noninverting Receiver Output (ROUT1B)**
- **Support Operation From 250 kbit/s to 1 Mbit/s**
- **Low Standby Current . . . 1  $\mu$ A Typ**
- **External Capacitors . . .  $4 \times 0.1 \mu$ F**
- **Accept 5-V Logic Input With 3.3-V Supply**
- **Inter-Operable With SN65C3243, SN75C3243**
- **RS-232 Bus-Pin ESD Protection Exceeds  $\pm 15$ -kV Using Human-Body Model (HBM)**
- **Applications**
  - **Battery-Powered Systems, PDAs, Notebooks, Sub-Notebooks, Laptops, Palmtop PCs, Hand-Held Equipment, Modems, and Printers**



### description/ordering information

The 'C3238 devices consist of five line drivers, three line receivers, and a dual charge-pump circuit with  $\pm 15$ -kV ESD protection pin to pin (serial-port connection pins, including GND). The charge pump and four small external capacitors allow operation from a single 3-V to 5.5-V supply. In addition, these devices include an always-active noninverting output (ROUT1B), which allows applications using the ring indicator to transmit data while the device is powered down. These devices operate at data signaling rates up to 1 Mbit/s and at an increased slew-rate range of 24 V/ $\mu$ s to 150 V/ $\mu$ s.

### ORDERING INFORMATION

$T_A$	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–0°C to 70°C	SOIC (DW)	Tube of 20	SN75C3238DW	75C3238
		Reel of 1000	SN75C3238DWR	
	SSOP (DB)	Reel of 2000	SN75C3238DBR	75C3238
	TSSOP (PW)	Tube of 50	SN75C3238PW	CA3238
Reel of 2000		SN75C3238PWR		
–40°C to 85°C	SOIC (DW)	Tube of 20	SN65C3238DW	65C3238
		Reel of 1000	SN65C3238DWR	
	SSOP (DB)	Reel of 2000	SN65C3238DBR	65C3238
	TSSOP (PW)	Tube of 50	SN65C3238PW	CB3238
Reel of 2000		SN65C3238PWR		

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



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# SN65C3238, SN75C3238

## 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

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### description/ordering information (continued)

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  $\overline{\text{FORCEOFF}}$  is high. During this mode of operation, if the device does not sense valid signal transitions on all receiver and driver inputs for 30 s, the built-in charge-pump and drivers are powered down, reducing the supply current to 1  $\mu\text{A}$ . By disconnecting the serial port or placing the peripheral drivers off, auto-powerdown plus will occur if there is no activity in the logic levels for the driver inputs. Auto-powerdown plus can be disabled when FORCEON and  $\overline{\text{FORCEOFF}}$  are high. With auto-powerdown plus enabled, the device automatically activates once a valid signal is applied to any receiver or driver input.  $\overline{\text{INVALID}}$  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  $\mu\text{s}$ .  $\overline{\text{INVALID}}$  is low (invalid data) if all receiver input voltages are between -0.3 V and 0.3 V for more than 30  $\mu\text{s}$ . Refer to Figure 5 for receiver input levels.

### Function Tables

EACH DRIVER

INPUTS				OUTPUT	DRIVER STATUS
DIN	FORCEON	$\overline{\text{FORCEOFF}}$	TIME ELAPSED SINCE LAST RIN OR DIN TRANSITION	DOUT	
X	X	L	X	Z	Powered off
L	H	H	X	H	Normal operation with auto-powerdown plus disabled
H	H	H	X	L	
L	L	H	<30 s	H	Normal operation with auto-powerdown plus enabled
H	L	H	<30 s	L	
L	L	H	>30 s	Z	Powered off by auto-powerdown plus feature
H	L	H	>30 s	Z	

H = high level, L = low level, X = irrelevant, Z = high impedance

EACH RECEIVER

INPUTS				OUTPUTS		RECEIVER STATUS
RIN2	RIN1, RIN3-RIN5	$\overline{\text{FORCEOFF}}$	TIME ELAPSED SINCE LAST RIN OR DIN TRANSITION	ROUT1B	ROUT	
L	X	L	X	L	Z	Powered off while ROUT1B is active
H	X	L	X	H	Z	
L	L	H	<30 s	L	H	Normal operation with auto-powerdown plus disabled/enabled
L	H	H	<30 s	L	L	
H	L	H	<30 s	H	H	
H	H	H	<30 s	H	L	
Open	Open	H	>30 s	L	H	

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

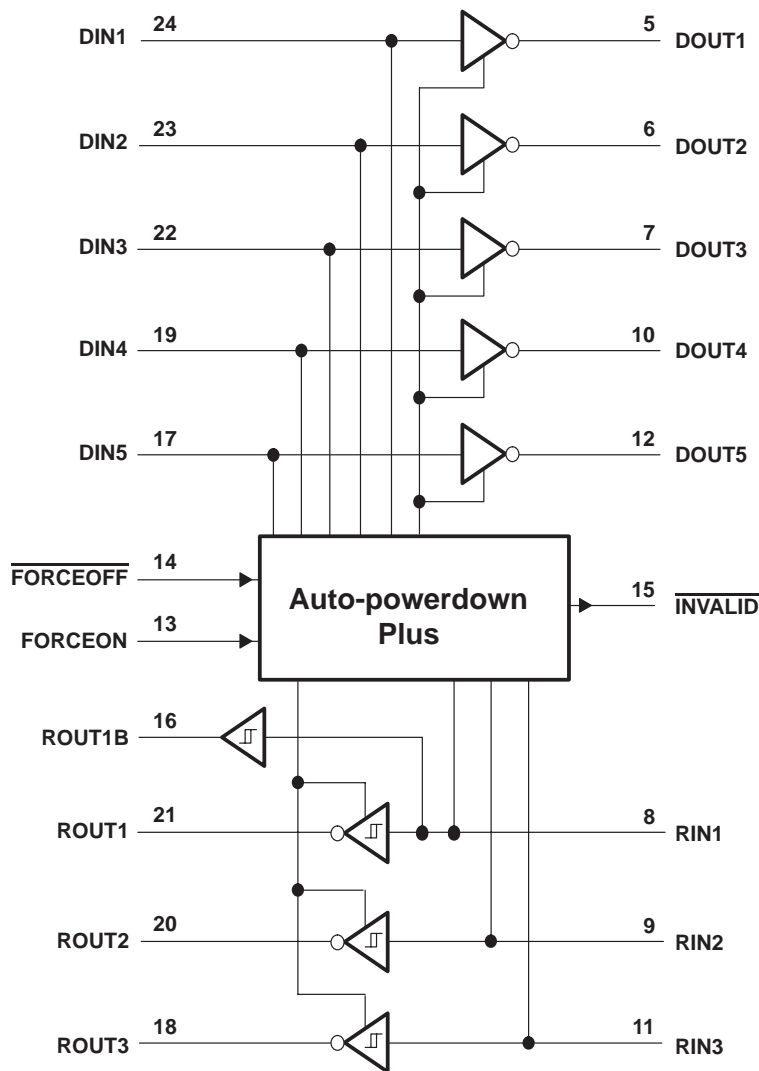


# SN65C3238, SN75C3238

## 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

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logic diagram (positive logic)



# SN65C3238, SN75C3238

## 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, $V_{CC}$ (see Note 1)	–0.3 V to 6 V
Positive output supply voltage range, $V_+$ (see Note 1)	–0.3 V to 7 V
Negative output supply voltage range, $V_-$ (see Note 1)	0.3 V to –7 V
Supply voltage difference, $V_+ - V_-$ (see Note 1)	13 V
Input voltage range, $V_I$ : Driver ( $\overline{\text{FORCEOFF}}$ , FORCEON)	–0.3 V to 6 V
Receiver	–25 V to 25 V
Output voltage range, $V_O$ : Driver	–13.2 V to 13.2 V
Receiver (INVALID)	–0.3 V to $V_{CC} + 0.3$ V
Package thermal impedance, $\theta_{JA}$ (see Notes 2 and 3): DB package	62°C/W
DW package	46°C/W
PW package	62°C/W
Operating virtual junction temperature, $T_J$	150°C
Storage temperature range, $T_{stg}$	–65°C to 150°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.

- NOTES:
- All voltages are with respect to network GND.
  - Maximum power dissipation is a function of  $T_{J(max)}$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_{J(max)} - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.
  - The package thermal impedance is calculated in accordance with JESD 51-7.

### recommended operating conditions (see Note 4 and Figure 6)

			MIN	NOM	MAX	UNIT	
Supply voltage		$V_{CC} = 3.3$ V	3	3.3	3.6	V	
		$V_{CC} = 5$ V	4.5	5	5.5		
$V_{IH}$	Driver and control high-level input voltage	DIN, $\overline{\text{FORCEOFF}}$ , FORCEON	$V_{CC} = 3.3$ V		2	V	
			$V_{CC} = 5$ V		2.4		
$V_{IL}$	Driver and control low-level input voltage	DIN, $\overline{\text{FORCEOFF}}$ , FORCEON			0.8	V	
$V_I$	Driver and control input voltage	DIN, $\overline{\text{FORCEOFF}}$ , FORCEON	0			5.5	V
$V_I$	Receiver input voltage		–25			25	V
$T_A$	Operating free-air temperature	SN75C3238	0			70	°C
		SN65C3238	–40			85	

NOTE 4: Testing supply conditions are C1–C4 = 0.1  $\mu$ F at  $V_{CC} = 3.3$  V  $\pm$  0.15 V; C1–C4 = 0.22  $\mu$ F at  $V_{CC} = 3.3$  V  $\pm$  0.3 V; and C1 = 0.047  $\mu$ F and C2–C4 = 0.33  $\mu$ F at  $V_{CC} = 5$  V  $\pm$  0.5 V.

### electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Note 4 and Figure 6)

PARAMETER		TEST CONDITIONS	MIN	TYP‡	MAX	UNIT	
$I_I$	Input leakage current	$\overline{\text{FORCEOFF}}$ , FORCEON		$\pm$ 0.01	$\pm$ 1	$\mu$ A	
$I_{CC}$	Supply current	Auto-powerdown plus disabled	No load, $\overline{\text{FORCEOFF}}$ and FORCEON at $V_{CC}$		0.5	2	mA
		Powered off	No load, $\overline{\text{FORCEOFF}}$ at GND		1	10	
		Auto-powerdown plus enabled	No load, $\overline{\text{FORCEOFF}}$ at $V_{CC}$ , FORCEON at GND, All RIN are open or grounded		1	10	$\mu$ A

‡ All typical values are at  $V_{CC} = 3.3$  V or  $V_{CC} = 5$  V, and  $T_A = 25^\circ\text{C}$ .

NOTE 4: Testing supply conditions are C1–C4 = 0.1  $\mu$ F at  $V_{CC} = 3.3$  V  $\pm$  0.15 V; C1–C4 = 0.22  $\mu$ F at  $V_{CC} = 3.3$  V  $\pm$  0.3 V; and C1 = 0.047  $\mu$ F and C2–C4 = 0.33  $\mu$ F at  $V_{CC} = 5$  V  $\pm$  0.5 V.



# SN65C3238, SN75C3238

## 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

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### DRIVER SECTION

**electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Note 4 and Figure 6)**

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V <sub>OH</sub>	High-level output voltage	All DOUT at R <sub>L</sub> = 3 kΩ to GND	5	5.4		V
V <sub>OL</sub>	Low-level output voltage	All DOUT at R <sub>L</sub> = 3 kΩ to GND	-5	-5.4		V
I <sub>IH</sub>	High-level input current	V <sub>I</sub> = V <sub>CC</sub>		±0.01	±1	μA
I <sub>IL</sub>	Low-level input current	V <sub>I</sub> at GND		±0.01	±1	μA
I <sub>OS</sub>	Short-circuit output current‡	V <sub>CC</sub> = 3.6 V, V <sub>O</sub> = 0 V		±35	±60	mA
		V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0 V		±40	±90	
r <sub>o</sub>	Output resistance	V <sub>CC</sub> , V <sub>+</sub> , and V <sub>-</sub> = 0 V, V <sub>O</sub> = ±2 V	300	10M		Ω
I <sub>off</sub>	Output leakage current	FORCEOFF = GND, V <sub>O</sub> = ±12 V, V <sub>CC</sub> = 3 V to 3.6 V			±25	μA
		V <sub>O</sub> = ±10 V, V <sub>CC</sub> = 4.5 V to 5.5 V			±25	

† All typical values are at V<sub>CC</sub> = 3.3 V or V<sub>CC</sub> = 5 V, and T<sub>A</sub> = 25°C.

‡ 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.

NOTE 4: Testing supply conditions are C1–C4 = 0.1 μF at V<sub>CC</sub> = 3.3 V ± 0.15 V; C1–C4 = 0.22 μF at V<sub>CC</sub> = 3.3 V ± 0.3 V; and C1 = 0.047 μF and C2–C4 = 0.33 μF at V<sub>CC</sub> = 5 V ± 0.5 V.

**switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Note 4 and Figure 6)**

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
Maximum data rate (see Figure 1)	R <sub>L</sub> = 3 kΩ, One DOUT switching	C <sub>L</sub> = 1000 pF		250		kbit/s
		C <sub>L</sub> = 250 pF, V <sub>CC</sub> = 3 V to 4.5 V		1000		
		C <sub>L</sub> = 1000 pF, V <sub>CC</sub> = 4.5 V to 5.5 V		1000		
t <sub>sk(p)</sub>	Pulse skew§	C <sub>L</sub> = 150 pF to 2500 pF, R <sub>L</sub> = 3 kΩ to 7 kΩ, See Figure 2		25		ns
SR(tr)	Slew rate, transition region (see Figure 1)	C <sub>L</sub> = 150 pF to 1000 pF, R <sub>L</sub> = 3 kΩ to 7 kΩ, V <sub>CC</sub> = 3.3 V		18	150	V/μs

† All typical values are at V<sub>CC</sub> = 3.3 V or V<sub>CC</sub> = 5 V, and T<sub>A</sub> = 25°C.

§ Pulse skew is defined as |t<sub>PLH</sub> – t<sub>PHL</sub>| of each channel of the same device.

NOTE 4: Testing supply conditions are C1–C4 = 0.1 μF at V<sub>CC</sub> = 3.3 V ± 0.15 V; C1–C4 = 0.22 μF at V<sub>CC</sub> = 3.3 V ± 0.3 V; and C1 = 0.047 μF and C2–C4 = 0.33 μF at V<sub>CC</sub> = 5 V ± 0.5 V.



# SN65C3238, SN75C3238

## 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

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### RECEIVER SECTION

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Note 4 and Figure 6)

PARAMETER	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V <sub>OH</sub> High-level output voltage	I <sub>OH</sub> = -1 mA	V <sub>CC</sub> - 0.6 V	V <sub>CC</sub> - 0.1 V		V
V <sub>OL</sub> Low-level output voltage	I <sub>OL</sub> = 1.6 mA			0.4	V
V <sub>IT+</sub> Positive-going input threshold voltage	V <sub>CC</sub> = 3.3 V		1.5	2.4	V
	V <sub>CC</sub> = 5 V		1.8	2.4	
V <sub>IT-</sub> Negative-going input threshold voltage	V <sub>CC</sub> = 3.3 V	0.6	1.2		V
	V <sub>CC</sub> = 5 V	0.8	1.5		
V <sub>hys</sub> Input hysteresis (V <sub>IT+</sub> - V <sub>IT-</sub> )			0.3		V
I <sub>off</sub> Output leakage current (except ROUT1B)	FORCEOFF = 0 V		±0.05	±10	µA
r <sub>i</sub> Input resistance	V <sub>I</sub> = ±3 V to ±25 V	3	5	7	kΩ

† All typical values are at V<sub>CC</sub> = 3.3 V or V<sub>CC</sub> = 5 V, and T<sub>A</sub> = 25°C.

NOTE 4: Testing supply conditions are C1-C4 = 0.1 µF at V<sub>CC</sub> = 3.3 V ± 0.15 V; C1-C4 = 0.22 µF at V<sub>CC</sub> = 3.3 V ± 0.3 V; and C1 = 0.047 µF and C2-C4 = 0.33 µF at V<sub>CC</sub> = 5 V ± 0.5 V.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Note 4)

PARAMETER	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
t <sub>PLH</sub> Propagation delay time, low- to high-level output	C <sub>L</sub> = 150 pF, See Figure 3		150		ns
t <sub>PHL</sub> Propagation delay time, high- to low-level output			150		
t <sub>en</sub> Output enable time	C <sub>L</sub> = 150 pF, R <sub>L</sub> = 3 kΩ, See Figure 4		200		ns
t <sub>dis</sub> Output disable time			200		
t <sub>sk(p)</sub> Pulse skew‡	See Figure 3		50		ns

† All typical values are at V<sub>CC</sub> = 3.3 V or V<sub>CC</sub> = 5 V, and T<sub>A</sub> = 25°C.

‡ Pulse skew is defined as |t<sub>PLH</sub> - t<sub>PHL</sub>| of each channel of the same device.

NOTE 4: Testing supply conditions are C1-C4 = 0.1 µF at V<sub>CC</sub> = 3.3 V ± 0.15 V; C1-C4 = 0.22 µF at V<sub>CC</sub> = 3.3 V ± 0.3 V; and C1 = 0.047 µF and C2-C4 = 0.33 µF at V<sub>CC</sub> = 5 V ± 0.5 V.



**SN65C3238, SN75C3238**  
**3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER**

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**AUTO-POWERDOWN PLUS SECTION**

**electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 5)**

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$V_{T+}(\text{valid})$	Receiver input threshold for $\overline{\text{INVALID}}$ high-level output voltage	$\overline{\text{FORCEON}} = \text{GND}$ , $\overline{\text{FORCEOFF}} = V_{CC}$			2.7	V
$V_{T-}(\text{valid})$	Receiver input threshold for $\overline{\text{INVALID}}$ high-level output voltage	$\overline{\text{FORCEON}} = \text{GND}$ , $\overline{\text{FORCEOFF}} = V_{CC}$	-2.7			V
$V_{T}(\text{invalid})$	Receiver input threshold for $\overline{\text{INVALID}}$ low-level output voltage	$\overline{\text{FORCEON}} = \text{GND}$ , $\overline{\text{FORCEOFF}} = V_{CC}$	-0.3		0.3	V
$V_{OH}$	$\overline{\text{INVALID}}$ high-level output voltage	$I_{OH} = -1 \text{ mA}$ , $\overline{\text{FORCEON}} = \text{GND}$ , $\overline{\text{FORCEOFF}} = V_{CC}$	$V_{CC} - 0.6$			V
$V_{OL}$	$\overline{\text{INVALID}}$ low-level output voltage	$I_{OL} = 1.6 \text{ mA}$ , $\overline{\text{FORCEON}} = \text{GND}$ , $\overline{\text{FORCEOFF}} = V_{CC}$			0.4	V

† All typical values are at  $V_{CC} = 3.3 \text{ V}$  or  $V_{CC} = 5 \text{ V}$ , and  $T_A = 25^\circ\text{C}$ .

**switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 5)**

PARAMETER		MIN	TYP†	MAX	UNIT
$t_{\text{valid}}$	Propagation delay time, low- to high-level output		0.1		$\mu\text{s}$
$t_{\text{invalid}}$	Propagation delay time, high- to low-level output		50		$\mu\text{s}$
$t_{\text{en}}$	Supply enable time		25		$\mu\text{s}$
$t_{\text{dis}}$	Receiver or driver edge to auto-powerdown plus	15	30	60	s

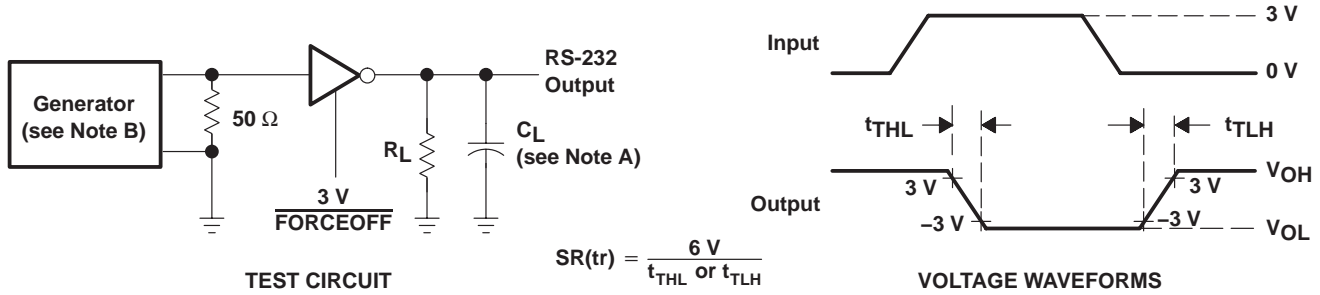
† All typical values are at  $V_{CC} = 3.3 \text{ V}$  or  $V_{CC} = 5 \text{ V}$ , and  $T_A = 25^\circ\text{C}$ .



# SN65C3238, SN75C3238 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

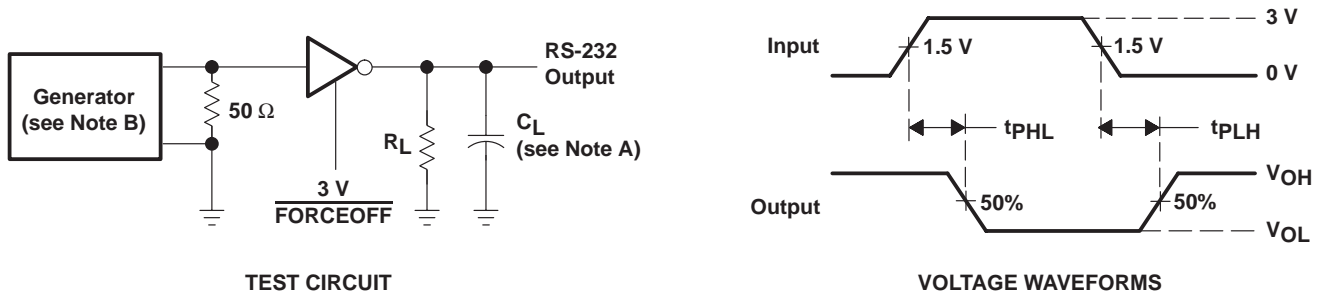
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## PARAMETER MEASUREMENT INFORMATION



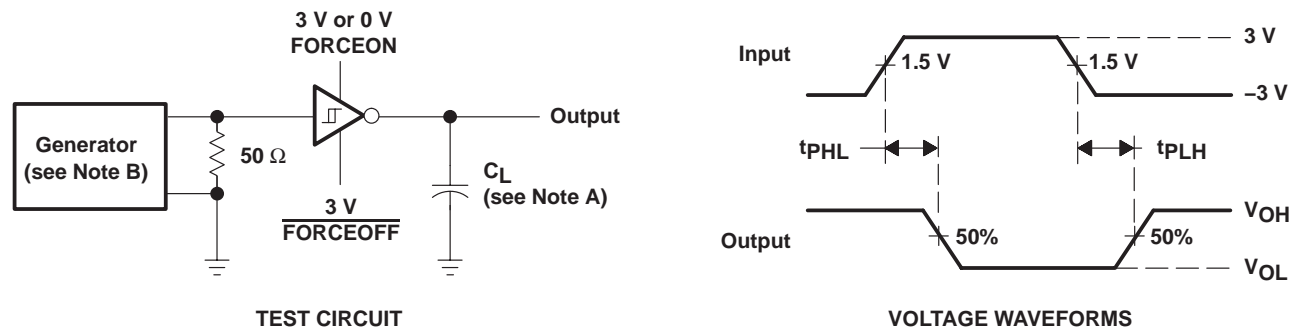
NOTES: A.  $C_L$  includes probe and jig capacitance.  
B. The pulse generator has the following characteristics: PRR = 1 Mbit/s,  $Z_O = 50\ \Omega$ , 50% duty cycle,  $t_r \leq 10\ \text{ns}$ ,  $t_f \leq 10\ \text{ns}$ .

Figure 1. Driver Slew Rate



NOTES: A.  $C_L$  includes probe and jig capacitance.  
B. The pulse generator has the following characteristics: PRR = 1 Mbit/s,  $Z_O = 50\ \Omega$ , 50% duty cycle,  $t_r \leq 10\ \text{ns}$ ,  $t_f \leq 10\ \text{ns}$ .

Figure 2. Driver Pulse Skew

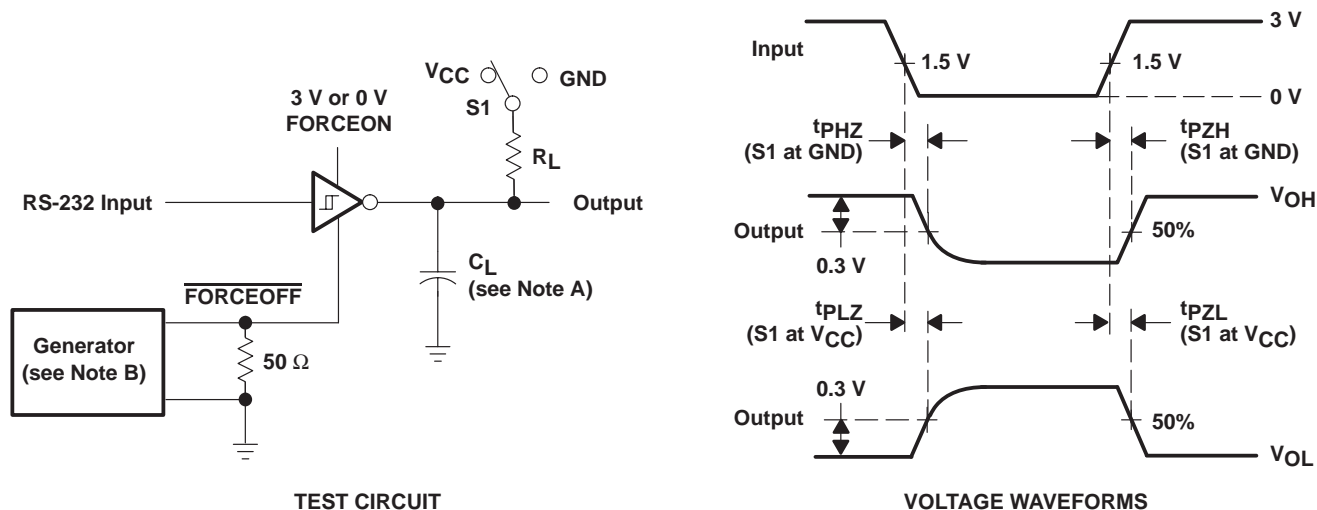


NOTES: A.  $C_L$  includes probe and jig capacitance.  
B. The pulse generator has the following characteristics:  $Z_O = 50\ \Omega$ , 50% duty cycle,  $t_r \leq 10\ \text{ns}$ ,  $t_f \leq 10\ \text{ns}$ .

Figure 3. Receiver Propagation Delay Times



**PARAMETER MEASUREMENT INFORMATION**



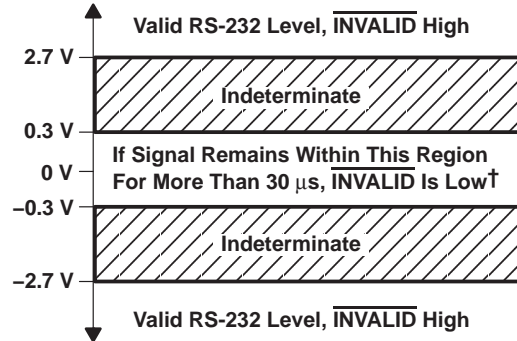
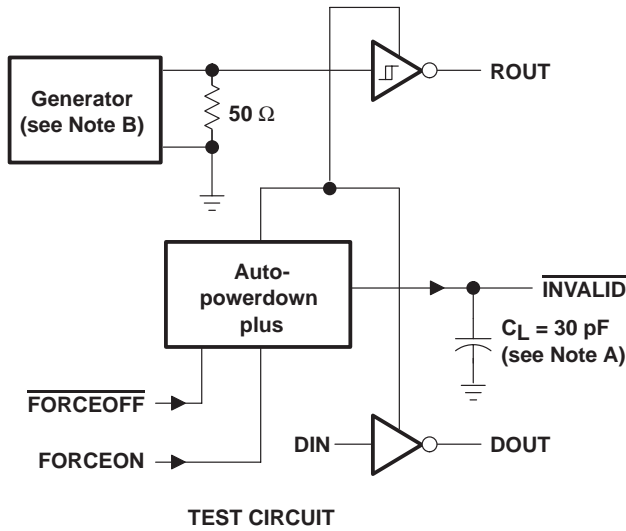
- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. The pulse generator has the following characteristics:  $Z_O = 50 \Omega$ , 50% duty cycle,  $t_r \leq 10 \text{ ns}$ ,  $t_f \leq 10 \text{ ns}$ .  
 C.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .  
 D.  $t_{PZL}$  and  $t_{PZH}$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

**Figure 4. Receiver Enable and Disable Times**

# SN65C3238, SN75C3238 3-V TO 5.5-V MULTICHANNEL RS-232 COMPATIBLE LINE DRIVER/RECEIVER

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## PARAMETER MEASUREMENT INFORMATION



† Auto-powerdown plus disables drivers and reduces supply current to 1  $\mu$ A.

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

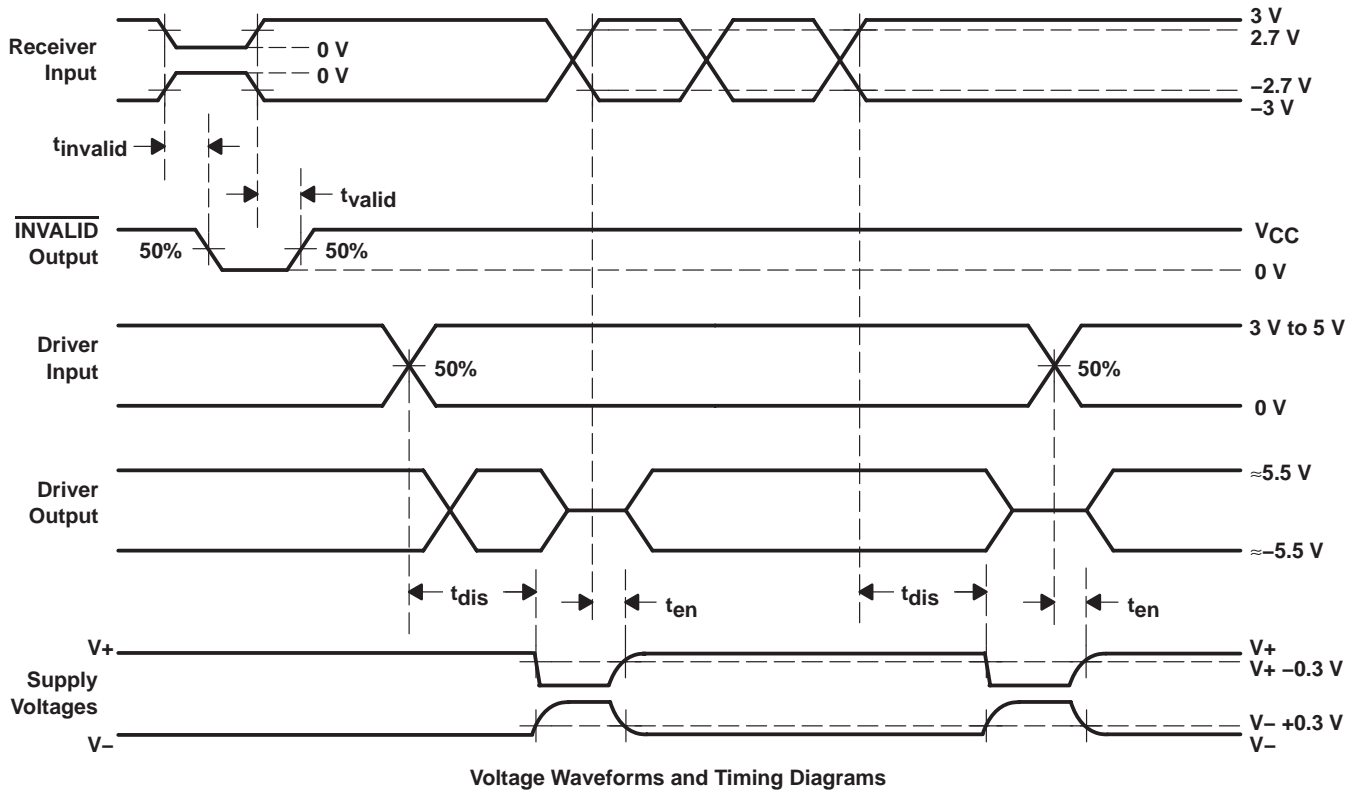
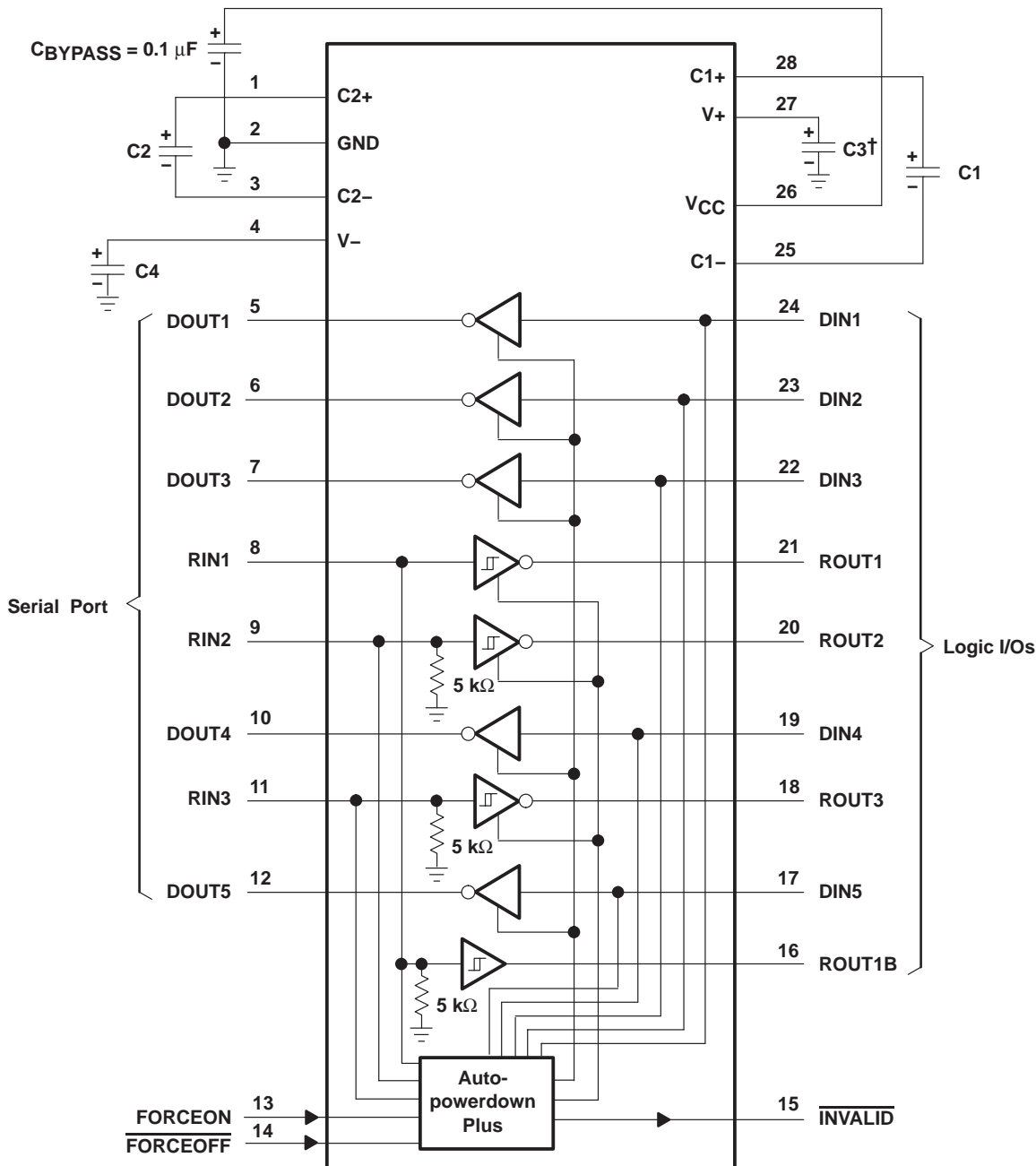


Figure 5.  $\overline{\text{INVALID}}$  Propagation Delay Times and Supply Enabling Time

**APPLICATION INFORMATION**



† C3 can be connected to V<sub>CC</sub> or GND.

NOTE A: Resistor values shown are nominal.

**V<sub>CC</sub> vs CAPACITOR VALUES**

V <sub>CC</sub>	C1	C2, C3, and C4
3.3 V ± 0.15 V	0.1 μF	0.1 μF
3.3 V ± 0.3 V	0.22 μF	0.22 μF
5 V ± 0.5 V	0.047 μF	0.33 μF
3 V to 5.5 V	0.22 μF	1 μF

**Figure 6. Typical Operating Circuit and Capacitor Values**

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN65C3238DB	PREVIEW	SSOP	DB	28	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN65C3238DBR	ACTIVE	SSOP	DB	28	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN65C3238DW	ACTIVE	SOIC	DW	28	20	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN65C3238DWR	ACTIVE	SOIC	DW	28	1000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN65C3238PW	ACTIVE	TSSOP	PW	28	50	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN65C3238PWR	ACTIVE	TSSOP	PW	28	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN75C3238DB	PREVIEW	SSOP	DB	28	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN75C3238DBR	ACTIVE	SSOP	DB	28	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN75C3238DW	ACTIVE	SOIC	DW	28	20	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN75C3238DWR	ACTIVE	SOIC	DW	28	1000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN75C3238PW	ACTIVE	TSSOP	PW	28	50	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN75C3238PWR	ACTIVE	TSSOP	PW	28	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-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 - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**None:** Not yet available Lead (Pb-Free).

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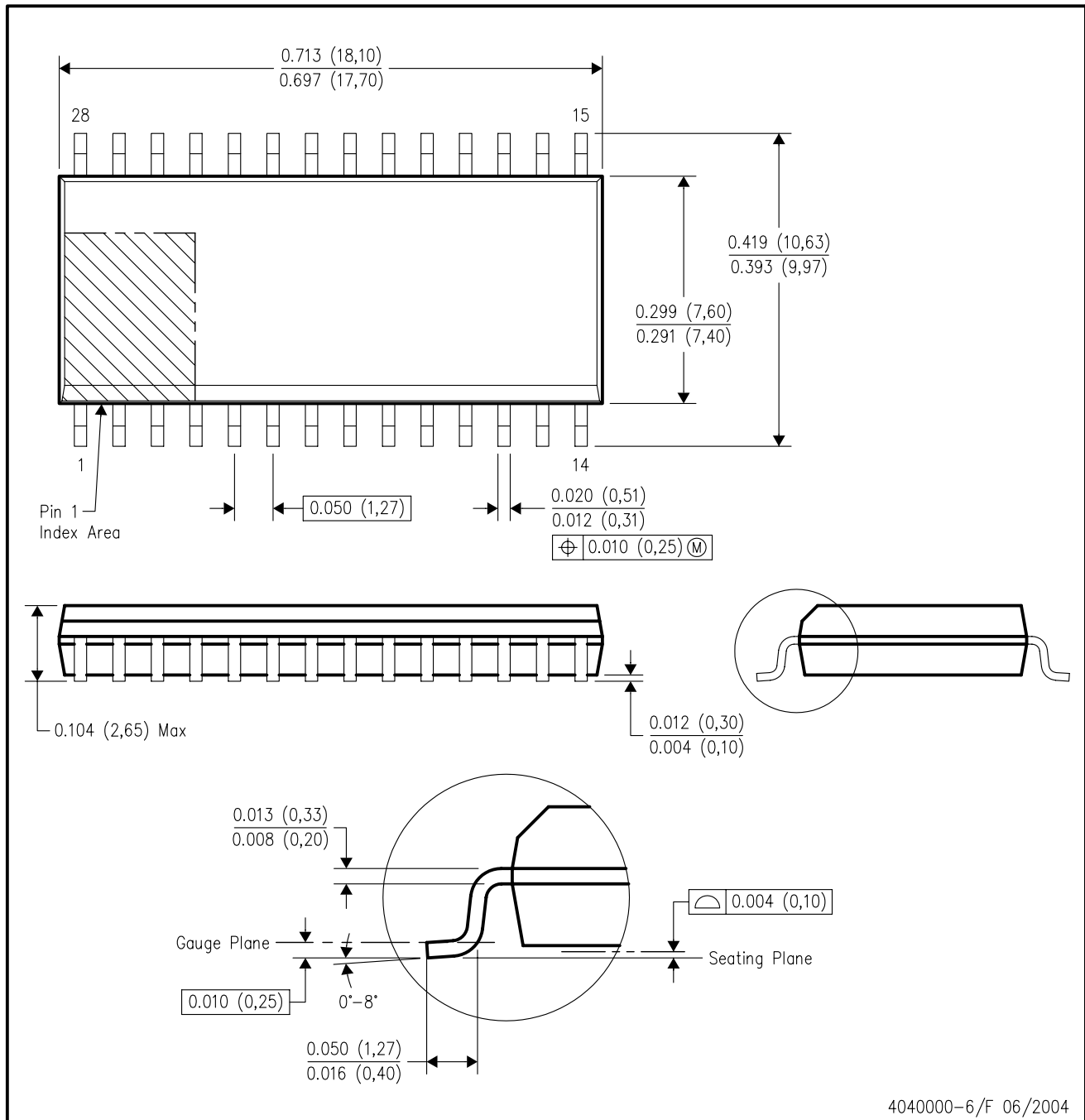
<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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DW (R-PDSO-G28)

PLASTIC SMALL-OUTLINE PACKAGE



4040000-6/F 06/2004

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - D. Falls within JEDEC MS-013 variation AE.

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

4040065 /E 12/01

PW (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- 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-153

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